Configuring NetFlow

About NetFlow

The NetFlow technology provides the metering base for a key set of applications, including network traffic accounting, usage-based network billing, network planning, as well as denial of services monitoring, network monitoring, outbound marketing, and data mining for both service providers and enterprise customers. Cisco provides a set of NetFlow applications to collect NetFlow export data, perform data volume reduction, perform post-processing, and provide end-user applications with easy access to NetFlow data. If you have enabled NetFlow monitoring of the traffic flowing through your datacenters, this feature enables you to perform the same level of monitoring of the traffic flowing through the Cisco Application Centric Infrastructure (Cisco ACI) fabric.

Instead of hardware directly exporting the records to a collector, the records are processed in the supervisor engine and are exported to standard NetFlow collectors in the required format.

For information about configuring NetFlow with virtual machine networking, see the *Cisco ACI Virtualization Guide*.

Note NetFlow is only supported on EX switches. See the *Cisco NX-OS Release Notes for Cisco Nexus 9000 Series ACI-Mode Switches* document for the release that you have installed for a list of the supported EX switches.

Configuring a NetFlow Exporter Policy for Virtual Machine Networking Using the NX-OS-Style CLI

The following example procedure uses the NX-OS-style CLI to configure a NetFlow exporter policy for virtual machine networking.

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Configure the exporter policy.

Example:

```
apic1(config)# flow vm-exporter vmExporter1 destination address 2.2.2.2 transport udp 1234
apic1(config-flow-vm-exporter)# source address 4.4.4.4
apic1(config-flow-vm-exporter)# exit
apic1(config)# exit
```

Configuring NetFlow and Tetration Analytics Feature Priority Through Node Control Policy Using NX-OS-Style CLI

The following example procedure uses the NX-OS-style CLI to configure the NetFlow and Tetration Analytics feature priority through a node control policy:

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Create a node control policy.

Example:

```
apic1(config)# node-control policy pol1
```

Step 3 Set NetFlow as the priority feature.

Example:

```
apic1(config-node)# feature netflow
```

Step 4 Exit the node control policy configuration.

Example:

```
apic1(config-node)# end
```

Step 5 Deploy the policy to node 101 and node 102.

Example:

```
ifav-isim15-ifc1(config)# fabric-internal
ifav-isim15-ifc1(config-fabric-internal)# template leaf-policy-group lpg1
ifav-isim15-ifc1(config-leaf-policy-group)# inherit node-control-policy pol1
ifav-isim15-ifc1(config-leaf-policy-group)# exit
ifav-isim15-ifc1(config-fabric-internal)# leaf-profile leafProfile1
ifav-isim15-ifc1(config-leaf-profile)# leaf-group leafgrp1
ifav-isim15-ifc1(config-leaf-group)# leaf 101
ifav-isim15-ifc1(config-leaf-group)# leaf 102
ifav-isim15-ifc1(config-leaf-group)# leaf-policy-group lpg1
ifav-isim15-ifc1(config-leaf-group)# end
```

Configuring NetFlow Node Policy Using the NX-OS-Style CLI

The following example procedure uses the NX-OS-style CLI to configure a NetFlow node policy:

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Configure the node policy.

Example:

```
apic1(config)# flow node-policy nodePol
apic1(config-flow-node-pol)# flow timeout collection 100
apic1(config-flow-node-pol)# flow timeout template 123
apic1(config-flow-node-pol)# exit
```

Configuring NetFlow Infra Selectors Using the NX-OS-Style CLI

You can use the NX-OS-style CLI to configure NetFlow infra selectors. The infra selectors are used for attaching a Netflow monitor to a PHY, port channel, virtual port channel, fabric extender (FEX), or port channel fabric extender (FEXPC) interface.

The following example CLI commands show how to configure NetFlow infra selectors using the NX-OS-style CLI:

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Create a NetFlow exporter policy.

Example:

In the following commands, the destination endpoint group is the endpoint group that the exporter sits behind. This endpoint group can also be an external Layer 3 endpoint group.

```
apic1(config)# flow exporter infraExporter1 destination address 1.2.3.4 transpo udp 1234
apic1(config-flow-exporter)# destination epg tenant tn2 application ap2 epg epg2
apic1(config-flow-exporter)# vrf member tenant tn2 vrf vrf2
apic1(config-flow-exporter)# version v9
apic1(config-flow-exporter)# source address 1.1.1.1
apic1(config-flow-exporter)# exit
```

Step 3 Create a second NetFlow exporter policy.

Example:

In the following commands, the destination endpoint group is the endpoint group that the exporter sits behind, which in this case is an external Layer 3 endpoint group.

```
apic1(config)# flow exporter infraExporter2
apic1(config-flow-exporter)# transport udp 9990
apic1(config-flow-exporter)# destination address 2001:db5:a0c:1f0::2
apic1(config-flow-exporter)# destination external-l3 epg tenant tn2 vrf v2 epg accounting-inst
apic1(config-flow-exporter)# vrf member tenant tn2 vrf vrf2
apic1(config-flow-exporter)# version v5
apic1(config-flow-exporter)# source address 2001:db8:a0b:12f0::1
apic1(config-flow-exporter)# exit
```

Step 4 Create a NetFlow record policy.

Example:

```
apic1(config)# flow record infraRecord1
apic1(config-flow-record)# match dst-ip
apic1(config-flow-record)# match dst-ipv4
apic1(config-flow-record)# match dst-ipv6
apic1(config-flow-record)# match dst-mac
apic1(config-flow-record)# match dst-port
apic1(config-flow-record)# match ethertype
apic1(config-flow-record)# match proto
apic1(config-flow-record)# match src-ip
apic1(config-flow-record)# match src-ipv4
apic1(config-flow-record)# match src-ipv6
apic1(config-flow-record)# match src-mac
apic1(config-flow-record)# match src-port
apic1(config-flow-record)# match tos
apic1(config-flow-record)# match vlan
apic1(config-flow-record)# collect count-bytes
apic1(config-flow-record)# collect count-pkts
apic1(config-flow-record)# collect pkt-disp
apic1(config-flow-record)# collect sampler-id
apic1(config-flow-record)# collect src-intf
apic1(config-flow-record)# collect tcp-flags
```

```
apic1(config-flow-record)# collect ts-first
apic1(config-flow-record)# collect ts-recent
apic1(config-flow-record)# exit
```

Step 5 Create a NetFlow monitor policy.

Example:

```
apic1(config)# flow monitor infraMonitor1
apic1(config-flow-monitor)# record infraRecord1
apic1(config-flow-monitor)# exporter infraExporter1
apic1(config-flow-monitor)# exporter infraExporter2
apic1(config-flow-monitor)# exit
```

You can attach a maximum of two exporters.

Step 6 Create an interface policy group (AccPortGrp).

Example:

```
apic1(config)# template policy-group pg1
apic1(config-pol-grp-if)# ip flow monitor infraMonitor1
apic1(config-pol-grp-if)# ipv6 flow monitor infraMonitor2
apic1(config-pol-grp-if)# exit
```

You can have one monitor policy per address family (IPv4 and IPv6).

Step 7 Create a node profile and infra selectors.

Example:

```
apic1(config)# leaf-profile lp1
apic1(config-leaf-profile)# leaf-group lg1
apic1(config-leaf-group)# leaf 101
apic1(config-leaf-profile)# exit
apic1(config)# leaf-interface-profile lip1
apic1(config-leaf-if-profile)# exit
apic1(config)# leaf-interface-profile lip1
apic1(config-leaf-if-profile)# leaf-interface-group lig1
apic1(config-leaf-if-group)# interface ethernet 1/5
apic1(config-leaf-if-profile)# policy-group pg1
apic1(config-leaf-if-profile)# exit
apic1(config-leaf-profile)# exit
```

Step 8 Create a port channel policy group (AccBndlGrp).

Example:

```
apic1(config)# template port-channel po6
apic1(config-if)# ip flow monitor infraMonitor1
apic1(config-if)# ipv6 flow monitor infraMonitor1
apic1(config-if)# exit
apic1(config-leaf-profile)# leaf-profile lp2
apic1(config-leaf-group)# leaf-group lg2
apic1(config-leaf-profile)# leaf 101
apic1(config-leaf-profile)# exit
apic1(config)# leaf-interface-profile lip2
apic1(config-leaf-if-profile)# exit
apic1(config)# leaf-interface-profile lip2
apic1(config-leaf-if-profile)# leaf-interface-group lig2
apic1(config-leaf-if-group)# interface ethernet 1/6
apic1(config-leaf-if-profile)# channel-group po6
apic1(config-leaf-if-profile)# exit
```

You can have one monitor policy per address family (IPv4 and IPv6). The interfaces can also be vPCs.

Configuring NetFlow Overrides Using the NX-OS-Style CLI

The following procudure configures NetFlow overrides using the NX-OS-Style CLI:

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Create the override.

Example:

```
apic1(config)# leaf 101
apic1(config-leaf)# vrf context tenant tn2 vrf vrf2
apic1(config-leaf)# exit
apic1(config)# interface ethernet 1/15
apic1(config-if)# ip flow monitor infraMonitor1
apic1(config-if)# ipv6 flow monitor infraMonitor2
apic1(config-if)# exit
apic1(config)# exit
apic1# exit
```

You can have one monitor policy per address family (IPv4 and IPv6). The interfaces can also be vPCs.

Configuring NetFlow Tenant Hierarchy Using the NX-OS-Style CLI

The following example procedure uses the NX-OS-style CLI to configure the NetFlow tenant hierarchy:

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Create a tenant and bridge domain, and add them to a VRF.

Example:

```
apic1(config)# tenant tn2
apic1(config-tenant)# vrf context vrf2
```

```
apic1(config-tenant-vrf)# exit
apic1(config-tenant)# bridge-domain bd2
apic1(config-tenant-bridge-domain)# vrf member vrf2
apic1(config-tenant-bridge-domain)# exit
apic1(config-tenant)# bridge-domain bd3
apic1(config-tenant-bridge-domain)# vrf member vrf2
apic1(config-tenant-bridge-domain)# exit
```

Step 3 Create an application endpoint group behind which the exporter resides.

Example:

```
apic1(config-tenant)# application ap2
apic1(config-tenant-app)# epg epg2
apic1(config-tenant-app)# bridge-domain member bd2
apic1(config-tenant-app-bridge-domain)# exit
apic1(config-tenant-app)# exit
```

Step 4 Create a second application endpoint group behind which the exporter resides.

Example:

```
apic1(config-tenant)# application ap3
apic1(config-tenant-app)# epg epg3
apic1(config-tenant-app)# bridge-domain member bd3
apic1(config-tenant-app-bridge-domain)# exit
apic1(config-tenant-app)# exit
```

Step 5 Attach a NetFlow monitor policy on the bridge domains.

Example:

```
apic1(config)# interface bridge-domain bd2
apic1(config-if)# ipv6 flow monitor tnMonitor1
apic1(config-if)# ip flow monitor tnMonitor1
apic1(config-if)# layer2-switched flow monitor tnMonitor1
apic1(config-if)# exit
apic1(config)# interface bridge-domain bd3
apic1(config-if)# ipv6 flow monitor tnMonitor1
apic1(config-if)# ip flow monitor tnMonitor1
apic1(config-if)# exit
```

You can have one monitor policy per address family (IPv4 and IPv6). The interfaces can also be vPCs.

Step 6 Create the Netflow exporter policy.

Example:

In the following commands, the destination endpoint group is the endpoint group that the exporter sits behind. This endpoint group can also be an external Layer 3 endpoint group.

```
apic1(config)# flow exporter tnExporter1
apic1(config-flow-exporter)# transport udp 1234
apic1(config-flow-exporter)# destination address 2.2.2.2
apic1(config-flow-exporter)# destination epg tenant tn2 application ap2 epg epg2
apic1(config-flow-exporter)# vrf member tenant tn2 vrf vrf2
apic1(config-flow-exporter)# version v9
apic1(config-flow-exporter)# source address 1.1.1.1
apic1(config-flow-exporter)# exit
```

Step 7 Create a second Netflow exporter policy.

Example:

In the following commands, the destination endpoint group is the endpoint group that the exporter sits behind, which in this case is an external Layer 3 endpoint group.

```
apic1(config)# flow exporter tnExporter2
apic1(config-flow-exporter)# transport udp 9990
apic1(config-flow-exporter)# destination address 2001:db5:a0c:1f0::2
apic1(config-flow-exporter)# destination external-l3 epg tenant tn2 vrf v2 epg accounting-inst
apic1(config-flow-exporter)# vrf member tenant tn2 vrf vrf2
apic1(config-flow-exporter)# version v5
apic1(config-flow-exporter)# source address 2001:db8:a0b:12f0::1
apic1(config-flow-exporter)# exit
```

Step 8 Create a NetFlow record policy.

Example:

```
apic1(config)# flow record tnRecord1
apic1(config-flow-record)# match dst-ip
apic1(config-flow-record)# match dst-ipv4
apic1(config-flow-record)# match dst-ipv6
apic1(config-flow-record)# match dst-mac
apic1(config-flow-record)# match dst-port
apic1(config-flow-record)# match ethertype
apic1(config-flow-record)# match proto
apic1(config-flow-record)# match src-ip
apic1(config-flow-record)# match src-ipv4
apic1(config-flow-record)# match src-ipv6
apic1(config-flow-record)# match src-mac
apic1(config-flow-record)# match src-port
apic1(config-flow-record)# match tos
apic1(config-flow-record)# match vlan
apic1(config-flow-record)# collect count-bytes
apic1(config-flow-record)# collect count-pkts
apic1(config-flow-record)# collect pkt-disp
apic1(config-flow-record)# collect sampler-id
apic1(config-flow-record)# collect src-intf
apic1(config-flow-record)# collect tcp-flags
apic1(config-flow-record)# collect ts-first
apic1(config-flow-record)# collect ts-recent
apic1(config-flow-record)# exit
```

Step 9 Create a NetFlow monitor policy.

Example:

```
apic1(config)# flow monitor tnMonitor1
apic1(config-flow-monitor)# record tnRecord1
apic1(config-flow-monitor)# exporter tnExporter1
apic1(config-flow-monitor)# exporter tnExporter2
apic1(config-flow-monitor)# exit
```

You can attach a maximum of two exporters.

Step 10 Add VLANs to the VLAN domain and configure a VRF for a leaf node.

Example:

```
apic1(config)# vlan-domain dom1
apic1(config-vlan)# vlan 5-100
apic1(config-vlan)# exit
apic1(config)# leaf 101
apic1(config-leaf)# vrf context tenant tn2 vrf vrf2
apic1(config-leaf-vrf)# exit
```

Step 11 Deploy an endpoint group on an interface to deploy the bridge domain.

Example:

```
apic1(config-leaf)# interface ethernet 1/10
apic1(config-leaf-if)# vlan-domain member dom1
apic1(config-leaf-if)# switchport trunk allowed vlan 10 tenant tn2 application ap2 epg epg2
apic1(config-leaf-if)# exit
```

Step 12 Deploy another endpoint group on an interface.

Example:

```
apic1(config-leaf)# interface ethernet 1/11
apic1(config-leaf-if)# vlan-domain member dom1
apic1(config-leaf-if)# switchport trunk allowed vlan 11 tenant tn2 application ap3 epg epg3
apic1(config-leaf-if)# exit
```

Step 13 Attach the monitor policy to the sub-interface.

Example:

```
apic1(config-leaf)# interface ethernet 1/20
apic1(config-leaf-if)# vlan-domain member dom1
apic1(config-leaf-if)# no switchport
apic1(config-leaf-if)# exit
apic1(config-leaf)# interface ethernet 1/20.20
apic1(config-leaf-if)# vrf member tenant tn2 vrf vrf2
apic1(config-leaf-if)# ipv6 address 20::1/64 preferred
apic1(config-leaf-if)# ipv6 flow monitor tnMonitor1
apic1(config-leaf-if)# ip flow monitor tnMonitor2
apic1(config-leaf-if)# exit
```

Step 14 Attach the monitor policy to a switched virtual interface (SVI).

Example:

```
apic1(config-leaf)# interface vlan 30
apic1(config-leaf-if)# vrf member tenant tn2 vrf vrf2
apic1(config-leaf-if)# ipv6 address 64::1/64 preferred
apic1(config-leaf-if)# ip flow monitor tnMonitor1
apic1(config-leaf-if)# ip6 flow monitor tnMonitor1
apic1(config-leaf-if)# exit
```

Step 15 Associate the SVI to a Layer 2 interface.

Example:

```
apic1(config-leaf)# interface ethernet 1/30
apic1(config-leaf-if)# vlan-domain member dom1
apic1(config-leaf-if)# switchport trunk allowed vlan 30 tenant tn2 external-svi
apic1(config-leaf-if)# exit
apic1(config-leaf)# exit
apic1(config)# exit
```

Consuming a NetFlow Exporter Policy Under a VMM Domain Using the NX-OS-Style CLI for VMware VDS

The following procedure uses the NX-OS-style CLI to consume a NetFlow exporter policy under a VMM domain.

Procedure

Step 1 Enter the configuration mode.

Example:

```
apic1# config
```

Step 2 Consume the NetFlow exporter policy.

Example:

```
apic1(config)# vmware-domain mininet
apic1(config-vmware)# configure-dvs
apic1(config-vmware-dvs)# flow exporter vmExporter1
apic1(config-vmware-dvs-flow-exporter)# active-flow-timeout 62
apic1(config-vmware-dvs-flow-exporter)# idle-flow-timeout 16
apic1(config-vmware-dvs-flow-exporter)# sampling-rate 1
apic1(config-vmware-dvs-flow-exporter)# exit
apic1(config-vmware-dvs)# exit
apic1(config-vmware)# exit
apic1(config)# exit
```

Enabling or Disabling NetFlow on an Endpoint Group Using the NX-OS-Style CLI for VMware VDS

The following procedure enables or disables NetFlow on an endpoint group using the NX-OS-style CLI.

Procedure

Step 1 Enable NetFlow:

Example:

```
apic1# config
apic1(config)# tenant tn1
apic1(config-tenant)# application app1
apic1(config-tenant-app)# epg epg1
apic1(config-tenant-app-epg)# vmware-domain member mininet
apic1(config-tenant-app-epg-domain)# flow monitor enable
apic1(config-tenant-app-epg-domain)# exit
apic1(config-tenant-app-epg)# exit
apic1(config-tenant-app)# exit
```

```
apic1(config-tenant)# exit
apic1(config)# exit
```

Step 2 (Optional) If you no longer want to use NetFlow, disable the feature:

Example:

```
apic1(config-tenant-app-epg-domain)# no flow monitor enable
```