How to Connect Milesight Gateway to the ChirpStack v4 platform

Version Change Log			
Version	Revision Date	Revision Details	Revised By
V1.0	20240614	Initial	lockon

Platform Introduction

The ChirpStack open-source LoRaWAN Network Server stack provides open-source components for LoRaWAN networks. Together they form a ready-to-use solution including a user-friendly web-interface for device management and APIs for integration. The modular architecture makes it possible to integrate within existing infrastructures. All components are licensed under the MIT license and can be used for commercial purposes. It supports Class A, Class B, and Class C modes, as well as adaptive data-rate, live-frame logging, channel configuration, multi-tenant, APIs and integration, etc.

This article will guide you how to integrate Milesight LoRaWAN gateways to ChirpStack server. Click here for more information about how to install ChirpStack.

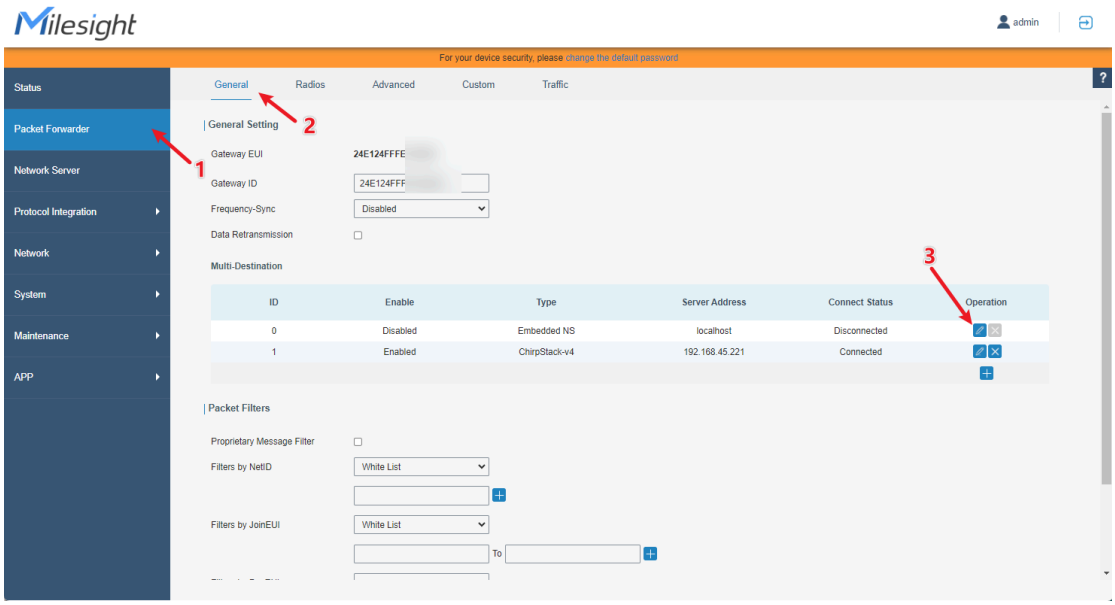
Preconditions

1. Have a gateway device with built-in packet forwarding capability. Here, I'm demonstrating using the UG65.
2. Deploy a chirpstack v4 system. Here, I am using Docker deployment, and the address is 192.168.45.221.
3. Ensure network connectivity between the gateway device and the chirpstack v4 system.

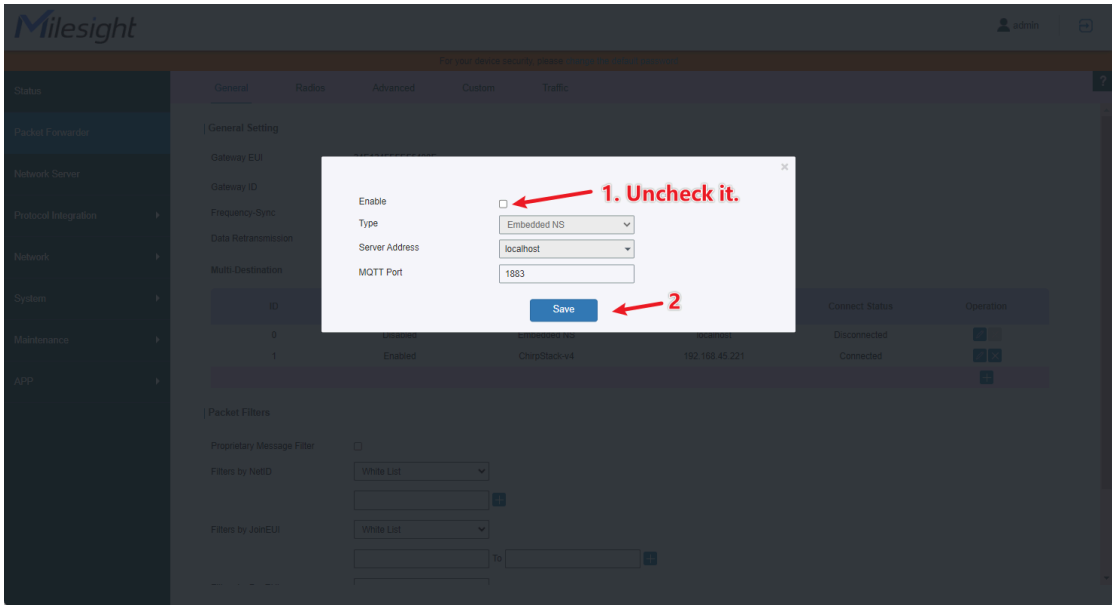
1. Gateway Configuration

1.1. Add Network Server

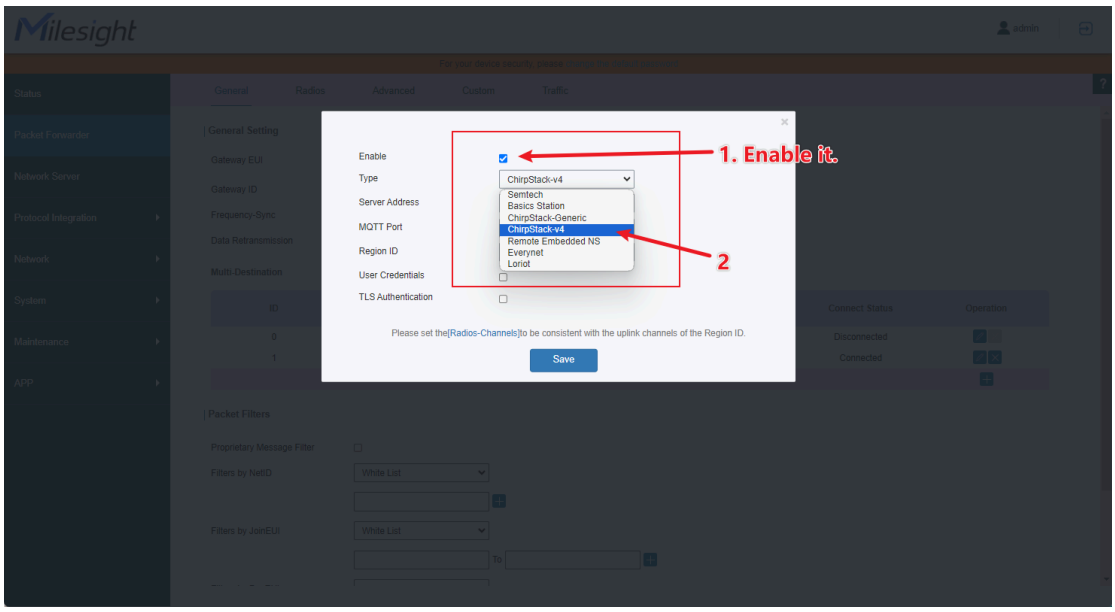
Login to the gateway and navigate to **Packetforward -> General**.

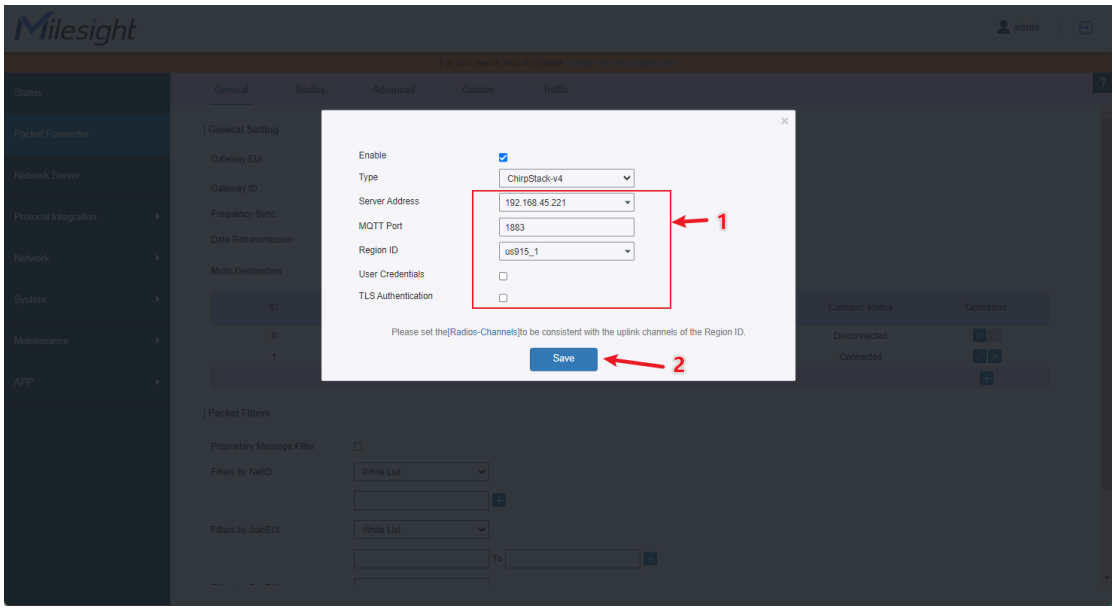


Disable the built-in Embedded NS under Multi-Destination.



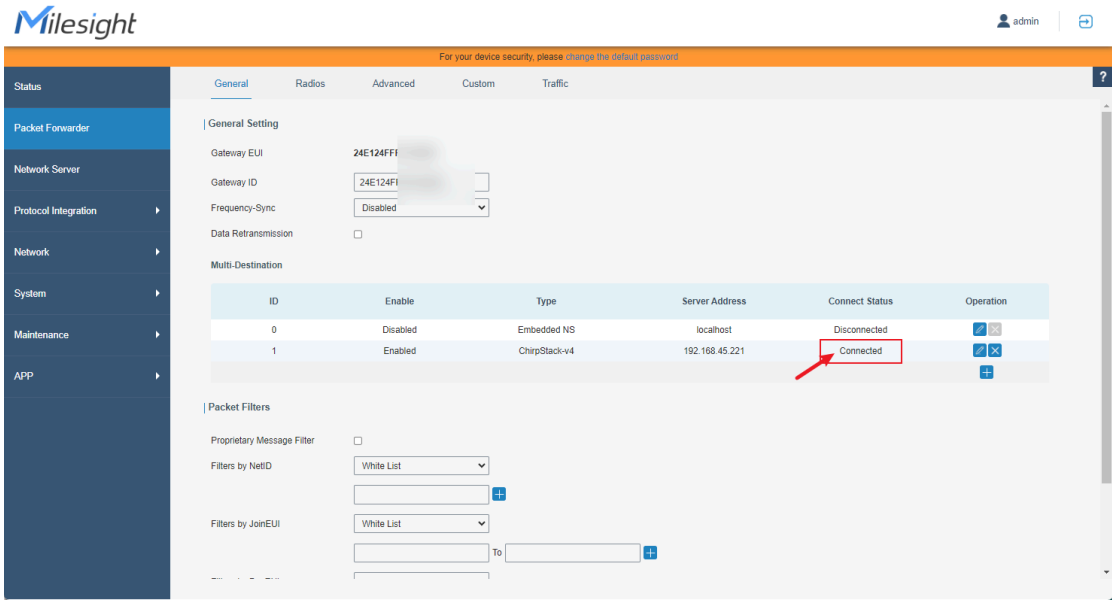
Add a new one. In the popup window, select **ChirpStack-v4** from the dropdown menu, and fill in the address as shown in the picture. Remember the Gateway EUI code; it will be used later.





1.2. Check Status

Wait for a moment. When the page displays "**Connected**," it indicates that the gateway and ChirpStack-v4 networks are interconnected. Proceed to the next steps. If there's no "Connected" prompt here, troubleshoot the network between the gateway and ChirpStack-v4.



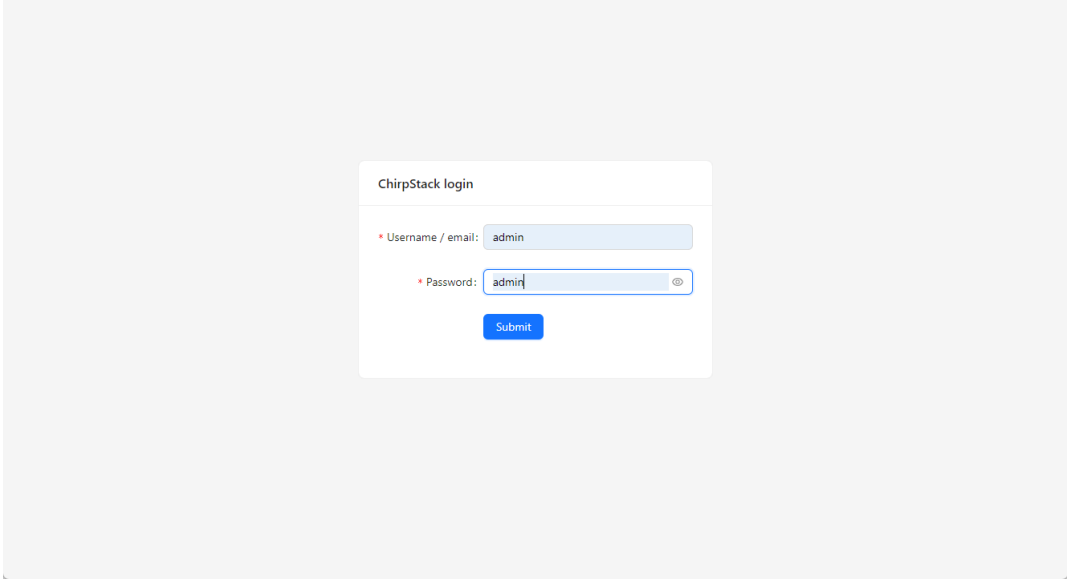
2. Overview of the Process

Next, let's discuss how to integrate a gateway and add LoRaWAN devices. The main operational steps can be summarized as follows:

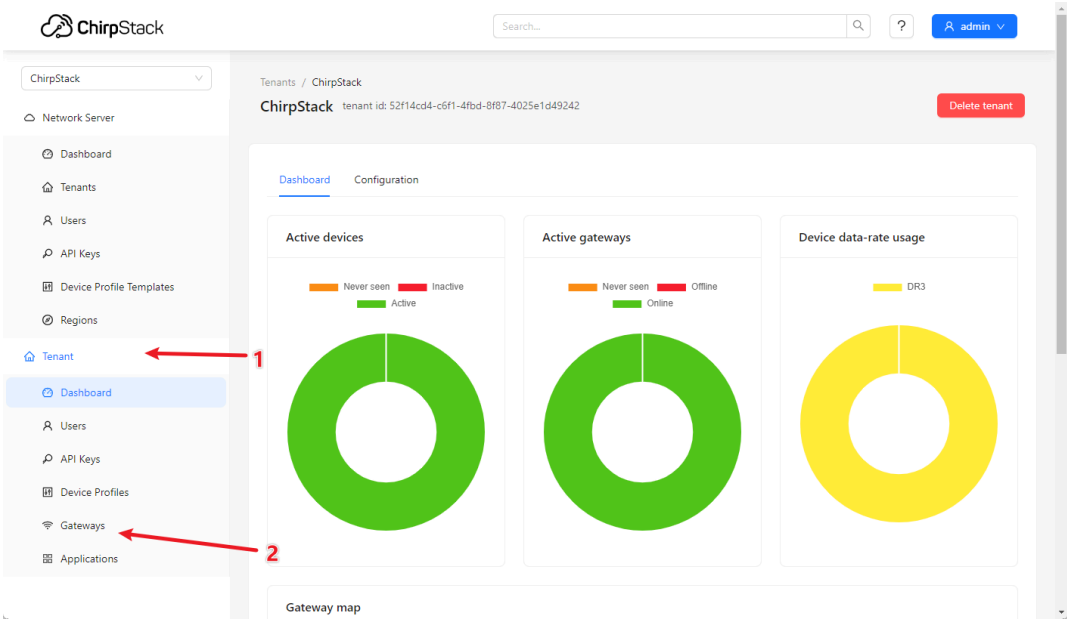
1. Integrate the gateway. Once the gateway is integrated, data streams from the gateway can be observed in ChirpStack-v4.
2. Create a device profile and input the relevant device decode code within the device profile.
3. Begin adding LoRaWAN devices. During the addition process, it's essential to select the appropriate device profile.
4. Check whether LoRaWAN data is being reported and if it can be decoded correctly.
5. If everything is functioning properly, it indicates successful integration of the gateway with ChirpStack-v4 and successful addition of the LoRaWAN device.

3. Adding a Gateway

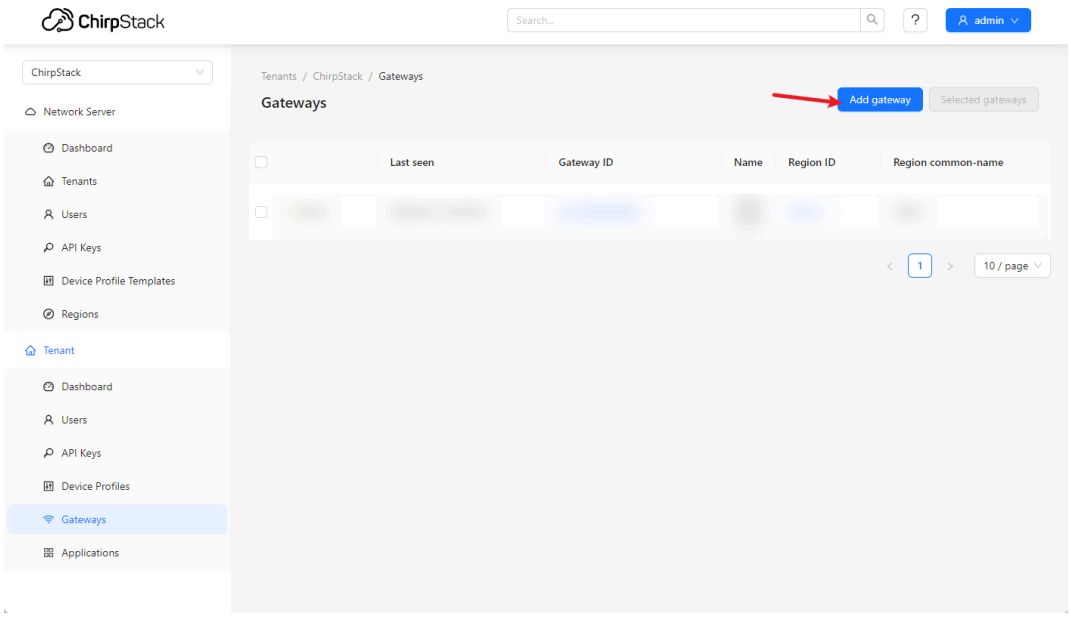
1. Log in to the management address of ChirpStack-v4, which is typically accessed via http://192.168.45.221:8080/ .



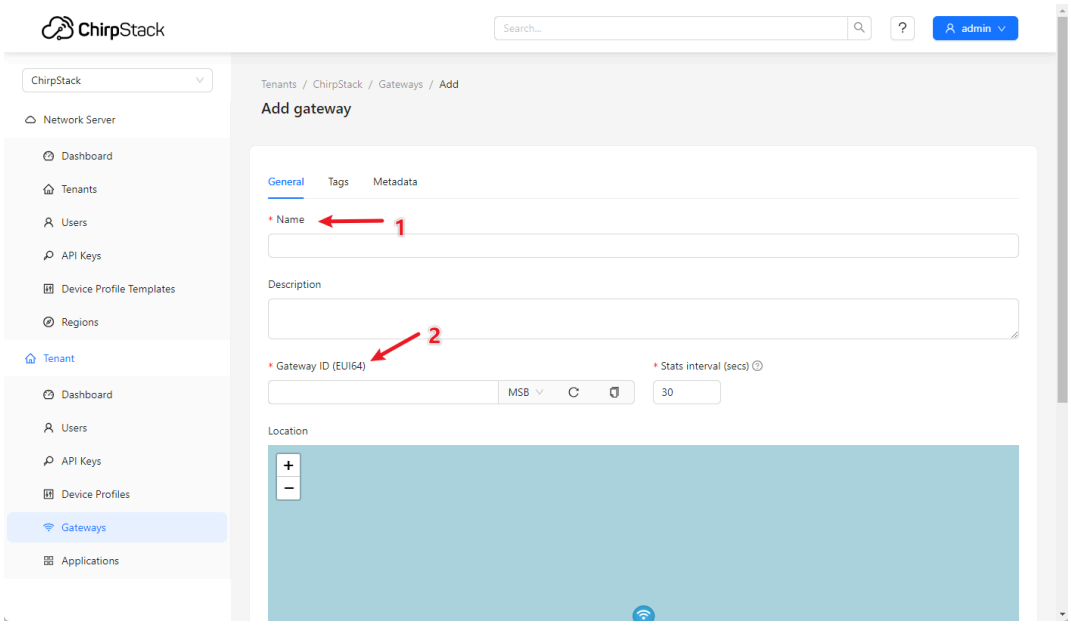
2. Navigate to Tenants -> Gateways.

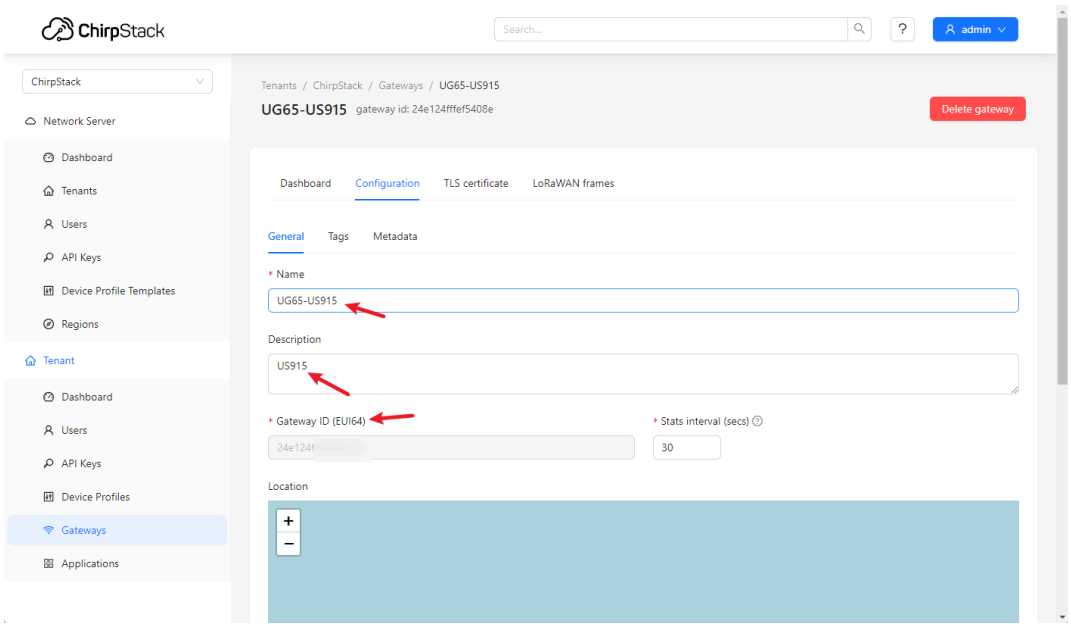


3. On the page, click on "Add gateway."

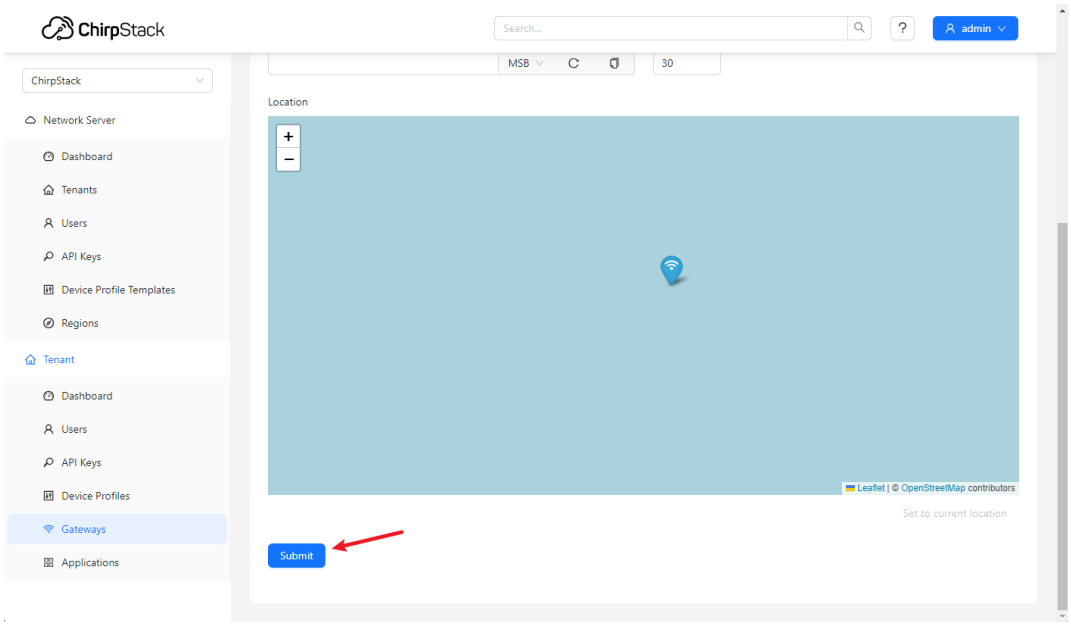


4. Fill in the relevant information on the popup page, mainly including the Name and Gateway ID (EUI64). Other information can be filled in as needed.

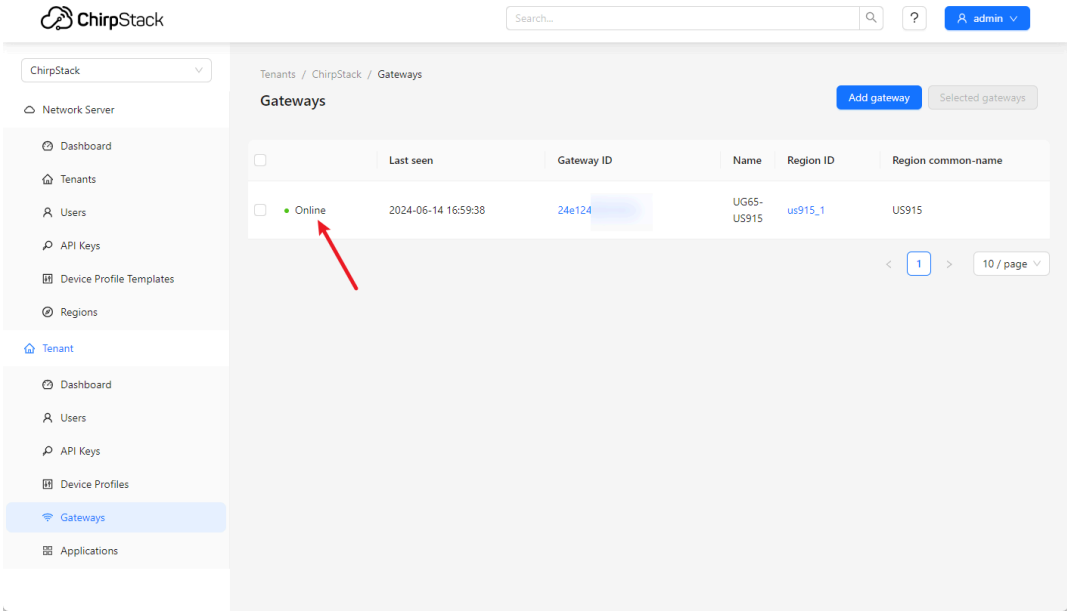




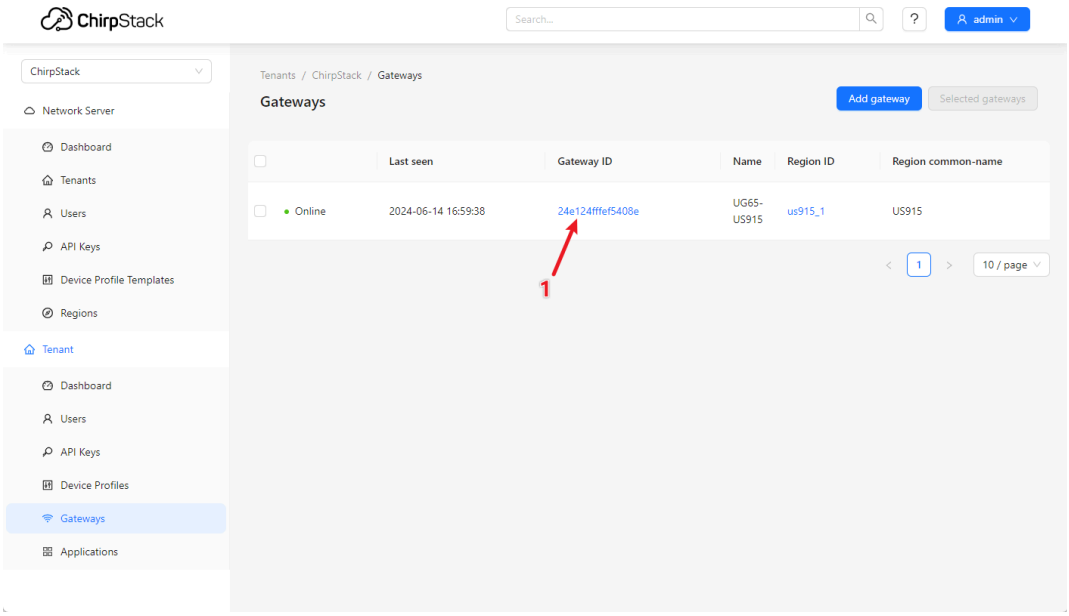
5. Once completed, click the "Submit" button at the bottom of the page to submit the data.

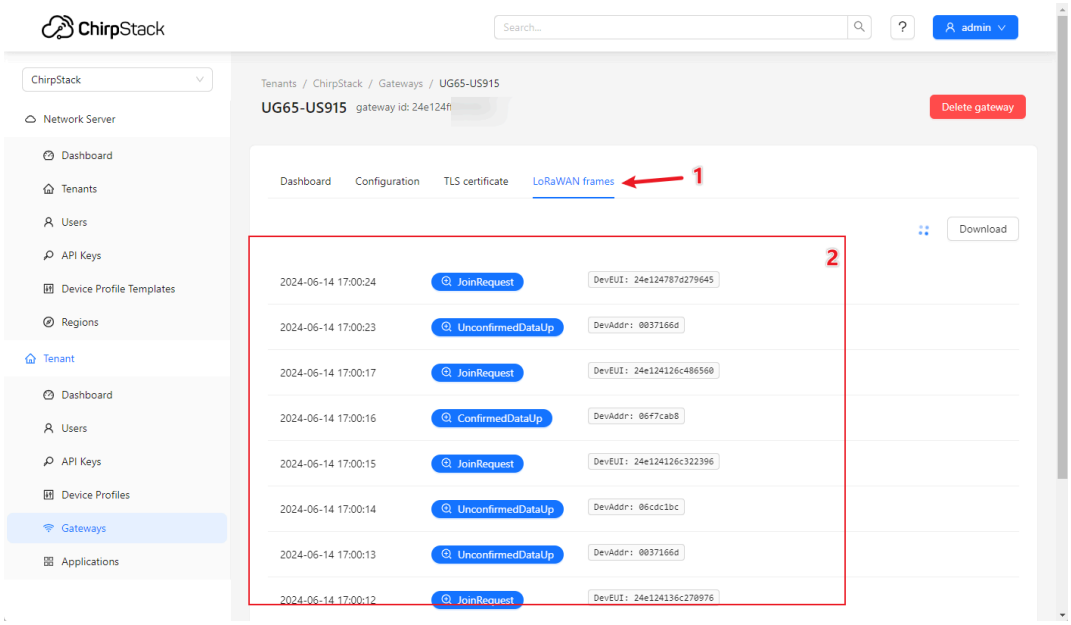


6. Wait for approximately 1-2 minutes and observe the status of the device. If it shows "Online," it indicates successful addition.



7. Click on the Gateway ID column to access the gateway ID. On the redirected page, find "LoRaWAN frames" to see if there's any data scrolling display, typically including JoinRequest, UnconfirmedDataUp, etc.

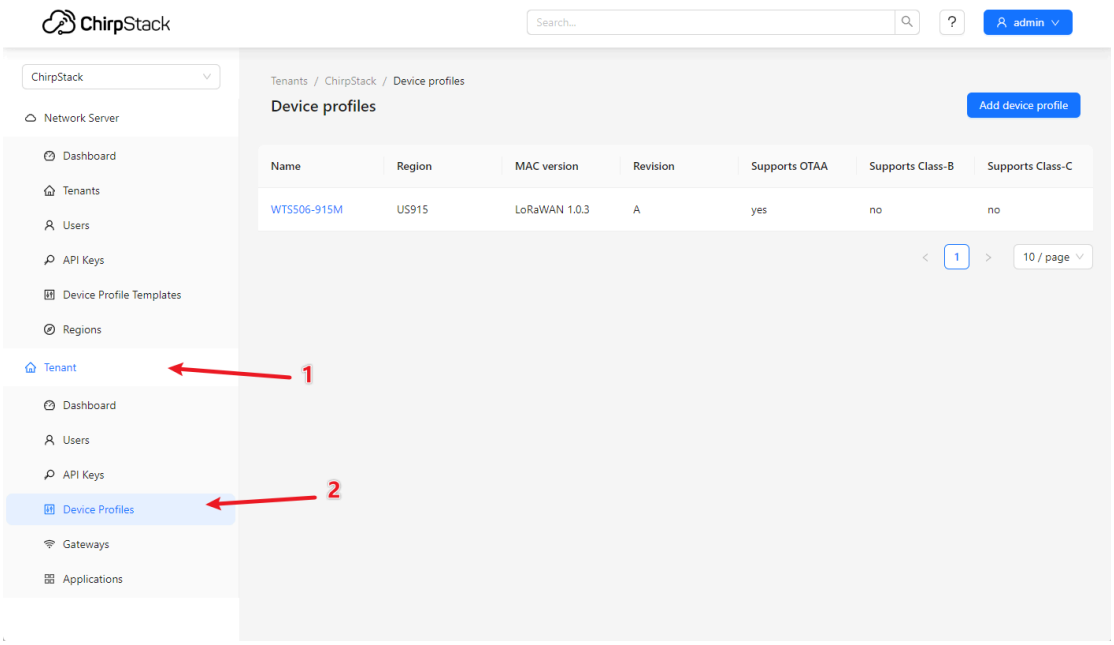




8. If data is present, it indicates successful integration of the gateway and establishment of the data link.

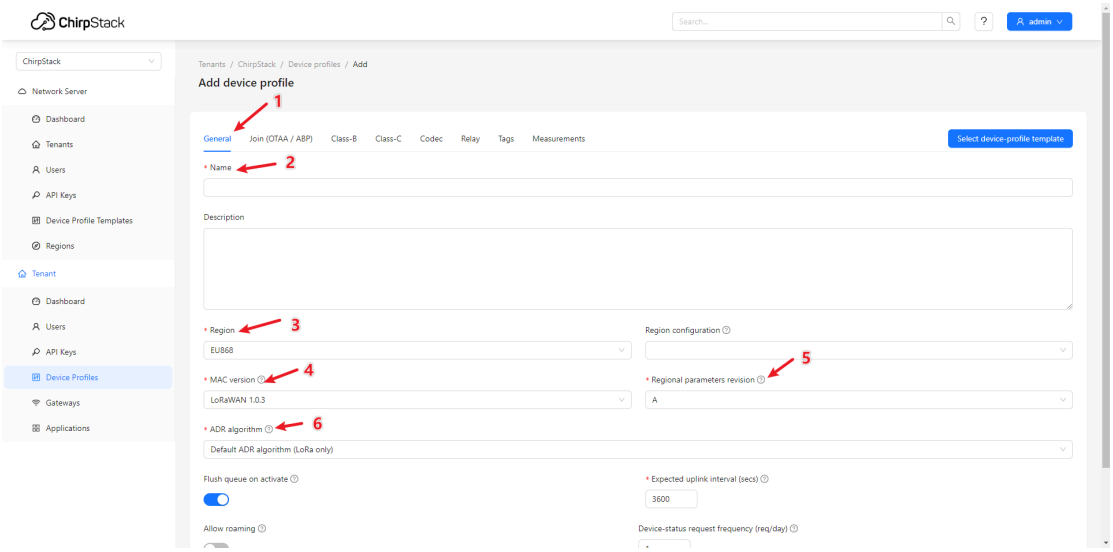
4. Adding Device Profile

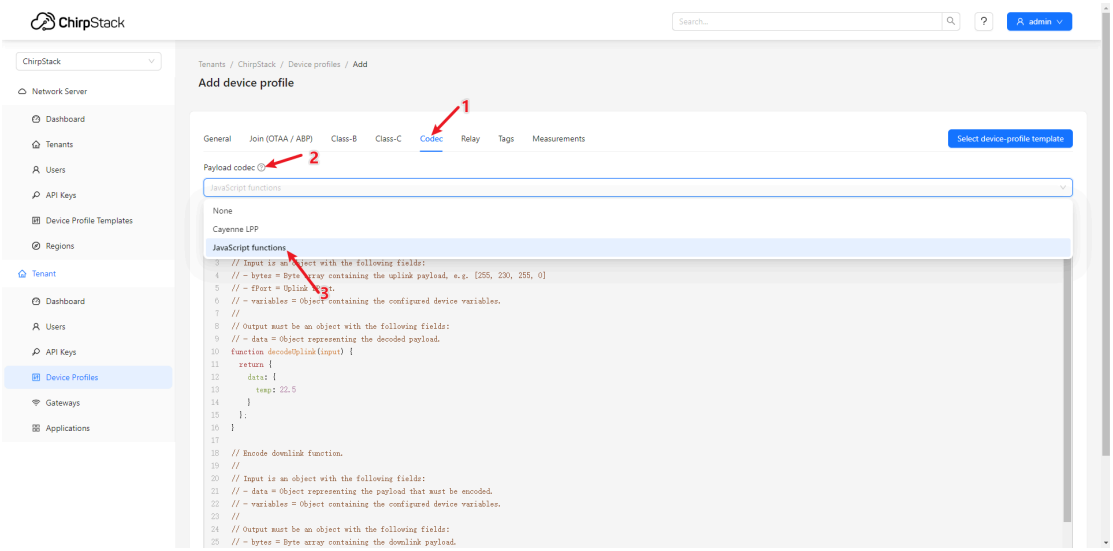
Navigate to the Tenants -> Device Profiles page, click "Add device profile."

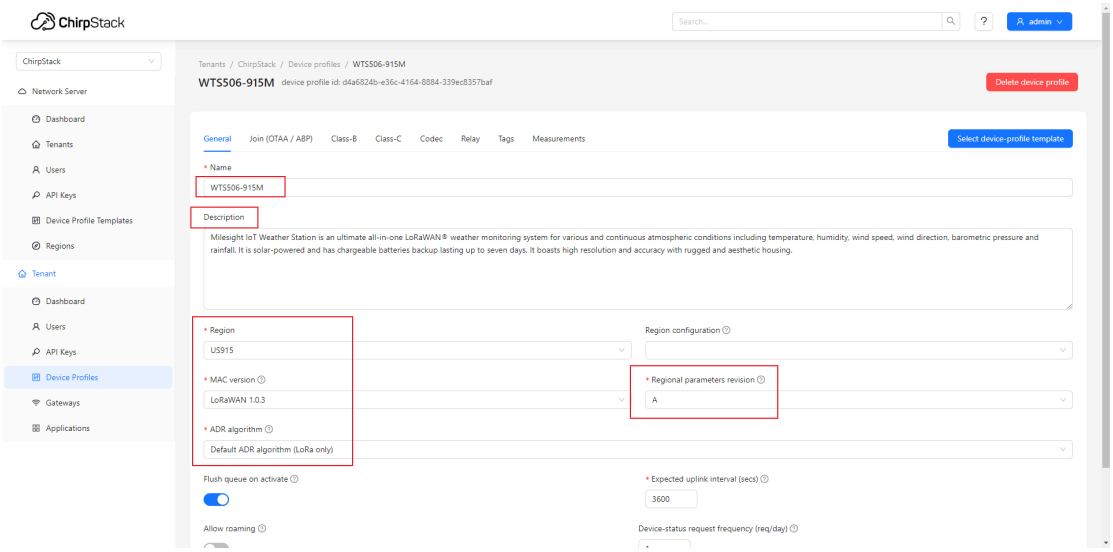


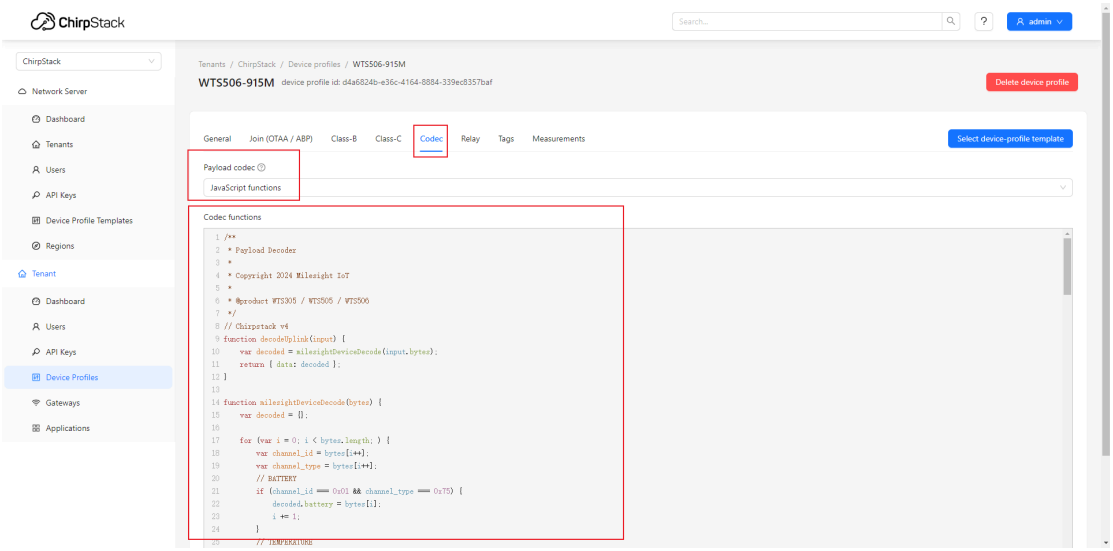
On the popup page, fill in the relevant information.

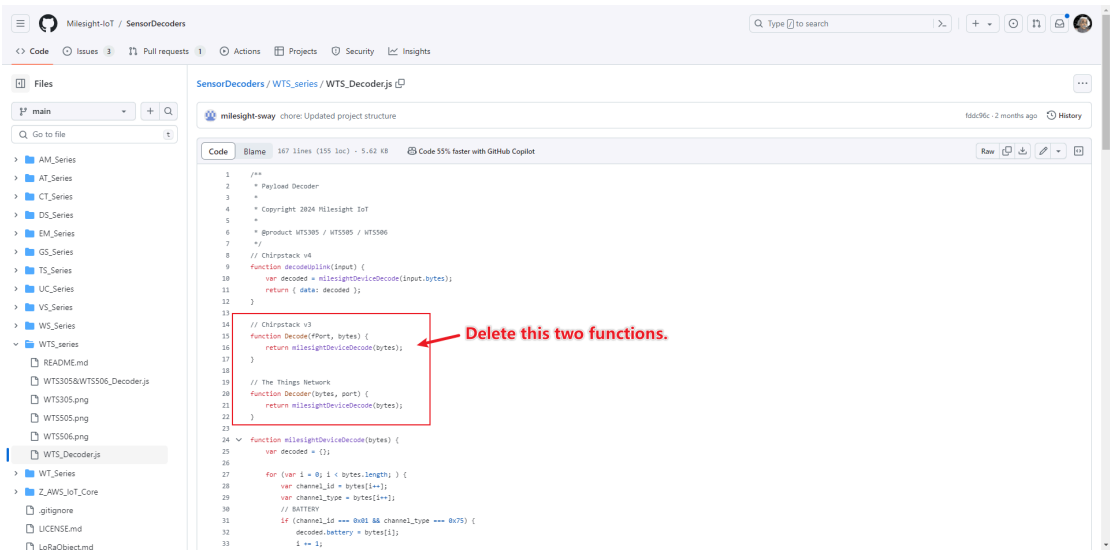
The main fields include the Name, Region, MAC version, ADR algorithm under the General tab, and Payload codec and Codec functions under the codec tab.



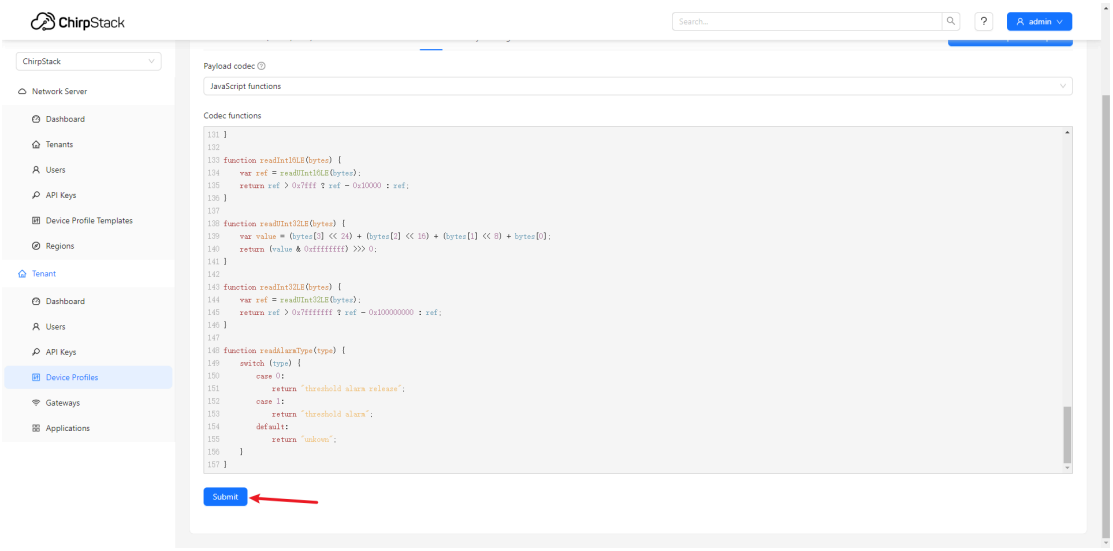



ChirpStack
admin
Tenants / ChirpStack / Device profiles / WTS506-915M
WTS506-915M device profile id: d4a6824b-e36c-4164-8884-339ec8357baf
Delete device profile
General
Join (OTAA / ABP)
Class-B
Class-C
Codec
Relay
Tags
Measurements
Select device-profile template
* Name
WTS506-915M
Description
Milesight IoT Weather Station is an ultimate all-in-one LoRaWAN® weather monitoring system for various and continuous atmospheric conditions including temperature, humidity, wind speed, wind direction, barometric pressure and rainfall. It is solar-powered and has chargeable batteries backup lasting up to seven days. It boasts high resolution and accuracy with rugged and aesthetic housing.
* Region
US915
Region configuration
* MAC version
LoRaWAN 1.0.3
* Regional parameters revision
A
* ADR algorithm
Default ADR algorithm (LoRa only)
Flush queue on activate
* Expected uplink interval (secs)
3600
Allow roaming
Device-status request frequency (req/day)


ChirpStack
admin
Tenants / ChirpStack / Device profiles / WTS506-915M
WTS506-915M device profile id: d4a6824b-e36c-4164-8884-339ec8357baf
Delete device profile
General
Join (OTAA / ABP)
Class-B
Class-C
Codec
Relay
Tags
Measurements
Select device-profile template
Payload codec
JavaScript functions
Codec functions
/**
* Payload Decoder
*
* Copyright 2024 Milesight IoT
*
* @product WTS305 / WTS505 / WTS506
*/
// Chirpstack v4
function decodeUplink(input) {
var decoded = milesightDeviceDecode(input.bytes);
return { data: decoded };
}
function milesightDeviceDecode(bytes) {
var decoded = {};
for (var i = 0; i < bytes.length;) {
var channel_id = bytes[i++];
var channel_type = bytes[i++];
// BATTERY
if (channel_id === 0x01 && channel_type === 0x75) {
decoded.battery = bytes[i];
i += 1;
}
// TEMPERATURE


Milesight-IoT / SensorDecoders
Code
Issues 3
Pull requests 1
Actions
Projects
Security
Insights
Files
main
Go to file
AM_Series
AT_Series
CT_Series
DS_Series
EM_Series
GS_Series
TS_Series
UC_Series
VS_Series
WS_Series
WTS_series
README.md
WTS305&WTS506_Decoder.js
WTS305.png
WTS505.png
WTS506.png
WTS_Decoder.js
WT_Series
Z_AWS_IoT_Core
.gitignore
LICENSE.md
LoRaObject.md
SensorDecoders / WTS_series / WTS_Decoder.js
milesight-sway chore: Updated project structure
Code
Blame
167 lines (155 loc) · 5.62 KB
Code 55% faster with GitHub Copilot
Raw
/**
* Payload Decoder
*
* Copyright 2024 Milesight IoT
*
* @product WTS305 / WTS505 / WTS506
*/
// Chirpstack v4
function decodeUplink(input) {
var decoded = milesightDeviceDecode(input.bytes);
return { data: decoded };
}
// Chirpstack v3
function Decode(fPort, bytes) {
return milesightDeviceDecode(bytes);
}
// The Things Network
function Decoder(bytes, port) {
return milesightDeviceDecode(bytes);
}
function milesightDeviceDecode(bytes) {
var decoded = {};
for (var i = 0; i < bytes.length;) {
var channel_id = bytes[i++];
var channel_type = bytes[i++];
// BATTERY
if (channel_id === 0x01 && channel_type === 0x75) {
decoded.battery = bytes[i];
i += 1;
Delete this two functions.

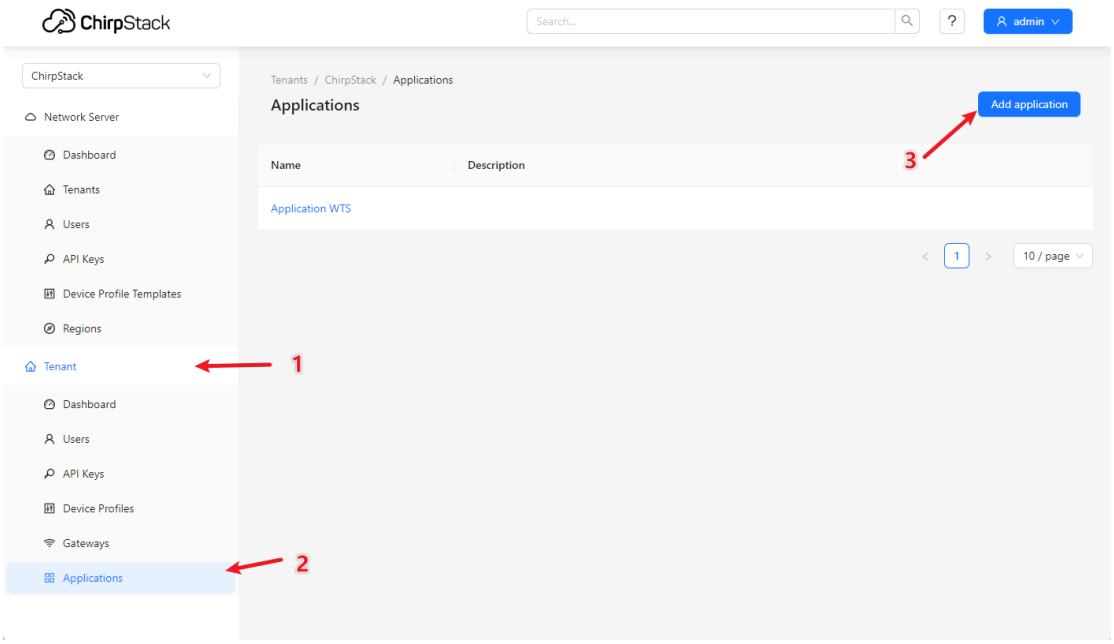
If using products from Milesight, you can access decode code at GitHub - Milesight-IoT/SensorDecoders .
Fill in the Codec functions with the appropriate decode code. However, please note that you need to delete the Decode function and Decoder function from this decode code; keep the rest unchanged.



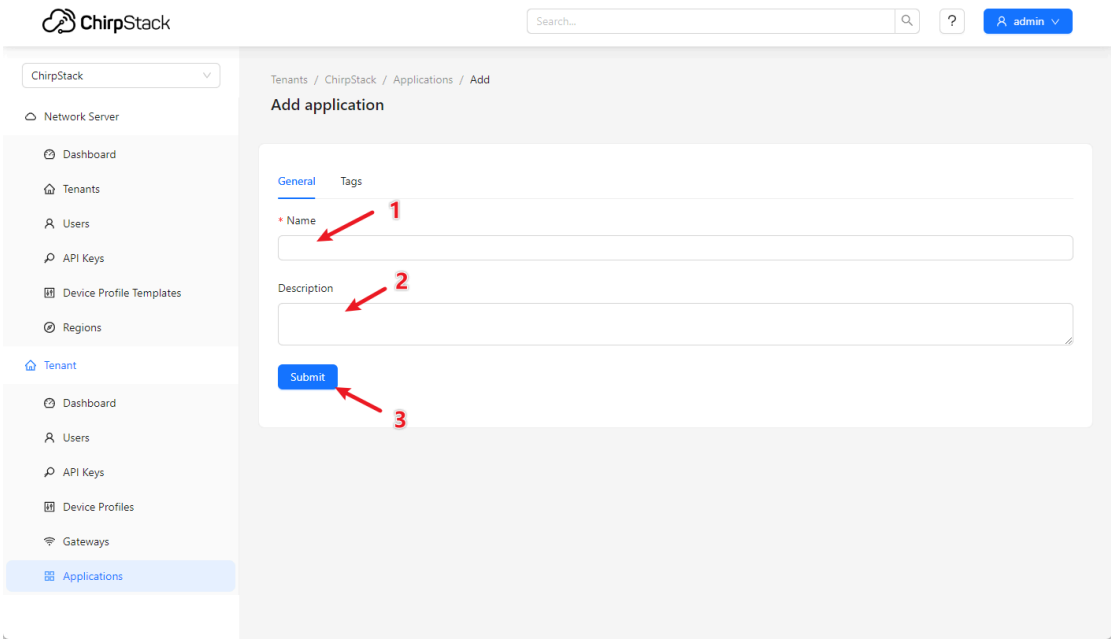
Once completed, click the "Submit" button at the bottom of the page to submit the data.

5. Adding LoRaWAN Device

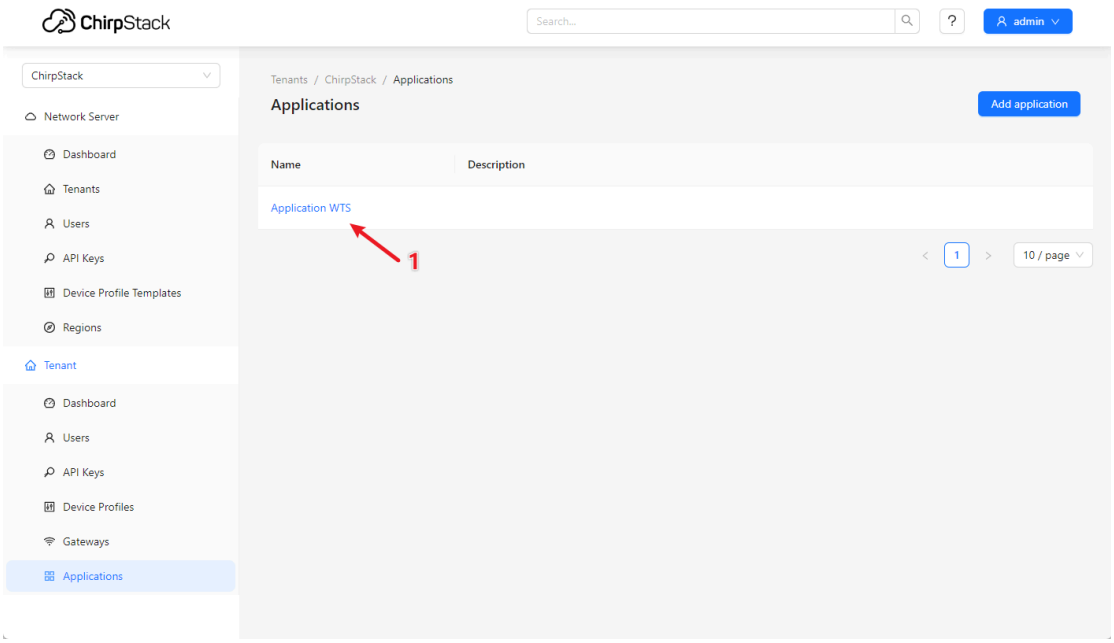
Navigate to Tenants -> Applications, create an application by clicking "Add application."

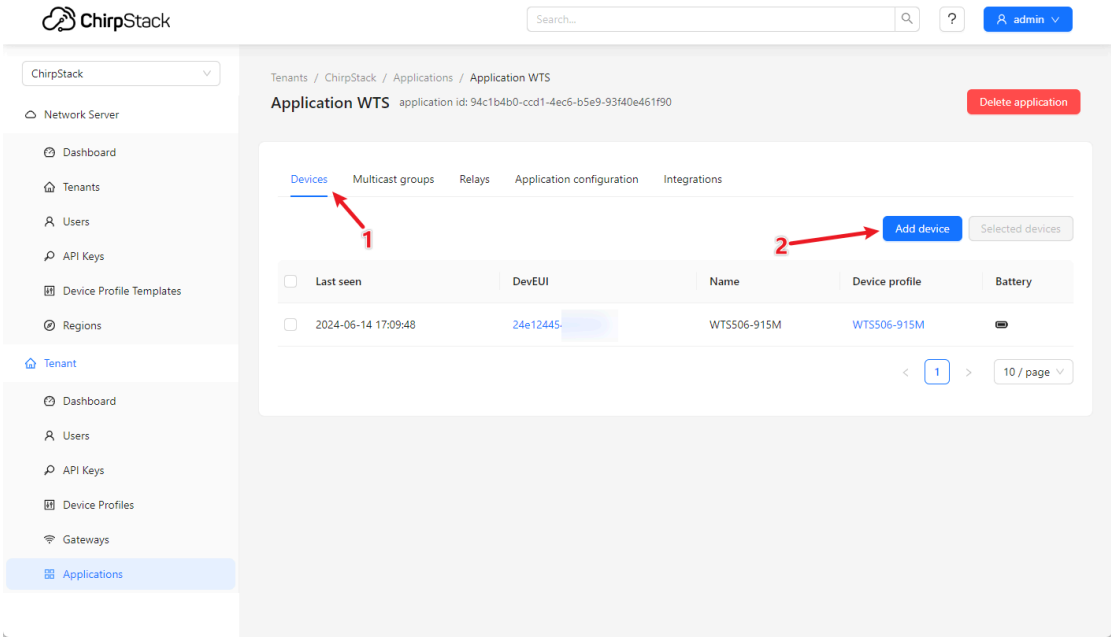


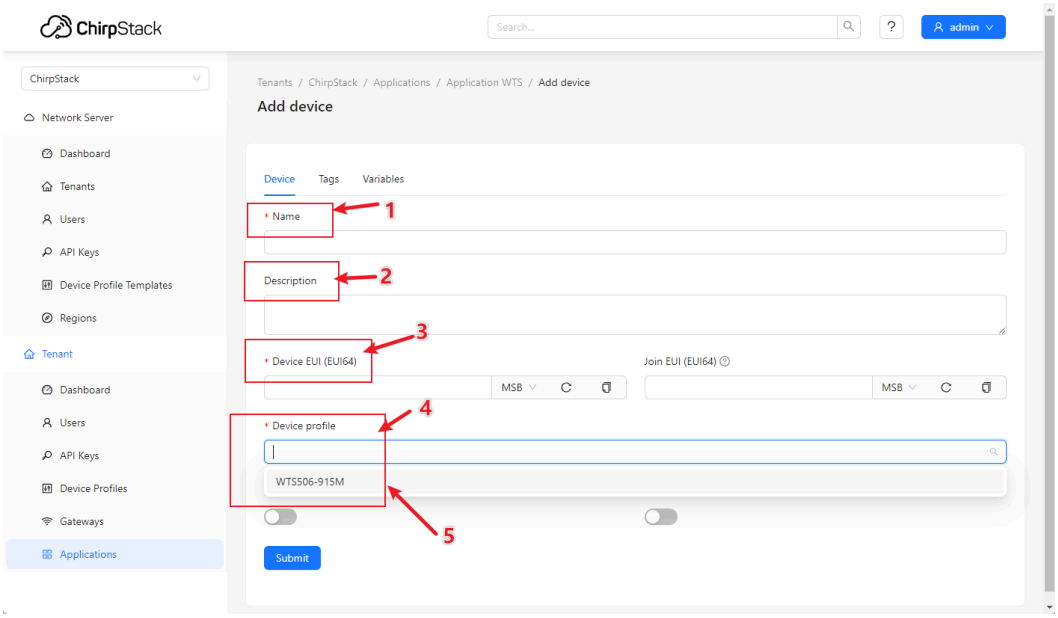
Fill in the Name and other relevant information on the popup page, then click the "Submit" button at the bottom to submit the data.



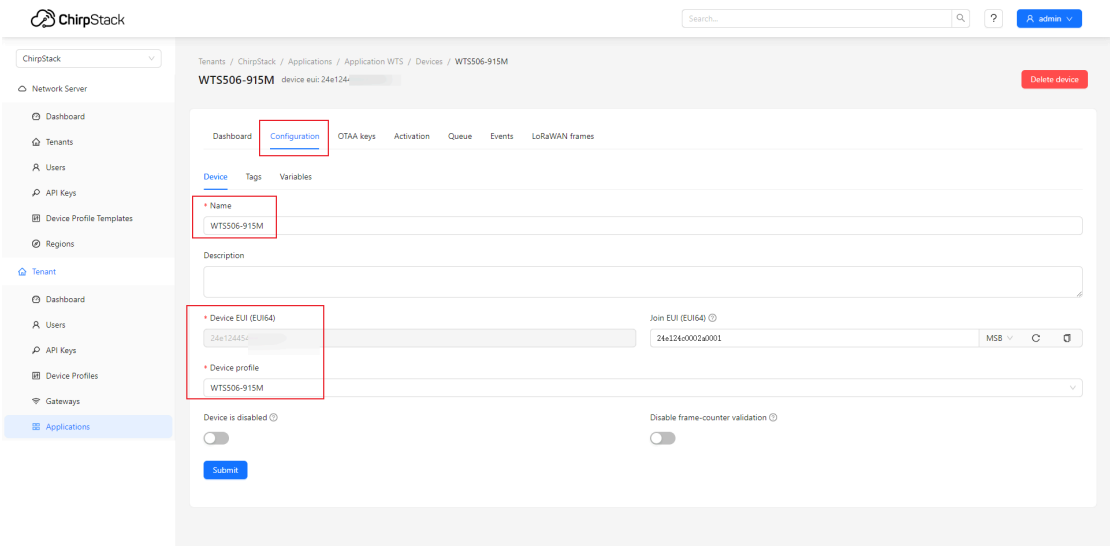
On the Applications page, click on the name of the application you just added. On the popup page, go to the Device tab, find the "Add device" button, and click it.

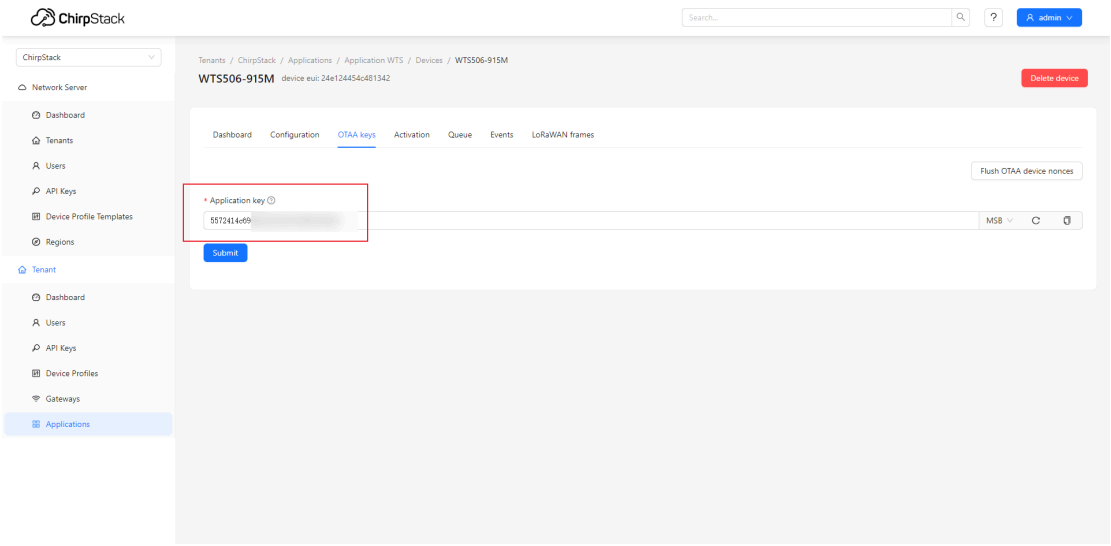

ChirpStack
Search...
admin
ChirpStack
Network Server
Dashboard
Tenants
Users
API Keys
Device Profile Templates
Regions
Tenant
Dashboard
Users
API Keys
Device Profiles
Gateways
Applications
Tenants / ChirpStack / Applications
Applications
Add application
Name
Description
Application WTS
1
1
10 / page


ChirpStack
Search...
admin
ChirpStack
Network Server
Dashboard
Tenants
Users
API Keys
Device Profile Templates
Regions
Tenant
Dashboard
Users
API Keys
Device Profiles
Gateways
Applications
Tenants / ChirpStack / Applications / Application WTS
Application WTS
application id: 94c1b4b0-ccd1-4ec6-b5e9-93f40e461f90
Delete application
Devices
Multicast groups
Relays
Application configuration
Integrations
1
2
Add device
Selected devices
Last seen
DevEUI
Name
Device profile
Battery
2024-06-14 17:09:48
24e12445-
WTS506-915M
WTS506-915M
1
10 / page



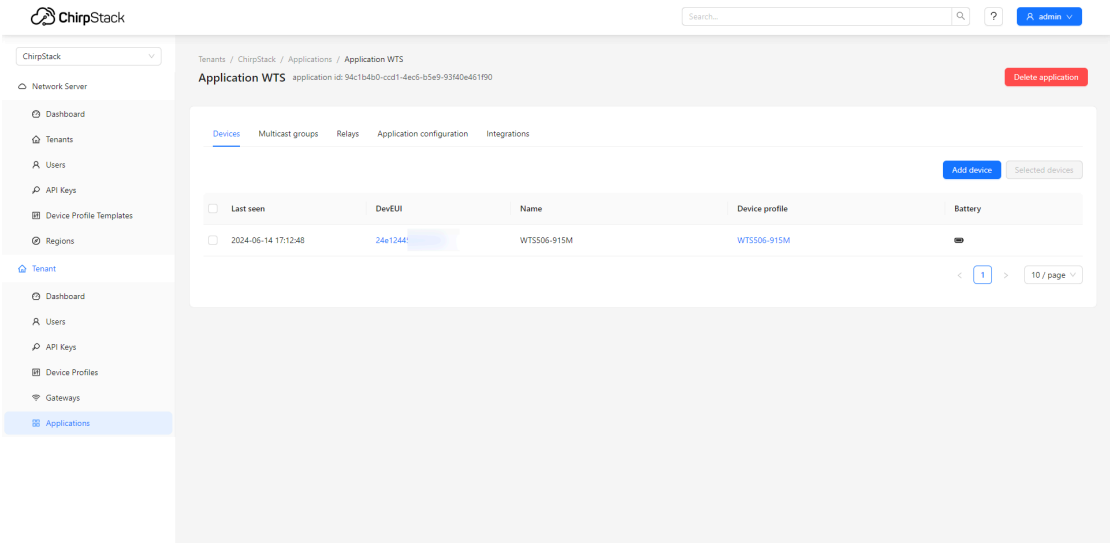
Fill in the Name, Device EUI (EUI64), and Device profile information obtained from your LoRaWAN device on the popup page.

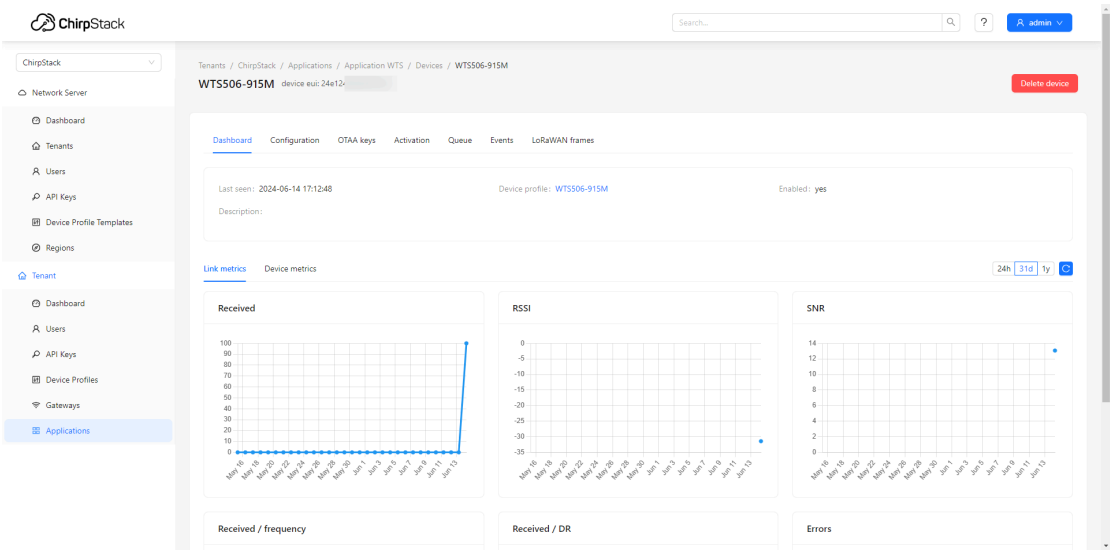


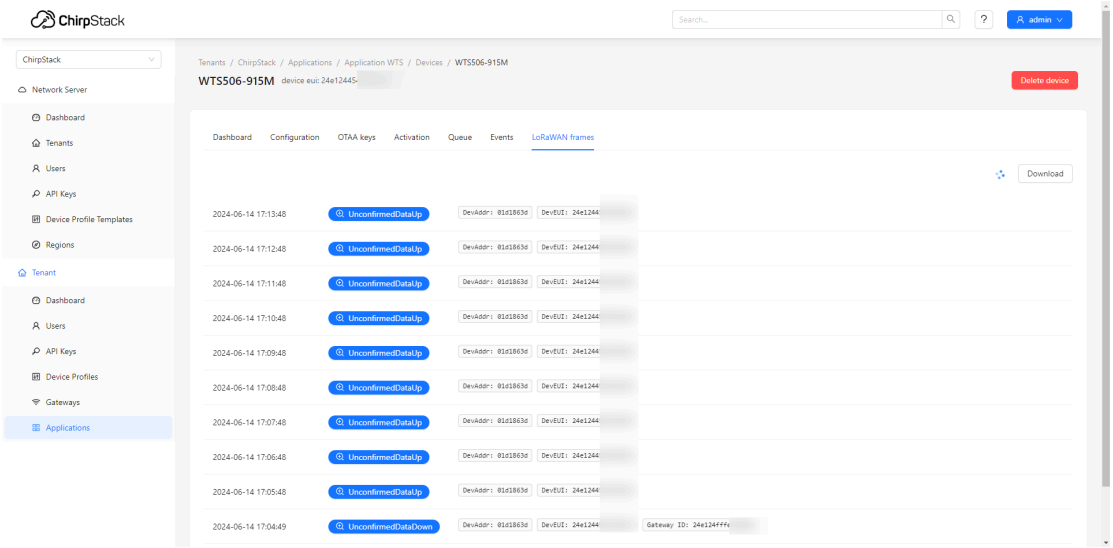


Click the "Submit" button at the bottom to submit the data. Another page will pop up to fill in the Application Key.

After completing the addition, the effect should appear as follows:

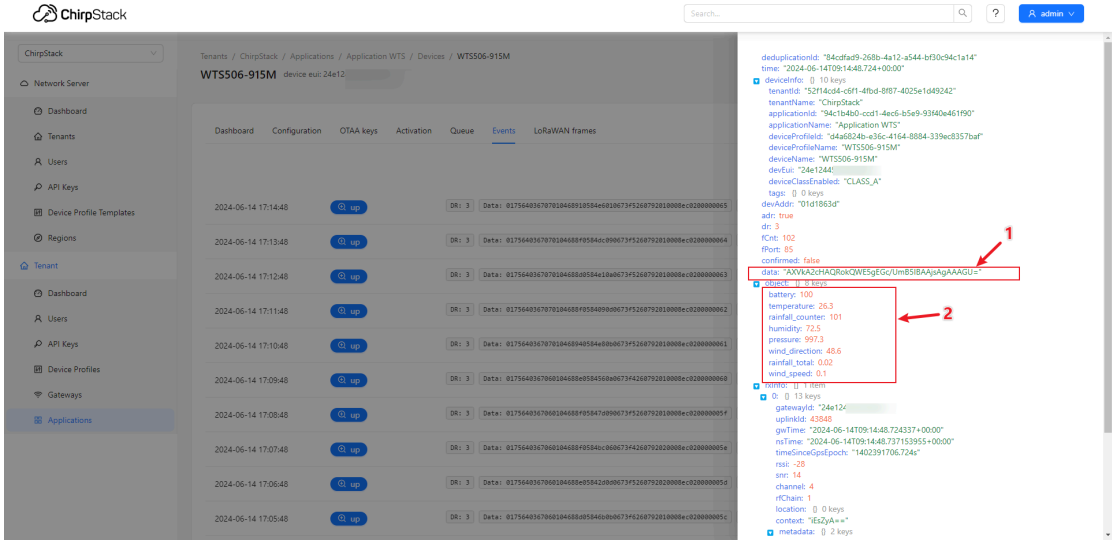






Note: During the process of adding a LoRaWAN device, ensure to select the correct Device Profile; otherwise, the device data may not be correctly parsed.

Here, navigate to the LoRaWAN frames page to see data scrolling and refreshing. Then, open the Events page and randomly check a few packets to verify if they are correctly parsed.



So far, the gateway has been successfully integrated with ChirpStack-v4 and can effectively read and parse data from LoRaWAN devices.

-END-