LoRaMesher library for LoRa mesh networks

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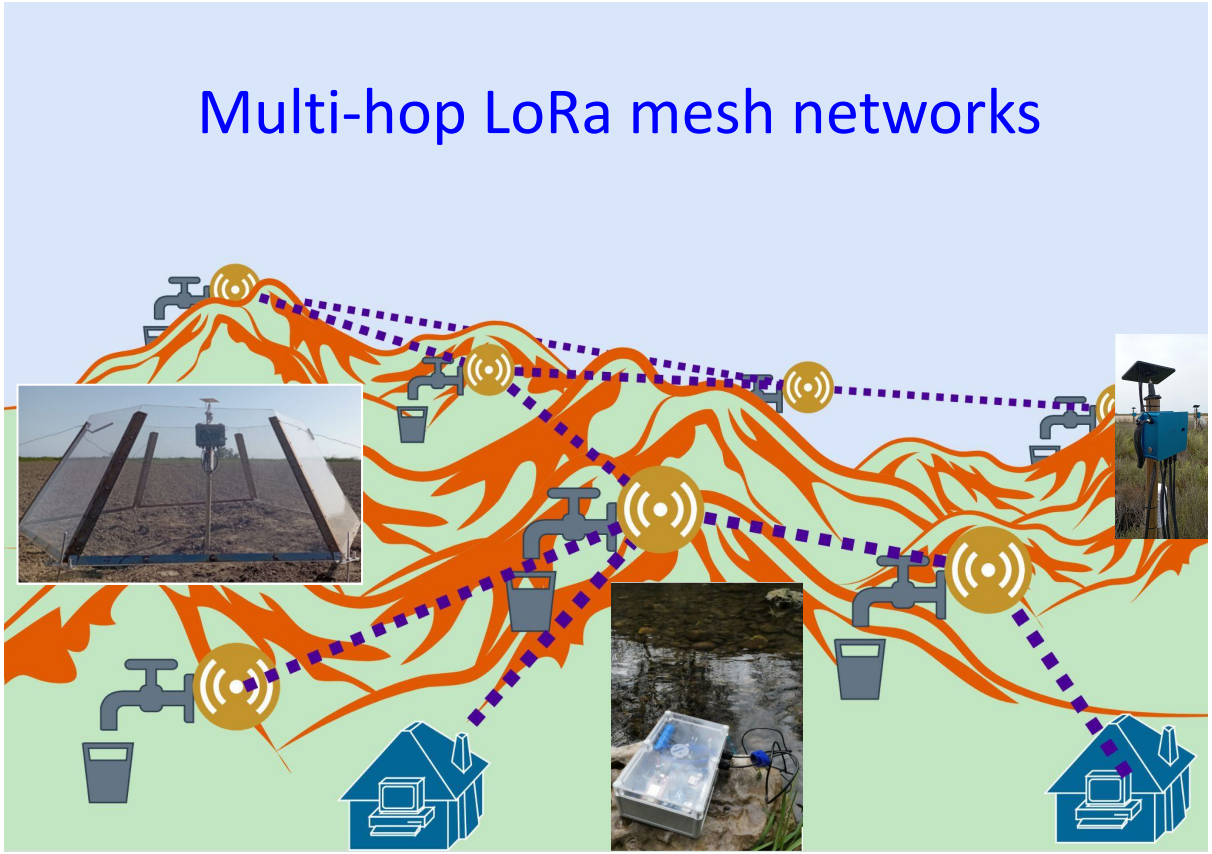
LoRaMesher

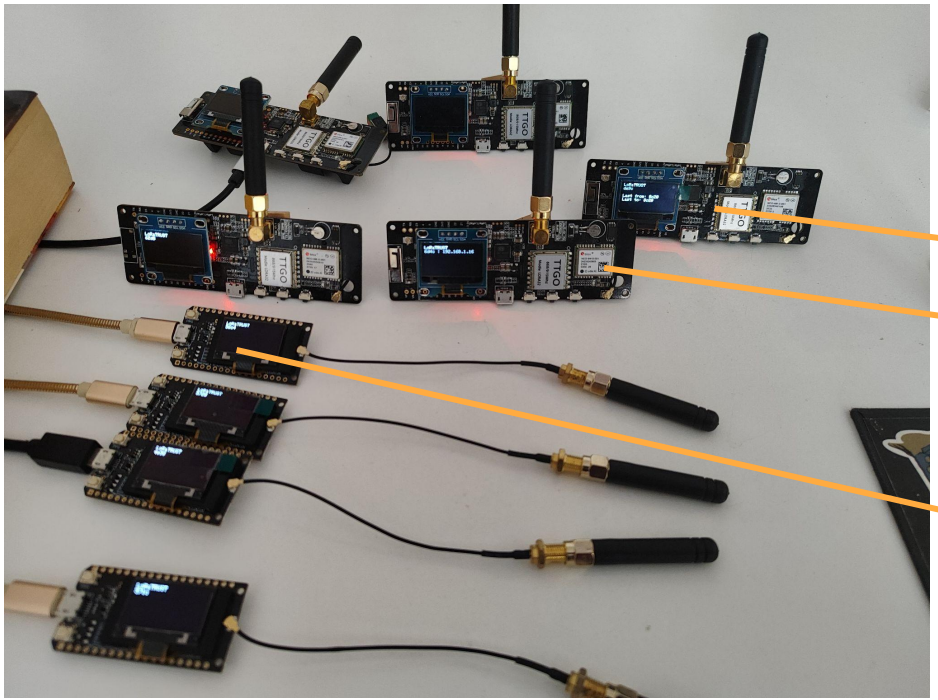
- A library for multi-hop LoRa mesh networks
- Node-to-node communication
- Distance vector routing
- Going beyond LoRaWAN
- Developed at UPC since 2021
- Implemented in C++
- git repository:

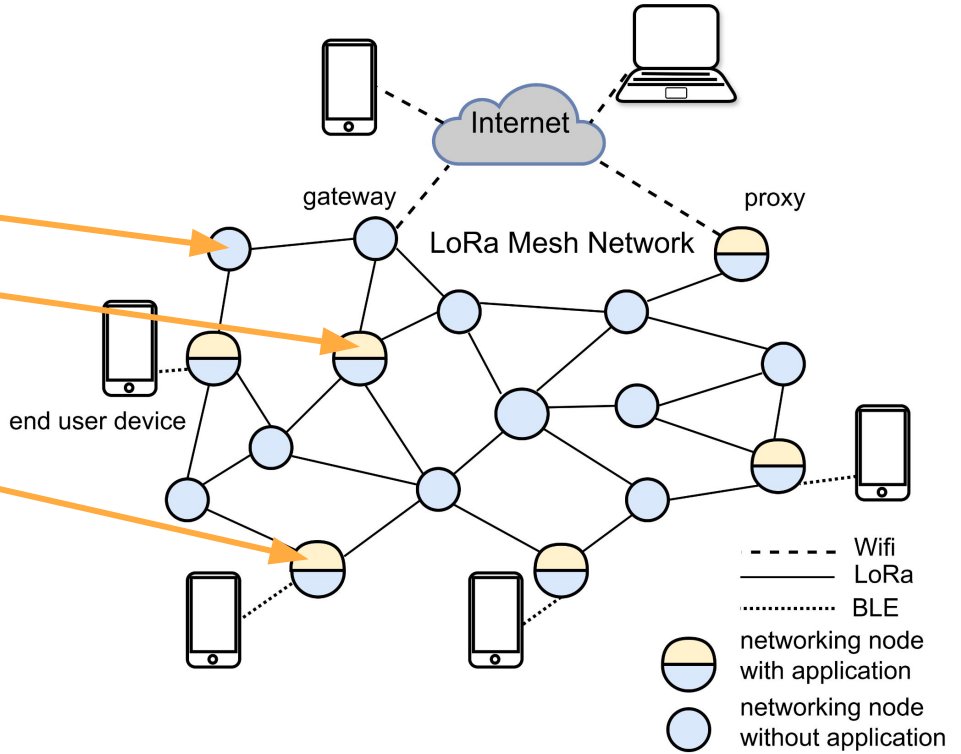
https://github.com/LoRaMesher/LoRaMesher



General scenario:

LoRa mesh network with router nodes and some applications





How to work with LoRaMesher?

https://github.com/LoRaMesher/LoRaMesher

1) Take an example

2) Integrate library

LoRaMesher / examples /

Jaimi5 fix: Changed examples for LoRaMesher

Name
..
Counter
CounterAndDisplay
LargePayload
SX1262

EXAMPLES

main.cpp

```
#include "LoraMesher.h"
…
LoraMesher& radio = LoraMesher::getInstance();
…

void setup() {
   …
   setupLoraMesher();
   createSendMessages();
}

void loop() {
   …
}
```

LoRaMesher / src /

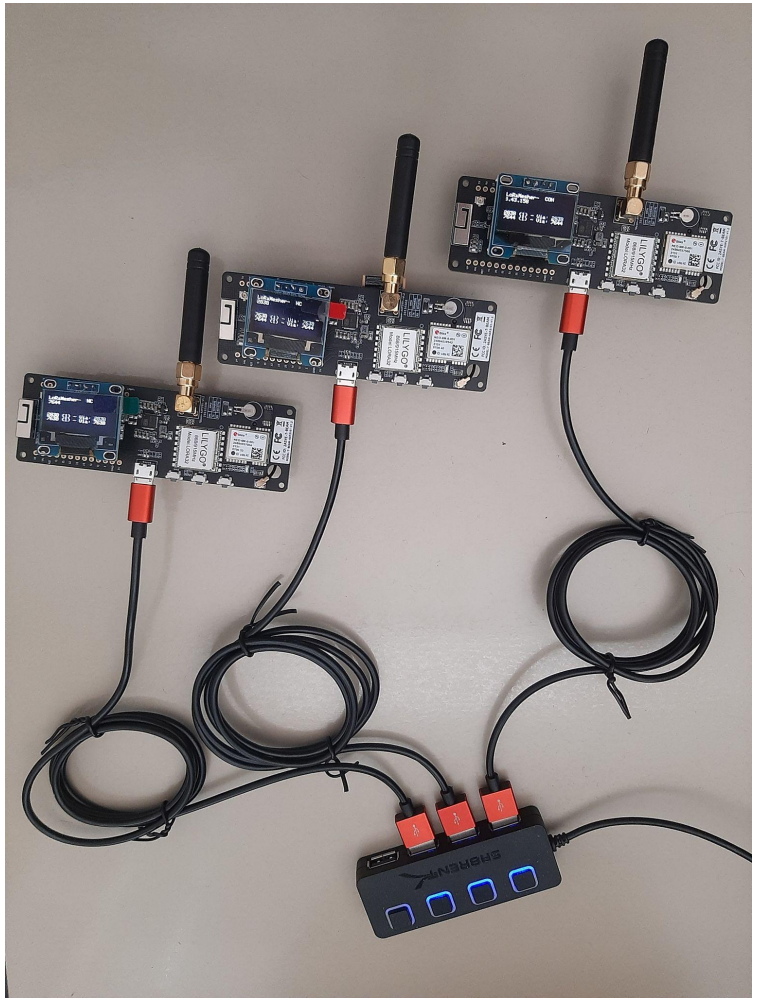
PTT3108 update pin for sx128x

Name
..
entities
modules
services
utilities
BuildOptions.cpp
BuildOptions.h
EspHal.cpp
EspHal.h
LoraMesher.cpp
LoraMesher.h

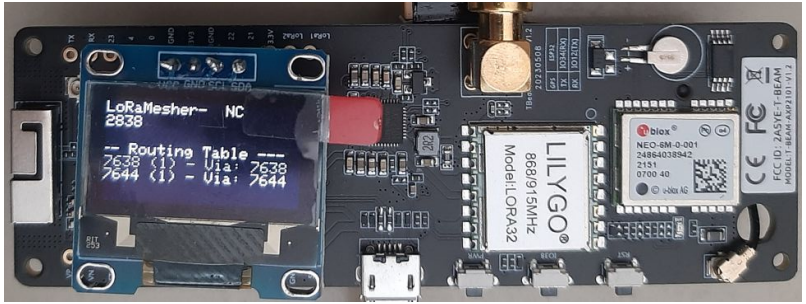
LIBRARY

How to work with LoRaMesher?

- Hardware: ESP32 microcontroller board, e.g., T-Beam
- Platformio to compile and flash



How to work with LoRaMesher?



Log messages from serial port

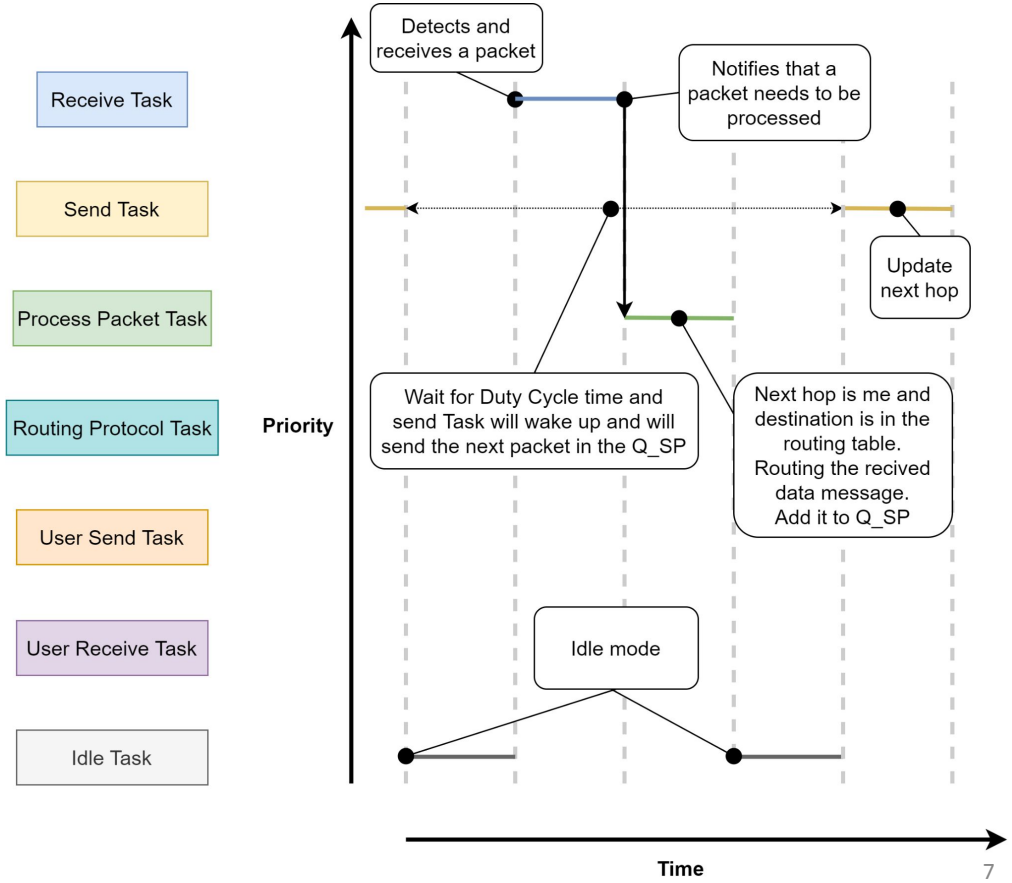
```
[262846][I][PacketService.cpp:12] createEmptyPacket(): [LoRaMesher] Packet created with 12 bytes
[262855][I][LoraMesher.cpp:392] receivingRoutine(): [LoRaMesher] Receiving LoRa packet: Size: 12 bytes RSSI: -27 SNR: 9
[262866][V][LoraMesher.cpp:647] processPackets(): [LoRaMesher] Size of Received Packets Queue: 1
[262875][V][LoraMesher.cpp:754] printHeaderPacket(): [LoRaMesher] Packet received -- Size: 12 Src: B4DC Dst: FFFF Id: 204 T
ype: 4 Via: 0 Seq_Id: 0 Num: 0
[262888][I][RoutingTableService.cpp:77] processRoute(): [LoRaMesher] Route packet from B4DC with size 1
[262898][I][RoutingTableService.cpp:99] resetReceiveSNRRoutePacket(): [LoRaMesher] Reset Receive SNR from B4DC: 9
[262908][I][RoutingTableService.cpp:192] printRoutingTable(): [LoRaMesher] Current routing table:
[262916][I][RoutingTableService.cpp:206] printRoutingTable(): [LoRaMesher] 0 - B4DC via B4DC metric 1 Role 0
[                                                                ] 1 - DD3C via DD3C metric 1 Role 0
[                                                                lesher] Deleting packet
[                                                                lesher] Deleting packet queue
[                                                                e unused after entering the task: 2212
[                                                                 300968
[                                                                letected while waiting 2
[275795][V][LoraMesher.cpp:754] printHeaderPacket(): [LoRaMesher] Packet send -- Size: 16 Src: F020 Dst: FFFF Id: 8 Type: 4
 Via: 0 Seq_Id: 0 Num: 0
[277393][V][LoraMesher.cpp:575] sendPackets(): [LoRaMesher] TimeOnAir 1582 ms, next message in 0 ms
```

Routing table at startup

```
0 - B4DC via B4DC metric 1 Role 0
1 - DD3C via B4DC metric 2 Role 0
```

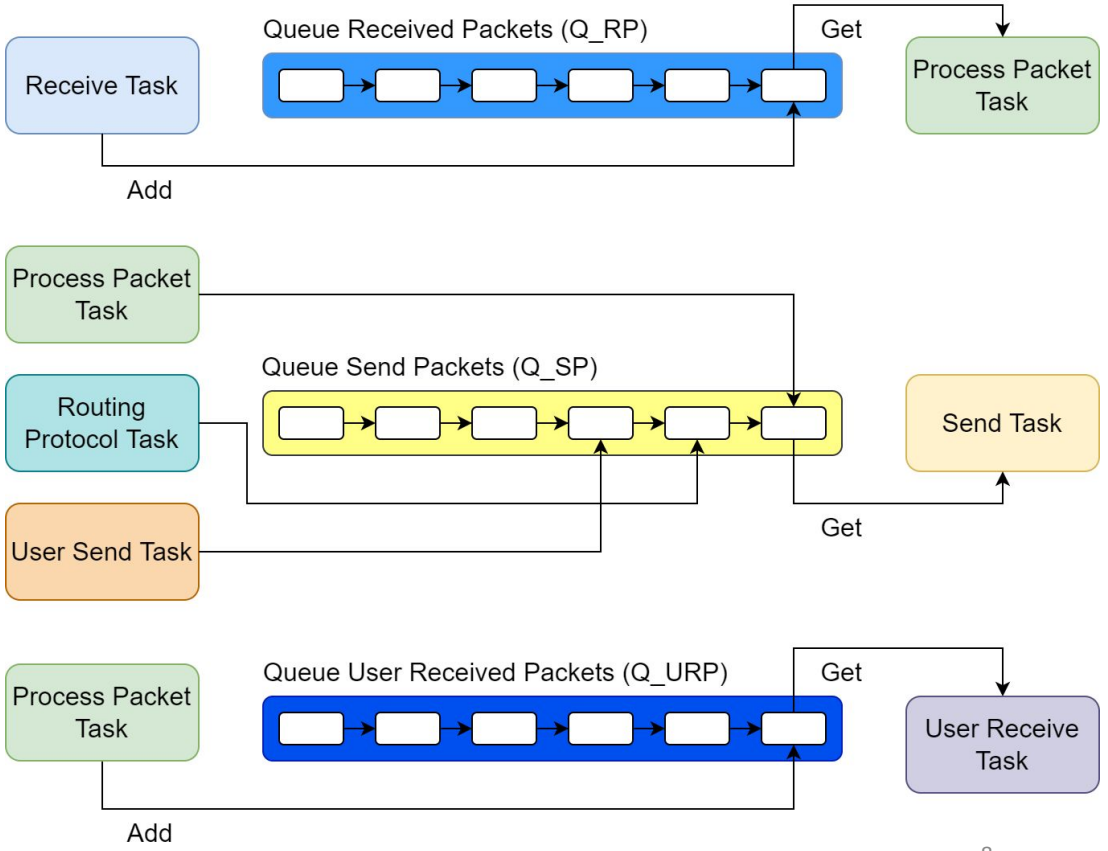
LoRaMesher implementation details: Tasks

- Task-based execution
- Uses FreeRTOS
- Example: Routing a received data packet.



LoRaMesher implementation details: Queues

- Received_Packet_Queue
- Send_Packets Queue
- User Received Packets Queue



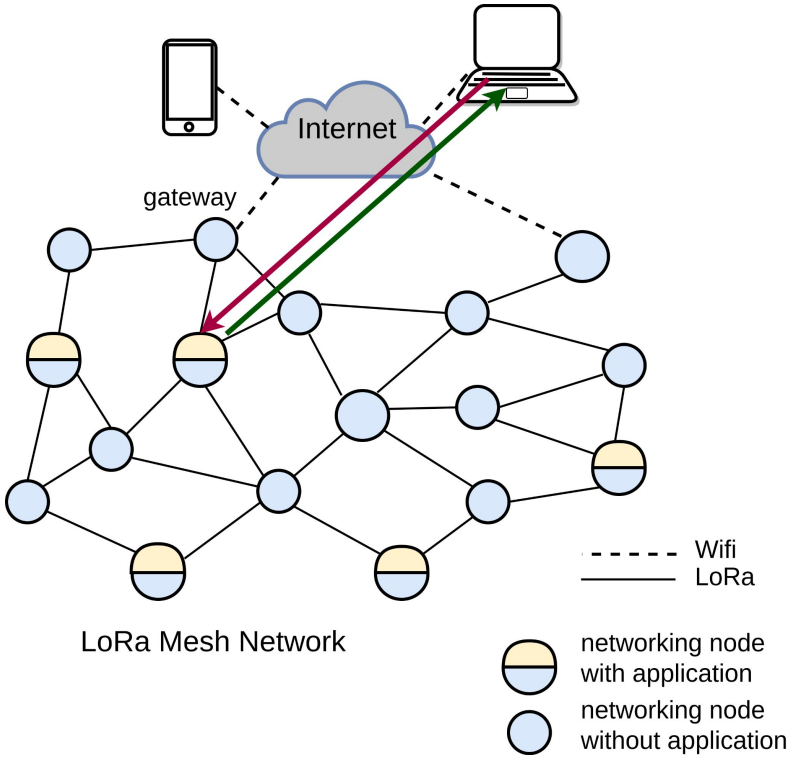
Permanent deployment of LoRaMesher nodes

Network monitor at

https://dsg.ac.upc.edu/loraupc/index.php

Next steps

- Integration with the Internet and bidirectional communication
- Services on LoRaMesher nodes
- Positioning to industrial solutions and LoRaWAN
- More experimentation
- Need for more demonstrators and applications



Thank you for your attention!

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