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Loriot Lorawan server

- **Basic setup** of Lorawan network infrastructure using the solution of commercial Lorawan service provider: Lorient.
- It is possible to create a **free account** and use a predefined **sample network** for Lorawan network integration following the given free network capacity and feature limitations (one network with up to 10 devices).

1. Create Loriot account, Chrome browser is recommended

<https://eu1.loriot.io>

2. Power the P-NUCLEO-LRWAN2 gateway using shield USB socket

3. With a second USB cable, configure the gateway using on-board ST-Link USB VCP (115200,8,N,1):

- Server address and ports: **AT+PKTFWD=eu1.loriot.io,1780,1780**
- Option: To reset DHCP use: **AT+FDEFAULT**



See UM2587 for P-NUCLEO-LRWAN2 details

https://www.st.com/resource/en/user_manual/dm00620948-getting-started-with-the-pnucleolrwan2-and-pnucleolrwan3-starter-packs-stmicroelectronics.pdf

4. Connect the gateway to the internet using P-NUCLEO-LRWAN2 Ethernet connector

5. Go to <https://eu1.loriot.io>
6. Add a gateway to the network

What is your base platform?



Packet Forwarder STM

Choose a different base platform

MAC address of eth0 interface

The MAC Address of the Ethernet port can be queried by running

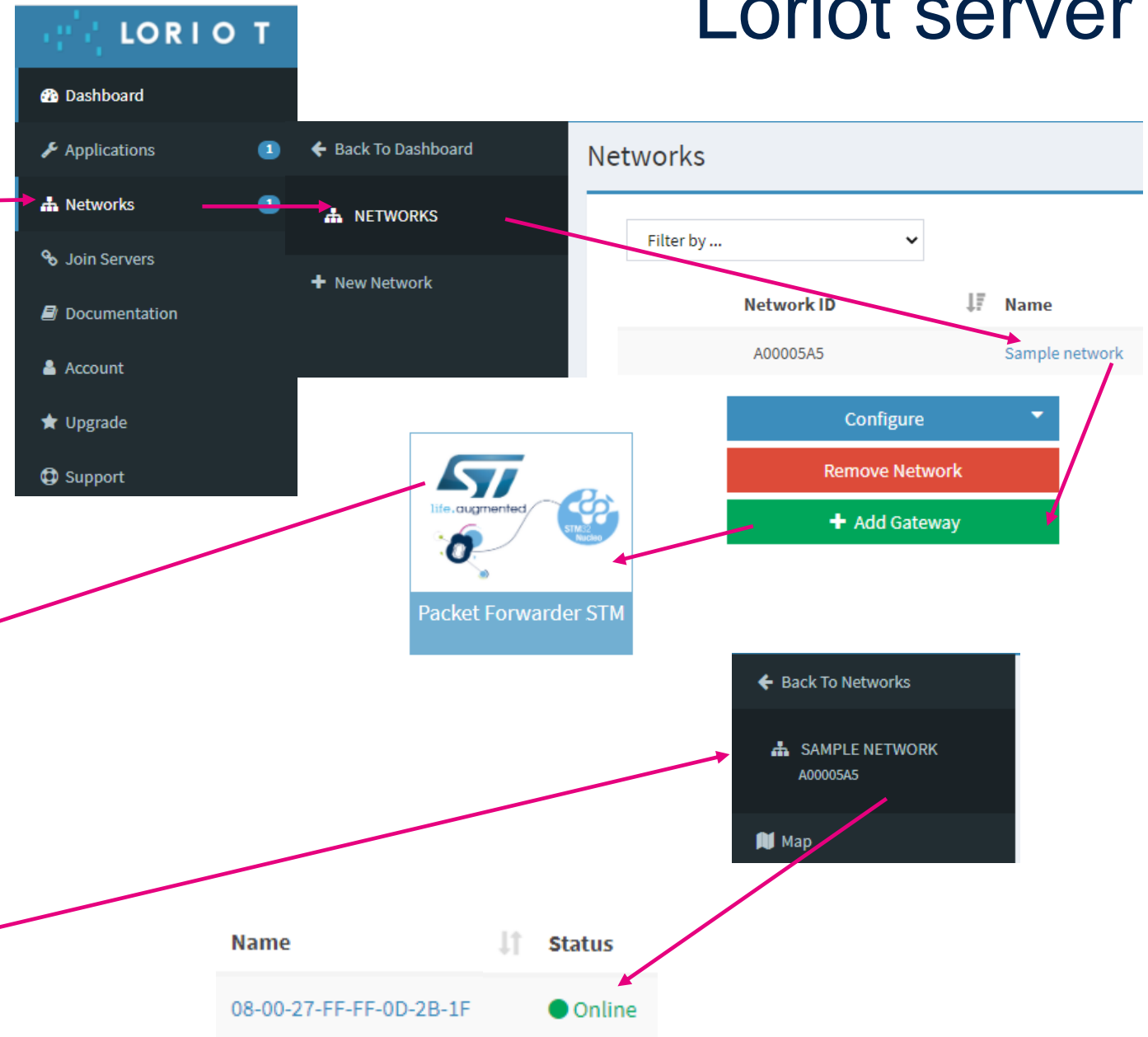
```
ifconfig eth0 | grep Hwaddr
```

command from your device's console. A sample output will be similar to

```
eth0 Link encap:Ethernet Hwaddr AB:CD:EF:12:34:56
```

Copy and paste the highlighted part (six octets separated by colons) from the output of your device console to the input field below

eth0 MAC address



The screenshot shows the Loriot server interface. The 'Networks' section is active, displaying a table with the following data:

Network ID	Name
A00005A5	Sample network

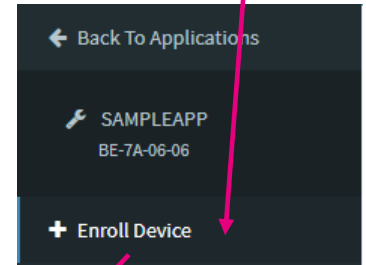
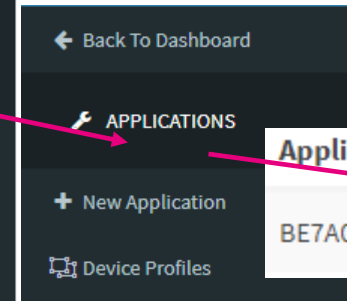
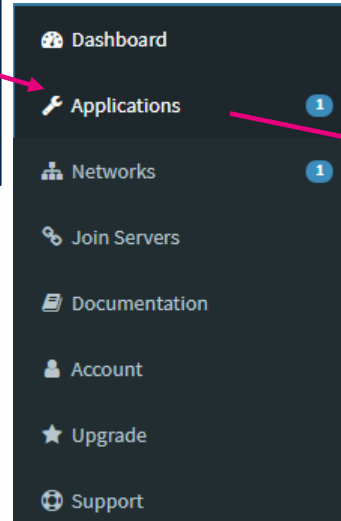
Below the table, there are three buttons: 'Configure', 'Remove Network', and '+ Add Gateway'. The '+ Add Gateway' button is highlighted. To the left, the 'Packet Forwarder STM' card is visible, showing the ST life.augmented logo and the STM32 Nucleo logo.

Below the 'Add Gateway' button, there is a modal window for the 'SAMPLE NETWORK' (A00005A5). It shows the 'Name' as '08-00-27-FF-FF-0D-2B-1F' and the 'Status' as 'Online'.

Loriot server

7. Use the SampleApp and Enroll Device.
Flash the Nucleo-WL board with
...\Attendee_resources\LoRaWAN_End_Node.bin and using
VCP of embedded ST-Link and terminal sw (115200,8,N,1), get
the node credentials.

```
APP_VERSION:      U1.0.0
MW_LORAWAN_VERSION: U2.2.1
MW_RADIO_VERSION:  U0.6.1
##### OTAA #####
##### AppKey:  2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### NwkKey:  2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### ABP #####
##### AppSKey: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### NwkSKey: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### DevEui:  00-80-E1-15-00-00-4D-BF
##### AppEui:  01-01-01-01-01-01-01-01
```



LoRaWAN® Version

LoRaWAN® 1.0.x

Enrollment Process

OTAA

Location

Disabled

You can define coordinates for static devices enabling this option.

Details

Title

MyNode1

Description

Device EUI

0080E11500004DBF

Application EUI

0101010101010101

Application Key

2B7E151628AED2A6ABF7158809CF4F3C

Device Profile

☐ Create Another

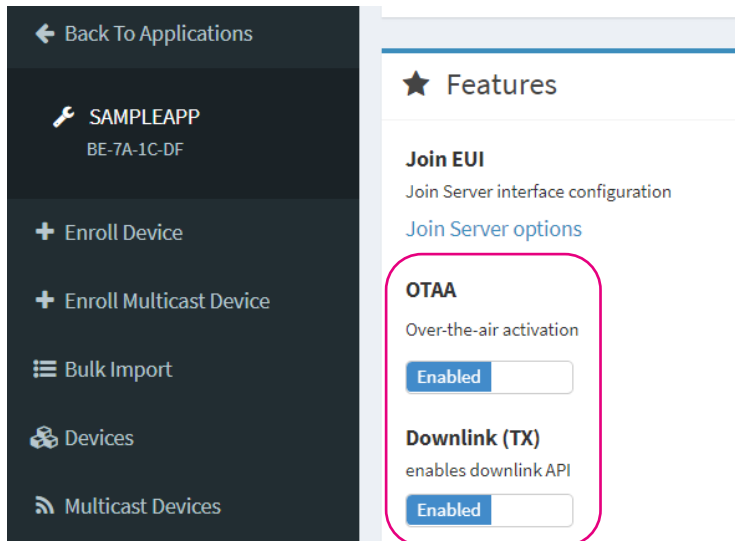
Enroll

Reset

8. In order to join the network, press the Nucleo-WL reset button and wait until the end of JOIN process, follow the red LED blinking and relevant terminal log

Loriot server

In case of JOIN FAILED, check the Sample Application in Loriot dashboard for OTAA and Downlink enabled



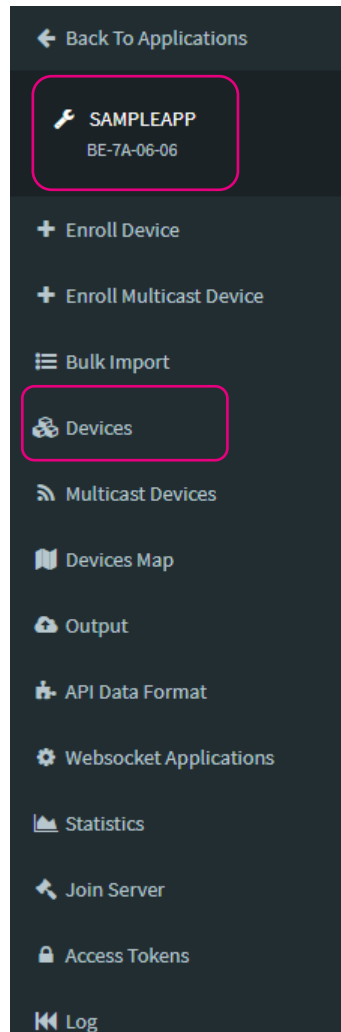
```
APP_VERSION:      U1.0.0
MW_LORAWAN_VERSION: U2.2.1
MW_RADIO_VERSION:  U0.6.1
##### OTAA #####
##### AppKey:  2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### NwkKey:  2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### ABP #####
##### AppSKey: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### NwkSKey: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
##### DevEui:  00-80-E1-15-00-00-4D-BF
##### AppEui:  01-01-01-01-01-01-01-01
0s048:TX on freq 868100000 Hz at DR 0
1s552:MAC txDone
6s574:RX_1 on freq 868100000 Hz at DR 0
6s710:PRE OK
7s247:HDR OK
8s393:MAC rxDone
##### = JOINED = OTAA =====
```

Red LED blinks here

9. Observe the uplink log & statistics on server side using SAMPLEAPP dashboard.

It is also possible to analyze the received data using Devices option

Loriot server



Last 25 frames received

Device EUI	FCntUp	Time	Port	Data
00-80-E1-15-00-00-4D-BF	23	a few seconds ago	2	32 34
00-80-E1-15-00-00-4D-BF	22	a few seconds ago	2	32 34
00-80-E1-15-00-00-4D-BF	21	a few seconds ago	2	32 34
00-80-E1-15-00-00-4D-BF	20	a minute ago	2	32 34
00-80-E1-15-00-00-4D-BF	19	a minute ago	2	32 34

Received uplink payload contains temperature ASCII characters i.e. **0x32 0x34** → **24°C**

10. Write down **Application ID**, **Access Token** and the server locale on which the account is registered – e.g. **eu1.loriot.io**

Application layer

← Back To Applications

SAMPLEAPP
BE-7A-1C-DF

+ Enroll Device

+ Enroll Multicast Device

≡ Bulk Import

Devices

Multicast Devices

Devices Map

Output

API Data Format

Websocket Applications

Statistics

Join Server

Access Tokens

Application Access Tokens

Security mechanism

To connect to any of the [application interfaces](#) provided by LOR I O T, you need to prove you are a legitimate user of the network application.

The public network is built for developers with ease of use in mind, so we don't require any complicated (but more secure) authentication mechanisms.

The only mechanism used is a security token (per-application). You will need to provide this token before any other interactions with the interface.

Note that anyone with knowledge of the token can access your data, so please keep the tokens as protected any of your passwords.

If you require a more secure authentication mechanism, please contact our [sales department](#).

Authentication Tokens

...DvOeXhZ7EAJFg==

✕ Revoke

Generate another authentication token

Click the eye to unhide the full Token

NEW! Updated token format

LOR I O T

Applications > SampleApp

← Back To Applications

SAMPLEAPP
BE-7A-1C-DF

+ Enroll Device

+ Enroll Multicast Device

≡ Bulk Import

Devices

Application / SampleApp

Details

Name
SampleApp

Application ID
BE7A1CDF

Device Used Capacity
6

11. Prepare the information in the following format (no spaces):
SERVER,AUTHORIZATION_TOKEN,APPLICATION_ID

e.g.
eu1,vnoc3w...7EAJFg==,BC...DF

12. Add a **HTTP Push** output, URL is: **http://80.211.198.155:1880/frames**
Fill the Authorization header with the information taken before

Application layer

Disclaimer:
The provided server will be available only during the workshop facilitation. The Node RED application flow can be downloaded from the server or provided on request.

← Back To Applications

SAMPLEAPP
BE-7A-1C-DF

+ Enroll Device

+ Enroll Multicast Device

≡ Bulk Import

🔗 Devices

📶 Multicast Devices

📖 Devices Map

☁ Output

🔧 API Data Format


⚙ Websocket Applications

📊 Statistics

👤 Join Server

🔒 Access Tokens

Application Output / BE7A1CDF

Output	Name	Mechanism	Type
HTTP:// HTTPS://	HTTP Push	Run your HTTP server and wait for POSTs	LORIoT.io
	WebSocket	Listen and wait	LORIoT.io

+ Add new output

***Maximum Application Output Limit Reached. Contact your administrator if you want to increase this limit.**

HTTP Push

Mechanism Run your HTTP server and wait for POSTs

How to use HTTP Push with LORIoT

Set up a HTTP server and listen for incoming POST requests from our server.

Output Configuration

Target URL for POSTs

Custom "Authorization" header value

Accept Cancel

13. Successful connection is visible in the terminal of End Node device, which is receiving the Increase/Decrease/Equalized temperature control.

```
90s072:temp= 21
90s073:TX on freq 868100000 Hz at DR 0
91s240:MAC txDone
92s261:RX_1 on freq 868100000 Hz at DR 0
92s398:PRE OK
92s934:HDR OK
93s425:MAC rxDone

##### ===== MCPS-Confirm =====
93s428:AppMsg -> INCREASE temperature.
```

Application layer

Temperature data

Device ▲	Temperature ▲
0080E1150500BE3A	21

14. Data coming to the Application layer server can be also viewed on this URL:
<http://80.211.198.155:1880/ui>

Thank you

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