

Cirrus Link SOLUTIONS Cirrus Link MQTT Modules

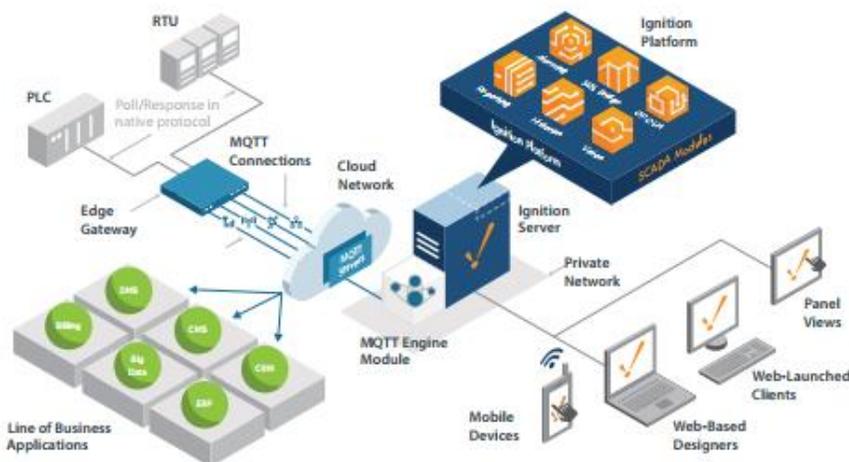
Ignition + MQTT

Adding the Cirrus Link MQTT Modules to Ignition empowers you to set up your own IIoT solution on a secure MQTT message-oriented middleware (MOM) infrastructure. Message Queueing Telemetry Transport (MQTT) is a proven, standard machine-to-machine (M2M) data transfer protocol that is quickly becoming the leading messaging protocol for the Industrial Internet of Things (IIoT). This Ignition IIoT solution increases data accessibility without straining data bandwidth, with the ability to self-create and instantly update data tags from virtually any device, and to make that data easily and instantly accessible to both operational and business applications.

Ignition IIoT is firmly rooted in the operational technologies of the plant floor and seamlessly integrates upwards to the IT-standard technologies utilized at the enterprise level. This provides the foundation to build full-featured, integrated HMI/SCADA solutions that bridge the gap between information technologies and operations technologies, facilitating increased efficiency of data communication throughout the enterprise.

Cirrus Link Solutions, an industry leader in MQTT and IIoT, has developed three modules to add the power of MQTT to the Ignition platform: The Cirrus Link MQTT Engine, MQTT Distributor, and MQTT Transmission Modules.

Ignition IIoT Architecture: Cloud-Based Redundant



The architecture of Ignition IIoT is flexible: you can set it up in the Cloud, (as shown above), on a private on-premise network, or a hybrid of both.

Features

- Increased Data Throughput & Efficiencies
- Self-Learning Data Tags
- Exceptional Redundancy & Security
- Automatic System Health Metrics
- Powered by Ignition

Powered by Ignition

Supported Operating Systems

- Windows Server 2008/2012
- Windows 7, 8, and 10
- Ubuntu Linux 12.04 or later
- Other Java SE-enabled OSes1

Supported Databases

- Microsoft® SQL Server
- MySQL
- Oracle
- PostgreSQL

Supported MQTT Servers

- Any server compliant with the 3.1.1 MQTT protocol OASIS standard

Requirements

- Ignition v7.7.6+
- Java SE 8 (server)
- Java SE 6, 7, or 8 (client)
- 1024 MB RAM3
- 1 GB free HD space
- MQTT Servers
- Edge Gateway Hardware

1. Ignition is compatible with any Java SE 8-enabled OS. Full support is only offered for listed OSes.

2. MQTT Distributor Module is limited to 50 edge gateways.

3. Requirements vary by usage



Cirrus Link MQTT Engine Module for Ignition

Create an Efficient IIoT Data Pipeline

MQTT Engine Module

Build Industrial IoT (IIoT) solutions on a MQTT MOM infrastructure with the MQTT Engine Module to provide a path to deliver data to both operational and business applications. Utilize the MQTT protocol's publish-and-subscribe methodologies to inject data into industrial SCADA applications utilizing the Cirrus Link MQTT Engine Module which connects the data from MQTT servers compliant with the 3.1.1 MQTT protocol OASIS standard, creating an extremely efficient and robust IIoT architecture with Ignition.

With the Cirrus Link MQTT Engine Module for Ignition, polling at the host is no longer necessary; this solution uses edge gateways (sold separately), pushing the proprietary protocol polling to the edge of the SCADA or telemetry network, creating one pipeline for all data, which increases throughput and efficiencies of data acquisition throughout an enterprise. This solution is especially useful for wide-area SCADA applications such as oil-and-gas pipeline controls and solutions with restricted or high-cost communications like VSAT or cellular.



Increased Data Throughput and Efficiencies

MQTT messaging enabled by the edge gateways provides an extremely efficient use of the transport layer to send and receive more data, more frequently, and with less overhead. This is achieved by pushing the polling to the edge of the network which vastly increases the performance of the overall solution. This results in the retrieval of more data from PLCs, RTUs, and other devices such as cameras or sensors, thus achieving increased system awareness and improved control.

Self-Learning Data Tags

The MQTT Engine Module subscribes to the data from the edge gateways through MQTT servers. Upon each initial connection, it automatically learns all the data tags and instantly creates them in Ignition. Once tags are created, their data values are continually updated as new values are published from the field. This feature produces a self-aware IIoT solution that dynamically updates by rapidly learning all existing and any newly created data tags and makes them readily available to the entire Ignition platform. With the MQTT Engine Module, you can simply connect to your data and rapidly build IIoT solutions with Ignition's full-featured set of

HMI, SCADA, and MES development tools. Cirrus Link MQTT Engine Module for Ignition The Cirrus Link MQTT Engine Module allows an Ignition Gateway to quickly and easily create connections to MQTT servers and start receiving data. MQTT Servers RTU PLC Edge Gateway Ignition Server MQTT Connections MQTT Servers MQTT Engine Module Poll/Response in native protocol.

Exceptional Redundancy and Security

Scalability, disaster recovery, high availability, and enhanced security are native capabilities of the MOM infrastructure. The edge gateways create an inbound connection to the MQTT servers with TLS security closing all ports over their network connection. Not having a port open enhances the security at the endpoints of the system, closing off many typical attack possibilities. Secondly, the edge gateways are in control of both their network path and the MQTT server utilized. The edge gateway will know when it loses a primary communication path and will move to a secondary one; it is also self-aware of when the primary communication path returns. Upon an MQTT server failure, the edge gateway will connect to the next available server providing as many levels of redundancy as you need. With these features, uptime is improved with quicker failover and acknowledgements when issues arise.

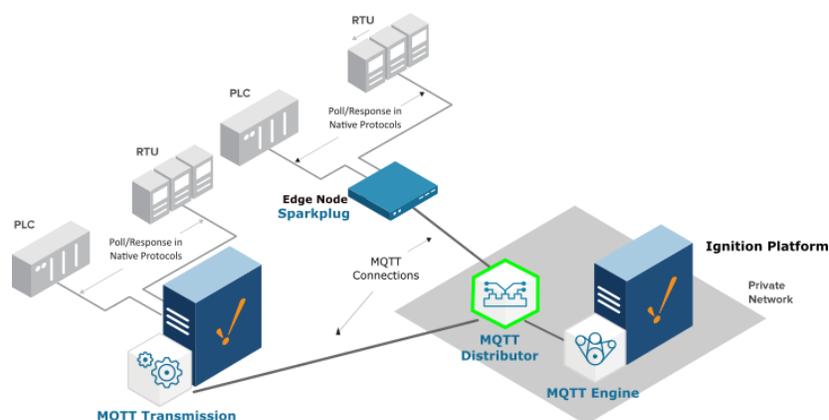
Automatic System Health Metrics

When the MQTT Engine Module creates the tags for data, it also creates metrics to track the health of the system. These metrics are historical data points providing valuable information when diagnosing issues within the overall system. The module creates metrics for the end device, the edge gateways, and the MOM infrastructure of MQTT servers analyzing the availability and lost connectivity. These metrics are presented with pre-built viewing screens, or a client can use the data points to build screens specifically for their own requirements.



Cirrus Link MQTT Distributor & Distributor Plus Module

Connect, Publish, and Subscribe to IIoT Data

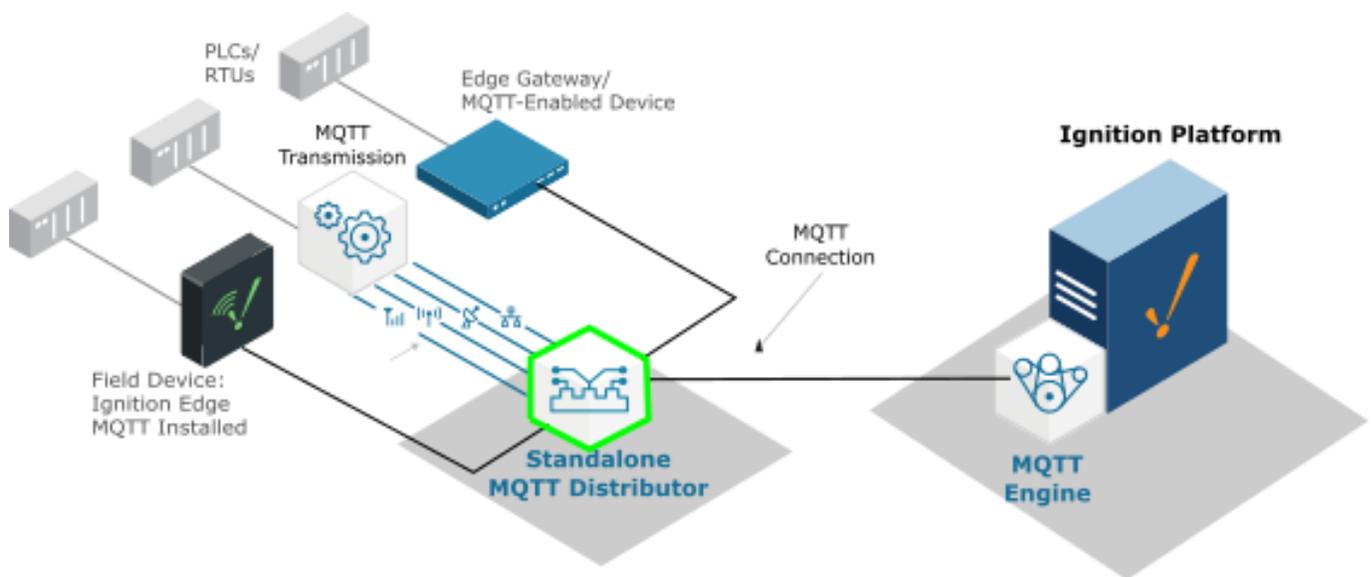


The MQTT Distributor Module is an MQTT server, compliant with the 3.1.1 MQTT protocol OASIS standard. It enables MQTT clients to securely connect, publish, and subscribe data, supplying data to both operational and business applications throughout the enterprise. The MQTT Distributor module comes in two versions,

Distributor and Distributor Plus. Standard Distributor supports up to 50 simultaneously MQTT Clients and Distributor Plus supports up to 250 for larger installations.

Enabling MQTT Distributor in conjunction with the MQTT Engine Module provides the components for a self-contained MOM infrastructure from one Ignition gateway. This combination delivers the requirements for IIoT solutions and wide-area SCADA applications such as oil and gas pipeline controls solutions. It is ideal for situations where there are restricted or high-cost communications such as in VSAT or cellular connectivity. This solution is also highly effective for increasing the data throughput for high-performance plant-floor solutions.

The MQTT Distributor Module is available as a Standalone Module. It can be purchased as a Standalone MQTT Server not needing an Ignition license making ideal for distributing one or more MQTT Distributor Modules for scalability, redundancy and diverse location applications to increase reliability.



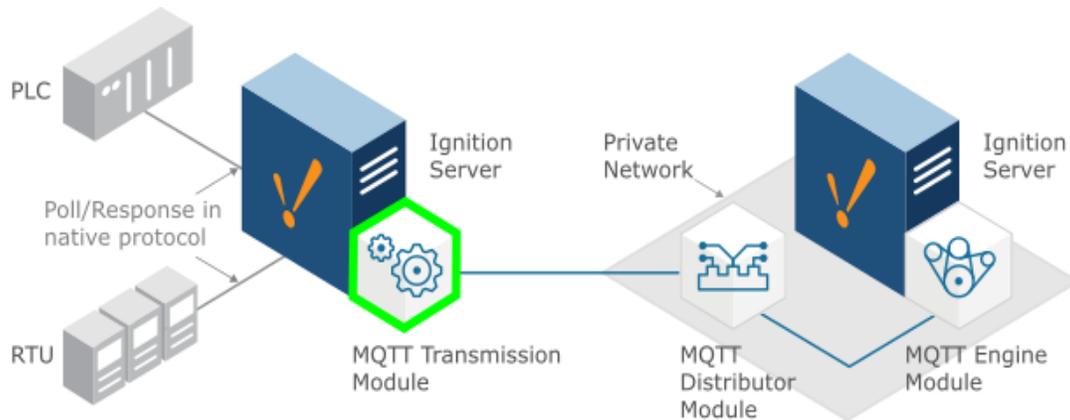
Cirrus Link MQTT Transmission Module for Ignition

Push Tag Change events to MQTT Server

The main purpose of the MQTT Transmission module is to bridge the OT IT gap mobilizing OT data for use within both OT and IT applications. It enables any tag on Ignition to be published via MQTT, transforming the tags and their properties into the Sparkplug MQTT Topic and Payload format for use to Edge Gateways, multiple Ignition Gateway Platforms and any other MQTT enabled IIoT application. The MQTT Transmission module also can provide connectivity for tag data to connect to AWS Greengrass for Machine Learning and Big Data Analytics.

MQTT Transmission with Ignition inherently provide a data management tool. This allows the user to utilize Ignitions simple drag and drop tag editor to choose which tags are sent to IIoT Applications and/or AWS Greengrass. Using the Sparkplug specification means the data is sent securely and extremely efficiently

resulting in highly responsive system updates. The MQTT Transmission module also supports store and forward functionality, meaning if the communication link to the MQTT Server is interrupted time-stamped data will be held locally until the link re-establishes. Once reconnected live data resumes and historic data is backfilled as communication bandwidth allows.



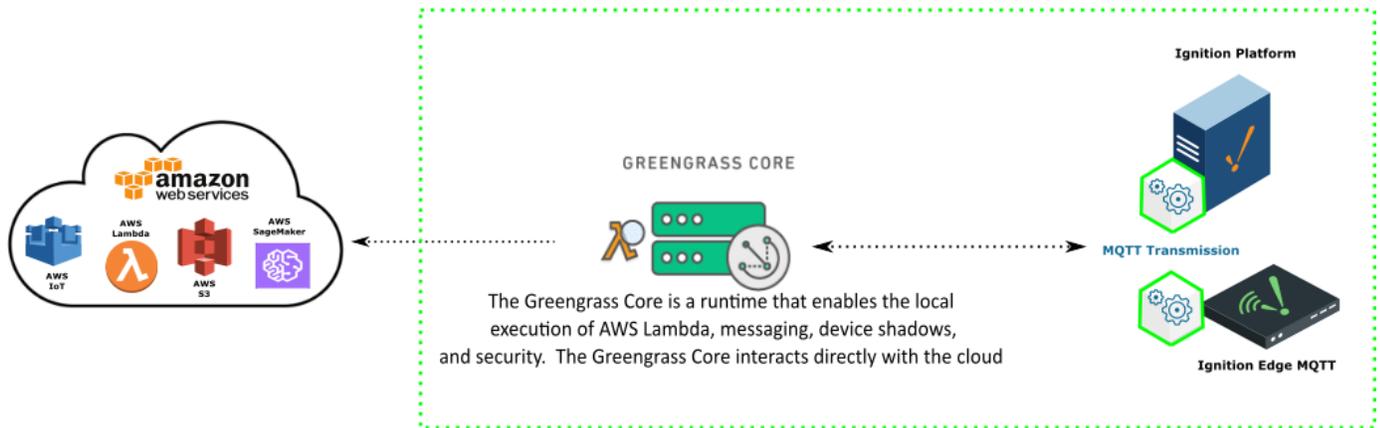
Ignition TAG into MQTT Bridge

MQTT Transmission is powerful in providing Ignition with an OPC-UA to MQTT bridge. This enables clients with any legacy SCADA/HMI an easy tool to bridge the data to MQTT and build out the IIoT application with minimal cost and effort.

Benefits

- OT IT Bridge mobilizing data for IIoT applications
- Provide Secure & Efficient connectivity of data to one or more Ignition gateways and supporting MQTT Applications
- Connect Ignition tags to AWS Greengrass for Machine Learning and Predictive Analytics
- Provides a simple visual tag tool to select, rename, scale and manage which tags are made available to the IIoT enterprise i.e. provide the “slicing and dicing”
- Store and forward when connection path is lost, data is stored and sent when is re-established
- Utilizes highly efficient report by exception MQTT Sparkplug to reduce bandwidth consumption and increase performance
- Outbound TLS secure connection to control what data is accessible, ideal for sending data outside DMZ to the business enterprise not effecting control
- Available both on Ignition Gateway and Ignition Edge MQTT to meet most any IIoT application
- Multi MQTT Server support for Scalability and Redundancy
- OPC-UA to MQTT bridge to easily enable legacy SCADA/HMI apps to connect their data

GREENGRASS GROUP



Ignition TAG into AWS Greengrass

AWS Greengrass

AWS Greengrass is software that lets you run local compute and Machine Learning (ML) capabilities for connected devices in a secure way. Greengrass connected devices can run AWS Lambda functions, keep device data in sync, and communicate with other IOT devices securely. This capability gives access to the powerful ML tools available in Amazon AWS, such as AWS SageMaker. These tools make it easy to build and deploy ML into your process to quickly deliver results of predictive analytics on machine failure or maintenance scheduling to achieve a higher level of efficiency.

Support Information

Tutorials: <https://docs.chariot.io/>

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