Technical Guide

IPFIX

Feature Overview and Configuration Guide

Introduction

IP Flow Information Export (IPFIX) is an IETF protocol defined in RFC 7011 that provides a standard for exporting IP flow data from a network for analysis. Network administrators analyze the IP flow data, and make decisions, such as applying QoS policies or maybe adding more bandwidth to network areas that need it.

In simple terms, here's how it works:

Flow Observation

When data moves across a network, it generates flows of packets between devices. A flow is a sequence of packets that share certain characteristics, such as the same source and destination IP addresses, the same protocol, and the same port numbers.

Flow Collection

A network device, such as a router or switch, monitors these flows. It keeps track of flow-related information, like how many packets were sent, how many bytes of data were transferred, and how long the flow lasted.

Data Exporting

The device then packages this flow information into a standardized format defined by IPFIX. It creates records that describe each flow and sends these records to a central collector or monitoring system.

Data Analysis

The central collector receives the IPFIX data from multiple devices across the network. It stores and analyzes the data, providing insights into network usage, performance, and potential security issues.

This guide describes how to enable IPFIX on a device, enable a flow observation point on an interface, set flow key fields to generate unique flows, and configure a collector to export these flows.

AlliedWare Plus™ OPERATING SYSTEM

Products and software version that apply to this guide

This guide applies to x530 Series switches that are running version 5.5.4-1 or later.

For the latest information, see the following documents:

- The product's Datasheet
- The AlliedWare Plus Datasheet
- The product's Command Reference

These documents are available from the above links on our website at alliedtelesis.com.

Related documents

See the following document for more detailed information: RFC 7011.

Licensing

IPFIX is part of the standard feature set of the device software therefore there are no special licensing requirements.

Content

Configuring IPFIX

Basic configuration steps

In simple terms, here's how you configure IPFIX:

1. Enable flow service on the device.
2. Create a flow record to configure match fields for classification of flows on incoming IP traffic.
3. Create a flow exporter to configure the IPFIX collector to export IPFIX messages.
4. Create a flow monitor to combine a flow record and a flow exporter configuration.
5. Assign the flow monitor on a switchport to start IPFIX monitoring.
6. On a PC/Server, set up an IPFIX collector tool to receive IPFIX messages for analysis.

And here's a configuration example based on the list above:

1. Enable flow service on the device

```
awplus(config)# service flow
```

2. Create a flow record to configure match fields for classification of flows on incoming IP traffic.

   The match fields can include some or all of these fields: DSCP, IPv4 Source Address, IPv4 Destination Address, IP protocol (TCP/UDP), Source port, and Destination port.

```
awplus(config)# flow record FLOW_RECORD
awplus(config-flow-record)# match ipv4 protocol
awplus(config-flow-record)# match transport source-port
awplus(config-flow-record)# match transport destination-port
```

3. Create a flow exporter to configure the IPFIX collector to export IPFIX messages.

   The IPFIX collector records flows for a given period of time and generates user friendly reports.

```
awplus(config)# flow exporter FLOW_EXPORTER
awplus(config-flow-exporter)# description IPFIXCOL-PC
awplus(config-flow-exporter)# destination 192.168.1.2
awplus(config-flow-exporter)# transport udp
```

4. Create a flow monitor to combine a flow record and a flow exporter configuration

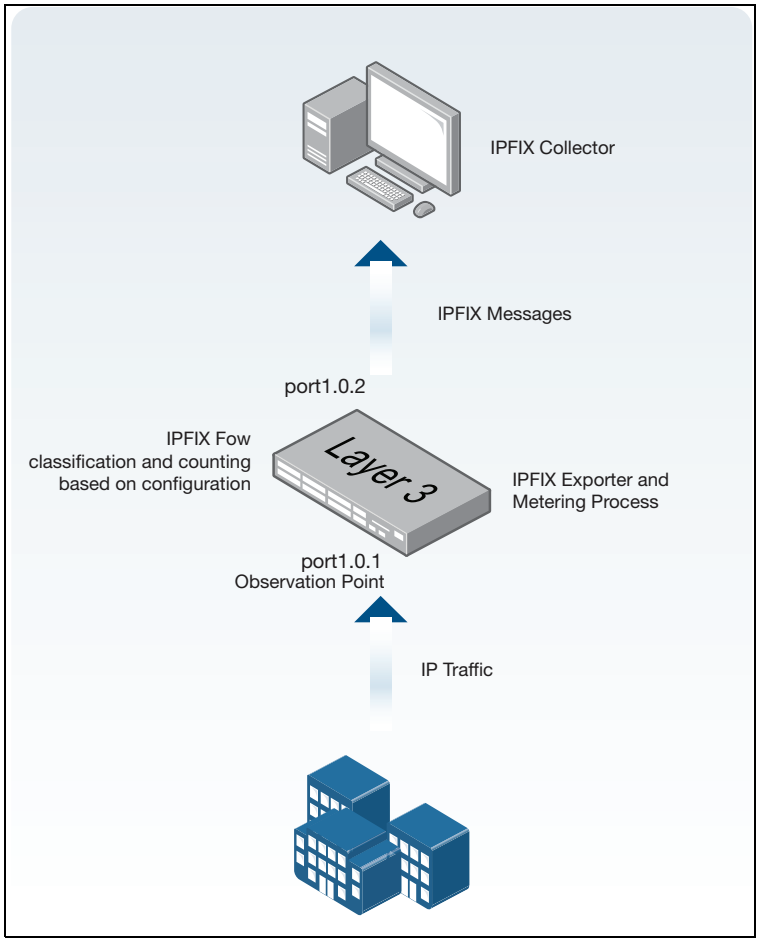
```
awplus(config)# flow monitor FLOW_MONITOR
awplus(config-flow-monitor)# description MONITORING-PC
awplus(config-flow-monitor)# record FLOW_RECORD
awplus(config-flow-monitor)# exporter FLOW_EXPORTER
```

5. Assign the flow monitor on a switchport to start IPFIX monitoring. This is known as the observation point.

```
awplus(config)# int port1.0.1
awplus(config-if)# flow monitor-map FLOW_MONITOR
```

6. On a PC/Server, set up an IPFIX collector tool to receive IPFIX messages for analysis.

- On the Layer 3 device:
  - configure flow classification match fields that correspond to an IPFIX flow key.
  - configure the IPFIX collector information
  - enable IPFIX on the switchport (the Observation point). Any incoming IP traffic on the switchport is classified into unique IPFIX flows based on the flow key extracted from the packet and each flow is then counted by the silicon.
- The Layer 3 device exports IPFIX messages containing the packet counters and flow information (such as essential IP header fields and observation point details) received on the switchport to the IPFIX collector at regular intervals.
- IPFIX collector records flows for a given period of time and generates user friendly reports.



IPv6 flow identification

AlliedWare Plus version 5.5.4-2.2 onwards supports flow identification for IPv6 flows.

Flow classification for IPv6 packets is based on any or all of the following information: IPv6 Source Address, IPv6 Destination Address, IP protocol (TCP/UDP), Source port, Destination port, and DSCP. There are also some device specific support details to be aware of, as outlined below:

Table 1: IPv6 flow identification device requirements

Device	Command required for full support	IPv6 field support
x530 GS980MX	Yes platform hwfilter-size [basicipv4-full-ipv6]	**basic** Source address = Match on First 4 bytes + Last 6 bytes, Destination address = Match Last 1 byte, and other match fields **ipv4-full-ipv6** Full Source/Destination IPv6 address match with other match fields
x320 GS980EM	No	Partial match: Source address full match, Destination address = Match Last 1 byte, and other match fields.
x220 x320-52 GS980M	No	Partial match: Source address full match, Destination address = Match Last 1 byte, and other match fields.
SBx81CFC960	No	Partial match: Source address full match, Destination address = Match Last 1 byte, and other match fields.

Configuration example

1. Enable flow service on the device

```
awplus(config)# service flow
```

2. Create a flow record to configure match fields for classification of flows on incoming IPv4 traffic.

```
awplus(config)# flow record FLOW_RECORD_V4
awplus(config-flow-record)# match ipv4 protocol
awplus(config-flow-record)# match ipv4 source-address
awplus(config-flow-record)# match transport source-port
awplus(config-flow-record)# match transport destination-port
```

3. Create a flow record to configure match fields for classification of flows on incoming IPv6 traffic.

```
awplus(config)# flow record FLOW_RECORD_V6
awplus(config-flow-record)# match ipv6 protocol
awplus(config-flow-record)# match ipv6 source-address
awplus(config-flow-record)# match transport source-port
awplus(config-flow-record)# match transport destination-port
```

4. Create a flow exporter to configure the IPFIX collector and export IPFIX messages.

```
awplus(config)# flow exporter FLOW_EXPORTER
awplus(config-flow-exporter)# description IPFIXCOL-PC
awplus(config-flow-exporter)# destination 192.168.1.2
awplus(config-flow-exporter)# transport udp
```

5. Create a flow monitor to combine a flow record and a flow exporter configuration.

```
awplus(config)# flow monitor FLOW_MONITOR
awplus(config-flow-monitor)# description MONITORING-PC
awplus(config-flow-monitor)# record FLOW_RECORD_V4
awplus(config-flow-monitor)# record ipv6 FLOW_RECORD_V6
awplus(config-flow-monitor)# exporter FLOW_EXPORTER
```

6. Assign the flow monitor on a switchport to start IPFIX monitoring.

```
awplus(config)# int port1.0.1
awplus(config-if)# flow monitor-map FLOW_MONITOR
```

Monitoring IPFIX

To display brief information about state, configuration, and total number of flows:

```
awplus# show flow

FLOW Brief Information:

Status                  : Enabled
Records configured      : 2
Monitors configured     : 1
Exporters configured    : 1
Interfaces monitored    : 1
Total number of flows   : 11
```

To display flow records and the set match fields:

```
awplus# show flow record

FLOW Record Information:

Number of records: 2

Record FLOW_RECORD_V4:
 Match IP fields        : (-IPV4-PROTOCOL-SAADDR-)
 Match Transport fields : (-SRCPORT-DESTPORT-)

 Record FLOW_RECORD_V6:
 Match IP fields        : (-IPV6-PROTOCOL-SAADDR-)
 Match Transport fields : (-SRCPORT-DESTPORT-)
```

To display flow exporter information:

```
awplus# show flow exporter

FLOW Exporter Information:

Number of exporters: 1

Exporter FLOW_EXPORTER:
 Description            : IPFIXCOL-PC
 Destination address    : 192.168.1.2
 Transport type         : udp
 Transport port         : 4739
 Observation Domain Id  : 3738442430
```

To display flow monitor information:

```
awplus# show flow monitor

FLOW Monitor Information:

Number of configured monitors: 1

Monitor FLOW_MONITOR:
 Description            : MONITORING-PC
 Record IPv4            : FLOW_RECORD_V4
 Record IPv6            : FLOW_RECORD_V6
 Exporter               : FLOW_EXPORTER
 Interface              : port1.0.1
  State                 : OK
  Number of flows       : 11
```

Troubleshooting

- During fast-failover, some flow data may be lost as the new TCP/UDP session with the IPFIX Collector is established on the new Master and flow processing resumes.
- The number of IPFIX flows supported on the device is approximately the same as the number of ACLs supported/available on the device.
- IPFIX is not supported on AT-SBx81GS24a and AT-SBx81XS6 LIFs on SBx81CFC960.
- IPFIX flow monitoring can be affected by other features that use high priority rules that supersede the IPFIX rules. This includes policy-map/class-map, access-list and rules created by other high priority protocols/features.

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