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Automate Traditional Three-Tier vPC-Based Deployment Using NDFC

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BRKDCN-1659

Cisco Webex App

Questions?

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

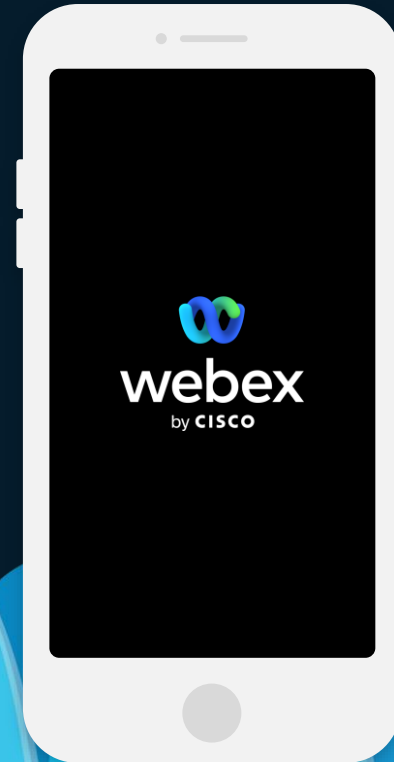
How

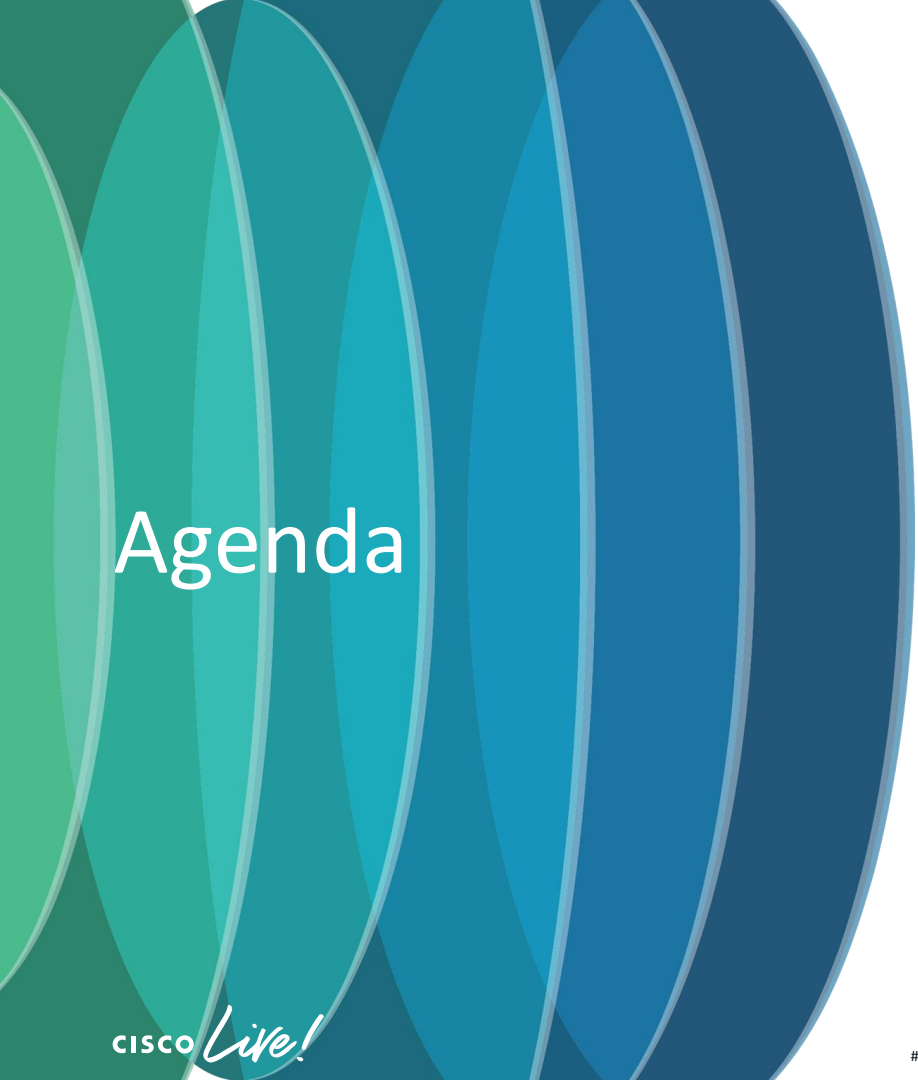
- 1 Find this session in the Cisco Live Mobile App
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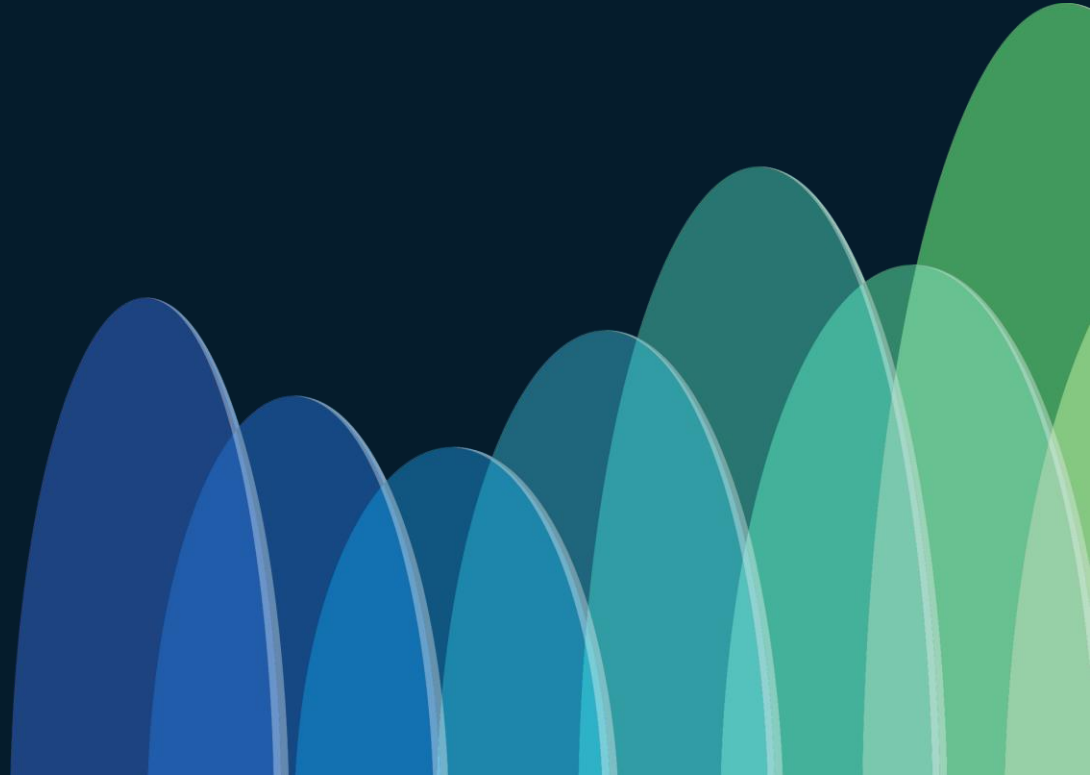




Agenda

- NDFC Overview
- What is Enhanced Classic LAN?
- Use-Cases of Enhanced Classic LAN
- Conclusion

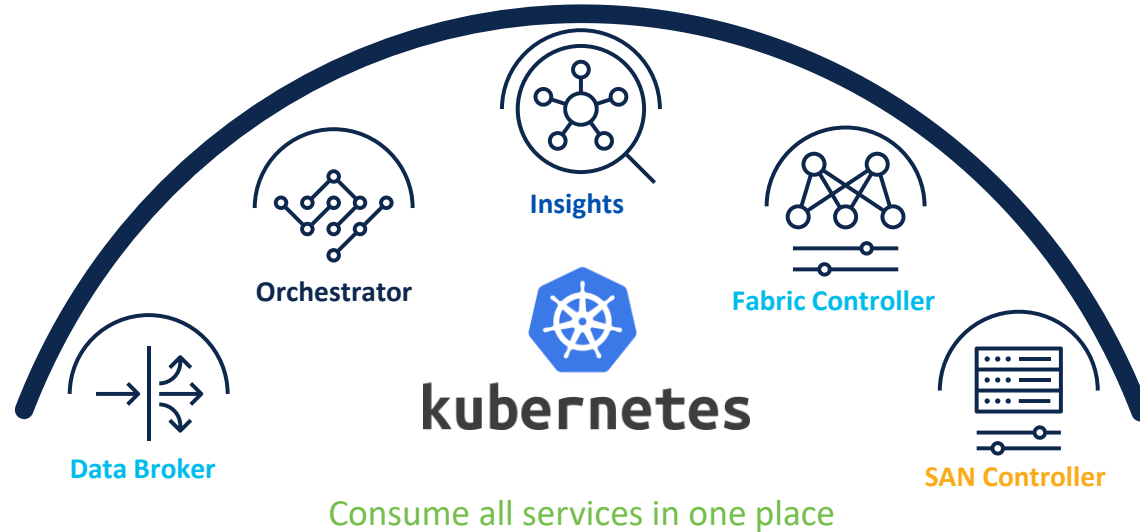
Introduction to NDFC



Cisco Nexus Dashboard

Simple to automate, simple to consume

Powering automation
Unified agile platform



Private cloud

| Third-party Apps

| Public cloud



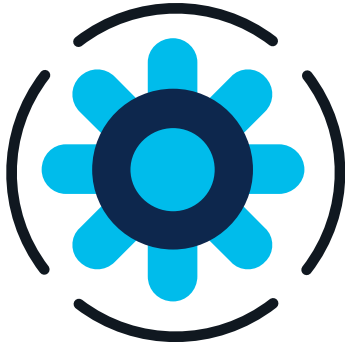
aws



Google Cloud

Azure

Cisco Nexus Dashboard Fabric Controller



Automation

Accelerate provisioning
and simplify deployments



Management

In depth Management
and control for all
network deployments



Visibility

Get Centralized Visibility
and Monitoring views

Why NDFC?



Multi-Architecture

VXLAN, Multi-Site, Classic Ethernet, BGP Routed Fabric



Multi-Topology, Multi-Protocol

Depending on Fabric Technology you have flexibility to run protocols such as IGP, BGP, MPLS, etc.



Multi-Domain, Multi-Platform

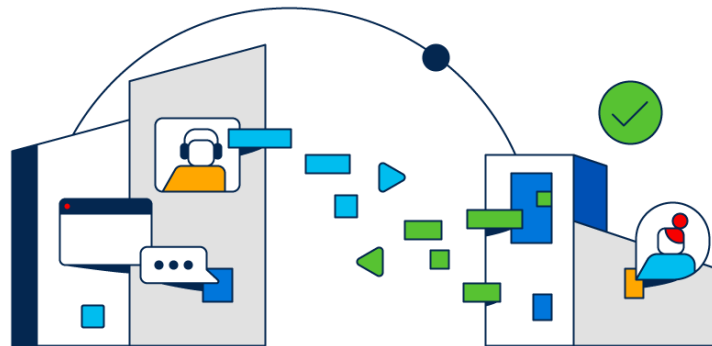
LAN, SAN, Media Fabrics
Nexus 2k/5k/6k/7k/9k, MDS, IOS-XE, IOS-XR,
Non-Cisco

Enhanced Classic LAN



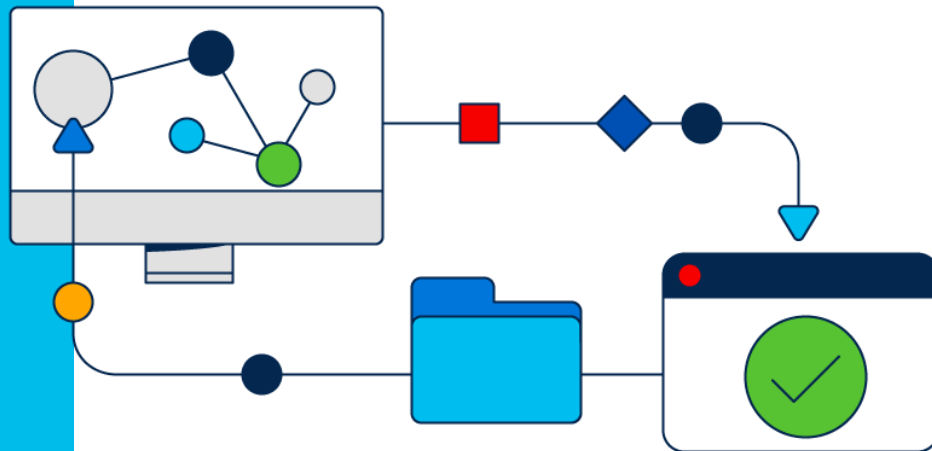
Networks today!

1. Large % still on Legacy Networking
2. No SDN / Automation
3. Most applications don't yet need Overlays
4. Large install base of Nexus (Nexus 7k, Nexus 9k)



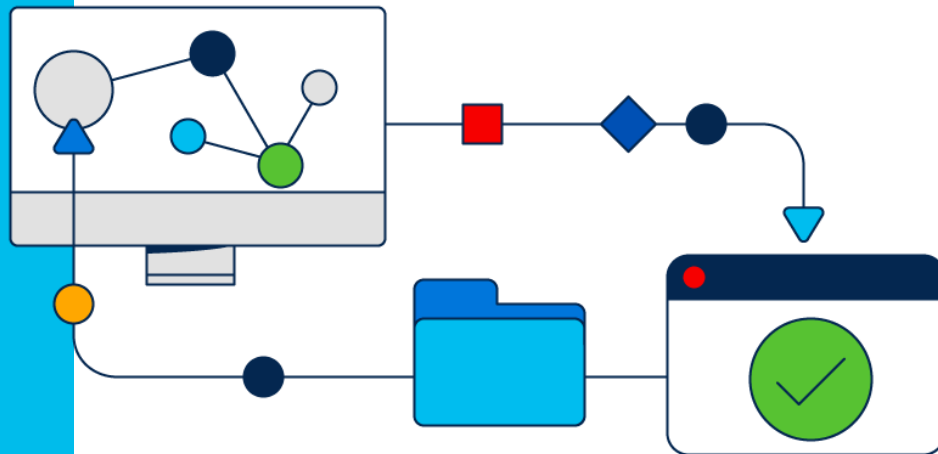
Problem!

1. Switch by switch configuration
2. Use of CLI
3. Manual checks of best practice configurations, config and design guides
4. Manual configurations for Spanning Tree, FHRP, vPC, allowing VLANs, Routing between Agg and Core, VRF-Lite etc.



End State!

1. Adoption of SDN
2. Keep the same architecture, but use the latest Nexus 9k hardware
3. Investment protection for Nexus 7000
4. Journey to VXLAN EVPN



Solution with Enhanced Classic LAN

Ease of Configurations

Configure at scale

Automate the network

No manual push

Single pane of glass

Intent based Configurations

Role based configs (Access, Agg, Core)

One click vPC pairing

Auto config of b2b vPC between Access and Agg

Config of Networks and VRFs using policies

VRF-Lite config

Modernize your network

Use integrated best practices in NDFC

Preview before you deploy

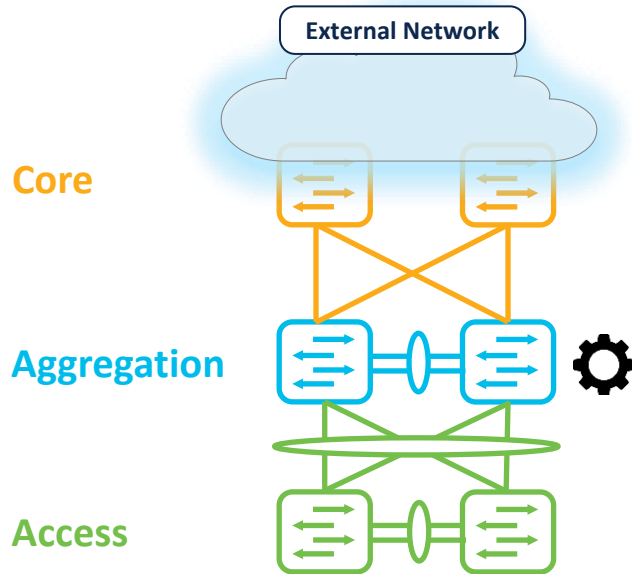
Use Change Control and Rollback

Get VXLAN ready

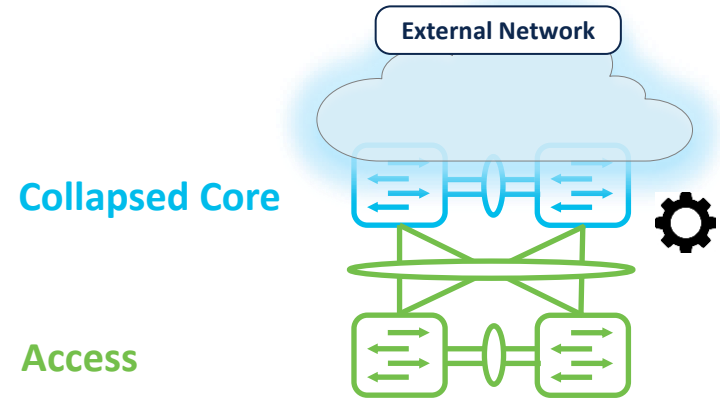
Traditional 3-Tier Classic Ethernet Networks

Deployment considerations

Option-1: 3-Tier with Agg as L2/L3 boundary



Option-2: 2-Tier with Collapsed Core as L2/L3 boundary

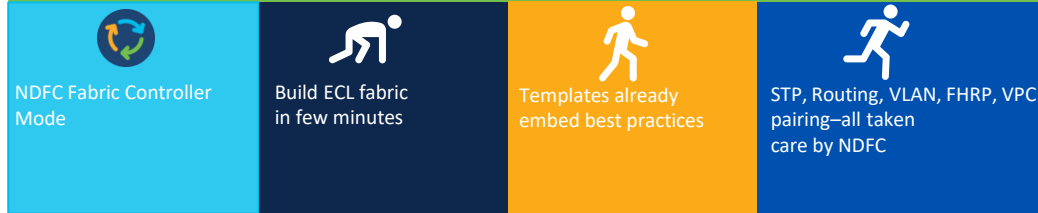


 Layer-2/Layer-3 boundary

Enhanced Classic LAN Use- cases Greenfield Deployment

Enhanced Classic LAN Greenfield

Not on Enhanced Classic LAN Today?



Step 2

Discover

Import switches with POAP or Day-0 config
Define switch Roles (Access or Aggregation)
Create vPC pairs

Step 1

Create

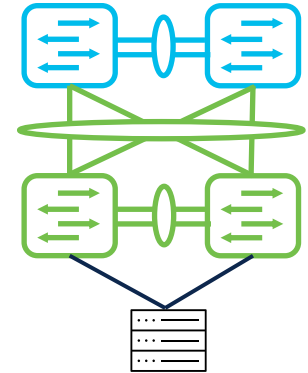
Define fabric settings (FHRP, Routing, VLAN) -
STP, VPC pairing, VLAN pool, etc.

Step 3

Recalculate and Deploy

Generates config based on intent
Preview side by side diffs

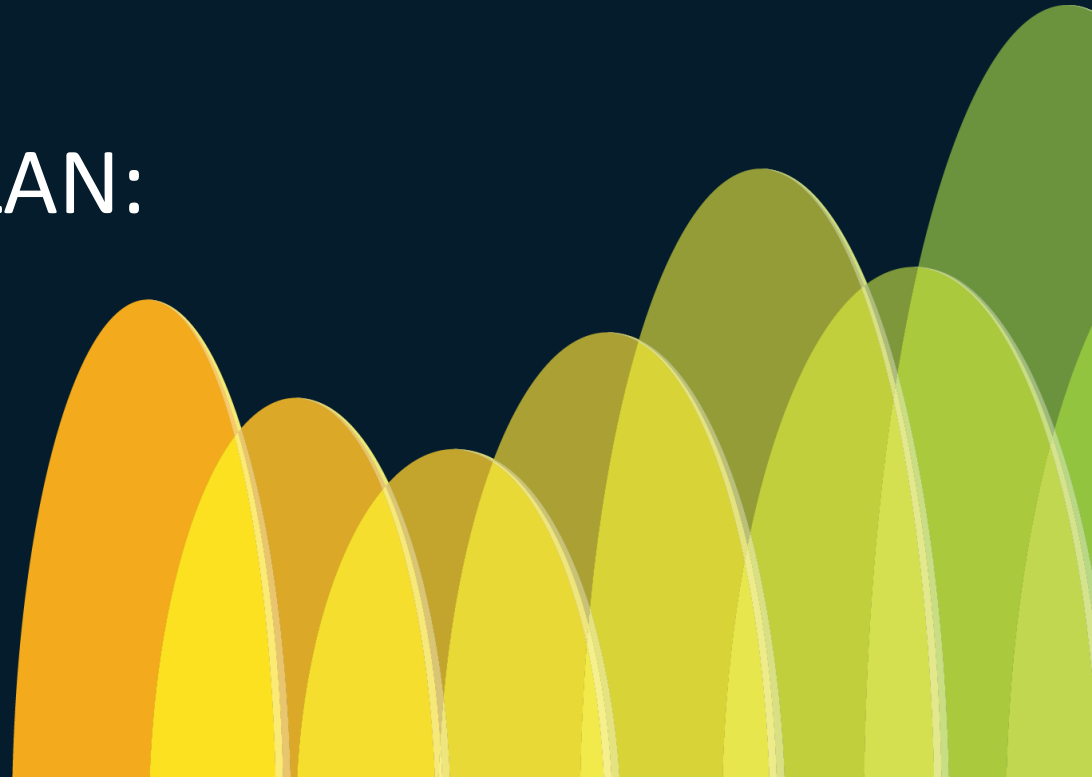
Cisco best practice implemented



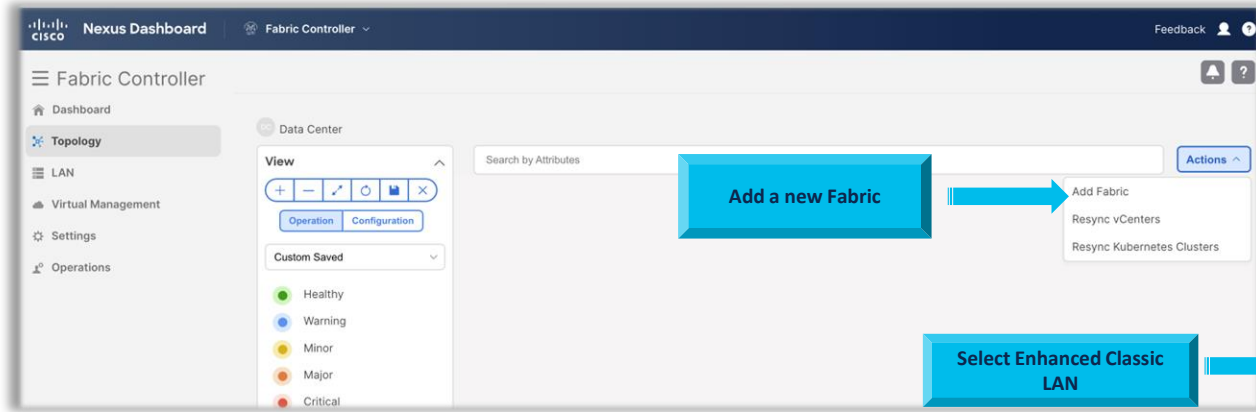
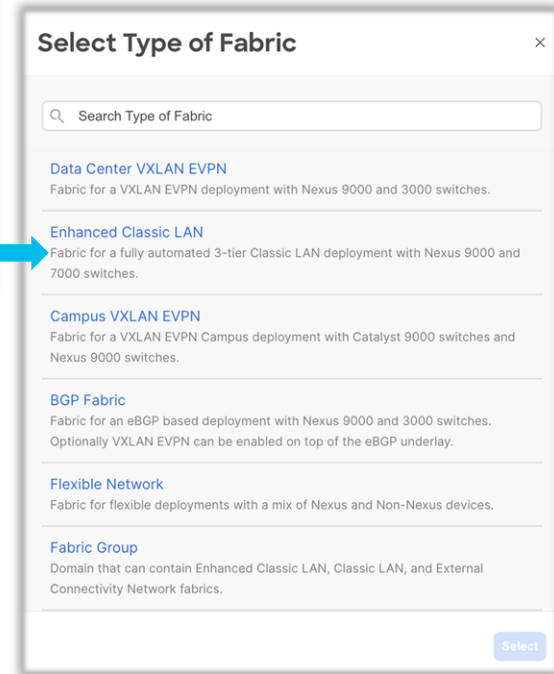
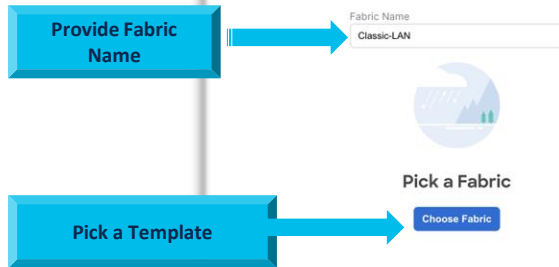
Fast, automated process



Enhanced Classic LAN: Day-0



Step 1 -> Create a Fabric



Step 1 -> Create a Fabric

(continued)

Create Fabric

Fabric Name

Classic-LAN

Pick Fabric

[Enhanced Classic LAN >](#)

General Parameters

Spanning Tree

VPC

Protocols

Advanced

Resources

Manageability

Bootstrap

First Hop Redundancy Protocol

hsrc

▼

HSRP or VRRP

Routing Protocol

eBGP

▼

VRF Lite Agg-Core or Collapsed Core-WAN Peering Protocol Options

BGP ASN*

1-4294967295 | 1-65535[.0-65535] It is a good practice to have a unique ASN for each Fabric.

Enable Performance Monitoring

☐

FHRP – HSRP or VRRP

BGP ASN

Routing Protocol –
eBGP, OSPF, None

PM Metrics

Step 1 -> Create a Fabric

(continued)

Spanning Tree Protocol –
RPVST, MST,
Unmanaged

VLAN range

STP Bridge
Priority

Fabric Name
Classic-LAN

Pick Fabric
[Enhanced Classic LAN >](#)

General Parameters **Spanning Tree** VPC Protocols Advanced Resources Manageability Bootstrap Configuration Backup

Spanning Tree Root Bridge Protocol
rpvst+
Protocol to be used for configuring Root Bridge: rpvst+: Rapid Per-VLAN Spanning Tree, mst: Multiple Spanning Tree, unmanaged (default): STP Root not managed by NDFC. Note: Spanning Tree Settings and Bridge Configs are applicable at Aggregation layer only.

Spanning Tree VLAN Range*
1-3967
Vlan range, Example: 1,3-5,7,9-11, Default is 1-3967 (Applicable only for Aggregation devices)

MST Instance Range
MST instance range, Example: 0-3,5,7-9, Default is 0 (Applicable only for Aggregation devices)

Spanning Tree Bridge Priority
0
Bridge priority for the spanning tree in increments of 4096 (Applicable only for Aggregation devices)

Spanning Tree Hello Interval
2
Set the number of seconds between generation of config bpdu, default is 2

Step 1 -> Create a Fabric

(continued)

Fabric Name
Classic-LAN

Pick Fabric
[Enhanced Classic LAN >](#)

General Parameters **Spanning Tree** **VPC** **Protocols** **Advanced** **Resources** **Manageability**

vPC Auto Recovery Time (In Seconds)
360 (Min:240, Max:3600)

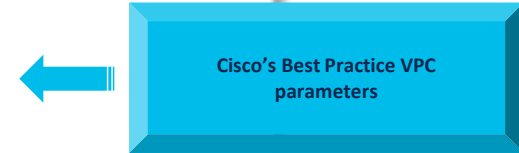
vPC Delay Restore Time (In Seconds)
150 (Min:1, Max:3600)

vPC Peer Link Port Channel ID
500 (Min:1, Max:4096)

vPC IPv6 ND Synchronize
☒ Enable IPv6 ND synchronization between vPC peers

vPC Domain Id Range
1-1000 vPC Domain id range to use for new pairings

vPC Layer-3 Peer-Router Option
☐ Enable Layer-3 Peer-Router on all Aggregation Devices



Step 1 -> Create a Fabric

(continued)

General Parameters Spanning Tree VPC Protocols Advanced **Resources** Manageability Bootstrap

Network VLAN Range
2300-2999
Per Switch Network VLAN Range (Min:2, Max:4094)

Agg-Core/Agg-Edge Connectivity
Auto
VRF Lite Agg-Core and Agg-Edge Router Inter-Fabric Connection Options

VRF Lite Subinterface dot1q Range
2-511
Per Agg dot1q Range for VRF Lite Connectivity (Min:2, Max:4093)

Auto Generate VRF Lite Configuration on Agg and Core/Edge
☒
Flag that controls auto generation of VRF LITE sub-interface and peering configuration on Agg & Core/Edge devices. If set, auto created VRF Lite links will have 'Auto Generate Flag' enabled.

VRF Lite IP Version
IPv4_only
Choice

IPv4 VRF Lite Subnet IP Range*
10.33.0.0/16

IPv4 VRF Lite Subnet Mask Length*
30

VRF Lite VLAN Range
2000-2299
(Min:2, Max:4094)

Per VRF Per Agg SVI Auto-Provisioning
☒
Per VRF Per Agg IPv4 Pool for SVI between VPC Aggs*
10.34.0.0/16
Prefix pool to assign IPv4 subnet to VRF SVI

Per VRF Per Agg IPv6 Pool for SVI between VPC Aggs*
2001::10:34:0:0/112
Prefix pool to assign IPv6 subnet to VRF SVI

Network VLAN Range

Auto Generate VRF-Lite Config when Core/Edge is Nexus

VRF-Lite IP Version – v4, v6 or both

Auto Generate per-VRF iBGP across Agg pair

Step 2 -> Add Switches

The screenshot displays the Cisco DNA Center 'Topology' page. The interface includes a left sidebar with navigation and configuration options, a central workspace, and a right-hand 'Actions' menu.

- Navigation:** At the top left, 'Data Center' (selected) and 'Classic-LAN' are visible.
- View Panel:** Contains zoom controls (+, -, pan, reset, save, close), a 'Show Logical Links' toggle, tabs for 'Operation' and 'Configuration', a 'Hierarchical' view selector, a status legend (In-Sync, Pending, In Progress, Out-of-Sync, NA), and a 'Multi-select' toggle.
- Workspace:** The main area for the topology diagram. A blue callout box with the text 'Add switches inside the fabric' and an arrow points towards the center.
- Actions Menu:** A blue 'Actions' button in the top right corner opens a dropdown menu with the following options: 'Detailed View', 'Edit Fabric', 'Add Switches' (highlighted with a red box), 'Recalculate and Deploy', and 'More'.

Step 2 -> Add Switches

(continued)

- NDFC uses SSH, SNMP, and CDP to discover seed and switches 'x' hop away from seed
- Seed IP must be management IP of switch

The screenshot shows the 'Seed Switch Details' configuration page in NDFC. The 'Switch Addition Mechanism' is set to 'Discover'. The 'Seed IP' field contains '192.18.0.13', with an annotation 'Switch Mgmt0 IP' pointing to it. The 'Authentication Protocol' is set to 'MD5'. The 'Username' is 'admin' and the 'Password' is masked with dots, with an annotation 'Switch Discovery Credentials' pointing to it. The 'Max Hops' is set to '2', with an annotation 'Switch Hops based on CDP' pointing to it. The 'Preserve Config' checkbox is unchecked, with an annotation 'Greenfield or Brownfield' pointing to it. A note at the bottom states: 'Unchecking this will clean up the configuration on switch(es)'.

Switch Addition Mechanism*

☒ Discover

Seed Switch Details

Seed IP*
192.18.0.13
Ex: "2.2.2.20" or "10.10.10.40-60" or "2.2.2.20, 2.2.2.21"

Authentication Protocol*
MD5

Username*
admin

Password*
.....

Max Hops*
2

Preserve Config
☐

Unchecking this will clean up the configuration on switch(es)

Switch Mgmt0 IP

Switch Discovery Credentials

Switch Hops based on CDP

Greenfield or Brownfield

Step 2 -> Add Switches

(continued)

Add Switches – Fabric: Classic-LAN

Seed Switch Details

Fabric Classic-LAN	Switch 192.168.101.91-96	Authentication Protocol MD5	Username admin
Password ● Set	Max Hops 0	Preserve config ● Disabled	

[← Back](#)

Discovery Results

Filter by attributes

☒	Switch Name	Serial Number	IP Address	Model	Version	Status	Progress
☒	agg02-dc1	9QKPGYM64AF	192.168.101.96	N9K-C9300v	9.3(8)	● Manageable	
☒	access03-dc1	9OB1HRNUOXZ	192.168.101.93	N9K-C9300v	9.3(8)	● Manageable	
☒	agg01-dc1	97FBMJ24STC	192.168.101.95	N9K-C9300v	9.3(8)	● Manageable	
☒	access02-dc1	9RYVFT7E0M9	192.168.101.92	N9K-C9300v	9.3(8)	● Manageable	
☒	access01-dc1	97EWA6G0UJ9	192.168.101.91	N9K-C9300v	9.3(8)	● Manageable	
☒	access04-dc1	9XLB9QDOCDK	192.168.101.94	N9K-C9300v	9.3(8)	● Manageable	

Close Add Switches

Switch Inventory Management

Step 2 -> Add Switches

(continued) POAP option

- Power-On Auto Provisioning is touchless automation of network switch bring-up
- Only Out-of-Band POAP supported for Enhanced Classic LAN (POAP using mgmt0 port)

Enable Bootstrap and
Local DHCP server

DHCP Scope and Default
Address

Pick Fabric
Enhanced Classic LAN >

General Parameters Spanning Tree VPC Protocols Advanced Resources Manageability **Bootstrap** Configuration Backup Flow Monitor

Enable Bootstrap ☒ Automatic IP Assignment For POAP

Enable Local DHCP Server ☒ Automatic IP Assignment For POAP From Local DHCP Server

DHCP Version
DHCPv4

DHCP Scope Start Address*
192.168.92.100 Start Address For Switch POAP

DHCP Scope End Address*
192.168.92.110 End Address For Switch POAP

Switch Mgmt Default Gateway*
192.168.92.1 Default Gateway For Management VRF On The Switch

Switch Mgmt IP Subnet Prefix*
24 (Min:8, Max:30)

DHCPv4 Multi Subnet Scope A

Step 2 -> Add Switches

(continued) POAP option

Bootstrap switch in a Fabric

Switches in POAP loop

Switch Addition Mechanism*

☐ Discover ☒ Bootstrap(POAP) ☐ Pre-provision

Switch Credentials

Admin password*

For discovery, use*

☒ Admin user and supplied password ☐ Specify a new user

Switches to Bootstrap

Filter by attributes

	Serial Number	Model	Version	IP Address	Hostname	Gateway	Role	Action
☐	98Z8CSLLPTL	N9K-C9300v	10.2(4)			192.168.92.1/24		Edit
☐	9REYJCVCVSI	N9K-C9500v	10.2(4)			192.168.92.1/24		Edit
☐	9UXZ1T3RXUW	N9K-C9300v	10.3(1)			192.168.92.1/24		Edit

Mgmt0 IP address

Hostname

Switch role (Access/Agg)

Edit to provide more details

Edit bootstrap switch

IP Address*

192.168.92.201

Hostname*

Access3

Image Policy

Select...

Switch Role

Access

Data*

```
{
  "modulesModel": [
    "N9K-X9364v",
    "N9K-vSUP"
  ],
  "gateway": "192.168.92.1/24"
}
```

Cancel

Save

Step 3 -> Set Role

The screenshot displays the Cisco DNA Center 'Topology' page. On the left, a sidebar contains a 'View' section with icons for zooming and a 'Show Logical Links' toggle. Below this are tabs for 'Operation' and 'Configuration', and a 'Hierarchical' view selector. A status legend shows 'In-Sync' (green), 'Pending' (blue), 'In Progress' (yellow), 'Out-of-Sync' (red), and 'NA' (grey). At the bottom of the sidebar, a 'Multi-select' toggle is shown with '0 selected'. The main area features a 'Filter by Attributes' search bar and an 'Actions' dropdown. The network diagram shows a sequence of nodes: 'agg02-dc1', 'agg01-dc1', 'access04-dc1', 'access03-dc1', 'access02-dc1', and 'access01-dc1'. Above the diagram, 'NET' (Networks: 0) and 'VRF' (VRFs: 1) are listed. A 'Select Role' dialog is open on the right, showing a 'Search Role' input and two options: 'Access (current)' and 'Aggregation'.

Step 4 -> VPC Pairing

agg02-dc1

- Detailed View
- Preview Config
- Deploy Config
- Discovery
- Set Role
- Manage Interfaces
- Manage Policies
- vPC Pairing**
- More

vPC Pairing

Select vPC Peer for agg02-dc1

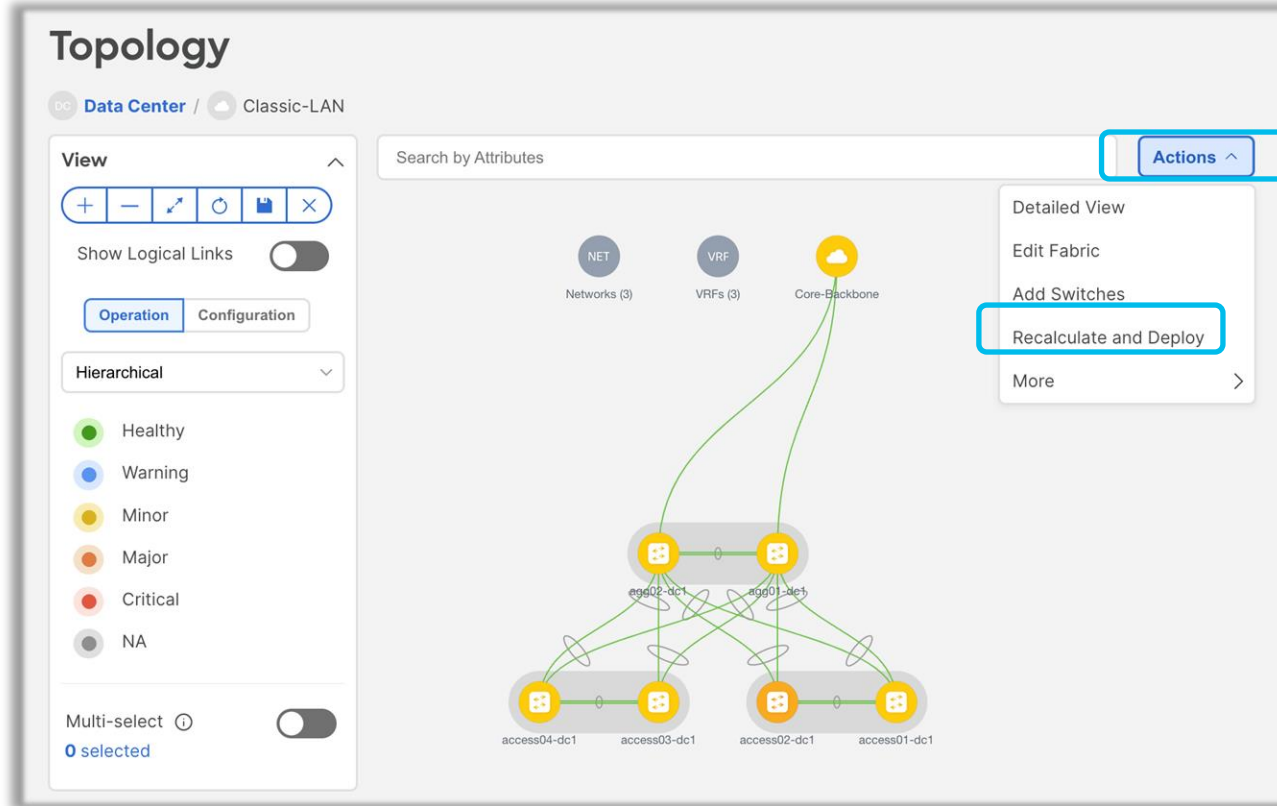
Filter by attributes

Device	Recommended	Reason	Serial Number	IP Address
☒ agg01-dc1	True	Switches are connected and have same role	97FBMJ24STC	192.168.101.95
☐ access01-dc1	False	Switches have different roles	97EWA6G0UJ9	192.168.101.91
☐ access02-dc1	False	Switches have different roles	9RYVFT7E0M9	192.168.101.92
☐ access03-dc1	False	Switches have different roles	90B1HRNUOXZ	192.168.101.93
☐ access04-dc1	False	Switches have different roles	9XLB9QDOCDK	192.168.101.94

agg02-dc1

agg01-dc1

Step 5 -> Recalculate and Deploy



Step 5 -> Recalculate and Deploy

(continued)

Deploy Configuration - Classic-LAN

1 Config Preview 2 Deploy Progress

Filter by attributes [Resync All](#)

Switch Name	IP Address	Role	Serial Number	Fabric Status	Pending Config	Status Description	Progress	Resync Switch
access02-dc1	192.168.101.92	Fabric Configuration status	VFT7E0M9	Out-Of-Sync	466 Lines	Out-of-Sync	<div></div>	Resync
agg01-dc1	192.168.101.95		3MJ24STC	Out-Of-Sync	425 Lines	Out-of-Sync	<div></div>	Resync
access04-dc1	192.168.101.94	access	9XLB9QDOCDK	Out-Of-Sync	466 Lines	Out-of-Sync	<div></div>	Resync
access01-dc1	192.168.101.91	access	97EWA6G0UJ9	Out-Of-Sync	462 Lines	Out-of-Sync	<div></div>	Resync
agg02-dc1	192.168.101.96	aggregation	9QKPGYM64AF	Out-Of-Sync	425 Lines	Out-of-Sync	<div></div>	Resync
access03-dc1	192.168.101.93	access	9OB1HRNUOXZ	Out-Of-Sync	466 Lines	Out-of-Sync	<div></div>	Resync

[Close](#) [Deploy All](#)

Step 5 -> Recalculate and Deploy

(continued)

Pending Config - Classic-LAN - agg01-dc1

Pending Config Side-by-Side Comparison

```
cfs eth distribute
feature bgp
feature dhcp
feature hsrp
feature interface-vlan
feature lacp
feature nxapi
feature vpc
feature lldp
feature tacacs+
nxapi http port 80
nxapi https port 443
router bgp 65500
configure terminal
service dhcp
snmp-server host 10.124.124.246 traps version 2c public udp-port 2162
ip dhcp relay
route-map fabric-rmap-redist-subnet permit 10
  match tag 12345
ip dhcp relay information option
ip dhcp relay information option vpn
ipv6 dhcp relay
```

Aggregation role
related features

Pending Config - Classic-LAN - agg01-dc1

Pending Config Side-by-Side Comparison

```
vpc domain 1
ip arp synchronize
peer-gateway
peer-switch
delay restore 150
peer-keepalive destination 192.168.101.96 source 192.168.101.95
auto-recovery reload-delay 360
ipv6 nd synchronize
interface port-channel500
switchport
switchport mode trunk
spanning-tree port type network
description "vpc-peer-link agg01-dc1--agg02-dc1"
no shutdown
vpc peer-link
```

VPC domain
towards Agg02

VPC peer-link
towards Agg02

Step 5 -> Recalculate and Deploy

(continued)

Pending Config - Classic-LAN - agg01-dc1

Pending Config Side-by-Side Comparison

```
interface port-channel1
  switchport
  switchport mode trunk
  mtu 9216
  vpc 1
  spanning-tree bpduguard disable
  spanning-tree guard root
  description vPC-agg-connected-to-vPC-access:access02-dc1~access01-dc1-vPC1
  no shutdown
  switchport trunk allowed vlan none
interface port-channel2
  switchport
  switchport mode trunk
  mtu 9216
  vpc 2
  spanning-tree bpduguard disable
  spanning-tree guard root
  description vPC-agg-connected-to-vPC-access:access04-dc1~access03-dc1-vPC1
  no shutdown
  switchport trunk allowed vlan none
```

VPC PO towards Access01-02 switches

VPC PO towards Access03-04 switches

Pending Config - Classic-LAN - agg01-dc1

```
no shutdown
  switchport trunk allowed vlan none
interface ethernet1/64
  switchport
  switchport mode trunk
  mtu 9216
  no shutdown
  switchport trunk allowed vlan none
interface ethernet1/8
  switchport
  switchport mode trunk
  mtu 9216
  no shutdown
  switchport trunk allowed vlan none
interface ethernet1/9
  switchport
  switchport mode trunk
  mtu 9216
  no shutdown
  switchport trunk allowed vlan none
spanning-tree vlan 1-3967 priority 0
```

Aggregation default port-type

STP Root on Aggregation

Step 5 -> Recalculate and Deploy

(continued)

Pending Config - Classic-LAN - agg01-dc1

Pending Config Side-by-Side Comparison

Running Config

```
16 hostname agg01-dc1
17 icam monitor scale
18 interface ethernet1/1

24 interface ethernet1/10

30 interface ethernet1/11
```

Expected Config

```
14 feature tacacs+
15 feature vpc
16 hostname agg01-dc1

18 interface ethernet1/1
20   description "PO 500 (vpc-peer-link) member agg01-dc1-Ethernet1/1 to agg0
21   2-dc1-Ethernet1/1"
22   switchport
23   switchport mode trunk
24 interface ethernet1/10
25   mtu 9216
26   no shutdown
27   switchport
28   switchport mode trunk
29   switchport trunk allowed vlan none
30 interface ethernet1/11
31   mtu 9216
32   no shutdown
33   switchport
```

Step 5 -> Recalculate and Deploy

(continued)

Pending Config - Classic-LAN - access01-dc1

Pending Config Side-by-Side Comparison

```
cfs eth distribute
feature lacp
feature lldp
feature vpc
snmp-server host 10.124.124.240 traps version 2c public udp-port 2162
vpc domain 2
  peer-keepalive destination 192.168.101.92 source 192.168.101.91 hold-timeout 3
  peer-switch
  auto-recovery reload-delay 360
interface port-channel500
  switchport
  switchport mode trunk
  description "vpc-peer-link access01-dc1--access02-dc1"
  no shutdown
  spanning-tree port type network
  switchport trunk allowed vlan 1-4094
  vpc peer-link
```

Access role
related features

VPC domain towards
Access02

VPC peer-link
towards Access02

Pending Config - Classic-LAN - access01-dc1

Pending Config Side-by-Side Comparison

```
interface port-channel1
  switchport
  switchport mode trunk
  mtu 9216
  vpc 1
  spanning-tree bpduguard disable
  spanning-tree guard loop
  description vPC-access-connected-to-vPC-agg:agg02-dc1--agg01-dc1-vPC1
  no shutdown
  switchport trunk allowed vlan none
interface ethernet1/10
  switchport
  switchport mode trunk
  mtu 9216
  spanning-tree port type edge trunk
  no shutdown
  switchport trunk allowed vlan none
interface ethernet1/11
  switchport
  switchport mode trunk
  mtu 9216
  spanning-tree port type edge trunk
  no shutdown
  switchport trunk allowed vlan none
```

VPC PO towards Agg01-02
switches

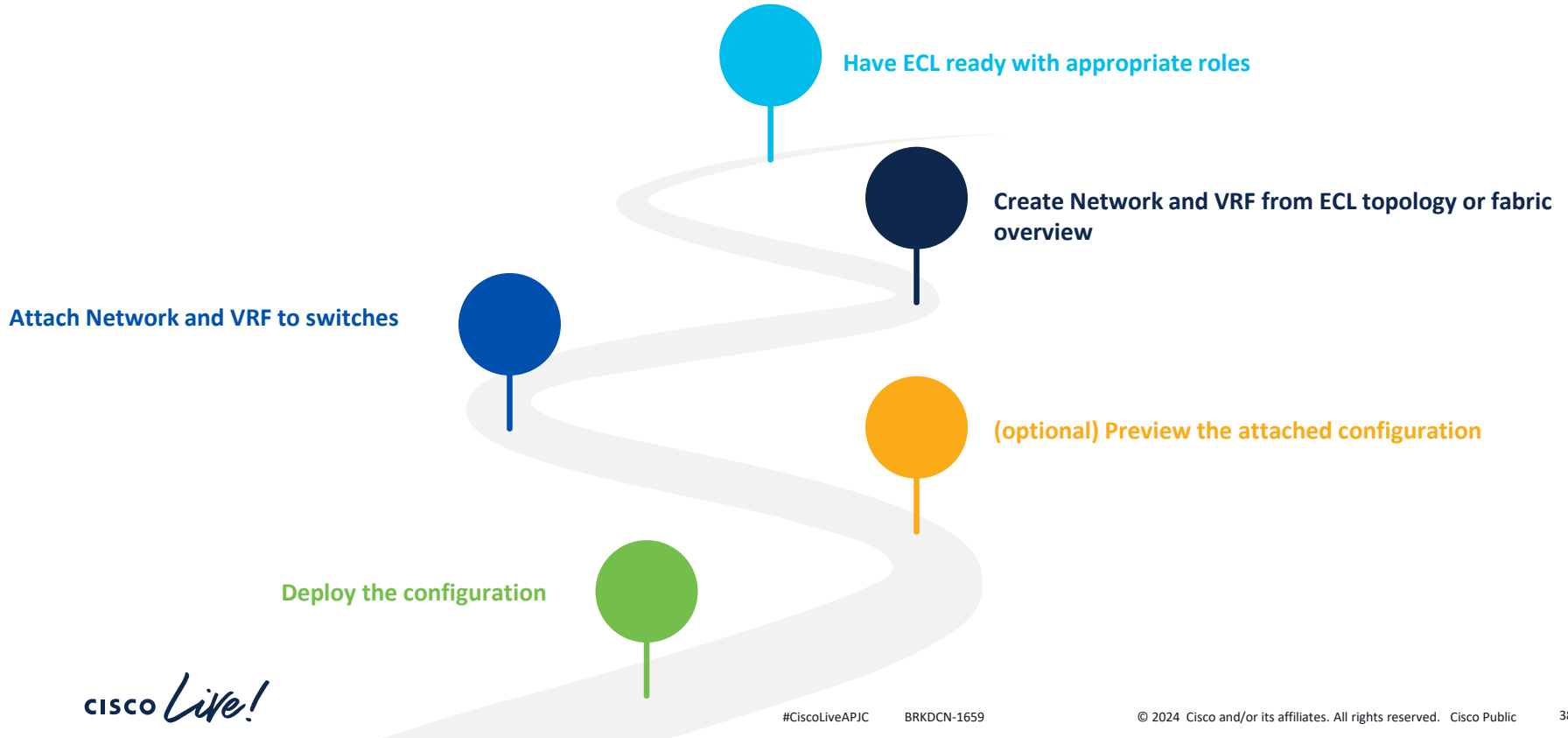
Access default port-type

Enhanced Classic LAN: Day-1

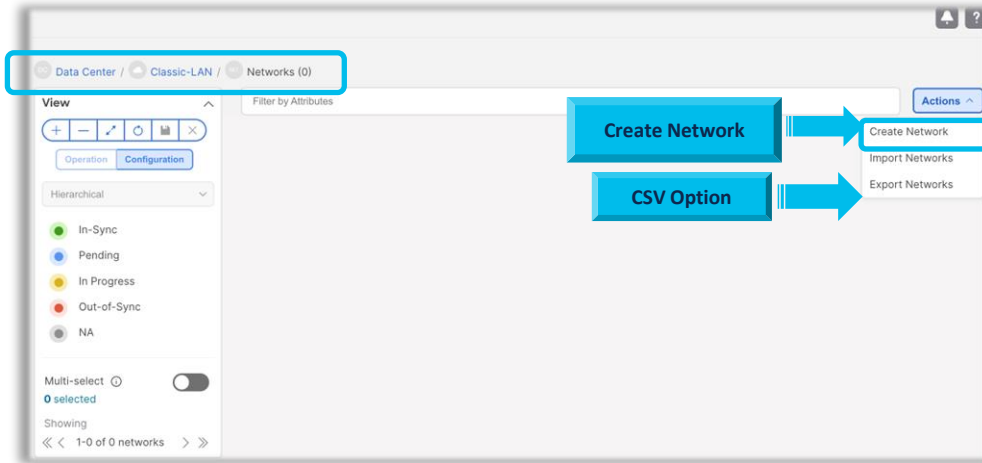


Deploy Network and VRF

in Enhanced Classic LAN



Step1 -> Create Network and VRF



Network Name*
MyNetwork_30002

Layer 2 Only
☐

VRF Name*
MyVRF_50002

VLAN ID*
2302

Network Template*
Network_Classic >

General Parameters Advanced

IPv4 Gateway/NetMask
192.168.1.253/24

Interface IPv4 addr on active*
192.168.1.252

Interface IPv4 addr on standby*
192.168.1.254

Auto Generated Name

L2 or L3 Network

VRF

Create VRF

Propose VLAN

Auto Generated VLAN ID

Default Gateway SVI

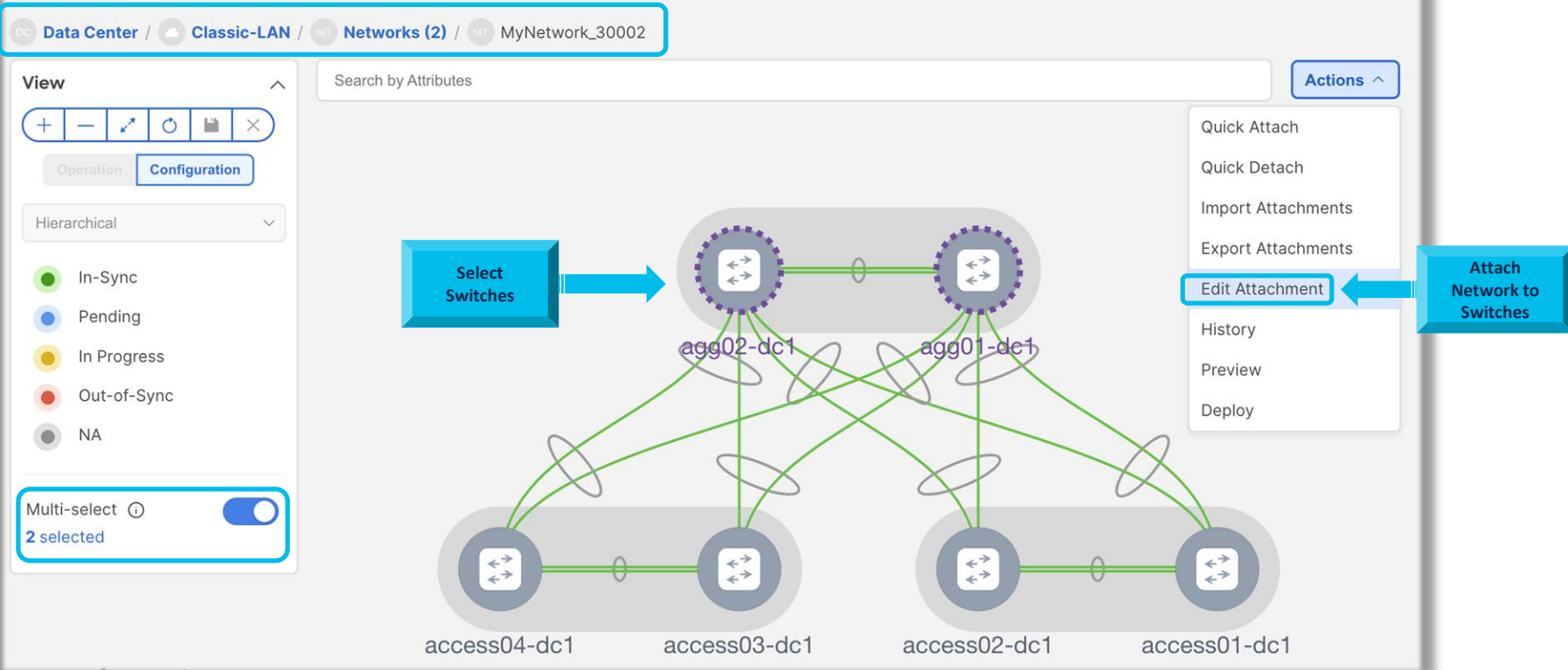
FHRP Active/Backup

example 192.0.2.2. Interface IP address on the active/master device

example 192.0.2.3. Interface IP address on the standby/back up device

Step 2 -> Attach Network and VRF

Topology



Step 2 -> Attach Network and VRF

(continued)

Edit Network Attachment - MyNetwork_30002

agg02-dc1 (9QKPGYM64AF) - agg01-dc1 (97FBMJ24STC)

Detach ☐ Attach ☒

VLAN*
2302

FHRP Active
☐ agg02-dc1 (9QKPGYM64AF)
☒ agg01-dc1 (97FBMJ24STC)

Interface Attachment(s)

Filter by attributes

☐ Interface/Ports	Switch	Status	Port Type	Port Description	Neighbor Info
☒ Port-channel2	access01-dc1	false	trunk	towards-app-host	
☒ Port-channel2	access02-dc1			towards-app-host	
☐ Ethernet1/5	access01-dc1				
☒ Ethernet1/5	access04-dc1	false	trunk	standalone-lab-host	
☐ Ethernet1/5	access02-dc1	false	trunk		
☒ Ethernet1/5	access03-dc1	false	trunk	standalone-lab-host	

Cancel Save

Network and VRF Configs

Pending Config - Classic-LAN - agg01-dc1

Pending Config

```
vrf context myvrf_50002
  address-family ipv4 unicast
  address-family ipv6 unicast
exit
router bgp 65500
  vrf myvrf_50002
    address-family ipv4 unicast
      redistribute direct route-map fabric-rmap-redist-subnet
    exit
    address-family ipv6 unicast
      redistribute direct route-map fabric-rmap-redist-subnet
```

VRF and BGP Configs

```
vlan 2302
  name test-network
interface Vlan2302
  vrf member myvrf_50002
  ip address 192.168.1.252/24 tag 12345
  no ip redirects
  no ipv6 redirects
  mtu 9216
  description test-network
  no shutdown
  hsrp version 2
  hsrp 1
    ip 192.168.1.253
    priority 120
    preempt
exit
configure terminal
interface port-channell
  switchport trunk allowed vlan add 2302
interface port-channel2
  switchport trunk allowed vlan add 2302
```

VLAN definition

SVI Configs with Active
FHRP

Allow VLAN towards
Access devices

Network and VRF Configs

Pending Config - Classic-LAN - agg02-dc1

Pending Config

```
vrf context myvrf_50002
  address-family ipv4 unicast
  address-family ipv6 unicast
exit
router bgp 65500
  vrf myvrf_50002
    address-family ipv4 unicast
      redistribute direct route-map fabric-rmap-redist-subnet
    exit
    address-family ipv6 unicast
      redistribute direct route-map fabric-rmap-redist-subnet
```

VRF and BGP Configs

```
vlan 2302
  name test-network
interface Vlan2302
  vrf member myvrf_50002
  ip address 192.168.1.254/24 tag 12345
  no ip redirects
  no ipv6 redirects
  mtu 9216
  description test-network
  no shutdown
  hsrp version 2
  hsrp 1
    ip 192.168.1.253
    preempt
exit
configure terminal
```

VLAN definition

SVI Configs with
Standby FHRP

Allow VLAN towards
Access devices

```
interface port-channel1
  switchport trunk allowed vlan add 2302
interface port-channel2
  switchport trunk allowed vlan add 2302
```

Network and VRF Configs

Pending Config - Classic-LAN - access01-dc1

Pending Config

VLAN definition

```
vlan 2302
configure terminal
interface port-channel1
  switchport trunk allowed vlan add 2302
interface port-channel2
  switchport trunk allowed vlan add 2302
```

Allow VLAN towards
Aggregation (uplink)
and Compute-Host
(downlink)

Pending Config - Classic-LAN - access02-dc1

Pending Config

VLAN definition

```
vlan 2302
configure terminal
interface port-channel1
  switchport trunk allowed vlan add 2302
interface port-channel2
  switchport trunk allowed vlan add 2302
```

Allow VLAN towards
Aggregation (uplink)
and Compute-Host
(downlink)

Pending Config - Classic-LAN - access03-dc1

Pending Config

VLAN definition

```
vlan 2302
configure terminal
interface ethernet1/5
  switchport trunk allowed vlan add 2302
interface port-channel1
  switchport trunk allowed vlan add 2302
```

Allow VLAN towards
Aggregation (uplink)
and Compute-Host
(downlink)

Pending Config - Classic-LAN - access04-dc1

Pending Config

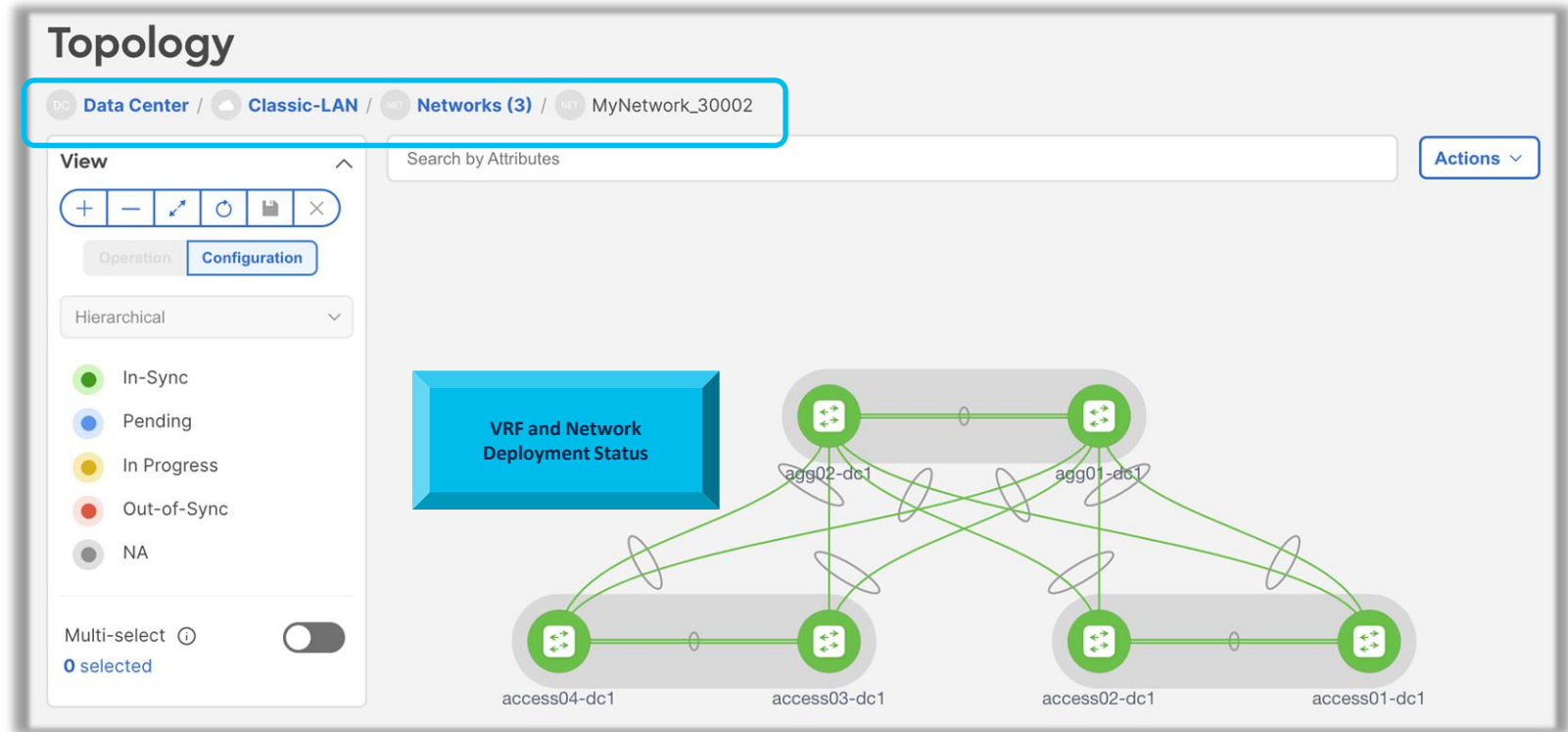
VLAN definition

```
vlan 2302
configure terminal
interface ethernet1/5
  switchport trunk allowed vlan add 2302
interface port-channel1
  switchport trunk allowed vlan add 2302
```

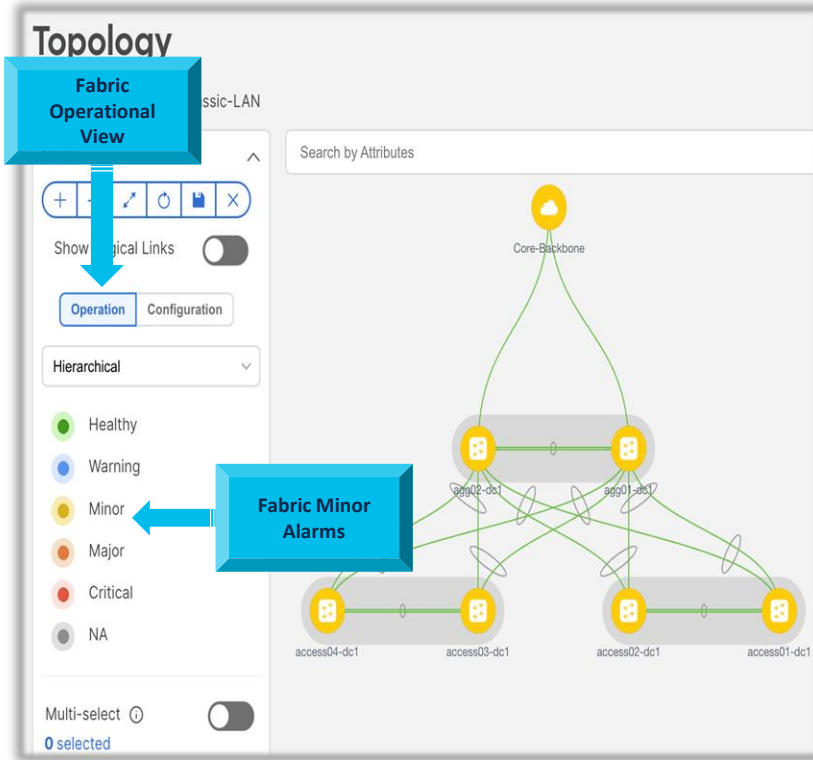
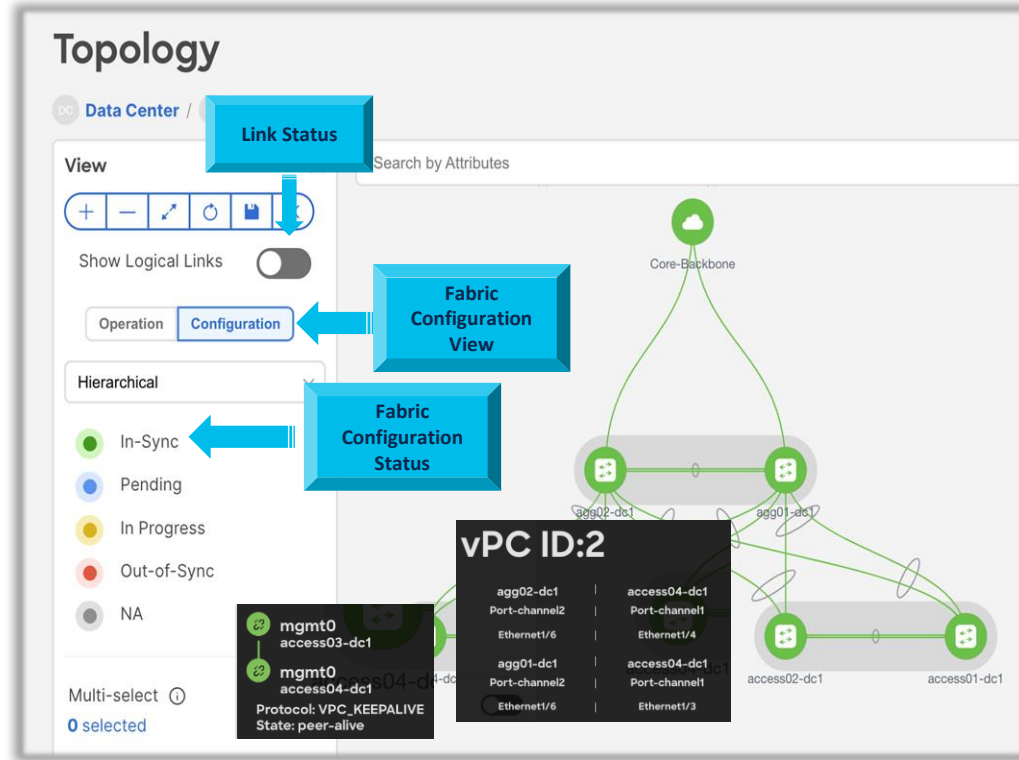
Allow VLAN towards
Aggregation (uplink)
and Compute-Host
(downlink)

Network and VRF Deployment Status

In Enhanced Classic LAN



NDFC Enhanced Classic LAN Topology View



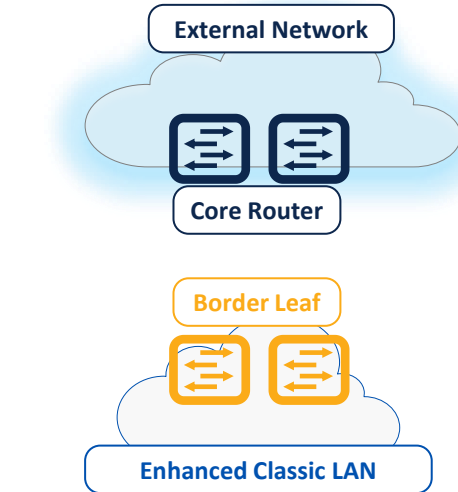
Enhanced Classic LAN External IP Handoff

Who can be the External Router?



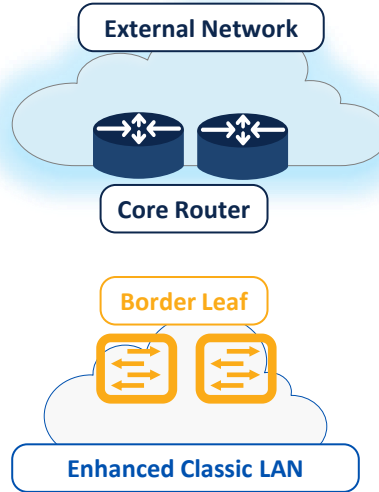
Core or Edge Router Placement Option

Nexus and Non-Nexus support



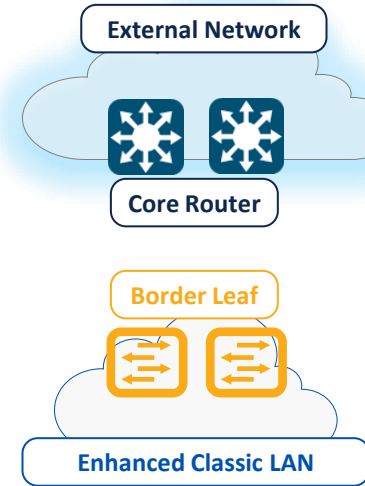
Managed NX-OS

- ✓ - Nexus 9000
- ✓ - Nexus 7000



Managed IOS-XR

- ✓ - Cisco 8000
- ✓ - ASR 9000
- ✓ - NCS 5500



Managed IOS-XE

- ✓ - Catalyst 9000
- ✓ - Catalyst 8000
- ✓ - ASR 1000
- ✓ - CSR 1000

Managing Core/Edge Devices

- Part of 'External Connectivity Network' Fabric
- Create Fabric, discover Switches, set Role, Recalculate & Deploy

The screenshot displays the Cisco DNA Center interface for managing a fabric. It is divided into three main sections:

- Create Fabric:** Shows the 'Fabric Name' as 'Core-Fabric'. Under 'General Parameters', 'BGP AS #' is set to '65534'. The 'Pick Fabric' dropdown is set to 'External Connectivity Network'.
- Add Switches - Fabric: Core-Fabric:** Shows the 'Switch Addition Mechanism' set to 'Discover'. Under 'Seed Switch Details', the 'Fabric' is 'Core-Fabric', 'Switch' is '192.18.0.22', and 'Max Hops' is '2'. The 'Discovery Results' table lists discovered switches:

Switch Name	Serial Number	IP Address
Core1	9FBR20MC7SJ	192.18.0.22
Core2	92NWQIKMBHH	192.18.0.23

- Fabric Overview - Core-Fabric:** Shows a table of switches with their roles and statuses. The 'Switches' tab is active.

Switch	IP Address	Role	Serial Number	Mode	Config Status	Oper Status	Discovery Status	Model
Core1	192.18.0.22	Leaf	9FBR20MC7SJ	Normal	NA	Minor	OK	N9K-C9300v
Core2	192.18.0.23	Leaf	92NWQIKMBHH	Normal	NA	Minor	OK	N9K-C9300v

On the right, the 'Select Role' dropdown menu is open, showing various roles. The 'Edge Router' role is highlighted.

Select Role

- Search Role
- Border Spine
- Border Gateway
- Border Gateway Spine
- Super Spine
- Border Super Spine
- Border Gateway Super Spine
- Access
- Aggregation
- Edge Router
- Core Router
- ToR

Enabling Auto VRF-LITE

Aggregation to Nexus Edge/Core Router

Step 2

IFC prototypes

Define IFC Type: "Auto"
Recalculate config and deploy

Agg-Core Connectivity

Auto

VRF Lite Agg-Core Inter-Fabric Connection Options

Auto Generate VRF Lite Configuration on Agg and Core

VRF Lite Subnet IP Range

10.33.0.0/16

VRF Lite Subnet Mask

30

Flag that controls auto generation of VRF LITE sub-interface and peering configuration on Agg & Core devices. If set, auto created VRF Lite links will have 'Auto Generate Flag' enabled.

Address range to assign P2P Agg-Core Connections (Min:24, Max:31)



Step 1

Create and Import

Define ECL and External Fabric. Set respective roles (e.g. Aggregation, Core)
Uncheck Fabric monitor mode in External Fabric if the Edge router is in managed mode



Step 3

Deploy Symmetric VRF-Lite Extension

Define Individual VRF extension on the Aggregation
NDFC will add Sub-int and eBGP peering on Aggregation and neighbor Core router
Deploy on ECL Fabric and External Network Fabric

VRF-LITE: Aggregation to Nexus Core

Defining IFC Link on physical interface

- IFC link has been defined
 - Policy should be **ext_fabric_setup**
 - IPs auto selected from **VRF-Lite Subnet IP Range**

Fabric Overview - Classic-LAN Actions ↺ ? — ×

Overview Switches **Links** Interfaces Interface Groups Policies Networks VRFs Event Analytics History Resources

Links Protocol View

Fabric Name == Classic-LAN↔Core-Backbone × Edit Clear All Actions

☐	Fabric Name	Name	Policy	Info	Admin State	Oper State
☐	Classic-LAN↔Core-Backbone	agg01-dc1~Ethernet1/7---core-dc1~Ethernet1/7	ext_fabric_setup	Link Present	↑ Up	↑ Up
☐	Classic-LAN↔Core-Backbone	agg02-dc1~Ethernet1/7---core-dc1~Ethernet1/6	ext_fabric_setup	Link Present	↑ Up	↑ Up

VRF-LITE: Aggregation to Nexus Core

Defining VRF extensions on Aggregation

- Verify ECL fabric VRFs were created and customize if needed
 - LAN > Fabrics > **Double click** (your ECL Fabric) > **VRFs**

The screenshot displays the 'Fabric Overview - Classic-LAN' interface. At the top, there's a navigation bar with tabs: Overview, Switches, Links, Interfaces, Interface Groups, Policies, Networks, **VRFs** (highlighted with a red box), Event Analytics, History, and Resources. Below the navigation bar, there's a search bar with 'VRF Name == Internet' and buttons for 'Edit', 'Clear All', and 'Actions'. A table lists VRFs with columns 'VRF Name' and 'VRF Status'. The 'Internet' VRF is highlighted with a red box. To the right of the table, an 'Actions' dropdown menu is open, showing options: Create, **Edit** (highlighted with a red box), Deploy, and Import. A red arrow points from the 'Edit' option to a red callout box that says: 'Edit VRF if you want to modify route advertisement or other VRF specifics'.

VRF-LITE: Aggregation to Nexus Core

Defining VRF extensions on Aggregation

Edit VRF

VRF Name*

Internet

VLAN ID

2002

Propose VLAN

VRF Template*

[VRF_Classic >](#)

General Parameters

Advanced

Routing Protocol

eBGP

VRF Lite Agg-Core or Collapsed Core-WAN Peering Protocol (from Fabric Settings)

General Parameters

Advanced

Redistribute Direct Route Map

FABRIC-RMAP-REDIST-SUBNET

Max BGP Paths

2

1-64

Config Static 0/0 Route



Flag to Control Static Default Route Configuration

Enable BGP Authentication



Enable Auto Peering over SVI Between VPC Aggs



Flag to Control per VRF iBGP/OSPF Peering between Aggs. The protocol to use is based on vrf-lite routing protocol in Fabric setting

VRF-LITE: Aggregation to Nexus Core

Defining VRF extensions on Aggregation

- **Attach** VRF to Aggregation and extend through **VRF-Lite**

VRF Overview - Internet

Actions Refresh

Overview **VRF Attachments** Networks

Note: Access switches are not directly displayed, but are configured via aggregation switches.

Filter by attributes

Actions

☒ VRF Name	VLAN ID	Switch	Status	Attachment	Switch Role	History
☒ Internet		agg02-dc1	NA	Detached	aggregation	☒ Edit
☒ Internet		agg01-dc1	NA	Detached	aggregation	Preview
						Deploy

VRF-LITE: Aggregation to Nexus Core

Defining VRF extensions on Aggregation

Edit VRF Attachment - Internet

agg02-dc1(9QKPGYM64AF) - agg01-dc1(97FBMJ24STC)

Detach ☐ Attach ☒

VLAN*

2002

Extend*

VRF_LITE

Extension
Type

MTU

9216

ENABLE_IFC_NETFLOW



AUTO_VRF_LITE_FLAG



PEER_VRF_NAME*

Internet

Provide VRF name for External
Core. By default, NDFC uses the
same name as Agg VRF

ROUTE_MAP_IN



IPv4 Inbound Route Map. No route-map if
blank

ROUTE_MAP_OUT



IPv4 Outbound Route Map. If blank, use
'EXTCON-RMAP-FILTER' or 'EXTCON-RMAP-
FILTER-ALLOW-HOST'

Extension

Filter by attributes

Attach-All

Detach-All

Attach VRF

Action	Attached	Source Switch	Type	IF_NAME	Dest. Switch	Dest. Interface	DOT1Q_ID	IP_MASK	IP_TAG
Edit	Attached	agg02-dc1	VRF_LITE	Ethernet1/7	core-dc1	Ethernet1/6	3	10.33.0.5/30	
Edit	Attached	agg01-dc1	VRF_LITE	Ethernet1/7	core-dc1	Ethernet1/7	3	10.33.0.1/30	

VRF-LITE: Aggregation to Nexus Core

Preview and Deploy VRF extensions on Aggregation

Pending Config - Classic-LAN - agg01-dc1

```
vrf context internet
  description Internet
  ip route 0.0.0.0/0 10.33.0.2
  address-family ipv4 unicast
  address-family ipv6 unicast
exit
router bgp 65500
```

VRF Configs

Default route static
towards External Core

```
vrf internet
  address-family ipv4 unicast
```

```
    redistribute direct route-map fabric-rmap-redist-subnet
    maximum-paths 2
    exit
  address-family ipv6 unicast
    redistribute direct route-map fabric-rmap-redist-subnet
    maximum-paths 2
    exit
```

Route-Map to advertise all connected SVIs
to External Core

```
neighbor 10.33.0.2
  remote-as 65099
  address-family ipv4 unicast
    send-community both
```

eBGP IPv4 VRF neighbor
configs

Aggregation Physical
Interface Config

```
interface ethernet1/7.3
  encapsulation dot1q 3
  mtu 9216
  vrf member internet
  ip address 10.33.0.1/30
  no shutdown
configure terminal
```

VRF-LITE: Aggregation to Nexus Core

Preview and Deploy VRF extensions on External Core

Pending Config - Core-Backbone - core-dc1

Pending Config Side-by-Side Comparison

```
vrf context internet
 address-family ipv4 unicast
exit
router bgp 65099
```

VRF Configs

```
vrf internet
 address-family ipv4 unicast
 neighbor 10.33.0.1
 remote-as 65500
 address-family ipv4 unicast
 send-community both
exit
neighbor 10.33.0.5
 remote-as 65500
 address-family ipv4 unicast
 send-community both
```

eBGP IPv4 VRF neighbor configs

Core Physical Interface Config

```
configure terminal
interface ethernet1/6.3
 vrf member internet
 mtu 9216
 encapsulation dot1q 3
 ip address 10.33.0.6/30
 no shutdown
interface ethernet1/7.3
 vrf member internet
 mtu 9216
 encapsulation dot1q 3
 ip address 10.33.0.2/30
 no shutdown
```

Enhanced Classic LAN Use- cases

Brownfield Deployment

Enhanced Classic LAN **Brownfield**

Already using 3-Tier LAN?
Want to use NDFC for managing your fabric?



NDFC fully supports
Brownfield



Non-disruptive import
of existing 3-Tier Classic
LAN
deployments



Learns topology, all
configuration,
associated resources, IP
subnets, VLANs, STP,
etc.



Start Managing fabric as
if provisioned from
NDFC

Step 2

Discover

Import switches with **Preserve Config**

Define switch Roles (Access and Aggregation)



Step 1

Create

Define fabric settings (FHRP, Routing, VLAN) -

Match STP, VPC pairing, VLAN pool, etc.



Step 3

Recalculate and Deploy

Sanity checks for mis-config and Normalizes configuration to
best practices

Enhanced Classic LAN Brownfield

Existing Networks and VRFs are learnt on a Brownfield import

Fabric Overview - Bf-Fab

Overview Switches Links Interfaces Interface Groups Policies **Networks** VRFs Event Analytics History Resources Virtual Infrastructure Metrics

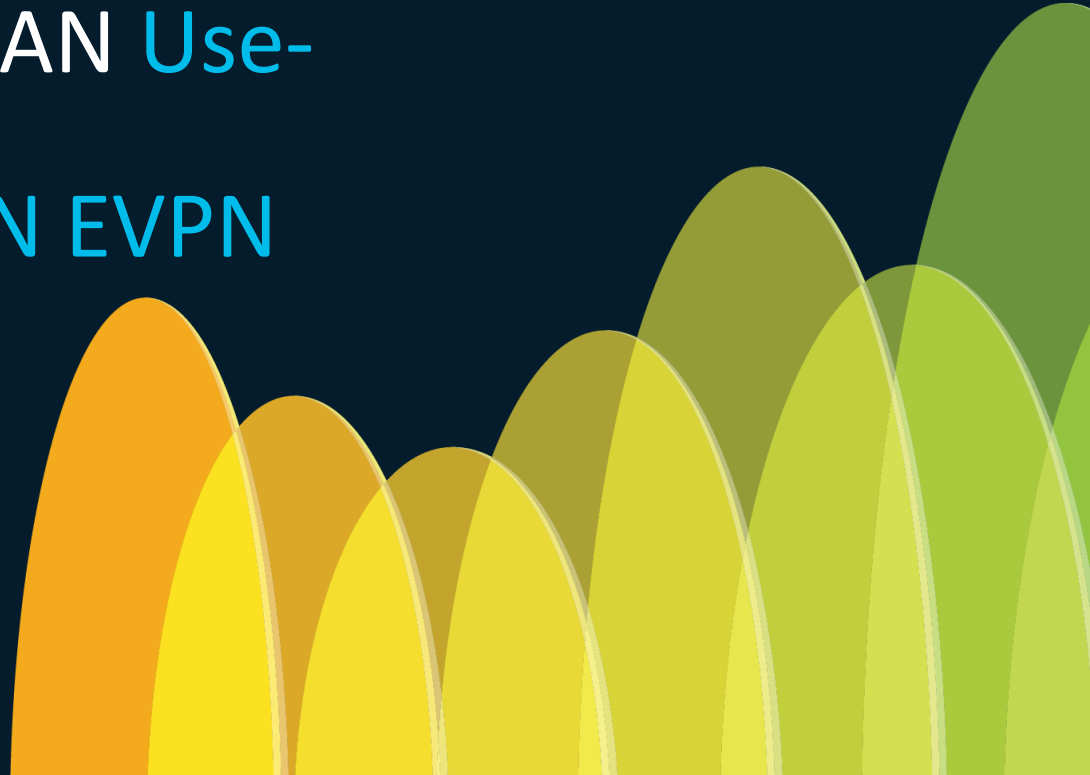
☐	Network Name	VRF Name	IPv4 Gateway/Suffix	IPv6 Gateway/Prefix	Network Status	VLAN ID	Interface Group
☐	Auto_Net_VLAN301	default	192.168.31.1/24		DEPLOYED	301	
☐	Auto_Net_VLAN300	NA			DEPLOYED	300	
☐	Auto_Net_VLAN2303	NA			DEPLOYED	2303	
☐	Auto_Net_VLAN2302	myvrf_50002	192.168.11/24				
☐	Auto_Net_VLAN2304	NA					
☐	Auto_Net_VLAN32	vrf-prod	192.168.32.1/24				
☐	Auto_Net_VLAN34	vrf-prod		2001::192:168:34:1/120			
☐	Auto_Net_VLAN2301	NA					
☐	Auto_Net_VLAN2300	nonprod	1.1.1.1/24	2001::1:1:1:1/112			

VRFs

Overview Switches Links Interfaces Interface Groups Policies Networks **VRFs** Event Analytics History Resources Virtual Infrastructure Metrics

☐	VRF Name	VRF Status
☐	default	DEPLOYED
☐	vrf-prod	DEPLOYED
☐	myvrf_50002	DEPLOYED
☐	nonprod	DEPLOYED

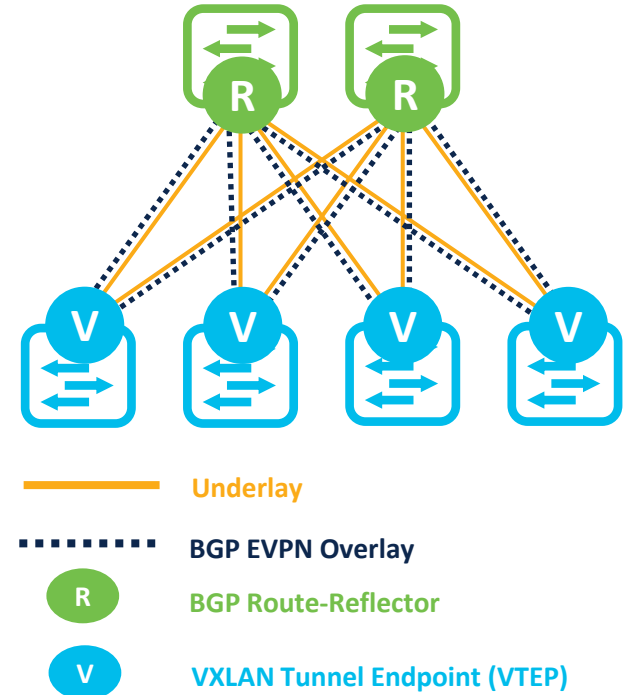
Enhanced Classic LAN Use- cases Migration to VXLAN EVPN



Next Generation– VXLAN BGP EVPN Fabrics

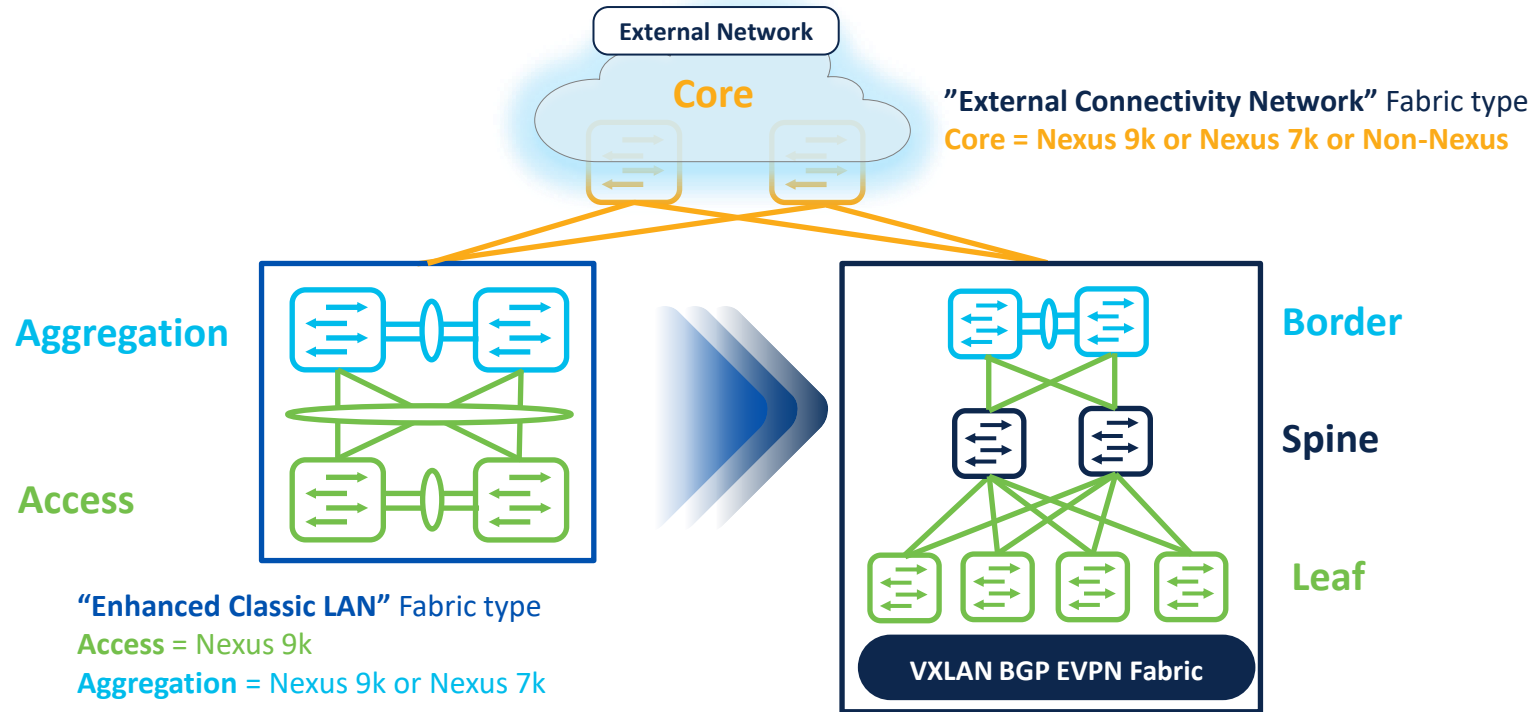
Becoming Industry De-Facto Standard

- An **IGP** is **recommended** for the **underlay** (OSPF or IS-IS)
 - BGP can also be used if needed
- **BGP EVPN** must be used in the overlay to exchange endpoints information
 - **Spines** act as **route-reflectors**
- **VXLAN** is used to transport endpoint traffic in the fabric
 - **Leafs** are considered **VTEP** as they **encapsulate** and **decapsulate VXLAN traffic**



Building VXLAN BGP EVPN DC with Nexus 9000

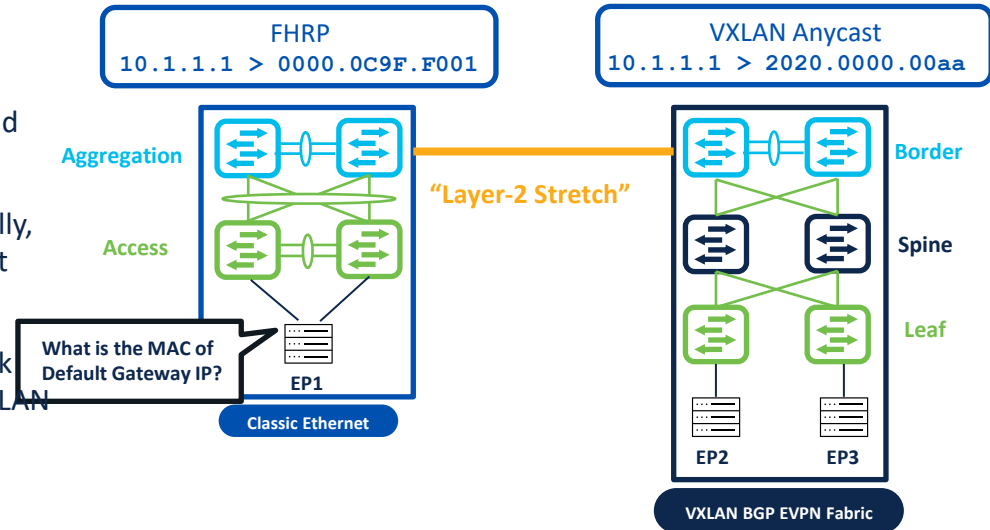
Co-existence or Migration from ECL to VXLAN BGP EVPN Fabric



Classic Ethernet to VXLAN Migration

Default Gateway Placement Considerations

- **Prior to NX-OS 10.2(3) FHRP and Distributed Anycast Gateway (DAG) cannot co-exist**
- FHRP and DAG run in different modes. CE/FP uses HSRP/VRRP while VXLAN uses anycast gateway
- **They cannot be active simultaneously**
- With HSRP the MAC is derived from the HSRP version and the group.
- In VXLAN EVPN the DAG virtual MAC is configured globally, that means all VLANs have the same MAC for the default gateway
- **Two options:** Keep default gateway in the CE/FP network until migration is finished or migrate gateways to the VXLAN EVPN fabric prior to workload migration
- MAC alignment needs to be done in either mode



Classic Ethernet to VXLAN Migration

First Hop Gateway Premigration Steps - MAC alignment

- Manually updating ARP cache isn't feasible
- Prior to any migration HSRP VMAC needs to be changed to the DAG MAC
- Hosts need to be updated by changing the standby HSRP member to active to force a GARP*

*There's a possibility that not all hosts ARP cache gets updated

**All pre-migration steps should be performed during a maintenance window

HSRP VMAC configuration on Aggregation

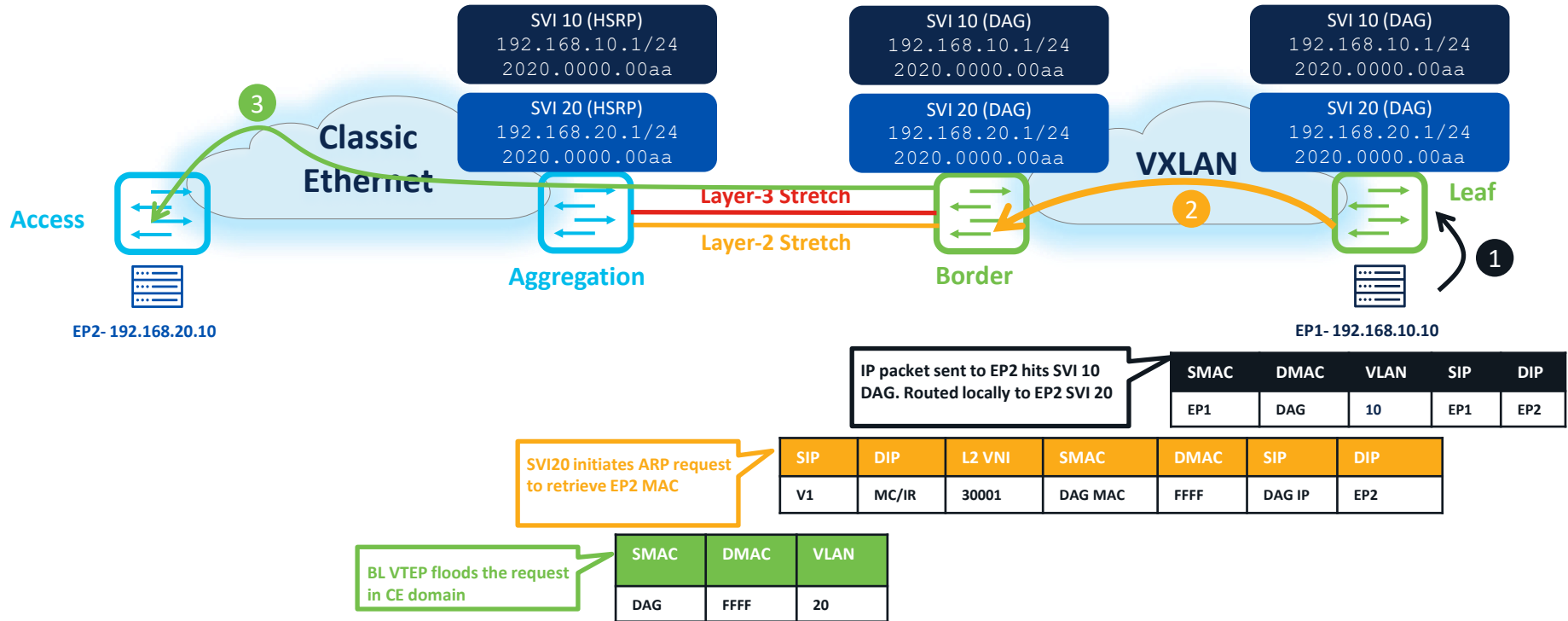
```
interface vlan 20
  vrf member Tenant-A
  ip address 192.168.20.201/24
  hsrp 10
    ip 192.168.20.1
    mac-address 2020.0000.00aa
```

HSRP VMAC configuration on Aggregation

```
interface vlan 20
  vrf member Tenant-A
  ip address 192.168.20.201/24
  hsrp 10
    ip 192.168.20.1
    mac-address 2020.0000.00aa
    priority 120
    preempt
```

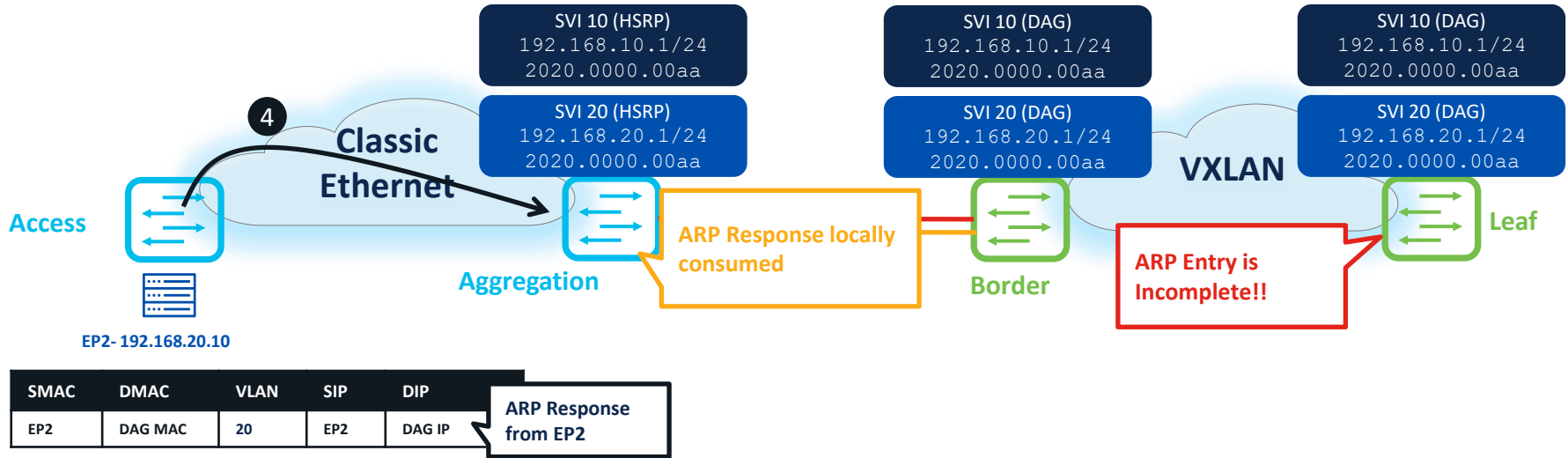
Classic Ethernet to VXLAN Migration

What's the problem before NXOS- 10.2(3)



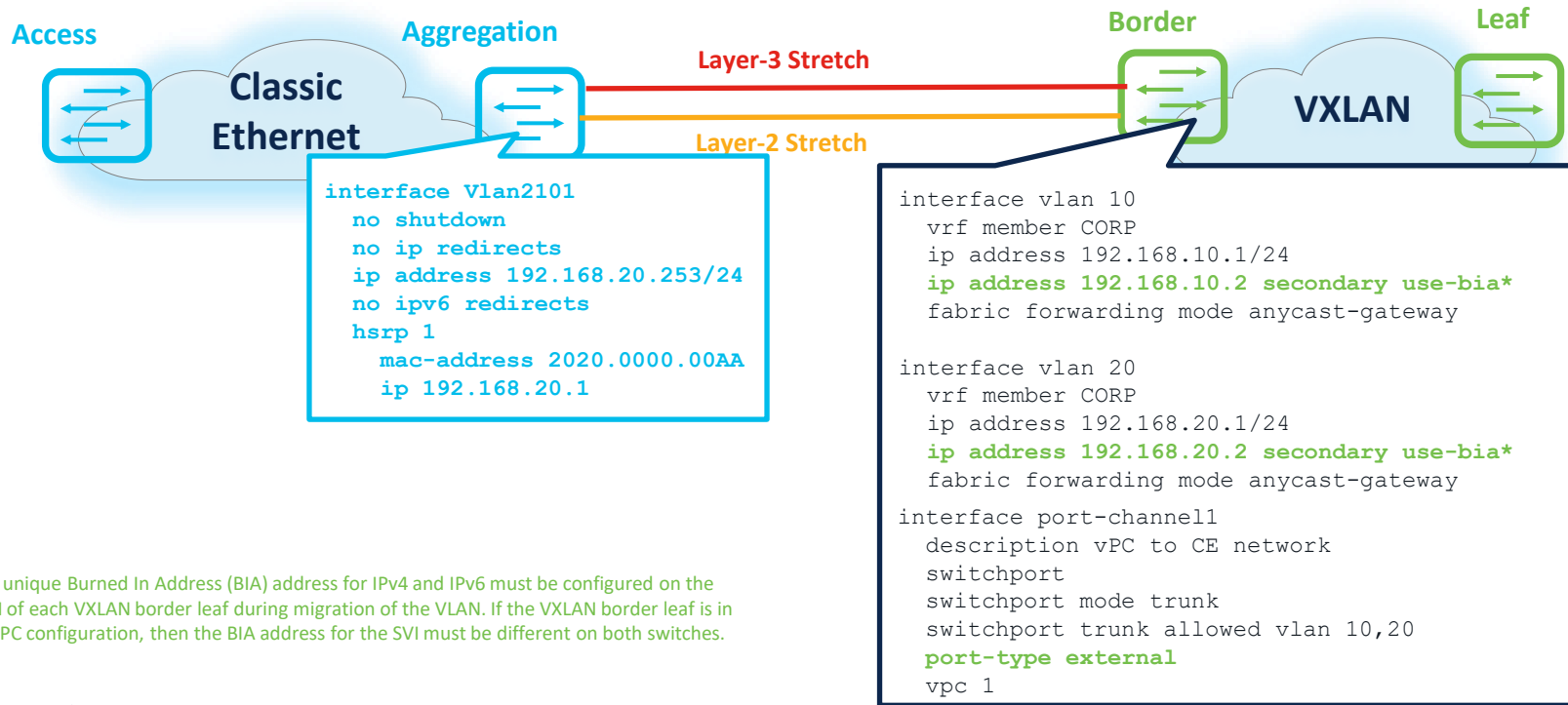
Classic Ethernet to VXLAN Migration

What's the problem before NXOS- 10.2(3)



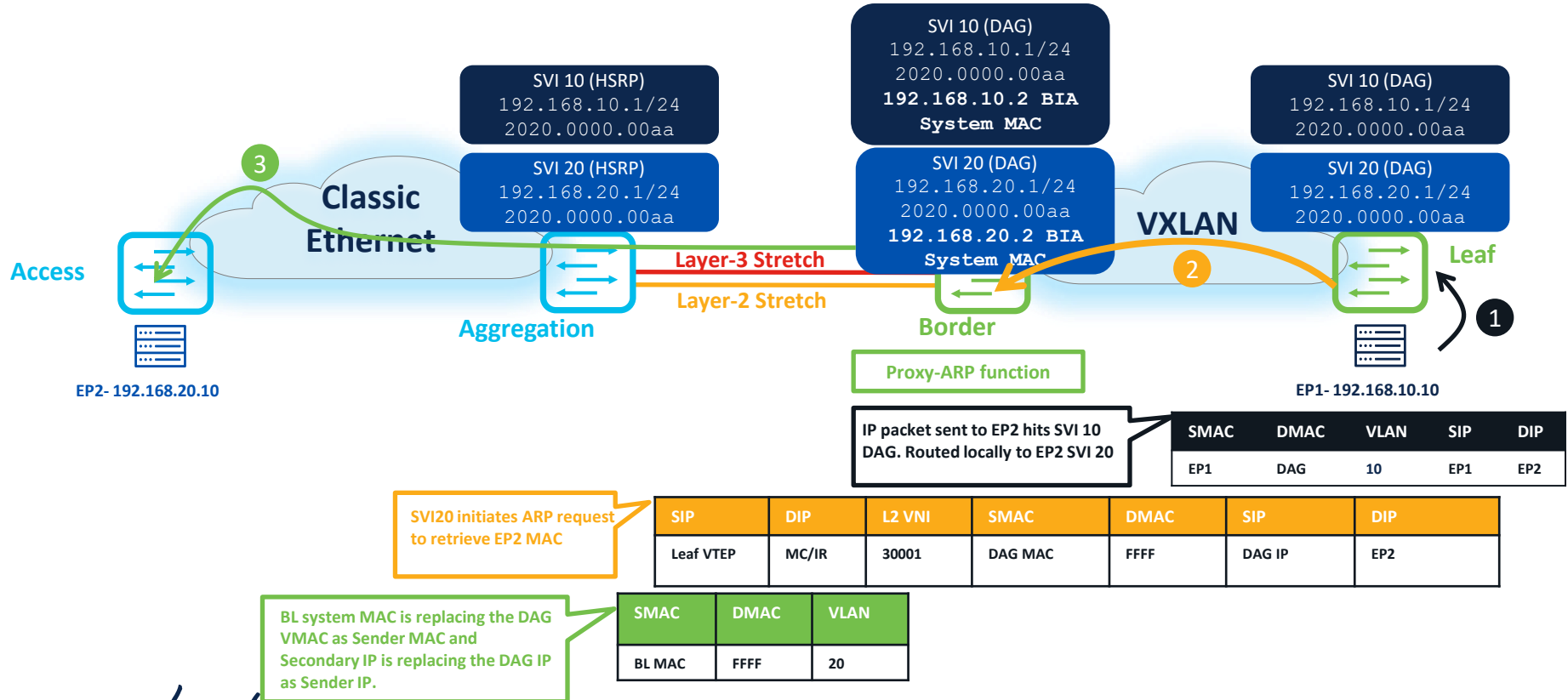
Classic Ethernet to VXLAN Migration

Default Gateway Coexistence of HSRP and Anycast Gateway - 10.2(3)

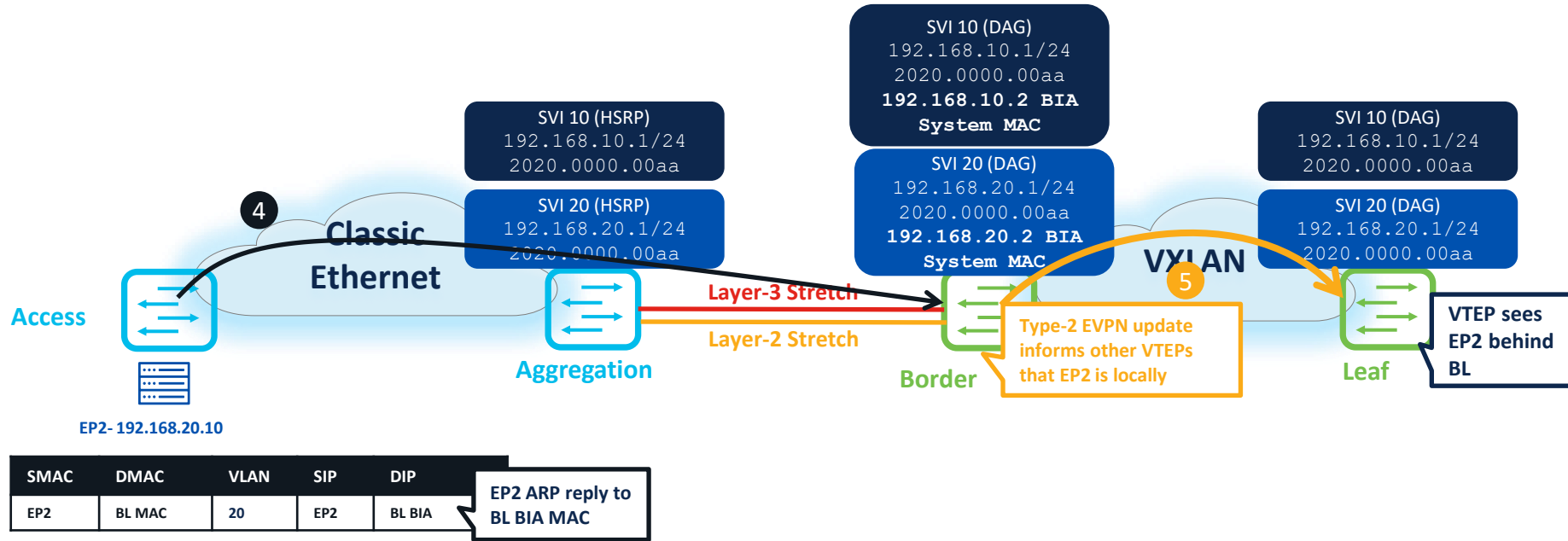


*A unique Burned In Address (BIA) address for IPv4 and IPv6 must be configured on the SVI of each VXLAN border leaf during migration of the VLAN. If the VXLAN border leaf is in a vPC configuration, then the BIA address for the SVI must be different on both switches.

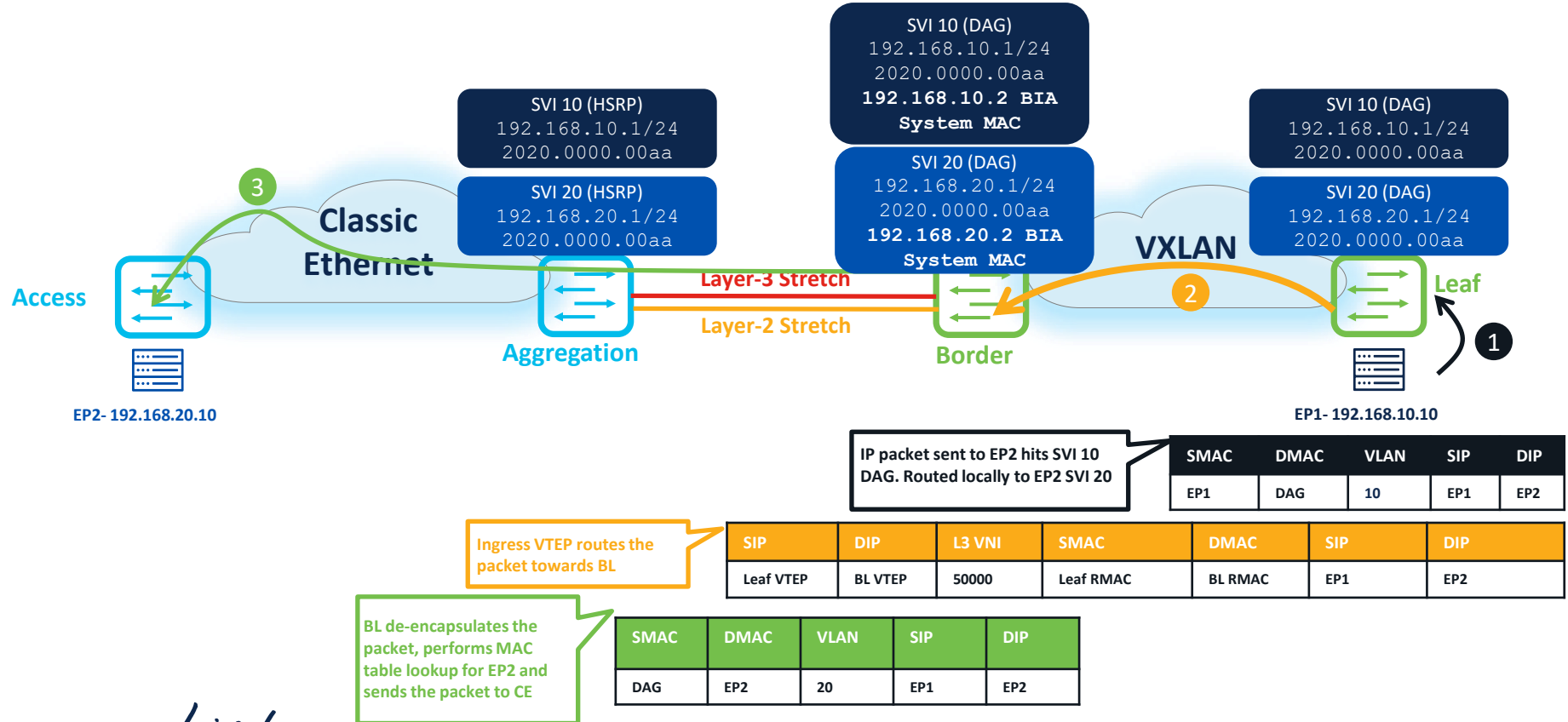
Classic Ethernet to VXLAN Migration



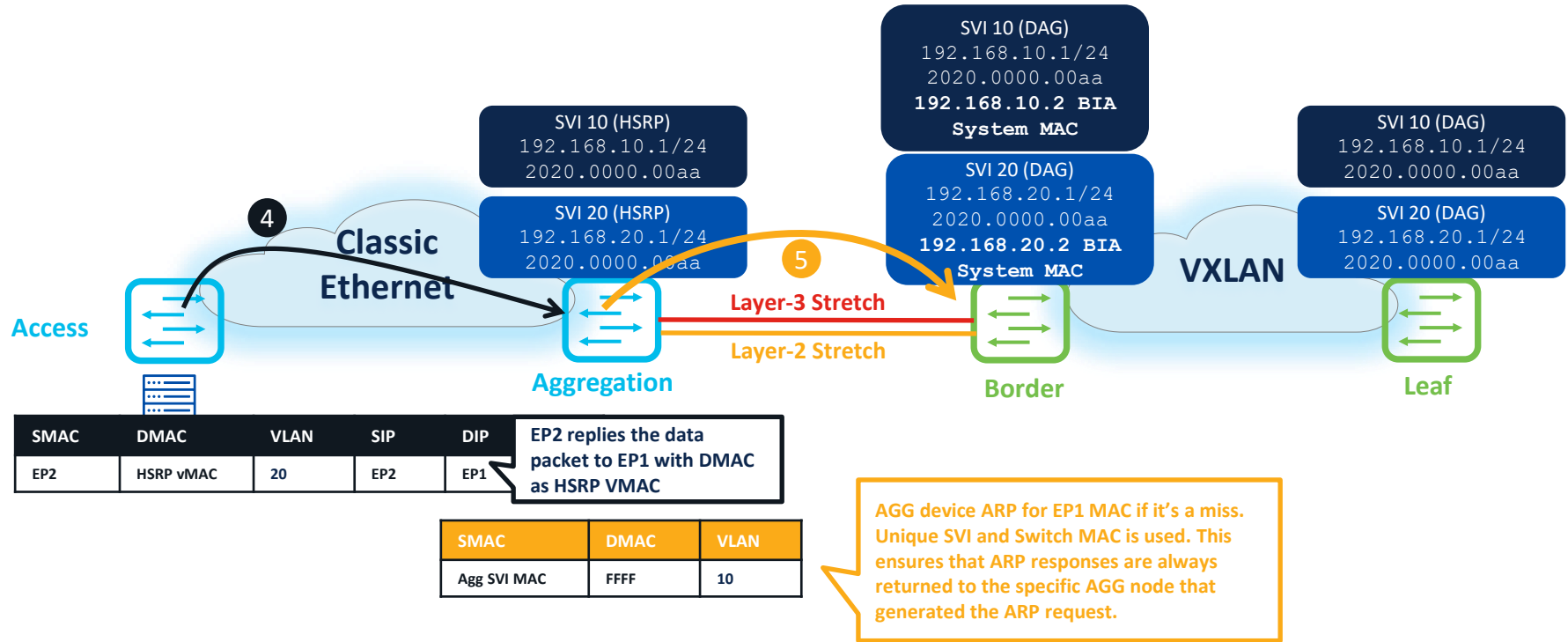
Classic Ethernet to VXLAN Migration



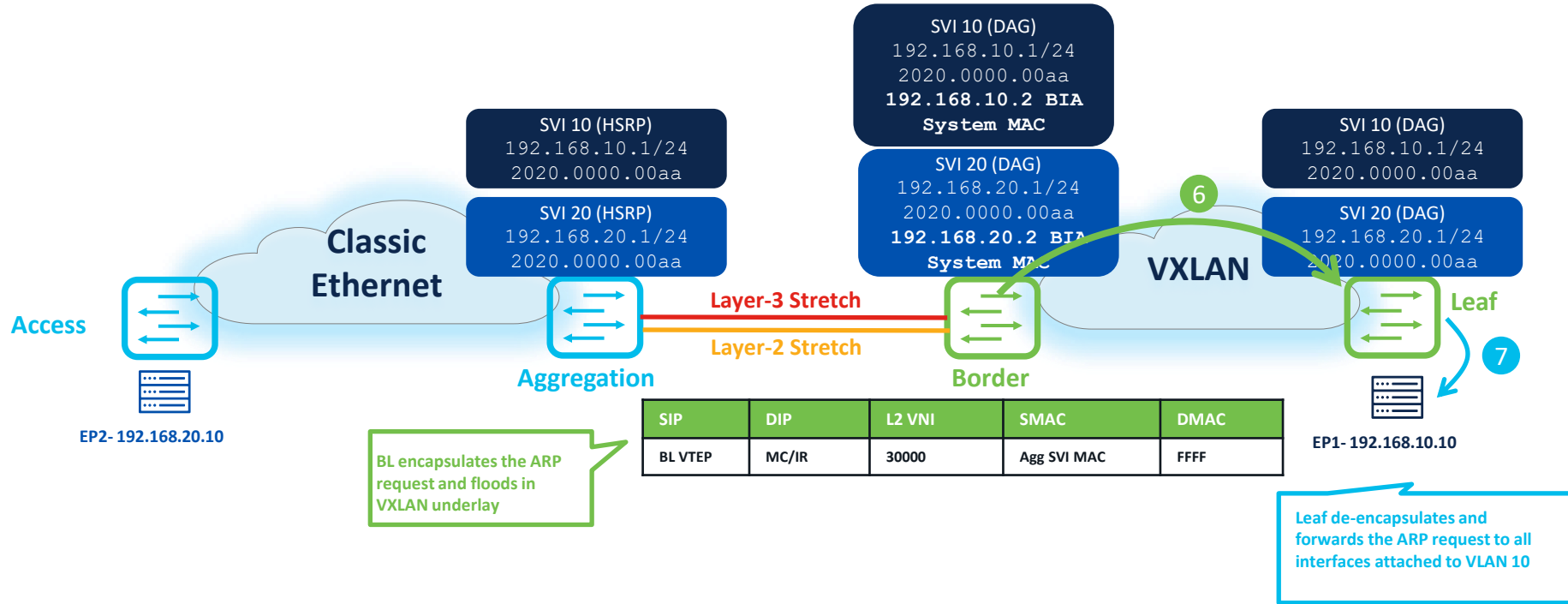
Classic Ethernet to VXLAN Migration - Routed



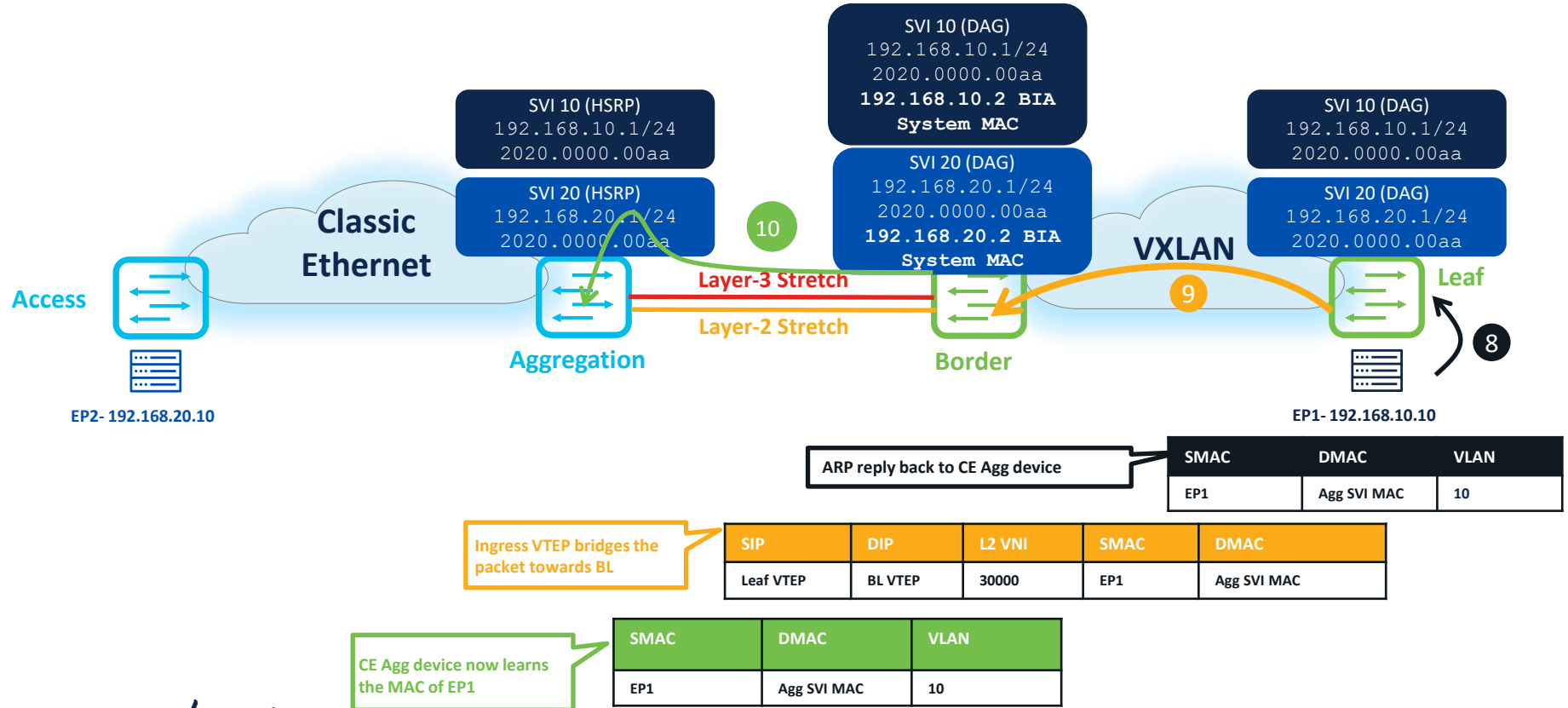
Classic Ethernet to VXLAN Migration - Routed



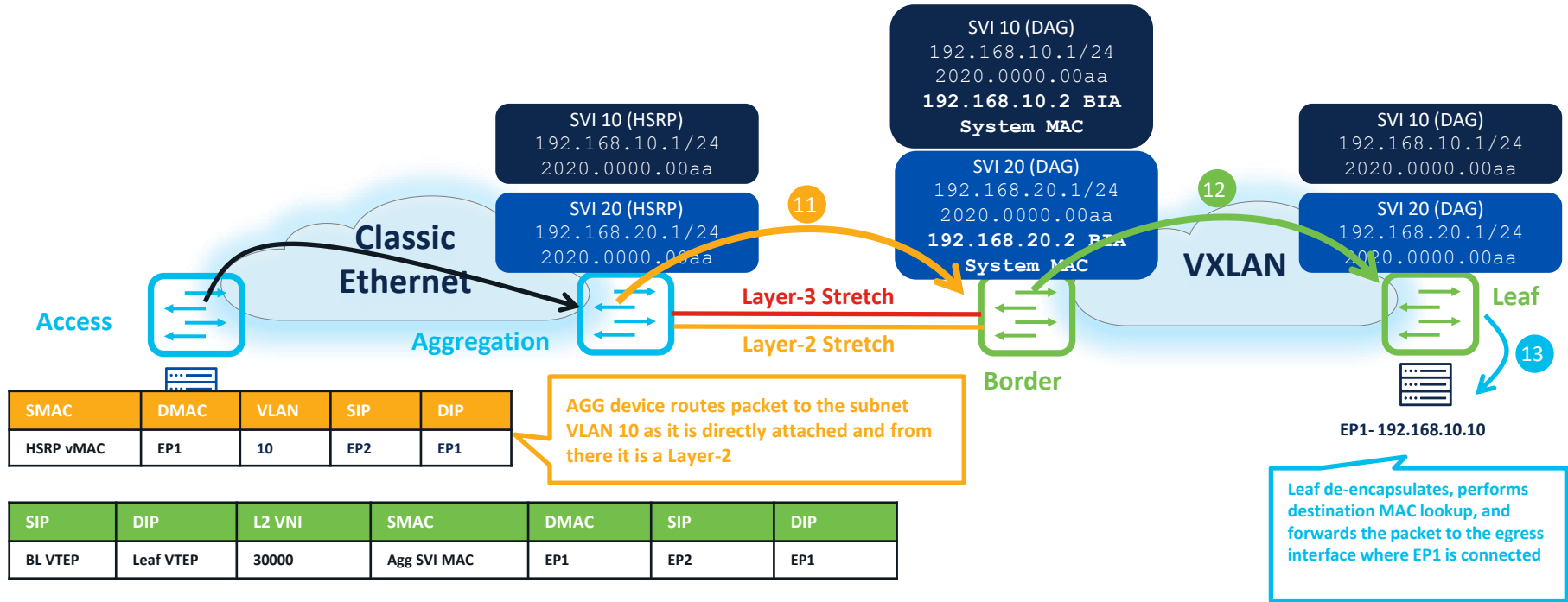
Classic Ethernet to VXLAN Migration - Routed



Classic Ethernet to VXLAN Migration - Routed



Classic Ethernet to VXLAN Migration - Routed



Migration to VXLAN BGP EVPN Fabric

Using NDFC- High Level Steps

Step 1

Discover existing Brownfield Classic Ethernet Network using ECL. Supported roles are access and aggregation. NDFC will learn existing Networks and VRFs

Step 2

Setup Greenfield Data Center VXLAN BGP EVPN fabric. Discover and import greenfield switches in NDFC for VXLAN Day-0 and Day-1 configs

Step 3

Create Layer-2 VPC port-channel and Layer-3 IP handoff between Aggregation switches in ECL and Border Leafs in VXLAN fabric

Step 4

Deploy new Networks from VXLAN fabric. Migrate existing Networks from ECL to VXLAN. Co-existence of FHRP and DAG is supported started NX-OS 10.2(3)

Step 5

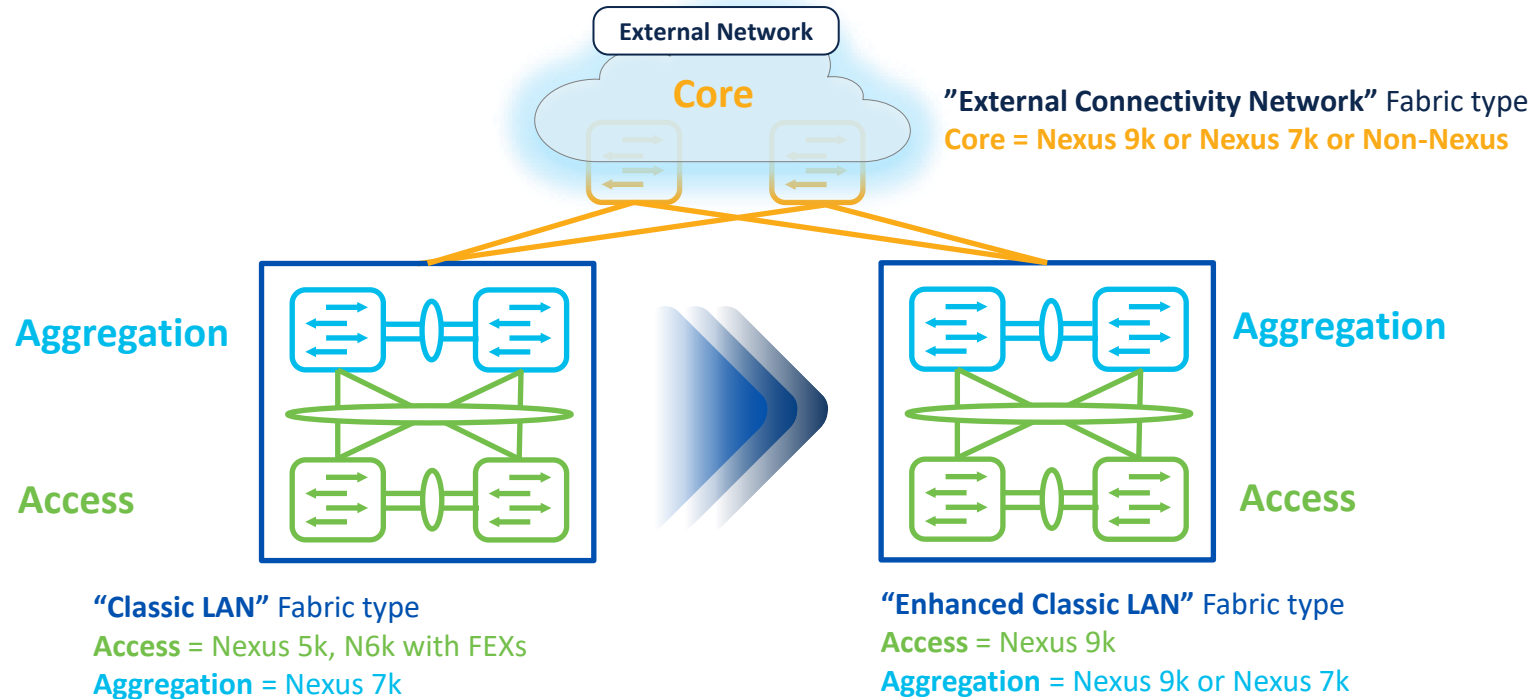
Classic Ethernet Network in ECL can eventually be retired as the refresh to Nexus 9000 in VXLAN BGP EVPN fabric completes

For more information visit BRKDCN-2951 and Cisco White Paper

<https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/migrating-classic-ethernet-to-vxlan-bgp-evpn-white-paper.html>

Building DC with Nexus 9000

Migration from older nexus to newer nexus platform



Migration from CL to ECL

Step 1

Preserve existing Nexus 5000 or 6000 with FEXs in Classic LAN (continue managing using Policies)

Step 2

Create Enhanced Classic LAN fabric and Brownfield import of any existing Nexus 9000 or 7000

Step 3

Greenfield add of any new Nexus 9000 into Enhanced Classic LAN to leverage full automation, compliance, and management

Step 4

Create Layer-2 VPC port-channel between Nexus 5000 or 6000 in Classic LAN and Nexus 9000 in Enhanced Classic LAN

Step 5

Keep Core router part of External connectivity network for VRF-LITE use-cases

Step 6

Nexus 5000 or 6000 in Classic LAN can eventually be retired as the refresh to Nexus 9000 in Enhanced Classic LAN completes

Enhanced Classic LAN

Day-2



Deployment History Tool

Who deployed what, when, where?

Fabric Overview - External-Edge

Overview Switches Links Interfaces Policies Event Analytics **History** Resources

Deployment History | Policy Change History

Filter by attributes

HostName	Entity Name	Entity Type	Source	Commands	Status	Serial Number	Status
Edge-router	Vlan100	INTERFACE	UNDERLAY	Detailed History	● SUCCESS	91UP4O2KI8R	Successfully deployed admin May 02 2023, 12:20:20
Edge-router	Vlan100	INTERFACE	UNDERLAY	Detailed History	● FAILED	91UP4O2KI8R	
Edge-router	SWITCH	SWITCH	UNDERLAY	Detailed History	● SUCCESS	91UP4O2KI8R	

CLI response messages for easier troubleshooting

Command Execution Details for Edge-router(91UP4O2KI8R)

Config	Status	CLI Response
vrf member eng	● SUCCESS	Warning: Deleted all L3 config on interface Vlan100 VRF eng does not exist. Create vrf to make interface Vlan100 operational
ip address 4.4.4.1/24	● SUCCESS	
no ip redirects	● SUCCESS	
no ipv6 redirects	● SUCCESS	
hsrp version 2	● FAILED	Failed to configure hsrp version 2 on Vlan100 due to invalid command.
hsrp 44	● FAILED	Failed to execute this command, since command#7 (hsrp version 2) failed.
ip 4.4.4.2	● FAILED	Failed to execute this command, since command#7 (hsrp version 2) failed.

CLI command: hsrp version 2

Command Execution Details for Edge-router(91UP4O2KI8R)

Config	Status	CLI Response
router bgp 65100	● SUCCESS	
address-family ipv4 unicast	● SUCCESS	
network 100.1.1.0/24	● SUCCESS	

Streamlined Image and Patch Mgmt. for NX-OS

Simplify, Speed up, and Mitigate Risks of Errors



Why

Upgrading manually might take a long time and prone to error



How

Image Management Automates the whole Upgrade process.



What

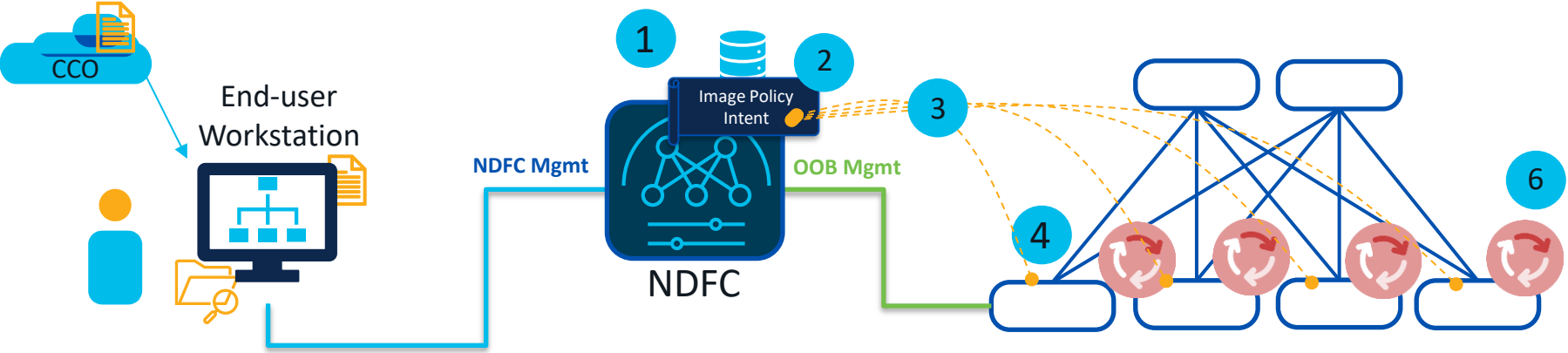
Automate Software Upgrade for One or a Group of Cisco Nexus switches



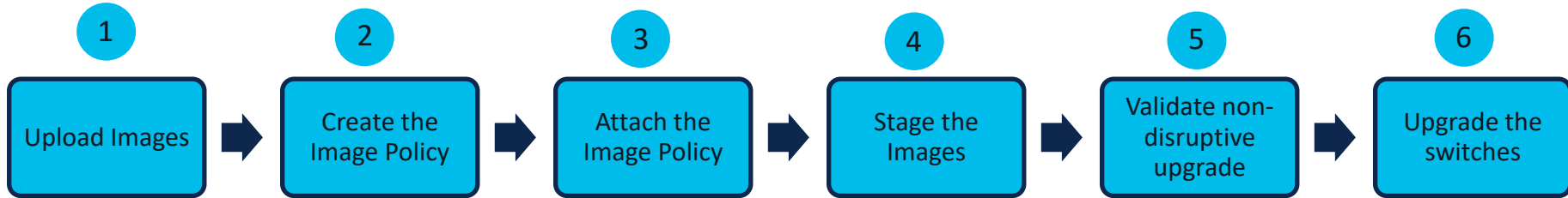
When

Scheduled & On-demand

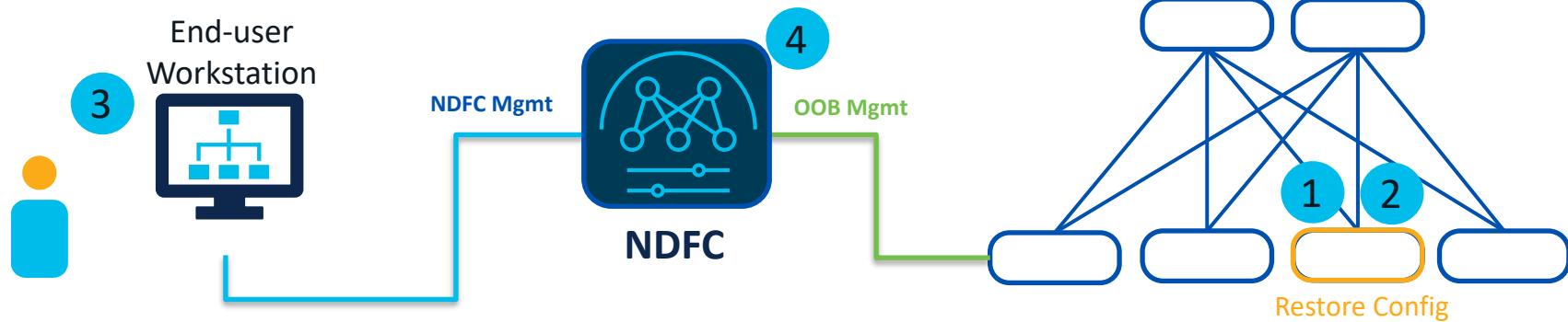
Image Management Workflow with NDFC



Discover the switches into Nexus Dashboard Fabric Controller.



Return Material Authorization (RMA)



1

From the Fabric Overview, select the concerned switch and Change its Mode to Maintenance

2

Replace the switch with new one

3

Provision RMA and Set the Admin Password (for POAP). Manual RMA is also supported

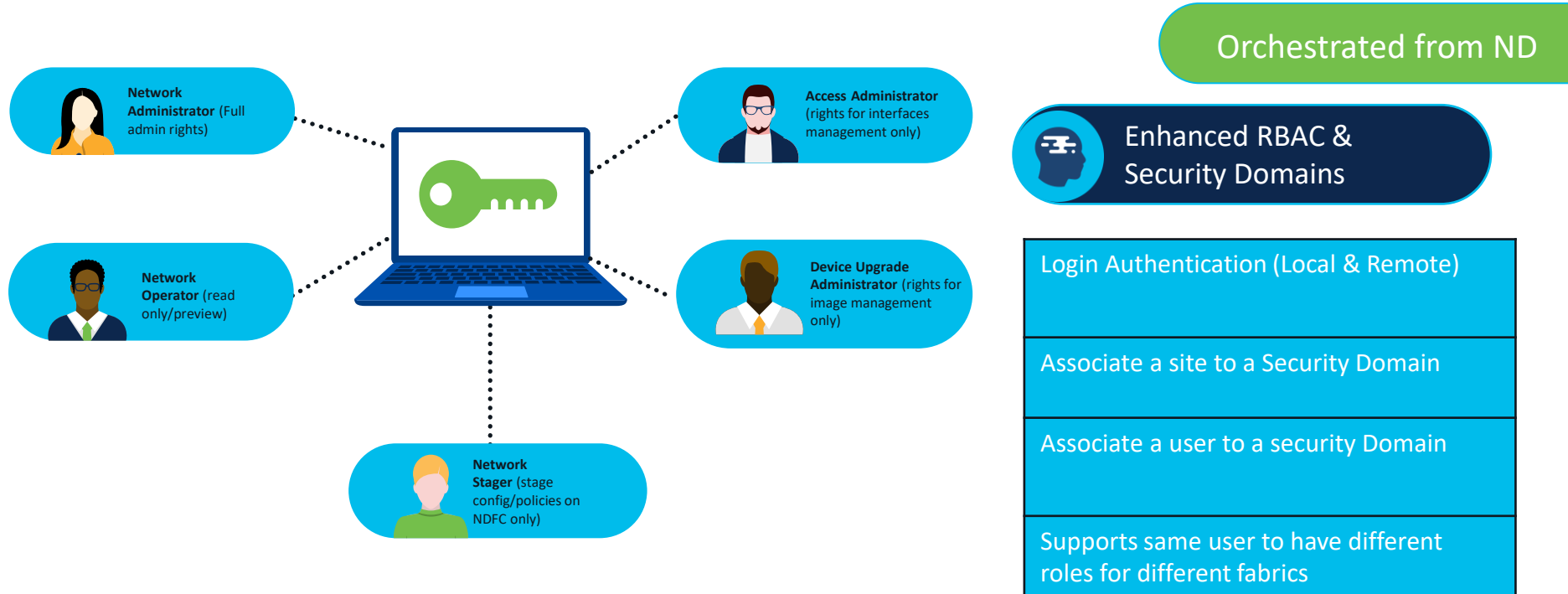
4

Select the device to replace and click Provision RMA

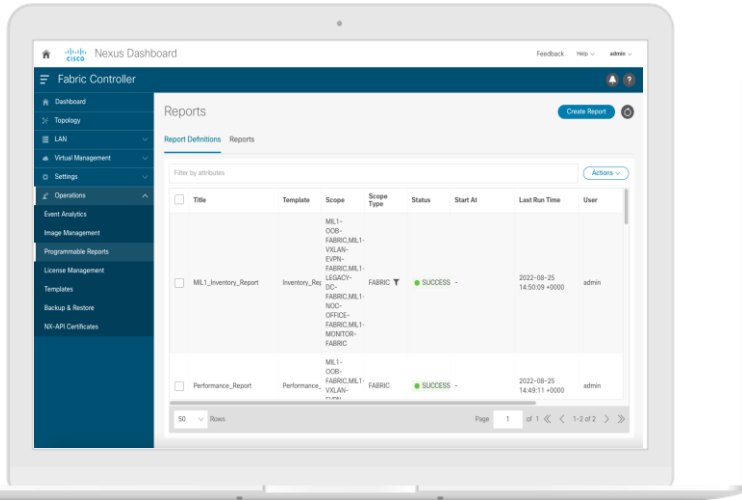
5

Move the device back to Normal Mode (~5 mins for full configuration)

Granular Role-Based Access Control (RBAC)



Programmable Reports



Report Name*

Performance-Report

Select Template*

Performance_Report >

Top records to Chart*

3

Max Number of Rows to show per Table*

20

Include CPU*

true

Include Memory*

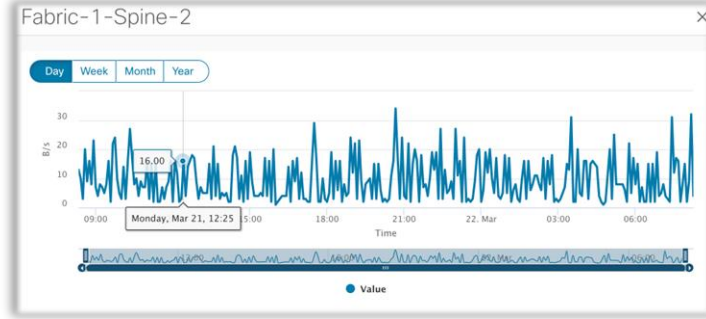
true

Include Links*

true

Include Other Ports*

true



LAN-Perf-Report-2 - Monday, March 21st 2022, 3:22:12 pm



NDFC Compute Visibility

Virtual Machines Manager Integration (Read Only) and Visibility



Virtual Management Menu ➞ Virtual Infrastructure Manager Tab



Add the Instance of choice: vCenter, K8s cluster or OpenStack cluster with its reachability information as well as its credential



Expand the view to compute hosts, virtual switches and Virtual Machines. Select any VM and get Networks details up to the Leaf node



From the topology view, enter into the VMM instance to view the Hosts, Virtual Switches, and Virtual Machines

VMM Visibility



vCenter Instance

Visualise the Virtual Infrastructure at different layer



Hosts

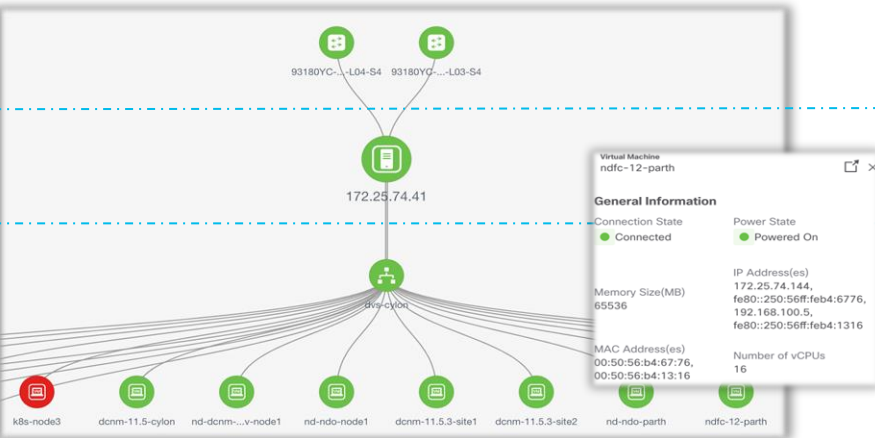
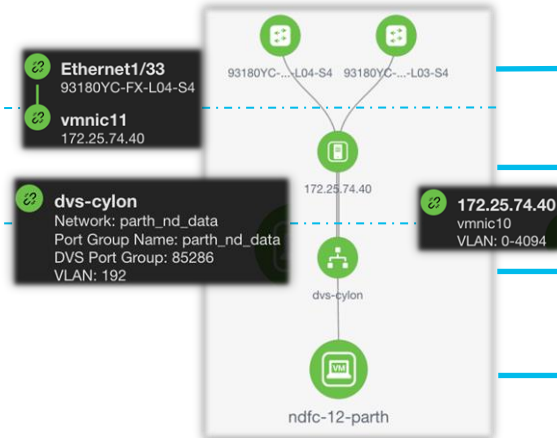


DVS



VM

Display connectivity Details



Leaf nodes

Physical Host

DVS

Virtual Machines

K8s Visibility



K8s Instance

Visualise the K8s Infrastructure at different layer



Nodes



PODs

Display connectivity details

Leaf nodes

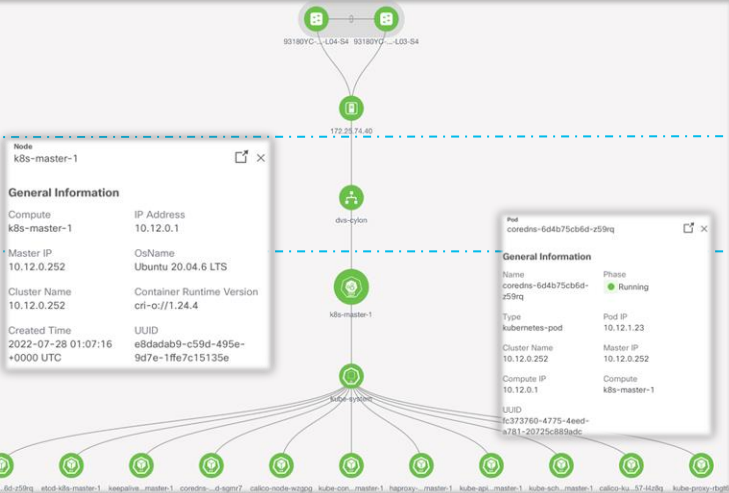
Physical Host

DVS

K8s Node

Namespace

POD



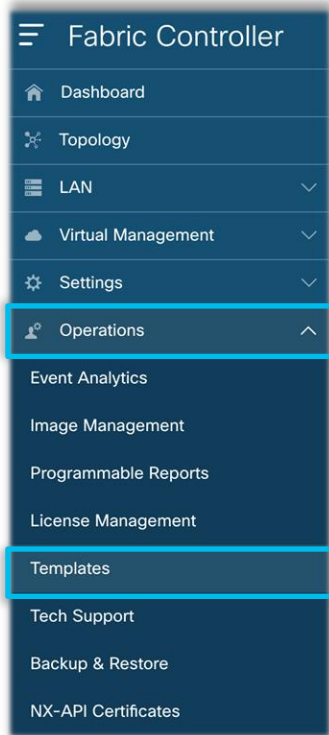
dvs-cylon
Network: network_k8s_prod_206
Port Group Name: network_k8s_prod_206
DVS Port Group: 94221
VLAN: 206

10.12.0.252
k8s-master-1
kube-system

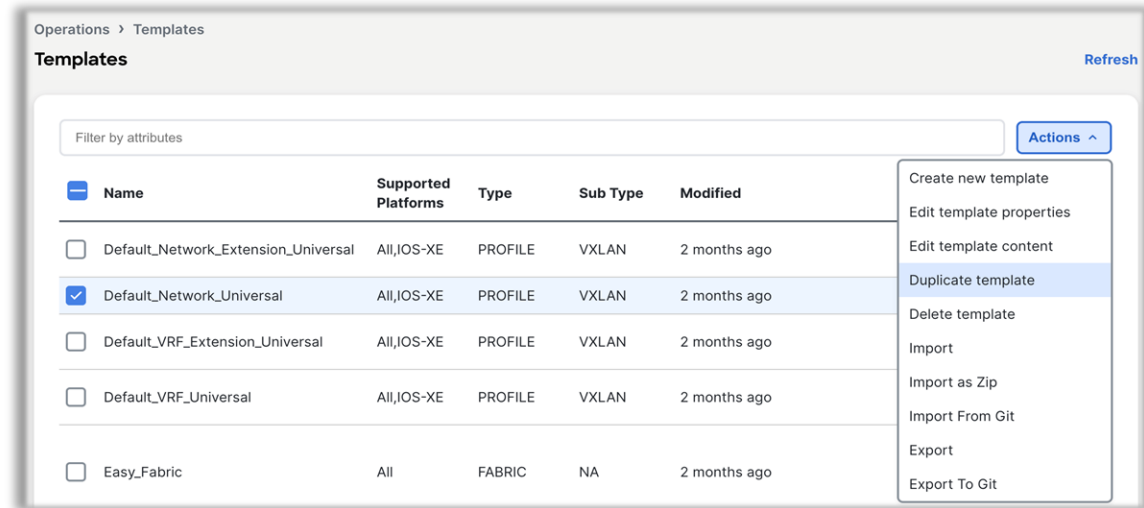
10.12.0.252
kube-system
10.12.1.23
coredns-6d4b75cb6d-z59rq

Cisco Live!

Key NDFC Template Terminology



- **Template:** CLI code-chunks of CLI features, with variables and default values, that go from VXLAN EVPN fabrics up to the Overlay networks, VRFs, and much more, like PBR, vPC pairing, BGP, MPLS, etc.
- **NOTE: Do Not** edit/modify shipping templates. Instead, duplicate the existing template to change the contents and provide a unique name.



Template Types

Policy:	<ul style="list-style-type: none">•Broadly used to configure devices features (hence, the Policy Template reference everywhere in NDFC)
Profile:	<ul style="list-style-type: none">•Overlay Mode, config-profile mode for VRFs and Networks. where the overlay dependencies are managed in the same place (BGP, vlan, vni, intfs, vrf, etc)
CLI:	<ul style="list-style-type: none">•Overlay Mode, can be used instead of Profile. Config is pushed in a “traditional” CLI format
Fabric:	<ul style="list-style-type: none">•The “heavy-lifter” special python template, manages the fabric global parameters and the Policy and Profile/CLI Template Intents for each fabric device.
Show:	<ul style="list-style-type: none">•Allows pushing a bulk of show commands to devices in order to verify services status.
Report:	<ul style="list-style-type: none">•Used to support the Programmable Reports feature, a python SDK bundled with NDFC, provided to simplify report generation.
Exec	<ul style="list-style-type: none">•To use commands available in EXEC mode, includes show commands, clear commands, and other commands that perform actions that you do not save in the device configuration.

Policy Template Instance (PTI)

- When a Policy Template is attached to a device, a unique **Policy ID** is generated, contains details, variable values and the expected generated configuration of that template that will be applied to the device.

Generated Config

```
#POLICY-110920#  
router bgp 65001  
  neighbor 10.2.0.2  
    remote-as 65001  
  update-source loopback0  
  address-family l2vpn evpn  
    send-community  
    send-community extended
```

Policy
Manager

Overview Switches Links Interfaces Interface Groups **Policies** Networks VRFs Services Event Analytics History Resources

Template contains evpn X

Priority order, lowest number
gets executed first

Edit Clear All

Actions ^

Template	Descr...	Content Type	Switch	Entity Name	Entity Type	Source	Priority	Editable	Mark Deleted	Policy ID
☐ base_evpn		TEMPLATE_CLI	Site1-BPE-2	SWITCH	SWITCH	UNDERLAY	100	false	false	POLICY-37600
☐ base_evpn		TEMPLATE_CLI	site1-BPE-1	SWITCH	SWITCH	UNDERLAY	100	false	false	POLICY-37440
☒ evpn_bgp_rr_neighbor		TEMPLATE_CLI	S1-LEAF-1-DDD36RU38	SWITCH	SWITCH	UNDERLAY	150	false	false	POLICY-110920
		TEMPLATE_CLI	S1-LEAF-1-	SWITCH	SWITCH	UNDERLAY	150	false	false	POLICY-110920

Add Policy
Edit Policy
Edit Membership
Delete Policy
Generated Config
Push Config

Policy
Templates

CISCO Live!

Easily license your NDFC

Software included with switch subscription licenses

Tier-based



NXOS Essentials, Advantage, Premier

OR



DCN Essentials, Advantage, Premier

Install base (NX-OS)

New purchase (NX-OS)



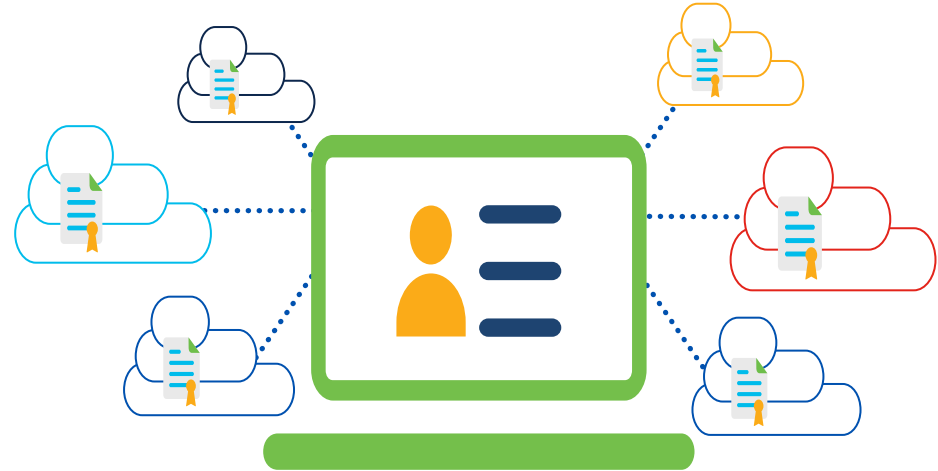
Increased ease of use
and efficient consumption



Less restrictions with flexible
reporting



Reduced overall licensing
friction for users



NDFC 12.0 is transitioning to a Smart Licensing only release

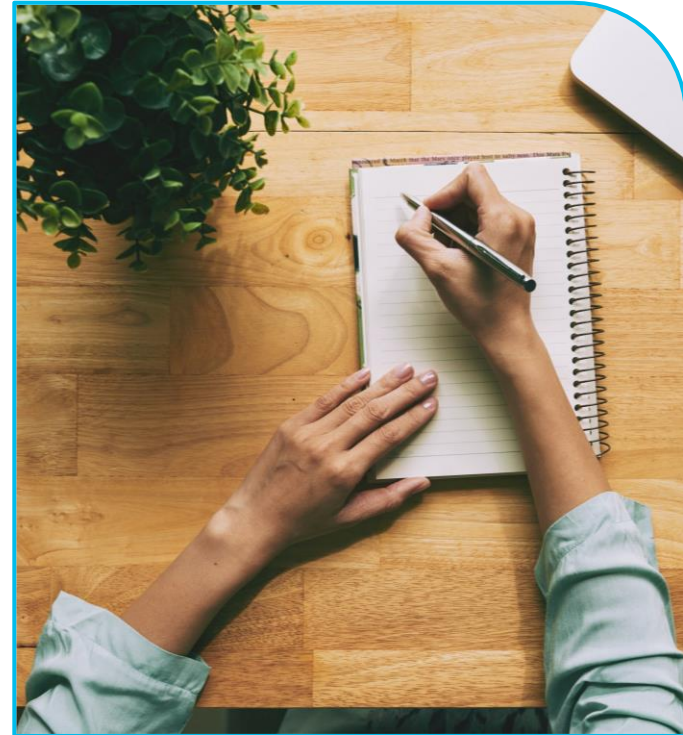
References

- Deep dive demo - [Management of Data Center Architectures using NDFC - YouTube](#)
- Installation of Nexus Dashboard - <https://www.cisco.com/c/en/us/support/data-center-analytics/nexus-dashboard/products-installation-guides-list.html>
- Nexus Dashboard capacity planning tool - <https://www.cisco.com/c/dam/en/us/td/docs/dcn/tools/nd-sizing/index.html>
- NDFC user guide - <https://www.cisco.com/c/en/us/support/cloud-systems-management/prime-data-center-network-manager/products-installation-and-configuration-guides-list.html>
- Whitepaper on ECL - <https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/enhanced-classic-lan-in-cisco-ndfc-1213.html>
- Migration from Classic LAN to VXLAN - <https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/migrating-classic-ethernet-to-vxlan-bgp-evpn-white-paper.html#CiscoNexusDashboardFabricController>

Conclusion



- 1** Investment protection for Nexus 7000 and Nexus 9000 for Classic Ethernet Networks. Support for Brownfield and Greenfield.
- 2** Simplified Day-0 and Day-1 configuration provision using Cisco's best practices including FHRP, STP, VPC, IP routing, and more!
- 3** Extended Day-2 support using intuitive Image management, Performance monitoring, and VMM visualization



Keynote Deep Dives

Wednesday
10:30am – 11:30am



Experiences Amplified:
How AI Can Fuel
Better Employee
and Customer
Experiences

Level 1
Room 106



Smart, Secure,
Seamless:
Transforming
Experiences with
Next-Generation
Networking

Level 2
Room 204



Harness a Bold
New Era:
Transform Data
Centre and
Service Provider
Connectivity

Level 2
Room 203



Securing User to
Application and
Everything in
Between

Level 2
Melbourne Room 2



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Thank you

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