Getting Started in LoRaWAN Hands On

Class 4: No Service? No Problem! Building your own LoRaWAN server

November 30, 2017

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Presented by:

This Week's Agenda

11/27 An Overview of Low-Power IoT Technologies

11/28 Introduction to LoRa and LoRaWAN

11/29 The design of a LoRaWAN node, hands-on

11/30 No Service? No Problem!

Building your own LoRaWAN server

12/1 Testing Our LoRaWAN design

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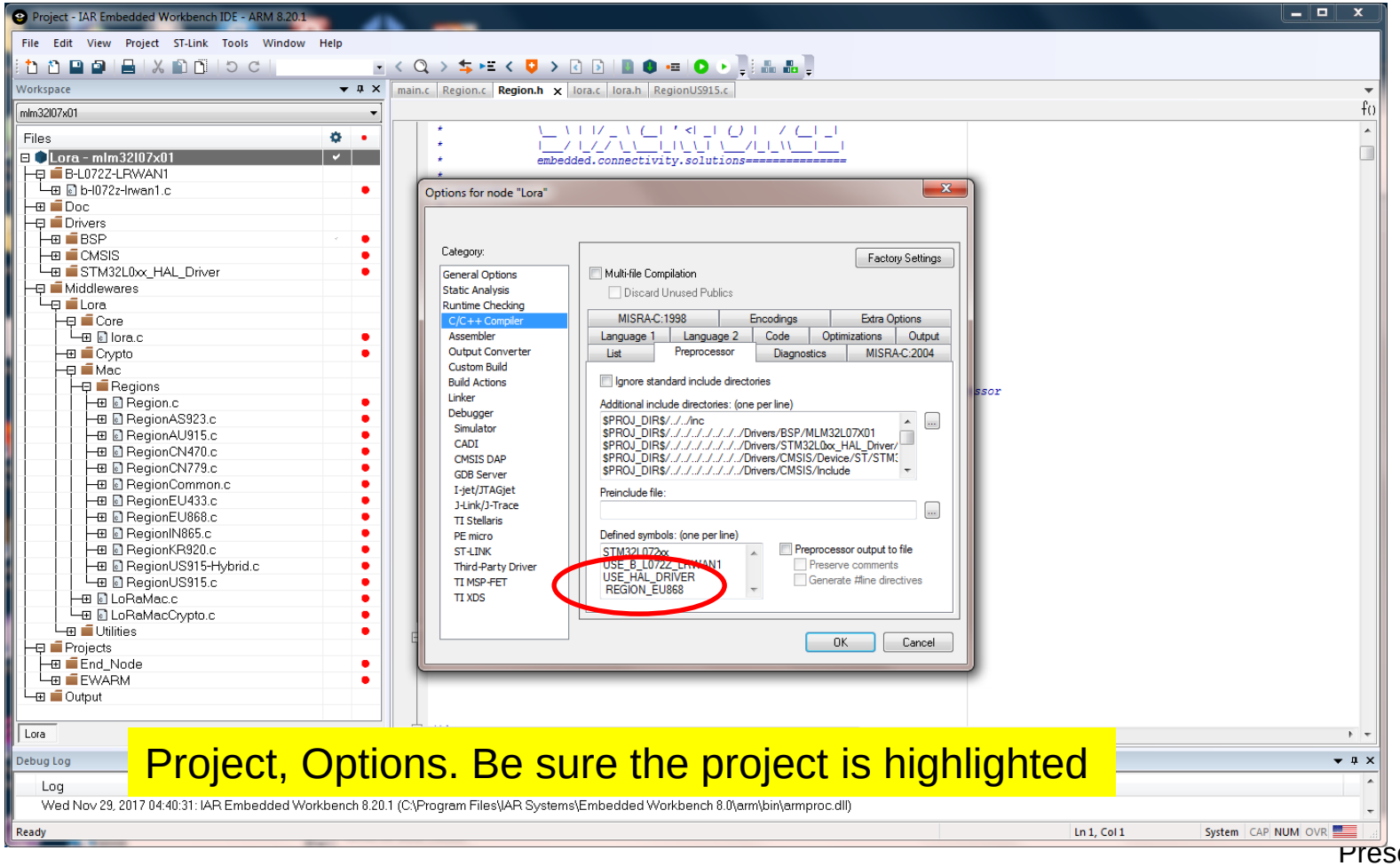
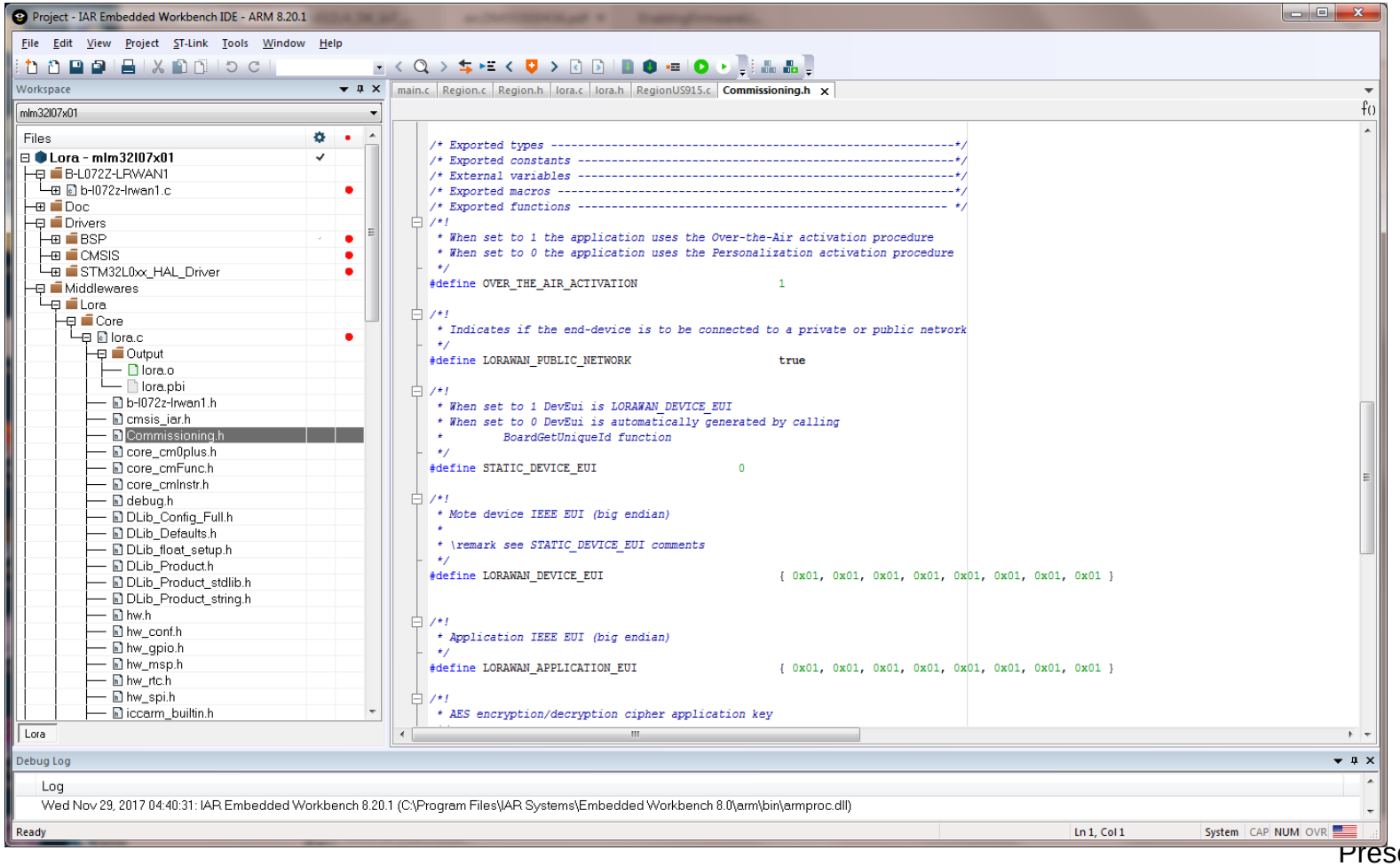
Picking up from Yesterday



Defining Commissioning



Commissioning in LoRaWAN

- One of the features built into LoRa is the option of Over the Air Authentication (OTAA)- This allows a node to be brought into the network dynamically without local interaction
- Note that some services such as the free tier of LORIOT do not support OTAA

Keys

- Another method of authentication is the assignment of a network and a device key by the service provider. These are entered into the node and are typically stored in a secure memory area (trust zone or external crypto chip)
- Most secure way of commissioning but is also the most labor intensive is not done OTA

EUI

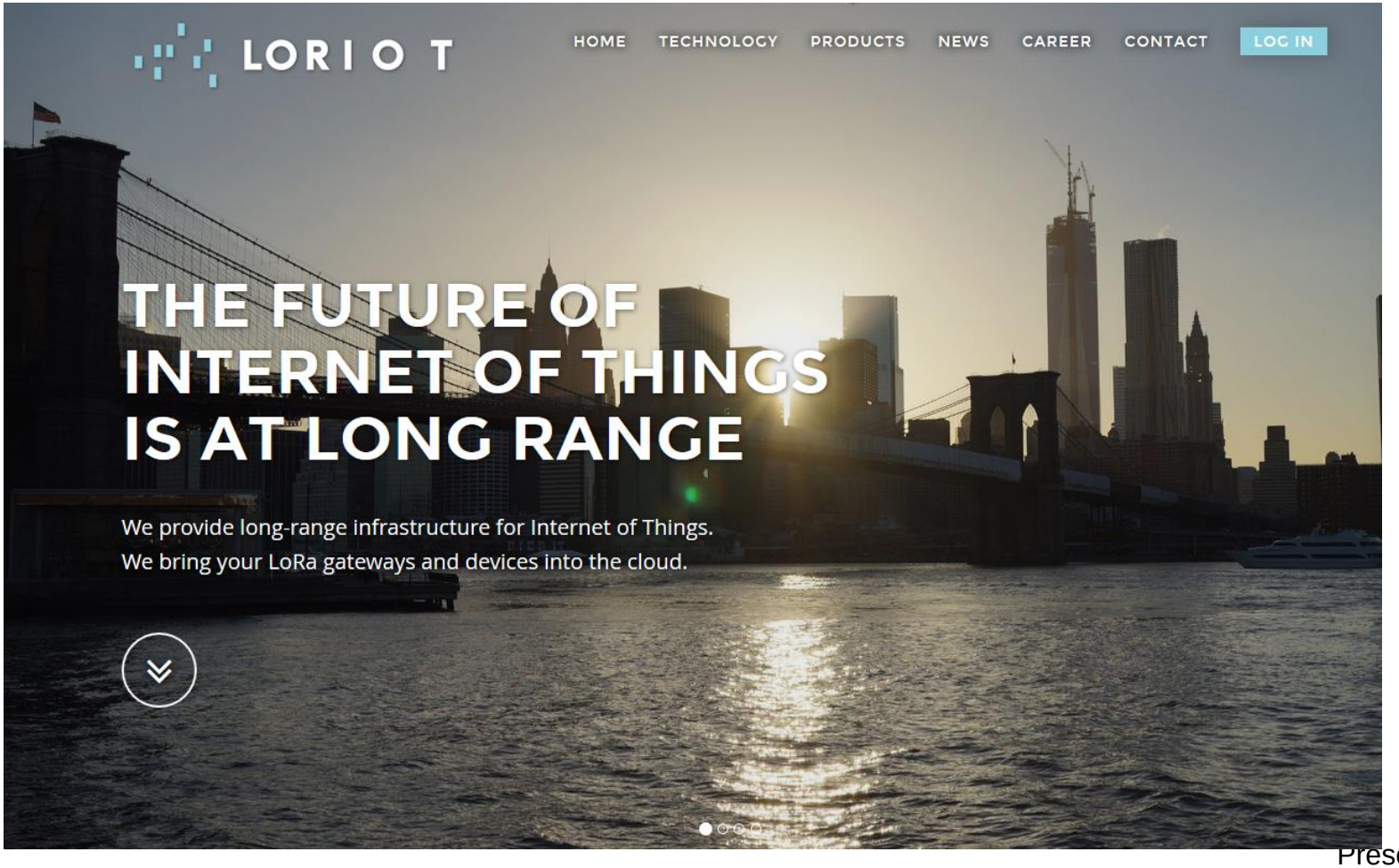
- Extended Unique Identifier
- 64 bits – part of IPv6
- Extended version of the 48-bit “MAC address” – a globally unique address assigned to every networked device
- The EUI can be used in commissioning as a universal node identifier in the early commissioning process

Question 1 – why not just use the EUI as the node identifier?

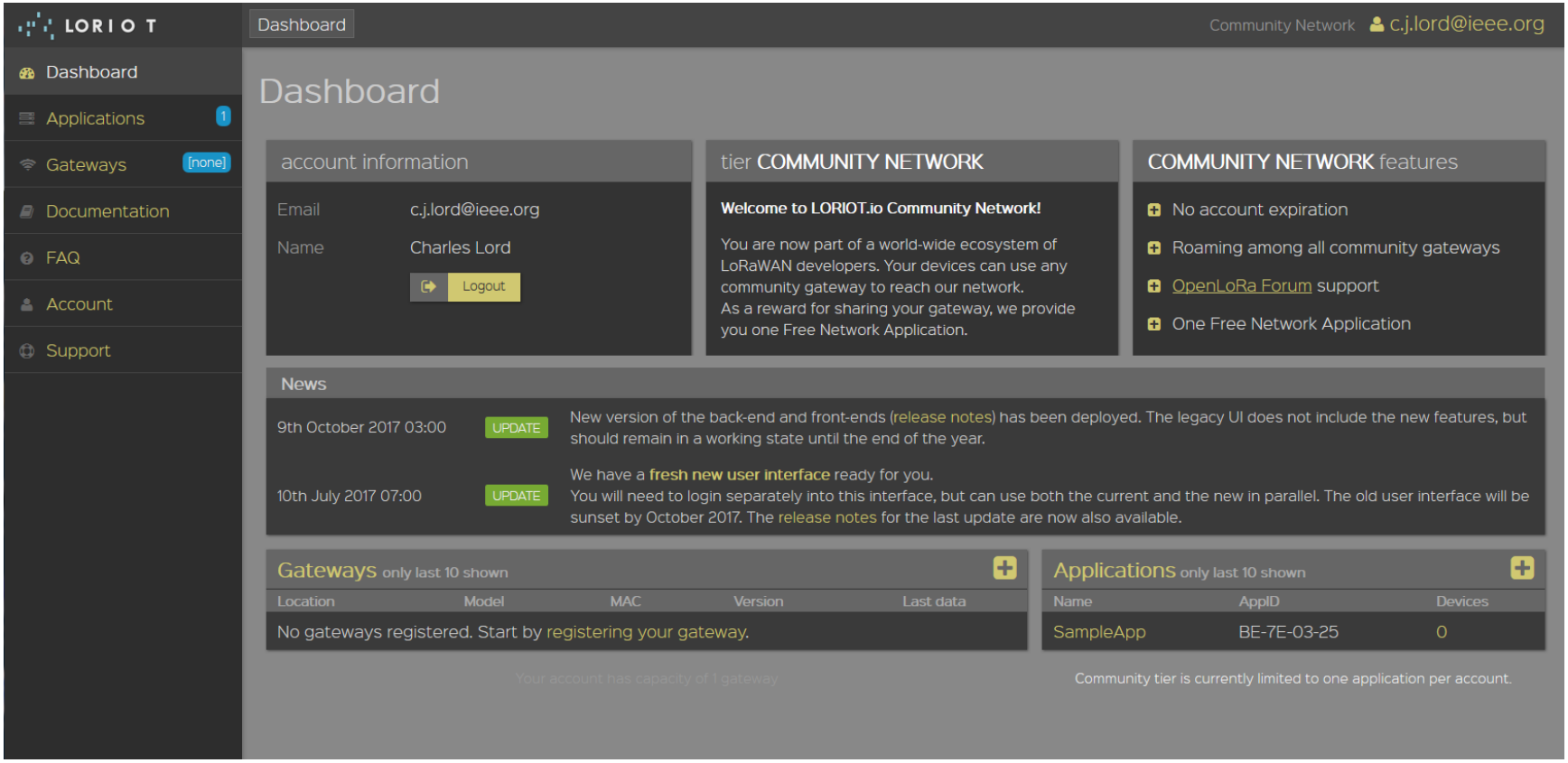
Adding a Local Gateway

- Even with a local commercial provider, it is wise in developing LoRa devices to have your own development gateway
- Due to the flexibility of the LoRaWAN standard and OpenLoRa, an end node will operate the same with a local gateway through a network concentrator as it will through a commercial network – but you have control over your own gateway

We will use LORIOT.io



Join the free Community Network



LORIOT supports all known gateways

Seeed Studio Gateway Kit

RisingHF RHF0M301

- 10 channel LoRa transceiver
- Designed to work with Raspberry Pi
- Simple SPI port allows use with most processors

How They Map

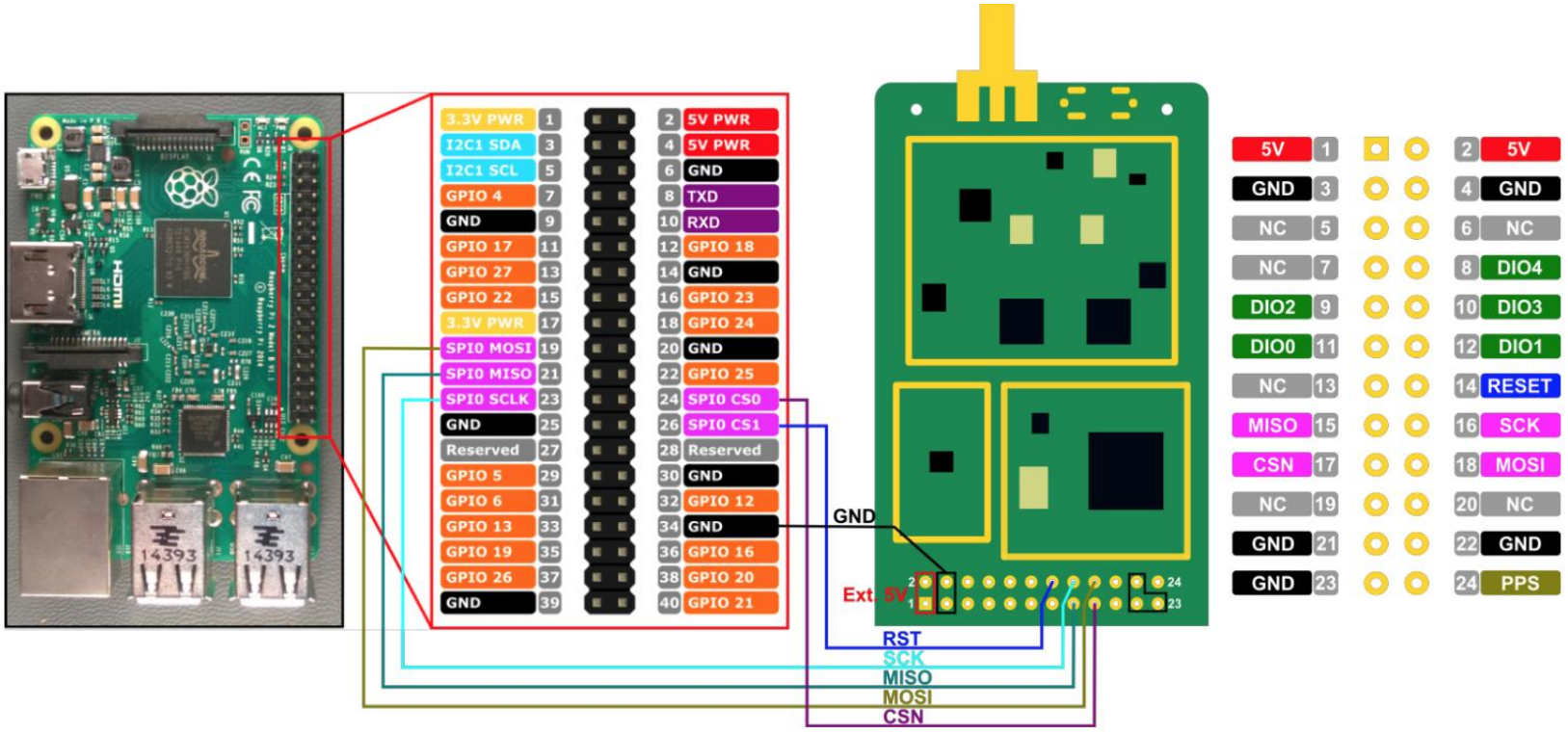
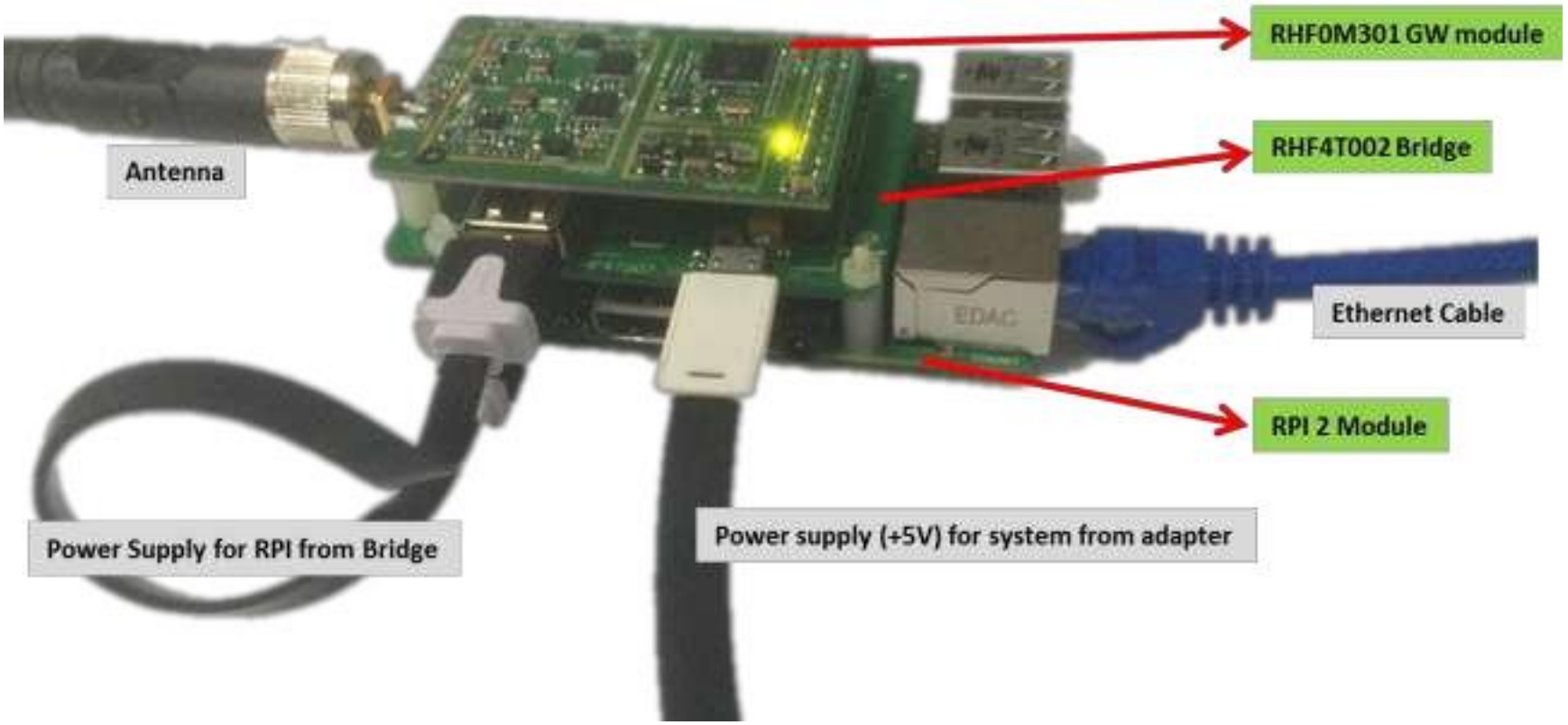


Figure 4-1 RHF0M301 and RPi Connection

Bridge Board



RisingHF / Seeed Kit

- Includes the bridge board, all cables, ant
- Does not include Raspberry Pi (but does include a compatible port of Raspian on microSD along with LORIOT and Things code)
- Also includes a FTDI serial-to-USB to patch and log into the RPi linux to get ethernet MAC as well as local IPv4 address (for SSH)

Manual for Setup

UM01649

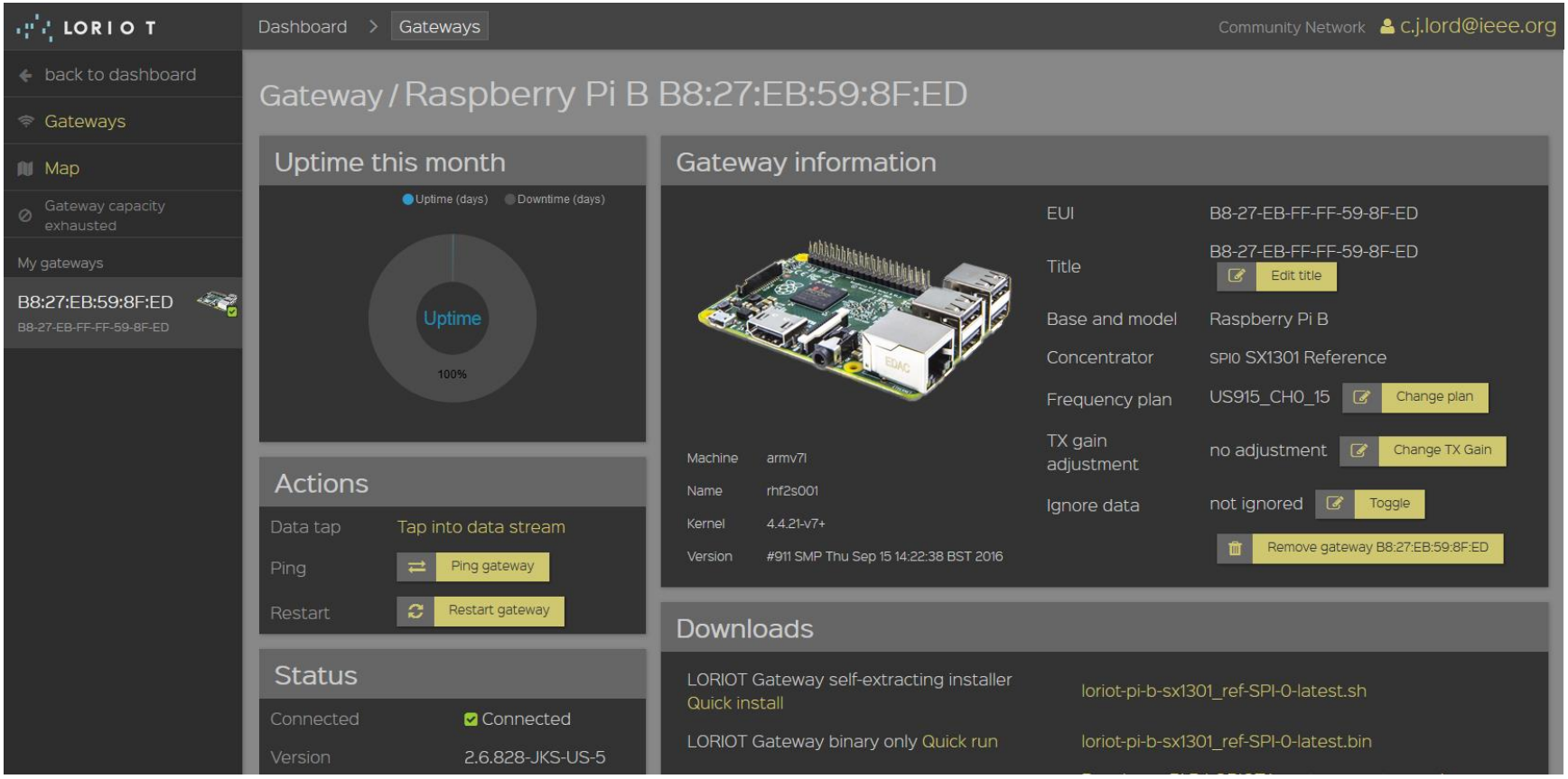
IoT Discovery User Manual

V2.1

Document Information

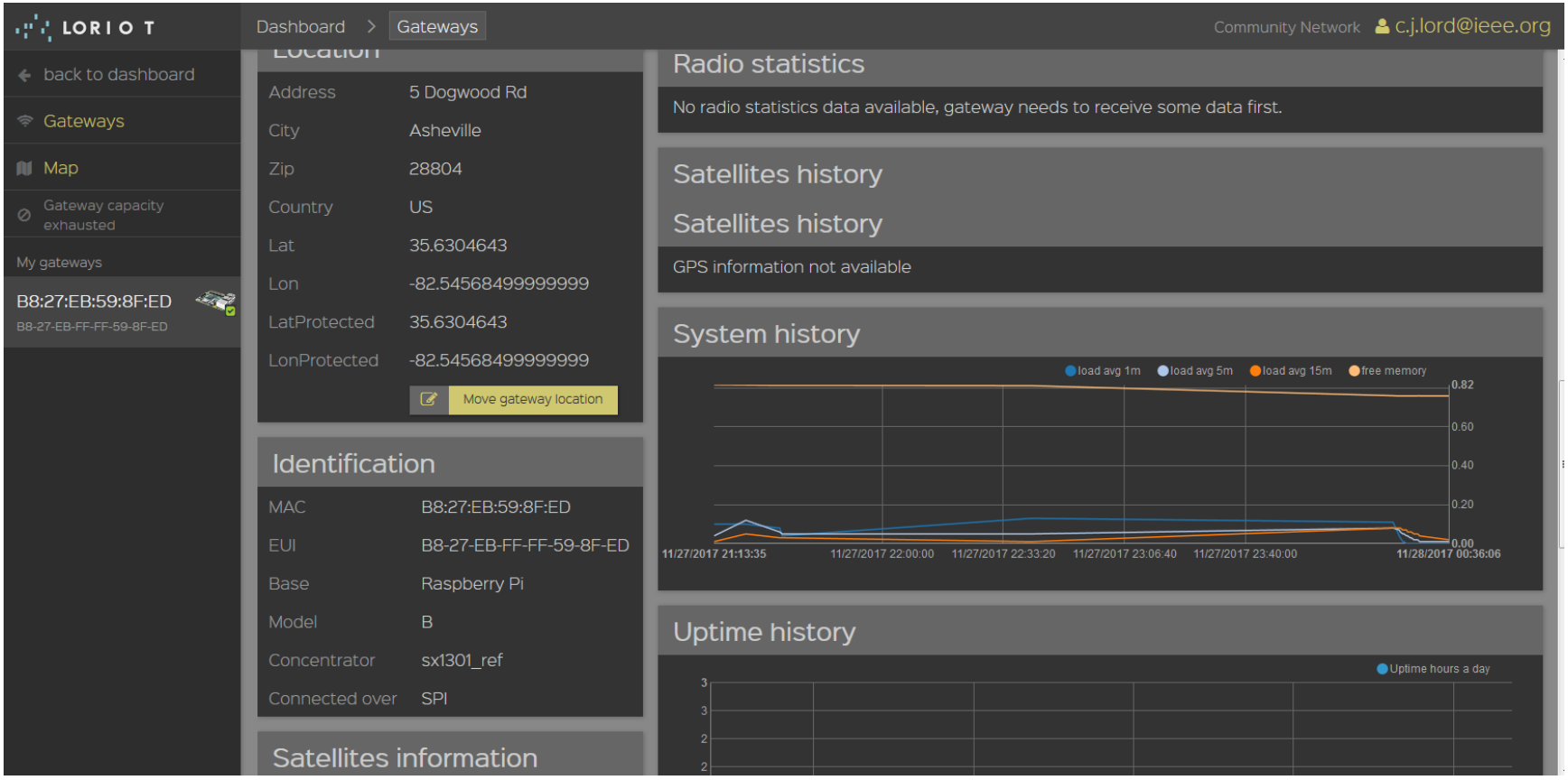
Item	Content
Keyword	*LoRaWAN，UM，IoT，Wireless communication*
	This document describes how to use, test and configure

Community Allows One Gateway



Question 2 - What is the distinguishing feature of the Raspberry Pi 3B versus 3?

Register the Gateway

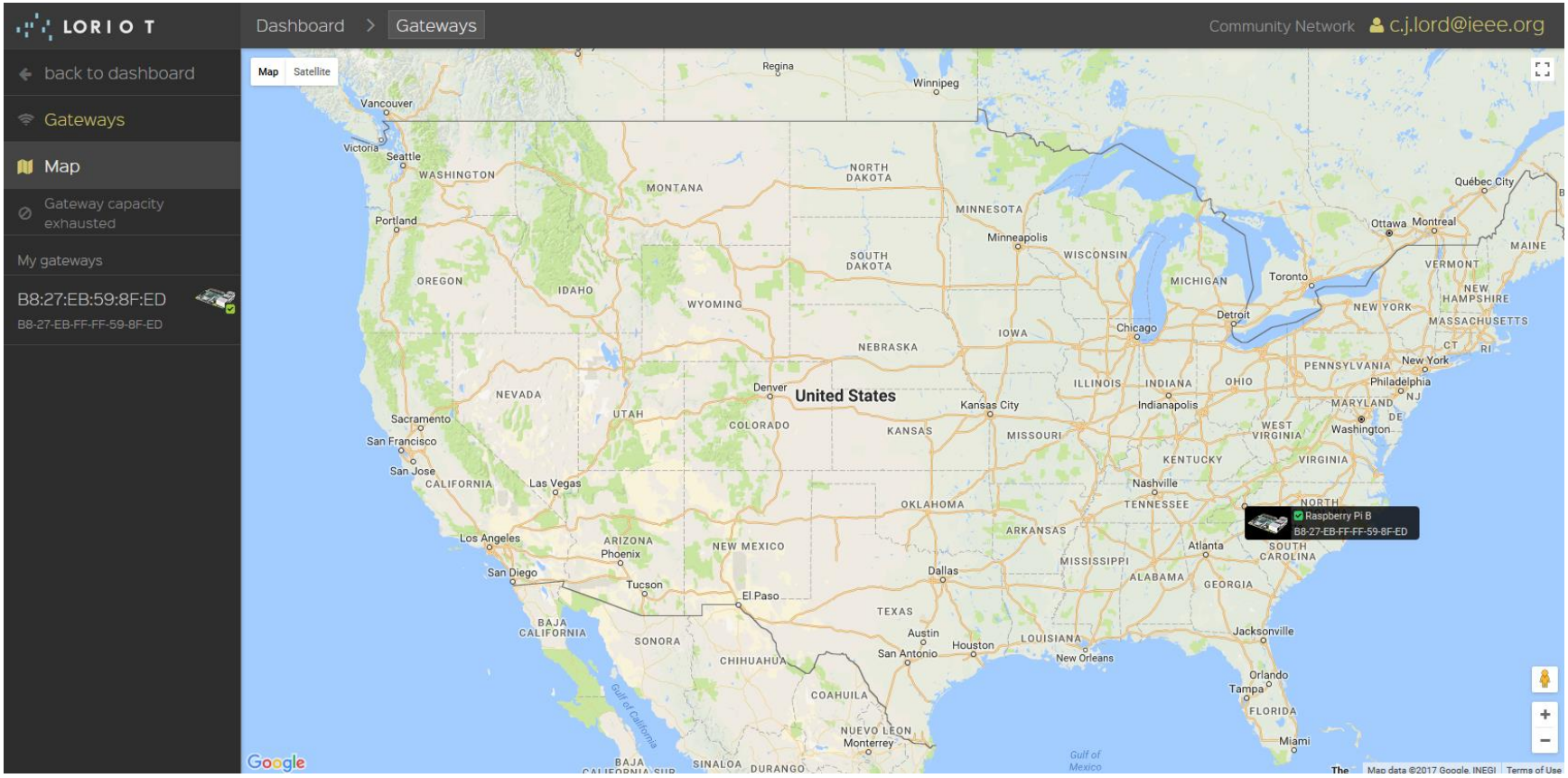


Channel Plan (US)

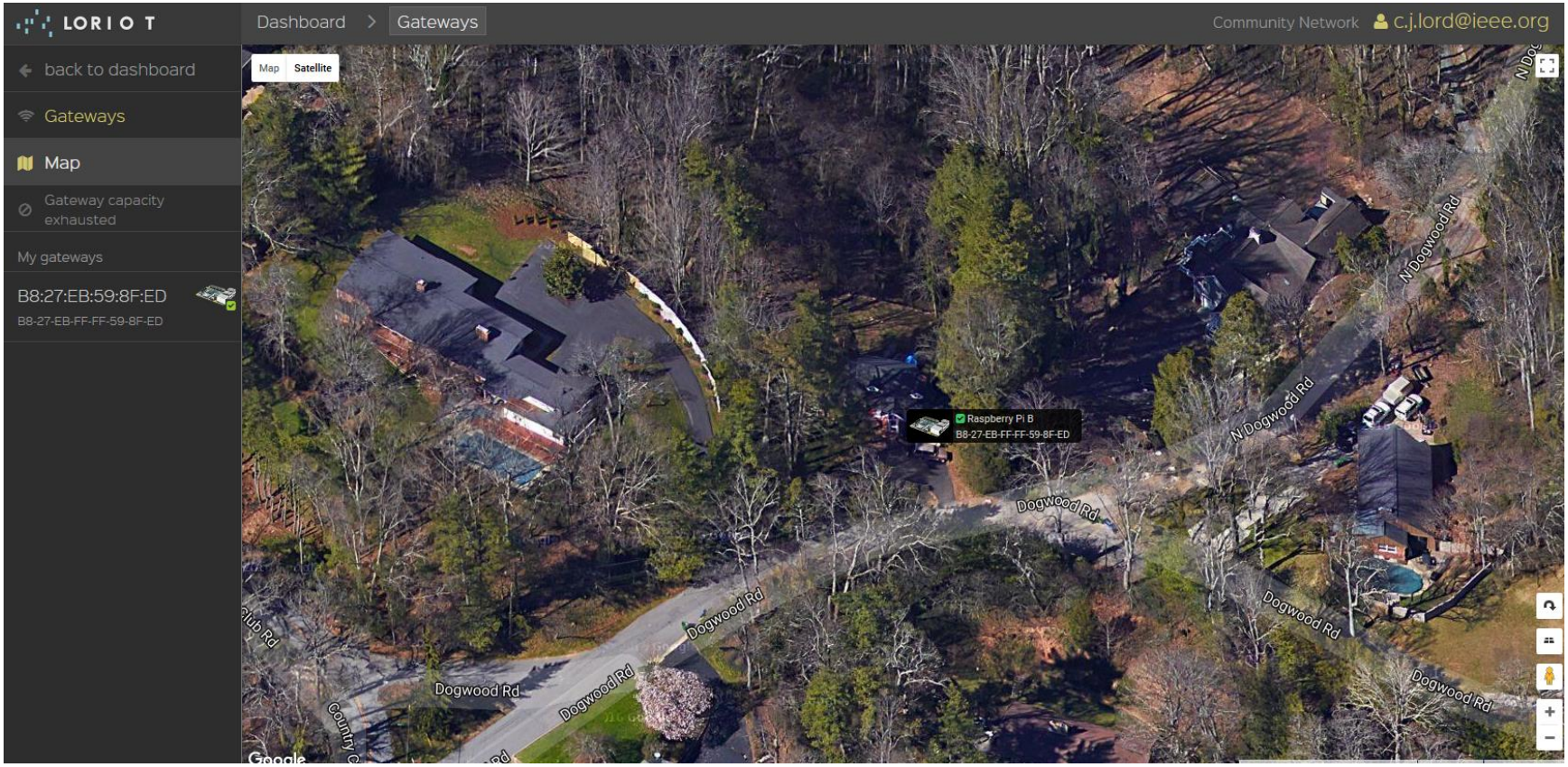
Channel allocation

Radio	Center frequency [MHz]	Bandwidth [kHz]	Modulation
0	902.300	125	MultiSF
0	902.500	125	MultiSF
0	902.700	125	MultiSF
0	902.900	125	MultiSF
1	903.100	125	MultiSF
1	903.300	125	MultiSF
1	903.500	125	MultiSF
1	903.700	125	MultiSF
0	903.000	500	SF8
0	902.700	250	FSK

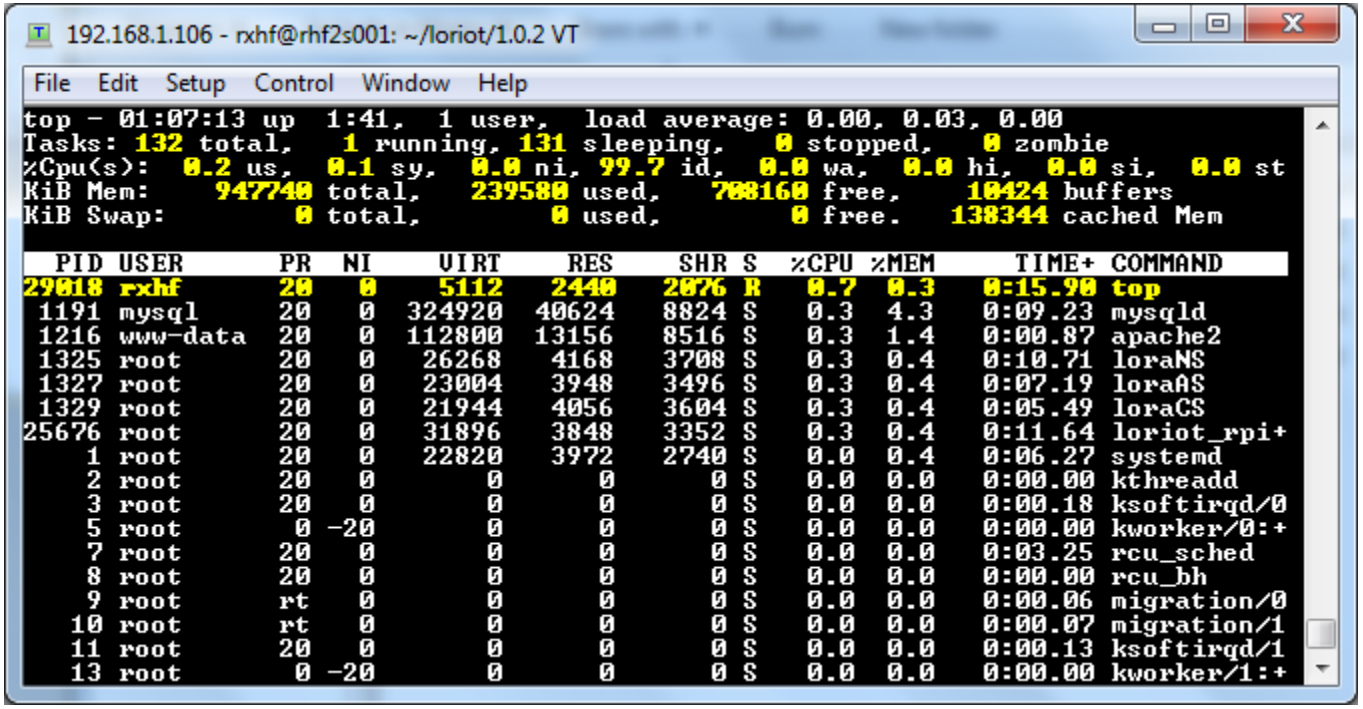
There I am


LORIOT
Dashboard
Gateways
Community Network
c.j.lord@ieee.org
back to dashboard
Gateways
Map
Gateway capacity exhausted
My gateways
B8:27:EB:59:8F:ED
B8-27-EB-FF-FF-59-8F-ED
Map
Satellite
United States
Raspberry Pi B
B8-27-EB-FF-FF-59-8F-ED
Google

…up close and personal…

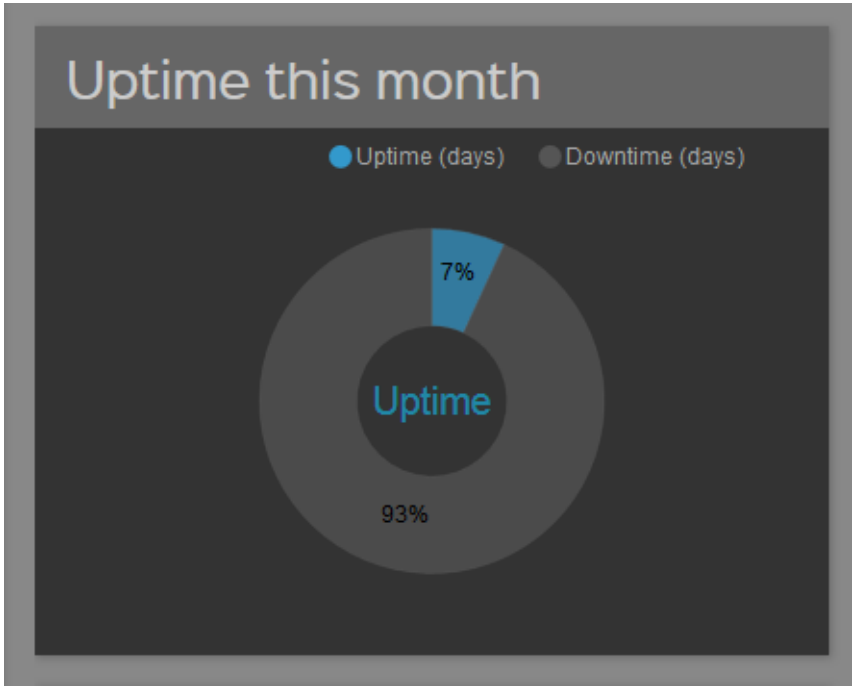


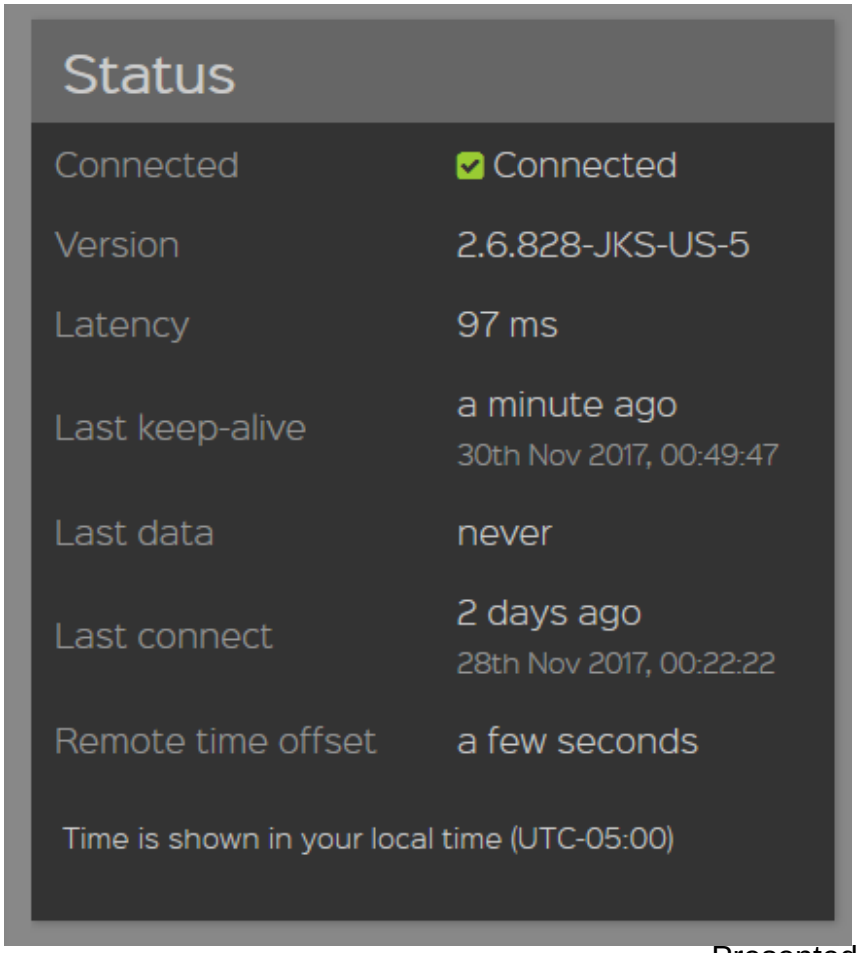
top command – There is Our Server



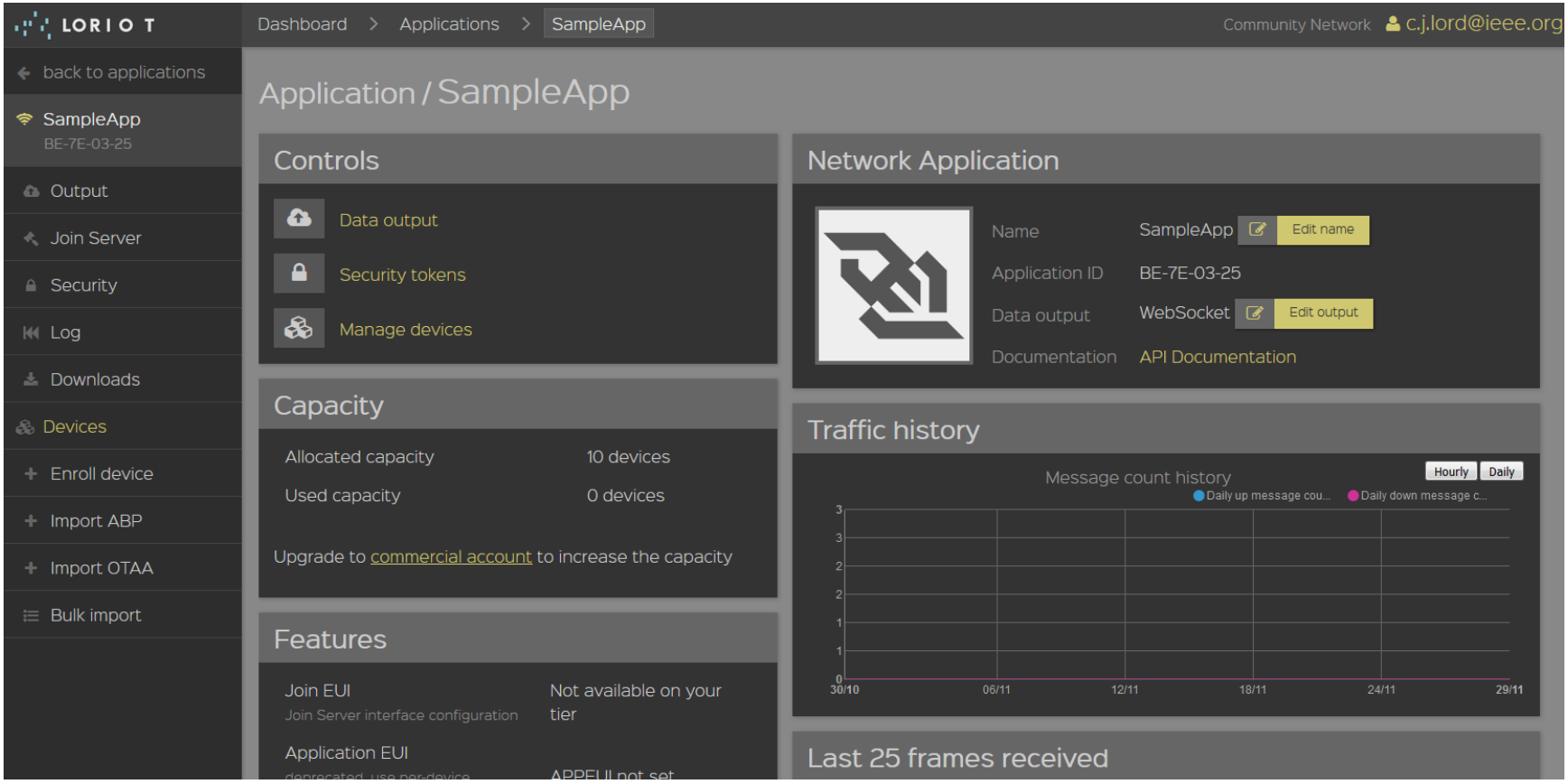
Question 3 – What is the Windows equivalent command?

After Two Days…





Coming Up Next



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Please stick around as I answer your questions!

- Please give me a moment to scroll back through the chat window to find your questions
- I will stay on chat as long as it takes to answer!
- I am available to answer simple questions or to consult (or offer in-house training for your company)
  c.j.lord@ieee.org
  http://www.blueridgetechnc.com
  http://www.linkedin.com/in/charleslord
  Twitter: @charleslord
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