

Nube iO Connectivity and Security Outline



About LoRa	3
What is LoRa? What makes it such a great technology?	3
What is LoRaWan?	3
Is loRa only for wide-area-networks?	3
LoRa Vs LoRaWan	3
Advantages of LoRaWAN	3
Disadvantages of LoRaWAN	4
Advantages of LoRa-'RAW'	4
Disadvantages of LoRa-'RAW'	4
Network Overview	5
Web Admin Console	6
Connection Method	6
Authorisation Code Flow	6
Password Credentials Flow	6
Client Credentials Flow	6
Remote Site Connections	7
3G/4G	7
VPN	7
Unsecured Protocols Used	7
Modbus	7
BACnet	7
About Nube iO	8



About LoRa

What is LoRa? What makes it such a great technology?

LoRa is a unique modulation format that can be generated by Semtech LoRa parts, including the SX1272 and SX1276 transceiver chips. It's a really inexpensive, efficient way to get processing gain in a small chip-scale transceiver. It works with a family of highly integrated base station chips (SX1301 and SX1257) with high capacity, so you can use it to build pretty sophisticated point to multipoint networks.

What is LoRaWan?

LoRaWAN is a media access control (MAC) layer protocol designed for large-scale public networks with a single operator. It is built using Semtech's LoRa modulation scheme. [This article](#), What Is LoRaWAN?, will walk you through how it works, why it's ideal for public networks, chirp rate, processing gain, downlink and uplink capabilities, and much more.

Is loRa only for wide-area-networks?

No, it's not. LoRaWAN as a protocol is strictly for wide-area networks, but LoRa as a lower-level physical layer technology (PHY) can be used in all sorts of applications outside of wide area.

LoRa Vs LoRaWan

Advantages of LoRaWAN

- End to end encryption.
- Data can be handled by any configured TTN LoRaWAN gateway.

The protocol stack uses all 4 layers:

- LoRa Application Layer
- LoRa MAC Layer
- LoRa PHY Layer
- LoRa RF Layer
- Highly scalable.
- Can use all available LoRaWAN compliant devices on the same network.



Disadvantages of LoRaWAN

- Limited airtime (30 secs a day).
- 10 downlinks a day including acknowledgements.
- 12 Byte Packet size limit.
- Configuration required for all devices.

Advantages of LoRa-'RAW'

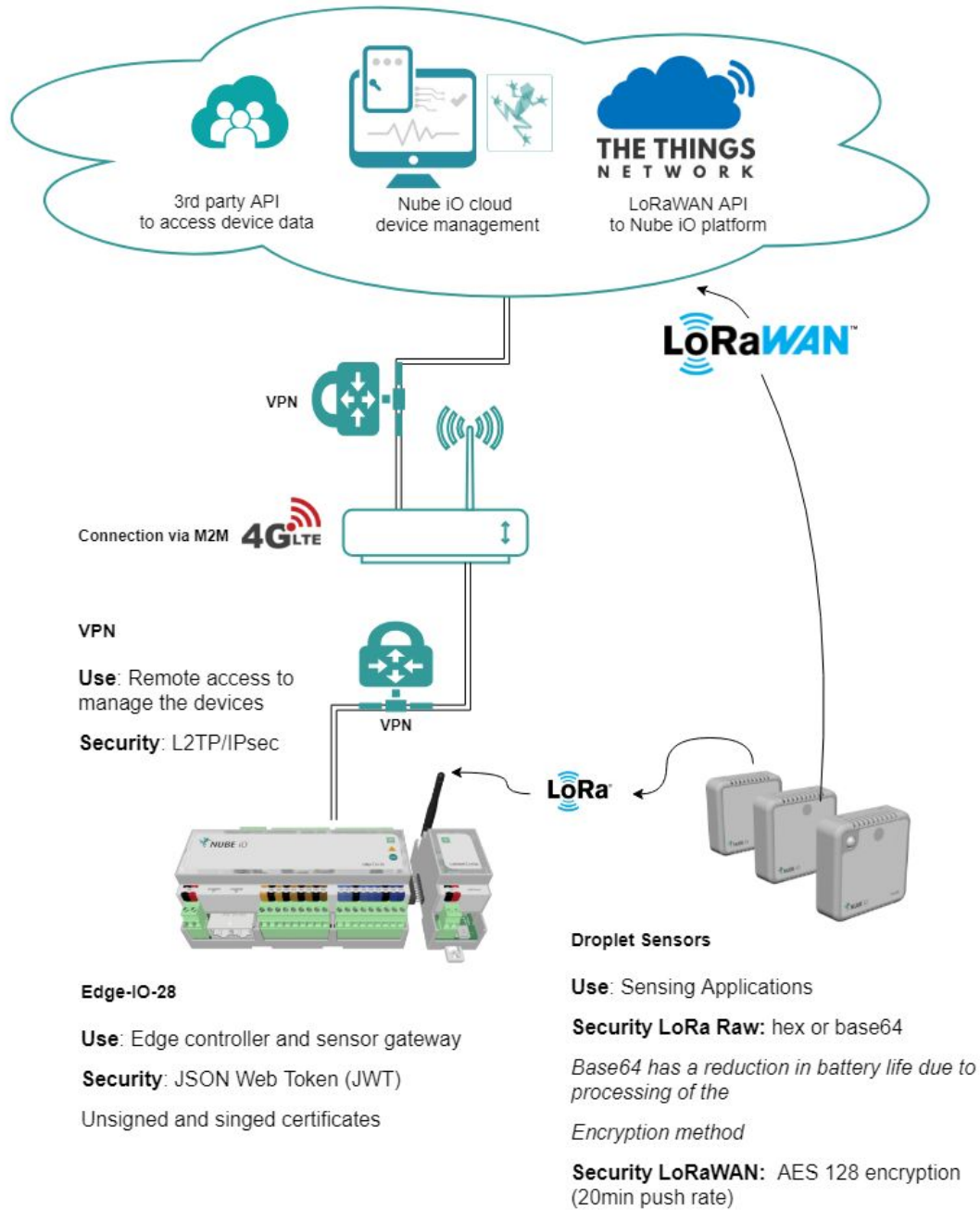
- Can exist on a private 'gaped' network.
- No MAC layer required.
- Can transmit both encrypted and unencrypted data.
- Can be completely single channel.
- Cheaper Gateways.
- Less development overhead.
- Less administration overhead.
- Zero handling of customer data.
- Already developed.

Disadvantages of LoRa-'RAW'

- Less secure.
- Supports less sensors to gateway.
- Additional steps required to support data.
- Back-end required to access data.
- Has to be custom hardware (restricted to only our hardware)



Network Overview



Web Admin Console

Connection Method

OAuth2 lets users grant the access to the desired resources to third party applications, giving them the possibility to enable and disable those accesses whenever they want.

OAuth2 supports the following flows.

- Authorisation Code Flow (for apps with servers that can store persistent information).
- Password Credentials Flow (when previous flow can't be used or during development).
- Client Credentials Flow (the client can request an access token using only its client credentials)

Authorisation Code Flow

The authorisation code grant type is used to obtain both access tokens and refresh tokens and is optimized for confidential clients. As a redirection-based flow, the client must be capable of interacting with the resource owner's user-agent (typically a web browser) and capable of receiving incoming requests (via redirection) from the authorisation server.

For more details see [OAuth2 specification, section 4.1](#).

Password Credentials Flow

The resource owner password credentials grant type is suitable in cases where the resource owner has a trust relationship with the client, such as the device operating system or a highly privileged application. The authorisation server should take special care when enabling this grant type, and only allow it when other flows are not viable.

The grant type is suitable for clients capable of obtaining the resource owner's credentials (username and password, typically using an interactive form). It is also used to migrate existing clients using direct authentication schemes such as HTTP Basic or Digest authentication to OAuth by converting the stored credentials to an access token.

For more details see [OAuth2 specification, section 4.3](#).

Client Credentials Flow

The client can request an access token using only its client credentials (or other supported means of authentication) when the client is requesting access to the protected resources under its control, or those of another resource owner that have been previously arranged with the authorisation server (the method of which is beyond the scope of this specification).



The client credentials grant type MUST only be used by confidential clients.

For more details see [OAuth2 specification, section 4.4](#).

Remote Site Connections

3G/4G

The 4G connection is provided via M2MOne - a speciality 4G SIM provider. We have a management console for managing our sims and plans. New sim can be added and removed within hours

VPN

We have a managed VPN using Security method L2TP/IPsec.

- TLS or SSL Security
- AES256 remote access encryption
- Payload encryption
- Device blacklisting
- Device SSL certificates

Unsecured Protocols Used

Some building and industrial automation products have no authentication methods below are the list we currently support.

Modbus

[Link to Modbus](#)

BACnet

[Link to BACnet](#)



About Nube iO

Designed by HVAC controls experts, Nube iO provides a reliable and economical platform to control and monitor your HVAC system. With emphasis on utilising open platforms and device security, Nube iO allows you to break free from restrictive BMS platforms without the huge cost of having to replace existing controllers.

Born in the age of IoT, Nube iO provides you with the ability to access your data from the web. No longer do you need hundreds of sensors or a huge budget in order to get your data online. Whether you have one sensor or thousands, the scalability of the platform makes it economical regardless of the size of your system.

To learn more about our products and solutions, visit: nube-io.com

What we work with

Feature Spotlight	<ul style="list-style-type: none"> ● Equipment condition monitoring, HVAC, lighting, temperatures and occupancy. ● Collection, storage and analysis of large amounts of data. ● Structured export of data for use with other analysis tools. ● Browser based programming. No need for expensive software and licensing. ● Support for low cost hardware and sensors. ● Compatibility and integration with third party products. ● Remote Monitoring via system alarms, email, and SMS notifications, allows you to respond to issues as they occur. This reduces equipment downtime and can prevent unnecessary service calls.
Potential Data Exchange Methods	<ul style="list-style-type: none"> ● MQTT ● Web Socket ● AMQP ● Onboard database storage ● Haystack ● Obix (Can push data to an Obix Server) ● Inbuilt Modbus TCP Server ● JSON ● XML ● CSV ● BACnet/IP ● LoRa (Long Range/Low Power Wireless sensors) ● KNX (Read and write to KNX device)
Compatible Security Options	<ul style="list-style-type: none"> ● TLS or SSL Security ● AES256 remote access encryption ● Payload encryption ● Device blacklisting ● Device SSL certificates

