Fast Wireguard Mesh

VPP + wgsd + wg = ♡

Interconnect your services with taste

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Wireguard Mesh

How to dynamically and securely interconnect services running at different locations?

- Must be **secure**
  - Services run at different locations (crossing internet) and/or in public clouds
  - All communications must be encrypted
- Must be **efficient**
  - Mesh: direct peer-to-peer connections between services
  - Fast: crypto is CPU intensive
- Must be **automated**
  - How to do service discovery?
  - How to automate interconnects?
- Must be **simple** to configure and operate

➔ **Wireguard DNS Service Discovery + VPP to the rescue!**

WireGuard

- WireGuard is a new VPN protocol and tools
- Popular thanks to its ease-of-use vs OpenVPN and IPsec/IKEv2
- UDP-based

➔ Interesting solution to easily interconnect services in uncontrolled network environments, eg. multi-cloud

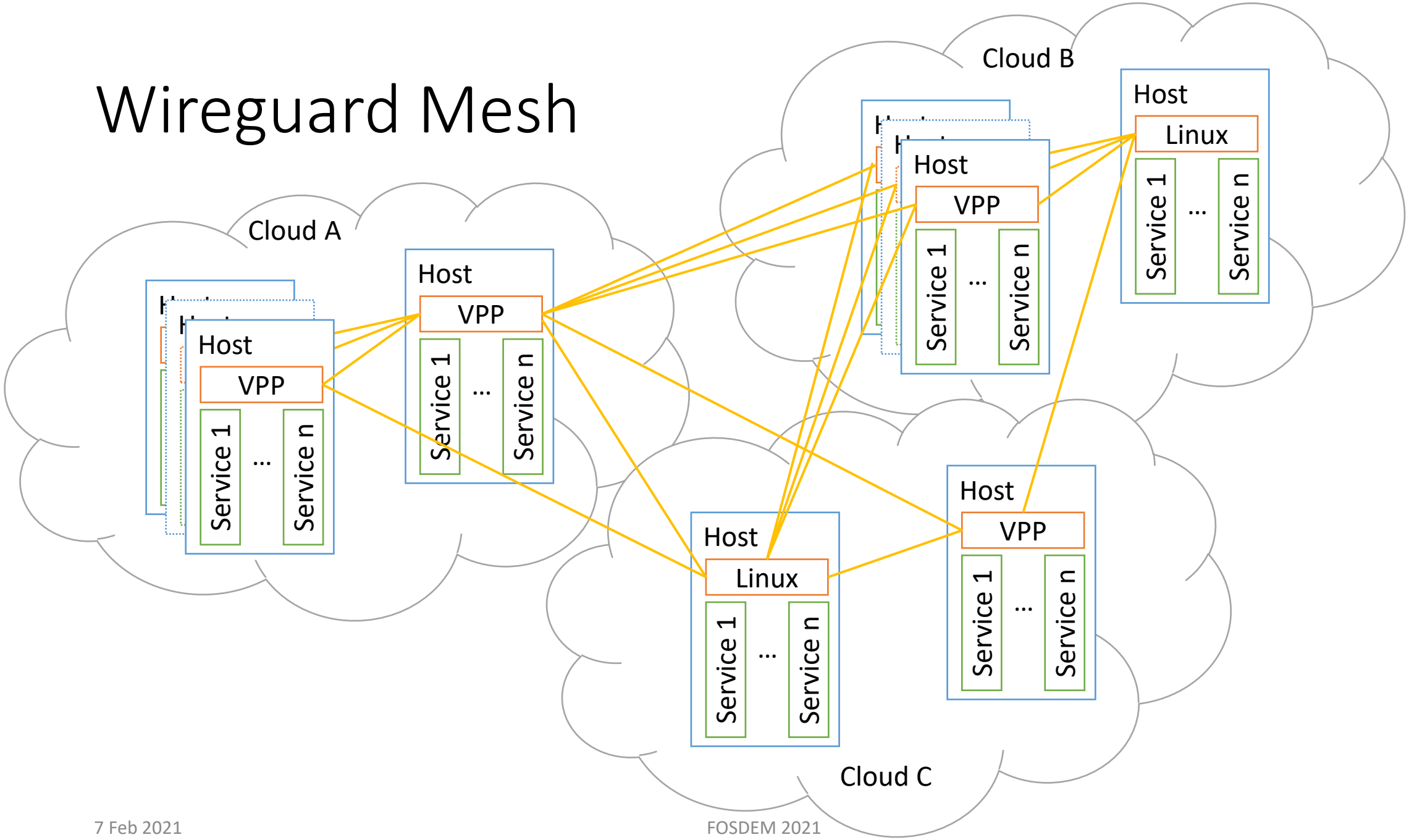
VPP

- Opensource userspace dataplane project: https://fd.io
- Fastest userspace dataplane running on general-purpose CPUs (x86, ARM)
- Used to interconnect services locally in a server or services themselves
  - vSwitch, vRouter, services load-balancer, etc.
  - Firewall-as-a-Service, Load-Balancer-as-a-Service, etc.
- Interoperable with Linux netstack
- ***Very*** fast crypto
  - IPsec support since a long time
  - WireGuard added recently

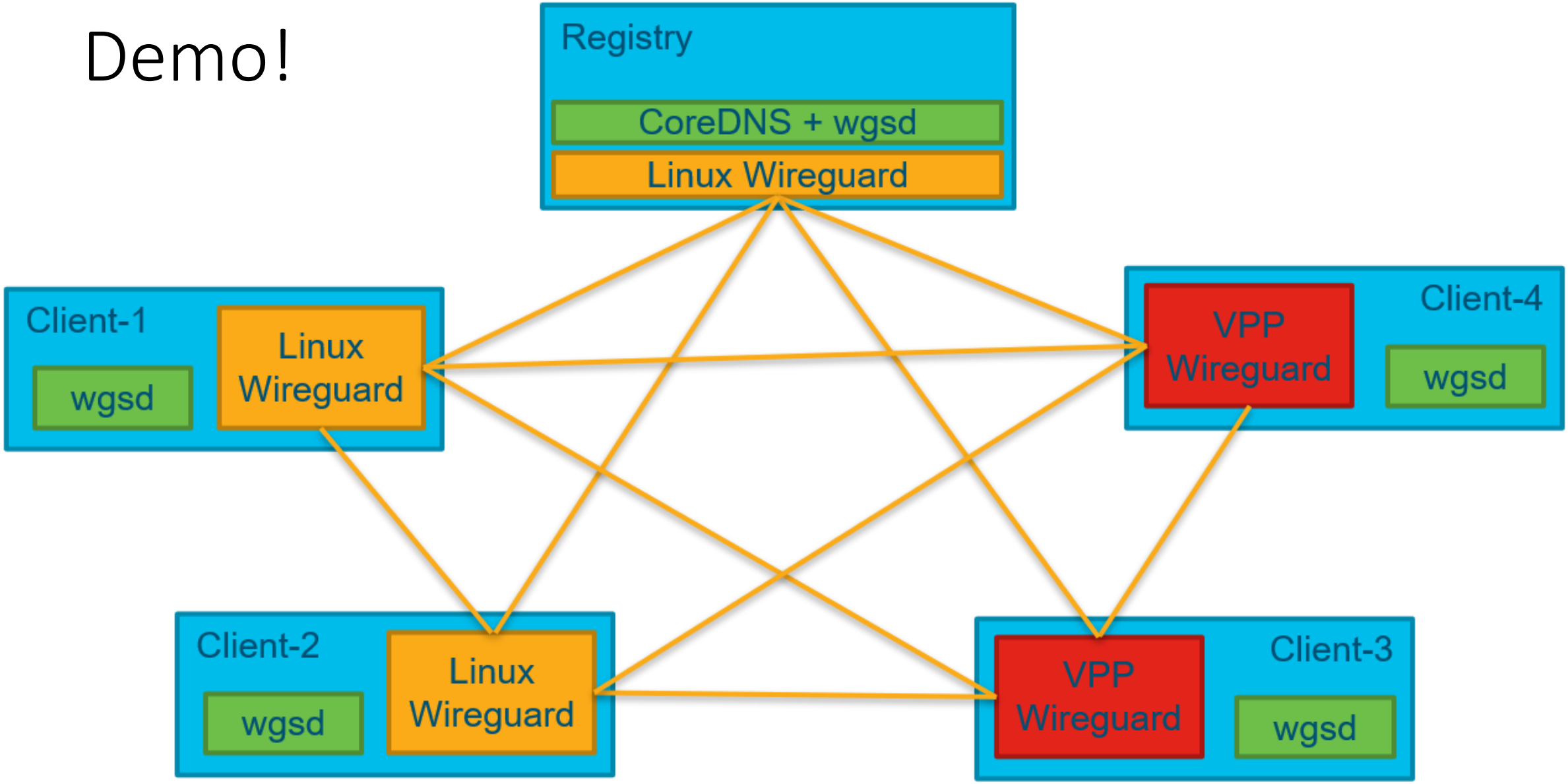
Wireguard DNS Service Discovery

- New opensource project: **wgsd** “Wireguard DNS Service Discovery” by Jordan Whited
  - https://www.jordanwhited.com/posts/wireguard-endpoint-discovery-nat-traversal/
  - https://github.com/jwhited/wgsd
- Use DNS-SD (RFC6763) to publish Wireguard peers
  - All peers connect to the “registry” through Wireguard
  - The registry serves all of its peers through DNS-SD (SRV records)
  - Any peer can request the configuration of another service to the registry and then connect to it directly
- Wireguard is used as a gatekeeper, database and even for NAT traversal
  - Gatekeeper: all mesh participants must be able to connect to the registry node (so must know the secret)
  - Database: the wgsd service does not keep track of the mesh participants, it relies on the Wireguard peer database
  - NAT traversal: other mesh participants connect to the destination IP and UDP port allocated when connecting to the registry (NAT punch-holing)

Wireguard Mesh



Demo!


Registry
CoreDNS + wgsd
Linux Wireguard
Client-1
wgsd
Linux Wireguard
Client-4
VPP Wireguard
wgsd
Client-2
wgsd
Linux Wireguard
Client-3
VPP Wireguard
wgsd

Status

- This is a work-in-progress
  - Several modifications are merged/implemented in upstream wgsd
  - Others are in-progress
  - VPP Wireguard implementation is still young
  - VPP and wgsd integration is still a bit rough ☺

- Feel free to try it out!
  - https://github.com/bganne/wgsd/blob/master/vagrant/README

Thank you!