

LoRaWAN server configuration

towards hub.sensefarm.com

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Example usage of the CUBE02 sensor serie with different LoRaWAN servers and operators



The collage illustrates the integration of multiple LoRaWAN servers and operators:

- Sensefarm Hub:** Shows an "Overview" page with 5 active devices and 0 alarm devices. It includes sections for "Active Devices" (5), "Alarm Devices" (0), and "Devices".
- Höganäs Energi:** Shows a "Kontrollrummet" (Control Room) interface displaying real-time bath temperature data for various locations: HÖGANÄS (8.9 °C), HÖGANÄS (8.8 °C), MÖLLE (8.9 °C), VIKEN (8.8 °C), TÖNSTORP (8.4 °C), and ARILD (8.8 °C).
- Google Maps:** A map of Skälderviken and Angelholmen showing water temperature data. Locations like Arild, Svanå, Rekekrön, and Nyhamnsläge are marked with temperature values: 6.31 °C, 6.19 °C, and 20.17 °C.
- Sensefarm Hub (Detailed View):** Shows a detailed view of a device's data over time, including a table of recent measurements and a map showing the device's location with specific data points.

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 V3
 - <https://console.cloud.thethings.network/>

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

A screenshot of a web browser displaying the Sensefarm Hub Members page at hub.sensefarm.com/members. The page shows a list of members with their project roles: Owner, Admin, or Viewer. A red circle highlights the 'Admin' role next to a member's name. Another red circle highlights the 'Manage Projects' button in the top right corner of the page. The left sidebar includes links for Overview, Charts, Devices, and Actions.

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.com web interface. On the left, a sidebar menu includes 'Overview', 'Charts', 'Devices' (which is highlighted with a red circle), 'Actions', 'Chat', and 'Members'. The main area displays a device detail page for 'Halmstadgården Norr centrum 205'. The page has sections for 'Admin area' (Project Owner) and 'Device information'. The 'Device information' section lists the following details:

Name	Halmstadgården Norr centrum 205
Type	CUBE02
ID	[REDACTED]
Connected Gateway	B82 [REDACTED] 88
Source	sensefarm-lora
Latest report	November 18th 2020, 17:04:22
Latest Message Interval	10 minutes

A 'Hide Advanced Info' button is circled in red. Below it, the 'Keys' section is circled in red and contains the following settings:

Join Type	ABP
Class	A
devAddr	01000205
nwkSKey	42E3F[REDACTED]B1C73D
appSKey	224C[REDACTED]246

At the bottom, there is a section for 'Uplink Payload (Raw Data)'.

Cube02 sensors are locked down to use ABP and SF12 to work in rapidly changing outdoor radio environments.

OTAA and ADR requires good bi-directional radio coverage which can not be guaranteed all year around due to leafs and sudden rain.

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 Sensefarm Hub device manager interface. On the left, a sidebar lists categories like Devices, Multicast groups, Connectivity plans, AS routing profiles, Application servers, and Settings. Under Devices, there is a list of existing LoRaWAN devices, each with details such as Device ID, EUI, Model, and Activation profile. In the center, a modal window titled "New device" is open. The "Administrative data" section includes fields for Device name (Test - 70B3D55460000EFB), Marker (with a change location button), Administrative info, and Administrative location (55° 43' 1" N 13° 13' 30" E). The "Device identification" section is highlighted with red circles around its fields: Manufacturer (Generic), Model (LoRaWAN 1.0.2 revB - class A - Rx2_SF12 eu868), Device activation (Activation By Personalization (ABP)), DevEUI (70B3D55460000EFB), DevAddr (01000EFB), and NwkKey (E32 5E0A5F4). The "Network parameters" section shows a Connectivity plan assigned to ORESUNDSKRAFT Connectivity Supplier / ORESUNDSKRAFT Bas (999). The "Application layer handling" section shows an Application server routing profile assigned to sensefarm-cube02 and an AppSKey entry (D7D5 D4E8). The top right corner of the modal has a "Create" button, which is also circled in red.

Security

The device frame counter used by the crypto inside the device is reset to Zero upon reset (press internal black button) 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 a web-based interface for managing a device named CUBE02-70B3D554600000C8. The left sidebar lists various device configurations under 'ThingPark Wireless' and 'Devices'. A red circle highlights the 'Settings' option under the 'Network' section. The main panel is titled 'Node settings' and contains two tabs: 'Alarm Settings' and 'Troubleshooting'. Under 'Alarm Settings', there are sections for 'No uplink activity alarm settings' and two checkboxes for 'Activate threshold1' and 'Activate threshold2', each with a trigger dropdown set to 'After 2 days of inactivity'. Under 'Troubleshooting', a section titled 'Security context' contains a single button labeled 'Reset security context', which is also highlighted with a red circle. The top right corner of the screen shows a user profile for 'Anders Hedb'.

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

The screenshot shows the Sensefarm AB - ThingPark Wireless deviceManager interface. The left sidebar displays navigation options: Devices (selected), Network, Settings, Alarms (5), History, Multicast groups, Connectivity plans, AS routing profiles, Application servers (highlighted with a red circle), and Settings. The main area is titled "Application servers". A blue header bar says "Add application servers" and has a "Create" button highlighted with a red circle. Below this is a table titled "Application servers" with columns: Name, ID, Status, and Type. It lists two entries: "sensefarm-cube01-tw" (TWA_100039957.39645.AS, Active, HTTP Application Server (LoRaWAN)) and "sensefarm-cube02" (TWA_100039957.39642.AS, Active, HTTP Application Server (LoRaWAN)). At the bottom, a modal window titled "New application server" is open, showing fields for "Name:" and "Type:". The "Type:" dropdown menu is open, showing four options: "HTTP Application Server (LoRaWAN)" (selected), "HTTP Application Server (LoRaWAN)", "HTTP Application Server (Cellular)", and "Kafka Cluster".

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)

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

Currently implemented API's -

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

<https://actility.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 ThingPark Wireless application interface for managing devices and application servers.

Left Panel (Devices):

- Network node has 5 Alarms and 1 History entry.
- AS routing profiles node has 1 entry: sensefarm-cube01-tw.
- Application servers node has 2 entries: sensefarm-cube02 (selected) and sensefarm-cube01-tw.
- Settings node.

Right Panel (Application server configuration):

Application server:

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

Uplink/downlink security:

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

Bottom Panel (Uplink/downlink security configuration):

Save, Close buttons.

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

Bottom Right Panel (Route configuration):

Source ports: * Sequential

Destinations:

- Destination: https://actility.sensefarm.com/CUBE02 (highlighted with a red circle)

Add a route, Edit, Add, Delete, Up, Down buttons.

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 screenshot shows the configuration of an Application Server named "Request inspector". The "Application server" tab is active, displaying fields for Name (Request inspector), ID (TWA_100039957.45432.AS), Content Type (JSON), Type (HTTP Application Server (LoRaWAN)), and Status (Active). Below this, the "Uplink/downlink security" tab shows an Inactive status. The "Route" tab includes source ports (*) and a blast routing strategy. The "Destinations" tab lists a single destination: <https://requestinspector.com/p/01e62007pkde0ttmgeq5a1jmf>. A red circle highlights the "Request inspector" application under the "Application servers" section in the left sidebar.

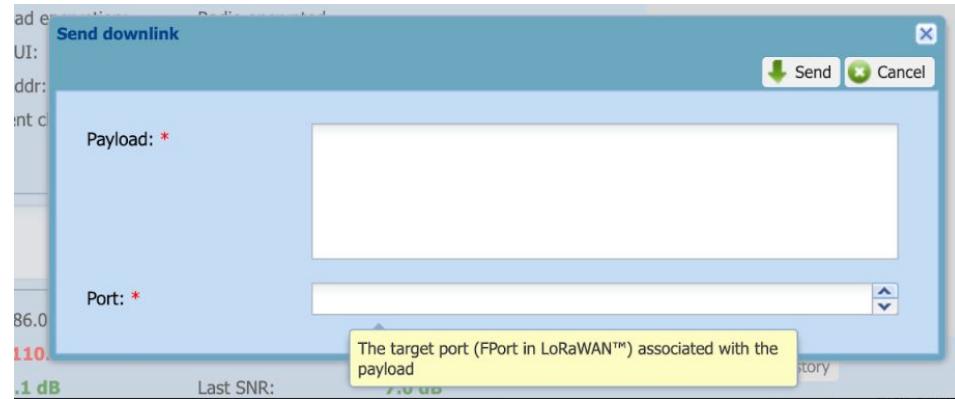
The screenshot shows the configuration of an AS routing profile named "sensefarm-cube01-tw". The "AS routing profile" tab is active, displaying fields for Name (sensefarm-cube01-tw), ID (TWA_100039957.34218), Type (LoRaWAN), and Is default (unchecked). The "Destinations" tab lists two entries: "Local application server" with Destination "sensefarm-cube01-tw" and another "Local application server" entry with Destination "Request-inspector". A red circle highlights the "sensefarm-cube01-tw" routing profile under the "AS routing profiles" section in the left sidebar.

Sendind downlink data

Downlink messages can change the update interval.
Some pre-defined values can be found on this link -

<https://github.com/Sensefarm/protocols/blob/master/Sensefarm-LPP.md#downlink-pre-defined-example-messages>

Cube02 does not care about Fport, so set it to 1.



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 shows a web browser window with multiple tabs open. The active tab is 'apps.talkpool.com/#/application/70-B3-D5-54-60-00-00-00/customer_servers'. The page title is 'Edit Customer Server' under the 'Customer Servers' section. The 'Customer Server Configuration form' contains the following fields:

- Customer Server Name:** SensefarmHub
- If Enabled, will include the LoRa radio parameters for the device frames**: A radio button labeled 'Yes' is selected.
- Protocol Type:** A dropdown menu set to 'HTTP(S)'
- HTTP(S) URL:** A text input field containing 'https://talkpool.sensefarm.com'

At the bottom of the configuration form are 'Update' and 'Cancel' buttons. Below the configuration form is a table titled 'Customer Servers' with one entry:

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

At the bottom of the table, it says 'Showing 1 to 1 out of 1 entries'. Navigation buttons at the bottom right include 'First', 'Previous', 'Next', and 'Last'.

Talkpool - Adding a device. “.” “-” must be inserted into EUI and Address fields

admin area

Owner

Device information

Name	70B3D554600001C1
Type	CUBE02
Source	sensefarm
Created	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,  
  "sync": true}
```

The screenshot shows the Talkpool web application interface. On the left, there's a sidebar with 'Talkpool' branding and navigation links for Home, Applications, and Network Activity. The main content area has a blue header bar with the text 'Home / Applications / 70-B3-D5-54-60-00-00-00 / Personalised Devices'. Below the header, there are tabs for Info, Devices, Traffic, Over-The-Air Devices, Personalised Devices (which is selected), and Customer Servers. A sub-header 'SensefarmTest (70-B3-D5-54-60-00-00-00)' is displayed. The central part of the screen is titled 'Add New Personalised Device' and contains instructions: 'To Configure a Personalised Device, please enter Device EUI, Network Address, Application Session Key and Network Session Key'. It features four input fields: 'Device EUI' (containing '70-B3-D5-54-60-00-01-C1'), 'Network Address' (containing '01:00:01:C1'), 'Application Session Key' (containing 'C5487683D17389DF731111'), and 'Network Session Key' (containing 'E0FD04CC4779F0D7B5FAD'). Each field has a red oval highlighting its value. At the bottom right of this section are 'Add Device' and 'Cancel' buttons. Below this, another section titled 'Personalised Devices Configured to the Application' lists entries with columns for Device EUI, Network Address, Application Session Key, Network Session Key, and Actions. The first entry in the list is blurred.

Talkpool

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

The screenshot shows a web browser displaying the Talkpool device settings interface. The URL in the address bar is `apps.talkpool.com/#/device/70-B3-D5-54-60-00-01-83/settings`. The page title is "Home / Devices / 70-B3-D5-54-60-00-01-83 / Settings". The main content area is titled "CUBE02 (70-B3-D5-54-60-00-01-83)". Below this, there are tabs for "Info", "Traffic", "Downlink", and "Settings", with "Settings" being the active tab. Under "Settings", there are sub-tabs for "Identification Info" and "Build Info", with "Identification Info" being the active tab. On the right side of the page, there is a section titled "Device Build Info" which includes fields for "Vendor" and "Model". The "Model" field contains the value "CUBE02", which is circled in red. Below these fields are sections for "Firmware", "Serial Number", and "Lora Version", each with their respective input fields.

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

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

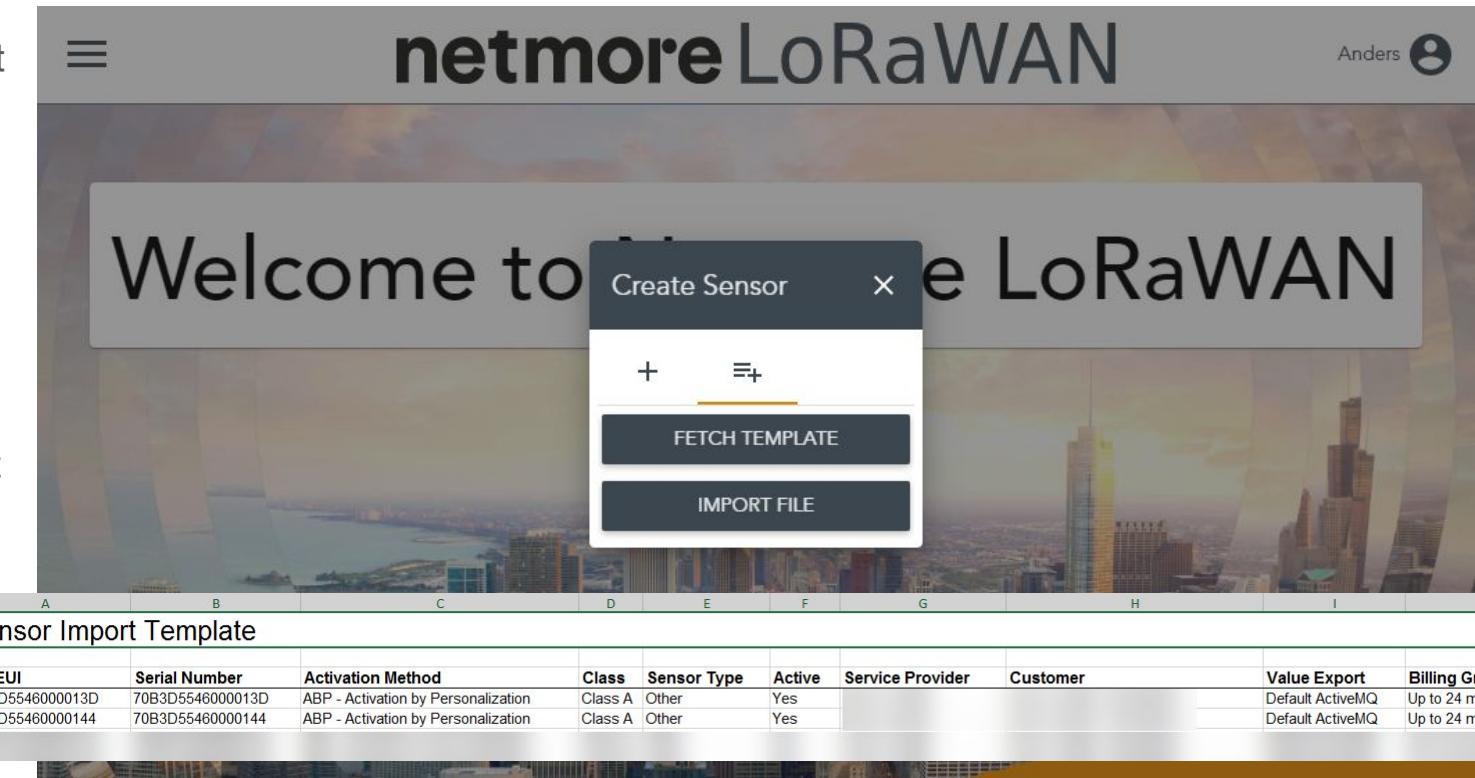
Netmore configuration with hub.sensefarm.com

<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

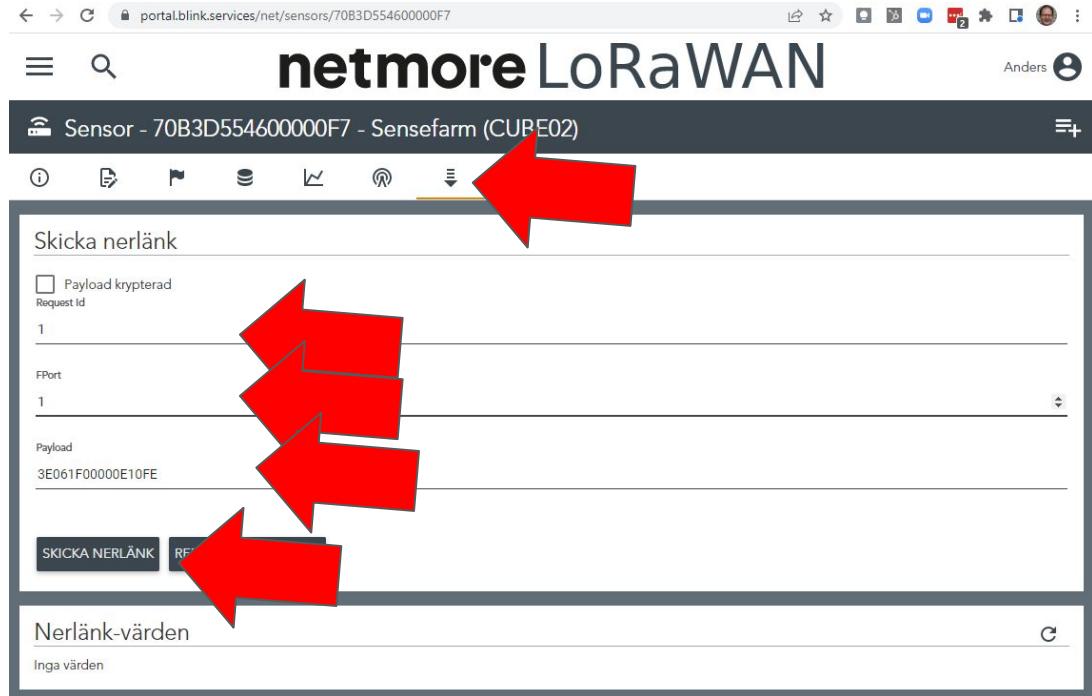


Downlink changes of timing

Downlink messages can change the update interval.
Some pre-defined values can be found on this link -

<https://github.com/Sensefarm/protocols/blob/master/Sensefarm-LPP.md#downlink-pre-defined-example-messages>

Cube02 does not care about Fport, so set it to 1.



Transferring data to hub.sensefarm.com

For a new customer that wish to use hub.sensefarm.com with their own account at the Netmore Lorawan portal, a new MQTT topic must be set up by the Netmore support team.

Sensefarms mqtt-data-account must also be allowed to listen to the new topic, so please contact Sensefarm to work this out with the Netmore Support.

Chirpstack

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

Chirpstack

The image displays three screenshots of the ChirpStack Application Server interface:

- Screenshot 1: Device-profiles / localhost**
 - Shows the "Device-profile name" field set to "localhost".
 - Shows the "LoRaWAN MAC version" field set to "1.0.3".
 - Shows the "Uplink interval (seconds)" field set to "600".
 - Contains a red circle around the "Device-profile name" field.
 - Contains a red circle around the "LoRaWAN MAC version" field.
 - Contains a red circle around the "UPDATE DEVICE-PROFILE" button.
- Screenshot 2: Applications / localhost / Devices / Create**
 - Shows the "Device name" field set to "70B3D55460000154".
 - Shows the "Device EUI" field set to "70 B3 D5 54 60 00 01 54".
 - Shows the "Device-profile" field set to "localhost".
 - Contains a red circle around the "Device EUI" field.
 - Contains a red circle around the "Device-profile" field.
 - Contains a red circle around the "Disable frame-counter validation" checkbox, which is checked.
- Screenshot 3: Applications / localhost / Devices / 70B3D55460000154**
 - Shows the "Device address" field set to "01 (54".
 - Shows the "Network session key (LoRaWAN 1.0)" field set to "1e 85 0".
 - Shows the "Application session key (LoRaWAN 1.0)" field set to "B2 1C 4B".
 - Contains a red circle around the "Device address" field.
 - Contains a red circle around the "Network session key (LoRaWAN 1.0)" field.
 - Contains a red circle around the "Application session key (LoRaWAN 1.0)" field.

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)

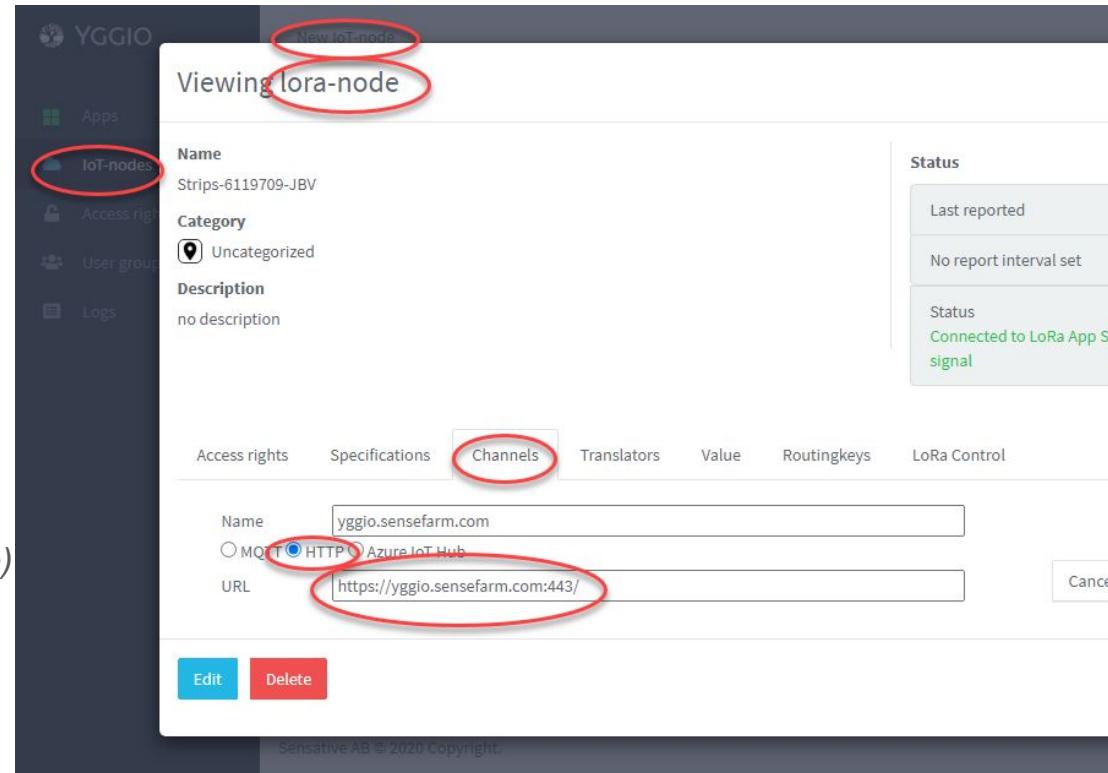
Do not select that node as we need the raw data!

Select Channels

Select HTTP

Enter URL:

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



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

Login, click "New IoT node" (it's not marked as a button)

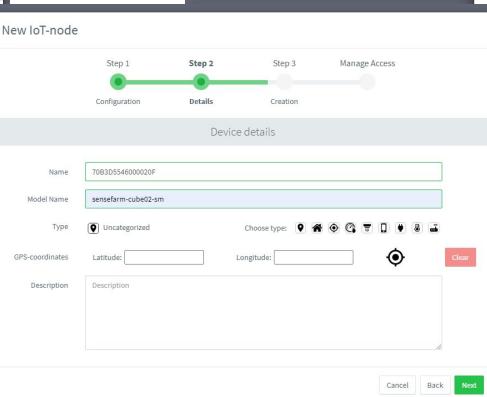
Select "Lora", "Actility Thingpark", "ABP"

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-kraftringen.sensefarm.com:443/"

Name	70B3D5546000020F
Category	(location icon)
Description	no description
Status	Last reported: Never No report interval set Status: Connected to Krafringen-Thingpark-Connector, Signal unknown

The Things Network V3

<https://console.cloud.thethings.network/>

Application

<https://ttn.sensefarm.com>

The screenshot shows the 'Edit webhook' configuration page in The Things Stack Community Edition. The top navigation bar includes 'Overview', 'Applications' (which is highlighted with a red box), 'Gateways', and 'Organizations'. The left sidebar lists various integration options: 'Overview', 'End devices', 'Live data', 'Payload formatters', 'Integrations' (expanded), 'MQTT' (disabled), 'Webhooks' (selected and highlighted with a red box), 'Storage Integration' (disabled), 'AWS IoT' (disabled), 'Azure IoT' (disabled), 'LoRa Cloud' (disabled), 'Collaborators', 'API keys', and 'General settings'. The main content area is titled 'Edit webhook' and contains the following fields:

- Webhook ID***: ttn-sensefarm-com
- Webhook format***: JSON
- Base URL***: https://ttn.sensefarm.com
- Downlink API key**: (redacted)
- Request authentication**: Use basic access authentication (basic auth)
- Additional headers**: + Add header entry
- Filter event data**: + Add filter path

Enabled event types

For each enabled event type an optional path can be defined which will be appended to the base URL

- Uplink message**: /path/to/webhook
An uplink message is received by the application
- Normalized uplink**: /path/to/webhook
A normalized uplink payload
- Join accept**

After registering the device -
Extra settings
needs to be set
under
General settings->
Network Layer ->
Advanced Mac
Settings

The screenshot shows the 'THE THINGS STACK Community Edition' interface. At the top, there are logos for 'THE THINGOS NETWORK' and 'THE THINGS STACK Community Edition'. The navigation bar includes 'Overview', 'Applications' (which is selected), 'Gateways', and 'Organizations'. Below this, the 'Applications' section shows a tree structure: Applications > sensefarm-hub-application > End devices > eui-70b3d57ed0057be7 > General settings. The right panel displays details for the device 'eui-70b3d57ed0057be7' (ID: eui-70b3d57ed0057be7). It shows 'No activity yet' and tabs for Overview, Live data, Messaging, Location, Payload formatters, and General settings (which is highlighted with a red box). The 'Basic' section contains a description: 'Description, cluster information and metadata'. A 'Collapse' button is at the bottom right.

