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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:

Multi-hop LoRa mesh networks





General scenario:

LoRa mesh network with router nodes and some applications





How to work with LoRaMesher?

https://github.com/LoRaMesher/LoRaMesher

main.cpp 1) Take an example Name ... Integrate library 2) #include "I oraMesher.h" entities . . . modules LoraMesher& radio = LoraMesher::getInstance(); LoRaMesher / examples / ΓŪ . . . services Jaimi5 fix: Changed examples for LoRaMesher void setup() { utilities . . . BuildOptions.cpp Name setupLoraMesher(); createSendMessages(); BuildOptions.h LIBRARY **I** ... } EspHal.cpp Counter EXAMPLES void loop() { CounterAndDisplay B EspHal.h . . . LargePayload LoraMesher.cpp SX1262 LoraMesher.h ٩

LoRaMesher / src /

гD

PTT3108 update pin for sx128x

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 ype: 4 Via: 0 Seg 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 Routing table at startup esher] Deleting packet esher] Deleting packet queue B4DC via B4DC metric 1 Role 0 e unused after entering the task: 2212 300968 DD3C via B4DC metric 2 Role 0 etected while waiting 2 [275795][V][LoraMesher.cpp:754] printHeaderPacket(): [LoRaMesher] Packet send -- Size: 16 Src: F020 Dst: FFFF Id: 8 Type: Via: 0 Seg Id: 0 Num: 0 '393][V][LoraMesher.cpp:575] sendPackets(): [LoRaMesher] TimeOnAir 1582 ms, next message in 0 ms

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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