# **Kerlink** communication is everything

Getting Started with Kerlink Gateways and AWS IoT Core for LoRaWAN

**Getting Started Guide** 



## Getting Started with Kerlink Gateways and AWS IoT Core for LoRaWAN

	Redaction	Validation	Approbation
Trigram	JCA	GBO	YDE
Date	2020-10-26		
Signature			

Version	Edits
1.0	Initial version
1.1	Add AWS IoT Core for LoRaWAN missing screens and update credential section
1.2	Update after AWS review
1.3	Update based on AWS template
1.4	Typo corrections

Reference	Description
[1]	https://wikikerlink.fr/wirnet-productline/doku.php?id=wiki:lora:aws



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This guide will walk you through the unboxing, connection, and installation of Kerlink Wirnet iFemtocell Gateway to be used with AWS IoT Core for LoRaWAN.

When you order a Kerlink Wirnet iFemtocell Gateway with AWS IoT Core for LoRaWAN support, it comes preconfigured.

#### 1 Unboxing

The package contains the following elements:

- Kerlink iFemtocell gateway
- LoRa Antenna (862-873MHz, 902-928MHZ, 3dBi, 50Ω; vertical polarization)
- AC/DC Power supply (Input 110-240V, output 12V, 0.5A jack connector) (EU or US plug depending on the reference ordered)

#### 1.1 Cabling

First, connect the LoRa Antenna to the SMA connector on the Wirnet iFemtocell.

Then, plug an Ethernet cable to the Wirnet iFemtocell and to your network. The Wirnet iFemtocell will establish 2 connections to the Internet through your network: one to AWS, and one to Kerlink Wanesy Management Center.

Finally, connect the power jack to the Wirnet iFemtocell and plug the power supply to the wall socket.



Figure 1: Wirnet iFemtocell setup (EU version pictured)

#### **1.2 First boot**

The Wirnet iFemtocell will boot and eventually update its firmware to the latest version. Refer to the LEDs color to follow the bootstrap procedure.

To ensure the Wirnet<sup>™</sup> iFemtoCell is started up, check the behavior of the LED indicators:



LED	Specification					
LED 1: Power/Status	A solid Green for Power LED	A solid Green for Power LED				
	A Status Red LED	A Status Red LED				
	Gateway Status	"Status LED" Behavior				
	Boot part 1	Fix on				
	Boot part 2	Heartbeat	LED 1 LED 2 LED 3			
	Boot part 3	Blink every second				
	Run time	Off	000			
	Power down sequence	Heartbeat				
	Update	Blink / 0.4 second				
	Restore backup	Blink / 2 seconds				
	Restore stock	Blink / 4 seconds				
LED 2: Backhaul	RED during boot		_			
	0	ovided by Kerlink is installed:				
	RED if applicative software	-	Reset On/DFI			
	GREEN blinking during app	Icon Par L				
	GREEN fix if applicative so		Keriink communication is even where			
LED 3: LoRa Data	RED during boot	a continuity				
	The applicative software pro					
	Applicative software mana					
	Rx: GREEN blinking	-				
	Tx: RED blinking		Figure 2: Wirnet iFemtocell LEDs			

Once LED 1 (Power/Status) and LED 2 (Backhaul) are solid green, your gateway is ready.

#### **2** Connect to Kerlink Wanesy Management Center

Once the gateway online, you can connect to Kerlink Wanesy Management Center. This is the central place to monitor, configure and remotely access your gateway.

#### 2.1 Log-in

Your sales contact will send you the credentials and URL to connect to WMC. Connect to the WMC instance and enter the username and password.





Figure 3: Wanesy Management Center login page

#### 2.2 Gateway overview

Once logged-in, go to "Management >> Gateway" menu. You will find your gateway on that page.

10 <u>1</u> 0 g0						台 Selection (0 gate	ways) 台 Selection (0	end-devices)	kerlink_d
Select your fleet: All	fleets								
Filter									>
Gateways									:
Ċ, ^ EUI	© Fleet	Name	© Brand	Description	Status	Backhaul	Door	GPS	
Ċ₊ 7276FF003	9040884 demo_fleet	iFemtocell	Kerlink	Wirnet iFemtoCell (868)	Connected	Ethernet	Not applicable	Not applicable	
Rows per page: 10	~			1				1.	of 1
	Select your fleet: All Filter Gateways ¢, - Eul ¢, 72767603	Select your fleet:	Select your fleet: All fleets  Filter Gateways C, eu  eFleet  Name C, 727/JF0239040884 demo_fleet if emocoli	Select your fleet: All fleets v Filter GateWays C, - EUI Fleet Name Brand C, 727/JF003064084 demo.fleet if emiccell Kerlink	Select your fleet: All fleets v Filter Gate-ways	Select your fleet: All fleets v           Filter           Gate-ways $\mathbf{e}_{\mathbf{k}}$ * EVI * Fleet * Name * Brand * Description Status $\mathbf{e}_{\mathbf{k}}$ * 273/677023940884 demo_fleet if Perstocell Kerlink Wirnet iFerntocell (066) Connected	Select your fleet:       All fleets         Filter         Gateways         Ch       * EVI       ® Fleet       ® Description       Status       Bachhaul         Ch       * 27/JF70393040844       demo.fleet       Ifernicell       Kerlink       Winet FemtoCell (868)       Connected       Ethernet	Select your fleet:       All fleets       v         Filter       Caleways         Caleways       * Brand       * Description       Status       Bachhaul       Dor         Cytop 72704F0030940884       demo_fleet       # Prentocell       Korlink       Wirnet iFentoCell (068)       Convaccied       Ethernet       Not applicable	Select your fleet:       All fleets         Filter         GateWays         Ch       ® Fleet       ® Rand       ® Description       Status       Backhaul       Door       OPS         Ch       * EVI       ® Fleet       ® Rand       ® Description       Status       Backhaul       Door       OPS         Ch       * 277/JF0030960884       demo.fleet       if emtocell       Kerlink       Wrinet if emtocell (868)       Connected       Ethernet       Not applicable       Not applicable

Figure 4: Wanesy Management Center - Gateway management page

Select your gateway by clicking on its EUI. You will get the gateway overview with all the details you need. In case of multiple gateways, look for your gateway EUI using the "Filter" window. Enter in the EUI search field the last 6 digits of your Gateway's Board ID located on the label at the back of the Wirnet iFemtocell.



Name         Overview         Ordinguations         N         Base         Operations         Operations <th< th=""><th></th><th>iFemtocell 7276FF0039040884</th><th>Wirnet iFemtoCell (868) Connected</th><th></th><th></th><th>demo_fi</th></th<>		iFemtocell 7276FF0039040884	Wirnet iFemtoCell (868) Connected			demo_fi
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RAM         53 %.         No data         2202/10/27 15:29:00         HELLO           System disk         42 %.         Locked         2202/10/27 15:29:00         GPS         LOCKED           User disk         1 %.         1 %.         ESSI cellular         0 dlm         2202/10/27 15:29:00         GPS         LOCKED           SSS cellular         0 dlm         2202/10/27 15:29:00         GPS         LOCKED           Liptime         62 %         Construction         TRUE           Uptime         6 days         Construction         TRUE						
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Figure 5: Wanesy Management Center - Gateway overview

Note or copy to your clipboard the **Gateway EUI** for the following registration on AWS.

You can use all the other menus to explore all the capabilities of your gateway and the associated service. This overview will be sufficient for the moment.

#### **3** Setup your AWS account and Permissions

Note: The following sections (3.1, 3.2, 3.3) have been provided by AWS. Please contact AWS support for additional information.

If you don't have an AWS account, refer to the instructions in the guide <u>here</u>. The relevant sections are **Sign up for an AWS account** and **Create a user and grant permissions**.

#### 3.1 Overview

The high-level steps to get started with AWS IoT Core for LoRaWAN are as follows:

- 1. Set up Roles and Policies in IAM
- 2. Add a Gateway (see section Add the Gateway to AWS IoT)
- 3. Add Device(s) (see section Add a LoRaWAN Device to AWS IoT)
  - a. Verify device and service profiles
  - b. Set up a Destination to which device traffic will be routed and processed by a rule.

These steps are detailed below. For additional details, refer to the AWS <u>LoRaWAN developer</u> guide.



#### 3.2 Set up Roles and Policies in IAM

#### 3.2.1 Add an IAM Role for CUPS server

Add an IAM role that will allow the Configuration and Update Server (CUPS) to handle the wireless gateway credentials.

This procedure needs to be done only once, but must be performed before a LoRaWAN gateway tries to connect with AWS IoT Core for LoRaWAN.

- Go to the IAM Roles page on the IAM console
- Choose Create role.
- On the **Create Role** page, choose **Another AWS account**.
- For Account ID, enter your account id.
- Choose Next: Permissions
- In the search box next to **Filter policies**, enter AWSIoTWirelessGatewayCertManager.
  - If the search results show the policy named AWSIoTWirelessGatewayCertManager, select it by clicking on the checkbox.
  - If the policy does not exist, please create it as follows:
    - Go to the <u>IAM console</u>
    - Choose **Policies** from the navigation pane.
    - Choose Create Policy. Then choose the JSON tab to open the policy editor. Replace the existing template with this trust policy document:

"Version": "2012-10-17", "Statement": [ "Sid": "IoTWirelessGatewayCertManager", "Effect": "Allow", "Action": [ "iot:CreateKeysAndCertificate", "iot:DescribeCertificate", "iot:ListCertificates", "iot:RegisterCertificate" ], "Resource": "\*" }

- Choose **Review Policy** to open the *Review* page.
- For Name, enter AWSIoTWirelessGatewayCertManager. Note that you <u>must not</u> use a different name. This is for consistency with future releases.
- For **Description**, enter a description of your choice.



- Choose **Create policy**. You will see a confirmation message showing the policy has been created.
- Choose Next: Tags, and then choose Next: Review.
- In **Role name**, enter *IoTWirelessGatewayCertManagerRole*, and then choose **Create role**.
  - **Note** that you <u>must not</u> use a different name. This is for consistency with future releases.
- In the confirmation message, choose IoTWirelessGatewayCertManagerRole to edit the new role.
- In the **Summary**, choose the **Trust relationships** tab, and then choose **Edit trust** relationship.
- In the **Policy Document**, change the **Principal** property to represent the IoT Wireless service:



After you change the Principal property, the complete policy document should look like this:



• Choose **Update Trust Policy** to save your changes and exit.

At this point, you've created the *IoTWirelessGatewayCertManagerRole* and you won't need to do this again.

#### 3.2.2 Add IAM role for Destination to AWS IoT Core for LoRaWAN

Prepare your AWS account to work with AWS IoT Core for LoRaWAN. First, create an IAM role with permissions to describe the IoT end point and to deliver messages to IoT cloud. Then,



update the trust policy to grant AWS IoT Core for LoRaWAN permission to assume this IAM role when delivering messages from devices to your account.

**NOTE** – The examples in this document are intended only for dev environments. All devices in your fleet must have credentials with privileges that authorize only intended actions on specific resources. The specific permission policies can vary for your use case. Identify the permission policies that best meet your business and security requirements. For more information, refer to <u>Example policies</u> and Security Best practices.

- In the IAM console, choose **Roles** from the navigation pane to open the **Roles** page.
- Choose Create Role.
- In Select type of trusted entity, choose Another AWS account.
- In Account ID, enter your AWS account ID, and then choose Next: Permissions.
- Choose Next: Permissions
- Search for your IAM policy. Type in the policy name to find your policy. Select it.
- Choose Next: Tags.
- Choose Next: Review to open the Review page. For Role name, enter an appropriate name of your choice. For Description, enter a description of your choice.
- Choose Create role.

Create the corresponding policy

- Go to the <u>IAM console</u>
- Choose **Policies** from the navigation pane.
- Choose **Create Policy**. Then choose the **JSON** tab to open the policy editor. Replace the existing template with this trust policy document:

- Choose **Review Policy** to open the Review page. For Name, enter a name of your choice. For **Description**, enter a description of your choice.
- Choose **Create policy**.

Update your policy's trust relationship.



- In the IAM console, choose **Roles** from the navigation pane to open the **Roles** page
- Enter the name of the role you created earlier in the search window, and click on the role name in the search results
- Choose the **Trust relationships** tab to navigate to the Trust relationships page.
- Choose **Edit trust relationship**. The principal AWS role in your trust policy document defaults to root. Replace the existing policy with this:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "",
            "Effect": "Allow",
            "Principal": {
               "Service": "iotwireless.amazonaws.com"
            },
            "Action": "sts:AssumeRole",
            "Condition": {}
            }
        ]
}
```

• Choose Update Trust Policy

#### 3.3 Add the Gateway to AWS IoT

To connect to AWS IoT Core for LoRaWAN, Kerlink Wirnet iFemtocell Gateway comes with Basic Station pre-installed and enabled.

Basic Station is a LoRaWAN Packet Forwarder. It is a program that runs on Kerlink gateways which forward LoRaWAN RF packets to AWS IOT Core for LoRaWAN network server.

#### 3.3.1 Preparation

To complete setting up your gateway, you need:

- LoRaWAN region. For example, if the gateway is deployed in a US region, the gateway must support LoRaWAN region US915.
- Gateway LNS-protocols. Currently, the LoRa Basics Station protocol is supported.
- Gateway ID (Gateway EUI you noted earlier.

#### 3.3.2 Add the LoRaWAN Gateway

To register the Gateway with AWS IoT Core for LoRaWAN, follow these steps:

- Go to the <u>AWS IoT Core console</u>.
- Select Wireless connectivity in the navigation panel on the left.
- Choose Intro, and then choose Get started. This step is needed to pre-populate the default profiles.
- Under Add LoRaWAN gateways and wireless devices, choose Add gateway.



- In the Add gateway section, fill in the GatewayEUI and Frequency band (RF Region) fields.
- Enter a descriptive name in the **Name optional** field. We do not recommend you leave it blank.
- Choose Add gateway
- On the **Configure your Gateway** page, find the section titled **Gateway certificate**.
- Select Create certificate.
- Once the **Certificate created and associated with your gateway** message is shown, select **Download certificates** to download the certificate (*xxxxx.cert.pem*) and private key (*xxxxx.private.key*).
- In the section **Provisioning credentials**, choose **Download server trust certificates** to download the CUPS (cups.trust) and LNS (lns.trust) server trust certificates.
- Copy the CUPS endpoint to your clipboard and paste it into a new text file named cups.uri.
- Copy the LNS endpoint to your clipboard and paste it into a new text file named tc.uri.
- Choose **Submit** to add the gateway.

#### 3.4 Prepare credentials for Basic Station

Basic Station only recognize certificates and keys with specific names, so you need to rename the files as follow:

- You should have cups.trust
- Rename Ins.trust to tc.trust
- Copy the xxxxx.cert.pem to cups.crt
- Copy the xxxxx.cert.pem to tc.crt
- Copy the xxxxx.private.key to cups.key
- Copy the xxxxx.private.key to tc.key
- You should have the cups.uri and tc.uri file already.

#### **3.5 Upload credentials to your Wirnet iFemtocell**

To install those certificates on your gateway, login to Wanesy Management Center again. This time browse to your gateway and select **Remote access** >> **File Explorer**.



ker <b>link</b>	👔 🧝 👷 😌 Selection (0 gateways) 🖰 Selection (0 gateways) 🖓 Selection (0 gateways) 🖓 Selection (0 gateways)
communication is everything Wanesy Management Center	Femtocel  723/67003904084 Winet [FemtoCell (868) Connected demo_Reet
3.2	Overview Configurations V KPI Data V Remote access V Spectrum Diagnostic V :
🗠 Management 🗸 🗸	
Fleets	
Gateways	
Clusters	>Crete >Critome bin boot dev etc home keros lib nonexistent proc run sbin sys user usr
Multicast groups	>C:         hoto         Image: Constant of the second of t
End-devices	>C) proc //withtp >C) run
крі	> Crister > Crister
Workflows	
Administration	

Figure 6: Wanesy Management Center - File Explorer

Navigate to /etc/station/ folder and upload your credential files there using the "Upload File" menu for each.

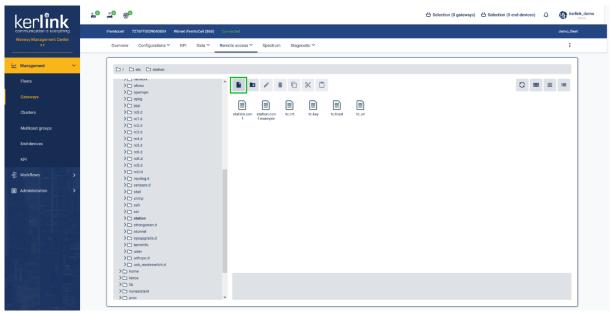


Figure 7: Wanesy Management Center: Upload file

#### **3.6 Enable the credentials**

To enable your credentials, go to **Remote access** >> **Command** and type the following command.

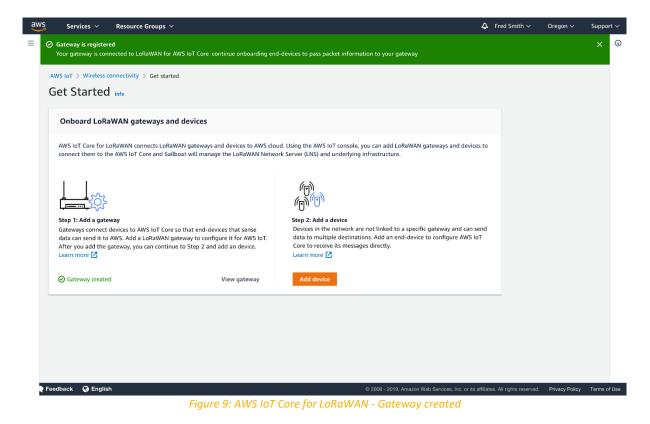
monit restart station



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🗠 Management 🗸 🗸	(1276Fr0038040884)\$ monit restart station [7276Fr0038040884)\$		^
Fleets			
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End-devices			
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Figure 8: Wanesy Management Center - command

Going back to AWS IoT Core for LoRaWAN interface, you should see your gateway connected.



Congratulations! You can now move to end-device on-boarding with AWS IoT Core for LoRaWAN. Refer to "Getting Started with Kerlink WAL-e AWS IoT Core for LoRaWAN" in [1].

#### **End of Document**

Confidential