

A large, abstract graphic on the left side of the image consists of numerous thin, yellowish-gold lines that curve and overlap to create a sense of depth and motion, resembling waves or a stylized sunburst.

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Track: Networking  
and SONiC

# An Architecture for a Highly Available Disaggregated NOS built upon Open Networking Linux

Pat Moore, Director of Sales, Metaswitch Networks  
Jonathan Cumming, Architect, Metaswitch Networks

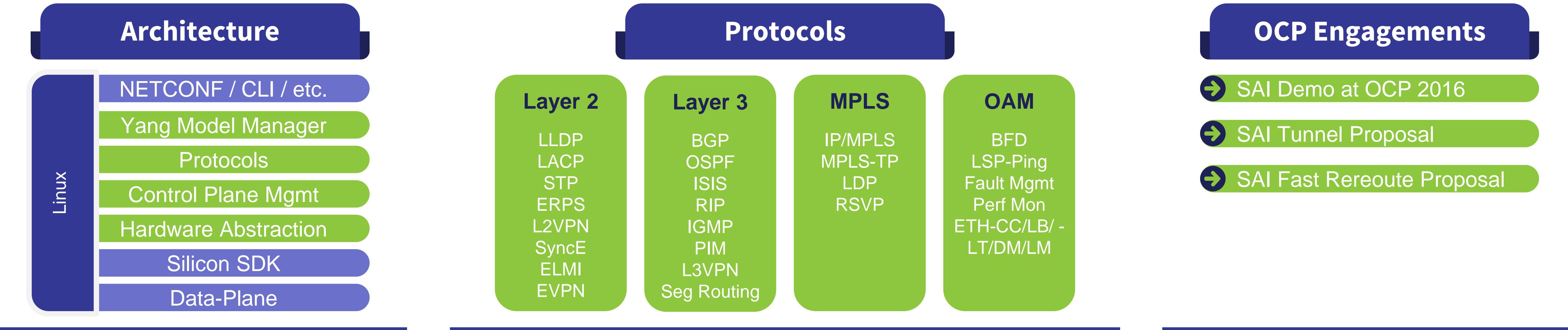


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# Metaswitch Networking Software



## Some of our Customers



[www.metaswitch.com/stacks](http://www.metaswitch.com/stacks)

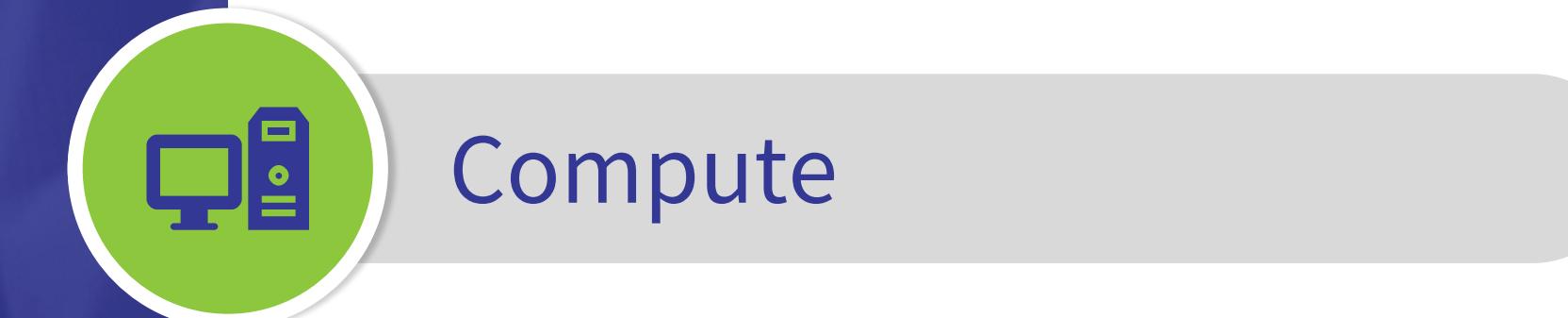
**metaswitch**  
disruptive cloud native communications software



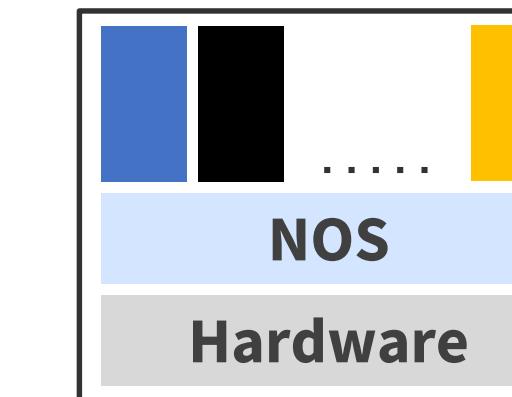
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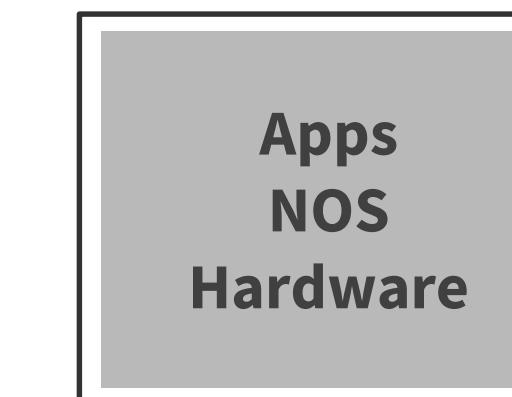
# Disaggregation Today



## Data Center Networking



## Telco Networking



- ▶ Standard, swappable HW
- ▶ Open OS
- ▶ Vibrant App Ecosystem
- ▶ Automated
- ▶ Flexible



- ▶ Standard swappable HW
- ▶ Open NOS: SONiC, Stratum
- ▶ Vibrant App Ecosystem
- ▶ HA through network design

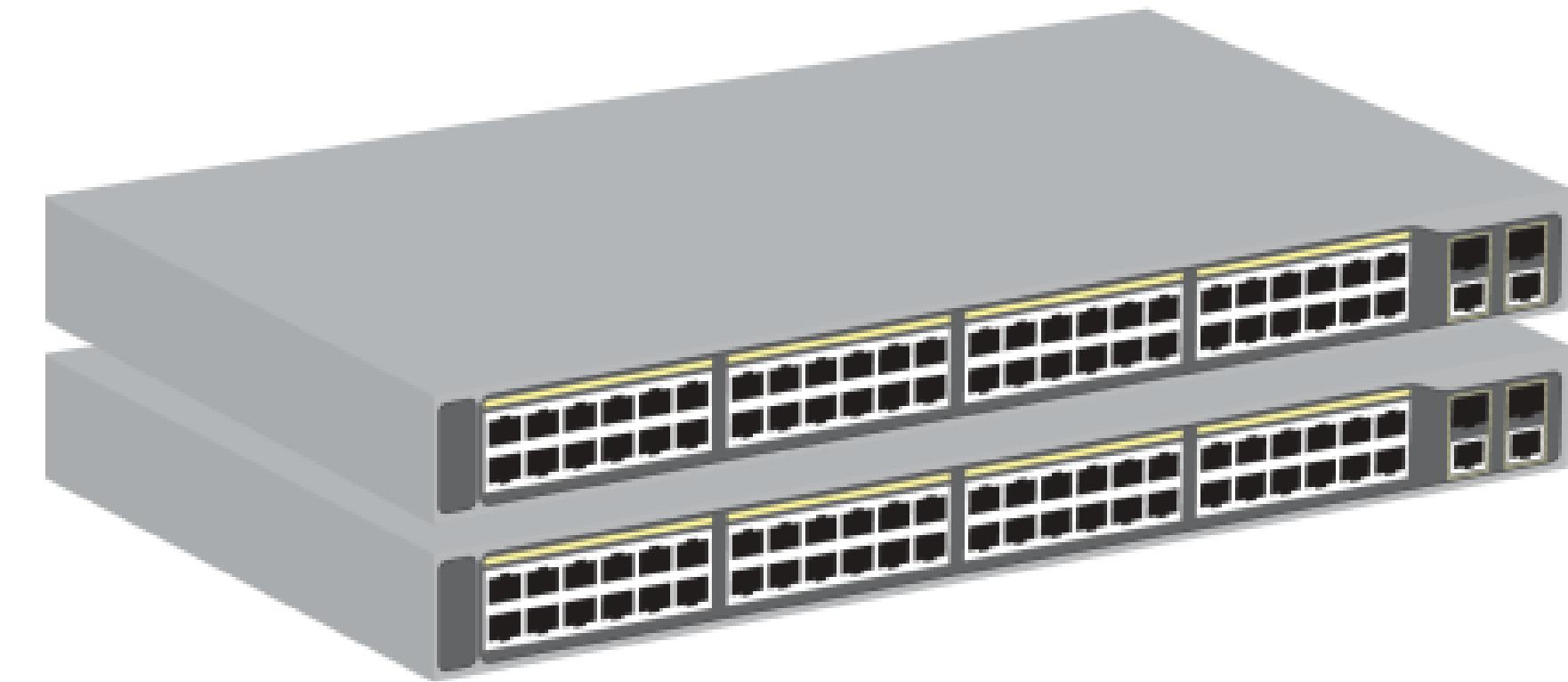


- ▶ Proprietary, closed HW & SW
- ▶ No App Ecosystem
- ▶ Vendor lock-in
- ▶ HA in each switch/router



# Telco-grade Highly Available Router

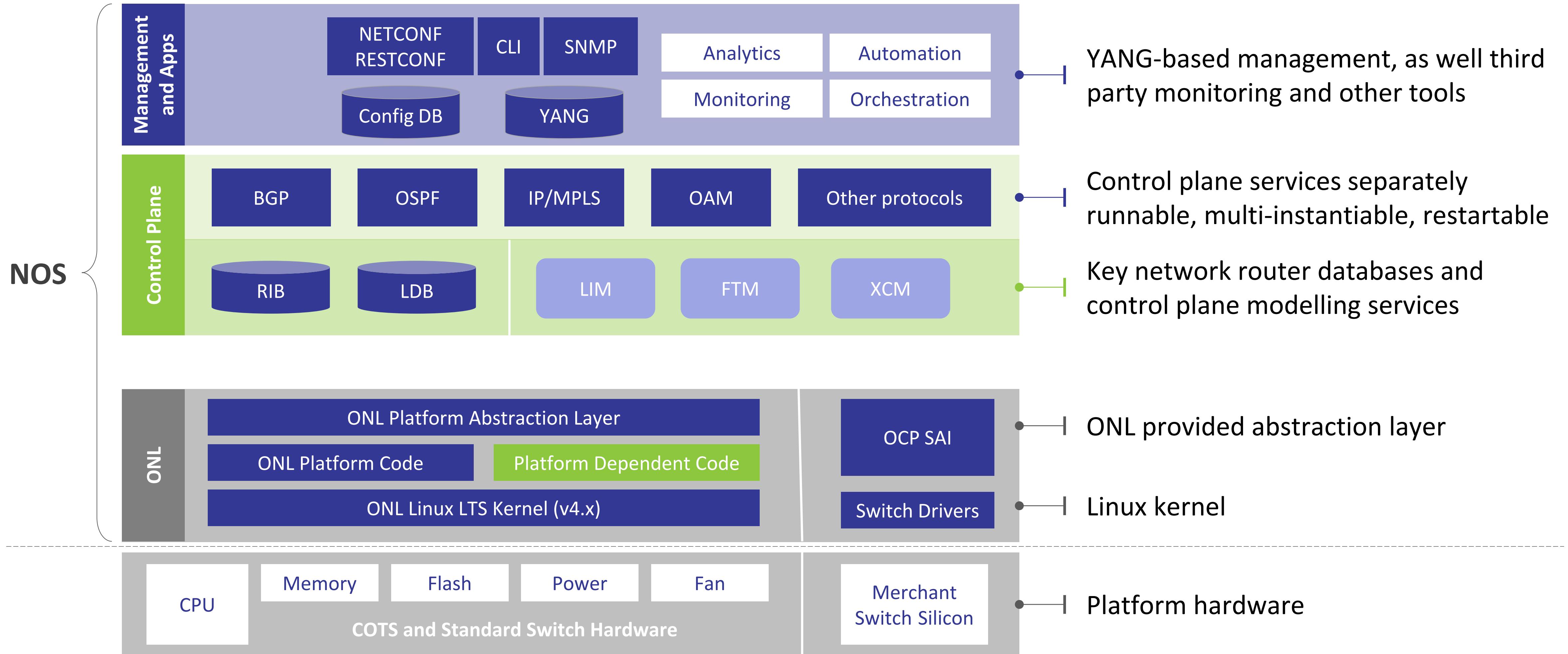
- Single node in the network
- Survives hardware and software failures
- Minimizes impact of failure
- Redundant hardware using stacked whiteboxes
- Surviving unit takes over if one unit fails



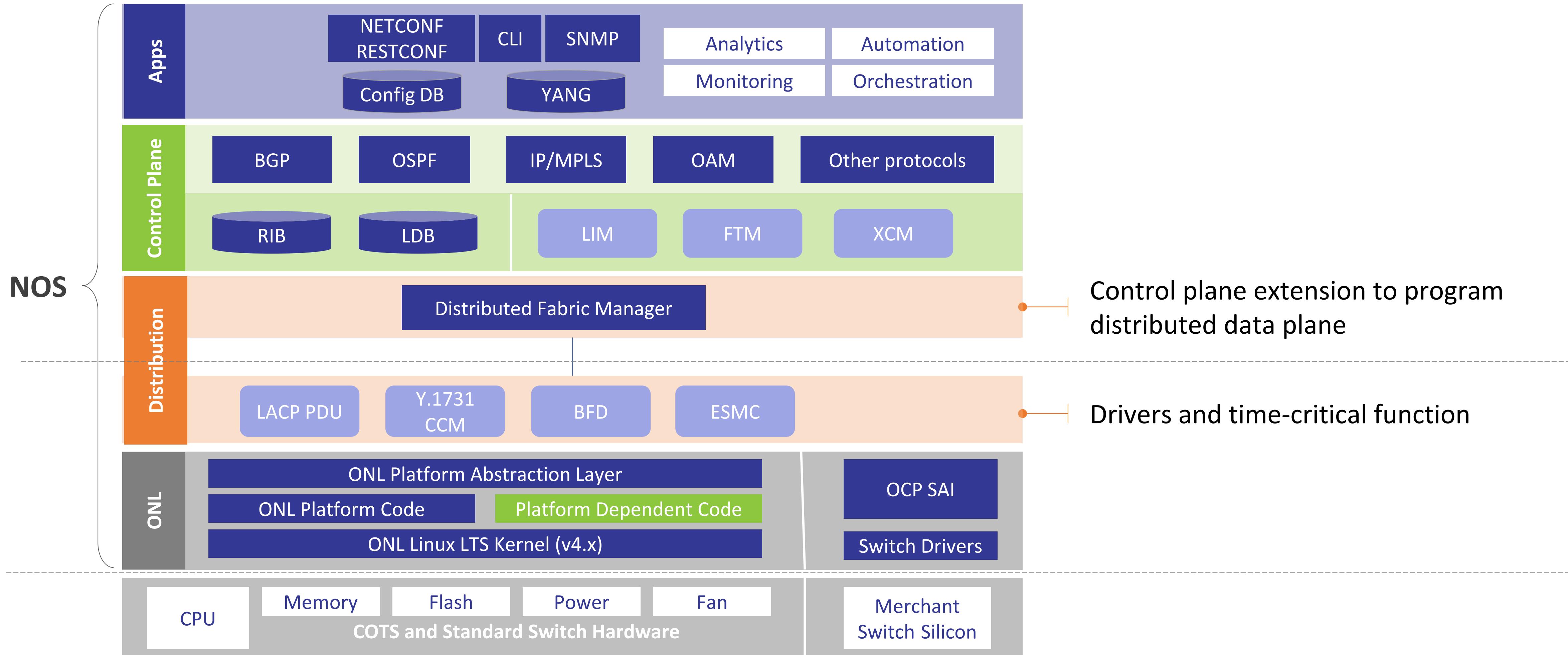
# Architecture of a Portable Telco NOS



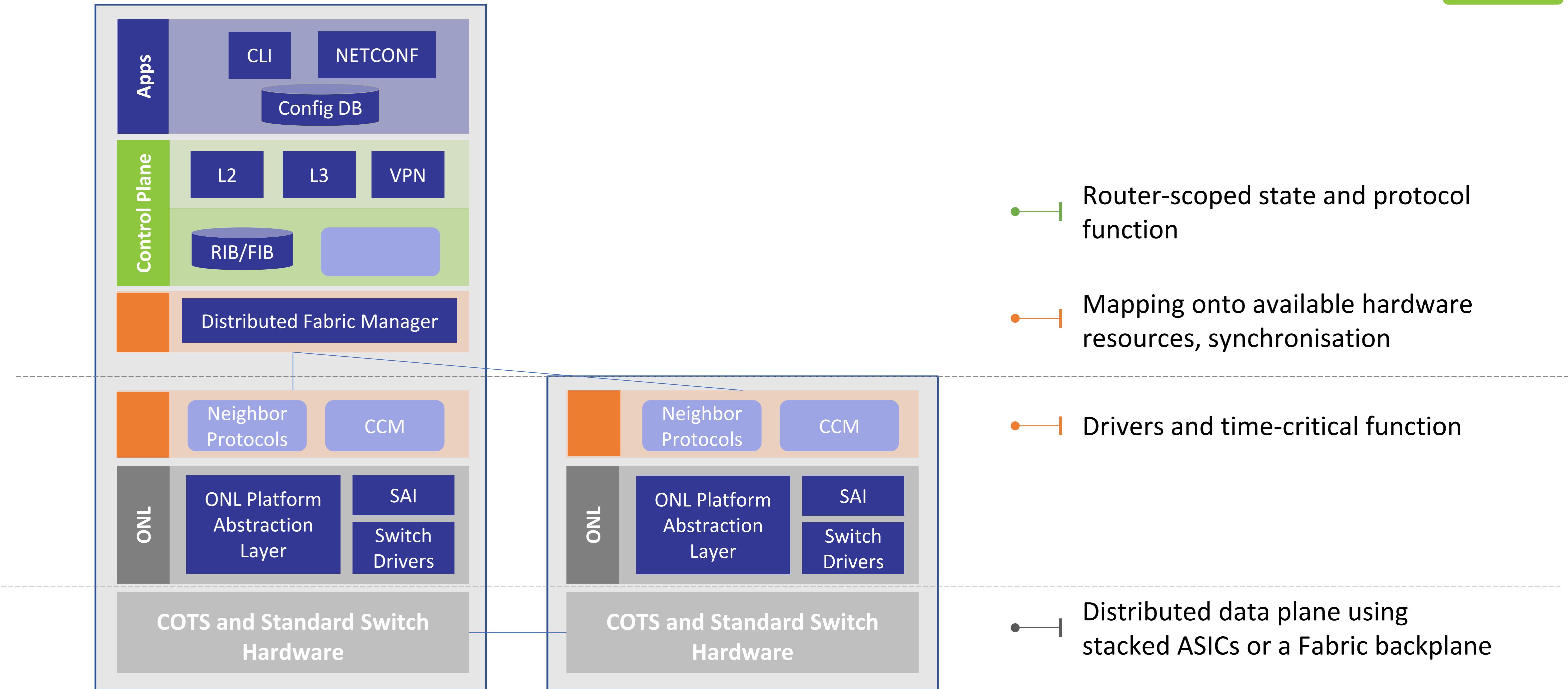
NETWORKING



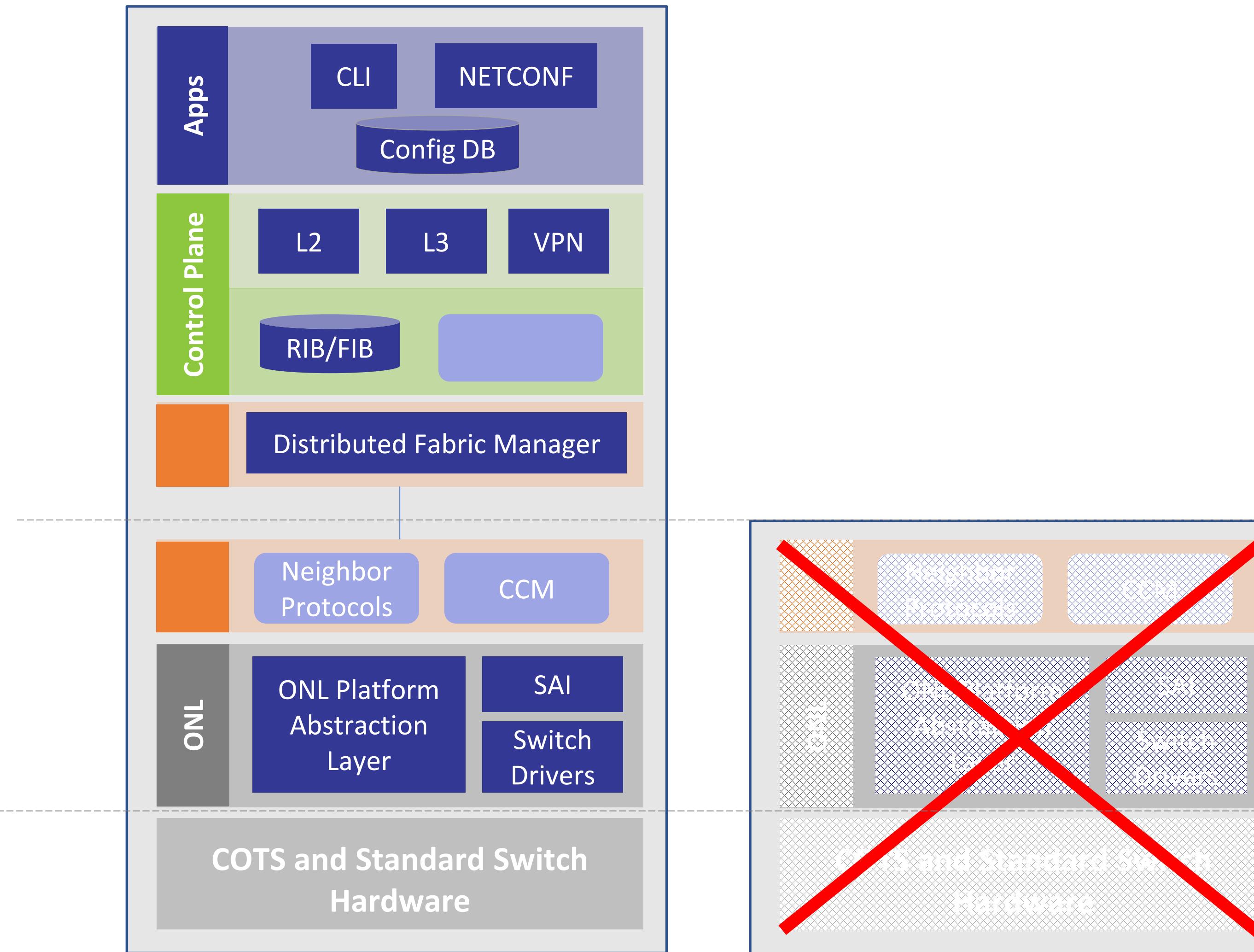
# Architecture of a Distributable NOS



# Distributed Data Plane



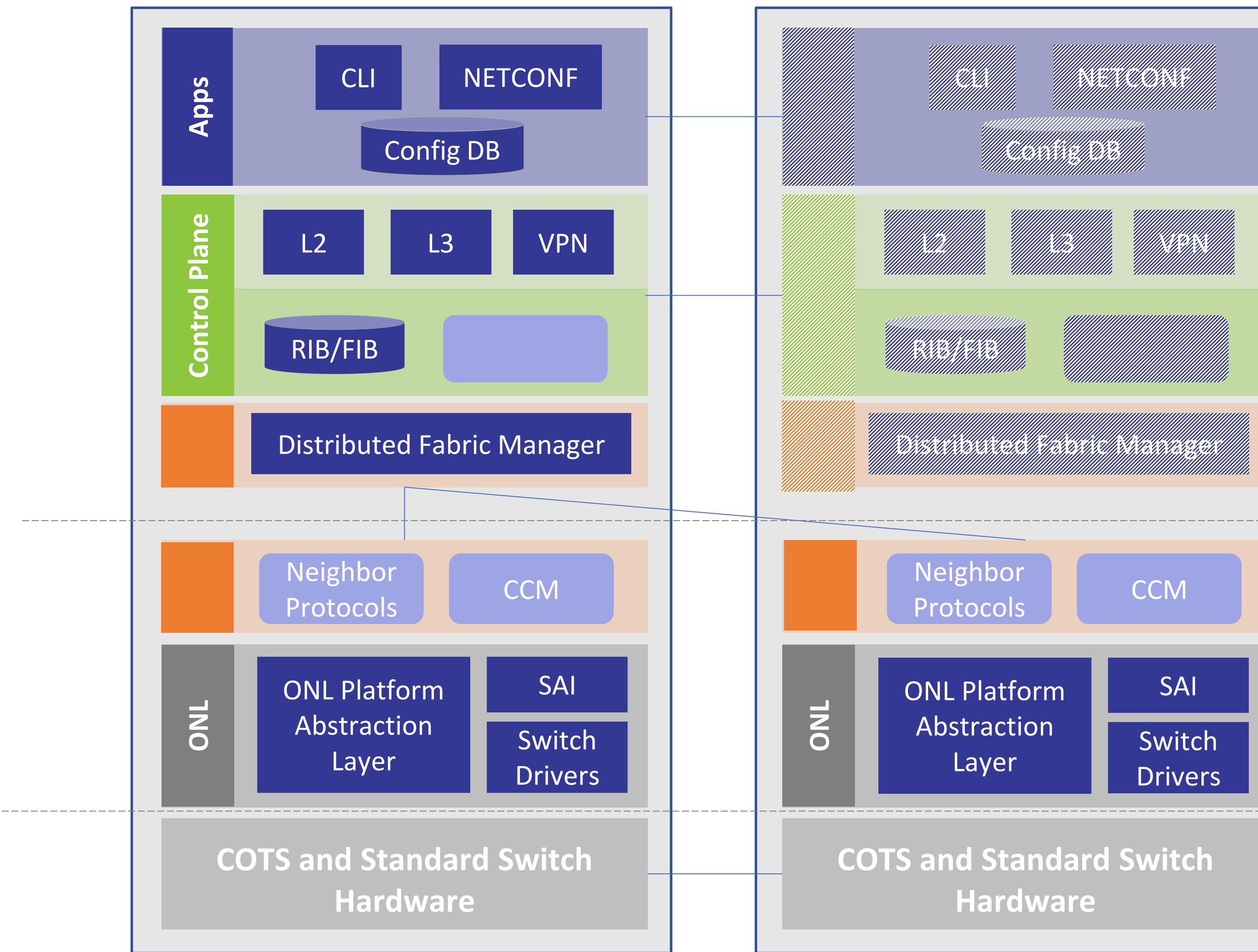
# Data Plane Failure



Control Plane signals interface changes to protocol neighbors

Connectivity maintained over remaining interfaces

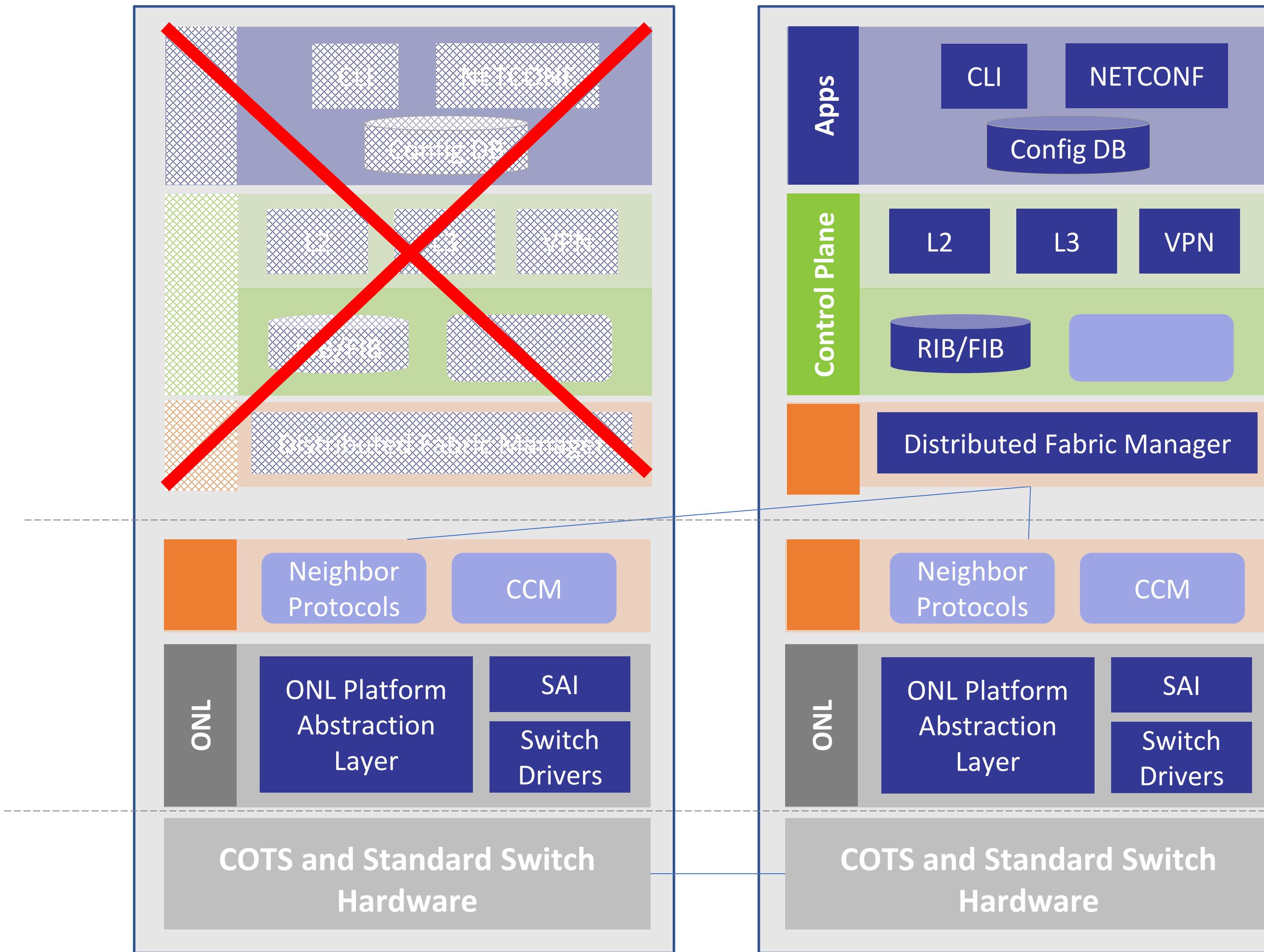
# Redundant Control Plane





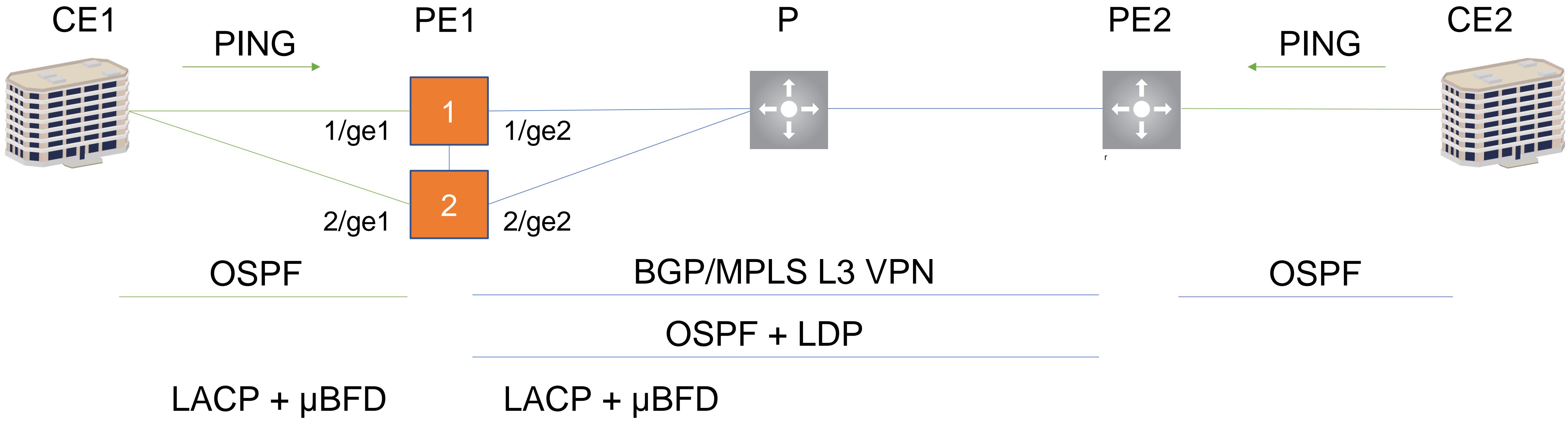
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# Control Plane Failure



- Configuration replayed on restart
- Graceful restart + state replication to minimize disruption
- Programming resynchronised once GR has completed
- Neighbour Protocols maintain connectivity during control plane failure
- Non-stop Forwarding

# Telco L3VPN Scenario



- Reboot active unit
- Kill Control Plane of active unit



# Case Study – Failover

- ▶ Metaswitch NOS Toolkit components
- ▶ Provider-Edge Router failover
- ▶ PoC only

The image shows a laptop screen with two terminal windows. The top window, titled 'nodeAp - PUTTY', displays the output of a command to start a configuration script and check location status:

```
root@nodeAp:~# sh start_cli.sh
root connected from 10.60.33.251 using ssh on nodeAp
nodeAp# show location
LOCATION NAME          LOCATION STATUS      ROLE
=====
Control plane 1        active
Control plane 2        active
Data plane 1           active
Data plane 2           active
nodeAp#
```

The bottom window, titled 'root@nodeD:~', shows ICMP traffic statistics:

```
root@nodeD:~#
64 bytes from 10.29.0.5: icmp_seq=2192 ttl=62 time=6.30 ms
64 bytes from 10.29.0.5: icmp_seq=2193 ttl=62 time=8.11 ms
64 bytes from 10.29.0.5: icmp_seq=2194 ttl=62 time=6.72 ms
64 bytes from 10.29.0.5: icmp_seq=2195 ttl=62 time=9.43 ms
64 bytes from 10.29.0.5: icmp_seq=2196 ttl=62 time=6.35 ms
64 bytes from 10.29.0.5: icmp_seq=2197 ttl=62 time=6.39 ms
64 bytes from 10.29.0.5: icmp_seq=2198 ttl=62 time=11.2 ms
64 bytes from 10.29.0.5: icmp_seq=2199 ttl=62 time=5.56 ms
64 bytes from 10.29.0.5: icmp_seq=2200 ttl=62 time=5.53 ms
64 bytes from 10.29.0.5: icmp_seq=2201 ttl=62 time=5.98 ms
64 bytes from 10.29.0.5: icmp_seq=2202 ttl=62 time=6.59 ms
64 bytes from 10.29.0.5: icmp_seq=2203 ttl=62 time=6.56 ms
```

# NOS Cookbook

Step-by-Step guide to building a Portable NOS for Telcos

Leverages OCP Technologies

- ▶ ONIE, ONL, SAI etc.

Standard, Flexible Architecture

- ▶ Portability built-in from inception

Provides modern and open interfaces

- ▶ Automation, Orchestration etc.

Supports open & closed source components

[www.metaswitch.com/cookbook](http://www.metaswitch.com/cookbook)



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Open Network Linux



White  
Papers

**Switch  
Abstraction  
Interface**



# Call to Action

## White Box HA - Facilitating Telco deployment

Metaswitch NOS Toolkit info:

[www.metaswitch.com/nos-toolkit](http://www.metaswitch.com/nos-toolkit)

Download the NOS Cookbook:

[www.metaswitch.com/cookbook](http://www.metaswitch.com/cookbook)

SAI Project source code:

[github.com/opencomputeproject/SAI](https://github.com/opencomputeproject/SAI)



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OCP Regional Summit  
26–27, September, 2019

