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## Introduction to NDFC: Simplifying Management of Your Data Center

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BRKDCN-1119

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## Agenda

- Introduction to NDFC
- Install and Deployment
- Fabric Automation and Demo
- Fabric Management
- Fabric Visibility and Monitoring
- Licensing
- Conclusion



4

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



#### And your world is constantly changing...



#### New Name, New Architecture from Release 12.0



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#### Cisco Nexus Dashboard Fabric Controller app accessed through Cisco Nexus Dashboard



9

## NDFC–Comprehensive Data Center Automation Tool

NDFC helps you easily and reliably deploy, operate and maintain VXLAN-EVPN, LAN, SAN, and Media fabrics for Cisco NX-OS Nexus and MDS infrastructure and interconnect with public clouds



NDFC addresses challenges by providing comprehensive solution-level control, automation, visibility, monitoring, and integration

## NDFC: Install and Deployment

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#### NDFC 12.0 on Nexus Dashboard (ND)

Exclusively will run as a service on ND

Supported on both virtual and physical ND

Complete micro-services architecture

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

Increased flexibility and scalability

Nexus Dashbaard	
<ul> <li>n club Nexus Dashb</li> <li>Admin Console</li> <li>Overview</li> <li>Sites</li> <li>Sites</li> <li>Sites</li> <li>System Resources</li> <li>Operations</li> <li>Infrastructure</li> <li>Administrative</li> </ul>	v vlo2122-Custer           Service Catalog           tstaled Service         App Store           c           v           voor vloat Stale deployments           to 300           to 300           to 300           to 300
Benefits Highly customizable	Single pane of glass view

#### NDFC new look and feel

Old

#### B dulle Data Center Network Manager SCOPE: MSD \* # A 0 Dashboard Quick Search - Bearch Show Auto Refresh \* Topology Switch Health FEX Ca Links Control · Al Monitor Logical Links VPC Only Bandwidth Administration Ul Controls Applications Compute Custom saved layout + 0%. 📕 60-89%. 📕 >80% - 🖩 U

#### New







### DCNM 11 to NDFC 12 Form Factors



Cisco Nexus Dashboard Fabric Controller 12.1.1e

NDFC 12.1.1 (3 x pND or 5 x vND) Switches: 400 managed or 1000 monitor



### NDFC 12 installation

#### NDFC installation happens in two major steps:



1. Install Nexus Dashboard cluster Platform Either Virtual OVA [App profile 3 or 5 nodes ] or 3 Physical Cisco Service Engines

2. Install the NDFC service from Cisco DC App Center on top of the Nexus Dashboard Cluster

## NDFC 12 installation over ND L2 HA

Nexus Dashboard Network Interface connectivity - vND and pND (SE)



## NDFC 12 installation over ND L3 HA



Cisco Nexus Dashboard Fabric Controller 12.1.1e

Nexus Dashboard Network Interface connectivity - vND and pND (SE)



### NDFC 12 connectivity

Option # 1: Switch Mgmt0 is accessed via the ND Mgmt Interface



ND Mgmt. Interface is dedicated to ND Cluster Mgmt. (HTTPs/SSH access, NTP, DNS, Web Proxy, etc..)

ND Mgmt. Interface is used for Switch Mgmt0 (Discovery, Deploy, Monitor, Image Mgmt, POAP etc..)

ND Data/Fabric Interface is used for Endpoint Locator, PMN/PTP Telemetry

#### List of configuration tasks to enable option 1 Switch Mgmt0 accessed via the ND Mgmt Interface

Fabric OOB Mgmt:

OOB Mgmt (i.e. Switch mgmt0 interfaces) is accessed via the ND Mgmt Interface

- Add static route(s) associated to the ND Mgmt interface pointing to the switches mgmt0 subnet(s)
- Alternatively, the ND Mgmt interface can be configured as part of the same subnet with the mgmt0 interfaces.
- o Define the persistent IP addresses in the ND management subnet
  - Used for SCP-POAP, SNMP-Trap

All Inband communication to the fabrics (i.e. via front panel ports) must use the ND Data interface. Example Endpoint Locator, PMN/PTP Telemetry.

https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/cisco-nexus-dashboard-fabric-controller-deployment-guide.html#Introduction

### NDFC 12 connectivity

Option # 2: Switch Mgmt0 is accessed via the ND Data Interface



ND Mgmt. Interface is dedicated to ND Cluster Mgmt (HTTPs/SSH access, NTP, DNS, Web Proxy, etc..)

ND Data/Fabric Interface is used for Switch OOB and Inband Mgmt. (Discovery, Deploy, Monitor, Image Mgmt, POAP, etc..)



ND Data/Fabric Interface is used for Endpoint Locator, PMN/PTP Telemetry

#### List of configuration tasks to enable option 2 Switch Mgmt0 and Front panel interfaces accessed via the ND Data Interface

Fabric OOB Mgmt:

OOB Mgmt (i.e. Switch mgmt0 interfaces) is accessed via the ND Data Interface

- Add static route(s) associated to the ND Data interface pointing to the switches mgmt0 subnet(s).
- Define the persistent IP addresses in the ND Data subnet
  - Used for SCP-POAP, SNMP-Trap
- Change the global NDFC setting from "Management" to "Data".

All Inband communication to the fabrics (i.e. via front panel ports) must use the ND Data interface. Example Switch Inband mgmt., Inband POAP, Endpoint Locator, PMN/PTP Telemetry.

https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/cisco-nexus-dashboard-fabric-controller-deployment-guide.html#Introduction

#### List of configuration tasks to enable option 2 Switch Mgmt0 and Front panel interfaces accessed via the ND Data Interface

Special configuration for performing Image management on switches mgmt0 using ND Data interface:

- By default, when a switch mgmt0 is discovered using ND Data interface then NDFC uses "Default VRF" for operations such as SCP/Image management. As the switch mgmt0 interface is usually not reachable over Default VRF, we will need to perform the following tasks for image management feature.
- If switches are not added into the fabric then perform Step-1 but if switches are added/already discovered and present in the fabric then perform Step-2

#### Step 1: Enable NDFC server settings Navigate to NDFC settings > Discovery > Enable the setting

LAN discovery PING	test timeout*			
3000		LAN dis	covery PING test timeout	in msec (Default is 3000)
LAN discovery PING	test retry number*			
3		LAN dis	covery PING test retry nur	mber (Default is 3)
Worker max switch o	apacity*			
100		Worker	max switch capacity (Def	ault is 100)
Maximum timeout fo	r blocking API to add device	es in seconds*		
900				

#### Step 2: Update discovery VRF per switch Navigate to switches overview > Actions > Discovery > Update VRF

Jpdate Discovery VRF			
Current VRF default			
	$\times \sim$		
Enter VRF to rea	ach NDFC services		
	$\times$ $\sim$		
Select Layer-3 interface to rea	ach NDFC services		
Ca	ancel OK		
	Current VRF default Enter VRF to rea Select Layer-3 interface to rea		

### NDFC 12 connectivity

Option # 3: Switch Mgmt0 is accessed via the ND Mgmt. Interface but Image mgmt. over ND Data



ND Mgmt. Interface is dedicated to ND Cluster Mgmt. (HTTPs/SSH access, NTP, DNS, Web Proxy, etc..)

ND Mgmt. Interface is used for OOB Mgmt (Discovery, Deploy, Monitor, POAP etc..)

ND Data/Fabric Interface is used for Image mgmt., Inband Mgmt., Inband POAP, Endpoint Locator, PMN/PTP Telemetry

#### List of configuration tasks to enable option 3 Switch Mgmt0 via ND Mgmt. interface and Front Panel accessed via the ND Data

Fabric OOB Mgmt:

Interface

OOB Mgmt (i.e. Switch mgmt0 interfaces) is accessed via the ND Mgmt. Interface Front panel (i.e. Switch Lo0, SVI interfaces) is accessed via the ND Data Interface

- Add static route(s) associated to the ND Data interface pointing to the switches mgmt0 subnet(s).
- Define the persistent IP addresses used for SCP/POAP/SNMP and associate them to the ND Data interface.
- Change the global NDFC setting from "Management" to "Data".

Fabric Inband Mgmt.: All Inband communications to the fabrics (i.e. via front panel ports) must use the ND Data interface.

https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/cisco-nexus-dashboard-fabric-controller-deployment-guide.html#Introduction

#### Nexus Dashboard Distributed Cluster Deployment for NDFC

- 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.













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# Nexus Dashboard service connectivity considerations w/o co-hosting





# Nexus Dashboard service connectivity considerations w/ co-hosting





### NDFC Co-hosting with ND Insight





Form Factor	ND Version	NDFC Version	NDI Version	NDFC Mode	ND Cluster # Nodes	NDFC Max Switches
Physical (pND)	2.1(2d)	12.0.2(f)	6.1.1	Fabric Discovery	4	50
Physical (pND)	2.2(1h)	12.1.1(e)	6.1.2	Fabric Controller	5	50

NOTE: For more information on Nexus Dashboard services compatibility and matrix: https://www.cisco.com/c/dam/en/us/td/docs/dcn/tools/nd-sizing/index.html

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#### NDFC backup & restore



### NDFC service backup & restore



- Configuration Backup: Config Intent, Discovery, Credential, and Policies.
- Full Backup: Configuration Backup + historical data like reports, metric charts.

# NDFC Fabric backup & restore What?



## NDFC Fabric backup & restore When?

Automatic Hourly backup or Scheduled backups for fabric configurations and intents

NDFC backs up only when there's a configuration push.

Golden Backup to mark backups as references that you don't want to delete

Restore configurations of member fabrics in a MSD fabric Globally

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## NDFC Key Features-1: Automation

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#### Automation



Accelerate provisioning from days to minutes

Easy to understand approach to auto-bootstrapping of entire fabric

Rapid Deployment with Fabric Builder best practice templates for VXLAN-EVPN

Optimized for both large deployments and traditional deployment models

Service Insertion and Layer-3 handoff

DevOps friendly


## Automate VXLAN EVPN deployments Provision a new fabric in minutes



## Fabric builder



## Day-0 in the life of NDFC Underlay using Fabric Builder



### <u>Create</u>

Define fabric settings – ASN#, Replication Mode, IGP, Backup schedule, etc.



### <u>Discover</u>

Import switches (Supports POAP) Define Switch Roles and vPC

Generates configuration based on intent

Recalculate and Deploy





2



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## VXLAN EVPN Greenfield





## Day-1 in the life of NDFC - overlay management

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- Top-Down deployment via GUI or REST APIs
- Network/VRF Creation with best-practice Overlay Policies
- Deployment to Switches and/or Interfaces
- Per Network/Per Switch deployment History
- Overlay Resource Manage Tracking for VNIs, VLANs, etc.

# VXLAN EVPN Brownfield migration



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### Step 2

#### scover

Import switches with **Preserve Config** Define switch Roles (Border, Leaf, Spine, etc)

Step 1 Create Define fabric settings (Underlay, Overlay) -Match AS#, Replication Mode, IGP, etc. Step 3 Recalculate and Deploy Sanity checks for mis-config and Normalizes configuration to best practices



# NDFC L4-L7 services integration

- Network orchestration of L4-L7 Service Appliance attached to a VXLAN EVPN fabric
- Automated guided workflows to define and peer service nodes. Dynamic PBR and Topology Visualization
- No configuration will be done on the service appliance themselves

### Step 2

### Route Peering

Specify deployment type: Inter-tenant v Intra-tenant Peering protocols, network parameters, and service IP



#### Step 1 Define Service Node

Onboard a service device such as a firewall, load balancer or VNF. Specify service node name, type, and interface attachment details

Navigate to NDFC LAN menu and Services window

## Step 3

### Service Policy

Optionally specify traffic redirection rules to/from the service nodes. Supports PBR for Intra-tenant





Host A

Host B

## NDFC L4-L7 services integration

use-cases

Virtual & Physical Form Factor Static & Dynamic Peering vPC/Non-vPC Attachments Support for Firewall, Load Balancer, and VNF use-cases



One-Arm

**PBR Use-cases** 

Two-Arms





## L4-L7 service node guidelines

Supported on VXLAN EVPN with the Easy\_Fabric Template

Enabled on Cisco CloudScale based Nexus 9000 switches

Leaf, Border Leaf, Border Spine, Border Super Spine, vPC Border Gateway

L4-L7 Service node automation using NDFC UI or NDFC REST API

L4-L7 Services generate Kafka Notification for Real-Time Interaction

NDFC does not manage or generate configurations on service nodes. NDFC automates the switch(es) where the service nodes are connected



## Service Node statistics From the Topology – Open the Redirected Flows Icon

Search for Redirected Flows for a particular Service Policy

Highlight Switches which has Service Policy configured





## Service Node statistics





Display Cumulative statistics From the Service Policy

### Search for Redirected Flows for a Particular Policy

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## VXLAN EVPN External Layer-3 connectivity

VRF Lite is used for connecting the fabric to an external Layer 3 domain (N-S)

Each Tenants (VRF) can connect outside the Fabric via a Borders Leaf Node



## VXLAN EVPN External Layer-3 connectivity Pre-requisites and Guidelines



Extend Layer-3 services to Nexus 9000, Nexus 7000, Catalyst 9000, ASR 1000, ASR 9000, ASR 8000, NC 5500

Supported role for Easy Fabric: Border, Border Spine, Border Gateway, Border Gateway Spine, Border Super Spine, and Border Gateway Super Spine

NDFC automates and auto-deploy Edge router VRF-Lite configurations when Edge device is a Nexus

\*Meta switch in External fabric supported \*A common case when user does not import destination Edge router in NDFC. In this case just create an empty External fabric.

Layer-3 Ethernet and Port-channel supported

### Easy Fabric



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## NDFC Seamless Protocol Gateway Integration



## Increase developer agility with NDFC DevOps



# Controller based approach

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RESTAPI, Ansible, Terraform

Reduced logic complexity in your code, only focus on workflow



# Controller based approach - NDFC

- Full set of RESTAPI support
- Built-in Swagger tool to quickly test it
- Terraform Provider and Ansible Collection is shipping

NDFC GUI > <u>https://ND-Mgmt-IP/</u>

NDFC REST API > <u>https://ND-Mgmt-IP/apidocs/</u>

https://ND-Mgmt-IP/appcenter/cisco/ndfc/api/\*

	Retrieve service	route peering of the specified service node		
Q, Search	This api is used to retrieve service route peeting of the selected service node under the selected fathic		Details	
	0ET /sppcenter/ciscoindfc/api/v1/elastic-service/fabrics/(fabric-name)/service-nodes/(node-name)/peerings			
	rei fabrio-name	stins	Try It Example	
	required	Name of external fabric where the service node is located		
	Li node-name required	string Name of service node	Path params	
	QUERY PARAMETERS		fabric-name required	Name of external f
Retrieve service route peering of the specified service node	exclude-detail	boolean Flag to not include detailed info, e.g. service networks' attachment statuses	node-name required	Name of service re
Add service route peering to the specified service node	Responses			
	> 200 Service route peering is retrieved Successfully		Query params	
specified service node	> 400 Invalid Fabric or request payload		exclude-detail	talse v
Retrieve service route peering for the specified attached fabric	> 500 Other Exceptions			Run
Delete service route peering for the specified attached fabric				
Attach (enable) the service route peering of the specified service node			1	
Detach (disable) the service route peering of the specified service node	Add service rout	e peering to the specified service node service route peering under the selected fabric, i.e. the logical attachment to the easy fabric	Details	
Deploy the service route peerings of the specified service node	POST /appo	nter/cisco/ndfc/api/v1/elastic-service/fabrics/(fabric-name)/service-nodes/(node-name)/peerings		
Retrieve service route peering with the specified peering name	PATH PARAMETERS		Try It Example	
	pet fabric-name	sting	_	

\* https://ND-Mgmt-IP/appcenter/cisco/ndfc/api/v1/lan-fabric/rest/control/fabrics

# Demo: Building VXLAN EVPN fabric using NDFC

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🗢 Nexus Dashboard	× +	~			
← → C ▲ Not Secure   https://	172.25.74.144/#/apps iab 🤣 IOS XR Line card 👼 Cisco IOS XR Wor 📴 Cisco IOS XR Fun 🥑 Segment Routing 🔛 IOS XR L2VPN Ser 🔚 IOS XR Bundles G 📀 ASR9000/XR RPL 🐝 ASR9000/XR: Loa	☆ 💩 😘 🎧 🎘 🗖 🕑 : 🃬 AWS DX VIF limita »			
n dudu Nexus Dashb	board	Feedback Help $\sim$ parth $\sim$			
= Admin Console	o ndfc-12-parth				
<ul><li>Overview</li><li>Sites</li></ul>	Service Catalog	Ø			
Services	Installed Services App Store				
Image: System Resources V   Image: Operations V   C Infrastructure V	Nexus Dashboard Fabric Controller	Actions ~			
$\mathbf{r}^{\circ}$ Administrative $\checkmark$	Manage LAN, SAN, and Media deployments. 12.1.1e				
	Versions Pods Containers				

# NDFC Key Features-2: Management

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## 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



## Optimize your deployments with NDFC



# Configuration compliance



Ensure fabric consistency

Continuously monitors if configuration is compliant with user intent

Error detection, flag drifts for remediation





## Granular Role-Based Access Control (RBAC)



Benefit

### Increases efficiency and further reduces administrative workflows

### Streamlined Image and Patch Management for NXOS Simplify, Speed up, and Mitigate Risks of Errors



# Streamlined Image and Patch Management for NXOS



## Image Management Workflow



Discover the switches into Nexus Dashboard Fabric Controller



## Return Material Authorization (RMA) POAP or Manual RMA flow



## NDFC to NDFC Multi-Site using ND Orchestrator



## Data Center Interconnectivity



Scale out

- 30 Cisco NDFC VXLAN-EVPN fabrics (Starting) NDO 4.0)
- 500 VRFs and networks (L2–1500, L3–1000)



Virtual routing and forwarding stretch

L2/L3 network stretch



### BGP EVPN/VXLAN across sites

Full-mesh

· Centralized to route-server

Inter-site connectivity automation through BGWs



Static port/VLAN provisioning

#### Visibility



- Fault information for NDFC objects within NDO
- Tunnel and NDFC object health within NDO



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## Hybrid & Multi-Cloud

Roadmap | 2HCY22





## Non-Nexus platform support

### IOS-XE Cat9k VXLAN EVPN Automation

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



### IOS-XR ASR 9000/NCS5500 managed mode

NDFC 12 will support 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 Key Features-3: Visibility and Monitoring

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# 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


# NDFC 12 Dashboard



# NDFC 12 Dashboard



Allow network administrators to focus on daily operation around the health, sync configuration, and performance of data center switching.



Multiple additional Tabs based on the Features enabled (EPL, VMM, K8s)



# Visualize multiple fabrics with topology views



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# NDFC 12 Topology Operational Color Coding

The element is in good health and functioning as intended.

The element is in warning state and requires attention to prevent any further problems

The element has major issues and requires attention to prevent any further problems

The element has minor issues

Configuration



Operation

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The element is in critical state and requires immediate attention



The element has not been discovered



## NDFC 12 Topology Configuration Color Coding

Operation

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**—** 

Configuration

(The element is In-Sync with the intended configuration.

The element has pending deployments.

Indicates that active deployments are in-progress.

The element is Out-of-Sync with the intended configuration.

No support for Configuration Sync/not discovered



# NDFC 12 Topology

Switch Logical Links

- Troubleshoot Physical v Logical peering's
- Routing Protocol state details
- Physical link details such as IP prefix, Interface speed, Interface mode, and more...





# 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





 $\sim$ 

Report Name\*

Select Template\*
Performance\_Report >

3

20

true

true

true

true

Include Memory\*

Include Links\*

Include Other Ports\*

Performance-Report

Top records to Chart\*

Max Number of Rows to show per Table\*

# Switch Performance Monitoring – The Steps

Enable Performance Monitoring Feature from Feature Management 2 Update SMTP parameters in NDFC server setting for E-mail notification Enable the Performance Monitoring knob at the Fabric level Navigate to NDFC Operations and Programmable Reports section to create PM report 57 Visualize PM reports at Multiple locations: Reports window, Switch overview, Fabric overview, and main Dashboard window



#### Viewing Alarms and Events





#### Viewing Alarms and Events

#### Create & Activate new Alarm Policies

All Devices							
licy Name •							
escription							
Forwarding E	mail						
rameters							
CPU Utilization		Memory Utilization			Environmental Tempo	erature	
Greater than	% O Warning	Greater than	%	O Warning	Greater than	°C	O Warning
Greater than	% O Minor	Greater than	%	O Minor	Greater than	°C	O Minor
Greater than	% Ø Major	Greater than	%	O Major	Greater than	°C	O Major
Greater than	% Oritical	Greater than	%	O Critical	Greater than	°C	O Critical
Device Availability		Device Feature					
Device Access	Peripherals	Protocol					
SNMP	Fan	BFD					
SSH	Power Supply	BGP					
	Modulo	HSRP					



#### Device Health Policy

#### Viewing Alarms and Events

#### Create & Activate new Alarm Policies

Device Health Polic	cy 💽 Interface Health Polic	y 🔿 Syslog Ala	rm Policy					
Devices								
All Devices								
Policy Name∗								
Description								
Forwarding E	mail Linkstate							
Parameters								
Bandwidth (In/Out)		Inbound Errors	8					
	% 📀 Warning	Greater than	3	6 O Warning				
Greater than								
Greater than	% O Minor	Greater than	9	6 O Minor				
Greater than Greater than Greater than	% O Minor % O Major	Greater than Greater than	9	6 O Minor 6 O Major				
Greater than Greater than Greater than Greater than Greater than	%     O Minor       %     O Major       %     O Critical	Greater than Greater than Greater than	9 9 9	<ul> <li>Minor</li> <li>Major</li> <li>Critical</li> </ul>				
Greater than	%     O Minor       %     O Major       %     O Critical	Greater than Greater than Greater than	9 9 9 9 9	<ul> <li>Minor</li> <li>Major</li> <li>Critical</li> <li>scards</li> </ul>			Outbound Discards	
Greater than	%     O Minor       %     O Major       %     O Critical	Greater than Greater than Greater than	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	<ul> <li>Minor</li> <li>Major</li> <li>Oritical</li> </ul>	errors per 5 minutes	O Warning	Outbound Discards Greater than	errors per 5 mir
Greater than	%     O Minor       %     O Major       %     O Critical   errors per 5 minutes errors per 5 minutes	Greater than Greater than Greater than O Warning O Minor	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	6 O Minor 6 O Major 6 O Critical 8 cards	errors per 5 minutes errors per 5 minutes	© Warning © Minor	Outbound Discards Greater than Greater than	errors per 5 mir errors per 5 mir

# Device Health Policy

#### Interface Health Policy



#### Viewing Alarms and Events

Create & Activate new Alarm Policies	->	Device Health Policy
bolicy Name +	• <b>-\/</b> -	Interface Health Policy
yslogClear+		Syslog Alarm Policy
cisco litter		

#### Viewing Alarms and Events



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## NDFC 12 Topology ngOAM Source & Destination Physical Path of a particular flow



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### NDFC Compute Visibility Virtual Machines Manager Integration (Read Only) and Visibility



Virtual Management Menu S 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 particular 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



# Compute Visibility







EndPoint Locator relies on Fabric Inband Mgmt to collect EP information, using the ND Data Interface

An endpoint is typically anything with one IP address (IPv4 and\or IPv6) and/or MAC address

NDFC pre-provisions the switches that host the MP-BGP Route Reflector function to peer with them

NDFC contacts the selected RRs and add the appropriate BGP neighbor statements on the RR (Spine)

# Endpoint Locator and Visualizer



The Endpoint Locator (EPL) feature allows Real-time Tracking of Endpoints within a Data Center.

Tracing the Network Life History of Endpoints

Analyze trends associated with endpoint such as additions, removals, moves, and so on

# **Endpoint Locator and Visualizer**



# NDFC with Day 2 operations

Seamless integration with Day 2 operations app NDI for in depth telemetry analytics



Benefit

Advanced monitoring and troubleshooting capabilities

# **Cisco Nexus Dashboard Insights**

#### 360-degree visibility



#### Analytics



Digitization, telemetry, correlation

#### Integrate with NDFC



Unprecedented visibility into data center environments

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### Nexus Dashboard Insights Use Cases



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# NDFC Licensing

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# NDFC 12.1.1 is out now!

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# What's new in 12.1(1)



**Cisco Nexus Dashboard Fabric** Controller 12.1.1e



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# What's new in 12.1(1)



Cisco Nexus Dashboard Fabric Controller 12.1.1e



# NDFC Summary and Benefits

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# NDFC solution benefits



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# Companion sessions – week at a glance



# Technical session surveys

- Attendees who fill out a minimum of four session surveys and the overall event survey will get Cisco Live branded socks!
- Attendees will also earn 100 points in the Cisco Live Game for every survey completed.
- These points help you get on the leaderboard and increase your chances of winning daily and grand prizes.



# Cisco learning and certifications

From technology training and team development to Cisco certifications and learning plans, let us help you empower your business and career. www.cisco.com/go/certs

#### Pay for Learning with Cisco Learning Credits

(CLCs) are prepaid training vouchers redeemed directly with Cisco.

# E Learn

#### Cisco U.

IT learning hub that guides teams and learners toward their goals

#### **Cisco Digital Learning**

Subscription-based product, technology, and certification training

#### **Cisco Modeling Labs**

Network simulation platform for design, testing, and troubleshooting

#### Cisco Learning Network

Resource community portal for certifications and learning

# En Train

**Cisco Training Bootcamps** Intensive team & individual automation and technology training programs

#### **Cisco Learning Partner Program**

Authorized training partners supporting Cisco technology and career certifications

#### Cisco Instructor-led and Virtual Instructor-led training

Accelerated curriculum of product, technology, and certification courses

E Certify

### Cisco Certifications and Specialist Certifications

Award-winning certification program empowers students and IT Professionals to advance their technical careers

#### **Cisco Guided Study Groups**

180-day certification prep program with learning and support

#### Cisco Continuing Education Program

Recertification training options for Cisco certified individuals

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- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
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