



Cisco Plug-in for OpenFlow Command Reference

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activate

To activate an application installed in a virtual services container, use the **activate** command in virtual services configuration mode. To deactivate the application, use the **no** form of this command.

activate

no activate

Syntax Description This command has no arguments or keywords.

Command Default The application installed in the virtual services container is not activated.

Command Modes Virtual services configuration (config-virt-serv)

Command History	Release	Modification
	Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.

Examples The following example shows how an application installed in a virtual services container is activated .

```
Device# virtual-service install name openflow_agent package
bootflash:/ofa-1.0.0-n3000-SPA-k9.ova
```

Note: Installing package 'bootflash:/ofa-1.0.0-n3000-SPA-k9.ova' for virtual service 'openflow_agent'. Once the install has finished, the VM may be activated. Use 'show virtual-service list' for progress.

```
Device# 2013 Mar 8 20:35:23 n3k-202-194-2 %$ VDC-1 %$ %VMAN-2-INSTALL_STATE: Successfully
installed virtual service 'openflow_agent'
```

```
Device# configure terminal
```

```
Device(config)# virtual-service openflow_agent
```

```
Device(config-virt-serv)# activate
```

Related Commands	Command	Description
	hardware profile openflow	Enables support and allocates resources for Cisco Plug-in for OpenFlow VLAN tagging actions on the device hardware.
	show virtual-service list	Displays the status of installation of all applications on the virtual service container.
	show virtual-service version	Displays the version of an application installed in the virtual service container of a device.
	show virtual-service version installed	Displays the version of OpenFlow Agent application installed on the virtual services container of device.

Command	Description
virtual-service	Provisions an application installed in the virtual services container of a device.
virtual-service install	Installs an application on the virtual services container of a device.

controller

To configure a controller for a Cisco Plug-in for OpenFlow logical switch, use the **controller** command in logical switch configuration mode. To remove the controller definitions for the logical switch, use the **no** form of this command.

```
controller ipv4 ipv4-address [port port-number][vrf vrf-name]security {none| tls}no-tls
no controller ipv4 ipv4-address [portport-number][vrf vrf-name]security {none| tls}
```

Syntax Description

ipv4 <i>ipv4-address</i>	Specifies the IPv4 address of the controller.
port <i>port-number</i>	(Optional) Specifies the port through which the device must connect to the controller. The default value is 6533.
vrf <i>vrf-name</i>	(Optional) Specifies the virtual routing and forwarding (VRF) instance defined for the controller. The default value is default.
security none	(Optional) Disables Transport Layer Security (TLS) for the controller connection.
security tls	(Optional) Enables Transport Layer Security (TLS) for the controller connection.

Command Default

No controllers are defined for Cisco Plug-in for OpenFlow. If the **security none** keyword is not used, TLS has to be configured using the **security tls** command.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.
Cisco Plug-in for OpenFlow Release 1.1	This command was modified. The no-tls keyword was added.

Examples

The following example shows how the **controller** command is used to configure a controller for an Cisco Plug-in for OpenFlow logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# pipeline 201

Device(config-ofa-switch)# controller ipv4 10.1.0.6 port 6666 security none
Device(config-ofa-switch)# of-port interface ethernet1/1
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

Related Commands

Command	Description
of-port interface (OpenFlow)	Configures an interface as a port of an Cisco Plug-in for OpenFlow logical switch
openflow	Configures Cisco Plug-in for OpenFlow.
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode
show openflow hardware capabilities	Displays the match and action capabilities of a device.

hardware profile openflow

To enable support and allocates resources for Cisco Plug-in for OpenFlow VLAN tagging actions on the device hardware, use the **hardware profile openflow** command in global configuration mode. To disable VLAN tagging actions, use the **no** form of this command.

hardware profile openflow

no hardware profile openflow

Syntax Description This command has no keywords or arguments.

Command Default VLAN tagging actions for Cisco Plug-in for OpenFlow are disabled.

Command Modes Global configuration (config)

Command History	Release	Modification
	6.0(2)U1(1)	This command was introduced.

Usage Guidelines The **hardware profile openflow** command must be entered before an application is installed on the virtual services container of a device.

Examples

```
Device# configure terminal
Device(config)# hardware profile openflow
Device(config)# exit
Device# copy running-config startup-config
Device# reload
```

Related Commands	Command	Description
	virtual-service install	Installs an application on the virtual services container of a device.

of-port interface (OpenFlow)

To configure an interface as a port of an Cisco Plug-in for OpenFlow logical switch, use the **of-port interface** command in logical switch configuration mode. To remove port configurations for an interface on an Cisco Plug-in for OpenFlow logical switch, use the **no** form of this command.

of-port interface *interface-name*

no of-port interface *interface-name*

Syntax Description

<i>interface-name</i>	Name of interface to be configured.
-----------------------	-------------------------------------

Command Default

No ports are configured for the Cisco Plug-in for OpenFlow logical switch.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.

Usage Guidelines

Do not abbreviate the interface type. Ensure that interface types used are spelled out clearly and typed in lowercase, as shown in the examples. For example, **ethernet** and **port-channel**. If the keyword is abbreviated or not in lowercase, the interface is not configured. Ensure that the interface name does not have a space between the interface type and number.

The Ethernet interface configured can be a member interface of a port channel.

You must configure an interface as a port of Cisco Plug-in for OpenFlow only when Cisco Plug-in for OpenFlow is active and running. When an interface is configured as a port of Cisco Plug-in for OpenFlow, the **mode openflow** configuration is added to the interface. This configuration is removed when the **no** form of **of-port interface** is used only if the Cisco Plug-in for OpenFlow is running and active.

Examples

The following example shows how the **interface** command is used to configure an interface to be a port of an Cisco Plug-in for OpenFlow logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# of-port interface ethernet1/1
Device(config-ofa-switch)# of-port interface port-channell
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

max-backoff

To configure the maximum TCP triggered backoff interval for which Cisco Plug-in for OpenFlow can wait before retrying a connection to the controller, use the **max-backoff** command in logical switch configuration mode. To restore the default backoff interval, use the **no** form of this command.

max-backoff *backoff-timer*

no**max-backoff** *backoff-timer*

Syntax Description

<i>backoff-timer</i>	Interval, in seconds, for which a device can wait before retrying a connection to the controller.
	<ul style="list-style-type: none"> • Range is from 1 to 65535. • Default value is 8 seconds.

Command Default

A maximum backoff of 8 seconds is configured.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow 1.1	This command was introduced.

Examples

The following example shows how the **max-backoff** command is used to configure a controller for an OpenFlow Agent logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# max-backoff 3
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

openflow

To configure Cisco Plug-in for OpenFlow and enter Cisco Plug-in for OpenFlow Release configuration mode, use the **openflow** command in global configuration mode. To remove all configurations made for Cisco Plug-in for OpenFlow and exit Cisco Plug-in for OpenFlow Release configuration mode, use the **no** form of this command.

openflow

no openflow

Command Default

The Cisco Plug-in for OpenFlow is not configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.

Examples

The following example shows how the **openflow** command is used to configure the Cisco Plug-in for OpenFlow.

```
Device> enable
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# controller ipv4 10.1.0.6
Device(config-ofa-switch)# interface ethernet1/1
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.
of-port interface (OpenFlow)	Configures an interface as a port of an Cisco Plug-in for OpenFlow logical switch
openflow	Configures Cisco Plug-in for OpenFlow.
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode
max-backoff	Configures an interval for which Cisco Plug-in for OpenFlow logical switch must wait before retrying a connection to the controller.
tls trust-point	Configures local and remote trust points needed for a Transport Layer Security (TLS) connection to the controller
probe-interval	Configures an interval that Cisco Plug-in for OpenFlow logical switch waits before sending a probe to query an idle connection to controller.

Command	Description
pipeline	Configures a pipeline.
rate-limit	Configures the rate at which packets are sent to a controller by Cisco Plug-in for OpenFlow logical switch.

pipeline

To configure a pipeline for a Cisco Plug-in for OpenFlow logical switch, use the **pipeline** command in logical switch configuration mode. To remove the pipeline configurations, use the **no** form of this command.

pipeline *pipeline-id*

no pipeline

Syntax Description

<i>pipeline-id</i>	Configures pipeline number. This value must be taken from the output of the show openflow hardware capabilities
--------------------	--

Command Default

A pipeline is not configured.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.1	This command was introduced.

Usage Guidelines

This command specifies the forwarding table used by Cisco Plug-in for OpenFlow logical switch. You can use the **show openflow hardware capabilities** command to view supported pipelines for a device.

Examples

The following example shows how to configure a pipeline for an Cisco Plug-in for OpenFlow logical switch for a Nexus 3000 Series device.

```
Device(config)# openflow
Device(config-ofa)# switch 1
! Specifies the pipeline that enables the L3 ACL Forwarding Table.
Device(config-ofa)# pipeline 201
```

Related Commands

Command	Description
show openflow hardware capabilities	Displays the match and action capabilities of a device.

probe-interval

To configure an interval that Cisco Plug-in for OpenFlow logical switch waits before sending a probe to query an idle connection to controller, use the **probe-interval** command in logical switch configuration mode. To restore the default probe interval, use the **no** form of this command.

probe-interval *probe-interval*

no probe-interval *probe-interval*

Syntax Description

<i>probe-interval</i>	Interval, in seconds, at which an idle controller connection is probed.
	<ul style="list-style-type: none"> • Default value is 5 seconds. • Range is from 5 to 65535.

Command Default

The idle controller connection is probed every 5 seconds.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.1	This command was introduced.

Examples

The following example shows how the **probe-interval** command is used to configure a probe interval for an idle controller connection.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa)# probe-interval 6
Device(config-ofa)# end
Device# copy running-config startup-config
```

rate-limit

To configure the rate at which packets are sent to the controller by Cisco Plug-in for OpenFlow logical switch, use the **rate-limit** command in the logical switch configuration mode. To remove the rate limit configurations, use the **no** form of this command.

rate-limit packet_in *packet-rate* **burst** *number-of-packets*

no rate-limit packet_in *packet-rate* **burst** *number-of-packets*

Syntax Description

packet_in <i>packet-rate</i>	Configures, in packets per seconds, the maximum rate at which packets are sent to controller. <ul style="list-style-type: none"> • Range is from 1 to 65535. • Default value is 0. This indicates that rate limit is disabled and that packets are sent at the maximum possible rate.
burst <i>number-of-packets</i>	Configures the maximum supported bursts or number of packets destined for the controller that can be stored by the logical switch at any time. <ul style="list-style-type: none"> • Range is from 1 to 65535.

Command Default

Rate limit is not configured for Cisco Plug-in for OpenFlow logical switch.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.1	This command was introduced.

Examples

The following example shows how the **rate-limit** command is used to configure the rate limit for Cisco Plug-in for OpenFlow logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# rate-limit packet_in 30 burst 50
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

show openflow copyright

To display copyright and open-source information related to Cisco Plug-in for OpenFlow, use the **show openflow copyright** command in privileged EXEC mode.

show openflow copyright

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Examples

The following is sample output of the **show openflow copyright** command:

```
Device# show openflow copyright

Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2013, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
```

Related Commands

Command	Description
openflow	Configures Cisco Plug-in for OpenFlow.

show openflow interface

To display a list of Cisco Plug-in for OpenFlow logical switch ports, use the **show openflow interface switch** command in privileged EXEC mode.

show openflow interface [*interface-name*] [**switch** *switch-id*]

Syntax Description

<i>interface-name</i>	(Optional) Name of the interface. See Usage Guidelines for more details.
<i>switch-id</i>	(Optional) Unique switch identifier. 1 is the only permitted value.

Command Default

Displays a list of all interfaces associated with the Cisco Plug-in for OpenFlow logical switch.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Usage Guidelines

Do not abbreviate the interface. Ensure that the **ethernet** or **port-channel** keywords are spelled out completely and are typed in lowercase. For example, **ethernet1/1** or **port-channel2**. If the keyword is abbreviated or not in lowercase, the interface is not configured.

Only interfaces specified by the **interface (OpenFlow)** command can display an output.

Examples

The following is sample output of the **show openflow interface** command:

```
Device# show openflow interface

Logical Switch Id: 1
  Interfaces:
    Ethernet1/11
    Ethernet1/12
    Ethernet1/13
    Ethernet1/2
    Ethernet1/24
    Ethernet1/25
    Ethernet1/3
    Ethernet1/4
    port-channel2

Device# show openflow interface ethernet1/2 switch 1

Logical Switch Id: 1
  Interface: ethernet1/2
Device# show openflow interface switch 1

  Interfaces:
```

```
Ethernet1/11  
Ethernet1/12  
Ethernet1/13  
Ethernet1/2  
Ethernet1/24  
Ethernet1/25  
Ethernet1/3  
Ethernet1/4  
port-channel2
```

Related Commands

Command	Description
of-port interface (OpenFlow)	Configures an interface as a port of an Cisco Plug-in for OpenFlow logical switch
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

show openflow switch

To display information related to an Cisco Plug-in for OpenFlow logical switch, use the **show openflow switch** command in privileged EXEC mode.

show openflow switch [*switch-id*]

Syntax Description

<i>switch-id</i>	(Optional) Cisco Plug-in for OpenFlow logical switch ID. Only the value 1 is permitted.
------------------	--

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.

Examples

The following is sample output of the **show openflow switch** command on Nexus 3000 Series Device.

```
Device# show openflow switch 1

Logical Switch Context
  Id: 1
  Switch type: Forwarding
  Pipeline id: 201
  Signal version: Openflow 1.0
  Data plane: secure
  Table-Miss default: NONE
  Config state: no-shutdown
  Working state: enabled
  Rate limit (packet per second): 0
  Burst limit: 0
  Max backoff (sec): 8
  Probe interval (sec): 5
  TLS local trustpoint name: not configured
  TLS remote trustpoint name: not configured
  Stats coll. period (sec): 5
  Logging flow changes: Disabled
  OFA Description:
    Manufacturer: Cisco Systems, Inc.
    Hardware: N3K-C3064PQ V01
    Software: 6.0(2)U2(1) of_agent 1.1.0_fc1
    Serial Num: SSI15200QD8
    DP Description: n3k-200-141-3:sw1
  OF Features:
    DPID:0001547fee00c2a0
    Number of tables:1
    Number of buffers:256
    Capabilities: FLOW_STATS TABLE_STATS PORT_STATS
    Actions: OUTPUT SET_VLAN_VID STRIP_VLAN SET_DL_SRC SET_DL_DST
  Controllers:
    1.1.1.1:6653, Protocol: TLS, VRF: s
  Interfaces:
```

```
Ethernet1/1
Ethernet1/7
```

Table 1: show openflow switch Field Descriptions

Field	Description
Id	Cisco Plug-in for OpenFlow logical switch identifier.
Switch type	Type of switch. The possible values are as follows: <ul style="list-style-type: none"> • Forwarding—Forwards packets to controller.
Pipeline ID	Identifier used for pipeline.
Layer	Network layer on which the switch operates.
Data plane: secure	Security levels of the data plane.
Table-Miss default:	Fallback state of switch.
Signal version	OpenFlow version.
Config state:	The switch is in a configuration state of no shutdown.
Working state:	The switch is in a working state.
TLS	Transport Layer Security (TLS) capability and trust points.
Rate Limit	Rate limit.
Burst Limit	Burst limit.
Maximum Backoff	Maximum backoff.
Probe interval	Probe interval.
Stats coll. period (sec):	Time period at which stats are collected.
Logging Flow changes	
Manufacturer: Cisco Systems, Inc.	Manufacturer of the Cisco Plug-in for OpenFlow software.

Field	Description
Hardware	Device on which the Cisco Plug-in for OpenFlow is installed.
Software:	Operating system running on the device.
Serial Num:	Serial Number of the device.
DP Description	Data Path description used by the controller to identify the device.
DPID	Data Path identifier used by the controller to identify the device.
Number of tables	Number of flows defined for the device on the controller.
Number of buffers	Number of buffers allocated to the device.
Capabilites:	Match capabilities available on this device.
Actions:	Actions available on this device.
Controllers: 192.168.1.31:8005, Protocol: TCP, VRF: default 192.168.94.173:6633, Protocol: TCP, VRF: management	Controllers connected to this device, port number used, protocol used for between the controller and the device, and the VRF on which the controller is defined.
Interfaces:	List of interfaces defined for the device.

show openflow switch controller

To display information about controllers connected to an Cisco Plug-in for OpenFlow switch, use the **show openflow switch controller** command in privileged EXEC mode.

```
show openflow switch [switch-id] [controllers[stats]]
```

Syntax Description

<i>switch-id</i>	(Optional) Cisco Plug-in for OpenFlow logical switch identifier.
stats	(Optional) Cisco Plug-in for OpenFlow Displays controller based statistics.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Usage Guidelines

A device can connect to up to eight controllers.

Examples

The following is sample output of the **show openflow switch 1 controllers** command:

```
Device# show openflow switch 1 controllers
```

```
Logical Switch Id: 1
Total Controllers: 1
Controller: 1
  10.168.1.31:7777
  Protocol: tcp
  VRF: default
  Connected: Yes
  Role: Other
  state:ACTIVE
  sec_since_connect:31474
```

The following is sample output of the **show openflow switch 1 controllers** command:

```
Device# show openflow switch 1 controllers
```

```
Logical Switch Id: 1
Total Controllers: 1
Controller: 1
  10.86.201.162:8050
  Protocol: tcp
  VRF: management
  Local Trustpoint: disabled
  Remote Trustpoint: disabled
  Connected: Yes
  Role: Master
  state:ACTIVE
  sec_since_connect:36844
```

Table 2: show openflow switch controllers Field Description

Field	Descriptions
Logical Switch Id: 1	Indicates the unique switch identifier.
Total Controllers: 1	Indicates the total number of controllers connected to this device.
Controller: 1	Indicates the controller identifier.
192.168.1.31:7777	Indicates the IP address of the controller and the controller port used for the connection.
Protocol: TCP	Indicates the protocol used for controller-device communication.
VRF: default	Indicates the virtual routing and forwarding (VRF) instance of which the controller is part of.
Local Trustpoint	Status of local trustpoint
Remote Trustpoint	Status of remote trustpoint
Connected: Yes	Indicates whether the switch is connected to the controller.
Role: Other	Indicates the role of the controller. <ul style="list-style-type: none"> • Master—Full access, at most one • Slave - Read-only access • Other— Default role, full access
state:ACTIVE	Indicates the state of the controller. Possible values are given below: <ul style="list-style-type: none"> • ACTIVE—The controller is active. • BACKOFF—The controller is in a state of backoff.
sec_since_connect	Indicates the number of seconds that have elapsed since the connector connected to the device.

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.

Command	Description
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

show openflow switch flows

To display a list of flows defined for Cisco Plug-in for OpenFlow logical switch and related information, use the **show openflow switch flows** command in privileged EXEC mode.

show openflow switch *switch-id* **flows**[**configured**| **controller**| **default**| **fixed**| **pending**| **pending-del**][**brief** | **summary**]

Syntax Description

<i>switch-id</i>	(Optional) Cisco Plug-in for OpenFlow logical switch identifier.
configured	(Optional) Displays information related to configured flows.
controller	(Optional) Displays flow information related to controllers.
default	(Optional) Displays default information related to flows.
fixed	(Optional) Displays information related to fixed flows.
fixed	(Optional) Displays information related to fixed flows.
pending	(Optional) Displays information related to pending flows.
pending-del	(Optional) Displays brief information related to flows pending deletion.
summary	(Optional) Displays a summary of information related to flows.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Usage Guidelines

The flows displayed are configured by the controller that is connected to Cisco Plug-in for OpenFlow logical switch on the device.

Examples

The following is sample output of the **show openflow switch 1 flows** command:

```
Device# show openflow switch 1 flows
Logical Switch Id: 1
Total flows: 1
 1
  Rule:          ip,d1_vlan=99
  Actions:      strip_vlan,output:1
```

```

Priority:          0x8000
Table:            0
Cookie:           0x466c6f7732
Duration:         176.383s
Number of packets: 0
Number of bytes:  0

```

Device# **show openflow switch 1 flows**

Total flows: 2

Flow: 1

```

Rule:             ip,d1_vlan=99
Actions:          strip_vlan,output:1
Priority:         0x8000
Table:           0
Cookie:          0x466c6f7732
Duration:        96.359s
Number of packets: 0
Number of bytes:  0

```

Flow: 2

```

Rule:             ip,in_port=2,d1_vlan=50
Actions:          output:1
Priority:         0x8000
Table:           0
Cookie:          0x1
Duration:        95.504s
Number of packets: 0
Number of bytes:  0

```

Table 3: show openflow switch flows Field Descriptions

Field	Descriptions
Rule	<p>List of rules defined for the flow. This is related to the match capabilities of the device. The possible rules are listed below:</p> <ul style="list-style-type: none"> • <code>dl_vlan=vlan-id</code>—Packet has the given VLAN ID. • <code>in_port</code>—Packet has arrived on the given input port. • <code>ip</code>—Packet uses the IP protocol. • <code>nw_dst</code>—Packet is destined for a given destination address prefix. • <code>nw_src</code>—Packet is from a given source address prefix. • <code>nw_tos</code>—Packet has the given IP ToS bits set. • <code>tp_dst</code>—Packet is destined for the given TCP/UDP destination port. • <code>tp_src</code>—Packet is from for the given TCP/UDP source port.

Field	Descriptions
Actions	<p>List of actions to be defined if a packet matches the flow (abides by the rules defined in the flow). The possible actions are:</p> <ul style="list-style-type: none"> • drop—Drop. • mod_vlan_vid—Rewrite VLAN ID. • output:<i>number</i>—Output to one or more physical ports. • output:6533—Output to the controller. • strip_vlan—Strip the VLAN ID. • mod_dl_src—Modify the source MAC address. • mod_dl_dst—Modify the destination MAC address. <p>If multiple actions are associated with a flow, they are processed in the order specified. The output action should be the last action in the action list. Any action after the output action is not supported.</p>
Priority	Priority of the flow.
Table	Table number.
Cookies	Cookies defined for the flow.
Duration	Duration, in seconds, for which the flow was executed.
Number of packets: 0	Number of packets/bytes that matched the flow.
Number of bytes: 0	Number of bytes exchanged for the flow.

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

show openflow switch ports

To display the mapping between the Cisco Plug-in for OpenFlow logical switch ports and the device's physical interfaces, use the **show openflow switch ports** command in privileged EXEC mode.

showopenflow switch [*switch-id* [**ports**]]

Syntax Description

<i>switch-id</i>	(Optional) Cisco Plug-in for OpenFlow logical switch identifier.
ports	(Optional) Displays send and receive statistics for each port defined for an Cisco Plug-in for OpenFlow logical switch.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Examples

The following is sample output of the **show openflow switch 1 ports** command:

```
Device# show openflow switch 1 ports
```

```
Logical Switch Id: 1
Port Interface Name Config-State Link-State Features
 2 Ethernet1/2 PORT_UP LINK_UP 10MB-FD
 3 Ethernet1/3 PORT_UP LINK_DOWN 100MB-HD AUTO_NEG
 4 Ethernet1/4 PORT_UP LINK_UP 10MB-FD
11 Ethernet1/11 PORT_UP LINK_UP 1GB-FD
12 Ethernet1/12 PORT_UP LINK_UP 1GB-FD
13 Ethernet1/13 PORT_UP LINK_UP 1GB-FD
24 Ethernet1/24 PORT_UP LINK_DOWN 1GB-HD AUTO_NEG
25 Ethernet1/25 PORT_UP LINK_DOWN 1GB-HD AUTO_NEG
321 port-channel2 PORT_UP LINK_DOWN 100MB-HD AUTO_NEG
```

Table 4: show openflow switch 1 ports Field Description table

Field	Descriptions
Logical Switch Id: 1	Indicates the unique switch identifier.
Port	Indicates port numbers assigned for an interface by Cisco Plug-in for OpenFlow logical switch.
Interface Name	Indicates the name of the physical interface.
Config-State	Indicates the configured state of a port or interface.

Field	Descriptions
Link-State	Indicates the physical link state of a port or interface.
Features	<p>Indicates the configured speed or duplex settings. The values of the output are read as follows:</p> <ul style="list-style-type: none"> • 10MB-FD— Displays that the port has been set to 10-Mbps speed and full duplex. • 10MB-HD—Displays that the port has been set to 10-Mbps speed and half duplex. • 100MB-HD AUTO_NEG— Displays that the port has been auto-negotiated to 100-Mbps speed and half duplex. • 1GB-FD— Displays that the port has been set to 1-Gbps speed and full duplex. • 1GB-HD AUTO_NEG—Displays that the port has been auto-negotiated to 1-Gbps speed and half duplex.

Related Commands

Command	Description
of-port interface (OpenFlow)	Configures an interface as a port of an Cisco Plug-in for OpenFlow logical switch
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

show openflow switch stats

To display send and receive statistics for each port defined for the Cisco Plug-in for OpenFlow logical switch, use the **show openflow switch stats** command in privileged EXEC mode.

show openflow switch *switch-id* stats

Syntax Description

<i>switch-id</i>	(Optional) Cisco Plug-in for OpenFlow logical switch identifier.
------------------	--

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Examples

The following is sample output of the **show openflow switch 1 stats** command:

```
Device# show openflow switch 1 stats
Logical Switch Id: 1
Total ports 9
  Port 4: rx pkts=8570, bytes=2459590, drop=0, errs=0,
tx pkts=8585, bytes=2461949, drop=0, errs=0,
  Port 2: rx pkts=0, bytes=0, drop=0, errs=0,
tx pkts=0, bytes=0, drop=0, errs=0,
Total tables 1
  Table 0: classifier
  Wildcards = 0x3ffffff
  Max entries = 1000000
  Active entries = 0
  Number of lookups = 0
  Number of matches = 0
```

The following is sample output of the **show openflow switch 1 stats** command:

```
Device# show openflow switch 1 stats
Logical Switch Id: 1
Total ports: 1
  Port 4: rx pkts=8570, bytes=2459590, drop=0, errs=0,
tx pkts=8585, bytes=2461949, drop=0, errs=0,
  Port 2: rx pkts=0, bytes=0, drop=0, errs=0,
tx pkts=0, bytes=0, drop=0, errs=0,
Total tables: 1
  Table 0: classifier
```

```

Wildcards = 0x3fffff
Max entries = 1500
Active entries = 0
Number of lookups = 0
Number of matches = 0

```

Table 5: Field Description table for show openflow openflow_agent switch 1 stats

Field	Descriptions
Logical Switch Id: 1	Indicates the unique switch identifier.
Total ports: 1	Indicates the total number of ports defined for the switch.
Port: N	Indicates the port number.
rx pkts=0, bytes=0, errs=0	Indicates the number of packets and bytes received by the port and the number of errors generated while receiving data.
tx pkts=0, bytes=376480	Indicates number of packets and bytes sent by the port.
Total tables	Indicates the total number of tables defined for the device on the controller.
Table 0: classifier	Indicates the name of the table.
Wildcards	Indicates the wildcard character.
Max entries	Indicates the maximum number of flow entries defined in the table.
Active entries	Indicates the number of active flow entries in the table.
Number of lookups	Indicates the number of table lookups that have occurred.
Number of matches	Indicates the number of matches that have occurred for the flow entries in the table.

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode

show openflow hardware capabilities

To display the match and action capabilities of a device, use the **show openflow hardware capabilities** command in privileged EXEC mode.

show openflow hardware capabilities

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC (#)

Command History	Release	Modification
	Cisco Plug-in for OpenFlow Release 1.0	This command was introduced.

Usage Guidelines This command displays the list of match and action capabilities supported on this device. The controller connected to this device can define flows using this match criteria and can associate actions to be executed when packets match the flow criteria. The match and action criteria supported for various devices are given below.

Examples The following is sample output for the **show openflow hardware capabilities** command.

The following is sample output for Nexus 3000 Series device.

```
Device# show openflow hardware capabilities

Pipeline ID: 201

Flow table ID: 0

Match Capabilities                               Match Types
-----
ethernet type                                   mandatory
VLAN ID                                         optional
VLAN priority code point                       optional
IP DSCP                                         optional
IP protocol                                     optional
IPv4 source address                            lengthmask
IPv4 destination address                      lengthmask
source port                                     optional
destination port                               optional
in port (virtual or physical)                 optional

Actions:
  output to: specified interface, use normal forwarding, controller
  set: set eth source mac, set eth destination mac, set vlan id
  pop: pop vlan tag
  other actions: drop packet

Pipeline ID: 202
```

```

Flow table ID: 0

Match Capabilities
-----
ethernet type
VLAN ID
VLAN priority code point
IP DSCP
IP protocol
IPv4 source address
IPv4 destination address
source port
destination port
in port (virtual or physical)

Match Types
-----
mandatory
optional
optional
optional
optional
lengthmask
lengthmask
optional
optional
optional

Actions:
  output to: specified interface, use normal forwarding, controller
  set: set eth source mac, set eth destination mac, set vlan id
  pop: pop vlan tag
  other actions: drop packet

Flow table ID: 1

Match Capabilities
-----
ethernet mac destination
VLAN ID

Match Types
-----
mandatory
mandatory

Actions:
  output to: specified interface
  other actions: drop packet

```

Table 6: show openflow hardware capabilities Field Descriptions

Command	Description
Pipeline ID	Pipeline to be configured for using the table.
Flow table ID	Table number in a logical switch.
Min Timer	Minimum time at which polling for statistics occurs.
Max Timer	Maximum time at which polling for statistics occurs.
Match Capabilities	Displays a list of match capabilities that can be defined for this device. The definitions of the different match criteria can be found in the OpenFlow 1.0 specification.
Match Types	Displays the type of match criteria. The match types and their meaning are as followed: <ul style="list-style-type: none"> • required—This criteria must be defined for a flow. • optional—This criteria may be defined for a flow. It is optional. • prefix—This criteria is an IP prefix.

Command	Description
Actions	<p>Displays a list of actions that can be defined for this device, if a packet matches the flow criteria. The actions can be as follows:</p> <ul style="list-style-type: none"> • output to—Output the packet to the specified location. • set—Set the specified parameter for a packet. • pop—Remove the specified parameter for a packet. • other actions—Execute the specified action. The actions can be as follows: <ul style="list-style-type: none"> ◦ drop—Drop the packet.
Stats	Displays a list of parameters for which statistics are collected.
Others: packet out	Sending of packets to an output location (packet out) is supported by this Cisco Plug-in for OpenFlow.

Related Commands

Command	Description
hardware profile openflow	Enables support and allocates resources for Cisco Plug-in for OpenFlow VLAN tagging actions on the device hardware.

switch (OpenFlow)

To configure Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode, use the **switch** command in Cisco Plug-in for OpenFlow Release configuration mode. To remove the Cisco Plug-in for OpenFlow logical switch configurations, use the **no** form of this command.

switch *logical-switch-id*

no switch *logical-switch-id*

Syntax Description

<i>logical-switch-id</i>	Specifies a numerical ID for the logical switch.
	<ul style="list-style-type: none"> Only logical switch ID 1 is supported.

Command Default

Cisco Plug-in for OpenFlow logical switch is not defined.

Command Modes

Cisco Plug-in for OpenFlow Release configuration (config-ofa)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Examples

The following example describes how the **switch** command is used in configuring Cisco Plug-in for OpenFlow logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# controller ipv4 10.1.0.6
Device(config-ofa-switch)# interface ethernet1/1
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.
of-port interface (OpenFlow)	Configures an interface as a port of an Cisco Plug-in for OpenFlow logical switch
openflow	Configures Cisco Plug-in for OpenFlow.

Command	Description
switch (OpenFlow)	Configures Cisco Plug-in for OpenFlow logical switch used for Layer 2 switching and enter logical switch configuration mode
max-backoff	Configures an interval for which Cisco Plug-in for OpenFlow logical switch must wait before retrying a connection to the controller.
tls trust-point	Configures local and remote trust points needed for a Transport Layer Security (TLS) connection to the controller
probe-interval	Configures an interval that Cisco Plug-in for OpenFlow logical switch waits before sending a probe to query an idle connection to controller.
pipeline	Configures a pipeline.
rate-limit	Configures the rate at which packets are sent to a controller by Cisco Plug-in for OpenFlow logical switch.

shutdown (OpenFlow)

To disable an Cisco Plug-in for OpenFlow logical switch, use the **shutdown** command in logical switch configuration mode. To re-enable the Cisco Plug-in for OpenFlow logical switch, use the **no** form of this command.

shutdown

no shutdown

Syntax Description This command has no arguments or keywords.

Command Default The Cisco Plug-in for OpenFlow logical switch is enabled.

Command Modes Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Version 1.0	This command was introduced.

Examples

The following example describes how the **shutdown** command is used to disable an Cisco Plug-in for OpenFlow logical switch.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# shutdown
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```


tls trust-point

To configure local and remote trust points needed for a Transport Layer Security (TLS) connection to the controller, use the **tls trust-point** command in logical switch configuration mode.

tls trust-point local *local-trust-point-name* **remote** *remote-trust-point-name*

no tls trust-point local *local-trust-point-name* **remote** *remote-trust-point-name*

Syntax Description

local <i>local-trust-point-name</i>	Configures the local trust point.
remote <i>remote-trust-point-name</i>	Configures the remote trust point.

Command Default

TLS is enabled for controller connections, but TLS trust points are not configured.

Command Modes

Logical switch configuration (config-ofa-switch)

Command History

Release	Modification
Cisco Plug-in for OpenFlow Release 1.1	This command was introduced.

Usage Guidelines

This command does not set up the TLS connection and only configures the trust points.

If this command is not configured, TLS must be disabled in order for the controller connection to work using the **no-tls** keyword of the **controller** command. Otherwise the controller connection fails.

Examples

The following example shows how the **tls trust-point** command is used to configure a TLS connection to a controller.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# controller ipv4 10.1.1.1
Device(config-ofa-switch)# tls trust-point local XXX remote YYY
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

The following example shows how TLS must be disabled if the **tls trust-point** command is not used.

```
Device> enable
Device# configure terminal
Device(config)# openflow
Device(config-ofa)# switch 1
Device(config-ofa-switch)# controller ipv4 10.1.1.1 security none
Device(config-ofa-switch)# end
Device# copy running-config startup-config
```

Related Commands

Command	Description
controller	Configure a controller for an Cisco Plug-in for OpenFlow.



Virtual Services Commands

- [show virtual-service list](#), page 40
- [show virtual-service detail](#), page 42
- [show virtual-service storage pool list](#), page 45
- [show virtual-service utilization](#), page 46
- [show virtual-service version](#) , page 48
- [show virtual-service version installed](#), page 49
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- [virtual-service install](#), page 58
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show virtual-service list

To display the status of installation of all applications on the virtual service container, use the **show virtual-service list** command in privileged EXEC mode.

show virtual-service list

Syntax Description This command has no keywords or arguments.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Examples

The following is sample output of the **show virtual-service list** command with the status of the installation is shown as Installing.

```
Device# show virtual-service list
System busy installing virtual-service 'WAAS'. The request may take several minutes...
Virtual Service List:
Name                Status              Package Name
-----
multiova            Activated           multiova-working.ova
WAAS                Installing          ISR4451X-WAAS-5.2.0-b...
fe-ovr2#
*Feb 13 14:08:25.276: %VIRT_SERVICE-5-INSTALL_STATE: Successfully installed virtual service
WAAS
```

The following is sample output of the **show virtual-service list** command with the status of the installation is shown as Installed.

```
Device# show virtual-service list
Virtual Service List:
Name                Status              Package Name
-----
multiova            Activated           multiova-working.ova
WAAS                Installed           ISR4451X-WAAS-5.2.0-b...
```

Table 7: show virtual-service Field Descriptions

Command	Description
Status	<p>Indicates the status of installation of all applications installed in the virtual services container of a device. It can be one of the following:</p> <ul style="list-style-type: none"> • Initializing—Indicates that support for the application is being initialized. • Installing—Indicates that the application is being installed. • Installed—Indicates that the application has been installed but has not been activated yet. • Activating—Indicates that virtual services package has been installed and is being activated. • Activated—Indicates that virtual services package has been installed and activated. • Activate Failed—Indicates that activation of the application has failed. • Deactivated—Indicates that the application has been deactivated.

Related Commands

Command	Description
activate	Activates an application installed in a virtual services container.
show virtual-service version	Displays the version of an application installed in the virtual service container of a device.
show virtual-service version installed	Displays the version of OpenFlow Agent application installed on the virtual services container of device.
virtual-service	Provisions an application installed in the virtual services container of a device.
virtual-service install	Installs an application on the virtual services container of a device.

show virtual-service detail

To display the resources committed by applications installed in the virtual services container of a device upon activation, use the **show virtual-service detail** command in privileged EXEC mode.

show virtual-service [**detail** [**name** *virtual-service-name*]]

Syntax Description

name <i>virtual-service-name</i>	(Optional) Specifies the name of the application for which resources committed is to be displayed. The maximum length of the name is 20. The hyphen is not a valid character.
---	---

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Examples

The following is sample output of the **show virtual-service detail** command:

```
Device# show virtual-service detail
Virtual Service vm_foo Detail:

Package Metadata:
Package name       : foo.ova
Application name   : SampleApp
Application description : Sample suite - HelloNetwork
Certificate type   : Development Package
OVA path           : /bootflash/foo.ova
State              : Activated
Watchdog           : Disabled
Disk reservation  : 81 MB
Memory reservation : 510 MB
CPU reservation    : 20% system CPU
VCPUs              : 1
Attached devices:
Type              Name          Alias
-----
Serial/shell      serial0
Disk              /mnt/config_disk
Disk              /
Serial/Trace      serial3
Serial/Syslog     serial2
Serial/aux        serial1
Serial/shell      serial0
```

The following is sample output of the **show virtual-service detail name** command:

```
Device# show virtual-service detail name openflow_agent

Virtual service openflow_agent detail
State           : Installed
Package information
```

```

Name           : ofa-1.0.0-n3000-SPA-k9.ova
Path           : bootflash:/ofa-1.0.0-n3000-SPA-k9.ova
Application
  Name         : OpenflowAgent
  Installed version : 0.1
  Description   : Cisco Openflow Agent
Signing
  Key type     : Cisco development key
  Method       : SHA-1
Licensing
  Name         : None
  Version      : None
Resource reservation
  Disk         : 55 MB
  Memory       : 0 MB
  CPU reservation : 0% system CPU

Attached devices
Type           Name           Alias
-----
Serial/Trace   serial3
Serial/Syslog  serial2
Serial/aux
Serial/shell
Disk           /mnt/core
Disk           /mnt/ofa
Disk           _rootfs

```

Table 8: show virtual-service detail Field Description

Field	Description
State	<p>Indicates the status of the installation of an application on the virtual services container of a device. It can be one of the following:</p> <ul style="list-style-type: none"> • Initializing—Indicates that support for the application is being initialized. • Installing—Indicates that the application is being installed. • Installed—Indicates that the application has been installed but has not been activated yet. • Activating—Indicates that the application has been installed and is being activated. • Activated—Indicates that the application has been installed and activated. • Activate Failed—Indicates that the application activation has failed. • Deactivated—Indicates that the application has been deactivated.
Package information	<p>Displays information related to the application installation package with .ova extension (OVA file) used for installation.</p>

Field	Description
Application	Displays information related to the installed application.
Signing	Displays information related to the method used to sign the OVA file. <ul style="list-style-type: none">• SHA-1—Cisco signed package
Licensing	Displays the name and version of the license of the OVA file.
Resource reservation	Resources reserved by the application. This includes disk space, memory, and CPU usage.
Attached devices	Type, name, and alias of the device attached to the application. This is defined in the machine definitions file delivered with the OVA package.

show virtual-service storage pool list

To display an overview of storage locations (pools) used for virtual service containers, use the **show virtual-service storage pool list** command in privileged EXEC mode.

show virtual-service storage pool list

Syntax Description This command has no keywords or arguments.

Command Modes Privileged EXEC (#)

Command History	Release	Modification
	6.0(2)U1(1)	This command was introduced.

Examples The following is sample output of the **show virtual-service storage pool list** command:

```
Device# show virtual-service storage pool list
Virtual-Service storage pool list
Name                Pool Type      Path
-----
virt_strg_pool_bf_vdc_1  directory     /bootflash/virt_strg_pool_bf_vdc_1
```

Related Commands	Command	Description
	virtual-service	Provisions an application installed in the virtual services container of a device.

show virtual-service utilization

To display an overview of resources used by applications installed in the virtual services container of a device, use the **show virtual-service utilization** command in privileged EXEC mode.

show virtual-service utilization name *virtual-service-name*

Syntax Description

name <i>virtual-service-name</i>	Specified the name of an application installed in the virtual services container of the device.
---	---

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Examples

The following is sample output of the **show virtual-service utilization** command:

```
Device# show virtual-service version utilization name openflow_plugin
```

```
Virtual-Service Utilization:
```

```
CPU Utilization:
CPU Time: 0 % (30 second average)
CPU State: R : Running
```

```
Memory Utilization:
Memory Allocation: 716800 Kb
Memory Used:      20272 Kb
```

```
Storage Utilization:
Name: N/A, Alias: N/A
RD Bytes: 0          WR Bytes: 0
RD Requests: 0      WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0  Usage: 0 %
```

```
Name: /mnt/core, Alias: N/A
RD Bytes: 0          WR Bytes: 0
RD Requests: 0      WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0  Usage: 0 %
```

```
Name: /mnt/ofa, Alias: N/A
RD Bytes: 0          WR Bytes: 0
RD Requests: 0      WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0  Usage: 0 %
```

```
Name: _rootfs, Alias: N/A
```

```
RD Bytes:      0          WR Bytes:      0
RD Requests:  0          WR Requests:  0
Errors:       0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0   Usage: 0 %
```

Related Commands

Command	Description
virtual-service	Provisions an application installed in the virtual services container of a device.

show virtual-service version

To display the version of an application installed in the virtual service container of a device, use the **show virtual-service version** command in privileged EXEC mode.

show virtual-service version [**name** *virtual-service-name* **installed**]

Syntax Description

name <i>virtual-service-name</i>	(Optional) Specifies the name of an application installed in the virtual services container of a device.
installed	Specifies that the installed version of OpenFlow Agent must be displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Examples

The following is sample output of the **show virtual-service version** command:

```
Device# show virtual-service version name openflow_agent installed
Virtual service openflow_agent installed version:
Name : OpenflowAgent
Version : 1.0
```

Related Commands

Command	Description
activate	Activates an application installed in a virtual services container.
show virtual-service list	Displays the status of installation of all applications on the virtual service container.
show virtual-service version installed	Displays the version of OpenFlow Agent application installed on the virtual services container of device.
virtual-service	Provisions an application installed in the virtual services container of a device.
virtual-service install	Installs an application on the virtual services container of a device.

show virtual-service version installed

To display the version of OpenFlow Agent application installed on the virtual services container of device, use the **show virtual-service version installed** command in privileged EXEC mode.

show virtual-service version installed

Syntax Description This command has no keywords or arguments.

Command Modes Privileged EXEC (#)

Command History	Release	Modification
	6.0(2)U1(1)	This command was introduced.

Examples The following is sample output of the **show virtual-service version installed** command:

```
Device# show virtual-service version installed

Virtual service openflow_agent installed version:
  Name : OpenflowAgent
  Version : 1.0
```

Related Commands	Command	Description
	virtual-service	Provisions an application installed in the virtual services container of a device.

show virtual-service

To display an overview of resources used by virtual service containers, use the **show virtual-service** command in privileged EXEC mode.

show virtual-service [**detail** [**name** *virtual-service-name*]] **list** | **global** | **storage pool list** | **version** [**name** *virtual-service-name*] **installed** | **utilization** {**name** *virtual-service-name* | **statistics** CPU}]

Syntax Description

detail	(Optional) Displays detailed information of all or a specific virtual service container.
name <i>virtual-service-name</i>	(Optional) Specifies the name of the virtual service. The length of the name is 20 characters. Hyphen is not a valid character.
list	(Optional) Displays a list of all virtual services.
global	(Optional) Displays information related to all virtual services containers.
storage pool list	(Optional) Displays location of pools where virtual services are stored.
version name <i>virtual-service-name</i> installed	(Optional) Displays version information of the specified virtual services container.
version installed	(Optional) Displays version information of all virtual services container.
utilization name <i>virtual-service-name</i>	(Optional) Displays resource utilization of a virtual services container.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco Nexus 3000 Series NX-OS Release 6.0(2)U1(1)	This command was introduced.

Examples

The following is sample output of the **show virtual-service** command:

```
Device# show virtual-service
Virtual Service Global State and Virtualization Limits:

Infrastructure version : 1.2
Total virtual services installed : 4
Total virtual services activated : 1
Maximum memory for virtualization : 1000 MB
Maximum HDD storage for virtualization : 0 MB
Maximum bootflash storage for virtualization : 600 MB
Maximum system CPU : 80%
```

```

Maximum VCPUs per virtual service : 1

Committed memory      : 510 MB
Committed disk storage : 81 MB
Committed system CPU  : 20%
Available memory      : 490 MB
Available disk storage : 519 MB
Available system CPU   : 60%
Machine types supported : LXC

Device# show virtual-service global

Virtual Service Global State and Virtualization Limits:

Infrastructure version : 1.3
Total virtual services installed : 1
Total virtual services activated : 1

Maximum memory for virtualization : 768 MB
Maximum HDD storage for virtualization : 0 MB
Maximum bootflash storage for virtualization : 600 MB
Maximum system CPU : 6%
Maximum VCPUs per virtual service : 1

Committed memory      : 700 MB
Committed disk storage : 285 MB
Committed system CPU   : 1%

Available memory      : 68 MB
Available disk storage : 211 MB
Available system CPU   : 5%
Machine types supported : LXC
Machine types disabled : KVM

```

Examples

The following is sample output of the **show virtual-service detail** command:

```

Device# show virtual-service detail

Virtual Service vm_foo Detail:

Package Metadata:
Package name      : foo.ova
Application name   : SampleApp
Application description : Sample suite - HelloNetwork
Certificate type   : Development Package
OVA path          : /bootflash/foo.ova
State             : Activated
Watchdog          : Disabled
Disk reservation  : 81 MB
Memory reservation : 510 MB
CPU reservation   : 20% system CPU
VCPUs            : 1
Attached devices:
Type             Name             Alias
-----
Serial/shell    serial0
Disk            /mnt/config_disk
Disk            /
Serial/Trace    serial3
Serial/Syslog   serial2
Serial/aux      serial1
Serial/shell    serial0

```

Examples

The following is sample output of the **show virtual-service list** command:

```

Device# show virtual-service list

```

Virtual Service List:

Name	Status	Package Name
vm_foo	Activated	foo.ova

Examples

The following is sample output of the **show virtual-service storage pool list** command:

```
Device# show virtual-service storage pool list
Virtual-Service storage pool list
Name                Pool Type  Path
-----
virt_strg_pool_bf_vdc_1  directory /bootflash/virt_strg_pool_bf_vdc_1
```

Examples

The following is sample output of the **show virtual-service version installed** command:

```
Device# show virtual-service version installed
Virtual service openflow_agent installed version:
Name : OpenflowAgent
Version : 0.1
```

Examples

The following is sample output of the **show virtual-service utilization** command:

```
Device# show virtual-service version utilization name openflow_agent
Virtual-Service Utilization:
CPU Utilization:
CPU Time: 0 % (30 second average)
CPU State: R : Running

Memory Utilization:
Memory Allocation: 716800 Kb
Memory Used:      20272 Kb

Storage Utilization:
Name: N/A, Alias: N/A
RD Bytes: 0                WR Bytes: 0
RD Requests: 0            WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0   Usage: 0 %

Name: /mnt/core, Alias: N/A
RD Bytes: 0                WR Bytes: 0
RD Requests: 0            WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0   Usage: 0 %

Name: /mnt/ofa, Alias: N/A
RD Bytes: 0                WR Bytes: 0
RD Requests: 0            WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
Available(1K blocks): 0   Usage: 0 %

Name: _rootfs, Alias: N/A
RD Bytes: 0                WR Bytes: 0
RD Requests: 0            WR Requests: 0
Errors: 0
Capacity(1K blocks): 0    Used(1K blocks): 0
```


Available (1K blocks): 0

Usage: 0 %

Table 9: show virtual-service Field Descriptions

Command	Description
Status	<p>Indicates the status of the virtual services container. It can be one of the following:</p> <ul style="list-style-type: none"> • Initializing—Indicates that support for virtual services is being initialized for the device. • Installing—Indicates that the virtual service package is being installed on the device. • Installed—Indicates that the virtual service package has been installed on the device but has not been activated yet. • Activating—Indicates that virtual services package has been installed and is being activated on the device. • Activated—Indicates that virtual services package has been installed and activated on the device. • Activate Failed—Indicates that virtual services package activation has failed. • Deactivated—Indicates that the virtual services package has been deactivated.
Machine Types supported	<p>Indicates the operating system-level virtualization method used for running multiple isolated containers. The following machine types are supported:</p> <ul style="list-style-type: none"> • LXC - Linux Containers.

Related Commands

Command	Description
virtual-service	Provisions an application installed in the virtual services container of a device.

virtual-service

To provision an application installed in the virtual services container of a device and enter virtual services configuration mode, use the **virtual-service** command in global configuration mode. To remove the provisioning of an application installed in the virtual services container of a device and exit virtual services configuration mode, use the **no** form of this command.

virtual-service *virtual-service-name*

no virtual-service *virtual-service-name*

Syntax Description

<i>virtual-service-name</i>	Name of the application installed on the virtual services container of a device.
-----------------------------	--

Command Default

An installed application is not provisioned.

Command Modes

Global configuration (config)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Usage Guidelines

You can configure only one virtual service container at a time.

Examples

```
Device# hardware profile openflow agent
Device# virtual-service install name openflow_agent package
bootflash:/ofa-1.0.0-n3000-SPA-k9.ova
```

```
Note: Installing package 'bootflash:/ofa-1.0.0-n3000-SPA-k9.ova' for virtual service
'openflow_agent'. Once the install has finished, the VM may be activated. Use 'show
virtual-service list' for progress.
Device# 2013 Mar  8 20:35:23 n3k-202-194-2 %$ VDC-1 %$ %VMAN-2-INSTALL_STATE: Successfully
installed virtual service 'openflow_agent'
Device# configure terminal
Device(config)# virtual-service openflow_agent
Device(config-virt-serv)# activate
```

Related Commands

Command	Description
show virtual-service list	Displays the status of installation of all applications on the virtual service container.

Command	Description
show virtual-service version installed	Displays the version of OpenFlow Agent application installed on the virtual services container of device.
show virtual-service version	Displays the version of an application installed in the virtual service container of a device.
virtual-service install	Installs an application on the virtual services container of a device.

virtual-service connect

To connect to an application installed on the virtual services container of a device, use the **virtual-service connect** command in privileged EXEC mode.

virtual-service connect name *virtual-service-name* {**console** | **aux**}

Syntax Description

name <i>virtual-service-name</i>	Specifies the name of the application installed on the virtual services container of a device.
console	Specifies that a connection to the application is to be made through the console port defined by the virtual services container. Note This does not refer to the console port of the device.
aux	Specifies that a connection to the application is to be made through the AUX port of the virtual services container. Note This does not refer to the auxiliary port of the device.

Command Default

No connection exists to the specified application installed on the virtual services container of a device.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Usage Guidelines

You can connect to a virtual service running on a device through serial ports defined in the machine definition file in XML. You cannot connect to the virtual service container if the virtual machine definition file, does not specify that access to console or AUX port is needed.

The console and AUX ports used in the command does not refer to the console and AUX ports of the device.

The username requested here is dbg. To exit the login shell, enter Ctrl-C three times.

Examples

```
Device# virtual-service connect name myagent aux
Connecting to virtual-service. Exit using ^c^c^c
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^']'.
```

```

MontaVista(R) Linux(R) 6.0
MontaVista Linux CGE 6 .dev-snapshot-20130430 nx3k-1.cisco.com ttyS1
nx3k-1.cisco.com login: dbg
Last login: Thu Jun 20 12:33:35 BST 2013 on pts/1
1) ps
2) wd-disable
3) wd-enable
4) ls_core
5) exit
#?^CConnection closed by foreign host.
Connection to virtual-service terminated.
Device#

```

Related Commands

Command	Description
activate	Activates an application installed in a virtual services container.
virtual-service	Provisions an application installed in the virtual services container of a device.
virtual-service install	Installs an application on the virtual services container of a device.
virtual-service move	Collect log and core files of an application installed in the virtual services container of a device

virtual-service install

To install an application on the virtual services container of a device, use the **virtual-service install** command in privileged EXEC mode. To upgrade an installed application, use the **upgrade** keyword of the command.

virtual-service install name *virtual-service-name* **package** *file_url*

virtual-service upgrade name *virtual-service-name* **package** *file_url*

Syntax Description

name <i>virtual-service-name</i>	Specifies the name of the virtual service. The length of the name is 20 characters. Hyphen is not a valid character.
package <i>file-url</i>	Specifies the complete path of the OVA package that is to be installed. This is a file with a .ova extension.

Command Default

Specified application is not installed on a virtual services container.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Usage Guidelines

The OpenFlow Agent application software is packaged into a file with a .ova extension (OVA file). The package must first be copied to a location on a device using the **copy scp:** command before it is installed on the device.

The **install** keyword extracts the OVA file, validates the contents of the file, creates a virtual service instance, and validates the virtual machine definition file in XML. The command adds a line to the `bootflash://virtual-instance.conf` file. Copying configurations to the startup-config file of the device is not required to preserve the installation of the OVA file. You can install a different OVA file on the active and standby Route Processors (RPs).

To activate the installed virtual services container, use the **activate** command.

The **upgrade** keyword replaces the software in the virtual services container with the specified package. The command adds a line to the file. The virtual service may not be upgraded while it is activated. Use the **no activate** command to deactivate it.

Examples

The following example shows how the **virtual-service install** command is used to install a virtual services container.

```
Device# copy scp://10.10.1.1/ofa-1.0.0-n3000-SPA-k9.ova bootflash:/ofa-1.0.0-n3000-SPA-k9.ova
Device# virtual-service install name openflow_agent package
bootflash:/ofa-1.0.0-n3000-SPA-k9.ova
```

```
Note: Installing package 'bootflash:/ofa-1.0.0-n3000-SPA-k9.ova' for virtual service
'openflow_agent'. Once the install has finished, the VM may be activated. Use 'show
virtual-service list' for progress.
Device# 2013 Mar 8 20:35:23 n3k-202-194-2 %$ VDC-1 %$ %VMAN-2-INSTALL_STATE: Successfully
installed virtual service 'openflow_agent'
```

```
Device# configure terminal
Device(config)# virtual-service openflow_agent
Device(config-virt-serv)# activate
```

The following examples shows how you can monitor the status of the installation of the virtual services container. The Status field indicates the status of the installation.

The following is sample output of the **show virtual-service list** command with status of the installation is 'Installing'.

```
Device# show virtual-service list
System busy installing virtual-service 'WAAS'. The request may take several minutes...
Virtual Service List:
Name                               Status                               Package Name
-----
multiova                            Activated                            multiova-working.ova
WAAS                                 Installing                            ISR4451X-WAAS-5.2.0-b...
Device#
*Feb 13 14:08:25.276: %VIRT_SERVICE-5-INSTALL_STATE: Successfully installed virtual service
WAAS
```

The following is sample output of the **show virtual-service list** command with the status of the installation is 'Installed'.

```
Device# show virtual-service list
Virtual Service List:
Name                               Status                               Package Name
-----
multiova                            Activated                            multiova-working.ova
WAAS                                 Installed                            ISR4451X-WAAS-5.2.0-b...
```

Related Commands

Command	Description
activate	Activates an application installed in a virtual services container.
virtual-service	Provisions an application installed in the virtual services container of a device.
show virtual-service	
virtual-service connect	Connects to an application installed on the virtual services container of a device.
show virtual-service list	Displays the status of installation of all applications on the virtual service container.
virtual-service move	Collect log and core files of an application installed in the virtual services container of a device

virtual-service uninstall

To uninstall an application from the virtual services container of a device, use the **virtual-service uninstall** command in privileged EXEC mode.

virtual-service uninstall name *virtual-service-name*

Syntax Description

name <i>virtual-service-name</i>	Specifies the name of the application installed in the virtual services container of a device.
---	--

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Usage Guidelines

The **uninstall** keyword removes the installed virtual service container. The virtual service may not be uninstalled while it is configured or activated.

Before uninstalling a virtual services container, use the **no virtual-service** command to remove the configurations of the application and the **no activate** command to deactivate it.

Examples

```
Device# configure terminal
Device(config)# virtual-service openflow_plugin
Device(config-virt-serv)# no activate
Device(config-virt-serv)# end
Device# virtual-service uninstall name openflow_plugin
```

Related Commands

Command	Description
activate	Activates an application installed in a virtual services container.
virtual-service	Provisions an application installed in the virtual services container of a device.
show virtual-service	
virtual-service connect	Connects to an application installed on the virtual services container of a device.
show virtual-service list	Displays the status of installation of all applications on the virtual service container.

Command	Description
virtual-service move	Collect log and core files of an application installed in the virtual services container of a device

virtual-service move

To collect log and core files of an application installed in the virtual services container of a device, use the **virtual-service move** command in privileged EXEC mode.

virtual-service move *name* *virtual-service-name* {**core** | **log**} **to** *destination-url*

Syntax Description

name <i>virtual-service-name</i>	Specifies the name of the application installed on the virtual services container of a device.
core	Moves core files generated by the virtual service container.
log	Moves log files generated by the virtual service container.
to <i>destination-url</i>	Specifies the path to which core or log files are moved.

Command Default

This command has no default behavior.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
6.0(2)U1(1)	This command was introduced.

Examples

The following example shows how to collect log files of an application.

```
Device# virtual-service move name myagent log to bootflash://module-1/
```

Related Commands

Command	Description
virtual-service	Provisions an application installed in the virtual services container of a device.
virtual-service connect	Connects to an application installed on the virtual services container of a device.
virtual-service install	Installs an application on the virtual services container of a device.