

# Advanced Meshtastic Repeater Topics

Store and Forward, position reporting, and telemetry for infrastructure repeater nodes.

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# Store and Forward

## What Is Store and Forward?

Store and Forward (S&F) is a Meshtastic server module that **buffers messages for nodes that are temporarily offline**. When a client node comes back within range, the S&F server replays the messages the client missed while it was away.

## How It Works

1. A node with S&F enabled in *server mode* listens to all channel 0 messages and stores them in a ring buffer in RAM.
2. When a client node configured in *client mode* reconnects to the mesh, it sends a replay request.
3. The server transmits buffered messages up to the configured **History Return Max** count and within the **History Return Window** time range.

## Hardware Requirements

The server node needs sufficient RAM to maintain a useful message buffer:

- **Recommended:** T-Beam, Heltec V3, or any ESP32-S3 device with 4 MB+ PSRAM, or any nRF52840-based device (RAK4631, Nordic development kits).
- **Avoid:** Devices with very limited RAM (original ESP8266-based boards, small OLED nodes without PSRAM) - they may not maintain buffers of useful size.

## Server Configuration

1. Navigate to **Config** → **Module Config** → **Store and Forward**.
2. Set **Enabled** → **true**.
3. Set **Is Server** → **true**.
4. Set **History Return Max** - the maximum number of messages to replay per request (default: 30).
5. Set **History Return Window** - the time window in minutes from which to replay messages.
6. Save and reboot the node.

# Client Configuration

On each client device that should receive replays:

1. **Config** → **Module Config** → **Store and Forward** → **Enabled** → **true**.
2. Set role to **Client** (or **Client Mute** if the device should not rebroadcast).

The client will automatically request a replay from the nearest S&F server when it joins the mesh.

## Ideal Use Cases

- Hikers or cyclists who move in and out of mesh coverage.
- Vehicles that periodically leave and re-enter a covered area.
- Remote monitoring stations that reconnect on a schedule.
- Emergency communication networks where message delivery must be ensured.

## Limitations

- S&F only replays **channel 0 messages** by default in current firmware versions.
- Large message volumes on small-RAM devices will cause the ring buffer to overwrite older messages quickly.
- The server node must be **continuously powered and on-mesh** - a node that goes offline loses its buffer.
- S&F adds overhead to the server node; monitor channel utilisation on high-traffic networks.

# Position and Telemetry for Infrastructure Nodes

## Why Position Accuracy Matters

An accurate position lets your repeater appear correctly on [meshmap.net](https://meshmap.net) and in the [Meshtastic app](#)'s node list. Other operators use your node's reported position to plan coverage, model signal paths, and verify that packets are actually being relayed from the expected location.

## Fixed Position vs. GPS

Most unattended infrastructure repeaters do not need GPS hardware. Instead, configure a **fixed position** using the known coordinates of the deployment site:

1. Look up the coordinates of your site with any map application (Google Maps, OSMand, etc.) - right-click the location and copy the lat/lon.
2. In the Meshtastic app: **Config** → **Position** → **Fixed Position** → **Enable**.
3. Enter the **latitude**, **longitude**, and **altitude** (in metres).
4. Save. The node will broadcast this position at the configured interval without needing a GPS fix.

If your device has GPS hardware and the repeater is mobile (e.g. a vehicle relay), leave GPS enabled and set the Smart Position Broadcast threshold appropriate for your speed.

## Position Broadcast Interval

This setting controls how often the node announces its location on the mesh.

- **Default:** 15 - 30 minutes - appropriate for mobile nodes.
- **Recommended for static infrastructure:** 1 - 6 hours (3600 - 21600 seconds). A repeater that never moves does not need to announce its position frequently.
- Reducing this interval lowers airtime consumption and channel utilisation - important on busy networks.

# Smart Position Broadcast

Meshtastic's Smart Position feature broadcasts a new position only when the node has moved beyond a configurable distance threshold. **For a static repeater, disable Smart Position and use a fixed timed interval instead** - Smart Position is designed for moving nodes and may behave unexpectedly on hardware without GPS.

## Device Telemetry

Meshtastic can broadcast device health metrics over the mesh, including:

- Battery voltage and charge percentage.
- Node uptime.
- Channel utilisation (percentage of airtime used for receiving).
- Air utilisation (percentage of airtime used for transmitting).

Enable and configure telemetry at **Config → Module Config → Telemetry → Device Metrics**. Set the broadcast interval - the default of  seconds (hourly) is appropriate for most infrastructure nodes.

## Remote Health Monitoring

Once device telemetry is enabled, any operator who can see your node on the mesh can view its reported battery voltage and channel utilisation in the Meshtastic app's node detail view. This provides passive, no-cost remote monitoring:

- A gradual drop in reported battery voltage warns of a failing solar charge or depleted battery before the node goes offline.
- High channel utilisation (above ~40%) indicates the node is in a congested area - consider adjusting transmit power or the position broadcast interval.
- Uptime resets alert you to unexpected reboots (power glitches, firmware crashes).

For critical infrastructure nodes, consider setting up a **MQTT bridge** to push telemetry to an external monitoring system - see the Meshtastic MQTT documentation for details.