# **GCI: Configuration**

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Google IoT Core was retired in the summer of 2023. Clearblade IoT Core provides a drop-in replacement for the MQTT Server endpoint. As a result, Clearblade IoT Core works with Cirrus Link's Google Cloud Injector and the Google Cloud. More information is available here: https://iot.clearblade.com.

The Google Cloud Injector module provides the ability to push Tag data to a Clearblade IoT Core. The settings configuration for this module are located under the Configure tab of the Ignition Gateway web UI. Once in the configuration section there are four tabs: General, Cloud IoT Core, Sets, and Tag Agents. Each of these tabs is described in detail in the following sections.

# General

The first tab contains the general settings for the Google Cloud Injector module.

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General	documentar	lon here							
Auditing									

The general configurations options available on this tab are listed below:

#### Main

- Enabled
  - Sets whether the module is enabled or disabled. If disabled, the Tag Agents will not run and now data will be pushed to any configured endpoints.

## Cloud IoT Core

The next tab is the list of Cloud IoT Core endpoints that the module will connect to. This is where data from the Tag Agents will be pushed.

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nfig Modules				
Projects	Setting Name Enabled MQTT Endpoint URL GCP Project ID	GCP Device ID Set Store & Forward Enabled	History Max Size History Max Age	e Status
Gateway Settings	No Cloud IoT Core Settings			
- outenuy settings	-> Create new Claud IoT Core Setting			
NETWORKING	Create new Cloud for Core Setting			
Web Server				
Email Settings				
Gateway Network				

One or more Cloud IoT Core endpoints can be configured on this tab. The configuration options for a Cloud IoT Core connection are listed below.

#### Main

- Setting Name
- This is a friendly name of the Clearblade IoT Core used to easily identify it. This must also be unique.
- Enabled
- Whether or not this Injector Setting is enabled to push data to the endpoint
- MQTT Endpoint URL
  - The Endpoint URL. Note this can be modified to support the correct ClearBlade endpoint for your configuration
     Default: ssl://us-central1.clearblade.com:1884
  - Default: ssl://us-central1
- GCP Project ID
  - The Google Cloud Platform project under which this device is provisioned
- GCP Cloud Region
  - The Google Cloud Platform cloud region under which this device is provisioned
- GCP Registry ID
  - The Clearblade Platform registry ID under which this device is provisioned
- GCP Device ID
   The Cl
- The Clearblade Platform device ID under which this device is provisioned
- Private Key File
  - ° The private key file associated with the public key provisioned for the device in Clearblade Registry
  - The key needs to be in PKCS8 format
- Algorithm
  - The algorithm type used by the key file
- Set
- The Set this Cloud IoT Core Setting is associated with

#### Store & Forward

- Store & Forward Enabled
  - Whether to enable Store & Forward capabilities for this endpoint
- Store & Forward Type
  - The type of the Store & Forward mechanism options: In\_Memory and Disk\_Backed (available in release 4.0.17 and higher)
  - Data stored with an In\_Memory Store & Forward will not be persisted across a module configuration change, module disable/enable, module restart or power loss
  - Data stored with a Disk\_Backed Store & Forward will persist across a module configuration change, module disable/enable, module restart or power loss
- Message Capacity deprecated in 4.0.19
  - The maximum number of messages to store before dropping the oldest historical messages
- History Max Size
  - The maximum number of megabytes history can use before dropping the data
  - In\_Memory Store & Forward will use the Ignition Java Heap memory
- History Max Age added in 4.0.19
  - The maximum number of minutes to store history before dropping the data
- Flush Period
  - ° The period of time to wait (in milliseconds) between sending when flushing messages

### Advanced

- Port
- TCP Port number to use. Default is 8883
- Proxy Type
  - ° The proxy type if a proxy server is being used. Default is NONE
  - Options are NONE, HTTP, HTTPS
- Proxy Hostname
  - ° The Proxy Hostname if a proxy server is being used
- Proxy Port

   The Proxy port number if a proxy server is being used
- Keep Alive • The MQTT Keep Alive timeout for the MQTT Connection
- Max Message Size
- The maximum message size allowed for an MQTT message before the message will be broken up into smaller messages
- Max Throughput
- Maximum throughput per second in bytes. The modules will throttle messages to prevent exceeding this max limit. Default is 524,288 Session Expiration
  - ° The number of minutes before the session token expires. Default is 1440

## **Advanced Store & Forward**



H2 Database Port

° TCP Port to connect to H2 Database for Disk\_Backed Store & Forward

Clicking on the "Create new Cloud IoT Core Setting..." link will bring up the following form for adding a new Clearblade IoT Core endpoint.

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Ignit	tion				Help 🕜	Get Desig	ner
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Config	Projects						
	Redundancy	Main					
	Gateway Settings						
	NETWORKING	Setting Name	A friendly name for this Cloud IoT Core setting				
	Web Server	Enabled	✓ Enable this setting				
	Email Settings						
	Gateway Network	MQTT Endpoint URL	ssl://us-central1.clearblade.com:1884 The MQTT Server Endpoint				
	Conorol		(default: ssl://mqtt.googleapis.com:8883)				
	Auditing						
	Users, Roles	GCP Project ID	The GCP project under which this device is provisioned				
	Service Security						
	Identity Providers	GCP Cloud Region					
	OAuth2 Clients		The GCP cloud region under which this device is provisioned				
	Security Zones	GCP Registry ID					
	DATABASES		i ne GCP registry ID under which this device is provisioned				
	Connections	GCP Device ID					
	Drivers		The GCP ID of this device				
	Store and Forward	Private Key File	Browse) No file selected. The private key file associated with the public key provisioned for the device in GCP				

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<b>lil</b> atus	History Realtime		Store & Forward									
¢ onfig	OPC CLIENT		Store & Forward Enabled	Enable Store and Forward capabilities for this stream								
	OPC Connections OPC Quick Client		Store & Forward Type	Choose One  The Type of this Store & Forward mechanism								
	орс иа Device Connections Security		History Max Size	500 Maximum number of megabytes history can use before dropping the data								
	Server Settings		History Max Age	44640 Maximum number of minutes to store history before dropping the data								
	ENTERPRISE ADMINISTRATION		Flush Period	100 Upon reestablishing communication, the period to wait in milliseconds between sending when flushing messages								



## Sets

The Sets tab contains a list of Google Cloud Sets. Each set represents a grouping of Clearblade IoT Core endpoints. When a set is referenced by a Tag Agent the Agent will push Tag data to all Clearblade IoT Core endpoints contained within that Set. The Sets are disjoint, meaning that a single Clearblade IoT Core endpoint cannot be in more than one set. Out of the box the Google Cloud Injector module will have one "Default" set defined.

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onfig	Projects		Name	Descrip	ation		ush Policy					
	Redundancy		Name	Descri	0001	r	ush Folicy		_			
	Gateway Settings		Default	Default	set	Ρ	USH_TO_ALL		de	lete	edit	
	NETWORKING	-	Create ne	w Google Cloud Set.								
	Web Server											
	Email Settings											
	O Search											

Additional Sets can be configured for situations where multiple Tag Agents will need to push to different Cloud IoT Core endpoints. The configuration options for Sets are listed below.

## Main

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		Config > Gcp > Google C	loud Injector Settings											
Home	Local Devices	Trial Mode 1:42:03 We're	dad you're test driving our software. Have fun.				Activate	gnition						
<b>.lıı</b> Status	ENTERPRISE ADMINISTRATION	Show advanced	Show advanced properties											
\$	SEQUENTIAL EUNCTION CHARTS	Advanced												
Config	Settings	Proxy Type	Proxy Type NONE * The Proxy Type if a proxy server is being used											
GOOGLE CLOUD INJECTOR Settings PERSPECTIVE Branding Customization		Proxy Hostname	The Proxy hostname if a proxy server is being used											
		Proxy Port	The Proxy port number if a proxy server is being used											
		Keep Alive	30 The MQTT Client keep alive time (in seconds) (default: 30)											
		Max Message Size	262144 Maximum message size before dividing into multiple messages (default: 262,144)											
		Max Throughput	524288 Maximum throughput per second in bytes. The module will throttle messages to preve (default: 524,288)	ent exceeding this max limit										
		Session Expiration	1440 The number of minutes before the session token expires (default: 1,440)											
		Session Token Auto-refresh	Canable session token auto-refresh											

- •
- $^{\circ}\;$  This is the friendly name of the set used to easily identify it.

Name

- Description This is a friendly description of the set.
- Push Policy
  - This defines which endpoints to push to. If PUSH\_TO\_ALL is selected, every endpoint that is part of this set will receive all messages. If PUSH\_TO\_ANY is selected, only one of the endpoints that is part of this set will receive any given message. PUSH\_TO\_ANY is useful when adding endpoint configurations to increase the throughput of the Injector.

Clicking on the 'Create new Google Cloud Set...' link will bring up the following form to add a new Set.

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Backup/Restore									
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Licensing	General	Cloud for Core Sets Tag Agents							
ig Modules Projects									
Redundancy	Main								
Gateway Settings		Default							
	Name	Default The friendly name of this Set							
NETWORKING						_			
Email Settings	Description	Default set							
Gateway Network	beschption	Description of this Set							
SECURITY	Push Policy	PUSH_TO_ALL  The Push Policy defines whether all cloud end-points in a set will be pushed to or only one will at a t	ime						
General									
Users, Roles									
Service Security		Save Changes							
Identity Providers									
OAuth2 Clients									
<b>Q</b> Search									

**Tag Agents** 

Tag Agents are the workers within Google Cloud Injector that monitor tag events, convert them to a JSON representation, and push them to one or more Clearblade IoT Core endpoints. Out of the box the Google Cloud Injector module will have one "default" Tag Agent defined.

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<b>\$</b>	Licensing		General	Cloud Io1	Lore	Sets	Tag A	gents								
Config	Modules															
	Redundancy		Name		Enabled	Tag Provi	der Name	Tag Path	Convert UDT:	Publish UDT Definitions	Set	Group ID Edge Node II	D Device ID			
	Gateway Settings		GCP_TagAge	ent_Default	true	default		Edge Node	s true	true	Default			delete	edit	
► Create new Tag Agent Settings																
	Web Server															
	Email Settings															
	<b>Q</b> Search															

Tag Agents are configured to point to a single folder. All Tags within that folder will be monitored by the Tag Agent.

#### **Agent Settings**

- Name
  - A unique name for the tag agent.
- Enabled
  - Sets whether the Tag Agent is enabled or disabled. If disabled, the Tag Agent will not run and no data will be pushed to any configured endpoints.
- Tag Provider Name
- The name of the Tag provider containing the tags.
- Tag Path
  - An optional folder path under the Tag provider where the root folder of the Tags can be found.
- Push Trigger
  - The trigger to use when pushing data. EVENT\_DRIVEN (default) means to push on change events. PERIODIC means to push all data on a periodic basis.
  - Tag Pacing Period
    - The buffer period, in milliseconds, that Tag events will be aggregated into a single payload before pushing.
- Convert UDTs
  - Whether to convert UDT members to normal Tags before publishing. If enabled the Tags representing the UDT member will retain their member path prefixed by the UDT Instance name.
  - Publish UDT Definitions
    - This can only be set if 'Convert UDTs' is false
    - Whether or not to push the UDT Definitions in the the NBIRTH messages
  - Optimize UDTs
    - This can only be set if 'Convert UDTs' is false
    - Whether or not to 'convert UDTs' only for DATA messages.
- Set
  - $^{\circ}~$  The Set of Clearblade IoT Core endpoints that the Tag Agent will push to.

## **Sparkplug Settings**

- Group ID
- An ID representing a logical grouping of MQTT Edge Of Network (EoN) Nodes and Devices into the infrastructure.
- Edge Node ID
  - An ID that uniquely identifies the MQTT Edge Of Network (EoN) Node within the infrastructure.
- Device ID
  - $^{\circ}~$  An optional ID that uniquely identifies a Device within the infrastructure.

The Sparkplug settings are optional and allow for an additional customization of how the Tag Agent scans and discovers tag within the specified Tag Path. Here is a brief description of how the Agent scans/discovers folders based on the different combinations of potential Sparkplug Settings.

- If all three IDs are left blank the Agent will assume the following folder structures follow the Tag Path:
  - <groupFolder>/<edgeNodeFolder>/<deviceFolder>/<tags>
     <groupFolder>/<edgeNodeFolder>/<tags>
- If only the Group ID is specified the Agent will assume the following folder structure follows the Tag Path:
  - <edgeNodeFolder>/<deviceFolder>/<tags>
  - o <edgeNodeFolder>/<tags>

- If the Group ID and the Edge Node ID are specified the Agent will assume the following folder structure follows the Tag Path:
   <deviceFolder>/<tags>
   <tags>
- If the Group ID, Edge Node ID, and the Device ID are specified the Agent will assume the following folder structure follows the Tag Path:
   <a href="https://creativecommons.org"><a href="https://creativecommons.org"></a>

As you can see, the Sparkplug settings can be defined by setting these IDs in this configuration page, or leave them blank so that the Agent will scan and discover them based on the tag tree layout.

#### Advanced

- Filtered Properties
  - A semicolon delimited list of Tag properties to filter/block from being published. These should typically not be modified unless there is an explicit requirement that a specific property is needed to be added or removed from the default.

Clicking on the 'Create new Tag Agent Settings..' link will bring up the following form to add a new Tag Agent.

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Overview	Config > Gcp > Google Cl	oud Injector Settings										
Backup/Restore	Trial Mode 1:37:00 We're gla	Trial Mode 1:37:00 We're glad you're test driving our software. Have fun.										
Ignition Exchange	General Clo	ud IoT Core Sets Tag Agents										
Modules												
Projects												
Redundancy	Agent Settings											
Gateway Settings		GCP Tagégent Default										
NETWORKING	Name	A unique name for the Tag Agent										
Web Server						-						
Email Settings	Enabled	default: true)										
Gateway Network						-						
SECURITY	Tag Provider Name	default										
General		The Name of the tag provider										
Auditing	Teo Deth	Edge Nodes										
Users, Roles	Tag Path	A path to the root folder where the tag tree starts (optional)										
Service Security						-						
OAuth2 Clients	Push Trigger	EVENT_DRIVEN   The trigger to use when pushing data EVENT_DRIVEN (default) means to push	on change quests REPIONIC mean	ns to push all da	ta on a							
Security Levels		periodic basis.	ron change events. PERIODIC mea	ns to push att ua	ta on a							
Security Zones												
DATABASES	Tag Pacing Period	1000 If using an EVENT DRIVEN Push trigger, the waiting period in milliseconds after	er an initial tag change event before	e pushing all cha	anged							
Connections	ing i uning i criou	tags. If using PERIODIC, the number of milliseconds to wait between pushing a	all data.		3.1							
Drivers		former stand				-						
Store and Forward	Convert UDTs	Converts UDT members to normal Tags										
ALARMING	Publish UDT Definitions	Publish UDT Definitions in BIRTH										
General						-						
Journal	Optimize UDTs	Optimizes UDT payload sizes in NDATA and DDATA payloads										
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	OPC UA Device Connections Security		Device ID	An ID representing a Device (optional)				-	
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	Local Devices Advanced Settings								
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