

Dell PowerEdge FN I/O Module (FN IOM) – Easy Deployment Guide

Configuring upstream switch ports and bringing up the server-facing ports on FN IOMs in the PowerEdge FX2 chassis

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Revisions

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August 2015	1.1	Changed FN IOA to FN IOM Revised "Overview" Section	Trieu Phan
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1 Overview

Ease of deployment and use are central tenants of the Dell PowerEdge FN I/O Module (FN IOM). Simplifying deployment and management allows anyone without the expertise of a network administrator to plug-n-play and maximize time to value.

FN IOMs include the Dell PowerEdge FN410S, FN410T, and FN2210S.

By default, network ports on the PowerEdge FC-Series servers (FC830, FC630, etc.) installed in the FX2 chassis are down until the uplink (external) port channel is operational on the FN IOM. This is due to a feature called Uplink Failure Detection (UFD) whereby when upstream connectivity fails, the FN IOM disables the downstream, server-facing links.

This deployment guide provides configuration examples for common upstream switches to establish a functional uplink and bring up the network ports on PowerEdge FC-Series servers in three easy steps:

1. Ensure the FN IOM is at its factory default settings.
2. Create an LACP port channel on the upstream switch.
3. Verify that connected FN IOM ports are up.

The FN IOM ships from the factory with these default settings:

Mode	Standalone (non-default modes are Programmable-mux, Full-switch, Stack and VLT)
Chassis Management Controller (CMC) Configuration	Yes
Data Center Bridging Exchange Protocol (DCBx)	Enabled
FIP Snooping Bridge (FSB)	Enabled on FN410S & FN410T; Disabled on FN2210S
NPIV Proxy Gateway Mode (NPG)	Enabled on FN2210S; Disabled on FN410S & FN410T
iSCSI Optimization	Enabled
Broadcast Storm Control	Enabled
Internet Group Management Protocol (IGMP) Flood Restrict	Enabled
Ports	All ports are administratively up, in hybrid (trunk) mode, belong to all VLANs, and allow jumbo frames (MTU set to 12000). All uplink (external) Ethernet ports are pre-configured in LACP port channel 128.
Uplink Failure Detection (UFD)	Enabled
TACACS+/RADIUS/AAA Acct/AAA Auth	Disabled
DHCP Client (out-of-band management interface)	Enabled
Internet Group Management Protocol (IGMP) v2 & v3	Enabled
Auto LACP LAG for server-facing (internal) ports	Enabled

Figure 1 Factory default settings

Note: For more information on Uplink Failure Detection and all other configuration settings, see the [Dell PowerEdge FN I/O Module Configuration Guide](#).

2 Step 1 - Ensure the FN IOM is set to factory defaults

No configuration is required on the FN IOM if the system is in its factory default state.

If the system configuration has been modified or is in an unknown state, Dell recommends resetting it to factory defaults. This will put the FN IOM in Standalone Mode with all other settings in a known state.

2.1 Command line method

Note: For instructions on accessing the command line interface, see Appendix B.

To reset the FN IOM to factory default settings via the command line interface (CLI), use the `restore factory-defaults stack-unit 0 clear-all` command:

```
Dell#restore factory-defaults stack-unit 0 clear-all  
Proceed with factory settings? Confirm [yes/no]:y
```

Factory settings are applied and the system reboots. This process takes about 3 minutes.

The FN IOM requires no further configuration.

2.2 Graphical user interface method

Older versions of the Dell Networking Operation System (DNOS) only allow FN IOM configuration via the CLI. Starting with DNOS 9.9, FN IOMs can be configured for most common deployments with an easy-to-use graphical user interface (GUI) called the Dell Blade I/O Manager.

Launch the Dell Blade I/O Manager in one of two ways:

- Within the CMC GUI
- From a web browser by directly typing the management IP address of the FN IOM into the address bar with port number 8081, for example: `http://172.25.210.218:8081`.

Note: To determine or configure the FN IOM's management IP address, see Appendix C.

To launch the Blade I/O Manager from the CMC interface, navigate to **Chassis Overview > I/O Module Overview** in the left pane. This displays the **I/O Module Status** page. Click the **Launch I/O Module GUI** button next to the correct FN IOM as shown in Figure 2.

The screenshot shows the Dell Chassis Management Controller (CMC) interface. The top navigation bar includes the Dell logo, 'Chassis Management Controller', 'Enterprise', and links for 'Support', 'About', and 'Log Out'. The left sidebar shows a tree view with 'Chassis Overview' expanded, leading to 'Chassis Controller', 'Server Overview', and 'I/O Module Overview'. The 'I/O Module Overview' section is active, showing a list of modules. The main content area is titled 'I/O Module Status' and contains a table with the following data:

Slot	Health	Fabric	Name	Launch I/O Module GUI	Mode	Role	Power Status	Service Tag
A1	✓	10 GbE KR	Dell PowerEdge FN 410S IOM	Launch I/O Module GUI	Standalone	Standalone	On	0000000
A2	✓	10 GbE KR	Dell PowerEdge FN 410S IOM	Launch I/O Module GUI	Standalone	Standalone	On	0000000

Figure 2 CMC I/O Module Status page

Either method will open the Blade I/O Manager login screen shown in Figure 3.

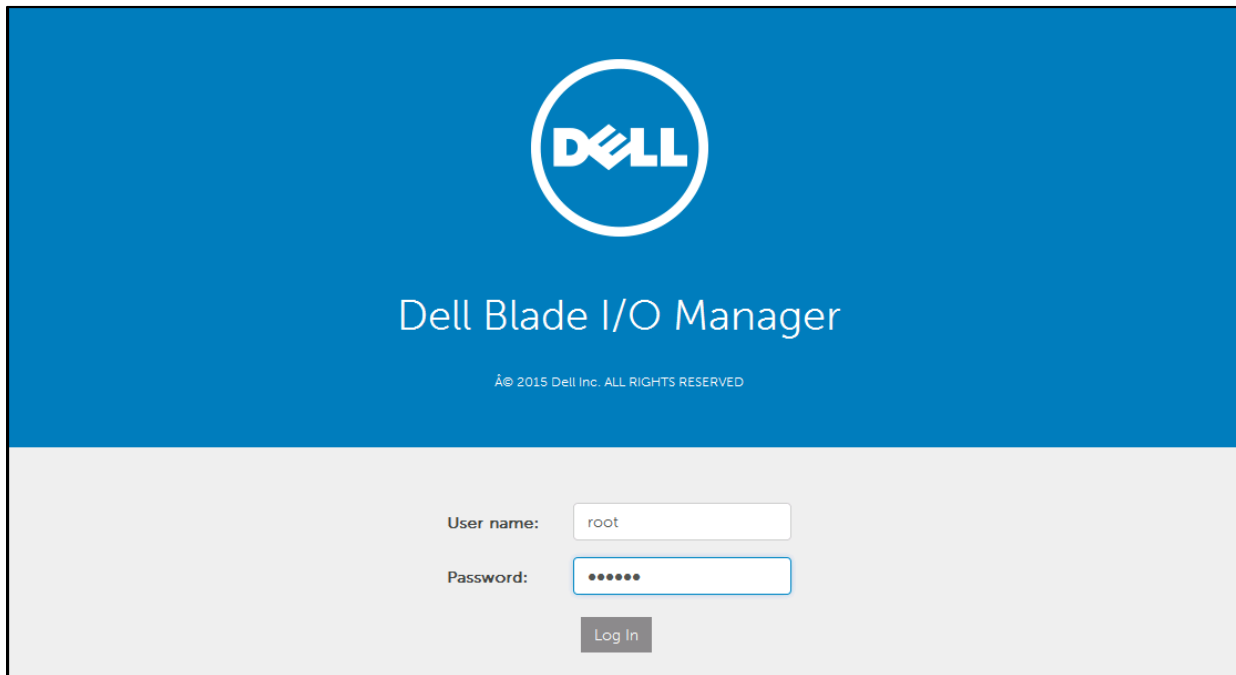
The image shows the Dell Blade I/O Manager login screen. It has a blue header with the Dell logo and the text "Dell Blade I/O Manager". Below the header, there is a light gray section containing the login form. The form has two input fields: "User name:" with the value "root" and "Password:" with masked characters. Below the password field is a "Log In" button. The copyright notice "© 2015 Dell Inc. ALL RIGHTS RESERVED" is visible below the title.

Figure 3 FN IOM Dell Blade I/O Manager login screen

The default credentials are User name: root, Password: calvin.

Depending on the state of the system, one of the following displays after logging in:

- The Initial Setup Wizard, or
- The Dashboard page (Initial Setup Wizard does not launch)

Initial Setup Wizard - If the Initial Setup Wizard runs automatically after login as shown in Figure 4, the FN IOM is in its default factory state.

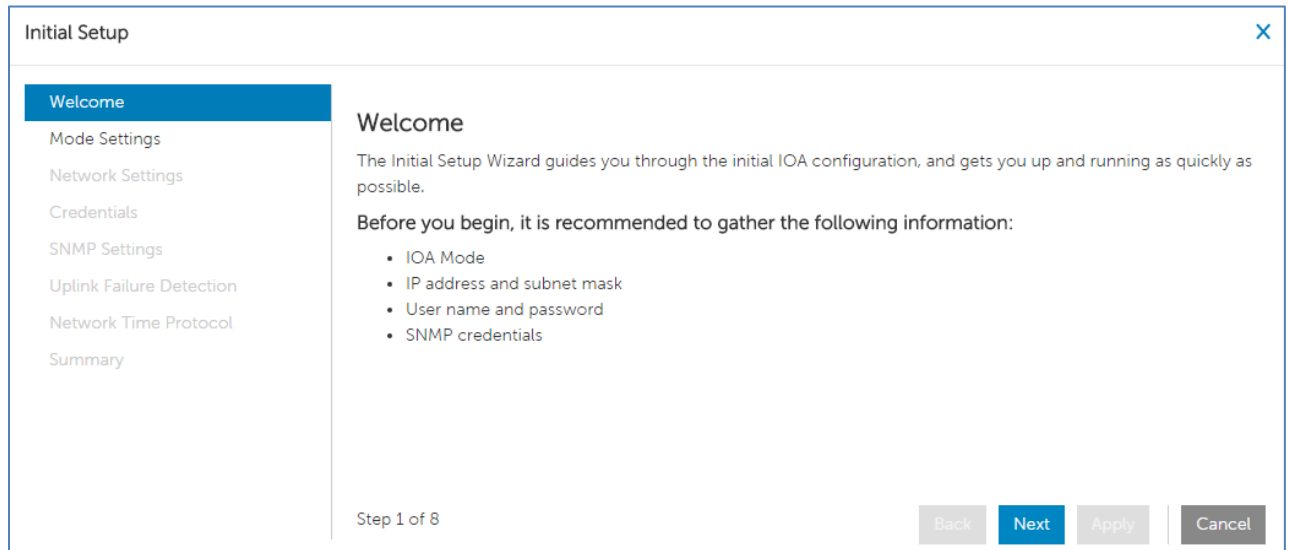


Figure 4 FN IOM Initial Setup Wizard

Since this confirms the FN IOM is in the factory default state, stop here and proceed to [Step 2 – Configure Interfaces and the Port Channel on the Upstream Switch](#), or optionally continue with the Initial Setup Wizard.

Note: If proceeding with the Initial Setup Wizard, in order to stay consistent with this guide, leave the system set to **Standalone Mode (default)** and **Uplink Failure Detection** set to **Enabled** when prompted. Other settings in the wizard can be changed as desired.

Dashboard page (Initial Setup Wizard does not launch) - If the FN IOM is not in its default factory state, the Initial Setup Wizard does not automatically run and the **Dashboard** page displays as shown in Figure 5.

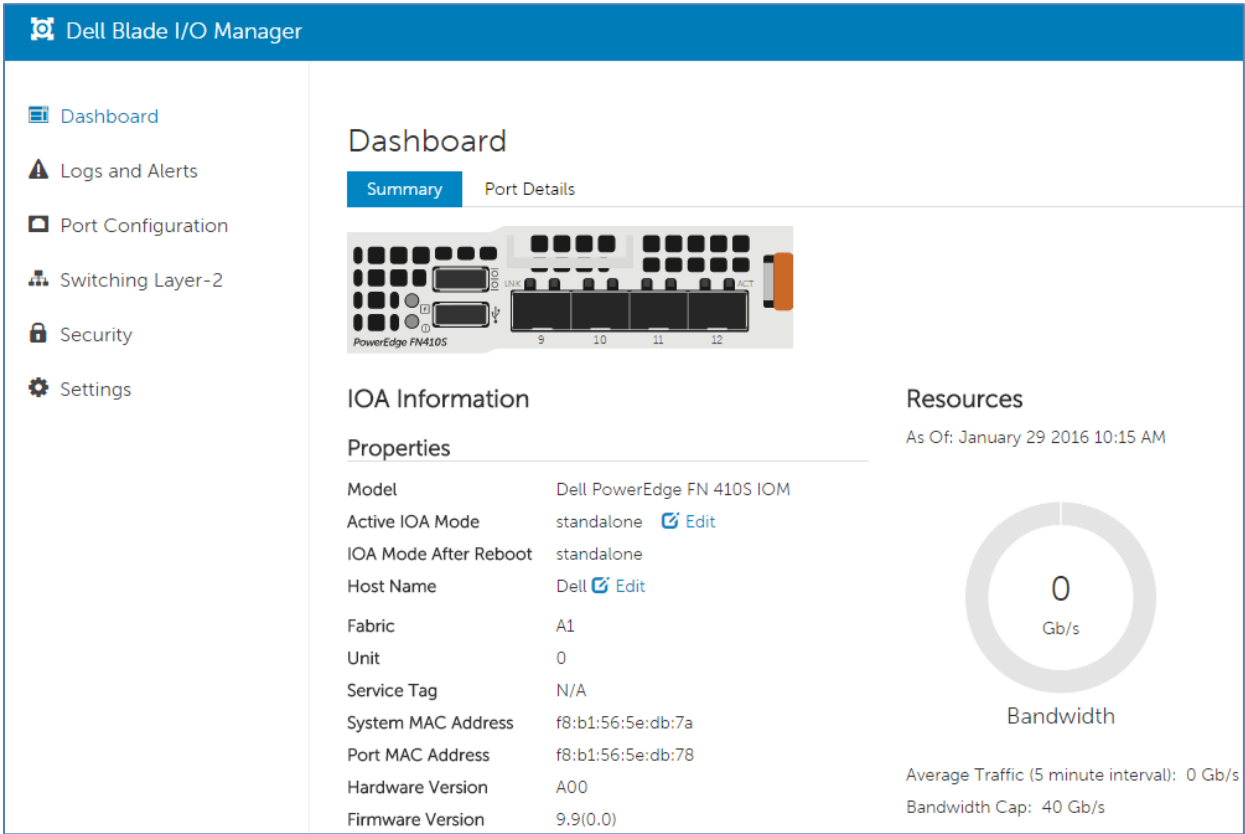


Figure 5 Dell Blade I/O Manager Dashboard page

To put the system in its factory default state, select **Settings** in the left pane. On the **Settings** page under **Restore IOA**, click **Edit** as shown in Figure 6.

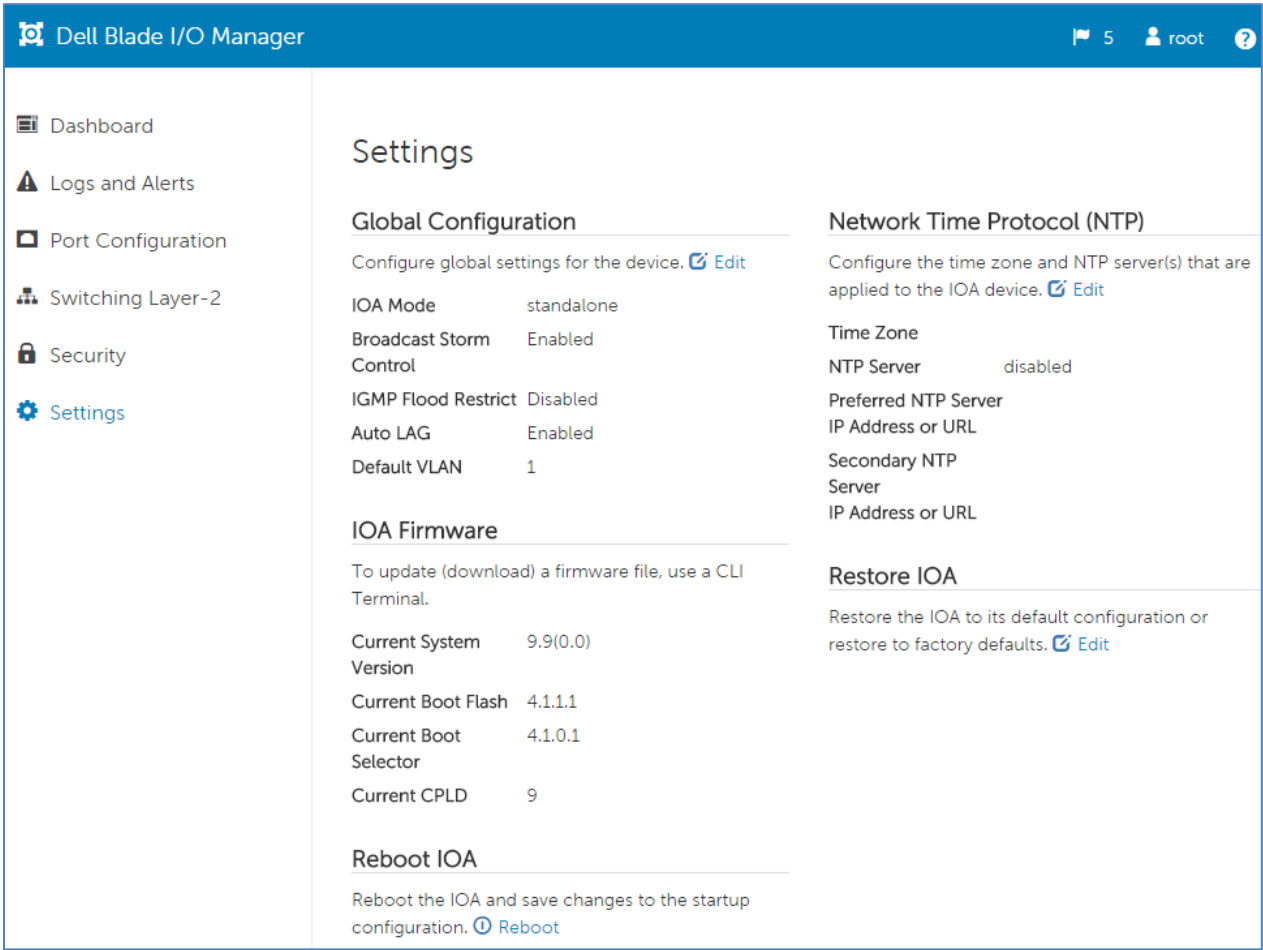
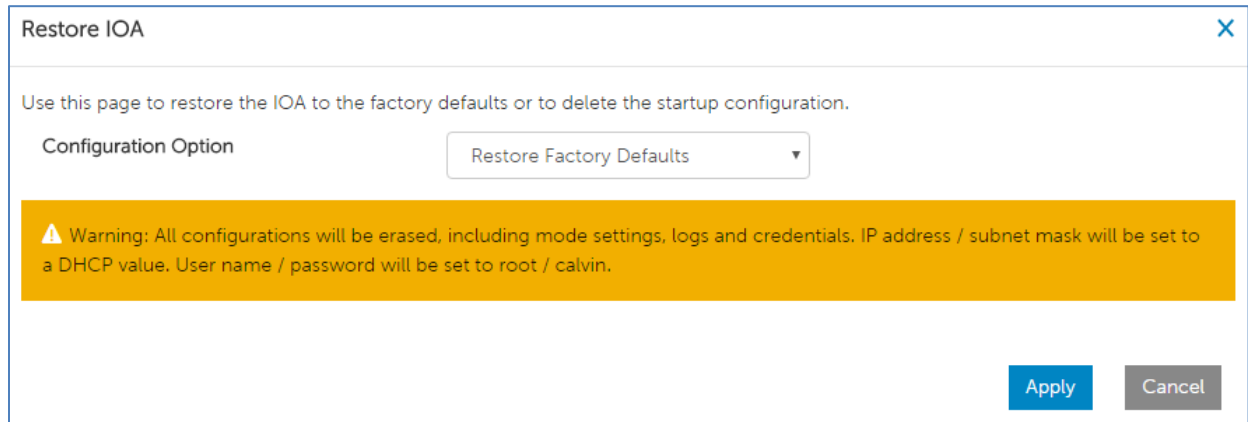


Figure 6 Dell Blade I/O Manager Settings page

In the **Restore IOA** dialog box, select **Restore Factory Defaults** from the drop-down menu as shown in Figure 7.



Restore IOA

Use this page to restore the IOA to the factory defaults or to delete the startup configuration.

Configuration Option Restore Factory Defaults ▼

⚠ Warning: All configurations will be erased, including mode settings, logs and credentials. IP address / subnet mask will be set to a DHCP value. User name / password will be set to root / calvin.

Apply Cancel

Figure 7 Restore IOA - reset to factory defaults

Click **Apply** and answer **Yes** when prompted in the confirmation dialog box.

Factory settings are applied and the system reboots. (This process takes about 3 minutes.)

If remaining in the Blade I/O Manager, the browser window must be refreshed after the FN IOM reboots. The FN IOM requires no further configuration.

3 Step 2 – Configure interfaces and the port channel on the upstream switch

This section provides the commands used to configure LACP port channels on common upstream switches that may be connected to the FN IOM, as shown in Figure 8.

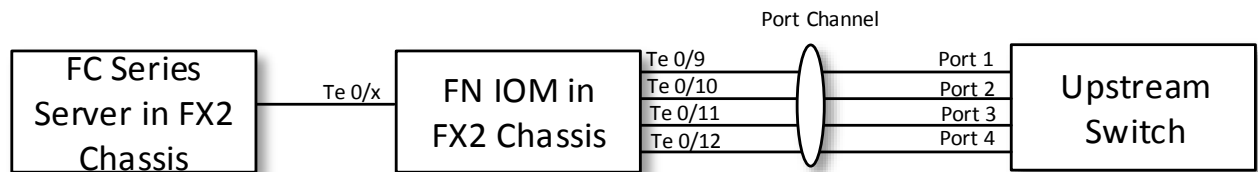


Figure 8 Interfaces and LACP port channel

Note: Figure 8 is specific to the FN410S or FN410T. If using the FN2210S in its default configuration, only use Ethernet ports Te 0/11 and Te 0/12 in the uplink port channel since ports Te 0/9 and Te 0/10 have been replaced by Fibre Channel ports.

By default, the external Ethernet ports on the FN IOM are preconfigured in port channel 128 with LACP enabled. Port channel 128 is in hybrid (trunk) mode and configured to allow all VLANs.

In order for the downstream (server-facing) ports on the FN IOM to come up, port channel 128 must be up. Port channel 128 will come up when connected to a properly configured LACP port channel on an upstream switch.

Make the physical network connections by connecting any combination of the FN IOM's external Ethernet ports to the upstream switch. The port channel may have a minimum of one and a maximum of four links (or two links for the FN2210S in its default configuration). Configure a port channel on the upstream switch as shown in the next section.

3.1 Upstream switch configuration examples

In each of the following examples, four interfaces are configured in the port channel on the upstream switch.

Note: Change the interface numbers and number of ports used in the examples to match the actual connections.

Any valid ID number can be used for the port channel number on the upstream switch. The examples below use port channel 10 on the upstream switch.

3.1.1 Dell Networking OS 9.x

```
S4810(conf)#interface range tengigabitethernet 0/1-4
S4810(conf-if-range-te-0/1-4)#no shutdown
S4810(conf-if-range-te-0/1-4)#port-channel-protocol lacp
S4810(conf-if-range-te-0/1-4-lacp)#port-channel 10 mode active

S4810(conf)#interface port-channel 10
S4810(conf-if-po-10)#portmode hybrid
S4810(conf-if-po-10)#switchport
S4810(conf-if-po-10)#no shutdown
```

Example upstream switch used is Dell Networking S4810

3.1.2 Arista EOS 4.x

```
Arista(config)#interface Ethernet 21-24
Arista(config-if-Et21-24)#switchport mode trunk
Arista(config-if-Et21-24)#channel-group 10 mode active
Arista(config-if-Et21-24)#no shutdown

Arista(config)#interface port-Channel 10
Arista(config-if-Po10)#switchport mode trunk
Arista(config-if-Po10)#no shutdown
```

Example upstream switch used is Arista 7050Q-16

3.1.3 Cisco NX-OS 7.x

```
Nx5548(config)# interface Ethernet 1/1-4
Nx5548(config-if-range)# switchport mode trunk
Nx5548(config-if-range)# channel-group 10 mode active
Nx5548(config-if-range)# no shutdown

Nx5548(config)# interface port-channel 10
Nx5548(config-if)# switchport mode trunk
Nx5548(config-if)# no shutdown
```

Example upstream switch used is Cisco Nexus 5548

3.1.4 Brocade Network OS 4.x

```
VDX(config)# interface TenGigabitEthernet 10/0/1-4
VDX(conf-if-te-10/0/1-4)# channel-group 10 mode active type standard
VDX(conf-if-te-10/0/1-4)# no shutdown

VDX(config)# interface Port-channel 10
VDX(config-Port-channel-10)# switchport
VDX(config-Port-channel-10)# switchport mode trunk
VDX(config-Port-channel-10)# no shutdown
```

Example upstream switch used is Brocade VDX6730

4 Step 3 - Verify connected FN IOM ports are up

With the port channel of the upstream switch properly configured and physical connections made, port channel 128 on the FN IOM comes up. This in turn causes UFD to enable the FN IOM's downstream, server-facing ports. The status of port channel 128 and individual ports can be verified using the CLI or GUI.

4.1 Verify via the command line

A series of messages are logged on the FN IOM indicating port channel 128 is up and ports connected to the servers downstream are up as well:

```
Changed interface state to up: Po 128

Downstream interface cleared from UFD error-disabled: Te 0/1
Downstream interface cleared from UFD error-disabled: Te 0/2
Downstream interface cleared from UFD error-disabled: Te 0/3
...etc.
```

Note: Log messages are output to the serial console by default and can also be viewed with the `show logging` command.

Run the following commands to verify the port channel and internal ports are up:

```
Dell#show interfaces port-channel 128
Port-channel 128 is up, line protocol is up
```

Refer to Appendix A.3 for the full command output.

```
Dell#show interfaces status
```

Port	Description	Status	Speed	Duplex	Vlan
Te 0/1		Up	10000 Mbit	Full	1-4094
Te 0/2		Down	Auto	Auto	1-4094
Te 0/3		Up	10000 Mbit	Full	1-4094
Te 0/4		Down	Auto	Auto	1-4094
Te 0/5		Up	10000 Mbit	Full	1-4094
Te 0/6		Down	Auto	Auto	1-4094
Te 0/7		Up	10000 Mbit	Full	1-4094
Te 0/8		Down	Auto	Auto	1-4094
Te 0/9		Up	10000 Mbit	Full	--
Te 0/10		Up	10000 Mbit	Full	--
Te 0/11		Up	10000 Mbit	Full	--
Te 0/12		Up	10000 Mbit	Full	--

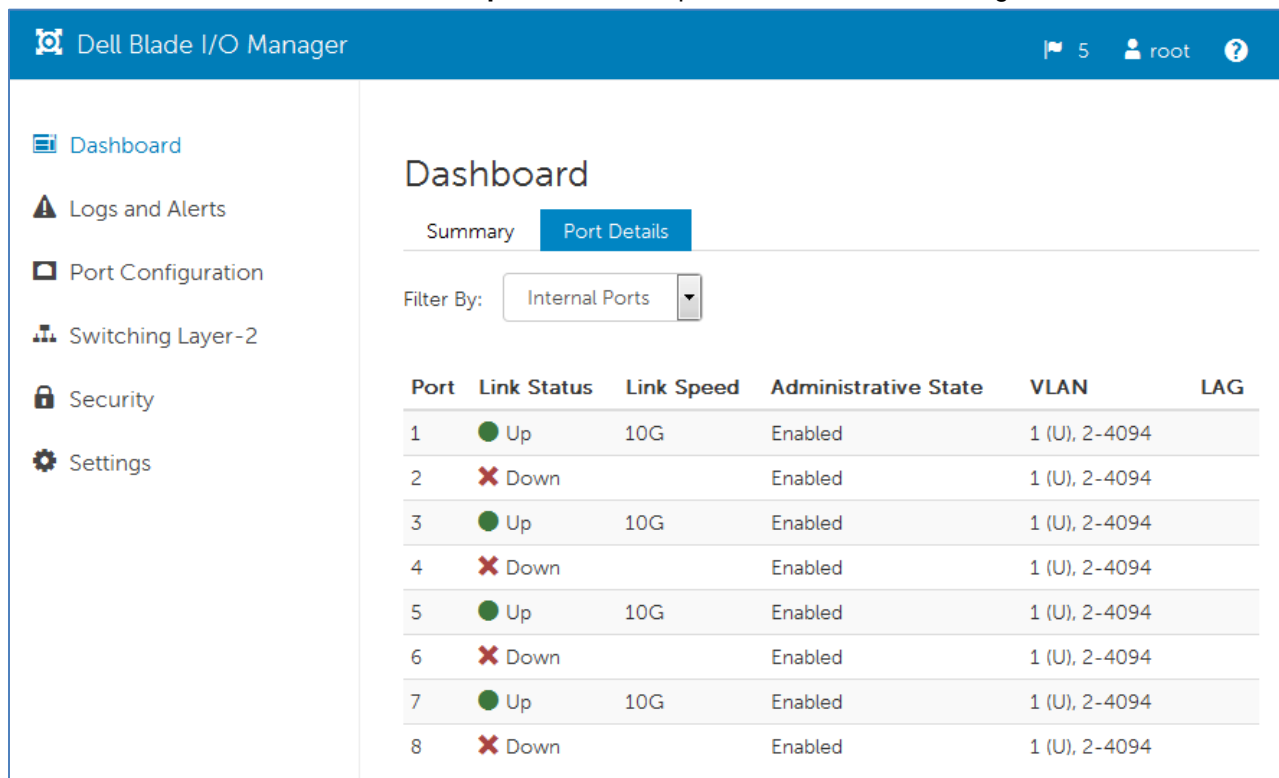
Note: Internal server-facing ports are Te 0/1-8. This example does not use internal ports Te 0/2, Te 0/4, Te 0/6, and Te 0/8.

4.2 Verify via the graphical user interface

Login to the Dell Blade I/O Manager either by launching it from the CMC GUI or by entering the FN IOM management IP address and port 8081 in a web browser. For example, <http://172.25.210.218:8081>.

Complete the following procedure to verify the status of the internal ports and external port channel.

1. On the Blade I/O Manager home page (**Dashboard**), select the **Port Details** tab near the top of the right pane.
2. Select **Filter By: Internal Ports** in the drop down menu if necessary.
3. Ensure that the **Link Status** is **Up** for all internal ports in use as shown in Figure 9.



The screenshot shows the Dell Blade I/O Manager GUI. The left sidebar contains navigation links: Dashboard, Logs and Alerts, Port Configuration, Switching Layer-2, Security, and Settings. The main content area is titled 'Dashboard' and has two tabs: 'Summary' and 'Port Details' (which is selected). Below the tabs is a 'Filter By:' dropdown menu set to 'Internal Ports'. A table displays the status of 8 internal ports. The table has columns for Port, Link Status, Link Speed, Administrative State, VLAN, and LAG. Ports 1, 3, 5, and 7 are 'Up' with a link speed of 10G. Ports 2, 4, 6, and 8 are 'Down' with a link speed of 10G. All ports have an 'Enabled' administrative state and are associated with VLAN 1 (U), 2-4094.

Port	Link Status	Link Speed	Administrative State	VLAN	LAG
1	Up	10G	Enabled	1 (U), 2-4094	
2	Down	10G	Enabled	1 (U), 2-4094	
3	Up	10G	Enabled	1 (U), 2-4094	
4	Down	10G	Enabled	1 (U), 2-4094	
5	Up	10G	Enabled	1 (U), 2-4094	
6	Down	10G	Enabled	1 (U), 2-4094	
7	Up	10G	Enabled	1 (U), 2-4094	
8	Down	10G	Enabled	1 (U), 2-4094	

Figure 9 Dell Blade I/O Manager GUI - Internal Port Status

Note: This example does not use internal ports 2, 4, 6, and 8.

4. Select **Switching Layer-2** in the left pane.
5. Scroll down in the right pane to **External Ports** and verify port channel 128 is up as shown in Figure 10.

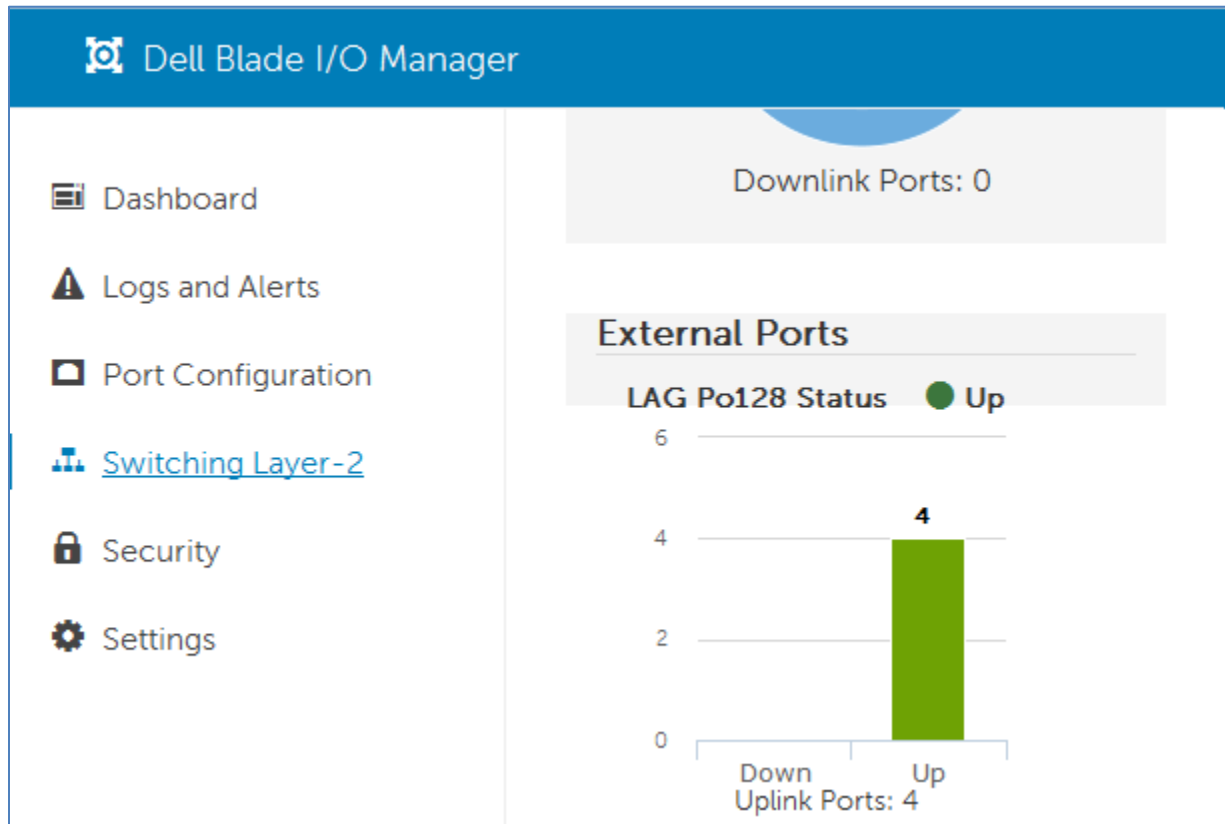


Figure 10 Dell Blade I/O Manager GUI - port channel 128 is up and contains four ports

A Sample FN IOM CLI commands & output

Note: For more information see the [Dell PowerEdge FN I/O Module Configuration Guide and Command Line Reference Guide](#).

A.1 Uplink Failure Detection commands

The FN IOM ships with Uplink Failure Detection (UFD) enabled. This feature ensures that failover occurs properly if upstream links go down. The FN IOM uses LACP for the uplink port channel so administrators must also configure the corresponding connections at the upstream switch in an LACP port channel. If the upstream switch is not configured properly, Uplink Failure Detection will cause the internal server-facing ports to stay in a down state.

Administrators can disable UFD on a preconfigured FN IOM using the following commands:

```
Dell#configure
Dell(conf)#uplink-state-group 1
Dell(conf-uplink-state-group-1)#no enable

Dell#show uplink-state-group
Uplink State Group: 1    Status: Disabled, Down
```

Use the following commands to re-enable UFD:

```
Dell#configure
Dell(conf)#uplink-state-group 1
Dell(conf-uplink-state-group-1)#enable

Dell#show uplink-state-group
Uplink State Group: 1    Status: Enabled, Up
```

A.2 Port disabled by Uplink Failure Detection

In this example, port channel 128 is down on the FN IOM due to a disconnected or misconfigured upstream switch. When this happens, UFD disables the downstream server-facing ports (interfaces TenGigabitEthernet 0/1–8) on the FN IOM.

The following command output shows the status of server-facing interface TenGigabitEthernet 0/1 when port channel 128 is down. The line showing it has been disabled by UFD is highlighted.

```
Dell#show interfaces tengigabitethernet 0/1
TenGigabitEthernet 0/1 is up, line protocol is down(error-disabled[UFD])
Hardware is Delleth, address is f8:b1:56:6e:fc:59
  Current address is f8:b1:56:6e:fc:59
Server Port AdminState is N/A
Pluggable media not present
Interface index is 1048580
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :f8b1566efc59
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed auto
Flowcontrol rx off tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 01:26:42
Queueing strategy: fifo
Input Statistics:
  941 packets, 98777 bytes
  83 64-byte pkts, 591 over 64-byte pkts, 267 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
  694 Multicasts, 247 Broadcasts, 0 Unicasts
  0 runs, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  1474 packets, 238933 bytes, 0 underruns
  0 64-byte pkts, 204 over 64-byte pkts, 1071 over 127-byte pkts
  175 over 255-byte pkts, 24 over 511-byte pkts, 0 over 1023-byte pkts
  1198 Multicasts, 276 Broadcasts, 0 Unicasts
  0 throttles, 0 discarded, 0 collisions, 0 wredrops
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec,         0 packets/sec, 0.00% of line-rate
    Time since last interface status change: 00:00:17
```

A.3 Output of “show interfaces port channel 128” command

In the following command output, upstream port channel 128 is up on the FN IOM. As a result, UFD enables all downstream server-facing ports. The output also shows the port channel uses LACP, it has 40 Gbps bandwidth (shown as `LineSpeed 40000 Mbit`) and the port channel consists of four ports: `TenGigabitEthernet 0/9-12`.

```
Dell#show interfaces port-channel 128
Port-channel 128 is up, line protocol is up
Created by LACP protocol
Hardware address is f8:b1:56:5e:db:78, Current address is
f8:b1:56:5e:db:78
Interface index is 1258356736
Minimum number of links to bring Port-channel up is 1
Internet address is not set
Mode of IPv4 Address Assignment : NONE
DHCP Client-ID :f8b1565edb78
MTU 12000 bytes, IP MTU 11982 bytes
LineSpeed 40000 Mbit
Members in this channel:  Te 0/9(U) Te 0/10(U) Te 0/11(U) Te 0/12(U)
ARP type: ARPA, ARP Timeout 04:00:00
Queueing strategy: fifo
Input Statistics:
    871 packets, 113460 bytes
    433 64-byte pkts, 108 over 64-byte pkts, 242 over 127-byte pkts
    0 over 255-byte pkts, 88 over 511-byte pkts, 0 over 1023-byte pkts
    464 Multicasts, 24 Broadcasts, 383 Unicasts
    0 runs, 0 giants, 0 throttles
    0 CRC, 0 overrun, 0 discarded
Output Statistics:
    8667 packets, 1097173 bytes, 0 underruns
    258 64-byte pkts, 1299 over 64-byte pkts, 7021 over 127-byte pkts
    89 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte pkts
    8182 Multicasts, 150 Broadcasts, 335 Unicasts
    0 throttles, 0 discarded, 0 collisions, 0 wredrops
Rate info (interval 299 seconds):
    Input 00.00 Mbits/sec,          0 packets/sec, 0.00% of line-rate
    Output 00.00 Mbits/sec,        5 packets/sec, 0.00% of line-rate
Time since last interface status change: 00:27:17
```

B Accessing the FN IOM command line interface (CLI)

B.1 Accessing the CLI via the console port

To access the FN IOM CLI using a serial console, use the console port (upper USB port) on the FN IOM and connect it to a computer running VT100 terminal emulation software such as PuTTY or TeraTerm. The USB console port is implemented as a data terminal equipment (DTE) connector.

Use the serial cable provided with the FN IOM. The cable has a USB type-A connector for the console port and a DB-9 connector for the terminal.

Configure the terminal emulation software as follows:

- Select the appropriate serial port (for example, COM 1) to connect to the console.
- Set the data rate to `115200 baud`.
- Set the data format to `8 data bits, 1 stop bit, and no parity`.
- Set the flow control to `none`.
- Set the terminal emulation mode to `VT100` (if software has a mode setting).

The default enable password for the FN IOM is `calvin`.

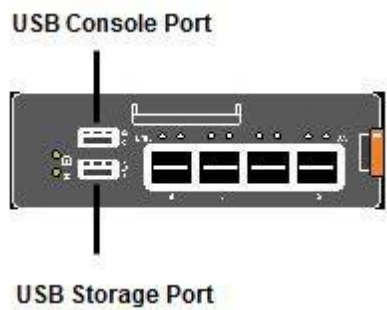


Figure 11 USB Ports on FN IOM

B.2 Accessing the CLI via Telnet or SSH

For remote out-of-band management, enter the management interface IP address of the FN IOM into a Telnet or SSH client and log in to the switch using the user name `root` and password `calvin`.

See Appendix C if the management IP address is unknown or needs to be configured.

C Viewing/configuring the management IP address

By default, the FN IOM is configured to receive its out-of-band management IP address via DHCP using the same physical Ethernet connection as the CMC. This interface only handles management traffic. If the management IP address is unknown or needs to be configured, use either the FN IOM's CLI or the CMC's GUI.

C.1 Viewing/configuring the management IP address via the CLI

If DHCP is enabled (default), and a DHCP server is available on the network, use the `show interfaces managementethernet 0/0` command to determine the DHCP-configured IP address, subnet mask, and default gateway. The following command and its output show the DHCP-assigned IP address is 172.25.210.218 and the subnet mask is 255.255.0.0. The DHCP server did not provide a default gateway in this example, as indicated by `Router: 0.0.0.0`.

```
Dell#show interfaces managementethernet 0/0
ManagementEthernet 0/0 is up, line protocol is up
Hardware is DellEth, address is f8:b1:56:5e:db:78
    Current address is f8:b1:56:5e:db:78
Pluggable media not present
Interface index is 7340033
Internet address is 172.25.210.218/16
Mode of IPv4 Address Assignment : DHCP

DHCP Client information:
Subnet Mask(1):255.255.0.0
Router(3):0.0.0.0
```

The following syntax shows how to configure a static IP address on the management interface if DHCP is not used. This example uses an IP address of 172.25.210.100 with a subnet mask of 255.255.255.0 (specified using /24 in CIDR notation):

```
Dell#configure
Dell(conf)#interface managementethernet 0/0
Dell(conf-if-ma-0/0)#ip address 172.25.210.100/24
```

The following syntax shows how to configure a static default gateway IP address for the management interface. This example uses 172.25.210.254 as the default gateway:

```
Dell#configure
Dell(conf)#management route 0.0.0.0/0 172.25.210.254
```

C.2 Viewing/configuring the management IP address via the CMC GUI

1. Connect to the CMC's GUI in a browser.
2. Navigate to Chassis Overview > I/O Module Overview in the left pane.
3. Select the **Setup** tab at the top of the right pane to open the **Configure I/O Module Network Settings** page.
4. Scroll down to the applicable slot for the FN IOM - **Slot A1** or **Slot A2**.

Note: Slot A1 is the top slot and slot A2 is the bottom slot on the FX2 chassis.

5. Scroll down to the **Network Settings** section. If DHCP is enabled (default), and a DHCP server is available on the network, the DHCP-configured **IP Address**, **Subnet Mask**, and **Gateway** display. In Figure 12, the DHCP-configured management interface IP address for the FN IOM in Slot A1 is 172.25.210.218.

If a static IP address is preferred, uncheck the **Enable DHCP** box, enter the network settings manually, and click **Apply**.

The screenshot shows the Dell Chassis Management Controller (CMC) GUI. The left sidebar contains a navigation tree with the following items: Chassis Overview, Chassis Controller, Server Overview (with sub-items: 1 WIN-IEBPQI76, 2 localhost (Com), 3 SLOT-03 (Com), 4 SLOT-04 (Com)), I/O Module Overview (with sub-items: A1 10 GbE KR, A2 10 GbE KR), Front Panel, Fans, Power Supplies, and Temperature Sensors. The main content area is titled 'Configure I/O Module Network Settings' and has tabs for Properties, Setup, Power, Troubleshooting, and Update. The 'Setup' tab is selected. Below the tabs, there is a 'Jump to:' section with links for Slot A1 and Slot A2. A message box states: 'Network setting changes may not be reflected immediately. Refreshing the page after delay will display the new settings.' The main content area shows 'Slot A1: Dell PowerEdge FN 410S IOM' with a table of attributes and values. The 'Network Settings' section is expanded, showing 'Enable DHCP' checked, 'IP Address' as 172.25.210.218, 'Subnet Mask' as 255.255.0.0, and 'Gateway' as 0.0.0.0.

Attribute	Value
Power State	On
Operation Status	Ready
Network Settings	
IPv4	Enable DHCP <input checked="" type="checkbox"/>
	IP Address 172.25.210.218
	Subnet Mask 255.255.0.0
	Gateway 0.0.0.0

Figure 12 Management IP address of FN IOM in CMC GUI

D Terminology

CIDR (Classless Inter-Domain Routing): Expresses the subnet mask using slash notation. For example, /16 means there are 16 leading 1-bits in the subnet mask, which is the same as 255.255.0.0.

CLI (Command Line Interface): Text-based interface for issuing commands to a device, typically accessed using the serial console, telnet, or SSH.

CMC (Chassis Management Controller): Allows out-of-band management of the Dell PowerEdge FX2 chassis, as well as servers and FN IOMs within the chassis.

DHCP (Dynamic Host Configuration Protocol): A network management protocol used to dynamically assign network settings to devices connected to a network.

Fault Tolerance: Enables a network to continue operating properly in the event of a failure of some of its components.

FN IOA (FN I/O Aggregator): Legacy term for FN IOM.

FN IOM (FN I/O Module): FN IOM refers to a switch module on the rear of the Dell PowerEdge FX2 chassis that receives and transmits network I/O from the blade servers. FN IOMs include the FN410S, FN410T and FN2210S.

GUI (Graphical User Interface): The Dell Blade I/O Manager and CMC interfaces discussed in this guide are GUIs and can also be referred to as Web User Interfaces since they are browser-based.

LACP (Link Aggregation Control Protocol): LACP controls the bundling (aggregating) of several physical ports to form a single logical channel. LACP allows a network device to negotiate an automatic bundling of links by sending LACP packets to the peer, which is a directly connected device that also implements LACP.

LAG (Link Aggregation Group): See Port Channel.

Out-of-Band: A separate management network on a switch or other networked device that takes management traffic off of the production network.

Port Channel: Port channels combine multiple physical interfaces into one logical interface. Port channels provide increased bandwidth, redundancy and load balancing.

Serial Console: The management interface that is accessible using the serial (or console) port on the switch.

SSH (Secure Shell): A network protocol that allows users to securely log in to a switch's CLI over a network. SSH uses Transmission Control Protocol port 22 by default.

Telnet: A network protocol that allows users to log in to a switch's CLI over a network. Unlike SSH, telnet connections are not secure. Telnet uses Transmission Control Protocol port 23 by default.

UFD (Uplink Failure Detection): When upstream connectivity fails, the FN IOM disables the downstream, server-facing links. This feature ensures failovers occur properly if links are lost upstream. The FN IOM uses

LACP for the uplink port channel so it is necessary for the corresponding connections at the upstream switch to also be configured as an LACP port channel.

E Support and Feedback

Contacting Technical Support

Support Contact Information

Web: <http://Support.Dell.com/>

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