

NetFlow Tracker Performance and Scalability Information

Application performance and scaling

In any NetFlow Tracker environment, the goal should be to provide quality reports to the end user as quickly as possible.

When operating on suitable hardware (see below), NetFlow Tracker has been designed to provide good sub minute response times for any requested reports when the following guidelines are followed:

- There should be less than 50 NetFlow packets exported per second to NetFlow Tracker from a single device. **(Allows for a maximum of 1500 flows per second)**
- Across all devices, the total exports to NetFlow Tracker should be 1,300 NetFlow packets per second or less. **(Allows for a maximum of 40,000 flows per second)**

Note: A server with higher specification than that stated below will be able to cope with more exports per second. However, it is expected that no single device (router or switch) should be exporting more than 100 NetFlow export datagrams per second. If this is being exceeded, Fluke Networks recommends using NetFlow sampling to bring down the number of exported packets to a more reasonable level.

Hardware performance and scaling

To satisfy the reporting requirements, suitable hardware for operating NetFlow Tracker would consist of a modern enterprise class server with at least:

Server specification

For 40,000 flows/s:

- 4 Intel CPUs (2* dual core 2.6 Ghz or faster)
- 6* 300 GB (10k RPM) SAS drives in a RAID 10 configuration
- 4 GB of RAM

For 20,000 flows/s:

- 4 Intel CPUs (2* dual core 2.6 Ghz or faster)
- 4* 300 GB (10k RPM) SAS drives in a RAID 10 configuration
- 4 GB of RAM

For 10,000 flows/s:

- 2 Intel CPUs (1* dual core 2.6 Ghz or faster)
- 3* 300 GB (10k RPM) SAS/SCSI drives in a RAID 5 configuration
- 2 GB of RAM

Minimum spec

- Pentium 4, 2 GHz+ processor
- 2 GB of RAM
- High speed disks (recommend SCSI disks 100 GB 10,000+rpm)

Note: The overriding performance factor on a NetFlow Tracker server while running reports is the disk IO performance; this should be taken into account when selecting hardware platform, operating system and file system format.

Example: faster disk access = quicker reports

If there are multiple processors on the server, they will be utilized to improve performance where possible.



Disk performance

The disk space required for a NetFlow Tracker installation is entirely dependent on the volume of data to be processed and the number of long term reports requested.

For a typical installation, it would be recommended that 100 GB disks (10,000 rpm) be utilized in order to facilitate good reporting performance and allows for future reporting needs.

Disk sizing

A basic rule of thumb to calculate disk space is that an export rate of 1 datagram (30 sessions) per second will utilize approximately 1 GB of disk space to store data for seven days of real-time reporting.

Example:

Number of routers	2
Average exports rate per second	20
Real time reporting period (days)	14
Data volume GB	80

*Volume gigabytes – (number of routers * average export rate) * (real-time storage period / 7)*

- 40,000 flows/s requires up to 1.6 TB for seven days of real time storage data
- 20,000 flows/s requires up to 833 GB for seven days of real time storage data
- 10,000 flows/s requires up to 416 GB for seven days of real time storage data

For long term reports, allow 40 MB for each instance of a report.

NetFlow bandwidth requirements

Cisco Systems has issued guidelines which state that NetFlow exports require approximately 1 to 1.5% of network bandwidth to transport the export datagrams.

Example: *If you are using NetFlow to monitor a fully loaded 2 MB line, NetFlow exports will require approximately 20 to 30kb/s of bandwidth.*

To approximate the network usage required for NetFlow exports, use the following spreadsheet by filling in the expected number of exports per second.

Exports per second	10	sec.
Bandwidth usage =	120	Kb/s
Volume per hour =	432	MB

*Bandwidth usage in kb/s – (number of exports per second * 1500 * 8) / 1000
Volume per hour in MB – (Bandwidth usage in kbs * 3600) / 1000*

Due to the potential volumes of traffic, it is recommended (but not required) that the NetFlow Tracker be installed “as close as possible” to the routers exporting the data, i.e., connected to a local LAN interface.

NetFlow export volumes

To gauge the amount of NetFlow packets being generated per second, use one of the following two techniques:

If you have an existing tracker installation

(Note: Future versions of tracker will display this information directly from the performance page)

Access the performance counters page in NetFlow Tracker

“Home->Settings->Performance Counters”

At the top of the page, take note of when the counters were last reset.

Example: *0d 4h17m37s ago*

On the same page, find the table titled either “**Total for all devices**” or titled with the name of the device you are interested in.

Take note of the number of exports.

Example: *2536730*

Using these two pieces of data, fill in the information collected into the following spreadsheet, the number of exports per second will be show at the bottom of the sheet.

Total exports	2536730
Collection in days	0
Collection in hours	4
Collection in minutes	17
Collection in seconds	37
Exports per second	164.12

If you have no existing tracker installation

Enable NetFlow on the router(s) of interest, including enabling NetFlow on each interface of interest.

Enable exporting to a local IP address (doesn't have to be a real address).

Issue a "show version" and take note of the devices up-time.

Example: 3 days, 2 hours, 27 minutes

Issue a "clear ip flow stats" to reset the NetFlow statistics counters.

Wait for a suitable period of time (preferably spanning a busy period on the network in order to see the "busiest" traffic periods), two to three hours should be sufficient.

Again issue a "show version" and take note of the devices up-time.

Example: 3 days, 23 hours, 7 minute

Issue a "show ip flow export" and take note of the number of UDP datagrams that have been sent.

Example: 44323 flows exported in 2262931 UDP datagrams

Use these three pieces of data to fill in the following spreadsheet to gauge the number of exports per second.

Start uptime days	3
Start uptime hours	2
Start uptime minutes	27
End uptime days	3
End uptime hours	23
End uptime minutes	7
UDP datagrams	2262931
Exports per second	30.42

$$\text{Total exports} / (((\text{end_number_of_days} - \text{start_number_of_days}) * 86400) + ((\text{end_number_of_hours} - \text{start_number_of_hours}) * 3600) + ((\text{end_number_of_minutes} - \text{start_number_of_minutes}) * 60) + (\text{end_number_of_seconds} - \text{start_number_of_seconds}))$$

NetFlow tracker architecture

NetFlow tracker is built using the following technologies

Mysql database: This is an open source, commercially supported database. Fluke Networks has been using it successfully for more than five years in a number of products due to its proven performance, versatility and support infrastructure.

JAVA: The Sun Microsystems implementation of Java was selected to develop NetFlow Tracker. This development platform allowed Fluke Networks to develop a high performance application which can run on multiple hardware platforms with minimal technical requirements from the installation team.

Apache Tomcat web/application server: This open source web/application server facilitates the generation of highly configurable, scalable and responsive browser based interfaces. It was selected by Fuke Networks as it provides the most streamlined access to the data possible without requiring end users to install application client software.

Internet browser: The only requirement from the end user's client machine is that it has a JAVA enabled internet browser. Using this browser, the user will be able to:

- Utilize the interactive graphing capabilities.
- Access real-time and long-term reporting.
- Export interesting data to CSV format.
- Export interesting reports to a "printable" format.

Architecture diagram

The following diagram shows the architecture of the NetFlow Tracker solutions in relation to the above components.

