Meshcore

Introduction

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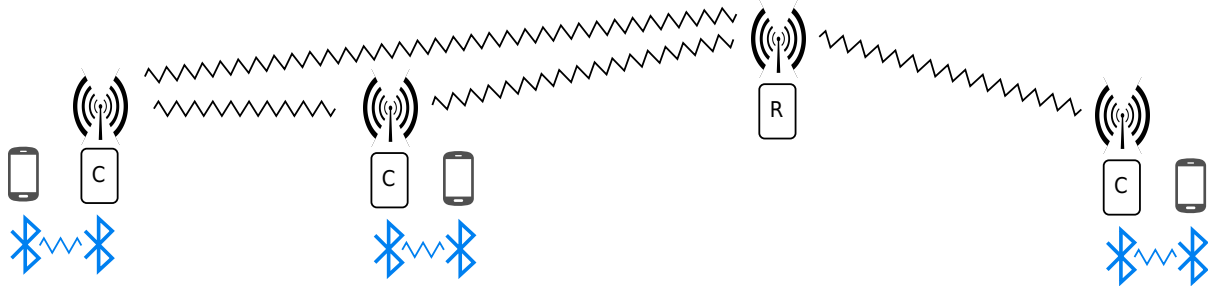
> MeshCore is an open-source mesh networking protocol and software platform designed for off-grid, low-power text communication using LoRa (Long Range) radio technology. The system enables decentralized, multi-hop wireless messaging without reliance on cellular networks or internet infrastructure.
>
> Use cases include emergency and disaster communications, outdoor and remote activities, [...] and experimental and educational deployments of low-power mesh networking.
>
> [It] is designed to [...] operate in unlicensed ISM frequency bands such as 868 MHz and 915 MHz, depending on regional regulations.

The basic idea is that each person has a small *companion* device C paired to their cell phone via bluetooth, and via that device, they can text each other or post public messages using the 915 MHz band, all without a special license. The signal can travel directly between *companion* devices if they are close enough, or via a series of *repeaters* R to extend coverage.



Getting Started: Companions [1)]

What is MeshCore?

- MeshCore is a simple, secure, off-grid, mesh communications app.
- It's powered by long range LoRa radios and the open source MeshCore firmware.
- You can send text messages to other mesh nodes that are in radio range without the internet. This means it still works even when WiFi, Cellular and Starlink are down.
- Solar powered repeater nodes can be placed on high points to increase messaging range.

MeshCore nodes used as *companion* devices.

A MeshCore node setup as a *repeater*.

What is needed to use MeshCore?

- The MeshCore app downloaded to your phone or computer.
- A mesh node with the MeshCore *companion* firmware to send messages from.
- If needed, a mesh node with the MeshCore *repeater* firmware to extend messaging range.
- Each person that wants to send messages will need their own companion node.

Download the MeshCore App

- Search for “MeshCore” by “Liam Cottle” on Google Play or the Apple App Store.
- Alternatively, download for Windows, MacOS and Web from https://meshcore.io
- You should save an offline copy of the software so it’s available without the internet.

Where to buy MeshCore nodes?

- Recommended devices are listed at https://meshcore.io
- Alternatively, supported devices listed on https://meshcore.io/flasher can be purchased online from overseas suppliers such as AliExpress or SeeedStudio, or Robot Shop in Canada.

Flash the Firmware

On Linux, you may have to add the “dialout” group to your user. To do that, type the following in the terminal replacing “USER” with your username and reboot your computer:

```
sudo usermod -a -G dialout USER
```

You should also use a Chromium based web browser like Brave.

If you already have Meshcore installed, download your current settings:

- Open the MeshCore app (Android, iOS, Web App, NodeJS, Python)
- Navigate to the Settings (the gear in the top right corner)
- Scroll down to the “Extra Tools” section and select “Export Config”
- “Select All” and click on the check mark in the top right corner to save the “.json” file to your phone.

Flash the Meshcore Firmware:

- Connect the companion device to your computer via USB.
- Go to https://meshcore.io/flasher (using a Chromium Browser).
- Select your device
- Select Companion Bluetooth
- Select Enter DFU Mode

- Select Erase Flash
- Select Flash

To re-load the config file:

- Open the MeshCore App
- Connect to the companion device, but it probably had a different bluetooth name now
- The PIN might be listed on your companion's screen
- Skip Setup
- Navigate to the Settings (the gear in the top right corner)
- Scroll down to the “Extra Tools” section and select “Import Config”
- Click on “Select File”
- Select the “*.json” file
- “Select All” and click on the check mark in the top right corner.

See Scott Baker's article for more information.

Connect to your MeshCore Device

- Turn on your node.
- Open the MeshCore App.
- Tap the “Connect” button in the top right corner.
- Tap the “MeshCore-XXXX” device that matches the name shown on your MeshCore device’s screen.
- Enter the PIN displayed on your MeshCore device’s screen.
- If your device doesn’t have a screen, the default pin is 123456.
- Once pairing is successful, you’ll be taken to the main screen.

Tap “Connect” in the top right corner.

Tap “MeshCore-XXXX” which matches the name on your MeshCore device.

You are now connected!

If you’re having trouble pairing with Bluetooth, try rebooting your phone.

Set your Public Display Name

You should now rename your MeshCore node. The name you choose will be seen by other users on the MeshCore network.

- Tap the settings icon in the top right corner.
- Tap the name field, backspace until it’s empty, then type your name.
- After entering your name, tap the tick icon in the top right to save it.


Tap the settings icon in the top right corner.


Tap the name field, and enter your name.


Tap the tick icon in the top right to save.


The device name in Bluetooth results will not update until you reboot your node.

Configure Radio Settings

MeshCore can be used all over the world. Different countries have different regulations on which radio frequencies can be used for public, license free communication. To ensure your node is operating legally, please make sure to select radio settings that are compliant in your country.

The MeshCore app provides a list of radio presets that have been suggested by the community for use in specific countries/regions.

To configure the radio settings for your MeshCore node:

- Tap the settings icon in the top right corner.
- Tap the “Choose Preset” button in the radio settings section.
- Tap the radio settings that match the name of your country/region.
- You will be taken back to the settings screen.
- Tap the tick icon in the top right corner to save your settings.


Tap the settings icon in the top right corner.


Tap the “Choose Preset” button in the radio settings section.


Tap the radio settings that match the name of your country/region.

In the South West BC area, edit the settings to the following:

	Until Sept 30, 2026	From Oct 1, 2026
Frequency	910.425	909.000
Bandwidth	62.5 kHz	62.5 kHz
Spreading Factor	7	7
Coding Rate	5	5

See here for more details.

Send a public broadcast message

Messages sent to the Public channel can be seen by anyone on the MeshCore network. They are repeated across the mesh by all repeaters that hear them. Other mesh nodes in range of you or a repeater that rebroadcast the message, should receive it.

The public channel can be used as a large group chat for general conversation amongst all users on the mesh. It could also be used to send emergency alerts.

It’s not recommended to send confidential information on the public channel as anyone can read these messages.

To send a message:

- Tap the channels tab at the bottom of the screen.
- Tap the “Public” channel.
- Type a message and press the send icon.


Tap the channels tab at the bottom of the screen.


Tap the “Public” channel.


Type a message and press the send icon.

Outgoing messages will show “Heard 1 repeat” if your node heard a nearby repeater passing on your message. If there are no nearby repeaters, it will show “Sent”. It’s not possible to know who received a channel message.

Share your Contact Details (via QR Code)

Before you can send private, encrypted, direct messages to someone, you and the person you send the message to must both add each other as contacts. If the other person doesn't also add you as a contact, your messages to them will fail to deliver.

Contacts can be added in multiple ways:

- Privately in person by scanning QR Codes.
- Publicly via the mesh by sending and receiving an "Advert".

To share your contact details privately via QR Code:

- Tap the 3 dot menu in the top right.
- Tap the "My Contact Code" menu item.
- Show the QR Code to the other person.


Tap the 3 dot menu in the top right.


Tap the "My Contact Code"menu item.


Show the QR Code to the other person.

The QR Code contains your Node Name, Node Type and Public Identity Key. Your contact details will not be transmitted over the mesh. Only the person who scans your QR Code will receive your contact details.

To add a contact via QR Code:

- Tap the 3 dot menu in the top right.
- Tap the “Add Contact” menu item.
- Tap the “Scan QR Code” button.
- If requested, grant access to the device’s camera.
- Point the device’s camera at the QR Code.
- The contact details will be automatically added to your contacts list.

Tap the 3 dot menu in the top right.

Tap the “Add Contact” menu item.

Tap the “Scan QR Code” button and point the camera at the QR Code.

You may need to accept a permissions request for the MeshCore app to access your camera. This permission must be granted to be able to scan the QR Code.

Share your Contact Details (via Advert)

If you are unable to privately share your contact details in person via a QR Code, you may alternatively share them publicly to everyone on the mesh by sending an “Advert”.

An advert is an unencrypted packet transmitted by your MeshCore node. It includes your node name, node type, public identity key and a cryptographic signature to prevent anyone from tampering with the information as it’s sent across the mesh.

You can send two types of adverts:

Zero Hop	Flood Routed
The advert won’t be retransmitted by any repeaters.	The advert will be rebroadcast by all repeaters that hear it.
Your contact details will only be received by nearby nodes.	Your contact details could be received by everyone on the mesh.

To share your contact details publicly via the mesh:

- Tap the signal icon in the top right.
- Tap the “Advert (Zero Hop)” or “Advert (Flood Routed)” menu item.
- Your contact details will be transmitted to the mesh.


Tap the signal icon in the top right.


Tap the “Advert (Zero Hop)” or “Advert (Flood Routed)” menu item.


Your contact details will be transmitted to the mesh.

Adverts are not encrypted. Sending an advert will share your contact details with everyone in range.

Send Private Messages

Once you've added a contact, and that contact has added you back, you can send private messages to each other across the mesh. These messages are encrypted and only the intended recipient can read the message contents.

To send a private message:

- Tap the contact you want to send a message to.
- Type a message and press the send icon.
- The app will try several times to deliver your message to the recipient.
- If it's successful, it will show "Delivered" with a check mark.
- If an automatic acknowledgement from the recipient is not received after some time, the message will turn red and show as "Failed".
- When messages are received, they will show up in the conversation viewer.

Tap the contact you want to send a message to.

Type a message and press the send icon.

Received messages will show up in the conversation viewer.

A message may get marked as failed even though it was successfully delivered to the recipient. This happens if we did not receive the acknowledgement reply from the recipient node. In this case, it's recommended to send the message again. Once you see the delivered check mark, you know for sure it was received.

Retry sending a failed Direct Message

When you send a direct message to someone, it’s possible that it may not go through after several automatic attempts. This can happen for many different reasons, such as:

- Being out of range of the intended recipient.
- There are no repeaters in between you and the intended recipient.
- The intended recipient’s radio might be turned off.
- There might be interference on the radio spectrum.

To try sending the failed message again:

- Long press the failed message shown in red.
- Tap the “Retry Sending” button shown in the message actions popup.
- Your message will try sending again.


Long press the failed message shown in red.


Tap the “Retry Sending” message action.


Your message will try sending again.

When sending direct messages, **you must both add each other as contacts** first. The recipient's companion radio must be turned on to receive the message and to provide a delivery report. You must also be in radio range of each other, or have a working path of repeaters between each other.

Ping a Repeater

To check the signal strength to and from a nearby repeater, you can run a ping test.

- Tap the 3 dot menu icon next to a repeater contact.
- Tap the “Ping (Zero Hop)” menu item.
- A green popup will show signal strengths if successful.
- A red popup will show “Timeout” if your companion didn’t hear the repeater.

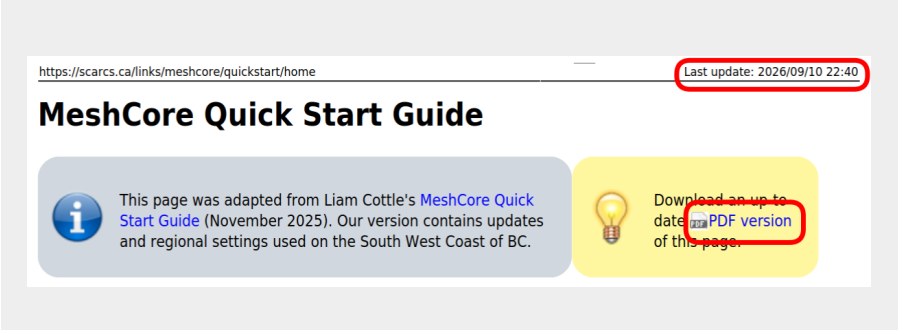
Tap the 3 dot menu icon next to a repeater contact.

Tap the “Ping (Zero Hop)” menu item.

A green popup will show signal strengths if successful.

Ping tests do not hop through multiple repeaters. You must be in range of the specific repeater you are ping testing. For a ping test to be successful, the repeater must hear your companion signal directly, and your companion must hear the repeater signal directly. If you’re not in range of the repeater, the ping test will fail with a timeout error.

See the new MeshCore Quick Start Guide. At the top of the page, you'll notice a link to download a PDF version of that page. The PDF will show the date when the web page was last updated. That way you can judge how recent the information is.



Next Step: Repeaters

- Install a repeater like the *SenseCAP Solar Node P1-Pro* from seeed studio or RobotShop
- Use an antenna like this one, this one or one of these.

If you already have Meshcore installed (but not the bootloader), download your current settings:

- Go to https://config.meshcore.io/
- Connect your device to your computer with a USB cable.
- Click on `Connect`
- Click on `Export`
- Click on `Disconnect`
- Locate the `.json` file (probably in your Downloads folder).

Download the bootloader:

- Go to https://meshcore.io/flasher
- Select your device
- Select `Repeater` (or `Room Server`)
- Click on `Download`
- Select the `*bootloader-x.x.x-OTAFIXx.x.uf2` file
- Locate the `.uf2` file (probably in your Downloads folder).

Copy the bootloader over to your device:

- Connect your device to your computer with a USB cable.
- Double click on the reset button.
- Open the drive that just mounted on your computer
- Copy the `.uf2` file to the drive.
- The drive may close on its own right away. This is normal.

Flash the Meshcore Firmware:

- Go to https://meshcore.io/flasher
- Select your device
- Select `Repeater` (or `Room Server`)
- Select `Enter DFU Mode`
- Select `Erase Flash`
- Select `Flash`

Re-upload your settings:

- Select `Configure via USB` from the previous page, or navigate to https://config.meshcore.io/
- Select `Connect`
- Select `Import`
- Select your `.json` file
- Scroll down to the `Access` section and retype your `New Admin password` (it doesn't remember it)
- Scroll down and select `Save settings`
- Select `Disconnect`

Setup the Over the Air (OTA) update app (first time only):

- Download the “nRF Device Firmware Update” app by “Nordic Semiconductor ASA” (Android, Apple)
- Open the DFU app
- In the settings, check `Packet receipt notification`

Perform an OTA update:

- Using your phone's browser, navigate to https://meshcore.io/flasher
  - Select your device
  - Select `Repeater` (or `Room Server`)
  - Select `Download`
  - Select the firmware `zip` file (**not** the bootloader file)
- Using the Meshcore app, login to your repeater (or room server) using the admin password.
  - For Room Servers: go to `Remote Management`
  - Go to the `Command Line`
  - Type `start ota`, you should get a message that says: `OK - mac: xx:xx:xx:xx:xx:xx`
- Open the DFU app
  - Under `File` click `Select` to chose the firmware `.zip` file
  - Under `Device` click `Select` and chose the device that has DFU in the name. If there are no device with DFU in the name select the device with OTA in the name.
  - Under `Progress` click `Start`
  - If you selected a device with OTA, the process will fail at `DFU initialization`. Not to worry, go back to the previous step and now you should be able to select a device with DFU in the name.

See Scott Baker's article for more information.

More Advanced: Sensors

- Install sensors.

Maps

- Official MeshCore Node map
- Community generated map
- SWBC Map with links by VE7KOD

Here's how to use MeshCore's Antenna Coverage tool to model line of sight coverage:

- Navigate to the web version of the MeshCore App
- You don't need to connect to an actual Meshcore device.
- Click on \$\quad \vdots \quad \$ on the top right corner and then select `Tools`
- Enter the `Antenna Coverage` tool
- Where it says `0 Coverage Layers` click on \$\quad \vdots \quad \$ and select `Import JSON`
- Import

this file

Tools

- MeshCore Analyser
- Path Profiler

Resources

- Official MeshCore Website and Github
- Youtube Presentation by Liam Cottle
- Scott Baker's Website
- Vancouver Island Amateur Radio Discord Meshcore tips & Tricks NEW
- Salish Mesh Website
- Forum
- MeshCore vs Meshtastic
- Channels vs Rooms vs DMs

1)

The Getting Started section used Liam Cottle's MeshCore Quick Start Guide from November 2025 as a starting point (CC-BY-SA). We then updated and expended it with regional settings used on the South West Coast of BC.