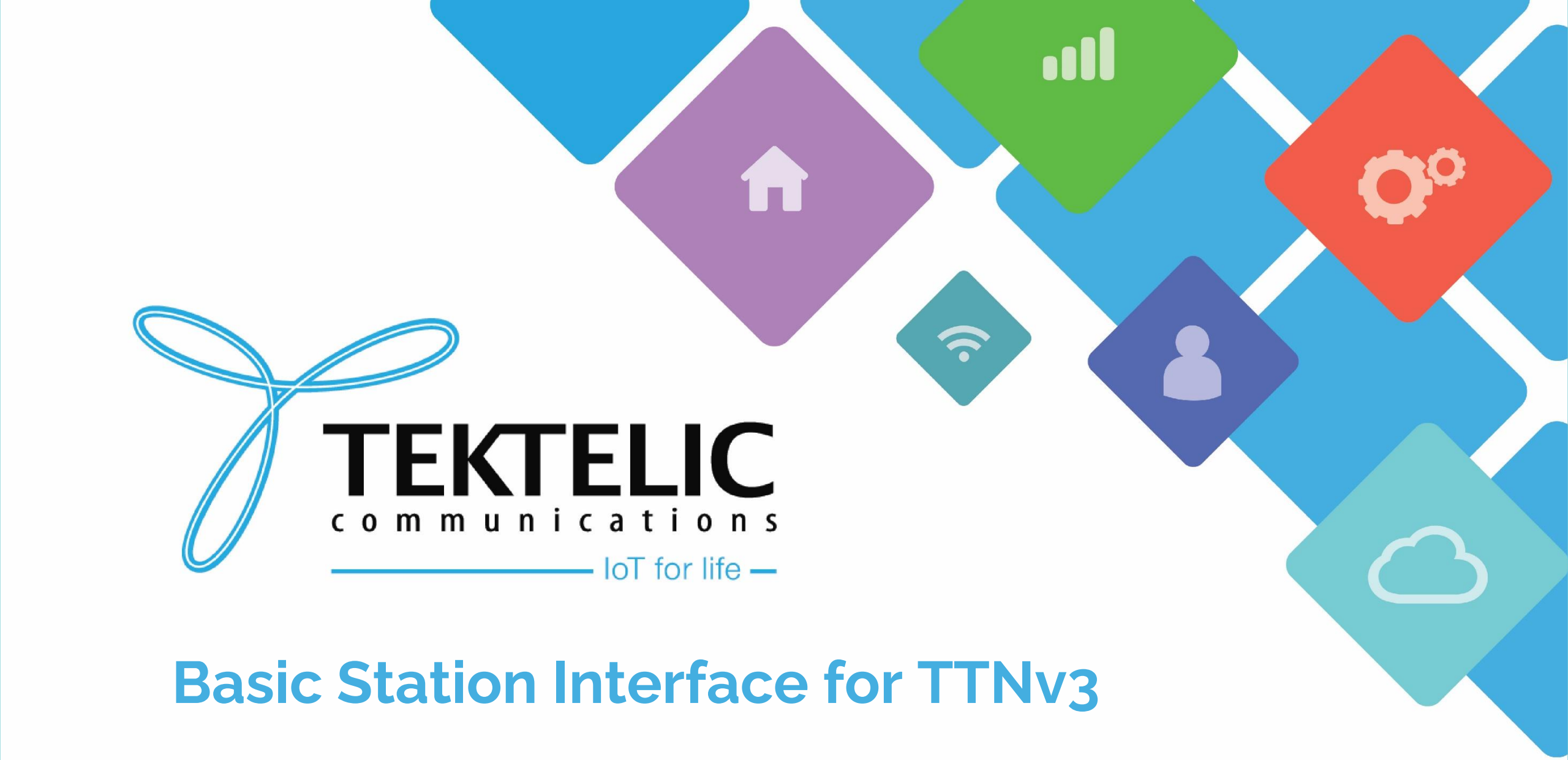

Basic Station Interface for TTNv3

Introduction

- Reference guide to install a Basic Station interface on a gateway for TTNv3

- List requirements

- High-level procedure involves five steps

1. Setup the GW with Basic Station
2. Register GW on TTNv3
3. Configure CUPS to Send LNS API Key
4. Configure files required for GW

Requirements

- Gateway with the required BSP version and Basic Station installed
- The Things Network account

Requirements (Continued)

- Installing Basic Station in a gateway with BSP older than the major+minor version of the 2021-08 system release will cause the gateway to be **CORRUPTED indefinitely.** Hence, ensure that the BSP is updated prior to installing Basic Station. The 2021-08 system releases are listed below. BSP Upgrade instructions can be found in the COMMUNITY section of the Support Portal.

Gateway	Major+Minor Version
Kona Micro	3.3.x
Kona Micro PoE	2.4.x
Kona Macro	4.3.x
Kona Mega	4.3.x
Kona Enterprise	Any version works

Table-1 BSP Version Requirements

Installing Basic Station

While there are various methods to install Basic Station on your Kona gateway, the following slides will install it with command line.

1. Login to the gateway using SSH
2. Check the current version of Basic Station if it is installed
3. Obtain Basic Station

Installing Basic Station (Continued)

1. Login to the gateway using SSH. Use the following table for the credentials:

Username	Password	Notes
root	9-Digit Serial number of the Gateway (i.e. 1618B0052)	• Applies to gateways with serial numbers that start with 21 and below.
admin	Random string of characters provided on the test report.	• Applies to gateways with serial numbers that start with 22 and above. • **Some units in this category may still have root as the user and the serial number as the default password.**

Table-2 Username and Password

2. Check the current version of Basic Station if installed
   - **opkg info tektelic-bstn | grep Status**

NOTE: If the password is not on the test report, contact Tektelic Support and provide the following:
- T-code (i.e. **T000XXYY**), Revision (i.e. **E1**), and serial number (i.e. **1212A3434**)

Installing Basic Station (Continued)

To install Basic Station, we recommend updating to the latest BSP version. The latest BSP version also includes the most up-to-date version of Basic Station. You can find instructions to update the BSP here:

- Through KonaFT
- Through the TEKTELIC KORE Network Server

Once the latest BSP update has been installed, you can install Basic Station with the following command:

- **opkg install tektelic-bstn**

Installing Basic Station (Continued)

In **/etc/default/config.json**, the following settings must be configured.

- “server_address”: “127.0.0.1”,

The following setting **MUST** be added under the **“gateway-conf” section**.

- “report_count”: 1,

NOTE: Customers with a US Micro/Enterprise gateway will need a config.json file configured for the 2nd sub-band of frequencies in US915. You can acquire that here:

(Knowledge Base -> Support -> Basic Station -> Basic Station Interface for TTNv3)

Installing Basic Station (Continued)

If the MQTT bridge is installed, please configure it as follows:

- Insert a “#” in front of the following lines:
  - **“ns_host”** in **“mqtt-bridge.conf”** on gateways **older than 3.3.X** for Micro, 4.3.X for Macro/Mega
  - **“url”** in **“tektelic-bridge.ns.toml”** on gateways **newer than 3.3.0** for Micro, 4.3.X for Macro/Mega
- Remove the “#” in front of the following lines:
  - **“oam_host”** in **“mqtt-bridge.conf”** on gateways **older than 3.3.X** for Micro, 4.3.X for Macro/Mega
  - **“url”** in **“tektelic-bridge.oam.toml”** on gateways **newer than 3.3.0** for Micro, 4.3.X for Macro/Mega
- Once the changes have been made, restart the MQTT bridge with the following command:
  - **/etc/init.d/mqtt-bridge restart**

Register gateway on TTNv3

Login to TTNv3 Network Server with a web browser:

a) If using **The Things Stack Community Edition**:

i. https://eu1.cloud.thethings.network/ - For EU based Customers

ii. https://nam1.cloud.thethings.network/ - For NA Based Customers

iii. https://au1.cloud.thethings.network/ - For AU Based Customers

b) If using **The Things Stack Cloud**:

a) Use the URL for your organization. More information can be found here.

Register gateway on TTNv3 (Continued)

1. Navigate to the **Gateways** page and select **Register gateway** button.
2. Enter the **Gateway EUI**
3. Enter the Gateway ID, Gateway Name and appropriate Frequency plan for your region (used by TTN).
4. Check the option **'Require authenticated connection'** to onboard the gateway via LoRa Basic Station (BSTN).
5. Then, check the following options:
    1. Generate API Key for CUPS
    2. Generate API Key for LNS
6. Uncheck the options, as this will enable the GW to be public:
    1. Share status within network
    2. Share location within network
7. Finalize by selecting **Register gateway**.
8. You will get a prompt to download the API Keys. Please make sure to download them and store them as you will not be able to retrieve them again.

Register gateway on TTNv3 (Continued)

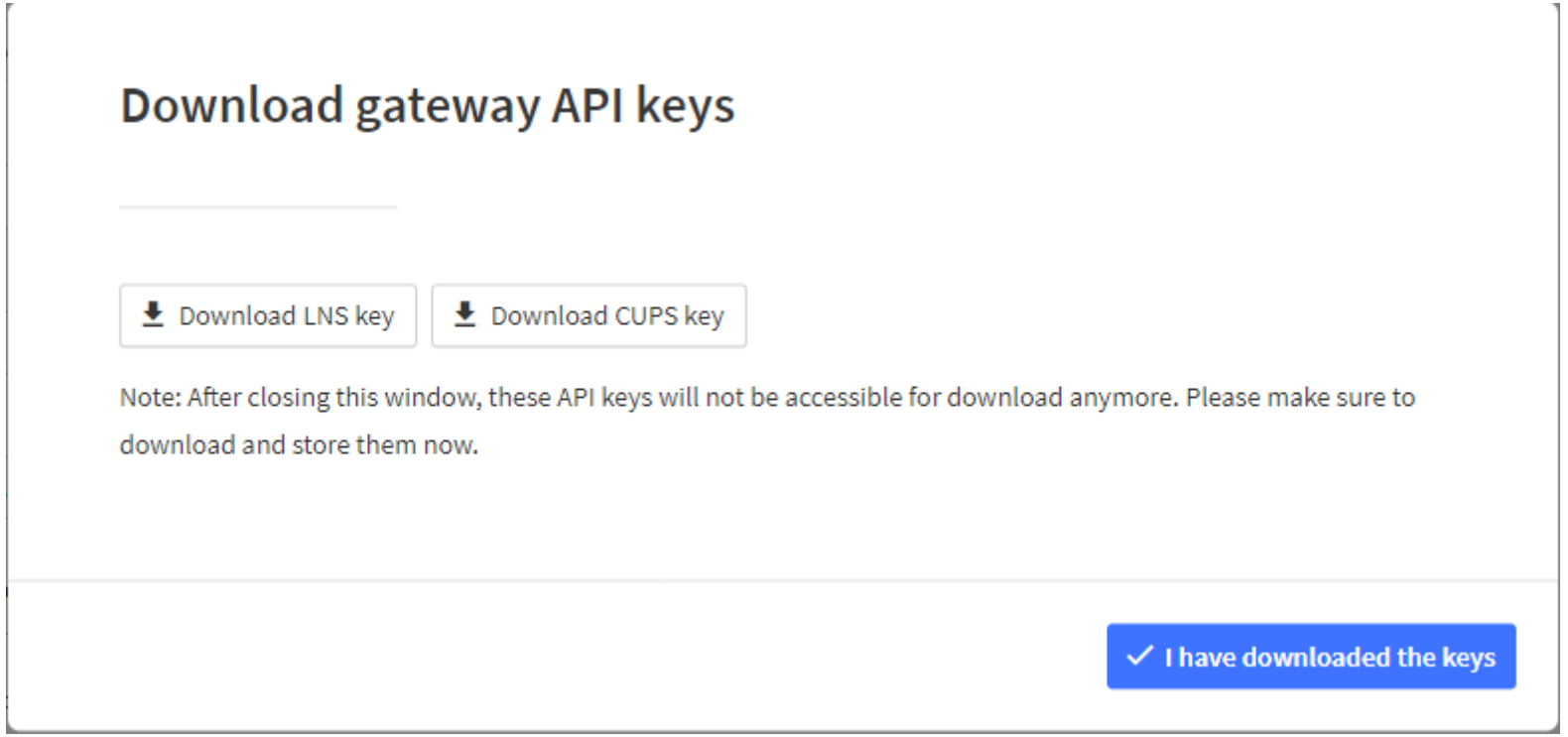

Figure-1 API key prompt

Register gateway on TTNv3 (Continued)

The LNS key that you downloaded is automatically copied to the below field on TTN Console under General Settings tab as shown below:

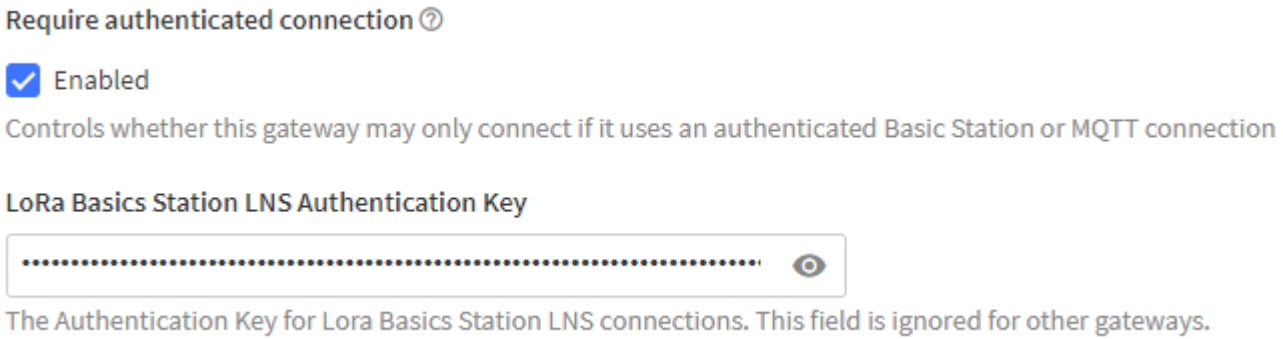

Figure-2 LNS Authentication Key

Register gateway on TTNv3 (Continued)

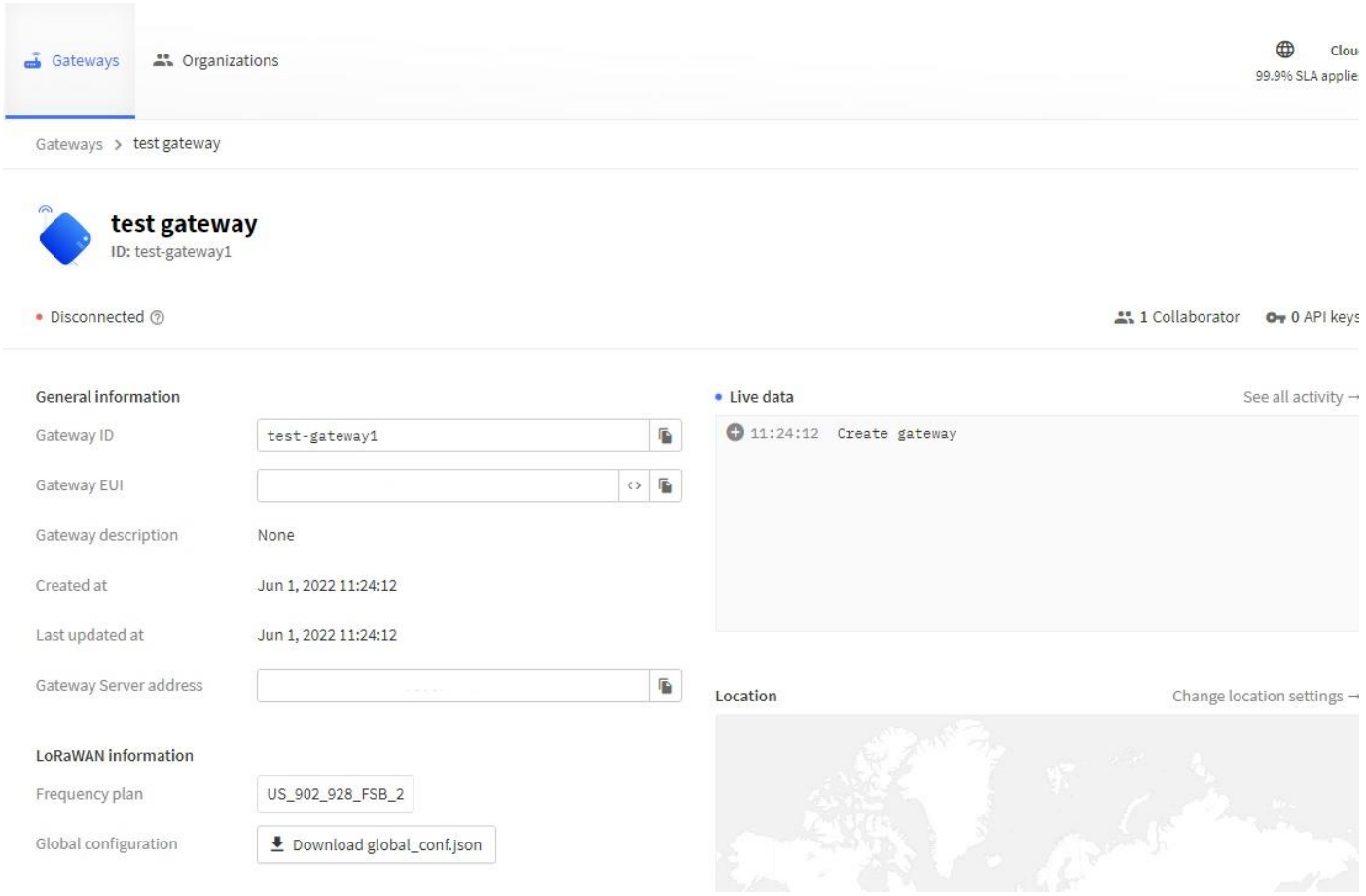

Figure-3 Registered Gateway

Generating Required Files

The following files (keys and certificates) are used by the gateway to connect to TTNv3.

Note: The below 6 certificates can be generated anywhere as long as the files are all in one place and you have sufficient permissions to modify them. At the end of this guide, these 6 files **must** be found in **/etc/bstn** depending on how you configure the GW.

- **tc.uri**
- **tc.trust**
- **tc.key**
- **cups.uri**
- **cups.trust**
- **cups.key**

Generating Required Files (Continued)

The TEKTELIC Basic Station Interface for TTNv3 uses two protocols: LNS and CUPS. The LNS protocol is only required for sending and receiving LoRaWAN data with Basic Station whereas CUPS is not. **For the simplest configuration, we recommend generating ONLY CUPS files.**

By default, CUPS is **enabled** on the GW. Configuring CUPS will automatically retrieve and configure LNS credentials, automatically generating the **tc.key**, **tc.trust**, and **tc.uri** files. If you wish, you can configure the gateway to only use LNS. Further details will be provided in the following slide.

Please see the following table for the files you will need to generate:

CUPS only	LNS only
cups.uri	tc.uri
cups.trust	tc.trust
cups.key	tc.key

Table-3 Required files

Generating Required Files (Continued)

To configure the GW to only use the LNS protocol, additional configuration is required. Please make the following change to the file:

- **/etc/default/bstn.toml**
- Change the field **“skip_cups”** to **true.**
  - **skip_cups: true,**

Once configured, proceed with generating the rest of the required files:

- **tc.uri**
- **tc.trust**
- **tc.key**

cups.uri (LNS Server Address)

The server address is the network endpoint of The Things Stack LNS. It is a combination of the **protocol (https)**, the **server address**, and the **port**.

To generate a **cups.uri** file, run the command below.

Note: For the following command, replace server-address with your TTNv3 Network Server URL.

- **echo "https://*replace-with-server-address*:443" > cups.uri**

The *replace-with-server-address* has to be replaced with the Gateway Server address on TTN console as shown below:

cups.trust (CUPS Trust)

To create a **cups.trust** file, download the complete certificate list (.pem) with the following command:

- **curl https://curl.haxx.se/ca/cacert.pem --output cups.trust -L**

cups.key (CUPS Key)

The following commands will generate a **cups.key** file.

NOTE: Replace your-cups-api-key with the CUPS API key that you download when you registered the GW. Do not include 'Authorization: Bearer '. Only copy the highlighted in the example shown below.

- **CUPS_KEY="your-cups-api-key"**
- **echo "Authorization: Bearer $CUPS_KEY" | perl -p -e 's/\r\n|\n|\r/\r\n/g' > cups.key**

Example cups.key: Authorization: Bearer **NNSXS.XXXXXXXXXXXXXXXXXX.XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**

CUPS_KEY="**NNSXS.XXXXXXXXXXXXXXXXXX.XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX** "

tc.uri (LNS Server Address)

- This file should contain the LNS Server Address: **wss://<server-address>:8887**

- The server address is the network endpoint of The Things Stack LNS. It is a combination of the **protocol (wss)**, the **server address**, and the **port.** To create this file, run the following command:
- **echo "wss://*replace-with-server-address*:8887" > tc.uri**

The *replace-with-server-address* has to be replaced with the Gateway Server address on TTN console as shown below:

tc.trust (LNS Trust)

To create a **tc.trust** file, download the complete certificate list (.pem) with the following command:

- **curl https://curl.haxx.se/ca/cacert.pem --output tc.trust -L**

tc.key (LNS Key)

The following commands will generate a **tc.key** file.

NOTE: Replace your-lns-api-key with the LNS API key that you download when you registered the GW. Do not include 'Authorization: '. Only copy the highlighted in the example shown below.

- **LNS_KEY="your-lns-api-key"**
- **echo "Authorization: Bearer $LNS_KEY" | perl -p -e 's/\r\n|\n|\r/\r\n/g' > tc.key**

Example tc.key: Authorization: Bearer **NNSXS.XXXXXXXXXXXXXXXXXX.XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**

LNS_KEY="**NNSXS.XXXXXXXXXXXXXXXXXX.XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX** "

Configuring Required Files

Once the required files are generated, they will need to be placed in the following folder: **/etc/bstn/**

Gateways that require admin credentials will need to input a few more commands to configure the files. See next slide for further details.

Configuring Required Files (Continued)

If the required files were generated outside of the gateway, please upload them to the following directories:

- Gateways with ***root credentials:*** **/etc/bstn/**
- Gateways with ***admin credentials:*** **/home/admin/**

For gateways with ***root credentials,*** proceed to the next slide.

For gateways with ***admin credentials,*** run the following commands and then proceed to the next slide:

- **sudo chown root:root /home/admin/***
- **sudo mv /home/admin/* /etc/bstn/**

NOTE: These commands will change ownership of *any* miscellaneous visible files within the home folder. If you do not want this, please create a new directory for the required files, modify and run the above commands.

Restart Packet Forwarder and BSTN Bridge

Restart both Basic Station and the Packet Forwarder to finish the process:

- **/etc/init.d/tektelic-bstn restart**
- **/etc/init.d/pkt_fwd restart**

The gateway will now come online on the TTN console.

Logs for troubleshooting can be found in the directory:

- **/var/log/bstn.log**
- **/var/lib/logs/bstn.<number>.gz** – for past rotated logs

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