

**1. Introduction** 

This document is dedicated to the **ADS-270** LoRaWAN unit, designed for IOT telemetry solutions. It is a low power device designed to operate on battery or mains power. The unit incorporates a Microchip Rn2483 (EU) or RN2903 (North America) LoRaWAN module that features a unique MAC ID.

In order to realize LoRaWAN systems a gateway with internet connectivity, an appropriately configured backend system to manage transmitted data and a front end to visualize and manage data are required.

This document describes in brief how to,

- setup 2 different models of LoRaWAN gateways,
- configure devices on the The Things network (TTN) backend.
- connect devices to Infinite's cloud platform the WaT (web aided telemetry)

The Things Network backend runs an open Internet of Things infrastructure supported by a global ecosystem of thousands of developers, IT integrators, hardware manufacturers, universities and governments.

In order to successfully configure and register the device the user must prepare the following identification credentials,

- Device EUI (8 digit HEX) printed on a sticker inside the device
- Application EUI (8 digit HEX) acquired from the TTN platform
- Network Session Key (16 digit HEX) acquired from the TTN platform
- Net App Session Key (16 digit HEX) acquired from the TTN platform
- Device address (8 digit) acquired from the TTN platform

## **2.** How to set up gateways

In order to configure a gateway, an account with the TTN must be created first. Go to,

https://account.thethingsnetwork.org/register

→ ◯ බ A https://account.thethingsnetwork.or pogle ≪ Search D WaT D WaT Eve \$\$ Web Port - Lancom	fregister		i 🕲 Not syncing 🔹
	HOME CONSOLE		
	THE THINGS		
	CREATE AN ACCOUNT Greate an account for The Things Network and start exploring the world of Internet of Things with us.		
	USERNAME This will be your username – pick a good one because you will not be able to change it.		
	Individe     CARA. ADDESS     You all reaches a confirmation email, as well as occasional account related emails, if this     email address it monaged by a relief and relation as the corporate email address, the     paid.exection of the december of the section of the december of the section and     paid.exection of the december of the december of the section of the     paid.exection of the december of the     paid.exection of the december of the decembe		
	DASSW/DD		
	NEWSLETTER     Subscribe to the newsletter.		
	Create account		
	By registering an account you agree to our Terms and Conditions and Privacy Policy.		

and create an account.

Once logged in, in the console you can register your gateway and application.

	Lancon .			Applications	Gateways	Support	A akaka	~
	6	Hi Christ						
Th	Welcome to T s is where the magic happens. Here you can work with your collab	he Things Network Console. data. Register applications, d orators and settings.	vices and gateways, manage your i	itegrations,				
	$\bigcirc$		î					
	$\otimes$							
	APPLICATIONS		GATEWAYS					



## 2.1 The Things Indoor Gateway

The Things Indoor Gateway (TTIG) is designed to be a fully compliant, ultra low-cost LoRaWAN gateway, with Wi-Fi as the backhaul. The gateway comes with a wall plug, and can be powered over USB-C on 900mA, making the gateway even suitable for applications that require dynamic coverage.



Features:

- An 8 channel LoRaWAN indoor gateway.
- Supports the state-of-the-art BasicStation Protocol.
- Supports LBT.
- Simple setup steps taking lesser than 5 mins.
- Can connect to any network backend of choice.
- Setup and Connectivity over Wi-Fi.
- Can be powered up via a USB-C cable or via an elegant connector to the power outlet.
- Built-in omnidirectional antenna for indoor use.
- EU868, US915, AS923 and CN470 versions available.
- Security via a range of modes.



## Activate the gateway

- 1. Press the reset button (small button at the back of the gateway next to the USB-C port) for 5 seconds until the LED blinks rapidly GREEN<->RED for a couple of times.
- 2. Hold the SETUP (button at the top of the gateway, next to the LED) for 10 seconds until the LED blinks rapidly in RED.
- 3. The gateway now exposes a Wi-Fi AP whose SSID is MINIHUB-xxxxx where xxxxxx is the last 6 digits of the gateway ID.
- 4. The password for this network is printed on the back panel of the device under Wi-Fi PW.
- 5. After connecting to this network go to 192.168.4.1 using a web browser to access the Wi-Fi config page.





6. Select the Wi-Fi network and enter the password if it's a closed network.

7. Select the "Save and Reboot" option.

- 8. If your config is right,
- 9. The gateway will blink GREEN for a few seconds while it connects to this network.
- Then, it will blink GREEN<->RED for a few seconds while it connects to the CUPS endpoint and fetches the necessary information to connect to the LNS traffic endpoint.
- 11. If your configuration was successful, the LED will be solid GREEN which means that the gateway is connected to the LoRaWAN network and is ready to handle packets.

# Connection to the The Things Network Backend

- 1. To connect this gateway to the The Things Network console, register the gateway by checking the "I'm using the Legacy Packet Forwarder" option.
- 2. The EUI of the gateway is NOT the Wi-Fi MAC address printed on the back of the gateway but is derived from the first number on the top of the sticker below the QR code.
- 3. This number can also be obtained from the Wi-Fi Setup Page





- 4. To derive this take the code for example *5BA0CB80042B* and insert *FFFE* to after the first 6 characters to make it a 64bit EUI such as *5BA0CBFFFE80042B*
- 5. This is the value to be entered in the Gateway ID field on the <u>console</u>.
- 6. Enter in other details such as location, frequency plan and router.
- 7. If your configuration was successful, you should start receiving packets (if there are LoRaWAN nodes transmitting nearby).

## **Operating Modes**

## Configuration Mode (CONF)

• In this mode, the device acts as a Wi-Fi AP to which users can connect and configure a Wi-Fi network(s) to which the gateway will connect to during normal operation. The device cannot route LoRaWAN packets in this mode.

## Gateway Mode (GW)

• In this mode, the device acts as a gateway to route traffic between the LoRaWAN Device and the Network. The Wi-Fi AP for configuration is not available in this mode.

### LED states



Color(s)	Illumination Pattern	Operation Mode	Meaning
GREEN	Blinking (freq 1 sec)	GW	Wi-Fi not connected (or trying to connect)
GREEN	Blinking (freq 1/4 sec)	GW	Connected to Wi-Fi, establishing connection to LNS/Configuring radio
GREEN	Solid	GW	Connected to Wi-Fi, connected to LNS backend, listening for Packets
GREEN/RED	Alternate Blinking (freq 1/4 sec)	CONF	Scanning Wi-Fi networks, setting up Config AP
RED	Blinking (freq 1/4 sec)	CONF	Config AP Active

## **Button Actions**

There are three possible button actions on the TTIG

- SETUP Button pressed for 10s:
  - $\circ$   $\;$  Switch to CONF mode if in GW mode.
- SETUP Button pressed for 5s:
  - Reboot if in CONF mode, do nothing in GW mode.
- RESET Button pressed for 5s:
  - Factory reset (wipe out Wi-Fi and LNS credentials, though CUPS credentials are retained).



## 2.2 Laird RG1xx Gateway

The Sentrius RG1xx LoRa-Enabled Gateway from Laird is the ultimate in secure, scalable, robust LoRa solutions for end-to-end control of your private LoRaWAN network. Leveraging Laird's field-proven and reliable 50 Series "Wireless Bridge" certified module, it also offers enterprise dual-band Wi-Fi, BT v4.0 (BLE and Classic) and wired Ethernet for complete design freedom. Based on the Semtech SX1301/SX1257 chipset designs, it offers a LoRa range up to 10 miles and pre-loaded LoRa Packet Forwarder software, perfect for highly scalable, flexible IoT networks. The Sentrius RG1xx Gateway works with Laird's Sentrius RM1xx Series LoRa+BLE certified modules for simple out-of-the-box integration and is compatible with 3rd party Cloud and LoRa partners, as well as any LoRaWAN certified client devices.



It is also available in an outdoor IP67 rated case





## Connecting the RG1xx

A 12v 2A power supply is included with the gateway and an ethernet cable. Attach the antennas to the unit, the LoRa antenna needs to be connected to the 868/915MHz port and the two Wi-Fi antennas need to be connected to the 2.4/5.5GHz ports. Laird RG1xx antennas.



Attach the ethernet cable between the gateway and network interface, then connect the power cable.



1. Determine the last three bytes of your gateway's Ethernet MAC address. This can be found on the label on the bottom of the gateway; the last three bytes are highlighted.



Laird	Sentrius™	RG191	(450-0179)
Laliu	915 MHz Intellig LoRaWAN, Wi-Fi	ent Gateway includ , Bluetooth, and Etl	ing hernet
Smart Technology. Delivered.			50
Contains FCC ID: SQG-WB50NBT			HC
Contains IC: 3147A-WB50NBT			
Contains FCC ID: SQG-1001			
Contains IC: 3147A-1001		13763	922007063995
Ethernet MAC ID: C0:EE:40:29:37:88			
WIFI MAC ID: CO:EE:40:0A:D9:49			
M2 EUI: CO:EE:40:FF:FF:29:37:8B		ê Ş	US PALAS
www.lairdtech.com/RG1xx_Getting_Started			
User Name: sentrius	0117174	12.3	0.258-2690
Password: RG1xx	511/1/4		

2. Enter the URL into the web browser to access the web interface. For example, for the gateway used in this guide, the URL is https://rg1xx29378B.local, where "29378B" are the last 6 digits of the Ethernet MAC address. Note that to do this requires an operating system which supports mDNS such as a Linux distribution with Avahi, Windows 10 or newer, or Mac.

- 3. Accept the self-signed security certificate in the browser.
- 4. Click Advanced.

Privacy error X	
← → C A Not secure   bttps://10.16.130.9	
	Your connection is not private Attackers might be trying to steal your information from <b>10.16.130.9</b> (for example, passwords, messages, or credit cards). NETSER_CERT_AUTHORITY_INVALID
	ADVANCED Back to safety

5. Click Proceed.





Login to the gateway using the username sentrius and password RG1xx
 It is recommended that the default password is changed for security reasons. The password can be changed on the Wi-Fi -> Advanced web page.

Alternatively, a connection to the gateway can be made using Wi-Fi Quick Config, to do this:

1. Depress and hold the user button (see #2 below) for 7 seconds.



- 2. From a wirelessly enabled device perform a scan.
- 3. Connect to the access point rg1xx29378B, where "29378B" are the last 6 digits of the Ethernet MAC address found on the label on the bottom of the gateway. The network is secured with WPA2 with a password that is the same as the SSID.
- 4. Open a web browser to https://192.168.1.1
- 5. Login to the gateway using the username sentrius and password RG1xx
- 6. It is recommended that the default password is changed for security reasons. The password can be changed on the Wi-Fi -> Advanced web page.



## Connecting the Gateway to the Internet

## Setting Up Ethernet

By default, the Ethernet port is set up for DHCP addressing. Connect the Ethernet cable to a network with internet access. If more advanced Ethernet configuration is needed, please see the Sentrius RG1xx User Manual in the documentation tab of the RG1xx product page at lairdtech.com: http://www.lairdtech.com/products/rg1xx-lora-gateway

## Setting Up Wi-Fi

By default, the Wi-Fi in the gateway is not configured to connect to a Wi-Fi network. You must access the web interface on the gateway via the Ethernet interface to setup the Wi-Fi connection.

To set up the Wi-Fi, follow these steps:

1. Once logged into the web interface, navigate to the Wi-Fi page.

Laird	Dashboard	LAN	Wi-Fi	LoRa Settings Logou
Scan				Access Point Scan
rofiles				Qcan
Advanced				UGUIT
Status	Connected		_	
SSID	BestWiFi			
Channel	6			
Bit Rate	54 Mbps			
Client IP	192.168.1.27			
RSSI: -50 dBr	n			
Disable Wi-Fi				

2. To connect to a Wi-Fi network, click Scan to scan for nearby Wi-Fi networks. Scanning continues until you click Stop or select one of the scan results in the list. Scanning for networks



Laird	Dashboard LAN W	7-Fi LoRa Settings				Logo
can		Access Point Scan				
rofiles			Sca	nning O		
dvanced						
		SSID	BSSID	Channel	R S SI	Security
Status	Connected					
SSID	BestWiFi	CATS_CATS_CATSSS	CA:10:39:39:29:CA	6	-22	WPA_PSK
Channel	6	* Ezurio WPA				
Rit Data	54 Mhos	Ezurio WPA	90:72:40:17:26:28	11	-52	WPA2_PSK,WPA2_PSK_TKIF
Dit Kate	54 Mops	Ezurio WPA	90:72:40:17:26:29	36	-66	WPA2_PSK,WPA2_PSK_TKI
IP Address	192.168.1.27	Y ssid1				
RSSt -50 dBm		ssid1	11 22:33 33 22:11	1	-54	WPA2_PSK
		ssid1	11:22:33:33:22:12	1	-58	WPA2_PSK
Disable Wi-Fi		Ben's Mobile	11:22:33:33:22:11	3	-71	WPA2_PSK
		ssid2	19:29:39:39:29:19	6	-73	WPA2_AES
		7 Results(s)				

- 3. Click on the applicable scan result.
- 4. Enter the information for the Wi-Fi network.

Laird Dashboard LAN WI	Fi LoRa Settings	
	Wi-Fi Profile: ssid1	
Scan	Ac	
Profiles	Protile Name	
Advanced	ssid1	
	SSID	
Status Connected	\$SI ssid1	security
SSID BestWiEi	CAT Security	VPA_PSK
	Ezu WPA2_PSK	VPA2_PSK,WPA2_PSK_TKIP,WPA_PSK
Channel 6	ssid	VPA2_PSK
Bit Rate 54 Mbps	Ezu	VPA2_PSK,WPA2_PSK_TKIP,WPA_PSK
Client IP 192.168.1.27	ssid	VPA2 AFS
RSSI: -50 dBm	PSK required, needs to be at least 8 characters.	
	SSIC	VPA2_AES,CCKM_AES
Disable WI-Ei	Connect	



## LoRa Packet Forwarding Setup

To set up LoRa packet forwarding on the gateway, follow these steps:

1. Click the LoRa tab in the main menu. LoRa Configuration

Laird Dashboard LAN Wi-Fi	LoRa Settings	Logout
Presets	select preset	
Forwarder	The Things Network Legacy - US	
Advanced	You may lose your LoRa settings when applying a preset!	
Traffic	THE THINGS	
Gateway Connected false	Apply NETWORK	
Gateway EUI AwesomeSauce	https://www.thethingsnetwork.org/	
Region Code US	Forwarder.	
Mode semtech	semtech Preset Server Address: router.us.thethings.network	
	Preset Upstream / Downstream Ports: 1700 / 1700	

- In the dropdown labeled Select Preset, select the preset for The Things Network Legacy (TTN).
- 3. Click Apply.

The network server must be compatible with the packet forwarder being used on the gateway. The packet forwarder can be custom configured on the forwarder, radios, and advanced pages. If the LoRa network operated on a different channel plan it is also necessary to program this into the gateway on the radios page.



## **3. Configuration with The Things Network**

## **3.1 Set up your account with The Things Network**

To set up your account with The Things Network, follow these steps:

- 1. Go to https://www.thethingsnetwork.org/.
- 2. Create an account or log in to your existing account,

THETHINGS	HOME CONSOLE
	THE THINGS
	Please log in to see this page
	EMAIL OR USERNAME
	PASSWORD
	Login
	Foreot your password? Create an account

- 3. Click Console.
- 4. Register your gateway:
  - 1. From the console screen, click Gateways.

THE THINGS CONSOLE NETWORK COMMUNITY EDITION			Applications	Gateways	<b>*</b>
	Welcome to The TF Welcome to The TF This is where the magic happens. Here you devices and gateways, manage your	ings Network Console. can work with your data. Register applic: integrations, collaborators and settings.	ations,		
AF		GATEW	AYS		

2. Click register gateway.



THE THINGS CONSOLE	Арр	olications	Gateways	<b>•</b>
Gateways				
GATEWAYS				🕒 <u>register gateway</u>
You da	not have any gateways			
Get sta	rted by registering one!			

3. Obtain the gateway ID from the Sentrius RG1xx web interface or from the bottom label on the Gateway.

	Laird	Dashboard	LAN	Wi-Fi	LoRa
	Presets				select
	Forwarder				Th
	Radios				
	Advanced				
	Gateway Connected	true			
	Gateway ID	C0EE40FFF	F2935F2		
	Region Code	US			
	Mode	forwarder			
	aird	Sentrius <sup>™</sup>	R	G191	(450-0179)
·	_anu	915 MHz Int LoRaWAN, V	elligent Gate Ni-Fi, Blueto	eway includir oth, and Ethe	ernet
Sm Contain Contain Contain Contain Etherne	nart Technology. Delivered. ns FCC ID: SQG-WB50NBT ns FCC ID: SQG-1001 ns FCC ID: SQG-1001 ns IC: 3147A-1001 et MAC ID: C0:EE:40:29:37:8B			C	FC
M2 EUI	AC ID: CO:EE:40:0A:D9:49 : CO:EE:40:FF:FF:29:37:88			Rev:	
www.la	airdtech.com/RG1xx_Getting_Starte	ed		1301	140 A 44

4. Fill in the information to register the gateway as shown below.

User Name: sentrius

Password: RG1xx



0117174

14145-05

If the gateway is set to use "The Things Network Legacy" preset, be sure to check "I'm using the legacy packet forwarder". Otherwise, the gateway can use the <The Things Network> preset and the checkbox should be left unchecked

THETHINGS CONSOLE A	pplications	Gateways	• · · ·
Gateways $ ightarrow$ Register			
REGISTER GATEWAY			
Gateway EUI The EUI of the gateway as read from the LoRa module			
C0 EE 40 FF FF 29 35 F2			8 bytes
I'm using the legacy packet forwarder Select this if you are using the legacy <u>Semtech packet forwarder</u> .			
Description A human-readable description of the gateway			
Sentrius RG191 LoRa Gateway			0
Frequency Plan The <u>frequency plan</u> this gateway will use			
United States 915MHz			\$
<section-header><section-header><section-header><text><text><section-header><image/><image/></section-header></text></text></section-header></section-header></section-header>	e map.	lat Ing V Hispland Rd Thiene Google Terms of	0.0000000 0.0000000 30 1 0 0 Ville Ville Dorse Buy R Dorse Buy R
		Cancel	Register Gateway

1. Click Register Gateway.

If using an RG186 gateway, be sure to select an EU router.

Once the gateway is registered, and if the gateway is communicating to The Things network, the status should display as connected.



#### Applications Gateways Gateways > 🚫 eui-c0ee40ffff2935f2 Overview Traffic Settings GATEWAY OVERVIEW Settings Gateway ID eui-c0ee40ffff2935f2 Description Sentrius RG191 LoRa Gateway Owner Status • connected What is this? Frequency Plan United States 915MHz Router ttn-router-us-west Gateway Key 🔹 📩 base64 📳 Last Seen 14 seconds ago Received Messages 251164 Transmitted Messages 149

#### ADS-270 - How to build a LoRaWAN IoT telemetry application



## **3.2 Create an Application with TTN**

To create an application that can receive data from your LoRa-enabled gateway, complete the following steps:

- 1. At The Things Networks website, click Applications in the top right of the menu.
- 2. Click Add Application
- 3. Complete the field as shown below. Note that **application ID** should be in lower case and used to uniquely identify your application on the network.

	Applications C	Gateways	-	
Applications > Add Application				
ADD APPLICATION				
Application ID The unique identifier of your applicat	on on the network			
rg1xx_quickstart			±.	0
Description A human readable description of you	new app			
Quickstart application for the Sentr	us RG1xx Gateway			0
Application EUI An application EUI will be issued for 1	he Things Network block for convenience, you can add your own in the application settings page.			
	EUI issued by The Things Network			
Handler registration Select the handler you want to regist	r this application to			
ttn-handler-us-west				0
		Cancel	Add appli	

Note: If using an RG186 gateway, be sure to select an EU Handler registration. Once you have created your application, click Add application to save it.



## **3.3 Register your end-device with TTN**

To register your end-device as the device that will send data to TTN, follow these steps:

- 1. From the applications screen, select the application that you added in the previous section.
- 2. Click register device.

THE THINGS CONSOLE N ET W O & K COMMUNITY EDITION			Applications	Gateways		
Applications > 🤤 rg1xx_quickstart						
	Overview	Devices	Payload Formats	Integrations	Data	Settings
APPLICATION OVERVIEW						
Application ID rglxc,quickstart Description Quickstart application for the Sentrius RG1xx Gateway Created 3 hours ago Handler thr-handler-us-west (current handler)					do	cumentation
APPLICATION EUIS           • = 70 83 05 7E F0 00 57 AE					O I	manage euis
DEVICES				• register device	<b>o</b> mar	nage devices
¢) 0	registered devices					
COLLABORATORS				0	manage c	ollaborators
				collaborators dele	te device	settings
ACCESS KEYS					0 (	manage kevs
default key devices messages	•				≑ bas	:64

- 3. Choose and enter a **Device ID**. For Device ID, choose a for this application unique ID of lower case, alphanumeric characters and nonconsecutive and \_.
- 4. Leave the **App Key** to be generated.
- 5. For App EUI, select the generated EUI from the list.
- For an eight-byte **Device EUI**. Infinite recommends using the MAC ID of the ADS-270 as a Device EUI.



	THINGS WORK	COMMUNIT	DLE Y EDITION								Applicatio	ns Gateways	-	~
pplications >	🥥 rg	g1xx_quicks	art > Dev	ices										
									Overview	Devices	Payload Formate	Integrations	Data	Settings
REGISTER	R DEVI	ICE											<u>bulk i</u>	mport devices
Device ID This is the u	unique ide	dentifier for	he device in	this app. Th	e device ID	will be imn	nutable.							
rm1xx_de	v_board_	i_01												0
Device EL The device I	<b>UI</b> EUI is the	ne unique ide	ntifier for th	s device on	the networl	k. You can	change the E	UI later.						
× 12	34 56 7	78 90 AB	CD EF											8 bytes
App Key The App Ke	y will be	e used to sec	ure the comm	nunication b	etween you	ı device an	d the netwo	rk.						
/							this field wi	ll be gene	rated					
App EUI														
70 B3 D5	7E FØ ØØ	00 57 AE												٥
												Canc	el	Register

- 7. Click Register.
- 8. You will be redirected to the newly registered device where you can find the generated **App Key** needed to activate the device.
- Make note of the <u>Device EUI, Application EUI, and the App Key</u>. These keys are needed later to set up the ADS-270.

THE THINGS CONSOLE	Applications Gateways
Applications > 🛞 rg1xx_quickstart > Devices > 📰 rm1xx_dev	board_01
	Overview Data Settings
DEVICE OVERVIEW	
Application ID rg1xx_quickstart Device ID rm1xx_dev_board_01	
Activation Method OTAA	
Device EUI 💠 🛱 12 34 56 78 90 AB CD 1	F (1)
Application EUI         <>         <>         70 B3 D5 7E F0 00 57 J	E B
App Key 🗘 🛱 👁 ······	
Status • never seen	
Frames up 0 reset frame counters Frames down 0	



#### Personalize device for ABP

The ADS-270 supports Activation by Personalisation (ABP). With ABP you don't have to wait for a downlink window to become available to confirm the activation.

- 1. In the Console, go to the device you'd like to personalize.
- 2. From the top right menu, select Settings.
- 3. For Activation method, click ABP.
- 4. Leave the Network Session Key and App Session Key to be generated for you or click customize it if you'd like to set them yourself.

THE THINGS CONSOLE		Applications	Gateways	Support	0
Applications > 😂 🛻 > Devices > 📻	Settings				
		Overvlew	Data Set	dings	
DEVICE SETTINGS	SETTINGS				
General Location	Description A human-readable description of the device		a		
	Device EUI The serial number of your radio module, similar to a MAC address 20 00 04 A3 08 00 F3 C7 5D		👩 8 bytes		
	Application EUI 70 83 D5 7E D0 03 54 57		<		
	Activation Method OTAA ABP				
	Device Address 26 01 10 68		🥝 4 bytes		
	Network Session Key Network Session Key will be generated App Session Key				
	App Session Key will be generated				
	16 bit 32 bit				
	Delete Device	Car	ncel Sz	ve	

5. Click Save to finish.



You will be redirected back to the device, where you will find the **Device Address** and

**session keys** (Network Session Key and Net App Session) needed to activate the device.

## **Payload Format**

The device payload must be decoded into a more readable and usable format for data storage and visualization.

- 1. Go to your device and select "Payload Formats" from the menu.
- 2. Click on the decoder.
- 3. Copy and paste the decoder script below into the decoder's integrated text editor and click save.

```
function hex to ascii(str1)
 {
        var hex = str1.toString();
var str = '';
for (var n = 0; n < hex.length; n += 2) {</pre>
                  str += String.fromCharCode(parseInt(hex.substr(n, 2), 16));
         }
         return str;
 }
function Decoder(b, port) {
     var temp = {};
     var a = {};
var s = {};
     if (b.length==12){
     for (var i=0; i<b.length; i++){</pre>
                  a[i] = b[i].toString(16);
            }
    temp = a[0] + a[1];
    s.channel = hex_to_ascii(temp);
    s.sign = hex_to_ascii(a[2]);
    temp = a[3]+a[4]+a[5]+a[6]+a[7]+a[8]+a[9]+a[10];
    temp = hex_to_ascii(temp);
    s.value = temp.replace(/\x20/g, "");
    s.di = hex_to_ascii(a[11]);
     }
     else if (b.length==1){
       s.payload = "test";
     }
     else{
       s.payload = "error";
     }
    return s;
    }
```



THE THINGS CONSOLE							Applications	Gateways	Support	0	,
	Applications > is lora_2 > Payload Formats										
		Overview	Devices	Payload Formats	Integrations	Data	Settings				
	PAYLOAD FORMATS										
	Payload Format The payload format sent by your devices										
	Custom						0				
	decoder converter validator encoder					remov	e decoder				
	<pre>1 function hex_to_ascii(strl) 2 { 3 var hex = strl.toString(); 4 var str = 'i'; 5 for (var n = 0; n &lt; hex_length; n == 2) { 6 j str = String.fromCharCode(parseInt(hex.substr(n, 2), 16)); 7 return str; 8 return str;</pre>						Î				
	9 } 10 11 12 function Decoder(b, port) {				d	lecoder has r	to changes				
	Payload										
				0 byb	= <b>1</b>		Test				



## **3.4 Configuring the ADS-270 unit**

The ADS-270 needs to be configured with the,

- Device EUI (8 digit HEX) printed on a sticker inside the device
- Application EUI (8 digit HEX) acquired from the TTN platform
- Network Session Key (16 digit HEX) acquired from the TTN platform
- Net App Session Key (16 digit HEX) acquired from the TTN platform
- Device address (8 digit) acquired from the TTN platform

The way to enter the unit setup mode is the following:

- 1. Install the USB driver on a PC.
- 2. Connect the USB port to a PC. The Status LED is lighting for 2 sec.
- Place a Jumper on JMP1. The Status LED starts blinking, indicating setup mode.
   Program execution is suspended.

There are two ways to program the unit:

1. Connecting the unit to a PC and using a terminal program to pass the ASCII commands to the unit, according to the scheme: "Command, Parameters <CR>". The terminal settings should be: Baud rate: 115200 bps, Data bits: 8, Parity: none, Stop bits: 1, Flow control: none.

2. Connecting the unit to a PC and using the WA Manager software. This is the most convenient way. The Device EUI, which is necessary for connecting the unit to the LoRaWAN network, is automatically read during downloading the parameter file to the device. The Device EUI is also printed on a label in the device interior.

The user needs to configure the remaining credentials and download the configuration to the ADS-270.



al Analog Inputs Cou	unters SDI-12 MODBUS Data Transmission	
s/N	1 Type ADS-270	Firmware Version 2.0
evice Identification Device name ADS-270		Unit ID 10000001
Device Address	26011568	
Application EUI	70DD62684964FEF2	
Net Session Key	23DEF51891A5A669BDB5D4D8A946	
Net Application Key	9097C3AFE545E95AFEF9172FB7E61B3A	
Data Rate	5	
Power Index	1	
Uplink Counter Preset	1	
		EXPORT

For sensor configuration, transmission rates, battery life and all the functions of the ADS-270 please consult the device manual.

Removing the Jumper at JMP1 will exit the configuration mode and set the device in operation mode.



## **3.5 Configuring an integration at the TTN**

When successfully configured the ADS-270 will transmit data via the gateway to the TTN backend.

Applications > 🤤 lora\_2 > Data Overview Devices Payload Formats Integrations Data Settings APPLICATION DATA Il pause 🗊 clear Filters uplink downlink activation ack error time counter port devid: tora2 payload: 30 32 2B 30 2E 30 30 32 20 20 20 30 channel: "92" di: "9" sign: "+" value 11:53:54 9128 22 11:52:54 9127 2 devid: lora2 payload: 30 31 2B 31 2E 32 33 20 20 20 30 channel: "#1" di: "#" sign: "+" value: " 2 1 9126 27 devid: lora2 payload: 30 33 2B 32 35 2E 35 20 20 20 20 30 channel: "03" di: "0" sign: "+" . 11:51:54 11:50:54 devid: lora2 payload: 30 32 2B 30 2E 30 30 32 20 20 20 30 channel: \*02\* di: \*8\* sign: \*+\* vi 9125 79 11:49:54 9124 76 devid: Iora2 payload: 30 31 2B 31 2E 32 33 20 20 20 30 channel: "81" di: "8" sign: "+" 11:48:54 9123 52 devid: lora2 payload: 30 33 28 32 35 2E 34 20 20 20 20 30 channel: "83" di: "8" sign: "+" 11:47:54 9122 dev id: lora2 payload: 30 32 2B 30 2E 30 30 32 20 20 20 30 channel: "82" di: "8" sign: "+" 11:46:54 9121 5 devid: lora2 payload: 30 31 2B 31 2E 32 33 20 20 20 30 channel: "81" di: "8" sign: "+" vi 11:45:54 9120 94 devid: lora2 payload: 30 33 2B 32 35 2E 34 20 20 20 30 channel: "83" di: "8" sign: "+" va . 11:44:54 9119 90 dev id: lora2 payload: 30 32 2B 30 2E 30 30 32 20 20 20 30 channel: "82" di: "8" sign: "+" v . . . 11:43:54 9118 87 devid: lora2 payload: 30 31 2B 31 2E 32 33 20 20 20 20 30 channel: "81" di: "8" sign: "+" value " . 11:42:54 9117 47 devid: lora2 payload: 30 33 2B 32 35 2E 34 20 20 20 20 30 channel: "83" di: "8" sign: "+" value:

Data can be seen at the application data section of applications at the TTN console.

In order to forward the data to a front-end application for data management and visualisation an integration must be configured.

Integrations are the easiest way to connect your devices to applications.

A common integration is to forward messages to some webhook or other messaging endpoint (uplink messages). For these situations we provide a set of messaging integrations which act as a bridge between the Handler Data API and any endpoint you configure. It also provides you with an endpoint to send messages back to devices (downlink messages). Easy to configure and use is the HTTP Integration.



H	andler	н	andler
Data	Application Manager	Data	Application Manager
HTTP Integration		HTTP Integration	
Configuration		Template	
Application		Configuration	
		Platform	
		Application	

- 1. Go to applications and select an application in the Console.
- 2. Select Integrations from the top-right menu.
- 3. Click the add integration link.
- Click to select the integration you'd like to add. Select HTTP integration and to connect to the WaT configure URL : <u>http://195.97.109.136:14601</u>

ioogle 🦇 Search 🗋 WaT 🗅 WaT Eye 🍟	Web Port - Lancom		Cther favo
THE THINGS CONSOLE			Applications Gateways Support 🕅 akaka 🗸
	Applications > 🤤 infinite_locawan > Integrations > Iorawan_infinite_callback		
	Overview Devices Payload Formats Integr	ations Data Settings	
	INTEGRATION OVERVIEW		
	Process ID torswaru/infinite_calitact		
	Status = Running Platform \$\2, HTTP Internation (v2.6.0) documentation		
	Asthor The Things Industries BV.		
	Description Sends uplink data to an endpoint and receives downlink data over HTTP.		
	SETTINGS		
	Access Key The access key used for downlink		
	default key (dentas menages		
	URL The URL of the andpoint		
	http://195.97.109.136:14601	•	
	Method The HTTP method to use		
	POST	•	
	Authorization The value of the Authorization header		

5. Click Create integration to finish.



# 4. Configuring an ADS-270 with Infinite's cloud applications.

Infinite offers a variety of cloud applications to manage and visualise device data.

These include

• The WaT (web aided telemetry platform). Accessible at

www.cloud-telemetry.com

• The WaT Eye (live weather data dashboard). Accessible at

http://91.138.204.120:14616/

• The WaT smart applications for IOs and Android phones and tablets.

The only perquisite for an ADS-270 to be recognised automatically by the above applications is to configure at the device parameters at the Descr field the Device EUI.

Devices	× +					- 0
→ C O ▲ Mŋ	ασφαλής   5.172.19	4.30/Devices.aspx				x 🧿 💹 🗟 🖌 🕈 🎘 ()
Εφαρμογές 📔 Wine@Dine	e 😳 Infinite 🖯	Πρώτο Θέμα 🐜 Νοοz 🕻	🖲 WaT 🕥 WaTEye 🥥	WaTA 🚏 Web Port Lancom 🚱 WaT Lancom	🕲 WaTEye Lancom 💥 MEXIL Dev	Αλλοι σελιδοδείκ
				Autonomous RTUs tew horizons in off-grid telemetry Learn more.	Up to 10 years maintenance-free operation infinite	
Main   Map   Chart	Measurements	Alarm Events   Alarm	ACK   Status   GPS	File Archives   TCP Archives   Billing	Cog Out (pratos)	
Devices   Groups   Ser	ver Recipients	Alarm Messages   Wea	ther		App Store	
Devices						
pand + Collapse -	Main Parameters	Alarming Mag Chart Dig	ital Analog Output Count	ters SDI RS-485		
All	Edit Save 0	Cancel				
ADU-500/700	-	Main		Other		
Athens	ID	1649	Version			
Bregen	Name	ADS-270 LRW1	UID			
City Centre	Descr	00D2A198E03EB646	SID			
Crack Pilot	Dhana Number	100-01	Vorbasa Basaansa			
Demo	Phone Number	+30X1	verbuse kesponse			
🗉 🛄 Oslo	Type	ADS-27x 👻	Merge Alarms			
Power	Client	Infanite LTD Y	Avail SMS Alarm Limit	t		
ADS LORA TEST	Status	Active	SMS Counter Preset			
ADS-270 LRW1		U Inactive	Retries			
ADS-270 LRWV2	Show In Tree	W Yes	Retry Delay (Sec)			
ADU-500 4G_LTE		C NO	Status Msg Period			
ADU-500 T11	EDI		(Min) Status Idle Time			
ADU-500-1216	EDI Format	Detail	Period (Sec)			
ADU-500-CMPS1	Chack (SSM	O Ch in Columns	Pin Number			
ADU-510	Character Set		Last Alarm Value Check			
ADU-700 YLT1	Comments			and and a second s		
ADU-700-T2		A	Al Alarm Deadband			
Dordrecht		Subscription	(%)			
Farm	Start Date		Al Sampling Delay (Sec)			
I ondon	(dd/mm)	- Katta	Al Sampling Interval			



## **5. Lossant Enterprise IoT platfrom**

An example integration to a 3<sup>rd</sup> party cloud platform will be given to demonstrate the capabilities of the ADS-270 LoraWan unit. For this demonstration the Losant platform was chosen.

Losant is an easy to use, modern, and powerful Enterprise IoT platform designed to allow rapid build of real time connected solutions.

It is an application enablement platform which allows enterprises to effectively build applications that securely scale to millions of devices. With real-time stream processing and batch processing capabilities, users can create dynamic experiences and perform complex analytics.

# **5.1 Create Application**

A free user account with Losant is required. An account can be created at <u>www.losant.com</u> After creating an account, the user will be prompted to create an application. Select "Add Application" to create a new application.

My Sandbox		Add Applie
	WELCOME TO YOUR SANDBOX This is your personal development sandbox. It is a fully functional environment that allows you to learn and experiment with the Losant platform at no cost.	
	New to Losant? We recommend following the walkthrough to get acquainted.	
	Ready to go? Start building now.	
	Experience Losant in action. SCHEDULE A DEMO	

Select the "Blank Application" template.



Applications > New Application

Looking for the fast track? Start with a template.

Application templates can get you up and running much quicker. Choose the use case that best applies to you and start from there. You can always modify and delete resources created by these templates later.



Provide a name and an optional description for the application and then select "Create Application".

Blank	Application	×
	Application Name	
	Testį	
	test2	
	е.д. му нем аррисации цезсприон	
	Create Application Cancel	



## **5.2 Add the Device**

Test from My Sendbox Test n Clear Q Search (~+L) Nor n description pr Edit No logs yet. Search your application . Overview A Events DEVICES 尊 Z 19 No Devices It the things in No Dashboards No Workflows 
 Q::
 Access Keys

 Image: Device Recipes
 the data in he full power Add Device Add Dashboard Add Workflow Data Tables About This Application Edit Integrations DATA VISUALIZATIO Application README This is your application's README, written in multiple developers collaborating on a single works. If you hav Markdown. Feel free to replace this of e application, a good README is an in Data Explorer
 Notebooks Application Overview Page VIENAL WORKFLOW B rview page. Other items on this page This README is part of the application of Z Workflows Application Description: This should be a one- or two-sentence description of this application. This README is where we record about the application.
 Application Search box can be used to quickly find and navigate to any number of resources in this application.
 Recent Resources: These lists, which are under the search box, contain recently created or viewed resources in this application. Custom Nodes (a) Overview

Select "Add Device" from the Application Overview page.

#### When creating the device, select "Standalone" as the Device Class.

Test from My Sandbox	Devices > New Device										
Q Search (¬=+L)	Choose a type for your new device.										
Overview	Choose which class of device you would like to create. While in	most cases a device's class can	be changed after creation, you	I should choose a class based o	n your needs for this device now	and in the near future.					
▲ Events	Standalone	Ø	@ Gateway	0	🏾 Edge Comput	e ®					
DEVICES	Standalone devices are	the most common type	Gateways connect di	rectly to Losant. They	Edge Compute devi	ces can run Edge Workflows					
:(i): Devices	of device within Losant. state - through either a	They report their own n MQTT connection, the	report state and rece own behalf as well as	eive commands on their s on behalf of Perinheral	without an Internet	connection. They typically verful hardware, i.e. devices					
🔍 Access Keys	REST API or application	workflows. They may	devices.		that can run an ope	rating system such as					
Device Recipes	or may not represent a	physical device.			Linux.						
DATA SOURCES	Choose Standalone -	<b>`</b>	Choose Gateway		Choose Edge Con	npute					
🌐 Data Tables											
🖧 Webhooks		Peripheral	0	🐰 System	0						
Integrations		Peripherals can only re	port state and receive	Systems are a spec	al device class. They						
DATA VISUALIZATION		commands through a (	Sateway. They typically	represent a family	of devices that make up it. Their state data is an						
Dashboards		Internet on their own	such as a Bluetooth	aggregation of raw	data reported by their child						
Data Explorer		sensor or an embedde	d device.	devices.							
Notebooks		Choose Peripheral		Choose System							
- more a cons											
VISUAL WORKFLOW ENGINE											
🖉 Workflows											

A device must be configured. Provide a name and an optional description for the device.



Test from My Sandbox	Devices > New Device > (\$) New Standalone Device
Q Search (¬=+L)	DEVICE OVERVIEW
Overview	Give your device a name and optionally a description.
▲ Events	Name
DEVICES	LUId
🗇 Devices	Description
🔍 Access Keys	
🗐 Device Recipes	
DATA SDURCES	DEVICE CLASS (?)
III Data Tables	Choose a class for this device. Different device classes behave in different ways and expose specific
🖧 Webhooks	functionality.
Integrations	Device Class
	Standalone 💌
DATA VISUALIZATION	
Dashboards	PARENT SYSTEM ⑦
() Data Explorer	Optionally, choose a system to which this device should belong. By assigning this device to a system, its raw
Notebooks	attribute values can be used to calculate aggregated system attributes.
VISUAL WORKFLOW ENDINE	Parent System
Z= Workflows	Select a system device
Ht Custom Nodes	
EXPERTENCE	DEVICE TAGS
Overview	Device tags provide a way to organize your devices. Tags are defined as keys and values. In other parts of the platform, like visualizations, you can query devices by their tags.
✓ Edit	
## Users & Groups	keys may only contain uppercase letters, lowercase letters, numbers, underscores (_) or hypnens (-).
Files	Key Value
Domains & Slugs	
P Versions	
4	Where do I define attributes? X
SETTINGS	we'll walk you through defining your device's attributes after it's been created.
(2) Application Info	
API Tokens	
lata Archive	Create Device Cancel

Select "Create Device" to configure the attributes for the new device.

Device attributes describe each data point the device is collecting. Attributes are used by Losant to identify the data this device will report and store in Losant's time-series database.

Add attributes and then press the "Update Attributes" button.



Test from My Sandbox	Devices > 🏟 Lora 🕻	1					Device A/
Q Search (~+L)	Properties Attributes Simulator						II CL
Overview							No logs yet. Listening
▲ Events			ATTRIBUTES				
		The following attributes are currently configured	for this device. These attributes can delete all data associated with the	be deleted an	đ		
EVICES		optionally recreated, but know that doing so will	delete all data associated with the	accribute.			
Devices		Device has r	no existing attributes.				
Access Reys							
i Device Recipes							
ATA SOURCES		AL	DD ATTRIBUTES				
🔢 Data Tables		Add additional attributes to this device to begin i per device.	reporting new state data. Attribute	names must be	unique		
🖧 Webhooks		Attribute Name	Data Tupo				
Integrations		Tomporature	ta String	_	-		
		lemperature	w String	÷			
Dashhoards		Attribute Name	Data Type				
Data Explorer		channel	As String	~	-		
		Attribute Name	Data Type				
ISUAL WORKFLOW ENGINE		sign	As String	~	-		
A Workflows							
HI Custom Nodes		Attribute Name	Data Type				
XPERIENCE			Select	v			
Overview							
		<ul> <li>Include optional description fields</li> </ul>					
- 9% Users & Groups							
T Files		Update Attributes Cancel					
Demains & Flugs							

## **5.3 Workflows**

Workflows help describe the logic for applications.

To create a workflow, select "Workflows" from the Application Menu. Then, select "Add Workflow."

Test from My Sandbox	Workflows 🕲						Add Workfic
Q. Search (-c+L)	Workflows allow you to define the intelligence behind y	our application.					×
Overview     Events	Worlflows provide a way to build complex business logic using a drag-and Compute devices and provide a seamless way to integrate data from local	-drop interface. Application Workflows sources with your cloud application. Ex	can be triggered by a number of inc perience Workflows handle request	coming messages and offer a wide ts to your Experience Endpoints, a	range of data and third-party service integrati d are versioned with the application Experien	ons. Edge Workflows ce.	are deployed to Edge
evices	APPLICATION WORKFLOWS ©						
Access Keys	Filter Results						0 items 😋 Import Add
DATA SOURCES	Name 🗘	Last Updated 🗘		Default Version		Recent Runs	Recent Errors
I Data Tables			No application workflows	s found.			
🙏 Webhooks							
Integrations		<u></u>	it your Things to work. Connect your rysical and digital worlds.	CREATE APPLICATION WORKFLOW			
DATA VISUALIZATION		_					
Data Evolutor							
Notebooks							
-							
26 Workflows							
E Custom Nodes							
EXPERIENCE	EXPERIENCE WORKFLOWS ©						
② Overview	Filter	Experience Version					
s∕5 Edit	Filter Results	develop			v		0 items (C) Import Add
222 Users & Groups	Name 🗘		Last Updated 🗘			Recent Runs	Recent Errors
🗁 Files			No experience workflows	found.			
Domains & Slugs		名 :	indle requests to your experience	CREATE EXPERIENCE WORKFLOW			
SETTINGS			ngen man an an an an an an an				

Name the workflow and select Application Workflow as the workflow type, then press the "Create Workflow" button.



Test from My Sandbox	Workflows > New Workflow	
Q Search (¬=+L)		CREATE WORKFLOW
Overview Events		Workflows provide the business logic behind all parts of your IoT solution. This can include processing data, generating notifications, interfacing with your local equipment, or even backing your entire custom user experience.
DEVICES		Workflow Name
Devices		Lora
Recess Keys		Workflow Type
Device Recipes		△ Application ▼
DATA SOURCES		Description
🏢 Data Tables		
🖧 Webhooks		
Integrations		
DATA VISUALIZATION		Create Workflow Cancel
🕖 Data Explorer		
Notebooks		
VISUAL WORKFLOW ENGINE		
🔁 Workflows		
Ht Custom Nodes		

After creation the workflow canvas is enabled.

Test from My Sandbox	Workflows > 🛆 Lora: develop 💽		Save & Deplo	ny -
O Search (-c+L)	Q, Add Nodes (<+D) ←   X (□ □   ← ~   Q, Q, 12 Q,   Щ	Co 🙏 WEBHOOK 💿	SETTINGS	0
Outralian	Storage: Set Value     A     Bit Table: Insert Rows     A     Webhook	The Webhook Trigger kicks off a workflow whenever a specific Losant web endpoint is hit.	Workflow Name	٥
Events	Table: Get Rows	Label		P
DEVICES	1 Table: Update Row	Add Description	Description	8
(i) Devices	Table: Delete Rows	EXAMPLE RIVLOAD		in in
C Access Keys	O Debug	• (root) {} 10 keys	Undeta	
DATA SOURCES	6 Device: Command	"applicationId": "\$F6C33989449720078df969" "applicationName": "Test"	oposte	0
Data Tables 人 Webhooks	© Device: State	"path": "/example/path" "mathevit" "mathevit"	Delete Workflow	
Integrations	Endpoint: Reply	method i post "headers": () 4 keys "method": () 4 keys		
DATA VISUALIZATION	C GCP Pub/Sub	* "body": () 2 keys *flowId*: "#f6c55as5bs6b886d835c"		
Dashboards     Data Explorer		"flowlane": "Lora" 🔹		
Notebooks	Notebook: Execute	CHOOSE HOOK Select which of your application's webbooks you would like to		
VISUAL WORKPLOW ENDINE	* Particle Call	trigger this workflow. If you need to create a new webhook, you can do so here.		
25 Workflows	SendGrid	A webhook name A webhook name		
EXPERIENCE	Slack	No Webhooks Available		
Overview	Enall	Delate Node		
SEE Hears & Ground	SMS			

Select "Webhook Trigger Node" and click where the red arrow is pointing.



Test from My Sandbox	Webhooks > New Webhook
Q Search (¬=+L)	NUM WZDIODY
	NEW WEDRUUN
(b) Overview	Alter you cleate your new webnook, you will be assigned a unique ort. For making your requests.
∧ Events	Webhook Name
-	Lora
DEVICES	
Devices	VERIFICATION
🔫 Access Keys	Some webhook providers require the endpoint to be verified. Losant will automatically respond to verification requests for the following providers. If you are attempting to use a webhook provider that
Device Recipes	requires verification and is not listed below, please let us know.
DATA SOURCES	No Verification O Alexa O Facebook Messenger O Fitbit O Twilio
🏢 Data Tables	Weiter for Territor
🖧 Webhooks	vernaation code lemplate
Integrations	e.g. ([globals.webhookVerity]]
DATA VISUALIZATION	Response Code
😰 Dashboards	200
🕖 Data Explorer	
Notebooks	BASIC AUTH
	You can optionally choose to require basic auth for requests against this webhook.
VISUAL WORKFLOW ENGINE	Basic Auth Username Template
A Workflows	e.g. {[globals.username]}
Ht Custom Nodes	
EXPERIENCE	Basic Auth Password Template
Ø Overview	e.g. {{globals.password}}
<pre></pre>	
288 Users & Groups	CUSTOM REPLIES 🛞
Files	You can optionally choose to configure this webhook to wait for a reply from a workflow. When checked, this means that when a request is made against this webhook, the request will wait for a Webhook. Benly node
Domains & Slugs	to be executed in a workflow for the particular request, and that reply will be returned. If no workflow
U Versions	provides a reply within 30 seconds, the request will be timed out.
	Wait for reply from workflow
SETTINGS	
Application Info	
API Tokens	Create Webhook Cancel
lata Archive	

Name the Webhook and press the "Create Webhook" button. After that a URL will appear. Copy this URL.



Test from My Sandbox	Webhooks > Lora URL: https://rriggers.losant.com/webhooks/jbG2p-aM96j-EELuoprGNzdgDjcrriOdPu+V3rq [Copy]
O Search (+1)	
Section ( = · c)	EDIT WEBHOOK
Outpilut	Webhook Name
() Overview	Lora
▲ Events	
DEVICES	VERIFICATION
Devices	Some webbook providers require the endpoint to be verified. Losant will automatically respond to
🕾 Access Keys	vermication requests for the nonving providers, me vermation code is tempatation from on Application Globals. If you are attempting to use a webhook provider that requires verification and is not listed below,
Device Recipes	please let us know.
	No Verification
ITT Data Tables	Varification Code Template
A Webbooks	e a filledada e anabana (daraifa)
and Integrations	
m integrations	Response Code
DATA VISUALIZATION	200
Dashboards	
🕖 Data Explorer	BASIC AUTH
Notebooks	You can optionally choose to require basic auth for requests against this webhook. These fields are templatable from your Application Globals.
VISUAL WORKFLOW ENGINE	Basic Auth Username Template
沿 Workflows	e a filalohais usarnamall
Ht Custom Nodes	eig ((geodialacement))
EXPERIENCE	Basic Auth Password Template
Ø Overview	e.g. {[globals.password]}
√> Edit	
888 Users & Groups	CUSTOM REPLIES (D)
🗁 Files	You can optionally choose to configure this webhook to wait for a reply from a workllow. When checked, this means that when a request is made asainst this webhook, the request will wait for a Webhook: Reply node
Domains & Slugs	to be executed in a workflow for the particular request, and that reply will be returned. If no workflow newider a subwinkflow for a consider, the neuron twill be a limed out.
12 Versions	provides a reply wronin so seconds, the request with be united out.
	Wait for reply from workflow
SETTINGS	
Application Info	
<ul> <li>API Tokens</li> </ul>	Save Webhook Cancel Delete Webhook
lata Archive	

Navigate to The Things Network Console, select your application and then the integrations of this application and fill the gap "URL" with the URL that appeared after the creation of the webhook.

THE THINGS CONSOLE N E T W O R K COMMUNITY EDITION								Applications	Gateways	Support	0-
	Applications > 😂 lora_2 > Integrations > lora2										
		Overvlew	Devices	Payload Formats	Integrations	Data	Settings				
	INTEGRATION OVERVIEW										
	Process ID lora2										
	Status • Running										
	Platform A HTTP Integration (v2.6.0)	lon									
	Author The Things industries B.V.										
	Description Sends uplink data to an endpoint and receives do	ownlink data over	HTTP								
	SETTINGS										
	Access Key The access key used for downlink										
	default key devices massages						٥				
	URL The URL of the endpoint										
	https://trlggers.losant.com/webhooks/jbG2p-aM96j-zELuopxl3NzdgDjzrlrOd	Pu-Y3rq					•				
	Method										
	POST						•				
	Authorization The value of the Authorization header										
							۰				
	Custom Header Name										
	An optional custom HTTP header that you would like to add to the request										
							•				
	Custom Header Value										
	i ne value of the custom header						0				
	_										
	Delete Integration				Cance	H	Save				



Back to workflow select the Debug Node and the Device State Node. Connect all the nodes together and press "Save & Deploy" button.

Q Search (s+1) ←   × 1) ⊕   × 1 ⊕   × 0 ⊕   × 0 ⊕   × 0 ⊕   ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	0	
Overview	11   ×	¢
Events		2 00
aevzes		in.
Access Keys film Table: Update Row		ø
🖉 Device Recipes 🖶 Table: Delete Rows		
DATA SQUICES DUTIN'S		Q
III Data Tables O Debug		
🛆 Webhooks 😰 Device: Command		
S Integrations S Device State Debug		
DATA VISUALIZATION E Endpoint Reply		
Dashboards		
() Data Explorer		
VIENA KORVIJA PIOIDE		
2 Wortflows		
In Custom Nodes Particle Call		
Eventshice SendGrid		
Slack		
V Eart Eart Eart		
m users a droups		
Domains & Slues		
V Versions		

Turn on the switch "Toggle live debug stream" (1), select "Debug" (2), click on the Device State Node (3) and define the attributes and their values (4).

Test from My Sandbox	Workflows + 🛆 Lora: develop 🔹	Save 6 Deploy	•
Q. Search (+=+L)	Q. Add Nodes (m+D) ← ( 米 10 0 ) → → ( Q. Q. 22 Q. ) ■	1 💽 CO AVALE SAME 🕜 🖉 LÉBOC 🕐	2
	Storage: Get Value	The Device: State Node allows you to set the state of any device you've created.	0
Overview	Storage: Set Value	Later "trigger1d": "5465750e0e719606766942" Later "ecolication1d": "5465530014497200706969"	P
A Events	Table: Insert Rows	Device: State * "data": () 5 keys	
Devices	Table: Get Rows	note to: angstoow () "downlink_url": "https://integrations.thefhir	
SE Devices	Table: Update Row	* "Wetadata": [] # POS	1
(III) Device Recipes	Table: Delete Rows	NEW PSCORE + 01 // Anys	1
DATA BOURCES	Surreurs	First, choose a device whose state we will set.     *********************************	9
📖 Data Tables	0 Debug	*resi*: -107	L.
🙏 Webhooks	B Device: Command	Devre ID "time": "	L.
Integrations	da Device: State	* * * * ******************************	
DATA VIBUALIZATION	Endpoint: Reply	O Use a Device ID specified on the current payload "coding_rate": "4/5"	L.
Dashboards	GCP Pub/Sub	"dsta_rate": "5778425" Device 0 ISON Puth "nodulation": "109A"	L.
Notebooks	HTTP	e.g. (lata.myDeviceld "Frequency": 668.1	
	мотт	* "peyload_fields": () < #apys	
3 Workflows	Notebook: Execute 3 © Device: State	4 "value": "24.9"	L.
Custom Nodes	Particle Call	render to blank values will be ignored. You may reference the "di": "0"	L.
EXPERIENCE	SandGrid	state update by puytoat path, ISUN temptate or individual "thanel": "83" field input. "payload_rea": "YDMYPIQUDS4gICAw"	L.
② Overview	G Slack	Data Hethod "counter": 2270	ч.
🖉 Edit	E Emsil	Individual Fields	
2015 Users & Groups	Cue:	Atribute White "dev_1d": "Lore2" "ano 1d": "Lore2"	
Domains & Slugs	Trant	Temperature = string or (data.suluePath) "query": () # keys	
P Versions		Attribute Wile "accept-encoding"; "gzip"	
DETTINOS		channel = mrmg or [[dataseluePuth]] "content-type": "deplication/json"	
(i) Application Info	Weonook: Keply	Attribute Wale "content-length": "614"	
API Tokens	Horkflow	sign * string or [[data.valuePath]] *x-forwarded-for*; *52.109.225.46* *x-forwarded-arota*: *https*	
Data Archive	EUGTOM NODES	"s-real-in", "52,169,225,45"	



	STATE
Now, define the attribute(s) an ignored. You may reference the field input.	nd their values. Attributes that render to blank values will be ie state updates by payload path, JSON template or individual
Data Method	
Individual Fields	~
Attribute	Value
Temperature	= {{data.body.payload_fields.value}}
Attribute	Value
channel	= {{data.body.payload_fields.channel}}
Attribute	Value
sign	= {{data.body.payload_fields.sign}}

At the end select "Save & Deploy".

## **5.4 Create a Dashboard**

A dashboard is made up of blocks. Each block offers a different way to present data. Create a new dashboard by selecting "Dashboards" from the application menu and then select "Add Dashboard".

Test from My Sandbox	Dashboards 🗇		Add Dashboard
Q Search (¬=+L)	Filter		
Overview	Priter Results		0 items
A Events	Name 🗘		Public?
DEVICES		No dashboards found.	
Devices			
🕾 Access Keys		Start visualizing your Things. ADD DASHBOARD	
🕮 Device Recipes			
DATA SOURCES			
🌐 Data Tables			
🖧 Webhooks			
📳 Integrations			
DATA VISUALIZATION			
Dashboards			
⑦ Data Explorer			
Notebooks			
VISUAL WORKFLOW ENGINE			

Name the new dashboard and press "Create Dashboard" button.



ashboards allow you to vie ashboard to get started.	w stats, graphs, events and devices across multiple applications. Name	your
ashboard Name		
Lora		
escription		
Create Dashboard	Cancel	

Select a block. For each block, you can configure what device state data to display within the block. At this example we used Gauge Block.





Lora

The sec. 1.1.		BLOCK	OVERVIEW		
The gauge blo historical data	ck displays a sing or display the m	le attribute value aggi ost recently received (	regated from one or data. (View Docume	ntation)	aggregate
Temperatur	re				
e.g. Monito	n lext	temperature levels i	n Building 8		
	is pressure and				
Choose wheth	er you want the b	DAT.	A TYPE	data should be aggre	gated and/or
updated only	with the rest of yo	our dashboard.			_
O L G	ive Stream reat for displaying ill update automat	data from a single devic ically when new data is	e per query. Historica received.	l data is not available. I	Block
) H G	istorical reat for displaying	data from multiple devi	ces and/or aggregatir	ig points. Block will upd	late
		DUR	RATION		
Gauge blocks ( historical data	can aggregate his , the information	torical data or display is aggregated togethe	the most recently r er using the specifie	eceived data. When d d aggregator.	lisplaying
	Du	ration			
		Last received data p	oint	~	
		BLOG	EK DATA		
Select the dev or both. If the aggregator is a	ices and attribute duration is select applied to the las	es to display. Devices o ted as the most recent t data point for all sel	can be specified as a t data point and mo ected devices.	a selection of devices, re than one device is	, device tags, selected, the
vevice IDs / Tag	>				× -
Attribute				Aggregation	
Temperatur	e		× -		~
		GAUG9	E STYLE	Last	
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Choose your ga number display	uge type, option y rules. Gauge Type	GAUGI	E STYLE	a default color and se	t your
Choose your ga number display	uge type, option; y rules. Gauge Type Thermome	GAUGI ally set a label, and if eter	e style	a default color and se	t your
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Test from My Sandbox	Lora			 As of: Now ▼ → I	0 **
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				Edit Settings	
Overview Events		40		Generate Repor	t
EVICES				Dark Theme	$\bigcirc$
🕸 Devices				C Fullscreen	õ
😤 Access Keys		-20			
Device Recipes				⊁ Dashboard Context	(Manage)
TA SOURCES				No context define	d.
Data Tables		04.0		Add Context	
Webhooks		24.9			
Integrations			ένα λεπτό πριν		
ATA VISUALIZATION					
Dashboards					
) Data Explorer					
Notebooks					

There is no limitation in the number of blocks that can be added.

## **5.5 Experiences**

New application Experiences must first go through a short bootstrapping process before you starting to use the relative features.

## 5.5.1 Choose a slug.

An expe data. Ea	rience makes it e ch experience in	easy to build custo cludes custom use	m interfaces on to rs, groups, endpoi	p of your devices and nts and views.
The best It will in powered To get st	way to get start clude an exampl by a workflow a arted, give us yo	ted is with an exam te user and a few e and rendered with our custom experie	ple experience the ndpoints and view a view. nce slug and click	at we'll build for you. s. Each endpoint is "Create My
Experier	ice".			1
https://	5e0e46c1a045	a30006c4bd29	onlosant com	
<ul> <li>Bootstrap</li> <li>Build This in</li> <li>Skip</li> </ul>	resources starter layouts acludes everything bootstrapping an	and routes you need to authentic nd build from scrat our basic layouts, auth	ate users and start re ch entication routes and	ndering pages.



By default, the application experience includes a slug that matches your application ID; this slug cannot be deleted. You can also enter a custom slug during the bootstrapping process.

Click on "Create My Experience".

## **5.5.2 Test your Experience**

If you chose to create the sample resources, you'll receive instructions for testing your new endpoints and views.

We've create your new ex	d some views, endpoints, workflows and users so you can test out perience. You may edit or delete these resources at any time.
If you'd like the <mark>Experier</mark>	to see a step-by-step guide for how to build this example, please rea ice View Walkthrough.
	Visit your Experience at:
http	s://5e0e3cb21e2d4c0006429c0c.on.losant.space/
	Log in with these credentials:
	Email: test.user.8bjjzomu87@example.com
	Password: 8bjjzomu87

Click the link provided on the summary screen, which should redirect you to your new login page.

③ Log In   My Experience x +		
C h 5f6c53989449f700070df969.onlosant.com/login		☆ \varTheta :
infinite Infinite Losant		Log In
	inf <mark>in</mark> te	
	Helol	
	Email address	
	e.g. test.user@example.com	
	Password	
	Sign In	
	© 2020 All rights reserved	



Sign in with the provided credentials and you will then see the placeholder home page.



The page will look like that.

Try to log in to the page we created as an example for you to get a first impression of the result. Navigate to,

https://infinite.onlosant.com/login

To log in, type "guest@infinite.com" for the email address and "infinite" for the password.

← → C 🔒 infinite.onlosant.com/login		c	<b>→</b> ☆	ABP	*	≡J	Θ	:
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	Infinite 2020							
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	guest@infinite.com							
	Password							
	Sign In							
	© 2020. All rights reserved.							



When you successfully log in, you will see the below home page.



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Revision: 1.3

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