Cirrus Link MQTT Modules
## for Ignition by Inductive Automation

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, adds the power of MQTT to the Ignition platform with four modules: The Cirrus Link MQTT Engine, MQTT Distributor Module, MQTT Transmission Module, and MQTT Injector Module.

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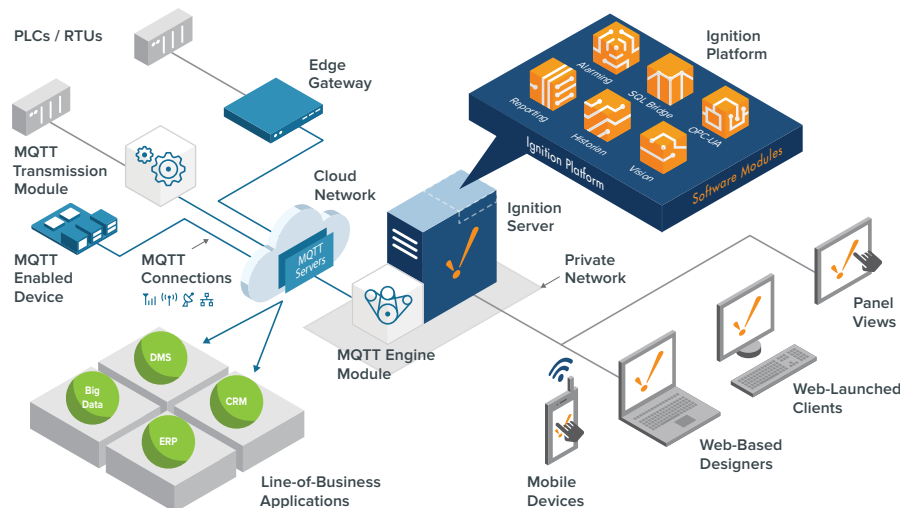
The architecture of Ignition IIoT is flexible: you can set it up in the Cloud, (as shown above), on a private on-premise network, or a hybrid of both.

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

Supported Operating Systems
Windows Server 2008/2012
Windows 7, 8, and 10
Ubuntu Linux 12.04 or later
Other Java SE-enabled OSes[1]

Supported Databases
Microsoft® SQL Server
MySQL
Oracle
PostgreSQL

Supported MQTT Servers
The MQTT Distributor Module[2] and 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 RAM[3]
1 GB free HD space
MQTT Servers

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

Build IIoT solutions on a MQTT MOM infrastructure with the Cirrus Link 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 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 MQTT Engine Module, polling at the host is no longer necessary; this solution uses edge gateways (sold separately) or MQTT-enabled devices, 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.

PLC

Poll/Response in
native protocol

Edge
Gateway

Ignition
Server

MQTT Engine
Module

RTU

MQTT
Connections
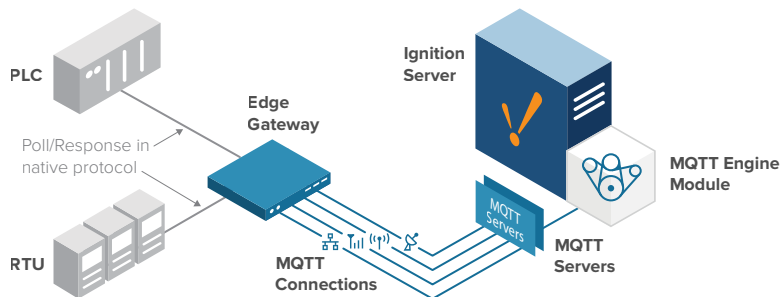
MQTT
Servers

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 or having MQTT-enabled devices publish data directly, 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.

Open-Source Tools for Third Party Device Integration

The MQTT Engine Module implements the Cirrus Link open-source reference specification called Sparkplug. Sparkplug defines the MQTT Topic and Payload specifications and describes the methodology of how edge gateways or MQTT-enabled devices connect to the Ignition platform. Device and application providers are provided with open-source tools, such as the specification, sample code, and applications to connect their products to an MQTT middleware infrastructure and to the MQTT Engine Module on Ignition.

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 development tools.

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.
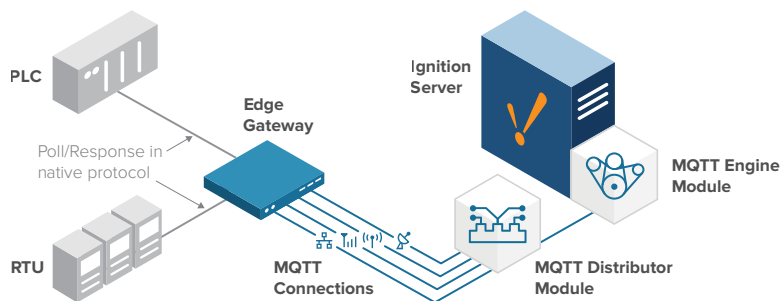
Cirrus Link MQTT Distributor Module for Ignition
Connect, Publish, and Subscribe to IIoT Data

The Cirrus Link MQTT Distributor Module for Ignition is an MQTT server launched by the Ignition Gateway, compliant with the 3.1.1 MQTT protocol OASIS standard. It enables MQTT clients to securely connect, publish, and subscribe to data, thereby supplying data to operational and business applications throughout the enterprise.

The MQTT Distributor Module 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 applications where there are restricted or high-cost communications such as VSAT or cellular connectivity. This solution is also highly effective for increasing the data throughput for high-performance industry-floor solutions.

Cirrus Link MQTT Transmission Module for Ignition
Use Ignition to Publish Data from the Edge of the Network

The MQTT Transmission Module takes Ignition tag-change events and publishes them as MQTT messages to an MQTT server. The module follows the Cirrus Link Sparkplug MQTT specification for its data transmission, allowing connectivity to the MQTT Engine Module or other line-of-business applications within the middleware infrastructure. This is extremely useful because it provides Ignition with an OPC-UA-to-MQTT bridge, enabling more efficient bandwidth usage over larger networks and easier data integration into multiple applications. The Ignition platform becomes a true source of data not just for real-time control and HMI applications but to the enterprise itself.
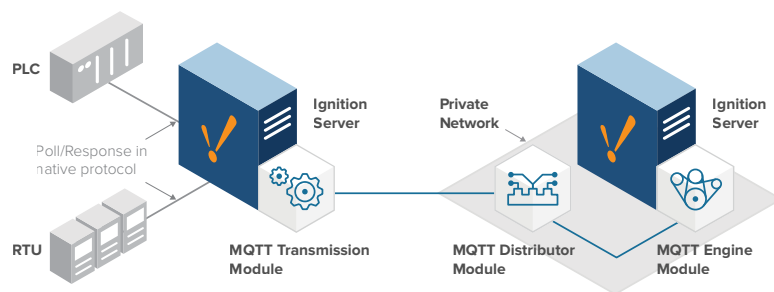
Cirrus Link MQTT Injector Module for Ignition
Simulate Live PLC Data

The Cirrus Link MQTT Injector Module emulates edge gateways simulating live PLC data. It is an easy-to-configure tool that can emulate edge gateways sending changed data in configurable intervals. Each simulated edge gateway connects to an MQTT server enabling the MQTT Engine Module to receive data. This module is perfect for testing the functionality and throughput of different IIoT solutions utilizing MQTT and Ignition.

Powered By Ignition
Build Your IIoT on the Power of Ignition

The Cirrus Link MQTT Modules are IIoT modules for Ignition, the powerful industrial application platform from Inductive Automation. The Cirrus Link MQTT Modules all integrate seamlessly with the Ignition platform and all other Ignition modules. Because these modules are built on the power of the Ignition platform, they share the same advantages, such as cross-platform compatibility, unlimited free clients, robust out-of-the-box SQL database support, and fast installation. Together with the full power of the Ignition industrial application platform with fully integrated HMI, SCADA, and MES functionality, the Cirrus Link MQTT Modules for Ignition define a true IIoT solution unlike any other on the market today.

Cirrus Link Solutions is a third-party Ignition module developer with over 30 years of experience in SCADA, and is an industry leader in MQTT and IIoT. To learn more, visit: *cirrus-link.com*

The Cirrus Link MQTT Modules for Ignition are available for download at *inductiveautomation.com*