

# Meshlium Xtreme

## Technical Guide



## Specifications



Figure : Meshlium unit

<b>Processor</b>	1 GHz Quad Core (x86)	
<b>RAM memory</b>	2 GB (DDR3)	
<b>Disk memory</b>	16 GB	
<b>Power</b>	6 to 12 W (12 V)	
<b>Power source</b>	PoE (Power Over Ethernet)	
<b>Max current supply</b>	2 A	
<b>Enclosure</b>	Material	Aluminum
	Dimensions	300 x 220 x 87 mm
	Weight	2.2 kg
	External protection	IP65
<b>Temperature range</b>	-20 °C / 50 °C	
<b>Response time to Ethernet ping</b>	60 s	
<b>Time to have all the services running</b>	60 s	
<b>Types of power supply*</b>	AC-220 V (DC-12 V)	
	Linux, Debian based	
	Meshlium Manager System	
<b>Management software</b>	(open source)	
<b>Security</b>	Authentication WEP, WPA, WPA2, HTTPS	

(\*) Only with the accessories supplied by Libelium

### WiFi (2.4 GHz) radio (Access Point/Scanner)



WiFi radio	
Chipset	Qualcomm Atheros QCA9882
TX power	20 dBm
Range	500 m*
Antenna 5dBi dipole	
Type	Omni-directional, dipole
Gain	5 dBi
Dimensions	224 x 22 mm

(\*) Depending on antenna and line of sight

### RF radio modules



Model	XBee-PRO 802.15.4
Frequency	2.4 GHz
TX power	18 dBm (10 dBm for EU models)
Rx sensitivity	-100 dBm
Antenna	5 dBi dipole
Range	1.6 km (750 m in EU models)*



Model	XBee 868LP
Frequency	868 MHz
TX power	14 mW
Rx sensitivity	-106 dBm
Antenna	4.5 dBi dipole
Range	8.4 km*



Model	XBee-PRO 900HP
Frequency	900 MHz
TX power	24 dBm
Rx sensitivity	-110 dBm
Antenna	4.5 dBi dipole
Range	15.5 km*

(\*) Depending on antenna and line of sight

### 4G/LTE module



<b>Protocols</b>	4G, LTE, 3G, WCDMA, HSPA, UMTS, GPRS, GSM
<b>Frequency bands, EU/BR version</b>	LTE - 800 (B20) / 1800 (B3) / 2600 (B7) UMTS - 850 (B5) / 900 (B8) / 2100 (B1) GSM/GPRS - 900 / 1800
<b>Frequency bands, US version</b>	LTE - 700 (B17) / 850 (B5) / AWS1700 (B4) / 1900 (B2) UMTS - 850 (B5) / 1900 (B2) GSM/GPRS - 850 / 1900
<b>Frequency bands, AU version</b>	LTE - 700 (B17) / 1800 (B3) / 2600 (B7) (AU models do not support 3G, GPRS or GSM)
<b>Output power</b>	Class 4 (2 W, 33 dBm) @ GSM 850/900 Class 1 (1 W, 30 dBm) @ GSM 1800/1900 Class E2 (0.5 W, 27 dBm) @ EDGE 850/900 Class E2 (0.4 W, 26 dBm) @ EDGE 1800/1900 Class 3 (0.25 W, 24 dBm) @ UMTS Class 3 (0.2 W, 23 dBm) @ LTE
<b>RX rate</b>	Up to 100 Mb/s
<b>TX rate</b>	Up to 50 Mb/s
<b>Antenna</b>	4 dBi
<b>SIM card</b>	Access via the External micro-SIM socket

### GPS Module



<b>Modes</b>	Assisted GPS (A-GPS), Standalone mode (NMEA frames)
<b>Antenna</b>	4 dBi

*The AU models do not have a GPS receiver*

### Bluetooth Scanner



<b>Protocol</b>	Bluetooth 2.1 + EDR Class 2
<b>TX power</b>	3 dBm
<b>Antenna</b>	5 dBi dipole
<b>Range</b>	20-30 m*

*(\*) Depending on antenna and line of sight*

## Understanding Meshlium

### Concepts

Meshlium is an IoT gateway that may contain up to 4 different radio interfaces: a WiFi 2.4 GHz (Access Point), a 4G/3G/GPRS/GSM and 2 XBee/RF radios. Meshlium also integrates a GPS module for mobile and vehicular applications and may include Bluetooth and WiFi radios too for scanning applications. These features along with an aluminum IP65 enclosure allows Meshlium to be placed outdoors.

Meshlium can work as:

- an RF (XBee) to Ethernet router for Waspote nodes\*
- an RF (XBee) to 4G/3G/GPRS/GSM router for Waspote nodes\*
- a WiFi Access Point
- a WiFi to 4G/3G/GPRS/GSM router
- a GPS – 4G/3G/GPRS/GSM real-time tracker
- a smartphone scanner (detects iPhone and Android devices)

\* More info about Waspote at: <http://www.libelium.com/waspote>

All the networking options can be controlled from the **Manager System**, a web interface which comes with Meshlium. It allows you to control all the interfaces and system options in a secure, easy and quick way.

### Meshlium models

There are different Meshlium models depending on the radios integrated:

Meshlium model	Ethernet	WiFi AP	4G/3G/GPRS/GSM	802.15.4	868/900	WiFi & Bluetooth scanners
Meshlium 4G 802.15.4 AP 868 EU	✓	✓	EU/BR version	EU version	868	
Meshlium 4G 802.15.4 AP 900 US	✓	✓	US version	World version	900 US	
Meshlium 4G 802.15.4 AP 900 BR	✓	✓	EU/BR version	World version	900 BR	
Meshlium 4G 802.15.4 AP 900 AU	✓	✓	AU version	World version	900 AU	
Meshlium 4G AP 868 EU	✓	✓	EU/BR version		868	
Meshlium 4G AP 900 US	✓	✓	US version		900 US	
Meshlium 4G AP 900 BR	✓	✓	EU/BR version		900 BR	
Meshlium 4G AP 900 AU	✓	✓	AU version		900 AU	
Meshlium 4G 802.15.4 AP EU	✓	✓	EU/BR version	EU version		
Meshlium 4G 802.15.4 AP US	✓	✓	US version	World version		
Meshlium 4G 802.15.4 AP BR	✓	✓	EU/BR version	World version		
Meshlium 4G 802.15.4 AP AU	✓	✓	AU version	World version		
Meshlium 4G AP Scanner EU/BR	✓	✓	EU/BR version			✓
Meshlium 4G AP Scanner US	✓	✓	US version			✓
Meshlium 4G AP Scanner AU	✓	✓	AU version			✓

Each model with RF modules can have XBee-PRO 802.15.4 and XBee 868LP or XBee-PRO 900HP (depending on the region).

## Storage

The size of the Meshlium hard disk is 16 GB. The Operating System and the Manager System take ~3 GB. This means the space which can be used to store the data captured and to be used by the applications loaded by the user is:

- $16 \text{ GB} - 3 \text{ GB} = 13 \text{ GB}$

Some of this space (7.2 GB) is assigned to the user partition: `"/mnt/user"`.

The local database files can be found in: `"/mnt/user/mysql/MeshliumDB"`.

## Application model by model

### Meshlium RF 4G AP

Meshlium can take the sensor data which comes from a Wireless Sensor Network (WSN) made with Wasp mote sensor devices\* equipped with RF (XBee) radios and send it to the Internet using the Ethernet interface or the 4G/3G/GPRS/GSM interface. Besides, Wasp motes with GPRS, GPRS+GPS, 3G, 4G or WiFi can send sensor info through the access point or through the Internet via HTTP protocol. Users can connect directly to Meshlium using the WiFi interface to control it and access to the sensor data. Users can also connect to Meshlium via WiFi with laptops and smart phones and get access to the Internet (as a common Access Point).

(\*) <http://www.libelium.com/waspote>

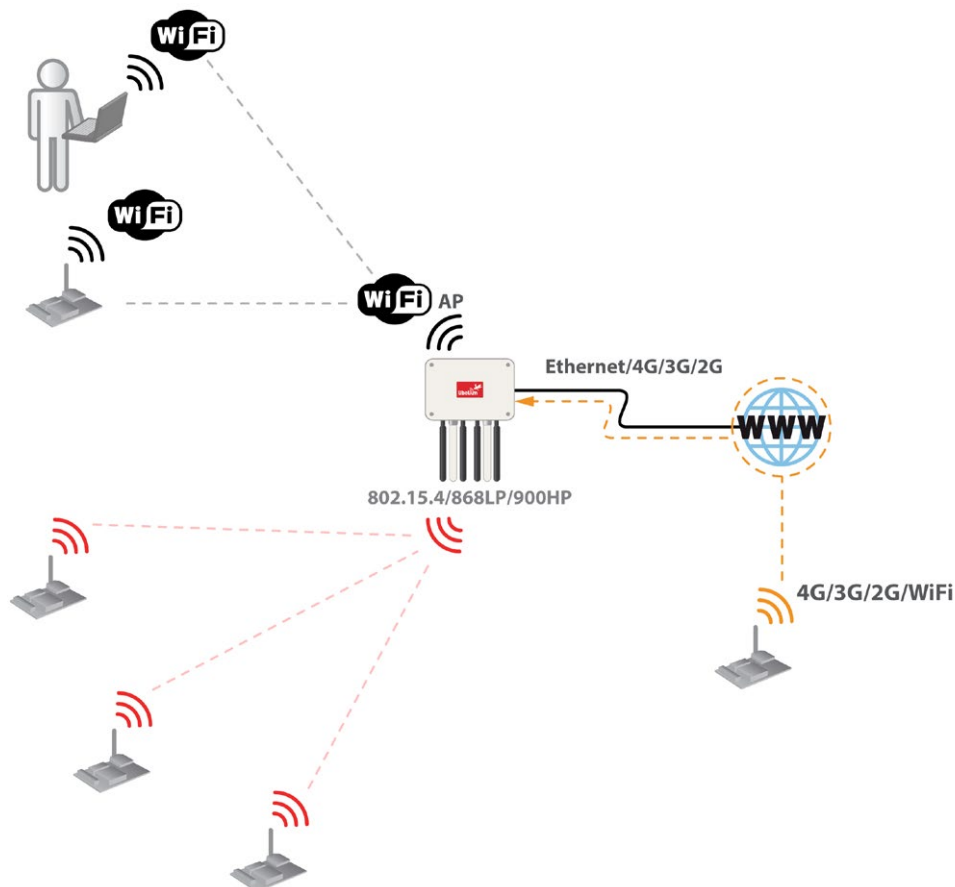


Figure : Meshlium RF 4G AP

## Meshlium Scanner 4G AP

It allows to detect Smartphones (iPhone, Android) and in general any device which works with **WiFi** or **Bluetooth** interfaces. The collected data can be send to the Internet by using the Ethernet interface or the 4G/3G/GPRS/GSM connectivity. Besides, Waspnotes with GPRS, GPRS+GPS, 3G, 4G or WiFi can send sensor info through the access point or through the Internet via HTTP protocol. Users can connect directly to Meshlium using the WiFi interface to control it and access to the sensor data. Users can also connect to Meshlium via WiFi with laptops and smart phones and get access to the Internet (as a common Access Point).

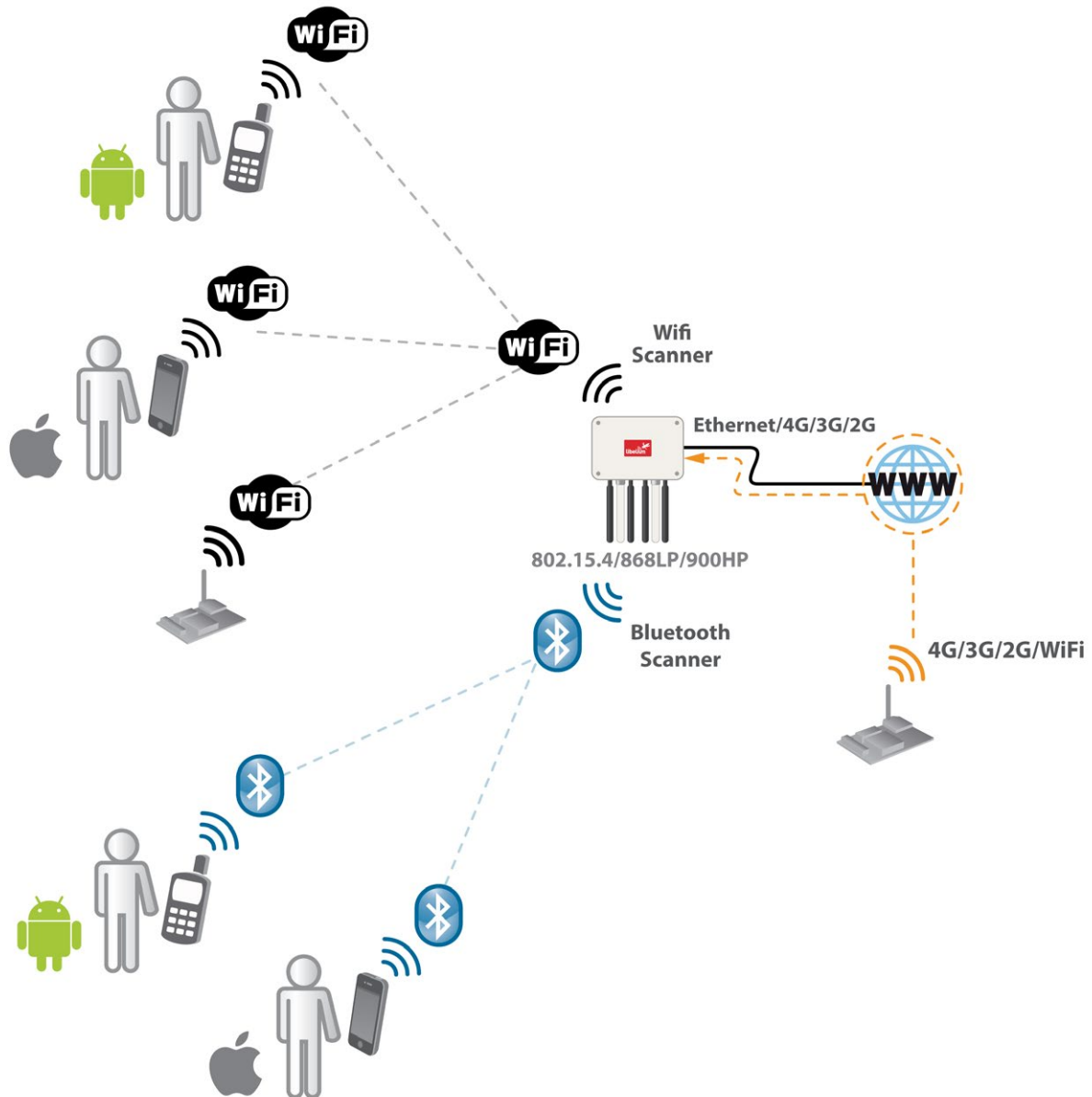


Figure : Meshlium Scanner 4G AP

## Cloud Connectors

The aim of this chapter is to introduce the user to the Meshlium Cloud Connector functionality. This section will help you to connect your Meshlium to a third party cloud platform.

Only sensor data can be sent to the cloud services.

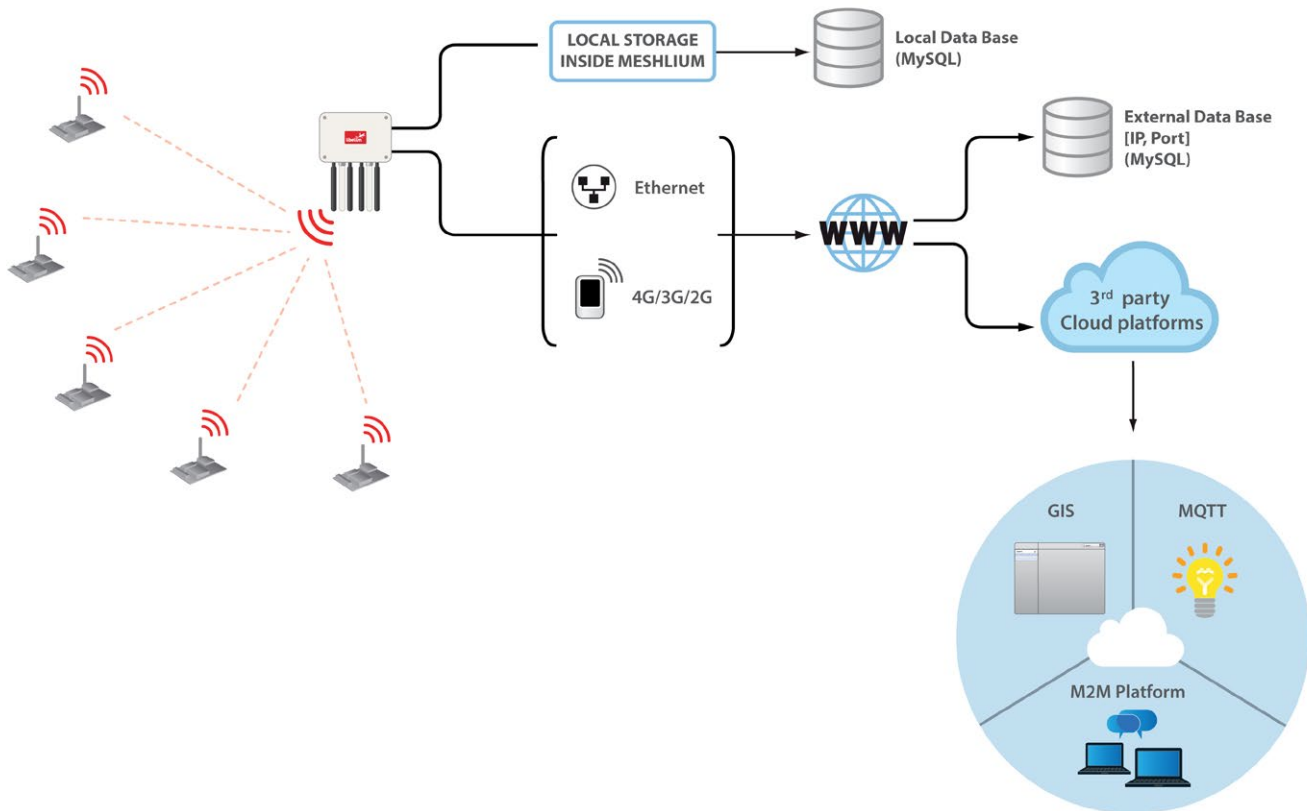


Figure : Cloud connector diagram

Interfacing Meshlium with 3rd party cloud services should be the last step the user develops in any project. The user should analyze if the use of clouds is needed, and if so, that will be the last step in the project. Before trying clouds, make sure all the Waspnote units are sending frames to Meshlium, and Meshlium is receiving and inserting them on the local database properly.

### What is a cloud platform?

Cloud computing is a major change in our industry. One of the most important parts of that paradigm are cloud platforms. This kind of platforms let developers write applications that run in the cloud, use services provided from the cloud or both.

### Meshlium Cloud Connector

Meshlium runs a set of scripts for implementing the data synchronization from its internal database "to the cloud". In other words, those scripts send data to webservers where the cloud service providers host their clouds. Those scripts are called Cloud Connector.

We have divided the Cloud Connector into 2 groups: "IoT Solutions" and "IoT Platforms".

IoT Platforms are professional development frameworks for developing data management applications, including Esri, ThingWorx, IBM Bluemix, Telefónica and Microsoft Azure.

IoT Solutions are specific applications focused in different verticals. Libelium promotes the Cloud Partnership Program for any cloud service provider that would like to foster their very own solution using our products.



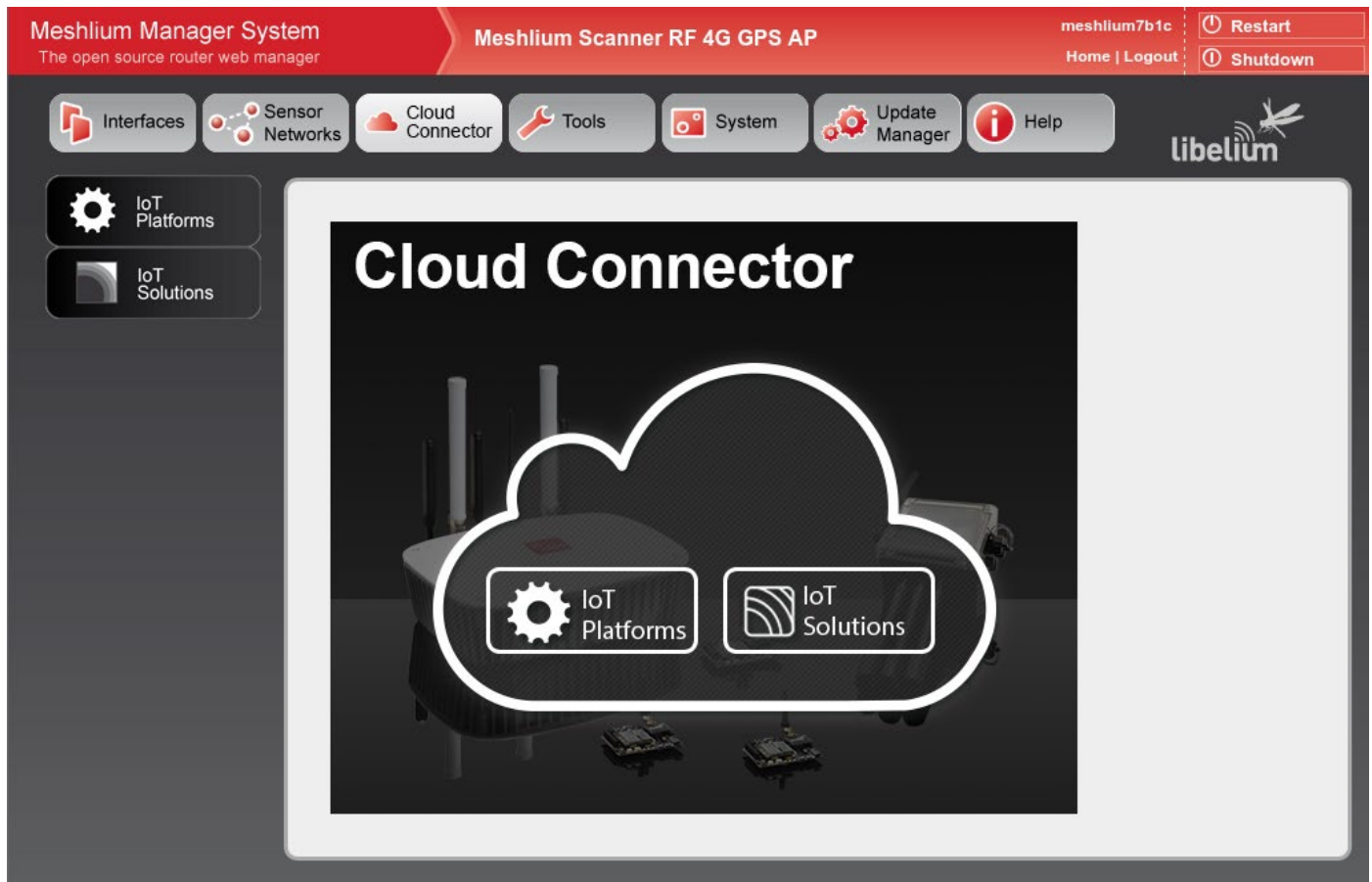


Figure : Cloud Connector main menu on the Manager System