

Designing Access and Core Switching Architectures with Meraki

CISCO Live !

Enterprise Cloud managed switching

Brennan Martin
Technical Leader, Enterprise Switching Experiences

Cisco Webex App

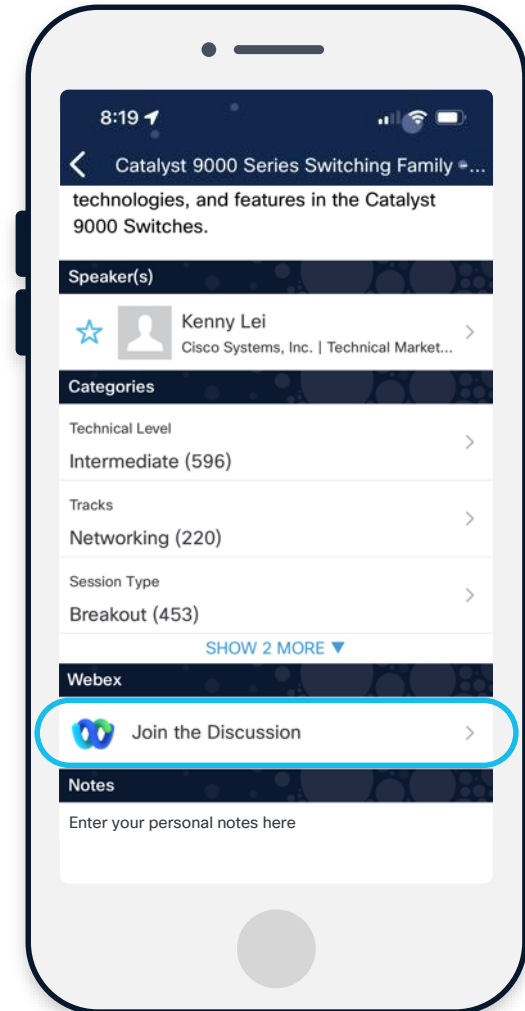
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 13, 2025.



Agenda

- 01 **Intro**
- 02 **Cloud management with IOS XE**
- 03 **Configuration Source**
- 04 **Cloud Configuration**
- 05 **Platforms**
- 06 **Preview: IOS XE 17.18 Cloud switching**
- 07 **Enterprise Switching Architectures**



I'm a Canadian that loves building networks

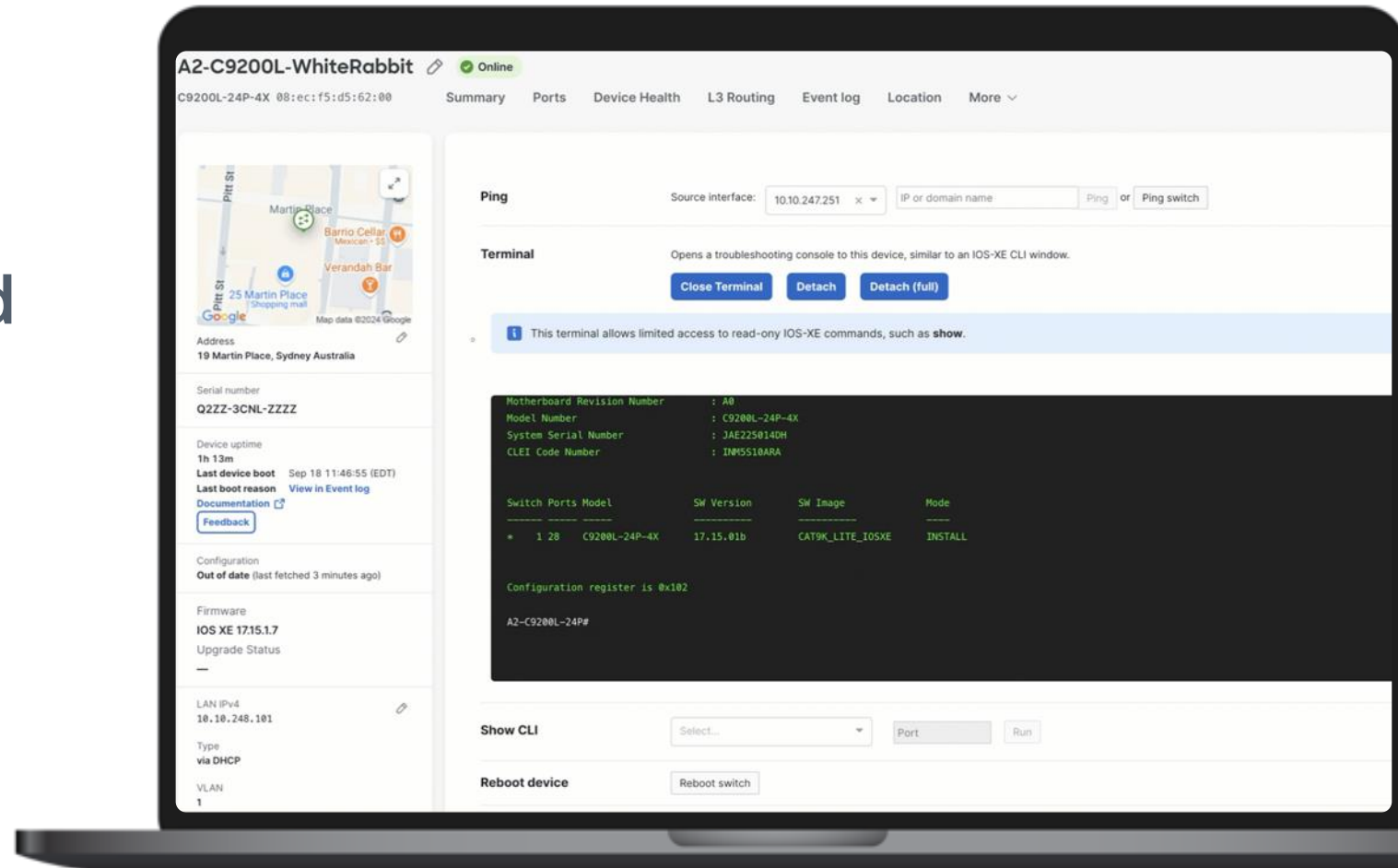
- Based in Saskatoon, Saskatchewan – Canada
- 20+ years building networks
- CCIE R/S #50782
- More time underground than in data centers
- Ask me about potash
- I know the secret to a happy life

Cloud management with IOS XE

We've been busy on cloud enablement

IOS XE 17.15 – *50% improvement in config apply and boot times*

- Streamlined Onboarding
- Config on device or cloud
- Cloud CLI
- Support for C9200L



Streamlined Onboarding

```
WW_CORE_9300(config)# service meraki connect

Switch 1 has been successfully registered
Meraki MAC: AABBCDDEEFF
Cloud ID: QXXX-XXXX-YYYY

*May 7 00:16:03.519: %MERAKEI-5-SWITCH_REGISTER_SUCCESS: Switch 1 has been successfully registered.
*May 7 00:16:03.519: %MERAKEI-5-MAC_ADDR: Meraki MAC: AABBCDDEEFF
*May 7 00:16:03.519: %MERAKEI-5-CLOUD_ID: Cloud ID: QXXX-XXXX-YYYY

Device Registration Status:
-----
Switch          Serial          Cloud ID      Mac Address    Migration
Num    PID      Number          ID              Address        Status      Mode
-----
1      C9300-24UX    XXYQCCXC      QXXX-XXXX-YYYY aabb.cdd.eeff  Registered C9K-C [Monitoring]
```

Cloud Management App-less Onboarding

- Automated Registration and Nextunnel creation (service meraki connect)
- Simply claim the Cloud ID and add to a network

```
Service meraki connect: enable

Meraki Tunnel Config
-----

Fetch State:
Fetch Fail:
Last Fetch(UTC):
Next Fetch(UTC):
Config Server:
Primary:          usw.nt.meraki.com
Secondary:        use.nt.meraki.com
Client IPv6 Addr: FD0A:9B09:1F7:1:9A18:88FF:FE00:CC00
Network Name:     .Corrin - switch

Meraki Tunnel State
-----

Primary:          Up
Secondary:        Up
Primary Last Change(UTC): 2024-05-29 23:34:02
Secondary Last Change(UTC): 2024-05-29 23:34:02
Client Last Restart(UTC): 2024-05-29 23:33:56

Meraki Tunnel Interface
-----

Status:          Enable
Rx Packets:      795767
Tx Packets:      600246
Rx Errors:       0
Tx Errors:       0
Rx Drop Packets: 0
Tx Drop Packets: 0

Meraki Device Registration
-----

url:              https://catalyst.meraki.com/nodes/register
```

Connection State

(show meraki connect)

Streamlined Onboarding

Choose Your Configuration Source When Onboarding

Add devices to network



Device management and configuration source

C9200/C9300 devices

- ☐ Cloud configuration
Configuration is sourced from the Meraki Dashboard.
- ☒ Device configuration **Beta**
Configuration remains local to the device.

Device configuration credentials

Please provide the [level 15 configuration access credentials](#) so the Meraki dashboard can make necessary configuration changes to these devices.

Username

Password

 [Show](#)

IOS-XE enable password (optional)

 [Show](#)

☒ I accept the [Terms and Conditions](#)

[Cancel](#)

[Back](#)

[Next](#)

Cloud Configuration

Existing configuration removed
Reload with full cloud configurations synced to
IOS XE

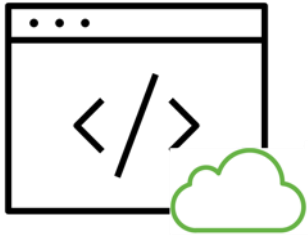
Device Configuration

Enter switch local credentials
Dashboard connection and telemetry IOS XE
configurations provisioned by Dashboard

Cloud CLI for Cloud Managed Catalyst

IOS XE 17.15

Interactive CLI terminal for all cloud managed IOS XE switches



Summary Ports **Cloud CLI** Event log Location Tools Config history

Cloud terminal Opens the interactive cloud CLI terminal in read-only mode for read-only users or configuration mode for full users

[Close terminal](#) [Detach terminal](#)

☐ Capture the session to output a text file

```
Welcome to the interactive CLI IOS XE terminal
You are in Configuration Mode
Connecting to 154226464089088...

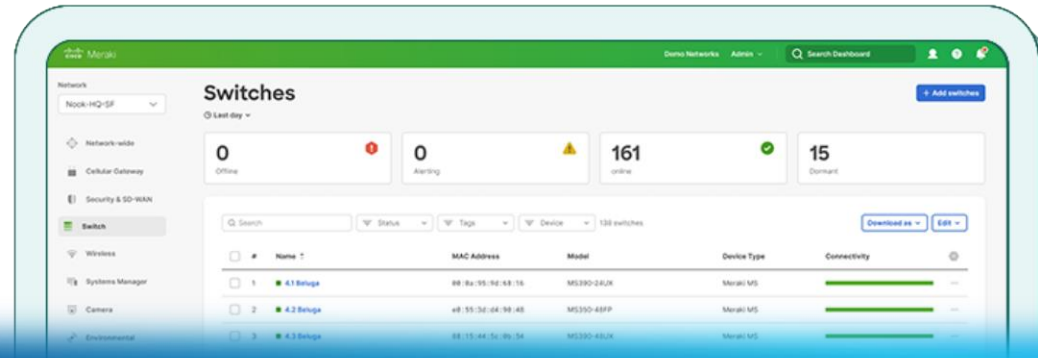
C9k-02#conf t
Enter configuration commands, one per line. End with CNTL/Z.
C9k-02(config)#
C9k-02(config)#vlan 240
C9k-02(config-vlan)#name office_core_1
C9k-02(config-vlan)#exit
C9k-02(config)#
C9k-02(config)#int g1/0/15
C9k-02(config-if)#sw acc vlan 240
C9k-02(config-if)#sw mode access
C9k-02(config-if)#
C9k-02(config-if)#end
C9k-02#wr mem
Building configuration...
[OK]
```

Secure direct terminal with
IOS XE Meraki tunnel

CLI access from anywhere

Complete config commands
with audit logging

Now supporting 9200L



IOS XE 17.15 - AVAILABLE NOW



C9300L



C9300



C9300
X



C9200L

Configuration Source

Configuration Source



Cloud Configuration

Exclusively managed by Dashboard

Config stored in cloud and synced to IOS XE

Perform configurations with Dashboard UI

Uplink auto configuration



Device Configuration

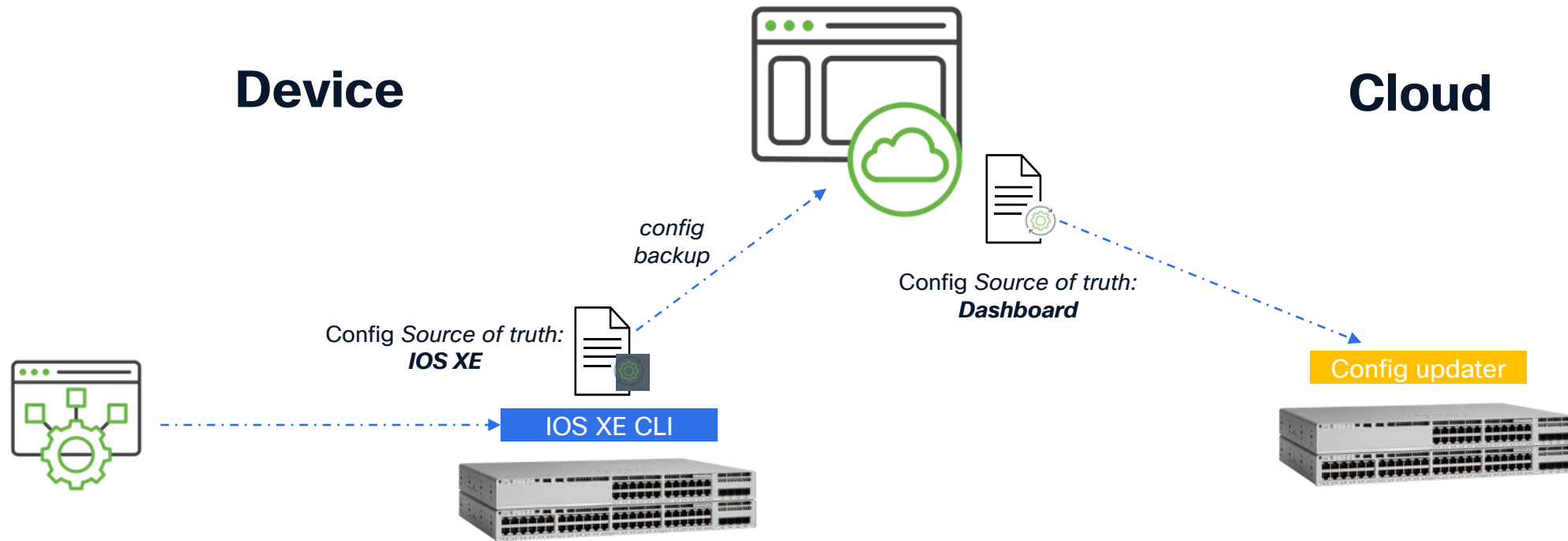
Management flexibility

Config stored in IOS XE with cloud backup

Perform configurations with Cloud CLI terminal

Uplink discovery

Configuration Source



Adopt cloud-managed networking as you evolve your IT operations to cloud

Full cloud-managed for efficient and scalable cloud network operations

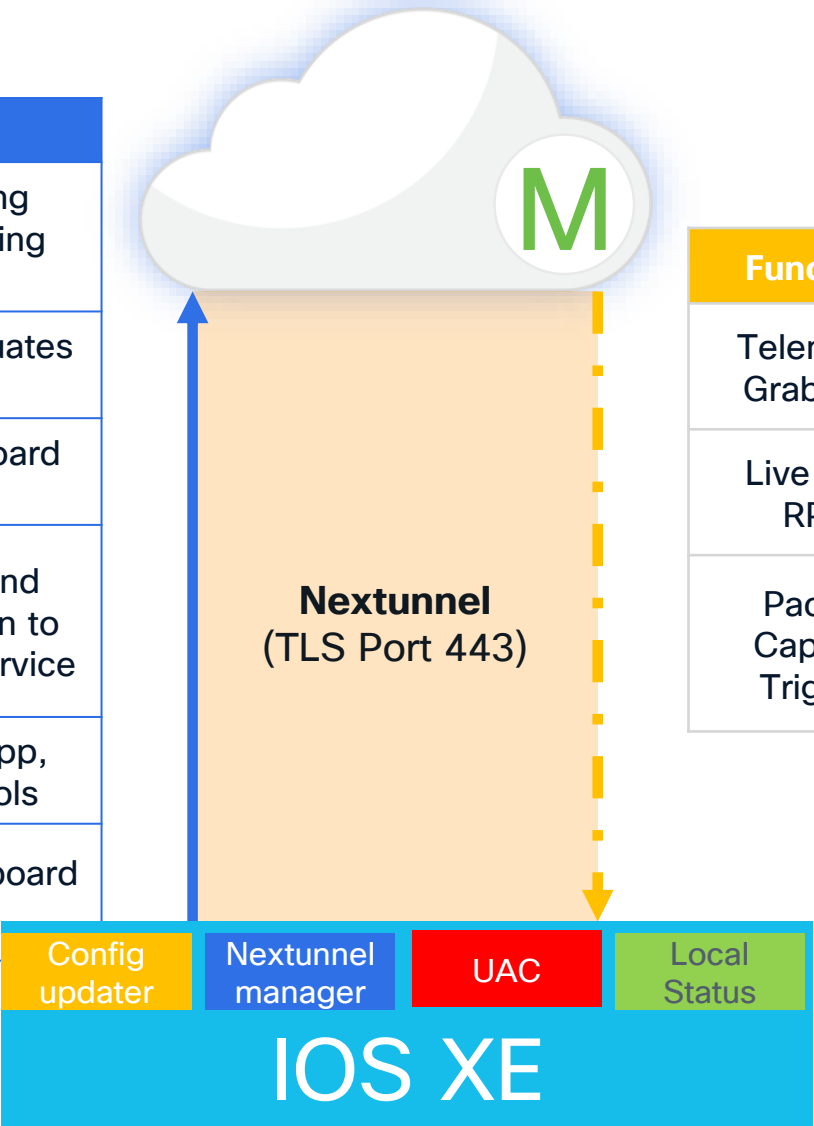
Cloud Configuration

Cloud management with IOS XE

Architecture Advancements

How did we improve the architecture?

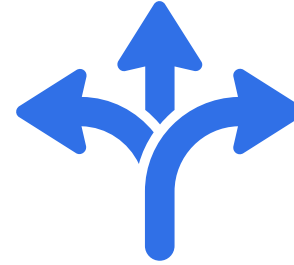
Function	Use
Uplink Auto Configuration (UAC)	Dynamic interface creation using discovery mechanisms maintaining connectivity to dashboard
Connect Service	Checks in to dashboard and evaluates state flags
Packet Capture	Stream packet capture to dashboard browser proxy
Config File DL/UL and deployment	Uploads current configuration and pulls XML formatted configuration to deploy locally against NetConf Service
Local Status Page	Hosted in IOS XE instead of in app, providing local configuration tools
Telemetry Cache	Stores telemetry on box for Dashboard grabbers to retrieve



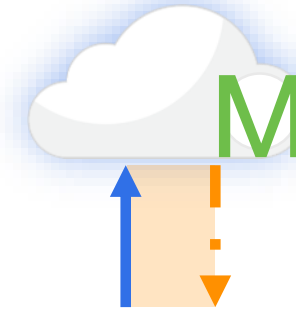
Function	Use
Telemetry Grabbers	Pulls telemetry directly from IOS XE for presentation in Dashboard
Live Tool RPC	Executes Live Tools via NetConf RPC
Packet Capture Trigger	Executes packet capture process using NetConf RPC

Resilient connectivity to the Cloud

Uplink Auto Config (UAC) *Can I reach Dashboard?*



Nextunnel *Connect to Dashboard*

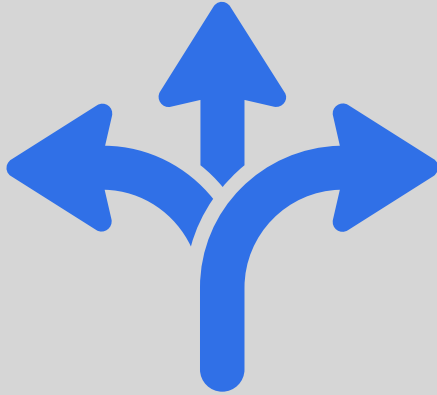


Config Updater Apply and Synchronize Config, Safe config rollback



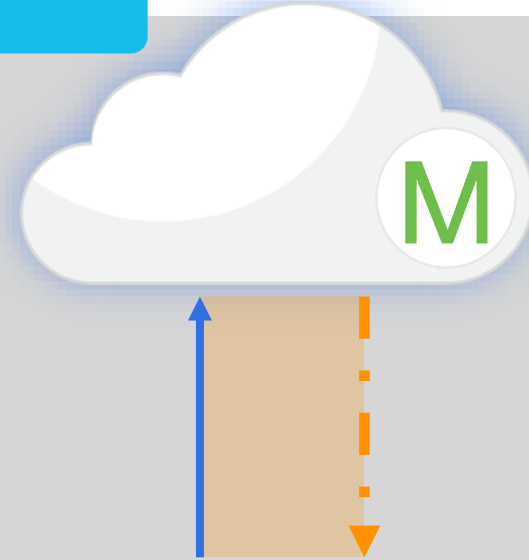
Resilient connectivity to the Cloud

IOS XE 17.15



Uplink Auto Config (UAC)

- Automated discovery for dashboard connectivity
- Automated failover / path discovery
- Tunable for primary interface
- Creates a ranked/scored interface list



Nextunnel

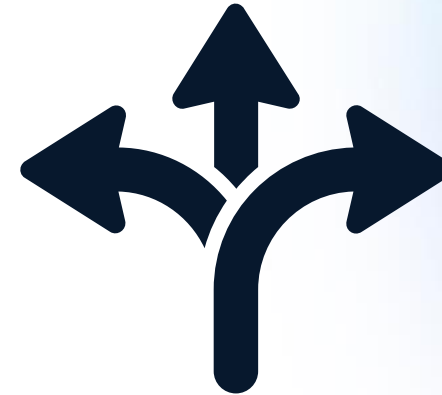
- Secure tunnel to Dashboard for configuration and telemetry

Uplink Auto Config

```
Rocky_and_Bullwinkle#show uac ?  
  active-vlan  Active vlans in network  
  uplink       Uplink Autoconfig Uplink info
```

show uac

- Which VLANs has UAC discovered?
- Which VLAN has the best score?
- Which SVI is being used to reach Meraki Dashboard?



Nextunnel

show meraki connect

- Has the switch fetched tunnel config?
- Is the tunnel up?
- Are packets coming/going?

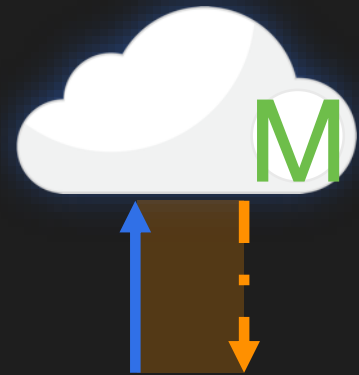
```
Rocky_and_Bullwinkle#sh meraki connect
Service meraki connect: enable

Meraki Tunnel Config
-----
Fetch State:                Config fetch succeeded
Fetch Fail:
Last Fetch(UTC):            2025-01-28 16:25:24
Next Fetch(UTC):            2025-01-28 17:28:58
Config Server:              cs46-2037.meraki.com
Primary:                    usw.nt.meraki.com
Secondary:                  use.nt.meraki.com
Client IPv6 Addr:           FD0A:9B09:1F7:1:2E3F:BFF:FE2B:9F80
Network Name:               Eh2 - switch

Meraki Tunnel State
-----
Primary:                    Up
Secondary:                  Up
Primary Last Change(UTC):   2025-01-23 19:17:42
Secondary Last Change(UTC): 2025-01-23 19:17:42
Client Last Restart(UTC):   2025-01-22 19:25:10

Meraki Tunnel Interface
-----
Status:                     Enable
Rx Packets:                  22355237
Tx Packets:                  35429584
Rx Errors:                   0
Tx Errors:                   0
Rx Drop Packets:             0
Tx Drop Packets:             0

Meraki Device Registration
-----
url:                         https://catalyst.meraki.com/nodes/register
```



Resilient connectivity to the Cloud

IOS XE 17.15



Config Updater

- Fetch and apply config from Dashboard
- Safe configuration rollback: 30 minute recovery mechanism for configuration error

Config Updater

show meraki config updater

- Can the switch fetch config?
- Can the switch upload the config?
- Does the switch need to upload config?



```
Rocky_and_Bullwinkle#sh meraki config updater
Config Updater
-----
Current state:                      Ready

Latest operation
-----
Upload running config

Get running config: Pass
  start time(UTC): 2025-01-29 22:22:15
  result time(UTC): 2025-01-29 22:22:33
  Running config location: /flash/meraki/config_updater/monitor/upload.config
Get presigned url: Not needed
  start time(UTC): 2025-01-29 22:22:33
  result time(UTC): 2025-01-29 22:22:36
  dashboard status code: 204
Upload config: Not started
```

Demo: Cloud CLI

Terminal

Opens a troubleshooting console to this device, similar to an IOS-XE CLI window.

Close Terminal

Detach

i This terminal allows limited access to read-only IOS-XE commands, such as **show**.

```
WW_CORE_9300X#show ip route bgp
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is 10.10.254.2 to network 0.0.0.0

    10.0.0.0/8 is variably subnetted, 86 subnets, 7 masks
B       10.10.0.0/16 [200/0] via 10.10.250.11, 02:09:58
B       10.12.5.0/24 [20/0] via 10.10.0.30, 08:31:41
```

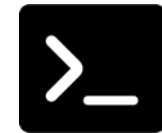
Optimizations



**Management Interface
Architecture Change**



**Default Network
Module**

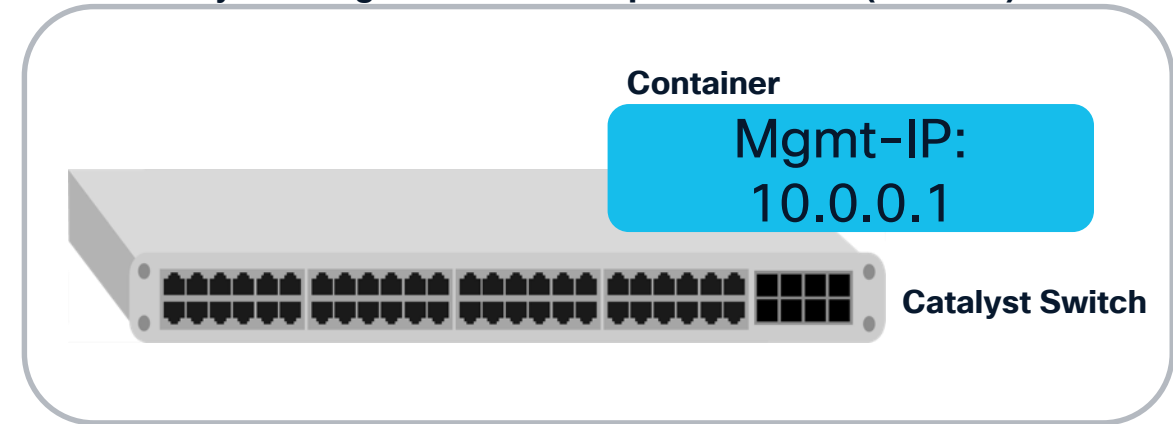


Command Runner

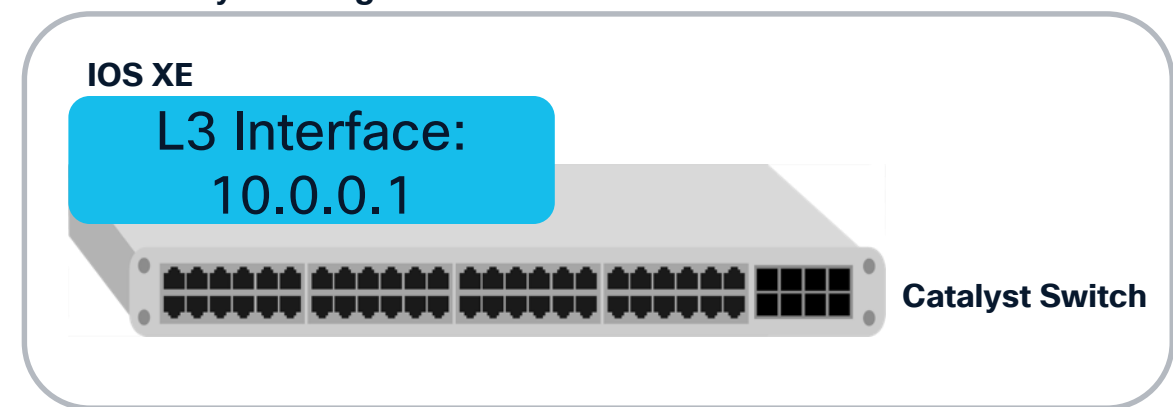
Management Interface Architecture Change

- The management interface is now an L3 Interface. Switches running CS firmware required a dedicated management IP address, now management is handled by **any L3 interface**
- All configuration for management connectivity and L3 interfaces is now available on the Routing & DHCP page.
- If a switch is L2 only, DHCP will work 👍 but enabling L3 requires first setting a static management IP

L2 Catalyst Management Behavior prior to IOS XE (<= CS17)



L2 Catalyst Management Behavior with IOS XE



Management Interface Architecture Change

Switch Summary page>

The screenshot shows the Cisco Switch Summary page. On the left, a navigation menu has 'Switching' selected, with a sub-menu showing 'Monitor', 'Switches' (highlighted with a green checkmark), and 'Switch Ports'. The main content area displays the switch's IP configuration. A red circle with the number '1' points to the 'Edit' icon (pencil) next to the 'LAN IPv4' section. The 'LAN IPv4' section shows the IP address '10.20.20.4', the type 'statically assigned', and the VLAN '20'. A red circle with the number '2' points to the 'IPv4 Type' dropdown menu, which is currently set to 'Static'. A red circle with the number '3' points to the 'Save' button at the bottom right of the configuration panel. A yellow warning box with an exclamation mark icon contains the text: 'Visit the **Routing & DHCP** page to configure your Uplink L3 Interface.'

1. Edit IP config


2. Change Type to Static

3. Redirect to Routing & DHCP page

Management Interface Architecture Change

VLAN

IP Toggle IPv4 Only IPv6 Only

 Choose the **Both** tab to configure both IPv4 and IPv6

IPv4

V4 Uplink ☒

Subnet

Interface IP

Default gateway

DNS server 1

DNS server 2

Uplink interfaces include DNS and Default Gateway settings

Easily move the uplink to a different interface

- Define the new gateway
- Confirm DNS

IPv4

V4 Uplink ☒

Subnet

Interface IP

Default gateway

DNS server 1

DNS server 2

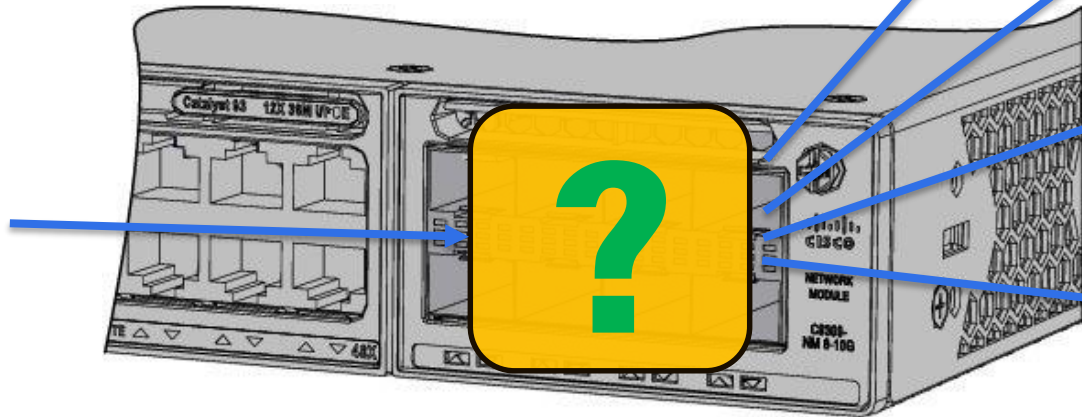
Multicast routing

Default Network Module

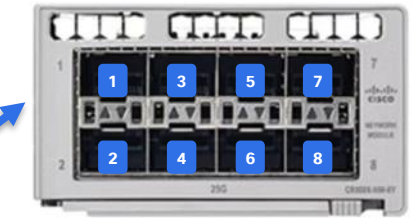
Simplification of Network Module Configuration

- When a module is not installed, configuration is now consolidated into 8 default ports which are mapped to the appropriate interfaces when a Network Module is installed.
- Prior to this architecture, every potential network module required unique config. A 48-port switch required configuring 98 ports to cover each possible module. We now have only 56 ports (48+8) which covers existing and future modules.

Pre-Configured
Default Ports

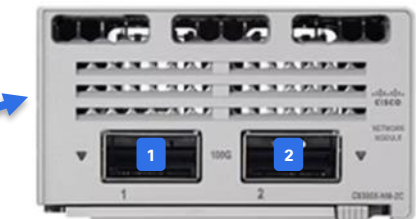


Unassigned



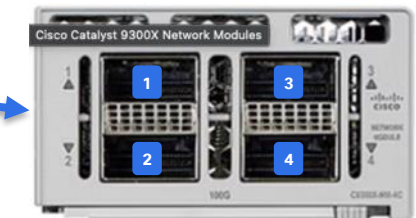
Unassigned

C9300X-NM-8Y



Unassigned

C9300X-NM-2C



Unassigned

C9300X-NM-4C

Default Network Module

The CS way:

- Which module is installed?
- Is any module installed?



C9300-NM-4G



C9300X-NM-8Y



C9300X-NM-2C

- ☐ [STACK-MS390-RR / 4×10G / 1 details](#)
- ☐ [STACK-MS390-RR / 4×10G / 2 details](#)
- ☐ [STACK-MS390-RR / 4×10G / 3 details](#)
- ☐ [STACK-MS390-RR / 4×10G / 4 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 1 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 2 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 3 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 4 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 5 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 6 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 7 details](#)
- ☐ [STACK-MS390-RR / 8×10G / 8 details](#)
- ☐ [STACK-MS390-RR / 2×40G / 1 details](#)
- ☐ [STACK-MS390-RR / 2×40G / 2 details](#)

Default Network Module

The IOS XE 17.15.2+ way:

☐ [Bullwinkle / DEFAULT / 1 details](#)

☐ [Bullwinkle / DEFAULT / 2 details](#)

☐ [Bullwinkle / DEFAULT / 3 details](#)

☐ [Bullwinkle / DEFAULT / 4 details](#)

☐ [Bullwinkle / DEFAULT / 5 details](#)

☐ [Bullwinkle / DEFAULT / 6 details](#)

☐ [Bullwinkle / DEFAULT / 7 details](#)

☐ [Bullwinkle / DEFAULT / 8 details](#)

No module installed



C9300X-NM-8Y



8x10G installed

☐ [Mr Peabody / 8x10G / 1 details](#)

☐ [Mr Peabody / 8x10G / 2 details](#)

☐ [Mr Peabody / 8x10G / 3 details](#)

☐ [Mr Peabody / 8x10G / 4 details](#)

☐ [Mr Peabody / 8x10G / 5 details](#)

☐ [Mr Peabody / 8x10G / 6 details](#)

☐ [Mr Peabody / 8x10G / 7 details](#)

☐ [Mr Peabody / 8x10G / 8 details](#)

Show CLI / Command runner

Quick access to over 30 common CLI outputs

- Platform monitoring
- Device tracking
- Stacking details
- Dashboard connection status
- Etc...

Show CLI

Show Power Over Ethernet D... x ▾

Run

Outputs power over ethernet details

Show Power Over Ethernet Details ↻

```
1 Rocky# show power inline
```

Module	Available (Watts)		Used (Watts)	Remaining (Watts)	
-----	-----	-----	-----	-----	-----
1	595.0		0.0	595.0	
Interface	Admin	Oper	Power (Watts)	Device	Class Max
-----	-----	-----	-----	-----	-----
Tel1/0/1	auto	off	0.0	n/a	n/a 60.0
Tel1/0/2	auto	off	0.0	n/a	n/a 60.0
Tel1/0/3	auto	off	0.0	n/a	n/a 60.0
Tel1/0/4	auto	off	0.0	n/a	n/a 60.0
Tel1/0/5	auto	off	0.0	n/a	n/a 60.0
Tel1/0/6	auto	off	0.0	n/a	n/a 60.0
Tel1/0/7	auto	off	0.0	n/a	n/a 60.0
Tel1/0/8	auto	off	0.0	n/a	n/a 60.0
Tel1/0/9	auto	off	0.0	n/a	n/a 60.0
Tel1/0/10	auto	off	0.0	n/a	n/a 60.0
Tel1/0/11	auto	off	0.0	n/a	n/a 60.0

Demo: Command Runner

Show CLI

Select...

Run

Show Connected Devices

1 Rocky# show device-tracking database

Binding Table has 6 entries, 0 dynamic (limit 200000)
Codes: L - Local, S - Static, ND - Neighbor Discovery, ARP - Address Resolution Protocol, DH4 - IPv4 DHCP, DH6 - IPv6 DHCP, PKT - Other
Preflevel flags (prlvl):
0001:MAC and LLA match 0002:Orig trunk 0004:Orig access
0008:Orig trusted trunk 0010:Orig trusted access 0020:DHCP assigned
0040:Cga authenticated 0080:Cert authenticated 0100:Statically assigned

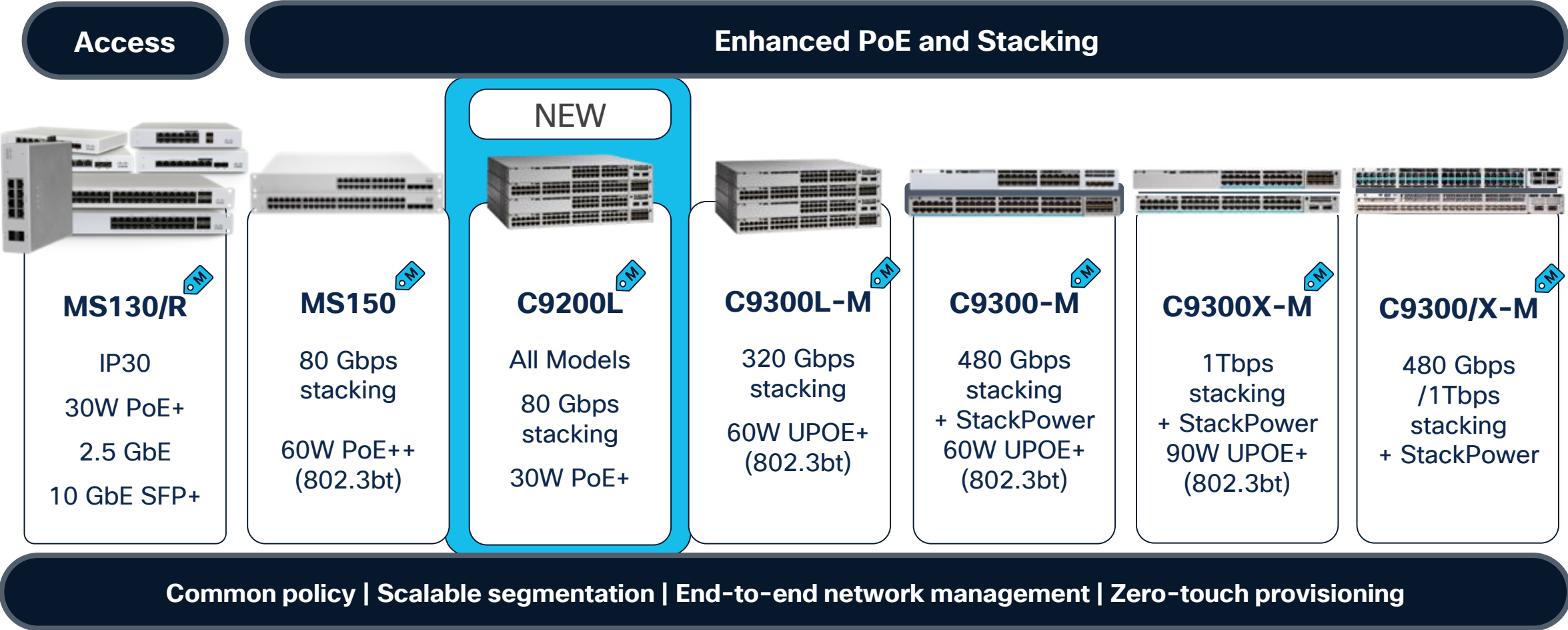
	Network Layer Address	Link Layer Address	Interface	vlan	prlvl	age	state	Time left
L	10.80.80.253	0018.0a4f.0003	Vl80	80	0100	27307mn	REACHABLE	
L	10.20.102.254	0018.0a4f.0003	Vl102	102	0100	27992mn	REACHABLE	
L	10.20.101.254	0018.0a4f.0003	Vl101	101	0100	27992mn	REACHABLE	
L	10.20.100.254	0018.0a4f.0003	Vl100	100	0100	27992mn	REACHABLE	
L	10.20.20.4	0018.0a4f.0003	Vl20	20	0100	27992mn	REACHABLE	
L	FE80::218:AFF:FE4F:3	0018.0a4f.0003	Vl20	20	0100	27992mn	REACHABLE	

Platforms

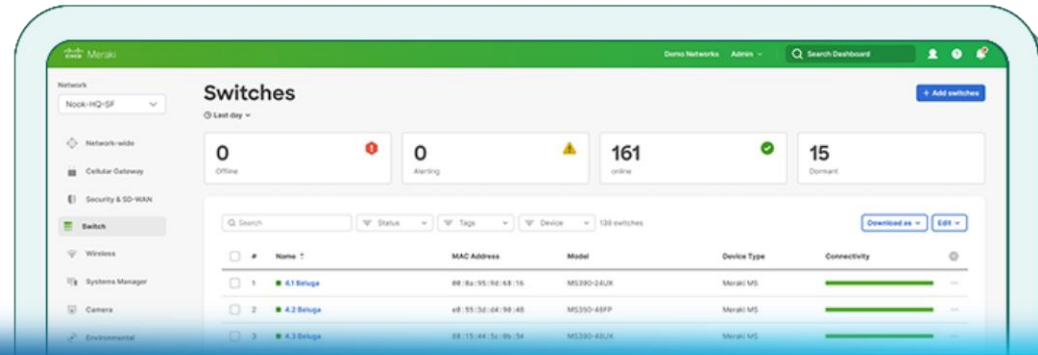
A next-gen model for every network need

MS17

IOS XE 17.15



Unlocking the full C9000 Portfolio



Preview: Extend secure connectivity to rugged outdoor networks
Targeting Spring 2026



IE3500*

IOS XE 17.15 - AVAILABLE NOW

IOS XE 17.18



C9300L



C9300



C9300X



C9200L



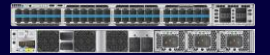
C9500



C9200/CX



C9300LM



C9350

Every C9200 and C9300 model

Preview: IOS XE 17.18

Cloud switching

beta summer 2025

Cloud Managed Enterprise Switching on IOS XE 17.18

Enterprise Feature Development

Advanced Routing

Routed Ports

Loop-free Routed Access

VRF Lite

Scalable Macro Segmentation

BGP

Flexible, Open Dynamic Routing

High-Availability

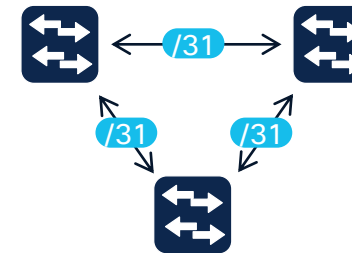
Rapid PVST+

Enhanced L2 Loop Prevention

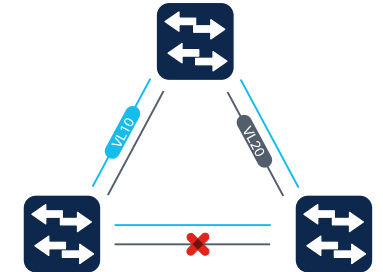
StackWise Virtual (SVL)
ISSU

Sub-second downtime
firmware upgrades

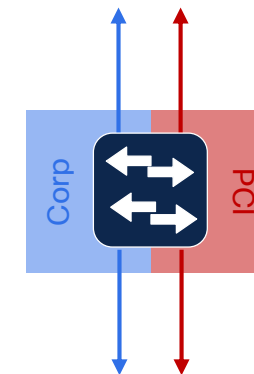
Routed Ports



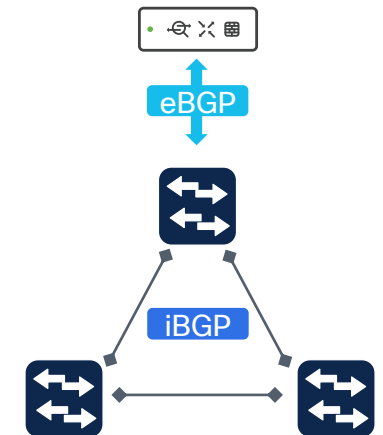
RPVST+



VRF Lite

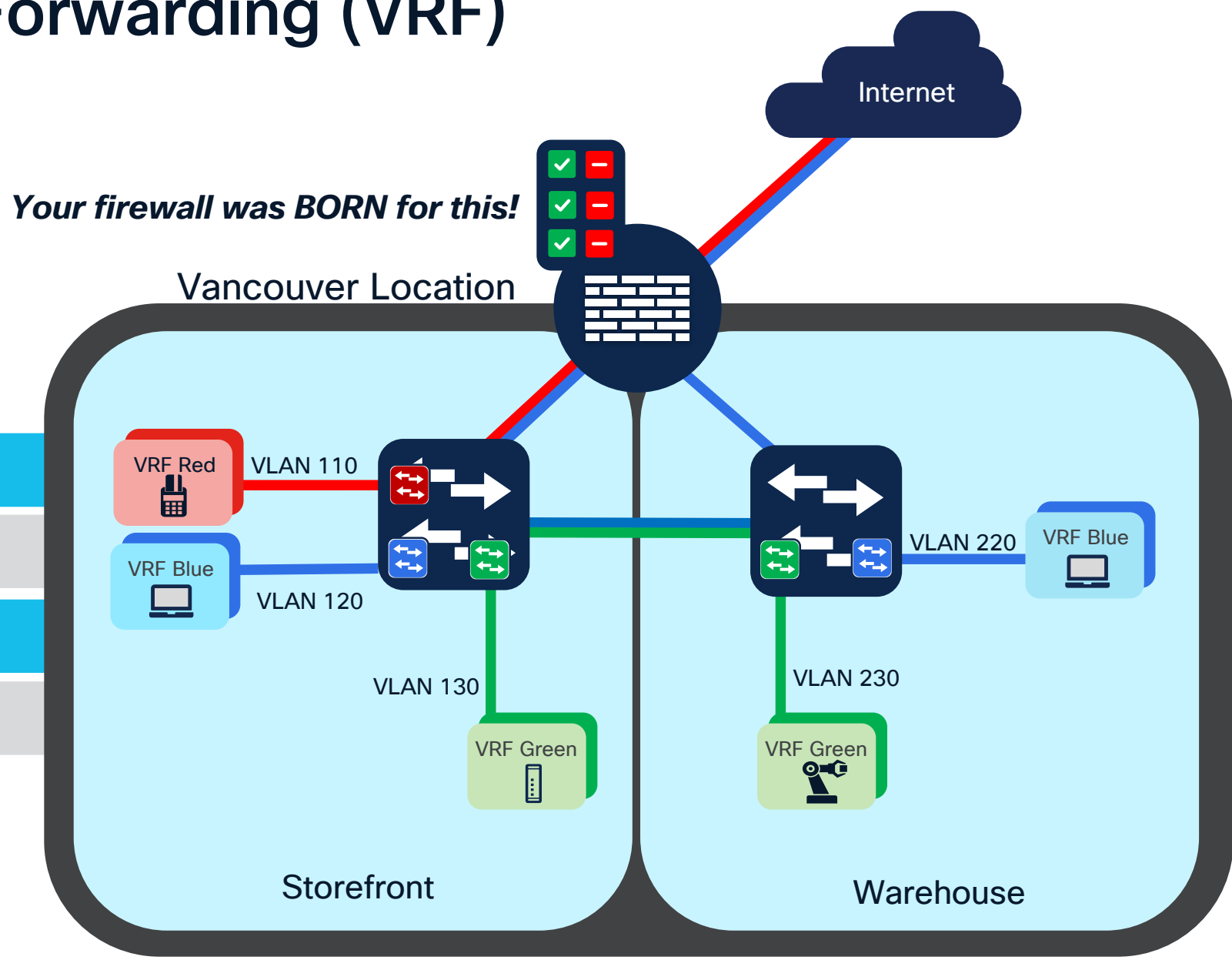


BGP



Virtual Routing and Forwarding (VRF)

- Macro-segmentation that scales
- Centralized ACLs
- Efficient route handling and forwarding
- A separate lane for management traffic



VRF Config

Organization > VRFs









VRF

0 VRFs with associated interfaces

0 VRFs without associated interfaces

Q Search

+ Add VRF

<input type="checkbox"/>	Name	Description	Route distinguisher	Route target	Networks
<input type="checkbox"/>	Default	—	—	—	—  
<input type="checkbox"/>	BLUE_VRF	IoT	52:106	—	—  
<input type="checkbox"/>	GREEN_VRF	PCI	52:108	—	—  
<input type="checkbox"/>	RED_VRF	Evil Printers and Fax Machines	52:107	—	—  

- Create VRFs at an organization-level
- Assign a name, and Route Distinguisher

← VRF

Edit BLUE_VRF

Configuration details

VRF name *

BLUE_VRF

Description

IoT

Route distinguisher ⓘ

52:106

Route target ⓘ

Save changes

Cancel

VRF Config

Switching > Routing & DHCP

<input type="checkbox"/> Switch or switch stack	Interface	Name	VRF ↕	Subnet
<input type="checkbox"/> Doug	80 VLAN	eighty	BLUE_VRF	10.80.80.0/24
<input type="checkbox"/> Rocky_and_Bullwinkle	80 VLAN	BLUE VLAN 80	BLUE_VRF	10.80.80.0/24
<input type="checkbox"/> Bob	Bob / 13 Routed	Bobs routed port	BLUE_VRF	10.88.88.0/24
<input type="checkbox"/> Bob	Bob / 14 Routed	Bobs 2nd routed port	BLUE_VRF	10.89.89.0/24
<input type="checkbox"/> Doug	0 Loop	0	BLUE_VRF	10.252.252.252/32
<input type="checkbox"/> Doug	20 VLAN	Uplink Vlan 20	Default	10.20.20.0/24

- Assign interfaces to a VRFs

← Routing & DHCP

Edit Interfaces

Interface editor

Interface mode

☐ VLAN

☒ Routed port

☐ Loopback

Switch or switch stack

Bob

Switch ports

Bob / 9

Name

Transit Network Routed Port

VRF

GREEN_VRF

IP toggle

☒ IPv4 only

☐ IPv6 only

☐ Both

Select "Both" in IP Toggle to configure both IPv4 and IPv6

Subnet

10.52.108.0/24

Interface IP

10.52.108.254

IPv4

Routed Ports

Routed peer to peer links
East/West and North/South

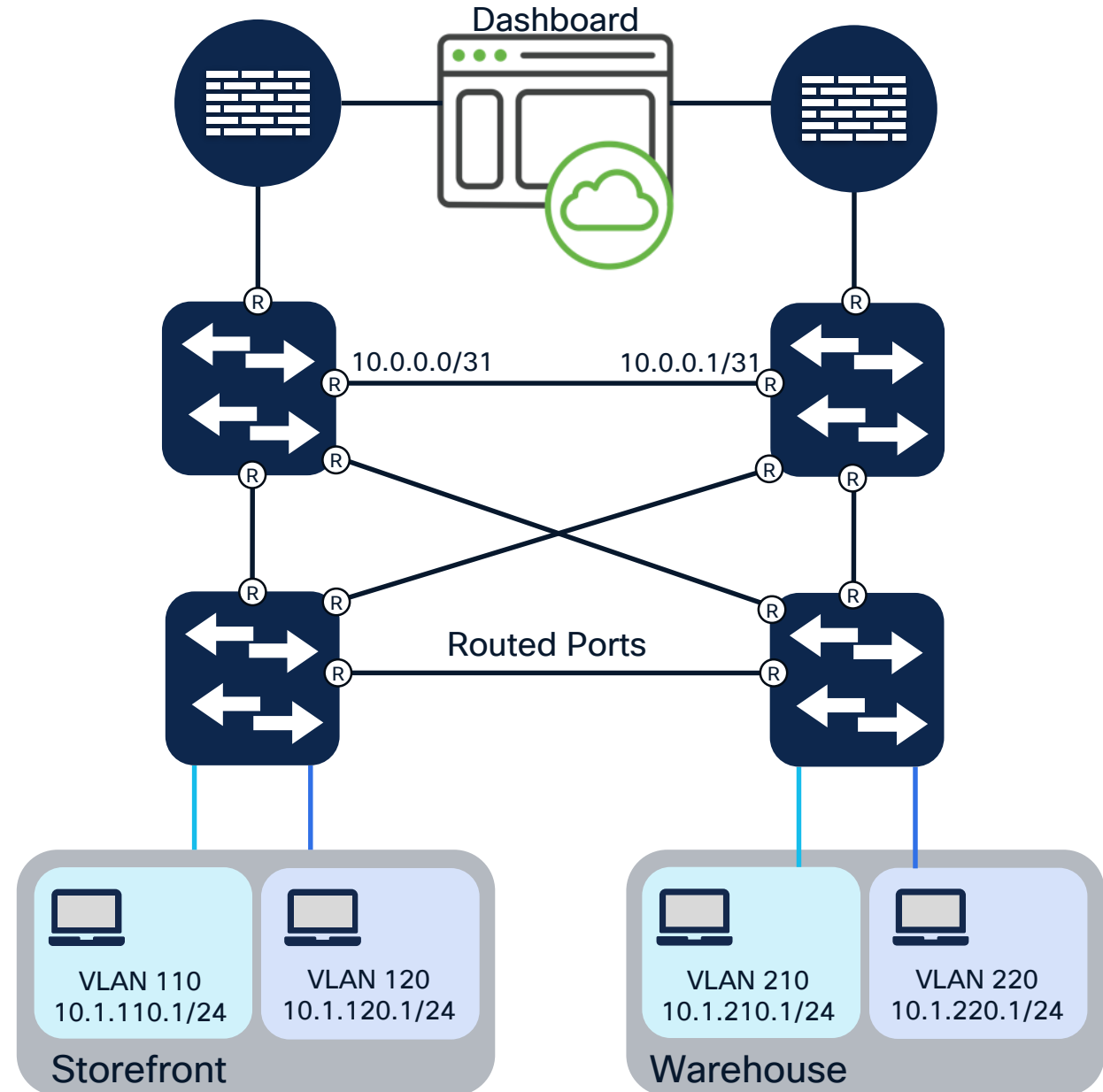
/31 Addressing

Reduced VLAN ID consumption

Faster Convergence

STP boundaries

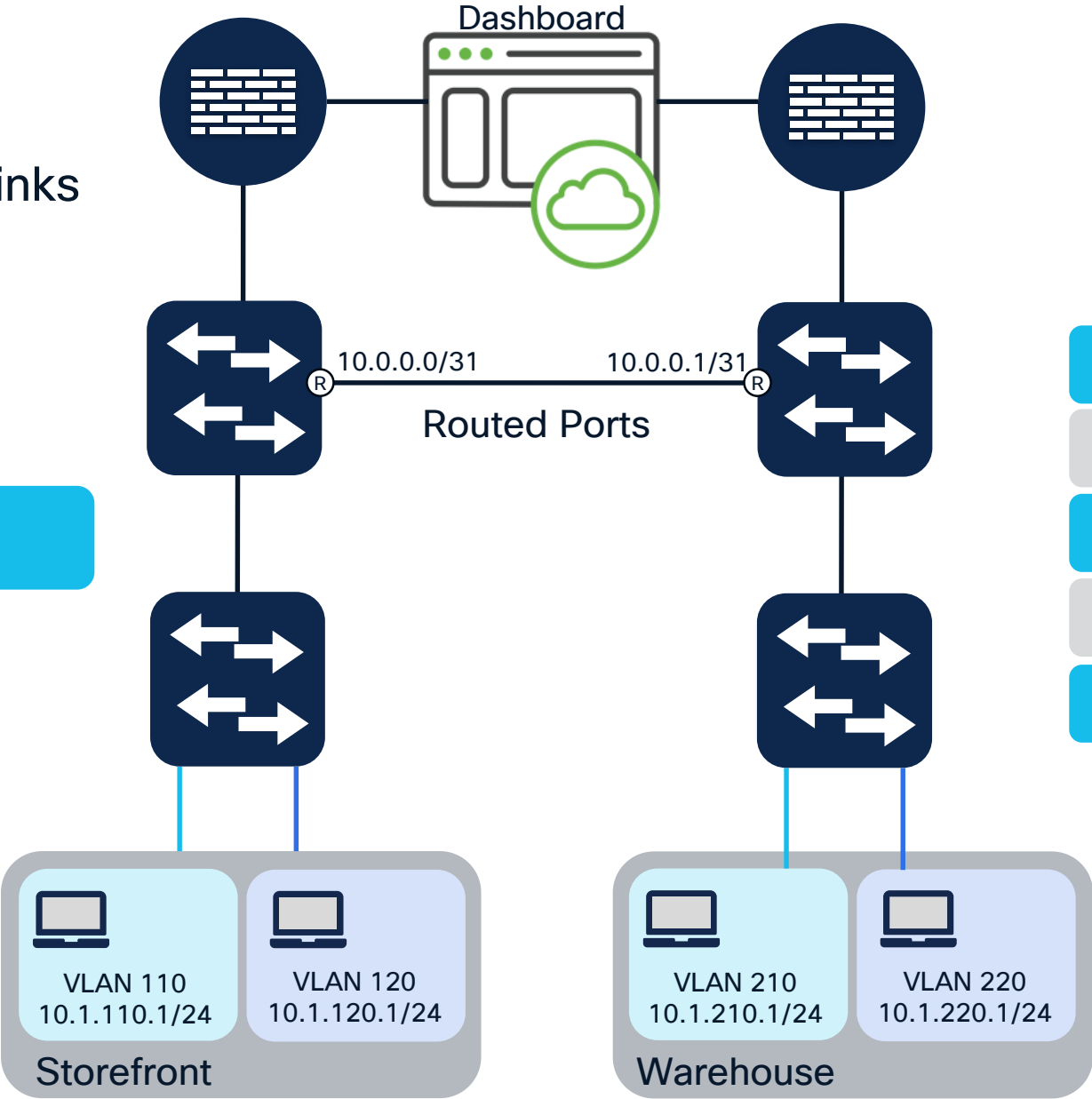
Equal cost load balancing



Routed Ports

East/West peer to peer links
(no Dashboard uplink)

Join separate networks

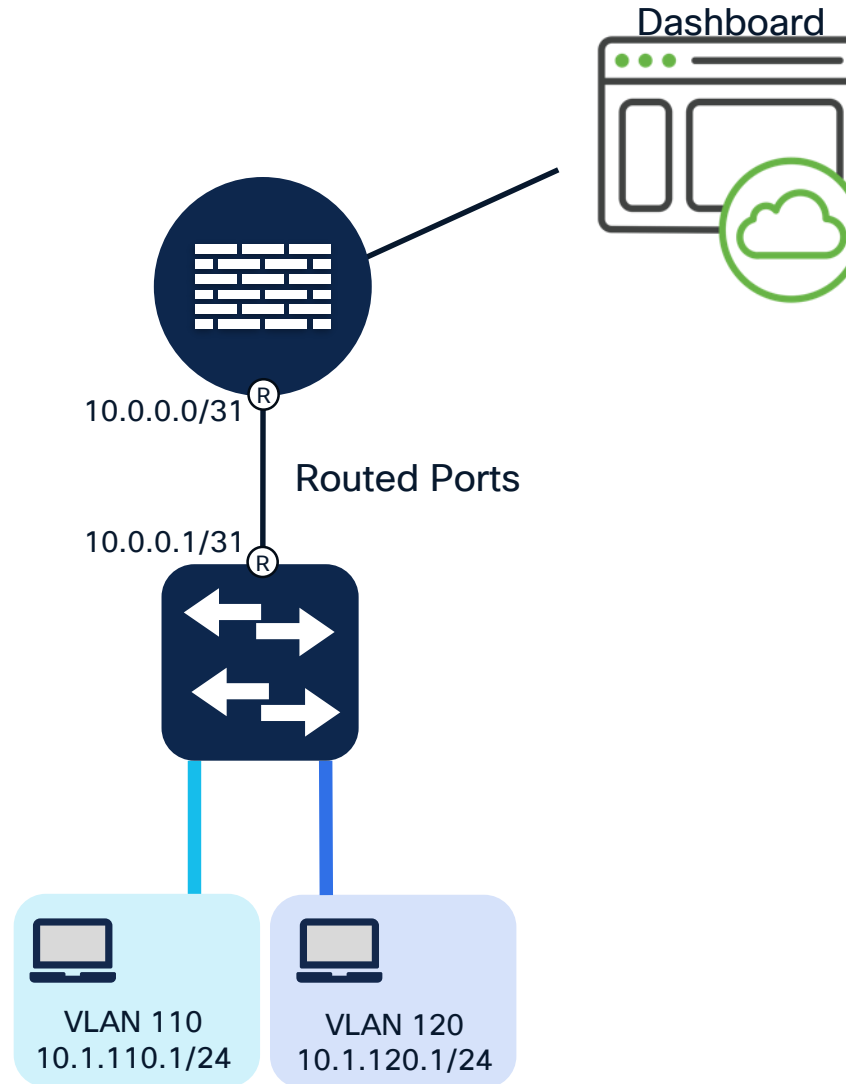


- /31 Addressing
- Reduced VLAN ID consumption
- Faster Convergence
- STP boundaries
- Equal cost load balancing

Routed Ports

Northbound peer to peer links with Dashboard uplink

Routed uplink to Dashboard



/31 Addressing

Reduced VLAN ID consumption

Faster Convergence

STP boundaries

Equal cost load balancing

Routed Port Config

Switching > Switches > Switch Summary

Update 1 Ports

Selected Switch / Port

Bob/13

Interface mode

☐ Switch port

☒ Routed port

☒ Navigate to configure routed port

Name

Transit Network

Tags

Port status

☒ Enabled

Link negotiation

Auto negotiate

EEE ⓘ

☐ Enabled

Port schedule

Unscheduled

PoE

☒ Enabled

Port isolation

☐ Enabled

Cancel

Update

Switching > Routing & DHCP

← Routing & DHCP

Edit Interfaces

Interface editor

Interface mode

☐ VLAN

☒ Routed port

☐ Loopback

Switch or switch stack

Bob

Switch ports

Bob / 9

Name

Transit Network Routed Port

VRF

GREEN_VRF

IP toggle

☒ IPv4 only

☐ IPv6 only

☐ Both

Select "Both" in IP Toggle to configure both IPv4 and IPv6

IPv4

Subnet

10.52.108.0/24

Interface IP

10.52.108.254

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BRKENS-1402

44

Routed Port Config

Switching > Routing & DHCP

Routing & DHCP

Interfaces

☐

Switch or switch stack

Interface

☐

C9300-Lab1

1 VLAN

☐

C9300-Lab1

C9300-Lab1 / 5 Routed

☐

C9300-Lab1

C9300-Lab1 / 1 Routed

☐

C9300-Lab1

C9300-Lab1 / 3 Routed

☐

C9300-Lab1

111 VLAN



Adorable new routed port icon ♥

New tags for routed ports and VLAN Interfaces(SVIs)

BGP

Simple eBGP/iBGP

- Full stack meraki (MX + Catalyst)
- Vendor neutral peering

Large Campus Route-Reflector

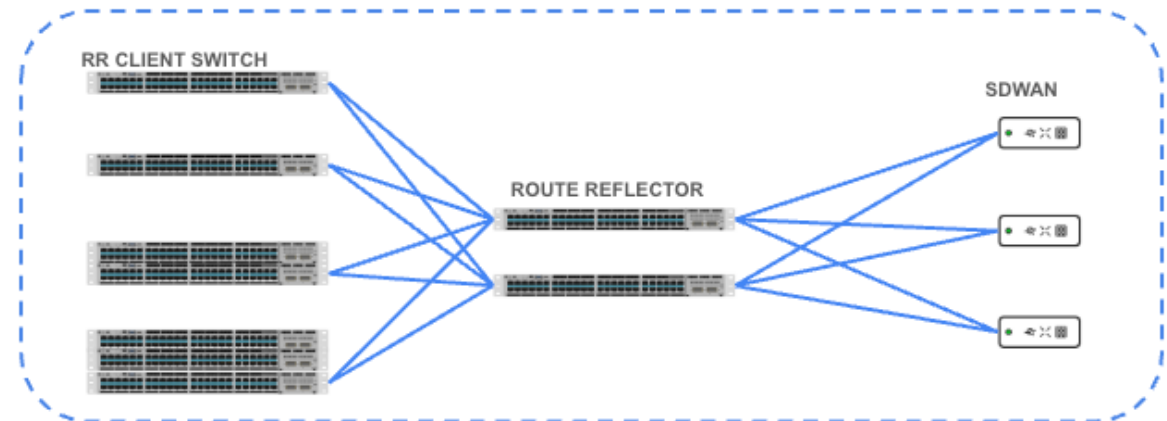
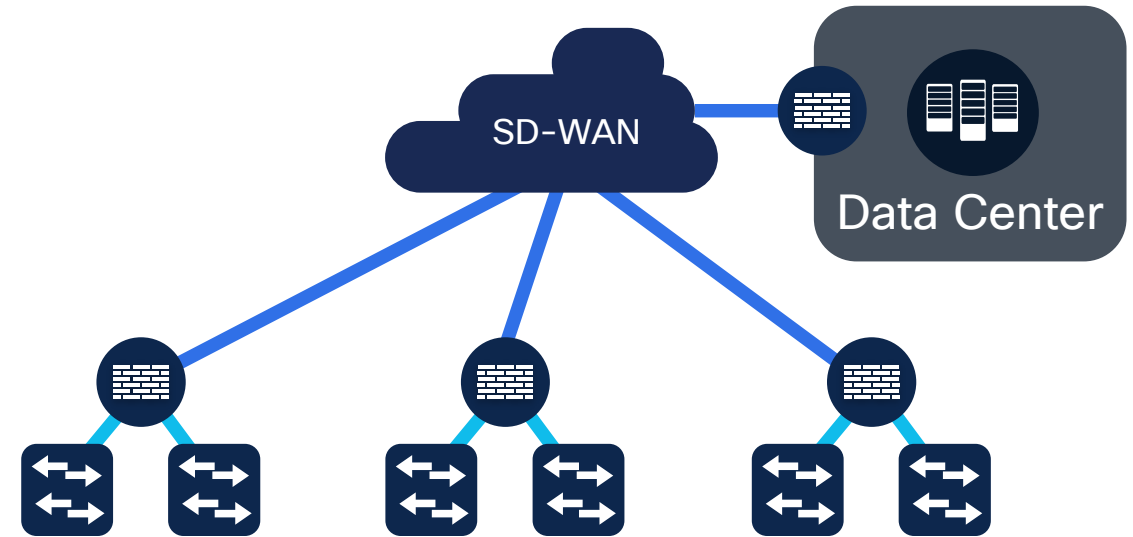
- iBGP peer route-reflector
- Loopback support
- Route filtering and AS-path control
- Traffic ECMP

Spin your own

- Per-switch configuration
- Peer-group templates
- Common policy objects

Requirements

- Firmware: IOS XE 17.18+
- HW: C9500, C9300X, C9300, C9300L, C9300LM



BGP Config

Switching > BGP Routing

Create an ASN

BGP Routing

General

BGP Filters

ASN

Autonomous System Numbers (ASN)

+ Add ASN

⚠️ ASNs can only be deleted once BGP routers have been removed. [How to remove BGP routers.](#)

ASN	Description	BGP routers	
65500		1	

Rows per page 10 1-1 of 1 < 1 >

BGP Routing

General

BGP Filters

ASN

Create a BGP Router

BGP Routers ⓘ

+ Add router

	Switch name	Model	ASN ⓘ	Active peers	Advertised routes
<div><div>Enable</div></div>	Bob	C9300-24UX	65500	0	1 ...

Rows per page 20 1-1 of 1 < 1 >

Enable BGP per switch

BGP Config

Route Filtering

Add prefix-list

Name

Restrict Advised Prefixes

Description (optional)

Rules

+ Add rule

Sequence #	Action	Prefix	GE	LE	
10	Deny	10.100.0.0/16	23		
20	Deny	10.101.0.0/16	24		

Cancel

Add

Add AS-path access-list

Number

10

Description (optional)

Rules

+ Add rule

Action	Path	
Deny	65100 65101 65328	

Prefix-lists

AS-path
access-lists

Peering Config

Local Networks

Enable	Subnet	Description	
<input checked="" type="checkbox"/>	10.255.255.255/32	BobLoop	
<input checked="" type="checkbox"/>	10.20.0.0/16	20 Network	

BGP Peer Groups

Supports either an IPv4 or IPv6 address.

#	Name	Description	Neighbors Count	
1	WANGroup	WAN peer group	1	

Peer Group Settings

Remote AS

65234

Update Source

Loop0

Multihop

255

Authentication

Enabled

Weight

32768

Peers

Active	Peer	Description	
<input checked="" type="checkbox"/>	52.105.10.23	WAN SP1	

Advertise local networks
Create Peer Groups
Attach Peers

StackWise Virtual Setup

Create Stack

Stack name

Hourglass Twins

Q Search

Device type

2 results

	Name	Serial number	Model
<input checked="" type="checkbox"/>	Ash Twin	Q2ZZ-6SH4-2458	C9500-24Y4C
<input checked="" type="checkbox"/>	Ember Twin	Q2ZZ-A22Z-2HL3	C9500-24Y4C

Rows per page 30 1-2 of 2 < 1 >

Cancel Create

Configure your StackWise Virtual pair

To successfully provision Catalyst 9500 switches as a StackWise Virtual pair, select switch ports below to set up SVL and DAD links.

Please ensure you have **physically connected** the ports selected below before proceeding

Stack name Hourglass Twins

Members Ash Twin , Ember Twin

SVL links

Select between 2 and 8 ports on each switch to establish the SVL link. Note that any existing switch port config will be overwritten for ports selected here.

Ash Twin

Ember Twin

1 × 2 ×

1 × 2 ×

DAD link

Select 1 port to establish the DAD link. Note that any existing switch port config will be overwritten for the port selected here.

Ash Twin

Ember Twin

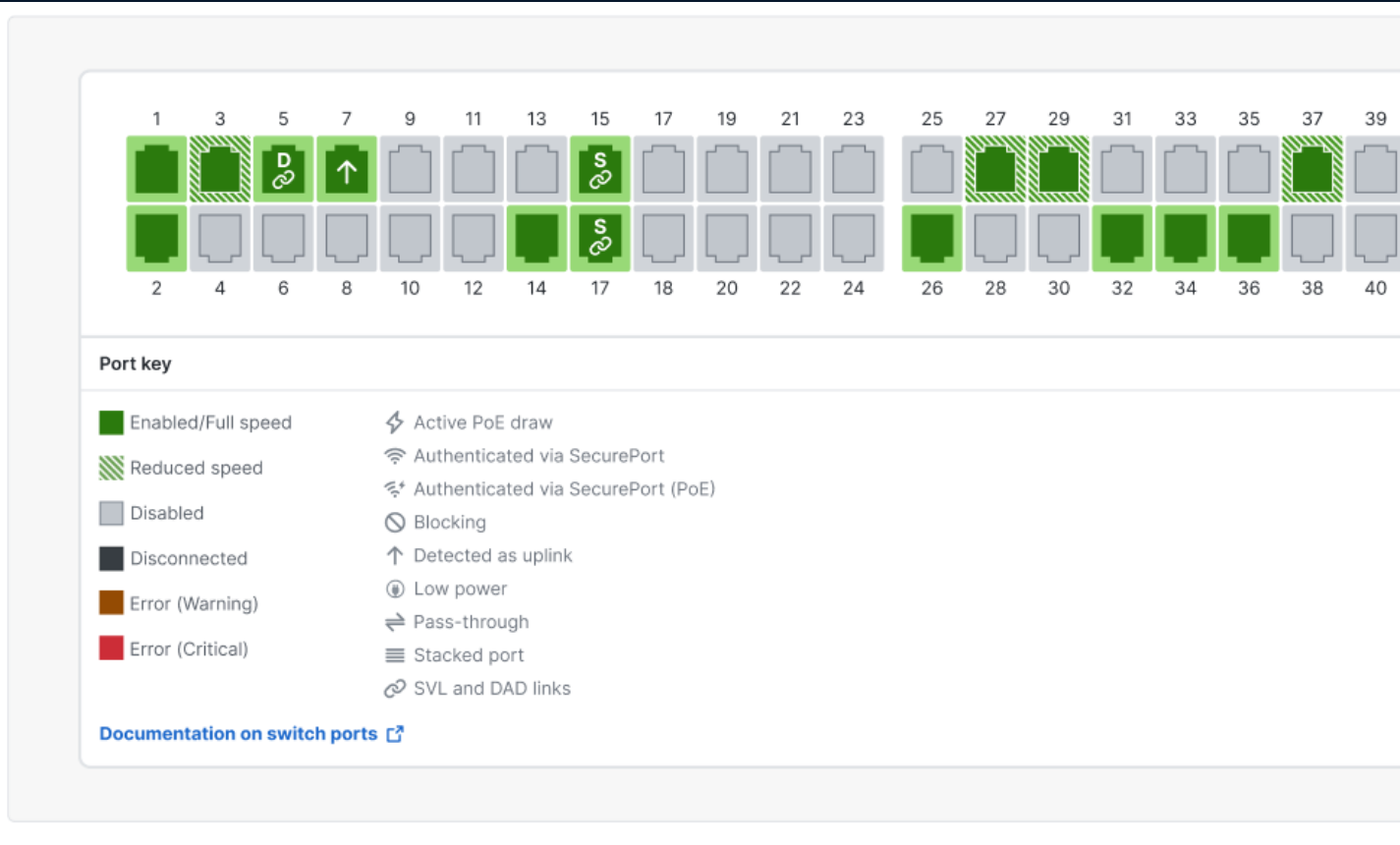
3

3

☒ I acknowledge that by clicking 'Configure' I have physically connected the ports selected for SVL and DAD links.

Cancel Configure

StackWise Virtual Config



StackWise Virtual Pair Provisioning

Monitor your new StackWise Virtual pair creation process.

Number of StackWise Virtual pairs being provisioned: 5

My SVL Stack

SVL domain configuration

Members [sfo12-4-1-sw-01-pdu](#), [sfo12-4-1-sw-01-pdu](#)

SVL links Port 1, Port 2

DAD links Port 5

Provisioning progress

1/4 SVL domain configuration

[Cancel provisioning](#) [Go to stack](#)

My SVL Stack 2

SVL and DAD link configuration

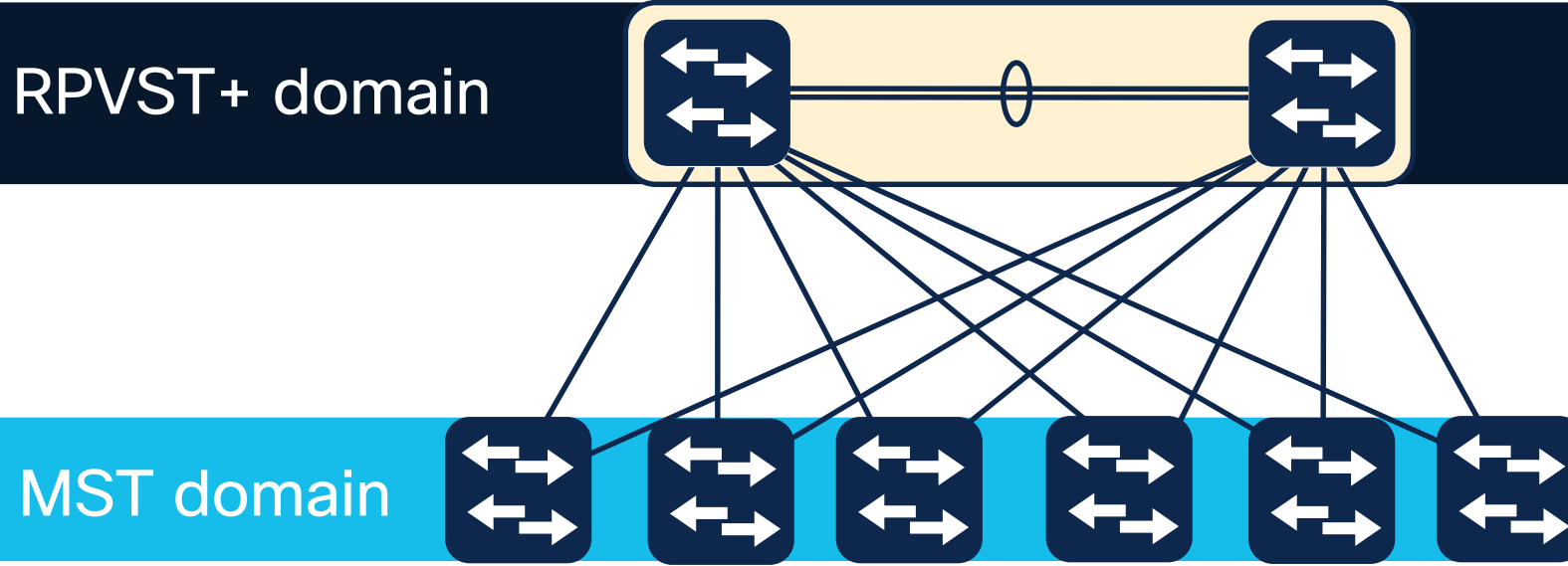
My SVL Stack 3

SVL and DAD link configuration

My SVL Stack 4

StackWise Virtual pair ready

Mixed Spanning-tree Versions



Rules of MST PVST+ interaction

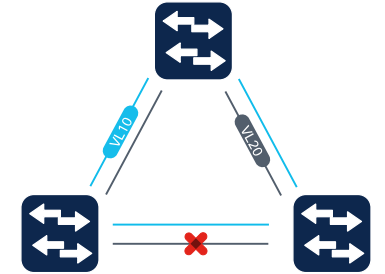
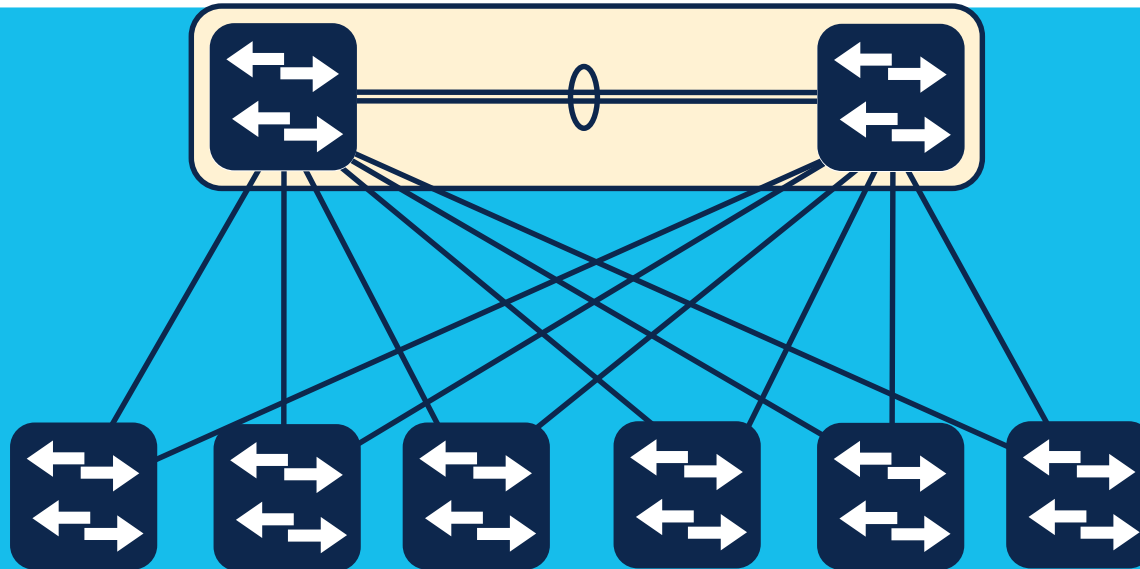
- If the MST bridge is the root, this bridge must be the root for all VLANs
- If the PVST+ bridge is the root, this bridge must be the root for all VLANs (this includes the CST, which always runs on VLAN 1, regardless of the native VLAN, when the CST runs PVST+)
- The simulation fails and produces an error message if the MST bridge is the root for the CST, while the PVST+ bridge is the root for one or more other VLANs. A failed simulation puts the boundary port in root inconsistent mode.

REF: [Understanding Multiple Spanning Tree Protocol \(802.1s\)](#)

RPVST+

RPVST+

RPVST+ domain



VLANs and PVST+ Instances

Time to use VLAN Database

Cloud-managed switches start with max supported active VLANs

- Catalyst 9300 = 1000
- Catalyst 9200 = 512

Catalyst switches can't run that many PVST+ instances

- Catalyst 9300 max 300 PVST instances
- Catalyst 9200 max 128 PVST instances
- Max 13000 STP Virtual ports*

VLAN profiles

Edit profile

Profile name

Building 12 VLANs

Iname

bldg12

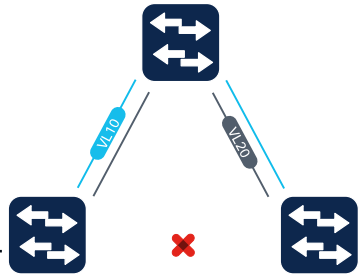
Active VLANs

1,4-8,10,20,30,33,80,100-102,106

The secret to a happy life is pruning unneeded VLANs

*STP virtual ports = trunks * active VLANs on trunk + number of non-trunk ports.

RPVST+ Config



Switching > Switch Settings

STP configuration

STP configuration mode

- ☒ Enable Spanning Tree
- Select Spanning Tree mode for Catalyst switches:
 - ☐ Enable Multiple Spanning Tree (MST)
 - ☒ Enable Rapid per-VLAN Spanning Tree (RPVST+)

i Operating network with a mix of RPVST+ and RSTP may cause unexpected issues, please refer to [Documentation](#) for best practices for operating mixed STP environments.

- ☐ Disable Spanning Tree

STP bridge priority ⓘ

Switches/Stacks	Bridge priority	VLAN list	Actions
Default	32768		
Rocky_and_Bullwinkle	8192	1-4094	

[+ Set the bridge priority for another switch or stack](#)

Set the STP mode for the entire network

Set bridge priorities per switch & VLAN

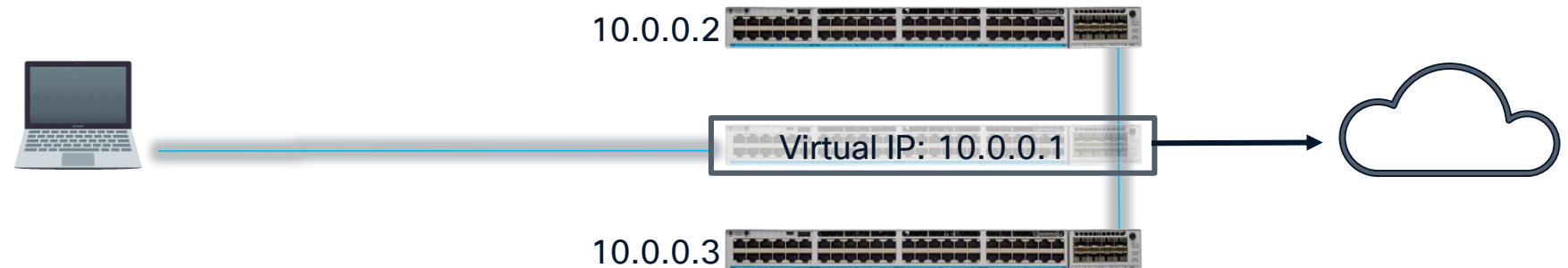
VRRP

Flexible, interoperable HA **Coming 17.18.2*

- 1 Create/Edit a Layer3 SVI on each switch
- 2 Enable "VRRP" for IPv4 or IPv6
- 3 Configure both switches with matching Group-ID and VIP
- 4 Assign Priority to control Active

High Availability (VRRP)	
<input checked="" type="checkbox"/>	Enabled
Virtual IP	
10.0.40.1	
Priority	
Custom	
Custom priority	
155	
Group ID	
120	

- IPv4 and IPv6 Support
- Per-Interface Control
- Compatible with OSPF/BGP/VRF
- Standards-based compatibility



Enterprise Switching Architectures

Enterprise Campus

Campus Core

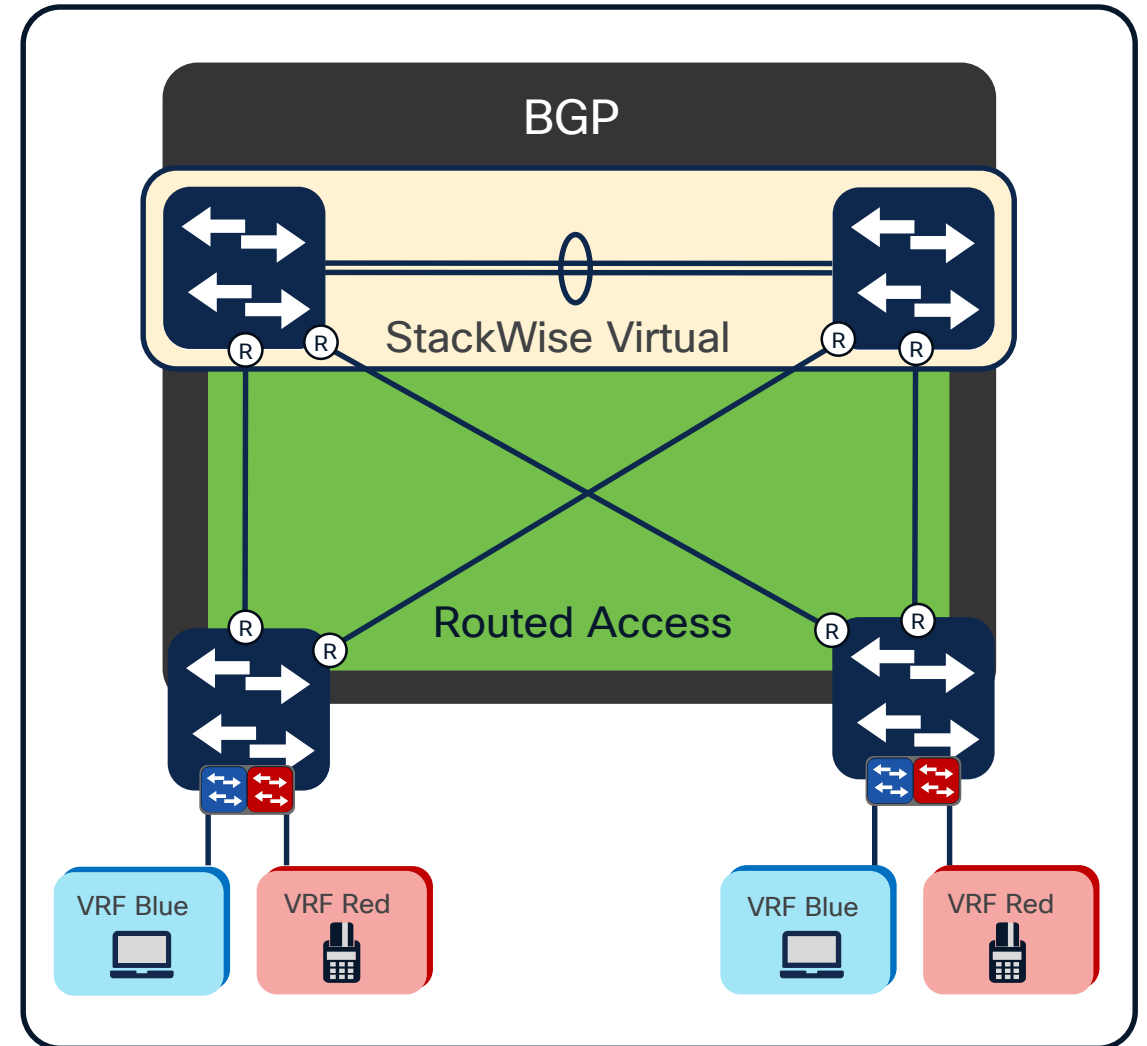
Low-latency, high-availability

Core-Access Interconnect

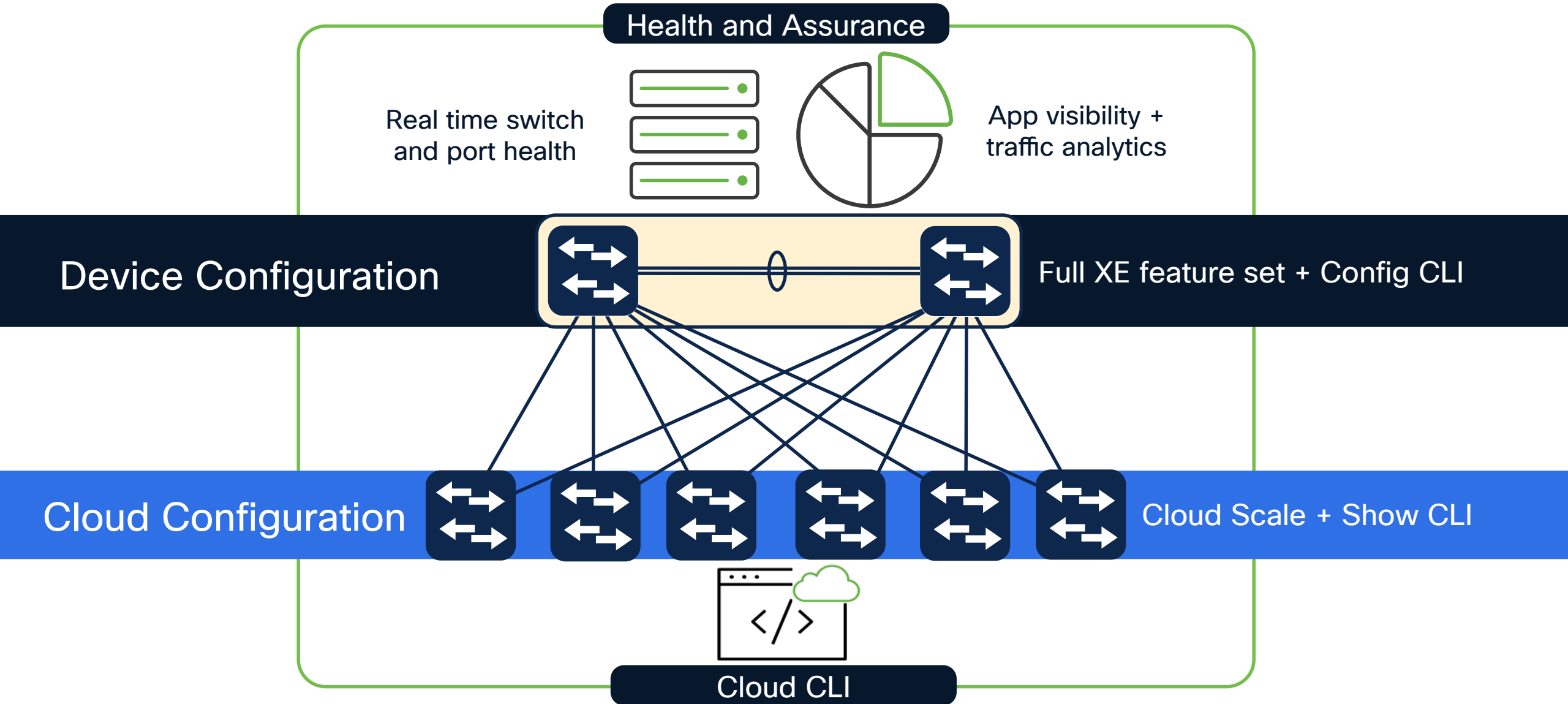
L3 routed access, limited STP
RPVST+ is still common

Campus Access

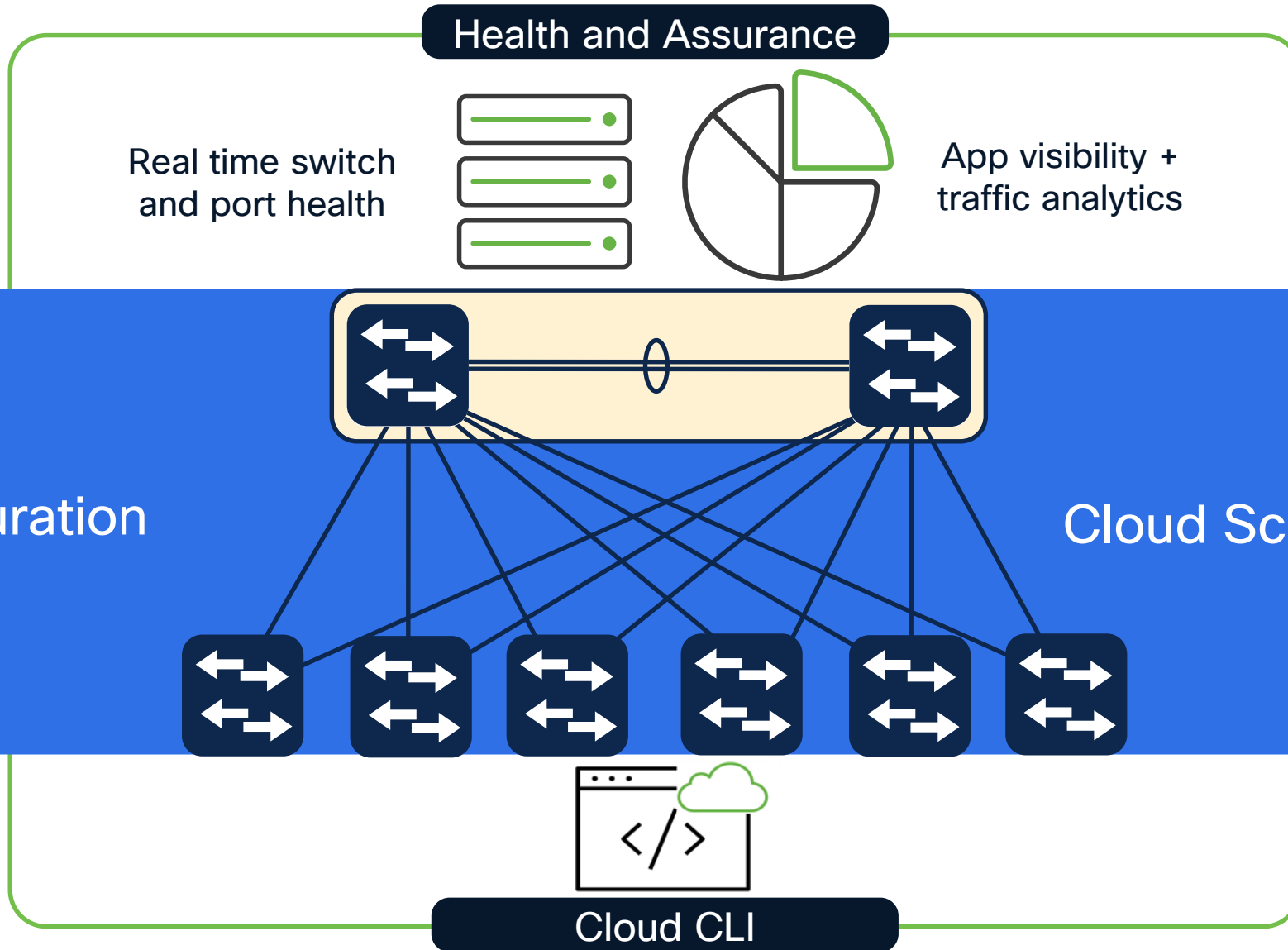
VRF segmented access layer
RPVST+ is common



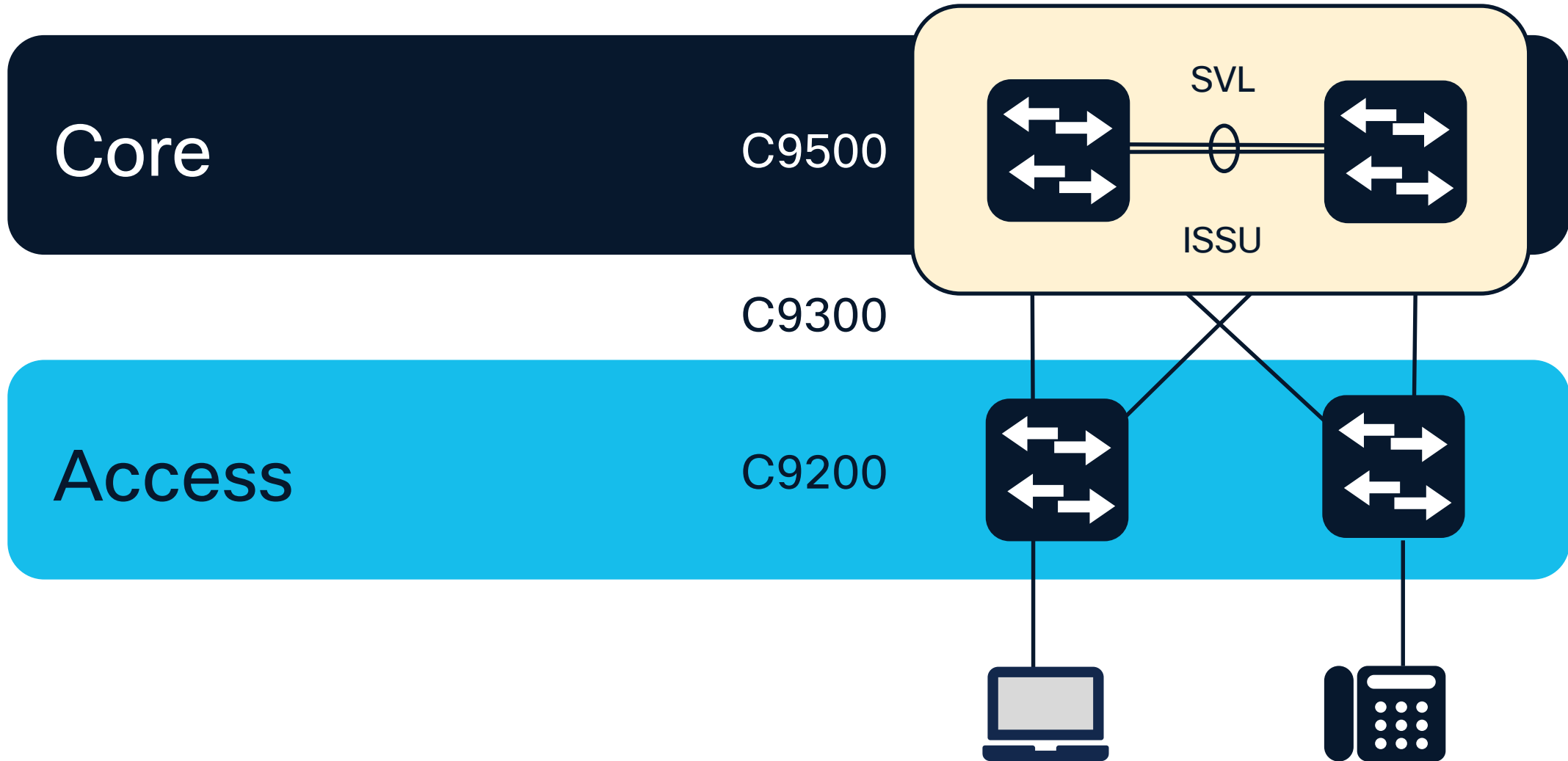
Flexible Config for Enterprise Cloud-management



Full cloud config for Enterprise Cloud-management



Core and Access Platforms



Enterprise Cloud-managed switching

Advanced Routing

Routed Ports

Loop-free routed access

VRF Lite

Scalable macro segmentation

BGP

Flexible, open dynamic routing

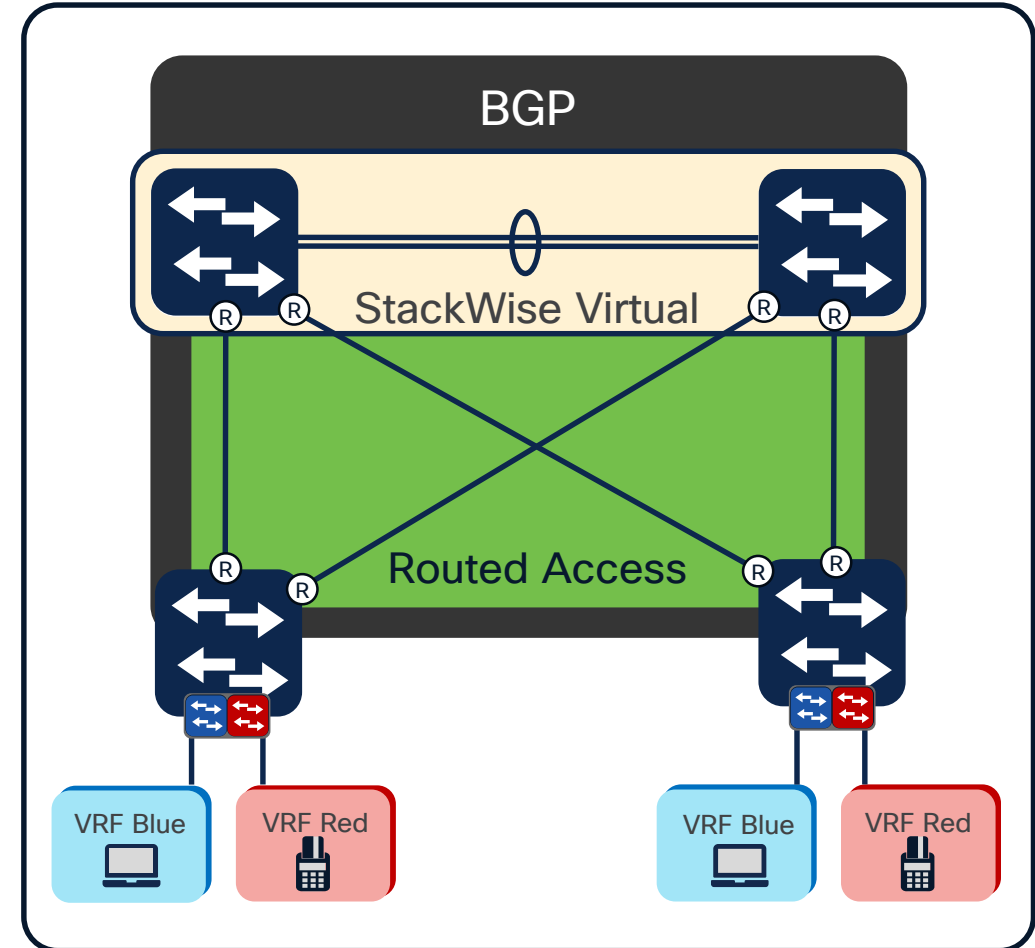
High-Availability

Rapid PVST+

Enhanced L2 loop prevention

StackWise Virtual (SVL)
ISSU

Sub-second downtime
firmware upgrades



Advanced L3

Routed Ports

Leverage Layer 3:

- Limit spanning-tree issues
- Smaller broadcast domains
- Faster Convergence
- Fewer VLANs

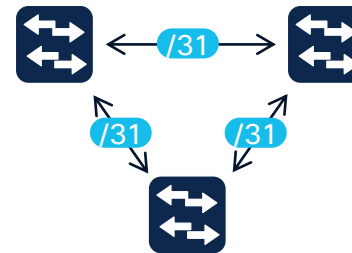
VRF

- Simple Macro Segmentation

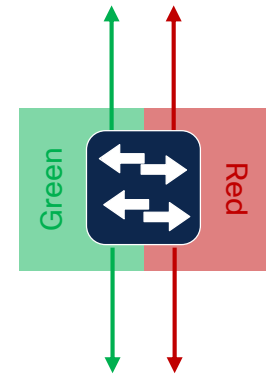
BGP

- Highly Flexible Reachability

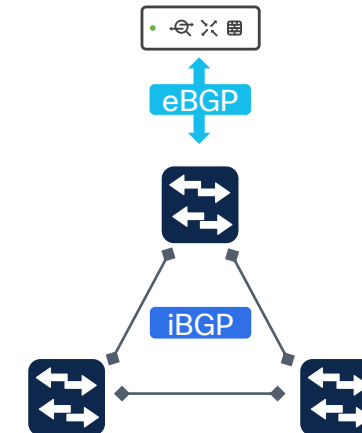
Routed Interfaces



VRF Lite



BGP



High Availability

Stackwise Virtual and ISSU

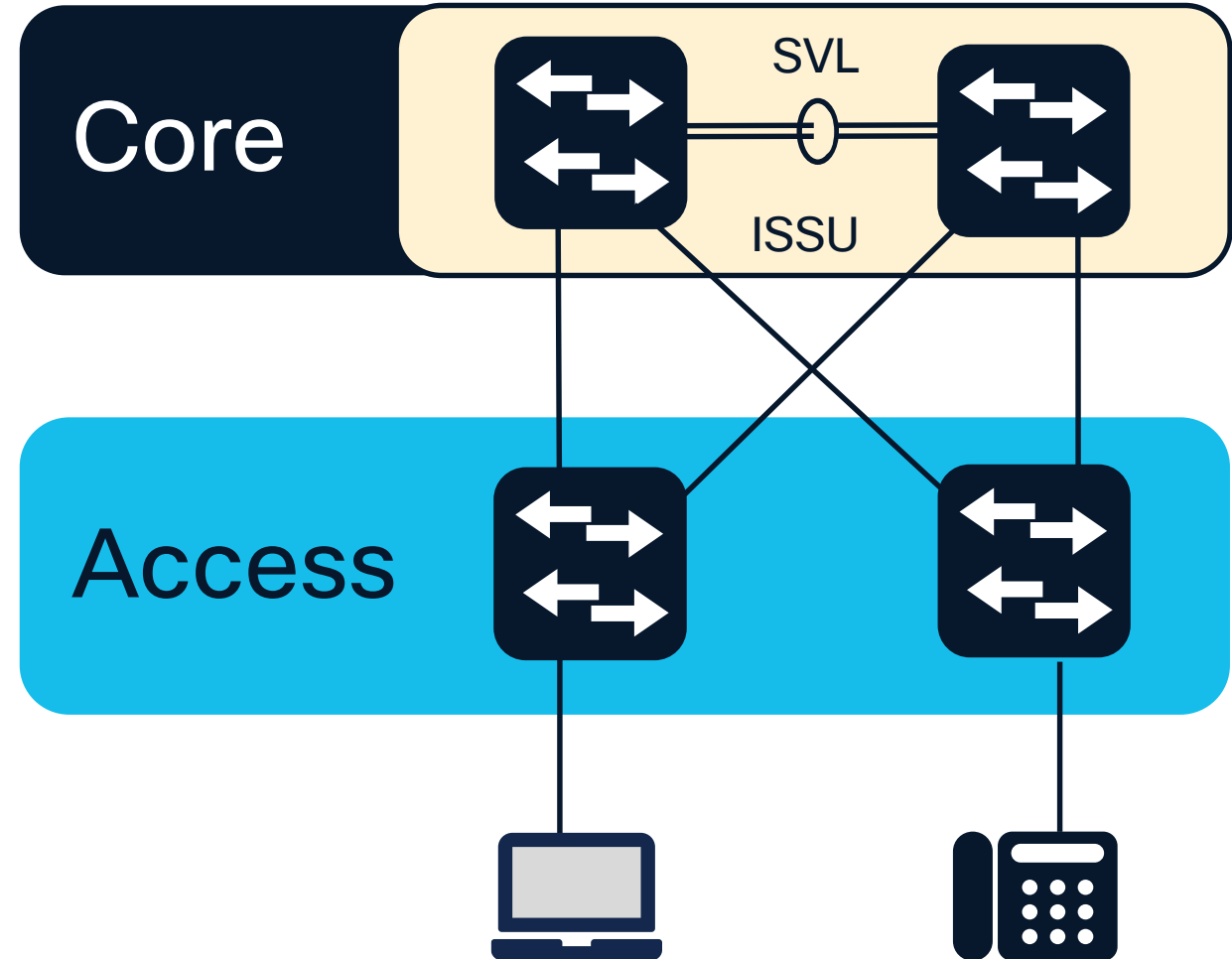
- Sub-second downtime upgrades

Staged Upgrades

- Roll incremental upgrades across a campus network

RPVST+

- Interoperability with all Catalyst based platforms
- Per-VLAN high availability

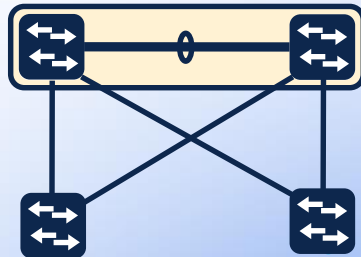


Is cloud ready for you?



Cloud manage your Catalyst

Check out the Cloud CLI



Look to the core in 17.18

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