

# A modern multi service backbone



Giuseppe Abate



[giuseppe-abate-0103061b/](https://www.linkedin.com/in/giuseppe-abate-0103061b/)





# About me

With over twenty years of experience, coordinates the NOC and Network Engineering Teams in Fiber Telecom.

Giuseppe Abate  
NOC Team Leader - Fiber Telecom

[g.abate@fibertelecom.it](mailto:g.abate@fibertelecom.it)



# Agenda

- How create scalable solutions
- Network Fabric concept
- Control plane
- How to use a MAN in a Fabric architecture
- How to simplify the backbone
- How to merge the MAN/Fabric with the Backbone
- How to deliver service



# Goals

- ✖ Scalable
- ✖ Resilient
- ✖ Simple
- ✖ Uniform
- ✖ Automatable
- ✖ Modern

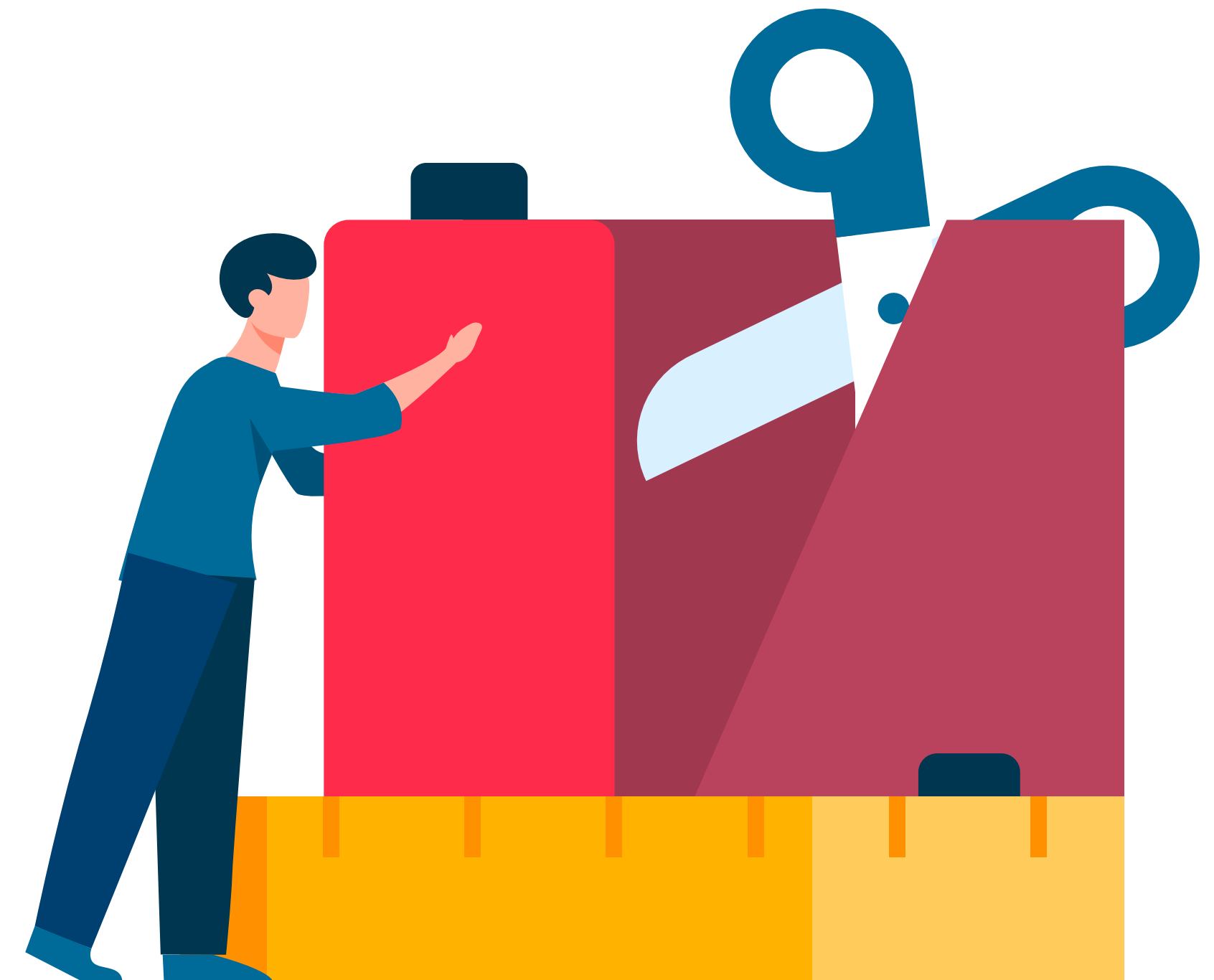


# The Basics

## The “network fabric” concept

Let's start with the basics.

How to create scalable solutions.

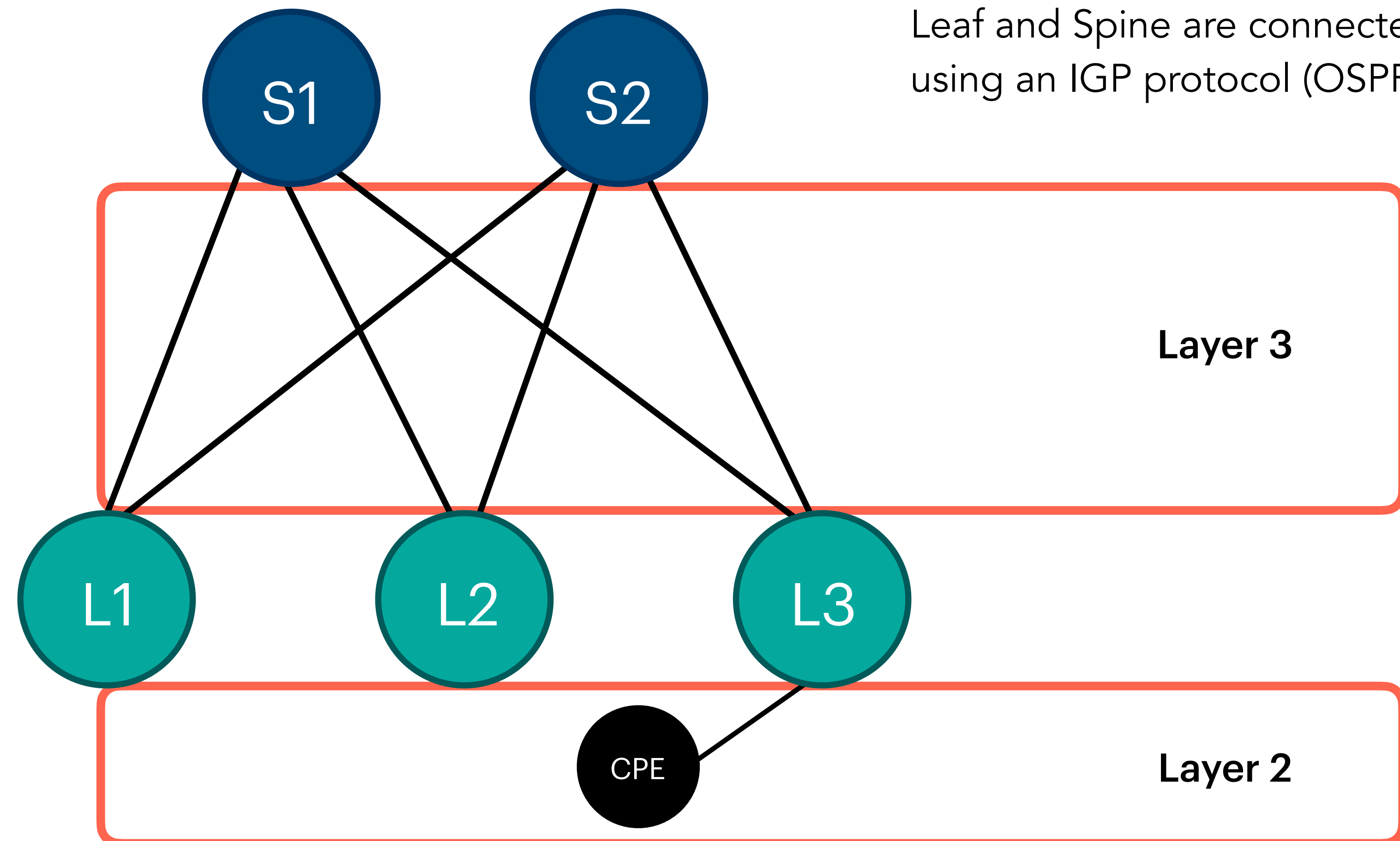


# Network fabric

## CLOS / Spine & Leaf

- ✱ ECMP
- ✱ Resilience
- ✱ Scalable

Leaf and Spine are connected in L3 using an IGP protocol (OSPF/ISIS)



# Network fabric

Link down simulation

Equal Cost Multi Path

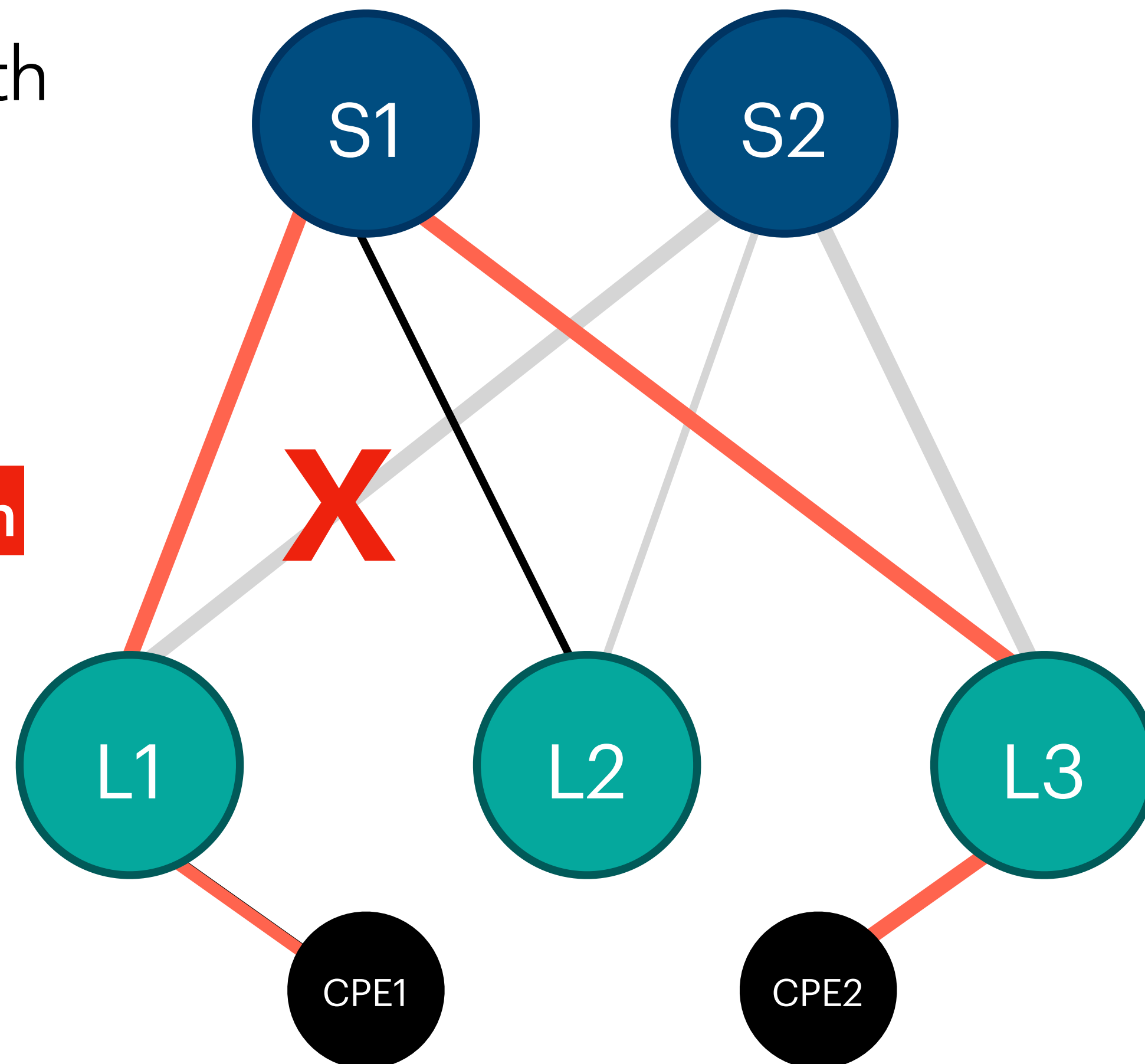
— ECMP

Link down

X

Resilient

No customer disservice





# Network fabric

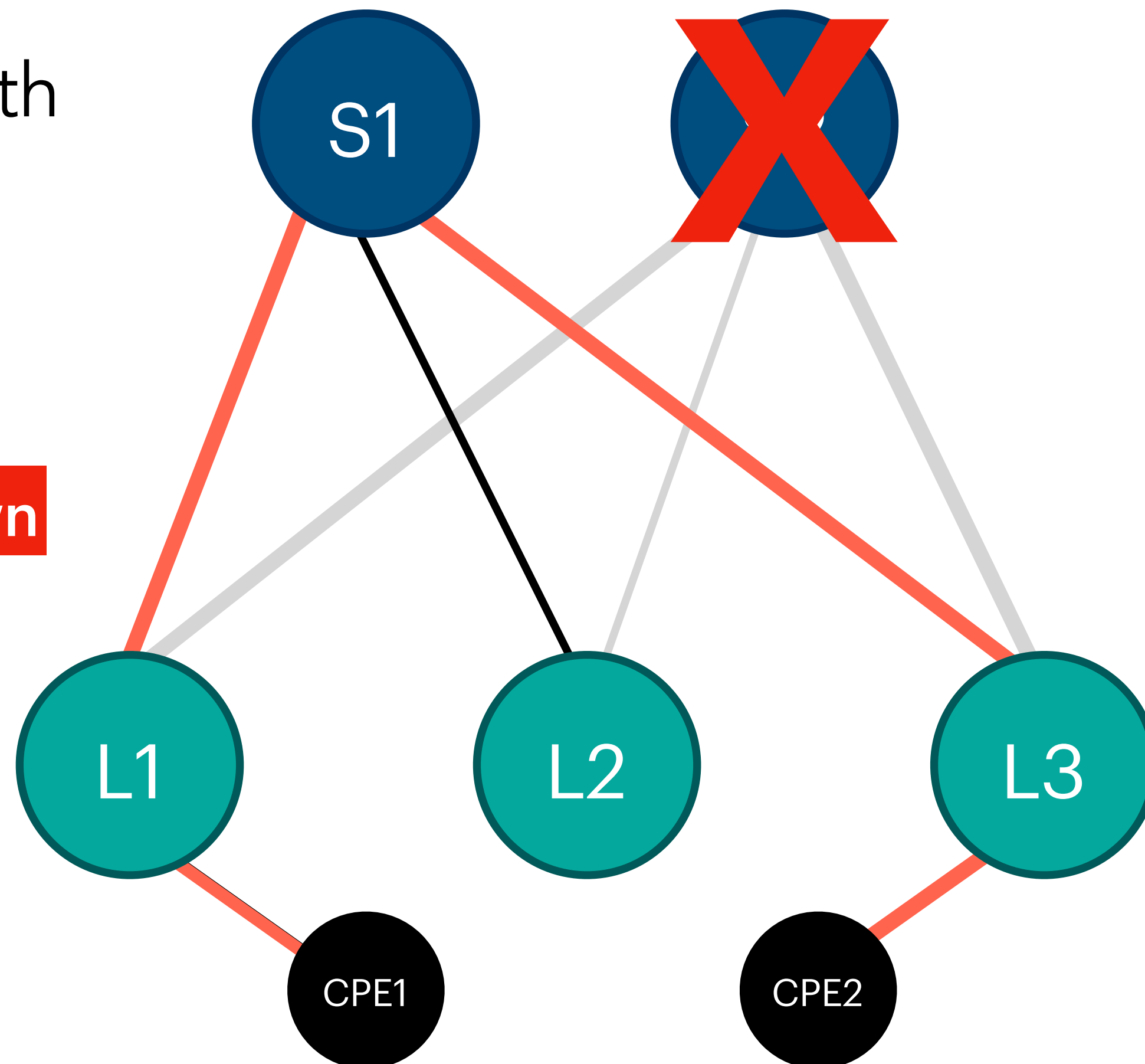
Node down simulation

Equal Cost Multi Path  
— ECMP

Spine down

Resilient

No customer disservice

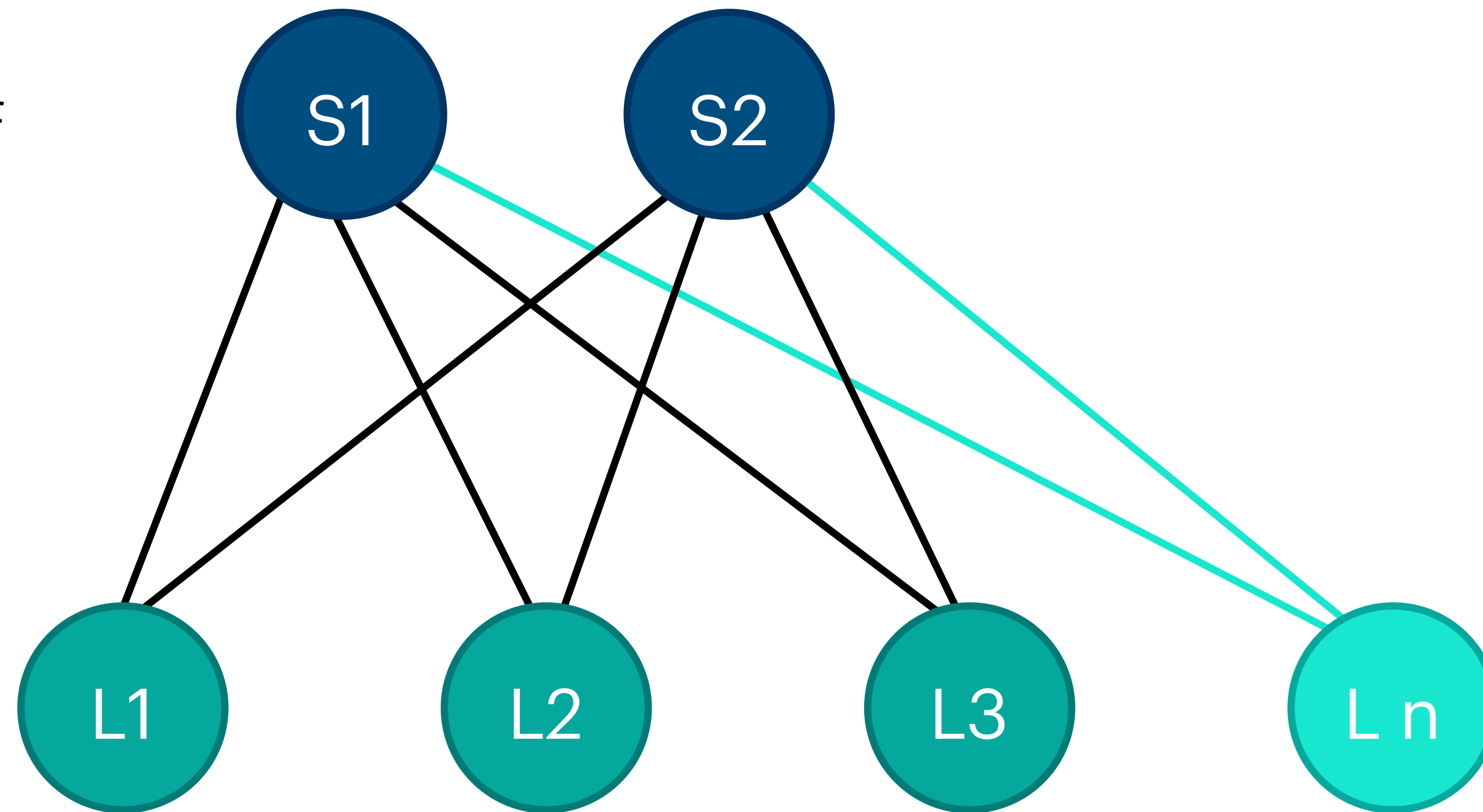




# Scalability

Scale-Out

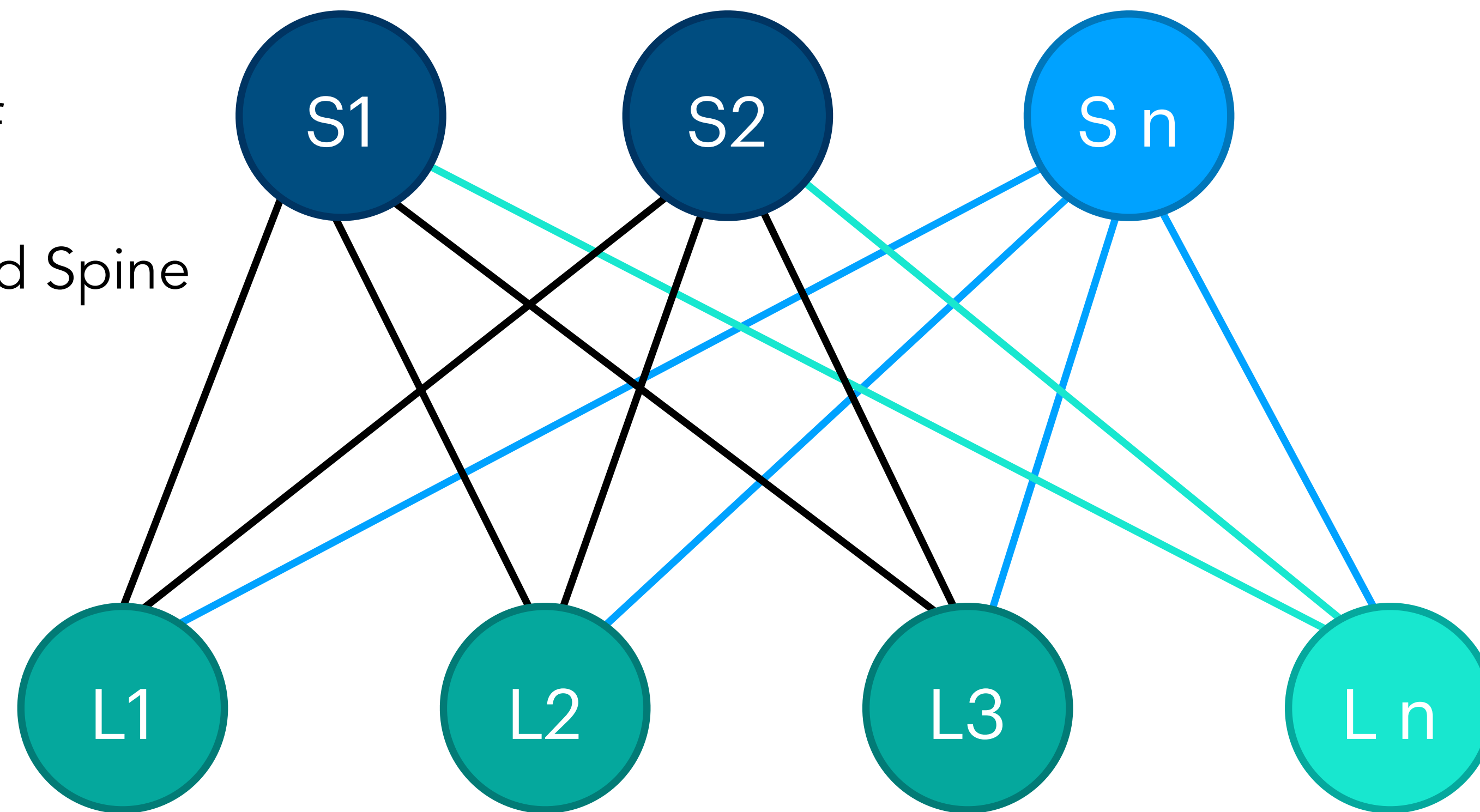
✖ **Need Ports?:** Add Leaf



# Scalability

Scale-Out

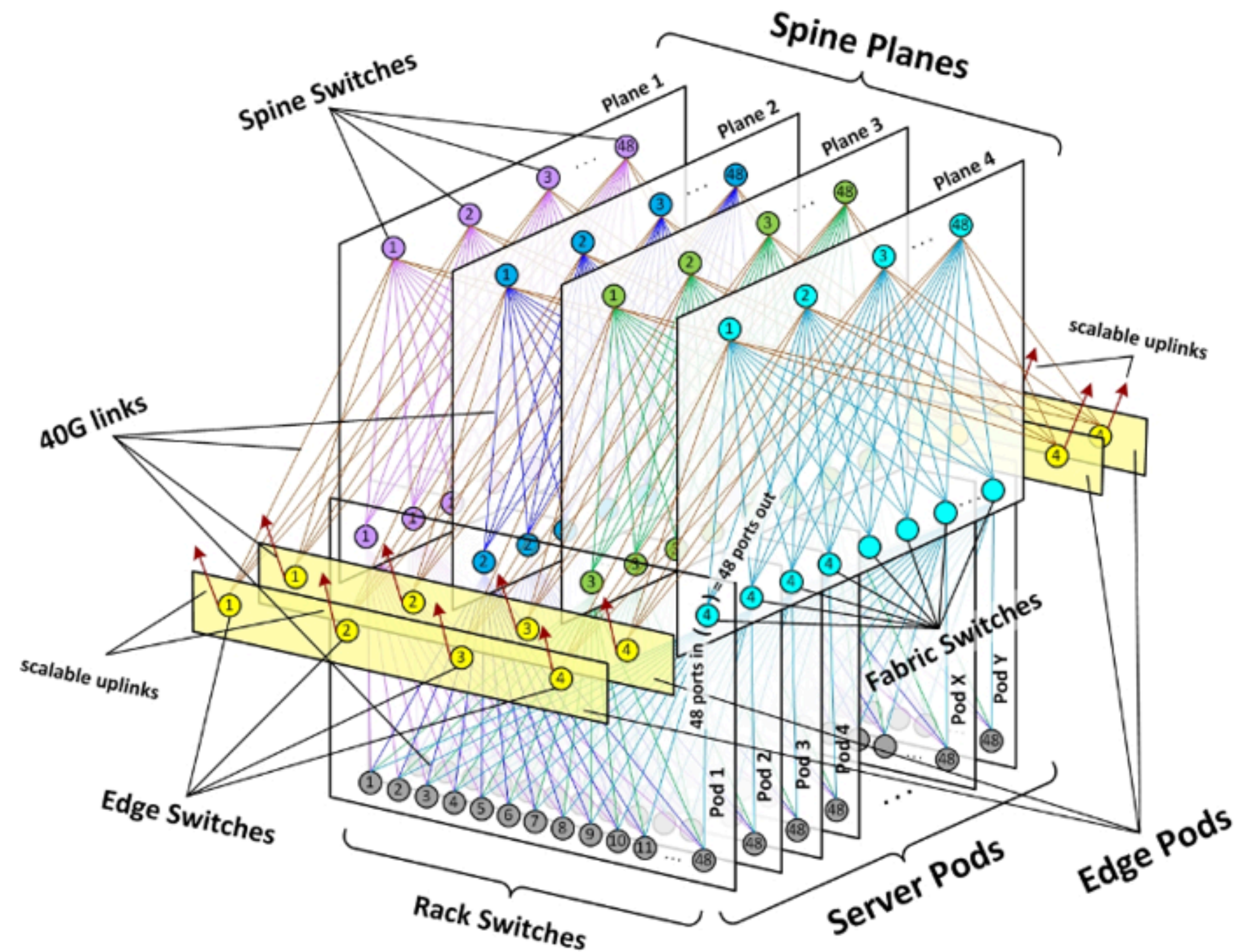
- ✖ **Need Ports?:** Add Leaf
- ✖ **Need Bandwidth?:** Add Spine





# Hyperscaler

**Fabric:** Stage 5 - Add SuperSpine



Schematic of Facebook data center fabric network topology

<https://engineering.fb.com/2014/11/14/production-engineering/introducing-data-center-fabric-the-next-generation-facebook-data-center-network/>



# Power is nothing without control

## Control Plane EVPN

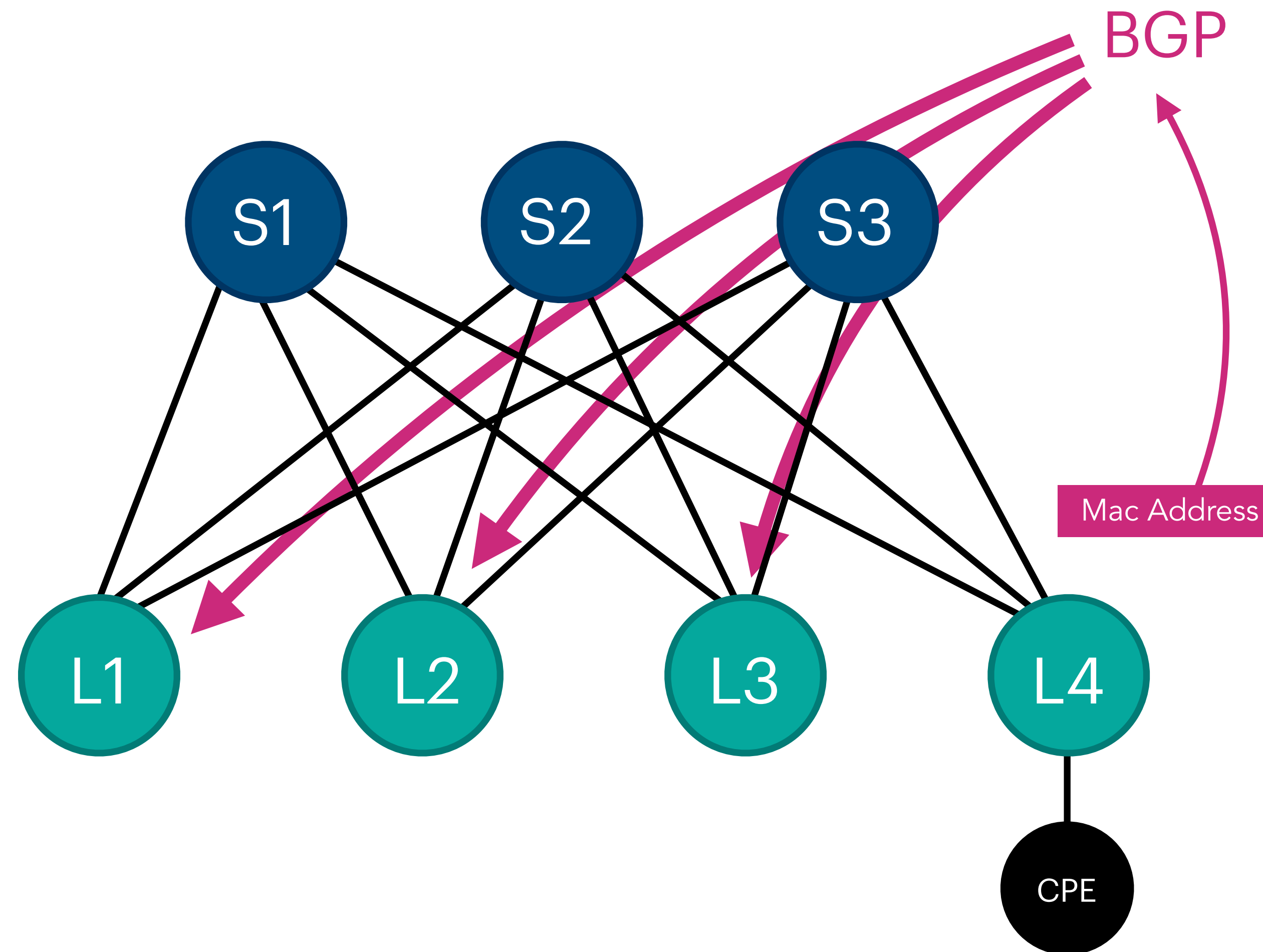
- ✖ Based on BGP
- ✖ Create the topology (Tunnel End Point)
- ✖ Manages redundancy ( ESI-LAG )
- ✖ Distributes MAC-ADDRESS information
- ✖ Prevents LOOP
- ✖ Traffic optimize





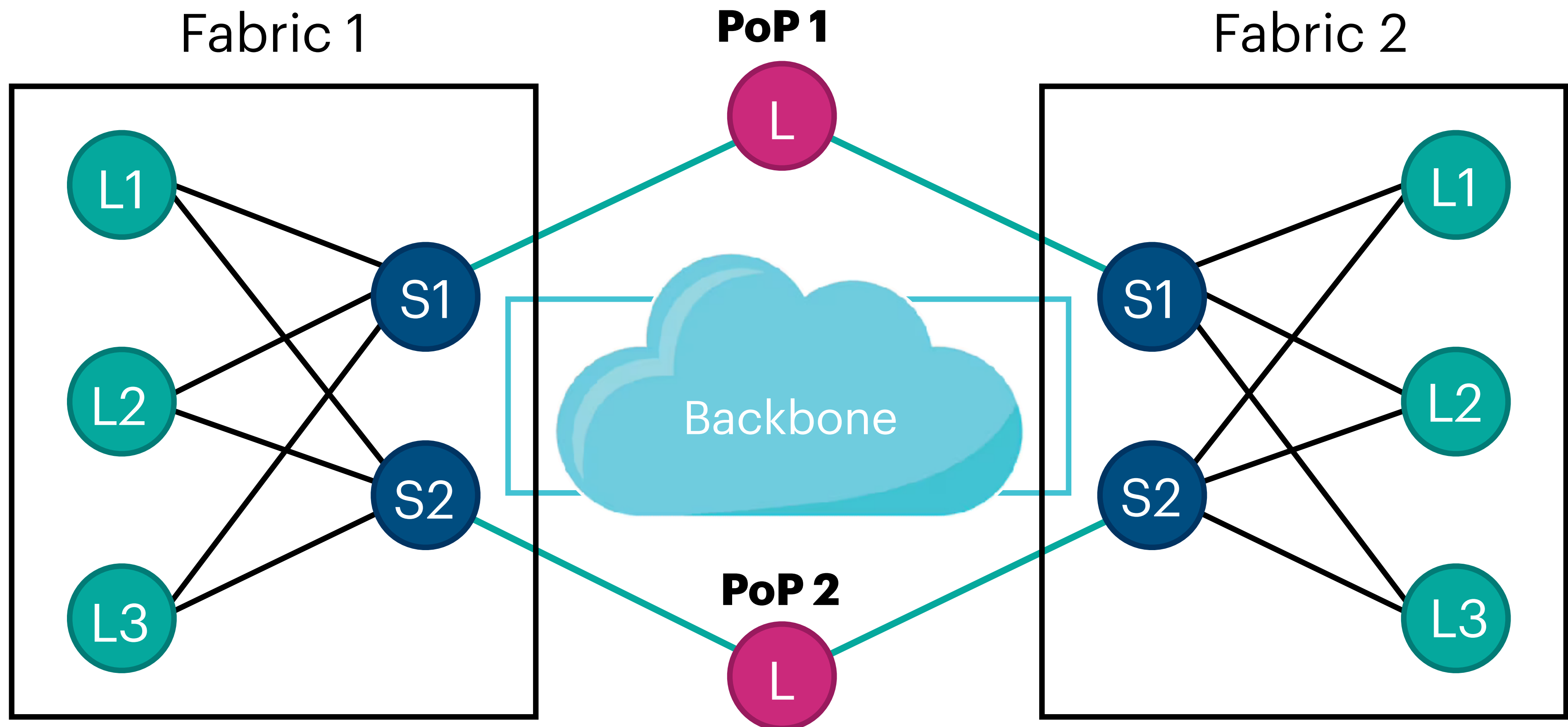
# Power is nothing without control

## Control Plane EVPN



# How we used fabrics

**FT MANs are based on FABRIC architecture**



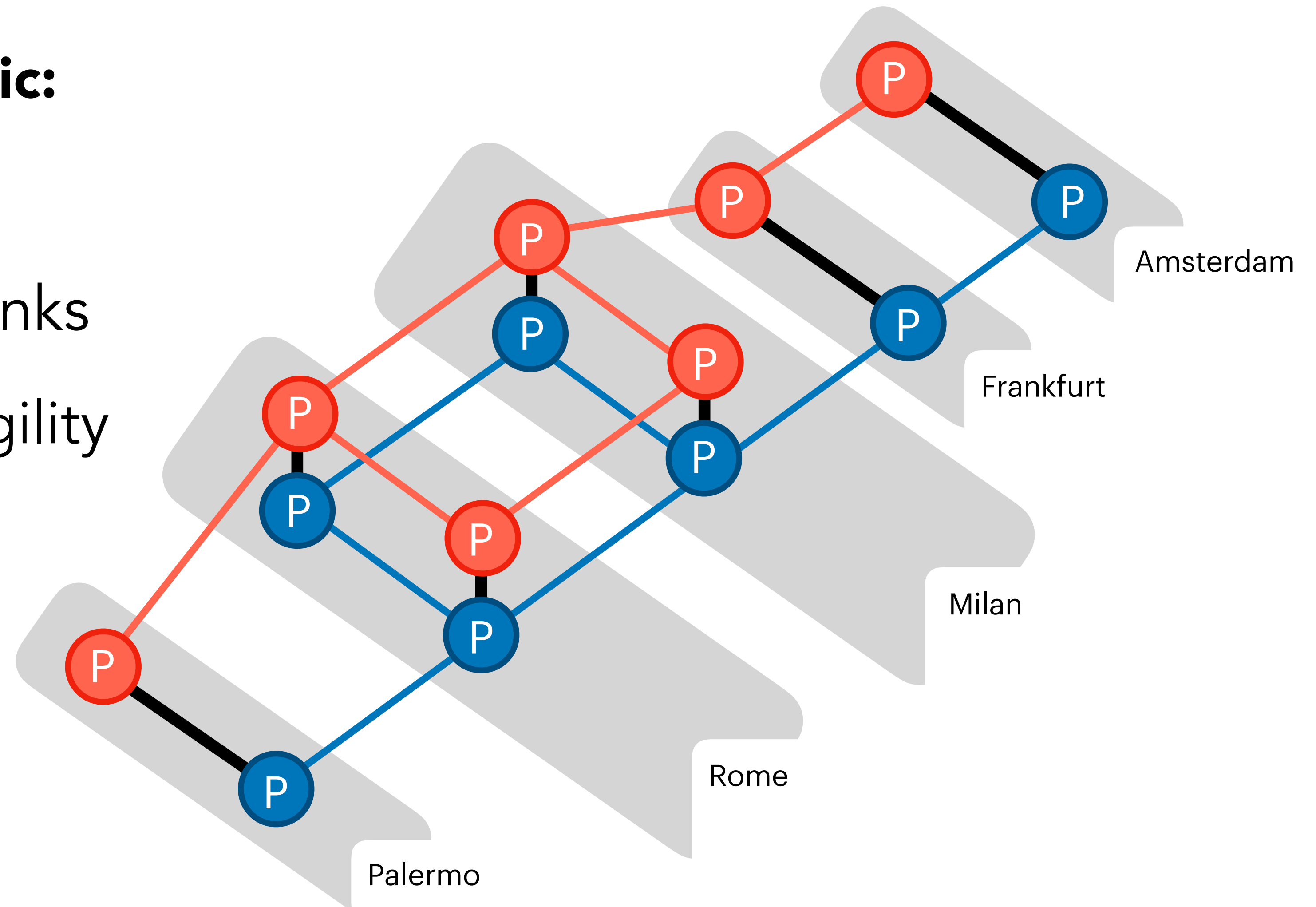


# The Backbone

## Backbone Vs. MAN/Fabric:

Compared difference

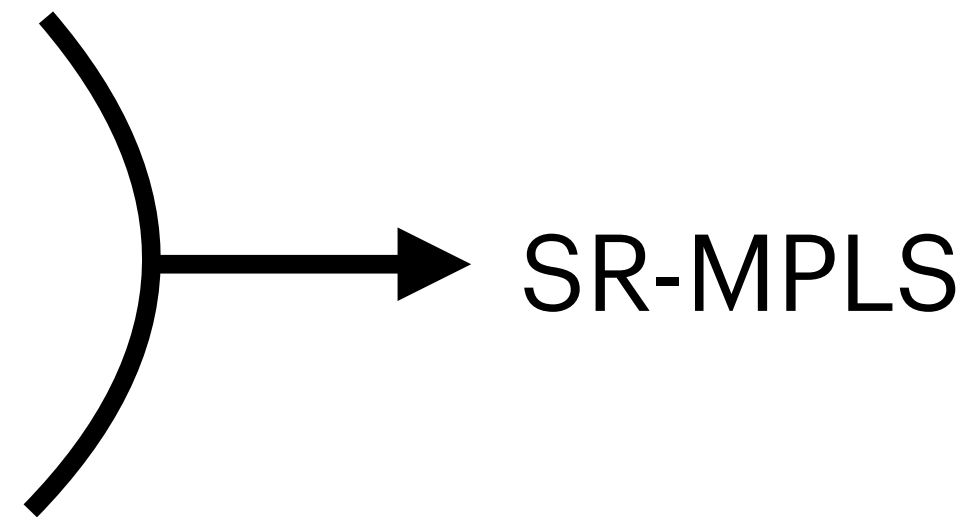
- ✖ Cost of geographic links
- ✖ Long-distance link fragility
- ✖ Dual Plane



# The New Control Plane

## Rationalization

- ✖ RSVP
- ✖ LDP
- ✖ Auto-Bandwidth



## Standardize

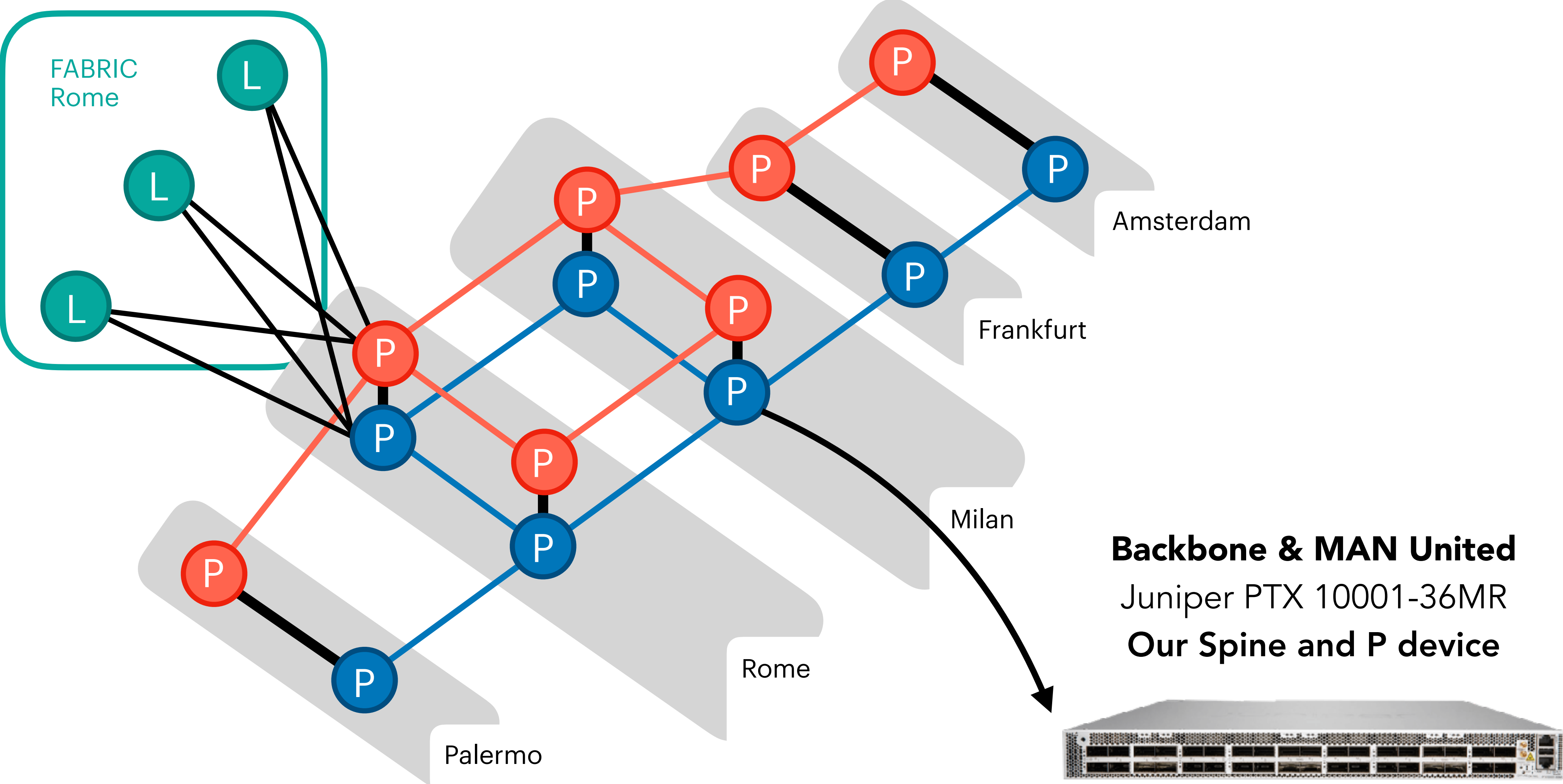
- ✖ Dual Stack → 6PE Single Stack
- ✖ IPv4 & IPv6 are treated the same

## Modern

- ✖ From SNMP to Streaming Telemetry



# Final Result





# Final Result

## Backbone & MAN United - Unique Control Plane

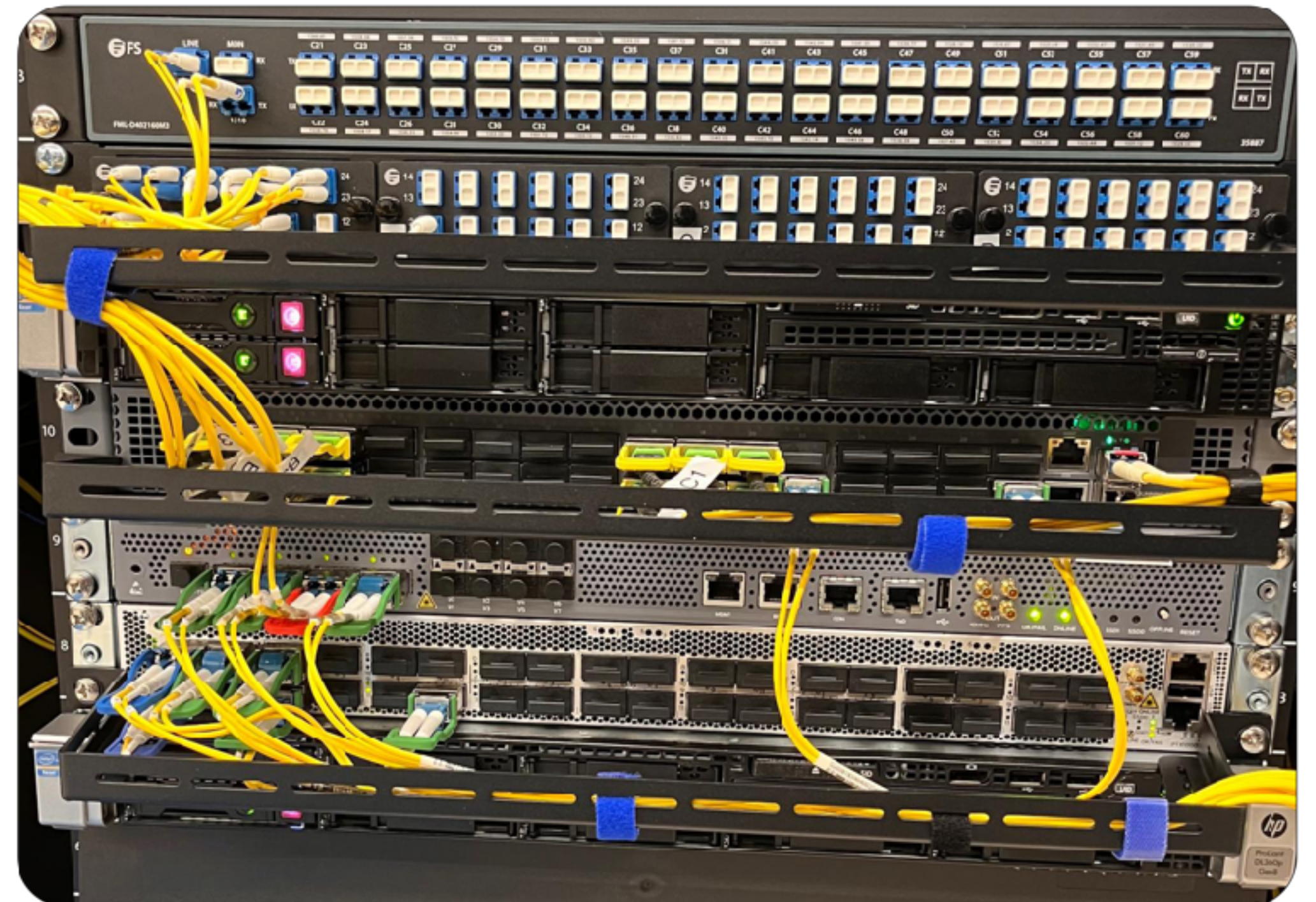
Possibility of Providing ALL TYPE OF SERVICES

### PTX10001-36MR

The PTX10001-36MR is a high-capacity, space and power-optimized routing and switching platform.

It delivers 9.6 Tbps of throughput and 10.8 Tbps of I/O capacity in a 1 U, fixed form factor.

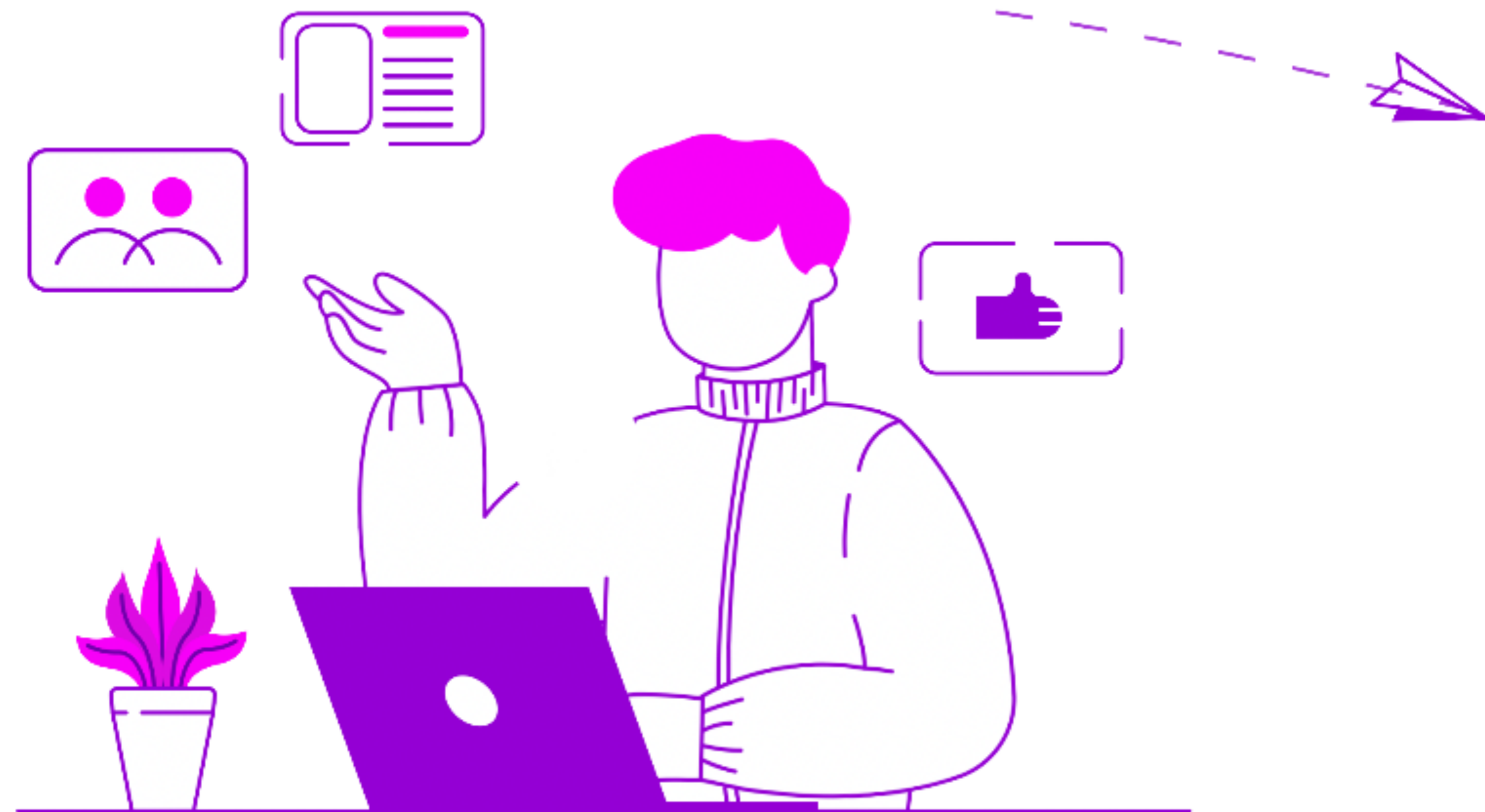
Based on the Juniper Express 4 ASIC, the platform provides dense 100GbE and 400GbE connectivity for highly scalable routing and switching in cloud, service provider, and enterprise networks and data centers.





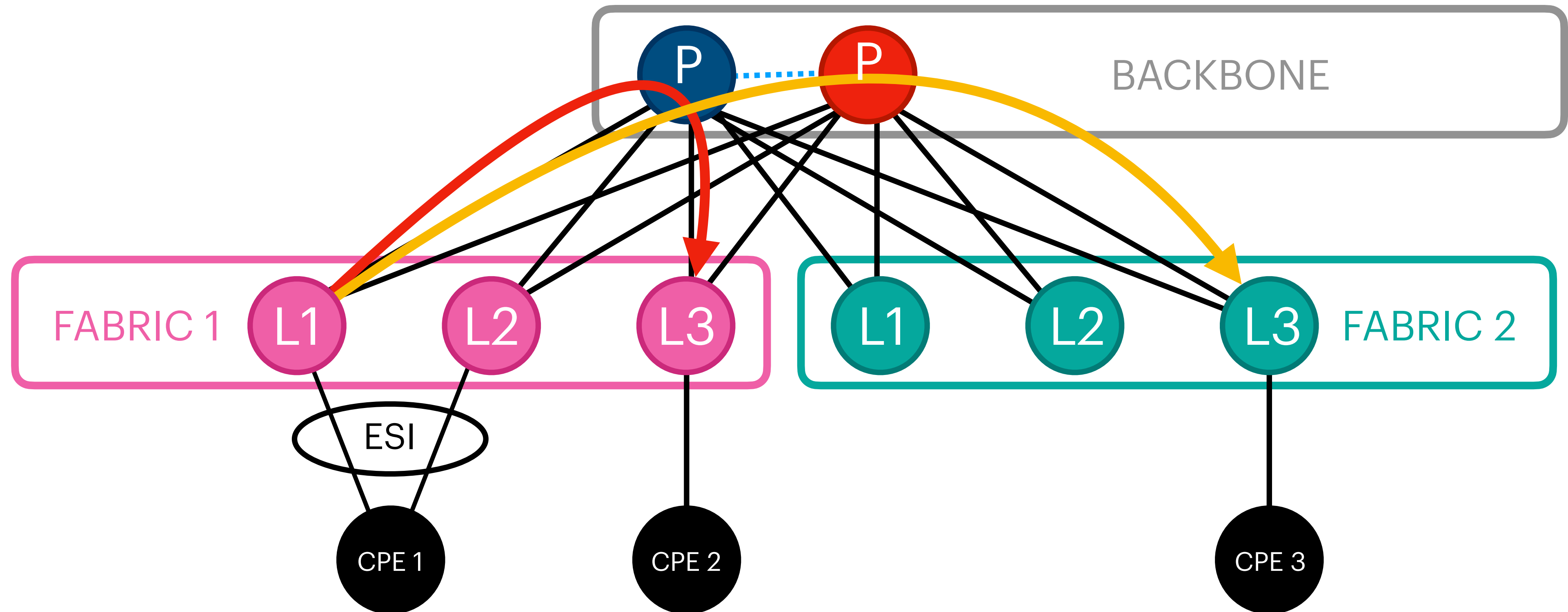
# How Do We Use It

## The Services



# Layer-2 Services

ESI LAG MAN Backbone on Dualplane and Esi Lag on MAN Milan



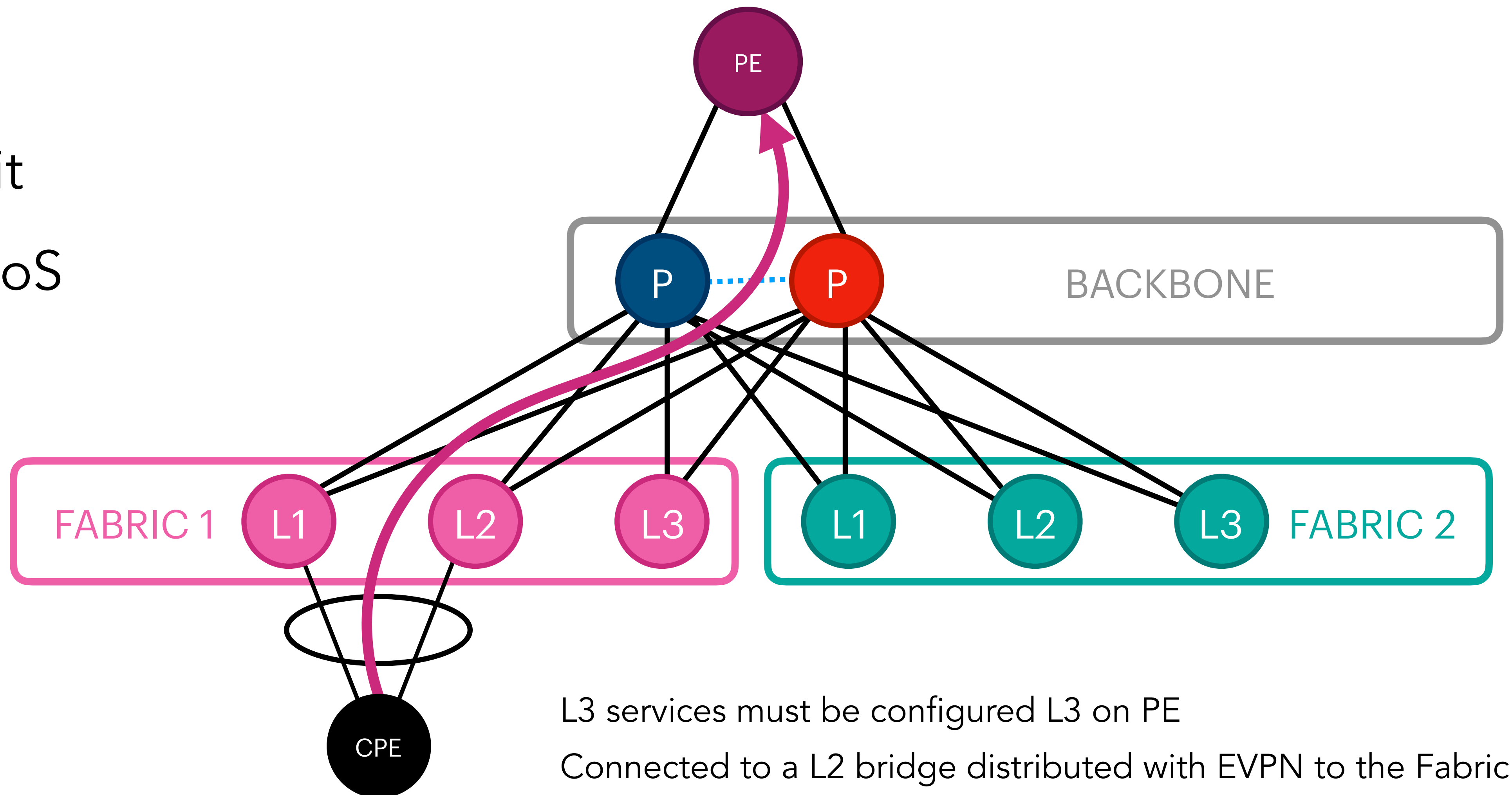
PtP/PtMP - LAN IXP in Remote Peering - Remote Direct Cloud





# Layer-3 Services

- ✖ IP Transit
- ✖ Anti DDoS



# Conclusion

The work of the last two years has revolutionized the FT Backbone

- ✦ Redesigned MANs with a scalable architecture
- ✦ introducing an EVPN control-plane
- ✦ Simplified backbone infrastructure
- ✦ Traffic protection on EVERYTHING
- ✦ L2/L3 and mixed services fully controlled by EVPN
- ✦ Real-time monitoring via Telemetry streaming
- ✦ ECMP and SR-MPLS





Giuseppe Abate  
g.abate@fibertelecom.it



# Thank you



**Fiber  
Telecom**

THE NETWORK PARTNER