

  
**UG65 Lora Wan**  
**Niagara 4 Driver**



# tyrrell UG65 Lora Wan Niagara 4 Driver User Guide

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## Product Information

- The LoRaWAN Driver provides a fast and simple interface to a LoRaWAN-based system of devices.
- It can be used with any Niagara Station to communicate with a Mulesight LoRaWAN Gateway, supporting both local LAN and remote cellular connections.
- Integration of LoRaWAN networks into Niagara without manual setup of JSON payloads
- Support for known and unknown devices
- Bidirectional connection to LoRaWAN Gateway via HTTP interface
- Compatible with all brands of Niagara 4
- Follow the installation instructions provided in the user manual to install the LoRaWAN Driver on your Niagara platform.
- Configure the Mulesight LoRaWAN Gateway (e.g., UG65) to establish a connection with the driver.
- Follow the setup guidelines outlined in the manual.
- The LoRaWAN driver is licensed based on points. Ensure that you have the necessary licenses for the number of points in your system.
- Refer to the manual for instructions on licensing and software maintenance.
- Check the list of supported devices to ensure compatibility with your LoRaWAN devices.
- The driver supports both known and unknown devices.

## INTRODUCTION

- The LoRaWAN Driver can be used to provide a fast and simple interface to a LoRaWAN-based system of devices. The driver can be used from any Niagara Station (Web Sup / JACE / 3rd Party Controller) to a Mulesight LoRaWAN Gateway (such as UG65).
- This includes Mulesight Gateways on a local LAN or via a remote cellular connection.
- The driver is designed to simplify the integration of LoRaWAN networks into Niagara without having to manually setup and decode JSON payloads. The driver will support 'known' devices and also support new/unknown devices.
- The connection to the LoRaWAN Gateway is bidirectional over an HTTP interface.

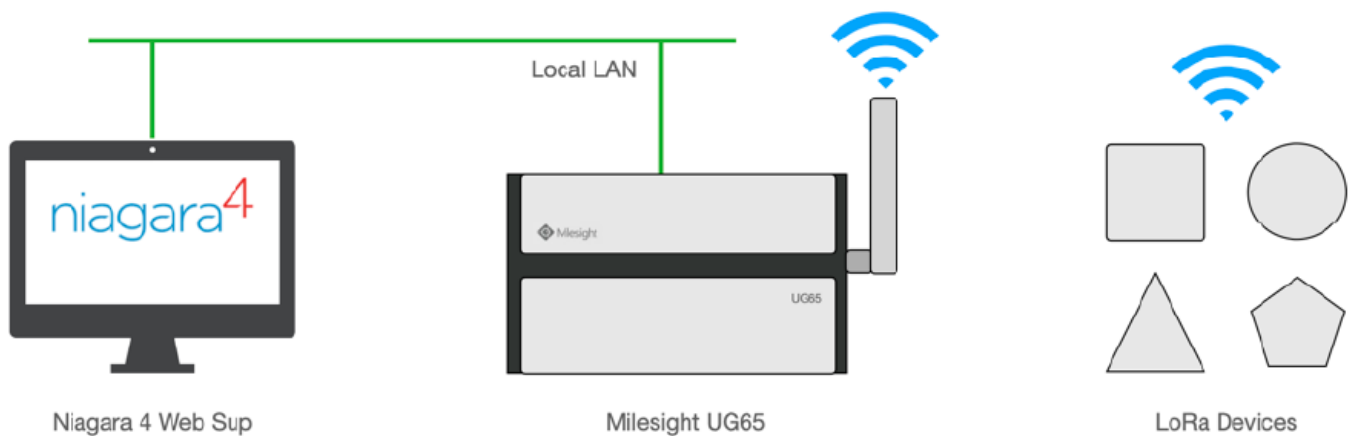
- The Driver is compatible with all brands of Niagara 4 (Tridium / Centraline / Distech / Honeywell / JCI / Trend etc).

The LoRaWAN Driver can be used in several different scenarios on different Tridium Niagara-based platforms via a Milesight Gateway:

- Web Supervisor
- JACE8000 / JACE9000
- Any 3rd Party Controller (IoT Controller / Lynxspring / iSMA MAC36 etc).

### Example 1

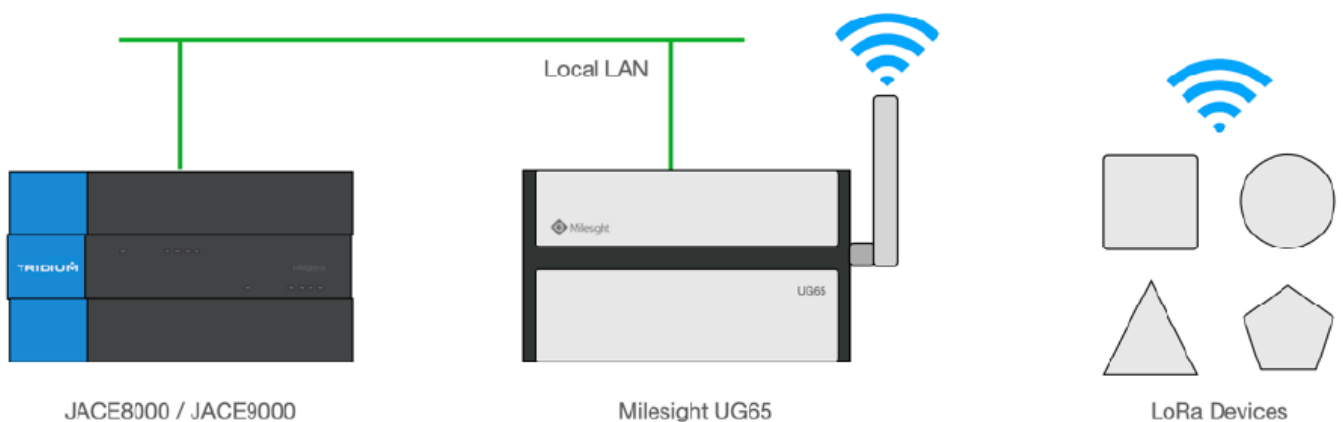
Web Supervisor – Milesight UG65 Gateway (Local LAN)



- The Web Supervisor integrates directly with the local Milesight UG65 Gateway.
- All configured LoRaWAN devices will be discoverable in the Niagara Station and their enclosed points will also be discoverable.

### Example 2

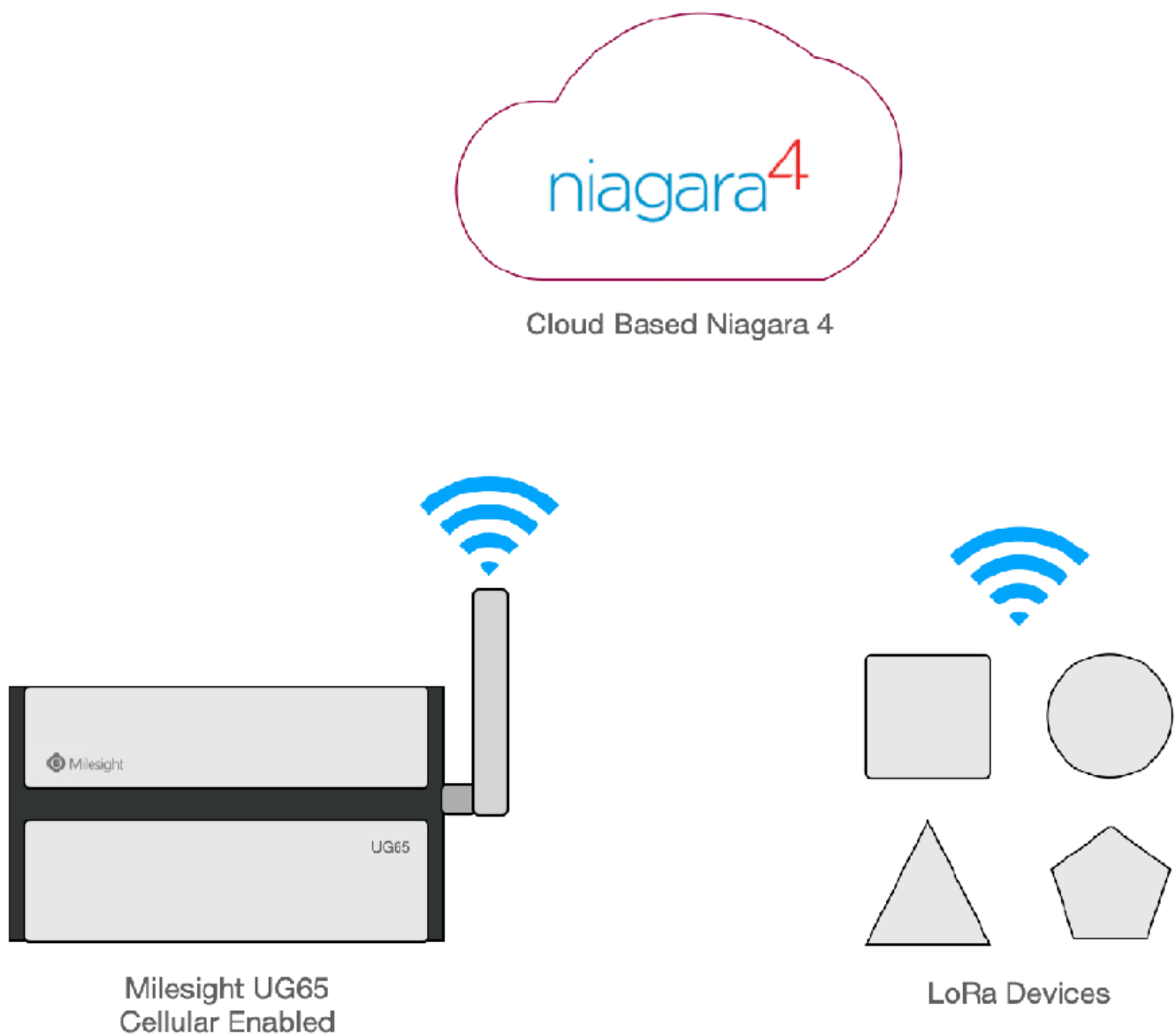
Niagara Enabled Controller – Milesight UG65 Gateway (Local LAN)



- The JACE8000 / 3rd Party Controller integrates directly with the local Milesight UG65 Gateway.
- All configured LoRaWAN devices will be discoverable in the Niagara Station and their enclosed points will also be discoverable.

### Example 3

Cloud-Based Niagara 4 – Remote Milesight UG65 Gateway (Cellular)



- The Web Supervisor integrates remotely to the remote Milesight UG65 Gateway (with an integrated SIM card).
- All configured LoRaWAN devices will be discoverable in the Niagara Station and their enclosed points will also be discoverable.

### LICENSING & SOFTWARE MAINTENANCE

- The LoRaWAN driver is licensed based on points. Each LoRaWAN point will also consume one Global Capacity Point License.
- You will need to provide your Niagara 4 Host ID as part of your purchase. If you are expanding your system in the future you will need to ensure that your LoRaWAN Driver has been expanded to cover the number of new points being added.
- Once the license has been generated you can re-import your Niagara license files from the Platform > License Manager providing you have an internet connection, alternatively you can be emailed a copy of the new license files.
- The LoRaWAN Driver includes a software maintenance feature. Every new purchase of the driver will support the current release of Niagara 4 and the next release of Niagara 4, any subsequent upgrades will require a

software maintenance license to be purchased.

- As an example, the current release of Niagara 4 is N4.13, a new driver purchase will cover you for N4.13 and a future upgrade to N4.14. Any further upgrades, for example to N4.15 or above, will require a software maintenance license to be updated. The software maintenance license would then cover you for the now current release of Niagara 4 (as an example N4.15). You can upgrade from any previous release with a single software maintenance purchase.
- Ensure the target Host License Manager is up to date with a Tyrrell. license and Tyrrell.certificate containing the required license features.
- Any questions or queries concerning this item should be sent to [sales@tyrrellproducts.com](mailto:sales@tyrrellproducts.com)

### LoRaWAN Driver License Packs

Product Code	Descrip/on
LoRaWAN 0025	LoRaWAN Driver 25 Point License Pack 1x LoRaWAN Network 25x LoRaWAN Points
LoRaWAN 0050	LoRaWAN Driver 50 Point License Pack 1x LoRaWAN Network 50x LoRaWAN Points
LoRaWAN 0100	LoRaWAN Driver 100 Point License Pack 1x LoRaWAN Network 100x LoRaWAN Points
LoRaWAN 0250	LoRaWAN Driver 250 Point License Pack 1x LoRaWAN Network 250x LoRaWAN Points
LoRaWAN 0500	LoRaWAN Driver 500 Point License Pack 1x LoRaWAN Network 500x LoRaWAN Points

### LoRaWAN Driver Upgrade Packs

LoRa0025-UPG	25x LoRaWAN Points
LoRa0050-UPG	50x LoRaWAN Points
LoRa0100-UPG	100x LoRaWAN Points
LoRa0250-UPG	250x LoRaWAN Points
LoRa0500-UPG	500x LoRaWAN Points

## DRIVER INSTALLATION

- The LoRaWAN Driver supports Niagara 4.10 and above.

## NOTE

If your installation is running an older version of the Niagara software then it must be upgraded to meet the above requirements to run this service.

Any future updates to the LoRaWAN Service will be available for the current release and previous Niagara 4 release. All other releases will become legacy and unsupported.

## Niagara 4 Installation

You will need the version specific JAR files for your Niagara 4 installation. These can be downloaded from the Customer Portal or alternatively contact support.

To install the Service copy the below JARS to c:\niagara\niagara 4.x.xx\modules

- LoRaWAN-rt.jar
- LoRaWAN-wb.jar

Once the files have been put into the correct directory close your workbench, and relaunch. Any running Stations on the local machine will have to be re-started to make use of the LoRaWAN Driver.

The LoRaWAN Driver is now ready to use in a local station or to commission / update a JACE.

To install the driver on a JACE use the Commissioning Wizard on the platform of the target device.

## MILESIGHT SETUP

The Milesight Gateway will need to have a specific configuration applied:

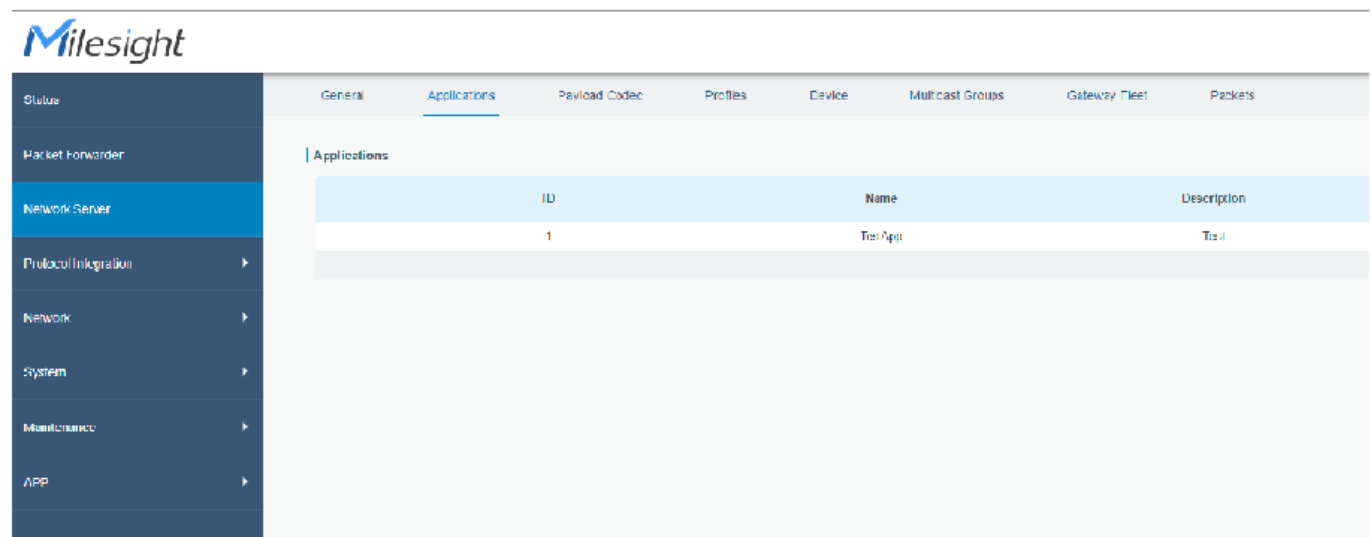
- Create An Application(s)
- Assign LoRaWAN Devices to the Application(s)

The integration between Niagara 4 and Milesight gateway will support HTTP connections only.

This is a current limitation of the Milesight Gateways.

## MILESIGHT APPLICATIONS

- Login to your Milesight Gateway (the default details are printed on the rear of the unit).
- Navigate to Network Server > Applications



- Create a new Application and save it.

Status
Packet Forwarder
Network Server
Protocol Integration
Network
System
Maintenance
APP

General
Applications
Payload Codec
Profiles
Device
Multicast Groups

Packets

Applications

Name
Niagara 4

Description
Niagara 4 Connection

Data Transmission

Type

Operation

+

Save
Cancel

- Re-edit the Application and a new Operation – HTTP
- Edit the Uplink Data field to `http://IPADDRESS/lorawan/noAuthListener/uplink`.
- Where IPADDRESS is the address of your Niagara 4 Station. Example:  
`http://192.168.23.10/lorawan/noAuthListener/uplink`

Status
Packet Forwarder
Network Server
Protocol Integration
Network
System
Maintenance
APP

General
Applications
Payload Codec
Profiles
Device
Multicast Groups
Gateway Fleet
Packets

Applications

Name
Niagara4

Description
Niagara 4 Application

Data Transmission

Type
HTTP

HTTP Header

Header Name

Header Value

Operation

+

URL

Data Type

URL

Uplink data

http://192.168.23.10/lorawan/

- Save both the Operation and Application, then return to the main menu.

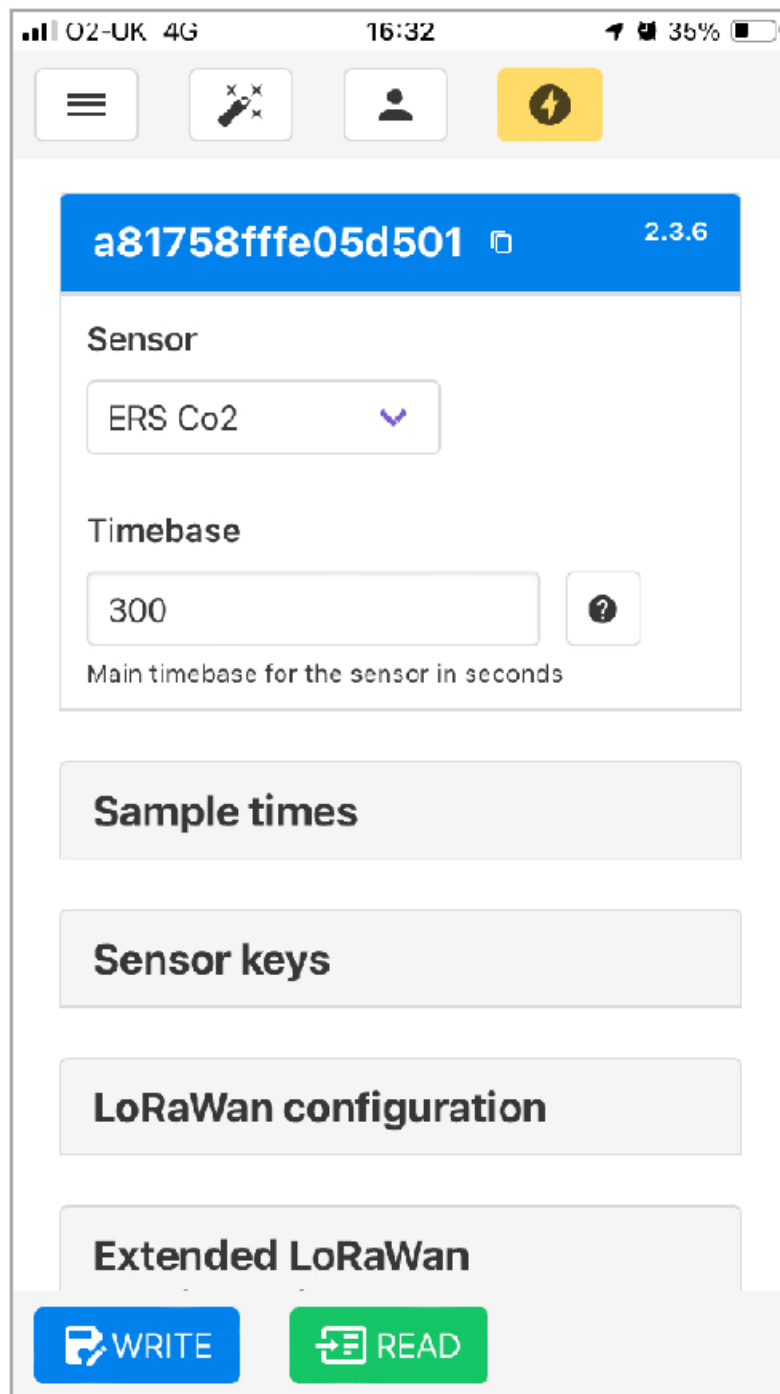
## LORAWAN SENSORS

- Before configuring the Niagara Station you will need to ensure that your Milesight Gateway is paired with at least one LoRaWAN Device.
- You may require a dedicated Mobile Phone App to configure the sensor, the guide will demonstrate an Elsy

sensor.

- Download the Sensor App onto your Mobile Device.

**Note:** Your mobile device must be fitted with a NFC chip to work.



- Make note of the Sensor UID (a81758fffe05d501)
- In the Milesight Gateway navigate to Network Server > Device

**Add a new Device**



Device Name	Elsys 3in1
Description	Technicals Desk
Device EUI	a81758ffe05d501
Device-Profile	ClassA-OTAA ▼
Application	Niagara4 ▼
Payload Codec	None ▼
fPort	1
Frame-counter Validation	<input type="checkbox"/>
Application Key	328d1a19bd244d3b129ba1514fd
Device Address	
Network Session Key	
Application Session Key	
Uplink Frame-counter	0
Downlink Frame-counter	0

Se2ng	Descrip/on
<b>Device Name</b>	Unique Name of the Device
<b>Descrip/on</b>	User Friendly DescripGon
<b>Device EUI</b>	From the Sensors App
<b>Device Profile</b>	From Spec Sheet Of Device
<b>Applica/on</b>	Your Custom application in the previous step
<b>Payload Codec</b>	None By Default Can be changed for new/unknown devices (see later section)
<b>App Key</b>	From the Sensors App Milesight Default is: 5572404c696e6b4c6f52613230313823

- Once you have added a device ensure it is active and sending data before proceeding.
- Once working the Last Seen and Activated fields will update.

admin

General

Applications

Payload Codec

Profiles

Device

Multicast Groups

Gateway Fleet

Packets

?

Device

Add

Back to top

Default All

Search

Device Name	Device ID	Device Profile	Application	Last Seen	Activated	Operations
niagara-dev1	AS4768b444-0a1a01	Station 4 (Ni4) AA	Niagara 4	2023-09-08 10:00:00	<div></div>	<div></div> <div></div>

Showing 1 to 1 of 1 rows

**NIAGARA WEB SERVICE**

- Connect to your Niagara 4 Station.
- Navigate to Station > Services > Web Service.
- Set the HTTP option to TRUE and Ensure HTTPS ONLY is set to FALSE.

WebService (Web Service)

Status

{ok}

Fault Cause

Enabled

true

Http Port

80 tcp

Http Enabled

true

Https Port

443 tcp

Https Enabled

true

Https Only

false

**LORAWAN DRIVER**

- Navigate to Station > Config > Drivers and add a new LoRaWAN Driver.
- Navigate to the AX Property Sheet view of the Network.

LoRaWANNetwork (LoRaWAN Network)	
Status	{ down }
Enabled	<input checked="" type="radio"/> true ▼
Fault Cause	
Health	Fail [11-Jan-24 5:09 PM GMT] No data received re...
Alarm Source Info	Alarm Source Info
Monitor	LoRaWAN Ping Monitor
Tuning Policies	Tuning Policy Map
Network Server Type	None ▼
Network Server	Null Network Server

- Change the Network Server Type to Milesight UG65

## NETWORK SERVER

- Expand the Network Server Section

Property Sheet	
LoRaWANNetwork (LoRaWAN Network)	
Status	{ down }
Enabled	<input checked="" type="radio"/> true ▼
Fault Cause	
Health	Fail [11-Jan-24 5:09 PM GMT] No data received re...
Alarm Source Info	Alarm Source Info
Monitor	LoRaWAN Ping Monitor
Tuning Policies	Tuning Policy Map
Network Server Type	Milesight UG65 ▼
Network Server	Milesight UG65 Network Server
Url	
Username	
Password	

**Note:** The user account MUST be the admin account.

Setting	Description
URL	IP of the Milesight Gateway http://192.168.23.150
Username	admin
Password	Admin account password

## DEVICE MANAGER

- Navigate to the LoRaWAN Driver > Device Manager and press Discover.
- The driver will then discover all available devices from the Milesight Gateway

Lorawan Discovery

Discovered

Device Name	Device Eui	Description	Last Seen
<div><div></div><div>Elsys 3in1</div></div>	A81758FFFE05D501	Technicals Desk	2023-12-07 09:43:43.446873 +0800 CST

Database

Name	Type	Exts	Device Eui	Device Type
------	------	------	------------	-------------

- Add the required device(s) to the Station database.

When adding a device the Add Window will have a Device Type option. The driver has a preconfigured library of devices that will automatically 'work'. New / Unknown devices can still be added but need to be set with a 'Generic' profile and the JSON payload decode. Refer to the section Supported Devices for more information.

Name	Type	Device Eui	Device Type
Elsys 3in1	LoRaWAN Device	A81758FFFE05D501	ELSYS CO2 Lite

☐ **Name**

☐ **Type**

☐ **Device Eui**

☐ **Device Type**

Generic (pre-decoded JSON)  
 RAK7431  
**ELSYS CO2 Lite**  
 adeunis Pulse  
 Milesight AM319  
 Milesight EM300-MCS  
 Milesight EM300-SLD/ZLD  
 Milesight EM300-TH  
 Milesight TS101

- Once the device has been added navigate to the Points container of the device.

## POINT DISCOVERY

- In the Point Manager Window press the Discover button and all available points will be presented.

Lorawan Discovery					
Discovered					
Point Name	Display Name	Point Type	Json Field	Device Facets	Point Facets
temperature	Temperature	control:NumericPoint	temperature	precision=1,units=°C	precision=1,units=°C
humidity	Humidity	control:NumericPoint	humidity	precision=0,units=%	precision=0,units=%
co2	CO2	control:NumericPoint	co2	precision=0,units=ppm	precision=0,units=ppm
vdd	Battery	control:NumericPoint	vdd	precision=0,units=mV	precision=0,units=mV

- Add the required Points to the Station Database.

Database					
Name	Type	Out	Enabled	Device Facets	Json Field
temperature	Numeric Point	0.0 °C {stale}	true	precision=1,units=°C	temperature
humidity	Numeric Point	0 % {stale}	true	precision=0,units=%	humidity
co2	Numeric Point	0 ppm {stale}	true	precision=0,units=ppm	co2
vdd	Numeric Point	0 mV {stale}	true	precision=0,units=mV	vdd

- The Points will all remain STALE until the LoRaWAN sensor next reports to the Gateway.
- Check the device configuration either way for the next publish cycle or change the device config to report more frequently during setup.

Database					
Name	Type	Out	Enabled	Device Facets	Json Field
temperature	Numeric Point	22.9 °C {ok}	true	precision=1,units=°C	temperature
humidity	Numeric Point	39 % {ok}	true	precision=0,units=%	humidity
co2	Numeric Point	1669 ppm {ok}	true	precision=0,units=ppm	co2
vdd	Numeric Point	3627 mV {ok}	true	precision=0,units=mV	vdd

- The points will then only update their values when the LoRaWAN sensor reports to the LoRaWAN Gateway (for example every 5 minutes).

## SUPPORTED DEVICES

The LoRaWAN driver automatically supports the following device types:

- Adonis Pulse Counter  
2x Configurable Pulse Counter Inputs
- B Meters RFM-LR1  
For pre-equipped single-jet water meters
- EISys CO2 Lite (3 in 1)  
Temp / Hum / CO<sub>2</sub>
- Milesight AM102L  
Temp / Hum
- Milesight AM103L  
Temp / Hum / CO<sub>2</sub>
- Milesight AM307  
7 in 1 Sensor  
Temp / Hum / Motion / Light / TVOC / Barometric Press / CO<sub>2</sub>
- Milesight AM308  
9 in 1 Sensor  
Temp / Hum / Motion / Light / TVOC / Pressure / CO<sub>2</sub> / PM2.5 / PM10
- Milesight AM319  
11 in 1 Sensor

Temp / Hum / Motion / Light / TVOC / Pressure / CO<sub>2</sub> / PM2/5 / PM10 / (HCHO)<sup>2</sup> / (O<sub>3</sub>)<sup>2</sup>

- Milesight EM300 DI  
Temp / Hum / DI or Pulse Counter
- Milesight EM300 MCS  
Temp / Hum / Magnetic Switch
- Milesight EM300 SLD/ZLD  
Temp / Hum / Leak Detection
- Milesight EM300 TH  
Temp / Hum
- Milesight TS101  
Insertion Temp
- Milesight TS201  
Flying Lead Temperature Probe
- Milesight TS301  
1x Connector for PT100 Sensor OR Magnetic Switch
- Milesight TS302  
2x Connector for PT100 Sensor OR Magnetic Switch
- Milesight UC300  
IO Controller  
4\* DI / 2\* DO / 2\* 4-20mA / 2\* 0-10v / 2\* PT100 Sensor  
\*RS485 NOT CURRENTLY SUPPORTED!
- Milesight VS350  
Passage People Counter
- Milesight WT101\* (In Development)  
Smart Radiator Thermostat

Other devices are supported in one of two ways:

- Use the 'Generic' profile and decode the incoming JSON
- For Sensor/Device Types that are not listed in the LoRaWAN Niagara driver, please ask Tyrrell Products Ltd about adding your LoRaWAN Device type to the driver's dropdown list.

This will greatly simplify the process of adding devices in the future.

## LORAWAN DEVICE PAYLOAD DE-CODING

- New/unknown LoRaWAN device types can still be supported by using the "Generic (predecoded JSON)" Device Type drop-down list option in combination with some modifications to the device manufacturer-supplied JavaScript "Payload Decoder Function".
- This example will cover an EM300-TH.
- You will need the manufacturer's decoder script.
- As an example: [https://github.com/Milesight-IoT/SensorDecoders/blob/main/EM\\_Series/EM300\\_Series/EM300-TH/EM300-TH\\_Chirpstack.js#L1](https://github.com/Milesight-IoT/SensorDecoders/blob/main/EM_Series/EM300_Series/EM300-TH/EM300-TH_Chirpstack.js#L1)



```

/**
 * Payload Decoder for Milesight Network Server
 *
 * Copyright 2023 Milesight IoT
 *
 * @product EM300-TH
 */
function Decode(fPort, bytes) {
    return milesight(bytes);
}

function milesight(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
        else if (channel_id === 0x03 && channel_type === 0x67) {
            // °C
            decoded.temperature = readInt16LE(bytes.slice(i, i + 2)) / 10;
            i += 2;

            // °F
            // decoded.temperature = readInt16LE(bytes.slice(i, i + 2)) / 10 * 1.8 + 32;
            // i += 2;
        }
        // HUMIDITY
        else if (channel_id === 0x04 && channel_type === 0x68) {
            decoded.humidity = bytes[i] / 2;
            i += 1;
        }
        // TEMPERATURE & HUMIDITY HISTROY
        else if (channel_id === 0x20 && channel_type === 0xce) {
            var point = {};
            point.timestamp = readUInt32LE(bytes.slice(i, i + 4));
            point.temperature = readInt16LE(bytes.slice(i + 4, i + 6)) / 10;
            point.humidity = bytes[i + 6] / 2;

            decoded.history = decoded.history || [];
            decoded.history.push(point);
            i += 8;
        } else {
            break;
        }
    }

    return decoded;
}

```

- More JSON has been chopped for the sake of convenience.
- You will need to copy the whole of the JS to Notepad++ and modify the first part

### Original Example



```

/**
 * Payload Decoder for Milesight Network Server
 *
 * Copyright 2023 Milesight IoT
 *
 * @product EM300-TH
 */
function Decode(fPort, bytes) {
    return milesight(bytes);
}

function milesight(bytes) {
    var decoded = {};
}

```

### Modified Example

```

/**
 * Payload Decoder for Milesight Network Server
 *
 * Copyright 2023 Milesight IoT
 *
 * @product EM300-TH
 */
function Decode(fPort, bytes) {
    var decoder = {};
    decoder.devEUI = LoRaObject.devEUI;
    decoder.dataJson = milesight(bytes);
    decoder.time = LoRaObject.time;
    return decoder;
}

function milesight(bytes) {
    var decoded = {};
}

```

## Information

- The entry decoder. data on = milesight(bytes); must match up with the next section line function milesight(bytes).
- Once modified copy with the whole of JS to apse into the milesight gateway.

Open the Milesight Web Server and log in.

Navigate to Network Server > Payload Codec Add a new Custom Payload Codec.

Custom Payload Codec

Name

JSON Codec EM300

Description

Test EM300-TH

Template

None

Payload Decoder

Payload Decoder Function

```

1  /**
2   * Payload Decoder for Milesight Network Server
3   *
4   * Copyright 2023 Milesight IoT
5   *
6   * @product EM300-TH
7   */
8  function Decode(fPort, bytes) {
9      // return milesight(bytes);
10     var decoder = {};
11     decoder.devEUI = LoRaObject.devEUI;
12     decoder.dataJson = milesight(bytes);
13     decoder.time = LoRaObject.time;
14     return decoder;
15 }
16
17 function milesight(bytes) {
18     var decoded = {};

```

- Paste the modified JSON into the Payload Decoder Field Save the custom codec.
- Navigate to Network Server > Device
- Edit the Device in question
- Change the Payload Codec from None to JSON Codec EM300 (or appropriate Codec Name)

MS\_EM300

Device Name

MS\_EM300

Description

TH300

Device EUI

24E124136B327698

Device-Profile

ClassA-OTAA

Application

Niagara4

Payload Codec

JSON Codec EM300

fPort

1

Frame-counter Validation

☐

Application Key

5572404c696e6b4c6f526132303e

Device Address

06097d82

Network Session Key

f1fb78eab56b278b062ff17edd0d3

Application Session Key

e1cf7cdb8bc22486270ca8c818e

Uplink Frame-counter

29

Downlink Frame-counter

2

Save & Apply

## NIAGARA GENERIC JSON

- Return to the Niagara Station and discover the LoRaWAN devices.
- Add the target device handset the Device Type to Generic (pre-coded JSON)
- The Point Discovery will not work and the points will have to be manually programmed based on their JSON payload names. These can all be obtained from the Payload Decoder.

Name	Type	Facets	Fault Cause	Enabled	Device Facets	Tuning Policy Name	Read Value
Temp	Numeric Point	units=null,precision=1,min=-inf,max=+inf		true		defaultPolicy	24.40 {ok}

Name: Temp  
 Type: Cannot edit  
 Facets: units=null,precision=1,min=-inf,max=+inf  
 Fault Cause:   
 Enabled: true  
 Device Facets:   
 Tuning Policy Name: defaultPolicy  
 Read Value: 24.40 {ok}  
 Write Value: 0.00 {ok}  
 Json Field: temperature

OK Cancel

- In the above example, the JSON Field is temperature.
- The Name and Facets can be configured as required based on the point type.
- The next time the LoRaWAN device reports to the Gateway the points will update their values.



## REVISION HISTORY

REVISION	DESCRIPTION
1.0	Draft Release For Approval
1.1	General Update
1.2	List of Automatically Supported Devices Expanded

## FAQ

- **How do I expand my LoRaWAN system with new points?**
  - To expand your system with new points, you will need to ensure that your LoRaWAN Driver's license covers the additional points. Contact support for assistance with expanding your license.
- **Can I use the LoRaWAN Driver with other brands of Niagara 4?**
  - Yes, the LoRaWAN Driver is compatible with all brands of Niagara 4, including Tridium, Centraline, Distech, Honeywell, JCI, and Trend.

## Documents / Resources

  <small>LoRaWAN Driver (Milesight) for Tridium Niagara 4 Technical Guide</small>	<a href="#">tyrrell UG65 Lora Wan Niagara 4 Driver</a> [pdf] User Guide UG65 Lora Wan Niagara 4 Driver, UG65, Lora Wan Niagara 4 Driver, Wan Niagara 4 Driver, Nia gara 4 Driver, 4 Driver
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## References

- [User Manual](#)

[Manuals+](#), [Privacy Policy](#)

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