Content

Chapter 1 Commands for Mirroring Configuration

1.1 monitor session source interface

Command: monitor session *<session>* source {interface *<interface-list>* | cpu [slot *<slotnum>*]} {rx| tx| both}

　　　　　no monitor session *<session>* source {interface *<interface-list>* | cpu [slot *<slotnum>*]}

Function: Specify the source interface for the mirror. The no form command will disable this configuration.

Parameters: *<session>* is the session number for the mirror. Currently only 1 to 4 is supported. ***<interface-list>*** is the list of source interfaces of the mirror which can be separated by "-" and ";". **cpu slot *<slotnum>*** specifies the CPU on the specified board to be the source of the mirror for debugging. Datagram received by or sent by the specified CPU.　Currently the CPU mirror is only supported be configured in session 4. **rx** means to filter the datagram received by the interface, while **tx** for the datagram sent out, and **both** means both of income and outcome datagram.

Command mode: Global mode

Usage Guide: This command is used to configure the source interfaces for the mirror. It is not restricted the source interface of the mirror on the switch. The source can be one interface, or can be multiple interfaces. Both of the income and outcome datagram can be mirrored, or they can be mirrored selectively. If no [rx | tx | both] is specified, both are made to be the default. When multiple interfaces are mirrored, the direction of the mirror can be different, but they should be configured separately.

Example: Configure to mirror the datagram sent out by interface 1/0/1-4　and to mirror the datagram received by interface1/0/5

Switch(config)#monitor session 1 source interface ethernet 1/0/1-4 tx

Switch(config)#monitor session 1 source interface ethernet1/0/5 rx

1.2 monitor session source interface access-list

Command: monitor session <session> source {interface <interface-list>} access-list <num> {rx|tx|both}

         no monitor session <session> source {interface <interface-list>} access-list <num>

Function: Specify the access control for the source of the mirror. The no form command will disable this configuration.

Parameters: <session> is the session number for the mirror. Currently only 1 to 4 is supported**. <**interface-list> is the list of source interfaces of the mirror which can be separated by '-' and ';'**. <num>** is the number of the access list**.** rx means to filter the datagram received by the interface**.** tx for the datagram sent out, **and** both means both of income and outcome datagram.

Command Mode: Global Mode.

Usage Guide: This command is used to configure the source interfaces for the mirror. It is not restricted the source interface of the mirror on the switch. The source can be one interface, or can be multiple interfaces. For flow mirror, only datagram received can be mirrored. The parameters can be **rx, tx, both**.   The related access list should be prepared before this command is issued. For how to configure the access list, please refer to ACL configuration. The mirror can only be created after the destination interface of the corresponding session has been configured.

Example: Configure the mirror interface 1/0/6 to filter with access list 120 in session 2.

Switch(config)#monitor session 2 source interface 1/0/6 access-list 120 rx

1.3 monitor session destination interface

Command: monitor session <session> destination interface <interface-number>

         no monitor session <session> destination interface <interface-number>

Function: Specify the destination interface of the mirror. The no form command will disable this configuration.

Parameters: <session> is the session number of the mirror, which is currently limited to 1-4. **<interface-number>** is the destination interface of the mirror.

Default: None.

Command Mode: Global mode

Usage Guide: 4 destination mirror interface is supported on the switch. To be mentioned. The interface which is configured as the destination of the mirror should not be configured

as the member of the interface trunk. And the maximum throughput of the interface is recommended to be larger than the total throughput of the interfaces to be mirrored. If the destination of a session is removed, the mirror path configured in the session will be removed at the same time. And if the destination interface is reconfigured, the interface, CPU mirror path will be recovered. To be mentioned, the flow mirror can only be recovered after the destination of the interface is re-configured.

Example: Configure interface 1/0/7 as the destination of the mirror.

Switch(config)#monitor session 1 destination interface ethernet 1/0/7

1.4 show monitor

Command: show monitor

Function: To display information about the source and destination ports of all the mirror sessions.

Command Mode: Admin Mode

Usage Guide: This command is used to display the source and destination ports for the configured mirror sessions. For port mirroring, CPU mirroring and flow mirroring, the mirror mode of the source can be displayed. For MAC mirroring, MAC mirror configuration will be displayed for the supported switch cards.

Example:

Switch#show monitor

Chapter 2 Commands for RSPAN Configuration

2.1 remote-span

Command: remote-span

        no remote-span

Function: To configure VLAN to RSPAN VLAN. The no form of this command will delete the RSPAN VLAN.

Parameter: None.

Command Mode: VLAN Configuration Mode.

Default: Not configured.

Usage Guide: This command is used to configure the existing VLAN as RSPAN VLAN. Dedicated RSPAN VLAN should be configured before RSPAN can function. When configuring RSPAN VLAN, it should be made sure that specialized VLAN, such as the default VLAN, dynamic VLAN, private VLAN, multicast VLAN, and layer 3 interface enabled VLAN, should not be configured as RSPAN VLAN. If any existing sessions are still working when RSPAN is disabled, these sessions will be still working regardless the configuration change. However, if any layer 3 interface is configure in the VLAN after RSPAN is disable, the existing RSPAN session will be stopped.

Example:

Switch(Config-Vlan5)#remote-span

2.2 monitor session remote vlan

Command: monitor session <*session*> remote vlan <*vid*>

        no monitor session <*session*> remote vlan

Function: To configure local mirror session to RSPAN. The no form of this command will restore the RSPAN to local mirror.

Parameter: <*session*>: session ID, range between 1~4. **<*vid*>:** The id of RSPAN VLAN.

Command Mode: Global Mode.

Default: Not configured.

Usage Guide: To configure local mirror session to RSPAN. The VLAN id is the RSPAN VLAN. The mirrored data grams will be attached with RSPAN tags.

Example:

Switch(config)#monitor session 1 remote vlan 5

2.3 monitor session reflector-port

Command: monitor session *<session>* **reflector-port** *<interface-number>*

         no monitor session *<session>* **reflector-port** *<interface-number>*

Function: To configure reflector port, the no form of this command will delete the reflector port.

Parameter: *<session>*: Session ID, range between 1~4, *<interface-number>*: Interface number.

Command Mode: Global Mode.

Default: Not configured.

Usage Guide: This command configures the reflector port for the destination of mirror data grams, and disables the MAC learning function of the specified port. The configuration of reflector port is to change the mode of the local port from the destination port mode to be the reflector mode. Hence, the configuration of reflector port and the destination port are exclusive. The no command is used to restore the reflector port to normal port. The source port, in access or trunk mode, should not be added to RSPAN VLAN. When the reflector port is configured as springboard of CPU TX direction mirroring, it must be configured as TRUNK port and allows the RSPAN VLAN data passing, the Native VLAN should not be configured as RSPAN VLAN. After configured RSPAN, the vlan tag will be added on the packet of the egress mirror. It will cause the abort error frame on the reflection port, so the default MTU value of the switch should be modified.

Example:

Switch(config)#monitor session 1 reflector-port ethernet1/0/3

Chapter 3 Commands for sFlow

3.1 sflow agent-address

Command: sflow agent-address <*agent-address*>

        no sflow agent-address

Function: Configure the sFlow sample proxy address. The "no" form of this command deletes the proxy address.

Parameter: <*agent-address* > is the sample proxy IP address which is shown in dotted decimal notation.

Command Mode: Global Mode.

Default: None default value.

Usage Guide: The proxy address is used to mark the sample proxy which is similar to OSPF or the Router ID in the BGP. However it is not necessary to make the sFlow sample proxy work properly.

Example: Sample the proxy address at global mode.

switch (config)#sflow agent-address 192.168.1.200

3.2 sflow analyzer

Command: sflow analyzer sflowtrend

        no sflow analyzer sflowtrend

Function: Configure the analyzer used by sFlow, the no command deletes the analyzer.

Parameter: sflowtrend is the analyzer of Inmon.

Command Mode: Global Mode

Default: Do not configure

Usage Guide: Configure this command when using sFlowTrend.

Example:

Switch(config)#sflow analyzer sflowtrend

3.3 sflow counter-interval

Command: sflow counter-interval <*interval-value*>

        no sflow counter-interval

Function: Configure the max interval of the sFlow statistic sampling; the "no" form of this

command deletes the statistic sampling interval value.

Parameter:<*interval-value*> is the value of the interval with a valid range of 20~120 and shown in second.

Command Mode: Port Mode

Default: No default value

Usage Guide: If no statistic sampling interval is configured, there will not be any statistic sampling on the interface.

Example: Set the statistic sampling interval on the interface e1/0/1 to 20 seconds.

Switch(Config-If-Ethernet1/0/1)#sflow counter-interval 20

3.4 sflow data-len

Command: sflow data-len *<length-value>*

             no sflow data-len

Function: Configure the max length of the sFlow packet data; the "**no sflow data-len**" command restores the default value.

Parameter: *<length-value>* is the value of the length with a value range of 500-1470.

Command Mode: Port Mode.

Default: The value is 1400 by default.

Usage Guide: When combining several samples to a sFlow group to be sent, the length of the group excluding the MAC head and IP head parts should not exceed the configured value.

Example: Configure the max length of the sFlow packet data to 1000.

switch (Config-If-Ethernet1/0/2)#sflow data-len 1000

3.5 sflow destination

Command: sflow destination *<collector-address>* [*<collector-port>*]

             no sflow destination

Function: Configure the IP address and port number of the host on which the sFlow analysis software is installed. If the port has been configured with IP address, the port configuration will be applied, or else the global configuration will be applied. The "no" form of this command restores the port to default and deletes the IP address.

Parameter: *<collector-address>* is the IP address of the analyzer, shown in dotted decimal notation. ***<collector-port>*** is the destination port of the sent sFlow packets.

Command Mode: Global Mode and Port Mode.

Default: The destination port of the sFlow packet is defaulted at 6343, and the analyzer has no default address.

Usage Guide: If the analyzer address is configured at Port Mode, this IP address and port configured at Port Mode will be applied when sending the sample packet. Or else the address and port configured at global mode will be applied. The analyzer address should be configured to let the sFlow sample proxy work properly.

Example: Configure the analyzer address and port at global mode.

switch (config)#sflow destination 192.168.1.200 1025

3.6 sflow header-len

Command: sflow header-len *<length-value>*

             no sflow header-len

Function: Configure the length of the head data packet copied in the sFlow data sampling. The "no" form of this command restores the default value.

Parameter: *<length-value>* is the value of the length with a valid range of 32-256.

Command Mode: Port Mode.

Default: 128 by default.

Usage Guide: If the packet sample can not be identified whether it is IPv4 or IPv6 when sent to the CPU, certain length of the head of the group has to be copied to the sFlow packet and sent out. The length of the copied content is configured by this command.

Example: Configure the length of the packet data head copied in the sFlow data sampling to 50.

Switch(Config-If-Ethernet1/0/2)#sflow header-len 50

3.7 sflow priority

Command: sflow priority *<priority-value>*

             no sflow priority

Function: Configure the priority when sFlow receives packet from the hardware. The "no" form of the command restores the default.

Parameter: *<priority-value>* is the priority value with a valid range of 0-3.

Command Mode: Global Mode.

Default: The default value is 0.

Usage Guide: When sample packet is sent to the CPU, it is recommended not to assign high priority for the packet so that regular receiving and sending of other protocol packet

will not be interfered. The higher the priority value is set, the higher its priority will be.

Example: Configure the priority when sFlow receives packet from the hardware at global mode.

switch (config)#sflow priority 1

3.8 sflow rate

Command: sflow rate { input *<input-rate>* | output *<output-rate >*}

         no sflow rate [input | output]

Function: Configure the sample rate of the sFlow hardware sampling. The "no" form of this command deletes the sampling rate value.

Parameter: *<input-rate>* is the rate of ingress group sampling, the valid range is 1000~16383500.

        <output-rate> is the rate of egress group sampling, the valid range is 1000~16383500.

Command Mode: Port Mode.

Default: No default value.

Usage Guide: The traffic sampling will not be performed if the sampling rate is not configured on the port. And if the ingress group sampling rate is set to 10000, this indicates there will be one group be sampled every 10000 ingress groups.

Example: Configure the ingress sample rate on port e1/0/1 to 10000 and the egress sample rate to 20000.

Switch(Config-If-Ethernet1/0/1)#sflow rate input 10000

Switch(Config-If-Ethernet1/0/1)#sflow rate output 20000

3.9 show sflow

Command: show sflow

Function: Display the sFlow configuration state.

Parameter: None.

Command Mode: All Modes.

Usage Guide: This command is used to acknowledge the operation state of sFlow.

Switch#show sflow

Sflow version 1.2

Agent address is 172.16.1.100

Collector address have not configured

Collector port is 6343

Sampler priority is 2

Sflow DataSource: type 2, index 194(Ethernet1/0/2)

    Collector address is 192.168.1.200

    Collector port is 6343

    Counter interval is 0

    Sample rate is input 0, output 0

    Sample packet max len is 1400

    Sample header max len is 50

    Sample version is 4

Displayed Information	Explanation
Sflow version 1.2	Indicates the sFlow version is 1.2
Agent address is 172.16.1.100	Address of the sFlow sample proxy is 172.16.1.100
Collector address have not configured	the sFlow global analyzer address is not configured
Collector port is 6343	the sFlow global destination port is the defaulted 6343
Sampler priority is 2	The priority of sFlow when receiving packets from the hardware is 2.
Sflow DataSource: type 2, index 194(Ethernet1/0/1)	One sample proxy data source of the sFlow is the interface e1/0/1 and its type is 2 (Ethernet), the interface index is 194.
Collector address is 192.168.1.200	The analyzer address of the sampling address of the E1/0/1 interface is 192.168.1.200
Collector port is 6343	Default value of the port on E1/0/1 interface sampling proxy is 6343.
Counter interval is 20	The statistic sampling interval on e1/0/1 interface is 20 seconds
Sample rate is input 10000, output 0	The ingress traffic rate of e1/0/1 interface sampling proxy is 10000 and no egress traffic sampling will be performed
Sample packet max len is 1400	The length of the sFlow group data sent by the e1/0/1 interface should not exceed 1400 bytes.
Sample header max len is 50	The length of the packet data head copied in the data sampling of the e1/0/1 interface sampling proxy is 50
Sample version is 4	The datagram version of the sFlow group sent by the E1/0/1 interface sampling proxy is 4.

Chapter 4 Commands for IPFIX

4.1 cache

Command: cache {entries *<entries>* | timeout {active *<active- time>* | inactive *<inactive- time>*} | type {normal | tcp-end detect}}

no cache {entries | timeout {active | inactive} | type}

Function: This command can configures the record number, the output record method, aging time and active time which are saved in the cache.

Parameter: entries *<entries>*: Control the max record number which can be saved. This value should be big enough to avoid the record losing due to the cache is full. In the following, there are four value options:

  item1   correspond to the max record number which can be saved as 512

  item2   correspond to the max record number which can be saved as 1024

  item3   correspond to the max record number which can be saved as 2048

  item4   correspond to the max record number which can be saved as 4096

There are two kinds of the output record time, timeout active and timeout inactive can be configured at the same time, the explanations are as follows:

  timeout active *<active-time>*: Set the active time of the record. When the corresponding time reaches for an active record then it will be exported. In the following, there are four value options:

  time1   correspond to the min active time which can be set as 1 minute for the record

  time2   correspond to the min active time which can be set as 10 minutes for the record

  time3   correspond to the min active time which can be set as 60 minutes for the record

  time4   correspond to the min active time which can be set as 300 minute for the record

  timeout inactive *<inactive-time>*: Set the aging time of the record. When a list entry does not update in the corresponding time then it will be exported. In the following, there are four value options:

  time1   correspond to the aging time which can be set as 1 second for the record (the flow record is exported directly, and this record only include a packet information)

  time2   correspond to the aging time which can be set as 60 seconds for the record

time3   correspond to the aging time which can be set as 120 seconds for the record

time4   correspond to the aging time which can be set as 320 seconds for the record

cache configures the output method of the records. In the following, two methods are optional:

cache type normal: Use this method, the list entries of the cache process the aging according to the time value of timeout active and timeout inactive. When a list entry is aged, it will be deleted from cache and exported to collector by exporter.

cache type tcp-end detect: Use this method to process the aging output and check the end tag of TCP packets according to the time value of timeout active and timeout inactive. When the port receives the end tag of TCP, it will export the records of the cache.

Command mode: ipfix monitor configuration mode.

Default: ***<entries>*** the default value is 2048

　　　　　<active-time> the default value is 1 minute

　　　　　<inactive-time> the default value is 60s

　　　　　cache type the default setting is normal

Usage Guide: When configure the cache under the monitor mode, it needs to ensure that the monitor is not applied by any ports currently.

If the monitor is applied by the port, then cancel the application from the port.

Example:

The max record number of cache as 1024 that corresponds to the monitor. When the active time of the records exceeds 1 minute, then export the records.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# cache entries item2

Switch(Config-ipfix-monitor)# cache timeout active time1

Switch(Config-ipfix-monitor)# cache type normal

The max record number of cache as 512 that corresponds to the monitor, then export the record directly.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# cache entries item1

Switch(Config-ipfix-monitor)# cache timeout inactive 1

4.2 clear ipfix statistic exporter

Command: clear ipfix statistic exporter *<exporter-name>*

Function: This command clears the flow record statistic information of the specific exporter.

Parameter: *<exporter-name>*: the name of exporter, the range can not exceed the character string which is 32 bytes.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch# clear ipfix statistic exporter export-to-server

4.3 clear ipfix statistic interface ethernet

Command: clear ipfix statistic interface ethernet *<IFNAME>*

Function: This command clears the flow record statistic information of the specific port.

Parameter: *<IFNAME>*: The port name of which the IPFIX statistic information will be cleared.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch# clear ipfix statistic interface ethernet 1/0/1

4.4 collect counter

Command: collect counter {bytes | packets}

         no collect counter {bytes | packets}

Function: This command configures the number of bytes or the packets of a flow as the non-keyword field.

Parameter: bytes: Configure the bytes number of the flows as the non-keyword field.

         packets: Configure the packets number of the flows as the non-keyword field.

Command Mode: ipfix record configuration mode

Default: Do not configure by default.

Usage Guide: The non-keyword field provides the extra information, but it is not used to match and create new flows. If more than one options are selected, then this command can configures many times.

Example: Configure the bytes number of the flows as the non-keyword field.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# collect counter bytes

4.5 collect timestamp sys-uptime

Command: collect timestamp sys-uptime {first | last}

              no collect timestamp sys-uptime {first | last}

Function: This command configures the arrival time as the non-keyword field for the first or the last packet of the flows.

Parameter: first: The arrival time of the first packet as the non-keyword field in the flows.

              last: The arrival time of the last packet as the non-keyword field in the flows.

Command Mode: ipfix record configuration mode

Default: Do not configure by default.

Usage Guide: The non-keyword field provides the extra information, but it is not used to match and create new flows. If more than one options are selected, then this command can configures many times.

Example: Configure the arrival time of the first packet as the non-keyword field in the flows.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# collect timestamp sys-uptime first

4.6 deal

Command: deal {non-discard | discard | all}

              no deal

Function: This command configures whether monitoring the discarded packets which are tagged.

Parameter: non-discard: Only monitor the discarded packets which are not tagged

              discard: Only monitor the discarded packets which are tagged

              all: Monitor all packets

Command Mode: ipfix monitor configuration mode

Default: Only monitor the discarded packet which is not tagged by default.

Usage Guide: When configuring the deal under the monitor mode, it needs to ensure that the monitor is not applied by any ports currently.

    If the monitor is applied by the port, then cancel the application from the port.

Example: Monitor all packets.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# deal all

4.7 debug ipfix

Command: debug ipfix {monitor | exporter}

        no debug ipfix {monitor | exporter}

Function: This command opens or closes the application debug switch for IPFIX.

Parameter: monitor: What will be monitored is that the flow records need to export, then print the debug information.

        exporter: Export the flow records, so as to print the debug information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example: Open the debug switch of the monitor.

Switch#debug ipfix monitor

4.8 description

Command: description <*string*>

        no description

Function: This command configures the description for monitor, exporter, record, sampler.

Parameter: <*string*>: Describe the character string, the length can not exceeds 128 characters.

Command Mode: ipfix monitor configuration mode

        ipfix exporter configuration mode

        ipfix record configuration mode

        ipfix sampler configuration mode

Default: None.

Usage Guide: None.

Example: This monitor is used to monitor all input packets, join the description information as below:

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# description used for monitoring all packets received

4.9 exporter

Command: exporter <*name*>

        no exporter <*name*>

Function: This command defines the flow record output rules of the monitor by configuring an exporter.

Parameter: *<name>*: is the exporter name, the range can not exceeds the character string which is 32 bytes.

Command Mode: ipfix monitor mode

Default: None.

Usage Guide: Use ipfix exporter to configure the output parameters before the exporter of the monitor is configured. Multi-exporters can be configured for a monitor that means the flow record information can be exported to multi-devices. At present, one monitor can configures 3 exporters at most.

Example: Configure the exporter as export-to-server for the monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# exporter export-to-server

4.10 ipfix apply monitor

Command: ipfix apply monitor *<monitor-name>* [sampler *<sampler-name>*] {input | output}

**   no ipfix apply monitor *<monitor-name>* [sampler *<sampler-name>*] {input | output}**

Function: This command applies the ipfix monitor function to the port.

Parameter: monitor <monitor-*name*>: The name of the monitor which needs to be applied to the port, the range can not exceed the character string which is 32 bytes.

**   sampler <sampler-*name*>:** The name of the sampler which needs to be applied to the port, the range can not exceed the character string which is 32 bytes.

**   input:** Monitor the ingress direction of the port.

**   output:** Monitor the egress direction of the port.

Command Mode: Port mode

Default: By default, disable the monitor on the port.

Usage Guide: Use ipfix monitor command and ipfix sampler command to configure the relating parameters before monitor and sampler are applied to the port. After the sampling rule is applied, ipfix device can record the packets which are sampled by the sampler only. For each port, both the ingress and egress direction only can configure one ipfix monitor.

Example: Set the IPFIX function of the ingress direction for the port.

Switch(Config)# interface ethernet 1/0/2

Switch(Config-If-Ethernet1/0/2)# ipfix monitor my-ipfix-monitor sampler SAMPLER-1 input

4.11 ipfix exporter

Command: ipfix exporter <*name*>

         no ipfix exporter <*name*>

Function: This command creates new exporter or modifies the existent exporter, so as to enter ipfix exporter configuration mode of the switch.

Parameter: <*name*>: is the exporter name, the range can not exceed the character string of 32 bytes.

Command Mode: Global mode

Default: None.

Usage Guide: The system can configure 512 exporters at most. An exporter only configures an IPv4 source/ destination address or an IPv6 source/ destination address. If modify the exporter, it needs to ensure that the exporter is not used by the monitor which is applied to the port. If delete the exporter, it needs to ensure that the exporter is not used by any monitor. The late configuration will cover the previous configuration.

Example: Create the exporter.

Switch(Config)# ipfix exporter export-to-server

Switch(Config-ipfix-exporter)#

4.12 ipfix monitor

Command: ipfix monitor <*name*>

         no ipfix monitor <*name*>

Function: This command creates new monitor or modifies the existent monitor, so as to enter ipfix monitor configuration mode of the switch.

Parameter: <*name*>: is the monitor name, the range can not exceeds the character string of 32 bytes.

Command Mode: Global mode

Default: None.

Usage Guide: This mode can configures exporter, cache and record, etc. The system supports 512 ipfix monitors at most. If delete or modify the monitor, it needs to ensure that the monitor is not applied to the port, otherwise, use no ipfix apply command to delete the monitor from the port.

Example: Create the monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)#

4.13 ipfix record

Command: ipfix record <*name*>

         no ipfix record <*name*>

Function: This command creates new record or modifies the existent record, so as to enter ipfix record configuration mode of the switch.

Parameter: <*name*>: is the record name, the range can not exceeds the character string of 32 bytes.

Command Mode: Global mode

Default: None.

Usage Guide: The flow matching keyword is configured under this mode. The system supports 512 ipfix records at most. If modify the record, it needs to ensure that the record is not used by the monitor which is applied to the port. If delete the record, it needs to ensure that the record is not used by any monitor. The flow keyword command and the non-keyword command can be configured many times according to the requirement in this mode.

Example: Create the record.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)#

4.14 ipfix sampler

Command: ipfix sampler <*name*>

         no ipfix sampler <*name*>

Function: This command creates new sampler or modifies the existent sampler, so as to enter ipfix sampler configuration mode of the switch.

Parameter: <*name*>: is the sampler name, the range can not exceeds the character string of 32 bytes.

Command Mode: Global mode

Default: None.

Usage Guide: Use the sampling function to reduce the number of the packets which are monitored by the device. After enabling the sampler, the packets are processed by the device that is the original 1/N, so as to reduce the load of the device. The port applies ipfix monitor and sampler to monitor the sampling packets. The system supports 512 ipfix samplers at most. If modify or delete the sampler, it needs to ensure that the sampler is not used by the monitor which is applied to the port. Otherwise, use no ipfix apply command to delete it from the port.

Example: Create the sampler.

Switch(Config)# ipfix sampler SAMPLER-1

Switch(Config-ipfix-sampler)#

4.15 ipv4 destination

Command: ipv4 destination *<ipv4-address>* [source *<ipv4-address>*]

              no ipv4 destination

Function: This command configures destination and source IPv4 addresses which are exported by the flow records.

Parameter: *<ipv4-address>*: The destination/ source IPv4 address is exported by the flow records.

Command Mode: ipfix exporter configuration mode

Default: By default, the source address is the IPv4 address of the layer 3 interface which includes the output port.

Usage Guide: None.

Example: Set the flow records to be exported to 172.16.1.1.

Switch(Config)# ipfix exporter export-to-server

Switch(Config-ipfix-exporter)# ipv4 destination 172.16.1.1

4.16 ipv6 destination

Command: ipv6 destination *<ipv6-address>* [source *<ipv6-address>*]

              no ipv6 destination

Function: This command configures destination and source IPv6 addresses which are exported by the flow records.

Parameter: *<ipv6-address>*: The destination/ source IPv6 address is exported by the flow records, is the global unicast address.

Command Mode: ipfix exporter configuration mode

Default: By default, the source address is the IPv6 address of the layer 3 interface which includes the output port .

Usage Guide: None.

Example: Set the flow records to be exported to 2001::1, the source address of the output packets as 2001::2.

Switch(Config)# ipfix exporter export-to-server

Switch(Config-ipfix-exporter)# ipv6 destination 2001::1 source 2001::2

4.17 match datalink ether-type

Command: match datalink ether-type

          no match datalink ether-type

Function: This command configures the ether-type value as the keyword.

Parameter: None.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: Use this keyword to match the monitor packets. This command is the keyword option (L2-KEY) of the non-IP packets. If select ipv4 command and select ipv6 command are not configured, then all packets use this keyword to process the match; if select ipv4 command is configured, then IPv4 packets use IPv4 keywords to match, other packets use this keyword to match; if select ipv6 command is configured, the IPv6 packets use IPv6 keywords to match, other packets use this keyword to match; if select ipv4 command and select ipv6 command are configured, then IPv4 packets use IPv4 keywords to match, IPv6 packets use IPv6 keywords to match, non-IP packets use this keyword to match.

Example: Configure ethernet type as the match keyword.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match datalink ether-type

4.18 match datalink mac

Command: match datalink mac {destination-address | source-address}

          no match datalink mac {destination-address | source-address}

Function: This command configures the MAC address as the keyword. If more than one options are selected, then this command can be configured many times.

Parameter: destination-address: The destination MAC field that match the packets.

          source-address: The source MAC field that match the packets.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: Use this keyword to match the monitor packets. This command is the keyword option (L2-KEY) of the non-IP packets. If select ipv4 command and select ipv6 command are not configured, then all packets use this keyword to process the match; if select ipv4 command is configured, then IPv4 packets use IPv4 keywords to match, other packets use this keyword to match; if select ipv6 command is configured, the IPv6 packets use IPv6 keywords to match, other packets use this keyword to match; if select ipv4

command and select ipv6 command are configured, then IPv4 packets use IPv4 keywords to match, IPv6 packets use IPv6 keywords to match, non-IP packets use this keyword to match.

Example: Configure the destination MAC address as the match keyword.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match datalink mac destination-address

4.19 match datalink vlan

Command: match datalink vlan {id | priority}

　　　　　　no match datalink vlan {id | priority}

Function: This command configures the vlan id or vlan priority as the keyword. If more than one options are selected, then this command can be configured many times.

Parameter: vlan id: Match the vlan id value of the packets.

　　　　　　vlan priority: Match the vlan priority of the packets.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: Use this keyword to match the monitor packet. This command is the keyword option (L2-KEY) of the non-IP packets. If select ipv4 command and select ipv6 command are not configured, then all packets use this keyword to match; if select ipv4 command is configured, then IPv4 packets use IPv4 keywords to match, other packets use this keyword to match; if select ipv6 command is configured, the IPv6 packets use IPv6 keywords to match, other packets use this keyword to match; if select ipv4 command and select ipv6 command are configured, then IPv4 packets use IPv4 keywords to match, IPv6 packets use IPv6 keywords to match, non-IP packets use this keyword to match.

Example: Configure the vlan id as the match keyword.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match datalink vlan id

4.20 match ip

Command: match ip {protocol | tos | destination-port | source-port}

　　　　　　no match ip {protocol | tos | destination-port | source-port}

Function: This command configures the head field of the IP packets as the keyword. If more than one options are selected, then this command can be configured many times.

Parameter: protocol: For the IPv4 packet, match the protocol field; for the IPv6 field, match the next-header field.

tos: Match the tos field of the packets.

destination-port: Match the destination port ID field of the packets.

source-port: Match the source port ID field of the packets.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: This command is the keyword option (IP-KEY) of the IP packets. If select ipv4 command is configured, then the keyword is configured by this command to validate the IPv4 packets. If select ipv6 is configured, then the keyword is configured by this command to validate the IPv6 packets.

Example: Configure the protocol as the match keyword.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match ip protocol

4.21 match ipv4-mask

Command: match ipv4-mask destination *<mask-length>* source *<mask-length>*

        no match ipv4-mask

Function: This command configures the IPv4 source/ destination address or the address mask as the keyword.

Parameter: *<mask-length>*: Specify the mask length, the range from 0 to 32m, and 0 means this address is not matched.

        destination: Match the IPv4 destination address of the packets.

        source: Match the IPv4 source address of the packets.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: This command is the keyword option (IPv4-KEY) of the IPv4 packets. Only select ipv4 is configured, then the keyword configured by this command to validate the IPv4 packets, otherwise invalidation.

Example: Configure the 24 bits mask of IPv4 destination address as the match keyword, and do not match the source address.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match ipv4-mask destination 24 source 0

4.22 match ipv6 flow-label

Command: match ipv6 flow-label

        no match ipv6 flow-label

Function: This command configures the IPv6 flow-label field as the keyword.

Parameter: None.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: This command is the keyword option (IPv6-KEY) of the IPv6 packets. Only select ipv6 is configured, then the keyword is configured by this command to validate the IPv6 packets, otherwise invalidation.

Example: Configure the flow-label field as the match keyword.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match ipv6 flow-lable

4.23 match ipv6-prefix

Command: match ipv6-prefix destination *<prefix-length>* source *<prefix-length>*

          no match ipv6-prefix

Function: This command configures the IPv6 source/ destination address or the address mask as the keyword.

Parameter: *<prefix-length>*: Specify the prefix length, the range from 0 to 128, and 0 means this address is not matched.

          destination: Match the IPv6 destination address of the packets.

          source: Match the IPv6 source address of the packets.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: IPv6 packets use this keyword to match. This command is the keyword option (IPv6-KEY) of the IPv6 packets. Only select ipv6 is configured, then the keyword configured by this command to validate the IPv6 packets, otherwise invalidation.

Example: Configure the 64 bits prefix of IPv6 destination address and the 63 bits prefix of the IPv6 source address as the match keywords.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# match ipv6-prefix destination 64 source 63

4.24 rate

Command: rate *<number>*

          no rate

Function: This command sets the packet interval of the sampling.

Parameter: *<number>*: The sampling interval as 1/N, N packets sample one (Do not

distinguish the type of the packets), the configuration range from 2 to 8191.

Command Mode: ipfix sampler configuration mode

Default: Sample all packets by default.

Usage Guide: None.

Example: Set the sampling interval as 1/0/3.

Switch(Config)# ipfix sampler SAMPLER-1

Switch(Config-ipfix-sampler)# rate 3

4.25 record

Command: record {<*name*> | default-set [ipv4] | [ipv6] | [l2] | [ipv4-ipv6] | [ipv4-l2] | [ipv6-l2]}

            no record

Function: This command defines the flow keyword of the monitor packets by configuring a record.

Parameter: <*name*>: The record name, the range can not exceed the character string of 32 bytes. The defining of the record must exist.

            record default-set: Use the keywords of the corresponding basic flow for the packets of each type, that means to use the basic flow keywords of L2 for L2 packets; use the IPv4 keywords for IPv4 packets; use the IPv6 keywords for IPv6 packets;

            record default-set ipv4: Use the basic flow keywords of IPv4, it includes seven keywords: Port, Source IP Address, Destination IP Address, Protocol, Tos, L4 Source Port, L4 Destination Port. So use the basic flow keywords of IPv4 for IPv4 packets, use L2 keywords for other packets, and only the port is defaulted by L2 keywords;

            record default-set ipv6: Use the basic flow keywords of IPv6, it includes eight keywords: Port, Source IPv6 Address, Destination IPv6 Address, Next Header, Tos, L4 Source Port, L4 Destination Port, IPv6 Flow Label. So use the basic flow keywords of IPv6 for IPv6 packets, use L2 keywords for other packets, and only the port is defaulted by L2 keywords;

            record default-set l2: Use the basic flow keywords of L2, it includes six keywords: Port, Source MAC Address, Destination MAC Address, VLAN ID, VLAN Priority, Ether Type. So use the basic flow keywords of L2 for all packets;

            record default-set ipv4-ipv6: Use the basic flow keywords of IPv4 and IPv6. So use the basic flow keywords of IPv4 for IPv4 packets, use the basic flow keywords of IPv6 for IPv6 packets, use L2 keywords for other packets, and only the port is defaulted by L2 keywords;

            record default-set ipv4-l2: Use the basic flow keywords of IPv4 and L2. So use the basic flow keywords of IPv4 for IPv4 packets, use the L2 keywords for other

packets;

          record default-set ipv6-l2: Use the basic flow keywords of IPv6 and L2. So use the basic flow keywords of IPv6 for IPv6 packets, use the L2 keywords for other packets.

Command Mode: ipfix monitor configuration mode

Default: None.

Usage Guide: Each monitor has only one corresponding record, but a record can applies to multi-monitors. If delete or modify the used record, the monitor is not applied to any ports that must be ensured.

Example:

The monitor packets use the basic flow keywords for monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# record default-set

The monitor packets use the basic flow keywords of IPv4 for monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# record default-set ipv4

The monitor packets use the basic flow keywords of IPv4 and IPv6 for monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# record default-set ipv4-ipv6

The monitor packets use the named record app-traffic-analysis for monitor.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# record app-traffic-analysis

4.26 select

Command: select {ipv4 | ipv6}

          no select {ipv4 | ipv6}

Function: This command selects the type of the match keyword for the flow records.

Parameter: ipv4: The packets can match the IPv4 keywords.

          ipv6: The packets can match the IPv6 keywords.

Command Mode: ipfix record configuration mode

Default: None.

Usage Guide: This command uses IPv4, IPv6 keywords to configure the matching of the flow records. If more than one options are selected, this command can be configured many times. After this command is configured, the configuration of match ip/match

ipv4-mask/match ipv6-mask command takes effect.

Example: Configure the packets to match IPv4 and IPv6 keywords.

Switch(Config)# ipfix record app-traffic-analysis

Switch(Config-ipfix-record)# select ipv4

Switch(Config-ipfix-record)# select ipv6

4.27 set packet-type

Command: set packet-type {ipv4 | ipv6 | l2}

               no set packet-type {ipv4 | ipv6 | l2}

Function: This command configures the monitoring packet type.

Parameter: ipv4: Monitor the IPv4 packets

            ipv6: Monitor the IPv6 packets

            l2: Monitor the non-IP packets

Command Mode: ipfix monitor configuration mode

Default: By default, the port does not monitor any packets by the default port.

Usage Guide: This command configures the type of the packets monitored by the ports. If more than one options are selected, this command can be configured many times. The port only monitor the packets that configure the type and does not process the packets of other types. It needs to associate with select ipv4 | ipv6 command.

Example: Set the port to only monitor IPv4 and non-IP packets.

Switch(Config)# ipfix monitor my-ipfix-monitor

Switch(Config-ipfix-monitor)# set packet-type ipv4

Switch(Config-ipfix-monitor)# set packet-type l2

4.28 show ipfix exporter

Command: show ipfix exporter [<*exporter-name*>]

Function: This command shows the output configuration information of IPFIX in the switch.

Parameter: <*exporter-name*>: The name of the exporter which needs to show the configuration information, the length can not exceed 32 characters.

         If <*exporter-name*> parameter is not provided, then show all exporter information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch#show ipfix exporter export-to-server

IPFIX Exporter export-to-server：

  Description: User defined

  No. of monitor users: 1

  No. of port users: 1

  Transport Configuration:

  Destination IPv4/IPv6 address: 172.16.1.1

  Source IPv4/IPv6 address: 172.16.6.2

  Transport Protocol: UDP

  Destination Port: 9995

  Refresh rate: 120 seconds

Displayed information	Explanation
IPFIX Exporter	The exporter name
Description	The description information of exporter
No. of monitor users: 1	The monitor number that use this output
No. of port users	The port number that use this output
Destination IPv4/IPv6 address	Export the destination IPv4/IPv6 address of IPFIX message
Source IPv4/IPv6 address	Export the source IPv4/IPv6 address of IPFIX message
Transport Protocol	Transport the using protocol of IPFIX message
Destination Port	Export the destination port ID of IPFIX message
Refresh rate	The retransmit frequency of the template

4.29 show ipfix interface Ethernet

Command: show ipfix interface ethernet *<IFNAME>*

Function: This command shows the IPFIX configuration information of the port.

Parameter: *<IFNAME>*: the port name which will show the IPFIX configuration information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch# show ipfix interface ethernet 1/0/1

Interface Ethernet1/0/1

monitor: my-flow-monitor

monitor direction: output

traffic(ip): sampler SAMPLER-2

Displayed Information	Explanation
Interface Ethernet	The port name
monitor	The monitor name is applied by the port
monitor direction	The monitor direction of the packets
traffic(ip)	The sampling configuration of the ports （When the sampling is not configured, then show it as ON）

4.30 show ipfix monitor

Command: show ipfix monitor [<*monitor-name*>]

Function: This command shows the IPFIX monitor information of the switch.

Parameter: *<monitor-name>*: The name of the monitor which needs to show the configuration information, the length can not exceed 32 characters.

If *<monitor-name>* parameter is not provided, then show all monitor information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch#show ipfix monitor my-ipfix-monitor

IPFIX Monitor my-ipfix-monitor:

Description: User defined

 No. of port users: 1

IPFIX record: app-traffic-analysis

IPFIX exporter count：1

IPFIX exporter: export-to-server

Cache:

 Type: normal

 Inactive Timeout: 60 seconds

 Active Timeout: 10 minutes

 Size: 4096 entries

Deal type: non-discard

Packet type: IPv4

Displayed information	Explanation
IPFIX Monitor	The monitor name
Description	The description information of monitor
No. of port users	The port number that use this monitor
IPFIX record	The flow keyword configuration of monitor
IPFIX exporter count	The exporter number is used by monitor
IPFIX exporter	The exporter name is used by monitor
Type	Record the output method
Inactive Timeout	The aging time
Active Timeout	The active time
Size	The max record number which can be saved
Deal type	Monitor the type of the packets (non-discard/discard)
Packet type	Monitor the type of the packets (IPv4/IPv6/L2)

4.31 show ipfix record

Command: show ipfix record [<*record-name*>]

Function: This command shows the IPFIX record information of the switch.

Parameter: <*record-name*>**:** The name of the record which needs to show the configuration information, the length can not exceed 32 characters.

If <*record-name*> parameter is not provided, then show all record information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch #show ipfix record app-traffic-analysis

IPFIX record app-traffic-analysis:

Description: This ipfix record tracks application usage

No. of monitor users: 1

No. of port users: 1

Fields:

  select ipv4

  match ipv4-mask destination 24 source 0

  match ip source-port

  match ip destination-port

  collect counter packets

  collect counter bytes

Displayed Information	Explanation
IPFIX record	The record name
Description	The description information of record
No. of monitor users: 1	The monitor number that use this record
No. of port users: 1	The port number that use this record
Fields	The keyword is configured by the record
select ipv4	Use IPv4 keyword to match
match ipv4 destination mask 24	Use the destination IP address as the match keyword, the address mask as 24
match ip source-port	Use the source port of the transport layer protocol as the match keyword
match ip destination-port	Use the destination port of the transport layer protocol as the match keyword
collect counter packets	Use the non-keyword packets
collect counter bytes	Use the non-keyword bytes

4.32 show ipfix sampler

Command: show ipfix sampler [<*sampler-name*>]

Function: This command shows the IPFIX sampling information of the switch.

Parameter: <*sampler-name*>**:** The name of the sampler which needs to show the configuration information, the length can not exceed 32 characters.

      If <*sampler-name*> parameter is not provided, then show all sampler information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch#show ipfix sampler SAMPLER-1

Sampler SAMPLER-1:

Description: User defined

No. of port users: 1

Rate: 1 out of 3

Displayed Information	Explanation
Sampler	The sampler name
Description	The description information of sampler
No. of port users: 1	The port number that use this sampling
Rate	The sampling configuration

4.33 show ipfix statistic exporter

Command: show ipfix statistic exporter [<*exporter-name*>]

Function: This command shows the statistic value of the flow records which are exported by the specific exporter.

Parameter: <*exporter-name*>: The exporter name, the length can not exceed the character string which is 32 bytes.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch# show ipfix statistic exporter export-to-server

IPFIX Exporter export-to-server:

 Total packets: 100

  Success packets: 95

  Fail packets: 5

Displayed Information	Explanation
IPFIX Exporter	The exporter name
Total	The total of IPFIX information which is exported
Success	The IPFIX information number of sending success
Fail	The IPFIX information number of sending fail

4.34 show ipfix statistic interface Ethernet

Command: show ipfix statistic interface ethernet *<IFNAME>*

Function: This command shows the number of the flow records (that is, the number of flow record of sending to CPU and storing in hardware) which are monitored on the specific port for IPFIX.

Parameter: *<IFNAME>*: The port name which will show the flow record information.

Command Mode: Admin mode

Default: None.

Usage Guide: None.

Example:

Switch# show ipfix statistic interface ethernet 1/0/1

Interface Ethernet1/0/1

Number of record sent: 100

Number of record stored: 120

Displayed Information	Explanation
Interface Ethernet	The port name
Number of record sent	The number of the flow records which are processed by CPU
Number of record stored	The number of the flow records which are stored by the hardware

4.35 transport

Command: transport {udp | tcp | sctp} [destination-port *<port>*]

   no transport

Function: This command configures the protocol and the destination port ID which is used to transport records, at present, only the UDP protocol is supported.

Parameter: udp/ tcp/ sctp: Configure the protocol which is used to transport records.

   destination-port *<port>*: The port ID is used to transport record, the range from 4000 to 65535.

Command Mode: ipfix exporter configuration mode

Default: The default uses the UDP protocol; the default destination port ID is 4739.

Usage Guide: None.

Example: Set the UPD protocol which is used to transport records, the destination port ID as 9998.

Switch(Config)# ipfix exporter export-to-server

Switch(Config-ipfix-exporter)# transport udp destination-port 9998

4.36 udp template

Command: udp template {timeout-rate *<seconds>* | refresh-rate *<packets>*}

           no udp template

Function: This command configures the retransmit interval of the template.

Parameter: *<seconds>*: Set the retransmit frequency of the template, use the time as the unit, the range from 1 tso 86400 (s)

         <packets>: Set the retransmit frequency of the template, use the packet number as the unit, the range from 1 to 1000

Command Mode: ipfix exporter configuration mode

Default: By default, the retransmit frequency of the template uses the time as the unit, the interval as 120s.

Usage Guide: Two methods are optional for the retransmit mode of the template, one method is using the time as the unit, the other is using the packet number as the unit. After this command is configured, the template information will retransmit according to the configuration at a time, so as to the flow records can be analyzed exactly by the transceiver. The options of this command can not be configured at the same time, only one retransmit mode can be selected.

Example: Set the packet number as the unit for the retransmit frequency of the template, 20 packets retransmit one time.

Switch(Config)# ipfix monitor my-ipfix-exporter

Switch(Config-ipfix-exporter)# udp template refresh-rate 20