MeshCore

What is MeshCore?

MeshCore enables off-grid communication using LoRa (Long Range) radios. Meshcore is becoming the defacto off-grid networking choice in the Show Low area.

MeshCore is an open-source project that uses small, low-cost LoRa (Long Range) radios to create a decentralized, **off-grid** communication network. It lets you send short text messages and share GPS locations *without* any cell service or internet. Messages hop directly from device to device over long-range radio, so you can stay in touch during outdoor adventures, emergencies, or anywhere regular networks don't reach.

Think of it as your own private walkie-talkie text network - free to use once you have the devices, and supported by a friendly community of users and developers worldwide.

LoRa Radio Technology

The magic behind MeshCore's range is LoRa ("Long Range") radio. LoRa is a low-power wireless protocol that operates on license-free radio bands (915 MHz in the US). These radios can send data for several kilometers - often 2-5 km in typical conditions, and much farther (tens of kilometers) with line-of-sight and good antennas.

LoRa's data rate is very low compared to Wi-Fi or cellular, so MeshCore is limited to text messages and GPS locations (no photos or big files), and messages have a maximum length of around 200+ characters. This is plenty for short communications like "I'm at the campsite" or emergency signals.

Hardware

One of the great things about MeshCore is that it runs on affordable, off-the-shelf hardware. Most MeshCore nodes use an ESP32 or similar microcontroller paired with a LoRa radio module, plus optionally a GPS receiver. Popular choices include:

- LILYGO T-Beam (ESP32 with LoRa and built-in GPS)
- LILYGO T-Echo (nRF52-based with e-ink screen)
- Heltec WiFi LoRa boards
- RAK Wireless modules

These boards typically cost $30-$50, making it practical to get a few for your group.

The MeshCore App

MeshCore is designed to be beginner-friendly. There's a free official Meshtore companion app for Android and iOS that pairs with your device via Bluetooth or Wi-Fi. Once connected, the app provides a chat interface very similar to a messaging app.

The mobile app also shows a map with GPS locations of your team - super useful for hiking or search & rescue, as you can see where all your MeshCore-equipped friends are on a map.

MeshCore supports encryption so your messages aren't readable by others outside your group. You can set your own channel name and encryption key to create a private network. The communications use strong AES encryption.

Common Use Cases

Emergency Communication: When disasters strike and cell towers go down , MeshCore serves as a backup network for first responders and communities.

Outdoor Adventures: Hikers, campers, and skiers can stay in contact over many kilometers of terrain where there's no cell service.

Group Events: At festivals or large gatherings where cellular networks are overloaded, MeshCore provides reliable local communication.

Device Roles

MeshCore devices can play one of three roles:

Companion: Your personal device that pairs with your phone. Does not relay messages for others.

Repeater: Infrastructure node that forwards traffic. Place these in strategic elevated locations.

Room Server: Stores messages when recipients are offline and forwards them when they return.

Hardware & Software

MeshCore runs on LoRa devices such as - Heltec WiFi LoRa, RAK Wireless modules, LILYGO T-Beam and T-Echo, the T-Deck, and more.

MeshCore's team provides a web-based Flasher Tool that makes it easy to select your board model and flash the appropriate firmware. The MeshCore mobile app (Android/iOS) is free to download and use. The app lets you see network topology, delivery confirmations, and even set specific routes for messages.

Kachina
Amateur Radio Club
https://kachinaarc.org
KachinaARCinfo@gmail.com
P.O. Box 2996, Show Low, AZ 85902