

Meshtastic

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An open source, off-grid, decentralized, mesh network built to run on affordable, low-power devices

What, How, Why, When

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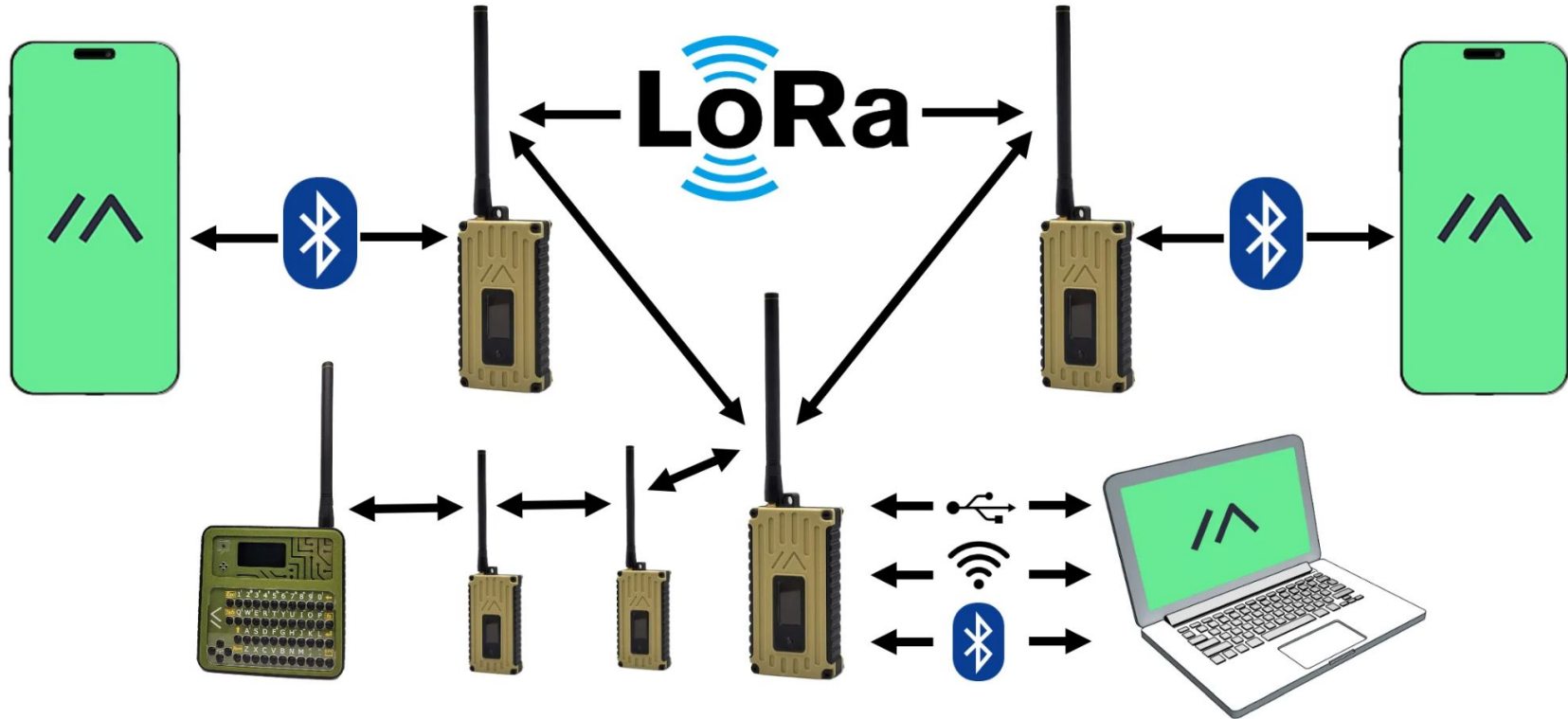
What is It?

Definition: Meshtastic is a community-driven, open-source project that allows users to create a private, long-range, low power, mesh network for communication without the need for cellular service or the internet.

Meshtastic Project

- Open-source project
- Long range: Can reach up to ~158 miles/~254 km
- No phone required
- Decentralized
- Encrypted communication
- Excellent battery life
- Text messaging
- GPS based location
- Android, Apple, Linux, Web Browser capable

LoRa

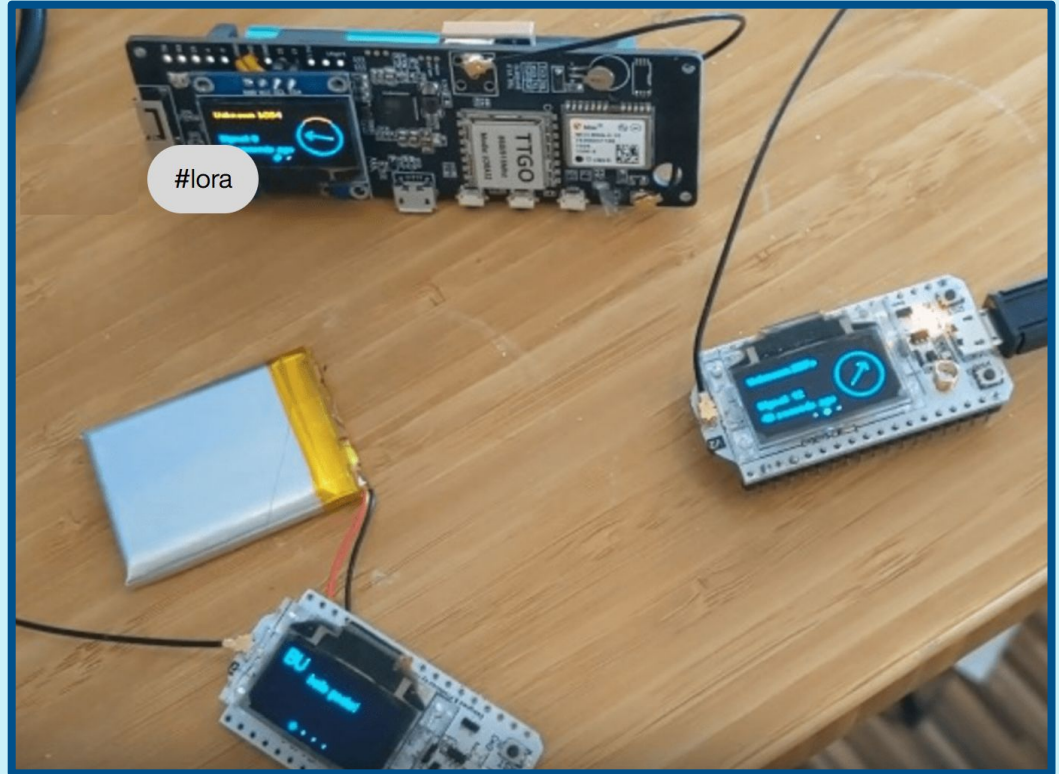


How it Works

Meshtastic uses inexpensive LoRa radios to create a mesh network that can forward packets between devices. Each device can see the location and distance of other devices in the mesh, and can send and receive text messages.

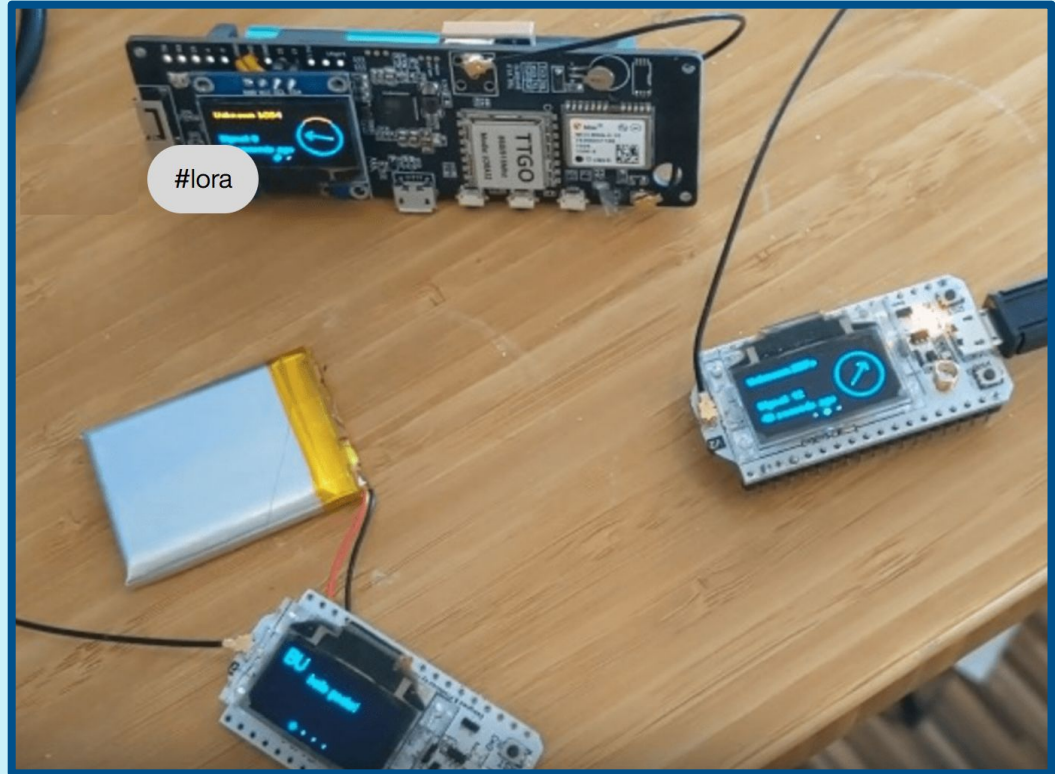
LoRa Radios

- LoRa = Long Range
- Low Power (~1 watt or less)
- Transmit data over wide areas
- Data rate is 300 to 50,000 bits per second
- GPS & Bluetooth capable



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Meshtastic Bandwidth & Bitrate

Meshtastic's bandwidth and bitrate are affected by several factors, including:

Bandwidth: The amount of the spectrum used.

Spreading Factor (SF): How data is spread out over time. Each increase in SF doubles the airtime for transmission.

Coding Rate: The amount of *redundancy* encoded to resist noise. Increasing the coding rate increases reliability but decreases data-rate.

LoRa presets: Meshtastic has several presets that vary in speed, range, bandwidth, and airtime. The presets include:

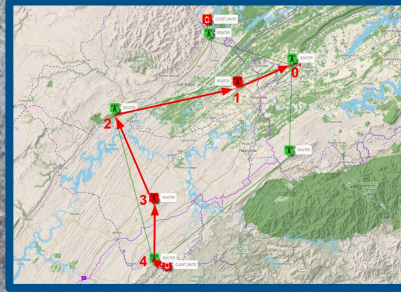
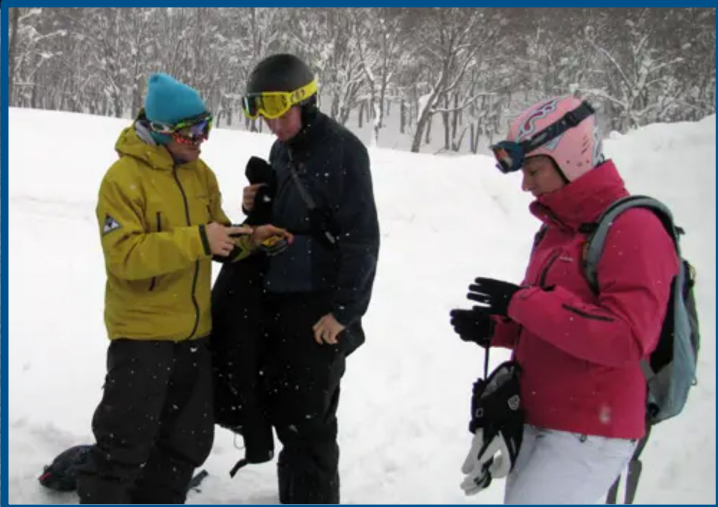
SHORT_TURBO : Fastest, highest bandwidth, shortest range, and lowest airtime. Not legal to use in all regions.

VERY_LONG_SLOW : Slowest, lowest bandwidth, longest range, and highest airtime. Not recommended for regular use.

When & Why to Use It

Meshtastic is useful for activities like hiking, skiing, hunting, camping, and emergency rescue operations, where reliable internet & cell network access is limited, and where closed-source GPS communicators are not suitable.

Uses



Activate Windows
Go to Settings to activate


Features

Meshtastic uses encryption to keep conversations private. It also has a protocol that makes every node a potential repeater, so messages can reach a wider area.

Hams **can** use higher power (10 watts) & higher gain antennas.

Hams **cannot** use encryption.

Hams must transmit their call sign once every 10 minutes.

A photograph of a solar-powered mesh node mounted on a metal pole on a mountain peak. The node consists of a vertical antenna, a solar panel, and a control box. The background shows a vast, hazy mountain range under a sunset sky with scattered clouds. The foreground is a grassy slope with some evergreen trees.

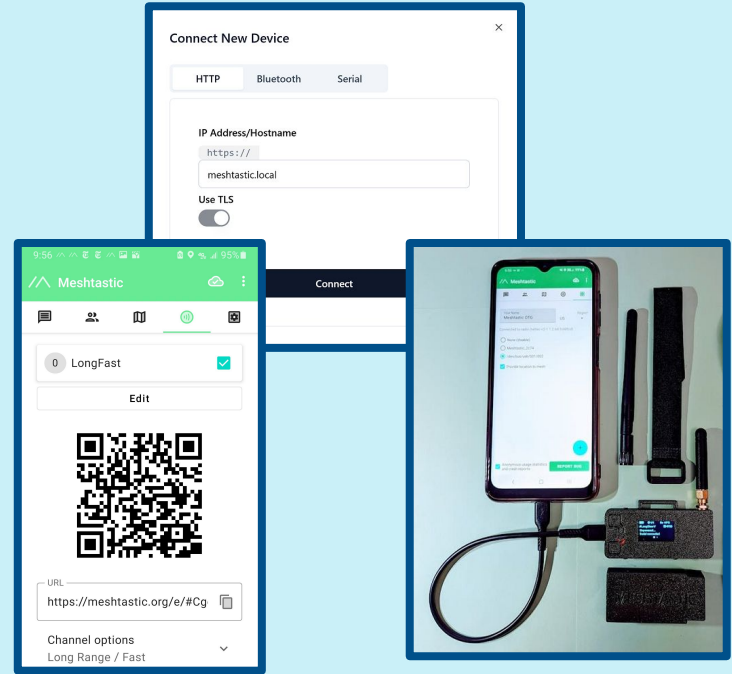
Solar-powered
mountain top mesh
node - great location
for a Meshtastic
repeater site.

Getting Started

You can manage your Meshtastic devices through:

- 1) a web client;
- 2) the Meshtastic app; or
- 3) via a serial/usb connection.

You'll need to set a region for your devices (i.e. U.S.), and configure the LoRa radio settings.



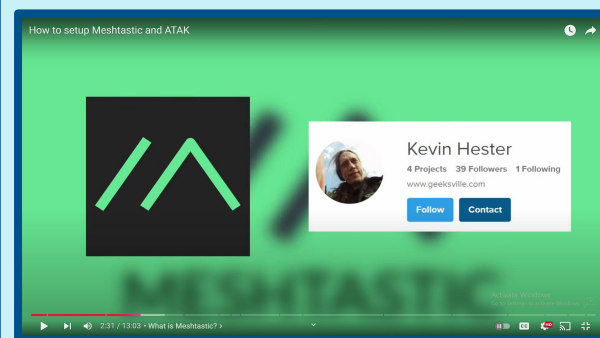
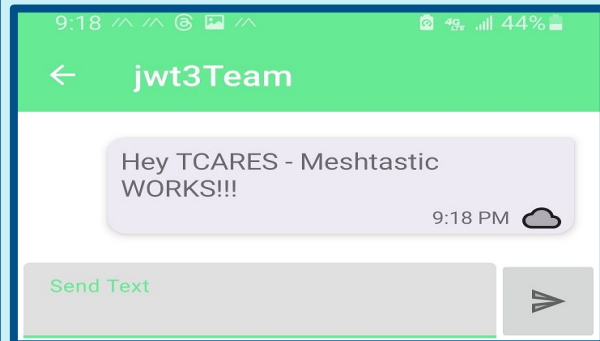
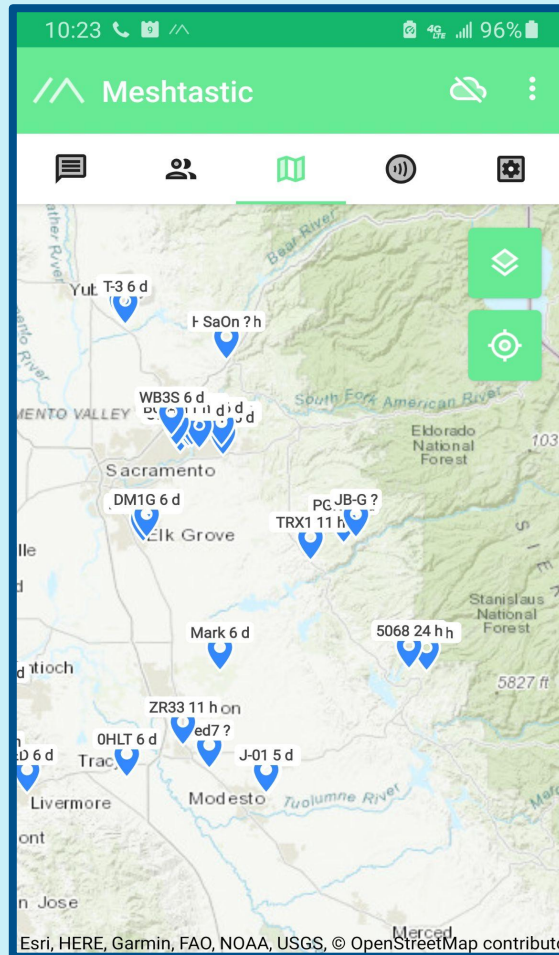
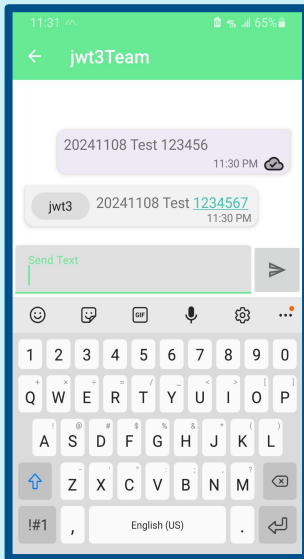
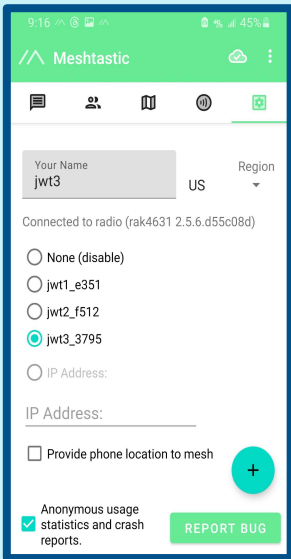
Unboxing 2 Nodes



LILYGO T-Echo Meshtastic LoRa SX1262
Wireless Module 915MHz TTGO

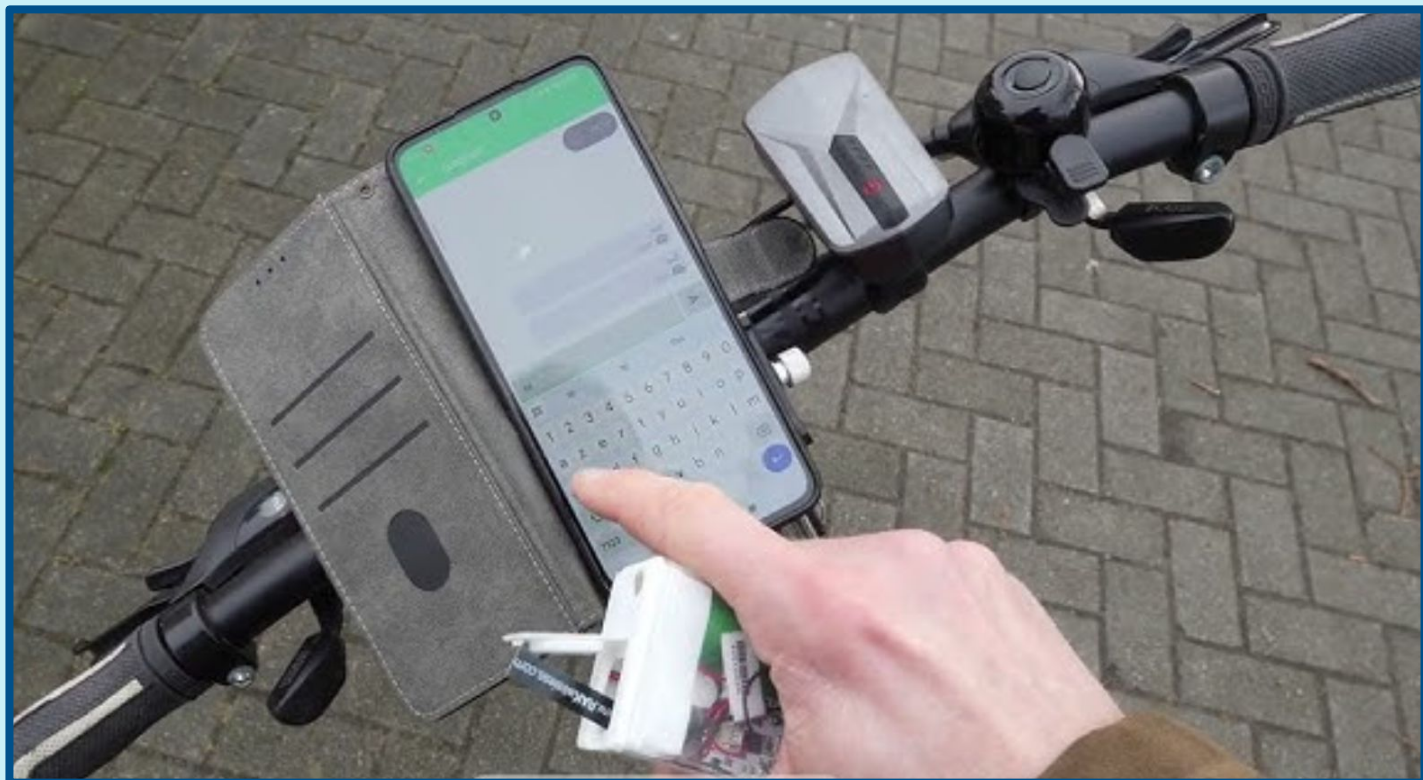
\$62⁰⁰





Summary

- Open-source, radio mesh network for comms
- No need for cellular network, or internet connection
- Uses inexpensive LoRa (Long Range) radios (~915 MHz) to create the mesh network
- Forwards packets (i.e. texts & GPS data) between devices
- No need for a license (for family/friends), but there is a Ham Mode (no encryption; higher power; higher gain antennas; must transmit call sign every 10 minutes)
- To Get Started: Get a LoRa Node (<\$75), set up the Meshtastic app (free) on your device, configure it, start chatting, and play radio!



Worldwide Nodes



Legend

- MQTT Connected
- MQTT Disconnected
- Offline Too Long

Activate Windows
Go to Settings to activate Windows.

Resources

1. Meshtastic Website: <https://meshtastic.org/>
2. Central Valley Mesh: <https://centralvalleymesh.net/>
3. Central Valley Mesh Nodes: <https://meshinfo.cvme.sh/nodes.html>
4. Discord Channel: <https://discord.com/channels/1219387517795569665/1219387518395617295>
5. Meshtastic Github: <https://github.com/meshtastic>
6. Meshtastic Map: <https://meshtastic.liamcottle.net/>
7. Meshtastic Youtube: <https://www.youtube.com/@Meshtastic>
8. Meshtastic Glossary of Terms: <https://meshtastic.org/docs/terms/>