

SQL Bridge (Transaction Groups)

Overview

The SQL Bridge Module enables the creation of Transaction Groups that synchronize data between PLCs and databases. You can use Transaction Groups to easily log from PLCs to the database, move data from the database back to PLCs, and even keep the two synchronized. Drag and drop functionality makes setup of Transaction Groups quick and easy.

Originally conceived as an easy data storage method, Transaction Groups have become a core feature of Ignition. In their simplest form, they regularly read values from OPC addresses and store them into a SQL database. While data collection is still their primary use, they have grown in functionality over time.

To set up and use Transaction Groups, SQL knowledge is not required. Ignition can automatically create and manage the database table for each group. Prior experience writing SQL queries or creating database tables are not required to log data.

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The screenshot shows the configuration window for a Transaction Group named "Tank Levels". The group is currently "Running" and "Enabled". It is configured with the following settings:

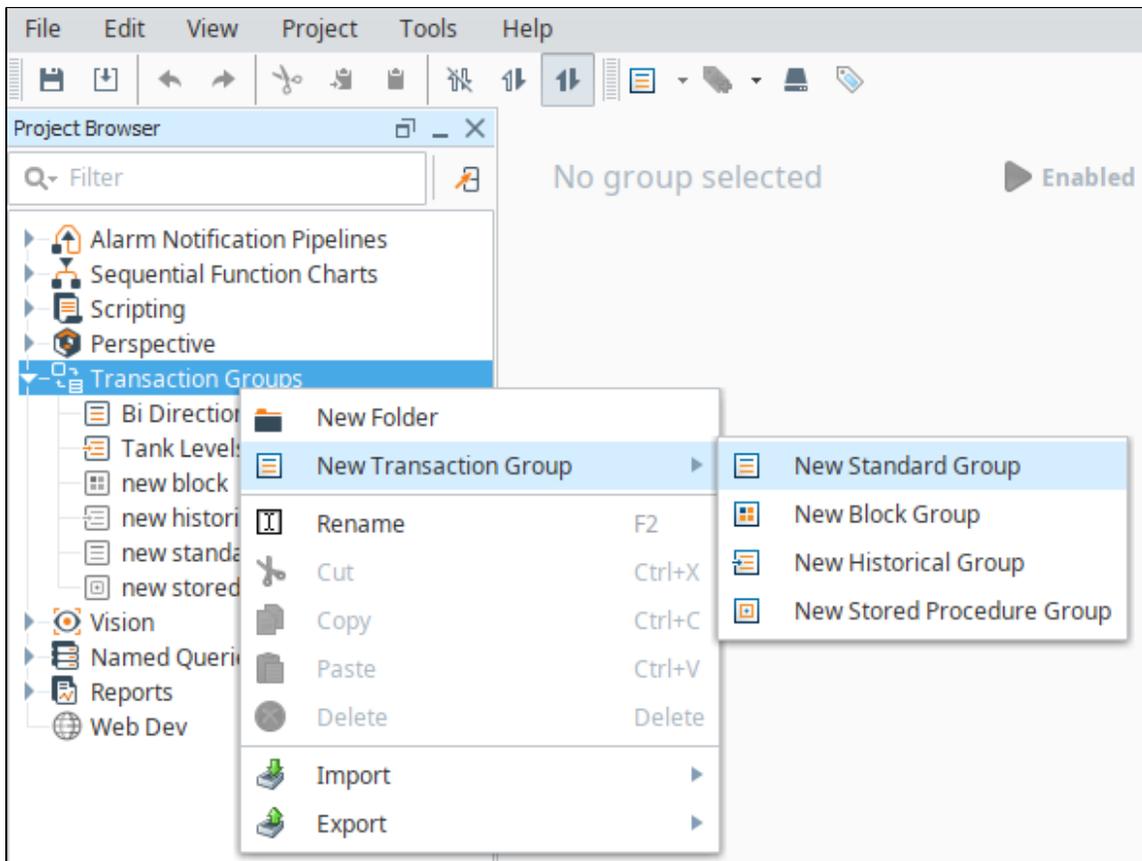
- Basic OPC/Group Items (7):** A table with 7 items, each with a source and target name.
- Run-Always Expression Items (ignore trigger) (0):** An empty table.
- Triggered Expression Items (0):** An empty table.
- Execution Scheduling:** Set to "Timer" with a rate of 1 second(s).
- Data source:** Set to "<Default>".
- Table name:** Set to "group_table".
- Automatically create table:** Checked.
- Use custom index column:** "group_table_ndx" (unchecked).
- Store timestamp to:** "t_stamp" (checked).
- Store quality code to:** "quality_code" (unchecked).
- Delete records older than:** 1 day(s) (unchecked).

Types of Transaction Groups

There are four types of Transaction Groups, and they each handle data a little differently:

- Historical Groups
- Standard Groups
- Block Group
- Stored Procedure Group

All Transaction Groups can execute at a set rate or on a [schedule](#). A [trigger](#) can be used to determine when the group should record. You can use Ignition's expression language in the trigger to allow complex logic to determine when logging occurs, making precision execution easy.



Historical Data Logging

Historical Groups quickly and easily store data from the plant floor into any kind of SQL database. Items from any or all devices can be included in the same group, just drag a few tags over and start the group running. Ignition will log the data until you tell it to stop.

The screenshot shows the Ignition software interface. The top part displays a 'new historical' group configuration. The group is 'Running' and 'Enabled'. It lists 'Basic OPC/Group Items (6)' with columns: Item Name, Source Value, Latched Value, Target Name, Data Type, and Properties. The items are: Sim_Generic/Ramp/Ramp0 (344.427), Sim_Generic/Ramp/Ramp1 (58.320), Sim_Generic/Ramp/Ramp2 (119.427), Sim_Generic/Ramp/Ramp3 (247.480), Sim_Generic/Ramp/Ramp5 (465.267), and Sim_Generic/Ramp/Ramp4 (158.320). The configuration also shows 'Execution Scheduling' set to 'Timer' with a value of 1 second(s), 'Data source' set to 'MySQL', and 'Table name' set to 'ramp_historical'. The 'Automatically create table' checkbox is checked.

The bottom part shows the 'Database Query Browser' with the query: `SELECT * FROM ramp_historical`. The query is executed, and the results are displayed in a table with 10 rows. The columns are: ramp_historical_..., Ramp0, Ramp1, Ramp2, Ramp3, Ramp5, Ramp4, and t_stamp. The results are as follows:

ramp_historical_...	Ramp0	Ramp1	Ramp2	Ramp3	Ramp5	Ramp4	t_stamp
1	794.84	96.13	169.84	304.195	496.775	396.13	2019-06-18 10:2
2	808.187	6.14	-16.813	19.21	5.117	6.14	2019-06-18 10:2
3	821.52	16.14	-3.48	34.21	13.45	16.14	2019-06-18 10:2
4	834.867	26.15	9.867	49.225	21.792	26.15	2019-06-18 10:2
5	848.2	36.15	23.2	64.225	30.125	36.15	2019-06-18 10:2
6	861.547	46.16	36.547	79.24	38.467	46.16	2019-06-18 10:2
7	874.88	56.16	49.88	94.24	46.8	56.16	2019-06-18 10:2
8	888.227	66.17	63.227	109.255	55.142	66.17	2019-06-18 10:2
9	901.56	76.17	76.56	124.255	63.475	76.17	2019-06-18 10:2
10	914.92	86.19	89.92	139.285	71.825	86.19	2019-06-18 10:2

The query browser also shows 'Limit SELECT to: 1000 rows' and '268 rows fetched in 0.013s'. The 'Execute' button is visible.

Database and OPC Synchronization

Standard Groups are the most flexible group. They are capable of not only storing OPC values in the database, but can also write database values to OPC addresses or synchronize data changes between both the database and PLC. With this group you can create true realtime value tables in the database, and allow anything that can talk to the database to push values to a PLC. This is often used to create Recipe systems where the recipe values are stored in the database, and a user can select a recipe to write all your settings directly to Tags. Changing recipes is as easy as changing a tag value or selecting a name.

Line 1 Recipe
Running

Enabled Disabled Pause

Basic OPC/Group Items (4)

Item Name	Source Va...	Latched V...	Mode	Target Name	Data Type	Properties
CaseCount	96.716	95.882	—	CaseCount	Float8	
CurrentOrder	0	0	←	CurrentOrder	Int2	
CurrentRun	0	0	←	CurrentRun	Int2	
RunControl	0	0	←	RunControl	Int4	

Large Data Block Storage

Transfer large amounts of data very efficiently with the Block Group. This groups allows you to send whole arrays of data to and from the database. It works just like the Standard group, but on a much larger scale.

T4 ACC
Execution Disabled

Enabled Disabled Pause

Item View Block View

Block Items (0)

Item Name	Source ...	Latche...	Mode	Target Name	Data Type	Prop	Size
Item_T4_0			—	T4_0_ACC	String		2
—ns=1;s=[SLC]_Meta:T4/T4:0/T4:0.ACC	0						
—ns=1;s=[SLC]_Meta:T4/T4:0/T4:0.DN	false						
Item_T4_1			—	T4_3_ACC	String		2
Item_T4_2			—	T4_2_ACC	String		2
Item_T4_3			—	T4_1_ACC	String		2

Stored Procedures

The Stored Procedure Group allows you to use PLC data as inputs and outputs for your existing Stored Procedures. With the Stored Procedure Group, your IT department can have control over how data is entered and returned from the database.

Calc Line Downtime
Running

Enabled
 Disabled
 Pause

Basic OPC/Group Items (2)					
Item Name	Value	Target Name	Output	Data Ty...	Propert...
Line Number	3	linenum	None	Int2	
Minutes Down	82	Read-only	minutes	Int2	

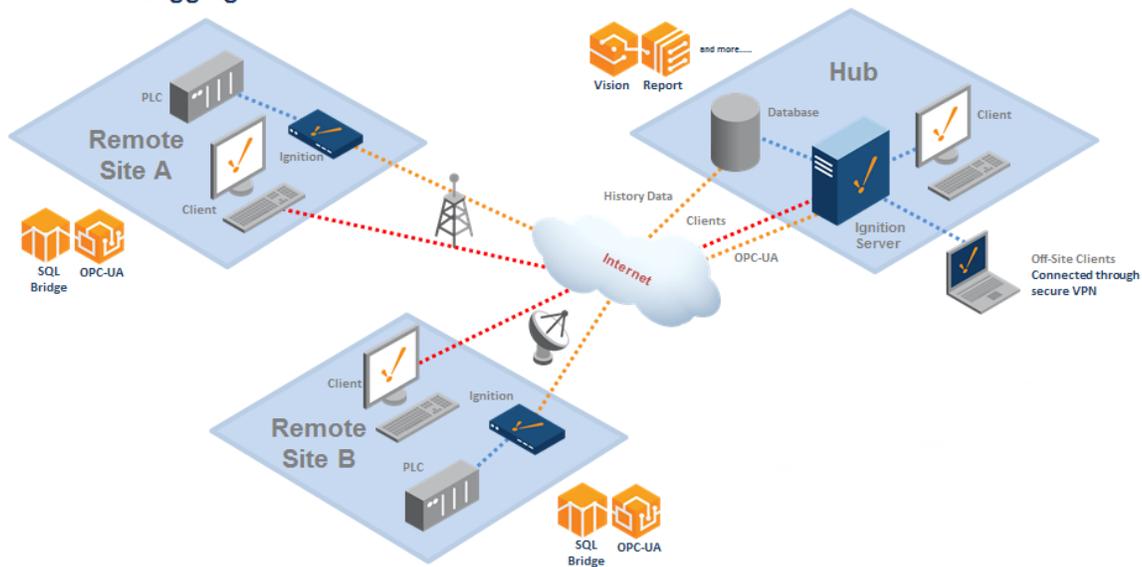
Run-Always Expression Items (ignore trigger) (0)				
Item Name	Value	Target Name	Data Type	Properties

Action Trigger Options
 Execution Scheduling:
 Timer Schedule
 1 second(s)
 Data source:
 DB
 Store timestamp to:
 Store quality code to:
 Procedure name:
 downtime_minutes

Centralizing Data Collection

In Distributed systems, PLCs can be spread out over great distances to remote sites. Collecting and centralizing data from each can be difficult and time consuming. To combat this problem, Transaction Groups are used as the cornerstone of our **Hub and Spoke** architecture. Historical Groups can be applied locally to each PLC for a minimal cost, and forward all data into a single, central, database.

Remote Site with Central Hub Remote Logging



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