Overview

What repeaters are, why they matter, and how they fit into a MeshCore network.

What is a MeshCore Repeater?

A MeshCore repeater is a device configured to run headlessly - without a connected phone or computer - whose sole job is to receive messages and forward them automatically. Repeaters form the backbone of any robust MeshCore network.

How a repeater works

Every MeshCore node listens for incoming radio packets. A repeater runs headless (no phone needed) and stores no message history, though some hardware (such as the Heltec V3 or T-Beam) does include a small status display. When it receives an eligible packet, it forwards it - skipping duplicates it has already seen and applying the network's forwarding rules - extending the message's reach to nodes that would otherwise be out of range.

This forwarding is automatic and requires no human intervention after initial deployment.

Why repeaters matter

Direct device-to-device range at ground level in a built-up area is often just a few hundred meters to roughly 1 km, depending heavily on terrain, obstructions, and antennas (range-test data for 915 MHz LoRa varies widely - as low as ~0.4 km in dense forest). A single repeater placed at elevation - a rooftop, hilltop, or communications tower - can extend coverage well beyond ground-level range: in favorable terrain with clear line of sight, often on the order of 10-20 km (6-12 miles) to nodes in its area, and farther node-to-node when both ends are elevated. Expect much less (a few km, or roughly 1-10 miles) where terrain or obstructions block line of sight. These are approximate, environment-dependent figures, not a guaranteed radius.

The more repeaters a community deploys in well-chosen locations, the more resilient and far-reaching the network becomes. Each additional repeater increases redundancy and reduces the chance of any single point of failure.

Repeater vs personal node

Personal node (BLE Companion)	Repeater
Paired with a smartphone	Runs standalone, no phone needed
Powered on/off by user	On continuously (solar or mains)
Used for sending/receiving messages	Forwards messages only
Typically carried or kept indoors	Mounted at elevation outdoors

Advertisements

Repeaters periodically broadcast **advertisements** announcing their presence on the network. These contain the repeater's identity, geographic position (if configured), and public encryption credentials. Other nodes use this information to discover the repeater and route messages through it.

As of current MeshCore firmware (2025-2026), the default flood advertisement interval for a repeater is 12 hours (set via `set flood.advert.interval <hours>`, range 3-168). Defaults can change between releases, so confirm yours with `get flood.advert.interval`. A zero-hop advert (`advert.zerohop`) is locally visible only; a flood advert (`advert`) propagates through other repeaters across the network.

Why Deploy a Repeater?

The case for community repeater infrastructure

A LoRa mesh network is only as strong as its infrastructure. Personal nodes carried in pockets or sitting in homes have limited range and go offline when their owners do. A well-placed repeater is always on, always forwarding, and serves every person in its coverage area simultaneously.

Key benefits

Extended range

A repeater at elevation can relay messages much farther than two ground-level handhelds could reach each other directly. With clear line of sight in favorable terrain, an elevated node can reach roughly 10 - 20 km (about 6 - 12 miles); a link between two elevated stations in ideal open terrain can stretch toward 20 - 25 miles, but expect substantially less with terrain obstruction or a handheld client. Without repeaters, two people a mile apart in a city might not be able to reach each other directly. Through a rooftop repeater, they can.

Network resilience

The more relay paths exist between any two points, the harder the network is to disrupt. If a node on a path goes offline, MeshCore can re-route — but only after the existing path fails and a new path is discovered, which introduces delay and can lose messages in the interim. Genuine redundancy requires a real alternate physical path, so build at least two independent routes for any critical link.

Always-on coverage

Unlike personal nodes that go offline when their owner's phone battery dies, a solar repeater operates indefinitely. Coverage is consistent regardless of whether individual users are active.

Multi-hop reach

MeshCore's firmware allows a high flood hop maximum (up to 64), but reliability falls off well before that. In practice, 3 - 5 hops through well-placed repeaters is the usable range and is enough to span considerable distances. A chain of rooftop or hilltop repeaters can cover an entire metro area or rural county.

Who should deploy a repeater?

Anyone with access to a good high location - a rooftop, a tall tree, a balcony with a clear view - can meaningfully contribute to local coverage. You do not need professional antenna installation experience for a basic install. However, outdoor and elevated mounts require proper weatherproofing, grounding and lightning protection (bond/ground per NEC 810 for fixed outdoor antennas), and care with any work at height. A simple pole mount and a weatherproof enclosure are often sufficient.