

# Nutanix and Mellanox SN2010 Switch Deployment using NEO™

## Quick Start Guide

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Rev 1.0

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# Table of Contents

<b>1</b>	<b>Overview .....</b>	<b>4</b>
<b>2</b>	<b>Mellanox MLAG based, Leaf-Spine Topology.....</b>	<b>5</b>
<b>3</b>	<b>Nutanix and Mellanox Spectrum SN2010 MLAG.....</b>	<b>6</b>
3.1	Install the Mellanox NEO .....	7
3.2	NEO Plugin for Nutanix Auto Provisioning .....	8
3.3	MLAG Switch Configuration .....	9
3.4	Nutanix AHV LAG (bond) configuration to LACP .....	17
3.5	Nutanix Nodes visibility only mode .....	18

# 1 Overview

Mellanox switches allow you to create a network fabric that offers predictable, low-latency switching while achieving maximum throughput and linear scalability. Combined with the features and intelligence of the Mellanox Onyx™ operating system (OS), multilink aggregation groups (MLAGs) create a highly available L2 fabric across Mellanox networking appliances to ensure that you can meet even the most stringent SLAs.

MLAGs aggregate ports across multiple physical switches. Configuring link aggregation between physical switch ports and Nutanix appliances enables the Nutanix Controller Virtual Machine (CVM) to utilize all pNICs and actively load balances user VMs on TCP streams. This capability is a key advantage, particularly in all-flash clusters.

Mellanox Onyx operating system provides a streamlined deployment model with a full documentation set to facilitate networking configurations ranging from basic to advanced. Mellanox Spectrum ASIC (application-specific integrated circuit) delivers 100GbE port speed with the industry's lowest port-to-port latency (approximately 300 ns or about 0.6 us leaf-to-spine).

In this user guide we will showcase a leaf-spine topology deployment using MLAGs. Managing and updating each switch independently with MLAG mitigates the single point of failure that typically results from employing stacking techniques within the switches.

In this document we will be using Mellanox [NEO™](#) to deploy the network for our Nutanix cluster. NEO is a powerful platform for data-center network orchestration, designed to simplify network provisioning, monitoring, and operations of the modern data-center. NEO offers robust automation capabilities that extend existing tools, from network staging and bring-up to day-to-day operations.

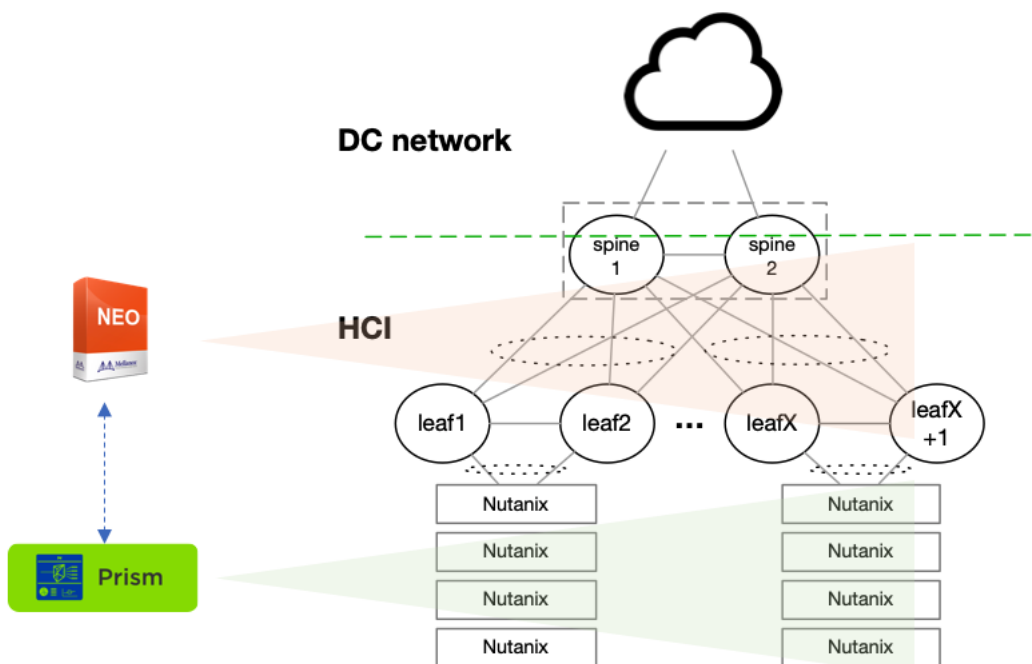
Mellanox NEO integrates with the Nutanix Prism to provide visibility and auto-provisioning.

## 2 Setup

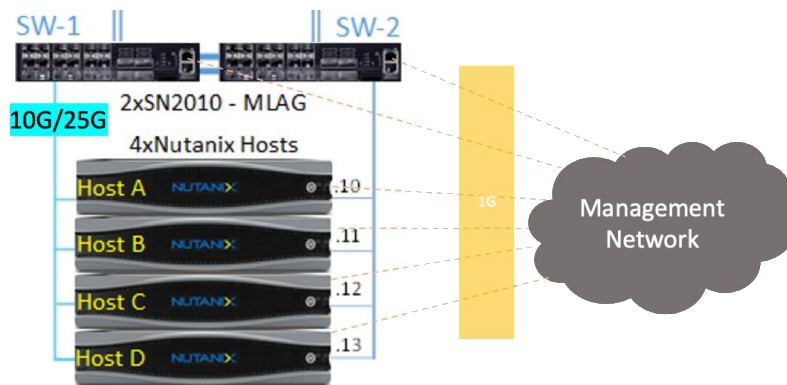
### 2.1 Mellanox MLAG-Based Leaf-Spine Topology

In this setup, we demonstrate how to achieve a Mellanox MLAG-based leaf-spine topology utilizing Mellanox SN2000 Series switches. This reference architecture consists of Mellanox SN2010 switches (18 ports x 10/25GbE + 4 ports x 40/100GbE) as leaf switches and SN2700 (32 ports x 100GbE) as spine switches.

The routing between VLANs can be done by the spine switches (which also operate in MLAG for the downlinks) or at the layer above the spines.



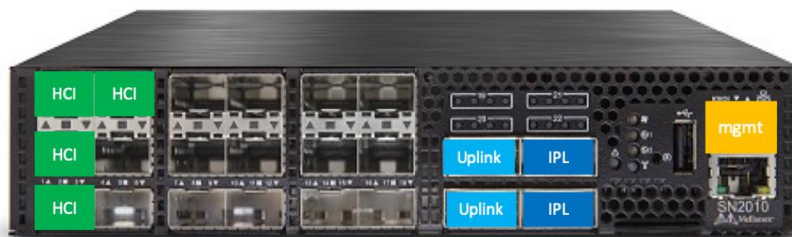
## 2.2 Nutanix and Mellanox Spectrum SN2010 MLAG



In the diagram that will be used for this guide, there are four Nutanix nodes that are connected using an active-active LACP bond to a pair of Mellanox SN2010 switches that are configured in MLAG.

Prerequisites:

- NEO version should be at least 2.4
- Onyx version should be latest available
- Bring-up your Nutanix cluster before starting the Switch configuration flow
- Configure management IP addresses for both switches (statically or through DHCP)
- NEO server should be able to access the management network



**NOTE:** SN2700 spine switches are not displayed in this diagram (please see general diagrams) since the focus of the guide is on MLAG configuration on SN2010 leaf switches.

## 2.3 Installing Mellanox NEO

[Download](#) the Mellanox NEO and install it.



**NOTE:** There is an option to install NEO via the Nutanix Calm.

**Below is an example installation on a Linux environment:**

1. Copy and unpack the NEO package:

```
# cd /tmp
# scp root@my-server:/tmp/neo.tar.gz .
# tar -zxvf neo.tar.gz
```

2. Install the NEO software:

```
# cd /neo
# ./neo-installer.sh
```

3. Start the NEO service:

```
# /opt/neo/neoservice start
```

4. Open a web browser and type:

<http://<my-server-name-or-ip>/neo>

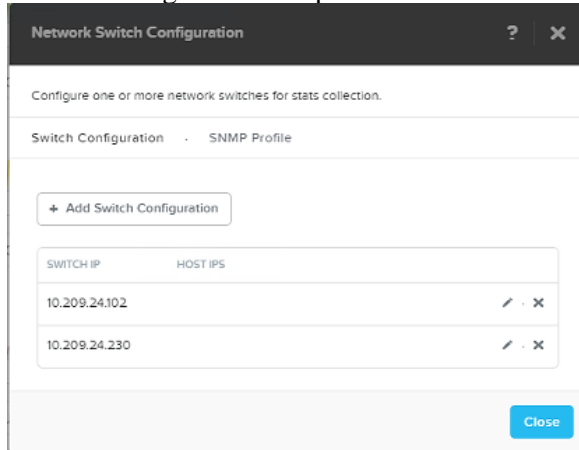
Insert default administrator credentials:

Username: admin  
Password: 123456

## 2.4 NEO Plugin for Nutanix Auto Provisioning

Install the NEO plugin if you would like to use the NEO Auto VLAN provisioning functionality with Nutanix. This plugin enables NEO to track VMs on the Nutanix nodes and to auto create/delete VLANs from the attached switch ports.

1. Add the switches to the Nutanix Prism via the online user interface. Click the wrench icon on the right and then proceed to Network Switch Configuration.



The switch will be discovered and will appear in the switch table as follows:

SWITCH ID	SWITCH NAME	MANAGEMENT ADDRESSES	VENDOR NAME	LOCATION INFO	CONTACT INFO	DESCRIPTION
bfe6c7ff-d8ef-46e2-b107-fed5ee14ef4e	r-nutanix-sw01	10.209.39.15	Unknown	unknown	unknown	Mellanox SX1012.MLNX-OS.SWv3.6.3004

2. Download the NEO Nutanix plugin from [MyMellanox](#).
3. Install the plugin inside the NEO server:

```
#rpm -i nutanix-neo-1-1.4.3.x86_64.rpm
#vi /opt/nutanix-neo/config/nutanix-neo-plugin.cfg
```

4. Follow the instructions in the configuration file (.cfg). Insert the IP address and credentials for NEO, Prism, and the local server.
5. Start Nutanix-NEO service

```
#service nutanix-neo start
```



## 2.5 MLAG Switch Configuration

Once the Nutanix plugin is initiated, all Nutanix nodes and Mellanox switches will be automatically added to NEO (**Managed Elements** → **Devices**).



**NOTE:** If the plugin is not been used, the switches should be manually added. It is still possible to gain visibility without auto provisioning by manually Adding the Nutanix nodes, see [section 3.5](#).

To manually add switches:

The screenshot shows the Mellanox NEO interface. The left sidebar contains a navigation menu with the following items: Dashboard, Managed Elements (1), Devices (2), Inventory, Ports, Cables, Groups, Sites, Virtual Machines, Virtual Switches, Network Map, Services, and Configuration Management. The 'Managed Elements' and 'Devices' items are highlighted in green. A yellow box with the number '3' highlights the '+ Add' button in the top right of the 'Devices' section. The main content area displays a table of devices with the following data:

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	✓	✓	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06	MSN2010	✓	✓	98:03:9B:F2:70:00
10.209.39.23	CL1-AHV-NTNX-1	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:3E

Below the table, it says 'Showing 1 to 3 of 3 devices' and there are navigation arrows.

If your Nutanix nodes have 10GbE interfaces, first set your switchports to 10GbE (Default is 25GbE).

Select both switches and right click, then select “Provisioning”:

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	🟢	🟢	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06		🟢	🟢	98:03:9B:F2:70:00
10.209.39.23	CL1-AHV-NTNX-		🟢	🟢	00:E0:ED:93:A4:3E
10.209.39.24	CL1-AHV-NTNX-		🟢	🟢	00:E0:ED:93:8F:47
10.209.39.25	nutanix-dev11.mtr.labs.m		🟢	🟢	00:E0:ED:93:A4:6C

Out of the available “Templates”, select the port-speed template and run it:

**1** Templates

**2** Global Variables

- Interface: 1/1-1/3
- Speed: 10000

**3**

IP	Name	Profile
10.209.39.20	r-nutanix-sw05	Ethernet
10.209.39.21	r-nutanix-sw06	Ethernet

**4**

- Update Device Information
- Take Running Config Snapshot
- Configuration Write: Add "configuration write" to make provisioning persistent

**5**

Start Create Task

Start the NEO MLAG bring-up wizard:

Both switches should be selected. The Wizard will validate that a connection between the two ports exists for the MLAG IPL:

Bring Up Wizard

Device Discovery | MLAG | Network Configuration | Monitoring | Summary

Devices | Device Access

- Please add the devices that are part of the network (switches and hosts).
- If they do not appear in the table, please add them manually or by LLDP based discovery.
- Once all the devices are populated, please select the two top of rack switches that will be used for MLAG.

+ Add Device

IP	System Type	Discovery
No Selected Devices		

IP	System Type	Discovery
10.209.39.21	Mellanox Switch	✓
10.209.39.20	Mellanox Switch	✓

Previous Next

## 2.5.1 MLAG Configuration

If the Nutanix plugin is not being used, you will need to manually add VLANs (1) and manually add MLAG port-channel towards the servers (2).



### NOTE:

If active-backup bond is been used on the Nutanix nodes, go to (2) and delete all of the mlag-port-channels, these should be used only in case LACP is been used on the Nutanix bond side.

Bring Up Wizard

Device Discovery | **MLAG** | Network Configuration | Monitoring | Summary

10.209.39.21 IPL Ports 21,22

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22										

10.209.39.20 IPL Ports 21,22

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22										

1 Networks Default 2 MLAG Port Channels 3

Advanced >

Previous Next

1 Networks Default

+ Add Filter ...

Name	Vlan ID
Default	1

< > 1 to 1 of 1

2

Default MLAG Port Channels 3,4,5

+ Add Filter ...

MLAG Port Channel	Switch1 Members	Switch2 Members	Switch Port Mode	Native VLAN	Allowed VLANs
3	1/1	1/1	Hybrid	Default	<a href="#">/</a> <a href="#">/</a>
4	1/3	1/3	Hybrid	Default	<a href="#">/</a> <a href="#">/</a>
5	1/2	1/2	Hybrid	Default	<a href="#">/</a> <a href="#">/</a>

< > 1 to 3 of 3

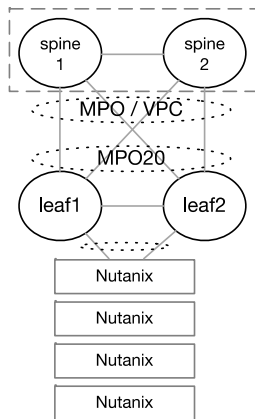
## 2.5.2 Switch Uplinks

L2 ports are used as MLAG switch uplinks towards the Spine switches. These ports need to be aggregated into a single MLAG port (Mpo).

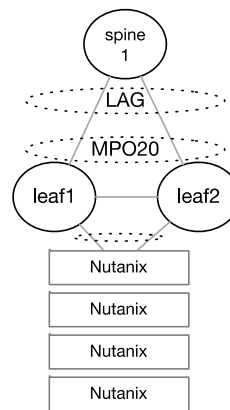
Each MLAG switch has two uplinks towards the Spine switches, port numbers 1/19 and 1/20.

Example of Core/Spine switch connection:

### Uplinks towards MLAG / VPC



### Uplinks towards single switch



### 2.5.2.1 Configure the Uplinks

1. Click on the edit of the MLAG Port channels
2. Select the uplinks ports
3. Set uplink port mode to Trunk
4. All VLANs should be allowed on the port

#### Add MLAG Port Channel

**10.209.39.21 Members**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22										

**10.209.39.20 Members**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22										

**MLAG Port Channel**

20

**Switch Port Mode**

Trunk

**Allowed VLANs**

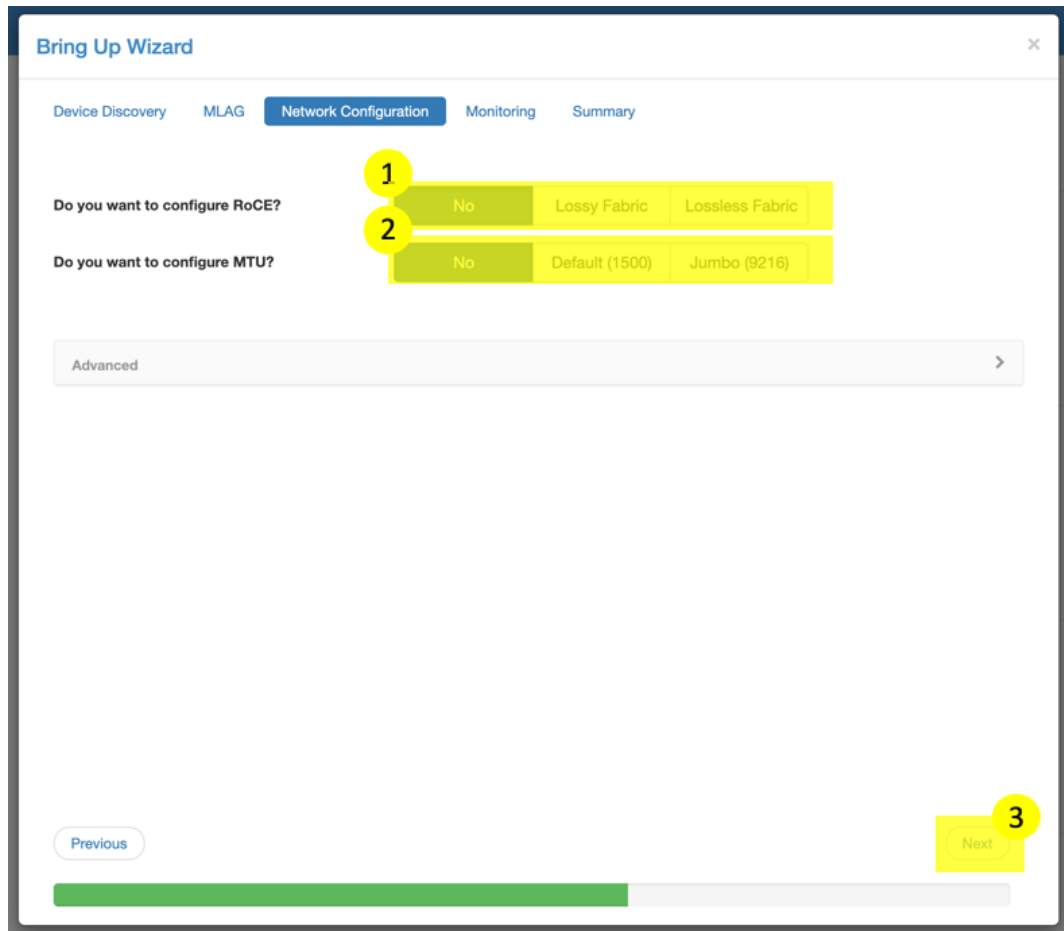
All VLANs

Close Submit

### 2.5.2.2 General network configuration:

In case RoCE is been used select the required mode and NEO will automatically configure the switches.

Set the required MTU:



Monitoring capabilities will be automatically deployed on both switches as part of the wizard, each switch will stream telemetry data such as Buffers utilization, Counters, WJH and control state towards the NEO service:

**Bring Up Wizard**

Device Discovery | MLAG | Network Configuration | **Monitoring** | Summary

Please select the telemetry sessions that will be used to collect data and monitor your switch performance:

Telemetry Session	
<input checked="" type="checkbox"/>	NEO Counters
<input checked="" type="checkbox"/>	NEO Buffer Events
<input checked="" type="checkbox"/>	What Just Happened
<input type="checkbox"/>	NEO Counter Events (RoCE)

Please select the telemetry snapshots that you want to use to monitor your network configuration:

	Name	Command Line	Interval	
<input checked="" type="checkbox"/>	VLAN	show vlan	5	Minutes
<input checked="" type="checkbox"/>	Switch Port	show interfaces switchport	5	Minutes
<input checked="" type="checkbox"/>	MAC	show mac-address-table	5	Minutes
<input checked="" type="checkbox"/>	MLAG	show mlag	5	Minutes
<input checked="" type="checkbox"/>	MLAG interfaces	show interfaces mlag-port-channel summary	5	Minutes
<input checked="" type="checkbox"/>	MLAG VIP	show mlag-vip	5	Minutes

[+ Add Task](#)

[Previous](#) [Next](#)

Review the summary and Apply the configuration:

**Bring Up Wizard**

Device Discovery | MLAG | Network Configuration | Monitoring | **Summary**

The following settings summarize all previous steps:

**MLAG**

10.209.39.21		10.209.39.20		Advanced			
IPL IP	IPL Port Range	IPL IP	IPL Port Range	Virtual IP	Virtual System MAC	Port Channel	VLAN
10.10.10.1	1/21,1/22	10.10.10.2	1/21,1/22	192.168.1.1 / 24	00:00:5E:00:01:00	2	4093

**Networks**

Name	Vlan ID
Default	1
Network100	2

**MLAG Ports Channels**

MLAG Port Channel	Switch1 Members	Switch2 Members	Switch Port Mode	Network	Allowed VLANs
3	1/1	1/1	Hybrid	Default	
4	1/3	1/3	Hybrid	Default	
5	1/2	1/2	Hybrid	Default	

**Telemetry Sessions**

Session Name
NEO Counters
NEO Buffer Events
NEO WJH

[Previous](#) [Apply Configurations](#)

Once done you will be able to see the configuration on each of the switches:

### Devices

[+ Add](#)

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	✓	✓	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06	MSN2010	✓	✓	98:03:9B:F2:70:00
10.209.39.23	CL1-AHV-NTNX-1	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:3E
10.209.39.24	CL1-AHV-NTNX-2	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:8F:47
10.209.39.25	nutanix-dev11.mtr.labs.mlx	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:6C

Showing 1 to 5 of 5 devices

Device Information (10.209.39.21) X86\_64 3.7.1134 2019-01-24 13:38:57 x86\_64

General Ports Inventory Events Jobs Device Access Groups  
 Links Config Telemetry Snapshots VLAN **Link Aggregation**  
 Cables Docker Containers Sessions

#### LAG

10 Filter... Copy

Port Channel	Members	Admin State	Operational State	Switchport Mode	MTU	Acc VL
Po1	Eth1/21, Eth1/22	Enabled	UP	Trunk	9216	N/A

Showing 1 to 1 of 1 entries

#### MLAG

10 Filter... Copy

MLAG Port	Local				MLAG	
	Members	MTU	Operational State	Admin State	Members	MTU
Mpo3	Eth1/3	1500	UP	Enabled	No Members	N/A
Mpo4	Eth1/2	1500	UP	Enabled	No Members	N/A
Mpo2	Eth1/1	1500	UP	Enabled	No Members	N/A

Showing 1 to 3 of 3 entries

VLANs will be automatically configured/deleted when using the Nutanix plugin based on the VMs which are created/deleted via PRISM.

### Devices

[+ Add](#)

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	✓	✓	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06	MSN2010	✓	✓	98:03:9B:F2:70:00
10.209.39.23	CL1-AHV-NTNX-1	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:3E
10.209.39.24	CL1-AHV-NTNX-2	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:8F:47
10.209.39.25	nutanix-dev11.mtr.labs.mlx	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:6C

Showing 1 to 5 of 5 devices

Device Information (10.209.39.21) X86\_64 3.7.1134 2019-01-24 13:38:57 x86\_64

General Ports Inventory Events Jobs Device Access Groups  
 Links Config **Telemetry Snapshots** VLAN Link Aggregation  
 Cables Docker Containers Sessions

Select Task: Bring-up Task: show vlan

View Compare

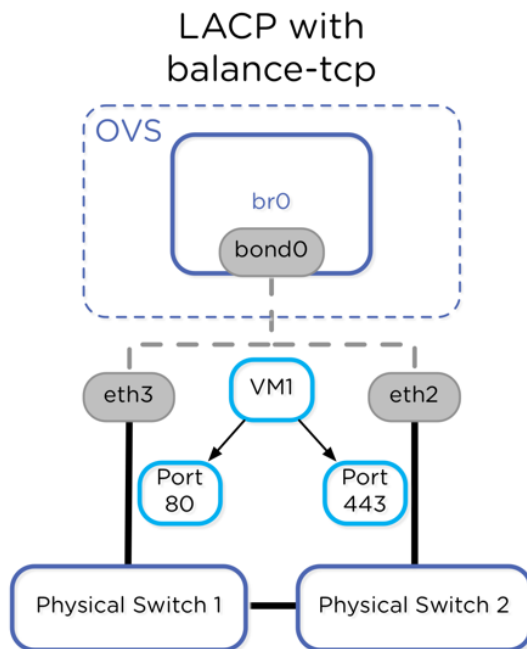
Compare latest snapshot with: snapshot\_2019-04-22\_11-26-10

Latest snapshot  Selected snapshot

```
show vlan
-----
VLAN  Name          Ports
-----
1     default      Eth1/4, Eth1/5, Eth1/6, Eth1/7, Eth1/8, Eth1/9, Eth1/10, Eth1/11, Eth1/12, Eth1/13, Eth1/14, Eth1/15, Eth1/16, Eth1/17, Eth1/18, Eth1/19, Eth1/20, Mpo2, Mpo3, Mpo4
187   Mpo2, Mpo3
4094
```



## 2.6 Nutanix AHV LAG (Bond) Configuration to LACP



To configure LACP on Nutanix AHV execute the following commands:

```
nutanix@CVM$ ssh root@192.168.5.1 "ovs-vsctl set port bond0 lacp=active"
nutanix@CVM$ ssh root@192.168.5.1 "ovs-vsctl set port bond0
bond_mode=balance-tcp"
nutanix@CVM$ ssh root@192.168.5.1 "ovs-vsctl set port bond0
other_config:lacp-fallback-ab=true"
```



**NOTE:** In case that not an LACP bond used, there is no need to configure any MLAG Ports (MPo) on the switches as the bond will use Active-Backup mode.

## 2.7 Nutanix Nodes Visibility-Only Mode

Enable Prism visibility mode:

The screenshot shows the Mellanox NEO interface. On the left sidebar, the 'Settings' menu item is highlighted with a yellow circle labeled '1'. The main content area is titled 'Settings' and has several tabs: Discovery, System, Logs, Users, Device Access, Email, Events Policy, Image Profiles, Telemetry, and Virtualization. The 'Virtualization' tab is selected and highlighted with a yellow circle labeled '2'. Below the tabs, there is a description: 'This tab includes the relevant attributes and configuration for virtualization related features and integrations with the vmware vCenter and Nutanix Prism virtualization orchestrators'. There are two sub-tabs: 'VCenter Settings' and 'Prism'. The 'Prism' sub-tab is active. Below this, there is a form for configuring a server. The 'Server' field contains '10.209.39.26' and is highlighted with a yellow circle labeled '3'. The 'Port' field contains '9440'. The 'Username' field contains 'admin'. The 'Password' field is masked with dots. A yellow circle labeled '4' highlights the 'Save' button at the bottom right of the form.

Set the Nutanix nodes credentials:

The screenshot shows the Mellanox NEO interface. On the left sidebar, the 'Settings' menu item is highlighted with a yellow circle labeled '1'. The main content area is titled 'Settings' and has several tabs: Discovery, System, Logs, Users, Device Access, Email, Events Policy, Image Profiles, Telemetry, and Virtualization. The 'Device Access' tab is selected and highlighted with a yellow circle labeled '2'. Below the tabs, there is a 'System Type' dropdown menu with 'Nutanix Host' selected, highlighted with a yellow circle labeled '3'. Below this, there is a form for configuring SSH access. The form has two sections: 'Access Credentials' and 'Connection Settings'. In the 'Access Credentials' section, the 'Username' field contains 'root' and is highlighted with a yellow circle labeled '4'. The 'Password' field is masked with dots and is highlighted with a yellow circle labeled '5'. In the 'Connection Settings' section, the 'Timeout (seconds)' field contains '60' and the 'Port' field contains '22'. A yellow circle labeled '5' highlights the 'Update' button at the bottom left of the form, next to a 'Cancel' button.

Add the Nutanix nodes:

The screenshot shows the Mellanox NEO interface. On the left sidebar, the 'Devices' menu item is highlighted with a yellow circle labeled '1'. In the main 'Devices' section, the '+ Add' button is highlighted with a yellow circle labeled '2'. The table below shows two existing devices:

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	✓	✓	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06	MSN2010	✓	✓	98:03:9B:F2:70:00

The 'Add New Devices' dialog box is shown. The 'Device' field contains 'Device IP' and is highlighted with a yellow circle labeled '1'. The '+ Add' button is highlighted with a yellow circle labeled '3'. The 'System Type' dropdown is set to 'Nutanix Host' and is highlighted with a yellow circle labeled '2'. Below the dialog, a table shows the selected entry:

IP	Vendor
10.209.39.23	Nutanix Host

The 'Add Devices' button at the bottom of the dialog is highlighted with a yellow circle labeled '4'.

Done:

The screenshot shows the 'Devices' table with three entries. The newly added device is highlighted in blue:

IP	Name	System Type	Status	Health	MAC Address
10.209.39.20	r-nutanix-sw05	MSN2010	✓	✓	98:03:9B:F2:6F:80
10.209.39.21	r-nutanix-sw06	MSN2010	✓	✓	98:03:9B:F2:70:00
10.209.39.23	CL1-AHV-NTNX-1	Nutanix NX-W00-1NL3-G5	✓	✓	00:E0:ED:93:A4:3E