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#CiscoLive

The bridge to possible

Introduction to NDFC:

Simplifying Management of Your Data Center

Richard Licon, Principal Technical Marketing Engineer

BRKDCN-1619

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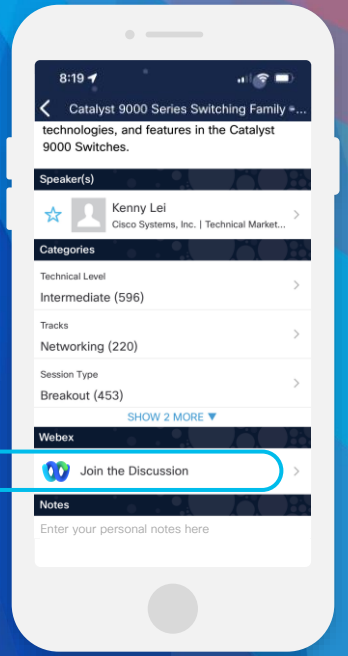

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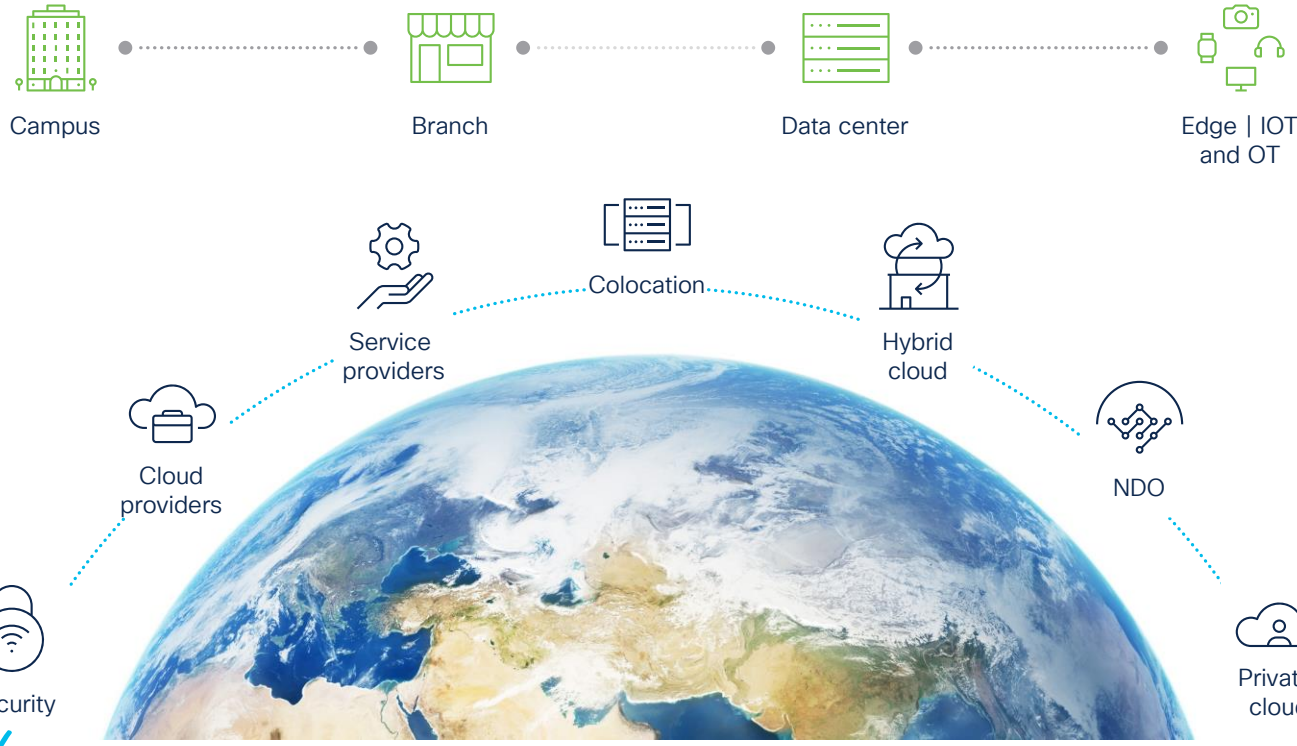
Agenda

- Introduction to NDFC
- Automation
- Automation Demo
- Management
- Visibility
- Summary

The new normal is a hyper-distributed, extremely diverse IT landscape



And your world is constantly changing...

How do you adapt to change now and stay in control for the future?

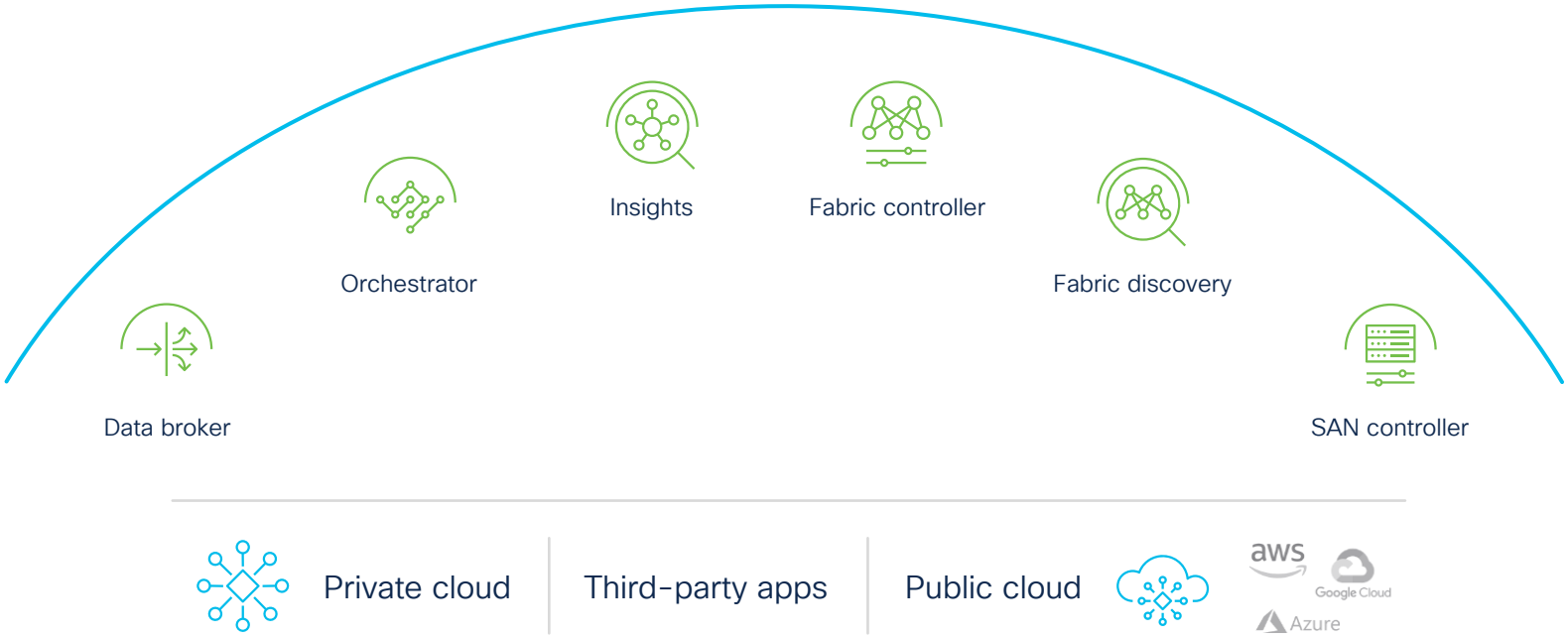
Connectivity

Operations

App experience

Cisco Nexus Dashboard

Simple to automate, simple to consume



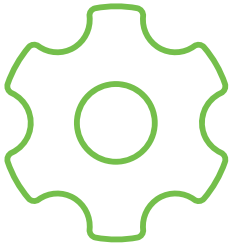
Cisco Nexus Dashboard Fabric Controller

Fabric discovery for LAN Deployments

Fabric controller for LAN and IPFM Deployments

SAN controller for MDS Fibre Channel deployments

Cisco Nexus Dashboard Fabric Controller

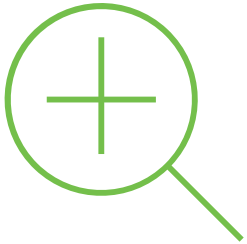


Automation

Accelerate provisioning and simplify deployments

Management

In depth Management and control for all network deployments



Visibility

Get Centralized Visibility and Monitoring views

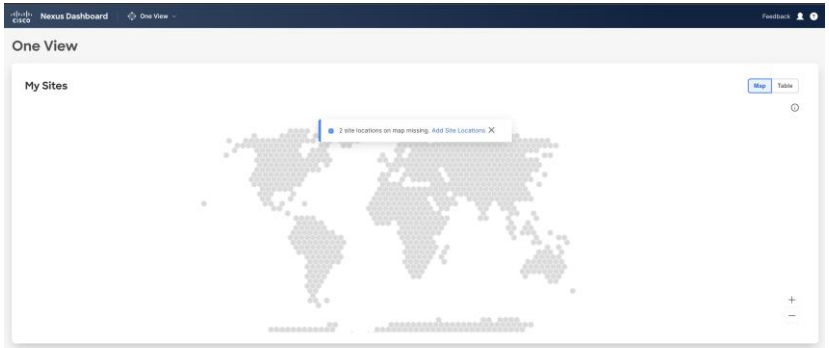
Cisco Nexus Dashboard Fabric Controller On Nexus Dashboard

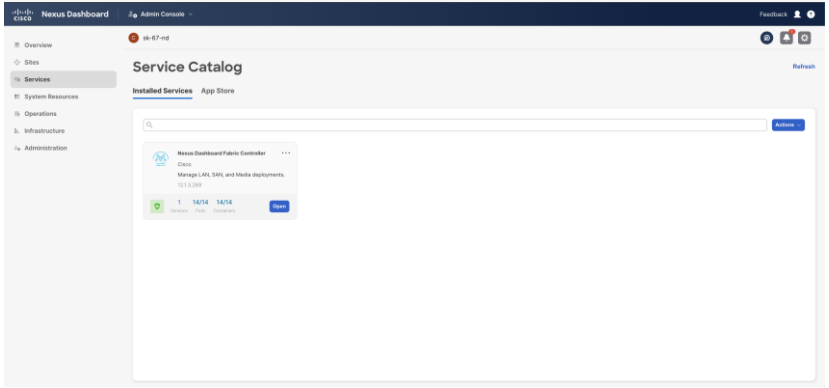
Exclusively a service on ND

Supported on both Virtual and Physical ND

Complete micro-services architecture

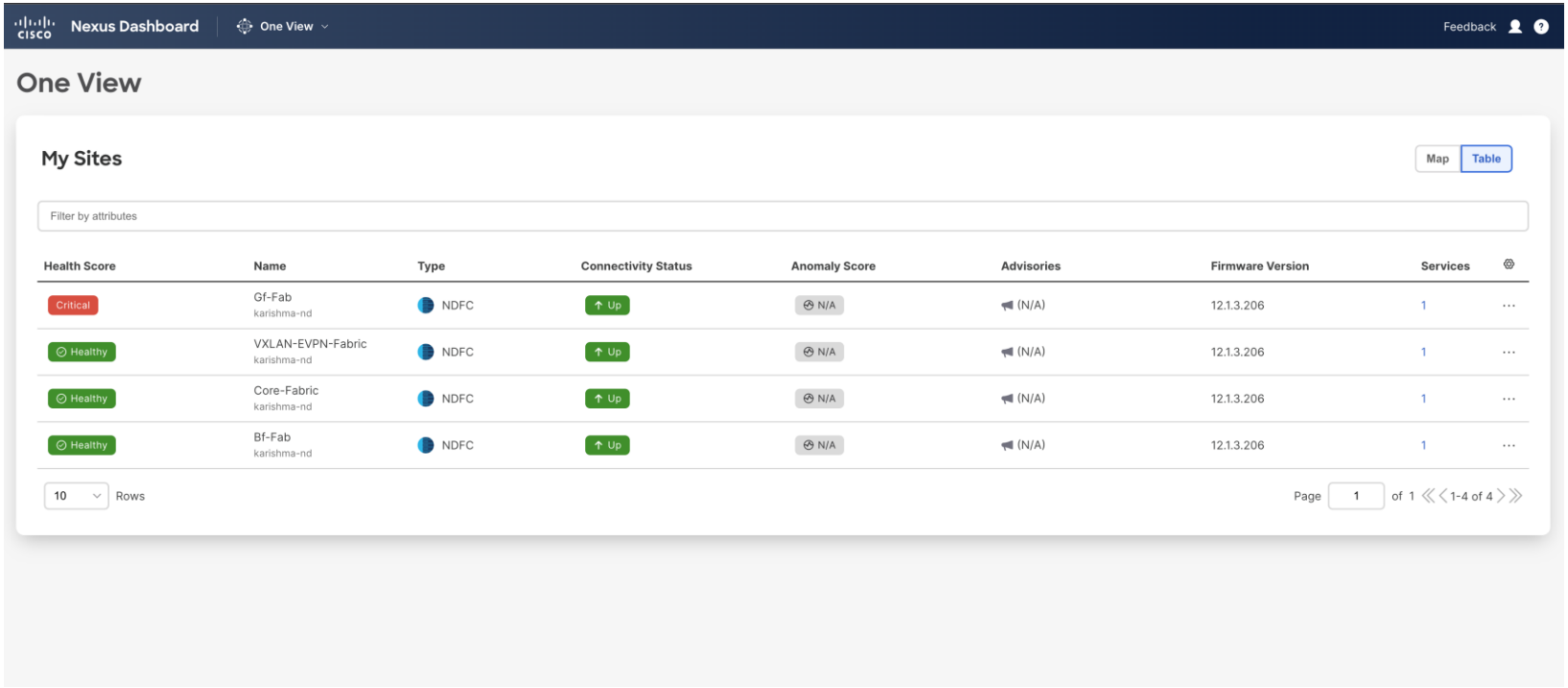
3-node active-active cluster with L2 or L3 HA



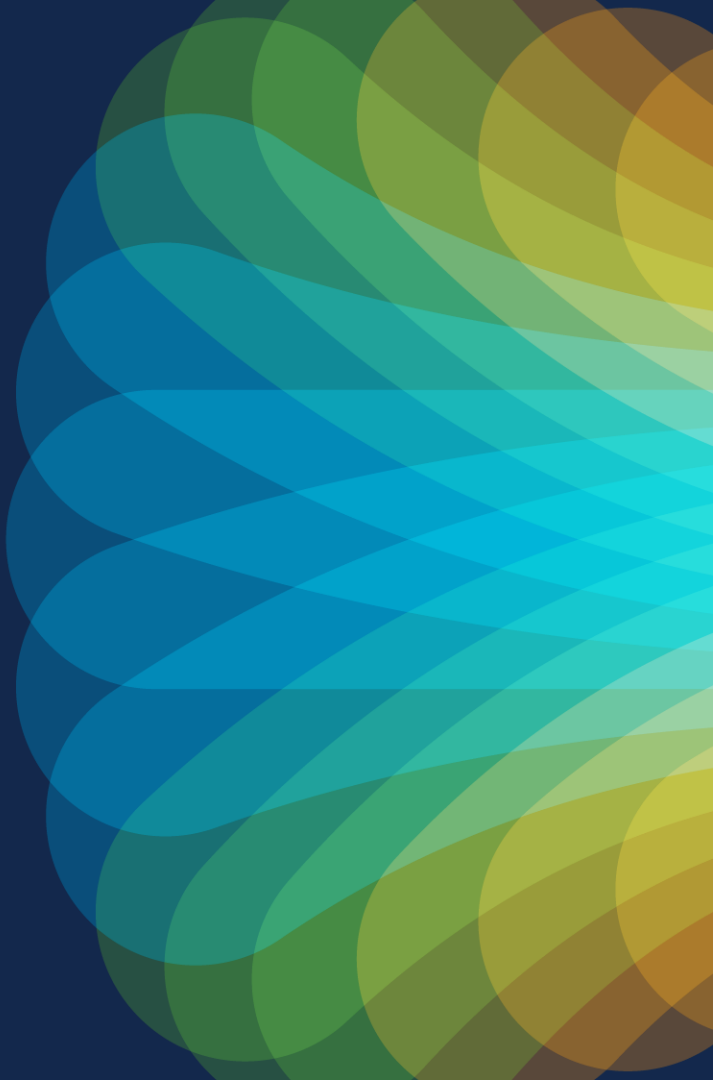


Increased flexibility and scalability | Highly customizable | Single pane of glass view

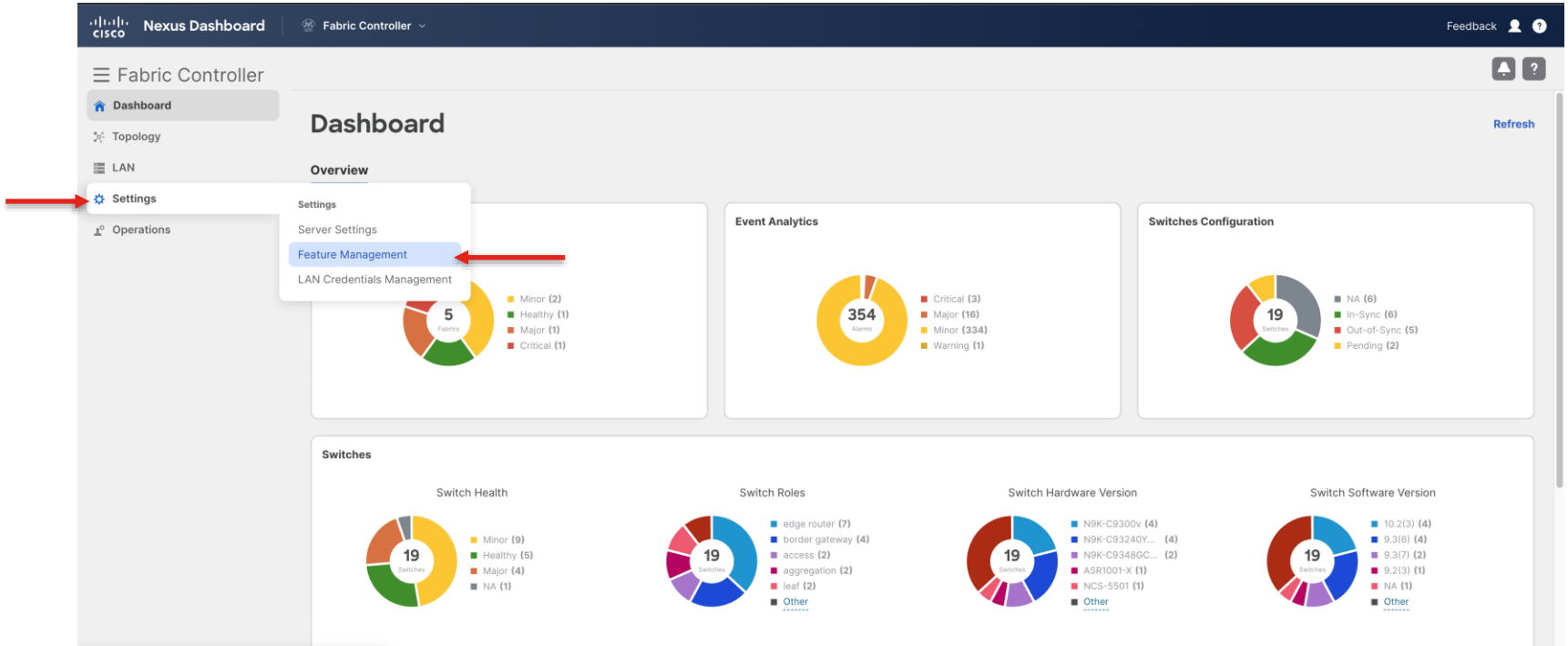
Cisco Nexus Dashboard One View



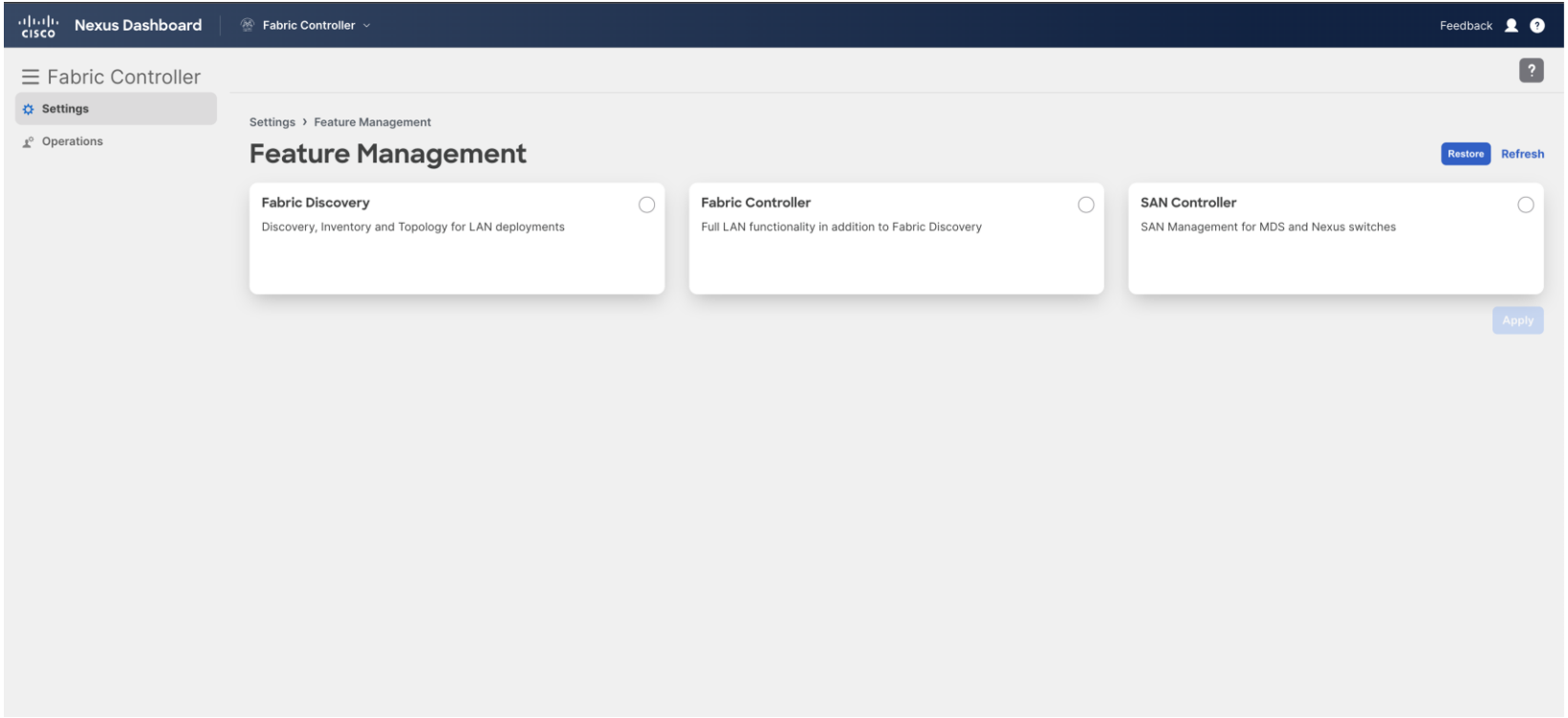
Nexus Dashboard Fabric Controller: Feature Manager



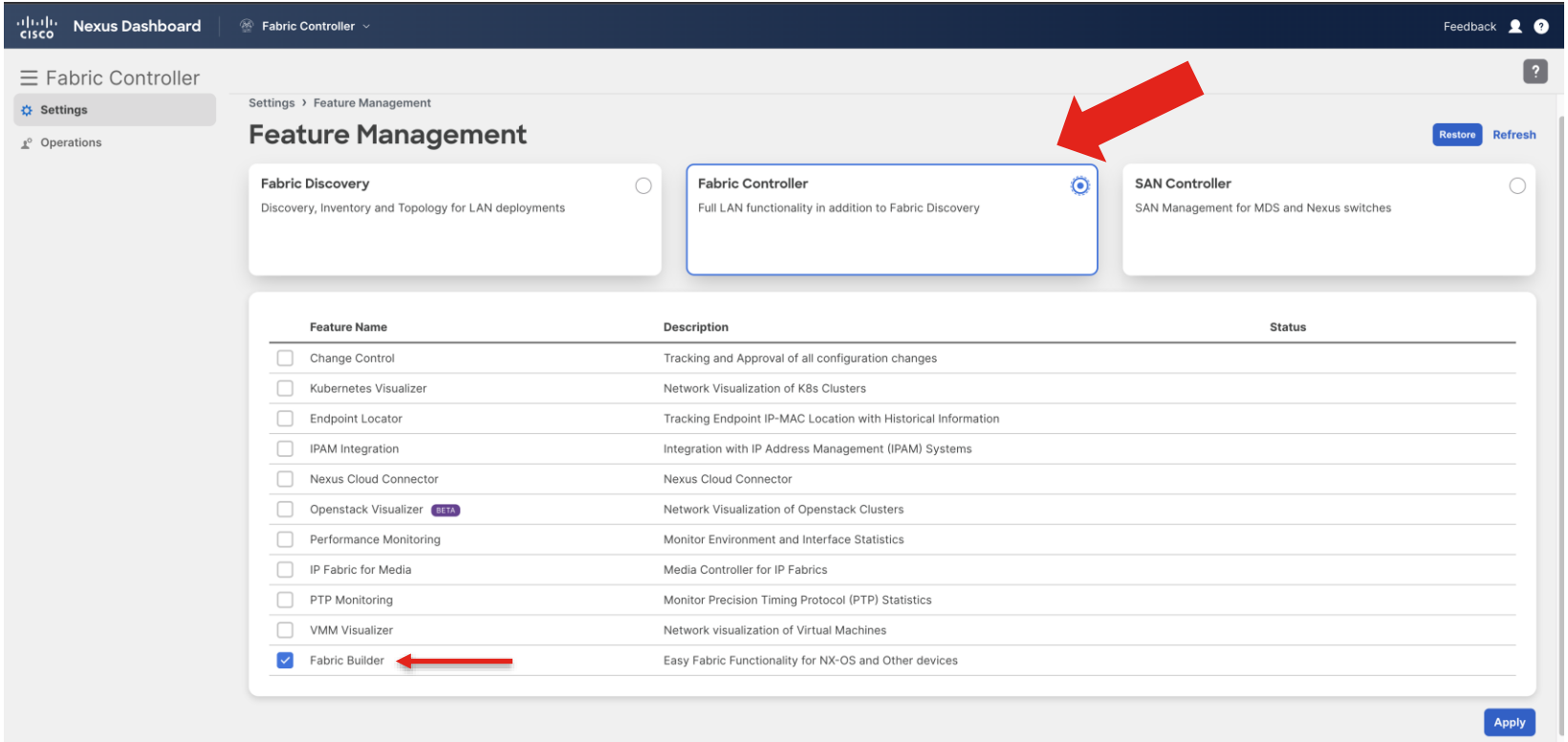
NDFC Feature Manager



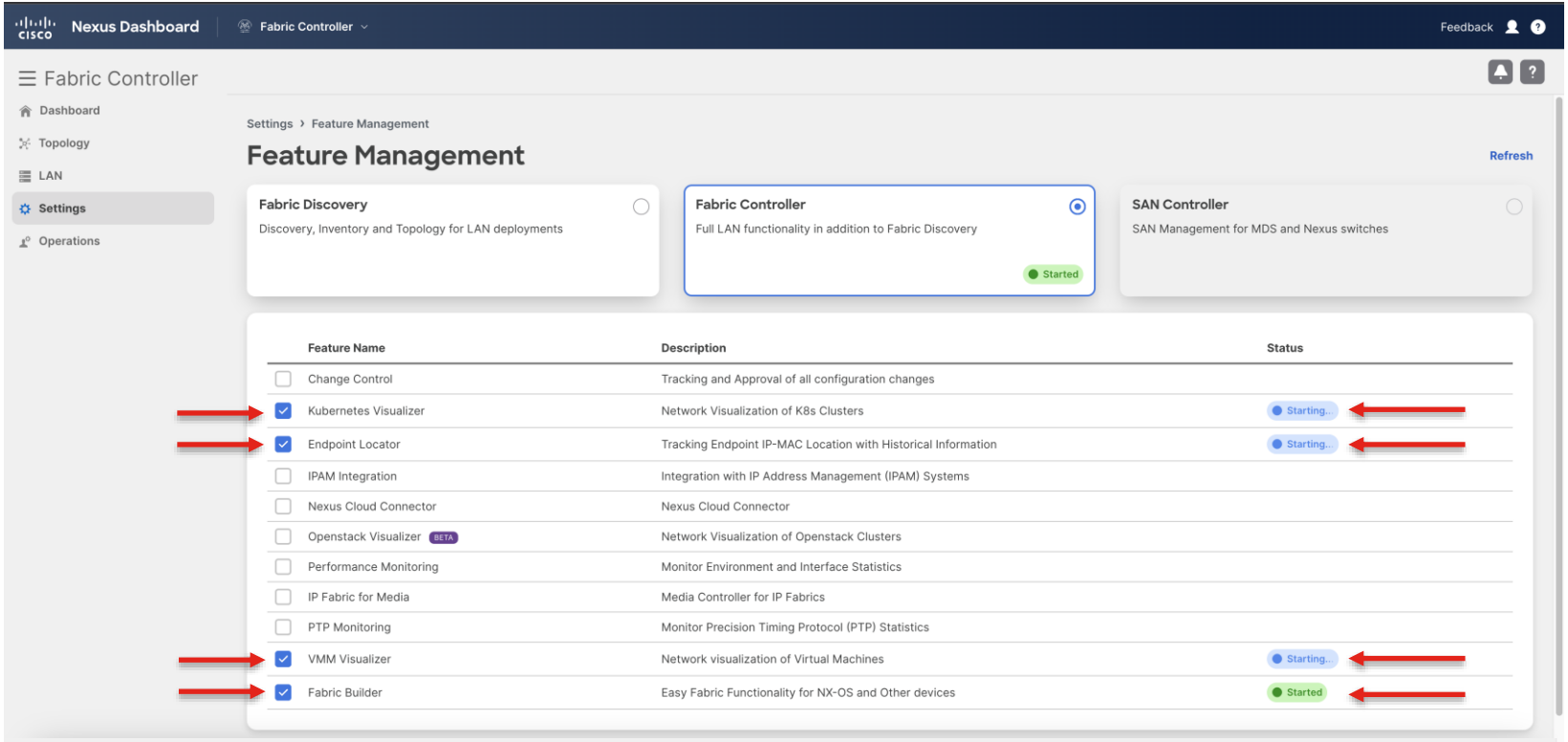
Nexus Dashboard Fabric Controller



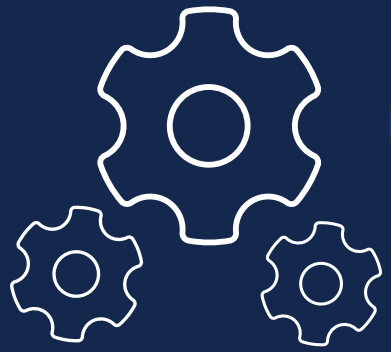
Nexus Dashboard Fabric Controller



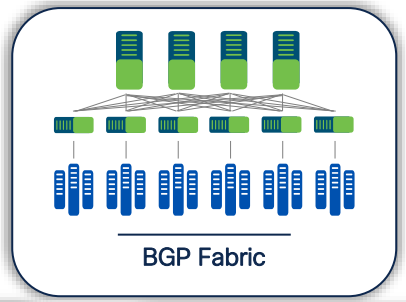
Nexus Dashboard Fabric Controller

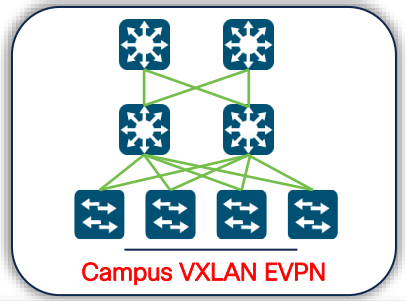


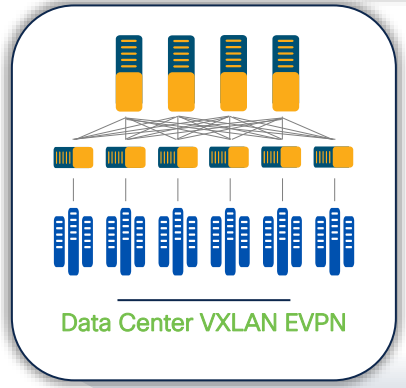
NDFC Automation

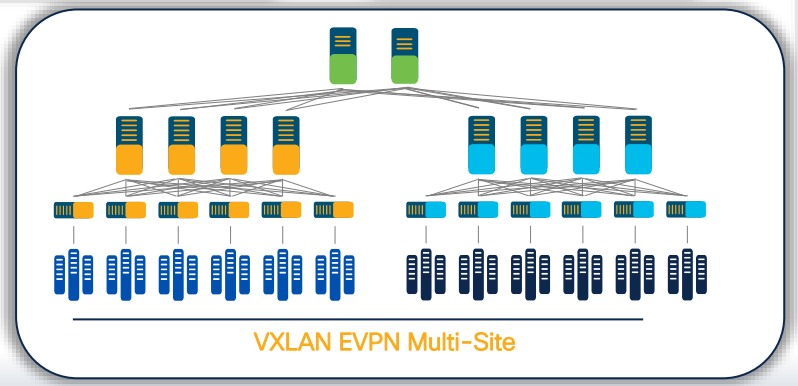


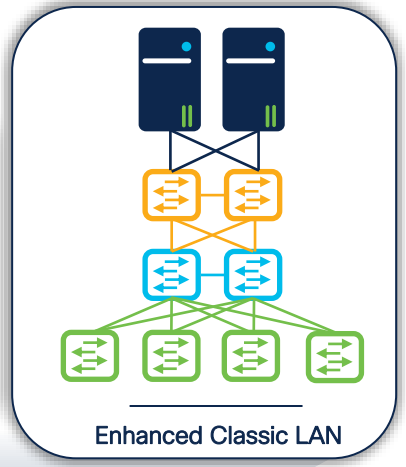
Fabric Builder

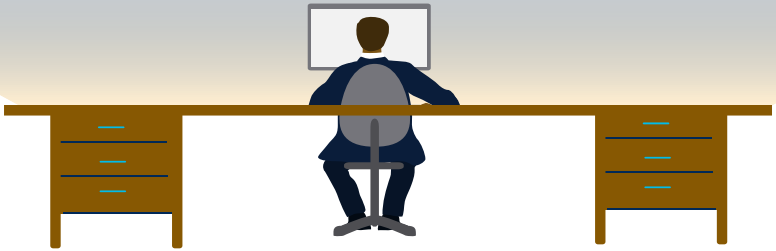






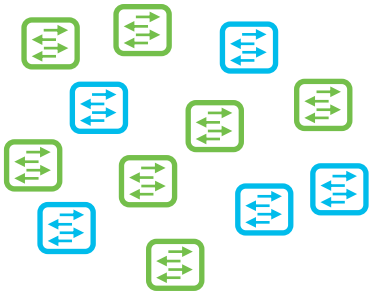






Automate VXLAN EVPN deployments
Provision a new fabric in minutes

Un-provisioned switches

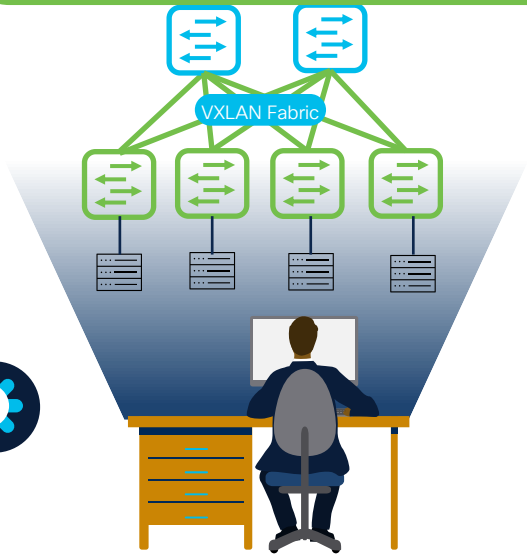


Support for both brownfield and greenfield deployments

Within NDFC
select fabric builder

Fast, automated process

Cisco's best practice implemented



Accelerate fabric deployments | Automated consistency | Minimize risk | Support for both Greenfield and Brownfield deployment

Fabric Templates Summary

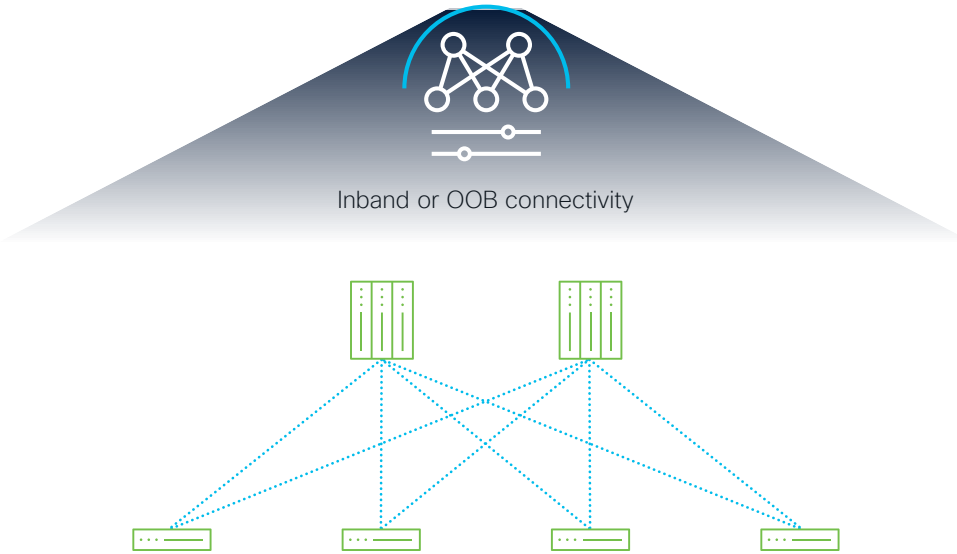
Type of Fabric	Description
Data Center VXLAN EVPN	Fabric for a VXLAN EVPN deployment with Nexus 9000 & 3000 switches.
Enhanced Classic LAN	Fabric for a fully automated 3-tier Classic LAN deployment with Nexus 9000 & 7000 switches.
Campus VXLAN EVPN	Fabric for a VXLAN EVPN Campus deployment with Catalyst 9000 switches & Nexus 9000 switches.
BGP Fabric	Fabric for an eBGP-based deployment with Nexus 9000 & 3000 switches. Optionally VXLAN EVPN can be enabled on top of the eBGP underlay.
Flexible Network	Fabric for flexible deployments with a mix of Nexus and Non-Nexus devices.
Fabric Group	Domain that can contain Enhanced Classic LAN, Classic LAN, & External Connectivity Network fabrics.
Classic LAN	Fabric to manage a legacy Classic LAN deployment with Nexus switches.
LAN Monitor	Fabric for monitoring Nexus switches for basic discovery & inventory management.
VXLAN EVPN Multi-Site	Domain that can contain multiple VXLAN EVPN Fabrics with Layer-2/Layer-3 Overlay Extensions & other Fabric Types.
Multi-Site Interconnect Network	Fabric to interconnect VXLAN EVPN fabrics for Multi-Site deployments with a mix of Nexus & Non-Nexus devices.
External Connectivity Network	Fabric for Core and Edge router deployments with a mix of Nexus and Non-Nexus devices.

Zero Touch Deployment
POAP – Power On Auto Provisioning

Flexible bootstrap and management via in-band (front-panel port) or out of band port

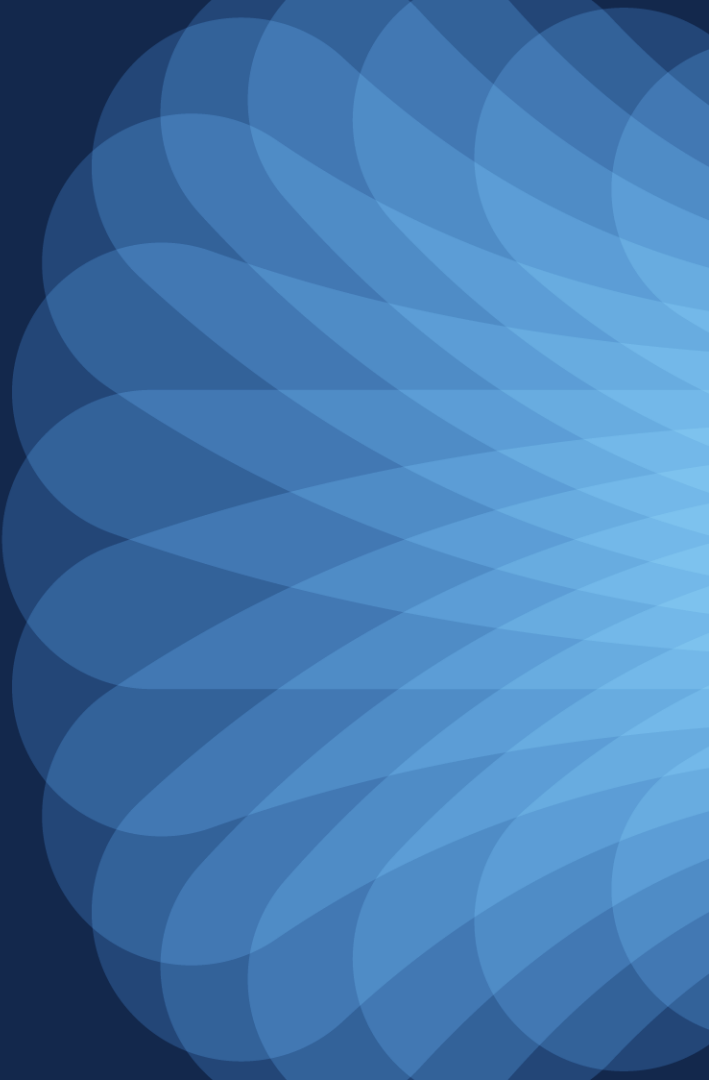
Supports VXLAN EVPN, Classic LAN fabrics

Convenient connectivity options for all device roles: leaf, spine, border leaf, border spine



Zero touch fabric onboarding and management

Data Center EVPN VXLAN Automation Demo



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NDFC Management

Management

Single point for management
for data center operations

Optimized for both large deployments
and traditional deployment models

Granular RBAC

Image management

RMA

Scale within and across data centers
with Nexus Dashboard Orchestrator

Management for non-Nexus platforms

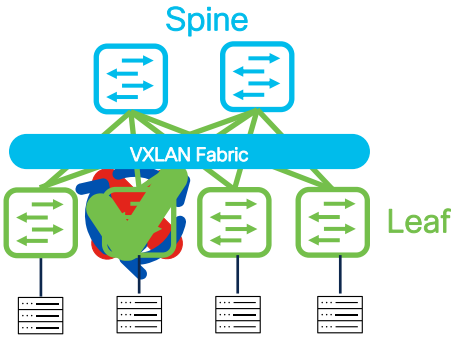
Reliability | Compliance | Secure

Configuration Compliance

Ensure fabric consistency

Continuously monitors if configuration is compliant with user intent

Error detection, flag drifts for remediation



Fabric reliability and visibility

Operations confidence

Streamlined Image and Patch Management for NXOS

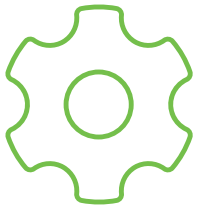
Simplify, Speed up, and Mitigate Risks of Errors

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

Streamlined Image and Patch Management

Maintenance mode

- Guided workflows
- Image upgrades, EPLD upgrades and downgrades, SMU



Pre-Upgrade Steps

1. **Upload** an image Images Tab
2. **Create** a Policy Image Policies Tab for image compliance
3. **Modify Groups** (Optional) Devices Tab to conveniently track upgrades for a set of switches
4. **Modify Policy** to Attach a Policy to the switches
5. **Stage Image** to copy images to the switches
6. **Validate** will indicate if the upgrade is disruptive or non-disruptive
7. **Run Pre-Report** (Optional) baseline state report, prior to upgrade run Pre ISSU

Disruptive Upgrade of a Device Group during a Maintenance Window

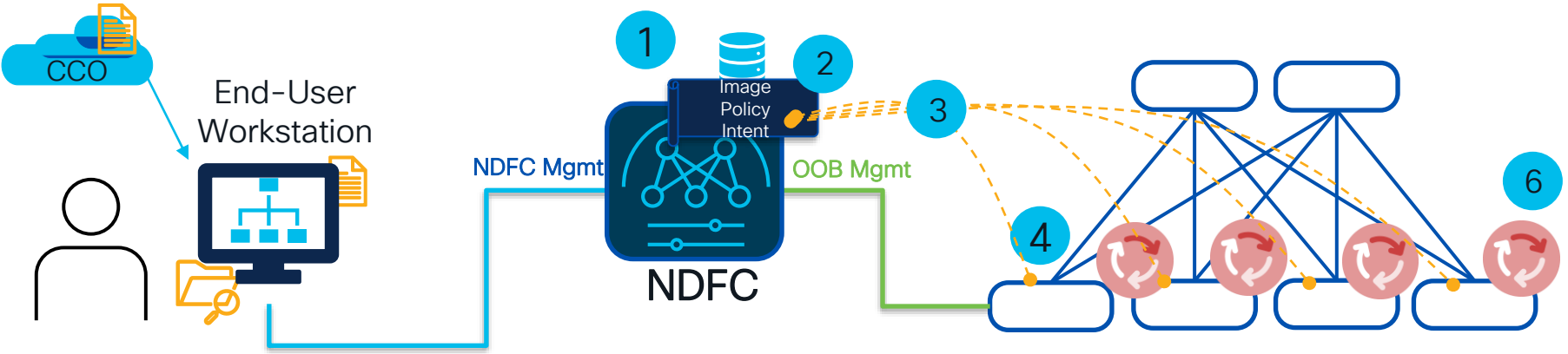
1. **Change Mode** to Maintenance
2. **Upgrade** up to 4 times NX-OS, EPLD and/or RPM. EPLD Golden is always separate
3. **Change Mode** to Normal
4. **Run Reports** (Optional) after switches are back to normal state run the Post ISSU

Non-Disruptive Upgrade of a Device Group during a Maintenance Window

1. **Upgrade** up to 2 times for NX-OS or RPM
2. **Run Reports** (Optional) after switches are back to normal state run the Post ISSU

Simplified | Intuitive | Customizable

Image Management Workflow Example

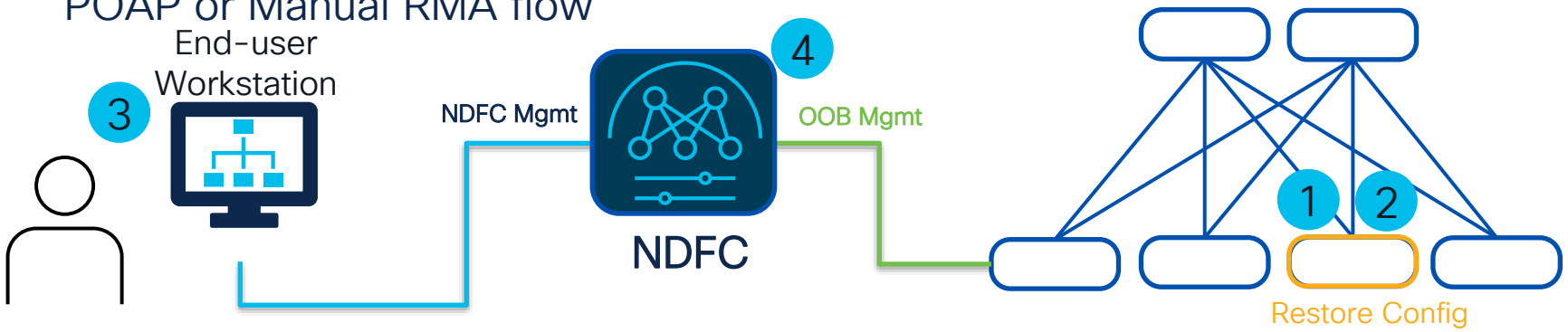


Discover the switches into Nexus Dashboard Fabric Controller.

1. Upload Images
2. Create the Image Policy
3. Attach the Image Policy
4. Stage the Images
5. Validate non-disruptive upgrade
6. Upgrade the switches

Return Material Authorization (RMA)

POAP or Manual RMA flow



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)
4. Select the device to replace and click Provision RMA
5. Move the device back to Normal Mode (~5 mins for full configuration)

Role-based access control (RBAC)

Network Administrator

Access Administrator

Network Operator

Network Stager

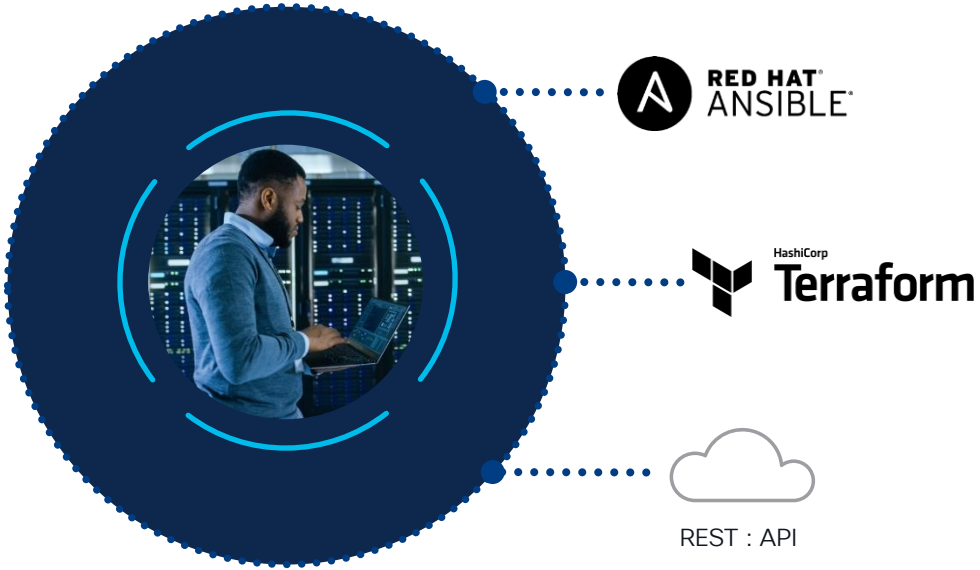
Device Upgrade Administrator

Increase efficiency and productivity with granular roles orchestrated from Cisco Nexus Dashboard

Increase developer agility with NDFC DevOps

Integrations with Ansible and Terraform

Utilize GUI or automation through APIs

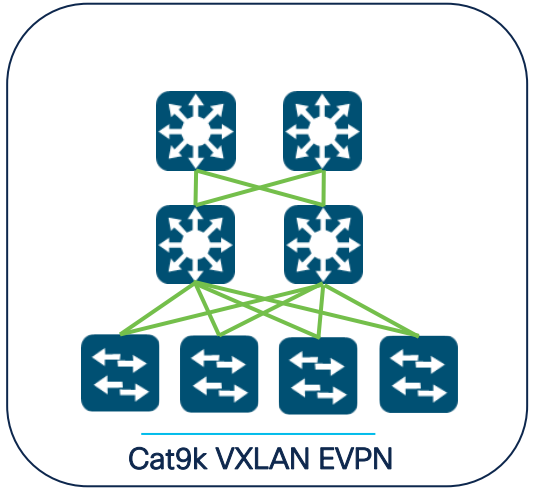


Accelerate deployments | Increase consistency | Minimize risk

Non-Nexus platform support

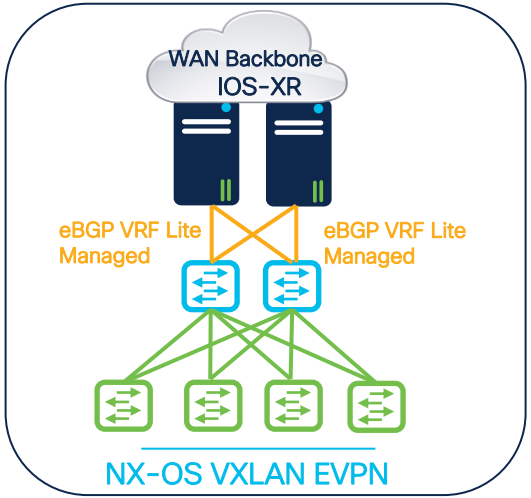
IOS-XE
Cat9k VXLAN EVPN Automation

NDFC 12 supports Fabric Builder template for Cisco IOS-XE: Catalyst 9k VXLAN EVPN automation.



IOS-XR
ASR 9000/NCS5500 managed mode

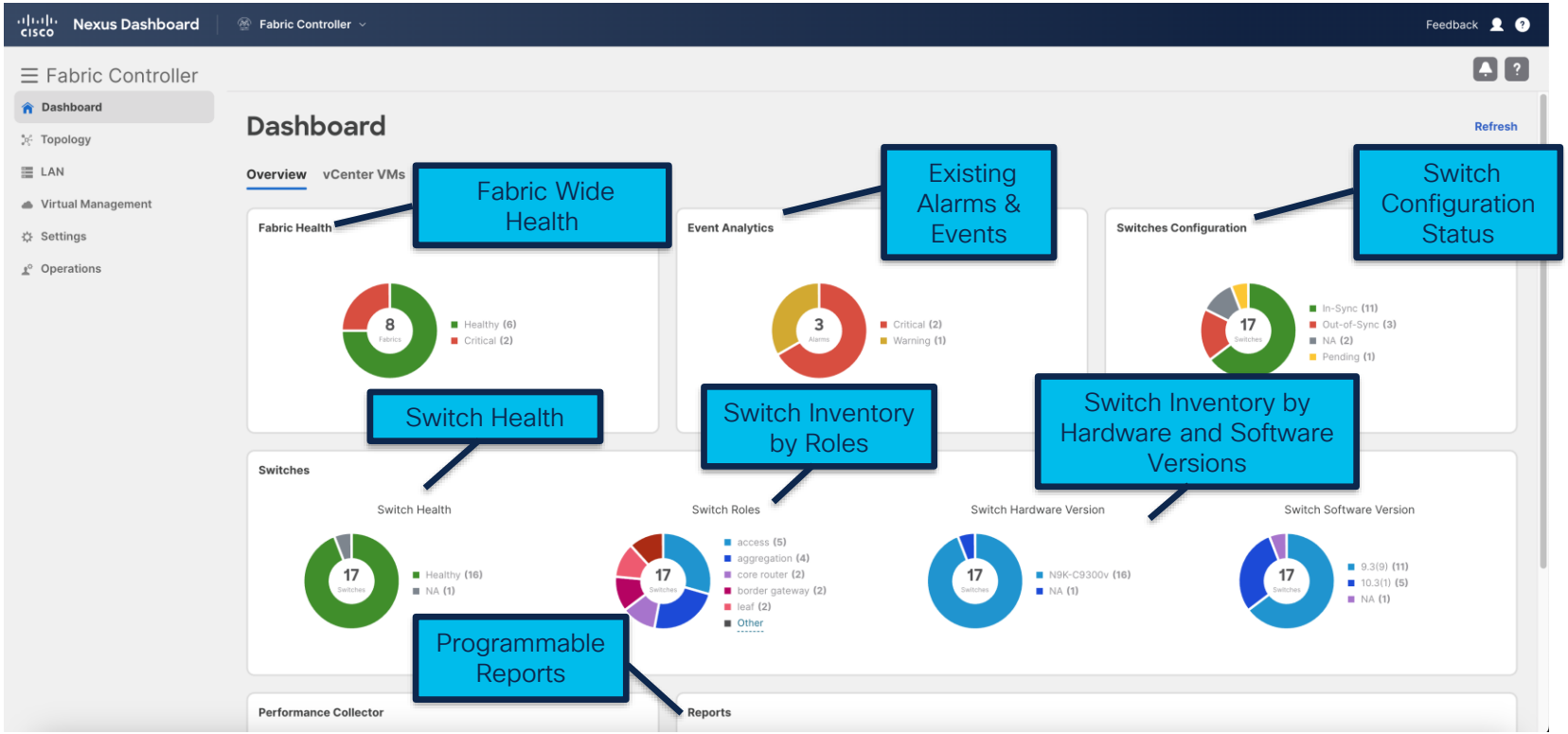
NDFC 12 supports config management for IOS-XR devices in External fabrics. Configuration compliance will also be enabled.



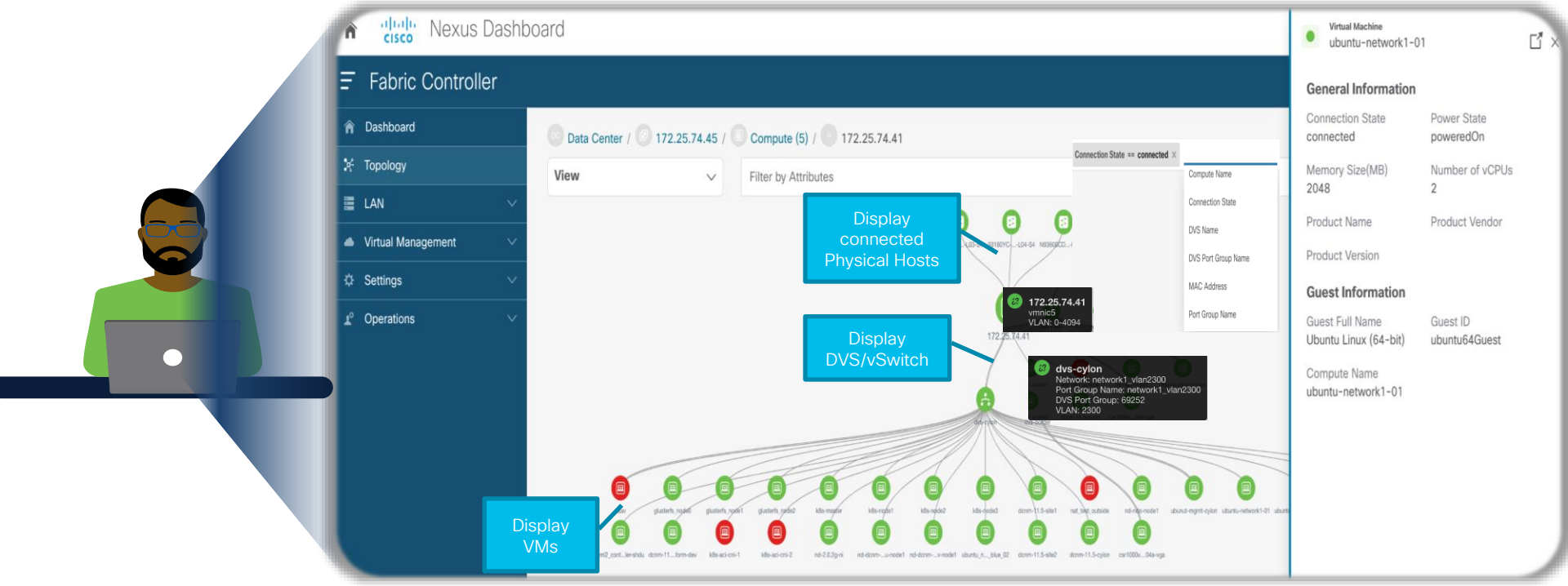
Increased functionality and support in NDFC for customers deploying non-Nexus switches

NDFC Visibility

NDFC Dashboard



Compute Visibility



Single point of management providing in depth visibility and information

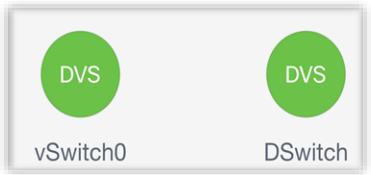
VMM, Kubernetes, and OpenStack VM level visibility

VMM Visibility

vCenter Instance

Visualise the virtual infrastructure at different layer

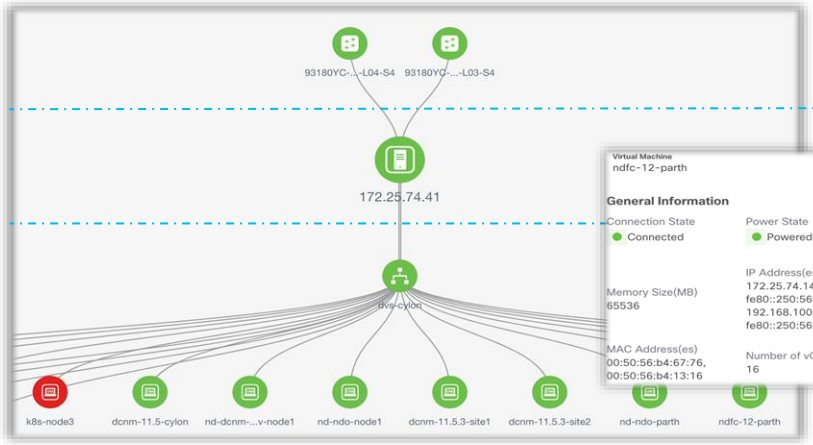
Hosts

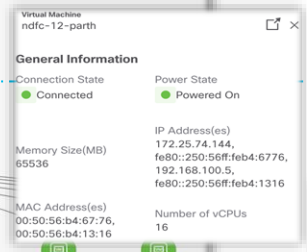


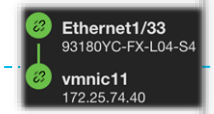
DVS

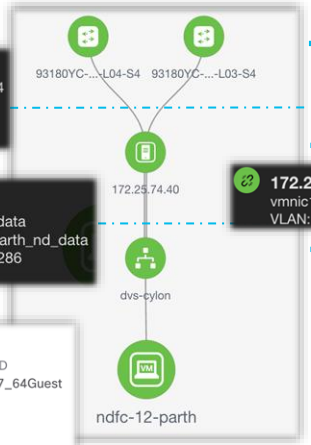
VM

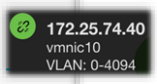
Display connectivity details

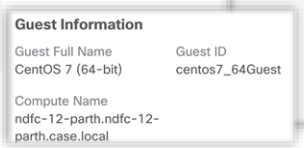












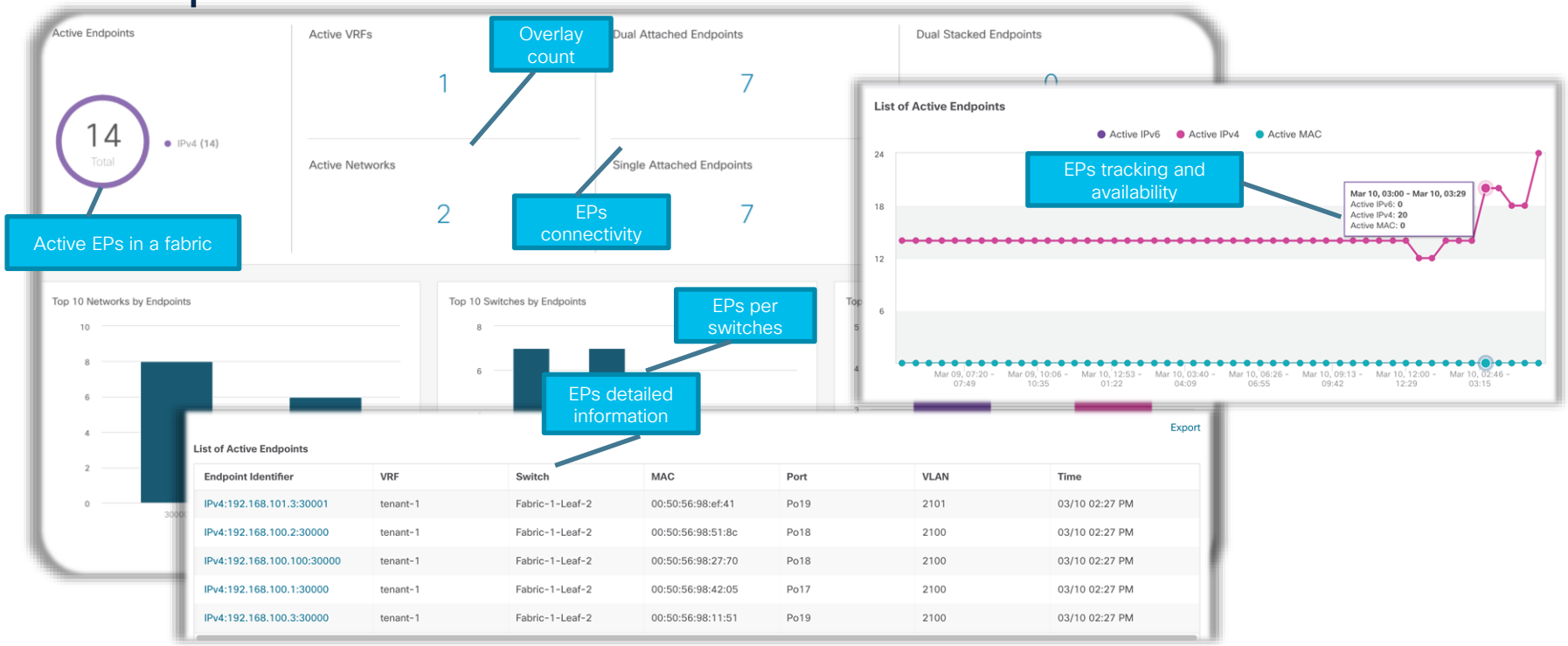
Leaf nodes

Physical Host

DVS

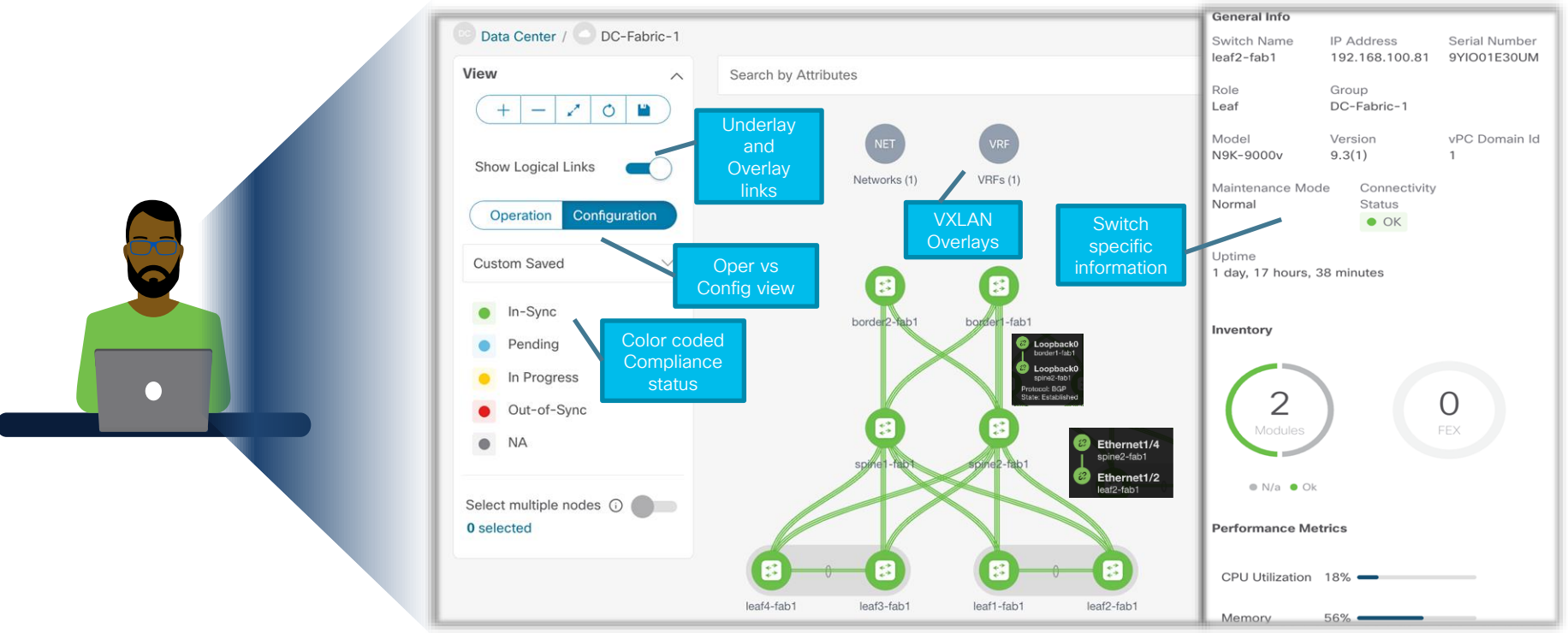
Virtual Machines

Endpoint Locator and Visualizer



Almost real-time data on active endpoints | Single pane of glass for all EP visualization | Endpoint life and history | Active VRFs and Networks

Visualize multiple fabrics with topology views



Switch Performance Metrics

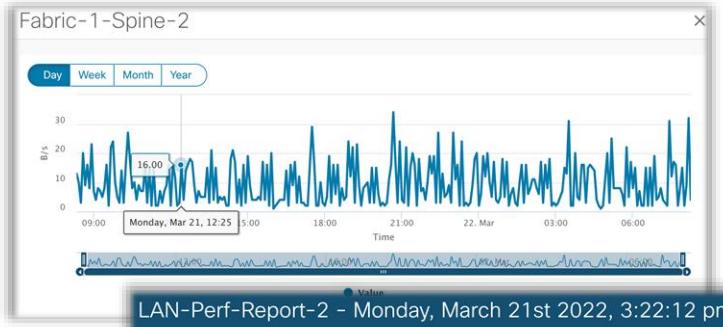
Real Time Switch Health & Performance Monitoring

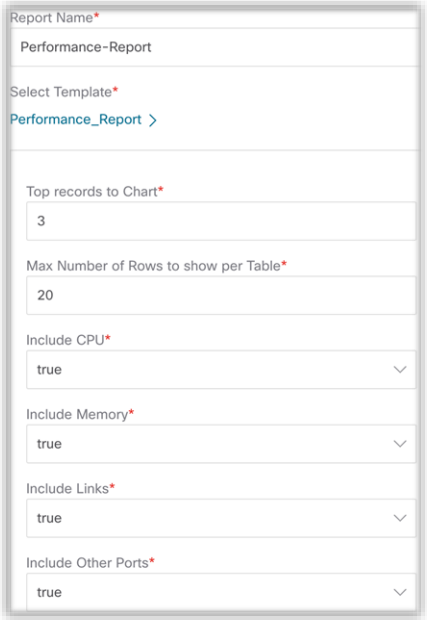
New Programmable Report to simplify Performance visualization

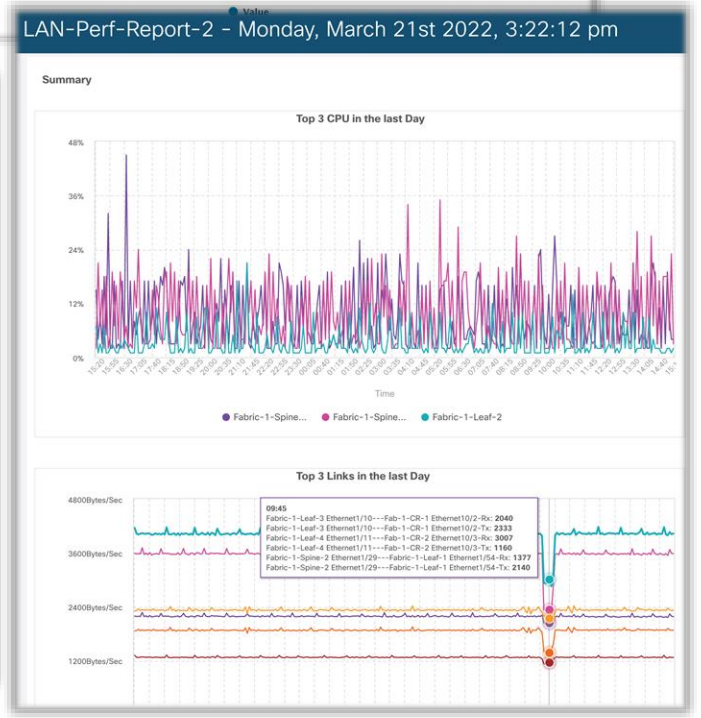
LAN & SAN Fabric Monitoring for CPU, Memory, Traffic and Interface Utilization

Enabled per Fabric for Easy Fabric, External and LAN Classic Template (NX-OS)

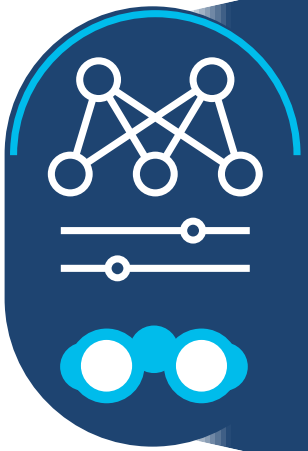
Email based out-of-band notification can be used to export reports externally







Visibility and monitoring



Get comprehensive monitoring

Enhanced topology views

Compute and endpoint visibility

VXLAN OAM support with NDFC

Obtain detailed inventory, health, resource consumption information on devices

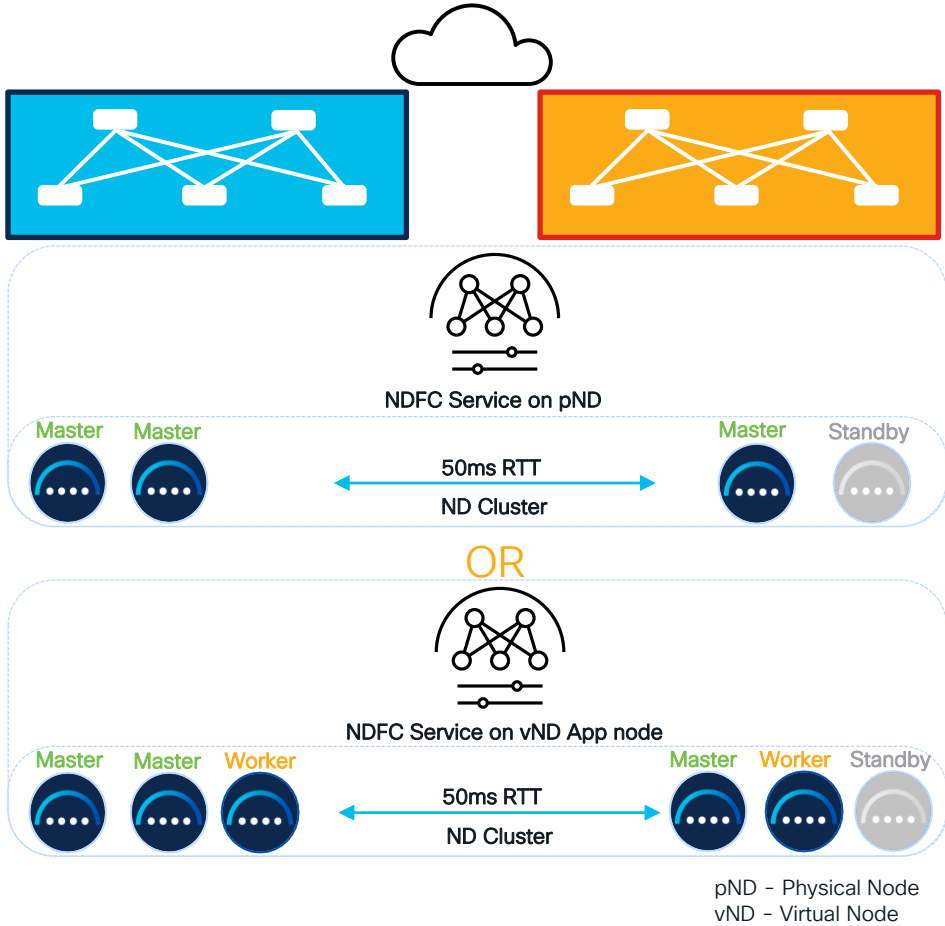
End-to-end visibility, monitoring and troubleshooting

Integrate with NDI for Day 2 operations

Intuitive | Deep visibility | Enhanced monitoring

Nexus Dashboard Fabric Controller
Distributed Cluster Deployment

- Master node: Control plane of a cluster. Performs scheduling tasks when PODs are instantiated based on resources/load and maintains state of the cluster.
- Worker node: Horizontal scale-out and host the application microservices.
- Standby node: Increasing HA in case of Master node failure. Only a Standby node can be promoted to Master.
- NDFC tolerates failure of up to 1 Master node. The ND/NDFC cluster goes into read-only when 2 Master nodes are down.



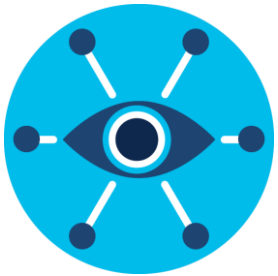
NDFC Summary & Benefits

NDFC solution benefits

Streamlined lifecycle management

Automate and configure your networks with ease

Maintain compliance and detect errors



Extensive visibility, monitoring and modernized topology views

Expand your network with integrations with NDO and NDI

Fill out your session surveys!

Attendees who fill out a minimum of four session surveys and the overall event survey will get **Cisco Live-branded socks** (while supplies last)!

Attendees will also earn 100 points in the **Cisco Live Challenge** for every survey completed.

These points help you get on the leaderboard and increase your chances of winning daily and grand prizes

Continue your education

- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand

The bridge to possible

Thank you

cisco Live!


cisco Live!
Let's go
#CiscoLive

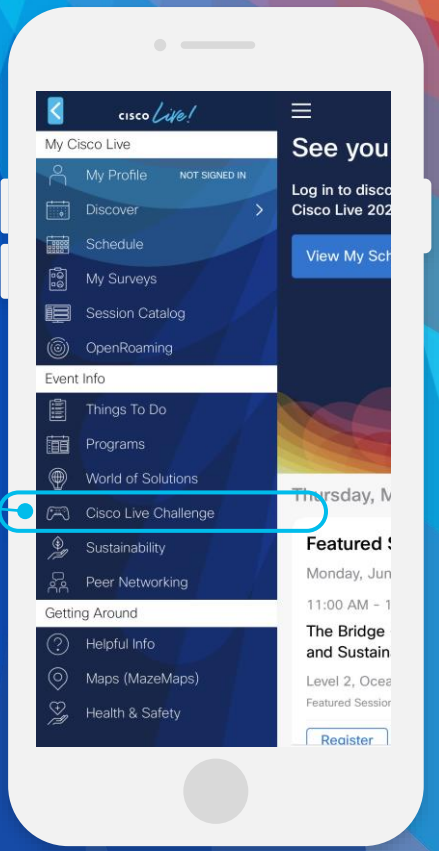
Cisco Live
Challenge

Gamify your Cisco Live experience!

Get points for attending this session!

How:

1. Open the Cisco Events App.
2. Click on 'Cisco Live Challenge' in the side menu.
3. Click on View Your Badges at the top.
4. Click the + at the bottom of the screen and scan the QR code:

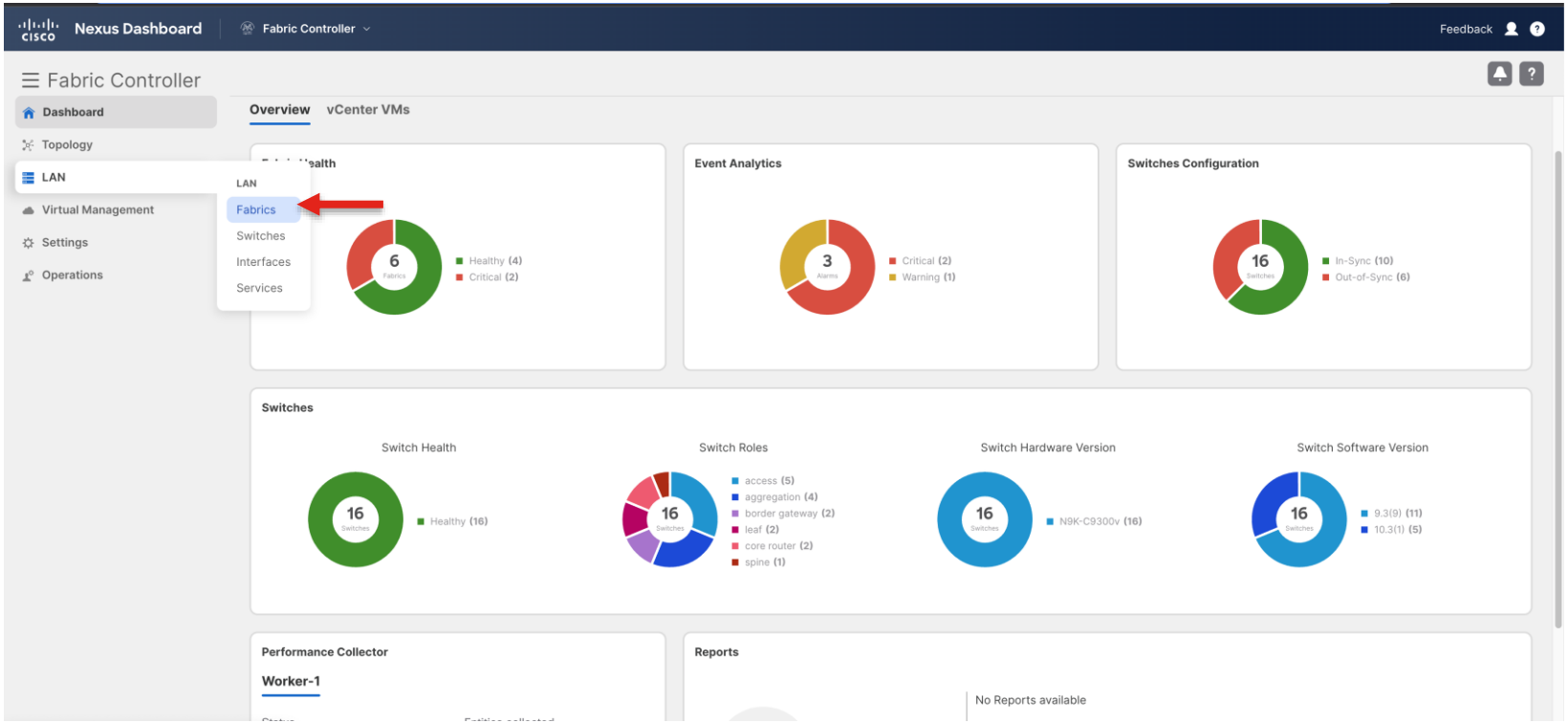


cisco Live!

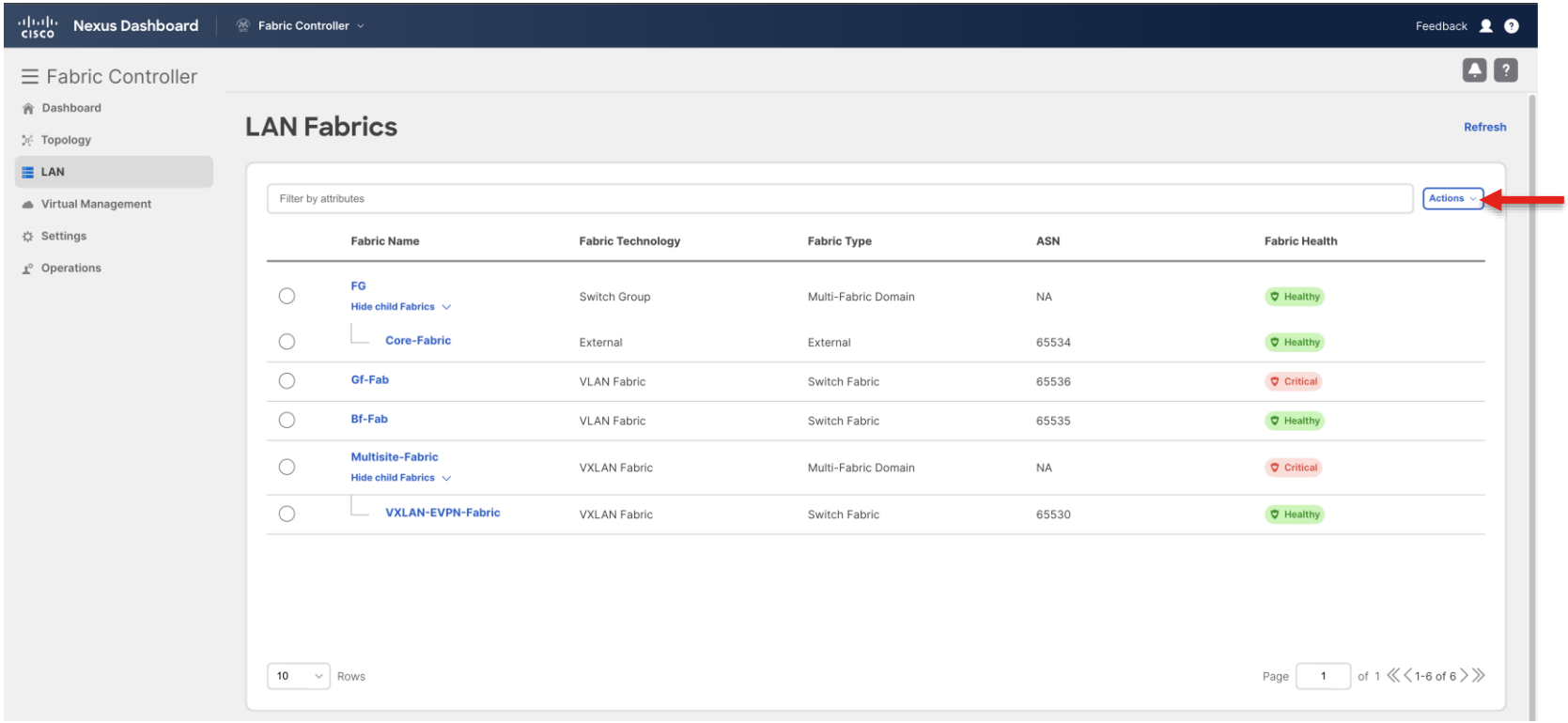
Backup Slides

Data Center EVPN VXLAN Automation Steps covered in Demo

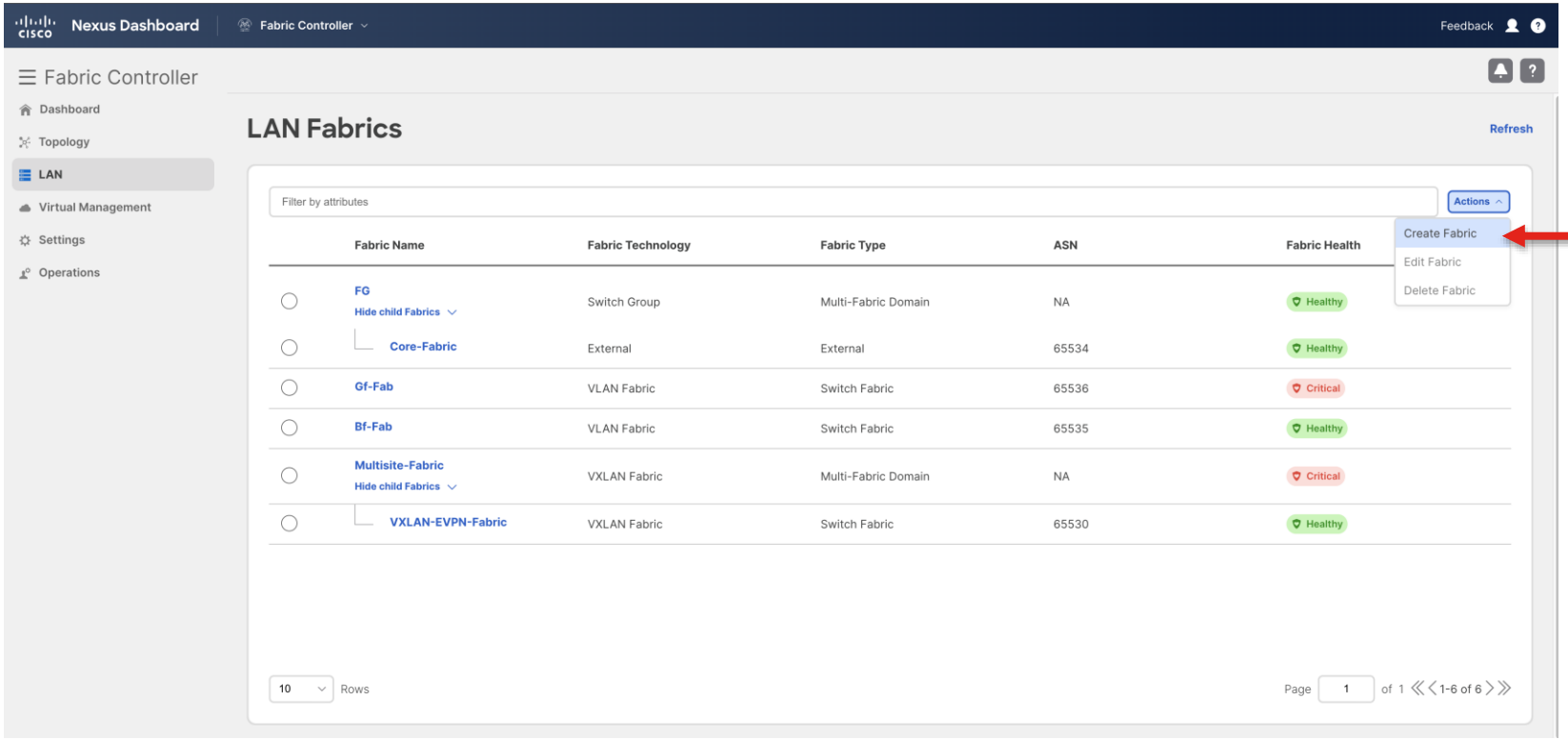
Create Fabric



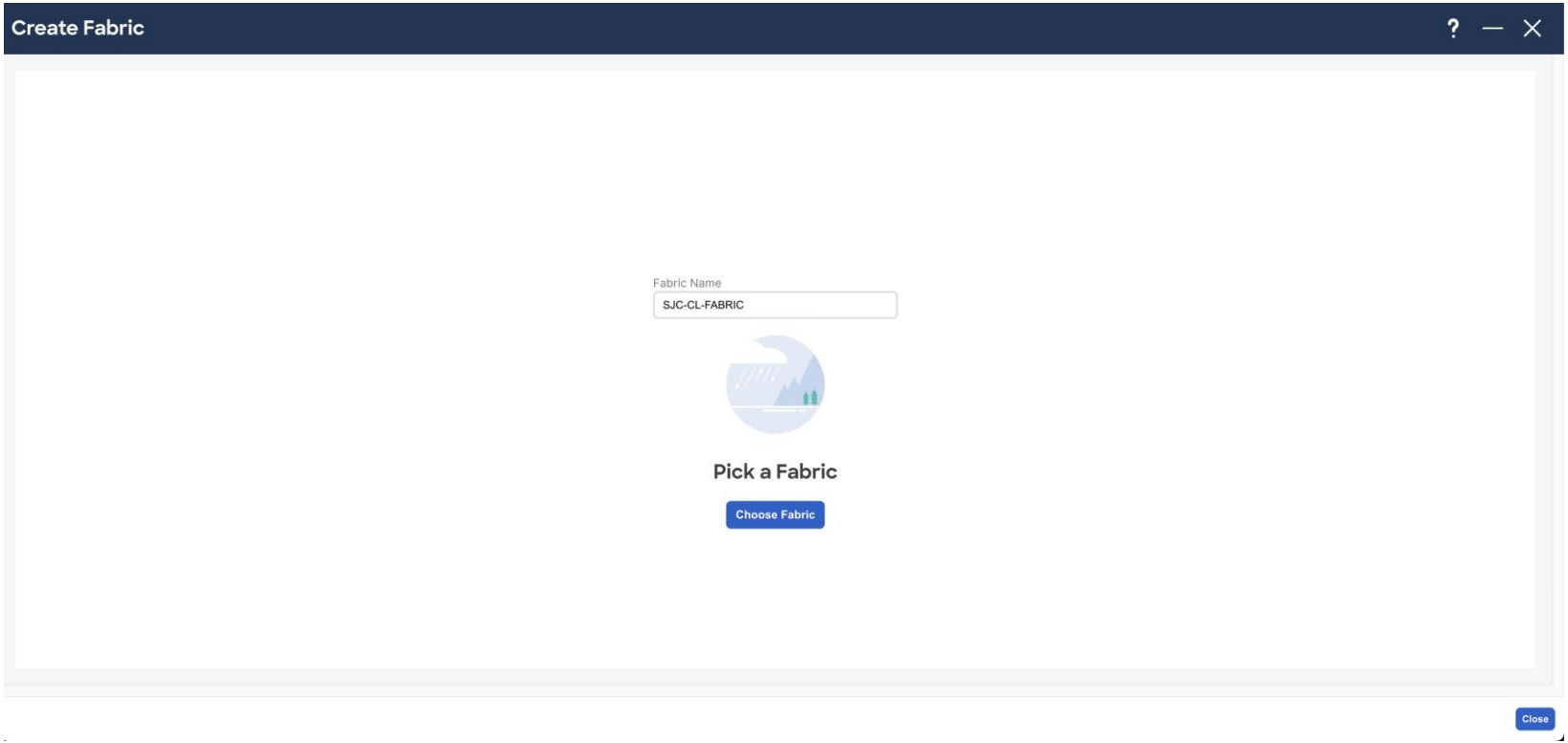
Create Fabric



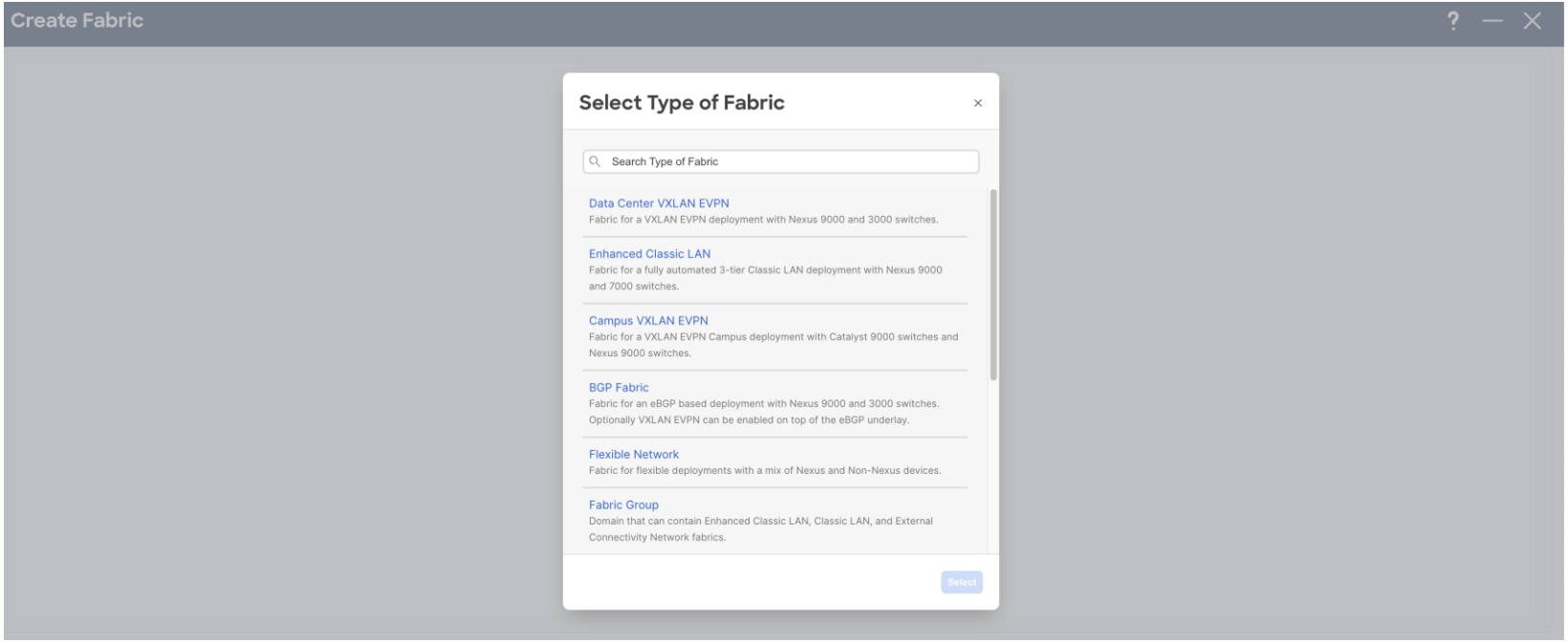
Create Fabric



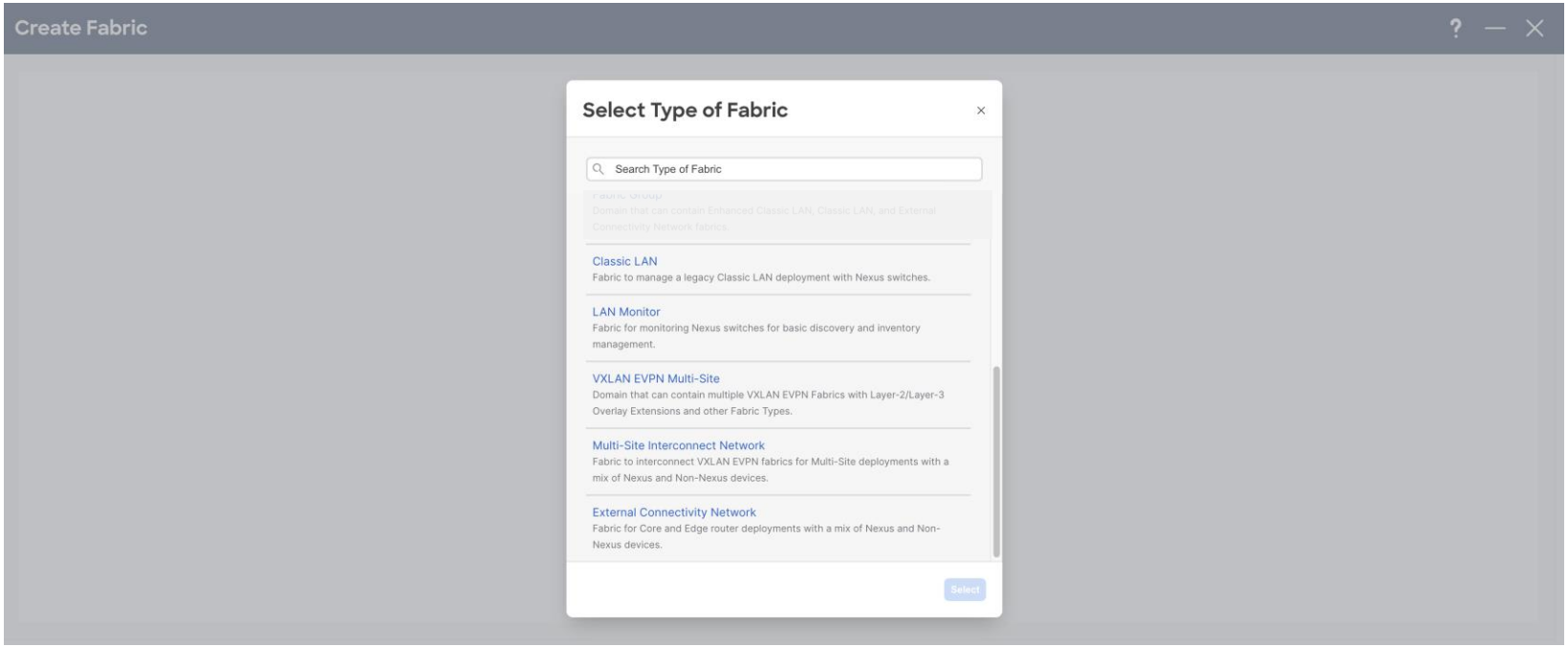
Create Fabric



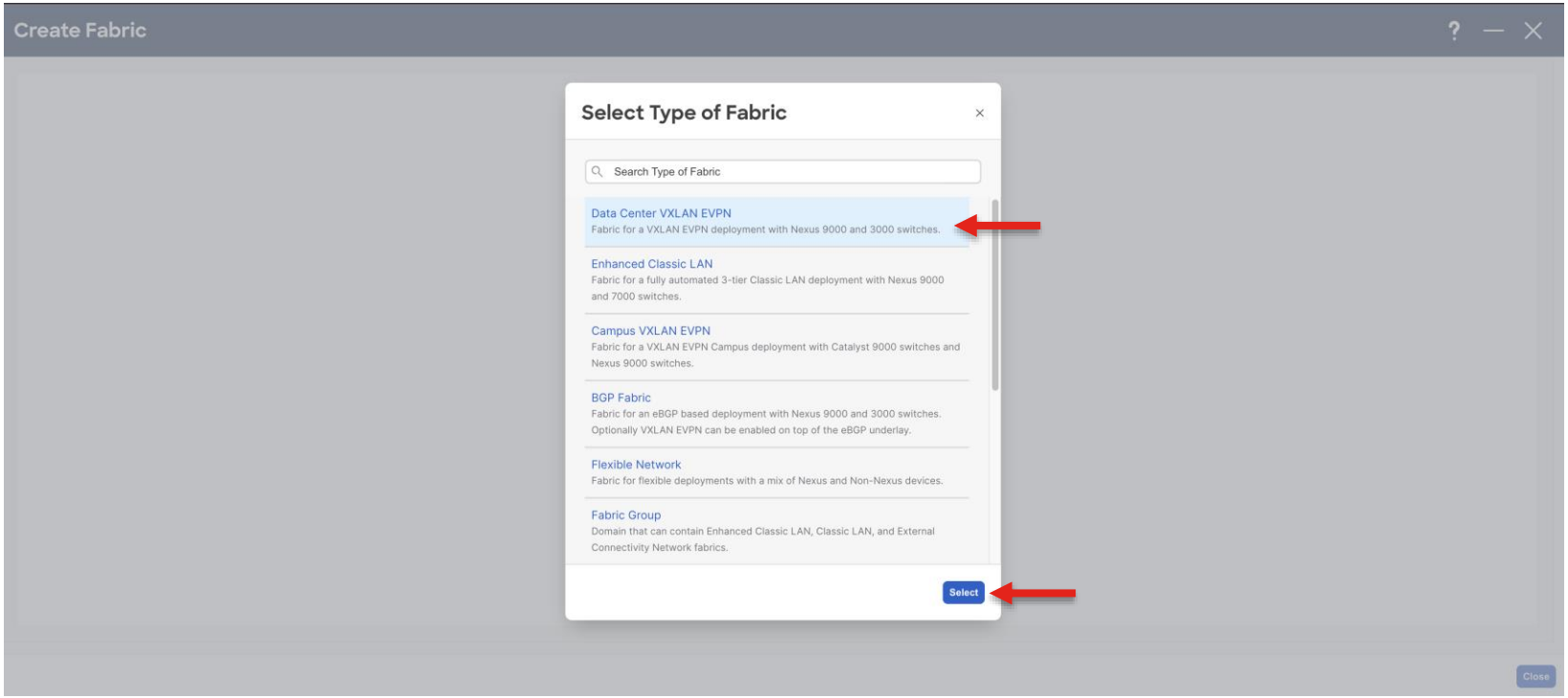
Select the Fabric Template



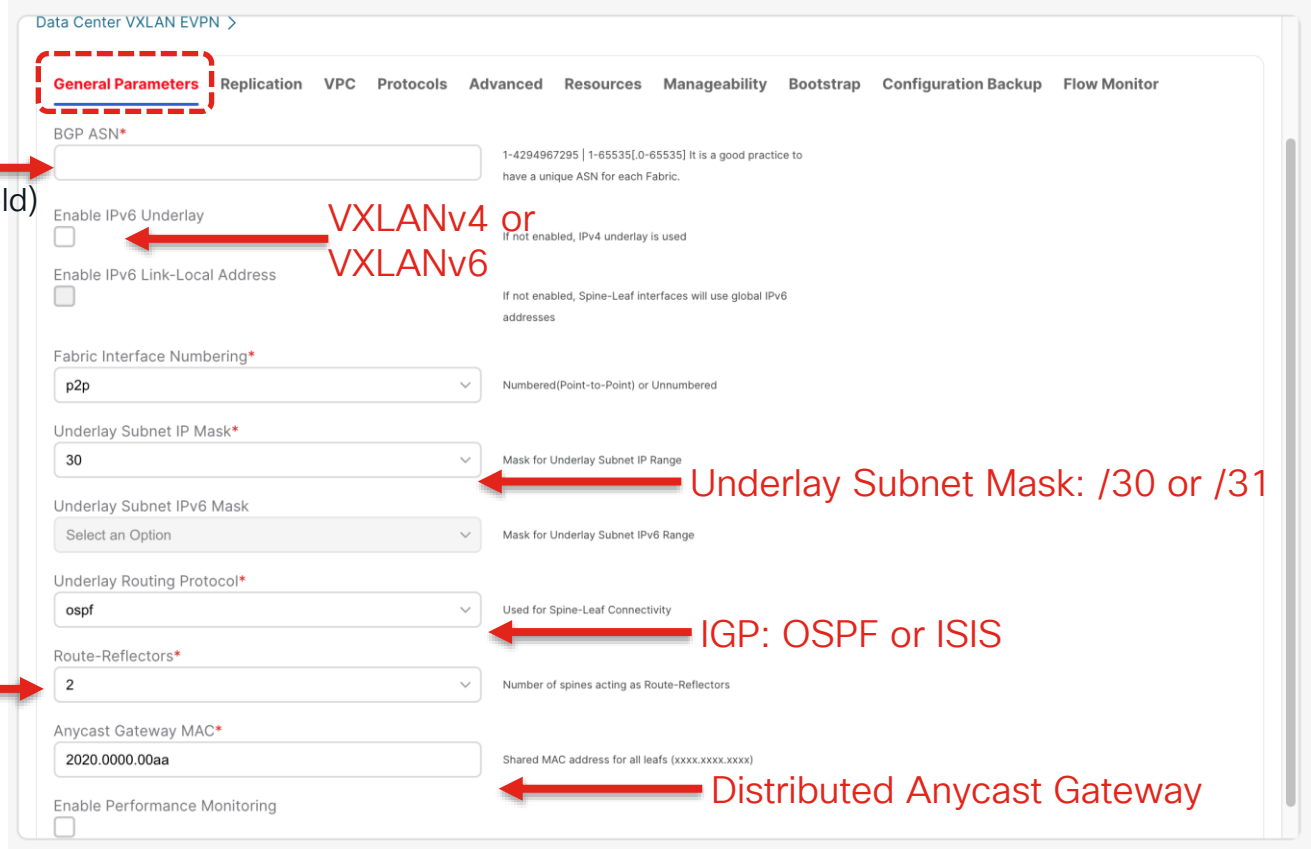
Select the Fabric Template (Continued)



Select the Fabric Template (Continued)



Create “Data Center VXLAN EVPN” Fabric General Parameters

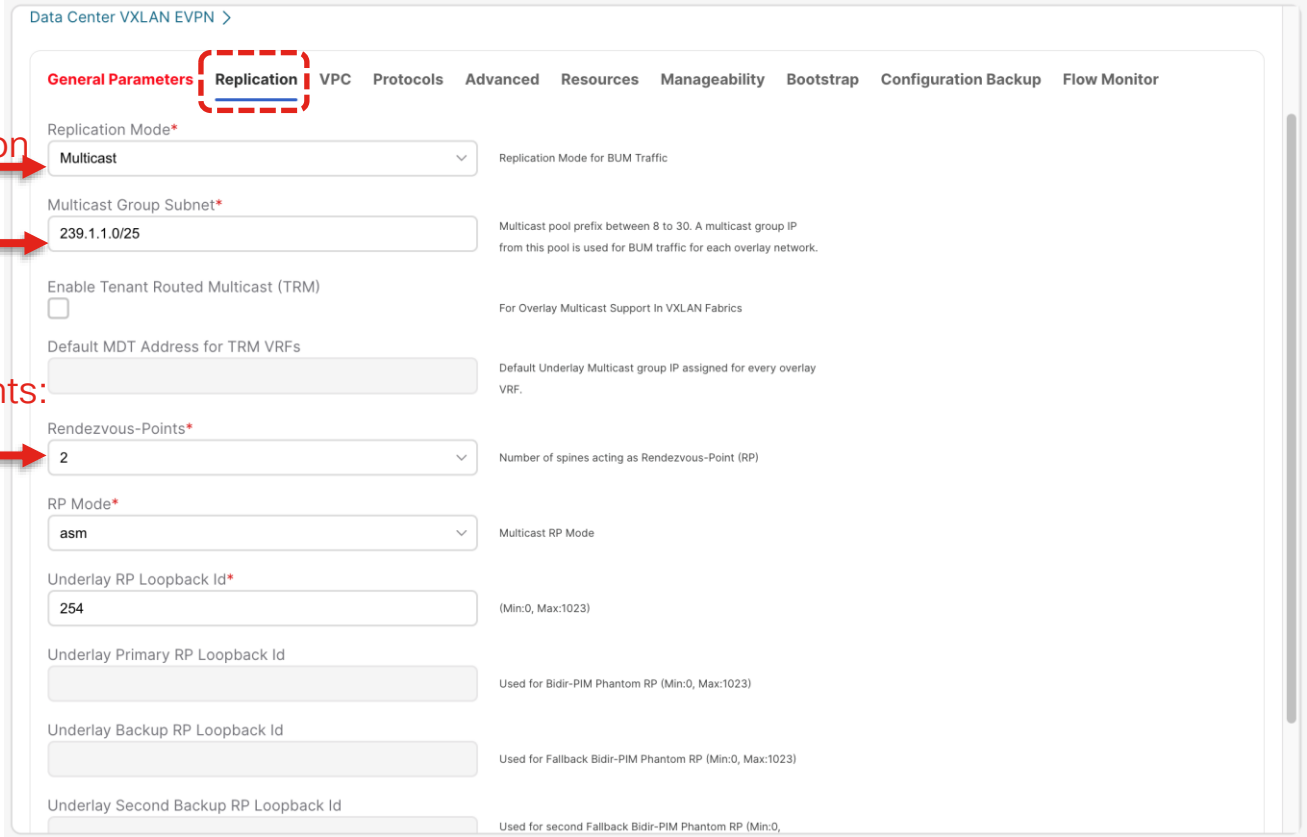


Create “Data Center VXLAN EVPN” Fabric Replication Parameters

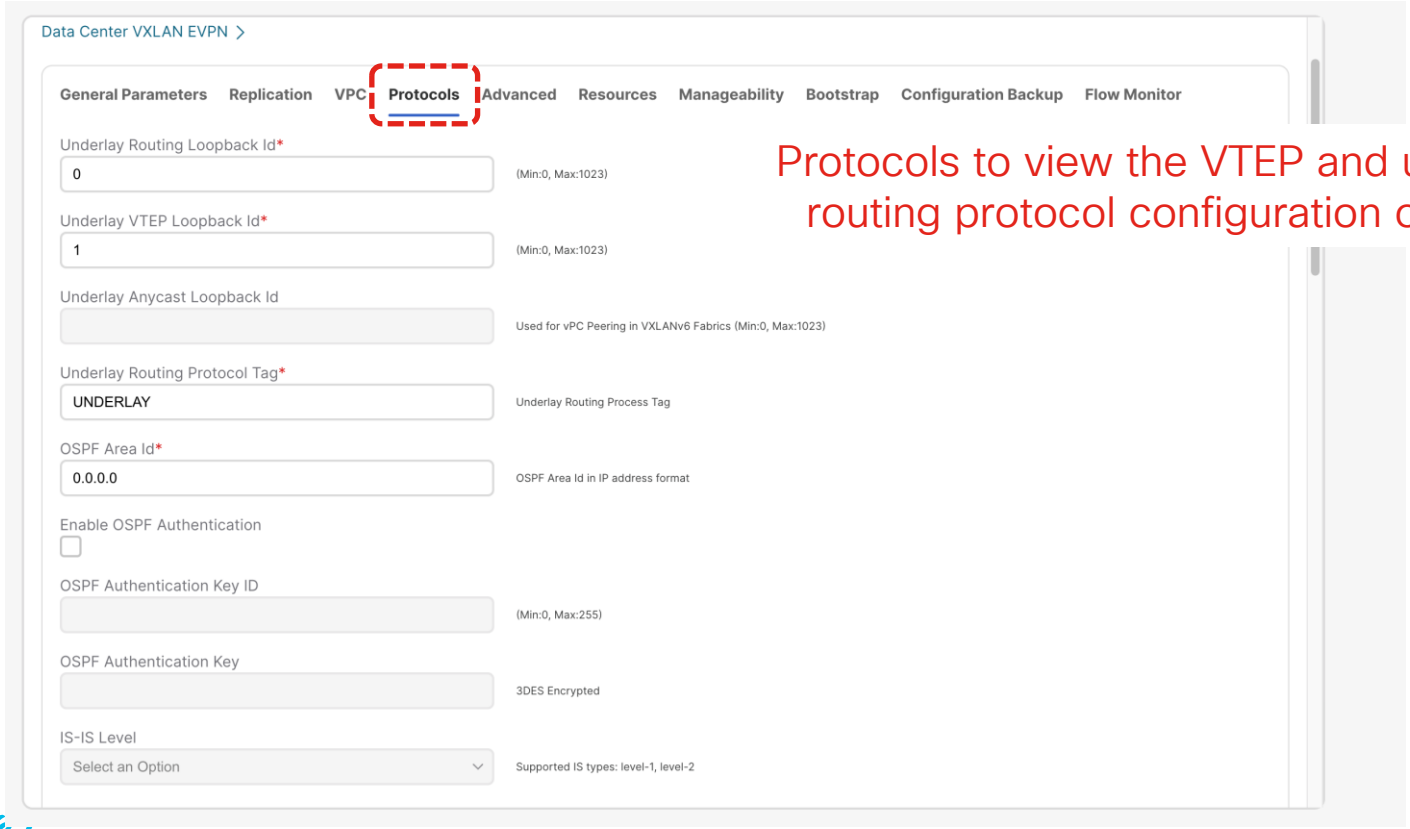
Multicast or Ingress Replication

L2VNI Multicast Group

Rendezvous Points: 2 or 4



Create “Data Center VXLAN EVPN” Fabric Protocol Parameters

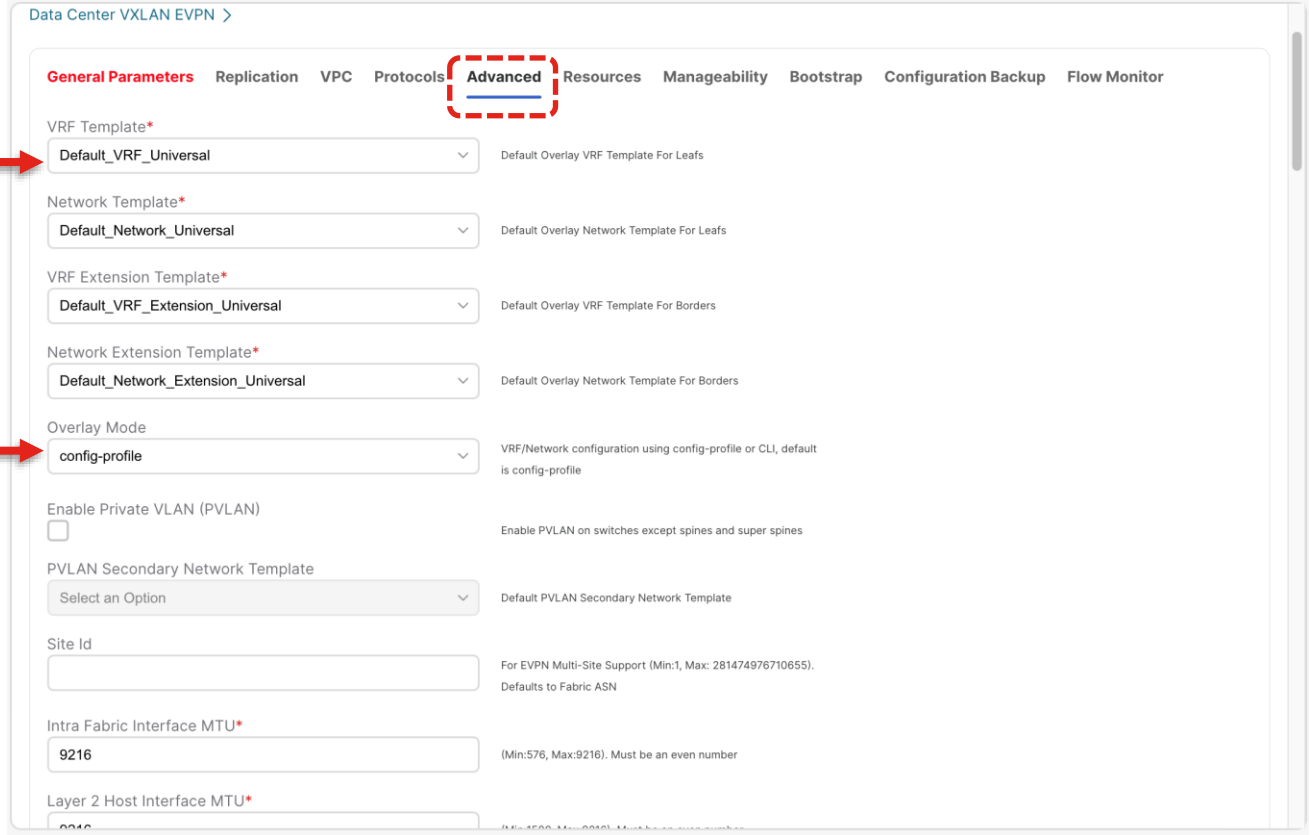


Protocols to view the VTEP and underlay routing protocol configuration options

Create “Data Center VXLAN EVPN” Fabric Advanced Parameters

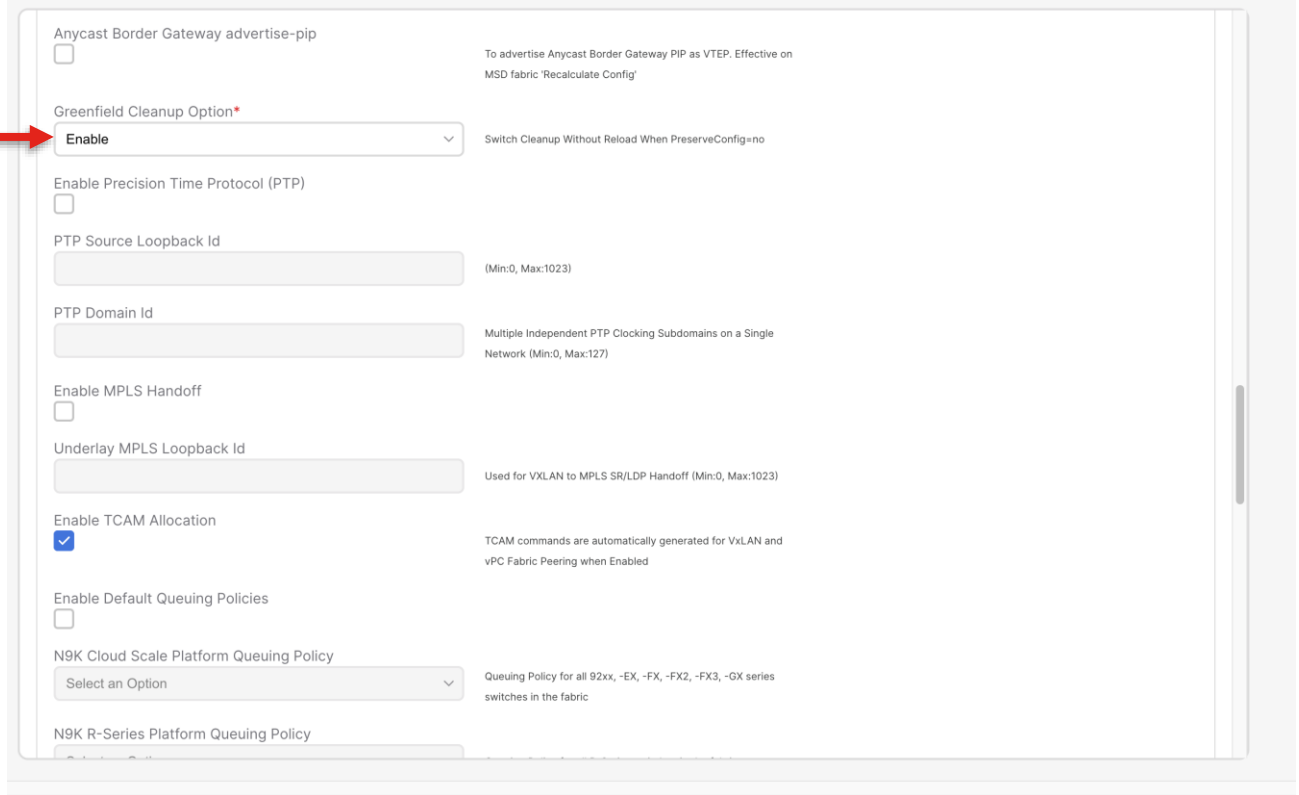
Cisco’s Best Practice Configuration Templates

VXLAN Overlay Mode: CLI or Config-Profile

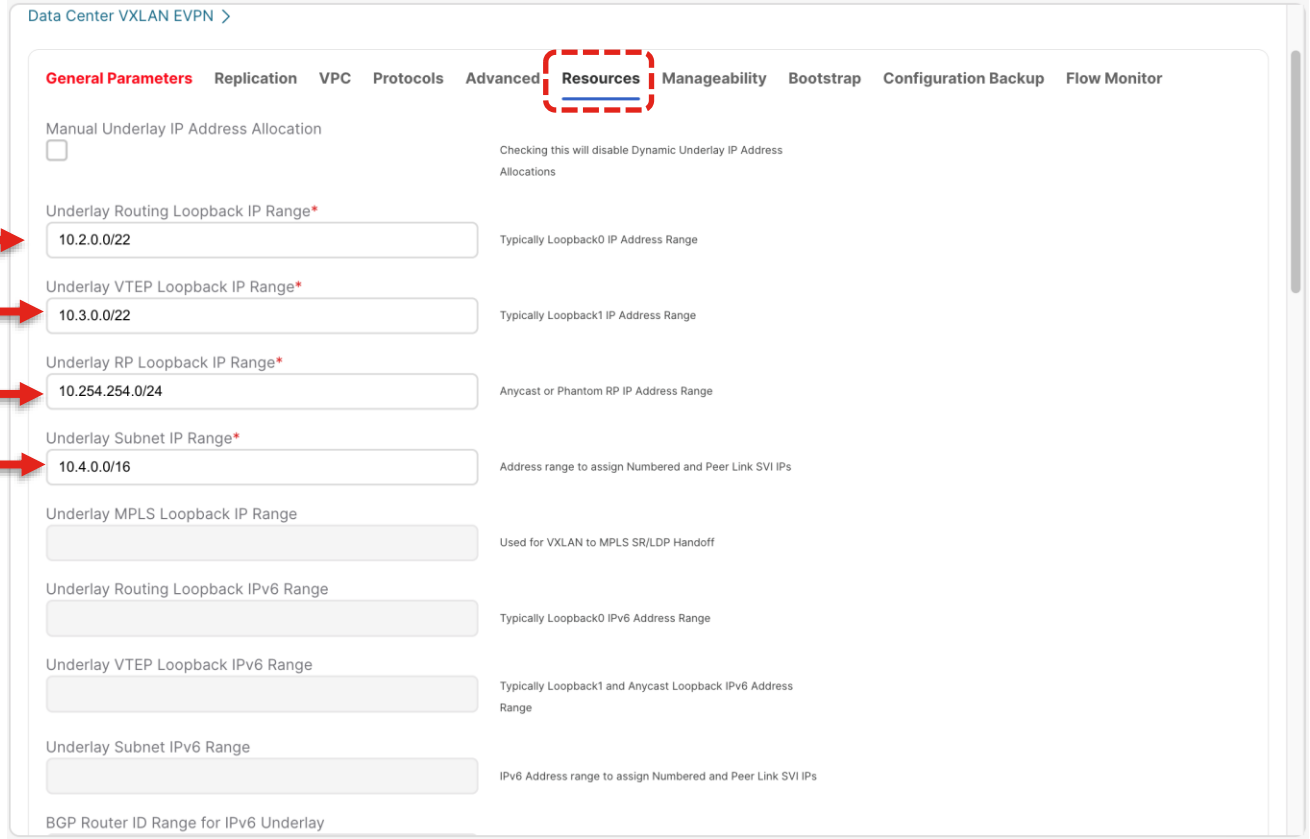


Create “Data Center VXLAN EVPN” Fabric Advanced Parameters (cont.)

When this option is enabled, NDFC will clean up the configuration on the switch with a best effort process without reloading the switch.



Create “Data Center VXLAN EVPN” Fabric Resource Parameters



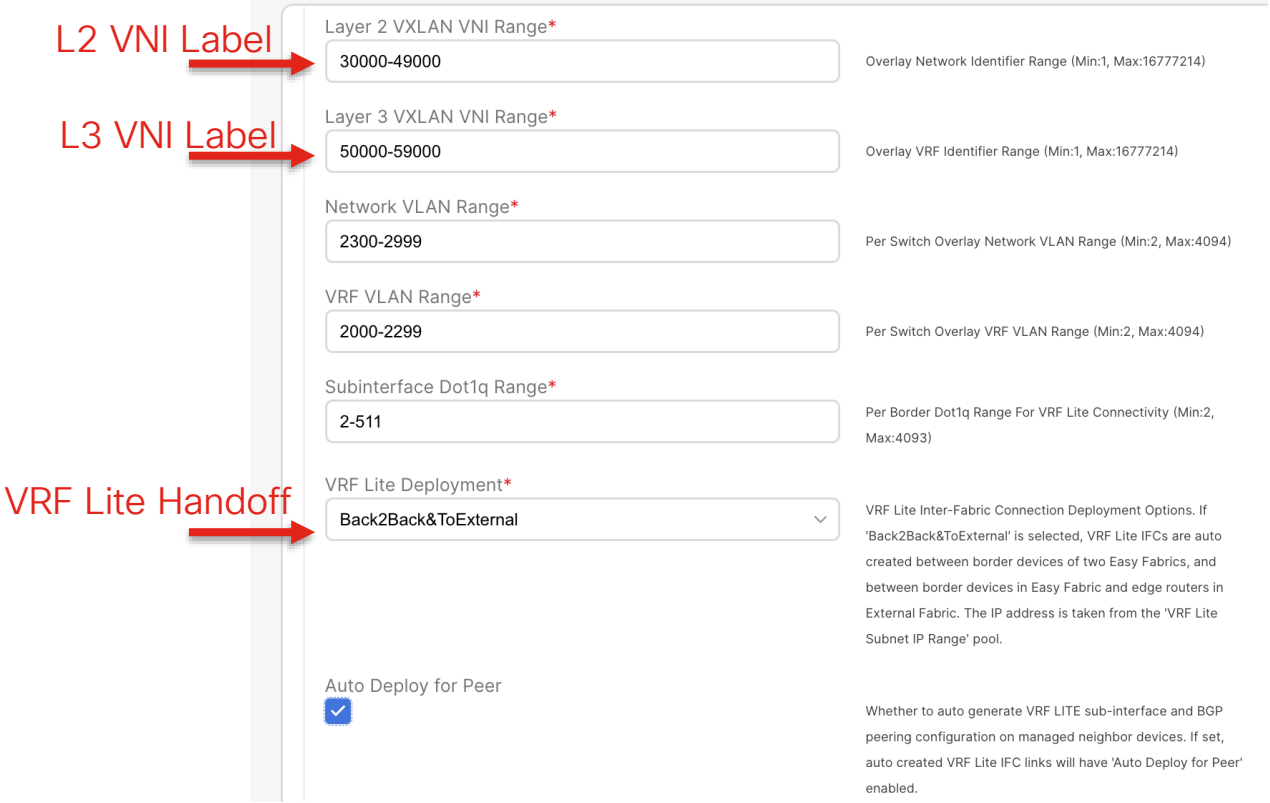
Router ID

VTEP IP

Underlay RP IP

P2P Underlay IP

Create “Data Center VXLAN EVPN” Fabric Resource Parameters (Cont.)



Create “Data Center VXLAN EVPN” Fabric Resource Parameters

VRF Lite IP Range

VRF Lite Subnet IP Range*
10.33.0.0/16
Address range to assign P2P Interfabric Connections

VRF Lite Subnet Mask*
30
(Min:8, Max:31)

Auto Allocation of Unique IP on VRF Extension over VRF Lite IFC
When enabled, IP prefix allocated to the VRF LITE IFC is not reused on VRF extension over VRF LITE IFC. Instead, unique IP Subnet is allocated for each vrf extension over VRF LITE IFC.

Per VRF Per VTEP Loopback Auto-Provisioning
Auto provision a loopback on a VTEP on VRF attachment

Per VRF Per VTEP IP Pool for Loopbacks
Prefix pool to assign IP addresses to loopbacks on VTEPs on a per VRF basis

Service Level Agreement (SLA) ID Range
10000-19999
Per switch SLA ID Range (Min:1, Max: 2147483647)

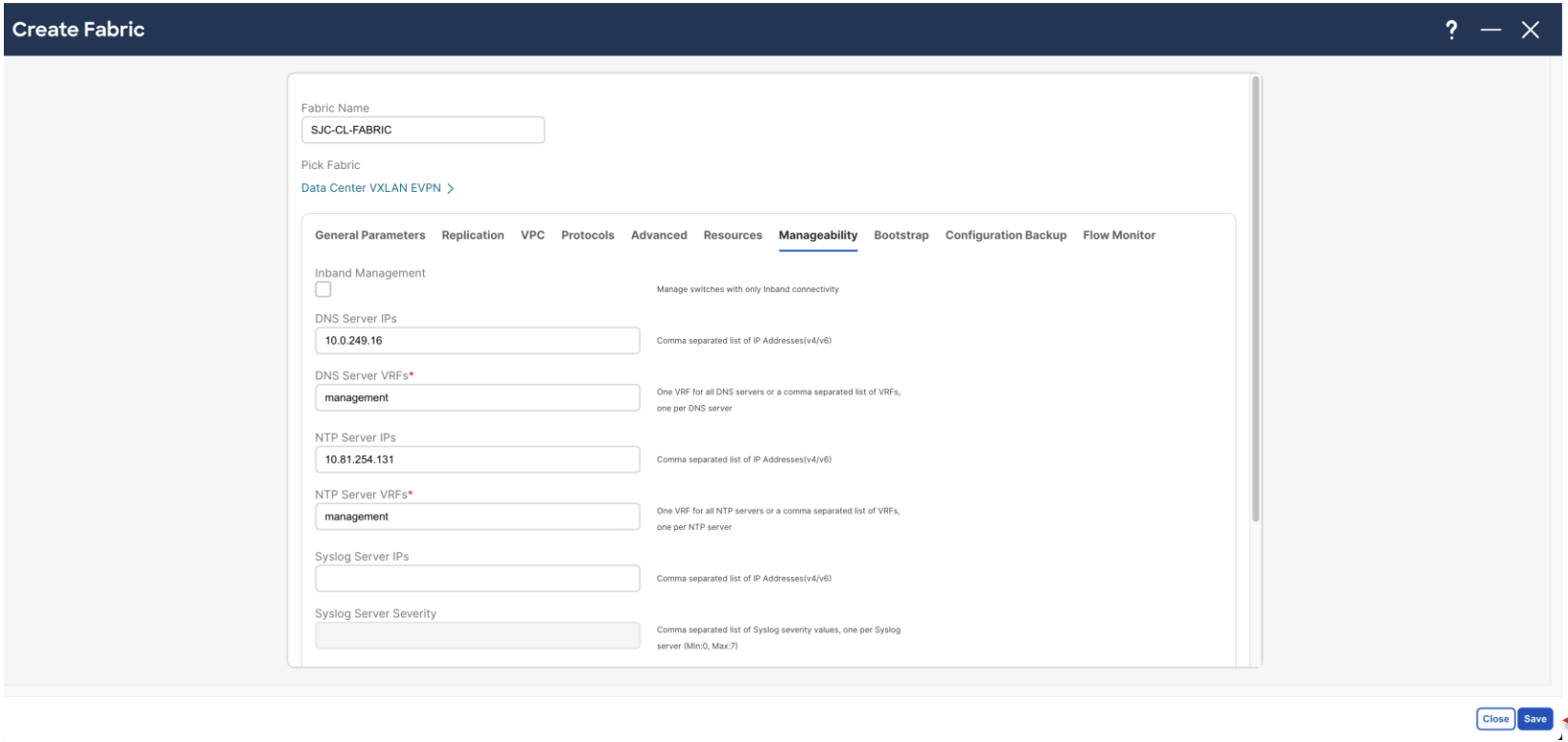
Tracked Object ID Range
100-299
Per switch tracked object ID Range (Min:1, Max: 512)

L4-7 Service Network

Service Network VLAN Range*
3000-3199
Per Switch Overlay Service Network VLAN Range (Min:2, Max:4094)

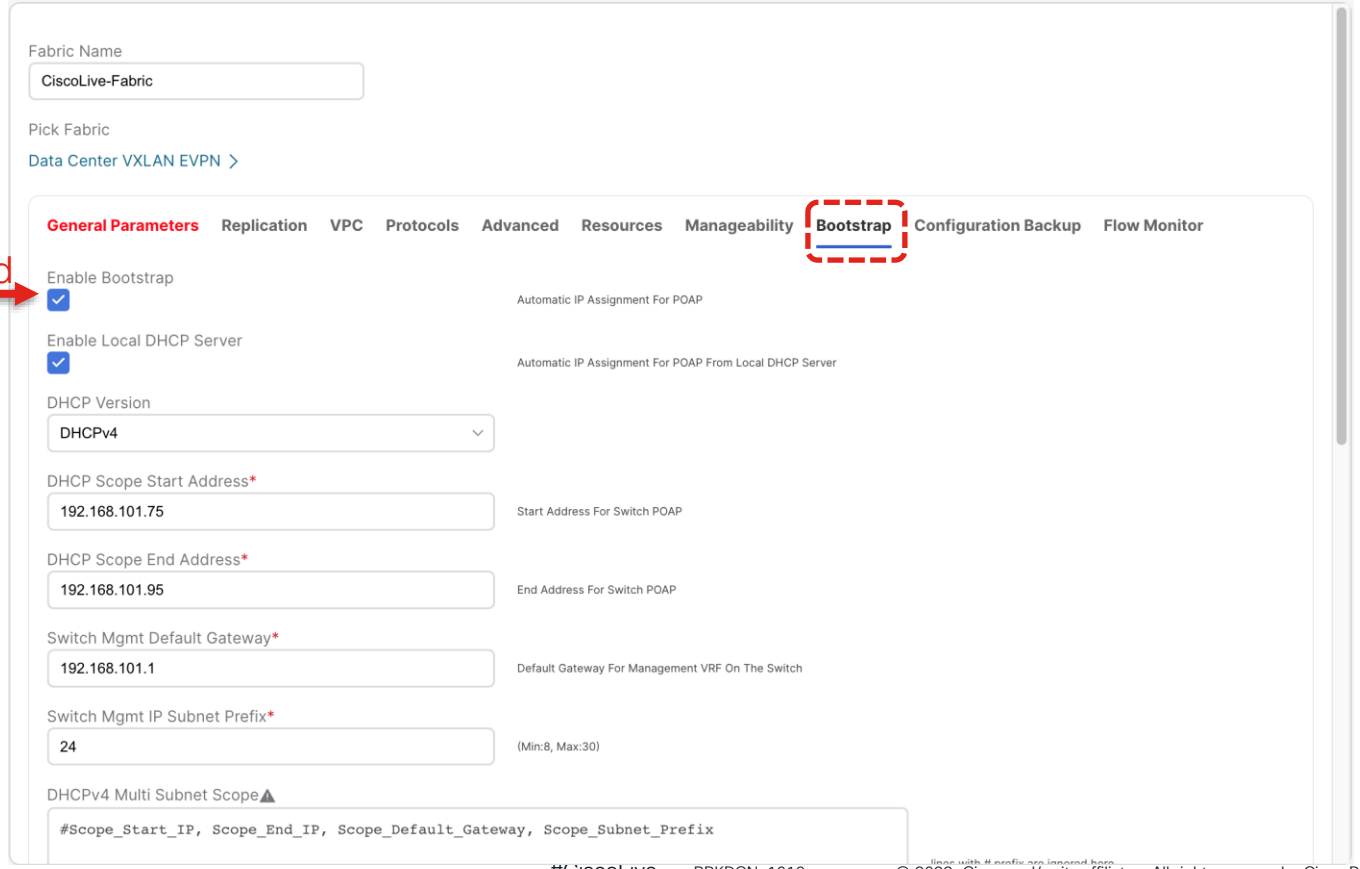
Route Map Sequence Number Range*
1-65534
(Min:1, Max:65534)

Create “Data Center VXLAN EVPN” Fabric Manageability Parameters

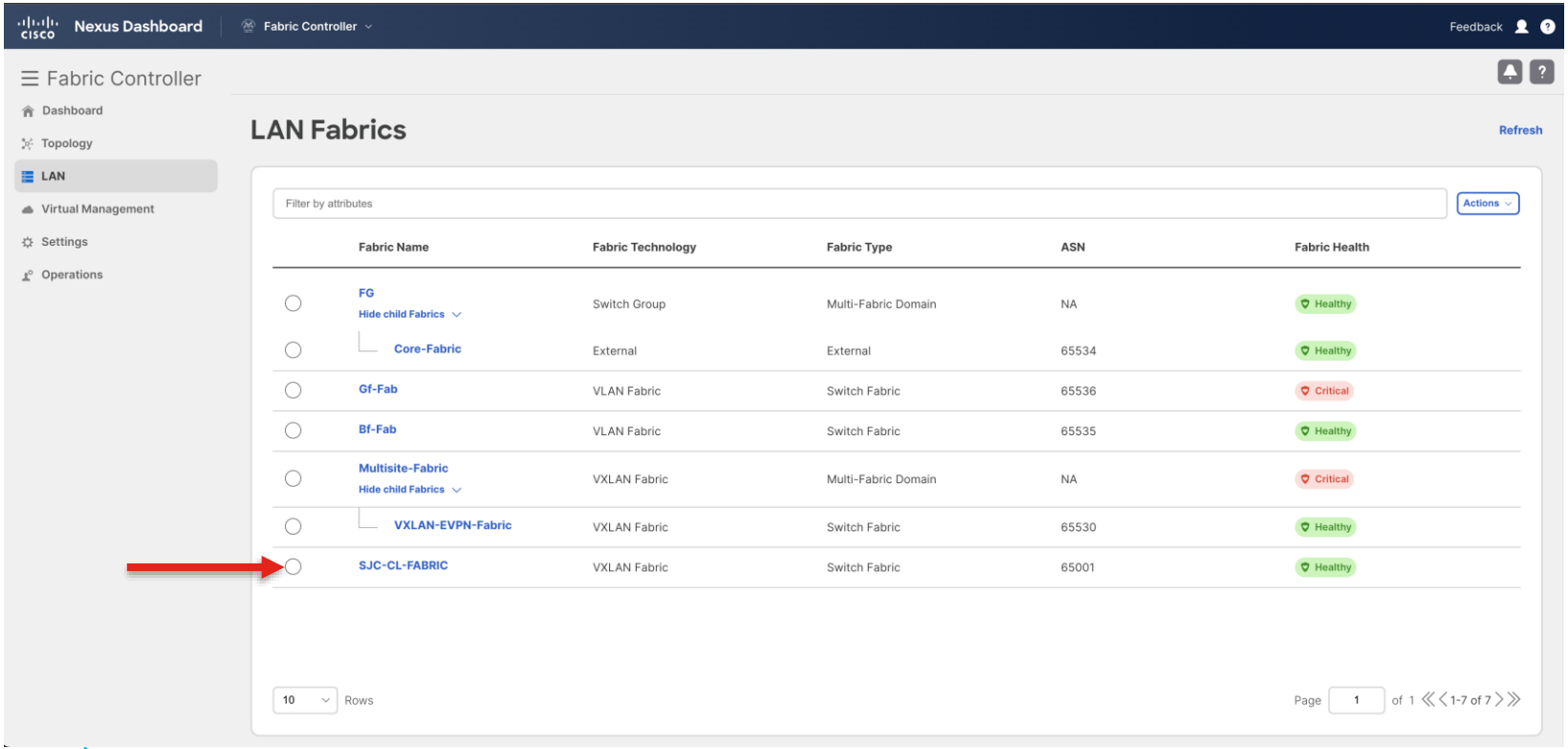


Create “Data Center VXLAN EVPN” Fabric Bootstrap Parameters

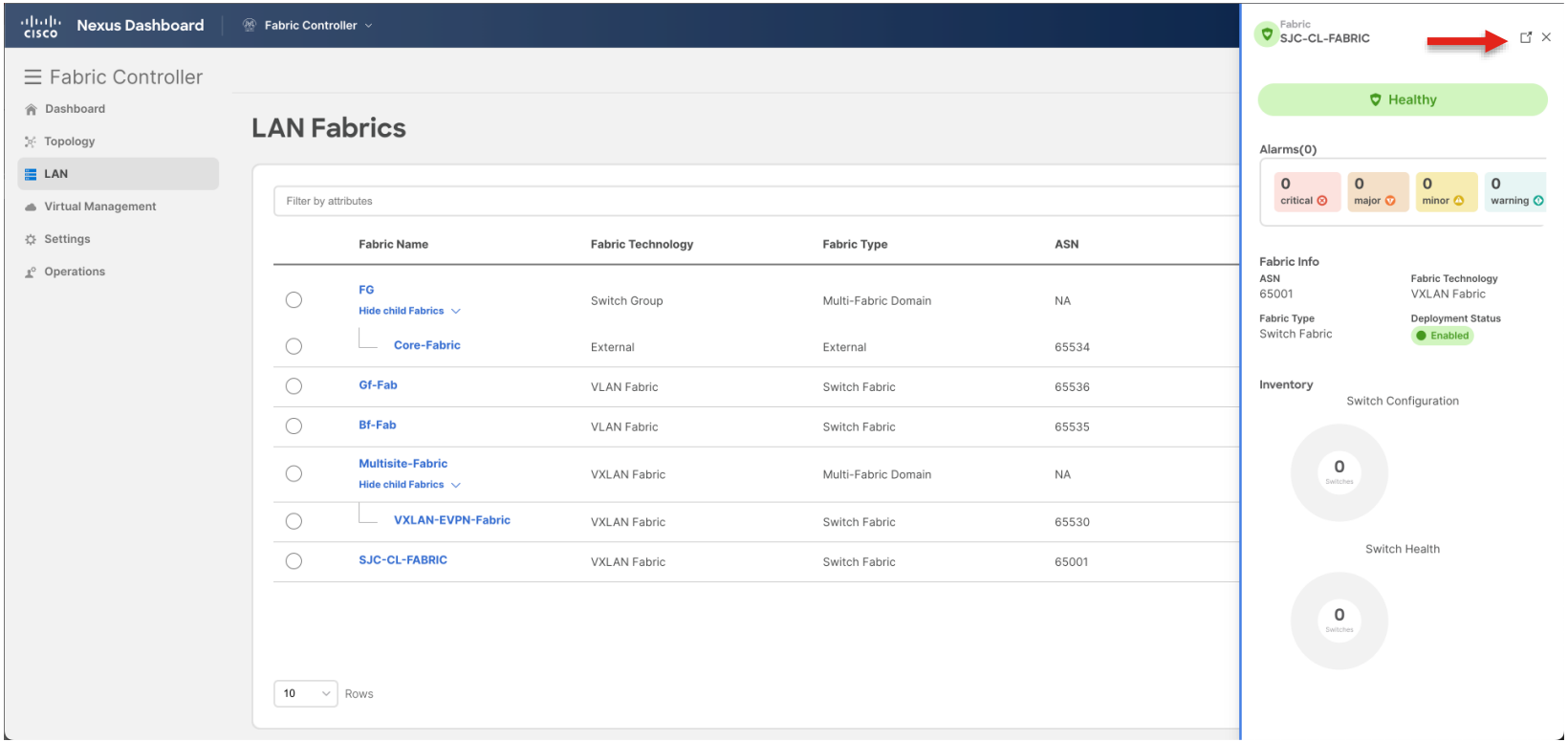
NDFC Built-in Bootstrap POAP Services Supports OOB and In-Band POAP



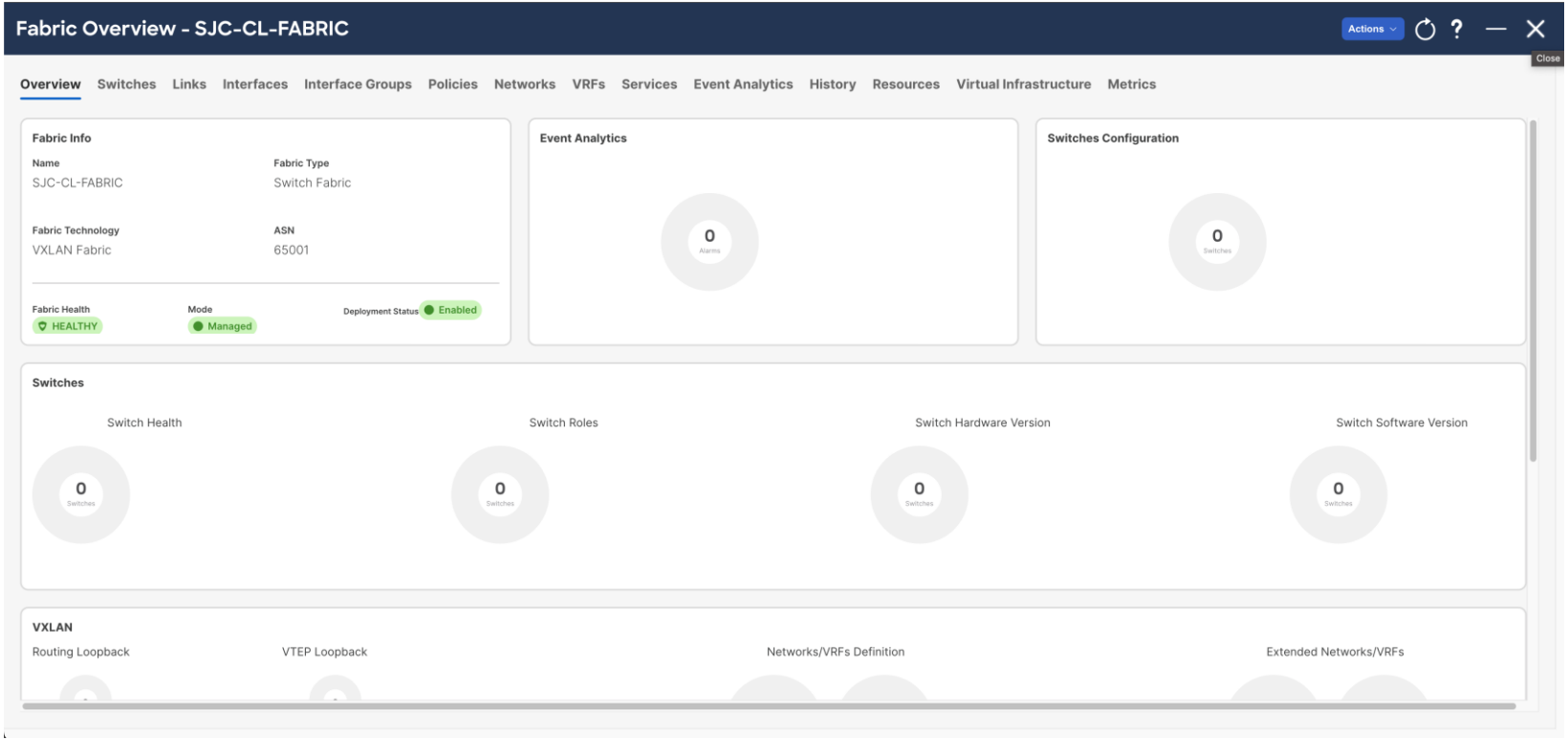
Verify “Data Center VXLAN EVPN” Fabric Created



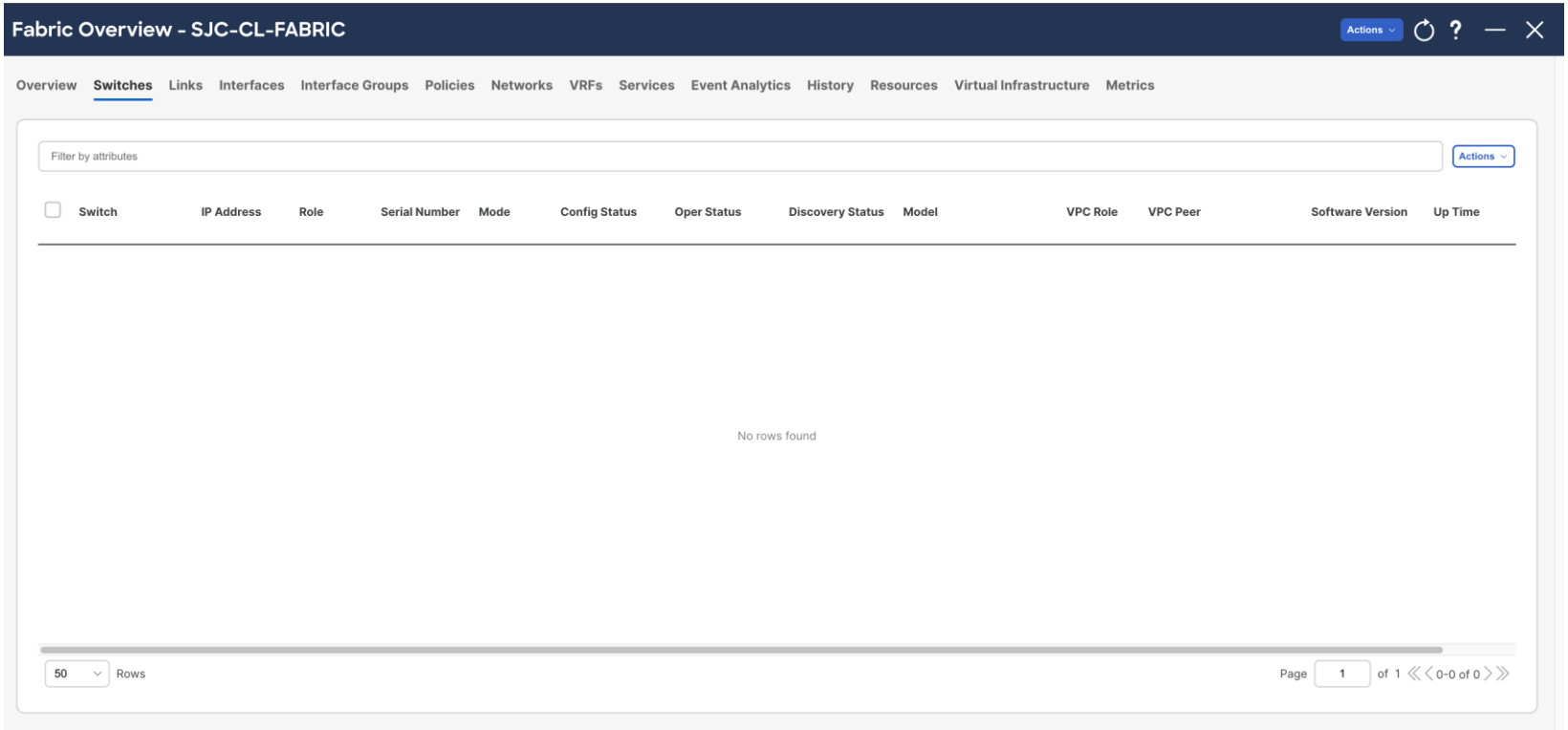
Verify Data Center VXLAN EVPN Fabric



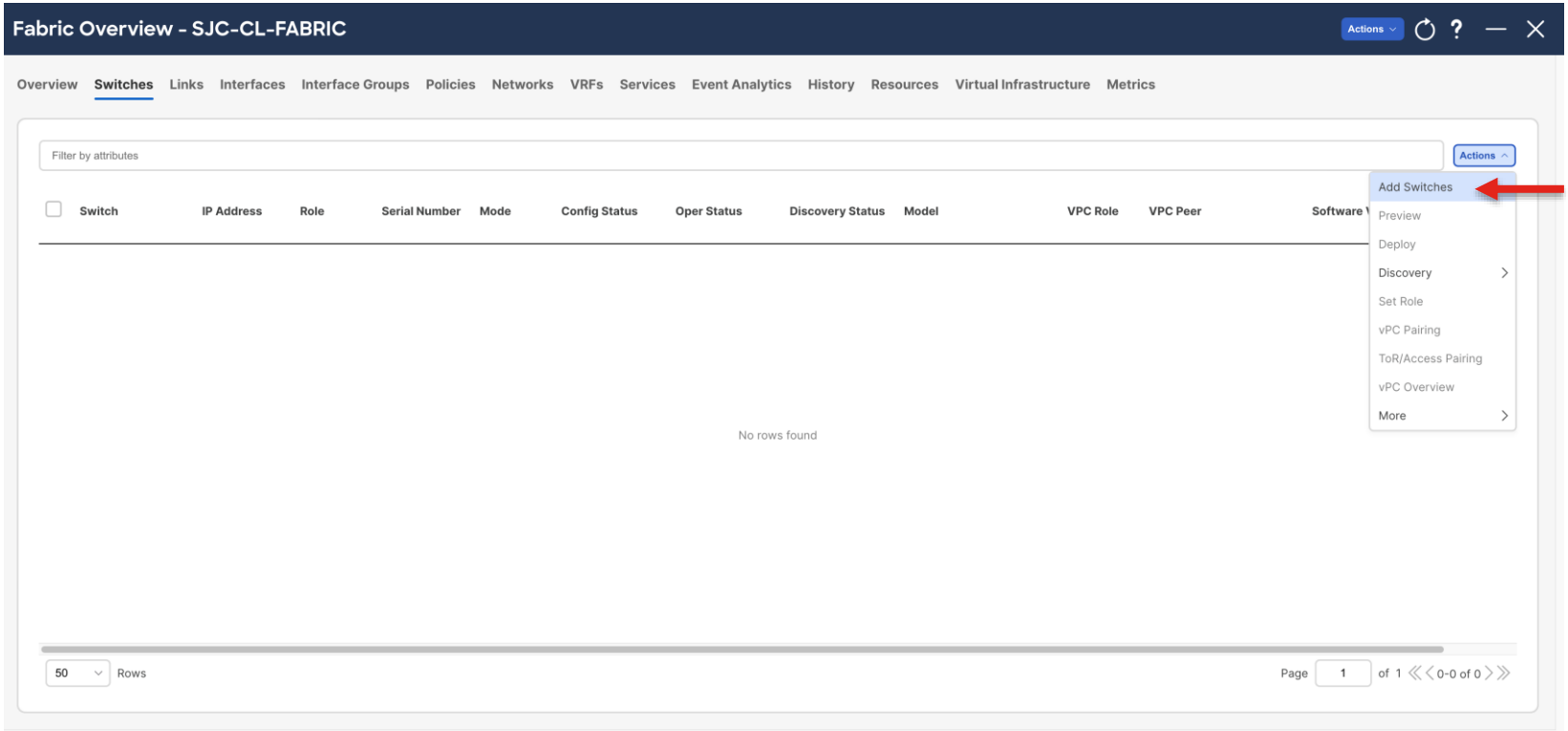
Fabric Overview



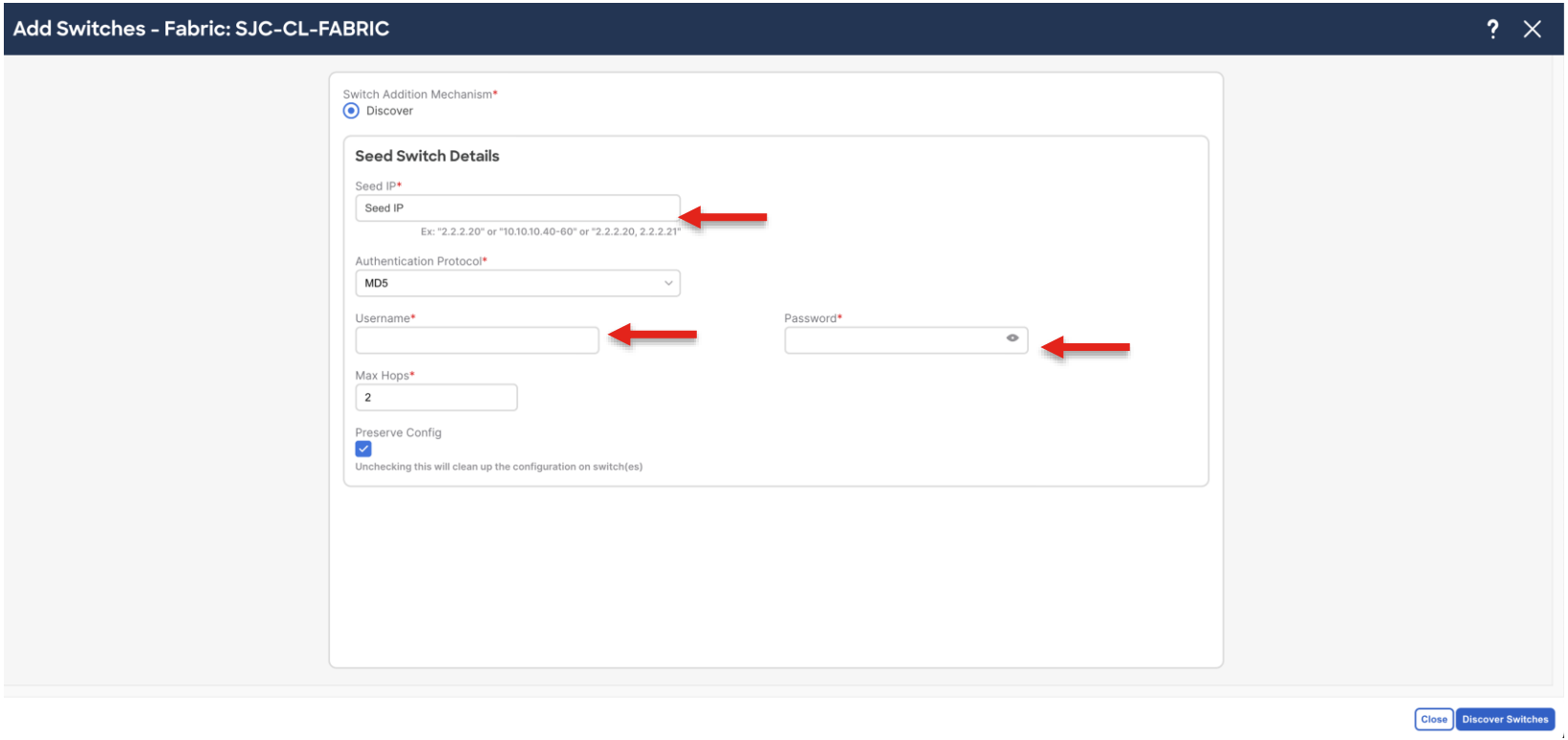
Fabric Overview -> Add Switches



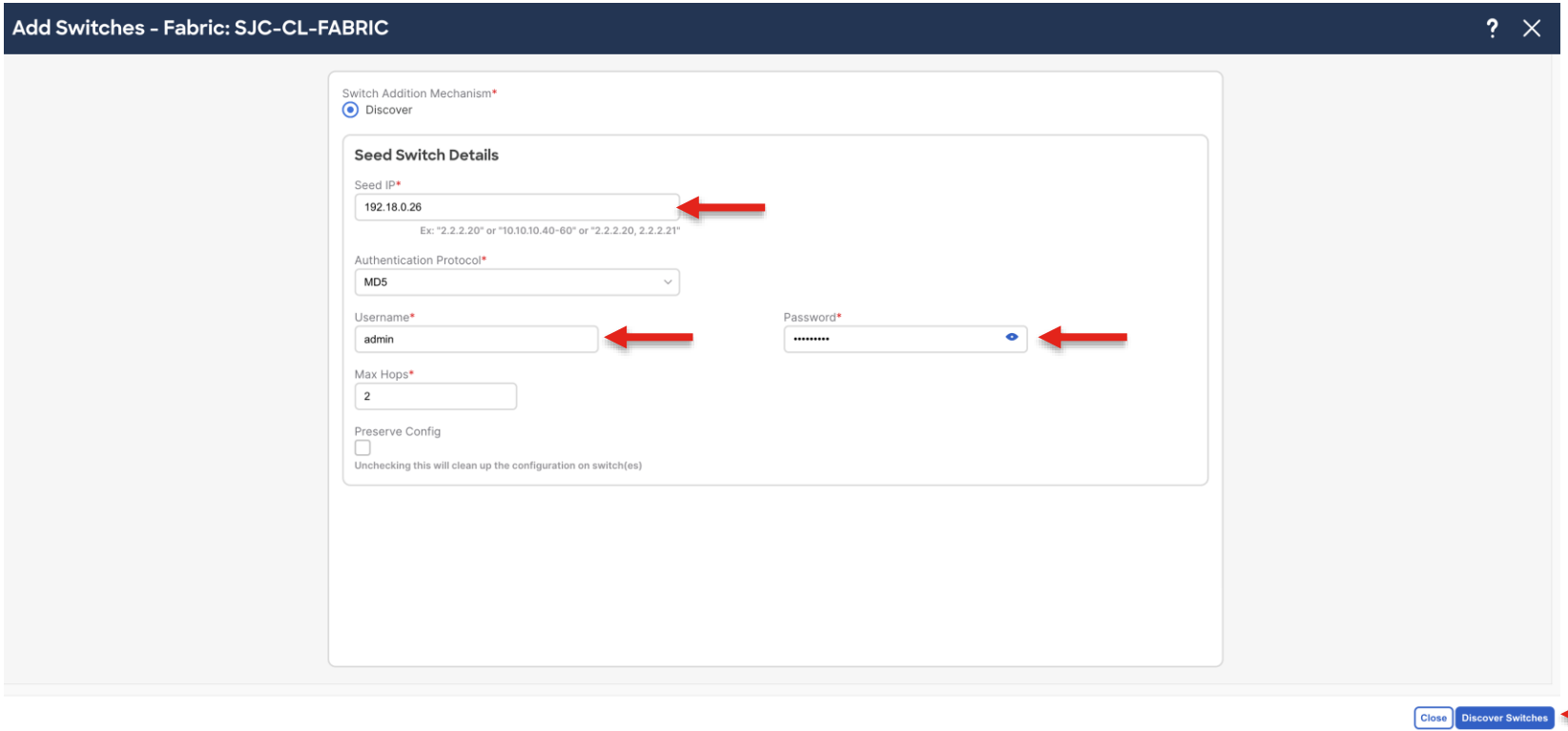
Add Switches to Fabric



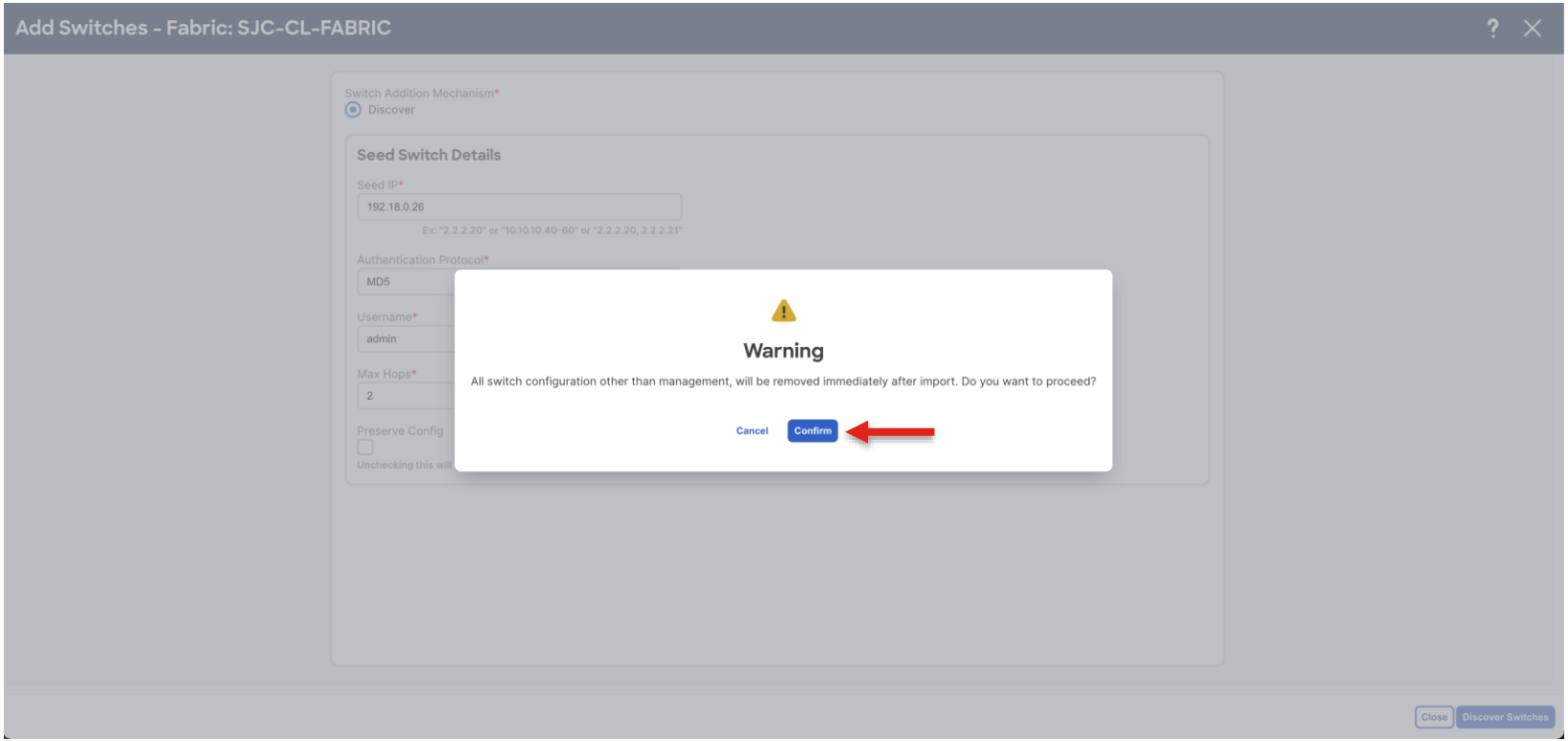
Add Switches to Fabric



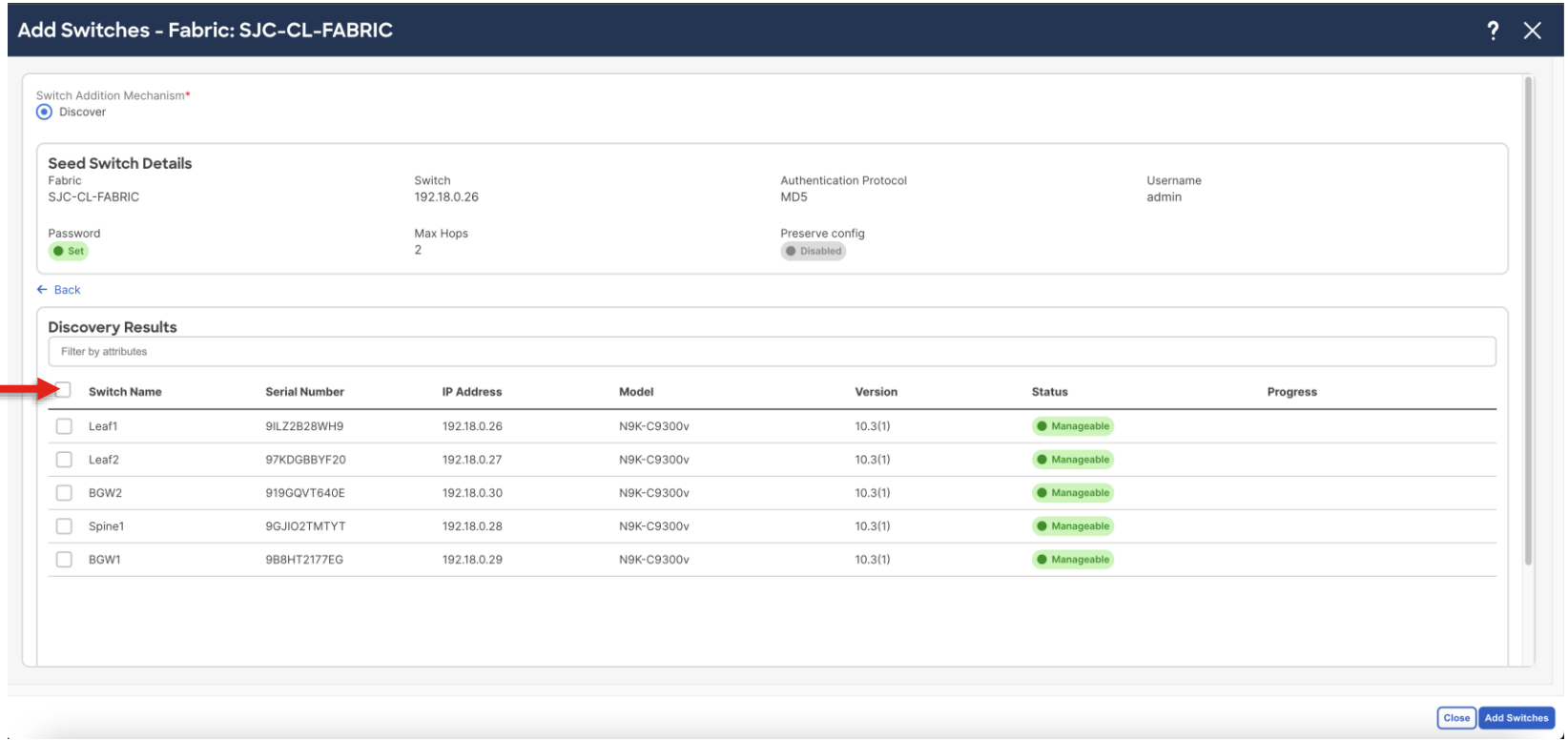
Populate Seed Switch Details



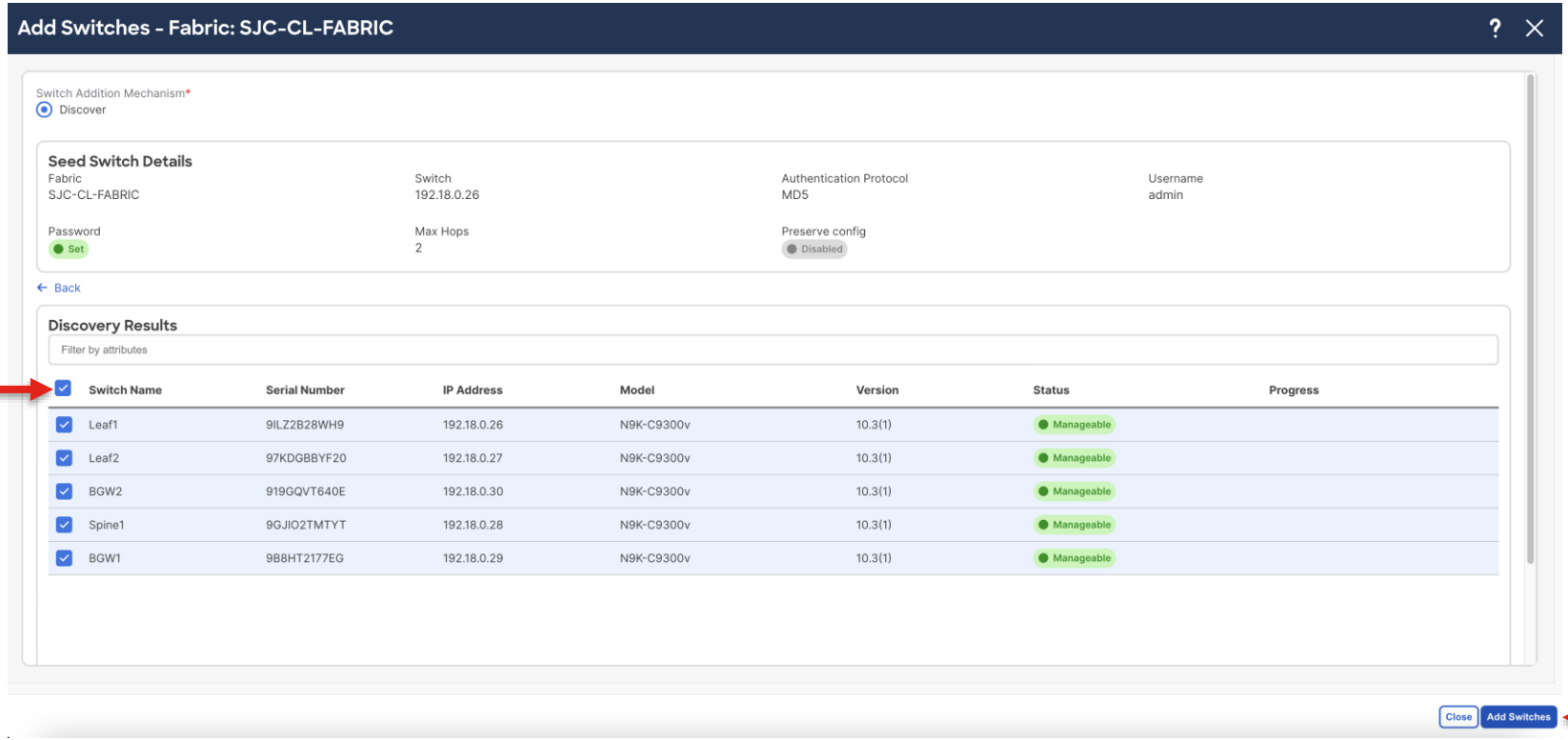
Confirm



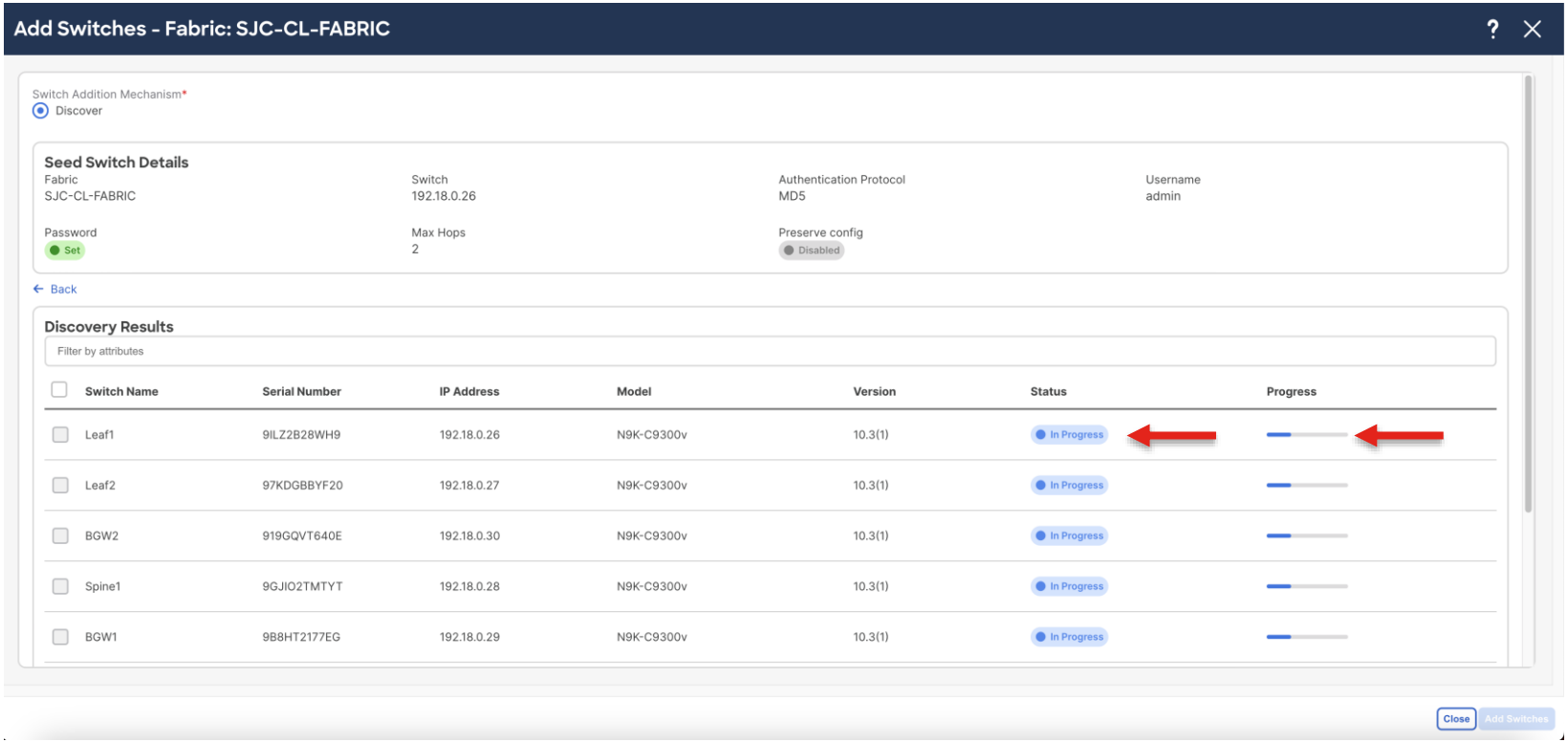
Add Switches to Fabric



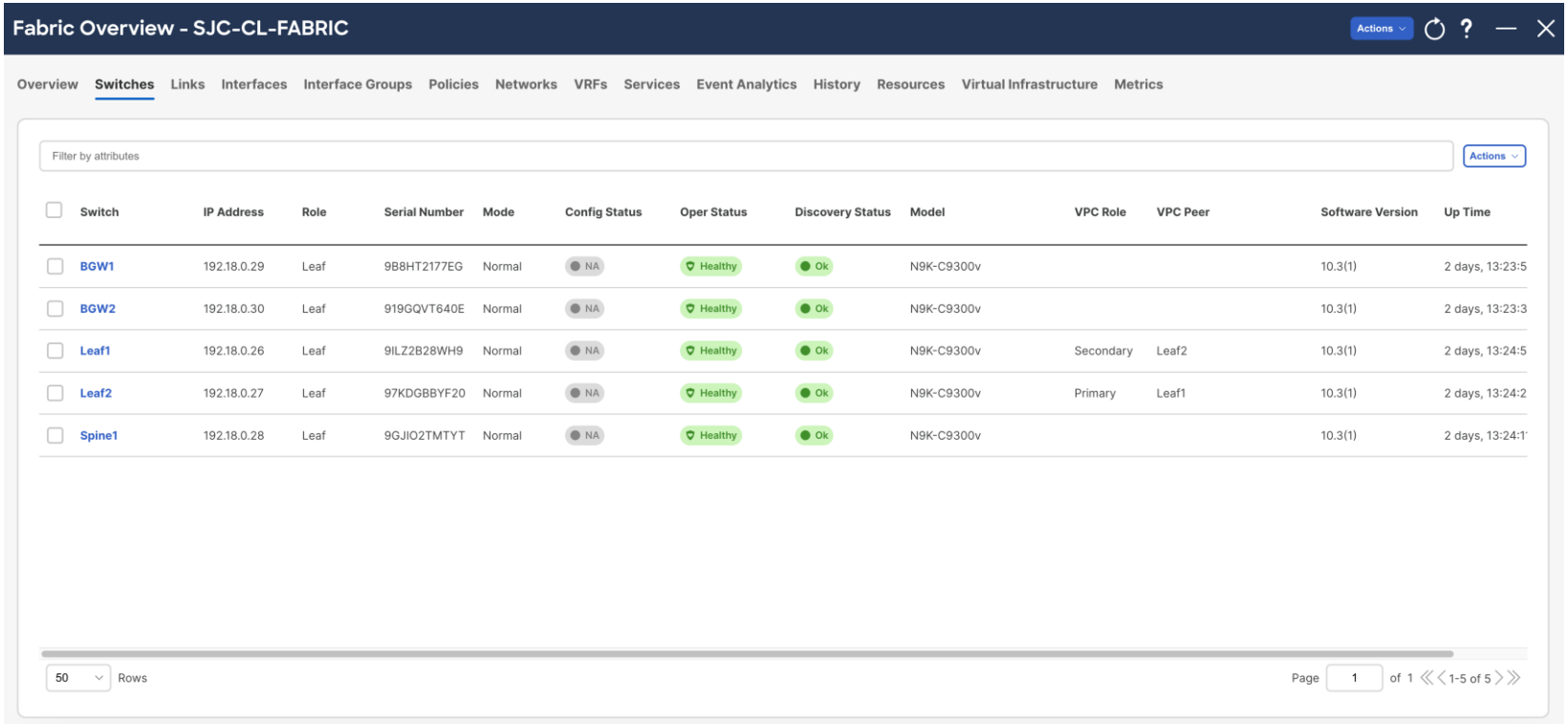
Add Switches to Fabric



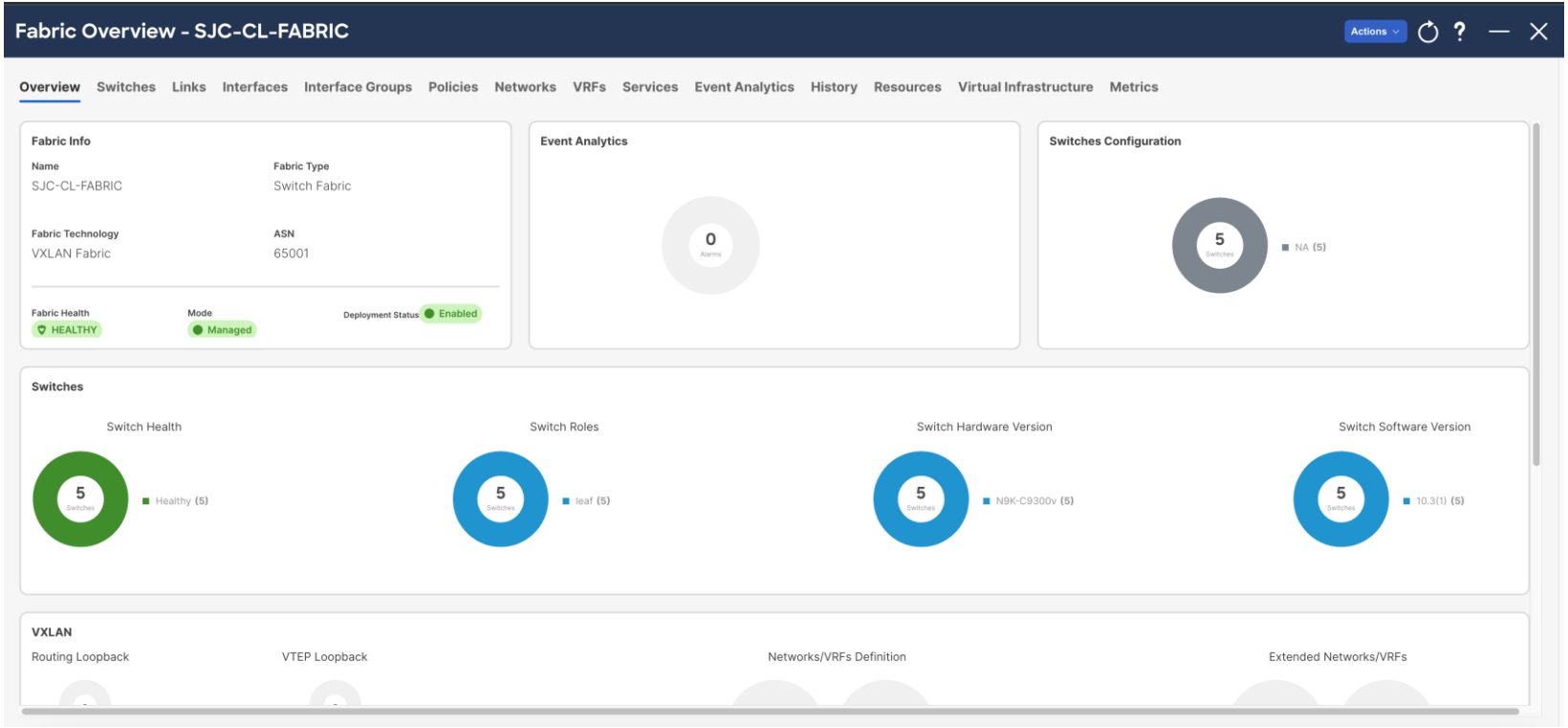
Add Switches - In-Progress



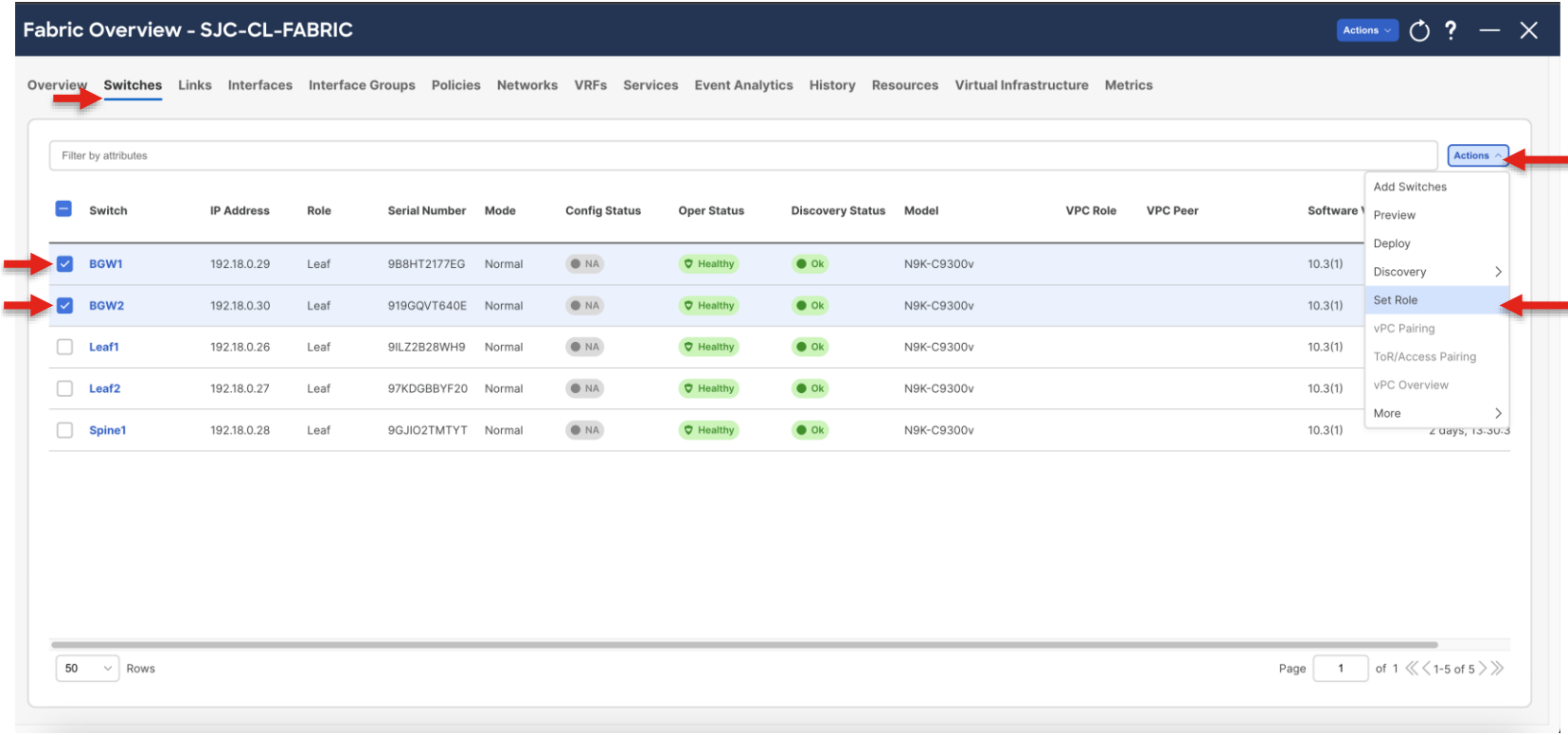
Review Added Switches



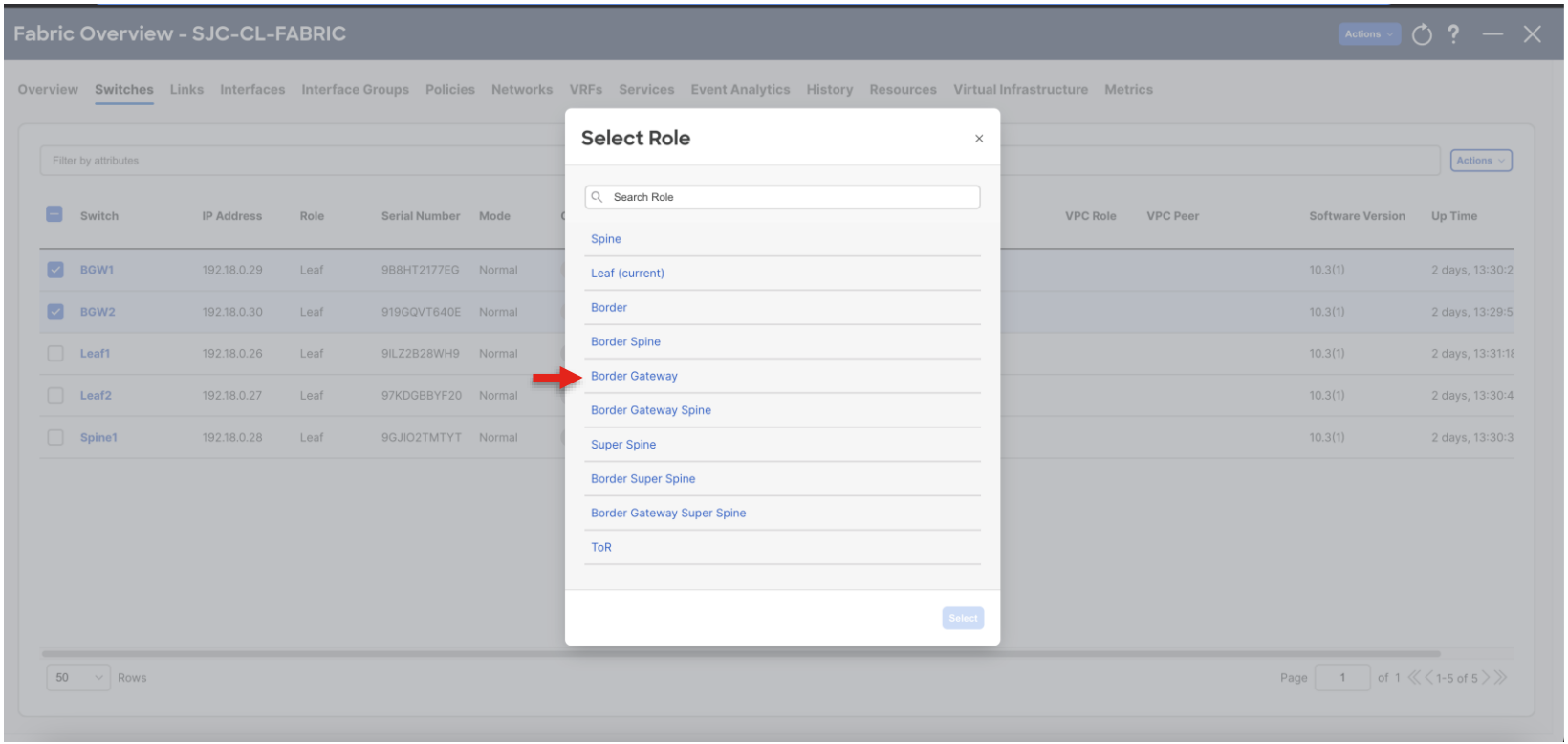
Review Overview Dashboard



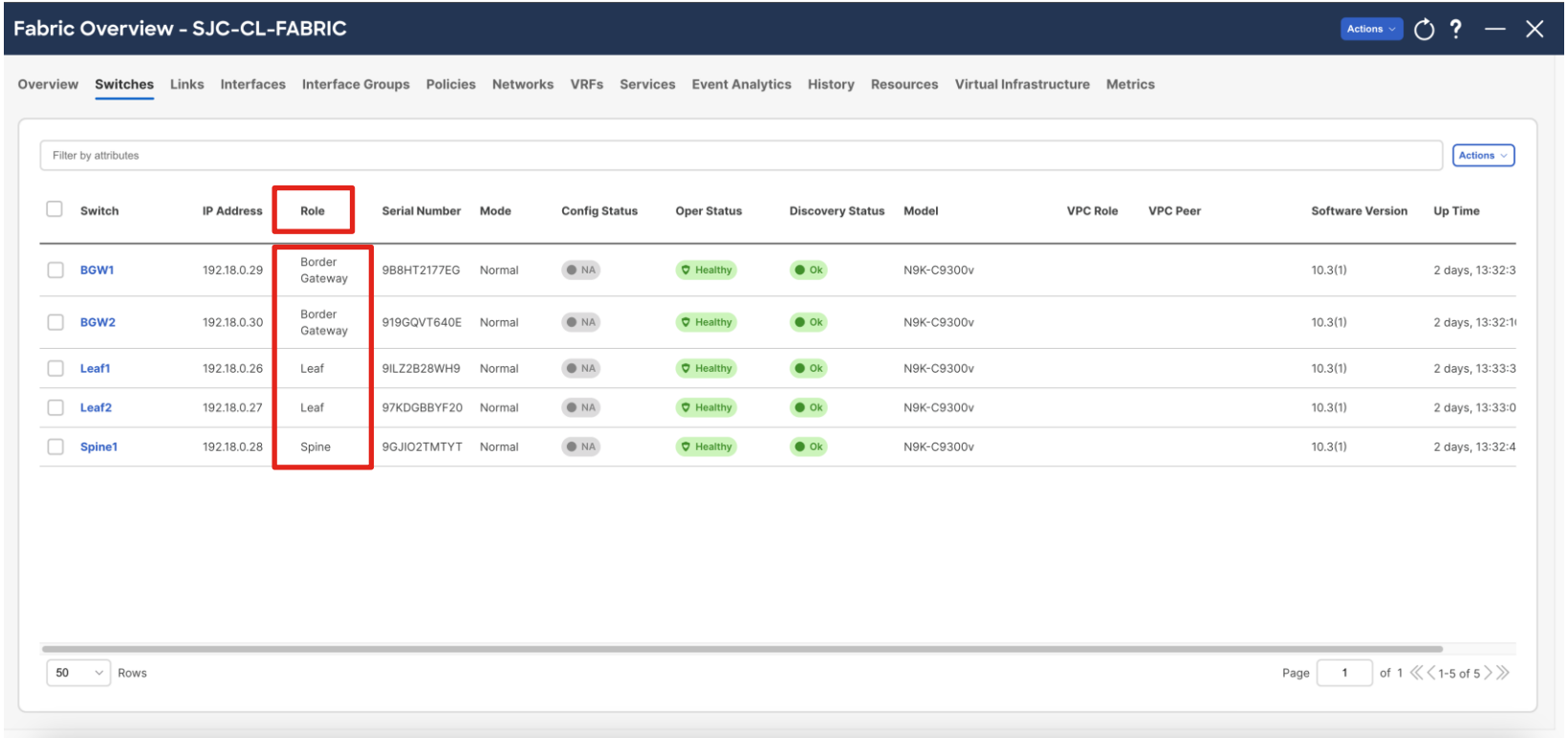
Set Switch Roles



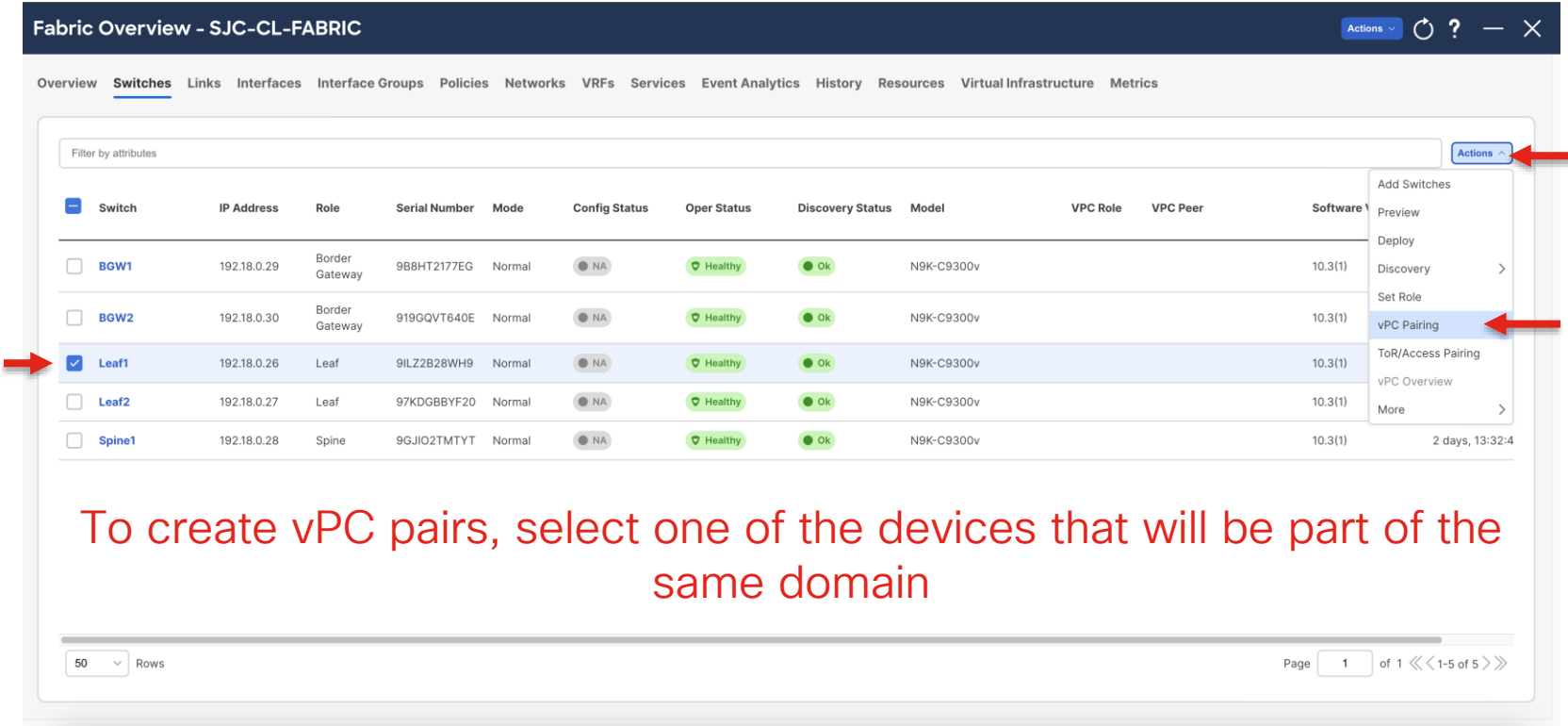
Set Switch Roles



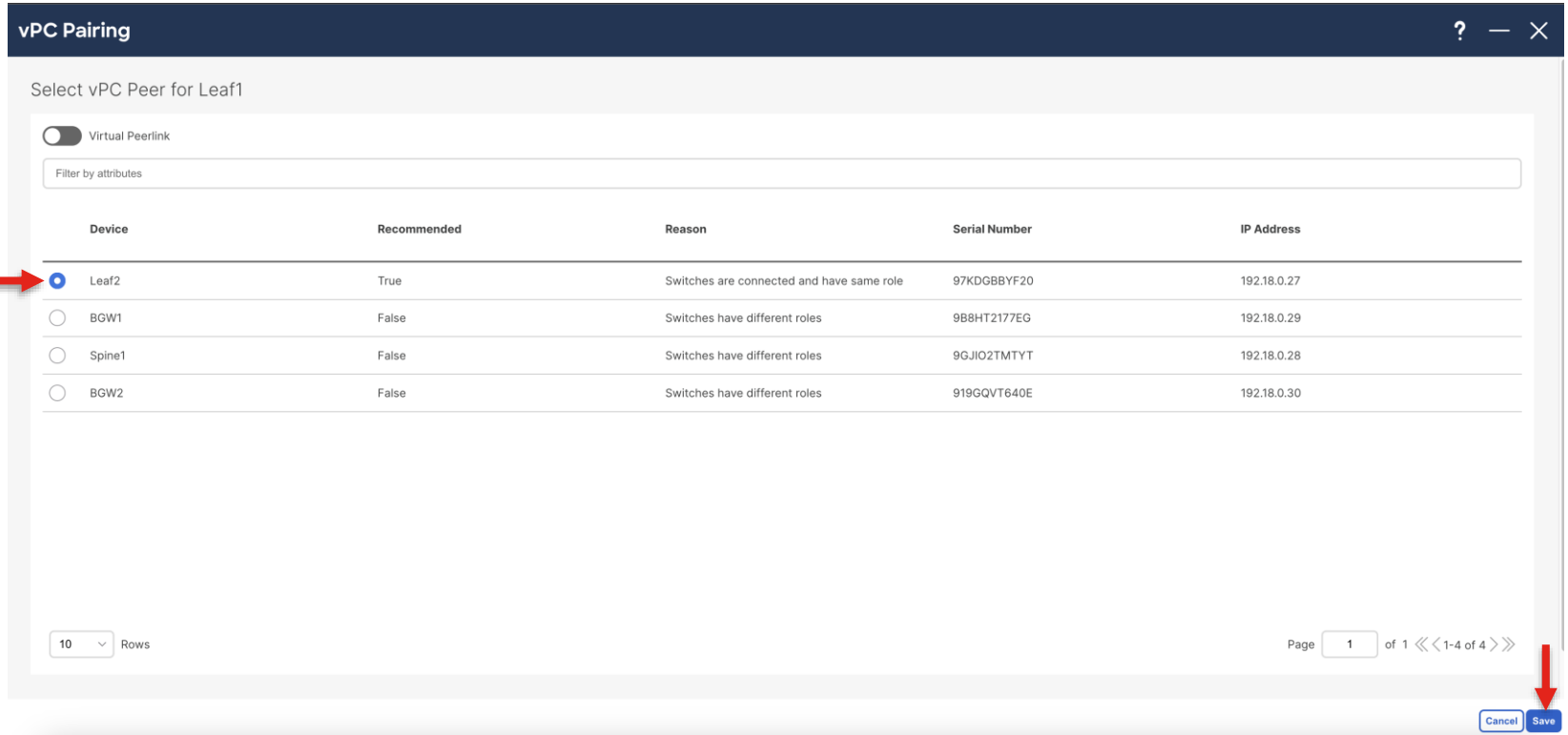
Review Switch Roles



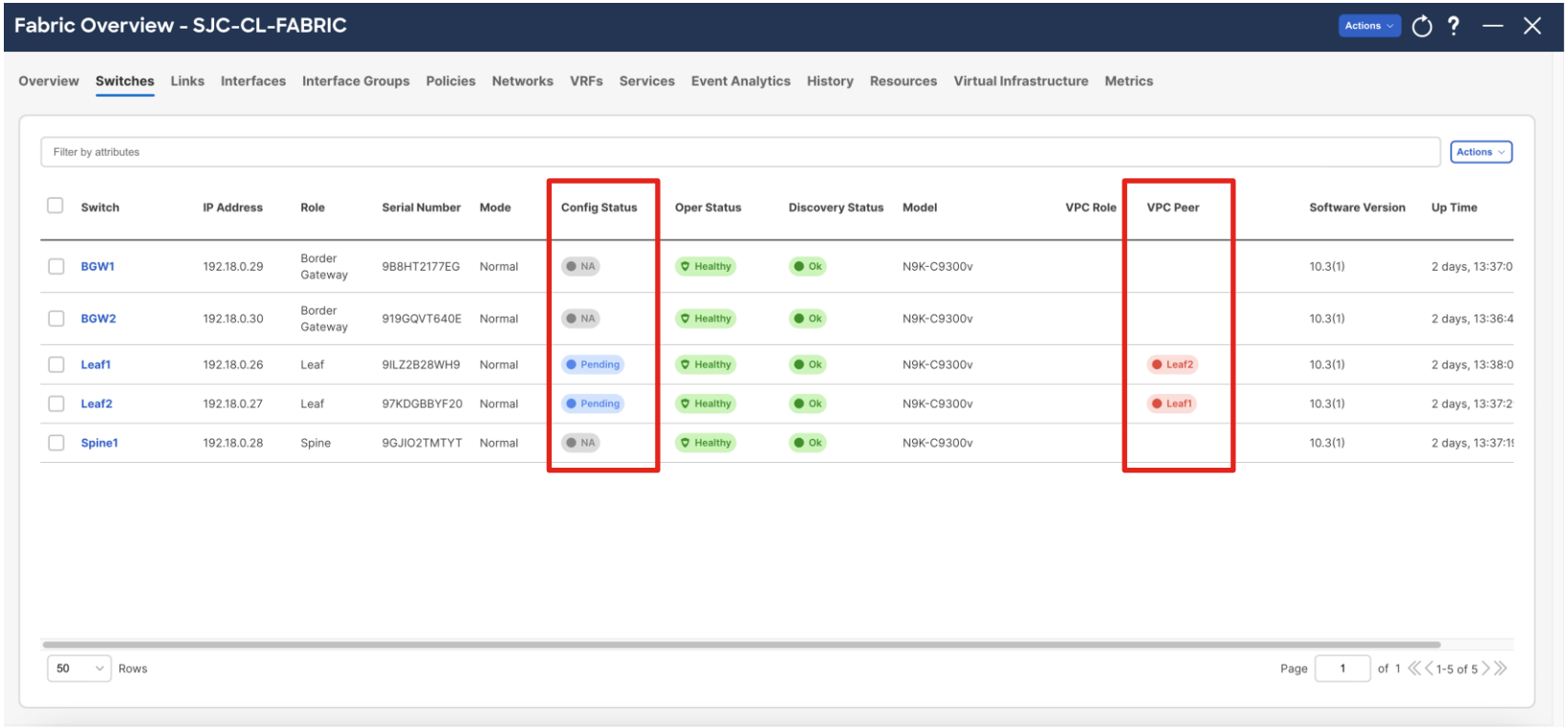
Create vPC Pairing



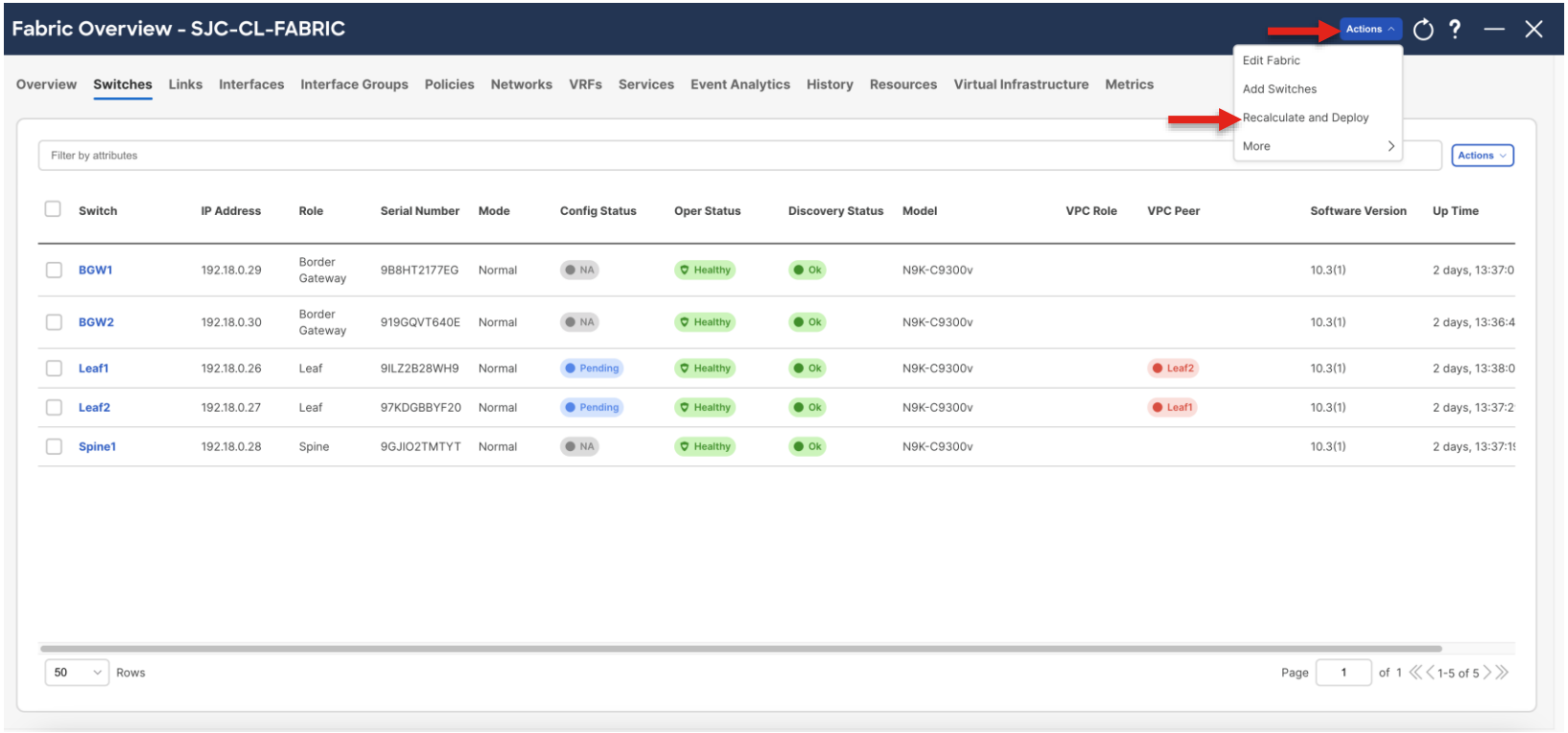
Create vPC Pairing



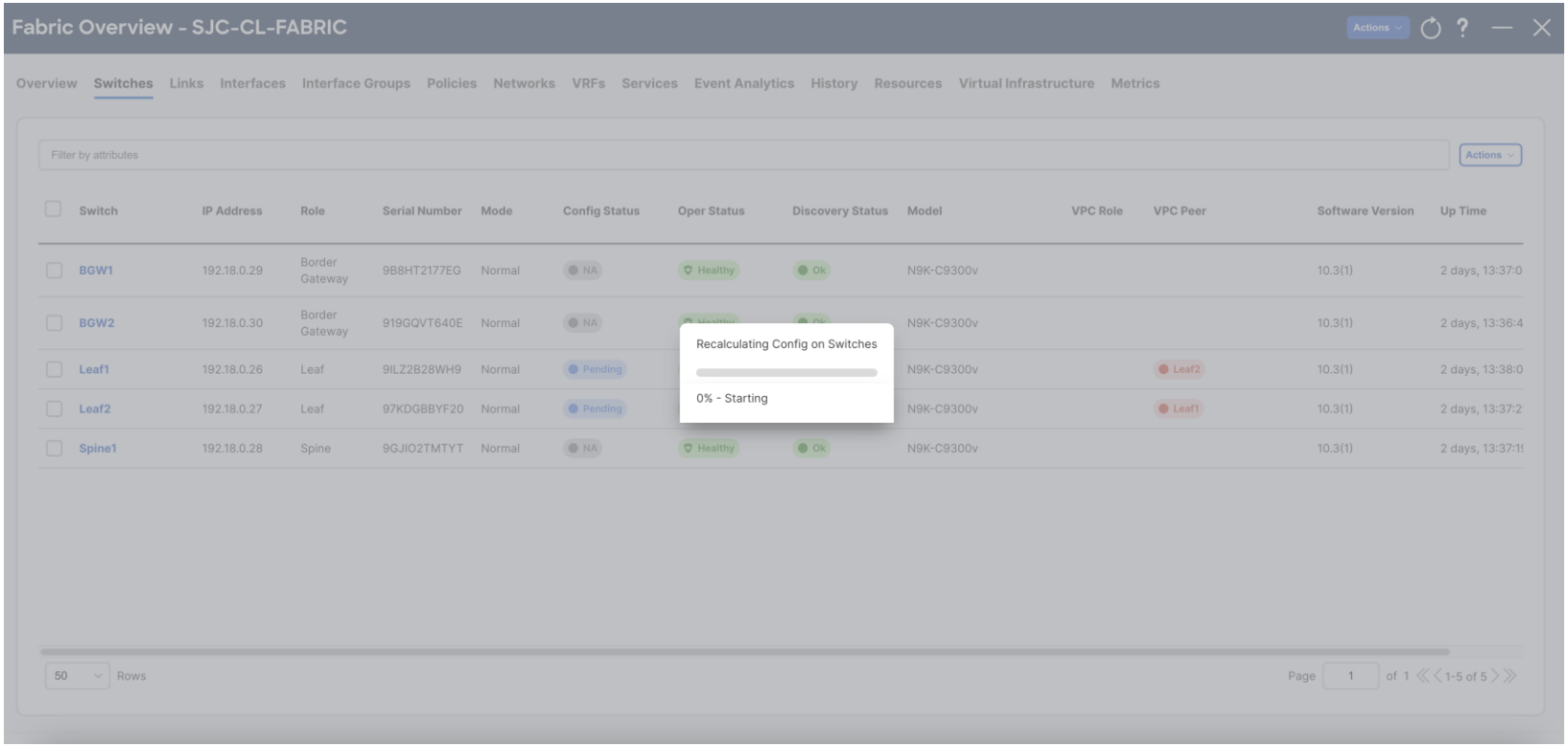
vPC Pairing



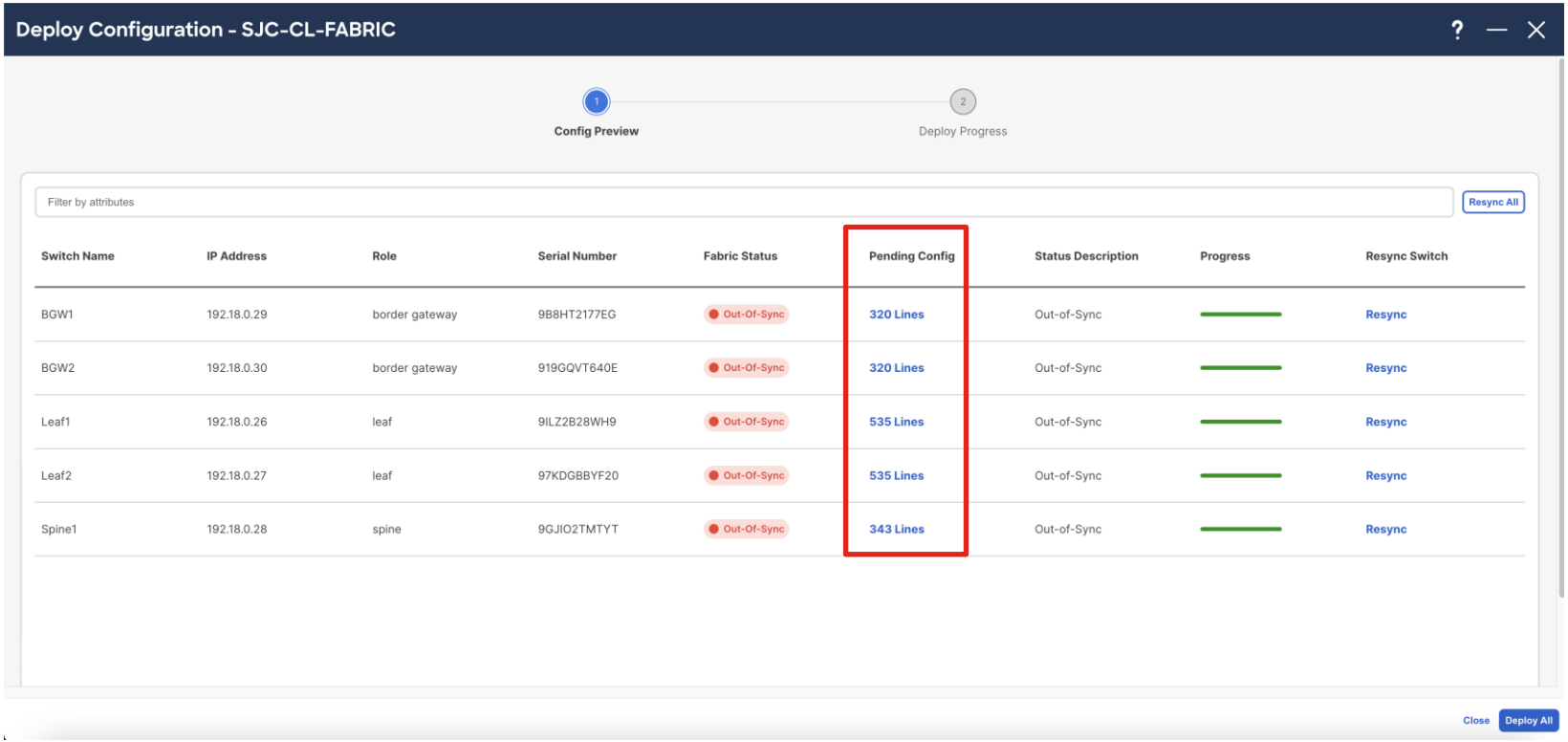
Initial Deployment



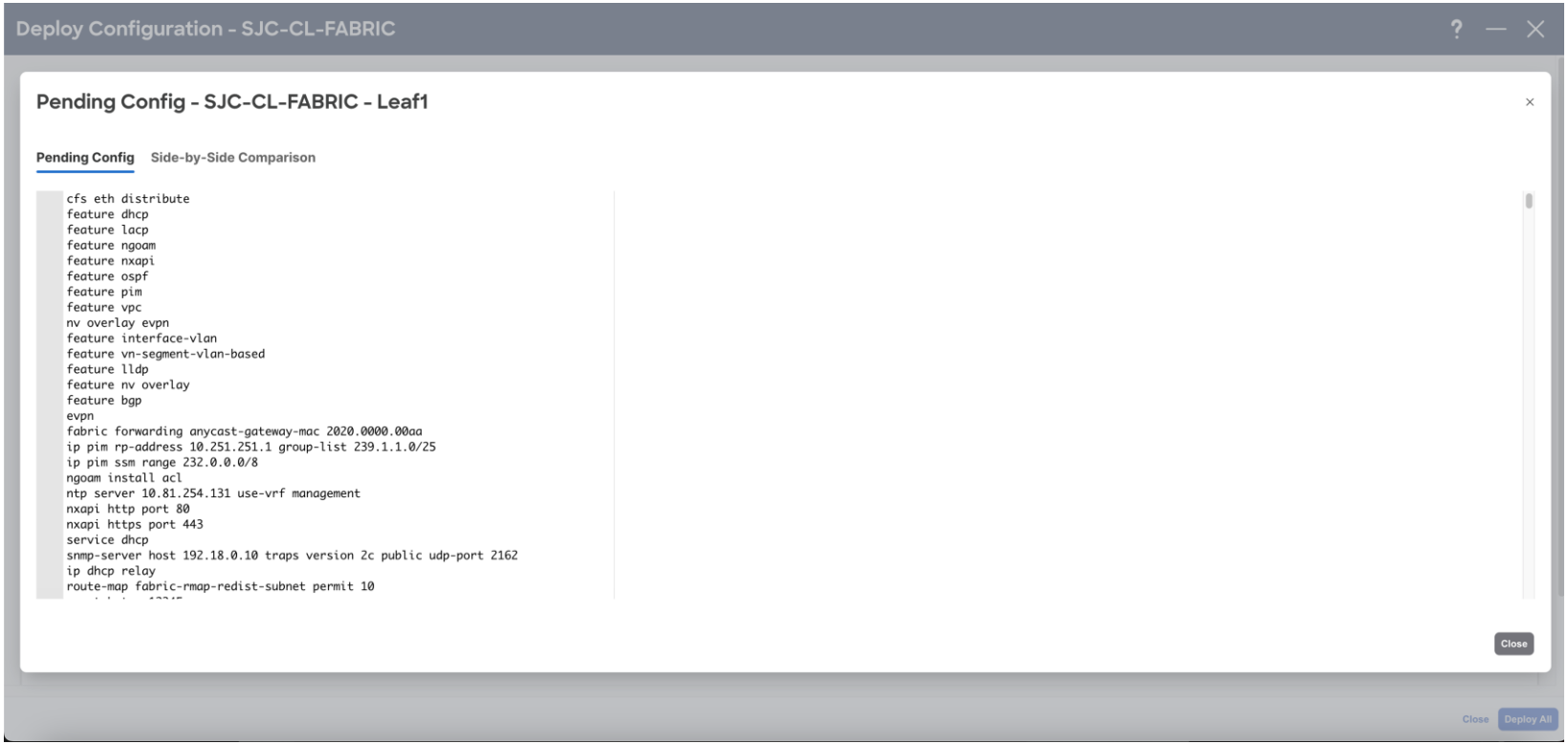
Recalculate and Deploy



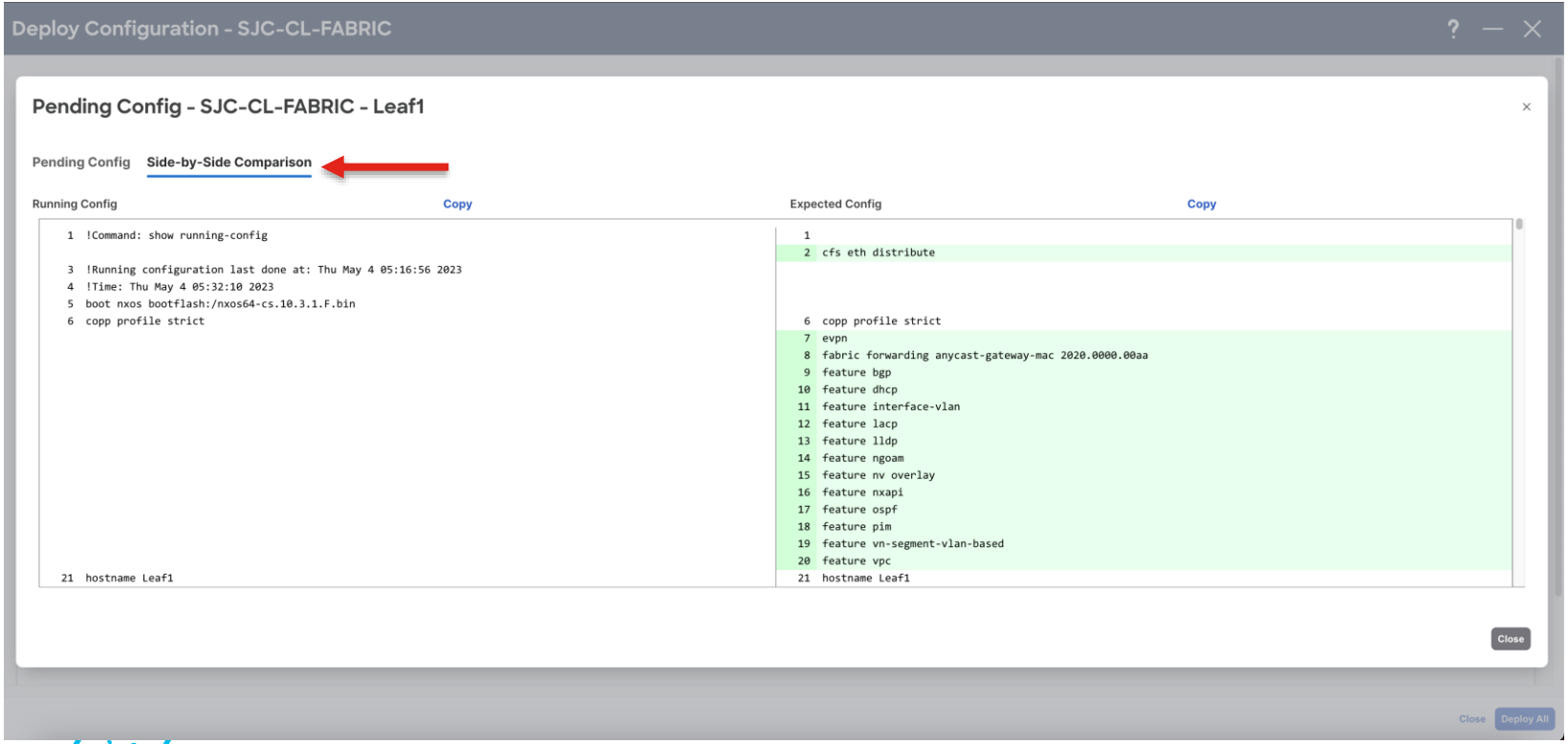
Recalculate and Deploy



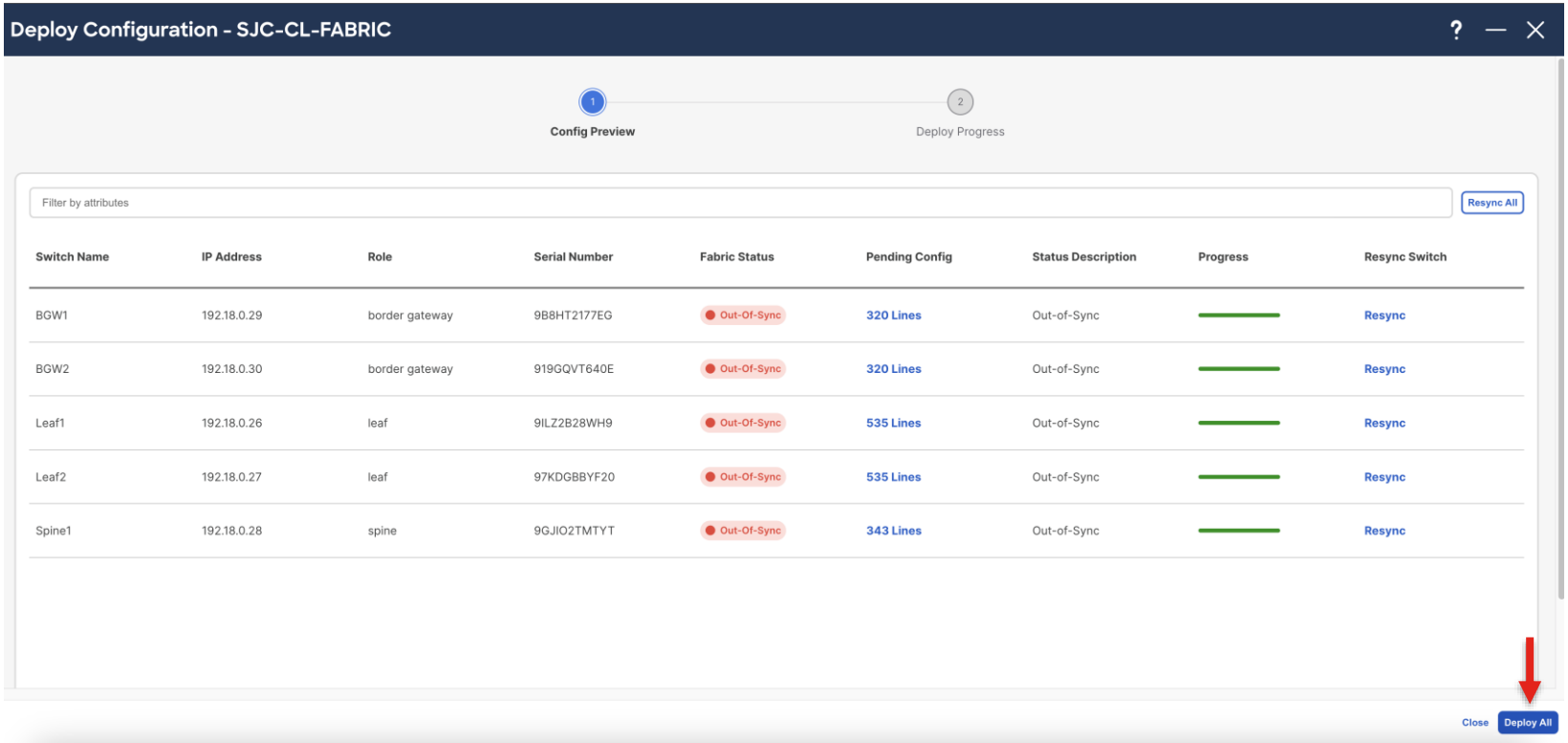
View Pending Configuration



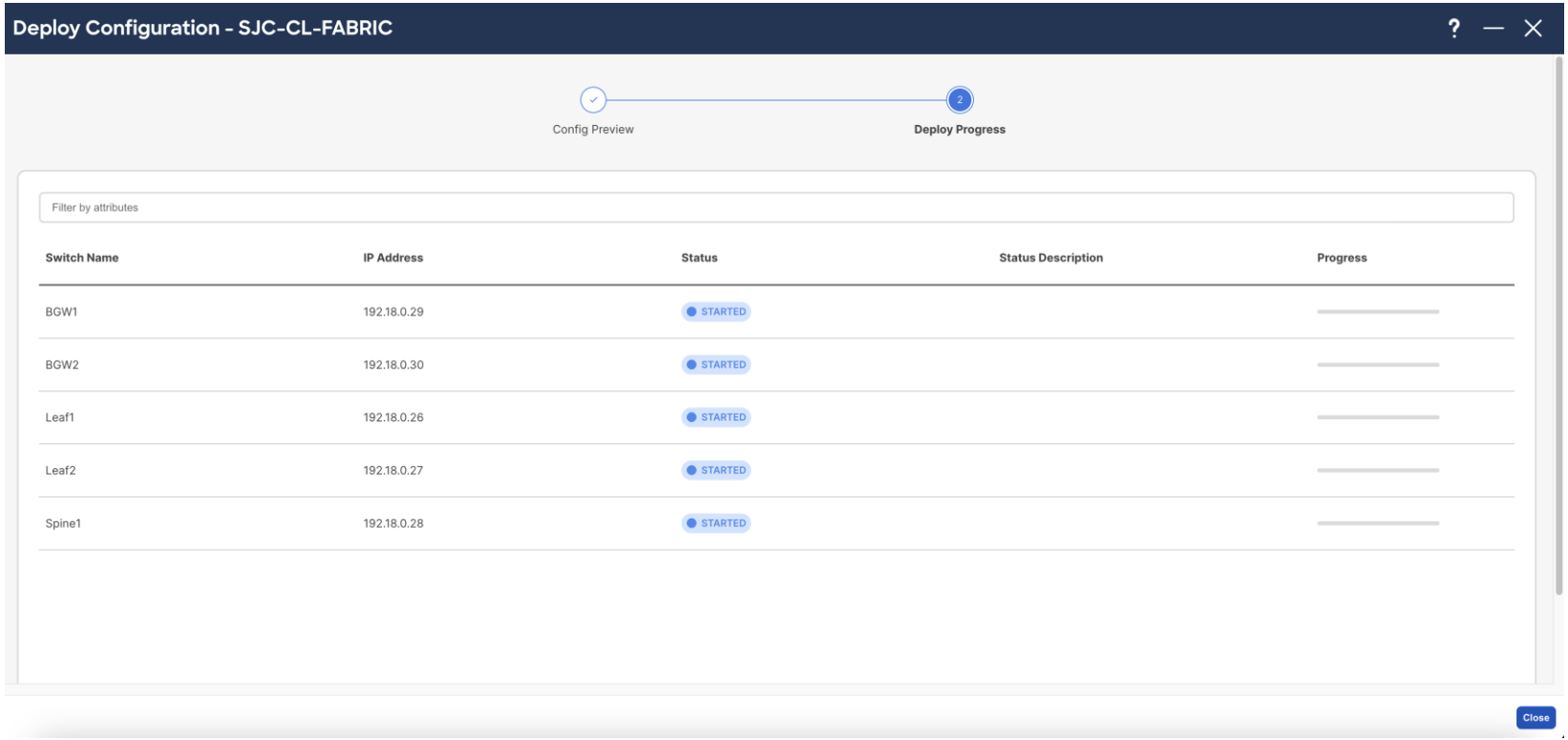
View Pending Configuration



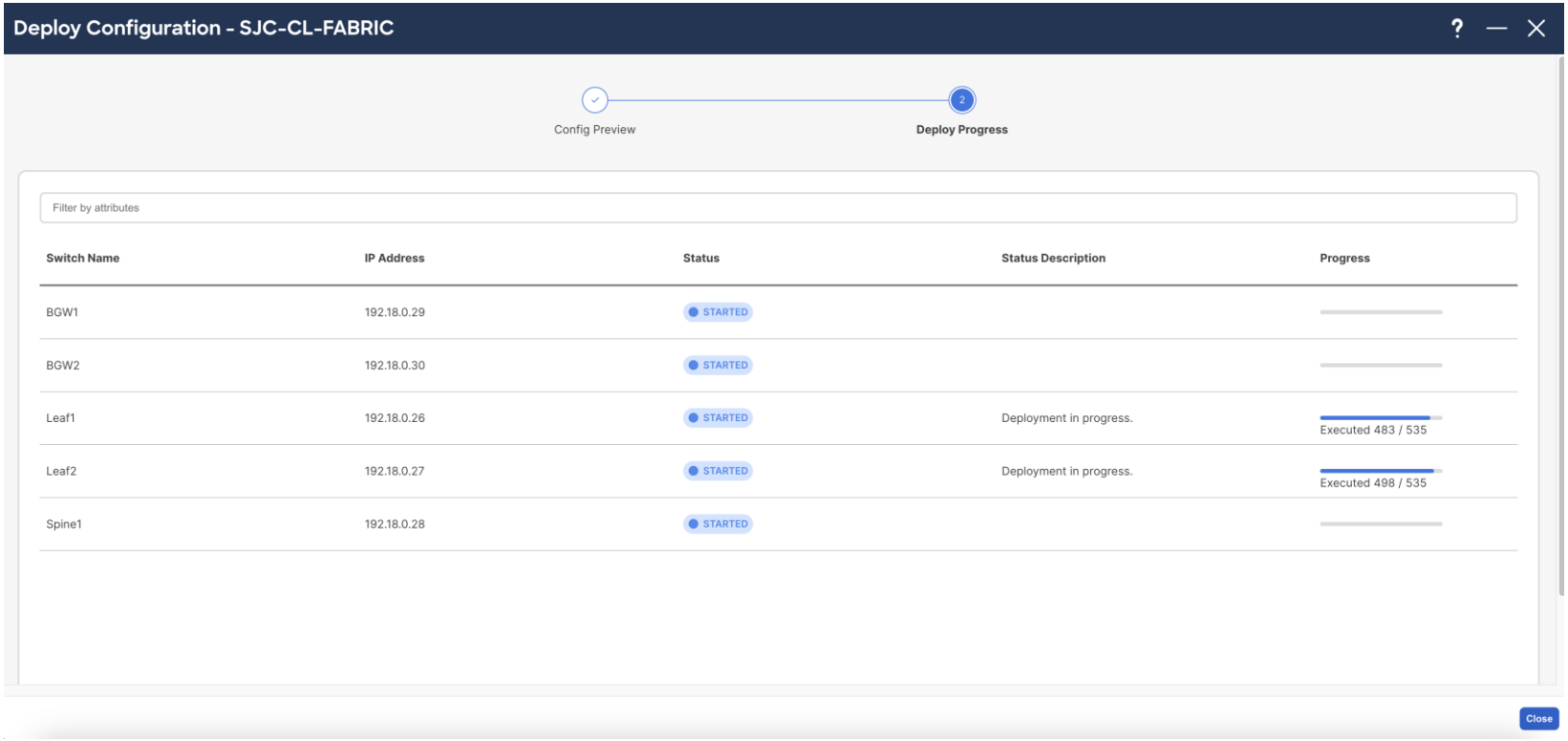
Deploy Configuration



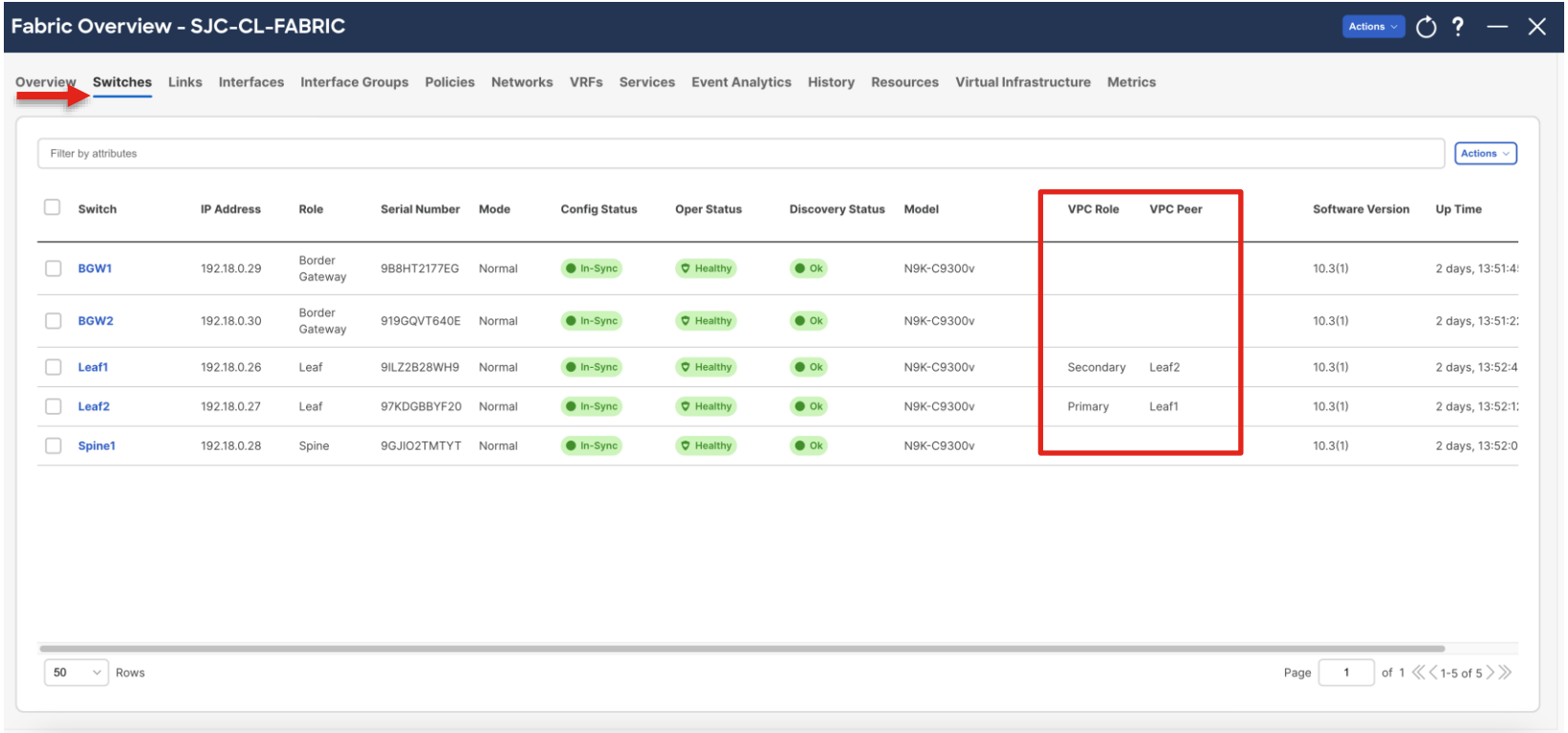
Deploy Configuration



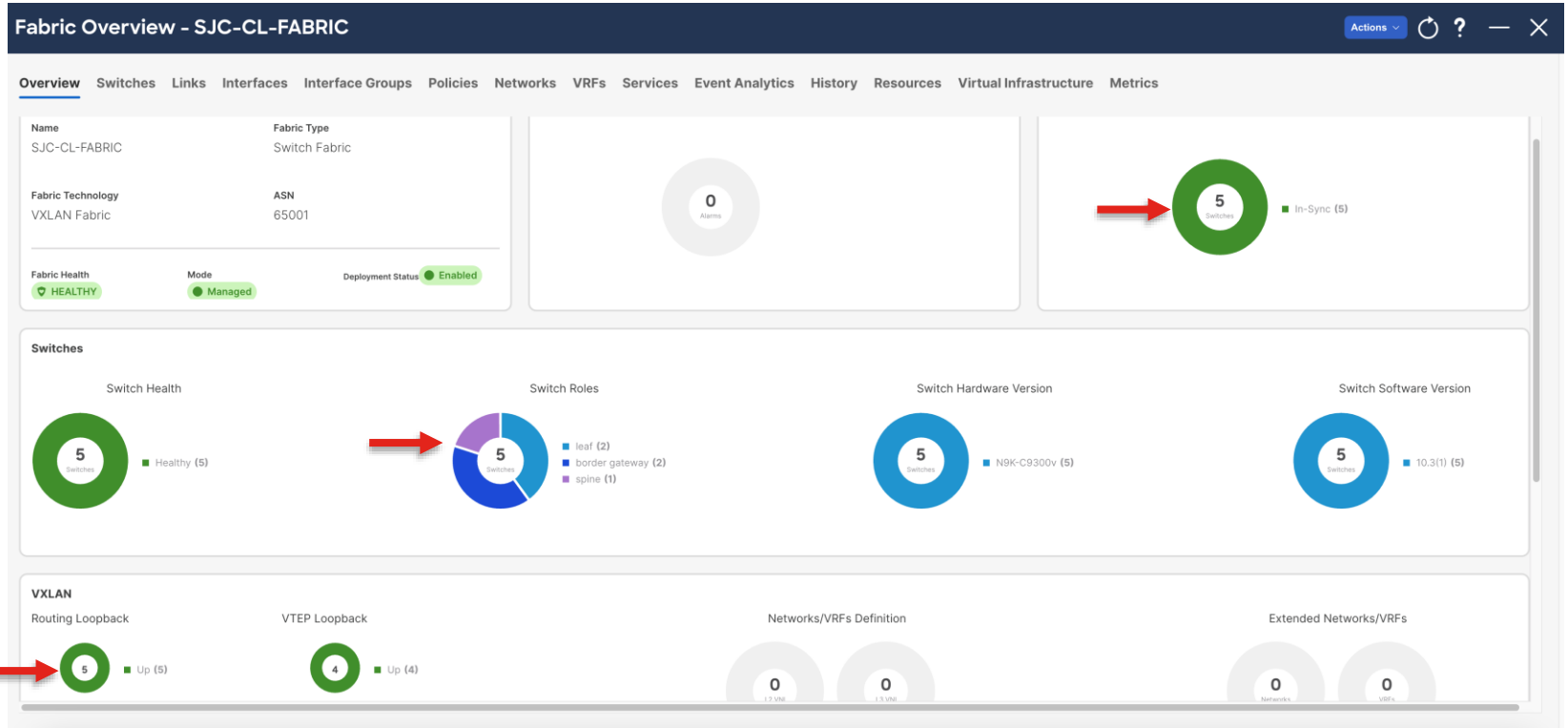
Deploy Configuration



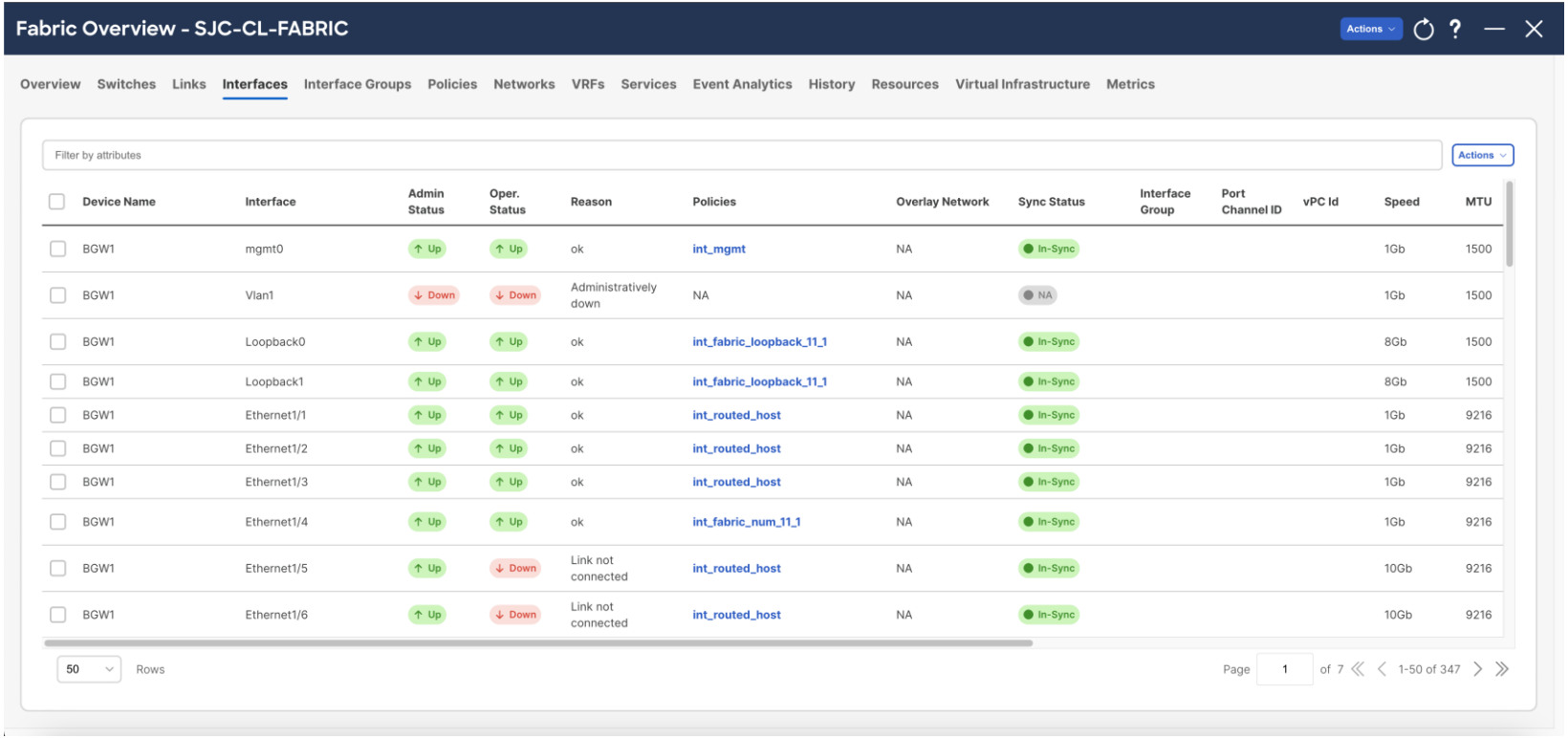
Switch Overview



Fabric Overview

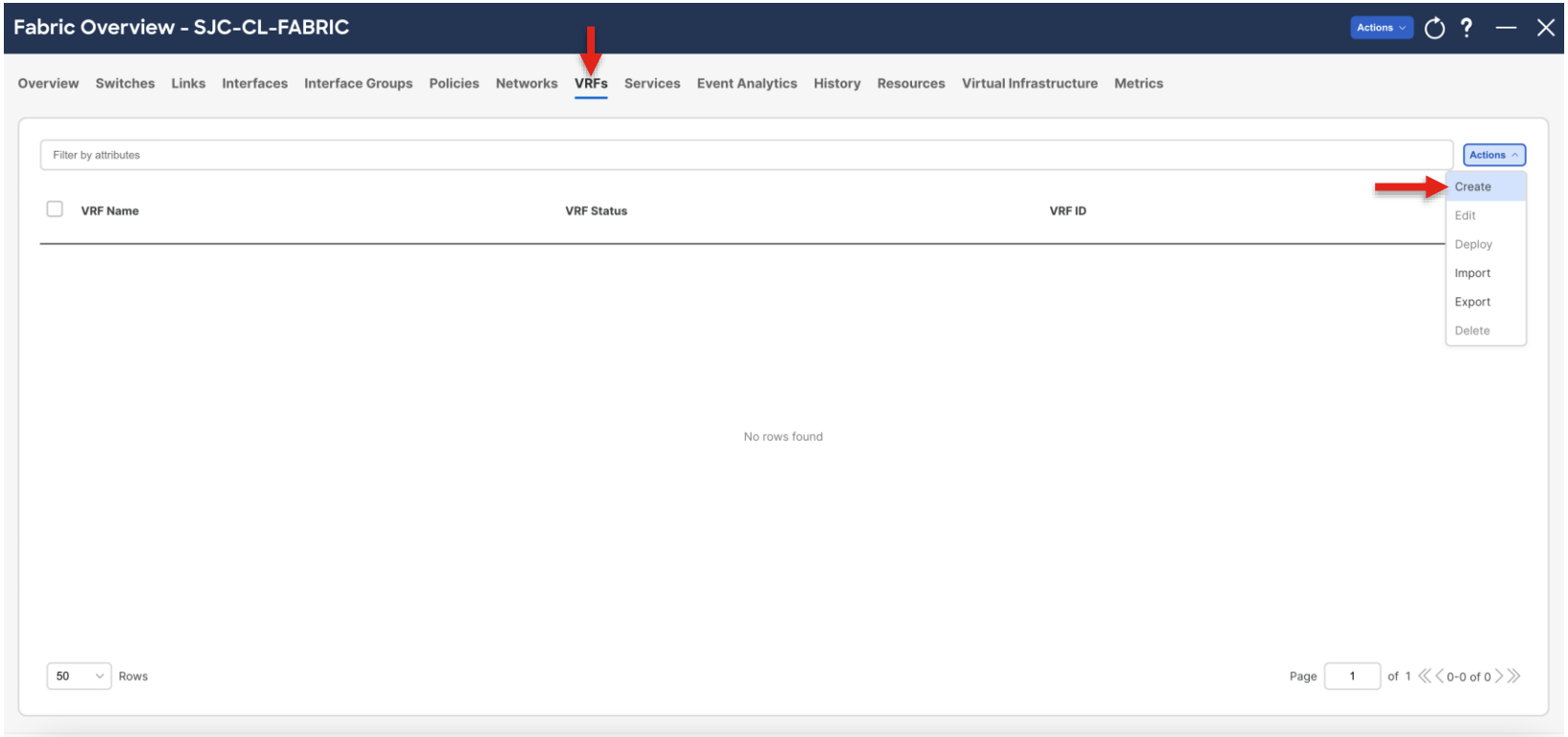


Edit Interface

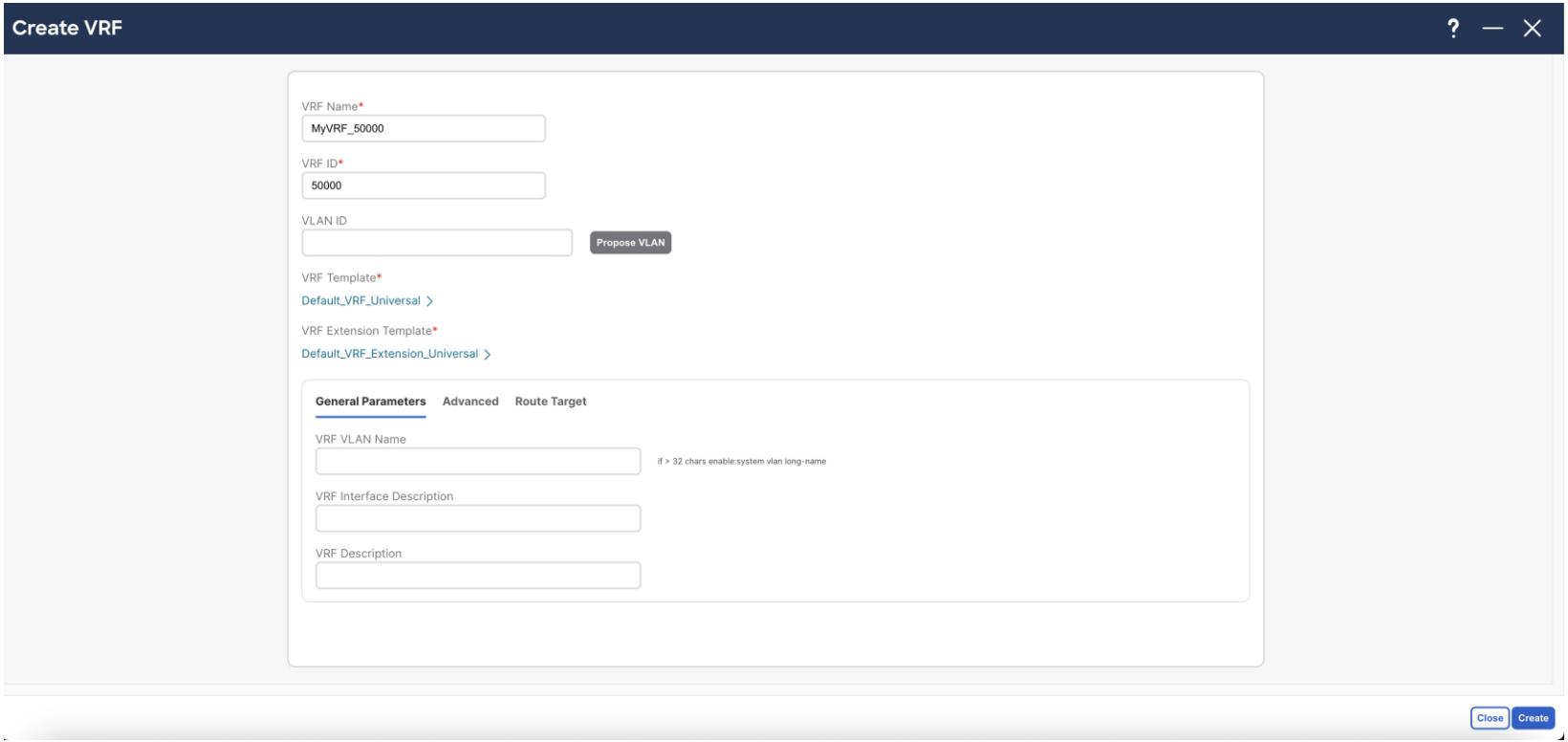


NDFC Day-1: VXLAN EVPN Underlay

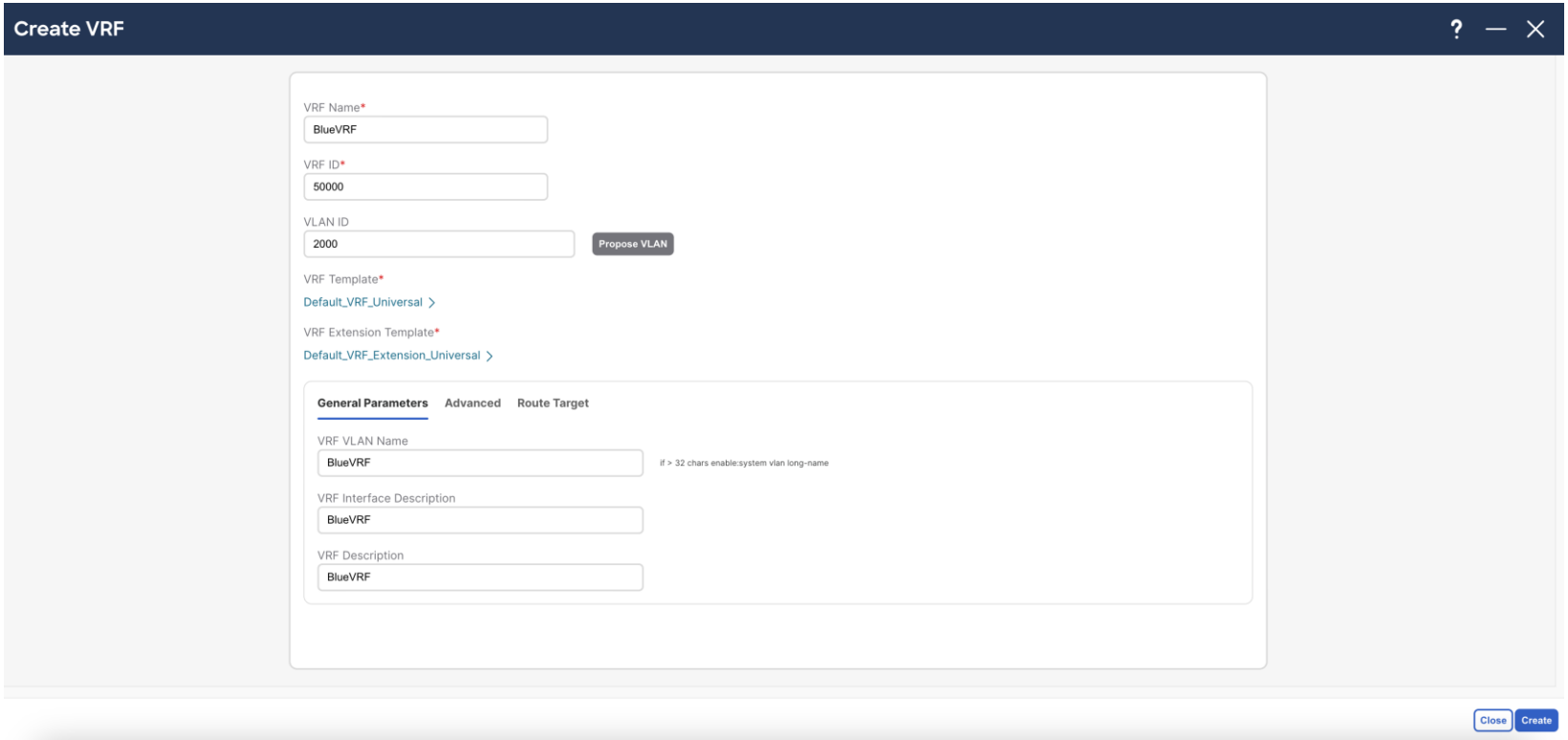
Create VRF



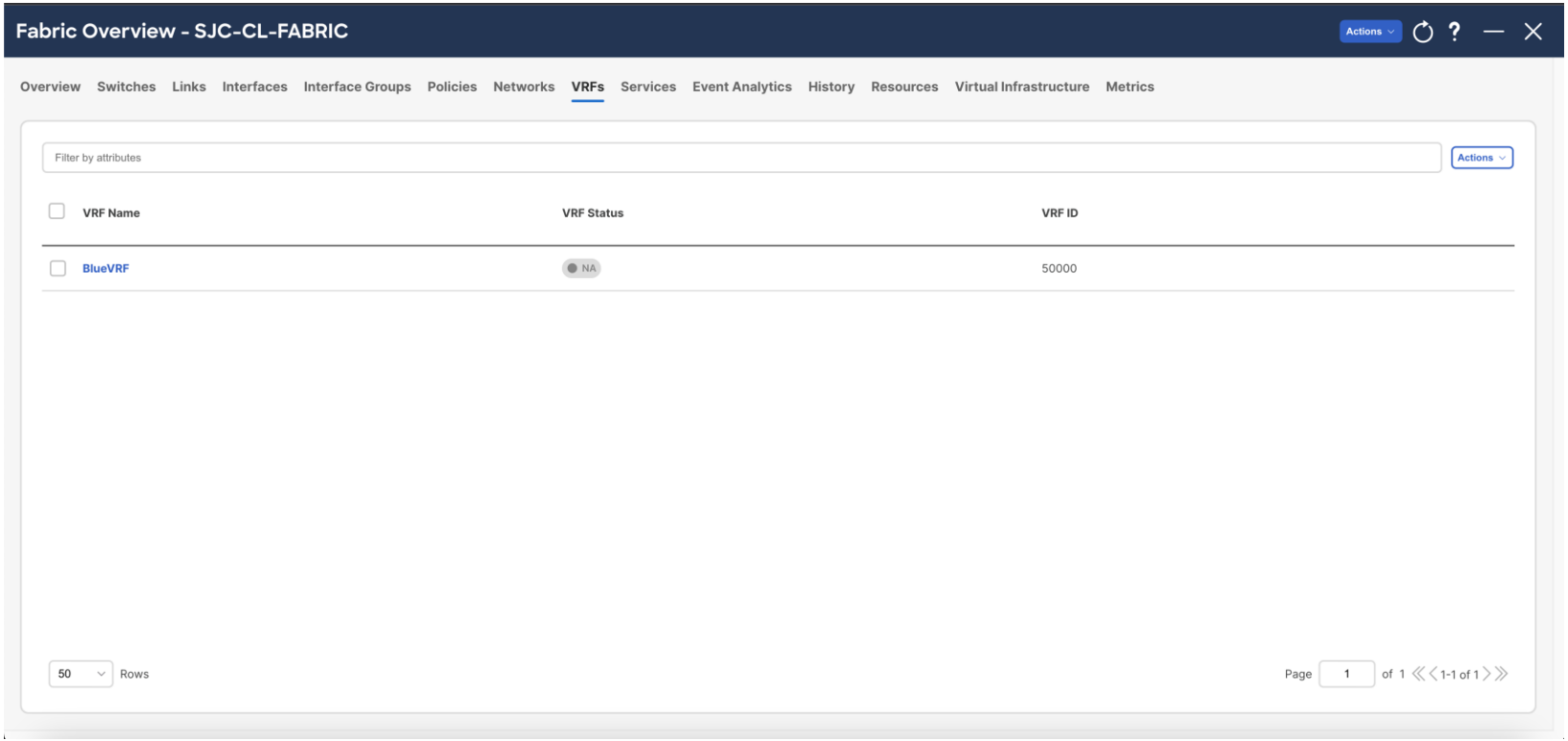
Populate VRF Wizard



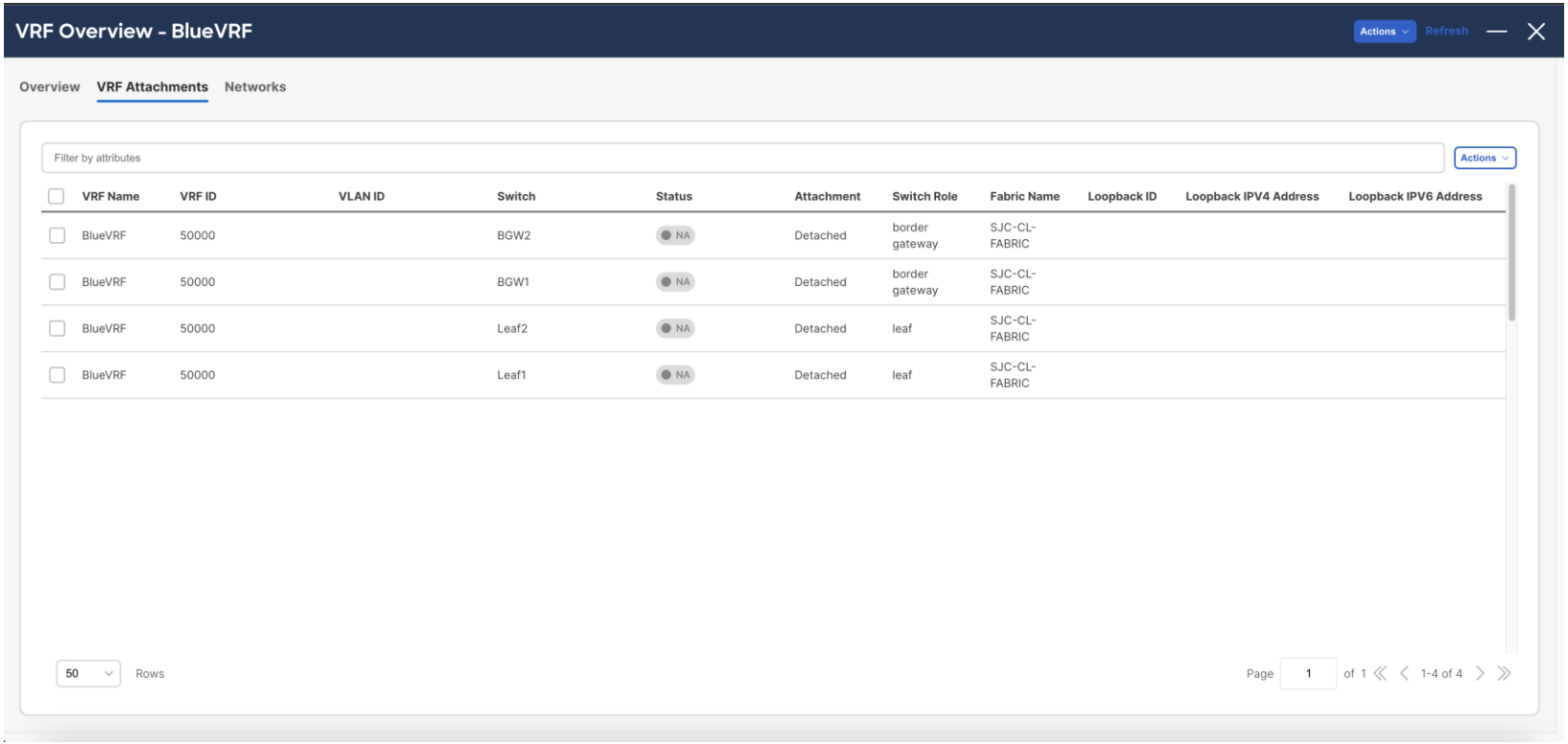
Populate VRF Wizard



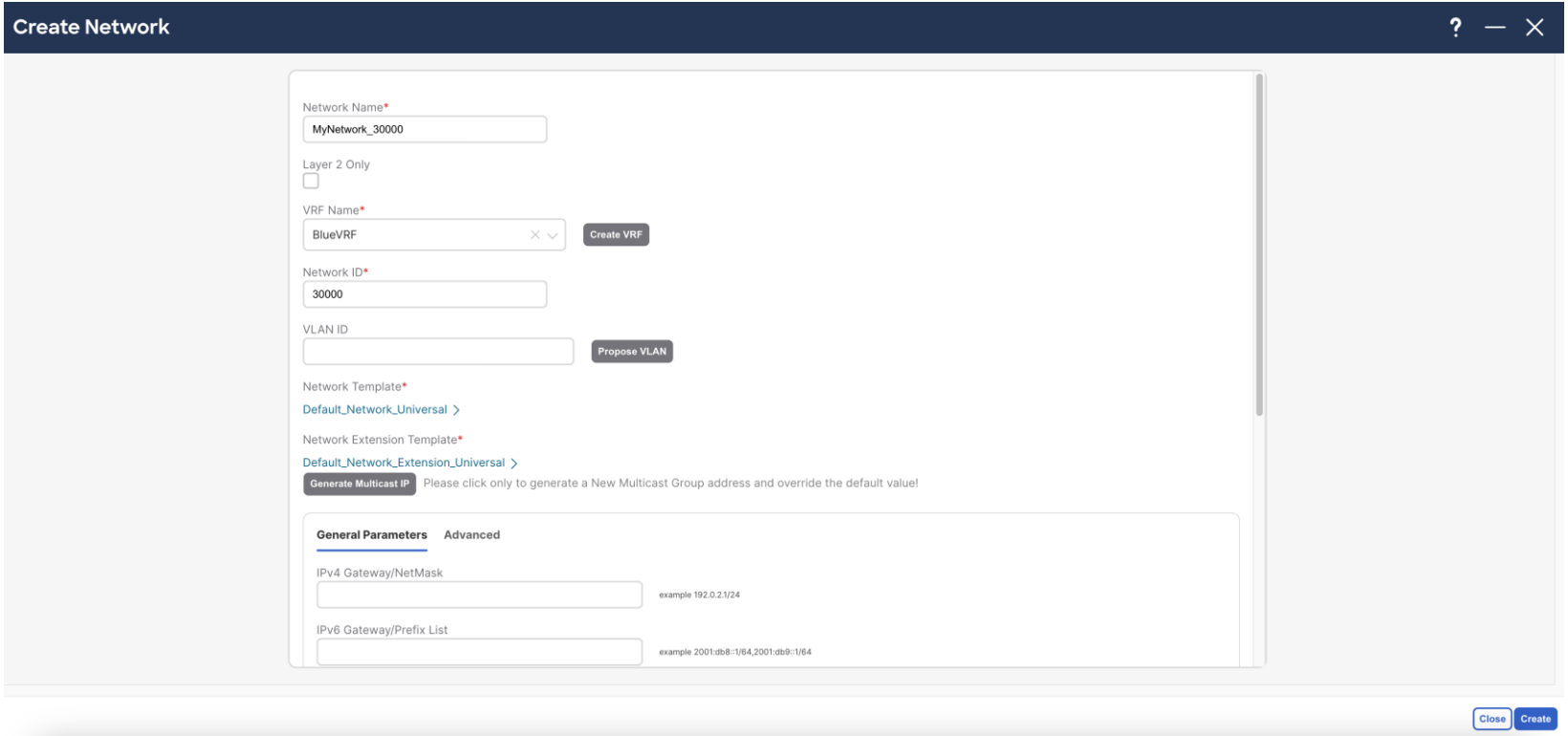
Confirm VRF Creation

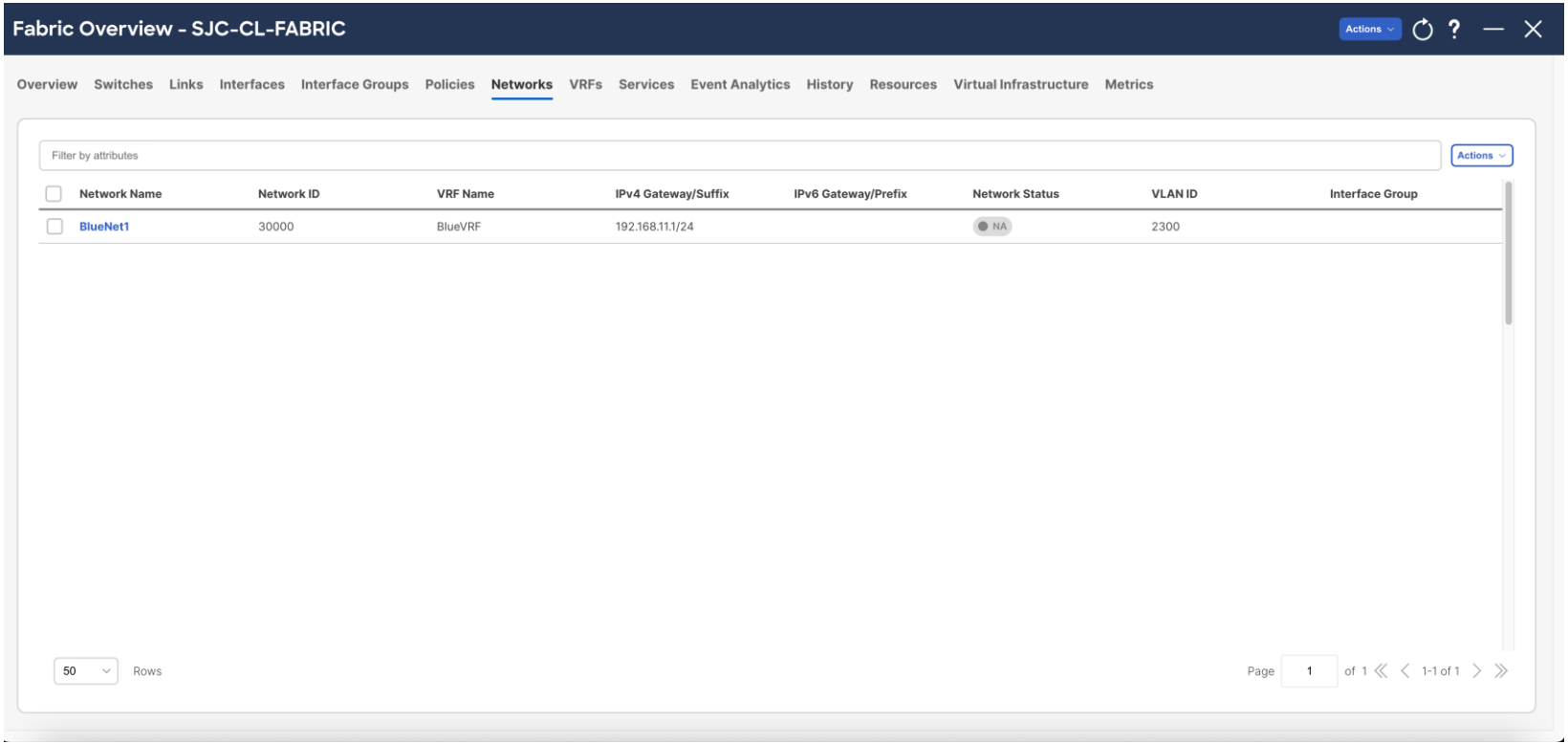


View VRF Attachments

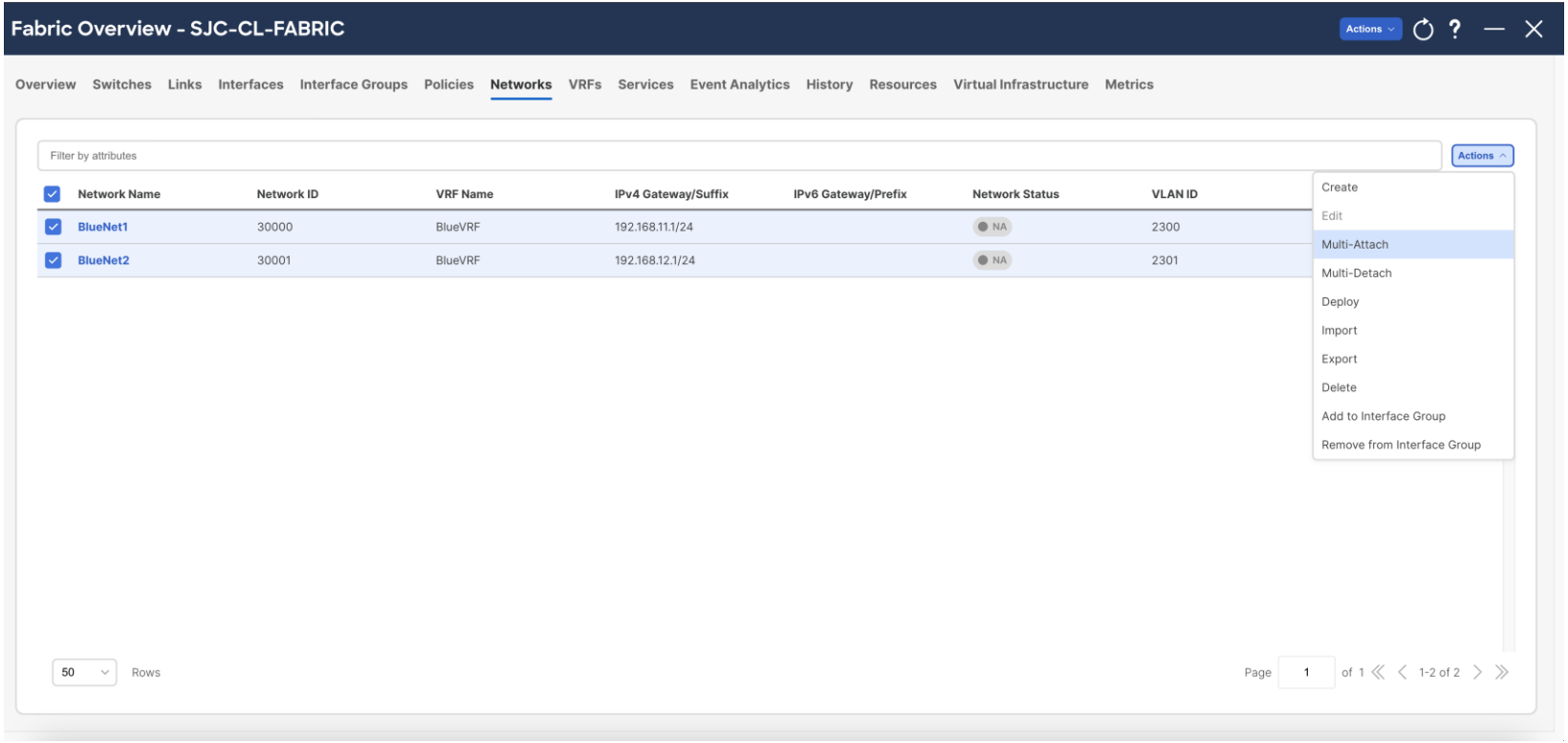


Create Network Wizard

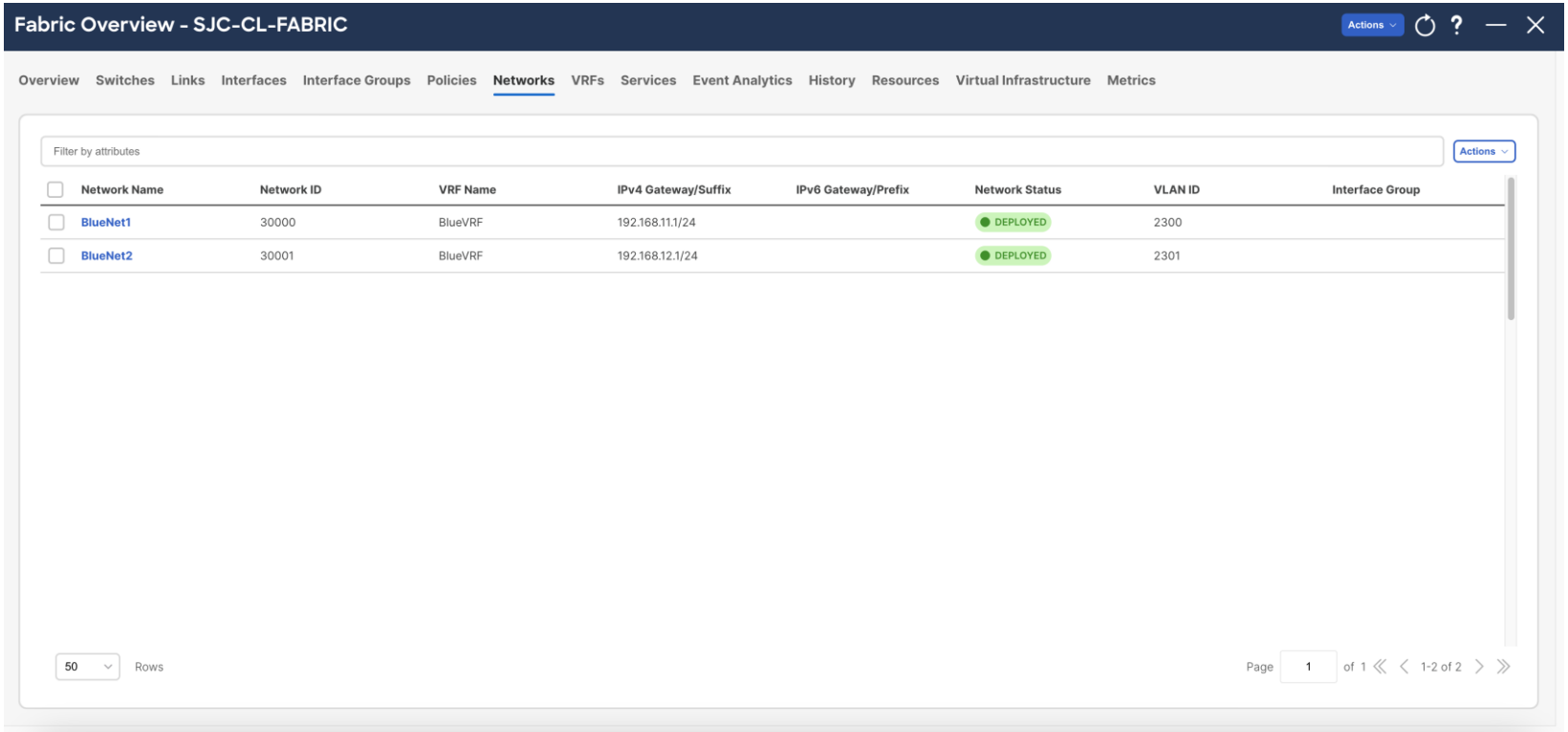


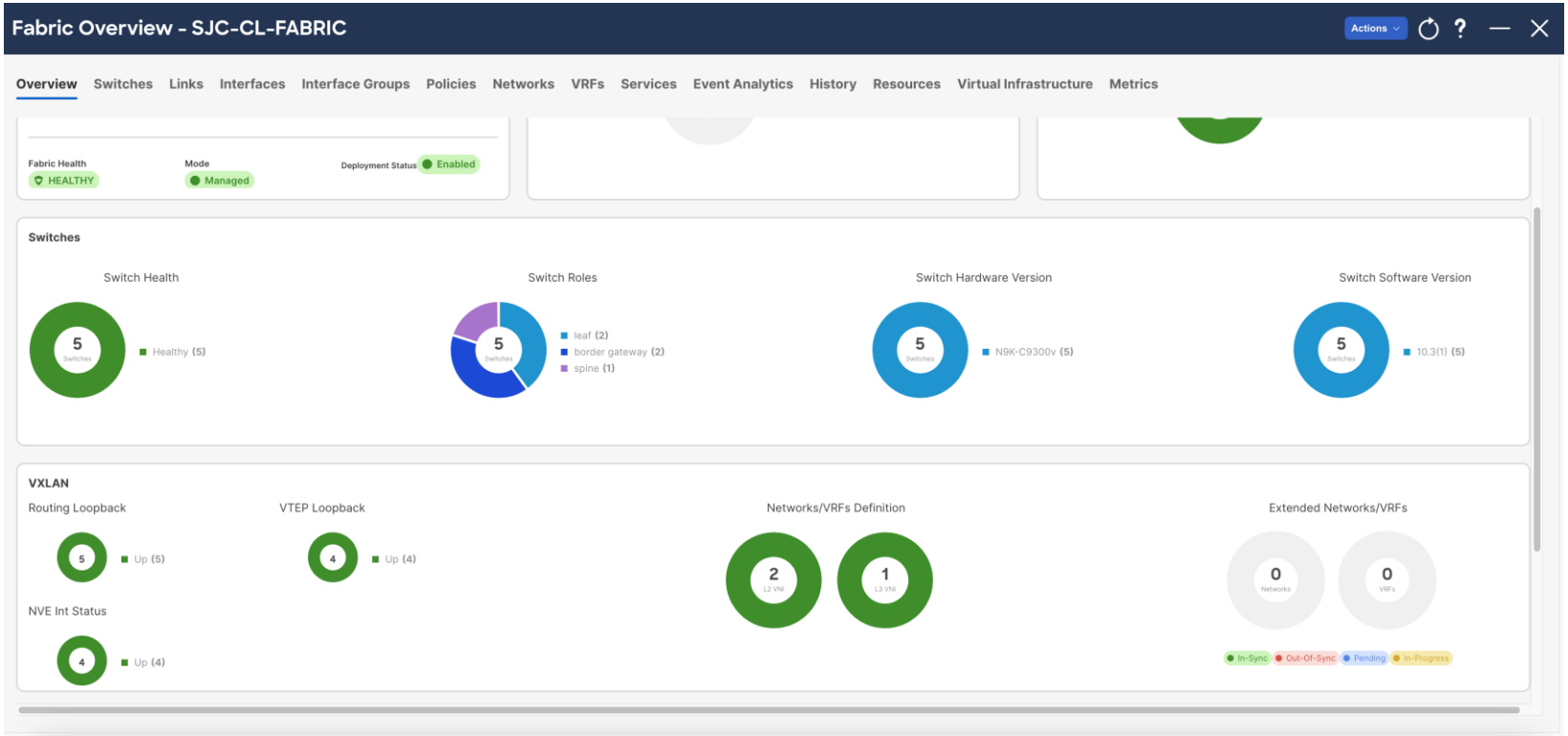


Network Attachments



Network Attachments





NDFC Topology View