Ignition 8.1 User Manual — Scripting Function Reference

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System Functions



The Ignition scripting API, which is available under the module name `system`, is full of functions that are useful when designing projects in Ignition. From running database queries, manipulating components, to exporting data, scripting functions can help. Some of these functions only work in the Gateway scope, and other only work in the Client scope, while the rest will work in any scope.

Additional information on scripting Ignition can be found in the **Scripting** section. In this section, we cover all of the built in scripting functions available inside of Ignition. Each page will have text at the top that looks like this:

> This function is used in **Python Scripting**.

This lets you know that you are looking at a function for the Python scripting language.

System Functions

You can see below there are many different categories of system functions available for your use. Each page includes examples to demonstrate the basics of each function, but it is helpful to understand scripting requirements when implementing functions. For example, some scripting functions like **system.tag.writeAsync** don't support special characters in tag path names. Users can work around this by using **Unicode** to pass the tag path to the function. So, although `system.tag.writeAsync("[default]HÅ/Motor_01", 10)` will fail, `system.tag.writeAsync(u"[default]HÅ/Motor_01", 10)` will work. For an overview and syntax scripting, refer to the **Python Scripting** section.

> **CAUTION**
>
> Many built-in objects, such as the system library, are mutable objects. Mutable objects can be overridden within a script. For example:

```
system = "foo"
```

Doing so will prevent later lines in the script from using methods on the object. While this is expected behavior in Python, it is strongly advised to **not** override built-in objects.

- system.alarm
- system.bacnet
- system.dataset
- system.date
- system.db
- system.device
- system.dnp3
- system.dnp
- system.eam
- system.file
- system.groups
- system.gui

system.iec61850

system.math

system.mongodb

system.nav

system.net

system.opc

system.opchda

system.opcua

system.perspective

system.print

system.project

system.report

system.roster

system.secsgem

system.security

system.serial

system.sfc

system.tag

system.twilio

system.user

system.util

system.vision

Functions by Scope

Gateway >

Vision >

Perspective >

system.alarm

Alarm Functions

The following functions give you access to view and interact with the Alarm system in Ignition.

acknowledge

Acknowledges any number of alarms, specified by their event ids.

cancel

Cancels any number of alarms, specified by their event ids.

createRoster

This function creates a new roster. Users may be added to the roster through the Gateway or the Roster Manage…

getRosters

This function returns a mapping of roster names to a list of usernames contained in the roster.

getShelvedPaths

Returns a list of ShelvedPath objects, which each represent a shelved alarm.

listPipelines

Will return a list of the available Alarm Notification Pipelines in a project.

queryJournal

Queries the specified journal for historical alarm events.

queryStatus

Queries the current state of alarms. The result is a list of alarm events, which can be queried for individual proper…

shelve

This function shelves the specified alarms for the specified amount of time.

unshelve

Unshelves a list of alarms based on the source paths provided.

Functions by Scope

Gateway >

Vision >

Perspective >

system.alarm.acknowledge

This function is used in **Python Scripting**.

Description

Acknowledges any number of alarms, specified by their event ids. The event id is generated for an alarm when it becomes active, and it is used to identify a particular event from other events for the same source. The alarms will be acknowledged by the logged in user making the call. Additionally, acknowledgement notes may be included and will be stored along with the acknowledgement.

This function uses different parameters based on the scope of the script calling it. Both versions are listed below.

Client Permission Restrictions

Permission Type: Alarm Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Client Scripts

```
system.alarm.acknowledge(alarmIds, [notes])
```

Parameters

Type	Parameter	Description
String[]	`alarmIds`	List of alarm event ids (uuids) to acknowledge.
String	`notes`	A string that will be used as the Ack Note on each acknowledged alarm event. If set to None , then an Ack Note note will not be assigned to the alarm event

Returns

Nothing

Changed in 8.1.15 As of 8.1.15, the function now returns the following:

List[String] `almIds` - List of alarm event ids (UUIDs) that were unable to be acknowledged successfully.

Scope

Vision Client

Syntax - Gateway Scripts

`system.alarm.acknowledge(alarmIds, notes, username)`

Parameters

Type	Parameter	Description
List[String]	`alarmIds`	List of alarm event ids (UUIDs) to acknowledge.
String	`notes`	A string that will be used as the Ack Note on each acknowledged alarm event. If set to None , then an Ack Note note will not be assigned to the alarm event.
String	`username`	The user that acknowledged the alarm.

Returns

Nothing

Changed in 8.1.15 As of 8.1.15, the function now returns the following:

List[String] `almIds` - List of alarm event ids (UUIDs) that were unable to be acknowledged successfully.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example shows the basic syntax for acknowledging an alarm from a client-based script
system.alarm.acknowledge(['c27c06d8-698f-4814-af89-3c22944f58c5'],'Saw this alarm, did something about it.')
```

Example #2

```
# This example shows the basic syntax for acknowledging an alarm from a gateway-based script
system.alarm.acknowledge(['c27c06d8-698f-4814-af89-3c22944f58c5'],'Saw this alarm, did something about it.', 'admin')
```

Example #3

```
# This code snippet could be used as a mouseReleased event handler on a Table component (not an Alarm Status Table component)
# whose data was the return value of the system.alarm.queryStatus function.
# It presents a right-click menu to acknowledge the currently selected alarms (for more than one, the table must be set to allow multiple selection).
# This example does not ask for an ack message, and therefore might fail if the alarms we're attempting to acknowledge require notes.
# Also, note that the system will ignore any alarms that have already been acknowledged.

if event.button==3:
    rows = event.source.selectedRows
    data = event.source.data
    if len(rows)>0:
        uuids = [str(data.getValueAt(r,'EventId')) for r in rows]
        def ack(event, uuids=uuids):
            system.alarm.acknowledge(uuids, None)
        menu = system.gui.createPopupMenu({'Acknowledge':ack})
        menu.show(event)
```

system.alarm.cancel

This function is used in **Python Scripting**.

Description

Cancels any number of alarm pipelines, specified by their event ids. Event ids can be obtains from the **system.alarm.queryStatus** function. Canceling a pipeline will not impact the alarm that triggered the pipeline. The alarm will still be active, but will drop out of alarm pipelines.

Client Permission Restrictions

Permission Type: Alarm Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.alarm.cancel(alarmIds)
```

Parameters

Type	Parameter	Description
List[String]	`alarmIds`	List of alarm pipeline event ids (UUIDs) to cancel.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows the basic syntax for cancelling an alarm.

system.alarm.cancel(['c27c06d8-698f-4814-af89-3c22944f58c5'])
```

Example #2

```
# To cancel all currently active alarms:

ids = []
results = system.alarm.queryStatus(state=["ActiveUnacked", "ActiveAcked"])
for result in results:
    id = result.getId()
    ids.append(str(id))

system.alarm.cancel(ids)
```

system.alarm.createRoster

This function is used in **Python Scripting**.

Description

This function creates a new roster. Users may be added to the roster through the Gateway or the Roster Management component

Client Permission Restrictions

Permission Type: Alarm Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.alarm.createRoster(name, description)
```

Parameters

Type	Parameter	Description
String	`name`	The name for the new roster
String	`description`	A description for the new roster. Required, but can be blank.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example creates a new roster
name = 'MyRoster'
description = 'A roster created by scripting'
system.alarm.createRoster(name, description)
```

system.alarm.getRosters

This function is used in **Python Scripting**.

Description

This function returns a mapping of roster names to a list of usernames contained in the roster.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.alarm.getRosters()
```

Parameters

None

Returns

Dictionary[String, List[String]] - A dictionary that maps roster names to a list of usernames in the roster. The list of usernames will be empty if no users have been added to the roster.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 Vision

```
# This script will get all the rosters and list the users in them.
rosters = system.alarm.getRosters()
for key, values in rosters.iteritems():
    # key is the roster name, values is a dict of usernames
    print 'Roster', key, 'contains these users:'
    for value in values:
        print '  ', value
```

Example #2 Perspective

```
# This script will get all the rosters and list the users in them.
rosters = system.alarm.getRosters()
for key, values in rosters.iteritems():
    # key is the roster name, values is a dict of usernames
    system.perspective.print('Roster ' + key + ' contains these users:')
    for value in values:
        system.perspective.print('  ' + value)
```

Output

```
Roster Admins contains these users:
   admin
Roster Supervisors contains these users:
   asmith
   jdoe
```

system.alarm.getShelvedPaths

This function is used in **Python Scripting**.

Description

Returns a list of ShelvedPath objects, which each represent a shelved alarm.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.alarm.getShelvedPaths()
```

Parameters

Nothing

Returns

List[ShelvedPath] - A list of ShelvedPath objects. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# The following code prints a list of the shelved alarms paths and prints them to
the console.
paths = system.alarm.getShelvedPaths()
for p in paths:
   print "Path: %s, Shelved by: %s, expires: %s, is expired? %s" % (p.getPath(),
p.getUser(), p.getExpiration(), p.isExpired())
```

system.alarm.listPipelines

This function is used in **Python Scripting**.

Description

Will return a list of the available Alarm Notification Pipelines in a project. The order of the returned list is not guaranteed.

The legacy behavior of this function (7.9 and prior) did not have any parameters, and it would always check all projects for pipelines. Upon upgrade to version 8.#+, alarm pipelines were migrated to a project named "alarm-pipelines". See the **Upgrade Guide** for more details.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.alarm.listPipelines([projectName])
```

Parameters

Type	Parameter	Description
String	`projectName`	The project to check alarm pipelines for. If omitted, will look for a project named "alarm-pipelines". [optional]

Returns

List[String] - A list of pipeline names. The list will be empty if no pipelines exist. Unsaved name changes will not be reflected in the list.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script will print a list of all alarm pipeline names in the current
project.
project = system.util.getProjectName()
pipelines = system.alarm.listPipelines(project)
for pipeline in pipelines:
    print pipeline
```

Example #2

```
# This script will retrieve all pipelines across all projects
projects = system.project.getProjectNames()

for p in projects:
    print "Project %s has the following alarm pipelines:" % p
    pipelines = system.alarm.listPipelines(p)

    for i in pipelines:
        print "- %s" % i
```

system.alarm.queryJournal

This function is used in **Python Scripting**.

Description

Queries the specified journal for historical alarm events. The result is a list of alarm events, which can be parsed for individual properties.

Click here for more information on alarm properties.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.alarm.queryJournal([startDate], [endDate], [journalName], [priority], [state], [path], [source], [displaypath], [all_properties], [any_properties], [defined], [includeData], [includeSystem], [includeShelved], [isSystem], [provider])
```

Parameters

Type	Parameter	Description
Date	`startDate`	The start of the time range to query. Defaults to 8 hours previous to now if omitted. Time range is inclusive. [optional]
Date	`endDate`	The end of the time range to query. Defaults to now if omitted. [optional]
String	`journalName`	The journal name to query. If only one journal exists on the Gateway, can be omitted. [optional]
List[Integer/String]	`priority`	A list of possible priorities to match. Priorities can be specified by name or number, with the values: Diagnostic(0), Low(1), Medium(2), High(3), Critical(4). [optional]
List[Integer/String]	`state`	A list of event states to match. Valid values can either be integers or strings, representing a number of states. See **State Parameter Values** for a listing of possible values. [optional]
List[String]	`path`	A list of possible source paths to search at. The wildcard `*` may be used. [optional]
List[String]	`source`	A list of possible source paths to search at. The wildcard `*` may be used. [optional]
List[String]	`displaypath`	A list of display paths to search at. Display paths are separated by `/`, and if a path ends in `/*`, everything below that path will be searched as well. [optional]
List[Tuple[String, String, Any]]	`all_properties`	A set of property conditions, all of which must be met for the condition to pass. This parameter is a list of tuples, in the form (`propName`, `condition`, value). Valid propName values can be either associated data or the keys listed on the **PyAlarmEvent object**. Valid condition values: `=`, `!=`, `<`, `<=`, `>`, `>=`. String values

Type	Parameter	Description
		can only be compared using `=` and `!=` conditions. [optional]
List[Tuple[String, String, Any]]	`any_properties`	A set of property conditions, any of which will cause the overall condition to pass. This parameter is a list of tuples, in the form (`propName`, `condition`, value). Valid propName values can be either associated data or the keys listed on the **PyAlarmEvent object**. Valid condition values: `=`, `!=`, `<`, `<=`, `>`, `>=`. String values can only be compared using `=` and `!=` conditions. [optional]
List[String]	`defined`	A list of string property names, all of which must be present on an event for it to pass. [optional]
Boolean	`includeData`	Whether or not event data should be included in the return. If True, returns Python dictionaries (or nulls) for Active, Clear, Ack, Event Value, and Runtime data inside of the AlarmQueryResult object. Not required when defining `all_properties` or `any_properties`. [optional] See **Example #6** below for how to return Event Value data.
Boolean	`includeSystem`	Specifies whether system events are included in the return. [optional]
Boolean	`includeShelved`	A flag indicating whether shelved events should be included in the results. Defaults to false. [optional]
Boolean	`isSystem`	Specifies whether the returned event must or must not be a system event. [optional]
List[String]	`provider`	A list of tag providers to include in the query. Omitting this parameter will query all providers. [optional]

Returns

AlarmQueryResult - The AlarmQueryResult object is a list of PyAlarmEvent objects. **See Scripting Object Reference**.

Additionally, each PyAlarmEvent inside of the AlarmQueryResult object has several built-in methods to extract alarm information. More details on these methods can be found on the **Scripting Object Reference** page.

Changed in 8.1.11 As of 8.1.11, objects inside of the AlarmQueryResult object are now instances of PyAlarmEvent. Formerly they were AlarmEvent objects.

> **IMPORTANT**
>
> Each item in the resulting list is a separate alarm event: an alarm becoming active is one item, while the same alarm becoming acknowledged is a separate item. This differs from **system.alarm.queryStatus()** which groups each event into a single item.

Scope

Gateway, Vision Client, Perspective Session

State Parameter Values

String Representation	Integer Representation
ClearUnacked	0
ClearAcked	1
ActiveUnacked	2
ActiveAcked	3

New in 8.1.8

The `state` parameter now accepts Enabled and Disabled as valid values, allowing the function to match on events where alarms were enabled or disabled. This requires that the **Stored Enabled & Disabled Events** property is enabled.

String Representation	Integer Representation
Enabled	4
Disabled	5

Code Examples

Example #1

```
# This example shows the basic syntax for querying from the journal in a button's actionPerformed event, with a date range selector ("Range"), storing the results back to a table called "Table":

table = event.source.parent.getComponent("Table")
range= event.source.parent.getComponent("Range")

results = system.alarm.queryJournal(journalName="Journal",
startDate=range.startDate, endDate=range.endDate)
table.data = results.getDataset()
```

Example #2

```
# This example extends the previous to only include non-acknowledged events of High or Critical severity, who have associated data called "Department", set to "maintenance". It also excludes system events (shelving notifications, etc):

table = event.source.parent.getComponent("Table")
range= event.source.parent.getComponent("Range")

results = system.alarm.queryJournal(journalName="Journal",
startDate=range.startDate, endDate=range.endDate, state=['ActiveUnacked',
'ClearUnacked'], all_properties=[("Department","=","maintenance")], priority=
["High", "Critical"], includeSystem=False)
table.data = results.getDataset()
```

Example #3

```

```

```
# Iterating through results

end = system.date.now()
start = system.date.addHours(end, -1)

data = system.alarm.queryJournal(startDate = start, endDate = end)

# Convert the results into a PyDataSet, since they're easy to iterate through
pyData = system.dataset.toPyDataSet(data.getDataset())

for row in pyData:
    print row["DisplayPath"], " - ", row["EventState"]
```

Example #4

```
# Using any_properties (OR operator)

defined = ["DisplayPath", "Source"]
props = [
    ("DisplayPath","=","yo"),
    ("Source","Like","*Write*")
]

results = system.alarm.queryJournal(any_properties=props)

print len(results)
for r in results:
    print r['source']
```

Example #5

```
# Using all_properties (AND operator)

props = [
            ("EventId","=","9bb7e0ee-011b-4f37-8e07-e54706e11852"),
            ("Priority","=","Medium"),
            ("EventTime", "=", "Jan 04 17:07:12 UTC 2022")
]
results = system.alarm.queryJournal(all_properties=props)
```

Example #6

```
# use eventValue in a script
endDate = system.date.now()
startDate = system.date.addMinutes(endDate, -1)

alarms = system.alarm.queryJournal(
    startDate=startDate,
    endDate=endDate,
    includeData = True,
    includeSystem = False
    )

for alarm in alarms:
    print alarm.getId(), alarm.get('eventValue'), alarm['eventValue']
```

system.alarm.queryStatus

This function is used in **Python Scripting**.

Description

Queries the current state of alarms. The result is a list of alarm events, which can be parsed for individual properties. The results provided by this function represent the current state of alarms, in contrast to the historical alarm events retrieved by the **system.alarm.queryJournal** function.

> **NOTE**
>
> Depending on the number of alarm events in the system, this function can be fairly intensive and take a while to finish executing. This can be problematic if the application is attempting to show the results on a component (such as using this function to retrieve a count of alarms). In these cases it's preferred to call this function in a gateway script of some sort (such as a **timer script**), and store the results in a tag.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.alarm.queryStatus([priority], [state], [path], [source], [displaypath], [all_properties], [any_properties], [defined], [includeShelved], [provider])
```

Parameters

Type	Parameter	Description
List[Integer/String]	`priority`	A list of possible priorities to match. Priorities can be specified by name or number, with the values: Diagnostic(0), Low(1), Medium(2), High(3), Critical(4). [optional]
List[Integer/String]	`state`	A list of states to allow. See **State Values** for a list of options. [optional]
List[String]	`path`	A list of possible source paths to search at. The wildcard `*` may be used. Works the same as the source argument, and either can be used. [optional]
List[String]	`source`	A list of possible source paths to search at. The wildcard `*` may be used. Works the same as the path argument, and either can be used. [optional]
List[String]	`displaypath`	A list of display paths to search at. Display paths are separated by `/`, and if a path ends in `/*`, everything below that path will be searched as well. [optional]
List[Tuple[String, String, Any]]	`all_properties`	A set of property conditions, all of which must be met for the condition to pass. This parameter is a list of tuples, in the form (`propName`, `condition`, value). Valid propName values can be either associated data or the keys listed on the **PyAlarmEvent object**. Valid condition values: `=`, `!=`, `<`, `<=`, `>`, `>=`. String values can only be compared using `=` and `!=` conditions. [optional]
List[Tuple[String, String, Any]]	`any_properties`	A set of property conditions, any of which will cause the overall condition to pass. This parameter is a list of tuples, in the form (`propName`, `condition`, value). Valid propName values can be either associated data or the keys listed on the **PyAlarmEvent object**. Valid condition values: `=`, `!=`, `<`, `<=`, `>`, `>=`. String values

Type	Parameter	Description
		can only be compared using `=` and `!=` conditions. [optional]
List[String]	`defined`	A list of string property names, all of which must be present on an event for it to pass. [optional]
Boolean	`includeShelved`	A flag indicating whether shelved events should be included in the results. Defaults to false. [optional]
List[String]	`provider`	A list of tag providers to include in the query. Omitting this parameter will query all providers. [optional]

Returns

AlarmQueryResult - The AlarmQueryResult object is a list of PyAlarmEvent objects with some additional helper methods, see **Scripting Object Reference**.

Additionally, each PyAlarmEvent inside of the AlarmQueryResult object has several built-in methods to extract alarm information. More details on these methods can be found on the **Scripting Object Reference** page.

Changed in 8.1.11 Prior to 8.1.11, objects inside of the AlarmQueryResult object were instances of AlarmEvent.

> **NOTE**
>
> Each item in the resulting list is a combination of each alarm event for the same alarm: details for when the alarm became active, acknowledged, and cleared are combined into a single item. This differs from **system.alarm.queryJournal()** which splits these events into separate items

Scope

Gateway, Vision Client, Perspective Session

State Parameter Values

String Representation	Integer Representation
ClearUnacked	0
ClearAcked	1
ActiveUnacked	2
ActiveAcked	3

Code Examples

Example #1

```
# This example queries the state of all tags named "HiAlarm", and puts the results in a Vision table Component named "Table" (this assumes it's being run from a button on the same screen)
#   Note that this example is simple for the sake of brevity. Normally you'll want to use system.util.invokeAsynchronous to search for alarms in a separate thread, especially so if calling
#   this function from a component based script. See the next example for more information.

table = event.source.parent.getComponent("Table")

results = system.alarm.queryStatus(source=["*HiAlarm*"])
table.data = results.getDataset()
```

Example #2

```
# In this example we'll call system.alarm.queryStatus in a separate thread, and
return the results to the data property on a Vision Table component. Similar to
the example above.
#   What makes this example different is that it offers better performance when
calling from a Vision component. Depending on the number of alarm events in the
system, queryStatus
#   may take a significant amount of time to finish, which would lock up a Vision
Client while the script is running in the GUI thread. Thus this example will use
#   system.util.invokeAsynchronous to call queryStatus in a separate thread, and
then system.util.invokeLater make any changes to our components.


# Define a function that will retrieve alarm data in a separate thread
def getAlarms():
    # Call queryStatus to retrieve the alarm data we're looking for, and store the
results in a variable.
    #   In this case, we're looking for alarm events that contain the word
"Sensor" in the source path.
    results = system.alarm.queryStatus(source=["*Sensor*"])

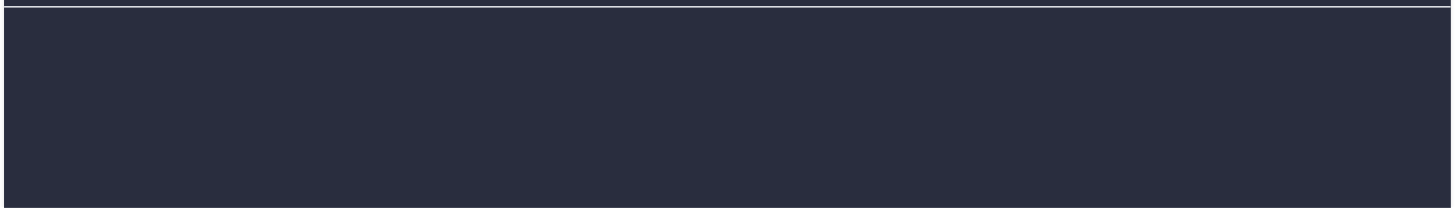
    # From this same script, define a separate function that will later interact
with the
    #    GUI, allowing us to move our alarm data over to a component
    # We're also using the getDataset() function on the object returned by
queryStatus,
    #   since that will provide a dataset that our table component will expect.
    def setTheTable(alarms = results.getDataset()):

        # Replace the property reference below with a path leading to whichever
property
        #    you want to move the alarm data to.
        event.source.parent.getComponent("Table").data = alarms

    # The last thing we'll do in the separate thread is call invokeLater
    #   which will let our setTheTable function run in the GUI thread
    system.util.invokeLater(setTheTable)


# Call the getAlarms function in a separate thread, which starts the whole process
system.util.invokeAsynchronous(getAlarms)
```

Example #3



```
# The any_properties parameter allows you to filter the results for specific
properties. This is useful when searching for alarms that contain associated data.

# Build a List of Tuples that represent the properties to search for. In this
case, if our alarms have an Associated Data named 'Group', we can use
# the following to search for potential values
props = [("Group", "=", "value1"), ("Group", "=", "value2")]
state = ["ActiveUnacked", "ActiveAcked"]

alarms = system.alarm.queryStatus(any_properties = props, state = state)

# Here we're printing out the number of alarms that meet our criteria. We could
replace this and further examine each individual alarm in a for-loop instead.
print len(alarms)
```

Example #4

```
# Using all_properties (AND operator)

props = [
            ("EventId","=","9bb7e0ee-011b-4f37-8e07-e54706e11852"),
            ("Priority","=","Medium"),
            ("EventTime", "=", "Jan 04 17:07:12 UTC 2022")
]
results = system.alarm.queryStatus(all_properties=props)
```

system.alarm.shelve

This function is used in **Python Scripting**.

Description

This function shelves the specified alarms for the specified amount of time. The time can be specified in minutes (timeoutMinutes) or seconds (timeoutSeconds). If an alarm is already shelved, this will overwrite the remaining time. If no timeout is specified, will default to 15 minutes.

Client Permission Restrictions

Client Permission: Alarm Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.alarm.shelve(path, [timeoutSeconds], [timeoutMinutes])
```

Parameters

Type	Parameter	Description
List[String]	`path`	A list of possible source paths to search at. If a path ends in "/*", the results will include anything below that path.
Integer	`timeoutSeconds`	The amount of time to shelve the matching alarms for, specified in seconds. Setting this to 0 will unshelve the alarms. [optional]
Integer	`timeoutMinutes`	The amount of time to shelve the matching alarms for, specified in minutes. Setting this to 0 will unshelve the alarms. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example assumes that data has been loaded into a table ("Table") from
system.alarm.queryStatus, and it shelves the selected alarms for 5 minutes.
# It also assumes that it is being executed from a button's actionPerformed event.

table = event.source.parent.getComponent('Table')
rows = table.selectedRows
data = table.data
if len(rows)>0:
   sourcePaths = [str(data.getValueAt(r,'Source')) for r in rows]
   system.alarm.shelve(path=sourcePaths,timeoutMinutes=5)
```

system.alarm.unshelve

This function is used in **Python Scripting**.

Description

Unshelves a list of alarms based on the source paths provided.

Client Permission Restrictions

Client Permission: Alarm Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.alarm.unshelve(path)
```

Parameters

Type	Parameter	Description
List[String]	`path`	A list of possible source paths to search at. If a path ends in "/*", the results will include anything below that path.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Unshelve an Alarm at a Path

testPath = "prov:TAG_PROVIDER_NAME:/tag:TAG_PATH:/alm:ALARM_NAME"
system.alarm.unshelve(path= [testPath])
```

system.bacnet

BACnet Functions

The following functions are used with the **BACnet driver** and a BACnet/IP device.

readRaw

Read from any BACnet object not explicitly supported by the BACnet driver.

readRawMultiple

This function is the bulk version of system.bacnet.readRaw to allow multiple object/property combinations to be r…

synchronizeTime

Notifies the remote device of the correct current time, which is the system time (factoring in time zone and DST) o…

synchronizeTimeUtc

Notifies the remote device of the correct current time in UTC.

writeRaw

Write to any BACnet object not explicitly supported by the BACnet driver.

writeRawMultiple

This function is the bulk version of system.bacnet.writeRaw by writing properties to objects provided equal-lengt…

writeWithPriority

Write to the Present_Value attribute of an object with a custom priority level.

Functions by Scope

Gateway >

Perspective >

Constants

The system.bacnet function contains three packages (objectType, propertyId, and Enums) that reference Java classes. These references allow the classes to be imported through scripts without needing to know their full path. For example, both scripts below use system.bacnet to import the calendar object type without using `from com.serotonin.bacnet4j.type.enumerated import ObjectType`. See the **system.bacnet.readRaw** page for more details.

Example code using an import statement

```
from system.bacnet.enumerated import ObjectType

ot = ObjectType.calendar
```

Exmaple code not using an import statement

```
ot = system.bacnet.enumerated.ObjectType.calendar
```

system.bacnet.readRaw

New in 8.1.18

This function is used in **Python Scripting**.

Description

Read from any BACnet object not explicitly supported by the BACnet driver.

> **NOTE**
>
> To use this function, the BACnet driver must be installed.

> **CAUTION**
>
> Please use caution when interacting directly with any BACnet device, as writing to an object may have unintended consequences and could result in data loss.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.readRaw(deviceName, objectType, objectId, propertyId, [propertyArrayIndex])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to read from.
ObjectType	`objectType`	The numeric id of the objectType of the object instance being read from. See the objectType Reference below.
Integer	`objectId`	The object instance number to read.
PropertyIdentifier	`propertyId`	The PropertyIdentifier of the object instance being read. See the propertyId Reference below.
Integer	`propertyArrayIndex`	[optional] The array index of the property to read from. This parameter is optional and should not be used when reading from the entire array or if the property is not an array.

Returns

Nothing

Scope

Gateway

Importing Classes

You can import classes from system.bacnet.* like you would other Python classes:

Example

```
```

```
from system.bacnet.enumerated import ObjectType
from system.bacnet.enumerated import PropertyIdentifier

ot = ObjectType.calendar
pid = PropertyIdentifier.dateList
```

You can also iterate those system.bacnet.* packages to see all available classes:

Example

```
for d in dir(system.bacnet.constructed):
    print d
```

API Docs

BACnet4j Library of all classes available for import can be accessed at this link: **BACnet4j Library 6.0.1 API Docs**

References

objectType Reference

Values for the **objectType** parameter can be referenced at system.bacnet.enumerated.ObjectType.*

objectType Reference List

- analogInput
- analogOutput
- analogValue
- binaryInput
- binaryOutput
- binaryValue
- calendar
- command
- device
- eventEnrollment
- file

- group
- loop
- multiStateInput
- multiStateOutput
- notificationClass
- program
- schedule
- averaging
- multiStateValue
- trendLog
- lifeSafetyPoint
- lifeSafetyZone
- accumulator
- pulseConverter
- eventLog
- globalGroup
- trendLogMultiple
- loadControl
- structuredView
- accessDoor
- timer
- accessCredential
- accessPoint
- accessRights
- accessUser
- accessZone
- credentialDataInput
- networkSecurity
- bitstringValue
- characterstringValue
- datePatternValue
- dateValue
- datetimePatternValue
- datetimeValue
- integerValue

- largeAnalogValue
- octetstringValue
- positiveIntegerValue
- timePatternValue
- timeValue
- notificationForwarder
- alertEnrollment
- channel
- lightingOutput
- binaryLightingOutput
- networkPort
- elevatorGroup
- escalator
- lift

propertyId Reference

Values for the **propertyId** parameter can be referenced at system.bacnet.enumerated.PropertyIdentifier.*

propertyId Reference List

- ackedTransitions
- ackRequired
- action
- actionText
- activeText
- activeVtSessions
- alarmValue
- alarmValues
- all
- allWritesSuccessful
- apduSegmentTimeout
- apduTimeout
- applicationSoftwareVersion

- archive
- bias
- changeOfStateCount
- changeOfStateTime
- notificationClass
- controlledVariableReference
- controlledVariableUnits
- controlledVariableValue
- covIncrement
- dateList
- daylightSavingsStatus
- deadband
- derivativeConstant
- derivativeConstantUnits
- description
- descriptionOfHalt
- deviceAddressBinding
- deviceType
- effectivePeriod
- elapsedActiveTime
- errorLimit
- eventEnable
- eventState
- eventType
- exceptionSchedule
- faultValues
- feedbackValue
- fileAccessMethod
- fileSize
- fileType
- firmwareRevision
- highLimit
- inactiveText
- inProcess
- instanceOf

- integralConstant
- integralConstantUnits
- limitEnable
- listOfGroupMembers
- listOfObjectPropertyReferences
- localDate
- localTime
- location
- lowLimit
- manipulatedVariableReference
- maximumOutput
- maxApduLengthAccepted
- maxInfoFrames
- maxMaster
- maxPresValue
- minimumOffTime
- minimumOnTime
- minimumOutput
- minPresValue
- modelName
- modificationDate
- notifyType
- numberOfApduRetries
- numberOfStates
- objectIdentifier
- objectList
- objectName
- objectPropertyReference
- objectType
- optional
- outOfService
- outputUnits
- eventParameters
- polarity
- presentValue

- priority
- priorityArray
- priorityForWriting
- processIdentifier
- programChange
- programLocation
- programState
- proportionalConstant
- proportionalConstantUnits
- protocolObjectTypesSupported
- protocolServicesSupported
- protocolVersion
- readOnly
- reasonForHalt
- recipientList
- reliability
- relinquishDefault
- required
- resolution
- segmentationSupported
- setpoint
- setpointReference
- stateText
- statusFlags
- systemStatus
- timeDelay
- timeOfActiveTimeReset
- timeOfStateCountReset
- timeSynchronizationRecipients
- units
- updateInterval
- utcOffset
- vendorIdentifier
- vendorName
- vtClassesSupported

- weeklySchedule
- attemptedSamples
- averageValue
- bufferSize
- clientCovIncrement
- covResubscriptionInterval
- eventTimeStamps
- logBuffer
- logDeviceObjectProperty
- enable
- logInterval
- maximumValue
- minimumValue
- notificationThreshold
- protocolRevision
- recordsSinceNotification
- recordCount
- startTime
- stopTime
- stopWhenFull
- totalRecordCount
- validSamples
- windowInterval
- windowSamples
- maximumValueTimestamp
- minimumValueTimestamp
- varianceValue
- activeCovSubscriptions
- backupFailureTimeout
- configurationFiles
- databaseRevision
- directReading
- lastRestoreTime
- maintenanceRequired
- memberOf

- mode
- operationExpected
- setting
- silenced
- trackingValue
- zoneMembers
- lifeSafetyAlarmValues
- maxSegmentsAccepted
- profileName
- autoSlaveDiscovery
- manualSlaveAddressBinding
- slaveAddressBinding
- slaveProxyEnable
- lastNotifyRecord
- scheduleDefault
- acceptedModes
- adjustValue
- count
- countBeforeChange
- countChangeTime
- covPeriod
- inputReference
- limitMonitoringInterval
- loggingObject
- loggingRecord
- prescale
- pulseRate
- scale
- scaleFactor
- updateTime
- valueBeforeChange
- valueSet
- valueChangeTime
- alignIntervals
- intervalOffset

- lastRestartReason
- loggingType
- restartNotificationRecipients
- timeOfDeviceRestart
- timeSynchronizationInterval
- trigger
- utcTimeSynchronizationRecipients
- nodeSubtype
- nodeType
- structuredObjectList
- subordinateAnnotations
- subordinateList
- actualShedLevel
- dutyWindow
- expectedShedLevel
- fullDutyBaseline
- requestedShedLevel
- shedDuration
- shedLevelDescriptions
- shedLevels
- stateDescription
- doorAlarmState
- doorExtendedPulseTime
- doorMembers
- doorOpenTooLongTime
- doorPulseTime
- doorStatus
- doorUnlockDelayTime
- lockStatus
- maskedAlarmValues
- securedStatus
- absenteeLimit
- accessAlarmEvents
- accessDoors
- accessEvent

- accessEventAuthenticationFactor
- accessEventCredential
- accessEventTime
- accessTransactionEvents
- accompaniment
- accompanimentTime
- activationTime
- activeAuthenticationPolicy
- assignedAccessRights
- authenticationFactors
- authenticationPolicyList
- authenticationPolicyNames
- authenticationStatus
- authorizationMode
- belongsTo
- credentialDisable
- credentialStatus
- credentials
- credentialsInZone
- daysRemaining
- entryPoints
- exitPoints
- expirationTime
- extendedTimeEnable
- failedAttemptEvents
- failedAttempts
- failedAttemptsTime
- lastAccessEvent
- lastAccessPoint
- lastCredentialAdded
- lastCredentialAddedTime
- lastCredentialRemoved
- lastCredentialRemovedTime
- lastUseTime
- lockout

- lockoutRelinquishTime
- maxFailedAttempts
- members
- musterPoint
- negativeAccessRules
- numberOfAuthenticationPolicies
- occupancyCount
- occupancyCountAdjust
- occupancyCountEnable
- occupancyLowerLimit
- occupancyLowerLimitEnforced
- occupancyState
- occupancyUpperLimit
- occupancyUpperLimitEnforced
- passbackMode
- passbackTimeout
- positiveAccessRules
- reasonForDisable
- supportedFormats
- supportedFormatClasses
- threatAuthority
- threatLevel
- traceFlag
- transactionNotificationClass
- userExternalIdentifier
- userInformationReference
- userName
- userType
- usesRemaining
- zoneFrom
- zoneTo
- accessEventTag
- globalIdentifier
- verificationTime
- baseDeviceSecurityPolicy

- distributionKeyRevision
- doNotHide
- keySets
- lastKeyServer
- networkAccessSecurityPolicies
- packetReorderTime
- securityPduTimeout
- securityTimeWindow
- supportedSecurityAlgorithms
- updateKeySetTimeout
- backupAndRestoreState
- backupPreparationTime
- restoreCompletionTime
- restorePreparationTime
- bitMask
- bitText
- isUtc
- groupMembers
- groupMemberNames
- memberStatusFlags
- requestedUpdateInterval
- covuPeriod
- covuRecipients
- eventMessageTexts
- eventMessageTextsConfig
- eventDetectionEnable
- eventAlgorithmInhibit
- eventAlgorithmInhibitRef
- timeDelayNormal
- reliabilityEvaluationInhibit
- faultParameters
- faultType
- localForwardingOnly
- processIdentifierFilter
- subscribedRecipients

- portFilter
- authorizationExemptions
- allowGroupDelayInhibit
- channelNumber
- controlGroups
- executionDelay
- lastPriority
- writeStatus
- propertyList
- serialNumber
- blinkWarnEnable
- defaultFadeTime
- defaultRampRate
- defaultStepIncrement
- egressTime
- inProgress
- instantaneousPower
- lightingCommand
- lightingCommandDefaultPriority
- maxActualValue
- minActualValue
- power
- transition
- egressActive
- interfaceValue
- faultHighLimit
- faultLowLimit
- lowDiffLimit
- strikeCount
- timeOfStrikeCountReset
- defaultTimeout
- initialTimeout
- lastStateChange
- stateChangeValues
- timerRunning

- timerState
- apduLength
- ipAddress
- ipDefaultGateway
- ipDhcpEnable
- ipDhcpLeaseTime
- ipDhcpLeaseTimeRemaining
- ipDhcpServer
- ipDnsServer
- bacnetIpGlobalAddress
- bacnetIpMode
- bacnetIpMulticastAddress
- bacnetIpNatTraversal
- ipSubnetMask
- bacnetIpUdpPort
- bbmdAcceptFdRegistrations
- bbmdBroadcastDistributionTable
- bbmdForeignDeviceTable
- changesPending
- command
- fdBbmdAddress
- fdSubscriptionLifetime
- linkSpeed
- linkSpeeds
- linkSpeedAutonegotiate
- macAddress
- networkInterfaceName
- networkNumber
- networkNumberQuality
- networkType
- routingTable
- virtualMacAddressTable
- commandTimeArray
- currentCommandPriority
- lastCommandTime

- valueSource
- valueSourceArray
- bacnetIpv6Mode
- ipv6Address
- ipv6PrefixLength
- bacnetIpv6UdpPort
- ipv6DefaultGateway
- bacnetIpv6MulticastAddress
- ipv6DnsServer
- ipv6AutoAddressingEnable
- ipv6DhcpLeaseTime
- ipv6DhcpLeaseTimeRemaining
- ipv6DhcpServer
- ipv6ZoneIndex
- assignedLandingCalls
- carAssignedDirection
- carDoorCommand
- carDoorStatus
- carDoorText
- carDoorZone
- carDriveStatus
- carLoad
- carLoadUnits
- carMode
- carMovingDirection
- carPosition
- elevatorGroup
- energyMeter
- energyMeterRef
- escalatorMode
- faultSignals
- floorText
- groupId
- groupMode
- higherDeck

- installationId
- landingCalls
- landingCallControl
- landingDoorStatus
- lowerDeck
- machineRoomId
- makingCarCall
- nextStoppingFloor
- operationDirection
- passengerAlarm
- powerMode
- registeredCarCall
- activeCovMultipleSubscriptions
- protocolLevel
- referencePort
- deployedProfileLocation
- profileLocation
- tags
- subordinateNodeTypes
- subordinateTags
- subordinateRelationships
- defaultSubordinateRelationship
- represents

Enums Reference

Values for the **Enums** parameter can be referenced at system.bacnet.enums.*

Enums Reference List

- DayOfWeek
- MaxApduLength
- MaxSegments
- Month

Code Examaples

Reading an Array

Reading EventTimeStamps property from an instance 0 AnalogOutput object.

Example

```
ot = system.bacnet.enumerated.ObjectType.analogOutput
pid = system.bacnet.enumerated.PropertyIdentifier.eventTimeStamps

timestamps = system.bacnet.readRaw("bacnetDevice", ot, 0, pid)
for t in timestamps:
    print t
```

Reading an Array Element

Reading index 0 of EventTimeStamps property from an instance 0 AnalogOutput object.

Example

```
ot = system.bacnet.enumerated.ObjectType.analogOutput
pid = system.bacnet.enumerated.PropertyIdentifier.eventTimeStamps

# read index 0 of eventTimeStamps property
arrayCount = system.bacnet.readRaw("bacnetDevice", ot, 0, pid, 0)
print arrayCount
```

system.bacnet.readRawMultiple

New in 8.1.32

This function is used in **Python Scripting**.

Description

This function is the bulk version of **system.bacnet.readRaw** to allow multiple object/property combinations to be read simultaneously from a single request. Returns a list of corresponding Encodable objects provided equal-length lists of object types, object instance numbers, property IDs, and property array indices.

> **NOTE**
>
> To use this function, the **BACnet** driver must be installed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.readRawMultiple(deviceName, objectTypes, objectIds, propertyIds)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to read from.
ObjectTypes	`objectTypes`	The numeric ids of the objectType of the object instances being read from. See the objectType Reference below.
Integer	`objectIds`	The object instance number to read.
PropertyIdentifier	`propertyIds`	The PropertyIdentifier of the object instance being read. See the propertyId Reference below.

Returns

A list of Encodable objects corresponding to the properties being read.

Scope

Gateway

References

objectType Reference

Values for the **objectType** parameter that can be referenced at system.bacnet.enumerated.ObjectType.*

objectType reference

```
analogInput
analogOutput
analogValue
binaryInput
binaryOutput
binaryValue
calendar
command
device
eventEnrollment
file
group
loop
multiStateInput
multiStateOutput
notificationClass
program
schedule
averaging
multiStateValue
trendLog
lifeSafetyPoint
lifeSafetyZone
accumulator
pulseConverter
eventLog
globalGroup
trendLogMultiple
loadControl
structuredView
accessDoor
timer
accessCredential
accessPoint
accessRights
accessUser
accessZone
credentialDataInput
networkSecurity
bitstringValue
characterstringValue
datePatternValue
dateValue
datetimePatternValue
datetimeValue
integerValue
largeAnalogValue
octetstringValue
```

```
positiveIntegerValue
timePatternValue
timeValue
notificationForwarder
alertEnrollment
channel
lightingOutput
binaryLightingOutput
networkPort
elevatorGroup
escalator
lift
```

propertyId Reference

Values for the **propertyId** parameter that can be referenced at system.bacnet.enumerated.PropertyIdentifier.*

propertyId reference

```
ackedTransitions
ackRequired
action
actionText
activeText
activeVtSessions
alarmValue
alarmValues
all
allWritesSuccessful
apduSegmentTimeout
apduTimeout
applicationSoftwareVersion
archive
bias
changeOfStateCount
changeOfStateTime
notificationClass
controlledVariableReference
controlledVariableUnits
controlledVariableValue
covIncrement
dateList
daylightSavingsStatus
deadband
derivativeConstant
derivativeConstantUnits
description
descriptionOfHalt
deviceAddressBinding
deviceType
effectivePeriod
elapsedActiveTime
errorLimit
eventEnable
eventState
eventType
exceptionSchedule
faultValues
feedbackValue
fileAccessMethod
fileSize
fileType
firmwareRevision
highLimit
inactiveText
inProcess
instanceOf
```

```
integralConstant
integralConstantUnits
limitEnable
listOfGroupMembers
listOfObjectPropertyReferences
localDate
localTime
location
lowLimit
manipulatedVariableReference
maximumOutput
maxApduLengthAccepted
maxInfoFrames
maxMaster
maxPresValue
minimumOffTime
minimumOnTime
minimumOutput
minPresValue
modelName
modificationDate
notifyType
numberOfApduRetries
numberOfStates
objectIdentifier
objectList
objectName
objectPropertyReference
objectType
optional
outOfService
outputUnits
eventParameters
polarity
presentValue
priority
priorityArray
priorityForWriting
processIdentifier
programChange
programLocation
programState
proportionalConstant
proportionalConstantUnits
protocolObjectTypesSupported
protocolServicesSupported
protocolVersion
readOnly
reasonForHalt
```

```
recipientList
reliability
relinquishDefault
required
resolution
segmentationSupported
setpoint
setpointReference
stateText
statusFlags
systemStatus
timeDelay
timeOfActiveTimeReset
timeOfStateCountReset
timeSynchronizationRecipients
units
updateInterval
utcOffset
vendorIdentifier
vendorName
vtClassesSupported
weeklySchedule
attemptedSamples
averageValue
bufferSize
clientCovIncrement
covResubscriptionInterval
eventTimeStamps
logBuffer
logDeviceObjectProperty
enable
logInterval
maximumValue
minimumValue
notificationThreshold
protocolRevision
recordsSinceNotification
recordCount
startTime
stopTime
stopWhenFull
totalRecordCount
validSamples
windowInterval
windowSamples
maximumValueTimestamp
minimumValueTimestamp
varianceValue
activeCovSubscriptions
```

```
backupFailureTimeout
configurationFiles
databaseRevision
directReading
lastRestoreTime
maintenanceRequired
memberOf
mode
operationExpected
setting
silenced
trackingValue
zoneMembers
lifeSafetyAlarmValues
maxSegmentsAccepted
profileName
autoSlaveDiscovery
manualSlaveAddressBinding
slaveAddressBinding
slaveProxyEnable
lastNotifyRecord
scheduleDefault
acceptedModes
adjustValue
count
countBeforeChange
countChangeTime
covPeriod
inputReference
limitMonitoringInterval
loggingObject
loggingRecord
prescale
pulseRate
scale
scaleFactor
updateTime
valueBeforeChange
valueSet
valueChangeTime
alignIntervals
intervalOffset
lastRestartReason
loggingType
restartNotificationRecipients
timeOfDeviceRestart
timeSynchronizationInterval
trigger
utcTimeSynchronizationRecipients
```

```
nodeSubtype
nodeType
structuredObjectList
subordinateAnnotations
subordinateList
actualShedLevel
dutyWindow
expectedShedLevel
fullDutyBaseline
requestedShedLevel
shedDuration
shedLevelDescriptions
shedLevels
stateDescription
doorAlarmState
doorExtendedPulseTime
doorMembers
doorOpenTooLongTime
doorPulseTime
doorStatus
doorUnlockDelayTime
lockStatus
maskedAlarmValues
securedStatus
absenteeLimit
accessAlarmEvents
accessDoors
accessEvent
accessEventAuthenticationFactor
accessEventCredential
accessEventTime
accessTransactionEvents
accompaniment
accompanimentTime
activationTime
activeAuthenticationPolicy
assignedAccessRights
authenticationFactors
authenticationPolicyList
authenticationPolicyNames
authenticationStatus
authorizationMode
belongsTo
credentialDisable
credentialStatus
credentials
credentialsInZone
daysRemaining
entryPoints
```

```
exitPoints
expirationTime
extendedTimeEnable
failedAttemptEvents
failedAttempts
failedAttemptsTime
lastAccessEvent
lastAccessPoint
lastCredentialAdded
lastCredentialAddedTime
lastCredentialRemoved
lastCredentialRemovedTime
lastUseTime
lockout
lockoutRelinquishTime
maxFailedAttempts
members
musterPoint
negativeAccessRules
numberOfAuthenticationPolicies
occupancyCount
occupancyCountAdjust
occupancyCountEnable
occupancyLowerLimit
occupancyLowerLimitEnforced
occupancyState
occupancyUpperLimit
occupancyUpperLimitEnforced
passbackMode
passbackTimeout
positiveAccessRules
reasonForDisable
supportedFormats
supportedFormatClasses
threatAuthority
threatLevel
traceFlag
transactionNotificationClass
userExternalIdentifier
userInformationReference
userName
userType
usesRemaining
zoneFrom
zoneTo
accessEventTag
globalIdentifier
verificationTime
baseDeviceSecurityPolicy
```

```
distributionKeyRevision
doNotHide
keySets
lastKeyServer
networkAccessSecurityPolicies
packetReorderTime
securityPduTimeout
securityTimeWindow
supportedSecurityAlgorithms
updateKeySetTimeout
backupAndRestoreState
backupPreparationTime
restoreCompletionTime
restorePreparationTime
bitMask
bitText
isUtc
groupMembers
groupMemberNames
memberStatusFlags
requestedUpdateInterval
covuPeriod
covuRecipients
eventMessageTexts
eventMessageTextsConfig
eventDetectionEnable
eventAlgorithmInhibit
eventAlgorithmInhibitRef
timeDelayNormal
reliabilityEvaluationInhibit
faultParameters
faultType
localForwardingOnly
processIdentifierFilter
subscribedRecipients
portFilter
authorizationExemptions
allowGroupDelayInhibit
channelNumber
controlGroups
executionDelay
lastPriority
writeStatus
propertyList
serialNumber
blinkWarnEnable
defaultFadeTime
defaultRampRate
defaultStepIncrement
```

```
egressTime
inProgress
instantaneousPower
lightingCommand
lightingCommandDefaultPriority
maxActualValue
minActualValue
power
transition
egressActive
interfaceValue
faultHighLimit
faultLowLimit
lowDiffLimit
strikeCount
timeOfStrikeCountReset
defaultTimeout
initialTimeout
lastStateChange
stateChangeValues
timerRunning
timerState
apduLength
ipAddress
ipDefaultGateway
ipDhcpEnable
ipDhcpLeaseTime
ipDhcpLeaseTimeRemaining
ipDhcpServer
ipDnsServer
bacnetIpGlobalAddress
bacnetIpMode
bacnetIpMulticastAddress
bacnetIpNatTraversal
ipSubnetMask
bacnetIpUdpPort
bbmdAcceptFdRegistrations
bbmdBroadcastDistributionTable
bbmdForeignDeviceTable
changesPending
command
fdBbmdAddress
fdSubscriptionLifetime
linkSpeed
linkSpeeds
linkSpeedAutonegotiate
macAddress
networkInterfaceName
networkNumber
```

networkNumberQuality
networkType
routingTable
virtualMacAddressTable
commandTimeArray
currentCommandPriority
lastCommandTime
valueSource
valueSourceArray
bacnetIpv6Mode
ipv6Address
ipv6PrefixLength
bacnetIpv6UdpPort
ipv6DefaultGateway
bacnetIpv6MulticastAddress
ipv6DnsServer
ipv6AutoAddressingEnable
ipv6DhcpLeaseTime
ipv6DhcpLeaseTimeRemaining
ipv6DhcpServer
ipv6ZoneIndex
assignedLandingCalls
carAssignedDirection
carDoorCommand
carDoorStatus
carDoorText
carDoorZone
carDriveStatus
carLoad
carLoadUnits
carMode
carMovingDirection
carPosition
elevatorGroup
energyMeter
energyMeterRef
escalatorMode
faultSignals
floorText
groupId
groupMode
higherDeck
installationId
landingCalls
landingCallControl
landingDoorStatus
lowerDeck
machineRoomId
makingCarCall

```
nextStoppingFloor
operationDirection
passengerAlarm
powerMode
registeredCarCall
activeCovMultipleSubscriptions
protocolLevel
referencePort
deployedProfileLocation
profileLocation
tags
subordinateNodeTypes
subordinateTags
subordinateRelationships
defaultSubordinateRelationship
represents
```

Enums Reference

Enum objects which can be referenced at system.bacnet.enums.*

Enums reference

```
DayOfWeek
MaxApduLength
MaxSegments
Month
```

Code Example

Example

```
ot1 = system.bacnet.enumerated.ObjectType.analogOutput
pid1 = system.bacnet.enumerated.PropertyIdentifier.eventTimeStamps

# read indices of the eventTimeStamps property
arrayCount = system.bacnet.readRawMultiple(
    deviceName="bacnet_device_2",
    objectTypes=[ot1, ot1, ot1],
    objectIds=[1, 1, 1],
    propertyIds=[pid1, pid1, pid1],
    propertyArrayIndices=[1, 2, 3])
print arrayCount
```

system.bacnet.synchronizeTime

This function is used in **Python Scripting**.

Description

Notifies the remote device of the correct current time, which is the system time (factoring in time zone and DST) of the server Ignition is running on.

> **NOTE**
>
> To use this function, the BACnet driver must be installed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.synchronizeTime(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to write from.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Example

Code Snippet - Basic Usage

```
deviceName = "BACnet Remote"
system.bacnet.synchronizeTime(deviceName)
```

system.bacnet.synchronizeTimeUtc

This function is used in **Python Scripting**.

Description

Notifies the remote device of the correct current time in UTC.

> **NOTE**
>
> To use this function, the BACnet driver must be installed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.synchronizeTimeUtc(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to write from.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Example

Code Snippet - Basic Usage

```
deviceName = "BACnet Remote"
system.bacnet.synchronizeTimeUtc(deviceName)
```

system.bacnet.writeRaw

New in 8.1.18

This function is used in **Python Scripting**.

Description

Write to any BACnet object not explicitly supported by the BACnet driver.

New in 8.1.32 The system.bacnet.writeRaw() function will accept Encodable values on the value parameter.

> **NOTE**
>
> To use this function, the BACnet driver must be installed.

> **CAUTION**
>
> Please use caution when interacting directly with any BACnet device, as writing to an object may have unintended consequences and could result in data loss.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.writeRaw(deviceName, objectType, objectId, propertyId, value, [priority], [propertyArrayIndex])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to write from.
ObjectType	`objectType`	The numeric id of the objectType of the object instance being written to. See the objectType Reference below.
Integer	`objectId`	The object instance number to write to.
PropertyIdentifier	`propertyId`	The PropertyIdentifier of the object instance being written to. See the propertyId Reference below.
Object	`value`	The value to write. Clearing a value can be accomplished by writing a None value.
Integer	`priority`	[optional] The priority level to use when writing to commandable properties. Must match a level in the standard BACnet priority array (a value from 1 to 16). See the Priority Reference table below. This parameter is optional and defaults to 8 if not specified.
Integer	`propertyArrayIndex`	[optional] The array index of the property to write to. This parameter is optional and should not be used when writing to the entire array or if the property is not an array.

Returns

Nothing

Scope

Gateway

Importing Classes

You can import classes from system.bacnet.* like you would other Python classes:

Example

```
from system.bacnet.enumerated import ObjectType
from system.bacnet.enumerated import PropertyIdentifier

ot = ObjectType.calendar
pid = PropertyIdentifier.dateList
```

You can also iterate those system.bacnet.* packages to see all available classes:

Example

```
for d in dir(system.bacnet.constructed):
    print d
```

API Docs

BACnet4j Library of all classes available for import can be accessed at this link: **BACnet4j Library 6.0.1 API Docs**

References

objectType Reference

Values for the **objectType** parameter that can be referenced at system.bacnet.enumerated.ObjectType.*

objectType reference

```
analogInput
analogOutput
analogValue
binaryInput
binaryOutput
binaryValue
calendar
command
device
eventEnrollment
file
group
loop
multiStateInput
multiStateOutput
notificationClass
program
schedule
averaging
multiStateValue
trendLog
lifeSafetyPoint
lifeSafetyZone
accumulator
pulseConverter
eventLog
globalGroup
trendLogMultiple
loadControl
structuredView
accessDoor
timer
accessCredential
accessPoint
accessRights
accessUser
accessZone
credentialDataInput
networkSecurity
bitstringValue
characterstringValue
datePatternValue
dateValue
datetimePatternValue
datetimeValue
integerValue
largeAnalogValue
octetstringValue
```

```
positiveIntegerValue
timePatternValue
timeValue
notificationForwarder
alertEnrollment
channel
lightingOutput
binaryLightingOutput
networkPort
elevatorGroup
escalator
lift
```

propertyId Reference

Values for the **propertyId** parameter that can be referenced at system.bacnet.enumerated.PropertyIdentifier.*

propertyId reference

```
ackedTransitions
ackRequired
action
actionText
activeText
activeVtSessions
alarmValue
alarmValues
all
allWritesSuccessful
apduSegmentTimeout
apduTimeout
applicationSoftwareVersion
archive
bias
changeOfStateCount
changeOfStateTime
notificationClass
controlledVariableReference
controlledVariableUnits
controlledVariableValue
covIncrement
dateList
daylightSavingsStatus
deadband
derivativeConstant
derivativeConstantUnits
description
descriptionOfHalt
deviceAddressBinding
deviceType
effectivePeriod
elapsedActiveTime
errorLimit
eventEnable
eventState
eventType
exceptionSchedule
faultValues
feedbackValue
fileAccessMethod
fileSize
fileType
firmwareRevision
highLimit
inactiveText
inProcess
instanceOf
```

```
integralConstant
integralConstantUnits
limitEnable
listOfGroupMembers
listOfObjectPropertyReferences
localDate
localTime
location
lowLimit
manipulatedVariableReference
maximumOutput
maxApduLengthAccepted
maxInfoFrames
maxMaster
maxPresValue
minimumOffTime
minimumOnTime
minimumOutput
minPresValue
modelName
modificationDate
notifyType
numberOfApduRetries
numberOfStates
objectIdentifier
objectList
objectName
objectPropertyReference
objectType
optional
outOfService
outputUnits
eventParameters
polarity
presentValue
priority
priorityArray
priorityForWriting
processIdentifier
programChange
programLocation
programState
proportionalConstant
proportionalConstantUnits
protocolObjectTypesSupported
protocolServicesSupported
protocolVersion
readOnly
reasonForHalt
```

```
recipientList
reliability
relinquishDefault
required
resolution
segmentationSupported
setpoint
setpointReference
stateText
statusFlags
systemStatus
timeDelay
timeOfActiveTimeReset
timeOfStateCountReset
timeSynchronizationRecipients
units
updateInterval
utcOffset
vendorIdentifier
vendorName
vtClassesSupported
weeklySchedule
attemptedSamples
averageValue
bufferSize
clientCovIncrement
covResubscriptionInterval
eventTimeStamps
logBuffer
logDeviceObjectProperty
enable
logInterval
maximumValue
minimumValue
notificationThreshold
protocolRevision
recordsSinceNotification
recordCount
startTime
stopTime
stopWhenFull
totalRecordCount
validSamples
windowInterval
windowSamples
maximumValueTimestamp
minimumValueTimestamp
varianceValue
activeCovSubscriptions
```

```
backupFailureTimeout
configurationFiles
databaseRevision
directReading
lastRestoreTime
maintenanceRequired
memberOf
mode
operationExpected
setting
silenced
trackingValue
zoneMembers
lifeSafetyAlarmValues
maxSegmentsAccepted
profileName
autoSlaveDiscovery
manualSlaveAddressBinding
slaveAddressBinding
slaveProxyEnable
lastNotifyRecord
scheduleDefault
acceptedModes
adjustValue
count
countBeforeChange
countChangeTime
covPeriod
inputReference
limitMonitoringInterval
loggingObject
loggingRecord
prescale
pulseRate
scale
scaleFactor
updateTime
valueBeforeChange
valueSet
valueChangeTime
alignIntervals
intervalOffset
lastRestartReason
loggingType
restartNotificationRecipients
timeOfDeviceRestart
timeSynchronizationInterval
trigger
utcTimeSynchronizationRecipients
```

```
nodeSubtype
nodeType
structuredObjectList
subordinateAnnotations
subordinateList
actualShedLevel
dutyWindow
expectedShedLevel
fullDutyBaseline
requestedShedLevel
shedDuration
shedLevelDescriptions
shedLevels
stateDescription
doorAlarmState
doorExtendedPulseTime
doorMembers
doorOpenTooLongTime
doorPulseTime
doorStatus
doorUnlockDelayTime
lockStatus
maskedAlarmValues
securedStatus
absenteeLimit
accessAlarmEvents
accessDoors
accessEvent
accessEventAuthenticationFactor
accessEventCredential
accessEventTime
accessTransactionEvents
accompaniment
accompanimentTime
activationTime
activeAuthenticationPolicy
assignedAccessRights
authenticationFactors
authenticationPolicyList
authenticationPolicyNames
authenticationStatus
authorizationMode
belongsTo
credentialDisable
credentialStatus
credentials
credentialsInZone
daysRemaining
entryPoints
```

```
exitPoints
expirationTime
extendedTimeEnable
failedAttemptEvents
failedAttempts
failedAttemptsTime
lastAccessEvent
lastAccessPoint
lastCredentialAdded
lastCredentialAddedTime
lastCredentialRemoved
lastCredentialRemovedTime
lastUseTime
lockout
lockoutRelinquishTime
maxFailedAttempts
members
musterPoint
negativeAccessRules
numberOfAuthenticationPolicies
occupancyCount
occupancyCountAdjust
occupancyCountEnable
occupancyLowerLimit
occupancyLowerLimitEnforced
occupancyState
occupancyUpperLimit
occupancyUpperLimitEnforced
passbackMode
passbackTimeout
positiveAccessRules
reasonForDisable
supportedFormats
supportedFormatClasses
threatAuthority
threatLevel
traceFlag
transactionNotificationClass
userExternalIdentifier
userInformationReference
userName
userType
usesRemaining
zoneFrom
zoneTo
accessEventTag
globalIdentifier
verificationTime
baseDeviceSecurityPolicy
```

```
distributionKeyRevision
doNotHide
keySets
lastKeyServer
networkAccessSecurityPolicies
packetReorderTime
securityPduTimeout
securityTimeWindow
supportedSecurityAlgorithms
updateKeySetTimeout
backupAndRestoreState
backupPreparationTime
restoreCompletionTime
restorePreparationTime
bitMask
bitText
isUtc
groupMembers
groupMemberNames
memberStatusFlags
requestedUpdateInterval
covuPeriod
covuRecipients
eventMessageTexts
eventMessageTextsConfig
eventDetectionEnable
eventAlgorithmInhibit
eventAlgorithmInhibitRef
timeDelayNormal
reliabilityEvaluationInhibit
faultParameters
faultType
localForwardingOnly
processIdentifierFilter
subscribedRecipients
portFilter
authorizationExemptions
allowGroupDelayInhibit
channelNumber
controlGroups
executionDelay
lastPriority
writeStatus
propertyList
serialNumber
blinkWarnEnable
defaultFadeTime
defaultRampRate
defaultStepIncrement
```

```
egressTime
inProgress
instantaneousPower
lightingCommand
lightingCommandDefaultPriority
maxActualValue
minActualValue
power
transition
egressActive
interfaceValue
faultHighLimit
faultLowLimit
lowDiffLimit
strikeCount
timeOfStrikeCountReset
defaultTimeout
initialTimeout
lastStateChange
stateChangeValues
timerRunning
timerState
apduLength
ipAddress
ipDefaultGateway
ipDhcpEnable
ipDhcpLeaseTime
ipDhcpLeaseTimeRemaining
ipDhcpServer
ipDnsServer
bacnetIpGlobalAddress
bacnetIpMode
bacnetIpMulticastAddress
bacnetIpNatTraversal
ipSubnetMask
bacnetIpUdpPort
bbmdAcceptFdRegistrations
bbmdBroadcastDistributionTable
bbmdForeignDeviceTable
changesPending
command
fdBbmdAddress
fdSubscriptionLifetime
linkSpeed
linkSpeeds
linkSpeedAutonegotiate
macAddress
networkInterfaceName
networkNumber
```

networkNumberQuality
networkType
routingTable
virtualMacAddressTable
commandTimeArray
currentCommandPriority
lastCommandTime
valueSource
valueSourceArray
bacnetIpv6Mode
ipv6Address
ipv6PrefixLength
bacnetIpv6UdpPort
ipv6DefaultGateway
bacnetIpv6MulticastAddress
ipv6DnsServer
ipv6AutoAddressingEnable
ipv6DhcpLeaseTime
ipv6DhcpLeaseTimeRemaining
ipv6DhcpServer
ipv6ZoneIndex
assignedLandingCalls
carAssignedDirection
carDoorCommand
carDoorStatus
carDoorText
carDoorZone
carDriveStatus
carLoad
carLoadUnits
carMode
carMovingDirection
carPosition
elevatorGroup
energyMeter
energyMeterRef
escalatorMode
faultSignals
floorText
groupId
groupMode
higherDeck
installationId
landingCalls
landingCallControl
landingDoorStatus
lowerDeck
machineRoomId
makingCarCall

```
nextStoppingFloor
operationDirection
passengerAlarm
powerMode
registeredCarCall
activeCovMultipleSubscriptions
protocolLevel
referencePort
deployedProfileLocation
profileLocation
tags
subordinateNodeTypes
subordinateTags
subordinateRelationships
defaultSubordinateRelationship
represents
```

Enums Reference

Enum objects which can be referenced at system.bacnet.enums.*

Enums reference
DayOfWeek MaxApduLength MaxSegments Month

Code Examples

Writing to an Enumerated Object

Writing "reverse" or 1 to the Polarity property of an instance 1 BinaryLightingOutput object.

Example

```
ot = system.bacnet.enumerated.ObjectType.binaryLightingOutput
pid = system.bacnet.enumerated.PropertyIdentifier.polarity

# The below writes all do the same thing:

polarity = system.bacnet.enumerated.Polarity.forId(1)
system.bacnet.writeRaw("bacnetDevice", ot, 1, pid, polarity)

# Integer codes are automatically coerced to the appropriate enumerated object
system.bacnet.writeRaw("bacnetDevice", ot, 1, pid, 1)

# Enumerated names are also automatically coerced (case-insensitive)
system.bacnet.writeRaw("bacnetDevice", ot, 1, pid, "reverse")
```

Writing to an Array Element

Writing CalendarEntry to index 5 of the DateList property of an index 0 Calendar object.

Example

```
from java.util import GregorianCalendar

ot = system.bacnet.enumerated.ObjectType.calendar
pid = system.bacnet.enumerated.PropertyIdentifier.dateList

gc = GregorianCalendar()
gc.setTime(system.date.now())
date = system.bacnet.primitive.Date(gc)
ce = system.bacnet.constructed.CalendarEntry(date)

system.bacnet.writeRaw(
    deviceName="bacnetDevice",
    objectType=ot,
    objectId=0,
    propertyId=pid,
    value=ce,
    propertyArrayIndex=5
)
```

system.bacnet.writeRawMultiple

New in 8.1.32

This function is used in **Python Scripting**.

Description

This function is the bulk version of **system.bacnet.writeRaw** by writing properties to objects provided equal-length lists of object types, object instance numbers, property IDs, values, priorities, and property array indices. The system.bacnet.writeRawMultiple() function will accept Encodable values on the value parameter.

> **NOTE**
>
> To use this function, the **BACnet** driver must be installed.

> **CAUTION**
>
> Please use caution when interacting directly with any BACnet device, as writing to an object may have unintended consequences and could result in data loss.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.writeRawMultiple(deviceName, objectTypes, objectIds, propertyIds, values, [priorities], [propertyArrayIndices])
```

Parameters

Type	Parameter	Description
String	`deviceName`	Name of the configured BACnet/IP device instance to write from.
ObjectType	`objectTypes`	A list of ObjectType(s) for the object instance being written to.
Integer	`objectIds`	A list of object instance numbers to write to.
PropertyIdentifier	`propertyIds`	A list of PropertyIdentifier(s) for the object instances being written to.
Object	`values`	A list of values to write.
Integer	`priorities` [optional]	An optional list of priority levels to use when writing to commandable properties. All elements must be in the range [1..16]. Defaults to 8 for all properties when this parameter is omitted.
Integer	`propertyArrayIndices` [optional]	An optional list of array indices corresponding to array properties being written. None should be specified as an element when writing to the entire array property or if the property is not an array. Defaults to a list of None when this parameter is omitted.

Returns

No return value.

Scope

Gateway

References

objectType Reference

Values for the **objectType** parameter that can be referenced at system.bacnet.enumerated.ObjectType.*

objectType reference

```
analogInput
analogOutput
analogValue
binaryInput
binaryOutput
binaryValue
calendar
command
device
eventEnrollment
file
group
loop
multiStateInput
multiStateOutput
notificationClass
program
schedule
averaging
multiStateValue
trendLog
lifeSafetyPoint
lifeSafetyZone
accumulator
pulseConverter
eventLog
globalGroup
trendLogMultiple
loadControl
structuredView
accessDoor
timer
accessCredential
accessPoint
accessRights
accessUser
accessZone
credentialDataInput
networkSecurity
bitstringValue
characterstringValue
datePatternValue
dateValue
datetimePatternValue
datetimeValue
integerValue
largeAnalogValue
octetstringValue
```

```
positiveIntegerValue
timePatternValue
timeValue
notificationForwarder
alertEnrollment
channel
lightingOutput
binaryLightingOutput
networkPort
elevatorGroup
escalator
lift
```

propertyId Reference

Values for the **propertyId** parameter that can be referenced at system.bacnet.enumerated.PropertyIdentifier.*

propertyId reference

```
ackedTransitions
ackRequired
action
actionText
activeText
activeVtSessions
alarmValue
alarmValues
all
allWritesSuccessful
apduSegmentTimeout
apduTimeout
applicationSoftwareVersion
archive
bias
changeOfStateCount
changeOfStateTime
notificationClass
controlledVariableReference
controlledVariableUnits
controlledVariableValue
covIncrement
dateList
daylightSavingsStatus
deadband
derivativeConstant
derivativeConstantUnits
description
descriptionOfHalt
deviceAddressBinding
deviceType
effectivePeriod
elapsedActiveTime
errorLimit
eventEnable
eventState
eventType
exceptionSchedule
faultValues
feedbackValue
fileAccessMethod
fileSize
fileType
firmwareRevision
highLimit
inactiveText
inProcess
instanceOf
```

```
integralConstant
integralConstantUnits
limitEnable
listOfGroupMembers
listOfObjectPropertyReferences
localDate
localTime
location
lowLimit
manipulatedVariableReference
maximumOutput
maxApduLengthAccepted
maxInfoFrames
maxMaster
maxPresValue
minimumOffTime
minimumOnTime
minimumOutput
minPresValue
modelName
modificationDate
notifyType
numberOfApduRetries
numberOfStates
objectIdentifier
objectList
objectName
objectPropertyReference
objectType
optional
outOfService
outputUnits
eventParameters
polarity
presentValue
priority
priorityArray
priorityForWriting
processIdentifier
programChange
programLocation
programState
proportionalConstant
proportionalConstantUnits
protocolObjectTypesSupported
protocolServicesSupported
protocolVersion
readOnly
reasonForHalt
```

```
recipientList
reliability
relinquishDefault
required
resolution
segmentationSupported
setpoint
setpointReference
stateText
statusFlags
systemStatus
timeDelay
timeOfActiveTimeReset
timeOfStateCountReset
timeSynchronizationRecipients
units
updateInterval
utcOffset
vendorIdentifier
vendorName
vtClassesSupported
weeklySchedule
attemptedSamples
averageValue
bufferSize
clientCovIncrement
covResubscriptionInterval
eventTimeStamps
logBuffer
logDeviceObjectProperty
enable
logInterval
maximumValue
minimumValue
notificationThreshold
protocolRevision
recordsSinceNotification
recordCount
startTime
stopTime
stopWhenFull
totalRecordCount
validSamples
windowInterval
windowSamples
maximumValueTimestamp
minimumValueTimestamp
varianceValue
activeCovSubscriptions
```

```
backupFailureTimeout
configurationFiles
databaseRevision
directReading
lastRestoreTime
maintenanceRequired
memberOf
mode
operationExpected
setting
silenced
trackingValue
zoneMembers
lifeSafetyAlarmValues
maxSegmentsAccepted
profileName
autoSlaveDiscovery
manualSlaveAddressBinding
slaveAddressBinding
slaveProxyEnable
lastNotifyRecord
scheduleDefault
acceptedModes
adjustValue
count
countBeforeChange
countChangeTime
covPeriod
inputReference
limitMonitoringInterval
loggingObject
loggingRecord
prescale
pulseRate
scale
scaleFactor
updateTime
valueBeforeChange
valueSet
valueChangeTime
alignIntervals
intervalOffset
lastRestartReason
loggingType
restartNotificationRecipients
timeOfDeviceRestart
timeSynchronizationInterval
trigger
utcTimeSynchronizationRecipients
```

```
nodeSubtype
nodeType
structuredObjectList
subordinateAnnotations
subordinateList
actualShedLevel
dutyWindow
expectedShedLevel
fullDutyBaseline
requestedShedLevel
shedDuration
shedLevelDescriptions
shedLevels
stateDescription
doorAlarmState
doorExtendedPulseTime
doorMembers
doorOpenTooLongTime
doorPulseTime
doorStatus
doorUnlockDelayTime
lockStatus
maskedAlarmValues
securedStatus
absenteeLimit
accessAlarmEvents
accessDoors
accessEvent
accessEventAuthenticationFactor
accessEventCredential
accessEventTime
accessTransactionEvents
accompaniment
accompanimentTime
activationTime
activeAuthenticationPolicy
assignedAccessRights
authenticationFactors
authenticationPolicyList
authenticationPolicyNames
authenticationStatus
authorizationMode
belongsTo
credentialDisable
credentialStatus
credentials
credentialsInZone
daysRemaining
entryPoints
```

```
exitPoints
expirationTime
extendedTimeEnable
failedAttemptEvents
failedAttempts
failedAttemptsTime
lastAccessEvent
lastAccessPoint
lastCredentialAdded
lastCredentialAddedTime
lastCredentialRemoved
lastCredentialRemovedTime
lastUseTime
lockout
lockoutRelinquishTime
maxFailedAttempts
members
musterPoint
negativeAccessRules
numberOfAuthenticationPolicies
occupancyCount
occupancyCountAdjust
occupancyCountEnable
occupancyLowerLimit
occupancyLowerLimitEnforced
occupancyState
occupancyUpperLimit
occupancyUpperLimitEnforced
passbackMode
passbackTimeout
positiveAccessRules
reasonForDisable
supportedFormats
supportedFormatClasses
threatAuthority
threatLevel
traceFlag
transactionNotificationClass
userExternalIdentifier
userInformationReference
userName
userType
usesRemaining
zoneFrom
zoneTo
accessEventTag
globalIdentifier
verificationTime
baseDeviceSecurityPolicy
```

```
distributionKeyRevision
doNotHide
keySets
lastKeyServer
networkAccessSecurityPolicies
packetReorderTime
securityPduTimeout
securityTimeWindow
supportedSecurityAlgorithms
updateKeySetTimeout
backupAndRestoreState
backupPreparationTime
restoreCompletionTime
restorePreparationTime
bitMask
bitText
isUtc
groupMembers
groupMemberNames
memberStatusFlags
requestedUpdateInterval
covuPeriod
covuRecipients
eventMessageTexts
eventMessageTextsConfig
eventDetectionEnable
eventAlgorithmInhibit
eventAlgorithmInhibitRef
timeDelayNormal
reliabilityEvaluationInhibit
faultParameters
faultType
localForwardingOnly
processIdentifierFilter
subscribedRecipients
portFilter
authorizationExemptions
allowGroupDelayInhibit
channelNumber
controlGroups
executionDelay
lastPriority
writeStatus
propertyList
serialNumber
blinkWarnEnable
defaultFadeTime
defaultRampRate
defaultStepIncrement
```

```
egressTime
inProgress
instantaneousPower
lightingCommand
lightingCommandDefaultPriority
maxActualValue
minActualValue
power
transition
egressActive
interfaceValue
faultHighLimit
faultLowLimit
lowDiffLimit
strikeCount
timeOfStrikeCountReset
defaultTimeout
initialTimeout
lastStateChange
stateChangeValues
timerRunning
timerState
apduLength
ipAddress
ipDefaultGateway
ipDhcpEnable
ipDhcpLeaseTime
ipDhcpLeaseTimeRemaining
ipDhcpServer
ipDnsServer
bacnetIpGlobalAddress
bacnetIpMode
bacnetIpMulticastAddress
bacnetIpNatTraversal
ipSubnetMask
bacnetIpUdpPort
bbmdAcceptFdRegistrations
bbmdBroadcastDistributionTable
bbmdForeignDeviceTable
changesPending
command
fdBbmdAddress
fdSubscriptionLifetime
linkSpeed
linkSpeeds
linkSpeedAutonegotiate
macAddress
networkInterfaceName
networkNumber
```

networkNumberQuality
networkType
routingTable
virtualMacAddressTable
commandTimeArray
currentCommandPriority
lastCommandTime
valueSource
valueSourceArray
bacnetIpv6Mode
ipv6Address
ipv6PrefixLength
bacnetIpv6UdpPort
ipv6DefaultGateway
bacnetIpv6MulticastAddress
ipv6DnsServer
ipv6AutoAddressingEnable
ipv6DhcpLeaseTime
ipv6DhcpLeaseTimeRemaining
ipv6DhcpServer
ipv6ZoneIndex
assignedLandingCalls
carAssignedDirection
carDoorCommand
carDoorStatus
carDoorText
carDoorZone
carDriveStatus
carLoad
carLoadUnits
carMode
carMovingDirection
carPosition
elevatorGroup
energyMeter
energyMeterRef
escalatorMode
faultSignals
floorText
groupId
groupMode
higherDeck
installationId
landingCalls
landingCallControl
landingDoorStatus
lowerDeck
machineRoomId
makingCarCall

```
nextStoppingFloor
operationDirection
passengerAlarm
powerMode
registeredCarCall
activeCovMultipleSubscriptions
protocolLevel
referencePort
deployedProfileLocation
profileLocation
tags
subordinateNodeTypes
subordinateTags
subordinateRelationships
defaultSubordinateRelationship
represents
```

Enums Reference

Enum objects which can be referenced at system.bacnet.enums.*

Enums reference

```
DayOfWeek
MaxApduLength
MaxSegments
Month
```

Code Examples

Writing with an Enumerated Property

```
### Writing with an enumerated property
### Note you can reference the id (int) or name (string) from
system.bacnet.enumerated import DoorAlarmState

ot1 = system.bacnet.enumerated.ObjectType.accessDoor
pid1 = system.bacnet.enumerated.PropertyIdentifier.maskedAlarmValues
```

Writing with Property Array Indices

```

```

```
from system.bacnet.constructed import NameValue
from system.bacnet.primitive import UnsignedInteger

ot1 = system.bacnet.enumerated.ObjectType.integerValue
pid1 = system.bacnet.enumerated.PropertyIdentifier.tags
v1 = NameValue('I am', UnsignedInteger(0))
v2 = NameValue('writing', UnsignedInteger(0))
v3 = NameValue('values', UnsignedInteger(0))

system.bacnet.writeRawMultiple(
    deviceName="bacnet_device_2",
    objectTypes= [ot1, ot1, ot1],
    objectIds= [1, 1, 1],
    propertyIds= [pid1, pid1, pid1],
    values= [v1, v2, v3],
    propertyArrayIndices= [1, 2, 3])
```

system.bacnet.writeWithPriority

This function is used in **Python Scripting**.

Description

Write to the Present_Value attribute of an object with a custom priority level.

> **NOTE**
>
> To use this function, the **BACnet** driver must be installed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.bacnet.writeWithPriority(deviceName, objectType, objectId, value, priority)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured BACnet/IP device instance to write from.
Integer	`objectType`	The numeric id of the objectType of the object instance being written to. See the objectType Reference table below.
Integer	`objectId`	The object instance number to write to.
Object	`value`	The value to write. Clearing a value can be accomplished by writing a None value.
Integer	`priority`	The priority level to write the value at. Must match a level in the standard BACnet priority array (a value from 1 to 16). See the Priority Reference table below.

Returns

Nothing

Scope

Gateway, Perspective Session

objectType Reference

Object	ID
Analog Output	1
Analog Value	2
Binary Output	4
Binary Value	5
Device	8
Large Analog Value	46
Multi-State Output	14
Multi-State Value	19

Priority Reference

Level	Application
1	Manual-Life Safety
2	Automatic-Life Safety
3	Available
4	Available
5	Critical Equipment Control
6	Minimum On/Off
7	Available
8	Manual Operator
9	Available
10	Available
11	Available
12	Available
13	Available
14	Available
15	Available
16	Available

Code Example

Example

```
# Write a value of 'True' to Binary Value 1 with a Priority of 7.

deviceName = 'BACnet Remote'
objectType = 5 # Binary Value
objectId = 1
value = True
priority = 7


system.bacnet.writeWithPriority(deviceName, objectType, objectId, value, priority)
```

system.dataset

Dataset Functions

The following functions give you access to view and interact with datasets.

addColumn

Takes a dataset and returns a new dataset with a new column added or inserted into it.

addRow

Takes a dataset and returns a new dataset with a new row added or inserted into it.

addRows

Takes a dataset and returns a new dataset with new rows added or inserted into it.

appendDataset

Takes two different datasets and returns a new dataset with the second dataset appended to the first.

clearDataset

Takes a dataset and returns a new dataset with all of the same column names, but all of the rows deleted.

dataSetToHTML

Formats the contents of a dataset as an HTML page, returning the results as a string.

deleteRow

Takes a dataset and returns a new dataset with a row removed.

deleteRows

Takes a dataset and returns a new dataset with one or more rows removed.

exportCSV

Exports the contents of a dataset as a CSV file, prompting the user to save the file to disk.

exportExcel

Exports the contents of a dataset as an Excel spreadsheet, prompting the user to save the file to disk.

exportHTML

Exports the contents of a dataset to an HTML page. Prompts the user to save the file to disk.

filterColumns

Takes a dataset and returns a view of the dataset containing only the columns found within the given list of colu…

formatDates

Returns a new dataset with Date columns as strings formatted according to the dateFormat specified.

fromCSV

Converts a dataset stored in a CSV formatted string to a dataset that can be immediately assignable to a dataset …

getColumnHeaders

Takes in a dataset and returns the headers as a python list.

setValue

Takes a dataset and returns a new dataset with one value altered.

sort

Sorts a dataset and returns the sorted dataset.

toCSV

Formats the contents of a dataset as CSV (comma separated values), returning the resulting CSV as a string.

toDataSet

This function is used to 1. Convert PyDataSets to DataSets 2. Create new datasets from raw Python lists. When cr…

toExcel

Formats the contents of one or more datasets as an Excel spreadsheet, returning the results as a byte array.

toPyDataSet

This function converts from a normal DataSet to a PyDataSet, which is a wrapper class which makes working wit…

updateRow

Takes a dataset and returns a new dataset with a one row altered.

Functions by Scope

Gateway >

Vision >

Perspective >

system.dataset.addColumn

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with a new column added or inserted into it. If the columnIndex argument is omitted, the column will be appended to the end of the dataset.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.addColumn(dataset, [colIndex], col, colName, colType)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Please be aware that this dataset will not actually be modified (datasets are immutable), but rather will be the starting point for creating a new dataset.
Integer	`colIndex`	The index (starting at 0) at which to insert the new column. Will throw an IndexError if less than zero or greater than the length of the dataset. If omitted, the new column will be appended to the end. [optional]
List[Any]	`col`	A Python sequence representing the data for the new column. Its length must equal the number of rows in the dataset.
String	`colName`	The name of the column.
Type	`colType`	The type of the of the column. The type can be a Python builtin type, such as str , int, float, or a Java class, such as java.util.Date.

Returns

Dataset - A new dataset with the new column inserted or appended.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# This example will work on a Button component on a Vision window, given two Vision bar charts with
# default values. The script takes the dataset from Bar Chart 1, adds a column of integers called
# Center Area to the end of the existing data, and displays the new dataset in Bar Chart 2.

ds1 = event.source.parent.getComponent('Bar Chart 1').data
colCount = ds1.getColumnCount()
columnName = "Center Area"
columnData = []
for i in range(ds1.getRowCount()):
 columnData.append(i* 10)

ds2 = system.dataset.addColumn(ds1, colCount, columnData, columnName, int)
event.source.parent.getComponent('Bar Chart 2').data = ds2
```

Code Snippet

```
# This example will update a dataset tag by prepending an index column
path = "[default]Dataset Tag"

dataset = system.tag.readBlocking([path])[0].value
length = dataset.getRowCount()
valueList = []

for i in range(length):
    valueList.append(i)

newDataset = system.dataset.addColumn(dataset, 0, valueList, "index", int)

system.tag.writeBlocking([path], [newDataset])
```

system.dataset.addRow

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with a new row added or inserted into it. If the rowIndex argument is omitted, the row will be appended to the end of the dataset.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.addRow(dataset, [rowIndex], row)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Please be aware that this dataset will not actually be modified (datasets are immutable), but rather will be the starting point for creating a new dataset.
Integer	`rowIndex`	The index (starting at 0) at which to insert the new row. Will throw an IndexError if less than zero or greater than the length of the dataset. If omitted, the new row will be appended to the end. [optional]
List[Any]	`row`	A Python list representing the data for the new row. Its length must equal the number of columns in the dataset.

Returns

Dataset - A new dataset with the new row inserted or appended.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example would add a new option to a Vision Dropdown List by adding a row to its underlying dataset.
# Notice how the last line assigns the return value of the addRow function to the dropdown's data property.

# This script should be on a button that is a sibling to a Dropdown List component named "Dropdown".
dropdown = event.source.parent.getComponent("Dropdown")
newRow = [5, "New Option"]
dropdown.data = system.dataset.addRow(dropdown.data, newRow)
```

Code Snippet

```
# This snippet would add a new option into a Dropdown component just like above, but at the beginning:
dropdown = event.source.parent.getComponent("Dropdown")
newRow = [5, "New Option"]
dropdown.data = system.dataset.addRow(dropdown.data, 0, newRow) # Note that rowIndex is passed in
```

system.dataset.addRows

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with new rows added or inserted into it. If the rowIndex argument is omitted, the rows will be appended to the end of the dataset.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.addRows(dataset, [rowIndex], rows)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Please be aware that this dataset will not actually be modified (datasets are immutable), but rather will be the starting point for creating a new dataset.
Integer	`rowIndex`	The index (starting at 0) at which to insert the new row. Will throw an IndexError if less than zero or greater than the length of the dataset. If omitted, the new row will be appended to the end. [optional]
List[Any]	`rows`	A Python sequence of sequences representing the data for the new rows. The length of each sequence must equal the number of columns in the dataset.

Returns

Dataset - A new dataset with the new rows inserted or appended.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example adds new options to a Vision Dropdown List by adding a row to its underlying dataset.
# Note that the last line assigns the return value of the addRows function to the dropdown's data property.

dropdown = event.source.parent.getComponent("Dropdown")
newRow = [[5, "New Option"], [6, "Another New Option"]]
dropdown.data = system.dataset.addRows(dropdown.data, newRow)
```

Code Snippet

```
# This snippet adds new options into a Dropdown component just like above, but at the beginning:

dropdown = event.source.parent.getComponent("Dropdown")
newRow = [[5, "New Option"], [6, "Another New Option"]]
dropdown.data = system.dataset.addRows(dropdown.data, 0, newRow)
```

system.dataset.appendDataset

This function is used in **Python Scripting**.

Description

Takes two different datasets and returns a new **dataset** with the second dataset appended to the first. Will throw an error if the number and types of columns do not match.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.appendDataset(dataset1, dataset2)
```

Parameters

Type	Parameter	Description
Dataset	`dataset1`	The dataset that will come first in the returned dataset.
Dataset	`dataset2`	The second dataset that will be appended to the end in the returned dataset.

Returns

Dataset - A new dataset that is a combination of the original two datasets.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example pulls in the datasets from two different Vision table components,
# combines them, then writes the results to a third table.
# The two source datasets must have the same number and types of columns.

data1 = event.source.parent.getComponent('Table 1').data
data2 = event.source.parent.getComponent('Table 2').data
comboData = system.dataset.appendDataset(data1, data2)
event.source.parent.getComponent('Table 3').data = comboData
```

Code Snippet

```
# This code takes datasets from two Vision Power Tables and appends them onto a
regular Table.
# Get dataset from first power table
dataset1 = event.source.parent.getComponent('Power Table 1').data

#get dataset from second power table
dataset2 = event.source.parent.getComponent('Power Table 2').data

#use system.dataset.appendDataset() to combine datasets
dataset3 = system.dataset.appendDataset(dataset1, dataset2)

#assign data to third table
event.source.parent.getComponent('Table').data = dataset3
```

system.dataset.clearDataset

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with all of the same column names and types, but no rows.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.clearDataset(dataset)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset.

Returns

Dataset - A new dataset with no rows.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example pulls in the dataset from a Vision Table component, clears it, then writes the empty dataset back to the table.

data = event.source.parent.getComponent('Table').data
event.source.parent.getComponent('Table').data = system.dataset.clearDataset(data)
```

system.dataset.dataSetToHTML

This function is used in **Python Scripting**.

Description

Formats the contents of a **dataset** as an HTML page, returning the results as a string. Uses the `<table>` element to create a data table page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.dataSetToHTML(showHeaders, dataset, title)
```

Parameters

Type	Parameter	Description
Boolean	`showHeaders`	If true, the HTML table will include a header row.
Dataset	`dataset`	The dataset to export.
String	`title`	The title for the HTML page.

Returns

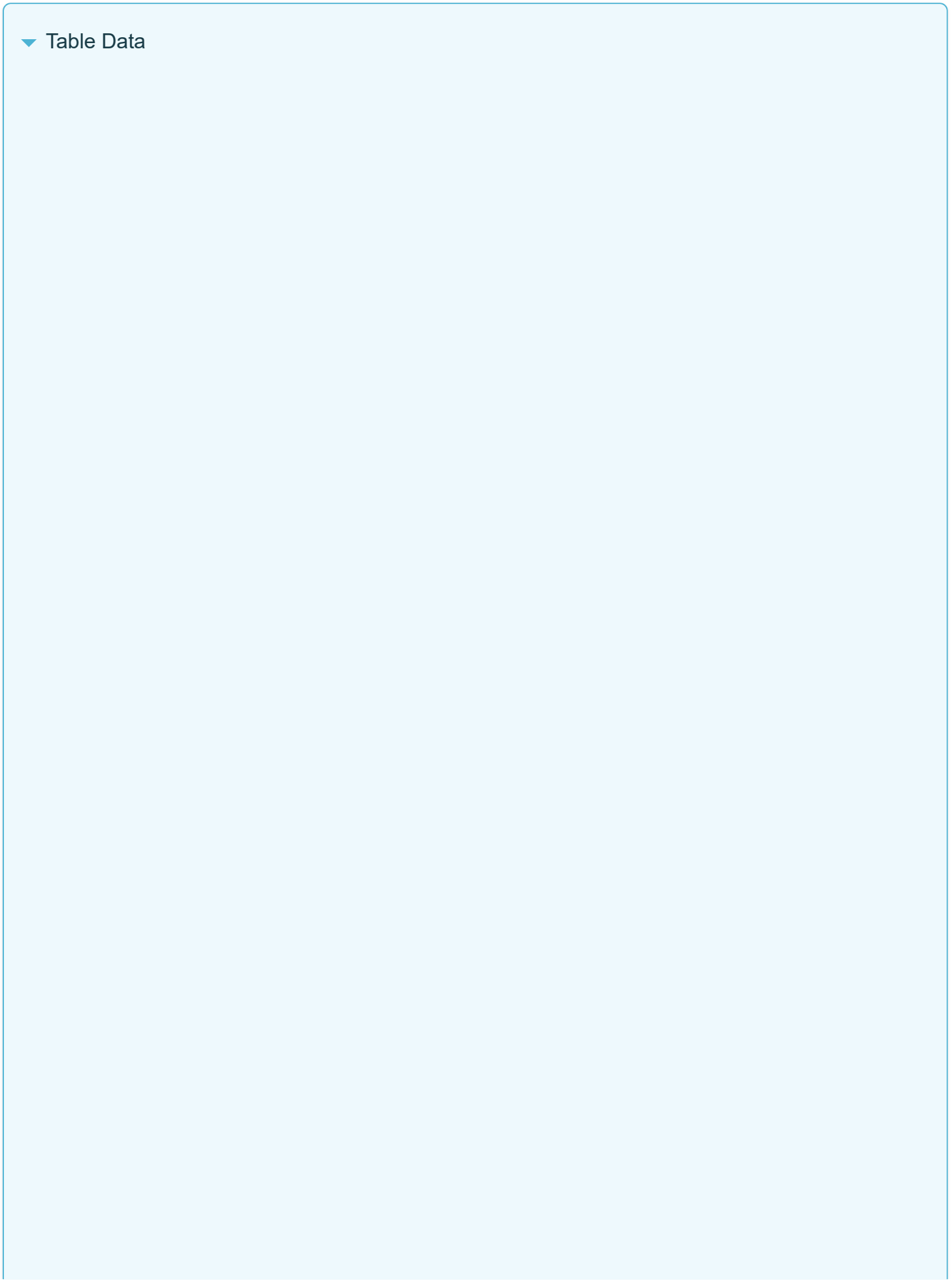
String - The HTML page as a string.

Scope

Gateway, Vision Client, Perspective Session

Example Output

Expand the panel below to see an example of the resulting HTML this function returns.



```
<HTML><HEAD><TITLE>Table Data</TITLE></HEAD>
<BODY>
<TABLE border='1'>
<TR>
    <TH>Col 1</TH>
    <TH>Col 2</TH>
    <TH>Col 3</TH>
</TR>
<TR>
    <TD align='right'>58</TD>
    <TD align='left'>Test Row 3</TD>
    <TD align='right'>27.524042612227795</TD>
</TR>
<TR>
    <TD align='right'>87</TD>
    <TD align='left'>Test Row 10</TD>
    <TD align='right'>43.48674729787205</TD>
</TR>
<TR>
    <TD align='right'>29</TD>
    <TD align='left'>Test Row 15</TD>
    <TD align='right'>82.46334440414927</TD>
</TR>
<TR>
```

```
    <TD align='right'>3</TD>

    <TD align='left'>Test Row 120</TD>

    <TD align='right'>15.07317567946509</TD>

</TR>



</TABLE>

</BODY></HTML>
```

Code Examples

Code Snippet

```python
# Get dataset from a Table component
dataset = event.source.parent.getComponent('Table').data

# Format dataset as HTML string
showHeaders = True
title = "Table Data"
html = system.dataset.dataSetToHTML(showHeaders, dataset, title)

# Choose filepath for output
filePath = "C:\\output\\results.html"

# Write the HTML to a file
system.file.writeFile(filePath, html)
```

Code Snippet

```
```

```
# This snippet would run a SQL query against a database, and turn the results into a string containing HTML. It then writes the string to a file on the local hard drive.

results = system.db.runNamedQuery("Fetch Records",{})
html = system.dataset.dataSetToHTML(1, results, "Production Report")
filePath = "C:\\output\\results.html"
system.file.writeFile(filePath, html)
```

system.dataset.deleteRow

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with the specified rowIndex removed.

> **NOTE**
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.deleteRow(dataset, rowIndex)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Please be aware that this dataset will not actually be modified (datasets are immutable), but rather will be the starting point for creating a new dataset.
Integer	`rowIndex`	The index (starting at 0) of the row to delete. Will throw an IndexError if out of bounds. The maximum bounds is defined by subtracting one from the number of rows in the dataset.

Returns

Dataset - A new dataset with the specified row removed.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example would remove the selected row from a Vision List component, by re-assigning the List's data property to the new dataset returned by the deleteRow function.

myList = event.source.parent.getComponent("List")
row = myList.selectedIndex
if row != -1: # make sure there is something selected
   myList.data = system.dataset.deleteRow(myList.data, row)
```

system.dataset.deleteRows

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with one or more rows removed.

> **NOTE**
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.deleteRows(dataset, rowIndices)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Please be aware that this dataset will not actually be modified (datasets are immutable), but rather will be the starting point for creating a new dataset.
List[Integer]	`rowIndices`	The indices (starting at 0) of the rows to delete. Will throw an IndexError if any element is less than zero or greater than the number of rows in the dataset - 1.

Returns

Dataset - A new dataset with the specified rows removed.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example would remove several rows from a Vision Table component, by re-assigning the Table's data property to the new dataset returned by the deleteRows function.

ds = event.source.parent.getComponent('Table').data
rows = [0,2,3,4]
ds = system.dataset.deleteRows(ds, rows)
event.source.parent.getComponent('Table').data = ds
```

system.dataset.exportCSV

This function is used in **Python Scripting**.

Description

Exports the contents of a **dataset** as a CSV file, prompting the user to save the file to disk. To write silently to a file, you cannot use the dataset.export* functions. Instead, use the **toCSV()** function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.exportCSV(filename, showHeaders, dataset)
```

Parameters

Type	Parameter	Description
String	`filename`	A suggested filename to save as.
Boolean	`showHeaders`	If true, the CSV file will include a header row.
Dataset	`dataset`	The dataset to export.

Returns

String - The path to the saved file, or None if the action was canceled by the user.

Scope

Vision Client

Code Examples

Code Snippet

```
# This snippet would prompt the user to save the data currently displayed in a
Table component to a CSV file, and would open the file (in an external program,
presumably Excel) after a successful save.

table = event.source.parent.getComponent("Table")
filePath = system.dataset.exportCSV("data.csv", 1, table.data)
if filePath != None:
    system.net.openURL("file:///"+filePath.replace('\\','/'))
```

system.dataset.exportExcel

This function is used in **Python Scripting**.

Description

Exports the contents of a **dataset** as an Excel spreadsheet, prompting the user to save the file to disk. Uses the same format as the **system.dataset.toExcel** function. To write silently to a file, you cannot use the dataset.export* functions. Instead, use the toExcel() function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.exportExcel(filename, showHeaders, dataset, [nullsEmpty])
```

Parameters

Type	Parameter	Description
String	`filename`	A suggested filename to save as.
Boolean	`showHeaders`	If true, the spreadsheet will include a header row.
Dataset / List[Dataset]	`dataset`	Either a single dataset, or a list of datasets. When passing a list, each element represents a single sheet in the resulting workbook.
Boolean	`nullsEmpty`	If True, the spreadsheet will leave cells with NULL values empty, instead of allowing Excel to provide a default value like 0. Defaults to False. [optional]

Returns

String - The path to the saved file, or None if the action was canceled by the user.

Scope

Vision Client

Code Examples

Code Snippet

```
# This snippet prompts the user to save the data currently displayed in a Table component to an Excel-compatible spreadsheet file. It opens the file after a successful save.

table = event.source.parent.getComponent("Table")
filePath = system.dataset.exportExcel("data.xlsx", 1, table.data)
if filePath != None:
   system.net.openURL("file://"+filePath)
```

system.dataset.exportHTML

This function is used in **Python Scripting**.

Description

Exports the contents of a **dataset** to an HTML page. Prompts the user to save the file to disk.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.exportHTML(filename, showHeaders, dataset, title)
```

Parameters

Type	Parameter	Description
String	`filename`	A suggested filename to save as.
Boolean	`showHeaders`	If true, the HTML table will include a header row.
Dataset / PyDataset	`dataset`	The dataset to export.
String	`title`	The title for the HTML page.

Returns

String - The path to the saved file, or None if the action was canceled by the user.

Scope

Vision Client

Code Examples

Code Snippet - Export Then Open

```
# This snippet prompts the user to save the data currently displayed in a Vision Table component to an HTML file, and opens the file in the default web  browser after a successful save.

table = event.source.parent.getComponent("Table")
filePath = system.dataset.exportHTML("data.html", 1, table.data, "Production Report")
if filePath != None:
   system.net.openURL("file://"+filePath)
```

system.dataset.filterColumns

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a view of the dataset containing only the columns found within the given list of columns.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.filterColumns(dataset, columns)
```

Parameters

Type	Parameter	Description
Dataset / PyDataset	`dataset`	The starting dataset.
List[Integer] / List[String]	`columns`	A list of columns to keep in the returned dataset. The columns may be in integer index form (starting at 0), or the name of the columns as strings. If a value passed to this parameter is not in a list, then an empty dataset will be returned.

Returns

Dataset - A new dataset containing the filtered columns. The order of columns in this dataset is determined by the column order provided to the columns parameter.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example takes the dataset from a two column Bar Chart and displays a subset
of the data in two separate tables.
# This is performed in a button component actionPerformed script.

chartData = event.source.parent.getComponent('Bar Chart').data

north = [0, 1] # Label and North Area columns (using column index)
south = ["Label", "South Area"] # Label and South Area columns (using column
names)

filteredData = system.dataset.filterColumns(chartData, north)
event.source.parent.getComponent('NorthTable').data = filteredData

filteredData = system.dataset.filterColumns(chartData, south)
event.source.parent.getComponent('SouthTable').data = filteredData
```

system.dataset.formatDates

This function is used in **Python Scripting**.

Description

Returns a new **dataset** replacing date typed columns with string typed columns. The new columns will match the formatting specified by the dateFormat parameter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.formatDates( dataset, dateFormat, [locale] )
```

Parameters

Type	Parameter	Description
Dataset / PyDataset	`dataset`	The starting dataset to format.
String	`dateFormat`	A valid Java DateFormat string, representing how the date should be formatted. For example: "yyyy-MM-dd HH:mm:ss". Refer to **Data Type Formatting Reference** for more information on the valid characters.
Locale	`locale`	The Locale to use for formatting. The Locale parameter accepts any valid Java Locale object, which can be found **here**. The Java Locale class must be imported, and the Locale must be defined in all caps. See the second example below for an idea of how that works. If no locale is provided, the system's locale will be used. [optional]

Returns

Dataset - A new dataset, containing the formatted dates.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example takes the dataset from a Vision Table component and formats the
dates to look like Fri, Jan 22, 2018.
# Reference the table's existing dataset
data = event.source.parent.getComponent('Table').data

# Apply formatting, and store the results in a new variable
formattedData = system.dataset.formatDates(data, "EEE, MMM d, yyyy")

# Write back to the table
event.source.parent.getComponent('Table').data = formattedData
```

Code Snippet

```
# This example formats the date similarly to the last example, but uses the
Italian Locale, which causes the dates to be formatted with the Locale.

from java.util import Locale

data = event.source.parent.getComponent('Table').data
locale = Locale.ITALY
formattedDataFr = system.dataset.formatDates(data, "yyyy-MM-dd HH:mm:ss", locale)

# Write back to the table
event.source.parent.getComponent('Table').data = formattedDataFr
```

system.dataset.fromCSV

This function is used in **Python Scripting**.

Description

Converts a **dataset** stored in a CSV formatted string to a dataset that can be immediately assignable to a dataset property in your project. Usually this is used in conjunction with **system.file.readFileAsString** when reading in a CSV file that was exported using **system.dataset.toCSV**.

The CSV string must be formatted in a specific way:

```
#NAMES
Col 1,Col 2,Col 3
#TYPES
I,str,D
#ROWS,6
44,Test Row 2,1.8713151369491254
86,Test Row 3,97.4913421614675
0,Test Row 8,20.39722542161364
78,Test Row 9,34.57127071614745
20,Test Row 10,76.41114659745085
21,Test Row 13,13.880548366871926
```

The first line must be #NAMES.

The second line must list the names of the columns of the dataset separated by commas.

The third line must be #TYPES.

The fourth line must list the type of each column of the dataset in order, separated by commas.

Data Type	Alias
byte.class	`byt`
short.class	`s`
int.class	`i`
long.class	`l`
float.class	`f`
double.class	`d`
bool.class	`b`
Byte.class	`Byt`
Short.class	`S`
Integer.class	`I`
Long.class	`L`
Float.class	`F`
Double.class	`D`
Boolean.class	`B`
Object.class	`O`
Color.class	`clr`
Date.class	`date`
Cursor.class	`cur`
Dimension.class	`dim`
Rectangle.class	`rect`

Data Type	Alias
Point.class	`pt`
String.class	`str`
Border.class	`border`

The fifth line must be #ROWS followed by a comma and then the number of rows of data (i.e. #ROWS, 6).

The following lines will be your data, each column value separated by a comma; each row on a separate line. The number of rows must match what was specified on line 5.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.fromCSV( csv )
```

Parameters

Type	Parameter	Description
String	`csv`	A string holding a CSV dataset in the format outlined above.

Returns

Dataset - A new dataset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example assumes the CSV file being read was a dataset exported
# using system.dataset.toCSV with the forExport flag set to True

# Specify file path.
file_path = "C:\\my_dataset.csv"
# Read in the file as a string.
data_string = system.file.readFileAsString(file_path)
# Convert the string to a dataset and store in a variable.
data = system.dataset.fromCSV(data_string)
# Assign the dataset to a table.
event.source.parent.getComponent('Table').data = data
```

system.dataset.getColumnHeaders

This function is used in **Python Scripting**.

Description

Takes in a **dataset** and returns the headers as a Python list.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.getColumnHeaders(dataset)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The input dataset.

Returns

List - A list of column header strings.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example fetches the dataset from a Vision table, and prints the table
headers as a list.
# Fetch data from table component.
data = event.source.parent.getComponent('Table').data
# Print dataset headers.
print system.dataset.getColumnHeaders(data)
```

Code Snippet

```
# Fetch data from Power Table component.
data = event.source.parent.getComponent('Power Table').data

# Print dataset headers.
print system.dataset.getColumnHeaders(data)

# Convert list to a string
listAsString = ' '.join(system.dataset.getColumnHeaders(data))

# Print list as string
print listAsString

# Do something useful, such as write the string to a label component
event.source.parent.getComponent('Label').text = listAsString
```

system.dataset.setValue

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with one value altered.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - columnName

```
system.dataset.setValue(dataset, rowIndex, columnName, value)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Will not be modified (datasets are immutable), but acts as the basis for the returned dataset.
Integer	`rowIndex`	The index of the row to set the value at (starting at 0).
String	`columnName`	The name of the column to set the value at. Case insensitive.
Any	`value`	The new value for the specified row/column.

Returns

Dataset - A new dataset, with the new value set at the given location.

Scope

Gateway, Vision Client, Perspective Session

Syntax - columnIndex

```
system.dataset.setValue(dataset, rowIndex, columnIndex, value)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Will not be modified (datasets are immutable), but acts as the basis for the returned dataset.
Integer	`rowIndex`	The index of the row to set the value at (starting at 0).
Integer	`columnIndex`	The index of the column to set the value at (starting at 0)
Any	`value`	The new value for the specified row/column.

Returns

Dataset - A new dataset, with the new value set at the given location.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# This snippet demonstrates how to take an initial dataset, set a new value on a
new dataset, and then write back to the source of the initial dataset.
# In this case we're using a Table component from the Vision module.
# Fetch a reference to an existing dataset.
table = event.source.parent.getComponent("Table")

# Make a new dataset with an updated value
newData = system.dataset.setValue(table.data, 3, "lname", 7)

# Repalce the table's dataset with our new dataset
table.data = newData
```

Code Snippet

```
# This snippet could be used for a Vision Button's actionPerformed event to change
the selected cell's value in a Table component to zero.
# Fetch table reference
table = event.source.parent.getComponent("Table")

# Fetch selected row and column
selRow = table.getSelectedRow()
selCol = table.getSelectedColumn()

# If row and column have been selected, update value in table to 0.
if selRow != -1 and selCol != -1:
   newData = system.dataset.setValue(table.data, selRow, selCol, 0.0)
   table.data = newData
```

system.dataset.sort

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a sorted version of the dataset. The sort order is determined by a single column. This works on numeric, as well as alphanumeric columns. When sorting alphanumerically, contiguous numbers are treated as a single number: you may recognize this as a "natural sort".

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Alphanumeric Sort

The table below represents an example of how alphanumeric values are sorted by the function. **Raw Column Values** represents the initial set of values in a column. The Sorted columns show how the function sorts in **Ascending** and **Descending** order.

Raw Column Values	Sorted - Ascending	Sorted - Descending
a1	a1	Z3
a22	A1	z3
Z3	a4	a77z99
z3	a7z9	a77z4
a4	a22	a22
a77z4	a77z4	a7z9
a77z99	a77z99	a4
a7z9	Z3	a1
A1	z3	A1

Natural Ordering

The naturalOrdering parameter allows the function to sort using either a natural ordering, or an alphabetical ordering.

Raw Column Values	Natural Ordering - Ascending	Alphabetical Ordering - Ascending
a11	a1	a1
a2	a2	a11
a1	a11	a2

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.dataset.sort(dataset, keyColumn [, ascending, naturalOrdering])`

Parameters

Type	Parameter	Description
Dataset	`dataset`	The dataset to sort.
Integer / String	`keyColumn`	The index of the column to sort on.
Boolean	`ascending`	True for ascending order, False for descending order. If omitted, ascending order will be used. [optional]
Boolean	`naturalOrdering`	True for natural ordering, False for alphabetical ordering. Ignored if the sort column is a directly sortable data type. If omitted, defaults to True (natural ordering). [optional]

Returns

Dataset - A new sorted dataset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Sorting a Dataset in a Vision Table Component

```
# This code will take the data in a Vision Table component, sort it based on the
column with index 1,
# and then reinsert the sorted data into the same Table.

data = event.source.parent.getComponent('Table').data
newData = system.dataset.sort(data, 1)
event.source.parent.getComponent('Table').data = newData
```

Code Snippet - Initializing and Sorting a Dataset by Column Name

```
# This code will create a dataset in scripting, and then sort it based on the name
of one of the columns.
# It then inserts the sorted dataset into a table component.

# Initialize column headers and empty data list
headers = ["City", "Population", "Timezone", "GMTOffset"]
data = []
# Add rows, one by one, into data list
data.append(["New York", 8363710, "EST", -5])
data.append(["Los Angeles", 3833995, "PST", -8])
data.append(["Chicago", 2853114, "CST", -6])
data.append(["Houston", 2242193, "CST", -6])
data.append(["Phoenix", 1567924, "MST", -7])
# Convert headers and data lists into dataset
cities = system.dataset.toDataSet(headers, data)
# Sort the resulting dataset by city name
newData = system.dataset.sort(cities, "City")
# Write final dataset to a table
event.source.parent.getComponent('Table').data = newData
```

system.dataset.toCSV

This function is used in **Python Scripting**.

Description

Formats the contents of a **dataset** as CSV (comma separated values), returning the resulting CSV as a string. If the "forExport" flag is set, then the format will be appropriate for parsing using the **system.dataset.fromCSV** function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.toCSV(dataset, showHeaders, forExport, localized)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The dataset to export to CSV.
Boolean	`showHeaders`	If set to true, a header row will be present in the CSV. Default is true.
Boolean	`forExport`	If set to true, extra header information will be present in the CSV data which is necessary for the CSV to be compatible with the fromCSV method. Overrides showHeaders. Default is false.
Boolean	`localized`	If set to true, the string representations of the values in the CSV data will be localized. Default is false.

Returns

String - The CSV data as a string.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This snippet runs a SQL query against a database and turns the results into a
CSV string. It would
# then store the resulting CSV to a file on the local hard drive.

results = system.db.runNamedQuery("Fetch Records",{})
csv = system.dataset.toCSV(dataset = results, showHeaders = True, forExport =
False)
filePath = "C:\\output\\results.csv"
system.file.writeFile(filePath, csv)
```

system.dataset.toDataSet

This function is used in **Python Scripting**.

Description

This function is used to convert a PyDataset to a dataset. In addition it can also create new datasets from a raw Python list. When creating a new dataset, headers should have unique names. For more information on datasets and PyDatasets, see the **Datasets** page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Convert PyDataset

```
system.dataset.toDataSet(dataset)
```

Parameters

Type	Parameter	Description
PyDataset	`dataset`	A PyDataset object to convert.

Returns

Dataset - The newly created dataset.

Scope

Gateway, Vision Client, Perspective Session

Syntax - Create from list

`system.dataset.toDataSet(headers, data)`

Parameters

Type	Parameter	Description
List[String]	`headers`	The column names for the dataset to create.
List[Any]	`data`	A list of rows for the new dataset. Each row must have the same length as the headers list, and each value in a column must be the same type.

Returns

Dataset - The newly created dataset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Create a simple dataset

```
# This example create a single column dataset.
header = ['myColumn']
rows = [[1], [2]]
dataset = system.dataset.toDataSet(header, rows)
```

Code Snippet - Converting Database Query Results into a Dataset

```
# This second example shows how this function can be used to convert from a
PyDataSet
# (which is what system.db.runQuery returns) to a normal DataSet, which is the
data type
# of a Table component's data property.

pyDataSet = system.db.runQuery("SELECT * FROM example1 LIMIT 100")
table = event.source.parent.getComponent("Table")
normalDataSet = system.dataset.toDataSet(pyDataSet)
table.data = normalDataSet
```

system.dataset.toExcel

This function is used in **Python Scripting**.

Description

Formats the contents of one or more **datasets** as an Excel spreadsheet, returning the results as a byte array. Each dataset specified will be added as a worksheet in the Excel workbook.

This function replaces the deprecated **system.dataset.dataSetToExcel** function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.toExcel(showHeaders, dataset, [nullsEmpty], [sheetNames])
```

Parameters

Type	Parameter	Description
Boolean	`showHeaders`	If True, the spreadsheet will include a header row. If False, the header row will be omitted.
List[Dataset]	`dataset`	A sequence of one or more datasets, one for each sheet in the resulting workbook.
Boolean	`nullsEmpty`	If True, the spreadsheet will leave cells with NULL values empty, instead of allowing Excel to provide a default value like 0. Defaults to False. [optional]
List[String]	`sheetNames`	Expects a list of strings, where each string is a name for one of the datasets. When used, there must be an equal number of string names in sheetName as there are datasets in the dataset parameter. Names provided in this parameter may be sanitized into acceptable Excel sheet names. [optional]

Returns

Array - A byte array representing an Excel workbook.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# This snippet would run a SQL query against a database, and turn the results into
a string that is XML that Excel can open.
# It then writes the string to a file on the local hard drive.

results = system.db.runNamedQuery("Fetch Records",{})
spreadsheet = system.dataset.toExcel(True, [results])
filePath = "C:\\output\\results.xlsx"
system.file.writeFile(filePath, spreadsheet)
```

system.dataset.toPyDataSet

This function is used in **Python Scripting**.

Description

This function converts from a normal **dataset** to a PyDataset, which is a wrapper class which makes working with datasets more Python-esque. For more information on datasets and PyDatasets, see the **Datasets** page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.toPyDataSet(dataset)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	A dataset object to convert into a PyDataset.

Returns

PyDataset - The newly created PyDataset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Summing Values in a Column

```
# This example script would be added to a button that is in the same container as
the table you are working with.
# It grabs the data of the Table component, and adds up the values in the first
column, displaying the result to the user.

# Get a Table component's data.
table = event.source.parent.getComponent("Table")
data = system.dataset.toPyDataSet(table.data)

# Loop through the data, summing the Value column.
value = 0.0
for row in data:
   value += row[0]

# Show the user the sum of the Value column.
system.gui.messageBox("The value is: %f" % value)
```

system.dataset.updateRow

This function is used in **Python Scripting**.

Description

Takes a **dataset** and returns a new dataset with a one row altered. To alter the row, this function takes a Python dictionary to represent the changes to make to the specified row. The keys in the dictionary are used to find the columns to alter.

> **NOTE**
>
> Datasets are immutable, which means they cannot be directly modified once created. Instead, this scripting function returns a new dataset with some modification applied, which must be assigned to a variable to be used. See **Altering a Dataset**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dataset.updateRow(dataset, rowIndex, changes)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	The starting dataset. Will not be modified (datasets are immutable), but acts as the basis for the returned dataset.
Integer	`rowIndex`	The index of the row to update (starting at 0).
Dictionary[String, Any]	`changes`	A dictionary of changes to make. The keys in the dictionary should match column names in the dataset, and their values will be used to update the row.

Returns

Dataset - A new dataset with the values at the specified row updated according to the values in the dictionary.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example could be used to dynamically change the data that an Easy Chart
displays.
# In this simple example, we assume that the chart is always configured to display
a single tank's level.
# This script updates the pen being displayed using a dynamic tank number.

# Generate new tag name and tag path.
tankNumber = 5
newName = "Tank %d Level" % tankNumber
newPath = "Tanks/Tank %d/Level" % tankNumber

# Consolidate changes into a dictionary.
updates = {"NAME": newName, "TAG_PATH":newPath}

# Update the Easy Chart.
chart = event.source.parent.getComponent("Easy Chart")
newPens = system.dataset.updateRow(chart.tagPens, 0, updates)
chart.tagPens = newPens
```

system.date

Date Functions

The following functions give you access to test and modify dates.

*Between

Calculates the amount of time between two dates.

add*

Add or subtract an amount of time to a given date.

format

Returns the given date as a string and formatted according to a pattern.

fromMillis

Creates a date object given a millisecond value

get*

Extracts a unit of time from a date.

getDate

Creates a new Date object given a year, month and a day.

getTimezone

Returns the ID of the current timezone.

getTimezoneOffset

Returns the current timezone's offset versus UTC for a given instant, taking Daylight Savings Time into account.

getTimezoneRawOffset

Returns the current timezone offset versus UTC, not taking daylight savings into account.

isAfter

Compares two dates to see if date_1 is after date_2.

isBefore

Compares two dates to see if date_1 is before date_2.

isBetween

Compares two dates to see if a target date is between two other dates.

isDaylightTime

Checks to see if the current timezone is using daylight savings time during the date specified.

midnight

Returns a copy of a date with the hour, minute, second, and millisecond fields set to zero.

now

Returns a java.util.Date object that represents the current time according to the local system clock.

parse

Attempts to parse a string and create a Date.

setTime

Takes in a date, and returns a copy of it with the time fields set as specified.

toMillis

Converts a Date object to its millisecond value elapsed since January 1, 1970, 00:00:00 UTC (GMT)

Functions by Scope

Gateway >

Vision >

Perspective >

system.date.*Between

This function is used in **Python Scripting**.

Description

This function is a set of functions that include:

Function	Description
system.date.millisBetween	Calculates the number of whole milliseconds between two dates.
system.date.secondsBetween	Calculates the number of whole seconds between two dates.
system.date.minutesBetween	Calculates the number of whole minutes between two dates.
system.date.hoursBetween	Calculates the number of whole hours between two dates.
system.date.daysBetween	Calculates the number of whole days between two dates. Daylight savings changes are taken into account.
system.date.weeksBetween	Calculates the number of whole weeks between two dates.
system.date.monthsBetween	Calculates the number of whole months between two dates. Daylight savings changes are taken into account.
system.date.yearsBetween	Calculates the number of whole years between two dates. Daylight savings changes are taken into account.

Order matters when passing in the two dates required by this function. system.date.*Between will subtract the first date from the second date, meaning if date 2 is further in time than date 1, then a positive amount of time has passed. If date 2 is backwards in time from date 1, then a negative amount of time has passed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.date.*Between(date_1, date_2)`

Parameters

Type	Parameter	Description
Date	`date_1`	The first date to use.
Date	`date_2`	The second date to use.

Returns

Integer - An integer that is representative of the difference between two dates.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example would grab the current time, and add 119 minutes to it, then
calculate the number
# of hours between the two dates.

first = system.date.now()
second = system.date.addMinutes(first, 119)
print system.date.hoursBetween(first, second) # This would print 1 since it is
only 1 whole hour.
```

Example #2

```

```

```
# This example would create two date objects, one on the 28th of May,
# and one on the 22nd of April, both in 2020. Because the second date is
# before the first date, a negative number will be returned.

first = system.date.getDate(2020, 4, 28)
second = system.date.getDate(2020, 3, 22)
print system.date.daysBetween(first, second) # This will print -36
```

Example #3

```
# This example can be placed on the action performed event of a button.
# It will then grab the week difference of two calendar components,
# and enter the value returned into a numeric text field.

first = event.source.parent.getComponent('Start Date Calendar').date
second = event.source.parent.getComponent('End Date Calendar').date
event.source.parent.getComponent('Numeric Text Field').intValue =
system.date.weeksBetween(first, second)
```

system.date.add*

This function is used in **Python Scripting**.

Description

This function is a set of functions that include:

Function	Description
system.date.addMillis	Add or subtract an amount of milliseconds to a given date and time.
system.date.addSeconds	Add or subtract an amount of seconds to a given date and time.
system.date.addMinutes	Add or subtract an amount of minutes to a given date and time.
system.date.addHours	Add or subtract an amount of hours to a given date and time.
system.date.addDays	Add or subtract an amount of days to a given date and time.
system.date.addWeeks	Add or subtract an amount of weeks to a given date and time.
system.date.addMonths	Add or subtract an amount of months to a given date and time. This function is unique since each month can have a variable number of days. For example, if the date passed in is March 31st, and we add one month, April does not have a 31st day, so the returned date will be the proper number of months rounded down to the closest available day, in this case April 30th.
system.date.addYears	Add or subtract an amount of years to a given date and time.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.date.add*(date, value)`

Parameters

Type	Parameter	Description
Date	`date`	The starting date.
Integer	`value`	The number of units to add or subtract. Positive values will add specified units, and negative values will subtracts specified units.

Returns

Date - A new date object offset by the integer passed to the function.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example adds two days to the date passed in.

today = system.date.now()
twoDaysFromToday = system.date.addDays(today, 2)
```

Example #2

```
# This example subtracts 20 minutes from the date object created.
# Notice that although our original date starts at midnight,
# so subtracting 20 minutes puts it at the previous day.

# Set your date as Thu Jun 25 00:00:00 PDT 2020
date = system.date.getDate(2020, 5, 25)

# Print the date adjustment of 20 minutes prior: Wed Jun 24 23:40:00 PDT 2020
print system.date.addMinutes(date, -20)
```

Example #3

```
# This example works as a property change script of a Vision Calendar component.
# It sets a second Calendar component two weeks in advance of the first Calendar
component.
if event.propertyName == "date":
    date = event.newValue
    event.source.parent.getComponent('End Date Calendar').date =
system.date.addWeeks(date, 2)
```

system.date.format

This function is used in **Python Scripting**.

Description

Returns the given date as a string and formatted according to a pattern. The pattern is a format that is full of various placeholders that display different parts of the date. These are case-sensitive. These placeholders can be repeated for a different effect. For example, M will give you 1-12, MM will give you 01-12, MMM will give you Jan-Dec, MMMM will give you January-December.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.format(date, format)
```

Parameters

Type	Parameter	Description
Date	`date`	The date to format.
String	`format`	A format string such as "yyyy-MM-dd HH:mm:ss". The format argument is optional. The default is "yyyy-MM-dd HH:mm:ss". Refer to **Data Type Formatting Reference** for a table of acceptable symbols.

Returns

String - A string representing the formatted datetime.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example would format the current date to look like "01/01/01"

today = system.date.now()
print system.date.format(today, "yy/MM/dd")
#This printed 16/04/01
```

Example #2

```
# This example would format the current date to look like "2001-01-31 16:59:59"
# This is a standard format that all databases recognize.

today = system.date.now()
print system.date.format(today, "yyyy-MM-dd HH:mm:ss")
```

system.date.fromMillis

This function is used in **Python Scripting**.

Description

Creates a date object given a millisecond value.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.fromMillis(millis)
```

Parameters

Type	Parameter	Description
Long	`millis`	The number of milliseconds elapsed since January 1, 1970, 00:00:00 UTC (GMT)

Returns

Date - A new date object

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will print out the date "Fri Aug 18 14:35:25 PDT 2017"
print system.date.fromMillis(1503092125000)
```

system.date.get*

This function is used in **Python Scripting**.

Description

This function is a set of functions that include:

Function	Description
system.date.getMillis	Extracts the milliseconds from a date, ranging from 0-999.
system.date.getSecond	Extracts the second from a date, ranging from 0-59.
system.date.getMinute	Extracts the minutes from a date, ranging from 0-59.
system.date.getHour12	Extracts the hour from a date. Uses a 12 hour clock, so noon and midnight are returned as 0.
system.date.getHour24	Extracts the hour from a date. Uses a 24 hour clock, so midnight is zero.
system.date.getDayOfWeek	Extracts the day of the week from a date. Sunday is day 1, Saturday is day 7.
system.date.getDayOfMonth	Extracts the day of the month from a date. The first day of the month is day 1.
system.date.getDayOfYear	Extracts the day of the year from a date. The first day of the year is day 1.
system.date.getMonth	Extracts the month from a date, where January is month 0.
system.date.getQuarter	Extracts the quarter from a date, ranging from 1-4.
system.date.getYear	Extracts the year from a date.
system.date.getAMorPM	Returns a 0 if the time is before noon, and a 1 if the time is after noon.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.date.get*(date)`

Parameters

Type	Parameter	Description
Date	`date`	The date to use.

Returns

Integer - An integer that is representative of the extracted value.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example would grab the current time, and print the current month.

date = system.date.now()
print system.date.getMonth(date) #This would print the current month.
```

Example #2

```
# This example would create a date object, and print out the quarter of that date.

date = system.date.getDate(2017, 3, 15) #This would print "Mon April 15 00:00:00
PDT 2016"
print system.date.getQuarter(date) #This will print 2
```

Example #3

```
# This example can be placed on the action performed event of a button.
# It will then grab the day of the week of the calendar component,
# and enter the value returned into a numeric text field.

date = event.source.parent.getComponent('Calendar').date
event.source.parent.getComponent('Numeric Text Field').intValue =
system.date.getDayOfWeek(date)
```

system.date.getDate

This function is used in **Python Scripting**.

Description

Creates a new Date object given a year, month and a day. The time will be set to midnight of that day.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.getDate(year, month, day)
```

Parameters

Type	Parameter	Description
Integer	`year`	The year for the new date.
Integer	`month`	The month of the new date. January is month 0.
Integer	`day`	The day of the month for the new date. The first day of the month is day 1.

Returns

Date - A new date, set to midnight of that day.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will create a new date object set to January 1st, 2017.

date = system.date.getDate(2017, 0, 1)
print date
```

system.date.getTimezone

This function is used in **Python Scripting**.

Description

Returns the ID of the current timezone.

If your Client and Gateway are in different time zones, the returned value will be dependent on where this script is run. IE: in a button on a client will return the Client time zone. On a Gateway script (including Perspective scripts), the function will return the Gateway time zone.

<details>
<summary>List of timezones</summary>

*This list is subject to change depending on the exact version of java that is installed.

- Africa/Abidjan
- Africa/Accra
- Africa/Addis_Ababa
- Africa/Algiers
- Africa/Asmara
- Africa/Asmera
- Africa/Bamako
- Africa/Bangui
- Africa/Banjul
- Africa/Bissau
- Africa/Blantyre
- Africa/Brazzaville
- Africa/Bujumbura
- Africa/Cairo
- Africa/Casablanca
- Africa/Ceuta
- Africa/Conakry
- Africa/Dakar
- Africa/Dar_es_Salaam
</details>

- Africa/Djibouti
- Africa/Douala
- Africa/El_Aaiun
- Africa/Freetown
- Africa/Gaborone
- Africa/Harare
- Africa/Johannesburg
- Africa/Juba
- Africa/Kampala
- Africa/Khartoum
- Africa/Kigali
- Africa/Kinshasa
- Africa/Lagos
- Africa/Libreville
- Africa/Lome
- Africa/Luanda
- Africa/Lubumbashi
- Africa/Lusaka
- Africa/Malabo
- Africa/Maputo
- Africa/Maseru
- Africa/Mbabane
- Africa/Mogadishu
- Africa/Monrovia
- Africa/Nairobi
- Africa/Ndjamena
- Africa/Niamey
- Africa/Nouakchott
- Africa/Ouagadougou
- Africa/Porto-Novo
- Africa/Sao_Tome
- Africa/Timbuktu
- Africa/Tripoli
- Africa/Tunis
- Africa/Windhoek

- America/Adak
- America/Anchorage
- America/Anguilla
- America/Antigua
- America/Araguaina
- America/Argentina/Buenos_Aires
- America/Argentina/Catamarca
- America/Argentina/ComodRivadavia
- America/Argentina/Cordoba
- America/Argentina/Jujuy
- America/Argentina/La_Rioja
- America/Argentina/Mendoza
- America/Argentina/Rio_Gallegos
- America/Argentina/Salta
- America/Argentina/San_Juan
- America/Argentina/San_Luis
- America/Argentina/Tucuman
- America/Argentina/Ushuaia
- America/Aruba
- America/Asuncion
- America/Atikokan
- America/Atka
- America/Bahia
- America/Bahia_Banderas
- America/Barbados
- America/Belem
- America/Belize
- America/Blanc-Sablon
- America/Boa_Vista
- America/Bogota
- America/Boise
- America/Buenos_Aires
- America/Cambridge_Bay
- America/Campo_Grande
- America/Cancun

- America/Caracas
- America/Catamarca
- America/Cayenne
- America/Cayman
- America/Chicago
- America/Chihuahua
- America/Coral_Harbour
- America/Cordoba
- America/Costa_Rica
- America/Creston
- America/Cuiaba
- America/Curacao
- America/Danmarkshavn
- America/Dawson
- America/Dawson_Creek
- America/Denver
- America/Detroit
- America/Dominica
- America/Edmonton
- America/Eirunepe
- America/El_Salvador
- America/Ensenada
- America/Fort_Wayne
- America/Fortaleza
- America/Glace_Bay
- America/Godthab
- America/Goose_Bay
- America/Grand_Turk
- America/Grenada
- America/Guadeloupe
- America/Guatemala
- America/Guayaquil
- America/Guyana
- America/Halifax
- America/Havana

- America/Hermosillo
- America/Indiana/Indianapolis
- America/Indiana/Knox
- America/Indiana/Marengo
- America/Indiana/Petersburg
- America/Indiana/Tell_City
- America/Indiana/Vevay
- America/Indiana/Vincennes
- America/Indiana/Winamac
- America/Indianapolis
- America/Inuvik
- America/Iqaluit
- America/Jamaica
- America/Jujuy
- America/Juneau
- America/Kentucky/Louisville
- America/Kentucky/Monticello
- America/Knox_IN
- America/Kralendijk
- America/La_Paz
- America/Lima
- America/Los_Angeles
- America/Louisville
- America/Lower_Princes
- America/Maceio
- America/Managua
- America/Manaus
- America/Marigot
- America/Martinique
- America/Matamoros
- America/Mazatlan
- America/Mendoza
- America/Menominee
- America/Merida
- America/Metlakatla

- America/Mexico_City
- America/Miquelon
- America/Moncton
- America/Monterrey
- America/Montevideo
- America/Montreal
- America/Montserrat
- America/Nassau
- America/New_York
- America/Nipigon
- America/Nome
- America/Noronha
- America/North_Dakota/Beulah
- America/North_Dakota/Center
- America/North_Dakota/New_Salem
- America/Ojinaga
- America/Panama
- America/Pangnirtung
- America/Paramaribo
- America/Phoenix
- America/Port-au-Prince
- America/Port_of_Spain
- America/Porto_Acre
- America/Porto_Velho
- America/Puerto_Rico
- America/Rainy_River
- America/Rankin_Inlet
- America/Recife
- America/Regina
- America/Resolute
- America/Rio_Branco
- America/Rosario
- America/Santa_Isabel
- America/Santarem
- America/Santiago

- America/Santo_Domingo
- America/Sao_Paulo
- America/Scoresbysund
- America/Shiprock
- America/Sitka
- America/St_Barthelemy
- America/St_Johns
- America/St_Kitts
- America/St_Lucia
- America/St_Thomas
- America/St_Vincent
- America/Swift_Current
- America/Tegucigalpa
- America/Thule
- America/Thunder_Bay
- America/Tijuana
- America/Toronto
- America/Tortola
- America/Vancouver
- America/Virgin
- America/Whitehorse
- America/Winnipeg
- America/Yakutat
- America/Yellowknife
- Antarctica/Casey
- Antarctica/Davis
- Antarctica/DumontDUrville
- Antarctica/Macquarie
- Antarctica/Mawson
- Antarctica/McMurdo
- Antarctica/Palmer
- Antarctica/Rothera
- Antarctica/South_Pole
- Antarctica/Syowa
- Antarctica/Troll

- Antarctica/Vostok
- Arctic/Longyearbyen
- Asia/Aden
- Asia/Almaty
- Asia/Amman
- Asia/Anadyr
- Asia/Aqtau
- Asia/Aqtobe
- Asia/Ashgabat
- Asia/Ashkhabad
- Asia/Baghdad
- Asia/Bahrain
- Asia/Baku
- Asia/Bangkok
- Asia/Beirut
- Asia/Bishkek
- Asia/Brunei
- Asia/Calcutta
- Asia/Chita
- Asia/Choibalsan
- Asia/Chongqing
- Asia/Chungking
- Asia/Colombo
- Asia/Dacca
- Asia/Damascus
- Asia/Dhaka
- Asia/Dili
- Asia/Dubai
- Asia/Dushanbe
- Asia/Gaza
- Asia/Harbin
- Asia/Hebron
- Asia/Ho_Chi_Minh
- Asia/Hong_Kong
- Asia/Hovd

- Asia/Irkutsk
- Asia/Istanbul
- Asia/Jakarta
- Asia/Jayapura
- Asia/Jerusalem
- Asia/Kabul
- Asia/Kamchatka
- Asia/Karachi
- Asia/Kashgar
- Asia/Kathmandu
- Asia/Katmandu
- Asia/Khandyga
- Asia/Kolkata
- Asia/Krasnoyarsk
- Asia/Kuala_Lumpur
- Asia/Kuching
- Asia/Kuwait
- Asia/Macao
- Asia/Macau
- Asia/Magadan
- Asia/Makassar
- Asia/Manila
- Asia/Muscat
- Asia/Nicosia
- Asia/Novokuznetsk
- Asia/Novosibirsk
- Asia/Omsk
- Asia/Oral
- Asia/Phnom_Penh
- Asia/Pontianak
- Asia/Pyongyang
- Asia/Qatar
- Asia/Qyzylorda
- Asia/Rangoon
- Asia/Riyadh

- Asia/Saigon
- Asia/Sakhalin
- Asia/Samarkand
- Asia/Seoul
- Asia/Shanghai
- Asia/Singapore
- Asia/Srednekolymsk
- Asia/Taipei
- Asia/Tashkent
- Asia/Tbilisi
- Asia/Tehran
- Asia/Tel_Aviv
- Asia/Thimbu
- Asia/Thimphu
- Asia/Tokyo
- Asia/Ujung_Pandang
- Asia/Ulaanbaatar
- Asia/Ulan_Bator
- Asia/Urumqi
- Asia/Ust-Nera
- Asia/Vientiane
- Asia/Vladivostok
- Asia/Yakutsk
- Asia/Yekaterinburg
- Asia/Yerevan
- Atlantic/Azores
- Atlantic/Bermuda
- Atlantic/Canary
- Atlantic/Cape_Verde
- Atlantic/Faeroe
- Atlantic/Faroe
- Atlantic/Jan_Mayen
- Atlantic/Madeira
- Atlantic/Reykjavik
- Atlantic/South_Georgia

- Atlantic/St_Helena
- Atlantic/Stanley
- Australia/ACT
- Australia/Adelaide
- Australia/Brisbane
- Australia/Broken_Hill
- Australia/Canberra
- Australia/Currie
- Australia/Darwin
- Australia/Eucla
- Australia/Hobart
- Australia/LHI
- Australia/Lindeman
- Australia/Lord_Howe
- Australia/Melbourne
- Australia/NSW
- Australia/North
- Australia/Perth
- Australia/Queensland
- Australia/South
- Australia/Sydney
- Australia/Tasmania
- Australia/Victoria
- Australia/West
- Australia/Yancowinna
- Brazil/Acre
- Brazil/DeNoronha
- Brazil/East
- Brazil/West
- CET
- CST6CDT
- Canada/Atlantic
- Canada/Central
- Canada/East-Saskatchewan
- Canada/Eastern

- Canada/Mountain
- Canada/Newfoundland
- Canada/Pacific
- Canada/Saskatchewan
- Canada/Yukon
- Chile/Continental
- Chile/EasterIsland
- Cuba
- EET
- EST5EDT
- Egypt
- Eire
- Etc/GMT
- Etc/GMT+0
- Etc/GMT+1
- Etc/GMT+10
- Etc/GMT+11
- Etc/GMT+12
- Etc/GMT+2
- Etc/GMT+3
- Etc/GMT+4
- Etc/GMT+5
- Etc/GMT+6
- Etc/GMT+7
- Etc/GMT+8
- Etc/GMT+9
- Etc/GMT-0
- Etc/GMT-1
- Etc/GMT-10
- Etc/GMT-11
- Etc/GMT-12
- Etc/GMT-13
- Etc/GMT-14
- Etc/GMT-2
- Etc/GMT-3

- Etc/GMT-4
- Etc/GMT-5
- Etc/GMT-6
- Etc/GMT-7
- Etc/GMT-8
- Etc/GMT-9
- Etc/GMT0
- Etc/Greenwich
- Etc/UCT
- Etc/UTC
- Etc/Universal
- Etc/Zulu
- Europe/Amsterdam
- Europe/Andorra
- Europe/Athens
- Europe/Belfast
- Europe/Belgrade
- Europe/Berlin
- Europe/Bratislava
- Europe/Brussels
- Europe/Bucharest
- Europe/Budapest
- Europe/Busingen
- Europe/Chisinau
- Europe/Copenhagen
- Europe/Dublin
- Europe/Gibraltar
- Europe/Guernsey
- Europe/Helsinki
- Europe/Isle_of_Man
- Europe/Istanbul
- Europe/Jersey
- Europe/Kaliningrad
- Europe/Kiev
- Europe/Lisbon

- Europe/Ljubljana
- Europe/London
- Europe/Luxembourg
- Europe/Madrid
- Europe/Malta
- Europe/Mariehamn
- Europe/Minsk
- Europe/Monaco
- Europe/Moscow
- Europe/Nicosia
- Europe/Oslo
- Europe/Paris
- Europe/Podgorica
- Europe/Prague
- Europe/Riga
- Europe/Rome
- Europe/Samara
- Europe/San_Marino
- Europe/Sarajevo
- Europe/Simferopol
- Europe/Skopje
- Europe/Sofia
- Europe/Stockholm
- Europe/Tallinn
- Europe/Tirane
- Europe/Tiraspol
- Europe/Uzhgorod
- Europe/Vaduz
- Europe/Vatican
- Europe/Vienna
- Europe/Vilnius
- Europe/Volgograd
- Europe/Warsaw
- Europe/Zagreb
- Europe/Zaporozhye

- Europe/Zurich
- GB
- GB-Eire
- GMT
- GMT0
- Greenwich
- Hongkong
- Iceland
- Indian/Antananarivo
- Indian/Chagos
- Indian/Christmas
- Indian/Cocos
- Indian/Comoro
- Indian/Kerguelen
- Indian/Mahe
- Indian/Maldives
- Indian/Mauritius
- Indian/Mayotte
- Indian/Reunion
- Iran
- Israel
- Jamaica
- Japan
- Kwajalein
- Libya
- MET
- MST7MDT
- Mexico/BajaNorte
- Mexico/BajaSur
- Mexico/General
- NZ
- NZ-CHAT
- Navajo
- PRC
- PST8PDT

- Pacific/Apia
- Pacific/Auckland
- Pacific/Bougainville
- Pacific/Chatham
- Pacific/Chuuk
- Pacific/Easter
- Pacific/Efate
- Pacific/Enderbury
- Pacific/Fakaofo
- Pacific/Fiji
- Pacific/Funafuti
- Pacific/Galapagos
- Pacific/Gambier
- Pacific/Guadalcanal
- Pacific/Guam
- Pacific/Honolulu
- Pacific/Johnston
- Pacific/Kiritimati
- Pacific/Kosrae
- Pacific/Kwajalein
- Pacific/Majuro
- Pacific/Marquesas
- Pacific/Midway
- Pacific/Nauru
- Pacific/Niue
- Pacific/Norfolk
- Pacific/Noumea
- Pacific/Pago_Pago
- Pacific/Palau
- Pacific/Pitcairn
- Pacific/Pohnpei
- Pacific/Ponape
- Pacific/Port_Moresby
- Pacific/Rarotonga
- Pacific/Saipan

- Pacific/Samoa
- Pacific/Tahiti
- Pacific/Tarawa
- Pacific/Tongatapu
- Pacific/Truk
- Pacific/Wake
- Pacific/Wallis
- Pacific/Yap
- Poland
- Portugal
- ROK
- Singapore
- SystemV/AST4
- SystemV/AST4ADT
- SystemV/CST6
- SystemV/CST6CDT
- SystemV/EST5
- SystemV/EST5EDT
- SystemV/HST10
- SystemV/MST7
- SystemV/MST7MDT
- SystemV/PST8
- SystemV/PST8PDT
- SystemV/YST9
- SystemV/YST9YDT
- Turkey
- UCT
- US/Alaska
- US/Aleutian
- US/Arizona
- US/Central
- US/East-Indiana
- US/Eastern
- US/Hawaii
- US/Indiana-Starke

- US/Michigan
- US/Mountain
- US/Pacific
- US/Pacific-New
- US/Samoa
- UTC
- Universal
- W-SU
- WET
- Zulu
- EST
- HST
- MST
- ACT
- AET
- AGT
- ART
- AST
- BET
- BST
- CAT
- CNT
- CST
- CTT
- EAT
- ECT
- IET
- IST

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.date.getTimezone()`

Parameters

Nothing

Returns

String - A representation of the current time zone.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will print out your current Timezone.

print system.date.getTimezone()
```

system.date.getTimezoneOffset

This function is used in **Python Scripting**.

Description

Returns the current timezone's offset versus UTC for a given instant, taking Daylight Savings Time into account.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.getTimezoneOffset([date])
```

Parameters

Type	Parameter	Description
Date	`date`	The instant in time for which to calculate the offset. Uses now() if omitted. [optional]

Returns

Double - The timezone offset compared to UTC, in hours.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will give the time zone offset using the date February 22, 2021
# and the computers current time zone.

date = system.date.getDate(2021, 1, 22)
print system.date.getTimezoneOffset(date) # returns -8.0 (if you are in Pacific
Daylight Time)
```

system.date.getTimezoneRawOffset

This function is used in **Python Scripting**.

Description

Returns the current timezone offset versus UTC, not taking daylight savings into account.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.getTimezoneRawOffset()
```

Parameters

Nothing

Returns

Double - The timezone offset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# This example will give the Raw timezone offset (ignoring daylight savings) for the computers current timezone.

print system.date.getTimezoneRawOffset() # returns -8.0 (if you are in the Pacific Timezone)
```

system.date.isAfter

This function is used in **Python Scripting**.

Description

Compares two dates to see if date_1 is after date_2.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.isAfter(date_1, date_2)
```

Parameters

Type	Parameter	Description
Date	`date_1`	The first date.
Date	`date_2`	The second date.

Returns

Boolean - True if date_1 is after date_2, false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
#This will compare if the first date is after the second date, which it is.

first = system.date.getDate(2018, 4, 28)
second = system.date.getDate(2018, 3, 22)
print system.date.isAfter(first, second) #Will print true.
```

system.date.isBefore

This function is used in **Python Scripting**.

Description

Compares two dates to see if date_1 is before date_2.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.isBefore(date_1, date_2)
```

Parameters

Type	Parameter	Description
Date	`date_1`	The first date.
Date	`date_2`	The second date.

Returns

Boolean - True if date_1 is before date_2, false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This will compare if the first date is before the second date, which it is not.

first = system.date.getDate(2018, 4, 28)
second = system.date.getDate(2018, 3, 22)
print system.date.isBefore(first, second) #Will print false.
```

system.date.isBetween

This function is used in **Python Scripting**.

Description

Compares two dates to see if a target date is between two other dates; checks to see if the target date is between the other two dates.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.isBetween(target_date, start_date, end_date)
```

Parameters

Type	Parameter	Description
Date	`target_date`	The date to compare.
Date	`start_date`	The start of a date range.
Date	`end_date`	The end of a date range. This date must be after the start date.

Returns

Boolean - True if target_date is >= start_date and target_date <= end_date, false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Coding Examples

Code Snippet

```
# This will compare if the first date is between the other dates, which it is not.
# Note that if the end date is before the start date, this function will always
return False

target = system.date.getDate(2017, 4, 28)
start = system.date.getDate(2017, 3, 22)
end = system.date.getDate(2017, 4, 22)
print system.date.isBetween(target, start, end) #Will print false.
```

system.date.isDaylightTime

This function is used in **Python Scripting**.

Description

Checks to see if the current timezone is using daylight savings time during the date specified.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.isDaylightTime([date])
```

Parameters

Type	Parameter	Description
Date	`date`	The date you want to check if the current timezone is observing daylight savings time. Uses now() if omitted. [optional]

Returns

Boolean - True if date is observing daylight savings time in the current timezone; false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
date = system.date.getDate(2018, 6, 28)
print system.date.isDaylightTime(date) #Will print True in the US Pacific time
zone.
```

system.date.midnight

This function is used in **Python Scripting**.

Description

Returns a copy of a date with the hour, minute, second, and millisecond fields set to zero.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.midnight(date)
```

Parameters

Type	Parameter	Description
Date	`date`	The starting date.

Returns

Date - A new date, set to midnight of the day provided

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example prints out the current date with the time set to midnight.

date = system.date.now()
print system.date.midnight(date)
```

system.date.now

This function is used in **Python Scripting**.

Description

Returns a java.util.Date object that represents the current time according to the local system clock.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.now()
```

Parameters

Nothing

Returns

Date - A new date, set to the current date and time.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will set a calendar component to the current date and time.

event.source.parent.getComponent('Calendar').date = system.date.now()
```

system.date.parse

This function is used in **Python Scripting**.

Description

Attempts to parse a string and create a Date. Causes ParseException if the date dateString parameter is in an unrecognized format.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.parse(dateString, [formatString], [locale])
```

Parameters

Type	Parameter	Description
String	`dateString`	The string to parse into a date.
String	`formatString`	Format string used by the parser. Default is "yyyy-MM-dd HH:mm:ss" Refer to **Data Type Formatting Reference**. [optional]
Object	`locale`	Locale used for parsing. Can be the locale name such as 'fr', or the Java Locale such as 'Locale.French'. Default is 'Locale.English'. Refer to **Java Locale**. [optional]

Returns

Date - The parsed date.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will return a date object set to the given date and time, May 28th, 1992 at 4:22am.
print system.date.parse('May 28, 1992 4:22', 'MMMM dd, yyyy hh:mm')
```

Code Snippet - Using the Locale Parameter

```
# This example demonstrates the locale parameter to parse a French date
print system.date.parse("juillet 15, 2015 10:32:15", "MMMM dd, yyyy hh:mm:ss", "fr")
```

Code Snippet - Using the Java Locale

```
# This example demonstrates using the Java Locale. If using the Java Locale, then you must import from the Locale class. The following example parses a German date.
from java.util import Locale
print system.date.parse('21-Februar-2017 04:22:00', 'dd-MMMM-yyyy HH:mm:ss', Locale.GERMAN)
```

system.date.setTime

This function is used in **Python Scripting**.

Description

Takes in a date, and returns a copy of it with the time fields set as specified.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.setTime(date, hour, minute, second)
```

Parameters

Type	Parameter	Description
Date	`date`	The starting date.
Integer	`hour`	The hours (0-23) to set.
Integer	`minute`	The minutes (0-59) to set.
Integer	`second`	The seconds (0-59) to set.

Returns

Date - A new date, set to the appropriate time.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will set the date object to the current date with the time set to 01:37 in the morning and 44 seconds.

date = system.date.getDate(2018, 6, 29) #getDate is zero based, so a month parameter of 6 will return July.
print system.date.setTime(date, 1, 37, 44) #This will print Sun July 29 01:37:44 PDT 2018
```

system.date.toMillis

This function is used in **Python Scripting**.

Description

Converts a Date object to its millisecond value elapsed since January 1, 1970, 00:00:00 UTC (GMT)

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.date.toMillis(date)
```

Parameters

Type	Parameter	Description
Date	`date`	The date object to convert.

Returns

Integer - an 8-byte integer representing the number of millisecond elapsed since January 1, 1970, 00:00:00 UTC (GMT)

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example takes the date Fri Aug 18 14:35:25 PDT 2017,
# and prints it out 1503092125000.

date = system.date.getDate(2017, 7, 18)
datetime = system.date.setTime(date, 14, 35, 25)
print system.date.toMillis(datetime)
```

system.db

Database Functions

The following functions give you access to view and modify data in the database.

addDatasource

Adds a new database connection in Ignition.

beginNamedQueryTransaction

Begins a new database named query transaction.

beginTransaction

Begins a new database transaction.

clearAllNamedQueryCaches

This clears the caches of all Named Queries in a project.

clearNamedQueryCache

This clears the cache of a Named Query.

closeTransaction

Closes the transaction with the given ID.

commitTransaction

Performs a commit for the given transaction.

createSProcCall

Creates an SProcCall object, which is a stored procedure call context.

dateFormat

This function is used to format Dates nicely as strings.

execSProcCall

Executes a stored procedure call.

getConnectionInfo

Returns a dataset of information about a single database connection, as specified by the name argument.

getConnections

Returns a dataset of information about each configured database connection. Each row represents a single conn…

refresh

This function will programmatically cause a SQL Query or DB Browse property binding to execute immediately.

removeDatasource

Removes a database connection from Ignition.

rollbackTransaction

Performs a rollback on the given connection.

runNamedQuery

Runs a named query and returns the results.

runPrepQuery

Runs a prepared statement against the database, returning the results in a PyDataSet.

runPrepUpdate

Runs a prepared statement against the database, returning the number of rows that were affected.

runQuery

Runs a SQL query, usually a SELECT query, against a database, returning the results as a dataset.

runScalarPrepQuery

Runs a prepared statement against a database connection just like the runPrepQuery function, but only returns t…

runScalarQuery

Runs a query against a database connection just like the runQuery function, but only returns the value from the fi…

runSFNamedQuery

Runs a named query through the store and forward system and to multiple datasources at the same time.

runSFPrepUpdate

Runs a prepared statement query through the store and forward system and to multiple datasources at the same …

runSFUpdateQuery

Runs a query through the store and forward system and to multiple datasources at the same time.

runUpdateQuery

Runs a query against a database connection, returning the number of rows affected.

setDatasourceConnectURL

Changes the connect URL for a given database connection.

setDatasourceEnabled

Enables/disables a given database connection.

setDatasourceMaxConnections

Sets the Max Active and Max Idle parameters of a given database connection.

Functions by Scope

Gateway >

Vision >

Perspective >

Constants

The following constants are available for system.db functions. See the **system.db.beginTransaction** and **system.db.createSProcCall** pages for more details.

- system.db.READ_UNCOMMITTED
- system.db.READ_COMMITTED
- system.db.REPEATABLE_READ
- system.db.SERIALIZABLE
- system.db.ORACLE_CURSOR
- system.db.DISTINCT
- system.db.STRUCT
- system.db.REF
- system.db.JAVA_OBJECT
- system.db.SQLXML

- system.db.ARRAY
- system.db.DATALINK
- system.db.OTHER
- system.db.BIT
- system.db.REAL
- system.db.LONGVARCHAR
- system.db.LONGVARBINARY
- system.db.TINYINT
- system.db.DOUBLE
- system.db.DATE
- system.db.NULL
- system.db.SMALLINT
- system.db.NUMERIC
- system.db.TIME
- system.db.ROWID
- system.db.INTEGER
- system.db.DECIMAL
- system.db.TIMESTAMP
- system.db.CLOB
- system.db.BIGINT
- system.db.CHAR
- system.db.BINARY
- system.db.NCLOB
- system.db.FLOAT
- system.db.VARCHAR
- system.db.VARBINARY
- system.db.BLOB
- system.db.NCHAR
- system.db.NVARCHAR
- system.db.LONGNVARCHAR
- system.db.BOOLEAN

system.db.addDatasource

This function is used in **Python Scripting**.

Description

Adds a new database connection in Ignition.

Client Permission Restrictions

Permission Type: Datasource Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.addDatasource(jdbcDriver, name, description, [connectUrl], [username], [password], [props], [validationQuery], [maxConnections])
```

Parameters

Type	Parameter	Description
String	`jdbcDriver`	The name of the JDBC driver configuration to use. Available options are based off the JDBC driver configurations on the the Gateway.
String	`name`	The datasource name.
String	`description`	Description of the datasource. [optional]
String	`connectUrl`	Default is the connect URL for JDBC driver. [optional]
String	`username`	Username to login to the datasource with. [optional]
String	`password`	Password for the login. [optional]
String	`props`	The extra connection parameters. [optional]
String	`validationQuery`	Default is the validation query for the JDBC driver. [optional]
Integer	`maxConnections`	Default is 8. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Adding a MySQL Database to a Gateway

```
```

```
system.db.addDatasource(jdbcDriver="myJDBCDriver", name="NewDatabase",
connectURL="jdbc:mysql://localhost:3306/test", username="root",
password="password", props="zeroDateTimeBehavior=convertToNull;")
```

system.db.beginNamedQueryTransaction

This function is used in **Python Scripting**.

Description

Begins a new database transaction using **Named Queries**. Database transactions are used to execute multiple queries in an atomic fashion. After executing queries, you must either commit the transaction to have your changes take effect or rollback the transaction, which will make all operations since the last commit not take place. The transaction is given a new unique string code, which is then returned. You can then use this code as the tx argument for other **system.db**.* function calls to execute various types of queries using this transaction.

An open transaction consumes one database connection until it is closed. Because leaving connections open indefinitely would exhaust the connection pool, each transaction is given a timeout. Each time the transaction is used, the timeout timer is reset. For example, if you make a transaction with a timeout of one minute, you must complete that transaction within a minute. If a transaction is detected to have timed out, it will be automatically closed and its transaction id will no longer be valid.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Vision

```
system.db.beginNamedQueryTransaction([database], [isolationLevel], [timeout])
```

Parameters

Type	Parameter	Description
String	`database`	The name of the database connection to create a transaction in. If omitted, uses the project's default connection.
Integer	`isolationLevel`	The transaction isolation level to use. Use one of the four constants: `system.db.READ_COMMITTED`, `system.db.READ_UNCOMMITTED`, `system.db.REPEATABLE_READ`, or `system.db.SERIALIZABLE`. If omitted, uses `system.db.READ_COMMITTED`. [optional]
Integer	`timeout`	The amount of time, in milliseconds, that this connection is allowed to remain open without being used. Timeout counter is reset any time a query or call is executed against the transaction, or when committed or rolled-back. If omitted, defaults to 30,000. [optional]

Returns

String - The new transaction ID. You'll use this ID as the "tx" argument for all other calls to have them execute against this transaction.

Scope

Vision Client

Syntax - Perspective and Gateway

```
system.db.beginNamedQueryTransaction(project, database, [isolationLevel], [timeout])
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project that contains the named query.
String	`database`	The name of the database connection to create a transaction in.
Integer	`isolationLevel`	The transaction isolation level to use. Use one of the four constants: system.db.READ_COMMITTED, system.db.READ_UNCOMMITTED, system.db.REPEATABLE_READ, or system.db.SERIALIZABLE. If omitted, uses system.db.READ_COMMITTED. [optional]
Integer	`timeout`	The amount of time, in milliseconds, that this connection is allowed to remain open without being used. Timeout counter is reset any time a query or call is executed against the transaction, or when committed or rolled-back. If omitted, defaults to 30,000. [optional]

Returns

String - The new transaction ID. You'll use this ID as the "tx" argument for all other calls to have them execute against this transaction.

Scope

Gateway, Perspective Session

Isolation Level Values

The following table lists each value of the isolationLevel parameter and its associated level. Either the integer value or constant may be passed. Note that some JDBC drivers only support some levels, so the driver's documentation should be consulted. Isolation levels are well documented online, but the following link is a great starting point: **Data Concurrency and Consistency**

Isolation Level	Int Value	Constant
Read Uncommitted	1	system.db.READ_UNCOMMITTED
Read Committed	2	system.db.READ_COMMITTED
Repeatable Read	4	system.db.REPEATABLE_READ
Serializable	8	system.db.SERIALIZABLE

Code Examples

Code Snippet - Running Named Query Using Named Query Transactions

```
# This example starts a transaction and checks a screen to see if the transaction
should be completed or reversed (rolled back).
# The example assumes you have several components on screen, including a Checkbox
and two input components, and a Named Query that takes in an ID and a string
value.

# Get details from the screen: Numeric Text Field, Text Field, Checkbox
idEntry = event.source.parent.getComponent('ID Field').intValue
valueEntry = event.source.parent.getComponent('Value Field').text
shouldRollback = event.source.parent.getComponent('CheckBox').selected

# Begin the transaction.
datasource = "MYSQL"
isolationLevel = system.db.READ_COMMITTED
timeout = 60000
txNumber = system.db.beginNamedQueryTransaction(datasource, isolationLevel,
timeout)

# Start by running a Named Query against the transaction.
namedQueryPath = "InsertQueries/AddValues"
params = {"id":idEntry, "value":valueEntry}
system.db.runNamedQuery(namedQueryPath, params, txNumber)

# Check the window to see if the user selected to cancel the transaction.
if shouldRollback:
    # cancel the transaction
    system.db.rollbackTransaction(txNumber)
    print "Transaction rolled back"
else:
    # complete the transaction
    system.db.commitTransaction(txNumber)
    print "Transaction committed"

# Close the transaction now that we are done.
system.db.closeTransaction(txNumber)
```

system.db.beginTransaction

This function is used in **Python Scripting**.

Description

Begins a new database transaction for using run* and runPrep* queries. Database transactions are used to execute multiple queries in an atomic fashion. After executing queries, you must either commit the transaction to have your changes take effect, or rollback the transaction which will make all operations since the last commit not take place. The transaction is given a new unique string code, which is then returned. You can then use this code as the tx argument for other system.db.* function calls to execute various types of queries using this transaction.

An open transaction consumes one database connection until it is closed. Because leaving connections open indefinitely would exhaust the connection pool, each transaction is given a timeout. Each time the transaction is used, the timeout timer is reset. For example, if you make a transaction with a timeout of one minute, you must use that transaction at least once a minute. If a transaction is detected to have timed out, it will be automatically closed and its transaction id will no longer be valid.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.beginTransaction(database, isolationLevel, timeout)
```

Parameters

Type	Parameter	Description
String	`database`	The name of the database connection to create a transaction in.
Integer	`isolationLevel`	The transaction isolation level to use. Use one of the four constants: • system.db.READ_COMMITTED • system.db.READ_UNCOMMITTED • system.db.REPEATABLE_READ • system.db.SERIALIZABLE
Long	`timeout`	The amount of time, in milliseconds, that this connection is allowed to remain open without being used. Timeout counter is reset any time a query or call is executed against the transaction, or when committed or rolled-back.

Returns

String - The new transaction ID. You'll use this ID as the "tx" argument for all other calls to have them execute against this transaction.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.beginTransaction(database, isolationLevel, timeout)
```

Parameters

Type	Parameter	Description
String	`database`	The name of the database connection to create a transaction in. Use "" for the project's default connection.
Integer/Constant	`isolationLevel`	The transaction isolation level to use. Use one of the four constants: • system.db.READ_COMMITTED • system.db.READ_UNCOMMITTED • system.db.REPEATABLE_READ • system.db.SERIALIZABLE
Long	`timeout`	The amount of time, in milliseconds, that this connection is allowed to remain open without being used. Timeout counter is reset any time a query or call is executed against the transaction, or when committed or rolled-back.

Returns

String - The new transaction ID. You'll use this ID as the "tx" argument for all other calls to have them execute against this transaction.

Scope

Vision Client, Perspective Session

Isolation Level Values

The following table lists each value of the isolationLevel parameter and its associated level. Either the integer value or constant may be passed. Note that some JDBC drivers only support some levels, so the driver's documentation should be consulted. Isolation levels are well documented online, but the following link is a great starting point: **Data Concurrency and Consistency**

Isolation Level	Int Value	Constant
Read Uncommitted	1	system.db.READ_UNCOMMITTED
Read Committed	2	system.db.READ_COMMITTED
Repeatable Read	4	system.db.REPEATABLE_READ
Serializable	8	system.db.SERIALIZABLE

Code Examples

Code Snippet - Running a Query Using Query Transactions

```
# This example starts a transaction with a 5 second timeout against the project's
default database, using the default isolation level. Then it executes a series of
update calls, and commits and closes the transaction.

txId = system.db.beginTransaction(timeout=5000)
status=2

for machineId in range(8):
   system.db.runPrepUpdate("UPDATE MachineStatus SET status=? WHERE ID=?",
      args=[status, machineId], tx=txId)

system.db.commitTransaction(txId)
system.db.closeTransaction(txId)
```

system.db.clearAllNamedQueryCaches

This function is used in **Python Scripting**.

Description

This clears the caches of all Named Queries in a project. If called from the shared scope (i.e., Tag Event Scripts, Alarm Pipelines, etc.), then the name of the project must be passed as a parameter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Project Scope

```
system.db.clearAllNamedQueryCaches()
```

Parameters

None

Returns

No Return Value

Scope

Vision Clients

Syntax - Shared Scope

```
system.db.clearAllNamedQueryCaches()
```

Parameters

Type	Parameter	Description
String	`project`	The Project that contains the named query whose cache needs to be cleared.

Returns

No Return Value

Scope

Gateway, Perspective Session

Code Examples

Example - Clear All Named Query Cache for a Specific Project

```
# Calling this simply clears all Named Query caches.
# This is assumed to run in the Shared Scope, so the name of the project must be included.
system.db.clearAllNamedQueryCaches("myProjectName")
```

Example - Clear All Named Query Cache

```
# If multiple Named Queries with varying parameters are called in a single script, then clearAllNamedQueryCaches can be used to free up the memory used by all of the newly created caches.
# This example is assumed to run in the Project Scope, so the project parameter may be omitted.

# This creates one cache.
params = {"param1":"A"}
system.db.runNamedQuery("myUpdateQuery", params)

# This creates a separate cache.
params = {"param1":"B"}
system.db.runNamedQuery("anotherUpdateQuery", params)

# Clear all of the caches from the current project. Note that all caches are cleared, including those generated from elsewhere on the Gateway.
system.db.clearAllNamedQueryCaches()
```

system.db.clearNamedQueryCache

This function is used in **Python Scripting**.

Description

This clears the cache of a Named Query. If called from the shared scope (i.e., Tag Event Scripts, Alarm Pipelines, etc.) then the name of the project must be passed as a parameter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Project Scope

```
system.db.clearNamedQueryCache(path)
```

Parameters

Type	Parameter	Description
String	`path`	The Path to the named query we want to clear the cache of.

Returns

No Return Value

Scope

Vision Client, Perspective Session

Syntax - Shared Scope

`system.db.clearNamedQueryCache(project, path)`

Parameters

Type	Parameter	Description
String	`project`	The Project that contains the named query whose cache needs to be cleared.
String	`path`	The Path to the named query we want to clear the cache of.

Returns

No Return Value

Scope

Gateway

Code Examples

Example - Clear Named Query Cache for a Specific Project

```
# Calling this simply clears all Named Query caches.
# This example is being called from the shared scope. If called from the project
scope, the projectName parameter should be omitted.


projectName = "myProject"
namedQueryPath = "folder/selectFromInventory"

system.db.clearNamedQueryCache(projectName, namedQueryPath)
```

Example - Clear Named Query Cache

```

```

```
# If the same Named Query is called multiple times with different parameters in a single script, then we can clear the caches once we're done with the following.
# This example assumes the script is running in the project scope. If called from the Shared Scope, the name of the project would need to be included.

namedQueryPath = "myUpdateQuery"

# This creates one cache.
params = {"param1":"A"}
system.db.runNamedQuery(namedQueryPath, params)

# This creates a separate cache.
params = {"param1":"B"}
system.db.runNamedQuery(namedQueryPath, params)

# Clear all of the caches from the specified Named Query. Note that all caches are cleared, including those generated from elsewhere on the Gateway.
system.db.clearNamedQueryCache(namedQueryPath)
```

system.db.closeTransaction

This function is used in **Python Scripting**.

Description

Closes the transaction with the given ID. You must commit or rollback the transaction before you close it. Closing the transaction will return its database connection to the pool. The transaction ID will no longer be valid.

Client Permission Restrictions

This scripting function has **Client Permission** restrictions.

Syntax

```
system.db.closeTransaction(tx)
```

Parameters

Type	Parameter	Description
String	`tx`	The transaction ID.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Running a Query Using Query Transactions

```
# This example starts a transaction with a 5 second timeout against the project's
default database, using the default isolation level. Then it executes a series of
update calls,
# and commits and closes the transaction.

txId = system.db.beginTransaction(timeout=5000)
status=2

for machineId in range(8):
   system.db.runPrepUpdate("UPDATE MachineStatus SET status=? WHERE ID=?",
      args=[status, machineId], tx=txId)

system.db.commitTransaction(txId)
system.db.closeTransaction(txId)
```

system.db.commitTransaction

This function is used in **Python Scripting**.

Description

Performs a commit for the given transaction. This will make all statements executed against the transaction since its beginning or since the last commit or rollback take effect in the database. Until you commit a transaction, any changes that the transaction makes will not be visible to other connections.

> **NOTE**
>
> If you are done with the transaction, you must close it after you commit it.

Client Permission Restrictions

This scripting function has **Client Permission** restrictions.

Syntax

```
system.db.commitTransaction(tx)
```

Parameters

Type	Parameter	Description
String	`tx`	The transaction ID.

Returns Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Running a Query Using Query Transactions

```
# This example starts a transaction with a 5 second timeout against the project's
default database, using the default isolation level. Then it executes a series of
update calls,
# and commits and closes the transaction.

txId = system.db.beginTransaction(timeout=5000)
status=2

for machineId in range(8):
   system.db.runPrepUpdate("UPDATE MachineStatus SET status=? WHERE ID=?",
      args=[status, machineId], tx=txId)

system.db.commitTransaction(txId)
system.db.closeTransaction(txId)
```

system.db.createSProcCall

This function is used in **Python Scripting**.

Description

Creates an SProcCall object, which is a stored procedure call context. This is an object that is used to configure a call to a stored procedure. Once configured, you'd use system.db.execSProcCall to call the stored procedure. The call context object then holds any results from the stored procedure. The SProcCall object has the following functions used for registering parameters:

- `SPRocCall.registerInParam(index OR name, typeCode, value)`
- `SPRocCall.registerOutParam(index OR name, typeCode)`
- `SPRocCall.registerReturnParam(typeCode)`

These functions are used to register any in/out parameters for the stored procedure. Parameters can be referenced by index (starting at 1, not 0), or by name. To register an in/out parameter, you simply register it twice - once as an input parameter with the value you'd like to pass to the stored procedure, and once as an output parameter. Note that not all JDBC drivers support named procedure parameters. If your function returns a value, you must use registerReturnParam to specify the data type of the returned value. Also be aware that this is different from stored procedures that return a result set, which doesn't require any setup on the SProcCall object.

Some database systems call stored procedures that return a value of "functions" instead of "procedures". For all of these functions, you'll need to specify a type code. These are codes defined by the JDBC specification. For your convenience, the codes exist as constants in the system.db namespace. Each type code will be mapped to a database-specific type by the JDBC driver. Not all type codes will be recognized by all JDBC drivers. The following type code constants are available for use in createSProcCall:

BIT	REAL	LONGVARCHAR	LONGVARBINARY
TINYINT	DOUBLE	DATE	NULL
SMALLINT	NUMERIC	TIME	ROWID
INTEGER	DECIMAL	TIMESTAMP	CLOB
BIGINT	CHAR	BINARY	NCLOB
FLOAT	VARCHAR	VARBINARY	BLOB
NCHAR	NVARCHAR	LONGNVARCHAR	BOOLEAN

The following type code constants are available for other uses, but are not supported by createSProcCall:

ORACLE_CURSOR	DISTINCT	STRUCT	REF
JAVA_OBJECT	SQLXML	ARRAY	DATALINK
OTHER			

Once the call context has been executed, you can retrieve the result set, return value, and output parameter values (if applicable) by calling the following functions:

- `SProcCall.getResultSet()` returns a dataset that is the resulting data of the stored procedure, if any.
- `SProcCall.getUpdateCount()` returns the number of rows modified by the stored procedure, or -1 if not applicable.
- `SProcCall.getReturnValue()` returns the return value, if registerReturnParam had been called.
- `SProcCall.getOutParamValue(index OR name)` returns the value of the previously registered out-parameter.

> **NOTE**
>
> When using a PostgreSQL database, this function can only make use of Postgres Functions and not Stored Procedures. Postgres Stored Procedures must be run using **system.db.runPrepUpdate**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Gateway

```
system.db.createSProcCall(procedureName, database, [tx], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`procedureName`	The named of the stored procedure to call.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the call will be executed in its own transaction.
Boolean	`skipAudit`	A flag which, if set to true, will cause the procedure call to skip the audit system. Useful for some queries that have fields which won't fit into the audit log.

Returns

SProcCall - A stored procedure call context, which can be configured and then used as the argument to system.db.execSProcCall.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.createSProcCall(procedureName, [database], [tx], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`procedureName`	The named of the stored procedure to call.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the call will be executed in its own transaction. [optional]
Boolean	`skipAudit`	A flag which, if set to true, will cause the procedure call to skip the audit system. Useful for some queries that have fields which won't fit into the audit log. [optional]

Returns

SProcCall - A stored procedure call context, which can be configured and then used as the argument to system.db.execSProcCall.

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet - Creating Stored Procedure Call

```
# This example calls a stored procedure named "start_batch" against the current project's default database connection that had no input or output parameters, and did not return any values or results:

call = system.db.createSProcCall("start_batch")
system.db.execSProcCall(call)
```

Code Snippet - Creating Stored Procedure Call

```
# This example would call a stored procedure "get_shift_workers" with no
arguments, which returned a result set of employees for the current shift. It then
pushes the resulting dataset into a Table component:

call = system.db.createSProcCall("get_shift_workers")
system.db.execSProcCall(call)

results = call.getResultSet()
table = event.source.parent.getComponent("Table")
table.data = results
```

Code Snippet - Creating Stored Procedure Call With Stored Procedure Parameters

```
# This example would call a stored procedure that took two arguments, the first an
integer and the second a string. It also is configured to return an integer value.

call = system.db.createSProcCall("perform_calculation")
call.registerReturnParam(system.db.INTEGER)
call.registerInParam(1, system.db.INTEGER, 42)
call.registerInParam(2, system.db.VARCHAR, "DC-MODE")

system.db.execSProcCall(call)

# Print the result to the console
print call.getReturnValue()
```

Code Snippet - Creating Stored Procedure Call With Stored Procedure Parameters

```
# This example would do the same as the one above, except for a stored procedure
that returned its value using an out-parameter. It also uses named argument names
instead of indexed arguments.

call = system.db.createSProcCall("perform_calculation")
call.registerInParam("arg_one", system.db.INTEGER, 42)
call.registerInParam("arg_two", system.db.VARCHAR, "DC-MODE")
call.registerOutParam("output_arg", system.db.INTEGER)

system.db.execSProcCall(call)

# Print the result to the console
print call.getOutParamValue("output_arg")
```

system.db.dateFormat

This function is used in **Python Scripting**.

Description

This function is used to format dates nicely as strings. It uses a format string to guide its formatting behavior. Learn more about date formatting in **Dates**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.db.dateFormat(date, formatPattern)
```

Parameters

Type	Parameter	Description
Date	`date`	The Date object that you'd like to format
String	`formatPattern`	A format pattern string to apply. Refer to **Data Type Formatting Reference** for a table of acceptable symbols.

Returns

String - The date as a string formatted according to the format pattern.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

```
# This example displays a message box on a button press that displays the selected
date (without the time)
# from a Calendar component, in a format like "Feb 3, 2009"
date = event.source.parent.getComponent("Calendar").latchedDate
toDisplay = system.db.dateFormat(date, "MMM d, yyyy")
system.gui.messageBox("The date you selected is: %s" % toDisplay)
```

```
# This example does the same as the one above, but also displays the time, in a
format like: "Feb 3, 2009 8:01pm"
date = event.source.parent.getComponent("Calendar").latchedDate
toDisplay = system.db.dateFormat(date, "MMM d, yyyy hh:mm a")
system.gui.messageBox("The date you selected is: %s" % toDisplay)
```

```
# This example takes two dates from two Popup Calendar components, formats them in
a manner that the database understands,
# and then uses them in a SQL query to limit the results to a certain date range.
startDate = event.source.parent.getComponent("StartDate").date
endDate = event.source.parent.getComponent("EndDate").date
startDate = system.db.dateFormat(startDate, "yyyy-MM-dd HH:mm:ss")
endDate = system.db.dateFormat(endDate, "yyyy-MM-dd HH:mm:ss")
query = ("SELECT * FROM mytable WHERE t_stamp >= '%s' AND t_stamp <= '%s'" %
(startDate, endDate))
results = system.db.runQuery(query)
event.source.parent.getComponent("Table").data = results
```

system.db.execSProcCall

New in 8.1.2

This function is used in **Python Scripting**.

Description

Executes a stored procedure call. The one parameter to this function is an SProcCall - a stored procedure call context. See the description of **system.db.createSProcCall** for more information and examples.

Client Permission Restrictions

Restrictions Prior to 8.1.2

This scripting function has no **Client Permission** restrictions on Ignition versions earlier than 8.1.2.

Restrictions for 8.1.2 and beyond

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.execSProcCall(callContext)
```

Parameters

Type	Parameter	Description
SProcCall	`callContext`	A stored procedure call context, with any input, output, and/or return value parameters correctly configured. Use **system.db.createSProcCall** to create a call context.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

There are no code examples available for this function.

system.db.getConnectionInfo

This function is used in **Python Scripting**.

Description

Returns a dataset of information about a single database connection, as specified by the name argument.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.db.getConnectionInfo(name)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the database connection to find information about. Will use the current project's default database connection if a name is not specified.

Returns

Dataset - A dataset containing information about the named database connection, or an empty dataset if the connection wasn't found. If a populated dataset is returned, the following data will be given:

Column Name	Description
Name	Returns the name of this datasource.
Description	Returns the description for this datasource.
DBType	Returns the database connection type. Example types include PostgreSQL, MSSQL, and Oracle.
Status	Returns the status of this datasource based on its last tested condition. Typical values include Valid, Faulted, and Reconnecting.
Problem	Returns a string describing the current problem, if the status is not good.
ExtStatus	Returns the "best" status of this datasource or of any failover datasources.
Throughput	Returns number of queries per second, including Insert and Select queries. Throughput will be -1 if idle.
ActiveConnections	Returns the current number of connections in use.
MaxConnections	Returns the maximum number of connections the underlying pool is configured to use.
ValidationQuery	Returns a SQL query that will be used to validate the status of this datasource. This query should always return at least 1 row.

Scope

Gateway, Vision Client, Perspective Session

> **NOTE**
> The database connection used when called from the Gateway scope is the connection configured on the Gateway scripting project.

Code Examples

Code Snippet - Getting Database Connection Information

```
# This example checks the database connection type and selects a query format that
matches.

connectionInfo = system.db.getConnectionInfo()
dbType = connectionInfo.getValueAt(0, "DBType")
if dbType == "MYSQL":
    # mysql format for a column with a space in the name
    query = "SELECT `amps value` FROM pumps"
else:
    # mssql format for a column with a space in the name
    query = "SELECT [amps value] FROM pumps"
```

system.db.getConnections

This function is used in **Python Scripting**.

Description

Returns a dataset of information about each configured database connection. Each row represents a single connection.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.db.getConnections()
```

Parameters

None

Returns

Dataset - A dataset, where each row represents a database connection.The dataset contains the following:

Column Name	Description
Name	Returns the name of this datasource.
Description	Returns the description for this datasource.
DBType	Returns the database connection type. Example types include PostgreSQL, MSSQL, and Oracle.
Status	Returns the status of this datasource based on its last tested condition. Typical values include Valid, Faulted, and Reconnecting.
Problem	Returns a string describing the current problem, if the status is not good.
ExtStatus	Returns the "best" status of this datasource or of any failover datasources.
Throughput	Returns number of queries per second, including Insert and Select queries. Throughput will be -1 if idle.
ActiveConnections	Returns the current number of connections in use.
MaxConnections	Returns the maximum number of connections the underlying pool is configured to use.
ValidationQuery	Returns a SQL query that will be used to validate the status of this datasource. This query should always return at least 1 row.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

There are no code examples available for this function.

system.db.refresh

This function is used in **Python Scripting**.

Description

This function will cause a Vision component binding to execute immediately. This is most often used for bindings that are set to Polling - Off. In this way, you cause a binding to execute on demand, when you know that the results of its query will return a new result. To use it, you simply specify the component and name of the property on whose binding you'd like to refresh.

Even though the function includes "db" in the name, the function can update all types of Vision component bindings, including Property and Expression bindings.

> **NOTE**
>
> Note: This function will only work within the Vision module. To manually execute bindings in Perspective, use the **refreshBinding** component method.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.refresh(component, propertyName)
```

Parameters

Type	Parameter	Description
JComponent	`component`	The component whose property you want to refresh.
String	`propertyName`	The name of the property that has a SQL Query binding that needs to be refreshed.

Returns

Boolean - True if the property was found and refreshed successfully.

Scope

Vision Client

Code Examples

Code Snippet - Refreshing a Table's Data Property

```
# This example could be placed in the actionPerformed event of a Button, to be used to refresh the data of a Table.
# Remember to use the scripting name of the property that you're trying to refresh, and that the property names are case-sensitive.

table = event.source.parent.getComponent("Table")
system.db.refresh(table, "data")
```

system.db.removeDatasource

This function is used in **Python Scripting**.

Description

Removes a database connection from Ignition.

Client Permission Restrictions

Permission Type: Datasource Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.removeDatasource(name)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the database connection in Ignition.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Removing Database from Gateway

```
# This results in the connection named MySQL being removed.
system.db.removeDatasource("MySQL")
```

system.db.rollbackTransaction

This function is used in **Python Scripting**.

Description

Performs a rollback on the given connection. This will make all statements executed against this transaction since its beginning or since the last commit or rollback undone.

If you are done with the transaction, you must also close it after you do a rollback on it.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.db.rollbackTransaction(tx)
```

Parameters

Type	Parameter	Description
String	`tx`	The transaction ID.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Python - Rollback a Transaction on an Exception

```python
# This example uses a for-loop to run multiple queries in a single Transaction,
and rollback if an error occurs.

# Create some variables for use later.
txId = system.db.beginTransaction(timeout=5000)
status=2
query = "UPDATE MachineStatus SET status=? WHERE ID=?"
errors = False  # A flag to denote if we ran into a problem with a query during
the transaction.

for machineId in range(8):
    try:
        system.db.runPrepUpdate(query,  args=[status, machineId], tx=txId)
    except:
        errors = True
        break
# If we encountered an error...
if errors:
    # ...then rollback the transaction
    system.db.rollbackTransaction(txId)
else:
    # Otherwise, commit it.
    system.db.commitTransaction(txId)
# In either case, close the transaction when we're done.
system.db.closeTransaction(txId)
```

system.db.runNamedQuery

This function is used in **Python Scripting**.

Description

Runs a Named Query and returns the results. Note that the number of parameters in the function is determined by scope. Both versions of the function are listed below.

This function accepts **keyword arguments**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Project Scope Syntax

```
system.db.runNamedQuery(path, [parameters], [tx], [getKey])
```

Parameters

Type	Parameter	Description
String	`path`	The path to the named query to run. Note that this is the full path to the query, including any folders.
Dictionary[String, Any]	`parameters`	A Python dictionary of parameters for the Named Query to use. [optional]
String	`tx`	An transaction ID, obtained from **beginNamedQueryTransaction**. If blank, it will not be part of a transaction. [optional]
Boolean	`getKey`	Only used for Update Query types. A flag indicating whether or not the result should be the number of rows affected (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]

Returns

PyDataset -

Changed in 8.1.29 The results of the Named Query as a **PyDataset**.

Any - Prior to 8.1.29, the exact object returned depends on the Query Type property of the Named Query. Query Types are selected on the Authoring Tab of a Named Query, and typically return the following:

- Query: A dataset
- Scalar Query: An integer representing the number of rows affected
- Update Query: An object matching the data type of the value returned

Scope

Vision Client, Perspective Session

Gateway Scope Syntax

```
system.db.runNamedQuery(project, path, [parameters], [tx], [getKey])
```

Parameters

Type	Parameter	Description
String	`project`	The project name the query exists in.
String	`path`	The path to the Named Query to run. Note that this is the full path to the query, including any folders.
Dictionary[String, Any]	`parameters`	A Python dictionary of parameters for the Named Query to use. [optional]
String	`tx`	An optional transaction ID, obtained from **beginNamedQueryTransaction**. If blank, will not be part of a transaction. [optional]
Boolean	`getKey`	Only used for Update Query types. A flag indicating whether or not the result should be the number of rows affected (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]

Returns

Any - The results of the query. The exact object returned depends on the Query Type property of the Named Query. Query Types are selected on the Authoring Tab of a Named Query, and typically return the following:

- Query: A dataset
- Scalar Query: An integer representing the number of rows affected
- Update Query: An object matching the data type of the value returned

Scope

Gateway

Code Examples

Example #1 Project Scope - Without Parameters

```
# This example runs a Named Query without any parameters in the Project scope.

# Request the Named Query to execute.
system.db.runNamedQuery("folderName/myNamedQuery")
```

Example #2 Project Scope - With Parameters

```
# This example runs a Named Query while passing some parameters in the Project
scope.
# The Named Query is assumed to have two parameters already defined on the Named
Query:
# param1 : A string
# param2 : An integer

# Create a Python dictionary of parameters to pass.
parameters  = {"param1":"my string", "param2":10}

# Run the Named Query.
system.db.runNamedQuery("myUpdateQuery", parameters)
```

Example #3 Gateway Scope

```
# This example runs a Named Query without any parameters in the Gateway scope.

# Request the Named Query to execute.
system.db.runNamedQuery("ProjectName", "folderName/myNamedQuery")
```

system.db.runPrepQuery

This function is used in **Python Scripting**.

Description

Runs a prepared statement against the database, returning the results in a PyDataSet. Prepared statements differ from regular queries in that they can use a special placeholder, the question-mark character (?), in the query where any dynamic arguments would go, and then use an array of values to provide real information for those arguments. Make sure that the length of your argument array matches the number of question-mark placeholders in your query.

This call should be used for SELECT queries. This is a useful alternative to system.db.runQuery because it allows values in the WHERE clause, JOIN clause, and other clauses to be specified without having to turn those values into strings. This is safer because it protects against a problem known as a SQL injection attack, where a user can input data that affects the query's semantics.

> **NOTE**
>
> The "?" placeholder refers to variables of the query statement that help the statement return the correct information. The "?" placeholder cannot reference column names, table names, or the underlying syntax of the query. This is because the SQL standard for handling the "?" placeholder excludes these items.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runPrepQuery(query, args, database, [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically a SELECT) to run as a prepared statement with placeholders (?) denoting where the arguments go.
Object[]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

PyDataSet - The results of the query as a PyDataSet

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.runPrepQuery(query, args, [database], [tx] )
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically a SELECT) to run as a prepared statement with placeholders (?) denoting where the arguments go.
Object[]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

PyDataSet - The results of the query as a PyDataSet

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet - Running Prepared Query With Query Parameter

```
# This example searches for all records in a LogEntry table where the message
contained a user-entered search term.

search = event.source.parent.getComponent("SearchFor").text
# Wrap the term in % signs for LIKE-style matching
search = '%' + search + '%'

results= system.db.runPrepQuery("SELECT * FROM LogEntry WHERE EntryText LIKE ?",
[search])
event.source.parent.getComponent("Table").data = results
```

system.db.runPrepUpdate

This function is used in **Python Scripting**.

Description

Runs a prepared statement against the database, returning the number of rows that were affected. Prepared statements differ from regular queries in that they can use a special placeholder, the question-mark character (?), in the query where any dynamic arguments would go, and then use an array of values to provide real information for those arguments. Make sure that the length of your argument array matches the number of question-mark placeholders in your query. This call should be used for UPDATE, INSERT, and DELETE queries.

This is extremely useful for two purposes:

- This method avoids the problematic technique of concatenating user input inside of a query, which can lead to syntax errors, or worse, a nasty security problem called a SQL injection attack . For example, if you have a user-supplied string that is used in a WHERE clause, you use single-quotes to enclose the string to make the query valid. What happens in the user has a single-quote in their text? Your query will fail. Prepared statements are immune to this problem.
- This is the only way to write an INSERT or UPDATE query that has binary or BLOB data. Using BLOBs can be very useful for storing images or reports in the database, where all clients have access to them.

> **NOTE**
>
> The "?" placeholder refers to variables of the query statement that help the statement return the correct information. The "?" placeholder cannot reference column names, table names, or the underlying syntax of the query. This is because the SQL standard for handling the "?" placeholder excludes these items.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runPrepUpdate( query, args, database, [tx], [getKey], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically an UPDATE, INSERT, or DELETE) to run as a prepared statement with placeholders (?) denoting where the arguments go.
Object[]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	The name of the database connection to execute against.
String	`tx`	Optional, A transaction identifier. If omitted, the update will be executed in its own transaction. [optional]
Boolean	`getKey`	Optional, A flag indicating whether or not the result should be the number of rows returned (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]
Boolean	`skipAudit`	Optional, A flag which, if set to true, will cause the prep update to skip the audit system. Useful for some queries that have fields which won't fit into the audit log. [optional]

Returns

Integer - The number of rows affected by the query, or the key value that was generated, depending on the value of the getKey flag.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.runPrepUpdate(query, args, [database], [tx], [getKey], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically an UPDATE, INSERT, or DELETE) to run as a prepared statement with placeholders (?) denoting where the arguments go.
Object[]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	Optional, The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	Optional, A transaction identifier. If omitted, the update will be executed in its own transaction. [optional]
Boolean	`getKey`	Optional, A flag indicating whether or not the result should be the number of rows returned (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]
Boolean	`skipAudit`	Optional, A flag which, if set to true, will cause the prep update to skip the audit system. Useful for some queries that have fields which won't fit into the audit log. [optional]

Returns

Integer - The number of rows affected by the query, or the key value that was generated, depending on the value of the getKey flag.

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet - Inserting Data Into Database

```
# This example gathers some user entered text and inserts it into the database.

userText = event.source.parent.getComponent("TextArea").text
userName = system.security.getUsername()
system.db.runPrepUpdate("INSERT INTO Comments (Name, UserComment) VALUES (?,?)",
[userName, userText])
```

Code Snippet - Inserting Data Into Database

```
# This example gathers some user entered text and inserts it into the database.
# Unlike the previous example, this example is explicitly declaring which database
connection to run the query against.
# Sometimes, you need to run a query against a database connection that is not the
default connection.

userText = event.source.parent.getComponent("TextArea").text
userName = system.security.getUsername()
databaseConnection = "AlternateDatabase"
system.db.runPrepUpdate("INSERT INTO Comments (Name, UserComment) VALUES (?,?)",
[userName, userText], databaseConnection)
```

Code Snippet - Reading File as Bytes and Inserting Bytes Into Database

```
# This code reads a file and uploads it to the database.

filename = system.file.openFile() # Ask the user to open a file
if filename != None:
   filedata = system.file.readFileAsBytes(filename)
   system.db.runPrepUpdate("INSERT INTO Files (file_data) VALUES (?)", [filedata])
```

Code Snippet - Inserting Data and Retrieving the Number of Affected Rows Using getKey Parameter

```
# This example inserts name, description, and building information into a table
called 'machines'. Demonstrates the ability to retrieve a newly created key value.

# Get the name, description, and building information.
name = event.source.parent.getComponent('Name').text
desc = event.source.parent.getComponent('Description').text
building = event.source.parent.getComponent('Building').selectedValue

# Insert the value.
id = system.db.runPrepUpdate("INSERT INTO machines (machine_name, description)
VALUES (?, ?)", [name, desc], getKey=1)

# Add a row to the 'machine_building_mapping' table.
system.db.runPrepUpdate("INSERT INTO machine_building_mapping (machine_id,
building) VALUES (?, ?)", [id, building])
```

Code Snippet - Inserting Data From a Table Component

```
# This example takes a dataset from a Table component and inserts new records into
the database, one row at a time.

# Read the contents of the table.
tableData = event.source.parent.getComponent('Table').data

# Convert it to a PyDataset. This is mostly for convenience, as they're easier to
iterate through.
pyData = system.dataset.toPyDataSet(tableData)

# Build the query we'll use. You could easily modify the line to accommodate the
table you're trying to insert into.
query = "INSERT INTO my_table (col1, col2) VALUES (?, ?)"

# Iterate.
for row in pyData:

    # Build an arguments list based on the current row. Using indexing here, so
'row[0]' is the 1st column, 'row[1]' is the 2nd column, etc.
    args = [row[0], row[1]]

    # Add a row to the database. Optionally, you could check the contents of the
row first and add an if-statement to prevent the record based on some criteria.
    system.db.runPrepUpdate(query, args)
```

Code Snippet - Calling a PostgreSQL Stored Procedure

```
# Stored Procedures can be called with this function by passing "call <query>",
where <query> is the stored procedure.
system.db.runPrepUpdate(
    query="call public.decimal_insert(?)",
    args = [10],
    database="POSTGRESQL"
)
```

system.db.runQuery

This function is used in **Python Scripting**.

Description

Runs a SQL query, usually a SELECT query, against a database, returning the results as a dataset. If no database is specified, or the database is the empty-string "", then the current project's default database connection will be used. The results are returned as a PyDataSet, which is a wrapper around the standard dataset that is convenient for scripting.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runQuery(query, database, [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query, usually a SELECT query, to run.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

PyDataSet - The results of the query as a PyDataSet.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.runQuery(query, [database], [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query, usually a SELECT query, to run.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

PyDataSet - The results of the query as a PyDataSet.

Scope

Vision Client, Persepctive Session

Code Examples

Assuming the following dataset:

ID	Value
3	9.87
2	67.2
1	3.55

If you executed the following code:

```
table = system.db.runQuery("SELECT * FROM TEST")
```

Table[2] would access the third row (rows are zero-indexed), and both table[2][0] and table[2]["ID"] would access the ID value of the third row.

As further example of how to use the results of runQuery, here are seven different ways to print out the table, and their results follow. Note that some of the later methods exercise some more advanced Jython concepts such as list comprehensions and string formatting, but their intent should be obvious. Generally speaking, the more concise Jython code becomes, the more readable it is.

Code Snippet - Executing Query and Printing Its Results

```
table = system.db.runQuery("SELECT * FROM Test")

print "Printing TEST Method 1..."
for row in table:
   for col in row:
      print col,
   print ""
print ""

print "Printing TEST Method 2..."
for row in table:
   print row[0], row[1]
print ""

print "Printing TEST Method 3..."
for row in table:
   print row["ID"], row["VALUE"]
print ""

print "Printing TEST Method 4..."
for rowIdx in range(len(table)):
   print "Row ",str(rowIdx)+": ", table[rowIdx][0], table[rowIdx][1]
print ""

print "Printing TEST Method 5..."
print [str(row[0])+", "+ str(row[1]) for row in table]
print ""

print "Printing TEST Method 6..."
print ["%s, %s" % (row["ID"],row["VALUE"]) for row in table]
print ""

print "Printing TEST Method 7..."
print [[col for col in row] for row in table]
print ""
```

The result would be:

Printing TEST Method 1...

0 3.55

1 67.2

2 9.87

Printing TEST Method 2...

0 3.55

1 67.2

2 9.87

Printing TEST Method 3...

0 3.55

1 67.2

2 9.87

Printing TEST Method 4...

Row 0: 0 3.55

Row 1: 1 67.2

Row 2: 2 9.87

Printing TEST Method 5...

['0, 3.55', '1, 67.2', '2, 9.87']

Printing TEST Method 6...

['0, 3.55', '1, 67.2', '2, 9.87']

Printing TEST Method 7...

[[0, 3.55], [1, 67.2], [2, 9.87]]

system.db.runScalarPrepQuery

This function is used in **Python Scripting**.

Description

Runs a prepared statement against a database connection just like the runPrepQuery function, but only returns the value from the first row and column. If no results are returned from the query, the special value None is returned.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runScalarPrepQuery(query, args, database, [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query (typically a SELECT) to run as a prepared statement with placeholders (?) denoting where the arguments go, that should be designed to return one row and one column.
List[Any]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

Any - The value from the first row and first column of the results. Returns None if no rows were returned.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.runScalarPrepQuery(query, args, [database], [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query (typically a SELECT) to run as a prepared statement with placeholders (?) denoting where the arguments go, that should be designed to return one row and one column.
List[Any]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

Any - The value from the first row and first column of the results. Returns None if no rows were returned.

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet - Executing Query

```
# This example searches for the user id of someone based on a typed in username.
name = event.source.parent.getComponent("User Search").text

result = system.db.runScalarPrepQuery("SELECT user_id FROM users WHERE username =
?", [name])
event.source.parent.getComponent("Text Field").data = result
```

system.db.runScalarQuery

This function is used in **Python Scripting**.

Description

Runs a query against a database connection just like the runQuery function, but only returns the value from the first row and column. If no results are returned from the query, the special value None is returned.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runScalarQuery(query, database, [tx])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query that should be designed to return one row and one column.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

Object - The value from the first row and first column of the results. - Returns None if no rows were returned.

Scope

Gateway

Syntax - Vision and Perspective

`system.db.runScalarQuery(query, [database], [tx])`

Parameters

Type	Parameter	Description
String	`query`	A SQL query that should be designed to return one row and one column.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the query will be executed in its own transaction. [optional]

Returns

Any - The value from the first row and first column of the results. Returns None if no rows were returned.

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This code counts the number of active alarms and acknowledges them all if there is at least one.
numAlarms = system.db.runScalarQuery("SELECT COUNT(*) FROM alarmstatus " + "WHERE unacknowledged = 1")
if numAlarms > 0:
   # There are alarms - acknowledge all of them
   system.db.runUpdateQuery("UPDATE alarmstatus SET unacknowledged = 0")
```

Code Snippet

```
# This code reads a single value from a table and shows it to the user in a popup.
level = system.db.runScalarQuery("SELECT Level FROM LakeInfo WHERE LakeId='Tahoe'")
system.gui.messageBox("The lake level is: %d feet" % level)
```

system.db.runSFNamedQuery

This function is used in **Python Scripting**.

Description

Runs a named query that goes through the **Store and Forward** system. Note that the number of parameters in the function is determined by scope. Both versions of the function are listed on this page.

> **NOTE**
>
> Only Update Named Queries are allowed in Store and Forward.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Gateway Scope Syntax

`system.db.runSFNamedQuery([project], path, params)`

Parameters

Type	Parameter	Description
String	`project`	The project name the query exists in. [optional]
String	`path`	The path to the Named Query to run. Note that this is the full path to the query, including any folders.
Dictionary[String, Any]	`params`	A Python dictionary of parameters for the Named Query to use.

Returns

Boolean - Returns true if successfully sent to the Store and Forward system.

Scope

Gateway, Perspective Session

Project Scope Syntax

`system.db.runSFNamedQuery(path, params)`

Parameters

Type	Parameter	Description
String	`path`	The path to the Named Query to run. Note that this is the full path to the query, including any folders.
Dictionary[String, Any]	`params`	A Python dictionary of parameters for the Named Query to use.

Returns

Boolean - Returns true if successfully sent to the Store and Forward system.

Scope

Vision Client

Code Examples

Simple Example - Without Parameters

```
# This example runs a Named Query without any parameters in the Project scope.
# The second argument in the function is NOT optional, so Named Queries that do not require a parameter
# must still pass an empty dictionary as an argument.

# Request the Named Query with an empty dictionary as the second parameter.
system.db.runSFNamedQuery("folderName/myNamedQuery", {})
```

Gateway Scope Example

```
# This example runs a Named Query without any parameters in the Gateway scope.
# The last argument in the function is NOT optional, so Named Queries that do not require a parameter
# must still pass an empty dictionary as an argument.

# Request the Named Query to execute.
system.db.runSFNamedQuery("ProjectName", "folderName/myNamedQuery", {})
```

Simple Example - With Parameters

```
# This example runs a Named Query while passing some parameters in the Project scope.
# The Named Query is assumed to have two parameters already defined on the Named Query:
# param1 : A string
# param2 : An integer

# Create a Python dictionary of parameters to pass
params = {"param1":"my string", "param2":10}

# Run the Named Query
system.db.runSFNamedQuery("myUpdateQuery", params)
```

system.db.runSFPrepUpdate

This function is used in **Python Scripting**.

Description

Runs a prepared statement query through the **Store and Forward** system and to multiple datasources at the same time. Prepared statements differ from regular queries in that they can use a special placeholder, the question-mark character (?) in the query where any dynamic arguments would go, and then use an array of values to provide real information for those arguments. Make sure that the length of your argument array matches the number of question-mark placeholders in your query. This call should be used for UPDATE, INSERT, and DELETE queries.

This is extremely useful for two purposes:

- This method avoids the problematic technique of concatenating user input inside of a query, which can lead to syntax errors, or worse, a nasty security problem called a SQL injection attack. For example, if you have a user-supplied string that is used in a WHERE clause, you use single-quotes to enclose the string to make the query valid. What happens in the user has a single-quote in their text? Your query will fail. Prepared statements are immune to this problem.
- This is the only way to write an INSERT or UPDATE query that has binary or BLOB data. Using BLOBs can be very handy for storing images or reports in the database, where all clients have access to them.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.runSFPrepUpdate(query, args, datasources)
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically an UPDATE, INSERT, or DELETE) to run as a prepared statement, with placeholders (?) denoting where the arguments go.
Object[]	`args`	A list of arguments. Will be used in order to match each placeholder (?) found in the query.
String[]	`datasources`	List of datasources to run the query through.

Returns

Boolean - Returns true if successfully sent to store-and-forward system.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Example 1: Run through single datasource
print system.db.runSFPrepUpdate("INSERT INTO recipes (name, sp1, sp2, sp3) VALUES (?,?,?,?)", ['A Name', 1032, 234, 1], datasources=["MySQLDatasource"])
```

Code Snippet

```
# Example 2: Run through two datasources
print system.db.runSFPrepUpdate("INSERT INTO recipes (name, sp1, sp2, sp3) VALUES (?,?,?,?)", ['A Name', 1032, 234, 1], datasources=["MySQLDatasource", "SQLServerDatasource"])
```

system.db.runSFUpdateQuery

This function is used in **Python Scripting**.

Description

Runs a query through the **Store and Forward** system and to multiple datasources at the same time.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.runSFUpdateQuery(query, datasources)
```

Parameters

Type	Parameter	Description
String	`query`	A query (typically an UPDATE, INSERT, or DELETE) to run.
String[]	`datasources`	List of datasources to run the query through.

Returns

Boolean - Returns true if successful and false if not.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Example 1: Run through single datasource
print system.db.runSFUpdateQuery("INSERT INTO recipes (name, sp1, sp2, sp3) VALUES
('A Name', 1032, 234, 1)", ["MySQLDatasource"])
```

Code Snippet

```
# Example 2: Run through two datasources
print system.db.runSFUpdateQuery("INSERT INTO recipes (name, sp1, sp2, sp3) VALUES
('A Name', 1032, 234, 1)", ["MySQLDatasource", "SQLServerDatasource"])
```

system.db.runUpdateQuery

This function is used in **Python Scripting**.

Description

Runs a query against a database connection, returning the number of rows affected. Typically this is an UPDATE, INSERT, or DELETE query. If no database is specified, or the database is the empty-string "", then the current project's default database connection will be used.

> **NOTE**
> You may want to use the runPrepUpdate query if your query is constructed with user input (to avoid the user's input from breaking your syntax) or if you need to insert binary or BLOB data.

Client Permission Restrictions

Permission Type: Legacy Database Access

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax - Gateway

```
system.db.runUpdateQuery(query, database, [tx], [getKey], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query, usually an INSERT, UPDATE, or DELETE query, to run.
String	`database`	The name of the database connection to execute against.
String	`tx`	A transaction identifier. If omitted, the update will be executed in its own transaction. [optional]
Boolean	`getKey`	A flag indicating whether or not the result should be the number of rows returned (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]
Boolean	`skipAudit`	A flag which, if set to true, will cause the update query to skip the audit system. Useful for some queries that have fields which won't fit into the audit log. [optional]

Returns

Integer - The number of rows affected by the query, or the key value that was generated, depending on the value of the getKey flag.

Scope

Gateway

Syntax - Vision and Perspective

```
system.db.runUpdateQuery(query, [database], [tx], [getKey], [skipAudit])
```

Parameters

Type	Parameter	Description
String	`query`	A SQL query, usually an INSERT, UPDATE, or DELETE query, to run.
String	`database`	The name of the database connection to execute against. If omitted or "", the project's default database connection will be used. [optional]
String	`tx`	A transaction identifier. If omitted, the update will be executed in its own transaction. [optional]
Boolean	`getKey`	A flag indicating whether or not the result should be the number of rows returned (getKey=0) or the newly generated key value that was created as a result of the update (getKey=1). Not all databases support automatic retrieval of generated keys. [optional]
Boolean	`skipAudit`	A flag which, if set to true, will cause the update query to skip the audit system. Useful for some queries that have fields which won't fit into the audit log. [optional]

Returns

Integer - The number of rows affected by the query, or the key value that was generated, depending on the value of the getKey flag.

Scope

Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# This code acknowledges all unacknowledged alarms # and shows the user how many alarms were acknowledged.
rowsChanged = system.db.runUpdateQuery("UPDATE alarmstatus SET unacknowledged = 0")
system.gui.messageBox("Acknowledged %d alarms" % rowsChanged)
```

Code Snippet

```
# This example inserts name, description, and building information into a table called 'machines'.  Demonstrates the ability to retrieve a newly created key value.

# Get the name, description, and building information.
name = event.source.parent.getComponent('Name').text
desc = event.source.parent.getComponent('Description').text
building = event.source.parent.getComponent('Building').selectedValue

# Insert the value.
id = system.db.runUpdateQuery("INSERT INTO machines (machine_name, description) "
+ "VALUES ('%s', '%s')" %(name, desc), getKey=1)

# Add a row to the 'machine_building_mapping' table.
system.db.runUpdateQuery("INSERT INTO machine_building_mapping " + "(machine_id, building) VALUES (%d, %d)" %(id, building))
```

system.db.setDatasourceConnectURL

This function is used in **Python Scripting**.

Description

Changes the connect URL for a given database connection.

Client Permission Restrictions

Permission Type: Datasource Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.setDatasourceConnectURL(name, connectUrl)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the database connection in Ignition.
String	`connectUrl`	The new connect URL.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Example:

system.db.setDatasourceConnectURL("MySQL", "jdbc:mysql://localhost:3306/test")
```

system.db.setDatasourceEnabled

This function is used in **Python Scripting**.

Description

Enables/disables a given database connection.

Client Permission Restrictions

Permission Type: Datasource Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.setDatasourceEnabled(name, enabled)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the database connection in Ignition.
Boolean	`enabled`	Enables/disables a given database connection.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Enabling a Database Connection

```
# Enable the database named "MySQL"

system.db.setDatasourceEnabled("MySQL", 1)
```

Code Snippet - Disabling a Database Connection

```
# Disable the database named "MySQL"

system.db.setDatasourceEnabled("MySQL", 0)
```

system.db.setDatasourceMaxConnections

This function is used in **Python Scripting**.

Description

Sets the *Max Active* and *Max Idle* parameters of a given database connection.

Client Permission Restrictions

Permission Type: Datasource Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.db.setDatasourceMaxConnections(name, maxConnections)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the database connection in Ignition.
Integer	`maxConnections`	Sets the *Max Active* and *Max Idle* parameters of a given database connection.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Setting the Max Connections of a Data Source

```
# Example 1: Enable a connection
system.db.setDatasourceMaxConnections("MySQL", 20)
```

system.device

Device Functions

The following functions give you access to view and edit device connections in the Gateway.

addDevice

listDevices

Returns a dataset of information about each configured device.

refreshBrowse

Forces Ignition to browse the controller.

removeDevice

Removes a given device from Ignition.

restart

Restarts the named device connection.

setDeviceEnabled

Enables/disables a device in Ignition.

setDeviceHostname

Changes the hostname of a device. Used for all ethernet based drivers.

getDeviceHostname

Returns the hostname of the device.

Functions by Scope

Gateway >

Vision >

Perspective >

system.device.addDevice

This function is used in **Python Scripting**.

Description

Adds a new device connection in Ignition. Accepts a dictionary of parameters to configure the connection. Acceptable parameters differ by device type: i.e., a Modbus/TCP connection requires a hostname and port, but a simulator doesn't require any parameters.

> **INFO**
>
> When using this function, the arguments **MUST** be passed in as keyword arguments.

Client Permission Restrictions

Permission Type: Device Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.device.addDevice(deviceType, deviceName, deviceProps, [description])
```

Parameters

Type	Parameter	Description
String	`deviceType`	The device driver type. Possible values are listed in the Device Types table below.
String	`deviceName`	The name that will be given to the new device connection.
Dictionary[String, Any]	`deviceProps`	A dictionary of device connection properties and values. Each deviceType has different properties, but most require at least a hostname. Keys in the dictionary are case-insensitive, spaces are omitted, and the names of the properties that appear when manually creating a device connection.
String	`description`	**New in 8.1.10** The description that will be given to the new device connection. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Device Types

The tables below represent Inductive Automation device types that can be created with this function. Some device types require manual configurations to become fully functional, such as loading configuration files or adding mapped entries. In these cases you won't be able to completely configure the device with this function alone. Those device types are marked with "(requires manual configuration)" in the table below.

In addition, this function can also add devices from 3rd party modules; you will need to supply the driver type, which the module developer will be able to provide.

Driver Name	Device Type
Allen-Bradley Logix Driver	LogixDriver
Allen-Bradley Micro800	com.inductiveautomation.Micro800DeviceType
Allen-Bradley MicroLogix	MicroLogix
Allen-Bradley PLC5	PLC5
Allen-Bradley SLC	SLC
DNP3 Driver	com.inductiveautomation.Dnp3DeviceType
Legacy DNP3 Driver	Dnp3Driver
Legacy Allen-Bradley CompactLogix	CompactLogix
Legacy Allen-Bradley ControlLogix	ControlLogix
Mitsubishi TCP	com.inductiveautomation.MitsubishiTcpDeviceType
Modbus RTU	ModbusRtu
Modbus RTU over TCP	ModbusRtuOverTcp
Modbus TCP	ModbusTcp
Omron FINS TCP **(requires manual configuration)**	com.inductiveautomation.FinsTcpDeviceType
Omron FINS UDP **(requires manual configuration)**	com.inductiveautomation.FinsUdpDeviceType
Omron NJ Driver	com.inductiveautomation.omron.NjDriver
IEC 61850 Driver	com.inductiveautomation.Iec61850DeviceType
Siemens S7-300	S7300
Siemens S7-400	S7400

Driver Name	Device Type
Siemens S7-1200	S71200
Siemens S7-1500	S71500
Simulators Dairy Demo Simulator	DairyDemoSimulator
Simulators Generic Simulator	Simulator
Simulators SLC Simulator	SLCSimulator
TCP Driver	TCPDriver
UDP Driver	UDPDriver

Device Properties

The `deviceProps` parameter is where you supply configuration values to the new connection. Value properties depend on which deviceType was specified. A listing of deviceProps keys can be found on the **system.device.addDevice - deviceProps Listing** page.

The keys in the `deviceProps` parameter are **case-insensitive**. Device properties not specified in the deviceProps parameter will fallback to default values if not specified (where applicable: i.e., "hostname" typically does not have a default value).

Code Examples

Code Snippet - Creating a New Simulator Device

```
# Below is an example of creating a new Generic Simulator device connection.
# Note that we MUST pass a dictionary as the 3rd parameter, even if it's empty.

# Call the function
system.device.addDevice(deviceType = "Simulator", deviceName =
"New_Generic_Simulator", deviceProps = {} )
```

Code Snippet - Creating a New Allen Bradley Logix Device

```
# Add a device using the Allen-Bradley Logix Driver for firmware v21+ devices
deviceProps = {}
deviceProps["Hostname"] = "192.168.1.2"
system.device.addDevice(deviceName="Test1", deviceType="LogixDriver",
deviceProps=deviceProps)
```

Code Snippet - Creating a New Siemens Device

```
# Below is an example of creating a new S7-1500 device connection.

# Build a Dictionary of parameters
newProps = {
            "HostName" : "10.0.0.1",
            "Port" : 102 # <---If adding additional parameters, make sure to add a
comma.
            }

# Call the function
system.device.addDevice(deviceType = "S71500", \
                        deviceName = "My_S7_1500_Device",\
                        deviceProps = newProps )
```

New in 8.1.28

Code Snippet - Creating a New Device in a Disabled State

```
# Add a Simulator device in a disabled state

# Define your dictionary. This is where the device will know whether to be added
in a disabled or enabled state.
# A value of 0 will add the device in a disabled state, while a value of 1 will
add the device in an enabled state.
newProps = {
            "Enabled" : 0
            }

# Call the system function
system.device.addDevice(deviceType = "Simulator",
                        deviceName = "MySimDevice",
                        deviceProps = newProps)
```

system.device.addDevice - deviceProps Listing

Below is a table of properties callable by system.device.addDevice.

> **NOTE**
>
> The `Description` and `Enabled` properties may not be configured with this function, although a device connection could be disabled with a call to system.device.setDeviceEnabled() after creating the connection.

Changed in 8.1.28

> **NOTE**
>
> Starting in version 8.1.28, you can set a device to be enabled or disabled when using system.device.addDevice, by specifying the `Enabled` property in the system function's `deviceProps` dictionary parameter. A value of "0" will add the new device in a disabled state, while a value of "1" will add the new device in an enabled state.

LogixDriver Keys

Device Property	Key
Hostname	hostname
Port	port
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Max Concurrent Requests	concurrency
Slot Number	slotnumber
Connection Path	connectionPath
Automatic Rebrowse	automaticrebrowseenabled
Identity Request Frequency	**New in 8.1.3** identityRequestFrequency
CIP Connection Size	cipconnectionsize
CIP Connection Timeout	**New in 8.1.10** cipConnectionTimeout
Enabled	**New in 8.1.28** enabled

CompactLogix Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Connection Path	path
Concurrent Requests	concurrentRequests
Disable Automatic Browse	disableAutomaticBrowse
Show String Arrays	showStringArrays
Status Request Poll Rate	pollRate
Enabled	**New in 8.1.28** enabled

com.inductiveautomation.omron.NjDriver Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Concurrency	concurrency
Connection Size	connectionSize
Slot Number	slotNumber
Date/Time Offset	dateTimeOffsetHours
Enabled	**New in 8.1.28** enabled

In addition to the keys above, the driver can be passed to a tagMap key, that allows addresses to be defined. For example:

```
props = {
            "hostName" : "10.0.0.1",
            "tagMap" :
"HOST\tNAME\tDATATYPE\tADDRESS\tCOMMENT\tTAGLINK\tRW\tPOU\n\tfoo\tUINT_BCD[0..1]\t\t\
            }

system.device.addDevice(deviceType = "com.inductiveautomation.omron.NjDriver", \
                        deviceName = "nj",\
                        deviceProps = props)
```

com.inductiveautomation.FinsTcpDeviceType

Device Property	Key
Hostname	hostname
Port	port
Timeout	timeout
Local Address	localAddress
Source Network	sourceNetwork
Source Node	sourceNode
Source Unit	sourceUnit
Destination Network	destinationNetwork
Destination Nodes	destinationNode
Destination Unit	destinationUnit
Concurrent Requests	concurrentRequests
Max Request Size	maxRequestSize
Max Gap Size	maxGapSize
Write Priority Ratio	writePriorityRatio
Enabled	**New in 8.1.28** enabled

com.inductiveautomation.FinsUdpDeviceType

Device Property	Key
Bind Address	bindAddress
Bind Port	bindPort
Remote Address	remoteAddress
Remote Port	remotePort
Timeout	timeout
Source Network	sourceNetwork
Source Node	sourceNode
Source Unit	sourceUnit
Destination Network	destinationNetwork
Destination Nodes	destinationNode
Destination Unit	destinationUnit
Concurrent Requests	concurrentRequests
Max Request Size	maxRequestSize
Max Gap Size	maxGapSize
Write Priority Ratio	writePriorityRatio
Enabled	**New in 8.1.28** enabled

com.inductiveautomation.MitsubishiTcpDeviceType

Device Property	Key
Device Series	series
Hostname	hostname
Port	port
Local Address	localAddress
Timeout	timeout
Max Gap Size	maxGapSize
Write Priority Ratio	writePriorityRatio
PC Number	**New in 8.1.43** PcNumber
Network Number	**New in 8.1.43** NetworkNumber
Request Destination Module I/O Number	**New in 8.1.43** DestinationIOModuleNumber
Request Destination Module Station Number	**New in 8.1.43** DestinationModuleStationNumber

ControlLogix Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Connection Path	path
Concurrent Requests	concurrentRequests
Disable Automatic Browse	disableAutomaticBrowse
Show String Arrays	showStringArrays
Status Request Poll Rate	pollRate
Slot Number	slotNumber
Enabled	**New in 8.1.28** enabled

com.inductiveautomation.Dnp3DeviceType Keys

Device Property	Key
Hostname	Hostname
Port	Port
Source Address	SourceAddress
Destination Address	DestinationAddress
Response Timeout	ResponseTimeout
Keep Alive Timeout	KeepAliveTimeout
Integrity Poll Period	IntegrityPollPeriod
Class 1 Poll Period	Class1PollPeriod
Class 2 Poll Period	Class2PollPeriod
Class 3 Poll Period	Class3PollPeriod
Unsolicited Event Classes	UnsolicitedEventClasses
Analog Output Command Mode	AnalogOutputCommandMode
Analog Output Read After Operate	AnalogOutputReadAfterOperate
Analog Output Read After Operate Delay	AnalogOutputReadAfterOperateDelay
Binary Output Command Mode	BinaryOutputCommandMode
Binary Output Read After Operate	BinaryOutputReadAfterOperate
Binary Output Read After Operate Delay	BinaryOutputReadAfterOperateDelay
Binary Output Trip Close Code	BinaryOutputTCC

Device Property	Key
Binary Output Operation Type	BinaryOutputOT
Binary Output Count	BinaryOutputCount
Binary Output On Time	BinaryOutputOnTime
Binary Output Off Time	BinaryOutputOffTime
Auto Time Sync	**New in 8.1.39** AutoTimeSync
Application Layer Debug Logging	AppLayerDebugLogging
Physical Layer Debug Logging	PhysLayerDebugLogging

Dnp3Driver Keys

Device Property	Key	Acceptable Values
Hostname	hostname	
Port	port	
Local Address	**New in 8.1.8** localAddress	
Source Address	sourceAddress	
Destination Address	destinationAddress	
Integrity Poll Interval	integrityPollInterval	
Direct Operate Enabled	directOperateEnabled	
Unsolicited Messages Enabled	unsolicitedMessagesEnabled	
Message Fragment Size	maxMessageFragmentSize	
Message Timeout	timeout	
Retries	retries	
Time Synchronization Enabled	**New in 8.1.17** TimeSynchronizationEnabled	
Link Layer Confirmation	linkLayerConfirmationEnabled	
Default Outstation Conformance Level	outstationConformanceDefault	• "UNKNOWN" • "ONE" • "TWO" • "THREE" • "FOUR"
Analog Input Points	analogInputDefaultValueType	• "INTEGER"

Device Property	Key	Acceptable Values
		• "SHORT" • "FLOAT" • "DOUBLE" • "VARIATION_0"
Analog Input Frozen Points	analogInputFrozenDefaultValueType	• "INTEGER" • "SHORT" • "FLOAT" • "DOUBLE" • "VARIATION_0"
Analog Output Points	analogOutputDefaultValueType	• "INTEGER" • "SHORT" • "FLOAT" • "DOUBLE" • "VARIATION_0"
Counter Points	counterDefaultValueType	• "INTEGER" • "SHORT" • "VARIATION_0"
Counter Frozen Points	counterFrozenDefaultValueType	• "INTEGER" • "SHORT" • "VARIATION_0"
Binary Input Points	binaryInputDefaultValueType	• "PACKED" • "WITH_FLAGS" • "VARIATION_0"

Device Property	Key	Acceptable Values
Double-Bit Binary Input Points	doubleBitBinaryInputDefaultValueType	• "PACKED" • "WITH_FLAGS" • "VARIATION_0"
Binary Output Points	binaryOutputDefaultValueType	• "PACKED" • "WITH_FLAGS" • "VARIATION_0"
Enabled	**New in 8.1.28** enabled	

IEC61850Driver Keys

Device Property	Key
Hostname	Hostname
Port	Port
Request Timeout	RequestTimeout
Authentication Enabled	AuthenticationEnabled
Authentication Password	AuthenticationPassword
Use SCD File	UseScdFile
Use Configured Hostname	UseConfiguredHostname
Use Configured OSI Params	UseConfiguredOsiParams
IED Name	IedName
Access Point Name	AccessPointName
Client AE Qualifier	ClientAeQualifier
Client AP Title	ClientApTitle
Client Presentation-Selector	ClientPSel
Client Session-Selector	ClientSSel
Client Transport-Selector	ClientTSel
Server AE Qualifier	ServerAeQualifier
Server AP Title	ServerApTitle
Server Presentation-Selector	ServerPSel

Device Property	Key
Server Session-Selector	ServerSSel
Server Transport-Selector	ServerTSel
Use Report Timestamp	UseReportTimestamp
Enabled	**New in 8.1.28** enabled

Micro800 Keys

Device Property	Key
Hostname	hostname
Port	port
Local Address	localAddress
Timeout	timeout
Max Concurrent Requests	concurrency
Write Priority Ratio	writePriorityRatio
Automatic Rebrowse Enabled	automaticRebrowseEnabled
CIP Connection Size	cipConnectionSize
CIP Connection Timeout	cipConnectionTimeout
Enabled	enabled

MicroLogix Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Browse Cache Timeout	browseCacheTimeout
Connection Path	path
Disable Processor Browse	disableProcessorBrowse
Zero TNS Connection	useZeroTnsConnections
Enabled	**New in 8.1.28** enabled

ModbusRtu Keys

Device Property	Key
Serial Port	serialPort
Bit Rate	bitRate
Data Bits	dataBits
Parity	parity
Stop Bits	stopBits
Handshake	handshake
Communication Timeout	communicationTimeout
RS-485 Mode	rs485Mode
Max Holding Registers Per Request	maxHoldingRegistersPerRequest
Max Input Registers Per Request	maxInputRegistersPerRequest
Max Coils Per Request	maxCoilsPerRequest
Max Discrete Inputs Per Request	maxDiscreteInputsPerRequest
Reverse Word Order	reverseWordOrder
One-based Addressing	zeroBasedAddressing2
Span Gaps	spanGaps
Allow Write Multiple Registers Request	writeMultipleRegistersRequestAllowed
Force Multiple Register Writes	forceMultipleRegisterWritesEnabled
Allow Write Multiple Coils Request	writeMultipleCoilsRequestAllowed

Device Property	Key
Allow Read Multiple Registers Request	readMultipleRegistersRequestAllowed
Allow Read Multiple Coils	readMultipleCoilsAllowed
Allow Read Multiple Discrete Inputs	readMultipleDiscreteInputsAllowed
Reconnect After Consecutive Timeouts	reconnectAfterConsecutiveTimeouts
Max Retry Count	maxRetryCount
Reverse String Byte Order	reverseStringByteOrder
Right Justify String	rightJustifyStrings
Read Raw Strings	readRawStrings
Enabled	**New in 8.1.28** enabled

ModbusRtuOverTcp and ModbusTcp Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Port	port
Communication Timeout	communicationTimeout
Concurrent Requests	**New in 8.1.0** concurrentRequests
Max Holding Registers Per Request	maxHoldingRegistersPerRequest
Max Input Registers Per Request	maxInputRegistersPerRequest
Max Coils Per Request	maxCoilsPerRequest
Max Discrete Inputs Per Request	maxDiscreteInputsPerRequest
Reverse Word Order	reverseWordOrder
One-based Addressing	zeroBasedAddressing2
Span Gaps	spanGaps
Allow Write Multiple Registers Request	writeMultipleRegistersRequestAllowed
Force Multiple Register Writes	forceMultipleRegisterWritesEnabled
Allow Write Multiple Coils Request	writeMultipleCoilsRequestAllowed
Allow Read Multiple Registers Request	readMultipleRegistersRequestAllowed
Allow Read Multiple Coils	readMultipleCoilsAllowed
Allow Read Multiple Discrete Inputs	readMultipleDiscreteInputsAllowed

Device Property	Key
Reconnect After Consecutive Timeouts	reconnectAfterConsecutiveTimeouts
Max Retry Count	maxRetryCount
Reverse String Byte Order	reverseStringByteOrder
Right Justify String	rightJustifyStrings
Read Raw Strings	readRawStrings
Enabled	**New in 8.1.28** enabled

PLC5 Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Browse Cache Timeout	browseCacheTimeout
Connection Path	path
Disable Processor Browse	disableProcessorBrowse
Zero TNS Connection	useZeroTnsConnections
Enabled	**New in 8.1.28** enabled

S7300, S7400, S71200, and S71500 Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Port	port
PDU Size	pduSize
Rack Number	rackNumber
CPU Slot Number	cpuSlotNumber
Reconnect After Consecutive Timeouts	reconnectAfterConsecutiveTimeouts
Enabled	**New in 8.1.28** enabled

SLC Keys

Device Property	Key
Hostname	hostname
Local Address	**New in 8.1.8** localAddress
Timeout	timeout
Browse Cache Timeout	browseCacheTimeout
Connection Path	path
Disable Processor Browse	disableProcessorBrowse
Zero TNS Connection	useZeroTnsConnections
Enabled	**New in 8.1.28** enabled

TCPDriver Keys

Device Property	Key	Acceptable Values
Port(s)	ports	
Address	address	
Local Address	**New in 8.1.8** localAddress	
Connect Timeout	**New in 8.1.17** ConnectTimeout	
Inactivity Timeout	inactivityTimeout	
Message Delimiter Type	messageDelimiterType	• "PacketBased" • "CharacterBased" • "FixedSize"
Message Delimiter	messageDelimiter	
Field Count	fieldCount	
Field Delimiter	fieldDelimiter	
Write Timeout	**New in 8.1.24** WriteTimeout	
Writeback Enabled	writebackEnabled	
Writeback Message Delimiter	writebackDelimiter	
Enabled	**New in 8.1.28** enabled	

UDPDriver Keys

Device Property	Key	Acceptable Values
Port(s)	ports	
Address	address	
Message Delimiter Type	messageDelimiterType	• "PacketBased" • "CharacterBased" • "FixedSize"
Message Delimiter	messageDelimiter	
Field Count	fieldCount	
Field Delimiter	fieldDelimiter	
Message Buffer Size	messageBufferSize	
Multicast	multicast	
Enabled	enabled	

system.device.listDevices

This function is used in **Python Scripting**.

Description

Returns a dataset of information about each configured device. Each row represents a single device.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.device.listDevices()
```

Parameters

Nothing.

Returns

Dataset - A dataset, where each row represents a device. Contains 4 columns:

- Name
- Enabled
- State
- Driver

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Listing Devices Configured on Your Gateway

```
deviceDataset = system.device.listDevices()

# Assign the deviceDataset to a Power Table. This example assumes
# the Power Table is in the same container as the component that called this
script
event.source.parent.getComponent('Power Table').data = deviceDataset
```

system.device.refreshBrowse

This function is used in **Python Scripting**.

Description

Forces Ignition to browse the controller. Only works for Allen-Bradley controllers using legacy Allen-Bradley drivers, such as CompactLogix and ControlLogix.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.device.refreshBrowse(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device in Ignition.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Example 1:
system.device.refreshBrowse("CLX")
```

system.device.removeDevice

This function is used in **Python Scripting**.

Description

Removes a given device from Ignition.

Client Permission Restrictions

Permission Type: Device Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.device.removeDevice(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device in Ignition.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example 1

```
# Example 1:
system.device.removeDevice("CLX")
```

system.device.restart

New in 8.1.8

This function is used in **Python Scripting**.

Description

Restarts the named device connection.

Client Permission Restrictions

Permission Type: Device Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.device.restart(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device connection to restart. The function will throw an error if the specified deviceName does not exist on the host gateway.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
system.device.restart("my_device")
```

system.device.setDeviceEnabled

This function is used in **Python Scripting**.

Description

Enables/disables a device in Ignition.

Client Permission Restrictions

Permission Type: Device Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.device.setDeviceEnabled(deviceName, enabled)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device in Ignition.
Boolean	`enabled`	Specifies whether the device connection will be set to enabled or disabled state.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Example 1: Enable a device

system.device.setDeviceEnabled("CLX", 1)
```

Code Snippet

```
# Example 2: Disable a device

system.device.setDeviceEnabled("CLX", 0)
```

system.device.setDeviceHostname

This function is used in **Python Scripting**.

Description

Changes the hostname of a device. Used for all ethernet based drivers.

Client Permission Restrictions

Permission Type: Device Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.device.setDeviceHostname(deviceName, hostname)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device in Ignition.
String	`hostname`	The new IP address or hostname.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example 1

```
# Set Hostname:

system.device.setDeviceHostname("CLX", "10.10.1.20")
```

system.device.getDeviceHostname

This function is used in Python Scripting.

Description

Returns the hostname of the device.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.device.getDeviceHostname()
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the device in Ignition.

Returns

The hostname of the device. The value will display null if the device doesn't have a hostname.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# The following example displays the device hostname
# for the device as entered in Ignition.

print system.device.getDeviceHostname(deviceName)
```

system.dnp3

> **NOTE**
>
> The following functions use system.dnp3 and the Legacy DNP3 driver. See system.dnp for DNP3 functions using the DNP3 driver.

DNP3 Functions

The following functions give you access to interact with the DNP3 devices.

directOperateAnalog

Issues a Select-And-Operate command to set an analog value in an analog output point.

directOperateBinary

Issues a Direct-Operate command for digital control operations at binary output points (CROB).

freezeAnalogs

Issues a freeze command on the given analog outputs.

freezeAnalogsAtTime

Issues a freeze command on the given analog outputs at the given time for the specified duration.

freezeCounters

Issues a freeze command on the given counters.

freezeCountersAtTime

Issues a freeze command on the given counters at the given time for the specified duration.

selectOperateAnalog

Issues a Select-And-Operate command to set an analog value in an analog output point.

selectOperateBinary

Issues a Select-And-Operate command for digital control operations at binary output points (CROB).

Functions by Scope

Gateway >

Vision >

Perspective >

Constants

- system.dnp3.NUL = 0
- system.dnp3.PULSE_ON = 1
- system.dnp3.PULSE_OFF = 2
- system.dnp3.LATCH_ON = 3
- system.dnp3.LATCH_OFF = 4
- system.dnp3.CLOSE = 1
- system.dnp3.TRIP = 2

Status Codes

Many of the dnp3 functions return a status code. Those codes and their meaning are listed below.

Code Number	Identifier Name	Description
0	SUCCESS	Request accepted, initiated, or queued.
1	TIMEOUT	Request no accepted because the operate message was received after the arm timer timed out. The arm timer was started when the select operation for the same point was received.
2	NO_SELECT	Request no accepted because no previous matching select request exists. (An operate message was sent to activate an output that was not previously armed with a matching select message).
3	FORMAT_ERROR	Request not accepted because there were formatting errors in the control request (either select, operate, or direct operate).
4	NOT_SUPPORTED	Request not accepted because a control operation is not supported for this point.
5	ALREADY_ACTIVE	Request not accepted, because the control queue is full or the point is already active.
6	HARDWARE_ERROR	Request not accepted because of control hardware problems.
7	LOCAL	Request not accepted because Local/Remote switch is in Local position.
8	TOO_MANY_OBJS	Request not accepted because too many objects appeared in the same request.
9	NOT_AUTHORIZED	Request not accepted because of insufficient authorization.

Code Number	Identifier Name	Description
10	AUTOMATION_INHIBIT	Request not accepted because it was prevented or inhibited by a local automation process.
11	PROCESSING_LIMITED	Request not accepted because the device cannot process any more activities than are presently in progress.
12	OUT_OF_RANGE	Request not accepted because the value is outside the acceptable range permitted for this point.
13 to 125	RESERVED	Reserved for future use.
126	NON_PARTICIPATING	Sent in request messages indicating that the outstation will not issue or perform the control operation.
127	UNDEFINED	Request not accepted because of some other undefined reason.

system.dnp3.directOperateAnalog

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a Select-And-Operate command to set an analog value in an analog output point.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.directOperateAnalog(deviceName, index, value, [variation])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
Integer	`index`	The index of the object to be modified in the outstation.
Numeric	`value`	The analog value that is requested (of type int, short, float, or double).
Integer	`variation`	The DNP3 object variation to use in the request.

Returns

Integer - The DNP3 **status code** of the response, as an integer.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows setting the analog output at index 0 to the
#   Double value 3.14

system.dnp3.directOperateAnalog("Dnp3", 0, 3.14)
```

Example #2

```
# This example shows setting the analog output at index 2 to the
#   Integer value 300

system.dnp3.directOperateAnalog("Dnp3", 2, 300)
```

Example #3

```
# This example shows setting the analog output at index 15 to the
#   Short value 33.  The value sent in the request is converted
#   for the object variation, 2.

system.dnp3.directOperateAnalog("Dnp3", 15, 33.3333, 2)
```

Example #4

```
# This example shows setting the analog output at index 1 to the
#   Float value 15.0.  The value sent in the request is converted
#   for the object variation, 3.

system.dnp3.directOperateAnalog("Dnp3", 1, 15, 3)
```

system.dnp3.directOperateBinary

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a Direct-Operate command for digital control operations at binary output points (CROB).

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.directOperateBinary(deviceName, indexes, opType, tcCode, count, onTime, offTime)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
List	`indexes`	A list of indexes of the objects to be modified in the outstation.
Integer	`opType`	The type of the operation. 0=NUL, 1=PULSE_ON, 2=PULSE_OFF, 3=LATCH_ON, 4=LATCH_OFF
Integer	`tcCode`	The Trip-Close code, used in conjunction with the opType. 0=NUL, 1=CLOSE, 2=TRIP
Integer	`count`	The number of times the outstation shall execute the operation.
Long	`onTime`	The duration that the output drive remains active, in millis. [optional]
Long	`offTime`	The duration that the output drive remains non-active, in millis. [optional]

Returns

The DNP3 **status code** of the response, as an integer.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows latching off 3 binary output points with the Direct-Operate
command.

off = system.dnp3.LATCH_OFF
system.dnp3.directOperateBinary("Dnp3", [0, 1, 2], off)
```

Example #2

```
# This example shows setting a binary output point at index 3 to pulse at 5 second
intervals
# with the Direct-Operate command.

pulse = system.dnp3.PULSE_OFF
trip = system.dnp3.TRIP
system.dnp3.directOperateBinary("Dnp3", [3], pulse, trip, 5000, 5000)
```

system.dnp3.freezeAnalogs

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a freeze command on the given analog outputs.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.freezeAnalogs(deviceName, [indexes])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
List	`indexes`	A list of specific indexes on which to issue the freeze command. An empty list can be passed to freeze all analogs.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows a request to freeze all analog inputs in the outstation.
system.dnp3.freezeAnalogs("Dnp3", [])
```

Example #12

```
# This example shows a request to freeze analog inputs at indexes 1, 3, and 5.
system.dnp3.freezeAnalogs("Dnp3", [1, 3, 5])
```

system.dnp3.freezeAnalogsAtTime

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a freeze command on the given analog outputs at the given time for the specified duration.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.freezeAnalogsAtTime(deviceName, absoluteTime, intervalTime, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
Integer	`absoluteTime`	The absolute time at which to freeze, in millis.
Integer	`intervalTime`	The interval at which to periodically freeze, in millis.
List	`indexes`	A list of specific indexes on which to issue the freeze command. An empty list will freeze all points.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows a request to freeze analog inputs at indexes 2 and 4,
# 5 minutes from the current time, with no interval.
from time import *

fiveMikes = (60 * 1000 * 5) + int(time() * 1000) #ms
system.dnp3.freezeAnalogsAtTime("Dnp3", fiveMikes, 0, [2, 4])
```

system.dnp3.freezeCounters

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a freeze command on the given counters.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.freezeCounters(deviceName, [indexes])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
List	`indexes`	A list of specific indexes on which to issue the freeze command. An empty list can be passed to freeze all counters. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows a request to freeze all counters in the outstation.
system.dnp3.freezeCounters("Dnp3")
```

Example #2

```
# This example shows a request to freeze counters at indexes 1, 3, and 5.
system.dnp3.freezeCounters("Dnp3", [1, 3, 5])
```

system.dnp3.freezeCountersAtTime

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a freeze command on the given counters at the given time for the specified duration.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.freezeCountersAtTime(deviceName, absoluteTime, intervalTime, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
Integer	`absoluteTime`	The absolute time at which to freeze, in millis.
Integer	`intervalTime`	The interval at which to periodically freeze, in millis.
List	`indexes`	A list of specific indexes on which to issue the freeze command. An empty list will freeze all counters.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows a request to freeze counters at indexes 2 and 4,
#  5 minutes from the current time, with no interval.
from time import *

fiveMikes = (60 * 1000 * 5) + int(time() * 1000) #ms
system.dnp3.freezeCountersAtTime("Dnp3", fiveMikes, 0, [2, 4])
```

system.dnp3.selectOperateAnalog

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a Select-And-Operate command to set an analog value in an analog output point.

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.selectOperateAnalog(deviceName, index, value, [variation])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device driver.
Integer	`index`	The index of the object to be modified in the outstation.
Numeric	`value`	The analog value that is requested (of type int, short, float, or double).
Integer	`variation`	The DNP3 object variation to use in the request. [optional]

Returns

The DNP3 **status code** of the response, as an integer.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows setting the analog output at index 0 to the Double value 3.14
system.dnp3.selectOperateAnalog("Dnp3", 0, 3.14)
```

Example #2

```
# This example shows setting the analog output at index 2 to the Integer value 300
system.dnp3.selectOperateAnalog("Dnp3", 2, 300)
```

Example #3

```

```

```
# This example shows setting the analog output at index 15 to the Short value 33.
# The value sent in the request is converted for the object variation, 2.
system.dnp3.selectOperateAnalog("Dnp3", 15, 33.3333, 2)
```

Example #4

```
# This example shows setting the analog output at index 1 to the Float value 15.0.
# The value sent in the request is converted for the object variation, 3.
system.dnp3.selectOperateAnalog("Dnp3", 1, 15, 3)
```

system.dnp3.selectOperateBinary

> **NOTE**
>
> The following function uses **system.dnp3** and the **Legacy DNP3 driver**. See **system.dnp** for **DNP3** functions using the **DNP3 driver**.

This function is used in **Python Scripting**.

Description

Issues a Select-And-Operate command for digital control operations at binary output points (CROB).

Client Permission Restrictions

Permission Type: DNP3 Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.dnp3.selectOperateBinary(deviceName, indexes, opType, tcCode, [count], [onTime], [offTime])
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the **DNP3 driver**.
List	`indexes`	A list of indexes of the objects to be modified in the outstation.
Integer	`opType`	The type of operation. 0=NUL, 1=PULSE_ON, 2=PULSE_OFF, 3=LATCH_ON, 4=LATCH_OFF
Integer	`tcCode`	The Trip-Close code, used in conjunction with the opType. 0=NUL, 1=CLOSE, 2=TRIP
Integer	`count`	The number of times the outstation shall execute the operation. [optional]
Integer	`onTime`	The duration that the output drive remains active, in millis. [optional]
Integer	`offTime`	The duration that the output drive remains non-active, in millis. [optional]

Returns

The DNP3 **status code** of the response, as an integer.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example shows latching on 3 binary output points with the Select-And-
Operate command.

latch = system.dnp3.LATCH_ON
system.dnp3.selectOperateBinary("Dnp3", [0, 1, 2], latch)
```

Example #2

```
# This example shows setting a binary output point at index 3 to pulse at 5 second
intervals
# with the Select-And-Operate command.

pulse = system.dnp3.PULSE_ON
trip = system.dnp3.TRIP
system.dnp3.selectOperateBinary("Dnp3", [3], pulse, trip, 2, 5000, 5000)
```

system.dnp

> **NOTE**
>
> The following functions use **system.dnp** and the **DNP3 driver**. See **system.dnp3** for **DNP3** functions using the **Legacy DNP3 driver**.

DNP Functions

The following functions give you access to interact with the DNP3 devices.

demandPoll

Issues a poll request for one or more classes.

directOperateAnalog

Performs a Direct Operate command on an analog point.

directOperateBinary

Performs a Direct Operate command on a binary point.

freezeAnalogs

Issues an Immediate Freeze command targeting one or more analog points.

freezeAtTimeAnalogs

Issues a Freeze at Time command targeting one or more analog points.

freezeAtTimeCounters

Issues a Freeze at Time command targeting one or more counters.

freezeClearAnalogs

Issues a Freeze and Clear command targeting one or more analog points.

freezeClearCounters

Issues a Freeze and Clear command targeting one or more counters.

freezeCounters

Issues an Immediate Freeze command targeting one or more counters.

selectOperateAnalog

Performs a Select then Operate command on an analog point.

selectOperateBinary

Performs a Select then Operate command on a binary point.

synchronizeTime

Issues a Synchronize Time command using the current Ignition Gateway time.

Functions by Scope

Gateway >

system.dnp.demandPoll

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a poll request for one or more classes.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.demandPoll(deviceName, classList)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
List	`classList`	A List of classes (1, 2, 3) to issue polls.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.demandPoll("DNP3", [1])
```

system.dnp.directOperateAnalog

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Performs a Direct Operate command on an analog point.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.directOperateAnalog(deviceName, variation, index, value)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Integer	`variation`	The Group 41 variation to use during the operation.
Integer	`index`	The index of the analog point.
Numeric	`value`	The requested value.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.directOperateAnalog("DNP3", 1, 0, 3.14)
```

system.dnp.directOperateBinary

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Performs a Direct Operate command on a binary point.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.directOperateBinary(deviceName, index, tcc, opType, count, onTime, offTime)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Integer	`index`	The index of the binary point.
Integer	`tcc`	Trip Close Code: 0=NUL, 1=CLOSE, 2=TRIP.
Integer	`opType`	Operation Type: 0=NUL, 1=PULSE_ON, 2=PULSE_OFF, 3=LATCH_ON, 4=LATCH_OFF.
Integer	`count`	The number of times the outstation shall execute the operation.
Integer	`onTime`	Duration (in milliseconds) the output drive remains active.
Integer	`offTime`	Duration (in milliseconds) the output drive remains non-active.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.directOperateBinary("DNP3", 3, 1, 3, 2, 5000, 5000)
```

system.dnp.freezeAnalogs

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues an Immediate Freeze command targeting one or more analog points.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeAnalogs(deviceName, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
List	`indexes`	The indices of the analog points to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.freezeAnalogs("Dnp3", [1, 3, 5])
```

system.dnp.freezeAtTimeAnalogs

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a Freeze at Time command targeting one or more analog points.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeAtTimeAnalogs(deviceName, absoluteTime, intervalTime, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Long	`absoluteTime`	Absolute time (in milliseconds since epoch UTC) when the initial action should occur.
Long	`intervalTime`	Interval time (in milliseconds) between periodic actions.
List	`indexes`	The indices of the analog points to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
from time import *

fiveMikes = (60 * 1000 * 5) + int(time() * 1000)
system.dnp.freezeAtTimeAnalogs("DNP3", fiveMikes, 0, [2, 4])
```

system.dnp.freezeAtTimeCounters

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a Freeze at Time command targeting one or more counters.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeAtTimeCounters(deviceName, absoluteTime, intervalTime, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Long	`absoluteTime`	Absolute time (in milliseconds since epoch UTC) when the initial action should occur.
Long	`intervalTime`	Interval time (in milliseconds) between periodic actions.
List	`indexes`	The indices of the counters to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
from time import *

fiveMikes = (60 * 1000 * 5) + int(time() * 1000)
system.dnp.freezeAtTimeCounters("DNP3", fiveMikes, 0, [2, 4])
```

system.dnp.freezeClearAnalogs

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a Freeze and Clear command targeting one or more analog points.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeClearAnalogs(deviceName, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
List	`indexes`	The indices of the analog points to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.freezeClearAnalogs("DNP3", [1, 3, 5])
```

system.dnp.freezeClearCounters

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a Freeze and Clear command targeting one or more counters.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeClearCounters(deviceName, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
List	`indexes`	The indices of the counters to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.freezeClearCounters("DNP3", [1, 3, 5])
```

system.dnp.freezeCounters

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues an Immediate Freeze command targeting one or more counters.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.freezeCounters(deviceName, indexes)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
List	`indexes`	The indices of the counters to freeze.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.freezeCounters("DNP3", [1, 3, 5])
```

system.dnp.selectOperateAnalog

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Performs a Select then Operate command on an analog point.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.selectOperateAnalog(deviceName, variation, index, value)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Integer	`variation`	The Group 41 variation to use during the operation.
Integer	`index`	The index of the analog point.
Numeric	`value`	The requested value.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.selectOperateAnalog("DNP3", 1, 0, 3.14)
```

system.dnp.selectOperateBinary

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Performs a Select then Operate command on a binary point.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.selectOperateBinary(deviceName, index, tcc, opType, count, onTime, offTime)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.
Integer	`index`	The index of the binary point.
Integer	`tcc`	Trip Close Code: 0=NUL, 1=CLOSE, 2=TRIP.
Integer	`opType`	Operation Type: 0=NUL, 1=PULSE_ON, 2=PULSE_OFF, 3=LATCH_ON, 4=LATCH_OFF.
Integer	`count`	The number of times the outstation shall execute the operation.
Integer	`onTime`	Duration (in milliseconds) the output drive remains active.
Integer	`offTime`	Duration (in milliseconds) the output drive remains non-active.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.selectOperateBinary("DNP3", 3, 1, 3, 2, 5000, 5000)
```

system.dnp.synchronizeTime

> **NOTE**
>
> The following function uses **system.dnp** and the **DNP3 driver**. For **system.dnp3** functions and the **Legacy DNP3 driver**, see **DNP3**.

This function is used in **Python Scripting**.

Description

Issues a Synchronize Time command using the current Ignition Gateway time.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.dnp.synchronizeTime(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the DNP3 device instance.

Returns

Nothing.

Scope

Gateway

Code Examples

Code Snippet

```
system.dnp.synchronizeTime("DNP3")
```

system.eam

EAM Functions

The following functions give you access to view EAM information from the Gateway.

getGroups

Returns the names of the defined agent organizational groups in the Gateway.

queryAgentHistory

Returns a list of the most recent agent events.

queryAgentStatus

Returns the current state of the matching agents.

runTask

Takes the name of a task as an argument as a string (must be configured on the Controller before hand), attempts…

Functions by Scope

Gateway >

Vision >

Perspective >

system.eam.getGroups

This function is used in **Python Scripting**.

Description

Returns the names of the defined agent organizational groups in the Gateway. This function can only be called from the Controller.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.eam.getGroups()
```

Parameters

Nothing

Returns

A list of group names.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# Return and print all of the EAM groups
groups = system.eam.getGroups()
for group in groups:
    print group
```

system.eam.queryAgentHistory

This function is used in **Python Scripting**.

Description

Returns a list of the most recent agent events. This function can only be called from the Controller.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.eam.queryAgentHistory(groupIds, agentIds, startDate, endDate, limit)
```

Parameters

Type	Parameter	Description
List	`groupIds`	A list of groups to restrict the results to. If not specified, all groups will be included.
List	`agentIds`	A list of agent names to restrict the results to. If not specified, all agents will be allowed.
Date	`startDate`	The starting time for history events. If null, defaults to 8 hours previous to now.
Date	`endDate`	The ending time for the query range. If null, defaults to "now".
int	`limit`	The limit of results to return. Defaults to 100. A value of 0 means "no limit".

Returns

Dataset - A dataset with columns id, agent_name, agent_role, event_time, event_category, event_type, event_source, event_level, event_level_int, and message, where each row is a new agent event.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 -Querying for Agent Task History

```
# This script will loop through each row of the dataset and grab out every value
from that row and assign it to a matching variable. Those variables can then be
used in some way.
results=system.eam.queryAgentHistory()
for row in range(results.rowCount):
    eventId=results.getValueAt(row, "id")
    agentName=results.getValueAt(row, "agent_name")
    agentRole=results.getValueAt(row, "agent_role")
    eventTime=results.getValueAt(row, "event_time")
    eventCategory=results.getValueAt(row, "event_category")
    eventType=results.getValueAt(row, "event_type")
    eventSource=results.getValueAt(row, "event_source")
    eventLevel=results.getValueAt(row, "event_level")
    eventLevelInt=results.getValueAt(row, "event_level_int")
    message=results.getValueAt(row, "message")
    #Can include some code here to use the variables in some way for each row.
```

Example #2 - Querying for Agent Task History

```
# This script grabs the agent event history from agents called Agent1, Agent2,
Agent3, and will then place the data into a table on the same window.
results=system.eam.queryAgentHistory(agentIds=["Agent1", "Agent2", "Agent3"])
event.source.parent.getComponent('Table').data = results
```

system.eam.queryAgentStatus

This function is used in **Python Scripting**.

Description

Returns the current state of the matching agents. This function can only be called from the Controller.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.eam.queryAgentStatus(groupIds, agentIds, isConnected)
```

Parameters

Type	Parameter	Description
List	`groupIds`	A list of groups to restrict the results to. If not specified, all groups will be included.
List	`agentIds`	A list of agent names to restrict the results to. If not specified, all agents will be allowed.
Boolean	`isConnected`	If True, only returns agents that are currently connected. If False, only agents that are considered down will be returned, and if not specified, all agents will be returned.

Returns

Dataset - A dataset with columns AgentName, NodeRole, AgentGroup, LastCommunication, IsConnected, IsRunning, RunningState, RunningStateInt, LicenseKey, and Version, where each row is a new agent.

> **NOTE**
>
> Possible values for RunningState and RunningStateInt are: 0 = Disconnected, 1 = Running, 2 = Warned, 3 = Errored

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Querying Agent Status Information

```
# This script will loop through each row of the dataset and grab out every value
from that row and assign it to a matching variable. Those variables can then be
used in some way.
results=system.eam.queryAgentStatus()
for row in range(results.rowCount):
    agentName=results.getValueAt(row, "AgentName")
    nodeRole=results.getValueAt(row, "NodeRole")
    agentGroup=results.getValueAt(row, "AgentGroup")
    lastComm=results.getValueAt(row, "LastCommunication")
    isConnected=results.getValueAt(row, "IsConnected")
    isRunning=results.getValueAt(row, "IsRunning")
    runningState=results.getValueAt(row, "RunningState")
    runningStateInt=results.getValueAt(row, "RunningStateInt")
    licenseKey=results.getValueAt(row, "LicenseKey")
    platformVersion=results.getValueAt(row, "Version")
    # Can include some code here to use the variables in some way for each row
like printing each variable to the console.
```

Example #2 - Querying Agent Status Information

```
# This script will grab status information from agents called Agent1, Agent2,
Agent3, and will then place the data into a table on the same window.
results=system.eam.queryAgentStatus(agentIds=["Agent1", "Agent2", "Agent3"])
event.source.parent.getComponent('Table').data = results
```

system.eam.runTask

This function is used in **Python Scripting**.

Description

Takes the name of a task as an argument as a string (must be configured on the Controller before hand), attempts to execute the task. This function can only be called from the Controller.

To run in the client, the user needs a **role-based permission**. This permission is disabled by default.

Client Permission Restrictions

Permission Type: EAM Task Execution

Syntax

```
system.eam.runTask(taskname)
```

Parameters

Type	Parameter	Description
String	`taskname`	Name of the task to run. If more than one task has this name, an error will be returned.

Returns

A `UIResponse` with a list of infos, errors, and warnings. The **UIResponse** object is functionally a list of runTask objects.

Scope

Gateway, Vision Client, Perspective Session

UI Response

The `UIResponse` is an object containing three lists, each containing different logging information about the task that was run. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the task.
- `getErrors()` - Returns a list of error messages that were encountered during the task.
- `getInfos()` - Returns a list of "info" messages that were encountered during the tasks.

These messages represent normal logging events that occurred during the task, and can be useful when trying to visualize the events that lead up to a task failure.

Code Examples

Example #1

```
# Simply execute a task called 'Collect Backup'
taskName = "Collect Backup"
response = system.eam.runTask(taskName)
```

Example #2

```
# Execute a task and display the responses from it.

# create a function to print out the responses in a nice format
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

# Run the task
taskName = "Collect Backup"
response = system.eam.runTask(taskName)

# Print out the returned Warnings (if any)
warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

# Print out the returned Errors (if any)
errors = response.getErrors()
print "Errors are:"
printResponse(errors)

# Print out the returned Info (if any)
infos = response.getInfos()
print "Infos are:"
printResponse(infos)
```

system.file

File Functions

The following functions give you access to read and write to files.

fileExists

Checks to see if a file or folder at a given path exists.

getTempFile

Creates a new temp file on the host machine with a certain extension, returning the path to the file.

openFile

Shows an "Open File" dialog box, prompting the user to choose a file to open.

openFiles

Shows an "Open File" dialog box, prompting the user to choose a file or files to open.

readFileAsBytes

Opens the file found at path filename, and reads the entire file.

readFileAsString

Opens the file found at path filename, and reads the entire file. Returns the file as a string.

saveFile

Prompts the user to save a new file named filename.

writeFile

Writes the given data to the file at file path filename.

Functions by Scope

Gateway >

Vision >

Perspective >

system.file.fileExists

This function is used in **Python Scripting**.

Description

Checks to see if a file or folder at a given path exists.

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.fileExists(filepath)
```

Parameters

Type	Parameter	Description
String	`filepath`	The path of the file or folder to check.

Returns

Boolean - True if the file/folder exists, false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This basic example shows how the fileExists function is used in its simplest
form:
if system.file.fileExists("C:\\temp_file.txt"):
   system.gui.messageBox("Yes, the file exists")
else:
   system.gui.messageBox("No, it doesn't exist")
```

Example #2

```
# This code uses the fileExists function, along with other system.file.*
functions, to prompt the user to confirm that they want to overwrite an existing
file.
filename = system.file.saveFile(name)
if filename != None:
   reallyWrite = 1
   if system.file.fileExists(filename):
   overwriteMessage = "File '%s' already exists. Overwrite?"
      reallyWrite = system.gui.confirm(overwriteMessage % filename)
   if reallyWrite:
      system.file.writeFile(filename, "This will be the contents of my new file")
```

system.file.getTempFile

This function is used in **Python Scripting**.

Description

Creates a new temp file on the host machine with a certain extension, returning the path to the file. The file is marked to be removed when the Java VM exits.

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.getTempFile(extension)
```

Parameters

Type	Parameter	Description
String	`extension`	An extension, like ".txt", to append to the end of the temporary file.

Returns

String - The path to the newly created temp file.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code writes some data to a temporary file, and then opens that file.
# Assume that the data variable holds the contents of an Excel (xls) file.

filename = system.file.getTempFile("xls")
system.file.writeFile(filename, data)
system.net.openURL("file://" + filename)
```

system.file.openFile

This function is used in **Python Scripting**.

Description

Shows an "Open File" dialog box, prompting the user to choose a file to open. Returns the path to the file that the user chose, or None if the user canceled the dialog box. An extension can optionally be passed in that sets the filetype filter to that extension.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.openFile([extension], [defaultLocation])
```

Parameters

Type	Parameter	Description
String	`extension`	A file extension, such as "pdf", to try to open. [optional]
String	`defaultLocation`	A folder location, such as "C:\MyFiles", to use as the default folder to store in. [optional]

Returns

String - The path to the selected file, or Nothing if canceled.

Scope

Vision Client

Code Examples

Example #1 - Opening a File

```
# This code would prompt the user to open a file of type 'gif'. If None is
returned, it means the user canceled the open dialog box.

path = system.file.openFile('gif')
if path != None:
   # do something with the file
```

Example #2 - Opening a File and Specifying a Default Location

```
# This code would prompt the user to open a file of type 'pdf' from their stored
documents folder. If None is returned, it means the user canceled the open dialog
box.
# Note: the computer running this code needs to have network access to the
"fileserver" computer.
path = system.file.openFile('pdf', '\\fileserver\PDF_Storage')
if path != None:
   # do something with the file
```

system.file.openFiles

This function is used in **Python Scripting**.

Description

Shows an "Open File" dialog box, prompting the user to choose a file or files to open. Returns the paths to the files that the user chooses, or None if the user canceled the dialog box. An extension can optionally be passed in that sets the filetype filter to that extension.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.openFiles([extension], [defaultLocation])
```

Parameters

Type	Parameter	Description
String	`extension`	A file extension, such as "pdf", to try to open. [optional]
String	`defaultLocation`	A folder location, such as "C:\MyFiles", to use as the default folder to store in. [optional]

Returns

List - The paths to the selected files, or None if canceled.

Scope

Vision Client

Code Examples

Example #1

```
# This code would prompt the user to open files of type 'gif'. If None is
returned, it means the user canceled the open dialog box.

paths = system.file.openFiles('gif')
if paths != None:
   # do something with the file
```

Example #2

```
# This code would prompt the user to open files of type 'pdf' from their stored
documents folder. If None is returned, it means the user canceled the open dialog
box.
# Note: the computer running this code needs to have network access to the
"fileserver" computer.
path = system.file.openFiles('pdf', '\\fileserver\PDF_Storage')
if path != None:
   # do something with the file
```

Example #3

```
# This code prompts the user to open files of any type and loop through all
returned file paths.

paths = system.file.openFiles()
if len(paths) != 0:
    for path in paths:
        # Do something with the file.
        print path
```

system.file.readFileAsBytes

This function is used in **Python Scripting**.

Description

Opens the file found at path filename, and reads the entire file. Returns the file as an array of bytes. Commonly this array of bytes is uploaded to a database table with a column of type BLOB (Binary Large OBject). This upload would be done through an INSERT or UPDATE SQL statement run through the system.db.runPrepUpdate function. You could also write the bytes to another file using the system.file.writeFile function, or send the bytes as an email attachment using system.net.sendEmail.

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.readFileAsBytes(filepath)
```

Parameters

Type	Parameter	Description
String	`filepath`	The path of the file to read.

Returns

List[Byte] - The contents of the file as an array of bytes.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would prompt the user to choose a file. If the user chooses a file, it
would then read that file and upload it to a database table called Files into a
BLOB column called file_data.

path = system.file.openFile()
if path != None:
   bytes = system.file.readFileAsBytes(path)
   system.db.runPrepUpdate("INSERT INTO Files (file_data) VALUES (?)", [bytes])
```

system.file.readFileAsString

This function is used in **Python Scripting**.

Description

Opens the file found at path filename, and reads the entire file. Returns the file as a string. Common things to do with this string would be to load it into the text property of a component, upload it to a database table, or save it to another file using system.file.writeFile function.

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.file.readFileAsString(filepath, [encoding])
```

Parameters

Type	Parameter	Description
String	`filepath`	The path of the file to read.
String	`encoding`	The character encoding of the file to be read. Will throw an exception if the string does not represent a supported encoding. Common encodings are "UTF-8", "ISO-8859-1" and "US-ASCII". Default is your system's default. [optional]

Returns

String - The contents of the file as a string.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Reading File as String

```
# This code would prompt the user to choose a text file. If the user chooses a
file, it would then set a text area on the screen to display the file.

path = system.file.openFile("txt")
if path != None:
   contents = system.file.readFileAsString(path)
   event.source.parent.getComponent("Text Area").text = contents
```

system.file.saveFile

This function is used in **Python Scripting**.

Description

Prompts the user to save a new file named filename. The optional extension and typeDesc arguments will be used for a file type filter, if any. If the user accepts the save, the path to that file will be returned. If the user cancels the save, None will be returned.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax #1

```
system.file.saveFile(filename)
```

Parameters

Type	Parameter	Description
String	`filename`	A file name to suggest to the user.

Returns

String - The path to the file that the user decided to save to, or None if they canceled.

Scope

Vision Client

Syntax #2

`system.file.saveFile(filename, [extension], [typeDesc])`

Parameters

Type	Parameter	Description
String	`filename`	A file name to suggest to the user.
String	`extension`	The appropriate file extension, like "jpeg", for the file. [optional]
String	`typeDesc`	A description of the extension, like "JPEG Image". [optional]

Returns

String - The path to the file that the user decided to save to, or None if they canceled.

Scope

Vision Client

Code Examples

Example #1 - Saving a File (Text Area)

```
# This code would prompt the user to save the text in a text area to a file.

path = system.file.saveFile("myfile.txt")
if path is not None:
   system.file.writeFile(path, event.source.parent.getComponent("Text Area").text)
```

Example #2 - Saving a File (Script Console)

```

```

```
# This code prompts the user to save direct text in the system.file.writeFile()'s
data parameter to a file.

path = system.file.saveFile("myfile.txt")
if path is not None:
  system.file.writeFile(path, "Hello World")
```

system.file.writeFile

This function is used in **Python Scripting**.

Description

Writes the given data to the file at file path filename. If the file exists, the append argument determines whether or not it is overwritten (the default) or appended to. The data argument can be either a string or an array of bytes (commonly retrieved from a BLOB in a database or read from another file using system.file.readFileAsBytes).

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax (charData param)

```
system.file.writeFile(filepath, charData, [append], [encoding])
```

Parameters

Type	Parameter	Description
String	`filepath`	The path of the file to write to.
String	`charData`	The character content to write to the file.
Boolean	`append`	If true, the file will be appended to if it already exists. If false, the file will be overwritten if it exists. The default is false. [optional]
String	`encoding`	The character encoding of the file to write. Will throw an exception if the string does not represent a supported encoding. Common encodings are "UTF-8", "ISO-8859-1" and "US-ASCII". Default is "UTF-8". [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Syntax (data param)

```
system.file.writeFile(filepath, data, [append], [encoding])
```

Parameters

Type	Parameter	Description
String	`filepath`	The path of the file to write to.
Byte[]	`data`	The binary content to write to the file.
Boolean	`append`	If true, the file will be appended to if it already exists. If false, the file will be overwritten if it exists. The default is false. [optional]
String	`encoding`	The character encoding of the file to write. Will throw an exception if the string does not represent a supported encoding. Common encodings are "UTF-8", "ISO-8859-1" and "US-ASCII". Default is "UTF-8". [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

> **CAUTION**
>
> The system.file.saveFile function used in the examples below is only a Vision Client function, so the following scripts will not work in Perspective.

Example #1

```
#This code would download a BLOB from a database and save it to a file.

resultSet = system.db.runQuery("SELECT file_data FROM Files WHERE id=12")
   if len(resultSet) > 0: # if the query returned anything...
      data = resultSet[0][0] # grab the BLOB at the 0th row and 0th column
      filename = system.file.saveFile("MyDownloadedFile.xyz")
      if filename is not None:
         system.file.writeFile(filename, data)
```

Example #2

```
# This code would write the contents of a text area to a file.

data = event.source.parent.getComponent("Text Area").text
filename = system.file.saveFile("MyDownloadedFile.txt")
if filename is not None:
   system.file.writeFile(filename, data)
```

system.groups

Transaction Group Functions

The following functions give you access to import and remove Transaction Groups.

loadFromFile

Loads a transaction group configuration from an xml export, into the specified project (creating the project if nec…

removeGroups

Removes the specified groups from the project.

Functions by Scope

Gateway >

Perspective >

system.groups.loadFromFile

This function is used in **Python Scripting**.

Description

Loads a transaction group configuration from an xml export, into the specified project (creating the project if necessary). The mode parameter dictates how overwrites occur.

> **NOTE**
>
> This function is scoped for Perspective Sessions, but since all scripts in Perspective run on the Gateway, the file must be located on the Gateway's file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.groups.loadFromFile(filePath, projectName, mode)
```

Parameters

Type	Parameter	Description
String	`filePath`	The path to a valid transaction group xml or csv file.
String	`projectName`	The name of the project to load into.
int	`mode`	How duplicates will be handled. 0 = Overwrite, 1 = Ignore, 2 = Replace the existing project with this one.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Example #1 - Loading a Transaction Group Into a Project

```
# Note that backslashes are used in Windows filepaths, but are also escaped in
Python. Thus, we use the double-backslashes here.
path = "C:\\Users\\user\\Desktop\\group.xml"

projName = "MyProject"

# Read a Transaction Group from a file and overwrite any preexisting groups that
match those in our file.
system.groups.loadFromFile(path, projName, 0)
```

system.groups.removeGroups

This function is used in **Python Scripting**.

Description

Removes the specified groups from the project. The group paths are `Folder/Path/To/GroupName`, separated by forward slashes.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.groups.removeGroups(projectName, paths)
```

Parameters

Type	Parameter	Description
String	`projectName`	The project to remove from. If the project does not exist, throws an IllegalArgumentException.
List[String]	`paths`	A list of paths to remove. Group paths are the full path to the resource, separated by forward slashes, e.g., "Folder/Path/To/GroupName".

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Example #1 - Removing Transaction Group from Project

```
projName = "MyProject"
groups = ["Historical/Group1","DataSync/Group2"]

system.groups.removeGroups(projName, groups)
```

system.gui

GUI Functions

The following functions allow you to control windows and create popup interfaces.

chooseColor

Prompts the user to pick a color using the default color-chooser dialog box.

closeDesktop

Allows you to close any of the open desktops associated with the current client.

color

Creates a new color object, either by parsing a string or by having the RGB[A] channels specified explicitly.

confirm

Displays a confirmation dialog box to the user with Yes and No options, and a custom message.

convertPointToScreen

Converts a pair of coordinates that are relative to the upper-left corner of a component to be relative to the upper-…

createPopupMenu

Creates a new popup menu, which can then be shown over a component on a mouse event.

desktop

Allows for invoking system.gui functions on a specific desktop.

errorBox

Displays an error-style message box to the user.

findWindow

Finds and returns a list of windows with the given path.

getCurrentDesktop

Returns the handle of the desktop this function was called from.

getScreenIndex

Returns an integer value representing the current screen index based on the screen from which this function was…

getDesktopHandles

Gets a list of all secondary handles of the open desktops associated with the current client.

getOpenedWindowNames

Finds all of the currently open windows and returns a tuple of their paths.

getOpenedWindows

Finds all of the currently open windows and returns a tuple of references to them.

getParentWindow

Finds the parent (enclosing) window for the component that fired an event and returns a reference to it.

getQuality

Returns the data quality for the property of the given component as an integer.

getScreens

Get a list of all the monitors on the computer this client is open on.

getSibling

Given a component event object, looks up a sibling component.

getWindow

Finds a reference to an open window with the given name.

getWindowNames

Returns a list of the paths of all windows in the current project, sorted alphabetically.

inputBox

Opens up a popup input dialog box.

isTouchscreenModeEnabled

Checks whether or not the running Client's Touch Screen mode is currently enabled.

messageBox

Displays an informational-style message popup box to the user.

openDesktop

Creates an additional Desktop in a new frame.

openDiagnostics

Opens the client runtime diagnostics window, which provides information regarding performance, logging, active…

passwordBox

Pops up a special input box that uses a password field, so the text isn't echoed back in clear-text to the user.

setScreenIndex

Moves an open client to a specific monitor.

setTouchscreenModeEnabled

Alters a running Client's Touch Screen mode on the fly.

showNumericKeypad

Displays a modal on-screen numeric keypad, allowing for arbitrary numeric entry using the mouse, or a finger on …

showTouchscreenKeyboard

Displays a modal on-screen keyboard, allowing for arbitrary text entry using the mouse, or a finger on a touchscr…

transform

Sets a component's position and size at runtime.

warningBox

Displays a message to the user in a warning style popup dialog.

Functions by Scope

Vision ›

Constants

- system.gui.ACCL_NONE = 0

- system.gui.ACCL_CONSTANT = 1
- system.gui.ACCL_FAST_TO_SLOW = 2
- system.gui.ACCL_SLOW_TO_FAST = 3
- system.gui.ACCL_EASE = 4
- system.gui.COORD_SCREEN = 0
- system.gui.COORD_DESIGNER = 1

system.gui.chooseColor

This function is used in **Python Scripting**.

Description

Prompts the user to pick a color using the default color-chooser dialog box.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.chooseColor(initialColor, [dialogTitle])
```

Parameters

Type	Parameter	Description
Color	`initialColor`	A color to use as a starting point in the color choosing popup.
String	`dialogTitle`	The title for the color choosing popup. Defaults to "Choose Color". [optional]

Returns

Color - The new color chosen by the user.

Scope

Vision Client

Code Examples

Example #1

```
# This code would be placed in the actionPerformed event of a button
# and would change the background color of the container the button was placed in.

parent = event.source.parent
newColor = system.gui.chooseColor(parent.background)
parent.background = newColor
```

system.gui.closeDesktop

This function is used in **Python Scripting**.

Description

Allows you to close any of the open desktops associated with the current client. See the **Multi-Monitor Clients** page for more details about using multiple monitors.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.closeDesktop(handle)
```

Parameters

Type	Parameter	Description
String	`handle`	The handle for the desktop to close. The screen index cast as a string may be used instead of the handle. If omitted, this will default to the primary desktop. Alternatively, the handle "primary" can be used to refer to the primary desktop.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# The following example will close this desktop
system.gui.closeDesktop()
```

Example #2

```
# The following example will close desktop 2
# The handle must be a string
system.gui.closeDesktop("2")
```

Example #3

```
# The following example will close the desktop named "Left Monitor"
system.gui.closeDesktop("Left Monitor")
```

system.gui.color

This function is used in **Python Scripting**.

Description

Creates a new color object, either by parsing a string or by having the RGB[A] channels specified explicitly. See **toColor** to see a list of available color names.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax (String)

```
system.gui.color(color)
```

Parameters

Type	Parameter	Description
String	`color`	A string that will be coerced into a color. Can accept many formats, such as "red" or "#FF0000" or "255,0,0".

Returns

Color - The newly created color.

Scope

Vision Client

Syntax (int)

`system.gui.color(red, green, blue, [alpha])`

Parameters

Type	Parameter	Description
Integer	`red`	The red component of the color, an integer 0-255.
Integer	`green`	The green component of the color, an integer 0-255.
Integer	`blue`	The blue component of the color, an integer 0-255.
Integer	`alpha`	The alpha component of the color, an integer 0-255. [optional]

Returns

Color - The newly created color.

Scope

Vision Client

Code Examples

Example #1

```
# This example changes the background color of a component to red.

myComponent = event.source
myComponent.background = system.gui.color(255,0,0) # turn the component red
```

system.gui.confirm

This function is used in **Python Scripting**.

Description

Displays a confirmation dialog box to the user with "Yes" and "No" options, and a custom message.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.confirm(message, [title], [allowCancel])
```

Parameters

Type	Parameter	Description
String	`message`	The message to show in the confirmation dialog.
String	`title`	The title for the confirmation dialog. [optional]
Boolean	`allowCancel`	Show a cancel button in the dialog. [optional]

Returns

Boolean - True if the user selected "Yes"; false if the user selected "No". None if the user selected "Cancel".

Scope

Vision Client

Code Examples

Example #1

```
# By using the confirm function in an if statement, we can let the user confirm an
action.
# In this case, we shut down the plant if the user confirms it, otherwise, we
don't do anything.

if system.gui.confirm("Are you sure you want to shutdown the plant?", "Really
Shutdown?"):
   system.db.runUpdateQuery("UPDATE ControlTable SET Shutdown=1")
```

system.gui.convertPointToScreen

This function is used in **Python Scripting**.

Description

Converts a pair of coordinates that are relative to the upper-left corner of a component to be relative to the upper-left corner of the entire screen.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.convertPointToScreen(x, y, event)
```

Parameters

Type	Parameter	Description
Integer	`x`	The X-coordinate, relative to the component that fired the event.
Integer	`y`	The Y-coordinate, relative to the component that fired the event.
EventObject	`event`	An event object for a component event.

Returns

Tuple - A tuple of (x,y) in screen coordinates.

Scope

Vision Client

Code Example

Code Snippet - Getting Location of Mouse Click

```
# This example gets the coordinates where the mouse is (from the corner of the
monitor) and displays them in a label.
# Get the screen coordinates of the pointer and write them to a label.
# For this example, the code was placed on the root container of a window under
the mouseClicked event handler.

coords = system.gui.convertPointToScreen(event.x, event.y, event)
event.source.getComponent('Label').text = "x: %s y: %s" %(coords[0], coords[1])
```

system.gui.createPopupMenu

This function is used in **Python Scripting**.

Description

Creates a new popup menu, which can then be shown over a component on a mouse event. To use this function, first create a Python sequence whose entries are strings, and another sequence whose entries are function objects. The strings will be the items that are displayed in your popup menu, and when an item is clicked, its corresponding function will be run. Your functions must accept an event object as an argument. See also: **Functions**.

The function returns a JPopupMenu. This object has a show(event) function that allows your code to determine when the popup menu should show itself. See the examples for more information.

> **NOTE**
>
> A popup menu must be created on either the mousePressed or mouseReleased event handlers. This function is not appropriate for invoking on the property change event.
>
> Also, the mouse motions that invoke the popup menu are dependent on the operating system and may behave differently depending on which button you press on the mouse. Because of the different popup-trigger settings on different operating systems, the example code may behave differently on Linux or iOS. The way around this is to do the same code in both the mousePressed and mouseReleased events. In order to avoid code duplication, consider placing the code in a custom method.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.createPopupMenu(itemNames, itemFunctions)
```

Parameters

Type	Parameter	Description
List[String]	`itemNames`	A list of names to create popup menu items with.
List[String]	`itemFunctions`	A list of functions to match up with the names. Passing in a None object will cause a separator line to appear in the popup menu, and the corresponding string will not be displayed (note that a corresponding string must be supplied, since the number of elements in the itemFunctions parameter must always match the number of elements in the itemNames parameter).

Returns

JPopupMenu - The **javax.swing.JPopupMenu** that was created.

Scope

Vision Client

Code Examples

Example #1

```
# This first example demonstrates the fundamentals of making a popup menu. Put the
following script in the mouseReleased event of a component.
# This will only work on Windows - continue on for cross-platform instructions.
# Right click on the component to see the resulting pop-up menu that is created
with this code.

def sayHello(event):
   system.gui.messageBox("Hello World")
menu = system.gui.createPopupMenu(["Click Me"], [sayHello])
menu.show(event)
```

Example #2 - Adding a Separator

```
# Similar to the first example, we'll add an additional option, as well as a
separator between the two options.

def sayHello(event):
   system.gui.messageBox("Hello World")

def sayGoodbye(event):
   system.gui.messageBox("See you later")

menu = system.gui.createPopupMenu(["Say Hi", "Separator", "Say Goodbye"],
[sayHello, None, sayGoodbye])
menu.show(event)
```

Example #3

```
# The following code demonstrates how to edit a component's custom property after
you right clicked the component.
# This code makes use of functions in order to edit the components custom
properties.
# The following code should be located in the mouse released event handler.
# Also, there must be custom properties present on the component in order to
handle these functions.
# For example, there must be a custom property called 'DatabaseProvider' that
takes a string.
if event.button != event.BUTTON1:
    def editDatabaseProvider(event):
        result = system.gui.inputBox("Database
Provider",event.source.parent.DatabaseProvider)
        event.source.parent.DatabaseProvider = result

    def editTable(event):
        result = system.gui.inputBox("Table Name",event.source.parent.Table)
        event.source.parent.Table = result

    def editColumn(event):
        result = system.gui.inputBox("Column Name",event.source.parent.Column)
        event.source.parent.Column = result

    def editKeyColumn(event):
        result = system.gui.inputBox("Key Column
Name",event.source.parent.KeyColumn)
        event.source.parent.KeyColumn = result

    names = ["Edit DB Provider", "Edit Table Name", "Edit Column Name", "Edit Key
Column"]
    functions = [editDatabaseProvider, editTable, editColumn, editKeyColumn]
    menu = system.gui.createPopupMenu(names, functions)
    menu.show(event)
```

Example #4

```
# This example shows a nested popup menu, with menus within menus.  All menu items
call sayHello().
def sayHello(event):
   system.gui.messageBox("Hello World")
subMenu = [["Click Me 2", "Click Me 3"], [sayHello, sayHello]]
menu = system.gui.createPopupMenu(["Click Me", "SubMenu"], [sayHello, subMenu])
menu.show(event)
```

system.gui.desktop

This function is used in **Python Scripting**.

Description

Allows for invoking system.gui functions on a specific desktop.

See the **Multi-Monitor Clients** page for more details.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.desktop(handle)
```

Parameters

Type	Parameter	Description
String	`handle`	The handle for the desktop to use. The screen index cast as a string may be used instead of the handle. If omitted, this will default to the primary desktop. Alternatively, the handle "primary" can be used to refer to the primary desktop.

Returns

WindowUtilities - A copy of **system.gui** (**WindowUtilities**) that will be relative to the desktop named by the given handle.

Scope

Vision Client

Code Examples

Example #1 - Opening Message Box in a Different Desktop

```
# The following example makes a message box appear on the primary desktop,
# regardless of where the script originates.
# system.gui.desktop() function requires a handle be passed to it for this example
# to work properly.

system.gui.desktop().messageBox("This will appear on the Primary Desktop")
```

Example #2 - Showing Open Windows in a Specific Desktop

```
# Retrieves a list of open windows in a specific Desktop. This example assumes a
desktop with the handle "2nd Desktop" exists.
name = "2nd Desktop"
# Returns a tuple of open windows in the Desktop named "2nd Desktop".
windows = system.gui.desktop(name).getOpenedWindows()

# Converts the tuple to a string, and shows the items in a message box.
system.gui.messageBox(str(windows))
```

system.gui.errorBox

This function is used in **Python Scripting**.

Description

Displays an error-style message box to the user.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.errorBox(message, [title])
```

Parameters

Type	Parameter	Description
String	`message`	The message to display in an error box. Will accept HTML formatting.
String	`title`	The title for the error box. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1 - Using Error Box

```
# Turn on compressor #12, but only if the user has the right credentials.

if 'Supervisor' in system.security.getRoles():
    updateQuery = "UPDATE CompressorControl SET running=1 WHERE compNum = 12"
    system.db.runUpdateQuery(updateQuery)
else:
    errorMessage = "Unable to turn on Compressor 12."
    errorMessage += " You don't have proper security privileges."
    system.gui.errorBox(errorMessage)
```

system.gui.findWindow

This function is used in **Python Scripting**.

Description

Finds and returns a list of windows with the given path. If the window is not open, an empty list will be returned. Useful for finding all instances of an open window that were opened with **system.nav.openWindowInstance**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.findWindow(path)
```

Parameters

Type	Parameter	Description
String	`path`	The path of the window to search for.

Returns

List - A list of **window objects**. May be empty if window is not open, or have more than one entry if multiple windows are open.

Scope

Vision Client

Code Examples

Example #1 - Finding a Window and Closing It

```
# This example finds all open instances of the window named "Popup" and closes
them all.

allInstances = system.gui.findWindow("Popup")
for window in allInstances:
    system.nav.closeWindow(window)
```

system.gui.getCurrentDesktop

This function is used in **Python Scripting**.

Description

Returns the handle of the desktop this function was called from. Commonly used with the **system.gui.desktop** and **system.nav.desktop** functions.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getCurrentDesktop( )
```

Parameters

Nothing

Returns

String - The handle of the current desktop.

Scope

Vision Client

Code Example

Getting a Desktop's Handle

```
```

```
# Shows the desktop's handle in a message box.
system.gui.messageBox("This desktop's handle is: %s" %
system.gui.getCurrentDesktop())
```

system.gui.getScreenIndex

This function is used in **Python Scripting**.

Description

Returns an integer value representing the current screen index based on the screen from which this function was called.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getScreenIndex()
```

Parameters

Nothing

Returns

Integer - The screen from which the function was called.

Scope

Vision Client

Code Examples

Example #1

```
# Prints an integer representing the screen from which the function was called.
print system.gui.getScreenIndex()
```

system.gui.getDesktopHandles

This function is used in **Python Scripting**.

Description

Gets a list of all **secondary** handles of the open desktops associated with the current client. In this case, **secondary** means any desktop frame opened by the original client frame.

For example, if the original client opened two new frames ('left client' and 'right client'), then this function would return ['left client', 'right client'].

See the **Multi-Monitor Clients** page for more details.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getDesktopHandles()
```

Parameters

Nothing

Returns

List[Any] - A Python list of unicode strings, representing the handle of all secondary desktop frames.

Scope

Vision Client

Code Examples

Example #1 - Getting Desktop Handles

```
# The following example list all handles (except the main client)
# in the client console (Help -> Diagnostics -> Console)

print system.gui.getDesktopHandles()
```

Example #2 - Putting Desktop Handles in a Table

```
# Create the header and fetch handle names
header = ["Desktop Names"]
handleList = system.gui.getDesktopHandles()

# change the handle name list into a column
handleColumn = [[name] for name in handleList]

# display the handle list in a table component
event.source.parent.getComponent('Handles Table').data =
system.dataset.toDataSet(header, handleColumn)
```

system.gui.getOpenedWindowNames

This function is used in **Python Scripting**.

Description

Finds all of the currently open windows and returns a tuple of their paths.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getOpenedWindowNames()
```

Parameters

Nothing

Returns

Tuple - A tuple of strings, representing the path of each window that is open. Printing the return value will display results in the Vision Client console if not writing to a component property.

Scope

Vision Client

Code Examples

Example #1 - Printing Open Window Paths

```
# This example prints out into the console the full path for each opened window.

windows = system.gui.getOpenedWindowNames()
print 'There are %d windows open' % len(windows)
for path in windows:
    print path
```

system.gui.getOpenedWindows

This function is used in **Python Scripting**.

Description

Finds all of the currently open windows and returns a tuple of references to them.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getOpenedWindows()
```

Parameters

Nothing

Returns

Tuple - A tuple of the opened windows, not their names, but the actual **window** objects themselves. Printing the return value will display results in the Vision Client console if not writing to a component property.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This example prints out the path of each currently opened window to the console.

windows = system.gui.getOpenedWindows()
print 'There are %d windows open' % len(windows)
for window in windows:
    print window.getPath()
```

system.gui.getParentWindow

This function is used in **Python Scripting**.

Description

Finds the parent (enclosing) window for the component that fired an event and returns a reference to it.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getParentWindow(event)
```

Parameters

Type	Parameter	Description
EventObject	`event`	A component event object.

Returns

FPMIWindow - The **window** that contains the component that fired the event.

Scope

Vision Client

Code Examples

Example #1 - Getting Window and Changing Its Title

```
# Use this in an event script to change the window's title.

window = system.gui.getParentWindow(event)
window.title='This is a new title'
```

system.gui.getQuality

This function is used in **Python Scripting**.

Description

Returns the data quality for the property of the given component as an integer. This function can be used to check the quality of a Tag binding on a component in the middle of the script so that alternative actions can be taken in the event of device disconnections.

A description of the quality codes can be found on the **Quality Codes and Overlays** page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getQuality(component, propertyName)
```

Parameters

Type	Parameter	Description
JComponent	`component`	The component whose property is being checked.
String	`propertyName`	The name of the property as a string value.

Returns

Integer - The data quality of the given property as an integer.

Scope

Vision Client

Code Examples

Example #1

```
# The following code checks the quality code on an component. If a quality is
anything other than good, a message appears.

# Fetch the quality code from the Value property on a Numeric Label. The Numeric
Label in this example is inside the same container as this script.
qualityCode = system.gui.getQuality(event.source.parent.getComponent('Numeric
Label'), "value")

# Evaluate the quality code. If a value other than 192 is returned:
if str(qualityCode) == "Good":
    # The quality code is good, so continue working. This example simply shows a
message, but could be modified to do something more meaningful
    system.gui.messageBox("The property is showing good quality")
else:
    # ...then show a message informing the user. Using Python's string formatting
(%i) to pass the quality code into the message.
    system.gui.messageBox("Operation Aborted \n The associated tag is showing
quality code %s \n Please check the device connection" % qualityCode)
```

system.gui.getScreens

This function is used in **Python Scripting**.

Description

Get a list of all the monitors on the computer this client is open on. Use with **system.gui.setScreenIndex()** to move the client.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getScreens()
```

Parameters

Nothing

Returns

List[Tuple[String, Integer, Integer]] - A sequence of tuples of the form (index, width, height) for each screen device (monitor) available.

Scope

Vision Client

Code Examples

Example #1 - Getting Screen Information

```
```

```
# This example fetches monitor data and pushes it to a table in the same
container.

screens = system.gui.getScreens()
pyData = []
for screen in screens:
    pyData.append([screen[0], screen[1], screen[2]])

# Push data to 'Table'.
event.source.parent.getComponent('Table').data =
system.dataset.toDataSet(["screen","width","height"], pyData)
```

system.gui.getSibling

This function is used in **Python Scripting**.

Description

Given a component event object, looks up a sibling component. Shortcut for **event.source.parent.getComponent("siblingName")**. If no such sibling is found, the special value None is returned.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getSibling(event, name)
```

Parameters

Type	Parameter	Description
EventObject	`event`	A component event object.
String	`name`	The name of the sibling component.

Returns

VisionComponent - Returns reference to the sibling component. See **VisionComponent**.

Scope

Vision Client

Code Examples

Example #1

```
# This example gets its sibling Text Field's text, and uses it.

textField = system.gui.getSibling(event, 'TextField (1)')
if textField is None:
   system.gui.errorBox("There is no text field!")
else:
   system.gui.messageBox("You typed: %s" % textField.text)
```

system.gui.getWindow

This function is used in **Python Scripting**.

Description

Finds a reference to an open window with the given name. Throws a ValueError if the named window is not open or not found.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getWindow(name)
```

Parameters

Type	Parameter	Description
String	`name`	The path to the window to field.

Returns

Window - A reference to the **window** object, if it was open.

Scope

Vision Client

Code Examples

Example #1

```
# This example will get the window named 'Overview' and then close it.

try:
   window = system.gui.getWindow('Overview')
   system.gui.closeWindow(window)

except ValueError:
   system.gui.warningBox("The Overview window isn't open")
```

Example #2

```
# This example will set a value on a label component in the 'Header' window.

try:
   window = system.gui.getWindow('Header')
   window.getRootContainer().getComponent('Label').text = "Machine 1 Starting"

except ValueError:
   system.gui.warningBox("The Header window isn't open")
```

system.gui.getWindowNames

This function is used in **Python Scripting**.

Description

Returns a list of the paths of all windows in the current project, sorted alphabetically.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.getWindowNames()
```

Parameters

None

Returns

Tuple - A tuple of strings, representing the path of each window defined in the current project.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This example would open windows that begin with "Motor" and pass in the
currently selected motor number.

motor = event.source.parent.number
windows = system.gui.getWindowNames()
for path in windows:
   if name[:5] == "Motor":
      system.nav.openWindow(path, {"motorNumber":motor})
```

system.gui.inputBox

This function is used in **Python Scripting**.

Description

Opens up a popup input dialog box. This dialog box will show a prompt message and allow the user to type in a string. When the user is done, they can click **OK** or **Cancel**. If OK is pressed, this function will return with the value that they typed in. If Cancel is pressed, this function will return the value None.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.inputBox(message, defaultText)
```

Parameters

Type	Parameter	Description
String	`message`	The message to display for the input box. Will accept HTML formatting.
String	`defaultText`	The default text to initialize the input box with.

Returns

String - The string value that was entered in the input box.

Scope

Vision Client

Code Examples

Example #1

```
# In the mouseClicked event of a label, this allows the user to change the label's text.

txt = system.gui.inputBox("Enter text:", event.source.text)
if txt != None:
   event.source.text = txt
```

system.gui.isTouchscreenModeEnabled

This function is used in **Python Scripting**.

Description

Checks whether or not the running Client's Touch Screen mode is currently enabled.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.isTouchscreenModeEnabled()
```

Parameters

Nothing

Returns

Boolean - True if the Client currently has Touch Screen mode activated.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This example is used in the Client Startup script to check if this Client is
being run on a touch screen computer (judged by an IP address) and set Touch
Screen mode.

ipAddress = system.net.getIpAddress()
query = "SELECT COUNT(*) FROM touchscreen_computer_ips WHERE ip_address = '%s' "
isTouchscreen = system.db.runScalarQuery(query %(ipAddress))
if isTouchscreen and not system.gui.isTouchscreenModeEnabled():
   system.gui.setTouchscreenModeEnabled(1)
```

system.gui.messageBox

This function is used in **Python Scripting**.

Description

Displays an informational-style message popup box to the user.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.messageBox(message, title)
```

Parameters

Type	Parameter	Description
String	`message`	The message to display. Will accept HTML formatting.
String	`title`	A title for the message box. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# Display the message Hello World! in a message box.
system.gui.messageBox("Hello World!")
```

system.gui.openDesktop

This function is used in **Python Scripting**.

Description

Creates an additional Desktop in a new frame. For more details, see the **Multi-Monitor Clients** page.

> **NOTE**
>
> This function accepts keyword arguments.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.openDesktop ([screen], [handle], [title], [width], [height], [x], [y], [windows])
```

Parameters

Type	Parameter	Description
Integer	`screen`	The screen index of which screen to place the new frame on. If omitted, screen 0 will be used. [optional]
String	`handle`	A name for the desktop. If omitted, the screen index will be used. [optional]
String	`title`	The title for the new frame. If omitted, the index handle will be used. If the handle and title are omitted, the screen index will be used. [optional]
Integer	`width`	The width for the new desktop's frame. If omitted, frame will become maximized on the specified monitor. [optional]
Integer	`height`	The height for the new desktop's frame. If omitted, frame will become maximized on the specified monitor. [optional]
Integer	`x`	The x coordinate for the new desktop's frame. Only used if both width and height are specified. If omitted, defaults to 0. [optional]
Integer	`y`	The y coordinate for the new desktop's frame. Only used if both width and height are specified. If omitted, defaults to 0. [optional]
PySequence	`windows`	A list of window paths to open in the new Desktop frame. If omitted, the desktop will open without any opened windows. [optional]

Returns

JFrame - A reference to the new **Desktop frame** object.

Scope

Vision Client

Code Examples

Example #1

```
# Create a list of window paths to open in the new desktop.
windowsToOpen = ["Main Windows/Main Window", "Navigation"]

# Creates a new desktop. The desktop will open the windows listed above.
system.gui.openDesktop(windows=windowsToOpen)
```

Example #2

```
# Creates a new desktop on monitor 0 (primary) with only the Overview window open.
system.gui.openDesktop(screen=0, windows=["Overview"])
```

Example #3

```
# Creates a new desktop on monitor 0 (primary) with only the Overview window open.
# Including a handle gives the new desktop a name. This is useful for using other
desktop scripting functions
system.gui.openDesktop(screen=0, handle="Left Monitor", windows=["Overview"])
```

system.gui.openDiagnostics

This function is used in **Python Scripting**.

Description

Opens the Client runtime Diagnostics window, which provides information regarding performance, logging, active threads, connection status, and the console. This provides an opportunity to open the Diagnostics window in situations where the menu bar in the client is hidden, and the keyboard shortcut (**Ctrl** + **Shift** + **F7**) can not be used.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.openDiagnostics()
```

Parameters

Nothing

Returns

Nothing

Scope

Vision Client

Code Example

Opening Diagnostics Window

```
```

```
# Opens the diagnostics window in a running client
system.gui.openDiagnostics()
```

system.gui.passwordBox

This function is used in **Python Scripting**.

Description

Pops up a special input box that uses a password field, so the text isn't echoed back in clear-text to the user. Returns the text they entered, or None if they canceled the dialog box.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.passwordBox(message, [title], [echoChar])
```

Parameters

Type	Parameter	Description
String	`message`	The message for the password prompt. Will accept HTML formatting.
String	`title`	A title for the password prompt. [optional]
String	`echoChar`	A custom echo character. Defaults to: `*` [optional]

Returns

String - The password that was entered, or None if the prompt was canceled.

Scope

Vision Client

Code Examples

Example #1

```
# This example prompts a user for a password before opening the 'Admin' screen.

password = system.gui.passwordBox("Please enter the password.")
if password == "open sesame":
   system.nav.openWindow("Admin")
```

system.gui.setScreenIndex

This function is used in **Python Scripting**.

Description

Moves an open client to a specific monitor. Use with **system.gui.getScreens()** to identify monitors before moving.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.setScreenIndex(index)
```

Parameters

Type	Parameter	Description
Integer	`index`	The new monitor index for this client to move to. 0 based.

Returns

Nothing

Scope

Vision Client

Code Example

Setting a Screen's Index

```
# This example could be used on a startup script to move the client to a 2nd monitor.

system.gui.setScreenIndex(1)
```

system.gui.setTouchscreenModeEnabled

This function is used in **Python Scripting**.

Description

Alters a running Client's Touch Screen mode on the fly.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.setTouchscreenModeEnabled(enabled)
```

Parameters

Type	Parameter	Description
Boolean	`enabled`	The new value for touchscreen mode being enabled.

Returns

Nothing

Scope

Vision Client

Code Example

Example #1 - Enabling Touchscreen Mode

```
# This example could be used on an input heavy window's internalFrameActivated
event to remove Touch Screen mode.

if system.gui.isTouchscreenModeEnabled():
   system.gui.setTouchscreenModeEnabled(False)
```

system.gui.showNumericKeypad

This function is used in **Python Scripting**.

Description

Displays a modal on-screen numeric keypad, allowing for arbitrary numeric entry using the mouse, or a finger on a touch screen monitor. Returns the number that the user entered.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.showNumericKeypad(initialValue, [fontSize], [usePasswordMode])
```

Parameters

Type	Parameter	Description
Number	`initialValue`	The value to start the on-screen keypad with.
Integer	`fontSize`	The font size to display in the keypad. [optional]
Boolean	`usePasswordMode`	If True, display a `*` for each digit. [optional]

Returns

Number - The value that was entered in the keypad.

Scope

Vision Client

Code Examples

Example #1

```
# This function is a holdover for backwards compatibility. Input components now
know when the Client is in Touch Screen mode and respond accordingly.
# This script would go in the MouseClicked or MousePressed action of a Text field
or Numeric Text field.

# For Integer Numeric Text field:
if system.gui.isTouchscreenModeEnabled():
   event.source.intValue = system.gui.showNumericKeypad(event.source.intValue)

# For Double Numeric Text field:
if system.gui.isTouchscreenModeEnabled():
   event.source.doubleValue =
system.gui.showNumericKeypad(event.source.doubleValue)

# For Text field:
# Notice the str() and int() functions used to convert the text to a number and
# vice versa.
# str() and int() are built-in Jython functions
if system.gui.isTouchscreenModeEnabled():
   event.source.text = str(system.gui.showNumericKeypad(int(event.source.text)))
```

system.gui.showTouchscreenKeyboard

This function is used in **Python Scripting**.

Description

Displays a modal on-screen keyboard, allowing for arbitrary text entry using the mouse, or a finger on a touchscreen monitor. Returns the text that the user entered.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.showTouchscreenKeyboard(initialText, [fontSize], [passwordMode])
```

Parameters

Type	Parameter	Description
String	`initialText`	The text to start the on-screen keyboard with.
Integer	`fontSize`	The font size to display in the keyboard. [optional]
Boolean	`passwordMode`	A True value will activate password mode, where the text entered is not echoed back in cleartext. [optional]

Returns

String - The text that was entered in the on-screen keyboard.

Scope

Vision Client

Code Examples

Example #1

```
# This function is a holdover for backwards compatibility. Input components now
know when the client is in Touch Screen mode and respond accordingly.
# This would go in the MouseClicked or MousePressed action of a Text Field or
similar component.

if system.gui.isTouchscreenModeEnabled():
   event.source.text = system.gui.showTouchscreenKeyboard(event.source.text)
```

system.gui.transform

This function is used in **Python Scripting**.

Description

Sets a component's position and size at runtime. Additional arguments for the duration, framesPerSecond, and acceleration of the operation exist for animation. An optional callback argument will be executed when the transformation is complete.

> **NOTE**
>
> The transformation is performed in Designer coordinate space on components that are centered or have more than two anchors.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.transform(component, [newX], [newY], [newWidth], [newHeight], [duration], [callback], [framesPerSecond], [acceleration], [coordSpace])
```

Parameters

Type	Parameter	Description
JComponent	`component`	The component to move or resize.
Integer	`newX`	An x-coordinate to move to, relative to the upper-left corner of the component's parent container. [optional]
Integer	`newY`	A y-coordinate to move to, relative to the upper-left corner of the component's parent container. [optional]
Integer	`newWidth`	A width for the component. [optional]
Integer	`newHeight`	A height for the component. [optional]
Integer	`duration`	A duration over which the transformation will take place. If omitted or 0, the transform will take place immediately. [optional]
Callable	`callback`	Function to be called when the transformation is complete. [optional]
Integer	`framesPerSecond`	Frame rate argument which dictates how often the transformation updates over the given duration. The default is 60 frames per second. [optional]
Integer	`acceleration`	An optional modifier to the acceleration of the transformation over the given duration. See **system.gui constants** for valid arguments. [optional]
Integer	`coordSpace`	The coordinate space to use. When the default screen coordinates are used, the given size and position are absolute, as they appear in the Client at runtime. When Designer Coordinates are used, the given size and position are pre-runtime adjusted values, as they would appear in the Designer. See **system.gui constants** for valid arguments. [optional]

Returns

Animator `animation` - An object that contains pause(), resume(), and cancel() methods, allowing for a script to interrupt the animation. See **Animator**.

Scope

Vision Client

Code Examples

Example #1

```
# This example changes the size the a component to 100x100.
# Run this script from the component that will be changed (i.e., on the
mouseEntered event).

system.gui.transform(component=event.source, newWidth=100, newHeight=100)
```

Example #2

```
# This example moves a component to coordinates 0,0 over the course of 1 second.
# When the animation is complete, the component is moved back to its original
position
# over the course of 2 seconds, slowing in speed as it approaches the end.

component = event.source.parent.getComponent('Text Field')
origX = component.x
origY = component.y

system.gui.transform(
    component,
    0, 0,
    duration=1000,
    callback=lambda: system.gui.transform(
        component,
        origX, origY,
        duration=2000,
        acceleration=system.gui.ACCL_FAST_TO_SLOW
    )
)
```

system.gui.warningBox

This function is used in **Python Scripting**.

Description

Displays a message to the user in a warning style popup dialog.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.gui.warningBox(message, [title])
```

Parameters

Type	Parameter	Description
String	`message`	The message to display in the warning box. Will accept HTML formatting if the message parameter is encapsulated in an <html> tag.
String	`title`	The title for the warning box. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code shows a yellow popup box similar to the system.gui.messageBox
function.
# Start the motor, or, warn the user if in wrong mode.
runMode = event.source.parent.getPropertyValue('RunMode')

# Cannot start the motor in mode #1
if runMode == 1:
   system.gui.warningBox("Cannot start the motor, current mode is <B>VIEW
MODE</B>")
else:
   system.db.runUpdateQuery("UPDATE MotorControl SET MotorRun=1")
```

system.iec61850

IEC 61850 Functions

The following functions give you access to interact with IEC 61850 devices.

cancel

Cancels the selection of an SBO type control on a configured IEC 61850 device to prevent the operate command f…

getControlParams

This function returns a list of report control names and their attributes contained in the configured IEC 61850 devi…

listFiles

This function returns a list of filenames from a remote path for the configured IEC 61850 device.

operate

This function operates on the IEC 61850 device control immediately, such as to change the position of a switch.

readFile

This function downloads remote files from the configured IEC 61850 device to an identified local path.

select

Select an SBO type control to prepare it for a subsequent operate command for a configured IEC 61850 device.

writeFile

This function uploads a file from a local path to the configured IEC 61850 device remote path.

Functions by Scope

Gateway >

Perspective >

Safety Considerations

When working with the IEC 61850 system control functions, it's crucial to understand the potential safety implications. Misuse of these functions can lead to unintended operations and potentially catastrophic results for a high voltage substation.

CHECK PARAMETER, CONTROL INTERLOCK, AND SYNCHROCHECK

The **Check** parameter associated with system.iec61850.getControlParams is of critical importance for safety. Inside the **Intelligent Electronic Device (IED)** itself, there are logical nodes for interlocking and synchronizing, named **Control Interlock (CILO)** and **Synchrocheck (RSYN)**. If the **Check** parameter is `00`, the IED will ignore **CILO** and **RSYN** and execute the command even if there is an interlock activated or the grid is not synchronized with the generator speed. The results of not knowing this can be catastrophic for a high voltage substation. It is crucial for an integrator to be aware of this.

SELECT FUNCTION

The system.iec61850.select function is used to confirm a chosen access point before the Operate function will run. This is especially important for **Select Before Operate (SBO)** type controls. Misuse of this function can lead to unintended operations. Always ensure that the 'Check' parameter is properly set and understood before using this function, as it can influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

OPERATE FUNCTION

The system.iec61850.operate function is used to write to the connected 61850 device when possible. However, it should be used with extreme caution. For Direct types, it allows an immediate change to an access point. For **Select Before Operate (SBO)** types, it should only be used after the Select function has confirmed the access point. Always ensure that the **Check** parameter is properly set and understood before using this function, as it can influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

CANCEL FUNCTION

The system.iec61850.cancel function will clear a selection of a **Select Before Operate (SBO)** type control if an operate command is not desired to be executed on the selected control. This function can be used as a safety measure to prevent unintended operations. Always ensure that the **Check** parameter is properly set and understood before using this function, as it can

influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

system.iec61850.cancel

New in 8.1.25

This function is used in **Python Scripting**.

Description

Cancels the selection of an SBO type control on a configured IEC 61850 device to prevent the **operate** command from performing.

> **CANCEL FUNCTION**
>
> The Cancel function will clear a selection of a **Select Before Operate (SBO)** type control if an operate command is not desired to be executed on the selected control. This function can be used as a safety measure to prevent unintended operations. Always ensure that the **Check** parameter is properly set and understood before using this function, as it can influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec81650.cancel(deviceName, mapParams)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
PyDictionary	`mapParams`	Control parameters dictionary that requires the following keys to be specified: name, T, orCat, orIdent, Check, and Test. These keys must match the params from the select function. If you do not know the required key value pairs, they can be found using the **getControlParams** function.

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example cancels the selected control

mapParams = {'name': u'SSSA_52AFA_FPRCTRL/CBCSWI1.Mod', 'T':1 'orCat': 0,
'orIdent': u'not-supported', 'Check': 0, 'Test': False}
system.iec61850.select("IEC61850", mapParams, 1)

# after the select function was applied, cancel if not needed.
system.iec61850.cancel("IEC61850", mapParams)
```

system.iec61850.getControlParams

New in 8.1.25

This function is used in **Python Scripting**.

Description

This function returns a list of report control names and their attributes contained in the configured IEC 61850 device.

> **CHECK PARAMETER, CONTROL INTERLOCK, AND SYNCHROCHECK**
>
> The **Check** parameter is of critical importance for safety. Inside the **Intelligent Electronic Device (IED)** itself, there are logical nodes for interlocking and synchronizing, named **Control Interlock (CILO)** and **Synchrocheck (RSYN)**. If the **Check** parameter is `00`, the IED will ignore **CILO** and **RSYN** and execute the command even if there is an interlock activated or the grid is not synchronized with the generator speed. The results of not knowing this can be catastrophic for a high voltage substation. It is crucial for an integrator to be aware of this.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec81650.getControlParams(deviceName)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.

Returns

List[PyDictionary] - A list of PyDictionaries, where each dictionary contains the following keys:

- name: Displays the logical device pathname.
- ctlModel: The type of control model defined by a the attribute value.
  - 0: Status-only
  - 1: Direct-with-normal-security
  - 2: SBO-with-normal-security
  - 3: Direct-with-enhanced-security
  - 4: SBO-with-enhanced-security
- T: The time stamp of the control object when the client issues the request.
- Check: Specifies the kind of check the control object performs, if any, before any control operation. This parameter may involve interlock and synchronizing logic, such as **Control Interlock (CILO)** and **Synchrocheck (RSYN)**, to ensure safe operation.
- ctlNumb: Displays the data object status change sequence number.
- orCat: Specifies the category of the origin request.
- orIdent: Displays the identification of the sender, if known.
- Test: Indicates the send is for test purposes only when true.

Scope

Gateway, Perspective Session

Code Examples

Example #1 - Retrieving Report Control Objects

```
# This example prints the control names and corresponding param values on the IEC
61850 device.
# Declare results variable using the system function and print

results = system.iec61850.getControlParams("IEC61850")
print(results)
```

system.iec61850.listFiles

New in 8.1.25

This function is used in **Python Scripting**.

Description

This function returns a list of filenames from a remote path for the configured IEC 61850 device.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec61850.listFiles(deviceName, remoteFilePath)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
String	`remoteFilePath`	The remote file path on the server of the configured IEC 61850 device for the file to read. [optional]

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example will pull files present in the
# device remote file path.

result = system.iec61850.listFiles("IEC61850", "")
print(result)
```

system.iec61850.operate

New in 8.1.25

This function is used in **Python Scripting**.

Description

This function operates on the IEC 61850 device control immediately, such as to change the position of a switch. This can be done directly, or following a select command.

> **OPERATE FUNCTION**
>
> The Operate function is used to write to the connected 61850 device when possible. However, it should be used with extreme caution. For Direct types, it allows an immediate change to an access point. For **Select Before Operate (SBO)** types, it should only be used after the Select function has confirmed the access point. Always ensure that the **Check** parameter is properly set and understood before using this function, as it can influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec61850.operate(deviceName, mapParams, controlValue)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
PyDictionary	`mapParams`	Control parameters dictionary that requires the following keys to be specified: name, T, orCat, orIdent, Check, and Test. Use the same params as the **select** function when operating on an SBO type control. If you do not know the required key value pairs, they can be found using the **getControlParams** function.
Float	`controlValue`	Control value (32-bit float).

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example sets a direct control value to 2.

mapParams = {'name': u'SSSA_52AFA_FPRCTRL/CBCSWI1.Mod', 'T':1 'orCat': 0,
'orIdent': u'not-supported', 'Check': 0, 'Test': False}
system.iec61850.operate("IEC61850", mapParams, 2)
```

system.iec61850.readFile

New in 8.1.25

This function is used in **Python Scripting**.

Description

This function downloads remote files from the configured IEC 61850 device to an identified local path.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec61850.readFile(deviceName, remoteFilePath, localFilePath)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
String	`remoteFilePath`	The remote file path on the server of the file to read.
String	`localFilePath`	The local file path on client to store the file contents.

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example reads the file contents from device remote file path.
# The read file is stored in the local file path.

# Ignition 61850 Device Name
device_name = 'IEC61850'

# File name you wish to read for the 61850 Device
file_name = 'COMFEDE.ced'

# Full Path where the file will be read from the 61850 device
file_path = '/{0}'.format(file_name)

# Full Path where to store your file on your Ignition Gateway
local_path = '/usr/local/bin/ignition/COMFEDE/{0}'.format(file_name)


system.iec61850.readFile(device_name, file_path, local_path)
```

system.iec61850.select

New in 8.1.25

This function is used in **Python Scripting**.

Description

Select an SBO type control to prepare it for a subsequent **operate** command for a configured IEC 61850 device. These selections can be removed by using the **cancel** function.

> **SELECT FUNCTION**
>
> The Select function is used to confirm a chosen access point before the Operate function will run. This is especially important for **Select Before Operate (SBO)** type controls. Misuse of this function can lead to unintended operations. Always ensure that the 'Check' parameter is properly set and understood before using this function, as it can influence the behavior of the **Control Interlock (CILO)** and **Synchrocheck (RSYN)** logical nodes in the **Intelligent Electronic Device (IED)**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec61850.select(device_name, mapParams, value)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
PyDictionary	`mapParams`	Control parameters dictionary that requires the following keys to be specified: name, T, orCat, orIdent, Check, and Test. If you do not know the required key value pairs, they can be found using the **getControlParams** function.
Float	`controlValue`	Control value (32-bit float).

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example prepares an SBO type control for an operate command.

mapParams = {'name': u'SSSA_52AFA_FPRCTRL/CBCSWI1.Mod', 'T':1 'orCat': 0,
'orIdent': u'not-supported', 'Check': 0, 'Test': False}
system.iec61850.select("IEC61850", mapParams, 1)
```

system.iec61850.writeFile

New in 8.1.25

This function is used in **Python Scripting**.

Description

This function uploads a file from a local path to the configured IEC 61850 device remote path.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.iec61850.writeFile(deviceName, localFilePath, remoteFilePath)
```

Parameters

Type	Parameter	Description
String	`deviceName`	The name of the configured IEC 61850 device.
String	`localFilePath`	The local file path on client to pull the file contents from.
String	`remoteFilePath`	The remote file path on the server of the file to write to.

Returns

No return value.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# This example writes the file contents
# from the local temporary path to the remote file path.

device_name = 'IEC61850'
file_name = 'COMFEDE.ced'
tmp_path = '/usr/local/bin/ignition/COMFEDE/{0}'.format(file_name)
file_path = '/{0}'.format(file_name)

system.iec61850.writeFile(device_name, tmp_path, file_path)
```

system.math

Math Functions

The following functions assist with running statistical analysis.

geometricMean

Calculates the geometric mean.

kurtosis

Calculates the kurtosis of a sequence of values.

max

Given a sequence of values, returns the greatest value in the sequence, also known as the "max" value.

mean

Given a sequence of values, calculates the arithmetic mean (average).

meanDifference

Given two sequences of values, calculates the mean of the signed difference between both sequences.

median

Takes a sequence of values, and returns the median.

min

Given a sequence of numerical values, returns the minimum value, also known as the "min" value.

mode

Given a sequence of values, returns the 'mode', or most frequent values.

normalize

Given a sequence of values, normalizes the values.

percentile

Given a sequence of numerical values, estimates the percentile of input.

populationVariance

Given a sequence of values, returns the population variance.

product

Given a sequence of values, calculates the product of the sequence.

skewness

Given a sequence of values, calculates the skewness (third central moment).

standardDeviation

Given a sequence of numerical values, calculates the simple standard deviation.

sum

Given a sequence of values, calculates the sum of all values.

sumDifference

Given two sequences of values, calculates the sum of the signed difference between both sequences.

sumLog

Given a sequence of values, calculates the sum of the natural logs.

sumSquares

Given a sequence of values, calculates the sum of the squares of all values.

variance

Given a sequence of values, calculates the variance of all values.

Functions by Scope

Gateway >

Vision >

Perspective >

system.math.geometricMean

This function is used in **Python Scripting**.

Description

Calculates the geometric mean. Geometric mean is a type of average which indicates a value in a set of numbers by using the product of values in the set and then taking the nth root, where *n* is the number of values in the set. This is different than an arithmetic mean, which calculates an average based off the sum of the numbers, and divides it by n number of values. Geometric means can only be positive numbers.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.geometricMean(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The geometric mean, or NaN if the input was empty or null. Because this uses logs to compute the geometric mean, will return NaN if any entries are negative.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Geometric Mean

```
# Create a List of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.geometricMean(values)
```

system.math.kurtosis

This function is used in **Python Scripting**.

Description

Calculates the kurtosis of a sequence of values. Kurtosis measures if data is peaked or flat relative to normal distribution. A set of data with high kurtosis will have distinct peaks near the mean, while a set of data with low kurtosis will have a flat top near the mean. Uniform distribution is typically a flat line.

Returns NaN (Not a Number) if passed an empty sequence measure of whether the data are heavy-tailed or light-tailed of a given distribution.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.kurtosis(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN. Requires at least four items in the list.

Returns

Float - The kurtosis, or NaN if the input was empty or null. Additionally, returns NaN if the values returned fewer than four values.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a List of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.kurtosis(values)
```

system.math.max

This function is used in **Python Scripting**.

Description

Given a sequence of values, returns the greatest value in the sequence, also known as the "max" value.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.max(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The maximum value contained in the values parameter, or NaN if the input was empty or null.

Scope

All

Code Examples

Example #1 - Getting the Max Value from List

```
# Create a List of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.max(values)
```

Example #2 - Getting the Max Value from Tag Values

```
# Create a List of Tag Paths to read
paths = ["[Sample_Tags]/ReadOnly/ReadOnlyInteger1","
[Sample_Tags]/ReadOnly/ReadOnlyInteger2","
[Sample_Tags]/ReadOnly/ReadOnlyInteger3","
[Sample_Tags]/ReadOnly/ReadOnlyInteger4","
[Sample_Tags]/ReadOnly/ReadOnlyInteger5"]

# Read the Tags, and store the complex results in a variable
values = system.tag.readBlocking(paths)

# Declare an empty list to append to later
tagValuesList = []

# For each Tag Path, iterate through our results...
for index in range(len(paths)):

    # ...grab the Tag values...
    tagValue = values[index].value
    # ...and append them to the empty list from earlier
    tagValuesList.append(tagValue)

# Print out the maximum value in the list
print system.math.max(tagValuesList)
```

system.math.mean

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the arithmetic mean (average).

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.mean(values)
```

Parameters

Type	Parameter	Description
Float[]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The arithmetic mean, or NaN if the input was empty or None.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.mean(values)
```

system.math.meanDifference

This function is used in **Python Scripting**.

Description

Given two sequences of values, calculates the mean of the signed difference between both sequences. In other words, returns the absolute difference between the mean values of two different sets of data.

Throws a DimensionMismatchException if the two sequences have different lengths.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.meanDifference(values1, values2)
```

Parameters

Type	Parameter	Description
List[Float]	`values1`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.
List[Float]	`values2`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The mean difference, or NaN if one of the parameters was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Mean Difference

```
# Create some lists.
firstList = [3.5, 5.6, 7.8, 7.4, 3.8]
secondList = [3.5, 5.6, -7.8, 7.4, -3.8]

# Prints the resulting value.
print system.math.meanDifference(firstList, secondList)
```

system.math.median

This function is used in **Python Scripting**.

Description

Takes a sequence of values, and returns the median. The median represents the middle value in a set of data.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.median(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The median, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Median

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.median(values)
```

system.math.min

This function is used in **Python Scripting**.

Description

Given a sequence of numerical values, returns the minimum value, also known as the "min" value.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.min(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The minimum value contained within the 'values' parameter, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Getting the Min Value from List

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Prints the resulting value.
print system.math.min(values)
```

Example #2 - Getting the Min Value from Tag Values

```
# Create a List of Tag Paths to read
paths = ["[Sample_Tags]/ReadOnly/ReadOnlyInteger1","
[Sample_Tags]/ReadOnly/ReadOnlyInteger2","
[Sample_Tags]/ReadOnly/ReadOnlyInteger3","
[Sample_Tags]/ReadOnly/ReadOnlyInteger4","
[Sample_Tags]/ReadOnly/ReadOnlyInteger5"]

# Read the Tags, and store the complex results in a variable
values = system.tag.readBlocking(paths)

# Declare an empty list to append to later
tagValuesList = []

# For each Tag Path, iterate through our results...
for index in range(len(paths)):

    # ...grab the Tag values...
    tagValue = values[index].value
    # ...and append them to the empty list from earlier
    tagValuesList.append(tagValue)

# Print out the maximum value in the list
print system.math.min(tagValuesList)
```

system.math.mode

This function is used in **Python Scripting**.

Description

Given a sequence of values, returns the 'mode', or most frequent values.

Returns an empty list if the sequence was empty or None.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.mode(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values.

Returns

List[Float] - A Java Array (functionally similar to a Python List) of floats representing the most frequent value(s) in the values parameter. If the values parameter was empty, then an empty list will be returned instead.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Getting the Mode from a List of Values

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 7.8]

# Return the most common values.
modes = system.math.mode(values)

# Print the first item in the result.
print modes[0]

# Iterate over the results.
for number in modes:
    print number
```

system.math.normalize

This function is used in **Python Scripting**.

Description

Given a sequence of values, normalizes the values. Normalizing data refers to adjusting values measured on different scales and brings them into alignment to allow the comparison of corresponding normalized values. This creates uniformity of values by eliminating the different units of measurement, and to more easily compare data from different places.

Returns an empty list if the sequence was empty or None.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.normalize(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values.

Returns

List[Float] - A Java array (functionally similar to a Python list) of floats representing normalized input, with a mean of 0 and a standard deviation of 1. Returns an empty array if the input was empty or None. If the standard deviation is 0, will return an array of float NaN (Not a Number).

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 7.8]

# Return the most common values.
normalized = system.math.normalize(values)

# Print the first item in the result.
print normalized[0]

# Iterate over the results.
for number in normalized:
    print number
```

system.math.percentile

This function is used in **Python Scripting**.

Description

Given a sequence of numerical values, estimates the percentile of input.

The percentile is a value on a scale that represents a percentage position in a list of data that can be equal to or below that value: i.e., the 25th percentile is a value below which 25% of observable data points may be found.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.percentile(values, percentile)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.
Float	`percentile`	The percentile to compute. A float greater than 0 and less than or equal to 100. Will throw an exception if the percentile is out of bounds.

Returns

Float - A value from the given list using the requested percentile of the input, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.4, 3.8]

# Print the 75th percentile.
print system.math.percentile(values, 75)
```

system.math.populationVariance

This function is used in **Python Scripting**.

Description

Given a sequence of values, returns the population variance. Population variance calculates how values in a dataset are spread out from their average value.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.populationVariance(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The population variance, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Population Variance

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.populationVariance(values)
```

system.math.product

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the product of the sequence: the result of multiplying of all values in the sequence together.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.product(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The product of all values in the values parameter, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Multiplying All Values in a List

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.product(values)
```

system.math.skewness

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the skewness (third central moment). Skewness is a measure of the degree of asymmetry of a distribution of the mean. If skewed to the left, the distribution has a long tail in the negative direction. If skewed to the right, the tail will be skewed in the positive direction. Skewness values greater than 1 or less than -1 indicate a highly skewed distribution, while skewness values between 0.5 and 1 or -0.5 and -1 indicate a moderately skewed distribution. Finally, skewness values between -0.5 and 0.5 indicate a more symmetrical distribution.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.skewness(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The skewness of the values parameter, or NaN if values was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Skewness

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.skewness(values)
```

system.math.standardDeviation

This function is used in **Python Scripting**.

Description

Given a sequence of numerical values, calculates the simple standard deviation. Standard deviation is a calculated number for how close, or how far the values of that dataset are in relation to the mean.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.standardDeviation(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The standard deviation of the values parameter, or NaN if the values was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Calculating Standard Deviation

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.standardDeviation(values)
```

system.math.sum

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the sum of all values. The sum is the number returned by addition.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.sum(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a Sequence of numerical values will return NaN.

Returns

Float - The sum of all values in the values parameter, or NaN if values was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Summing All Values In List

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.sum(values)
```

system.math.sumDifference

This function is used in **Python Scripting**.

Description

Given two sequences of values, calculates the sum of each sequence and finds the difference between them. In other words, the difference between sums from two sets of numbers.

Throws a DimensionMismatchException if the two sequences have different lengths.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.sumDifference(values1, values2)
```

Parameters

Type	Parameter	Description
List[Float]	`values1`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.
List[Float]	`values2`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The sum difference, or NaN if one of the parameters was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create some lists.
firstList = [3.5, 5.6, 7.8, 7.4, 3.8]
secondList = [3.5, 5.6, -7.8, 7.4, -3.8]

# Print the resulting value.
print system.math.sumDifference(firstList, secondList)
```

system.math.sumLog

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the sum of the natural logs (ln).

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.sumLog(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The sum of the natural logs of the input values, or NaN if the input was empty, None, or contains negative numbers.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.sumLog(values)
```

system.math.sumSquares

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the sum of the squares of all values. Sum squares measures how far individual values are from the mean by calculating how much variation there is in a set of values.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.sumSquares(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The sum of all squares of the 'values' parameter, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.sumSquares(values)
```

system.math.variance

This function is used in **Python Scripting**.

Description

Given a sequence of values, calculates the variance of all values. Variance measures how far values in a set are spread out from their mean value.

Returns NaN (Not a Number) if passed an empty sequence.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.math.variance(values)
```

Parameters

Type	Parameter	Description
List[Float]	`values`	A sequence of numerical values. Accepts both integers and floats. The sequence may not contain None type values. However, passing a None type object instead of a sequence of numerical values will return NaN.

Returns

Float - The variance of all values in the values parameter, or NaN if the input was empty or null.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Create a list of values.
values = [3.5, 5.6, 7.8, 7.4, 3.8]

# Print the resulting value.
print system.math.variance(values)
```

system.mongodb

MongoDB Functions

The following functions allow users to interact with a MongoDB instance. These functions require the MongoDB connector.

aggregate

Returns a list of aggregate results.

deleteMany

Removes documents from the collection that match the filter.

deleteOne

Removes a document from the collection that matches the filter.

find

Returns a list of PyDictionaries that matches the criteria specified on the filter parameter.

findOne

Returns a single PyDictionary that matches the criteria specified on the filter parameter.

insertMany

Inserts a list of PyDictionaries into a specified collection.

insertOne

Inserts a single PyDictionary into a specified collection.

listCollectionNames

Returns a list of all collection names.

listConnectorInfo

Returns a list of PyDictionary descriptors of all MongoDB Connectors.

replaceOne

Replaces a document in the collection that matches the filter.

updateMany

Updates all documents in the collection that match the filter.

updateOne

Updates a document in the collection that matches the filter.

Functions by Scope

Gateway >

Perspective >

system.mongodb.aggregate

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Returns a list of aggregate results.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.aggregate(connector, collection, aggregate, [collation])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
List[PyDictionary]	`aggregate`	A list of PyDictionaries to specify an aggregate pipeline. **See MongoDB documentation** for all valid aggregate options.
PyDictionary	`collation`	A PyDictionary of items to specify language-specific rules. **See MongoDB documentation** for all valid collation values. [optional]

Returns

List[PyDictionary] result - A list of PyDictionary results containing aggregation results.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
# Retrieve a both a connector name to query from.
connector = system.mongodb.listConnectorInfo()[0]['name']

# Specify aggregate that will find the sum of all key value pairs named
transaction_count.
aggregate = [
                {"$group":
                    { "_id": '',
                    "OverallTransactionTotal":{"$sum": "$transaction_count"}
                    }
                }
            ]

# Apply all parameters for our function call.
result = system.mongodb.aggregate(connector, "transactions", aggregate)

# Print the result. Here it is expected that the aggregate parameter's key
OverallTransactionTotal can be extracted.
print "Overall Transaction Total: " + str(result[0]["OverallTransactionTotal"])
```

system.mongodb.deleteMany

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Removes documents from the collection that match the filter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.deleteMany(connector, collection, filter, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	`options`	A PyDictionary for including additional delete configurations. [optional]

Returns

PyDictionary `result` - Result of delete action formatted as a PyDictionary with keys ‘acknowledged’ and ‘deleteCount’.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# Specify unique field values to locate specific documents.
filter = {"qualityControlProcess":"V020"}

# Apply parameters for function call.
print system.mongodb.deleteMany("MongoDB", "data", filter)
```

system.mongodb.deleteOne

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Removes a document from the collection that matches the filter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.deleteOne(connector, collection, filter, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	`options`	A PyDictionary for including additional delete configurations. [optional]

Returns

PyDictionary `result` - Result of delete action formatted as a PyDictionary with keys ‘acknowledged’ and ‘deleteCount’.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# Import required BSON types.
from system.mongodb.types import ObjectId

# Specify unique field values to locate specific document. Here we are specifying
the known _id of the document.
filter = {"_id": ObjectId("63fe3941519feb58abb3cda1")}

# Apply parameters for function call.
print system.mongodb.deleteOne("MongoDB", "customers", filter)
```

system.mongodb.find

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Returns a list of PyDictionaries that matches the criteria specified on the filter parameter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.find(connector, collection, filter, [projection], [sort], [collation], [limit], [skip])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	`projection`	A PyDictionary for including or omitting specific key value pairs in the query result. **See MongoDB documentation** for all valid project values. [optional]
PyDictionary	`sort`	A PyDictionary of specified items to sort returned results. **See MongoDB documentation** for all valid sort values. [optional]
PyDictionary	`collation`	A PyDictionary of items to specify language-specific rules. **See MongoDB documentation** for all valid collation values. [optional]
Int	`limit`	The maximum number of PyDictionaries that will be returned. [optional]
Int	`skip`	The number of PyDictionaries to skip before returning results. [optional]

Returns

List[PyDictionary] `result` - A list of PyDictionary results.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
# Retrieve a both a connector name and collection name to query from.
connector = system.mongodb.listConnectorInfo()[0]['name']
collection = system.mongodb.listCollectionNames(connector)[0]

# Specify unique field values to locate specific documents.
filter = {"qualityControlProcess":"V020"}
project = {"_id":1, "position":1,"elevation":1,"type":1}

# Specify any additional formatting for result.
sort = {"_id":1}
collation = {"locale":"en"}

# Apply all parameters for our function call.
documents = system.mongodb.find(connector, collection, filter, project, sort,
collation, limit=5, skip=0)

# Print the result. Here it is expected that all key value pairs specified in the
project parameter will be available.
for document in documents:
    print "Document ID: " + str(document["_id"])
    print "Type: " + str(document["type"])
    print "Position: " + str(document["position"])
    print "Elevation: " + str(document["elevation"])
```

Below is an example on how to use the MongoDB scripting functions for iterating through large datasets without the use of cursors or continuationPoint since it is not provided by the MongoDB connector.

Example #2 - Iterating Through Large Datasets Without Cursors

```
# Amount of results to return each iteration
pageSize = 5

# Starting with a blank filter for initial query
filter = {}

# Sort must include| `_id` after all other sort items are added
sort = {"year": 1, "_id": 1}

while True:
    results = system.mongodb.find("MongoDB", "movies", filter=filter, sort=sort,
limit=pageSize)

    for result in results:
        print result

    # get last returned result
    lastIndex = len(results) - 1

    if lastIndex < 0:
        # No results returned
        break

    lastItem = results[lastIndex]

    # filter will continue where the lastItem left off
    filter = {
        "$or": [
            {"year": {"$gt": lastItem["year"]}}, # allow items next in sort
            {"year": lastItem["year"], "_id": {"$gt": lastItem["_id"]}} # if sort
item is same, get the next item by ObjectID
        ]
    }

    if len(results) < pageSize:
        break
    else:
        print "==="
```

system.mongodb.findOne

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Returns a single PyDictionary that matches the criteria specified on the filter parameter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.findOne(connector, collection, filter, [projection])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	`projection`	A PyDictionary for including or omitting specific key value pairs in the query result. **See MongoDB documentation** for all valid project values. [optional]

Returns

PyDictionary `result` - A single PyDictionary as a result.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
# Retrieve a both a connector name and collection name to query from.
connector = system.mongodb.listConnectorInfo()[0]['name']
collection = system.mongodb.listCollectionNames(connector)[0]


# Specify unique field values to locate specific document.
filter = {"qualityControlProcess":"V020"}
project = {"_id":1, "position":1,"elevation":1,"type":1}

# Apply parameters for function call.
document = system.mongodb.findOne(connector, collection, filter, project)

# Print the result. Here it is expected that all key value pairs specified in the
project parameter will be available.
print "Document ID: " + str(document["_id"])
print "Type: " + str(document["type"])
print "Position: " + str(document["position"])
print "Elevation: " + str(document["elevation"])
```

system.mongodb.insertMany

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Inserts a list of PyDictionaries into a specified collection.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.insertMany(connector, collection, document, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
List[PyDictionary]	`document`	A list of PyDictionaries that will represent new records being added to the collection. **See MongoDB documentation** for more details about documents.
PyDictionary	`options`	A PyDictionary for including additional insert configurations. [optional].

Returns

List[PyObject] `objectIdList` - Keys representing the inserted documents. The keys will usually be BSON document ObjectId, unless a different key type is specified.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
```

```
# Import required BSON types.
from system.mongodb.types import ObjectId

# Specify required fields in a PyDictionary format for each BSON document in the
list.
documents = [
                {
                    "_id": ObjectId(),
                    "username": "jdoe",
                    "name": "Jane Doe",
                    "address": '123 First Street, City CA 12345',
                    "birthdate": system.date.getDate(2001, 4, 22),
                    "email": "jdoe@email.com",
                    "active": True,
                    "accounts": [],
                    "tier_and_details": {}
                },
                {
                    "_id": ObjectId(),
                    "username": "tanderson",
                    "name": "Thomas Anderson",
                    "address": '456 Seventh Street, City CA 98765',
                    "birthdate": system.date.getDate(1999, 3, 31),
                    "email": "tanderson@email.com",
                    "active": True,
                    "accounts": [],
                    "tier_and_details": {}
                }
            ]

# Apply parameters for function call.
print system.mongodb.insertMany("MongoDB", "customers", documents)
```

system.mongodb.insertOne

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Inserts a single PyDictionary into a specified collection.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.insertOne(connector, collection, document, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`document`	A PyDictionary of specified fields that will represent a record being added to the collection. **See MongoDB documentation** for more details about documents.
PyDictionary	`options`	A PyDictionary for including additional insert configurations. [optional].

Returns

PyObject `objectId` - Key of inserted document. This will usually be BSON document ObjectId, unless a different key type is specified.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
```

```
# Import required BSON types.

from system.mongodb.types import ObjectId
from system.mongodb.types import Timestamp

# Specify required document fields in a PyDictionary format for BSON document.
document = {
                "_id": ObjectId(),
                "transaction_count": 0,
                "bucket_start_date": Timestamp(),
                "bucket_end_date": '',
                "transactions": []

            }

# Apply parameters for function call.
print system.mongodb.insertOne("MongoDB", "transactions", document)
```

system.mongodb.listCollectionNames

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Returns a list of all collection names.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.listCollectionNames(connector)
```

Parameters

Type	Parameter	Description
String	`connector`	Name of connector (case-insensitive).

Returns

List[String] `collectionNames` - A List of all collection names.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# Retrieve a connector name to query from.

connectorList = system.mongodb.listConnectorInfo()

# Iterate through the list of connectors and print out all collection names found.
for connector in connectorList:
    print system.mongodb.listCollectionNames(connector['name'])
```

system.mongodb.listConnectorInfo

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Returns a list of PyDictionary descriptors of all MongoDB Connectors.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.listConnectorInfo()
```

Parameters

Nothing

Returns

List[PyDictionary] `connectors` - A list of PyDictionaries containing MongoDB Connector descriptors. Descriptor contains keys for 'name', 'description', 'status', and 'error' (if present).

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# Retrieve and print the returned list of connectors found.
connectors = system.mongodb.listConnectorInfo()

print connectors[0]['name']
print connectors[0]['status']
print connectors[0]['description']
print connectors[0]['error']
```

system.mongodb.replaceOne

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Replaces a document in the collection that matches the filter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.replaceOne(connector, collection, filter, replacement, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	`replacement`	New values to apply for all non-immutable document fields.
PyDictionary	`options`	A PyDictionary for including additional replace configurations. [optional]

Returns

PyDictionary `result` - Result of replace action formatted as a PyDictionary with keys ‘acknowledged’, ‘modifiedCount’, ‘matchedCount’, and ‘upsertedId’.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
```

```
# Import required BSON types.
from system.mongodb.types import ObjectId

# Specify unique field values to locate specific document. Here we are specifying
the known _id of the document.
filter = {"_id": ObjectId("63fe3941519feb58abb3cda1")}

# Specify required fields in a PyDictionary format for BSON document.
replacement = {
                    "username": "jdoe2",
                    "name": "Jane Doe II",
                    "address": '321 Second Street, City CA 56789',
                    "birthdate": system.date.getDate(2004, 5, 19),
                    "email": "jdoe2@email.com",
                    "active": True,
                    "accounts": [],
                    "tier_and_details": {}
                }


# Apply parameters for function call.
print system.mongodb.replaceOne("MongoDB", "customers", filter, replacement)
```

system.mongodb.updateMany

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Updates all documents in the collection that match the filter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.updateMany(connector, collection, filter, updates, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary	List[PyDictionary]	`updates`
PyDictionary	`options`	A PyDictionary for including additional update configurations. [optional].

Returns

PyDictionary `result` - Result of update action formatted as a PyDictionary with keys ‘acknowledged’, ‘modifiedCount’, ‘matchedCount’, and ‘upsertedId’.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
```

You can also iterate those system.mongodb.types packages to see all available classes:

Example

```
for d in dir(system.mongodb.types):
    print d
```

API Docs

MongoDB-specific data types come from the org.bson.types package of the Mongo Java Driver API. The library of classes available for import can be accessed at this link: **Mongo Java Driver 3.6.0 API Docs for Package org.bson.types**.

Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
# Specify unique field values to locate specific document. Here we are locating
documents with the field 'limit' equal to 9000.
filter = {"limit": 9000}

# Specify document fields to update for found BSON document(s). 'limits' is an
existing field on the document.
updates = [
            {"$set":
                {
                    "limit": 10000
                }
            }
        ]

# Apply parameters for function call.
print system.mongodb.updateMany("MongoDB", "accounts", filter, updates)
```

system.mongodb.updateOne

New in 8.1.28

This function is used in **Python Scripting**.

> **NOTE**
>
> Project Library scripts will not provide hints for MongoDB system functions unless the Script Hint Scope is set to **Gateway**. See the Scripting in Ignition page for more details on scripting hints.

Description

Updates a document in the collection that matches the filter.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.mongodb.updateOne(connector, collection, filter, updates, [options])
```

Parameters

Type	Parameter	Description
String	`connector`	The name of connector (case-insensitive).
String	`collection`	The name of collection (case-sensitive).
PyDictionary	`filter`	A PyDictionary for specifying matching key value pair criteria when querying a collection.
PyDictionary / List[PyDictionary]	`updates`	Changes to apply to specific document fields. Also supports aggregation pipeline for update operations See **MongoDB documentation** for all valid update operators.
PyDictionary	`options`	A PyDictionary for including additional update configurations. [optional].

Returns

PyDictionary `result` - Result of update action formatted as a PyDictionary with keys 'acknowledged', 'modifiedCount', 'matchedCount', and 'upsertedId'.

Scope

Gateway, Perspective Session

Importing Classes

You can import classes from system.mongodb.types like you would other Python classes:

Example

```
from system.mongodb.types import ObjectId

newObjectId = ObjectId.get()
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Types References

The following values can be referenced for the types parameter at system.mongodb.types:

```
Binary
Code
CodeWScope
CodeWithScope
Decimal128
INSTANCE
MaxKey
MinKey
ObjectId
Symbol
Timestamp
```

Code Examples

Example #1

```
# Import required BSON types.
from system.mongodb.types import ObjectId

# Specify unique field values to locate specific document. Here we are specifying
the known _id of the document.
filter = {"_id": ObjectId("63fe3941519feb58abb3cda1")}

# Specify document fields to update for found BSON document(s). 'accounts' is an
existing field on the document.
updates = [
            {"$set":
                {
                    "accounts": [415623, 983462]
                }
            }
        ]

# Apply parameters for function call.
print system.mongodb.updateOne("MongoDB", "customers", filter, updates)
```

system.nav

Navigation Functions

The following functions allow you to open and close windows in the client.

centerWindow

Given a window path, or a reference to a window itself, it will center the window.

closeParentWindow

Closes the parent window given a component event object.

closeWindow

Given a window path, or a reference to a window itself, it will close the window.

desktop

Allows for invoking system.nav functions on a specific desktop.

getCurrentWindow

Returns the path of the current "main screen" window, which is defined as the maximized window.

goBack

When using the Typical Navigation Strategy, this function will navigate back to the previous main screen window.

goForward

When using the Typical Navigation Strategy, this function will navigate "forward" to the last main-screen window …

goHome

When using the Typical Navigation Strategy, this function will navigate to the "home" window.

openWindow

Opens the window with the given path.

openWindowInstance

Operates exactly like system.nav.openWindow, except that if the named window is already open, then an addition…

swapTo

Performs a window swap from the current main screen window to the window specified.

swapWindow

Performs a window swap.

Functions by Scope

Vision >

system.nav.centerWindow

This function is used in **Python Scripting**.

Description

Given a window path, or a reference to a window itself, it will center the window. The window should be floating an non-maximized. If the window can't be found, this function will do nothing.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax #1 (String param)

```
system.nav.centerWindow(windowPath)
```

Parameters

Type	Parameter	Description
String	`windowPath`	The path of the window to center.

Returns

Nothing

Scope

Vision Client

Syntax #2 (FPMIWindow param)

```
system.nav.centerWindow(window)
```

Parameters

Type	Parameter	Description
FPMIWindow	`window`	A reference to the window to center.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This example centers the window named 'Overview'.
system.nav.centerWindow('Overview')
```

system.nav.closeParentWindow

This function is used in **Python Scripting**.

Description

Closes the parent window given a component event object.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.closeParentWindow(event)
```

Parameters

Type	Parameter	Description
EventObject	`event`	A component event object. The enclosing window for the component will be closed. Refer to **EventObject**.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code would be placed in the actionPerformed event of a button,
# and would close the window that contained the button.
system.nav.closeParentWindow(event)
```

system.nav.closeWindow

This function is used in **Python Scripting**.

Description

Given a window path, or a reference to a window itself, it will close the window. If the window can't be found, this function will do nothing.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax #1 (FPMIWindow Param)

```
system.nav.closeWindow(window)
```

Parameters

Type	Parameter	Description
FPMIWindow	`window`	A reference to the window to close.

Returns

Nothing

Scope

Vision Client

Syntax #2 (String Param)

```
system.nav.closeWindow(windowPath)
```

Parameters

Type	Parameter	Description
String	`windowPath`	The path of a window to close.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This example gets the window named 'Overview' and then closes it.
# If the window isn't open, a warning is shown.
try:
   window = system.gui.getWindow('Overview')
   system.nav.closeWindow(window)
except ValueError:
   system.gui.warningBox("The Overview window isn't open")
```

Example #2

```
# This example would close the window named 'Overview' in one step.
# If the window isn't open, the call to closeWindow will have no effect
system.nav.closeWindow('Overview')
```

system.nav.desktop

This function is used in **Python Scripting**.

Description

Allows for invoking **system.nav** functions on a specific desktop.

See the **Multi-Monitor Clients** page for more details.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.desktop(handle)
```

Parameters

Type	Parameter	Description
String	`handle`	The handle for the desktop to use. May be omitted for the primary desktop. [optional]

Returns

INavUtilities - A copy of **system.nav** (**INavUtilities**) that will alter the desktop named by the given handle.

Scope

Vision Client

Code Examples

Example #1

```
# The following example will close a window at path "Main Windows/Overview" in the Primary Desktop,
# regardless of where the script originates from.
system.nav.desktop().closeWindow("Main Windows/Overview")
```

Example #2

```
# Attempts to swap to a window at path "Main Windows/Main Window" on a specific Desktop. This example assumes a desktop with the handle "2nd Desktop" is already open.
system.nav.desktop("2nd Desktop").swapTo("Main Windows/Main Window")
```

system.nav.getCurrentWindow

This function is used in **Python Scripting**.

Description

Returns the path of the current "main screen" window, which is defined as the maximized window. With the **Typical Navigation Strategy**, there is only ever one maximized window at a time.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.getCurrentWindow()
```

Parameters

Nothing

Returns

String - The path of the current "main screen" window - the maximized window.

Scope

Vision Client

Code Examples

Example #1

```
# This code could run in a global timer script.
# After a 5-minute timeout, navigate back to the home screen.
if system.util.getInactivitySeconds()>300 and
system.nav.getCurrentWindow()!="Home":
   system.nav.swapTo("Home")
```

Example #2

```
# This code could run in a global timer script.
# After a 5-minute timeout, navigate back to the Over screen inside the Main
Windows folder.
if system.util.getInactivitySeconds()> 500 and
system.nav.getCurrentWindow()!="Main Windows/Overview":
    system.nav.swapTo("Main Windows/Overview")
```

system.nav.goBack

This function is used in **Python Scripting**.

Description

When using the **Typical Navigation Strategy**, this function will navigate back to the previous main screen window.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.goBack()
```

Parameters

Nothing

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
# This code would go in a button to move to the previous screen.
system.nav.goBack()
```

system.nav.goForward

This function is used in **Python Scripting**.

Description

When using the **typical navigation strategy**, this function will navigate "forward" to the last main-screen window the user was on when they executed a **system.nav.goBack()**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.goForward()
```

Parameters

Nothing

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code would go in a button to move to the last screen that used
system.nav.goBack().
system.nav.goForward()
```

system.nav.goHome

This function is used in **Python Scripting**.

Description

When using the **typical navigation strategy**, this function will navigate to the "home" window. This is automatically detected as the first main-screen window shown in a project. If you are using this system function with **system.nav.openWindow()**, your home window should be closed before navigating to it, or system.nav.goHome() may not work.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.goHome()
```

Parameters

Nothing

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code would go in a button to move to the Home screen.
system.nav.goHome()
```

system.nav.openWindow

This function is used in **Python Scripting**.

Description

Opens the window with the given path. If the window is already open, brings it to the front. The optional params dictionary contains key:value pairs which will be used to set the target window's root container's dynamic variables.

For instance, if the window that you are opening is named **TankDisplay** and has a dynamic variable in its root container named "TankNumber", then calling `system.nav.openWindow("TankDisplay", {"TankNumber" : 4})` will open the TankDisplay window and set root container, TankNumber, to four. This is useful for making parameterized windows, that is, windows that are re-used to display information about like pieces of equipment. See also: **Parameterized Popup Windows**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.nav.openWindow(path, [params])`

Parameters

Type	Parameter	Description
String	`path`	The path to the window to open.
Dictionary[String, Any]	`params`	A dictionary of parameters to pass into the window. The keys in the dictionary must match dynamic property names on the target window's root container. The values for each key will be used to set those properties. [optional]

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
# This is the simplest form of openWindow.
system.nav.openWindow("SomeWindowName")
```

Example #2

```
# A more complex example - a setpoint screen for multiple valves that opens
centered.
titleText = "Third Valve Setpoints"
tankNo = system.nav.openWindow("ValveSetPts", {"valveNum":3,
"titleText":titleText})
system.nav.centerWindow("ValveSetPts")
```

Example #3

```
# Opens a popup window, and sets the dimensions to 100 pixels x 100 pixels.
window = system.nav.openWindow("popup")
window.size = (100,100)
```

Keywords

system nav openWindow, nav.openWindow

system.nav.openWindowInstance

This function is used in **Python Scripting**.

Description

When called in a Vision Client, it operates exactly like **system.nav.openWindow()**, except that if the named window is already open, then an additional instance of the window will be opened. There is no limit to the number of additional instances of a window that you can open.

When called in the Designer, it operates similar to system.nav.openWindow(), except that if the named window is already open the function will swap to the opened window. Additional instances will not be opened. A warning is issued indicating why a new instance was not opened.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.openWindowInstance(path, [params])
```

Parameters

Type	Parameter	Description
String	`path`	The path to the window to open.
Dictionary[String, Any]	`params`	A dictionary of parameters to pass into the window. The keys in the dictionary must match dynamic property names on the target window's root container. The values for each key will be used to set those properties. [optional]

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
# This example would open three copies of a single HOA popup screen.

system.nav.openWindowInstance("HOA", {machineNum:3})
system.nav.openWindowInstance("HOA", {machineNum:4})
system.nav.openWindowInstance("HOA", {machineNum:5})
```

system.nav.swapTo

This function is used in **Python Scripting**.

Description

Performs a window swap from the current main screen window to the window specified. Swapping means that the opened window will take the place of the closing window - in this case it will be maximized. See also: **Navigation Strategies**.

This function works like **system.nav.swapWindow**, except that you cannot specify the source for the swap.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.nav.swapTo(path, [params])
```

Parameters

Type	Parameter	Description
String	`path`	The path of a window to swap to.
Dictionary[String, Any]	`params`	A dictionary of parameters to pass into the window. The keys in the dictionary must match dynamic property names on the target window's root container. The values for each key will be used to set those properties. [optional]

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
# This code would go in a button's ActionPerformed event to swap out of the
current window and into a window named MyWindow
system.nav.swapTo("MyWindow")
```

Example #2

```
# This code would go in a button's ActionPerformed event to swap out of the
current window and into a window named MyWindow.
# It also looks at the selected value in a dropdown menu and passes that value
into the new window.

# MyWindow's Root Container must have a dynamic property named "paramValue"
dropdown = event.source.parent.getComponent("Dropdown")
system.nav.swapTo("MyWindow", {"paramValue":dropdown.selectedValue})
```

Example #3

```
#This code cycles through a dictionary of windows. This could be placed on a
Client Event Timer Script to cycle through some windows.
#The below code assumes that each of the windows are in the same folder (named
"Main Windows")
#If the windows are in different folders, then the script would need to be
modified to prepend the correct folder name on the last line of code.


#Build a dictionary of window names without directories.
windowDict = {"Overview":"Motors", "Motors":"Alarming", "Alarming":"Scripting",
"Scripting":"Overview"}
#Find the current window
currentWin = system.nav.getCurrentWindow()
winObj = system.gui.getWindow(currentWin)
#Find the next window in the dictionary based on the name of the current window
(winObj)
nextWindow = windowDict[winObj.name]
#Swap to the next window
system.nav.swapTo("Main Windows/" + nextWindow)
```

system.nav.swapWindow

This function is used in **Python Scripting**.

Description

Performs a window swap. This means that one window is closed, and another is opened and takes its place - assuming its size, floating state, and maximization state. This gives a seamless transition - one window seems to simply turn into another.

This function works like **system.nav.swapTo**, except that you can specify the source and destination for the swap.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax #1 (String param)

```
system.nav.swapWindow(swapFromPath, swapToPath, [params])
```

Parameters

Type	Parameter	Description
String	`swapFromPath`	The path of the window to swap from. Must be a currently open window, otherwise this will act like an openWindow.
String	`swapToPath`	The name of the window to swap to.
Dictionary[String, Any]	`params`	A dictionary of parameters to pass into the window. The keys in the dictionary must match dynamic property names on the target window's root container. The values for each key will be used to set those properties. [optional]

Returns

Window - A reference to the swapped-to window.

Scope

Vision Client

Syntax #2 (EventObject param)

`system.nav.swapWindow(event, swapToPath, [params])`

Parameters

Type	Parameter	Description
EventObject	`event`	A component event whose enclosing window will be used as the "swap-from" window.
String	`swapToPath`	The name of the window to swap to.
Dictionary[String, Any]	`params`	A dictionary of parameters to pass into the window. The keys in the dictionary must match dynamic property names on the target window's root container. The values for each key will be used to set those properties. [optional]

Returns

Window - A reference to window that was navigated to. Refer to the list of **window** objects.

Scope

Vision Client

Code Examples

Example #1

```
# This code would go in a button's ActionPerformed event to swap out of the
# window containing the button and into a window named MyWindow.
system.nav.swapWindow(event, "MyWindow")
```

Example #2

```
# This code would swap from window named WindowA to a window named WindowB.
system.nav.swapWindow("WindowA", "WindowB")
```

Example #3

```
# This code would swap from window named WindowA to a window named WindowB.
# It also looks at the two calendar popup controls and passes the two selected
# dates to WindowB. WindowB's Root Container must have dynamic properties named
# "startDate" and "endDate".
date1 = event.source.parent.getComponent("Start Date").date
date2 = event.source.parent.getComponent("End Date").date
system.nav.swapWindow("WindowA", "WindowB", {"startDate":date1, "endDate":date2})
```

system.net

Net Functions

The following functions give you access to interact with http services.

getExternalIpAddress

Returns the client's IP address, as it is detected by the Gateway.

getHostName

Returns the host name of the computer that the client is currently running on

getIpAddress

Returns the IP address of the computer the client is running on, as it appears to the client.

getRemoteServers

This function returns a List of Gateway Network servers that are visible from the local Gateway.

httpClient

Provides a general use object that can be used to send and receive HTTP requests.

httpDelete

Performs an HTTP DELETE to the given URL.

httpGet

Retrieves the document at the given URL using the HTTP GET protocol.

httpPost

Retrieves the document at the given URL using the HTTP POST protocol.

httpPut

Performs an HTTP PUT to the given URL.

openURL

Opens the given URL or URI scheme outside of the currently running Client in whatever application the host oper…

sendEmail

Sends an email through the given SMTP server.

Functions by Scope

Gateway >

Vision >

Perspective >

system.net.getExternalIpAddress

This function is used in **Python Scripting**.

Description

Returns the Client's IP address, as it is detected by the Gateway. This means that this call will communicate with the Gateway, and the Gateway will tell the Client what IP address its incoming traffic is coming from. If you have a client behind a Network Address Translation (NAT) router, then this address will be the Wide Area Network (WAN) address of the router instead of the Local Area Network (LAN) address of the Client, which is what you'd get with **system.net.getIpAddress**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.getExternalIpAddress()
```

Parameters

Nothing

Returns

String - A text representation of the client's IP address, as detected by the Gateway

Scope

Vision Client

Code Examples

Code Snippet

```
# Put this script on a navigation button to restrict users from opening a specific page.

ip = system.net.getExternalIpAddress()
# check if this matches the CEO's IP address
if ip == "66.102.7.104":
   system.nav.swapTo("CEO Dashboard")
else:
   system.nav.swapTo("Manager Dashboard")
```

system.net.getHostName

This function is used in **Python Scripting**.

Description

Returns the host name of the computer that the script was ran on. When run in the Gateway scope, returns the Gateway hostname. When run in the Client scope, returns the Client hostname. On Windows, this is typically the "computer name." For example, might return EAST_WING_WORKSTATION or bobs-laptop.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.getHostName()
```

Parameters

Nothing

Returns

String - The hostname of the local machine.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Put this script on a navigation button to link dedicated machines to specific
screens.
comp = system.net.getHostName()
# check which line this client is tied to
if comp == "Line1Computer":
   system.nav.swapTo("Line Detail", {"line":1})
elif comp == "Line2Computer":
   system.nav.swapTo("Line Detail", {"line":2})
else:
   system.nav.swapTo("Line Overview")
```

system.net.getIpAddress

This function is used in **Python Scripting**.

Description

Returns the IP address of the computer that the script was ran on. When run in the Gateway scope, returns the Gateway IP address. When run in the Client scope, returns the Client IP address.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.getIpAddress()
```

Parameters

Nothing

Returns

String - Returns the IP address of the local machine, as it sees it.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# Put this script on a navigation button to link dedicated machines to specific
screens.
ip = system.net.getIpAddress()
# check which line this client is tied to
if ip == "10.1.10.5":
   system.nav.swapTo("Line Detail", {"line":1})
elif ip == "10.1.10.6":
   system.nav.swapTo("Line Detail", {"line":2})
else:
   system.nav.swapTo("Line Overview")
```

system.net.getRemoteServers

This function is used in **Python Scripting**.

Description

This function returns a list of Gateway Network servers that are visible from the local Gateway.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.getRemoteServers([runningOnly])
```

Parameters

Type	Parameter	Description
Boolean	`runningOnly`	If set to true, only servers on the Gateway Network that are running will be returned. Servers that have lost contact with the Gateway Network will be filtered out. [optional]

Returns

List[String] - A list of strings representing Gateway Network server IDs.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following will create a list of running servers on the Gateway Network, and
show the list in a message box.

# Collect the list of running servers
runningServers = system.net.getRemoteServers(True)

# Initialize the start of the message
serverStatusText = "The following servers are running:\n "
# Add each running server to the message
for server in runningServers:
    serverStatusText += "%s \n" % server

# Show the message
system.gui.messageBox(serverStatusText)
```

system.net.httpClient

This function is used in **Python Scripting**.

Description

Provides a general use object that can be used to send and receive HTTP requests. The object created by this function is a wrapper around Java's HttpClient class. Usage requires creating a `JythonHttpClient` object with a call to `system.net.httpClient`, then calling a method (such as `get()`, `post()`) on the `JythonHttpClient` to actually issue a request.

To learn more about Java's HttpClient class, click the link corresponding to your version of Ignition:

- 8.1.32 and earlier: **Java 11 HttpClient Docs**
- 8.1.33+: **Java 17 HttpClient Docs**

> **CAUTION**
>
> Be aware that httpClient instances are heavyweight, so they should be created sparingly and reused as much as possible. For ease of reuse, consider instantiating a new httpClient as a top-level variable in a project library script.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.httpClient([timeout], [bypass_cert_validation], [username], [password], [proxy], [cookie_policy], [redirect_policy], [version], [customizer])
```

Parameters

Type	Parameter	Description
Integer	`timeout`	A value, in milliseconds, to set the client's connect timeout setting to. Defaults to 60000. [optional]
Boolean	`bypass_cert_validation`	A boolean indicating whether the client should attempt to validate the certificates of remote servers, if connecting via HTTPS/SSL. Defaults to False. [optional]
String	`username`	A string indicating the username to use for authentication if the remote server requests authentication; specifically, by responding with a **WWW-Authenticate** or **Proxy-Authenticate** header. Only supports **Basic authentication**. If `username` is specified but not password, an empty string will be used for the password in the Basic Authentication response. Defaults to None. [optional]
String	`password`	A string indicating the password to use for authentication. Defaults to None. [optional]
String	`proxy`	The address of a proxy server, which will be used for HTTP and HTTPS traffic. If a port is not specified as part of that address, it will be assumed from the protocol in the URL, i.e. 80/443. Defaults to None. [optional]
String	`cookie_policy`	A string representing this client's cookie policy. Accepts values "ACCEPT_ALL", "ACCEPT_NONE", and "ACCEPT_ORIGINAL_SERVER" . [Defaults to "ACCEPT_ORIGINAL_SERVER"]
String	`redirect_policy`	A string representing this client's redirect policy. Acceptable values are listed below.

Type	Parameter	Description
		Defaults to "Never". [optional] • "NEVER" - never allow redirects • "ALWAYS" - allow redirects • "NORMAL" - allows redirects, except those that would downgrade to insecure addresses (i.e., HTTPS redirecting to HTTP)
String	`version`	**New in 8.1.16** A string specifying either `HTTP_2` or `HTTP_1_1` for the HTTP protocol. When omitted, the previous default of `HTTP_2` is implied. [optional]
Callable	`customizer`	A reference to a function. This function will be called with one argument (an instance of HttpClient.Builder). The function should operate on that builder instance, which allows for customization of the created HTTP client. Defaults to None. [optional]

Returns

JythonHttpClient - An object wrapped around an instance of Java's HttpClient class. The **httpClient** object has methods that can be called to execute HTTP requests against a server. See the panel below for more details.

Scope

Gateway, Vision Client, Perspective Session

JythonHttpClient

Once a JythonHttpClient object has been created, it can be used to handle many HTTP requests without needing to create a new client. Individual HTTP requests can be made with the methods detailed below.

JythonHttpClient Methods

Most of the following methods return either a **Response** object, or a **Promise** object that will eventually resolve to a Response object, if asynchronous. Asynchronous means that the method will be called, but will not block script execution - so multiple asynchronous calls to network services can be made in succession, without each call "waiting" for the result of the previous. Parameters for these functions are documented below.

Method	Description
.get()	Sends an HTTP GET call, blocking for a response.
.getAsync()	Sends an HTTP GET call without blocking.
.post()	Sends an HTTP POST call, blocking for a response.
.postAsync()	Sends an HTTP POST call without blocking.
.put()	Sends an HTTP PUT call, blocking for a response.
.putAsync()	Sends an HTTP PUT call without blocking.
.delete()	Sends an HTTP DELETE call, blocking for a response.
.deleteAsync()	Sends an HTTP DELETE call without blocking.
.patch()	Sends an HTTP PATCH call, blocking for a response.
.patchAsync()	Sends an HTTP PATCH call without blocking.
.head()	Sends an HTTP HEAD call, blocking for a response.
.headAsync()	Sends an HTTP HEAD call without blocking.
.options()	Sends an HTTP OPTIONS call, blocking for a response.
.optionsAsync()	Sends an HTTP OPTIONS call without blocking.
.trace()	Sends an HTTP TRACE call, blocking for a response.
.traceAsync()	Sends an HTTP TRACE call, without blocking for a response.
.request()	Sends an HTTP request, using a verb specified by the `method` parameter. Use method in cases where a non-standard verb is required, and you need the call block.
.requestAsync()	Sends an HTTP request, with a verb specified by the `method` parameter. Use method in cases where a non-standard verb is required, and you do not want t

Method	Description
	to block.

.setGson()	**New in 8.1.10**
	Used to override the JSON serialization behavior on the client instance. Expec
	single argument, which is a configured Gson instance. In most cases this meth
	unnecessary, but it can be useful in cases where the default serialization casts
	values in an unwanted way. To learn more, see **GsonBuilder**.
	`from com.inductiveautomation.ignition.common.gson import GsonBui`
	
	`# Create the client instance`
	`client = system.net.httpClient()`
	
	`# Create a new`
	`altGson = GsonBuilder().serializeNulls().create()`
	`client.setGson(altGson)`

Parameters

Parameters in this section can be used by any of the methods above. Exceptions to this rule will be defined on each parameter.

Type	Parameter	Description
String	`url`	The URL to connect to. [required]
String	`method`	The method to use in the request. [Required. Used by .request() and .requestAsync() only.]
String or Dictionary	`params`	URL parameters to send with the request. Defaults to None. [optional] • If supplied as a string, will be directly appended to the URL. • If supplied as a dictionary, key/value pairs will be automatically URL encoded.
String or Dictionary or byte[]	`data`	Data to send in the request. Defaults to None. [optional] • String data will be sent with a Content-Type of `text/plain; charset=UTF-8`, unless a different Content-Type header was specified. • Dictionaries will be automatically encoded into JSON to send to the target server, with a Content-Type header set to `application/json;charset=UTF-8` unless a different Content-Type header was specified. • Byte arrays will be streamed directly to the target server, with a Content-Type header of `application/octet-stream` unless a different Content-Type header was specified.
String	`file`	The path to a file, relative to the HTTP client instance. If specified, and the path is valid, the data in the file will be sent to the remote server. The file attribute overrides any value set in data; only the file's data will be sent. Defaults to None. [optional]
Dictionary	`headers`	A dictionary of HTTP headers to send with the request. Defaults to None. [optional]
String	`username`	Username to add to a Basic Authorization header in the outgoing request. If `username` is specified, but not

Type	Parameter	Description
		`password`, the password is encoded as an empty string. Defaults to None. [optional]
String	`password`	Password to add to a Basic Authorization header in the outgoing request. Defaults to None. [optional]
Integer	`timeout`	The read timeout for this request, in milliseconds. Defaults to 60000. [optional]

JythonHttpClient Attributes

This section documents available attributes on the JythonHttpClient object.

Attribute	Description	Return Type
.cookieManager	Returns a CookieManager, which can be used to get or set cookies on requests from this client, or to override the cookie storage policy of the client.	CookieManager
.javaClient	Returns the underlying Java HTTPClient instance.	HTTPClient

CookieManager

Each JythonHttpClient instance has an attached CookieManager. This CookieManager can be accessed to retrieve cookies set by external web services, or to set cookies (i.e., for authentication) before a request is made.

CookieManager Methods and Attributes

This section details methods on the CookieManager. Setting the cookie policy is easiest on the initial system.net.httpClient call, but the policy on the CookieManager can be overridden with a call to the built-in| `setCookiePolicy` method. Policies are defined in the **Java CookiePolicy interface**.

Attribute	Description	Return Type
.getCookieStore() .cookieStore	Returns the underlying CookieStore, which can be used to add, remove, or get cookies that have been set by requests from the parent HttpClient instance. See the **Java CookieStore interface** for more information.	CookieStore
.getCookieManager() .cookieManager	Sends an HTTP GET call, blocking for a response.	CookiePolicy
.setCookiePolicy(policy)	Sets a new CookiePolicy. See the **Java CookiePolicy interface** for more information.	None

```
from java.net import CookiePolicy

client = system.net.httpClient()
manager = client.getCookieManager()
manager.setCookiePolicy(CookiePolicy.ACCEPT_NONE)
```

Response Object

This section documents the Response object, returned by the request methods on the JythonHttpClient object. This object is simply a wrapper for Java's **HTTPResponse** object.

Response Methods and Attributes

This section details methods on the Response object.

Method and/or Attribute	Description	Data type
.getBody() .body	Returns the response content directly.	Byte Array
.getJson([encoding]) .json	Returns the response content as a dictionary, decoded with the encoding specified by the response. The optional encoding parameter can be used to specified how the JSON should be decoded before being mapped into Python objects (dictionary, list, etc). If the response is not valid JSON, an error will be thrown.	Dictionary
.getText([encoding]) .text	Returns the response content, decoded as a string - either with the charset specified by the response (defaulting to UTF-8 if not specified by the remote server), or using the encoding specified in the function call.	String
.getStatusCode() .statusCode	Return the status code of the response object (i.e., 200 or 404).	Integer
.isGood() .good	Returns True if the response was good (i.e., 200) or False if it was a client or server error (status code between 400 and 599).	Boolean
.isClientError() .clientError	Returns True if the response was a client error, as in an HTTP 4XX response.	Boolean
.isServerError() .serverError	Returns True if the response was a server error, as in an HTTP 5XX response.	Boolean
.getUrl() .url	Returns the URL this Response connected to.	String
.getHeaders() .headers	Returns a case-insensitive “dictionary” of headers present on the response. Values will always be in a list, even if only a single header value was returned.	Dictionary

Method and/or Attribute	Description	Data type
.getJavaResponse() .javaResponse	Returns the underlying Java **HttpResponse** behind this Response.	HttpResponse
.getCookieManager() .cookieManager	Returns the CookieManager. See the **CookieManager** section for more details.	CookieManager
.getRequest() .request	Returns a **RequestWrapper** object, which has details about the original request that was sent to return this response.	RequestWrapper

Promise Object

This section documents the Promise object, which is returned by the asynchronous methods available on the JythonHttpClient object. This object is a wrapper around Java's **CompletableFuture** class, and will return some different object once completed with `.get()`.

Promise Methods and Attributes

Method and/or Attribute	Description	Data type
.get([timeout])	Block for timeout until a result is available. The result object can technically be any type, if chaining, but will be a Response object when calling one of the HTTPClient methods. If the timeout is met without a result, an exception will be thrown. The timeout, if unspecified, is 60000 milliseconds (60 seconds).	Any
.then(callback)	Allows for chaining, by returning a new Promise which wraps the provided callback. The callback parameter should be a Python function that either accepts two arguments (the result, or an error, either of which can be None) *or* a single argument, but is able to accept exceptions as well as valid values.	Promise
.handleException(callback)	In the event of an exception in a potential chain of promises, `handleException` will be called with one argument (the thrown error) and is expected to return a new fallback value for the next step in the promise chain.	Promise
.whenComplete(callback)	Call the provided callback when this promise finishes evaluating. Callback will be called with return value as the first argument, and any thrown error as the second argument. Any return value will be ignored.	None
.cancel()	Attempt to cancel the wrapped Java future. Returns True if the cancellation succeeded.	Boolean
.getFuture() .future	Returns the underlying **Java CompletableFuture** object that this Promise contains.	CompletableFuture

Method and/or Attribute	Description	Data type
.isDone() .done	Returns True if the underlying future has completed - regardless of whether it was a good result or exception.	Boolean

RequestWrapper Object

This section documents the RequestWrapper object, which is simply a wrapper around Java's HTTPRequest object. This object can be used to determine details about the request that was originally sent to populate a Response object.

RequestWrapper Methods and Attributes

This section details methods on the RequestWrapper object.

Method and/or Attribute	Description	Data type
.getUrl() .url	Returns the actual URL that was contacted in the request.	String
.getMethod() .method	Return the HTTP method used in this request; GET, POST, PATCH, etc.	String
.getHeaders() .headers	Returns a case-insensitive “dictionary” of headers present on the request. Values will always be in a list, even if only a single value is present.	Dictionary
.getTimeout() .timeout	Returns the timeout this query was set to, or -1 if the timeout was invalid.	Integer
.getVersion() .version	Returns the HTTP version used for this request; will be either HTTP_1_1 or HTTP_2.	String
.getJavaRequest() .javaRequest	Returns the underlying **Java HttpRequest** object directly.	HttpRequest

Code Examples

Example #1

```
# Create the JythonHttpClient.
client = system.net.httpClient()

# Sent a GET request.
response = client.get("https://httpbin.org/get", params={"a": 1, "b": 2})

# Validate the response.
if response.good:
    # Do something with the response
    print response.json['args']['a']
```

Example #2 - Waiting for a Response

```
client = system.net.httpClient()

# Send a non-blocking request to an endpoint that will wait 3 seconds.
promise = client.getAsync("https://httpbin.org/delay/3", params={"a": 1, "b": 2})

# This will print before we get a response from the endpoint.
print "doing something while waiting..."
# do more work here...

# After the work on the previous lines, we can now block and wait for a response.
response = promise.get()
if response.good:
    print response.json['args']['a']
```

system.net.httpDelete

This function is used in **Python Scripting**.

Description

Performs an HTTP DELETE to the given URL.

Keep in mind that **JRE proxy settings** will influence how these functions conduct their network activities.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.net.httpDelete(url, [contentType], [connectTimeout], [readTimeout], [username], [password], [headerValues], [bypassCertValidation])
```

Parameters

Type	Parameter	Description
String	`url`	The URL to send the request to.
String	`contentType`	[Optional] The MIME type used in the HTTP 'Content-type' header.
Int	`connectTimeout`	[Optional] The timeout for connecting to the URL in milliseconds. Default is 10,000
Int	`readTimeout`	[Optional] The read timeout for the operation in milliseconds. Default is 60,000.
String	`username`	[Optional] If specified, the call will attempt to authenticate with basic HTTP authentication.
String	`password`	[Optional] The password used for basic HTTP authentication, if the username parameter is also present.
PyDictionary	`headerValues`	[Optional] A dictionary of name/value pairs that will be set in the HTTP header.
Boolean	`bypassCertValidation`	[Optional] If the target address in an HTTPS address, and this parameter is TRUE, the system will bypass all SSL certificate validation. This is not recommended, though is sometimes necessary for self-signed certificates.

Returns

String - The content returned for the DELETE operation.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This example attempts to perform a DELETE operation
URL = "http://myURL/folder.resource"
system.net.httpDelete(URL)
```

system.net.httpGet

This function is used in **Python Scripting**.

Description

Retrieves the document at the given URL using the HTTP GET protocol. The document is returned as a string. For example, if you use the URL of a website, you'll get the same thing you'd get by going to that website in a browser and using the browser's "View Source" function.

Keep in mind that **JRE proxy settings** will influence how these functions conduct their network activities.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.net.httpGet(url, connectTimeout, readTimeout, username, password, headerValues, bypassCertValidation, useCaches, throwOnError)
```

Parameters

Type	Parameter	Description
String	`url`	The URL to retrieve.
Integer	`connectTimeout`	The timeout for connecting to the URL. In milliseconds. Default is 10,000. [optional]
Integer	`readTimeout`	The read timeout for the get operation. In milliseconds. Default is 60,000. [optional]
String	`username`	If specified, the call will attempt to authenticate with basic HTTP authentication. [optional]
String	`password`	The password used for basic HTTP authentication, if the username parameter is also present. [optional]
Dictionary[String, String]	`headerValues`	A dictionary of name/value pairs that will be set in the HTTP header. [optional]
Boolean	`bypassCertValidation`	If the target address is an HTTPS address, and this parameter is true, the system will bypass all SSL certificate validation. This is not recommended, though is sometimes necessary for self-signed certificates. [optional]
Boolean	`useCaches`	Will cache the information returned by the httpGet call. If using this for something that constantly updates like an RSS feed, it would be better to set this to False. Default is True. [optional]
Boolean	`throwOnError`	Set to False if you wish to get the error body rather than a Python exception if the GET request returns an error code (non-200 responsive). Default is True. [optional]

Returns

String - The content found at the given URL.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

If you are using JSON, check out the **system.util.jsonEncode** and **system.util.jsonDecode**.

Example #1

```
# This code would return the source for Google's homepage
source = system.net.httpGet("http://www.google.com")
print source
```

Example #2 - Getting Weather Information

```
# This code would query Yahoo Weather for the temperature in Sacramento, CA
# and then find the current temperature using a regular expression

response = system.net.httpGet("https://query.yahooapis.com/v1/public/yql?
q=select%20*%20from%20weather.forecast%20where%20woeid%3D2489314")

# import Python's regular expression library
import re

# NOTE - if you've never seen regular expressions before, don't worry, they look
# confusing even to people who use them frequently.
pattern = re.compile('.*?<yweather:condition (.*?)/>', re.DOTALL)
match = pattern.match(response)
if match:
   subText = match.group(1)
   condition = re.compile('.*?text="(.*?)"').match(subText).group(1)
   temp = re.compile('.*?temp="(.*?)"').match(subText).group(1)
   print "Condition: ", condition
   print "Temperature (F): ", temp
else:
   print 'Weather service format changed'
```

system.net.httpPost

This function is used in **Python Scripting**.

Description

Retrieves the document at the given URL using the HTTP POST protocol. If a parameter dictionary argument is specified, the entries in the dictionary will encoded in "application/x-www-form-urlencoded" format, and then posted. You can post arbitrary data as well, but you'll need to specify the MIME type. The document is then returned as a string.

Keep in mind that **JRE proxy settings** will influence how these functions conduct their network activities.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - postParams Dictionary

`system.net.httpPost(url, postParams)`

Parameters

Type	Parameter	Description
String	`url`	The URL to post to.
Dictionary[String, String]	`postParams`	A dictionary of name/value key pairs to use as the post data.

Returns

String - The content returned for the POST operation.

Scope

Gateway, Vision Client, Perspective Session

Syntax - Alternative

```
system.net.httpPost(url, [contentType], [postData], [connectTimeout], [readTimeout], [username], [password], headerValues], [bypassCertValidation], [throwOnError])
```

Parameters

Type	Parameter	Description
String	`url`	The URL to post to.
String	`contentType`	The MIME type to use in the HTTP "Content-type" header. [optional]
String	`postData`	The raw data to post via HTTP. [optional]
Integer	`connectTimeout`	The timeout for connecting to the url. In milliseconds. Default is 10,000. [optional]
Integer	`readTimeout`	The read timeout for the get operation. In milliseconds. Default is 60,000. [optional]
String	`username`	If specified, the call will attempt to authenticate with basic HTTP authentication. [optional]
String	`password`	The password used for basic http authentication, if the username parameter is also present. [optional]
Dictionary[String, Integer]	`headerValues`	A dictionary of name/value pairs that will be set in the http header. [optional]
Boolean	`bypassCertValidation`	If the target address is an HTTPS address, and this parameter is True, the system will bypass all SSL certificate validation. This is not recommended, though is sometimes necessary for self-signed certificates. [optional]
Boolean	`throwOnError`	Set to false if you wish to get the error body rather than a Python exception if the POST request returns an error code (non-200 responsive). Default is True. [optional]

Returns

String - The content returned for the POST operation.

Scope

Gateway, Vision Client, Perspective Session

If you are using JSON, check out the **system.util.jsonEncode** and **system.util.jsonDecode**.

Code Example

Code Snippet

```
# This code sends an XML message to a hypothetical URL.
message = "<MyMessage><MyElement>here is the element</MyElement></MyMessage>"
system.net.httpPost("http://www.posttome.xyz/posthere", "text/xml", message)
```

system.net.httpPut

This function is used in **Python Scripting**.

Description

Performs an HTTP PUT to the given URL. Encodes the given dictionary of parameters using "applications/x-www-form-urlencoded" format.

Keep in mind that **JRE proxy settings** will influence how these functions conduct their network activities.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.net.httpPut(url, [contentType], putData, [connectTimeout], [readTimeout], [username], [password], [headerValues], [bypassCertValidation])
```

Parameters

Type	Parameter	Description
String	`url`	The URL to put to.
String	`contentType`	The MIME type used in the HTTP 'Content-type' header. [optional]
String	`putData`	The raw data to put via HTTP.
Int	`connectTimeout`	The timeout for connecting to the URL in milliseconds. Default is 10,000. [optional]
Int	`readTimeout`	The read timeout for the operation in milliseconds. Default is 60,000. [optional]
String	`username`	If specified, the call will attempt to authenticate with basic HTTP authentication. [optional]
String	`password`	The password used for basic HTTP authentication, if the username parameter is also present. [optional]
Dictionary[String, String]	`headerValues`	A dictionary of name/value pairs that will be set in the HTTP header. [optional]
Boolean	`bypassCertValidation`	If the target address in an HTTPS address, and this parameter is true, the system will bypass all SSL certificate validation. This is not recommended, though is sometimes necessary for self-signed certificates. [optional]

Returns

String - The content returned for the PUT operation.

Scope

Gateway, Vision Client, Perspective Session

Syntax

`system.net.httpPut(url, putParams)`

Parameters

Type	Parameter	Description
String	`url`	The URL to send the request to.
Dictionary[String, Integer]	`putParams`	A dictionary of name/value key pairs to use as the put data.

Returns

String - The content returned for the PUT operation.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Example - Simple Test

```
# The following example uses a test URL to echo back the data used in the PUT
request.
# Test URL courtesy of:
# http://stackoverflow.com/questions/5725430/http-test-server-that-accepts-get-
post-calls?answertab=votes#tab-top

# Specify URL and parameters to pass in the PUT call
URL = "http://httpbin.org/put"
params = {"testkey":"testValue"}

# Make the PUT request and print the results to the console
print system.net.httpPut(URL, params)
```

Code Example - Keyword Arguments

```
 """
This example attempts to authenticate with a username and password, as well as
specify a MIME type.
The Username and password are static in this example, but could easily make use of
other components to allow user input
or fetch data out of a database instead.
"""

URL = "http://httpbin.org/put"
params = {"testkey":"testValue"}
user = "myUser"
userPass = "password"

# Make the PUT request and print the results to the console
print system.net.httpPut(URL, params, username = user, password = userPass,
contentType = "text/html")
```

system.net.openURL

This function is used in **Python Scripting**.

Description

Opens the given URL or URI scheme outside of the currently running Client in whatever application the host operating system deems appropriate. For example, the URL:

```
"http://www.google.com"
```

will open in the default web browser, whereas this one:

```
"file://C:/Report.pdf"
```

will likely open in Adobe Acrobat. The Windows network-share style path like:

```
"\\Fileserver\resources\machine_manual.pdf"
```

will work as well (in Windows).

> **CAUTION**
>
> Be careful not to use this function in a full-screen client, as launching an external program will break your full-screen exclusive mode.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.net.openURL(url [, useApplet])`

Parameters

Type	Parameter	Description
String	`url`	The URL to open in a web browser.
Boolean	`useApplet`	If set to true (1), and the client is running as an Applet, then the browser instance that launched the applet will be used to open the URL. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code would open a web page
system.net.openURL("http://www.google.com")
```

Example #2

```
# This code would open a PDF document located at C: on the client computer
# Note the double backslashes are needed because backslash is the escape character
# for Python
system.net.openURL("file://C:\\myPDF.pdf")
```

Example #3

```
# This code would open a PDF document from a Windows-based file server
# Note the double backslashes are needed because backslash is the escape character
# for Python
system.net.openURL("\\\\MyServer\\MyDocs\\document.pdf")
```

system.net.sendEmail

This function is used in **Python Scripting**.

Description

Sends an email through the given SMTP server. Note that this email is relayed first through the Gateway; the Client host machine doesn't need network access to the SMTP server.

Note that you can use this function to send emails as text messages. Most phone service providers offer a domain that can be used to convert emails into text messages. For example: `1234567890@phone.domain.com`. Contact your cell carrier for details.

New in 8.1.22 Ignition now supports more attachment file formats with associated MIME type mappings, including `.ics`, `.ifb`, `.otf`, and `.wav`. Additional or modified mappings may be specified in `\webserver\webdefault.xml`:

Example

```
<!-- Add <mime-mapping> blocks like the one below or modify default mappings -->
<!-- Map the file extension 'pwn' to the specified mime-type: -->
<mime-mapping>
    <extension>pwn</extension>
    <mime-type>application/vnd.3m.post-it-notes</mime-type>
</mime-mapping>
```

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

TIP

This function accepts keyword arguments.

`system.net.sendEmail(smtp, fromAddr, [subject], [body], [html], to, [attachmentNames], [attachmentData], [timeout], [username], [password], [priority], [smtpProfile], [cc], [bcc], [retries], [replyTo])`

Parameters

Type	Parameter	Description
String	`smtp`	The address of an SMTP server to send the email through, like `mail.example.com`. A port can be specified, like `mail.example.com:25`. STARTTLS can also be forced, like `mail.example.com:587:tls`.
String	`fromAddr`	An email address to have the email come from.
String	`subject`	The subject line for the email. [optional]
String	`body`	The body text of the email. [optional]
Boolean	`html`	A flag indicating whether or not to send the email as an HTML email. Will auto-detect if omitted. [optional]
List[String]	`to`	A list of email addresses to send to. **New in 8.1.48** This parameter becomes optional if either the `cc` or `bcc` parameter is specified.
List[String]	`attachmentNames`	A list of attachment names. Attachment names must have the correct extension for the file type or an error will occur. [optional]
List[Byte]	`attachmentData`	A list of attachment data, in binary format. [optional]
Integer	`timeout`	A timeout for the email, specified in milliseconds. Defaults to 300,000 milliseconds (5 minutes). [optional]
String	`username`	If specified, will be used to authenticate with the SMTP host. [optional]
String	`password`	If specified, will be used to authenticate with the SMTP host. [optional]
String	`priority`	Priority for the message, from "1" to "5", with "1" being highest priority. Defaults to "3" (normal) priority.

Type	Parameter	Description
		[optional]
String	`smtpProfile`	If specified, the named SMTP profile defined in the Gateway will be used. If this keyword is present, the `smtp`, `username`, and `password` keywords will be ignored. [optional]
List[String]	`cc`	A list of email addresses to carbon copy. Only available if an `smtpProfile` is used. [optional]
List[String]	`bcc`	A list of email addresses to blind carbon copy. Only available if an `smtpProfile` is used. [optional]
Integer	`retries`	The number of additional times to retry sending on failure. Defaults to 0. Only available if an `smtpProfile` is used. [optional]
List[String]	`replyTo`	An optional list of addresses to have the recipients reply to. If omitted, this defaults to the from address. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would send a simple plain-text email to a single recipient, with no
attachments
body = "Hello, this is an email."
recipients = ["bobsmith@mycompany.com"]
system.net.sendEmail("mail.mycompany.com",
 "myemail@mycompany.com", "Here is the email!", body, 0, recipients)
```

Example #2

```
# This code would send an HTML-formatted email to multiple recipients (including
# cellphones) with no attachments
body = "<HTML><BODY><H1>This is a big header</H1>"
body += "And this text is <font color='red'>red</font></BODY></HTML>"
recipients = ["bobsmith@mycompany.com", "1235558383@vtext.com", "sally@acme.org",
"1235557272@vtext.com"]
myuser = "mycompany"
mypass = "1234"
system.net.sendEmail(smtp="mail.mycompany.com", fromAddr="myemail@mycompany.com",
subject="Here is the email!", body=body, html=1, to=recipients, username=myuser,
password=mypass)
```

Example #3

```
# This code ask the user for an attachment file and attaches the file.
filePath = system.file.openFile()
if filePath != None:
   # This gets the filename without the C:\folder stuff
   fileName = filePath.split("\\")[-1]
   fileData = system.file.readFileAsBytes(filePath)
   smtp = "mail.mycompany.com"
   sender = "myemail@mycompany.com"
   subject = "Here is the file you requested"
   body = "Hello, this is an email."
   recipients = ["bobsmith@mycompany.com"]
   system.net.sendEmail(smtp, sender, subject, body, 0, recipients, [fileName],
[fileData])
```

Example #4

```
# This code would send an HTML-formatted email to multiple recipients, including a cc, with no attachments,
# using an smtp server defined in the Gateway
body = "<HTML><BODY><H1>This is a big header</H1>"
body += "And this text is <font color='red'>red</font></BODY></HTML>"
recipients = ["bobsmith@mycompany.com", "1235558383@vtext.com", "sally@acme.org", "1235557272@vtext.com"]
cc_recipients = ["annejones@mycompany.com"]
smtp_server = "mySmtpServer"
system.net.sendEmail(smtpProfile=smtp_server, fromAddr="myemail@mycompany.com", subject="Here is the email!", body=body, html=1, to=recipients, cc=cc_recipients)
```

system.opc

OPC Functions

The following functions allow you to read, write, and browse OPC servers.

browse

Allows browsing of the OPC servers in the runtime, returning a list of tags.

browseServer

When called from a Vision Client, Perspective Session, or the Designer, returns a list of OPCBrowseElement obje…

browseSimple

Allows browsing of OPC servers in the runtime returning a list of tags.

getServers

Returns a list of server names.

getServerState

Retrieves the current state of the given OPC server connection.

isServerEnabled

Checks if an OPC server connection is enabled or disabled.

readValue

Reads a single value directly from an OPC server connection.

readValues

This function is equivalent to the system.opc.readValue function, except that it can operate in bulk.

writeValue

Writes a value directly through an OPC server connection synchronously.

writeValues

This function is a bulk version of system.opc.writeValue.

setServerEnabled

Enables or disables an OPC server connection.

Functions by Scope

Gateway >

Vision >

Perspective >

system.opc.browse

This function is used in **Python Scripting**.

Description

Allows browsing of the OPC servers in the runtime, returning a list of tags.

> **CAUTION**
>
> This function performs a fully recursive browse that can't be terminated, which can be especially problematic in larger systems. It is highly advised to use **system.opc.browseServer** instead since recursion with that function is driven by subsequent calls.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments. :::.
>
> ```
> system.opc.browse(opcServer, device, folderPath, opcItemPath)
> ```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server to browse
String	`device`	The name of the device to browse
String	`folderPath`	Filters on a folder path. Use * as a wildcard for any number of characters and a ? for a single character.
String	`opcItemPath`	Filters on a OPC item path. Use * as a wildcard for any number of characters and a ? for a single character.

Returns

List[OPCBrowseTag] - An array of OPCBrowseTag objects. OPCBrowseTag has the following functions: getOpcServer(), getOpcItemPath(), getType(), getDisplayName(), getDisplayPath(), getDataType().

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Browse every OPC server

tags = system.opc.browse()
for row in tags:
    print row.getOpcServer(), row.getOpcItemPath(), row.getType(),
    print row.getDisplayName(), row.getDisplayPath(), row.getDataType()
```

Example #2

```
# Browse Ignition OPC UA server

tags = system.opc.browse(opcServer="Ignition OPC UA Server")
```

Example #3

```
# Browse Specific Device

server = "Ignition OPC UA Server"
tags = system.opc.browse(opcServer=server, device="Dairy Demo Simulator")
```

Example #4

```
# Browse Specific Folder Path (not OPC item path)

server = "Ignition OPC UA Server"
tags = system.opc.browse(opcServer=server, folderPath="*Overview/AU 1*")
```

system.opc.browseServer

This function is used in **Python Scripting**.

Description

When called from a Vision Client, Perspective Session, or the Designer, returns a list of OPCBrowseElement objects for the given server. Otherwise, returns a list of PyOPCTagEx objects.

New in 8.1.8 As of 8.1.8, method nodes are now included in the browse results. Methods can be read and subscribed to, but not written to.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.browseServer(opcServer, nodeId)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection.
String	`nodeId`	The node ID to browse.

Returns

List - A list of **PyOPCTagEx** objects.

Scope

Gateway

Syntax - Vision Client Scope

```
system.opc.browseServer(opcServer, nodeId)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection.
String	`nodeId`	The node ID to browse.

Returns

List - A list of **OPCBrowseElement** objects.

Scope

Vision Client, Perspective Session, Designer

Object Summary

The OPCBrowseElement object has the following methods:

- getDisplayName() - Returns the display name of the object.
- getElementType() - Returns the element type. Element types are server, device, view, folder, object, datavariable, property and method.
- **New in 8.1.20** getNodeId() - Returns a string representing the server node ID. Functionally similar to **getServerNodeId()**, except it is available in all scopes, not just the Client/Designer.
- **New in 8.1.1** getDatatype() - Returns data type information.

The PyOPCTagEx object has the following methods to retrieve information:

- getDisplayName() - Returns the display name of the object.
- getElementType() - Returns the element type. Element types are server, device, view, folder, object, datavariable, property and method.
- getServerName() - Returns the server name as a string.
- getNodeId() - Returns a string representing the server node ID.

- **New in 8.1.1** getDataType() - Returns data type information.

Code Examples

Example #1

```
# Print the name of all devices on Ignition OPC UA
opcServer="Ignition OPC UA Server"
nodeId = "Devices"
devices = system.opc.browseServer(opcServer, nodeId)
for device in devices:
 print device.getDisplayName()
```

Example #2

```
# Print the object's server node ID
# This method call works in all scopes (Client, Gateway, and Perspective)
opcServer = "Ignition OPC UA Server"
nodeId = "Devices"
results = system.opc.browseServer(opcServer, nodeId)
for result in results:
    print "NodeID: ", result.getServerNodeId()
```

Example #3 - Recursive Browse

```python
# This example attempts to recursively browse OPC nodes. Be mindful of the maxDepth in larger systems.
# The example uses system.util.getLogger asynchronously, so if you're calling this in the Script Console,
# the output may appear in a different console (i.e., Designer console).

from functools import partial

maxDepth = 1    # Determines how deep the browse will go
serverName = 'Ignition OPC UA Server'
myLogger =  system.util.getLogger('My Browse') # Creating a logger to print the results

# Determines where the browse should start. An empty string will start at the root.
# Alternatively, '[device name]' will start at a certain device.
root = ''

def browse(nodeId, depth = 0):
    children = system.opc.browseServer(serverName, nodeId)

    for child in children:
        elementType = str(child.getElementType())
        childNodeId = child.getServerNodeId().getNodeId()

        msg = 'Depth - %s, Node - %s' % (depth, childNodeId)
        myLogger.info(msg)

        # If the element is an object, try to browse deeper.
        if (elementType == 'OBJECT' and depth < maxDepth):
            browse(childNodeId, depth + 1)

system.util.invokeAsynchronous(partial(browse, root))
```

system.opc.browseSimple

This function is used in **Python Scripting**.

Description

Allows browsing of OPC servers in the runtime returning a list of tags. browseSimple() takes mandatory parameters, which can be null, while browse() uses keyword-style arguments. The spelling on the `opcServer` and `device` parameters must be exact.

> **CAUTION**
>
> This function performs a fully recursive browse that can't be terminated, which can be especially problematic in larger systems. It is highly advised to use **system.opc.browseServer** instead since recursion with that function is driven by subsequent calls.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.browseSimple(opcServer, device, folderPath, opcItemPath)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server to browse
String	`device`	The name of the device to browse
String	`folderPath`	Filters on a folder path. Use * as a wildcard for any number of characters and a ? for a single character.
String	`opcItemPath`	Filters on a OPC item path. Use * as a wildcard for any number of characters and a ? for a single character.

Returns

OPCBrowseTag[] - An array of **OPCBrowseTag** objects. OPCBrowseTag has the following functions: getOpcServer(), getOpcItemPath(), getType(), getDisplayName(), getDisplayPath(), getDataType().

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This example will print out the the OPC item path for each item in a specific folder,

# Browse Ignition's OPC UA Server. This can be changed to match any connected OPC server.
server = "Ignition OPC UA Server"

# Focus on the "SLC" device connection. This must match a valid device connection in the OPC server.
device = "SLC"

# Specify that the folder path should contain "B3".
folderPath = "*B3*"

# This example is not filtering on a specific OPCItemPath, so it pass Python's None for this parameter
opcItemPath = None

# Call browseSimple and store the results in a variable. Note that it may take some time to complete the browse.
OpcObjects = system.opc.browseSimple(server, device, folderPath, opcItemPath)

# For each returned address, print out the
for address in OpcObjects:
    print address.getOpcItemPath()
```

system.opc.getServers

This function is used in **Python Scripting**.

Description

Returns a list of server names.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.getServers()
```

Parameters

Type	Parameter	Description
Boolean	`includeDisabled`	If set to True, enabled and disabled servers will be returned. If set to False, only enabled servers will be returned. Defaults to False. [optional]

Returns

List - A list of server name strings. If no servers are found, returns an empty list.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Printing Ignition OPC UA Servers

```
# print a list of all server names found
servers = system.opc.getServers()
if not servers:
 print "No servers found"
else:
 for server in servers:
     print server
```

system.opc.getServerState

This function is used in **Python Scripting**.

Description

Retrieves the current state of the given OPC server connection. If the given server is not found, the return value will be None. Otherwise, the return value will be one of these strings:

- UNKNOWN
- FAULTED
- CONNECTING
- CLOSED
- CONNECTED
- DISABLED

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.getServerState(opcServer)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of an OPC server connection.

Returns

String - A string representing the current state of the connection, or None if the connection doesn't exist.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following will check the state of all configured servers, and show them in a message box.
# This code interacts in the client scope, so it should be placed on a component, such as a Button.

# Retrieve a list of all servers in the gateway
allServers = system.opc.getServers()

# Initialize a message. The example will append the state of each server to this message.
# The "\n" at the end of the string adds a new line
message = "Server State:\n"

# Iterate through each server.
for server in allServers:

    # for each server, append the server name, a colon, the state of the server, and a new line
    message += server + ": " + system.opc.getServerState(server) + "\n"

# Show the state of the servers in a message box.
system.gui.messageBox(message)
```

system.opc.isServerEnabled

This function is used in **Python Scripting**.

Description

Checks if an OPC server connection is enabled or disabled.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.isServerEnabled(serverName)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of an OPC server connection.

Returns

Boolean - True if the connection is enabled, false if the connection is disabled

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
```

```
# The following will iterate through all configured OPC servers, and check if they are enabled or disabled
# This code interacts in the client scope, so it should be placed on a component, such as a Button.

# Retrieve a list of all servers in the gateway
allServers = system.opc.getServers()

# Initialize a message. The example will append the state of each server to this message.
# The "\n" at the end of the string adds a new line
message = "Server Status:\n"

# Iterate through each server.
for server in allServers:

    # for each server, append the server name, a colon, the state of the server, and a new line.
    # isServerEnabled returns a boolean, but may use the string format specifier (%s)
    message += "%s : %s \n" % (server, system.opc.isServerEnabled(server))

# Show the state of the servers in a message box.
system.gui.messageBox(message)
```

system.opc.readValue

This function is used in **Python Scripting**.

Description

Reads a single value directly from an OPC server connection. The address is specified as a string, for example, [MyDevice]N11/N11:0The object returned from this function has three attributes: value, quality, and timestamp. The value attribute represents the current value for the address specified.

The quality attribute is an OPC UA status code. You can easily check a good quality vs a bad quality by calling the isGood() function on the quality object. The timestamp attribute is Date object that represents the time that the value was retrieved at.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.readValue(opcServer, itemPath)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection in which the item resides.
String	`itemPath`	The item path, or address, to read from.

Returns

QualifiedValue - A **QualifedValue** object that contains the value, quality, and timestamp returned from the OPC server for the address specified.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
server = "Ignition OPC UA Server"
path = "[SLCSim]_Meta:N7/N7:0"
qualifiedValue = system.opc.readValue(server, path)
print "Value: " + str(qualifiedValue.getValue())
print "Quality: " + qualifiedValue.getQuality().toString()
print "Timestamp: " + qualifiedValue.getTimestamp().toString()
```

system.opc.readValues

This function is used in **Python Scripting**.

Description

This function is equivalent to the system.opc.readValue function, except that it can operate in bulk. You can specify a list of multiple addresses to read from, and you will receive a list of the same length, where each entry is the qualified value object for the corresponding address.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opc.readValues(opcServer, itemPaths)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection in which the items reside.
List[String]	`itemPaths`	A list of strings, each representing an item path, or address to read from.

Returns

List[QualifiedValue] - A sequence of **QualifedValue** objects, one for each address specified, in order. Each object contains a value, quality, and timestamp returned from the OPC server for the corresponding address.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will read values from a Tag provider called "testSimTags".
# Declare list values for itemPaths parameter
itemPaths = ['[testSimTags]_Meta:Random/RandomInteger1',
'[testSimTags]_Meta:Random/RandomInteger1']

# Call the system function
system.opc.readValues('Ignition OPC UA Server', itemPaths)
```

system.opc.writeValue

This function is used in **Python Scripting**.

Description

Writes a value directly through an OPC server connection synchronously. Will return an OPC UA status code object. You can quickly check if the write succeeded by calling isGood() on the return value from this function.

New in 8.1.27 Supplying a QualifiedValue to this system function will cause the DataValue to include the QualifiedValue's corresponding StatusCode when the DataValue is sent to the server.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opc.writeValue(opcServer, itemPath, value)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection in which the item resides.
String	`itemPath`	The item path, or address, to write to.
Object	`value`	The value to write to the OPC item.

Returns

Quality - The status of the write. Use returnValue.isGood() to check if the write succeeded. Refer to the list of **writeValue** objects.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Writing to an OPC Value

```
# This example will write to an OPC Tag that is on a provider called SLCSim
# Declare the server name
server = "Ignition OPC UA Server"

# Declare the Tag path
path = "[SLCSim]_Meta:N7/N7:0"

# Declare the system function parameters
oldQualifiedValue = system.opc.readValue(server, path)
newValue = oldQualifiedValue.getValue() + 1

# Call the system function and print out results
returnQuality = system.opc.writeValue(server, path, newValue)
if returnQuality.isGood():
    print "Write was successful"
else:
    print "Write failed"
```

system.opc.writeValues

This function is used in **Python Scripting**.

Description

This function is a bulk version of **system.opc.writeValue**. It takes a list of addresses and a list of objects, which must be the same length. It will write the corresponding object to the corresponding address in bulk. It will return a list of status codes representing the individual write success or failure for each corresponding address.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opc.writeValues(opcServer, itemPaths, values)
```

Parameters

Type	Parameter	Description
String	`opcServer`	The name of the OPC server connection in which the items reside.
List[String]	`itemPaths`	A list of item paths, or addresses, to write to.
List[Any]	`values`	A list of values to write to each address specified.

Returns

List[Quality] - An array of Quality objects, each entry corresponding in order to the addresses specified. Refer to the list of **writeValues** objects.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will write values to specified OPC items
# Declare a list of values
objectValue = [3]

# Declare the item path to write values back to
itemPath = "ns=1;s=[GoldSim]B3/B3:100"

# Write the values to the specified item. Replace "Ignition OPC UA Server" with
your chosen OPC UA server.
system.opc.writeValues("Ignition OPC UA Server", itemPath, objectValue)
```

system.opc.setServerEnabled

This function is used in **Python Scripting**.

Description

Enables or disables an OPC server connection.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opc.setServerEnabled(serverName, enabled)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of an OPC server connection.
Boolean	`enabled`	The new state the connection should be set to: true to enable the connection, false to disable.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following will iterate through all configured OPC servers, and check if they are enabled or disabled.
# If a OPC server is disabled, the code will enable it with a call to setServerEnabled.
# This code interacts in the Client scope, so it should be placed on a component, such as a Button.

# Retrieve a list of all servers in the Gateway.
allServers = system.opc.getServers(True)

# Initialize a message. The empty string is initially used so that the value may be checked later.
message = ""

# Iterate through each server.
for server in allServers:

    # For each server, call isServerEnabled. Uses Python's "not" operator to check if a false value is returned.
    if not system.opc.isServerEnabled(server):

        # If disabled, then enable the server.
        system.opc.setServerEnabled(server, True)

        # Append details about the state change we made to the message variable.
        message += "%s \n" % (server)

# Check to see if any changes were made. If the length (len()) of the message is less than 1 character, then a change wasn't made.
if len(message) < 1:

    # Notify the user that the code did not make any changes.
    system.gui.messageBox("No servers were modified")
else:

    # Otherwise, let the user know which servers we enabled.
    system.gui.messageBox("The following servers were modified:\n" + message)
```

system.opchda

OPC HDA Functions

The following functions give you access to interact with the HDA types of OPC servers.

For more information on OPC HDA, see the **OPC HDA properties** section of the Tag History Providers page.

If you are looking for an OPC HDA server to use, various OPC HDA server tools are available, such as Matrikon and Kepware.

browse

Performs a browse at the given root.

getAggregates

Will query the server for aggregates that it supports.

getAttributes

Queries the given server for the item attributes that are available with system.opchda.readAttributes.

getServers

Returns a list of the OPC-HDA servers configured on the system.

insert

Insert values on the OPC-HDA server.

insertReplace

Will insert values on the OPC-HDA server, or replace them if they already exist.

isServerAvailable

Checks to see if the specified OPC-HDA server is defined, enabled, and connected.

readAttributes

Reads the specified attributes for the given item over a time range.

readProcessed

readRaw

Reads raw values from the OPC-HDA server.

replace

Replaces values on the OPC-HDA server if the given item ID exists.

Functions by Scope

Gateway >

Vision >

Perspective >

system.opchda.browse

This function is used in **Python Scripting**.

Description

Performs a browse at the given root.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.browse(root)
```

Parameters

Type	Parameter	Description
String	`root`	The root at which to browse. Needs to be a qualified path.

Returns

BrowseResults[] - The results of the browse operation from the given root. Refer to the **Results** object in the SDK.

Scope

Gateway, Vision Client, Perspective Session

system.opchda.getAggregates

This function is used in **Python Scripting**.

Description

Will query the server for aggregates that it supports.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.getAggregates(serverName)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined **OPC-HDA** server to query.

Returns

List[Aggregate] - A list of supported **Aggregate** objects. Each object has 'id', 'name', and 'desc' properties defined.

Scope

Gateway, Vision Client, Perspective Session

system.opchda.getAttributes

This function is used in **Python Scripting**.

Description

Queries the given server for the item attributes that are available with **system.opchda.readAttributes()**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.getAttributes(serverName)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server to query.

Returns

List[AttributeInfo] - A list of AttributeInfo objects. See the AttributeInfo Methods panel for a listing of available methods.

Scope

Gateway, Vision Client, Perspective Session

AttributeInfo Methods

Method	Description	Return Type
getId()	Returns the ID of the attribute.	Integer
getName()	Returns the name of the attribute.	String
getDesc()	Returns the description of the attribute.	String
getType()	Returns the data type of the attribute.	Datatype

Code Examples

Code Snippet

```
# This example gets the description of a Matrikon OPC HDA explorer
# Declare a OPC HDA variable using the system function and prints out the results
opcHda = system.opchda.getAttributes('Matrikon HDA')
print opcHda

# Use the getDesc() method to get the description of the attribute and print out
the result
getDesc = hda[1].getDesc()
print getDesc
```

system.opchda.getServers

This function is used in **Python Scripting**.

Description

Returns a list of the OPC-HDA servers configured on the system. This call will return all configured and enabled servers, including those that are not currently connected.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.getServers()
```

Parameters

Nothing

Returns

List[String] - A list of the string names of servers.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will get a list of OPC HDA servers
system.opchda.getServers()
```

system.opchda.insert

This function is used in **Python Scripting**.

Description

Insert values on the OPC-HDA server.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opchda.insert(serverName, itemId, value, date, quality)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server.
String	`itemId`	The item ID to perform the operation on.
Any	`value`	The value to insert.
Any	`date`	The date to insert.
Integer	`quality`	The quality to insert.

Returns

QualityCode - The result of the insert. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This will insert the value for May 28th, 2014 at 5:42:33.

date = system.date.getDate(2014, 4, 28)
datetime = system.date.setTime(date, 5, 42, 33)
system.opchda.insert("MyHistoryServer", "MyItemId", 42.5, datetime, 192)
```

system.opchda.insertReplace

This function is used in **Python Scripting**.

Description

Will insert values on the OPC-HDA server, or replace them if they already exist.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opchda.insertReplace(serverName, itemId, value, date, quality)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server.
String	`itemId`	The item ID to perform the operation on.
Object	`value`	The value to insert or replace.
Object	`date`	The date to insert or replace.
QualityCode	`quality`	The quality to insert or replace.

Returns

QualityCode - The result of the insert or replace operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will insert a new date for a specific entry on an OPC HDA server.
# Declare a date to insert
start = system.date.getDate(2022, 10, 25)

# Call the system function
hda = system.opchda.insertReplace('Matrikon HDA','1',3,start,1)

# Print out various attributes
print hda.isError()
print hda.getCode()
print hda.isBad()
print hda.isGood()
```

system.opchda.isServerAvailable

This function is used in **Python Scripting**.

Description

Checks to see if the specified OPC-HDA server is defined, enabled, and connected.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.isServerAvailable()
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the OPC-HDA server to check.

Returns

Boolean - Will be true if the server is available and can be queried, false if not.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will check to see if there is an OPC HDA server called "ServerName" available.
system.opchda.isServerAvailable(“ServerName”)
```

system.opchda.readAttributes

This function is used in **Python Scripting**.

Description

Reads the specified attributes for the given item over a time range. Attributes and their IDs are defined in the OPC-HDA specification, and can be discovered by calling **system.opchda.getAttributes()**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.readAttributes(serverName, itemId, attributeIds, startDate, endDate)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server to read.
String	`itemId`	The itemID to retrieve attributes for.
List[String]	`attributeIds`	The integer IDs of the attributes to read. The attribute ids are defined in the OPC-HDA specification. The attributes can also be obtained by calling **system.opchda.getAttributes()**. Some servers may not support all attributes.
String (can be other data types, such as int)	`startDate`	The starting date/time of the query.
String (can be other data types, such as int)	`endDate`	The ending date/time of the query.

Returns

List[ReadResults] - A list of read results which is one-to-one with the requested attributes. The ReadResult object has a serviceResult quality property that indicates whether the call was successful, and it is itself a list of QualifiedValues.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will get user-specified attributes over a period of time from a
Matrikon OPC HDA explorer.
# Declare start and end dates
start = system.date.getDate(2022, 10, 24)
end = system.date.getDate(2022, 10, 24)

# Call the system function
hda = system.opchda.readAttributes('Matrikon HDA','1',[1],start,end)
print hda
```

system.opchda.readProcessed

This function is used in **Python Scripting**.

Description

Reads processed values from the OPC-HDA server. Processed values are calculated values, based on the aggregate function requested for each item. The list of aggregates can be obtained by calling **system.opchda.getAggregates()**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.readProcessed(serverName, itemIds, startDate, endDate, resampleIntervalMS, aggregates)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server to read.
List[String]	`itemIds`	A list of item ids to read.
Any	`startDate`	The starting date/time of the query.
Any	`endDate`	The ending date/time of the query.
Integer	`resampleIntervalMS`	The interval, in milliseconds, that each value should cover.
List[Integer]	`aggregates`	A list which should be one-to-one with the item ids requested, specifying the integer id of the aggregation function to use. The aggregation ids are defined in the OPC-HDA specification. The list of aggregates can also be obtained by calling **system.opchda.getAggregates()**.

Returns

List[ReadResults] - A list of read results which is one-to-one with the item IDs passed in. The ReadResult object has a 'serviceResult' quality property that indicates whether the call was successful, and is itself a list of QualifiedValues.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example will read processed data from a Matrikon server between two
specified dates.
# Declare start and end dates
start = system.date.getDate(2022, 3, 14)
end = system.date.now()

# Call system function and print results
readValue = system.opchda.readProcessed("Matrikon",[1],start,end,1000,[1])
print readValue
```

system.opchda.readRaw

This function is used in **Python Scripting**.

Description

Reads raw values from the OPC-HDA server.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opchda.readRaw(serverName, itemIds, startDate, endDate, maxValues, boundingValues)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server to read.
List	`itemIds`	A list of item ids to read.
Object	`startDate`	The starting date/time of the query.
Object	`endDate`	The ending date/time of the query.
Integer	`maxValues`	The maximum number of values to return. 0 or less means unlimited.
Boolean	`boundingValues`	A boolean indicating whether or not the "bounding values" should be included in the result set. The bounding values provide a value exactly at the start and end dates, but may be resource-intensive to retrieve.

Returns

List[ReadResults] - A list of read results which is one-to-one with the item IDs passed in. The ReadResult object has a 'serviceResult' quality property that indicates whether the call was successful, and is itself a list of QualifiedValues.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example will read raw data from a Matrikon server between two specified
dates.
# Declare start and end dates
start = system.date.getDate(2022, 3, 14)
end = system.date.now()

# Call system function and print results
readValue = system.opchda.readRaw("Matrikon",[1],start,end,0,False)
print readValue
```

system.opchda.replace

This function is used in **Python Scripting**.

Description

Replaces values on the OPC-HDA server if the given item ID exists.

Client Permission Restrictions

Permission Type: OPC Server Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.opchda.replace(serverName, itemId, value, date, quality)
```

Parameters

Type	Parameter	Description
String	`serverName`	The name of the defined OPC-HDA server.
String	`itemId`	The item ID to perform the operation on.
Object	`value`	The value to replace.
Object	`date`	The date to replace.
Integer	`quality`	The quality to replace.

Returns

Integer - The items quality resulting from the operation.

Scope

Gateway, Vision Client, Perspective Session

system.opcua

OPC - UA Functions

The following functions allow you to interact directly with an OPC UA server.

addConnection

Adds a new OPC UA connection.

callMethod

Calls a method in an OPC UA server.

removeConnection

Removes an OPC UA Connection.

Functions by Scope

Gateway >

Perspective >

system.opcua.addConnection

New in 8.1.8

This function is used in **Python Scripting**.

Description

Adds a new OPC UA connection.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opcua.addConnection(name, description, discoveryUrl, endpointUrl, securityPolicy, securityMode, settings)
```

Parameters

Type	Parameter	Description
String	`name`	Name to assign to the new connection.
String	`description`	Description assigned to the new OPC UA connection.
String	`discoveryUrl`	Endpoint URL to use for discovery services.
String	`endpointUrl`	Endpoint URL to use for session services.
String	`securityPolicy`	The name of the SecurityPolicy to use. See the Security Policy table below for possible values.
String	`securityMode`	The name of the MessageSecurityMode to use. See the Message Security Mode table below for possible values.
Dictionary[String, Any]	`settings`	A dictionary of additional settings to apply to the connection. See the Settings table for a table of possible keys.

Returns

Nothing

Scope

Gateway, Perspective Session

Security Policy

Below is a listing of supported values for the securityPolicy argument:

- None
- Basic128Rsa15
- Basic256
- Basic256Sha256
- Aes128_Sha256_RsaOaep

- Aes256_Sha256_RsaPss

Message Security Mode

Below is a listing of supported values for the messageSecurityMode argument:

- None
- Sign
- SignAndEncrypt

Settings

Below is a listing of supported values for the settings argument:

Key	Data Type
ENABLED	Boolean
DISCOVERYURL	String
ENDPOINTURL	String
SECURITYPOLICY	String
SECURITYMODE	String
USERNAME	String
PASSWORD	String
HOSTOVERRIDE	String
CONNECTTIMEOUT	Integer
ACKNOWLEDGETIMEOUT	Integer
REQUESTTIMEOUT	Integer
SESSIONTIMEOUT	Integer
MAXPEROPERATION	Integer
MAXREFERENCESPERNODE	Integer
MAXPENDINGPUBLISHREQUESTS	Integer
MAXNOTIFICATIONSPERPUBLISH	Integer
MAXMESSAGESIZE	Integer
MAXARRAYLENGTH	Integer
MAXSTRINGLENGTH	Integer
TYPEDICTIONARYFRAGMENTSIZE	Integer

Key	Data Type
KEEPALIVEFAILURESALLOWED	Integer
KEEPALIVEINTERVAL	Integer
KEEPALIVETIMEOUT	Integer
BROWSEORIGIN	String
CERTIFICATEVALIDATIONENABLED	Boolean
KEYSTOREALIAS	String
KEYSTOREALIASPASSWORD	String
FAILOVERENABLED	Boolean
FAILOVERTHRESHOLD	Integer
FAILOVERDISCOVERYURL	String
FAILOVERENDPOINTURL	String
FAILOVERHOSTOVERRIDE	String

Code Examples

Example #1

```
```

```
# The following could be used to connect to Ignition's OPC UA server.
system.opcua.addConnection(
    "test",
    "test desc",
    "opc.tcp://localhost:62541/discovery",
    "opc.tcp://localhost:62541",
    "Basic256Sha256",
    "SignAndEncrypt",
    {
    "username":"opcuauser",
    "password":"password"
    }
)
```

system.opcua.callMethod

This function is used in **Python Scripting**.

Description

Calls a method in an OPC UA server. To make the most of this function, you'll need to be familiar with methods in the **OPC UA server**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opcua.callMethod(connectionName, objectId, methodId, inputs)
```

Parameters

Type	Parameter	Description
String	`connectionName`	The name of the OPC UA connection to the server that the method resides in.
String	`objectId`	The NodeId of the Object Node the Method is a member of.
String	`methodId`	The NodeId of the Method Node to call.
List	`inputs`	A list of input values expected by the method.

Returns

Tuple - A tuple containing the following:

- 0 Resulting StatusCode for the call

- 1 A list of StatusCode objects corresponding to each input argument
- 2 A list of output values.

Scope

Gateway, Perspective Session

The StatusCode Object

This function returns multiple StatusCode objects. StatusCode is a tuple, containing the following:

Index Order	Description
0	The value of the code
1	The name of the code
2	A description of the code

Code Examples

Example #1

```
# Call the Server object's GetMonitoredItems method.
result = system.opcua.callMethod(
        "Ignition OPC UA Server",
        "ns=0;i=2253",
        "ns=0;i=11492",
        [1]
    )

# Below we print the various elements in the results. The print statements could
easily be replaced by something more useful.

# Prints the StatusCode for the call.
print result[0]

# Prints the list of StatusCodes, one for each input argument passed to
system.opcua.callMethod.
print result[1]

# Prints the output values from the call.
print result[2]
```

system.opcua.removeConnection

New in 8.1.8

This function is used in **Python Scripting**.

Description

Removes an OPC UA Connection.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.opcua.removeConnection(name)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the OPC UA connection to remove.

Returns

Boolean - A boolean value representing whether the function was able to remove the connection. Returns True if the connection was successfully removed. Returns False if the connection was not removed.

Scope

Gateway, Perspective Session

system.perspective

Perspective Functions

The following functions offer various ways to interact with a Perspective session from a Python script.

alterDock

Changes configuration of a specified dock on a Perspective page.

alterLogging

Changes Perspective Session logging attributes and levels.

authenticationChallenge

Triggers an authentication challenge action.

closeDock

Closes a docked view.

closePage

Closes the page with the given page id or the current page if no page id is provided.

closePopup

Closes a popup view.

closeSession

Closes the Perspective Session with the given sessionID or the current Session if no ID is provided.

download

Downloads data from the Gateway to a device running a Session.

getProjectInfo

Returns a dictionary of meta data from a Perspective Project.

getSessionInfo

Returns information about one or more Perspective Sessions.

isAuthorized

Checks if the user in the current Session is authorized against a target collection of security levels.

login

Triggers a login event that will allow the user to log in with the project's configured Identity Provider (IdP).

logout

Triggers a logout event, which will log the user out.

navigate

Navigates a Session to a specified view or mounted page.

navigateBack

Navigate the session to a specified view or mounted page.

navigateForward

Navigate the session to a specified view or mounted page. This is similar to a browser's "forward" function.

openDock

Opens a docked View. Requires the preconfigured dock ID for the view.

openPopup

Open a popup view over the given page.

print

Prints the supplied message to the local console or the gateway logs, as appropriate.

refresh

Triggers a refresh of the page.

sendMessage

Send a message to a message handler within the same session.

setTheme

Changes the theme in a page to the specified theme.

toggleDock

Toggles a docked view.

togglePopup

Opens or closes a popup view.

vibrateDevice

Cause a device running the Perspective Mobile App to vibrate.

workstation

Functions by Scope

Gateway >

Perspective >

system.perspective.alterDock

New in 8.1.19

This function is used in **Python Scripting**.

Description

Changes configuration of a specified dock on a Perspective page.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.alterDock(dockId, [config], [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`dockId`	The unique identifier of the dock to be modified. If no dock with the specified ID exists on the current page, a warning will be logged to the console.
PyDictionary	`config`	A PyDictionary containing the dock configuration to be applied when the script is run. If omitted, the dock configuration remains unchanged. [optional] The following properties can included in the `config` object: • **view**: The view to be displayed in the dock. • **viewParams**: A dictionary of name and value pairs to be passed as parameters to the view. • **display**: The display state of the dock. Accepted values are: ◦ visible ◦ onDemand ◦ auto • **resizable**: The resizable status of the dock. • **modal**: The modal status of the dock. • **content**: How the dock should interact with the main content. Accepted values are: ◦ push ◦ cover ◦ auto • **size**: The width or height of the dock, depending on orientation. • **autoBreakpoint**: The minimum page width at which a dock with "display = auto" remains visible. If the session width is smaller than this value, the dock is hidden and can be displayed on demand. • **anchor**: Determines whether the docked view remains visible while scrolling. Only available for North-docked views. Accepted values are: ◦ fixed

Type	Parameter	Description
		◦ scrollable • **handle**: Controls the visibility of a handle that allows users to expand or collapse the dock. Accepted values are: ◦ show ◦ hide ◦ autoHide • **handleIcon**: The path to an icon used to represent the dock when it is hidden.
String	`sessionId`	The ID of the session in which the dock modification is applied. If omitted, the modification applies to the current session. [optional]
String	`pageId`	The ID of the page where the dock is located. If omitted, the modification applies to the current page. [optional]

Returns

Nothing

Scope

Perspective Session

Code Examples

Code Snippet

```
# Change the size of a dock with the id 'my-dock-id'
system.perspective.alterDock('my-dock-id', { 'size': 500 } )
```

system.perspective.alterLoggin g

This function is used in **Python Scripting**.

Description

Changes Perspective Session logging attributes and levels. All parameters are optional, with the caveat that at least one of them needs to be used.

> **CAUTION**
>
> For the `system.perspective.alterLogging` function to work, the following line needs to be added to the `ignition.conf` file, and the Gateway restarted. "X" is the next number in the Java Additional Parameters list in the `ignition.conf` file. **Warning**, this will open potential security holes in the Gateway, and is not advised.

```
wrapper.java.additional.X=-Dperspective.enable-client-logging=true
```

Example

```
# Java Additional Parameters
wrapper.java.additional.1=-Ddata.dir=data
wrapper.java.additional.2=-Xdebug
wrapper.java.additional.3=-
Xrunjdwp:transport=dt_socket,server=y,suspend=n,address=8000
```

Syntax

> **TIP**
>
> This function accepts keyword arguments.

`system.perspective.alterLogging([remoteLoggingEnabled], [level], [remoteLoggingLevel], [sessionId], [pageId])`

Parameters

Type	Parameter	Description
Boolean	`remoteLoggingEnabled`	Will enable remote logging if True. Remote logging will send log events from the Session to the Gateway under the Perspective.Client logger if they meet the remoteLevel logging level requirement. [optional]
String	`level`	The desired Session logging level. Possible values are: all, trace, debug, info, warn, error, fatal, or off. The default is info. [optional]
String	`remoteLoggingLevel`	The desired remote logging level. Possible values are: all, trace, debug, info, warn, error, fatal, off. The default is warn. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current Page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Alter the logging level to trace.
system.perspective.alterLogging(level = 'trace')
```

system.perspective.authenticationChallenge

New in 8.1.16

This function is used in **Python Scripting**.

Description

Triggers an **authentication challenge** action.

Syntax

```
system.perspective.authenticationChallenge([sessionId], [pageId], [idp], [forceAuth], [timeout], [payload], [framing])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different Session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used. [optional]
String	`idp`	The name of the IdP to use for this authentication challenge. If omitted, the Project default IdP will be used. [optional]
Boolean	`forceAuth`	True if Ignition should ask the IdP to re-authenticate the user, even if the user is already signed into the IdP. False if Ignition should not ask the IdP to re-authenticate the user. If the IdP supports this option, the IdP will ask the user to re-enter their credentials, even if the user is already signed into the IdP. If omitted, the default value for this argument will fall back to the value in the Project Properties. [optional]
Integer	`timeout`	The number of minutes the system will wait in between the authentication request and the authentication response before timing out the request. If set to any number <= zero, the request is rejected. If omitted, the default of two minutes will be used as the timeout. [optional]
Any	`payload`	An opaque payload object that may contain any information. This object will be passed to the **onAuthenticationChallengeCompleted** Session event script. The payload should be a JSON-encodable data structure. [optional]
String	`framing`	A string representing the type of framing that should be used. • **self**: indicates that the same window should be used. • **new**: Indicates that a new tab should be used.

Type	Parameter	Description
		• **embedded**: indicates that an embedded Iframe should be used. Some IDPs may require Content-Security-Policy or other configuration changes to display their login page in the Session's Iframe. If omitted, the default value of `self` (same window) is used. [optional] **Note:** Perspective Workstation Sessions do not support `new` and will fall back to `self`. Mobile Sessions only support `self`.

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Opens an authentication challenge in a new tab that will time out in three minutes.
system.perspective.authenticationChallenge(idp = "administrators", timeout = 3, payload = {"isAction":"true"}, framing = "new")
```

system.perspective.closeDock

This function is used in **Python Scripting**.

Description

Closes a docked view.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.closeDock(id, [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`id`	The unique, preconfigured dock ID for the docked view. Is specified when a view is assigned as docked for a particular page (in Page Configuration).
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Closes a docked view with the given dock id.
system.perspective.closeDock('myDockID')
```

system.perspective.closePage

This function is used in **Python Scripting**.

Description

Closes the page with the given page id or the current page if no page id is provided. If a message is provided, it is displayed on the page when the page closes. Otherwise the default message (set in the **Project properties**) is displayed.

Syntax

```
system.perspective.closePage([message], [sessionId], [pageID])
```

Parameters

Type	Parameter	Description
String	`message`	The message to display when the page closes. If omitted, the default message (set in the Project Properties) is shown. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different Session, the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to be closed. If omitted, the current pageId is used. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Closes the page with the given pageId.
system.perspective.closePage('Your page has been closed.')
```

system.perspective.closePopup

This function is used in **Python Scripting**.

Description

Closes a popup view.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.closePopup(id, [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`id`	The unique identifier for the popup, given to the popup when first opened. If given an empty string, then the most recently focused popup will be closed.
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current Page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Closes the popup with the given id.
system.perspective.closePopup('popup 4')
```

Code Snippet

```
# Closes the last focused popup
system.perspective.closePopup('')
```

system.perspective.closeSession

This function is used in **Python Scripting**.

Description

Closes the Perspective Session with the given sessionID or the current Session if no ID is provided. If a message is provided, it is displayed on the page when the Session closes. Otherwise the default message (set in the **Project properties**) is displayed.

> **NOTE**
> In the Perspective App, the user is returned to the launch screen.

Syntax

```
system.perspective.closeSession([message], [sessionId])
```

Parameters

Type	Parameter	Description
String	`message`	The message to display when the Session closes. If omitted, the default message (set in the **Project properties**) is shown. [optional]
String	`sessionId`	Identifier of the Session to be closed. If omitted, the current sessionId is used. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if `sessionId` is supplied to the call.

Code Examples

Code Snippet

```
# Closes the Session with the given sessionId.
system.perspective.closeSession('Your Session has ended.','2e1c98a8-182e-43ce-84e8-a71d441c2cce')
```

system.perspective.download

This function is used in **Python Scripting**.

Description

Downloads data from the Gateway to a device running a Session.

When calling from the Gateway scope, the call must include a sessionId.

New in 8.1.14
This function interacts with mobile apps directly to ensure that download requests can be saved to the local device. Requires version 1.0.2 of the **Ignition Perspective App**.

Syntax - Gateway Scope

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.download(filename, data, [contentType], sessionId, [pageId])
```

Parameters

Type	Parameter	Description
String	`filename`	Suggested name for the downloaded file.
String	`data`	The data to be downloaded. May be a string, a byte[], or an InputStream. Strings will be written in UTF-8 encoding.
String	`contentType`	Value for the "Content-Type" header, for example: "text/plain; charset=utf-8". [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call.
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Syntax - Session Scope

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.download(filename, data, [contentType], [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`filename`	Suggested name for the downloaded file.
String	`data`	The data to be downloaded. May be a string, a byte[], or an InputStream. Strings will be written in UTF-8 encoding.
String	`contentType`	Value for the "Content-Type" header, for example: "text/plain; charset=utf-8". [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Perspective Session

Code Examples

Code Snippet

```
# Downloads the file "myFile.pdf" (located on the Gateway) to the user running the current Session.

filename = 'myFile.pdf'
data = system.file.readFileAsBytes('C:\\'+filename)
system.perspective.download(filename, data)
```

system.perspective.getProjectInfo

New in 8.1.4

This function is used in **Python Scripting**.

Description

Returns a dictionary of meta data from a Perspective Project. Exact fields are as follows:

Key	Value
name	The name of the project.
title	The project title.
description	The project description.
lastModified	Date the project was last modified.
lastModifiedBy	Username that last modified the project.
views	An array with path key for each view in the project.
pageConfigs	An array of objects describing the project's configured pages. Each page configuration object will have two properties: `url`, and `primaryView`.

For additional information, refer to **Project Settings**.

Syntax

```
system.perspective.getProjectInfo()
```

Parameters

None

Returns

Dictionary [String, Any] - A dictionary of project meta data. See the table in the description for a listing of keys.

Scope

Perspective Session

Code Examples

Code Snippet

```
# This example will print out attributes of a project in the browser console.
system.perspective.print(system.perspective.getProjectInfo())
```

system.perspective.getSessionInfo

This function is used in **Python Scripting**.

Description

Returns information about one or more Perspective Sessions. The information returned by this function is a combination of information available on the **Perspective Sessions status** page on the Gateway, and some Session props (id and userAgent). Exact fields are as follows:

Key	Description	Value
userAgent	Details about the device or browser running the Session.	String
id	The Session ID (or Designer ID if called from the Designer).	String
username	The logged-in user's name or "Unauthenticated" if the Session is not authenticated.	String
project	The name of the project active in the Session.	String
uptime	The time (in milliseconds) the Session has been active since creation.	Integer
clientAddress	The IP address or hostname of the client running the Session.	String
lastComm	The time (in milliseconds) since the last communication with the Gateway.	Integer
sessionScope	The environment where the Session is running: • designer • browser • ios • android	String
activePages	The number of pages currently active in the Session.	Integer
recentBytesSent	The number of bytes sent to the Gateway in the most recent communication.	Integer
totalBytesSent	The total number of bytes sent to the Gateway by the Session.	Integer
pageIds	A list of the IDs of pages currently open in the Session.	List
authorized	Whether the user was authorized when the Session data was retrieved (**True** or **False**)	Boolean

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.getSessionInfo([usernameFilter], [projectFilter])
```

Parameters

Type	Parameter	Description
String	`usernameFilter`	A filter based on logged in user. [optional]
String	`projectFilter`	A filter based on the project name. [optional]

Returns

List - A list of objects (**PyJsonObjectAdapter**).

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
# This code counts the number of times a user named "billy" is logged in.
sessions = system.perspective.getSessionInfo("billy")
print "Billy has %d sessions" % len(sessions)
```

Code Snippet

```

```

```
# This script gets all sessions using the "MyProject" project and displays
information about them.
# Get the Session info.
projectResults = system.perspective.getSessionInfo(projectFilter="MyProject")
# Loop through the sessions.
# Enumerate() gives both the Session object and the index.
for index, sessionObj in enumerate(projectResults):
    # Print session info
    print "Session", index, ": username: ", sessionObj["username"], "uptime: ",
sessionObj["uptime"], " seconds"
```

system.perspective.isAuthorized

This function is used in **Python Scripting**.

Description

Checks if the user in the current Session is authorized against a target collection of security levels.

Syntax

```
system.perspective.isAuthorized(isAllOf, securityLevels, [sessionID])
```

Parameters

Type	Parameter	Description
Boolean	`isAllOf`	True if the current user must have all of the given security levels to be authorized. False if the current user must have at least one of the given security levels to be authorized.
List[String]	`securityLevels`	An array of string paths to a security level node in the form of "Path/To/Node". Each level in the tree is delimited by a forward slash character. The public node is never a part of the path.
String	`sessionId`	**New in 8.1.3** Identifier of the Session to target. If omitted, the current Session will be used automatically. [optional]

Returns

True if the user logged into the specified session is authorized, false otherwise.

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if `sessionId` is supplied to the call.

Code Examples

Code Snippet

```
# Returns true if the current user has either Administrator or Baz.
# Returns false if they have neither.
path1 = "Authenticated/Roles/Administrator"
path2 = "Foo/Bar/Baz"
isAuthorized = system.perspective.isAuthorized(False, [path1, path2])
```

system.perspective.login

This function is used in **Python Scripting**.

Description

Triggers a login event that will allow the user to log in with the project's configured Identity Provider (IdP). For this function to work, an IdP must be set in Perspective **Project properties**. This is particularly useful when you want it to be possible to start a session without authentication and sign in to access certain restricted features.

Note that calling this function after a user is already logged in will **not** log out the previous user.

> **CAUTION**
>
> Be advised that this function should not be used in the same script, or in the same triggering event as **system.perspective.logout**. Logging in and Logging out should always be triggered by separate events.

Syntax

```
system.perspective.login([sessionId], [pageId], [forceAuth])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the Page to target. If omitted, the current Page will be used automatically. [optional]
Boolean	`forceAuth`	Determines if Ignition should ask the IdP to re-authenticate the user, even if the user is already signed into the IdP. If set to true, then the IdP will ask the user to re-enter their credentials. If set to false, then the Gateway will request that the IdP use the last provided credentials for the Session, potentially allowing re-authentication without requiring the user to re-type their credentials. Note that support for this argument is determined by the IdP; the IdP may choose to ignore this request. If this parameter is omitted, then the function will use the re-authentication setting defined under **Project properties**. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Force Authentication

```
# When forceAuth is True, the user will always be required to type in their
credentials, even if they're already logged in.
system.perspective.login(forceAuth=True)
```

system.perspective.logout

This function is used in **Python Scripting**.

Description

Triggers a logout event, which will log the user out. For this function to work, an Identity Provider (IdP) must be set in the **Perspective Project properties**.

> **CAUTION**
>
> Be advised that this function should not be used in the same script, or in the same triggering event as system.perspective.login. Logging in and Logging out should always be triggered by separate events.

Syntax

```
system.perspective.logout([sessionId], [pageId], [message])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different Session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the Page to target. If omitted, the current Page will be used automatically. [optional]
String	`message`	**New in 8.1.8** The message to display when the user logs out of their session. This message is only shown when the project requires authentication. If omitted, the default message (set in **Project Properties**) is shown. [Optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# This example is a script on a Button component and will log the current user out.
system.perspective.logout()
```

system.perspective.navigate

This function is used in **Python Scripting**.

Description

Navigates a Session to a specified view or mounted page.

The function can be used in three different ways, depending on which parameter is specified:

- `page`: Navigates to a Perspective page.
- `url`: Navigates to a web address, so the function can be used to navigate the user to a web portal, search engine, or other website. This parameter is specified via keyword argument.
- `view`: Navigates to a view. Note that using this parameter does not modify the web browser's address bar, so the browser's history will not contain a listing for the new view. This parameter is specified via keyword argument.

> **NOTE**
>
> This function supports most common protocols, so it can be used to perform tasks like initiating a call (tel:), text (sms:), or email (mailto:) from Perspective.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.navigate(page, url, view, [params], [sessionId], [pageId], [newTab])
```

> **NOTE**
>
> Although `page`, `view`, and `url` are all available to specify navigation, only one will be applied at a time. If more than one of these parameters is included in the function, the `page` parameter will receive top priority, followed by `view`, and then `url`.

Parameters

Type	Parameter	Description
String	`page`	The URL of a Perspective page to navigate to. The path can include an optional leading slash, so "new-page" and "/new-page" both navigate the Session to the "new-page" page. See **Page URLs** for more information.
String	`url`	The URL of a web address to navigate to. If the `page` or `view` parameters are specified, then this parameter is ignored.
String	`view`	If specified, will navigate to a specific view. Navigating to a view with this parameter does not change the address in the web browser. Thus the web browser's back button will not be able to return the user to the previous view. If the `page` parameter is specified, then this parameter is ignored.
Dictionary[String, String]	`params`	Used only in conjunction with the view parameter, Dictionary of values to pass to any parameters on the view. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different Session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]
Boolean	`newTab`	**New in 8.1.5** If True, opens the contents in a new tab. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet - Page

```
# Navigating to a perspective page. The 'page' parameter doesn't require the use
of a keyword argument.
system.perspective.navigate('/new-page')
```

Code Snippet - Web Address

```


# Navigating to a web address. Note that we're using a keyword argument here.
# web addresses must use a scheme (like 'http://') at the beginning
system.perspective.navigate(url = 'http://docs.inductiveautomation.com')

# Navigating to a perspective page with url parameters.
system.perspective.navigate(url='http://<GatewayIP>:
<port>/data/perspective/client/<projectName>/view?key=8')
```

Code Snippet - Notifications

```
# Initiating a call.
system.perspective.navigate(url= "tel:+1999-999-9999")

# Initiating a text with message contents.
system.perspective.navigate(url= "sms:+1-999-999-9999?&body=My%20Message")

# Initiating an email.
system.perspective.navigate(url= "mailto:someone@example.com?
subject=This%20is%20the%20subject&cc=someone_else@example.com&body=This%20is%20the%20
```

Code Snippet - View

```
# Navigating to a new view. Again, we need to use a keyword argument. We are
passing in two parameters, called "myParam" and "myParam2".
system.perspective.navigate(view = 'folder/myView', params =
{'myParam':1,'myParam2':'Test'})
```

system.perspective.navigateBack

New in 8.1.5

This function is used in **Python Scripting**.

Description

Navigate the session to a specified view or mounted page. This is similar to a browser's "back" function.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.navigateBack([sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
system.perspective.navigateBack()
```

system.perspective.navigateForward

New in 8.1.5

This function is used in **Python Scripting**.

Description

Navigate the session to a specified view or mounted page. This is similar to a browser's "forward" function.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.perspective.navigateForward([sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
system.perspective.navigateForward()
```

system.perspective.openDock

This function is used in **Python Scripting**.

Description

Opens a docked View. Requires the preconfigured dock ID for the view.

Syntax

```
system.perspective.openDock(id, [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`id`	The unique, preconfigured dock ID for the docked View. Is specified when a View is assigned as docked for a particular Page (in Page Configuration).
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different Session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the Page to target. If omitted, the current Page will be used automatically. [optional]
Dictionary[String, String]	`params`	Parameters that can be passed into the docked view. Must match the docked views View Parameters. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Opens a docked view with a dock ID of "myDockID" on the current page and
Session.
system.perspective.openDock("myDockID", params = {"stationNum":2})
```

system.perspective.openPopup

This function is used in **Python Scripting**.

Description

Open a **popup view** over the given page.

Syntax

```
system.perspective.openPopup(id, view, [params], [title], [position], [showCloseIcon], [draggable], [resizable], [modal], [overlayDismiss], [sessionId], [pageId], [viewportBound])
```

Parameters

Type	Parameter	Description
String	`id`	A unique popup string. Will be used to close the popup from other popup or script actions.
String	`view`	The path to the View to use in the popup.
Dictionary[String, Any]	`params`	Dictionary of key-value pairs to use as input parameters to the View. [optional]
String	`title`	Text to display in the title bar. Defaults to an empty string. [optional]
Dictionary[String, Integer]	`position`	Dictionary of key-value pairs to use for position. Possible position keys are: left, top, right, bottom, width, height. Defaults to the center of the window. [optional]
Boolean	`showCloseIcon`	Shows the close icon if True. Defaults to True. [optional]
Boolean	`draggable`	Allows the popup to be dragged if True. Defaults to True. [optional]
Boolean	`resizable`	Allows the popup to be resized if True. Defaults to False. [optional]
Boolean	`modal`	Makes the popup modal if True. A modal popup is the only view the user can interact with. Defaults to False. [optional]
Boolean	`overlayDismiss`	Allows the user to dismiss and close a modal popup by clicking outside of it if True. Defaults to False. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. [optional]

Type	Parameter	Description
String	`pageId`	Identifier of the Page to target. If omitted, the current Page will be used automatically. When targeting a different session, then this parameter must be included in the call. [optional]
Boolean	`viewportBound`	**New in 8.1.3** If True, popups will be "shifted" to always open within the bounds of the viewport. If the popup would be larger than the viewport, then it will be resized to fit within the bounds. Default is False. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Opens a popup view. We are passing in two parameters, called "myParam" and
"myParam2". We also set some additional properties of the popup.
system.perspective.openPopup("myPopupId",'folder/myView', params =
{'myParam':1,'myParam2':'Test'}, showCloseIcon = False, resizable = True)
```

Code Snippet

```
```

```
# Opens a popup view. The top left corner of the popup will be 100 pixels from the left and top edges of the session.
system.perspective.openPopup('myPopupId', 'folder/myView', position = {'left':100,'top':100})
```

system.perspective.print

This function is used in **Python Scripting**.

Description

Prints the supplied message to the local console (or the gateway logs, as appropriate) - by default, this means the Output Console when in the Designer, and the browser's console when in a live session.

Syntax

```
system.perspective.print([message], [sessionId], [pageId], [destination])
```

Parameters

Type	Parameter	Description
String	`message`	The print statement that will be displayed on the console. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current Page will be used automatically. [optional]
String	`destination`	Where the message should be printed. If specified, must be "client", "gateway", or "all". Default is "client". [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Sends print statement to the gateway logs.
system.perspective.print(message="Hello World", destination="gateway")
```

system.perspective.refresh

This function is used in **Python Scripting**.

Description

Triggers a refresh of the page.

> **NOTE**
> This method should not be confused with the **refreshBinding** component method, which automatically fires a binding on a Perspective component property.

Syntax

```
system.perspective.refresh([sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current Page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# This example will refresh the current Perspective page.
system.perspective.refresh()
```

system.perspective.sendMessage

This function is used in **Python Scripting**.

Description

Send a message to a **component message handler** within the same session. This function cannot interact with Session Message Handlers configured in Session Events, even if the `scope` of session is specified.

> **MESSAGE HANDLERS EXECUTION**
>
> Invoked Message Handlers **execute asynchronously** to the calling script.

The Scope Parameter

It is important to be mindful of the `scope` parameter when calling this function. The `scope` argument corresponds to the listening scope of the component message handlers on any Perspective component.

It is possible to have multiple instances of a view open in a single page, thus invoking the function with a value of page for the `scope` parameter (or omitting the parameter) will invoke the message handlers on all valid message types. This advice is also applicable when the `scope` parameter value is passed as session, as all instances of the matching message type in the whole session will be called.

Syntax

```
system.perspective.sendMessage(messageType, payload, [scope], [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`messageType`	The message type that will be invoked. Message handlers configured within the project are listening for messages of a specific messageType.
Dictionary[String, String]	`payload`	A Python dictionary representing any parameters that will be passed to the message handler.
String	`scope`	The scope that the message should be delivered to. Valid values are "session", "page", or "view". If omitted, "page" will be used. [optional]
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Sends a message to all Message Handlers configured on the current view,
indicating that a new item has been added to a list.
system.perspective.sendMessage("NewItem", payload =
{"itemName":"banana","itemQuantity":6}, scope = "view")
```

system.perspective.setTheme

This function is used in **Python Scripting**.

Description

Changes the theme in a page to the specified theme.

Note that this function only changes the theme for a single page, not the entire session. To change the theme for a session, write directly to the `session.theme` property instead.

Syntax

```
system.perspective.setTheme(name, [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`name`	The theme name to switch to. Possible values are "dark" or "light".
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current page will be used automatically. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet - Changing Session Theme

```
# Change the current page's theme to the dark theme.
system.perspective.setTheme("dark")
```

system.perspective.toggleDock

This function is used in **Python Scripting**.

Description

Toggles a docked view.

Syntax

```
system.perspective.toggleDock(id, [sessionId], [pageId])
```

Parameters

Type	Parameter	Description
String	`id`	The unique, preconfigured 'Dock ID' for the docked view. Is specified when a view is assigned as docked for a particular page (in Page Configuration).
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the Page to target. If omitted, the current Page will be used automatically. [optional]
Dictionary[String, String]	`params`	Parameters that can be passed into the docked view. Must match the docked views View Parameters. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet

```
# Toggles a docked view with ID "myDockID". We are passing in two parameters,
called "myParam" and "myParam2".
system.perspective.toggleDock('myDockID', params =
{'myParam':1,'myParam2':'Test'})
```

system.perspective.togglePopup

This function is used in **Python Scripting**.

Description

Toggles a **popup view**. Will open up the popup if it has not been opened yet. Otherwise, it will close the currently opened popup.

Syntax

```
system.perspective.togglePopup(id, view, [params], [title], [position], [showCloseIcon], [draggable], [resizable], [modal], [overlayDismiss], [sessionId], [pageId], [viewportBound])
```

Parameters

Type	Parameter	Description
String	`id`	A unique popup string. Will be used to close the popup from other popup or script actions.
String	`view`	The path to the view to use in the popup.
Dictionary[String, Any]	`params` - Dictionary of key-value pairs to us as input parameters to the View. [optional]	
String	`title`	Text to display in the title bar. Defaults to an empty string. [optional]
Dictionary[String, Integer]	`position`	Dictionary of key-value pairs to use for position. Possible position keys are: left, top, right, bottom, width, height. Defaults to the center of the window. [optional]
Boolean	`showCloseIcon`	Will show the close icon if True. Defaults to True. [optional]
Boolean	`draggable`	Will allow the popup to be dragged if True. Defaults to True. [optional]
Boolean	`resizable`	Will allow the popup to be resized if True. Defaults to False. [optional]
Boolean	`modal`	Will make the popup modal if True. A modal popup is the only view the user can interact with. Defaults to False. [optional]
Boolean	`overlayDismiss`	Will allow the user to dismiss and close a modal popup by clicking outside of it if True. Defaults to False. [optional]

Type	Parameter	Description
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically. When targeting a different session, then the pageId parameter must be included in the call. [optional]
String	`pageId`	Identifier of the page to target. If omitted, the current Page will be used automatically. [optional]
Boolean	`viewportBound`	**New in 8.1.3** If True, popups will be "shifted" to open within the bounds of the viewport. If the popup would be larger than the viewport, then it will be resized to fit within the bounds. Default is False. [optional]

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if both `sessionId` and `pageId` are supplied to the call.

Code Examples

Code Snippet - View

```
```

```
# Toggles a popup view. We are passing in two parameters, called "myParam" and
"myParam2".
system.perspective.togglePopup("myPopupId",'folder/myView', params =
{"myParam":1,"myParam2":"Test"})
```

system.perspective.vibrateDevice

This function is used in **Python Scripting**.

Description

When called from the **Perspective App**, will cause the device to vibrate for the specified number of milliseconds.

> **NOTE**
>
> iOS vibration duration is fixed. This function will cause an iOS device to vibrate for its default duration, 0.4 seconds (400 milliseconds).

Syntax

```
system.perspective.vibrateDevice(integer, [sessionId])
```

Parameters

Type	Parameter	Description
String	`duration`	The duration in milliseconds to vibrate the device. **Note:** iOS vibration duration is fixed. Thus, this parameter will not impact the vibration duration on devices running iOS.
String	`sessionId`	Identifier of the Session to target. If omitted, the current Session will be used automatically.

Returns

Nothing

Scope

Gateway, Perspective Session

> **NOTE**
>
> This function will only work in the Gateway scope if `sessionId` is supplied to the call.

Code Examples

Code Snippet - View

```
# Vibrates the device for 1/2 second (500 milliseconds).
system.perspective.vibrateDevice(500)
```

system.perspective.workstation

Perspective Workstation Functions

The following functions offer various ways to interact with Perspective Workstation from a Python script. Note that the functions here only work when called from a session running in Perspective Workstation.

exit

When called from a session running in Workstation, this function will close Workstation.

toKiosk

Attempts to put Workstation into Kiosk mode.

toWindowed

Attempts to put Workstation into Windowed mode.

Functions by Scope

Gateway >

Perspective >

system.perspective.workstation.exit

This function is used in **Python Scripting**.

Description

When called from a session running in Workstation, this function will close Workstation.

Syntax

`system.perspective.workstation.exit()`

Parameters

Nothing

Returns

Nothing

Scope

Perspective Session

Code Examples

Code Snippet

```
# This example will close the current Perspective Workstation Session.
system.perspective.workstation.exit()
```

system.perspective.workstation.toKiosk

This function is used in **Python Scripting**.

Description

When called from a session running in **Perspective Workstation**, attempts to put Workstation into Kiosk mode.

Syntax

```
system.perspective.workstation.toKiosk()
```

Parameters

Nothing

Returns

Nothing

Scope

Perspective Session

Code Examples

Code Snippet

```
# This example will set a Perspective Workstation Session into Kiosk mode.
system.perspective.workstation.toKiosk()
```

system.perspective.workstation.toWindowed

This function is used in **Python Scripting**.

Description

When called from a Session running in **Perspective Workstation**, attempts to put Workstation into windowed mode.

Syntax

```
system.perspective.workstation.toWindowed()
```

Parameters

Nothing

Returns

Nothing

Scope

Perspective Session

Code Examples

Code Snippet

```
# This example will set the Perspective Workstation Session to windowed mode.
system.perspective.workstation.toWindowed()
```

system.print

Print Functions

The following functions allow you to send to a printer.

createImage

Takes a snapshot of a component and creates a Java BufferedImage out of it.

createPrintJob

Provides a general printing facility for printing the contents of a window or component to a printer.

printToImage

This function prints the given component (such as a graph, container, entire window, etc) to an image file, and sa…

getPrinterNames

Lists the available local printers.

getDefaultPrinterName

Obtains the local default printer.

Functions by Scope

Gateway >

Vision >

Perspective >

system.print.createImage

This function is used in **Python Scripting**.

Description

Takes a snapshot of a component and creates a Java BufferedImage out of it. You can use `javax.imageio.ImageIO` to turn this into bytes that can be saved to a file or a BLOB field in a database.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.print.createImage(component)
```

Parameters

Type	Parameter	Description
Component	`component`	The component to render.

Returns

`BufferedImage` - A **java.awt.image.BufferedImage** representing the component.

Scope

Vision Client

Code Examples

Code Snippet

```
from java.io import File
from javax.imageio import ImageIO

component = event.source.parent.getComponent('TestPieChart')
bufferedImage = system.print.createImage(component)

rawPath = system.util.getProperty("user.home") +
system.util.getProperty("file.separator") +"chart_createImage.jpg"
formattedPath = File(rawPath)

ImageIO.write(bufferedImage , "jpg", formattedPath)
```

system.print.createPrintJob

This function is used in **Python Scripting**.

Description

Provides a general printing facility for printing the contents of a window or component to a printer. The general workflow for this function is that you create the print job, set the options you'd like on it, and then call print() on the job. For printing reports or tables, use those components' dedicated print() functions.

The PrintJob object that this function returns has the following properties:

Property	Description
Show Print Dialog	If true (1), then the print dialog window will be shown before printing. This allows users to specify printing options like orientation, printer, paper size, margins, etc. [default: 1]
Fit To Page	If the component is too big or small to fit on a page, it will be proportionately zoomed out or in until it fits into the page. [**default: 1]**
Zoom Factor	If greater than zero, this zoom factor will be used to zoom the printed image in or out. For example, if this is 0.5, the printed image will be half size. If used, this zoom factor overrides the Fit To Page parameter. [default: -1.0]
Orientation	The orientation that the page will be printing at. 1 for Portrait, 0 for Landscape. [default: 1]
Page Width	The width of the paper in inches. [default: 8.5]
Page Height	The height of the paper in inches. [default: 11]
Left Margin, Right Margin, Top Margin, Bottom Margin	The margins, specified in inches. [default: 0.75]
Printer Name	The name of the printer that this will default print to, if available.

The properties of the PrintJob object can be altered before printing the document.

Property	Retrieve the value with...	Set the value with...
Show Print Dialog	.isShowPrintDialog()	.setShowPrintDialog(boolean)
Fit To Page	.isFitToPage()	.setFitToPage(boolean)
Zoom Factor	.getZoomFactor()	.setZoomFactor(double)
Orientation	.getOrientaion()	.setOrientation(int)
Page Width	.getPageWidth()	.setPageWidth(float)
Page Height	.getPageHeight()	.setPageHeight(float)
Left Margin	.getLeftMargin	.setLeftMargin(float)
Right Margin	.getRightMargin()	.setRightMargin(float)
Top Margin	.getTopMargin()	.setTopMargin(float)
Bottom Margin	.getBottomMargin()	.setBottomMargin(float)
Printer Name	.getPrinterName()	.setPrinterName(string)
**All Margins **	-	.setMargins(float)

* All Margins isn't a property of the PrintJob, but rather all four of the PrintJob's Margins can be set at the same time using that function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.print.createPrintJob(component)
```

Parameters

Type	Parameter	Description
Component	`component`	The component that you'd like to print.

Returns

JythonPrintJob - A print job that can then be customized and started. To start the print job, use .print(). Refer to **JythonPrintJob** objects.

Scope

Vision Client

Code Examples

Example #1

```
# Put this code on a button to print out an image of the container the button is in.
# A print dialog box will be displayed, allowing the user to specify various aspects of the print job.
job = system.print.createPrintJob(event.source.parent)
job.print()
```

Example #2

```
# Put this code on a button to print out an image of components in a container component,
# giving very specific print options and removing the ability for the user to configure the print job.
job = system.print.createPrintJob(event.source.parent.getComponent('Container'))
job.setShowPrintDialog(0)
job.setPageHeight(3)
job.setPageWidth(5)
job.setMargins(.5)
job.setOrientation(0)
job.print()
```

system.print.printToImage

This function is used in **Python Scripting**.

Description

This function prints the given component (such as a graph, container, entire window, etc) to an image file, and saves the file where ever the operating system deems appropriate. A filename and path may be provided to determine the name and location of the saved file.

While not required, it is highly recommended to pass in a filename and path. The script may fail if the function attempts to save to a directory that the client does not have access rights to.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.print.printToImage(component [, filename])
```

Parameters

Type	Parameter	Description
Component	`component`	The component to render.
String	`filename`	A filename to save the image as. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code would go on a button and save an image of the container that it is in.
system.print.printToImage(event.source.parent, "C:\\temp\\Screen.jpg")
```

Example #2 - User Selected Location

```
# Again, this example would save an image of the container, but prompts the user
for a location and filename with system.file.saveFile()

# Ask the user for a location. Uses a default filename of "image.png"
path = system.file.saveFile("image.png")

# If the path is not None...
if path != None:
    #Save the file
    system.print.printToImage(event.source.parent, path)
```

system.print.getPrinterNames

New in 8.1.22

This function is used in **Python Scripting**.

Description

Lists the available local printers.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.print.getPrinterNames()
```

Parameters

None

Returns

List - A list of strings that contain the names of local printers. Returns an empty list if there are no available local printers.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
```

```
# This code will return a list of names of the machine's local printers.
system.print.getPrinterNames()
```

system.print.getDefaultPrinterName

New in 8.1.22

This function is used in **Python Scripting**.

Description

Obtains the local default printer.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.print.getDefaultPrinterName()
```

Parameters

None

Returns

String - A string that represents the default printer. Returns null if there is no default printer.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This code will return the name of the local default printer.
system.print.getDefaultPrinterName()
```

system.project

Project Functions

The following functions allow you to list projects on the Gateway through scripting.

getProjectName

Returns the name of the project where the function was called from.

getProjectNames

Returns an unsorted collection of strings, where each string represents the name of a project on the Gateway.

requestScan

Requests a manual scan of the projects directory in order to refresh projects and their resources.

Functions by Scope

Gateway >

Vision >

Perspective >

system.project.getProjectName

This function is used in **Python Scripting**.

Description

Returns the name of the project where the function was called from. When called from the Gateway scope from a resource that originates from a singular project (reports, SFCs, etc.), will return that resources project. Resources that run in the Gateway scope, but are configured in a singular project (such as a report), will use that project's name.

When called from a scope that does not have an associated project (a Tag Event Script), the function will return the name of the Gateway scripting project. If a Gateway scripting project has not been configured, then returns an empty string.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.project.getProjectName()
```

Parameters

Nothing

Returns

String - The name of the currently running project.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This code displays the name of the currently running project to the appropriate
console,
# depending on scope (Designer console, Gateway console, etc.).
system.util.getLogger("myLogger").warn("You are running project: %s" %
system.project.getProjectName())
```

system.project.getProjectNames

This function is used in **Python Scripting**.

Description

Returns an unsorted collection of strings, where each string represents the name of a project on the Gateway. If no projects exist, returns an empty list.

This function only ever returns project names, ignoring project titles. The function also ignores the "enabled" property, including disabled projects in the results.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.project.getProjectNames()
```

Parameters

Nothing

Returns

List - A list containing string representations of project names on the Gateway.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# Calling this from the Script Console prints out each project name.
print system.project.getProjectNames()
```

system.project.requestScan

This function is used in **Python Scripting**.

Description

Requests a manual scan of the projects directory in order to refresh projects and their resources. If a scan is currently running, this method has no effect and will return when the in-progress scan has finished. This function blocks the current thread until a scan has completed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.project.requestScan([timeout])
```

Parameters

Type	Parameter	Description
Integer	`timeout`	The amount of time, in seconds, to block the current thread before timing out. Default is 10 seconds. [optional]

Returns

None

Scope

Gateway, Perspective Session

Code Example

Code Snippet

```
# This example requests a manual scan of the project directory
# while blocking the current thread for 30 seconds before timing out.
system.project.requestScan(30)
```

system.report

Report Functions

The following functions give you access to report details and the ability to run reports.

executeAndDistribute

Executes and distributes a report.

executeReport

Immediately executes an existing report and returns a List[Byte] of the output.

getReportNamesAsDataset

Gets a data of all reports for a project.

getReportNamesAsList

Gets a list of all reports for a project.

Functions by Scope

Gateway >

Vision >

Perspective >

Constants

The system.report package exports the `QueryResults` class, which can be used to manually construct a nested query result in a scripted report data source. In other words, `system.report.QueryResults` is equivalent to importing the `com.inductiveautomation.reporting.common.api.QueryResults` class directly.

system.report.executeAndDistribute

This function is used in **Python Scripting**.

Description

Executes and distributes a report. Similar to **scheduling a report to execute**, except a schedule is not required to utilize this function. This is a great way to distribute the report on demand from a Client. Throws an IllegalArgumentException when any of the following occurs: If the file type is not recognized, path does not exist, project does not exist, or a key is not valid.

> **NOTE**
>
> The function system.report.executeAndDistribute() does not run on its own thread and can get blocked. For example, if a printer is backed up and it takes a while to finish the request made by this function, the script will block the execution of other things on that thread until it finishes. Be sure to keep this in mind when using it in a script.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.report.executeAndDistribute(path, project, [parameters], action, [actionSettings])
```

Parameters

Type	Parameter	Description
String	`path`	The path to the existing report.
String	`project`	The name of the project where the report is located. Optional in client scope.
Dictionary[String, Integer]	`parameters`	A dictionary of parameter overrides, in the form name:value pairs. [optional]
String	`action`	The name of the distribution action to use. The action parameter supports the following keys as strings: • email • print • save • ftp
Dictionary[List, Any]	`actionSettings`	A dictionary of settings particular to the action. Missing values will use the default value for that action. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Values for actionSettings

The action settings parameter supports an optional dictionary of settings particular to the action. Missing values will use the default value for that action.

> **NOTE**

> The email action now has the ability to add emails to the reply to field of the email. The replyTo, replyToRoles, and replyToUserSource keys have been added to the possible dictionary options.

- email
  - Setting Keys: "smtpServerName", "from", "subject", "body", "attachmentName", "retries", "fileType", "to", "cc", "bcc", "replyTo", "useRoles", "roles", "userSource", "replyToRoles", "replyToUserSource".
  - `To`, `cc`, `bcc`, and `replyTo` must be Python lists. If useRoles is True, `to`, `cc` and `bcc` will be ignored and all email addresses for all users matching `roles` in `userSource` (which defaults to the project's current user source) will be in the to field. Similarly, all users matching the `replyToRoles` in `replyToUserSource` will be in the `reply` to field of the email. If `useRoles` is true but no `roles` are listed, all user email addresses in `userSource` will be in the to field. If omitted, `fileType` defaults to pdf.

  In addition, smtpServerName is the name of the **SMTP Profile** on the Gateway.

- print
  - Setting Keys: "primaryPrinterName", "backupPrinterName", "copies", "printBothSides", "collate", "useRaster", "rasterDPI", "useAutoLandscape", "pageOrientation".
  - `primaryPrinterName` defaults to the default printer. `backupPrinterName` defaults to "none", but can also have the special value of "default". `printBothSides`, `collate`, and `useRaster` are booleans which default to false. `rasterDPI` is only used if `useRaster` is true. `useAutoLandscape` defaults to true. If `useAutoLandscape` is false, `pageOrientation`, which can have values of "portrait" or "landscape" (default is "portrait"), is used.

- save
  - Setting Keys: "path", "fileName" and "format".
  - Since the script is sent to the gateway for execution, path and fileName must be relative to the Gateway.

- ftp
  - Setting Keys: "server", "port", "username", "password", "useSSL", "path", "fileName", and "format".
  - Server and fileName are required. If omitted, fileType defaults to pdf, port defaults to 21, and useSSL defaults to false.

Values for the fileType Parameter

Acceptable values are:

- pdf (recommended)
- html
- csv
- rtf
- jpeg
- png
- xml
- xls
- xlsx

> **XLS AND XLSX FORMATS**
>
> The xls and xlsx format options may return less than pixel perfect results. This is due to how many spreadsheet programs interpret the resulting file. As a result, the pdf format is recommended in most cases.

Code Examples

Code Snippet - Emailing a Report

```
# Executes and distributes the report to an email address.
system.report.executeAndDistribute(path="My Report Path", project="My Project",
action= "email",
actionSettings = {"to":["plantmanager@myplant.com"],
"smtpServerName":"myplantMailServer", "from":"reporting@myplant.com",
"subject":"Production Report"})
```

Code Snippet - Emailing a Report

```

```

```
# Executes and distributes the report to all users in the default user source who are Supervisors or Managers.
system.report.executeAndDistribute(path="My Report Path", project="My Project",
action= "email",
actionSettings = {"useRoles":True, "roles":["Supervisor", "Manager"],
"smtpServerName":"myplantMailServer", "from":"reporting@myplant.com",
"subject":"Production Report"})
```

Code Snippet - Emailing a Report

```
# Executes and distributes the report to all users in the user source specified which has no roles defined.
system.report.executeAndDistribute(path="My Report Path", project="My Project",
action= "email",
actionSettings = {"userSource":"TestUsers","useRoles":True, "roles":[],
"smtpServerName":"papercut", "from":"test@test.com", "subject":"Test Report"})
```

Code Snippet - Sending Report to FTP Server

```
# Executes and distributes the report to an ftp server with parameter values passed into the report
reportParameters = {"StartDate":system.date.addHours(system.date.now(), -12),
"EndDate":system.date.now()}
settings = {"server":"10.20.1.80", "port":22, "username":"Ignition",
"password":"Secret", "useSSL": False, "path":"C:\\FTP", "fileName":"Ignition
Report", "format":"pdf"}
system.report.executeAndDistribute(path="My Report Path", project="My Project",
parameters=reportParameters, action= "ftp", actionSettings = settings)
```

Code Snippet - Saving Report

```
# Executes and distributes the report to save a PDF
settings = {"path":"C:\\Ignition Reports", "fileName":"Report.pdf",
"format":"pdf"}
system.report.executeAndDistribute(path="My Report Path", project="My Project",
action="save", actionSettings=settings)
```

system.report.executeReport

This function is used in **Python Scripting**.

Description

Immediately executes an existing report and returns a List[Byte] of the output. Throws an IllegalArgumentException when any of the following occurs: If the file type is not recognized, path does not exist, project does not exist.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts **keyword arguments**.

```
system.report.executeReport(path, project, [parameters], fileType)
```

Parameters

Type	Parameter	Description
String	`path`	The path to the existing report.
String	`project`	The name of the project where the report is located. Optional in client scope.
Dictionary[String, Integer]	`parameters`	A dictionary of parameter overrides, in the form name:value. [optional]
String	`fileType`	The file type the resulting byte array should represent. Defaults to "pdf". Not case-sensitive

Returns

List[Byte] - A byte array of the resulting report.

Scope

Gateway, Vision Client, Perspective Session

Values for the fileType Parameter

Acceptable values are:

- pdf
- html
- csv
- rtf
- jpeg
- png
- xml
- xls
- xlsx

> **XLS AND XLSX FORMATS**
>
> The xls and xlsx format options may return less than pixel perfect results. This is due to how many spreadsheet programs interpret the resulting file. As a result, the pdf format is recommended in most cases.

Code Example

Code Snippet - Executing Report

```
# Executes the report, overriding two parameters.
overrides = {"myStringParam":"Hello world", "myIntParam":3}
bytesArray = system.report.executeReport(path="My Path", project="MyProject",
parameters=overrides, fileType="pdf")
```

system.report.getReportNamesAsDataset

This function is used in **Python Scripting**.

Description

Gets a data of all reports for a project. Throws an IllegalArgumentException when any of the following occurs: If the project name is omitted in the Gateway scope, project does not exist.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts keyword arguments.

```
system.report.getReportNamesAsDataset([ project], [includeReportName])
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project where the reports are located. Optional in client scope.
Boolean	`includeReportName`	**New in 8.1.5** When set to False, the end of Path does not include the report name. Default is True. [optional]

Returns

Dataset - A dataset of report paths and names for the project. Returns an empty dataset if the project has no reports.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Gets a dataset of reports for the current project and displays
# them in a Tree View component.

event.source.parent.getComponent('Tree View').data =
system.report.getReportNamesAsDataset()
```

system.report.getReportNamesAsList

This function is used in **Python Scripting**.

Description

Gets a list of all reports for a project. Throws an IllegalArgumentException when any of the following occurs: If the project name is omitted in the Gateway scope or if project does not exist.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.report.getReportNamesAsList(project)
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project where the reports are located. Optional in Client scope and Perspective Session scope.

Returns

List - A list of report paths for the project. Returns an empty list if the project has no reports.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# Gets a list of reports for the current project and prints it.
reports = system.report.getReportNamesAsList()
for report in reports:
    print report

"""Output from the above example looks like the following:
Comparisons
Line Reports/Line 1/Defect rates
Line Reports/Line 1/Production
Line Reports/Line 2/Defect Rates
"""
```

system.roster

Roster Functions

Functions that provide roster manipulation, including adding and remove users from a roster.

addUsers

Adds a list of users to an existing roster. Users are always appended to the end of the roster.

createRoster

Creates a roster with the given name and description, if it does not already exist.

deleteRoster

Deletes a roster with the given name.

getRoster

Returns the roster corresponding to the given name.

getRosterNames

Returns a list of roster names.

getRosters

Returns a dictionary of rosters, where the key is the name of the roster, and the value is an array list of string use…

removeUsers

Removes one or more users from an existing roster.

Functions by Scope

Gateway >

Perspective >

system.roster.addUsers

This function is used in **Python Scripting**.

Description

Adds a list of users to an existing roster. Users are always appended to the end of the roster.

Syntax

```
system.roster.addUsers(rosterName, [users])
```

Parameters

Type	Parameter	Description
String	`rosterName`	The name of the roster to modify.
List	`users`	A list of **User** objects that will be added to the end of the roster. User objects can be created with the **system.user.getUser** and **system.user.addUser** functions. These users must exist before being added to the roster.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
# Adds a couple of users to a roster.
userSource = "default"
rosterName = "rosterEast"

# getUser() returns a user object, which is needed for addUser()
userA = system.user.getUser(userSource, "george")
userB = system.user.getUser(userSource, "joe")

system.roster.addUsers(rosterName, [userA, userB])
```

system.roster.createRoster

This function is used in **Python Scripting**.

Description

Creates a roster with the given name and description, if it does not already exist.

This function was designed to run in the Gateway and in Perspective sessions. If creating rosters from Vision clients, use **system.alarm.createRoster** instead

Syntax

```
system.roster.createRoster(name, description)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the roster to create.
String	`description`	The description for the roster. May be None, but the parameter is mandatory.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
# Create an empty roster with a description.
system.roster.createRoster("rosterEast", "East plant user roster")


# Create an empty roster roster without a description.
system.roster.createRoster("rosterWest", None)
```

system.roster.deleteRoster

New in 8.1.1

This function is used in **Python Scripting**.

Description

Deletes a roster with the given name.

Syntax

```
system.roster.deleteRoster(rosterName)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the roster to delete.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
system.roster.deleteRoster("some roster")
```

system.roster.getRoster

New in 8.1.21

This function is used in **Python Scripting**.

Description

Returns the roster corresponding to the given name. You can call getUsers() to access a list of User objects in the RosterModel.

New in 8.1.29 Call getDescription() to access the Description field of the specified roster.

Syntax

```
system.roster.getRoster(rosterName)
```

Parameters

Type	Parameter	Description
String	`name`	The name of the roster to get the RosterModel object from.

Returns

RosterModel - The RosterModel object of the given roster name.

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
```

```
# This example gets the RosterModel object from a roster called "some roster" when
a Button is pressed and prints the object to the browser console.

roster = system.roster.getRoster("some roster")
system.perspective.print(roster)
```

system.roster.getRosterNames

New in 8.1.21

This function is used in **Python Scripting**.

Description

Returns a list of roster names.

Syntax

`system.roster.getRosterNames()`

Parameters

None.

Returns

List[String] - List of rosters on the Gateway.

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
# This example gets a list of rosters from the Gateway when a Button is pressed
and prints the list to the browser console.

roster = system.roster.getRosterNames()
system.perspective.print(roster)
```

system.roster.getRosters

This function is used in **Python Scripting**.

Description

Returns a dictionary of rosters, where the key is the name of the roster, and the value is an array list of string user names.

This function was designed to run in the Gateway and in Perspective sessions. If creating rosters from Vision clients, use **system.alarm.getRosters** instead.

Syntax

```
system.roster.getRosters()
```

Parameters

Nothing

Returns

Dictionary[String, List[String]] - A dictionary that maps roster names to a list of usernames in the roster. The list of usernames may be empty if no users have been added to the roster.

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
```

```
# This example prints out all existing rosters to the console of a Perspective
session:

rosters = system.roster.getRosters()

# Iterate over the rosters, extracting the name and user lists.
for name, users in rosters.items():

    # Format the results in a somewhat presentable manner.
    msg = "{0} : {1}".format(name, users)

    # Output the result.
    system.perspective.print(msg)
```

Get Each User in a Roster

```
# This example prints out each user in a certain roster.
rosters = system.roster.getRosters()

# Specify the roster with the key (the name of the roster), and iterate over the
users.
for user in rosters['myRoster']:

    # Output the users.
    system.perspective.print(user)
```

system.roster.removeUsers

This function is used in **Python Scripting**.

Description

Removes one or more users from an existing roster.

Syntax

```
system.roster.removeUsers(rosterName, users)
```

Parameters

Type	Parameter	Description
String	`rosterName`	The name of the roster to modify.
List	`users`	A list of **User** objects that will be removed from the roster. User objects can be created with the **system.user.getUser** and **system.user.addUser** functions.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Code Snippet

```
```

```
userSource = "default"
rosterName = "rosterEast"

# getUser() returns a user object, which is needed for removeUser()
user = system.user.getUser(userSource, "joe")

system.roster.removeUsers(rosterName, [user])
```

system.secsgem

SECS/GEM Functions

The following functions allow you to interact with equipment defined by the SECS/GEM module. Note that the **SECS/GEM** module must be installed before these functions will be accessible.

copyEquipment

Creates a copy of an equipment connection.

deleteToolProgram

Deletes a process program from the Gateway.

enableDisableEquipment

Enables or disables a Tuple of equipment connections from a script.

getResponse

Attempts to retrieve a response message from the Gateway.

getToolProgram

Returns a process program from the Gateway that was previously sent by a a tool in an S7F3 message.

getToolProgramDataset

Returns a Dataset containing information about all stored process programs.

sendRequest

Sends a JSON-formatted SECS message to a tool.

startSimEventRun

Starts a configured simulator event run in the Gateway.

toDataset

Converts a SECS message data structure, as returned by the system.secsgem.getResponse function, into a datas…

toTreeDataset

Changes an existing dataset, as returned by the system.secsgem.toDataSet function, to make it usable for the Tre…

sendResponse

Sends a JSON-formatted SECS response message to a message sent by a tool.

Functions by Scope

Gateway >

Vision >

Perspective >

system.secsgem.copyEquipment

This function is used in **Python Scripting**.

Description

Creates a copy of an equipment connection and places it in the Gateway > Config > SECS/GEM > Equipment. Common settings can be overridden for the new connection.

An exception is thrown if the new equipment connection cannot be created.

Client Permission Restrictions

Permission Type: SECS/GEM Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when called in the Gateway scope.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.secsgem.copyEquipment( equipmentSource, newEquipmentName, enabled, activeAddress, activePort, passiveAddress, passivePort, deviceId [, dbTablePrefix] [,description])
```

Parameters

Type	Parameter	Description
String	`equipmentSource`	Some new equipment settings will be retrieved from this equipment connection. Specify the source equipment connection name.
String	`newEquipmentName`	The name of the new equipment connection.
Boolean	`enabled`	If set to false, the new equipment connection will be disabled after it is created.
String	`activeAddress`	IP Address of new equipment. Must be specified if the SECS/GEM module is used in Active mode. Otherwise, do not use this parameter.
Integer	`activePort`	Port number of new equipment. Must be specified if the SECS/GEM module is used in Active mode. Otherwise, do not use this parameter.
String	`passiveAddress`	IP Address of new equipment. Must be specified if the SECS/GEM module is used in Passive mode. Otherwise, do not use this parameter.
Integer	`passivePort`	Port number of new equipment. Must be specified if the SECS/GEM module is used in Passive mode. Otherwise, do not use this parameter.
Integer	`deviceId`	Unique identifier of new equipment. This value must be an integer, and is specified within the equipment.
String	`dbTablePrefix`	SECS/GEM database table names will use the specified prefix for the new equipment connection. If no prefix is specified, the description of the source equipment will be used. Optional.
String	`description`	The description for the new equipment connection. If no description is specified, the description of the source equipment will be used. Optional.

Returns

Nothing

Scope

Vision Client

Address and Port Parameters

When calling this function, only one set of address and port parameters need to be specified: Either **activeAddress** and **activePort**, or **passiveAddress** and **passivePort**. Optionally, both sets of parameters may be specified, but the function will throw an exception if neither are specified.

Code Examples

Code Snippet - Copy Equipment

```
system.secsgem.copyEquipment(equipmentSource="ToolOne",
newEquipmentName="ToolTwo", enabled=True, activeAddress="192.168.1.5",
activePort=15500, deviceId=0)
```

system.secsgem.deleteToolProgram

This function is used in **Python Scripting**.

Description

Deletes a process program from the Gateway.

Client Permission Restrictions

Permission Type: SECS/GEM Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when called in the Gateway scope.

Syntax

```
system.secsgem.deleteToolProgram(ppid)
```

Parameters

Type	Parameter	Description
String	`ppid`	The PPID that was sent from the tool when the S7F3 message was saved.

Returns

Nothing

Scope

Vision Client

Code Examples

Code Snippet

```
# Name of the Tool Program that will be deleted
targetProgram = "Old Program"

system.secsgem.deleteToolProgram(targetProgram)
```

system.secsgem.enableDisableEquipment

This function is used in **Python Scripting**.

Description

Enables or disables a Tuple of equipment connections from a script.

Client Permission Restrictions

Permission Type: SECS/GEM Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when called in the Gateway scope.

Syntax

```
system.secsgem.enableDisableEquipment(enable, names)
```

Parameters

Type	Parameter	Description
Boolean	`enable`	Set to True to enable equipment connections, or set to False to disable them.
Tuple	`names`	A Tuple of Strings. Each String should match an Equipment Connection configured on the Gateway. If this parameter contains the name of an Equipment Connection that does not exist, then a message will be included in the List returned by this function.

Returns

List - A List of unicode strings. Each string contains a message about an equipment connection that could not be enabled/disabled. If the list is empty, then all specified equipment connections were successfully modified.

Scope

Vision Client

Code Examples

Code Snippet

```
# Executing this example script will attempt to disable two Equipment Connections

# Create a Python Tuple of equipment names to disable.
equipmentNames = ("ToolOne","ToolTwo")

# Invoke the Function
result = system.secsgem.enableDisableEquipment(False, equipmentNames)

# Print the results of any equipment connections that could not be modified.
print result
```

system.secsgem.getResponse

This function is used in **Python Scripting**.

Description

Attempts to retrieve a response message from the Gateway. The transaction id from the sent message is used to retrieve the response.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.getResponse(transactionID, equipment, [timeout], [poll])
```

Parameters

Type	Parameter	Description
Integer	`transactionID`	The transactionID of the request and response. The transactionID is used to retrieve the response. Typically used in conjunction with **system.secsgem.sendRequest** to generate a transactionID.
String	`equipment`	Name of equipment connection.
Integer	`timeout`	Specifies in seconds how long to wait for a response before returning None. If omitted the timeout will be 5 seconds.
Integer	`poll`	Specifies in milliseconds how often to poll the system for a response. If omitted the poll will be 150 milliseconds.

Returns

Any - A Python object, typically a dictionary. The actual result is a JSON string that's decoded into a Python object, as shown on the mapping on the **system.util.jsonDecode** page.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet 1

```
```

```
# Replace the string below with the equipment name you want to send the request to.
myEquipment = "EquipmentOne"

# Define the contents of the body. We're using an empty string, since S1F1 doesn't expect a body, and we need to define something (Python's None will result in an exception).
body = ""

# Store the returned transactionID in a variable.
transactionID = system.secsgem.sendRequest("S1F1", True, body, myEquipment)

# Use the transactionID to lookup the response.
response = system.secsgem.getResponse(transactionID, myEquipment, 2)

# We're printing out the response here, but you could do something more useful instead.
print response
```

Code Snippet 2

```
# This example demonstrates how to retrieve the value of a Status Variable via
S1F3.
# If using the simulator that comes with the SECS/GEM module, this example will
return the current time from the Clock Status Variable.

# Replace the string below with the equipment name you want to send the request
to.
myEquipment = "EquipmentOne"

# Define the contents of the body. The Clock Status Variable has an SVID of 1.
body = [{"format":"U4", "value":1}]

# Store the returned transactionID in a variable.
transactionID = system.secsgem.sendRequest("S1F3", True, body, myEquipment)

# Retrieve the response.
response = system.secsgem.getResponse(transactionID, myEquipment, 2)

## We need to do some digging to get the value of the Clock:
## -The response is a Dictionary.
## -Inside of the response is the key "body".
## -The value of "body" is a Python List containing another Dictionary (which has
our Clock value)
##      Thus we use [0] to access the Dictionary.
## -The Dictionary contains a key named "value", which is the value of our clock.
theDatetime = response["body"][0]["value"]

# We parse the date into something more human readable, and print it out.
print system.date.parse(theDatetime, "yyMMddHHmmss")
```

system.secsgem.getToolProgram

This function is used in **Python Scripting**.

Description

Returns a process program from the Gateway that was previously sent by a a tool in an S7F3 message.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.getToolProgram(ppid)
```

Parameters

Type	Parameter	Description
String	`ppid`	The PPID that was sent from the tool when the S7F3 message was saved.

Returns

Dictionary - A Python Dictionary containing the following keys: [editDate, ppbody, bodyFormat].

- `editDate` - holds the last date the program was saved.
- `ppbody` - holds the actual program.
- `bodyFormat` - holds the format ('A', 'B', 'I', etc) of the original message PPBODY.

Scope

Vision Client

Code Examples

Code Snippet

```
# Retrieve information on all programs, and convert them to a PyDataset.
# PyDatasets are easier to iterate over.
results = system.secsgem.getToolProgramDataset()
pyResults = system.dataset.toPyDataSet(results)

for program in pyResults:
    # If the format of the program is ASCII...
    if program[2] == "A":

        ppid = program[0]
        # ...retrieve more information on the program...
        programData = system.secsgem.getToolProgram(ppid)
        # ...and print the program. Writing to a file would most
        # likely be a better practice here.
        print "Program %s: %s" % (ppid,programData[1])
```

system.secsgem.getToolProgramDataset

This function is used in **Python Scripting**.

Description

Returns a Dataset containing information about all stored process programs.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.getToolProgramDataset()
```

Parameters

None

Returns

Dataset - A Dataset containing information about all stored process programs. Includes the following columns in order: ppid, editDate, bodyFormat.

- `ppid` - The name (PPID) of the program.
- `editDate` - The last known date the program was saved.
- `bodyFormat` - The format of the program. Uses notation matching SECS item definitions: "A" for ASCII, "B" for binary, etc.

Scope

Vision Client

Code Examples

Code Snippet

```
# Retrieve information about all programs.
results = system.secsgem.getToolProgramDataset()

# Convert the Dataset to a PyDataset, since they are easier to iterate over.
pyResults = system.dataset.toPyDataSet(results)
for program in pyResults:

    # Print out details on each program.
    print "Program %s was last modified on %s" % (program[0], program[1])
```

system.secsgem.sendRequest

This function is used in **Python Scripting**.

Description

Sends a JSON-formatted SECS message to a tool. An equipment connection must be configured for the tool in the Gateway.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.sendRequest(streamFunction, reply, body, equipment)
```

Parameters

Type	Parameter	Description
String	`streamFunction`	The stream and function of the SECS message to send. Example: "S1F13"
Boolean	`reply`	Whether or not the SECS message expects a reply message.
Object	`body`	This contains the body of a SECS message. The argument can be a Python Object or JSON string representing the body of a SECS message. If this argument is a string then it will be converted to a Python Object using the **system.util.jsonDecode** function.
String	`equipment`	Name of the equipment connection to use.

Returns

Integer - The transactionID of the SECS message response.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet - Sending a S1F1 Message

```
# Replace the string below with the equipment name you want to send the request to.
myEquipment = "EquipmentOne"

# Define the contents of the body. We're using an empty string, since S1F1 doesn't expect a body, and we need to define something (Python's None will result in an exception).
body = ""

# Store the returned transactionID in a variable. This script could be extended by using system.secsgem.getResponse to view the response.
transactionID = system.secsgem.sendRequest("S1F1", True, body, myEquipment)
```

system.secsgem.startSimEventRun

This function is used in **Python Scripting**.

Description

Starts a configured simulator event run in the Gateway. Note, that this function only works with the simulators that come included with the SECS/GEM module.

The function will throw an exception if the specified Event Run cannot be started.

Client Permission Restrictions

Permission Type: SECS/GEM Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when called in the Gateway scope.

Syntax

```
system.secsgem.startSimEventRun(simulatorName, eventRunName)
```

Parameters

Type	Parameter	Description
String	`simulatorName`	The simulator that holds the configured event run. Will throw an exception if the specified simulator can't be found.
String	`eventRunName`	The event run to start. Will throw an exception if the specified simulator can't be found.

Returns

Nothing

Scope

Vision Client

Code Examples

Code Snippet

```
# This examples requires that the Gateway has a simulator named "simulator1", and
# an Event Run in that same simulator named "myEventRun".
mySimulator = "simulator1"
eventRun = "myEventRun"

system.secsgem.startSimEventRun(mySimulator, eventRun)
```

system.secsgem.toDataset

This function is used in **Python Scripting**.

Description

Converts a SECS message data structure, as returned by the **system.secsgem.getResponse** function, into a dataset and returns it.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.toDataset(secsObject)
```

Parameters

Type	Parameter	Description
Any	`secsObject`	A Python object, such as Sequence or a Dictionary, representing a SECS message to convert to a dataset. More information on how to format the Python object can be found on the **SECS Definition Language (SDL) File** page.

Returns

DataSet - A DataSet representing a SECS message.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Receive a SECS message.
object = system.secsgem.getResponse(transactionID, "myEquipment", 2)

# Turn the message into a dataset.
dataset = system.secsgem.toDataSet(object)

# Assuming this script was called from a component script, and a Table component
was in the same container as the component that called this script, we could pass
# the dataset to the Data property.
event.source.parent.getComponent('Table').data = dataset
```

Code Snippet - Manually Making the Message

```
{
   "header":{
      "doc":"nonexistent function",
      "stream":100,
      "function":100,
      "reply":"False"
   },
   "body":[
      {
         "doc":"FirstItem, my first nonsense item",
         "format":"U4",
         "value":1234
      },
      {
         "doc":"SecondItem, the other nonsense item",
         "format":"U4",
         "value":5678
      }
   ]
}
```

system.secsgem.toTreeDataset

This function is used in **Python Scripting**.

Description

Changes an existing dataset, as returned by the **system.secsgem.toDataSet** function, to make it usable for the **Tree View** component.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.toTreeDataset(dataset)
```

Parameters

Type	Parameter	Description
Dataset	`dataset`	A DataSet containing a SECS message. Note that this parameter cannot take a JSON message, so the object returned by **system.secsgem.getResponse** must first be processed by **system.secsgem.toDataSet**.

Returns

Dataset - A dataset containing a SECS message with the following columns, as suited for Vision's tree view component: "path", "text", "icon", "background", "foreground", "tooltip", "border", "selectedText", "selectedIcon", "selectedBackground", "selectedForeground", "selectedTooltip", "selectedBorder"

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# Assuming the variable named "message" contains a SECS message, we will first convert it to a Dataset.
dataset = system.secsgem.toDataset(message)

# The initial dataset generated by toDataSet will not work with the Tree View component, so we'll modify it...
dataset = system.secsgem.toTreeDataset(dataset)

# ...and now pass the dataset into the Tree View component's data property.
event.source.parent.getComponent('Tree View').data = dataset
```

system.secsgem.sendResponse

This function is used in **Python Scripting**.

Description

Sends a JSON-formatted SECS response message to a message sent by a tool. An equipment connection must be configured for the tool in the Gateway, and this must be used within a Message Handler to create a **Custom Message Response Handler**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.secsgem.sendResponse(transactionID, systemBytes, streamFunction, body, equipment)
```

Parameters

Type	Parameter	Description
Integer	`transactionID`	The TxID of the response. The TxID from the received request in the payload of the message handler must be specified here.
Integer	`systemBytes`	The SystemBytes of the response. The SystemBytes from the received request in the payload of the message handler must be specified here.
String	`streamFunction`	The stream and function of the SECS message to send. Example: "S1F14"
Any	`body`	This contains the body of a SECS response. The argument can be a Python Object or JSON string representing the body of a SECS message. If this argument is a string then it will be converted to a Python Object using the **system.util.jsonDecode** function.
String	`equipment`	Name of the equipment connection to use.

Returns

Nothing

Scope

Gateway, Perspective Session

Code Examples

Code Snippet - Sending a S1F1 Message

```
# This will create a logger that will print to the console that a custom response
is happening for S6F12.
# It will then send the response with system.secsgem.sendResponse().
equipment= payload['Equipment']
txId = payload['TxID']
systemBytes = payload['SystemBytes']
message = payload['Message']

msg = "Equipment=" + equipment
msg += ", TxID=" + str(txId)
msg += ", SystemBytes=" + str(systemBytes)
msg += ", Message=" + message
logger = system.util.getLogger("SECSGEM.Gateway.S6F12Handler")
logger.info("S6F12Handler: Sending back response to S6F11 message:" + msg)

body = '{"format":"B", "value": 0, "doc":"ACKC6, Acknowledge Code", "codeDesc":
"Accepted"}'
system.secsgem.sendResponse(txId, systemBytes, "S6F12", body, equipment)
logger.info("S6F12Handler: S612 response sent")
```

system.security

Security Functions

The following functions give you access to interact with the users and roles in the Gateway. These functions require the Vision module, as these functions can only be used with User Sources and their interaction with Vision Clients.

getRoles

Finds the roles that the currently logged in user has, returns them as a Python tuple of strings.

getUsername

Returns the currently logged-in username.

getUserRoles

Fetches the roles for a user from the Gateway.

isScreenLocked

Returns whether or not the screen is currently locked.

lockScreen

Used to put a running client in lock-screen mode.

logout

Logs out of the client for the current user and brings the client to the login screen.

switchUser

Attempts to switch the current user on the fly.

unlockScreen

Unlocks the client, if it is currently in lock-screen mode.

validateUser

Tests credentials (username and password) against an authentication profile.

Functions by Scope

Gateway >

Vision >

Perspective >

system.security.getRoles

This function is used in **Python Scripting**.

Description

Finds the roles that the currently logged in user has, returns them as a Python tuple of strings.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.getRoles()
```

Parameters

Nothing

Returns

Tuple - A list of the roles (strings) that are assigned to the current user.

Scope

Vision Client

Code Examples

Example #1

```
# This would run on a button to prevent certain users from opening a window

if "Supervisor" in system.security.getRoles():
   system.nav.openWindow("ManagementOnly")
else:
   system.gui.errorBox("You don't have sufficient privileges to continue")
```

system.security.getUsername

This function is used in **Python Scripting**.

Description

Returns the currently logged-in username.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.getUsername()
```

Parameters

Nothing

Returns

String - The current user name.

Scope

Vision Client

Code Examples

Example #1

```
# This code would run on a startup script and does special logic based upon who
was logging in
name = system.security.getUsername()
if name == 'Bob':
   system.nav.openWindow("BobsHomepage")
else:
   system.nav.openWindow("NormalHomepage")
```

system.security.getUserRoles

This function is used in **Python Scripting**.

Description

Fetches the roles for a user from the Gateway. This may not be the currently logged in user. Requires the password for that user. If the User Source name is omitted as the authentication profile identifier, then the current project's default User Source is used.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Vision

```
system.security.getUserRoles(username, password, [authProfile], [timeout])
```

Parameters

Type	Parameter	Description
String	`username`	The username to fetch roles for.
String	`password`	The password for the user.
String	`authProfile`	The name of the authentication profile (User Source) to run against. Optional. Leaving this out will use the project's default profile. [optional]
Integer	`timeout`	Timeout for client-to-gateway communication. Default is 60,000ms. [optional]

Returns

Tuple - A list of the roles that this user has, if the user authenticates successfully. Otherwise, returns None.

Scope

Vision Client

Syntax - Gateway and Perspective

`system.security.getUserRoles(username, password, [authProfile])`

Parameters

Type	Parameter	Description
String	`username`	The username to fetch roles for.
String	`password`	The password for the user.
String	`authProfile`	The name of the authentication profile (User Source) to run against. Leaving this out will use the project's default profile. [optional]

Returns

Tuple - A list of the roles that this user has, if the user authenticates successfully. Otherwise, returns None.

Scope

Gateway, Perspective Session

Code Examples

Example #1

```
# Fetch the roles for a given user, and check to see if the role "Admin" is in
them.

reqRole = "Admin"
username = "Billy"
password= "Secret"
roles = system.security.getUserRoles(username, password)
if reqRole in roles:
   # do something requiring "Admin" role.
```

system.security.isScreenLocked

This function is used in **Python Scripting**.

Description

Returns whether or not the screen is currently locked.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.isScreenLocked()
```

Parameters

Nothing

Returns

Boolean - A flag indicating whether or not the screen is currently locked.

Scope

Vision Client

Code Example

Code Snippet

```
```

```
# This would run in a timer script to lock the screen after 15 seconds of
inactivity, and then log the user out after 30 seconds of inactivity.

if system.util.getInactivitySeconds() > 15 and not
system.security.isScreenLocked():
   system.security.lockScreen()
elif system.util.getInactivitySeconds() > 30:
   system.security.logout()
```

system.security.lockScreen

This function is used in **Python Scripting**.

Description

Used to put a running client in lock-screen mode. The screen can be unlocked by the user with the proper credentials, or by scripting via the **system.security.unlockScreen()** function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.lockScreen([obscure])
```

Parameters

Type	Parameter	Description
Boolean	`obscure`	If true(1), the locked screen will be opaque, otherwise it will be partially visible. [optional]

Returns

Nothing

Scope

Vision Client

Code Example

Code Snippet

```
# This would run in a timer script to lock the screen after 15 seconds of
inactivity, and then log the user out after 30 seconds of inactivity.

if system.util.getInactivitySeconds() > 15 and not
system.security.isScreenLocked():
   system.security.lockScreen()
elif system.util.getInactivitySeconds() > 30:
   system.security.logout()
```

system.security.logout

This function is used in **Python Scripting**.

Description

Logs out of the Client for the current user and brings the Client to the login screen.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.logout()
```

Parameters

Nothing

Returns

Nothing

Scope

All

Code Example

Code Snippet

```
# This would run in a timer script to log the user out after 30 seconds of
inactivity.
if system.util.getInactivitySeconds() > 30:
   system.security.logout()
```

system.security.switchUser

This function is used in **Python Scripting**.

Description

Attempts to switch the current user on the fly. If the given username and password fail, this function will return false. If it succeeds, then all currently opened windows are closed, the user is switched, and windows are then re-opened in the states that they were in.

If an event object is passed to this function, the parent window of the event object will not be re-opened after a successful user switch. This is to support the common case of having a switch-user screen that you want to disappear after the switch takes place.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.switchUser(username, password, [event], [hideError])
```

Parameters

Type	Parameter	Description
String	`username`	The username to try and switch to.
String	`password`	The password to authenticate with.
EventObject	`event`	If specified, the enclosing window for this event's component will be closed in the switch user process. Refer to the list of **Event** objects. [optional]
Boolean	`hideError`	If true (1), no error will be shown if the switch user function fails. Default is False. [optional]

Returns

Boolean - False if the switch user operation failed, True otherwise.

Scope

Vision Client

Code Example

Code Snippet

```
# This script would go on a button in a popup window used to switch users without
logging out of the client.

# Pull the username and password from the input components
uname = event.source.parent.getComponent("Username").text
pwd = event.source.parent.getComponent("Password").text

# Call switchUser. The event object is passed to this
# function so that if the username and password work,
# this window will be closed before the switch occurs.
success= system.security.switchUser(uname,pwd,event)

# If the login didn't work, give input focus back to the
# username component, so that the user can try again
if not success:
   event.source.parent.getComponent("Username").requestFocusInWindow()
```

system.security.unlockScreen

This function is used in **Python Scripting**.

Description

Unlocks the client, if it is currently in lock-screen mode.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.security.unlockScreen()
```

Parameters

Nothing

Returns

Nothing

Scope

Vision Client

Code Example

Code Snippet

```
```

```
# This code would go in a global script to automatically unlock the screen on a
specific computer

comp = system.net.getHostName()
if comp == 'Line 1':
   system.security.unlockScreen()
```

system.security.validateUser

This function is used in **Python Scripting**.

Description

Tests credentials (username and password) against an authentication profile (User Source). Returns a boolean based upon whether or not the authentication profile accepts the credentials. If the User Source name is omitted, then the current project's default authentication profile is used.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax (Client)

```
system.security.validateUser(username, password, [authProfile], [timeout])
```

Parameters

Type	Parameter	Description
String	`username`	The username to validate.
String	`password`	The password for the user.
String	`authProfile`	The name of the authentication profile (User Source) to run against. Leaving this out will use the project's default profile. [optional]
Integer	`timeout`	Timeout for Client-to-Gateway communication. Default is 60,000ms. [optional]

Returns

Boolean - False if the user failed to authenticate; True if the username/password was a valid combination.

Scope

Vision Client

Syntax (Gateway)

`system.security.validateUser(username, password, [authProfile])`

Parameters

Type	Parameter	Description
String	`username`	The username to validate.
String	`password`	The password for the user.
String	`authProfile`	The name of the authentication profile (User Source) to run against. Optional. Leaving this out will use the project's default profile. [optional]

Returns

Boolean - False if the user failed to authenticate; True if the username/password was a valid combination.

Scope

Gateway, Perspective Session

Code Example

Code Snippet

```
# This would require the current user to enter their password again before
proceeding.

currentUser = system.security.getUsername()
password = system.gui.passwordBox("Confirm Password")
valid = system.security.validateUser(currentUser, password)
if valid:
   # do something
else:
   system.gui.errorBox("Incorrect password")
```

system.serial

Serial Functions

The following functions give you access to read and write through serial ports.

closeSerialPort

Closes a previously opened serial port.

configureSerialPort

Configure a serial port for use in a later call.

openSerialPort

Opens a previously configured serial port for use.

port

Returns a context manager wrapping a serial port, allowing the rest of the system to interact with that port.

readBytes

Read numberOfBytes bytes from a serial port.

readBytesAsString

Read numberOfBytes bytes from a serial port and convert them to a String.

readLine

Attempts to read a line from a serial port.

readUntil

Reads a byte at a time from a serial port until a delimiter character is encountered.

sendBreak

Sends a break signal for approximately millis milliseconds.

write

Write a String to a serial port using the platforms default character encoding.

writeBytes

Write a List[Byte] to a serial port.

Functions by Scope

Gateway >

Vision >

Perspective >

system.serial.closeSerialPort

This function is used in **Python Scripting**.

Description

Closes a previously opened serial port. Returns without doing anything if the named serial port is not currently open. Will throw an exception if the port is open and cannot be closed.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.closeSerialPort(port)
```

Parameters

Type	Parameter	Description
String	`port`	The name of the serial port, e.g., "COM1" or "dev/ttyS0".

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Using a Literal Value

```
# This example will close a port called "COM1".
system.serial.closeSerialPort("COM1")
```

Code Snippet - Using a Variable

```
# This example will close a port using a variable called port that has a value of
"COM1"
port = "COM1"
system.serial.closeSerialPort(port)
```

system.serial.configureSerialPort

This function is used in **Python Scripting**.

Description

Configure a serial port for use in a later call. This only needs to be done once unless the configuration has changed after the initial call. All access to constants must be prefixed by " system.serial. ".

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.serial.configureSerialPort(port, [bitRate], [dataBits], [hardwareFlowControl], [parity], [stopBits])
```

Parameters

Type	Parameter	Description
String	`port`	The name of the serial port, e.g., "COM1" or "/dev/ttyS0". This parameter is required.
Integer	`bitRate`	Configure the bit rate. Valid values are defined by the following constants [optional]: `system.serial.BIT_RATE_110`, `system.serial.BIT_RATE_150`, `system.serial.BIT_RATE_300`, `system.serial.BIT_RATE_600`, `system.serial.BIT_RATE_1200`, `system.serial.BIT_RATE_2400`, `system.serial.BIT_RATE_4800`, `system.serial.BIT_RATE_9600`, `system.serial.BIT_RATE_19200`, `system.serial.BIT_RATE_38400`, `system.serial.BIT_RATE_57600`, `system.serial.BIT_RATE_115200`, `system.serial.BIT_RATE_230400`, `system.serial.BIT_RATE_460800`, `system.serial.BIT_RATE_921600`
Integer	`dataBits`	Configure the data bits. Valid values are defined by the following constants [optional]: `system.serial.DATA_BITS_5`, `system.serial.DATA_BITS_6`, `system.serial.DATA_BITS_7`, `system.serial.DATA_BITS_8`
Boolean	`hardwareFlowControl`	Configure hardware flow control. On or off. [optional]
Integer	`parity`	Configure parity. Valid values are defined by the following constants [optional]:

Type	Parameter	Description
		`system.serial.PARITY_EVEN`, `system.serial.PARITY_ODD`, `system.serial.PARITY_MARK`, `system.serial.PARITY_SPACE`, `system.serial.PARITY_NONE`
Integer	`stopBits`	Configure stop bits.Valid values are defined by the following constants [optional]: `system.serial.STOP_BITS_1`, `system.serial.STOP_BITS_2`

> **NOTE**
>
> The serial library was updated in 8.0. Any constants, like HANDSHAKE, that do not have an equivalent value will result in a value of 0.

Returns

SerialConfigurator - A SerialConfigurator object with exposed functions that can be used to configure the serial port instead of, or in addition to, the arguments passed to `configureSerialPort`.

Scope

Gateway, Vision Client, Perspective Session

SerialConfigurator Methods

Below is a listing of methods on the SerialConfigurator object. All methods return the original SerialConfigurator object, but with a modified parameter value. For a list of possible values, see the appropriate parameter on the function description above.

Method	Description
setBitRate	Sets the bit rate on the SerialConfigurator.
setDataBits	Sets the data bits on the SerialConfigurator.
setParity	Sets the parity on the SerialConfigurator.
setStopBits	Sets the stop bits on the SerialConfigurator.
setFlowControl	Sets the flow control on the SerialConfigurator.
setHandshake	Sets the handshake on the SerialConfigurator.
setHardwareFlowControl	Sets the hardware flow control on the SerialConfigurator.

Code Examples

Example #1 Configuring Serial Port

```
# Configure a serial port using keyword args.
# The "port" keyword is mandatory.

system.serial.configureSerialPort(\
port="COM1",\
bitRate=system.serial.BIT_RATE_9600,\
dataBits=system.serial.DATA_BITS_8,\
handshake=system.serial.HANDSHAKE_NONE,\
hardwareFlowControl=False,\
parity=system.serial.PARITY_NONE,\
stopBits=system.serial.STOP_BITS_1)
```

Example #2 Configuring Serial Port

```
# Configure a serial port using a SerialConfigurator (returned by
configureSerialPort()):

system.serial.configureSerialPort("COM1")\
.setBitRate(system.serial.BIT_RATE_9600)\
.setDataBits(system.serial.DATA_BITS_8)\
.setHandshake(system.serial.HANDSHAKE_NONE)\
.setHardwareFlowControl(False)\
.setParity(system.serial.PARITY_NONE)\
.setStopBits(system.serial.STOP_BITS_1)
```

system.serial.openSerialPort

This function is used in **Python Scripting**.

Description

Opens a previously configured serial port for use. Will throw an exception if the serial port cannot be opened.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.openSerialPort(port)
```

Parameters

Type	Parameter	Description
String	`port`	The name of the serial port, e.g., "COM1" or "dev/ttyS0".

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet - Using a Literal Value

```
# This example will open a port called "COM1"
system.serial.openSerialPort("COM1")
```

Code Snippet - Using a Variable

```
# This example will open a port using a variable called port that has a value of
"COM1"
port = "COM1"
system.serial.openSerialPort(port)
```

system.serial.port

This function is used in **Python Scripting**.

Description

Returns a **context manager** wrapping a serial port, allowing the rest of the system to interact with that port. This function effectively combines the **system.serial.configureSerialPort**, **system.serial.openSerialPort**, and **system.serial.closeSerialPort** functions into a single call.

Intended to be used with the **Python 'with' statement**. The object aliased in the 'with' statement has special access to all of the other **system.serial** functions, allowing for reads and writes.

Closing the port happens automatically once the 'with' statement ends.

Accepts the same arguments as **configureSerialPort**, and access to constants must be prefixed by "system.serial." (as shown in the parameter descriptions).

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.port(port, [bitRate], [dataBits], [handshake], [hardwareFlowControl], [parity], [stopBits])
```

Parameters

Type	Parameter	Description
String	`port`	The name of the serial port, e.g., "COM1" or "/dev/ttyS0". This parameter is required.
Integer	`bitRate`	Configure the bit rate. Valid values are defined by the following constants [optional]: `system.serial.BIT_RATE_110`, `system.serial.BIT_RATE_150`, `system.serial.BIT_RATE_300`, `system.serial.BIT_RATE_600`, `system.serial.BIT_RATE_1200`, `system.serial.BIT_RATE_2400`, `system.serial.BIT_RATE_4800`, `system.serial.BIT_RATE_9600`, `system.serial.BIT_RATE_19200`, `system.serial.BIT_RATE_38400`, `system.serial.BIT_RATE_57600`, `system.serial.BIT_RATE_115200`, `system.serial.BIT_RATE_230400`, `system.serial.BIT_RATE_460800`, `system.serial.BIT_RATE_921600`
Integer	`dataBits`	Configure the data bits. Valid values are defined by the following constants [optional]: `system.serial.DATA_BITS_5`, `system.serial.DATA_BITS_6`, `system.serial.DATA_BITS_7`, `system.serial.DATA_BITS_8`
Boolean	`hardwareFlowControl`	Configure hardware flow control. On or off. [optional]
Integer	`parity`	Configure parity. Valid values are defined by the following constants [optional]:

Type	Parameter	Description
		`system.serial.PARITY_EVEN`, `system.serial.PARITY_ODD`, `system.serial.PARITY_MARK`, `system.serial.PARITY_SPACE`, `system.serial.PARITY_NONE`
Integer	`stopBits`	Configure stop bits.Valid values are defined by the following constants [optional]: `system.serial.STOP_BITS_1`, `system.serial.STOP_BITS_2`

> **NOTE**
>
> The serial library was updated in 8.0. Any constants, like HANDSHAKE, that do not have an equivalent value will result in a value of 0.

Returns

PortManager - A wrapper around the configured port, that can be entered by using a 'with' statement. The port will automatically close on exiting the 'with' statement scope.

Scope

Gateway, Vision Client, Perspective Session

Using the PortManager

The PortManager is the primary way to interact with a serial port when using this function. It has special access to the other system serial functions. Specifically:

- **system.serial.readBytes**
- **system.serial.readBytesAsString**
- **system.serial.readLine**
- **system.serial.readUntil**
- **system.serial.sendBreak**
- **system.serial.write**

- **system.serial.writeBytes**

Calling these functions from the PortManager does **not** require the 'port' parameter, as the port is implied by system.serial.port. However all other parameters are available (see the linked pages in the bullet list above).

In addition, you do not include 'system.serial.' when accessing the other serial functions mentioned above, as the aliased object has access to them. Thus:

```
# Correct
with system.serial.port("COM1") as port:
    port.write("some string")

# Incorrect
with system.serial.port("COM1") as port:
    system.serial.write("COM1", "some string")
```

Code Examples

Example 1: Simple Example with Descriptions

```
# Reads a value from a port.

# First we call the function using a 'with' statement, and create an aliased
object named 'port'
with system.serial.port("COM1", bitRate=system.serial.BIT_RATE_9600) as port:

    # Within the 'with' statement, we can call other serial functions by
referencing the aliased object.
    # Meaning, in this example, 'port' can easily call the
system.serial.readLine() function with the following:
    line = port.readLine(60000)
```

Example 2: Using all Parameters

```
# Same idea as example one, but uses all available parameters.
with system.serial.port(
        port = "COM1",
        bitRate = system.serial.BIT_RATE_110,
        dataBits = system.serial.DATA_BITS_5,
        handshake = system.serial.HANDSHAKE_CTS_DTR,
        hardwareFlowControl = False,
        parity = system.serial.PARITY_EVEN,
        stopBits = system.serial.STOP_BITS_1) as port:

    line = port.readLine(60000)
```

system.serial.readBytes

This function is used in **Python Scripting**.

Description

Read `numberOfBytes` bytes from a serial port.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.readBytes(port, numberOfBytes [, timeout])
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
int	`numberOfBytes`	The number of bytes to read.
int	`timeout`	Maximum amount of time, in milliseconds, to block before returning. Default is 5000. [optional]

Returns

List[Byte] - A list containing bytes read from the serial port.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This example will read a specified number of bytes from a port called "COM1".
port = "COM1"

system.serial.readBytes("COM1",2)
```

system.serial.readBytesAsString

This function is used in **Python Scripting**.

Description

Read numberOfBytes bytes from a serial port and convert them to a String. If a specific encoding is needed to match the source of the data, use **system.serial.readBytes** and use the desired encoding to decode the byte array returned.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.readBytesAsString(port, numberOfBytes, [timeout], [encoding])
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
Integer	`numberOfBytes`	The number of bytes to read.
Integer	`timeout`	Maximum amount of time, in milliseconds, to block before returning. Default is 5000. [optional]
String	`encoding`	Encoding to use when constructing the string. Defaults to the platform's default character set. [optional]

Returns

String - A String created from the bytes read.

Scope

Gateway, Vision Client, Perspective Session

The Encoding Parameter

The encoding parameter can be used to decode a string with any of the possible encoding character sets that are available. By default, the following character sets are provided by **the Java platform** (dash characters and underscores are interchangeable). Dashed examples are shown below:

- ISO-8859-1
- US-ASCII
- UTF-16
- UTF-16BE
- UTF-16LE
- UTF-8

Code Example

Code Snippet

```
# This example will read a specified number of bytes as a String from a port
called "COM1".
port = "COM1"
numberOfBytes = 2

system.serial.readBytesAsString(port,numberOfBytes)
```

system.serial.readLine

This function is used in **Python Scripting**.

Description

Attempts to read a line from a serial port. A "line" is considered to be terminated by either a line feed ('\n'), a carriage return ('\r'), or a carriage return followed immediately by a line feed.

The function will wait until the timeout period for a terminator. If the timeout is reached before the line is properly terminated, then the buffer will be dumped, possibly resulting in data loss.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.readLine(port [, timeout] [, encoding])
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
Integer	`timeout`	Maximum amount of time, in milliseconds, to block before returning. Default is 5000. [optional]
String	`encoding`	The String encoding to use. Default is UTF8. [optional]

Returns

String - A line of text.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This example will read from the "COM1" port and set the timeout to 10000
milliseconds.
port = "COM1"
timeout = 10000
system.serial.readLine(port,timeout)
```

system.serial.readUntil

This function is used in **Python Scripting**.

Description

Reads a byte at a time from a serial port until a delimiter character is encountered. The read will block for up to timeout milliseconds before returning.

> **CAUTION**
>
> If the delimiter is not found before the timeout period, then the buffer will dump, potentially resulting in data loss.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.readUntil(port, delimiter, includeDelimiter, [timeout])
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
Char	`delimiter`	The delimiter to read until.
Boolean	`includeDelimiter`	If true, the delimiter will be included in the return value.
Integer	`timeout`	Timeout in milliseconds. Default is 5000. [optional]

Returns

String - Returns a String containing all 8-bit ASCII characters read until the delimiter was reached, and including the delimiter if the "includeDelimiter" parameter was true.

Scope

Gateway, Vision Client, Perspective Session

Code Example

Code Snippet

```
# This example will read bytes from an open port called "COM1" until the delimiter character is reached.
port = "COM1"
delimiter = "$"

system.serial.readUntil(port,delimiter,True)
```

system.serial.sendBreak

This function is used in **Python Scripting**.

Description

Sends a break signal for approximately millis milliseconds.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.sendBreak(port, millis)
```

Parameters

Type	Parameter	Description
String	`port`	The name of the serial port, e.g., "COM1" or "dev/ttyS0".
Integer	`millis`	Approximate length of break signal, in milliseconds.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will send a break signal to a port called "COM1" for 10000
milliseconds.
port = "COM1"
millis = 10000

system.serial.sendBreak(port,millis)
```

system.serial.write

This function is used in **Python Scripting**.

Description

Write a String to a serial port using the platforms default character encoding.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.write(port, toWrite, [timeout], [encoding])
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
String	`toWrite`	The String to write.
Integer	`timeout`	A timeout, in milliseconds. Writes exceeding this period will . Defaults to 5000 [optional]
String	`encoding`	Encoding to decode the string with, for example: UTF-8. Default is the platform default character set. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

The encoding Parameter

The encoding parameter can be used to decode a string with any of the possible encoding character sets that are available. By default, the following character sets are provided by the **Java platform** (dash characters and underscores are interchangeable). Dashed examples are shown below:

- ISO-8859-1
- US-ASCII
- UTF-16
- UTF-16BE
- UTF-16LE
- UTF-8

Code Example

Code Snippet

```
# This example will write a string to a port called "COM1".
port = "COM1"
toWrite = "I am a string"

system.serial.write(port,toWrite)
```

system.serial.writeBytes

This function is used in **Python Scripting**.

Description

Write a List[Byte] to a serial port.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.serial.writeBytes(port, toWrite)
```

Parameters

Type	Parameter	Description
String	`port`	The previously configured serial port to use.
List[Byte]	`toWrite`	The List[Byte] to write.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will write a list of bytes to a port called "COM1"
port = "COM1"
toWrite = [1,1,0,0,1]

system.serial.writeBytes(port,toWrite)
```

system.sfc

SFC Functions

The following functions give you access to interact with the SFCs in the Gateway.

cancelChart

Cancels the execution of a running chart instance.

getRunningCharts

Retrieves information about running charts.

getVariables

Get the variables in a chart instance's scope.

pauseChart

Pauses a running chart instance.

redundantCheckpoint

Synchronizes chart and step variables of the specified chart instance across a redundant cluster.

resumeChart

Resumes a chart that was paused.

setVariable

Sets a variable inside a currently running chart.

setVariables

Sets any number of variables inside a currently running chart.

startChart

Starts a new instance of a chart.

Functions by Scope

Gateway >

Vision >

Perspective >

Chart Scope Variables

There are a number of built-in variables maintained by the SFC engine that can be read through the `chart` scope. Some of the common built-in variables are shown in the table below.

> **NOTE**
>
> Certain chart scoped variables may interfere with the internal functions of the chart. For example, creating a variable like chart.values will conflict with a pyDictionary's values() method and therefore the chart will show an error. Since SFC charts use Python Dictionaries to manage chart scoped variables, the methods associated with Python Dictionaries act like reserved words.

Variable Name	Description
chart.instanceId	The string UUID of the running chart instance.
chart.startTime	A `java.util.Date` object that indicates when the chart instance started running.
chart.runningTime	An integer representing the number of seconds the chart has been running for.
chart.parent	The chart scope of the enclosing chart (if any). Null if this chart was not executed as part of an enclosing step.

system.sfc.cancelChart

This function is used in **Python Scripting**.

Description

Cancels the execution of a running chart instance. Any running steps will be told to stop, and the SFC chart will enter Canceling state. Will throw a KeyError if the ID does not match any running chart instance.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.cancelChart(id)
```

Parameters

Type	Parameter	Description
String	`id`	The ID of the chart instance to cancel.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following attempts to stop an SFC but will alert the user if the id of the
chart is not currently running.
id = 'Some long string value. It can be obtained using
system.sfc.getRunningCharts()'
try:
    system.sfc.cancelChart(id)
except:
    system.gui.messageBox("Could not stop the SFC")
```

system.sfc.getRunningCharts

This function is used in **Python Scripting**.

Description

Retrieves information about running charts. Can search all running charts, or be filtered charts at a specific path. This function will return charts that are in a Paused state.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.sfc.getRunningCharts([chartPath])
```

Parameters

Type	Parameter	Description
String	`chartPath`	The path to a chart to filter on: i.e., "folder/chartName". If specified, only charts at the path will be included in the returned dataset. If omitted, the function will return data for all active charts.

Returns

Dataset - A dataset with information on the active chart. Contains the following columns:

- instanceId - the chart instance, or UUID of the chart.
- chartPath - The path to the chart.
- startDate - A date object noting when the chart instance started.
- startedBy - The name of the user that started the chart.
- chartState - The current state of the chart. Possible states are "Running" and "Paused".

- keyParamName - Name of the chart's Key Parameter. Returns None if a Key Parameter is not defined.
- keyParamValue - Value of the chart's Key Parameter. Returns None if a Key Parameter is not defined.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Check All Running Charts

```
# This example will check for all running charts, and return a formatted string detailing each chart instance.

# Check for all running charts. The path may be specified as a string to filter the results.
data = system.sfc.getRunningCharts()
# Create a string to append chart data to. The "\n" is a new line character.
chartData = "The following charts are running:\n"

# Iterate through each chart
for row in range(data.rowCount):

    # Extract the instanceId and chartPath values from the current row
    runningChartId = data.getValueAt(row, "instanceId")
    runningChartPath = data.getValueAt(row, "chartPath")

    # Append a string to chartData with the values extracted above
    chartData += "Id: %s, Path: %s\n" % (runningChartId, runningChartPath)

# Print the string of chart Id's and Paths
print chartData
```

Example #2 - Retrieve Chart 'instanceId' Using 'chartPath'

```
# This example will return the instanceId of chart instances with a specific
chartPath.
# A valid path must be defined for this example.

# Return data for running instances at a specific path. "folder/myChart" should be
replaced with a valid path.
data = system.sfc.getRunningCharts("folder/myChart")

# Initialize a list to contain all instance Ids
chartIds = []

# Iterate through each chart, and fetch the instanceId
for row in range(data.rowCount):
    chartIds.append(data.getValueAt(row, "instanceId"))

# Print the chartIds list
print chartIds
```

system.sfc.getVariables

This function is used in **Python Scripting**.

Description

Get the variables in a chart instance's scope. Commonly used to check the value of a Chart Parameter, or determine how long the chart has been running for.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.sfc.getVariables(instanceId)
```

Parameters

Type	Parameter	Description
String	`instanceId`	The instance identifier of the chart.

Returns

PyChartScope - Effectively a Python dictionary of variables, Step scopes for active steps are found under the "activeSteps" key. In addition to those keys, Chart Parameters will also be included in the dictionary as keys. More information on this object can be found in our **Javadocs**.

Scope

Gateway, Vision Client, Perspective Session

Keys in the PyChartScope

The following keys are in the PyChartScope object.

Key	Description	Value Type
parent	If the chart is enclosed in another chart, this Dictionary returns information on the parent chart. Otherwise, returns None. The keys returned by the parent dictionary is identical to calling system.sec.getVariables() directly on an instance of the parent chart.	Dictionary
instanceId	The instance identifier of the chart.	Unicode
startTime	A date object representing when the chart started.	Date
runningTime	A long representing the amount of time the chart has been running.	Long
chartPath	A path (as shown in the Project Browser) leading to the chart.	String
activeSteps	A dictionary of all active steps in the chart. The keys in this dictionary are UUID values representing the individual steps. The value of each key, is another dictionary, with the following keys: • id: The step's ID. • name: The name of the active step. • runningTime: The amount of time (as a long) that the step has been active.	Dictionary
Chart Params	In addition to the built-in keys mentioned above, each configured chart parameter will be represented as a key:value pair in the PyChartScope.	Varies, based on the value of the chart parameter

Code Examples

Example #1 - Show Chart Data to the User

```
# This example will show the chart path and start time of a single chart in a
messageBox.
# We can make use of the SFC Monitor component to give the users the ability to
pick a single running chart

# Fetch the ID of a running chart. In this case, we used the Instance ID property
on a SFC Monitor component
id = event.source.parent.getComponent('SFC Monitor').instanceId

# Retrieve the variables from the chart
chartVars = system.sfc.getVariables(id)

# Show the path and starttime of the chart in a messageBox
system.gui.messageBox("Chart Path: %s has been running since %s" %
(chartVars["chartPath"], chartVars["startTime"]))
```

Example #2 - Print the Name and Running Time for All Active Steps

```
# Get the name and running time for each step in each running chart.

# Return data for running instances at a specific path. "folder/myChart" should be
replaced with a valid path.
data = system.sfc.getRunningCharts("folder/myChart")

# Initialize a list to contain all instance Ids
chartIds = []
# Iterate through each chart, and fetch the instanceId
for row in range(data.rowCount):
    chartIds.append(data.getValueAt(row, "instanceId"))

# Now that we have the ID for all active charts, pull variables out of each.
for id in chartIds:
    chartVars = system.sfc.getVariables(id)

    # Prints the chart instance ID. In the context of this example, this line is
used to delineate
    # between all our print statements.
    print "Details for Chart ID: %s" % chartVars["instanceId"]


    # Create a variable that references the activeSteps dictionary. Creating a
variable here
    # makes the syntax below a bit cleaner.
    allSteps = chartVars["activeSteps"]


    # Iterate through the active steps. A "step" represents the key of each step
    # in the activeSteps ("allSteps") dictionary
    for step in allSteps:

        # store the value of the current step dictionary in a variable. This is
simply to keep
        # the syntax below clean. Equivalent to: chartVars["activeSteps"][step]
        currStep = allSteps[step]

        # Print out the name and running time of each step.
        print "Step %s has been running for %i seconds" % (currStep['name'],
currStep['runningTime'])
```

system.sfc.pauseChart

This function is used in **Python Scripting**.

Description

Pauses a running chart instance. Any running steps will be told to pause, and the chart will enter Pausing state. Will throw a KeyError if the ID does not match any running chart instance.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.pauseChart(id)
```

Parameters

Type	Parameter	Description
String	`id`	The ID of the chart instance to pause

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following attempts to pause a SFC.
id = 'Some long string value. It can be obtained using
system.sfc.getRunningCharts()'

system.sfc.cancelChart(id)
```

system.sfc.redundantCheckpoint

This function is used in **Python Scripting**.

Description

Synchronizes chart and step variables of the specified chart instance across a redundant cluster, allowing the chart instance to continue where it left off if a redundant failover occurs. Check out **redundancy sync** for more information.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.redundantCheckpoint(instanceId)
```

Parameters

Type	Parameter	Description
String	`instanceId`	The instance identifier of the chart.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# This example will create a redundant checkpoint in case the primary Gateway in the redundant pair fails.
instanceId = "The ID of the chart you want to synchronize across the redundant pair"

system.sfc.redundantCheckpoint(instanceId)
```

system.sfc.resumeChart

This function is used in **Python Scripting**.

Description

Resumes a chart that was paused. Steps which were previously paused will be resumed, and chart will enter Resuming state. Will throw a KeyError if the ID does not match any running chart instance.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.resumeChart(id)
```

Parameters

Type	Parameter	Description
String	`id`	The ID of the chart instance to resume.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following attempts to resume a paused SFC.
id = "The ID of the SFC you want to resume"

system.sfc.resumeChart(id)
```

system.sfc.setVariable

This function is used in **Python Scripting**.

Description

Sets a variable inside a currently running **SFC chart**.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.setVariable(instanceId, [stepId], variableName, variableValue)
```

Parameters

Type	Parameter	Description
String	`instanceId`	The instance identifier of the chart.
String	`stepId`	The id for a step inside of a chart. If omitted the function will target a chart scoped variable. [optional]
String	`variableName`	The name of the variable to set.
Object	`variableValue`	The value for the variable to be set to.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

> **NOTE**
>
> Omitting the **stepId** parameter will cause the function to target a chart scoped variable. If the variable is persistent to the whole chart, or used in multiple different steps, then this parameter should be omitted.
>
> If a stepId parameter is used, then the function will target a step scoped variable. The step associated with the stepId must be the currently active step.

Code Examples

Code Snippet

```
# The following passes the chart instance ID and step ID to a client message
Handler. The message handler can then wait
# for user input, and then write back to the step variables.

# The example assumes there is a chart scoped variable called confirmEndchart, and
a step scoped variable called "messageSent".

# Get the instanceId of the current chart
chartID = chart.get("instanceId")

# Get the id of the step
stepID = step.get("id")

# Create a payload to pass to the client.
# Include the instanceId and stepId so the script from the message handler knows
which
# chart and step to write to
payload = {"chartID" : chartID, "stepID" : stepID}

# Send the message
system.util.sendMessage(project = "SFC", messageHandler = "SFCMessage", payload =
payload

############

# The following script would be placed on a client message handler. This receives
the payload,
# and sets a variable on either the chart or step depending on user selection

# Read items out of the payload
id = payload['chartID']
stepId = payload['stepID']

# Ask the user to end the chart
if system.gui.confirm("Would you like to end the process"):
    #If yes, end the chart. confirmEndChart is chart scoped, so only 3 parameters
are passed
    system.sfc.setVariable(id,"confirmEndChart",True)
else:
    #If no, reset the step.messageSent variable so that the user will be prompted
again
    #messageSent is step scoped, so 4 parameters are passed
    system.sfc.setVariable(id,stepId,"messageSent",False)
```

system.sfc.setVariables

This function is used in **Python Scripting**.

Description

Sets any number of variables inside a currently running chart.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.setVariables(instanceId, [stepId], variableMap)
```

Parameters

Type	Parameter	Description
String	`instanceId`	The instance identifier of the chart.
String	`stepId`	The id for a step inside of a cart. If omitted the function will target a chart scoped variable. [optional]
Dictionary[String, Any]	`variablesMap`	A dictionary containing the name:value pairs of the variables to set.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

> **NOTE**
>
> Omitting the **stepId** parameter will cause the function to target a chart scoped variable. If the variable is persistent to the whole chart, or used in multiple different steps, then this parameter should be omitted.
>
> If a stepId parameter is used, then the function will target a step scoped variable. The step associated with the stepId must be the currently active step.

Code Examples

Code Snippet

```
# Get the instance ID from the selected chart on a SFC Monitor component
id = event.source.parent.getComponent('SFC Monitor').instanceId

# Create a Python dictionary of values. This example assumes there are variables on the
# chart named chartParam and counter. The script will set these to 1, and 0 respectively
dict = {"chartParam":1, "counter":0}

# Set the variables on the chart
system.sfc.setVariables( id, dict)
```

system.sfc.startChart

This function is used in **Python Scripting**.

Description

Starts a new instance of a chart. The chart must be set to "Callable" execution mode.

Client Permission Restrictions

Permission Type: SFC Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.sfc.startChart(projectName, chartPath, parameters)
```

Parameters

Type	Parameter	Description
String	`projectName`	The name of the project that the chart was created in. The project that this function is called in will be used if no name is provided, or if the function is called from outside a project, the default Gateway project name will be used.
String	`chartPath`	The path to the chart, for example "ChartFolder/ChartName".
Dictionary[String, Any]	`parameters`	A dictionary of arguments. Each key-value pair in the dictionary becomes a variable in the chart scope and will override any default.

Returns

String - The unique ID of this chart.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# The following will start an SFC with a dictionary of values to use inside the chart
args= {"var1":10, "Var2":15,"Var3":1}
path = "ChartFolder/ChartName"
sfcID = system.sfc.startChart(path, args)
```

system.tag

Tag Functions

The following functions give you access to interact with Ignition Tags.

browse

Returns a list of nodes found at the specified path.

browseHistoricalTags

Will browse for any historical Tags at the provided historical path.

configure

Creates tags from a given list of Python dictionaries or from a JSON source string.

copy

Copies Tags from one folder to another.

deleteAnnotations

Removes stored annotations from the sqlth_annotations table.

deleteTags

Deletes multiple tags or tag folders.

exists

Checks whether or not a tag with a given path exists.

exportTags

Exports tags to a file on a local file system.

getConfiguration

Retrieves tags from the Gateway as Python dictionaries.

importTags

Imports a JSON tag file at the provided path.

isOverlaysEnabled

Returns whether or not the current client's quality overlay system is currently enabled.

move

Moves tags or folders to a new destination.

query

Queries a Tag Provider to produce a list of tags that meet the specified criteria.

queryAnnotations

Queries annotations stored in the Tag History system for a set of paths for a given time range.

queryTagCalculations

Queries various calculations (aggregations) for a set of tags over a specified range.

queryTagDensity

Queries the Tag History system for information about the density of data.

queryTagHistory

Issues a query to the Tag Historian.

readAsync

Asynchronously reads the value of the tags at the given paths.

readBlocking

Reads the value of the tags at the given paths.

rename

Renames a single tag or folder.

requestGroupExecution

Sends a request to the specified tag group to execute now.

setOverlaysEnabled

Enables or disables the component quality overlay system.

storeAnnotations

Stores annotations into the tag history system.

storeTagHistory

Inserts data into the tag history system, allowing Tag history to be recorded via scripting.

writeAsync

Asynchronously writes values to tags at specified paths.

writeBlocking

Writes values to tags at the given paths.

Functions by Scope

Gateway >

Vision >

Perspective >

system.tag.browse

This function is used in **Python Scripting**.

Description

Returns a list of **nodes** found at the specified path. The list objects are returned as dictionaries with some basic information about each node.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.browse(path, filter)
```

Parameters

Type	Parameter	Description
String	`path`	The path that will be browsed, typically to a folder or UDT instance.
Dictionary[String, Any]	`filter`	A dictionary of browse filter keys. Keys are listed below.

Returns

Results - A Results object which contains a list of Tag dictionaries, one for each Tag found during the browse. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Filter Keys

The following keys represent filter criteria that can be used by the `filter` parameter.

- name - The name of the item. Utilizes the * character as a wildcard character.

```
# Literally search for "MyTag"
{"name":"MyTag"}

# Searches for any names that contain "Tag" in their name
{"name":"*Tag*"}
```

- dataType - Represents the data type on the Tag. Valid values can be found on the **Tag Properties** page.

```
{"dataType":"Int4"}
```

- valueSource - Represents how the node derives its value. Generally only used by nodes with a Tag type of "AtomicTag". Valid values can be found on the Value Source description on the **Tag Properties** page.

```
{"valueSource":"opc"}
```

- tagType - The type of the node (Tag, folder, UDT instance, etc). A list of possible types can be found on the **Tag Properties** page.

```
{"tagType":"AtomicTag"}
```

- typeId - Represents the UDT type of the node. If the node is a UDT definition, then the value will be `None`. If the node is not a UDT, then this filter choice will **not** remove the element. As such, this filter functions best when paired with a tagType filter with a value of UdtInstance.

```
{"typeId":"myUDT", "tagType":"UdtInstance"}
```

- quality - Represents the quality on the node. While there are many types of quality codes, this function only recognizes "Bad" and "Good". More granular quality codes are ignored.

```
{"quality":"Good"}
```

- maxResults - Limits the amount of results that will be returned by the function.

```
{"maxResults":10}
```

- recursive -

  New in 8.1.2 Allows the browse to find all Tags inside the starting folder or UDT instance, even if they are inside nested folders or UDT instances themselves. Accepted values are True and False. False is the default, meaning that the browse will only return tags directly inside the starting folder or UDT instance.

```
{"recursive":True}
```

Results Object

The contents of each dictionary in the Results object varies based on the tagType of the node in question.

General Keys

By default all dictionaries contain the following:

- fullPath - A fully qualified Tag path to the node, including the name of the node. The value returned by this key is a BasicTagPath. However you can easily cast the variable to a string:

```
# Browse the Tag Provider named "default".
results = system.tag.browse("[default]")

for i in results.getResults():
    stringPath = str(i['fullPath'])

    # Do something useful with the stringPath...
```

- hasChildren - A boolean representing if the node contains sub-nodes, such as folders and UDT definitions. Useful in cases where you need to recursively call the browse function.

- name - The name of the node. The value returned by this key is unicode. However, you can easily cast the variable to a string:

```
# Browse the Tag Provider named "default".
results = system.tag.browse("[default]")

for i in results.getResults():
    stringType = str(i['name'])

    # Do something useful with the stringType...
```

- tagType - The type of the node. The value returned by this key is TagObjectType. However, you can easily cast the variable to a string:

```
# Browse the Tag Provider named "default".
results = system.tag.browse("[default]")

for i in results.getResults():
    stringType = str(i['tagType'])

    # Do something useful with the stringType...
```

Tag Keys

If the node is a Tag (`tagType` = `AtomicTag`), then it will also contains the following keys:

Key	Description
dataType	The data type of the tag.
valueSource	Represents how the Tag derives its value.
value	The last known qualified value on the tag.

UDT Keys

Both UDT Instances and UDT Definitions add the following key:

Key	Description
tagId	Represents the parent UDT.
tagType	Represents the type of the node. UDT Definitions will have a value of `None`.

Code Examples

Example #1 - Simple Browse

```
# This simple script will browse a given Tag path, in this case the root of the
provider called default, and print the results.

results = system.tag.browse(path = '[default]', filter = {})
for result in results.getResults():
    print result
```

Example #2 - Filtered Browse

```
# This simple script will browse a given Tag path, in this case the root of the
provider called default, and print the results.
# It also is filtering out anything that is not Atomic Tag, like folders and UDT
Instances.

results = system.tag.browse(path = '[default]', filter = {'tagType':'AtomicTag'})
for result in results.getResults():
    print result
```

Example #3 - Wildcards with the Name Parameter

```
# Similar to the Filtered Browse above, except a wildcard character may be used
when filtering on the name parameter
# The wildcard character ( the * character) represents any number of characters,
including none.

results = system.tag.browse(path = '[default]', filter = {'name':'*M*'})
for result in results.getResults():
    print result
```

Example #4 - Simple Browse with Condition

```
# This simple script will browse a given Tag path, in this case the root of the
Tag Provider called default, and print the results.
# After it browses, it finds all of the items that do not have children and prints
only those.

results = system.tag.browse(path='[default]', filter={})
for result in results.getResults():
    if not result['hasChildren']:
        print(result)
```

Example #5 - Recursive Browse

```
# This script has created a browseTags function which can be called with a Tag
path and filter.
# The function will recursively find all items under that path by going into
folders and UDT Instances.
# This example gives the initial path of '[default]', meaning it will find every
item in the Tag Provider called default.

results = system.tag.browse("[default]", {"tagType":"UdtInstance",
"recursive":True}).results
for result in results:
        print str(result['fullPath'])
```

system.tag.browseHistoricalTags

This function is used in **Python Scripting**.

Description

Will browse for any historical tags at the provided historical path. It will only browse for tags at the path, and will not go down through any children. Will return with a BrowseResults object, which can be accessed using the methods below:

- .getResults() will get the underlying result set.
- .getReturnedSize() will get the number of records in the result set.
- .getContinuationPoint() will get the continuation point if this function was limited, allowing you to use it in another function call to continue the browse.

The result set returned from .getResults() is a list of Results objects. This list can be iterated through with a standard for loop, and each object in the list can be accessed with the following methods:

- getPath() will get the full Historical Tag Path for that object.
- getType() will get the type of the object.
- hasChildren() a flag indicating whether or not the object has any children.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.browseHistoricalTags(path, [nameFilters], [maxSize], [continuationPoint])
```

Parameters

Type	Parameter	Description
String	`path`	The Historical Tag Path to browse. See the Tag Export page for a **description of how to construct a historical Tag**.
List[String]	`nameFilters`	A list of name filters to be applied to the result set. [optional]
Integer	`maxSize`	The maximum size of the result set. [optional]
Any	`continuationPoint`	Sets the continuation point in order to continue a browse that was previously started and then limited. Use getContinuationPoint() on the Results object (see *Returns* below) to get the continuation point. [optional]

Returns

Results - A Results object which contains a list of Tag dictionaries, one for each Tag found during the browse. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script will browse for any history tags at the specified historical path
and print out all of their Historical Tag Paths to the console.

path='histprov:DB:/drv:controller:default:/tag:simulator/turbine 3'
browse = system.tag.browseHistoricalTags(path) #We call the function and place the
BrowseResults that get returned into a variable called browse.
results = browse.getResults() #We can then call getResults() on the BrowseResults
variable, and store that in a variable called results.
for result in results: #We can now loop through the results in a for loop.
    print result.getPath() #We then call .getPath() on the individual objects to
get the Tag Path.
```

CAUTION

The following script can be very dangerous, as it recursively calls itself until there are no more children. If you have a lot of Historical Tags and provide it with a path that is to something on the top level, it could take a long time and even lock up your system.

Example #2

```
# This script will browse for Historical Tags and print their Historical Tag Path
to the console, starting from the specified path,
# and going all the way down until there are no more children.
# This is useful because the function by itself will only provide results that are
located at the specified path, but not for anything further in.
# This function recursively calls itself if there are any results that still have
children.
# So if the specified path has any folders, the function will browse those as well
until it can't browse any further.
# If you have a lot of Historical Tags and do not specify a path in the function,
it will browse for all of your Historical Tags,
# which could take some time and may lock up your system. It is recommended to
specify some sort of path.

def browse(path='histprov:DB:/drv:controller:default:/tag:simulator'):
    for result in system.tag.browseHistoricalTags(path).getResults():
        print result.getPath()
        if result.hasChildren():
            browse(result.getPath())
browse()
```

system.tag.configure

This function is used in **Python Scripting**.

Description

Creates tags from a given list of Python dictionaries or from a JSON source string. Can be used to overwrite a current tag's configuration.

When utilizing this function, the tag definitions must specify the names of properties with their scripting/JSON name. A reference of these properties can be found on the **Tag Properties** and **Tag Alarm Properties** pages.

New in 8.1.33 It is no longer necessary to specify the datatype when editing a dataset tag. The dataset tag will now keep expected structure and correctly deserialize new values.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.configure(basePath, tags, [collisionPolicy])
```

Parameters

Type	Parameter	Description
String	`basePath`	The starting point where the new tags will be created. When making changes to existing tags with this function, you want to set the path to the parent folder of the existing tag(s), not the tag(s) themselves.
Any	`tags`	A list of tag definitions, where each tag definition is a Python dictionary. Alternatively, a JSON source string may be passed to this parameter. When editing existing tags, it is generally easier to retrieve the tag configurations with **system.tag.getConfiguration**, modify the results of the getConfiguration call, and then write the new configuration to the parent folder of the existing tag(s).
String	`collisionPolicy`	The action to take when a tag or folder with the same path and name is encountered. Defaults to Overwrite. [optional]. Possible values include: • a - Abort and throw an exception. • o - Overwrite and replace existing tag's configuration. • i - Ignore that item in the list. • m - MergeOverwrite, modifying values that are specified in the definition, without impacting values that aren't defined in the definition. Use this when you want to apply a slight change to tags, without having to build a complete configuration object.

Returns

List - A List of QualityCode objects, one for each tag in the list, that is representative of the result of the operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Edit Multiple Tags

```
# This example will retrieve some existing tag configurations, make changes to the
configurations,
# and write the new configurations to the original tags.


# Define a base path. Sometime useful, but we could hardcode the paths
# in the getConfiguration() and configure() calls.
parentPath = "[NewProvider]SomeFolder"

# Get the current configurations recursively, which is useful when targeting
# folders and UDT Instances.
configs = system.tag.getConfiguration(parentPath + "/AnotherFolder", True)

# The getConfiguration() above always returns a list of dictionaries, and our
results
# are inside of the first dictionary.
for tag in configs[0]['tags']:

    # Check each node. At this point we may get folders or other nodes
    # that we're uninterested in. Examine tagType to figure it out.
    # Note that we're making sure the tagType is in fact a string for this
comparison.
    if str(tag['tagType']) != 'Folder':

        # Make a change to the Tag. If we're iterating over UDT instances,
        # then we can change the parameters here. Commented example below:
        # tag['parameters']['myParam'] = foo

        # In our case, we'll just disable the Tags.
        tag['enabled'] = False

system.tag.configure(parentPath, configs, "o")
```

Example #2 - Adding a New Tag

```
# This example will add a new OPC Tag. It can be further expanded to modify more
# properties on the Tag. Additionally, this example can be used to edit an
existing Tag
# by setting the baseTagPath to a Tag that already exists, and by modifying the
collision policy.

# The provider and folder the Tag will be placed at.
baseTagPath = "[default]MyFolder"

# Properties that will be configured on that Tag.
tagName = "myNewTag"
opcItemPath = "ns=1;s=[Simulator]_Meta:Sine/Sine0"
opcServer = "Ignition OPC-UA Server"
valueSource = "opc"
sampleMode = "TagGroup"
tagGroup = "Default"

# Configure the tag.
tag = {
            "name": tagName,
            "opcItemPath" : opcItemPath,
            "opcServer": opcServer,
            "valueSource": valueSource,
            "sampleMode" : sampleMode,
            "tagGroup" : tagGroup
        }

# Set the collision policy to Abort. Thus, if a Tag already exists at the base
path,
# we will not override the Tag. If you are overwriting an existing Tag, then set
this to "o".
collisionPolicy = "a"

# Create the Tag.
system.tag.configure(baseTagPath, [tag], collisionPolicy)
```

Example #3 - Interacting with Alarms

```
# The provider and folder the Tag will be placed at.
baseTagPath = "[default]"

# Create a list of alarms, where each alarm is a Python dictionary.
alarms = [
            {
                "name":"My scripting alarm",
                "mode":"AboveValue",
                "setpointA":10
            }
        ]

# Configure the list of Tags. We're only interacting with a single Tag, but still
need to pass
# a list as an argument.
tags = [
            {
                "alarms":alarms,
                "name":"myTag"
            }
        ]

# Abort if this example attempts to overwrite any of your existing Tags.
collisionPolicy = "a"

# Create the Tag.
system.tag.configure(baseTagPath, tags, collisionPolicy)
```

Example #4 - Add UDT Instance

```
# This example will add a new UDT Instance. It can be further expanded to modify
more
# properties on the Tag. Additionally, this example can be used to edit an
existing Tag
# by setting the baseTagPath to a Tag that already exists, and by modifying the
collision policy.

# The provider and folder the Tag will be placed at.
baseTagPath = "[default]Motors"

# Properties that will be configured on that Tag.
tagName = "Motor 1"
typeId = "Motor"
tagType = "UdtInstance"
# Parameters to pass in.
motorNum = "1"

# Configure the Tag.
tag = {
            "name": tagName,
            "typeId" : typeId,
            "tagType" : tagType,
            "parameters" : {
              "motorNum" : motorNum
              }
       }

# Set the collision policy to Abort. That way if a tag already exists at the base
path,
# we will not override the Tag. If you are overwriting an existing Tag, then set
this to "o".
collisionPolicy = "a"

# Create the Tag.
system.tag.configure(baseTagPath, [tag], collisionPolicy)
```

Example #5 - Adding Folders in other Folders

```
# Folders are nodes with a 'tagType' set to 'Folder'.
# Each folder can contain a 'tags' value, which containers other tags and folders.

Tags={'tagType': 'Folder',
        'name': 'NewFolderName',
        'tags' : [
                    {
                    'name': 'anotherfolder',
                    'tagType': 'Folder',
                    'tags': [{}]            # There aren't any objects defined
here, so this will just be an empty folder.
                    }
                ]
        }

system.tag.configure(   basePath = '',
                        tags = Tags,
                        collisionPolicy = "o"
                    )
```

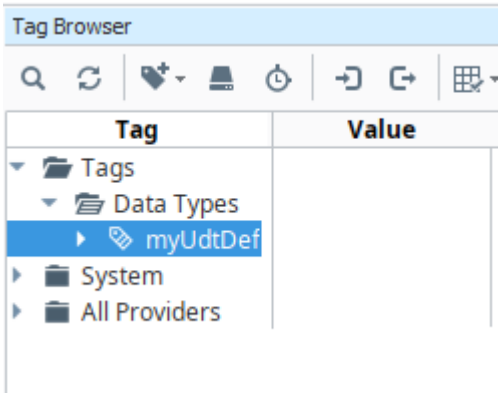
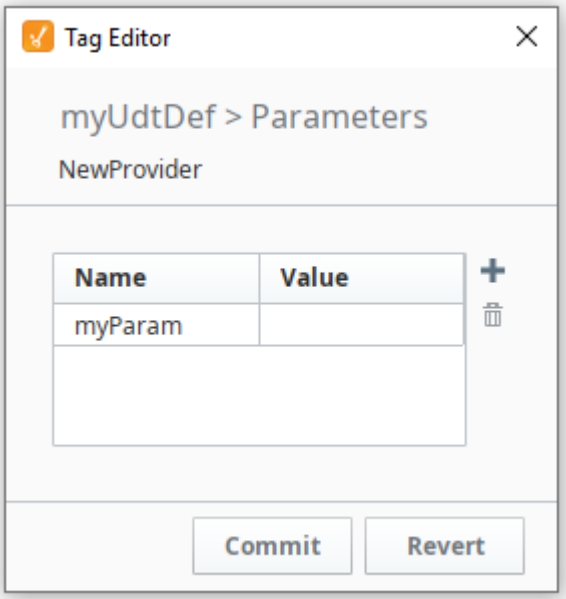
Example #6 - UDT Parameters and Bindings

```
# This example configures bindings that make use of three UDT parameters.
tag = {
  "name": "UDTName",
  "parameters": {
    "device": {
      "dataType": "String",
      "value": "[Sample_Device]"
    },
    "opcPath": {
      "dataType": "String",
      "value": "_Meta:Ramp/Ramp0"
    },
    "opcServer": {
      "dataType": "String",
      "value": "Ignition OPC UA Server"
    }
  },
  "tagType": "UdtType",
  "tags": [
    {
    # Creating a binding involves change the key to an object, with a "bindType"
key set to "parameter", and a
    #  "binding" key set to the binding. Note that the actual binding can consist
multiple parameters and characters
      "opcItemPath": {
        "bindType": "parameter",
        "binding": "{device}{opcPath}"
      },
      "opcServer": {
        "bindType": "parameter",
        "binding": "{opcServer}"
      },
      "valueSource": "opc",
      "name": "New Tag",
      "tagType": "AtomicTag"
    }
  ]
}

path = "[default]"
system.tag.configure(path, [tag], "o")
```

Example #7 - Writing to Parameters in UDT Definition

In this example, we're going to change the value on a UDT Definition parameter with a script. It assumes there is a UDT Definition already configured at the root of the Data Types folder (in this case, named "`myUdtDef`"), and contains a parameter (named "`myParam`").

Tag Browser	Tag Editor
	


```
# UDT Definitions reside in the "_types_" folder, which can be retrieved
# via the Tag Browser : right-click > Copy Tag Path.
# Retrieving the existing configuration is much easier than typing it all out.
tag = system.tag.getConfiguration("[default]_types_/myUdtDef")

# This line is accessing the first tag in our results (the UDT Definition), then
returns the
# 'parameters' dictionary, which then provides access to individual parameters.
tag[0]['parameters']['myParam'] = '300'

# Overwrite the existing configuration.
collisionPolicy = "o"

# Write the new configuration to our existing UDT Definition.
# Note that the first parameter is to the parent folder of the Definition,
# not a path to the Definition.
system.tag.configure("[default]_types_", tag, collisionPolicy)

# Once the configure call finishes, myParam on the Definition should have a value
of 300.
```

system.tag.copy

This function is used in **Python Scripting**.

Description

Copies tags from one folder to another. Multiple Tag and folder paths may be passed to a single call of this function. The new destination can be a separate tag provider.

Copying UDTs Across Tag Providers

When copying UDTs to a different provider, the destination provider must have a matching UDT definition. The function copies Tags sequentially, so definitions can be placed earlier in the list, with instances following after:

```
# The '_types_' part of the path denotes the Data Types folder. You can retrieve
the path to your UDT definition with right-click on
# on the Tag in the Tag Browser > Copy Tag Path.
udtDef = '[default]_types_/Motor'
udtInstances = '[default]UDT_Instances_Folder'

# When building the Tag list, place the definitions in list before the instances.
tags = [udtDef, udtInstances]
```

Tag Groups

Tag Groups will not be copied to the new provider, so the copied Tags may not initially execute. This can be remedied by creating a matching Tag Group in the destination provider, either before or after the Tags have been copied.

Remote Tag Providers

This function can move Tags to or from a **Remote Tag provider**. In this case, the Tag Access **Service Security** settings on both providers must be set to ReadWriteEdit.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.copy(tags, destination, [collisionPolicy])
```

Parameters

Type	Parameter	Description
List	`tags`	A List of tag paths to move.
String	`destination`	The destination to copy the tags to. All specified tags will be copied to the same destination. The destination tag provider must be specified.
String	`collisionPolicy`	The action to take when a tag or folder with the same path and name is encountered. Defaults to Abort. [optional]. Possible values include: • a - Abort and throw an exception • o - Overwrite and replace existing tag's configuration • i - Ignore that item in the list.

Returns

List - A List of QualityCode objects, one for each tag in the list, that is representative of the result of the operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Copy a Tag or Folder

```
# Define the tag/folder path(s).
tags = ['[default]Old_Tags/Subfolder' ]

# We'll move the tag/folder above to the new path.
destination = '[default]New_Tags'

# If there is a collision with the destination, we'll abort the process.
policy = 'a'

# Copy the Tags.
system.tag.copy(tags, destination, policy)
```

system.tag.deleteAnnotations

New in 8.1.0

This function is used in **Python Scripting**.

Description

Removes stored annotations from the sqlth_annotations table. Requires the full Tag path (including history provider) for each annotation, as well as each annotation's storage ID.

The function expects two lists (PySequences) of equal length. The items in each list is 1-to-1, meaning the first item in the "paths" list relates to the first item in the "storageIds" list, the second item in "paths" relates to the second item in "storageIds", etc.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.deleteAnnotations(paths, storageIds)
```

Parameters

Type	Parameter	Description
List[String]	`paths`	A list of Tag paths with existing annotations. The paths are equivalent to what would be used for a Tag history query, and should specify the source provider as well. For example, `HistoryProvider/Gateway:[Provider]Path/To/Tag`.
List[String]	`storageIds`	A sequence of storage identifiers that will be deleted. Storage ID values can be retrieved with **system.tag.queryAnnotations**.

Returns

A list of qualified values. The quality code will indicate success or failure, and if successful, the storage id of the annotation will have been deleted. See **Scripting Object Reference**.

Scope

Gateway, Vision Clients, Perspective Sessions

Code Examples

Example #1

```
paths = ["[My-Provider]Station_1/ph", "[My-Provider]Station_2/ph"]
storageId = [2,3]

system.tag.deleteAnnotations(paths, storageId)
```

system.tag.deleteTags

This function is used in **Python Scripting**.

Description

Deletes multiple tags or tag folders. When deleting a tag folder, all tags under the folder are also deleted.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.deleteTags(tagPaths)
```

Parameters

Type	Parameter	Description
List	`tagPaths`	A List of the paths to the tags or tag folders that are to be removed.

Returns

List - A List of QualityCode objects, one for each tag in the list, that is representative of the result of the operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Deleting Tags

```
# This example will delete several Tags. Modify the paths argument to change which
Tags will be deleted.
# Note that a confirmation isn't automatically included, so be cautious when
calling this on a production server.

paths = [
    '[default]A_Tag',
    '[default]Folder/Some_Other_Tag'
]

# Delete the Tags.
results = system.tag.deleteTags(paths)

# We could expand this example further by examining the list of quality codes...
for index in range(len(results)):

    # ...check if a returned anything except Good.
    if results[index].isNotGood():

        # ...and do something if we failed, such as retrieve the Tag path from
earlier, and pair it with a quality code.
        print 'Could not delete tag at path: %s \n Reason: %s' % (paths[index],
results[index])
```

system.tag.exists

This function is used in **Python Scripting**.

Description

Checks whether or not a tag with a given path exists.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.exists(tagPath)
```

Parameters

Type	Parameter	Description
String	`tagPath`	The path of the tag to look up.

Returns

Boolean - True if a Tag exists for the given path, false otherwise.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would write a 1 to the Tag "Compressors/C28/ClearFault" if that Tag
exists.

if system.tag.exists("Compressors/C28/ClearFault"):
   system.tag.write("Compressors/C28/ClearFault", 1)
```

system.tag.exportTags

This function is used in **Python Scripting**.

Description

Exports tags to a file on a local file system.

The term "local file system" refers to the scope in which the script was running; for example, running this script in a Gateway Timer script will export the file to the Gateway file system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts keyword arguments.

```
system.tag.exportTags([filePath], tagPaths, [recursive], [exportType])
```

Parameters

Type	Parameter	Description
String or Nothing	`filePath`	The file path that the tags will be exported to. If the file does not already exist, this function will attempt to create it. **Changed in 8.1.8** Previously, the filePath parameter was required. If omitted, causes the function to return the tag export as a string.
List	`tagPaths`	A List of tag paths to export. All tag paths in the list must be from the same parent folder.
Boolean	`recursive`	Set to true to export all tags under each tag path, including tags in child folders. Defaults to true. [optional]
String	`exportType`	The type of file that will be exported. Set to "json" or "xml". Defaults to "json".

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example attempts to export the entire Tag Provider, including UDT
definitions.

# The filepath is Operating System dependent, so the path notation below may
differ based on where the function is called from.
filePath = 'C:\\Users\\myUser\\Desktop\\myTags'
tagPaths = ["[default]"]
recursive = True

system.tag.exportTags(filePath, tagPaths, recursive)
```

Example #2

```
# Exports the entire tag provider named "default" as a string, and
# returns the string to a "tags" variable.
tags = system.tag.exportTags(tagPaths = ["[default]"])
```

Example #3

```
# Exports all UDTs from the _types_ folder of a specific Tag Provider into a
single file.

filePath = 'C:\\UDTExports\\MyUDTs.json'
tagPaths = ["[provider]_types_"]

system.tag.exportTags(filePath, tagPaths)
```

system.tag.getConfiguration

This function is used in **Python Scripting**.

Description

Retrieves tags from the Gateway as Python dictionaries. These can be edited and then saved back using **system.tag.configure**.

> **NOTE**
>
> The configurations returned by this function can only contain properties that are **not** using their default values. Thus, if a property on a tag has not been modified from its default value, then it will **not** be included in the returned list.
>
> Should you need to read the value of a tag property, regardless of whether it's using the default value or not, use **system.tag.readBlocking** instead:
>
> ```
> system.tag.readBlocking(["[default]path/to/tag.engUnit"])
> ```

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.tag.getConfiguration(basePath, recursive)`

Parameters

Type	Parameter	Description
String	`basePath`	The starting point where the tags will be retrieved. This can be a folder containing, and if `recursive` is true, then the function will retrieve all of the tags in the folder.
Boolean	`recursive`	If true, the entire tag tree under the specified path will be retrieved.

Returns

List - A List of tag dictionaries. Nested tags are placed in a list under the `tags` key in the dictionary.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Access a Single Property on a Single Tag

```
# This example will look up the name property on a Tag.

path = '[default]My_Folder/My_Tag'

config = system.tag.getConfiguration(path, False)

# While the call above was directed at a single Tag, the function
# still returns a list, so we access index 0 to examine the properties
# (hence the "[0]").
#
# Additionally, we can access the name property in a similar manner
# to accessing a key in a Python Dictionary.

print config[0]['name']
```

Example #2 - Get All Properties for a Single Configuration

```
# This example will get the configuration of a single Tag

# Update the path here with the Tag path you're trying to reach
path = '[default]Sine/Sine0'

# Get the configurations
tags = system.tag.getConfiguration(path)

for tagDict in tags:

    # Iterate over the dictionary with the iteritems function
    for key, value in tagDict.iteritems():

        # Do something with the keys and values
        print key, ' : ', value
```

Example #3 - Return an Entire Folder of Tag Configurations

```
# This example will get the configurations of Tags under a folder.

# Update the path here with the folder you want to start at
folder = '[default]Folder/Another_Folder'

# Get the configurations. We'll specify True for the second parameter to search
# recursivly
nodes = system.tag.getConfiguration(folder, True)

# Iterate over the results
for item in nodes:

    # Through the results, search each dictionary
    for key, value in item.iteritems():

        # ...looking for a 'tags' key
        if key == 'tags':
            print '#######Found some tags!#######'

            # iterate over the Tag configurations we found
            for tagConfig in value:

                # Do something with the results.
                print tagConfig["name"]
```

Example #4 - Get UDT Information

```
# This example gets information from a UDT called "tagNumber" and prints it out to
the console.

# Declare a variable and get the UDT path for the basePath parameter
path = "[default]_types_/tagNumber"

# Run the system function and assign the value to a variable
tagDict = system.tag.getConfiguration(path, False)

# Print the results
print tagDict
```

system.tag.importTags

This function is used in **Python Scripting**.

Description

Imports a JSON tag file at the provided path. Also supports XML and CSV Tag file exports from legacy systems.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.importTags(filePath, basePath, [collisionPolicy])
```

Parameters

Type	Parameter	Description
String	`filePath`	The file path of the tag export to import.
String	`basePath`	The Tag path that will serve as the root node for the imported tags.
String	`collisionPolicy`	The action to take when a tag or folder with the same path and name is encountered. Defaults to Overwrite. [optional]. Possible values include: • a - Abort and throw an exception • o - Overwrite and replace existing tag's configuration • i - Ignore that item in the list.

Returns

List - A List of QualityCode objects, one for each tag in the list, that is representative of the result of the operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script will import a .json file containing Sine Tags from the desktop into a folder in the Tag Browser called "Imported Tags".
filePath = "C:/Users/[USERNAME]/Desktop/SineTags.json"
basePath = "[default]Imported Tags"

system.tag.importTags(filePath,basePath)
```

system.tag.isOverlaysEnabled

This function is used in **Python Scripting**.

Description

Returns whether or not the current client's quality overlay system is currently enabled.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.isOverlaysEnabled()
```

Parameters

Nothing

Returns

Boolean - True if overlays are currently enabled.

Scope

Vision Client

Code Examples

Example #1

```
# This code will return whether or not overlays are currently enabled.
print system.tag.isOverlaysEnabled()
```

system.tag.move

This function is used in **Python Scripting**.

Description

Moves tags or folders to a new destination. The new destination can be a separate tag provider. If interested in copying the tags to a new destination, instead of moving them, please see the **system.tag.copy** page.

Moving Across Tag Providers

When moving UDTs to a different provider, the destination provider must have a matching UDT definition. This function moves folders/tags sequentially, so definitions can be placed earlier in the list, with instances following after.

Note that moving tags with this function will not move or otherwise update prior Tag History or Alarm Journal entries: the old records will persist in the database at the old path, while future entries will be based on the new paths.

Remote Tag Providers

Additionally, this function can move tags to or from a **Remote Tag provider**. In this case, the Tag Access **Service Security** settings on both providers must be set to ReadWriteEdit.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.move(tags, destination, [collisionPolicy])
```

Parameters

Type	Parameter	Description
List	`tags`	A List of tag paths to move.
String	`destination`	The destination to move the tags to. The destination tag provider must be specified: i.e., `[default]Folder/myTag`.
String	`collisionPolicy`	The action to take when a tag or folder with the same path and name is encountered. Defaults to Overwrite. [optional]. Possible values include: • a - Abort and throw an exception • o - Overwrite and replace existing tag's configuration • i - Ignore that item in the list.

Returns

List - A List of QualityCode objects, one for each tag in the list, that is representative of the result of the operation. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Rename a Folder

```
# This function moves a folder in a Tag provider to a new folder.

# Since both paths are at the same node, the "Old_Folder" will be placed at the
root of the provider, and the name changed, effectively renaming the folder.
tags = ['[default]Old_Folder']
destination  = '[default]New_Folder/'

# Move the folder.
system.tag.move(tags, destination)
```

Example #2 - Move Multiple Folders to a New Folder

```
# This function moves an entire folder of Tags to a new destination.

# Define the source and new path.
tags = ['[default]Old_Folder', '[default]Another_Folder' ]
destination  = '[default]New_Folder/Imports'

# If there are any conflicts with the new destination, then abort the operation
policy = 'a'

# Move the folder
system.tag.move(tags, destination)
```

system.tag.query

New in 8.1.19

This function is used in **Python Scripting**.

Description

Queries a Tag Provider to produce a list of tags that meet the specified criteria. Provides the same functionality as the **Tag Report Tool**.

> **NOTE**
>
> **Properties** contained within a set or properties that are a set require wildcards around search terms when using **Like** and **Not Like**. These properties are listed below.
>
> - Alarms (Only returns results when searching for alarm names)
> - Parameters
> - Qualified Value
> - Read Permissions
> - Tag Event Scripts
> - Value (If the value data type is a set)
> - Write Permissions

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts **keyword arguments**.

```
system.tag.query([provider], [query], [limit], [continuation])
```

Parameters

Type	Parameter	Description
String	`provider`	The Tag Provider to query. **Note:** Technically, this parameter is optional, but omitting it will result in an empty Results object. [optional]
PyObject	`query`	An object that specifies the query conditions. Can be configured in the **Tag Report Tool** using the *Copy as Script* function. See example below. [optional]
Integer	`limit`	Maximum results to return. If more results are possible, the result will have a continuation point set. [optional]
String	`continuation`	The tag ID of a previously returned continuation point, to continue the associated query from that point [optional]

Returns

Results - A Results object which contains a list of tag dictionaries, one for each tag found during the browse. See **Scripting Object Reference**.

Scope

Gateway

Code Examples

Example #1

```
provider = 'Sample_Tags'
limit = 100

query = {
  "condition": {
    "path": "Ramp/Ramp*",
    "tagType": "AtomicTag",
    "attributes": {
      "values": [
        "alarm"
      ],
      "requireAll": True
    },
    "valueSource": "opc",
    "quality": "Error"
  },
  "returnProperties": [
    "path",
    "tagType",
    "quality"
  ]
}

# Limited to 100 rows. Use continuation functionality to continue from last
result,
# or remove limit for full results.
results = system.tag.query(provider, query, limit)
for result in results:
    print(result)


# To continue from last result, use continuation
 # Note: The query is stored on the gateway, and therefore does not need to be
sent again.
# A query parameter will be ignored if continuation is specified.
results = system.tag.query(continuation=results.continuationPoint)
for result in results:
    print(result)
```

New in 8.1.28

Example #2 - Using OR and AND Operators

```
# This example uses the "Or" operator introduced in version 8.1.28. Note that the
"Or" (line 18) and "And" (line 21, line 31) operators are used in the
# JSON query parameter, not in the system function itself.
# This example was written using the Tag Report Tool's "Copy as Script"
functionality.

provider = 'default'
limit = 100

query = {
  "options": {
    "includeUdtMembers": True,
    "includeUdtDefinitions": False
  },
  "condition": {
    "attributes": {
      "values": [],
      "requireAll": True
    },
    "properties": {
      "op": "Or",
      "conditions": [
        {
          "op": "And",
          "conditions": [
            {
              "prop": "name",
              "comp": "Like",
              "value": "*tag*"
            }
          ]
        },
        {
          "op": "And",
          "conditions": [
            {
              "prop": "name",
              "comp": "Like",
              "value": "*1*"
            }
          ]
        }
      ]
    }
  },
  "returnProperties": [
    "tagType",
    "quality"
```

```
  ]
}

# Limited to 100 rows. Use continuationPoint functionality to continue from last result,
# or remove limit for full results.
results = system.tag.query(provider, query, limit)
```

system.tag.queryAnnotations

New in 8.1.0

This function is used in **Python Scripting**.

Description

Queries annotations stored in the Tag History system for a set of paths for a given time range.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.queryAnnotations(paths, [startTime], [endTime], [types])
```

Parameters

Type	Parameter	Description
List[String]	`paths`	A list of tag paths to query. The paths are equivalent to what would be used for a Tag History Query, and should specify the Source Providers as well. For example, `[HistoryProvider/Gateway:Provider]Path/To/Tag`.
Date	`startTime`	The start of the time range. If not defined, defaults to 12 hours ago. [optional]
Date	`endTime`	The end of the time range. If not defined, defaults to "now". [optional]
List[String]	`types`	A list of string "types" to filter on. Types are defined by the annotations and various subsystems, and may vary with different providers. Possible annotation types are listed on the **system.tag.storeAnnotations** page. [optional]

Returns

List[Annotation] - A list of **Annotation** objects that match the query criteria.

Scope

Gateway, Vision Clients, Perspective Sessions

The Annotation Object

Properties on the annotation objects returned by this function can be references by name (i.e., Annotation.storageId). The table below represent properties on the object.

Property	Description
path	Represents the tag path associated with the annotation.
type	Represents the type of annotation.
rangeStart	The start time of the annotation.
rangeEnd	The end time of the annotation.
data	Any data (such as a description, or user entered text) associated with the annotation.
storageId	Represents the ID value of the annotation, as listed in the sqlth_annotations table. Used in conjunction with the **system.tag.storeAnnotations** to change existing annotations, and **system.tag.deleteAnnotations** to remove annotations.
deleted	Flag representing if the entries are deleted or not.

Code Examples

Example #1

```
paths = ["[My-Provider]Station_1/ph"]
annotations = system.tag.queryAnnotations(paths)

for i in annotations:
    print i.storageId
```

system.tag.queryTagCalculations

This function is used in **Python Scripting**.

Description

Queries various calculations (aggregations) for a set of tags over a specified range. Returns a dataset with a row per tag, and a column per calculation.

This is useful when you wish to aggregate tag history collected over a period of time into a single value per aggregate. If you want multiple values aggregated to a single time slice (i.e., hourly aggregates for the same tag over an 8 hour period) consider using **system.tag.queryTagHistory**.

> **NOTE**
>
> Make sure the deadband style is set to Discrete Mode if you do not want seed values included in the raw data returned.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts **keyword arguments**.

```
system.tag.queryTagCalculations(paths, calculations, [startDate], [endDate], [rangeHours], [rangeMinutes], [aliases], [includeBoundingValues], [validatesSCExec], [noInterpolation], [ignoreBadQuality])
```

Parameters

Type	Parameter	Description
List[String]	`paths`	An array of tag paths (strings) to query calculations for. The resulting dataset will have a row for each tag, and a column for each calculation.
List[String]	`calculations`	An array of calculations (aggregation functions) to execute for each tag. Valid values are: "Average" (time-weighted), "MinMax", "LastValue", "SimpleAverage", "Sum", "Minimum", "Maximum", "DurationOn", "DurationOff", "CountOn", "CountOff", "Count", "Range", "Variance", "StdDev", "PctGood", and "PctBad".
Date	`startDate`	The starting point for the calculation window. If omitted, and range is not used, 8 hours before the current time is used. [optional]
Date	`endDate`	The end of the calculation window. If omitted, and range is not used, uses the current time. [optional]
Integer	`rangeHours`	Allows you to specify the query range in hours, instead of using start and end date. Can be positive or negative, and can be used in conjunction with startDate or endDate. [optional]
Integer	`rangeMinutes`	Same as rangeHours, but in minutes. [optional]
List[String]	`aliases`	Aliases that will be used to override the tag path names in the result dataset. Must be 1-to-1 with the tag paths. If not specified, the tag paths themselves will be used. [optional]

Type	Parameter	Description
Boolean	`includeBoundingValues`	A boolean flag indicating that the system should attempt to load values before and after the query bounds for the purpose of interpolation. The effect depends on the aggregates used. The default is true. For more information see **Seeded Values**. [optional]
Boolean	`validatesSCExec`	A boolean flag indicating whether or not data should be validated against the scan class execution records. If false, calculations may include data that is assumed to be good, even though the system may not have been running. Default is true. [optional]
Boolean	`noInterpolation`	A boolean flag indicating that the system should not attempt to interpolate values in situations where it normally would, such as for analog Tags. Default is false. [optional]
Boolean	`ignoreBadQuality`	A boolean flag indicating that bad quality values should not be used in the query process. If set, any value with a "bad" quality will be completely ignored in calculations. Default is false. [optional]

Returns

Dataset - A dataset representing the calculations over the specified range. A demonstration of the table appears below. There is a row per tag ID, and a column per requested calculation. Tag path is returned in the first column.

tagpath	calculation1	calculation2	calculationN
path1	value	value	value
path2	value	value	value
pathN	value	value	value

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
system.tag.queryTagCalculations(paths=['Historical Tag'], calculations=
['Average'], noInterpolation=False)
```

Example #2

```
# Build a list of String tag paths
paths = [
            "[default]Folder/Tag1",
            "[default]Folder/Tag2"
        ]

# Determine the calculation to use
calc = ["StdDev"]

# Define the date range
end = system.date.now()
start = system.date.parse("2019-07-30 4:00:00")

# Run the query, returning the results as an Ignition dataset
data = system.tag.queryTagCalculations(paths, calc, start, end)

# From here you would need to do something useful with the data variable. You
could extract the values
#   and write them to a Tag, pass them to a dataset property on a component, or
any number of other things.
print "The calculated value for the first tag is " + str(data.getValueAt(0,1))
print "The calculated value for the second tag is " + str(data.getValueAt(1,1))
```

system.tag.queryTagDensity

This function is used in **Python Scripting**.

Description

Queries the Tag history system for information about the density of data. In other words, how much data is available for a given time span.

This function is called with a list of Tag paths, and a start and end date. The result set is a two column dataset specifying the timestamp, and a relative weight. Each row is valid from the given time until the next row. Tags are assigned a 1 or a 0 if they are present or not. All values are then multiplied together to get a decimal based percentage for the density. Thus, for four Tag paths passed in, if three Tags were present during the span, the result would be 0.75.

> **NOTE**
>
> This function relies on being able to validate the data against tag group execution. This function will be unable to return density information for tags that were stored by an **Internal Historian Provider**, as well as cases where tag group validation is disabled (such as by disabling **Enable State Data Detection**).

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.queryTagDensity(paths, startDate, endDate)
```

Parameters

Type	Parameter	Description
PySequence	`paths`	An array of tag paths (strings) to query.
Date	`startDate`	The start of the range to query.
Date	`endDate`	The end of the range to query.

Returns

Dataset - A two-column dataset consisting of a timestamp and a weight with a value between 0 and 1. Each row is valid until the next row.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Print Example

```
# Will grab the density of a Tag and print it out to the console.
density = system.tag.queryTagDensity(
    ['[default]myTag'],
    system.date.addHours(system.date.now(), -24),
    system.date.now())

density = system.dataset.toPyDataSet(density)
for row in density:
    print row[0], row[1]
```

Example #2 - Density Readouts for Each Day

```
# Create a list of times going back in time at day increments.
# This forces density readouts at each day, even if two days had the same density.
now = system.date.now()
times = [system.date.addDays(now, -1), system.date.addDays(now, -2),
system.date.addDays(now, -3), system.date.addDays(now, -4),
system.date.addDays(now, -5), system.date.addDays(now, -6)]

# Create start and end date variables, as well as a variable that holds each
history density.
startDate = now
endDate = now
list = []

# Loop through the list of times.
for time in times:

    # Set the new end date to whatever the start date was previously
    # and the new start date to the next time in the list.
    endDate = startDate
    startDate = time

    # Query Tag Density using a list of Tagpaths with the startDate and endDate
values.
    density = system.tag.queryTagDensity(
    ['[default]tag1', '[default]tag2', '[default]tag3', '[default]tag4',
'[default]tag5'],
    startDate, endDate)

    # Add each row of the returned dataset to a list of rows.
    density = system.dataset.toPyDataSet(density)
    for row in density:
        list.append([row[0], row[1]])

# Place the results in a table.
event.source.parent.getComponent('Table').data =
system.dataset.toDataSet(['Times', 'Density Percentages'], list)
```

Example #3



```
# Create a list of times going back in time at day increments.
# This forces density readouts at each day, even if two days had the same density.
# This differs from the previous example in that it uses the new
system.dataset.appendDataset function, which is only available in 7.9.7.
now = system.date.now()
times = [system.date.addDays(now, -1), system.date.addDays(now, -2),
system.date.addDays(now, -3), system.date.addDays(now, -4),
system.date.addDays(now, -5), system.date.addDays(now, -6)]

# Create start and end date variables.
startDate = now
endDate = now

# Loop through the list of times.
for time in times:
    # Set the new end date to whatever the start date was previously
    # and the new start date to the next time in the list.
    endDate = startDate
    startDate = time

    # Query Tag Density using a list of Tagpaths with the startDate and endDate
values.
    density = system.tag.queryTagDensity(
    ['[default]EquipmentFour', '[default]Ramp/Ramp6', '[default]Ramp/Ramp7',
'[default]Ramp/Ramp8', '[default]Ramp/Ramp9'],
    startDate, endDate)
    if endDate == now:
        densities = density
    else:
        densities = system.dataset.appendDataset(densities, density)

# Place the results in a table.
event.source.parent.getComponent('Table').data = densities
```

system.tag.queryTagHistory

This function is used in **Python Scripting**.

Description

Issues a query to the Tag Historian. Querying tag history involves specifying the tags and the date range, as well as a few optional parameters. The Tag Historian will find the relevant history and then interpolate and aggregate it together into a coherent, tabular result set. This function takes a list of strings, where each string is a tag path, like `Tanks/Tank5` or `[OracleProvider]Sump/Out2`. This function also supports historical tag paths, see **Tag Paths** for more information.

This is useful when you're trying to retrieve tag history data over a period of time. However, if you are trying to take a range of time and aggregate the data to a single value, consider using **system.tag.queryTagCalculations**.

The return size determines how the underlying data is aggregated and interpolated. If a distinct return size is specified, that will be the number of rows in the resulting dataset. You can use special numbers 0 and -1 that mean "Natural" and "On-Change", respectively. Natural calculates a return size based on the rate of the logging historical scan classes. For example, if you query 1 hour of data for a scan class logging every minute, the natural return size is 60. On-Change means that you'll get an entry whenever any of the tags under consideration have changed. Instead of defining a fixed return size, the parameters intervalHours and intervalMinutes can be used. These parameters can be used independently or together to define a window size. For example, if you defined a 1 hour range, with intervalMinutes=15, you would get 4 rows as a result.

> **NOTE**
>
> Make sure the deadband style is set to Discrete Mode if you do not want seed values included in the raw data returned.

The span of the query can be specified using startDate and endDate. You can also use rangeHours and rangeMinutes in conjunction with either start or end date to specify the range in dynamic terms. For example, you could specify "rangeHours=-8" to get the last 8 hours from the current time. Or you could use "startDate='2012-05-30 00:00:00', rangeHours=12" to get the first half of the day for May 30th, 2012.

> **CAUTION**

> Please note that intervals returned by Historical queries are inclusive of the endDate, including when the endDate is set to now(). This means you may see one additional interval than expected that only contains future dates, which get interpolated to 0 and can cause trending issues.
>
> For example, if you want data from 10am - 11am in 1 minute windows, you'll need to set your query from 10am-10:59am. Querying to 11am would create an interval to contain it and that window will often return 0 since there is typically no future value. Additionally, if you went on to add the results of two queries of adjoining times, such as 10am - 11am and 11am - 12pm, the first window of the second period would have duplicate data to the last window of the first period.

The aggregation mode is used when the data is denser than what your request. This happens when using fixed return sizes, as there will often be multiple raw values for the window interval defined. Another common operation is to set the return size to 1, in order to use these aggregate functions for calculation purposes. The available functions are:

- "MinMax": Will return two entries per time slice - the min and the max.
- "Average": Will return the time-weighted average value of all samples in that time slice.
- "LastValue": Returns the most recent actual value to the end of the window. Note that if a value does not exist in this window, a 0 will be returned in cases where interpolation is turned on.
- "Sum": The values in the time slice are added together.
- "SimpleAverage": Returns the simple mathematical average of the values - ((V 1 +V 2 +...+V n)/n)
- "Maximum": The maximum value of the window.
- "Minimum": The minimum value of the window.
- "DurationOn": The time, in seconds, that the value was recorded as non-zero.
- "DurationOff": The time, in seconds, that the value was recorded as zero.
- "CountOn": The number of times the value has transitioned from a zero value to a non-zero value.
- "CountOff": The number of times the value has transitioned from a non-zero value to a zero value.
- "Count": The number of "good", non-interpolated values per window.
- "Range": The difference between the min and max.
- "Variance": The variance for "good", non-interpolated values. Does not time weight.
- "StdDev": The standard deviation for "good", non-interpolated values. Does not time weight.
- "PctGood": The percentage of time the value was good.
- "PctBad": The percentage of time the value was bad.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **NOTE**
>
> This function accepts **keyword arguments**.

```
system.tag.queryTagHistory(paths, [startDate], [endDate], [returnSize], [aggregationMode], [returnFormat], [columnNames], [intervalHours], [intervalMinutes], [rangeHours], [rangeMinutes], [aggregationModes], [includeBoundingValues], [validateSCExec], [noInterpolation], [ignoreBadQuality], [timeout], [intervalSeconds], [rangeSeconds])
```

Parameters

Type	Parameter	Description
List[String]	`paths`	An array of tag paths (strings) to query. Each tag path specified will be a column in the result dataset.
Date	`startDate`	The earliest value to retrieve. If omitted, 8 hours before current time is used. [optional]
Date	`endDate`	The latest value to retrieve. If omitted, current time is used. [optional]
Integer	`returnSize`	The number of samples to return. -1 will return values as they changed, and 0 will return the "natural" number of values based on the logging rates of the scan class(es) involved. -1 is the default. [optional]
String	`aggregationMode`	The mode to use when aggregating multiple samples into one time slice. Valid values are: "Average" (time-weighted), "MinMax", "LastValue", "SimpleAverage", "Sum", "Minimum", "Maximum", "DurationOn", "DurationOff", "CountOn", "CountOff", "Count", "Range", "Variance", "StdDev", "PctGood", and "PctBad". Default is "Average" (time-weighted). [optional]
String	`returnFormat`	Use "Wide" to have a column per tag queried, or "Tall" to have a fixed-column format. Default is "Wide". [optional]
List[String]	`columnNames`	Aliases that will be used to override the column names in the result dataset. Must be 1-to-1 with the tag paths. If not specified, the Tag paths themselves will be used as column titles. [optional]

Type	Parameter	Description
Integer	`intervalHours`	Allows you to specify the window interval in terms of hours, as opposed to using a specific returnSize. The Historian will use the intervalHours value to determine the return size automatically based on the start and end date. For example, if your start and end date are 12 hours apart, and you pass an interval of 2 hours, the Historian will calculate your return size as 6. If you specify a returnSize, all interval parameters are ignored. [optional]
Integer	`intervalMinutes`	Same as intervalHours, but in minutes. Can be used on its own, or in conjunction with intervalHours. [optional]
Integer	`rangeHours`	Allows you to specify the query range in hours, instead of using start and end date. Can be positive or negative, and can be used in conjunction with startDate or endDate. [optional]
Integer	`rangeMinutes`	Same as rangeHours, but in minutes. [optional]
List[String]	`aggregationModes`	A one-to-one list with paths specifying an aggregation mode per column. [optional]
Boolean	`includeBoundingValues`	A boolean flag indicating that the system should attempt to include values for the query bound times if possible. The default for this property depends on the query mode. For more information see **Seeded Values**. [optional]
Boolean	`validateSCExec`	A boolean flag indicating whether or not data should be validated against the scan class execution records. If false, data will appear flat (but good quality) for periods of time in which

Type	Parameter	Description
		the system wasn't running. If true, the same data would be bad quality during downtime periods. [optional]
Boolean	`noInterpolation`	A boolean flag indicating that the system should not attempt to interpolate values in situations where it normally would. This will also prevent the return of rows that are purely interpolated. [optional]
Boolean	`ignoreBadQuality`	A boolean flag indicating that bad quality values should not be used in the query process. If set, any value with a "bad" quality will be completely ignored in calculations and in the result set. [optional]
Integer	`timeout`	Timeout in milliseconds for Client Scope. This property is ignored in the Gateway Scope. [optional]
Integer	`intervalSeconds`	**New in 8.1.0** Same as intervalHours and interval Minutes, but in seconds. Can be used on its own, or in conjunction with intervalHours and intervalMinutes. [optional]
Integer	`rangeSeconds`	**New in 8.1.0** Allows you to specify the query range in seconds, instead of using start and end date. Can be positive or negative, and can be used in conjunction with startDate or endDate. [optional]

Returns

Dataset - A dataset representing the historian values for the specified tag paths. The first column will be the timestamp, and each column after that represents a tag.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# The following example will return a dataset with one row detailing maximum value
of a Tag named 'Sine' for the past 30 minutes.
endTime = system.date.now()
startTime = system.date.addMinutes(endTime, -30)
dataSet = system.tag.queryTagHistory(paths=['Sine'], startDate=startTime,
endDate=endTime, returnSize=1, aggregationMode="Maximum", returnFormat='Wide')
```

system.tag.readAsync

This function is used in **Python Scripting**.

Description

Asynchronously reads the value of the tags at the given paths. Meaning, execution of the calling script will continue without waiting for this function to finish. This is useful in cases where the rest of the script should continue without waiting for the results from system.tag.readAsync.

Instead of returning the tag read results to the calling script, the results are processed by a Python callback function.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.readAsync(tagPaths, callback)
```

Parameters

Type	Parameter	Description
List	`tagPaths`	A List of Tag paths to read from. If no property is specified in the path, the Value property is assumed.
Callable	`callback`	A Python callback function to process the read results. The function definition must provide a single argument, which will hold a List of qualified values when the callback function is invoked. The qualified values will have three sub-members: value, quality, and timestamp.

Returns

Nothing

Scope

Gateway, Vision Clients, Perspective Sessions

Code Examples

Example #1

```
# Define a function that will iterate over the results of our async read.
def checkValues(asyncReturn):

    # In this case we'll just create a counter, and increment it when values are
over 100.
    counter = 0
    for qValue in asyncReturn:
        if qValue.value > 100:
            counter += 1

    # Replace this part of the function with something more useful, such as
    # a Tag or DB write.
    # The print statement will output in the Designer Console instead of the
Script Console since the print function runs on a separate thread.
    print str(counter)

# Define the Tag paths you want to read.
paths = ["[default]Tag1", "[default]Tag2"]

system.tag.readAsync(paths, checkValues)
```

system.tag.readBlocking

This function is used in **Python Scripting**.

Description

Reads the value of the tags at the given paths. Will "block" until the read operation is complete or times out. Meaning, execution of the calling script will pause until this function finishes. This is useful in cases where the tag read must complete before further lines in the same script should execute.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.readBlocking(tagPaths, [timeout])
```

Parameters

Type	Parameter	Description
String or List[String]	`tagPaths`	Either a string of a single tag path, or a list of strings tag paths to read from. If no property is specified in a path, the Value property is assumed.
Integer	`timeout`	How long to wait in milliseconds before the read operation times out. This parameter is optional, and defaults to 45000 milliseconds if not specified. [optional]

Returns

List - A list of QualifiedValue objects corresponding to the tag paths. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Read From Multiple Tags

```
# Specify the paths.
paths = ["[default]Folder/Tag_A","[default]Folder/Tag_B"]

# Send the reads off.
values = system.tag.readBlocking(paths)

# Here we can examine each value.
for i in range(len(values)):
    print "Tag at Path: %s\n Had a value of %s" % (paths[i], values[i].value)
```

Example #2 - Read From a Single Tag

```
# Specify the paths.
path = ["[default]Folder/Tag_A"]

# Send the reads off.
# Function returns a list of qualified values, one qualified value for every tag path we are reading
qualifiedValues= system.tag.readBlocking(path)
value = qualifiedValues[0] # extract the qualified value from this list, there should only be 1 because we are reading a single tag value

print value.value # prints out the value of the Tag A
print value.quality # prints out the quality of Tag A
print value.timestamp # prints out the timestamp of Tag A's value
```

system.tag.rename

This function is used in **Python Scripting**.

Description

Renames a single tag or folder.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.rename(tag, newName, [collisionPolicy])
```

Parameters

Type	Parameter	Description
String	`tag`	A path to the tag or folder to rename.
String	`newName`	The new name for the tag or folder.
String	`collisionPolicy`	The action to take when a tag or folder with the same path and name is encountered. Defaults to Abort. [optional]. Possible values include: • a - Abort and throw an exception • o - Overwrite and replace existing tag's configuration • i - Ignore that item in the list.

Returns

QualityCode - A QualityCode object that contains the results of the rename operation.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Rename a Folder

```
old = "[default]folder/tag"
new = "noun_1"      # Note that the new name should not include the full path or
tag provider. Just the name suffices.

system.tag.rename(old, new)
```

system.tag.requestGroupExecution

This function is used in **Python Scripting**.

Description

Sends a request to the specified tag group to execute now.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.requestGroupExecution(provider, tagGroup)
```

Parameters

Type	Parameter	Description
String	`provider`	Name of the Tag Provider that the tag group is in.
String	`tagGroup`	The name of the tag group to execute.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will use a Tag Provider called "default" and a Tag group called [default].
system.tag.requestGroupExecution("default", "[default]")
```

system.tag.setOverlaysEnabled

This function is used in **Python Scripting**.

Description

Enables or disables the component quality overlay system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.setOverlaysEnabled(enabled)
```

Parameters

Type	Parameter	Description
Boolean	`enabled`	True to turn on Tag overlays; false to turn them off.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This example will turn Tag overlays on.
system.tag.setOverlaysEnabled(True)
```

system.tag.storeAnnotations

New in 8.1.0

This function is used in **Python Scripting**.

Description

Stores annotations into the tag history system. Annotations are stored by the underlying historian implementations, so different providers may store in different ways, and some providers may not support annotation storage. All parameters are 1-to-1, so all provided lists should be of the same length. If a particular annotation doesn't need a parameter, that element can be None in the list.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.storeAnnotations(paths, startTimes, [endTimes], [types], [data], [storageIds], [deleted])
```

Parameters

Type	Parameter	Description
List[String]	`paths`	A list of tag paths to store for. The paths are equivalent to what would be used for a tag history query, and should specify the source provider as well. For example, `[HistoryProvider/Gateway:Provider]Path/To/Tag`. This parameter is required, even if storage ids are included, because it is used to identify the underlying storage provider.
List[Date]	`startTimes`	The start times of the events. If omitted, defaults to the current time.
List[Date]	`endTimes`	The end times of the event, if applicable. If omitted, does not store an end time for the annotation. [optional]
List[Annotation]	`types`	The type id for the annotation. If not defined, "marker" will be used. See the **Annotation Types** for more details. [optional]
List[String]	`data`	Data for the annotation, such as text describing the meaning of the annotation. [optional]
List[String]	`storageIds`	If defined, the function will instead update the existing annotation instead of adding new ones, overriding existing values for the annotation with those provided by this function (if the corresponding delete parameter is True). Storage id is available on the Annotation object, and is returned as the result value from the storeAnnotations call. [optional]
List[Boolean]	`deleted`	A list of booleans indicating that the individual annotation should be deleted. Requires storage id to be set as well. [optional]

Returns

A list of QualifiedValues. The quality code will indicate success or failure. If successful, the storage id of the annotation will be returned in the value. See **Scripting Object Reference**.

Scope

Gateway, Vision Clients, Perspective Sessions

Annotation Types

Possible annotation types are listed below.

Type	Description
note	A user created annotation. Used in cases specifically where a user adds the annotation (such as from the Power Chart's built-in interface).
range	A date range that indicates a special area.
marker	A singular point in time.
trace	A single point or date range that indicates an X-trace.

Code Examples

Example #1 - Minimal Agruments

```
paths = ["[My-Provider]Station_1/ph"]

system.tag.storeAnnotations(paths)
```

Example #2 - More Arguments

```

```

```
paths = ["[My-Provider]Station_1/ph"]
startTimes = [system.date.now()]
endTimes = [system.date.addMinutes(startTimes[0], 1)]
types = ["range"]
data = ["some text"]

system.tag.storeAnnotations(paths, startTimes, endTimes, types,data)
```

Example #3 - Updating Existing Annotations

```
# First, retrieve existing annotations based on some criteria.
paths = ["[My-Provider]Station_1/ph"]
time = system.date.now()
annotations = system.tag.queryAnnotations(paths,
system.date.addMinutes(time,-10),time)

# Iterate over the annotations, checking for some other criteria. In this case,
we'll change "marker" types to "note" types.
for a in annotations:
    if a.type == "marker":
        system.tag.storeAnnotations([a.path], [a.rangeStart], [a.rangeEnd],
["note"], [a.data], [a.storageId])
```

system.tag.storeTagHistory

> **NOTE**
>
> This function was originally deprecated in 8.0.0. It was reintroduced in version 8.1.8.

This function is used in **Python Scripting**.

Description

Inserts data into the tag history system, allowing Tag history to be recorded via scripting.

The Tag paths are associated with a historical and realtime provider, but they do not necessarily need to exist in the realtime provider. This means records from non-existent (virtual) Tags can be stored in the Tag History system. Because of this, it is imperative that Tag paths passed to the function are typed precisely, otherwise the history will be stored at an incorrect path.

Note that the Tag History system does cache tag data. Thus, if this function is called, the tag path and tag id are cached until the history provider or gateway are restarted. This means manually removing the tag from the sqlth_te table, and then calling this function again with the same path will **not** re-populate the tag execution table (especially so when working purely with virtual tag paths). Instead, the cache must first be cleared, and then a new entry will be added the next time this function is called.

Changed in 8.1.13 If a Tag's datatype changes after recording Tag history, this function will create a new entry in the sqlth_te table to reflect the change.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.tag.storeTagHistory(historyprovider, tagprovider, paths, values, [qualities], [timestamps])
```

Parameters

Type	Parameter	Description
String	`historyprovider`	The historical provider to store to.
String	`tagprovider`	The name of the realtime Tag Provider to associate these tags with. The Tag Provider does not need to exist, and the Tag paths do not need to exist in it.
List	`paths`	A list of paths to store. The values, qualities, and timestamps are one-to-one with the paths. A single path may be present multiple times in order to store multiple values.
List	`values`	A list of values to store.
List	`qualities`	A list of integer quality codes corresponding to the values. Quality codes can be found on the **Quality Codes and Overlays** page. If omitted, GOOD quality will be used. [optional]
List	`timestamps`	A list of Date timestamps corresponding to the values. If omitted, the current time will be used. A java.util.date object may be passed, so the **system.date** functions can be used to return a timestamp. [optional]

Returns

Nothing

Scope

Gateway, Vision Clients, Perspective Sessions

Code Examples

Example #1 - Single Tag

```
# This example stores history for a fictitious tag path in a non-existent Tag
provider,
# but both could be substituted for actual resources in the project.
#Note that the History Provider specified must exist in the system.

histProv = "My History Provider"
tagProv = "My Tag Provider"
paths = ["folder/tag"]
values = [10]

#Store the history with the variables declared above.
system.tag.storeTagHistory(histProv, tagProv, paths, values)
```

Example #2 - Single Tag, Multiple Entries

```
# Stores multiple records for a single tag path.
# Could be modified to store more records by increasing the number of items in
each list.
# Additionally, different tag paths could be used for each record.

paths = ["folder/tag","folder/tag"]
values = [15, 300]
quals = [192, 192]

# Generate the date: Jan 19th 2017 10:02:44 AM local time
date = system.date.getDate(2017, 0, 19)
histDate = system.date.setTime(date, 10, 02, 44)
dates = [system.date.now(), histDate]

# Store the history with the variables declared above.
system.tag.storeTagHistory("My History Provider", "My Tag Provider", paths,
values, quals, dates)
```

system.tag.writeAsync

This function is used in **Python Scripting**.

Description

Asynchronously writes values to tags at specified paths. The script will not wait for the write operation to complete before moving on, but you can provide a callback function to run further code after the write has finished.

For a blocking tag write operation, see **system.tag.writeBlocking**.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.writeAsync(tagPaths, values, [callback])
```

Parameters

Type	Parameter	Description
List	`tagPaths`	A List of tag paths to write to. A tag property can be included in the path. If no property is specified in a tag path, the Value property is assumed.
List	`values`	The values to write to the specified paths.
Callable	`callback`	A function that will be invoked after the write operation is complete. The function must take a single argument: a List of **QualityCode** objects corresponding to the results of the write operation. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Write to Multiple Tags

```
paths = ["[default]Tag1", "[default]Folder/Tag2"]
values = [10, 10]
system.tag.writeAsync(paths, values)
```

Example #2 - Using a Callback Function

```
paths = ["[default]Tag1", "[default]Folder/Tag2"]
values = [10, 10]

def myCallback(asyncReturn):
    for result in asyncReturn:
        # Do something if a bad qualified value was returned
        if not result.good:
            print result

system.tag.writeAsync(paths, values, myCallback)
```

system.tag.writeBlocking

This function is used in **Python Scripting**.

Description

Writes values to tags at the given paths. This function will "block" until the write operation is complete or times out. Meaning, execution of the calling script will pause until this function finishes. This is useful in cases where the tag write must complete before further lines in the same script should execute.

Client Permission Restrictions

Permission Type: Tag Editing

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.tag.writeBlocking(tagPaths, values, [timeout])
```

Parameters

Type	Parameter	Description
List	`tagPaths`	A List of tag paths to write to. If no property is specified in a tag path, the Value property is assumed.
List	`values`	A list of values to write to the specified tag paths.
Integer	`timeout`	How long to wait in milliseconds before the write operation times out. This parameter is optional and defaults to 45000 milliseconds if not specified. [optional]

Returns

List - A List of QualityCode objects, one for each Tag path. See **Scripting Object Reference**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - Write to Multiple Tags

```
# Create a list with the tag paths to be updated.
paths = ["[default]Folder/Tag_A","[default]Folder/Tag_B"]

# Create a list with the update values, one value for each path.
values = [1,2]

# Execute the write operation.
system.tag.writeBlocking(paths, values)
```

system.twilio

Twilio Functions

The following functions give you access to read info and send SMS through Twilio. This requires the **Twilio Module**, which is not included in a typical installation.

getAccounts

Returns a list of Twilio account names that have been configured in the Gateway.

getAccountsDataset

Returns a list of Twilio account names that have been configured in the Gateway as a single-column Dataset.

getPhoneNumbers

Returns a list of outgoing phone numbers for a Twilio account.

getPhoneNumbersDataset

Returns a list of outgoing phone numbers for a Twilio account as a single-column Dataset.

sendSms

Sends an SMS message.

Functions by Scope

Gateway >

Vision >

Perspective >

system.twilio.getAccounts

This function is used in **Python Scripting**.

Description

Returns a list of Twilio account names that have been configured in the Gateway.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.twilio.getAccounts()
```

Parameters

Nothing

Returns

List[String] - A list of configured Twilio account names.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Retrieves a list of Twilio accounts and then iterates through the resulting
list.
# Call system.twilio.getAccounts() and store the returned list into a variable.
twilioAccounts = system.twilio.getAccounts()

# Iterate through the list of accounts.
for account in twilioAccounts:
    # Prints the account name to the console.
    print account
```

system.twilio.getAccountsDataset

This function is used in **Python Scripting**.

Description

Returns a list of Twilio account names that have been configured in the Gateway as a single-column Dataset.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.twilio.getAccountsDataset()
```

Parameters

Nothing

Returns

Dataset - A list of configured Twilio accounts as a single-column Dataset.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Retrieves a list of Twilio accounts and then passes the data to a Table
component's data property.

# Call system.twilio.getAccountsDataset() and store the returned list into a
variable.
twilioAccounts = system.twilio.getAccountsDataset()


# Pass the dataset to a Table component. The Table is located in the same
container as the
# component calling this script.
event.source.parent.getComponent('Table').data = twilioAccounts
```

system.twilio.getPhoneNumbers

This function is used in **Python Scripting**.

Description

Returns a list of outgoing phone numbers for a Twilio account. Note that these numbers are supplied by Twilio, and are not defined on a user in Ignition.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.twilio.getPhoneNumbers(accountName)
```

Parameters

Type	Parameter	Description
String	`accountName`	The Twilio account to retrieve phone numbers for

Returns

List[String] - A list of phone numbers for the given Twilio account

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Retrieves a list of phone numbers associated with a Twilio account and then
iterates through the resulting list.
# Checks against a Twilio profile configured on the Gateway by the name of "Twilio
Account".

# Call system.twilio.getPhoneNumbers() and store the returned list into a
variable.
twilioNumbers = system.twilio.getPhoneNumbers("Twilio Account")

# Iterate through the list of numbers.
for number in twilioNumbers:

    # Prints the numbers to the console
    print number
```

system.twilio.getPhoneNumbersDataset

This function is used in **Python Scripting**.

Description

Returns a list of outgoing phone numbers for a Twilio account as a single-column Dataset. Note that these numbers are supplied by Twilio, and are not defined on a user in Ignition.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.twilio.getPhoneNumbersDataset(accountName)
```

Parameters

Type	Parameter	Description
String	`accountName`	The Twilio account for which to retrieve phone numbers.

Returns

Dataset - A list of phone numbers for the given Twilio account as a single-column Dataset

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Retrieves a list of phone numbers associated with a Twilio account and then
passes the resulting list to a Table component's Data property.
# Checks against a Twilio profile configured on the Gateway by the name of "Twilio
Account".

# Call system.twilio.getPhoneNumbers() and store the returned list into a
variable.
twilioNumbers = system.twilio.getPhoneNumbersDataset("Twilio Account")

# Pass the dataset to a Table component. The Table is located in the same
container as the
# component calling this script.
event.source.parent.getComponent('Table').data = twilioNumbers
```

system.twilio.sendSms

This function is used in **Python Scripting**.

Description

Sends an SMS message.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.twilio.sendSms(accountName, fromNumber, toNumber, message)
```

Parameters

Type	Parameter	Description
String	`accountName`	The Twilio account to send the SMS from.
String	`fromNumber`	The outbound phone number belonging to the Twilio account to use.
String	`toNumber`	The phone number of the recipient.
String	`message`	The body of the SMS.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Code Snippet

```
# Send an SMS message.
# Fetch the Twilio account name.
# getAccounts() returns a list, so the "[0]" operator is referring to the first
item in the list.
account = system.twilio.getAccounts()[0]

# Fetch the first number associated with the account.
fromNumber = system.twilio.getPhoneNumbers(account)[0]

# Fetch a specific user's contact information.
# A static value is used below, but system.user.getUser() could be used to
retrieved a user's phone number.
toNumber = "+19165550101"

# Define the text message.
# A static message is used below, but multiple messages could be stored in a
database table and retrieved here.
textMessage = "This is the body of a text message"

# Send the message.
system.twilio.sendSms(account, fromNumber, toNumber, textMessage)
```

system.user

User Functions

The following functions give you access to view and edit users.

addCompositeSchedule

Allows two schedules to be combined into a composite schedule.

addHoliday

Allows a holiday to be added.

addRole

Adds a role to the specified user source.

addSchedule

Adds a schedule.

addUser

Adds a new user to a user source.

createScheduleAdjustment

Creates a schedule adjustment.

editHoliday

Allows a holiday to be edited.

editRole

Renames a role in the specified user source.

editSchedule

Allows a schedule to be edited.

editUser

Alters a specific user in a user source, replacing the previous data with the new data passed in.

getHoliday

Returns a specific holiday.

getHolidayNames

Returns a collection of Strings of all holiday names.

getHolidays

Returns a sequence of all of the holidays available.

getNewUser

Creates a new user object.

getRoles

Returns a sequence of strings representing all of the roles configured in a specific user source.

getSchedule

Returns a specific schedule.

getScheduledUsers

Returns a list of users that are scheduled.

getScheduleNames

Returns a sequence of strings representing the names of all of the schedules available.

getSchedules

Returns a sequence of all available schedule models, which can be used to return configuration information on th…

getUser

Looks up a specific user in a user source, by username.

getUsers

Retrieves the list of users in a specific user source.

getUserSources

Returns a sequence of objects representing all of the user source profiles configured in the Gateway.

isUserScheduled

Will check if a specified User is scheduled currently or on a specified date/time.

removeHoliday

Allows a holiday to be deleted.

removeRole

Removes a role from the specified user source.

removeSchedule

Allows a schedule to be deleted.

removeUser

Removes a specific user from the a user source based on username.

Functions by Scope

Gateway >

Vision >

Perspective >

system.user.addCompositeSchedule

This function is used in **Python Scripting**.

Description

Allows two schedules to be combined into a composite schedule.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.addCompositeSchedule(name, scheduleOne, scheduleTwo, [description])
```

Parameters

Type	Parameter	Description
String	`name`	The name of the new composite schedule.
String	`scheduleOne`	The first schedule to combine.
String	`scheduleTwo`	The second schedule to combine.
String	`description`	Description of the new combined schedule. [optional]

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the add. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the add.
- `getErrors()` - Returns a list of error messages that were encountered during the add.
- `getInfos()` - Returns a list of "info" messages that were encountered during the add.

These messages represent normal logging events that occurred during the add, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Assuming you already have two schedules configured, named "A Shift" and "B
Shift",
# you could create a composite schedule with the following.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

response = system.user.addCompositeSchedule("A and B Shift", "A Shift", "B Shift",
"Both A and B combined")

warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

errors = response.getErrors()
print "Errors are:"
printResponse(errors)

infos = response.getInfos()
print "Infos are:"
printResponse(infos)

"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 New schedule "A and B Shift" added.
"""
```

system.user.addHoliday

This function is used in **Python Scripting**.

Description

Allows a holiday to be added.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.addHoliday(holiday)
```

Parameters

Type	Parameter	Description
HolidayModel	`holiday`	The holiday to add, as a **HolidayModel** object.

Returns

UIResponse - A **UIResponse** object with lists of warning, errors and info about the success or failure of the add. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the add.
- `getErrors()` - Returns a list of error messages that were encountered during the add.
- `getInfos()` - Returns a list of "info" messages that were encountered during the add.

These messages represent normal logging events that occurred during the add, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example adds a holiday.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

from com.inductiveautomation.ignition.common.user.schedule import HolidayModel
from java.util import Date
holidayName = "Groundhog Day"
d = Date(2016 - 1900, 2, 2)         # java dates start in 1900
repeatAnnually = False
myHoliday = HolidayModel(holidayName, d, repeatAnnually)
response = system.user.addHoliday(myHoliday)

warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

errors = response.getErrors()
print "Errors are:"
printResponse(errors)

infos = response.getInfos()
print "Infos are:"
printResponse(infos)

"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 New holiday "Groundhog Day" added.
"""
```

system.user.addRole

This function is used in **Python Scripting**.

Description

Adds a role to the specified user source. When altering the Gateway System User Source, the **Allow User Admin** setting must be enabled.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.addRole(userSource, role)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source to add a role to. Blank will use the default user source.
String	`role`	The role to add. Role must not be blank and must not already exist.

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the add. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the add.

- `getErrors()` - Returns a list of error messages that were encountered during the add.
- `getInfos()` - Returns a list of "info" messages that were encountered during the add.

These messages represent normal logging events that occurred during the add, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example adds a role "Operator" to the user source "MyUserSource".
system.user.addRole("MyUserSource", "Operator")
```

system.user.addSchedule

This function is used in **Python Scripting**.

Description

Adds a schedule.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.addSchedule(schedule)
```

Parameters

Type	Parameter	Description
ScheduleModel	`schedule`	The schedule to add. Can be a **BasicScheduleModel** or **CompositeScheduleModel** object (or any other class that extends **AbstractScheduleModel**).

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the add. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the add.
- `getErrors()` - Returns a list of error messages that were encountered during the add.
- `getInfos()` - Returns a list of "info" messages that were encountered during the add.

These messages represent normal logging events that occurred during the add, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example tries to add the schedule NewSchedule based on an existing schedule
MySchedule, and prints the results of the action.

# This function prints the response received.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

# The main function.
mySchedule = system.user.getSchedule("Always")
if mySchedule != None and mySchedule.getType() == "basic schedule":
    mySchedule.setObserveHolidays(False)
    mySchedule.setName("NewSchedule")
    response = system.user.addSchedule(mySchedule)
    warnings = response.getWarns()
    print "Warnings are:"
    printResponse(warnings)

    errors = response.getErrors()
    print "Errors are:"
    printResponse(errors)

    infos = response.getInfos()
    print "Infos are:"
    printResponse(infos)
"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 New schedule "NewSchedule" added.
"""
```

system.user.addUser

This function is used in **Python Scripting**.

Description

Adds a new user to a user source. Used in combination with **getNewUser** to create new user.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.addUser(userSource, user)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source to add a user to. If set to an empty string, the function will attempt to use the project's default user source (if called from a project).
User	`user`	The **user** to add, as a User object. Refer also to the PyUser class.

Returns

UIResponse - A **UIResponse** object which contains lists of the errors, warnings, and information returned after the add attempt. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the add.

- `getErrors()` - Returns a list of error messages that were encountered during the add.
- `getInfos()` - Returns a list of "info" messages that were encountered during the add.

These messages represent normal logging events that occurred during the add, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Get new user.
userToGet = system.user.getNewUser("AcmeWest", "mTrejo")

# Add some contact info.
contactInfo = {"email":"mTrejo@acmewest.com","sms": "5551234"}
userToGet.addContactInfo(contactInfo)
userToGet.set("password", "thisIsMyPassword")

# Adds a user to the the AcmeWest usersource.
system.user.addUser("AcmeWest", userToGet)
```

system.user.createScheduleAdjustment

This function is used in **Python Scripting**.

Description

Creates a schedule adjustment.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.createScheduleAdjustment(startDate, endDate, isAvailable, note)
```

Parameters

Type	Parameter	Description
Date	`startDate`	The starting date of the schedule adjustment.
Date	`endDate`	The ending date of the schedule adjustment.
Boolean	`isAvailable`	True if the user is available during this schedule adjustment.
String	`note`	A note about the schedule adjustment.

Returns

Schedule Adjustment - A **ScheduleAdjustment** object that can be added to a user.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Specify the range of the schedule change.
start = system.date.parse("2019-07-01 17:00:00")
end = system.date.parse("2019-07-05 17:00:00")

# Create an adjusted schedule.
scheduleAdjustment = system.user.createScheduleAdjustment(start, end, True,
"Summer swing schedule change.")

# Get the user we need to adjust.
user = system.user.getUser("default", "george")

# Apply the adjusted schedule to the temporary user that lives in this script.
user.addScheduleAdjustments([scheduleAdjustment])

# Override the old george user in the user source, with the new user we created in
this script.
system.user.editUser("default", user)
```

system.user.editHoliday

This function is used in **Python Scripting**.

Description

Allows a holiday to be edited.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.editHoliday(holidayName, holiday)
```

Parameters

Type	Parameter	Description
String	`holidayName`	The name of the holiday to edit. Name is case-sensitive.
HolidayModel	`holiday`	The edited holiday, as a **HolidayModel** object.

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the edit. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the edit.
- `getErrors()` - Returns a list of error messages that were encountered during the edit.
- `getInfos()` - Returns a list of "info" messages that were encountered during the edit.

These messages represent normal logging events that occurred during the edit, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example gets a holiday and edits it.

# This function prints the response received.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

# The main function.
holidayName = "Labor Day"
myHoliday = system.user.getHoliday(holidayName)
if myHoliday != None:
    myHoliday.setRepeatAnnually(False)
    response = system.user.editHoliday(holidayName, myHoliday)

    warnings = response.getWarns()
    print "Warnings are:"
    printResponse(warnings)

    errors = response.getErrors()
    print "Errors are:"
    printResponse(errors)

    infos = response.getInfos()
    print "Infos are:"
    printResponse(infos)

"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 Holiday "Labor Day" updated.
"""
```

system.user.editRole

This function is used in **Python Scripting**.

Description

Renames a role in the specified user source. When altering the Gateway System User Source, the **Allow User Admin** setting must be enabled.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.editRole(userSource, oldName, newName)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source in which the role is found. Blank will use the default user source.
String	`oldName`	The role to edit. Role must not be blank and must exist.
String	`newName`	The new name for the role. Must not be blank.

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the edit. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the edit.
- `getErrors()` - Returns a list of error messages that were encountered during the edit.
- `getInfos()` - Returns a list of "info" messages that were encountered during the edit.

These messages represent normal logging events that occurred during the edit, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example edits the role "Operator" in the user source "MyUserSource" and
edits it to the role "User".
system.user.editRole("MyUserSource", "Operator", "User")
```

system.user.editSchedule

This function is used in **Python Scripting**.

Description

Allows a schedule to be edited.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.editSchedule(scheduleName, schedule)
```

Parameters

Type	Parameter	Description
String	`scheduleName`	The name of the schedule to edit. Name is case-sensitive.
ScheduleModel	`schedule`	The schedule to add. Can be a **BasicScheduleModel** or **CompositeScheduleModel** object (or any other class that extends **AbstractScheduleModel**).

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and info about the success or failure of the edit. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the edit.

- `getErrors()` - Returns a list of error messages that were encountered during the edit.
- `getInfos()` - Returns a list of "info" messages that were encountered during the edit.

These messages represent normal logging events that occurred during the edit, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example tries to edit the schedule MySchedule, and prints the results of
the action.

# This function prints the response received.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

# The main function.
oldScheduleName = "MySchedule"
mySchedule = system.user.getSchedule(oldScheduleName)
if mySchedule != None and mySchedule.getType() == "basic schedule":
    mySchedule.setObserveHolidays(False)
    mySchedule.setName("MyEditedSchedule")
    mySchedule.setDescription("A modified description")
    response = system.user.editSchedule(oldScheduleName, mySchedule)
    warnings = response.getWarns()
    print "Warnings are:"
    printResponse(warnings)

    errors = response.getErrors()
    print "Errors are:"
    printResponse(errors)

    infos = response.getInfos()
    print "Infos are:"
    printResponse(infos)
else:
    print "Basic schedule", oldScheduleName, "not found."
"""The example above outputs the following:Warnings are:
None
Errors are:
None
Infos are:
Schedule "MyEditedSchedule" updated."""
```

system.user.editUser

This function is used in **Python Scripting**.

Description

Alters a specific user in a user source, replacing the previous data with the new data passed in.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.editUser(userSource, user)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source in which the user is found. Blank will use the default user source.
User	`user`	The user to update, as a **User** object. Refer also to the **PyUser** class.

Returns

A **UIResponse** object with lists of warnings, errors, and information returned after the edit attempt. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the edit.
- `getErrors()` - Returns a list of error messages that were encountered during the edit.

- `getInfos()` - Returns a list of "info" messages that were encountered during the edit.

These messages represent normal logging events that occurred during the edit, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Retrieve the user we're going to edit.
userToChange = system.user.getUser("default", "george")

# Make a change to the user. In this case, we're adding some contact info.
contactInfo = {"email":"ignition_user@mycompany.com","sms": "5551212"}
userToChange.addContactInfo(contactInfo)

# Edit the user. Because the user object we're passing in has a user name, the
function
# already knows which user to edit.
system.user.editUser("default", userToChange)
```

system.user.getHoliday

This function is used in **Python Scripting**.

Description

Returns a specific holiday.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getHoliday(holidayName)
```

Parameters

Type	Parameter	Description
String	`holidayName`	The name of the holiday to return. Case-sensitive

Returns

HolidayModel - The holiday, as a **HolidayModel** object, or None if not found. Add holidays using the **system.user.addHoliday** function.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will get a holiday and print info about it.
holidayName = "Labor Day"
holiday = system.user.getHoliday(holidayName)
if holiday == None:
    print holidayName, "not found"
else:
    print holiday.getName(), holiday.getDate(), holiday.isRepeatAnually()

"""The example above outputs the following:
Labor Day 2015-09-07 00:00:00.0 False
"""
```

system.user.getHolidayNames

This function is used in **Python Scripting**.

Description

Returns a collection of Strings of all holiday names.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getHolidayNames()
```

Parameters

Nothing

Returns

List - A list of all holiday names, or an empty list if no holidays are defined. Add holidays using the **system.user.addHoliday** function.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example prints the name of every holiday.

holidayNames = system.user.getHolidayNames()
for holidayName in holidayNames:
    print holidayName
```

system.user.getHolidays

This function is used in **Python Scripting**.

Description

Returns a sequence of all of the holidays available.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getHolidays()
```

Parameters

Nothing

Returns

List - A list of holidays, as **HolidayModel** objects. Add holidays using the **system.user.addHoliday** function.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example prints information about every holiday.
holidays = system.user.getHolidays()
if len(holidays) == 0:
    print "No holidays defined"
for holiday in holidays:
    print holiday.getName(), holiday.getDate(), holiday.isRepeatAnnually()
```

system.user.getNewUser

This function is used in **Python Scripting**.

Description

Creates a new user object. The user will not be added to the user source until **addUser** is called.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.getNewUser(userSource, username)
```

Parameters

Type	Parameter	Description
String	`userSource`	The name of the user source in which to create a user.
String	`username`	The username for the new user. Does not check if the username already exists or is valid.

Returns

User - The new user, as a **User** object. Refer also to the **PyUser** class.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Get new user.
userToGet = system.user.getNewUser("AcmeWest", "mTrejo")

# Add some contact info.
contactInfo = {"email":"mTrejo@acmewest.com","sms": "5551234"}
userToGet.addContactInfo(contactInfo)
userToGet.set("password", "mypassword")

# Adds a user to the AcmeWest usersource.
system.user.addUser("AcmeWest", userToGet)
```

Example 2

```
# Util for printing the responses.
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

# Make a brand new 'blank' user. Not saved until we save.
user = system.user.getNewUser("", "myAwesomeUser")

# Let's fill in some fields. Note we have two ways to access property names.
user.set("firstname", "Naomi")
user.set(user.LastName, "Nagata")
user.set("password", "1234567890")

# We can add contact info one at a time. Up to the script user to make sure the
type is legit.
user.addContactInfo("email", "naomi@roci.com")

# We can add a lot of contact info.
contactInfo = {"email":"ignition_user@mycompany.com","sms": "5551212"}
user.addContactInfo(contactInfo)

# We can delete contact info. Only deletes if both fields match.
user.removeContactInfo("sms", "5551212")

# We can add a role. If the role doesn't already exist, user save will fail,
depending on user source.
user.addRole("Mechanic")

# We can add a lot of roles.
roles = ["Administrator", "Operator"]
user.addRoles(roles)

# We can remove a role.
user.removeRole("Operator")

# We can add a schedule adjustment too.
date2 = system.date.now()
date1 = system.date.midnight(date2)
user.addScheduleAdjustment(date1, date2, False, "An adjustment note")

# We can make a bunch of adjustments and add them en-masse.
date3 = system.date.addDays(date2, -4)
adj1 = system.user.createScheduleAdjustment(date3, date2, True, "Another note")
adj2 = system.user.createScheduleAdjustment(date3, date1, False, "")
user.addScheduleAdjustments([adj1, adj2])
```

```
# and we can remove a schedule adjustment. All fields must match.
user.removeScheduleAdjustment(date1, date2, True, "Some other note")

# Finally, we will save our new user and print responses.
response = system.user.addUser("", user)

warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

errors = response.getErrors()
print "Errors are:"
printResponse(errors)

infos = response.getInfos()
print "Infos are:"
printResponse(infos)
```

system.user.getRoles

This function is used in **Python Scripting**.

Description

Returns a sequence of strings representing all of the roles configured in a specific user source.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getRoles(userSource)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source to fetch the roles for.

Returns

List - A List of strings that holds all the roles in the user source.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will print a list of all user roles in the default user source:

roles = system.user.getRoles("")
for role in roles:
    print role
```

system.user.getSchedule

This function is used in **Python Scripting**.

Description

Returns a specific schedule.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getSchedule(scheduleName)
```

Parameters

Type	Parameter	Description
String	`scheduleName`	The name of the schedule to return. Case-sensitive

Returns

ScheduleModel - The schedule, which can be a **BasicScheduleModel** object, **CompositeScheduleModel** object, or another type registered by a module. If a schedule was not found, the function will return None if called from a Vision Client or the Designer. if called in from a Perspective Session or anywhere else in the Gateway scope, will throw an IllegalArgumentException.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will get a schedule and print info about it.

# This function handles recursive printing of the different schedule types.
Modules can register more types than listed here.
def printScheduleInfo(aSchedule):
    if aSchedule.getType() == "basic schedule":
        print "Basic schedule type: ",aSchedule.getName(),
aSchedule.getDescription(), aSchedule.isAllDays(), aSchedule.isObserveHolidays()
    elif aSchedule.getType() == "composite schedule":
        compositePieces = aSchedule.getModels()
        print "Composite schedule type:",aSchedule.getName(),
aSchedule.getDescription(), " which is made up of..."
        for piece in compositePieces:
            printScheduleInfo(piece)
    else:
        print "Other schedule type: ", aSchedule.getName(),
aSchedule.getDescription(), aSchedule.getType(), aSchedule.isObserveHolidays()

# The main function.
scheduleName = "MySchedule"
schedule = system.user.getSchedule(scheduleName)
if schedule == None:
    print "Schedule", scheduleName, "was not found"
else:
    printScheduleInfo(schedule)

"""The example above outputs the following:
Basic schedule type:  MySchedule A description False True"""
```

system.user.getScheduledUsers

This function is used in **Python Scripting**.

Description

Returns a list of users that are scheduled. If no users are scheduled, it will return an empty list.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getScheduledUsers(userSource, [date])
```

Parameters

Type	Parameter	Description
String	`userSource`	The name of the user source to check for scheduled users.
Date	`date`	The date to check schedules for. May be a Java Date or Unix Time in ms. If omitted, the current date and time will be used. [optional]

Returns

List - List of all Users (as **User** objects) scheduled for the given date, taking schedule adjustments into account. Refer also to the **PyUser** class.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Get all users scheduled for the date specified in a popup calendar and print
their names.

date = event.source.parent.getComponent('Popup Calendar').date
users = system.user.getScheduledUsers("default", date)

if users == None:
    print "No users scheduled"
else:
    print "Scheduled users:"
    for user in users:
        print user.get(user.Username)
```

system.user.getScheduleNames

This function is used in **Python Scripting**.

Description

Returns a sequence of strings representing the names of all of the schedules available.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getScheduleNames()
```

Parameters

Nothing

Returns

List - A List of Strings that holds the names of all the available schedules.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This example will print a list of all available schedules.

schedules = system.user.getScheduleNames()
for schedule in schedules:
    print schedule
```

system.user.getSchedules

This function is used in **Python Scripting**.

Description

Returns a sequence of all available schedule models, which can be used to return configuration information on the schedule, such as time for each day of the week.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getSchedules()
```

Parameters

Nothing

Returns

List - A list of schedules. Each schedule can be a **BasicScheduleModel** object, **CompositeScheduleModel** object, or another type registered by a module.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will print a list of all available ScheduleModels.

# This function handles recursive printing of the different schedule models.
Modules can register more types than listed here.
def printScheduleInfo(aSchedule):
    if aSchedule.getType() == "basic schedule":
        print "Basic schedule type: ",aSchedule.getName(),
aSchedule.getDescription(), aSchedule.isAllDays(), aSchedule.getAllDayTime()
    elif aSchedule.getType() == "composite schedule":
        compositePieces = aSchedule.getModels()
        print "Composite schedule type:",aSchedule.getName(),
aSchedule.getDescription(), " which is made up of..."
        for piece in compositePieces:
            printScheduleInfo(piece)
    else:
        print "Other schedule type: ", aSchedule.getName(),
aSchedule.getDescription(), aSchedule.getType(), aSchedule.isObserveHolidays()


# The main function.
schedules = system.user.getSchedules()
for schedule in schedules:
    printScheduleInfo(schedule)
```

system.user.getUser

This function is used in **Python Scripting**.

Description

Looks up a specific user in a user source, by username. The full User object is returned except for the user's password.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getUser(userSource, username)
```

Parameters

Type	Parameter	Description
String	`userSource`	The name of the user source to search for the user in. Can be a blank string to use the Vision Client's default user source.
String	`username`	The username of the user to search for.

Returns

User - The user, as a **User** object.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will print the first and last name of the current user using the
default datasource:
userName = system.security.getUsername()
user = system.user.getUser("", userName)
print user.get('firstname') + " " + user.get('lastname')
```

system.user.getUsers

This function is used in **Python Scripting**.

Description

Retrieves the list of users in a specific user source. The "User" objects that are returned contain all of the information about that user, except for the user's password.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getUsers(userSource)
```

Parameters

Type	Parameter	Description
String	`userSource`	The name of the user source to find the users in.

Returns

List - A List of **User** objects.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example will print the first and last name of all users, using the default
datasource:

users = system.user.getUsers("")
for user in users:
    print user.get(user.FirstName) + " " + user.get(user.LastName)
```

system.user.getUserSources

This function is used in **Python Scripting**.

New in 8.1.15

Description

Returns a sequence of objects representing all of the user source profiles configured in the Gateway. Each object has a "name" property, a "description" property, and a "type" property.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.getUserSources()
```

Parameters

None

Returns

List - A List of all user source profiles configured in the system in ascending order by their names.

Scope

Gateway, Vision Client, Perspective Session

UserSource Object

Each UserSource returned represents an object with the following properties:

- name

- description
- type

Code Examples

Example #1

```
uList = system.user.getUserSources()
print len(uList)
```

system.user.isUserScheduled

This function is used in **Python Scripting**.

Description

Will check if a specified User is scheduled currently or on a specified date/time.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.user.isUserScheduled(user, [date])
```

Parameters

Type	Parameter	Description
User	`user`	The user object to check the schedule for.
Date / Integer	`date`	The date to check schedules for. May be a Java Date or Unix Time in ms. If omitted, the current date and time will be used. [optional]

Returns

Boolean - True if the user is scheduled for the specified date; false if not.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Print whether or not the user "oper1" is scheduled currently.

user = system.user.getUser("", "oper1")
if system.user.isUserScheduled(user):
    print "oper1 is scheduled"
else:
    print "oper1 is not scheduled"
```

system.user.removeHoliday

This function is used in **Python Scripting**.

Description

Allows a holiday to be deleted.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.removeHoliday(holidayName)
```

Parameters

Type	Parameter	Description
String	`holidayName`	The name of the holiday to delete. Case-sensitive.

Returns

UIResponse - A list of **UIResponse** objects with lists of warnings, errors, and info about the success or failure of the deletion. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the deletion.
- `getErrors()` - Returns a list of error messages that were encountered during the deletion.
- `getInfos()` - Returns a list of "info" messages that were encountered during the deletion.

These messages represent normal logging events that occurred during the deletion, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

holidayName = "Labor Day"
response = system.user.removeHoliday(holidayName)

warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

errors = response.getErrors()
print "Errors are:"
printResponse(errors)

infos = response.getInfos()
print "Infos are:"
printResponse(infos)

"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 Holiday "Labor Day" deleted.
"""
```

system.user.removeRole

This function is used in **Python Scripting**.

Description

Removes a role from the specified user source. When altering the Gateway System User Source, the **Allow User Admin** setting must be enabled.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.removeRole(userSource, role)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source in which the role is found. Blank will use the default user source.
String	`role`	The role to remove. The role must exist.

Returns

UIResponse - A list of **UIResponse** objects with lists of warnings, errors, and info about the success or failure of the deletion. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the deletion.
- `getErrors()` - Returns a list of error messages that were encountered during the deletion.

- `getInfos()` - Returns a list of "info" messages that were encountered during the deletion.

These messages represent normal logging events that occurred during the deletion, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Removes the role "User" in the user source "MyUserSource".
system.user.removeRole("MyUserSource", "User")
```

system.user.removeSchedule

This function is used in **Python Scripting**.

Description

Allows a schedule to be deleted. Note that schedules which are used in Composite Schedules can not be deleted until they are removed from the Composite Schedule.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.removeSchedule(scheduleName)
```

Parameters

Type	Parameter	Description
String	`scheduleName`	The name of the schedule to delete. Case-sensitive.

Returns

UIResponse - A list of **UIResponse** objects with lists of warnings, errors, and info about the success or failure of the deletion. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the deletion.
- `getErrors()` - Returns a list of error messages that were encountered during the deletion.
- `getInfos()` - Returns a list of "info" messages that were encountered during the deletion.

These messages represent normal logging events that occurred during the deletion, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This example tries to delete the schedule MySchedule, and prints the results of
the action.

def printResponse(responseList):
    if len(responseList) > 0:
        for response in responseList:
            print "", response
    else:
        print " None"

scheduleName = "MySchedule"
response = system.user.removeSchedule(scheduleName)

warnings = response.getWarns()
print "Warnings are:"
printResponse(warnings)

errors = response.getErrors()
print "Errors are:"
printResponse(errors)

infos = response.getInfos()
print "Infos are:"
printResponse(infos)

"""The example above outputs the following:
Warnings are:
 None
Errors are:
 None
Infos are:
 Schedule "MySchedule" deleted.
"""
```

system.user.removeUser

This function is used in **Python Scripting**.

Description

Removes a specific user from the a user source based on username. When altering the Gateway System User Source, the **Allow User Admin** setting must be enabled.

Client Permission Restrictions

Permission Type: User Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.user.removeUser(userSource, username)
```

Parameters

Type	Parameter	Description
String	`userSource`	The user source in which the user is found. Blank will use the default user source.
String	`username`	The username of the user to remove.

Returns

UIResponse - A **UIResponse** object with lists of warnings, errors, and information returned after the removal attempt. The contents of the lists are accessible from the getter methods.

- `getWarns()` - Returns a list of warning messages that were encountered during the deletion.
- `getErrors()` - Returns a list of error messages that were encountered during the deletion.

- `getInfos()` - Returns a list of "info" messages that were encountered during the deletion.

These messages represent normal logging events that occurred during the deletion, and can be useful when trying to visualize the events that lead up to a failure.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Removes user jHopkins from the AcmeWest user source.
system.user.removeUser("AcmeWest", "jHopkins")
```

system.util

Utility Functions

The following functions give you access to view various Gateway and Client data, as well as interact with other various systems.

audit

Inserts a record into an audit profile.

beep

Tells the computer where the script is running to make a "beep" sound.

execute

Executes the given commands via the operating system, in a separate process.

exit

Exits the running client, as long as the shutdown intercept script doesn't cancel the shutdown event.

getAvailableLocales

Returns a collection of strings representing the Locales added to the Translation Manager, such as 'en' for English.

getAvailableTerms

Returns a collection of available terms defined in the translation system.

getClientId

Returns a hex-string that represents a number unique to the running client's session.

getConnectionMode

Retrieves this client session's current connection mode.

getConnectTimeout

Returns the connect timeout in milliseconds for all client-to-gateway communication.

getEdition

Returns the "edition" of the Vision client - "standard", "limited", or "panel".

getGatewayAddress

Returns the address of the Gateway that the Client is currently communicating with.

getGatewayStatus

Returns a string that indicates the status of the Gateway.

getGlobals

This method returns a dictionary that provides access to the legacy global namespace.

getInactivitySeconds

Returns the number of seconds since any keyboard or mouse activity.

getLocale

Returns the current string representing the user's Locale, such as 'en' for English.

getLogger

Returns a Logger object that can be used to log messages to the console.

getModules

Returns a dataset of information about each installed module.

getProjectName

Returns the name of the project that is currently being run.

getProperty

Retrieves the value of a named system property.

getReadTimeout

Returns the read timeout in milliseconds for all client-to-gateway communication.

getSessionInfo

Returns a PyDataSet holding information about all of the open Designer sessions and Vision Clients.

getSystemFlags

Returns an integer that represents a bit field containing information about the currently running system.

getVersion

invokeAsynchronous

Invokes (calls) the given Python function on a different thread.

invokeLater

Invokes (calls) the given Python function object after all of the currently processing and pending events are done …

jsonDecode

Takes a JSON string and converts it into a Python object such as a list or a dictionary.

jsonEncode

Takes a Python object such as a list or dictionary and converts into a JSON string.

modifyTranslation

This function allows you to add or modify a global translation.

playSoundClip

Plays a sound clip from a wav file to the system's default audio device.

queryAuditLog

Queries an audit profile for audit history.

retarget

This function allows you to programmatically 'retarget' a Vision Client to a different project and/or different Gatew…

sendMessage

This function sends a message to clients running under the Gateway, or to a project within the Gateway itself.

sendRequest

This function sends a message to the Gateway, working in a similar manner to the sendMessage function, except …

sendRequestAsync

This function sends a message to the Gateway and expects a response.

setConnectionMode

Sets the connection mode for the client session.

setConnectTimeout

Sets the connect timeout for Client-to-Gateway communication.

setLocale

Sets the user's current Locale.

setLoggingLevel

Sets the logging level on the given logger.

setReadTimeout

Sets the read timeout for Client-to-Gateway communication.

threadDump

Creates a thread dump of the current running JVM.

translate

This function allows you to retrieve the global translation of a term from the translation database using the curren…

Functions by Scope

Gateway >

Vision >

Perspective >

system.util.audit

This function is used in **Python Scripting**.

Description

Inserts a record into an audit profile.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.audit([action], [actionTarget], [actionValue], [auditProfile], [actor], [actorHost], [originatingSystem], [eventTimestamp], [originatingContext], [statusCode])
```

Parameters

Type	Parameter	Description
String	`action`	What happened. Default is null. [optional]
String	`actionTarget`	What the action happened to. Default is null. [optiona
String	`actionValue`	The value of the action. Default is no value. [optional
String	`auditProfile`	Where the audit record should be stored. Defaults to profile (if specified), or the Gateway audit profile if ca Perspective Session scope. [optional]
String	`actor`	Who made the change. Will be populated automatica there is a known user. [optional]
String	`actorHost`	The hostname of whoever made the change. Will be if omitted. [optional]

List[String]	`originatingSystem`	An even-length list providing additional context to the appended to the automatically generated list.
		
		Typically, the automatically generated context looks l
		
		`sys:${gatewayName}:\project:${projectNam`
		
		If you provided `["component", "Joe'sButton", "f` would get a record with:
		
		`originatingSystem:sys:${gatewayName}:\pr` `\component:Joe'sButton:\field:value.`
		
		If a string is provided, this automatic context will not provided string will be written directly into the origina the audit profile. [optional]

Date	`eventTimestamp`	When the event happened. Will be set to the current
Integer	`originatingContext`	What scope the event originated from: 1 means Gate 4 means Client. Will be set automatically if omitted. [

Type	Parameter	Description
Integer	`statusCode`	A quality code to attach to the object. Defaults to 0, i meaning. [optional]

Returns

Nothing

Scope

Gateway, Vision Client, and Perspective Session.

Code Examples

Example #1

```
# All of the parameters are optional, so you're free to only provide parameters you're interested in.
# In the very least provide just the action you wish to record, which gives the function a chance to look up all of the other parameters automatically.
system.util.audit("The user did a thing!")
```

Example #2

```
# Simple example just showing parameter usage.
myAction = "The button was pressed"
myTarget = "My Button"

system.util.audit(action = myAction , actionTarget = myTarget )
```

system.util.beep

This function is used in **Python Scripting**.

Description

Tells the computer where the script is running to make a "beep" sound. The computer must have a way of producing sound.

A Word on Scope

While this function is technically scoped for Gateway and Perspective Sessions, it's intended for use in Vision Clients.

When calling this function from the Gateway scope, the sound will not play unless the operating system has been configured to allow services to play sounds (an uncommon scenario).

When calling this function from Perspective, the script also executes on the Gateway, meaning the caveat above about allowing services to play sounds is a factor. In addition, the sound will play on the Gateway, not the session. To play sounds from a Perspective Session, it's recommended to use the play() component method on the **Perspective Audio** component.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.beep()
```

Parameters

Nothing

Returns

Nothing

Scope

Gateway*, Vision Client, Perspective Session*

* See **A Word on Scope** above.

Code Examples

Example #1

```
# This will simply cause the system where the script is being executed to emit a
beep sound.
# That system must have a way to produce sound, such as speakers or headphones.

system.util.beep()
```

system.util.execute

This function is used in **Python Scripting**.

Description

Executes the given commands via the operating system, in a separate process. The commands argument is an array of strings. The first string is the program to execute, with subsequent strings being the arguments to that command.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.execute(commands)
```

Parameters

Type	Parameter	Description
List[String]	`commands`	A list containing the command (1st entry) and associated arguments (remaining entries) to execute.

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This function flushes the resolver cache.
system.util.execute(["ipconfig", "/flushdns"])
```

Example #2

```
# This code starts the Firefox browser and opens the Google home page.
# Although system.util.execute() is also Perspective Session scoped, the following
code snippet
# will not work in a Perspective Session due to limitations of launching programs
from a web environment.
system.util.execute(['C:\\Program Files\\Mozilla Firefox\\firefox.exe',
'https://www.google.com'])
```

Example #3

```
# This code runs the Notepad program and opens the Ignition license text file.
# Although system.util.execute() is also Perspective Session scoped, the following
code snippet
# will not work in a Perspective Session due to limitations of launching programs
from a web environment.
system.util.execute(['notepad.exe', 'C:\\Program Files\\Inductive
Automation\\Ignition\\license.txt'])
```

system.util.exit

This function is used in **Python Scripting**.

Description

Exits the running client, as long as the shutdown intercept script doesn't cancel the shutdown event. Set force to true to not give the shutdown intercept script a chance to cancel the exit. Note that this will quit the Client completely. you can use system.security.logout() to return to the login screen.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.exit([force])
```

Parameters

Type	Parameter	Description
Boolean	`force`	If true (1), the shutdown-intercept script will be skipped. Default is false (0). [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code would exit the client after confirming with the user.
if system.gui.confirm("Are you sure you want to exit?"):
    system.util.exit()
```

system.util.getAvailableLocales

This function is used in **Python Scripting**.

Description

Returns a collection of strings representing the Locales added to the Translation Manager, such as 'en' for English.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getAvailableLocales()
```

Parameters

Nothing

Returns

List - A list of Java **Locale** objects.

Scope

Vision Client

Code Examples

Example #1

```
```

```
#This code will take all of the available locales, and put them into a text field
on the same window.

collection = system.util.getAvailableLocales()
locales = ''
for locale in collection:
    if locales == '':
        locales += locale
    else:
        locales += ", " + locale
event.source.parent.getComponent('Text Field').text = locales
```

system.util.getAvailableTerms

This function is used in **Python Scripting**.

Description

Returns a collection of available terms defined in the translation system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getAvailableTerms()
```

Parameters

Nothing

Returns

List - A list of all of the terms available from the translation manager, as strings.

Scope

Vision Client

Code Examples

Example #1

```
# This code will print out a list of all of the available terms to the console.

collection = system.util.getAvailableTerms()
for term in collection:
    print term
```

system.util.getClientId

This function is used in **Python Scripting**.

Description

Returns a hex-string that represents a number unique to the running client's session. You are guaranteed that this number is unique between all running clients.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getClientId()
```

Parameters

Nothing

Returns

String - A special code representing the client's session in a unique way.

Scope

Vision Client

Code Examples

Example #1

```
# This code prints the current client's id to the debug console.
id = system.util.getClientId()
print id
```

system.util.getConnectionMode

This function is used in **Python Scripting**.

Description

Retrieves this client session's current connection mode. 3 is read/write, 2 is read-only, and 1 is disconnected.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getConnectionMode()
```

Parameters

Nothing

Returns

Integer - The current connection mode for the client.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code will set a client to read-only after a timeout of 30 seconds.
# Add this code to a client timer script

mode = system.util.getConnectionMode()
if mode == 3 and system.util.getInactivitySeconds() > 30:
    system.util.setConnectionMode(2)
```

system.util.getConnectTimeout

This function is used in **Python Scripting**.

Description

Returns the connect timeout in milliseconds for all client-to-gateway communication. This is the maximum amount of time that communication operations to the Gateway will be given to connect. The default is 10,000ms (10 seconds).

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getConnectTimeout()
```

Parameters

Nothing

Returns

Integer - The current connect timeout, in milliseconds. Default is 10,000 (ten seconds)

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code would print out the current connect timeout
print system.util.getConnectTimeout()
```

system.util.getEdition

This function is used in **Python Scripting**.

Description

Returns the "edition" of the Vision client - "standard", "limited", or "panel".

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getEdition()
```

Parameters

Nothing

Returns

String - The edition of the Vision module that is running the client.

Scope

Vision Client

Code Examples

Example #1

```
# This code will write the Vision module edition to a text field on the same page.

event.source.parent.getComponent('Text Field').text = system.util.getEdition()
```

system.util.getGatewayAddress

This function is used in **Python Scripting**.

Description

Returns the address of the Gateway with which the Client is currently communicating.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getGatewayAddress()
```

Parameters

Nothing

Returns

String - The address of the Gateway with which the client is communicating.

Scope

Vision Client

Code Examples

Example #1

```
# This code would open up the gateway config page.
address = system.util.getGatewayAddress()
system.net.openURL("%s/web/config/" % address)
```

system.util.getGatewayStatus

This function is used in **Python Scripting**.

Description

Returns a string that indicates the status of a Gateway. A status of `RUNNING` means the Gateway is fully functional. If an exception occurs, the function returns `ERROR` with the associated error message appended. This function can be used to test the availability and operational state of a remote Gateway.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getGatewayStatus(gatewayAddress, [connectTimeoutMillis], [socketTimeoutMillis])
```

Parameters

Type	Parameter	Description
String	`gatewayAddress`	The Gateway address to ping, in the form of ADDR:PORT.
Integer	`connectTimeoutMillis`	The maximum time in milliseconds to attempt to initially contact a Gateway. [optional]
Integer	`socketTimeoutMillis`	The maximum time in milliseconds to wait for a response from a Gateway after initial connection has been established. [optional]
Boolean	`bypassCertValidation`	If the target address is an HTTPS address, and this parameter is True, the system will bypass all SSL certificate validation. This is not recommended, though is sometimes necessary for self-signed certificates.

Returns

String - A string that indicates the status of the Gateway. A status of RUNNING means that the Gateway is fully functional.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
REMOTE_GATEWAY = "10.20.6.253:8088"

def check_remote_gateway(address=REMOTE_GATEWAY):

    try:
        status = system.util.getGatewayStatus(address)
    except Exception as err:
        print "Error checking Gateway status for {0}: {1}".format(address, err)
        return

    if status == "RUNNING":
        print "Central Gateway is available!"
    else:
        print "Central Gateway status: {0}".format(status)

# Run asynchronously so the call doesn't block the calling thread (UI/gateway
event thread).
system.util.invokeAsynchronous(check_remote_gateway)
```

system.util.getGlobals

This function is used in **Python Scripting**.

Description

This method returns a dictionary that provides access to the legacy global namespace. As of version 7.7.0, most new scripts use the modern style of scoping, which makes the 'global' keyword act very differently. Most importantly, the modern scoping rules mean that variables declared as 'global' are only global within that one module. The system.util.getGlobals() method can be used to interact with older scripts that used the old meaning of the 'global' keyword.

New in 8.1.0 The globals dictionary now persists across the lifetime of the JVM, and is accessible at system.util.globals. This means system.util.globals will work as an alternative to system.util.getGlobals. However, system.util.getGlobals is still the only option that will appear in the Designer's autocomplete feature.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getGlobals()
```

Parameters

Nothing

Returns

Dictionary[String, Any] - The global namespace, as a dictionary.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1 - system.util.getGlobals

```
# Read and print out global variable 'foo'
print system.util.getGlobals()['foo']
```

Example #2 - system.util.globals

```
# Write value 'hello' to global variable 'foo'
system.util.globals['foo'] = 'hello'
```

system.util.getInactivitySeconds

This function is used in **Python Scripting**.

Description

Returns the number of seconds since any keyboard or mouse activity.

> **NOTE**
>
> This function will always return zero in the Designer.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getInactivitySeconds()
```

Parameters

Nothing

Returns

Integer - The number of seconds the mouse and keyboard have been inactive for this client.

Scope

Vision Client

Code Examples

Example #1

```
# This code could run in a global timer script.
# After a 5-minute timeout, navigate back to the home screen
if system.util.getInactivitySeconds()>300 and
system.nav.getCurrentWindow()!="Home":
   system.nav.swapTo("Home")
```

system.util.getLocale

This function is used in **Python Scripting**.

Description

Returns the current string representing the user's Locale, such as 'en' for English.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getLocale()
```

Parameters

Nothing

Returns

String - String representing the user's Locale, such as 'en' for English.

Scope

Vision Client

Code Examples

Example #1

```
```

```
# print a test if they are using English
locale = system.util.getLocale()
if locale == "en":
    print "Using English"
```

system.util.getLogger

This function is used in **Python Scripting**.

Description

Returns a Logger object that can be used to log messages to the console. Each Logger has a name, which is typically structured hierarchically using periods, indicating where in the project the Logger is used. You can use any naming scheme you like, however a well-planned naming scheme makes finding log entries and setting log levels much easier. Loggers can be shared between scripts simply by giving them the same name. Six levels of logging are available:

- Fatal - A severe error that will cause termination of the script.
- Error - A runtime error or other unexpected condition.
- Warn - An undesired condition, but one that does not interfere with execution.
- Info - An event that should be noted on the console, but is not an error.
- Debug - Detailed information useful in debugging.
- Trace - Highly detailed information.

To view log messages from Gateway scripts, in the Gateway go to Status > Diagnostics > Logs. To view log messages from Client scripts, including scripts in components, in the Client go to Help > Diagnostics > Log Viewer, or in the Designer go to Tools > Console. The default logging level is info, meaning that all messages with level info or higher are logged, and messages with a level of debug or trace are discarded.

To change the logging level for a Logger in a Gateway script, go to Status > Diagnostics > Logs > Click the Settings  icon. The new logging level will remain until it is changed or the Gateway is restarted. To change the logging level in a Client script, go to Help > Diagnostics > Logging Levels. Logging levels can not be changed in the Designer. The following methods are available to a Logger:

- Logger.fatal(String) - Logs a message with level fatal.
- Logger.fatalf(String, Args...) - Logs a formatted message with level fatal, using Java's Formatter syntax.
- Logger.error(String) - Logs a message with level error.
- Logger.errorf(String, Args...) - Logs a formatted message with level error, using Java's Formatter syntax.
- Logger.warn(String) - Logs a message with level warn.

- Logger.warnf(String, Args...) - Logs a formatted message with level warn, using Java's Formatter syntax.
- Logger.info(String) - Logs a message with level info.
- Logger.infof(String, Args...) - Logs a formatted message with level info, using Java's Formatter syntax.
- Logger.debug(String) - Logs a message with level debug.
- Logger.debugf(String, Args...) - Logs a formatted message with level debug, using Java's Formatter syntax.
- Logger.trace(String) - Logs a message with level trace.
- Logger.tracef(String, Args...) - Logs a formatted message with level trace, using Java's Formatter syntax.
- Logger.isTraceEnabled() - Returns True if the current log level is at least trace.
- Logger.isDebugEnabled() - Returns True if the current log level is at least debug.
- Logger.isInfoEnabled() - Returns True if the current log level is at least info.

> **NOTE**
>
> Log messages generated from this function are always sent to the calling scope's console.
>
> - Designer - **Designer Console**
> - Vision - Vision Client Console: Help menu > Diagnostics > Console tab
> - Perspective and Gateway - Gateway's **Diagnostic Logs** page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getLogger(name)
```

Parameters

Type	Parameter	Description
String	`name`	The name of a logger to create.

Returns

LoggerEx - A new **LoggerEx** object used to log informational and error messages.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would log a message with level info
logger = system.util.getLogger("myLogger")
logger.info("Hello, world.")
```

Example #2 - Python String Formatting syntax

```
# This code would log a formatted message with level info.
who = 'Bob Jones'
num = 5
logger = system.util.getLogger("myLogger")
logger.info("Machine started by %s, employee ID %d"% (who, num))
```

Example #3 - Java's Formatter syntax

```
# This code would log a formatted message with level info. Similar to the "Python
String Formatting syntax" example above, but using Java's Formatter syntax
# Note the 'f' at the end of the method name.
who = 'Bob Jones'
num = 5
logger = system.util.getLogger("myLogger")
logger.infof("Machine started by %s, employee ID %d", who, num)
```

Example #4

```

```

```
# This code would check if the debug level is enabled for this logger before
# executing the remaining code. Although not needed for a simple log entry like
# in this example, it can eliminate expensive function calls in a more complex
# log entry.
logger = system.util.getLogger("myLogger")
if logger.isDebugEnabled():
    logger.debug("Hello, world!")
```

system.util.getModules

This function is used in **Python Scripting**.

Description

Returns a dataset of information about each installed module. Each row represents a single module.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getModules()
```

Parameters

Nothing

Returns

Dataset - A dataset, where each row represents a module. Contains five columns: Id, Name, Version, State (Running, Faulted, etc), and its current License Status (Trial, Activated, etc.)

Scope

Gateway

Code Examples

Example #1

```
```

```
#Return the names of all installed modules

results = system.util.getModules()
for row in range(results.rowCount):
    names = results.getValueAt(row, "Name")
    print names
```

system.util.getProjectName

This function is used in **Python Scripting**.

Description

Returns the name of the project that is currently being run. When run from the Gateway scope from a resource that originates from a singular project (reports, SFCs, etc.), will return that resources project.

When called from a scope that does not have an associated project (a Tag Event Script), the function will return the name of the Gateway scripting project. If a Gateway scripting project has not been configured, then returns an empty string.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getProjectName()
```

Parameters

Nothing

Returns

String - The name of the currently running project.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would display the name of the currently running project
system.gui.messageBox("You are running project: %s" %
system.util.getProjectName())
```

system.util.getProperty

This function is used in **Python Scripting**.

Description

Retrieves the value of a named system property. Some of the available properties are:

- file.separator. The system file separator character. (for example, "/" (unix) or "" (windows))
- line.separator. The system line separator string. (for example, "\r\n" (carriage return, newline))
- os.arch. Operating system architecture. (for example, "x86")
- os.name. Operating system name. (for example, "Windows XP")
- os.version. Operating system version. (for example, "5.1")
- user.home. User's home directory.
- user.name. User's account name.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getProperty(propertyName)
```

Parameters

Type	Parameter	Description
String	`propertyName`	The name of the system property to get.

Returns

String - The value for the named property.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script would store the contents of the Text Area component in the users
home directory.
homeDir = system.util.getProperty("user.home")
sep = system.util.getProperty("file.separator")
path = "%s%smyfile.txt" %(homeDir, sep)
system.file.writeFile(path, event.source.parent.getComponent("Text Area").text)
```

system.util.getReadTimeout

This function is used in **Python Scripting**.

Description

Returns the read timeout in milliseconds for all client-to-gateway communication. This is the maximum amount of time allowed for a communication operation to complete. The default is 60,000ms (1 minute).

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getReadTimeout()
```

Parameters

Nothing

Returns

Integer - The current read timeout, in milliseconds. Default is 60,000 (one minute)

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code will find the current read timeout and write it to a numeric text
field on the same page.

event.source.parent.getComponent('Numeric Text Field').intValue =
system.util.getReadTimeout()
```

system.util.getSessionInfo

This function is used in **Python Scripting**.

Description

Returns a PyDataSet holding information about all of the open Designer sessions and Vision Clients. Optional regular-expression based filters can be provided to filter the username or the username and the project returned.

Key	Description	Value
username	The username of the Session.	String
project	The project name associated with the Session.	String
address	The client's network address (IP address or hostname).	String
isDesigner	Whether the Session is a Designer Session (**True** or **False**)	Boolean
clientId	The unique ID of the client.	String
creationTime	The date when the Session was created.	Date

This function will not return all sessions across a cluster - only the cluster node that is being communicated with by the client who makes the call.

> **TIP**
>
> This function accepts keyword arguments.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getSessionInfo([usernameFilter], [projectFilter])
```

Parameters

Type	Parameter	Description
String	`usernameFilter`	A regular-expression based filter string to restrict the list by username. [optional]
String	`projectFilter`	A regular-expression based filter string to restrict the list by project [optional]

Returns

PyDataSet - A dataset representing the Gateway's current sessions.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code would get the entire table of sessions and put it in an adjacent table
table = event.source.parent.getComponent("Table")
sessions = system.util.getSessionInfo()
table.data = system.db.toDataSet(sessions)
```

Example #2

```
# This code would count the number of times a user named "billy" is logged in
sessions = system.util.getSessionInfo("billy")
system.gui.messageBox("Billy has %d sessions" % len(sessions))
```

Example #3

```
# This code would return session info on all users starting with the letters "bi"
sessions = system.util.getSessionInfo("bi.*")
```

Example #4

```
# This code uses a single character wildcard in the username
sessions = system.util.getSessionInfo("bi.ly")
```

Example #5

```
# This code would return session info on a user named "bill.smith"
sessions = system.util.getSessionInfo("bill\.smith")
```

system.util.getSystemFlags

This function is used in **Python Scripting**.

Description

Returns an integer that represents a bit field containing information about the currently running system. Each bit corresponds to a specific flag as defined in the bitmask below. The integer return will be a total of all of the bits that are currently active. See the example for tips on how to extract the information in this bit field. Note that the tag `[System]Client/System/SystemFlags` contains the same value.

Flag	Flag Description	Bit Value
Designer Flag	Set if running in the Designer.	1
Preview Flag	Set if running in the Designer, and the Designer is in preview mode.	2
Client Flag	Set if running as a Client.	4
Webstart Flag	Set if running as a Client in Web Start mode.	8
Applet Flag	Set if running as a Client in Applet mode.	16
Fullscreen Flag	Set if running as a Client in full screen mode.	32
SSL Flag	Set if communication to the Gateway is encrypted with SSL.	64
Mobile Flag	Set if currently running a mobile-launched client.	128

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

`system.util.getSystemFlags()`

Parameters

Nothing

Returns

Integer - A total of all the bits that are currently active. A full-screen Client launched from the Gateway webpage with no SSL will have a value of 44 (Fullscreen flag + Webstart Flag + Client Flag).

Scope

Vision Client

Code Examples

Example #1

```
# The first part of the script will take the integer representing the system
flags, convert it to bits, and place it in a list and then print it out.
# The second part of the script will take the list of bits, and place it in a
table showing what each of the bits represent.

myList = []
flags = system.util.getSystemFlags()
for i in range(8,-1,-1):
    myList.insert(0, flags >> i & 1)
print myList

headers = ["Designer Flag", "Preview Flag", "Client Flag", "Webstart Flag",
"Applet Flag", "Fullscreen Flag", "SSL Flag", "Mobile Flag", "Staging Flag"]
data = system.dataset.toDataSet(headers, [myList])
table = event.source.parent.getComponent("Table")
table.data = data
```

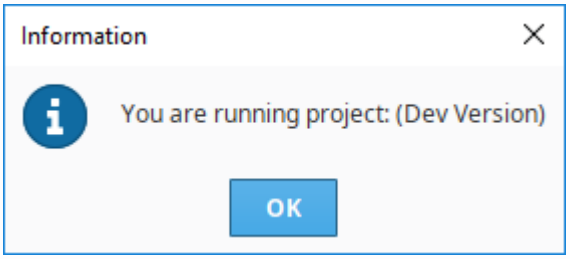
system.util.getVersion

This function is used in **Python Scripting**.

Description

Returns the Ignition version number that is currently being run.

> **NOTE**
>
> If the version is from a nightly build or developer version that is not yet released, the version number will come back as "Dev Version", for example:



Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.getVersion()
```

Parameters

Nothing

Returns

Version - The currently running Ignition version number, as a **Version** object.

Scope

Gateway, Vision Client, Perspective Session

The following table documents available attributes on the object.

Method and/or Attribute	Description	Return Type
.major	Returns only the major version number. 8.0.2 returns 8	Integer
.minor	Returns only the minor version number. 8.0.2 returns 0	Integer
isFutureVersion()	Takes in a string version number and returns whether the current version is greater than the given version (true or false). Note: this does account for Snapshot, RC or Beta versions. Version format expected: "X.X.X" ie "8.1.53" See example below.	Boolean

Code Examples

Example #1

```
# This code displays the name of the currently running Ignition version number.
system.gui.messageBox("You are running project: %s" % system.util.getVersion())
```

Example #2

```
# This code displays whether a given version is older than the current version.
currentVersion = system.util.getVersion()
testVersion = "8.1.53"
isFuture = currentVersion.isFutureVersion(testVersion)
print "Your version (%s) is older than %s: %s" %(currentVersion, testVersion,
isFuture)
```

system.util.invokeAsynchronous

This function is used in **Python Scripting**.

Description

Invokes (calls) the given Python function on a different thread. This means that calls to invokeAsynchronous will return immediately, and then the given function will start executing asynchronously on a different thread. This is useful for long-running data intensive functions, where running them synchronously (in the GUI thread) would make the GUI non-responsive for an unacceptable amount of time.

> **CAUTION**
>
> This function should not be used to asynchronously interacts with the GUI in Vision. This means interacting with window navigation, setting and getting component properties, showing error/message popups, and really any other methods that can interact with components and windows. If you need to do something with the GUI in Vision with this function, this must be achieved through a subsequent call to **system.util.invokeLater**.
>
> By contrast, this function is safe to use in the gateway, which also means calls from Perspective are safe.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.invokeAsynchronous(function, [args], [kwargs], [description])
```

Parameters

Type	Parameter	Description
Callable	`function`	A Python function object that will be invoked in a newly created thread.
List [Any]	`args`	A list or tuple of Python objects that will be provided to the called function as arguments. Equivalent to the * **operator**. [optional]
Dictionary[String, Any]	`kwargs`	A dictionary of keyword argument names to Python object values that will be provided to the called function as keyword arguments. Equivalent to the ** **operator**. [optional]
String	`description`	A description to use for the asynchronous thread. Will be displayed on the current scope's diagnostic view for scripts. For Vision and the Designer, this would be the "Scripts" tab of the Diagnostics popup. For Perspective and the Gateway scope, this would be the Gateway's **Running Scripts** status page. [optional]

Returns

Thread - The executing **Thread**.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
```

```
# This code would do some data-intensive processing, and then call
# back to the GUI to let it know that it is finished.
# We use default function parameters to pass the root container into these
# functions. (See a Python reference if you don't understand this)

def longProcess(rootContainer = event.source.parent):
   # Do something here with the database that takes a long time
   results = ...( something )
   # Now we'll send our results back to the UI
   def sendBack(results = results, rootContainer = rootContainer):
      rootContainer.resultsProperty = results
   system.util.invokeLater(sendBack)

system.util.invokeAsynchronous(longProcess) #Note that this is 'longProcess'
instead of 'longProcess()'
```

system.util.invokeLater

This function is used in **Python Scripting**.

Description

Invokes (calls) the given Python function object after all of the currently processing and pending events are done being processed, or after a specified delay. The function will be executed on the GUI, or event dispatch, thread. This is useful for events like propertyChange events, where the script is called before any bindings are evaluated.

If you specify an optional time argument (number of milliseconds), the function will be invoked after all currently processing and pending events are processed plus the duration of that time.

Note that you will also need to use **system.gui.desktop** for multi-monitor setups.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.invokeLater(function, [delay])
```

Parameters

Type	Parameter	Description
Callable	`function`	A Python function object that will be invoked later, on the GUI, or event-dispatch, thread with no arguments.
Integer	`delay`	A delay, in milliseconds, to wait before the function is invoked. The default is 0, which means it will be invoked after all currently pending events are processed. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# The code in the update/refresh button uses the 'date' property on the two
# calendar components, which are bound to the current_timestamp property on their
# parent. We want to simulate a button press when the window opens, but only
# after the date properties' bindings have been evaluated.

if event.propertyName == 'current_timestamp':
    # Define a function to click the button
    def clickButton(button = event.source.parent.getComponent('Refresh')):
        button.doClick()
        system.gui.messageBox("Button has been clicked!")

    # Tell the system to invoke the function after
    # the current event has been processed
    system.util.invokeLater(clickButton)
```

system.util.jsonDecode

This function is used in **Python Scripting**.

Description

Takes a JSON string and converts it into a Python object such as a list or a dictionary. If the input is not valid JSON, a string is returned.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.jsonDecode(jsonString)
```

Parameters

Type	Parameter	Description
String	`jsonString`	The JSON string to decode into a Python object.

Returns

Any - The decoded Python object. See the table below for a listing of how JSON objects are mapped to Python objects.

Scope

Gateway, Vision Client, Perspective Session

JSON to Python Mapping

The table below lists possible JSON types, and the Python types this function maps to.

JSON Type	Mapped Python Type
Boolean (true/false)	Boolean (True/False)
String	String
Numeric	Number (Float, Integer)
null	None
Array	List
Object	Dictionary

Code Examples

Example #1

```
# The following example reads in a JSON string, and converts the string to a
Python object.
# The example attempts to read the JSON string from a text file, but this could
easily be modified to read data from a web server.

# Read the JSON string
jsonString = system.file.readFileAsString("C:\tmp\\json.txt")

# Decode the JSON string and store the results into a variable
obj = system.util.jsonDecode(jsonString)

# Do something with the results. The code below prints the datatype of the results
to the console.
print type(obj)
```

system.util.jsonEncode

This function is used in **Python Scripting**.

Description

Takes a Python object such as a list or dictionary and converts into a JSON string.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.jsonEncode(pyObj, [indentFactor])
```

Parameters

Type	Parameter	Description
Any	`pyObj`	The Python object to encode into JSON such as a Python list or dictionary.
Integer	`indentFactor`	The number of spaces to add to each level of indentation for prettyprinting. [optional]

Returns

String - The encoded JSON string.

Scope

Gateway, Vision Client, Perspective Session

JSON to Python Mapping

The table below lists possible Python types, and how they map to JSON objects.

JSON Type	Mapped Python Type
Boolean (true/false)	Boolean (True/False)
String	String
Numeric	Number (Float, Integer)
null	None
Array	Sequence
Object	Dictionary
New in 8.1.28 Float	BigDecimal (Java)

Code Examples

Example #1

```
# The following example builds a Python dictionary, and converts it to a JSON string

# Build the Python dictionary
employeeDict = {"employees":[{"firstName":"John", "lastName":"Doe"},
{"firstName":"Anna", "lastName":"Smith"},{"firstName":"Peter",
"lastName":"Jones"}]}

# Convert the dictionary and store the resulting JSON string in a variable.
jsonString = system.util.jsonEncode(employeeDict)
```

system.util.modifyTranslation

This function is used in **Python Scripting**.

Description

This function allows you to add or modify a global translation.

Client Permission Restrictions

Permission Type: Translation Management

Client access to this scripting function is blocked to users that do not meet the role/zone requirements for the above permission type. This function is unaffected when run in the Gateway scope.

Syntax

```
system.util.modifyTranslation(term, translation, [locale])
```

Parameters

Type	Parameter	Description
String	`term`	The key term to translate.
String	`translation`	The translated value to store.
String	`locale`	If specified, the locale code (such as "es") identifying the language of the translation. Otherwise, the currently set language is used.[optional]

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This code adds or updates a translation into French
# for the world Hello. Note the u in front "Allô!", which
# is needed for Python strings outside of the 7-bit ASCII
# range.
system.util.modifyTranslation("Hello", u"Allô!", "fr")
```

system.util.playSoundClip

This function is used in **Python Scripting**.

Description

Plays a sound clip from a wav file to the system's default audio device. The wav file can be specified as a filepath, a URL, or directly as a raw List[Byte].

A Word on Scope

While this function is technically scoped for Gateway and Perspective Sessions, it's intended for use in Vision Clients.

When calling this function from the Gateway scope, the sound will not play unless the operating system has been configured to allow services to play sounds (an uncommon scenario).

When calling this function from Perspective, the script also executes on the Gateway, meaning the caveat above about allowing services to play sounds is a factor. In addition, the sound will play on the Gateway, not the session. To play sounds from a Perspective Session, it's recommended to use the play() component method on the **Perspective Audio** component.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Using a Byte List

```
system.util.playSoundClip(wavBytes, [volume], [wait])
```

Parameters

Type	Parameter	Description
List[Byte]	`wavBytes`	A byte list of a wav file.
Float	`volume`	The clip's volume, represented as a floating point number between 0.0 and 1.0. [optional]
Boolean	`wait`	A boolean flag indicating whether or not the call to playSoundClip should block further script execution within the triggering event until the clip finishes. Useful in cases where code on lines after the playSoundClip call should wait until the sound clip finishes playing. [optional]

Returns

Nothing

Scope

Gateway*, Vision Client, Perspective Session*
*See **A Word on Scope** above.

Syntax - Using a Filepath or URL

```
system.util.playSoundClip(wavFile [, volume] [, wait])
```

Parameters

Type	Parameter	Description
String	`wavFile`	A filepath or URL that represents a wav file.
Float	`volume`	The clip's volume, represented as a floating point number between 0.0 and 1.0. [optional]
Boolean	`wait`	A boolean flag indicating whether or not the call to playSoundClip should block further script execution within the triggering event until the clip finishes. Useful in cases where code on lines after the playSoundClip call should wait until the sound clip finishes playing. [optional]

Returns

Nothing

Scope

Gateway*, Vision Client, Perspective Session*
*See **A Word on Scope** above.

Code Examples

Example #1

```
# This code would play a sound clip at full volume that was located on the current
# host's filesystem. It will not return until the clip in finished playing.
system.util.playSoundClip("C:\\sounds\\siren.wav")
```

Example #2

```
# This code would pull a sound clip out of a BLOB field from a database,
# playing it asynchronously at half volume.

query = "SELECT wavBlob FROM sounds WHERE type='alert_high'"
soundData = system.db.runScalarQuery(query)

system.util.playSoundClip(soundData, 0.5, 0)
```

system.util.queryAuditLog

This function is used in **Python Scripting**.

Description

Queries an audit profile for audit history. Returns the results as a dataset.

A description of the returned dataset can be found on the **Ignition Database Table Reference** page.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax - Gateway Scope

```
system.util.queryAuditLog(auditProfileName, [startDate], [endDate], [actorFilter], [actionFilter], [targetFilter], [valueFilter], [systemFilter], [contextFilter])
```

Parameters

Type	Parameter	Description
String	`auditProfileName`	The name of the audit profile to pull the history from.
Date	`startDate`	The earliest audit event to return. If omitted, the current time - 8 hours will be used. [optional]
Date	`endDate`	The latest audit event to return. If omitted, the current time will be used. [optional]
String	`actorFilter`	A filter string used to restrict the results by actor. [optional]
String	`actionFilter`	A filter string used to restrict the results by action. [optional]
String	`targetFilter`	A filter string used to restrict the results by target. [optional]
String	`valueFilter`	A filter string used to restrict the results by value. [optional]
String	`systemFilter`	A filter string used to restrict the results by system. [optional]
Integer	`contextFilter`	A bitmask used to restrict the results by context. 0x01 = Gateway, 0x02 = Designer, 0x04 = Client. [optional]

Returns

Dataset - A dataset with the audit events from the specified profile that match the filter arguments.

Scope

Gateway

Syntax - Perspective Session and Vision Client Scope

```
system.util.queryAuditLog([auditProfileName], [startDate], [endDate], [actorFilter], [actionFilter], [targetFilter], [valueFilter], [systemFilter], [contextFilter])
```

Parameters

Type	Parameter	Description
String	`auditProfileName`	The name of the audit profile to pull the history from. [optional] **Note:** The project must have an Audit Profile configured in Project Properties. Otherwise this parameter is mandatory.
Date	`startDate`	The earliest audit event to return. If omitted, the current time - 8 hours will be used. [optional]
Date	`endDate`	The latest audit event to return. If omitted, the current time will be used. [optional]
String	`actorFilter`	A filter string used to restrict the results by actor. [optional]
String	`actionFilter`	A filter string used to restrict the results by action. [optional]
String	`targetFilter`	A filter string used to restrict the results by target. [optional]
String	`valueFilter`	A filter string used to restrict the results by value. [optional]
String	`systemFilter`	A filter string used to restrict the results by system. [optional]
Integer	`contextFilter`	A bitmask used to restrict the results by context. 0x01 = Gateway, 0x02 = Designer, 0x04 = Client. [optional]

Returns

Dataset - A dataset with the audit events from the specified profile that match the filter arguments.

Scope

Perspective Session, Vision Client

Code Examples

Example #1

```
# This script queries an audit log, checks to see if a user john made any tag
writes in the last 8 hours
# (since the startDate parameter is omitted), and writes the results to a table.
data = system.util.queryAuditLog(auditProfileName='AuditLog', actorFilter='john',
actionFilter='tag write')

event.source.parent.getComponent("Table").data = data
```

system.util.retarget

This function is used in **Python Scripting**.

Description

This function allows you to programmatically 'retarget' a Vision Client to a different project and/or different Gateway. You can have it switch to another project on the same Gateway, or another Gateway entirely, even across a WAN. This feature makes the vision of a seamless, enterprise-wide SCADA application a reality.

The retarget feature will attempt to transfer the current user credentials over to the new project / Gateway. If the credentials fail on that project, the user will be prompted for a valid username and password. Once valid authentication has been achieved, the currently running project is shut down, and the new project is loaded.

You can pass any information to the other project through the parameters dictionary. All entries in this dictionary will be set in the global scripting namespace in the other project. Even if you don't specify any parameters, the system will set the variable _RETARGET_FROM_PROJECT to the name of the current project and _RETARGET_FROM_GATEWAY to the address of the current Gateway. Parameters can be accessed from the other project by calling **system.util.getGlobals**[parameterKey].

> **NOTE**
>
> You cannot retarget across different major Ignition versions, such as 7.9 to 8.0.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

`system.util.retarget(project, [addresses], [params], [windows])`

Parameters

Type	Parameter	Description
String	`project`	The name of the project to retarget to.
String or List	`addresses`	The address of the Gateway that the project resides on. If omitted, the current Gateway will be used. Format is `host:port` when not using SSL/TLS, or `https://host:port` when SSL/TLS is enabled on the target gateway. This can be a list of strings. When using a list, the function will try each address in order, waiting for the timeout period between each address attempt. [optional]
Dictionary[String, Any]	`params`	A dictionary of parameters that will be passed to the new project. They will be set as global variables in the new project's Python scripting environment. [optional]
List[String]	`windows`	A list of window paths to use as the startup windows. If omitted, the project's normal startup windows will be opened. If specified, the project's normal startup windows will be ignored, and this list will be used instead. [optional]

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This code would switch to a project named 'TankControl' on the same Gateway
# as the currently running project
system.util.retarget("TankControl")
```

Example #2

```
# Similar to the above example, except passes a parameter to the new project via
keyword arguments.
system.util.retarget("TankControl", params = {"SomeParameter":1234})
```

Example #3

```
# This code would switch to a project named "TankControl" on a
# Gateway located at a different IP address running on port 8080, and
# would open the window named "Graph", and set a global JYTHON variable in the
# new project named "retargetOccured" to the value 1 (one).
system.util.retarget("TankControl", "10.30.2.33:8080", {"retargetOccured":1},
["Graph"])
```

Example #4

```
# This example is similar to the previous, except it could be used to retarget to
a gateway that
# has SSL/TLS enabled. Simply specify "https://" at the start of the address.
system.util.retarget("TankControl", "https://10.30.2.33:8043",
{"retargetOccured":1}, ["Graph"])
```

Example #5

```
# This code would switch to a project named "TankControl" on a
# Gateway located at a different IP address using SSL on port 8043.
system.util.retarget("TankControl", "https://10.30.2.34:8043")
```

Example #6

```
# This code would be put in a button in the target that was retargeted to,
# and act as a 'back' button, that would retarget back to the original project.

# Fetch the global values that are automatically created when you retarget.
project = system.util.getGlobals()['_RETARGET_FROM_PROJECT']
gateway = system.util.getGlobals()['_RETARGET_FROM_GATEWAY']

# Retarget.
system.util.retarget(project, gateway)
```

system.util.sendMessage

This function is used in **Python Scripting**.

Description

This function sends a message to clients running under the Gateway or to a project within the Gateway itself. To handle received messages, you must set up event script message handlers within a project. These message handlers run Jython code when a message is received. You can add message handlers under the **Message** section of the client/Gateway event script configuration dialogs.

Messages cannot be received within a Designer. However, messages can be sent within the Designer in a script (assuming that read/write comm is enabled).

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.sendMessage(project, messageHandler, [payload], [scope], [clientSessionId], [user], [hasRole], [hostName], [remoteServers])
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project containing the message handler.
String	`messageHandler`	The name of the message handler that will fire upon receiving a message.
Dictionary[String, Any]	`payload`	A dictionary which will get passed to the message handler. Use "payload" in the message handler to access dictionary variables. [optional]
String	`scope`	Limits the scope of the message delivery to "C" (clients), "G" (Gateway), "CG" for clients and the Gateway, or "S" Session. Any combination of C, G, and S are available. Defaults to "CS" if the user name, role, or host name parameters are set, and to "CGS" if none of these parameters are set. [optional]
String	`clientSessionId`	Limits the message delivery to a client with the specified session ID. [optional]
String	`user`	Limits the message delivery to clients where the specified user has logged in. [optional]
String	`hasRole`	Limits the message delivery to any client where the logged in user has the specified user role. [optional]
String	`hostName`	Limits the message delivery to the client that has the specified network host name. [optional]
List	`remoteServers`	A list of Strings representing Gateway Server names. The message will be delivered to each server in the list. Upon delivery, the message is distributed to the local Gateway and clients as per the other parameters. [optional]

Returns

List - A List of strings containing information about each system that was selected for delivery, where each List item is comma-delimited.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example 1

Client and Gateway Scope Script

```
# Simple message to both Client and Gateway handlers.
project="X"
# It's important that both Gateway and Client versions of this message handler have b
messageHandler="myMessageHandler"
scope="CG"
myDict = {'first': "Hello", 'second': "World"}
results=system.util.sendMessage(project,messageHandler,myDict,scope)

# Assuming that there is one local client running project X, the results List will co
#type=Gateway,project=X,messageHandler=testHandler,filterParams={hostName=, clientSes
hasRole=},sendStatus=SENT

#type=Client,sessionId=65F7A472,clientAddress=127.0.0.1,clientHostName=127.0.0.1,proj
{hostName=, clientSessionId=, scope=CG, user=, hasRole=},sendStatus=SENT
```

Example 2

Specified User Script

```
# Message to client handlers only where a specified user is logged in.
system.util.sendMessage(project="X",messageHandler="myMessageHandler",scope="C",user=
```

Example 3

Remote Server Script

```
# Message to remote servers over the Gateway Network (since 7.8.2).
servers = ["agent-8088", "agent-9000"]
system.util.sendMessage(project="X",messageHandler="myMessageHandler",remoteServers=s
```

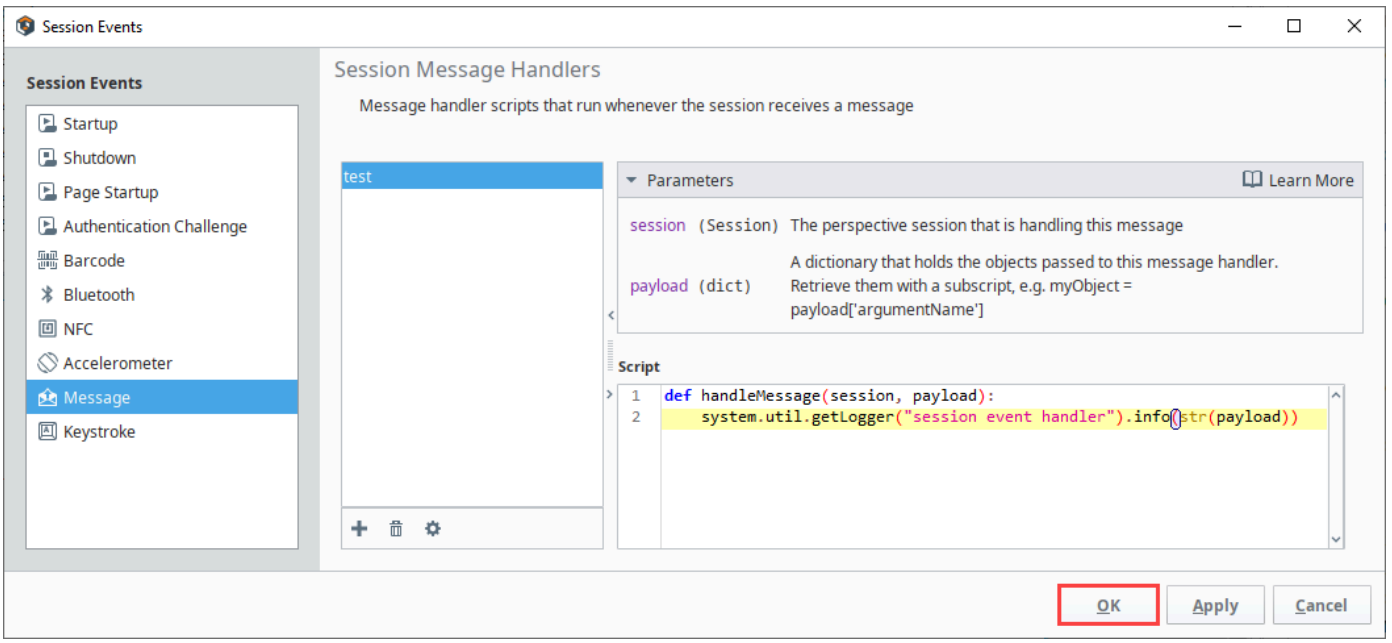
Example 4

The following example demonstrates how to trigger this function with a Tag Change Event.

1. Open the Project tab in the Designer and select **Session Events**.
2. On the Session Events screen, click **Message**.
3. Click the Add ✚ icon.
4. Enter **test** in the Message Handler Settings Name field.
5. Click **OK**.
6. Enter the following script and click **OK**.

Session Message Handler Script

```
def handleMessage(session, payload):
    system.util.getLogger("session event handler").info(str(payload))
```



7. Right-click on a tag in the Tag Browser that will be used to trigger the Tag Change Event and open the Tag Editor. In this example, our tag is a memory tag labeled test.

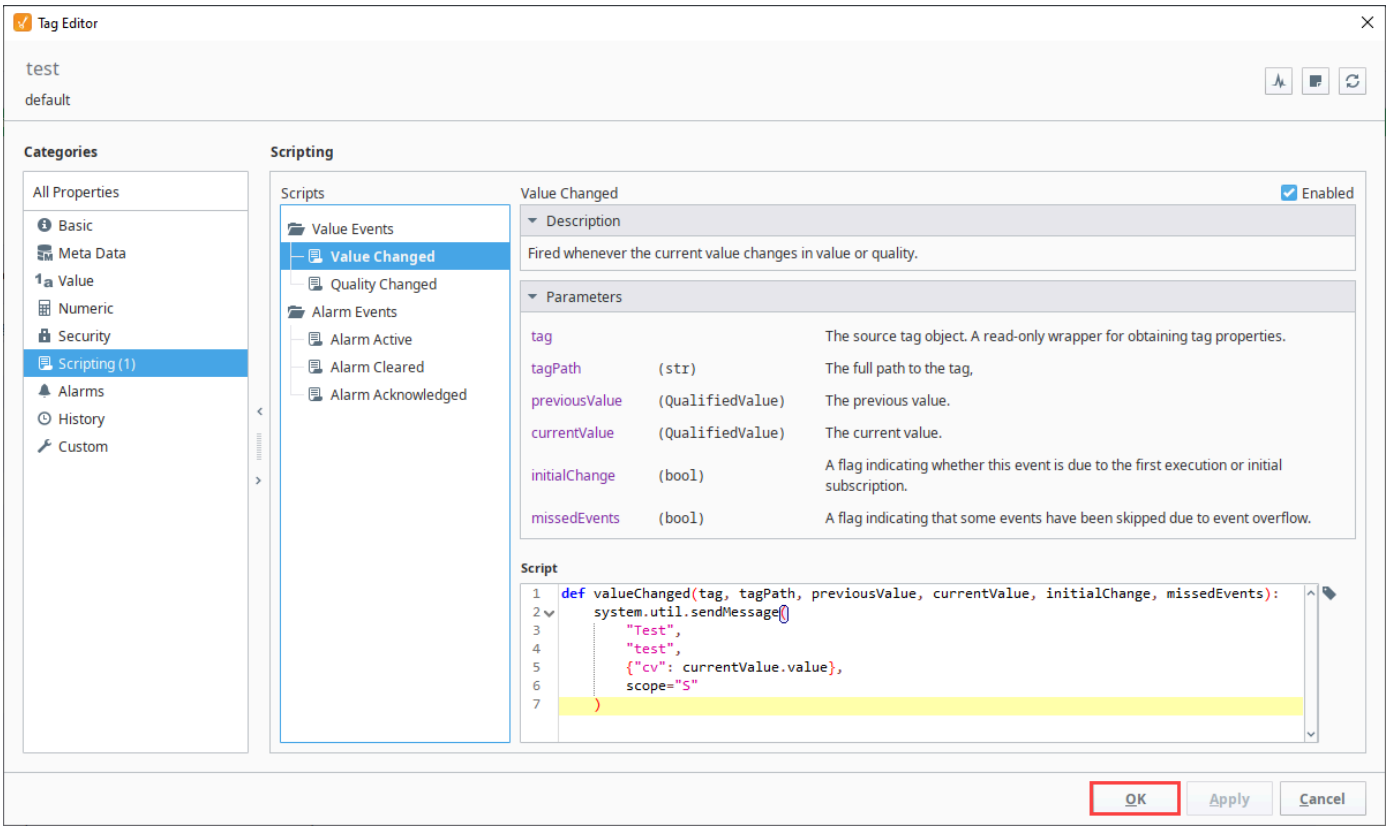
8. Click **Scripting**.

9. Click **Value Events** > **Value Changed**.

10. Enter the following script specifying the project, the message handler, payload, and scope.

Value Changed Script

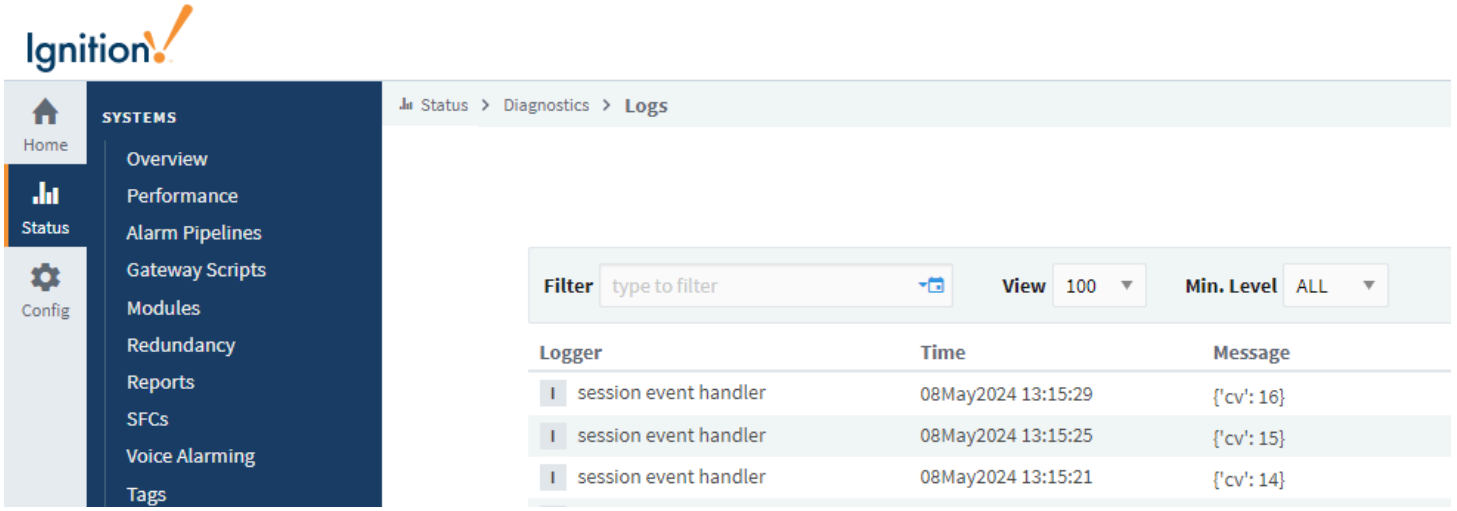
```
def valueChanged(tag, tagPath, previousValue, currentValue, initialChange,
missedEvents):
    system.util.sendMessage(
        "Test",
        "test",
        {"cv": currentValue.value},
        scope="S"
    )
```



11. Click **OK**.

12. Save your project.

Now you can test this example, by launching your Perspective Session and changing the value of your tag. You'll see the messages appear on **Gateway Status** > **Diagnostics** > **Logs** page for each value change.


Ignition
Home
Status
Config
SYSTEMS
Overview
Performance
Alarm Pipelines
Gateway Scripts
Modules
Redundancy
Reports
SFCs
Voice Alarming
Tags
Status > Diagnostics > Logs
Filter
type to filter
View
100
Min. Level
ALL
Logger
Time
Message
I session event handler
08May2024 13:15:29
{'cv': 16}
I session event handler
08May2024 13:15:25
{'cv': 15}
I session event handler
08May2024 13:15:21
{'cv': 14}

system.util.sendRequest

This function is used in **Python Scripting**.

Description

This function sends a message to the Gateway, working in a similar manner to the **sendMessage** function, except sendRequest expects a response to the message. To handle received messages, you must set up Gateway Event Script message handlers within a project. These message handlers run Jython code when a message is received. You can then place a return at the end of the code to return something to where the sendRequest was originally called from. You can add message handlers under the "Message" section of the Gateway Event Script configuration dialog.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.sendRequest(project, messageHandler, [payload], [remoteServer], [timeoutSec])
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project containing the message handler.
String	`messageHandler`	The name of the message handler that will fire upon receiving a message.
Dictionary[String, Any]	`payload`	A dictionary which will get passed to the message handler. Use "payload" in the message handler to access dictionary variables. [optional]
String	`hostName`	Limits the message delivery to the client that has the specified network host name. [optional]
String	`remoteServer`	A string representing a target Gateway Server name. The message will be delivered to the remote Gateway over the Gateway Network. Upon delivery, the message is distributed to the local Gateway and clients as per the other parameters. [optional]
String	`timeoutSec`	The number of seconds before the sendRequest call times out. [optional]

Returns

Object - The return from the message handler.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# Request sent to the message handler 'test' which then saves the return value to
returnValue and prints it.
returnValue = system.util.sendRequest(project='ACME', messageHandler='test',
payload={'hoursOn':15})
print returnValue
```

system.util.sendRequestAsync

This function is used in **Python Scripting**.

Description

This function sends a message to the Gateway and expects a response. Works in a similar manner to the **sendRequest** function, except sendRequestAsync will send the request and then immediately return a handle for it. The Request handle has the following methods:

- get() - Block for result, throw an exception on failure.
- cancel() - Cancel the request. Any completion callback will be called with CancellationException
- block() - Like get(), but will return a Boolean True or False once complete, indicating completion success. If False, call getError() to get the exception object.
- getError() - Returns the error result or null. Similar to get(), in that this will block for a result.
- onSuccess(PyFunction) - Will set a function to run on a successful completion callback or set a new one if one was already defined in the sendRequestAsync call.
- onError(PyFunction) - Will set a function to run on a failed completion callback or set a new one if one was already defined in the sendRequestAsync call.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.sendRequestAsync(project, messageHandler, [payload], [remoteServer], [timeoutSec], [onSuccess], [onError])
```

Parameters

Type	Parameter	Description
String	`project`	The name of the project containing the message handler.
String	`messageHandler`	The name of the message handler that will fire upon receiving a message.
Dictionary[String, Any]	`payload`	A dictionary which will get passed to the message handler. Use "payload" in the message handler to access dictionary variables. [optional]
String	`hostName`	Limits the message delivery to the client that has the specified network host name. [optional]
String	`remoteServer`	A string representing the target Gateway server name. The message will be delivered to the remote Gateway over the Gateway Network. Upon delivery, the message is distributed to the local Gateway and clients as per the other parameters. [optional]
String	`timeoutSec`	The number of seconds before the sendRequest call times out. [optional]
Callable	`onSuccess`	Should take one argument, which will be the result from the message handler. Callback functions will be executed on the GUI thread, similar to **system.util.invokeLater**. [optional]
Callable	`onError`	Should take one argument, which will be the exception encountered. Callback functions will be executed on the GUI thread, similar to **system.util.invokeLater**. [optional]

Returns

Request Handle - The **Request** object that can be used while waiting for the message handler callback.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This will call the message handler 'test', and will return a handle into
myHandle.
# We then call get() on myHandle, which will block the script and will wait for a
return or throw an exception on failure.
myHandle = system.util.sendRequestAsync(project='ACME', messageHandler='test',
payload={'number':55})
myHandle.get()
```

Example #2

```
# This will call the message handler 'test', and will return a handle into
myHandle.
# In this example, we will define a function to run when the message handler has
successfully finished, using the onSuccess function on the Request Handle.

# Note that function accepts a single argument for the message.
def successFunc(message):
    system.gui.messageBox("Successfully finished: %s" % message)

# We're specifying that the request should timeout after 5 seconds.
myHandle = system.util.sendRequestAsync(project='ACME', messageHandler='test',
payload={'number':55}, timeoutSec=5)

# Call the Request Handler's onSuccess function, passing in successFunc.
myHandle.onSuccess(successFunc)
```

system.util.setConnectionMode

This function is used in **Python Scripting**.

Description

Sets the connection mode for the client session. Normally a client runs in mode 3, which is read-write. You may wish to change this to mode 2, which is read-only, which will only allow reading and subscribing to tags, and running SELECT queries. Tag writes and INSERT/UPDATE/DELETE queries will not function. You can also set the connection mode to mode 1, which is disconnected, all tag and query features will not work.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.setConnectionMode(mode)
```

Parameters

Type	Parameter	Description
Integer	`mode`	The new connection mode. 1 = Disconnected, 2 = Read-only, 3 = Read/Write.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This example, which could go in a project's startup script, would check the
current username
# and set the connection mode to read-only if it is the "guest" user.

username = system.security.getUsername()
if "guest" == username.lower():
   # Set "guest" user to read-only mode
   system.util.setConnectionMode(2)
else:
   system.util.setConnectionMode(3)
```

system.util.setConnectTimeout

This function is used in **Python Scripting**.

Description

Sets the connect timeout for Client-to-Gateway communication. Specified in milliseconds.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.setConnectTimeout(connectTimeout)
```

Parameters

Type	Parameter	Description
Integer	`connectTimeout`	The new connect timeout, specified in milliseconds.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This code would set the current connect timeout to 30 seconds
system.util.setConnectTimeout(30000)
```

system.util.setLocale

This function is used in **Python Scripting**.

Description

Sets the user's current Locale. Any valid Java locale code (case-insensitive) can be used as a parameter, including ones that have not yet been added to the Translation Manager. An invalid locale code will cause an Illegal Argument Exception.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.setLocale(locale)
```

Parameters

Type	Parameter	Description
Object	`locale`	**Changed in 8.1.22** A locale code, such as "en_US" for US English, or a java.util.Locale object.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
# This script will set the client locale to Arabic.

system.util.setLocale('ar')
```

system.util.setLoggingLevel

This function is used in **Python Scripting**.

Description

Sets the logging level on the given logger. This can be a logger you create, or a logger already defined in the system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.setLoggingLevel(loggerName, loggerLevel)
```

Parameters

Type	Parameter	Description
String	`loggerName`	The unique name of the logger to change the logging level on, for example "Tags.Client".
String	`loggerLevel`	The level you want to change to logger to: "trace", "debug", "info", "warn" or "error".

Returns

Nothing

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
system.util.setLoggingLevel("Reporting", "debug") # This would set the logger called Reporting to the debug level.
```

system.util.setReadTimeout

This function is used in **Python Scripting**.

Description

Sets the read timeout for Client-to-Gateway communication. Specified in milliseconds.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.setReadTimeout(readTimeout)
```

Parameters

Type	Parameter	Description
Integer	`readTimeout`	The new read timeout, specified in milliseconds.

Returns

Nothing

Scope

Vision Client

Code Examples

Example #1

```
```

```
# This script will set the read timeout to 20 seconds.

system.util.setReadTimeout(20000)
```

system.util.threadDump

This function is used in **Python Scripting**.

Description

Creates a thread dump of the current running JVM.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.util.threadDump()
```

Parameters

Nothing

Returns

String - The dump of the current running JVM.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script will take a thread dump of the current JVM, and write it to a Text Area component.

event.source.parent.getComponent('Text Area').text = system.util.threadDump()
```

system.util.translate

This function is used in **Python Scripting**.

Description

This function allows you to retrieve the global translation of a term from the translation database using the current locale.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

> **TIP**
>
> This function accepts keyword arguments.

```
system.util.translate(term, [locale], [strict])
```

Parameters

Type	Parameter	Description
String	`term`	The term to look up.
String	`locale`	Which locale to translate against. Useful when there are multiple locales defined for a single term. If omitted, the function attempts to use the current locale (as defined by the client, session, or Designer). [optional]
Boolean	`strict`	If false, the function will return the passed term (param 1) if it could not find a defined translation for the locale: meaning, if you pass a term that hasn't been configured, the function will just send the term back to you. If true, then the function will return a None when it fails to find a defined translation. Default is false. [optional]

Returns

String - The translated term.

Scope

Gateway, Vision Client, Perspective Session

Code Examples

Example #1

```
# This script will take a term written into a Text Field component, translate it using the translation database,
# and then write it back to the same Text Field.
# it uses the current locale since none is specified.

text = event.source.parent.getComponent('Text Field').text
translation = system.util.translate(text)
event.source.parent.getComponent('Text Field').text = translation
```

Example #2

```
# This code block demonstrates how to use the locale parameter.

# Use the currently detected locale.
system.util.translate("Hello")

# Translate to Italian.
system.util.translate("Hello", "it")

# Translate to a regional variant - Irish English in this case.
system.util.translate("Hello", "en-ie")
```

system.vision

Vision Functions

The following functions will allow you to update your Vision Client project using scripting.

getKeyboardLayouts

Returns a list of keyboard layouts available on this system.

updateProject

Updates the Vision Client project with saved changes.

Functions by Scope

Vision >

system.vision.getKeyboardLayouts

New in 8.1.28

This function is used in **Python Scripting**.

Description

Returns a list of keyboard layouts available on this system.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.vision.getKeyboardLayouts()
```

Parameters

None

Returns

None

Scope

Vision Client

Code Example

Code Example

```
# list all keyboard layouts that support English
for layout in system.vision.getKeyboardLayouts():
    if "en" in layout.supportedLanguages:
        print layout.name
```

system.vision.updateProject

New in 8.1.24

This function is used in **Python Scripting**.

Description

Updates the Vision Client project with saved changes. This function is intended to be used in conjunction with the "None" option of Vision Project update modes in the Project Properties, and the Vision Client System Tag **ProjectUpdateAvailable**.

Client Permission Restrictions

This scripting function has no **Client Permission** restrictions.

Syntax

```
system.vision.updateProject()
```

Parameters

None

Returns

None

Scope

Vision Client

Code Example

Code Snippet

```
# This script is intended to go on a Button component.
# Upon clicking, the Vision Client project will update with the latest changes.
system.vision.updateProject()
```