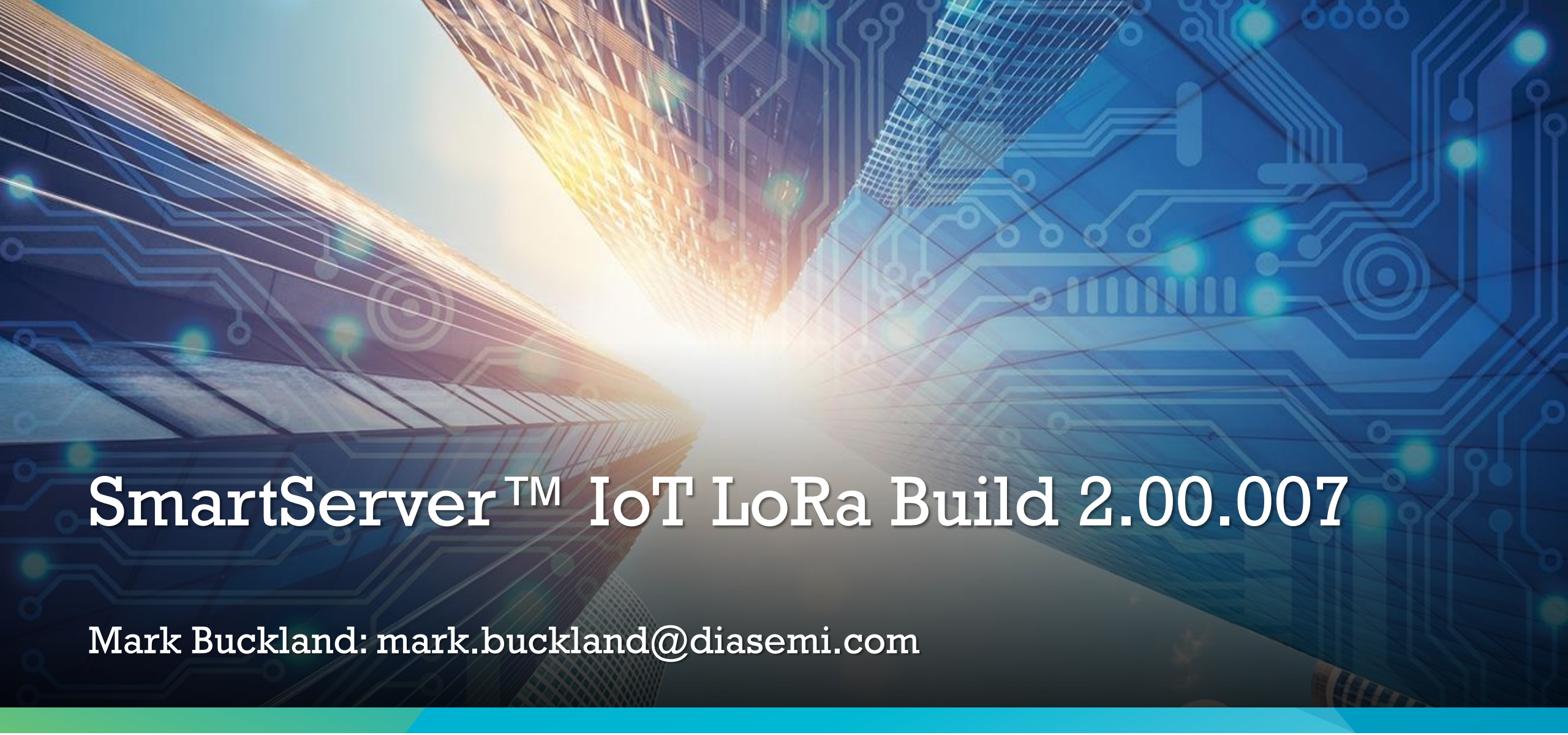


SmartServer™ IoT LoRa Build 2.00.007

Mark Buckland: mark.buckland@diasemi.com

MARCH 2022

© 2022 Dialog Semiconductor

Agenda: Essentials

- LoRa & LoraWAN
- LoRaWAN Architecture
- SmartServer IoT LoRaWAN Overview
- SmartServer IoT LoRaWAN 2.00.006 Specification
- ChirpStack LoRaWAN Network Server
- Hardware/IP Configuration
- Typical Hardware
- Server IoT and IAP Architecture
- Static LoRa Gateway Interface
- Integration Process Overview
- SmartServer IoT CMS
- Cloaning The SmartServer Image Overview
- Backup
- Connecting to ChirpStack
- Creating a Gateway
- Creating Devices
- JoinRequest/JoinAccept
- Auto Mapping
- LoRaWAN Device Naming Convention
- devices.csv File
- Are we there yet?
- lora_gw.btm File
- Generic IoT Node-RED Cloud Connector
- Redundant LoRa Gateways
- The View From BACnet Using YABE
- Log Files
- Deleting/Renaming Devices in ChirpStack
- MQTT Ports
- Adding New Device Types
- Chaging Passwords
- Q&A

© 2022 Dialog Semiconductor

Agenda: Adding Non-LoRa Devices

- Adding Non-LoRa Devices
- BACnet Discovery
- Types
- Setting Device and Datapoint Names
- Setting Datapoint Polling Rates & DBW
- EPS
- Q&A

© 2022 Dialog Semiconductor

Agenda: Detailed Configuration Instructions

- Pre-requisites
- Under The Hood
- ChirpStack Application Server MQTT Output
- Configuring MultiTech Gateway
- Configuring RAK7258 Gateway
- Cloning SmartServer IoT Image
- Creating The Gateway in ChirpStack
- Creating LoRa WAN Devices in ChirpStack
- SmartServer Datapoint Browser Polling Rate
- SmartServer Upgrades
- Setting the SmartServer Date
- Setting App Keys and Adjusting TX Rates
- Testing the Gateway
- Testing Devices
- Finding PC Serial Port
- Putty Serial Connection
- Finding SmartServer IPV4 Address
- Log Files
- Using Yabe
- MQTT Debugging
- Backup
- Configuring Node-RED Cloud Connections
  - GCP
  - AWS
  - Azure
- Deleting Devices
- Q&A

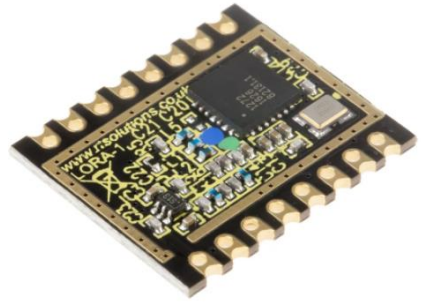
© 2022 Dialog Semiconductor

The Essentials

Adesto

LoRa & LoRaWAN

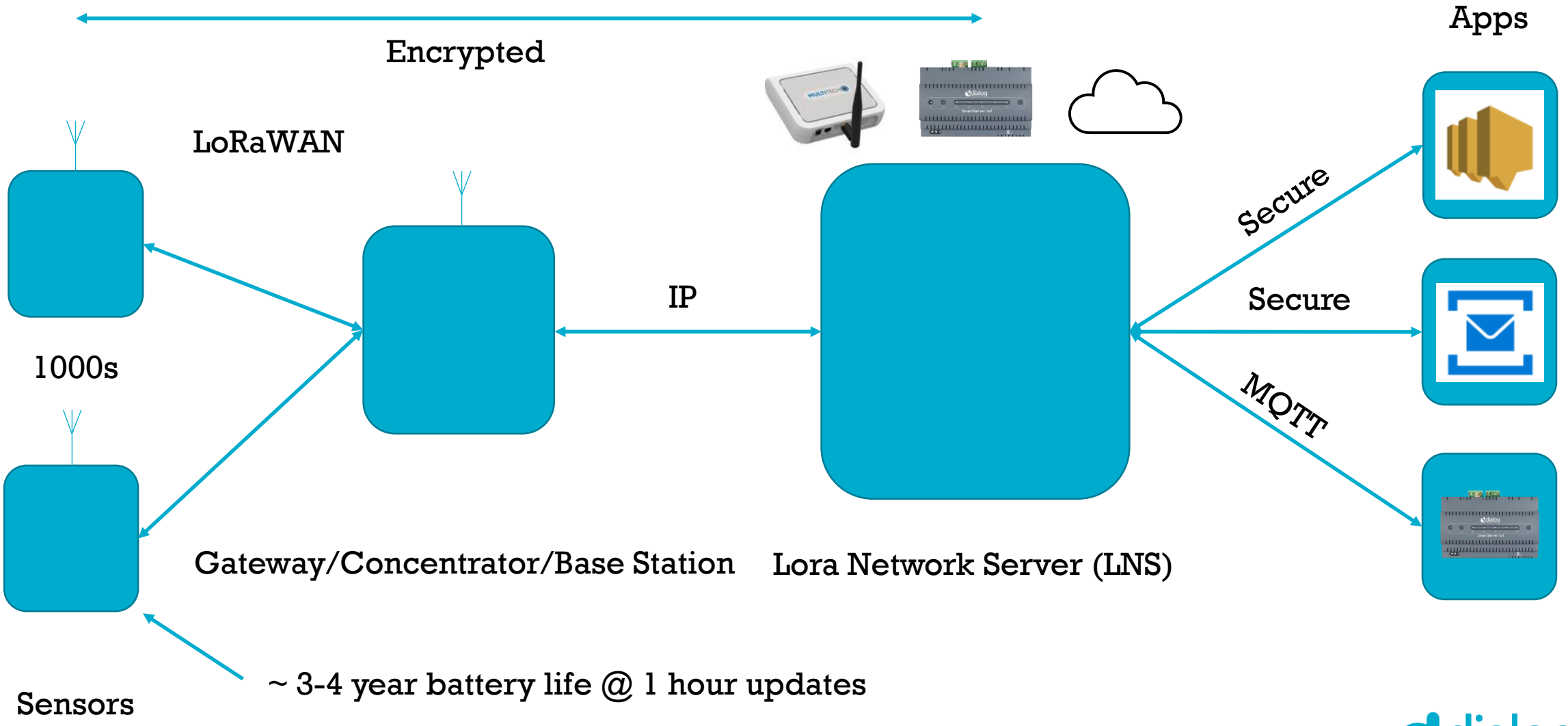
- LoRa (Long Range) is a low-power wide-area network (LPWAN) protocol developed by Semtech.
  - Based on spread spectrum modulation
  - Uses license-free sub-gigahertz radio frequency bands like 433 MHz, 868 MHz (Europe), 915 MHz (Australia and North America), 865 MHz to 867 MHz (India) and 923 MHz (Asia).
  - Enables long-range transmissions (more than 10 km in rural areas) with low power consumption
  - Achieves data rates from 27 Kbps to 0.3 Kbps depending upon the spreading factor.
- LoRa covers the physical layer, while other technologies and protocols such as LoRaWAN (Long Range Wide Area Network) cover the upper layers.
- The LoRa Alliance® is an open, nonprofit association that has grown to more than 500 members whose mission is to develop and promote LoRaWAN® technology and its ecosystem to deliver massive IoT



RF Solutions
LoRa Module

© 2022 Dialog Semiconductor

LoRaWAN Architecture

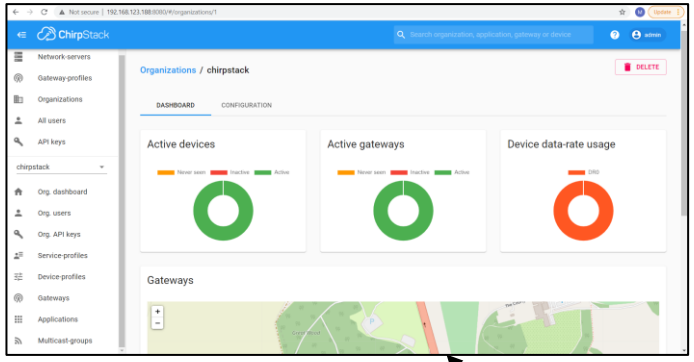


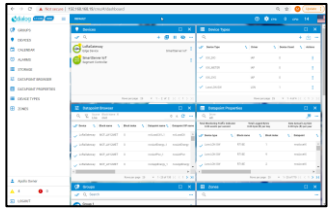
© 2022 Dialog Semiconductor

SmartServer IoT LoRaWAN Overview

LoRaWAN Sensors

ChirpStack LoRaWAN Network Server





MQTT Cloud

OPC UA

IAP Internet of Things ACCESS PROTOCOL

data fabric

BACnet

LON

Modbus

IAP

LoRaWAN

ANSI/CTA 709.10

© 2022 Dialog Semiconductor

dialog SEMICONDUCTOR

2.00.007 Specification

- SmartServer 3.26.001
  - Ubunutu 20.04
  - TLS 1.3
  - PostgresSQL 12.0
  - Log4j hotfix applied
- ChirpStack 3.1.5
  - Improved data logging
- Auto LoRaWAN to BACnet mapping
- Tested with the following LoRaWAN gateways:
  - MultiTech MTCAP 868 Series
  - RAK 7258
  - RAK 7268
- Typical minimum LoRaWAN uplink rate 15 minutes (ex. alarms)
- CMS browser poll rate = 0 (for MQTT bandwidth reasons)
- Typically 20% CPU loading
- Additional BACnet, LON, Modbus & IAP devices may be added within certain constraints (EPS, CPU% etc.)
- OPC UA support

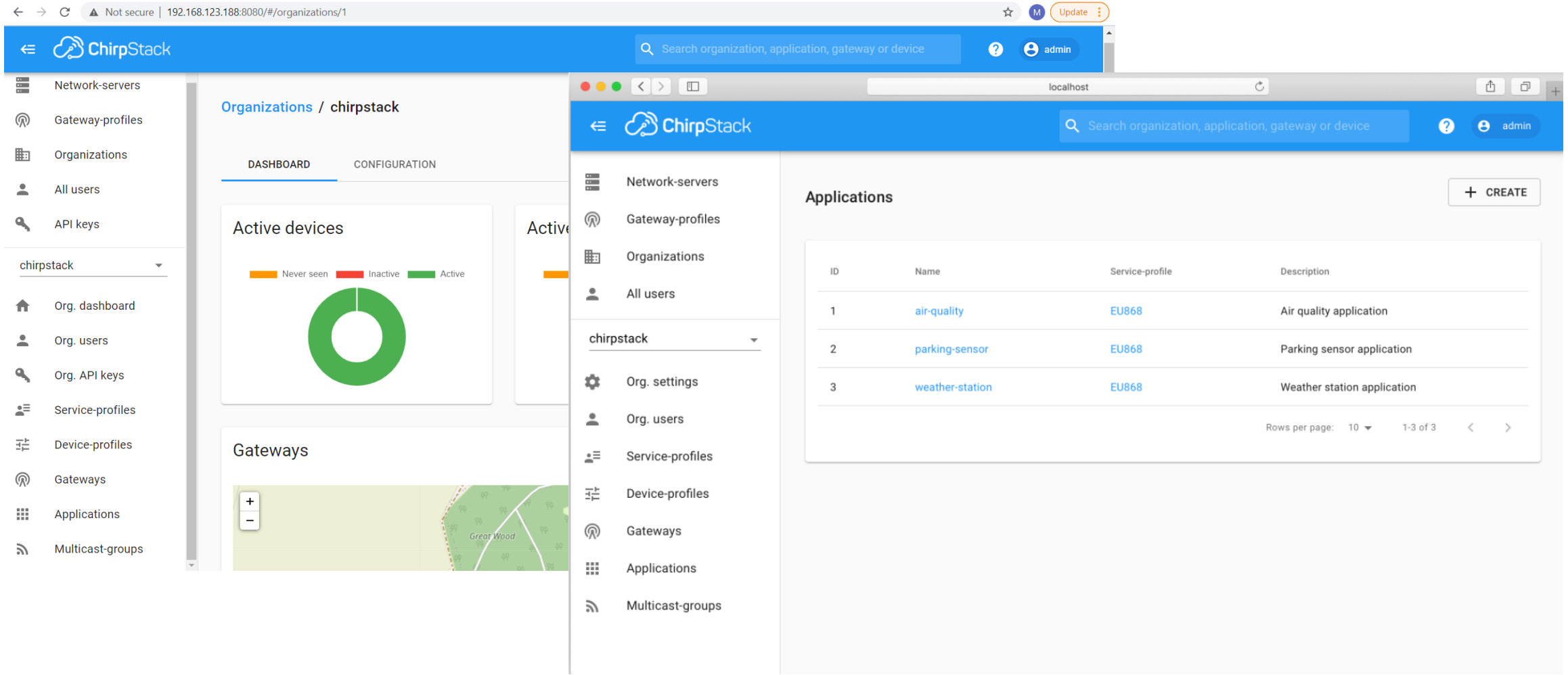
Support for 10* each of the following device types:

- Netvox R712
- Netvox R718N17
- Netvox R718N37
- Netvox R718N315
- Netvox R718E
- Netvox R718E
- Netvox R311FA
- Netvox R313WA
- Netvox 718AB
- Netvox 718AD
- Netvox 718DB
- IMBuildings IM_Counter_EU_W
- MC Climate MC_LW_TH01
- MC Climate Vicki
- Elsys ERS_LITE
- Elsys ERS_CO2
- Elsys ERS_CO2_LITE
- Elsys ERS_EYE
- EnLink ENL-AIR
- EnLink ENL_STS_AF
- Milesight AM319

*Can be adjusted as required – 4096 DPs max

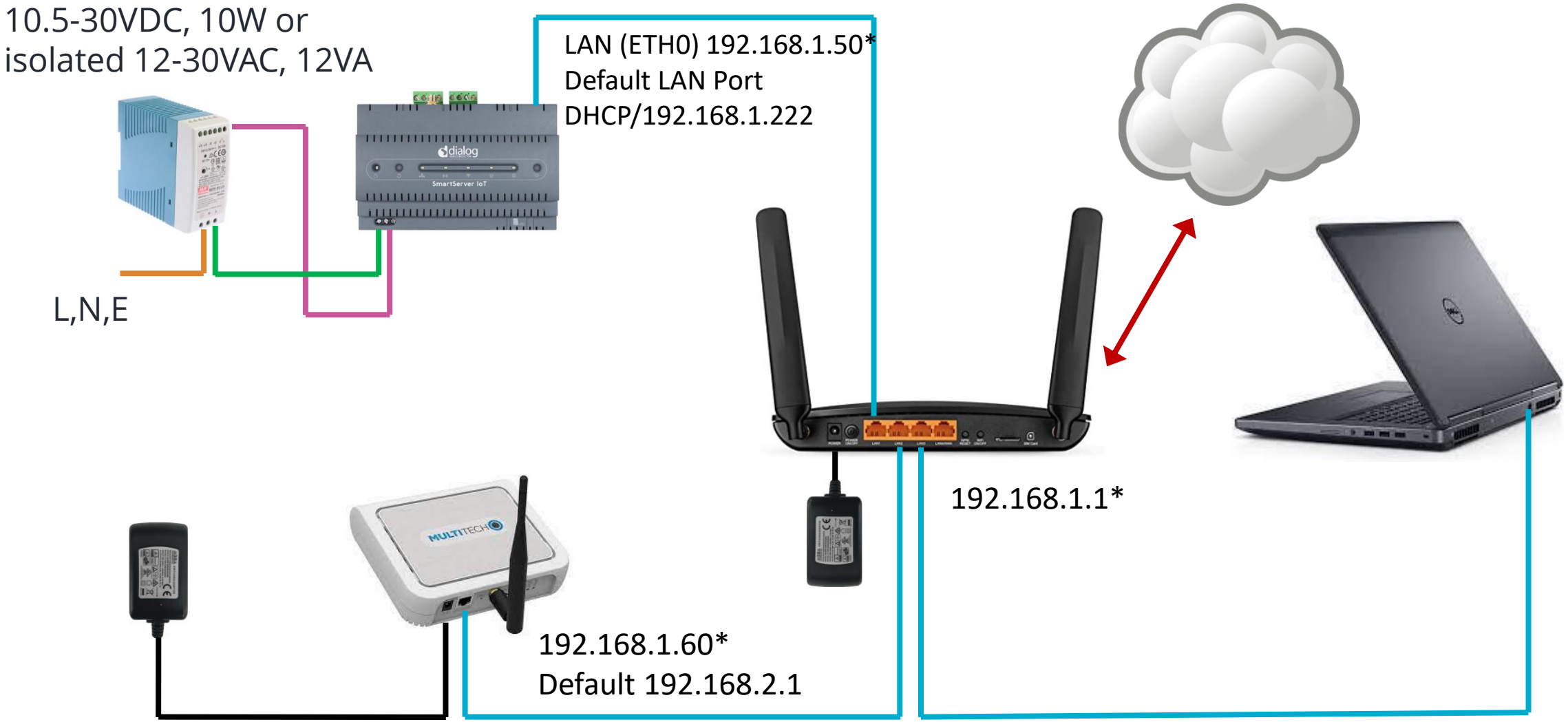
© 2022 Dialog Semiconductor

ChirpStack, open-source LoRaWAN® Network Server stack



© 2022 Dialog Semiconductor

Hardware/IP Configuration

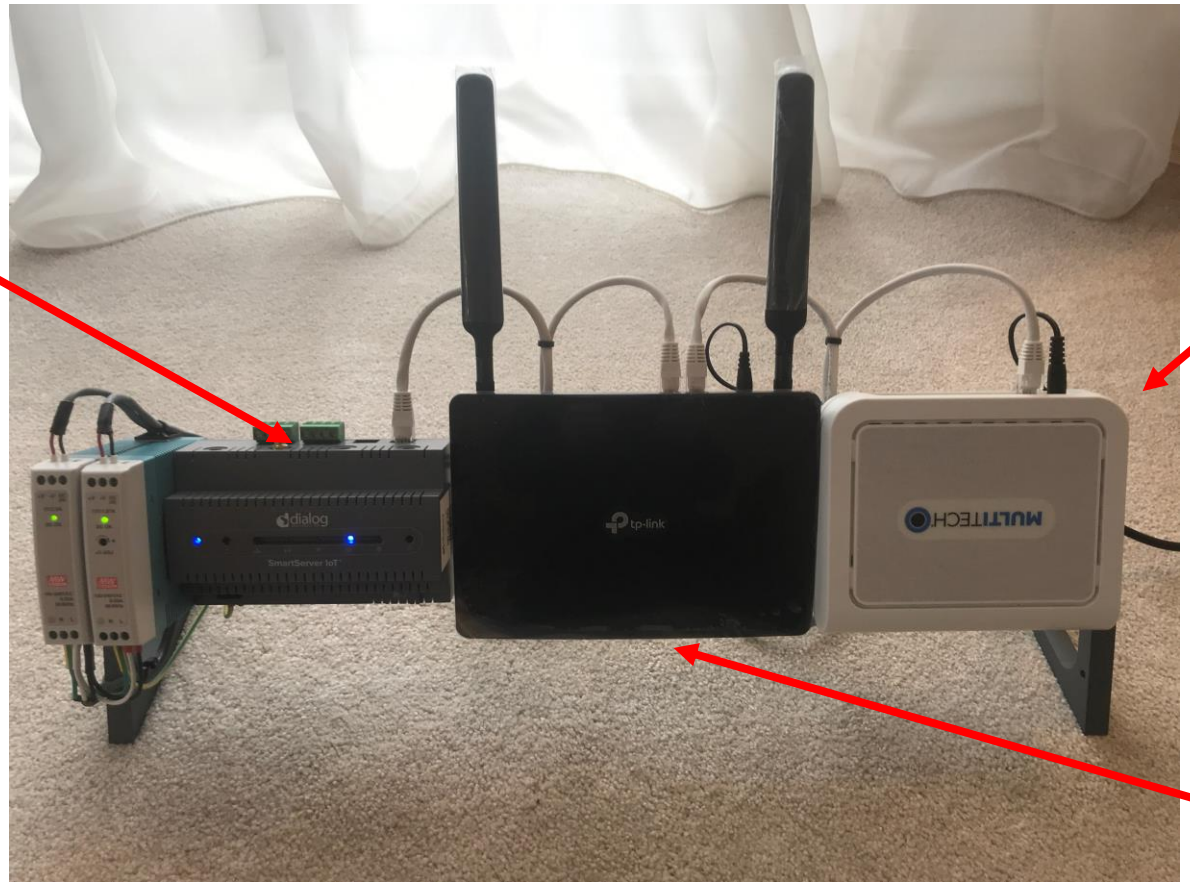


© 2022 Dialog Semiconductor

* As Required

Typical Hardware

SmartServer IoT



LoRa Gateway

IP Infrastructure

© 2022 Dialog Semiconductor

SmartServer IoT and IAP Architecture

Published Cloud Integrations

Google Cloud Azure IBM Cloud

LoRa Integration

docker Support

Node-RED Development

TALQ Support

AI and Analytics Service

BMS or OPC Client

Central Management System (CMS)

IAP/MQTT

IAP/REST

Control Application

IoT Apps & Web Pages

Ethernet Interface

SmartServer IoT

Scheduler Service | Connection Service | Alarm Service | OPC UA Server | IAP/MQTT Message Broker | BACnet Server | CMS and IAP/REST Server | Custom Web Pages | lora_gw

IoT Access Protocol (IAP/MQTT) Message Bus

BACnet Driver | Modbus Driver | LON Driver | IAP Driver | Custom Driver

Hardware Interface Bus

RS-485 Interface | RS-485 Interface | Ethernet Interface | USB Interfaces

Modbus RTU

Custom RS-485

LON/IP, LON IP-852, BACnet/IP, Modbus TCP

U60 LON FT | U60 LON TP-1250 | IOX | Custom Interface

IAP Internet of Things ACCESS PROTOCOL

Legend

- Services
- Server interfaces
- Driver interfaces
- HW interfaces
- 3rd party modules
- Custom Services/ Apps

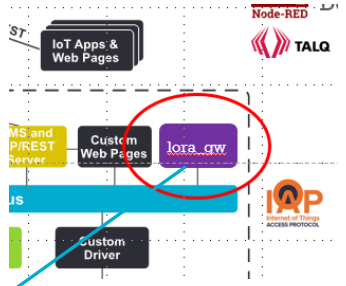
© 2022 Dialog Semiconductor

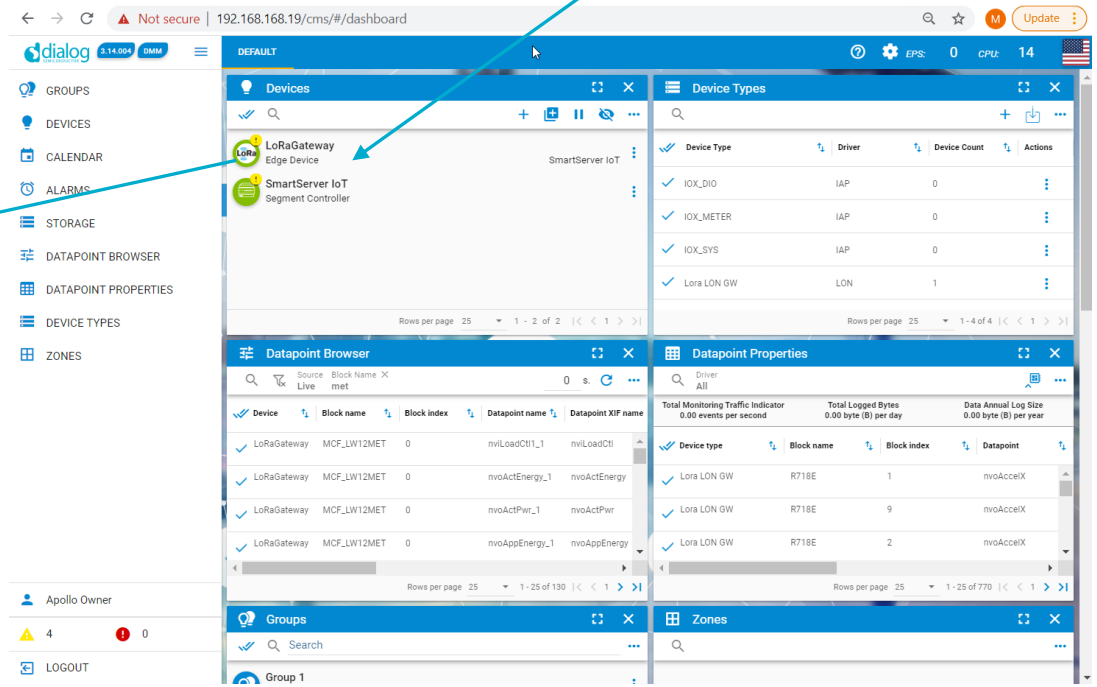
dialog SEMICONDUCTOR

Static LoRa Gateway Interface

ERS_CO2/0 – ERS_CO2/n-1

AM319/0 – AM319/n-1



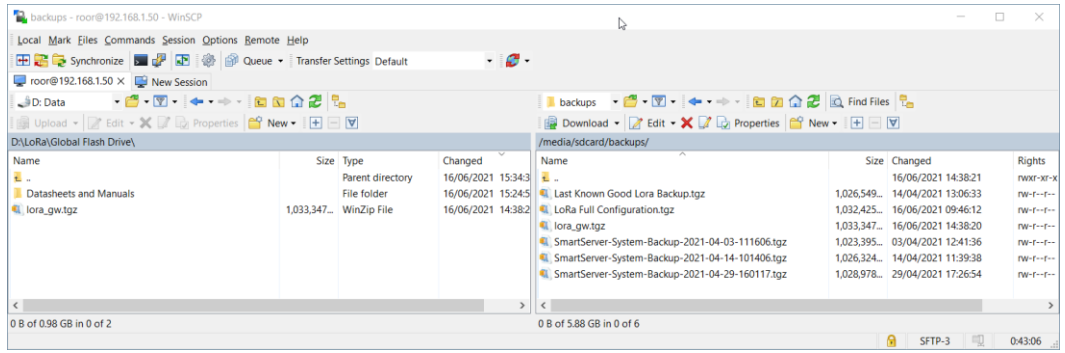


© 2022 Dialog Semiconductor

Integration Process Overview - As Minimalist As It Gets

Your key take aways:

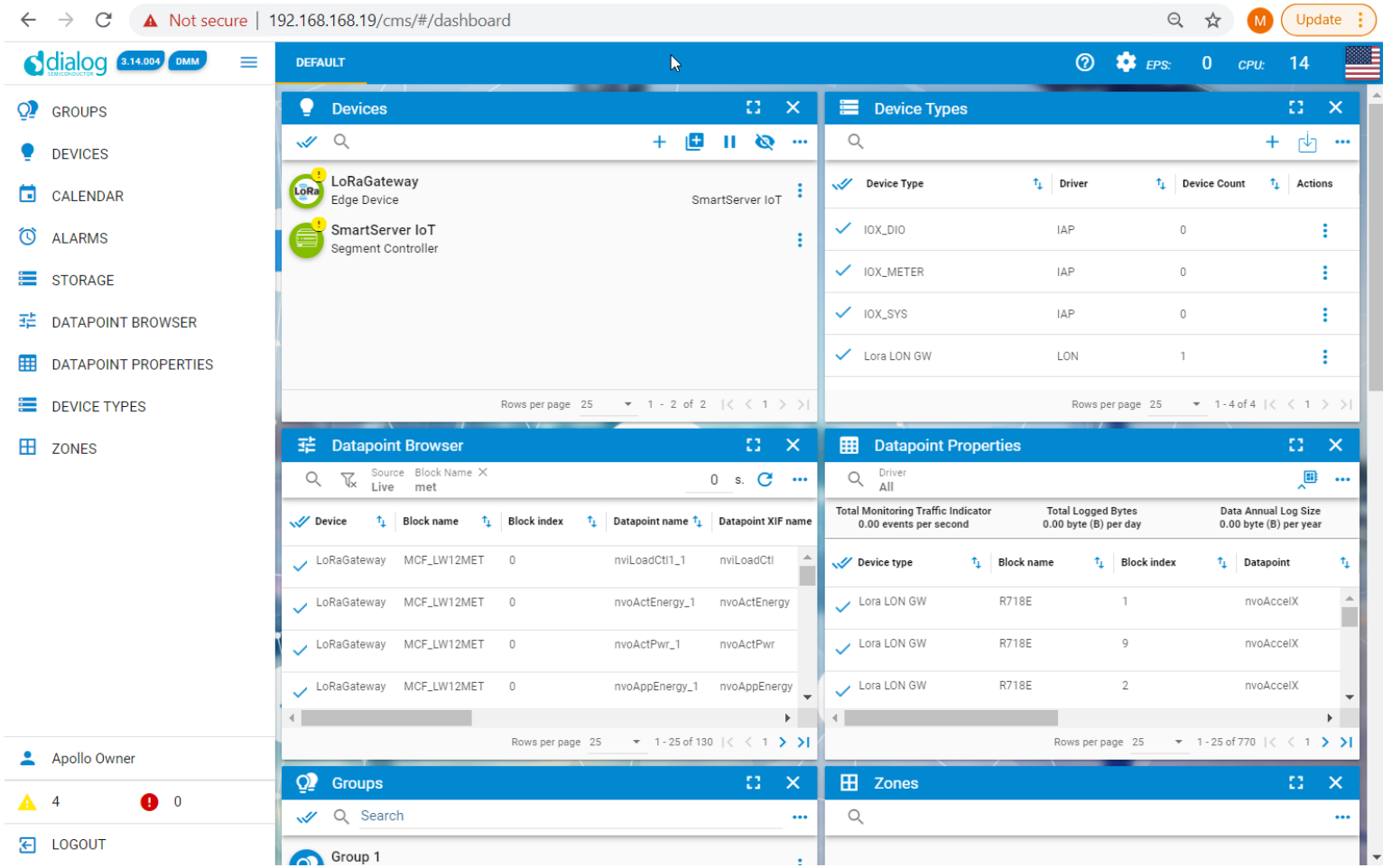
- Configure external LoRaWAN gateway(s)
- Clone standard LoRa gateway image to target SmartServer
- Add Gateway in ChirpStack
- Add LoRaWAN devices in ChirpStack (Profile, Name, DevEUI, App Key
- Check join requests/join accepts
- Go to lunch for 90 minutes
- Test & Backup



© 2022 Dialog Semiconductor

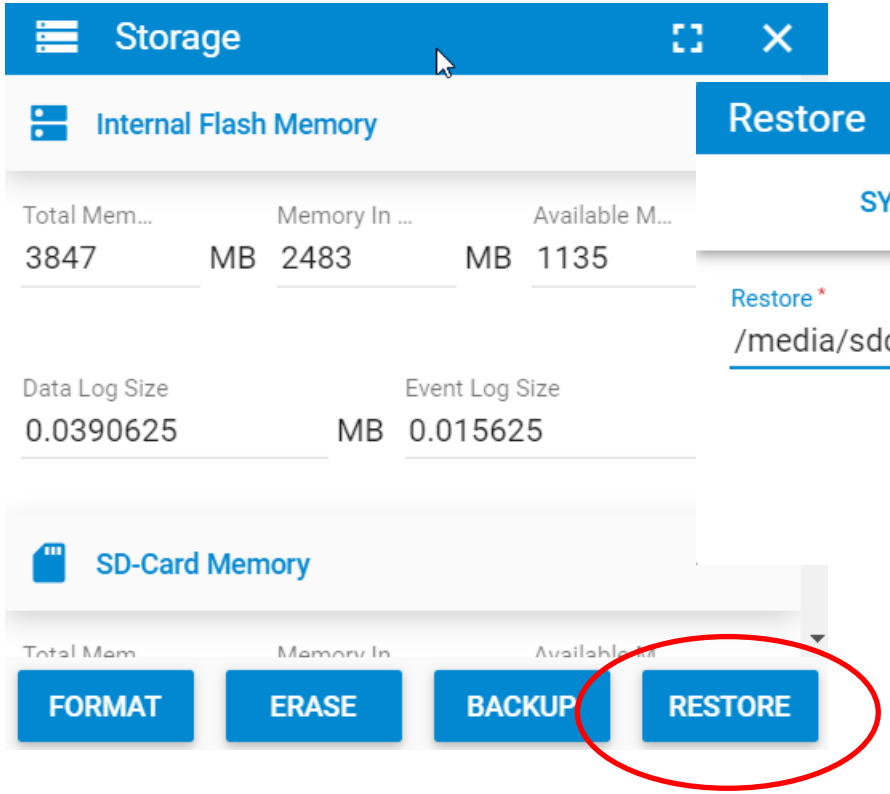
SmartServer IoT CMS

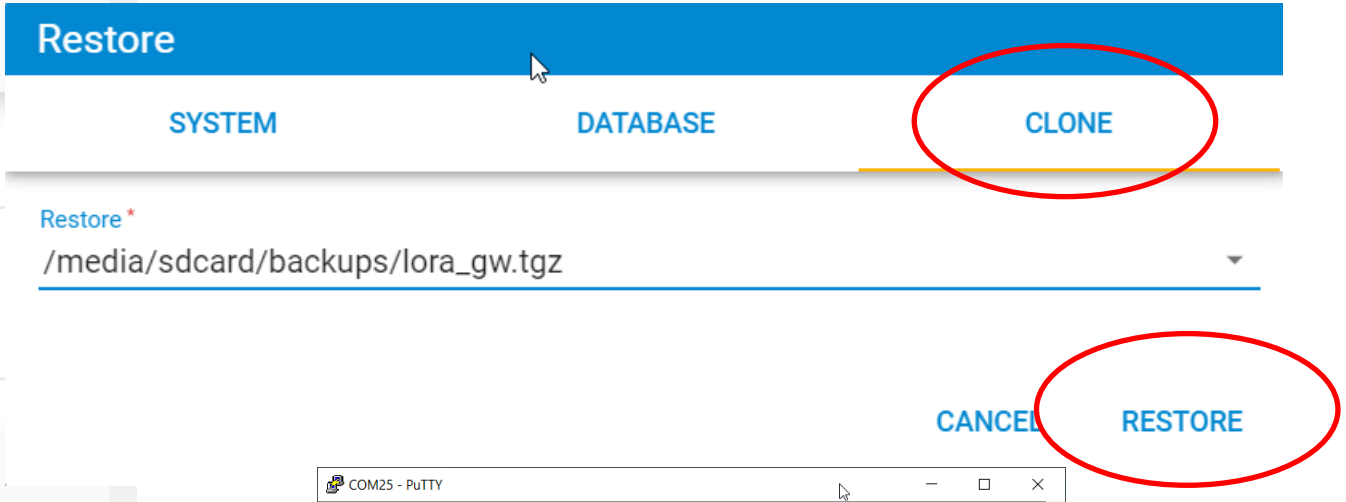
192.168.1.50/cms apollo/Sgq4-2FKQ

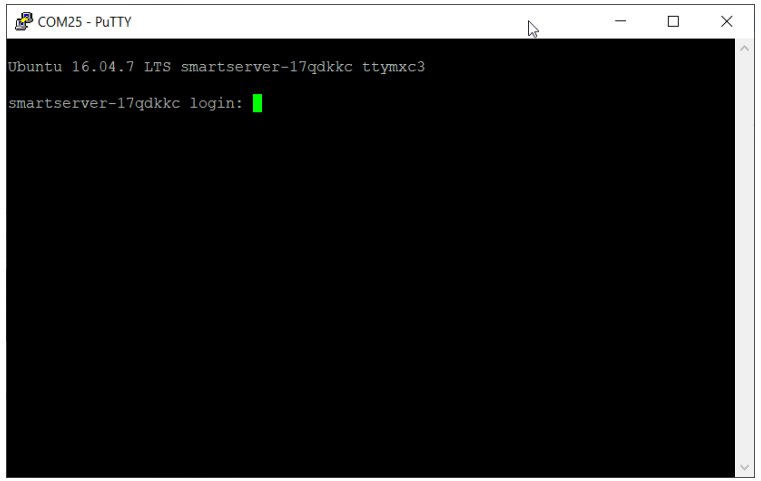


© 2022 Dialog Semiconductor

Clone Image – Clone Image







Notes:

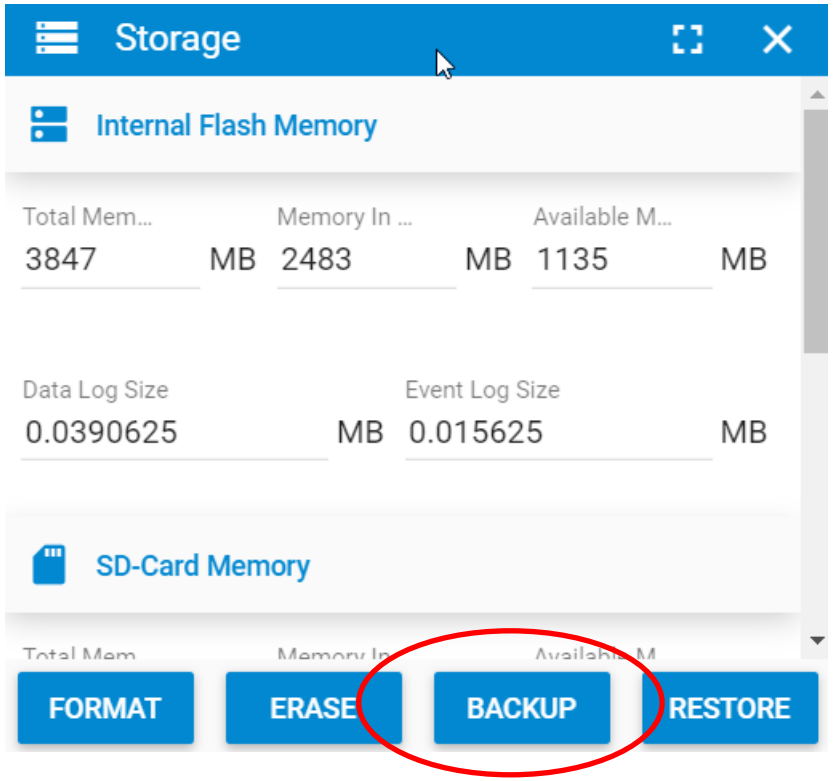
1) Monitor progress using a serial console (Putty with 115200 baud) connection

2) SmartServer will have the password from the imaged device after cloning

© 2022 Dialog Semiconductor

Backup

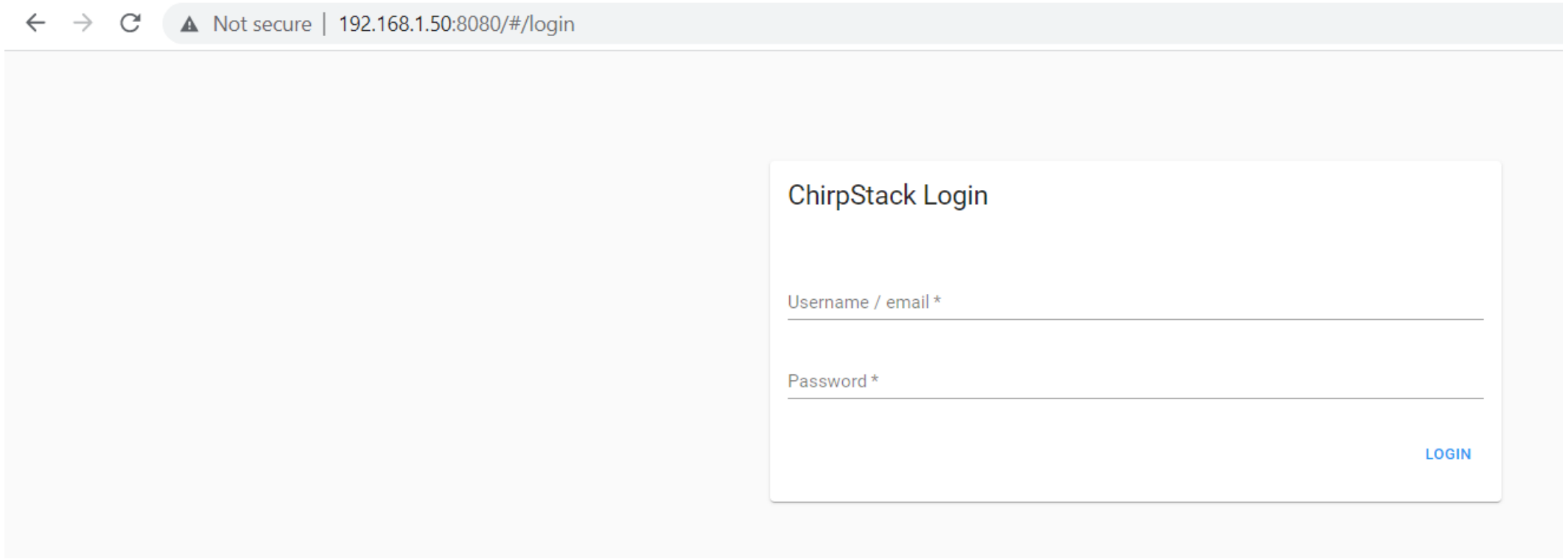
- Once configured, take a backup and save in a few places….
- Backup system, not database
- Takes around 35 minutes



© 2022 Dialog Semiconductor

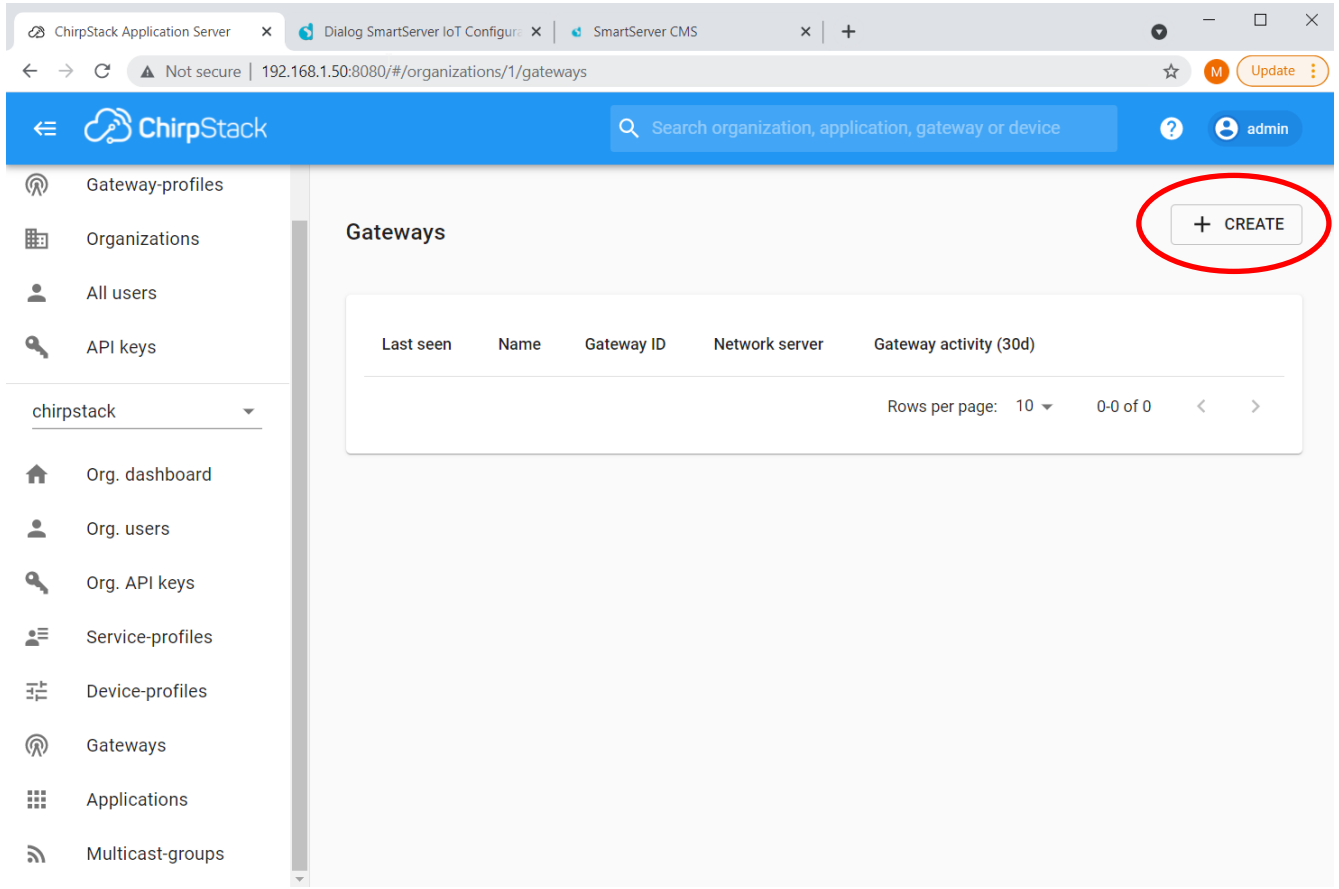
Connecting to ChirpStack

192.168.1.50:8080 admin/Sgq4-2FKQ



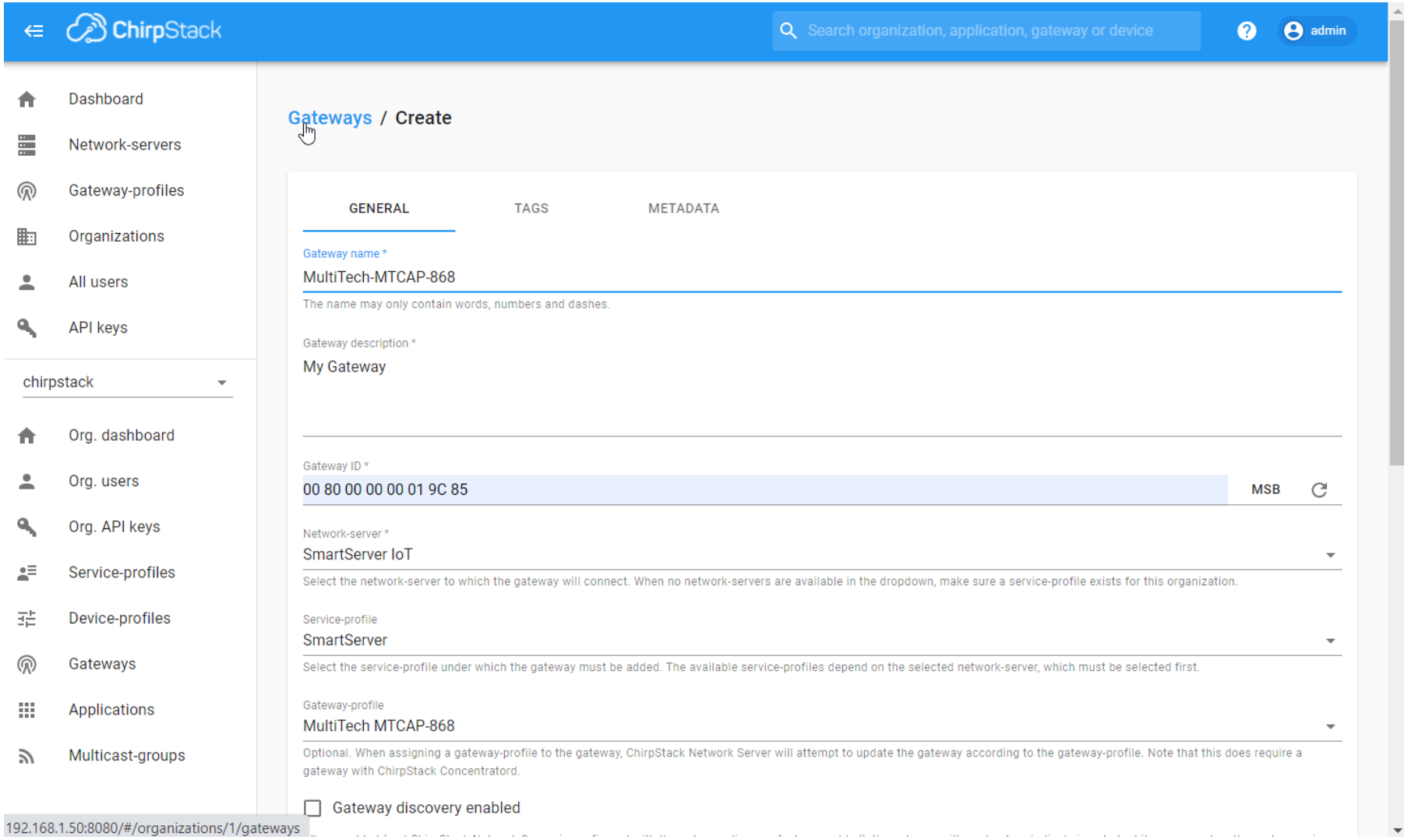
© 2022 Dialog Semiconductor

Creating LoRaWAN Gateway in Chirpstack



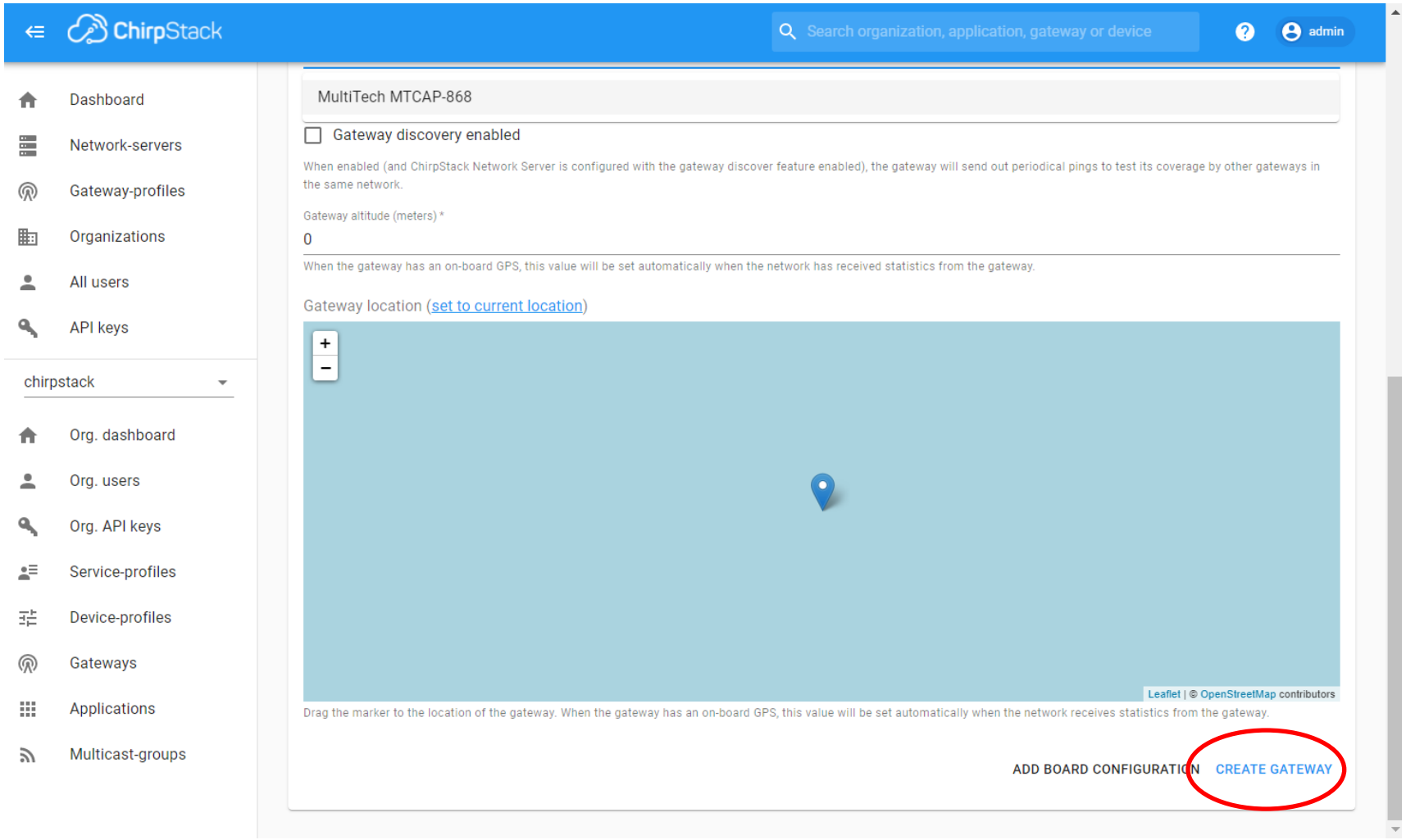
© 2022 Dialog Semiconductor

Creating LoRaWAN Gateway in Chirpstack (cont.)



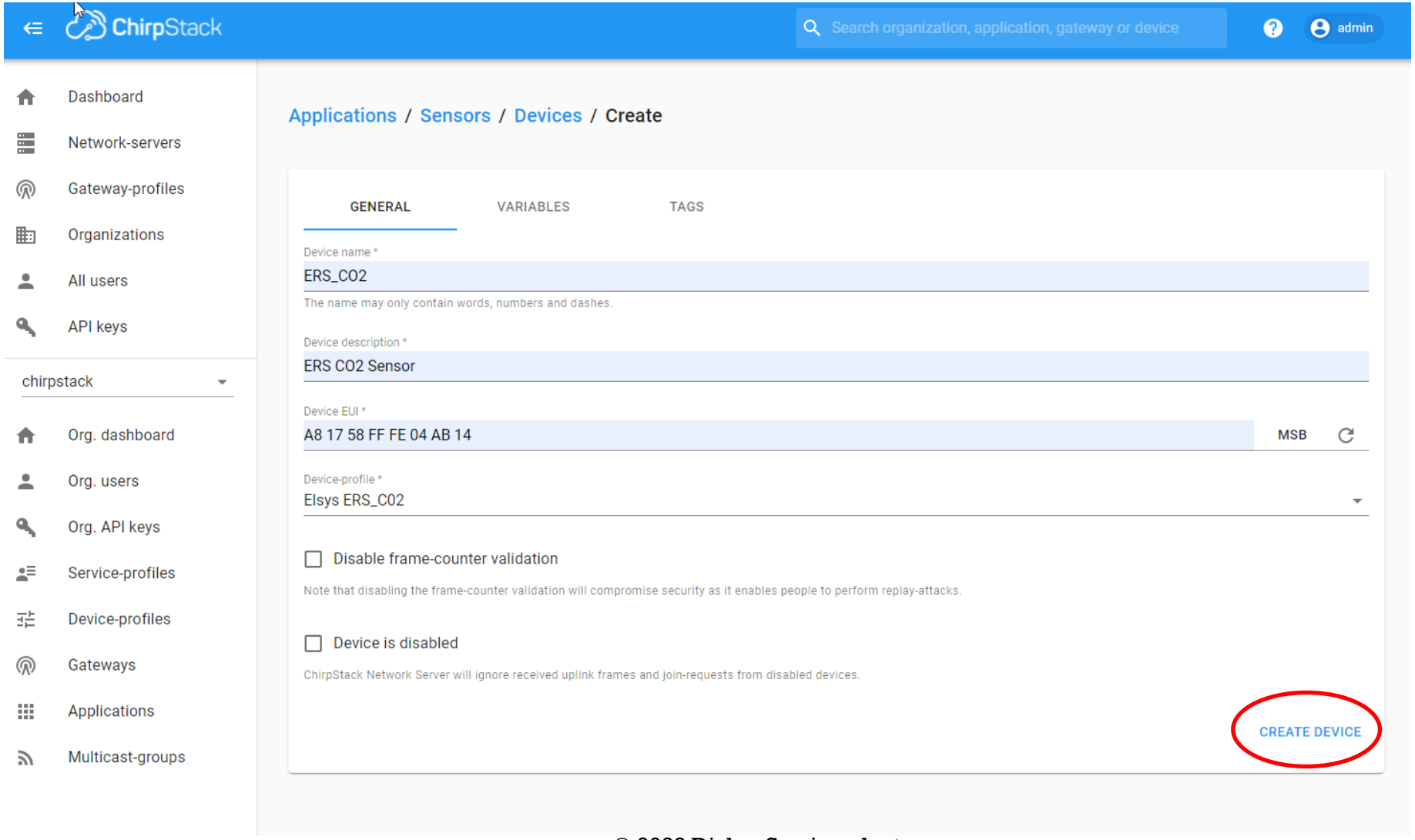
© 2022 Dialog Semiconductor

Creating LoRaWAN Gateway in Chirpstack (cont.)



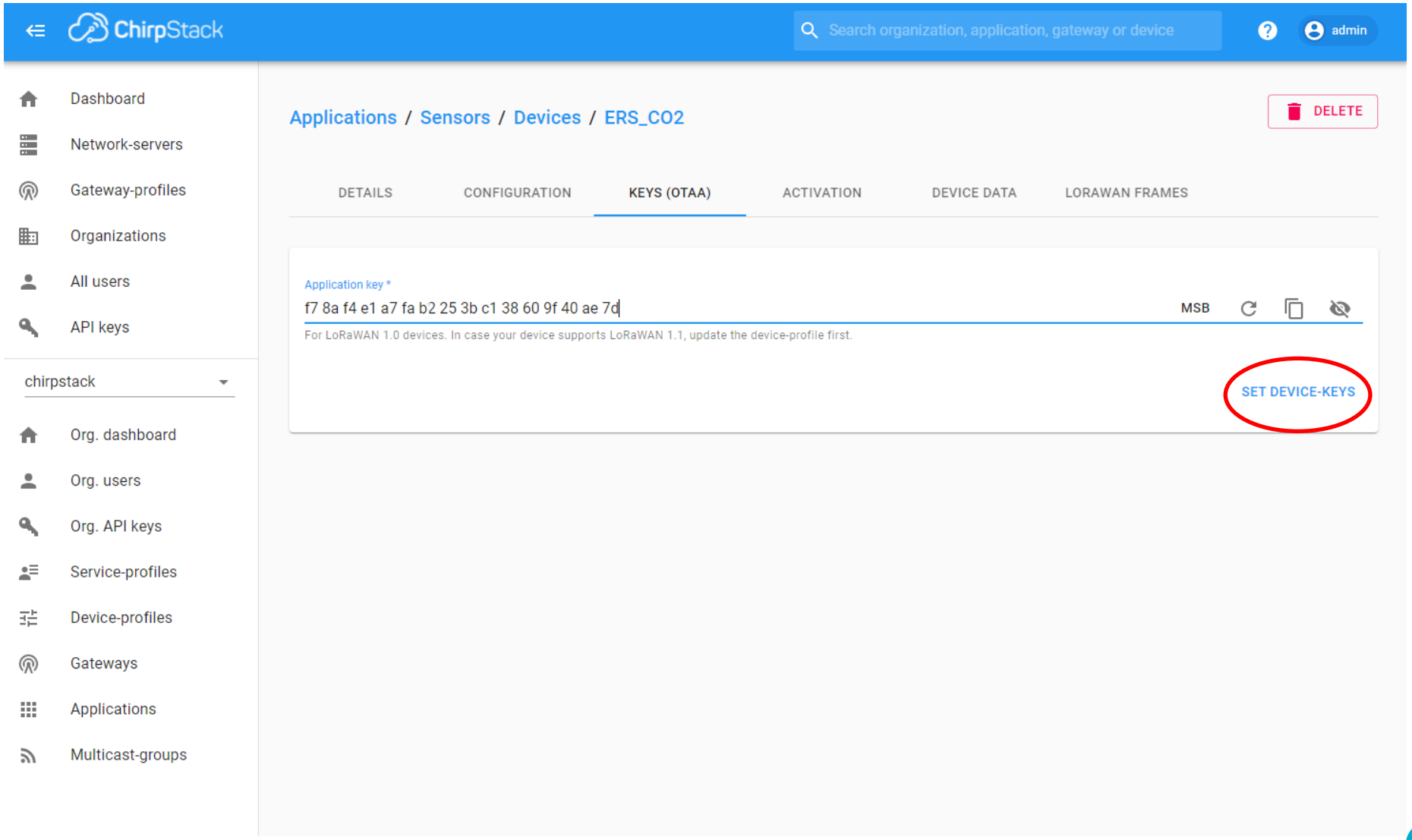
© 2022 Dialog Semiconductor

Creating LoRaWAN Devices in ChirpStack



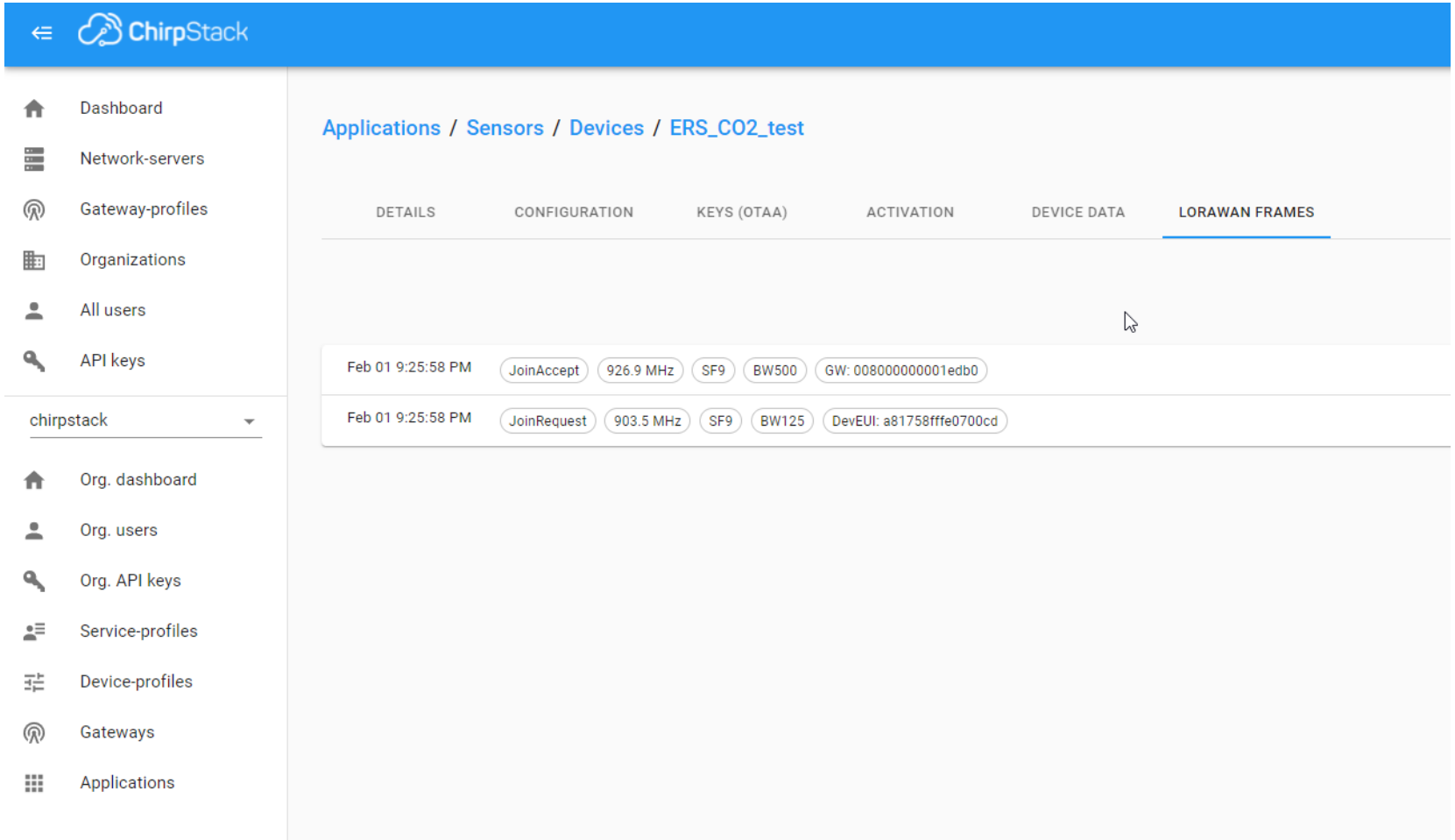
© 2022 Dialog Semiconductor

Creating LoRaWAN Devices in ChirpStack



© 2022 Dialog Semiconductor

JoinRequest/JoinAccept



© 2022 Dialog Semiconductor

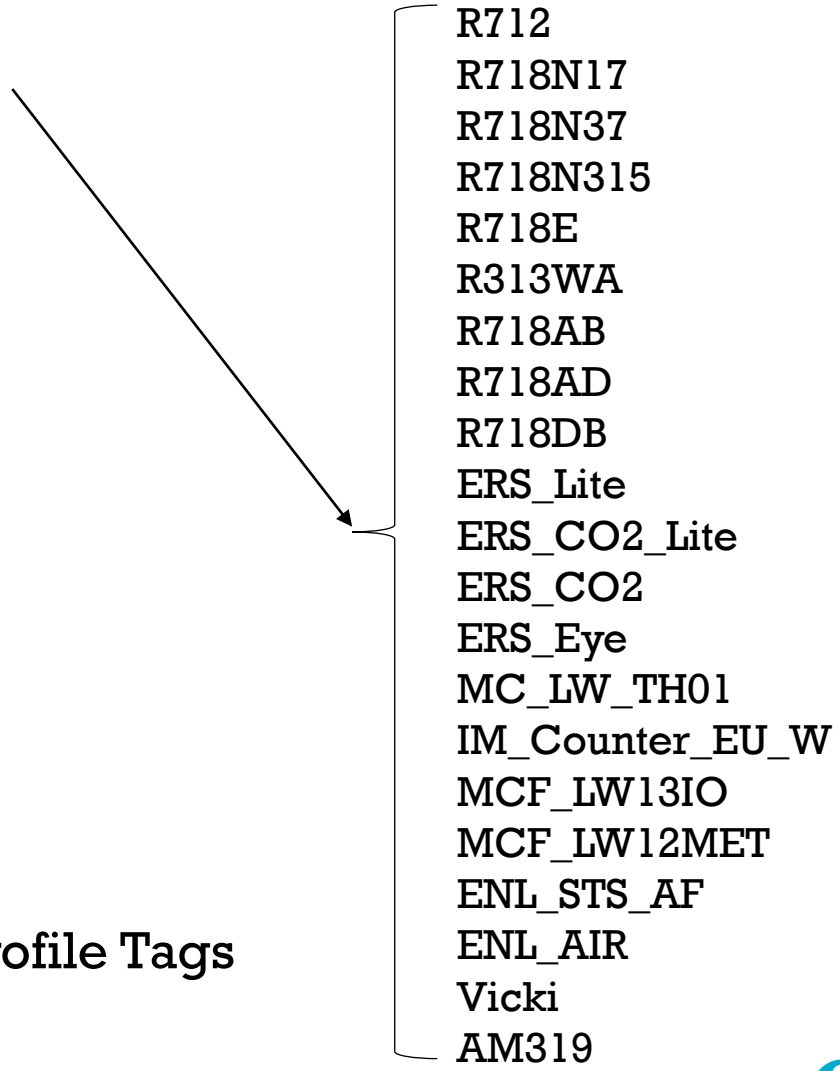
Automatic Mapping

- LoRaWAN DevEUIs have to be statically mapped to internal application blocks and block indices
- Internal application datapoints have to be mapped to BACnet objects
- Both operations require accurate data entry, so this is automated

© 2022 Dialog Semiconductor

LoRaWAN Device Naming Convention

- LoRaWAN device names must include their type
- No spaces are allowed
- Only alphanumeric characters and underscores
- For example:
  - R712
  - R712_Outside
  - R313WA_Board_Room_Seat
  - AM319_Fourth_Floor_Air_Quality
- Later ChirpStack releases will include Device Profile Tags



© 2022 Dialog Semiconductor

devices.csv File

- Used to map LoRaWAN deveui to IAP/MQ blocks and block indices
- Automatically generated
  - Do not edit
- Includes the ChirpStack device name which includes the device type
- If necessary, add LoRaWAN devices in the order you wish them to appear in lora_gw.btm
- ChirpStack does not include the device profile tags in 3.1.5
- CSV file is initially unpopulated except for the headers
- Provides an as built BOM

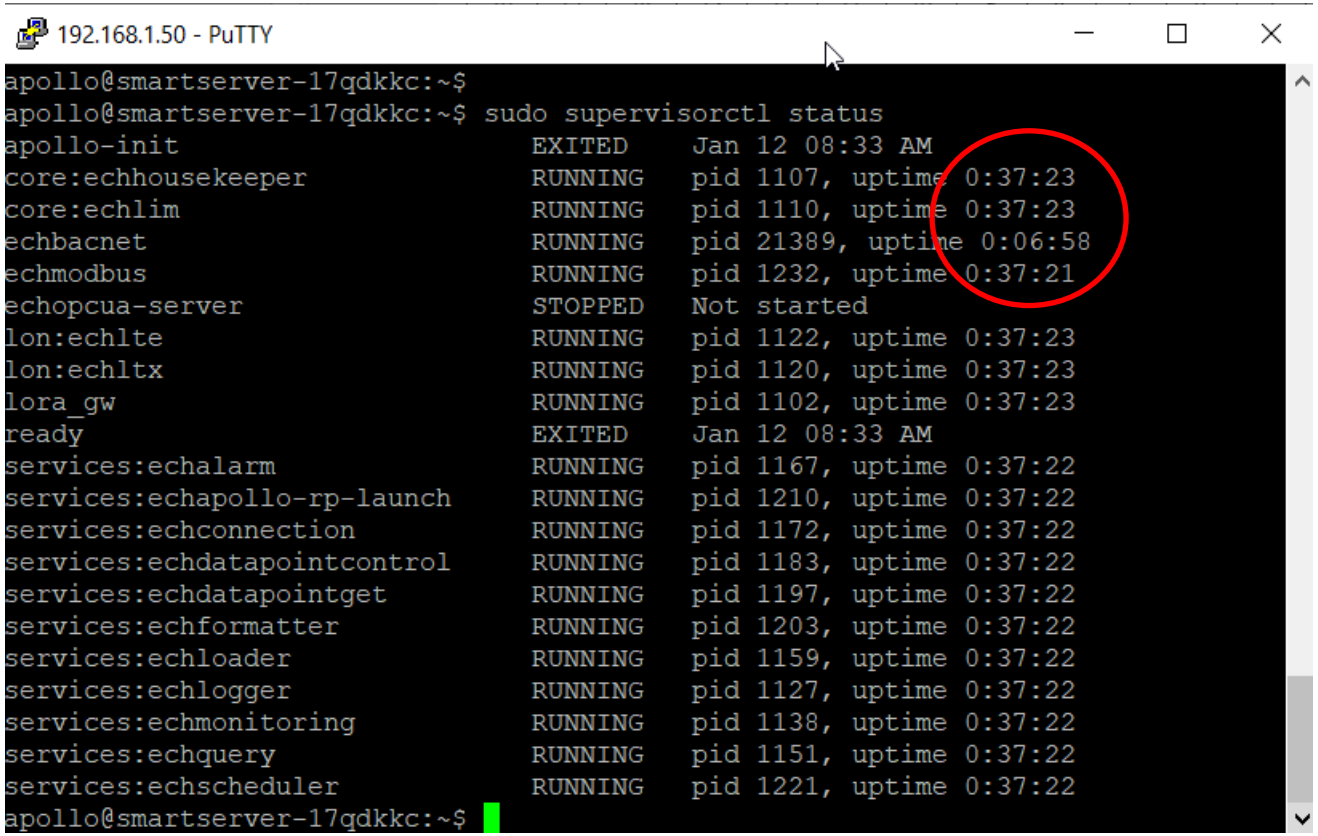
	A	B	C	D	E	F
1	pad	device_type	block_index	deveui	lora_application	device_name
2		ENL_STS_AF	0	0004a30b01275427	1	ENL_STS_AF_400_Second_Floor_VAV_Duct
3		ERS_CO2_Lite	0	a81758fffe0537a1	1	ERS_CO2_Lite_Fourth_Floor_Sales
4		R718E	0	00137a100000d69f	1	R718E_Heat_Exchanger_1
5		MCF_LW12MET	0	70b3d58ff10183b4	1	MCF-LW12MET
6		MCF_LW13IO	0	70b3d58ff10183ce	1	MCF-LW13IO
7		R718N315	0	00137a100000a2ac	1	R718N315_Third_Floor_Riser
8		R718N17	0	00137a100000966c	1	R718N17_Aux_Feed
9		R718E	1	00137a100000d69c	1	R718E_Heat_Exchanger_2
10		MC_LW_TH01	0	70b3d52dd40000a1	1	MC-LW-TH01_0_Plant_Room
11		ERS_Eye	0	a81758fffe04d037	1	ERS_Eye_Board_Room
12		Vicki	0	70b3d52dd3000abc	1	Vicki_0
13		Vicki	1	70b3d52dd3000b65	1	Vicki_1
14		ERS_CO2	0	a81758fffe0625c2	1	ERS_CO2_Third_Floor_Kitchen
15		Vicki	2	70b3d52dd3002eac	1	Vicki_2
16		ERS_Lite	0	a81758fffe04b491	1	ERS_Lite_Engineering
17		AM319	0	24e124710b423509	1	AM319_First_Floor
18		R718AB	0	00137a1000013df0	1	R718AB
19		R718DB	0	00137a1000013cbc	1	Netvox_R718DB
20		R718AD	0	00137a1000011e6d	1	R718AD
21		IM_Counter_EU_W	0	0004a30b00edc875	1	IM-Counter-EU-W_0_Front_Door
22		R313WA	0	00137a100000f887	1	R313WA_Sample_Sofa
23		R712	0	00137a100000d1c1	1	R712_Outside

/var/apollo/data/lora_gw/support/devices.csv

© 2022 Dialog Semiconductor

Are We There Yet?

- Wait until the echbacnet service has been restarted - see by uptime difference to other services
- Use “sudo supervisorctl status” in a console/ssh connection (apollo/Sgq4-2FKQ)



© 2022 Dialog Semiconductor

lora_gw.btm File

- Used to map internal application datapoints to BACnet datapoints
- Automatically generated, echbacnet is automatically restarted 90m after last new device found

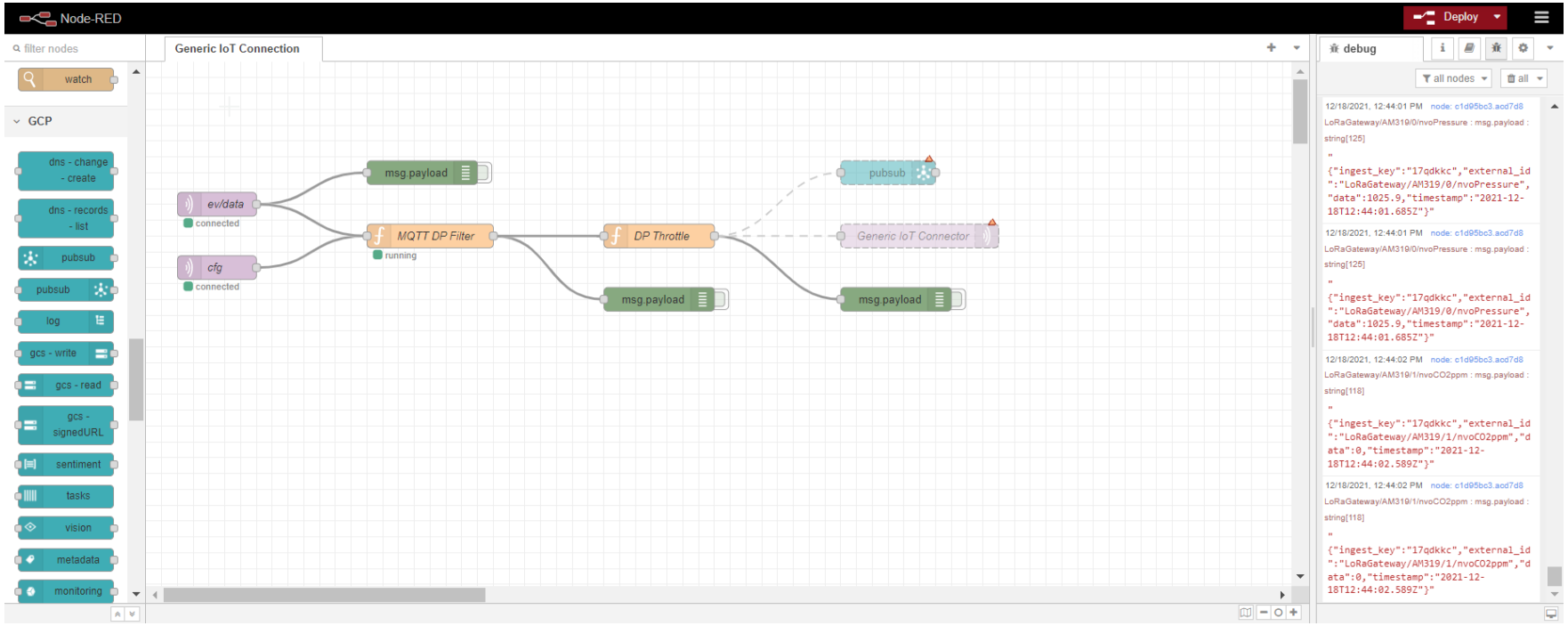
	A	B	C	D	E	F	G	H	I	
1	#filetype	bacnet_type_map								
2	#version	v0.0.0								
3	#product_name	lora_gw								
4	Technology	Block Type	Block Handle	Point Name	bacnet_type	Instance	Name	Description	Units	SNV
5	lon	ENL_STS_AF	0	nvoBattV	AI	1	ENL_STS_AF/0 Battery Voltage	ENL_STS_AF_400_Second_Floor_VAV_Duct - Battery Voltage	volts	valu
6	lon	ENL_STS_AF	0	nvoAirFlow	AI	2	ENL_STS_AF/0 Air Flow	ENL_STS_AF_400_Second_Floor_VAV_Duct - Air Flow	meters-per-second	valu
7	lon	ENL_STS_AF	0	nvoDiffPress	AI	3	ENL_STS_AF/0 Diff Pressure	ENL_STS_AF_400_Second_Floor_VAV_Duct - Diff Pressure	millibars	valu
8	lon	ENL_STS_AF	0	nvoHumidity	AI	4	ENL_STS_AF/0 Humidity	ENL_STS_AF_400_Second_Floor_VAV_Duct - Humidity	percent-relative-humidity	valu
9	lon	ENL_STS_AF	0	nvoTemp	AI	5	ENL_STS_AF/0 Temperature	ENL_STS_AF_400_Second_Floor_VAV_Duct - Temperature	degrees-celsius	valu
10	lon	ERS_CO2_Lite	0	nvoBattV	AI	6	ERS_CO2_Lite/0 Battery Voltage	ERS_CO2_Lite_Fourth_Floor_Sales - Battery Voltage	volts	valu
11	lon	ERS_CO2_Lite	0	nvoCO2ppm	AI	7	ERS_CO2_Lite/0 CO2 ppm	ERS_CO2_Lite_Fourth_Floor_Sales - CO2 ppm	parts-per-million	valu
12	lon	ERS_CO2_Lite	0	nvoHumidity	AI	8	ERS_CO2_Lite/0 Humidity	ERS_CO2_Lite_Fourth_Floor_Sales - Humidity	percent-relative-humidity	valu
13	lon	ERS_CO2_Lite	0	nvoTemp	AI	9	ERS_CO2_Lite/0 Temperature	ERS_CO2_Lite_Fourth_Floor_Sales - Temperature	degrees-celsius	valu
14	lon	R718E	0	nvoAccelX	AI	10	R718E/0 Acceleration X	R718E_Heat_Exchanger_1 - Acceleration X	meters-per-second	valu
15	lon	R718E	0	nvoAccelY	AI	11	R718E/0 Acceleration Y	R718E_Heat_Exchanger_1 - Acceleration Y	meters-per-second	valu
16	lon	R718E	0	nvoAccelZ	AI	12	R718E/0 Acceleration Z	R718E_Heat_Exchanger_1 - Acceleration Z	meters-per-second	valu
17	lon	R718E	0	nvoBattV	AI	13	R718E/0 Battery Voltage	R718E_Heat_Exchanger_1 - Battery Voltage	volts	valu
18	lon	R718E	0	nvoTemp	AI	14	R718E/0 Temperature	R718E_Heat_Exchanger_1 - Temperature	degrees-celsius	valu
19	lon	R718E	0	nvoVelocityX	AI	15	R718E/0 Velocity X	R718E_Heat_Exchanger_1 - Velocity X	millimeters-per-second	valu
20	lon	R718E	0	nvoVelocityY	AI	16	R718E/0 Velocity Y	R718E_Heat_Exchanger_1 - Velocity Y	millimeters-per-second	valu
21	lon	R718E	0	nvoVelocityZ	AI	17	R718E/0 Velocity Z	R718E_Heat_Exchanger_1 - Velocity Z	millimeters-per-second	valu
22	lon	MCF_LW12MET	0	nviLoadCtl	BO	18	MCF_LW12MET/0 Load Control	MCF-LW12MET - Load Control	no-units	stat
23	lon	MCF_LW12MET	0	nvoLoadSts	BI	19	MCF_LW12MET/0 Load Status	MCF-LW12MET - Load Status	no-units	stat
24	lon	MCF_LW12MET	0	nvoActEnergy	AI	20	MCF_LW12MET/0 Active Energy	MCF-LW12MET - Active Energy	watt-hours	valu

/var/apollo/data/bacnetrouter/res/lora_gw.btm

© 2022 Dialog Semiconductor

Generic IoT Node-RED Cloud Connector

- Included in image
- Connection for:
  - AWS
  - Azure
  - Watson
  - GCP
- Directories are set established for TLS certs
- Disabled out of the box
- Set polling rates in Datapoint Properties widget for DPs in question apart from for LoRa DPs which are automatically handled



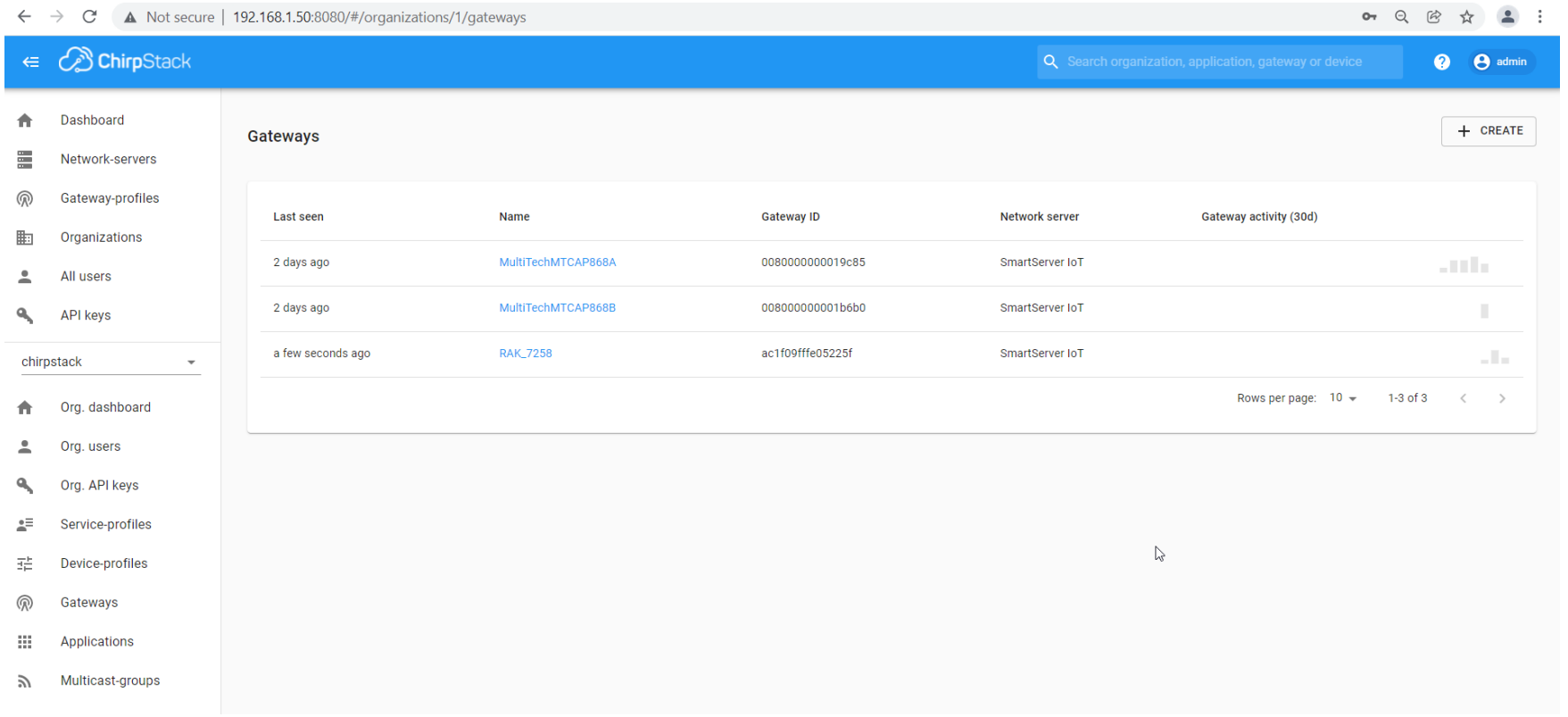
{"ingest_key":"17qdkkc","external_id":"LoRaGateway/AM319/0/nvoPressure","data":1025.9,"timestamp":"2021-12-18T12:44:01.685Z"}

/var/apollo/data/certs/tls

© 2022 Dialog Semiconductor

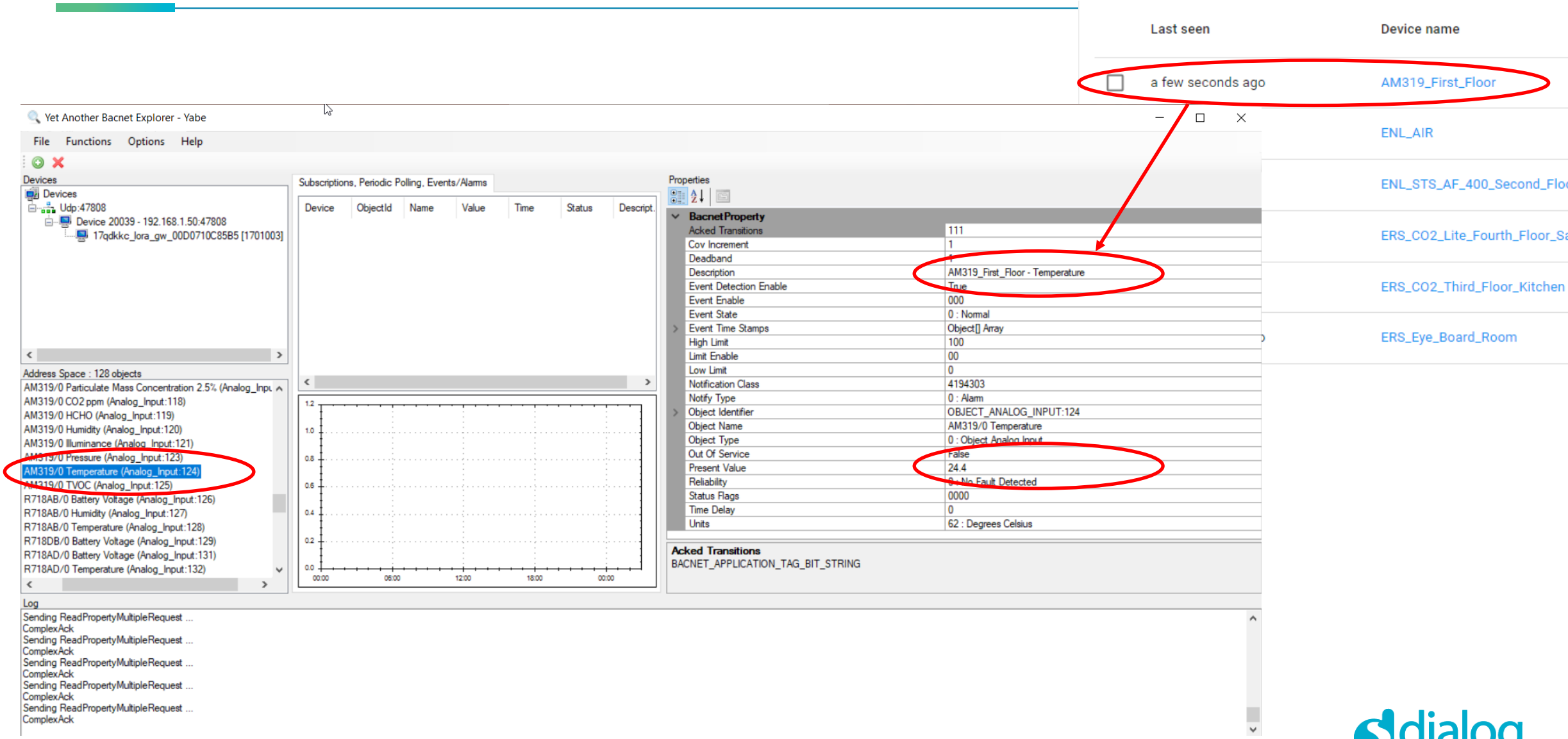
Redundant LoRaWAN Gateways

- Additional routers can be incorporated for:
  - Redundancy
  - Better coverage



© 2022 Dialog Semiconductor

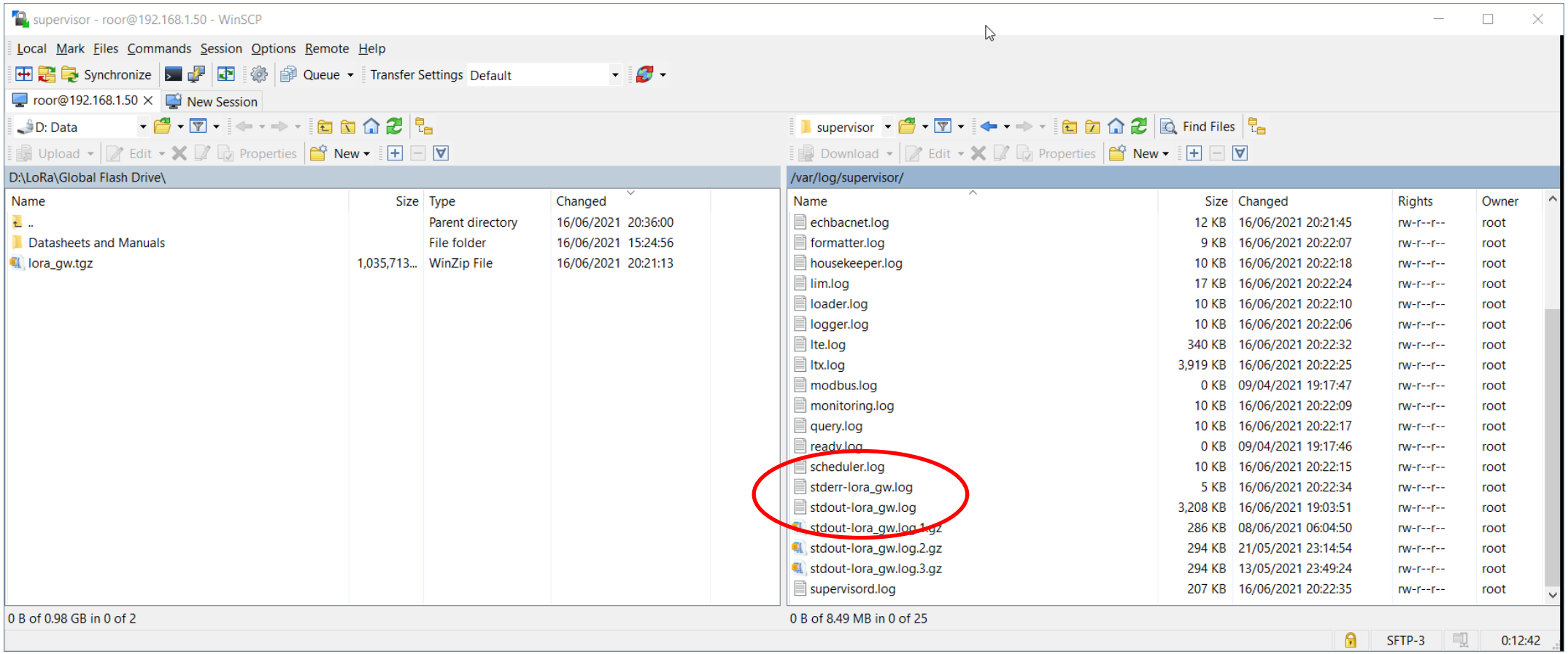
The View From BACnet Using YABE



© 2022 Dialog Semiconductor

Log Files

- Log files can be found at: /var/log/supervisor



© 2022 Dialog Semiconductor

Deleting/Renaming Devices in ChirpStack

- Deleting a device in Chirpstack will not delete it from within IAP
  - It will also leave the device in the ChirpStack database
  - Legacy data will re-appear if DevEUIs are re-used
- To delete devices from IAP, from a console/SSH session, run the script:
  - sudo /var/apollo/data/lora_gw/support/reset.sh
- Or from the support folder
  - sudo ./reset.sh

© 2022 Dialog Semiconductor

MQTT Ports

- MQTT Ports 1883 and 8883 are open by default
- Close them down if not needed

```
sudo ufw status numbered
sudo ufw delete <number>
```

- Repeat as necessary

© 2022 Dialog Semiconductor

Adding New Device Types/Counts

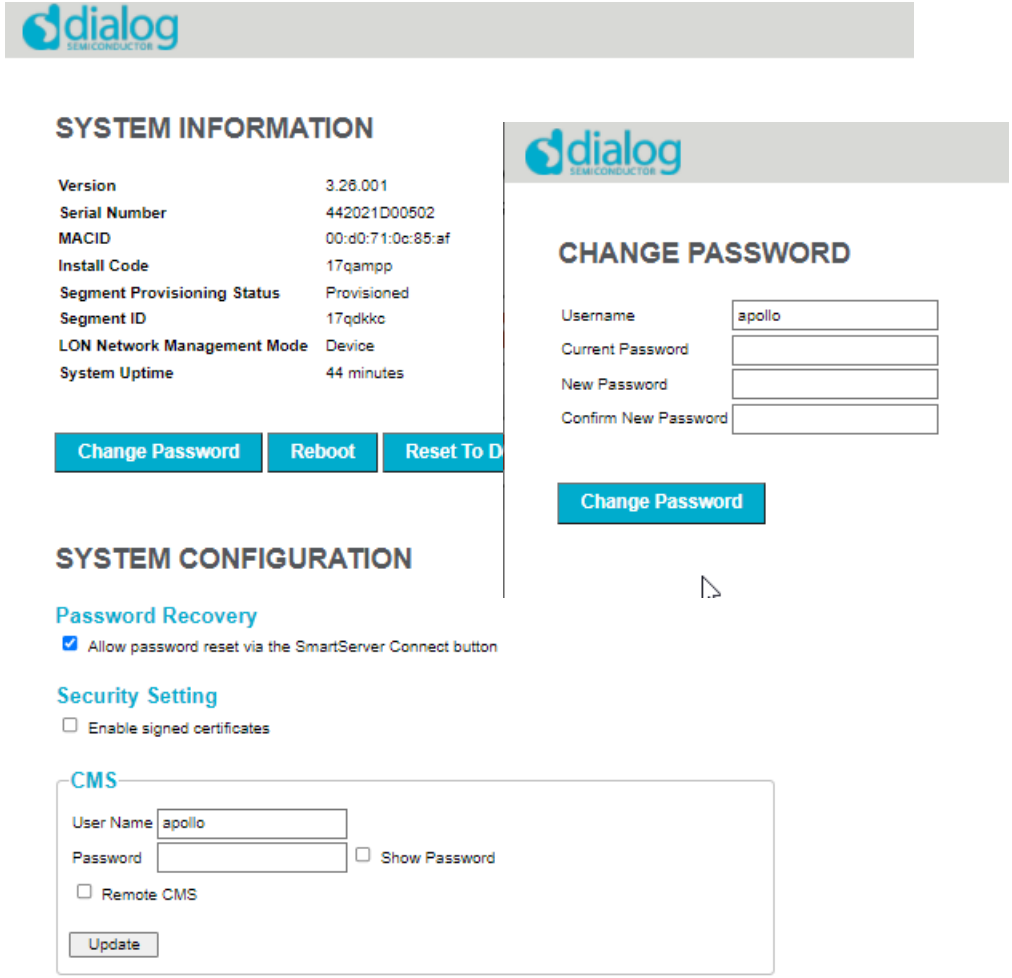
- For new device types and count changes ask Dialog!
- 4096 DPs max

© 2022 Dialog Semiconductor

Passwords

You should change the SmartServer system and CMS password along with the ChirpStack password.

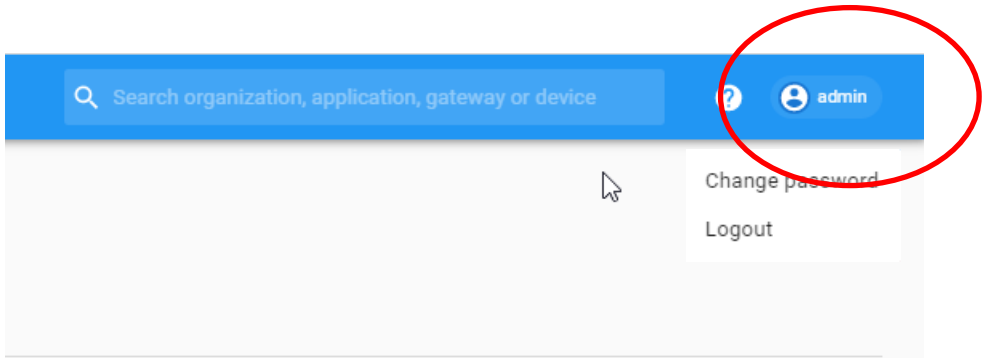
For the SmartServer use the System tab in the Configuration User interface

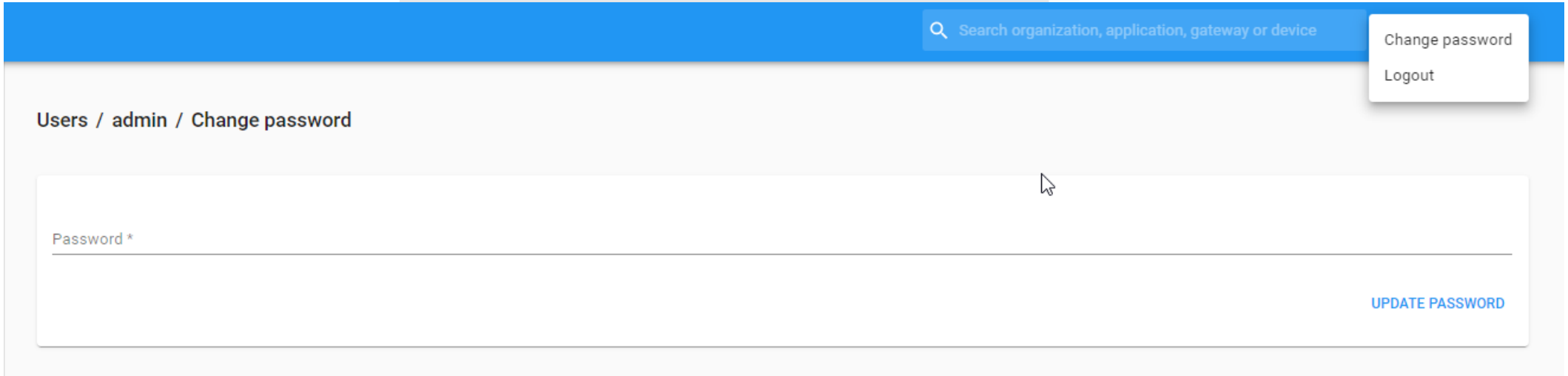


© 2022 Dialog Semiconductor

ChirpStack

- For the ChirpStack use the admin button at the top right





© 2022 Dialog Semiconductor

© 2022 Dialog Semiconductor

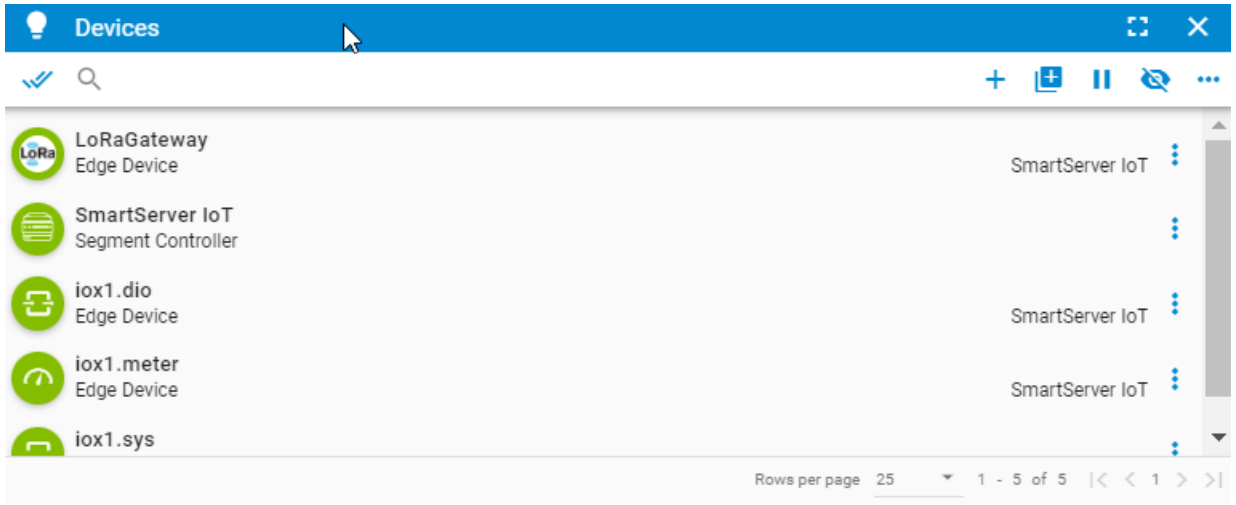
Adding Non-LoRa Devices

Adesto

Adding Non-LoRa Devices

- Support device types can be added manually (types and instantiation) or by using discovery
- BACnet, LON and Modbus discovery is supported
- Discovered devices have a unique naming convention
- Any device can be renamed as required in the Devices widget
- An unobtrusive approach must be taken, so as not to affect existing control strategies
- Polling rates must be sympathetic to the channel in question and SmartServer EPS and CPU%
- Do not rely on BACnet COV
- Detailed guidance can be found at:

http://iecdocs.diasemi.com/display/PortSSIoT/Discovering%2C+Defining%2C+or+Importing+Devices

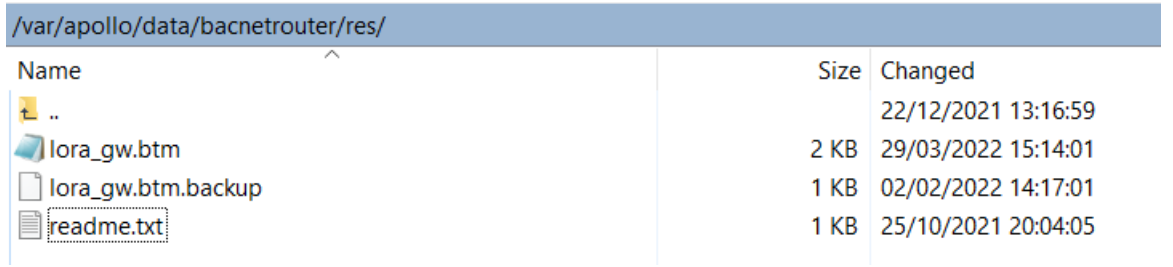


© 2022 Dialog Semiconductor

BACnet Discovery - Overview

- BACnet discovery may take a while to run to completion
- BACnet initially uses broadcast addressing initially
  - BBMDs must be in place
- It may not find everything in one pass
  - Validate the discovered device count
- To start discovery, simply click the discover icon in the Device widget

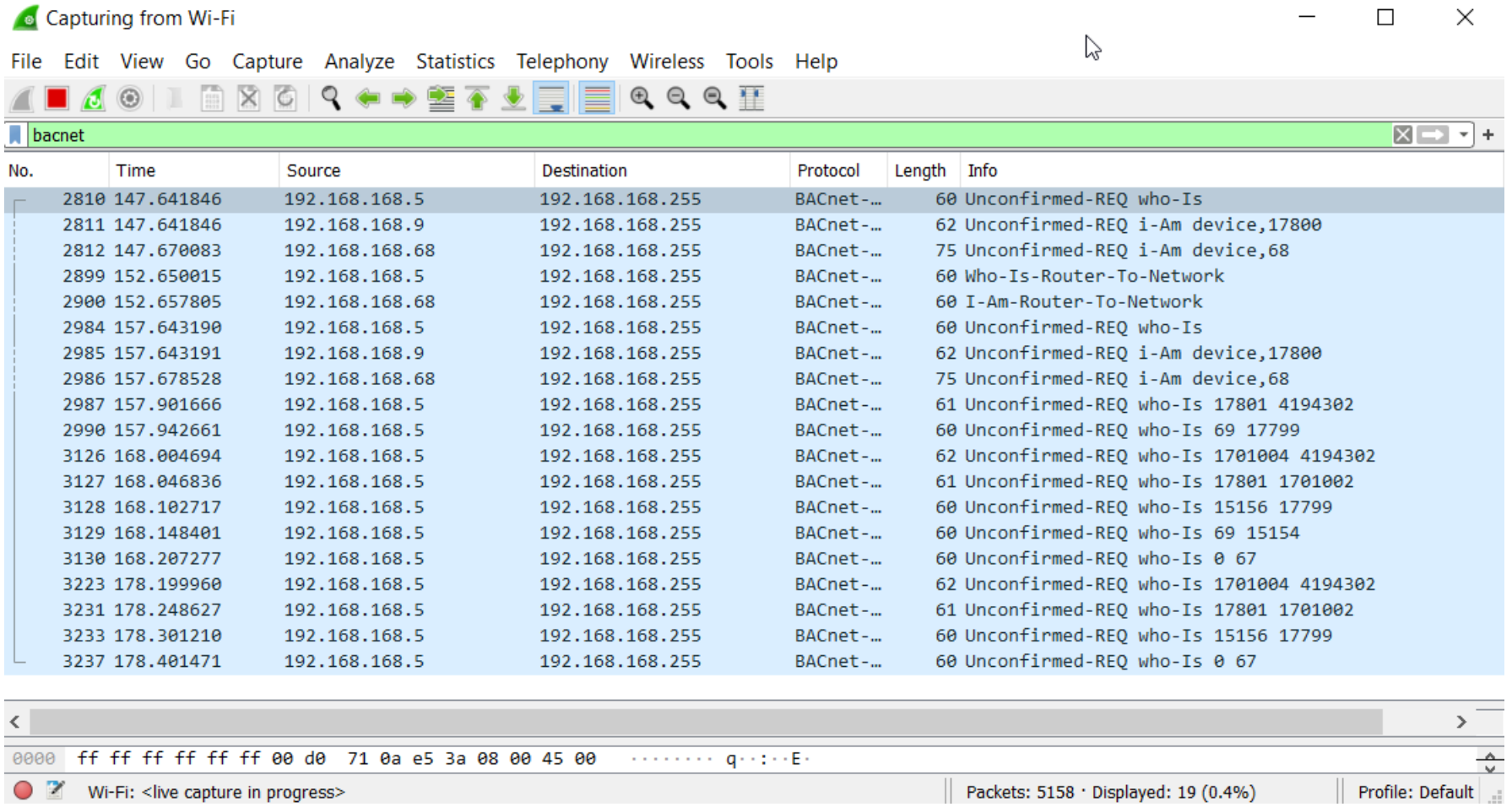
/var/apollo/data/bacnetrouter/res/
Before starting discovery



© 2022 Dialog Semiconductor

The View From WireShark

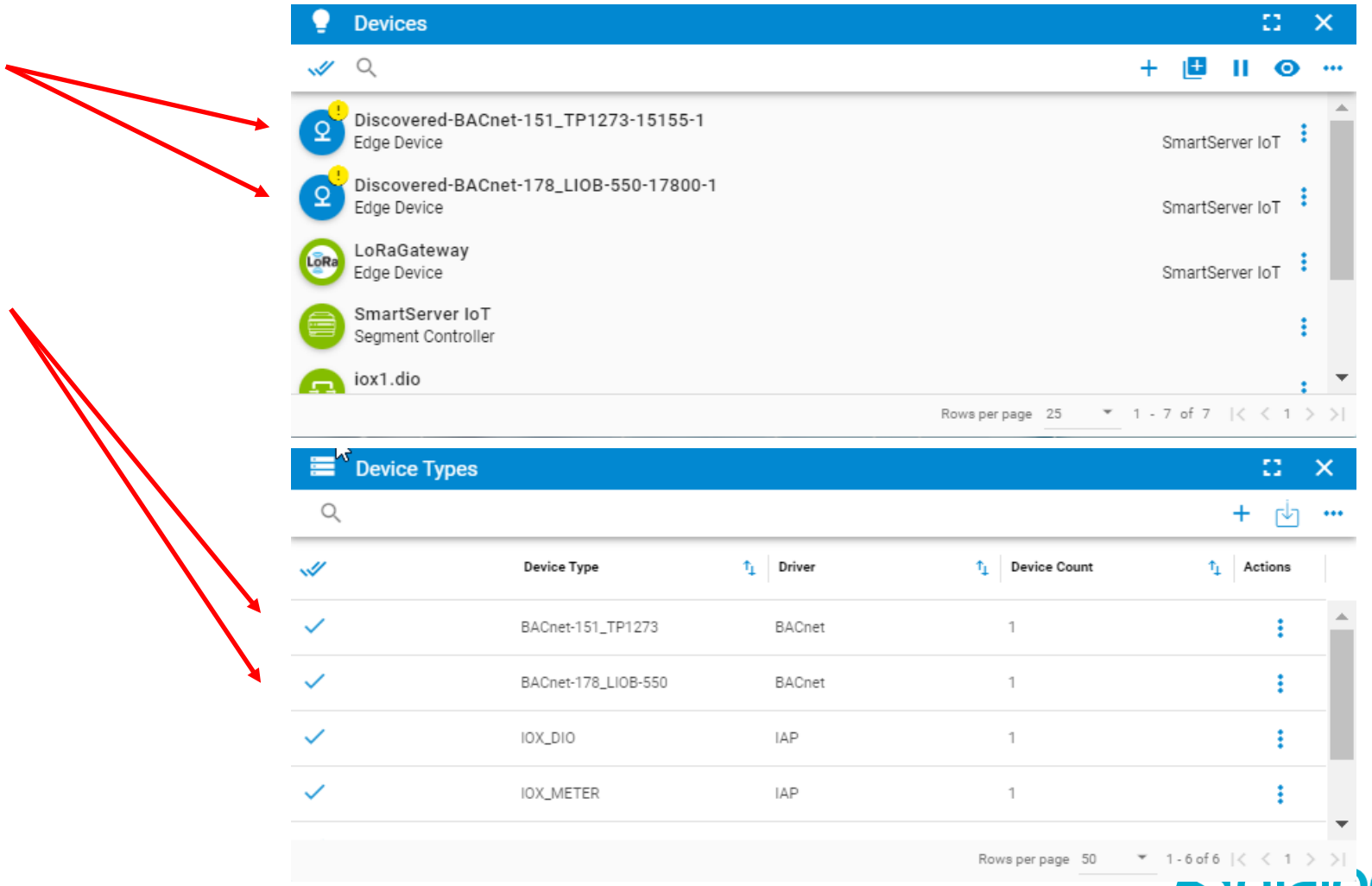
- Only the broadcast traffic will be visible



© 2022 Dialog Semiconductor

Device and Device Types Widget

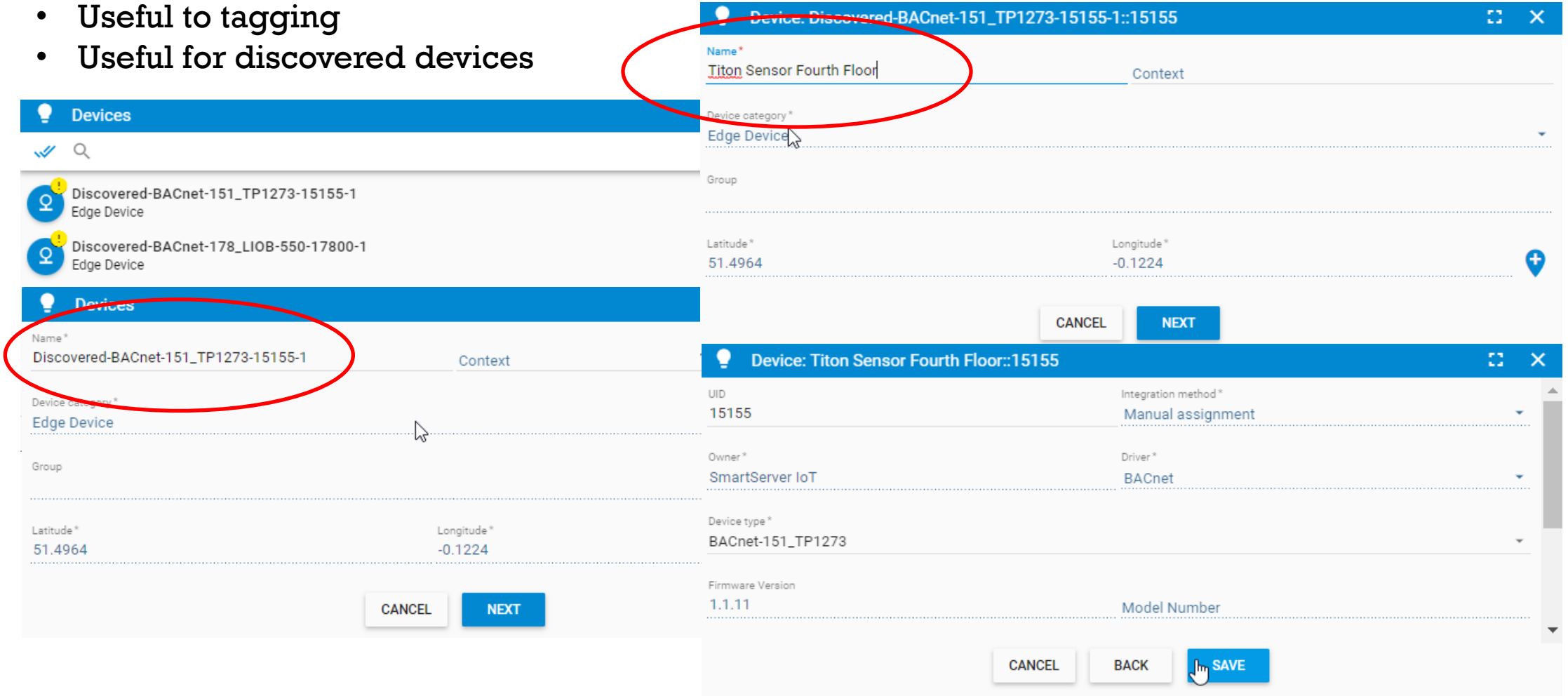
- Discovered devices will appear in the Devices widget
- Discovered devices must be provisioned from the Devices Widget
- Associated types will appear in the Device Types widget



© 2022 Dialog Semiconductor

Changing Device Names

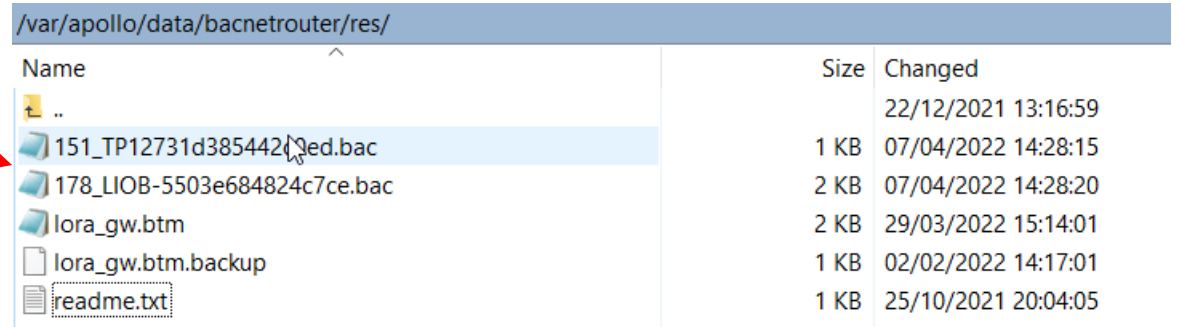
- You can rename a device in the Devices widget
- Useful to tagging
- Useful for discovered devices



© 2022 Dialog Semiconductor

/var/apollo/data/bacnetrouter/res .bac Files

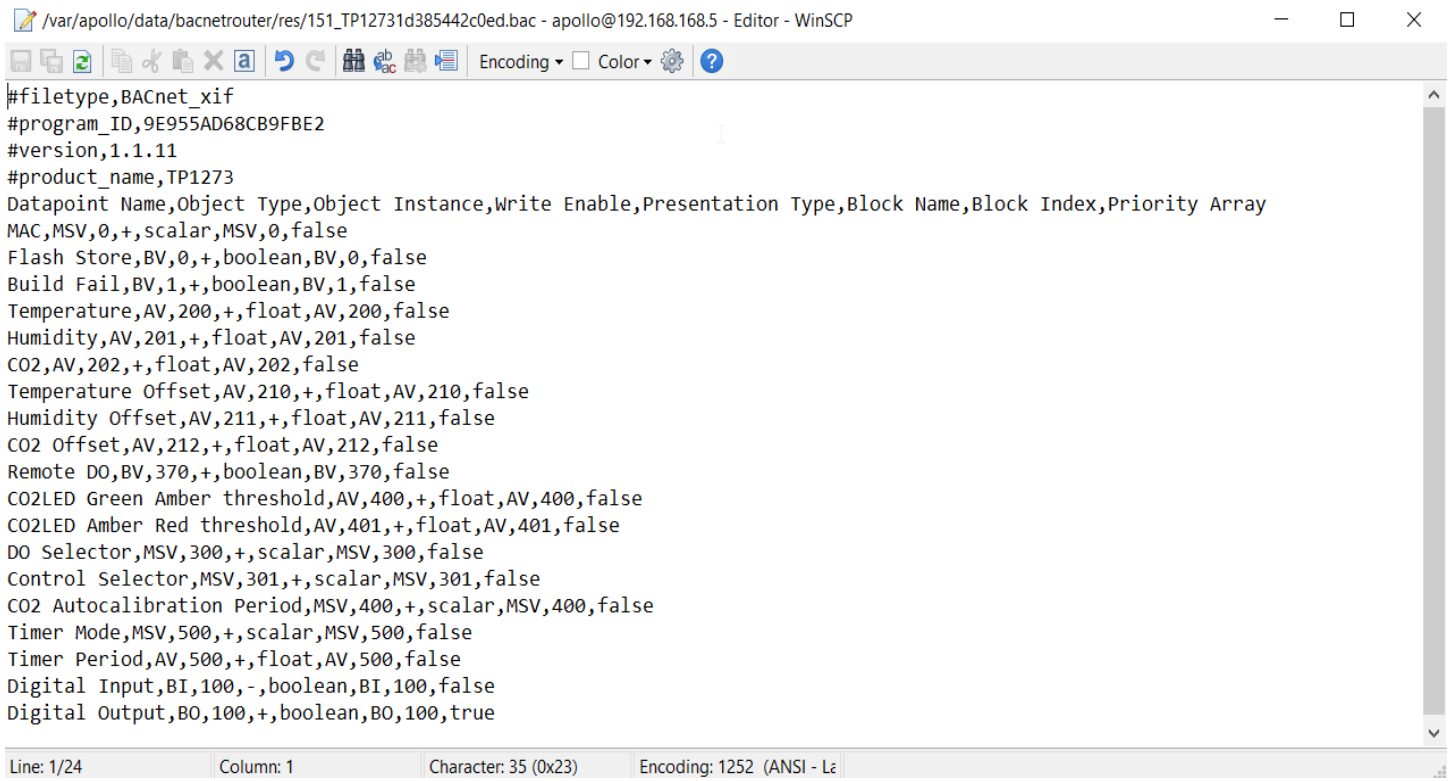
- The BACnet external interface files (*.bac) can be found in /var/apollo/data/bacnetrouter/res
- CSV format



© 2022 Dialog Semiconductor

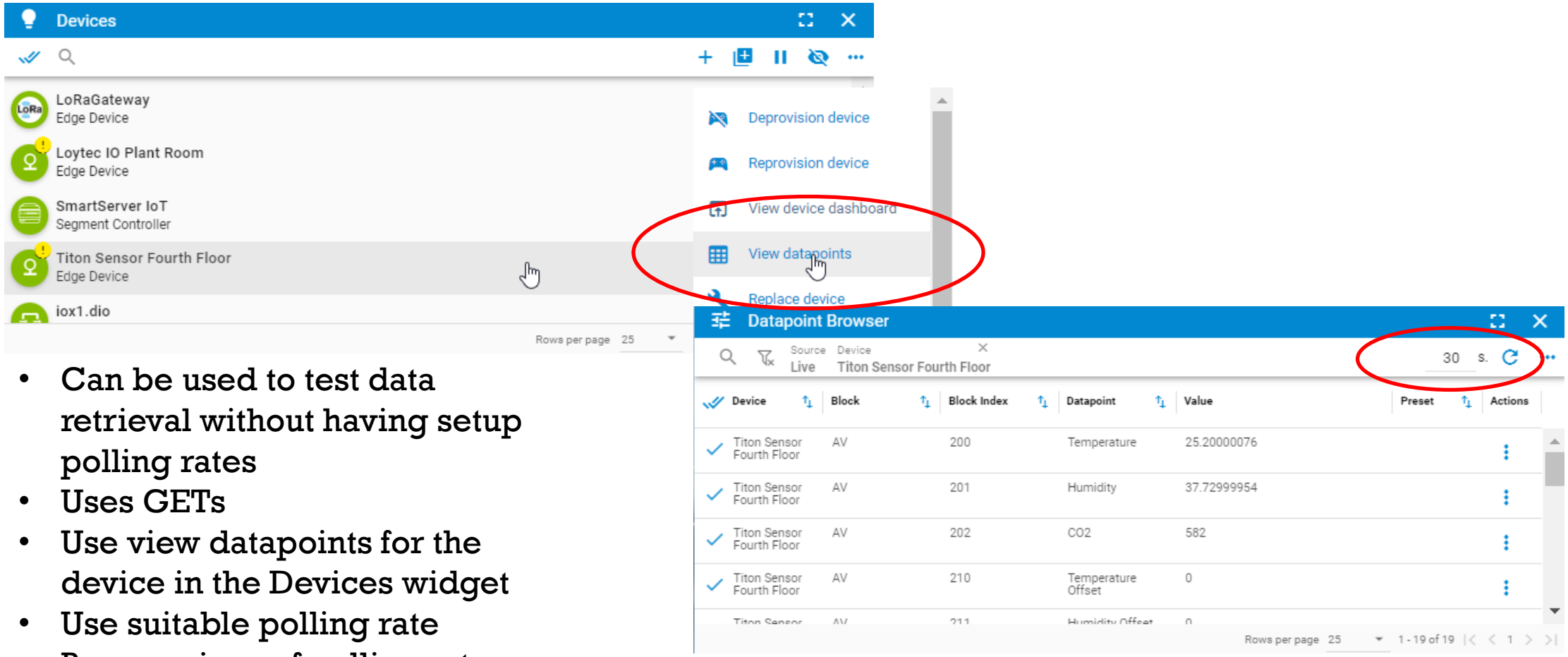
Setting Datapoint Names

- You can rename BACnet and Modbus device type datapoints if required
- Restart the relevant service afterwards
- Useful for discovered datapoint names
- Rename datapoints in the relevant file
- Check in the Device Types widget for the file prefix in question
- Reboot or restart the relevant service after editing



© 2022 Dialog Semiconductor

Data Browser Widget

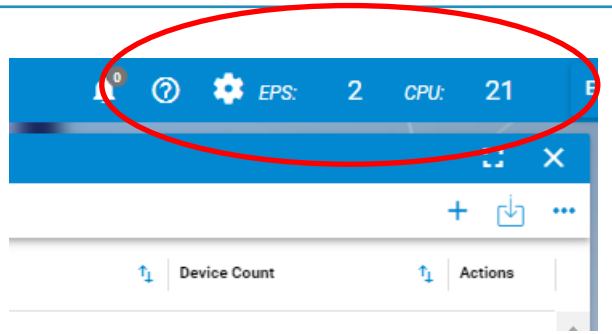


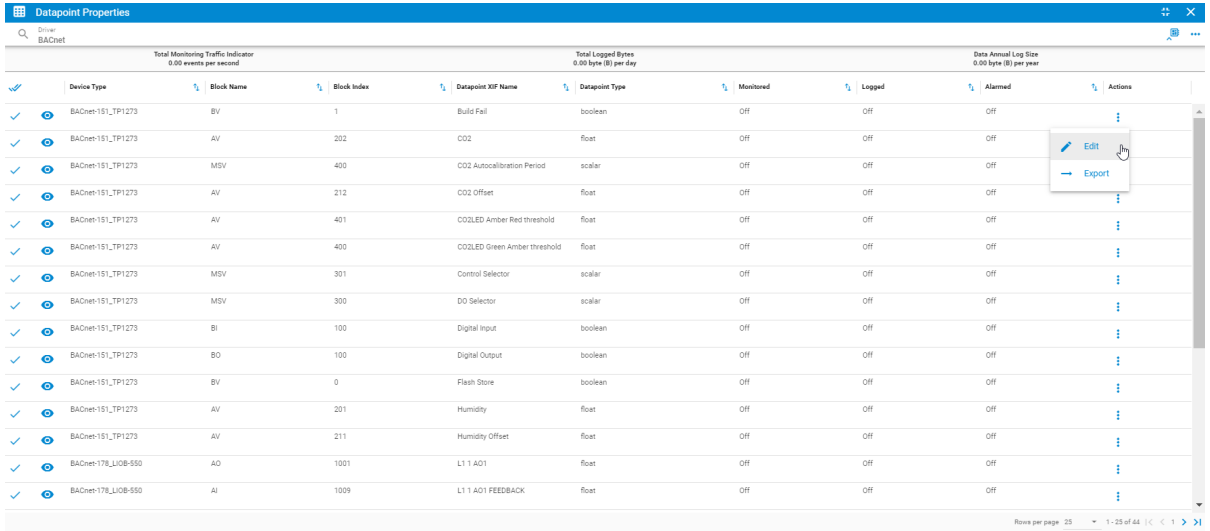
- Can be used to test data retrieval without having setup polling rates
- Uses GETs
- Use view datapoints for the device in the Devices widget
- Use suitable polling rate
- Be conscious of polling rate
- Never use a non-zero polling rate for LoRa Gateway device

© 2022 Dialog Semiconductor

Setting Datapoint Polling Rates

- This must be done sympathetically to:
  - Not impeded control strategy requirements
    - BACnet MS/TP and Modbus RTU are slow channels
  - Take advantage of slow changing datapoints such as temperatures
  - Keep SmartServer EPS to <40 and CPU% to <40%
  - Cloud service time resolution requirements
  - Cloud storage availability
- Datapoint Properties are set by type, not device instance
- Worst case, the LoRa Gateway with 15 minute uplinks can generate ~5 EPS

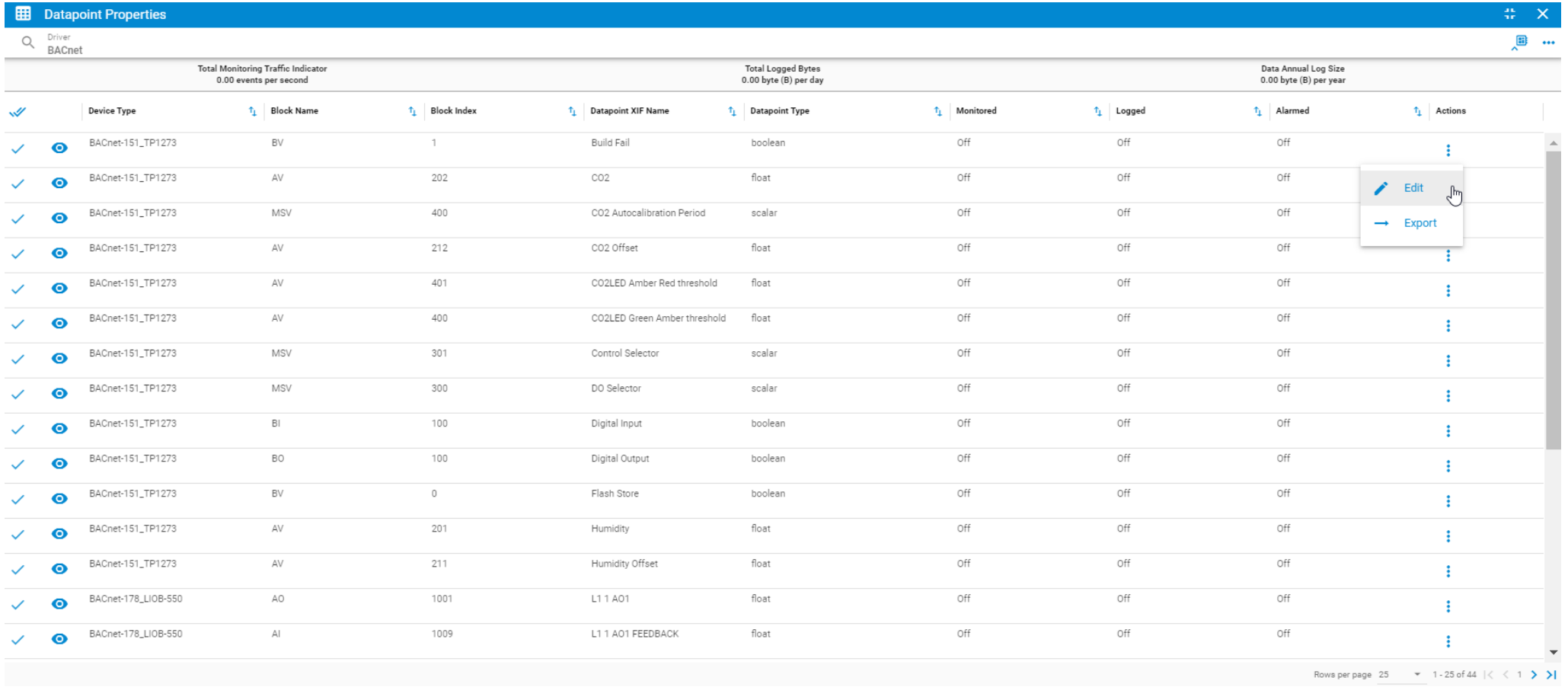




© 2022 Dialog Semiconductor

Setting Datapoint Polling Rates (continued)

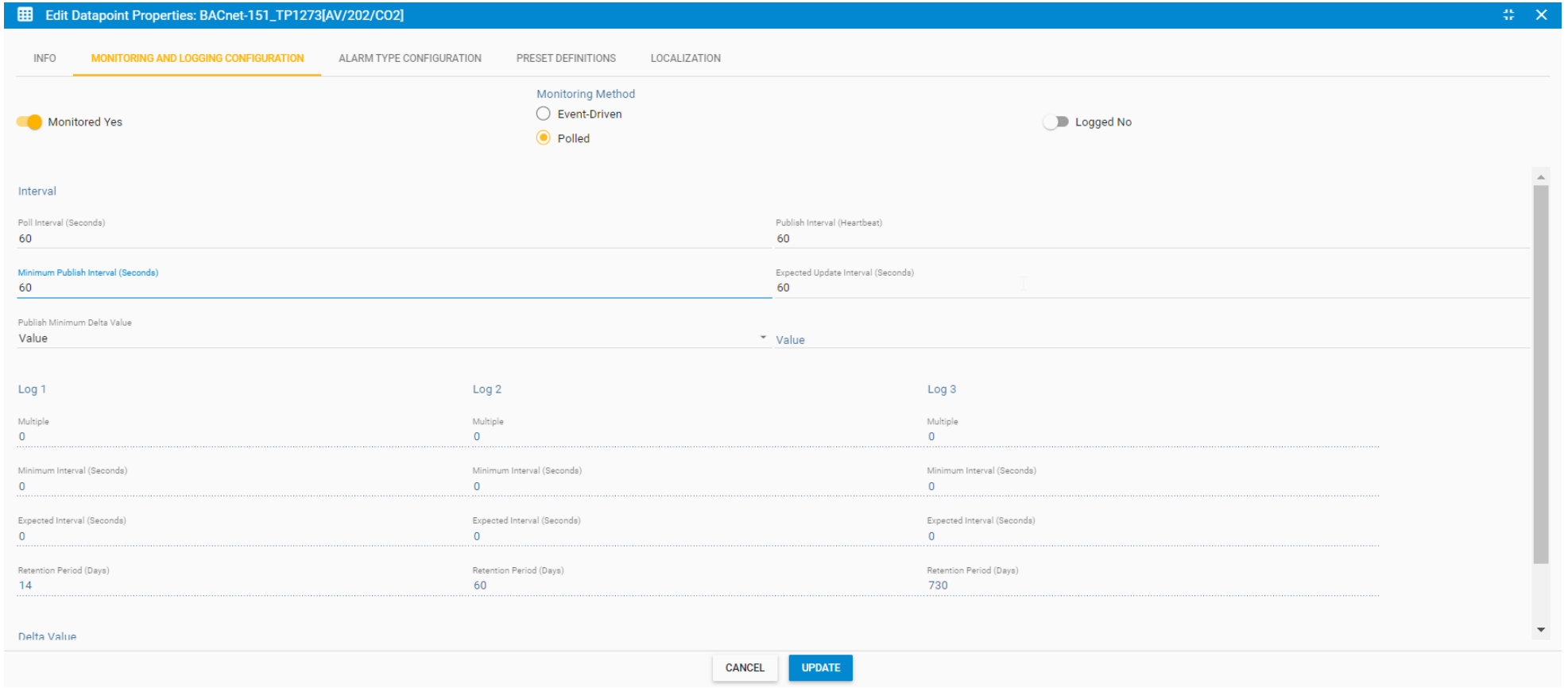
- Filter as required
- Show unconfigured DPs
- Select edit for the DP



© 2022 Dialog Semiconductor

Setting Datapoint Polling Rates (continued)

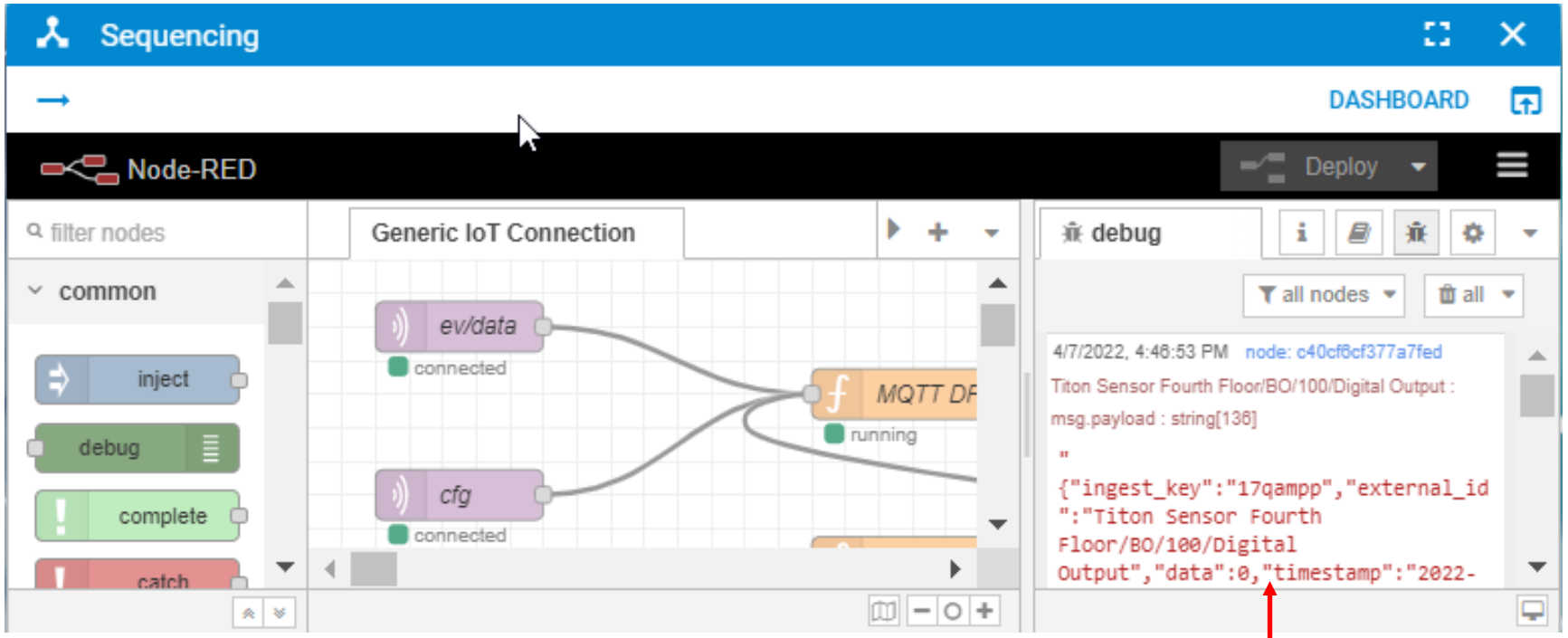
- Edit DP properties as required



© 2022 Dialog Semiconductor

Sequencing Widget

- Once polling rate has been set, or the Datapoint Browser widget has a non-zero polling rate set, data will be sent to the endpoint once it is configured



Discovered BACnet device

© 2022 Dialog Semiconductor

© 2022 Dialog Semiconductor

Detailed Configuration Instructions

Adesto

Pre-Requisites

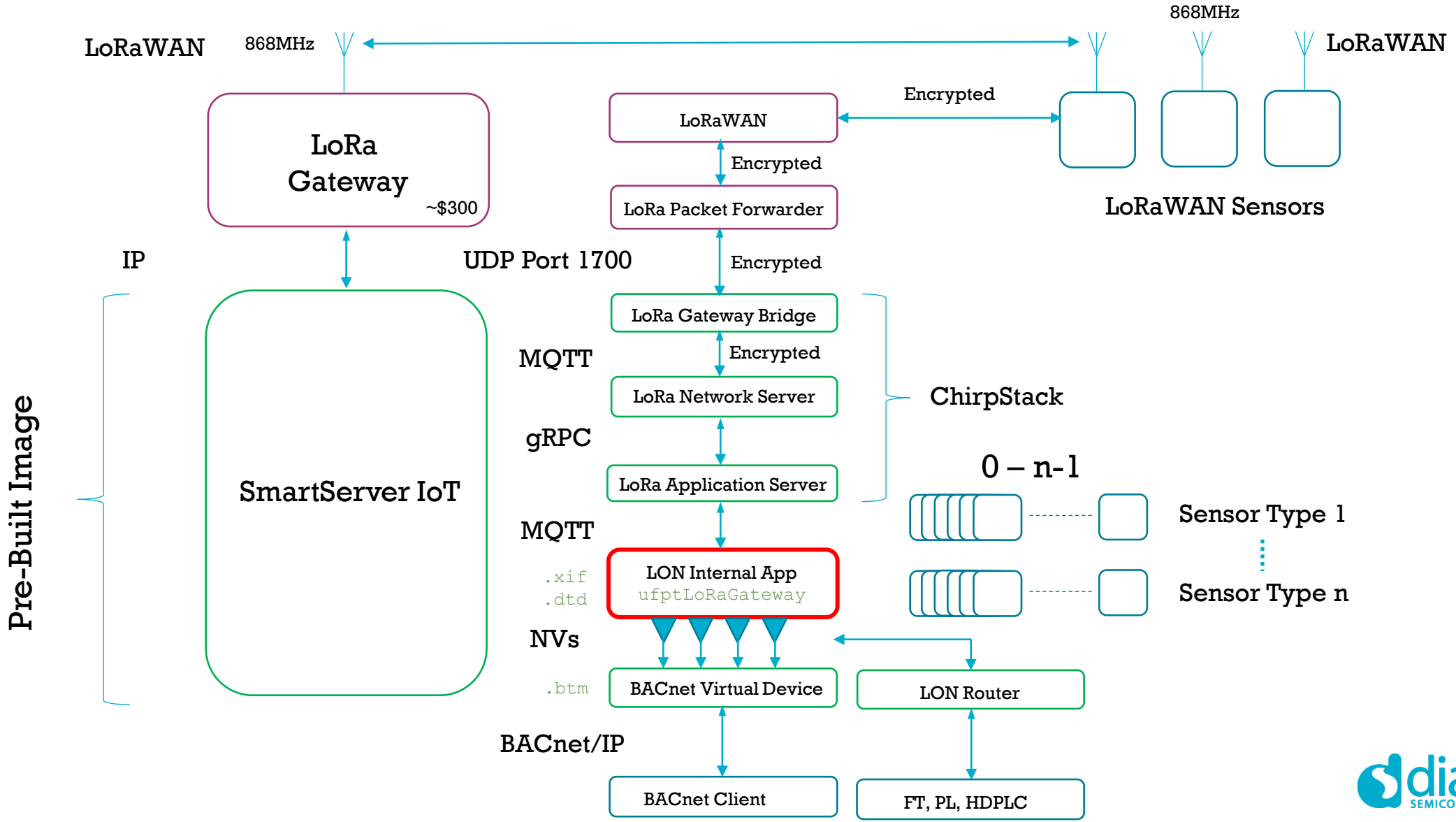
The following applications are necessary for integration:

- WinSCP
- Putty
- Chrome
- YABE

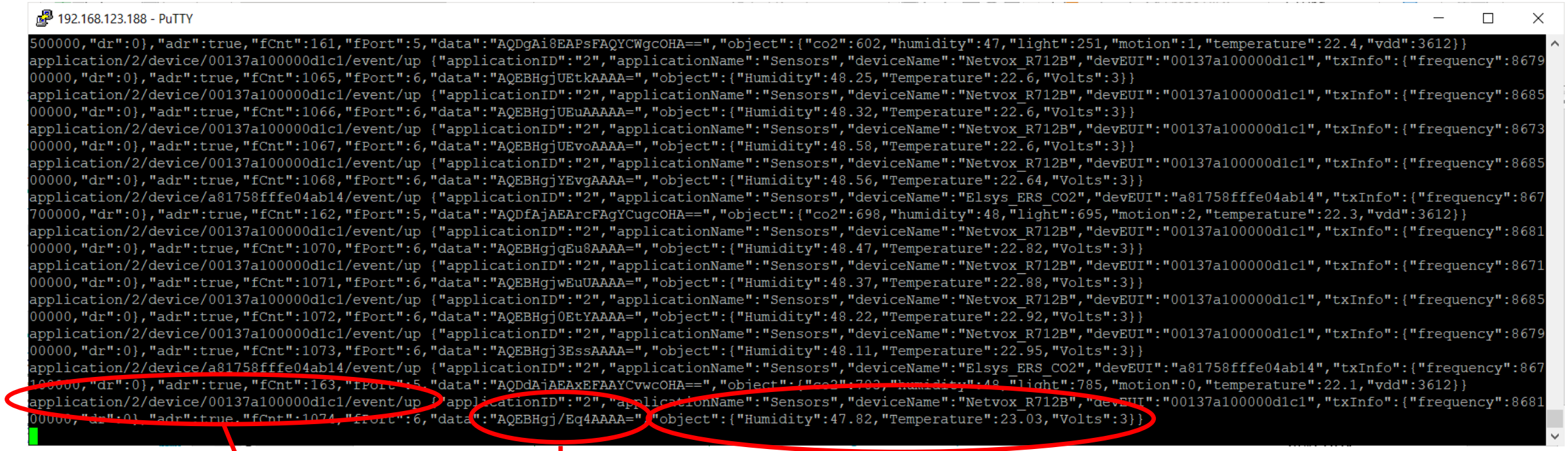
- *Don't forget a lot of sensors use 3.6V AA batteries – please check the specifications*

© 2022 Dialog Semiconductor

Under The Hood: SmartServer IoT LoRa Integration



ChirpStack Application Server MQTT Output



Base64 data

application/2/device/00137a100000c425/event/up

App ID

DEVEUI

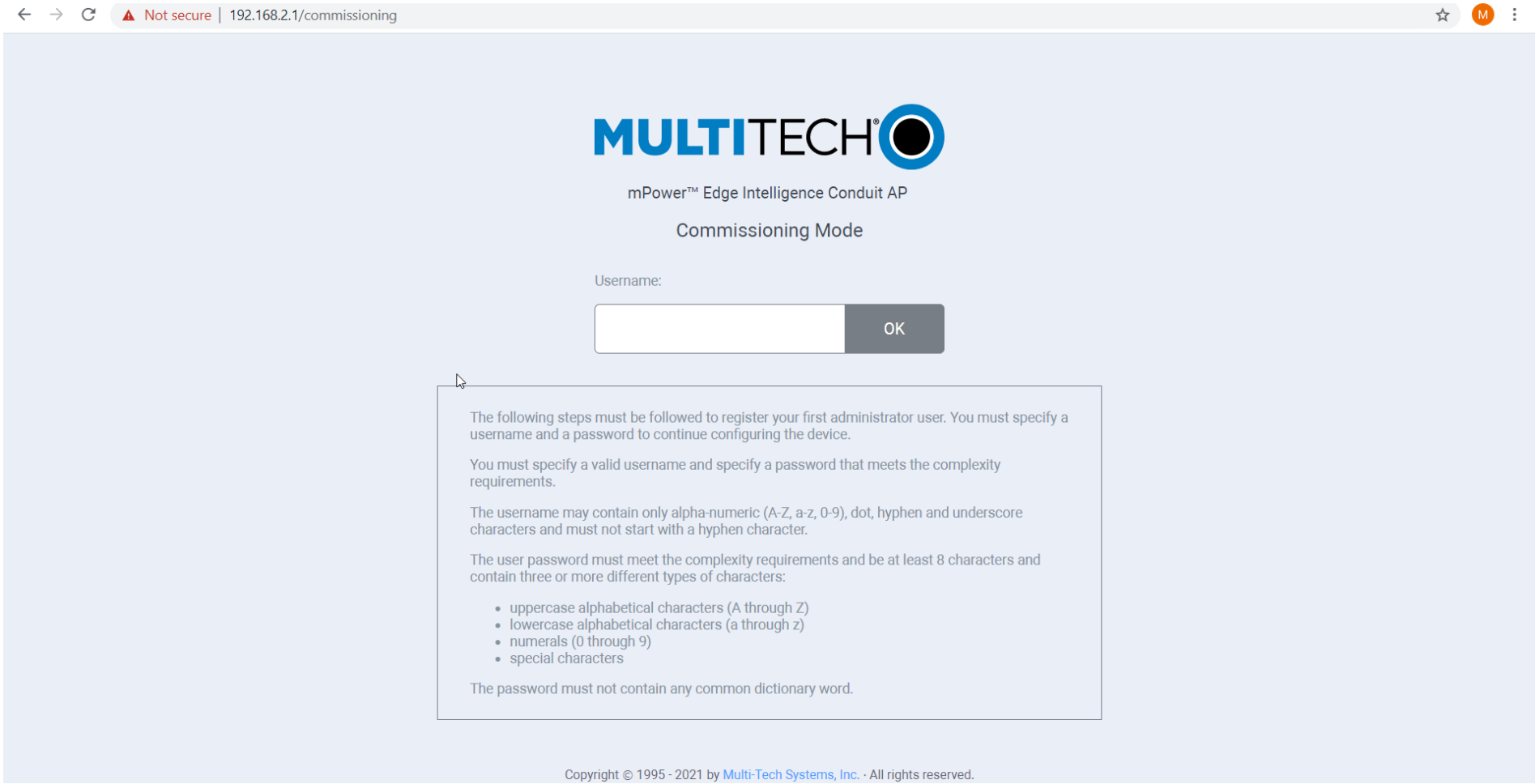
Uplink

Decoded JSON Object

"object":{"Humidity":47.82,"Temperature":23.03,"Volts":3}

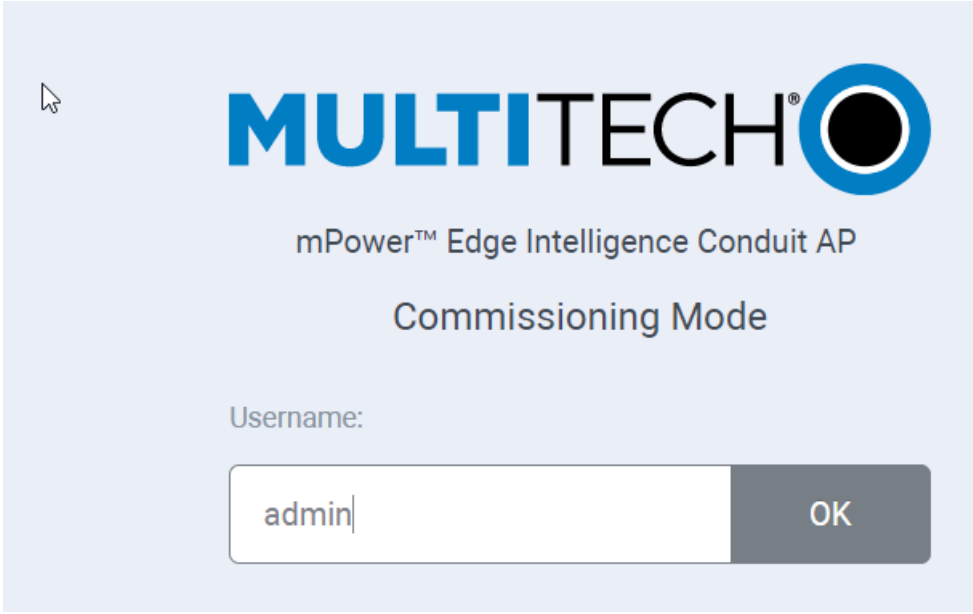
© 2022 Dialog Semiconductor

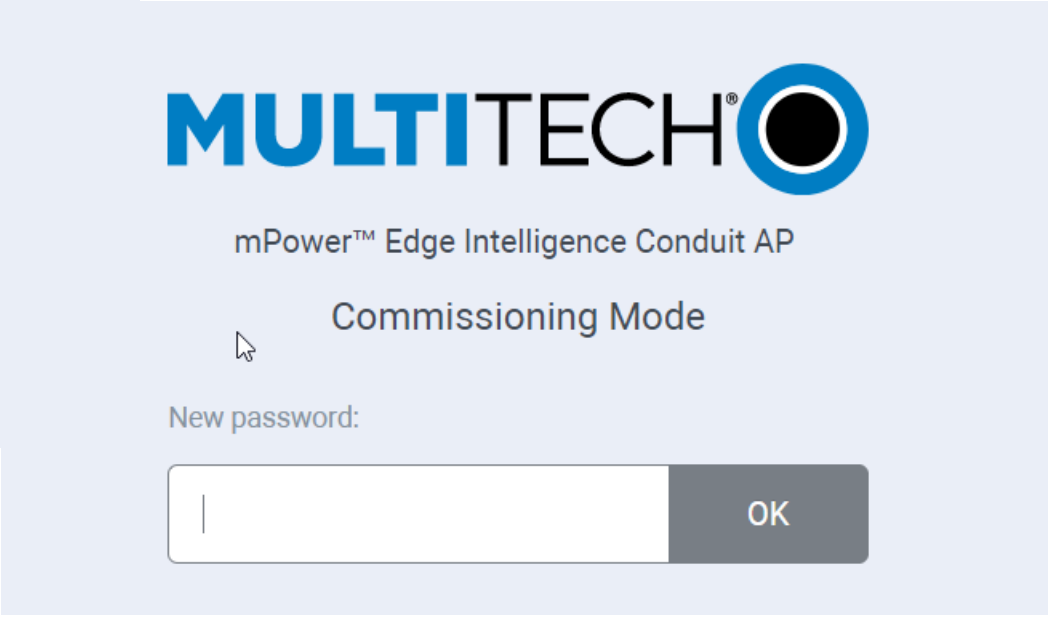
Configure MultiTech Gateway – Initialize



© 2022 Dialog Semiconductor

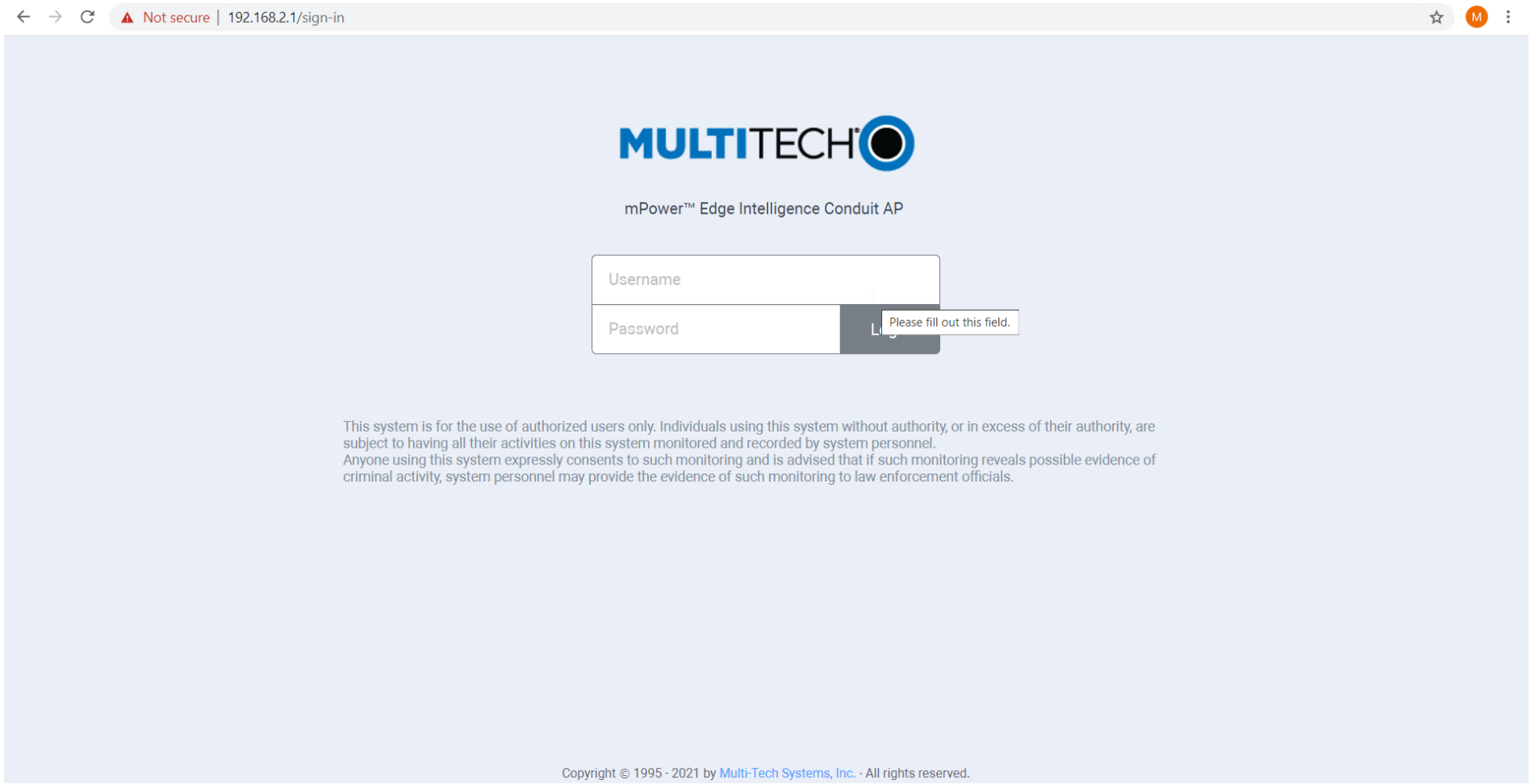
Configure MultiTech Gateway – Initialize (cont.)





© 2022 Dialog Semiconductor

Configure MultiTech Gateway – Initialize (cont.)



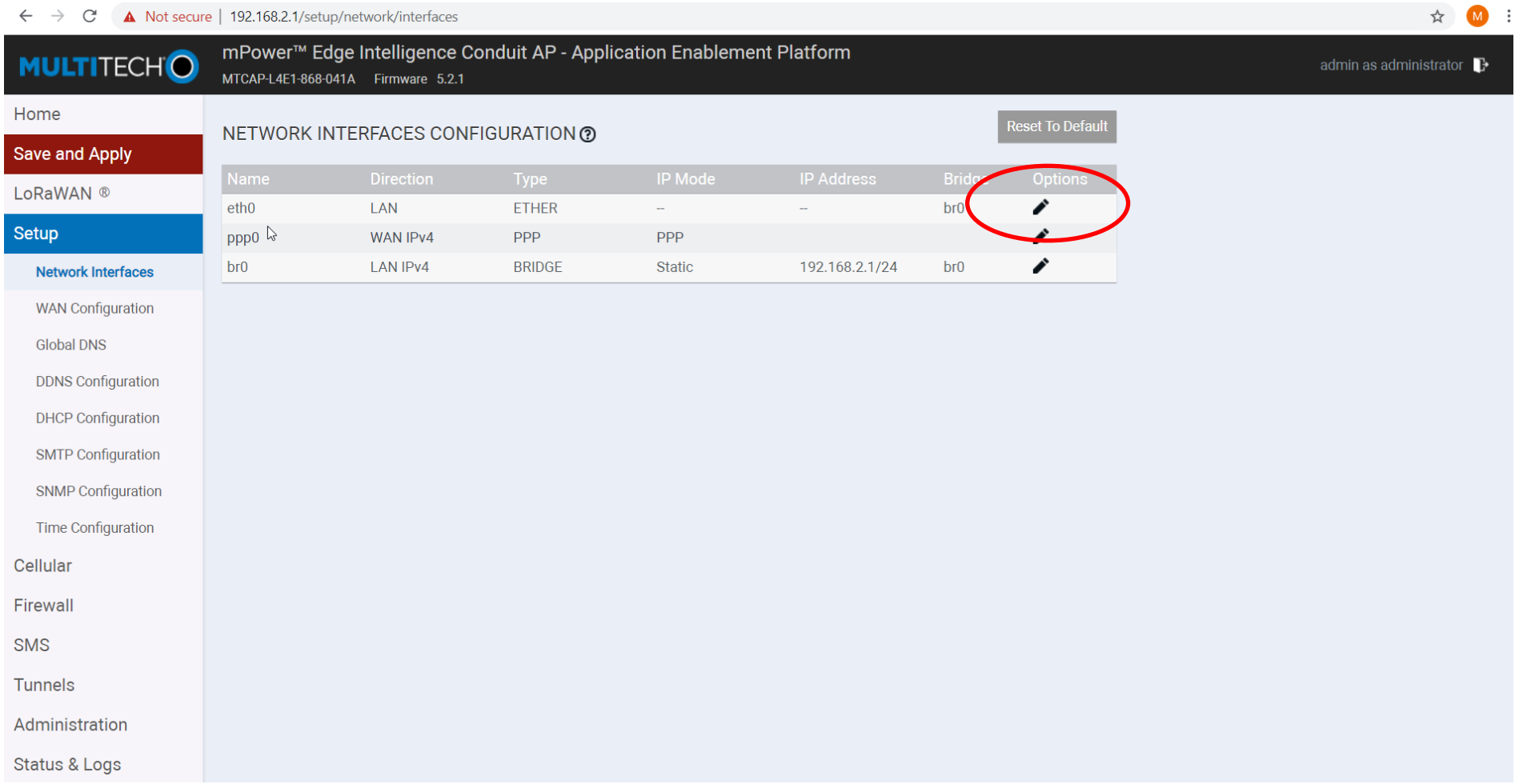
© 2022 Dialog Semiconductor

Configure MultiTech Gateway – Initialize (cont.)

Do not use the First-Time Setup Wizard

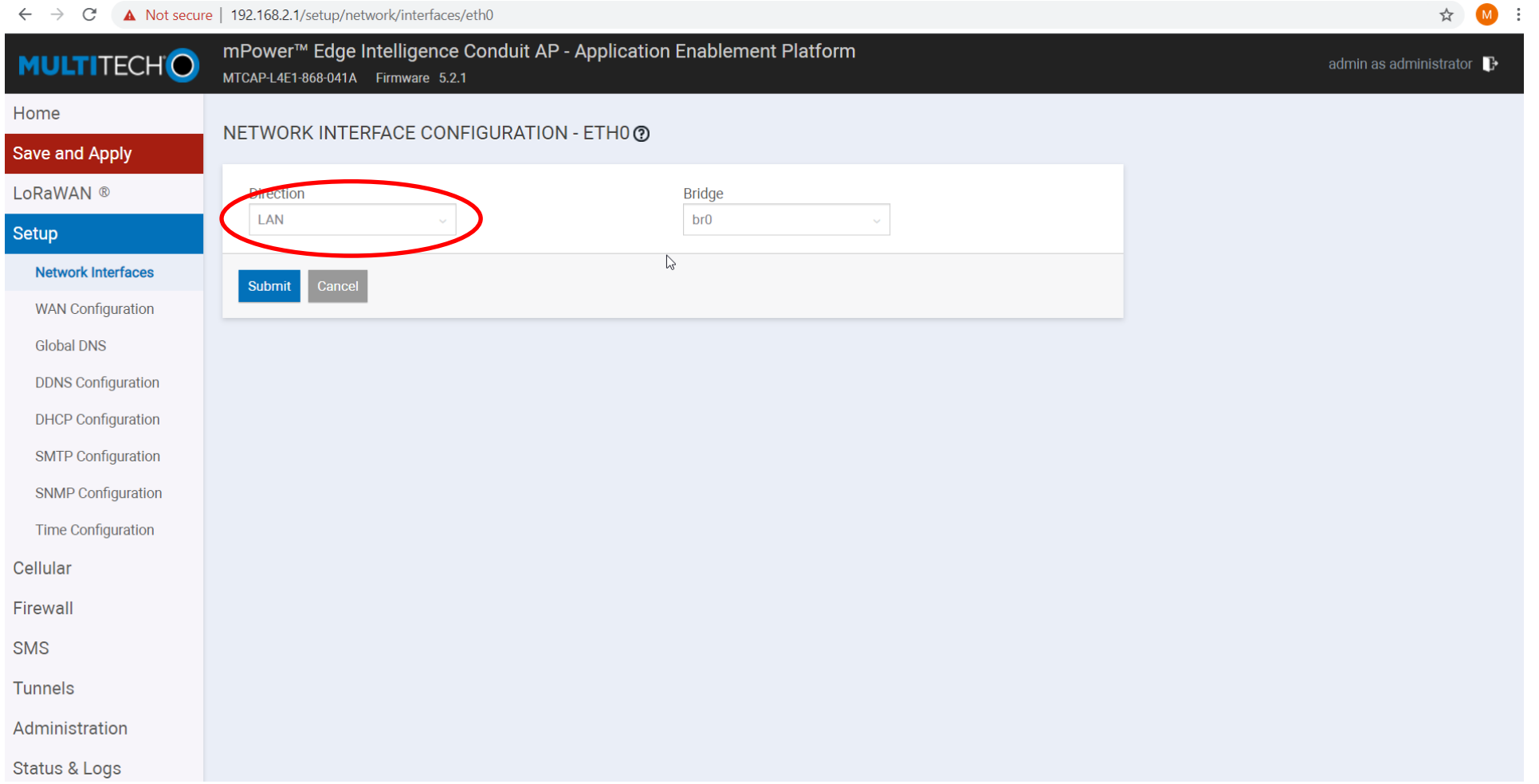
© 2022 Dialog Semiconductor

Configure MultiTech Gateway – Setup eth0



© 2022 Dialog Semiconductor

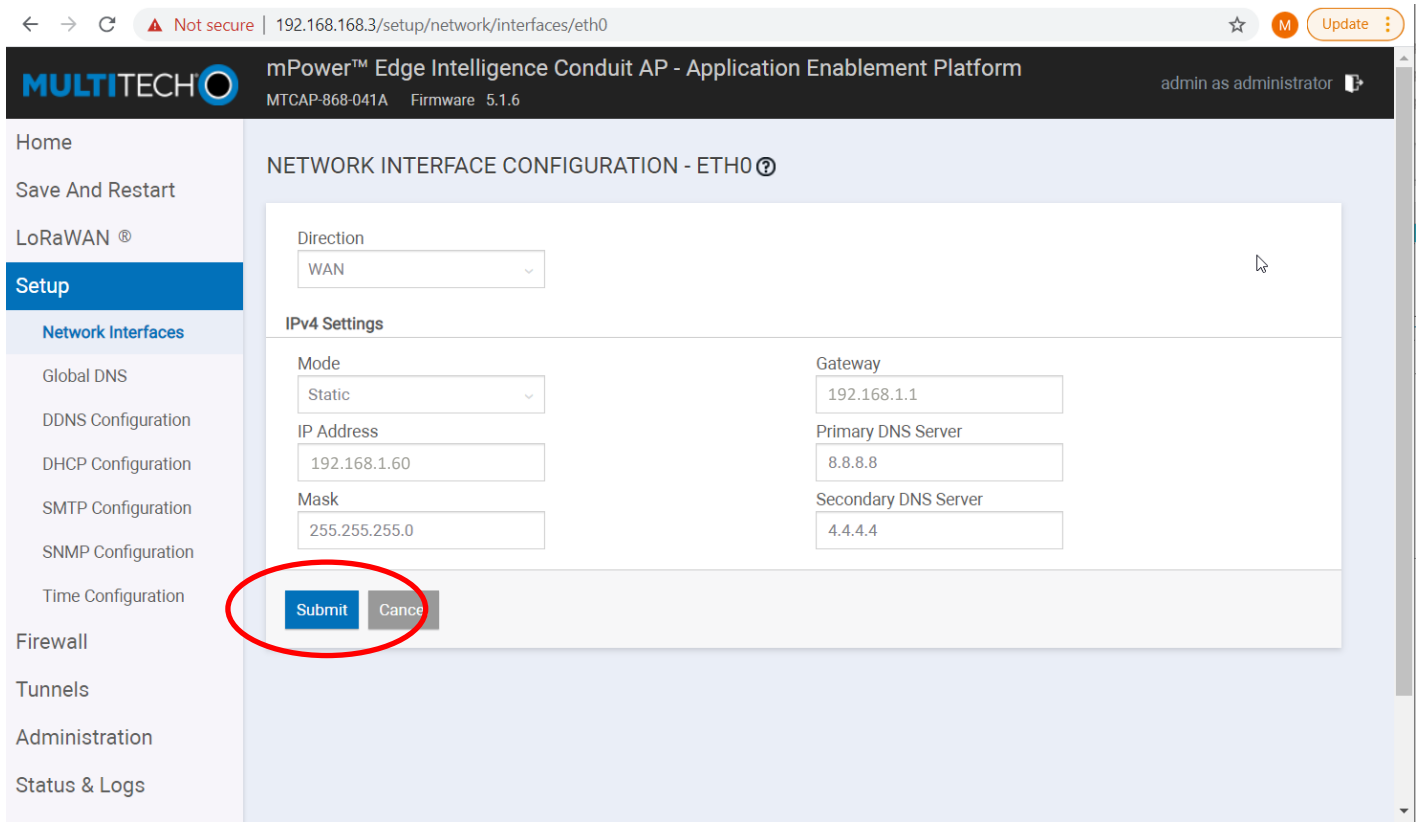
Configure MultiTech Gateway – Setup eth0 (cont.)



© 2022 Dialog Semiconductor

Configure MultiTech Gateway – Setup eth0 (cont.)

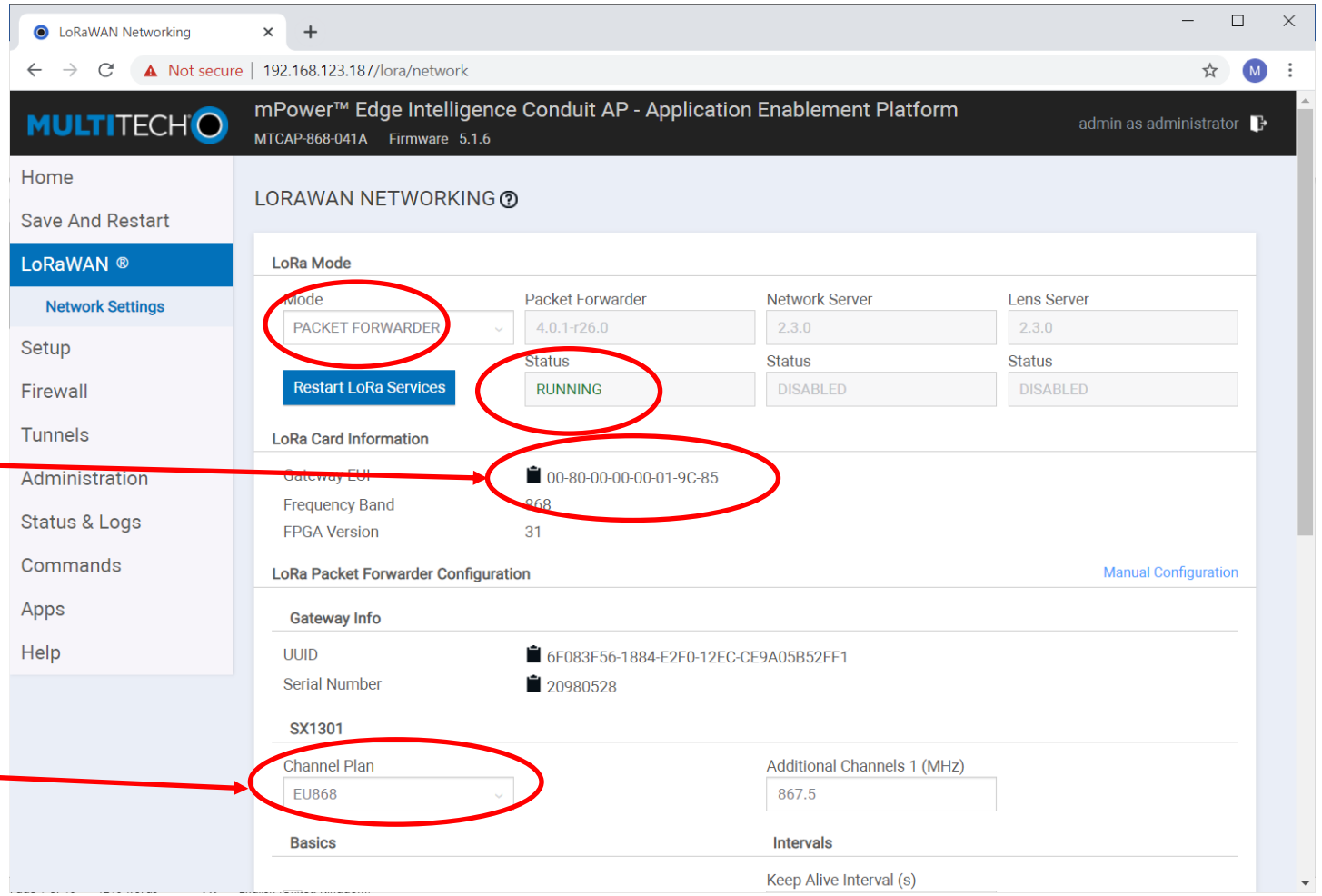
- Default address: 192.168.2.1
- Required address: 192.168.1.60
- Default user: admin/admin
- Note: ping is disabled



© 2022 Dialog Semiconductor

Configure MultiTech Gateway – Set As LoRa Packet Forwarder

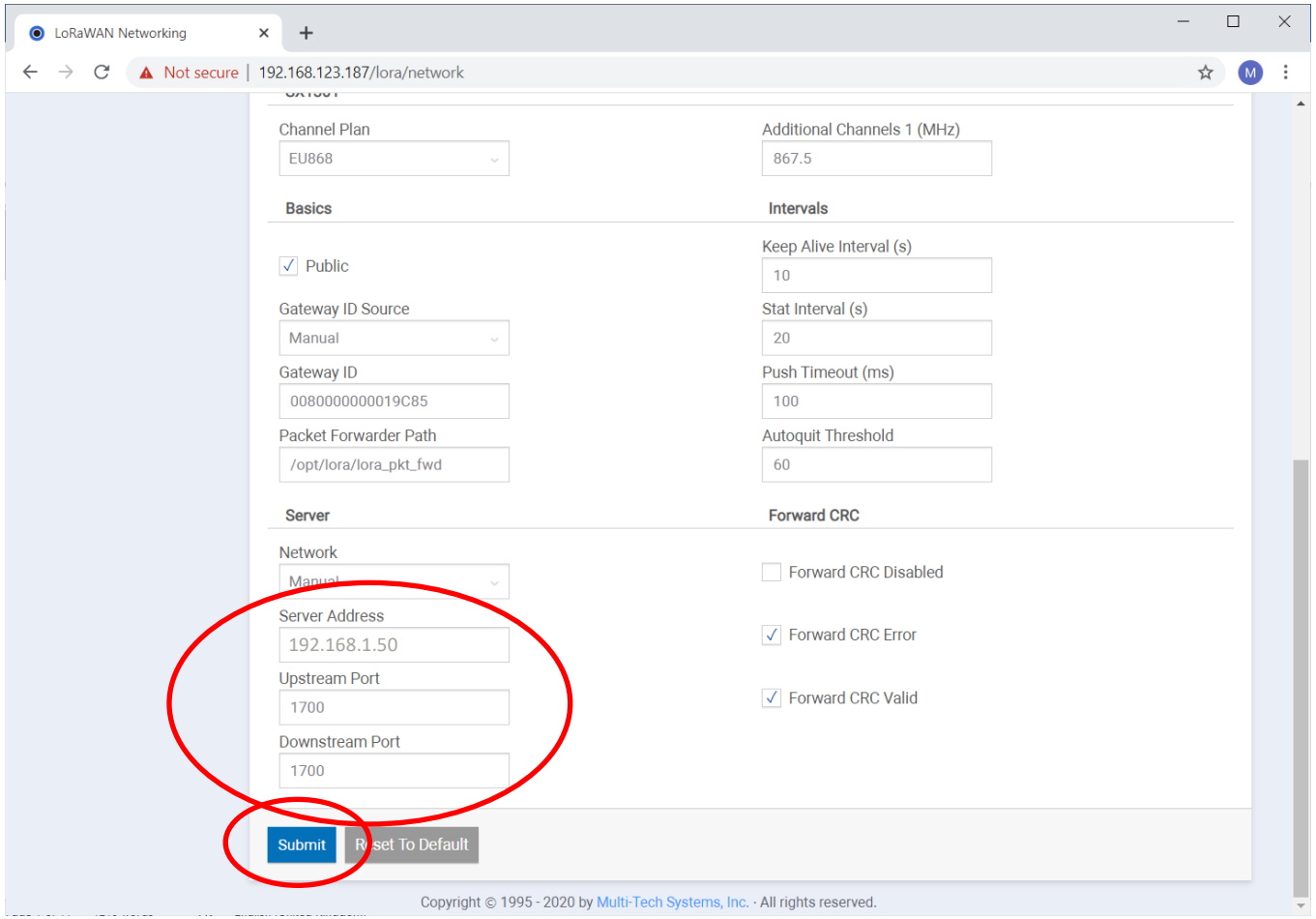
- Make a note of the Gateway EUI
- As required



© 2022 Dialog Semiconductor

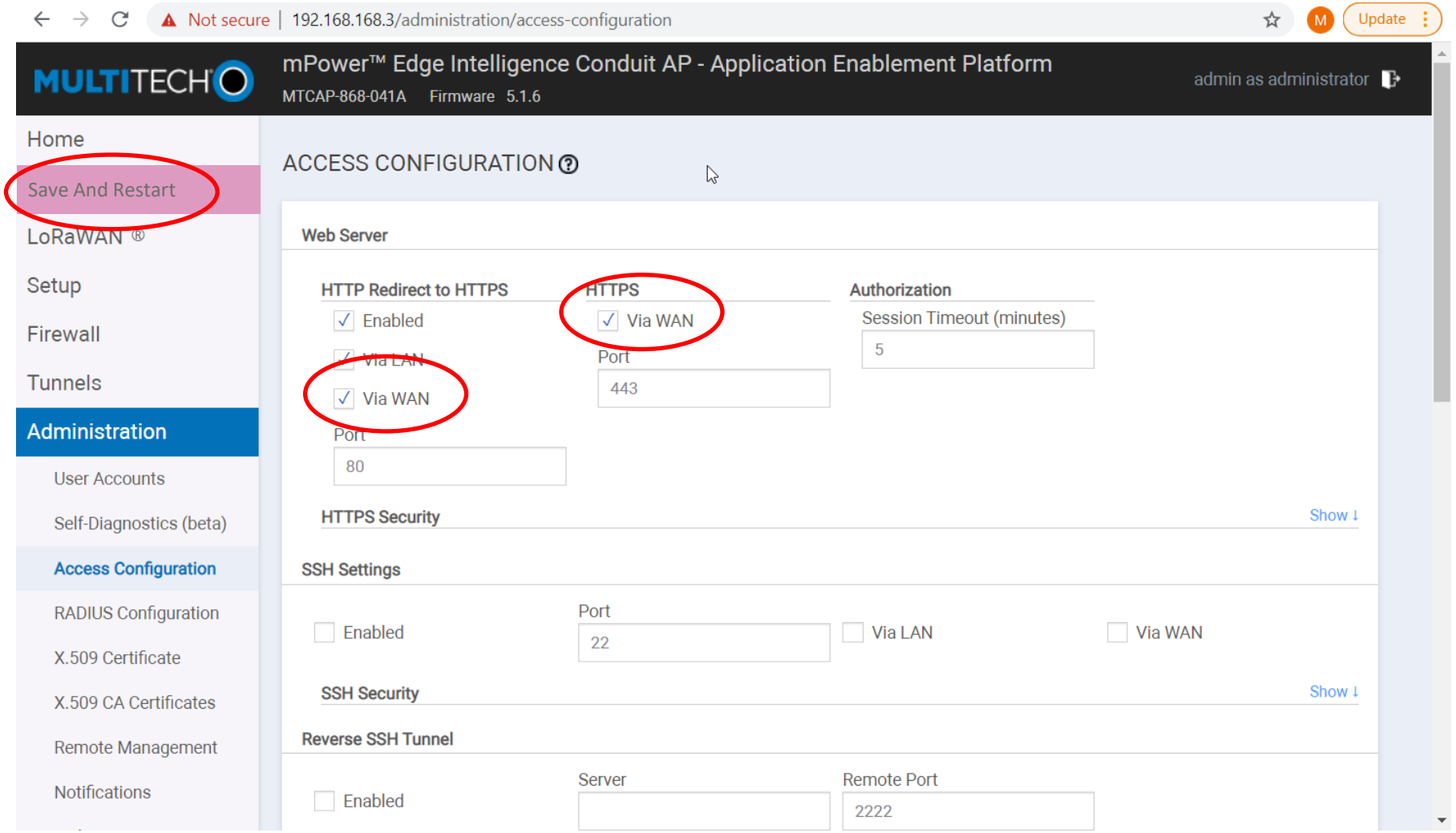
Configure MultiTech Gateway – Set As LoRa Packet Forwarder (cont.)

Server Address: 192.168.1.50
Upstream/Downstream Port: 1700



© 2022 Dialog Semiconductor

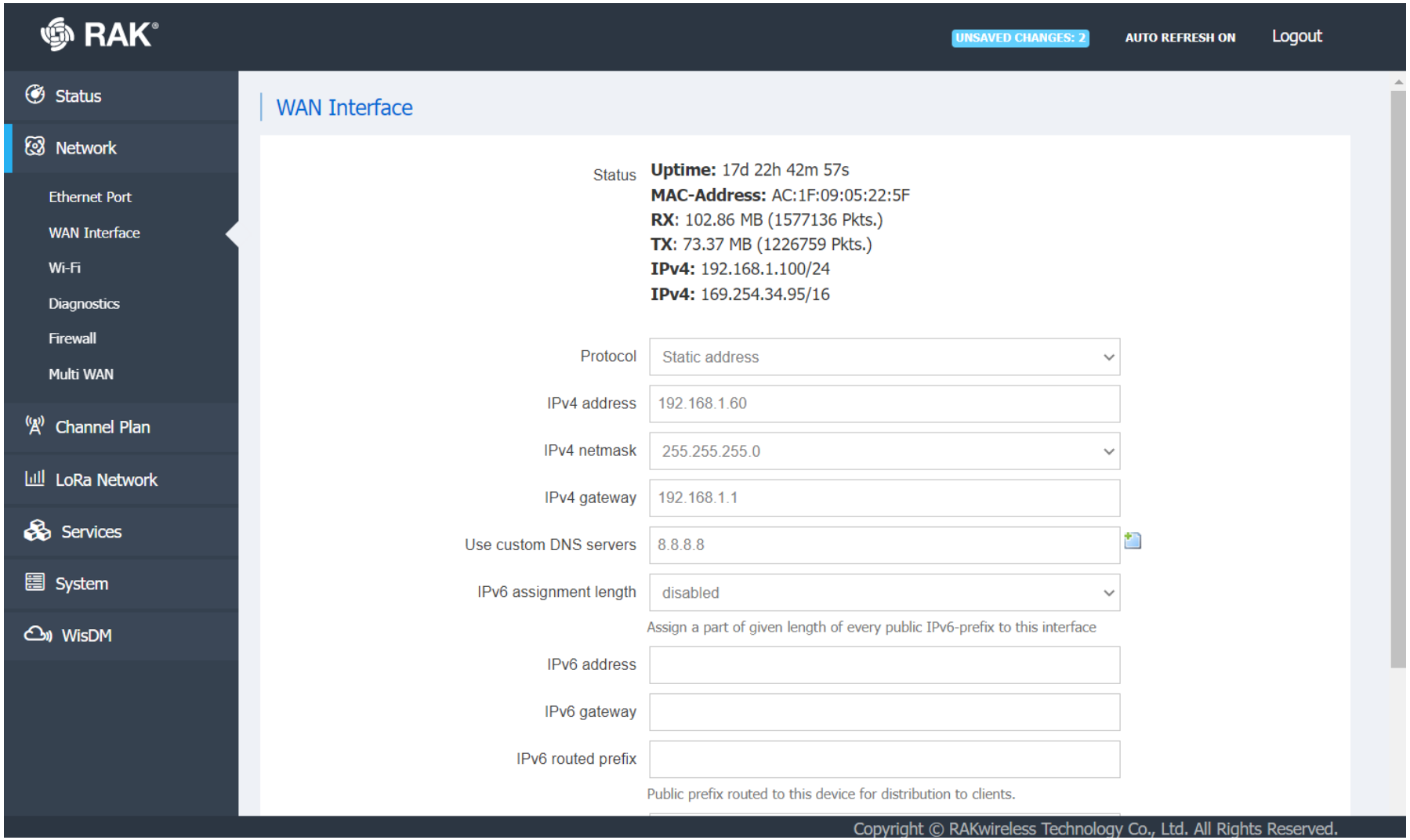
Configure MultiTech Gateway – Set WAN Access



Scroll Down and Click Submit then Click Save and Restart

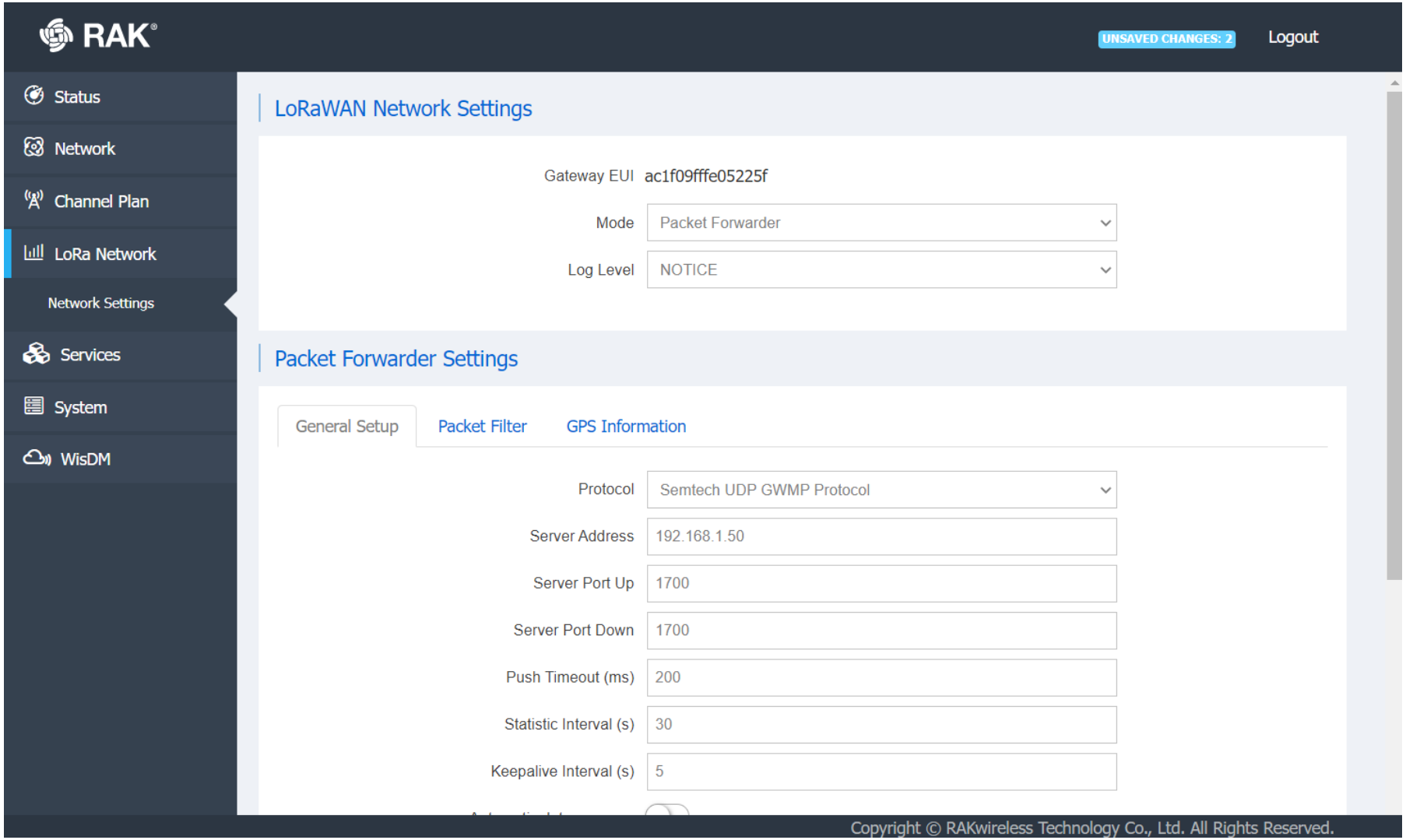
© 2022 Dialog Semiconductor

Configuring RAK7258



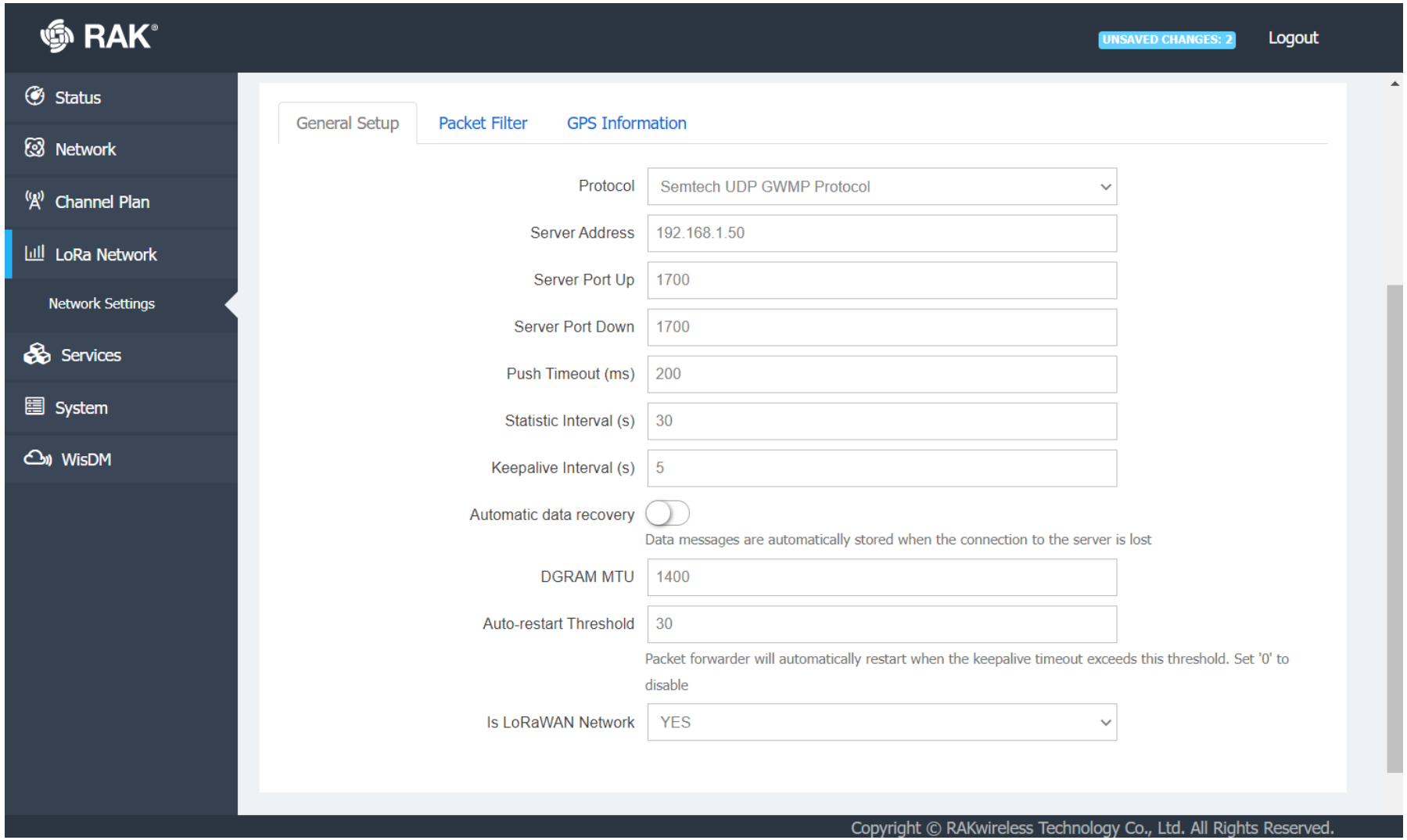
© 2022 Dialog Semiconductor

Configuring RAK7258 (continued)



© 2022 Dialog Semiconductor

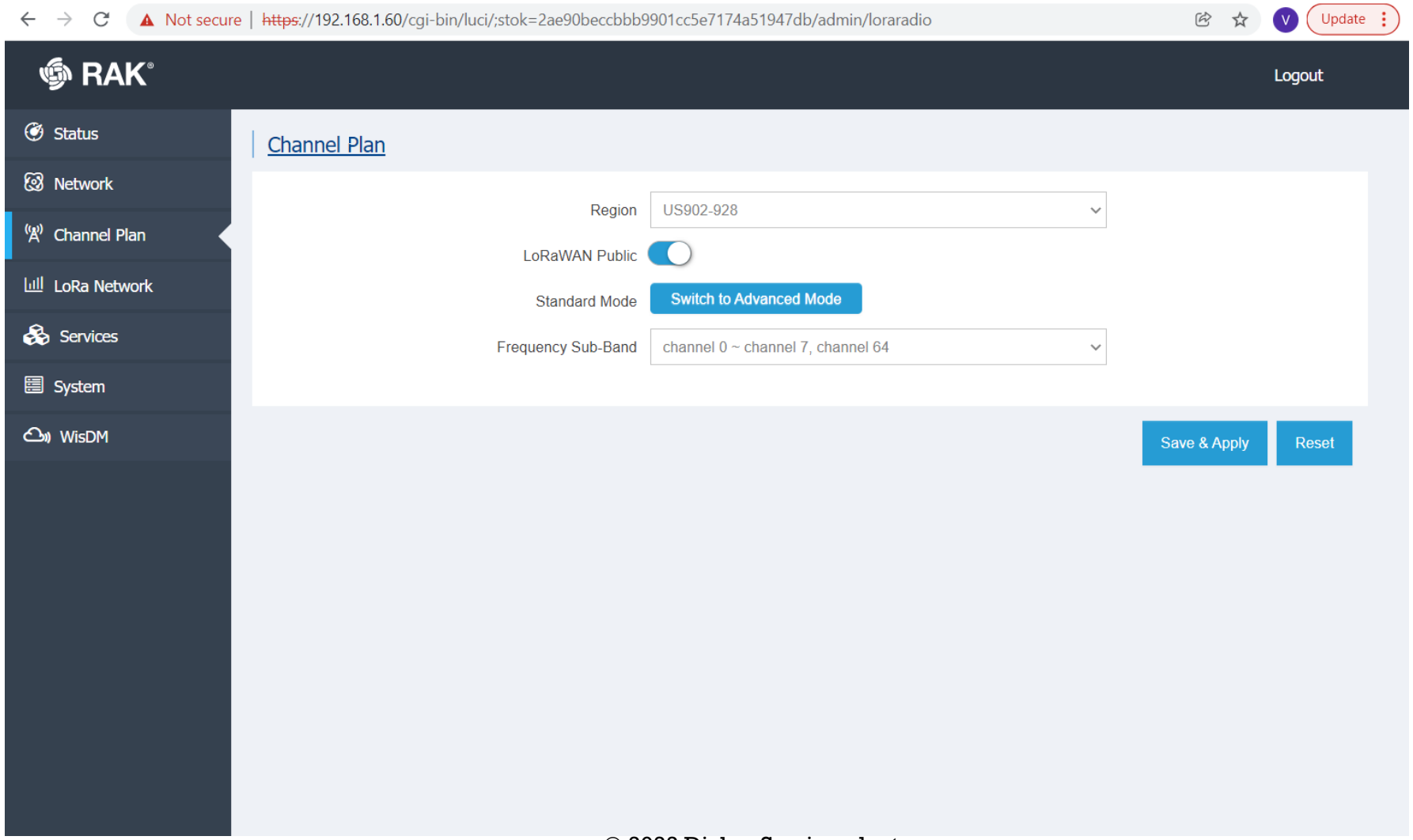
Configuring RAK7258 (continued)



© 2022 Dialog Semiconductor

Configuring RAK7258 (continued)

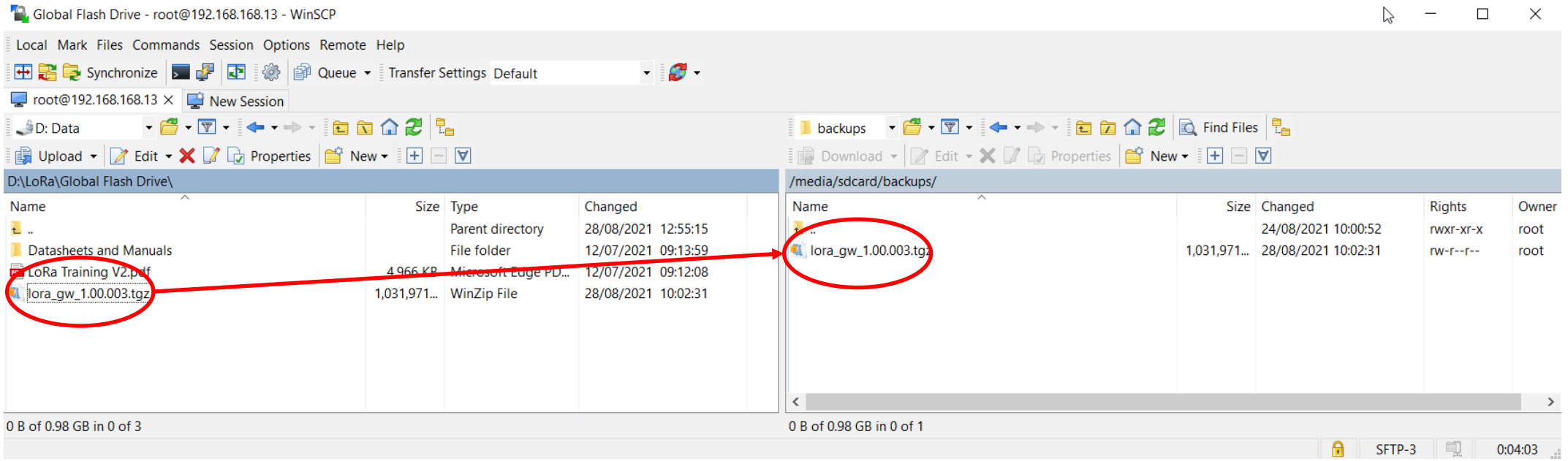
For US, adjust channel plan to channel 0 – channel 7, channel 64



© 2022 Dialog Semiconductor

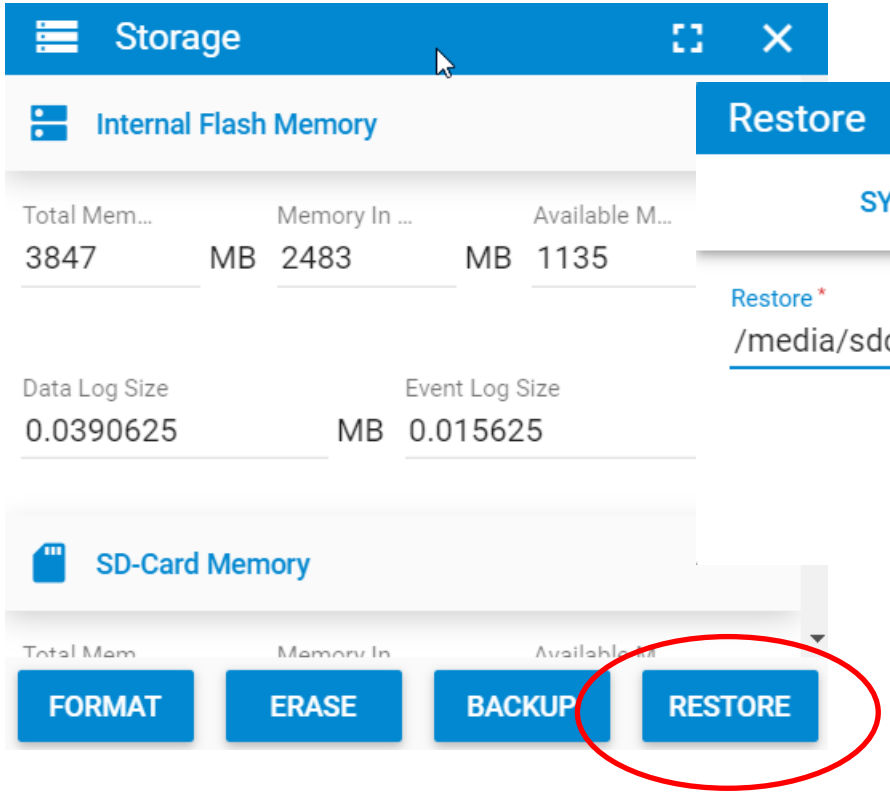
Cloning the SmartServer Image

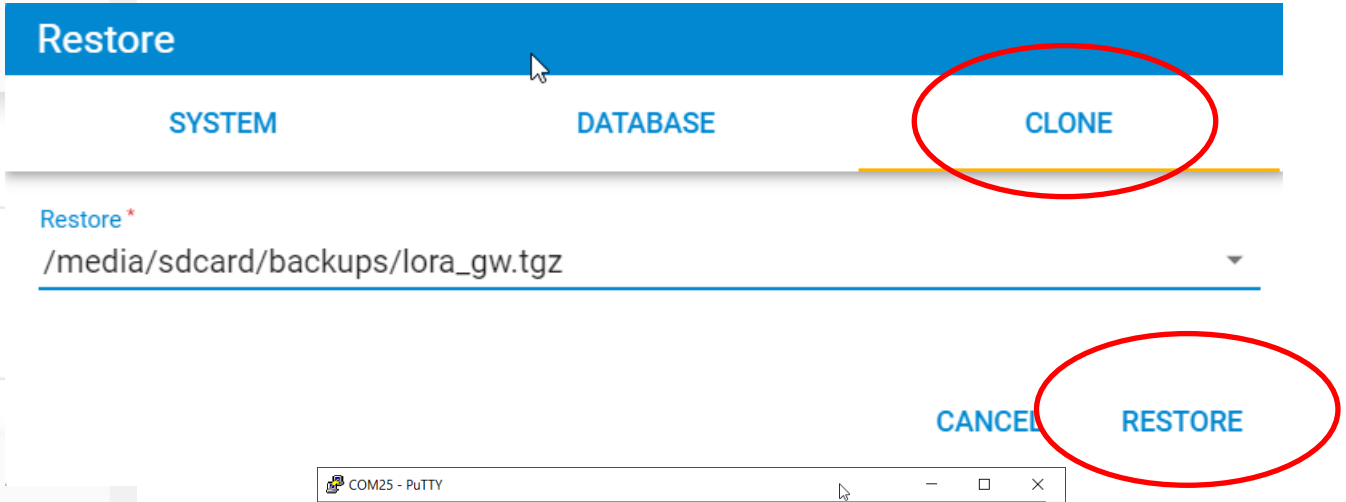
- Start with a SmartServer re-imaged to 3.26
- Connect SmartServer to the internet
- Establish a connection to the SmartServer using WinSCP with user "root" **NOT** "apollo"
- Copy lora_gw_<build>_<region>.tgz Image to SmartServer's /media/sdcard/backup folder
- Maintains original MAC IDs and host name
- Hit F5 in the CMS to refresh

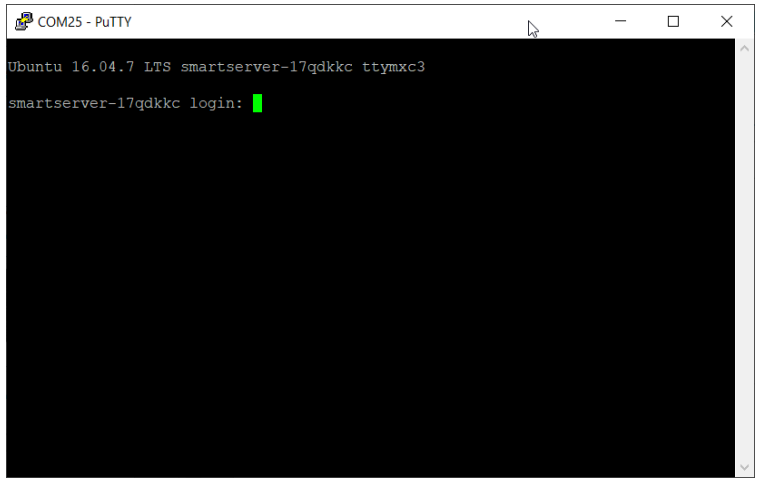


© 2022 Dialog Semiconductor

Clone Image – Clone Image







Notes:

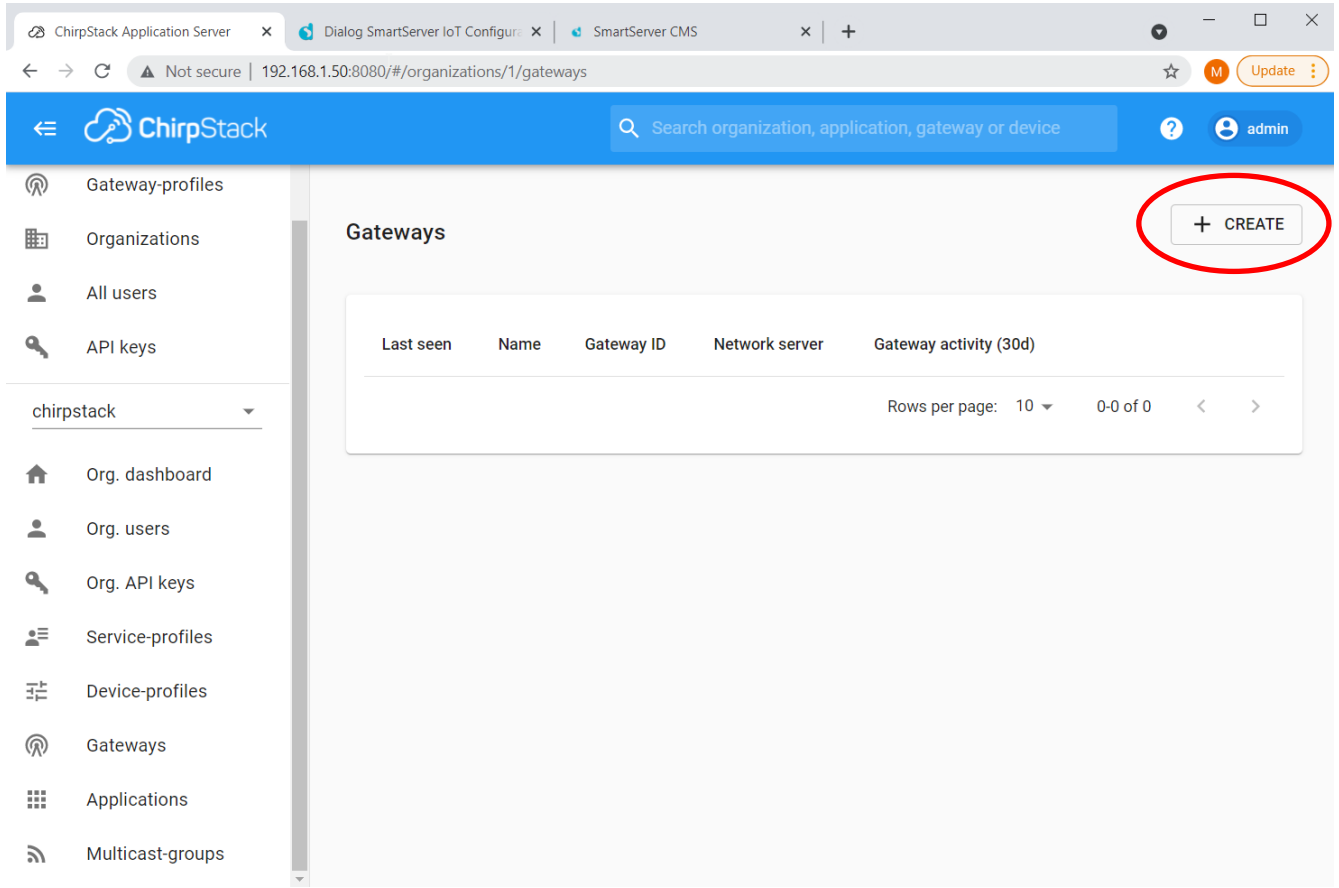
1) Monitor progress using a serial console connection

2) SmartServer will have the password from the imaged device after cloning

© 2022 Dialog Semiconductor

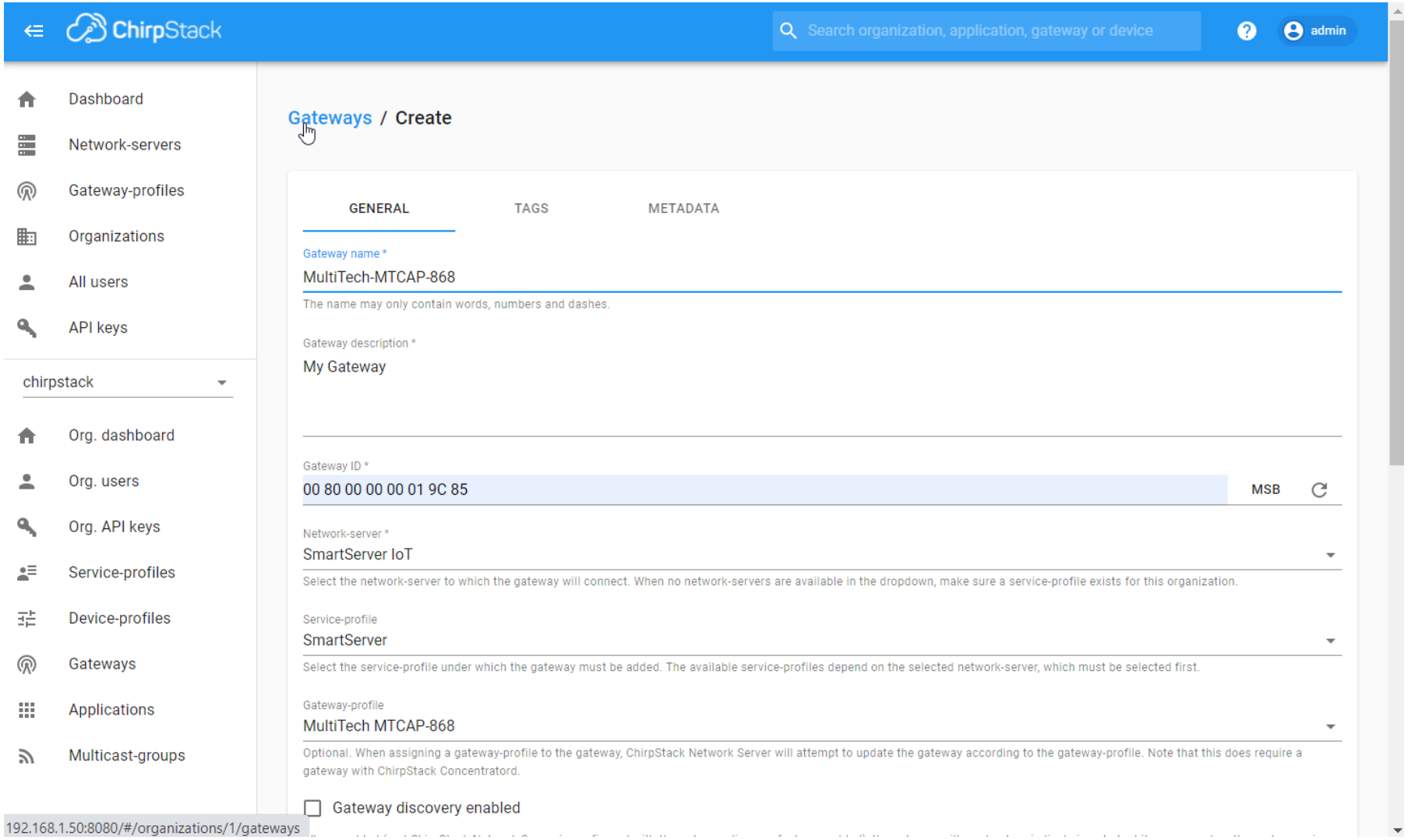
Creating LoRaWAN Gateway in Chirpstack

192.168.1.50:8080 admin/Sgq4-2FKQ



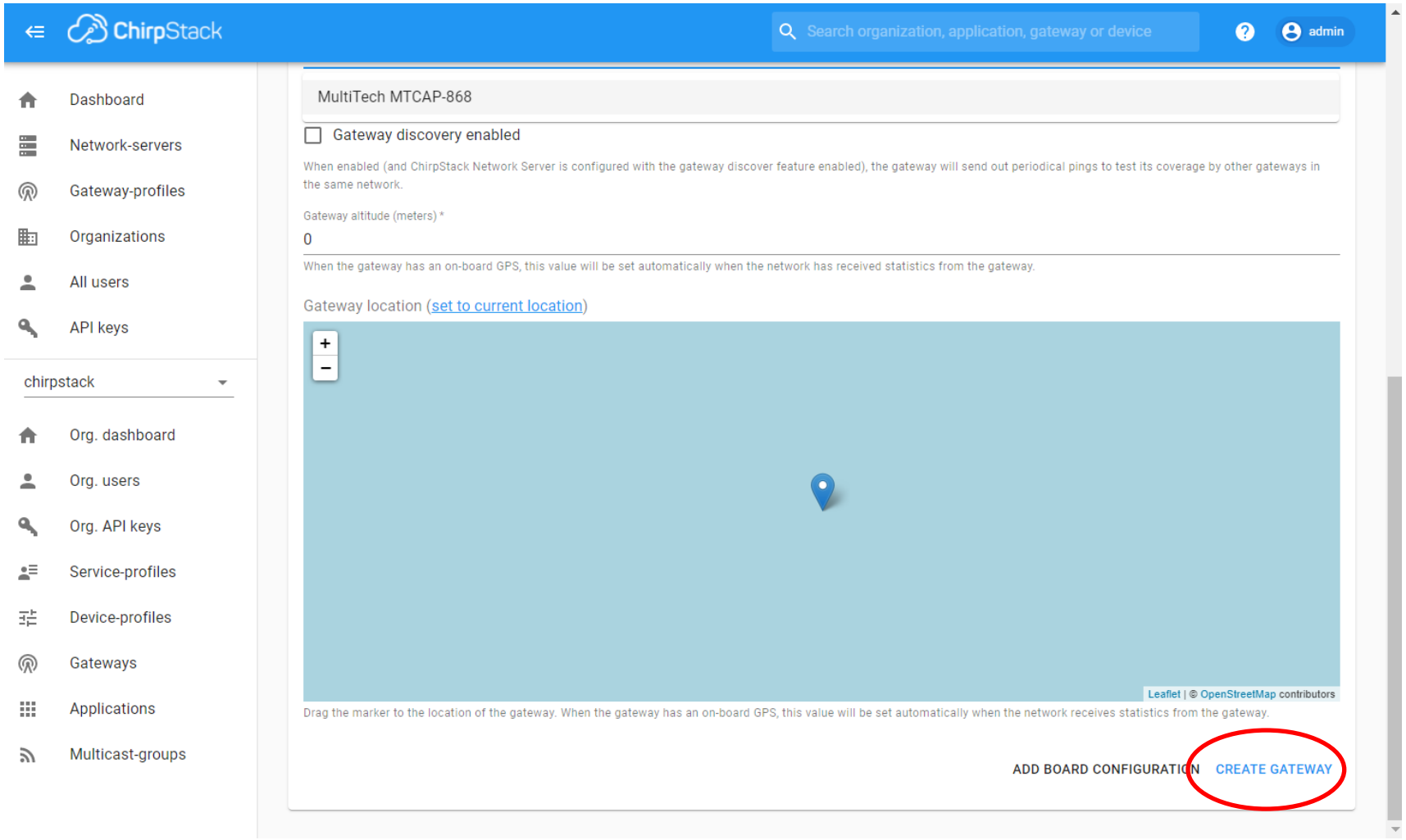
© 2022 Dialog Semiconductor

Creating LoRaWAN Gateway in Chirpstack (cont.)



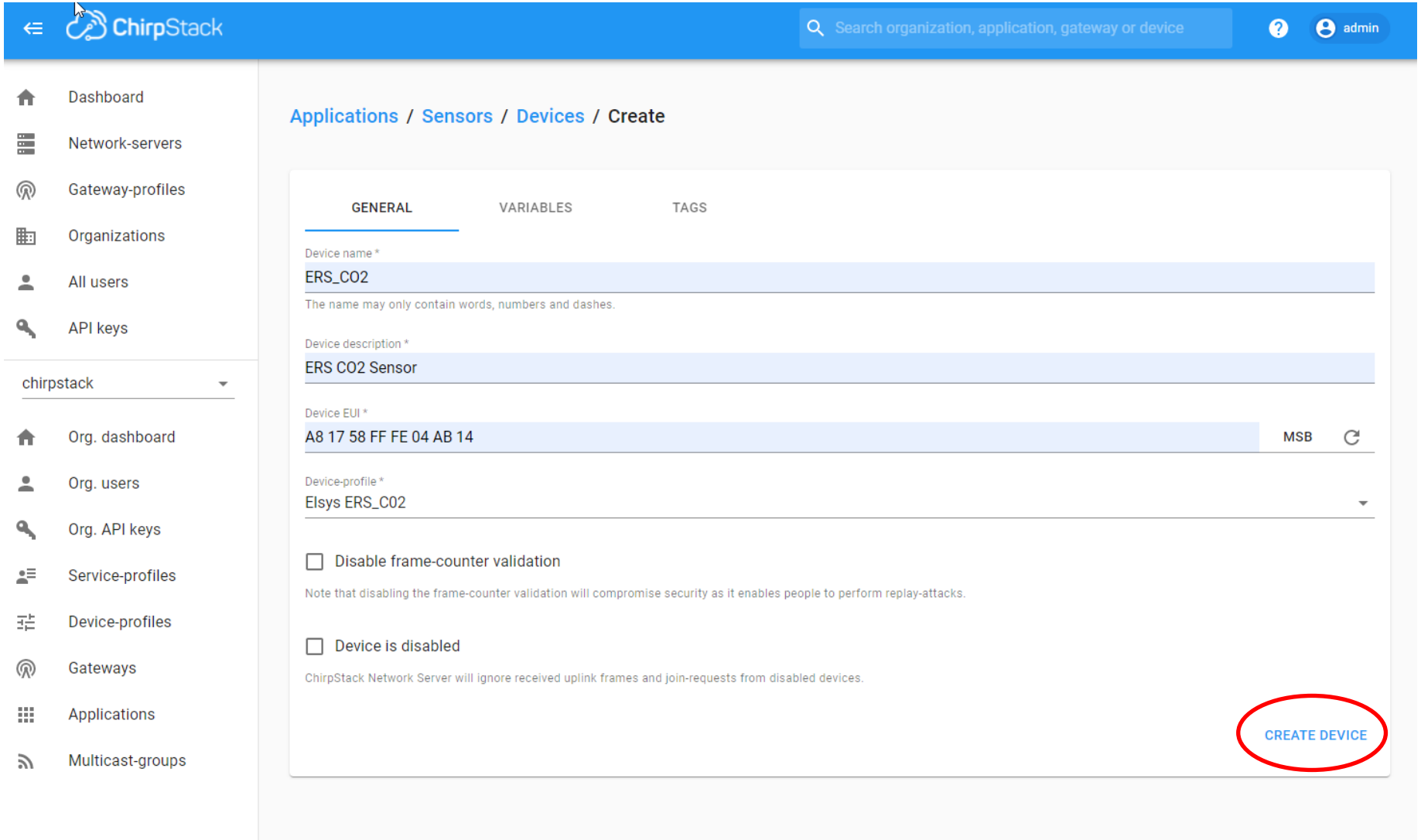
© 2022 Dialog Semiconductor

Creating LoRaWAN Gateway in Chirpstack (cont.)



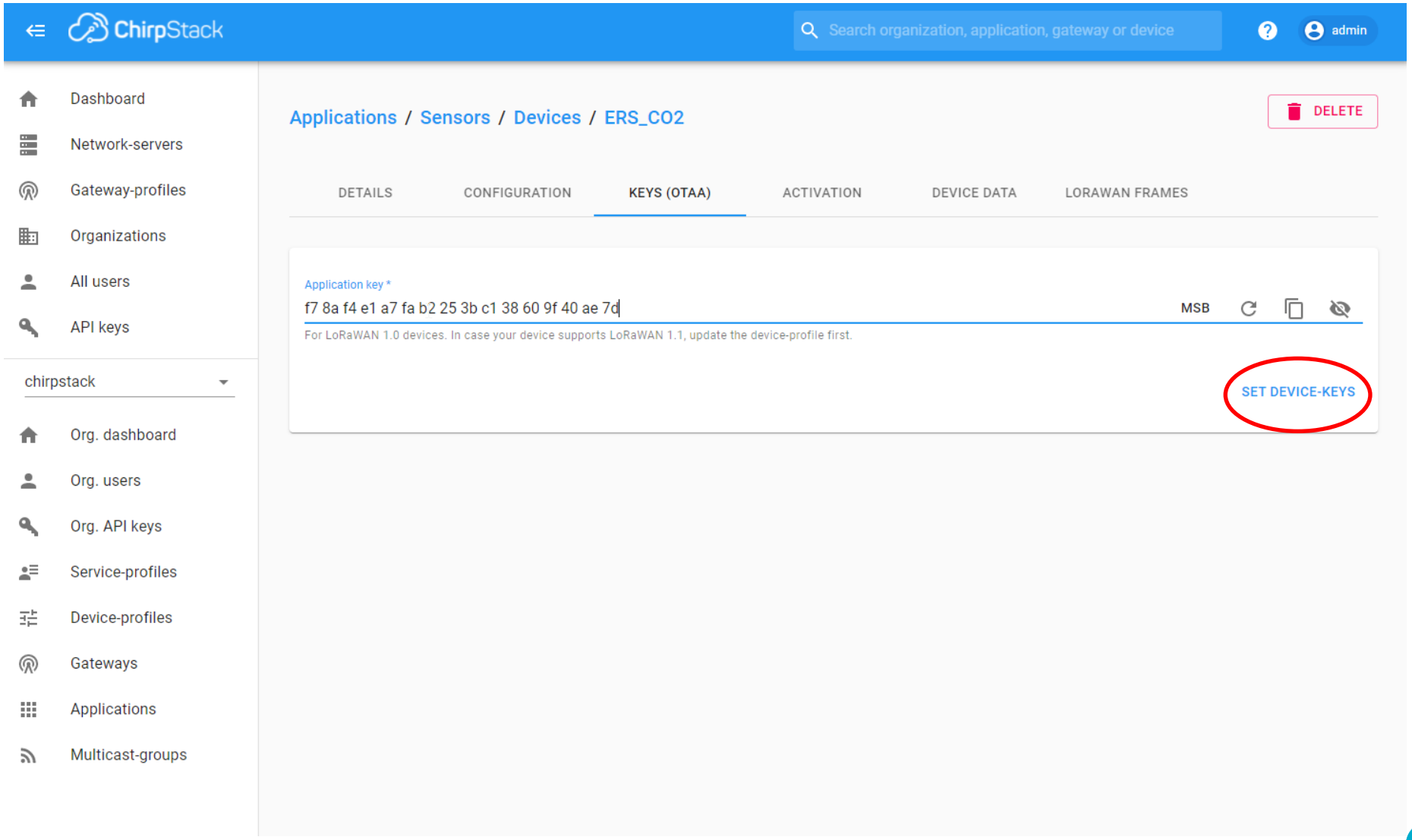
© 2022 Dialog Semiconductor

Creating LoRaWAN Devices in ChirpStack



© 2022 Dialog Semiconductor

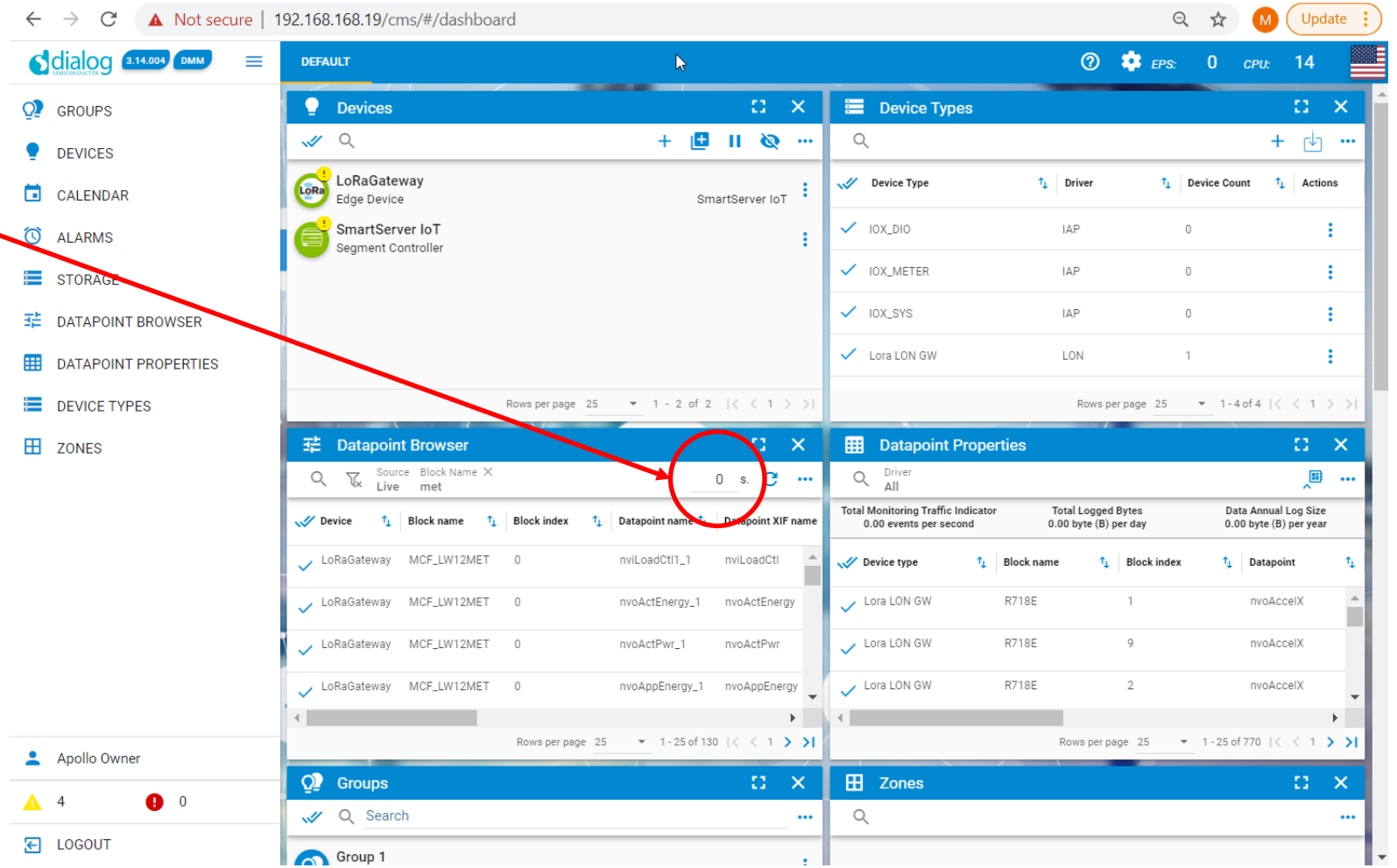
Creating LoRaWAN Devices in ChirpStack



© 2022 Dialog Semiconductor

Datapoint Browser Widget Polling Rate = 0

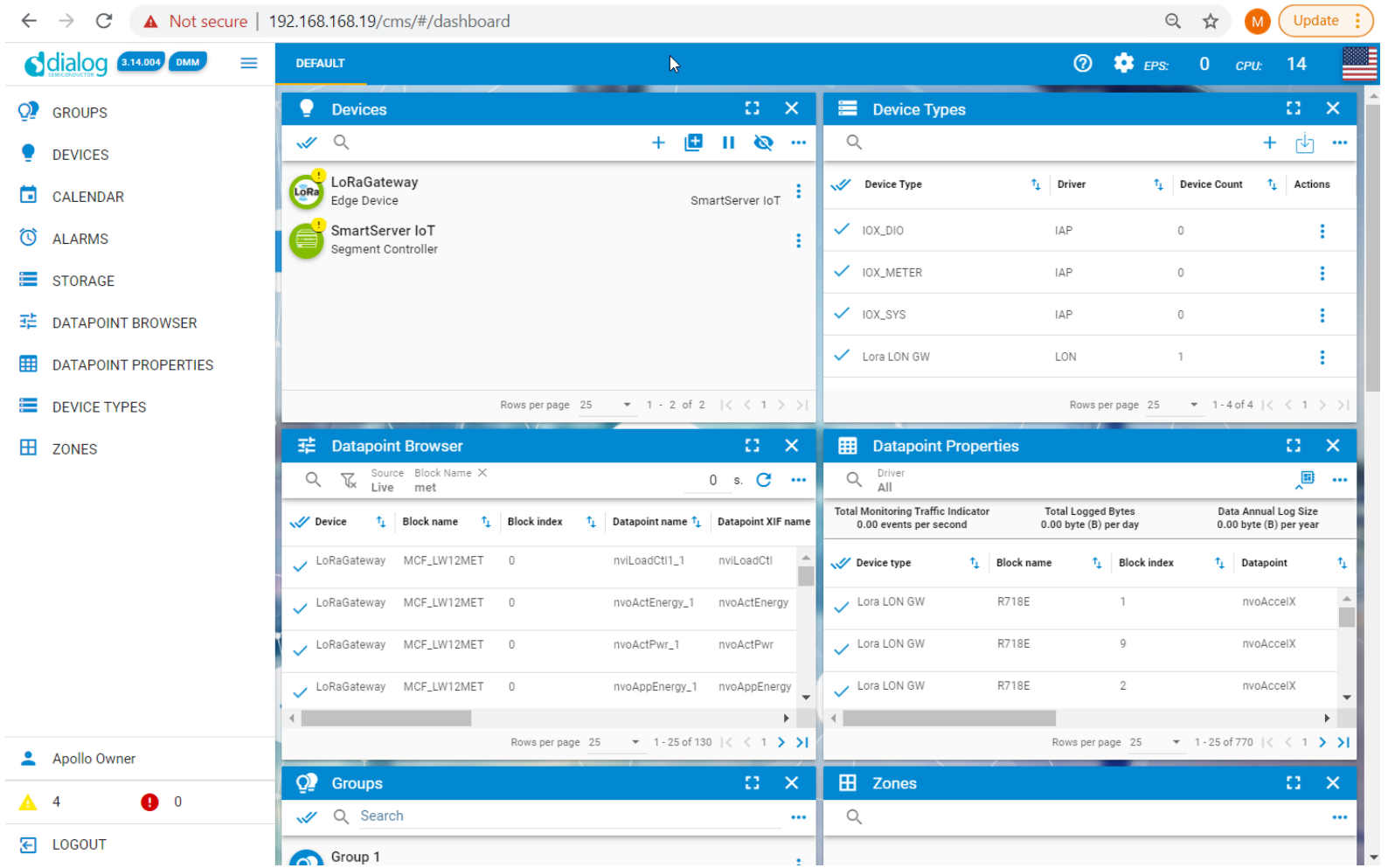
- Ensure polling rate is set to 0 while in use to reduce MQTT traffic
- Close browser after use



© 2022 Dialog Semiconductor

SmartServer Upgrades

Note: Do not upgrade or re-image a SmartServer once cloned



© 2022 Dialog Semiconductor

Set The SmartServer IoT Date

- SmartServer 3.26 is configured for automatic date and time from the internet.
- Connect the SmartServer to the internet and it should set the time and date automatically.

© 2022 Dialog Semiconductor

Setting App Keys & Adjusting TX Rates

**** Do not use default app keys, as this is a security issue, set policies with suppliers ****

Netvox keys are either default or set by supplier (https://kms.alliot.co.uk/index)
Netvox TX rates etc. are adjusted via ChirpStack using Base64 encoded data
(see Netvox user's guide & cheat sheet)
Netvox keys can be changed over the air if needed

Elsys keys are set using their NFC Android app (write the key down somewhere safe)
Elsys TX rates are set using their NFC Android app

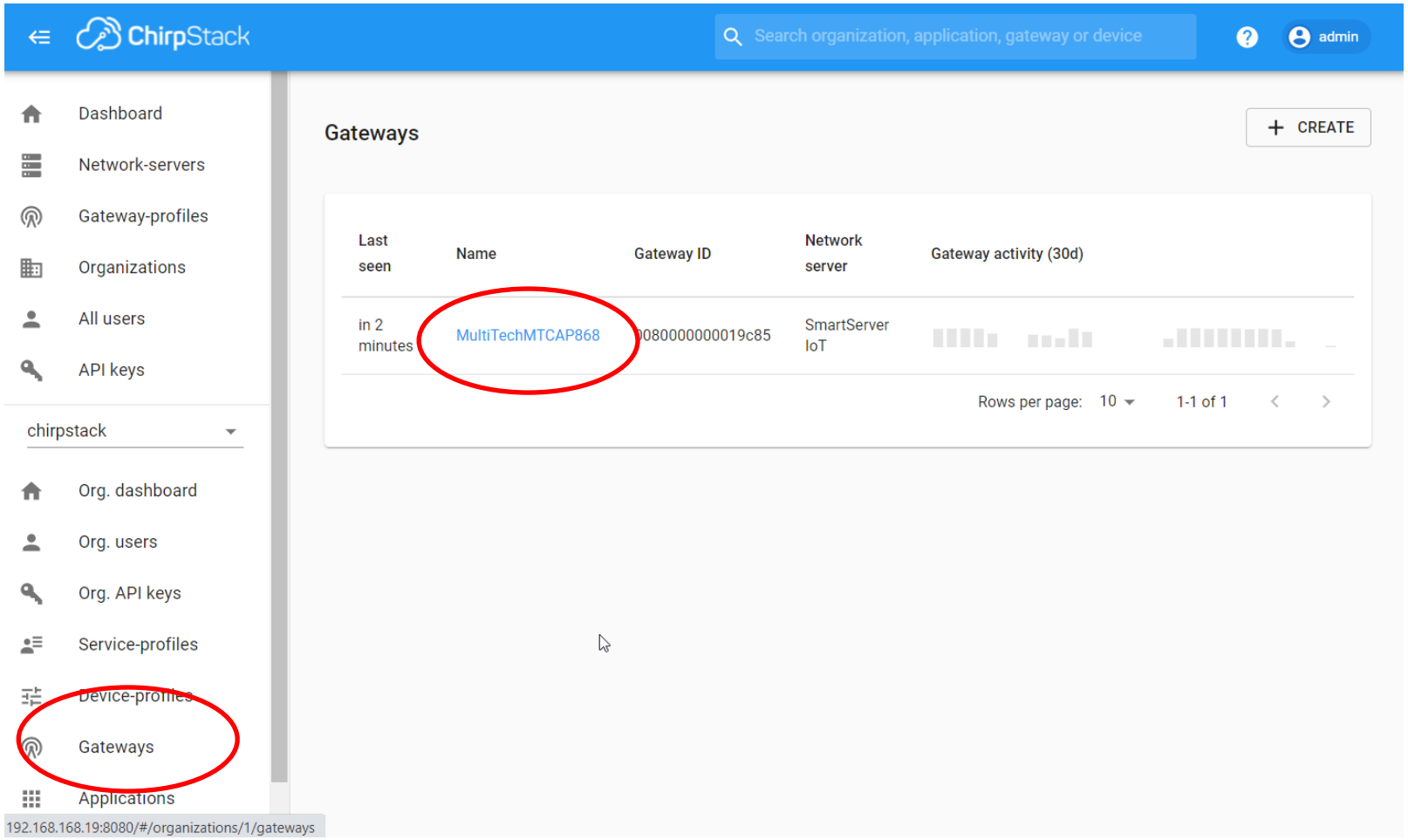
MC Climate keys are typically set by supplier
MC Climate TX rates are set using their NFC Android app

IMBuildings keys are typically set by supplier
IMBuildings TX rates are set using their NFC Android app

MileSight keys are typically set by the supplier
Use NFC app to configure devices

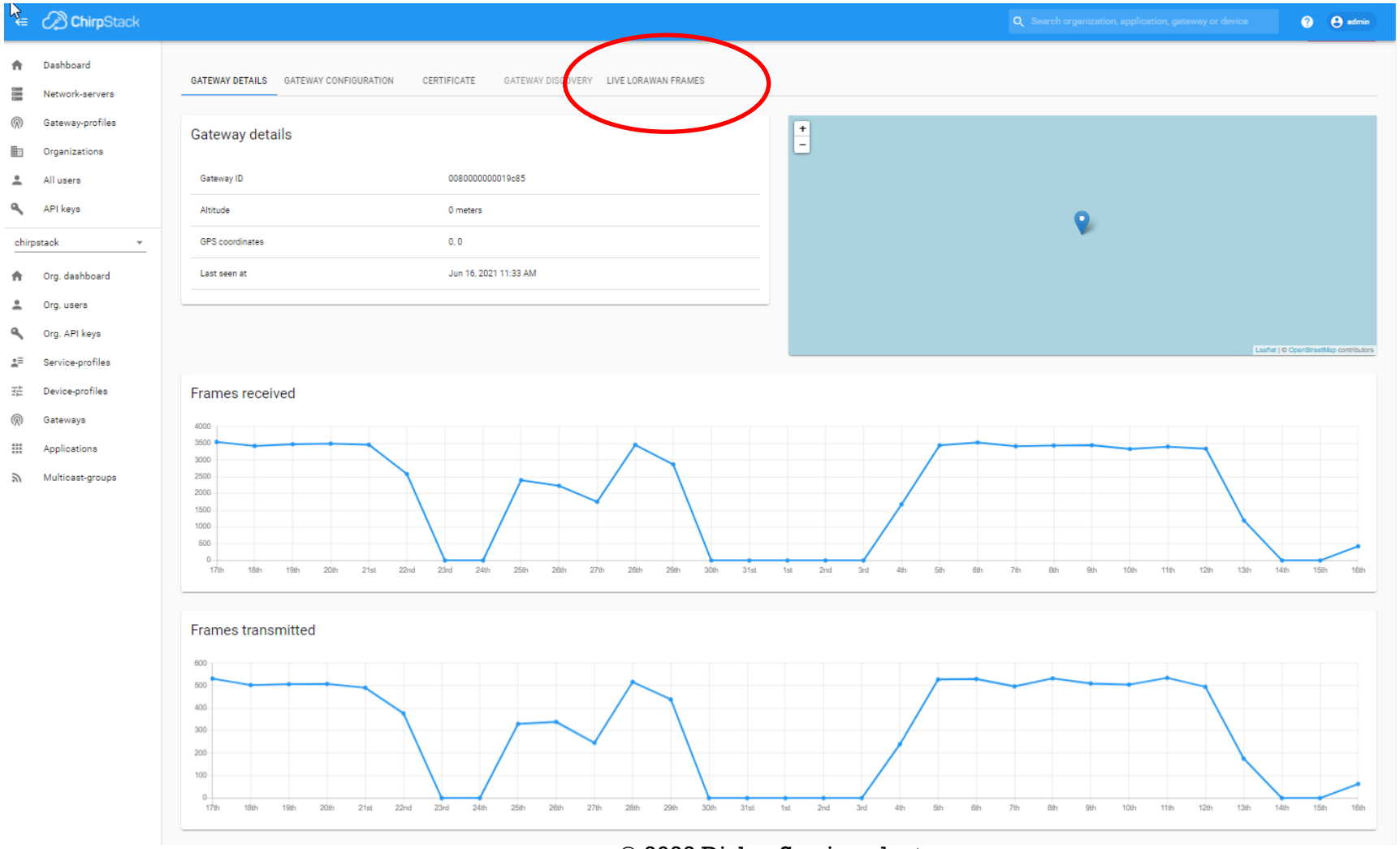
© 2022 Dialog Semiconductor

Testing The Gateway



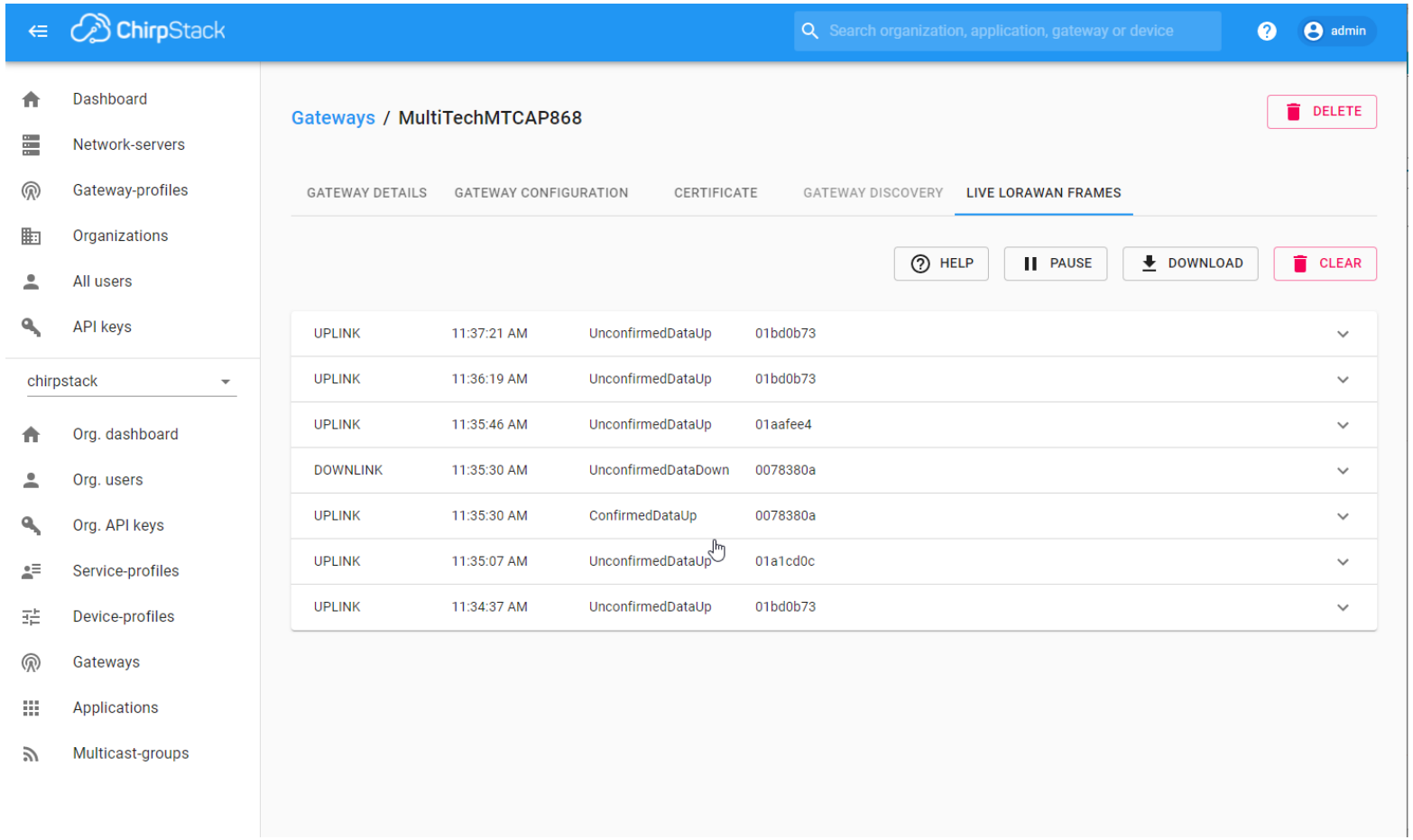
© 2022 Dialog Semiconductor

Testing The Gateway (cont.)



© 2022 Dialog Semiconductor

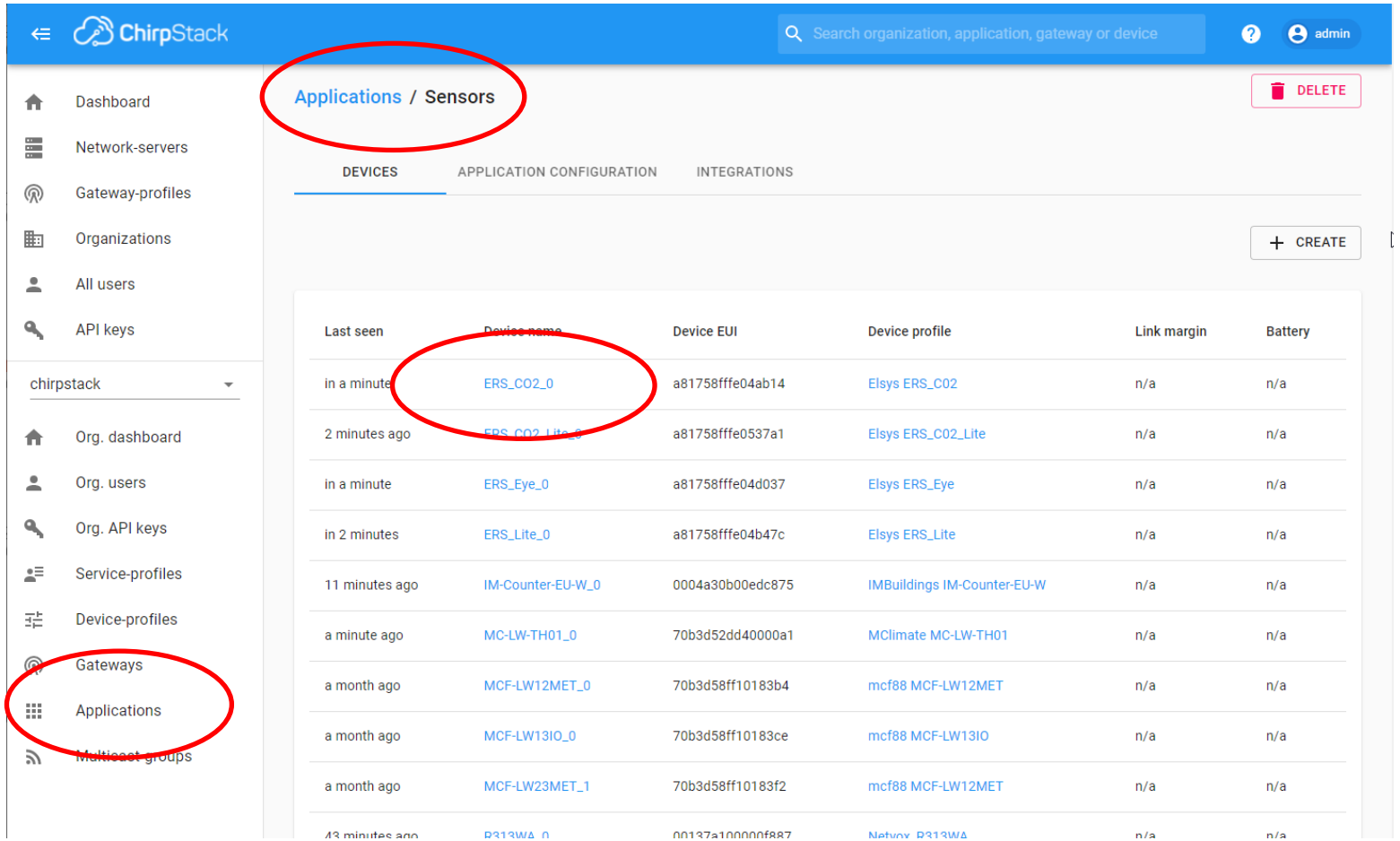
Testing The Gateway – Live Frames



Note: You may see data from devices you are not interested in, such as join requests

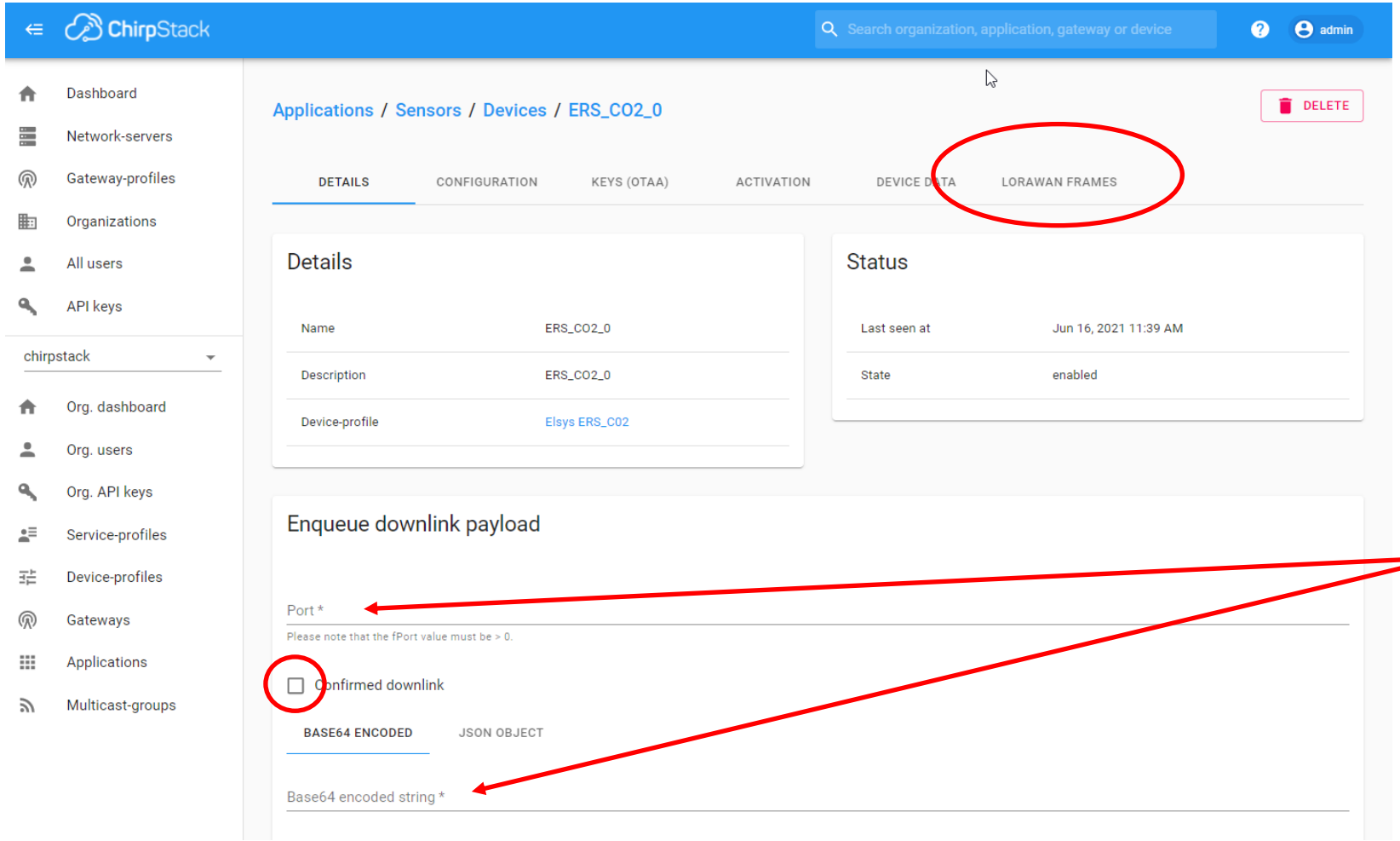
© 2022 Dialog Semiconductor

Testing Devices



© 2022 Dialog Semiconductor

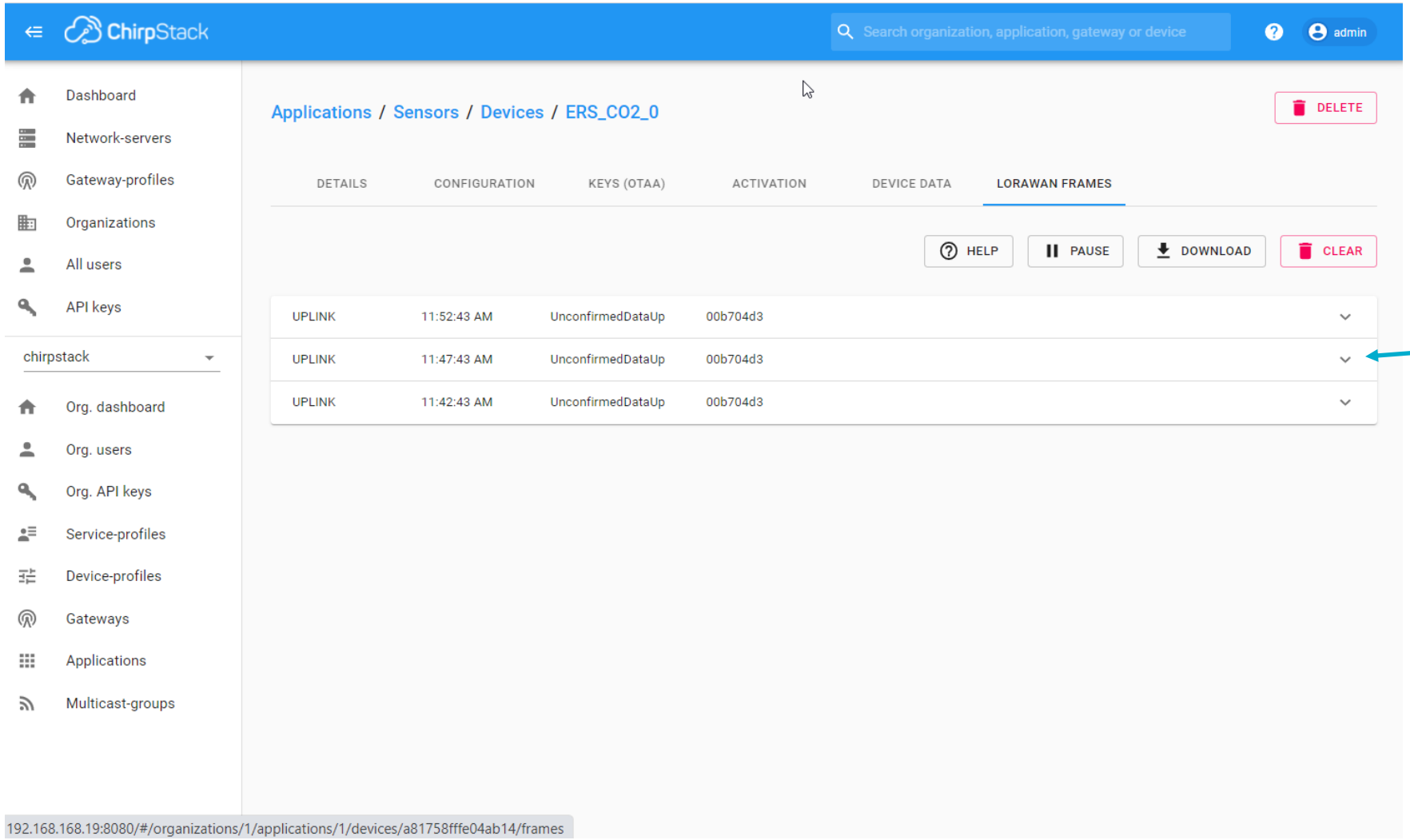
Testing Specific Devices



Note: This is where you put downlink base 64 data to send to devices – alwaysset the port and use confirmed downlink

© 2022 Dialog Semiconductor

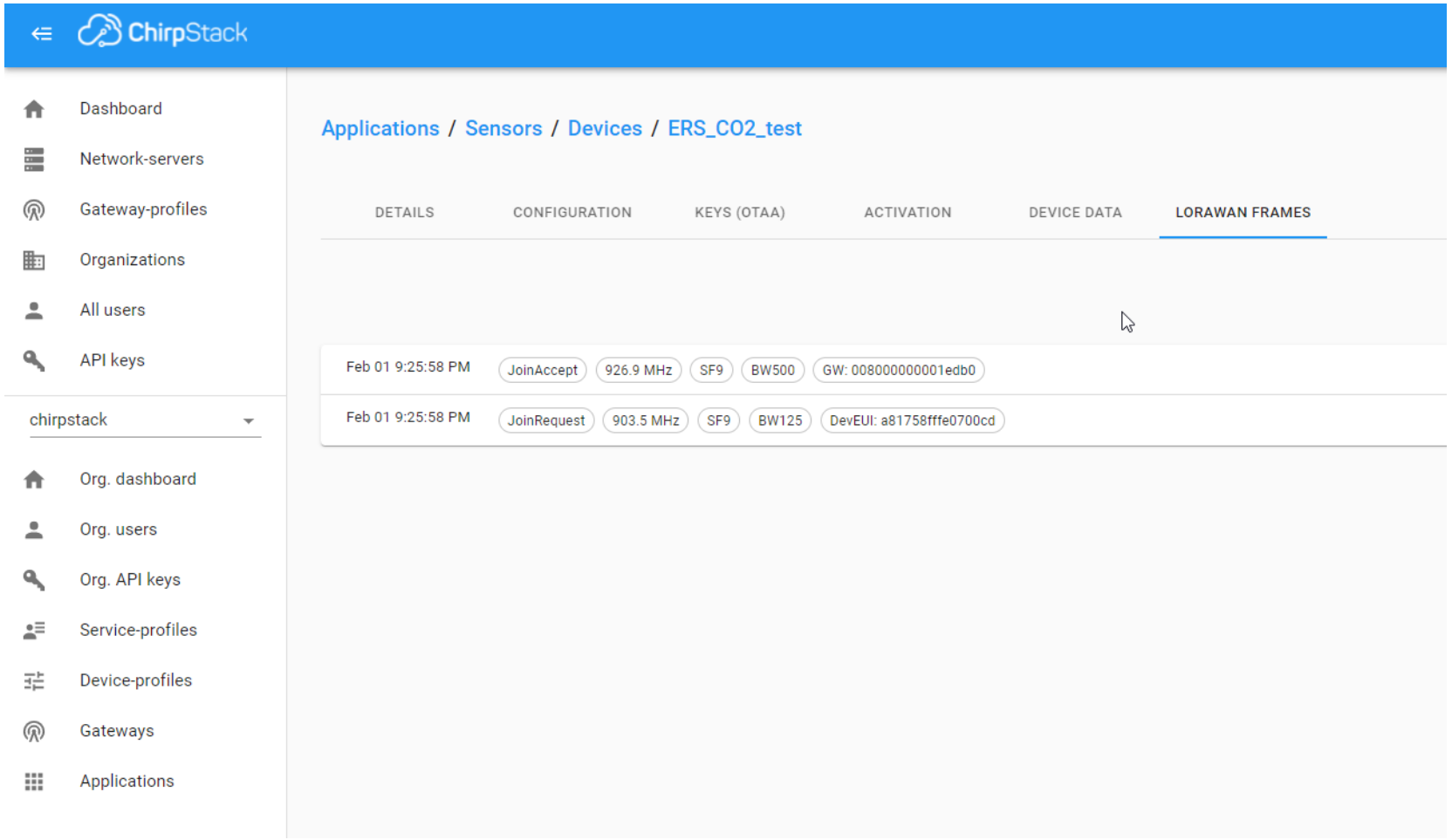
Testing Devices – Live LoRaWAN Frames



- See detail with the drop-down arrow

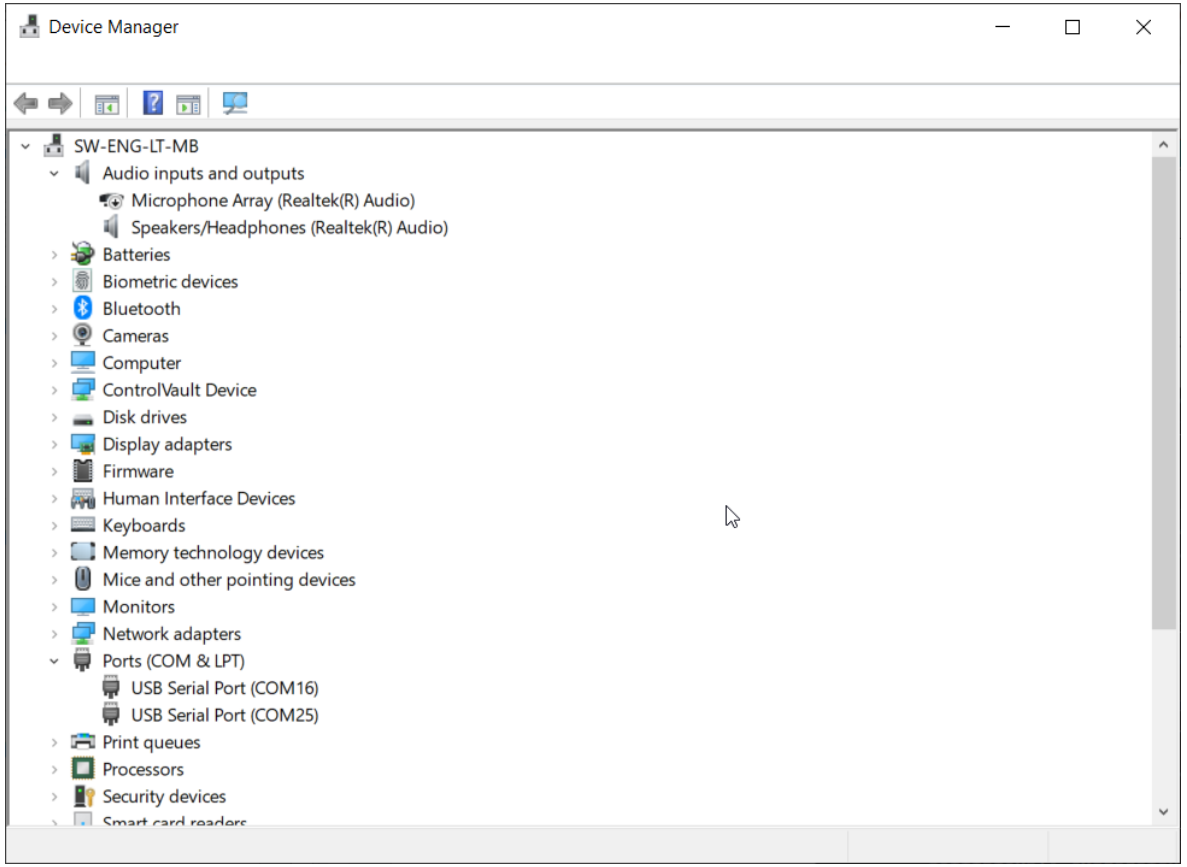
© 2022 Dialog Semiconductor

JoinAccept/JoinRequest



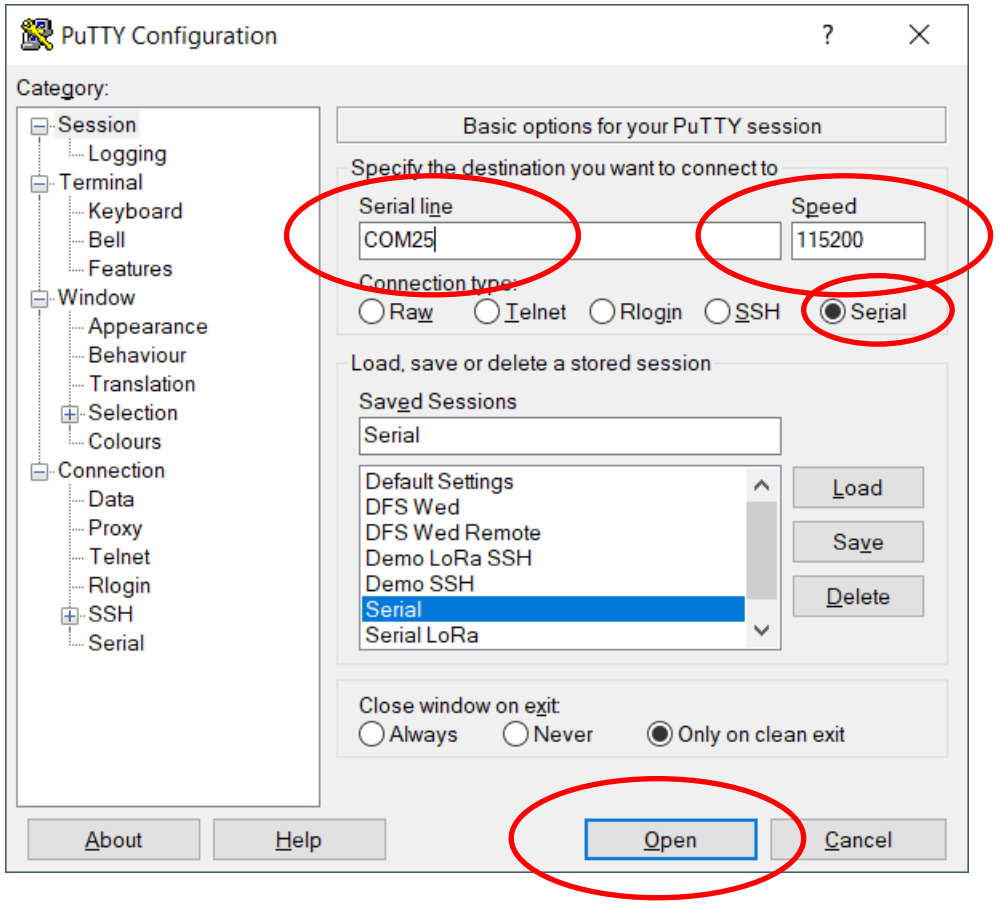
© 2022 Dialog Semiconductor

Finding PC Serial Port – Device Manager



© 2022 Dialog Semiconductor

Putty Serial Connection

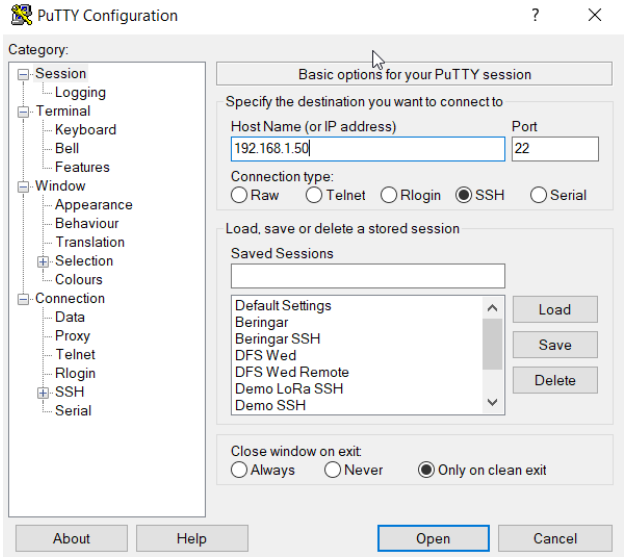


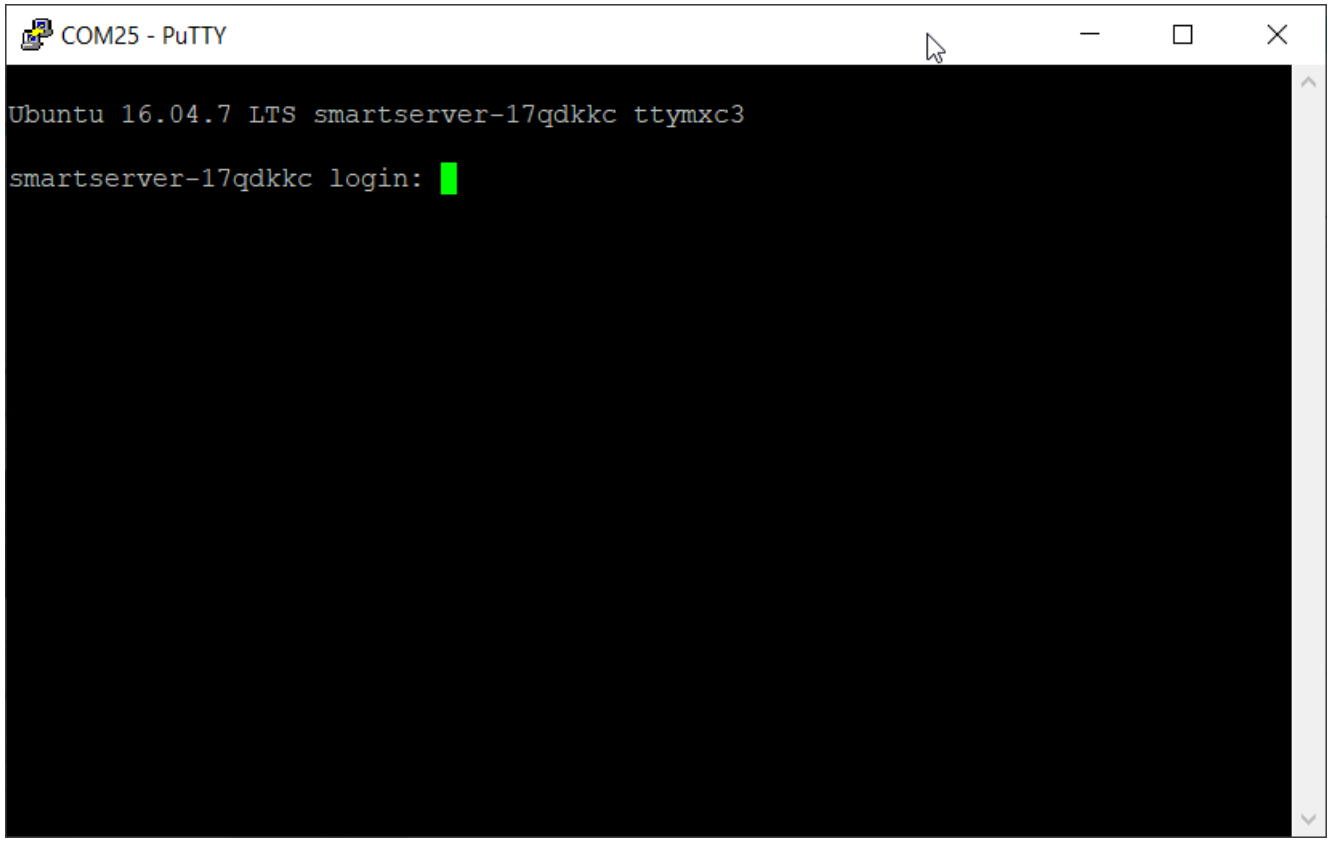
© 2022 Dialog Semiconductor

Putty Serial Connection - Login

Note: Serial connections are similar to SSH connections, but SSH connections are not persistent over reboots

You might need to hit enter to get the login prompt up

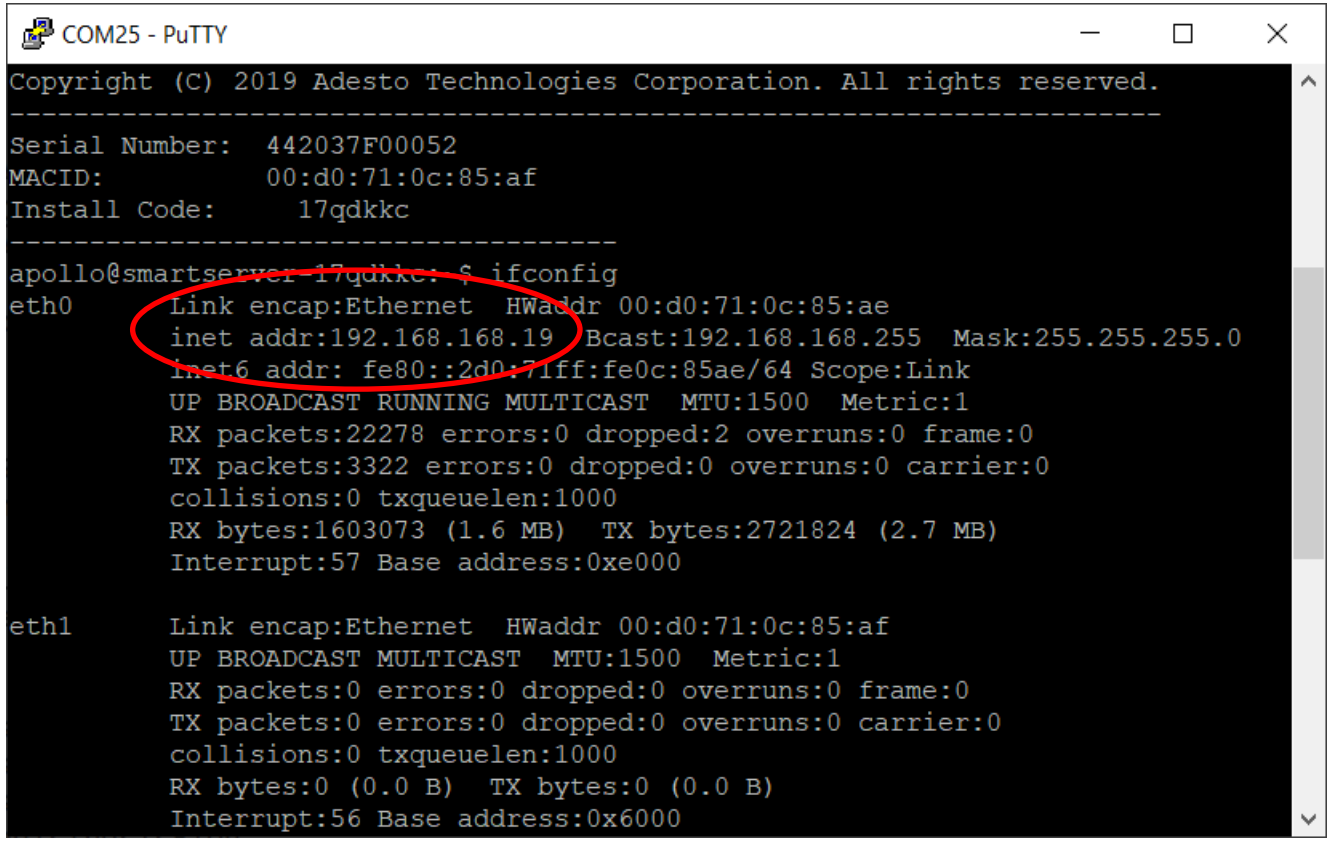




© 2022 Dialog Semiconductor

Putty Determine IPV4 Address: ifconfig

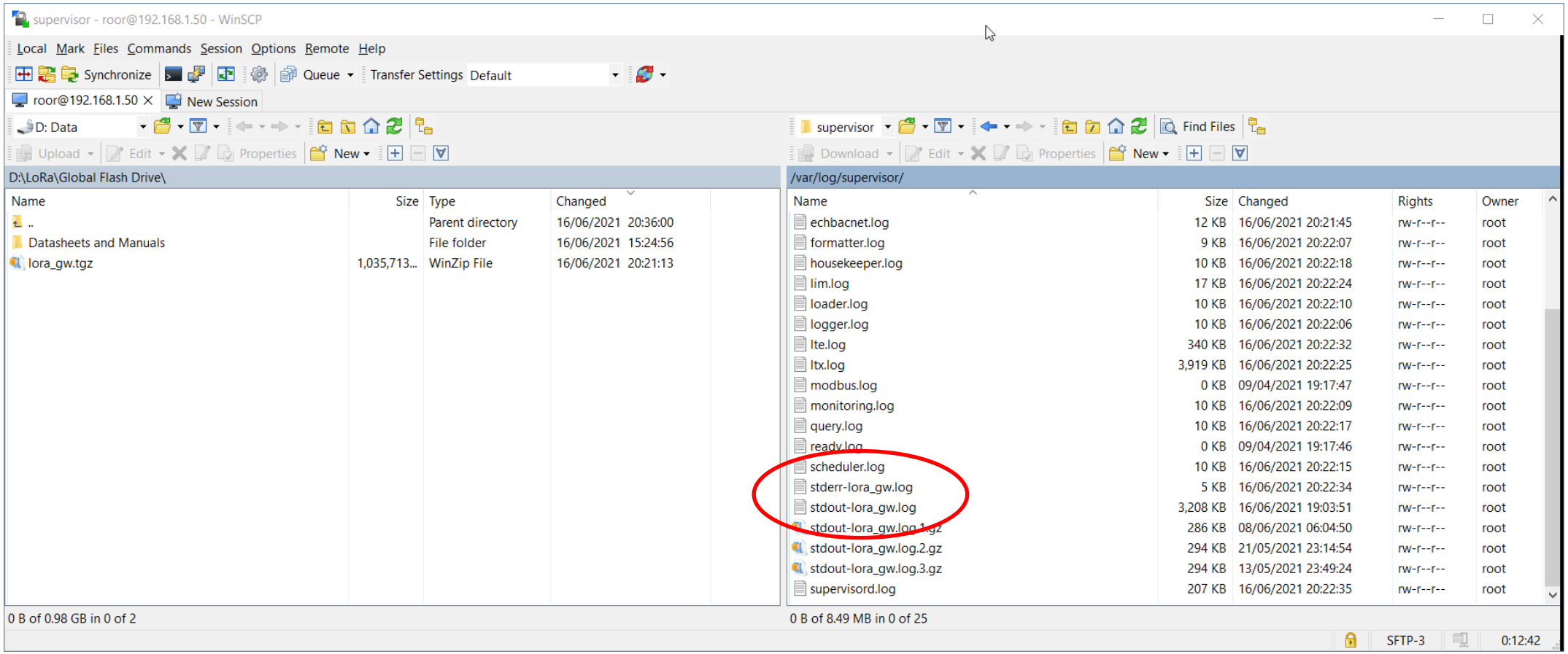
- Use the command: ifconfig



© 2022 Dialog Semiconductor

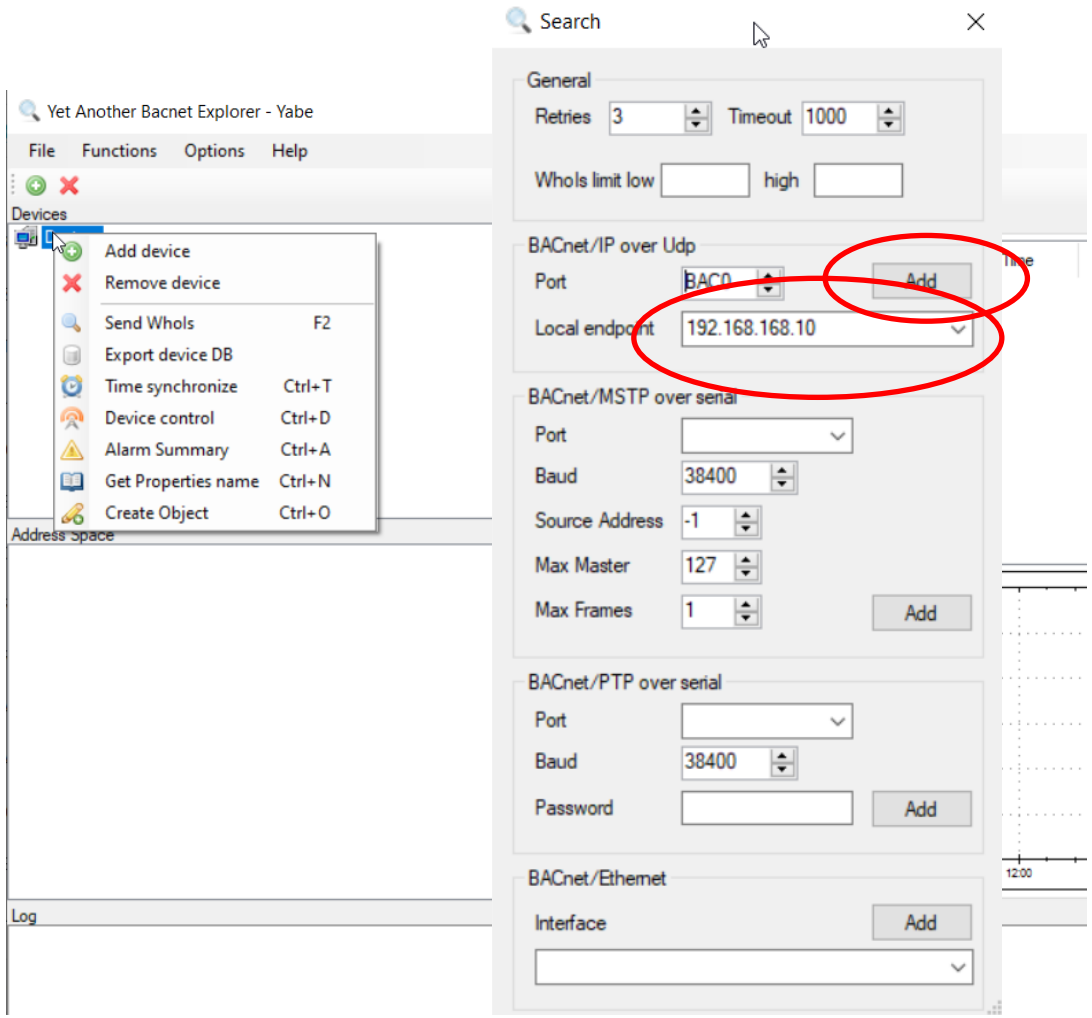
Log Files

- Log files can be found at: /var/log/supervisor



© 2022 Dialog Semiconductor

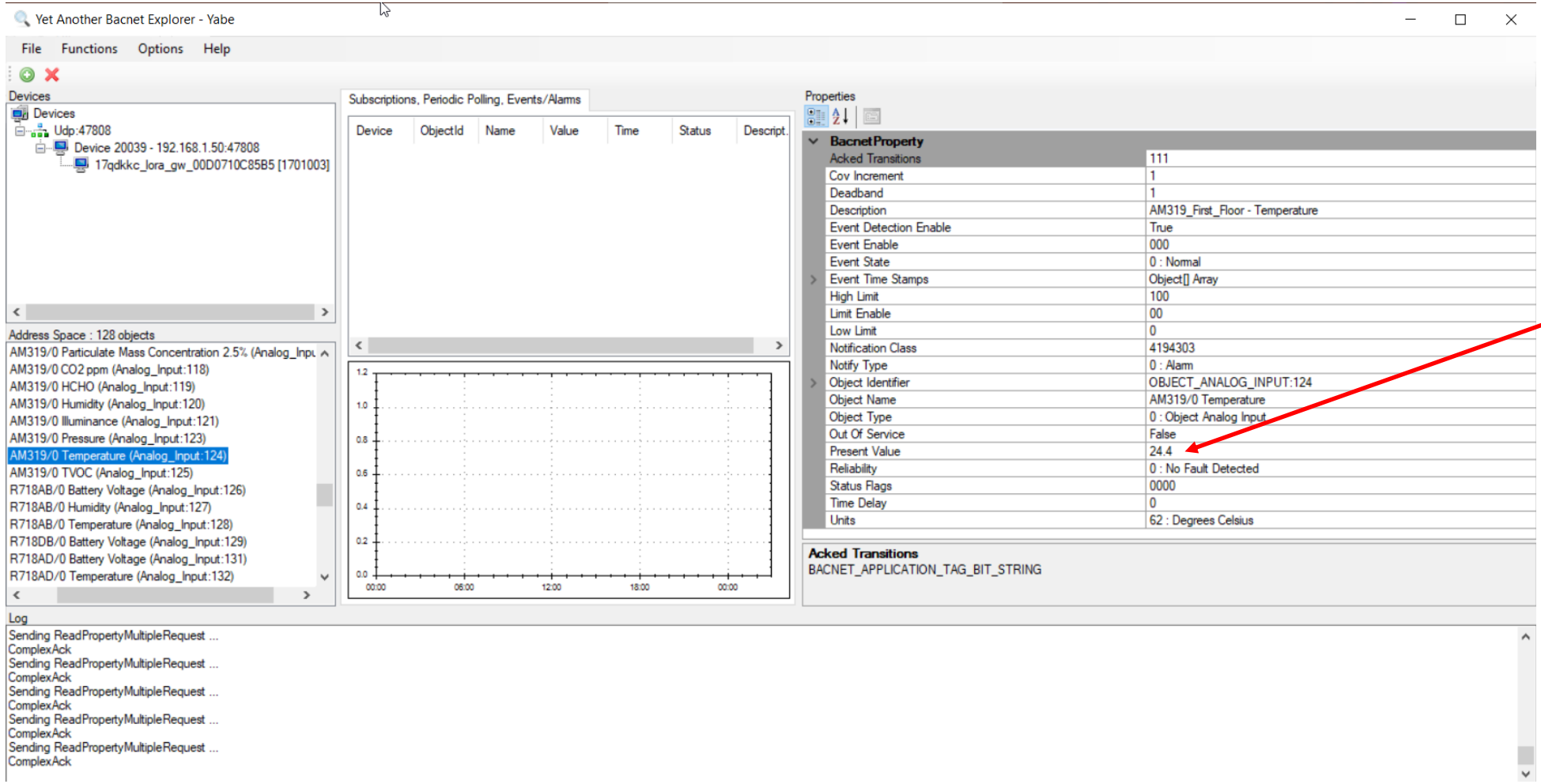
YABE Adding Device (local)



© 2022 Dialog Semiconductor

YABE & BACnet Datapoints

- Present value will only be valid after LoRa update has been received after echbacnet has been restarted



Look for Present Value

© 2022 Dialog Semiconductor

MQTT Debugging

The ChirpStack application topic can be monitored from a Putty SSH session using:

```
mosquitto_sub -v -t application/#
```

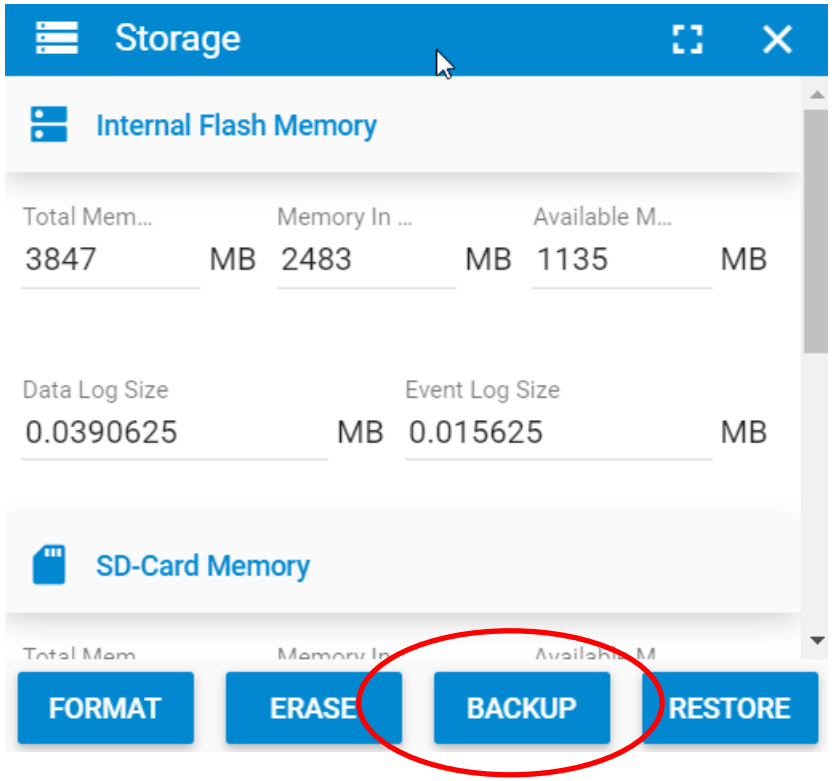
The SmartServer ev/data topic can be monitored a Putty SSH session using:

```
mosquitto_sub -v -t glp/0/+/ev/data
```

© 2022 Dialog Semiconductor

Backup

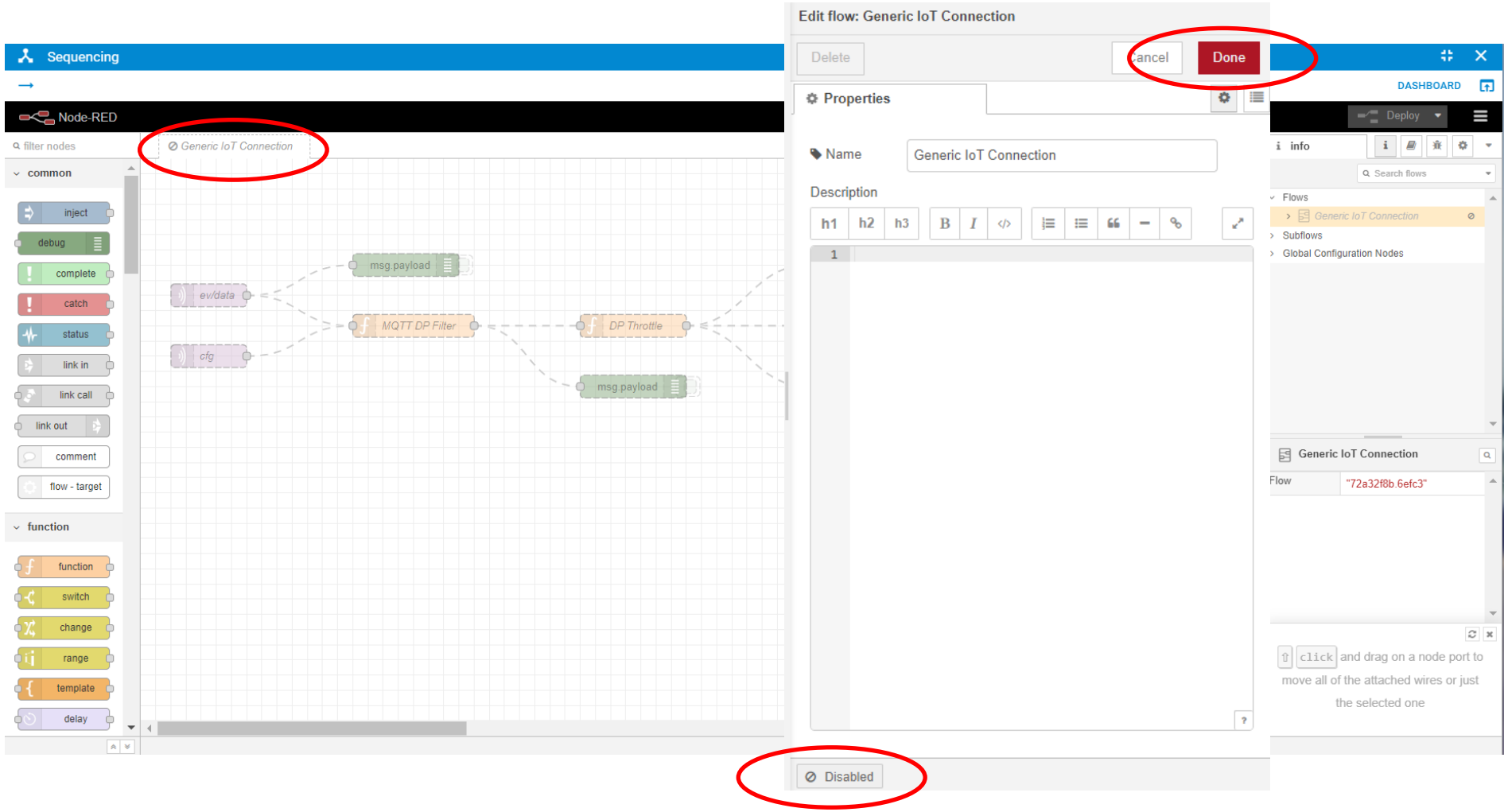
- Once configured, take a backup and save in a few places….
- Backup system, not database
- Takes around 35 minutes



© 2022 Dialog Semiconductor

Configuring Node-RED Flow

- Disabled by default
- Double click flow tab
- Click disabled
- Click done



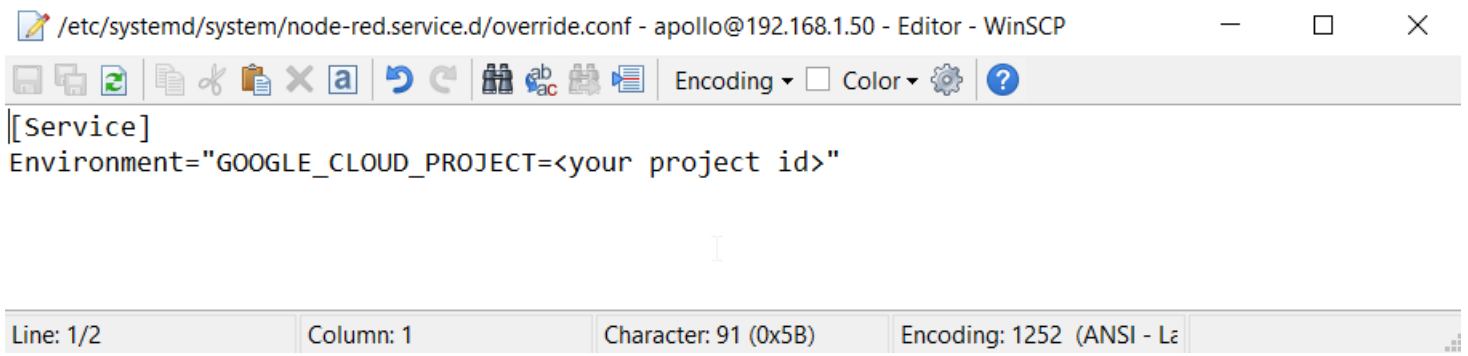
© 2022 Dialog Semiconductor

Configuring Node-RED Google Cloud Platform (GCP) Connections

- Please see the following for details on setting up GCP connections:

http://iecdocs.diasemi.com/display/PortSSIoT/Google+Cloud+Platform+(GCP)+Application+Example

- The file /etc/systemd/system/node-red.service.d is already established in the image
  - Just your add project id

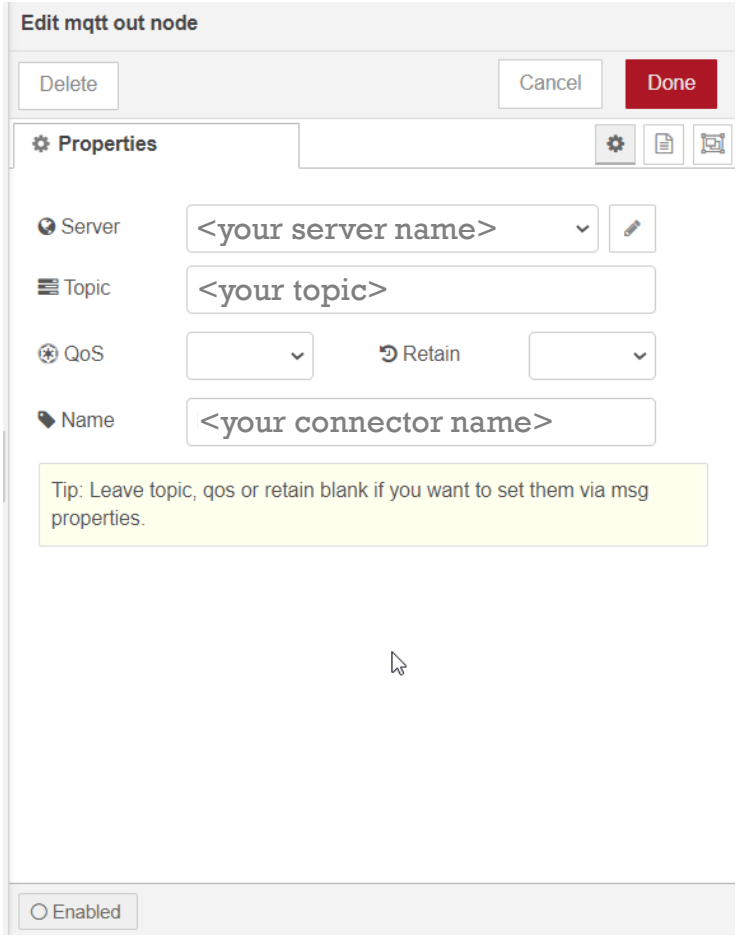


© 2022 Dialog Semiconductor

Configuring Node-RED AWS Connections

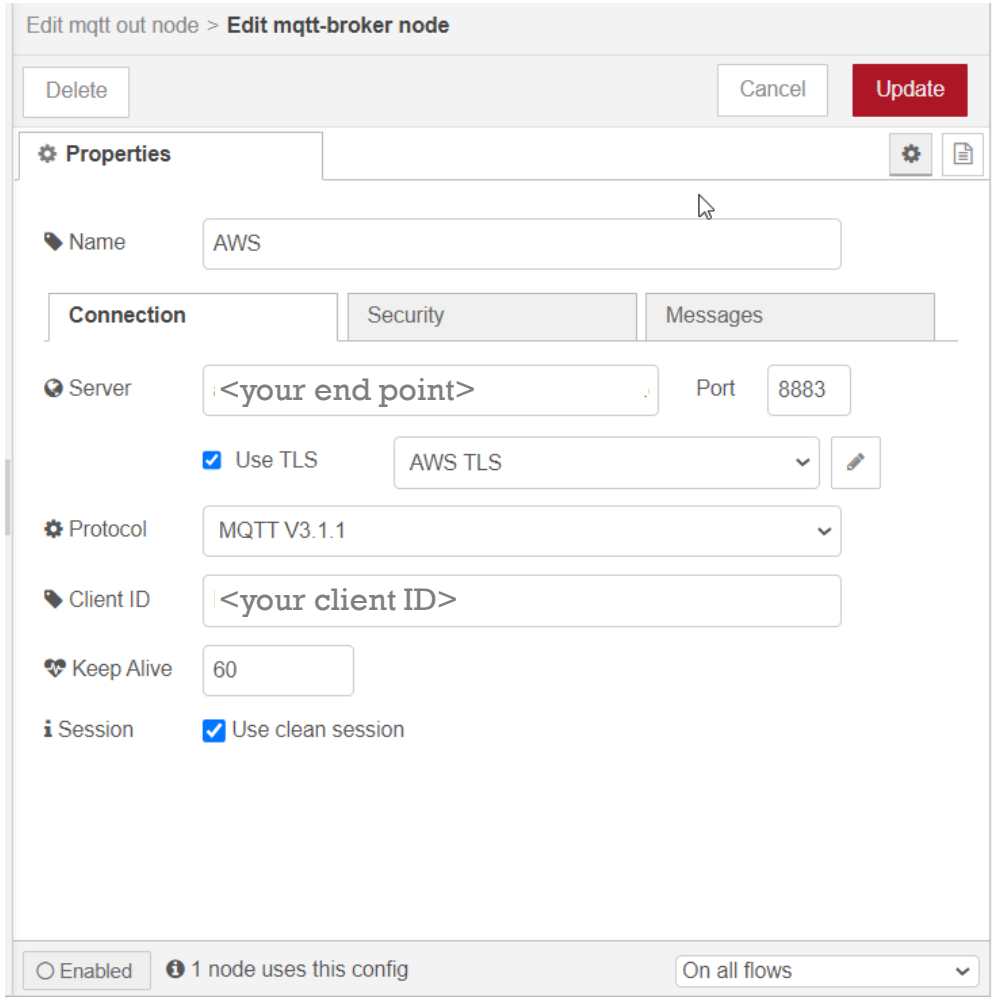
Information you will need:

- Topic
- End point
- Client ID
- Certificate (pem format)
- Private Key (pem format)
- CA Cert (pem format)



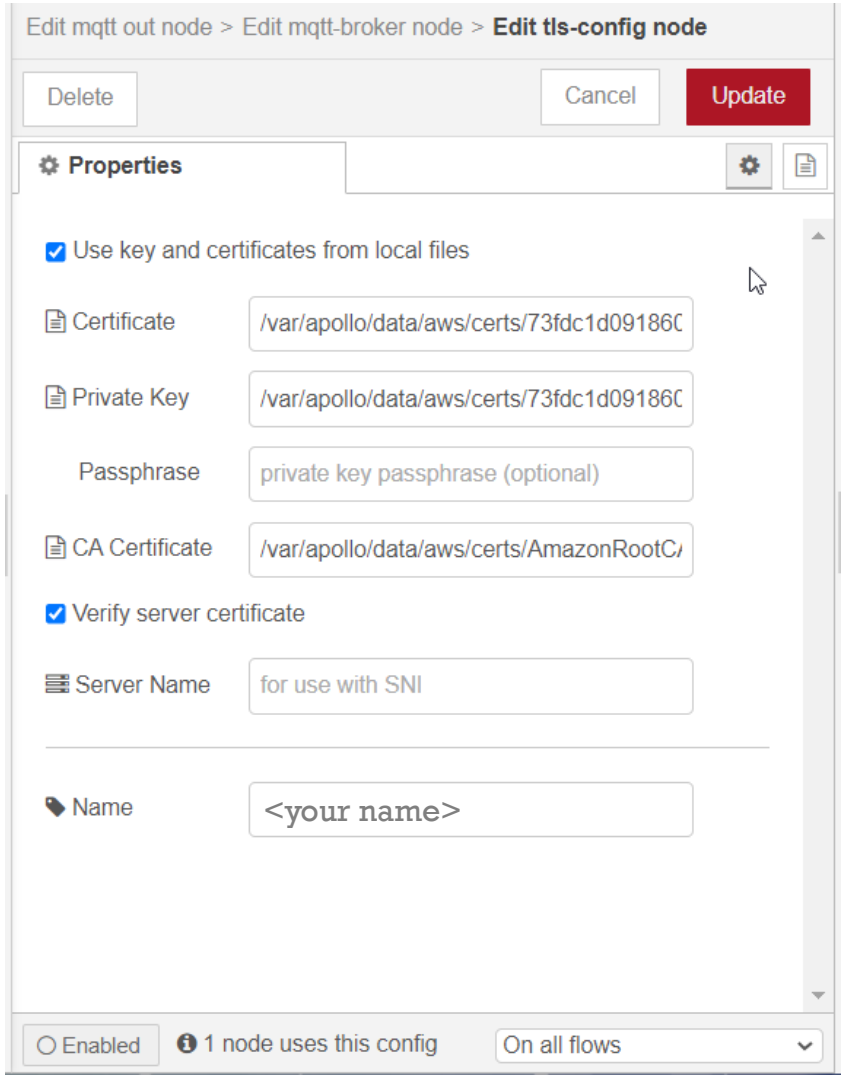
© 2022 Dialog Semiconductor

Configuring Node-RED AWS Connections (continued)



© 2022 Dialog Semiconductor

Configuring Node-RED AWS Connections (continued)

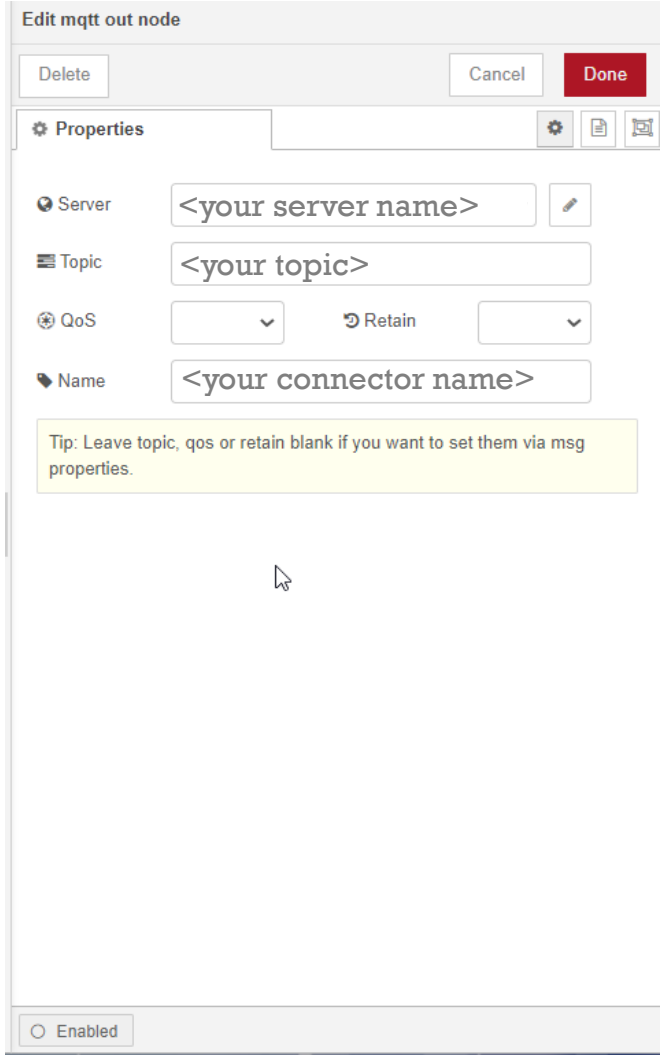


© 2022 Dialog Semiconductor

Configuring Node-RED Azure Connections

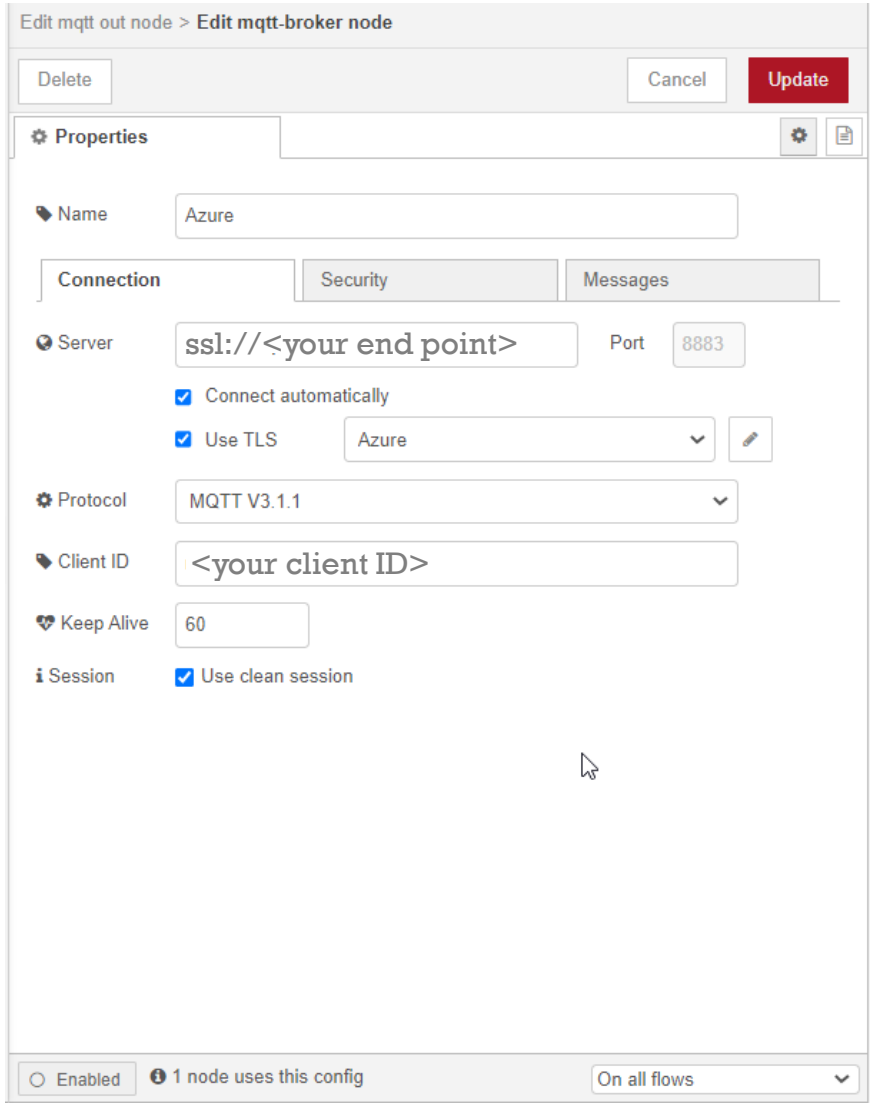
Information you will need:

- Topic
- End point
- Client ID
- CA Cert (pem format)
- Username
- Password



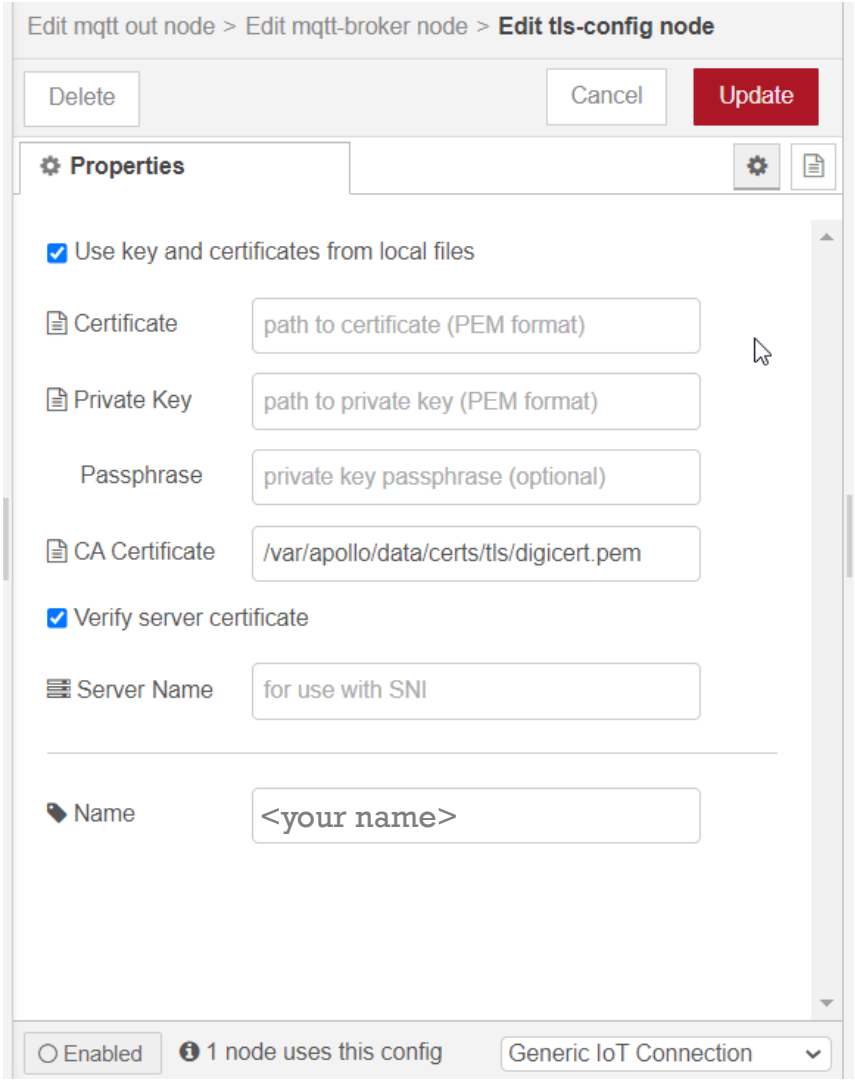
© 2022 Dialog Semiconductor

Configuring Node-RED Azure Connections (continued)



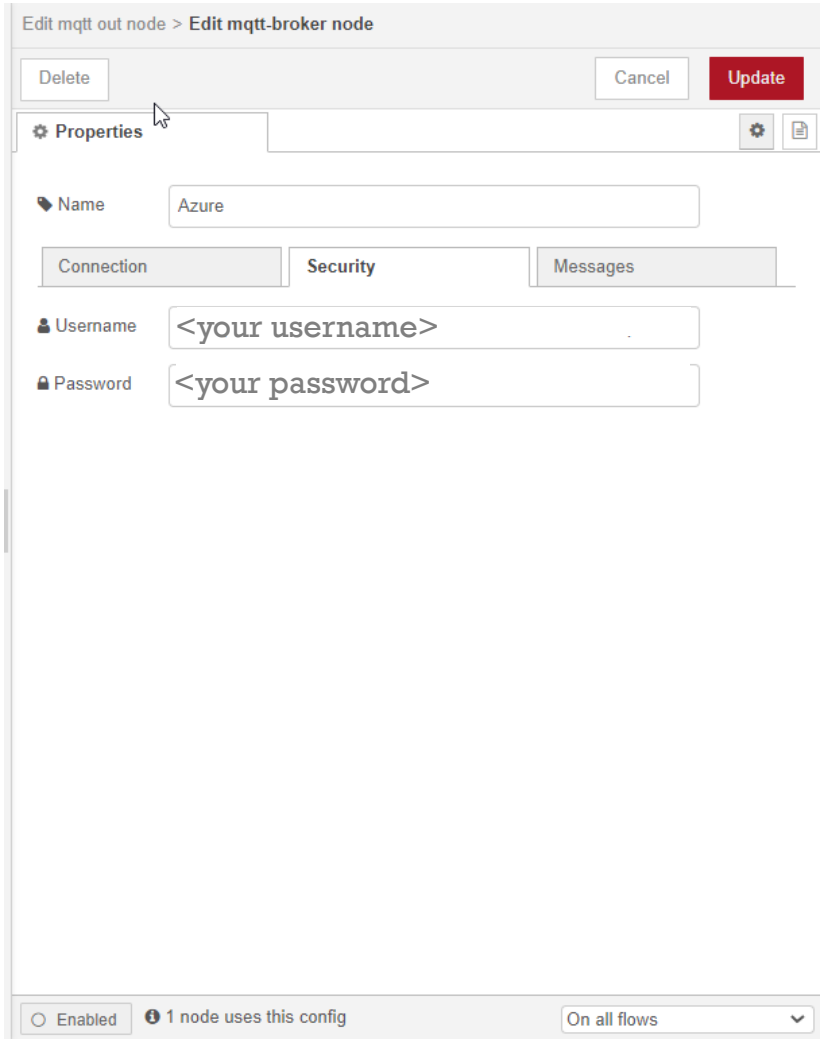
© 2022 Dialog Semiconductor

Configuring Node-RED Azure Connections (continued)



© 2022 Dialog Semiconductor

Configuring Node-RED Azure Connections (continued)



© 2022 Dialog Semiconductor

© 2022 Dialog Semiconductor

Powering the Smart Connected Future

www.dialog-semiconductor.com

Personal • Portable • Connected

© 2022 Dialog Semiconductor