



Netmaker: Overview for LF Networking

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LF Networking TAC

About Netmaker

- <https://github.com/gravitl/netmaker>
- Made Public in 2020
- Switched to Apache-2.0 at OSS Europe
- Over 8k stars on GitHub
- Discord community > 1,700 members
- Running on over 30,000 devices
- Hundreds of known business users

About Netmaker, Inc.

- Founded in 2020
- US-based C-Corp
- Y-Combinator graduate
- Full time team of 7 engineers

Problem

Problem Statement #1: Administrators need a better way to automate secure connections between endpoints in modern, distributed business environments.

Problem Statement #2: Engineers want to utilize WireGuard in their businesses, but lack the adequate tools to manage it at scale.

WireGuard

- Extremely simple, performant, and configurable
- In the Linux kernel
- Can create networks of many shapes and sizes
- Great base layer for building a modern network

Limitations

WireGuard is small and simple by design, so it lacks many features required for building more complex networks:

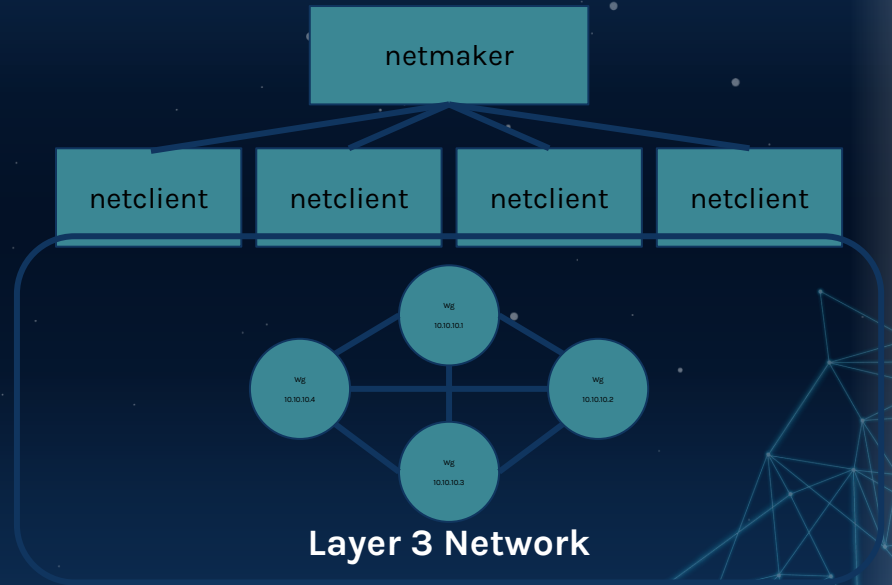
- ✘ Device enrollment
- ✘ Centralized management / automation
- ✘ Access controls
- ✘ Peer / Endpoint discovery

Netmaker Architecture: High Level

Server: Manages state for machines and networks. Think “Kubernetes Control Plane but for WireGuard.”

- API server for admin commands
- MQTT broker for server-client comms

Client: Manages WireGuard locally. Sends and receives configuration changes via server.

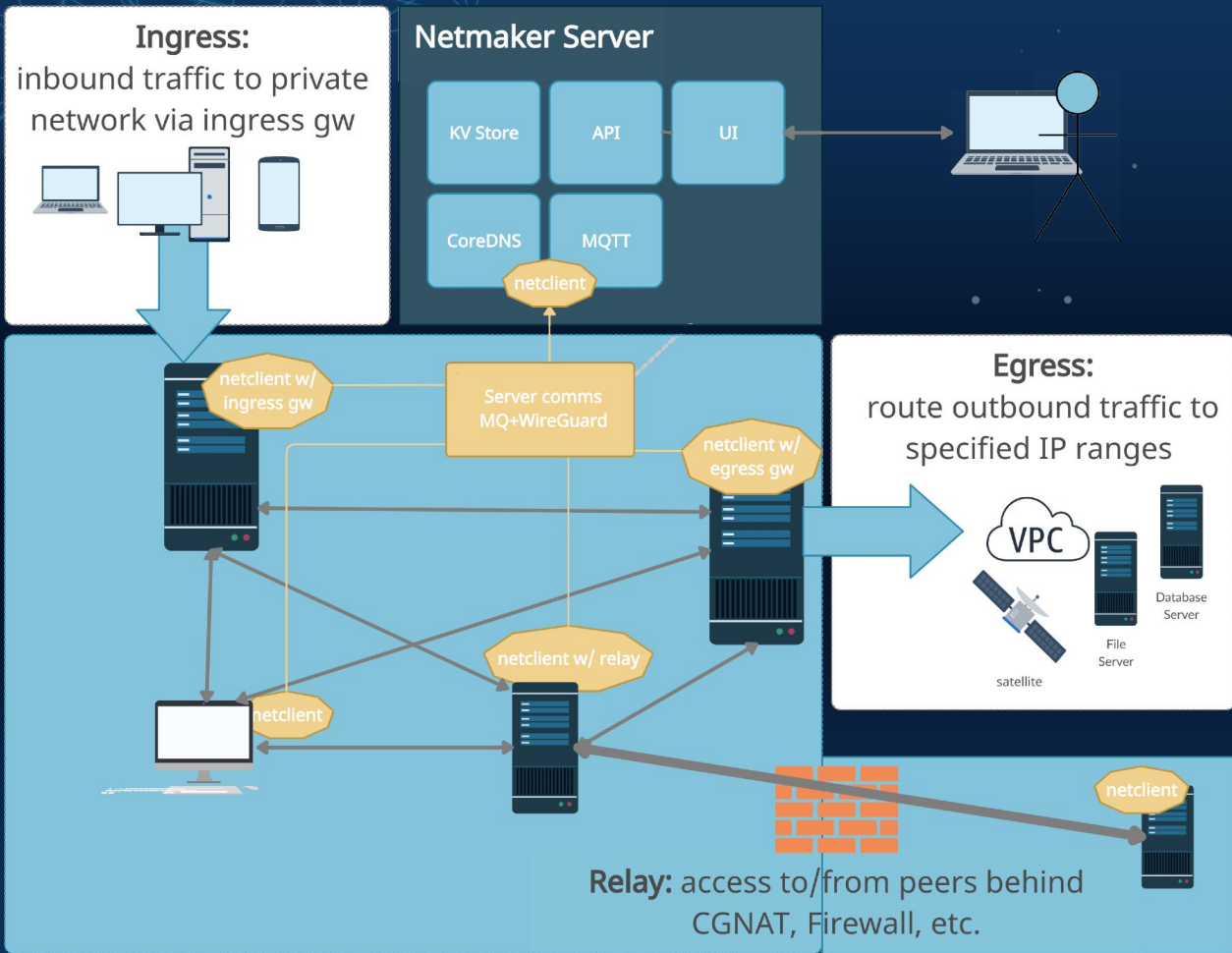


Architecture: Components

- **Server:** Written in Golang - REST API for Admin Management
- **Database:** SQLite by default, compatible with others
- **MQTT Broker:** Mosquitto by default, compatible with EMQX
- **Client:** Written in Golang, relies on WireGuard
- **DNS:** CoreDNS
- **Reverse Proxy:** Caddy by default, compatible with most

Architecture: Designing Networks

- **Networks:** Define a subnet in which machines are deployed. Machines get a VIP within the network.
E.x. 10.10.10.0/24
- **Enrollment Keys:** Create keys that devices use to enroll with the network
- **Device Settings:** Manage low-level settings within the network such as MTU, IP address, port, connection status, etc.
- **Users:** Define administrators to manage the system
- **Access Controls:** Define which devices have access to which other devices
- **Ingress Gateway:** Define a gateway to provide access to the network with static WireGuard configurations (client-less)
- **Egress Gateway:** Define a gateway to provide access to external networks from the virtual network.
EX: an AWS VPC



Use Case: IT Remote Access

Example: An IT administrator needs to give remote workers access to the office network.



Use Case: Cloud Overlay

A DevOps engineer needs to build a Kubernetes cluster that spans an AWS VPC and their data center.



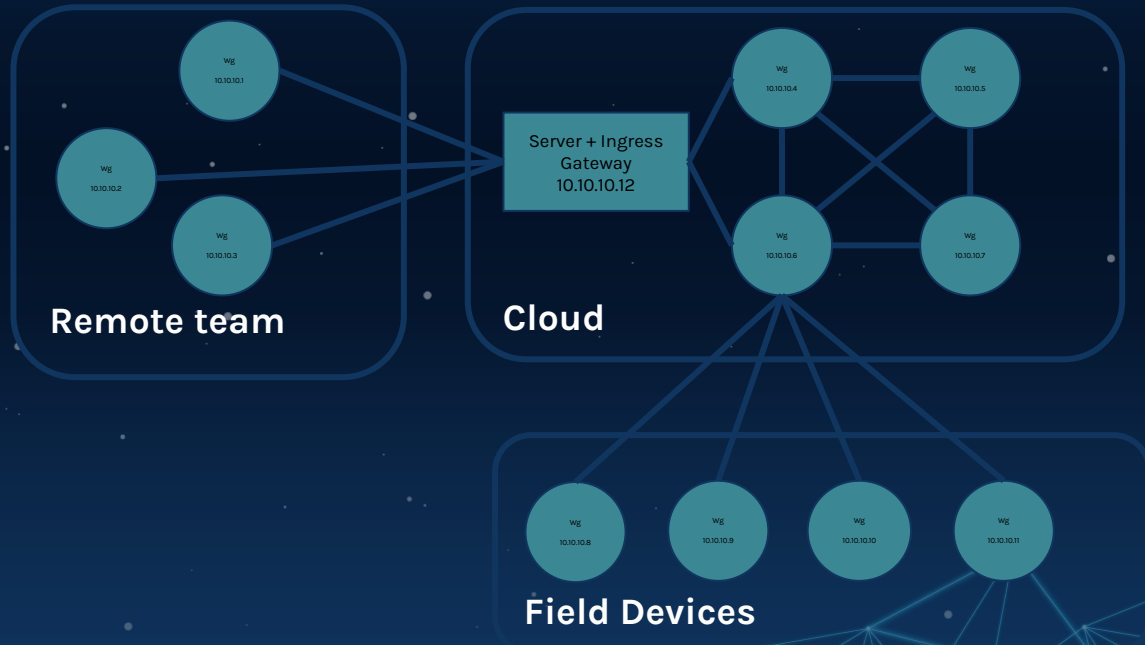
Use Case: Site-to-Site

A network engineer needs to bridge access across multiple office networks



Use Case: Edge/IoT

Example: A network engineer needs to manage a fleet of devices on mixed networks (5G, WiFi), and create a secure link to services running in the cloud.



Business Usage

- Hundreds of known business signups
- 35 consent to being publicly listed
- Currently running on over 30,000 devices
- Use cases span all those listed, but the top use case is remote access, particularly for edge/IoT.

Quotes

“We are a hotel company and we have been using Netmaker to connect hotels with each other and give teleworkers access to the internal network in a secure, fast and easy-to-manage way for more than a year. It is wonderful software.”

- Anonymous

“As our infrastructure grew, managing network configurations became a cumbersome task. Netmaker solved this with its intuitive dashboard, enabling us to effortlessly add to and manipulate our SD-WAN networks in a couple clicks.”

- 366 Computers

“Netmaker simplifies our networking at edge locations.”

- Edgeflare

“Absolute Game Changer!!!”

- Lyteworx

“We use Netmaker for 3 primary purposes as a VPN:

- access to security cameras at multiple properties
- access to dev and prod IT hardware for our sys admins
- access to shared data storage for our employees.

With Netmaker the remote administration of these capabilities is simultaneously simple and powerful.”

- Cleanflo Water Technologies

Why LF Networking?

“Our software & projects provide platforms and building blocks for Network Infrastructure & Services across Service Providers, Cloud Providers, Enterprises, Vendors, System Integrators that enable rapid interoperability, deployment & adoption.”

Netmaker envisions itself as exactly this: a building block for network infrastructure and services across clouds and environments, allowing for rapid deployment, interoperability, and automation.

Thanks!

Do you have any questions?

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netmaker.io

CREDITS: Credit to Jason A. Donenfeld, creator of WireGuard, to whom all rights belong for the registered WireGuard trademark.

