# Publishing Data to Azure IoT Edge

## **Prerequisites**

- Create an IoT Hub Azure
- Register an IoT Edge Device in IoT Hub
- Install Azure Edge
- Configure the CA certificates for the IoT Device
- Install Azure CLI on a development system

## Summary

The tutorial will provide step by step instructions for the following:

- Configuring Azure IoT Hub to allow client connections to a deployed IoT Edge Hub
- Connecting Azure Injector to the IoT Edge Hub
- · Publishing data from Azure Injector to Azure IoT Edge Hub and viewing the data

# Tutorial

There are two primary ways to connect to an Azure Edge Hub via MQTT from an MQTT client. These are 'module' or 'device' connections. A module connection typically involves an application deployed as a docker container that runs in Azure Edge. This is the preferred way of connecting the Azure Injector module to Azure Edge Hub. This tutorial will use this method for connecting to Azure IoT Edge.

After completing the prerequisites, you should have an IoT Edge Device as shown below. In this example, it has a name of 'My-IoT-Edge' and is listed under the IoT Edge devices.

CirrusLinklotHub01 - Microso	ift Azur X +	
$\leftarrow \rightarrow $ C O A	52 https://portal.azure.com/#@cirruslink.onmicrosoft.com/resource/subscriptions/eb40216b-6f65-43e1-b7cf-6f6	82 ✿
≡ Microsoft Azure 🔎 Search	n resources, services, and docs (G+/) 🛛 😨 😨 🛞 ?	wes.johnson@cirruslink CIRRUS LINK SOLUTIONS (CIRRU
Home > CirrusLinklotHub01		
CirrusLinklotHub01	IoT Edge 🖈 …	×
	🕂 Add an IoT Edge device 📧 Create Deployment 🖼 Create Layered Deployment 🖒 Refresh 📋 Delete	
O Pricing and scale		
Networking	Deploy Azure services and solution-specific code to on-premises devices. Use IoT Edge devices to perform compute and ar	nalytics tasks on data before it's sent to $\square^{1}$
Certificates	the cloud.	
Built-in endpoints	IoT Edge devices IoT Edge deployments	
- Failover		
😂 Properties		
🔒 Locks		
Evolorors	Field Operator Value	
	+ X = V _ My-IoT-Edge'	
Query explorer	+ Add new clause	
lol devices	Query devices	> Switch to query editor
Automatic Device Management		
🔮 IoT Edge	Device ID     Runtime Response     IoT Edge Module Count     Connected Client Cou	unt Deployment Count
R IoT device configuration	My-IoT-Edge 417 - The device's deploym 1 0	0
Device updates		
Messaging		

Note this shows an error that the '417 - The device's deployment configuration is not set'. This can be fixed by creating a deployment configuration for this Azure Edge Device.

## Step 1: Create Deployment Configuration

Begin by clicking the Device in the Azure Portal. After doing so, you should see something similar to what is shown below.

				2	iohncon@cirruclink		
Microsoft Azure 🔎	Search resources, services, and do	cs (G+/)			US LINK SOLUTIONS (CIRRU		
ome > CirrusLinklotHub01 >							
<b>∕ly-loT-Edge</b> ☆ · irrusLinklotHub01					>		
🗈 Save 🧲 Set modules 🔏	Manage child devices 🖁 Trouble	eshoot 🗮 Device twin 🔍 Manaj	ge keys \vee  🕐 Refresh				
vice ID 🕕	My-IoT-Edge						
rimary Key 🚺							
condary Key 🕕		0					
mary Connection String 🌘					٥		
condary Connection String 🕕					0		
۲ Edge Runtime Response 🌒	417 The device's deplo	yment configuration is not set					
able connection to IoT Hub 🕕	Enable     Disable						
rent device 🜒	No parent device						
Nodules IoT Edge hub conne	ections Deployments and Con	figurations					
		Specified in Deployment	Reported by Device	Runtime Status	Exit Code		
Name	Туре	speemen in beprojiment					
Name ŞedgeAgent	Type IoT Edge System Module	⊖ No	✓ Yes	running	0		
Name jedgeAgent jedgeHub	Type IoT Edge System Module Module Identity	⊖ No NA	√ Yes NA	running NA	0 NA		

Now click 'Set modules' in the upper left corner. That will open the following page.

Set	modules on device: My-IoT-Edge× +							
← → C	◯ A == https://portal	azure.com/#blade/Microsoft_Azu	re_lotHub/StandaloneFra	ameBlade/path/%2	2Fdevices%2Fd	device% 🟠	$\bigtriangledown$	» =
≡ Microsoft	Azure $P$ Search resources, services,	and docs (G+/)		D G	L <sup>2</sup> 🐵	? &	wes.johnson@cirruslin cirrus link solutions (cir	k
Home > CirrusLink	klotHub01 > My-IoT-Edge >							
Set module	es on device: My-IoT-E	dge						×
Modules Route	es Review + create							
Container Registry	y Credentials							
You can specify crede	entials to container registries hosting modul	e images. Listed credentials are used	o retrieve modules with a	matching				
URL. The Edge Agent	will report error code 500 if it can't find a c	ontainer registry setting for a module						
Name	Address	User name	Password					
An IoT Edge module i oT Edge runtime. Usi nodules on each dev nodules can be set 1	is a Docker container you can deploy to IoT ing this UI you can import Azure Service IoT rice will be counted towards the quota and 0 times per second if no other updates are	Edge devices. It communicates with of Edge modules or specify the settings throttled based on the IoT Hub tier an happening in the IoT Hub. Learn more	ther modules and sends d for an IoT Edge module. S d units. For example, for S1 e	ata to the Setting 1 tier,				
	Runtime Settings							
There are no listed lo	T Edge Modules.							
Send usage data to M is collected.	licrosoft to help improve our products and	services. Read our privacy statement t	o learn more. See details of	f what data				
Review + create	< Previous	Next: Routes >						

Add a new 'Container Registry Credentials' with the following parameters.

- Name: DockerHub
- Address: https://registry.hub.docker.com/
  User Name: username
- - Note the Ignition image is public and doesn't require a username and password to access. However, this field must be non-empty and can be set to any non-empty value.
- Password: password
  - Note the Ignition image is public and doesn't require a username and password to access. However, this field must be non-empty and can be set to any non-empty value.

Now click the '+ Add' drop down under 'IoT Edge Modules' and select 'IoT Edge Module' as shown below.

set modu	tes on device: My-101-Edge × +		
$\leftarrow \rightarrow $ G	O A and or https://portal.azure.c	om/#blade/Microsoft_Az	zure_lotHub/StandaloneFrameBlade/path/%2Fdevices%2Fdevi ☆ 🛛 🖓 🛁
≡ Microsoft Azuı	$\sim$ Search resources, services, and docs (G+	+A	国家 日本 Cirruslink (Cirruslink)
Home > CirrusLinklotH	ub01 > My-loT-Edge >		
Set modules of CirrusLinklotHub01	on device: My-IoT-Edge		×
Modules Routes	Review + create		
Container Registry Cre	dentials		
You can specify credentials URL. The Edge Agent will r	to container registries hosting module images. List eport error code 500 if it can't find a container regis	ed credentials are used to try setting for a module.	retrieve modules with a matching
NAME	ADDRESS	USER NAME	PASSWORD
DockerHub	https://registry.hub.docker.com/	username	······ 🛍
Name	Address	User name	Password
An IoT Edge module is a D IoT Edge runtime. Using th modules on each device w modules can be set 10 tim	ocker container you can deploy to IoT Edge devices is UI you can import Azure Service IoT Edge moduli ill be counted towards the quota and throttled base es per second if no other updates are happening in me Settings	. It communicates with oth es or specify the settings fo d on the IoT Hub tier and u the IoT Hub. Learn more	er modules and sends data to the or an IoT Edge module. Setting units. For example, for S1 tier,
+ IoT Edge Module	DESIRED STATUS		
+ Marketplace Module			
+ Azure Stream Analyti	cs Module		
Send usage data to Micros collected.	oft to help improve our products and services. Reac	d our privacy statement to l	learn more. See details of what data is
Review + create	< Previous Next: Rou	tes >	

This will open the following page.

• • •	Set modules on device: My-IoT-Edg: X +			
$\leftarrow \rightarrow$	C C a se https://portal.azure.com/#blade/Microsoft_Azure_lotHub/StandaloneFrameBlade/path/%2Fdevices%2Fdevice%	${igsidential}$	≫ ≡	<u>+</u>
≡	Microsoft Azure 🔎 Search resources, services, and docs (G+/)	Cirrus	link	9
Home	> CirrusLinklotHub01 > My-IoT-Edge >			
Set	modules on device: My-IoT-Edge		×	
CITTUSLIF	KIOTMUDU I			
Mod	Add IoT Edge Module		×	1
Cont	Specify the settings for an IoT Edge custom module. Learn more			
You ca URL. 1	IoT Edge Module Name *			
NAME	Module name			
Doc	Module Settings Environment Variables Container Create Options Module Twin Settings			
Nan	Image URI *			
IoT E	Image URI			
An Io	Restart Policy			
loT Ec modu	always 🗸			
modu	Desired Status			
+	running V			
NAME	Image Pull Policy			
There	V			
	Startup Order			
	200			
	Auto			

- Set the following fields under 'Module Settings'. IoT Edge Module Name: Ignition

  - Image URI: inductiveautomation/ignition:8.1.x where x is the latest stable release from the 8.1.x branch.

The latest version is updated and available here: https://hub.docker.com/r/inductiveautomation/ignition  $\oslash$ 

- Restart Policy: always
  Desired Status: running
  Image Pull Policy: On create
  Startup Order: 200

- Leave the 'Environment Variables' blank
  Under 'Container Create Options' set the following JSON as the value. The 'Binds' field is required and there to preserve Ignition configuration across container deployments.

```
{
   "HostConfig": {
       "Binds": [
           "IgnitionData:/usr/local/bin/ignition/data"
       ],
       "PortBindings": {
           "8088/tcp": [
               {
                   "HostPort": "8088"
               }
           ],
           "8043/tcp": [
               {
                   "HostPort": "8043"
               }
           ],
           "8060/tcp": [
              {
                   "HostPort": "8060"
               }
           ]
       }
   }
}
```

• Leave the 'Module Twin Settings' blank

Finally, click 'Add'. After doing so you should see the following.

Set modu	lles on device: My-loT-Edg∈ × +								
$\leftarrow \   \rightarrow \   {\tt G}$	○ A = or https://portal.azure.cd	om/#blade/Microsoft_Az	ure_lotHub/StandaloneF	rameBlade/pat	h/%2Fdevice	s%2Fdevi ☆		$\boxtimes$ »	=≜
≡ Microsoft Azu	$\mathcal{P}$ Search resources, services, and docs (G+	ŀΛ		d Iç	₽ 🕸	? 🔊	wes.johnson( cirrus link soli	Cirruslink	: 🕘
Home > CirrusLinklotH	lub01 > My-IoT-Edge >								
Set modules	on device: My-IoT-Edge 🦷								×
Modules Routes	Review + create								
Container Registry Cre	edentials								
You can specify credential URL. The Edge Agent will	s to container registries hosting module images. List report error code 500 if it can't find a container regis	ed credentials are used to r try setting for a module.	etrieve modules with a mat	ching					
NAME	ADDRESS	USER NAME	PASSWORD						- 1
DockerHub	https://registry.hub.docker.com/	username	•••••	۱.					- 1
Name	Address	User name	Password						- 1
IoT Edge Modules An IoT Edge module is a D IoT Edge runtime. Using th modules on each device w modules can be set 10 tim + Add ~ @ Runti	Docker container you can deploy to IoT Edge devices is UI you can import Azure Service IoT Edge module ill be counted towards the quota and throttled base lees per second if no other updates are happening in me Settings	. It communicates with othe es or specify the settings fo d on the IoT Hub tier and u the IoT Hub. Learn more	er modules and sends data r an IoT Edge module. Setti nits. For example, for S1 tie	to the ng r,					
NAME	DESIRED STATUS								- 1
Ignition Send usage data to Micro- is collected.	running soft to help improve our products and services. Read	d our privacy statement to le	earn more. See details of wh	ill at data					
Review + create	< Previous Next: Rou	tes >							

#### Now click 'Next: Routes'. This will open the following page.

		.com/#blade/Microsoft_/	Azure_lotHub/Standal	onerrameBlade/path/9			' =
Microsof	t Azure $P$ Search resources, services, and	l docs (G+/)	Þ.	] 🖟 🗘 🕸	? 🕅 🎖	wes.johnson@cirruslink cirrus link solutions (cirri	(
Home > CirrusLir	nklotHub01 > My-IoT-Edge >						
Set modul	les on device: My-IoT-Edg	е					$\times$
Modules Rout	tes Review + create						
Routes							
'ou can set routes b	netween modules, which gives you the flexibility t	o send messages where th	ney need to go without th	ne need			
or additional servic	es to process messages or to write additional co	de. Learn more					
AME	VALUE	PRIORITY	TIME TO LIVE (SECS)	] 📾			
route	FROM /messages/* INTO \$upstream		7200	] 🛄			
Route name	FROM /messages/* INTO \$upstream	0	7200	]			
Review + creat	e < Previous N	NT Review + create >					

Leave the default route in place. This will allow messages to flow from Azure IoT Edge Hub to Azure IoT Hub. This feature will be used later in this tutorial. Now click 'Review + create' in the lower left corner. This will bring up the following page.



Finally, click 'Create' in the lower left corner. This will deploy the Ignition module to Azure Edge. It takes a few minutes. You can use the 'Refresh' button on the Device page to check the status of the deployment. Once Ignition has successfully deployed, you should see the following. Specifically note that \$edgeHub and 'Ignition' now show a 'Runtime Status' of 'running'.

$\leftrightarrow$ $\rightarrow$ C (	) 🔒 🔤 🗣 https://portal.az	zure.com/#blade/Microsoft_Azure_	lotHub/StandaloneFrameBlade/pa	ath/%2Fdevices%2Fdevi 🟠	$\boxtimes$ »			
E Microsoft Azure	Search resources, services, and dc	ocs (G+/)		우 않 ? 전 wes.j	johnson@cirruslink			
lome > CirrusLinklotHub01 >				CIRCO	S LINK SOLUTIONS (CIRRU			
<b>My-loT-Edge</b> ☆ ·					>			
🖫 Save 🧲 Set modules   🍰	Manage child devices 🛛 🖁 Troubl	leshoot 🗮 Device twin 🔍 Mana	ge keys \vee 🜔 Refresh					
evice ID 🕕	My-IoT-Edge				[			
rimary Key 🚺								
condary Key 🕕		0						
imary Connection String 🜒								
condary Connection String 🕕	••••••				٥			
F Edge Runtime Response   🕕	200 OK							
able connection to IoT Hub 🕕								
vant davies	No parent device							
	۲							
Modules IoT Edge hub conne	ections Deployments and Con	figurations						
Name	Туре	Specified in Deployment	Reported by Device	Runtime Status	Exit Code			
\$edgeAgent	IoT Edge System Module	✓ Yes	✓ Yes	running	0			
\$edgeHub	IoT Edge System Module	✓ Yes	✓ Yes	running	0			
	IoT Edge Custom Module	✓ Yes	✓ Yes	running	0			
gnition								
Ignition								

Now click the 'Ignition' module link near the bottom of the page. This will open the following page.

$\rightarrow C$		Jeubeer	intione/eb/0216b_6f65_43e1_b7cf_6f62be03		
		2500501		0 //	
Microsoft Azure 🔑 Sear	ch resources, services, and docs (G+/)		도 🕼 🗳 🔅 ? 📈 wes.johnso cirrus link s	n@cirruslink. OLUTIONS (CIRRU	, ( )
ome > CirrusLinklotHub01 > My-lo	-Edge >				
IoT Edge Module E	Details 🖈 …				×
Module Identity Twin      Direct m	ethod 🕐 Refresh 🖳 Troubleshoot				
lodule Identity Name 🕕	My-IoT-Edge/Ignition				đ
rimary key 🕡	*****			٢	Ð
econdary key 🕕	*****			0	Ð
onnection string (primary key)					ľ٩.
shineedon sanig (prindry key)		nin ika kata kata kata kata kata kata kata			Ξ.
onnection string (secondary key) ①				•	Ð
IoT Edge Module Settings Contair	ner Create Options Environment Variables	****	Percented Value	ø	0
IoT Edge Module Settings Contair Setting Name	ner Create Options Environment Variables Desired Value	*******	Reported Value	0	
Innection string (secondary key) () Interfedge Module Settings Contain Setting Name Image URI Marine	ner Create Options Environment Variables Desired Value inductiveautomation/ignition:8.1.7	*********	Reported Value inductiveautomation/ignition:8.1.7	0	
Interest and a grantery (c)	ner Create Options Environment Variables Desired Value inductiveautomation/ignition:8.1.7 1.0		Reported Value inductiveautomation/ignition:8.1.7		
Interest and a grantery (as) (as) (as) (as) (as) (as) (as) (as)	her Create Options Environment Variables Desired Value inductiveautomation/ignition:8.1.7 1.0 docker burger		Reported Value inductiveautomation/ignition:8.1.7 1.0 docker		
IoT Edge Module Settings Contain Setting Name Image URI Version Type Restart Policy	er Create Options Environment Variables Desired Value inductiveautomation/ignition:8.1.7 1.0 docker always N/A		Reported Value inductiveautomation/ignition:8.1.7 1.0 docker always Mon. Iul 26.2021 21:37:41 CMT-0700 (Pacific Daulinht Time)	0 0 0 0 0 0	
onnection string (secondary key) () oT Edge Module Settings Setting Name Image URI Version Type Restart Policy Last Start Time UTC Status Description	eer Create Options Environment Variables Desired Value inductiveautomation/ignition:8.1.7 1.0 docker always N/A N/A		Reported Value inductiveautomation/rignition:8.1.7 1.0 docker always Mon Jul 26 2021 21:37:41 GMT-0700 (Pacific Daylight Time)	0 0 0 0 0 0 0 0 0	
Intersection string (secondary key) () Intersection string (secondary key) () Inters	eer Create Options Environment Variables  Desired Value  inductiveautomation/ignition:8.1.7  1.0  docker always N/A N/A N/A N/A N/A		Reported Value inductiveautomation/ignition:8.1.7 1.0 docker always Mon Jul 26 2021 21:37:41 GMT-0700 (Pacific Daylight Time) running running	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	
Intersection string (secondary key) () Intersection string (secondary key) () Inters	eer Create Options Environment Variables  Desired Value  inductiveautomation/ignition:8.1.7  1.0  docker  always N/A N/A N/A N/A N/A N/A N/A N/A		Reported Value inductiveautomation/ignition:8.1.7 1.0 docker always Mon Jul 26 2021 21:37:41 GMT-0700 (Pacific Daylight Time) running running	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	

Copy the 'Connection string (primary key)' and save it for later use. This will be used in the Ignition configuration to establish an MQTT Connection from Ignition's Azure Injector module to Azure IoT Edge Hub.

## Step 2: Install Ignition

At this point, Ignition is running as a Docker container in Azure Edge. You should be able to browse to http://[ip\_address\_of\_azure\_edge]:8088. Replace [ip\_address\_of\_azure\_edge] with the IP address of your Azure Edge system. You should see something similar to the following.



Follow the steps in the Installing Ignition documentation and select either Ignition or Ignition Edge for this tutorial.

#### Step 3: Install and configure the Azure Injector Module

Follow the steps in the Module Installation guide to install the latest Azure Injector Module.

Now select 'Settings' under the Azure Injector section in the left navigation panel near the bottom. After doing so, you should see the following page.

$- \rightarrow \mathbf{G}$	O D localhost:8088/web/config/azure.azureInjectorSettings?3	☆		⊚ ± □ :
Ignition Gateway				🕹 admin   Log Ou
gnition			Help 🕜	Get Designer
SYSTEM	Config > > Azure Injector Settings			
Overview	Trial Mode 1:59:48 We're glad you're test driving our software. Have fun.			Activate Igniti
Backup/Restore				
Ignition Exchange	General Azure InT Hubs Azure InT Edges Azure Event Hubs Azure InT Central Sets	Tag Agents		
Licensing		ing Agenta		
Proiects				
Redundancy	Main			
Gateway Settings	Enabled Zenable the Azure Injector module			
NETWORKING				
Web Server				
Gateway Network	Save Changes			
Email Settings				
SECURITY	Note: For additional details on configuring Azure Injector, see the documentation			
General	here			
Auditing				
Users, Roles				
Service Security				
Identity Providers				
Security Levels				
Q Search				

Now select 'Azure IoT Edges' from the tabs near the top of the page. This will open the following page.

	→ G		calhost:8088/we	eb/config/azure.azur	reInjectorSettings?15				ដ		© ⊻ ⊔
Ignitio	n Gateway										Log O
gni	tion									Help 🕜	Get Designe
▲	SYSTEM	🌣 Con	fig > > Azure I	njector Settings							
ome	Overview	Trial	Mode 1:36:38	We're glad you're test driv	ving our software. Have fun.						Activate Ignit
hi –	Backup/Restore										
atus	Ignition Exchange		Consel	Anne InT Holes	Annual Int Colore	Anna Danit Unita	Annual Int Control	Cata	Tee Arreste		
•	Licensing		General	Azure IoT Hubs	Azure IoT Edges	Azure Event Hubs	Azure IoT Central	Sets	Tag Agents		
nfig	Modules			_							
	Projects		Settings	Certificates							
	Gateway Settings										
	Gateway Settings		Setting N	ame	Enabled Se	t Automatic	Store & Forward E	nabled		Status	
	NETWORKING		No Azura	IoT Edge Settings							
	Web Server		NOALUIE	for Euge Settings							
	Gateway Network		→ Create	new Azure IoT Edge	Setting						
	Email Settings										
	SECURITY										
	General										
	Auditing										
	<b>Q</b> Search										

Now select the 'Certificates' tab next to 'Settings'. This will show the following page.

$\rightarrow$ C	🗘 🗋 local	host:8088/web	/config/azure.azure	elnjectorSettings?19				☆		◙⊀ଘ	
nition Gateway										💄 admin   Log Out	
Inition									Help 🕜	Get Designer	
SYSTEM	🌣 Config	fig > > Azure Injector Settings									
ne Overview	Trial Mo	<b>de 1:35:01</b> W	e're glad you're test drivii	ng our software. Have fun.						Activate Ignitio	
Backup/Restore											
us Ignition Exchange		Course 1		Annual Articleur	terre Constitute	to a later to a later	C 14	Technick			
Licensing		General	Azure IoT Hubs	Azure Io1 Edges	Azure Event Hubs	Azure IoT Central	Sets	Tag Agents			
ig Modules											
Projects		Settings	Certificates								
Gateway Settings											
Gateway Settings		Friendly N	ame	Certific	ate Filename		File Desc	ription			
NETWORKING		No Cortificator									
Web Server		No Certificates									
Gateway Network		→ Create new Certificate									
Email Settings											
SECURITY		Note: For additional details on configuring MOTT Transmission, see the									
General		documentation here									
Auditing											
Users, Roles											
Service Security											
C. Carnels											

Click 'Create new Certificate'. Then browse to the Azure IoT Edge Device Root CA that you provisioned during the installation and configuration of the Azure IoT Edge Device. Give it a friendly name as shown below.

$\rightarrow$ G	O D localhost:8088/we	b/config/azure.azur	elnjectorSettings?24				☆		⊗ ⊁ 🖸 ≣
gnition Gateway									Log Out ⊥admin   Log Out
Inition								Help 🕜	Get Designer
SYSTEM	Config > > Azure I	njector Settings							
Overview	Trial Mode 1:40:05 V	Ve're glad you're test driv	ng our software. Have fun.						Activate Ignitio
Backup/Restore									
Licensing	General	Azure IoT Hubs	Azure IoT Edges	Azure Event Hubs	Azure IoT Central	Sets	Tag Agents		
ig Modules		_							
Projects	Settings	Certificates							
Gateway Settings									
NETWORKING	Main								
Web Server	Castificate	File Browno	list odar davias av Ct.						
Gateway Network	Upload	The certific	ate file or private key to u	ipload					
Email Settings				_					
SECURITY	Friendly N	ame IoT Edge The friendl	Device Root CA / name of this certificate	file or private key					
General									
Auditing Users, Roles	File Descri	ption The descrip	tion of this cortificato file	or private key					
Service Security		The descrip	cion or any certificate inte	or private key					
Identity Providers									
				Create New C	ertificate				

Now click 'Create New Certificate'. After doing so you should see something similar to the following.

← -	$\rightarrow$ C	000	calhost:8088/we	b/config/azure.azure	elnjectorSettings?30				☆		⊚ ⊀ ⊑	
Ignitio	n Gateway										≛admin   L	og Oı
gni	tion									Help 🕜	Get Desi	gnei
A I	SYSTEM	🌣 Con	fig > > Azure I	njector Settings								
ome	Overview	Trial	Mode 1:39:17 V	Ve're glad you're test drivi	ng our software. Have fun.						Activate	Igniti
h	Backup/Restore											
atus	Ignition Exchange		Conoral	Anuro IoT Hubs	Anuro IoT Edges	Azura Evant Hubs	Azura IoT Control	Sata	Tag Agents			
•	Licensing		General	Azure for Hubs	Azure for Edges	Azure Event Hubs	Azure for Central	Sets	Tag Agents			
nfig	Modules			_								
	Redundancy		Settings	Certificates								
	Gateway Settings											
			🗸 Succe	essfully created new G	Certificate "IoT Edge De	vice Root CA''						
	NETWORKING		Polos dist		6		rii- n-					
	Web Server		Friendly	name	Certificate	Filename	File De	scription				
	Email Settings		IoT Edge I	Device Root CA	iot-edge-d	evice-ca-CA.cert.pem				delete	edit	
	_		→ Create r	new Certificate								

Now select the 'Settings' tab directly to the left of the 'Certificates' tab. Then click the 'Create new Azure IoT Edge Setting...' link. This will open the following page.

	🗘 🗋 localhost:8088/web/confi	ig/azure.azureInjectorSettings?17				☆		⊠ ¥ ⊑ :
Ignition Gateway								💄 admin   Log Ou
gnition							Help 🕑	Get Designer
SYSTEM	Config > > Azure Injector	Settings						
me Overview	Trial Mode 1:35:55 We're glad	d you're test driving our software. Have fun.						Activate Igniti
Backup/Restore								
Ignition Exchange								
Licensing	General Azur	Azure Iol Hubs Azure Iol Edges	Azure Event Hubs	Azure foi Central	Sets	Tag Agents		
nfig Modules								
Redundancy	Settings 0	Certificates						
Gateway Settings								
NETWORKING	Main							
Web Server			_					
	Setting Name	A friendly name for this Azura IoT E	dae setting					
Gateway Network		A menuty name for this Azure for E	uge setting					
Gateway Network Email Settings								
Gateway Network Email Settings	Enabled	Enable this setting						
Gateway Network Email Settings SECURITY General	Enabled	Enable this setting						
Gateway Network Email Settings SECURITY General Auditing	Enabled	✓ Enable this setting           Default           The Set this IoT Edge is associated	v with					
Gateway Network Email Settings SECURITY General Auditing Users, Roles	Enabled	C Enable this setting Default The Set this IoT Edge is associated	• with					

Set the following parameters in the form (leave all others in their default state)

- Main Section

- Setting Name: Azure loT Edge
   Authentication Section

   Password: The Connection String associated with the 'Ignition' module you captured earlier in this tutorial.
   CA Certificate File: The 'IoT Edge Device Root CA' created in the previous step

After the parameters are set, click the 'Save Changes' button at the bottom of the page. After doing so, you should see the following.

← -	> C	🗘 🗋 loca	lhost:8088/wel	o/config/azu	e.azurelnjec	torSettings?5	0				☆		⊠ ₹	_ =
Ignitio	n Gateway												≗admin	Log Out
gni	tion											Help 🕜	Get Des	signer
♠	SYSTEM	🌣 Config	> > Azure Ir	jector Settir	gs									
ome	Overview	Trial M	ode 0:59:30 W	e're glad you're	test driving our	software. Have fu	n.						Activat	e Ignitio.
հւ	Backup/Restore													
atus	Ignition Exchange													
<b>\$</b>	Licensing		General	Azure IoT F	ubs /	Azure Io1 Edges	Azure E	vent Hubs	Azure IoT Central	Sets	Tag Agents			
onfig	Modules			_										
	Projects		Settings	Certific	ites									
	Gateway Settings													
			Succe	sfully updat	d Azure IoT	Edge Setting "	Azure IoT Edge'							
	NETWORKING			,										
	Web Server		Setting Na	me	Enabled	Set	Automatic	Store & I	orward Enabled	Statu	S			
	Gateway Network Email Settings		Azure IoT	Edge	true	Default	false	false		Conne	ected	delete	edit	
			→ Create n	ew Azure lo	Edge Setti	ng								

If everything went well, you should also see 'Connected' under the Status column.

	The status may take a couple of seconds to switch to a Connected status.
i	If the Status does not show connected, browse to the Ignition 'Status Logs' page to see any errors that may provide clues as to why the connection failed. Common issues include:
	<ul> <li>Mis-configured certificates resulting in TLS errors         <ul> <li>Revisit this page if this is the case.</li> </ul> </li> <li>Firewall issues         <ul> <li>Make sure the MQTTS port (usually 8883) is open all the way to the Azure Edge Hub</li> </ul> </li> </ul>

#### Step 4: Create tags to be published in Designer

Once the system is showing connected, tags can be created in Ignition Designer. Review the Inductive Automation documentation for Launching Designer against the Ignition gateway

When the Azure Injector modules is installed in Ignition, an Edge Node folder is automatically created in the 'default' Ignition tag provider.

🔴 😑 🌒 samp	lequickstart - Igni	tion Gatew	vay - Ignition Designer		
🗎 💾 🔸 🥕	3 ≝ 3	₩ 11 1	ŀ		
Tag Browser			ē	_ ×	<u> </u>
+- Q ♂ defa	ult		•	:-	s
Ta	gs		UDT Definitions		
Tag	Value		Data Type		
Edge Nodes					
			199 /	1024	mb 🛒

Create a tree structure under this folder as shown below with a memory tags - this folder structure creates the same hierarchy that is described in the Sparkplug B specification of Group ID, Edge ID, and Device ID.

Refer to the Ignition Tag Browser and Creating Tags documentation for assistance in configuring Ignition tags



#### Step 5: Publishing data

Using the Azure Command Line tools you previously installed on a development machine (from the prereqs here), run the following command

az iot hub monitor-eventshub-name YOUR_HUB_NAMEconsumer-group YOUR_CONSUMER_GROUPtimeout 0
You should see a message denoting the monitor is running as follows
Starting event monitor, use ctrl-c to stop

When the Azure Injector module is installed in Ignition, an Azure Injector tag provider is automatically created. This folder will contain both information tags about the module's version and state, as well as control tags for refreshing the module and Tag Agents.

Make sure that the Ignition Designer has read/write communications turned on by selecting the Project/Comm Read/Write button highlighted in the image below.

ag browser			ē	_ ×	^
+ · Q G Azure Injector			•	÷ -	s
Tags		UDT Definition	ons		
Tag	Value	Da	ta Type		

Review the Inductive Designer Interface documentation for additional assistance on setting the project communication mode

To refresh the default Tag Agent, open the folder "Azure Injector Control" and click on the Refresh Boolean. When this happens, the Tag Agent will scan the "Edge Nodes" folder and publish the Sparkplug BIRTH sequence to the Azure IoT Edge Hub.

Tag Browser		۵. -	- ×
T Q S Azure Injector		•	° S
Tags	U	DT Definitions	
Tag	Value	Data Type	
<ul> <li>▶-          Pefresh     </li> <li>►          Azure Injector Info     </li> </ul>		Boole	an
		210 / 1	024 mb 😫

A The Boolean tag will not change to true. This is really a one-shot and as a result, the tag will not change to true.

#### In the Azure CLI event monitor output you should see the following:

```
{
    "event": {
       "origin": "My-IoT-Edge",
       "payload": "{\"topic\":{\"namespace\":\"spBv1.0\",\"edgeNodeDescriptor\":\"My Group/My Edge Node\",\"
groupId\":\"My Group\",\"edgeNodeId\":\"My Edge Node\",\"type\":\"NBIRTH\"},\"payload\":{\"timestamp\":
1627401528598,\"metrics\":[{\"name\":\"bdSeq\",\"timestamp\":1627401528573,\"dataType\":\"Int64\",\"value\":0}],
\"seq\":0}}"
    }
}
{
    "event": {
       "origin": "My-IoT-Edge",
        "payload": "{\"topic\":{\"namespace\":\"spBv1.0\",\"edgeNodeDescriptor\":\"My Group/My Edge Node\",\"
groupId\":\"My Group\",\"edgeNodeId\":\"My Edge Node\",\"deviceId\":\"My Device\",\"type\":\"DBIRTH\"},\"
payload\":{\"timestamp\":1627401528604,\"metrics\":[{\"name\":\"My Tag\",\"timestamp\":1627401528604,\"
dataType\":\"Int32\",\"metaData\":{},\"properties\":{\"Quality\":{\"type\":\"Int32\",\"value\":192}},\"value\":
123}],\"seq\":1}}"
    }
}
```

The messages flowing into Azure IoT Edge Hub are also automatically routed to Azure IoT Hub because of the module deployment that was specified in the Azure IoT Edge.

#### Step 6: Force a data change

At this point you can also change the value of the tag that was created in Designer. The messages coming out of Azure Injector are 'event driven' meaning that a tag must change for data to flow. Changing the tag value to 122 results in the following message going to Azure Event Hub.

```
{
    "event": {
        "origin": "My-IoT-Edge",
        "payload": "{\"topic\":{\"namespace\":\"spBv1.0\",\"edgeNodeDescriptor\":\"My Group/My Edge Node\",\"
groupId\":\"My Group\",\"edgeNodeId\":\"My Edge Node\",\"deviceId\":\"My Device\",\"type\":\"DDATA\"},\"
payload\":{\"timestamp\":1627403950739,\"metrics\":[{\"name\":\"My Tag\",\"timestamp\":1627403949486,\"
dataType\":\"Int32\",\"value\":122}],\"seq\":2}}"
}
```

## **Additional Resources**

- Inductive Automation's Ignition download with free trial

   Current Ignition Release
- Cirrus Link Solutions Modules for Ignition

   Ignition Strategic Partner Modules
- Support questions
  - Check out the Cirrus Link Forum: https://forum.cirrus-link.com/
     Contact support: support@cirrus-link.com
- Sales questions
  - Email: sales@cirrus-link.com
  - Phone: +1 (844) 924-7787
- About Cirrus Link
  - https://www.cirrus-link.com/about-us/