MeshCore

Decentralised LoRa-Mesh Communication

Secure, off-grid and energy-efficient

What is MeshCore?

- Communication protocol built on LoRa (long-range RF)
- “Mesh” = network of devices (nodes) with multiple paths between them
- Goal: text-/data-messages (SMS-like) without internet or cellular towers
- De-central, without reliance on companies nor governments

Roles in the mesh network

Role	Function
Companion (client)	Hand-held device, sends and receives messages (Bluetooth connected to app on mobile phone)
Repeater	Relays messages, extends range, does not chat itself
Room server	Repeater + store (max 32) messages in a “room”

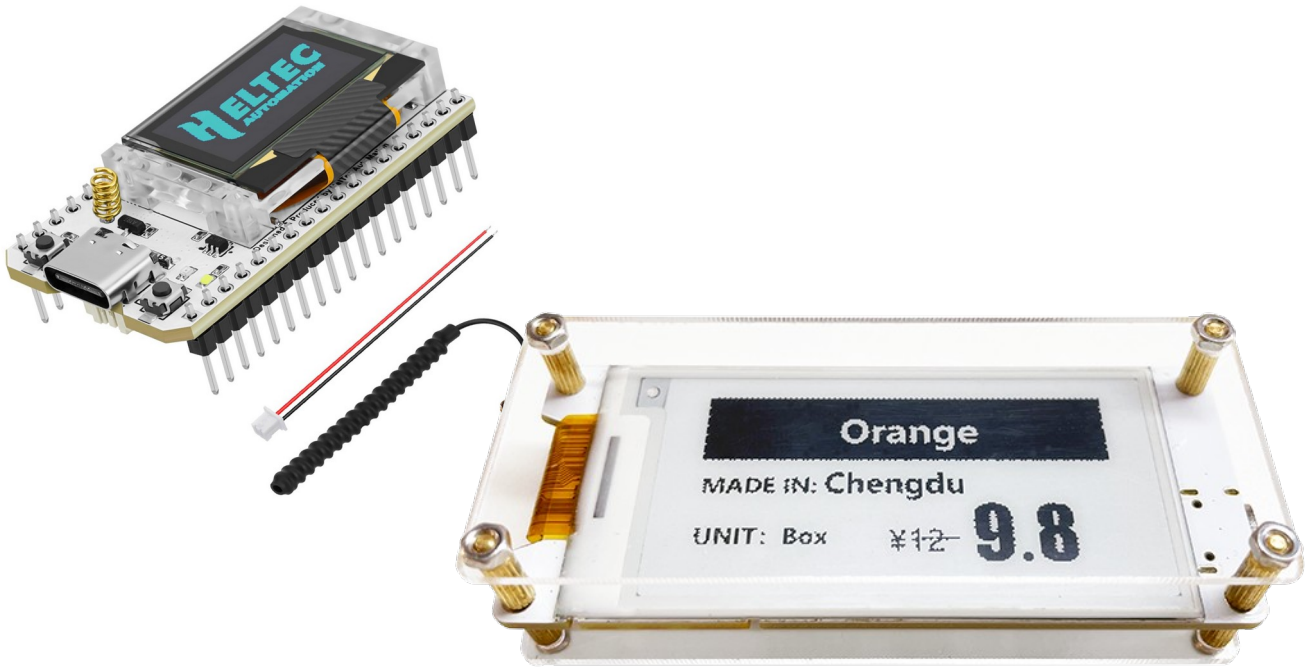
Range & hop mechanism

- One repeater → X-hop (e.g., Den Bosch → Eindhoven)
- With a few strategically placed repeaters you can create a kilometre-scale network
- “Advert” broadcast: a node announces its presence, other nodes hear it

Required hardware

LoRa capable devices (Heltec / Lilygo / other)

Prize: €20 to €90



Costs

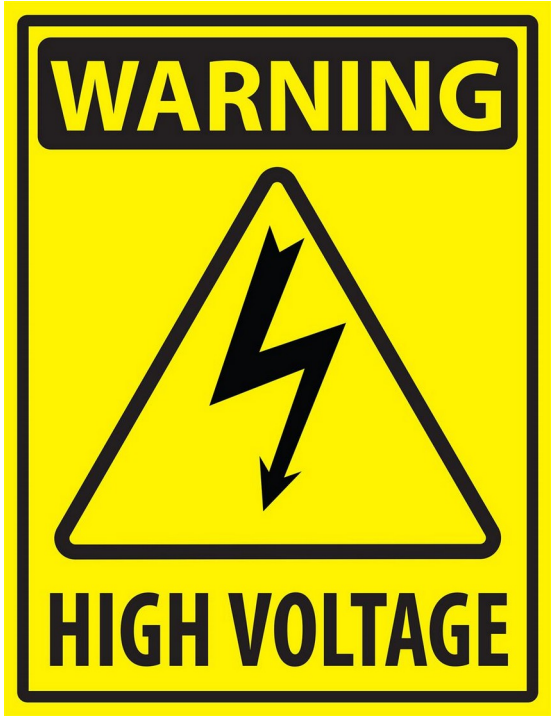
- No subscription or licence fees
- Only a one-off hardware investment

Applications beyond chat

- **Emergency communication** when power/internet fail
- **Sensor networks** (e.g., soil-moisture sensor in a community garden)
- **Future extensions**: games, festival information, etc.

Warning!

Always connect antenna when powering on a LoRa device!!!



Installation (Flashing firmware)

- MeshCore flasher page (chrome based browsers): https://flasher.meshcore.co.uk/
- ESPtool:
  download image: https://github.com/meshcore-dev/MeshCore/releases

  ```
  esptool --port /dev/ttyUSB0 --baud 115200 --chip esp32s3 write-flash 0x0000 Heltec_Wireless_Paper_companion_radio_ble-v1.11.0-6d32193-merged.bin
  ```

  ! Note: some device need to be put in DFU (Boot) mode prior to flashing!

  driver cp2101:
  https://www.silabs.com/documents/public/software/CP210x_Universal_Windows_Driver.zip

Usage of Companion node

- Install MeshCore app (Ios/Android)
- Pair via Bluetooth (enter the PIN shown on the device if applicable)
- Set up: username, network preset **“narrow EU/UK”**

! Note: repeater nodes and roomservers cannot be connected to MeshCore App

First use

- Send an advert (broadcast) → nearby nodes discover you
- Possible connection types:
  - Direct (nearby)
  - X hops (through repeaters)
  - Flood (multiple routes, not yet a clear path)

Options

- Add GPS module (and show to your contacts where you are)
- Add battery
- Build sensor-network
- Build games

Frequently asked questions

- **MeshCore vs. Meshtastic** → narrower bandwidth (62.5 kHz) → better in urban areas, less noise, more energy-efficient
- **Privacy** → default end-to-end encryption with key pairs; public channels (e.g., #public) are not encrypted, private DMs are
- **Repeaters / roomservers**: important infrastructure needed to connect the mesh: think of sourcing a repeater at important geographical places where there is still a MeshCore Void!

More info

- https://meshcore.co.uk/
- https://map.meshcore.dev
- https://www.meshnet.nl/
- https://valleirug.nl/

Heltec wireless paper: https://heltec.org/project/wireless-paper/