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Easy Deployment and Management of NXOS Fabrics (VXLAN) with DCNM

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BRKDCN-2939

CISCO *Live!*

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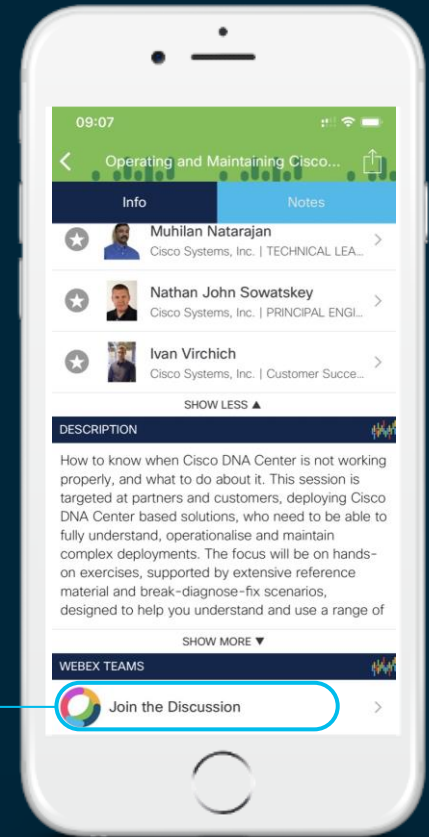
Cisco Webex Teams

Questions?

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

How

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



Agenda

- Introduction: DCNM 11.3 Overview
- VXLAN EVPN Greenfield Deployment
- VXLAN Multi-Site Fabric Deployment
- VXLAN EVPN Brownfield Deployment
- Monitoring, Maintenance & Troubleshooting
- Network Insights Advisor & Resources
- DCNM Fabric Live Demonstrations
- Conclusion: Evolution of Fabric Management

Introduction: DCNM

11.3 Overview

Why Choose DCNM for Your Data Center?



Automation



Visibility



Consistency

Data Center Network Manager (DCNM)

Single Management Solution for

- VXLAN EVPN Programmable Fabric
- Classic LAN Deployments
- IP Media Network Controller (PMN)
- SAN (MDS & Nexus)

Helps in Day 2 Operations

- Real-Time Topology
- Integrated Compute Visibility
- Performance Monitoring
- Fault Management
- Configuration Compliance
- Image Management, Upgrades and RMA

Addresses End-to-End Network Provisioning

- GUI/API-Based Provisioning
- Multi-Fabric & Multi-Site
- Network Configuration Backup & Restore

Network Architecture Deployment Modes

DCNM Modes

Fabric / Overlay Models

VXLAN + BGP-EVPN

- L2 over L3 overlay
- BGP-EVPN control plane
- VXLAN data plane

LAN Fabric Mode – Easy Fabric Template
(Nexus 3k/9k)

Traditional Models

Traditional L2 / L3

- L3 @ aggregation & L2 @ access
- L3 @ access
- 3-tier or spine-leaf model

LAN Fabric mode – External Fabric Template
LAN Classic Mode (Nexus 2k-9k)

LAN Fabric in DCNM 11 for Nexus 3K/9K

Deploy

Centralized config push

Preview

Side-by-side diff

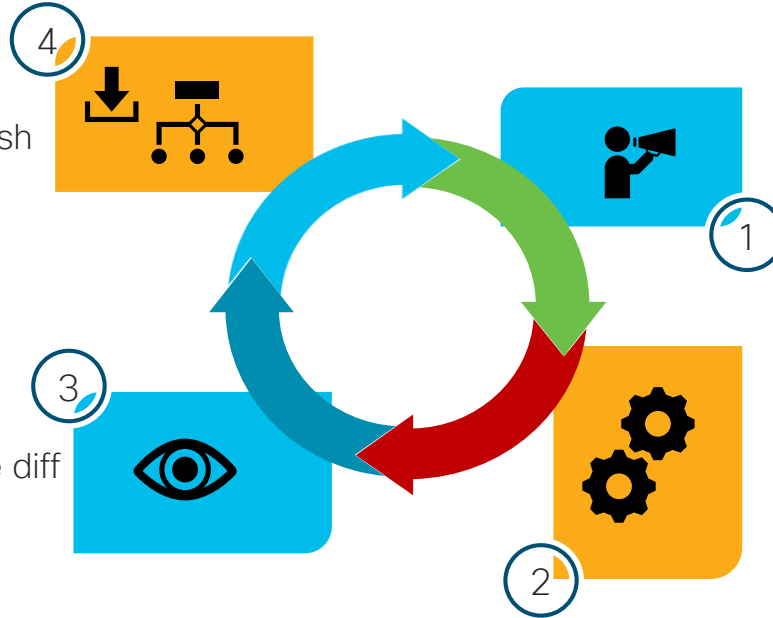
Define

Define Intent based on best practices

- Underlay
- Interfaces
- Overlay

Save

Generates configuration based on intent



Your fabric is ready in a few minutes

What's New in DCNM 11.2(1)?

Design & Deployment

- vPC Fabric Peering
- eBGP based Routed Fabrics
 - Enable EVPN on top (with EPL)
- Easy Fabric Brownfield Enhancements
 - Border Spine/Border GW Spine
 - PIM Bidir
 - Tenant Routed Multicast
- Day-0/Bootstrap with External DHCP server
- Public Cloud Connectivity with Azure (Preview*)

Day 2 Operations

- Network Insights Resources
- Network Insights Advisor
- IPv6 Support for external access (eth0)
- VMM Compute visibility with UCS-FI
- Topology View Enhancements
- Inline Upgrade from 11.0/11.1

Misc. Enhancements

- 250 Switches per DCNM
- Qualifying support for 7.0.3I4(x) long-lived release
- Fabric Template Enhancements
 - Bidir support with 4 RPs
 - ISIS/OSPF/BGP authentication
- Addition of Freeform configuration policies
- Top-down enhancements
 - On-demand generation of a free VLAN for a fabric
 - On-demand generation of an underlay multicast group

What's New in DCNM 11.3(1)?

Design & Deployment

- VXLAN IPv6 underlay
- IPv6 POAP
- Super-Spine and TOR support, Border PE
- Non-Nexus Switch Support
- Public Cloud Connectivity with Azure
- VXLAN to SR/LDP MPLS handoff
- TRM over Multi-Site
- Auto VRF-Lite (knob in IFC)
- Full Routed Fabric support

Day 2 Operations

- Network Insights continued
- EPL 2.0 ~ 4 sites
- New improved health score
- ServiceNow Integration
- IPv6 Support for eth2
- Inline Upgrade from 11.1/11.2 to 11.3(1)
- RPM and SMU install from DCNM
- Image management policies
- API inspector
- Operational view
- Kubernetes Cluster Visualization (Preview)

Misc. Enhancements

- 350 Switches/ 50k EPs
- Qualifying support for 9.3(x) long-lived release
- Fabric Template Enhancements
 - QOS templates
 - BFD support
 - PTP support
 - Strict CC
- History enhancements
- New Backup and Restore
- L3 port-channel support for external connectivity
- Clustered mode from UI
- Bonding support for ISO

Cisco DCNM VXLAN Auto-Deployment



Turn-Key VTEP
Deployment



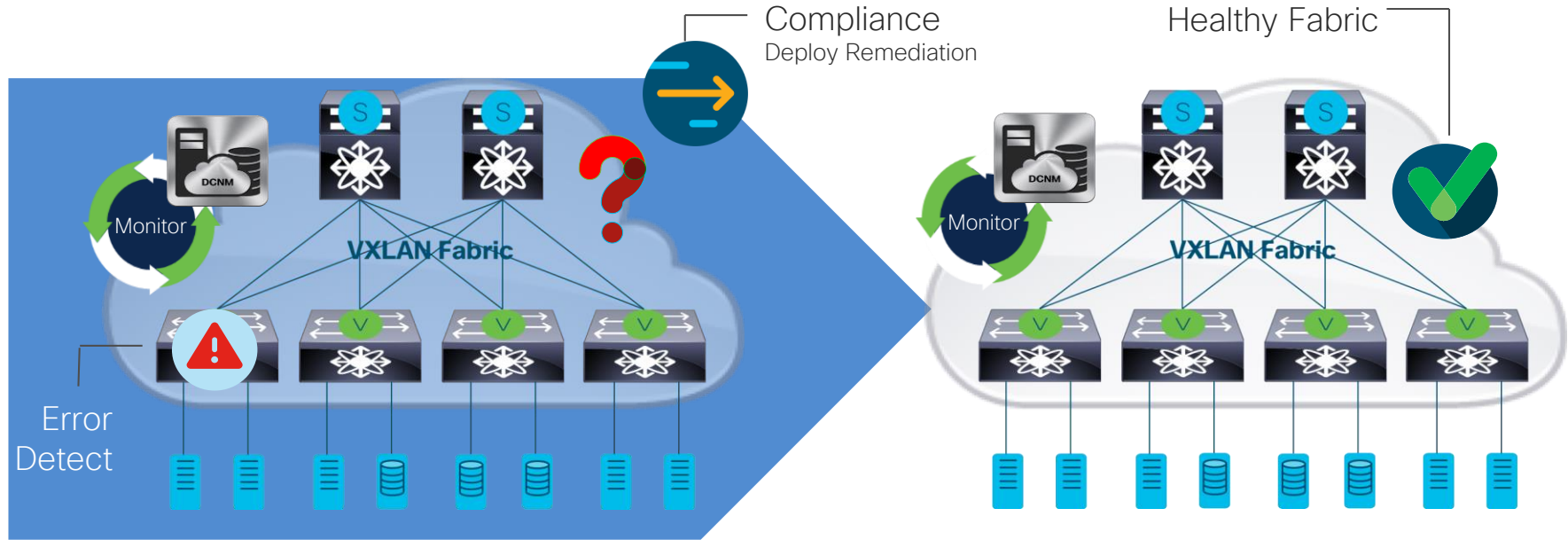
Simplified
Deployment



Managed-Fabric
Operations

cisco *Live!*

Fabric Compliance – Underlay / Overlay / Access



Compliance



Fabric Reliability & Visibility

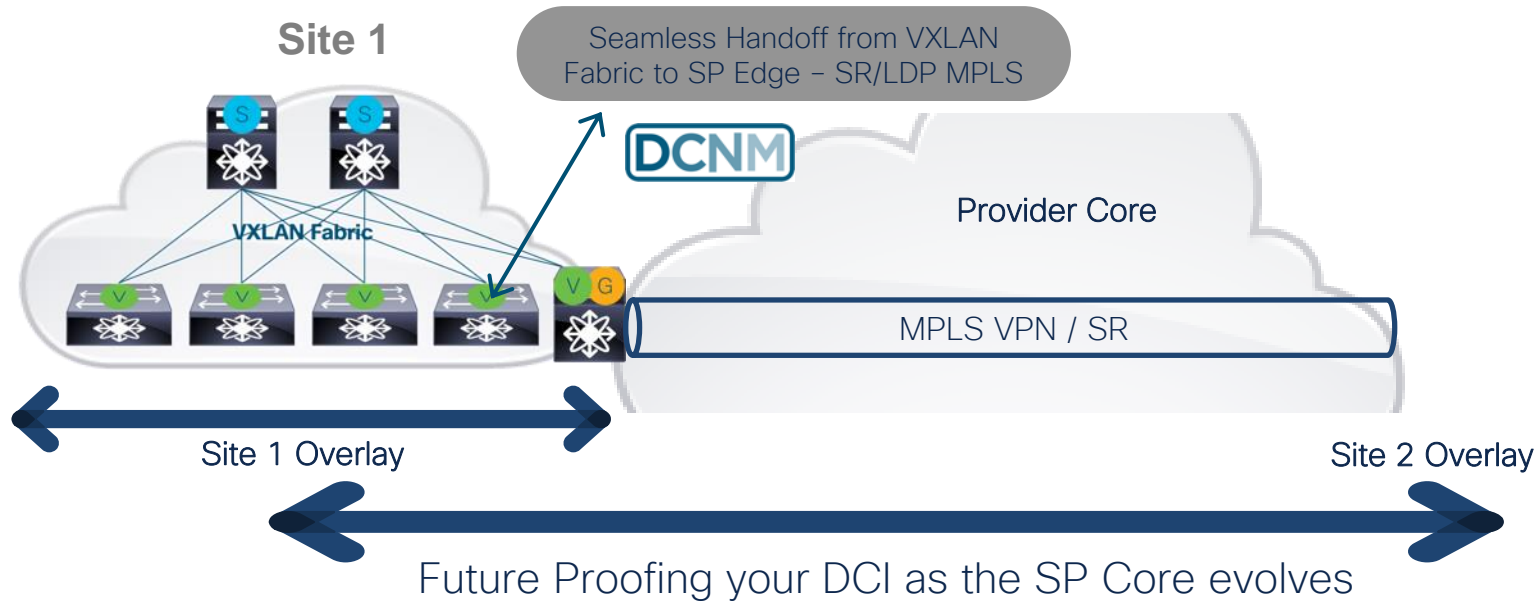


Operations Confidence

VXLAN-EVPN External Connectivity Deployment

- Provisions external connectivity from Borders to WAN
 - VRF Lite using sub-interfaces
 - Devices in External fabrics can be any Nexus, Neighbor, or Meta
- Provisions Layer-2 and Layer-3 DCI Connectivity with EVPN Multi-Site via Border Gateways
 - Workflow for Multi-Site Underlay and Overlay external connection peering using a Multi-Site Domain (MSD)
 - MSD is a fabric of fabrics
 - One-time definition for Networks & VRFs
 - TRM support added

DCNM 11.3(1) DCI Integration



Fault
Containment

Single Switch
Handoff

Separate Admin
Domains

Scalability

DCNM L4-L7 Services Integration

- Network orchestration of L4-7 service appliances attached to a VXLAN EVPN Fabric
- Service appliance attachment
- Service policy definition
- Topology visualization
- Monitoring the service appliance health
 - How much traffic is traversing service nodes...
- No configuration will be done on the service appliances themselves

Fabric Builder Scale & Limitation

- Switches per DCNM = 350
- Switch Freeform Policies Must Have Exact Copy of the “show running configuration” Output
- vPC on Spine not Supported
- No Layer-3 Port Channel Support Between Spine and Leaf
- L3 Port-Channel Support Added for External Connectivity

VXLAN EVPN Greenfield Deployment

LAN Fabric (VXLAN-EVPN) Greenfield Deployment

Controller-Centric Top Down Approach

Three Steps for deployment:

Underlay (POAP + Bootstrap)

Interfaces

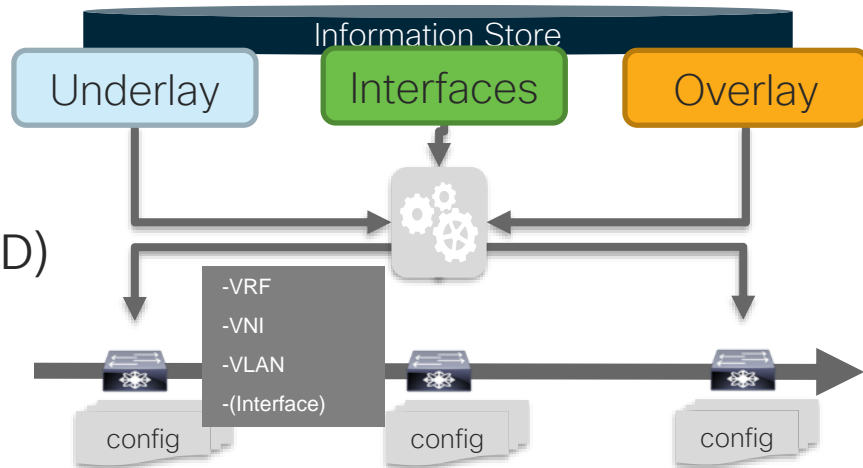
Overlay

Fabric Builder for Multi-Site Domain (MSD)

Centralized to Route Server

Direct peering between BGWS

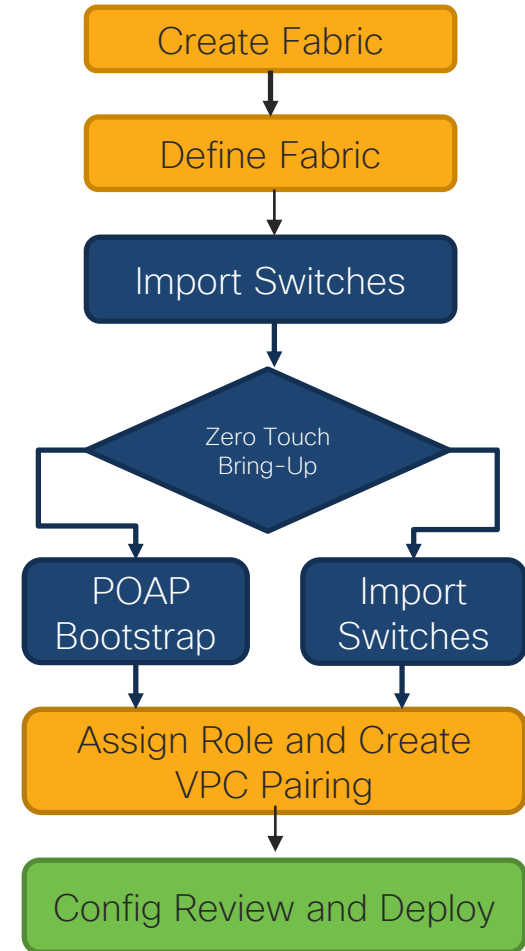
VRF-Lite External Connectivity



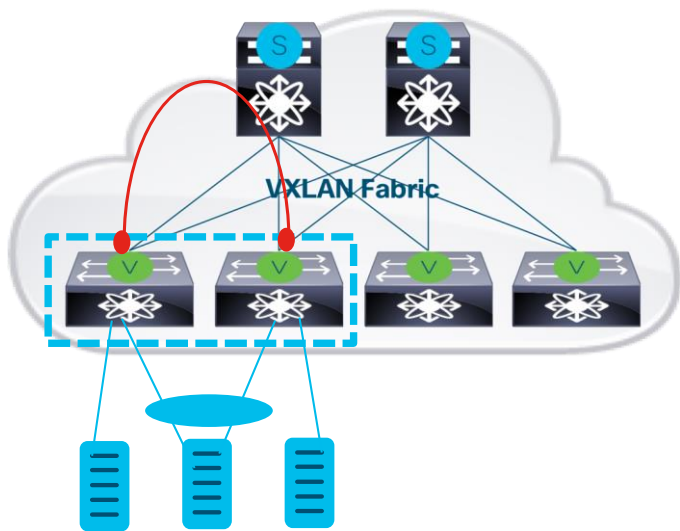
Underlay Deployment

VXLAN EVPN Fabric Builder

- Day-0 bring-up with Auto-Bootstrap
- Best practice flexible python templates for configuration generation
- Underlay includes:
 - Fabric Definition & Creation
 - Device Discovery
 - Configuration Generation, Preview, & Deploy
- Single-click VPC pairing
- Support any combination of replication, multicast, IGP, IP numbered/unnumbered options



VPC Fabric Peering – DCNM 11.2(1) Onwards



Enhanced dual-homing solution without wasting physical ports



Preserve traditional vPC characteristics

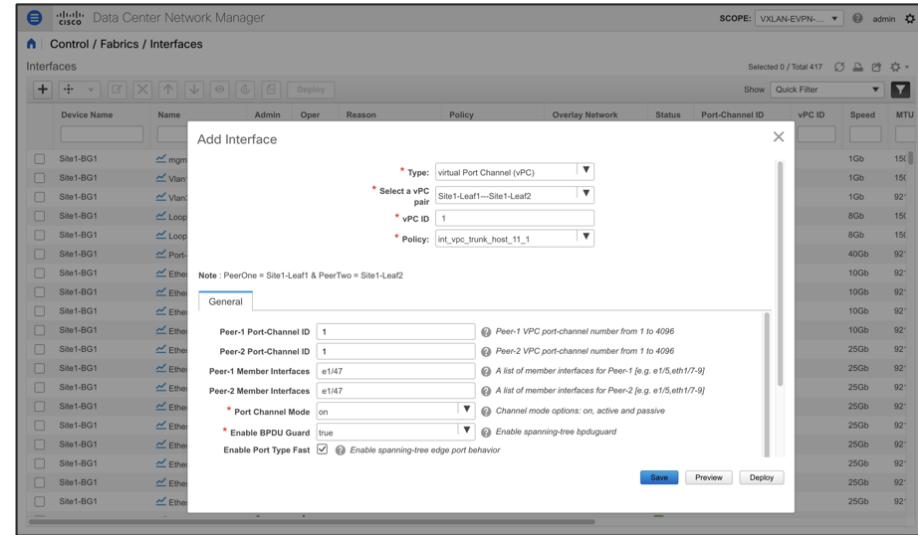


Optimized routing for singled homed end points with PIP

Host FEX/Breakout Connectivity

Interface Configuration

- Attaching Servers/Access switches/FEXes
- Best practice flexible python templates for interfaces
 - vPC, Port-Channels, Access, Trunk, Loopback, Sub interfaces, Routed interfaces
- Support for ST & AA FEX
- Support for Breakout Interfaces
- Customizable Interface Policies
- Bulk Configuration with REST APIs

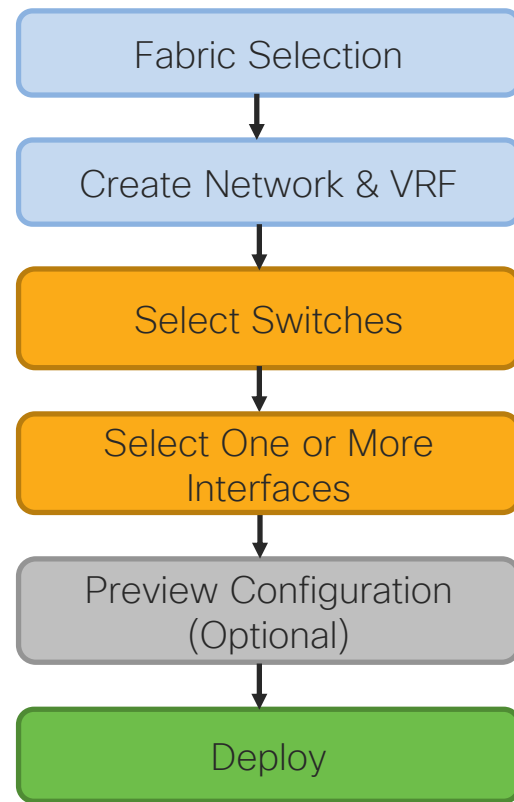


Fabric Interface Configuration

Overlay Deployment

Networks and VRF's

- Top-Down deployment via GUI or REST APIs
- Network/VRF Creation with custom Overlay Policies
- Deployment to switches and/or interfaces
 - Save & Deploy as distinct steps
- Multi-Site Deployment
- Per Network/Per Switch deployment history
- Overlay Resource Manager Tracking for VNIs, VLANs etc.
- Centralized tracking of all deployment including Overlays in Fabric Builder



External Fabrics – LAN Classic

- External Fabrics can be managed or monitored
- Support for Nexus 2k – 9k for VXLAN/Traditional Fabrics
 - IOS-XE family devices: CSR1000v, ASR1000
 - IOS-XR family devices: ASR9000, NCS5500
 - Catalyst 9000 family devices: C9500
- Non-Nexus Device Support
 - Arista Devices
- Configuration Compliance support in External Fabric Builder
- Config backup & restore with side-by-side diff view
- Support for EPL in External VXLAN-EVPN Fabrics

DCNM 11.3(1) Interfaces Scale & Limitations

LAN Fabric Installation Mode

LAN Fabric Installation Mode

Feature	Scale
Physical Interfaces	20k (11.1) / 25k (11.2) 30k (11.3(1))
Switch Scale	350 – In Managed Mode 750 – In Monitor Mode
L3 Scenario: Networks and VRFs per Fabric	1000 Networks/500 VRFs
L2 Scenario: Networks per Fabric	1500 Networks
Endpoint Locator	100K Endpoints across 4 Fabrics
Virtual Machine Manager End Points	5k
Maximum vCenter Instances per DCNM	4

VXLAN Multi-Site Fabric Deployment

VXLAN EVPN Multi-Site Deployment

Multi-Site Domain

Zero touch bring-up of Border Gateways

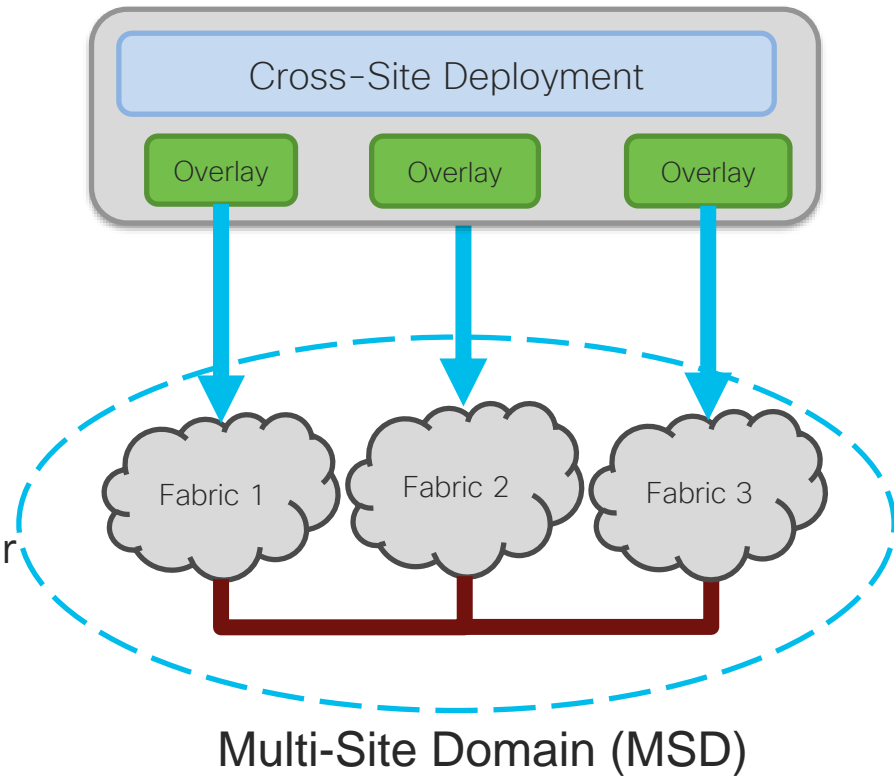
Workflow for Multi-Site Underlay and Overlay external connection peering

Multi-Site Domain with member fabrics aka Sites

One-time definition for Networks & VRFs

Definitions auto-inherited to members

On-Demand extension of VRFs/Networks over Multi-Site



VXLAN EVPN Multi-Site Deployment

Step 1

Multi-Site Setup

Select & Set **Border Gateway or Border Gateway Spine** Role Per Site



Add Multi-Site Members in MSD Fabric and Configure DCI Settings



Setup Underlay and Overlay Peering

Step 2

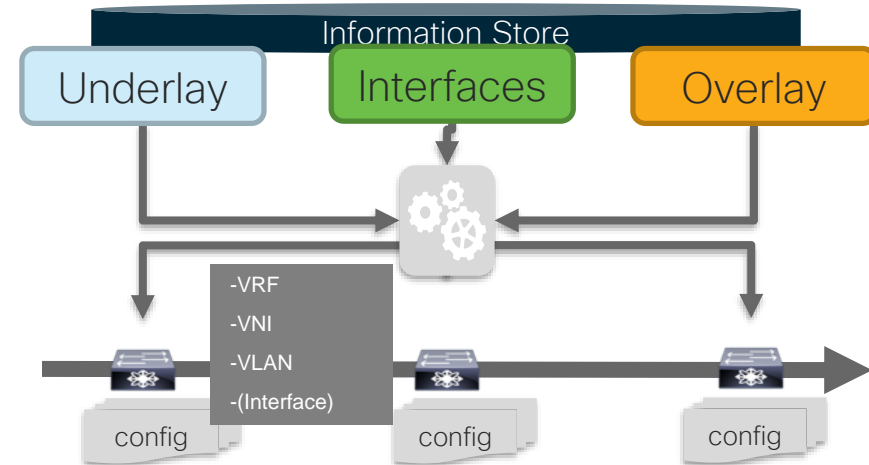
Multi-Site Extension

Extend Networks/VRFs on Border Gateways via MSD or individual member fabrics

VXLAN EVPN Brownfield Deployment

LAN Fabric Brownfield Deployment

- Non-disruptive import of existing VXLAN EVPN deployments
- Learns topology, all configuration, associated resources, IP subnets, VNIs, VLANs etc. from the existing deployment
 - State reverse populated into DCNM
- Start managing fabric as if provisioned from DCNM

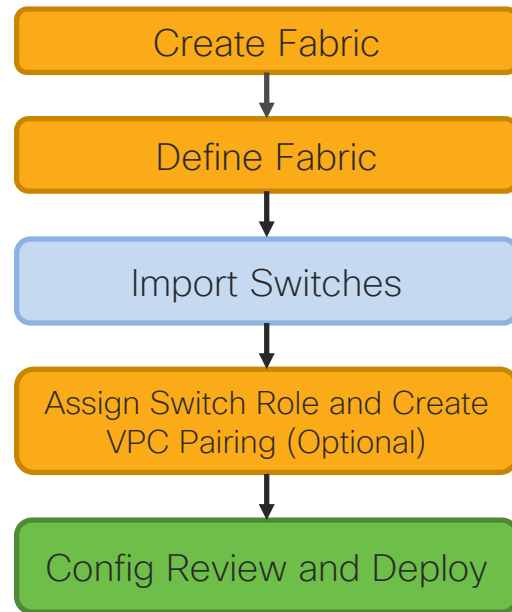


Brownfield Deployment

VXLAN EVPN Fabric Builder

Procedure:

- Fabric Definition & Creation
- Import Devices via Add Switches
 - Switches will be imported in “Migration” State
- Save & Deploy
 - Per switch configuration processing matched against selected Fabric Settings
 - All configuration & associated resource usage per switch learnt by the DCNM
 - Sanity checks for mis-configs with error reporting
 - Iterative process to continue migration post error correction



Brownfield Scale & Limitations

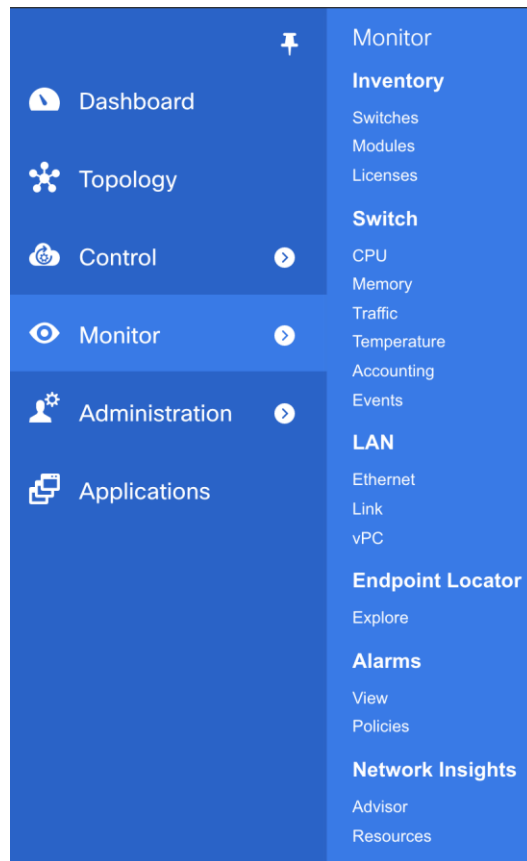
- eBGP Routed Fabric (optionally EVPN) not supported
- Import of Fabrics with Multi-Site requires re-creation of Multi-Site Overlay Inter-Fabric Connections
- Verified scale numbers
 - Switches per fabric = 70

Monitoring, Maintenance & Troubleshooting

Monitoring, Maintenance & Troubleshooting

Day 2 Operations

- Real-Time Network View
- Network Insights
- Common Operations
 - Update Credentials, Policies, Fabric wide History
- Configuration Compliance
- Resync Fabric
- Backup and Restore
- Endpoint Locator
- VXLAN OAM
- Software Upgrades
- RMA



Real Time Topology View

Real-Time Search

Health Score (color)

Link Pop-Up

Layout Options

Pop-Up Switch Dashboard

Site2-Leaf2
1.57.52.9
N9K-C9372PX

Summary
Status: ok
Serial number: SAL1936NJ52
CPU: ok
Memory: 45%

VPC Domain ID: 1
Role: Secondary
Peer: Site2-Leaf3
Peerlink State: Peer is OK
Keep Alive State: Peer is alive
Consistency State: Consistent
Send Interface: mgmt0
Receive Interface: mgmt0

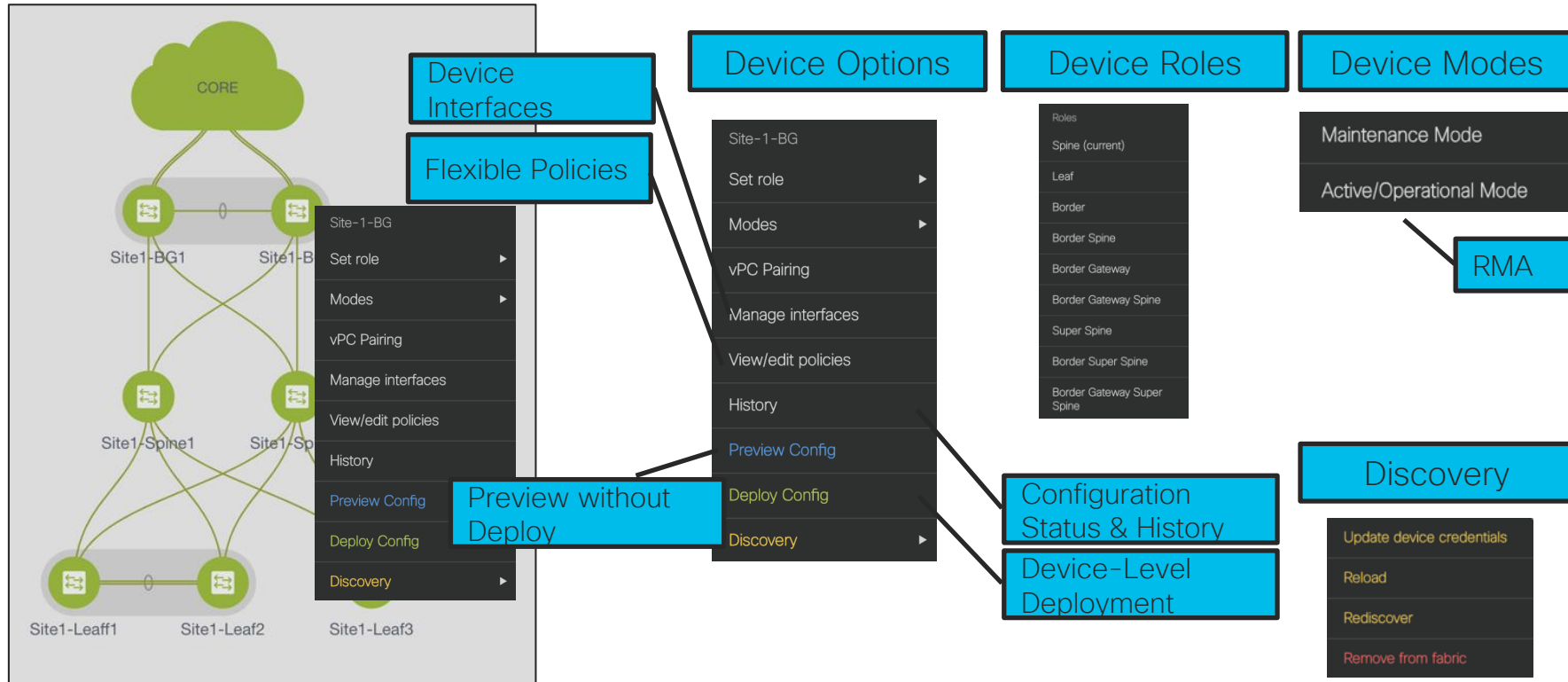
Health
96%
Modules in warning: 1/13
Switch ports in warning: 0/63
Events marked in warning or higher: 1/1000

Tags
+
System Tags

24 Hour Traffic
Avg Max Min
Rx 32.3 Bytes 46 Bytes 4 Bytes
Tx 32.8 Bytes 50 Bytes 4 Bytes

Tuesday, February 12, 2019 at 5:44:56 PM
Pacific Standard Time

Device Maintenance



Bulk Switch Functions

The screenshot displays the 'Fabric Builder: VXLAN-Site1' interface in the 'Switches' tab. A sidebar on the left contains an 'Actions' menu with options like 'Tabular view', 'Refresh topology', 'Save layout', 'Delete saved layout', 'Custom saved layout', 'Restore Fabric', 'Backup Now', 'Re-sync Fabric', 'Add switches', and 'Fabric Settings'. The main area shows a table of switches with columns for Name, IP Address, Role, Serial Number, Fabric Name, Fabric Status, Discovery Status, Model, Software Version, and Tracker Status. Annotations highlight the 'Multi-Select Option' (checkboxes), 'Tabular View' (sidebar menu item), 'Compliance Status' (Fabric Status), and 'Discovery Status' (Discovery Status).

Multi-Select Option

Tabular View


















Compliance Status

Discovery Status

		Name	IP Address	Role	Serial Number	Fabric Name	Fabric Status	Discovery Sta...	Model	Software Versi...	Tracker Stat...
1	<input type="checkbox"/>	Site-1-Spine	10.10.10.21	spine	FDO23171AKA	VXLAN-Site1	In-Sync	✓ ok	N9K-C93216TC-FX2	9.3(2)	NOT_INSTALLI
2	<input type="checkbox"/>	Site-1-BG	10.10.10.10	border ...	FDO23171AJV	VXLAN-Site1	In-Sync	✓ ok	N9K-C93216TC-FX2	9.3(2)	NOT_INSTALLI
3	<input type="checkbox"/>	Site-1-Leaf-1	10.10.10.11	leaf	FDO2313001L	VXLAN-Site1	In-Sync	✓ ok	N9K-C93360YC-FX2	9.3(2)	NOT_INSTALLI
4	<input type="checkbox"/>	Site-1-Leaf-2	10.10.10.12	leaf	FDO23130018	VXLAN-Site1	In-Sync	✓ ok	N9K-C93360YC-FX2	9.3(2)	NOT_INSTALLI

View Operational Status

Fabric Builder -> Fabric ->
Tabular View -> Operational
View

Switches Links Operational View						
Selected 0 / Total 8  						
<div>    </div> <div>Show All  </div>						
	<input type="checkbox"/>	Fabric Name	Name	isPresent?	Link State	Link Type
1	<input type="checkbox"/>	shyam-fx2<->terry-fx2	leaf1~Ethernet1/48 --- terry-spine~Ethernet1/47	true	 FULL	OSPF
2	<input type="checkbox"/>	shyam-fx2	bg~Loopback0 --- spine~Loopback0	true	 Established	BGP
3	<input type="checkbox"/>	shyam-fx2	bg~Ethernet1/45 --- spine~Ethernet1/45	true	 FULL	OSPF
4	<input type="checkbox"/>	shyam-fx2	spine~Loopback0 --- leaf3~Loopback0	true	 Established	BGP
5	<input type="checkbox"/>	shyam-fx2	spine~Loopback0 --- leaf1~Loopback0	true	 Established	BGP
6	<input type="checkbox"/>	shyam-fx2	leaf1~mgmt0 --- leaf2~mgmt0	true	 peer-alive	VPC_KEEPALIVE
7	<input type="checkbox"/>	shyam-fx2	spine~Loopback0 --- leaf2~Loopback0	true	 Established	BGP
8	<input type="checkbox"/>	shyam-fx2<->terry-fx2	leaf1~Vlan3600 --- terry-leaf2~Vlan3600	true	 FULL	OSPF

Deployment History per Switch



Switch History

Policy Deployment History for Site-2-Leaf-2 (SAL1812NTB6)

Policy Status

Entity Name	Entity Type	Source	Status	Status Description	User	Time of Completion
SAL1812NTB6	SWITCH	DCNM	SUCCESS	Successfully deployed	admin	2018-06-11 08:42:4
SAL1812NTB6	SWITCH	UNDERLAY	SUCCESS	Successfully deployed	admin	2018-06-11 07:24:1
Port-channel1	INTERFACE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-11 07:08:3
MyNetwork_30001	CONFIG_PROFILE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-11 07:08:3
MyNetwork_30001	CONFIG_PROFILE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-11 07:08:0
Port-channel1	INTERFACE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-11 07:08:0
SAL1812NTB6	SWITCH	DCNM	SUCCESS	Successfully deployed	admin	2018-06-10 15:42:4
Port-channel1	INTERFACE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-10 15:25:4
MyNetwork_30001	CONFIG_PROFILE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-10 15:25:4
MyNetwork_30001	CONFIG_PROFILE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-10 15:25:2
Port-channel1	INTERFACE	OVERLAY	SUCCESS	Successfully deployed	admin	2018-06-10 15:25:2
SAL1812NTB6	SWITCH	DCNM	SUCCESS	Successfully deployed	admin	2018-06-10 11:42:4
Ethernet2/10	INTERFACE	GLOBAL_INTERFA...	SUCCESS	Successfully deployed	admin	2018-06-10 11:00:2
Ethernet2/9	INTERFACE	GLOBAL_INTERFA...	SUCCESS	Successfully deployed	admin	2018-06-10 11:00:2
Ethernet2/8	INTERFACE	GLOBAL_INTERFA...	SUCCESS	Successfully deployed	admin	2018-06-10 11:00:2
Ethernet2/7	INTERFACE	GLOBAL_INTERFA...	SUCCESS	Successfully deployed	admin	2018-06-10 11:00:2

Deployment History

Policy Type

User Role

Underlay/Overlay/Interface Configuration Deployment

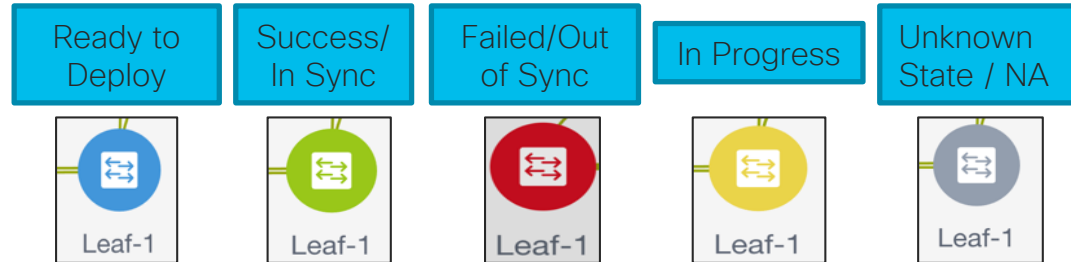
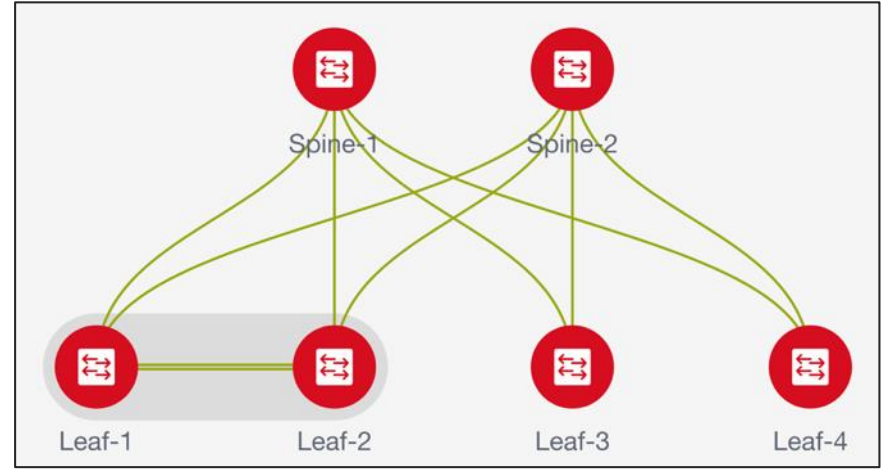
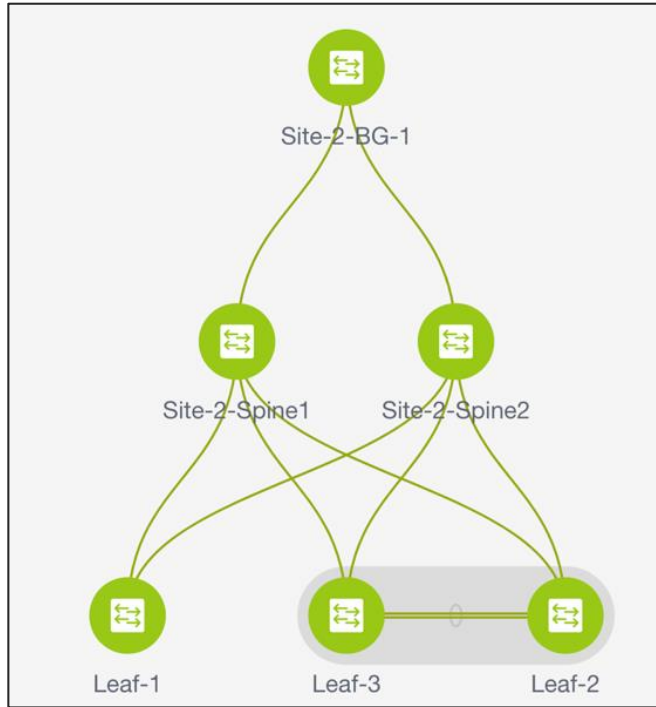
Fabric Wide History with Search

The screenshot displays the Cisco Data Center Network Manager interface for the 'Fabric Builder: VXLAN-Site1'. The top navigation bar includes the Cisco logo, 'Data Center Network Manager', a 'SCOPE: VXLAN-Site1' dropdown, and user information 'admin'. Below this, the 'Fabric Builder: VXLAN-Site1' header is shown with a 'Save & Deploy' button. The main content area has tabs for 'Switches', 'Links', and 'Operational View'. A toolbar contains icons for adding, deleting, editing, and deploying, along with buttons for 'View/Edit Policies', 'Manage Interfaces', 'History', 'Preview', 'Deploy', and 'Tracker Actions'. A table lists three components: Site-1-Spine, Site-1-BG, and Site-1-Leaf-1, all in 'In-Sync' status. A callout 'Fabric History' points to the 'History' button. Below the table, a 'Deployment History' section is visible, with a callout 'Fabric wide History' pointing to its title. This section contains a table with columns for Hostname, Entity Name, Entity Type, Source, Commands, Status, and Status Description. A callout 'Search keywords for config pushed in History' points to the 'Commands' column. An inset window titled 'Command Execution Details for Site-1-Leaf-1(FD02313001L)' shows a list of commands and their execution status (SUCCESS).

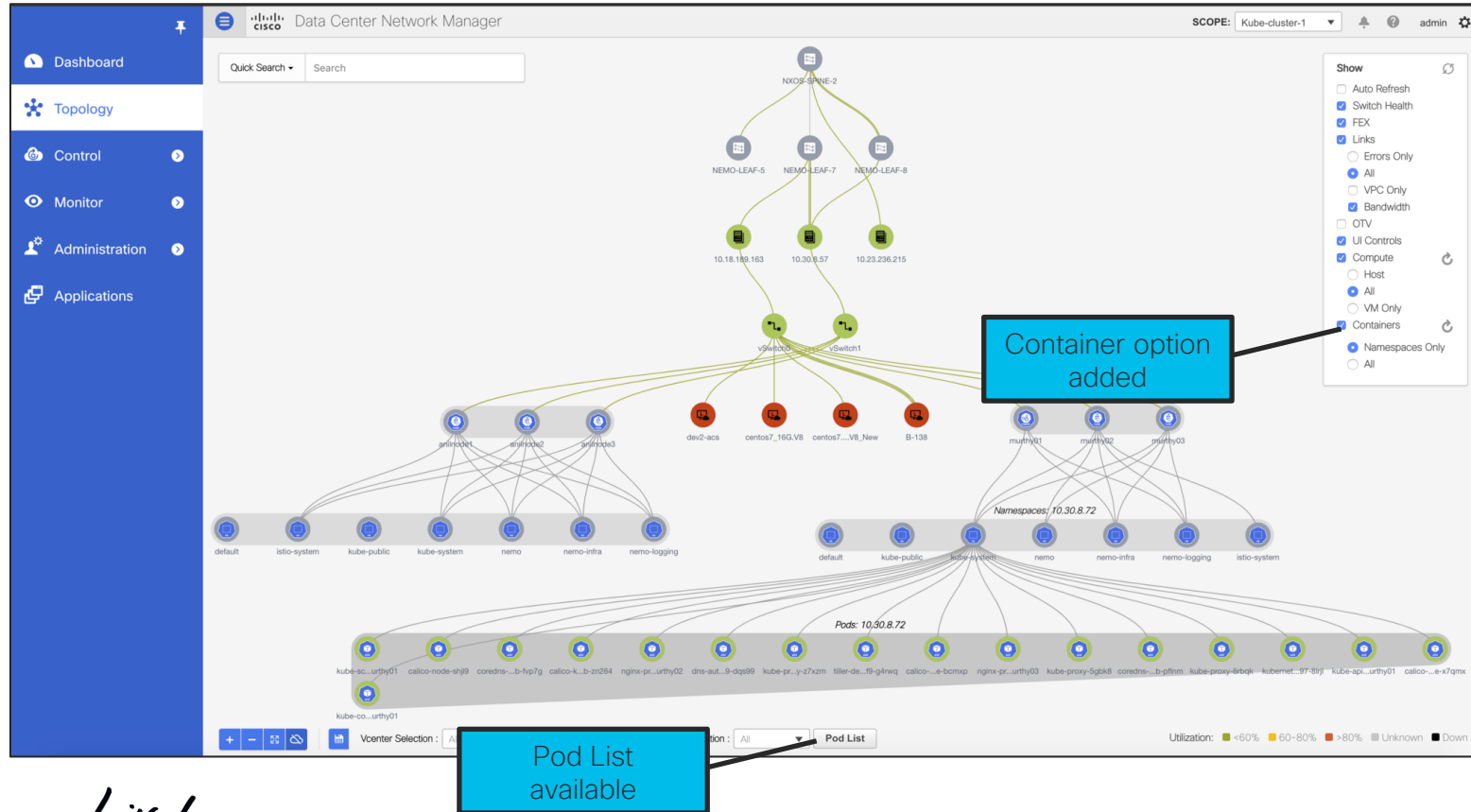
Host Name	IP Address	Role	Serial Number	Fabric Name	Fabric Status
Site-1-Spine	10.10.10.21	spine	FDO23171AKA	VXLAN-Site1	In-Sync
Site-1-BG	10.10.10.10	border ...	FDO23171AJV	VXLAN-Site1	In-Sync
Site-1-Leaf-1	10.10.10.1	leaf	13001L	VXLAN-Site1	In-Sync

Hostname(Serial Number)	Entity Name	Entity Type	Source	Commands	Status	Status Description
Site-1-Leaf-2(FD023130018)	FDO23130018	SWITCH	DCNM	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-1(FD02313001L)	FDO2313001L	SWITCH	DCNM	Detailed History	SUCCESS	Successfully deployed
Site-1-BG(FD023171AJV)	FDO23171AJV	SWITCH	DCNM	Detailed History	SUCCESS	Successfully deployed
Site-1-Spine(FD023171AKA)	FDO23171AKA	SWITCH	DCNM	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-1(FD02313001L)	Ethernet1/99	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-2(FD023130018)	Ethernet1/99	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-1(FD02313001L)	Ethernet1/98	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-2(FD023130018)	Ethernet1/98	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-1(FD02313001L)	Ethernet1/97	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-2(FD023130018)	Ethernet1/97	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-1(FD02313001L)	Ethernet1/96	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed
Site-1-Leaf-2(FD023130018)	Ethernet1/96	INTERFACE	UNDERLAY	Detailed History	SUCCESS	Successfully deployed

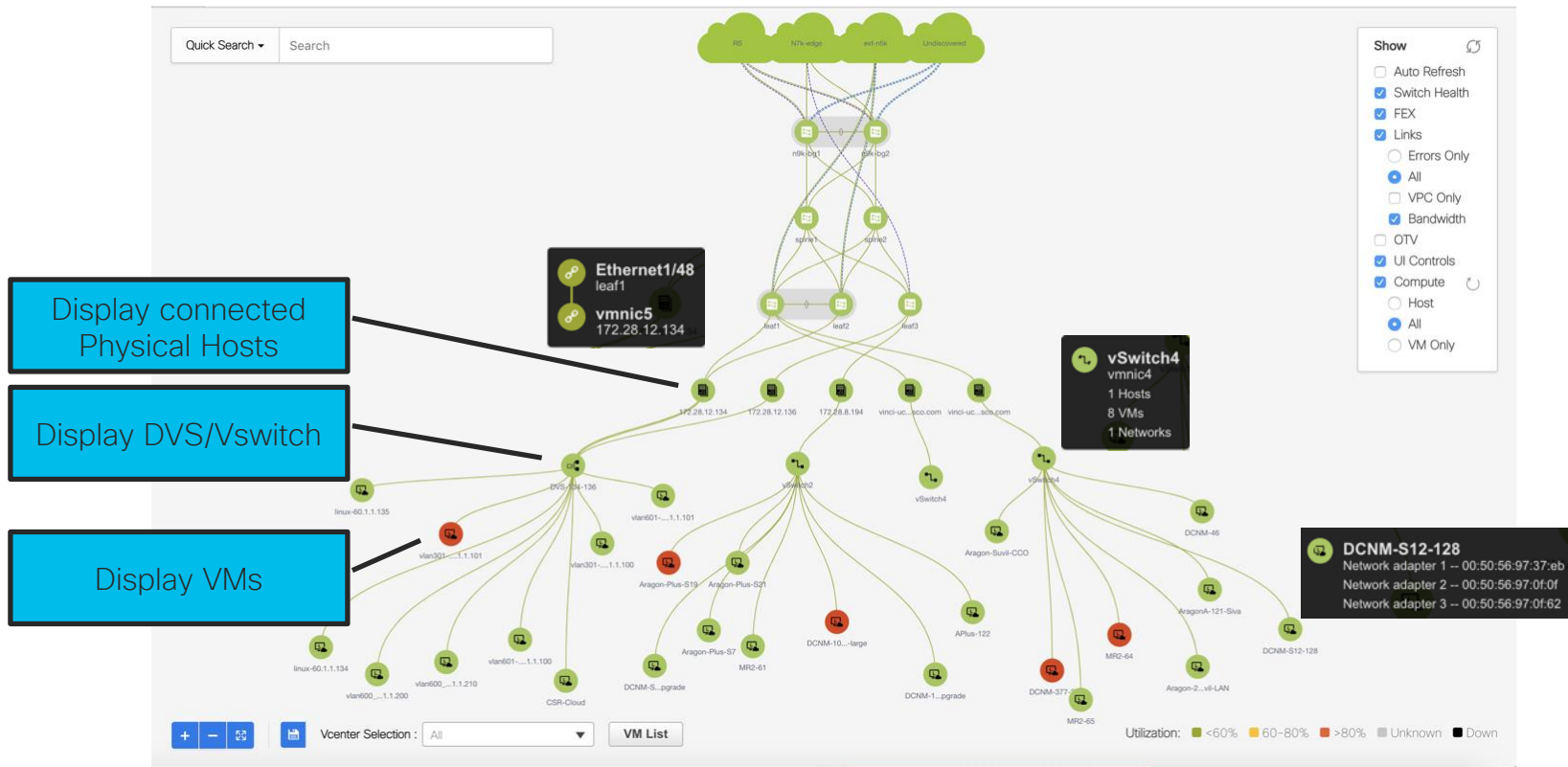
Configuration Compliance



Kubernetes Cluster Visualization in Topology



Virtual Machine Manager

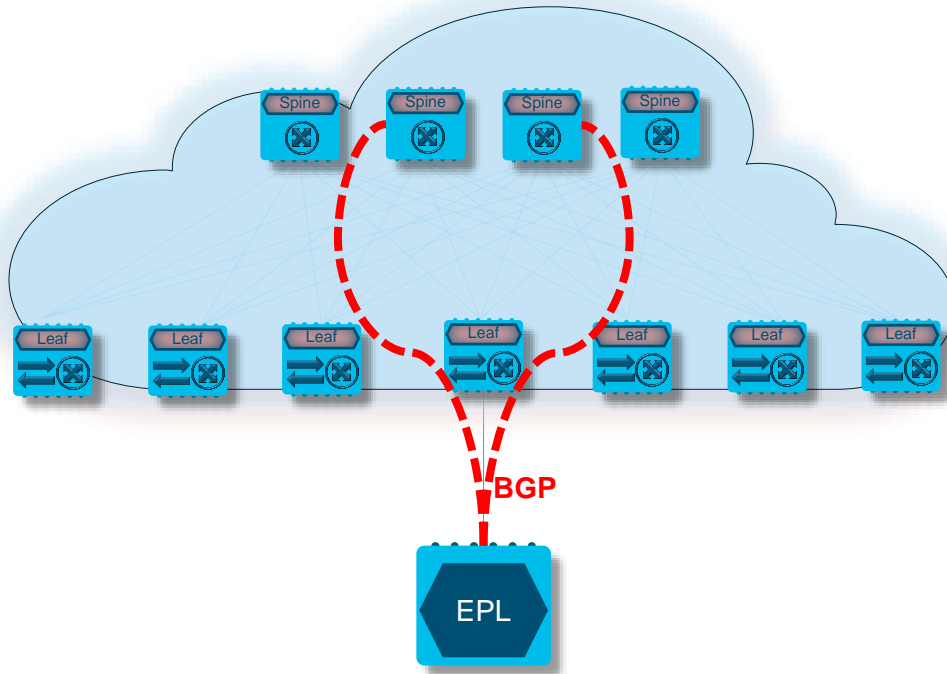


Resource Manager

The screenshot displays the Cisco Data Center Network Manager interface, specifically the Resource Manager section. The left sidebar contains navigation links: Dashboard, Topology, Control, Monitor, Administration, and Applications. The main content area is titled 'Control / Management / Resources' and shows a 'Resource Allocation' table. The table has columns for Scope Type, Scope, Allocated Resource, Allocated To, Resource Type, Is Allocated?, and Allocated On. The table is filtered by 'MSD-1' in the top right. A callout box labeled 'MSD' points to the 'MSD-1' filter. Another callout box labeled 'Fabric' points to the 'Fabric' column. A callout box labeled 'Devices' points to the 'Device' row. A callout box labeled 'Serial Number' points to the 'SAL18432P4S' column. A callout box labeled 'Deployment Type' points to the 'TOP_DOWN_VRF_VLAN' column.

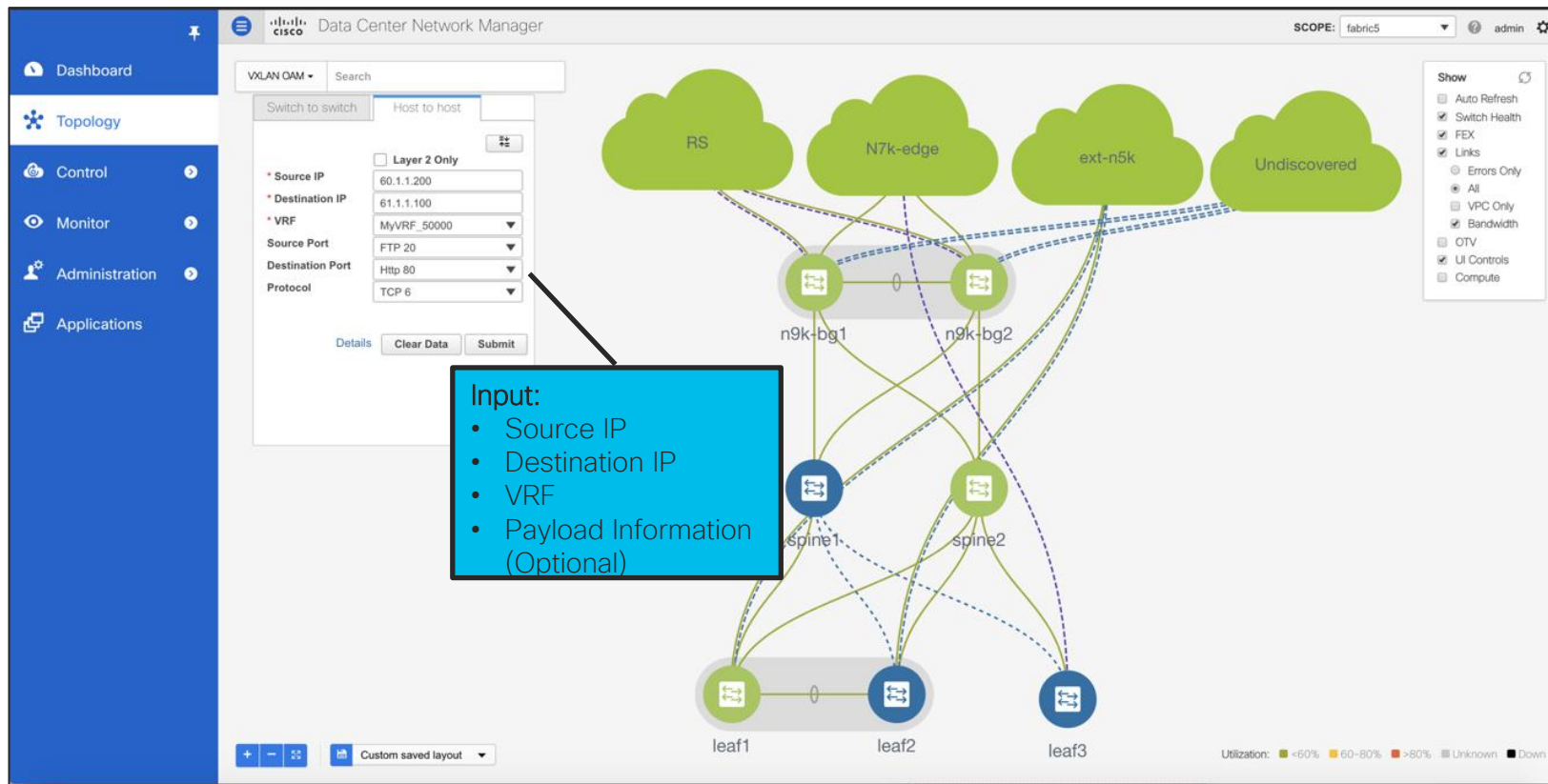
Scope Type	Scope	Allocated Resource	Allocated To	Resource Type	Is Allocated?	Allocated On
Device	SAL18432P4S	2003	Beer_Corona	TOP_DOWN_VRF_VLAN	Yes	6/12/2018, 8:51:52 AM
Device	SAL18432P4X	10	MyNetwork_30003	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 11:30:12 PM
Device	SAL18432P4X	301	MyNetwork_30002	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:20:05 PM
Device	SAL18432P4X	400	MyNetwork_30006	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 11:30:29 PM
Device	SAL18432P4X	401	MyNetwork_30007	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 11:30:37 PM
Device	SAL18432P4X	500	MyNetwork_30008	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 11:30:46 PM
Device	SAL18432P4X	500	port-channel500	PORT_CHANNEL_ID	Yes	6/2/2018, 2:14:21 PM
Device	SAL18432P4X	501	MyNetwork_30009	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 11:30:56 PM
Device	SAL18432P4X	600	MyNetwork_30000	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:10:47 PM
Device	SAL18432P4X	601	MyNetwork_30001	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:18:51 PM
Device	SAL18432P4X	2000	MyVRF_50000	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 10:10:47 PM
Device	SAL18432P4X	2001	foo	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 11:30:03 PM
Device	SAL18432P4X	2002	Drink_Pepsi	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 11:30:03 PM
Device	SAL18432P4X	2003	Beer_Corona	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 11:30:03 PM
Device	SAL18432P4X	2004	Juice_Orange	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 11:30:03 PM
Device	SAL18432P4X	2005	MyVRF_50005	TOP_DOWN_VRF_VLAN	Yes	6/3/2018, 11:30:03 PM
Device	SAL18432P4S	115	MyNetwork_30014	TOP_DOWN_NETWORK_VLAN	Yes	6/9/2018, 11:05:57 AM
Device	SAL18432P4S	115	MyNetwork_30014	TOP_DOWN_NETWORK_VLAN	Yes	6/9/2018, 11:05:57 AM
Device	SAL18432P4S	301	MyNetwork_30014	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:20:05 PM
Device	SAL18432P4S	600	MyNetwork_30014	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:10:48 PM
Device	SAL18432P4S	601	MyNetwork_30014	TOP_DOWN_NETWORK_VLAN	Yes	6/3/2018, 10:18:51 PM

Endpoint Locator (EPL)



- Endpoint Locator (EPL)
 - Application in DCNM
 - Peers with the Overlay Control-Plane (i.e. BGP EVPN)
 - BGP Receiver only (Passive)
- Searchable and Scalable Database for Real-Time and Historic Data
- Stores every Endpoint Control-Plane Event
- Correlates with Inventory Data

VXLAN OAM



VXLAN OAM

The screenshot displays the Cisco Data Center Network Manager interface. On the left is a navigation menu with options: Dashboard, Topology, Control, Monitor, Administration, and Applications. The main panel is titled 'VXLAN OAM' and includes a search bar and tabs for 'Switch to switch' and 'Host to host'. The 'Host to host' tab is active, showing configuration fields for Source IP (60.1.1.200), Destination IP (61.1.1.100), VRF (MyVRF_50000), Source Port (FTP 20), Destination Port (Http 80), and Protocol (TCP 6). A 'Details' button is highlighted with a red box and an arrow pointing to a callout. The callout, titled 'Details:', contains a list of items: Ingress Interface Counters and Egress Interface Counters etc. A modal window titled 'Host to Host OAM Details' is open, displaying a table of statistics for two interfaces: Eth1/45 and Eth1/43. The background shows a network topology with nodes like spine1, spine2, leaf1, leaf2, leaf3, n9k-bg2, ext-n5k, and Undiscovered, connected by various lines representing network links. A 'SCOPE: fabric5' dropdown and an 'admin' user indicator are in the top right. A 'Show' panel on the far right lists various monitoring options like Auto Refresh, Switch Health, FEX, Links, Errors Only, All, VPC Only, Bandwidth, OTV, UI Controls, and Compute.

Host to Host OAM Details

Index	1
Switch Name	spine1
IP address	11.4.0.25
Ingress Interface	
if_name	Eth1/45
if_state	UP
rx_len	84
rx_bytes	270524673
rx_pkt_rate	0
rx_byte_rate	129
rx_load	10
rx_ucast	137842
rx_mcast	1464258
rx_bcast	3
rx_discards	0
rx_errors	0
rx_unknown	0
rx_bandwidth	10000000
tx_len	76
tx_bytes	119477380
tx_pkt_rate	0
tx_byte_rate	67
tx_load	10
tx_ucast	138349
tx_mcast	829012
tx_bcast	204
tx_discards	0
tx_errors	0
tx_bandwidth	10000000
Egress Interface	
if_name	Eth1/43
if_state	UP
rx_len	84
rx_bytes	329353342
rx_pkt_rate	0
rx_byte_rate	113
rx_load	10
rx_ucast	1083465
rx_mcast	1277603
rx_bcast	47
rx_discards	0
rx_errors	0
rx_unknown	0

API Inspector

The image shows the Cisco Data Center Network Manager (DCNM) interface. On the left, a user menu is open, showing the user is logged in as 'admin'. The menu options are: 'Change Password...', 'About', 'REST API Tool' (highlighted with a blue bar and a callout), and 'Log out'. A callout box points to the 'REST API Tool' option, stating: 'To access API tool, on Each Page of DCNM UI'. The main interface displays a network topology diagram with various nodes like 'Fabric: shyam-fx2', 'Fabric: karthik-fab', and 'Fabric: Non-Nexus'. On the right, there is a 'Show' panel with options like 'Auto Refresh', 'Switch Health', 'FEX', 'Links', 'Errors Only', 'All', 'Logical Links', 'VPC Only', 'Bandwidth', and 'OTV'. A callout box points to the 'REST API Tool' option, stating: 'Opens another window with corresponding API calls'. In the foreground, a browser window titled 'DCNM' is open, displaying the 'API Inspector' tool. The browser address bar shows '172.28.11.197/apitrace.html'. The page content shows a list of API calls and their responses, including GET and POST requests to various endpoints like '/fm/forest/san/getVirtualCenters/7/cacheBust.timestamp=1576587589887' and '/fm/forest/topology/tags/USER?cacheBust.timestamp=1576587590922'.

admin

Logged in as admin

Change Password...

About

REST API Tool

Log out

To access API tool, on Each Page of DCNM UI

Opens another window with corresponding API calls

DCNM

Not Secure | 172.28.11.197/apitrace.html

Filter...

scroll to new items API-docs clear log

GET /fm/forest/san/getVirtualCenters/7/cacheBust.timestamp=1576587589887
Status 200 - Took 316ms
[{"topologyId": "true", "password": "5gTHNkDf5o", "fmServerIPString": "172.28.11.197", "ismanaged": "true", "statusdescription": "..."}]

GET /fm/api/afw/service/dcm-elasticsearch-api
Status 200 - Took 279ms
{"ServiceName": "dcm-elasticsearch-api", "FabricId": "", "ImageTag": "dcmelastic:5.6.7.11.2.2", "hostname": "elasticsearch.Cisco.a..."}

GET /fm/integrated/http_33500/dcm-elasticsearch-api/Data20Center/kcv_access_info_index/_search?pretty=true&q=*:*&size=10000
Status 200 - Took 337ms
{"took": 0, "timed_out": false, "_shards": {"total": 2, "successful": 2, "skipped": 0, "failed": 0}, "hits": {"to..."}}

POST /fm/forest/topology/tags/USER?cacheBust.timestamp=1576587590922
{"ids": [469880, 1779380, 1804030, 1804040, 1862710, 465450, 471230, 466930, 1804070, 1804080, 1804050, 1804100, 279800, 385590, 66690, 278160]
Status 200 - Took 2386ms

POST /fm/forest/topology/tags/SYSTEM?cacheBust.timestamp=1576587590923
{"ids": [469880, 1779380, 1804030, 1804040, 1862710, 465450, 471230, 466930, 1804070, 1804080, 1804050, 1804100, 279800, 385590, 66690, 278160]
Status 200 - Took 2572ms
[{"id": 1804080, "type": "SWITCH", "definedType": "SYSTEM", "value": "VTEP"}, {"id": 278160, "type": "SWITCH", "definedType": "SYSTEM", "va..."}

Network Insights Portfolio

DCNM Application Hosting Framework

Extensible Framework

Applications can run on the framework
instead of core S/W

“Future Proof” – new apps on existing
framework

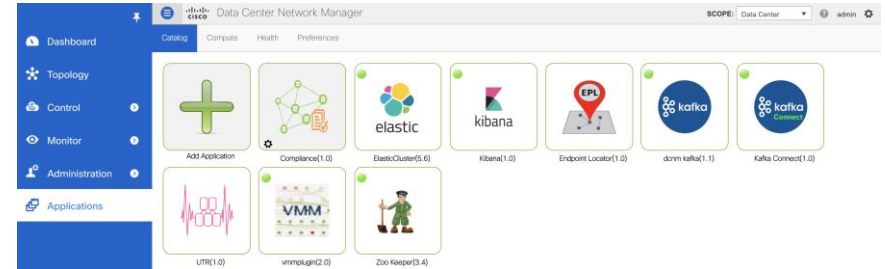
Separation between apps
Extensible

Examples: Telemetry, Analytics

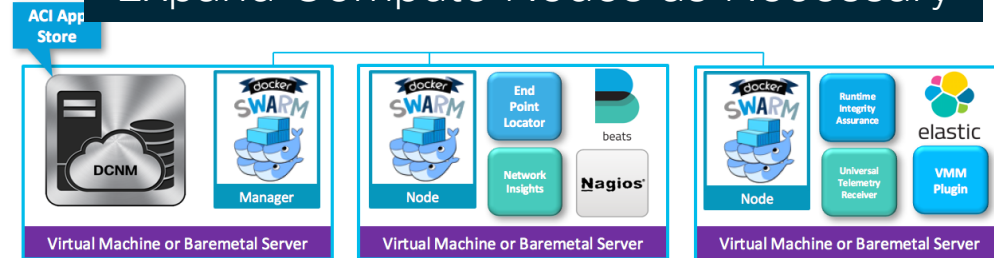
Apps, Reporting, Automation

Uses Worker-Nodes for expansion

Make All the Apps into Containers



Expand Compute Nodes as Necessary



Network Insights Applications

Network Insights Advisor



Network Insights Resources



Apps

DCNM



App Hosting Framework
App Store

Platform

Data collection and ingestion

Data correlation and analysis

Data visualization and action



Visibility

Learn from your network and recognize anomalies



Insights

See problems before your end users do

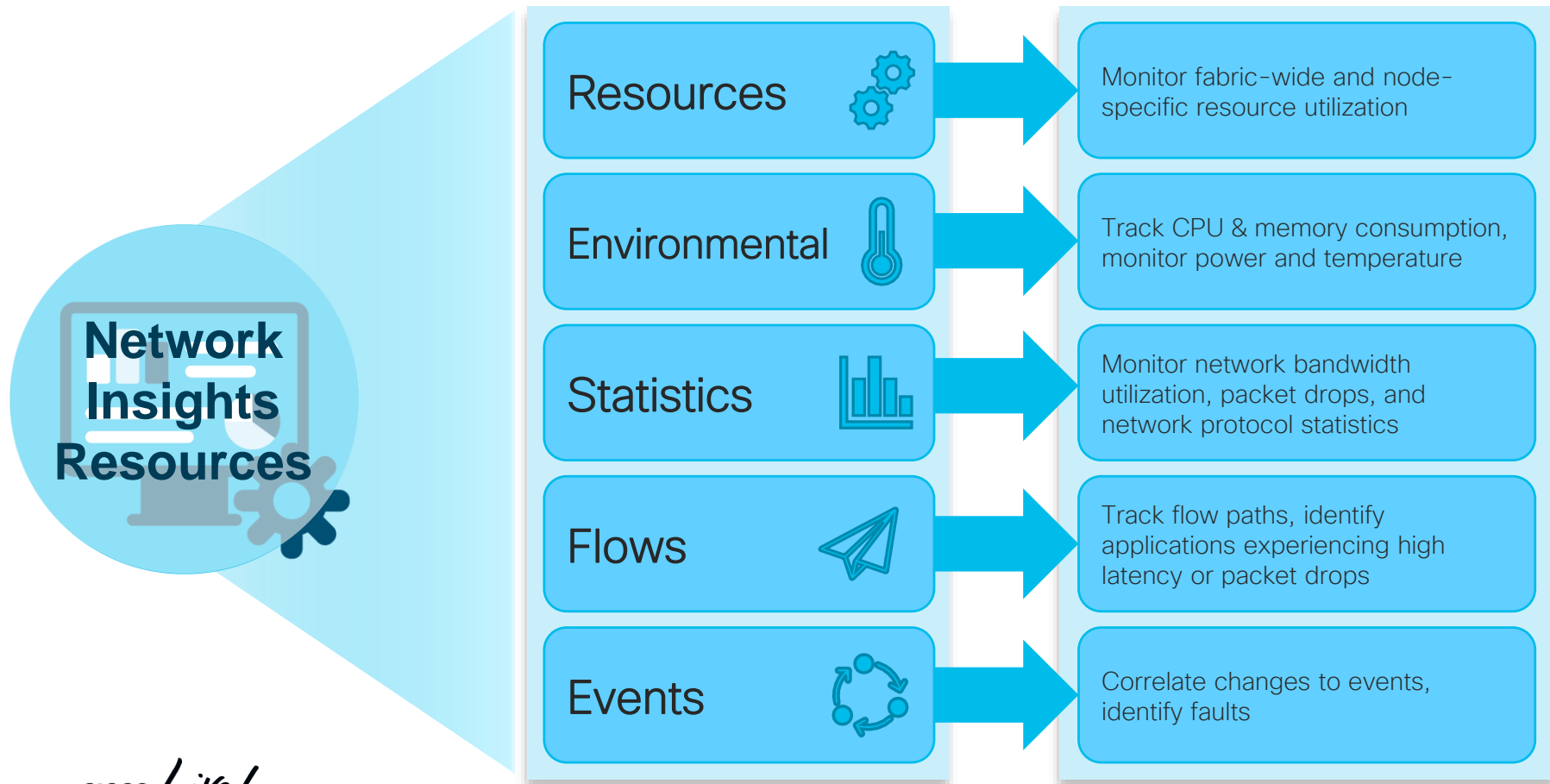


Proactive Troubleshooting

Find root cause faster with granular details

cisco *Live!*

How Can NIR Help with Day 2 Operations?



How Can NIA Help with Day 2 Operations?

Network Insights Advisor

Advisories



Deployment-specific recommendations & best practices, upgrade impact analysis

Notices



Inbox function, proactive EOL/EOS announcements, new Field Notices, new software/SMUs

Anomalies



Alert to known defects, PSIRTs, anomalous runtime behavior*

Compliance



System hardening checks, version-specific scale limits monitoring*

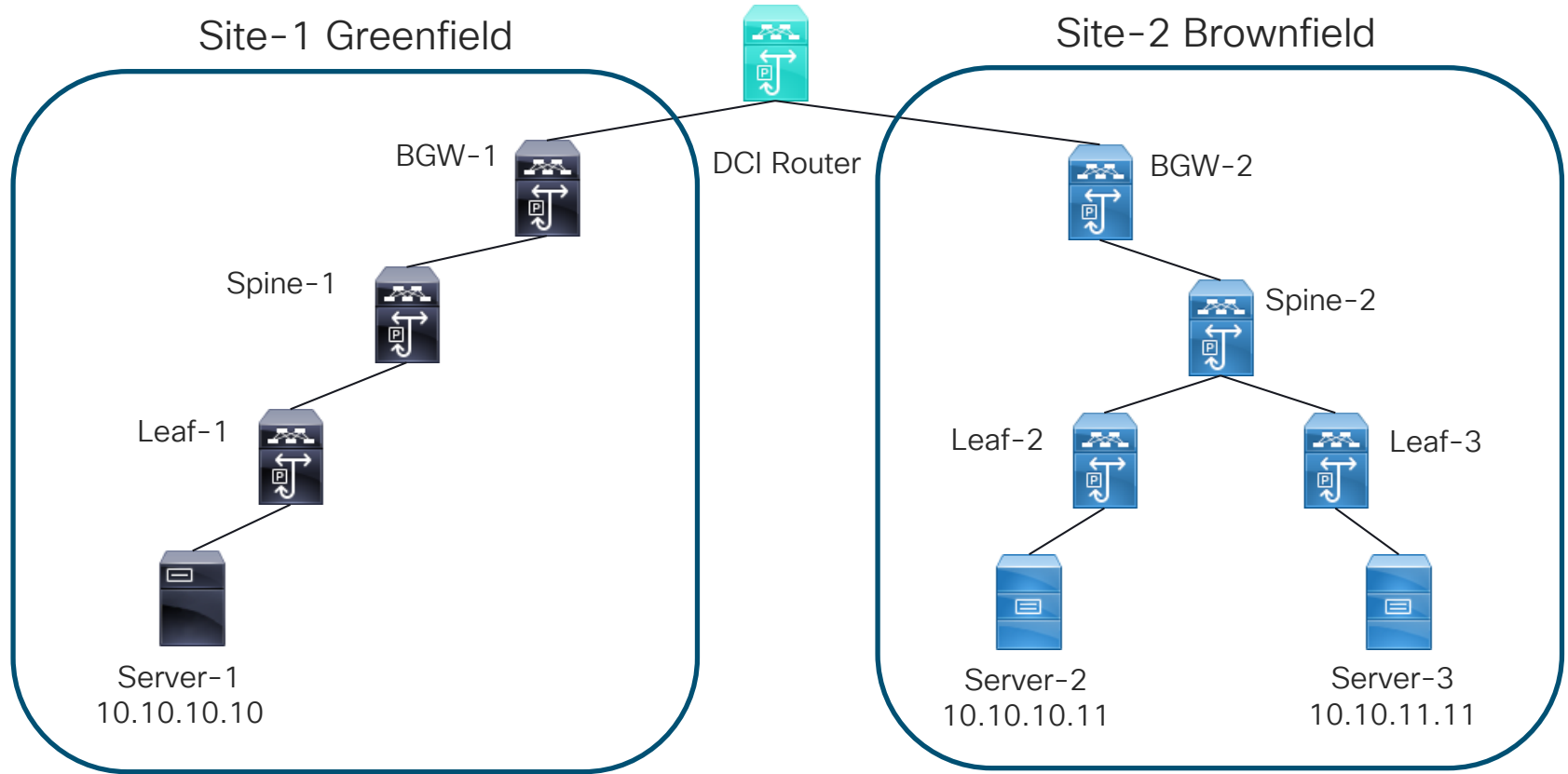
Diagnostics



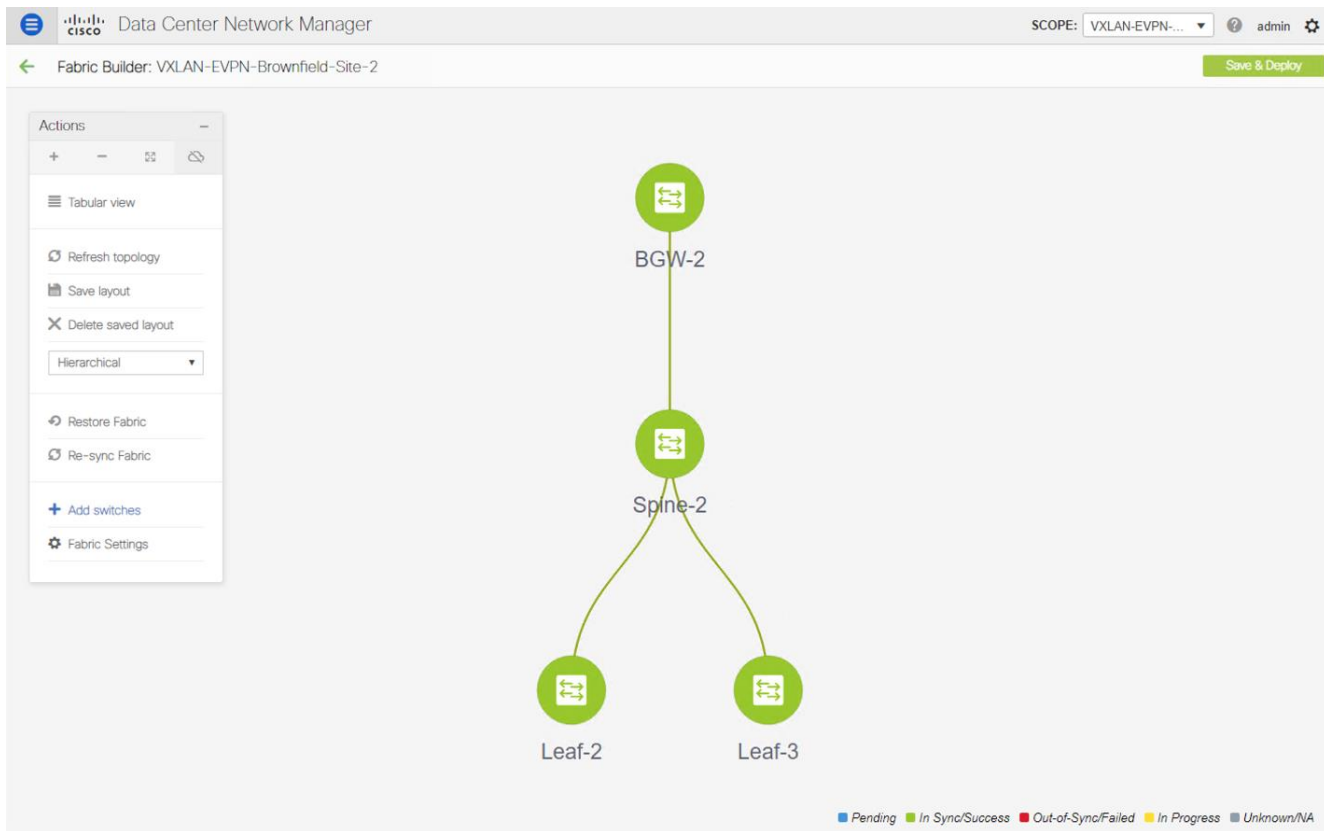
TAC assist, forwarding state checks*

DCNM Live Fabric Demonstrations

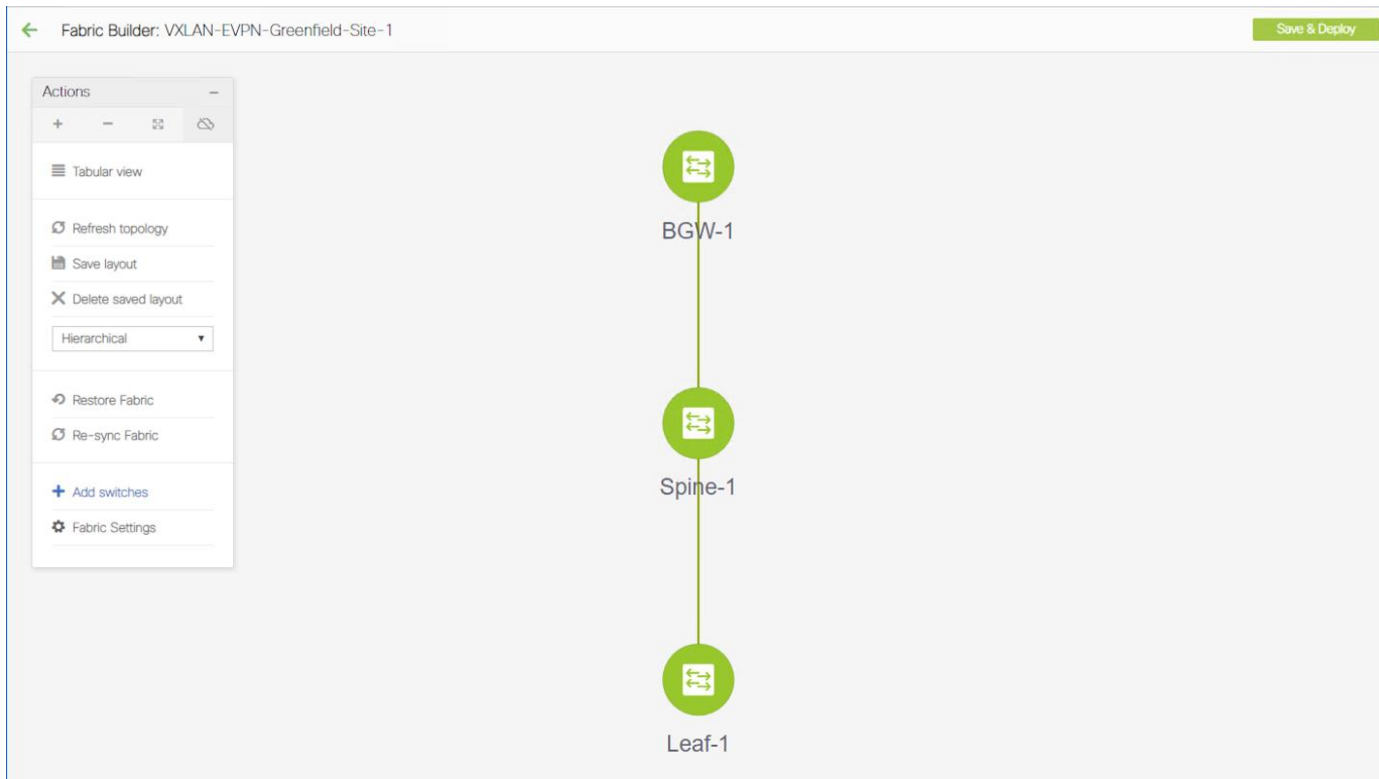
DCNM Lab Demo Topology



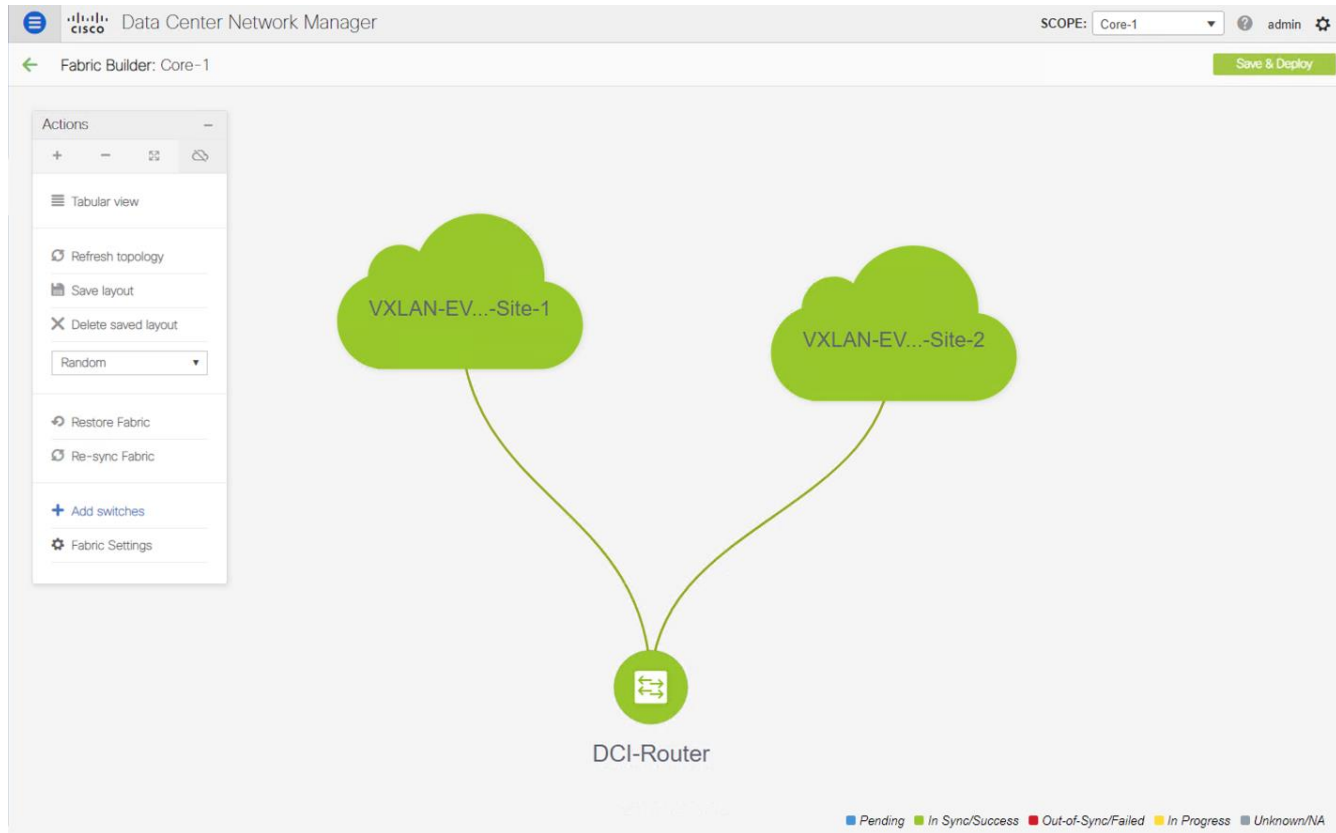
Demo Topology – Brownfield Site



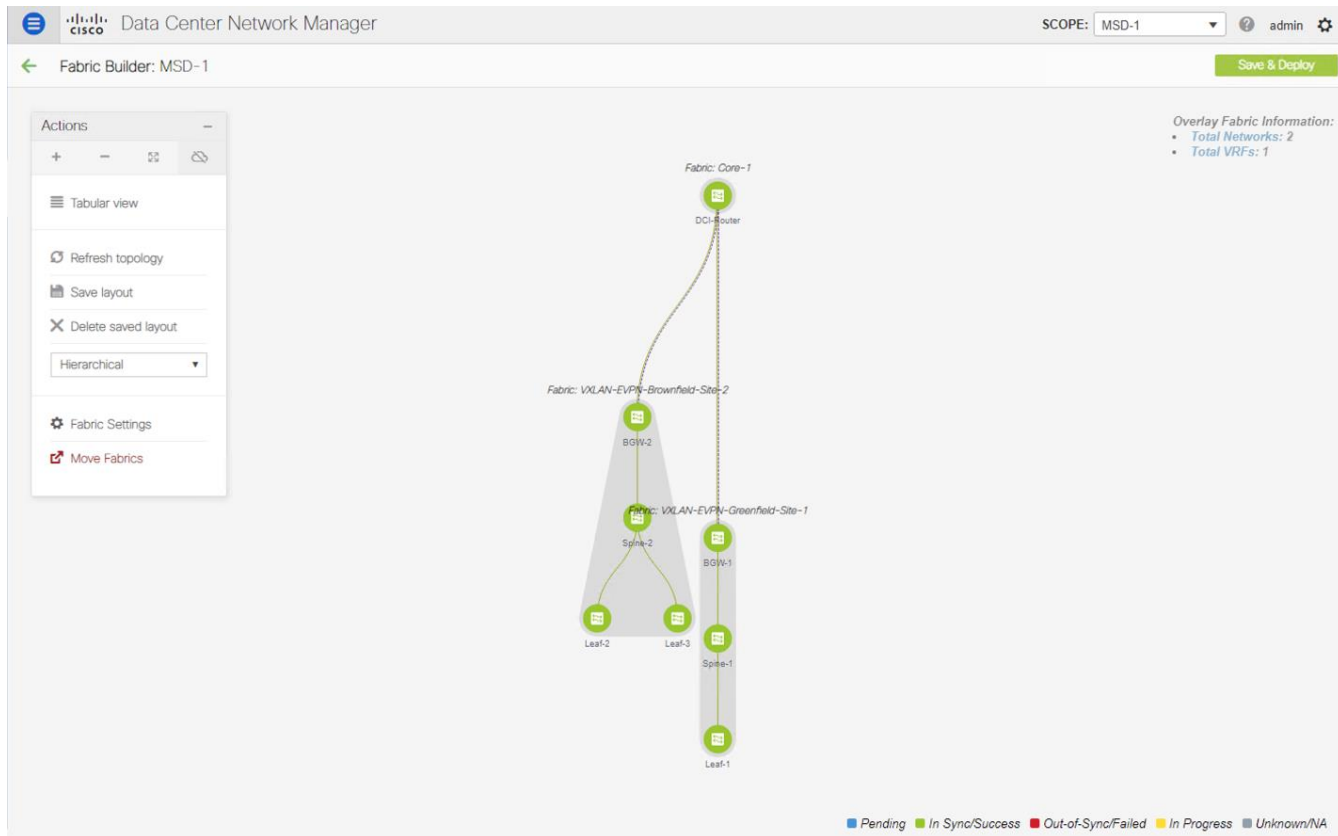
Demo Topology – Greenfield Site



Demo Topology – Core Network



Demo Topology – Multi Site Deployment



Demo – Network Insights (NIA/NIR)



Network Insights - Advisor



Network Insights - Resources

Summary

Why Choose DCNM for Your Data Center?



Automation



Visibility



Consistency

Complete your online session survey



- Please complete your session survey after each session. Your feedback is very important.
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