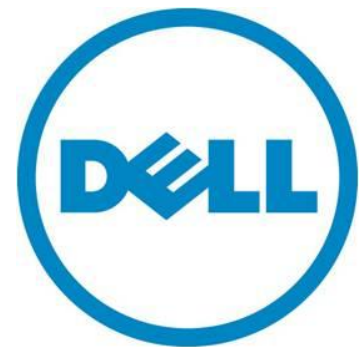


# Deployment of Dell M8024-k Blade Switch in Simple Mode with Cisco Nexus 5k Switch

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**A Dell Interoperability Whitepaper**

Victor Teeter



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# Contents

Contents.....	1
Summary.....	2
Simple Switch Mode.....	2
Testing Scenarios.....	4
Scenario 1: Plug and Play the Dell PowerConnect M8024-k switch.....	4
Configuring the Dell M8024-k Switch.....	5
Configuring the Cisco 5020 Switch.....	5
Scenario 2: Configuring an untagged VLAN on a single LAG.....	6
Configuring the Dell M8024-k Switch.....	6
Configuring the Cisco 5020 Switch.....	7
Validation.....	8
Scenario 3: Configuring multiple VLANs on a single LAG.....	9
Configuring the Dell M8024-k Switch.....	9
Configuring the Cisco 5020 Switch.....	10
Validation.....	11
Scenario 4: Configuring multiple LAGs and dedicating specific Uplinks.....	12
Configuring the Dell M8024-k Switch.....	12
Command-Line Interface.....	12
Configuring the Cisco 5020 Switch.....	16
Scenario 5: Configuring multiple VLANs on multiple LAGs.....	17
Configuring the Dell M8024-k Switch.....	17
Configuring the Cisco Nexus 5020 Switch.....	23
Scenario 6: Configuring a backup LAG for failover.....	25
Configuring the Dell M8024-k Switch.....	25
Configuring the Cisco Nexus 5020 Switch.....	26
Appendix - Network switch Versions.....	28
About Dell.....	28

## Summary

Adding a Dell™ PowerConnect™ blade (M-Series) switch, with a Dell PowerEdge™ M1000e modular blade enclosure, to an external Cisco Nexus Switch is a straightforward process. The addition of Simple Switch Mode on the Dell PowerConnect™ Blade switch further simplifies the process, allowing integration into existing network with minimal effort. This document is part of the Simple Connect campaign that includes both Simple Connect for SAN and Simple Connect for LANs – both targeted at today's FC SAN and Ethernet LAN environments and meant to serve as a supplement guide on how to interconnect equipment that makes up datacenter.

This document provides an easy to use step-by-step guide on how to configure and deploy [DELL M-Series 10Gbit/s Blade Switch \(M8024-k\)](#) (see Figure 1) with a Cisco Nexus 5020 Switch

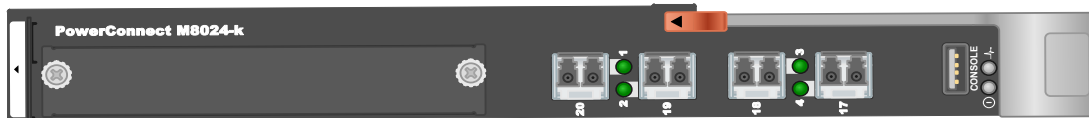


Figure 1. The Dell PowerConnect M8024-k switch

## Simple Switch Mode

[Simple Switch Mode](#), or SSM, allows server administrators, or anyone with very limited expertise in configuring Ethernet Switches, the ability to deploy a loop-free switching solution without having to configure the Spanning Tree Protocol (STP) or design its integration into the existing environment. The primary advantages of deploying SSM are as follows:

- Port Aggregation is easy to configure. Simply group internal ports and associate with external ports, assign VLANs (if required), and it's ready to go.
- SSM automatically configures multiple external ports into a Link Aggregation Control Protocol (LACP) trunk group.
- By using Aggregator Groups, the Simple Switch Mode provides loop-free operation without using STP.
- Port Aggregation is completely interoperable. Dynamic (via LACP) and static link aggregation is supported on the external ports.

To enable Simple Switch Mode on a Dell PowerConnect M8024-k switch, perform the following steps via Command Line or Web Interface:

### Command-Line Interface:

To enable simple mode on a M8024-k switch, follow the below:

```
console> enable
console# config
config# mode simple
console(config)# exit
console# copy running-config startup-config
console# exit
```

Later versions of the firmware do not require a reload of the switch, however some earlier versions do. Reload the switch if requested. Please run the **“show run”** command to verify you are in Simple Mode. Look for the following message within the first 5 lines of the running configuration:

```
.....
!System Operational Mode "Simple"
.....
```

### Web Interface:

Follow the steps below:

- Log into the switch.
- Select System → Operational Mode → Configuration.

In the Configuration screen, select **Enable** in the **Simple Mode** drop-down menu, and left-click **Apply** (see Figure 2).

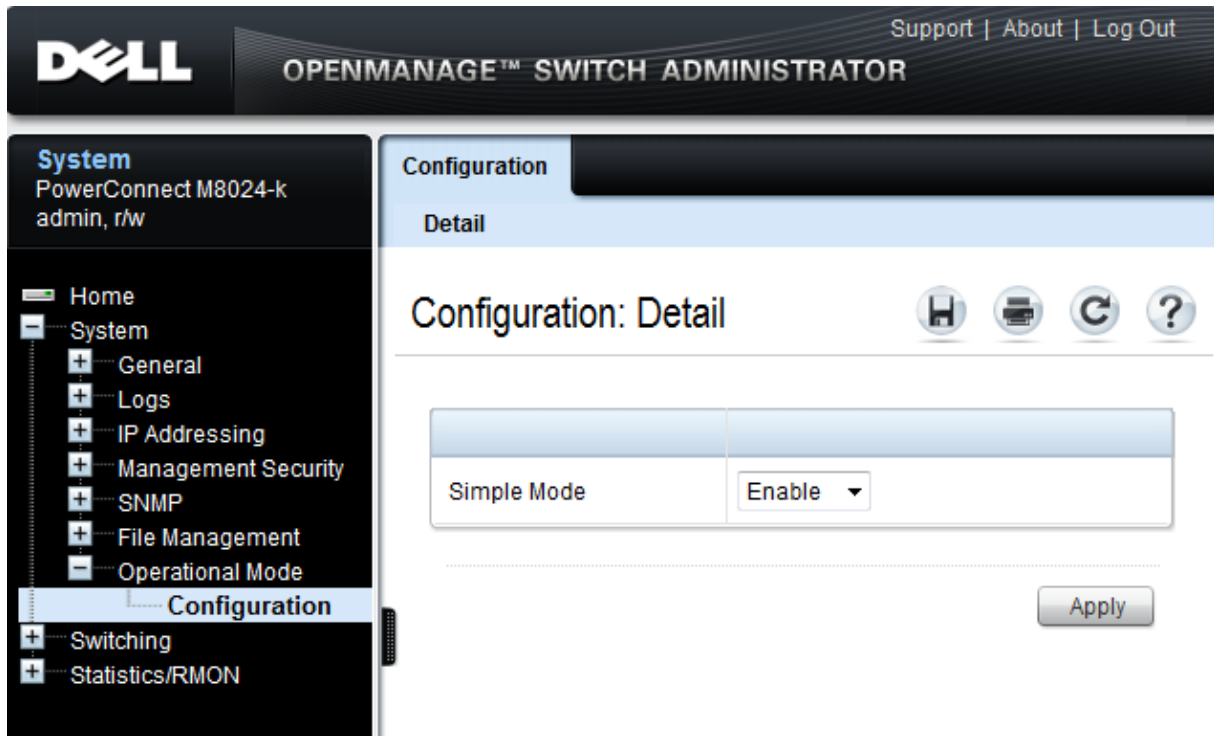


Figure 2. Simple Mode configuration on the Dell PowerConnect M8024-k switch.

## Testing Scenarios

The following sections will present an overview of a variety of different network deployment scenarios and will provide step-by-step set up guidance using configuration tools with screen shots as a visual guide. The intent of the paper is to show how some of the features of Simple Switch firmware can be used to easily and quickly configure both equipment to work with each other without requiring extensive knowledge of network.

- ✍ Each of the following scenarios in this document assume you are starting with a default Simple Mode configuration and (by default) ports Te1/0/1 through Te1/0/20 are currently members of Port Aggregator Group 1.
- ✍ All scenarios assume the M8024-k is using external ports 17-20 and that no module is installed providing additional external 10G ports.

### Scenario 1: Plug and Play the Dell PowerConnect M8024-k switch

This scenario shows a basic network setup between the PowerConnect M8024-k switch and the Cisco Nexus 5020. Figure 3 shows this connectivity.

By default, all internal ports and the first 4 external ports of a PowerConnect M8024-k are in port-aggregator group 1. This configuration can be easily changed by the user at any time. All internal and external ports within the same port aggregator group can communicate with each other. When one or more cables are plugged into external ports of the same port-aggregator group and in the same LAG role (primary or secondary) they are automatically joined in a LAG (link aggregation group). Secondary LAG roles are for backup LAGs in case of LAG failure.

- ✍ All ports in a port-aggregator group only go to a single destination, which eliminates the need for STP.
- ✍ Upstream switches using STP should have port-fast enabled on any links connected to an external port of an M8024-k while in Simple Mode. Internal ports of an M8024-k are not active unless there is at least one active external connection.

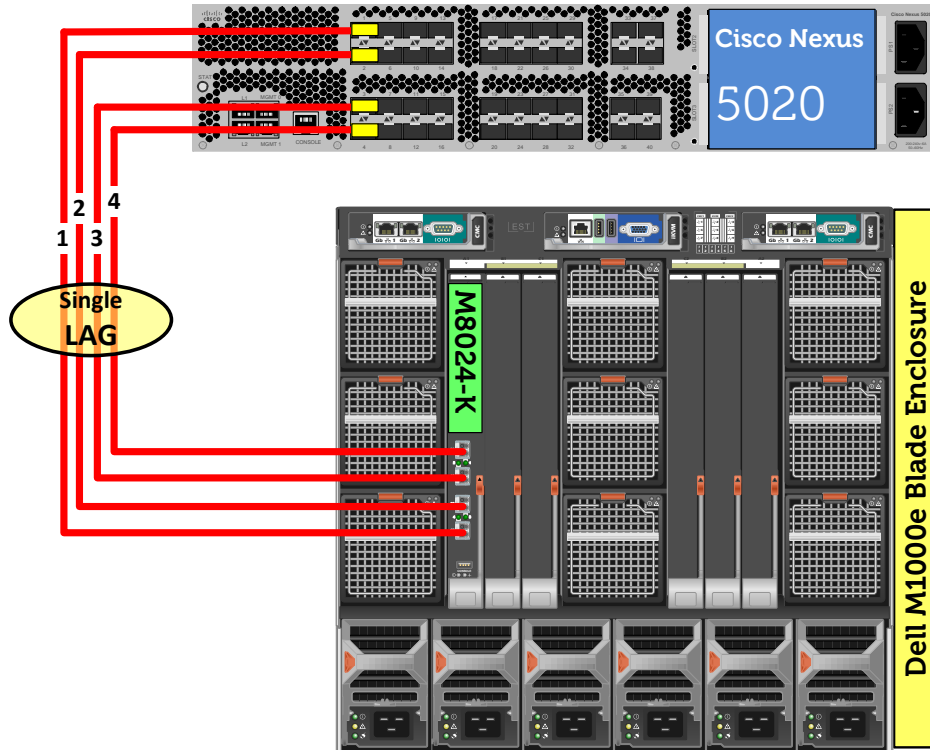


Figure 3. Graphic representation of Scenario 1

### Configuring the Dell M8024-k Switch

The only necessary configuration on the M8024-k switch side is to put the switch at Simple Switch mode. This procedure was explained at the previous sections.

### Configuring the Cisco 5020 Switch

Configure Link Aggregation Control Protocol (LACP) on Cisco switch ports. In this example, the first 4 ports of Cisco Nexus which are connected to M8024-k switch need to be configured as one single aggregation group. To do so, login to Cisco Nexus 5020 and follow the below changes:

```
Nexus5020#config
Nexus5020(config)#feature lacp
Nexus5020(config)#interface ethernet 1/1-4
Nexus5020(config-if-range)#channel-group 1 mode active
Nexus5020(config-if-range)#exit
Nexus5020(config)#exit
```

## Scenario 2: Configuring an untagged VLAN on a single LAG

This scenario shows an overview of configuring VLANs on the internal ports of the Dell PowerConnect M8024-k switch. Figure 4 shows this connectivity.

VLANs allow for greater granularity and quality of service (QoS) control over simple sub-netting, and Dell switches with Simple Switch Mode enabled offer a quick and easy VLAN configuration. In this example we will configure VLANs across the internal ports of the M8024-k and then extend these VLANs into the external network by configuring the Cisco Nexus switch.

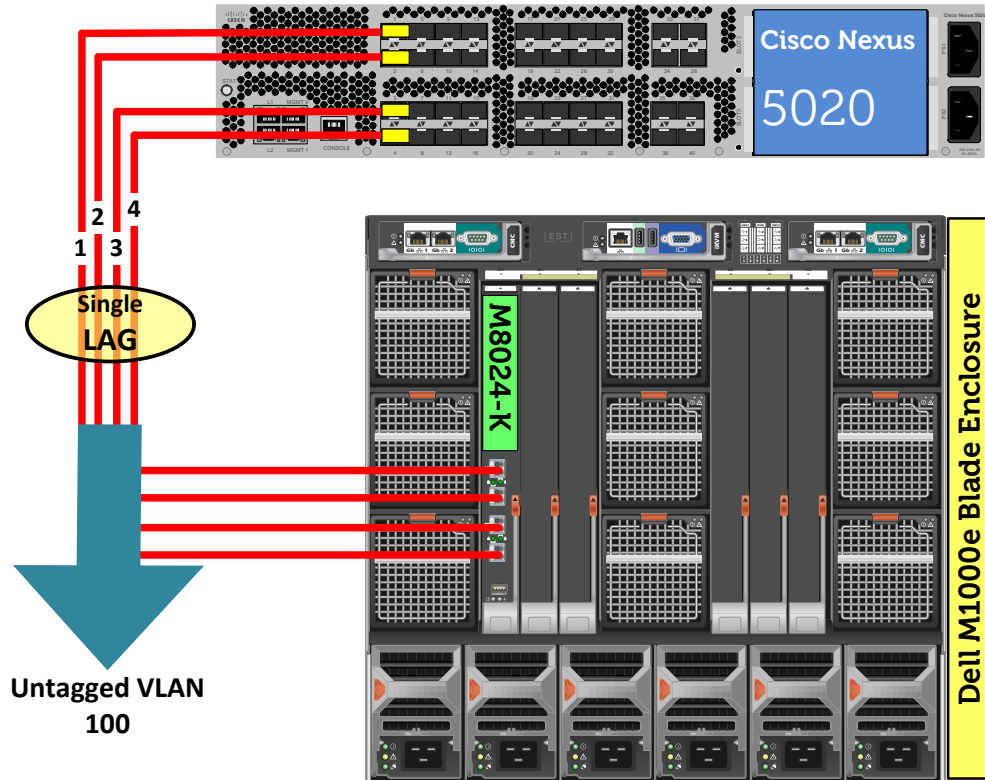


Figure 4. Graphic representation of Scenario 2.

### Configuring the Dell M8024-k Switch

#### Command-Line Interface:

Command-line interface for configuring the Dell M8024-k switch is as follow:

```
console(config)#port-aggregator group 1
console(config-portAggr-group-1)#interface tengigabitethernet 1/0/1
console(config-portAggr-if-Te1/0/1)#switchport general allowed vlan add 100 untagged
Warning! This operation changes default vlan of some interface(s).
console(config-portAggr-if-Te1/0/1)#exit
```



```
console(config-portAggr-group-1)#exit
console(config)#exit
```

### Web Interface:

Follow the steps below:

- Select Switching>Port Aggregator>Internal Port VLAN.
- Select any port from the Internal-Port menu. For this example we chose port Te1/0/1.
- Enter a VLAN number, i.e. 100, in the Untagged-VLAN field (Figure 5).

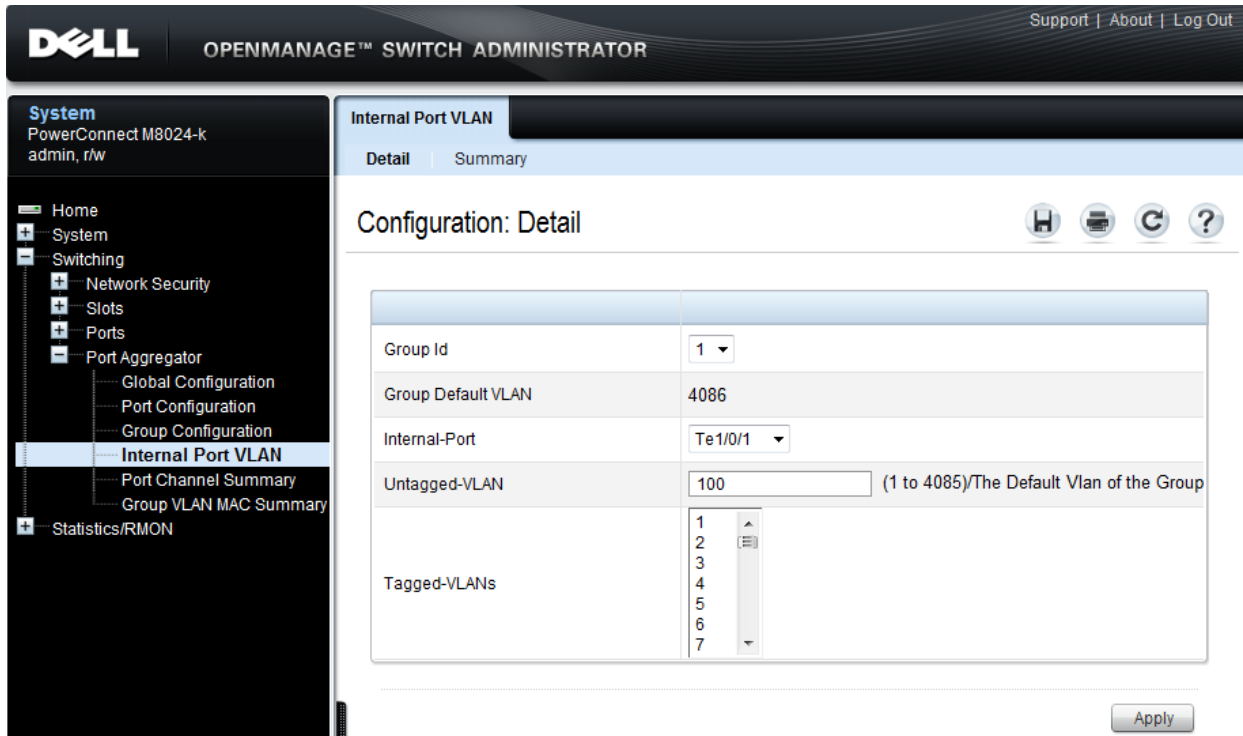


Figure 5. Web Interface for the Dell M8024-k Switch for Scenario 2.

- Click Apply.

### Configuring the Cisco 5020 Switch

Login to the Nexus 5020 and make the following changes:

```
Nexus5020# configure
Enter configuration commands, one per line. End with CNTL/Z.
Nexus5020(config)# feature lACP
Nexus5020(config)# vlan 100
Nexus5020(config-vlan)# exit
Nexus5020(config)# interface ethernet 1/1-4
```

```
Nexus5020(config-if-range)# channel-group 1 mode active
Nexus5020(config-if-range)# exit
Nexus5020(config)# interface port-channel 1
Nexus5020(config-if)# switchport mode trunk
Nexus5020(config-if)# switchport trunk allowed vlan 100
Nexus5020(config-if)# end
```

## Validation

To validate this scenario simply assign an arbitrary IP address to VLAN interface on the Cisco switch and try to ping that IP address from the server.

As an example, to assign an IP address to VLAN interface on Cisco Nexus use the following commands:

```
Nexus5020(config)# feature interface-vlan
Nexus5020(config)# interface vlan 100
Nexus5020(config-vlan)# ip address 10.1.1.100/16
Nexus5020(config-vlan)# no shutdown
Nexus5020(config-vlan)# exit
```

### Scenario 3: Configuring multiple VLANs on a single LAG

This section provides an overview of configuring multiple VLANs per internal port to connect to a server NIC with Tagging enabled, which is useful for management of VMs. Figure 6 shows the connectivity for this scenario.

- Adding a tagged or untagged VLAN to an internal port will add the same VLAN (tagged only) to all external ports that are members of the same port aggregator group as the internal port. The same VLAN cannot be in multiple aggregator groups on the M8024k.

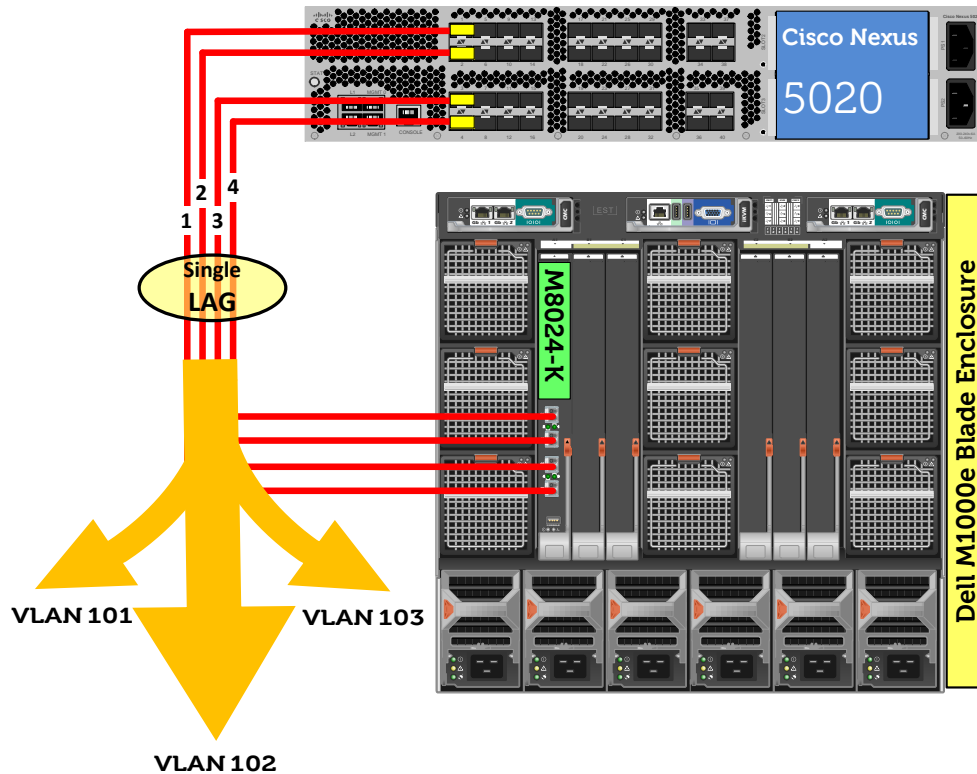


Figure 6. Graphic Representation of Scenario 3.

#### Configuring the Dell M8024-k Switch

##### Command-Line Interface:

Command-line interface for configuring the Dell M8024-k switch is as follow:

```
console(config)#port-aggregator group 1
console(config-portAggr-group-1)#lacp auto
console(config-portAggr-group-1)#interface tengigabitethernet 1/0/1
console(config-portAggr-if-Te1/0/1)#switchport general allowed vlan add 101-103
console(config-portAggr-if-Te1/0/1)#exit
```

```
console(config-portAggr-group-1)#exit
console(config)#port-aggregator lag-failover
Warning! Please ensure that lacp mode is 'auto' for all groups.
console(config)#exit
```

### Web Interface:

Follow the steps below:

- Select Switching > Port Aggregator > Internal Port VLAN.
- Select a port from the Internal-Port drop-down menu, i.e. Te1/0/1.
- From the Tagged-VLANs list select one or more VLANs, i.e. 101-103 (Figure 7).

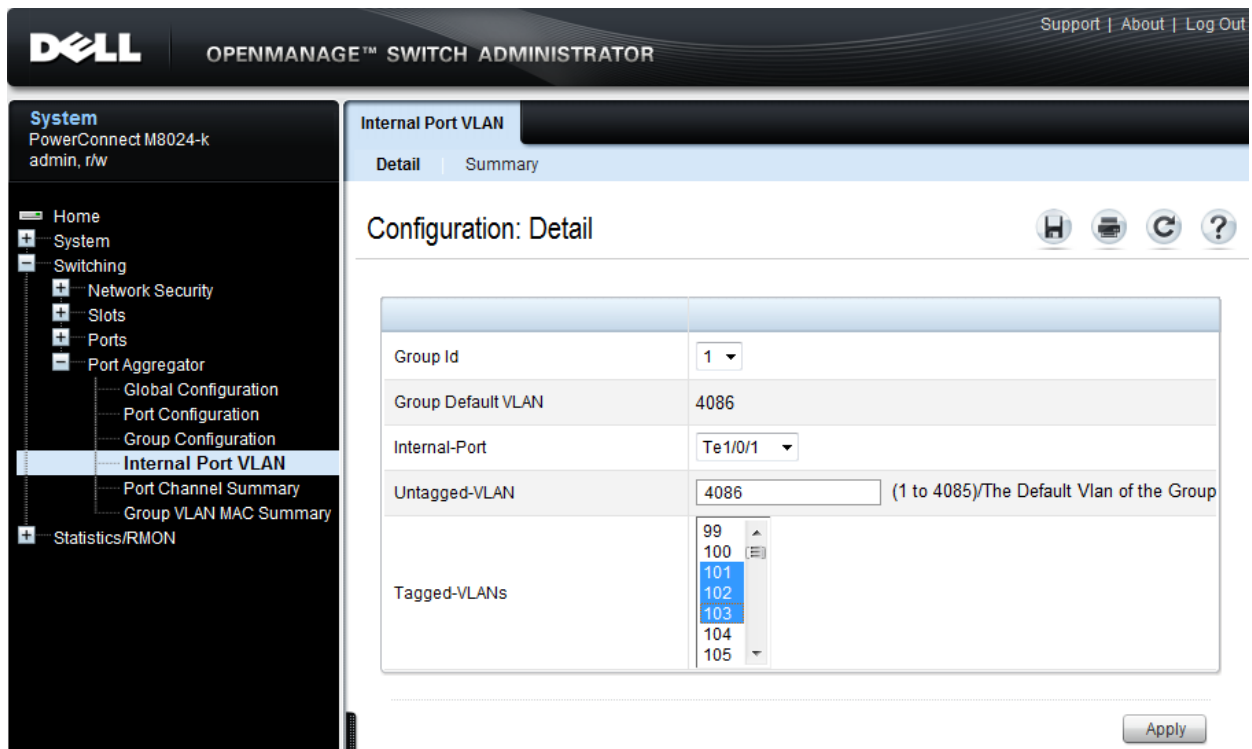


Figure 7. Web Interface for Dell M8024-k Switch for Scenario 3.

- Click Apply.

### Configuring the Cisco 5020 Switch

Login to the Cisco Nexus 5020 and make the following changes:

```
Nexus5020# configure
Enter configuration commands, one per line. End with CNTL/Z.
Nexus5020(config)# feature lacp
```

```
Nexus5020(config)# vlan 101-103
Nexus5020(config-vlan)# exit
Nexus5020(config)# interface ethernet 1/1-4
Nexus5020(config-if-range)# channel-group 1 mode active
Nexus5020(config-if-range)# exit
Nexus5020(config)# interface port-channel 1
Nexus5020(config-if)# switchport mode trunk
Nexus5020(config-if)# switchport trunk allowed vlan 101-103
Nexus5020(config-if)# end
```

## Validation

To validate scenario 3, assign three different IP addresses to each VLAN interfaces on the Cisco switch and try to ping that IP address from the server.


As an Example, to assign different IP addresses to VLAN interface on Cisco Nexus use the following commands:

```
Nexus5020(config)# feature interface-vlan
Nexus5020(config)# interface vlan 100
Nexus5020(config-vlan)# shutdown
Nexus5020(config-vlan)# exit

Nexus5020(config)# interface vlan 101
Nexus5020(config-vlan)# ip address 10.1.2.100/16
Nexus5020(config-vlan)# no shutdown
Nexus5020(config-vlan)# exit

Nexus5020(config)# interface vlan 102
Nexus5020(config-vlan)# ip address 10.1.3.100/16
Nexus5020(config-vlan)# no shutdown
Nexus5020(config-vlan)# exit

Nexus5020(config)# interface vlan 103
Nexus5020(config-vlan)# ip address 10.1.4.100/16
Nexus5020(config-vlan)# no shutdown
Nexus5020(config-vlan)# exit
```

-  In order to ping from server, make sure to use a correct subnet address and configure the network on your server correctly.

## Scenario 4: Configuring multiple LAGs and dedicating specific Uplinks

This section will provide an overview of configuring multiple Port Aggregation Groups (LAGs) to group specific attached blade servers and dedicating specific Uplinks to carry that traffic to the Cisco Nexus switch network. For this scenario, blade servers in M1000e ports 1 through 8 get configured in Port Aggregator Group 1, while blade servers in ports 9 through 16 get configured in Port Aggregator Group 2.

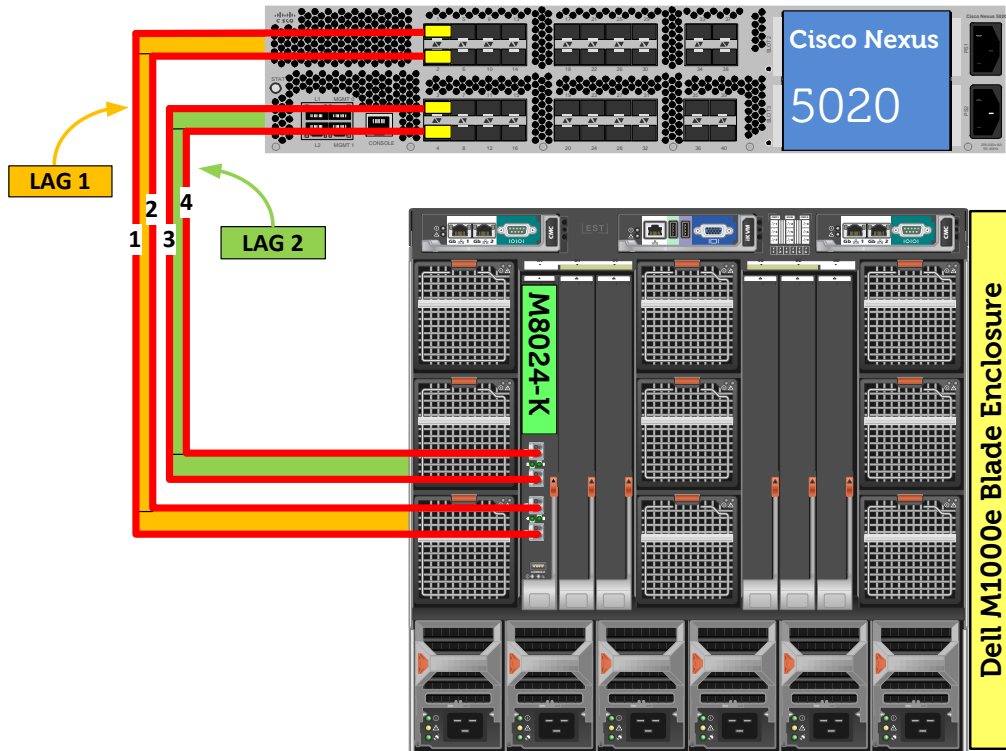


Figure 8. Graphic representation of Scenario 4.

### Configuring the Dell M8024-k Switch

#### Command-Line Interface:

Command-line interface for configuring the Dell M8024-k switch is as follow:

```
console#config
console(config)#port-aggregator group 1
```

```

console(config-portAggr-group-1)#no add interface tengigabitethernet 1/0/9-16
console(config-portAggr-group-1)#no add interface tengigabitethernet 1/0/19-20
console(config-portAggr-group-1)#exit
console(config)#port-aggregator group 2
console(config-portAggr-group-2)#add interface tengigabitethernet 1/0/9-16
console(config-portAggr-group-2)#add interface tengigabitethernet 1/0/19-20
console(config-portAggr-group-2)#exit
console(config)#exit
    
```

**Web Interface:**

Follow the steps below:

- Select Switching > Port Aggregator > Port Configuration.
- Add **Group 2** ports:
  - Change the group ID of *half* of the internal ports, i.e Te1/0/9-16 to group 2, while leaving the first half of the ports in group 1 (Figure 9).

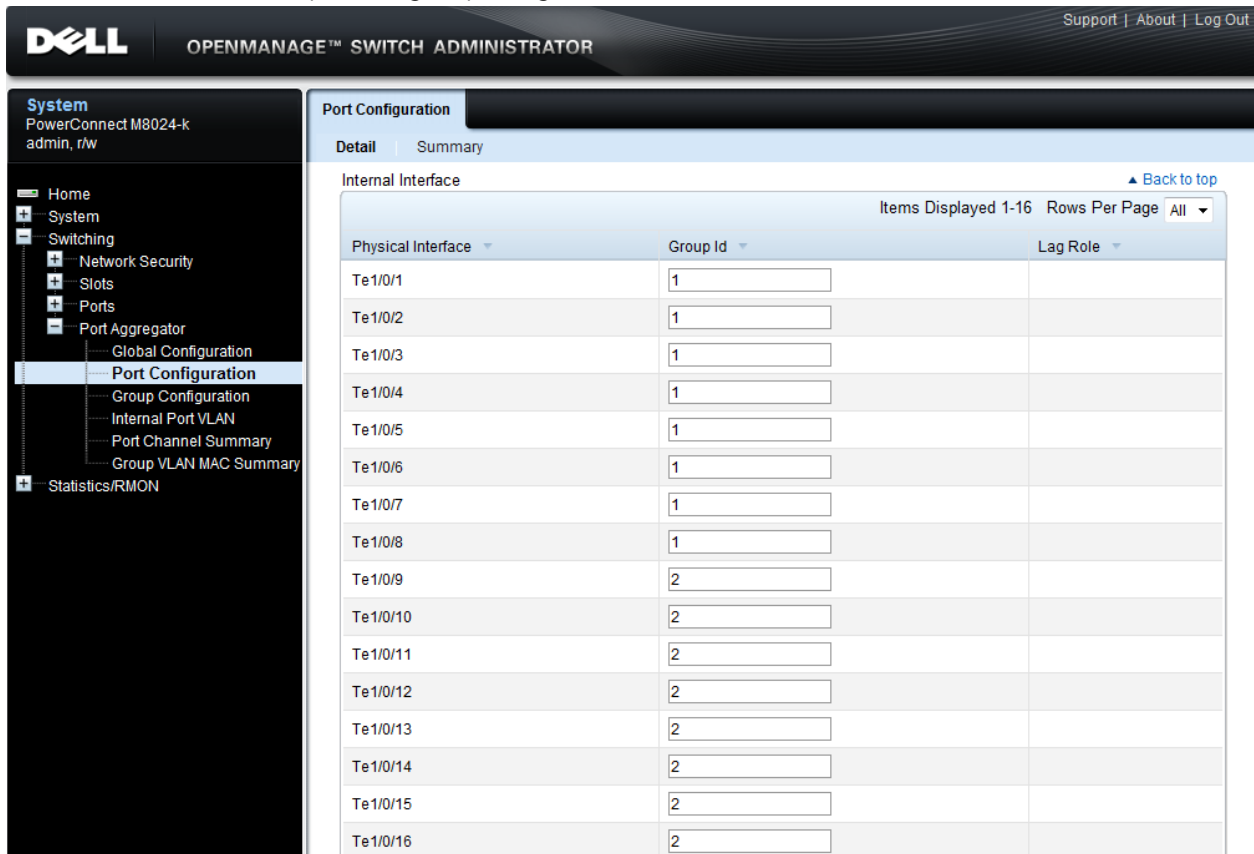


Figure 9. Web Interface for the Dell M8024-k Switch for Scenario 4.

- Change the group ID of the *external* ports you want to use, i.e. Te1/0/19-20 to group 2 (Figure 10).

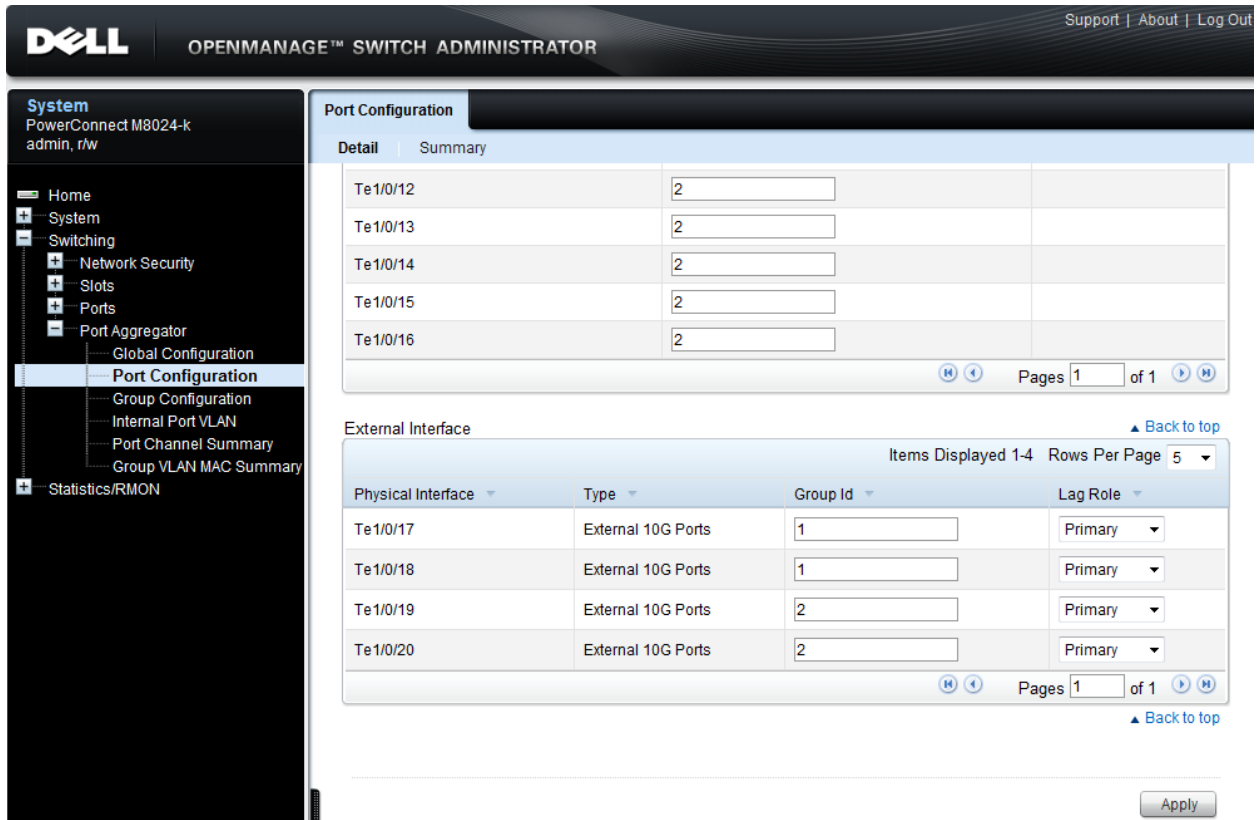


Figure 10. Web Interface for the Dell M8024-k Switch for Scenario 4.

- Verify **Group 1** ports:
  - Verify the group ID for the *first half* of the *internal* ports, i.e. Te1/0/1-8, remain in group 1 (the default for internal ports) (Figure 11).



The screenshot shows the Dell OpenManage Switch Administrator web interface. The top navigation bar includes the Dell logo, 'OPENMANAGE™ SWITCH ADMINISTRATOR', and links for 'Support | About | Log Out'. The left sidebar shows a navigation tree with 'System' selected, and 'Port Configuration' highlighted under the 'Switching' section. The main content area is titled 'Port Configuration' and has tabs for 'Detail' and 'Summary'. Below this, there is a section for 'Internal Interface' with a 'Back to top' link. A table displays 16 rows of internal interfaces, each with a 'Physical Interface' column, a 'Group Id' column (containing a text input field), and a 'Lag Role' column. The 'Group Id' values are 1 for Te1/0/1 through Te1/0/8, and 2 for Te1/0/9 through Te1/0/16. The table also shows 'Items Displayed 1-16' and 'Rows Per Page All'.

Physical Interface	Group Id	Lag Role
Te1/0/1	1	
Te1/0/2	1	
Te1/0/3	1	
Te1/0/4	1	
Te1/0/5	1	
Te1/0/6	1	
Te1/0/7	1	
Te1/0/8	1	
Te1/0/9	2	
Te1/0/10	2	
Te1/0/11	2	
Te1/0/12	2	
Te1/0/13	2	
Te1/0/14	2	
Te1/0/15	2	
Te1/0/16	2	

Figure 11. Web Interface for the Dell M8024-k Switch for Scenario 4.

- o Verify the group ID for the *first half* of the *external* ports you want to use, i.e. Te1/0/17-18, remain in group 1 (Figure 12).

The screenshot shows the Dell OpenManage Switch Administrator web interface. The top navigation bar includes the Dell logo, 'OPENMANAGE™ SWITCH ADMINISTRATOR', and links for 'Support | About | Log Out'. The left sidebar shows a navigation tree with 'Port Configuration' selected. The main content area is divided into two sections: 'Port Configuration' and 'External Interface'.

**Port Configuration**

Physical Interface	Group Id
Te1/0/12	2
Te1/0/13	2
Te1/0/14	2
Te1/0/15	2
Te1/0/16	2

**External Interface**

Physical Interface	Type	Group Id	Lag Role
Te1/0/17	External 10G Ports	1	Primary
Te1/0/18	External 10G Ports	1	Primary
Te1/0/19	External 10G Ports	2	Primary
Te1/0/20	External 10G Ports	2	Primary

At the bottom right of the interface, there is an 'Apply' button.

Figure 12. Web Interface for Dell M8024-k Switch for Scenario 4.

- Click Apply

## Configuring the Cisco 5020 Switch

Login to the Nexus 5020 and enter the following commands. In this example we are adding ports 1-2 to port-channel 1 and ports 3-4 to port-channel 2.

```
Nexus5020# configure
Enter configuration commands, one per line. End with CNTL/Z.
Nexus5020(config)# feature lACP
Nexus5020(config)# interface ethernet 1/1-2
Nexus5020(config-if-range)# channel-group 1 mode active
Nexus5020(config-if-range)# interface ethernet 1/3-4
Nexus5020(config-if-range)# channel-group 2 mode active
Nexus5020(config-if-range)# end
```

## Scenario 5: Configuring multiple VLANs on multiple LAGs

This scenario will demonstrate an overview of adding VLANs in a multi-AG configuration, which combine the advantages of virtual network administration with physical network separation.

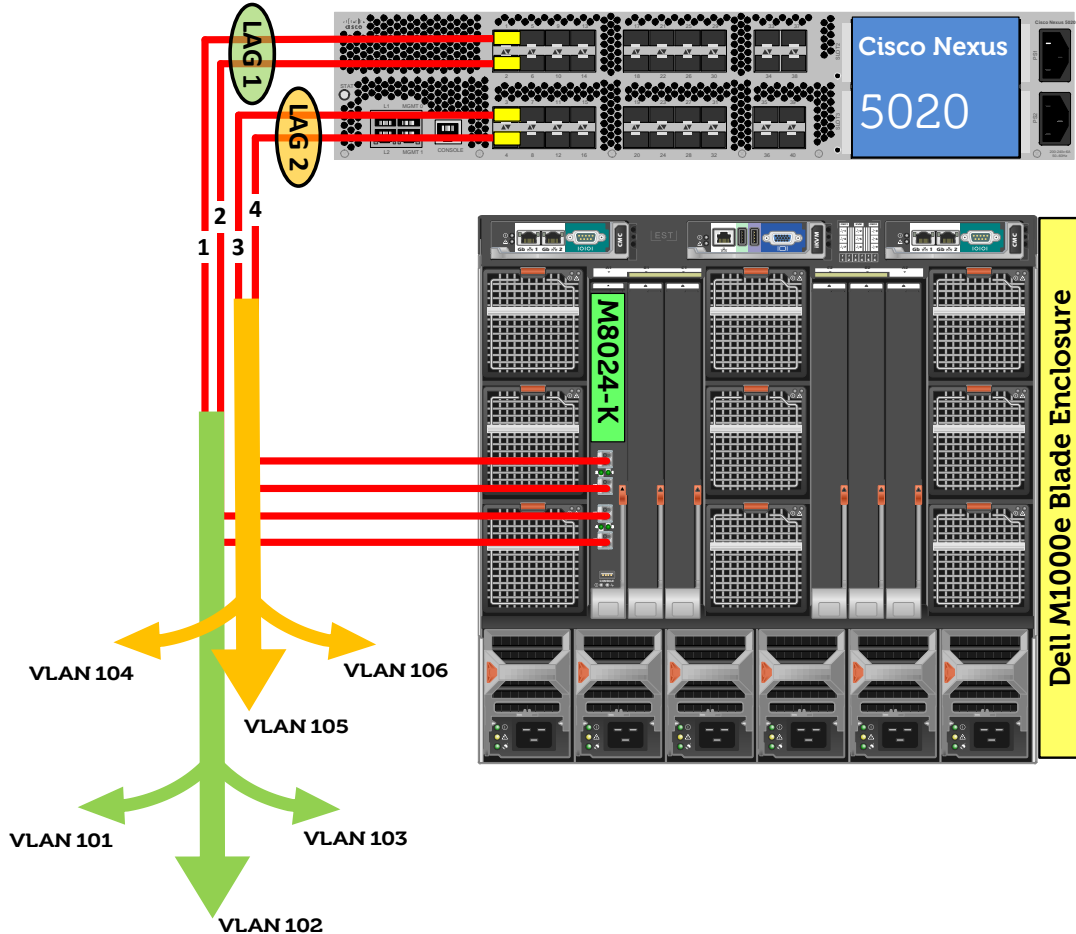


Figure 13. Graphic representation of Scenario 5.

### Configuring the Dell M8024-k Switch

#### Command-Line Interface:

Command-line interface for configuring the Dell M8024-k switch is as follow:

```

console#config
console(config)#port-aggregator group 1
console(config-portAggr-group-1)#no add interface Tengigabitethernet 1/0/9-16
console(config-portAggr-group-1)#no add interface Tengigabitethernet 1/0/19-20
console(config-portAggr-group-1)#interface Tengigabitethernet 1/0/1
console(config-portAggr-if-Te1/0/1)#switchport general allowed vlan add 101-103
console(config-portAggr-if-Te1/0/1)#exit
    
```

```

console(config-portAggr-group-1)#exit
console(config)#port-aggregator group 2
console(config-portAggr-group-2)#add interface Tengigabitethernet 1/0/9-16
console(config-portAggr-group-2)#add interface Tengigabitethernet 1/0/19-20
console(config-portAggr-group-2)#interface Tengigabitethernet 1/0/9
console(config-portAggr-if-Te1/0/9)#switchport general allowed vlan add 104-106
console(config-portAggr-if-Te1/0/9)#exit
console(config-portAggr-group-2)#exit
    
```

**Web Interface:**

Follow the steps below:

- Select Switching > Port Aggregator > Port Configuration.
- Add **Group 2** ports:
  - Change the group ID to group 2 for all *internal* ports connected to servers you want in group 2. In this scenario we will change Te1/0/9-16 to group 2 which allows any server in M1000e slots 9 through 16 to be in group 2 (Figure 14).

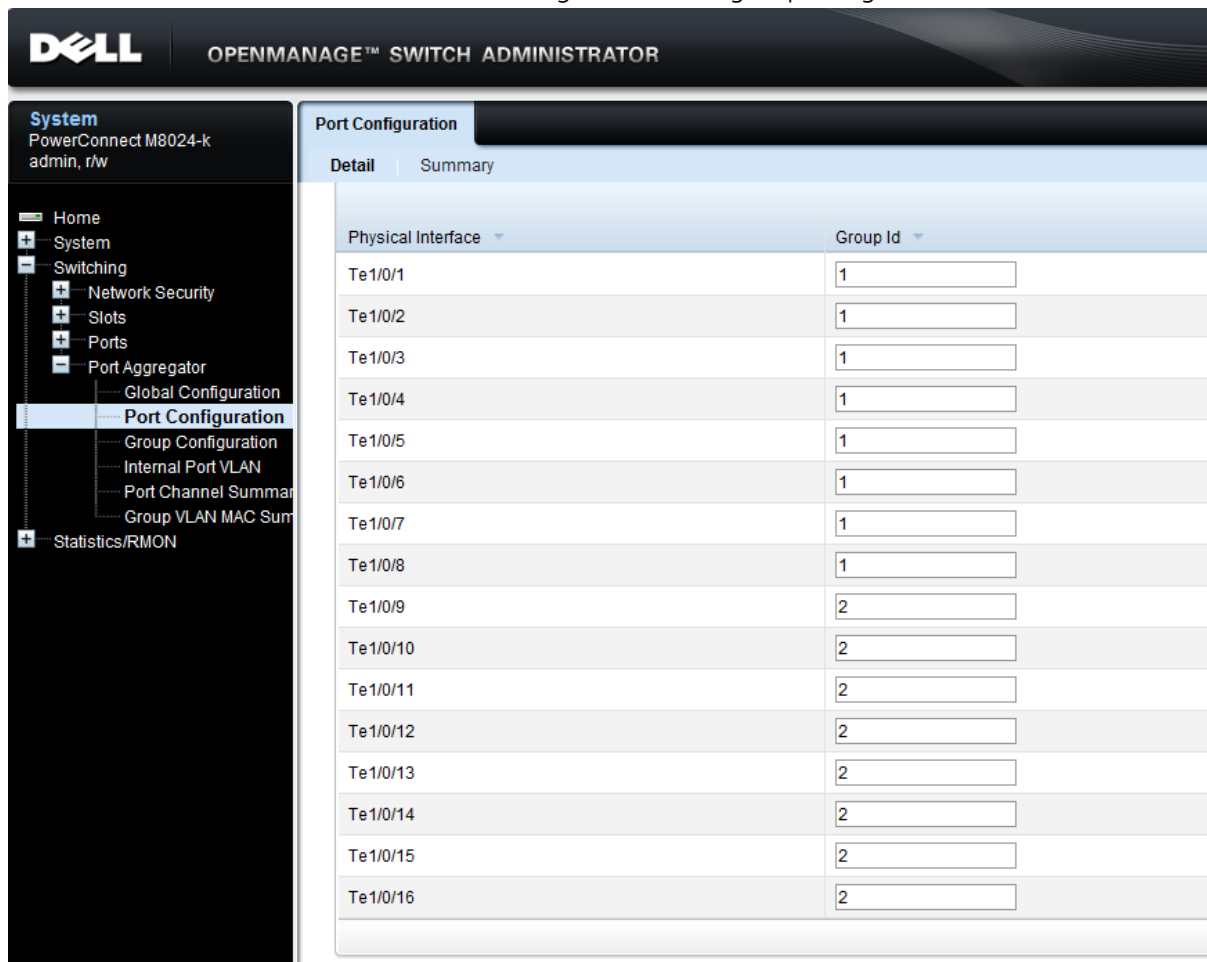


Figure 14. Web Interface for the Dell M8024-k Switch for Scenario 5.

- Change the group ID of the *external* ports you want to use to connect to the second Cisco Nexus, i.e. Te1/0/19-20, to group 2 (Figure 15).

The screenshot shows the Dell OpenManage Switch Administrator web interface. The left sidebar contains a navigation menu with options like Home, System, Switching, Network Security, Slots, Ports, Port Aggregator, Global Configuration, Port Configuration (selected), Group Configuration, Internal Port VLAN, Port Channel Summary, Group VLAN MAC Summary, and Statistics/RMON. The main content area is titled 'Port Configuration' and has two tabs: 'Detail' and 'Summary'. The 'Detail' tab shows a table of internal ports (Te1/0/11 to Te1/0/16) with a 'Group Id' column where all ports are set to '2'. Below this is an 'External Interface' section with a table showing ports Te1/0/17 to Te1/0/20. Ports Te1/0/17 and Te1/0/18 are in Group 1, while Te1/0/19 and Te1/0/20 are in Group 2. All external ports have a 'Lag Role' of 'Primary'. The interface also includes a 'Back to top' link and pagination controls.

Figure 15. Web Interface for Dell M8024-k Switch for Scenario 5.

- Add **Group 1** ports:
  - Verify the group ID of the remaining *internal* ports, i.e. Te1/0/1-8, remains in group 1 (the default for internal ports) (Figure 16).

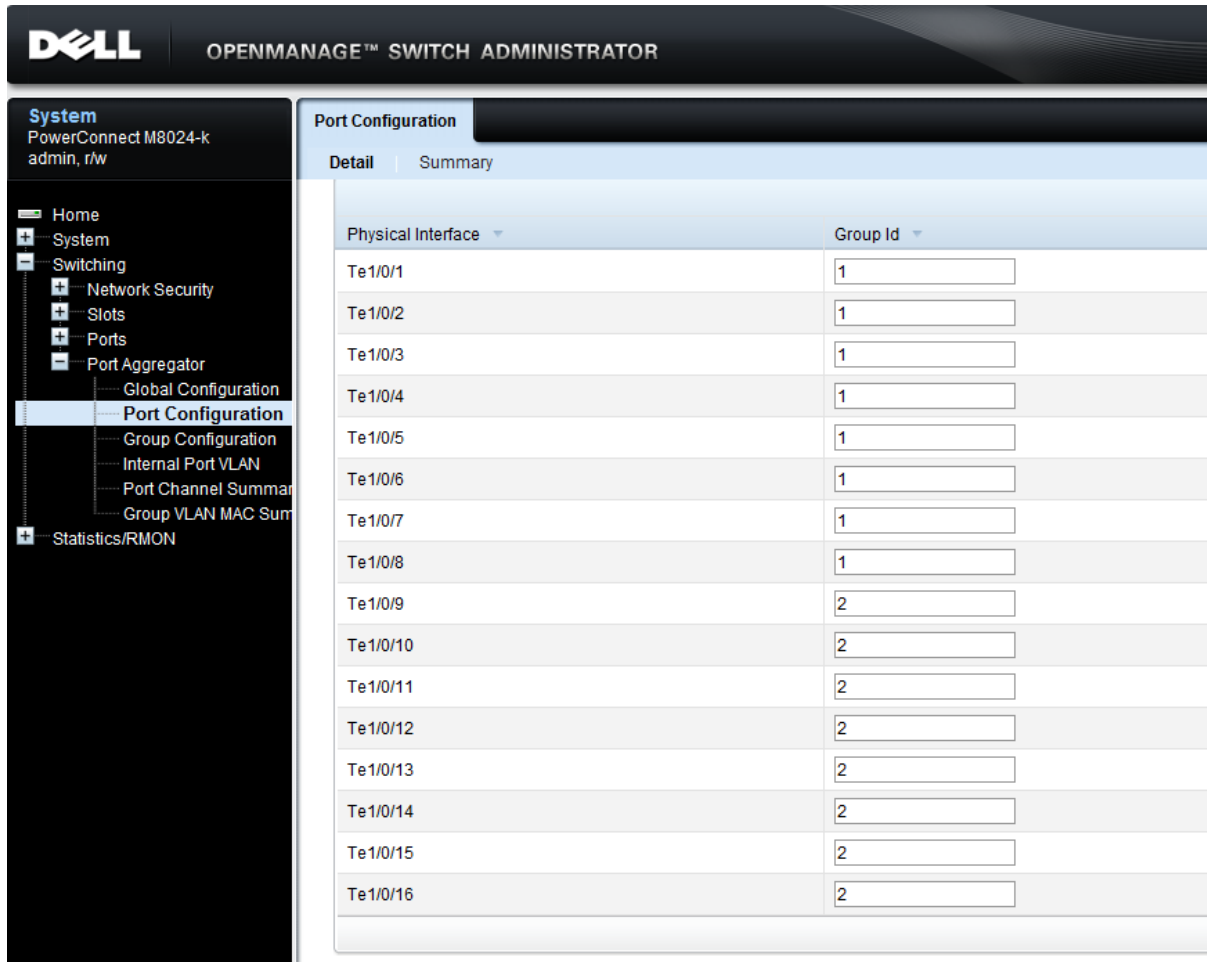


Figure 16. Web Interface for Dell M8024-k Switch for Scenario 5.

- Verify the group ID of the remaining *external* ports, i.e. Te1/0/17-18, remains in group 1 (the default) (Figure 17).

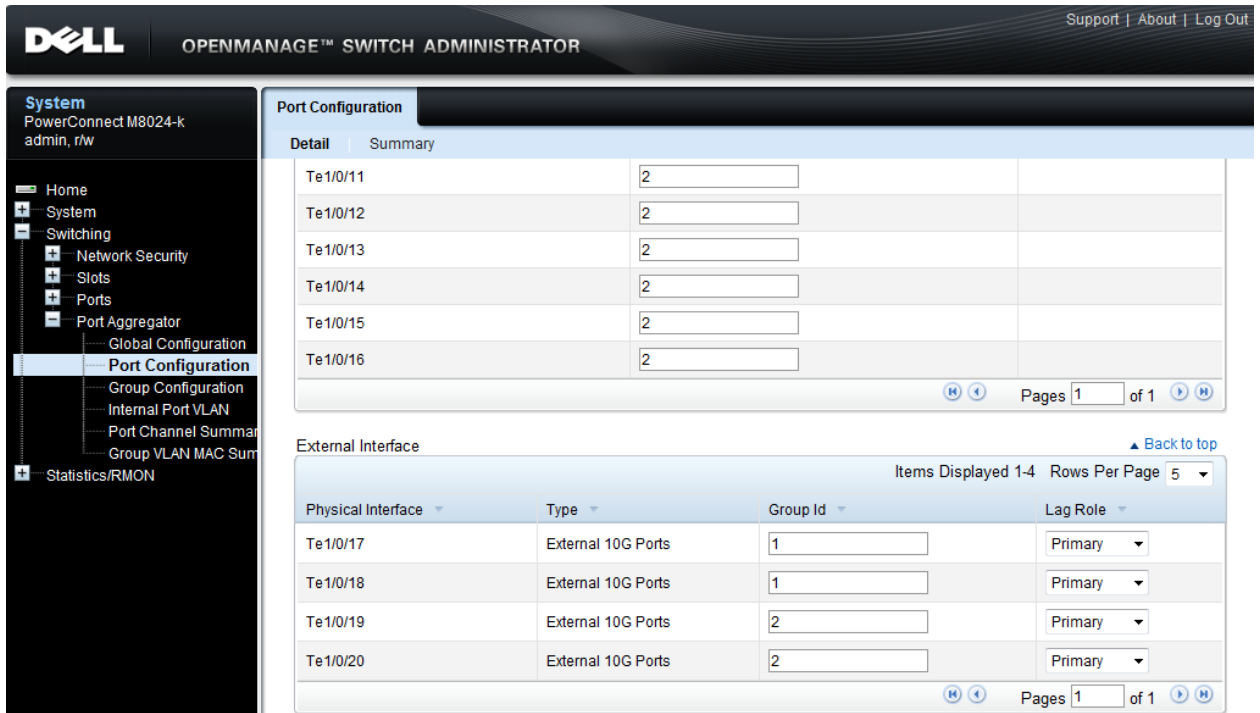


Figure 17. Web Interface for Dell M8024-k Switch for Scenario 5.

- Click Apply

Follow these next steps to assign internal port VLANs to the two groups.

- Select Switching > Port Aggregator > Internal Port VLAN
- Make sure Group Id is set to 1.
- Select a port from the Internal-Port drop-down menu, i.e. Te1/0/1.
- In the Tagged-VLANs menu, select the VLANs, i.e. 101-103, for this port (Figure 18).

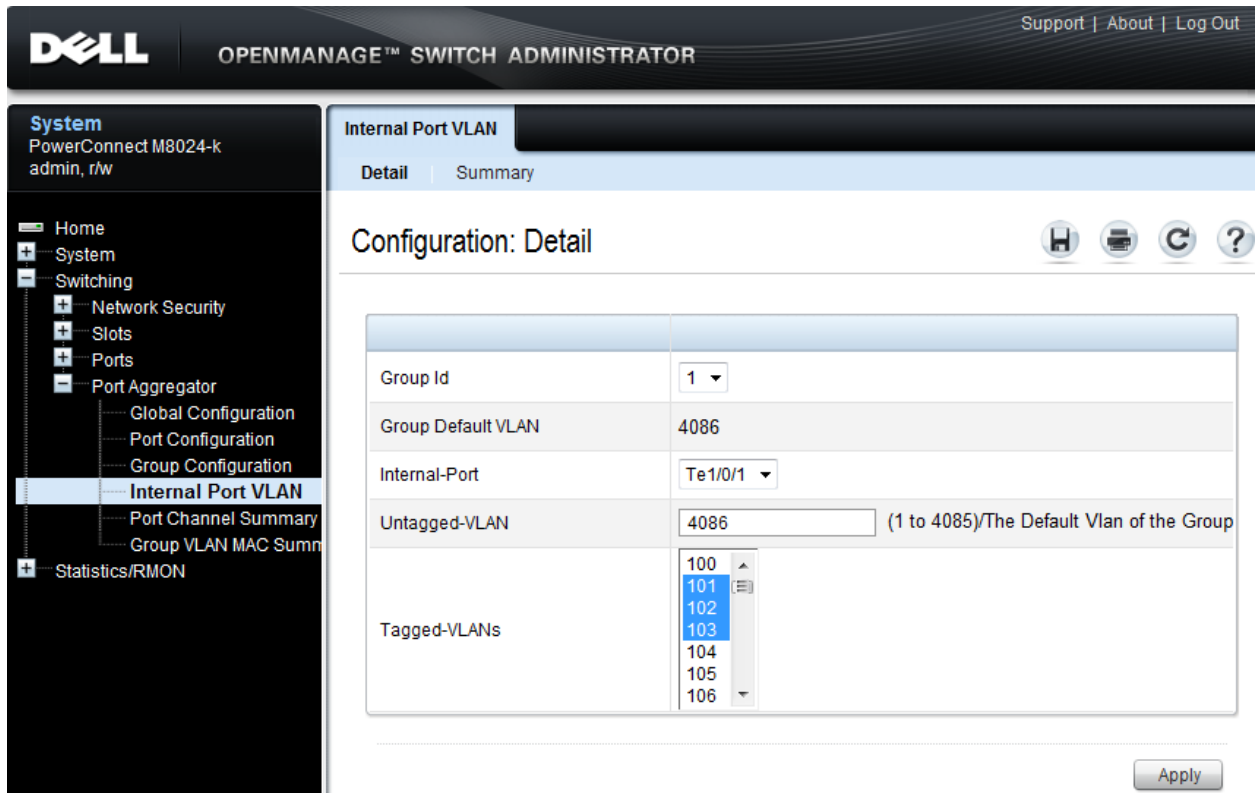


Figure 18. Web Interface for Dell M8024-k Switch for Scenario 5.

- Click Apply.
- Change the Group Id to 2.
- Select a port from group 2 using the Internal-Port drop-down menu, i.e. Te1/0/9.
- In the Tagged-VLANs menu, select the VLANs, i.e. 104-106, for this port (Figure 19).



The screenshot displays the Dell OpenManage Switch Administrator web interface. The top navigation bar includes the Dell logo, the text 'OPENMANAGE™ SWITCH ADMINISTRATOR', and links for 'Support | About | Log Out'. The left sidebar shows a navigation menu with 'System' selected, and 'Internal Port VLAN' highlighted under the 'Switching' section. The main content area is titled 'Internal Port VLAN' and shows the 'Configuration: Detail' view. The configuration table is as follows:

Group Id	2
Group Default VLAN	4087
Internal-Port	Te1/0/9
Untagged-VLAN	4087 (1 to 4085)/The Default Vlan of the Group
Tagged-VLANs	103, 104, 105, 106, 107, 108, 109

An 'Apply' button is located at the bottom right of the configuration area.

Figure 19. Web Interface for Dell M8024-k Switch for Scenario 5.

- Click Apply.

### Configuring the Cisco Nexus 5020 Switch

- Login to the **first** Nexus and enter the following commands to configure trunking and multiple VLANs on a port-channel.

```
Nexus5020# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Nexus5020(config)# feature lacp
Nexus5020(config)# vlan 101-103
Nexus5020(config-vlan)# exit
Nexus5020(config)# interface port-channel 1
Nexus5020(config-if)# switchport
Nexus5020(config-if)# switchport trunk allowed vlan 101-103
Nexus5020(config-if)# switchport mode trunk
Nexus5020(config-if)# exit
Nexus5020(config)# interface ethernet 1/1-2
Nexus5020(config-if-range)# switchport
Nexus5020(config-if-range)# channel-group 1 mode active
Nexus5020(config-if-range)# no shutdown
```

```
Nexus5020(config-if-range)# end
```

- Login to the **second** Nexus and enter the following commands to configure trunking and multiple VLANs on a port-channel.

```
Nexus5020-2# configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Nexus5020-2(config)# feature lacp
```

```
Nexus5020-2(config)# vlan 104-106
```

```
Nexus5020-2(config-vlan)# exit
```

```
Nexus5020-2(config)# interface port-channel 1
```

```
Nexus5020-2(config-if)# switchport
```

```
Nexus5020-2(config-if)# switchport trunk allowed vlan 104-106
```

```
Nexus5020-2(config-if)# switchport mode trunk
```

```
Nexus5020-2(config-if)# exit
```

```
Nexus5020-2(config)# interface ethernet 1/1-2
```

```
Nexus5020-2(config-if-range)# switchport
```

```
Nexus5020-2(config-if-range)# channel-group 1 mode active
```

```
Nexus5020-2(config-if-range)# no shutdown
```

```
Nexus5020-2(config-if-range)# end
```

## Scenario 6: Configuring a backup LAG for failover

This section provides an overview of setting up a straight-through topology with LAG failover. Simple Switch Mode LAG failover allows Dell switches to automatically change from the primary to the backup LAG in the event of a port failure, reducing potential downtime.

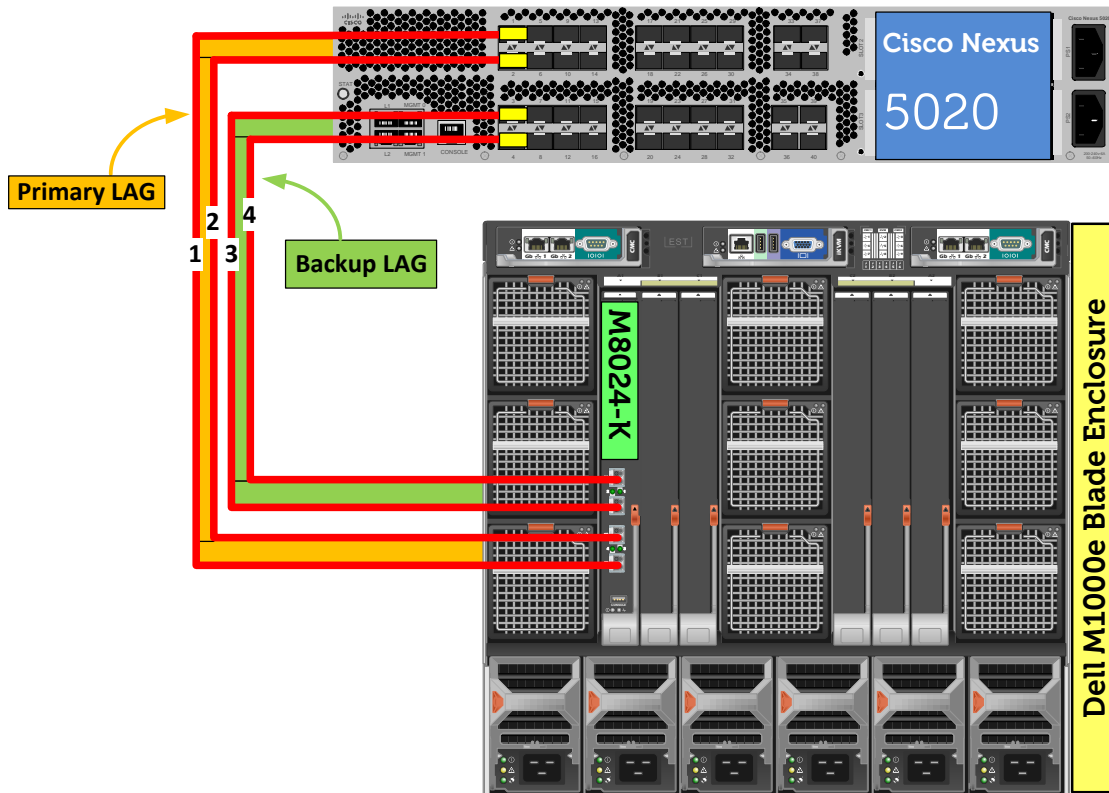


Figure 20. Graphic representation of Scenario 6.

### Configuring the Dell M8024-k Switch

#### Command-Line Interface:

Command-line interface for configuring the Dell M8024-k switch is as follow:

```
console(config)#port-aggregator group 1
console(config-portAggr-group-1)#no add interface Tengigabitethernet 1/0/19-20
console(config-portAggr-group-1)#add interface Tengigabitethernet 1/0/19-20 secondary
console(config-portAggr-group-1)#end
```

- ✍ Make sure to add two external 10Gig ports as a Secondary (backup) to group 1. The Primary LAG is created automatically using Simple Switch Mode. Since it automatically

puts all external ports into the Primary LAG, you will need to remove two ports from Primary and make them Secondary.

**Web Interface:**

Follow the steps below:

- Select Switching > Port Aggregator > Port Configuration
- In the Port Configuration screen, verify the Lag Role fields for Te1/0/17 and Te1/0/18 are set to Primary.
- Change the Lag Role of ports Te1/0/19 and Te1/0/20 to Secondary (Figure 21).

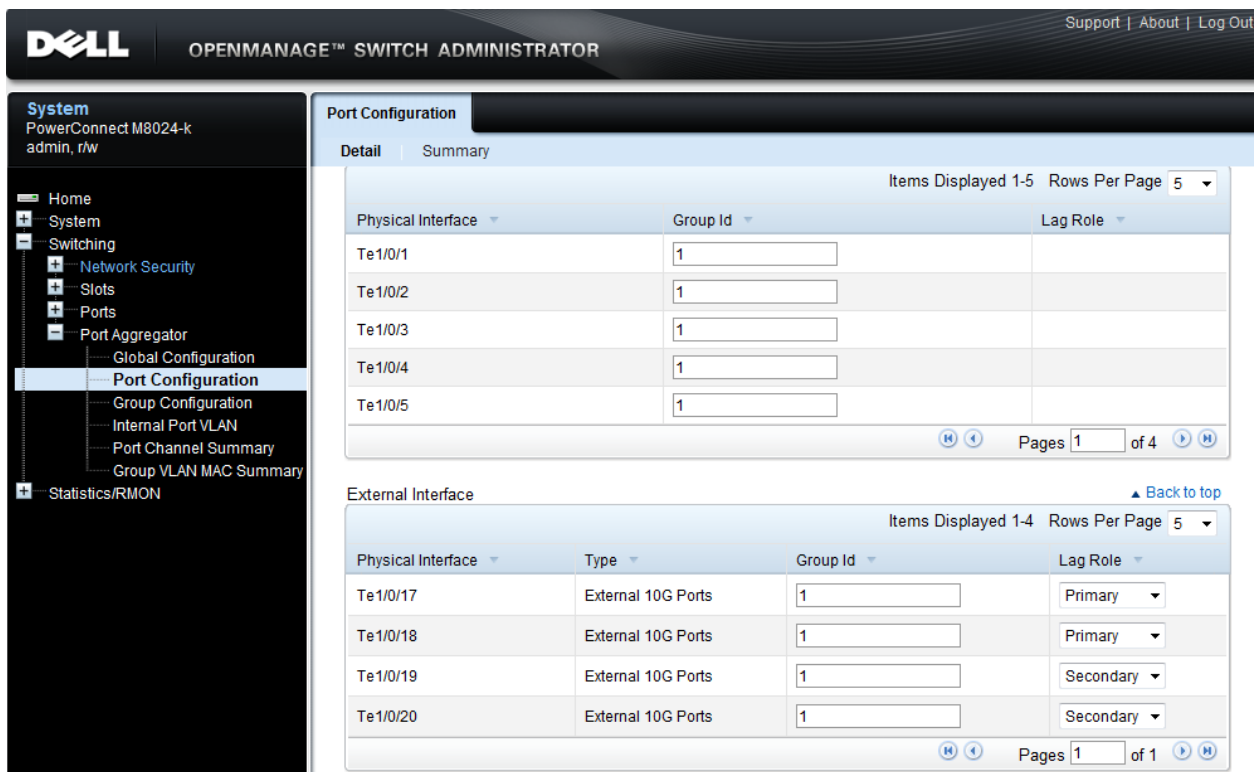


Figure 21. Web Interface for Dell M6348 Switch for Scenario 6.

- Click Apply.

**Configuring the Cisco Nexus 5020 Switch**

Login to the Nexus 5020 and make the following changes:

```
Nexus5020# configure
Enter configuration commands, one per line. End with CNTL/Z.
Nexus5020(config)# feature lacp
```

```
Nexus5020(config)# interface ethernet 1/1-2
Nexus5020(config)# switchport
Nexus5020(config-if-range)# channel-group 1 mode active
Nexus5020(config-if-range)# no shutdown
Nexus5020(config-if-range)# interface ethernet 1/3-4
Nexus5020(config)# switchport

Nexus5020(config-if-range)# channel-group 2 mode active
Nexus5020(config-if-range)# no shutdown
Nexus5020(config-if-range)# end
```

## Appendix - Network switch Versions

Version information for the network switches we used are as follows:

Network switch	Dell PowerConnect M8024k	Cisco Nexus 5020
Software version	4.1.0.6	5.0(3)N1(1b)

Table 1. Switch Firmware Versions

## About Dell

Dell (NASDAQ: DELL) is a leading technology provider to commercial and public enterprises around the world.