

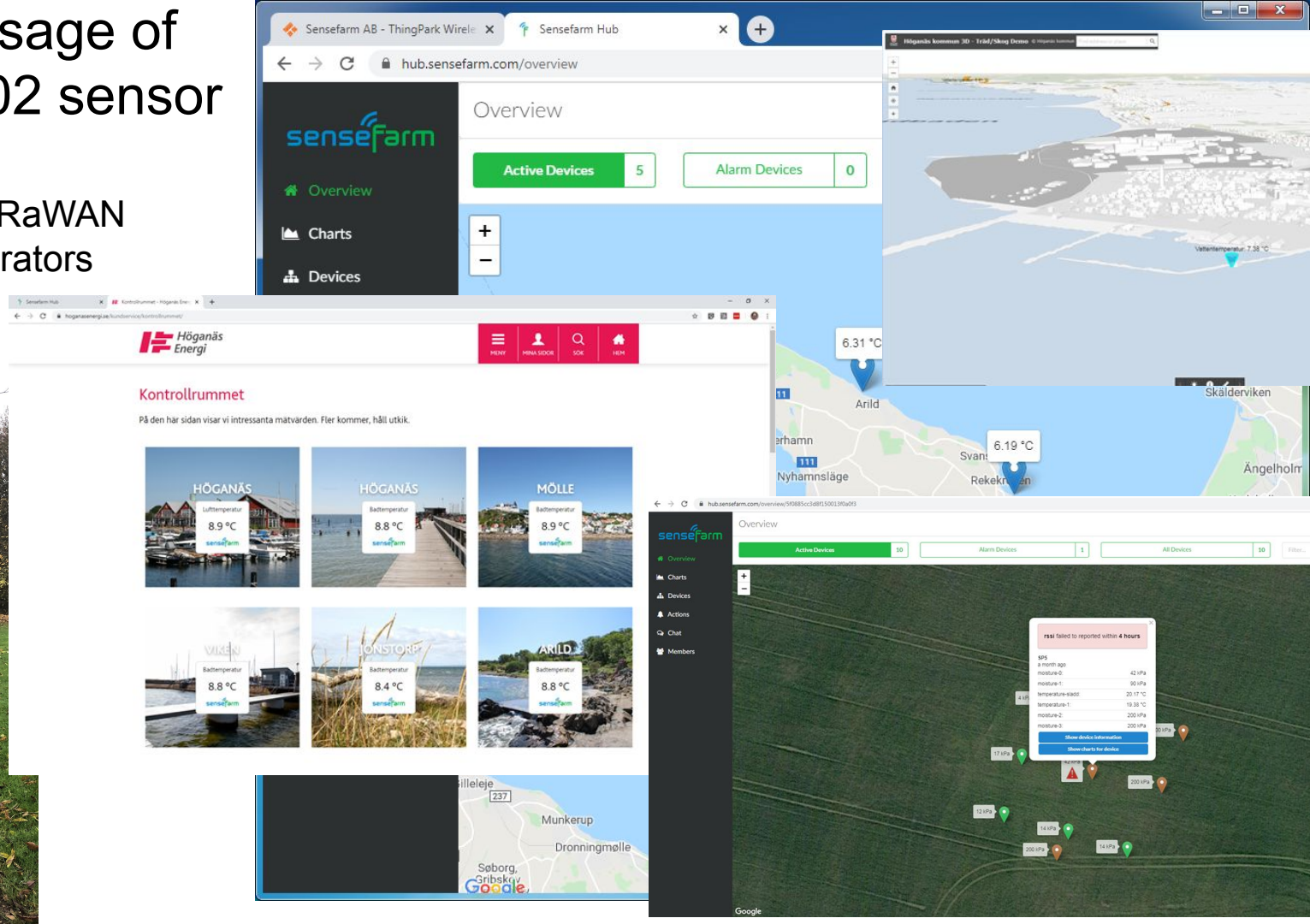
LoRaWAN server configuration

towards hub.sensefarm.com

© Sensefarm December 2020

Example usage of the CUBE02 sensor serie

with different LoRaWAN servers and operators



Content

- Locating the encryption keys for Sensefarm products
 - <https://hub.sensefarm.com>
- Actility
 - <https://stadshubb.thingpark.com/portal/web/>
- Talkpool
 - <https://apps.talkpool.com/>
- Netmore
 - <https://portal.blink.services/home>
- Chirpstack
 - <https://www.chirpstack.io/>
- Ygg.io (version 2 and 3)
 - <https://ygg.io>
- The Things Network
 - <https://account.thethingsnetwork.org/>

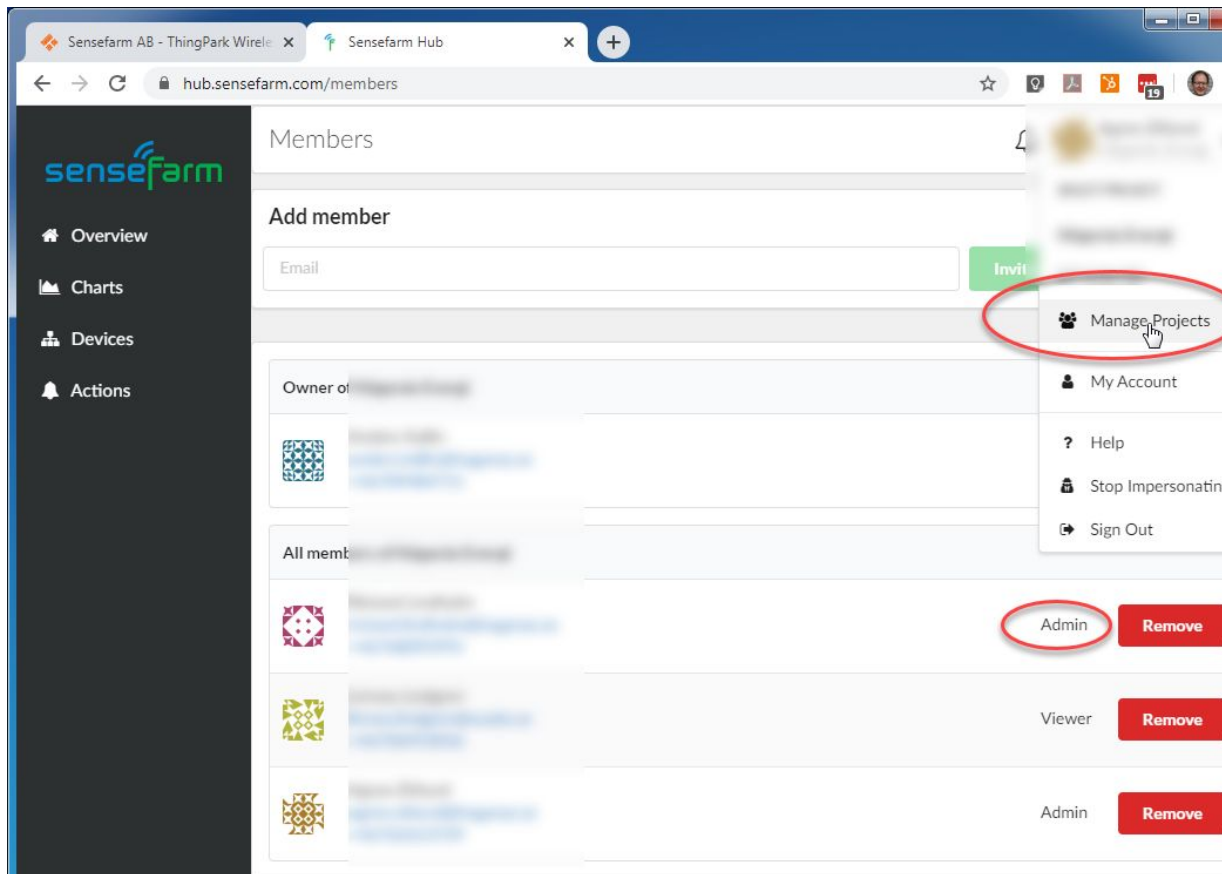
Locating device encryption keys - 1 of 2

Keys are printed on the lid of the device



They are easier to copy from
Hub.sensefarm.com

Project roles needed
for access to keys:
Owner, Admin



Locating device encryption keys - 2 of 2

Hub.sensefarm.com

Find device

Press Edit

Settings needed for ABP

devEUI

devAddr

appSKey

nwkSKey

The screenshot shows the SenseFarm web interface. On the left is a dark sidebar with navigation links: Overview, Charts, **Devices** (highlighted with a red circle), Actions, Chat, and Members. The main content area is titled 'Halmstadgården Norr centrum 205'. It contains an 'Admin area' section with a 'Project (Owner)' field. Below this is the 'Device information' section, which lists details for a device named 'Halmstadgården Norr centrum 205'. The device type is 'CUBE02'. A 'Hide Advanced Info' button is highlighted with a red circle. Below this button, the 'Keys' section is expanded, showing the following information: Join Type: ABP, Class: A, devAddr: 01000205, nwkSKey: 42E3F01B1C73D, appSKey: 224C12246. At the bottom of the keys section, there is a link for 'Uplink Payload (Raw Data)'.

Device information	
Name	Halmstadgården Norr centrum 205
Type	CUBE02
ID	[REDACTED]
Connected Gateway	B82 [REDACTED] 88
Source	sensefarm-fora
Latest report	November 18th 2020, 17:04:22
Latest Message Interval	10 minutes
Hide Advanced Info	
Keys	
Join Type	ABP
Class	A
devAddr	01000205
nwkSKey	42E3F01B1C73D
appSKey	224C12246
Uplink Payload (Raw Data)	

Cube02 sensors are locked down to use ABP and SF12 due to their outdoor field usage.

OTAA and ADR requires good bi-directional radio coverage which can not be guaranteed all year around due to plants, sudden rain and quick underground sensor placement.

Actility configuration

<https://stadshubb.thingpark.com/portal/web/>

Adding a device

Manufacturer - Generic
Model - very important to
get correct, many similar
variants:

LoRaWAN 1.0.2 rev B
Class A
Rx2_SF12
eu868

The screenshot shows the 'New device' form in the Sensefarm AB ThingPark Wireless interface. The form is divided into several sections, with red circles highlighting specific fields:

- Administrative data:**
 - Device name: Test - 70B3D55460000EFB
 - Marker: Change marker
 - Administrative info: (empty text field)
 - Administrative location: 55° 43' 1" N 13° 13' 30" E Change location
 - Motion indicator: Random
- Device identification:**
 - Manufacturer: Generic
 - Model: LoRaWAN 1.0.2 revB - class A - Rx2_SF12 eu868
 - Device activation: Activation By Personalization (ABP)
 - DevEUI: 70B3D55460000EFB
 - DevAddr: 01000EFB
 - NwkSKey: E32 5E0A5F4
- Network parameters:**
 - Connectivity plan: ORESUNDSKRAFT Connectivity Supplier / ORESUNDSKRAFT Bas (999)
- Application layer handling:**
 - Application server routing profile: sensefarm-cube02
 - AppSKeys: AppSKey D7D! D4E8 Port *

The left sidebar shows the 'Devices' menu item circled in red. Below it, a table lists existing devices with columns for Name, Type, Identifiers, and Connection status.

Name	Type	Identifiers	Connec
LoRa			
CUBE01-TW-70B3D554600	Testing	70B3D554600	ORESU
LoRaWAN 1.0 revB - class A Rx2_SF12	sensefarm-cube01	2DF3D4D9	
LoRa			
CUBE01-TW-70B3D554600	Testing	70B3D554600	ORESU
LoRaWAN 1.0 revB - class A Rx2_SF12	sensefarm-cube01	2D280C2D	
LoRa			
CUBE01-TW-70B3D554600	Testing	70B3D554600	ORESU
LoRaWAN 1.0 revB - class A Rx2_SF12	sensefarm-cube01	6A0AF032	
LoRa			
CUBE01-TW-70B3D554600	Testing	70B3D554600	ORESU
LoRaWAN 1.0 revB - class A Rx2_SF12	sensefarm-cube01	D9239A74	

v10.18.3-8337ec824 ©2019 Activity

Security

The device frame counter used by the crypto inside the device is reset to Zero upon reset of CUBE01 and CUBE02 (Should be done when battery is changed)

Thus options such as “Disable frame-counter validation” should be set on all LoRa-WAN servers for easy operation.

Actility has a button called “Reset security context” for this.

The screenshot shows the 'Sensefarm AB - ThingPark Wireless' web interface. On the left sidebar, the 'Settings' option under the 'Devices' section is circled in red. The main content area is titled 'Node settings' and shows 'Alarm Settings' with the message 'No uplink activity alarm settings.' Below this, the 'Troubleshooting' section contains a 'Security context' subsection, which has a 'Reset security context' button circled in red. The browser's address bar shows 'stadshubb.thingpark.com/deviceManager/'.

Set up connection to hub.sensefarm.com - 1 of 2

The screenshot shows the 'stadshubb.thingpark.com/deviceManager/' web interface for Sensefarm AB. The left sidebar contains a tree view with 'Application servers' highlighted. The main area displays a table of existing application servers and a 'New application server' dialog box.

Application servers table:

Name	ID	Status	Type
sensefarm-cube01-tw	TWA_100039957.39645.AS	Active	HTTP Application Server (LoRaWAN)
sensefarm-cube02	TWA_100039957.39642.AS	Active	HTTP Application Server (LoRaWAN)

New application server dialog:

The dialog box has a 'Name' field and a 'Type' dropdown menu. The 'Type' dropdown is open, showing the following options:

- HTTP Application Server (LoRaWAN)
- HTTP Application Server (LoRaWAN)
- HTTP Application Server (Cellular)
- Kafka Cluster

Red circles highlight the '+ Create' button in the 'Add application servers' section and the 'HTTP Application Server (LoRaWAN)' option in the 'Type' dropdown.

Set up connection to hub.sensefarm.com - 2 of 2

Currently implemented
API's -

<https://activity.sensefarm.com/CUBE02>

<https://activity.sensefarm.com/CUBE01-TW>

Use the correct one for the devices you have.
CUBE version is printed on device label and
available on hub.sensefarm.com device page
under "Factory defaults".

The "Tunnel interface authentication key" is
Available for customers upon request, but
turned off by default.

The screenshot shows the 'Application server' configuration page for a device named 'sensefarm-cube02'. The interface includes a sidebar with a tree view of device settings, a main configuration area, and a 'Destinations' dialog box.

Application server configuration:

- Name: sensefarm-cube02
- ID: TWA_100039957.39642.AS
- Content Type: JSON
- Type: HTTP Application Server (LoRaWAN)
- Status: Active

Uplink/downlink security configuration:

- Status: Active
- AS ID: hub-cube02
- Max timestamp deviation: 60 seconds

Destinations configuration:

- Destination: <https://activity.sensefarm.com/CUBE02>

Uplink/downlink security configuration dialog (bottom left):

- AS ID: hub-cube02
- Tunnel interface authentication key: BE-C4-99-C6-9E-9C-93-9E-41-3B-66-39-61-63-6C-61
- Max timestamp deviation (seconds): 60

Feeding sensor data to multiple applications from Actility

Only needed if sensor packets should be sent to more services than hub.sensefarm.com (requestinspector.com is a nice debugging tool as an example)

Add an extra application server.

Add the application to the routing profile used.

The image displays two screenshots of the Sensefarm AB [Subscriber] interface, illustrating the configuration of an application server and its integration into a routing profile.

Top Screenshot: Application server configuration

- Left sidebar:** Shows the navigation menu with 'Application servers' highlighted. Below it, 'sensefarm-cube01-tw' and 'Request inspector' are listed.
- Main panel:** Displays the configuration for the 'Request Inspector' application server.
 - Application server:**
 - Name: Request Inspector
 - ID: TWA_100039957.45432.AS
 - Content Type: JSON
 - Type: HTTP Application Server (LoRaWAN)
 - Status: Active
 - Uplink/downlink security:**
 - Status: Inactive
 - Max timestamp deviation: -
 - Activate button
 - Route:**
 - Source ports: *
 - Routing strategy: Blast
 - Destinations:**
 - Destination: <https://requestinspector.com/p/01e62007pkde0ttmgea5a1jmf>
 - Buttons: Edit, Add, Delete, Up, Down

Bottom Screenshot: AS routing profile configuration

- Left sidebar:** Shows the navigation menu with 'AS routing profiles' highlighted. Below it, 'sensefarm-cube01-tw' is listed.
- Main panel:** Displays the configuration for the 'sensefarm-cube01-tw' AS routing profile.
 - AS routing profile:**
 - Name: sensefarm-cube01-tw
 - ID: TWA_100039957.34218
 - Type: LoRaWAN
 - Is default: ☐
 - Destinations:**

Type	Destination
Local application server	sensefarm-cube01-tw
Local application server	Request-inspector

Talkpool configuration with hub.sensefarm.com

<https://apps.talkpool.com/>

Talkpool

apps.talkpool.com

Https URL:

<https://talkpool.sensefarm.com>

Include radio parameters = Yes

The screenshot displays the Talkpool web application interface. The browser's address bar shows the URL `apps.talkpool.com/#/application/70-B3-D5-54-60-00-00-00/customer_servers`. The interface has a dark blue sidebar on the left with navigation links: Home, Applications, and Network Activity. The main content area has a blue header with the breadcrumb `Home / Applications / 70-B3-D5-54-60-00-00-00 / Customer Servers`. Below the header, there's a tabbed interface with 'Info', 'Devices', 'Traffic', 'Over-The-Air Devices', 'Personalised Devices', and 'Customer Servers' selected. The 'Edit Customer Server' form is titled 'SensefarmTest(70-B3-D5-54-60-00-00-00)'. It contains a 'Customer Server Name' field with the value 'SensefarmHub', a toggle for 'Include Radio Parameters' set to 'Yes', a 'Protocol Type' dropdown set to 'HTTP(S)', and an 'HTTP(S) URL' field with the value 'https://talkpool.sensefarm.com'. At the bottom of the form are 'Update' and 'Cancel' buttons. Below the form is a 'Customer Servers' section with a table listing existing servers. The table has columns for Name, Include Radio Parameters, Protocol Type, Configuration Data, and Actions. One entry is shown: 'SensefarmHub' with 'Yes' for radio parameters, 'HTTP' protocol, and URL 'https://talkpool.sensefarm.com'. The interface also shows pagination controls at the bottom right.

Home / Applications / 70-B3-D5-54-60-00-00-00 / Customer Servers

SensefarmTest(70-B3-D5-54-60-00-00-00)

Info Devices Traffic Over-The-Air Devices Personalised Devices Customer Servers

Edit Customer Server

Customer Server Configuration form

Customer Server Name : Alphanumeric String (Max 50 Characters). Must Start with Alphabet. Allowed Special Characters (-)

SensefarmHub

If Enabled, will include the LoRa radio parameters for the device frames

Include Radio Parameters ☒ Yes

Protocol Type:

HTTP(S)



HTTP(S) URL : A Valid HTTP/HTTPS URL

https://talkpool.sensefarm.com

Update Cancel

Customer Servers

Show 50 entries

Name []	Include Radio [] Parameters	Protocol Type []	Configuration Data	Actions
SensefarmHub	Yes	HTTP	URL: https://talkpool.sensefarm.com	 

Showing 1 to 1 out of 1 entries

First Previous 1 Next Last

Talkpool - Adding a device.

“:” “-” must be inserted into EUI and Address fields

The image shows a screenshot of the Talkpool web interface. The top navigation bar includes a user profile for Anders Hedberg. The main content area is titled 'SensefarmTest (70-B3-D5-54-60-00-00-00) / Personalised Devices'. The 'Add New Personalised Device' form is displayed, with fields for Device EUI, Network Address, Application Session Key, and Network Session Key. The Device EUI field contains '70-B3-D5-54-60-00-01-C1' and the Network Address field contains '01:00:01:C1', both of which are circled in red. Below the form, a table shows 'Personalised Devices Configured to the Application' with columns for Device EUI, Network Address, Application Session Key, Network Session Key, and Actions.

admin area

Owner

Device information

Name	70B3D554600001C1
Type	CUBE02
Source	sensefarm
D	70B3D554600001C1
Latest report	May 13th 2020, 10:33
Latest Message Interval	No Info


Factory Defaults

```
{  "uniqueId": "333747073636373734004800",  "devEUI": "70B3D554600001C1",  "appEUI": "70B3D554600001C1",  "appKey": "2A749B3488D5997101CE",  "devAddr": "010001C1",  "appSKey": "C5487683D17389DF731111",  "nwksKey": "E0FD04CC4779F0D7B5FAD",  "generated": "2020-05-13T08:05:30.142Z",  "abp": true,  "evp": true}
```

Talkpool

Devices must be tagged “CUBE02” for hub.sensefarm.com to accept them.

← → ↻ apps.talkpool.com/#/device/70-B3-D5-54-60-00-01-83/settings



- Home
- Applications
- Network Activity

Home / Devices / 70-B3-D5-54-60-00-01-83 / Settings

CUBE02 (70-B3-D5-54-60-00-01-83)

Info Traffic Downlink Settings

Identification Info Build Info

Device Build Info

Vendor

Alphanumeric String (Max 50 Characters). Allowed Special Characters (-)

Enter Vendor

Model

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

CUBE02

Firmware

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Firmware

Serial Number

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Serial Number

Lora Version

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Lora Version

Netmore configuration with hub.sensefarm.com

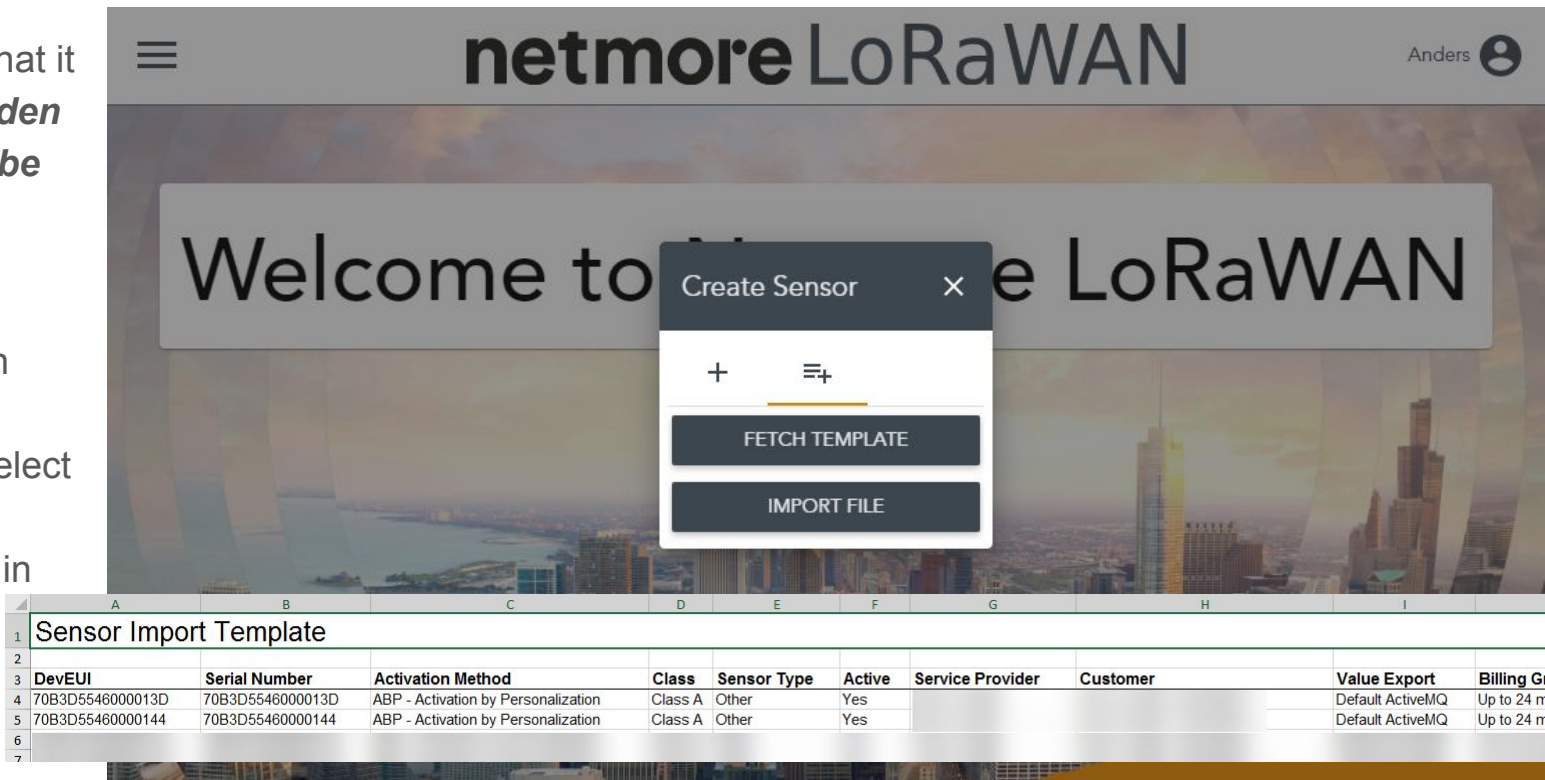
<https://portal.blink.services/home>

We really recommend the batch creation

Do one sensor manually, check that it works. ***Some hidden values can only be set by Netmore support!***

Then do the batch creation:

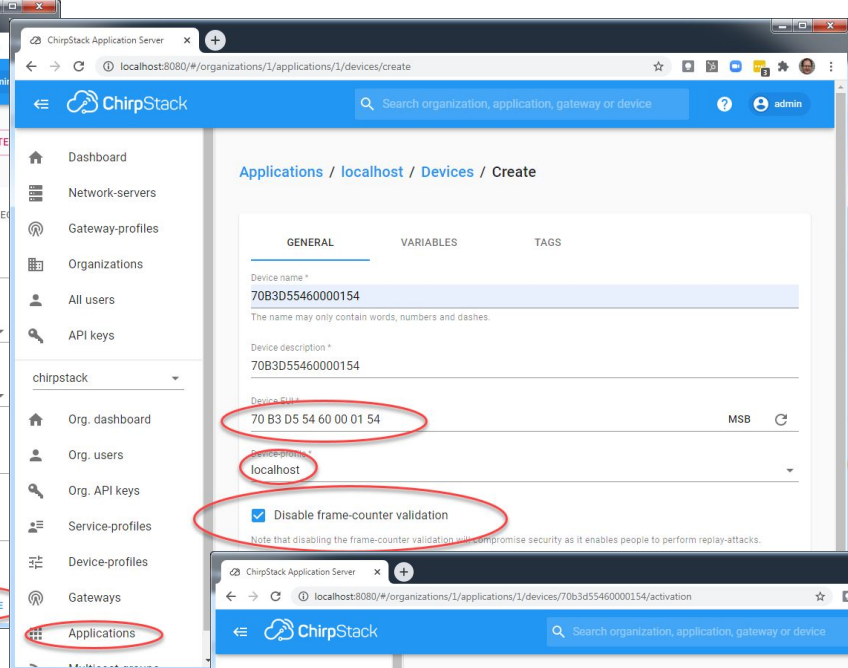
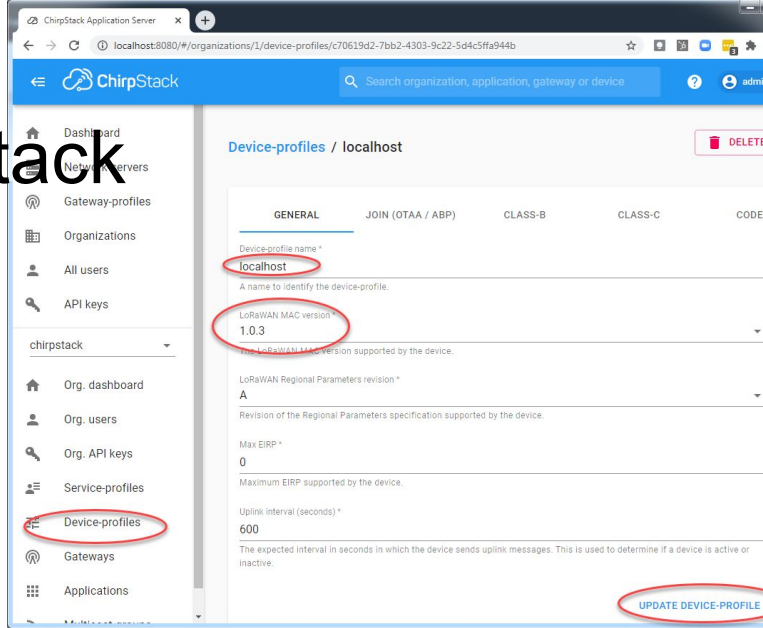
Create Sensor, Select batch, Fetch the template, Open it in excel, Fill it with values, re-import



Chirpstack

<https://www.chirpstack.io/>

Chirpstack



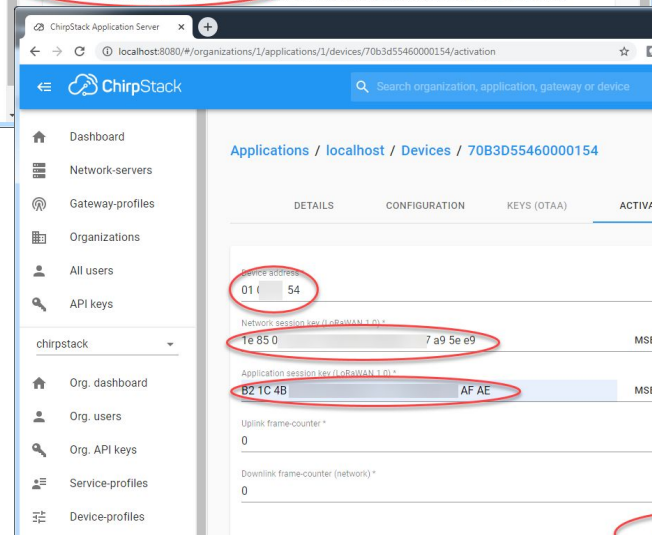
Create a device profile

1.0.3 protocol (or less)

Application

Mark “Disable frame-counter-validation” !

Activation-tab will show for ABP keys entering



Yggio

<https://ygg.io>

Yggio version 2

Select IoT-nodes

Press “New IoT-node” at the top of the screen and follow the wizard. Device model name is “sensefarm-cube02-sm”

Select the new node from the list.

*Obs! There is a translated xxx(simple-lora-node)
Do not select that node as we need the raw data!*

Select Channels

Select HTTP

Enter URL:

<https://yggio.sensefarm.com:443/>

The screenshot shows the YGGIO web interface for managing IoT nodes. In the left sidebar, the 'New IoT-node' button at the top and the 'IoT-nodes' menu item are circled in red. The main content area is titled 'Viewing lora-node' (also circled in red). It displays the configuration for a specific node: 'Strips-6119709-JBV'. The 'Category' is 'Uncategorized' and the 'Description' is 'no description'. Below this, there are tabs for 'Access rights', 'Specifications', 'Channels' (which is selected and circled in red), 'Translators', 'Value', 'Routingkeys', and 'LoRa Control'. Under the 'Channels' tab, there is a form with three fields: 'Name' (yggio.sensefarm.com), 'Protocol' (with radio buttons for MQTT, HTTP (selected and circled in red), and Azure IoT Hub), and 'URL' (https://yggio.sensefarm.com:443/ (circled in red)). At the bottom of the form are 'Edit' and 'Delete' buttons. On the right side, a 'Status' box shows 'Last reported', 'No report interval set', and a green status message: 'Connected to LoRa App S signal'.

Yggio version 3 (<https://krafringen.yggio.net>)

Login, click “New IoT node” (it’s not marked as a button)

Select “Lora”, “Activity Thingpark”, “ABP”

Enter correct values (found on hub.sensefarm.com -> Devices->Edit->Show Advanced Info) for Device ID, Device address, Network Session Key, Application Session Key.

Select “Class A”, “Next”

Name the device, select Model Name: “sensefarm-cube02-sm”

Press Next, Create. Skip privileges/sharing if not needed.

Once created, do...

Select the node again from the list.

Select “Channels”->”HTTP”

Enter “https://yggio-krafringen.sensefarm.com:443/”

The screenshot shows the 'New IoT-node' configuration page, Step 1: Configuration. It features a progress bar with four steps: Step 1 (Configuration), Step 2 (Details), Step 3 (Creation), and Step 4 (Manage Access). Below the progress bar, there are several sections: 'Device type' with a grid of options including Z-Wave Gateway, Z-Wave Device, Lora (selected), LoRa Gateway, Nibe, Wireless M-Bus, Generic, Enumerable State, Astro Clock, CoAP, LoRaWAN Server Connector, BLE2 Gateway, Solaq, The Things Network Connector, Network Connector, Mqtt Water, and Mqtt Connector; 'Connector' set to 'Activity Thingpark -> Krafringen-Thingpark-Connector'; 'Type' set to 'ABP'; 'Device ID (devEui)' set to '70B3D5546000020F'; 'Device Address (devAddr)' set to '004e4748'; 'Network Session Key (nwkSKey)' set to '2b7e151628aed2afabf7338809c94f3c'; and 'Application Session Key (appSKey)' set to '2b7e151628aed2afabf7338809c94f3c'. At the bottom, there are two buttons: 'Class A' (selected) and 'Class C'.

The screenshot shows the 'New IoT-node' configuration page, Step 2: Details. It features a progress bar with four steps: Step 1 (Configuration), Step 2 (Details), Step 3 (Creation), and Step 4 (Manage Access). Below the progress bar, there are several sections: 'Name' set to '70B3D5546000020F'; 'Model Name' set to 'sensefarm-cube02-sm'; 'Type' set to 'Uncategorized'; 'Choose type' with a dropdown menu showing various IoT device icons; 'GPS-coordinates' with 'Latitude' and 'Longitude' fields; and 'Description' with a text area. At the bottom, there are three buttons: 'Cancel', 'Back', and 'Next'.

The screenshot shows the 'Viewing ActivityThingpark Device' page. It features a progress bar with four steps: Step 1 (Configuration), Step 2 (Details), Step 3 (Creation), and Step 4 (Manage Access). Below the progress bar, there are several sections: 'Name' set to '70B3D5546000020F'; 'Category' set to 'Uncategorized'; 'Description' set to 'no description'; 'Status' set to 'Connected to Krafringen-Thingpark-Connector, Signal unknown'; 'Access rights' set to 'My application'; 'Specifications' set to 'MQTT' (selected); 'Channels' set to 'HTTP' (selected); 'Routingkeys' set to 'https://yggio-krafringen.sensefarm.com:443/'; 'LoRa Control' set to 'Cancel'; and 'Connection' set to 'Add'. At the bottom, there are three buttons: 'Edit', 'Delete', and 'Close'.

The Things Network

<https://console.thethingsnetwork.org/>

The Things Network

CUBE series of devices

The Cube-02 DevAddr can not be configured from the web-interface.

The TTN command line tool is needed, please check out "ttnctl devices set" on this page

<https://www.thethingsnetwork.org/docs/network/cli/api.html>

The TTN CLI tool can be downloaded from <https://www.thethingsnetwork.org/docs/network/cli/quick-start.html>

Hub.sensefarm.com

For connecting to hub.sensefarm.com, please contact info@sensefarm.com