

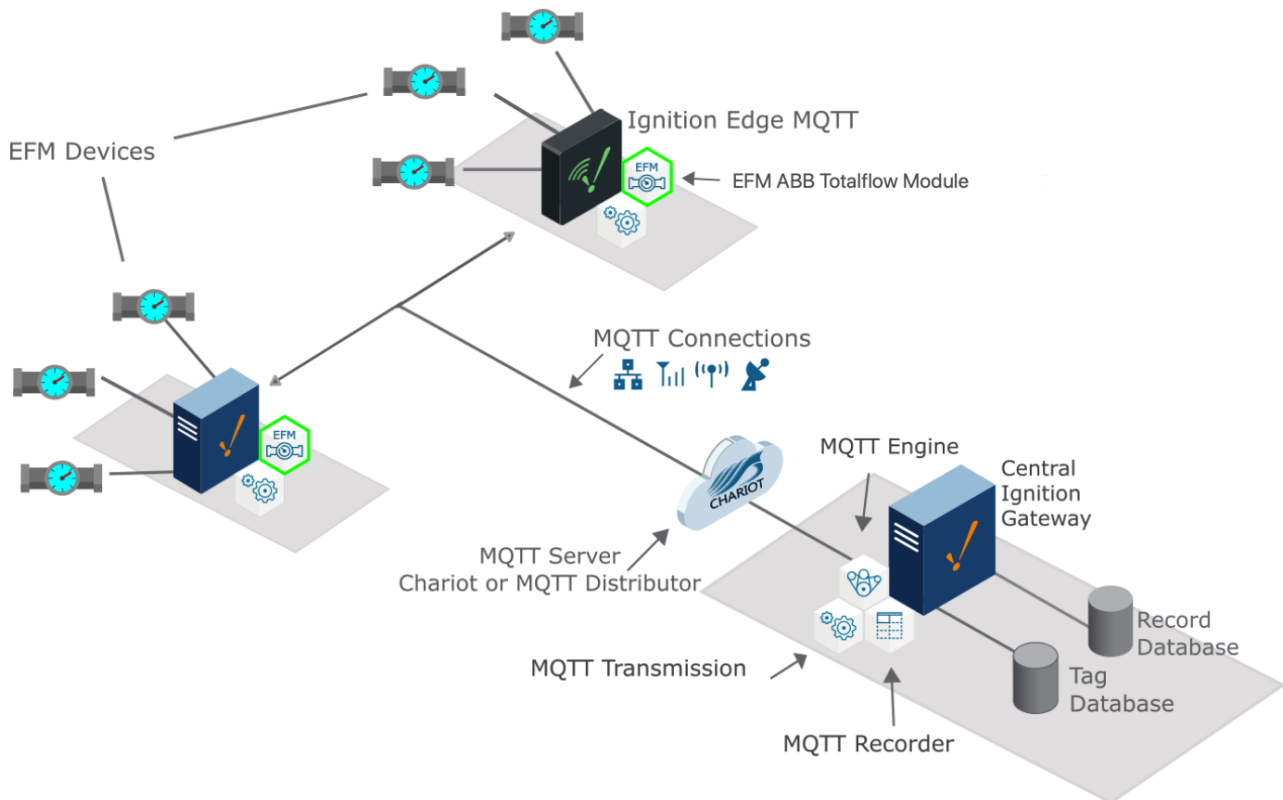
Sending ABB Totalflow History to a Central Ignition Gateway

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 history data from an ABB Totalflow device based on a specified polling rate. With MQTT Transmission, this history data 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 history to the central Ignition gateway.



Sending ABB Totalflow History to a Central Ignition Gateway

We must configure a total of five Cirrus Link modules on two different Ignition gateways to get history 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.

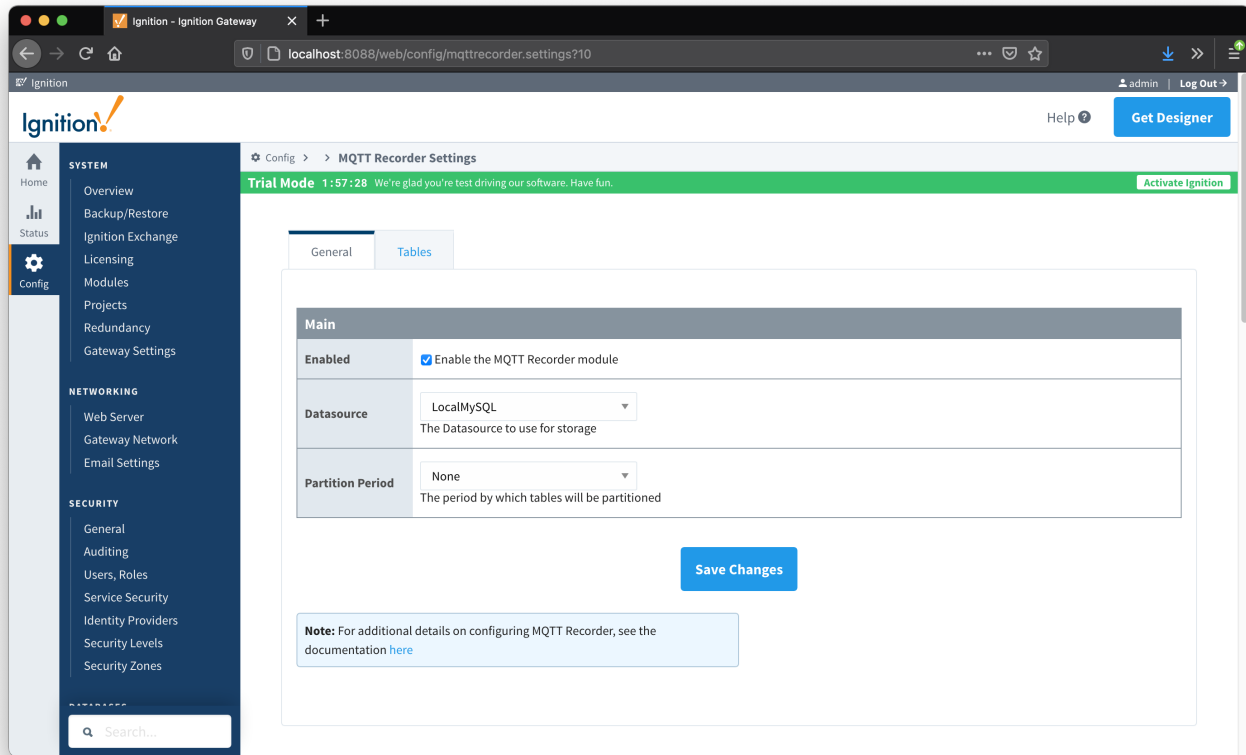
Central Ignition Gateway Setup

MQTT Distributor can be left in its default configuration.

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](#). Note Ignition supports additional database types. 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.

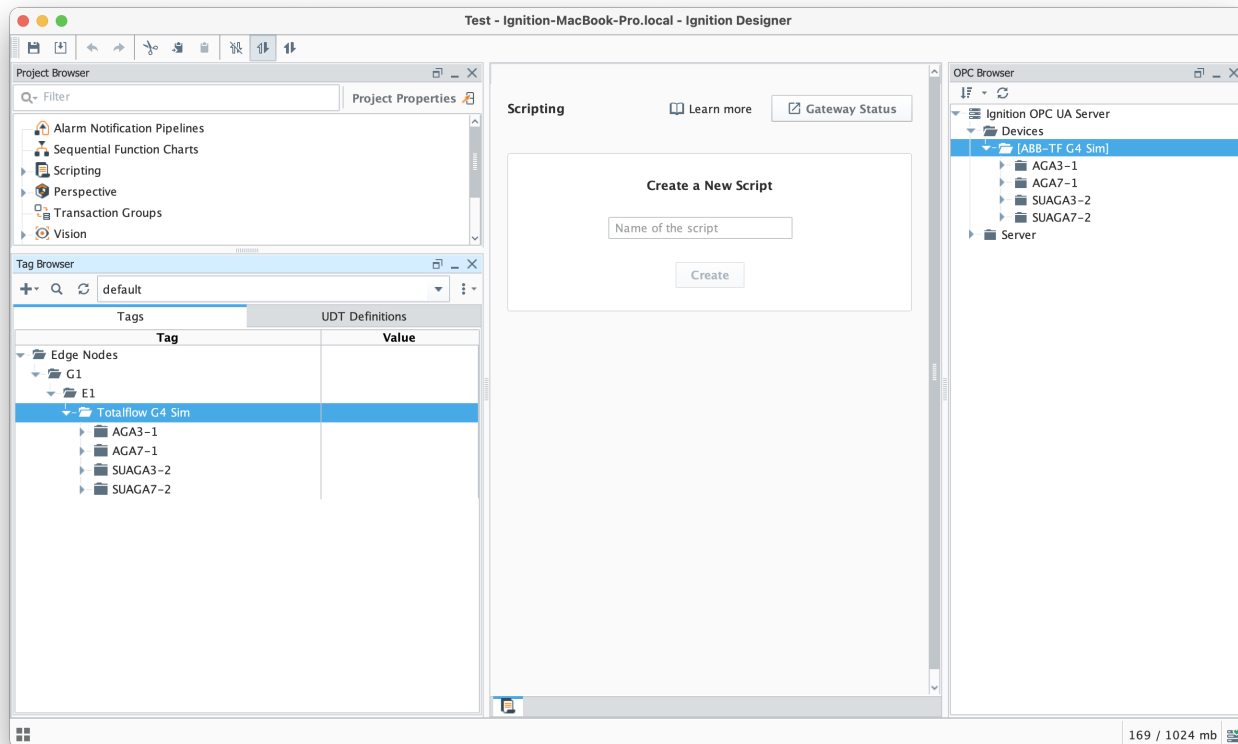


At this point, the Central Ignition Gateway with MQTT Distributor, MQTT Engine, and MQTT Recorder is fully configured and ready to receive MQTT Sparkplug messages from the Remote/Edge Ignition Gateway. MQTT Distributor listens on TCP port 1883 by default for inbound MQTT connections. Make sure the Operating 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]/...

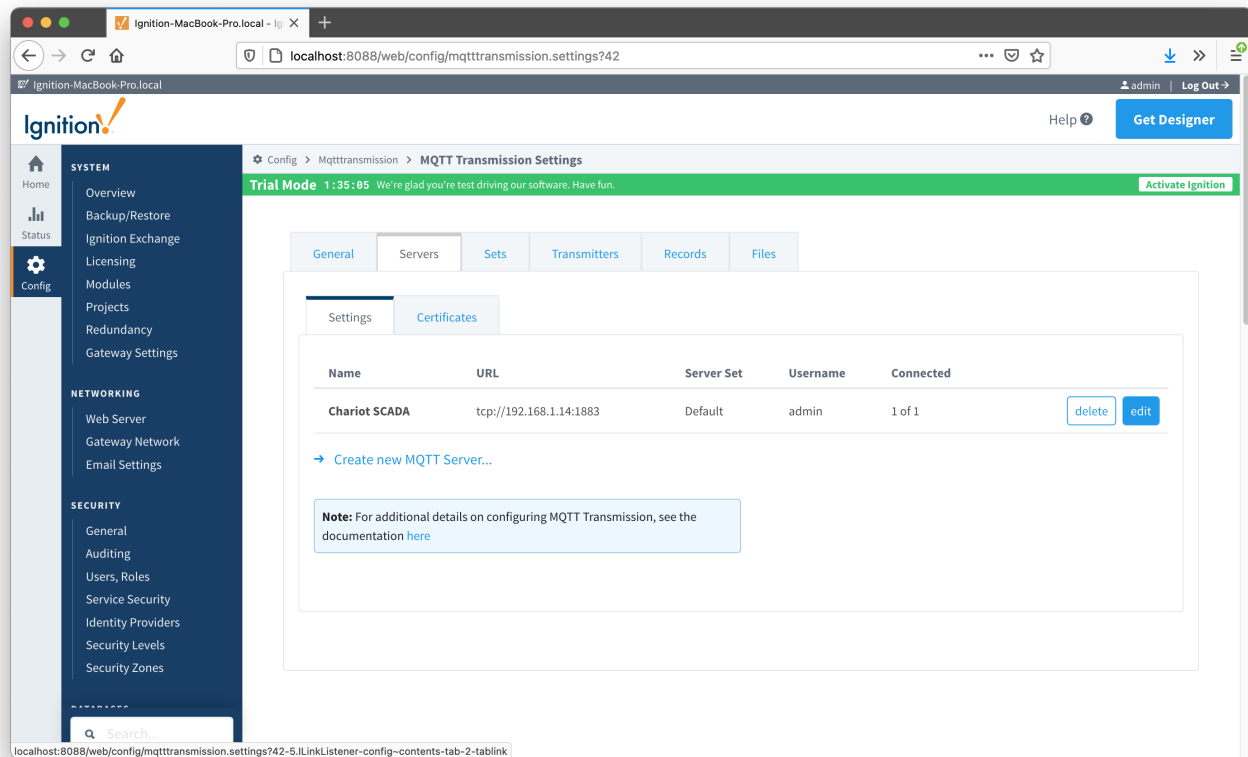
In the example below this implies the following definitions:

- [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.



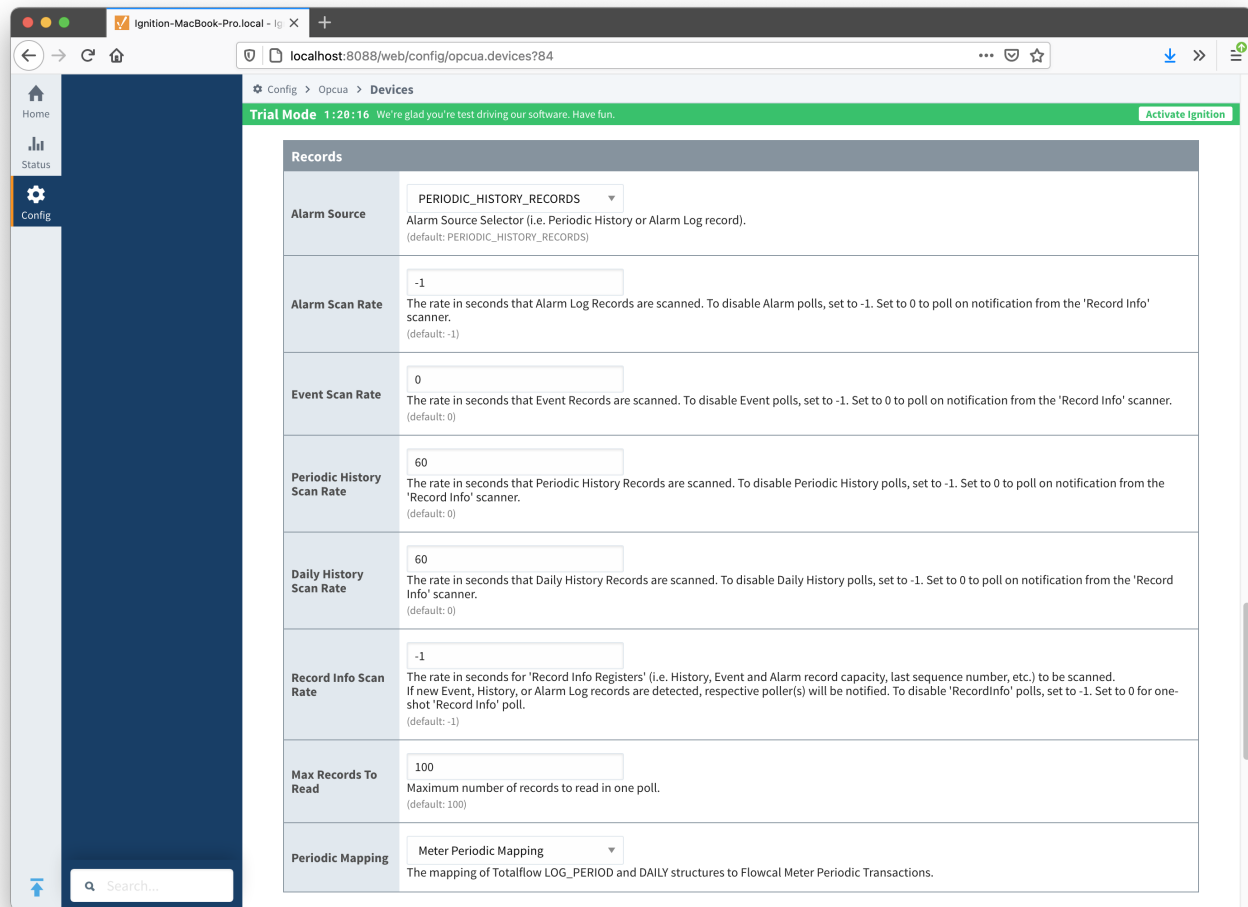
The next step is configuring the ABB Totalflow module. This is done as described in the [ABB Totalflow Configuration](#) manual. In going through the basic setup and configuration for History configuration the following steps must be performed:

- 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 desired history data (i.e. Periodic, Daily or both).

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

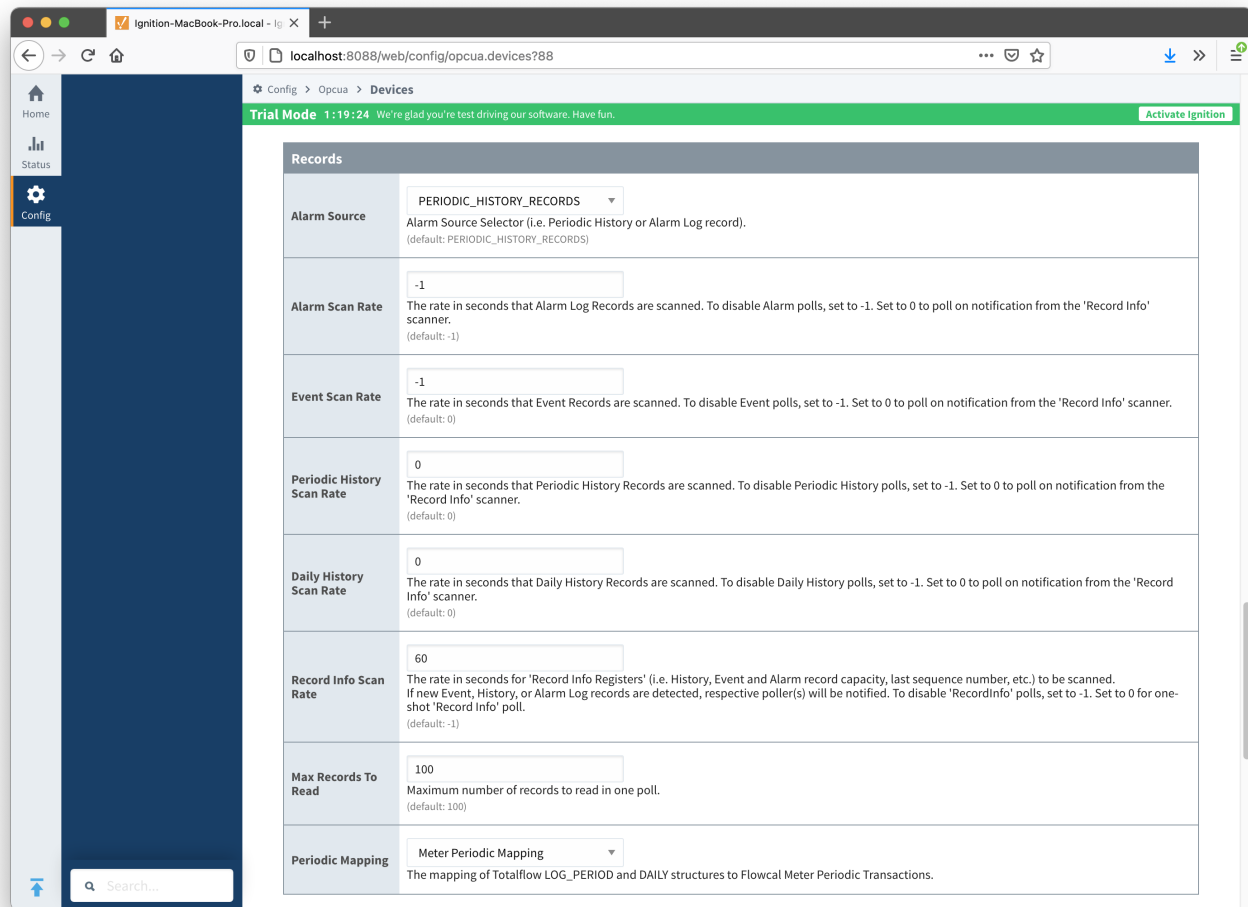
The first way to do it is to configure scan rates as shown below:

- **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 it own nor will it poll on notifications from the RecordInfoPoller.
- **Event Scan Rate**
 - Set to -1 to disable polling for Events.
 - If the 'Record Info Scan Rate' is set to -1, the 'Event Scan Rate' can be set to 0. With this setup, the EventPoller will not run on it own nor will it poll on notifications from the RecordInfoPoller.
- **Periodic History Scan Rate**
 - Set to a positive number to launch the PeriodicHistoryPoller with specified poll rate.
- **Daily History Scan Rate**
 - Set to a positive number to launch the DailyHistoryPoller with specified poll rate.
- **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**
 - Set to -1 to disable polling for Events.
- **Periodic History Scan Rate**
 - Set to 0 to poll on notification from the 'Record Info' poller.
- **Daily History Scan Rate**
 - Set to 0 to poll on notification from the 'Record Info' poller.
- **Record Info Scan Rate**
 - Set to a positive number to launch the RecordInfoPoller with specified poll rate. With this setup, Periodic and Daily History pollers 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 history data 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 are a few views of some history records using a third party database viewing tool.

(MySQL 5.7.12) ibinshok@127.0.0.1/testdb/rs_efm_meter_history_periodic

Search: rs_id

rs_id	rs_type	rs_group	rs_edge_node	rs_device	rs_record_time	rs_recorder_time	rs_fields	volume	temp_avg	sp_avg	flow_rate	intr_id	ftc
1	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591768800000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.1999206542969	0	109.67013549804688	3600	ACAG-1	
2	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591768800000	1596671316480	avg_base_density19.sp_avg19.flo...	340.2001037983986	0	109.6700579833986	3600	SUAGA-2	
1941	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591768800000	1596671299865	volume19.avg_base_density19.tem...	10.073758125305176	94.49996948242188	109.66976028710938	3600	SUAGA-3	
971	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591768800000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.0608785366211	94.5	109.66976028710938	3600	ACAG-1	
2	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591772400000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.2000732421875	0	109.66973876953125	3600	ACAG-1	
2912	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591772400000	1596671316480	avg_base_density19.sp_avg19.flo...	340.199959358740234	0	109.66973876953125	3600	SUAGA-2	
1942	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591772400000	1596671299865	volume19.avg_base_density19.tem...	10.073774337168555	94.5	109.66976028710938	3600	ACAG-1	
972	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591772400000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060890197753906	94.50000762393453	109.66976165771484	3600	ACAG-1	
3	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591776000000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.1997606640625	0	109.66976028710938	3600	SUAGA-3	
2913	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591776000000	1596671316480	avg_base_density19.sp_avg19.flo...	340.1999816894531	0	109.66976028710938	3600	SUAGA-2	
1943	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591776000000	1596671299865	volume19.avg_base_density19.tem...	10.0737676024084	94.5	109.66976028710938	3600	SUAGA-3	
973	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591776000000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060879073736426	94.49998474123094	109.66976028710938	3600	ACAG-1	
4	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591779600000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.2000427246094	0	109.66976028710938	3600	ACAG-1	
2914	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591779600000	1596671316480	avg_base_density19.sp_avg19.flo...	340.19989013671875	0	109.67002868652344	3600	SUAGA-2	
1944	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591779600000	1596671299865	volume19.avg_base_density19.tem...	10.073789565571875	94.50009151273418	109.66976028710938	3600	SUAGA-3	
974	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591779600000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060905456542969	94.49993896484375	109.66976028710938	3600	ACAG-1	
5	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591783200000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	170.194305141992188	0	109.67082214355469	1801	ACAG-1	
2915	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591783200000	1596671316480	avg_base_density19.sp_avg19.flo...	170.194305141992188	0	109.67082214355469	1801	SUAGA-2	
1945	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591783200000	1596671299865	volume19.avg_base_density19.tem...	5.039661222167869	94.5000998182189	109.67082214355469	1801	SUAGA-3	
975	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591783200000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	5.03226503601074	94.49996185302734	109.67082214355469	1801	ACAG-1	
6	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591862589000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	269.79754638671875	0	109.6700608911328	2855	ACAG-1	
2916	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591862589000	1596671316480	avg_base_density19.sp_avg19.flo...	269.7977249281875	0	109.6704254503906	2855	SUAGA-2	
1946	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591862589000	1596671299865	volume19.avg_base_density19.tem...	7.989078521728516	94.50006866455078	109.6704254503906	2855	SUAGA-3	
976	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591862589000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	7.978844101101742	94.5000915273418	109.6704254503906	2855	ACAG-1	
7	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591866000000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.2001647949219	0	109.6700210571289	3600	ACAG-1	
2917	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591866000000	1596671316480	avg_base_density19.sp_avg19.flo...	340.200137182125	0	109.66973114013672	3600	SUAGA-2	
1947	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591866000000	1596671299865	volume19.avg_base_density19.tem...	10.07378571860352	94.50004577636719	109.6700210571289	3600	ACAG-1	
977	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591866000000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060885429182324	94.50005340576172	109.66973114013672	3600	SUAGA-2	
8	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591869600000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.1997606640625	0	109.66973114013672	3600	ACAG-1	
2918	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591869600000	1596671316480	avg_base_density19.sp_avg19.flo...	340.1997375488281	0	109.66973114013672	3600	SUAGA-2	
1948	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591869600000	1596671299865	volume19.avg_base_density19.tem...	10.07375717163086	94.50005340576172	109.66973114013672	3600	SUAGA-3	
978	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591869600000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.06087589263916	94.50000762393453	109.66973114013672	3600	ACAG-1	
9	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591873200000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.2001037983986	0	109.66973114013672	3600	ACAG-1	
2919	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591873200000	1596671316480	avg_base_density19.sp_avg19.flo...	340.2001647949219	0	109.6708127241406	3600	SUAGA-2	
1949	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591873200000	1596671299865	volume19.avg_base_density19.tem...	10.073759078979492	94.49999237060547	109.6708127241406	3600	SUAGA-3	
979	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591873200000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060872077941895	94.5	109.66968499951172	3600	ACAG-1	
10	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591876800000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	340.2002868652344	0	109.6696710498047	3600	ACAG-1	
2920	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591876800000	1596671316480	avg_base_density19.sp_avg19.flo...	340.2001647949219	0	109.6696710498047	3600	SUAGA-2	
1950	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591876800000	1596671299865	volume19.avg_base_density19.tem...	10.07375126428227	94.4999771118164	109.6696710498047	3600	SUAGA-3	
980	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591876800000	1596671282767	volume19.temp_avg19.sp_avg19.flo...	10.060903549194336	94.49996948242188	109.6696710498047	3600	ACAG-1	
11	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591880400000	1596671261860	volume19.temp_avg19.sp_avg19.flo...	319.4097300390625	0	109.6697540282031	3380	SUAGA-2	
2921	EFM_METER_HISTORY_PERIODIC	G1	E1	Totalflow C4 Sim	1591880400000	1596671316480	avg_base_density19.sp_avg19.flo...	319.4100026621094	0	109.67002868652344	3380	SUAGA-3	

Rows 1 - 1,000 of 3,988 from table

testdb

Select Database

Structure

Content

Relations

Triggers

Table Info

Query

rs_id

rs_type

rs_group

rs_edge_node

rs_device

intr_id

rs_record_time

rs_recorder_time

rs_fields

period

sp_avg

last_log_period_seq

first_log_period_seq

temp_mrgs_lo

rs_efm_meter_alarm

rs_efm_meter_event

rs_efm_meter_history

rs_efm_meter_history_periodic

1 EFM_METER_HISTORY_DAILY

51 EFM_METER_HISTORY_DAILY

101 EFM_METER_HISTORY_DAILY

151 EFM_METER_HISTORY_DAILY

2 EFM_METER_HISTORY_DAILY

52 EFM_METER_HISTORY_DAILY

102 EFM_METER_HISTORY_DAILY

152 EFM_METER_HISTORY_DAILY

3 EFM_METER_HISTORY_DAILY

53 EFM_METER_HISTORY_DAILY

103 EFM_METER_HISTORY_DAILY

153 EFM_METER_HISTORY_DAILY

4 EFM_METER_HISTORY_DAILY

54 EFM_METER_HISTORY_DAILY

104 EFM_METER_HISTORY_DAILY

154 EFM_METER_HISTORY_DAILY

5 EFM_METER_HISTORY_DAILY

55 EFM_METER_HISTORY_DAILY

105 EFM_METER_HISTORY_DAILY

155 EFM_METER_HISTORY_DAILY

6 EFM_METER_HISTORY_DAILY

56 EFM_METER_HISTORY_DAILY

106 EFM_METER_HISTORY_DAILY

156 EFM_METER_HISTORY_DAILY

7 EFM_METER_HISTORY_DAILY

57 EFM_METER_HISTORY_DAILY

107 EFM_METER_HISTORY_DAILY

157 EFM_METER_HISTORY_DAILY

8 EFM_METER_HISTORY_DAILY

58 EFM_METER_HISTORY_DAILY

108 EFM_METER_HISTORY_DAILY

158 EFM_METER_HISTORY_DAILY

9 EFM_METER_HISTORY_DAILY

59 EFM_METER_HISTORY_DAILY

109 EFM_METER_HISTORY_DAILY

159 EFM_METER_HISTORY_DAILY

10 EFM_METER_HISTORY_DAILY

60 EFM_METER_HISTORY_DAILY

110 EFM_METER_HISTORY_DAILY

160 EFM_METER_HISTORY_DAILY

11 EFM_METER_HISTORY_DAILY

61 EFM_METER_HISTORY_DAILY

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1

G1</

- Phone: +1 (844) 924-7787
- About Cirrus Link
 - <https://www.cirrus-link.com/about-us/>