Loriot Lorawan server

- **Basic setup** of Lorawan network infrastructure using the solution of commercial Lorawan service provider: Loriot.

- 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).

Loriot server

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-NUCEO-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

Loriot server

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

LORIOT

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NETWORKS

+ New Network

Networks

Filter by ...

Network ID	Name
A00005A5	Sample network

Configure

Remove Network

+ Add Gateway

Packet Forwarder STM

What is your base platform?

Radio Front-end	Packet forwarder ▼
Bus	UDP ▼

STM Nucleo Development Kit includes a gateway that impl
See the packet forwarder guide for configuration details

Packet Forwarder STM

Choose a different base platform

← Back To Networks

🔀 SAMPLE NETWORK
A00005A5

🗺 Map

MAC address of eth0 interface

The MAC Address of the Ethernet port can be queried by running
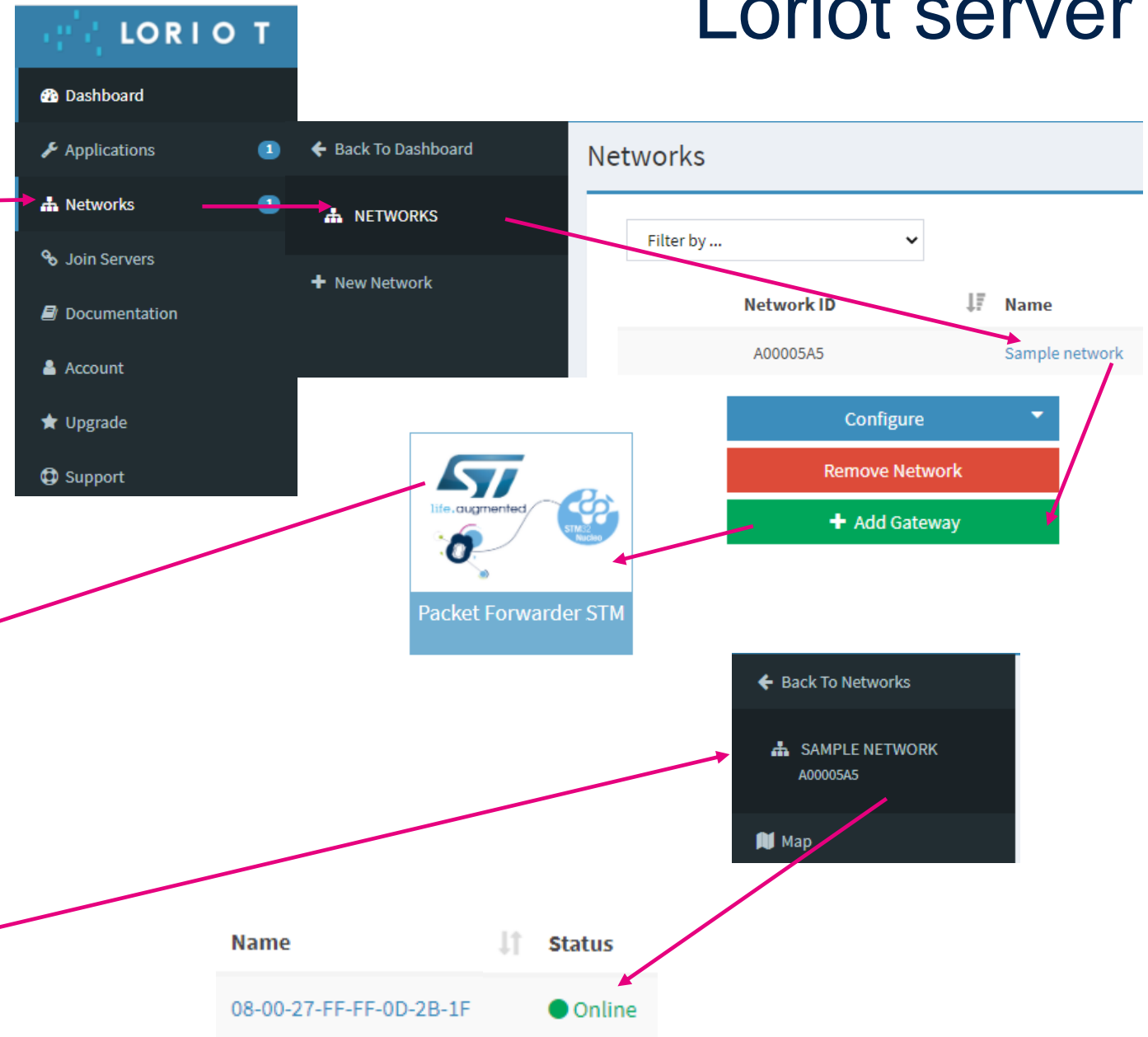
`ifconfig eth0 | grep HWaddr`

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 belo

eth0 MAC address

08:00:27:0D:2B:1F

Name	Status
08-00-27-FF-FF-0D-2B-1F	● Online

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.

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```
APP_VERSION:          V1.0.0
MW_LORAWAN_VERSION: V2.2.1
MW_RADIO_VERSION:     V0.6.1
###### 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
```

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APPLICATIONS
New Application
Device Profiles

Application ID   Name
BE7A0606   SampleApp

Back To Applications
SAMPLEAPP
BE-7A-06-06
+ Enroll Device
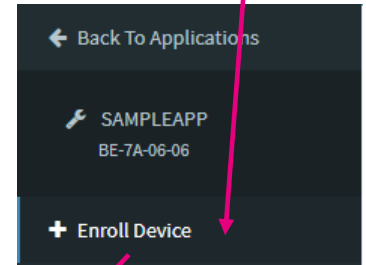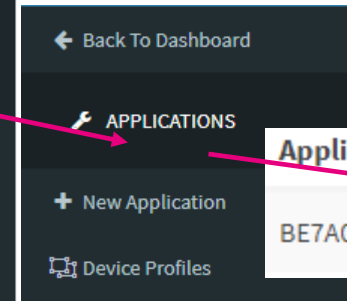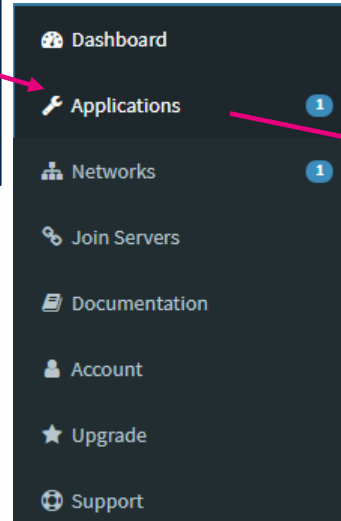
LoRaWAN® Version
LoRaWAN® 1.0.x

Enrollment Process
OTAA

Location   Disabled
You can define coordinates for static devices enabling this option.

Details

Title
MyNode1

Device EUI
0080E11500004DBF

Application EUI
0101010101010101

Application Key
2B7E151628AED2A6ABF7158809CF4F3C

Description

Device Profile

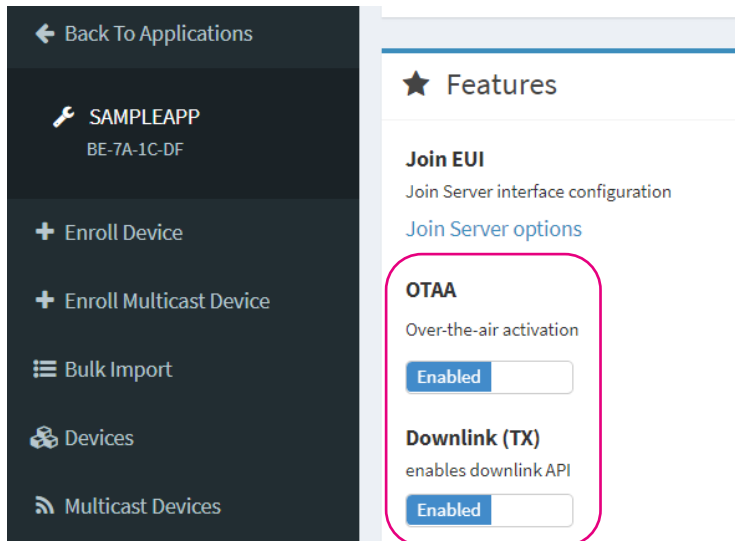life.augmented

☐ Create Another   Enroll   Reset

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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

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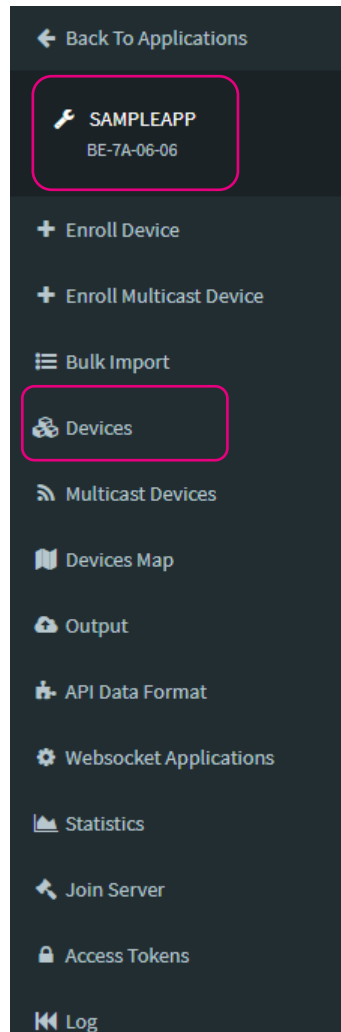


```
APP_VERSION:          V1.0.0
MW_LORAWAN_VERSION: V2.2.1
MW_RADIO_VERSION:    V0.6.1
###### OTAA ######
###### AppKey:   2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
###### NwkKey:   2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
###### ABP   ######
###### AppSKey:  2B 7E 15 16 28 AE D2 A6 AB 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

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

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

← Back To Applications				
🔧 SAMPLEAPP BE-7A-06-06				
➕ Enroll Device				
➕ Enroll Multicast Device				
☰ Bulk Import				
🗃 Devices				
🔊 Multicast Devices				
📖 Devices Map				
☁ Output				
⊹ API Data Format				
⚙ Websocket Applications				
📊 Statistics				
⚓ Join Server				
🔒 Access Tokens				
◄◄ Log				

🖨 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**

Application layer

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

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

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.

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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.
```

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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