# Industrial Automation Tech Note 53

# Crimson<sup>®</sup> Cloud Connectors: Sparkplug



## Abstract:

This document explains how to get Crimson 3.1 to talk to Inductive Automation's Ignition SCADA using the Sparkplug MQTT Connector. It assumes a basic knowledge of Crimson and its operation. For more details on the Crimson Cloud Connectors, please consult the Crimson User Manual.

## Products:

CR3000 HMIs / Graphite® HMI / Graphite Controllers

# **Use Case: Sparkplug Connector**

Transferring tag data to Inductive Automation's Ignition SCADA using Sparkplug.

#### **Required Software:**

Crimson 3.1

### Required Firmware:

Build 3106.000 or higher

#### Step 1 – Installing Java

Before installing the Ignition SCADA software, you must have a 64-bit Java Runtime Environment installed on your machine. The Oracle website has an unfortunate habit of installing the version required by your browser rather than that required by this application, so it is recommended that you perform the installation manually by visiting <a href="https://java.com/en/download/manual.jsp">https://java.com/en/download/manual.jsp</a> and referring to Figure 1 select the 64-bit Windows Offline installer.

Java Downloads for All O					θ	-	
← → C 🔒 Oracle Corp	poration [US]   https://java.com/en/de	ownload/manual.jsp			\$		
🛄 Apps 🛄 Favorites 🛄 C	iloud 💥 Aeon Wiki 🚆 PLCs.net 🔘	Sithub 🧱 Blog					
	Java <sup>-</sup>	Download Help	Searc	h 🔍			
	Available Operating	Java Downloads for All Oper	ating Systems		•		
	Systems <u>Vrindows</u> Mac	Recommended Version 8 Update 181 Release date July 17, 2018					
	<ul> <li><u>Nac</u></li> <li><u>Linux</u></li> <li><u>Solaris</u></li> </ul>	Select the file according to your operating system computer.	n from the list below to get the late	st Java for your			
	Help Resources	> Remove Older Versions	> What is Java?				
	» Troubleshoot Java	By downloading Java you acknowledge that	you have read and accepted the	terms of the <u>end user</u>			
	Java 7	license agreement					
	» Where can I get Java 7?	👭 Windows 🚯 Which should I c	hoose?				
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		filesize: 61.55 MB	en	owser in order to lable Java in your			
		Windows Offline (64-bit) filesize: 68.47 MB	Instructions	owser.			
		If you use 32-bit and 64-bit browsers interchang in order to have the Java plug-in for both brows					
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		* Oracle Java (Version 7 and later versions) rec or later and administrator privileges for installati		Mac OS X 10.7.3 (Lion)			
		👌 Linux					
		Linux RPM filesize: 64.49 MB	Instructions				
		Linux filesize: 50.40 MB		ter installing Java, you Il need to enable Java			

Figure 1.

You may have to reboot your system once installation has completed.



#### Step 2 – Installing Ignition

Visit the Inductive Automation website at <u>https://inductiveautomation.com/</u> and click on Download Ignition, refer to Figure 2.

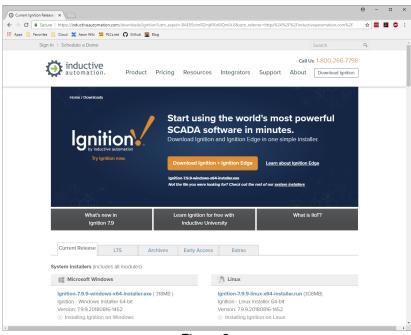


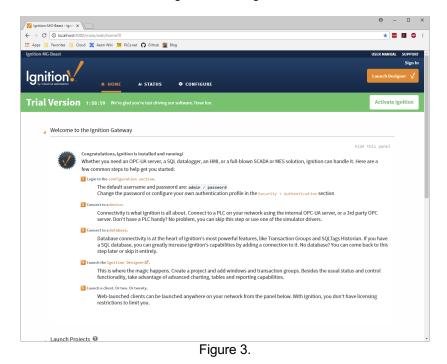
Figure 2.

Click on the *Download Ignition + Ignition Edge* button, complete the registration form and press *Download*. Once the download has completed, launch the Ignition Installer. Step through the usual steps and when offered the chance, select fully-fledged Ignition in its Typical configuration. Allow the installation to complete and click *Finish* with the Start Ignition Now box checked.



#### **Crimson® Cloud Connectors: Sparkplug**

Your default web browser should show something similar to Figure 3.



Make a note of this address or add it to your Bookmarks/Favorites as we shall be using it later.



#### Step 3 – Installing MQTT

Ignition does not come with MQTT functionality out of the box. To install the MQTT software, return to the Download Ignition webpage that we visited in **Step 2** and scroll down to Third Party modules from Cirrus Link.

🜠 Ignition-MG-Beast	- Ignit 🗴 🧿 Current Ignition Release   🗴			Θ	-	1
		tion?utm_expid=.RAE05ctmRZmjtFKo6lQmIA.0&utm_refer	rer=https%3A%2F%2Finductiveautomation.com%2F	☆		ኦ
Apps 📃 Favorite	es 📙 Cloud 💥 Aeon Wiki 🚆 PLCs.net 🎧 Github 📓	Blog				
	Third Party Modules All third party Ignition modules require the Ignitio To install third party modules: 1. Install Ignition: See Ignition installation guide					
		e and install it in the Ignition Gateway: See module in:	stallation guide			
	Cirrus Link Solutions MQTT Modules for Ign					
	See the release notes and usage documentat	ion for all Cirrus Link modules here.				
	MQTT Distributor Module	MQTT-Distributor-signed.modl (11MB)	Version: 3.4.3			
	MQTT Engine Module	MQTT-Engine-signed.modl (12MB)	Version: 3.4.3			
	MQTT Transmission Module	MQTT-Transmission-signed.modl (9MB)	Version: 3.4.3			
	MQTT Remote Management - Agent	MQTT-Remote-Agent-signed.modl (17MB)	Version: 3.4.3			
	MQTT Remote Management - Manager	MQTT-Remote-Manager-signed.modl (8MB)	Version: 3.4.3			
	Azure Injector Module	Azure-Injector-signed.modl (11MB)	Version: 3.4.3			
	AWS Injector Module	AWS-Injector-signed.modl (19MB)	Version: 3.4.3			
	Opto 22 groov EPIC and SNAP PAC Driver Module	Opto-22-groov-EPIC-and-SNAP-PAC-Driver- signed.modl (9MB)	Version: 3.4.3			
	SepaSoft, Inc. MES Modules for Ignition					
	CURRENT OEE 1.0 USERS: (versions 1.9.4 ar modules are available here.	nd prior) DO NOT UPGRADE TO THIS VERSION with	out reading this guide. Current Platform 1			
	Trace, OEE, Recipe and SPC require the instal	lation of Production, and ensure all are the same versi	on.			
	Web Services Module	Web-Services-Module.modl (3MB)	Version: 2.9.6.1808081531			
	Instrument Interface Module	Instrument-Interface-module.modi (IMB)	Version: 1.9.5.1806060804			

Figure 4.

Referring to Figure 4, click on both the *MQTT Distributor Module* and *MQTT Engine Module* and allow your web browser to download them to a convenient location. This will typically be the default Downloads directory on your PC.



Once the downloads have completed, return to the local Ignition webpage that opened at the end of **Step 2**, shown in Figure 5.

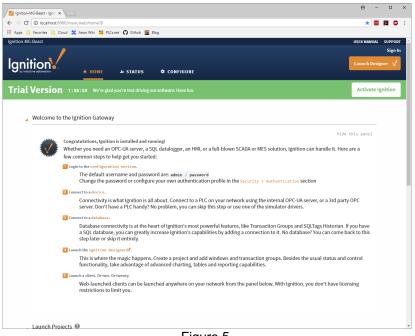


Figure 5.

Referring to Figure 5, click on the Configure option and enter the default credentials of admin and password.

Ignition-MG-Beast - Ignit 🗙			Θ – □
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Apps 🛄 Favorites 📃 Cloud	💥 Aeon Wiki 🚆 PLCs.net 🎧 Github 🦉 Blog		
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gnition V			Launch Designer 🤘
<ul> <li>by inductive automation</li> </ul>	A HOME JI STATUS 🗘 CC	DNFIGURE	
Search	Trial Version 1:48:51 We'reg		Activate Ignition
Overview		Configuration	
Backup/Restore Licensing		0	
Modules	From the	Configure section you can set up all connections, pr Here are some common actions to get you sta	
Projects		nere are some common actions to get you sta	a teu.
Redundancy Gateway Settings			
		♥ NETWORKING	
Gateway Network Email Settings			
	Update System Name	Enable SSL for the Gateway Network	Create a new user
ECURITY Auditing	Configure Redundancy	Create an SMTP Profile	Assign a user a new role
Users, Roles	Install or Upgrade a Module	Manage incoming/outgoing Gateway	View the logs of an audit profile
Service Security Security Zones	Create New Project	Network connections	Define a Security Zone
ATABASES	Activate a License		Set access levels on a Security Policy
Connections	Download Gateway Backup		
Drivers Store and Forward			
LARMING General			-
Journal	© CONNECTIONS	SYSTEMS	DATA ACQUISITION
Notification On-Call Rosters	Create a new database connection	Create an alarm journal profile	Define a new realtime tag provider
Schedules	Connect to a 3rd party OPC server	Manage schedules and holidays	Manage tag historians
	Create a new device connection	Create a new alarm notification profile	Ouickly read or write tags in a device
History	create a new device connection	create a new atarm nouncation profile	Quickty read of write tags in a device



Referring to Figure 6, from the left-hand menu, select the *Modules* option and scroll down to show the *Install or Upgrade a Module* option.

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	main/web/config/system.modules?1					\$		1
Apps 📙 Favorites 📙 Cloud	🗙 Aeon Wiki 🔢 PLCs.net 🔘 Gitt							
Notification On-Call Rosters	Modbus Driver	5.9.9 (b2018081614)	A driver for communicating with devices via Modbus-TCP.	Trial	Running	More 🕶	restart	
Schedules	Omron Driver	2.9.9 (b2018081614)	A driver for Omron NJ series PLCs.	Trial	Running	More 🕶	restart	
AGS History	OPC-UA	4.9.9 (b2018081621)	A cross-platform OPC-UA server.	Trial	Running	More 👻	restart	
Realtime DPC-UA SERVER	OpcCom	4.9.9 (b2018081622)	Bridge that exposes COM based OPC-DA servers to the system.	Trial	Running	More 👻	restart	
Certificates Devices	Reporting	4.9.9 (b2018081615)	Adds reporting capability.	Trial	Running	More 👻	restart	
Settings	SFC	3.9.9 (b2018081621)	Sequential Function Charts are customizable logic execution environments.	Trial	Running	More 👻	restart	
Servers Quick Client	Siemens Drivers	4.9.9 (b2018081614)	Siemens S7-300, S7-400 and S7-1200 drivers.	Trial	Running	More 👻	restart	
40BILE Settings	SMS Notification	4.9.9 (b2018081614)	Adds SMS notifications to Alarming	Trial	Running	More 👻	restart	
INTERPRISE	SQL Bridge	8.9.9 (b2018081614)	An OPC-to-SQL data logger and transaction manager.	Trial	Running	More 👻	restart	
Setup	Symbol Factory	5.9.9 (b2018081622)	Vector graphics clipart library for the Vision module.	Trial	Loaded	More 👻	restart	
EQUENTIAL FUNCTION HARTS Settings	Tag Historian	2.9.9 (b2018081614)	Turns any database into a powerful historian that can store and drive data in Ignition.	Trial	Running	More 👻	restart	
beccuip.	UDP and TCP Drivers	4.9.9 (b2018081614)	Drivers for receiving and parsing UDP or TCP packets.	Trial	Running	More 👻	restart	
	User Manual	4.9.9 (b2018081614)	Provides an offline version of http://docs.inductiveautomation.com.	Free	Running	More 👻	restart	
	Vision	9.9.9 (b2018081622)	A module that provides web-launched HMI/SCADA clients.	Trial	Running	More 👻	restart	
	→ Install or Upgrade a Mod	ule						
	Note: For details about a mod	dule's status, see the Modul	le Status page.					
		:	inductive					

Figure 7.

Referring to Figure 7, click on the Install or Upgrade a Module option to display the following.

Ignition-MG-Beast - Ignit 🗙		0 - 🗆 ×
← → C ① localhost:8088/	/main/web/config/system.modules?20	🖈 🔤 📕 🙂 E
🔢 Apps 📙 Favorites 📙 Cloud	i 💢 Aeon Wiki 🦉 PLCs.net 🜔 Github 📓 Blog	
Ignition-MG-Beast		USER MANUAL SUPPORT
		🚨 admin 🛛 Sign Out
	A HOME A STATUS CONFIGURE	Launch Designer 🧏
<b>Q</b> Search	Trial Version 1:48:07 We're glad you're test driving our software. Have fun.	Activate Ignition
SYSTEM Overview Backup/Restore Licensing	Install or Upgrade Module	
Modules     Projects     Redundancy     Gateway Settings     NETWORKING	To install a module, choose its • mod.]. Rie and press "install".           To upgrade a module, install the new vection on top of the existing version.           Modules can be downloaded from our website.	
Gateway Network Email Settings	Choose File No file chosen	
SECURITY Auditing Users, Roles Service Security	Install	
Security Zones		
Connections		
Drivers Store and Forward		
ALARMING		
General Journal		
Notification		
On-Call Rosters		
Schedules		
TAGS		
History		

Figure 8.

Referring to Figure 8, click *the Choose File* button and select the MQTT Distributor module you downloaded earlier. Accept the license agreement, indicate that you trust the module's digital signature, and allow the module to install. Repeat this process for the MQTT Engine module. Your modules page should now show something similar to Figure 9.

Ignition-MG-Beast - Ignit ×						0	- 0
→ C O localhost:8088/mi	ain/web/config/system.modules?2	4				\$	. 🗷 🍕
	🗙 Aeon Wiki 📲 PLCs.net 🎧 Git	hub 🧕 Blog					
Settings C CONNECTIONS	SFC	3.9.9 (b2018081621)	Sequential Function Charts are customizable logic execution environments.	Trial	Running	More 👻	restart
Servers Quick Client	Siemens Drivers	4.9.9 (b2018081614)	Siemens S7-300, S7-400 and S7-1200 drivers.	Trial	Running	More 👻	restart
BILE Settings	SMS Notification	4.9.9 (b2018081614)	Adds SMS notifications to Alarming	Trial	Running	More 👻	restart
TERPRISE MINISTRATION	SQL Bridge	8.9.9 (b2018081614)	An OPC-to-SQL data logger and transaction manager.	Trial	Running	More 👻	restart
ietup	Symbol Factory	5.9.9 (b2018081622)	Vector graphics clipart library for the Vision module.	Trial	Loaded	More 🕶	restart
UENTIAL FUNCTION IRTS	Tag Historian	2.9.9 (b2018081614)	Turns any database into a powerful historian that can store and drive data in Ignition.	Trial	Running	More 🕶	restart
TT DISTRIBUTOR	UDP and TCP Drivers	4.9.9 (b2018081614)	Drivers for receiving and parsing UDP or TCP packets.	Trial	Running	More 🕶	restart
ettings TENGINE	User Manual	4.9.9 (b2018081614)	Provides an offline version of http://docs.inductiveautomation.com.	Free	Running	More 🕶	restart
ettings	Vision	9.9.9 (b2018081622)	A module that provides web-launched HMI/SCADA clients.	Trial	Running	More 🕶	restart
	Cirrus Link Soluti View Certificate Name	<b>ONS</b> Version	Description	License	State		
	MQTT Distributor	3.4.3 (b2018070923)	An MQTT server	Trial	Running	More 🕶	restart
	MQTT Engine	3.4.3 (b2018070923)	An MQTT connector to multiple MQTT servers	Trial	Running	More 🕶	restart
	→ Install or Upgrade a Mo	dule dule's status, see the Modul	ie Status page.				
	Note: For details about a mo						

Figure 9.

Referring to Figure 9, note the Cirrus Link Solutions section in the module list, and the presence of the MQTT Distributor and MQTT Engine settings link in the left-hand menu. The MQTT Distributor needs no configuration for our application so click on the MQTT Engine option to configure that module, and scroll down to the *Miscellaneous* section.

→ C ① localhost:8088/mai	n/web/config/mgttengin		☆		
			ы	-	 •
Apps 📃 Favorites 🛄 Cloud 🗮	Aeon Wiki M PLCs.net ACCess Key				
Schedules		The optional Chariot Cloud Access Key used for Cirrus Link hosted Chariot MQTT Servers (optional)			
AGS	Chariot Cloud				
History	Secret Key	The optional Charlot Cloud Secret Key used for Cirrus Link hosted Charlot MQTT Servers (optional)			
Realtime		The optional charter cloud Secret key used for Cirrus Link hosted charter wight Servers (optional)			
PC-UA SERVER					
Certificates	Miscellaneous				
Devices	Block Node				
Settings	Commands	Enable blocking of outbound edge node tag writes			
PC CONNECTIONS	Block Device				
Servers	Commands	Enable blocking of outbound device tag writes			
Quick Client					
OBILE	Block Property Changes	Enable blocking of incoming Tag property changes			
Settings					
ITERPRISE DMINISTRATION	File Policy	Ignore v			
Setup		The policy for handling incoming files			
-					
EQUENTIAL FUNCTION HARTS	File Location				
Settings		The directory to store files in when using the "Store" file policy (optional)			
QTT DISTRIBUTOR	Store Historical	Enabled the writing of historical change events directly to the History provider instead of updating the Tag value			
Settings	Events	(default: true)			
QTT ENGINE					
Settings					
		Save Changes			
	Note: For addition	al details on configuring MQTT Engine, see the			
	documentation he	re			
					 _
		nductive.			
		O inductive			

#### Figure 10.

The only change required here is to uncheck the Block Node Commands box. This will allow Ignition to submit writes to our device. After unchecking the box, press the *Save Changes* button to commit the configuration.

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#### Step 4 – Piercing the Firewall

The MQTT Distributor listens for MQTT connections on Port 1883 of your PC. To ensure that connections can be received, we must open a hole in the firewall to allow them through. The exact process varies between versions of Windows but is similar enough that you ought to be able to follow along. Start by pressing CTRL+ESC or the Windows key to open your Windows start menu and typing the first few letters of *Firewall*. This should allow you to open the Windows Defender Firewall.

*	Windows Defender Firewall				-	×
	$ ightarrow ~ \uparrow 🎓 > Control Par$	nel > All Control Panel Items > Windows Defende	r Firewall	νõ	Search Control Panel	ρ
	Control Panel Home	Help protect your PC with Windows I	Defender Firewall			
	Allow an app or feature through Windows Defender	Windows Defender Firewall can help prevent hac through the Internet or a network.	kers or malicious software from gaining access to your PC			
	Firewall	Private networks	Connected 🔗			
ė	Change notification settings Turn Windows Defender Firewall on or off	Networks at home or work where you know and	I trust the people and devices on the network			
	Restore defaults	Windows Defender Firewall state:	On			
ø	Advanced settings	Incoming connections:	Block all connections to apps that are not on the list of allowed apps			
	Troubleshoot my network	Active private networks:	2 3689 Sorrel			
		Notification state:	Notify me when Windows Defender Firewall blocks a new app			
		Guest or public networks	Not connected 😒			
	See also					
	Security and Maintenance					
	Network and Sharing Center					

Figure 11.

Referring to Figure 11, on the left-hand side, select the Advanced Settings option and then select Inbound Rules.

Windows Defender Firewall wit Action View Help	n Aurence Acomy								
→ 2 10 3 10 100									
Windows Defender Firewall with	Inbound Rules						Actions	 	Ì
C Inbound Rules	Name	Group	Profile	Enabled	Action	Ov ^	Inbound Rules		
Cutbound Rules	ARK: Survival Evolved		All	Yes	Allow	No	New Rule		î
Connection Security Rules	ARK: Survival Evolved		All	Yes	Allow	No			
s Monitoring	ARK: Survival Evolved		All	Ves	Allow	No	Tilter by Profile		
	ARK: Survival Evolved		All	Yes	Allow	No	V Filter by State		
	Bitter Tides		Private	Yes	Allow	No	Filter by Group		
	Bitter Tides		Private	Ves	Allow	No	View		
	Bitter Tides Demo		All	Yes	Allow	No			
	Bitter Tides Demo		All	Ves	Allow	No	G Refresh		
	CAMV2 SERVER		Private	Yes	Allow	No	is Export List		
	CAMV2 SERVER BOARDCASTING		Private	Yes	Allow	No	Help		
	🛛 Exe File		Private	Ves	Allow	No	1 1 Kap		
	C Exe File		Private	Yes	Allow	No			
	File Transfer Program		Private	Ves	Allow	No			
	G File Transfer Program		Private	Ves	Allow	No			
	Java(TM) Platform SE binary		Private	Yes	Allow	No			
	Java(TM) Platform SE binary		Private	Ves	Allow	No			
	Java(TM) Platform SE binary		Private	Ves	Allow	No			
	Java(TM) Platform SE binary		Private	Yes	Allow	No			
	Java(TM) Platform SE binary		Private	Ves	Allow	No			
	Java(TM) Platform SE binary		Private	Yes	Allow	No			
	G Microsoft Lync		Public	Yes	Allow	No			
	Microsoft Lync		Public	Ves	Allow	No			
	Microsoft Lync UcMapi		Public	Yes	Allow	No			
	G Microsoft Lync UcMapi		Public	Ves	Allow	No			
	Microsoft Office Outlook		Private	Yes	Allow	No			
	Microsoft Visual Studio 2010		Private	Yes	Allow	No			
	Microsoft Visual Studio 2010		Private	Yes	Allow	No			
	Modbus Slave application file		Private	Yes	Allow	No			
	Modbus Slave application file		Private	Yes	Allow	No			
	Skype for Business 2016		Private	Ves	Allow	No			
	Skype for Business 2016		Private	Yes	Allow	No			
	Steam		All	Yes	Allow	No			
	Steam		All	Yes	Allow	No			
	Steam Web Helper		All	Yes	Allow	No			
	Steam Web Helper		All	Ves	Allow	No			
	Steam Web Helper		All	Ves	Allow	No			
	Steam Web Helper		All	Yes	Allow	No			
	SteamVR Performance Test		All	Ves	Allow	No			
	SteamVR Performance Test		All	Yes	Allow	No			
	O Unturned		All	Yes	Allow	No			
	Ø Unturned		All	Ves	Allow	No			
	Contained						1		
>	<					>			

Figure 12.

Referring to Figure 12, on the right-hand side, select the *New Rule* option and indicate that you want to create a Port rule as shown in Figure 13.



Rule Type		
Select the type of firewall rule to	o create.	
Saket the type of flewood rule to Steps: BrA Type Photosian Pets Adam Portis Name	What type of side would you'like to create?         Perprint         Rule that controls convections for a grogen.         Path         He in controls convections for a 10% or UDP part.         Pathor fibration         Rule in controls convections for a 10% or UDP part.         Pathor fibration         Rule in accountion for a 10% or UDP part.         Outline in         Custom side:	
	< Back Next > Cancel	

Figure 13.

Click Next, then referring to Figure 14, specify a *TCP* rule for port **1883** and click *Next*.

P New Inbound Rule Wiza		3
_	ra	·
Protocol and Ports		
Specify the protocols and ports	to which this rule applies.	
Sleps:		
<ul> <li>Rule Type</li> </ul>	Does this rule apply to TCP or U	DP?
Protocol and Ports	ICP	
<ul> <li>Action</li> </ul>	○ UDP	
<ul> <li>Profile</li> </ul>		
<ul> <li>Name</li> </ul>	Does this rule apply to all local p	orta or specific local ports?
	All local ports	
	Specific local ports:	1883
	Operation of the second sec	1883 Example: 80, 443, 5000-5010
		Example: du, 443, 0000/010
		< Back Next > Cancel



Indicate that the connection should be allowed, as shown in Figure 15, then click Next.

Action Peedly the action to be taken whe Reper: Rule Type Protocol and Pota Action Profile Name	In a contraction matches the conditions specified in the lot. What action should be laken when a contraction matches the specified conditions? <b>(a) Bore the contraction</b> The include contractions that are protected with Piece as well as those are not. <b>(b) Allow the contractions</b> that is secared The include and contractions that been administrated by areg Thes: Convections
Reps: Rule Type Protocol and Ports Action Profile	What action should be taken when a connection natches the specified conditions? (e) <b>direct the connection</b> The includes connections that are protected with Place as well as hoose are not. () <b>Now the connection that is a normal</b> The include not connection that have been advertiseded to using Place. Connections
Rule Type Protocol and Ports Action Profile	Boy the connection     The notative connections that are protected with IPsec as well as those are not.     More the connections that are protected with a secure     The notade or connections that have been anthentoated by using IPsec. Connections
Protocol and Ports Action Profile	Boy the connection     The notative connections that are protected with IPsec as well as those are not.     More the connections that are protected with a secure     The notade or connections that have been anthentoated by using IPsec. Connections
Action Profile	This includes connections that are protected with IPsec as well as those are not.  Allow the connection if it is secure This includes only connections that have been authenticated by using IPsec. Connections
Profile	This includes connections that are protected with IPsec as well as those are not.  Allow the connection if it is secure This includes only connections that have been authenticated by using IPsec. Connections
	Allow the gonnection if it is secure     This includes only connections that have been authenticated by using IPsec. Connections
Name	This includes only connections that have been authenticated by using IPsec. Connections
	Ref rods  Ref rods Ref rods  Ref rods Ref rods  Ref rods  Ref rods  Ref rods  Ref rods  Ref rods Ref rods Ref rods Ref rods Ref rods  Ref rods Ref rods  Ref rods Ref

Figure 15.



Enable the rule for all types of network as shown in Figure 16 and click Next.

PNew Inbound Rule Wizz		
Profile		
Specify the profiles for which thi	is rule applies.	
Steps:		
Rule Type	When does this rule apply?	
Protocol and Ports		
<ul> <li>Action</li> </ul>	✓ Domain	
Profile	Applies when a computer is connected to its corporate domain.	
Name	Private	
	Applies when a computer is connected to a private network location, such as a home or work place.	
	✓ Pyblic	
	Applies when a computer is connected to a public network location.	
	< Back Next > Cancel	

Figure 16.

As shown in Figure 17, name it **MQTT 1883** and select Finish to create the rule.

Nore Interrol Rule Waard  Name  Rub Type  Rub Type Rub Type  Rub Type  Rub Type Rub Type  Rub Type  Rub Type  Rub Type Rub Type  Rub Type Rub Type Rub Type Rub Type Rub Ty		
Specty he name and decodption of this sub- Steps: B fub Type B fubble for this B fubble Phylics B fubble B fu	Inbound Rule Wizard	
Ster		
Air Type     Protocal and Proto     Advin     Advin     More     Mane     Mane	name and description of	
Protocol and Parts     A claim     Ann     Same:     Morr     Morr     Morr     Morr		
a Adon a Patle Name: a Name (MOTT 1883)	/pe	
Profile     Name:     MATT 1853	and Ports	
Name MQTT 1883		
Name Carta		
Perception (percent)		
< gack Bnish Cancel		a
Figure 17.		



#### Step 5 - Creating an Outline Database

You should now open Crimson 3.1 and create a new database for your device. Before we configure the Sparkplug Connector, we shall need to perform a few steps to create the infrastructure used for testing. Red Lion will soon be making these so-called outline databases available via its website and including them in the Crimson installation. In the meantime, to manually create an outline database, start by navigating to the Communications category and selecting the *Ethernet 1* tab in the Network settings...

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Figure 18.

Referring to Figure 18, if the device is connected to a network that automatically allocates IP addresses via a DHCP server, you may leave these settings unchanged. **If you are manually specifying an IP address, you must also define a default gateway and manually provide DNS servers.** The gateway is necessary for your device to push data to the Internet and the DNS servers are used to convert the cloud server name into an IP address. The default server addresses of 8.8.8.8 and 8.8.4.4 will be suitable for most applications, but the <u>DNS Mode must be explicitly set to Manual if the Port Mode is set to Manual Configuration.</u>



Next select the Time Manager settings within the Services group.

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Figure 19.

Referring to Figure 19, perform the following actions...

- **1.** In the Control section, set the Enable Time Manager property to Yes.
- **2.** In the Time Client section, set the Enable SNTP setting to Yes.

The other settings may be left at their default values. These settings enable time synchronization, allowing your device to set its real-time clock from the Internet. Having an accurate real-time clock is important not only for time-stamping data, but also for ensuring the correct operation of certain security algorithms. **Once you have downloaded your outline database for the first time, select the Send Time option from the Link menu within Crimson to set the device's time zone to that of your PC.** If you need to set it to a different time zone, refer to the Crimson manuals for information on the time zone system variables.



Next navigate to the Data Tags category and press the New button five times...

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Figure 20.

Referring to Figure 20, select Tag5 in the Navigation pane and then rename it to Status.



Next navigate to the Display Pages category...

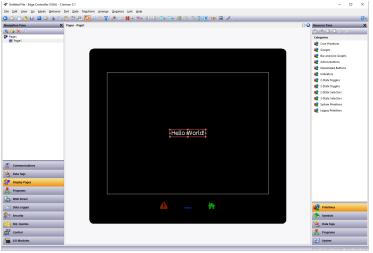


Figure 21.

Referring to Figure 21, perform the following actions...

- 1. Select the Hello World text and press *Delete* to remove it from the screen.
- **2.** In the Resource Pane, select the *Data Tags* category.
- 3. In the Resource Pane, click on Tag1 and, while holding down Shift + Ctrl, click on Status.
- 4. All five data tags should be selected.
- 5. Drag the resulting selection on to your display page.
- 6. Grab the bottom-right resizing handle and expand the data fields to a suitable size.
- 7. Click away from the data fields to deselect them.
- 8. Click on Tag1 and check the Data Entry box in the floating toolbar.
- Alternatively, *right-click* and select *Data* followed by *Data Entry*.
- 9. Repeat this operation for Tag2.



Your display page should now look like Figure 22.

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Figure 22.

Next right-click on the page and select Properties...

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On Remove:			Edit
On Tick:			Edit
On Update:		Tag3++,Tag4++	Edit

Figure 23.

Referring to Figure 23, perform the following actions...

- 1. Select the Actions tab.
- 2. Enter *Tag3++,Tag4++* in the On Update box.
- **3.** Press *OK* to save the changes.



Next navigate to the Web Server category...

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Figure 24.

Referring to Figure 24, perform the following actions...

- 1. Select the *Features* tab.
- 2. In the Remove View section, set the Remote Control property to enabled.

You have now created an outline database. Press F9 to download this to your device, and if this is the first time you are doing so, select the Send Time option from the Link menu to set the device's time and time zone. If the device has a display, you should be able to see the five tags. You will be able to edit the first two tags using the touchscreen, and the next two will be incrementing steadily as the display updates.

If your device does not have a display, open your web browser. In the address bar, enter the http:// followed by the IP address that you have allocated to your device to access the Crimson web server. Within the Crimson web server, select Remote View to view the device's virtual display and again note the behavior of the tags.



#### Step 8 – Configuring the Sparkplug Connector

We are now in a position to configure and test the Sparkplug Connector. We shall be configuring it to push four of the data tags that we have created. The fifth tag will be used to display the connection status. Start by returning to the Communications category and select the *Sparkplug MQTT* settings in the Connectors section.

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B de USB Host Ports	Data Topic	
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Weyboard	Node ID: CrimsonNode1	
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Amazon MQIT	Primary App ID: Not Used	
Amazon MQIT Azure MQIT	Authentication	
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Services	User Name: admin	
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Figure 25.

Referring to Figure 25, perform the following actions:

- **1.** In the Control section, set the Enable Agent property to Yes.
- 2. In the MQTT Server section, set the Host Name 1 property to the IP address of your PC.
- 3. In the Diagnostics section, set the Status property to Status.

The default credentials of *admin* and *changeme* match the defaults of the MQTT Engine.



Next select the Tag Data 1 tab, as shown in Figure 26:

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Figure 26.

Referring to Figure 26, perform the following actions:

- 1. In the Control section, set the Tag Writes property to Enabled.
- 2. Select the Data Tags category of the Resource Pane.
- 3. Drag Tag1 through Tag4 into the Contents field in the editing pane.

You have now configured Crimson to push Tag1 through Tag4 to Ignition once per second. Press *F9* to download the database to your device and check the Status tag on your display or via the web browser. A value of 4 should be displayed, indicating that the cloud connection has been established and that data is being pushed. A value of 0 typically indicates an issue with network connectivity or with DNS, while a value of 1 indicates that the server name was resolved but that the connection could not be established. A value of 2 indicates that you have define a primary application identifier in Ignition that does not match that in Crimson. A value of 3 indicates that the connection has been made, but that data has not been transferred. If you do not see a value of 4, check each item in this note carefully and ensure your Crimson configuration matches your Ignition settings.



#### Step 9 – Interacting with the Device

Now that we have configured Crimson to pass data to Ignition, we can view this data from the Tag Explorer within the Ignition designer. Return to the local Ignition webpage that opened at the end of Step 2 and select the Launch Designer button from the top right-hand corner. Depending on your browser and its configuration, the designer may open on its own, or you may be prompted as to the security of the download and then have to open the application manually from your download bar. You will eventually be shown a logon window similar to Figure 27.



Figure 27.

Enter the default credentials of admin and password and press Login...

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New Project	Project Name	Test	0
	Project Title		
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	Default Database		
	Default Tags Provider	default	
	Project Template	Blank	•
	Description		
		Greate New Project	
		<b>O</b> :	nductive

Figure 28.

Referring to Figure 28, enter a new Project Name of Test and press Create New Project. The Ignition Design should open, see Figure 29:



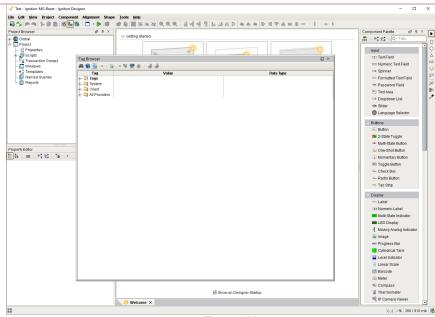


Figure 29.

If the Tag Browser window is not visible, enable it via the Panels option on the View menu.

Expand the tag browser to show...

- All Providers
- MQTT Engine
- Edge Nodes
- Crimson Devices
- CrimsonNode1
- Tags

The data being transmitted by your Crimson device should be visible as in Figure 30:

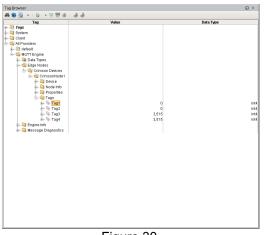


Figure 30.

To change a tag, double-click on its value, enter a new one and press Enter. The first time you do this, you will be prompted to switch the database into read-write mode. If the write does not succeed, check that you have writes enables in the tag set and that you unblocked node commands in the MQTT Engine.

For more information: http://www.redlion.net/support/policies-statements/warranty-statement

