IBM Network Performance Insight 1.1.0
Document Revision R2E1

Network Performance Insight
References

IBM
Before using this information and the product it supports, read the information in "Notices" on page 27.
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Network Performance Insight overview

IBM Network Performance Insight is a flow-based network traffic performance monitoring system.

Network Performance Insight provides comprehensive, flexible, and scalable traffic data management with visualization and reporting to support complex, multi-vendor, multi-technology networks. It offers a range of dashboard views with robust security features that are designed to meet the needs of executive management and converging network and IT operations teams.

Network Performance Insight offers near real-time and interactive view on the traffic data that helps in reduced network repair times and optimized network performance.

Network Performance Insight provides IBM Netcool® Operations Insight with network performance monitoring capabilities to address modern network management challenges around application-oriented, software-defined-networks in the enterprise data centers and intranet.

The following diagram shows how data is flowing through the various components in Network Performance Insight:
The flow records that are sent by the configured flow exporters are collected by Collector, segregated, and sent to Inventory or Analytics component based on the information that they contain.

Analytics component performs flow session categorization and aggregation. These results are then stored in Network Performance Insight database.

Additionally, you can control the flow interface to enable collection and perform administrative tasks on the web-based user interface on Jazz for Service Management portal. The dashboards provide up-to-date actionable information to increase insight into network problems and streamline root cause analysis.

The database can be queried to display the results on the Dashboard Application Services Hub portal in the form of specialized report tables, graphs, and charts that are ready for immediate use. The database is designed for high performance.

You can integrate Network Performance Insight with Tivoli Netcool/OMNIbus to take advantage of its fault management capabilities.

Network Performance Insight documentation consists of the following:
- Release summary
- Installing Network Performance Insight
- Configuring Network Performance Insight
- Integrating with Tivoli Netcool/OMNIbus component of Netcool Operations Insight.
- Using Network Performance Insight
- Troubleshooting Network Performance Insight
- References
- Technical notes

Related information:

IBM Network Performance Insight on IBM Knowledge Center
Service Management Connect

Connect, learn, and share with Service Management professionals: product support technical experts who provide their perspectives and expertise.

Access Network and Service Assurance community at https://www.ibm.com/developerworks/servicemanagement/nsa/index.html Use Service Management Connect in the following ways:

- Become involved with transparent development, an ongoing, open engagement between other users and IBM developers of Tivoli products. You can access early designs, sprint demonstrations, product roadmaps, and prerelease code.
- Connect one-on-one with the experts to collaborate and network about Tivoli and the Network and Service Assurance community.
- Read blogs to benefit from the expertise and experience of others.
- Use wikis and forums to collaborate with the broader user community.

Related information:

IBM Network Performance Insight community on developerWorks

Network Performance Insight technical training

For Tivoli technical training information, see the following Network Performance Insight Training website at https://tnpmsupport.persistentsys.com/updated_trainings

Support information

If you have a problem with your IBM Software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

Online

IBM Support Assistant
The IBM Support Assistant is a free local software serviceability workbench that helps you resolve questions and problems with IBM Software products. The Support Assistant provides quick access to support-related information and serviceability tools for problem determination. To install the Support Assistant software, go to http://www.ibm.com/software/support/isa

Troubleshooting Guide
For more information about resolving problems, see the problem determination information for this product.

Conventions used in this publication

Several conventions are used in this publication for special terms, actions, commands, and paths that are dependent on your operating system.

Typeface conventions

This publication uses the following typeface conventions:

Bold
• Lowercase commands and mixed case commands that are otherwise difficult to distinguish from surrounding text
• Interface controls (check boxes, push buttons, radio buttons, spin buttons, fields, folders, icons, list boxes, items inside list boxes, multicolumn lists, containers, menu choices, menu names, tabs, property sheets), labels (such as Tip:, and Operating system considerations)
• Keywords and parameters in text

*Italic*

• Citations (examples: titles of publications, diskettes, and CDs)
• Words defined in text (example: a nonswitched line is called a point-to-point line)
• Emphasis of words and letters (words as words example: "Use the word that to introduce a restrictive clause."); letters as letters example: "The LUN address must start with the letter L."
• New terms in text (except in a definition list): a view is a frame in a workspace that contains data.
• Variables and values you must provide: ... where myname represents....

*Monospace*

• Examples and code examples
• File names, programming keywords, and other elements that are difficult to distinguish from surrounding text
• Message text and prompts addressed to the user
• Text that the user must type
• Values for arguments or command options

*Bold monospace*

• Command names, and names of macros and utilities that you can type as commands
• Environment variable names in text
• Keywords
• Parameter names in text: API structure parameters, command parameters and arguments, and configuration parameters
• Process names
• Registry variable names in text
• Script names
Chapter 1. Database administration

Provides information about essential administration tasks such as backing up and restoring your traffic data that is stored in a specialized, indigenously developed database in IBM Network Performance Insight.

As a part of database best practices, it is recommended that you run backup operation regularly. Backup and recovery procedures protect your database against data loss and reconstruct the data, if there is a data loss.

A backup is a safeguard against unexpected data loss and application errors. If you lose the original data, then you can reconstruct it by using a backup.

You can use Network Performance Insight backup and restore scripts.

Backup data

There are two modes of backup in Network Performance Insight.

**Full backup**
Backup of the entire database. It represents the state of the database at the time when backup procedure completes.

**Differential backup**
Backup of the changed data since the previous backup. It backs up only the changed files since the previous full or differential backup to the most recent changes to the database files.

During the backup procedure, by default the backup engine creates the backup snapshot in the `<NPI_Home>/work/backup-snapshot` directory. The backup snapshot consists of hard link to the storage files.

The backup script identifies the backup mode based on the previous backup that is done from the snapshot directory.

By default, the backup procedure maintains a total of 7 backup snapshots, which consist of 1 full snapshot and 6 differential snapshot at any time in the `backup-snapshot` directory. The backup snapshots count is configurable in `npi.conf` file. See *Editing default settings in a configuration file* in Configuring Network Performance Insight.

Consider the following scenarios:

- There are 1 full and 5 differential backup snapshots that are created in the `backup-snapshot` directory.
  When you now run the backup script, it creates the sixth differential backup snapshot in the `<NPI_Home>/work/backup-snapshot` directory that contains the files that are changed since the previous backup.

- There are 1 full and 6 differential backup snapshots that are created in the `backup-snapshot` directory.
When you now run the backup script, it creates a new full backup snapshot and removes all previous snapshots.

The following table describes the naming convention of the backup file directories:

<table>
<thead>
<tr>
<th>Backup mode</th>
<th>Example</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>yyyy.MM.dd-HH.mm.ss-full</td>
<td>For example: 2015.08.10-04.57.31-full</td>
</tr>
<tr>
<td>Differential</td>
<td>yyyy.MM.dd-HH.mm.ss-diff</td>
<td>For example: 2015.08.24-10.44.09-diff</td>
</tr>
</tbody>
</table>

**Backing up data**

Create a backup of your Network Performance Insight database to prevent data loss if there is a database service outage. A simple backup script is used to do this task.

**Before you begin**

Ensure that the process is up and running.

To start the npi process, run the following command as root user:

```
# cd <NPI_Home>/bin
# ./npid start
```

**Procedure**

1. Log in as root user.
2. Change to /<NPI_Home>/bin directory:
   
   ```
   # cd /<NPI_Home>/bin
   ```

3. Run the following command to start the database backup procedure:
   
   ```
   # ./backup
   ```

   By default, the backup script takes the following two parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>-path</td>
<td>&lt;NPI_Home&gt;/work/backup-snapshot</td>
</tr>
<tr>
<td>-tool</td>
<td>&lt;NPI_Home&gt;/bin/backup-tool</td>
</tr>
</tbody>
</table>

**Note:** The default destination directory for the tar files.

**Note:** The backup script uses the default backup-tool script that is available in the Network Performance Insight package.

The backup script performs the following tasks in the background:

- Creates the backup snapshot in /<NPI_Home>/work/backup-snapshot directory. The backup-snapshot directory consists of hard link to the /<NPI_Home>/work/storage files.
- Creates tar files of the /<NPI_Home>/work/backup-snapshot folders to the backup destination directory. By default, /<NPI_Home>/work/backup.

For example, the contents of the /<NPI_Home>/work/backup directory:
4. Optional: Run the backup script with the `-path` option to back up the tar files to a different file system or location by using the following command:

```
# cd /<NPI_Home>/bin
# ./backup -path <Destination_directory>
```

It creates tar files of the `<NPI_Home>/work/backup-snapshot` folders to the backup destination directory that is specified in `-path`.

5. Optional: Run the backup script with the `-tool` option, if you want to override the default `backup-tool` script, by using the following command:

```
# cd /<NPI_Home>/bin
# ./backup -tool <Customised_script>
```

Where, the `Customized_script` is the full path of the script.

The `Customized_script` takes the following parameters from the backup script:

a. The full path of backup-snapshot directory.
b. The full path of backup directory.

By running the `Customized_script`, it provides the user the flexibility to perform any required tasks by using both the parameters as specified in (a) and (b).

**Note:** It depends entirely to the user on how they want to customize their `backup-tool` script.

Most importantly, user needs to know the backup-snapshot directory as this information is needed during the restore procedure.

6. Verify the `<NPI_Home>/log/backup.log` file for any issues during the backup procedure.

All messages during backup procedure are logged in `backup.log`.

**Related reference:**

"backup command reference" on page 8

Usage for the `backup` command. Run the `backup` command to back up Network Performance Insight storage database.

---

**Restoring data**

You can restore the Network Performance Insight database to a previous state by using the restore option. A backup image of the database must exist before you can use this script. The database is restored to the same state as the backup copy. A simple restore script is used to do this task.

**About this task**

Explains how to perform restore operation on Network Performance Insight database environment.

There are two typical scenarios when a restore procedure can be done.

1.
Restore to a new Network Performance Insight installation state.

When Network Performance Insight storage and backup-snapshot folders are corrupted or deleted due to any disk or system failure.

For example, you had a disk failure in your system and Network Performance Insight storage and backup-snapshot folders are deleted. Perform restore procedure by using the backup tar files that were saved remotely to any other devices from the Network Performance Insight server.

2. Restore to an existing Network Performance Insight installation state.

You want to restore the database to any state as the last backups that are done, while Network Performance Insight is still running.

For example, you have a running Network Performance Insight system. You want to restore your database to a state of a last backup that is done, for example, yesterday.

Procedure

1. Log in as root user.

   Important: Steps 2 - 5 are only applicable to Restore to a new Network Performance Insight installation state scenario.

   These steps are not needed when <NPI_Home>/work/backup-snapshot directory exists in your system.

2. Change to the <NPI_Home> directory:

   # cd <NPI_Home>

3. Create the following directory to hold the previously backup tar files of your Network Performance Insight:

   # mkdir -p work/backup-snapshot

4. From your backup device, copy the last 7 backup snapshots tar files, which include the most recent full backup snapshot tar file, to the following directory of your Network Performance Insight server:

   <NPI_Home>/work/backup-snapshot

5. Extract all copied backup tar files. For example,

   # tar -xvf 2015.08.10-04.57.31-full.tar

6. Before you run the restore procedure, the Network Performance Insight process needs to be stopped. Run the following command to stop the process:

   # cd <NPI_Home>/bin
   # ./npid stop

7. To restore from a previous backup file, run the following command:

   # cd <NPI_Home>/bin
   # ./restore

   The restore script backs up the storage folder, <NPI_Home>/work/storage by renaming the folder to <NPI_Home>/work/restore-backup.

   After the restore procedure successfully completes:
   • The backup content is restored from <NPI_Home>/work/backup-snapshot to the <NPI_Home>/work/storage directory.
   • The restore script removes the <NPI_Home>/work/restore-backup directory.

8. Verify the restore.log file for no issues during the restore procedure.

   All messages during restore procedure are logged in <NPI_Home>/log/restore.log

9. Run the following command to start Network Performance Insight process:
# cd <NPI_Home>/bin
# ./npid start

10. Check <NPI_Home>/log/npid.log to ensure that process starts without any errors.

Failed to restore

11. If a restore procedure fails, you can identify the following error message from the restore.log:
   GYMCSB1020 - Unable to revert Storage dir
   The error message indicates that the restore procedure fails, where the restore script is unable to revert the <NPI_Home>/work/restore-backup to <NPI_Home>/work/storage directory.

12. Remove the following directory. For example,
   # rm -rf <NPI_Home>/work/storage

13. Rename the <NPI_Home>/work/restore-backup directory to <NPI_Home>/work/storage.

Chapter 2. Command Line Interface

Provide command-line interfaces that are available in IBM Network Performance Insight to support installation, configuration, administration, and other tasks.

A list of commands available for Network Performance Insight users and administrators.

npid command reference

Usage for the npid command. Run the npid command to start, stop, and restart Network Performance Insight.

Location

<NPI_Home>/bin

NPI_Home is the location where Network Performance Insight is installed. For example, /opt/IBM/NPI.

Syntax

npid {start | stop | restart | kill | status | version | help}

Parameters

start
Starts Network Performance Insight application.

stop
Stops Network Performance Insight application.

restart
Stops and starts Network Performance Insight application.

kill
Kills the Network Performance Insight application process by using the command kill -9.

status
Checks if Network Performance Insight pid is running when you use the command ps -eaf.

version
Shows the version of Network Performance Insight that is installed.

help
Displays the usage for npid command.
backup command reference

Usage for the backup command. Run the backup command to back up Network Performance Insight storage database.

Location

<NPI_Home>/bin

NPI_Home is the location where Network Performance Insight is installed. For example, /opt/IBM/NPI.

Syntax

backup [-path | -tool]

Parameters

-path
The directory path of where the backup tar files are stored. By default, <NPI_Home>/work/backup

-tool
By default, this option uses the <NPI_Home>/bin/backup-tool script to create tar files of the backup-snapshot folders to the path specified in -path.

restore command reference

Usage for the restore command. Run the restore command to restore Network Performance Insight storage database.

Location

<NPI_Home>/bin

NPI_Home is the location where Network Performance Insight is installed. For example, /opt/IBM/NPI.

Syntax

restore

encrypt command reference

Usage for the encrypt command. Encrypts the passwords that are created for Jazz for Service Management and for Tivoli Netcool/OMNIbus components.

Location

<NPI_Home>/bin

NPI_Home is the location where Network Performance Insight is installed. For example, /opt/IBM/NPI.

Syntax

encrypt <password>
Parameters

password
   Provide the password to be encrypted.

The encrypted password must be copied to the npi.conf file. The encrypted forms of some passwords are required for security reasons. For example, https.keystore.password, https.key.password, security.dash.password, and event.netcool.omnibus.rest-api.password.

Note: The encrypted form of the password is randomly generated and you might get a different output when you run the tool multiple times.
Chapter 3. Configuring Flow devices

Provides the command reference with examples for configuring the flow devices to enable them to work with IBM Network Performance Insight, Version 1.1.0.

Before Network Performance Insight can gather data, routers and other network devices must be configured to send NetFlow data. These configurations are needed to ensure that routers send NetFlow data periodically to the Collector subsystem.

For more detailed information about setting up flow devices for Network Performance Insight, see the specific vendor documentation.

CAUTION:
Only IT administrators with experience in configuring routers and switches must use this information.

Supported devices and flow formats

IBM Network Performance Insight, Version 1.1.0 supports most of the devices and their flow formats that are available in the market.

Some of devices and their flow formats that Network Performance Insight v1.1.0 supports:

<table>
<thead>
<tr>
<th>Device</th>
<th>Flow format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco</td>
<td>NetFlow (v1, v5, v9, and IPFIX versions)</td>
</tr>
<tr>
<td>Juniper</td>
<td>J-Flow (v5 and v9)</td>
</tr>
<tr>
<td>Alcatel</td>
<td>Cflow (v5 and v9)</td>
</tr>
<tr>
<td>Huawei</td>
<td>NetStream (v5 and v9)</td>
</tr>
</tbody>
</table>

Configuring NetFlow on Cisco routers

NetFlow is a data collection and reporting protocol for monitoring network traffic that is supported by multiple vendors.

As a part of this configuration, network administrators must configure the devices to transmit NetFlow information actively to the network monitoring application and configure the interfaces to gather information about the traffic conversations. The configurations that you perform must be in line with the capacity of the network application. In this case, Network Performance Insight.

NetFlow also monitors layers 2-4 of Open Systems Interconnection (OSI) model and other flow technologies and provides information on network usage and port conversations activity.

Related information:

[Cisco IOS Configuration Fundamentals Command Reference, Release 12.2]
Cisco IOS command modes

You use the CLI to access Cisco IOS software.

Enter a question mark (?) at the CLI prompt to obtain a list of commands that are available for each command mode.

When you log in to the CLI, you are in user EXEC mode. User EXEC mode contains only a limited subset of commands. To have access to all commands, you must enter privileged EXEC mode, normally by using a password. From privileged EXEC mode, you can give any EXEC command; user or privileged mode. Or, you can enter global configuration mode.

These configuration modes are needed for you to change the running configuration. If you later save the running configuration to the start configuration, these changed commands are stored when the software is rebooted. To enter specific configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and various other modes, such as protocol-specific modes.

Command modes

Describes how to use various common command modes of the Cisco IOS software.

Command modes

Shows examples of the prompts displayed.

<table>
<thead>
<tr>
<th>Command mode</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Exec</td>
<td>Router&gt;</td>
</tr>
</tbody>
</table>
| When you log in to the CLI, you are in User Exec mode. Contains only a limited subset of commands. | Router> enable
Password <password>
Router# |
| Privileged Exec    | Router(config)# configure terminal |
| You can have access to all commands in this mode. Typically, require a password. Use the enable command. Your prompt changes to Router# | Note: Enter configuration commands, one per line. End with CTRL+Z or Exit command. |
| Global configuration | Router(config)# interface serial ?<0-6> Serial interface number |
| Enter the configure terminal privileged EXEC command to enter global configuration mode. Your prompt changes to Router(config)#. | Router(config)# interface serial 4 ?/ |
| Note: Enter “?” to display what you must enter next on the command line. | Router(config)# interface serial 4/ ?<0-3> Serial interface number |
| Interface configuration | Router(config)# interface serial 4/0 |
| From global configuration mode, specify an interface by using an interface command. Your prompt changes to Router(config-if)#. | Router(config-if)# interface serial 4/0 |
Command mode | Command
---|---
ROM monitor mode | Router# reload

**Enabling NetFlow on your devices**

To enable NetFlow, configure IP routing and use these commands in global configuration mode.

**About this task**

Enabling flow monitoring for an interface.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router(config)# interface type slot/port-adapter/port</td>
<td>Enters interface configuration mode and configures the interface. For example, interface GigabitEthernet1/0/3</td>
</tr>
<tr>
<td>Router(config-if)# ip route-cache flow</td>
<td>Enables NetFlow for IP routing.</td>
</tr>
<tr>
<td>Router(config-if)# ip route-cache ingress</td>
<td>Enables NetFlow on the sub interfaces with direction.</td>
</tr>
<tr>
<td>Router(config-if)# ip route-cache egress</td>
<td></td>
</tr>
<tr>
<td>Router(config-if)# ip flow egress</td>
<td></td>
</tr>
<tr>
<td>Router(config-if)# ip flow ingress</td>
<td></td>
</tr>
</tbody>
</table>

**Configuring the Flow Exporters**

NetFlow information can also be exported to network management applications.

**About this task**

To configure a router to export NetFlow information that is maintained in the NetFlow cache to Network Performance Insight, use these commands in global configuration mode. NetFlow information is exported to Network Performance Insight when the Flow expires in NetFlow cache.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router(config)# ip flow-export ip-address udp-port</td>
<td>Configures a router to export NetFlow cache entries to a Collector. <em>Note:</em> To disable IP routing, use the no IP routing command as: no ip flow-export.</td>
</tr>
<tr>
<td>Where</td>
<td></td>
</tr>
<tr>
<td><code>&lt;IP_address&gt;</code></td>
<td>IP address of the system to which you want to send the NetFlow information.</td>
</tr>
<tr>
<td><code>udp-port</code></td>
<td>UDP protocol-specific port number.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| **Router(config)# ip flow-export version 9 [peer-as | origin-as | bgp-nexthop]** | Specifies that the export packet uses the Version 9 format. Optionally, specify the origin or peer autonomous systems.  
  - **peer-as**  
    Specifies that export statistics include the originating autonomous system for the source and destination.  
  - **origin-as**  
    Specifies that export statistics include the peer autonomous system for the source and destination.  
  - **bgp-nexthop**  
    Specifies that export statistics include BGP next hop-related information. |
| **show ip flow export** | Displays statistics for the NetFlow data export, including statistics for the main cache and for all other enabled caches. |
| **Router(config)# ip flow-export source <interface>/<interface_number>** | Sets the source IP address of the NetFlow exports that are sent by the device to the specified IP address. |
| **Router(config)# ip flow-cache timeout active 1** | Active timeout is the frequency of active flow records that are exported from the flow cache to Network Performance Insight. Default value is 30 min. To get real-time traffic reports, set this value to 1. |
| **Router(config)# ip flow-cache timeout inactive 15** | Inactive timeout is the frequency of inactive flow records that are exported from the flow cache to Network Performance Insight. A flow record is inactive when the conversation between two interfaces is stopped. Default value is 15 sec. |

Related information:

[Configuring NetFlow and NetFlow Data Export](#)
Customizing the number of entries in flow cache

You can increase or decrease the number of entries that are maintained in the cache to meet your NetFlow traffic rates. The number of entries can be 1024 - 524288. The default is 65536.

About this task

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router(config)# ip flow-cache entries &lt;number&gt;</td>
<td>Changes the number of entries that are maintained in the NetFlow cache. CAUTION: Improper use of this feature might cause network problems. To return to the default NetFlow cache entries, use the no ip flow-cache entries in global configuration mode.</td>
</tr>
</tbody>
</table>

Monitoring NetFlow information

Use these commands to verify whether the NetFlow data export is functioning and displaying the data.

About this task

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router# show ip flow export</td>
<td>Displays information about NetFlow flow exporters and statistics.</td>
</tr>
<tr>
<td>Router# show flow exporter &lt;exporter_name&gt;</td>
<td>Displays the statistics of the specified Flow Exporter.</td>
</tr>
<tr>
<td>Router# show ip flow interface</td>
<td>Displays NetFlow accounting configuration on interfaces.</td>
</tr>
<tr>
<td>Router# show ip interface</td>
<td>Displays the usability status of interfaces that are configured for IP.</td>
</tr>
<tr>
<td>Router# show ip cache flow</td>
<td>Displays the NetFlow statistics such as: • IP packet size distribution • IP flow cache information • Flow information; protocol, total flow, flows per second</td>
</tr>
<tr>
<td>Router# clear ip flow stats</td>
<td>Clears the NetFlow statistics.</td>
</tr>
</tbody>
</table>
An example Cisco device configuration

Need more information
configure terminal
interface serial 3/0/0
ip route-cache flow
exit
ip flow-export 127.1.0.0 0 version 5 peer-as
exit
clear ip flow stats
Router# show ip cache flow

The output is as shown:

<table>
<thead>
<tr>
<th>IP packet size distribution (230151 total packets):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-32 64 96 128 160 192 224 256 288 320 352 384 416 448 480</td>
</tr>
<tr>
<td>.999 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000</td>
</tr>
<tr>
<td>512 544 576 608 640 672 704 736 768 800 832 864 896 928 960 992</td>
</tr>
<tr>
<td>.000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000</td>
</tr>
</tbody>
</table>

Configuring flow on Juniper devices

Provides commands and examples to configure J-Flow on an SRX Series device.

Command modes

<table>
<thead>
<tr>
<th>Command mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational mode</td>
<td>This mode displays the status of the device. In operational mode, you enter commands to monitor and troubleshoot the Junos OS, devices, and network connectivity.</td>
</tr>
<tr>
<td>When you log in to the router and type the CLI command, you are automatically in operational mode: user@host&gt;</td>
<td></td>
</tr>
<tr>
<td>Configuration mode</td>
<td>A configuration for a device that is running on Junos OS is stored as a hierarchy of statements. In configuration mode, you enter these statements to define all properties of the Junos OS, including interfaces, general routing information, routing protocols, user access, and several system and hardware properties.</td>
</tr>
<tr>
<td>user@host&gt;configure user@host#</td>
<td></td>
</tr>
<tr>
<td>To exit the mode, give the following commands: user@host# commit and-quit commit complete user@host</td>
<td></td>
</tr>
<tr>
<td>To exit without commit: user@host# exit Exiting configuration mode user@host&gt;</td>
<td></td>
</tr>
</tbody>
</table>

Active Flow monitoring

Flow monitoring versions 5, 8, and 9 support active flow monitoring. For active flow monitoring, the monitoring station participates in the network as an active router. A router performs the following actions during active Flow monitoring:

- Sampling
  The router selects and analyzes only a portion of the traffic.
- Sampling with templates
The router selects, analyzes, and arranges a portion of the traffic into templates.

- **Sampling per sampling instance**
  The router selects, analyzes, and arranges a portion of the traffic according to the configuration and binding of a sampling instance.

- **Port mirroring**
  The router copies entire packets and sends the copies to another interface.

- **Multiple port mirroring**
  The router sends multiple copies of monitored packets to multiple export interfaces with the next-hop-group statement at the (edit forwarding-options) hierarchy level.

- **Discard accounting**
  The router accounts for selected traffic before it discards. Such traffic is not forwarded out of the router. Instead, the traffic is quarantined and deleted.

- **Flow-tap processing**
  The router processes requests for active flow monitoring dynamically by using the Dynamic Tasking Control Protocol (DTCP).

Some of the commands for these actions are described here.

**Related information:**

- Flow Monitoring Feature Guide for Routing Devices
- Active Flow Monitoring Overview

**Configuring J-Flow versions 5 and 8**

Commands to configure J-Flow versions 5 and 8.

**About this task**

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user@host# set interfaces ge-0/0/0 unit 0 family inet sampling input</td>
<td>Enables sampling on one or more interfaces and specify the direction.</td>
</tr>
<tr>
<td>user@host# set interfaces ge-0/0/0 unit 0 family inet sampling output</td>
<td></td>
</tr>
</tbody>
</table>
### Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user@host# set forwarding-options sampling input rate 100</td>
<td>Specifies the sampling rate.</td>
</tr>
<tr>
<td>CAUTION: Activation of flow collection can have a significant impact on the performance of the SRX Series device. The smaller the sample rate, the bigger the impact. It is recommended to not use a sampling input rate of 1.</td>
<td></td>
</tr>
<tr>
<td>Where:</td>
<td>(Where: forwarding-options Starts the inline J-Flow configuration, so that the sampling and the J-Flow service thread are implemented in the forwarding engine.)</td>
</tr>
<tr>
<td>sampling</td>
<td>Configures the J-Flow packet sampling options.</td>
</tr>
<tr>
<td>input</td>
<td>Enables sampling.</td>
</tr>
<tr>
<td>rate</td>
<td>Specifies the ratio of packets to be sampled.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling family inet output flow-server 10.10.10.1 port 2056</td>
<td>Specifies the UDP port number of the host that is collecting cflowd packets.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling family inet output flow-server 10.10.10.1 version 5</td>
<td>Specify the version format 5.</td>
</tr>
</tbody>
</table>

### Related information:

- [SRX Getting Started - Configure J-Flow](#)

### Configuring J-Flow version 9

Commands to configure J-Flow versions 9.

### About this task

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user@host# set services flow-monitoring version9 template</td>
<td>Configures the J-Flow v9 template.</td>
</tr>
<tr>
<td>flow-active-timeout 30</td>
<td></td>
</tr>
<tr>
<td>user@host# set services flow-monitoring version9 template v4 flow-inactive-timeout 30</td>
<td></td>
</tr>
<tr>
<td>user@host# set services flow-monitoring version9 template v4 &lt;ipv4-template&gt;</td>
<td></td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling input rate 100</td>
<td>Specifies the sampling rate and run length.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling input run-length 0</td>
<td></td>
</tr>
</tbody>
</table>

---

18  Network Performance Insight References
<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user@host# set forwarding-options sampling family inet output flow-server &lt;IP_address&gt; port 2222</td>
<td>Configures the external flow collector and its port number. Note: The J-Flow v9 template is associated with the external flow collector. Up to eight flow collectors can be simultaneously configured.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling family inet output flow-server &lt;IP_address&gt; version9 template &lt;template_name&gt;</td>
<td></td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling input user@host# set forwarding-options sampling output family inet output inline-jflow source-address &lt;IP_address&gt;</td>
<td>Configure the inline-jflow, so that the sampling and the J-Flow service thread are implemented in the forwarding engine.</td>
</tr>
<tr>
<td>user@host# set interfaces ge-0/0/14 unit 0 family inet sampling input user@host# set interfaces ge-1/0/0 unit 0 family inet sampling output user@host# set interfaces ge-0/0/14 unit 0 family inet address &lt;IP_address&gt;/24</td>
<td>Configure the sampling filter on an interface (or interfaces) in the direction, on which the J-Flow service is required.</td>
</tr>
<tr>
<td>user@host# show interfaces descriptions</td>
<td>Displays all the configured interfaces.</td>
</tr>
</tbody>
</table>

Related information:

Juniper Flow Monitoring

Configuring the sampling instance

You can configure active sampling by using a sampling instance and associate that sampling instance to a particular Packet Forwarding Engine. In addition, you can define multiple sampling instances that are associated with multiple destinations (as many as the number of Packet Forwarding Engines in the chassis), with multiple protocol families per each sampling instance destination.

About this task

- set chassis fpc 0 sampling-instance s0
- set interfaces ge-0/0/14 unit 0 family inet sampling input
- set interfaces ge-0/1/0 unit 0 family inet sampling input
- set interfaces ge-0/1/0 unit 0 family inet address
- set interfaces ge-1/0/0 unit 0 family inet address
- set interfaces sp-2/0/0 unit 0 family inet
- set forwarding-options sampling instance s0 input rate 1
- set forwarding-options sampling instance s0 input run-length 0
- set forwarding-options sampling instance s0 family inet output flow-server 2.2.2.2 port 2055
- set forwarding-options sampling instance s0 family inet output flow-server 2.2.2.2 version9 template v4
- set forwarding-options sampling instance s0 family inet output interface sp-2/0/0 source-address 1.1.1.1
- set routing-options static route 50.0.0.0/8 next-hop 20.0.0.2
- set services flow-monitoring version9 template v4 flow-active-timeout 30
- set services flow-monitoring version9 template v4 flow-inactive-timeout 30
- set services flow-monitoring version9 template v4 ipv4-template

Related information:

Example: Sampling Instance Configuration
Configuring J-Flow version 9 for SRX-DataCenter devices

Commands to configure J-Flow versions 9 for SRX-DataCenter devices.

About this task

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user@host# set services flow-monitoring version9 template &lt;template_name&gt;</td>
<td>Configures the J-Flow v9 template</td>
</tr>
<tr>
<td>user@host# set sampling family inet output flow server &lt;flow_collector_ip_addr&gt; port &lt;flow_collector_port&gt; version9 template &lt;template_name&gt;</td>
<td>Configures external flow collector, in this case, Network Performance Insight Collector.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling instance &lt;instance1&gt; input rate 100</td>
<td>Specifies the sampling rate.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling instance &lt;instance1&gt; input run-length 0</td>
<td>Note: Currently, IPv4 template is supported.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling instance instance1 family inet output flow-server &lt;Ip_address&gt; port 2222</td>
<td>Configures the external flow collector and its port address.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling instance instance1 family inet output flow-server &lt;Ip_address&gt; version9 template &lt;template_name&gt;</td>
<td>Note: The J-Flow v9 template is associated with the external flow collector. Up to eight flow collectors can be simultaneously configured.</td>
</tr>
<tr>
<td>user@host# set forwarding-options sampling instance instance1 family inet output inline-jflow source-address &lt;Ip_address&gt;</td>
<td>Configures the inline-jflow, so that the sampling and the J-Flow service thread are implemented in the forwarding engine.</td>
</tr>
<tr>
<td>user@host# set interfaces ge-0/0/14 unit 0 family inet sampling input</td>
<td>Configures the sampling filter on an interface (or interfaces) in the direction, on which the J-Flow service is required.</td>
</tr>
<tr>
<td>user@host# set interfaces ge-0/0/14 unit 0 family inet address 2.2.2.1/24</td>
<td></td>
</tr>
</tbody>
</table>

Related information:
- SRX Getting Started - Configure J-Flow

Using the show commands

Describes the possible show command options in configuration mode and Operational mode.

About this task

configure
//To enter a configuration mode
show ?
<[Enter]> Execute this command

- access Network access configuration
- access-profile Access profile for this instance
- accounting-options Accounting data configuration
- applications Define applications by protocol characteristics
- apply-groups Groups from which to inherit configuration data
- chassis Chassis configuration
- class-of-service Class-of-service configuration
- ethernet-switching-options Ethernet-switching configuration options
- event-options Event processing configuration
- firewall Define a firewall configuration
- forwarding-options Configure options to control packet forwarding
- groups Configuration groups
- interfaces Interface configuration
- multi-chassis
- multicast-snooping-options Multicast snooping option configuration
- policy-options Policy option configuration
- protocols Routing protocol configuration
- routingGetInstancees Routing instance configuration
- routing-options Protocol-independent routing option configuration
- schedulers Security scheduler
- security Security configuration
- services Set services parameters
- smtp Simple Mail Transfer Protocol service configuration
- snmp Simple Network Management Protocol configuration
- system System parameters
- vlans VLAN configuration

| Pipe through a command

Exit
//To exit the configuration mode
Show
// To run the show command options in User Excec mode
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Show accounting profiles and records</td>
</tr>
<tr>
<td>arp</td>
<td>Show system Address Resolution Protocol table entries</td>
</tr>
<tr>
<td>as-path</td>
<td>Show table of known autonomous system paths</td>
</tr>
<tr>
<td>authentication-whitelist</td>
<td>Show 802.1X White List MAC addresses</td>
</tr>
<tr>
<td>bfd</td>
<td>Show Bidirectional Forwarding Detection information</td>
</tr>
<tr>
<td>bgp</td>
<td>Show Border Gateway Protocol information</td>
</tr>
<tr>
<td>chassis</td>
<td>Show chassis information</td>
</tr>
<tr>
<td>class-of-service</td>
<td>Show class-of-service (CoS) information</td>
</tr>
<tr>
<td>cfi</td>
<td>Show command-line interface settings</td>
</tr>
<tr>
<td>configuration</td>
<td>Show current configuration</td>
</tr>
<tr>
<td>connections</td>
<td>Show circuit cross-connect connections</td>
</tr>
<tr>
<td>database-replication</td>
<td>Show database replication information</td>
</tr>
<tr>
<td>dhcp</td>
<td>Show Dynamic Host Configuration Protocol information</td>
</tr>
<tr>
<td>dhcpv6</td>
<td>Show Dynamic Host Configuration Protocol v6 information</td>
</tr>
<tr>
<td>dialer</td>
<td>Show dialer information</td>
</tr>
<tr>
<td>dot1x</td>
<td>Show 802.1X information</td>
</tr>
<tr>
<td>dvmrp</td>
<td>Show Distance Vector Multicast Routing Protocol information</td>
</tr>
<tr>
<td>dynamic-tunnels</td>
<td>Show dynamic tunnel information information</td>
</tr>
<tr>
<td>esi</td>
<td>Show end system-to-intermediate system information</td>
</tr>
<tr>
<td>ethernet-switching</td>
<td>Show Ethernet-switching information</td>
</tr>
<tr>
<td>event-options</td>
<td>Show event-options information</td>
</tr>
<tr>
<td>firewall</td>
<td>Show firewall information</td>
</tr>
<tr>
<td>forwarding-options</td>
<td>Show forwarding-options information</td>
</tr>
<tr>
<td>gvrp</td>
<td>Show Generic VLAN Registration Protocol information</td>
</tr>
<tr>
<td>helper</td>
<td>Show port-forwarding helper information</td>
</tr>
<tr>
<td>hfrv</td>
<td>Show information related to Host (Direct route) Fast reroute</td>
</tr>
<tr>
<td>host</td>
<td>Show hostname information from domain name server</td>
</tr>
<tr>
<td>isccp</td>
<td>Show Inter Chassis Control Protocol information</td>
</tr>
<tr>
<td>igmp</td>
<td>Show Internet Group Management Protocol information</td>
</tr>
<tr>
<td>igmp-snooping</td>
<td>Show IGMP snooping information</td>
</tr>
<tr>
<td>ingress-replication</td>
<td>Show Ingress-Replication tunnel information</td>
</tr>
<tr>
<td>interfaces</td>
<td>Show interface information</td>
</tr>
<tr>
<td>ipv6</td>
<td>Show IP version 6 information</td>
</tr>
<tr>
<td>isdn</td>
<td>Show Integrated Services Digital Network information</td>
</tr>
<tr>
<td>isis</td>
<td>Show Intermediate System-to-Intermediate System information</td>
</tr>
<tr>
<td>l2circuit</td>
<td>Show Layer 2 circuit information</td>
</tr>
<tr>
<td>l2vpn</td>
<td>Show Layer 2 VPN information</td>
</tr>
<tr>
<td>lacp</td>
<td>Show Link Aggregation Control Protocol information</td>
</tr>
<tr>
<td>ldp</td>
<td>Show Label Distribution Protocol information</td>
</tr>
<tr>
<td>ldp</td>
<td>Show Link Layer Discovery Protocol information</td>
</tr>
<tr>
<td>log</td>
<td>Show contents of log file</td>
</tr>
<tr>
<td>mld</td>
<td>Show multicast listener discovery information</td>
</tr>
<tr>
<td>mld-snooping</td>
<td>Show MLD snooping information</td>
</tr>
<tr>
<td>mpls</td>
<td>Show mpls information</td>
</tr>
<tr>
<td>msdp</td>
<td>Show Multicast Source Discovery Protocol information</td>
</tr>
<tr>
<td>multicast</td>
<td>Show multicast information</td>
</tr>
<tr>
<td>mvpn</td>
<td>Show Multicast Virtual Private Network (MVPN) information</td>
</tr>
<tr>
<td>ntp</td>
<td>Show Network Time Protocol information</td>
</tr>
<tr>
<td>oam</td>
<td>Show OAM-related information</td>
</tr>
<tr>
<td>ospf</td>
<td>Show Open Shortest Path First Information</td>
</tr>
<tr>
<td>ospf3</td>
<td>Show Open Shortest Path First version 3 Information</td>
</tr>
<tr>
<td>pfe</td>
<td>Show Packet Forwarding Engine Information</td>
</tr>
<tr>
<td>pgm</td>
<td>Show Pragmatic Generalized Multicast information</td>
</tr>
<tr>
<td>pim</td>
<td>Show Protocol Independent Multicast information</td>
</tr>
<tr>
<td>policer</td>
<td>Show Interface policer counters and information</td>
</tr>
<tr>
<td>policy</td>
<td>Show policy information</td>
</tr>
<tr>
<td>pp</td>
<td>Show PPP process information</td>
</tr>
<tr>
<td>pppoe</td>
<td>Show PPP over Ethernet information</td>
</tr>
<tr>
<td>r2cp</td>
<td>Show Radio-to-Router Protocol information</td>
</tr>
<tr>
<td>rip</td>
<td>Show Routing Information Protocol information</td>
</tr>
<tr>
<td>ripng</td>
<td>Show Routing Information Protocol for IPv6 information</td>
</tr>
<tr>
<td>route</td>
<td>Show routing table information</td>
</tr>
<tr>
<td>rsvp</td>
<td>Show Resource Reservation Protocol information</td>
</tr>
<tr>
<td>sap</td>
<td>Show Session Announcement Protocol information</td>
</tr>
<tr>
<td>schedulers</td>
<td>Show the information on one or more schedulers</td>
</tr>
<tr>
<td>security</td>
<td>Show security information</td>
</tr>
<tr>
<td>services</td>
<td>Show services</td>
</tr>
<tr>
<td>smtp</td>
<td>Show Simple Mail Transfer Protocol information</td>
</tr>
<tr>
<td>snmp</td>
<td>Show Simple Network Management Protocol information</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Show Spanning Tree Protocol information</td>
</tr>
<tr>
<td>system</td>
<td>Show system information</td>
</tr>
<tr>
<td>task</td>
<td>Show routing protocol per-task information</td>
</tr>
<tr>
<td>ted</td>
<td>Show Traffic Engineering Database information</td>
</tr>
<tr>
<td>tgm</td>
<td>Show telephony gateway module information</td>
</tr>
<tr>
<td>version</td>
<td>Show software process revision levels</td>
</tr>
<tr>
<td>vlan</td>
<td>Show VLAN information</td>
</tr>
<tr>
<td>vpls</td>
<td>Show VPLS information</td>
</tr>
<tr>
<td>vrrp</td>
<td>Show Virtual Router Redundancy Protocol information</td>
</tr>
<tr>
<td>wan-acceleration</td>
<td>Show WAN acceleration module information</td>
</tr>
</tbody>
</table>
Verifying the configuration with show commands

To verify that your configuration is correct, use these commands on the monitoring station that is configured for active flow monitoring.

About this task

- `show services`
- `show services flow-monitoring`
- `show services flow-monitoring version9 template <template_name>`
- `show services accounting (flow | flow-detail)`
- `show services accounting memory`
- `show services accounting packet-size-distribution`
- `show services accounting status`
- `show services accounting usage`
- `show services accounting aggregation template template-name`

Most active flow monitoring operational mode commands contain equivalent output information to the following passive flow monitoring commands:

- `show services accounting errors = show passive-monitoring error`
- `show services accounting flow = show passive-monitoring flow`
- `show services accounting memory = show passive-monitoring memory`
- `show services accounting status = show passive-monitoring status`
- `show services accounting usage = show passive-monitoring usage`

The active flow monitoring commands can be used with most active flow monitoring applications, including sampling, discard accounting, port mirroring, and multiple port mirroring. The following command shows the output of the show commands that are used with the configuration example:

```
user@router> show services accounting errors
```

```
Service Accounting interface: sp-2/0/0, Local interface index: 542
Service name: (default sampling)
Error information
   Packets dropped (no memory): 0, Packets dropped (not IP): 0
   Packets dropped (not IPv4): 0, Packets dropped (header too small): 0
   Memory allocation failures: 0, Memory free failures: 0
   Memory free list failures: 0
   Memory overload: No, PPS overload: No, BPS overload: Yes

user@router> show services accounting flow-detail limit 10
```

```
Service Accounting interface: sp-2/0/0, Local interface index: 468
Service name: (default sampling)
Protocol  Source Address  Source Port  Destination Address  Destination Port  Packet count  Byte count
udp(17)  10.1.1.2  53  10.0.0.1  53  4329  3386035
ip(0)  10.1.1.2  0  10.0.0.2  0  4785  3719654
ip(0)  10.1.1.2  0  10.0.1.2  0  4530  3518769
udp(17)  10.1.1.2  0  10.1.7.1  0  5081  3916767
tcp(6)  10.1.1.2  20  10.3.0.1  20  1  1494
tcp(6)  10.1.1.2  20  10.168.80.1  20  1  677
tcp(6)  10.1.1.2  20  10.69.192.1  20  1  446
tcp(6)  10.1.1.2  20  10.239.240.1  20  1  1426
tcp(6)  10.1.1.2  20  10.126.160.1  20  1  889
tcp(6)  10.1.1.2  20  10.71.224.1  20  1  1046
```

```
user@router> show services accounting memory
```
Service Accounting interface: sp-2/0/0, Local interface index: 468
Service name: (default sampling)
Memory utilization
  Allocation count: 437340, Free count: 430681, Maximum allocated: 6782
  Allocations per second: 3366, Frees per second: 6412
  Total memory used (in bytes): 133416928, Total memory free (in bytes): 133961744

user@router> show services accounting packet-size-distribution

Service Accounting interface: sp-2/0/0, Local interface index: 468
Service name: (default sampling)
Range start  Range end  Number of packets  Percentage packets
  64          96          170516       100

user@router> show services accounting status

Service Accounting interface: sp-2/0/0, Local interface index: 468
Service name: (default sampling)
  Interface state: Monitoring
  Group index: 0
  Export interval: 60 secs, Export format: cflowd v5
  Route record count: 13, IFL to SNMP index count: 30, AS count: 1
  Time set: Yes, Configuration set: Yes
  Route record set: Yes, IFL SNMP map set: Yes

user@router> show services accounting usage

Service Accounting interface: sp-2/0/0, Local interface index: 468
Service name: (default sampling)
  CPU utilization
  Uptime: 4790345 milliseconds, Interrupt time: 1668537848 microseconds
  Load (5 second): 71%, Load (1 minute): 63%

Related information:

Verifying Your Work

Viewing device configuration

An example configuration for the J-Flow v9 template ipv4-test, flow collector 172.19.101.85 (port 2222) with sampling rate 1:100 and run length as 0.

For example, to view the configuration for the following set commands:
  set services flow-monitoring version9 template ipv4-test ipv4-template
  set forwarding-options sampling input rate 1
  set forwarding-options sampling input run-length 0
  set forwarding-options sampling family inet output flow-server 172.19.101.85 port 2222
  set forwarding-options sampling family inet output flow-server 172.19.101.85
  version9 template ipv4-test
  set forwarding-options sampling family inet output inline-jflow source-address 172.19.101.132
  set interfaces ge-0/0/14 unit 0 family inet sampling input
  set interfaces ge-0/0/14 unit 0 family inet address 23.23.23.1/24

Give this command to view the details:

show configuration
Configuring NetStream traffic on Huawei devices

Huawei devices support NetStream flow, which is a supported flow type in Network Performance Insight.

Related information:

[NetStream (Integrated) Technology White Paper]

Configuring NetStream export

Huawei NetStream works much like Cisco NetFlow. The NetStream process gathers detailed data about flows and stores them in a cache table. NetStream then processes the flow data from the cache table and sends it to Network Performance Insight for monitoring.

About this task

There are export options for flow sampling, aggregation, and flow record content depending on how and what you are monitoring and how you need to export and report.

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[RouterA] ip NetStream export host &lt;hostname&gt;</td>
<td>&lt;ip_address&gt; 9996</td>
</tr>
<tr>
<td>ip NetStream export source interface &lt;interface_name&gt;</td>
<td>Exports the NetStream data to a specified IP address.</td>
</tr>
<tr>
<td>[RouterA] ip NetStream sampler inbound 100</td>
<td>Configures global sampling.</td>
</tr>
<tr>
<td>[RouterA] ip NetStream sampler outbound 100</td>
<td></td>
</tr>
<tr>
<td>[RouterA-GigabitEthernet 1/0/0] ip address &lt;IP_address1&gt; &lt;IP_address2&gt;</td>
<td>Sets up an interface.</td>
</tr>
<tr>
<td>[RouterA-GigabitEthernet1/0/0] ip NetStream inbound</td>
<td>Enables NetStream statistics on the inbound and outbound interfaces</td>
</tr>
<tr>
<td>[RouterA-GigabitEthernet1/0/0] ip NetStream outbound</td>
<td></td>
</tr>
</tbody>
</table>
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