How Mesh Routing Works

When two nodes are too far apart to communicate directly, intermediate nodes relay the message. Meshtastic and MeshCore solve this differently.

Flooding (Meshtastic)

When a node receives a new packet it rebroadcasts it once - unless it first hears another node relay the same packet, in which case it stays quiet (managed flooding). Duplicate detection prevents loops. The message floods outward until it reaches its destination or exhausts its hop count (default 3, configurable up to 7).

- **Simple and robust:** No routing tables. New nodes work immediately. Self-healing if relay fails. (Since Meshtastic 2.6, direct messages additionally use a learned next-hop relay, with automatic fallback to flooding, so some routing state does exist for DMs.)
- **Limitation:** In a dense mesh, a single message can trigger dozens of rebroadcasts. This is why faster presets such as MediumFast are preferred in dense networks.

Path-based routing (MeshCore)

MeshCore discovers explicit routes before sending data:

1. Node A's first message is flood-routed; each repeater that relays it appends its ID to the packet's path
2. Destination D sends back a **delivery report** listing the repeaters the message traversed; this report is flood-routed back to A and becomes the basis for the future direct path
3. Node A caches the route A → B → C → D and uses it for all subsequent messages to D

- **More efficient at scale:** Messages travel only the established path - much less airtime than flooding in large networks
- **Limitation:** The first message to a new contact is flooded (using more airtime); the efficient direct path only kicks in from the second message onward. Topology changes require re-discovery.

Which is better?

Both work well in practice. Flooding is simpler and more resilient for small-to-medium networks. Path-based routing scales better for large infrastructure deployments. In practice, your choice is determined by which protocol your local community uses.

The mesh advantage

In Meshtastic, every node is a potential relay; in MeshCore, only nodes flashed as repeaters relay - client nodes deliberately do not. A hilltop repeater that can hear both a valley and a distant mountaintop effectively bridges those two coverage zones for all messages. A few well-placed infrastructure nodes have outsized impact on total network reach.

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