

SensiGFOX | LoRa 2.0 Getting Started



1 Config Dragino Pico Station

3

SensiEDGE Simplify & Accelerate

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4.3 FI	ashing	via	USB	Type-c
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5.4 Battery power

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1 Config Dragino Pico Station

1.1 Connect to Dragino

1. Connect the antenna, and network cable and turn on the device. After starting the device, it should be defined on the Wi-Fi network as " **dragino-xxxxxx** " (Figure 1). When the device is found, we connect to it and enter the default password: "**dragino+dragino**".



Figure 1. Wi-Fi network



2. When connected to the device, open the browser and enter the address: <u>http://10.130.1.1/</u> and enter (Figure 2):

User Name: root

Password: dragino

Figure 2. Site



S 10.130.1.1/cgi-bin/home.has × +	
\leftrightarrow \rightarrow C (3) 10.130.1.1/cgi-bin/home.has	
	Sign in http://10.130.1.1 Your connection to this site is not private Username root Password Sign in Cancel

3. Go to network settings Lora (Figure 3).







1.2 Configuration LoRa

1. In LoRa Configuration select the desired frequency (EU868 or US915) and click on **Save&Apply** (Figure 4).

Figure 4. Configuration Lora

	LoRaWAN 🗸	MQTT 🔻	TCP 🔻	Custom	Network -	System 🔻	LogRead ▼	Home	Logout
LoRa Configuration									
Debug Level	Low	~							
Radio Settings									
Keep Alive Period (sec)	30								
Frequency Plan	EU868 Europe 8	368Mhz (863~870	0)						
Static GPS coordinates	?								
Enable Static GPS			Altitud	le (m)	450				
Latitude	22.700000		Longit	ude	114.240000				
Current Mode:LoRaWAN Ser Save&Apply Disable Can	ntech UDP cel								

1.3 Configuration LORIOT

1. Go to configuration **LORIOT** (Figure 5).

Figure 5. Go to Loriot settings

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S dragino LoRa Gateway ×	+								0	— í) ×
\leftrightarrow \rightarrow C \blacktriangle Not secure 10.130	0.1.1/cgi-bin/lora-lora	has								\$. :
	LoRaWAN 🗸	MQTT 🗸	TCP 🗸	Custom	Network -	System 🗸	LogRead √	Home	Logout		
LoRa Configuration	LoRaWAN										
Debug Lovel	Amazon AW	S loT									
Debug Level		\leq									
Radio Settings											
Keep Alive Period (sec)	30										
Frequency Plan	EU868 Europe 8	68Mhz (863~87	0)		$\overline{}$						
Static GPS coordinates ?											
Enable Static GPS			Altitu	ude (m)	450						
Latitude	22.700000		Long	gitude	114.240000						
Current Mode:LoRaWAN Semi Save&Apply Disable Cance	tech UDP ୶										

2. In the configuration LORIOT, select the desired server (example: **Amsterdam - eu2.loriot.io**) and click on **Save&Apply** (Figure 6).

Figure 6. Configuration Loriot

ים 🍠	RAGINO LoRa -	LoRaWAN 🗸	MQTT 🔻	TCP 🔻	Custom	Network 🗸	System -	LogRead ▼	Home	Logout					
LORIC	OT Client Config	uration													
	Server Address	Amsterdam - eu2.lori	ot.io 🗸 <	Serve	er Port	1700									
				-											
	Client Certificate		~	Clien	t Key		~								
	CA File		~												
	eth0 MAC Address: A8:	:40:41:1F:D9:E7													
	Certificate Management														
Currer	nt Mode: LoRaWAN Ser	ntech UDP Click	Save & Apply	will change	to mode :Lo	RIOT									
Save8	Apply Cancel		,	3											
1	Δ														
1															

3. After configuring the LORIOT, go to the <u>Home</u> tab and you should see green checkmarks as in the picture, this means that everything is working (<u>Figure 7</u>).

Figure 7. Home page





2 Registration in Loriot

2.1 Registration in Server

1 Go to https://www.loriot.io/ and press REGISTER FREE (Figure 8).

Figure 8. Loriot site







2 Select server EU2 Amsterdam, Netherlands (Figure 9).

Figure 9. Select server



$\{\phi_i^{(i)}\}_{i=1}^{n}$	ORIO T	TM		Technology	א Products א K	(now-how	Ƴ Resources	Contact Login			
				Ċ							
		EMEA		ASIA	/ PACIFIC		AMERICAS				
	SERVER	LOC ⁷ TIO I		SERVER	LOCATION		SERVER	LOCATION			
	EU4PR0	Amsterdam, Netberlands	(::	AP4PR0			US3PR0	<u>Oregon City, USA</u>			
	EU1	Frankfurt, Germany	***	AU2PR0	<u>Sydney, Australia</u>		US1	<u>California, USA</u>			
	EU2	<u>Amsterdam, Netherlands</u>	*	111	new! Israel new!		US2	<u>New York, USA</u>			
ŝ	EU3	<u>Madrid, Spain</u>	(::	AP1	Singapore		SA1	<u>Sao Paulo, Brazil</u>			
	UK1	London, United Kingdom	*	AU1	<u>Sydney, Australia</u>						

3 Input all data and press the button **CREATE A FREE ACCOUNT** (Figure 10).



Figure 10. Create account

4 After confirmation via email enter the site (Figure 11).

Figure 11. Login to server





					-4 ² 4, Login LORIOT						-	σ	×
÷.	\rightarrow	С	Â	https://eu1.loriot.io/login		۲	P	ίê	ŵ	₅	۵	*	
•													
Ŧ					IORIO T								
					Email								
					Password								
					Log In								
					Reset password Register a new account								
					Impressum								

2.2 Register a gateway

Add Gateway. Press the button <u>Register a new gateway</u> (Figure 12).



and LORIO T	≡							Amsterdam Cor	mmunity Account					
🚯 Dashboard	😸 tier COMMUNI	ΤΥ ΑCCOUNT	-			_	COMMUNITY ACCOUNT features							
Applications 1														
📥 Networks 🛛 🔳	You are now part of a v	vorld-wide ecosy:	stem of LoRaWAN	" developers. Your o	devices can use any community		 Roaming among all o 	ommunity gateways						
℃ Join Servers	gateway to reach our r As a reward for sharing	network. g your gateway, w	e provide you one	Free Network Appl	lication.		 One Free Network Application 							
Documentation														
🚔 Account	I News													
★ Upgrade			Back to Busin	essConnect										
Support	Sep 1, 2021, 1:00:00 PM	INFO	The LORIOT B	usiness Connect - P	Public Server Edition is especially de	dicated to	icated to our community. Show the world the disruptive potential of your IoT solution! Apply by October, 15th!							
Alerts	Jun 1, 2021, 1:00:00 PM	UPDATE	LORIOT Netwo	ork Server 7.0 has b ease note for more o	een released! details.									
	Jun 1, 2021, 1:00:00 PM Impose Be confident in the delivery of your services and guarance connectivity for your solution. * Upgrade now to Professional Public Server with 990% SULevultitenancy and unlimited gateways.													
	Gateways of	Test			+ Register a new gatew	ау	Applications		+ Create New Application					
	Location Model			Version	Last Data	_	Name AppID		Devices					
			No Gateway	s Registered			SampleApp	BE-01-03-09	1					

2. Scroll down and select **Dragino LG308** if you use Dragino pico station LPS8 or LG308 (Figure 13).

Figure 13. Add the Dragino

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in LORIO T	■ Networks > Sample Network > Gateway Registration	Amsterdam Community Account
← Back To Networks		
A0000294	AUGTEK	
🅅 Мар	Aartesys AarteWAN Augtek	Cisco IXM LPWA Cisco Industrial Router IR910
	Comtac Base Server	Embit EMB-GW1301

3. Scroll a little below and you will see a field for entering the device address (Figure 14). If a Dragoni Pico Station is used, then the Eth0 Mac address can be taken on a *web-based GUI Dragino website* in LORIOT Client Configuration <u>1.3 Configuration LORIOT</u>.

Figure 14. Eth0 Mac address

LORIOT	E Networks > Sample Network > Gateway Regist	tration	≶ DRAGINO	LoRa 🔻	LoRaWAN 🔻	MQTT 🔫
← Back To Networks		Bus	I ORIOT Client	Config	uration	
A0000294	9	Dragino LG308 is fully su		. comig		
🛍 Мар			Server Addre	SS	Amsterdam - eu2.ioi	not.io 🗸
	Dragino LG308		Client Certific	cate		~
	Choose a different base platform		CA File			~
			eth0 MAC Ad	dress: A8	:40:41:1F:D9:E7	
	MAC address of eth0 interface		Certificate	anagement		
	The MAC Address of the Ethernet port can be queried	d by running				
	ifconfig eth0 grep HWaddr		Current Mode: LOR	awan Ser	mtech UDP Click	Save & Apply
	command from your device's console. A sample outp	out will be similar to	Save&Apply Cance	el		
	eth0 Link encap:Ethernet HWaddr AB:CD:EF:12	:34:56				
	Copy and paste the highlighted part (six octets separ	rated by cotons) from the out				
	* eth0 MAC address	5				
	AB:CD:EF:12:34:56					

4. Scroll down and here indicates the location of the modem and then click on **Register Dragino LG308 gateway (Figure 15)**.

Figure 15. Register Gateway



ICRIO T	Networks > Sample Network > Gateway Registration	Amsterdam Community Account 🔒 🕞 🏠
← Back To Networks	Map Manual Address	
SAMPLE NETWORK	Eigingala	
₩ Map	Sausinė Voškoniai Vartuva	Lepšiškiai Ginėnai
	Zemankems Romarkiai Ražiai	Lapes 202 Karmelavos k
	Domeikava 221 Baliai Radikiai Google Giraite	рад + + - - - - - - - - - -
	Register Dragino LG308 gateway	

5. After registering the gateway, a page with the gateway status will appear where it will be written that the connection status is **Disconnected** (Figure 16).

Figure	16.	Gateway	status
--------	-----	---------	--------

COLORIO T	■ Networks > Test > A8-40-41-FF-FF-1F-D9-E7			Amsterdam	Community Account	a 🕩
🗲 Back To Test	A8-40-41-FF-FF-1F-D9-E7 Ø					
A8-40-41-FF-FF-1F-D9-E7 A84041FFFF1FD9E7	-	Status				
Devices Activity		The gateway has been offline this mon	th.	No Data	Last Connect Never	
N Location				Never	No Data	
Lul Traffic	and the state of the state			Last Data		
🖗 Radio				wever		
📥 Spectral Scan	Disconnected Version 0.0.0	Details				
≢ System	Remove	MAC Address	Model			
II GPS		EUI	Concentrat	or		
🛓 Software		A8-40-41-FF-FF-1F-D9-E7	dragino-lg3	08		
H Log		Base Dragino	Connected SPI	Over		
Alerts		Last Remote IP Unknown				

6. To speed up the procedure for connecting the gateway to the server, you need to reboot the gateway. Need to refresh the page and wait until the gateway status changes to connected (Figure 17).

Figure 17. Gateway Connected



in LORIO T	■ Networks > Test > A8-40-41-FF-FF-1F-D9-E7			Amsterdam Con	nmunity Account	4	۲
🗲 Back To Test	A8-40-41-FF-FF-1F-D9-E7						_
A8-40-41-FF-FF-1F-D9-E7 A84041FFF1FD9E7		Status		latency	Last Connect		
Devices Activity		The gateway has been offline this mor	nth.	42 ms	21 Jan 2022 11:57:06 (a few seconds ago)		
📜 Location				Last Keep Alive 21 Jan 2022 11:57:21 (a few seconds	Remote Time Offset		
🔟 Traffic	and the second sec			ago)	No Data		
Radio	11.			Never			
📥 Spectral Scan	Connected Version 2.8.1483-DEV						
≢ System	Your version is Out Of Date , please update to the latest version	Details					
II GPS	Update	MAC Address A8:40:41:1F:D9:E7	Model LG308				
▲ Software	Ping	EUI	Concentr	ator			
144.1	Tap into data stream	A8-40-41-FF-FF-1F-D9-E7	dragino-lg	308			
HI Log		Base	Connecte	d Over			
A Alorte	Restart	Dragino	SPI				

7. Go to the main page of the server by clicking on the icon **LORIOT** (Figure 18).

Figure 18. Go to the main page

LORIO T	■ Networks > Test > A8-40-41-FF-FF-1F-D9-E7		Amsterdam
← Back To Test	A8-40-41-FF-FF-1F-D9-E7		
A8-40-41-FF-FF-1F-D9-E7 A840-11FFF1FD927		Status	Latency
Devices A tivity			42 ms Last Keep Alive
Lut Traffic	and the second		21 Jan 2022 12:06:12 (a few second ago)
P Radio	the state	Uptime (days) Downt	ime (days) Last Data
📥 Spectral Scan	Connected Version 2.8.1483-DEV		
≢ System	Your version is Out Of Date , please update to the latest version Update	Details MAC Address	Model
I GPS		A8:40:41:1F:D9:E7	LG308

2.3 Add a Device

1. In order to add SensiLora 2.0 device, you need now him **AppKey**, **JoinEui** and **DevEui** keys. The keys can be found using the SensiConfigurator program, download: <u>Ссылка на программу</u>. Use <u>Getting Started SensiConfigurator</u> document section <u>3.2 Device Information</u>

Add a Device. In the tab, Dashboard clicks on <u>SampleApp</u>.(Figure 19)



Figure 19. Go to SampleApp



3. Click on Enroll Device (Figure 20).

Figure 20. Enroll Device





4. In the tab Enroll Device, enter any Name in <u>Title</u> (step 1), then enter <u>Application key</u> (step 4), <u>Device EUI</u> (step 2) and <u>Join Eui</u> (step 3), (this keys can be found using the SensiConfigurator program, download: <u>Ссылка на</u> <u>программу</u>. Use <u>Getting Started SensiConfigurator</u> document section <u>3.2 Device</u> <u>Information</u>). Click <u>Enroll</u> (step 5) (Figure 21).

■ Q Search		
Enroll a new device		
LoRaWAN® Version LoRaWAN® 1.0.x Location DISABLED You can define coordinates for static devices enabling this option. Details Enter Any Title 1 Description	Enrollment Process OTA Device EUI 2 Join EUI 3 DevEUI (16 hex ogns) JoinEUI (16 hex ogns) Application Key 4 APPKEY (32 hex digits) Device Template Create Another Enrol 5 Reset Click	Device Information Device Name: SensiLora 2.0 Eirimware Version: 0.0.10 Lora Region: EU868 Battery: 100.0% Port: COM9 AppKey: 2B7E151628AED2A6ABF7158809CF4F3C DevEui: 333737396C307116 JoinEui: 0101010101010101 OK
Copyright © 2015 - 2023 LORIOT AG. All rights reserved.	606	

Figure 21. Add device

5. Go to the Devices page by clicking on the icon **<u>Back To Devices</u>** (Figure 22).

Figure 22. Back to Devices



ΙΟΡΙΟ Τ							
← Back To Devices	Device Details /	0080E10101010101					
SENSILORA2.0 00-80-E1-01-01-01-01-01	Name Device Template	SensiLora2.0 No Device Template Linked		Last Uplink RF Parameters			
Z Statistics	Battery	N/A		RSSI			
NI Location	ADR Description	Enabled No description		SNR Frequency			
🗞 LoRaWAN [®] Parameters	EUI	0080E10101010101 big endian (use by default)		SF Bandwidth			
ত Downlinks		little endian (for LoRaWAN $^{\circ}$ non-compliant devices)		Gateway			
■ Mac Commands Log	JoinEUI	Send downlink	C Edit device	Last data (10 latest records)* *Data can be received from any gateway on the server with co the time your gateways received data			

6. In the <u>Devices</u> tab, you can view the addition of a device. When the added device connects to the server then we should see the value: **RSSI, SNR, devSNR, SF and BAT,** for example, in Figure 23.

Figure 23. Status device

IN LORIO T	E Applications > SampleApp > Devices Amsterdam Community Account
 Back To Applications 	Devices
SAMPLEAPP BE-01-03-09	Filter by 🗸
+ Enroll Device	Device EUI JF Name I RSSI (dBm) I SNR (dB) I devSNR (dB) I SF I BAT ADR I Class I Last Seen I FCntUp I FCntDown I
☷ Bulk Import	O0-80-E1-01-01-01-01 SensiLora2.0 -88 9 6 12 IC ADR A a few seconds ago 4 1
🗞 Devices	
🛍 Devices Map	4 2
🔂 Output	
🔥 API Data Format	
Websocket Applications	

2.4 Loriot Uplink

1. In the SampleApp, go to the **Output** (Figure 24).

Figure 24. Go to Output



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CORIO T	■ Applications > SampleApp	Amsterdam — Community Account
Back To Applications	Application / SampleApp	
SAMPLEAPP BE-01-03-09	🖨 Details	Lul Traffic History
+ Enroll Device	Name SampleApp	Daily Last 24 Hours
🗮 Bulk Import	Application ID	Daily Uplinks Count Daily Downlinks Count
🗞 Devices	Device lised Canacity	20
📜 Devices Map	1 Multicast Device Used Canacity	15
✿ Output		10
📥 API Data Format		5
Websocket Applications	▲ Configuration	· · · · · · · · · · · · · · · · · · ·
🕍 Statistics	The modification of these parameters will change the functionality of the	గ్ళీ లో లో ట్ లో లో లో లో లో లో లో లో లో గ్ భ్ లో లో లో గ్ లో లో గ్ లో లో గో గో లో లో లో లో లో లో లో
🔦 Join Server	application, please be careful.	Daily Last 24 Hours
Access Tokens	10	
₩ Log	Multicast Device Capacity	Daily Uplinks Size Daily Downlinks Size
	1	800
		600

2. Data output link. Example: Use the <u>Target URL Template</u>, for example, Stm32CubeMonitor (Figure 25).

Figure 25. Target URL link

IN LORIO T	■ Applications	> SampleApp >			Amsterdam Community Account
Back To Applications	Applicatio	on Output / E	E010309		
SAMPLEAPP BE-01-03-09	Output	Name	Mechanism	Туре	
+ Enroll Device	ন্দ্র	WebSocket	Listen and wait	LORIOT.io	WebSocket Mechanism Listen and wait
i≡ Bulk Import		+ Add new output			How to use WebSocket with LORIOT
🕅 Devices Map					Point your browser or library to the WebSocket URL and listen for incoming messages
🔁 Output					
🏟 API Data Format					Output Configuration
Websocket Applications					 Tarret URL Template wss://eu2.loriot.io/app?token=vgEDCQAAAA1ldTlubG9yaW90LmlvsMd0v-NLa4RSNeRhHKi4GQ==
Les Statistics					Your token can be found in access tokens submenu of your application



3 LORIOT Integration to Thingsboard

3.1 Overview

1. After integrating LORIOT with the ThingsBoard, you can connect, communicate, process and visualize data from devices in the ThingsBoard IoT platform. For more information visit the website <u>LORIOT Integration</u>.

3.2 Registration

1. Go to ThingsBoard.cloud suit and register in the cloud

ThingsBoard	
G Login with Google	
Cogin with Facebook	
C Login with Github	
OR	
└── Username (email) *	
Password 🛛	
Forgot Password?	
Login	
Do not have an account? Sign up	

Figure 26. ThingsBoard Registration

3.3 Import a Data Converter

1. After registering and entering the clouds Download DataConverter: <u>SensiLora2 0 DataConverterV0.1.json</u>.

2., Add a Data Converter in ThingsBoard for this, go to <u>Data</u> <u>converters</u> (step 1), click <u>+</u> (step 2), and choose <u>Import converter</u> (step 3).

Figure 27. Import a Data Converter



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	‡ Data converters		Current subscription ThingsBoard Cloud I Status (Active)	Maker : Tenant administrator
Plan and billing	Data converters			+ <u>2</u> Q
III Solution templates NEW	Created time 🕹	Name	Туре	Create new converter
↔ Rule chains				1 Import converter
빛 Data converters 1				

2. In the window, Import Convert drag the downloaded Data Converter or click on the **Browse file**(step 1) and select the **SensiLora2 0 DataConverterV0.1.json**.

Figure 28. Choose a Data Converter

Import converter		×
Converter file *	Browse file	×
No file selected		
	Cancel	Import

3. The selected Data converter will appear (step 1) and then click on **Import** (step 2).





4. After Importing, a Data Converter with the name Loriot will appear in the window Data converters (step 1).



Figure 30. Loriot Data Converter

ThingsBoard	빛 Data converters	Current subscription ThingsBoard Cloud Maker Status Active
↑ Home		
Plan and billing	Data converters	
Solution templates NEW	☐ Created time ↓ Name	Туре
↔ Rule chains		Unlink
다 Data converters		υμπκ

3.4. Create Integration

1. After importing Data Converter move on to the creation of Integration. Go to <u>Integrations</u> (step 1), click on \pm (step 2), and in Integration type choose <u>Loriot</u> (step 3).

	➔ Integrations		Current subscription	ThingsBoard Cloud Maker	: O Tenant administrator
↑ Home		Add Integration	? ×		
🖻 Plan and billing	Integrations	1 2	3 4		+(2) Q
Solution templates	□ Created time ↓	Basic settings Uplink data converter Do	ownlink data converter Connection	Daily activity Status	Remote
✓··> Rule chains	0002 02 02 02 12:21:00	Integration type *	optional	Activo	
다 Data converters	2023-02-02 12:31:09	Select integration type	A	Active	
➔ Integrations 1		الله المعادي المعاد معادي المعادي المع معادي المعادي المعا معادي المعادي المعادي المعادي المعادي المعادي المعادي المعادي المعادي معادي معادي معادي معادي معادي معادي معادي م معادي معادي معا معادي مع	ka aming analytics, data integration streaming		
😯 Roles					
- Customers hierarchy		· '''' Distributed LoRaWAN Infrast	ration of devices with different capabilities the IoT platform.		
😫 User groups 🛛 🗸		Pub/Sub	obitMQ		
🐣 Customer groups 🛛 🗸		Service for asynchronous messaging between Mes apps. Prot	sage broker that supports multiple messaging pcols.		
🛅 Asset groups 🛛 🗸		ThingPark Message-oriented transport layer protocol T Mot	reators.com (T-Mobile - IoT CDP)		
🗔 Device groups 🛛 🗸					
🗜 Profiles 🗸 🗸					
🖬 Entity view groups 🛛 🗸					
💼 Edge groups 🛛 🗸					
			Next		
Widgets Library				remsperpage: 10 ▼ 1 -	

Figure 31. Add Integration

2. In line, <u>Name</u> enters the name Loriot Integration (step 1) and click <u>Next</u> (step 2).





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	➔ Integrations	Add Integration		rrent subscription	ThingsBoard Cloud Ma day left in trial	iker []	B Tenant ac	Iministrator
🔒 Home								_
🖶 Plan and billing	Integrations	12	3	4			+	GQ
III Solution templates NEW	□ Created time ↓	Basic settings Uplink data converter	Downlink data converter Optional	Connection	Daily activity	Status	Remote	
✓·· > Rule chains		Integration type *		~			_	
다. Data converters	2023-02-02 12:31:09					Active		•
		Loriot Integration 1						
😯 Roles		Enable integration						
= Customers hierarchy		ebug mode						
😫 User groups 🛛 🗸		Allow create devices or assets						
💒 Customer groups 🔹 🗸								
💼 Asset groups 🛛 🗸								
🚺 Device groups 🗸 🗸								
🖆 Profiles 🛛 🗸								
🖬 Entity view groups 🗸 🗸					-			
💼 Edge groups 🗸 🗸				Next	ems per page: 10	▼ 1 - 1 of	1 < <	> >

3. In Uplink Data Converter choose <u>Loriot</u> (step 1) and click <u>Next</u> (step 2).

Figure 33. Choose Loriot

	➔ Integrations	Add Integration		Current subscription	ThingsBoard Cloud Maker	B Tenant administrator
🔒 Home	_					
🖻 Plan and billing	Integrations	00	3	4		+ C Q
Solution templates	Created time 🗸	Basic settings Uplink data converter	Downlink data converter Optional	Connection	Daily activity Status	Remote
·›› Rule chains</th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>						
ţ Data converters		Select existing uplink data converter				
→ Integrations						
😯 Roles		Loriot (1)				
= Customers hierarchy		Create new uplink data converter				
🕒 User groups 🛛 🗸						
² Customer groups 🛛 🗸						
📰 Asset groups 🛛 🗸						
🗔 Device groups 🗸 🗸						
🖆 Profiles 🛛 🗸						
🖬 Entity view groups 🛛 🗸		Beek				
📾 Edge groups 🗸 🗸		Dack		Next	ems per page: 10 💌 1 - 0	of 0 < < > >

4. Choose <u>Select existing downlink data converter</u> and click to <u>Skip</u>.





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	➔ Integrations		Current subscription ThingsBoard Cloud Maker Cloud Maker Tenant administr	rator
f Home		Add Integration	2 ×	
🖻 Plan and billing	Integrations	Ø Ø 3		Q
Solution templates	□ Created time ↓	Basic settings Uplink data converter Downlink data converter Loriot Optional	Connection Daily activity Status Remote	
✓·· → Rule chains				
다 Data converters		Select existing downlink data converter		
➔ Integrations		Downlink data converter		
Roles				
- Customers hierarchy		Create new downlink data converter		
😫 User groups 🛛 🗸				
🚑 Customer groups 🛛 🗸				
📰 Asset groups 🛛 🗸				
🗔 Device groups 🗸 🗸				
🖆 Profiles 🛛 🗸			3	
🖬 Entity view groups 🗸 🗸		Reak		
🛋 Edge groups 🗸 🗸		Luch	ims per page: 10 • 1 - 0 of 0 < < >	>

5. Click to **Copy HTTP endpoint URL** and click **Add**.

Figure 35. Copy HTTP

🕷 ThingsBoard	∃ Integrations	Current subscription ThingsBoard Cloud Maker
Cloud Platform		Add Integration ② ×
H Home	Integrations	+ C Q
Plan and billing	Ĵ	
Solution templates	Created time 🗸	Basic settings Uplink data converter Downlink data converter Connection Loriot Optional Daily activity Status Remote
<い Rule chains		Base URL *
다 Data converters		
		https://thingsboard.cloud/api/v1/integrations/loriot/49298222-dd42-74bc-f34d-d203 👩 1
😯 Roles		Create Loriot Application output
= Customers hierarchy		Send downlink
😫 User groups 🛛 🗸		
² Customer groups 🛛 🗸		Enable security (Headers hiter)
📰 Asset groups 🛛 🗸		Execute remotely
□ Device groups ✓		Advanced settings 🗸
🖆 Profiles 🛛 🗸		
🔚 Entity view groups 🗸 🗸		
🛋 Edge groups 🛛 🗸		Add mis per page: 10 - 1-0 of 0 < < > >

6. Go to **Applications** in LORIOT.

Figure 36. Go to Applications



IN LORIO T	Q Search			
Dashboard	1 Charte			
n Applications	Cateways (2)	Devices (2)	Uplinks / Downlinks 🚯	Join Accept / Join Request 🖲
🗙 Networks 💶				
প্⊄ Join Servers			No data	No data
account				
🗃 Upgrade	 Online Offline 	 Active Inactive Never seen 	🔵 Uplinks 🌘 Downlinks	Join Accept Join Request
🌲 Alerts	🛦 Gateways			

7. Select Application.

Figure 37. Select Application

i LORIO T	Q Search						
 Back to Dashboard 		Π					
	LoRaWAN [®] Applications						
+ New Application	Application ID Q ↓	Name	Q ↓†	Devices	Q ↓†	Max. Devices	Q 11
🛱 Device Templates	BE010309	SampleApp		2		10	

8. In Application go to **Output** (step 1) and click to **Add new output** (step 2).



Figure 38. Add Output

IORIO T	■ Q Search					▲ • • • •
 Back to Applications 	Application / Sa	mpleApp				
BE-01-03-09	Output	Name	Mechanism	Туре		WebSocket
+ Enroll Device	रिश	WebSocket	Listen and wait	LORIOT.io	/ 🗇	Mechanism Listen and wait
🗮 Bulk Import	Add now of					
📲 Devices						How to use WebSocket with LORIOT
🛍 Devices Map						Point your browser or library to the WebSocket URL and listen for incoming messages
🗠 Output 🚺						Output Configuration
👍 API Data Format						Output Name
Websocket Applications						Target URL Template wss://eu2.loriot.io/app?token=vgEDCQAAAA1ldTlubG9yaW90LmlvsMd0v-NLa4RSNeRhHKi4GQ==
✓ Statistics						Your token can be found in access tokens submenu of your application
🦞 Join Server						
Access Tokens						
	Copyright © 2015 - 2023 L	ORIOT AG. All rights re	eserved.		<u> </u>	In LORIOT Internet of Things at Long Range Impressum

9. Select HTTP PUSH type.

Figure 39. Select HTTP Push

IN LORIO T	■ Q Search						
 Back to Applications 	Application Output	Application Output / BE010309					
BE-01-03-09	Choose output type			~			
+ Enroll Device	Where should we feed	your IoT data? See the A	Application API catalog for	ordetails			
🗮 Bulk Import	pn		HTTP:// HTTPS://	DD PubNub			
۰ Devices	PubNub 3rd party	Iron.io IronMQ v3 3rd party	HTTP Push	Mechanism Data delivery through 3rd party J	SON TLS cloud se		
🔰 Devices Map	_	and be		Setup parameters			
Output	<u>থ্য</u>	44	Cavanna	Output Name Ou	tput Name		
🎰 API Data Format	WebSocket	Amazon AWS IoT	myDevices Cayenne	Publish key Pu	hlish key		
Websocket Applications							
✓ Statistics	TLS	Š		Subscribe Key Sul	iscribe key		
🦅 Join Server	TLS Socket	IBM Cloud	Iron.io IronMQ v1	Channel name Cha	annel name		
Access Tokens		3rd party	3rd party	Add Output			



9. In <u>Target URL for POSTs</u> paste the HTTP URL with ThingsBoard (step 1) and click <u>Add Output</u> (step 2).

i LORIO T	🗮 Q Search			▲ • • • •
← Back to Applications	Where should we feed	your IoT data? See the A	pplication API catalog f	or details
SAMPLEAPP BE-01-03-09	PubNub	Iron.io IronMQ ^M	HTTP:// HTTPS:// HTTP Push	HTTP#// HTTP5:// Mechanism Run your HTTP server and wait for POSTs
+ Enroll Device	3rd party	3rd party	LORIOT.io	
🗮 Bulk Import	रिश	at a	C	Set up a HTTP server and listen for incoming POST requests from our server.
ң Devices	WebSocket	Amazon AWS IoT	myDevices Cayenne	
🗎 Devices Map	LORIOT.io	3rd party	3rd party	Setup parameters
🔂 Output		č		Output Name Output Name
🎰 API Data Format	TLS Socket	IBM Cloud	Iron.io IronMQ v1	Target URL for POSTs Target URL for POSTs
Websocket Applications	LORIOT.io	3rd party	3rd party	Custom "Authorization" header value Custom "Authorization" header value
✓ Statistics	AllThingsTalk		Microsoft Azure	Add Output 2 Copy
😽 Join Server	AllThingsTalk 3rd party		Azure IoT Hub 3rd party	
Access Tokens				
₩ Log	m	CoAP	×.	0 0 0 0
			SOFTWARE AG	Basic settings Uplink data converter Downlink data converter Connection
				Base URL * https://thingsboard.cloud
				HTTP endpoint URL https://things.board.cloud/ani/v1/integrations/Jorigt/40/98222.dd42.74bo-f94d-4202
				Create Loriot Application output Sand downlink

Figure 40. Paste HTTP

3.5 Device

1. To view, the active SensiLora 2.0 device go to <u>Device groups</u> (step 1), <u>All (step 2)</u>, and in the window, <u>All: Devices</u> will contain a device that is connected to the Loriot server and transmits data to it.





Figure 41. Active Devices

	ӣ Device groups 🔸 ӣ All		Current subscription ThingsBoard Cloud Maker Status 1 day left in trial	: Carant administrator
✿ Home				
Plan and billing	All: Devices 🧪			+ 1 C Q
Solution templates NEW	Created time V	Name Device profile	Label	
↔ Rule chains	2022.02.02.21-58-02	2227272066207116 Saneil ara2 0		0.5
다. Data converters	2020/00/02 21:00:02	SSS/S/S90CS0/110		•
	2023-02-02 13:32:01	Device A thermostat		0 🗊
😯 Roles				
= Customers hierarchy				
😫 User groups 🛛 🗸				
半 Customer groups 🛛 🗸				
📰 Asset groups 🛛 🗸		o T ≡ Q Search		
🗔 Device groups 💧 🔺	← Back to Applications			
[0] AII 2	SAMPLEAPP	Devices		
thermostat devices	BE-01-03-09	View device status chart		
🔓 Profiles 🗸 🗸	+ Enroll Device			
Entity view groups 🗸 🗸	🗮 Bulk Import	Device EUI Q	Q ↓↑ RSSI	
	Devices	33-37-37-39-6C-30-71-16 Lora	-43	
		4		
	🕅 Devices Map			

2. To view the received data from the sensors click on Device **SensiLora2.0** (step 1), next choose the **Latest telemetry** (step 2) and here you can see the readings of the sensors that the device measured (step 3), to view the rest of the readings you need to click on the \geq (step 4). To close the Device details click on the \underline{X} (step 5).

Figure 42. Latest telemetry



SensiGFOX | LoRa 2.0

	🗔 Device groups ゝ 🗔 All		Current subscription ThingsBoard Cloud Maker C: C: Tenant administrator
 A Home ▲ ▲ Plan and billing 	All: Devices 🧳		333737396C307116 5 Device details 2
Solution templates	□ Created time ↓	Name	< Details Attributes Latest telemetry 2 Alarms Events Relations Audit Logs
다가 Rule chains 다 Data converters	2023-03-06 18:26:10	333737396C307116	Latest telemetry Q
	2023-02-02 13:32:01	Device A	
 Roles Customers hierarchy 			2023-03-06 18:51:47 AccelerationX 0.02941995
🕒 User groups 🗸 🗸 🗸			2023-03-06 18:51:47 AccelerationY -1.0296982499999998
🕹 Customer groups 🗸 🗸 🗄			2023-03-06 18:51:47 AccelerationZ 9.836069949999999
Device groups			2023-03-06 18:51:47 BatteryVolt 4.19
Lon All			2023-03-06 18:51:47 freq 867500000
Profiles 🗸			2023-03-06 18:51:47 GyroX -0.004275984999999995
Entity view groups 🗸			□ 0.002.00.04.10.51.47 0.004 (4) Items per page: 1 1 -10 of 15 <<<>>>

3.6 Dashboard

3.6.1 Overview

1. You can create a Dashboard or import a Dashboard and skip the next steps, for this go to section <u>3.6.5 Import Dashboard</u>.

3.6.2 Add Dashboard

1. Add Dashboard, go to <u>Dashboard groups</u> (step 1), <u>All</u> (step 2), and click <u>+</u> (step 3). Enter a **SensiLora 2.0** in the <u>Title</u> field (step 4) and click <u>Add</u> (step 5).

Figure 43. Add Dashboard



SensiGFOX | LoRa 2.0

	Dashboard groups >	EE All	Current subscription ThingsBoard Cloud Maker Status Active	C 🕑 Tenant administrator
😤 Customer groups 🛛 🗸 🔺				
💼 Asset groups 🛛 🗸	All: Dashboards 🧪	Add Dashboard	② ×	+ <mark>3</mark> C Q
□ Device groups ✓	Created time ↓	Title *	A	
🖆 Profiles 🛛 🗸	_	SensiLora 2.0 (4)	_	
🖬 Entity view groups 🗸 🗸		Description		
🛋 Edge groups 🛛 🗸		,		
		Mobile application settings		
Widgets Library		Dashboard image		
E Dashboard groups				
II AII 2		No image selected × Δ Drag and drop an image or Browse fil	e	
OTA updates				
() Scheduler		Maximum upload file size: 512.0 KB		
🕇 White Labeling 🖌 🗸		Hide dashboard in mobile application		
🕙 Version control				
🕑 Audit Logs		Dashboard order in mobile application Cancel	Add 5	
11. Api Usage				
🖨 System Settings 🗸 🗸			Items per page: 10 💌	1 - 0 of 0 < < > >

2. Click on SesnsiLora 2.0 Dashboard.

Figure 44. Go to SesnsiLora 2.0 Dashboard

	🛢 Dashboard groups 🔸 📑 All	Current subscription ThingsBoard Gloud Maker :: S tenant aurunnsstrator :
🚣 Customer groups 🛛 🗸 🔺		
📰 Asset groups 🗸 🗸	All: Dashboards 🧪	+ <u>†</u> C Q
□ Device groups ✓	□ Created time ↓	Title
🔓 Profiles 🛛 🗸		
🖬 Entity view groups 🗸 🗸	2023-03-06 19:06:05	SensiLora 2.0 Click
🛋 Edge groups 🛛 🗸		
Edge management 🗸 🗸		
🚹 Widgets Library		
Dashboard groups 🔺		
All		
OTA updates		
Scheduler		
🕈 White Labeling 🗸 🗸		
S Version control		
(d) Audit Logs		Items per page: 10 💌 1 − 1 of 1 🗸 < > >

3.6.3 Add Entity aliases

1. Click on Change Dashboard (step 1).

Figure 45. Change Dashboard



SensiGFOX | LoRa 2.0



2. Click on Entity aliases (step 1).

Figure 46. Entity aliases

		📲 Dashboard groups 🔸 📲 All 🔸 📲 SensiLora 2.0	Current subscription ThingsBoard Cloud Maker : Current administrator :
22 Customer groups	~	♦ ■	🔹 🗔 \Xi 🕓 Realtime - last minute 生 🔨 []
Asset groups	~	Title *	Prifra discos
Device groups	~	SensiLora 2.0	
🔓 Profiles	~		
Entity view groups	~		
🛋 Edge groups	~		
👚 Edge management	~		
Widgets Library			
Dashboard groups	^		
OTA updates			·
() Scheduler			
P White Labeling	~		
S Version control			
🕘 Audit Logs			+ ×

3. Click on Add alias (step 1).

Figure 47. Go to Add alias



Entity aliases		×
Alias name	Entity filter	Resolve as multiple entities
Add alias		Cancel Save

4. In Add alias enters the name: <u>Sensors</u> (step 1), and next choose <u>Device type</u> (step 2), in Device type, enter the <u>SensiLora 2.0</u> type (step 3), and click <u>Add</u> (step 4).





5. Click to Save (step 1).

Figure 49. Save alias



Enti	ty aliases		×
	Alias name	Entity filter	Resolve as multiple entities
1.	Sensors	Devices of type 'SensiLora2.0'	- × ×
Add	alias		Cancel

3.6.4 Add Temperature widget

1. Add a new widget. For this click <u>Add new widget</u> (step 1) and choose to <u>Create new widget</u> (step 2).

Figure 50. Add widget



2. Choose the **<u>Cards</u>** widget bundle (step 1).



Figure 51. Choose the Cards widget



3. Choose the **Simple card** widget (step 1).

Figure 52.	Choose	the	Simple	e card
------------	--------	-----	--------	--------



4. Click to <u>Add</u> datasource (step 1).







Data Settings Advanced Actions Datasources Maximum 1 datasource is allowed. Please add datasource Please add datasource Data settings 	Data Settings Advanced Actions Atasources Please add datasource Add 1 Add 1 1 Add 1	ld Widget: Sin	nple card			?	×
Datasources Maximum 1 datasource is allowed. + Add 1 Data settings	Atasources Atasource Is allowed. Please add datasource Add 1 Add 1 Ata settings	Data	Settings	Advanced	Actions		
Please add datasource Data settings	Please add datasource	Datasources Maximum 1 datasourc	e is allowed.			^	
Data settings ~	ata settings ~	+ Add 1		Please add data	source		
Data settings 🗸 🗸	ata settings v						
		Data settings				~	
						Cancel	Add

5. In <u>Entity alias</u> choose <u>Sensors</u> (Step 1).



dd Wid	get: Simpl	e card				?	×
Data	a	Settings	Advanced	Actions			
Datasou Maximum	JICES 1 datasource is	allowed.				^	
	Туре	Parameters					
= 1.	Entity	Entity alias *	Entry Maximu	ta keys reseries/attributes are required. m 1 timeseries/attribute is allowed.		×	
Data se	ttings					~	
					Cancel	A	dd

6. Choose the <u>Temperature</u> key (step 1) and click <u>Add</u> (step 2). Figure 55. Add a Simple card





Δdd	Wida	ot.	Sim	nle	card
Auu	wiug	CL. (Sim		caru

Auu Wi	uget. Simpl			
Da	ata	Settings	Advanced Actions	A
Datas Maxim	ources um 1 datasource is	allowed.		^
	Туре	Parameters		
= 1	Entity	Entity allas * Sensors	× Latest data keys	Pwed.
Datas	settings		active inactivityAlarmTime	
			c reatedTime	Cancel Add

7. The added widget can be seen on the Dashboard (step 1) click to **Save** changes (step 2).





3.6.5 Import Dashboard

1. Download the Dashboard: sensiLora2 0 DashboardV0.1.json



2. Go to **Dashboard groups** (step 1), **All** (step 2), and click **Import dashboard** (step 3).

Figure 57. Choose Import Dashboard

	👫 Dashboard groups 🔸 🕂 All	Current subscription ThingsBoard Cloud Maker Status Active	E S Tenant administrator
	A		
😯 Roles	All: Dashboards 🧪		+ 主 C Q
E Customers hierarchy			3
😑 User groups 🛛 🗸	Created time	Title 🕈	
🚑 Customer groups 🛛 🗸			
📰 Asset groups 🛛 🗸			
🚺 Device groups 🗸 🗸			
🖆 Profiles 🗸 🗸			
📊 Entity view groups 🗸 🗸		No dashboards found	
🛋 Edge groups 🛛 🗸			
🕤 Edge management 🗸 🗸			
Widgets Library			
🕂 Dashboard groups 1			
H All 2			
OTA updates		Items per page: 10 👻	1 – 0 of 0 < < > >
	• ·		

3. Drag and drop the download Dashboard. Import Dashboard should be displayed (step 1), after clicking Import (step 2).

Figure 58. Import Dashboard



4. Go to SensiLora 2.0 Dashboard. Figure 59. Go to Dashboard



SensiGFOX | LoRa 2.0

	d	📕 Dashboard groups ゝ 🕂 All	Current subscription ThingsBoard Cloud Maker Status Active	C S Tenant administrator
	^			
😯 Roles		All: Dashboards 🕜		+ ± C Q
Customers hierarchy				
🕒 User groups 🛛 🗸		Created time	Title T	
💒 Customer groups 🗸 🗸		2023-03-08 09:18:14	SensiLora 2.0 Click	± 🗡 🗊
Asset groups 🗸 🗸				
□ Device groups ✓	•			

5. In SensiLora 2.0 Dashboard the following widgets are located:

- Temperature, units: °C
- Humidity, units: %
- **Pressure**, units: hPa
- Battery voltage, units: V
- Light, units: lux
- Accelerometer, units: m/s2
- Gyroscope, units: rad/sec
- Magnetometer, units: µT

Figure 60. SensiLora 2.0 Dashboard

		📕 Dashboard groups ゝ 📕 All 🗧	Current subscripti	on ThingsBoard Cloud Maker 33 C Tenant administrator
Device groups	~	SensiLora 2.0	SensiLora 2.0 -	j Entities 🕚 Realtime - last minute 🛓 🔝 🛟
Profiles	~	Temperature	Accelerometer	
📊 Entity view groups	~	25. 14		
📑 Edge groups	~		m/s2	
🕤 Edge management	~	-40 C 85	-1 23:56:40 23:56:50 23:57:00 23:57:10 23:57:20 23:57:20	
🕂 Widgets Library		Humidity	AccelerationX AccelerationX	
Dashboard groups	^	3442	AccelerationZ	
All		0 100	Gyroscope	
OTA updates		Pressure		
Scheduler		ם: ררפ	ad/s	
P White Labeling	~		23:56:40 23:56:50 23:57:00 23:57:10 23:57:20 23:57:30	
Version control		250 hPa 1250	- GyroX - GyroY	
🕑 Audit Logs		Battery Voltage	— GyroZ	Powered by Thingsboard v.3.4.3PAAS





4 STM32CubeMonitor

4.1 Install STM32CubeMonitor

1. Download and install a program from the ST site at this link <u>STM32CubeMonitor</u> and download an example project by this link <u>SensiLoRaCubeMonitorV0.3.json</u>. The main window STM32CubeMonitor is illustrated in Figure 61.



Figure 61. Main window STM32CubeMonitor



4.2 Import project

1. Opening the program and clicking on the <u>selection tab</u> (step 1), a selection menu will open, and then select <u>Import</u> (step 2). This action is illustrated in Figure 62.





2. A window will open with the choice of a file to import. In the import window, select <u>Clipboard</u> (step 3), then click on <u>select a file to import</u>



(step 4) and select the file <u>SensiLoRaCubeMonitorV0.3.json</u> which we downloaded. After selecting the file click on <u>Import</u> (step 5). This action is illustrated in Figure 63.

Mon Design - STM32CubeMonitor		- 0	×
STM32	Import nodes	C ^a DASHBOARD	≡
Q filter nodes Flow 1		-	- III
 STMicroelectronics 	Clipboard 3 Paste flow json o Leelect a file to import		
acq out))	Library		
)) acq in	"id": "780b10ab.0c7e6", Examples "type": "tab", "label": "SensiLoRa",		
	"disabled": false, "info": ""		
variables	<pre>// { "id": "151b9658.0519aa", "type": "websocket in", "z": "780b10ab.0c766", "name": "Loriot Uplink", "server": "", "server": "",</pre>		
✓ subflows Image: subflow single value	"Client": "54daab6.5790158", "x": 190, "y": 320, "wires": [[
 ✓ function 	Import to current flow new flow		
f function	Cancel Import 5		
			• 0 +

Figure 63. Import project

4.3 Configuration Loriot Uplink

1. Go to the tab SensiLora 2.0 (Figure 64).



Figure 64. Go to the SensiLora project



2. Configure the WebSocket **Loriot Uplink**, and double-click on it to open settings (Figure 65).





3. When opening the setting window, here we click on the <u>URL</u> <u>editing icon</u> (Figure 66).

Figure 66. Setting the Loriot Uplink



			– 0 ×
		-/ DEPLOY	
	Edit websocket i	n node	
	Delete		Cancel Done
	Properties		
Pressure	⊙ Туре	Connect to	~ Î
Humidity	URL	54daa66.5f90158	~
a Decode	Name	Loriot Uplink	
Accelerat			

4. In this window, we must insert the URL. If the Loriot server is used, then the link must be taken from 2.4 Loriot Uplink. After inserting the URL, click on **Update**. This action is illustrated in Figure 67.

Figure 67. URL

Amsterdam Community Account	
	Edit websocket in node > Edit websocket-client node
💸 WebSocket	Delete Cancel Update
Mechanism Listen and wait	Properties
How to use WebSocket with LORIOT Point your browser or library to the WebSocket URL and listen for incoming messages	URL ws://example.com/ws
Output Configuration Target URL Template Wss://eu2.loriot.io/app?token=vgEDCQAAAA1IdTiubG9yaW90LmlvsMd0v-NLa4RSNeRhHKi4GQ== Your token can be found in access tokens submenu of your application	Send/Receive payload URL should use ws:// or wss:// scheme and point to an existing websocket listener. By default, payload will contain the data to be sent over, or received from a websocket. The client can be configured to send or receive the
	entire message object as a JSON formatted string.

5. Click on **Done** (Figure 67) to save the URL.

Figure 67. Save the URL



		- 0 >
dit websocket i	in node	\checkmark
Delete		Cancel Done
Properties		
⊙ Туре	Connect to	~
URL	wss://eu2.loriot.io/app?toke	en=vgEDCQ/ 🗸

6. Click on **Deploy** (Figure 68) so that our changes are saved and take effect.





4.4 Dashboard

1. When we have changed the Server URL to the necessary and their status should be <u>connected</u> (Figure 69).



Figure 69. Status Loriot









3. If several projects are open, then we need to go to the tab of our project, for this we click on the selection project (step 1) and then click on **Sensilora** (step 2). This action is illustrated in Figure 71.



Figure 71. Selection of a project

Mon Node-RED Dashboard					\times
SensiLoRa	2				-
Home		STOP ACQUISITION	CLEAR GRAPHS		
			Show Points Zoom Show All		

4. After selecting the project, we should see a window (Figure 72).

Figure 72. Dashboard SensiLora



5. When the data is sent by SensiLora 2.0 to the server Loriot, we will see the value of the sensors (Figure 73).

Figure 73. Data with sensors







5 Flashing SensiLora 2.0

5.1 Install STM32CubeProgrammer

1. Download and install STM32CubeProgrammer from the ST site at this link: <u>STM32CubeMonitor</u> (Figure 74). There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there. Download the firmware: (<u>Firmware SensiLora 2.0</u>).

Image: State Programmer Image: State Programer Image: State Programer	SIM:	2CubeProgrammer		- U	×
Memory & File edition Not connect Port Address Size Device memory Address Size No data to display No data to display No data to display Verbosity level Target information Board Device ID Verbosity level <	STM32 Cube	Programmer	💿 f	🖻 🔰 🔆 🖌	57
Device memory Open file Address Size Data width 32-bit Find Data 0x Read Vib Vib <td></td> <td>Memory & File edition</td> <td></td> <td>🛑 Not cor</td> <td>nnected</td>		Memory & File edition		🛑 Not cor	nnected
Address Size OB CPU No data to display No data to display No data to display Cog Verbosity level 11:45:52: STM32CubeProgrammer API v2:7.0 11:45:52: STM3CubeProgrammer API v2:7.0 11:4		Device memory Open file +	USB	▼ Connect	
Image: Serial number		Address Size Data width 32-bit V Find Data 0x Read V	Port	USB configuration	- a
Image: constraint of the sector o	OB		Serial number		-
Indicate to data to	СРИ	No data to display	VID	0xdf11 0x0483	
Log Verbosity level 1 2 3 1145:52: ST-LINK error (DEV_CONNECT_ERR) Image: transmission of the second se	swv		Read Unprotect (M	ICU)	
	 (a) (b) (c) (c) (c) (c) 	Log Verbosity level 1 2 3 11/45:52 : STM32CubeProgrammer API v2.7.0 11/45:52 : ST-LINK error (DEV_CONNECT_ERR)	Board Device Type Device ID Revision ID Flash size Flash size	Target information	

Figure 74. STM32CubeProgrammer



5.2 Flashing with SensiEdge Basic Debugger

1. For the programming SensiLora 2.0 use the programmer SensiEdge Basic Debugger (Figure 74), if you don't have one, then go to <u>4.3 Flashing via USB Type-c</u>.

Figure 74. SensiEdge Basic Debugger



2. Connect the SensiLora 2.0 to the programmer SensiEdge Basic Debugger (Figure 75) and then connect the USB to the programmer.

Figure 75. Connect to programmer



3. Open the program STM32CubeProgrammer and select the <u>ST_LINK</u> (step 1) and then click on <u>Connect</u> (step 2) and if the connection



was successful, then we should see information about the controller (step 3). This action is illustrated in Figure 76.

Figure 76. Connect to SensiLoRa 2.0

Prg STM3	2CubeProgrammer				- 0 ×
STM32 Cube	Programmer		(19) f 🕒	y 🔀 🏹
	Memory & File edition		C		Not connected
	Device memory Open file +			ST-LINK ST-LINK	1 Connect 2
*	Address 0x08000000 Size 0x400 Data width	32-bit V Find Data Ox	Read 🗸	UART USB	F554852 👻 💋
OB				OTA Frequency (kHz)	•
CPU	No) data to display		Mode	Hot plug
swv				Access port	0 👻
				Reset mode	Hardware reset 🔹
	Log	Verbosity level	1 2 3	Shared	Disabled 🔹 🔐
	09:50:18: Bank : 0:00 09:50:18: Bank : 0:00 09:50:18: Xddress : 0x4002201c 3 09:50:18: Size : 104 Bytes 09:50:18: Bank : 0:01			External loader Target voltage	- 5.79 V
	09:50:18 : Address : 0x1ff80000 09:50:18 : Size : 20 Bytes 09:50:18 : UPLOADING			Firmware version	V2J38M27 Firmware upgrade
	09:50:18 : Size : 1024 Bytes 09:50:18 : Address : 00:800000 09:50:18 : Read progress:			Ta Board	rget information
$\overline{\mathscr{O}}$	09:50:18 : Data read successfully 09:50:18 : Time elapsed during the read operation is: 00:00:00.007 09:50:19 : Disconnected from device.			Device Type Device ID Revision ID	- - -
?			100%	Flash size CPU	-

4. After successfully connecting to the controller, select the tab **<u>Erasing & Programming</u>** (step 4) then click on the button **<u>Browse</u>** (step 5) a window will open where we have to specify the firmware file. Where to get the firmware file is described in <u>4.1 Install STM32CubeProgrammer</u>.



After selecting the firmware file, press **<u>Start Programm...</u>**. This action is illustrated in Figure 77.

Warning: There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there.

Prg STM3	2CubeProgrammer							-	o ×
STM32 Cube	Programmer) f 🕒	y X	57
	Erasing & Programming							🔶 Coi	nnected
	File path C:\firmware\SensiLora_863MHz_V0.1.bin	▼ Browse 5	Erase flash me	mory Er	ase external memo	гу	ST-LINK	▼ Di	sconnect
	art addr 0x08000000			Erase se	lected sectors Ful	ll chip erase	ST- Serial number	LINK configuration) ▼ Ø
	Skip flash erase before programming		Select	Index	Start Address	Size	Port	SWD	
	Verify programming			0	0x0800000	128	Frequency (kHz)	4000	-
CPU	Run atter programming	6		1	0x08000080	128	Mode	Hot plug	•
swv		Start Programm		2	0x08000100	128	Access port	0	-
REG	Log		1	erbosity l	evel 🖲 1 🔵	2 3	Shared	Hardware reset	
BETA	1992239 TREVISION ID TREV 2 095239 : UPICADING OPTION BYTES DATA 095239 : Bank : 0x00 095239 : Address : 0x4002201c 095239 : Size : 104 Bytes					^ •	External loader Target voltage	Disabled - 5.79 V	
	09:52:39 : Bank : 0x01 09:52:39 : Address : 0x1ff80000 09:52:39 : Size : 20 Bytes						Firmware version	V2J38M27	are upgrade
	09:52:39 : UPLOADING 09:52:39 : Size : 1024 Bytes						Board	arget information	
\bigcirc	0952239 : Read progress: 095239 : Pada progress: 095239 : Data read successfully 095239 : Time elapsed during the read operation is: 00:00:00.007						Device Type Device ID Revision ID	STM32L	07x/L08x/L010 MCU 0x447 Rev 7
?						100% 🛞	Flash size CPU		192 KB Cortex-M0+

Figure 77. Connect to SensiLoRa 2.0

5. After successfully loading the firmware, we should see the message Download verified successfully (Figure 78).

Figure 78. Successful programming



SensiGFOX | LoRa 2.0

Prg STM3	2CubeProgrammer										- 6) ×
STM32 Cube	Programmer							(19) f 🕒	9	\star	57
	Erasing & Programming										Conne	cted
		Start Programm	^	Erase flash me	mory E	rase external men	nory		ST-LINK	•	Discor	nnect
.	Automatic Mode	Start Programmi			Erase se	elected sectors	Full chip	erase	ST- Serial number	UNK configu	uration 4852	- 0
	Full chip erase			Colort	Index	Charle A delaware	Circ		Port	SWD		
OB	🗸 Download file				0	0x08000000	128		Frequency (kHz)	4000		-
CPU	Option bytes commands	Prg Message				× 0	128		Mode	Hot plug		-
swy		Deverteed		l sussessfully		0	128		Access port	0		-
<u> </u>			enneo	successionly		0	120	~	Reset mode	Hardware	reset	-
REG	Log					ок	2	3	Shared	Disabled		•
	09:55:8 : Memory Programming III: Sensil ora 863MHz V0.1 bin		_				^	\$	External loader			
	09:55:58 : File : SensiLora_863MHz_V0.1.bin 09:55:58 : Size : 95576 Butes								Target voltage			
	09:55:58 - Address - : 0x0800000 09:55:58 - Erasing memory corresponding to segment 0:								Firmware version	V2J38M27		
	09:55:58 : Erasing internal memory sectors [0 746] 09:55:58 : Download in Progress:								T;	arget inform	ation	upgrade
	09:55:59 : File download complete 09:55:59 : Time elansed during download operation: 00:00:00 949								Board	gernon	ution	
$\overline{\bigcirc}$	09:55:59 : Verifying 09:55:59 : Read progress:								Device Type	S	TM32L07x/	L08x/L010 MCU
	09:55:59 : Download verified successfully								Device ID Revision ID			0x447 Rev Z
\bigcirc							~		Flash size		0	192 KB
\sim							100%	\otimes	CPU		0	ntex-WU+

4.3 Flashing via USB Type-c

1. For flashing we will use such a program STM32CubeProgramming. First, we must disconnect the battery by disconnecting the jumper J4 (Figure 79), then we must hold down button S2 (Figure 52).



Figure 79. Jumper J4 and Button S2



2. When holding down button S2 connect the cable USB Type-c (Figure 80) and after a couple of seconds we release the button with this combination, and the board enters the programming mode.

Figure 80. Connect USB

3. Open the program STM32CubeProgrammer and select the <u>USB</u> (step 1) and then click on <u>Connect</u> (step 2) and if the connection was successful, then we should see information about the controller (step 3). This action is illustrated in Figure 81.

Figure 81. Connect via USB



STM32 Cube	Programmer						(19)	f 🕨	y 🔀 🟹		
	Memory & File	edition					,				
	Device memory	Open file +						USB ST-LINK	Connect 2		
	Address 0x0800	0000 🔻 Size	0x400	Data width	32-bit 👻 Find	Data Ox	Read 🔹	UART	g ration		
	Address	0	4	8	с	ASCII		USB			
OB	0x08000000	20005000	080045A1	08004039	0800403B	.P. ¡E9@;@	-	OTA	164/30410000		
=	0x08000010	0000000	00000000	00000000	00000000		4	PID	0xd 11		
CPU	0x08000020	0000000	00000000	00000000	0800403F	?@		VID	0x0483		
	0x08000030	0000000	0000000	08004041	08004043	A@C@		D 111			
swv	0x08000040	080045F1	080045F1	080040A9	080045F1	ñEñE©@ñE		Read Unprot	tect (MCU)		
	0x08000050	080045F1	0800404D	08004065	08004071	ñEM@e@q@					
	0x08000060	080045F1	080045F1	08004089	080045F1	ñEñE@ñE	×				
	Log		_			Verbosity level	1 2 3				
	16:15:07 : STM32Cube 16:15:09 : USB speed	eProgrammer API v2. : Full Speed (12MBit	7.0 /s)				î 🗳				
	16:15:09 : Manuf. ID : STMIcroelectronics 16:15:09 : Product ID : STM32 BOOTLOADER										
	16:15:09 : SN : 164730410000 16:15:09 : EW version : 0x011a										
	16:15:09 : Device ID	: 0x0447									
	16:15:09 : UPLOADING 16:15:09 : Bank	G OPTION BYTES DAT	'A								
$\overline{}$	16:15:09 : Address : 0x1ff80000								Target information		
	16:15:09 : Size : 20 Bytes 16:15:09 : UPLOADING						Board	-			
	16:15:09 : Size	: 1024 Bytes						Device			
	16:15:09 : Address 16:15:09 : Read proof	: 0x8000000	3					Device ID			
\geq	16:15:09 : Data read s	uccessfully					~	Revision ID	_		

4. After successfully connecting to the controller, select the tab **<u>Erasing & Programming</u>** (step 4) then click on the button **<u>Browse</u>** (step 5) a window will open where we have to specify the firmware file. Where to get the firmware file is described in <u>4.1 Install STM32CubeProgrammer</u>. After selecting the firmware file, press <u>Start Programm...</u> This action is illustrated in Figure 82.

Warning: There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there.



Figure 82. Programming via USB



5. After successfully loading the firmware, we should see the message Download verified successfully (Figure 83).

Figure 83. Successful programming



SensiGFOX | LoRa 2.0

STM32 Cube	Programmer							19	f 🕨	🔰 🔀 🗸	//
	Erasing & Programming									😑 Connecte	d
	Venny programming Run after programming		^	Erase flash memory Erase external memo			al memory		USB	Disconne SR configuration	ct
*		Start Programm		1	Erase sele	ected sectors	Full chip	erase	Port	USB1 -	ø
OB	Automatic Mode Full chip erase			Select	Index St	Start Addr	ress Sia 00 12	ze	Serial numbe PID	164730- 0xdf11	410000
CPU	✔ Download file				1	0x080000	80 12	128	VID	0x0483	
swv	Option bytes comman	Message ×				00 12 80 12 00 12	28 28 28 ~	Read Unproted	:t (MCU)		
	Log [3:02:16 : erasing sector 0737 @: 0x08017080 done 13:02:16 : erasing sector 0738 @: 0x08017100 done 13:02:16 : erasing sector 0739 @: 0x08017180 done 13:02:16 : erasing sector 0744 @: 0x08017200 done 13:02:16 : erasing sector 0744 @: 0x08017280 done 13:02:16 : erasing sector 0743 @: 0x08017300 done 13:02:16 : erasing sector 0743 @: 0x08017300 done 13:02:16 : erasing sector 0743 @: 0x08017400 done 13:02:16 : erasing sector 0744 @: 0x08017400 done 13:02:16 : erasing sector 0746 @: 0x08017400 done 13:02:16 : erasing sector 0746 @: 0x08017400 done 13:02:16 : erasing sector 0746 @: 0x08017500 done 13:02:16 : erasing sector 0746 @: 0x08017500 done 13:02:16 : erasing sector 0746 @: 0x08017500 done 13:02:26 : Fine download complete 13:02:26 : Time elapsed during download operation: 00:00:18:	707			(ОК	2	3	T Board Device	arget information	
Ø	13:02:26 : Verifying 13:02:26 : Read progress: 13:02:27 : Download verified successfully								Type Device ID Revision ID		MCU 0x447

5.4 Battery power

1. SensiGFOX | LoRa 2.0 integrating **SILA-UCR** (LoRa) and **SIFA-UCR** (Sigfox). Same hardware but different Software Firmware. Every board comes with a Rechargeable battery of 140mA. The battery is



soldered but disconnected until the user will close the jumper. Install a jumper in J4 to operate the device on battery power (Figure 84).

Figure 84. Battery power

