

User Guide

Thread X3

CONNECTIVITY

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Document Information

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Document Information	2
Overview	6
Each Thread Supports Three Devices	6
Sensors are Dependent on the Device	6
Thread Power	7
Thread Diagnostic Sensors	8
Adding a Thread as a Connection	8
If adding a Worldsensing Thread:	9
If adding a Sensemetrics Thread:	10
Connections Overview	12
Connection Types	12
Connection Status	13
Connection Functions	14
Thread Network Roles	15
Thread operation mode	15
Mode Gateway Threads	15
Mode Endpoint Threads	16
Power Scheduler	16
Navigating to Thread Power Schedule	17
Default Schedules	19
Creating New Schedules	21
Editing Schedules	23
Cloning Schedules	24
Deleting Schedules	25
Diagnostics Controls Menu	25
Navigating to the Diagnostics Page	26
Updating Firmware	27
Remote Commands	28
Logs	29
LED Status Indication	30
Color Diagnostic References	31
Save all the data and device/sensor configuration	32
How to Archive All Sensors	32

How to Swap Sensors to Another Thread	33
Swapping Sensors to another device port on the same Thread	34
CMT Edge API Connection	34
Retrieving iTwin IoT Asset API Key	34
CMT Edge Setup	36
iTwin IoT API Connection	37
CMT Cloud MQTT Connection	44
CMT Cloud Setup	44
CMT Cloud MQTT Push Settings	47
iTwin IoT CMT Cloud Connection	49
CMT Edge MQTT Connection	54
CMT Edge Setup	54
Setting Up CMT Edge MQTT Push	54
Retrieving CMT Edge Data	56
iTwin IoT CMT Edge Connection	58
Manual Data Import Options	61
Import Device	61
Adding the Import Device	61
Importing Data to the Import Sensor	67
Multi-Purpose Import Device	67
Adding the Multi-Purpose Import Device	67
Configuring the Multi-Purpose Import Device Sensors	72
Importing Data to the Import Sensor	74
Environmental best practices	75
CONTACT WORLDSENSING	76

Overview

The Thread is a plug-and-play data aggregation instrument that is used to power and connect any integrated hardware device. For a list of integrated devices, please see the [Support Devices List](#) article. The Thread will automatically create a Mesh node network to transfer the device's sensor data back to the gateway and onto the iTwin IoT software platform.

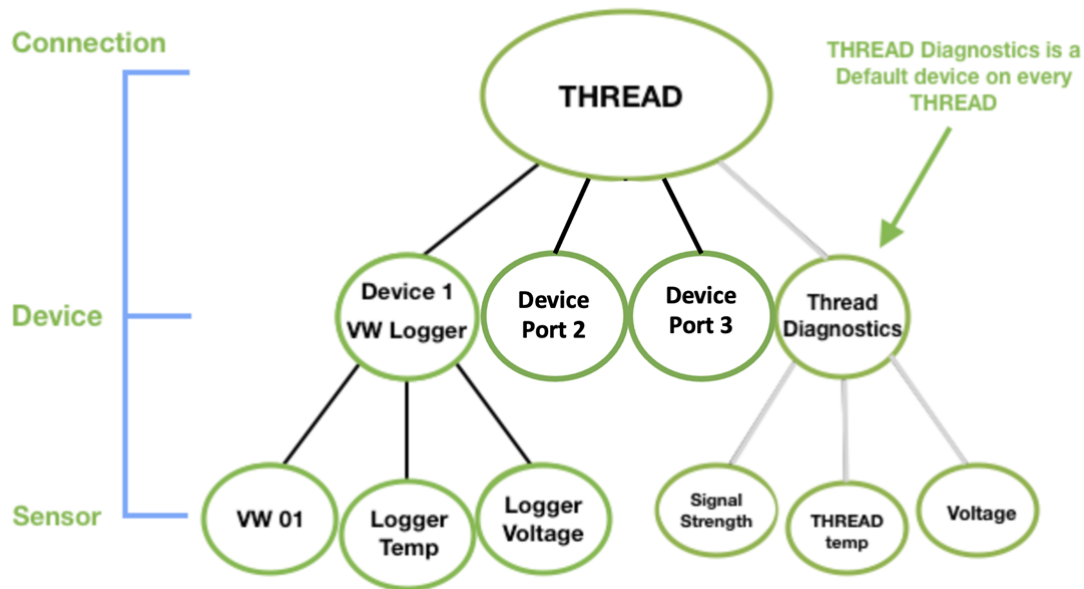
Each Thread Supports Three Devices

A Thread has three Device ports that can be configured to collect data from any supported device. These device ports are identified as ports 1 (right), 2 (middle), and 3 (left)

Sensors are Dependent on the Device

A Device can have one or many sensors associated with it, all dependent on what data is being sent from the device to the Thread. Sensors are where the data will be collected and stored with the iTwin IoT application.

Below is an example of how a Thread might be configured with associated Devices and Sensors.



This Thread has one device configured on Port 1, a Vibrating Wire datalogger that has a single Piezometer sensor attached to it. Once configured, the piezometer will be included in the sensor section as an individual sensor below the VW logger Device. The datalogger also has diagnostic sensors for battery voltage and temperature, which will be added as additional sensors below the device. Choose these sensors from the sensor selection tool in the Data modules to graph any metric read by each sensor.

No Devices are configured on Ports 2 and 3.

Thread Power

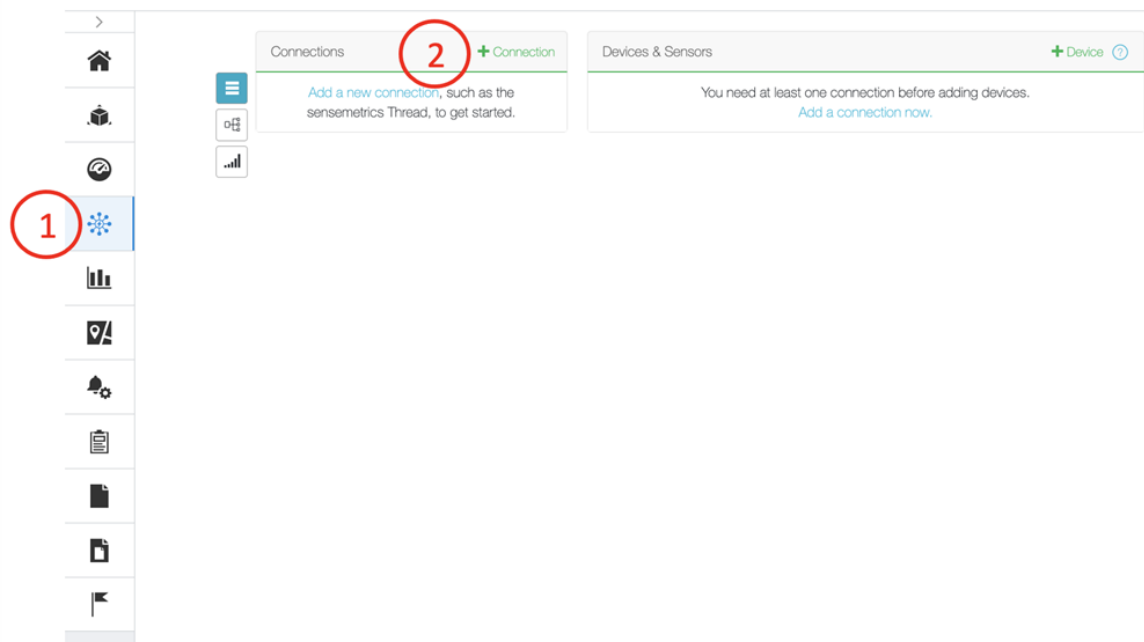
The Thread has a power button with LED diagnostics. The power input port is next to the power button, allowing the Thread to be powered on AC power or by solar panels.

Thread Diagnostic Sensors

Once added to the application, each Thread will have twelve-fourteen default diagnostic sensors populated under the Device on the Connectivity page, including several voltage and current sensors, sensor communication sensors, and Temperature. These can be selected and plotted as well to aid in evaluating Thread performance.

Adding a Thread as a Connection

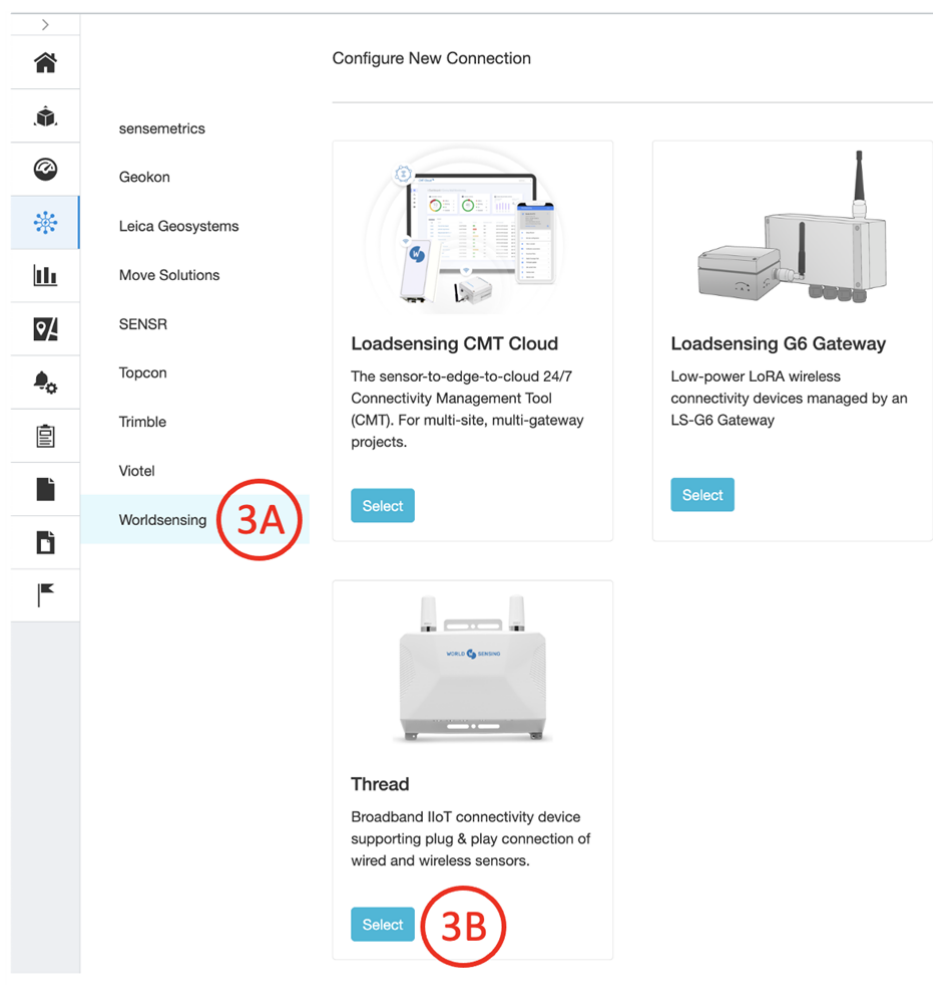
The Thread will be added as a Connection within the iTwin IoT hierarchy of Connections, Devices, and Sensors.



1. **Connectivity Page-** Navigate to the Connectivity Module.

2. **Add Connection-** Press the "+Connection" button in the Connections Column.
3. **Connection Selection**

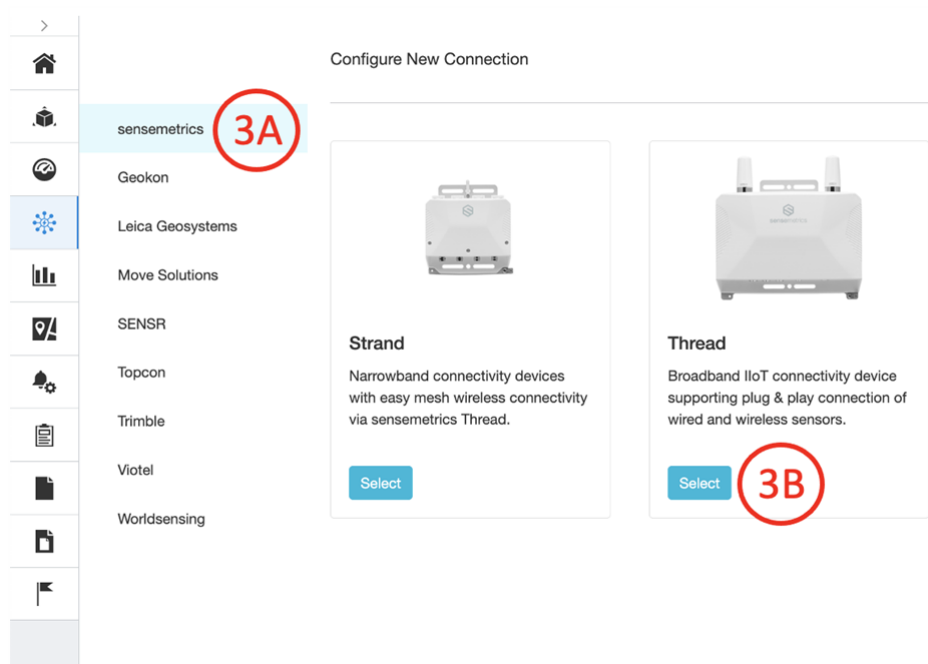
If adding a Worldsensing Thread:



3A- Select Worldsensing on the left side options bar.

3B- Click the "Select" icon below the Thread symbol.

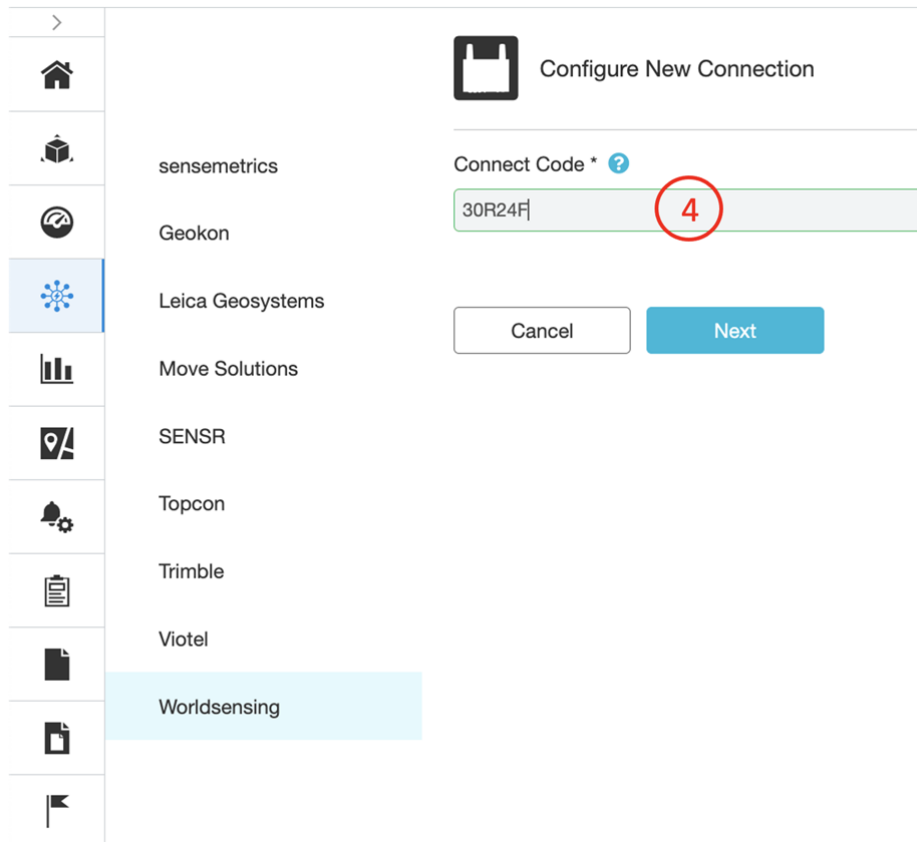
If adding a Sensemetrics Thread:














3A- Select Sensemetrics on the left side options bar.

3B- Click the "Select" icon below the Thread symbol.

4. Entering Thread Connect Code



>

sensemetrics

Geokon

Leica Geosystems

Move Solutions


SENSR


Topcon

Trimble

Viotel

WorldSensing

 Configure New Connection

Connect Code * 

30R24F 4

Cancel Next

Find and enter the 6-digit Connect Code of the Thread. This code is located on the silver label on the back of the Thread. The location is highlighted in the image below. Click "Next" after entering the Connect Code.



Connections Overview

Connections can be added to the platform through API, FTP, or direct cell or radio network communication, and can be seen in the Network Page.

Connection Types

iTwin IoT Connections can generally be grouped into two categories, file transfer-based and telemetry-based.






File Transfer Connections: are typically set up and configured in other software programs. The Connection is then established, and data is transferred from the external software into the iTwin IoT platform, automatically populating sensors. Examples of such connections include Worldsensing

CMT Cloud, Geomos Leica and Spider, Move Solutions sensors, Viotel sensors, and Kinometrics Etna2 Accelerographs.

Telemetry-based Connections: are added directly to the application. These Connections can be further divided into Gateways, which are responsible for aggregation and transmission of data to the iTwin IoT cloud, and Endpoints, which aggregate and then transmit data to Gateways. Examples of Gateway Connections include Worldsensing Threads and Worldsensing CMT Edge Gateways. Examples of Endpoint Connections include Sensemetrics Strands and Geokon Geonets.

Connection Status





The status indicators are located next to the connections in the Connectivity Module.

Icon	Description
	The green icon indicates the connection is currently connected to the network
	The red icon represents a Connection that is powered down or not able to establish a connection
	The blue icon represents a Connection in Low Power mode
	The grey icon indicates the Connection is archived
	The Signal Bar icon located underneath the Connection acts similarly to the signal bars on your cell phone. The more bars there are, the stronger the signal connection.

Note: In some cases, API or FTP connection color status may be misleading. Best practice is to verify connection status of these connections by looking at the sensors "Last:" timestamp on the right side of the Connectivity page.

Connection Functions

Connection functions are located either next to the connection or at the top of the connection module.

Indicator	Description
	Configure a Thread to use a supported Device on one of its Device Ports.
	Check the box next to any connection to filter its Devices and Sensors. Mass editing may be performed using the checkmarks
	Use the Gear icon at the top of the column to quickly edit a connection including notes and power schedule . Bulk editing is available if multiple connections are selected via the check box
	Sort the connection list by type, status, last activity and more

Thread Network Roles

Getting your network up and running on the sensemetrics platform is easy. We recommend configuring your network before beginning installation on a project. Begin by unpacking your Threads, we recommend plugging your Thread in using the Ethernet adaptor provided with your Thread. However, this is not necessary if you have a cellular Thread that can connect straight to the cloud using wireless cellular communication. Simply power on the Thread using the power button, and then log on to your sensemetrics account and add the connection to your project. Please see [adding a Thread as a connection](#) for more information on this.

Thread operation mode

Mode Gateway Threads

The Thread will operate in the role of a gateway when it is connected to a broadband Internet connection via Ethernet or cellular services. All cellular models will prioritize use of a cabled Internet connection, but will fall back to cellular service if the primary connection is interrupted. Reversing this priority is configurable in the Thread settings.

Thread devices configured with the optional active wireless mesh transceiver and operating in the role of a gateway, will serve as a wireless access point for any other Thread devices in proximity that also have the wireless mesh transceiver.

Gateways can host up to 25 wireless endpoint devices depending on many factors, including:

1. Distance between gateway and endpoint

2. Signal strength
3. RF noise in proximity
4. Sampling frequency
5. Configured sensor data rate

Installing additional Thread devices as gateways will automatically provide load balancing and redundancy for proximal Thread devices operating as endpoints. Gateway Threads will fall back and operate as an endpoint if internet uplink is disrupted and additional gateways are operating in proximity.

Mode Endpoint Threads

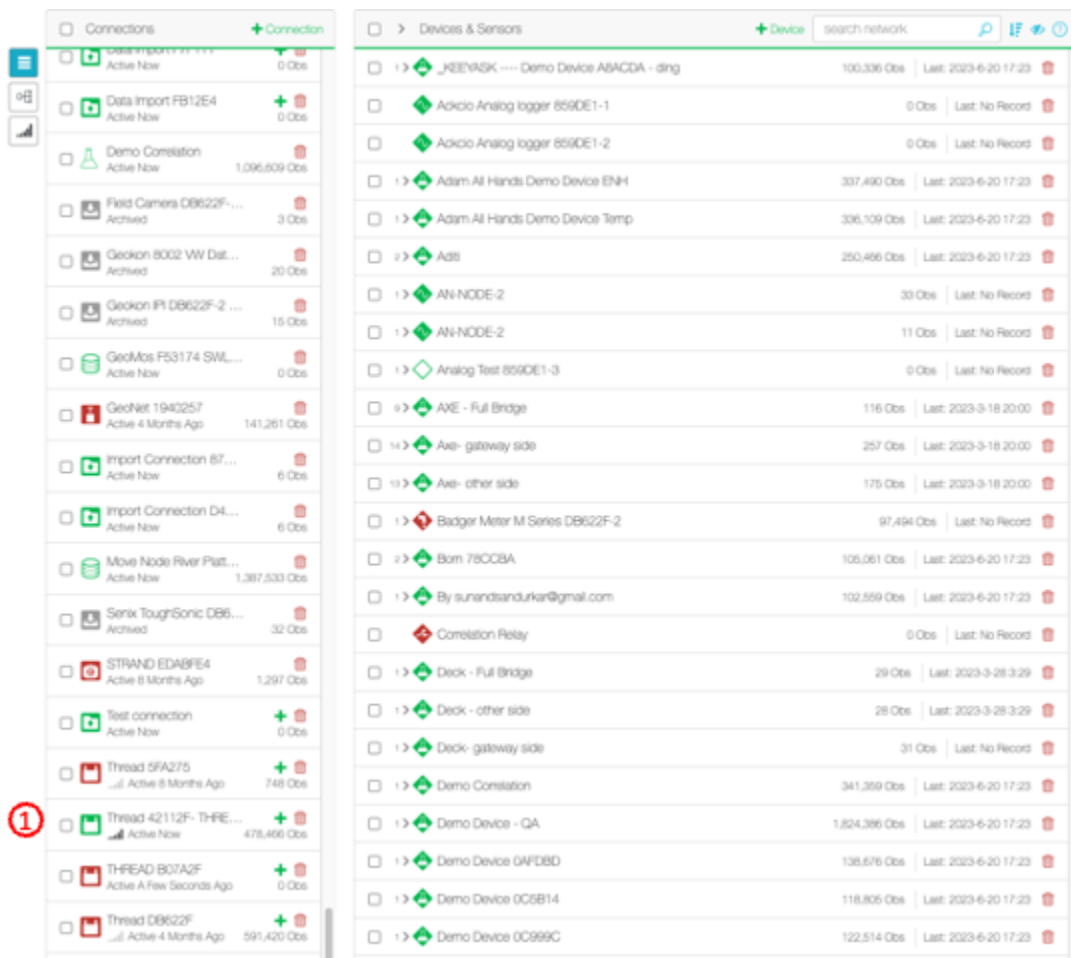
After setting up at least one Gateway Thread that connects directly to the network, you can connect additional Endpoint Threads. Endpoint Threads are not required to connect via a cabled network connection or internal cellular transceiver. Instead, Endpoints will connect to the cloud through neighboring gateway Thread devices using active wireless mesh. Endpoints will automatically negotiate a secure wireless connection - either directly through the closest gateway or by hopping through other endpoints. Up to three hops can be made to access a gateway.

Power Scheduler

The Power Scheduler allows users to implement default power schedules or build custom schedules to implement power-saving measures for Thread hardware, optimizing the use of power when operating in environments requiring solar panels or with other limited power sources. The Power Scheduler feature sets time parameters to determine when a Thread is awake (powered on and available to process commands or upload data) and when it is in sleep mode. Default schedule options cover most normal use-case power scenarios, while customizable schedules allow the user to implement a schedule specific to their needs. The Power Scheduler is set to 'Always On' by default, so the Thread is always available to process commands and record data.

Note: To change the Power Schedule, the Thread must be awake and online. If the Thread is asleep offline, the change will go into effect the next time the Thread is available to process commands.

Navigating to Thread Power Schedule



1. **Connection-** Click on the desired Thread on the Connections side of the Network page, then navigate to the 'Edit Configuration' tab on the left.

Thread 42112F- THREAD - RMS

Details

Edit Configuration **2**

Revision Management

Connect Code *

42112F

Power Scheduler

Always On **3**

Default Schedules

- ✓ Always On
- Low Power
- Low Power II
- Extended Low Power
- Extended Low Power II
- Working Hours

Connection ID

/fn/42112F/node

Connection Name *

Thread 42112F- THREAD - RMS

Location

32.70955556258856 *

-117.1587102141896 *

Elevation m

Notes


Cancel Apply

- Edit Configuration**- Click on the "Edit Configuration" button on the left side of the Thread screen.
- Dropdown Selection**- Clicking the dropdown option allows the user to view and select Default power schedules and user-customized schedules that have already been configured. Default options are illustrated below.

Details

Edit Configuration

Revision Management


 Thread 42112F- THREAD - RMS

Connect Code *

42112F

Power Scheduler

Always On

 4

Connection ID

/fn/42112F/node

Connection Name *

Thread 42112F- THREAD - RMS

Location

32.7095555556258856

-117.1567102141896

Elevation

m

Notes

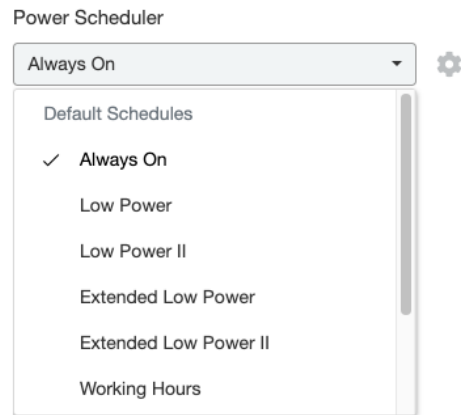
Cancel

Apply

4. **Scheduler Settings**- Clicking the cogwheel opens a pop-out window allowing the user to view schedule cycles, and create, modify, or delete custom schedules.

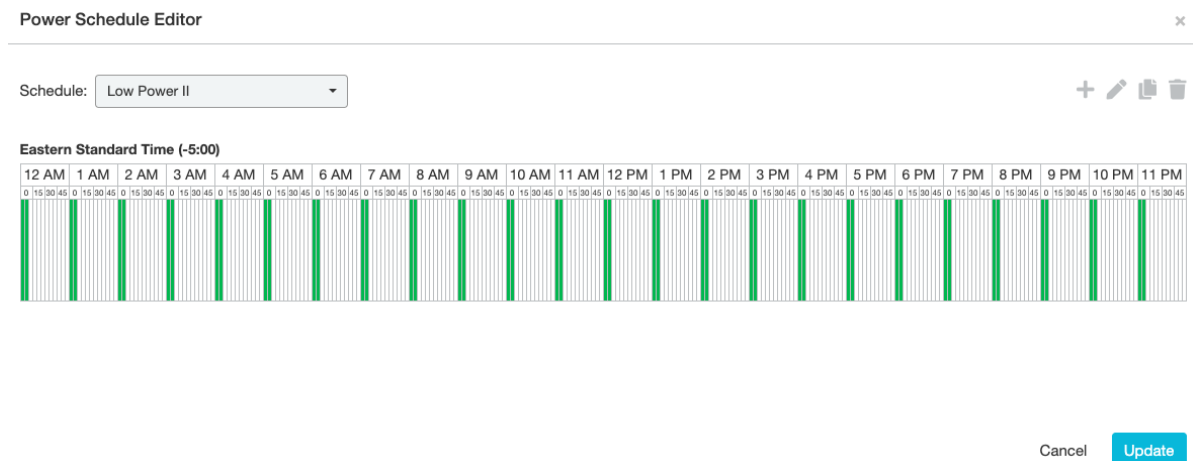
Default Schedules

Using a premade default schedule is a quick way to apply the most commonly used schedules. The default schedules don't require any setup and can be found in the Schedule dropdown bar.




Each default schedule will come with different pre-configured schedule rows (Wake Duration, Repeat, and Time settings). The default schedules cannot be edited, but you can quickly clone the schedule and edit it to your desired preferences.

Select a default schedule to view its different settings. Green bars indicate the Thread will be powered on, while white bars indicate that the Thread will be asleep.







Creating New Schedules

Custom power schedules can be created to best suit asset monitoring needs. Follow the steps outlined in Step 4 above to navigate to the Power Schedule settings window.







Once in the Power Schedule Editor, click the  icon at the top right corner. You can name the schedule, select your time zone, wake duration, if it repeats, and the time frame for the wake duration.

Power Schedule Editor


Schedule: New Schedule...



Mountain Standard Time (-7:00)


12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10
0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15
																						

Name:

Time Zone: Mountain Standard TI... 

Wake Duration: 30 minutes

Repeat: Every 4 hours

Time: 12:00 AM to 11:55 PM 

Cancel

Create

Name: Create a unique name for your custom schedule. Everyone within your organization will then be able to use this schedule on any Thread.

Wake Duration: Defines how long the Thread and connected devices/sensors are awake. During this time, the Thread will process commands and read data from the connected devices/sensors.

Repeat: Sets the frequency that the Wake Duration repeats.


Time: Sets the start and end time for the selected schedule row.

Additional Schedule Row: To create another row, click the **+** icon located to the right of the Time Zone. Configure your Wake Duration, Repeat, and Time settings for the new row.

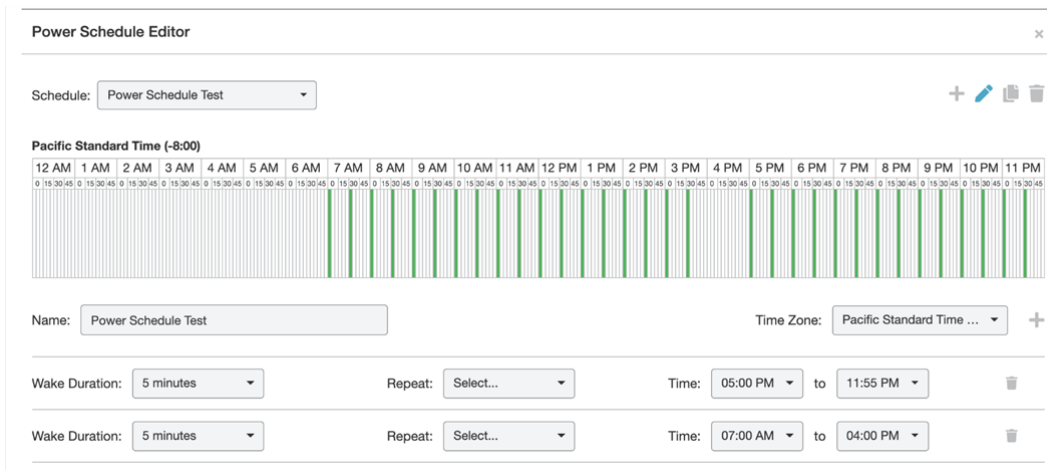
The screenshot shows the configuration interface for a Thread 71CC35 device. On the left is a sidebar with icons for home, details, edit configuration, revision management, and other settings. The main area has a header for 'Thread 71CC35' with a '+ Add Device' button and a help icon. Below the header, there are two columns of configuration fields. The left column includes 'Connect Code *' (71CC35), 'Power Scheduler' (Low Power II, highlighted with a red box), and a gear icon. The right column includes 'Connection ID' (/tn/71CC35/node), 'Connection Name *' (Thread 71CC35), 'Location' (Latitude, Longitude, Elevation), and 'Notes'. At the bottom, there are 'Cancel' and 'Apply' buttons, with the 'Apply' button highlighted with a red box.

Once you have configured all the parameters, click 'Create' in the bottom right corner. This creates a new Power Schedule that is now available to all users within your organization. To use the schedule on a Thread, you must select it in the 'Edit Configuration' Page and hit 'Apply'.

Editing Schedules

An existing custom power schedule can be edited or cloned in order to modify it to better suit your specifications. Follow the steps above outlined in Step 4 of Navigating to Thread Power Scheduler to navigate to the Power Schedule settings window. Click the  icon in the top right corner while viewing the desired custom schedule.


Note: Default Schedules cannot be modified. Please copy the default schedule and edit to your specifications.



The screenshot shows the 'Power Schedule Editor' window. At the top, there's a title bar with a close button. Below it, a 'Schedule:' dropdown menu is set to 'Power Schedule Test'. To the right of the dropdown are icons for adding, editing, cloning, and deleting schedules. The main area displays a timeline for 'Pacific Standard Time (-8:00)' from 12 AM to 11 PM. Each hour is represented by a column, and each column contains a series of vertical bars indicating the power state (0 or 15:30:45). Below the timeline, there's a 'Name:' field containing 'Power Schedule Test' and a 'Time Zone:' dropdown set to 'Pacific Standard Time ...'. At the bottom, there are two rows of settings for 'Wake Duration' (set to 5 minutes), 'Repeat' (set to 'Select...'), and 'Time' (set to 05:00 PM to 11:55 PM and 07:00 AM to 04:00 PM). Each row has a trash icon to its right.





The custom schedule will load the time zone selector and a Schedule Row (Wake Duration, Repeat, and Time) for you to edit. Click Update in the bottom right to save the changes you made.

Cloning Schedules

To clone an existing power schedule choose the schedule you want to clone in the Schedule selection bar. Default schedules and custom schedules can both be cloned. Click the  icon in the top right corner to start cloning. Once you have cloned the schedule, create a unique name. The Schedule Row will populate for you to modify. After renaming and modifying the schedule, click "Create" in the lower right corner of the window to save the new power schedule.

Power Schedule Editor

Schedule: New Schedule...



Pacific Standard Time (-8:00)

12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	0 15 30 45	


Name: Power Schedule Test Clone

Time Zone: Pacific Standard Time ...

Wake Duration: 5 minutes

Repeat: Select...


Time: 05:00 PM to 11:55 PM



Wake Duration: 5 minutes

Repeat: Select...


Time: 07:00 AM to 04:00 PM




Cancel

Create

Deleting Schedules

Choose the schedule you want to delete in the Schedule selection bar. Click the  icon in the top right corner. Once you confirm your action, the schedule will be permanently deleted.

Power Schedule Editor ✕

Schedule: New Schedule... + ✎ 📄 

Pacific Standard Time (-8:00)

12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45	0 15:30:45

Name: Power Schedule Test Clone Time Zone: Pacific Standard Time ... +

Wake Duration: 5 minutes Repeat: Select... Time: 05:00 PM to 11:55 PM 🗑

Wake Duration: 5 minutes Repeat: Select... Time: 07:00 AM to 04:00 PM 🗑

Cancel Create

Diagnostics Controls Menu

Threads can be remotely monitored with the Thread Diagnostics page of the Thread Connection, allowing the user to remotely update the Threads via the FOTA (Firmware Over-The-Air) firmware update system, as well as providing users with some additional remote controls and for troubleshooting or diagnosing the Thread. This article will explain available tools and guide the user in their use.

Note: The Thread Diagnostics page will only be accessible for users with an Admin role in the Organization.

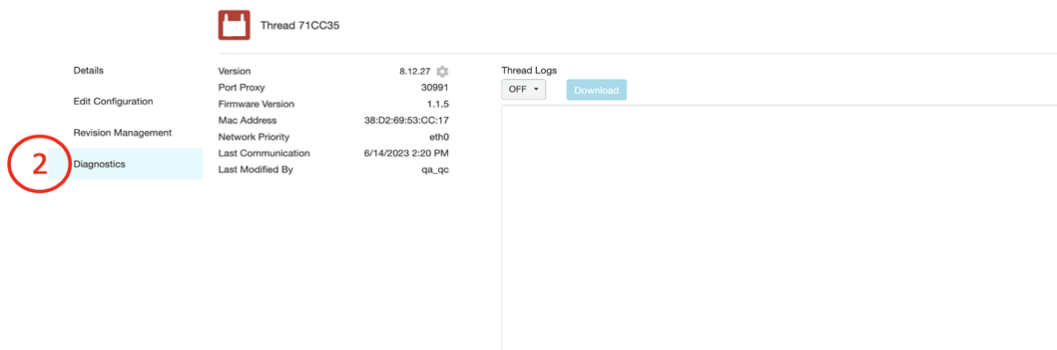
Navigating to the Diagnostics Page

1. From the Connectivity Module, click on the Thread name within the Connections column on the left side of the screen.

The screenshot displays the World Sensing interface. On the left, the 'Connections' panel lists various network components. A red circle with the number '1' highlights the entry 'Thread 926254', which is marked as 'Active 2 Years Ago' and has '897 Obs'. Below this, other connections like 'Thread BF0145', 'Thread 926254', 'B07A2F //DENVER RO...', 'Thread 959524 //REV...', 'Thread E4654F', and several 'Import Connection' and 'Archive Node' entries are visible. The bottom of the panel shows '14 Connections'.

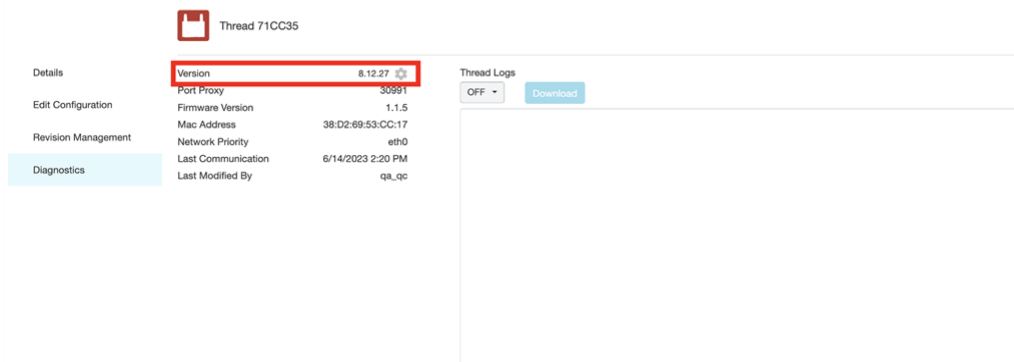
On the right, the 'Devices & Sensors' panel shows a list of devices and sensors. The first few entries are 'Geokon 8960-01C VW Interface OE43EE-2', 'Field Camera OE43EE-1', and 'Field Camera B07A2F-1'. Below these are several 'THREAD' entries, including 'THREAD OE43EE Diagnostics', 'Proxy BF0145-1', 'THREAD BF0145 Diagnostics', 'THREAD 926254 Diagnostics', 'dsfdfsdfs', 'Testing TCA', 'RST In-place Inclinator - Digital 926254-1', 'ShapeArray 214819', 'THREAD B07A2F Diagnostics', 'THREAD 959524 Diagnostics', and 'THREAD E4654F Diagnostics'. The bottom of the panel shows '14 Devices 101 Sensors 167,678 Observations'.

2. Click on the "Diagnostics" tab on the left side of the screen. The user will then be presented with the Diagnostics panel illustrated below.



Updating Firmware

Thread information, including the FW version, is listed on the left side of the Diagnostics panel below the Thread name. Clicking the cogwheel icon next to the Firmware version will open a window allowing the user to view the available Firmware versions for transmission to the Thread via FOTA.



After clicking on the cogwheel a pop up window will appear with a dropdown of available Firmware versions. The higher the number of the version the newer the Firmware is, the newest version of firmware will be found at the bottom of the dropdown list. It is recommended to always update your Thread device to the newest available Firmware version.

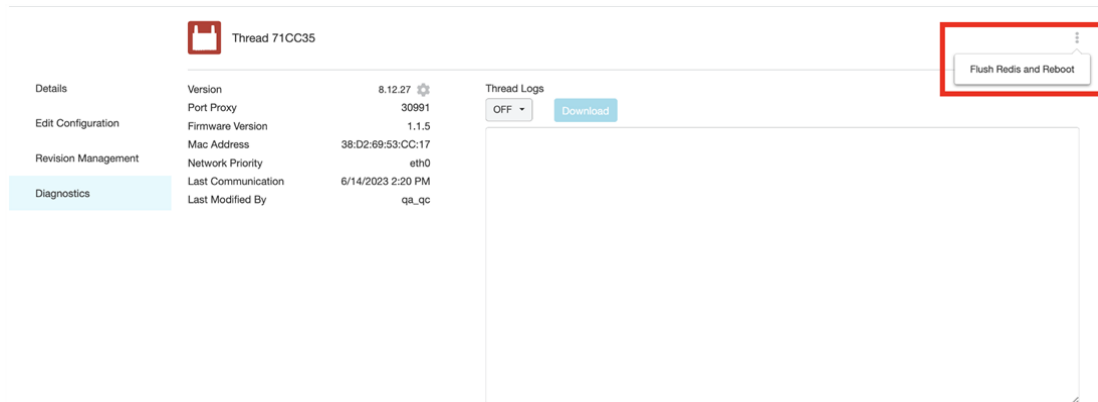
Clicking update will close the window and begin the update. A status bar will be visible in place of the Firmware version on the Diagnostics page. When the Thread is finished updating, it will turn off and reboot before reconnecting to the application.



Firmware Update Best Practice Notes: The Thread must be on in order to take the Firmware update command and receive the update data packet. The Customer Success team recommends turning the Thread to Always On in order to take the firmware update. If updating an Endpoint Thread, ensure that the Gateway Thread the Endpoint Thread is connecting to is updated first and that both Threads are in Always On before pushing the FOTA update to the endpoint Thread.

Remote Commands

Commands can be pushed to a Thread remotely if the Thread is On and connected to the application. The command can be used to remotely manipulate the Thread in the event that a Thread is not behaving in an expected manner. The Command can be accessed by clicking the Kebab icon in the upper right portion of the Diagnostics window.



Flush Redis and Reboot- This command turns the Thread hardware off and back on before booting the Thread back up.

Logs

Thread Logs can be a useful analytical and troubleshooting tool to help WorldSensing Customer Success remotely determine a Thread's behavior. This tool is only available for Threads acting as Gateways. To access Thread logs, click on the dropdown above the window in the middle of the Diagnostics page. The user can select from "Warn", "Info", "Debug", and "Trace". Each of the first three selections will provide Thread information with only that coding note, while Trace will provide all Thread information. Once selected, the Thread Logs will begin streaming in the window. Selecting the "Download" button will download a copy of the Thread Logs, which will then be accessible in the Asset Documents portion of the Documents Module.



Thread 926254

Version 8.0.25 
Port Proxy 30048
Firmware Version 3.0.1
Mac Address 60:64:05:45:26:29
Network Priority --
Last Communication 9/23/2021 8:42 PM
Last Modified By bryan.steiner

Thread Logs

OFF [Download](#)

✓ OFF

WARN

INFO

DEBUG

TRACE

LED Status Indication

The X3 Series THREAD has a multicolor LED behind the power button that provides a diagnostic indication of its current state. The reference guide below will assist the user in determining the current state of the Thread.



Color Diagnostic References

Color Spectrum LED: Boot up

Indicates boot process from cold start or sleep mode. This process lasts approximately 120 seconds.

CROSS-COLOR SPECTRUM MODULATION



Green LED: Connected

THREAD is active and operating in high-power mode and IS connected to the cloud.

GREEN FLASH, 3 SECOND FREQUENCY



Red LED: Disconnected

THREAD is active and operating in high-power mode and IS NOT connected to the cloud.

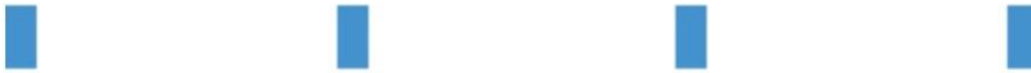
RED FLASH, 3 SECOND FREQUENCY



Blue LED: Low power mode

THREAD is in low-power mode to conserve battery and will wake at the next scheduled time.

BLUE FLASH, 10 SECOND FREQUENCY



Yellow LED: Battery below lower limit


Thread is in low-power mode to conserve battery and will wake once input power is restored and the battery exceeds the low voltage cutoff threshold.

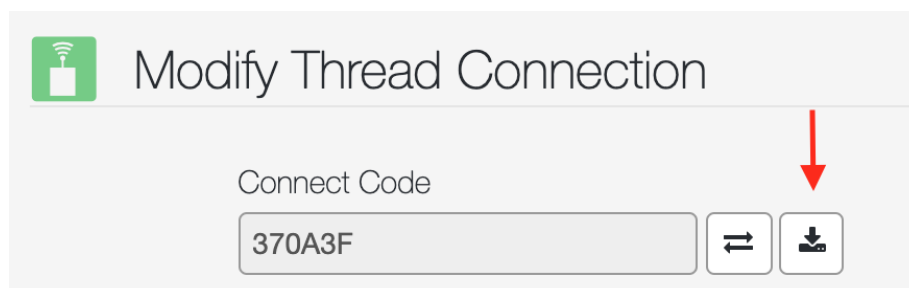
YELLOW FLASH, 10 SECOND FREQUENCY



Save all the data and device/sensor configuration

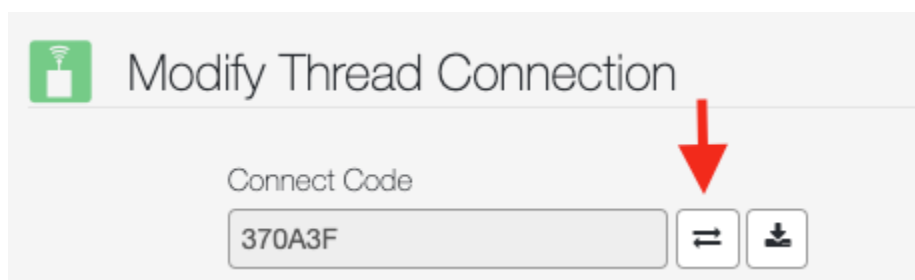
How to Archive All Sensors

Archiving a THREAD allows you to save all the data and device/sensor configuration settings to a virtual THREAD for the purpose of swapping out sensors or devices while still having access to past data. To Archive a THREAD, click the archive  button right of the Connect Code on the THREAD Configuration page.



How to Swap Sensors to Another Thread

You can swap all devices and sensors from one THREAD to another in a single function. On the THREAD configuration page, click the double arrow button next to the THREAD connect code.



From there, choose your target THREAD and the device ports for the previous THREAD's associated devices, then click Submit.

Device Transfer from THREAD 370A3F ×

Transfer device(s) and all associated data from the current connection to another one.

Transfer to:

Device	Port
Proxy 370A3F-1	<input type="text" value="1"/>

Swapping Sensors to another device port on the same Thread

To swap a device from one device port to another on the same THREAD, you must first archive the sensors on that THREAD. Once the data has been transferred to an archive node, you can open the archive node configuration page and follow the Swapping Sensors to a New Thread method, selecting the new device port as the new target port.

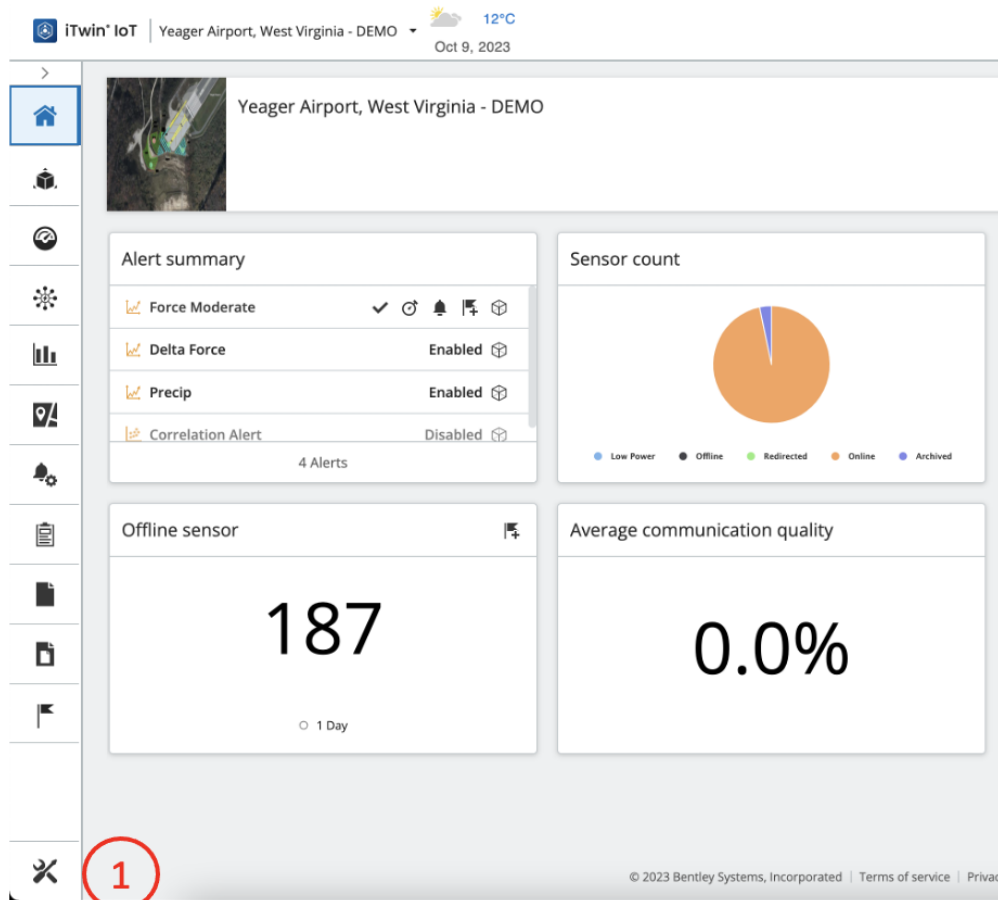
CMT Edge API Connection

The Worldsensing CMT Edge API connection supports the connection and transfer of data from CMT Edge into the iTwin IoT platform.

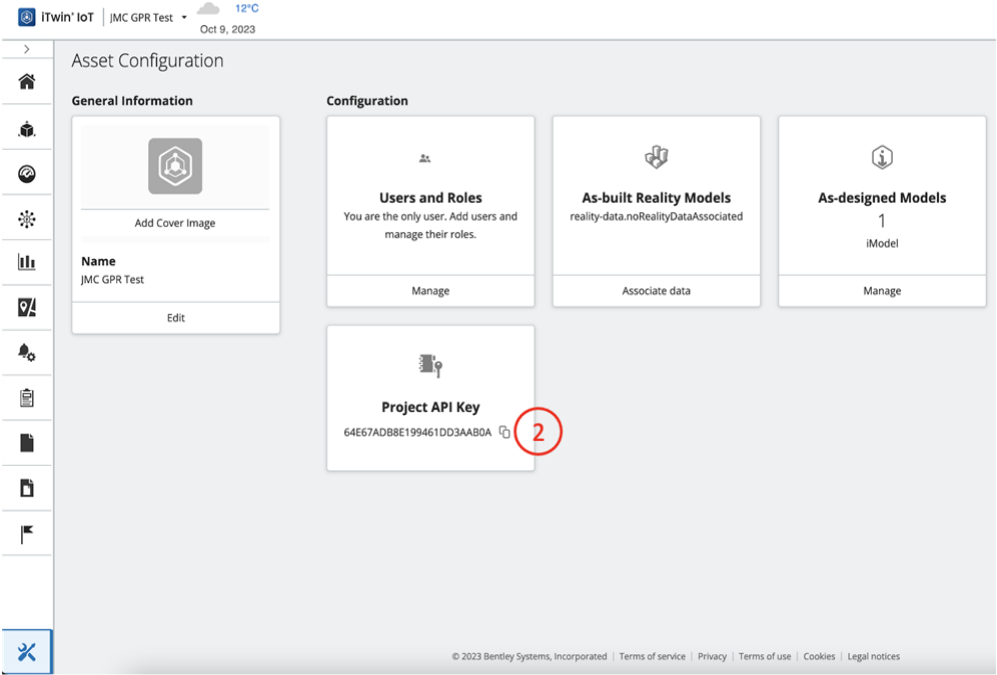
Retrieving iTwin IoT Asset API Key

An API key from the iTwin IoT asset will be required in order to establish the data transfer connection between Worldsensing and iTwin IoT. This section will guide the user in retrieving an API key from iTwin IoT.

1. Navigate to the Asset that data will be pushed to in iTwin IoT. From any page, click on the "Configure" icon in the lower left side of the page.




- The user will be directed to the "Asset Configuration" page. The API key will be available within a tile on this page. The API key can either be highlighted and copied, or the "Copy to Clipboard" button will save it for pasting in future steps.



CMT Edge Setup

Worldsensing and Loadsensing device configuration is performed through the CMT Edge network management software.

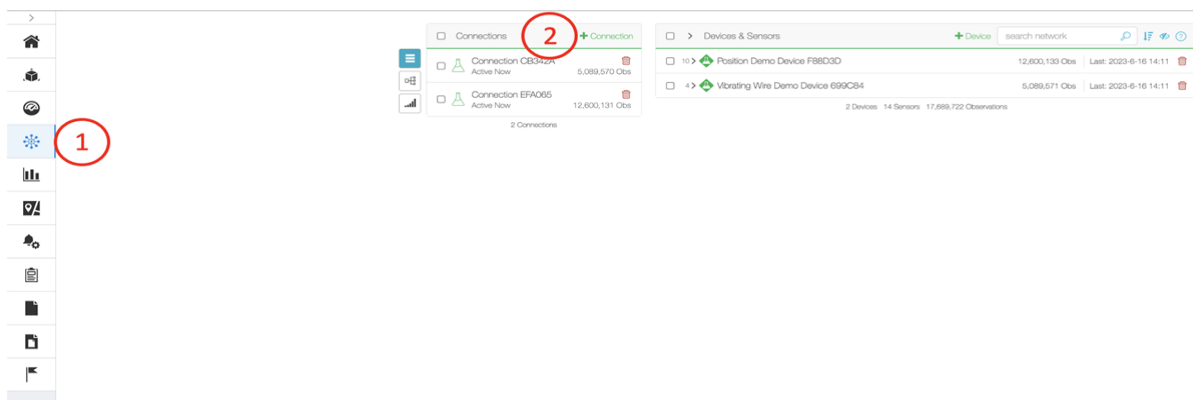
CMT Edge 		
Networks Status Configuration		
Networks		
/ Networks		
Id	Name	Nodes
21781	This is a secondary gateway. The main gateway is: 26120	13 6

Set up all projects and devices within the CMT Edge application. Please contact Worldsensing support with any questions regarding CMT Edge app login or Gateway and Device configuration.

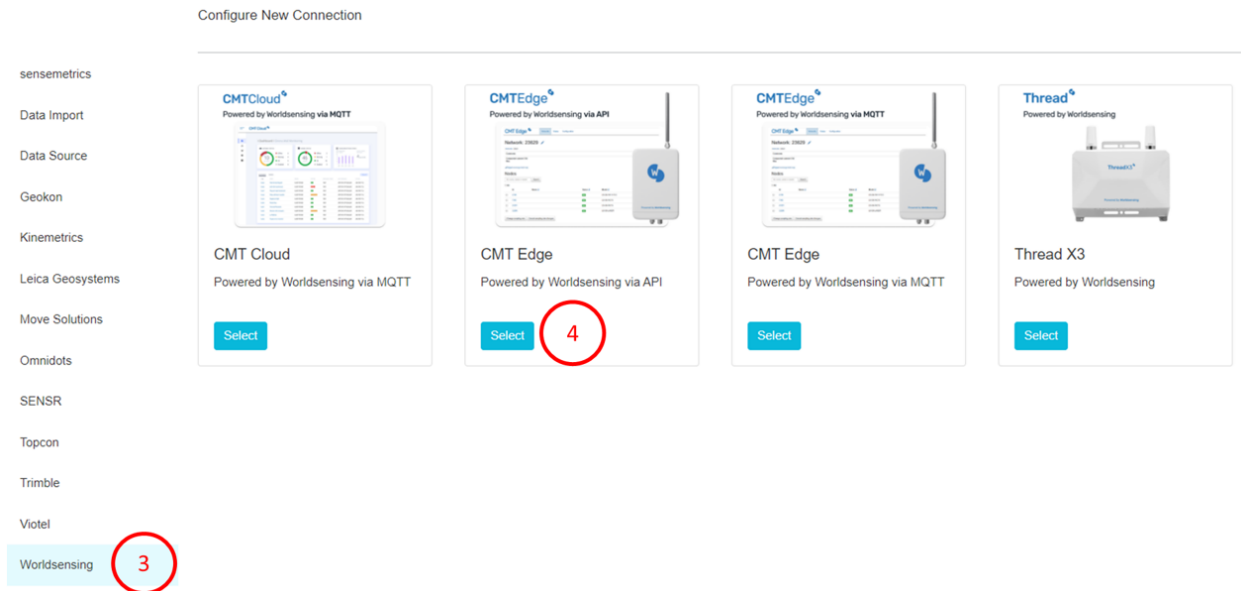
Once configured, the API connection is ready to be set up in iTwin IoT.

iTwin IoT API Connection

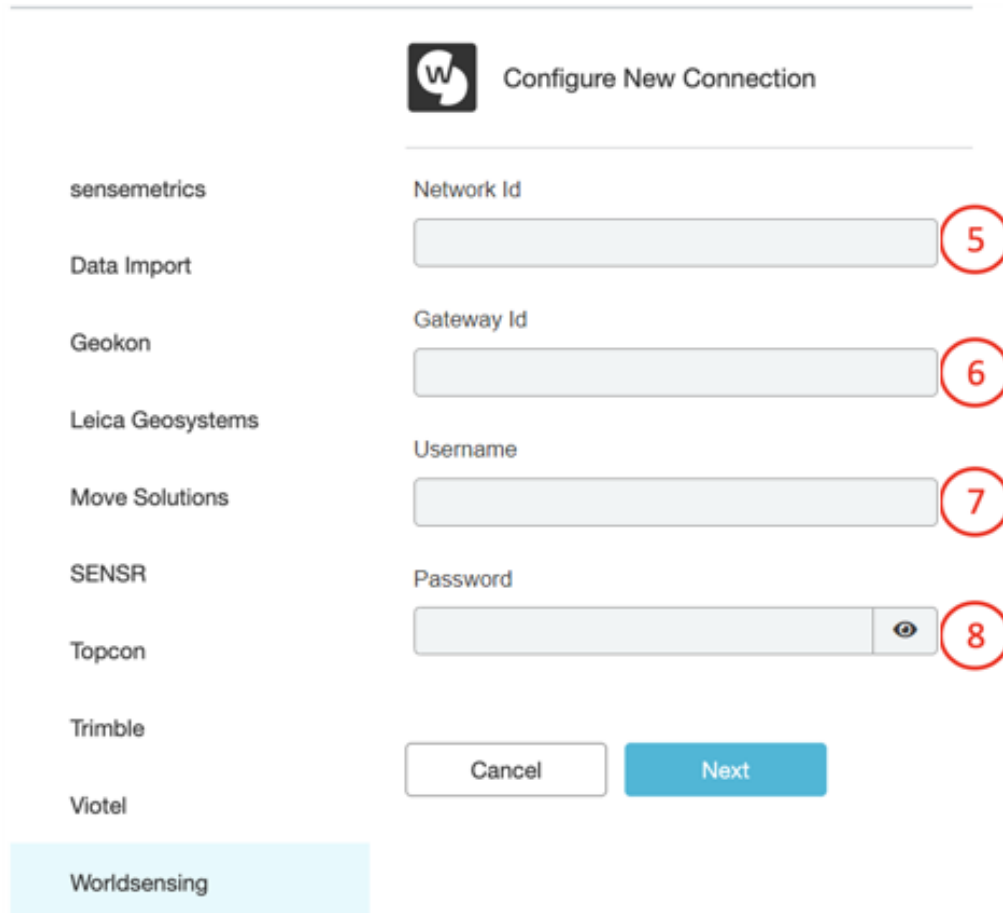
1. Within the iTwin IoT application, begin by navigating to the Connectivity Module.




2. Click on the "+Connection" icon.
3. Select WorldSensing from the available Connections list on the left sidebar.




- Click the "Select" icon on the Loadsensing G6 Gateway cloud tile.



 Configure New Connection

sensemetrics	Network Id	<input type="text"/>	5
Data Import			
Geokon	Gateway Id	<input type="text"/>	6
Leica Geosystems			
Move Solutions	Username	<input type="text"/>	7
SENSR	Password	<input type="password"/>	8
Topcon			
Trimble			
Viotel			
Worldsensing			

5. Network ID- Input the network ID found on the Networks page (image 1) or on Status page (image 2) of the CMT Edge application.

CMT Edge 

Networks

Status

Configuration

Networks

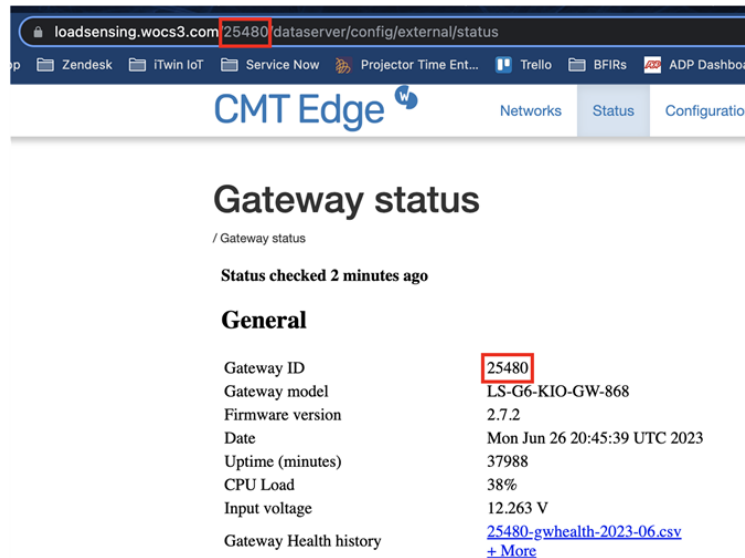
/ Networks

Id	Name
21781	This is a secondary gateway. The main gateway is: 26120

Application

Network ID	21781
Internet connection (ping)	Ping OK
Status reporting	Connection OK
Remote access	Connection OK

6. Gateway ID- Input the Gateway ID, which can be found in the URL or on the Status page of the CMT Edge application.



7. Username- Input your CMT Edge username used for logging into the application.
8. Password- Input your CMT Edge password used for logging into the application.

Click "Next" once all information has been input.

9. The next page will be the Edit Configuration page for the connection. Standard configurations are available. After configuration changes have been made, click "Next".

>

Loadensing G6 Gateway 21781

Details

Edit Configuration

Revision Management

Network Id

21781

Connection ID

/loadensing/21781/node

Gateway Id

25480

Connection Name *

Loadensing G6 Gateway 21781

Username

admin

Location

Latitude

Longitude

Elevation

m

Notes

Sampling Interval

5 Mins

Cancel

Apply

Once complete, Devices and Sensors will begin populating within the Connectivity module and observations will begin streaming from CMT Edge.

☐ Connections

+ Connection

☐ Loadensing G6 Gate...
Active Now0 Obs

1 Connection

☐ Devices & Sensors

+ Device

☐ Loadensing Data logger LS-G6-VW-1-EU 9444

loadensing

Record

☐ Device Pressure0 ObsLast: No Record

☐ Device Temperature0 ObsLast: No Record

☐ Device Uptime0 ObsLast: No Record

☐ Device Voltage0 ObsLast: No Record

☐ Received Signal Strength Indication0 ObsLast: No Record

☐ Signal to Noise Ratio0 ObsLast: No Record

☐ Spread Factor0 ObsLast: No Record

☐ VW Sensor 9444 10 ObsLast: No Record

☐ Loadensing Data logger LS-G6-VW-1-EU 238130 ObsLast: No Record

☐ Device Pressure0 ObsLast: No Record

☐ Device Temperature0 ObsLast: No Record

☐ Device Uptime0 ObsLast: No Record

☐ Device Voltage0 ObsLast: No Record

☐ Received Signal Strength Indication0 ObsLast: No Record

☐ Signal to Noise Ratio0 ObsLast: No Record

☐ Spread Factor0 ObsLast: No Record

☐ VW Sensor 23813 10 ObsLast: No Record

☐ Loadensing Data logger LS-G6-VW-1-EU 277330 ObsLast: No Record

☐ Device Pressure0 ObsLast: No Record

☐ Device Temperature0 ObsLast: No Record

☐ Device Uptime0 ObsLast: No Record

☐ Device Voltage0 ObsLast: No Record

☐ Received Signal Strength Indication0 ObsLast: No Record

19 Devices 158 Sensors 0 Observations

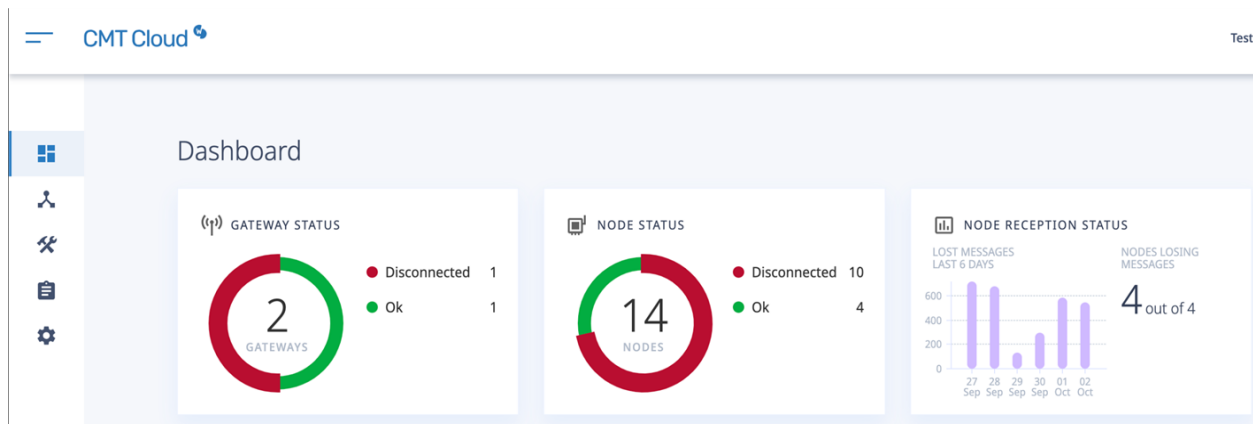
42

CMT Cloud MQTT Connection

The Worldsensing CMT Cloud MQTT connection supports the connection and transfer of data from CMT Cloud into the iTwin IoT platform.

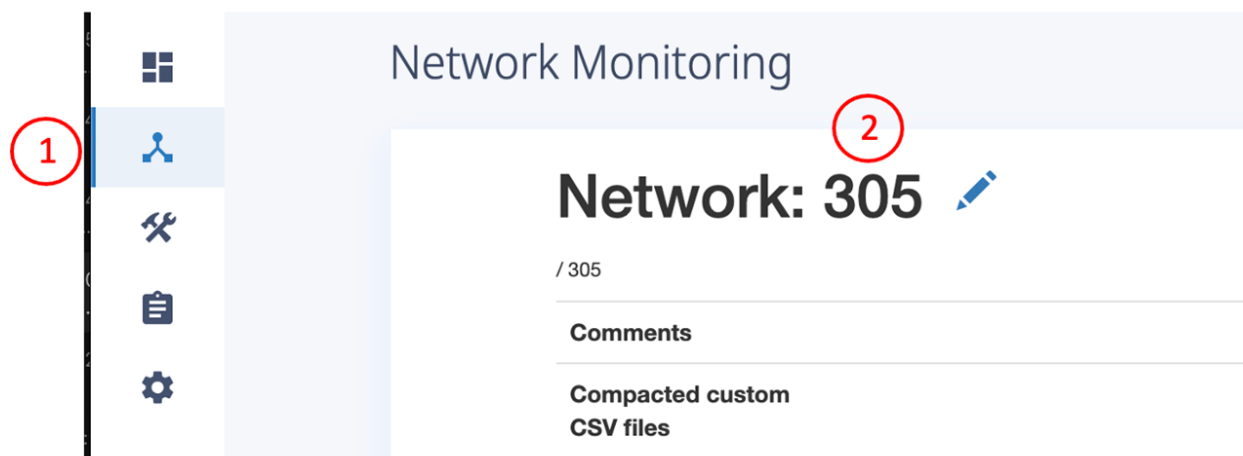
CMT Cloud Setup

Worldsensing and Loadsensing device configuration is performed through the CMT Cloud website.



Set up all projects and devices within the CMT Cloud application. Please contact Worldsensing support with any questions regarding CMT Cloud login or Gateway and Device configuration.

Once configured, the connection is ready to be set up in iTwin IoT. There are a few pieces of information to gather from the CMT cloud site for input into the iTwin IoT setup.



1. **Network**- Navigate to the Network page by clicking on the second icon on the left of the page.
2. **Network ID**- Record the Network ID listed in the page. This number may also be visible within the Cloud app's URL. The number will also serve as the Connectivity ID in the following setup page.

Please enter your credentials
to proceed

EMAIL ADDRESS

3

userx@worldsensing.com

PASSWORD

[Forgot password?](#)

4

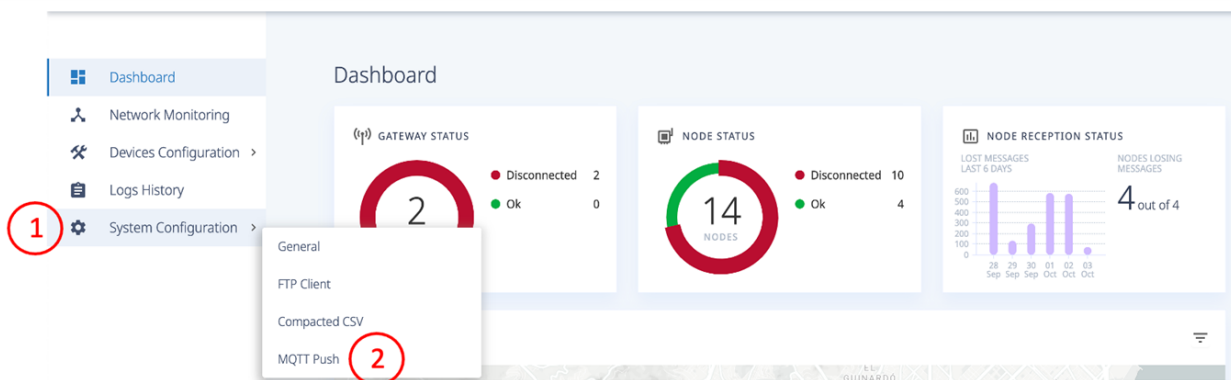
.....

[Sign in](#)

3. **Username**- Record your username used to login to CMT cloud.
4. **Password**- Record your password used to login to CMT cloud.

CMT Cloud MQTT Push Settings

MQTT Push needs to be enabled within CMT Cloud in order for data to be pushed between CMT Cloud and ITwin IoT. To confirm that the Push is enabled, follow the steps below.



1. Click on "System Configuration" on the left side of the screen. A pop-up window will appear to the right.
2. Click on "MQTT Push" in the pop-up window.

System Configuration / MQTT Push

This feature will push data received from data nodes to a MQTT server.

Enable MQTT push



3

Server ip / hostname

emqx-broker.sensemetrics.engineering

Server port

8883

Topic

loadsensing/prod/cloud/readings

Enable SSL



Server validation

Use system certificates



Authentication

User + password



Username

loadsensing

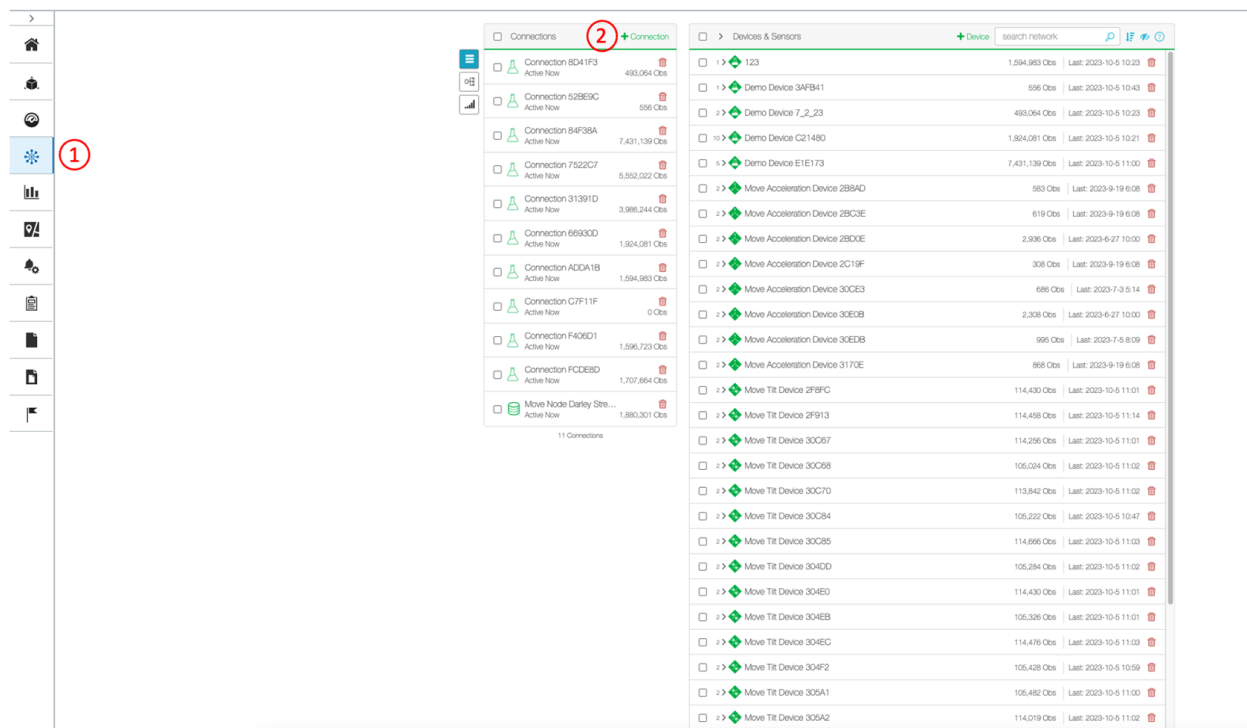
Password

.....

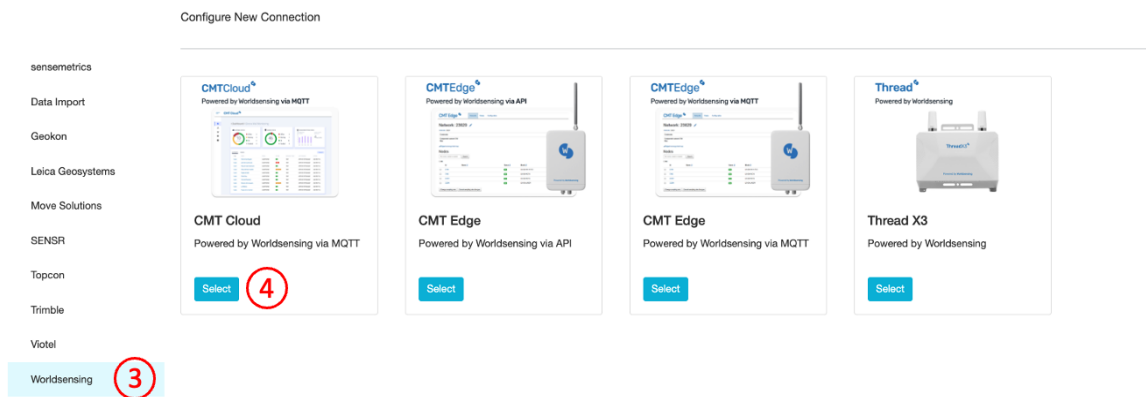
Save configuration

3. Confirm that the following page, illustrated below, is configured in the same manner as below, including enabling the MQTT Push and SSL checkboxes. Reach out to iTwin IoT [Bentley Customer Success](#) for the Password.


ITwin IoT CMT Cloud Connection



1. Within the application, begin by navigating to the Connectivity Module.
2. Click on the "+Connection" icon.



3. Select Worldsensing from the available Connections list on the left sidebar.
4. Click the "Select" icon on the CMT Cloud tile.



Configure New Connection

sensometrics

Data Import

Geokon

Leica Geosystems

Move Solutions

SENSR

Topcon

Trimble

Viotel

Worldsensing

Network Id

5


Connectivity Id

6

Username

7

Password

8 

Cancel
Next


5. **Network ID**- Input the Network ID from step 2 of the previous section.
6. **Connectivity ID**- Input the same number as Network ID for the Connectivity ID.
7. **Username**- Input your CMT Cloud username used for logging into the application.
8. **Password**- Input your CMT Cloud password used for logging into the application.

Click "Next" once all information has been input.

Details

Edit Configuration

Revision Management

 CMT Cloud 305

Network Id

305

Connectivity Id


305

Username

cmtcloudtest@worldsensing.com

Password

.....



Sampling Interval

5 Mins

Connection ID

/loadsensing_cmt_cloud/305/node

Connection Name *

CMT Cloud 305

Location

Latitude

°

Longitude

°

Elevation

m

Notes

Cancel

Apply

9

- The next page will be the Edit Configuration page for the connection. Standard configuration options like Connection Name change and location inputs are available. After configuration changes have been made, click "Apply".

☐ Connections
 + Connection

☐ Archive Node Mon Jul ...
Archived
1,974 Obs

☒ CMT Cloud 305
Active Now
209,018 Obs

☐ Archive Node Tue Jul 1 ...
Archived
0 Obs

☐ EU Demo Thread 253 ...
Active Now
58,513 Obs

☐ Loadensing CMT Edg...
Active 3 Hours Ago
0 Obs

☐ Thread AF2DB5_test2
Active 2 Months Ago
13,010 Obs

☐ US Demo Thread 2E4...
Active 2 Months Ago
9,295 Obs

☐ APAC Demo Thread 6...
Active 3 Months Ago
806 Obs

8 Connections

Loadensing Tiltmeter SDE
Online, Always On

Sensors

+ Device

search network

<input type="checkbox"/>	Loadensing Tiltmeter LS-G6-TIL90-XE 80639	90,676 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Spread Factor	12,957 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Tilt 90 Sensor 80639	38,848 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Signal to Noise Ratio	12,957 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Device Temperature	12,957 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Received Signal Strength Indication	12,957 Obs	Last: 2023-10-4 14:20
<input type="checkbox"/>	Device Voltage	0 Obs	Last: No Record
<input type="checkbox"/>	Device Uptime	0 Obs	Last: No Record
<input type="checkbox"/>	Loadensing Tiltmeter LS-G6-TIL90-IE 94031	51,755 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Device Temperature	10,351 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Signal to Noise Ratio	10,351 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Tilt 90 Sensor 94031	10,351 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Spread Factor	10,351 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Received Signal Strength Indication	10,351 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Device Uptime	0 Obs	Last: No Record
<input type="checkbox"/>	Device Voltage	0 Obs	Last: No Record
<input type="checkbox"/>	Loadensing Tiltmeter LS-G6-TIL90-IE 93970	29,195 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Spread Factor	744 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Tilt 90 Sensor 93970	26,219 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Device Temperature	744 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Signal to Noise Ratio	744 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Received Signal Strength Indication	744 Obs	Last: 2023-10-4 14:00
<input type="checkbox"/>	Device Voltage	0 Obs	Last: No Record
<input type="checkbox"/>	Device Uptime	0 Obs	Last: No Record

15 Devices 105 Sensors 209,018 Observations

Once complete, Devices and Sensors will begin populating within the Connectivity module and observations will begin streaming from CMT Cloud.

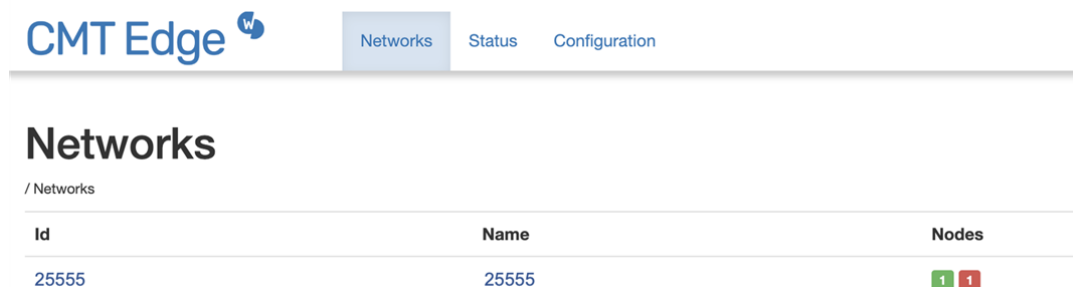
52

CMT Edge MQTT Connection



The Worldsensing CMT Edge MQTT connection supports the connection and transfer of data from CMT Edge into the ITwin IoT platform.

CMT Edge Setup

Load sensing gateway and device configuration is performed through the CMT Edge application. Set up all projects and devices within the CMT Edge application. Please contact Worldsensing support with any questions regarding CMT Edge login or Gateway and Device configuration.



The screenshot shows the CMT Edge application interface. At the top, there is a header with the 'CMT Edge' logo and a navigation menu with three tabs: 'Networks' (selected), 'Status', and 'Configuration'. Below the header, the main content area is titled 'Networks' with a subtitle '/ Networks'. A table is displayed with three columns: 'Id', 'Name', and 'Nodes'. The table contains one row with the following data: 'Id' is '25555', 'Name' is '25555', and 'Nodes' is represented by two small square icons, one green with the number '1' and one red with the number '1'.

Id	Name	Nodes
25555	25555	 

Setting Up CMT Edge MQTT Push

MQTT Push will need to be enabled within CMT Edge.

1. Click "Configuration" on the upper menu portion of the CMT Edge platform.
2. Click "MQTT push" on the dropdown options.

CMT Edge Networks Status **Configuration** 1

MQTT push

/ MQTT push

This feature will push data received from data nodes

Enable MQTT push ☒

Send Gateway Health data ☐

Send keep-alive data ☒

ClientID

Hostname

Port number

Topic

Server validation

Authentication

Username

Password

General
Compacted CSV

Internet
Cellular modem
Radio
Remote access
Repeater plugin

FTP client
Modbus gateway
MQTT push 2
Export configuration
Import configuration

Upload firmware
License Manager
Delete all
Reboot

3. Configure The MQTT push page with the same inputs as the image below. ClientID will be automatically filled in by the application. Ensure that the "Enable MQTT Push" and "Send keep-alive data" checkboxes are enabled. For the password input, reach out to [Bentley Customer Success](#).

MQTT push

/ MQTT push

This feature will push data received from data nodes to a MQTT server.

Enable MQTT push ☒

Send Gateway Health data ☐

Send keep-alive data ☒

3

ClientID

Hostname

Port number

Topic

Server validation

Authentication

Add

Username



Password



Enable bridge notifications ☒

Notifications topic

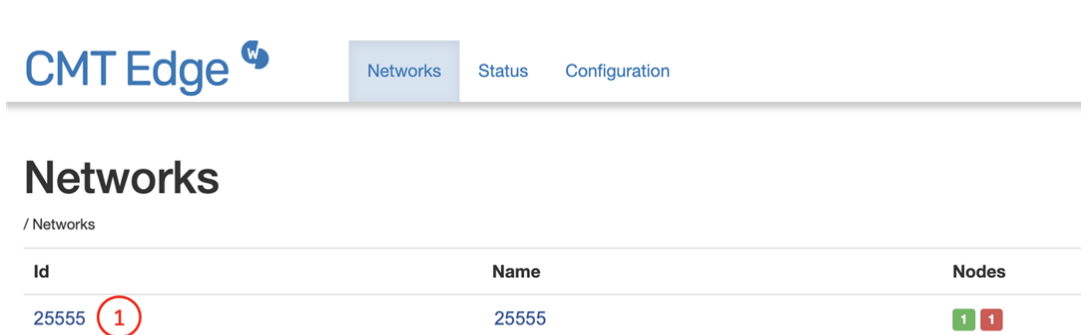
Save configuration

Once configuration is complete, click "Save configuration" at the end of the page.

Retrieving CMT Edge Data

Once configured, the connection is ready to be set up in iTwin IoT. There are a few pieces of information to gather from the CMT Edge site for input into the iTwin IoT setup.

1. **Network ID**- The Network ID can be located within the Networks page of the CMT Edge application.



CMT Edge

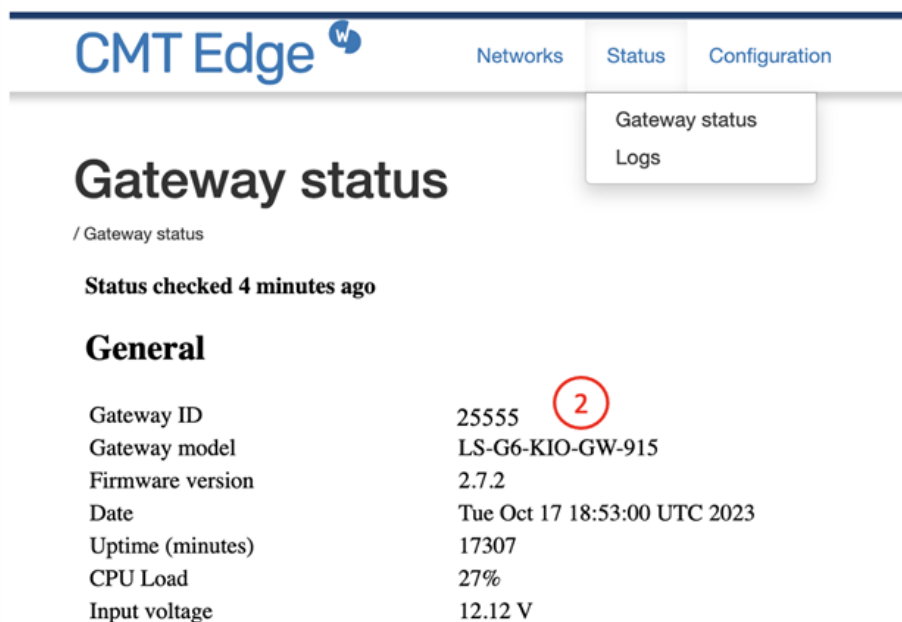
Networks Status Configuration

Networks

/ Networks

Id	Name	Nodes
25555 1	25555	1 1

2. **Gateway ID**- The Gateway ID can be found by navigating to the Status Bar and clicking on the Gateway Status. The Gateway ID will be listed in the following page.



CMT Edge

Networks Status Configuration

Gateway status

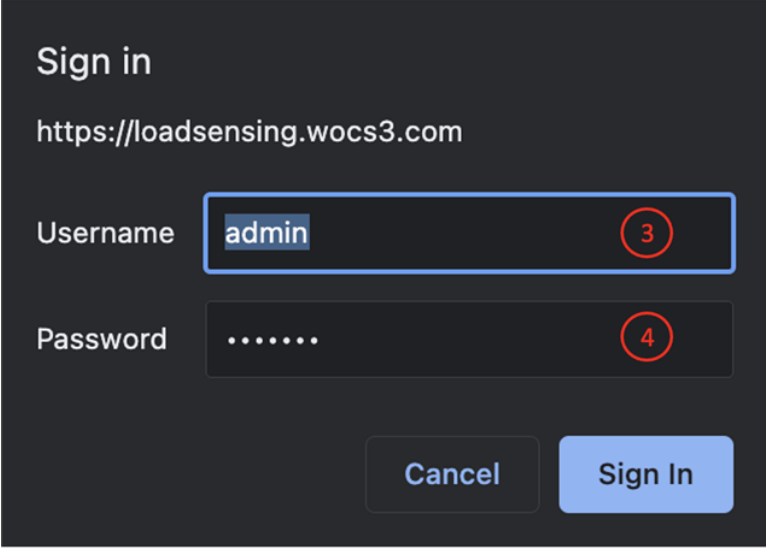
/ Gateway status

Status checked 4 minutes ago

General

Gateway ID	25555 2
Gateway model	LS-G6-KIO-GW-915
Firmware version	2.7.2
Date	Tue Oct 17 18:53:00 UTC 2023
Uptime (minutes)	17307
CPU Load	27%
Input voltage	12.12 V

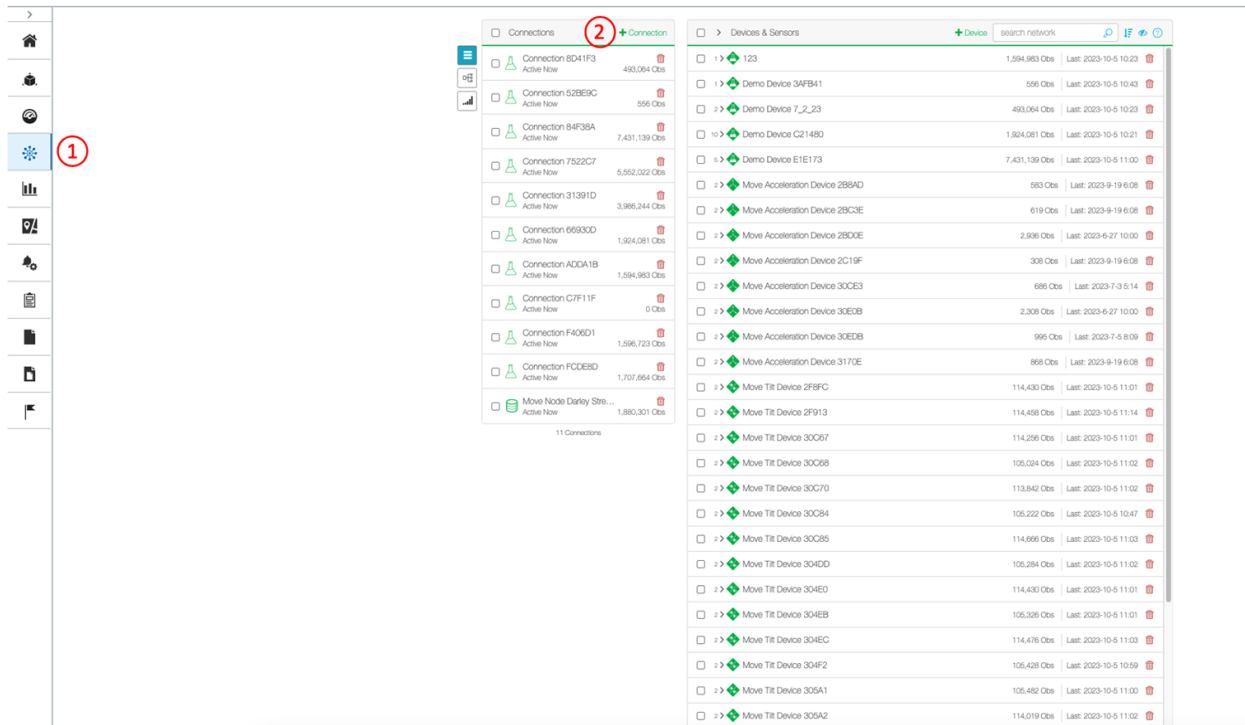
3. **Username**- Collect the username used for logging into the CMT Edge application.
4. **Password**- Collect the password used for logging into the CMT Edge application.



The image shows a dark-themed 'Sign in' dialog box. At the top, it says 'Sign in' followed by the URL 'https://loadsensing.wocs3.com'. Below this are two input fields. The first is labeled 'Username' and contains the text 'admin'; it is highlighted with a blue border and a red circle with the number '3' next to it. The second is labeled 'Password' and contains seven dots; it is also highlighted with a red circle and the number '4' next to it. At the bottom right are two buttons: 'Cancel' and 'Sign In'.

ITwin IoT CMT Edge Connection

With the information gathered from the Edge application, the Edge connection in iTwin IoT can be set up.



1. Within the application, begin by navigating to the Connectivity Module.
2. Click on the "+Connection" icon.

Configure New Connection

sensometrics

Data Import

Data Source

Geokon

Leica Geosystems

Move Solutions

Omnidots

SENSR


Topcon

Trimble

Viotel

Worldsensing 3


CMTCloud
Powered by Worldsensing via MQTT



CMT Cloud
Powered by Worldsensing via MQTT

Select


CMTEdge
Powered by Worldsensing via API



CMT Edge
Powered by Worldsensing via API

Select


CMTEdge
Powered by Worldsensing via MQTT



CMT Edge
Powered by Worldsensing via MQTT

Select 4


Thread
Powered by Worldsensing



Thread X3
Powered by Worldsensing

Select

3. Select Worldsensing from the available Connections list on the left sidebar.
4. Click the "Select" icon on the CMT Edge (via MQTT) tile.



Configure New Connection

Network Id

Gateway Id

Username

Password

...
👁

Cancel
Next

5. **Network ID**- Input the Network ID from step 1 of the previous section.
6. **Gateway ID**- Input the Gateway ID retrieved in step 2 of the previous section.
7. **Username**- Input your CMT Edge username used for logging into the application, outlined previously in step 3.
8. **Password**- Input your CMT Edge password used for logging into the application, outlined previously in step 4.

Click "Next" once all information has been input. Click "Apply" in the following "Edit Configuration" page of the connection. This will direct the user back to the Connectivity page. Once complete, Devices and Sensors will begin populating within the Connectivity module and observations will begin streaming from CMT Edge.

Manual Data Import Options

There are a couple of options available to users to house manually imported data collected by manual readings or sensors not connected to the iTwin IoT cloud. This section of articles will review those options.

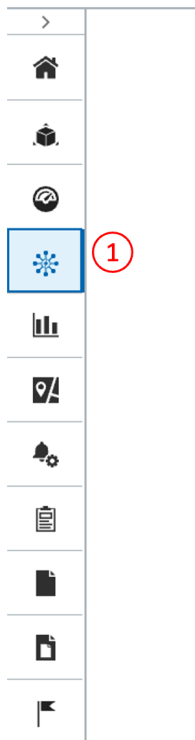
Import Device

The Import Device allows users to emulate a number of sensor types available within iTwin IoT. These sensors include Load Cell, Position, Position (ENH), Temperature, Tilt Biaxial, and Vibrating Wire. Follow this link for instructions about setting up an Import Device.

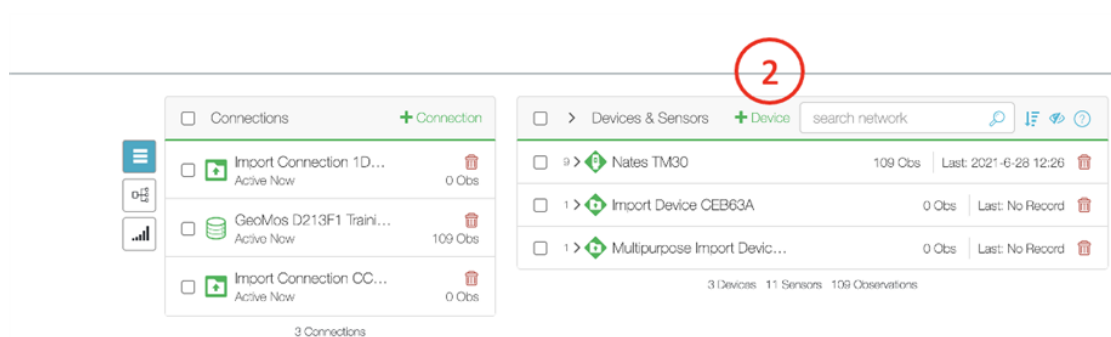
Adding the Import Device

This section of the article will guide the user in adding the Import Device to an Asset.

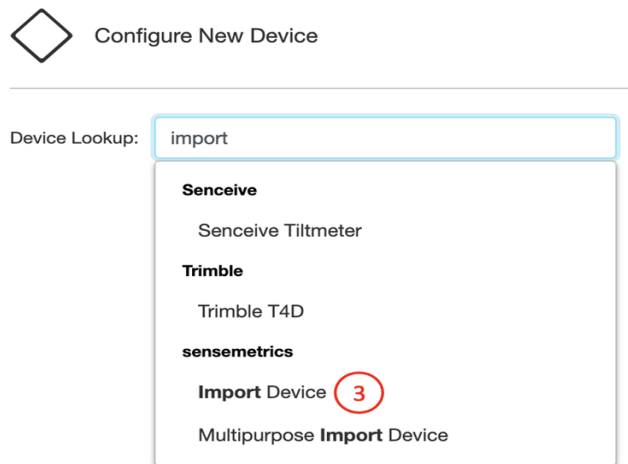
1. Navigate to the Connectivity Module.



2. Click the "+Device" icon.



3. Within the Device Lookup window, begin typing "Import Device". When the dropdown options begin to populate, select "Import Device".



4. A Connection selection dropdown will appear on the next page. If no previous Import Connections have been made, the user will be required to "Create New", and a new Import Connection will be made. Previously created Import Connections can also be selected, which can aid in Import Device management if multiple Import Devices are being utilized in the asset.



Configure New Device

Device Lookup:

Connection *

4

Create New

Import Connection 1DBD3B

Import Connection CC7769

5. Once a Connection is selected, two additional dropdowns will appear. The first dropdown allows the user to select which type of sensor the Import Device will emulate.
6. Next the user can select the number sensors of the selected emulation type that they would like to create.



Configure New Device

Device Lookup:

Connection *

Sensor Type To Emulate *

5

Number of Sensors *

6


7

7. Once configuration is complete, click "Next" to save those selections.
8. The user will then be directed to the Device "Edit Configuration" page, where items like Device Name, Location, etc. can be configured.
9. Click "Apply" to finish the configuration.

Details

Edit Configuration

Revision Management

 Import Device 754B9F

Connection *

Import Connection B0E3C6

Sensor Type To Emulate *

Temperature

Number of Sensors *

1

Location Sensor

Select...

Device ID

/man/B0E3C6/node/man/754B9F/device

Device Name *

Import Device 754B9F

Location

Latitude

Longitude

Elevation (m)

Notes

Cancel

Apply

The configured sensor or sensors will then be displayed under the device, as highlighted below.

Connections	Devices & Sensors
<div><div>Import Connection 1D...</div><div>Active Now</div><div>0 Obs</div></div> <div><div>Import Connection B0...</div><div>Active Now</div><div>0 Obs</div></div> <div><div>GeoMos D213F1 Traini...</div><div>Active Now</div><div>109 Obs</div></div> <div><div>Import Connection CC...</div><div>Active Now</div><div>0 Obs</div></div>	<div><div>Nates TM30</div><div>109 Obs</div><div>Last: 2021-6-28 12:26</div></div> <div><div>1 > Import Device CEB63A</div><div>0 Obs</div><div>Last: No Record</div></div> <div><div>1 > Multipurpose Import Device FE08A1</div><div>0 Obs</div><div>Last: No Record</div></div> <div><div>Import Device 754B9F</div><div>0 Obs</div><div>Last: No Record</div></div> <div><div>1 > Import Device 754B9F-01</div><div>0 Obs</div><div>Last: No Record</div></div>
4 Connections	4 Devices 12 Sensors 109 Observations

Importing Data to the Import Sensor

Now that the Import Sensor has been created, data in .csv format can be imported into the sensor.

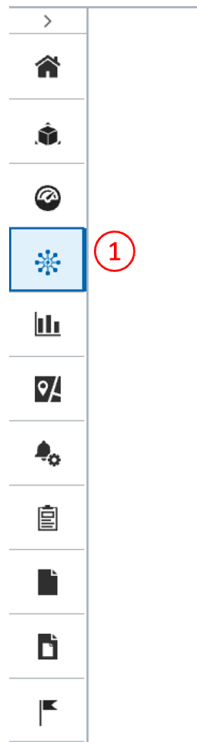
Multi-Purpose Import Device

The Multi-Purpose Import Device allows users to create a sensor or sensors and then select a data metric and metric unit that each sensor will store data for in iTwin IoT. Available metrics include Deposition, Depth, Depth to H2O, Distance 1D, Electrical Conductivity, Elevation, Elevation H2O, Force, Height, Δ Distance 1D, Oxidation-Reduction Potential, Precipitation, Pressure, pH, Humidity, Temperature, Tilt X, Tilt Y, Turbidity, Voltage, Volume, and Volumetric Flow Rate. Follow this link for instructions about setting up a Multi-Purpose Import Device.

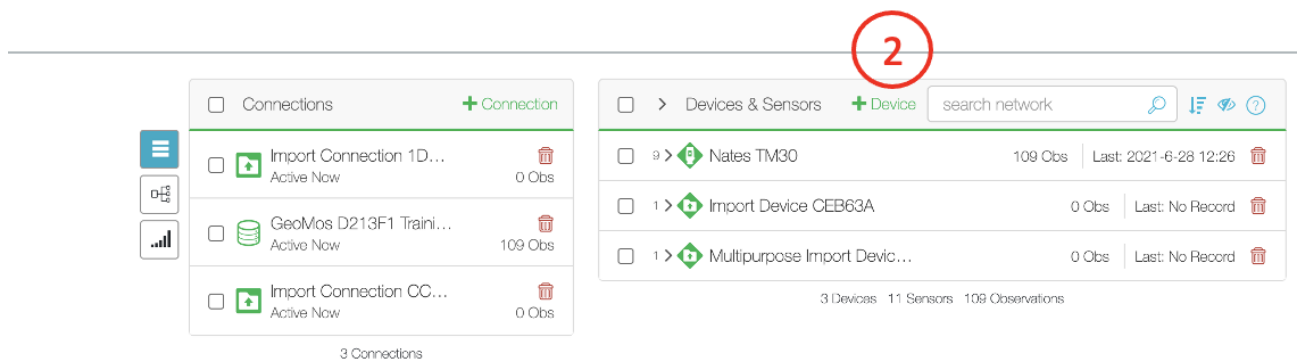
Adding the Multi-Purpose Import Device

This section of the article will guide the user in adding the Import Device to an Asset.

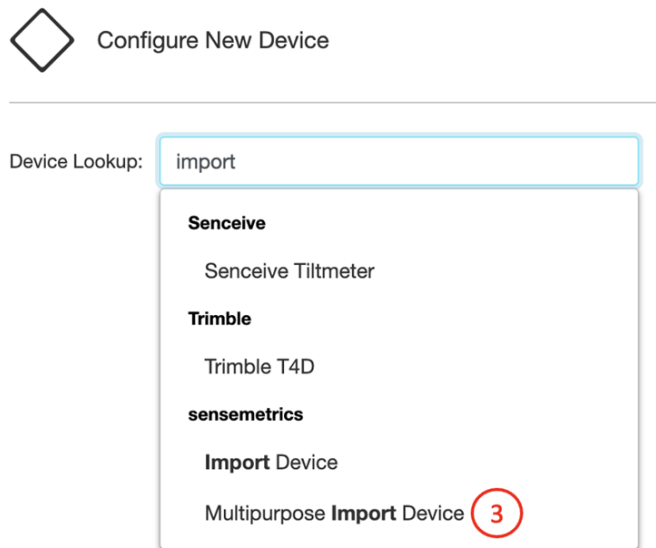
1. Navigate to the Connectivity Module.



2. Click the "+Device" icon.



3. Within the Device Lookup window, begin typing "Import Device". When the dropdown options begin to populate, select "Multi-Purpose Import Device".



4. A Connection selection dropdown will appear on the next page. If no previous Import Connections have been made, the user will be required to "Create New", and a new Import Connection will be made. Previously created Import Connections can also be selected, which can aid in Import Device management if multiple Import Devices are being utilized in the asset.



Configure New Device

Device Lookup:

Multipurpose Import Device

Connection *

Select...

4

Create New

Import Connection 1DBD3B

Import Connection CC7769

Import Connection B0E3C6

5. Once a Connection is selected, the user can select the number of sensors that they would like to create to be housed under the Device. Sensor metric configuration is completed at the sensor level, so sensors with different metric configurations can be added under the same device. Click "Next" when the sensor number selection is complete.



Configure New Device

Device Lookup:

Multipurpose Import Device

Connection *

Create New

Number of Sensors *

5

Cancel

Next

6. The user will be directed to the Device "Edit Configuration" page, where the user can configure the Device items like Device Name, Location, etc. Click "Apply" when finished configuring the Device.

Multipurpose Import Device 930A8C

Details
Edit Configuration
Revision Management

Connection *
Import Connection 4BCC1C

Number of Sensors *
1

Device ID
/man/4BCC1C/node/man/930A8C/device

Device Name *
Multipurpose Import Device 930A8C

Location
Latitude
Longitude
Elevation (m)

Notes

Cancel Apply **6**

The user will be navigated back to the main Connectivity Module page. The newly configured Multi-Purpose Import Device and its associated sensor/sensors will be visible under the Devices & Sensors portion of the Connectivity page.




<input type="checkbox"/>	▼ Multipurpose Import Device 930A8C	0 Obs	Last: No Record	
<input type="checkbox"/>	Multipurpose Import Device 930A8C-01	0 Obs	Last: No Record	

5 Devices 13 Sensors 109 Observations

Configuring the Multi-Purpose Import Device Sensors

Once the Multi-Purpose Import sensor is visible on the Connectivity page, it can be configured for the desired metric and unit.

1. Click on the sensor to be configured

<input type="checkbox"/>	▼	 Multipurpose Import Device 930A8C	0 Obs	Last: No Record	
<input type="checkbox"/>		 Multipurpose Import Device 930A8C-01	0 Obs	Last: No Record	

5 Devices 13 Sensors 109 Observations

2. Navigate from the "Details" page to the "Edit Configuration" page of the sensor.
3. The "Metric" dropdown allows the user to select the type of data that will be imported.
4. The "Unit" dropdown will provide the user with measurement metrics that are being imported.


The sensor name, location, etc. can also be configured on this page. Click "Apply" at the bottom of the page to save all configurations.

Details

2

Edit Configuration

Revision Management

 Multipurpose Import Device 930A8C-01

Metric

3

Deposition

Unit

4

m

Sensor ID

/man/4BCC1C/node/man/930A8C/device/man1/sensi

Sensor Name *

Multipurpose Import Device 930A8C-01

Device ID

/man/4BCC1C/node/man/930A8C/device

Serial Number

Location

Latitude

°

Longitude

°

Elevation

(m)


Notes

2

Details

Edit Configuration

Revision Management

 Multipurpose Import Device 930A8C-01

Metric3

Unit4

Sensor ID

/man/4BCC1C/node/man/930A8C/device/man1/sensi

Sensor Name *

Multipurpose Import Device 930A8C-01

Device ID

/man/4BCC1C/node/man/930A8C/device

Serial Number

Location

Latitude

°

Longitude

°

Elevation

(m) ▾

Notes

Importing Data to the Import Sensor

Now that the Multi-Purpose Import Sensor has been created, data in .csv format can be imported into the sensor. Please ensure that the metric and unit selected in the configuration above match the metrics and units of the data being imported.

Environmental best practices

Installation and operation

Please install Worldsensing products in an energy-efficient manner by minimizing power usage for computers, mobile phones or other devices needed for setup and configuration. Minimize the use of small components needed for installation, like mounting brackets and other connection materials. Avoid using toxic materials and/or hazardous substances.

- Set the sampling rate only in the nodes you need.
- When configuring the nodes, use "Set last configuration" whenever possible.
- Remove the batteries if you are not using the node.
- For nodes with switch, use the usb mode when not in operation.

Return Material Authorization (RMA)

In the event of requesting a Return Material Authorization (RMA) please make sure to use the most environmentally friendly mode of transportation possible.

Product End of Life and disposal

Please take the necessary measures to extend the life of the product and reuse it when possible.

Once the product reaches its end of life (EoL) recycling is crucial to divert material from waste streams into new applications.

Electrical and electronic devices, and batteries must be recycled according to the European Union WEEE Directive 2012/19/EU.

Please separate batteries from equipment.

This product and the batteries it may contain should not be discarded as unsorted waste. Please send them to separate collection facilities for recovery and recycling.

Product packaging

Worldsensing's product packaging is recyclable. Separate the different materials for a correct waste management.

Safety and emergency procedures

Please read the safety sheet that comes with our products before installing them. For safety information on batteries and other materials, as well as instructions in case of emergency please read the safety information available at: <https://info.worldsensing.com/safety-information/>

In the case of an emergency and after it has been managed, please evaluate the waste generated in order to dispose of it in accordance with current legislation and local regulation.

It is your responsibility to dispose of your waste equipment, batteries and packaging properly to help prevent potential negative consequences for the environment and human health.

The cost of environmental waste management is included in the battery's selling price.

By following these best practices you can help protect the environment. Thank you for your cooperation.

CONTACT WORLDSENSING

Need more support? Get in touch with our Customer Success team:

Email: support@worldsensing.com

Phone: +34 93 418 05 85 (08.30h - 16.30h UTC)

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