Workshop

MESHCORE™

Off-grid mesh radio communication

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Rob

21 January 2026

DO NOT CONNECT THE DEVICE TO USB WITHOUT CONNECTING THE ANTENNA

Introduction

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IoT-SensemakersAMS is a volunteer based community dedicated to:

Connecting people and sharing knowledge, ideas & hands-on experience

We meet up….

- 1th Wednesday of the month: DIY LAB
  - DIY hands-on at the Makerspace in OBA or online while #StayHome
  - #CitizenScience projects
- 3th Wednesday: Sensemakers Meetup
  - Sharing knowledge, ideas & connecting people at Marineterrein Amsterdam or online
- Random: Sensemakers Specials
  - Handson workshops, excursions…

Thanks to:

IN2TECH

oba

SURF SARA

Today’s goals

Experiment with off-grid *messaging*

Learn something new

Get inspired

Experiment with MeshCore

- Understand the concept of MeshCore
- Prepare your MeshCore device
- Test, experiment and get familiar with MeshCore

Contribute to the MeshCore network in the greater Amsterdam Area

- And keep using your device at home

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Today's Schedule

1. Introduction to MeshCore
2. Set up the MeshCore Companion
3. Test, Experiment and get familiar with MeshCore
4. Wrap-up

Introduction to MeshCore

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Introduction to Mesh Network

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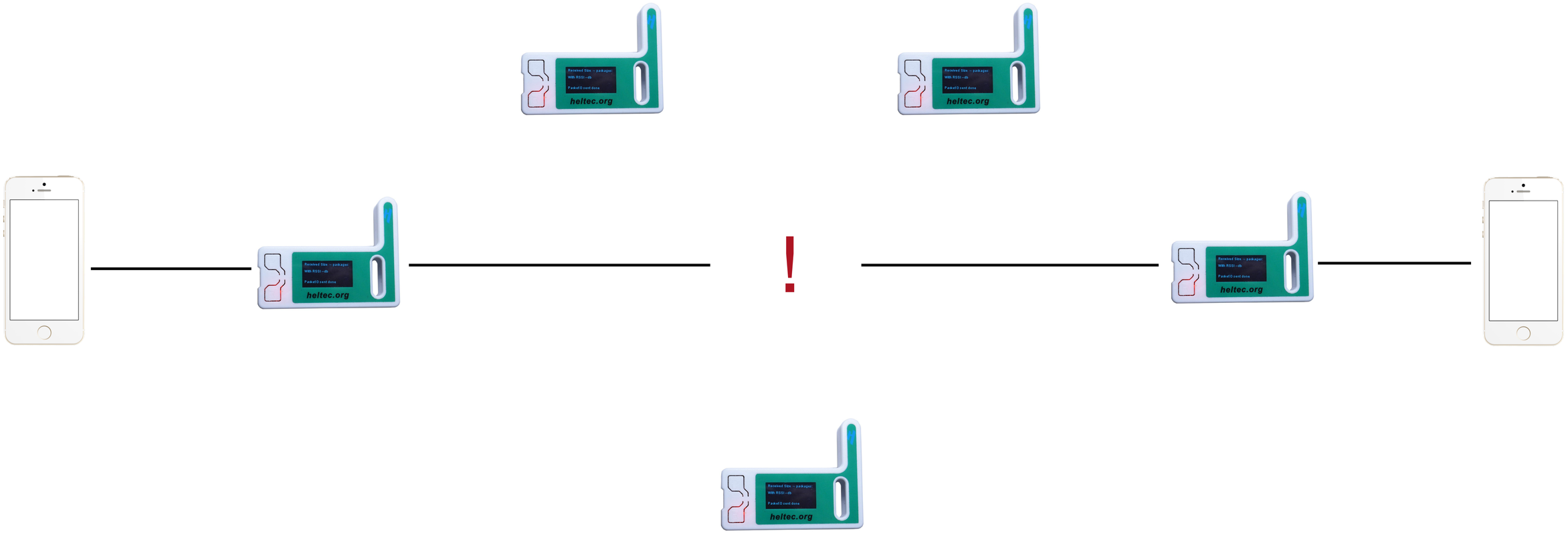
Introduction to Mesh Network



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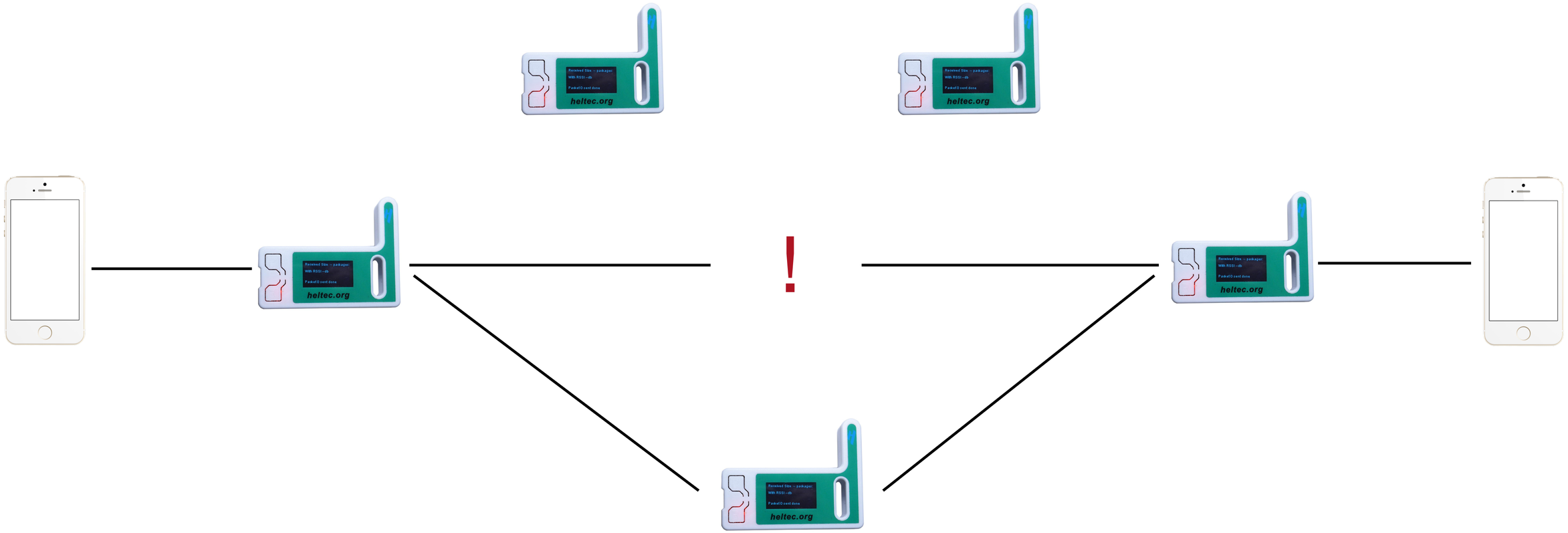
Introduction to Mesh Network



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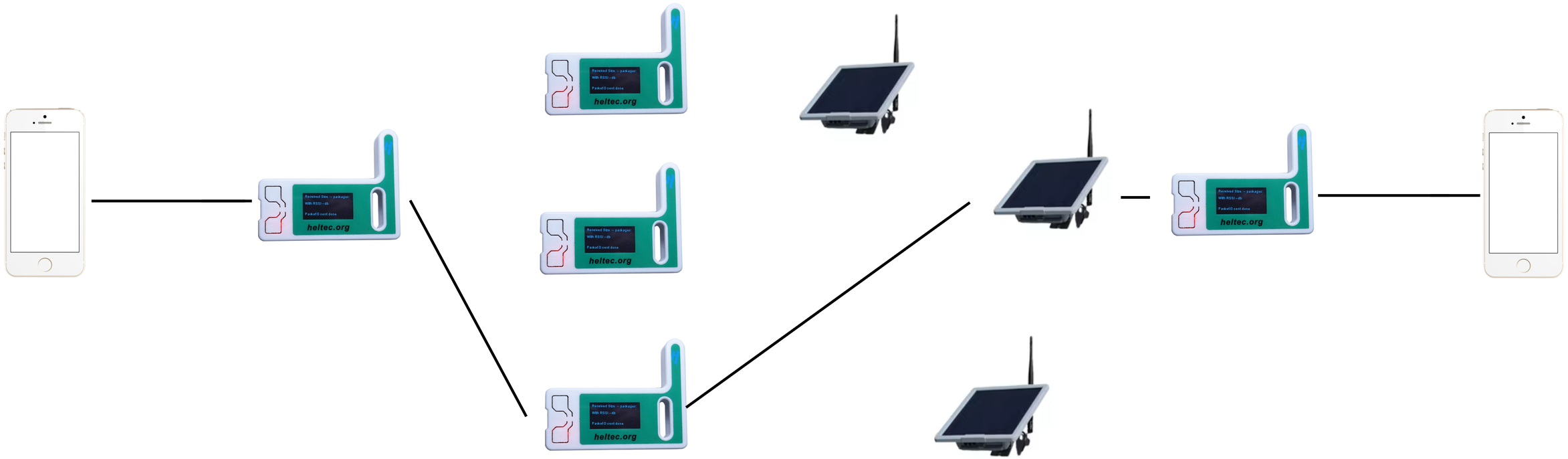
Introduction to Mesh Network



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MeshCore

What is MeshCore?

“MeshCore is a multi platform system for enabling secure text based communications utilising LoRa radio hardware. It can be used for Off-Grid Communication, Emergency Response & Disaster Recovery, Outdoor Activities, Tactical Security including law enforcement and private security and also IoT sensor networks.”

Key features

- Decentralised Network: No reliance on traditional infrastructure.
- Security First: All communications are encrypted for your privacy.
- Long-Range Communication: Utilize LoRa radio technology for long-range connectivity without using the Internet
- Flexible Integration: Easily integrates with off the shelf IoT devices and sensors.

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MeshCore vs Meshtastic

MeshCore

Easy set-up

User-friendly App

Seperate repeaters required

Higher reach and reliability

More efficient way to forward messages

Increasing in NL

Meshtastic

Complexer configuration

App less user friendly

Nodes (clients) forward messages

Sometimes full (traffic)

Decreasing in NL

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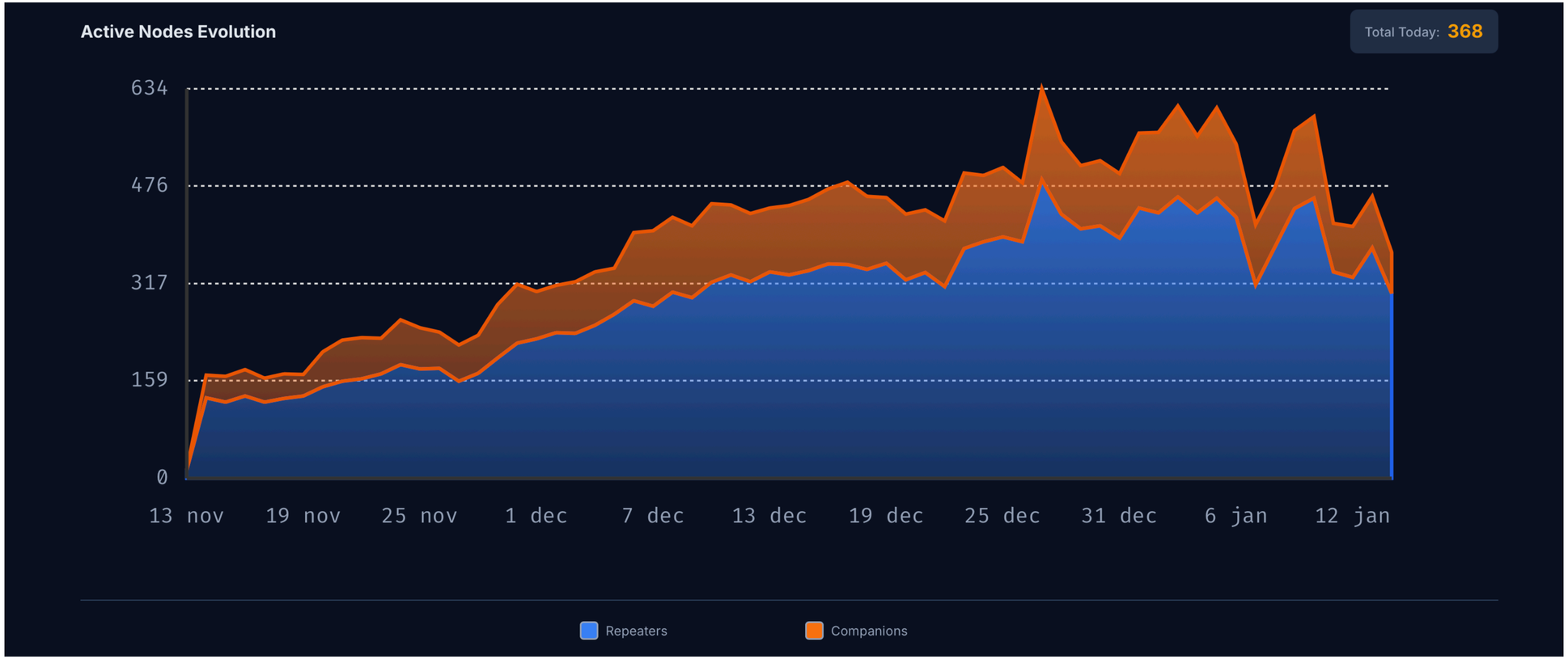
MeshCore Growth



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MeshCore Device Roles

Companion

Companion radios are for connecting to the Android or iOS app or web app as a messenger client.

Repeater

Repeaters are used to extend the range of a MeshCore network. A repeater's job is to forward MeshCore packets to the destination device. It does **not** forward or retransmit every packet it receives, unlike other LoRa mesh systems.

Roomserver

A room server is a simple BBS server for sharing posts. Room servers store message history on them and push the stored messages to users. Room servers allow roaming users to come back later and retrieve message history.

MeshCore

Channels & Contacts

Channels and Contacts determine with whom and how communication takes place within MeshCore.

Channels

A channel is a shared communication space in which multiple nodes participate.

- One-to-many or many-to-many communication
- Messages are visible to all participants
- Often dynamic membership

Used for:

- Group communication
- Public or shared information

Channels often use flooding or controlled distribution

Contacts

A contact is a known, specific node or user in the mesh network.

- Linked to a unique ID
- One-to-one communication
- Often stored persistently

Used for:

- Direct messages
- Private communication

Contacts form the basis for directed path communication.

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MeshCore

Channels & Contacts

Channels

Public channels:

- Public
- #Test
- #Gyverbot

Private channels:

- Sensemakers

Contacts

You can only sent/receive messages to/from contacts when you are in each others contact list

Note:

- you'll only receive messages from Companions that can reach you - and vice versa
- you'll only receive messages if you'r device is on when they were sent

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MeshCore

Flood & Path

Methods to distribute messages through the mesh network

Flood (Flooding)

Flooding means that a node forwards a message to all its known neighbors.

- No pre-defined path required
- Each message propagates throughout the entire network
- High probability of message arrival

Used for

- Network discovery
- Announcements (broadcast)
- Communication initiation

Path

With path routing, a message is sent along a specific path from node to node.

- Directed traffic (unicast)
- Only the involved nodes receive the message
- Bandwidth and energy efficient

Used for

- One-to-one communication
- Larger or stable networks

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MeshCore

Advert & Discovery

Advert and Discovery together form the mechanism by which nodes make each other visible and find each other within the mesh network.

Advert

An Advert is a message a node uses to advertise itself or a service to the network.

- It contains basic information about the node or service
- It is sent periodically or when a change occurs
- It propagates through the mesh network

Discovery

Discovery is the process by which a node actively or passively discovers other nodes or services based on received advertisements.

- Reads and processes advertisements
- Builds a local image of the network
- Forms the basis for routing and communication

Together they enable dynamic networks without central registration.

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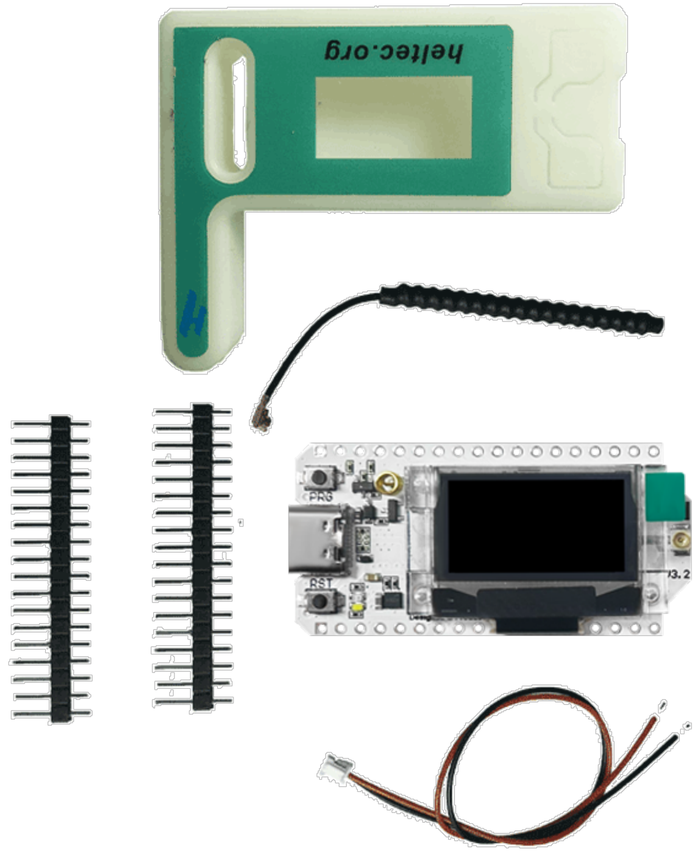
Set up the MeshCore Companion

Device

DO NOT CONNECT THE DEVICE TO USB WITHOUT CONNECTING THE ANTENNA

Heltec V3 ESP32

- Price-worthy, popular and accessible for non-techies
- ESP32 microcontroller with display, WiFi, Bluetooth and LoRa, antenna and case
- Can be expanded with:
  - GPS
  - LiPo Battery, eventually with Solar panel
  - Sensor(s)



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Set up the MeshCore Companion

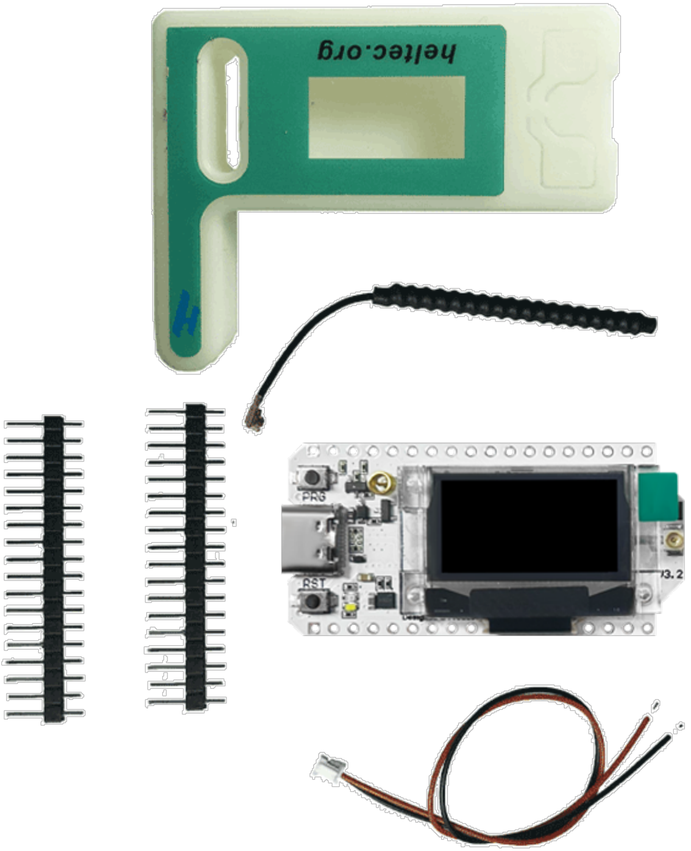
1. Mount the device
2. Install MeshCore firmware
3. Install the app on your mobile phone
4. Configure your device

Set up the MeshCore Companion

1. Mount the device

(Headers and power connector are not needed now)

- Carefully open the case
- Connect the antenna cable carefully to the device
- Put the device and the antenne in the case rear
- Put on the case front



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Set up the MeshCore Companion

2. Flash the MeshCore firmware onto your device

- Connect the device with a USB C cable to your laptop
- Open flasher.meshcore.co.uk in either MS Edge or Google Chrome
- Follow the instructions on the screen

1. Select target device e.g. *Heltec V3*
2. Choose Role (Companion Bluetooth)
3. Select Version (latest)
4. Check Erase device
5. Flash!
6. Select COM-port and confirm

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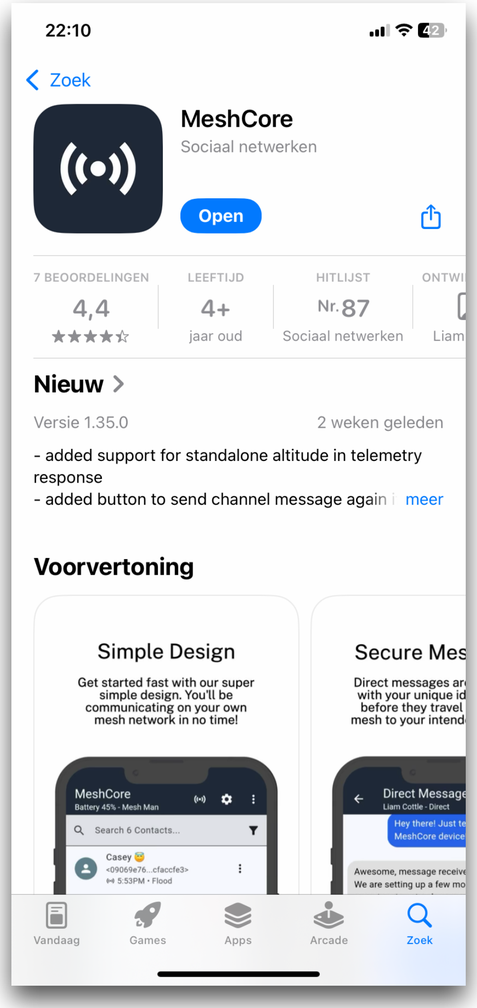
Set up the MeshCore Companion

3. Install MeshCore app on your mobile phone

- From the Appstore, install the app MeshCore
- Switch Bluetooth on your mobile phone *on*



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Set up the MeshCore Companion

4. Configure

MeshCore Companion can be configured with the MeshCore app (iOS or Android) via Bluetooth. When installed the USB version of the MeshCore firmware, the Webclient can be used instead.

1. (Re)start your device and write down the PIN

2. Ensure Bluetooth on your mobile phone is *on*

3. Open the MeshCore app on your smartphone and connect to your device

   Connect > Choose device > Enter PIN and confirm

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Set up the MeshCore Companion

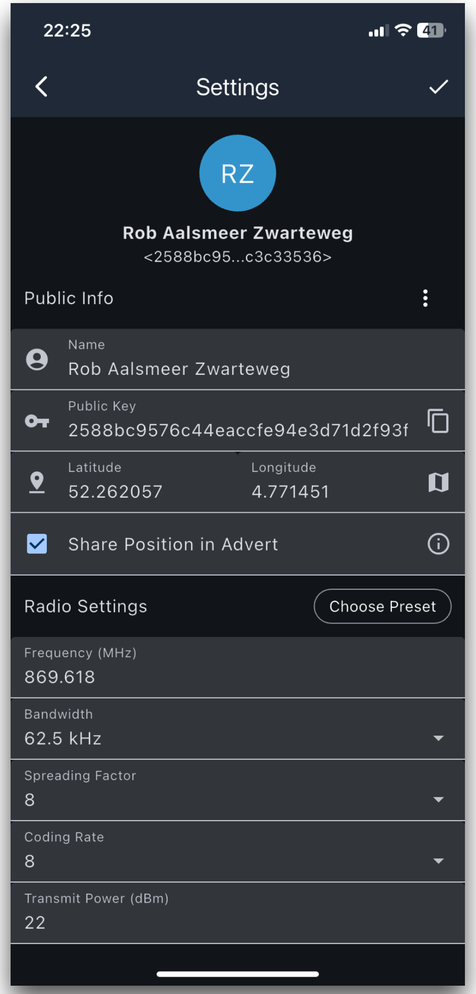
4. Configure (continued)

Name

Enter a name

Position

Find your position on Google Maps and fill out latitude and longitude. Check *Share position* in Advert



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Set up the MeshCore Companion

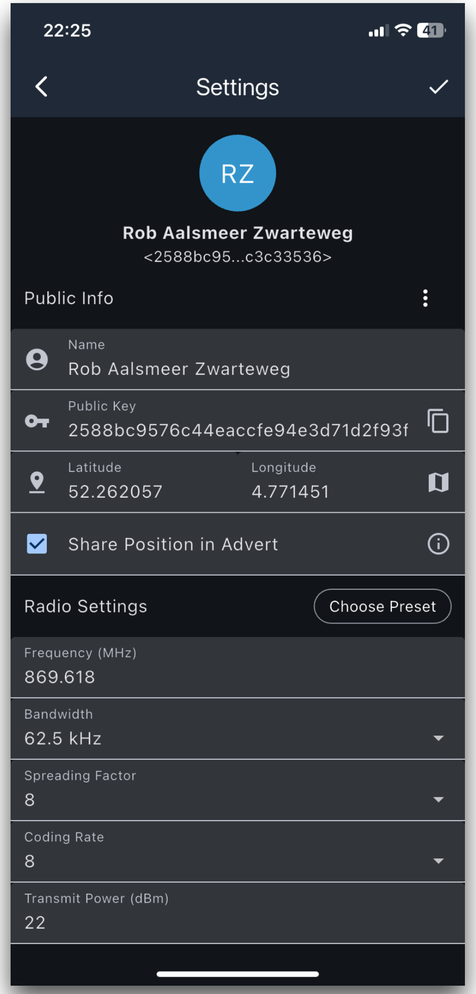
4. Configure (continued)

Radio settings

You can only communicate with devices with the same settings.

In the Netherlands *EU/UK Narrow* is used. When choosing this preset, the settings will be filled out

Save your changes by clicking the checkmark in the top left corner



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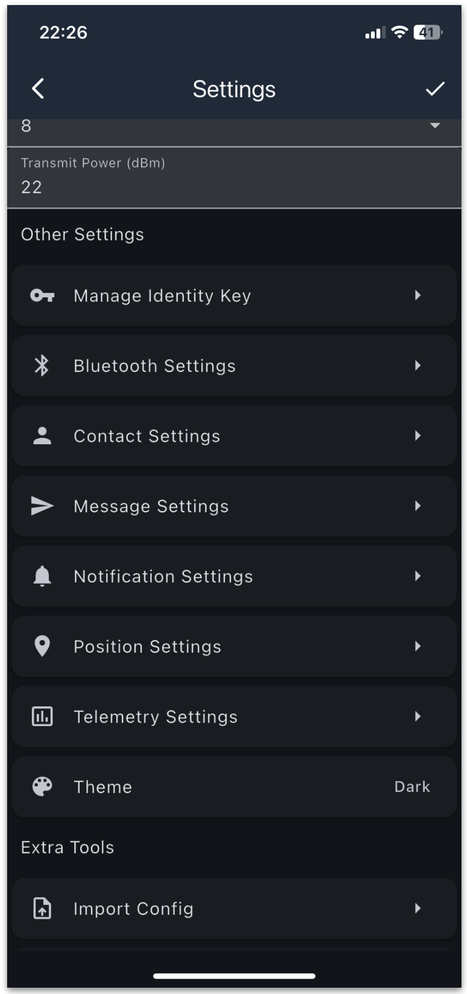
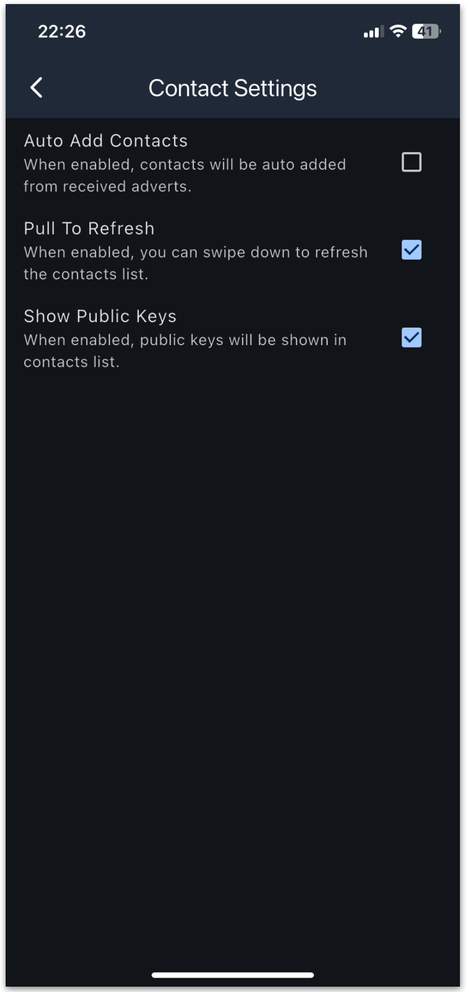
Set up the MeshCore Companion

4. Configure (continued)

Contact Settings (optional)

Disable Auto Add Contacts





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Test, experiment and get familiar with MeshCore

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Test, Experiment and Get familiar

Try ...

1. Advert your Companion
2. Discover Companions, Repeaters and Roomservers
3. Ping a repeater
4. Add Manon, Karl, Rob and/or your neighbour to your contactlist and drop them a message
5. Join the Sensemakers Channel and drop a message
6. Join the #test channel and send a message “Test”. View your reach and path
7. View your device on the map

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Wrap-up

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What did we do?

Introduced the concept of Mesh Networking

Dove into some MeshCore concepts

Mounted and configured our Companion device

Started experimenting with Advert and Discover, Channels and Contacts, Messaging

Saw our device and surrounding devices on the map

How to continue after tonight?

1. Discovery at your location
2. Advert your Companion at your location
3. Post in Channel Sensemakers and eventually your public key to build your network
4. See the path of messages received
5. Communicate with contacts
6. Try #Gyverbot
7. Consider a repeater
8. Give your email to Manon to join the Sensemakers Slack channel and drop your questions

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Links, URL’s, etc.

URL	Description
https://meshcore.co.uk/	MeshCore Website
	MeshCore Client (MS Edge or Chrome only)
	MeshCore Web Flasher (MS Edge or Chrome only)
meshet.nl	Dutch Mesh Community
	MeshCore FAQ
https://valleirug.nl/	
sensemakersams.org	Sensemakers website
https://meshcore.woodwar.com/reliability	

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End

Thanks !

Join us: 1st and/or 3rd Wednesday of the month in OBA.
Visit our website sensemakersams.org
Subscribe to our meetup group
Follow us on Twitter
Join our Slack channel

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