

# Monitoring Channel Utilization

Channel utilization is the single most important metric for diagnosing a congested Meshtastic network. High channel utilization causes missed messages, failed relays, and poor network performance.

## What Channel Utilization Measures

Channel utilization (reported as a percentage in device metrics telemetry) measures the fraction of time that the radio channel is occupied by any LoRa transmission audible to a given node. This includes:

- The node's own transmissions
- Relay transmissions from neighboring nodes
- Position and telemetry broadcasts from all nearby nodes

## The 25% Warning Threshold

The Meshtastic project recommends treating **25% channel utilization** as a warning threshold. Above this level:

- Packet collision probability increases significantly
- Message delivery reliability decreases
- Effective network throughput drops despite higher raw utilization

## Diagnosing High Channel Utilization

If channel utilization is above 25%, work through these checks:

1. **Count Router/Repeater nodes** - Too many infrastructure-role nodes in one area creates excessive relay traffic. Audit whether all Router/Repeater nodes are genuinely needed.
2. **Check telemetry intervals** - Frequent device metrics, position, or environment telemetry from many nodes adds up quickly. Increase intervals across the network.
3. **Identify high-traffic nodes** - Look at air utilization (the TX percentage) in device metrics. A node with very high air utilization is generating a disproportionate share of traffic.

4. **Switch dense-area personal nodes to Client Mute** - Each non-Mute client node attempts relay, multiplying traffic.

## Switching to a Faster Modem Preset

LoRa modem presets trade range for throughput. A faster preset carries the same data in less airtime, directly reducing channel utilization:

```
meshtastic --set lora.modem_preset LONG_FAST # default; good range, moderate speed
meshtastic --set lora.modem_preset MEDIUM_FAST # shorter range, faster; less airtime
meshtastic --set lora.modem_preset SHORT_FAST # short range, maximum speed
```

Switching from LONG\_FAST to MEDIUM\_FAST roughly halves the airtime per packet, halving channel utilization all else equal. The trade-off is reduced range. Use this when you have good node density and congestion is the problem.

## Viewing Channel Utilization

In the [Meshtastic app](#): **Node Details** → **Device Metrics** shows the reported channel utilization from each node's perspective. Check several nodes across the network to understand the overall picture - a node at the center of a dense cluster will see higher utilization than one on the fringe.

Via CLI:

```
meshtastic --info
```

The output includes current channel utilization and air utilization for the connected node.

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