

MESHTASTIC

A bad introduction by some guy you've probably never met before.

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An ~~bad~~ incomplete introduction by some guy you've probably never met before.

WHO IS THIS GUY?

- My name is Mike Skelly
- I've been running communication services on the internet for since 1996.
- Licensed Amateur Radio Operator since 2012.
- Administrator of New York Meshtastic Community Discord and nyme.sh domain.
- Future husband to Meredith (who you may also not know yet, but you definitely will, she's great)

MESHTASTIC

- What it is
- How it works
- What it's good for
- What it's bad at
- Getting started

WHAT IS MESHTASTIC?

Meshtastic[®] is a project that enables you to use inexpensive LoRa radios as a long range off-grid communication platform in areas without existing or reliable communications infrastructure. This project is 100% community driven and open source!

<https://meshtastic.org/docs/introduction>

WHAT IS LORA?

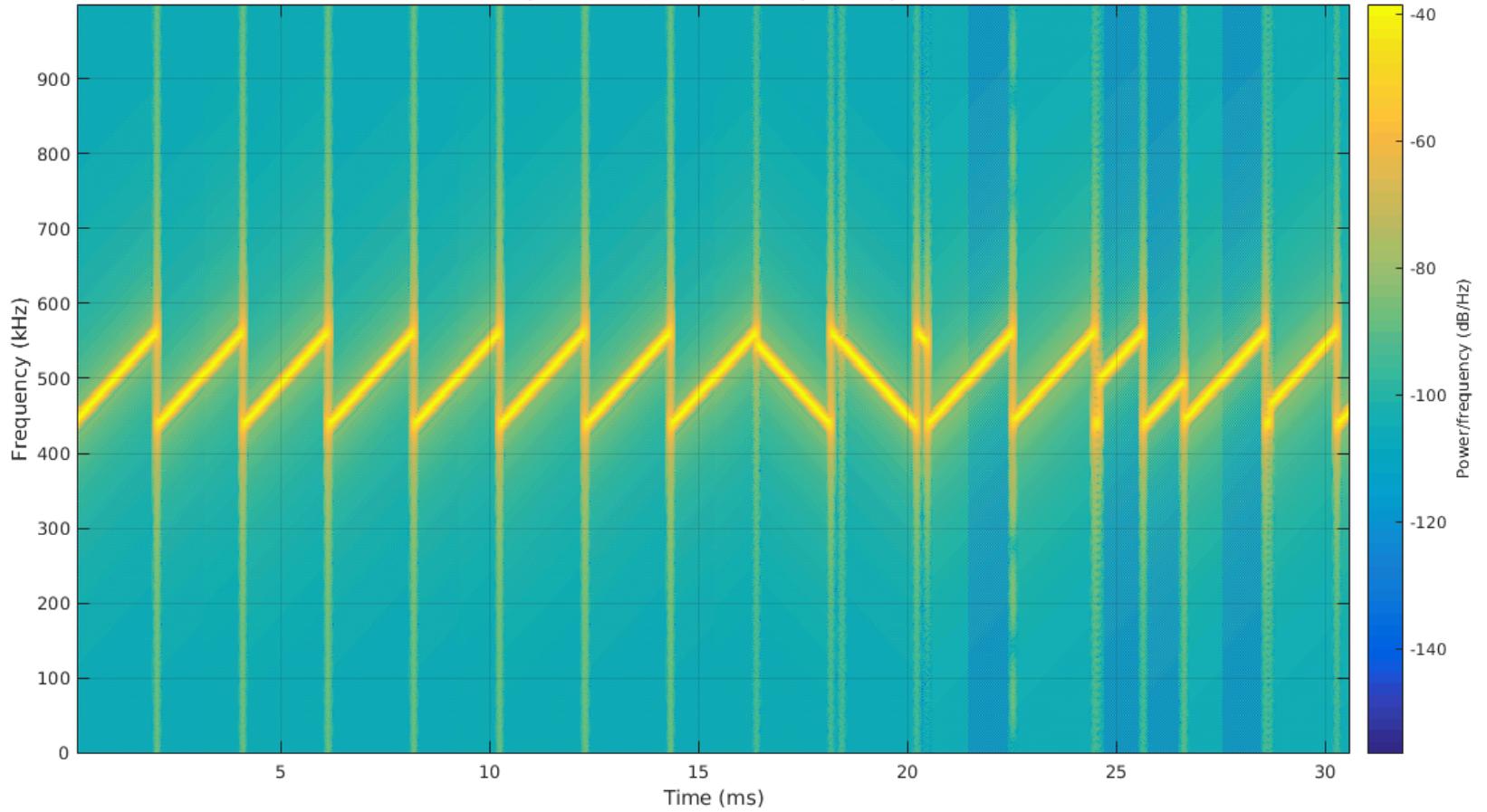
LoRa is a proprietary chirp spread spectrum modulation format owned by Semtech Corporation.

It uses the license free sub-gigahertz radio frequency bands (902-928Mhz in the US) with effective range reported by the manufacturer of approximately 3 miles in urban areas or up to 10 miles in more rural areas, with line of sight.

HOW THAT WORKS

This is the part where I refer you to online resources because I'm honestly not that expert at it... but look at this cool graphic!

LoRa Symbols [8 preamble, 2 Sync, 5 Symbols]



LORA IS NOT JUST MESHTASTIC

Meshtastic is one of many things that uses LoRa. Other projects include things like LoRaWAN, The Things Network, Reticulum, MeshCore, and I'm sure there are many others.

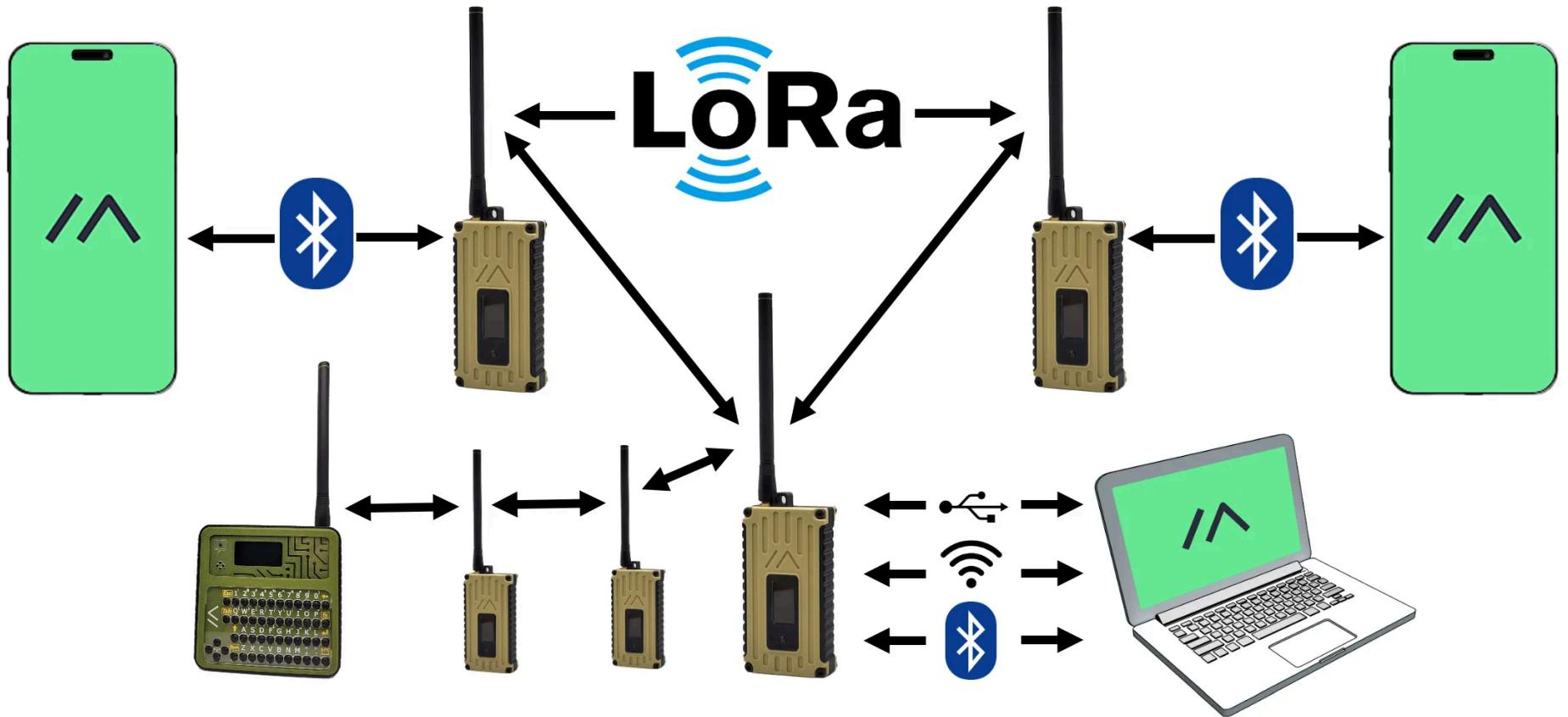
I'm not going to cover those, because this is supposed to be about Meshtastic (and not just because I don't know about them)

ENOUGH STALLING, WHAT IS MESHTASTIC?

Meshtastic is a message flooding relay mesh network, primarily useful for text-based messages, position reporting, and simple telemetry passing.

It has convenient official apps for mobile devices (Android and iOS), a web-client for computers, and a Python based CLI, as well as a number of community created clients, and tools thanks to its built in API.

EVERY TALK ABOUT MESHTASTIC SHOWS THIS GRAPHIC



PRETTY PICTURE, BUT WHAT DID THAT MEAN?

- Every node can be a relay (and is by default).
- Nodes with the same settings will automatically find each other and work together to pass messages.
- Nodes can be locally connected to using Serial, Bluetooth, or Wifi (depending on their hardware).
- Some nodes can even have hardware directly attached (like a screen or keyboard) to be used without a separate client device.

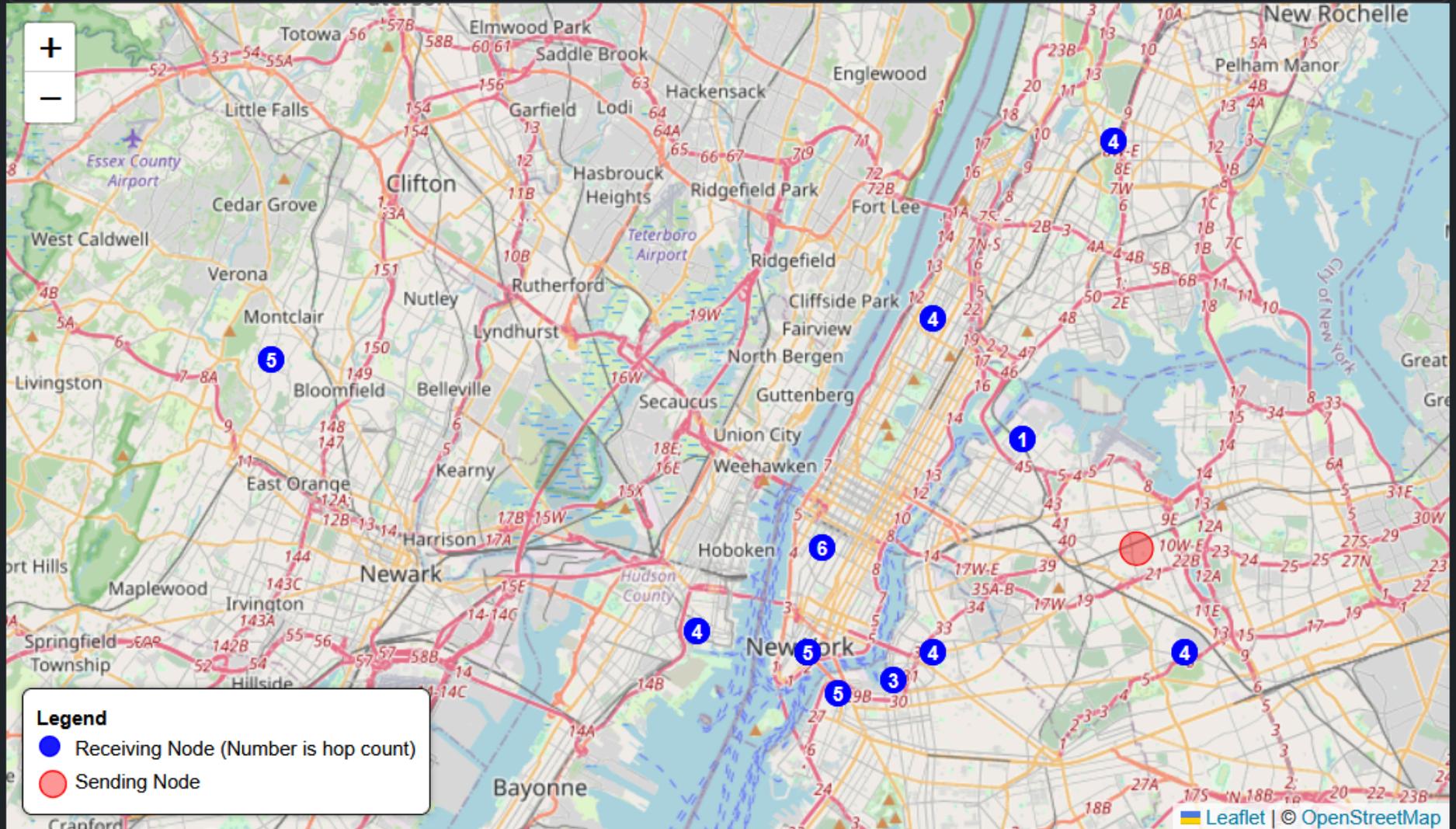
WHAT'S IT GOOD FOR?

- Messaging with your friends, family, or community members without the need for a cellphone network, wifi (or any other form of internet), or a license!
- Encrypted* messaging for private* chats, even over long distances.
- Sharing position (GPS or manual location) and telemetry information for air quality sensors, weather conditions, or even lightning detectors.

SENDING A MESSAGE

payload

Testing Queensboro Plaza. Upper platform



WHAT'S IT BAD AT?

- Encryption - Numerous exploits including spoofed identity, replay attacks, and denial of service attacks have been proven effective against the software.
- Privacy - Position and telemetry data can be remotely stored and are widely captured by various loggers online. Some protocol-level settings exist to reduce this, but it should not be used for protest or privacy sensitive applications.

WHAT'S IT BAD AT? ...

CONTINUED

- Reliability - Mesh relay can vary greatly due to node interference, bad setup, or weather. Hop limits may eat your message before reaching the destination.

GETTING STARTED

Wait a minute... He just said it's bad at a bunch of things, some of which seem pretty important!

Why would I want to get started with it after that?

THE GOOD PARTS

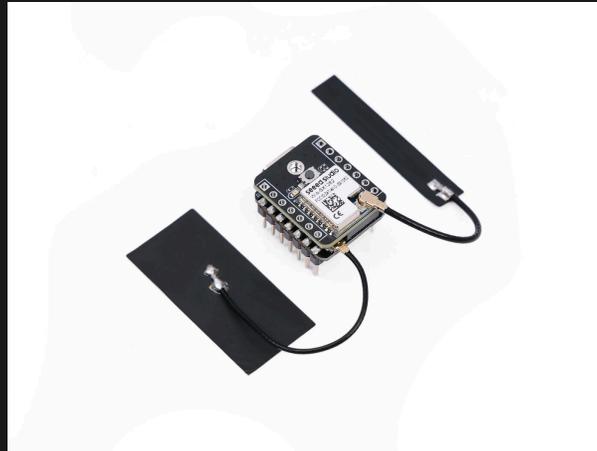
IT'S (RELATIVELY) CHEAP!

Premade nodes can be purchased for under 100 dollars, enabling you to get started immediately. If you are willing to do some soldering or DIY you can drop the cost to 15 dollars or less, even with tariffs.



\$76.97 on Rokland - LilyGo TTGO T-Echo

Features: Built in Screen, Battery, GPS,
Temperature/Humidity/Pressure Sensor



\$9.90 on SeeedStudio - XIAO ESP32S3 & Wio-SX1262
Kit

Features: Literally none of those things, but it's still a
functional node!

THE GOOD PARTS

IT'S (MOSTLY) EASY!

A simple cellphone app and no license required means anyone can get on the mesh RIGHT NOW.

Nodes will interoperate with each other out of the box, there may already be mesh in your area!

QR Code or URL for sharing channel information means you can get your friends and family on your private channels with very little effort.

THE GOOD PARTS

IT'S HIGHLY EXPANDABLE

Meshtastic has built-in support for a wide variety of hardware, sensors, and a programmable client API.

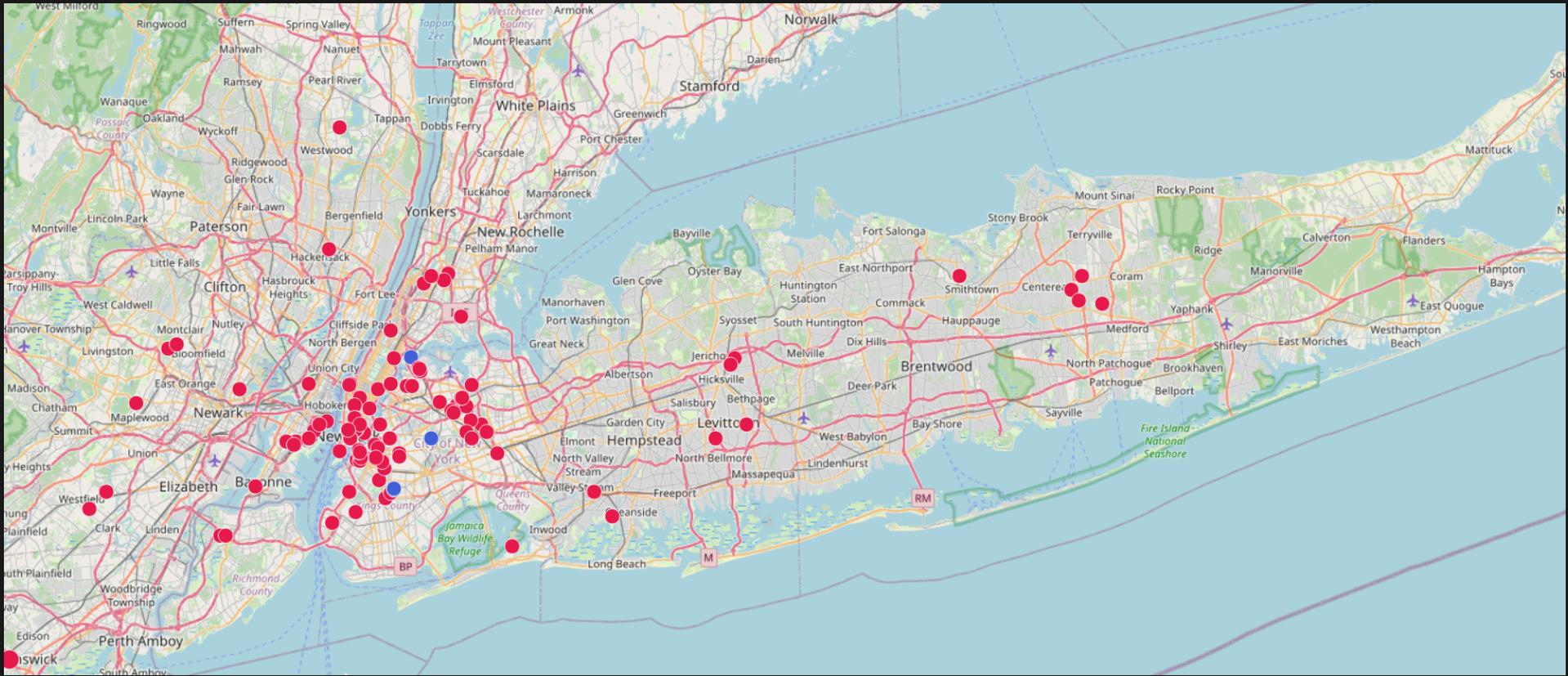
Built in MQTT support and API support makes it easy to connect to other tools.

If you like hacking or programming, there's a world of possibilities. If you don't, you can still use it and that's great!

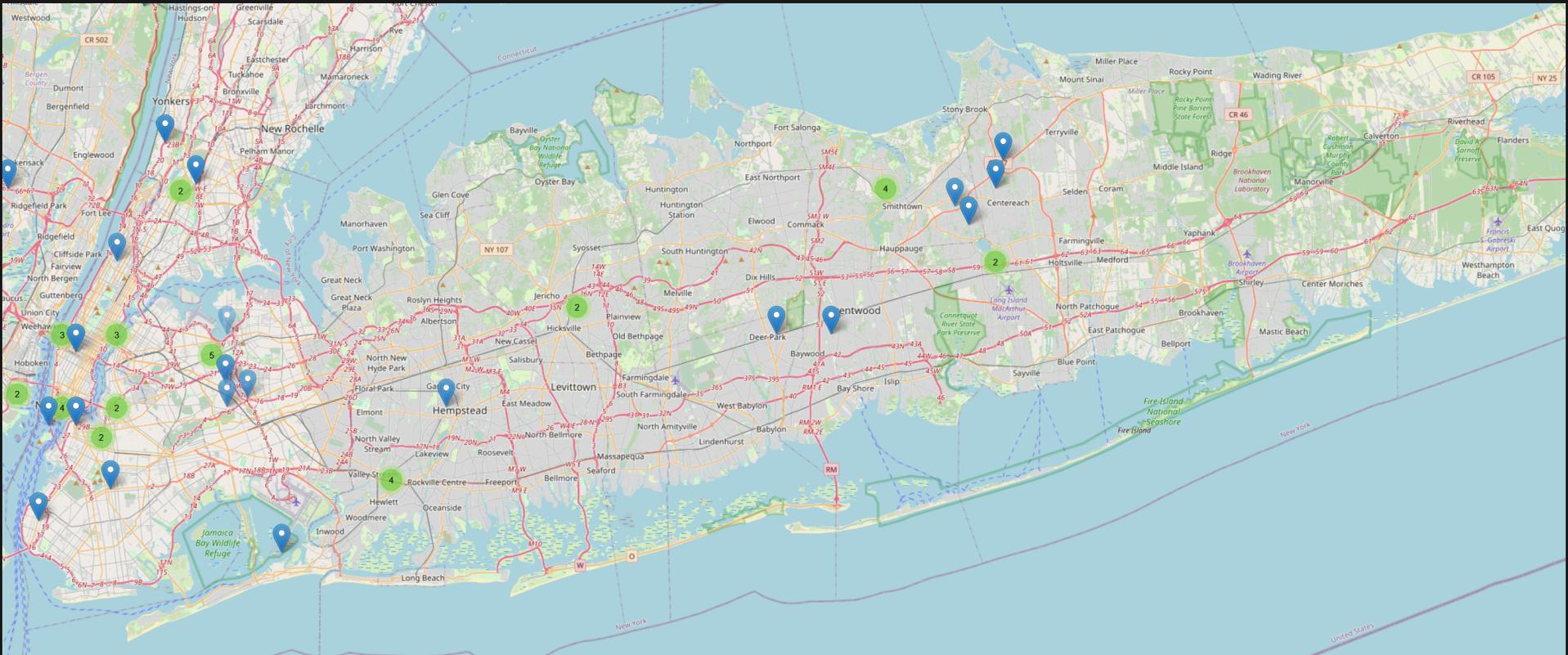
I left one of my nodes running
inside my bag on a recent flight
from Newark to Denver.

Oops?

MESHVIEW.NYME.SH



MESHMAP.NET



REAL WORLD USAGE

My partner and I brought some nodes with us to Super MAGFEST, a massive gaming and music festival inside a resort near DC.

Cellphone signal and wifi were both unreliable, Meshtastic worked right away and we were able to maintain connectivity both inside and outside the event venue.

Even better we got to chatting with other people using the mesh and organized an impromptu meetup on Saturday night!

THIS IS THE END... WHAT DID WE LEARN?

- Meshtastic can be a simple way to communicate over short or long distances avoiding interference and congestion on other networks.
- No license is required for use or purchase.
- There's probably already a mesh in your area.
- Getting on is easy and could lead to friendships, fun, or new opportunities (like giving this talk).

HOW DO I GET ONLINE?

Buy a node:

- <https://store.rokland.com/pages/meshtastic-hardware-rak-lilygo>
- <https://www.seeedstudio.com/meshtastic-products>
- <https://lilygo.cc/collections/lilygo-with-meshtastic>
- <https://heltec.org/product-category/lora/meshtastic/>

USEFUL LINKS

Visit <https://meshtastic.org> for more information about the Meshtastic Project

<https://nyme.sh> for more information about the New York Meshtastic Community or to join our Discord

For contact information, other projects, or a copy of these slides check out my website at <https://dracol.ing> or my other website <https://kd2bus.radio>

