

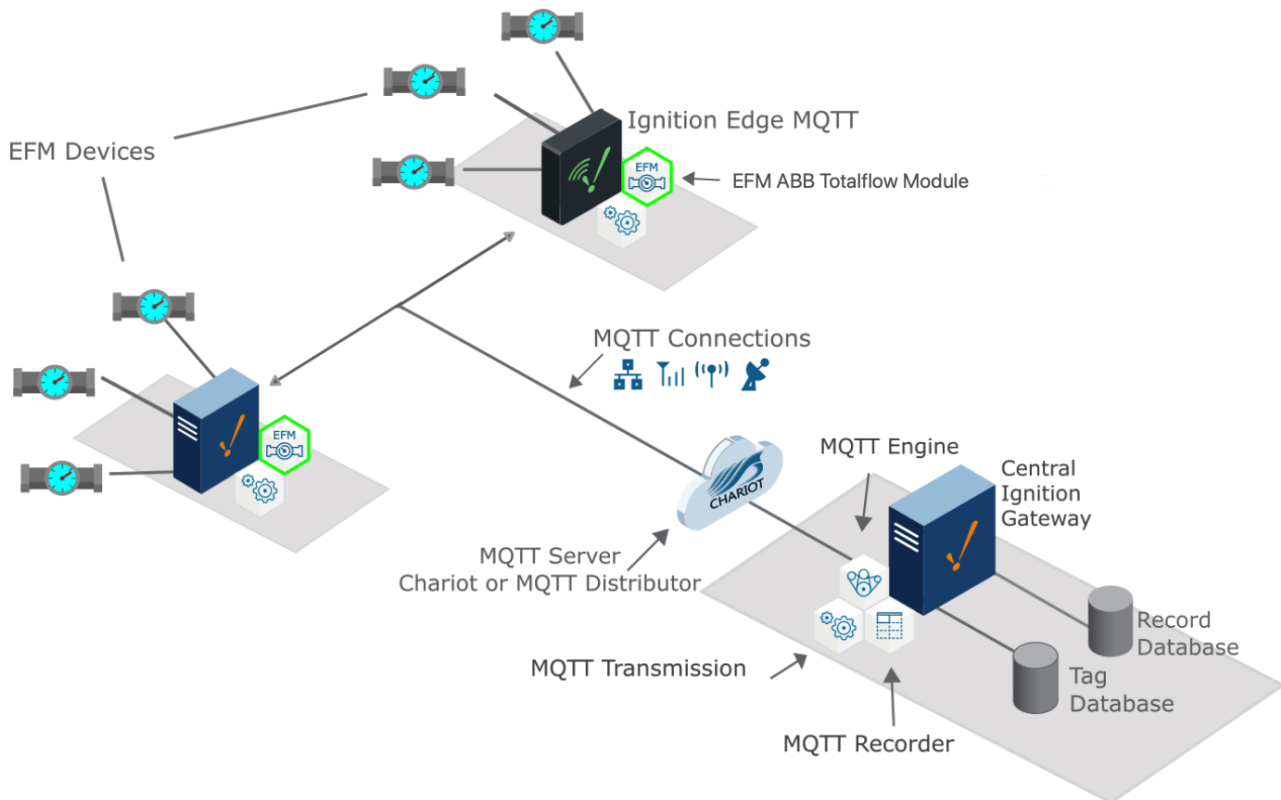
Sending ABB Totalflow Events to a Central Ignition Gateway

Prerequisites

- Knowledge of Ignition and Module installation process: [Cirrus Link Module Installation](#)
- Install the following MQTT Modules on two Ignition systems
 - Ignition System 1 (Central Ignition Gateway)
 - MQTT Distributor
 - MQTT Engine
 - MQTT Recorder
 - Ignition System 2 (Remote/Edge Ignition Gateway)
 - MQTT Transmission
 - EFM ABB Totalflow driver module

Overview

The EFM ABB Totalflow module is capable of polling events from an ABB Totalflow device based on a specified polling rate. With MQTT Transmission, these events can be published as Sparkplug records to an MQTT server. Any client subscribed on Sparkplug RECORD messages can receive these objects. In addition, MQTT Engine when combined with MQTT Recorder can also receive these messages and store these objects in a configured Ignition database. The following drawing shows the general architecture used to do this. This tutorial outlines the process of getting events to the central Ignition gateway.



Sending ABB Totalflow Events to a Central Ignition Gateway

We must configure a total of five Cirrus Link modules on two different Ignition gateways to get event data flowing from an ABB Totalflow device to a central database. These are:

- Central Ignition Gateway
 - MQTT Distributor
 - MQTT Engine
 - MQTT Recorder
- Remote/Edge Ignition Gateway
 - MQTT Transmission

- EFM ABB Totalflow

The configuration of each of these modules is covered below based on the Ignition gateway they're installed on.

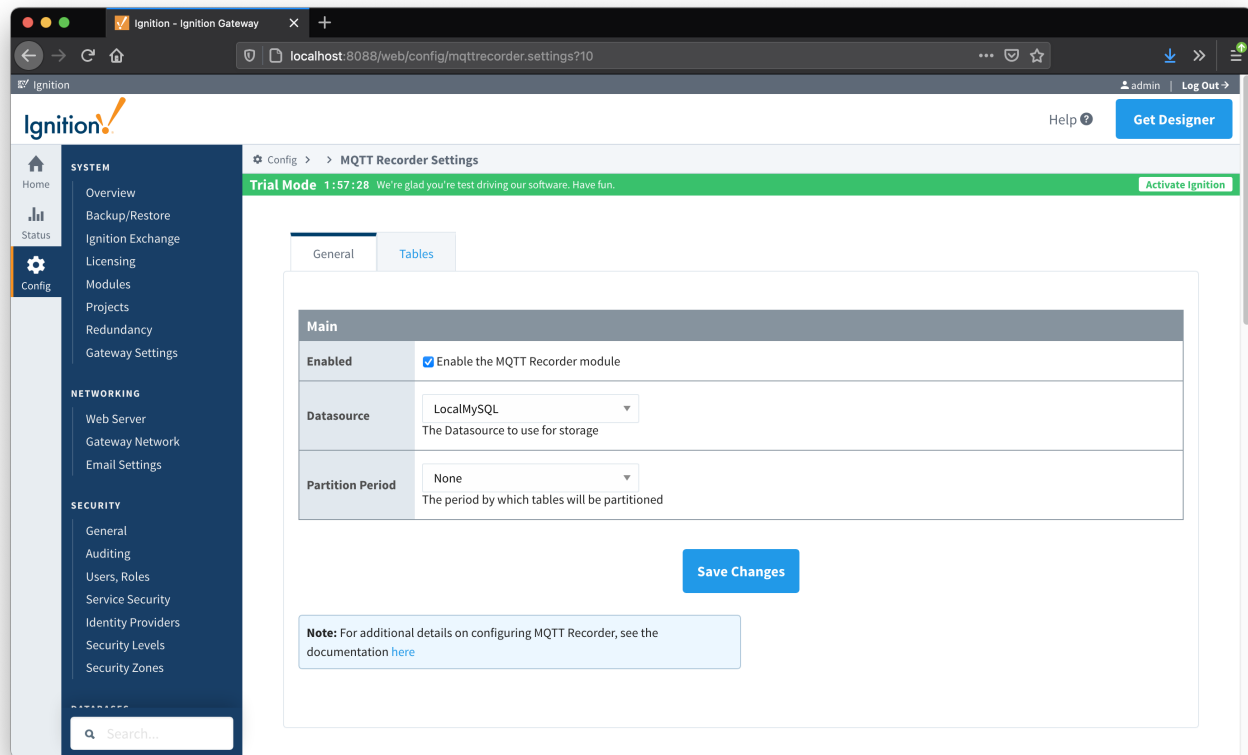
Central Ignition Gateway Setup

MQTT Distributor can be left in its default configuration. Note in a production system you would likely want to set up TLS especially if MQTT connections are using the Internet.

MQTT Engine can also be left in its default configuration.

MQTT Recorder requires that a database be set up in Ignition. That can be done as described in the 'Connect to a Database' section [here](#). Once a database is set up, MQTT Recorder can be configured. Do so by opening the Ignition Gateway Web UI and browsing to the Configure tab at the top of the screen and then selecting 'MQTT Recorder Settings' as shown in the lower left below.

Once there, select a Datasource as shown in the image below. This drop-down will be populated with any database connections set up in Ignition. Optionally, a Partition Period can be selected to segregated tables by time periods.

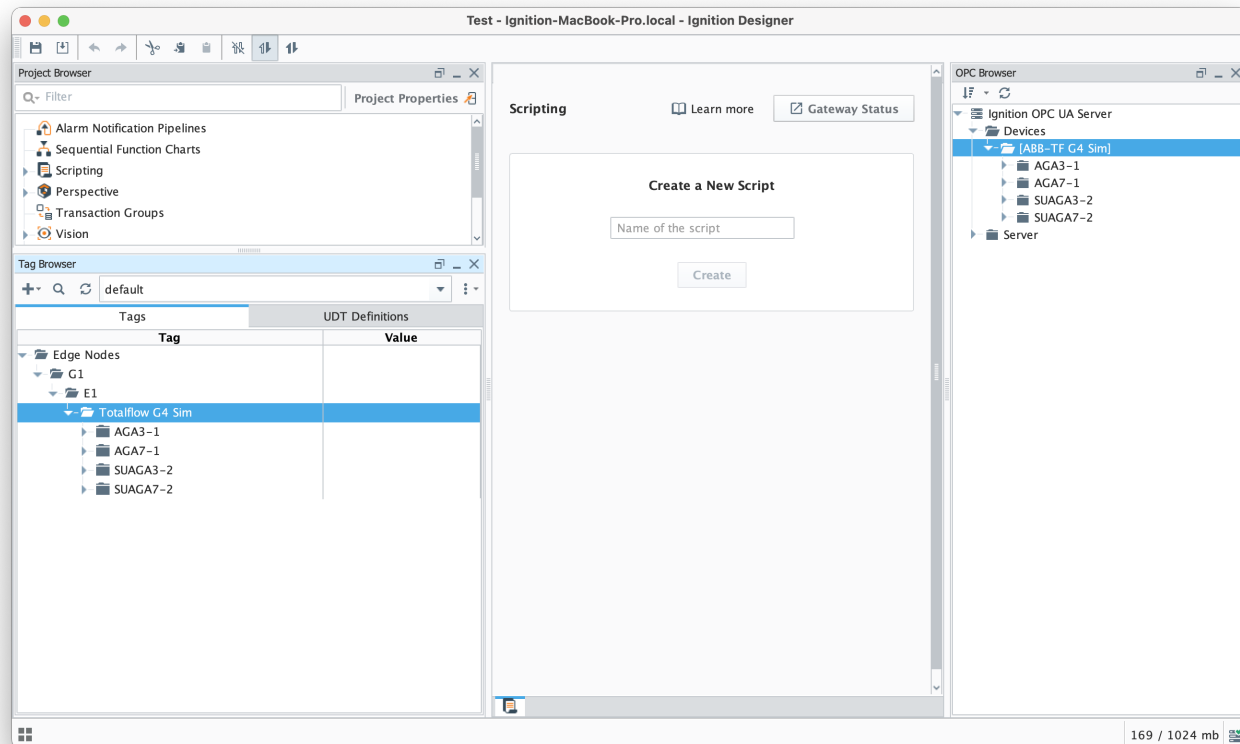


At this point, the Central Ignition Gateway with MQTT Distributor, MQTT Engine, and MQTT Recorder is fully configured and ready to receive MQTT Sparkplug messages from the Remote/Edge Ignition Gateway. MQTT Distributor listens on TCP port 1883 by default for inbound MQTT connections. Make sure the Operating System's Firewall, Antivirus, and Malware protection services allow inbound connections on port 1883/TCP before proceeding.

Remote/Edge Ignition Gateway Setup

With the Central Ignition Gateway ready to receive MQTT/Sparkplug RECORD objects, the EFM ABB Totalflow and MQTT Transmission modules can be configured on the Remote/Edge Ignition Gateway.

Start by configuring the MQTT Transmission module. Do so by opening Ignition Designer and creating a tag structure similar to what is shown below.



Note this structure is based on usage of the 'Default Transmitter' in MQTT Transmission. So, the directory structure is very important. Note the structure.

- tag provider/Edge Nodes/[Group ID]/[Edge Node ID]/[Device ID]/...

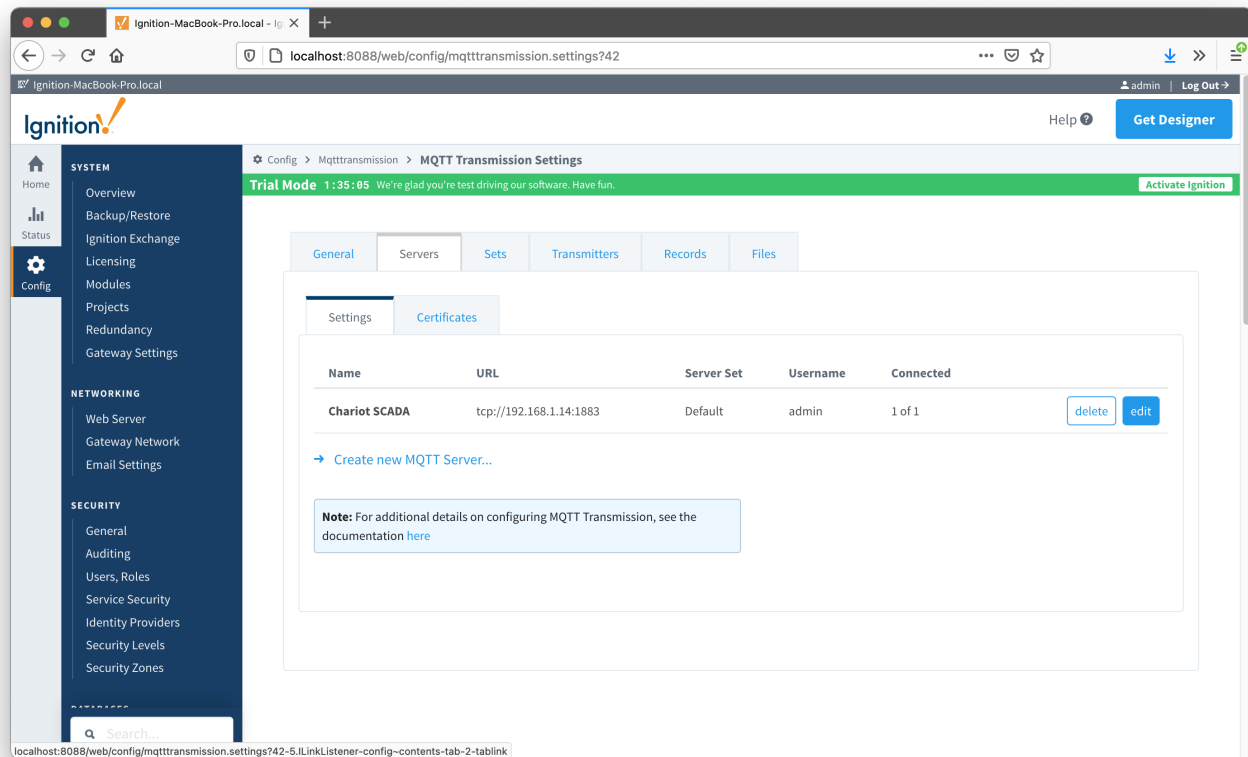
In the example below this implies the following definitions:

- [Group ID] = G1
- [Edge Node ID] = E1
- [Device ID] = Totalflow G4 Sim

These exact values will be used for the EFM ABB Totalflow connection Sparkplug parameters to tell the EFM ABB Totalflow which MQTT Transmission Transmitter configuration to use and, in turn, which MQTT connection to use to send the history data on.

Next the MQTT Transmission server configuration must be modified to point to the Central Ignition Gateway we set up earlier. To do so, in the Ignition Gateway Web UI browse to the Configure tab on the top and then to MQTT Transmission Settings in the lower left as shown below.

In the MQTT Transmission Settings configuration, click the Servers tab. Then click 'edit' on the Chariot SCADA MQTT Server definition. Modify the URL to match the URL of the Central Ignition Gateway. In this example, MQTT Distributor is installed on a Central Ignition Gateway at the IP address of 192.168.1.2. Once the URL is modified to match the configuration, there should be a '1 of 1' in the Connected column as shown below.



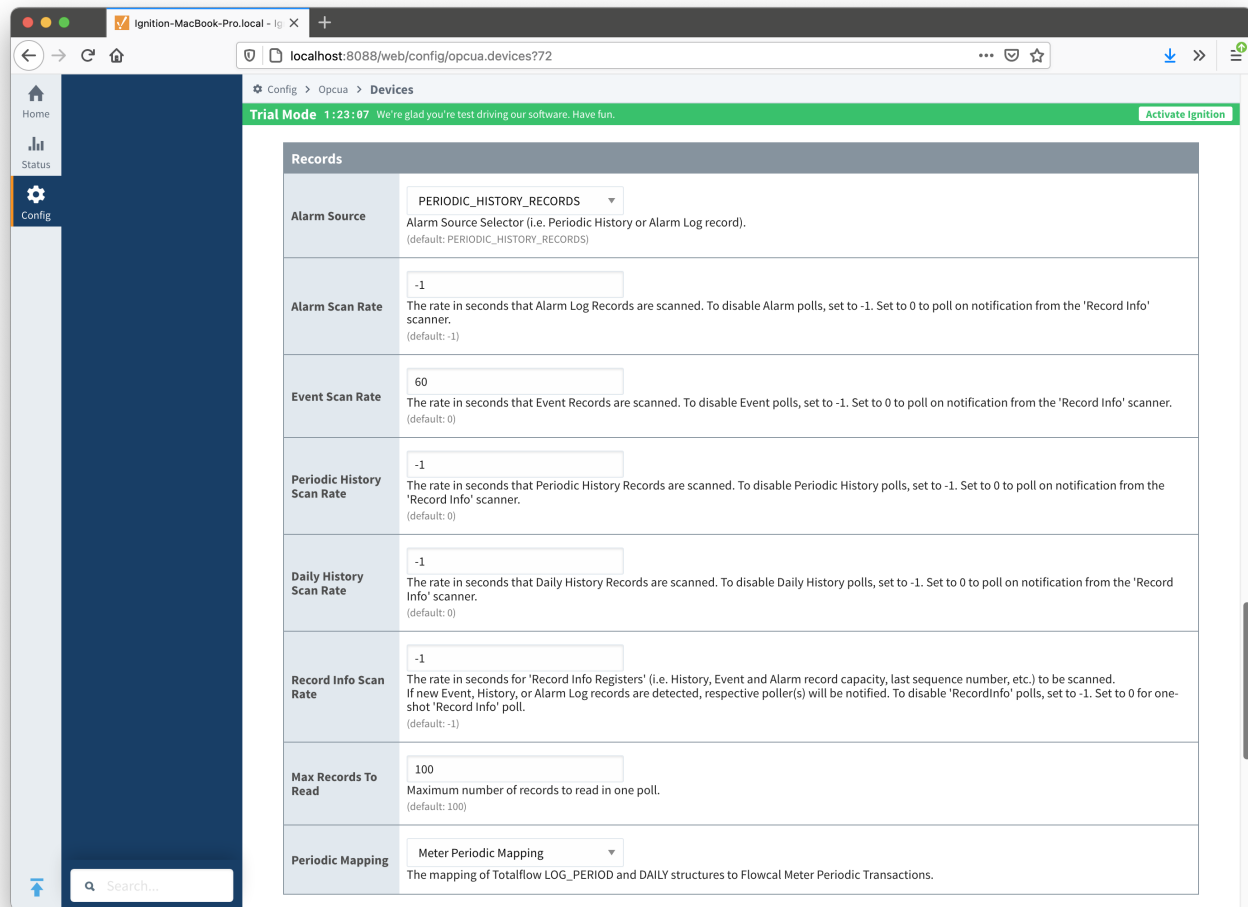
The next step is configuring the ABB Totalflow module. This is done as described in the [ABB Totalflow Configuration](#) manual. In going through the basic setup and configuration for Events configuration the following steps must be performed:

- Define the global Array-Registers definitions available for all ABB Totalflow devices in this Ignition instance.
 - This step can be skipped if not configuring the driver to poll for AAR data.
- Upload the Periodic Mappings for all ABB Totalflow devices in this Ignition instance.
 - This step can be skipped if default mapping provided by the driver is ok.
- Create the base device connection to the ABB Totalflow device.
- Specify the subset of global Array-Register definitions that this specific ABB Totalflow device uses.
 - This step can be skipped if not configuring the driver to poll for AAR data.
- Reconfigure device connection to enable polling for events.

As an example, let's configure the driver to poll for Event records and disable polling for Alarms and History. This can be done in two ways:

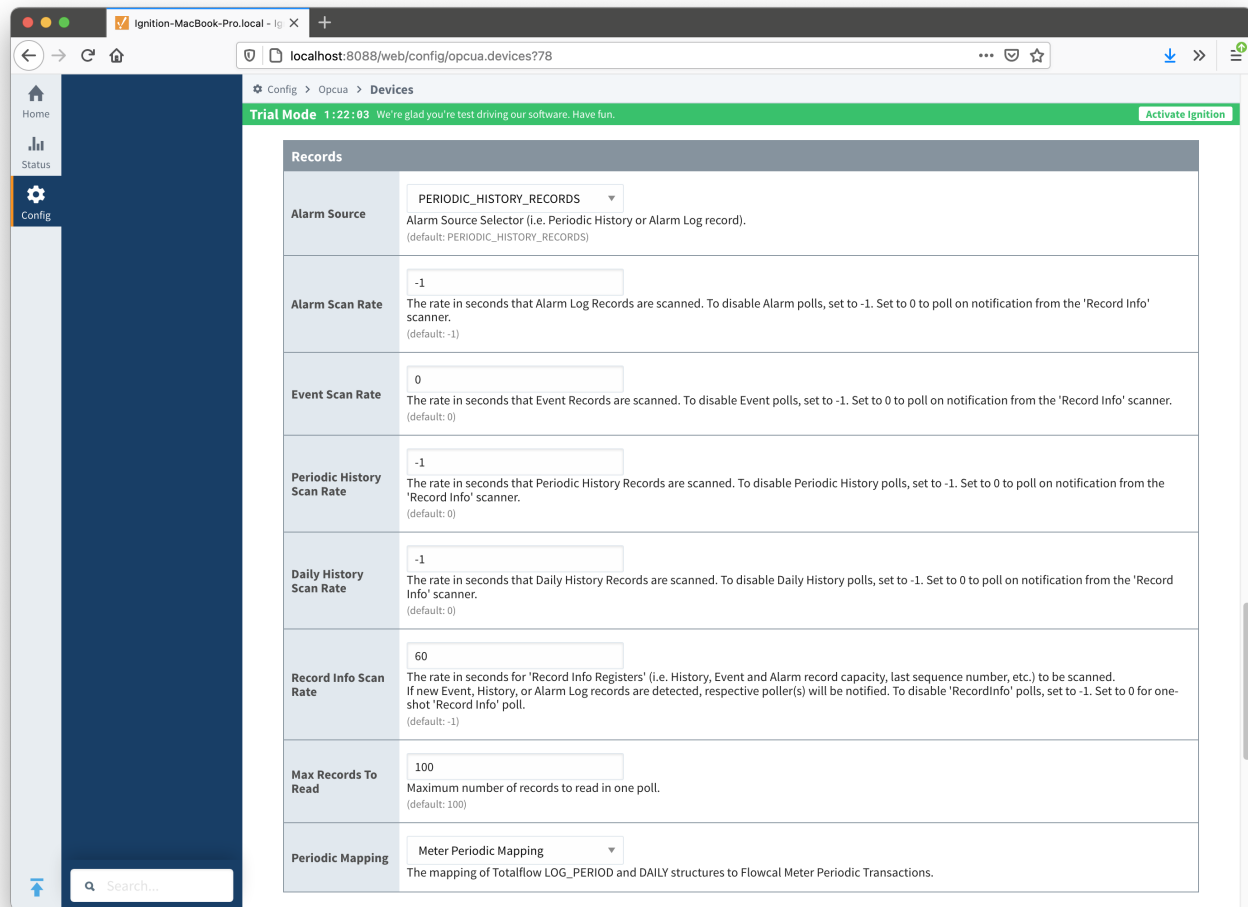
The first way to do it is to configure scan rates as shown below:

- **Alarm Scan Rate**
 - Set to -1 to disable polling for Alarms. If Alarms are not needed, it is the best practice to set the 'Alarm Scan Rate' to -1. With this setup, alarm records are not going to be pushed to the rs_efm_meter_alarm database table regardless of the alarm source setting (i.e. PERIODIC_HISTORY or ALARM_LOG_RECORDS).
 - If the 'Alarm Source' is set to the 'ALARM_LOG_RECORDS' and the 'Record Info Scan Rate' is set to -1, the 'Alarm Scan Rate' can be set to 0. With this setup, the AlarmPoller will not run on its own nor will it poll on notifications from the RecordInfoPoller.
- **Event Scan rate**
 - Set to a positive number to launch the EventPoller with specified poll rate.
- **Periodic History Scan Rate**
 - Set to -1 to disable polling for Periodic History records.
 - If the 'Record Info Scan Rate' is set to -1, the 'Periodic History Scan Rate' can be set to 0. With this setup, the PeriodicHistoryPoller will not run on its own nor will it poll on notifications from the RecordInfoPoller.
- **Daily History Scan Rate**
 - Set to -1 to disable polling for Daily History records.
 - If the 'Record Info Scan Rate' is set to -1, the 'Daily History Scan Rate' can be set to 0. With this setup, the DailyHistoryPoller will not run on its own nor will it poll on notifications from the RecordInfoPoller.
- **Record Info Scan Rate**
 - Set to -1 to disable the RecordInfoPoller so that there will be no notifications to Alarm, Events and History pollers on any 'RecordInfo' change such as 'Last Record Sequence number Used', etc.



The second way to do it is to configure scan rates as shown below:

- **Alarm Scan Rate**
 - Set to -1 to disable polling for Alarms.
- **Event Scan rate**
 - 0 Scan on notification form the 'Record Info' poller.
- **Periodic History Scan Rate**
 - Set to -1 to disable polling for Periodic History records.
- **Daily History Scan Rate**
 - Set to -1 to disable polling for Daily History records.
- **Record Info Scan Rate**
 - Set to a positive number to launch the RecordInfoPoller with specified poll rate. With this setup, EventPoller will be notified on any 'RecordInfo' change such as 'Last Record Sequence number Used', etc.



At this point, the EFM ABB Totalflow driver is configured and is polling for Events at the rate specified in the EFM ABB Totalflow device configuration.

MQTT Transmission is connected to the MQTT Server and as a result MQTT Engine is receiving tag change events. In addition, because an EFM ABB Totalflow device has been created and configured with the same Sparkplug Group ID, Edge Node ID, and Device ID, history data will also be pushed to the MQTT server as Sparkplug RECORD objects. When new history data is polled by the EFM ABB Totalflow driver, they will be published to the MQTT server, consumed by MQTT Engine, passed on to MQTT Recorder, and then inserted into the specified database. Below is a view of some events records using a third party database viewing tool.

MySQL 5.7.12 | ibinshok@127.0.0.1/testdb/rs_efm_meter_event

testdb

Select Database Structure Content Relations Triggers Table Info Query

TABLES

Search: rs_id

rs_id rs_type rs_group rs_edge_node rs_device mtr_id rs_record_time rs_reorder_time rs_fields val event old_val seq timestamp

rs_efm_meter_alarm

rs_efm_meter_event

rs_efm_meter_history_daily

rs_efm_meter_history_periodic

TABLE INFORMATION

created: 8/5/20

updated: 8/7/20

engine: InnoDB

rows: 277

size: 80.0 Kib

encoding: latin1

auto_increment: 278

277 rows in table

rs_id	rs_type	rs_group	rs_edge_node	rs_device	mtr_id	rs_record_time	rs_reorder_time	rs_fields	val	event	old_val	seq	timestamp
1	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591737030000	1596671332398	mtr_id12...	NULL	650	NULL	0	1591737030
67	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591737030000	1596671335649	mtr_id12...	NULL	650	NULL	0	1591737030
138	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591737030000	1596671338947	mtr_id12...	NULL	650	NULL	0	1591737030
204	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591737030000	1596671342396	mtr_id12...	NULL	650	NULL	0	1591737030
2	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591737204000	1596671332399	val12,old...	1591737204	652	0	2	1591737204
3	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591737204000	1596671332399	val12,old...	0	651	1591737204	1	1591737204
68	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591737204000	1596671335650	val12,old...	1591737204	652	0	2	1591737204
69	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591737204000	1596671335650	val12,old...	0	651	1591737204	1	1591737204
139	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591737204000	1596671338947	val12,old...	1591737204	652	0	2	1591737204
140	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591737204000	1596671338947	val12,old...	0	651	1591737204	1	1591737204
205	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591737204000	1596671342396	val12,old...	1591737204	652	0	2	1591737204
206	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591737204000	1596671342396	val12,old...	0	651	1591737204	1	1591737204
4	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591862585000	1596671332399	val12,old...	1591862585	652	0	4	1591862585
5	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591862585000	1596671332399	val12,old...	0	651	1591862585	3	1591862585
70	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591862585000	1596671335650	val12,old...	1591862585	652	0	4	1591862585
71	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591862585000	1596671335650	val12,old...	0	651	1591862585	3	1591862585
141	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591862586000	1596671338947	val12,old...	1591862585	652	0	4	1591862586
142	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591862586000	1596671338947	val12,old...	0	651	1591862585	3	1591862586
207	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591862586000	1596671342396	val12,old...	1591862586	652	0	4	1591862586
208	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591862586000	1596671342396	val12,old...	0	651	1591862586	3	1591862586
6	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591865654000	1596671332399	val12,old...	1591865654	652	0	6	1591865654
7	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591865654000	1596671332399	val12,old...	0	651	1591865654	5	1591865654
72	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591865654000	1596671335650	val12,old...	1591865654	652	0	6	1591865654
73	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591865654000	1596671335650	val12,old...	0	651	1591865654	5	1591865654
143	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591865654000	1596671338947	val12,old...	1591865654	652	0	6	1591865654
144	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591865654000	1596671338947	val12,old...	0	651	1591865654	5	1591865654
209	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591865654000	1596671342396	val12,old...	1591865654	652	0	6	1591865654
210	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591865654000	1596671342396	val12,old...	0	651	1591865654	5	1591865654
74	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591870871000	1596671335650	val12,old...	14.75	138	14.75	7	1591870871
75	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591870881000	1596671335650	val12,old...	11.22	138	14.75	8	1591870881
76	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591871509000	1596671335650	val12,old...	12.33	138	11.22	9	1591871509
77	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591871517000	1596671335650	val12,old...	14.55	138	12.33	10	1591871517
78	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591871531000	1596671335650	val12,old...	15.33	138	14.55	11	1591871531
8	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591883483000	1596671332399	val12,old...	1591883483	652	0	8	1591883483
9	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591883483000	1596671332399	val12,old...	0	651	1591883483	7	1591883483
79	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591883483000	1596671335650	val12,old...	1591883483	652	0	13	1591883483
80	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA3-1	1591883483000	1596671335650	val12,old...	0	651	1591883483	12	1591883483
145	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591883483000	1596671338947	val12,old...	1591883483	652	0	8	1591883483
146	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC3-2	1591883483000	1596671338947	val12,old...	0	651	1591883483	7	1591883483
211	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591883483000	1596671342396	val12,old...	1591883483	652	0	8	1591883483
212	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	SIUAC7-2	1591883483000	1596671342396	val12,old...	0	651	1591883483	7	1591883483
10	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591883776000	1596671332399	val12,old...	1591883776	652	0	10	1591883776
11	EFM_METER_EVENT	G1	E1	TotalFlow G4 Sim	ACA7-1	1591883776000	1596671332399	val12,old...	0	651	1591883776	9	1591883776

Additional Resources

- Inductive Automation's Ignition download with free trial
 - <https://inductiveautomation.com/downloads/>
- Azure Injector download with free trial
 - <https://inductiveautomation.com/downloads/third-party-modules>
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 - Check out the Cirrus Link Forum: <https://forum.cirrus-link.com/>
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