

EnOcean Serial Tunnel for Cisco AP

REVISION HISTORY

Version	Author	Reviewer	Date	Major Changes
1.0	Ilhem Brayek	OS/CS	09.2022	

Additional helpful information:

<https://bitbucket.org/enOcean-cloud/wss-tunnel-upload/src/master/>
<https://developer.cisco.com/docs/app-hosting-ap/#!deploy-iox-application-on-ap-using-ioxclient>
<https://iotconnector-docs.readthedocs.io/en/latest/>

Important!

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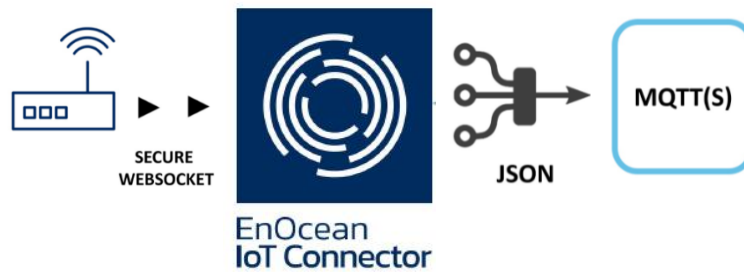
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1. ENOCEAN IOT CONNECTOR

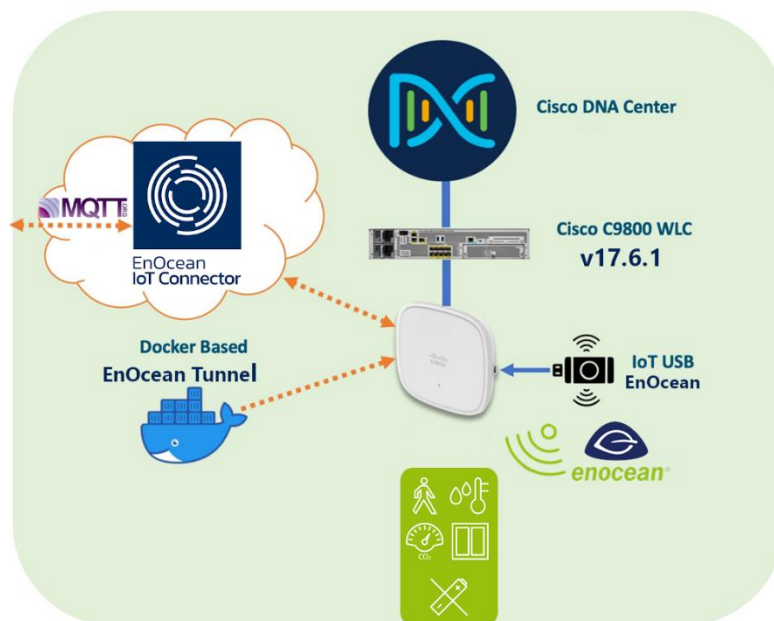
The EnOcean IoT Connector (IoTC):

- Is a software.
- Is available as a Docker container image.
- Transforms EnOcean IoT Data (EEPs) and sensor health into a standardized format- "key-Value pairs" in JSON.

The EnOcean IoT Connector (IoTC) allows for the easy processing of the super-optimized EnOcean radio telegrams.



2. ENOCEAN SERIAL TUNNEL FOR CISCO AP



EnOcean Serial Tunnel for Cisco AP

The EnOcean Serial Tunnel Application is an docker based IOx application for Cisco Catalyst 9100 Series AP. It receives EnOcean sub-gigahertz radio telegrams coming from the EnOcean USB Transceiver and forwards those unprocessed to a given destination where further data processing is executed. The data egress is EnOcean IoT Connector.

For more details please consult <https://bitbucket.org/enOcean-cloud/wss-tunnel-upload/src/master/>

3. PREREQUISITES

3.1. Before deployment

- Correct Cisco Setup: Cisco AP must be joined to a Cisco Wireless LAN Controller WLC (Catalyst 9800 with minimum version 17.6.1). A detailed description will follow in the next section.
- You must be able to deploy IOx application on the AP
- EnOcean USB Transceiver like EnOcean USB 300
- The used Switch/Power Injector must be compatible with PoE standard 802.3at otherwise the USB ports will not be powered on
- Other required components (console cable, Terminal Viewer to console into the AP e.g. [Mobaxterm](#))

4. HOW TO JOIN WLC

It is recommended to perform a factory reset before trying to join the WLC.

How to reset the Cisco AP to the default settings:

- Plug the console cable
- unplug the network/power (PoE) cable
- Press and hold the Mode button (located next to the console port)
- Plug the power back into the AP and keep pressing the mode button more than 20 seconds
- The AP will now clear all its configuration and restart. This may take a while.

Now after the Cisco AP has rebooted :

- Press "Enter" on the console
- You will be prompted for credentials.
The factory user and password: `cisco` and `Cisco`
- Type `en` to enable the AP (short for `enable`)
- You will be prompted again for the password: `Cisco`
- Type the command to join the WLC: `capwap ap primary-base WLC_NAME WLC_IP` where `WLC_NAME` is for example the Name of WLC at EnOcean Lab and `WLC_IP` is the public ip of EnOcean Lab. (if you are interested in getting the necessary information to join the WLC at EnOcean Lab, please contact [EnOcean Support](#))
- The Cisco AP will try to join the EnOcean Cisco WLC in the Cisco Lab – you can monitor the joining process via Console.
- The following will be passed on to the access point (the factory defaults will be overridden when joining completes)
 - SSH will be enabled
 - App host will be enabled

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- Local access will be enabled
 - NTP server will be set
 - New Credentials will be set. Please contact [EnOcean Support](#) for more information.
- The joining process is complete when the AP shows a steady green light on its LED.

5. CONNECT THE ENOCEAN USB TRANSCEIVER

The Cisco APs need to enable the inserted EnOcean USB Transceiver for operation. Please check with your IT administrator or Cisco Support how to enable the EnOcean USB Transceivers on your Catalyst APs.

The Cisco Catalyst 9800 Controller version min 17.6.1 or higher needs to be present for automatic EnOcean USB Transceiver operation. You can run **show version** command to find the actual version.

All EnOcean USB Transceiver e.g. EnOcean USB 300 use the same FTDI driver and USB PID/VID.

```
Product ID       : 6001
Vendor ID       : 403
Manufacturer    : EnOcean GmbH
Description     : ftdi_sio.ko
```

To confirm if the USB is successfully loaded into your APs you can check by running in your AP shell the **show usb list** command.

```
CiscoAP#show usb list
PID/VID/VER : Module
...
403/6001/600 : ftdi-sio
...
```

If the USB is not listed check with your administrator or Cisco support before you continue.

6. DEPLOY AND CONFIGURE THE APPLICATION

First the application needs to be deployed, afterwards it is configured and then restarted.

6.1. Deployment

You can download The EnOcean Serial Tunnel docker based IOx application [here](#).

In the download section, you find the tar file which contains the application. The json file is used only for activation when using IOxClient.

There are two ways to deploy a docker based IOx application:

- Using the Cisco DNA Center, you find the necessary steps [here](#)
- Using the IOxClient, we will provide a brief guide in the next section. For more details please refer to [complete guide](#).

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6.1.1.1. Deployment using IOxClient

IOxClient is available for download [here](#). Once downloaded you can proceed with the following steps:

- Run the executable file
- Create a profile to be used with the AP which will host the IOx application

```
root@ioxsde:~# ioxclient pr create
Active Profile : ap9105-202
Enter a name for this profile : testprofile          <<<<<<<< Name the profile
Your IOx platform's IP address[127.0.0.1] : 1.1.1.1  <<<<<<<< Enter the AP's IP address
Your IOx platform's port number[8443] :
Authorized user name[root] : admin                <<<<<<<< Enter the AP's Username
Password for admin :                               <<<<<<<< Enter the AP's Password
Local repository path on IOx platform[/software/downloads]:
URL Scheme (http/https) [https]:
API Prefix[/iox/api/v2/hosting/]:
Your IOx platform's SSH Port[2222]: 22            <<<<<<<< Change port to 22
Your RSA key, for signing packages, in PEM format[:
Your x.509 certificate in PEM format[:
Activating Profile new-profile
Saving current configuration
root@ioxsde:~#
```

- Install the IOx Application on AP

```
ioxclient --profile <profile-name> application install <package-name> <package.tar>
```

- Activate the IOx Application on AP

```
ioxclient --profile <profile-name> application activate <package-name> --payload <activation-payload-file>
```

- Start the IOx Application on AP

```
ioxclient --profile <profile-name> application start <package-name>
```

- Check IOx Application Status on AP

```
ioxclient --profile <profile-name> application list
```

6.2. Configuration

6.2.1.1. Package_config.ini file preparation

Prepare the package_config-ini file

```
[tunnel]
TUNNEL_AUTH_URL=<your input>
TUNNEL_USER=<your input>
TUNNEL_PASS=<your input>
TUNNEL_CA=<your input>
```

Following parameters are mandatory:

- TUNNEL_AUTH_URL Callback URL for secure websocket authentication. The actual target URL is communication in the authentication process.

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NOTE: TUNNEL_AUTH_URL target and the data egress e.g. EnOcean IoT Connector can be located in the local network or anywhere in the cloud. No special steps between local or cloud deployment are required.

When using IoT Connector as data egress the URL needs to have the correct format with path. i.e. `https://<URL or IP>/auth/cisco`. URL or IP is the location where the IoTC is deployed.

- TUNNEL_USER Username specified for Websocket authentication.
- TUNNEL_PASS Password specified for Websocket authentication.

Following parameters are optional:

- TUNNEL_CA If using a self-signed certificate the root certificate myCA.pem must be provided for SSL verification
- Encoding certificate in base64

```
# Go to the directory containing the .pem files
# Use base64 from Ubuntu
# Windows users can use the Ubuntu Docker image to do so
docker run -it --rm -v ${PWD}:/export ubuntu:latest
cd /export
# Linux and Windows users run this command
cat myCA.pem | base64 -w 0 >> myCA.base64.txt
```

- Set TUNNEL_CA to the contents of myCA.base64.txt

6.2.1.2. Upload the package_config.ini file

To configure the deployed the application you need to upload the package_config.ini file to the application & trigger and restart to apply the new settings.

You execute the upload via the same tool chain used for the deployment:

- via Cisco DNA Center [updated](#) & [restart](#) the app to apply the new configurations.
- via IOxClient [reference](#). e.g. `ioxclient application setconfig tunnel package_config.ini & restart ioxclient application restart tunnel`.
-

6.2.1.3. Get logs files

The EnOcean Tunnel logs application activity and error states into a log file - wss-tunnel.log. The log file can be obtained by the same toolset you have used for deployment.

- via Cisco DNA Center [Downloads](#).
- via IOxClient [downloads](#) e.g. `ioxclient application logs download`.