Configuring GIR (Cisco NX-OS Release 7.3(0)N1(1))

This chapter contains the following sections:

- Information About GIR, on page 1
- Guidelines and Limitations for GIR, on page 7
- Configuring Custom Maintenance Mode and Custom Normal Mode Profile, on page 8
- Creating a Snapshot, on page 9
- Adding Show Commands to Snapshots, on page 10
- Dumping Snapshot Sections, on page 12
- Entering Maintenance Mode, on page 13
- Returning to Normal Mode, on page 18
- Deleting a Maintenance Profile, on page 19
- Configuration Examples for GIR, on page 20
- Verifying GIR, on page 27
- Feature History for GIR, on page 30

Information About GIR

You can use Graceful Insertion and Removal (GIR) to put a switch in maintenance mode in order to perform debugging or an upgrade. When switch maintenance is complete, you can return the switch to normal mode.

When you place the switch in maintenance mode, all protocols are isolated from the network. When normal mode is restored, all the protocols are brought back up.

In Cisco NX-OS Release 7.1(0)N1(1), the default mode for GIR is "**shutdown**". When you place the switch in maintenance mode, all protocols are gracefully brought down and all physical ports are shut down. When normal mode is restored, all the protocols and ports are brought back up. The following protocols are supported:

- Border Gateway Protocol (BGP)
- BGPv6
- Enhanced Interior Gateway Routing Protocol (EIGRP)
- EIGRPv6
- Intermediate System-to-Intermediate System (ISIS)

- ISISv6
- Open Shortest Path First (OSPF)
- OSPFv3
- RIP

Also supported are:

- Virtual port channel (vPC) and vPC+
- Interfaces
- FabricPath

Starting with Cisco NX-OS Release 7.3(0)N1(1), the default mode for GIR is "**isolate**". Use the **system mode maintenance** command to put all the enabled protocols in maintenance mode. The switch will use the **isolate** command to isolate the protocols from the network. The switch will then be isolated from the network but is not shut down. Routing protocols will be running on the switch to maintain neighborship with peer switches when it is isolated from the network. The **isolate** command is applied on the protocol instance and is applicable for the following protocols:

- Border Gateway Protocol (BGP)
- BGPv6
- Enhanced Interior Gateway Routing Protocol (EIGRP)
- EIGRPv6
- Intermediate System-to-Intermediate System (ISIS)
- ISISv6
- Open Shortest Path First (OSPF)
- OSPFv3
- FabricPath (Only applicable for Spine switches)

Note

- You can use the **system mode maintenance shutdown** command to use the "**shutdown**" mode for GIR as in the Cisco NX-OS Release 7.1(0)N1(1).
- When you cold boot a switch that has custom profile configured and is running a Cisco NX-OS Release 7.3(1)N1(1) image to any other Cisco NX-OS Release that does not support maintenance mode, the same configuration file cannot be used after write-erase reload.
- In normal mode, the processing of protocols will happen in an order that is the reverse of the order in which the protocols are processed in maintenance mode. Similarly, in maintenance mode, the processing of protocols will happen in an order that is the reverse of the order in which the protocols are processed in normal mode.

Maintenance Profile

Maintenance profile contains a set of commands that will be applied sequentially during graceful removal or graceful insertion.

By default, the system isolates all enabled protocols during graceful removal and restores them during graceful insertion. The protocols are isolated and restored in a predefined order.

The switch supports the following profiles:

- Maintenance-mode profile—Contains all the commands that will be executed during graceful removal, when the switch enters maintenance mode.
- Normal-mode profile—Contains all the commands that will be executed during graceful insertion, when the switch returns to normal mode.

System-generated Profile

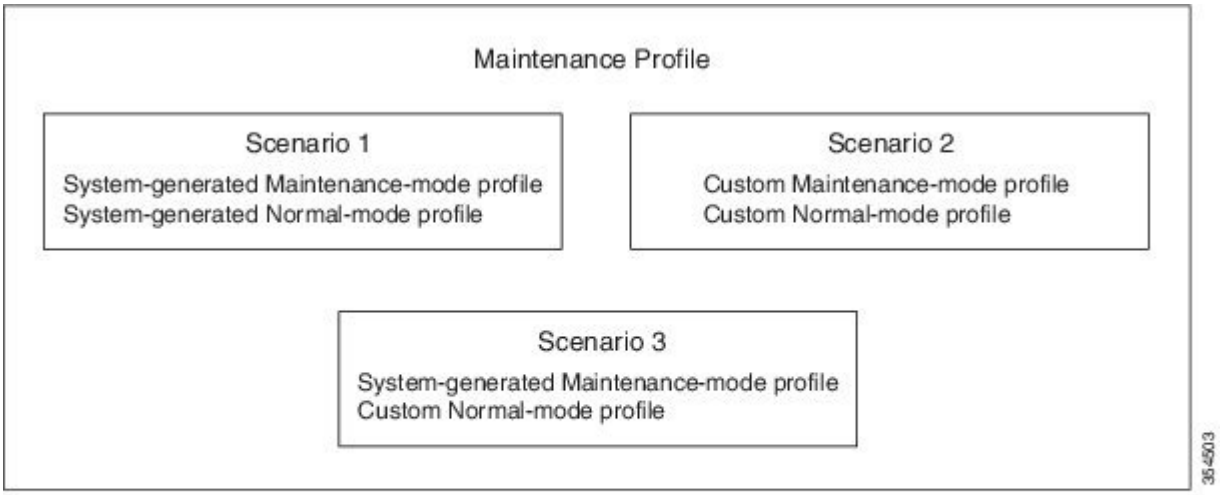
You can allow the system to generate a maintenance-mode or normal-mode profile with specific configuration commands. The system generates a maintenance-mode profile when you use the **system mode maintenance** command or a normal-mode profile when you use the **no system mode maintenance** command.

Custom Profile

You can create a custom maintenance-mode or normal-mode profile with configuration commands that can be applied during graceful removal or graceful insertion to isolate, shut down, or restore the protocols individually (or perform additional configurations). You can use a custom profile when the system-generated profile does not provide the required configuration or if you need to enhance the existing system-generated or custom profile to include additional functionality specific to your deployment. Use the **configure maintenance profile maintenance-mode** command to configure a custom maintenance-mode profile with the required commands or the **configure maintenance profile normal-mode** command to configure a custom normal-mode profile with the required commands.

The system-generated profile will overwrite the custom profile and vice-versa. The system can have either a system-generated maintenance-mode profile or a custom maintenance-mode profile at a time. Similarly, the system can have either a system-generated normal-mode profile or a custom normal-mode profile at a time. The scenarios are as given in the figure below:

Figure 1: Maintenance Profile Scenarios



Note We recommend using Scenario 1 or 2.

Unplanned Maintenance

You can put the switch in unplanned maintenance mode when the switch reloads due to a critical failure. For switches with a single supervisor, configure a reset reason CLI using the **system mode maintenance on-reload reset-reason** command to enable the switch to go into maintenance mode after a switch reloads due to a critical failure. For switches with dual supervisors, SUP switchover occurs when there is a critical failure of the switch and the switch will not go into maintenance mode. The maintenance-mode profile existing in the startup configuration is applied when the switch goes in to unplanned maintenance mode. If no maintenance mode profile exists in the startup configuration, a system-generated maintenance-mode profile is created and applied when the switch goes in to unplanned maintenance mode.

Maintenance Mode Timer

Use the **system mode maintenance timeout** command before entering maintenance mode to keep the switch in maintenance mode for a specified number of minutes. You can also use this command while the switch is in maintenance mode to change the number of minutes for which the switch will be in maintenance mode. The timer will then restart from that instant with the new timer value. Once the configured time elapses, the switch returns to normal mode automatically without using the **no system mode maintenance mode** command. Use the **no system mode maintenance timeout** command to disable the timer.

Snapshot

Use the **snapshot** command to capture the running states of selected features and to store the running states on the persistent storage media.

You can use snapshots to compare the state of a switch before it went into maintenance mode and after it came back to normal mode. The snapshot process consists of three parts:

- Creating a snapshot of the states of a few preselected features on the switch and storing them on the persistent storage media.
- Listing the snapshots taken at various time intervals and managing them.
- Comparing snapshots and showing the summary and details of each feature.

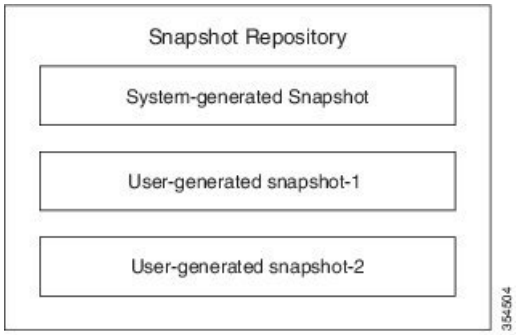
There are two types of snapshots:

- System-generated snapshot—This is generated by the system when you use the **[no] system mode maintenance** command. The system creates the before_maintenance snapshot just before the system goes into maintenance mode. The system creates the after_maintenance snapshot just before the system goes into normal mode. The system overwrites any old snapshots when you use the **[no] system mode maintenance** command. Use the **snapshot delete** {**all** | *snapshot-name*} command to delete the system-generated snapshots.

  In certain scenarios, the system-generated after_maintenance snapshot may be taken when hardware programming is ongoing. In such cases, we recommend taking a user-generated snapshot after the system has completed hardware programming and is in a stable state. You can then compare the new after_maintenance snapshot with the before_maintenance snapshot.
- User-generated snapshot—Use the **snapshot create** *name description* command to create a user-generated snapshot. Use the**snapshot delete** {**all** | *snapshot-name*} command to delete user-generated snapshots.

The system-generated and user-generated snapshots are stored in the snapshot repository.

Figure 2: Snapshot Repository



The following table lists the snapshot sections with the corresponding show commands:

Name of the Section	Corresponding 'show' command
bgp-sessions	show bgp sessions vrf all
eigrp	show ip eigrp topology summary
eigrpv6	show ipv6 eigrp topology summary
interface	show interface
ospf	show ip ospf vrf all
ospfv3	show ipv6 ospfv3 vrf all
isis	show isis database detail vrf all
rip	show ip rip vrf all
route-summary	show ip route summary vrf all
routev6-summary	show ipv6 route summary vrf all
vpc	show vpc

Suppress FIB Pending

The Suppress Forwarding Information Base (FIB) Pending feature uses the Border Gateway Protocol-Routing Information Base (BGP-RIB) and the Enhanced Interior Gateway Routing Protocol-Routing Information Base (EIGRP-RIB) feedback mechanism to avoid premature route advertisements and subsequent packet loss in a network. This mechanism is enabled by default and ensures that routes are installed locally before they are advertised to a neighbor.

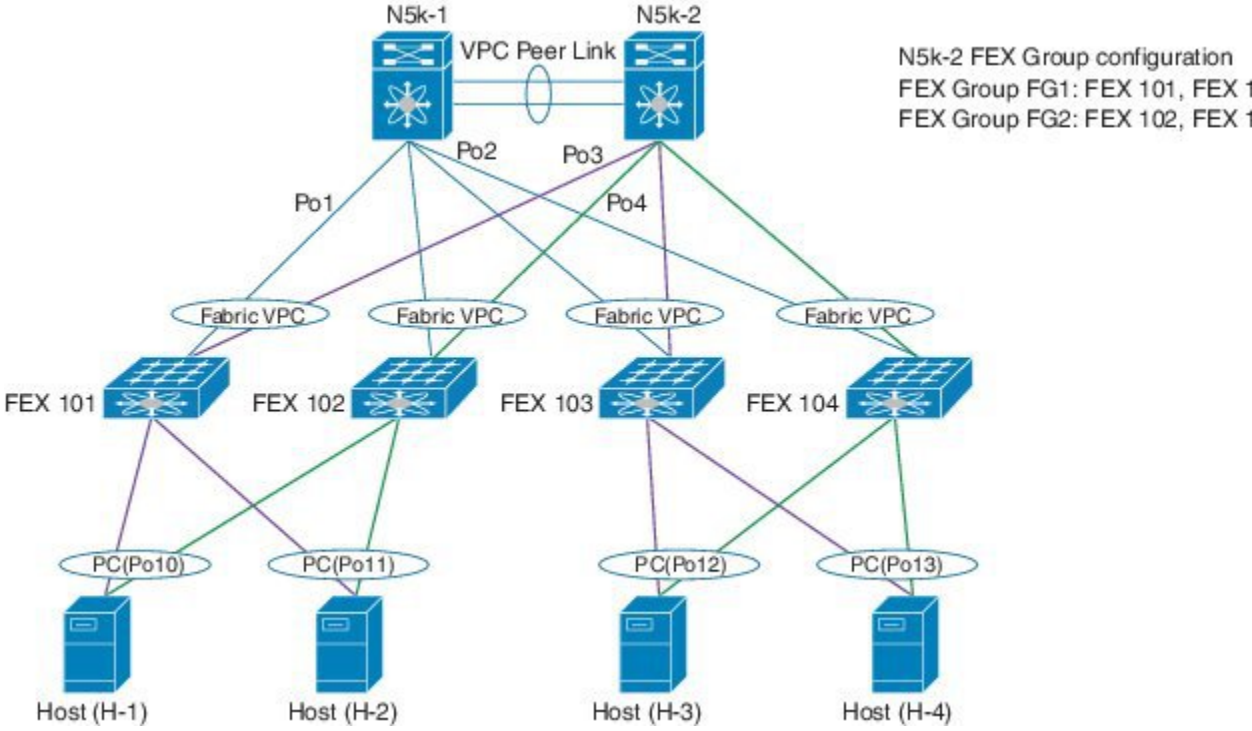
BGP and EIGRP wait for feedback from RIB indicating that the routes that EIGRP or BGP installed in the RIB are installed in the FIB before EIGRP or BGP sends out updates to the neighbors. EIGRP or BGP will send out updates of only those routes that have versions up to the version that FIB has installed. This selective update ensures that EIGRP or BGP does not send out premature updates resulting in attracting traffic even before the data plane is programmed after a switch reload, line card reload, or when the switch moves to normal mode from maintenance mode.

FEX Group GIR Functionality

You can use GIR to perform maintenance and software upgrade of the Cisco Nexus 5000, 5500 and 6000 Series switches and the connected FEXs in a dual homed vPC topology. A FEX group is a logical grouping of FEXs. A FEX group is added to optimize the procedure to bring up or take down the FEX.

Consider a scenario (refer figure below) where there are 2 FEX groups, FG1 and FG2 in a VPC domain. Assuming all hosts are redundantly connected, one leg is connected to one of the FEXs of FG1 and the other leg is connected to one of the FEXs of FG2. Before putting the “secondary” switch in maintenance mode, bring down FG1 to force all FEXs in FG1 to upgrade to newer version of image and establish connection to “primary” switch. After the connection to "primary" switch has been established, bring down FEXs of FG2 and then put the “secondary” switch in maintenance mode.

Figure 3: Sample Topology



Note Use the **fex-group** *name* command to create a FEX group. Use the **fex** *range* command to add or remove a FEX from the FEX-group. Use the **system fex-group** *name* **shutdown** command to shut down a FEX group. Use the**no system fex-group** *name* **shutdown** command to bring up a FEX group.

Guidelines and Limitations for GIR

- Custom maintenance profile has to be used for custom topologies and protocols that are not supported by automatic or system-generated profiles.
- Before starting with maintenance, ensure that the switch is not attracting any data traffic after the switch has been put in maintenance mode. You can use counters and statistics to ensure that there is no data traffic on the switch.
- Use the **system mode maintenance always-use-custom-profile** command when using custom profiles to ensure that the custom profile is not overwritten by the system-generated profile.
- Snapshot information is not copied automatically to the standby supervisor in a dual supervisor system.
- GIR may not provide zero application traffic loss for certain topologies and configurations.
- Starting with Cisco NX-OS Release 7.3(0)N1(1), we recommend not using the **configure profile [maintenance-mode | normal-mode] type admin** command and we strongly recommend using the **configure maintenance profile [maintenance-mode | normal-mode]** command.

- You cannot perform an in-service software upgrade (ISSU) or an in-service software downgrade (ISSD) in maintenance mode.

Configuring Custom Maintenance Mode and Custom Normal Mode Profile

You can create the maintenance-mode profile or normal-mode profile with configuration commands that can be applied during graceful removal or graceful insertion. We recommend using the **system mode maintenance always-use-custom-profile** command after configuring custom maintenance mode and custom normal mode profiles to ensure that custom profiles are always used during maintenance mode operations.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure maintenance profile** [**maintenance-mode** | **normal-mode**]	Enters a configuration session for the maintenance-mode profile or the normal-mode profile. **Note** Depending on which protocols you have configured, enter the appropriate commands to bring down the protocols.
Step 2	Required: switch# **end**	Closes the maintenance mode profile.

Example

This example shows how to create a custom maintenance mode profile:

```
switch# configure maintenance profile maintenance-mode
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom profile always for maintenance mode.
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# isolate
switch(config-mm-profile-router)# exit
switch(config-mm-profile)# sleep instance 1 10
switch(config-mm-profile)# interface ethernet 1/1
switch(config-mm-profile-if-verify)# shutdown
switch(config-mm-profile-if-verify)# end
Exit maintenance profile mode.
```

This example shows how to create a custom normal mode profile:

```
switch# configure maintenance profile normal-mode
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom profile always for maintenance mode.
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# interface ethernet 1/1
```

```
switch(config-mm-profile-if-verify)# no shutdown
switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# sleep instance 1 20
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# no isolate
switch(config-mm-profile-router)# end
Exit maintenance profile mode.
```

```
switch# show maintenance profile
[Normal Mode]
interface Ethernet1/1
no shutdown
sleep instance 1 20
router bgp 100
no isolate
[Maintenance Mode]
router bgp 100
isolate
sleep instance 1 20
interface Ethernet1/1
shutdown
```

Creating a Snapshot

You can create a snapshot of the running states of selected features. When you create a snapshot, a predefined set of show commands are run and the outputs are saved.

Procedure

	Command or Action	Purpose
Step 1	switch# **snapshot create** *name description*	Creates a snapshot. The *name* variable can be 64 characters in length. The *description* variable can be 256 characters in length. Use the **snapshot delete** {**all** | *snapshot-name*} command to delete all snapshots or a specific snapshot.
Step 2	(Optional) switch# **show snapshots**	Displays snapshots present on the switch.
Step 3	(Optional) switch# **show snapshots compare** *snapshot-name-1 snapshot-name-2* [**summary**]	Displays a comparison of two snapshots. The **summary** keyword displays just enough information to see the overall changes between the two snapshots.

Example

This example shows how to create a snapshot:

```
switch# snapshot create before_maint taken before maint
Executing 'show interface'... Done
Executing 'show ip route summary vrf all'... Done
Executing 'show ipv6 route summary vrf all'... Done
Executing 'show bgp sessions vrf all'... Done
```

```
Executing 'show ip eigrp topology summary'... Done
Executing 'show ipv6 eigrp topology summary'... Done
Executing 'show vpc'... Done
Executing 'show ip ospf vrf all'... Done
Feature 'ospfv3' not enabled, skipping...
Executing 'show isis database detail vrf all'... Done
Executing 'show ip rip vrf all'... Done
Executing user-specified 'show ip route detail vrf all'... Done
Snapshot 'before_maint' created
```

This example shows how to display the snapshots present on the switch:

```
switch# show snapshots
Snapshot Name           Time                          Description
-----------------------------------------------------------------------------
before_maint            Wed Oct 14 10:56:50 2015      taken before maint
```

This example displays a comparison between two snapshots:

```
switch# show snapshots compare before_maintenance after_maintenance summary
=============================================================================
Feature changed                       before_maintenance after_maintenance
=============================================================================
basic summary
   # of interfaces                          50               50
   # of vlans                               0                0
   # of ipv4 routes  vrf default            13               13
   # of ipv4 paths   vrf default            13               13
   # of ipv4 routes  vrf management         14               14
   # of ipv4 paths   vrf management         14               14
   # of ipv6 routes  vrf default            3                3
   # of ipv6 paths   vrf default            3                3

interfaces
   # of eth interfaces                      48               48
   # of eth interfaces up                   1                1
   # of eth interfaces down                 47               47
   # of eth interfaces other                0                0

   # of vlan interfaces                     0                0
   # of vlan interfaces up                  0                0
   # of vlan interfaces down                0                0
   # of vlan interfaces other               0                0
```

This example shows how to delete a snapshot:

```
switch# snapshot delete before_maint
switch# show snapshots
Snapshot Name           Time                          Description
-----------------------------------------------------------------------------
```

Adding Show Commands to Snapshots

You can specify additional **show** commands to be captured in snapshots. These **show** commands are defined in user-specified snapshot sections.

Procedure

	Command or Action	Purpose
Step 1	switch# **snapshot section add** *section "show-command" row-id element-key1* [*element-key2*]	Adds a user-specified section to snapshots. The *section* variable is used to name the **show** command output. You can use any word to name the section. The **show** command must be enclosed in quotation marks. Non-**show** commands will not be accepted. The *row-id* argument specifies the tag of each row entry of the **show** command's XML output. The *element-key1* and *element-key2* arguments specify the tags used to distinguish among row entries. In most cases, only the *element-key1* argument needs to be specified to be able to distinguish among row entries. **Note** To delete a user-specified section from snapshots, use the **snapshot section delete** *section* section command.
Step 2	(Optional) switch# **show snapshots sections**	Displays the user-specified snapshot sections.

Example

The following example shows how to add the **show ip route detail vrf all** command to the snapshot:

```
switch# snapshot section add v4route "show ip route detail vrf all" ROW_prefix ipprefix
switch# show snapshots sections
user-specified snapshot sections
--------------------------------
[v4route]
show command: show ip route detail vrf all
row id: ROW_prefix
key1: ipprefix
key2: -
```

The following example shows how to add the **show ipv6 route detail vrf all** command to the snapshot:

```
switch# snapshot section add routev6 "show ipv6 route detail vrf all" ROW_prefix ipprefix
added section "routev6"

switch# show snapshots sections
user-specified snapshot sections
--------------------------------
[routev6]
show command: show ipv6 route detail vrf all
row id: ROW_prefix
key1: ipprefix
key2: -
```

The following example shows how to delete a user-specified snapshot section:

```
switch# snapshot section delete v4route
deleted section ”v4route"

switch# show snapshots sections
user-specified snapshot sections
--------------------------------
none
```

The following example displays the XML output of the **show ip route detail vrf all** command:

```
switch(config)# show ip route detail vrf all | xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<nf:rpc-reply xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" xmlns="http://w
ww.cisco.com/nxos:7.3.0.N1.1.:urib">
 <nf:data>
  <show>
   <ip>
       <__readonly__>
         <TABLE_vrf>
          <ROW_vrf>
           <vrf-name-out>default</vrf-name-out>
           <TABLE_addrf>
            <ROW_addrf>
             <addrf>ipv4</addrf>
             <TABLE_prefix>
              <ROW_prefix>
               <ipprefix>0.0.0.0/32</ipprefix>
               <ucast-nhops>1</ucast-nhops>
               <mcast-nhops>0</mcast-nhops>
               <attached>false</attached>
              … <snip>
              </ROW_prefix>
```

Dumping Snapshot Sections

Procedure

	Command or Action	Purpose
Step 1	switch# **show snapshots dump** *snapshot-name*	Displays the content of the various sections in a generated snapshot.

Example

The following example shows how to dump content of the various sections in a generated snapshot:

```
switch# show snapshots dump new
File:  interface.xml        Snapshot:  new
========================================================================
<?xml version="1.0" encoding="ISO-8859-1"?>
<nf:rpc-reply xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" xmlns="http://w
ww.cisco.com/nxos:7.3.0.N1.1.:if_manager">
 <nf:data>
  <show>
```

```
<interface>
 <__readonly__>
  <TABLE_interface>
   <ROW_interface>
    <interface>mgmt0</interface>
    <state>up</state>
    <admin_state>up</admin_state>
    <eth_hw_desc>GigabitEthernet</eth_hw_desc>
    <eth_hw_addr>5cfc.666d.3b34</eth_hw_addr>
    <eth_bia_addr>5cfc.666d.3b34</eth_bia_addr>
    <eth_ip_addr>5.24.100.101</eth_ip_addr>
    <eth_ip_mask>16</eth_ip_mask>
    <eth_ip_prefix>5.24.0.0</eth_ip_prefix>
    <eth_mtu>1500</eth_mtu>
 … <snip> …
```

Entering Maintenance Mode

If you are going to create your own profile rather than using the system mode maintenance command to do it for you, see the Configuring Custom Maintenance Mode and Custom Normal Mode Profile section.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **system mode maintenance** [**always-use-custom-profile** |**dont-generate-profile** |**on-reload reset-reason** *reason* |**shutdown** |**timeout** *value*]	Puts all enabled protocols in maintenance mode (using the **isolate** command). Use the **dont-generate-profile** and **shutdown** options to put the switch in maintenance mode. • **dont-generate-profile**—Prevents the dynamic searching of enabled protocols and executes commands configured in a maintenance mode profile. Use this option if you want the system to execute commands in a custom maintenance mode profile. • **shutdown**—Shuts down all protocols and interfaces except the management interface (using the **shutdown** command). This option is disruptive while the default (using the **isolate** command) is not. The **on-reload reset-reason**, **timeout** and **always-use-custom-profile** options are used to configure maintenance mode parameters and will not put the switch in maintenance mode. • **timeout** *value*—Keeps the switch in maintenance mode for a specified number of minutes. The range is from 5 to 65535.

	Command or Action	Purpose
		We recommend setting the timeout value to at least 60 minutes. Once the configured time elapses, the switch returns to normal mode automatically. The **no system mode maintenance timeout** command disables the timer • **on-reload reset-reason** *reason*—Boots the switch into maintenance mode automatically in the event of a specified system crash. The **no system mode maintenance on-reload reset-reason** command prevents the switch from being brought up in maintenance mode in the event of a system crash. The maintenance mode reset reasons are as follows: • HW_ERROR—Hardware error • SVC_FAILURE—Critical service failure • KERN_FAILURE—Kernel panic • WDOG_TIMEOUT—Watchdog timeout • FATAL_ERROR—Fatal error • MANUAL_RELOAD---Manual reload • MAINTENANCE—Reloads the switch in maintenance mode if the switch was already in maintenance mode before reload. • MATCH_ANY—Any of the above reasons • ANY_OTHER—Any reload reason not specified above. The system prompts you to continue. Enter y to continue or n to terminate the process. **Note** We recommend configuring the reset reason and saving it to the startup configuration. This enables the switch to go into the maintenance mode after a switch reloads due to any reason.

	Command or Action	Purpose
		• **always-use-custom-profile**—Use this option to apply the existing custom maintenance mode profile and prevent creation of autogenerated maintenance mode profile. This option forces the dont-generate-profile option to be used even if it has not been specified using the **system mode maintenance** command. You cannot use the "shutdown" option when this option is being used.
Step 3	(Optional) switch# **show system mode**	Displays the current system mode. This command also displays the current state of the maintenance mode timer when the switch is in maintenance mode.

Example

This example shows how to put all the protocols in maintenance mode using the **system mode maintenance** command on a switch running the Cisco NX-OS Release 7.3(0)N1(1):

```
switch# configure terminal
switch(config)# system mode maintenance
Following configuration will be applied:

router bgp 100
  isolate
router ospf 100
  isolate
router isis 100
  isolate

Do you want to continue (y/n)? [no] y

Generating a snapshot before going into maintenance mode

Starting to apply commands...

Applying : router bgp 100
Applying :   isolate
Applying : router ospf 100
Applying :   isolate
Applying : router isis 100
Applying :   isolate

Maintenance mode operation successful.
```

This example shows how to shut down all protocols and interfaces on the switch:

```
switch# configure terminal
switch(config)# system mode maintenance shutdown
Following configuration will be applied:

router bgp 64581
  shutdown
```

```
router eigrp p2
  shutdown
  address-family ipv6 unicast
    shutdown
router eigrp 0
  shutdown
  address-family ipv6 unicast
    shutdown
router ospf 200
  shutdown
router isis 70
  shutdown
vpc domain 2
  shutdown
system interface shutdown

NOTE: 'system interface shutdown' will shutdown all interfaces excluding mgmt 0
Do you want to continue (yes/no)? [no] yes

Generating a snapshot before going into maintenance mode

Starting to apply commands...

Applying : router bgp 64581
Applying :   shutdown
Applying : router eigrp p2
Applying :   shutdown
Applying :   address-family ipv6 unicast
Applying :     shutdown
Applying : router eigrp 0
Applying :   shutdown
Applying :   address-family ipv6 unicast
Applying :     shutdown
Applying : router ospf 200
Applying :   shutdown
Applying : router isis 70
Applying :   shutdown
Applying : vpc domain 2
Applying :   shutdown2016 Jan 15 11:10:36.080386 CP-BL26-N7K-1A %$ VDC-1 %$
%VPC-2-VPC_SHUTDOWN: vPC shutdown status is ON

Applying : system interface shutdown

Maintenance mode operation successful.
switch(config)# 2016 Jan 15 11:10:42.057678 switch %$ VDC-1 %$ %MMODE-2-MODE_CHANGED: System
 changed to "maintenance" mode.
2016 Jan 15 11:10:42.058167 switch %$ VDC-1 %$ %MMODE-2-MODE_CHANGE_WARN: System will be
moved to "normal" mode in 5 minutes
```

This example shows how to keep the switch in maintenance mode for a specific number of minutes:

```
switch# configure terminal
switch (config)# system mode maintenance timeout 25

switch# show system mode
System Mode: Maintenance
Maintenance Mode Timer: 24 minutes 55 seconds remaining
```

This example shows how to automatically boot the switch into maintenance mode if a fatal error occurs:

```
switch# configure terminal
switch(config)# system mode maintenance on-reload reset-reason fatal_error
```

This example shows how to place the switch in maintenance mode by using a previously created maintenance mode profile :

```
switch# configure terminal
switch(config)# system mode maintenance dont-generate-profile

Following configuration will be applied:

router bgp 100
  isolate
sleep instance 1 10
interface Ethernet1/1
  shutdown

Do you want to continue (y/n)? [no] y

Generating a snapshot before going into maintenance mode

Starting to apply commands...

Applying : router bgp 100
Applying :   isolate
Applying : sleep instance 1 10
Applying : interface Ethernet1/1
Applying :   shutdown

Maintenance mode operation successful.
```

This example shows how to apply the existing custom maintenance mode profile and prevent creation of auto-generated maintenance mode profile:

```
switch# configure terminal
switch(config)# system mode maintenance always-use-custom-profile
```

This example shows how to put the switch in maintenance mode without presenting any switch prompts:

```
switch# configure terminal
switch(config)# system mode maintenance non-interactive
System mode switch to maintenance mode started. Will continue in background.
switch(config)# 2016 Dec  5 08:46:42 switch %$ VDC-1 %$ %MMODE-2-MODE_CHANGED: System changed
 to "maintenance" mode.

switch(maint-mode)(config)#
```

This example shows how to change the snapshot delay timer value:

```
switch# configure terminal
switch(config)# system mode maintenance snapshot-delay 150
```

Returning to Normal Mode

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	Required: switch# **no system mode maintenance** [**dont-generate-profile** | **non-interactive**]	Executes a previously created normal mode profile file or a dynamically created normal mode profile file. The **dont-generate-profile** keyword suppresses the creation of the normal mode maintenance profile and also prevents reusing the existing normal mode maintenance profile. The **non-interactive** keyword enables the switch to exit the maintenance mode without presenting any switch prompts. The system prompts you to continue. Enter **y** to continue or **n** to terminate the process. **Note** For large configurations, the interfaces will be up after a certain interval of time.

Example

This example shows how to return to normal mode from maintenance mode on a switch running the Cisco NX-OS Release 7.3(0)N1(1):

```
switch# configure terminal
switch(config)# no system mode maintenance
Following configuration will be applied:

interface Ethernet1/1
  no shutdown
sleep instance 1 20
router bgp 100
  no isolate

Do you want to continue (y/n)? [no] yes

Starting to apply commands...

Applying : interface Ethernet1/1
Applying :   no shutdown
Applying : sleep instance 1 20
Applying : router bgp 100
Applying :   no isolate

Maintenance mode operation successful.

Generating Current Snapshot

Please use 'show snapshots compare before_maintenance after_maintenance' to check the health
```

```
 of the system
switch(config)#


switch(config)# show system mode
System Mode: Normal
```

This example shows how to return to normal mode from maintenance mode by using the **dont-generate-profile** keyword:

```
switch(config)# no system mode maintenance dont-generate-profile
Following configuration will be applied:

interface Ethernet1/1
  no shutdown
sleep instance 1 20
router bgp 100
  no isolate

Do you want to continue (y/n)? [no] yes

Starting to apply commands...

Applying : interface Ethernet1/1
Applying :   no shutdown
Applying : sleep instance 1 20
Applying : router bgp 100
Applying :   no isolate

Maintenance mode operation successful.

The after_maintenance snapshot will be generated in 120 seconds
After that time, please use 'show snapshots compare before_maintenance after_maintenance'
to check the health of the system
switch(config)# 2016 Dec  5 08:51:46 switch %$ VDC-1 %$ %MMODE-2-MODE_CHANGED: System changed
 to "normal" mode.


switch(config)# show system mode
System Mode: Normal
```

Deleting a Maintenance Profile

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	Required: switch# **no configure maintenance profile** {**normal-mode** | **maintenance-mode**}	Deletes the normal mode or maintenance mode profiles.

Example

This example shows how to delete a maintenance profile:

```
switch# configure terminal
switch(config)# no configure maintenance profile maintenance-mode
```

Configuration Examples for GIR

This example shows how to create custom maintenance mode profile:

```
switch# configure maintenance profile maintenance-mode
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom
profile always for maintenance mode.
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# isolate
switch(config-mm-profile-router)# exit
switch(config-mm-profile)# sleep instance 1 10
switch(config-mm-profile)# interface ethernet 1/1
switch(config-mm-profile-if-verify)# shutdown
switch(config-mm-profile-if-verify)# end
Exit maintenance profile mode.
```

This example shows how to create custom normal mode profile:

```
switch# configure maintenance profile normal-mode
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom
profile always for maintenance mode.
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# interface ethernet 1/1
switch(config-mm-profile-if-verify)# no shutdown
switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# sleep instance 1 20
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# no isolate
switch(config-mm-profile-router)# end
Exit maintenance profile mode.
```

This example shows how to create a custom maintenance mode and normal mode profile for IPv6 protocols:

```
switch# configure terminal
switch(config)# configure maintenance profile maintenance-mode
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom
profile always for maintenance mode.
switch(config-mm-profile)# router ospfv3 ospf_ipv6
switch(config-mm-profile-router)# shutdown
switch(config-mm-profile-router)# exit
switch(config-mm-profile)# router eigrp 660
switch(config-mm-profile-router)# address-family ipv6 unicast
switch(config-mm-profile-router-af)# shutdown
switch(config-mm-profile-router-af)# exit
switch(config-mm-profile)# router isis isp
switch(config-mm-profile-router)# set-overload-bit always
switch(config-mm-profile-router)# address-family ipv6 unicast
switch(config-mm-profile-router-af)# shutdown
switch(config-mm-profile-router-af)# exit


switch# configure terminal
switch(config)# configure maintenance profile normal-mode
```

```
Please configure 'system mode maintenance always-use-custom-profile' if you want to use
custom
profile always for maintenance mode.
switch(config-mm-profile)# router isis isp
switch(config-mm-profile-router)# no set-overload-bit always
switch(config-mm-profile-router)# address-family ipv6 unicast
switch(config-mm-profile-router-af)# no shutdown
switch(config-mm-profile-router-af)# exit
switch(config-mm-profile)# router eigrp 660
switch(config-mm-profile-router)# address-family ipv6 unicast
switch(config-mm-profile-router-af)# no shutdown
switch(config-mm-profile-router-af)# exit
switch(config-mm-profile)# router ospfv3 ospf_ipv6
switch(config-mm-profile-router)# no shutdown
switch(config-mm-profile-router)# exit


switch# show maintenance profile
[Normal mode]
router isis isp
  no set-overload-bit always
  address-family ipv6 unicast
   no shutdown
router eigrp 660
  address-family ipv6 unicast
   no shutdown
router ospfv3 ospf_ipv6
   no shutdown
[Maintenance Mode]
router ospfv3 ospf_ipv6
  shutdown
router eigrp 660
  address-family ipv6 unicast
   shutdown
router isis isp
  set-overload-bit always
  address-family ipv6 unicast
   shutdown
```

This example shows how to create a custom maintenance mode profile and custom normal mode profile for VPC:

```
switch# configure terminal
switch(config)# configure maintenance profile maintenance-mode
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# isolate
switch(config-mm-profile-router)# exit
switch(config-mm-profile)# interface port channel 5
switch(config-mm-profile-if-verify)# vpc orphan port suspend
switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# interface port channel 6
switch(config-mm-profile-if-verify)# vpc orphan port
suspend switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# sleep instance 1 5
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# shutdown


switch# configure terminal
switch(config)# configure maintenance profile normal-mode
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# no shutdown
switch(config-mm-profile-vpc-domain)# exit
switch(config-mm-profile)# sleep instance 1 60
```

```
switch(config-mm-profile)# interface port channel 5
switch(config-mm-profile-if-verify)# no vpc orphan port suspend
switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# interface port channel 6
switch(config-mm-profile-if-verify)# no vpc orphan port suspend
switch(config-mm-profile-if-verify)# exit
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# no isolate


switch# show maintenance profile
[Normal Mode]
vpc domain 1
  no shutdown
sleep instance 1 60
interface port-channel 5
  no vpc orphan-port suspend
interface port-channel 6
  no vpc orphan-port suspend router
bgp 100
  no isolate

[Maintenance Mode]
router bgp 100
  isolate
interface port-channel 5 vpc
  orphan-port suspend
interface port-channel 6 vpc
  orphan-port suspend
sleep instance 1 5
  vpc domain 1 shutdown
```

This example shows how to use the **isolate** command to put all protocols into maintenance mode:

```
switch(config)# system mode maintenance

Following configuration will be applied:

router bgp 100
  isolate
router ospf 100
  isolate
router isis 100
  isolate

Do you want to continue (y/n)? [no] y

Generating a snapshot before going into maintenance mode

Starting to apply commands...

Applying : router bgp 100
Applying :   isolate
Applying : router ospf 100
Applying :   isolate
Applying : router isis 100
Applying :   isolate

Maintenance mode operation successful.
```

This example shows how to shut down all protocols and interfaces on the switch:

```
switch# configure terminal
switch(config)# system mode maintenance shutdown

Following configuration will be applied:

router bgp 64581
  shutdown
router eigrp p2
  shutdown
  address-family ipv6 unicast
    shutdown
router eigrp 0
  shutdown
  address-family ipv6 unicast
    shutdown
router ospf 200
  shutdown
router isis 70
  shutdown
vpc domain 2
  shutdown
system interface shutdown

NOTE: 'system interface shutdown' will shutdown all interfaces excluding mgmt 0
Do you want to continue (yes/no)? [no] yes

Generating a snapshot before going into maintenance mode

Starting to apply commands...

Applying : router bgp 64581
Applying :   shutdown
Applying : router eigrp p2
Applying :   shutdown
Applying :   address-family ipv6 unicast
Applying :     shutdown
Applying : router eigrp 0
Applying :   shutdown
Applying :   address-family ipv6 unicast
Applying :     shutdown
Applying : router ospf 200
Applying :   shutdown
Applying : router isis 70
Applying :   shutdown
Applying : vpc domain 2
Applying :   shutdown2016 Jan 15 11:10:36.080386 CP-BL26-N7K-1A %$ VDC-1 %$
%VPC-2-VPC_SHUTDOWN: vPC shutdown status is ON

Applying : system interface shutdown

Maintenance mode operation successful.
switch(config)# 2016 Jan 15 11:10:42.057678 CP-BL26-N7K-1A %$ VDC-1 %$ %MMODE-2-MODE_CHANGED:
 System changed to "maintenance" mode.
2016 Jan 15 11:10:42.058167 CP-BL26-N7K-1A %$ VDC-1 %$ %MMODE-2-MODE_CHANGE_WARN: System
will be moved to "normal" mode in 5 minutes
```

This example shows how to return to normal mode from maintenance mode:

```
switch# configure terminal
switch(config)# no system mode maintenance dont-generate-profile

Following configuration will be applied:
interface Ethernet1/1
  no shutdown
```

```
  sleep instance 1 20
router bgp 100
  no isolate
Do you want to continue (y/n)? [no] yes
Starting to apply commands...
Applying : interface Ethernet1/1
Applying :   no shutdown
Applying : sleep instance 1 20
Applying : router bgp 100
Applying :   no isolate
Maintenance mode operation successful.
Generating Current Snapshot
Please use 'show snapshots compare before_maintenance after_maintenance' to check the
health of the system
```

This example shows how to create custom maintenance mode and normal mode profiles for FabricPath:

```
switch# configure maintenance profile maintenance-mode
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# fabricpath domain default
switch(config-mm-profile-fabricpath-isis)# set-overload-bit always
switch(config-mm-profile-fabricpath-isis)# end
Exit maintenance profile mode.
switch#

switch# configure maintenance profile normal-mode
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# fabricpath domain default
switch(config-mm-profile-fabricpath-isis)# no set-overload-bit always
switch(config-mm-profile-fabricpath-isis)# end
Exit maintenance profile mode.
switch#


switch# show maintenance profile
[Normal Mode]
fabricpath domain default
  no set-overload-bit always
[Maintenance Mode]
fabricpath domain default
  set-overload-bit always
```

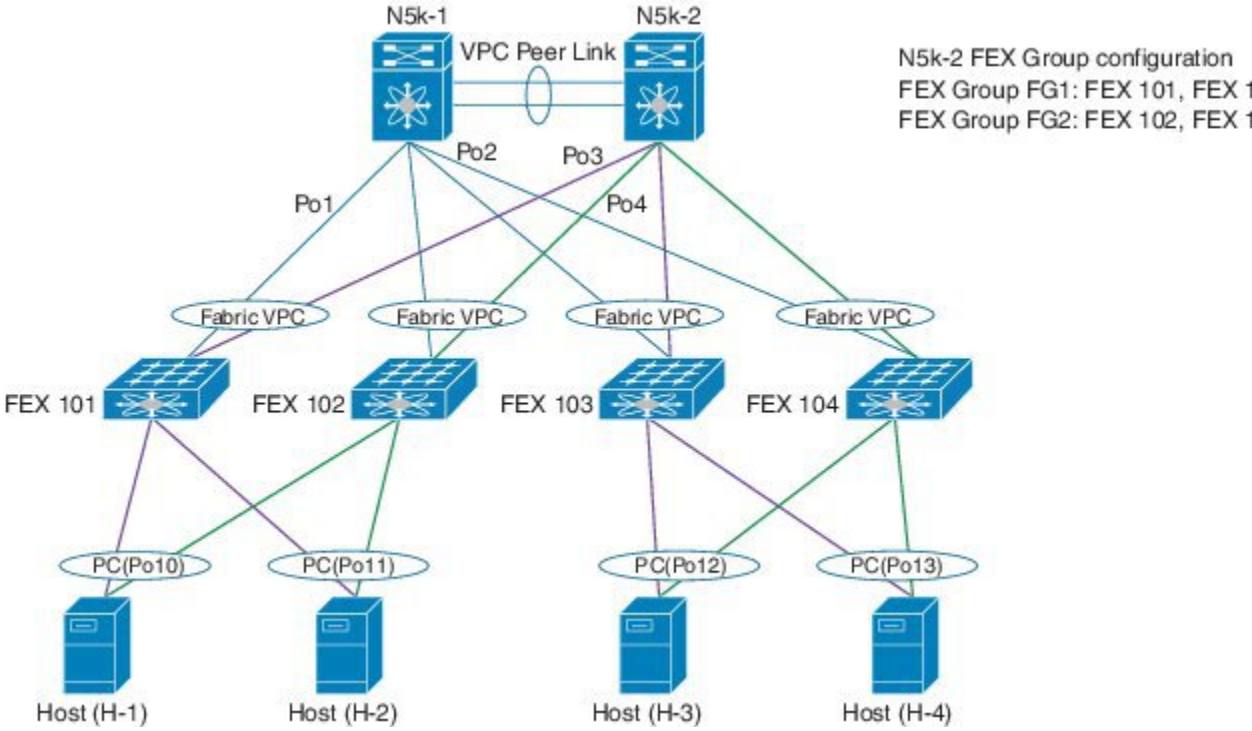
This example shows how to create custom maintenance mode and normal mode profiles for a virtual Port Channel (vPC):

```
switch# configure maintenance profile maintenance-mode
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# shutdown
switch(config-mm-profile-vpc-domain)# exit
switch(config-mm-profile)# system interface shutdown
switch(config-mm-profile)# end
Exit maintenance profile mode.
switch#


switch# configure maintenance profile normal-mode
Enter configuration commands, one per line. End with CNTL/Z.
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# no shutdown
switch(config-mm-profile-vpc-domain)# exit
switch(config-mm-profile)# no system interface shutdown
switch(config-mm-profile)# end
```

```
Exit maintenance profile mode.
switch#


switch# show maintenance profile
[Normal Mode]
vpc domain 1
  no shutdown
no system interface shutdown
[Maintenance Mode]
vpc domain 1
  shutdown
system interface shutdown
```

Note Use the **fex-group** *name* command to create a FEX group. Use the **fex** *range* command to add or remove a FEX from the FEX-group. Use the **system fex-group** *name* **shutdown** command to shut down a FEX group. Use the**no system fex-group** *name* **shutdown** command to bring up a FEX group

This example shows how to create a maintenance mode profile and normal mode profile for upgrading vPC with FEX (refer topology below):



N5K-1 configuration:

```
switch# configure terminal
switch(config)# configure maintenance profile maintenance-mode
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# shutdown
switch(config-mm-profile)# system interface shutdown
switch# configure terminal
switch(config)# configure maintenance profile normal-mode
```

```
switch(config-mm-profile)# no system interface shutdown
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# no shutdown
```

```
N5K-2 configuration:
switch# configure terminal
switch(config)# configure maintenance profile maintenance-mode
switch(config-mm-profile)# system fex-group fg1 shutdown
switch(config-mm-profile)# sleep 900
switch(config-mm-profile)# system fex-group fg2 shutdown
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# shutdown
switch(config-mm-profile-vpc-domain)# exit
switch(config-mm-profile)# system interface shutdown

switch# configure terminal
switch(config)# configure maintenance profile normal-mode
switch(config-mm-profile)# no system interface shutdown
switch(config-mm-profile)# vpc domain 1
switch(config-mm-profile-vpc-domain)# no shutdown
switch(config-mm-profile-vpc-domain)#  exit
switch(config-mm-profile)# no system fex-group fg2 shutdown
switch(config-mm-profile)# no system fex-group fg1 shutdown
```

This example shows the configuration to be used when there are port-channel or regular L2 ethernet interfaces (except vPC peer link) which carry vPC VLAN traffic and when the corresponding Switch Virtual Interface (SVI) state should not be controlled by these interfaces:

```
Port-channel configuration
switch(config)# interface port-channel3
switch(config-if)# description "L2-Cross Link eth3/3 eth4/3 eth5/3 eth6/3"
switch(config-if)# switchport
switch(config-if)# switchport mode trunk
switch(config-if)# switchport trunk allowed vlan 1101-1500
switch(config-if)# spanning-tree port type network
switch(config-if)# lacp min-links 2
switch(config-if)# switchport autostate exclude vlan 1101-1500


L2 Ethernet configuration
switch(config)# interface ethernet 3/3
switch(config-if)# switchport
switch(config-if)# switchport mode trunk
switch(config-if)# switchport trunk allowed vlan 1101-1500
switch(config-if)# switchport autostate exclude vlan 1101-1500
```

The "redistribute direct" configuration under Border Gateway Protocol (BGP) will attract traffic as the BGP **isolate** mode does not withdraw direct routes. This example shows how to use the **route-map** command to enable BGP to withdraw direct routes in **isolate** mode:

Policy Configuration

Use **route-map my-rmap-deny** in maintenance mode configuration to exclude SVIs having tag 200 configuration.

```
switch(config)# route-map my-rmap-deny deny 10
switch(config-route-map)# match tag 200
switch(config-route-map)# exit
switch(config)# route-map my-rmap-deny permit 20
```

Use **route-map my-rmap-permit** in normal mode configuration to include SVIs having tag 200 configuration.

```
switch(config)# route-map my-rmap-permit permit 10
switch(config-route-map)# match tag 200
switch(config-route-map)# exit
switch(config)# route-map my-rmap-permit permit 20
```

Virtual IP (vIP)/ Switch Virtual Interface (SVI) configuration

```
switch(config)# interface loopback 200
switch(config-if)# ip address 192.0.2.100/8 tag 200
switch(config)# interface vlan 2
switch(config-if)# ip address 192.0.2.108/8 tag 200
....
switch(config)# interface vlan 3
switch(config-if)# ip address 192.0.2.102/8 tag 200
```

BGP configuration

```
switch(config)# feature bgp
switch(config)# router bgp 100
switch(config-router)# neighbor 192.0.2.100
....
```

Maintenance mode profile

```
switch# configure maintenance profile maintenance-mode
switch(config-mm-profile)# router bgp 200
switch(config-mm-profile-router)# address-family ipv4 unicast
switch(config-mm-profile-router-af)# redistribute direct route-map my-rmap-deny
switch(config-mm-profile-router-af)# exit
switch(config-mm-profile)# sleep instance 1 10
```

Normal mode profile

```
switch# configure maintenance profile normal-mode
switch(config-mm-profile)# router bgp 100
switch(config-mm-profile-router)# address-family ipv4 unicast
switch(config-mm-profile-router-af)# redistribute direct route-map my-rmap-permit
switch(config-mm-profile-router-af)# exit
switch(config-mm-profile)# sleep instance 1 20
```

Verifying GIR

Use the following commands to verify the configuration:

Command	Purpose
show interface brief	Displays abbreviated interface information.
show maintenance on-reload reset-reason	Displays the reset reasons for which the switch comes up in maintenance mode.
show maintenance profile [maintenance-mode | normal-mode]	Displays the details of the maintenance mode or normal mode profile.
show maintenance snapshot-delay	Displays the after_maintenance snapshot-delay timer value.

Command	Purpose
show maintenance timeout	Displays the maintenance mode timeout period, after which the switch automatically returns to normal mode.
show tech-support mmode	Displays maintenance mode information for Cisco technical support.
show {running--config | startup--config} mmode [all]	Displays the maintenance-mode section of the running or startup configuration. The **all** option includes the default values.
show snapshots	Displays snapshots present on the switch.
show snapshots compare *snapshot-name-1 snapshot-name-2* [**summary | ipv4routes | ipv6routes**]	Displays a comparison of two snapshots. The **summary** option displays just enough information to see the overall changes between the two snapshots. The **ipv4routes** and the **ipv6routes** options display the changes in IPv4 and IPv6 routes between the two snapshots.
show snapshots dump *snapshot-name*	Displays content of the various sections in a generated snapshot.
show snapshots sections	Displays the user-specified snapshot sections.
show system mode	Displays the current system mode. This command also displays the current state of the maintenance mode timer when the switch is in maintenance mode.

Verifying GIR at Protocol Level

BGP (Maintenance mode)

Use the **show bgp process** command to display BGP status in maintenance mode:

```
switch# show bgp process

BGP Process Information
BGP Process ID                 : 11725
BGP Protocol Started, reason:  : configuration
BGP Protocol Tag               : 100
BGP Protocol State         : Running (Isolate)
BGP MMODE                  : Initialized
BGP Memory State               : OK
BGP asformat                   : asplain

BGP attributes information
Number of attribute entries    : 1
HWM of attribute entries       : 1
Bytes used by entries          : 100
Entries pending delete         : 0
HWM of entries pending delete  : 0
BGP paths per attribute HWM    : 3
BGP AS path entries            : 0
```

```
Bytes used by AS path entries  : 0
```

Use the **show bgp internal all statistics** command to display the number of BGP IPv4 and IPv6 prefixes that have been programmed and also the number of BGP IPv4 and IPv6 prefixes that have not been programmed:

```
BGP internal statistics information for VRF default, address family IPv4 Unicast
  Total prefixes in BGP Table: 3
  Total prefixes pending programming in HW: 0
BGP internal statistics information for VRF default, address family IPv6 Unicast
  Total prefixes in BGP Table: 0
  Total prefixes pending programming in HW: 0
```

EIGRP (Maintenance mode)

Use the **show ip eigrp** command to display EIGRP status in maintenance mode:

```
switch# show ip eigrp
IP-EIGRP AS 100 ID 30.1.1.1 VRF default
  Process-tag: 100
  Instance Number: 1
  Status: running (isolate)
  Authentication mode: none
  Authentication key-chain: none
  Metric weights: K1=1 K2=0 K3=1 K4=0 K5=0
  IP proto: 88 Multicast group: 224.0.0.10
  Int distance: 90 Ext distance: 170
  Max paths: 8
  Number of EIGRP interfaces: 1 (0 loopbacks)
  Number of EIGRP passive interfaces: 0
  Number of EIGRP peers: 1
  Redistributing:
    direct route-map passall
    static route-map passall
  Graceful-Restart: Enabled
  Stub-Routing: Disabled
  NSF converge time limit/expiries: 120/0
  NSF route-hold time limit/expiries: 240/6
  NSF signal time limit/expiries: 20/0
  Redistributed max-prefix: Disabled
  MMODE: Initialized
  Suppress-FIB-Pending Configured
```

ISIS (Maintenance mode)

Use the **show isis protocol** command to display ISIS status in maintenance mode:

```
switch# show isis protocol
ISIS process : 100
 Instance number :  1
 UUID: 1090519320
 Process ID 6969
VRF: default
  System ID : 0300.0000.0004  IS-Type : L2
  SAP : 412  Queue Handle : 16
  Maximum LSP MTU: 1492
  Stateful HA enabled
  Graceful Restart enabled. State: Inactive
  Last graceful restart status : none
  Start-Mode Complete
  BFD IPv4 is globally disabled for ISIS process: 100
  BFD IPv6 is globally disabled for ISIS process: 100
  Topology-mode is base
  Metric-style : advertise(wide), accept(narrow, wide)
```

```
  Area address(es) :
    10
  Process is up and running (isolate)
  VRF ID: 1
  Stale routes during non-graceful controlled restart
  Interfaces supported by IS-IS :
    Ethernet1/2
```

OSPF (Maintenance mode)

Use the **show ip ospf internal** command to display OSPF status in maintenance mode:

```
switch# show ip ospf internal

ospf 100
ospf process tag 100
ospf process instance number 1
ospf process uuid 1090519321
ospf process linux pid 6968
ospf process state running (isolate)
System uptime 6d06h
SUP uptime 2 6d06h

Server up : L3VM|IFMGR|RPM|AM|CLIS|URIB|U6RIB|IP|IPv6|SNMP|MMODE
Server required  : L3VM|IFMGR|RPM|AM|CLIS|URIB|IP|SNMP
Server registered: L3VM|IFMGR|RPM|AM|CLIS|URIB|IP|SNMP|MMODE
Server optional  : MMODE

Early hello : OFF
Force write PSS: FALSE
OSPF mts pkt sap 324
OSPF mts base sap 320
```

Feature History for GIR

The table below summarizes the new and changed features for this document and shows the releases in which each feature is supported. Your software release might not support all the features in this document. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release.

Feature Name	Release	Information
Graceful Insertion and Removal (GIR)	7.3(0)N1(1)	The default mode for GIR is “isolate”. Support for Unplanned Maintenance, Maintenance Mode timer, Supress FIB Pending, Adding Show commands to snapshots and dumping snapshot sections.
Graceful Insertion and Removal (GIR)	7.1(0)N1(1)	This feature was introduced. The default mode for GIR is “shutdown”. Refer Configuring GIR (Cisco NX-OS Release 7.1(0)N1(1)).