



NetFlow Analytics for Splunk

User Manual

Version 3.9.x

April 2019

Table of Contents

Introduction	3
Overview	3
Installation	4
Upgrading from prior version to 3.7 and above	4
Upgrading Technology Add-on for NetFlow (TA-netflow)	4
Upgrading Netflow Analytics for Splunk App (netflow)	4
Pre-installation Steps	6
Installing into a Single Splunk Server	6
Technology Add-on for NetFlow Installation	6
NetFlow Analytics for Splunk App Installation	6
Installing into a Distributed Splunk Environment	8
Configure Universal Forwarder Input.....	8
Administration	10
Settings > Configuration	10
Settings > NFO Index Usage	11
Settings > Update Device Dropdown.....	11
Dashboards	12
App Navigation Overview.....	12
Dashboard overview	12
Overview > Traffic Overview dashboard	13
Bandwidth by Hosts	14
Traffic by Source IP dashboard.....	14
Traffic by Destination IP dashboard	15
Traffic by Protocol and Port	15
Traffic by Host Pairs dashboard.....	16
Reports	16
Traffic by Subnets dashboard.....	17
Traffic by Protocol dashboard	17
Connections dashboards	18
Bandwidth by Network Devices.....	18
Top Devices by Traffic dashboard	18
Top Devices by Packet Rate dashboard.....	19
Interfaces Utilization dashboard	19
Watched Interfaces Utilization dashboard.....	20
Interface Groups dashboard.....	20
Services	20
Service Response Time dashboard.....	20
Asset Access Monitor	20
Security Events	21
Cyber Thread Statistics dashboard.....	21

DNS Security dashboard	22
More Traffic Statistics	22
Top Talkers and Destinations GEO Locations	22
TCP Health	23
Visitors by Country dashboard	23
Traffic by Autonomous Systems dashboard	24
Network Traffic by CBQoS dashboard	24
Traffic Analyzer and Planning (based on my-subnets.csv lookup)	25
Microsegmentation Analyzer and Planning	25
SNMP	26
SNMP interface errors and discards	26
SNMP CISCO - latest memory/cpu values	26
Cisco ASA Monitor	26
Cisco ASA Overview	27
Cisco ASA Top Bandwidth Consumers	27
Cisco ASA Top Destinations	27
Cisco ASA Top Violators	27
Cisco ASA Top Connectors	27
Palo Alto Networks	27
Palo Alto Networks Overview	28
Palo Alto Networks Top Bandwidth Consumers	28
Palo Alto Networks Top Destinations	28
Palo Alto Networks Top Violators	28
Palo Alto Networks Top Connectors	28
Palo Alto Top Applications	28
Palo Alto Top Applications and Users	29
Search Dashboards	29
How to generate sample events for testing purposes	30

Introduction

Overview

NetFlow Analytics for Splunk App is designed to deliver next generation, real-time, network resource management power to network and security analysts. NetFlow Optimizer™ (“NFO”) is a middleware that processes massive amount of flows to stream summarized and meaningful CIM (“Common Information Model”) compliant syslog events into Splunk Enterprise, and, optionally, all original flow records to inexpensive storage like Hadoop. The events are available for alerting and correlation with other machine data. NetFlow Analytics for Splunk App (“App”) provides visualization and reporting capabilities. The operators benefit from detailed visibility to their entire network and being able to address many IT use cases including bandwidth monitoring, capacity planning, congestion troubleshooting, and cyber security using threat intelligence lists.

The App also includes Cisco ASA and Palo Alto Network firewall flow data dashboards which present bandwidth usage, users, applications, and violators etc., enabling the continual reinforcement of firewall policies.

This guide is intended for network and security analysts who use the App to monitor and investigate problems. For additional NFO information please visit www.netflowlogic.com.

Installation

Upgrading from prior version to 3.7 and above

If you are not upgrading from previous versions of NetFlow Analytics for Splunk App and Technology Add-On for Netflow, skip this section and go to Pre-installation Steps section on page 6.

In the NetFlow Analytics for Splunk App starting from version 3.7 and above, to comply with Splunk guidelines, by default the events are inserted into the default index (index=main). Summary data is stored by default in summary index (index=summary).

In the previous versions (3.6 or older) the following indexes were created during the installation and operation:

1. flowintegrator – the main index for syslogs sent by NetFlow Optimizer
2. flowintegrator_pct_of_total - a summary index filled with data to speed up calculations of "% of Total" fields on the dashboards

Upgrading Technology Add-on for NetFlow (TA-netflow)



Starting from release 3.7 default index is `index=main`. When you upgrade to version 3.7, if you want to continue using the old index, please create `$SPLUNK_ROOT/etc/apps/TA-netflow/local/indexes.conf` file if it does not already exist, and add the following lines to it:

```
[flowintegrator]
homePath      = $SPLUNK_DB/flowintegrator/nfi_traffic/db
coldPath      = $SPLUNK_DB/flowintegrator/nfi_traffic/colddb
thawedPath    = $SPLUNK_DB/flowintegrator/thaweddb
```

The TA-netflow is expecting that the sourcetype of events sent from Netflow Optimizer would be set to "flowintegrator", so please add the following lines to `$SPLUNK_ROOT/etc/apps/TA-netflow/local/indexes.conf` file:

```
[udp://10514]
sourcetype = flowintegrator
index = flowintegrator
```

Restart Splunk for the changes in configuration to take effect.

Upgrading Netflow Analytics for Splunk App (netflow)



Starting from release 3.7 by default the summary indexes are saved to `index=summary`. To use the old data from the old summary indexes in the transition period, first the old indexes must be reintroduced in the `indexes.conf` and the `macro.conf` needs to be amended in the `$SPLUNK_ROOT/etc/apps/netflow/local`.

Create this file if it does not already exist `$SPLUNK_ROOT/etc/apps/netflow/local/indexes.conf` and add the following lines to it:

```
[flowintegrator_pct_of_total]
homePath = $SPLUNK_DB/flowintegrator_pct_of_total/nfi_traffic/db
coldPath = $SPLUNK_DB/flowintegrator_pct_of_total/nfi_traffic/colddb
thawedPath = $SPLUNK_DB/flowintegrator_pct_of_total/thaweddb
```

Create this file if it does not already exist `$SPLUNK_ROOT/etc/apps/netflow/local/macros.conf` and add the following lines:

```
[netflow_index]
definition = (index=main OR index=flowintegrator) sourcetype=flowintegrator

[summary_index_pct_of_total]
definition = (index=summary OR index=flowintegrator_pct_of_total)
```

Restart Splunk for the changes to take effect.

Pre-installation Steps

This App relies on NetFlow Optimizer software. To download a free trial of NetFlow Optimizer, please visit <https://www.netflowlogic.com/download/> and register to receive the FREE trial key. Please download NetFlow Optimizer Installation and Administration Guide from <https://www.netflowlogic.com/resources/documentation/> and follow instructions for your platform.

NetFlow Analytics for Splunk and Add-on are designed to work together. The Add-on can be used with the App or with Splunk Enterprise Security.

1. Download Technology Add-on for NetFlow from Splunkbase <https://splunkbase.splunk.com/app/1838/>
2. Download NetFlow Analytics for Splunk from Splunkbase <https://apps.splunk.com/app/489/>

Installing into a Single Splunk Server

Technology Add-on for NetFlow Installation

1. Install Technology Add-on for NetFlow.
2. Create the `$(SPLUNK_ROOT)/etc/apps/TA-netflow/local/inputs.conf` file, and add the following lines to it:

```
[udp://10514]
sourcetype = flowintegrator
```

3. By default NetFlow Optimizer events will be stored in main index. In case you want to use another index, for example `flowintegrator`, please create the `$(SPLUNK_ROOT)/etc/apps/TA-netflow/local/indexes.conf` file, and add the following lines to it:

```
[flowintegrator]
homePath      = $(SPLUNK_DB)/flowintegrator/nfi_traffic/db
coldPath      = $(SPLUNK_DB)/flowintegrator/nfi_traffic/colddb
thawedPath    = $(SPLUNK_DB)/flowintegrator/thaweddb
```

In that case make sure your `$(SPLUNK_ROOT)/etc/apps/TA-netflow/local/inputs.conf` file contains the following:

```
[udp://10514]
sourcetype = flowintegrator
index = flowintegrator
```

4. Restart Splunk

NetFlow Analytics for Splunk App Installation

Starting from version 3.7, to comply with Splunk guidelines, by default the events are inserted into the default index (`index=main`) and the summary indexes are saved to `index=summary`.

In previous versions NFO events were inserted into index `[flowintegrator]`, and the following summary indexes were

created and used: [flowintegrator_exp_ips] and [flowintegrator_pct_of_total].
To use or continue using custom indexes for your NetFlow events, please perform the following:

1. Install NetFlow Analytics for Splunk App.
2. Create the file if it does not already exist:
\$SPLUNK_ROOT/etc/apps/netflow/local/indexes.conf
and add the following lines to it:

```
[flowintegrator_pct_of_total]
homePath = $SPLUNK_DB/flowintegrator_pct_of_total/nfi_traffic/db
coldPath = $SPLUNK_DB/flowintegrator_pct_of_total/nfi_traffic/coldddb
thawedPath = $SPLUNK_DB/flowintegrator_pct_of_total/thaweddb
```

3. Create the file if it does not already exist:
\$SPLUNK_ROOT/etc/apps/netflow/local/macros.conf
and add the following lines to it:

```
[netflow_index]
definition = index=flowintegrator sourcetype=flowintegrator

[summary_index_pct_of_total]
definition = index=flowintegrator_pct_of_total
```

4. Create the file if it does not already exist:
\$SPLUNK_ROOT/etc/apps/netflow/local/savedsearches.conf
and add the following lines to it:

```
[cache_total_traffic]
action.summary_index._name = flowintegrator_pct_of_total
```

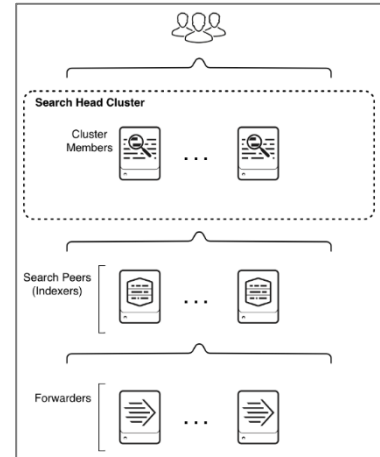
5. Restart Splunk for the changes to take effect.

Installing into a Distributed Splunk Environment

If you have Splunk distributed environment (separate search heads / indexers / forwarders), install NetFlow Analytics for Splunk App on search heads. Install Add-on on search heads and indexers/heavy forwarders.

There are three ways to ingest NetFlow Optimizer events into Splunk:

1. NFO sends events directly to Splunk indexer
2. NFO sends events directly to Splunk Universal Forwarder (they could be installed together or on separate machines)
3. NFO sends events to syslog-ng or rsyslog, and Splunk Universal Forwarder sends them to Splunk indexers



Configure Universal Forwarder Input

Create or modify %SPLUNK_HOME%/etc/system/local/inputs.conf file as follows. In general there are two options, either to listen directly for netflow events on a specific port or optionally to monitor files created by syslog-ng or rsyslog.

Receiving Syslogs Directly from NFO (UDP port 10514)

Add the following lines to inputs.conf file and modify it for your netflow index, if necessary:

```
[udp://10514]
sourcetype = flowintegrator
index = flowintegrator
```

Configuring Universal Forwarder with syslog-ng or rsyslog

In this scenario syslog-ng or rsyslog are configured to listen to syslogs sent by NFO on a UDP port 10514. Syslog-ng or rsyslog are usually writing the logs into configurable directories. In this example we assume that those are written to /var/log/netflow.

Add the following lines to inputs.conf file and modify it for your netflow index, if necessary:

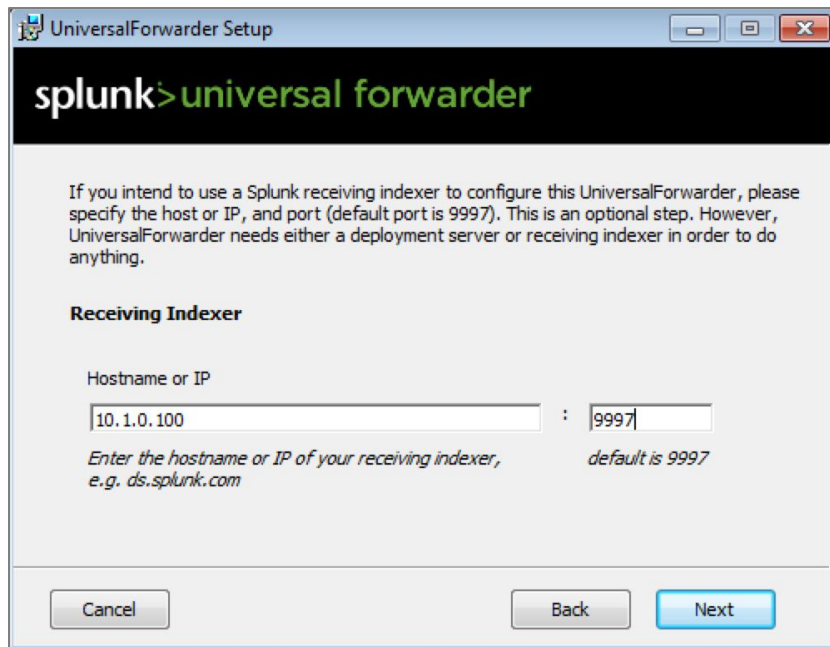
```
[monitor:///var/log/netflow]
sourcetype = flowintegrator
index = flowintegrator
```



It is very important to set sourcetype=flowintegrator and to point it to the index where Netflow Analytics for Splunk App and Add-on are expecting it.

Configure Universal Forwarder Output (Target Indexers)

During the installation of the Universal Forwarders a Receiving Indexer can be configured, as it can be seen here:



It is an optional step during the installation. If it was not configured or if load balancing is required, additional Receiving Indexers can be added later by adding to the %SPLUNK_HOME%/etc/system/local/outputs.conf file:

```
[tcpout]
defaultGroup = default-autolb-group

[tcpout:default-autolb-group]
server = 10.1.0.100:9997,10.1.0.101:9997
```

More info about load balancing:

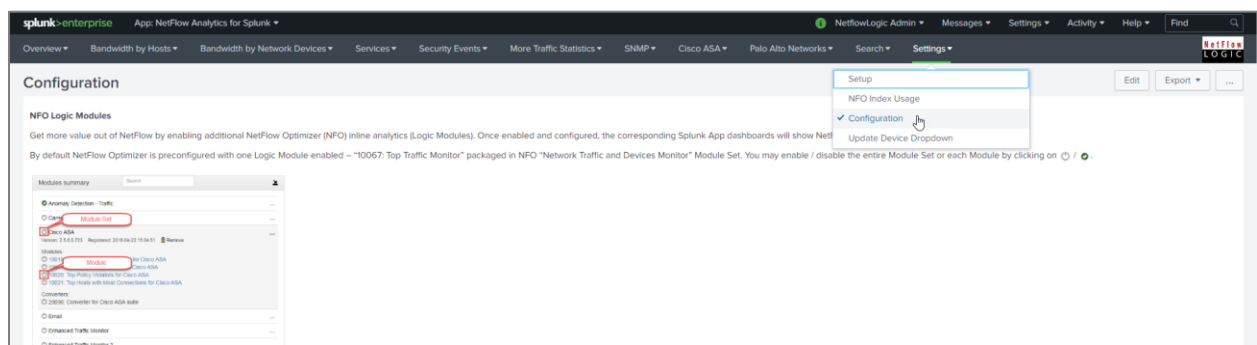
http://docs.splunk.com/Documentation/Splunk/latest/Forwarding/Setuploadbalancingd#How_load_balancing_works

Administration

Settings > Configuration

Get more value out of NetFlow by enabling additional NetFlow Optimizer (NFO) Logic Modules. By default NetFlow Optimizer is preconfigured with one Logic Module enabled – “10067: Top Traffic Monitor”. This Module feeds data to most bandwidth monitoring dashboards.

By enabling and configuring other NFO Modules, you activate additional NetFlow analytics to be sent to Splunk, which are visualized in corresponding dashboards. You may enable / disable the entire Module Set or each Module, as depicted below.



If you would like to organize your network devices in logical groups, please create `exporters-devices.csv` lookup file as shown on the Configuration page.

Several dashboards use network interface speed received via SNMP polling to calculate relative load of interfaces (% of Usage). If you would like to override the speed for certain interfaces, you can do so by creating the `interfaces.csv` lookup file. It is described on the Configuration page.

The type of the charts and the stacking mode can be customized on the app level by modifying the `visualisation.parameters.csv` lookup file in `$SPLUNK_ROOT/etc/apps/netflow/lookups/`

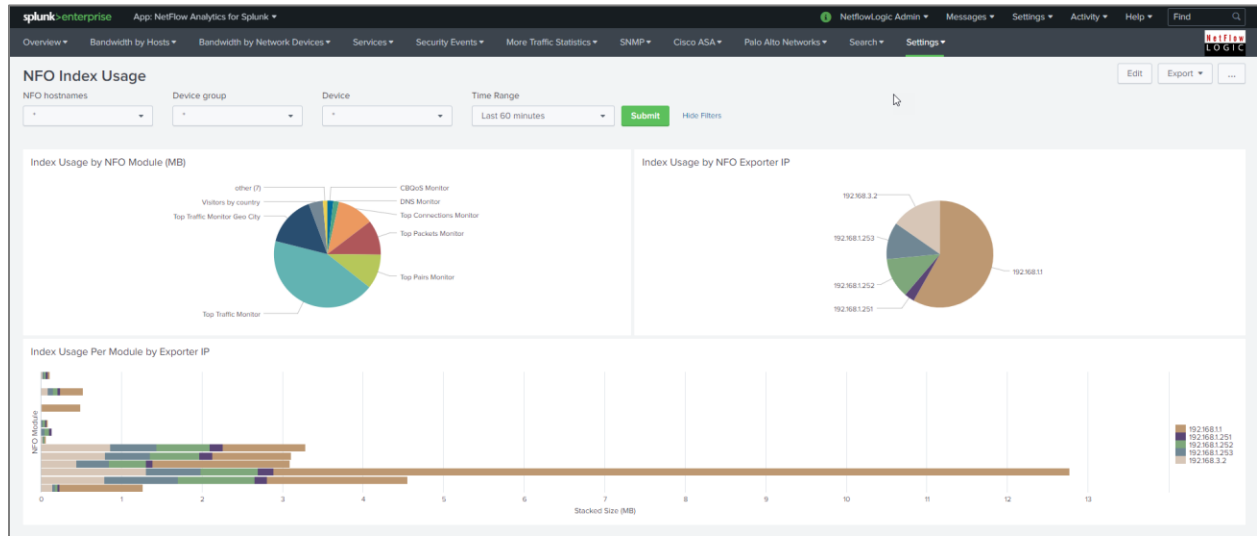
By default it has these values :

```
param,value
charting.chart,area
charting.chart.stackMode,stacked
```

To learn more about NetFlow Optimizer Modules please review NetFlow Optimizer User Guide which could be downloaded from <https://www.netflowlogic.com/resources/documentation/>.

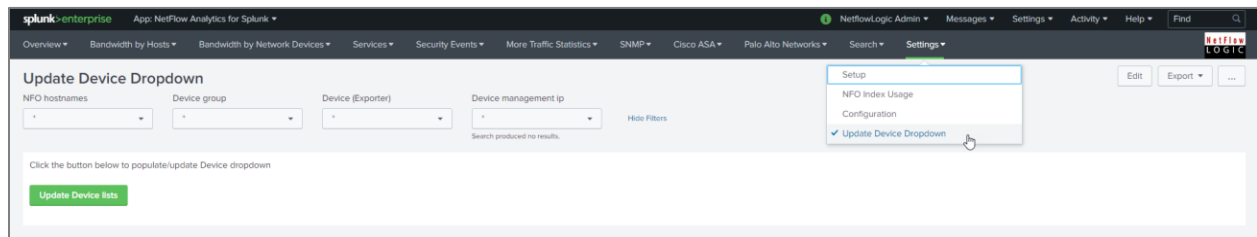
Settings > NFO Index Usage

This dashboard enables you to analyze how Splunk index is used by various NFO Modules and network devices. You can see which NFO Module is most chatty, and make configuration changes to assure you use your Splunk license wisely.



Settings > Update Device Dropdown

Most dashboards have Device dropdown (your NetFlow/sFlow exporter IPs and their SNMP names). This dropdown is populated automatically by "save_exporters" saved search which runs every 30 minutes. The SNMP related dashboards are using the management IP addresses. To refresh Device dropdown values go to Settings > Update Device Dropdown and press "Update Device lists" button.

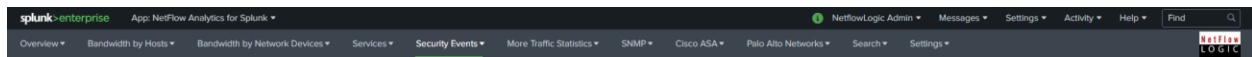


Please visit the Documentation section of the NetFlow Logic website or simply contact us at team_splunk@netflowlogic.com should you have any questions.

Dashboards

App Navigation Overview

The App dashboards are organized into logical groups, and could be accessed from the top navigation bar and drop-down menus.



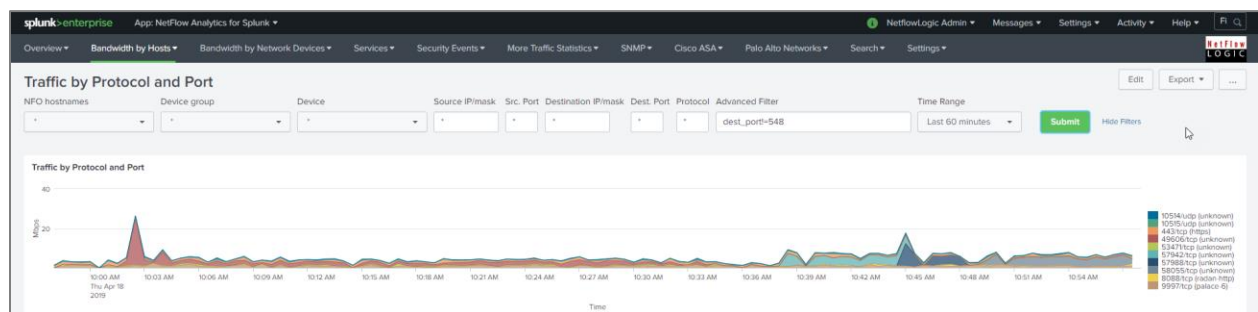
Overview is the default dashboard showing high level traffic statistics, such as top talkers, top listeners, traffic by protocol, traffic by protocol and destination ports, and top devices and interfaces by traffic volume.

Bandwidth by Hosts group has dashboards to view traffic statistics from communicating peers point of view. For example, Traffic by Source IP dashboard shows top talkers, and the ability to drill down to communicating peers as well as seeing network devices that reported these network conversations.

Bandwidth by Network Devices group has dashboards to view traffic statistics starting from network devices and interfaces. These dashboards allow you to drill down and see network conversations traversing network devices and interfaces.

Dashboard overview

Every dashboard has different filters at the top of the screen to enable further narrowing of the report. For example, the Traffic by Protocol and Port dashboard can be filtered by the NFO hostname, device group, device, source IP/mask, source port, destination IP/mask, destination port, protocol, Advanced Filter and time range.

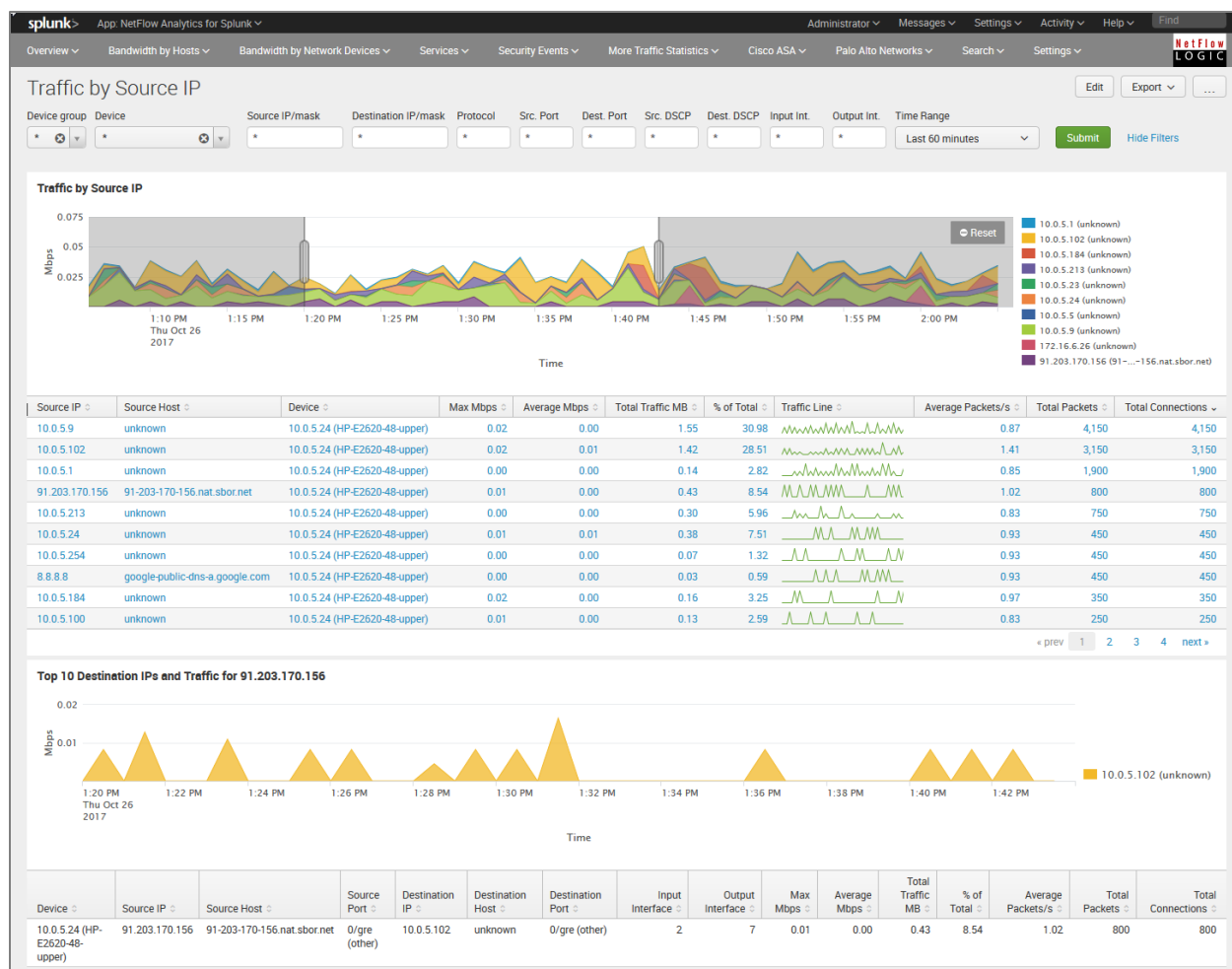


Please note that source and destination IP/mask filters could be specified as subnets (IP/mask), as full IP addresses (199.45.1.45), or as a partial IP address (199.45.1.*).

In Advanced Filter you can specify any SPL to be appended to your search criteria, for example

```
src_ip!=10.* and dest_ip=192.*
```

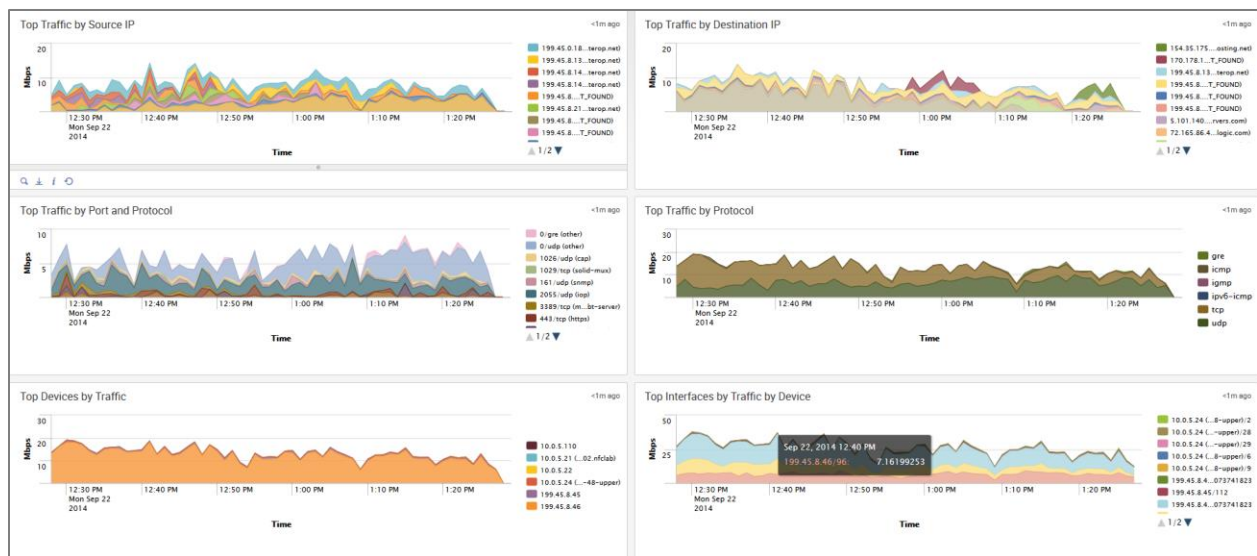
Starting with release 3.7.81 the timeline panel enables you to “pan and zoom” into specific time period. The selected time interval is propagated into all drilldown panels as shown below.



Overview > Traffic Overview dashboard

The Overview dashboard is the top view, aimed to provide a summary on traffic over a time period. The views can be filtered by the NFO Hostnames, Device Group, Device and Time Range.

The panels show Top Traffic by Source IP, Top Traffic by Destination IP, Top Traffic by Protocol and Port, Top Traffic by Protocol, Top Traffic by Protocol, Top Devices by Traffic, Top Interfaces by Traffic by Device. By clicking on the chart a drilldown is activated and the appropriate dashboard is opened with the selected value prepopulating the filter.



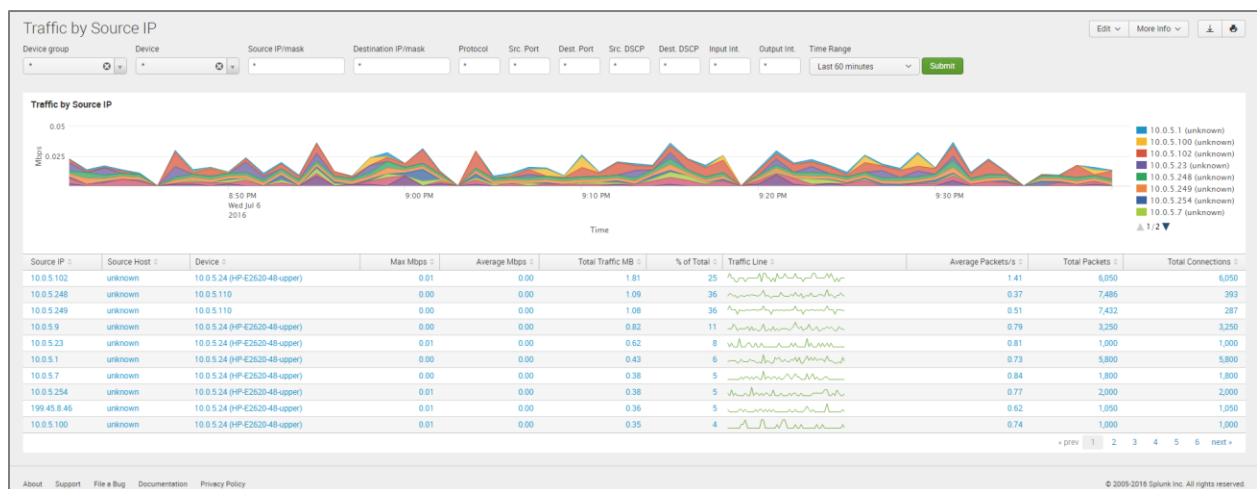
Bandwidth by Hosts

This section covers the dashboards and reports for monitoring traffic to and from hosts in your network, such as top talkers, top listeners, top host pairs, and many others.

Traffic by Source IP dashboard

The Traffic by Source IP dashboard (a.k.a. Top Talkers) monitors host which generate most traffic in your network. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows maximum and average traffic speed and volume, as well as packet rate and connections generated by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

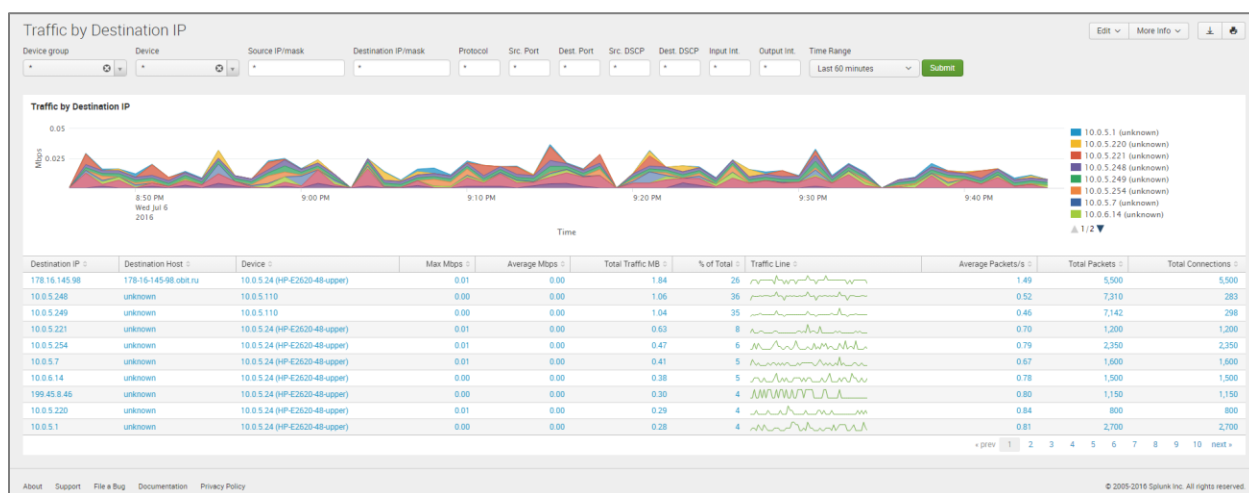


The Traffic by Source IP dashboard allows viewing talker traffic details – just click on the talker host IP or name, and drill down panel opens below showing all traffic destinations, including ports, network device interfaces, and traffic and packet rate details.

Traffic by Destination IP dashboard

The Traffic by Destination IP dashboard (a.k.a. Top Listeners) monitors host which receive most traffic in your network. As Traffic by Source IP, it is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic maximum and average speed and volume, as well as packet rate and connections received by each host.

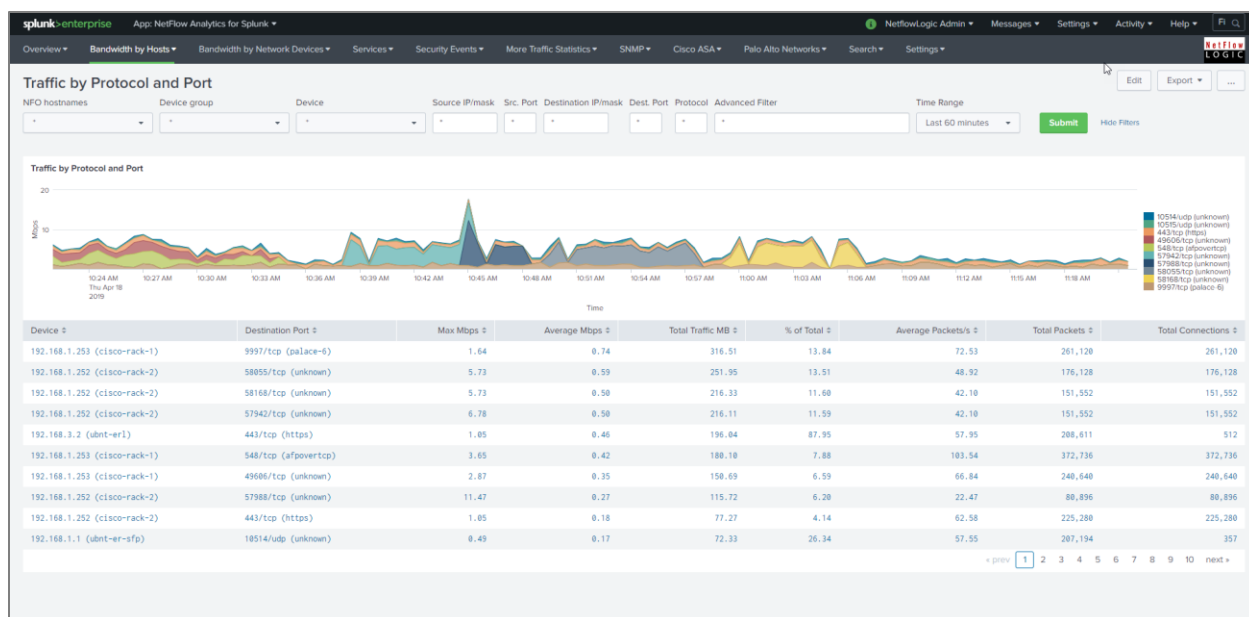
Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.



The Traffic by Destination IP dashboard allows viewing listener traffic details – just click on the listener host IP or name, and drill down panel opens below showing all traffic sources, including ports, network device interfaces, and traffic and packet rate details.

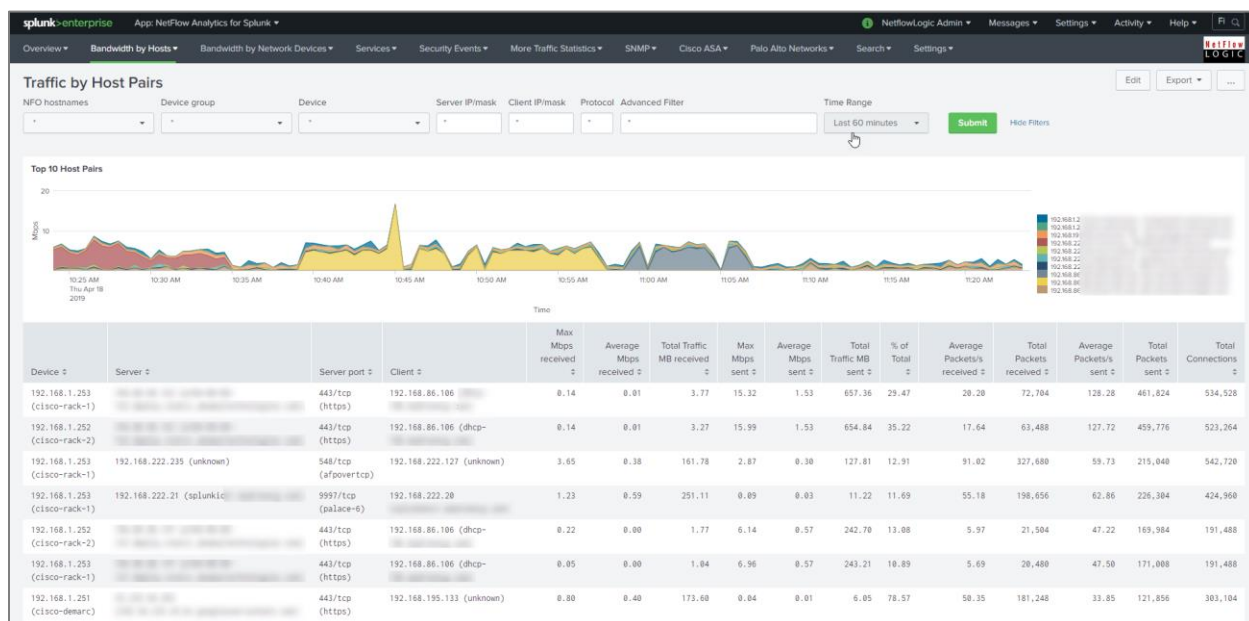
Traffic by Protocol and Port

The Traffic by Protocol and Port dashboard monitors traffic in your network by Service Name and Transport Protocol Port Number (a.k.a Destination port). The App is packaged with services.csv lookup file, which is used to display the service name and protocol, according to IANA: (<http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xhtml>).



Traffic by Host Pairs dashboard

The Traffic by Host Pairs dashboard shows consolidated **bidirectional** flows, sorted by traffic volume. You need to enable Module 10064: Top Pairs Monitor in order to see data in this dashboard. The Traffic by Host Pairs dashboard contains a timeline panel showing top 10 host pairs' traffic by volume, and the table showing top 100 host pairs with details, such as traffic volume and speed, packet rate, and connections count.



Reports

Reports section contains dashboards built to be printed or exported to PDF. The following reports are available today:

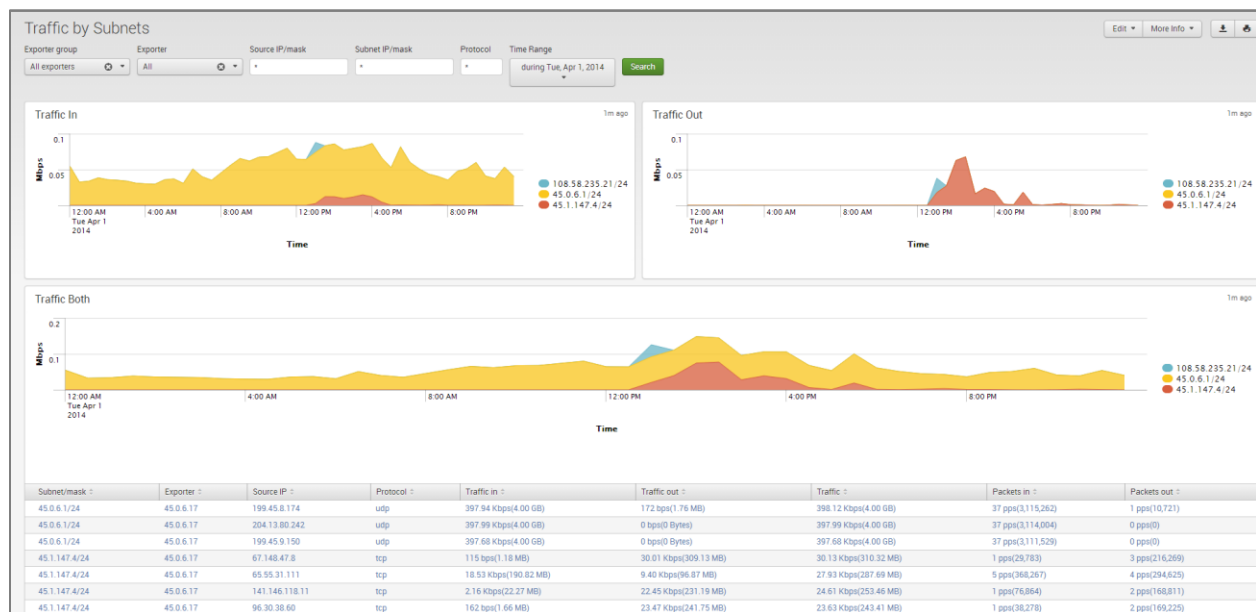
- Top Talkers

- Top Listeners
- Top Host Pairs

Traffic by Subnets dashboard

The Traffic by Subnets dashboard monitors subnets specified in NFO Module 10011: Network Subnets Monitor configuration. Please refer to NetFlow Optimizer User Guide for details. The Traffic by Subnets dashboard is useful for real time and historical monitoring of bandwidth utilization in specified subnets.

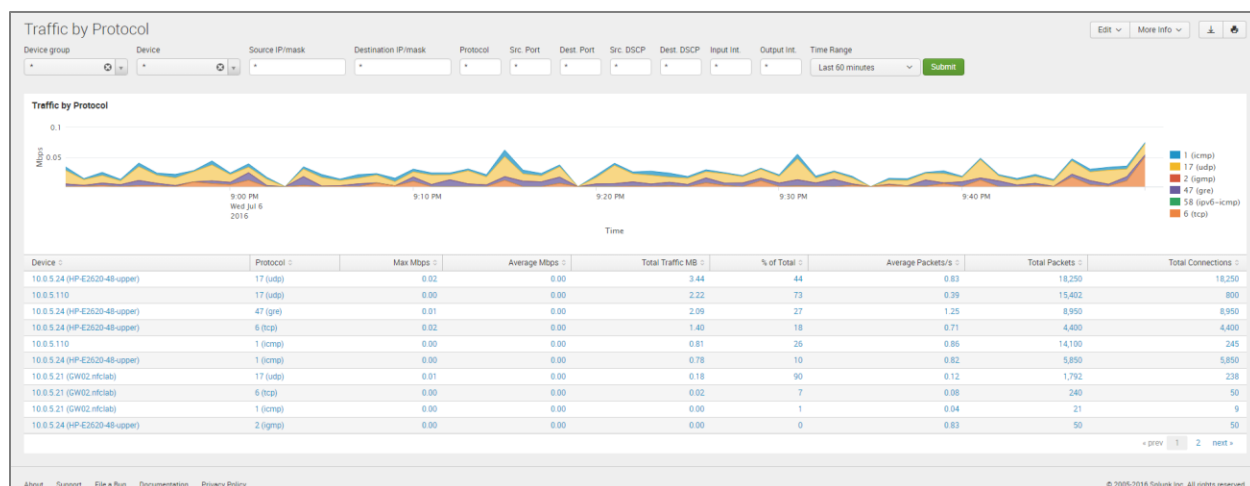
The dashboard shows traffic In, Out, and in Both directions. Traffic for the top 10 by traffic volume monitored subnets is shown in timeline panels. The table below shows for each subnet such details as Source IP, Traffic speed and volume by direction, as well as packet rate information.



Traffic by Protocol dashboard

The Traffic by Protocol dashboard monitors traffic in your network by transport protocol, going through each of the network devices. It is useful for real time or historical monitoring of you traffic composition. The App is packaged with protocols.csv lookup file, which is used to display the protocol name and number, according to IANA: (<http://www.iana.org/assignments/protocol-numbers/protocol-numbers.xhtml>).

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.



The Traffic by Protocol dashboard allows viewing traffic details for each protocol – just click on the protocol in the table below the graph, and drill down panel opens below showing all traffic details for the selected protocol, including source and destination hosts and port numbers, network device interfaces, and traffic speed and volume, packet rate, and connections.

Connections dashboards

Traffic dashboards described in the previous sections are based on NFO Modules that consolidated flow data and report top hosts by volume (Modules 10011, 10064, 10067 – default Module). Connections dashboards are based on NFO Module 10063, which reports top hosts by the number of connections regardless of traffic volume. There four dashboards to monitor host by connections.

- Connections by Source IP
- Connections by Destination IP
- Connections by Protocol and Port
- Connections by Protocol

These dashboards contain graphs and table with traffic details similar to corresponding Traffic dashboards.

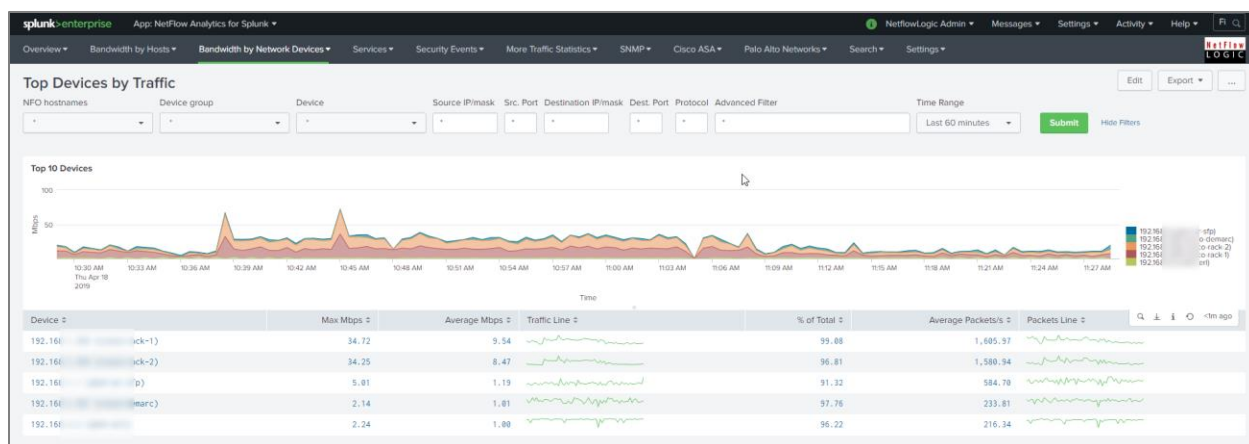
Bandwidth by Network Devices

In comparison to Host dashboards, which are host centric, the Network devices dashboards are device (routers, firewalls, VLAN's) centric, tracking the ingress and egress traffic.

Top Devices by Traffic dashboard

The Top Devices by Traffic dashboard monitors network devices with most traffic in your network. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows maximum and average traffic speed as well as packet rate traversing each network device.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.



The Top Devices by Traffic dashboard allows viewing network traffic details – just click on one of the devices, and drill down panel opens below showing traffic composition by each interface. Further drilldown shows traffic speed statistics (Min, Max, Average, Standard Deviation), and hosts communicating over the selected interface.

Top Devices by Packet Rate dashboard

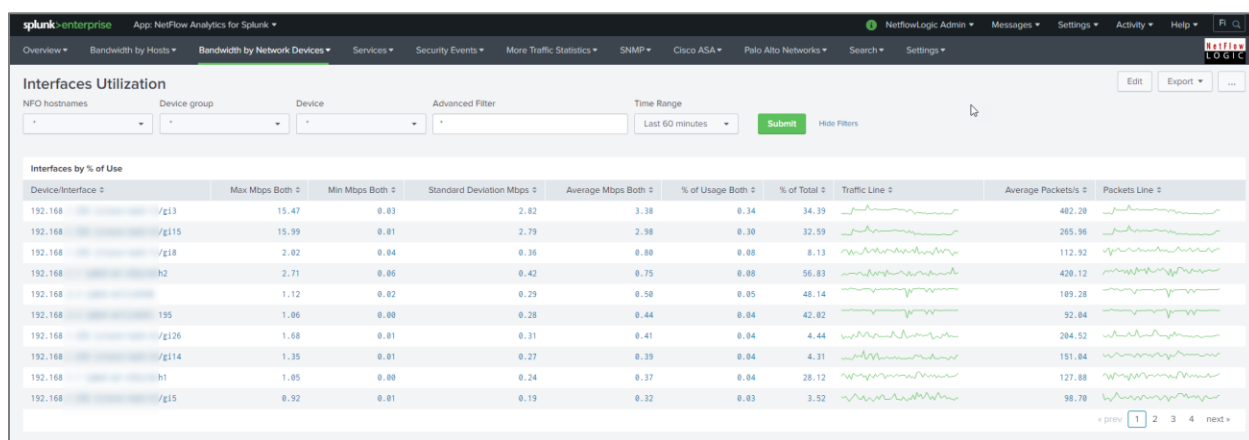
The Top Devices by Packet Rate dashboard is similar to Top Devices by Traffic dashboard, but the network devices are sorted by packet rate rather than traffic volume.



You need to enable Module 10068: Top Packets Monitor in order to see data in this dashboard.

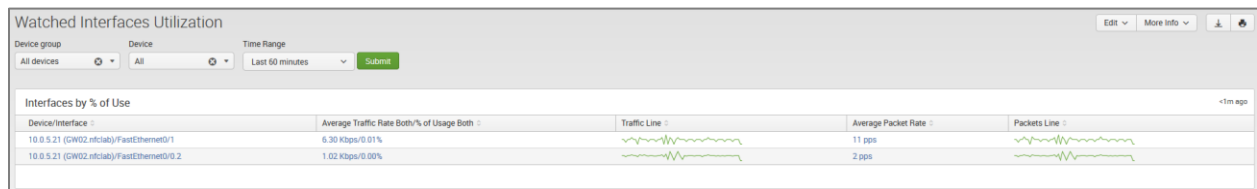
Interfaces Utilization dashboard

The Interfaces Utilization dashboard shows interfaces across your entire data center, with most loaded interfaces first. As in Top Devices dashboards, Interfaces Utilization allows drill down to examine traffic details going over the selected interface. Click on an interface, and panels below will show traffic speed statistics, and hosts communicating over the selected interface.



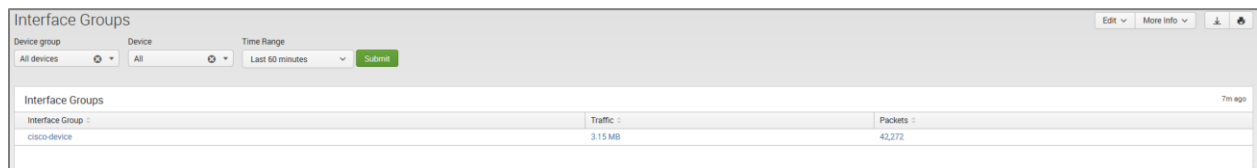
Watched Interfaces Utilization dashboard

The Watched Interfaces Utilization dashboard is very similar to Interface Utilization, but shows only the interfaces specified in watched-interfaces.csv lookup CSV file. Please see Watched Interfaces section at the bottom of App's Settings > Configuration page for more details.



Interface Groups dashboard

This dashboard shows consolidated information for Interface Groups. Interface Groups are defined in interface-groups.csv lookup CSV file. Please see Interface Groups section at the bottom of App's Settings > Configuration page for more details.



Services

Services dashboards enable users to monitor performance and traffic statistics of selected services in your datacenter. You need to enable corresponding NFO Modules in order to see data in these dashboards.

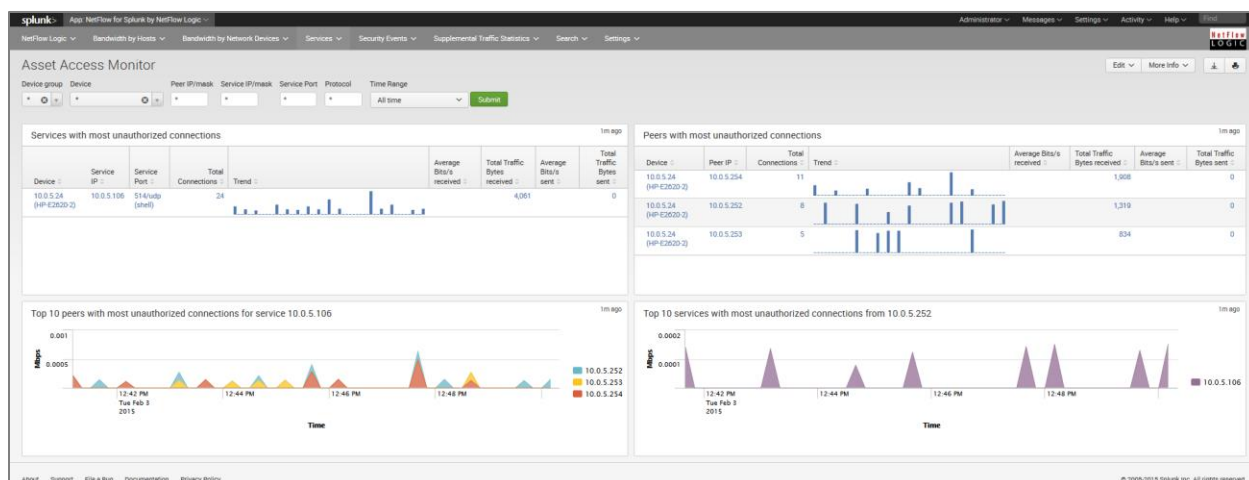
Service Response Time dashboard

To see data in this dashboard enable and configure Module 10017: Service Performance Monitor. Please refer to NetFlow Optimizer User Guide for details. Use Watch List parameter in this Module to specify the services you want to monitor (Service Destination IP, Destination Port, and Transport protocol).

Asset Access Monitor

To see data in this dashboard enable and configure Module 10014: Asset Access Monitor. Please refer to NetFlow Optimizer User Guide for details.

This dashboard shows top services with most unauthorized connections - traffic from unauthorized users to services (IP address, destination port, protocol configured in the NFO Module 10014: Asset Access Monitor) and top peers with most unauthorized connections – traffic to peers (IP address and subnet mask also configurable in NFO Module 10014 section).



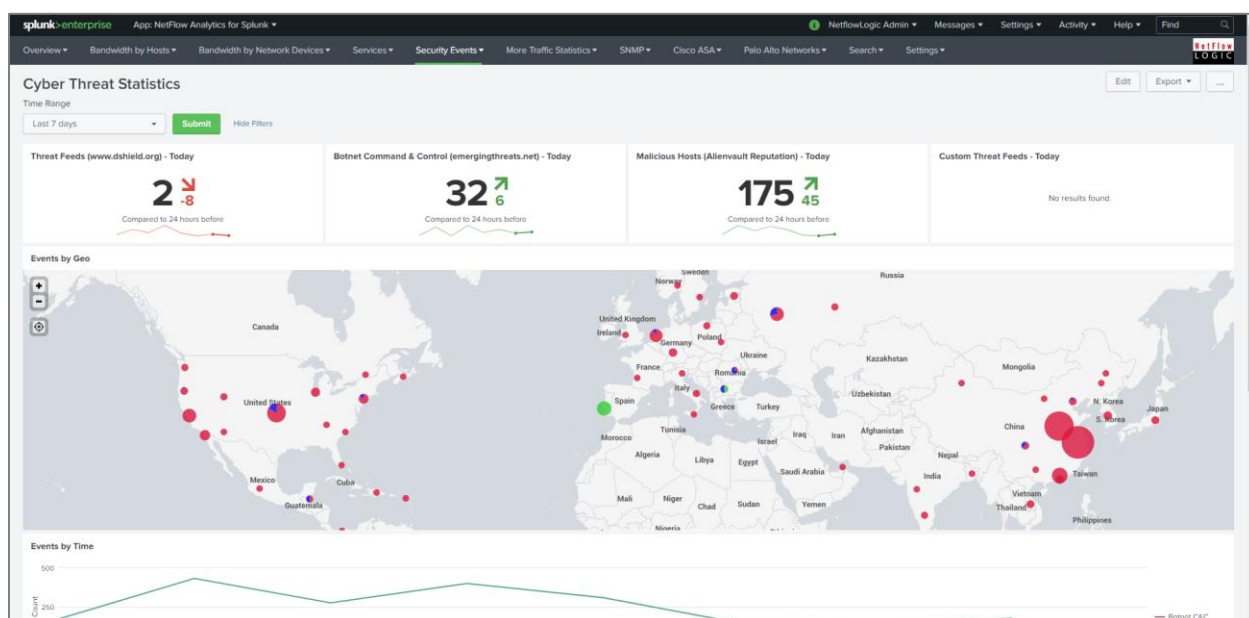
Security Events

Cyber Threat Statistics dashboard

The Cyber Threat Statistics dashboard enables your organization to analyze and prioritize network security event traffic. Using this dashboard you will be able to see geo location of top hosts, network traffic to and from known suspicious hosts. Out of the box we support geo county database from MaxMind and threat intelligence from Emerging Threats and Alienvault. A corporation can also integrate its own watch-list.

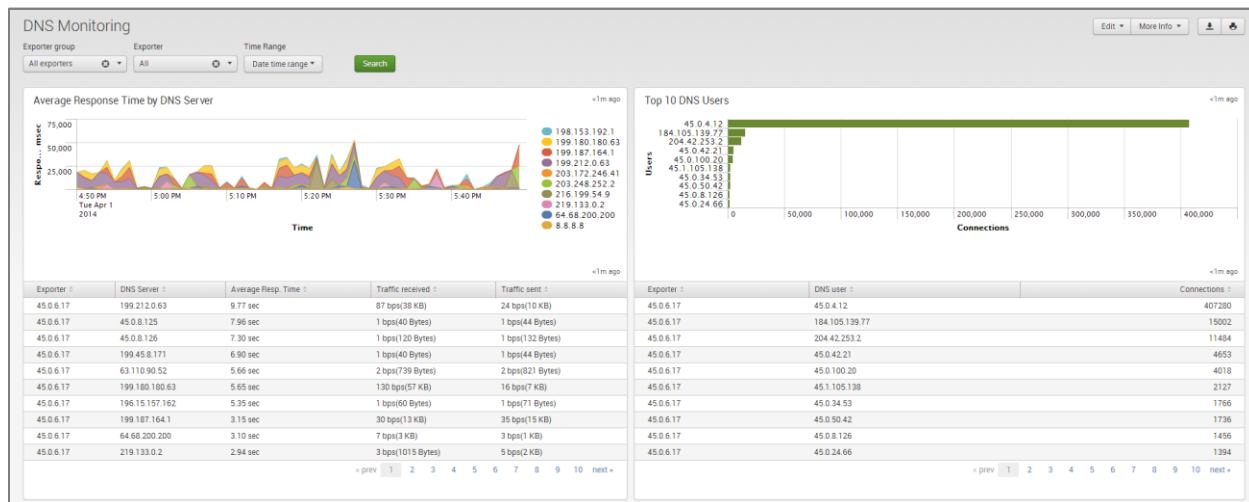


To see data in this dashboard enable Security Module Set: 10040, 10050, 10051, 10052, 10053 and install and setup the four utilities for each Module, create the required data sets and add them to the NetFlow Optimizer Modules.



DNS Security dashboard

To see data in this dashboard enable Module 10004: DNS Monitor. Please refer to NetFlow Optimizer User Guide for details. It is useful to monitor average response time of all DNS servers used in your network. The right panel also shows top DNS users.



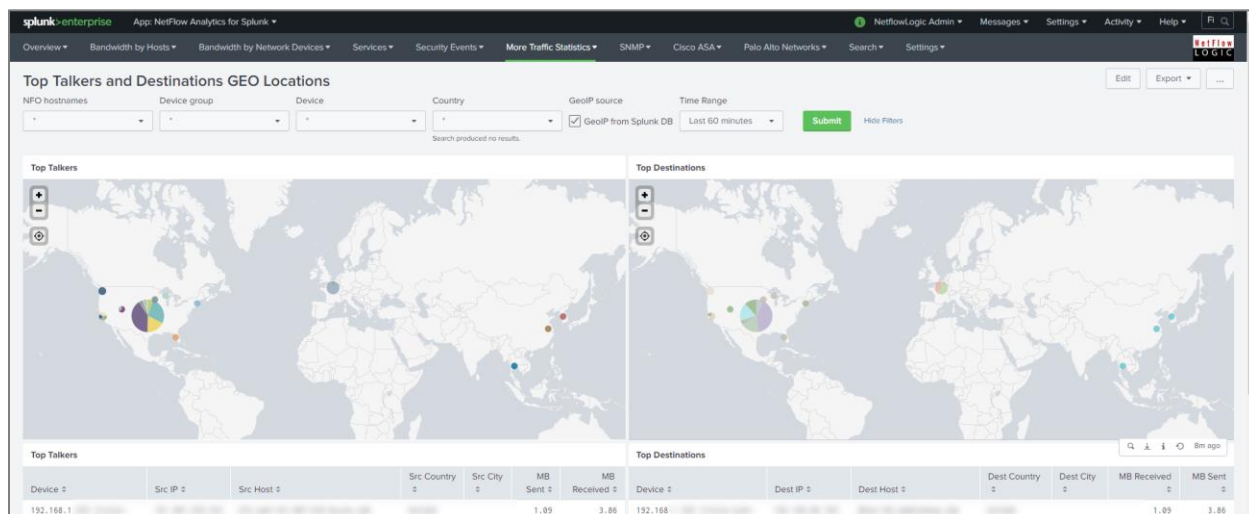
More Traffic Statistics

Top Talkers and Destinations GEO Locations

To see data in this dashboard enable and configure Module **10867: Top Traffic Monitor Geo City**. Please refer to NetFlow Optimizer User Guide for details.

This dashboard is visualizing the Top Talkers and Top Destinations on maps and lists more details in tables.

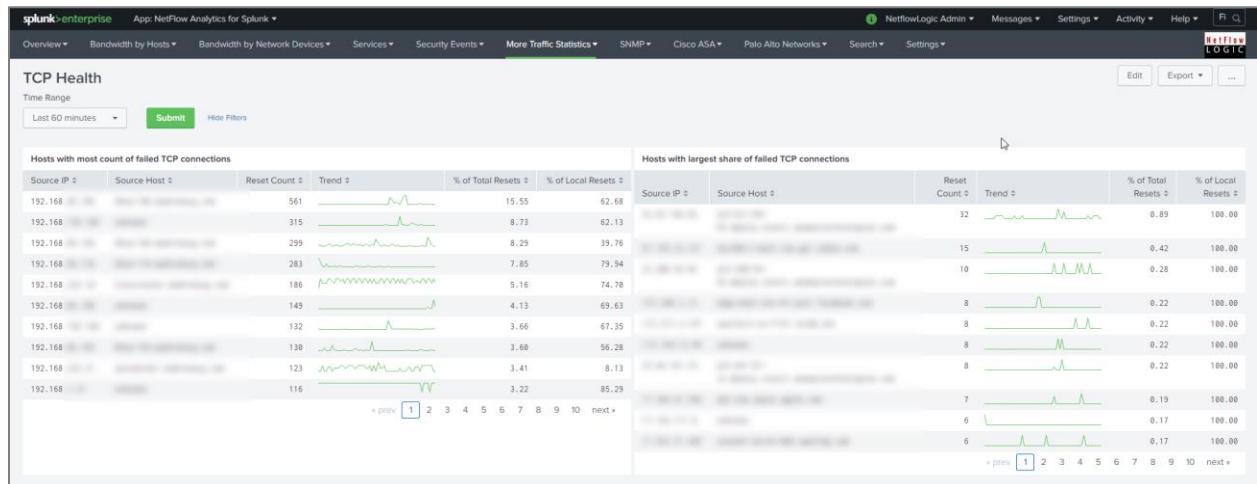
With the GeoIP source checkbox you can set to use Splunk-included GeoIP (typically updated with Splunk upgrades) or up-to-date GeoIP information provided by NFO.



TCP Health

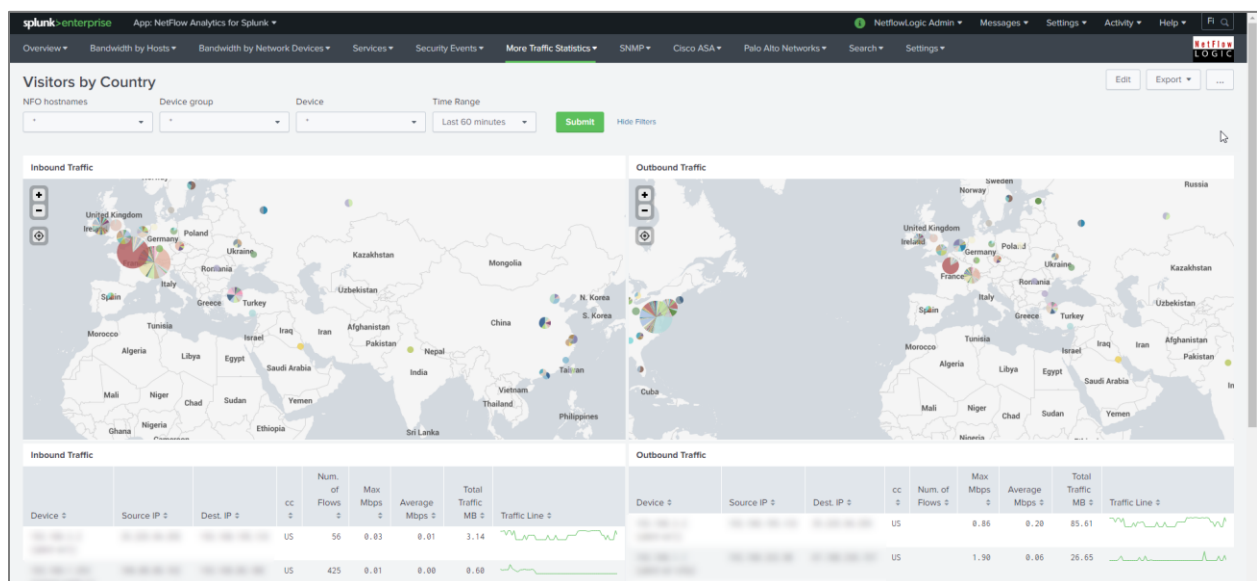
To see data in this dashboard enable and configure Module 10060: TCP Health. Please refer to NetFlow Optimizer User Guide for details.

The TCP Health dashboard monitors and detects top hosts with the most TCP Resets. Top hosts are defined by percent of TCP resets to the total number of Resets for definitive NetFlow exporter or by percent of TCP resets to the total number of host's connections. The TCP Health dashboard shows top hosts with most count of failed TCP connections and top hosts with largest share of failed TCP connections.



Visitors by Country dashboard

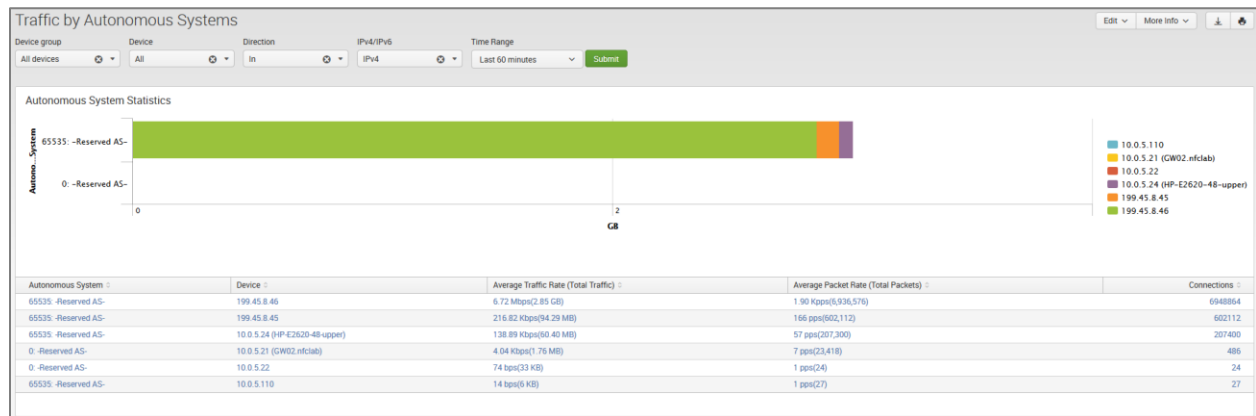
The Visitors by Country dashboard shows geographical locations of Source IP for inbound traffic and Destination IP for outbound traffic. You need to enable Module 10040: Visitors by country.



Traffic by Autonomous Systems dashboard

The Traffic by Autonomous Systems (AS) dashboard monitors traffic by AS. To see data in this dashboard enable and configure Module 10066: Autonomous Systems Monitor.

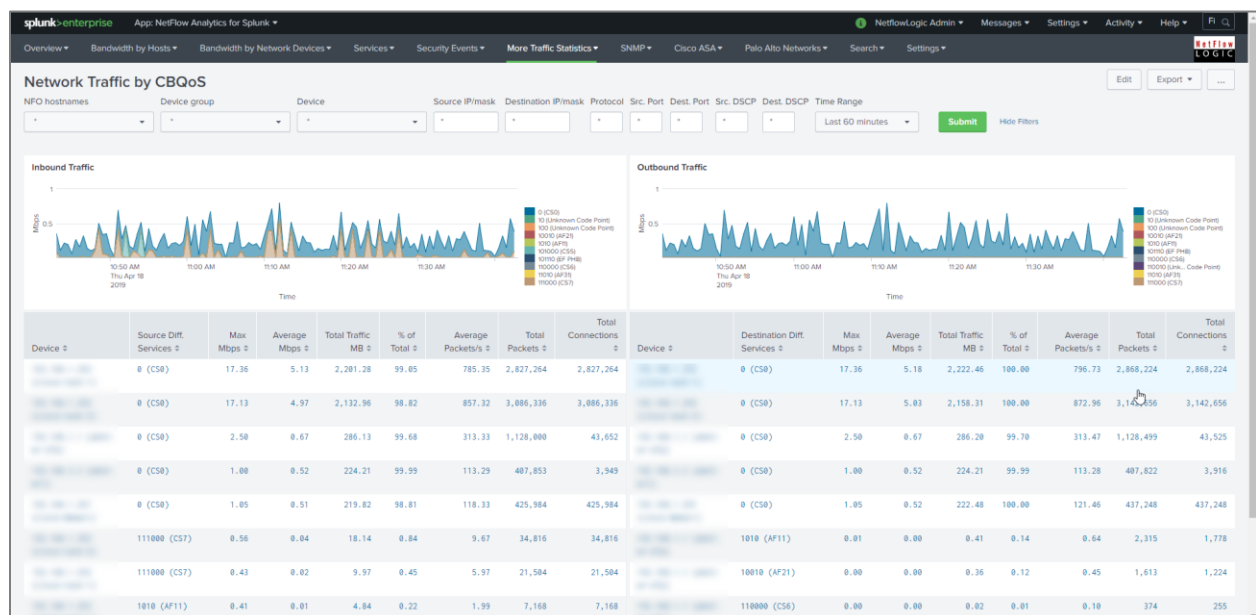
Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results. Select if you want to see incoming or outgoing traffic by AS. Indicate if you want to see statistics for IPv4 or IPv6 or both.



Network Traffic by CBQoS dashboard

The Network Traffic by CBQoS dashboard enables your organization to analyze and prioritize network traffic by Quality of Service (QoS). Using this dashboard you will be able to see how QoS policy is applied in each of your network device where it is enabled and reported, and if necessary tweak Type of Service (TOS) settings. To see data in this dashboard enable Module 10066: CBQoS Monitor.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

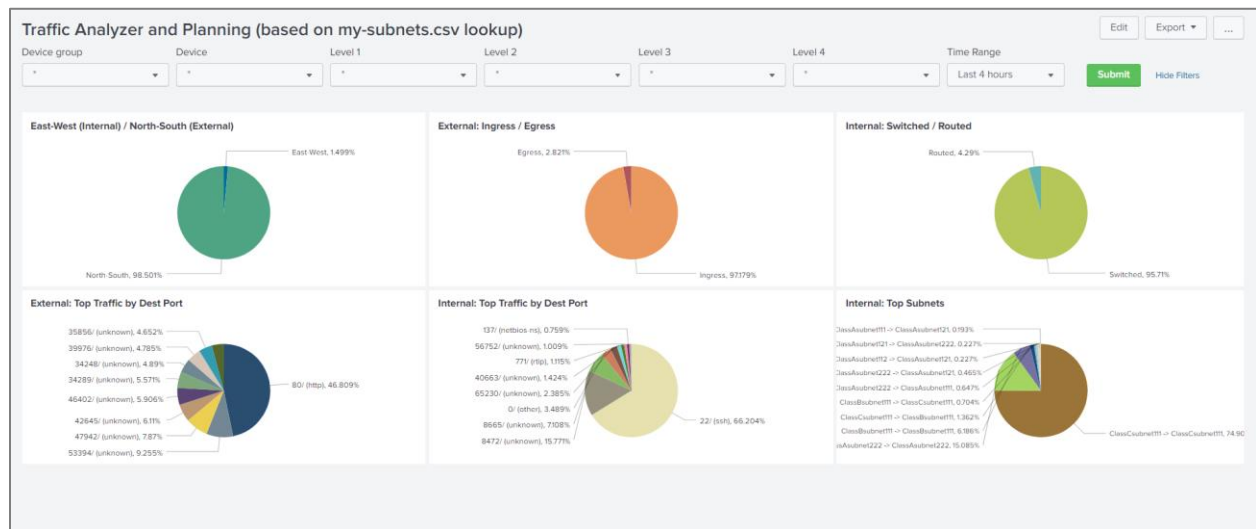


Traffic Analyzer and Planning (based on my-subnets.csv lookup)

This dashboard is using this lookup `$SPLUNK_HOME/etc/apps/netflow/lookups/my-subnets.csv` file to determine traffic in and out of your datacenter (East-West, South-North) as well as other subnet based statistics. It supports up to four-level hierarchy, and should be created in the format shown in this example:

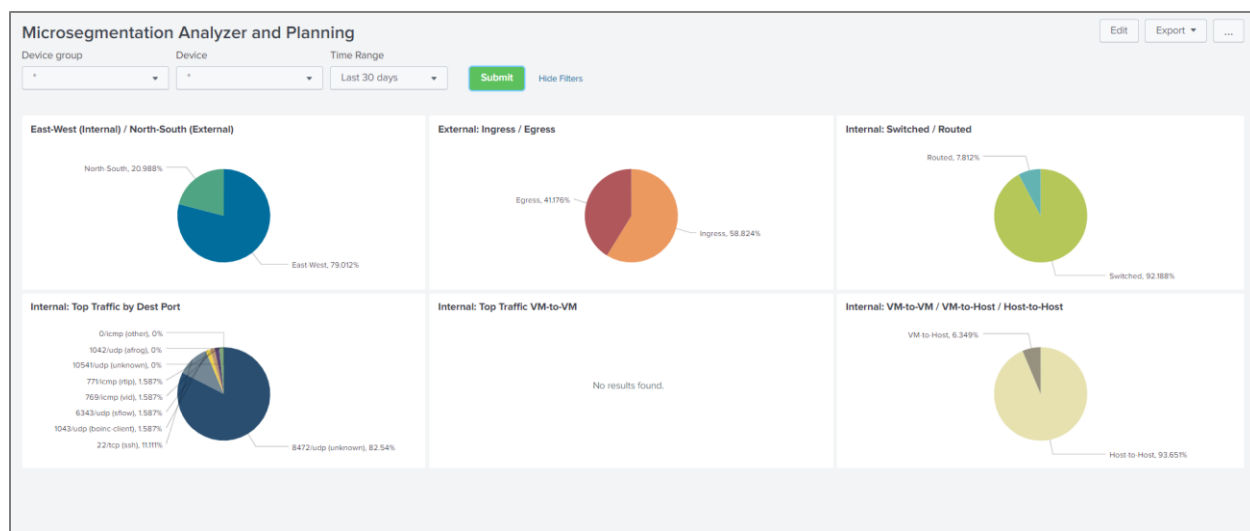
```
subnet,level_1,level_2,level_3,level_4,description
10.0.5.0/29,ClassA,ClassA1,ClassA11,ClassA111,ClassAsubnet111
10.0.5.8/29,ClassA,ClassA1,ClassA11,ClassA112,ClassAsubnet112
10.0.5.16/28,ClassA,ClassA1,ClassA12,ClassA121,ClassAsubnet121
10.0.5.32/27,ClassA,ClassA1,ClassA12,ClassA122,ClassAsubnet122
10.0.5.64/26,ClassA,ClassA2,ClassA21,ClassA211,ClassAsubnet211
10.0.5.128/27,ClassA,ClassA2,ClassA21,ClassA212,ClassAsubnet212
10.0.5.160/27,ClassA,ClassA2,ClassA22,ClassA221,ClassAsubnet221
10.0.5.192/26,ClassA,ClassA2,ClassA22,ClassA222,ClassAsubnet222
172.16.0.0/12,ClassB,ClassB1,ClassB11,ClassB111,ClassBsubnet111
192.168.0.0/16,ClassC,ClassC1,ClassC11,ClassC111,ClassCsubnet111
100::/18,IPv6_1,IPv6_11,IPv6_111,IPv6_1111,IPv6_1_subnet
104::/18,IPv6_2,IPv6_21,IPv6_211,IPv6_2111,IPv6_2_subnet
108::/18,IPv6_3,IPv6_31,IPv6_311,IPv6_3111,IPv6_3_subnet
10c::/18,IPv6_4,IPv6_41,IPv6_411,IPv6_4111,IPv6_4_subnet
```

The dashboard provides filters to apply to traffic statistics, so you can select all or the appropriate segment / sub-segment of your network.



Microsegmentation Analyzer and Planning

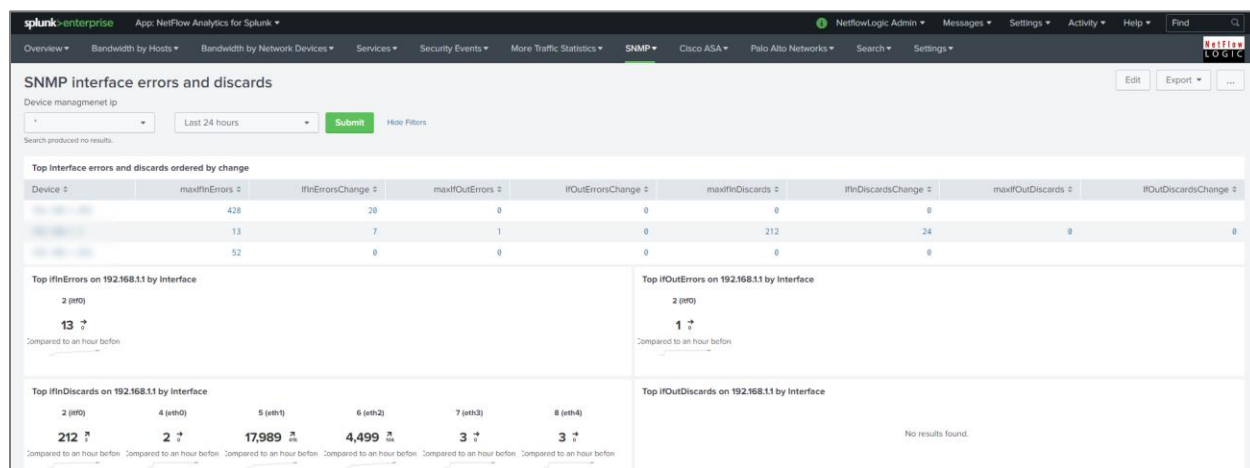
This dashboard relies on Microsegmentation Analytics NFO Module which is available upon request. This dashboard also is using this lookup `$SPLUNK_HOME/etc/apps/netflow/lookups/my-subnets.csv` file to determine traffic in and out of your datacenter (East-West, South-North) as well as other subnet based statistics



SNMP

SNMP interface errors and discards

This dashboard shows network device statistics using NFO's SNMP polling feature.



SNMP CISCO - latest memory/cpu values

This dashboard shows Cisco network device memory and CPU utilization using NFO's SNMP polling feature.

Cisco ASA Monitor

Cisco ASA Monitor dashboards show the output from NetFlow Optimizer Cisco ASA Module set, which in its turn designed to handle Cisco ASA NSEL.

Cisco ASA Overview

The Cisco ASA Overview dashboard aimed to provide a summary on traffic over the last 24 hours.

The panels show Geo location of hosts on the map, Top Bandwidth Consumers, Top Destinations, Top Violators, and Top Connectors.

Cisco ASA Top Bandwidth Consumers

This dashboard (a.k.a. Top Talkers) monitors host which generate most traffic in your network. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections count (created and denied) generated by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Cisco ASA Top Destinations

This dashboard (a.k.a. Top Listeners) monitors host which receive most traffic. The top of the dashboard has a map showing geographical locations of top destinations of the traffic in your network. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections count (created and denied) received by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Cisco ASA Top Violators

This dashboard shows hosts with most traffic of denied flows. It could be useful to reinforce Cisco ASA firewall policies.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Cisco ASA Top Connectors

This dashboard monitors host which generate most connections in your network. It is useful for identifying hosts that make most connections, but could be omitted from top bandwidth consumers because of the small packets they send, e.g. port scanners. The dashboard shows connections created by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Networks

Palo Alto Networks dashboards show the output from NetFlow Optimizer Palo Alto Networks Module set, which in its turn designed to handle Palo Alto Network proprietary NetFlow v9 fields.

Palo Alto Networks Overview

The Palo Alto Networks Overview dashboard aimed to provide a summary on traffic over selected period time.

The panels show Top Bandwidth Consumers, Top Destinations, Top Violators, Top Connectors, Top Applications, and Top Applications and Users.

Palo Alto Networks Top Bandwidth Consumers

This dashboard (a.k.a. Top Talkers) monitors host which generate most traffic in your network. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections count (created and denied) generated by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Networks Top Destinations

This dashboard (a.k.a. Top Listeners) monitors host which receive most traffic. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections count (created and denied) received by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Networks Top Violators

This dashboard shows hosts with most traffic of denied flows. It could be useful to reinforce Palo Alto Networks firewall policies.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Networks Top Connectors

This dashboard monitors host which generate most connections in your network. It is useful for identifying hosts that make most connections, but could be omitted from top bandwidth consumers because of the small packets they send, e.g. port scanners. The dashboard shows connections generated by each host.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Top Applications

This dashboard monitors traffic by Application as identified by Palo Alto Network devices. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections attributed to each application recognized by Palo Alto Networks devices.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Palo Alto Top Applications and Users

This dashboard monitors traffic by Application and Users as identified by Palo Alto Network devices. It is useful for real time or historical network utilization and bandwidth monitoring. The dashboard shows traffic volume and connections attributed to each application recognized by Palo Alto Networks devices, and allows to drill down to see users of each reported application.

Use the filtering options and time picker at the top of the dashboard to select the time interval and narrow down your search results.

Search Dashboards

There are three search dashboards within the App:

- Traffic Timeline - search criteria set to macro `netflow_search_traffic_rules`
- Cisco ASA Timeline
- Palo Alto Networks Timeline

To see all output from NFO enter "index=flowintegrator" in search area. To filter search results to a specific NFO Module, please add the corresponding Module output ID to your search, for example:

"index=flowintegrator nfc_id=20067"

You can add additional filters or any other Splunk search commands to narrow your search results and / or see various statistics. You can also save your custom searches there.

How to generate sample events for testing purposes

This functionality relies on the "The Splunk Event Generator" software available from <https://github.com/splunk/eventgen>.

Install the eventgen app on the indexer and perform the following:

1. Create directory \$SPLUNK_ROOT/etc/apps/TA-netflow/local/ if it doesn't exist
2. Copy eventgen.conf from /default to /local folder and change the line:

```
disabled = true
```

to

```
disabled = false
```

3. Restart Splunk