Network Services as Code
Enabled by Collaboration across Standards and Open Source
IIT RTC, October 14, 2021

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Agenda

- UniMgr project in OpenDaylight
- Carrier ethernet services defined by MEF
- Collaboration between MEF and IETF on YANG models
- Enhancements to Unimgr to support Cisco IOS XR

MEF

a non-profit *industry forum* of network, cloud & technology providers.

Together, we develop E2E service standards, automation APIs & certifications to empower *enterprise digital transformation*.

MEF 3.0's Global Services Framework

Accelerate assured services across automated networks

Assured

- SASE/Zero Trust
- SD-WAN
- IP
- Carrier Ethernet
- Optical Transport

Automated

- Orchestration across multiple service providers
- Orchestration over multiple network technology domains
- Standards and SDKs

Agile

- Cloud-based test & certification platform
- On-demand, user-initiated
- For both services & LSO APIs
- Plus certified professionals

Expanded

- MEF global membership
- MEF 3.0 Proofs of Concept
- MEF LSO Developer Community
- Open source projects & SDOs
- Enterprise Advisory Council
- Events, workshops, webinars

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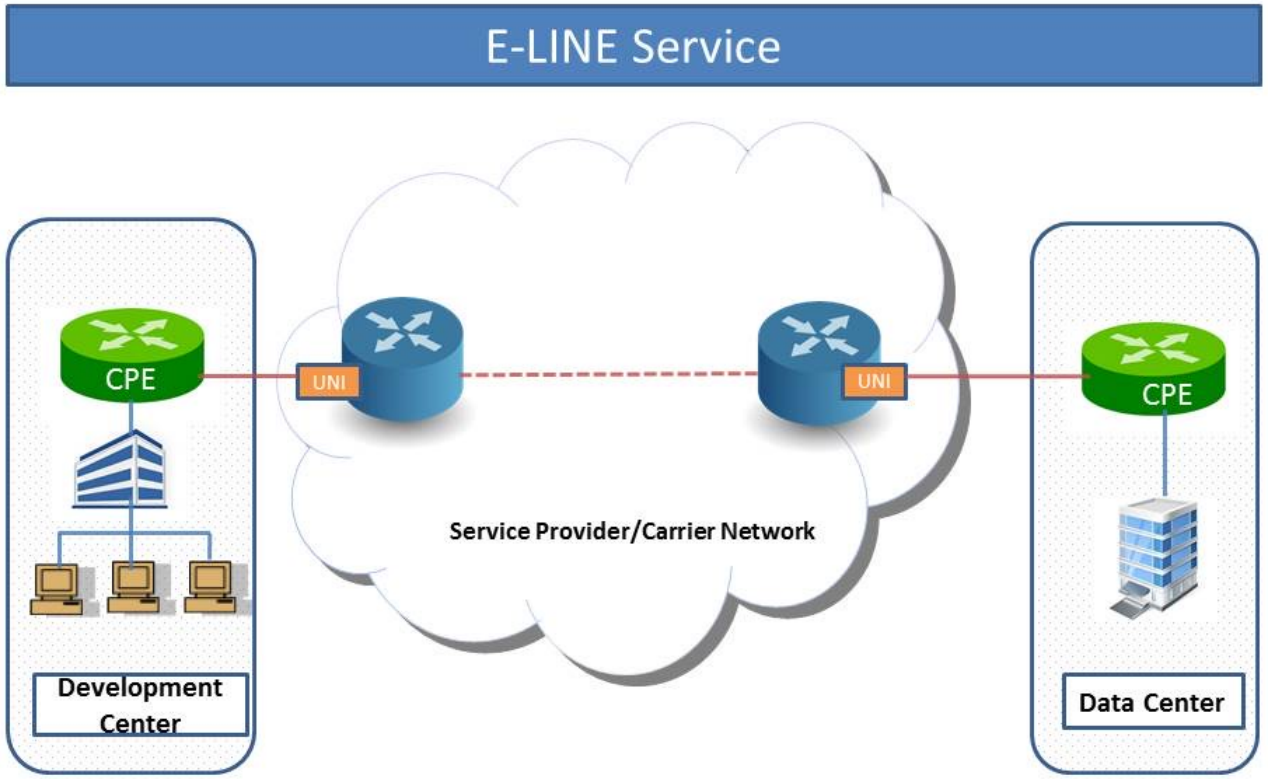
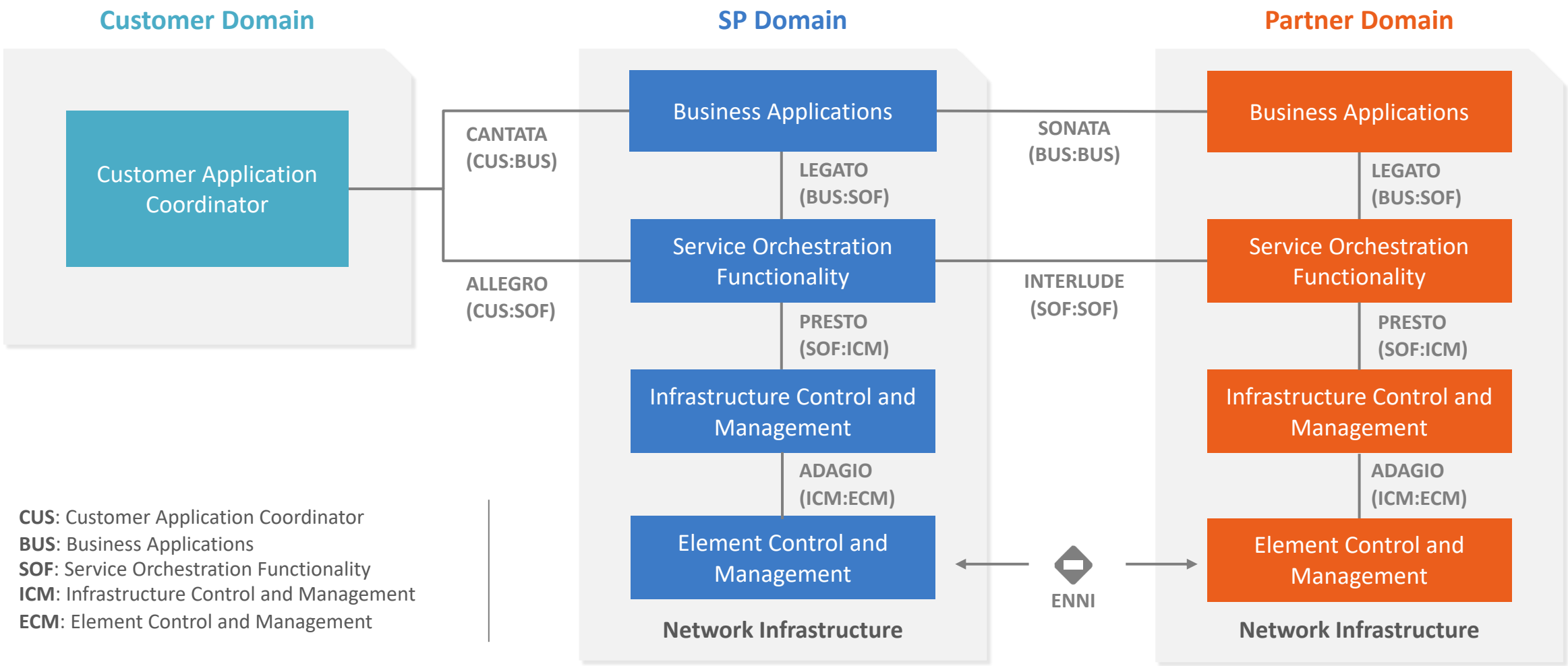
Subscriber Ethernet Services

- Offered by Service Provider to Subscriber
- Ethernet Line (E-Line), also E-LAN and E-Tree
- Ethernet Private Line (EPL) vs. Ethernet Virtual Private Line (EVPL)



CPE - Customer Premises Equipment
UNI – User Network Interface

The LSO Reference Architecture: MEF 55.1



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BUS: Business Applications
SOF: Service Orchestration Functionality
ICM: Infrastructure Control and Management
ECM: Element Control and Management

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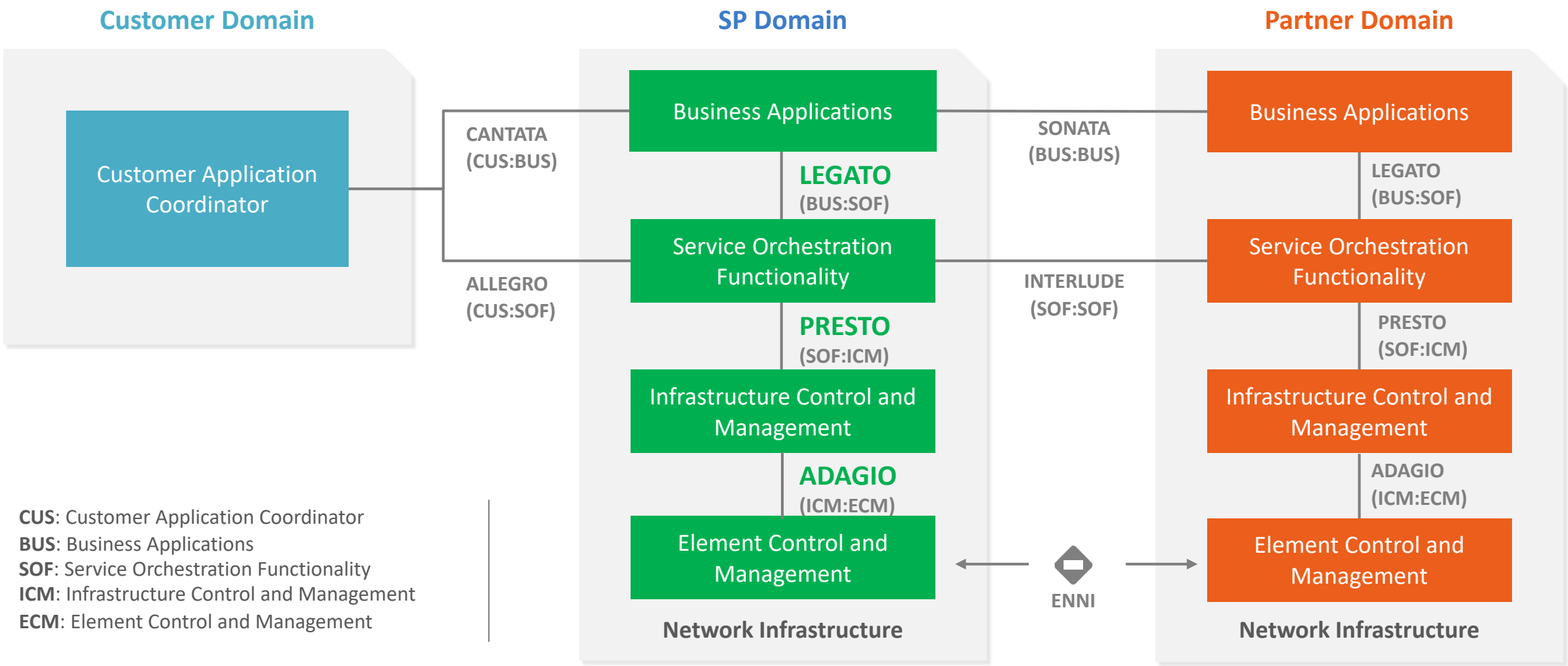

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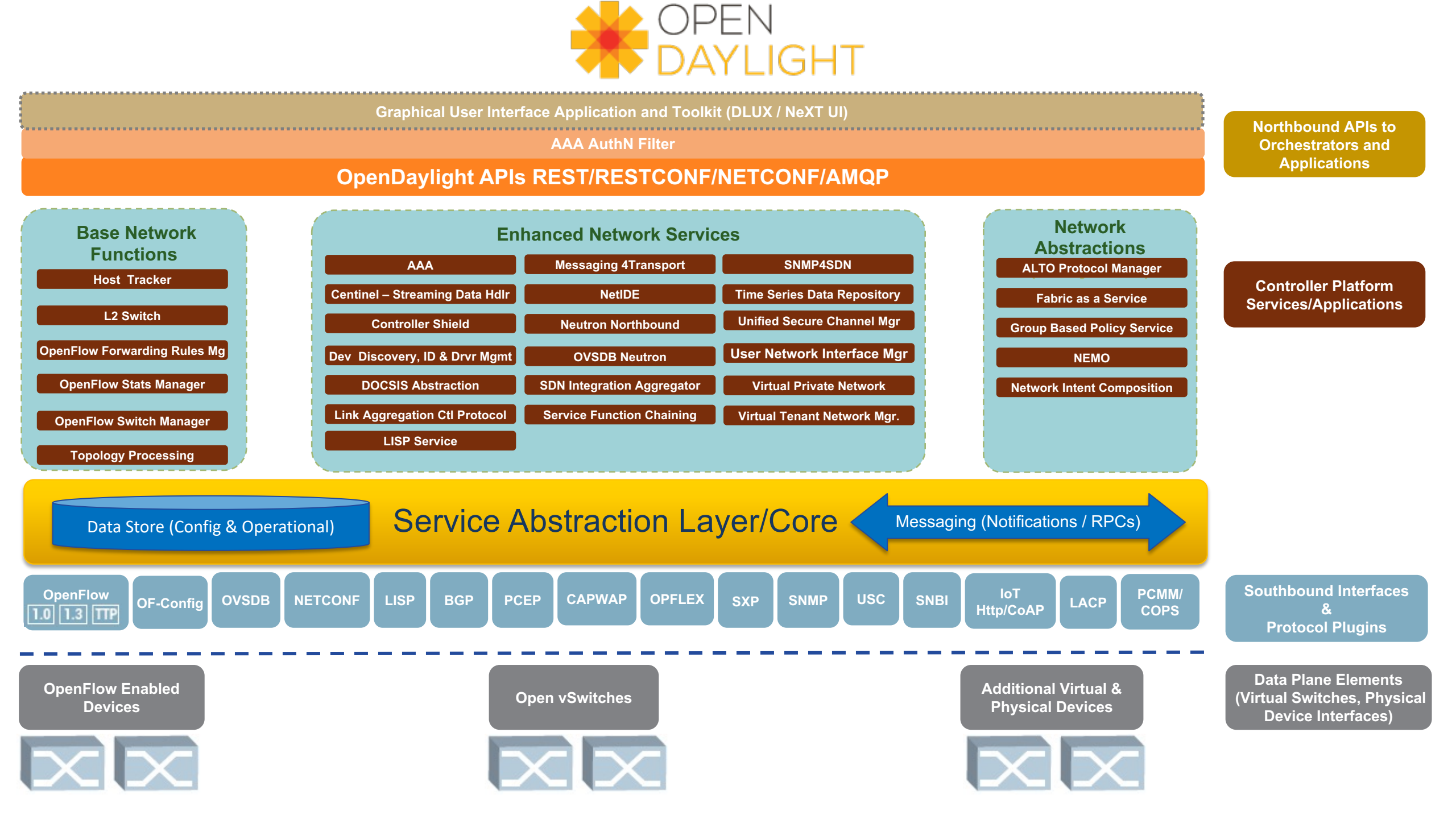
OPEN DAYLIGHT
Graphical User Interface Application and Toolkit (DLUX / NeXT UI)
AAA AuthN Filter
OpenDaylight APIs REST/RESTCONF/NETCONF/AMQP
Northbound APIs to Orchestrators and Applications
Base Network Functions
Host Tracker
L2 Switch
OpenFlow Forwarding Rules Mg
OpenFlow Stats Manager
OpenFlow Switch Manager
Topology Processing
Enhanced Network Services
AAA
Messaging 4Transport
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Centinel – Streaming Data Hdlr
NetIDE
Time Series Data Repository
Controller Shield
Neutron Northbound
Unified Secure Channel Mgr
Dev Discovery, ID & Drvr Mgmt
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User Network Interface Mgr
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Service Function Chaining
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ALTO Protocol Manager
Fabric as a Service
Group Based Policy Service
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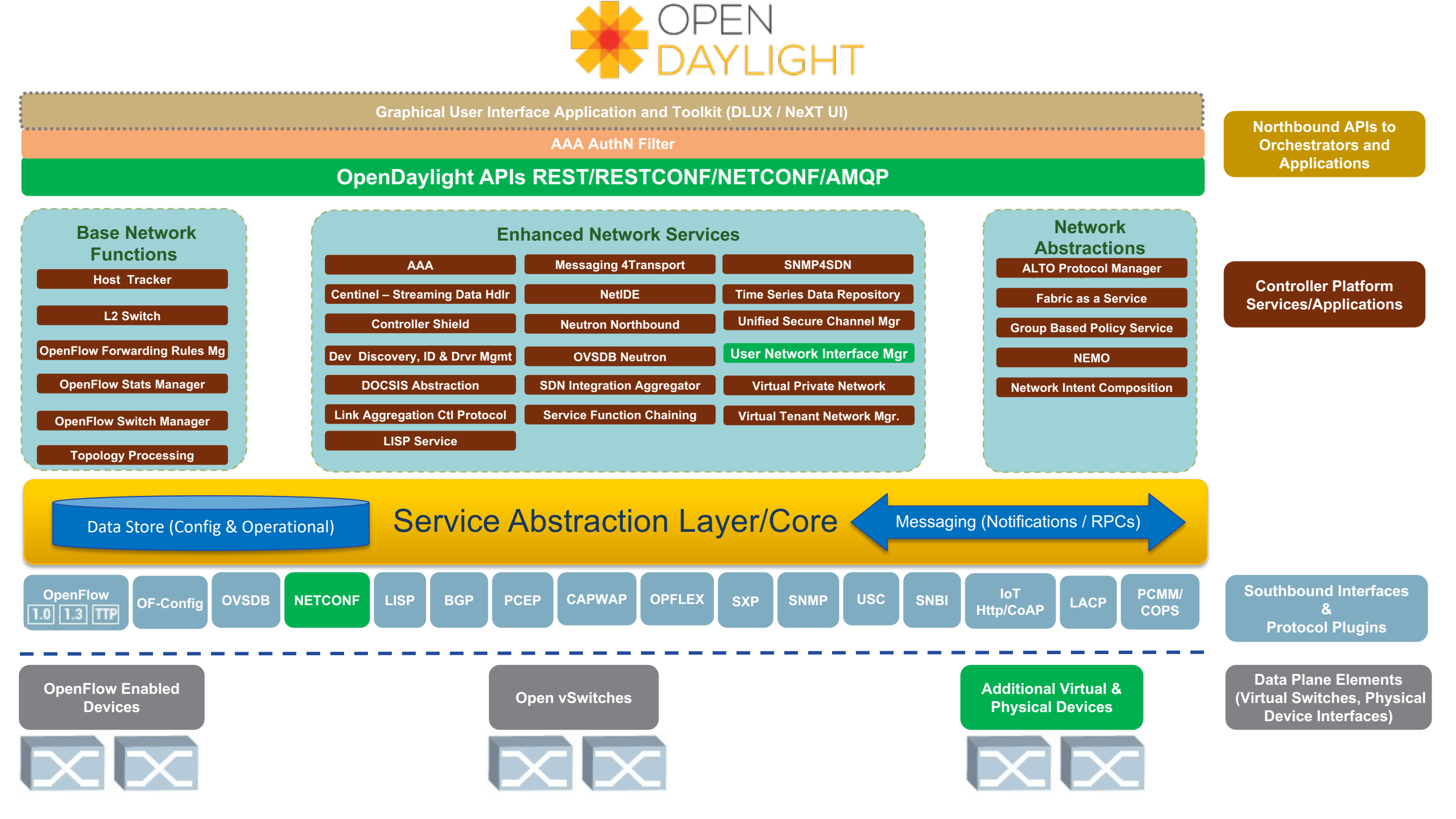
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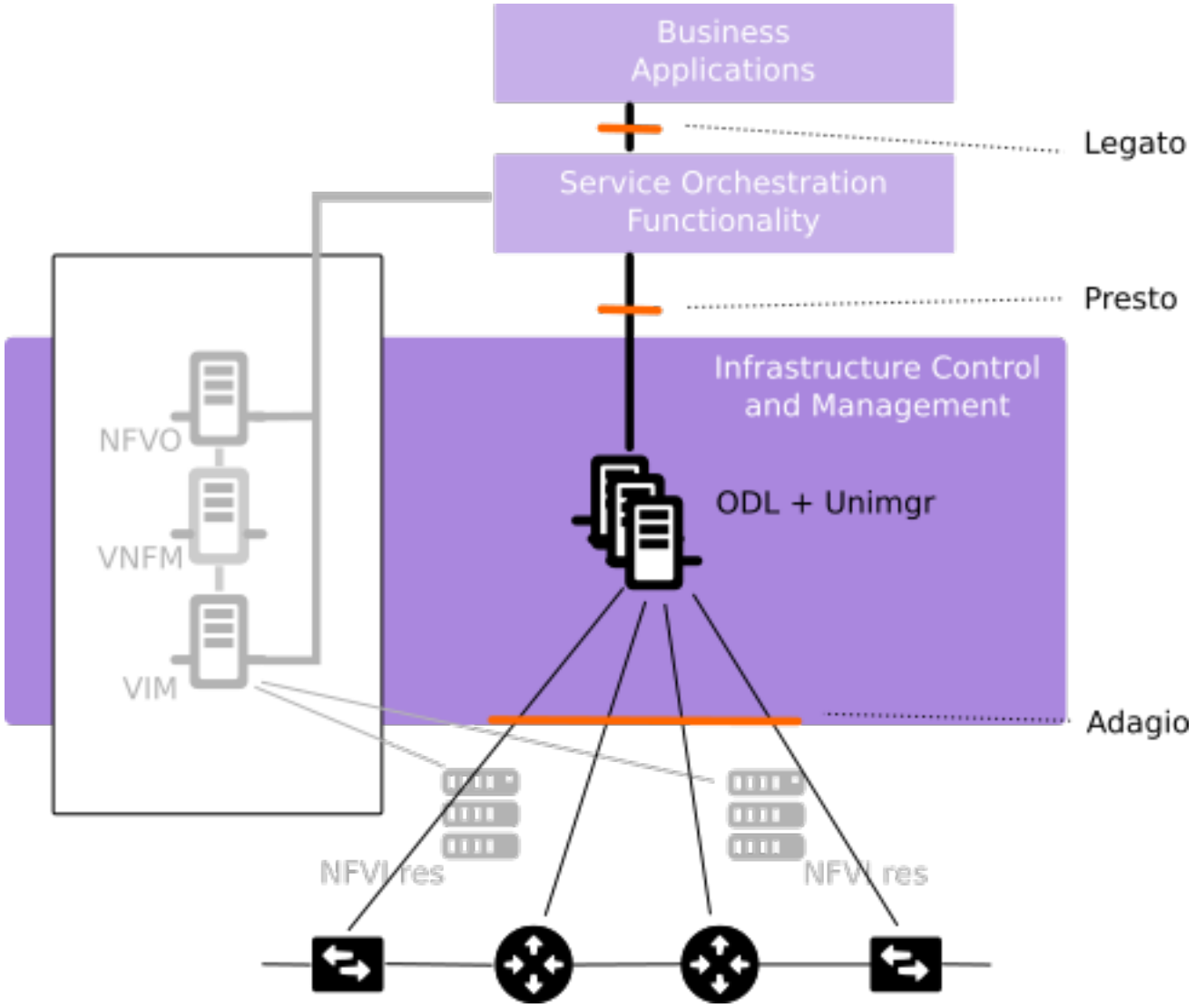
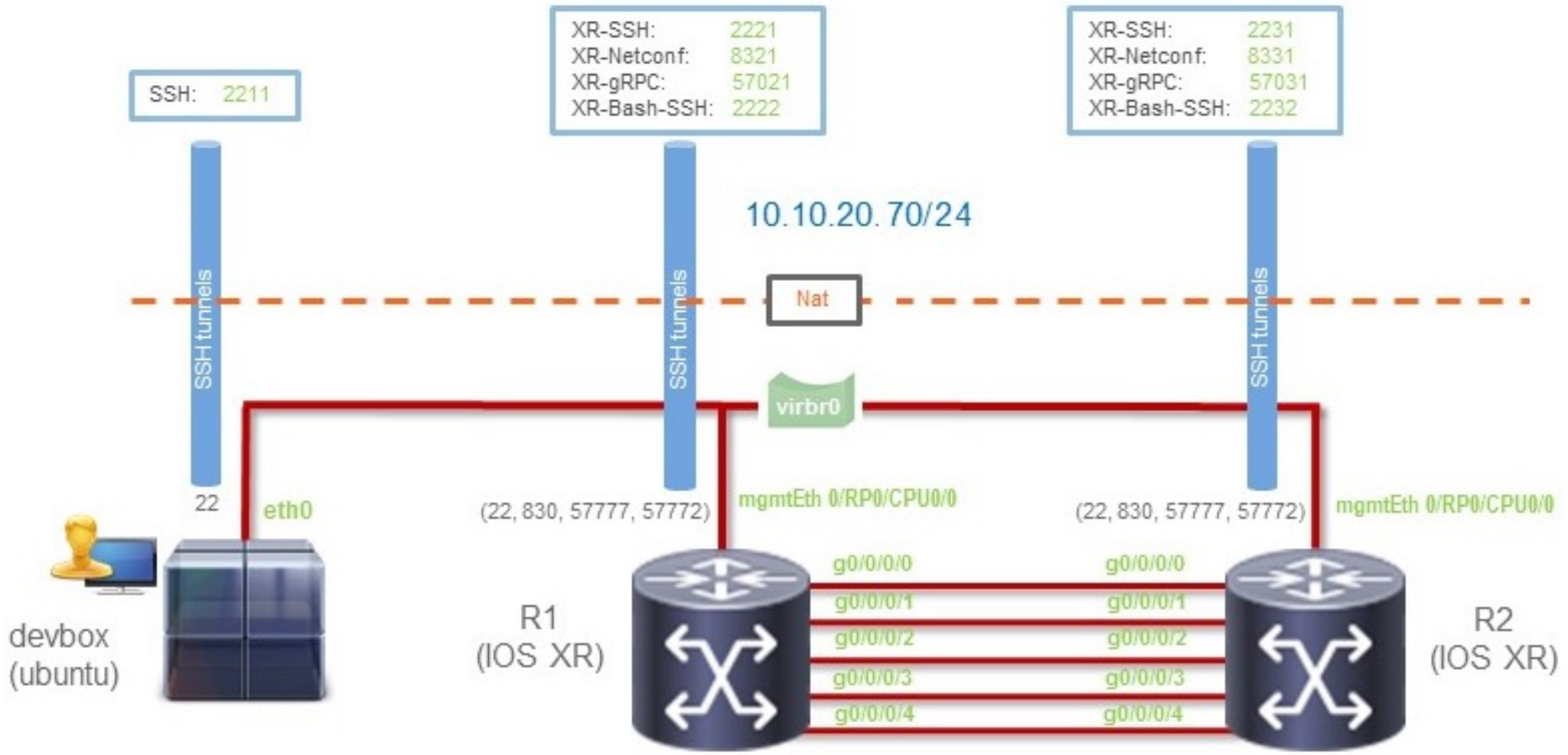
User Network Interface Manager - UniMgr

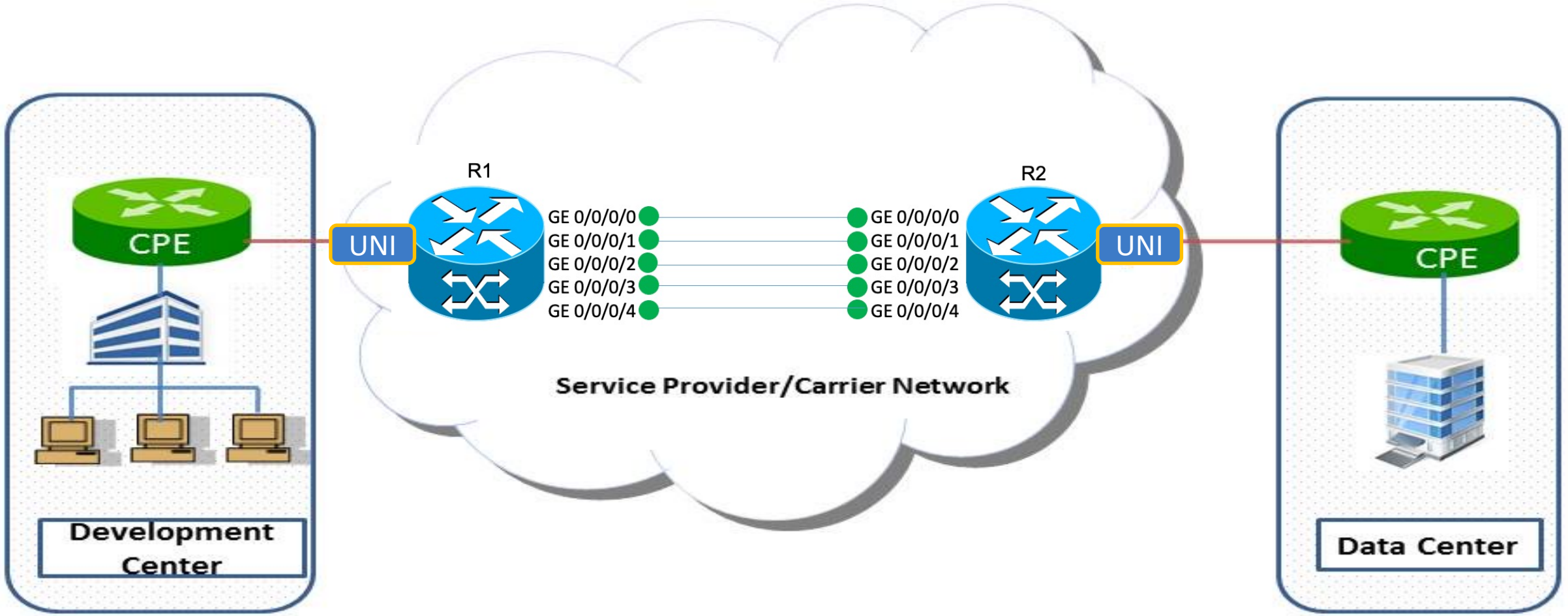
- Implements YANG models defined by MEF at Legato and Presto interface reference points
- Adagio supported by OpenDaylight via NETCONF/YANG
- Driver-based approach to support network devices from multiple vendors
- Cisco XR driver updated to support IOS 6.4.1



IOS XR Programmability Sandbox



E-LINE Service



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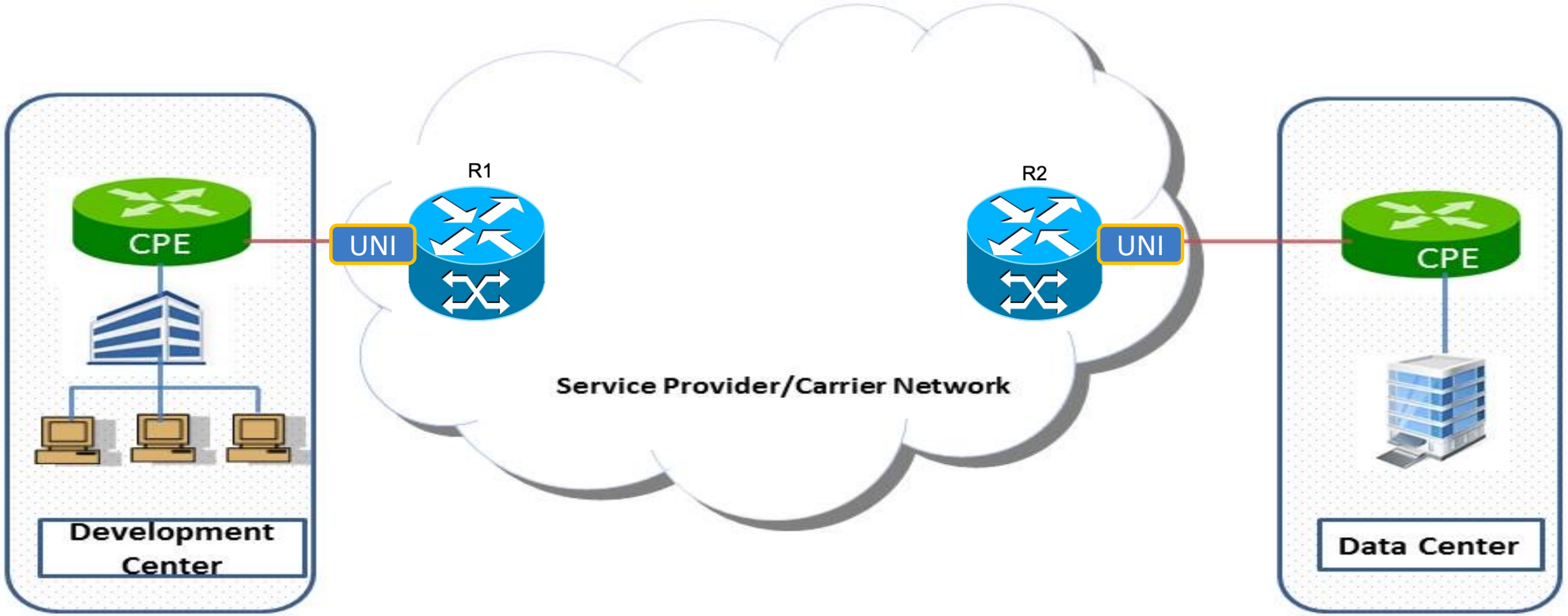

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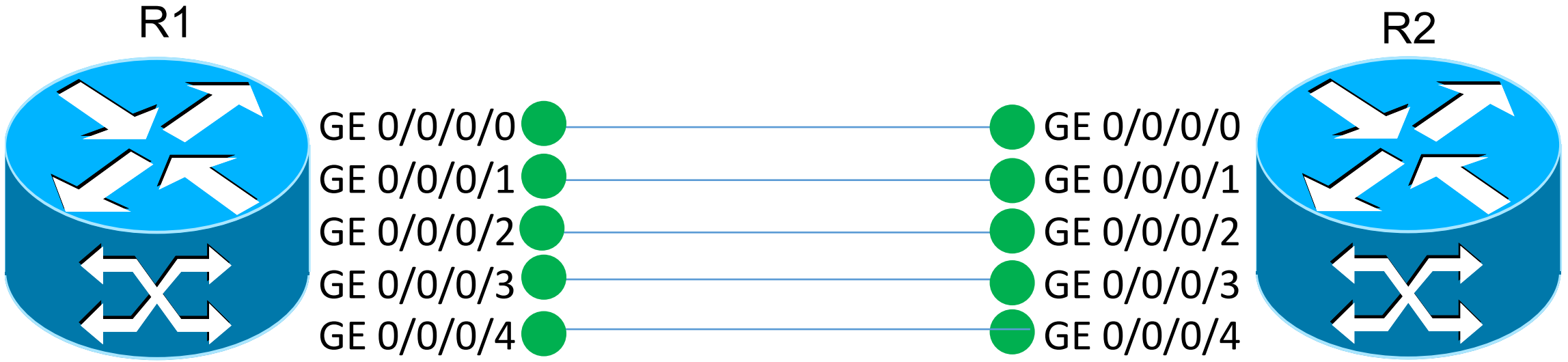
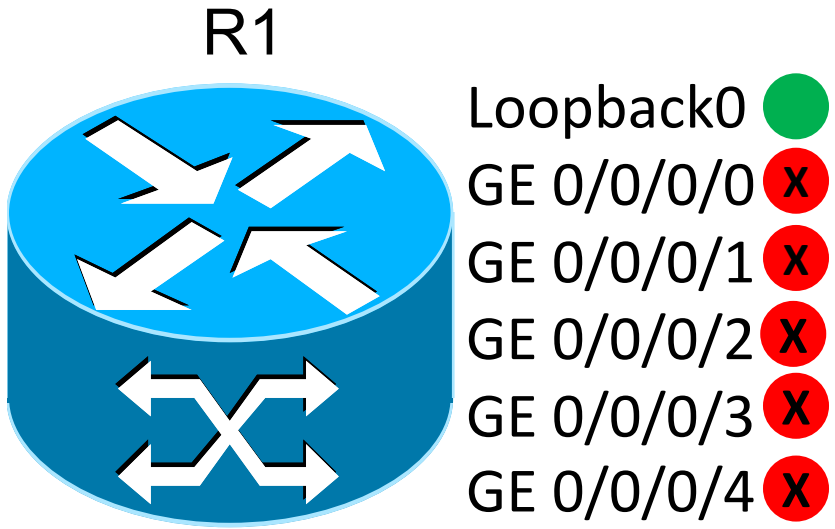
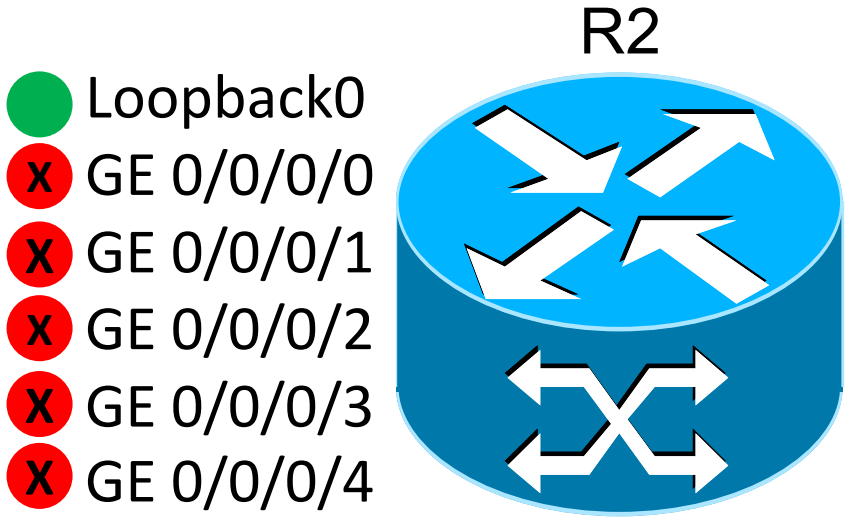
Sandbox Configuration



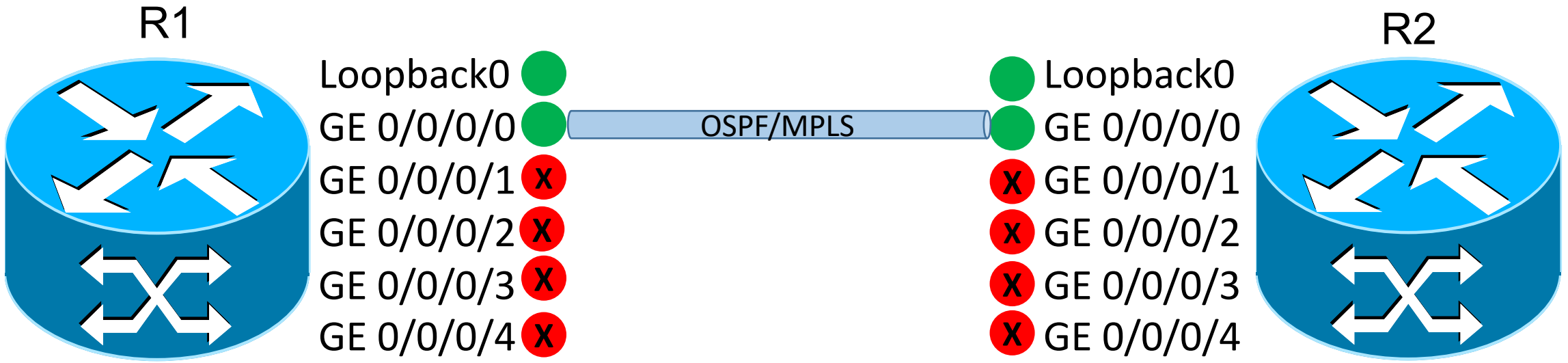
Shutdown all interfaces

Add Loopback Interface

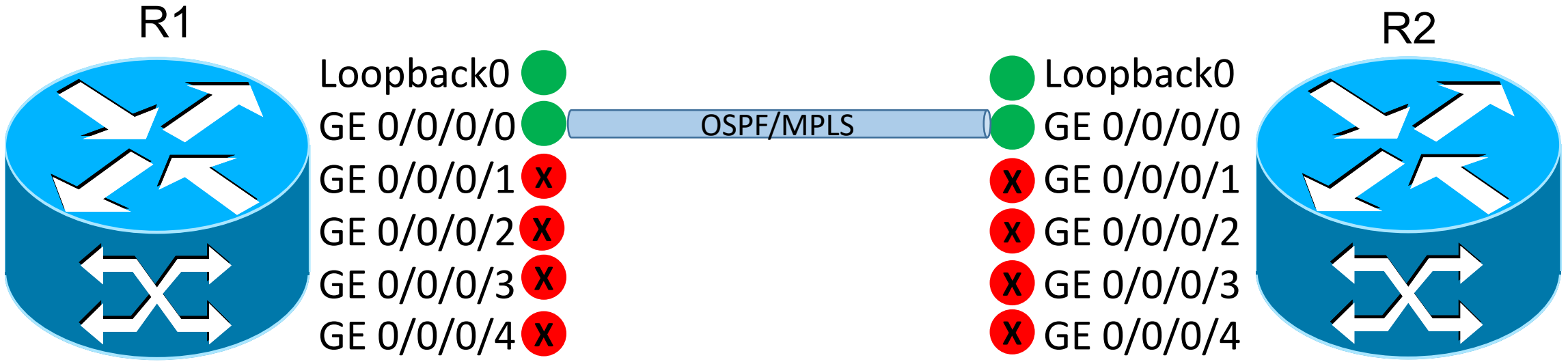




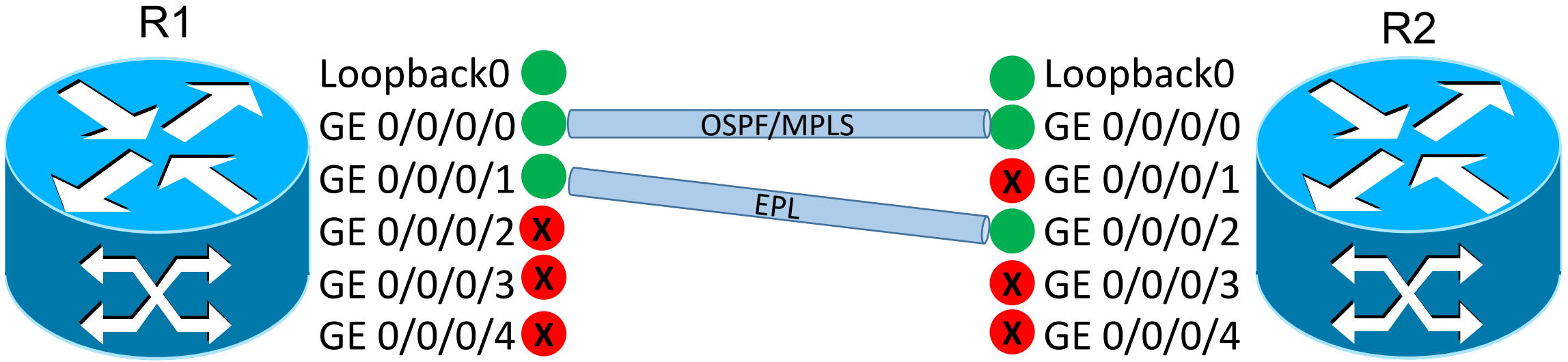
Configure OSPF and MPLS across GE 0



Day 0 Configuration

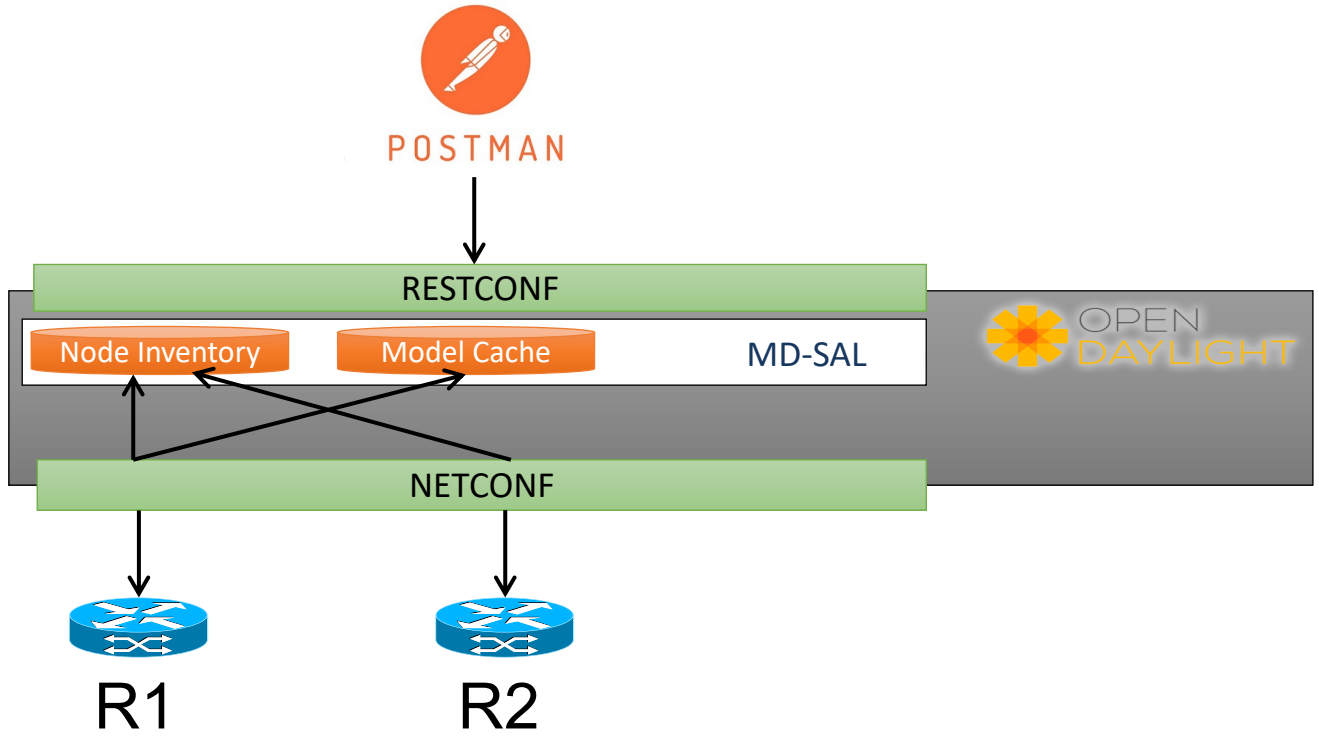


Enable an EPL Service from R1 to R2

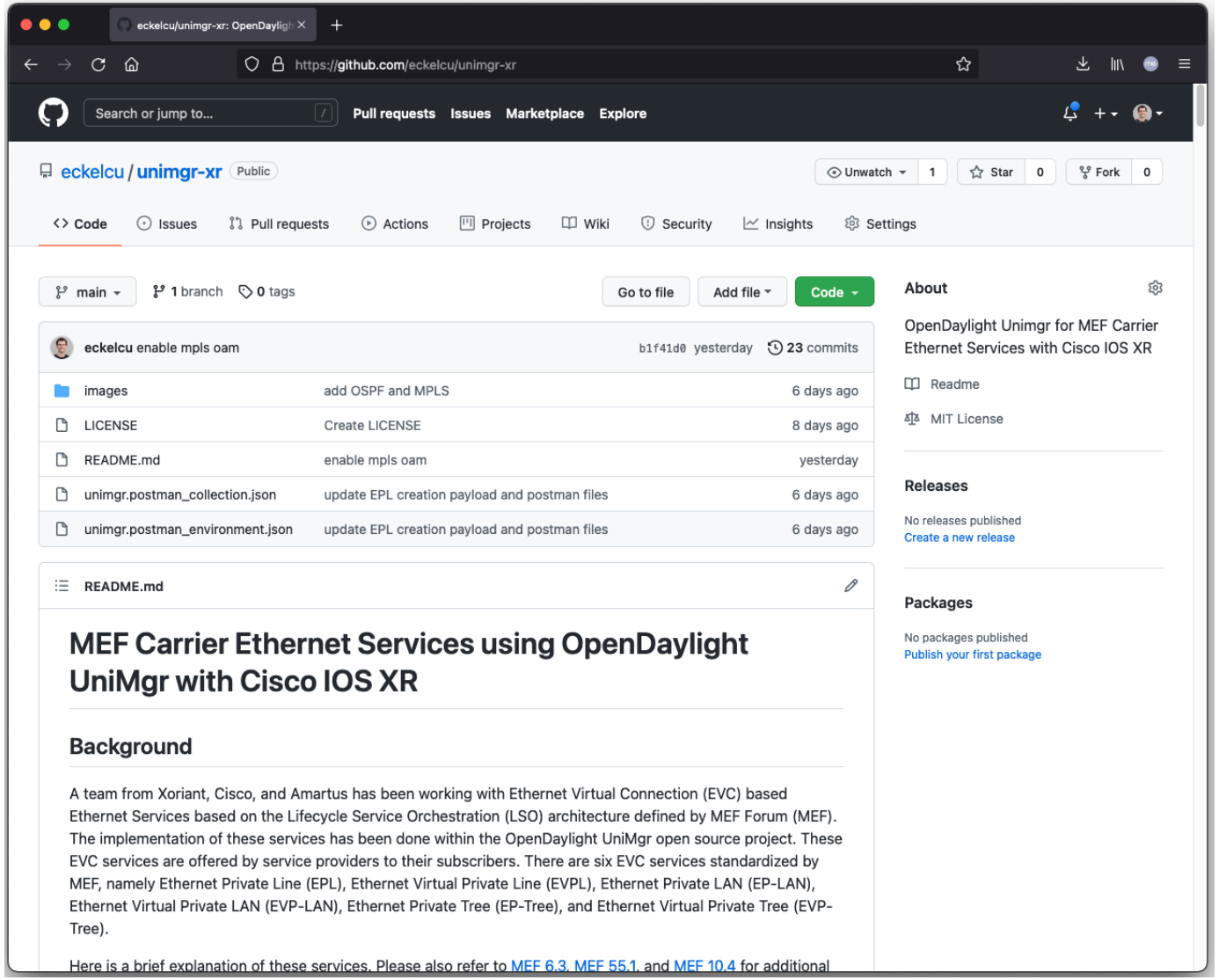


Mounting R1 and R2 in OpenDaylight

- R1 and R2 added via a RESTCONF ‘PUT’ to network-topology YANG module
- OpenDaylight connects to R1 and R2 and adds to Node Inventory
- Learns capabilities (YANG modules) and stores to Model Cache
- Postman used to drive interaction



Demo


eckelcu/unimgr-xr: OpenDaylig
https://github.com/eckelcu/unimgr-xr
Search or jump to...
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Explore
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Unwatch 1
Star 0
Fork 0
Code
Issues
Pull requests
Actions
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Insights
Settings
main
1 branch
0 tags
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23 commits
images add OSPF and MPLS 6 days ago
LICENSE Create LICENSE 8 days ago
README.md enable mpls oam yesterday
unimgr.postman_collection.json update EPL creation payload and postman files 6 days ago
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README.md
MEF Carrier Ethernet Services using OpenDaylight UniMgr with Cisco IOS XR
Background
A team from Xoriant, Cisco, and Amartus has been working with Ethernet Virtual Connection (EVC) based Ethernet Services based on the Lifecycle Service Orchestration (LSO) architecture defined by MEF Forum (MEF). The implementation of these services has been done within the OpenDaylight UniMgr open source project. These EVC services are offered by service providers to their subscribers. There are six EVC services standardized by MEF, namely Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL), Ethernet Private LAN (EP-LAN), Ethernet Virtual Private LAN (EVP-LAN), Ethernet Private Tree (EP-Tree), and Ethernet Virtual Private Tree (EVP-Tree).
Here is a brief explanation of these services. Please also refer to MEF 6.3, MEF 55.1, and MEF 10.4 for additional
About
OpenDaylight Unimgr for MEF Carrier Ethernet Services with Cisco IOS XR
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Releases
No releases published
Create a new release
Packages
No packages published
Publish your first package

Resources

- GitHub repo with instructions: https://github.com/eckelcu/unimgr-xr
- UniMgr code: https://github.com/opendaylight/unimgr
- UniMgr code changes: https://github.com/eckelcu/unimgr

Thank you!


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