Handling Network Growth and Congestion

A Meshtastic network that works well with five nodes may behave poorly at fifty. Managing growth proactively - rather than reacting after congestion degrades performance - is what separates a durable community network from one that works great until it doesn't.

Early Stage: 1 - 10 Nodes

At this scale, almost any configuration works. Long Fast is a reasonable default - it has good range and is the most common preset, making it easy for newcomers to join.

Focus at this stage belongs on placement, not optimization. A single well-placed repeater on a hilltop or water tower does more for network coverage than ten ground-level nodes. Get repeaters in good locations first.

Growth Stage: 10 - 50 Nodes

As the network grows, start monitoring channel utilization. The Meshtastic app displays this metric; check it periodically. Channel utilization is generally healthy below ~25% - the firmware defers transmitting until utilization drops below 25% (packets are deferred, not dropped). As a rule of thumb on the app's 1-minute window, green is under 25%, orange is 25-50%, and red is over 50%. Sustained utilization above ~25% (and especially above 50%) is a warning sign.

Actions at this stage:

- Audit hop limits. High hop limits cause individual messages to generate multiple retransmissions across many nodes. A hop limit of 3 is appropriate for most community networks; higher values compound congestion (the Meshtastic maximum is 7).
- Review node density. Clusters of nodes in the same small area all hear and retransmit each other's traffic. Nodes that add density without extending coverage add congestion without benefit.
- Begin discussing a potential preset migration with the community before it becomes urgent.

Scaling Stage: 50+ Nodes

At this scale, Long Fast will likely show sustained high utilization. Seriously consider migrating to Medium Fast or Medium Slow, which use higher data rates and shorter airtime per message to reduce congestion - in exchange for some range and receiver sensitivity compared to Long Fast. The point of the migration is to gain channel capacity, not range: Long Fast actually reaches farther, while the Medium presets are faster but shorter range. That capacity tradeoff is what matters when node count is high and airtime is the remaining problem.

This migration must be coordinated as a community. **All nodes must change simultaneously, or you split the network** - nodes on different presets cannot communicate.

Preset Migration Process

1. **Pick a date and time** for the migration window.
2. **Announce in all community channels** at least two weeks in advance. Post in Discord, on the website, and in any mailing lists. Include the specific preset being adopted.
3. **Document the change procedure** - a step-by-step guide for changing the preset in the Meshtastic app, for both Android/iOS and the web client.
4. **Change infrastructure repeaters first.** These are the reference points that participants will see when they join on the new preset.
5. **Ask all participants to update within the migration window.** A specific two-hour window on a weekend afternoon works better than "sometime this week."
6. **Keep one repeater on the old preset temporarily.** Leave a repeater on the old preset for 1 - 2 weeks after migration so not-yet-migrated stragglers still have something to join. Note this does **not** bridge the two presets - a node on the old preset cannot hear or relay to nodes on the new preset (different modem settings mean no interoperability). It only continues serving users who haven't migrated yet, giving them a way to see a message like "Network has migrated to Medium Slow - update your preset to rejoin" and self-serve the fix. True bridging between two presets requires a dual-radio gateway running both presets at once.

Managing the Public Channel

You cannot control what strangers do on the public channel. Trolling, spam messages, and misconfigured nodes that flood the network with repeated traffic are occasional realities on any open mesh.

Mitigation strategies:

- Maintain a **secondary private channel** for your community's operational use, regardless of network size. The public channel is for newcomers and casual use; the private channel is for your community's serious coordination.
- Document and enforce a **community hop limit recommendation**. Node roles and rebroadcast settings can limit how infrastructure nodes relay traffic, which helps limit cascading retransmissions.
- Treat persistent disruptive nodes as a maintenance issue, not a personal conflict. Document the node ID and behavior, and discuss with your community whether any technical mitigations are warranted.

Tracking Growth Health

Watch these indicators month over month:

- Node count - use your own node database or the Meshtastic app for accurate total and online counts. Note meshmap.net only shows nodes that report to the public Meshtastic MQTT server, so a private community network (with MQTT uplink off) will not appear there in full and it is not a reliable node-count dashboard for your network.
- Channel utilization during peak hours
- Ratio of infrastructure repeaters to client nodes (more repeaters relative to total nodes = better network health)

Growth that outruns infrastructure is the most common failure mode for community meshes. Adding repeaters ahead of demand keeps the network healthy through growth phases.

Revision #6
Created 2026-05-03 05:29:43 UTC by Mesh America Admin
Updated 2026-06-10 04:29:30 UTC by Mesh America Admin