# RAK831+Raspberry Pi3 Connect LORIOT V1.0

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# Content



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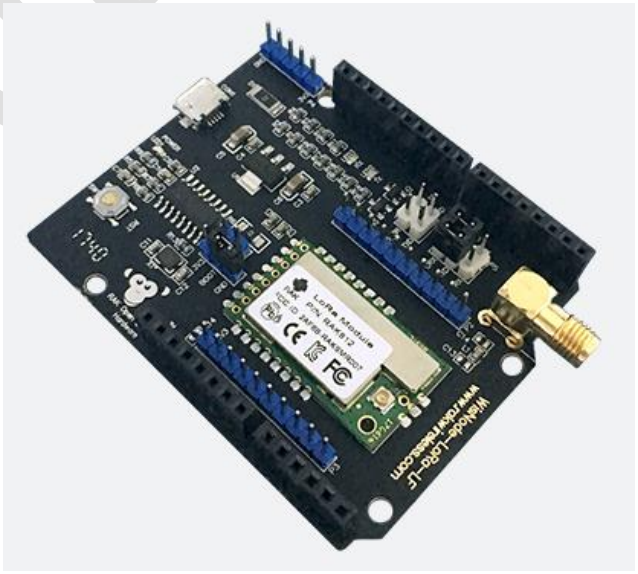
# 1. Required materials (hardware, tools)

- RAK831 LoRa Gateway board x1
- Raspberry Pi3 x1
- Converter Board x1
- Mini USB Data lines x2
- PC x1
- WisNode LoRa LF(RAK812) x1



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## 2. Introduction

This document is mainly for users of the RAK831 devices in the 433 and 470 bands. Of course, if the user wants to use the RAK831 devices in the 868 and 915 bands, Just when registering the device, the selected device name is different. The following steps will explain in detail. If you have any questions about LORIOT, please contact support@loriot.io

The LoRaWAN band described in this document is mainly EU433, and the cooperating node device is RAK812 development board WisNode LoRa LF.

This document mainly introduces users to the following points:

1. How to register for LORIOT?
2. How to use RAK831+raspberry pi3 Connects to LORIOT?
3. How to use the RAK812 to connect to a LoRaWAN gateway consisting of RAK831+ Raspberry Pi3+LORIOT?

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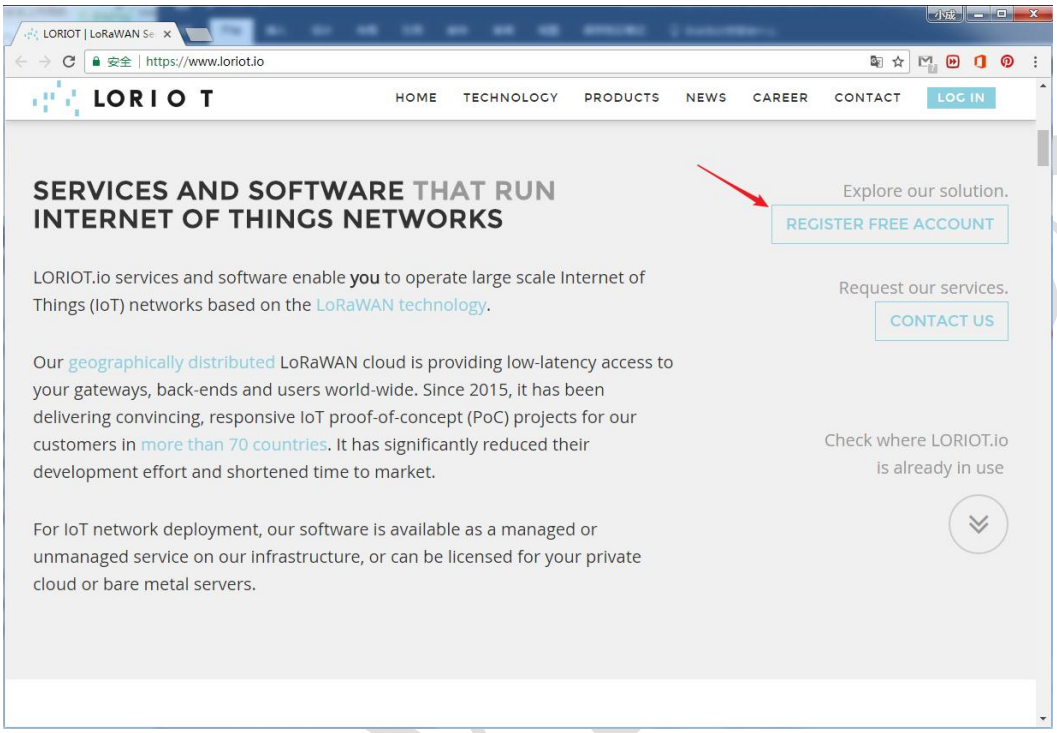
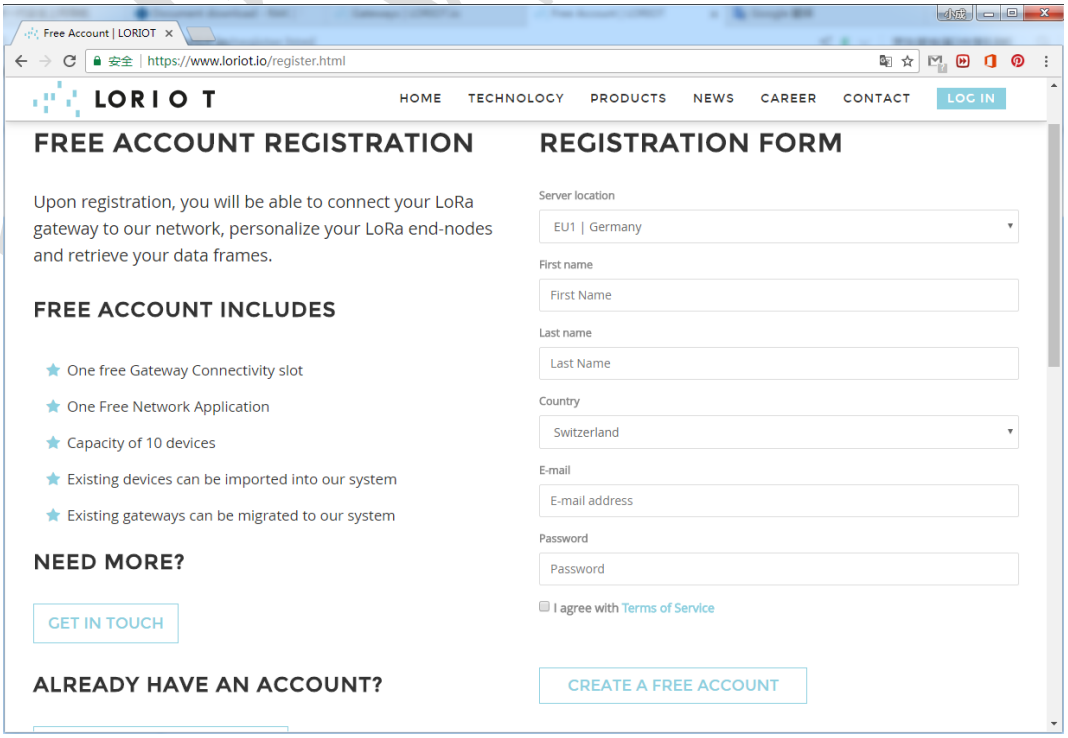
# 3. Register LORIOT

LORIOT is a Swiss start-up in the field of Internet of Things, founded in 2015. They core product today is software for scalable, distributed, resilient operation of LoRaWAN networks and end-to-end applications. Want to learn more please go to the official website: https://www.loriot.io/

Visit LORIOT official website, find the "REGISTER FREE ACCOUNT" button, click to enter the registration interface. You can also visit this link: https://www.loriot.io/register.html




In the registration interface, fill out the relevant information, and you can register for a LORIOT free account.





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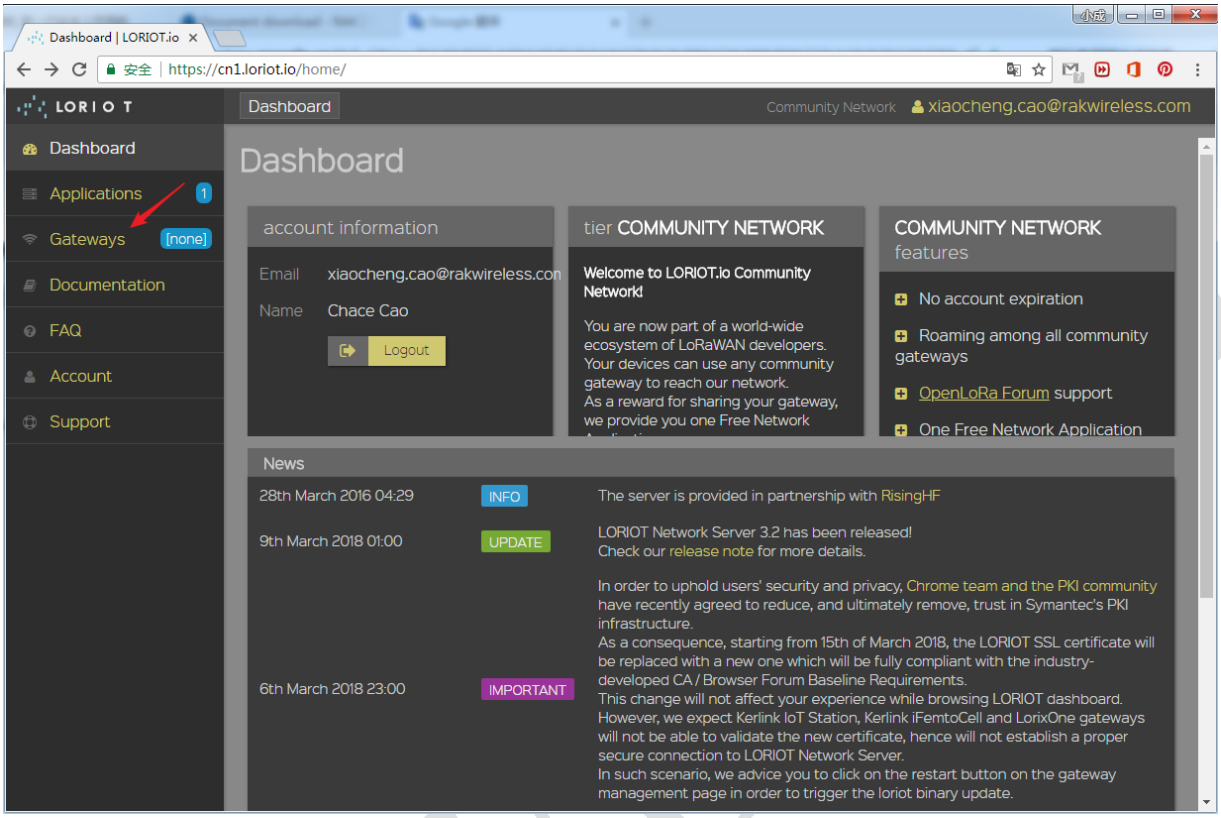
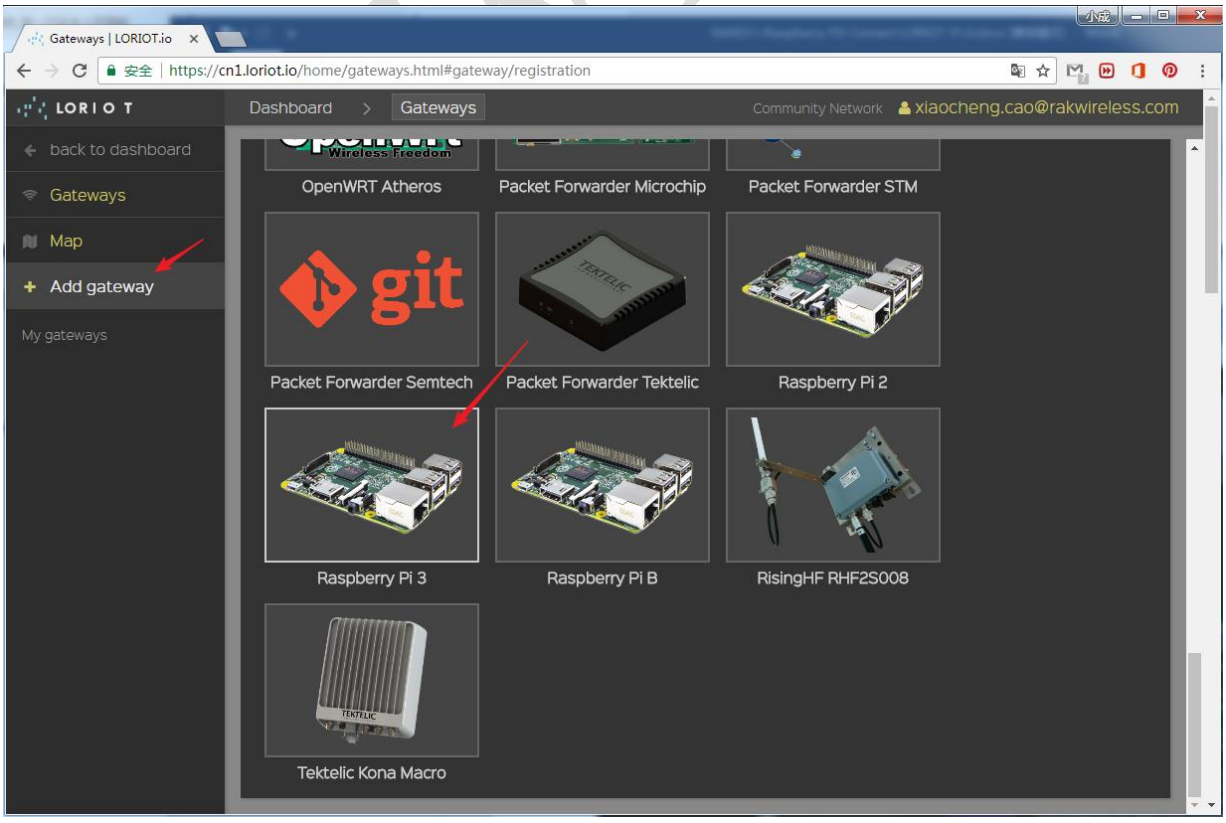
# 4. Connect LORIOT

After successfully registering your account, log in to the LORIOT Dashboard. You will see the interface shown below. Then click on "Gateway"




Click on "Add gateway" and select "Raspberry Pi3". Enter the gateway registration setting interface.





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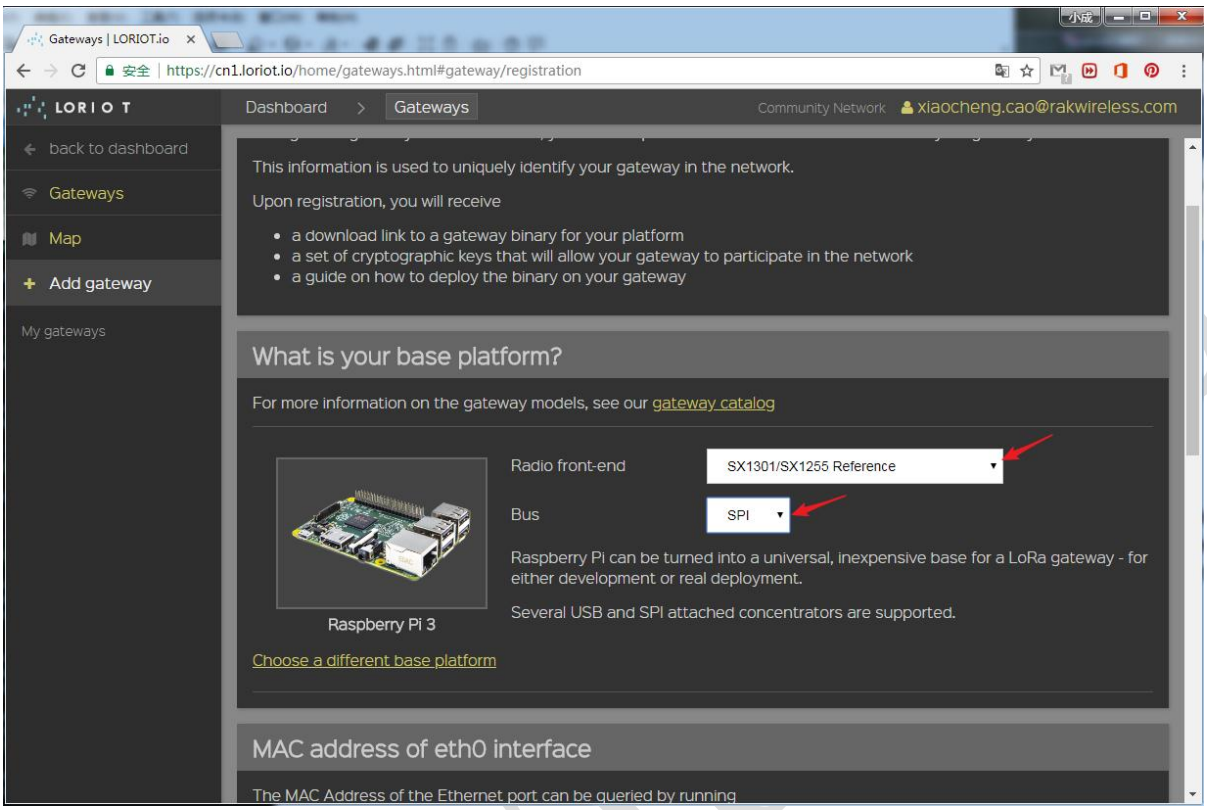
In the gateway registration setting interface, the first setting is “Radio front-end”. If you are purchasing a RAK831 433 or 470 band device, please select "SX1301/SX1255 Reference", If you are purchasing a RAK831 868 or 915 band device, please select "SX1301 Reference". Then the “Bus” select “SPI”.




The next setup needs to be compatible with the Raspberry Pi3 hardware, so there are requirements for the Raspberry Pi system. Because the Raspberry Pi official system has modified the Ethernet descriptor after 2017-06-23, it is no longer eth0. This will cause the LORIOT program to be abnormal, This means that the Raspberry Pi can only be connected to the network using network cable.so we recommend using the Raspberry Pi official system before the 2017-06-23 release. Here you can download all versions of the Raspberry Pi system:https://downloads.raspberrypi.org/raspbian/images/

For those who do not know how to use the Raspberry Pi and how to install the Raspberry Pi system, how to open the Raspberry Pi SPI interface and SSH interface. Please search google for solution.

After using SSH to connect the Raspberry Pi. Send "ifconfig" at the command line and you can see that the device Ethernet descriptor is "eth0".

```
pi@raspberrypi:~ $ ifconfig
eth0      Link encap:Ethernet  HWaddr b8:27:eb:9a:41:16
          inet addr:192.168.70.174  Bcast:192.168.70.255  Mask:255.255.255.0
          inet6 addr: fe80::4753:a217:1ac1:143c/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:2195 errors:0 dropped:0 overruns:0 frame:0
          TX packets:210 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:282713 (276.0 KiB)  TX bytes:23114 (22.5 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:227 errors:0 dropped:0 overruns:0 frame:0
          TX packets:227 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:20024 (19.5 KiB)  TX bytes:20024 (19.5 KiB)

wlan0     Link encap:Ethernet  HWaddr b8:27:eb:cf:14:43
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

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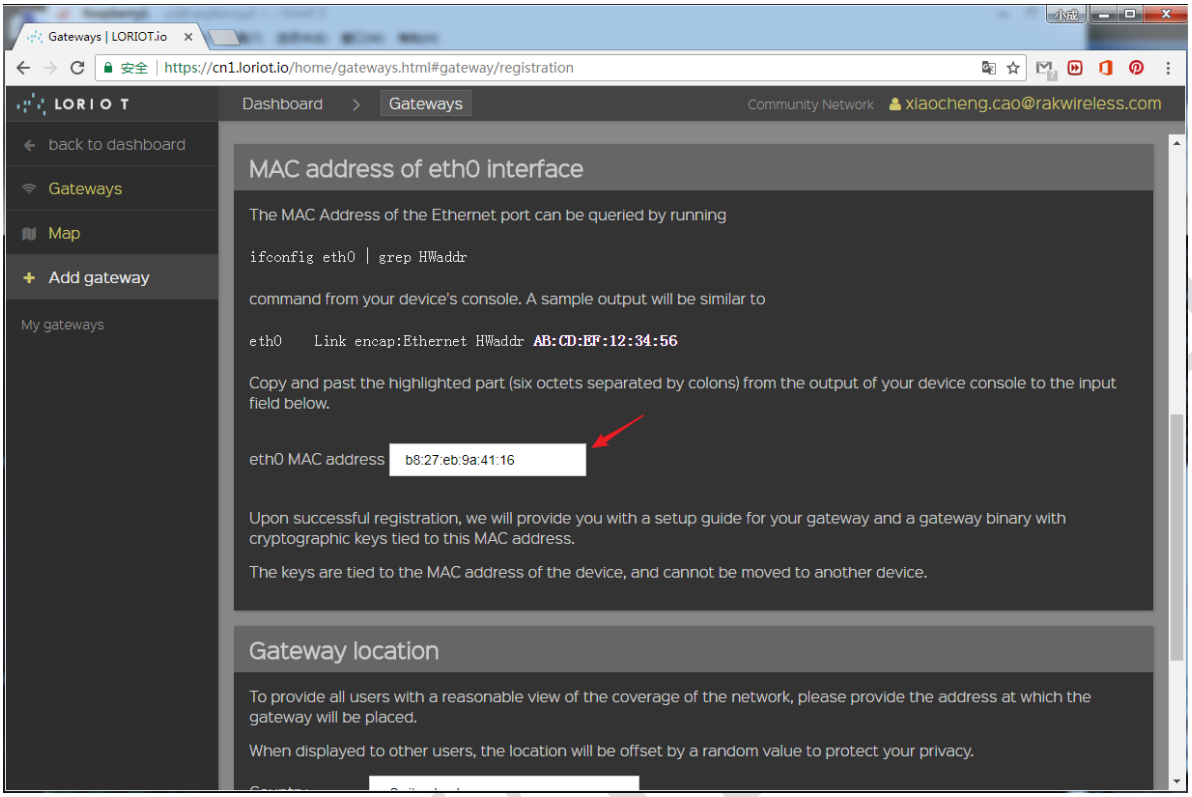
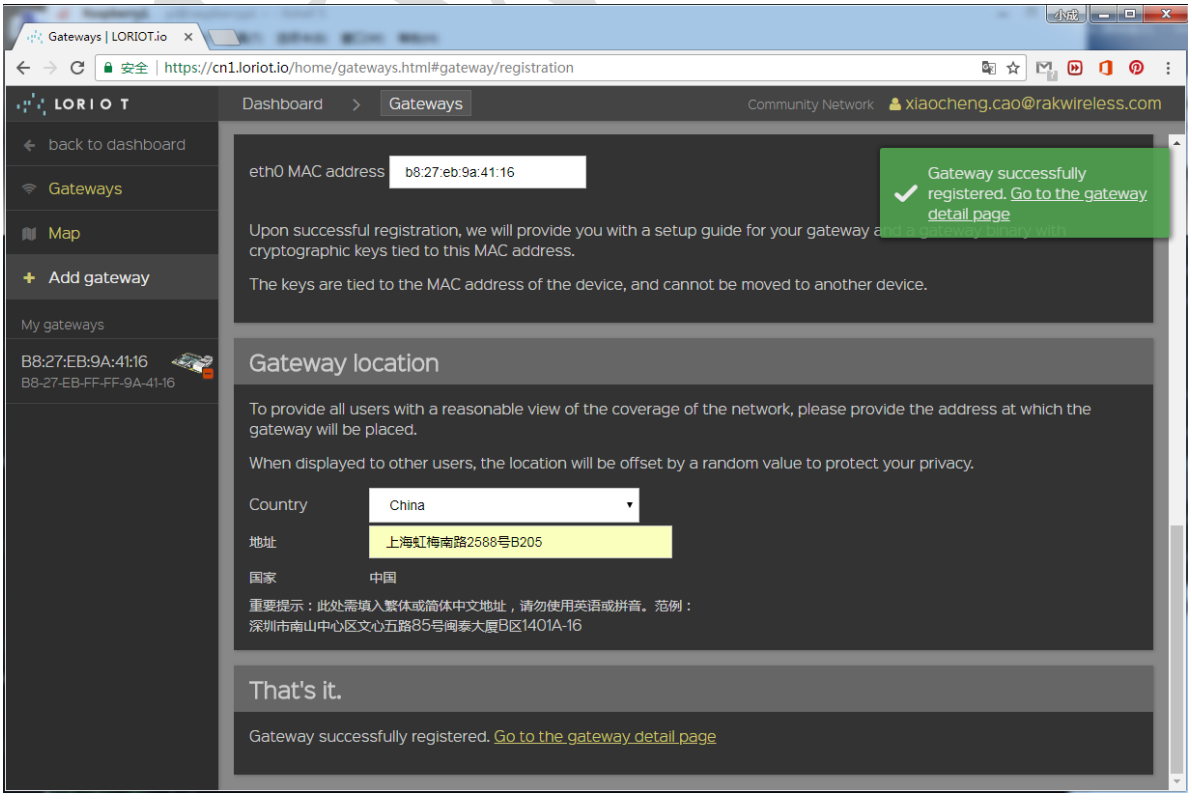
Then, send "ifconfig eth0 | grep HWaddr" command according to the prompt of the LORIOT gateway registration setting interface. Set the result in the "eth0 MAC address" box.

```
pi@raspberrypi:~ $ ifconfig eth0 | grep HWaddr
eth0      Link encap:Ethernet  HWaddr b8:27:eb:9a:41:16
pi@raspberrypi:~ $
```




Finally, set the gateway address. After the setting is complete, click the "Register Raspberry Pi 3 gateway" button to complete the gateway registration.

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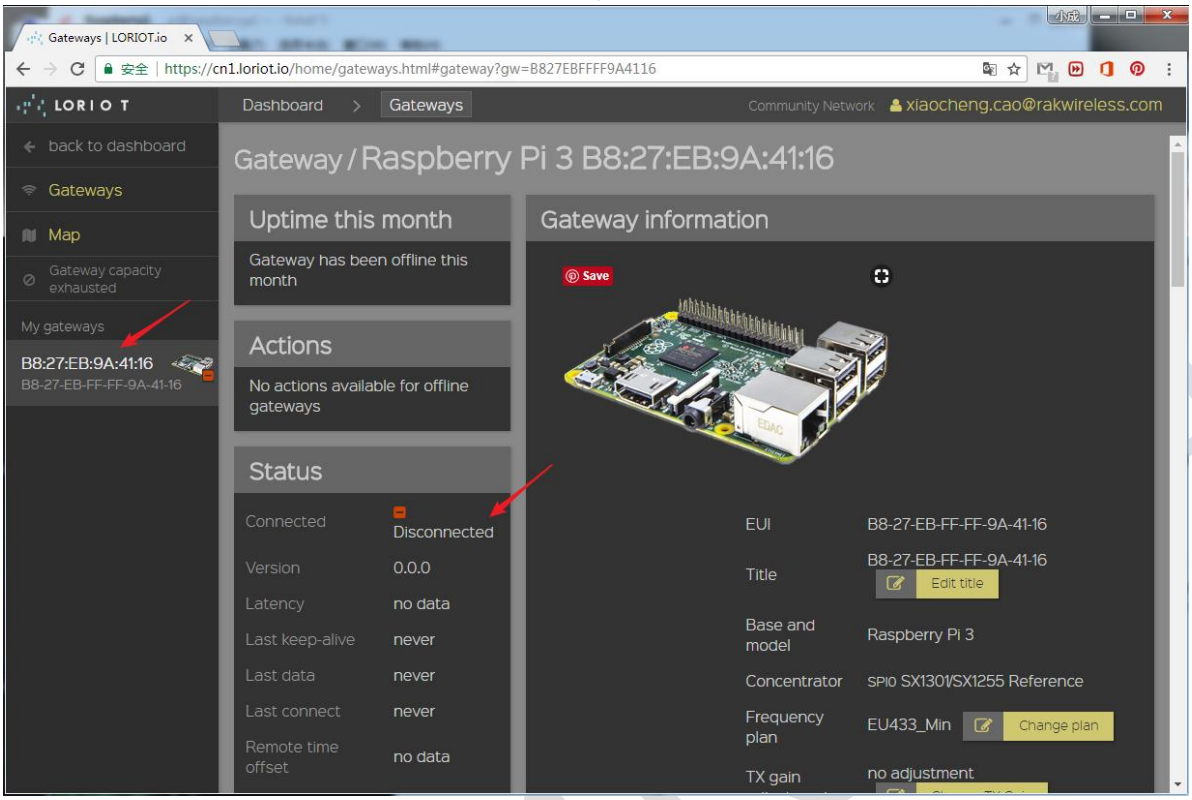
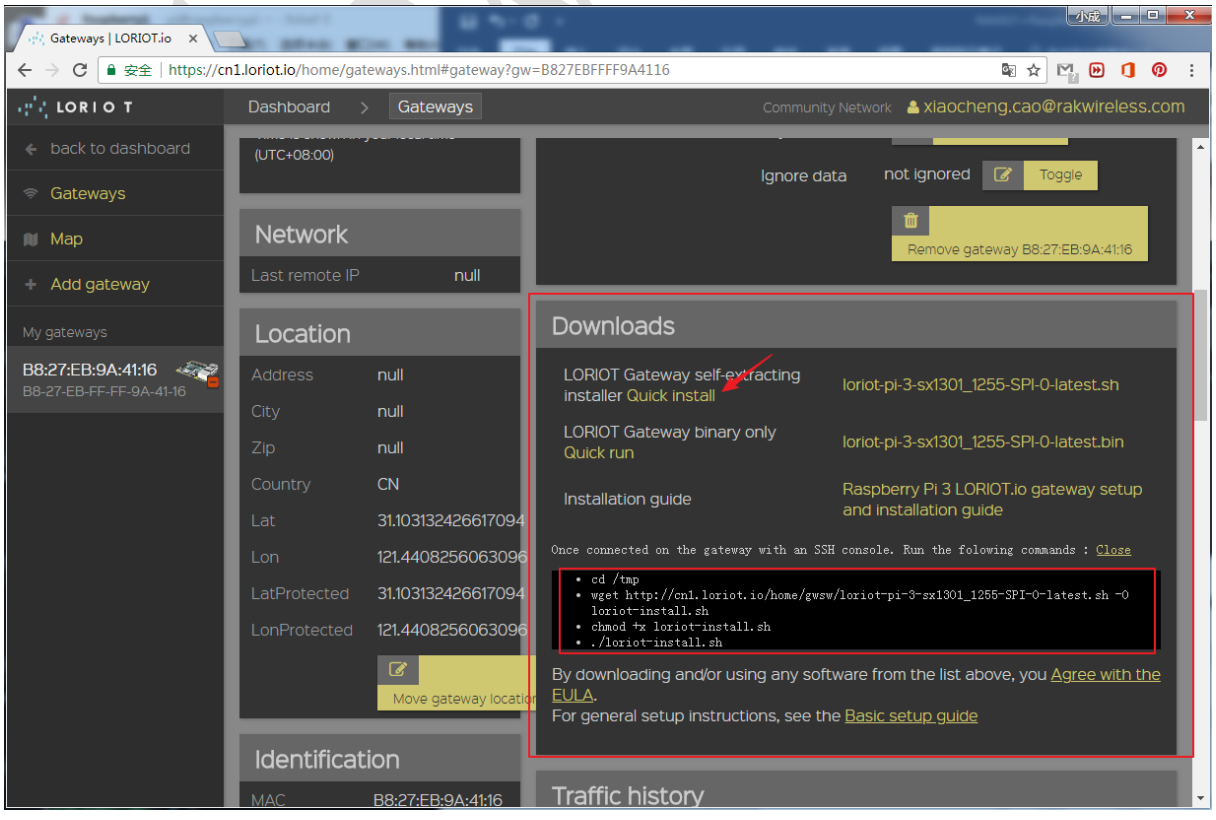
After the gateway device is registered successfully, click on the registered gateway device, and you can see that “Status” shows Disconnected. This is because the hardware device has not installed LORIOT software on this side. Next install Raspberry Pi software.




Drop down to the "Download" box, which shows how to install the LORIOT software to the Raspberry Pi. Click "Quick install" and follow the given steps to enter it step-by-step on the Raspberry Pi command line.





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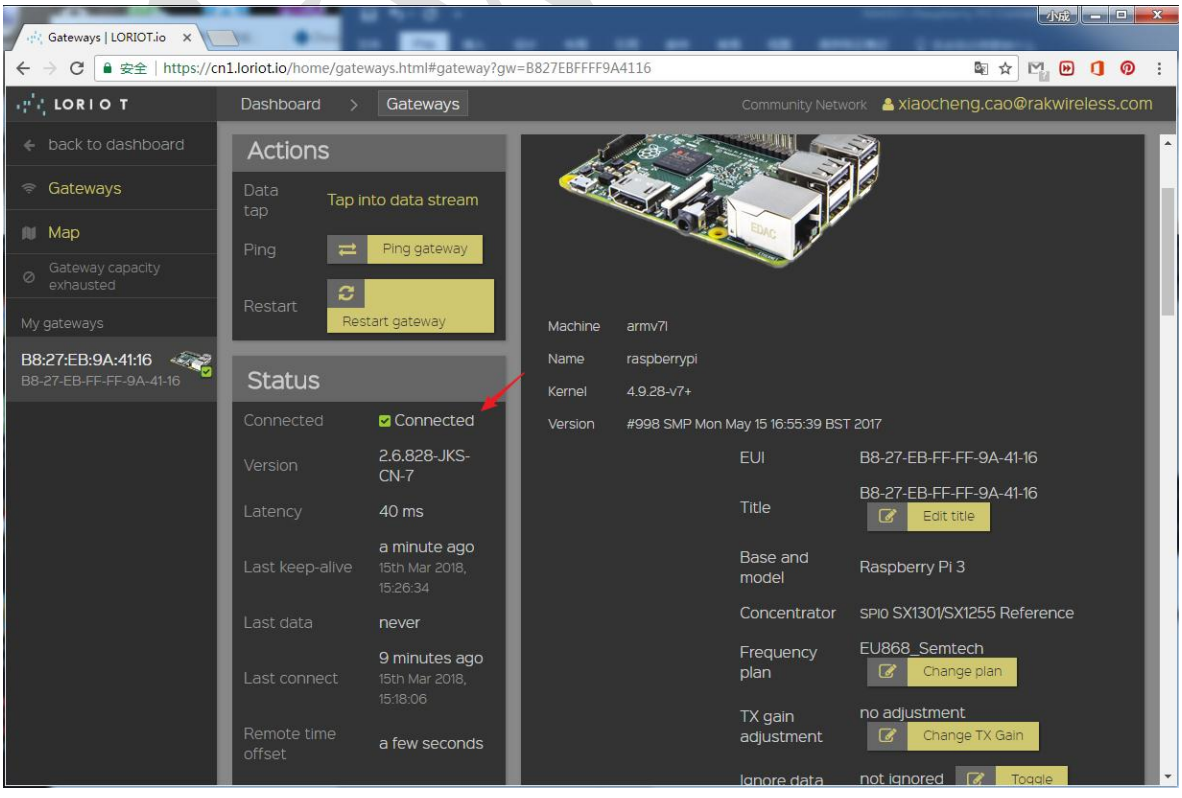
When entering the last command, you may need to add “sudo” before the command.

```
pi@raspberrypi:~ $ cd /tmp
pi@raspberrypi:/tmp $ wget http://cn1.loriot.io/home/gwsw/loriot-pi-3-sx1301_1255-SPI-0-latest.sh -O loriot-install.sh
--2018-03-15 07:17:14--  http://cn1.loriot.io/home/gwsw/loriot-pi-3-sx1301_1255-SPI-0-latest.sh
Resolving cn1.loriot.io (cn1.loriot.io)... 54.223.38.129
Connecting to cn1.loriot.io (cn1.loriot.io)|54.223.38.129|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 82141 (80K) [application/octet-stream]
Saving to: ‘ loriot-install.sh’

loriot-install.sh                   100%[=======================================================================>]  80.22K   468KB/s   in 0.2s

2018-03-15 07:17:15 (468 KB/s) - ‘ loriot-install.sh’  saved [82141/82141]

pi@raspberrypi:/tmp $ chmod +x loriot-install.sh
pi@raspberrypi:/tmp $ ./loriot-install.sh
ERROR: There is no sufficent permition to access /opt/lrt folder, may install with sudo
pi@raspberrypi:/tmp $ sudo ./loriot-install.sh
Extracting LORIOT files ... done
Installing LORIOT files ... start
Loriot Gateway installed. Starting Loriot Gateway ...
Gateway started. Gateway will also automatically start with next reboot
Installing LORIOT files ... done
pi@raspberrypi:/tmp $
```

After the installation is complete, you can check the RX LED of the RAK831 device to determine if the device is operating successfully.


You can also refresh the LORIOT page to refresh the device's status.

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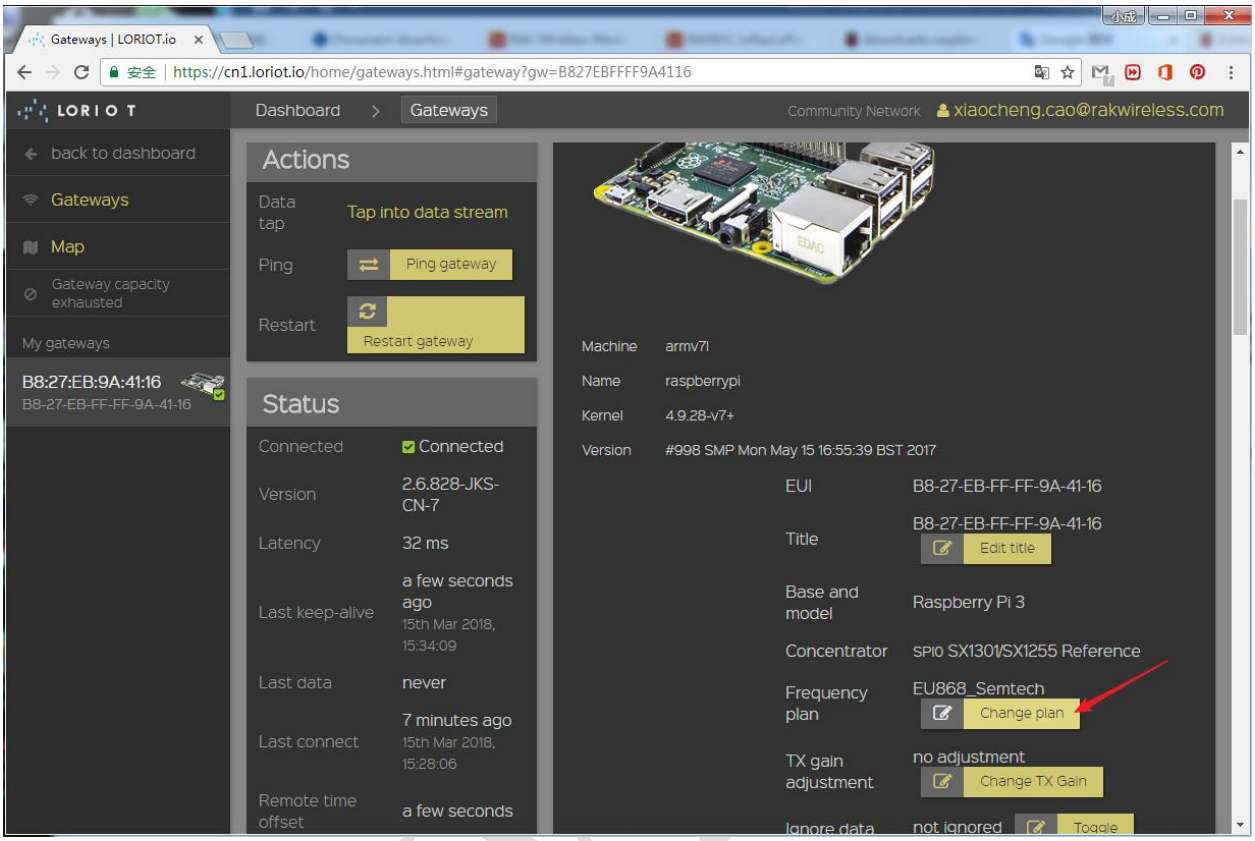
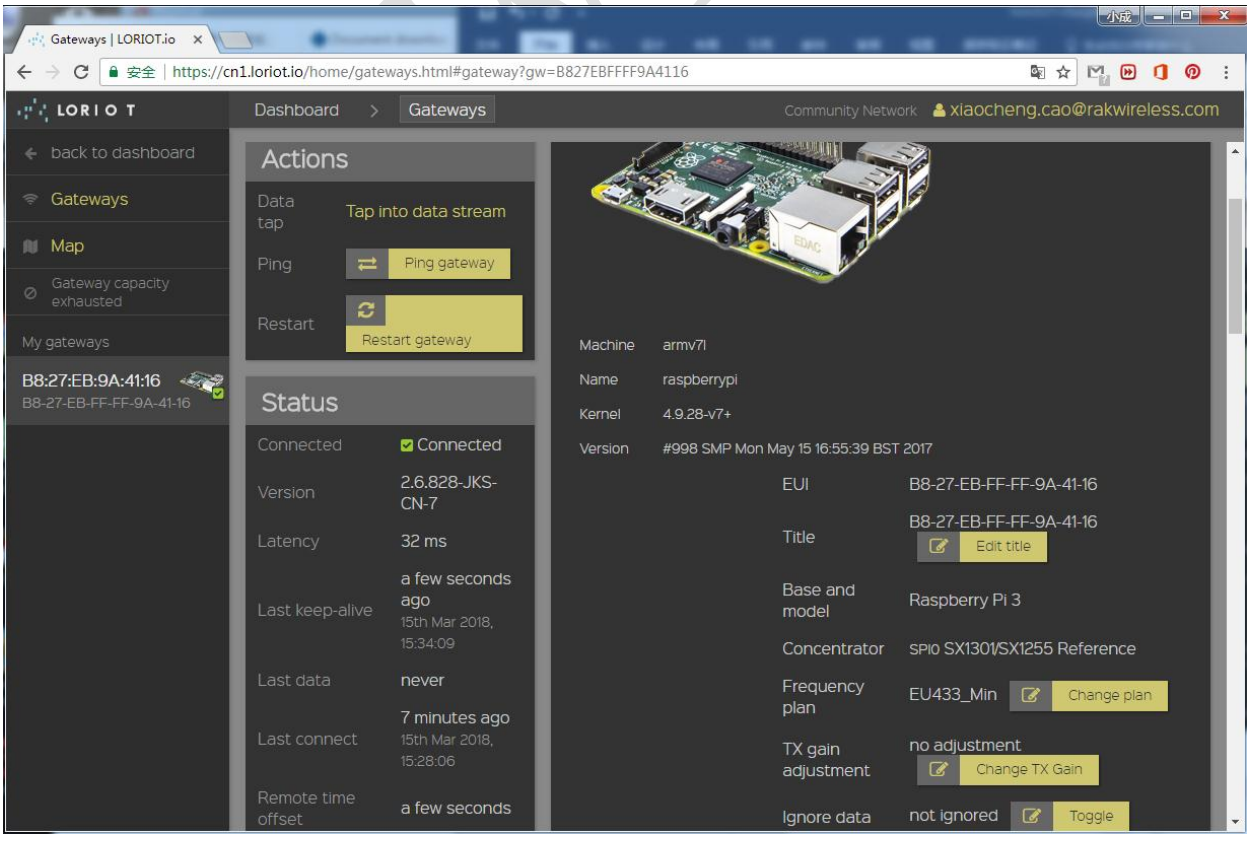
By this time, we have successfully connected the RAK831+ Raspberry Pi3 device to LORIOT. Next modify the frequency band. One of the advantages of LORIOT platform is that the platform does not need to modify the configuration file. After modifying the band area directly on the web page, the platform server directly delivers the control gateway equipment to modify the frequency band area. Therefore, we directly click on “Change Plan”, Select "EU433_Min".

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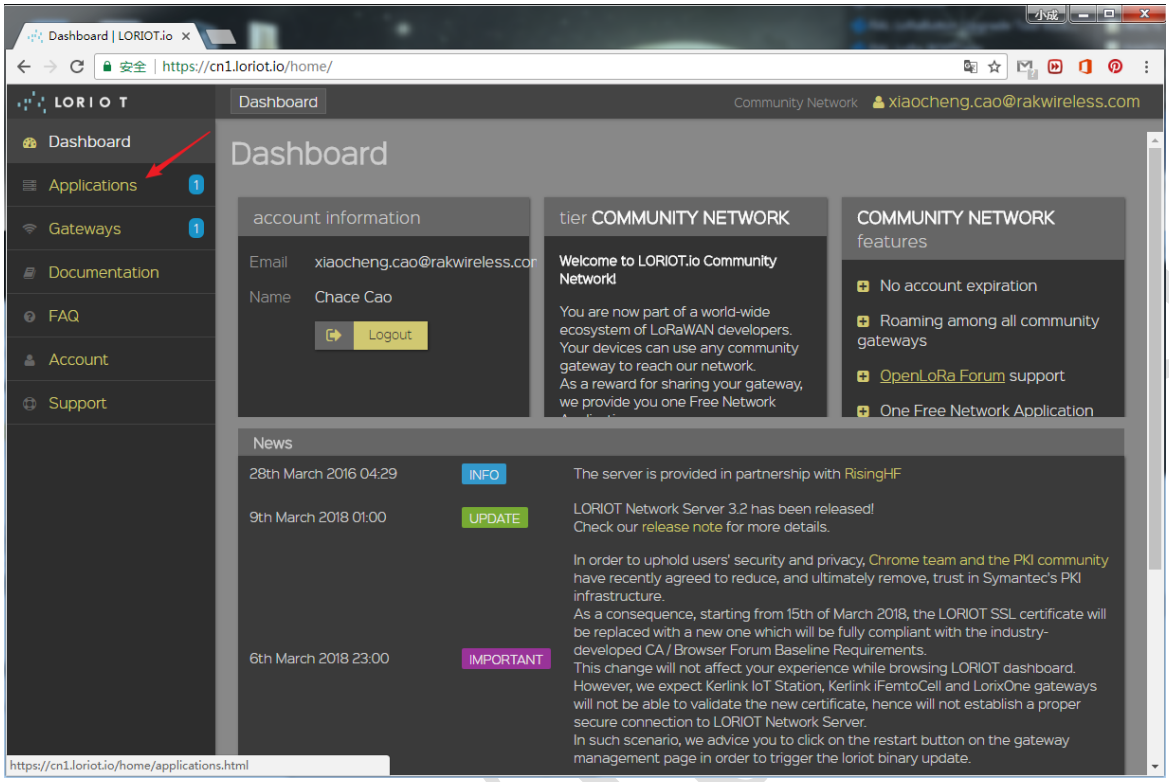
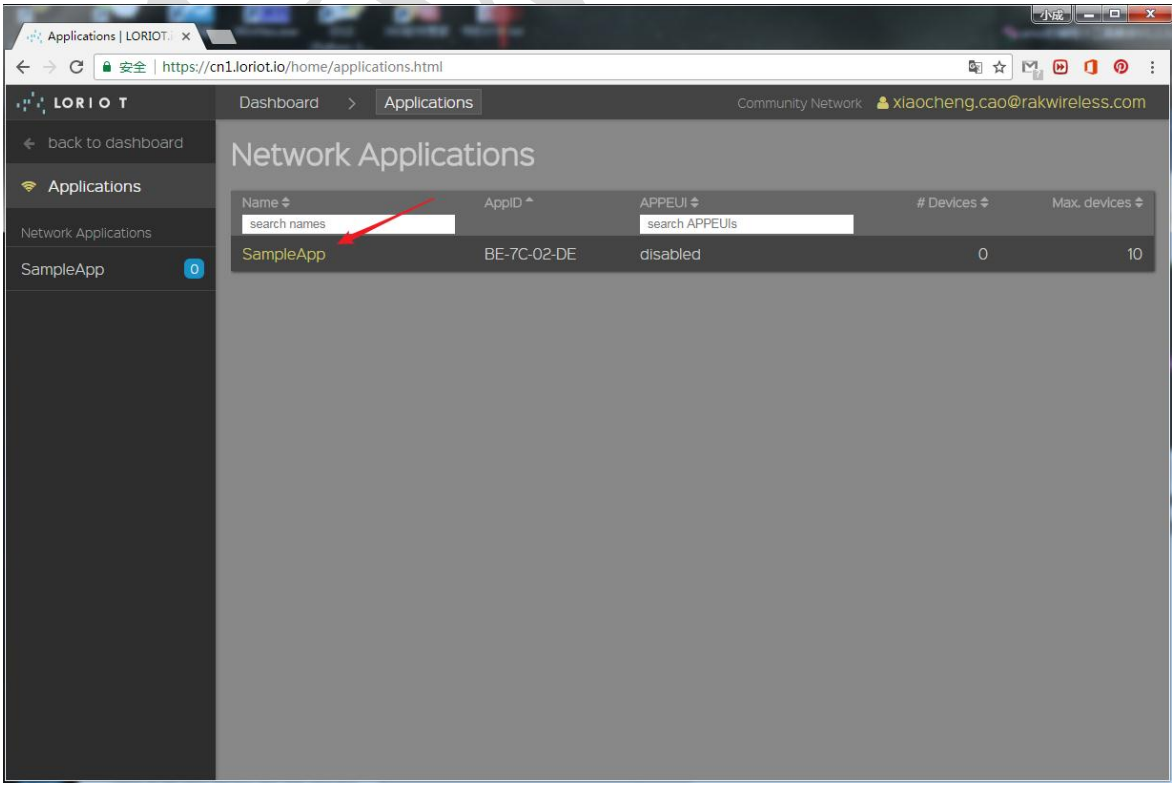
## 5. Node Connection

After the LoRaWAN gateway is set up, next create a node device. Return to Dashboard interface, click "Applications", enter the application interface.




In the application interface, LORIOT has created an application by default. In the application interface, LORIOT has created an application by default. If you are a free account, then you can only use this one application. Click “SampleApp”.





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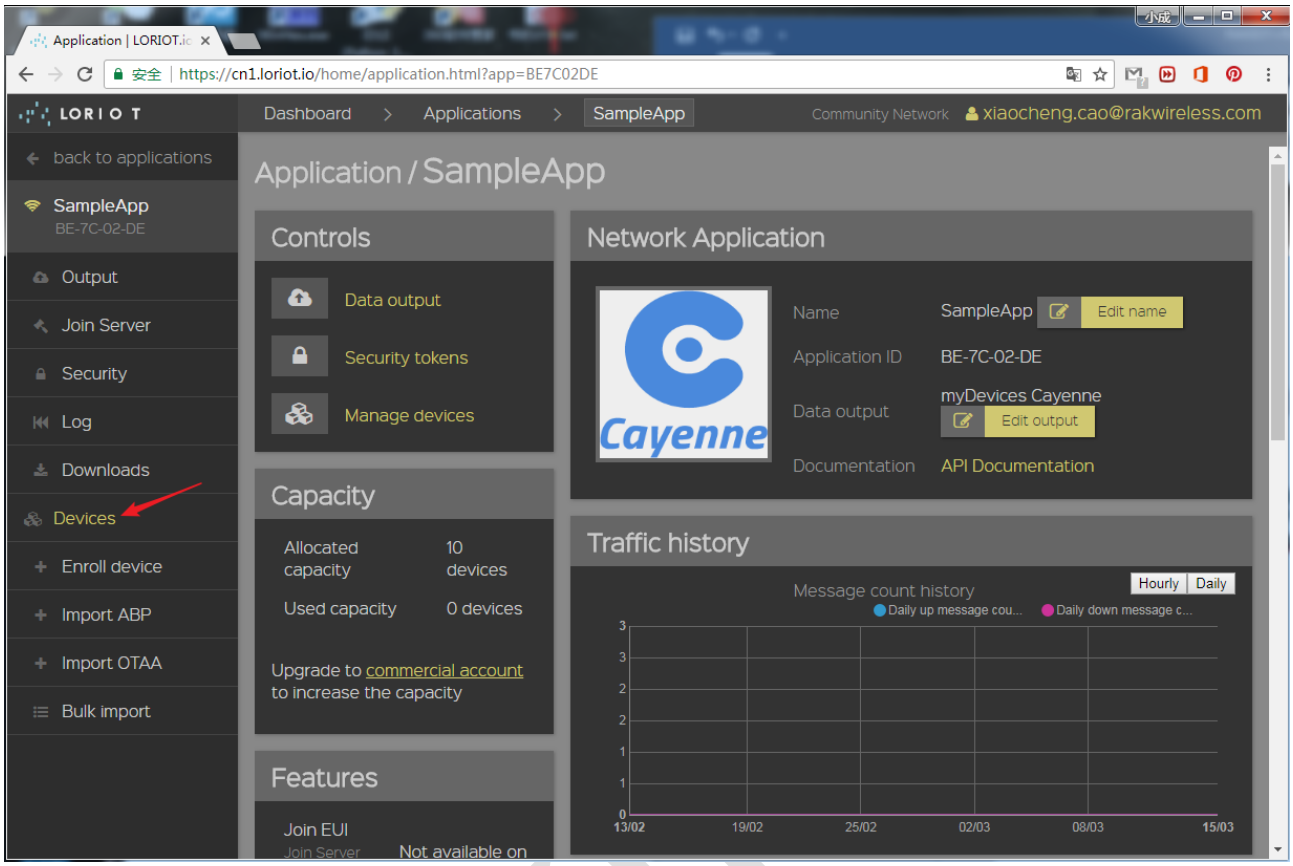
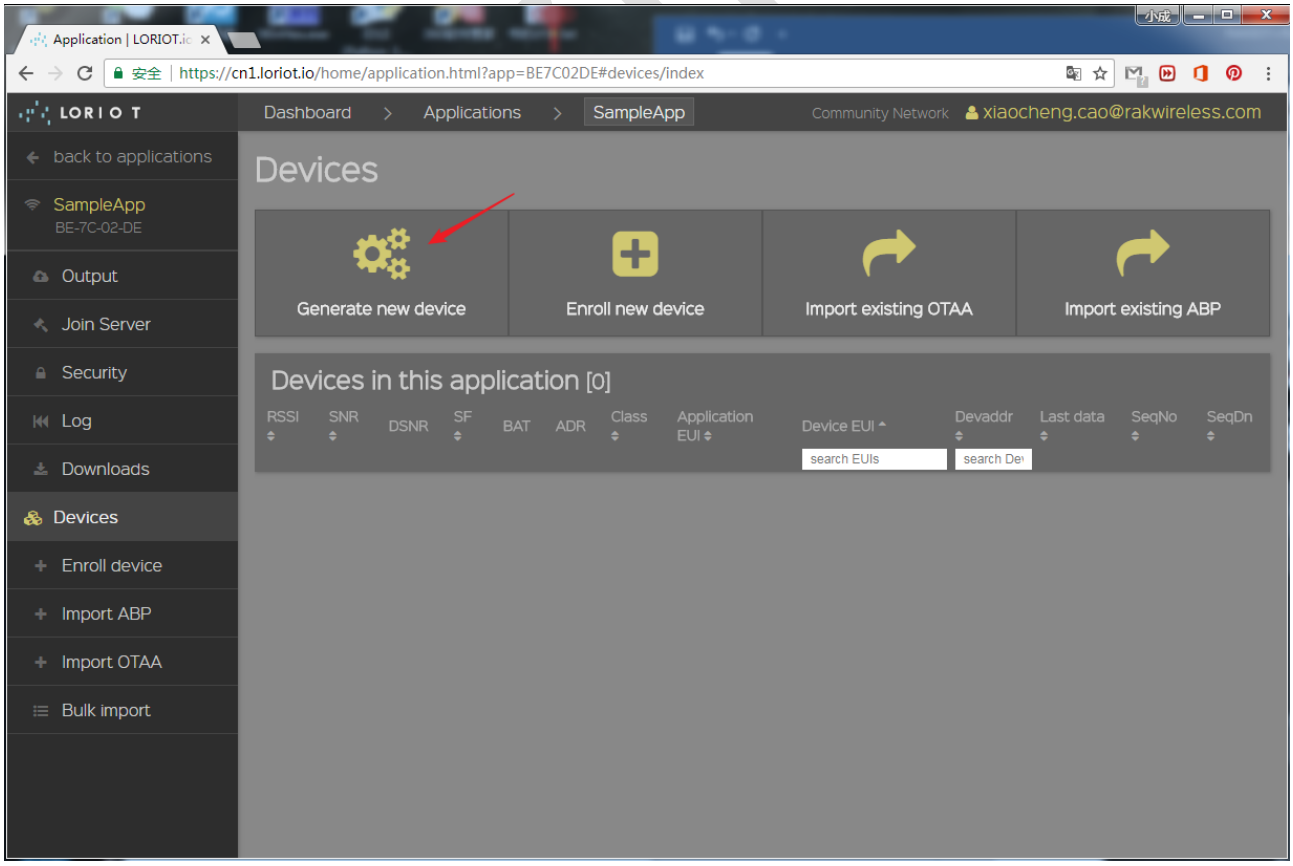
In the SampleApp interface, click on "Devices", Click "Generate new device" on the Devices interface. See the picture below:





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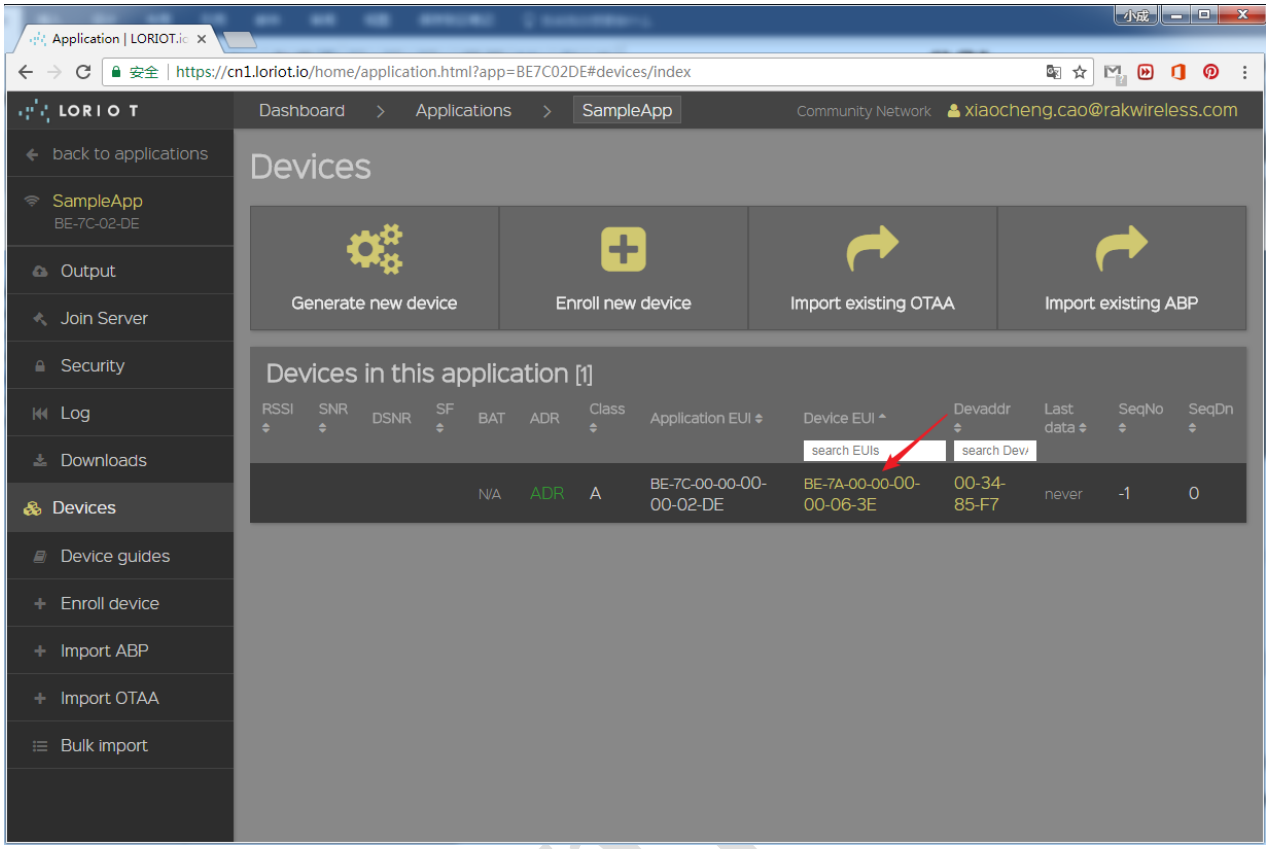
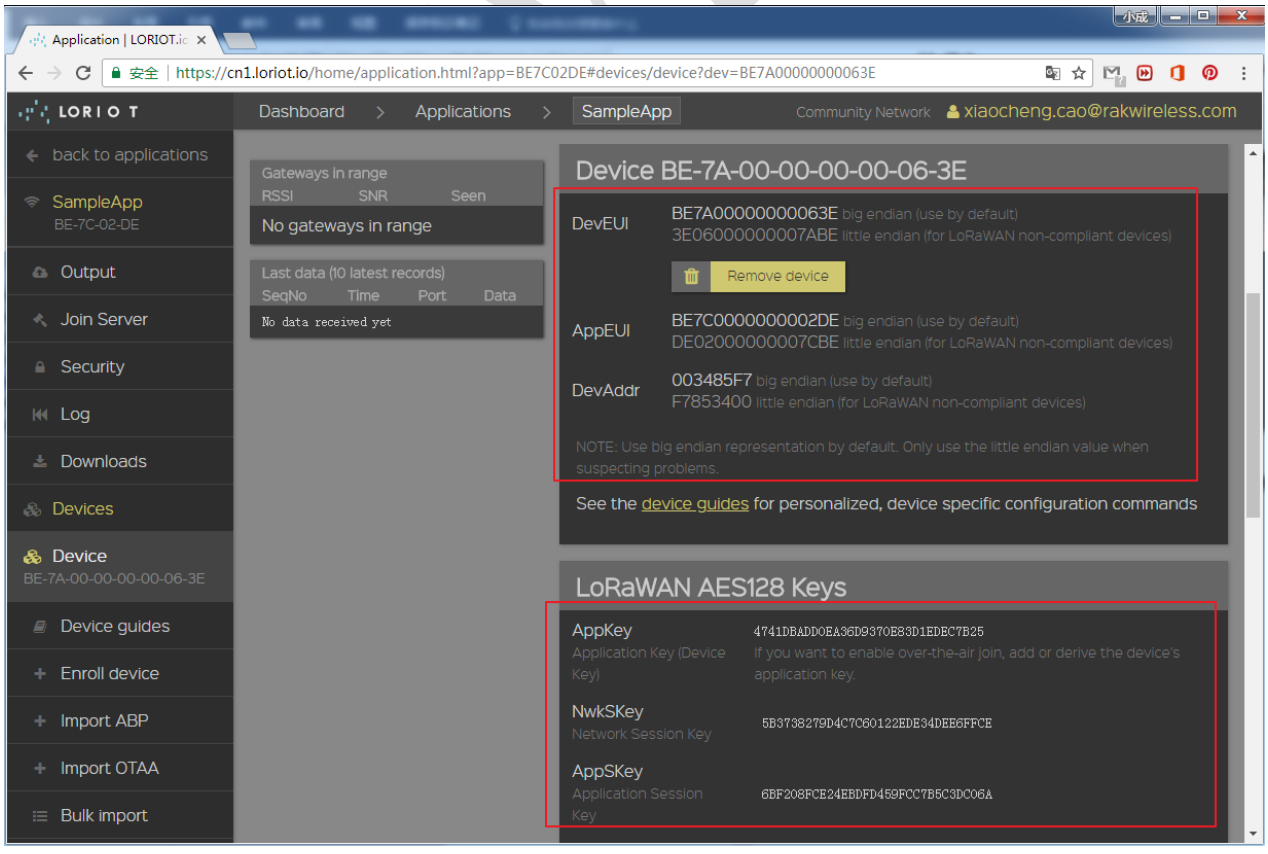
After clicking "Generate new device", LORIOT will automatically create a device. Click this device to enter the Device details interface.




After entering the " Device details " interface, you can see all the parameters that a node device added to the gateway. Including OTAA and ABP parameters.





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After obtaining these parameters, you can set the parameters of the node device RAK812 through the serial AT command. The command is as follows:

at+mode=0 // Set the device mode to LoRaWAN mode.

at+band // Query the frequency band information of the device.

at+set_config=dev_eui:xxxxxxxxxxxxxxxx // Set the device's DevEUI parameters.

at+set_config=app_eui:xxxxxxxxxxxxxxxx // Set the device's AppEUI parameters.

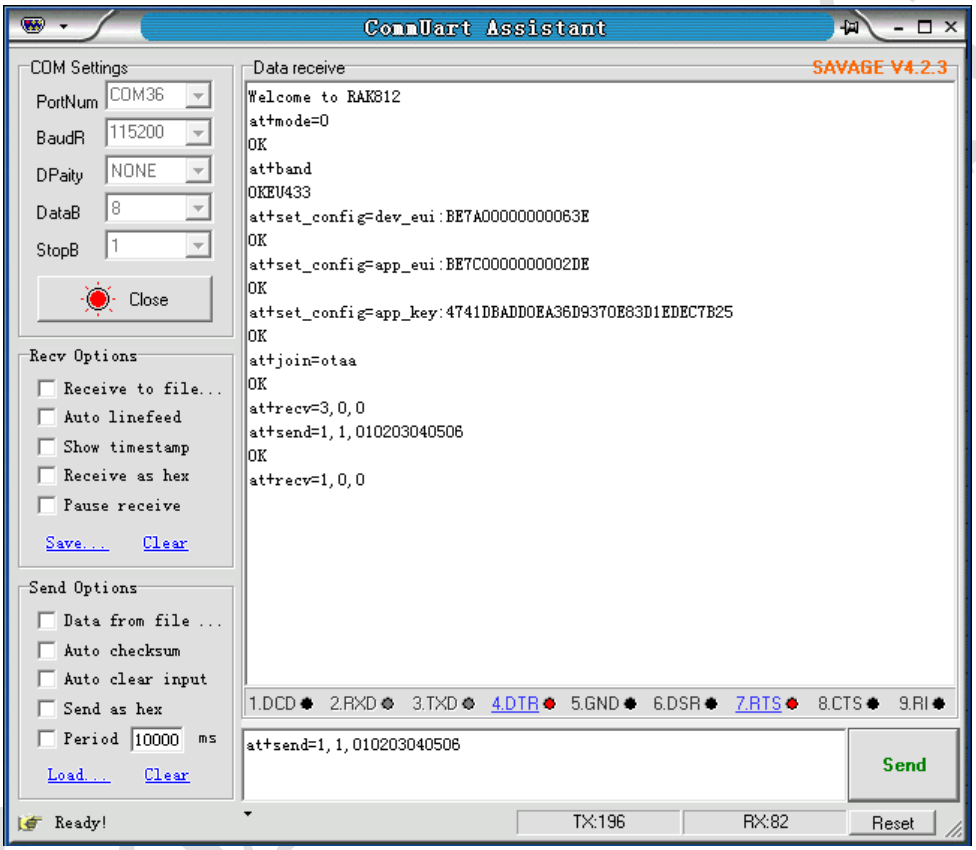
at+set_config=app_key:xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx // Set the device's AppKey parameters

at+join=otaa // Set the join method to OTAA, After setting, the device will try to join the network.

at+recv=3,0,0 // The data returned by the device indicates that the gateway was added successfully, If at+recv=6,0,0 is returned, it indicates that the device fails to join.

at+send=1,1,xxxxxx // Send a packet of data to the gateway.

at+recv=1,0,0 // This data is returned by the device, indicating that the data was sent successfully.





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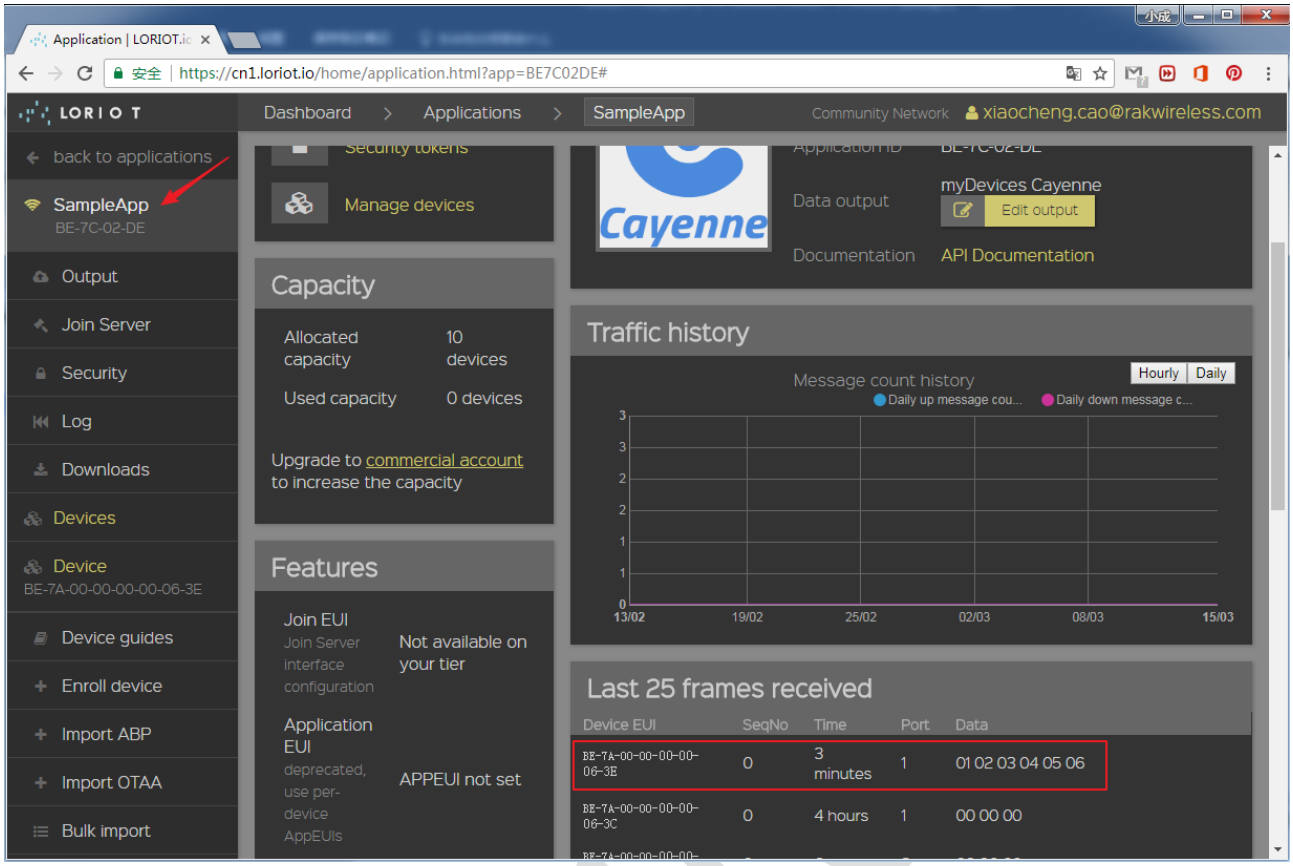
You can also view the sent data in LORIOT's SampleApp interface.

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# 7. Change Note

| Version | Date | Change |
|---|---|---|
| V1.0 | 2018-03-15 | Draft |

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