ExtremeAnalytics® User Guide

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Getting Started with ExtremeAnalytics

This topic provides information to help you get started using ExtremeAnalytics to view network application data in the ExtremeCloud IQ - Site Engine Analytics tab. It includes information on ExtremeAnalytics access requirements, configuring the ExtremeAnalytics engine, enabling NetFlow flow collection, and configuring network locations.

ExtremeAnalytics Access Requirements

In order to view the Analytics tab, you must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read Access or Read/Write Access capability. The Read Access capability allows the ability to access the Analytics tab and view the ExtremeAnalytics reports. The Read/Write capability adds the ability to configure ExtremeAnalytics engines and NetFlow Collecting devices. It also adds the ability to create and modify fingerprints.

ExtremeAnalytics Engine Configuration

The ExtremeAnalytics engine provides the engine to monitor and classify layer 7 application information based on data from CoreFlow switches and reports that information to ExtremeCloud IQ - Site Engine, where it is managed and displayed in the Analytics tab.

The ExtremeAnalytics engine must be installed and running on your network. For instructions, see the ExtremeAnalytics Engine Installation Guide.

Following installation, the ExtremeAnalytics engine must be added to ExtremeCloud IQ - Site Engine and enforced via the Configuration tab in the Analytics tab.

Enable Flow Collection

Because the Analytics tab displays reports based on NetFlow or Application Telemetry (sflow) flow data, you must enable your network devices that act as the flow sensors, and enable flow collection for their device interfaces. You must also configure your flow sensor devices to send their flow information to the ExtremeAnalytics engine. In addition, the device interfaces you enable for flow collection must match the interfaces configured for analysis by the engine.

Enable Jumbo Frames

When configuring a device as an Application Telemetry source for ExtremeAnalytics, jumbo frames must be enabled on the device and any device or virtual machine between the device and the ExtremeAnalytics engine.

For example, to enable jumbo frames on an ExtremeXOS/Switch Engine device, enter the following in the device CLI:

```
enable jumbo-frame ports all
```

- Configuration - Analytics

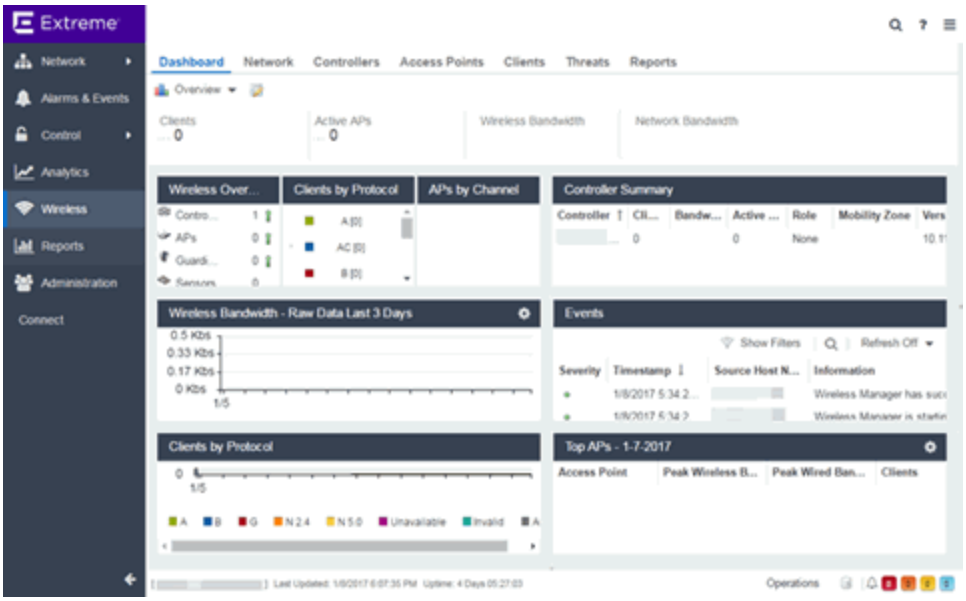
Configuring Enhanced Netflow for Extreme Analytics and Extreme Wireless Controller Version 10.21

When adding a Wireless Controller as a flow source in ExtremeCloud IQ - Site Engine, a mirror port is automatically created. Wireless Controllers on which a firmware version of 10.21 or higher is installed use IPFIX, so the mirror port is unnecessary.

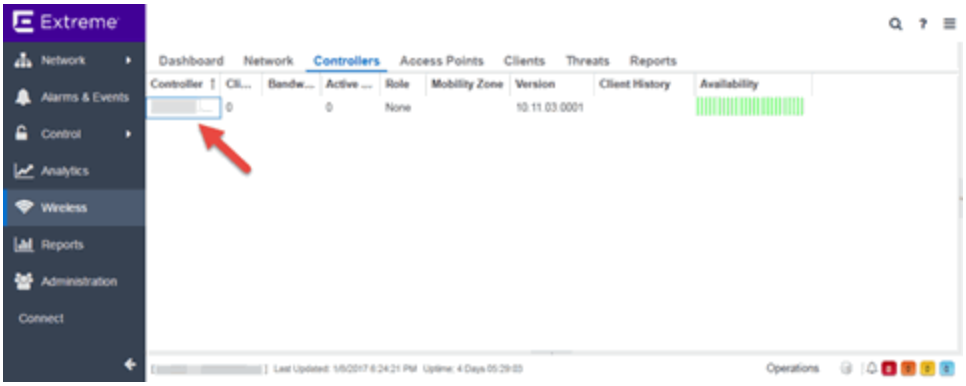
NOTE: Wireless Controllers on which a firmware version lower than 10.21 is installed still require the mirror port be configured.

To remove a mirror port on a Wireless Controller running version 10.21:

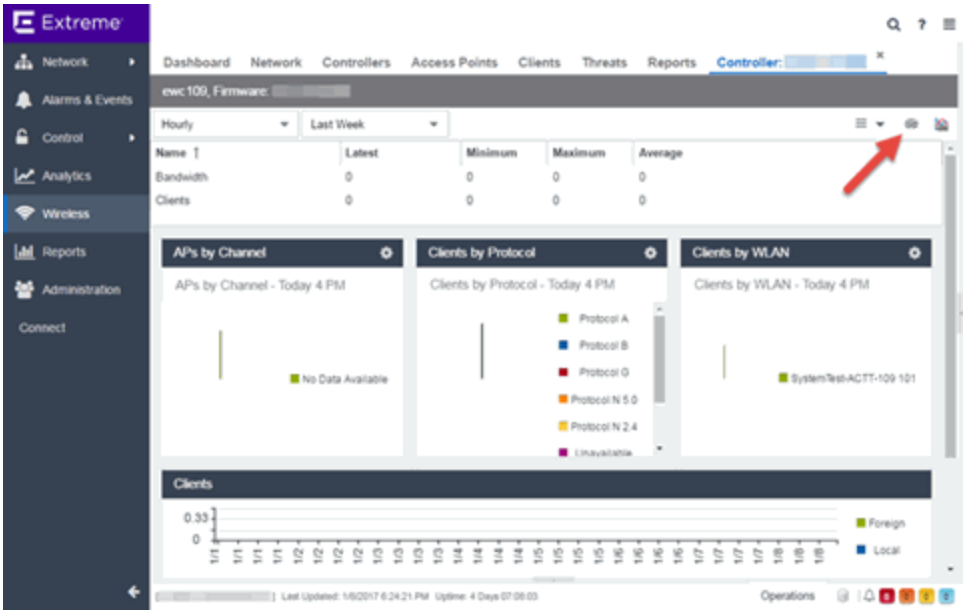
1. Access the **Wireless** tab in ExtremeCloud IQ - Site Engine.
   The Wireless tab opens.



2. Select the **Controllers** tab.
   The Controllers tab opens.

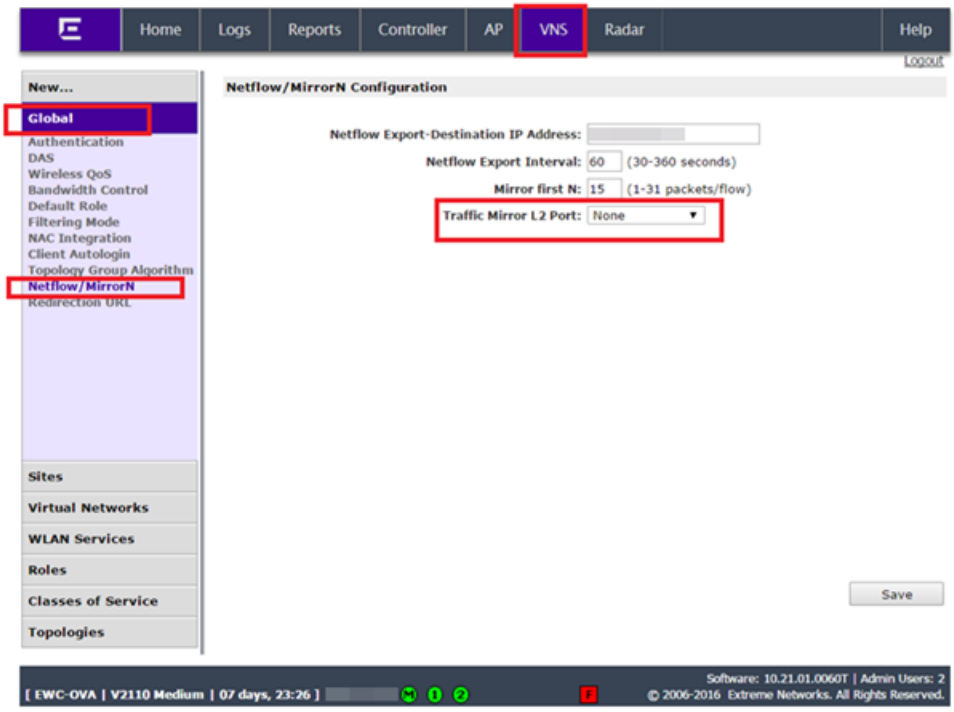


3. Select the **IP address** for the controller, located in the **Controller** column.
   The Wireless Controller Summary page opens.



4. Select the **WebView** icon ( ) at the top right of the Wireless Controller Summary page.
   The WebView opens for the controller.

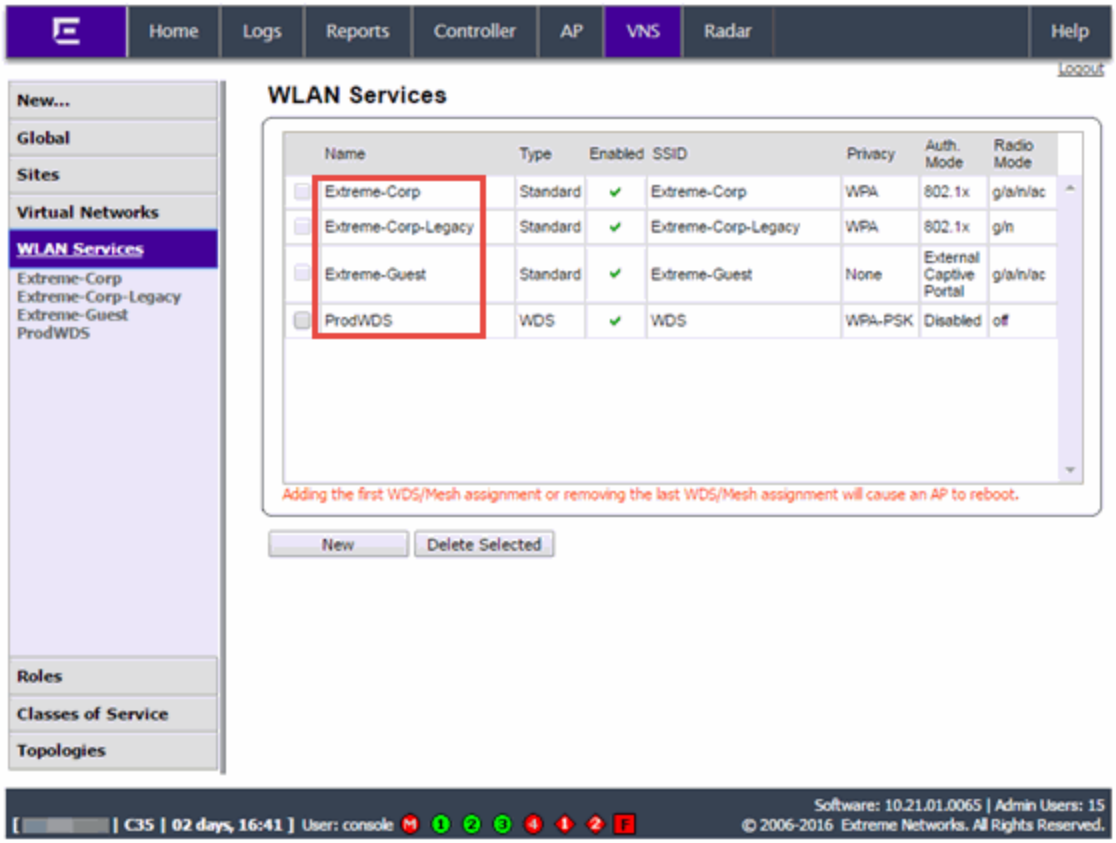
5. Select the **VNS** tab.
   The **VNS** tab opens.



6. Select **Netflow/MirrorN** from the left-panel.
   The Netflow/MirrorN Configuration page opens.
7. Select **None** from the **Traffic Mirror L2 Port** drop-down list.
8. Select the **Save** button.

NOTE: The Mirror Port in the Wireless Control Flow Sources section of the **Analytics** > **Configuration** > Configuration tab is not available when the **Traffic Mirror L2 Port** is disabled.

9. Select **WLAN Services** from the left-panel.
   The WLAN Services page opens.


Home
Logs
Reports
Controller
AP
VNS
Radar
Help
Logout
New...
Global
Sites
Virtual Networks
WLAN Services
Extreme-Corp
Extreme-Corp-Legacy
Extreme-Guest
ProdWDS
Roles
Classes of Service
Topologies
WLAN Services
Name
Type
Enabled
SSID
Privacy
Auth. Mode
Radio Mode
Extreme-Corp
Standard
Extreme-Corp
WPA
802.1x
g/a/n/ac
Extreme-Corp-Legacy
Standard
Extreme-Corp-Legacy
WPA
802.1x
g/n
Extreme-Guest
Standard
Extreme-Guest
None
External Captive Portal
g/a/n/ac
ProdWDS
WDS
WDS
WPA-PSK
Disabled
off
Adding the first WDS/Mesh assignment or removing the last WDS/Mesh assignment will cause an AP to reboot.
New
Delete Selected
[| C35 | 02 days, 16:41] User: console
Software: 10.21.01.0065 | Admin Users: 15
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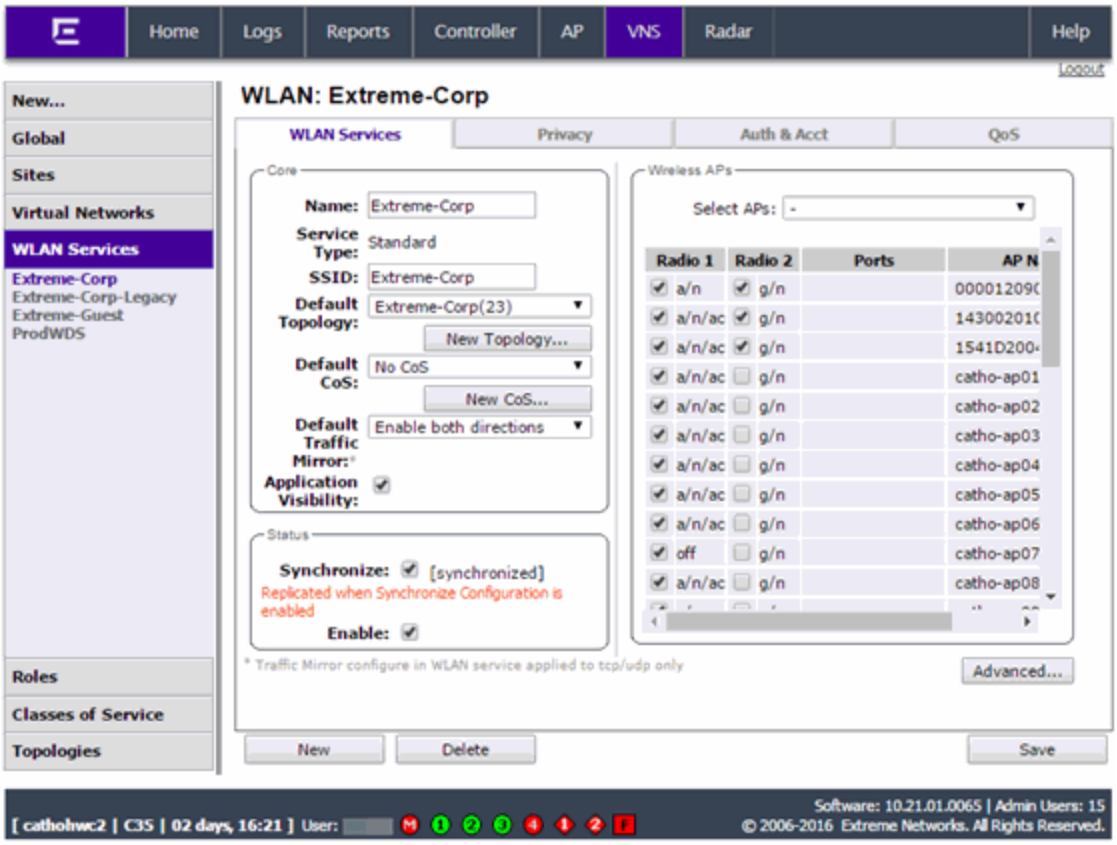
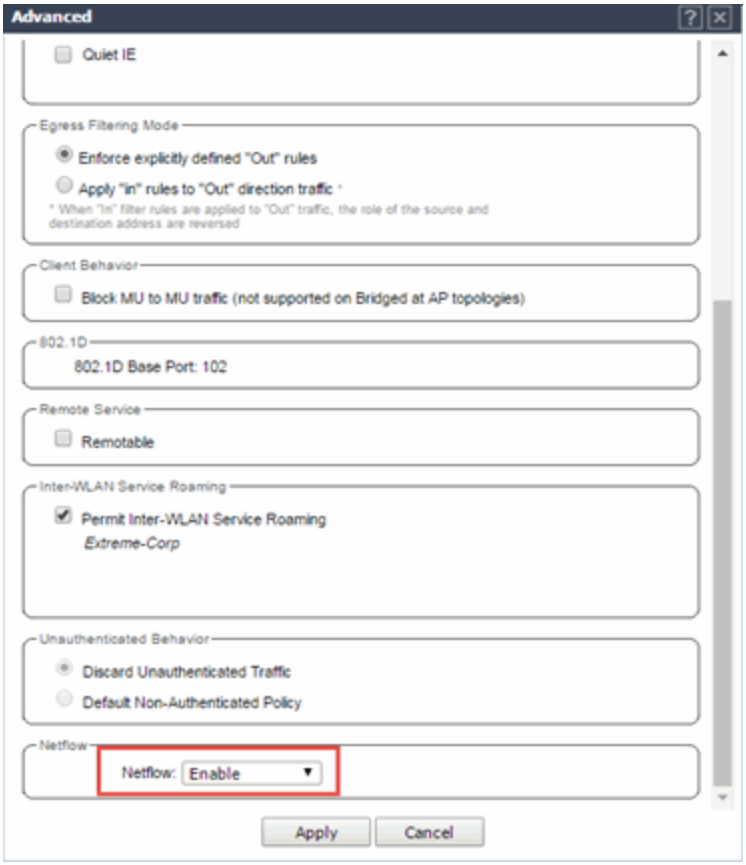
10. Select a wireless LAN in the table.
    The WLAN page opens for the selected wireless LAN.



11. Select the **Advanced** button.
    The **Advanced** window opens.

12. Scroll to the bottom of the window and ensure the **Netflow** drop-down list is set to **Enable**.



13. Select the **Apply** button.

The wireless controller is now configured.

NOTE: **Rx Packets** and **Rx Bytes** can incorrectly be **0** when flow data is gathered via a wireless controller running version 10.21 or higher. Additionally, application response times and some meta data can be blank. This is a known issue and will be addressed in a future release.

How to Deploy ExtremeAnalytics in an MSP or MSSP Environment

This Help topic presents instructions for deploying ExtremeAnalytics within an MSP (Managed Service Provider) or MSSP (Managed Security Service Provider) environment.

Configuring ExtremeCloud IQ - Site Engine Behind a NAT Router

If the ExtremeCloud IQ - Site Engine server is located behind a NAT (Network Address Translation) router, use the following steps to add an entry to the nat_config.txt file that defines the real IP address for the ExtremeCloud IQ - Site Engine server. This allows the ExtremeCloud IQ - Site Engine server to convert the NAT IP address received in the ExtremeAnalytics engine response to the real IP address used by the ExtremeCloud IQ - Site Engine server. Not adding the real IP address for the ExtremeCloud IQ - Site Engine server to the nat_config.txt file results in the ExtremeAnalytics engine incorrectly displaying a state of IMPAIRED (orange) rather than UP (green).

NOTE: The text in the nat_config.text file refers to a remote IP address and a local IP address. For this configuration, the NAT IP address is the remote IP address and the real IP address is the local IP address.

1. On the ExtremeCloud IQ - Site Engine server, add the following entry to the *<install directory>*`/appdata/nat_config.txt` file.
   `<NAT IP address>=<real IP address>`
2. Save the file.
3. If the ExtremeCloud IQ - Site Engine Management server IP address is not configured to use the NAT IP address of the ExtremeCloud IQ - Site Engine server, perform the following steps:
   a. Enter the following command at the engine CLI:
      `/opt/appid/configMgmtIP` *<IP address>*
      Where *<IP address>* is the NAT IP address of the ExtremeCloud IQ - Site Engine server.
      Press Enter.
   b. Restart the appidserver when the new IP address is configured by typing:
      `appidctl restart`
      Press Enter.
4. On the ExtremeCloud IQ - Site Engine server, add the following text to the *<install directory>*`/appdata/NSJBoss.properties` file. In the second to last line, specify the hostname of the ExtremeCloud IQ - Site Engine server.

NOTE: The ExtremeAnalytics engine functions as a client computer independent of the server. Both engines and clients must be able to resolve the hostname you specify.

```
# In order to connect to a ExtremeCloud IQ - Site
Engine server behind a NAT firewall or a
# ExtremeCloud IQ - Site
Engine server with multiple interfaces you must define these two
# variables on the ExtremeCloud IQ - Site Engine
server. The java.rmi.server.hostname
# should be the hostname (not the IP) if multiple IPs are being used
# so that each client can resolve the hostname to the correct IP that
# they want to use as the IP to connect to.
java.rmi.server.hostname=<hostname of the server>
java.rmi.server.useLocalHostname=true
```

5. Save the file.
6. Add the ExtremeCloud IQ - Site Engine server hostname to your DNS server, if necessary.

NOTE: ExtremeAnalytics engines, remote ExtremeCloud IQ - Site Engine clients, and any ExtremeControl engines must be able to connect to ExtremeCloud IQ - Site Engine using this hostname.

ExtremeAnalytics Application Data Collection

The ExtremeAnalytics engine provides an application data collection function that collects and records information about network utilization. It includes:

- General Usage Collection — High-level application-centric data, collected hourly and in five-minute intervals.
- Extended Application Collection — Detailed data about all end-systems in the network, collected hourly.

Application data collection is based on network flow information. Network utilization for various objects in the network (called targets) is measured, collected, and used to create application data reports in ExtremeCloud IQ - Site Engine.

NOTE: Ensure at least 4GB of swap space is available for flow storage or impaired functionality can occur. Use the `free` command to verify the amount of available RAM on your Linux system.

This Help topic describes application data collection, including collection targets, statistics, and intervals. It also describes the different collectors used to perform the collection, as well as the sources for flow information.

Data Collection Overview

Application data collection is performed by the ExtremeAnalytics engine. The engine collects flow records from switches in your network. It then augments the collected flow data with detailed application information derived by network packet inspection, resulting in rich analytical data.

For example, if a NetFlow record reports 100 bytes transferred from client Workstation 1 to server Host A, then the collection process would add 100 bytes to the tally for Workstation 1, and 100 bytes to the separate tally for Host A. If the flow is identified as traffic for the Payroll application, then 100 bytes would be added to another tally for Payroll as well. And finally, 100 bytes is added to another tally for the entire network. At the end of a collection interval, the totals for client Workstation 1, server Host A, the Payroll application, and the entire network are written to the database.

Data from network flows is collected in an aggregated form for a period of time (called a collection interval), and then stored in the ExtremeCloud IQ - Site Engine database. ExtremeCloud IQ - Site Engine uses this data to provide reports that show how your network is being utilized.

To conserve space on your ExtremeCloud IQ - Site Engine server hard drive, your ExtremeAnalytics engines only collect total flow records when the server hard drive drops below 10 GB of free space. If the ExtremeCloud IQ - Site Engine server hard drive drops an additional 1 GB (under 9 GB of free space), your ExtremeAnalytics engines stop collecting all flow data.

NOTE: To change the differential threshold (the additional amount of free space reduction after which all records stop being collected), edit the RM_FREE_SPACE_MINIMUM_ALLOW_SUMMARY_KB value in the NSJBOSS.properties file. The value is set to 1,000,000 KB by default, so ExtremeAnalytics stops collecting all records when free space reaches 10GB - 1,000,000 KB = 9 GB.

Collection Targets

Flow data is collected on objects in your network called targets. Some targets are physical, such as clients and servers, and some are logical, such as applications.

An ExtremeAnalytics engine can track the following target types:

- Client — The end-point of a flow that has the client role for that connection.
- Server — The end-point of a flow that has the server role for that connection.
- Application — An application in ExtremeAnalytics, identified through layer 7 analysis (for example, Facebook).
- Application Group — Application categories, such as Cloud Computing or Social Networking.
- Site — The client's physical location on the network, based on its IP address. Sites are used by ExtremeAnalytics to identify the physical location for the client of an application flow.
- Device Family — The kind of device determined for a client, such as Windows or iOS.
- Profile — An ExtremeControl profile assigned to a client.

In some cases, the engine can also track combinations of targets. For example, it can track the total number of bytes transferred from Workstation 1 for the Payroll application separately from Workstation 2 for Payroll, and from Workstation 1 for Facebook. These target and sub-target pairs provide for ExtremeCloud IQ - Site Engine drill-down reports, for example, reports to show the top Payroll clients or the top applications for Workstation 1.

This report shows the top 10 applications seen on the network (based on bandwidth) during the last hour.

Applications (Bytes) - 42.97 GB - Last hour

Applications	Application Group	Bytes	Sent Bytes	Received Bytes
nsbuild-linux3	Internal File Downloads	12.65 GB	202.69 MB	12.44 GB
Microsoft SQL Server	Databases	2.91 GB	479.26 MB	2.43 GB
CIFS	Storage	2.17 GB	386.53 MB	1.78 GB
WASSP	Protocols	1.99 GB	248.98 MB	1.74 GB
Web	Web Applications	1.75 GB	73.74 MB	1.67 GB
Extreme Networks	Corporate Website	1.54 GB	131.88 MB	1.41 GB
SSH	VPN and Security	1.34 GB	217.46 MB	1.12 GB
Outlook Office365	Mail	1.29 GB	466.91 MB	826.56 MB

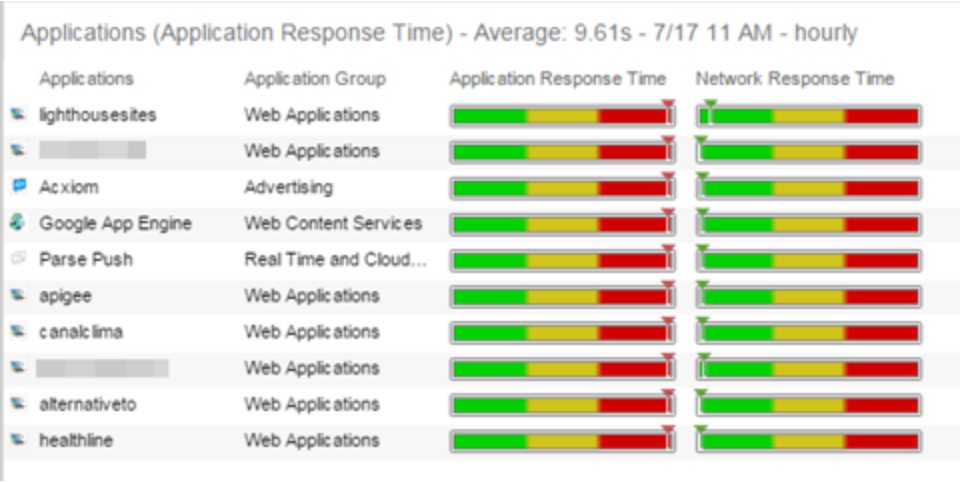
Collection Statistics

Collection statistics are quantitative data that can be collected for a target. This includes statistics directly reported in NetFlow records, such as bytes transferred, as well as information that can be derived indirectly, such as the number of unique clients seen using an application.

An ExtremeAnalytics engine can track the following statistics:

- Bytes — The number of bytes transferred in both directions, between the client and the server. Also known as bandwidth. You can track sent and received bytes as well as total bytes.
- Flows — The number of NetFlow records sent by the switch to report the traffic between the client and the server. You can track inbound and outbound flows as well as total flows.
- Clients — The number of unique clients associated with the target.
- Applications — The number of unique applications associated with the target.
- Network Response Time — The average amount of time to create a connection.
- Application Response Time — The average amount of time for a server to respond to a request.

This report shows the average application response times for the top 10 applications during the last hour.

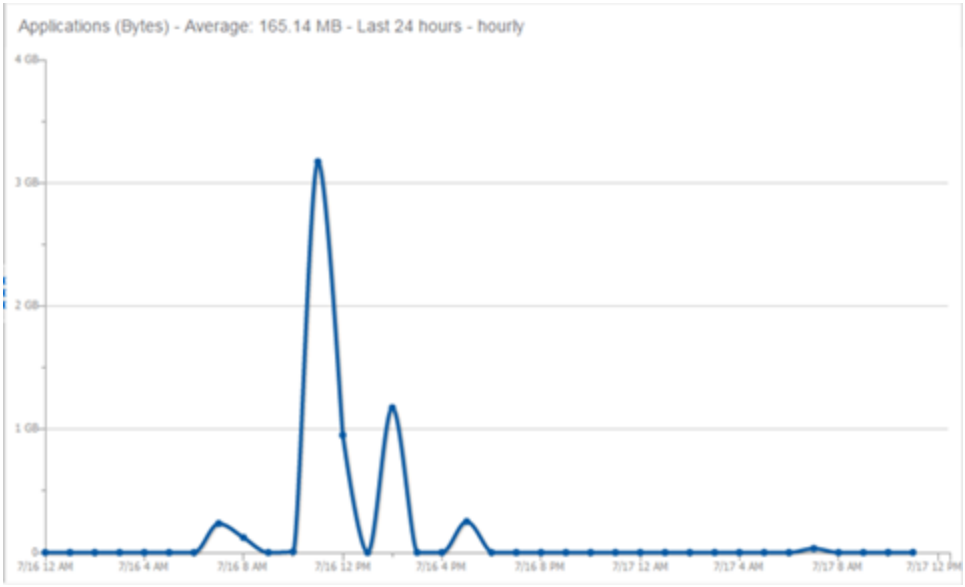


Collection Intervals

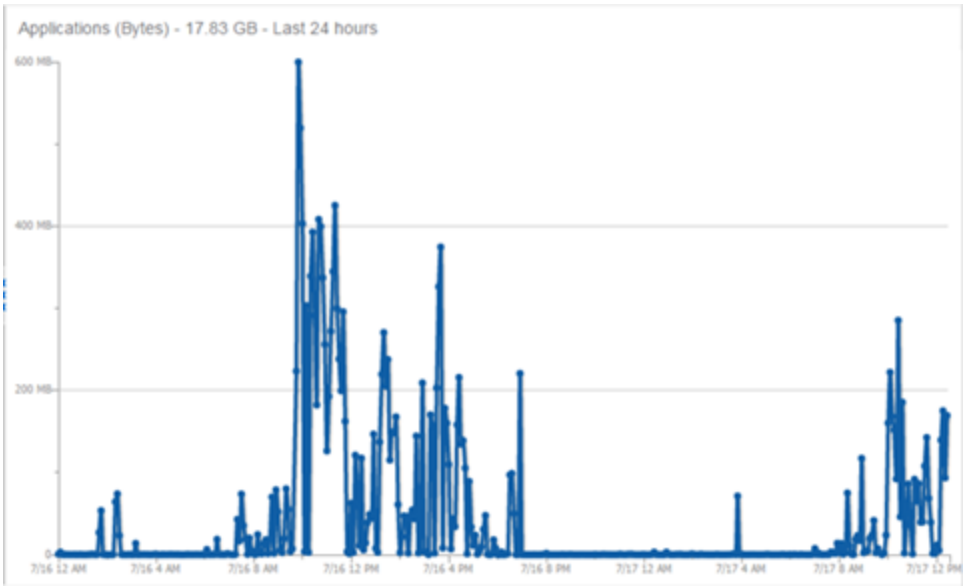
The ExtremeAnalytics engine collects and aggregates flow data for a period of time called an interval. At the end of the interval, the engine writes the totals to the ExtremeCloud IQ - Site Engine database and a new interval begins, with new totals collected starting at zero.

Some statistics are collected and written to the database on an hourly interval. Other statistics are collected at a high-rate interval of every five minutes, providing for a more detailed picture of how traffic changes over time.

This report shows application bandwidth over 24 hours based on an hourly interval.



This report shows application bandwidth over 24 hours based on a high-rate interval.



All statistics can be collected over multiple intervals and averaged. When viewing report data, it is important to know the interval used for any average that is displayed.

Certain statistics, such as bytes and flows, can be collected over multiple intervals to provide a total over time, while other statistics, such as client count, cannot. To illustrate, the number of bytes seen in two hours would be the total of the number of bytes seen in each hour. However, the number of unique clients seen in two hours would not be the total of the number of unique clients seen in each hour, as some clients were probably seen in both hours.

Using Sites to Collect In-Network Traffic

While flow data collection can aggregate data for all flow traffic that is visible, it can be more useful to aggregate data for *in-network* flows only. These are flows used by clients that are located in your internal network. By collecting data for only in-network flows, the overhead of aggregating data over an interval can be reduced.

You can define your internal network by configuring sites. A site is a set of IP masks that defines a well-known portion of your internal network. You can use the World site to identify your entire internal network. If you have already reserved certain IP address ranges for certain physical sites on your network, you can create multiple sites that correspond to these reserved IP ranges. Multiple sites can be created to identify different buildings, sites, or geographical areas of your network. Any IP that matches any site is considered to be in-network. If you define multiple sites, you will be able to analyze data broken down by site.

Data Collector Types

There are two kinds of data collectors used in ExtremeAnalytics.

- General Usage Collectors — These are hourly and high-rate collectors that record the top targets during an interval. Many types of targets and target-pairs are supported.
- End-System Details Collector — This is an hourly collector that attempts to capture and record data for all in-network clients and servers that it detects. All traffic collected is tagged with site, profile, device family, and other attributes.

Data from these collectors is stored separately in the database. The collector data used in a report depends on the nature of the report. Higher-level information, such as top applications during an hour, will be based on general usage collector data, since it is relatively inexpensive to access. End-system details data might be used when data for a specific client or server is needed, or when the information requested is highly specific, for example, top applications used by Android devices in the London site.

General Usage Collectors

General usage collectors collect data about all instances of a target for the interval, and then record only the most significant targets (typically, the 100 most significant targets).

When the top targets are calculated for a collection interval, several different statistics can be used as a basis for choosing the most significant entries. For example, collectors can record the top applications based on bytes, and also record the top applications based on number of clients. For each type of target collected, there are different sets of bases used.

General usage collectors operate at both hourly and high-rate intervals. They can collect data from all flows or from in-network flows only.

Hourly General Usage Collectors

The following table describes the hourly data collected by the general usage collectors.

Target	Sub-Target	Bases	Traffic Used
Total			In-Network Flows/ All Flows
Application		Bytes Received Bytes Transmitted Bytes Flows Receive Flows Transmit Flows Clients Network Response Time Application Response Time	In-Network Flows
Application	Client	Bytes	In-Network Flows
Application Group		Bytes Flows Clients	In-Network Flows
Client		Bytes Received Bytes Transmitted Bytes Flows Receive Flows Transmit Flows Applications Network Response Time Application Response Time	All Flows
Device Family		Bytes Flows Clients	In-Network Flows
Site		Bytes Flows Clients Network Response Time Application Response Time	In-Network Flows

Target	Sub-Target	Bases	Traffic Used
Profile		Bytes Received Bytes Transmitted Bytes Flows Receive Flows Transmit Flows Network Response Time Application Response Time	In-Network Flows
Threat		Bytes Flows Application Response Time Network Response Time Received Bytes Sent Bytes Inbound Flows Outbound Flows	In-Network Flows
Threat	Threat End-System Pair	Bytes Flows Application Response Time Network Response Time Received Bytes Sent Bytes Inbound Flows Outbound Flows	In-Network Flows
Server		Bytes Received Bytes Transmitted Bytes Flows Receive Flows Transmit Flows Network Response Time Application Response Time	All Flows
Application	Device Family	Bytes Flows Clients	In-Network Flows
Application	Profile	Bytes Flows Clients	In-Network Flows

High-Rate General Usage Collectors

The following table describes the high-rate data collected by the general usage collectors.

Target	Sub-Target	Bases	Traffic Used
Total			In-Network Flows/ All Flows
Application		Bytes Flows Clients	In-Network Flows
Application Group		Bytes Flows Clients	In-Network Flows
Device Family		Bytes Flows Clients	In-Network Flows
Site		Bytes Flows Clients	In-Network Flows
Profile		Bytes Flows Clients	In-Network Flows

End-System Details Collector

The end-system details collector tracks client/application target pairs.

Unlike general usage collectors, this collector attempts to record data for all in-network clients and servers it sees during the hour. For each client or server, it records data for up to 10 applications, plus an "other" category to capture the remaining traffic. Information such as location, device family, and profile are also recorded for each end-system.

The large number of targets recorded each hour and the amount of detail recorded for each one, can result in a large volume of data being stored in the database. In order to prevent disk space from being over-utilized, there is a total limit of 50,000 clients which can be recorded each hour across all ExtremeAnalytics engines. There is also a 25,000 client limit per engine for most license types. However, the per-hour total limit is 100 clients across all ExtremeAnalytics engines.

Flow Information Sources

The ExtremeAnalytics engine uses NetFlow or SFlow records from the switches and wireless controllers in your network as a source for flow data. Information such as IP addresses, ports, and bytes transferred comes from this flow data source.

This data is augmented with additional layer 7 application information produced by the ExtremeAnalytics engine through deep packet inspection. Information such as application name and network response time comes from this source.

There is additional information that can be obtained from sources other than NetFlow/SFlow records and deep packet inspection.

NOTE: Most of these sources rely on ExtremeControl data. If ExtremeControl is part of your network configuration, then ExtremeControl integration can be enabled (see instructions below) to provide access to these sources. Site data is obtained from sites configured in ExtremeCloud IQ - Site Engine.

The following is a list of information that can obtained from different sources:

- Hostname — The client or server's hostname can be derived using ExtremeControl. ExtremeControl integration must be enabled.
- Site — The site for a flow is the site of the client in the flow. Client and server sites are derived from the sites configured on the **Network** tab. If a client does not match a site, then the site is empty. If a flow has a site, the flow is considered to be in-network.
- Detailed Site — Detailed site information is derived from the switch and port information resolved for the client end-system. ExtremeControl Integration must be enabled.
- Device Family — The device family is a general description of the operating system detected in the client, for example, Windows, Linux, or Android. The device family is derived from network packet inspection. The device family can also be provided by ExtremeControl, if ExtremeControl integration is enabled.
- Profile — The client's profile is derived from the ExtremeControl profile assigned to the client end-system. ExtremeControl integration must be enabled.
- Username — The client's username is derived from network packet inspection. The username can also be provided by ExtremeControl, if ExtremeControl integration is enabled.

It is possible that different sources can provide different values for the same information. For example, network packet inspection can provide the device family name of Window 7, whereas ExtremeControl can provide the device family name of Windows.

Enabling ExtremeControl Integration

If your network configuration includes ExtremeControl, ExtremeControl data can be integrated with flow data to provide additional information. ExtremeControl integration is only useful if you are collecting flows for end-systems managed by ExtremeControl.

When ExtremeControl integration is enabled, if a client in a flow matches an end-system in ExtremeControl, then:

- The client hostname in the flow is derived from the end-system.
- The device family in the flow is derived from the end-system.
- The username in the flow is derived from the end-system.
- The profile in the flow is derived from the end-system's ExtremeControl profile.
- The detailed site in the flow is derived from end-system data.

If a server in a flow matches an end-system in ExtremeControl, then:

- The server hostname in the flow is derived from the end-system.

To enable ExtremeControl integration on the ExtremeAnalytics engine:

1. If the ExtremeControl distributed end-system cache is not enabled on the ExtremeCloud IQ - Site Engine server, you must enable it using the following steps.
    a. Select **Administration > Options** from the menu bar to open the **Access Control Options** window.
    b. Select **Advanced Settings**.
    c. In the End-System Mobility section, select the **Enable distributed end-system cache** option.
    d. Select the **Reload** button to reload the cache configuration on the ExtremeCloud IQ - Site Engine server. Select **OK**.
2. Enable ExtremeControl Integration on each ExtremeAnalytics engine where you want to use ExtremeControl data.
    a. Access the **Analytics** tab.
    b. Expand each ExtremeAnalytics engine and select Advanced Configuration. In the right panel under Configuration Options, select the **Enable ExtremeControl Integration** option.
    c. If your ExtremeControl engines are using Communication Channels, you must select the **ExtremeControl Communication Channel** option and enter the channel name. The ExtremeAnalytics engine is only able to access end-systems in its channel.
    d. Select **Save**.
    e. Enforce your ExtremeAnalytics engines.

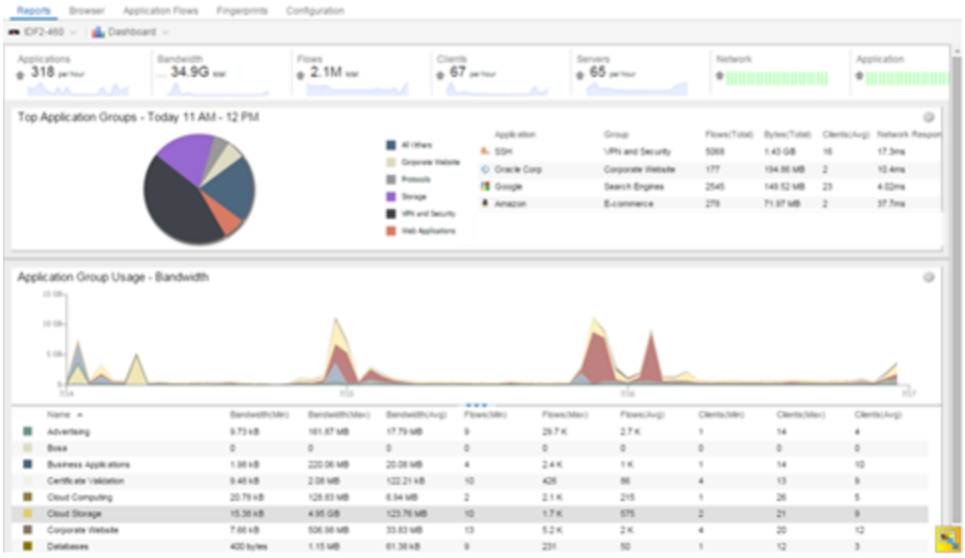
Reports

Data gathered from flow usage collection is the basis of many reports in the ExtremeCloud IQ - Site Engine's **Analytics** tab. When collection is enabled, these reports begin to exhibit data.

Dashboard Report

The following screen-shot shows the main Dashboard report. It contains data produced by the hourly General Usage collectors, and displays data for a specific hour. Across the top are the hour's totals. Below them are Top Application Groups, as a chart, and Top Applications, as a table, for the same hour. There is also Application Group Usage over the last 3 days, as a chart and as a table.

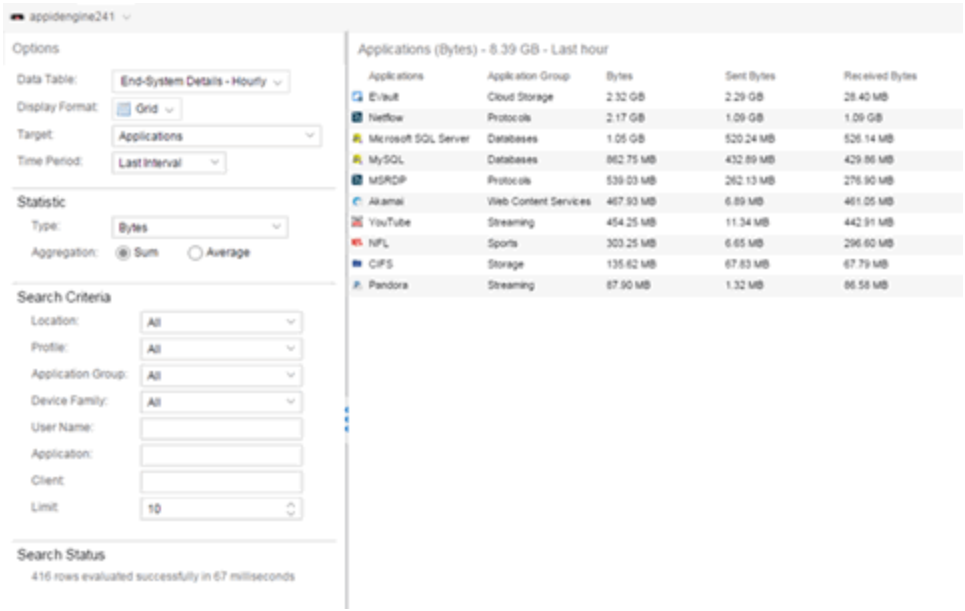
Note that data from different ExtremeAnalytics engines is maintained separately. If you have more than one ExtremeAnalytics engine, you need to select which engine to view, using the engine menu in the top-left corner.



Browser Reports

The Browser provides special reports that lets you select the targets, statistics, and collection interval for your report, as well as define search criteria to further filter report data. Using the Browser, you can create custom queries that provide greater flexibility in defining what data to display and how to display it. When you create a Browser report, you select which type of network activity data to use: end-system details (always hourly), application data hourly, or application data high-rate. For additional information, see Applications Browser.

The following screen-shot shows an example of a Browser report showing application/device family bandwidth usage for the last hour.



ExtremeAnalytics Tab Overview

The **ExtremeAnalytics** tab allows you to view and customize its dashboard and browser, as well as ExtremeAnalytics reports, fingerprints, and application flow data. You can also manage and configure your ExtremeAnalytics engines.

Additionally, the Menu icon (☰) at the top right of the screen provides links to additional information about your version of ExtremeCloud IQ - Site Engine.

NOTE: ExtremeAnalytics reports and application flow data is not available unless an ExtremeAnalytics engine is configured and you are a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read Access or Read/Write Access capability. The Read Access capability allows the ability to access the **Analytics** tab and view the ExtremeAnalytics reports. The Read/Write capability adds the ability to configure ExtremeAnalytics engines and NetFlow Collecting devices. It also adds the ability to create and modify fingerprints.

Viewing ExtremeAnalytics application data requires certain access requirements and prerequisites.

Introducing the Application Sensor Engine

As of ExtremeCloud IQ - Site Engine, 21.09.10, Extreme Networks is introducing the new Application Analytics Engine Engine. This new Analytics engine combines the sensor and engine into one package, eliminating the need for additional hardware requirements. A new Application Analytics Engine Installation Guide, which includes instructions for the installation and initial configuration of the Application Analytics Engine engine, has been added to ExtremeNetworks.com Support Documentation.

NOTE: The ExtremeCloud IQ - Site Engine, ExtremeControl, and ExtremeAnalytics Virtual Engine Installation Guide includes an overview of ExtremeCloud IQ - Site Engine, ExtremeControl, and ExtremeAnalytics virtual engine deployment requirements and how to deploy a virtual engine on a VMware® and Hyper-V server.

Dashboard

The Dashboard tab displays an overview of application usage on your network through a series of graphs. It allows you to view network activity statistics based on client/server, application, industry, and response time for the specified ExtremeAnalytics engine. Many of the reports are links to more detailed pages.

Browser

The Browser tab lets you query information about recent network activity stored in the ExtremeCloud IQ - Site Engine database and display results in various grid and chart report formats. Using the Browser, you can create custom queries based on selected options including a data target, statistic type, and other search criteria.

Application Flows

You can choose from the View drop-down list to show you several options in the table on the Application Flows tab, including the latest flows from the specified ExtremeAnalytics engine, the worst network and application response times, classified and unclassified flows, and flows during a specified time frame. The table presents bidirectional flow data (aggregate flows) or unidirectional flow data (base flows).

Fingerprints

A fingerprint is a description of a pattern of network traffic which can be used to identify an application. The Fingerprints tab provides detailed information about fingerprints used by ExtremeAnalytics to identify application flows. You can choose to view in-use and customized fingerprint data.

Packet Captures

Use the Packet Captures tab to analyze the packets from the flows displayed on the Application Flows tab. The packet captures you create are presented in a table, which allows you to view details about the packet capture. Additionally, using this tab you can select a packet capture and view it in a packet analyzer.

Configuration

The Configuration tab provides detailed information on the ExtremeAnalytics engines you configure. It also lets you add and enforce your engines, and access engine reports and diagnostics. You must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability to view the Configuration tab.

Reports

On the Reports tab, you can access a selection of reports that provide detailed information on application usage on your network, as well as network activity statistics based on application, user name, client, and site. For many of the reports, you can select an item in the report to view details or right-click an item to select from other focused reports.

- Dashboard Overview
- Browser
- Application Flows
- Fingerprints
- Configuration
- Reports

ExtremeAnalytics Dashboard Overview

Accessible from the **Analytics** tab in ExtremeCloud IQ - Site Engine, the **Dashboard** tab displays an overview of application usage on your network, as well as network activity statistics through a series of real-time reports. The Dashboard is flexible and customizable - you can choose the reports and the design of the page to meet your specific needs. Many of the reports are links to more detailed pages.

The Dashboard includes a drop-down list with links to additional report dashboards:

- Insights
- Client/Server
- Applications Browser
- Industry
- Response Time
- Network Service
- Tracked Applications

Several report pages can be launched in the **Reports > Reports Designer** view in ExtremeCloud IQ - Site Engine by selecting the **Launch in Report Designer** icon ().

Insights Dashboard Reports

The Insights dashboard displays graphs with real-time network and application usage and service data, and tools that you can use to customize the dashboard using drag-and-drop capabilities.

Five ring charts display real-time Engines, Disk Usage, Flow Rate, Network, and Application usage and service data. The ring charts are links to additional data. The Network and Application charts link to the Network Service and Response Time report dashboards, respectively, which are also accessible from the **Dashboard** drop-down list.

Use the Custom Dashboard to drag and drop only the graphs you want on your dashboard. Each graph is a real-time preview and many are linked to additional detail reports. You can also choose whether the graphs in the Application Group area are organized in columns or rows in the Custom Dashboard area.

Client/Server Dashboard Reports

This dashboard displays reports on clients and servers seen on the network over the last 24 hours. It also displays reports on top clients by bandwidth, flow, or number of applications, and top servers by bandwidth or flow.

Select the Info icon (i) at the top right of the dashboard page to read a description of each report.

Applications Browser Dashboard Report

The Application Browser Dashboard displays bubble maps for top applications by bytes and flows, top profiles by bytes, and top sites by bytes. Hovering over a bubble displays bandwidth use or the number of flows. Use the drop-down menus to change the start date and time for the reports.

Drill-down for more information by selecting an application bubble to open a new graph of clients, flows, and usage data for that application. In that graph, select a client link to view application data for that client.

Industry Dashboards

Enterprise Dashboard

The Enterprise Dashboard displays application information specific to the Enterprise network including social applications, storage applications and cloud, business applications and email, and network applications and protocols.

Education Dashboard

The Education Dashboard displays application information specific to the campus network including learning management systems, P2P, streaming, and social applications.

Healthcare Dashboard

The Healthcare Dashboard displays applications used in the healthcare environment including patient care, medical applications, and HIPAA.

Venue Dashboard

The Venue Dashboard displays data grouped according to sports, social media, news and weather applications, as well as software update applications.

Response Time Dashboard

The Response Time Dashboard displays the response time in milliseconds of application data grouped by different criteria, selected from the drop-down list. The data is displayed as a line graph, which is updated periodically.

Network Service Dashboard

The Network Service Dashboard displays the response time of network services for the top five worst-performing sites as well as the overall average of all sites. The data for each network service at a site is displayed as a bar and line graph, which is updated periodically.

Tracked Applications Dashboard

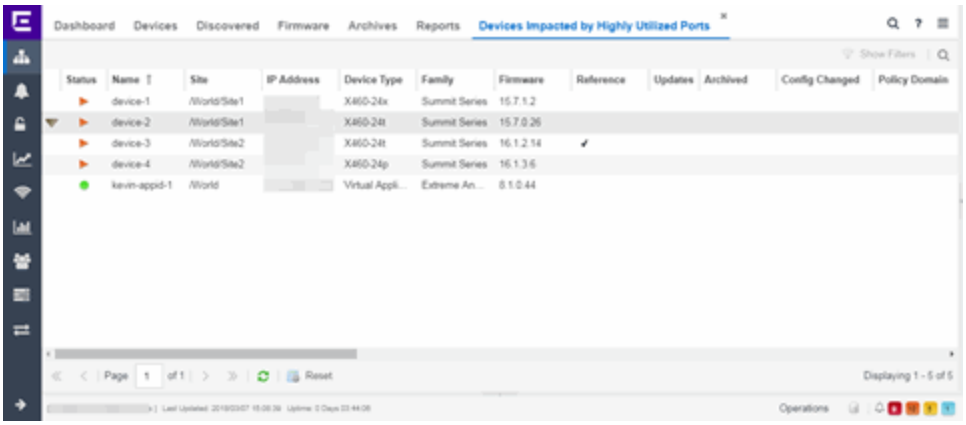
The Tracked Applications Dashboard displays the response time of the applications you configure in the **Tracked Applications** field on the **Analytics** > **Configuration** > Configuration tab. The data for each network service at a site is displayed as a bar and line graph, which is updated periodically. You can choose to organize the graphs in either columns () or rows ().

- ExtremeAnalytics tab

ExtremeAnalytics Insights Dashboard

Accessible from the **Analytics** tab in ExtremeCloud IQ - Site Engine, the Insights Dashboard displays an overview of application usage on your network, as well as network activity statistics based on client/server, application, industry, and response time.

Use the Insights Dashboard to view graphs that display real-time network and application usage and service data, and tools that you can use to customize your dashboard using drag-and-drop capabilities.

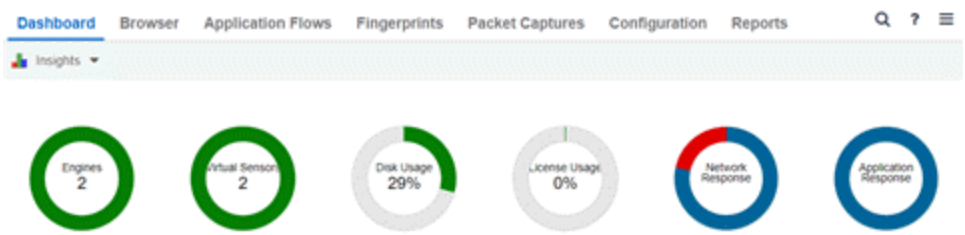


Insights

The Insights Dashboard displays ring charts and a customizable Application Group Dashboard. You can collapse and expand the ring charts and Application Group Dashboard for flexible display capabilities.

Ring Chart

Six ring charts display real-time Engines, Virtual Sensors, Disk Usage, Flow Rate, Network, and Application usage and service data:



- **Engines** — The number at the center of the ring chart indicates how many engines are represented by the chart. The colors in the graph indicate the states of the configured engines. Hover over a ring color

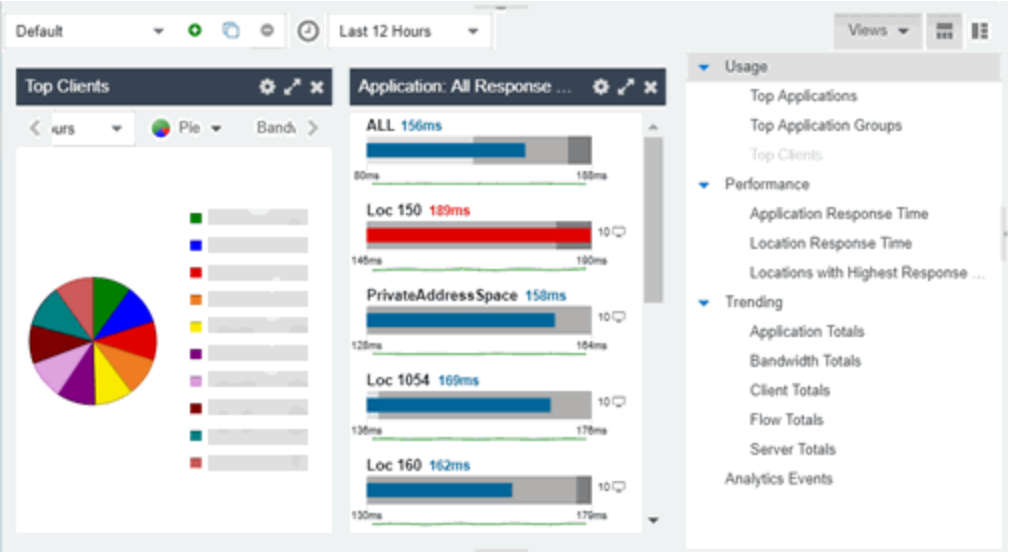
to display a tooltip with the status of that engine. Select the graph to display overview and status details.

- Virtual Sensors — The number at the center of the ring chart indicates how many virtual sensors are represented by the chart. The colors in the graph indicate the states of the configured virtual sensors. Hover over a ring color to display a tooltip with the status of that virtual sensor. Select the graph to display overview and status details. Select the graph to open the Virtual Sensors tab.
- Disk Usage — The number at the center of the ring chart indicates the percentage of Disk Usage. The colors in the graph display the percentage of disk usage being used. Hover over the ring color to display a tooltip with usage percentage and units of space details.

  Select the graph to open the Configuration tab, where you can configure the information displayed in the Insights Dashboard.
- Flow Rate — The number at the center of the ring chart indicates the flow rate percentage. The colors in the graph indicate the flow rates for the different engines being used. Hover over a ring color to display a tooltip with status, percentage and rate details for each engine. Select the graph to open the Licenses tab.
- Network Response — The colors in the graph indicate the network response time for the application/site. Hover over a ring color to display a tooltip with status details and the number of networks at that status. Select a color in the graph to open the Network Service dashboard, which displays network service details.
- Application Response — The colors in the graph indicate the application response time for the application/site. Hover over a ring color to display a tooltip with response time details and the number of applications within the expected response time range. Select a color in the graph to open the Response Time dashboard, which displays network and application response time charts and details.

Custom Dashboard

The Custom Dashboard is a customizable space for viewing graphs that you select from the Views drop-down list. The buttons at the top right of the Applications Group dashboard () enable you to save and copy your dashboard.



- Analytics Tab
- How to Use the Application Group Dashboard

How to Create an ExtremeAnalytics Insights Custom Dashboard

The **Dashboard** > **Insights** view in ExtremeCloud IQ - Site Engine provides you with graphs that display real-time network and application usage and service data, and tools that you can use to customize the dashboard using drag-and-drop capabilities.

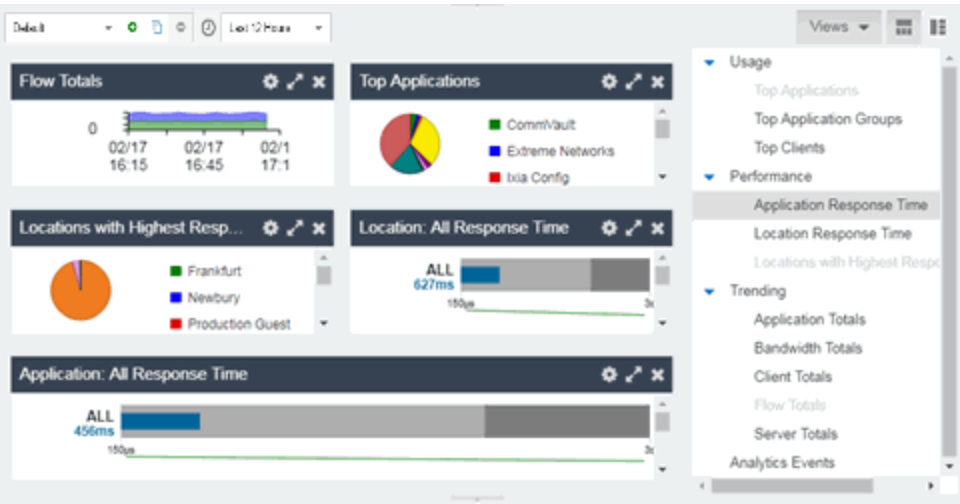
The **Custom** dashboard in the **Insights** view enables you the flexibility to create your graphs and reports preview area. Choose the graphs you want to view, the data that is displayed in the graphs, and how the graphs are displayed. You can collapse and expand the Custom dashboard for flexible display capabilities.

Custom Dashboard

The Custom dashboard is a flexible space for viewing graphs that you select from the Views drop-down list. The buttons at the top right of the Custom dashboard ( ) enable you to save and copy your dashboard.

- Select the **Create** button ( ) to create a new, empty dashboard where you can drag and drop the graphs you select from the Views drop-down list. The Create Dashboard window opens to enable you to name your new dashboard. Select the **Save** button to save the dashboard, which is available to all users in your network.

- Select the **Copy** button ( ) to copy the current dashboard, which you can customize by adding new graphs from the Views drop-down list. When you have edited the copied dashboard, select the **Save** button to save the new dashboard, which is available to all users in your network.



1. Select the **Views** drop-down list at the far right and select from the graphs in the drop-down list.
2. Drag and drop the graph(s) to the open area to the left. When in place, the link will display as a real-time preview of the graph.
3. Choose the orientation of your dashboard by selecting either the row ( ) or column ( ) button.
4. Hover over the data to display a tooltip with usage data.
5. Select the **Gear** button ( ) in each graph to further modify your Application Group graphs data:
    - **Top** — Choose the number of top applications, application groups or clients (depending on the graph) to be displayed in the graph
    - **Range** — Adjust the time frame of the data depicted in the graph by choosing from the drop-down list. The Custom Time option enables you to choose any start time, and the Custom Range option enables you to choose any start and end times.
    - **Graph style** — Select from pie, word cloud, tree map or bubble map graph styles in the drop-down list.
    - **Data** — Select from Bandwidth, Flows, Clients data types from the drop-down list.

Graphs

These graphs are available to be added as real-time previews to your Custom dashboard:

Usage

Top Applications — Displays usage data for the top applications. Select any color in the graph to display an encrypted web detail page for that application.

Top Application Groups — Displays usage data for the top application groups. Select any color in the graph to display an encrypted web detail page for that group.

Top Clients — Displays usage data for the top clients. Select any color in the graph to display application and application group detail page for that client.

Performance

Application Response Time — Displays response times for all applications. You can also create response time reports for individual applications and sites that you define.

Site Response Time — Displays response times for all sites. You can also create response time reports for individual applications and sites that you define.

Sites with Highest Response Time — Displays sites with the highest response times. Select any color in the graph to display network and application response time reports for that site.

Trending

Application Totals — Displays the total number of applications based on the date, time, and duration you choose. Select any color in the graph to display an application detail page.

Bandwidth Totals — Displays bandwidths for the application in a line graph based on the date, time and duration you choose. Select any data point in the graph to display a Top Applications by Bandwidth detail page.

Client Totals — Displays the total number of clients for the application based on the date, time, and duration you choose. Select any data point in the graph to display a Top Clients detail page.

Flow Totals — Displays the total number of outbound and inbound flows for the application based on the date, time, and duration you choose. Select any data point in the graph to display a Top Applications by Flows detail page.

Server Totals — Displays the total number of servers for the application based on the date, time, and duration you choose. Select any data point in the graph to display a Top Servers detail page.

Analytics Events

Analytics Events - This report displays the event log filtered to show only the events related to ExtremeAnalytics

ExtremeAnalytics Response Time Dashboard

The Response Time Dashboard displays the network and application response time data for the slowest targets on your network based on response time for the last 20 minutes. Use the graph to view response time data for a variety of filters, including application, device family, and username.

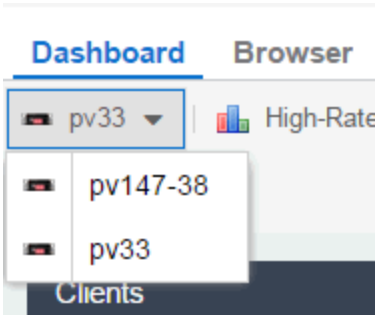
Additionally, you can use the dashboard to select the number of targets for which the response time is displayed and you can filter the information based on certain criteria and view flow data specific to the data you select.

To access the Response Time Dashboard, open the **Analytics** > **Dashboard** tab and select **Response Time** in the dashboard drop-down list.

Overview

The Response Time Dashboard contains two graphs, one displays the network response time and the other displays the application response time. Data is updated every 15 seconds and displays data over the last 20 minutes.

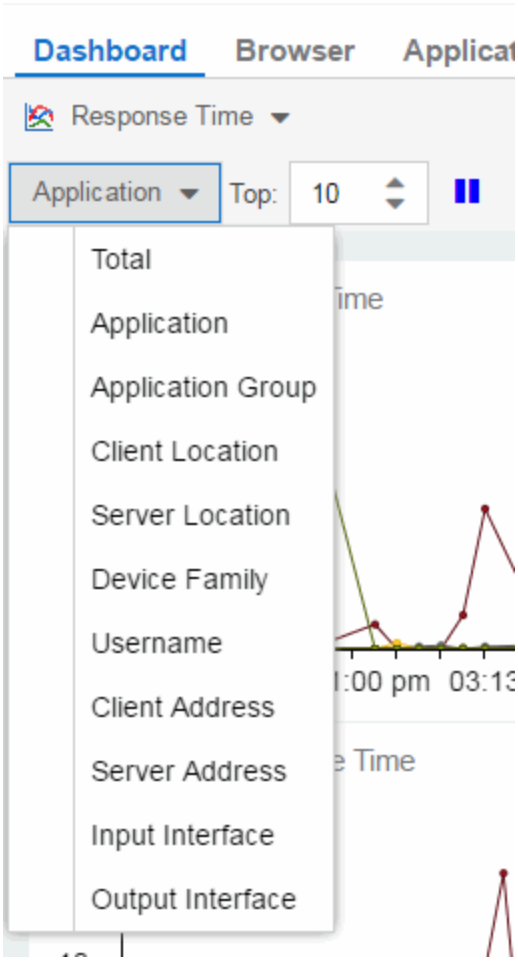
If you have multiple ExtremeAnalytics engines, use the **Engine** drop-down list to select an engine to use as the source for the report data.



Use the toolbar at the top of the window to display data based on criteria you select and updates the two graphs.

Application

Use the **Application** drop-down list to group the data in the Response Time Dashboard by the following criteria:



Top

Use the **Top** field to limit the results in the graphs to display only the top results based on the number you enter.

For example, you can configure the graphs to display the top 3 slowest applications by response time.

Tracked Applications

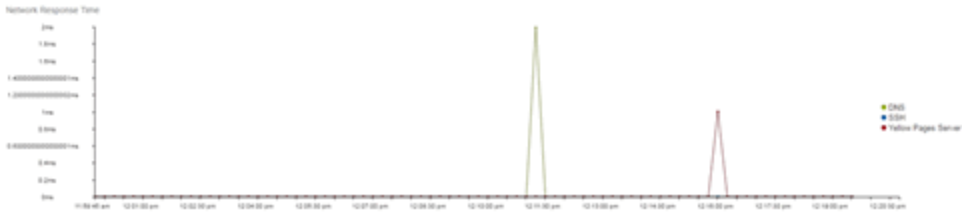
Select the **Tracked Applications** box to add response time results for tracked applications to the Network Response Time and Application Response Time graphs.

Filters

You can also use the filter options at the top of the window to search for specific criteria. Using these fields limits the data to Tracked Applications, Application, Username, Device Family, Client Site, and Server Site. Entering a value in one of these fields filters the results displayed in the graphs below. Clear the data by selecting the **Clear** (⊗) button to the right of the filter options.

Network Response Time Graph

The Network Response Time graph displays the response time (in milliseconds) the TCP request took to complete for the Top N slowest Targets. The data in this graph depends on the criteria you select in the toolbar at the top of the window and can be filtered to match specific criteria. ExtremeCloud IQ - Site Engine displays data collected by the ExtremeAnalytics engine over the previous 20 minutes updated every 15 seconds. Use the **Pause** button in the toolbar to stop the graph from updating. Selecting the **Unpause** button resumes the updates and refreshes the graph with the most up-to-date data.



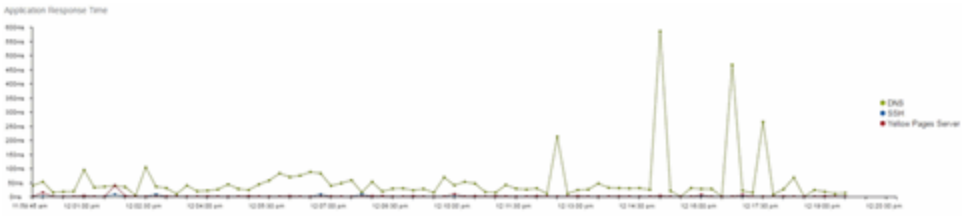
Hover over a point in the graph to see a pop-up with details about that application at that moment in time.

Selecting on a point opens a flow data table for that Target at that time at the bottom of the window, limited to match any filters you applied. Right-click a row in the flow to see additional options for working with that flow. Flows without an identified source are labeled with the device's IP Address.

Select the **Arrow** button (⌄⌄⌄) at the top of the flow data table to collapse the table and select the **Arrow** button (⌃⌃⌃) on the collapsed table to expand the table again.

Application Response Time Graph

The Application Response Time graph displays the response time (in milliseconds) the application request took to complete for the Top N slowest Targets. The data in this graph depends on the criteria you select in the toolbar at the top of the window and can be filtered to match specific criteria. ExtremeCloud IQ - Site Engine displays data collected by the ExtremeAnalytics engine over the previous 20 minutes updated every 15 seconds. Use the **Pause** button in the toolbar to stop the graph from updating. Selecting the **Unpause** button resumes the updates and refreshes the graph with the most up-to-date data.



Hover over a point in the graph to see a pop-up with details about that application at that moment in time.

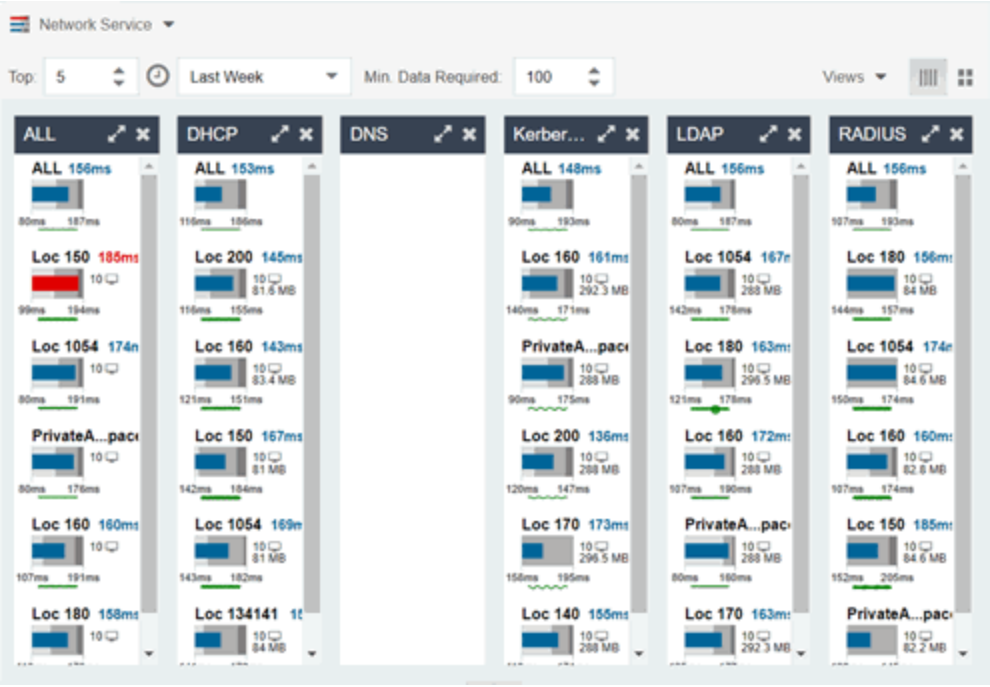
Selecting on a point opens a flow data table for that Target at that time at the bottom of the window, limited to match any filters you applied. Right-click a row in the flow to see additional options for working with that flow.

Select the **Arrow** button (⌄⌄⌄) at the top of the flow data table to collapse the table and select the **Arrow** button (⌃⌃⌃) on the collapsed table to expand the table again.

- ExtremeAnalytics

ExtremeAnalytics Network Service Dashboard

To access the Network Service Dashboard, open the **Analytics** > **Dashboard** tab and select **Network Service** in the dashboard drop-down list.



Overview

The Network Service Dashboard contains two graphs for each network service: the Expected Response Time bar graph displays the average response time over the selected time period and the Historical Response Time line graph displays the individual response times over that period for each site.

Select the number of sites displayed in each column in the **Top** field.

Use the **Time Period** drop-down list to display the date and time range for which data is displayed. Selecting **Custom** displays additional fields allowing you to indicate a **Start Date** and time and an **End Date** and time.

Use the **Minimum Required Response Time Dashboard Data Points** to configure the minimum amount of data ExtremeCloud IQ - Site Engine requires before displaying a given application or site pair. The data below this threshold is not reliable and can set off a false alarm, however, you can adjust how much data is required based on the individual needs of your network.

The Network Service Dashboard displays the performance (in response time) of your network services. Each column in the dashboard represents a service:

- ALL
- DHCP
- DNS
- Kerberos
- LDAP
- RADIUS

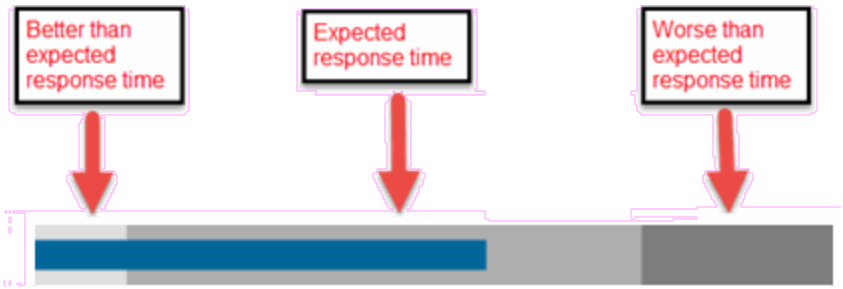
The top graphs for each service displays the average response time of all of the sites for that service, while the following rows indicate the top worst performing sites for that service.

You can display or hide any of the application columns using the **Views** drop-down list. You can also select the **X** at the top of a column to hide the column from the dashboard. Select the **Single Row** icon ( ) to display all columns in a single row, or select the **Double Row** icon ( ) to display the columns in two rows.

The worst performing sites are defined as those whose response time is the slowest when compared to the expected response time observed over the selected time period. For example, a site with an average RADIUS authentication response time of 40 ms over the past seven days that displayed a slowest response time of 50 ms would rank as a better performing site than a site with an average RADIUS authentication response time of 5 ms over the same period that displayed a slowest response time of 30 ms.

Expected Response Time

The Expected Response Time bar graph displays the range of response times, the most recently measured response time, and the expected response time for a network service a specific site during the date range you configure in the Date Range drop-down list. The value displayed on the far right of the graph is the slowest response time observed during the selected time period. The vertical green bar indicates the most recently observed response time for the network service.



Hover over the Expected Response Time graph to display a pop-up with the response time for the network service as well as the date and time the measurement occurred. The Expected Response Time bar graphs also display the client count, represented by a number and a monitor icon (10), and a client byte count observed as of the most recent measured minute. The client count is the number of clients using the service at the site. The client byte count indicates the amount of storage being utilized by clients. The data used for the client count, the client byte count, and the reported response time are from the same recently observed minute.

NOTE: Client counts and client byte counts are not provided for the bar graphs that display the average response time of all the sites for that service.

ExtremeCloud IQ - Site Engine uses a standard deviation of the values gathered as response times to determine the expected response time for a network service at a site. In the bar graph, the medium gray color indicates a response time that falls within the "expected" range. A response time in the light gray range is better than expected, while a response time in the dark gray is worse than expected.

When a response time is determined to be worse than expected, the site name and the response time indicator turn red to flag the service.

Selecting the Expected Response Time bar graph opens the Response Time dashboard (which is also accessible from the Analytics > Dashboard tab) filtered to display the network service. If you select the network service for a particular site, the Response Time dashboard also filters to that site.

Historical Response Time

The Historical Response Time line graph shows all of the response times observed for the network service at a site.

Hovering over a point in the graph causes a dot on the line graph to appear, indicating the point in the response time at which you are looking. Additionally, a pop-up with the date, time, and response time displays for that point.

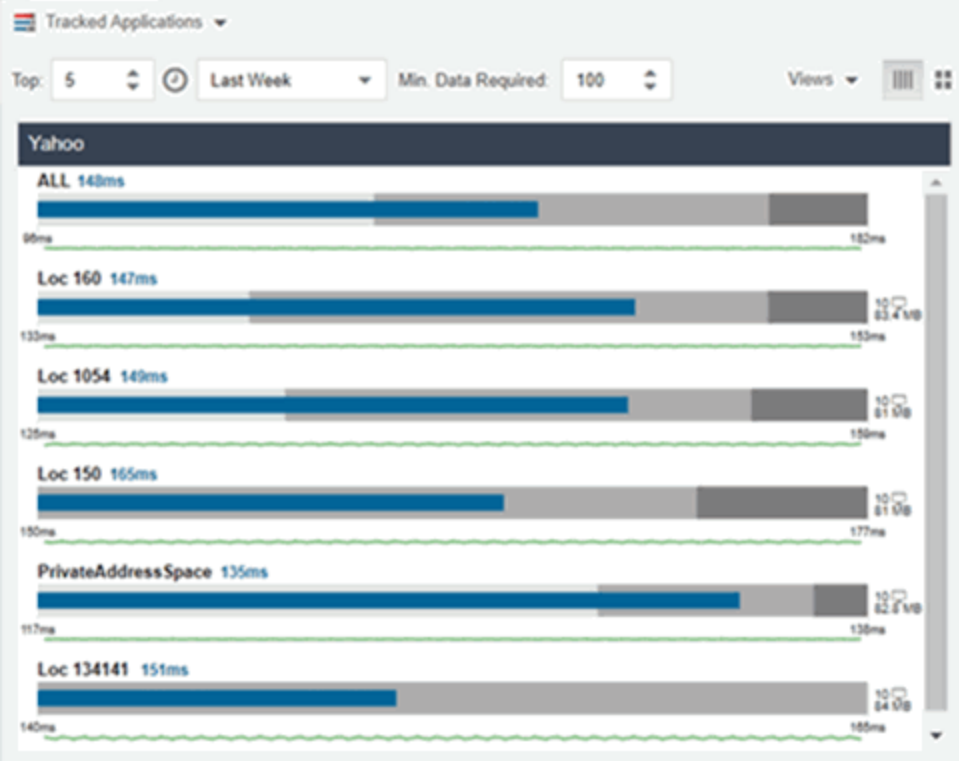
This is the data set from which ExtremeCloud IQ - Site Engine creates the Expected Response Time graph. The wider the expected response time range in the Expected Response Time graph (indicated by the medium gray color), the greater the variance in the values in this graph.

- ExtremeAnalytics tab

ExtremeAnalytics Tracked Applications Dashboard

The Tracked Application dashboard displays the performance (in response time) of your network for applications you configure in the **Tracked Applications** field on the **Analytics** > **Configuration** > **Configuration** tab.

To access the Tracked Application dashboard, open the **Analytics** > **Dashboard** tab and select **Tracked Applications** in the dashboard drop-down list.



Overview

The Tracked Applications dashboard contains two graphs for each application, one displays the average response time over the selected time period and the other displays the individual response times over that period for each site. Data is updated every minute and can be manually refreshed by selecting the **Refresh** button ( ).

Select the number of sites displayed in each column in the **Top** field. The Tracked Applications dashboard can display up to 25 sites.

Use the **Time Period** drop-down list to display the date and time range for which data is displayed. Selecting **Custom** displays additional fields allowing you to indicate a **Start Date** and time and an **End Date** and time.

Use the **Minimum Required Response Time Dashboard Data Points** to configure the minimum amount of data ExtremeCloud IQ - Site Engine requires before displaying a given application or site pair. The data below this threshold is not reliable and can set off a false alarm, however, you can adjust how much data is required based on the individual needs of your network.

Each column in the dashboard represents an application. The top row displays the average response time of all of the sites for that application, while the following rows indicate the top worst performing sites for that application.

You can display or hide any of the application columns using the **Views** drop-down list. You can also select the **X** at the top of a column to hide the column from the dashboard. Select the **Single Row** icon ( ) to display all columns in a single row, or select the **Double Row** icon ( ) to display the columns in two rows.

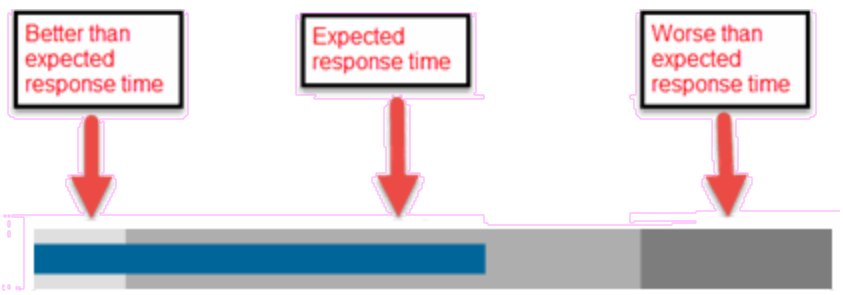
Select the **Maximize** icon ( ) to expand a single application column.

The worst performing sites are defined as those whose response time is the slowest when compared to the expected response time observed over the selected time period. For example, a site with an average Microsoft Office 365 authentication response time of 40 ms over the past seven days that displayed a slowest response time of 50 ms would rank as a better performing site than a site with an average Microsoft Office 365 authentication response time of 5 ms over the same period that displayed a slowest response time of 30 ms.

Expected Response Time

The Expected Response Time bar graph displays the range of response times, the most recently measured response time, and the expected response time for an application a specific site during the date range you configure in the Date Range drop-down list. The value displayed on the far right of the graph is the slowest response time observed during the selected time period. The vertical blue or red bar indicates the most recently observed response time for the application.

NOTE: The values in this graph are an average of all response times observed every minute.



Hover over the Expected Response Time graph to display a pop-up with the most recent response time for the application as well as the date and time the measurement occurred. The Expected Response Time bar graphs also display the client count, represented by a number and a monitor icon (10), and a client byte count observed as of the most recent measured minute. The client count is the number of clients using the service at the site. The client byte count indicates the amount of storage being utilized by clients. The data used for the client count, the client byte count, and the reported application response time are from the same recently observed minute.

NOTE: Client counts and client byte counts are not provided for the bar graphs that display the average application response time of all the sites for that service.

ExtremeCloud IQ - Site Engine uses the standard deviation of the values gathered as response times to determine the expected response time for an application at a site. In the bar graph, the medium gray color indicates a response time that falls within the "expected" range. This range is the average value of all observed response times plus or minus two standard deviations, or about 95 percent of all response time values. A response time in the light gray range is better than expected, while a response time in the dark gray is worse than expected.

When a response time is determined to be worse than expected, the site name and the response time indicator turn red to flag the application.

Selecting the Expected Response Time bar graph opens the Response Time dashboard filtered to display the application. If you select the application for a particular site, the Response Time dashboard also filters to that site.

Historical Response Time

The Historical Response Time line graph shows all of the response times observed for the application at a site.

NOTE: The values in this graph are an average of all response times observed every hour.

Hovering over a point in the graph causes a dot on the line graph to appear, indicating the point in the response time at which you are looking. Additionally, a pop-up with the date, time, and response time displays for that point.

This is the data set from which ExtremeCloud IQ - Site Engine creates the Expected Response Time graph. The wider the expected response time range in the Expected Response Time graph (indicated by the medium gray color), the greater the variance in the values in this graph.

- ExtremeAnalytics tab

ExtremeAnalytics Browser Overview

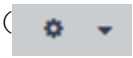
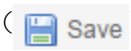
The **Browse**r tab lets you query information about recent network activity stored in the ExtremeCloud IQ - Site Engine database and display results in various grid and chart report formats. Using the Browser, you can create custom queries that provide greater flexibility in defining what data to display and how to display it. You can access the Browser from the ExtremeCloud IQ - Site Engine **Analytics** tab.

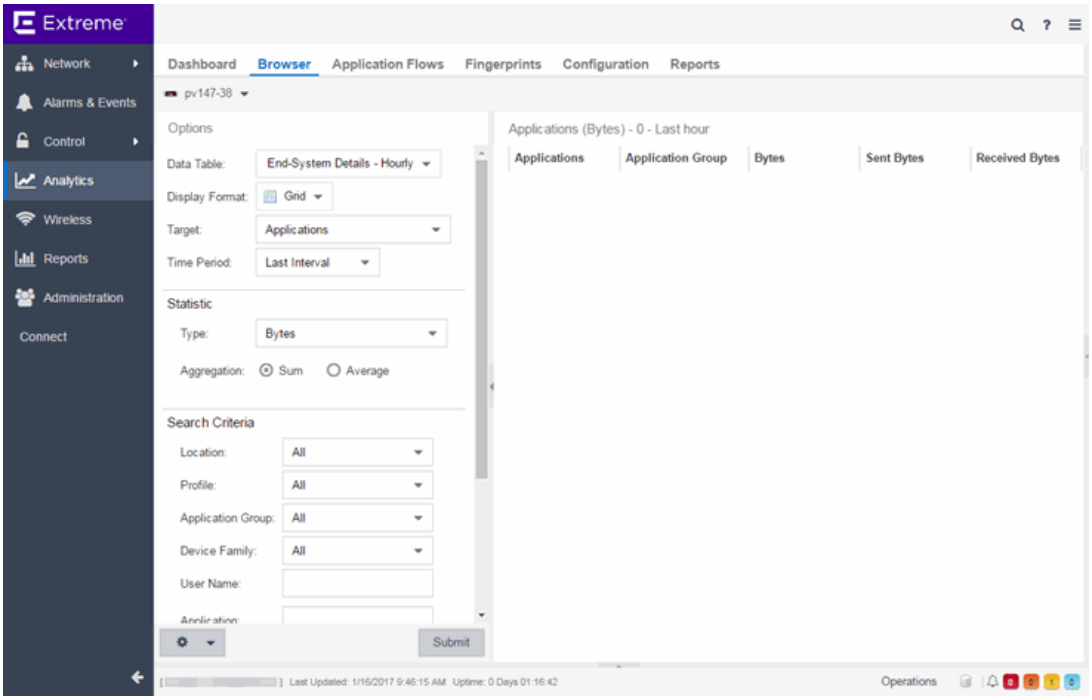
Overview

The Browser allows you to generate reports in several different formats using data based on selected options including a data target, statistic type, start time, and other search criteria.

For example, you can display application response time for the last hour or the last three days. You can view the results as a grid or a chart. You can filter the results to display data for a specific application or site.

If you have multiple ExtremeAnalytics engines, use the **Engine** drop-down list to select an engine to use as the source for the report data. Then, select the desired options on the left side of the Browser view and select **Submit**. The report is displayed on the right side of the view. Select an item in the report to view details or right-click an item to select from other focused reports.

After you have generated a report, use the **Gear** menu () (at the bottom left of the options panel) to () save it to the Report Designer to use as a custom component, () bookmark the report, or ( ) export it as a CSV file.



Data Aggregation

Network data displayed in a report is aggregated from your network by the ExtremeAnalytics engine and sent to ExtremeCloud IQ - Site Engine. The data gathering process begins with the ExtremeAnalytics engine, which monitors network activity on the switch or controller you configure using a traffic mirror and NetFlow or application telemetry. The traffic mirror gathers the first (N) packets of a flow to determine the application in use, while NetFlow (a flow-based data collection protocol) provides information about the amount of data sent and received for the application. The engine holds this information in its cache and transmits the aggregated data to ExtremeCloud IQ - Site Engine every five minutes to update the High-Rate data table information and every hour to update the hourly data table information. Creating a report in the Applications Browser displays the information sent from the ExtremeAnalytics engine to ExtremeCloud IQ - Site Engine based on the criteria you select.

NOTE: Information held in the ExtremeAnalytics engine's cache is not saved. Restarting the ExtremeAnalytics engine before the data in the memory cache is sent to ExtremeCloud IQ - Site Engine results in the loss of that information.

Options

Following are definitions of the different options available when creating your custom query.

Data Table

Select which type of network activity data to query. The correct data table to use depends on the nature of the report.

- End-System Details - Hourly — End-system data collected every hour. Used when data for a specific client or server is needed, or when the information requested is highly specific, for example top applications used by Android devices in the London site.
- Application Data - Hourly — Application data collected every hour. Used for higher level information, such as top applications during an hour.
- Application Data - High-Rate — Application data collected at a higher rate (every five minutes). Used for a more detailed picture of how traffic changes over time.
- Application Telemetry - Hourly — Application Telemetry flow data collected every hour.

Display Format

Select the display format for the report: Grid, Chart Over Time, Word Cloud, Tree Map, or Bubble Map.

Target

Network traffic information is collected on objects in your network called targets. Some targets are physical, such as clients and servers, and some are logical, such as applications. Select the type of target that you want information about. Available targets vary depending on the selected data table. If you want information on a specific target, specify that target in the Search Criteria options.

- Applications — An application in ExtremeAnalytics is identified through layer 7 analysis of network traffic. For example, an application can be identified as Facebook.
- Application/Client — Information about applications used by clients, or about clients using an application.
- Application/Device Family — Information about applications used by device families, or about device families using an application.
- Application/Interface — Information about the applications used by interfaces.
- Application/Profile — Information about applications used by profiles, or about profiles using an application.
- Application/Server — Information about applications accessed on a particular server, or about severs using an application.
- Application Groups — Application categories, such as Cloud Computing or Social Networking, which are implied by the application.
- Device Family — The kind of device determined for a client, such as Windows or iOS. Device information is only available for some network traffic.
- Interface/Applications — Information about interfaces used by applications.
- Application-Interface Pair/Client — Displays the applications and interfaces used by clients.
- Interface/Client — Information about the interfaces used by clients.

- Sites — Sites are used by ExtremeAnalytics to identify the physical location for the client of an application flow. A site is a set of IP address ranges that identify a portion of your network. Multiple sites can be created to identify different buildings, sites, or geographical areas of your network.
- Profiles — A profile assigned to a client. Profile information is only collected under certain circumstances.
- Threat — Displays a list of the threat classifications that occurred during the Time Period you select.
- Threat/Threat End-System Pair — Displays a list of the threat classifications broken down by the IP addresses of the end-systems involved in the flow (the trusted and untrusted hosts) that occurred during the Time Period you select.
- Clients — The end-point of a flow which has the client role for that connection.
- Servers — The end-point of a flow which has the server role for that connection.
- Total — The total values for all detected traffic for the interval used by the data table (hourly or high-rate).

Statistic

Statistics are quantitative data that can be collected for the selected target. Available statistics vary depending on the selected target. Select the desired statistic for the report:

- Bytes — The number of bytes transferred in both directions, between the client and the server. Also known as bandwidth.
- Flows — The number of NetFlow records sent by the switch to report the traffic between the client and the server.
- Application Response Time — The average amount of time for a server to respond to a request.
- Network Response Time — The average amount of time to create a connection.
- Received Bytes — The number of bytes received by clients. This can be an estimated number of bytes if you are using an Application Telemetry flow.
- Sent Bytes — The number of bytes sent by clients. This can be an estimated number of bytes if you are using an Application Telemetry flow.
- Inbound Flows — The number of NetFlow records sent by the switch to report the server-to-client traffic. This is a rough indication of the duration of client connections.
- Outbound Flows — The number of NetFlow records sent by the switch to report the client-to-server traffic. This is a rough indication of the duration of client connections.
- Clients — The number of unique clients that have been seen associated with the target.
- Servers — The number of unique servers that have been seen associated with the target.
- Application Count — The number of unique applications seen for the selected target.

For byte, flow, and application count statistics, if you select a time range that is larger that the interval, specify whether you want the data aggregated as a summation of all the values for that statistic or as an average of all the values for that statistic.

Start Time

Select the start time (duration) for the report: Last Interval, Today, Yesterday, Last 24 Hours, Last 3 Days, or Last Week. You can also specify a custom start time and end time for the

report. The Last Interval is the most recent recorded data covering a time period determined by the selected Data Table.

Search Criteria

Defining search criteria allows you to further filter the report data. Available criteria will vary depending on the selected data table and target. If you select either of the Application Data tables, you can only filter based on the selected target. For example, if you select Sites as your target, you can only filter on defined sites. If you select the End-System Details data table, you can filter on additional criteria. For example, if you select Sites as your target, you can filter on defined sites as well as flows for iOS devices.

You can enter a partial term in the text field or use the SQL wildcard "%" (as a substitute for multiple characters) or "_" (as a substitute for a single character) for multiple matches. For example, for the Device Family name, you could enter "iPhone %" to match iPhone 3, 4, and 5.

NOTE: Values entered in the text fields that contain multiple, non-alphanumeric characters can cause issues with the returned results. If this happens, alternate values should be used.

- Site — Select a site to match or select World. If a site has been added to a map, you will also see a selection for that map. If you select custom, you can enter a partial site name or use the SQL wildcard characters to match one or more sites.
- Profile — Select an ExtremeControl profile to match or select All. If you select custom, you can enter a partial profile name or use the SQL wildcard characters to match one or more profiles. Profile information is only collected under certain circumstances.
- Application Group — Select an application group to match or select All. If you select custom, you can enter a partial application group name or use the SQL wildcard characters to match one or more groups.
- Device Family — Select the operating system family to match or select All. If you select custom, you can enter a partial device family name or use the SQL wildcard characters to match one or more families. Device information is only available for some network traffic.
- User Name — Enter a client's username to match. Username information is only available for some network traffic.
- Application — Enter an application name to match.
- Client — Enter a client's IP address or hostname to match.
- Engine — Select the ExtremeAnalytics engine for which you are generating the report.
- Limit — Select the number of results to return, for example, 10 clients.

Display Options

If you have selected Chart Over Time as your report display format, you can select whether to display the data as a line or an area, and also select the color to use in the chart.

Bookmark

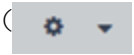
After you have generated a report, select the Gear menu ( ) in the lower left corner to save the options you have currently set. A new window opens for the current report with a link that can be bookmarked in your browser. You can then use the bookmark whenever you want the same search options.

Save to Report Designer

Select the Gear menu ( ) in the lower left corner to access the Save to Report Designer window. This window lets you save the currently defined report to use as a custom component in the Report Designer. The custom component uses the target, statistic, and start time currently defined in the Browser.

Enter a name for the custom component and select any search criteria that you want displayed in the component panel. The search criteria is displayed as fields in the component panel, providing a custom interface that lets you further refine report data. If no search criteria are selected, the saved component only uses the target, statistic, and start time definitions when requesting data, creating a view-only report.

Export to CSV

Select the Gear menu () in the lower left corner and select () to export the report data as a CSV file. The currently defined report opens in a spreadsheet, which can then be saved.

- ExtremeAnalytics tab

ExtremeAnalytics Application Flows

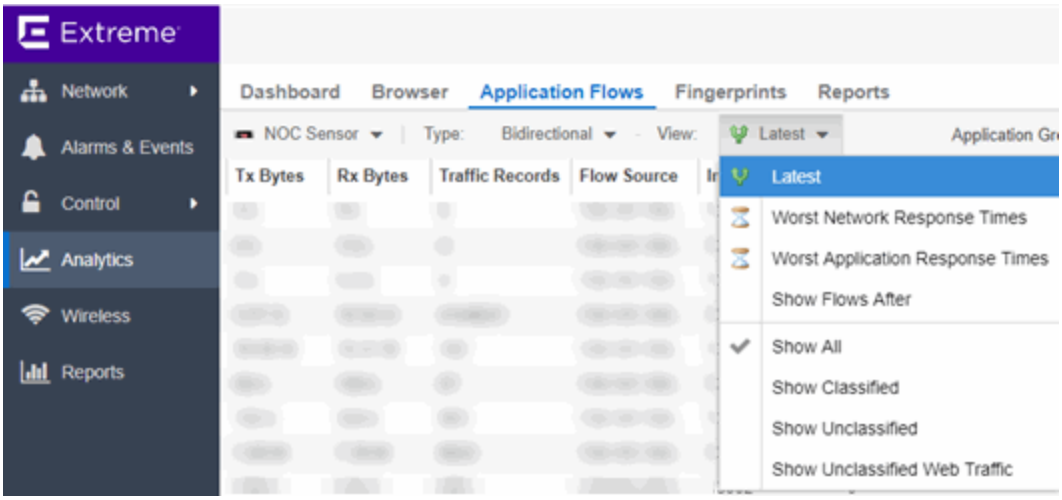
The **Application Flows** tab displays tables that present Historical, Bidirectional or Unidirectional client, server, and application flow data. To access the **Applications Flows** tab, open **Analytics > Application Flows**.

This Help topic provides information on the following topics:

- Overview
- Application Flows Tables
- Report Features

Overview

The **Application Flows** tab includes several functions that enable you to filter and customize your table data.



Appliance Engine

If your network uses multiple ExtremeAnalytics engines, use the **Engine** menu to select an engine to use as the source for the flow data.

Type

Use the **Type** menu to select whether to display Historical, Bidirectional (aggregate flows) or Unidirectional (base flows) flow data.

View

By default, the table displays the latest flows collected. Use the **View** menu to select different display options. The available options vary depending the flow type (bidirectional or unidirectional) selected.

- Latest — Displays the latest flows collected by the specified engine.
- Worst Network Response Times — Sorts the flows based on the worst TCP response time and displays the flows with the worst time at the top of the chart.
- Worst Application Response Times — Sorts the flows based on the worst application response time and displays the flows with the worst time at the top of the chart.
- Show Flows After — Enables you to select a start date and time for the flows displayed.
- Show All — Show all flows.
- Show Classified — Show only flows classified by an application fingerprint.
- Show Unclassified — Show only flows not classified by an application fingerprint.
- Show Unclassified Web Traffic — Show only web traffic that has not been classified by an application fingerprint.

Application Group

Use the Application Group menu to filter the table by application group.

Search

Use the Search field at the top right of the table to filter specific flow information. For example, searching on "snmp" or "10.20.30.131/24" filters the table so only flow data related to SNMP or the given subnet is displayed. You can enter one or more filters simultaneously, separated by semicolons. Individual components of a filter is separated by commas. For complete instructions on how to use the Flow Search, rest your cursor on the Search field and read the tooltip (select the "more" link in the tooltip). Press the Reset button at the bottom left of the window to clear the Search results and refresh the table.

You can also use the Search field to search for a specific application, user name, or IP address from your filtered results:

1. Select a user name or IP address from the filtered search results to launch PortView, which provides a detailed topology context for the user.
2. Enter meta= before the term for which you are searching includes all variations of that search term in the result set. For example, entering meta=extreme returns extremenetworks.com, www.extremenetworks.com, extreme.boston.com, and any other flows that include the word "extreme".
3. Right-click on a flow to access a menu of options including the ability to:
    - Add a new custom fingerprint based on the flow selected in the table.
    - Show all fingerprints associated with the application in the selected flow.
    - Create a UDP or TCP rule using the IP port.
    - Search ExtremeCloud IQ - Site Engine maps for the selected flow client.
    - Open a Flow Details report for the selected flow (bidirectional flows only).
    - Access a variety of reports for the flow.

Refresh

Use the Refresh drop-down list at the top right of the window to specify an interval (in seconds) at which the flows data automatically refreshes. To stop auto refresh, select the Refresh Off option.

Application Flows Tables

The columns included in the Application Flows tables vary, depending on the type of data flow you select (Historical, Bidirectional and Unidirectional). Additionally, right-click and select Start Packet Capture to save a packet capture of the flow on the Packet Captures tab.

Historical Flows

The Historical table displays short-term flow data storage you can use to determine trends in your network.

Bidirectional Flows

The Bidirectional table displays bidirectional flow data stored in memory. It provides aggregated flow data for a given client, server, server port, application, and protocol. All matching flows are aggregated to show the flow count, total duration, amount of data transmitted, and additional information. The bidirectional report presents flow data for real-time troubleshooting purposes, and is not designed for historical long-term flow collection. A check mark (✓) in the table denotes a tracked application or a tracked site.

Unidirectional Flows

The Unidirectional table displays unidirectional flow data stored in memory. It provides the raw non-aggregated flow data received from the flow sensors on the network. It presents flow data for real-time troubleshooting purposes, and is not designed for historical long-term flow collection. A check mark (✓) in the table denotes a tracked application or a tracked site.

Report Features

The Application Flows tables include several report features and functions that enable you to drill down for more detailed application, site, response time, mapping and policy functions. The report features vary, depending on the type of data flow you select (Historical, Bidirectional and Unidirectional).

Interactive Tables

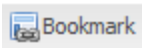
Manipulate table data in several ways to customize the view for your own needs:

- Select the column headings to perform an ascending or descending sort on the column data.
- Hide or display different columns by selecting a column heading drop-down arrow and selecting the column options from the menu.
- Filter data in each column by selecting a column heading drop-down arrow and using the Filters option on the menu.

The sort and filter functionality for these two tables behaves differently than for other ExtremeCloud IQ - Site Engine tables. In these tables, Max Rows are considered for display, and then sorting and filtering is applied to these rows. In other tables, sorting and filtering is applied to the entire table, and then Max Rows of the result is displayed. For example, if the Max Rows value is set to 50 and you create a filter for a specific IP address, only those 50 rows will be filtered for the IP, not all the flows maintained in memory on the server.

CSV Export

The CSV Export button enables you to save report data to a CSV file and to provide report data in table form.

Bookmark 

Use the Bookmark button to save the search, sort, and filtering options you have currently set. It opens a new window for the current report with a link that can be bookmarked in your browser. You can then use the bookmark whenever you want the same search, sort, and filtering options.

Max Rows

By default, the top 100 entries are displayed in the table. However, you can change this value using the Max Rows field at the bottom of the view.

Reset 

The Reset button enables you to clear the search fields and all filters, and to refresh the table.

Aggregate / Base Flows

Aggregate Flows (bidirectional table) and Base Flows (unidirectional table) data uses an X number of days, hh:mm:ss format and includes Current Load and Peak Load calculations in flows per second.

- ExtremeAnalytics tab

ExtremeAnalytics Bidirectional Flow Table

This table on the Application Flows tab displays bidirectional flow data that is stored in memory. Use it to view aggregated flow data for a given client, server, server port, application, and protocol. All matching flows are aggregated to show the flow count, total duration, amount of data transmitted, and additional information. The bidirectional report presents flow data for real-time troubleshooting purposes, and is not designed for historical long-term flow collection. A check mark (✔) in the table denotes a tracked application or a tracked site.

By default, the top 100 entries are displayed in the table. However, you can change this value using the Max Rows field at the bottom of the view.

Text at the bottom of the table shows:

- The CSV Export icon - allows you to save report data to a CSV file and to provide report data in table form

- Aggregate Flows data - uses an X number of days, hh:mm:ss format and includes Current Load and Peak Load calculations in flows per second

Following are definitions for the table columns:

Flow Summary
: Rest the cursor over the first column in the table and select the arrow to open the Flow Summary window. Flow summary information can include response times, Uniform Resource Identifier, and header data for the flow. In the Flow Summary window, use the Menu icon to access additional functionality, such as the ability to modify the application fingerprint or create a policy rule.

Flows
: The number of base flows included in the aggregate flow. Select a link in the Flows column to open a Flow Details tab that displays the individual flows that contributed to the aggregate flow.

Client Address
: The IP address or hostname of the system where the flow originated. Select the Client address link to open a PortView for the client (if it is in the database) or a PortView for the switch configured as the NetFlow sensor.

Server Address
: The IP address or hostname of the server handling the flow.

Server Port
: Either the TCP or UDP port on the server handling the flow.

Application
: The name of the application as identified by the ExtremeAnalytics engine using the Fingerprint database.

Application Group
: The flow application group to which the application belongs.

Application Info
: Additional information about the flow provided by the ExtremeAnalytics engine. Hover over the flow and a table of the information displays.

Type
: The content type of a flow, such as sound, video, or text. Select the Type icon to open the flow's URI.

Network Response
: The response time (in milliseconds) that it took for the TCP request to complete.

Application Response
: The response time (in milliseconds) that it took the application request to complete.

Site
: The name of the site that matches the client's IP address.

Detailed Site
The client's switch IP and switch port (wired), or controller IP, AP, and SSID (wireless).

Device Family
The operating system family for the client end-system.

User
The username used when the client system connected.

Profile
The ExtremeCloud IQ - Site Engine profile assigned to the client end-system.

Threat
Indicates if the flow contains potential threat activity from IP addresses known to be suspicious. IP addresses can be flagged as suspicious for a variety of reasons, including forced IP anonymity through the use of a Tor exit node, being listed as a threat by the Emerging Threats project, or classified as suspicious by internet users.

Protocol
The connection type protocol used by the flow.

Last Seen Time
The last time a unidirectional (base) flow was aggregated into this bidirectional flow.

Duration
The duration of a bidirectional (aggregate) flow is the sum of the durations of the unidirectional (base) flows that make up the bidirectional flow. The duration of a bidirectional flow can be greater than or less than the period of time indicated by the First Seen and Last Seen Time. This is because there can be times during that time period when no flow is active or when several flows are active at the same time.

NOTE: Bidirectional flows can be greater than the period of time between the First Seen and Last Seen Time columns because they display the sum of all flow records for a client and a server on a server port. For a flow that lasts for 60 seconds, there are two flow records (a client to server flow and a server to client flow), so the total duration can exceed 60 seconds. Multiple simultaneous connections from the client to the same server port (e.g. multiple browser windows open to a web-based email client) can also increase the duration.

Rate
The average bandwidth for the flow based on the total flow duration. Because bandwidth calculations are based on the total duration (not on the First Seen and Last Seen Time), they represent the average throughput for each flow considered separately, not as an aggregate.

Tx Packets
The number of packets transmitted for this flow. For flows collected via Application Telemetry, this number can be estimated.

Rx Packets
The number of packets received for this flow. For flows collected via Application Telemetry, this number can be estimated.

Tx Bytes
: The number of bytes transmitted for this flow. For flows collected via Application Telemetry, this number can be estimated.

Rx Bytes
: The number of bytes received for this flow. For flows collected via Application Telemetry, this number can be estimated.

Traffic Records
: The number of records received in each flow.

Flow Source
: The IP address of the NetFlow source switch, Application Telemetry source switch, or wireless controller sending the NetFlow data to the NetFlow collector.

Input Interface
: The interface receiving the flow on the NetFlow sensor.

Output Interface
: The interface transmitting the flow on the NetFlow sensor.

Client TOS
: The DSCP (Diffserv Codepoint) value for the client to server flow. The TOS/DSCP value is used to configure quality of service for network traffic.

Server TOS
: The DSCP (Diffserv Codepoint) value for the server to client flow. The TOS/DSCP value is used to configure quality of service for network traffic.

TTL
: The TTL (IP Time to Live) value of the flow. The TTL field indicates the maximum number of router hops the packet can make before being discarded. The TTL field is set by the packet sender and reduced by every router on the route to its destination. When the value hits zero, the packet is dropped.

- ExtremeAnalyticstab
- Application Flows tab

ExtremeAnalytics Unidirectional Flow Tables

This table on the Application Flows tab displays unidirectional flow data stored in memory. It displays the raw, non-aggregated flow data received from the flow sensors on the network. It presents flow data for real-time troubleshooting purposes, and is not designed for historical long-term flow collection. A check mark (✔) in the table denotes a tracked application or a tracked site.

Hover over an application in the table to display switch data, which is an accumulation of multiple switches into single flow record, as well as the path that flow has taken.

By default, the top 100 entries are displayed in the table. However, you can change this value using the Max Rows field at the bottom of the view.

Text at the bottom of the table shows Base Flows, using X number of days, hh:mm:ss format, and including Current Load and Peak Load calculations in flows per second.

Following are definitions for the table columns:

Flow Summary
: Rest the cursor over the first column in the table and select the arrow to open the **Flow Summary** window for a specific flow. Flow summary information can include response times, Uniform Resource Identifier, and header data for the flow. In the **Flow Summary** window, use the **Gear** menu to access additional functionality such as the ability to modify the application fingerprint or create a policy rule.

Client/Server Flows
: Identifies whether the flow is a Client Flow or a Server Flow . The client/server direction of a flow is calculated by the ExtremeAnalytics engine. Hover over the icon to see a tooltip with more information.

Source Address
: The IP address or hostname of the system where the flow originated. Select on the Source address link to open a **PortView** for the client or server (if it is in the database) or a **PortView** for the switch configured as the NetFlow sensor.

Source Port
: Either the TCP or UDP port on the client/server handling the flow.

Destination Address
: The IP address or hostname of the system that received the flow.

Destination Port
: Either the TCP or UDP port on the system that received the flow.

Application
: The name of the application as identified by the ExtremeAnalytics engine using the Fingerprint database.

Application Group
: The flow application group to which the application belongs.

Application Info
: Additional information about the flow provided by the ExtremeAnalytics engine.

Type
: The content type of a flow, such as sound, video, or text. Select on the **Type** icon to open the flow's URI.

Network Response
: The response time (in milliseconds) that it took for the TCP request to complete.

Application Response
: The response time (in milliseconds) that it took the application request to complete.

Site
: The site where the flow originated.

Detailed Site
: The client's switch IP and switch port (wired), or controller IP, AP, and SSID (wireless).

Device Family
: The operating system family for the client end-system.

User
: The username used when the client system connected.

Profile
: The ExtremeControl profile assigned to the client end-system.

Protocol
: The connection type protocol used by the flow.

Last Seen Time
: The last time the flow was seen.

Duration
: The amount of time that the flow was active.

Rate
: The average bandwidth for the flow based on the flow duration.

Packets
: The number of packets in this flow. For flows collected via Application Telemetry, this number can be estimated.

Bytes
: The number of bytes in this flow. For flows collected via Application Telemetry, this number can be estimated.

NetFlow Records
: The number of NetFlow records for this flow.

Flow Source
: The IP address of the NetFlow source switch, Application Telemetry source switch, or wireless controller sending the Flow data to the Flow collector.

Input Interface
: The interface receiving the flow on the Flow sensor.

Output Interface
: The interface transmitting the flow on the Flow sensor.

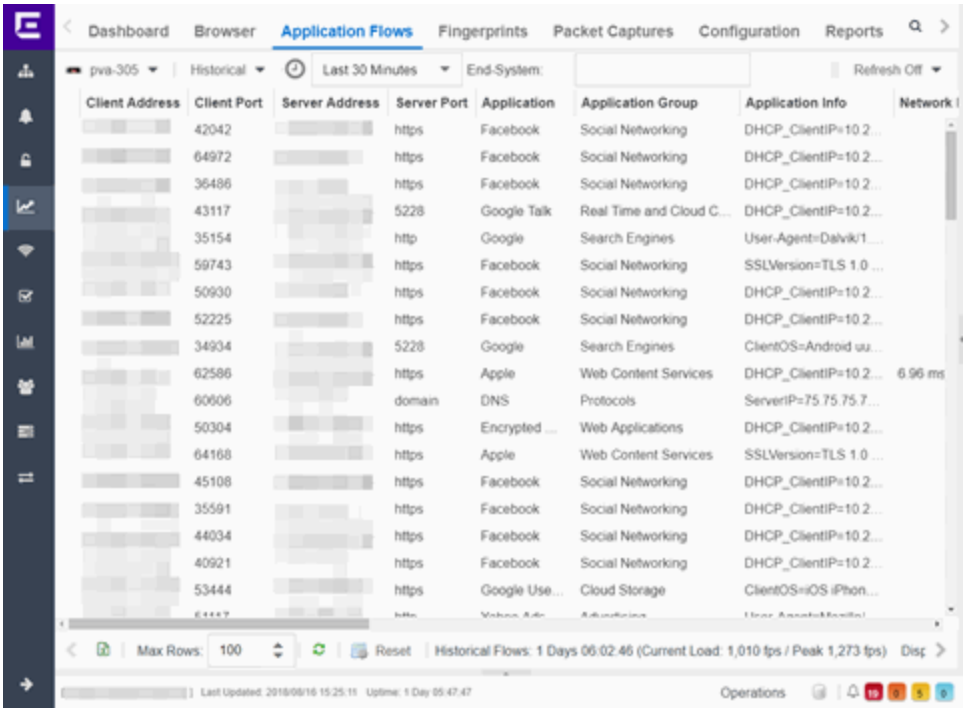
TOS
: The DSCP (Diffserv Codepoint) value for the flow. The TOS/DSCP value is used to configure quality of service for network traffic.

TTL
: The TTL (IP Time to Live) value of the flow. The TTL field indicates the maximum number of router hops the packet can make before being discarded. The TTL field is set by the packet sender and reduced by every router on the route to its destination. When the value hits zero, the packet is dropped.

- ExtremeAnalytics tab
- Application Flows tab

ExtremeAnalytics Historical Flow Table

The Historical Flow table in the **Application Flows** tab displays historical flow data that you can use to analyze trends in your network. The Historical Flow table is not designed for long-term flow collection.



Hover over an application in the table to display switch data, which is an accumulation of multiple switches into single flow record, as well as the path that flow has taken.

By default, the top 100 entries are displayed in the table. However, you can change this value using the Max Rows field at the bottom of the view.

Text at the bottom of the table shows Base Flows, using X number of days, hh:mm:ss format, and including Current Load and Peak Load calculations in flows per second.

Following are definitions for the table columns:

Client Address
: The IP address or hostname of the system where the flow originated. Select the Client address link to open a PortView for the client (if it is in the database) or a PortView for the switch configured as the NetFlow sensor.

Client Port
: Either the TCP or UDP port on the client handling the flow.

Server Address
: The IP address or hostname of the server handling the flow.

Server Port
: Either the TCP or UDP port on the server handling the flow.

Application
: The name of the application as identified by the ExtremeAnalytics engine using the Fingerprint database.

Application Group
: The flow application group to which the application belongs.

Application Info
: Additional information about the flow provided by the ExtremeAnalytics engine.

Network Response
: The response time (in milliseconds) that it took for the TCP request to complete.

Application Response
: The response time (in milliseconds) that it took the application request to complete.

Start Time
: The start time.

Duration
: The amount of time that the flow was active.

Last Seen
: The last time the flow was seen.

Client Site
: The name of the site that matches the client's IP address.

Server Site
: The site of the server.

Detailed Site
: Detailed site information

Protocol
: The connection type protocol used by the flow.

Rate
: The average bandwidth for the flow based on the flow duration.

Client Bytes
: The number of bytes in this flow. For flows collected via Application Telemetry, this number can be estimated.

Client Packets
: The number of packets in this flow. For flows collected via Application Telemetry, this number can be estimated.

Server Bytes
: The number of bytes in this flow. For flows collected via Application Telemetry, this number can be estimated.

Server Packets
: The number of packets in this flow. For flows collected via Application Telemetry, this number can be estimated.

Analytics Appliance
: The engine to which the server is assigned.

- ExtremeAnalytics
- Application Flows

ExtremeAnalytics Fingerprints Overview

The Fingerprints tab provides detailed information about fingerprints used by ExtremeAnalytics to identify application flows. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. They can be created based on flow, application or application group, or a destination address. For applications such as Facebook and Google, multiple fingerprints are included to capture the different ways these applications can be used.

Fingerprints are created and stored on the ExtremeCloud IQ - Site Engine server. When a fingerprint is changed or enabled, a flag is raised on the ExtremeAnalyticsengine to show it needs enforcing. Access the Browser from the ExtremeCloud IQ - Site Engine Analytics tab.

There are two types of fingerprints: system fingerprints and custom fingerprints.

System fingerprints are provided by ExtremeCloud IQ - Site Engine. They cannot be deleted; however, they can be modified or disabled. When a system fingerprint is modified, it results in a new custom fingerprint that overrides the original system fingerprint.

Custom fingerprints are either new user-defined fingerprints or modifications of system fingerprints. Custom fingerprints can be deleted. If a custom fingerprint was overriding a system fingerprint, then deleting the custom fingerprint will reload the original system fingerprint.

- ExtremeAnalytics tab

ExtremeAnalytics Custom Fingerprints

Custom fingerprints are either new user-defined fingerprints or modifications of system fingerprints. Custom fingerprints can be deleted. If a custom fingerprint was overriding a system fingerprint, then deleting the custom fingerprint will reload the original system fingerprint.

The Fingerprints view is divided into a left-panel tree and a table with six columns. The left-panel tree displays all the application groups and the fingerprints assigned to that group. The table on the right displays detailed information for each fingerprint. You can filter the information displayed in the table by selecting a single application group or fingerprint in the left-panel.

Fingerprint Table

The Fingerprint table displays detailed fingerprint information. Above the table, in the top left corner, is a Menu icon ☰, where you can access various system and fingerprint actions.

If you have multiple ExtremeAnalytics engines, an **Engine** menu is available that allows you to select an engine to use as the source for the fingerprint Matches data.

Use the **In Use** checkbox to filter the table to only show fingerprints that have had a match for the selected engine. Use the **Customized** checkbox to filter the table to display only custom fingerprints.

Menu

Use the **Menu icon** ☰ to access the following system and fingerprint actions. (You must have a fingerprint selected to enable the **Fingerprint** menu options.) Most of the options are also available by right-clicking on a fingerprint.

- Create Fingerprint — Add a new fingerprint.
- Modify Fingerprint — Change a fingerprint's description.
- Reset Fingerprint Counters — Reset the Matches counters.
- Delete Custom Fingerprint — Delete custom fingerprints, which can be identified by a ✓ in the Custom column.
- Fingerprint Definition — View the XML definition for a fingerprint.

Column Definitions

Following are definitions for the table columns. All columns are sortable in ascending and descending order and can be filtered by text or numeric values.

Application
: Name of the application this fingerprint detects. Select an **Application** link to view client, flow, and usage information for that specific application.

Fingerprint
: Name of the fingerprint.

Confidence
: Reliability of this fingerprint. Higher confidence fingerprints override lower confidence fingerprints when determining a match for a traffic flow. The values are from 1 to 100, with 100 being absolutely reliable.

Custom
: A check mark ✓ indicates the fingerprint is a custom (user-defined) fingerprint. It is custom if it is a new fingerprint that has been added, a system fingerprint that has been modified, or a system fingerprint that has been disabled.

Application Group
: The group this fingerprint's application belongs to. Application groups organize fingerprints into different types of applications such as Web applications or Business applications. You can sort the Application Flows view by application group, making it easier to view data for a specific type of flow. An application can only belong to one application group.

Matches
: The total number of times a traffic flow has matched this fingerprint for the selected engine. A match is an occurrence of the ExtremeAnalytics engine making a final determination that a flow matches a fingerprint after all refinements are completed. The corresponding flow in the opposite direction, if there is one, is also matched. See Notes below.

NOTES:

- Matches are stored and displayed per engine. If you have multiple engines, use the Engine menu to select an engine to use as the source for the Hits and Matches data.
- If a flow generates hits on multiple fingerprints, and one fingerprint has a higher confidence than another fingerprint, a hit is counted for each fingerprint, but a match is only recorded for the final, highest confidence fingerprint.
- If you need to reset the Matches counters, use the Reset Fingerprint Counters option from the Menu icon (☰).

Type
: The fingerprint type refers to how the fingerprint determines a match.

- FlexFire — These fingerprints execute specific matching algorithms encoded into the engine. Disabling the fingerprint disables the specific code that implements the fingerprint.
- PCRE — These fingerprints search using Perl Compatible Regular Expressions (PCRE).
- Port-based — These fingerprints search for traffic on a specific port (typically, server-only ports). These are very low-confidence fingerprints and are generally just used for wider coverage.
- Web-App Rule — These fingerprints search for a specific hostname in the URI of web requests.
- SSL Name — These fingerprints search for values in the SSL common name.
- Http Host — These fingerprints search for values in the HTTP hostname.

- Decoder — These fingerprints extract protocol metadata from a flow that is provided when we generate a match on that flow.
- General — Any fingerprint that isn't included in one of the other types. Typically, these fingerprints search for a straight pattern, or for a specific port and/or IP address with custom fingerprints (excluding custom Web-App Rule fingerprints).

Enabled

A ✓ indicates the fingerprint is enabled. When a fingerprint is enabled, it will be used to identify applications. When it is disabled, it will be ignored.

Last Modified

Date that the fingerprint was last modified.

Created

Date that the fingerprint was created.

Description

Description of the fingerprint.

- ExtremeAnalytics tab

Delete Custom Fingerprints

ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

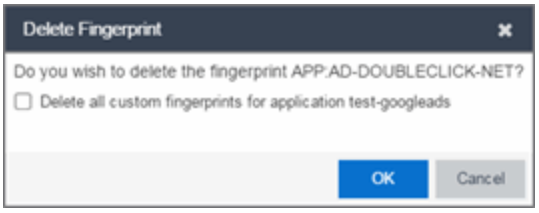
Deleting a Custom Fingerprint

Delete a custom fingerprint from the **Fingerprints** tab. A custom fingerprint is either a new user-defined fingerprint, a modification of a system fingerprint, or a disabled fingerprint. (Custom fingerprints can be identified by a ✓ in the Custom column.)

When you delete a custom fingerprint, it is removed entirely. If you delete a custom fingerprint overriding a system fingerprint, the original system fingerprint is reloaded. System fingerprints that have not been modified cannot be deleted, however, they can be disabled.

Use these steps to delete a custom fingerprint:

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine and then select the Fingerprints view
2. Right-click on the desired custom fingerprint in the Fingerprints table and select **Delete Custom Fingerprint**. The Delete Fingerprint window opens.



3. You can delete only the selected fingerprint or select the option to delete all custom fingerprints that match the application name of the selected fingerprint.
4. Select **OK**. If a custom fingerprint overrides a system fingerprint, then deleting the custom fingerprint reloads the original system fingerprint.
5. Enforce to push the change to your engines.

- ExtremeAnalytics tab

Custom Fingerprint Examples

The ExtremeAnalytics feature uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can create new custom fingerprints.

For additional information, see Getting Started with ExtremeAnalytics.

This Help topic provides examples of three different types of custom fingerprints you can create:

- Fingerprints Based on a Flow
- Fingerprints Based on an Application or Application Group
- Fingerprints Based on a Destination Address

For additional information, see Add and Modify Fingerprints.

Fingerprints Based on a Flow

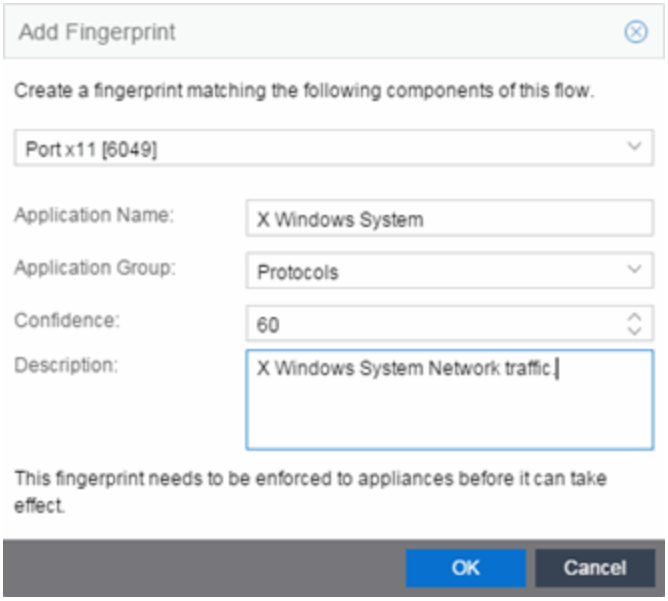
This example demonstrates how to create a custom fingerprint based on X Window System network traffic.

In the ExtremeCloud IQ - Site Engine Flows table (with the Show Unclassified View selected) you notice several flows that had an X Window System source port 6049. Since these flows are not currently identified with a fingerprint, you can create a fingerprint for those flows based on the port that x11 traffic normally runs over.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab.
2. Select the **Application Flows** tab.
3. In the table, select the **Show Unclassified View**.
4. Right-click on a flow with the **x11 Source Port** and select **Fingerprints** > **Add Fingerprint**.

5. The Add Fingerprint window opens.



6. Use the drop-down list to select matching **Portx11 [6049]**.
7. Set the **Application Name** to **X Window System**.
8. Set the **Application Group** to **Protocols**.
9. Set the **Confidence** level to **60** (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select **OK** to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

Fingerprints Based on an Application or Application Group

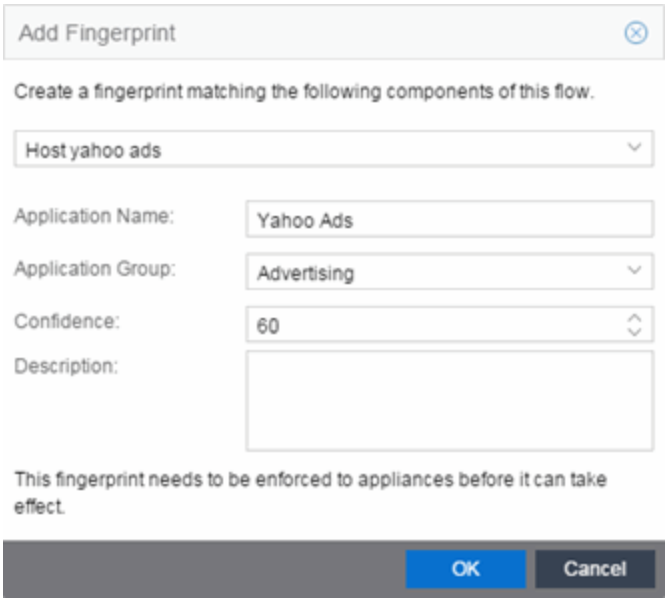
This example demonstrates how to create a fingerprint for some unclassified web traffic.

In the ExtremeCloud IQ - Site Engine Application Flows table (with the Show Unclassified Web Traffic View selected) you noticed several flows for the "yahoo ads" application that are part of the Web Applications group. You want to create a fingerprint that provides an application and application group specifically for this traffic, instead of letting it default to the Web Applications group. The new fingerprint categorizes "yahoo ads" flows into the Yahoo Ads ld application and the Advertising application group.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.

3. In the table, select the Show Unclassified Web Traffic View.
4. Right-click on a flow with the yahoo ads application and select Fingerprints > Add Fingerprint.
5. The Add Fingerprint window opens.



6. Use the drop-down list to select matching the "yahoo ads" host.
7. Set the Application Name to Yahoo Ads.
8. Set the Application Group to Advertising.
9. Set the Confidence level to 60 (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select OK to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

Fingerprints Based on a Destination Address

In both of the previous examples, you created a new custom fingerprint to cover a case where no appropriate fingerprint existed. You can also create a new fingerprint for traffic flows already identified as one application, but should be categorized as something else.

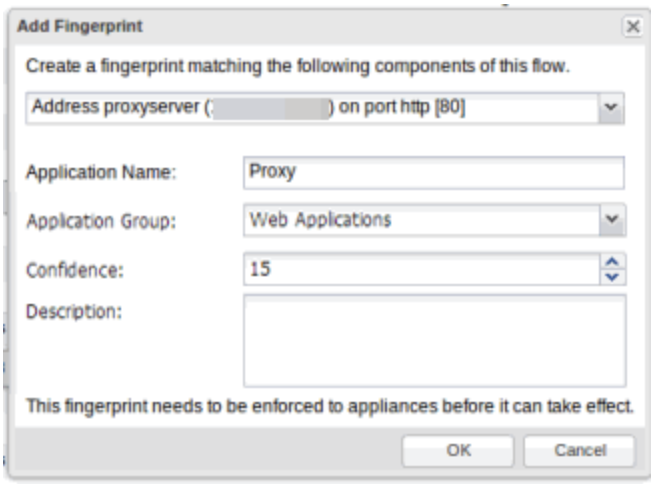
For example, let's say you have a Git repository on your network. Git repositories (a source code management system used in software development) are frequently accessed via SSH on port 22 (the standard TCP port assigned for SSH traffic). In this case, the SSH traffic flows is identified using the system SSH port-based fingerprint.

But what if you would like to more closely monitor who is accessing the Git repository? If you know you are running the Git server on a certain system (10.20.117.102 port 22, for our example), you can create a custom fingerprint to identify the Git traffic flows.

The fingerprint is based on one of the SSH flows using the IP address/port of the Git server and have a higher confidence than the system port-based fingerprint. The higher confidence fingerprint will override the lower confidence fingerprint when determining a match for the traffic flow.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.
3. In the table, right-click on an SSH port-based flow with the Git server destination address and select **Fingerprints** > **Add Fingerprint**.
4. The Add Fingerprint window opens.



5. Use the drop-down list to select matching the Git server IP address and port.
6. Set the **Application Name** to **Git**.
7. Select an **Application Group** that makes the most sense for your network. It might be **Web Collaboration**, **Databases**, **Business Applications**, or **Storage**. You can also create a new **Application Group** by entering a new required value.
8. Set the **Confidence** level to **60**, which is a higher confidence than the current fingerprint which is set at 10.
9. Select **OK** to create the fingerprint.
10. Enforce to push the new fingerprint to your engines.

- Analytics
- Add and Modify Fingerprints

Create Custom Fingerprints Based on Flow

The ExtremeAnalytics feature uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can create new custom fingerprints.

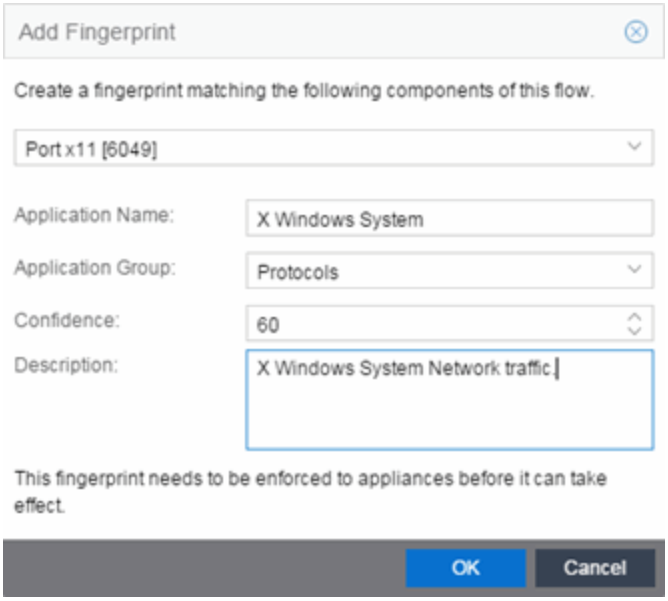
Creating Fingerprints Based on a Flow

This example demonstrates how to create a custom fingerprint based on X Window System network traffic.

In the ExtremeCloud IQ - Site Engine Flows table (with the Show Unclassified View selected) you notice several flows that had an X Window System source port 6049. Since these flows are not currently identified with a fingerprint, you can create a fingerprint for those flows based on the port that x11 traffic normally runs over.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab.
2. Select the **Application Flows** tab.
3. In the table, select the **Show Unclassified View**.
4. Right-click on a flow with the **x11 Source Port** and select **Fingerprints** > **Add Fingerprint**.
5. The Add Fingerprint window opens.



6. Use the drop-down list to select matching **Portx11 [6049]**.
7. Set the **Application Name** to **X Window System**.
8. Set the **Application Group** to **Protocols**.
9. Set the **Confidence** level to **60** (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select **OK** to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

- ExtremeAnalytics tab

Create Custom Fingerprints Based on Destination Address

The ExtremeAnalytics feature uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can create new custom fingerprints.

Creating Fingerprints Based on a Destination Address

Often, you will create a new custom fingerprint to cover a case where no appropriate fingerprint existed. However, you can also create a new fingerprint for traffic flows already identified as one application, but should be categorized as something else.

For example, let's say you have a Git repository on your network. Git repositories (a source code management system used in software development) are frequently accessed via SSH on port 22 (the standard TCP port assigned for SSH traffic). In this case, the SSH traffic flows is identified using the system SSH port-based fingerprint.

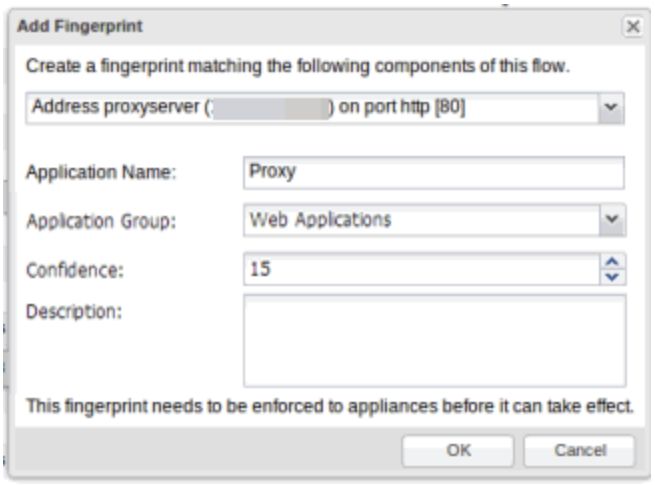
But what if you would like to more closely monitor who is accessing the Git repository? If you know you are running the Git server on a certain system (10.20.117.102 port 22, for our example), you can create a custom fingerprint to identify the Git traffic flows.

The fingerprint is based on one of the SSH flows using the IP address/port of the Git server and have a higher confidence than the system port-based fingerprint. The higher confidence fingerprint will override the lower confidence fingerprint when determining a match for the traffic flow.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.
3. In the table, right-click on an SSH port-based flow with the Git server destination address and select **Fingerprints** > **Add Fingerprint**.

4. The Add Fingerprint window opens.



5. Use the drop-down list to select matching the Git server IP address and port.
6. Set the **Application Name** to **Git**.
7. Select an **Application Group** that makes the most sense for your network. It might be **Web Collaboration**, **Databases**, **Business Applications**, or **Storage**. You can also create a new **Application Group** by entering a new required value.
8. Set the **Confidence** level to **60**, which is a higher confidence than the current fingerprint which is set at 10.
9. Select **OK** to create the fingerprint.
10. Enforce to push the new fingerprint to your engines.

Create Custom Fingerprints Based on Application or Application Group

The ExtremeAnalytics feature uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can create new custom fingerprints.

Creating Fingerprints Based on an Application or Application Group

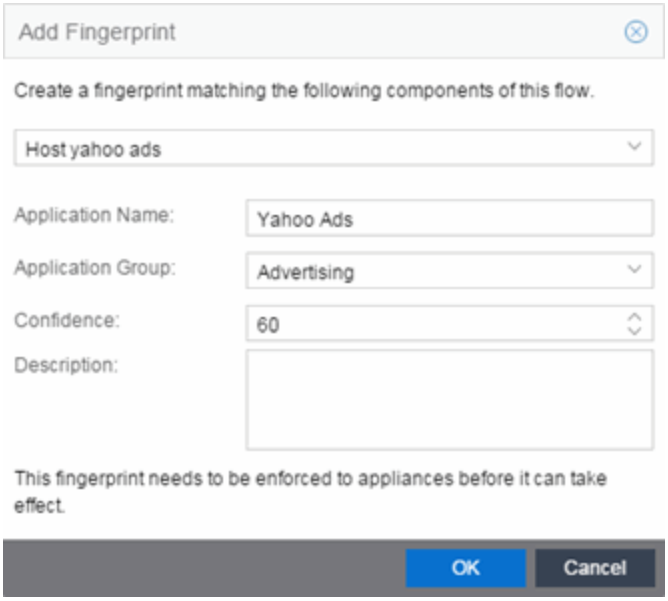
This example demonstrates how to create a fingerprint for some unclassified web traffic.

In the ExtremeCloud IQ - Site Engine Application Flows table (with the Show Unclassified Web Traffic View selected), several flows for the "yahoo ads" application are part of the Web Applications group. The following instructions will enable you to create a fingerprint that provides an application and application group specifically for this traffic, instead of letting it default to the Web Applications group. The new fingerprint categorizes "yahoo ads" flows into the Yahoo Ads ld application and the Advertising application group.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.
3. In the table, select the **Show Unclassified Web Traffic View**.
4. Right-click on a flow with the yahoo ads application and select **Fingerprints** > **Add Fingerprint**.

5. The Add Fingerprint window opens.



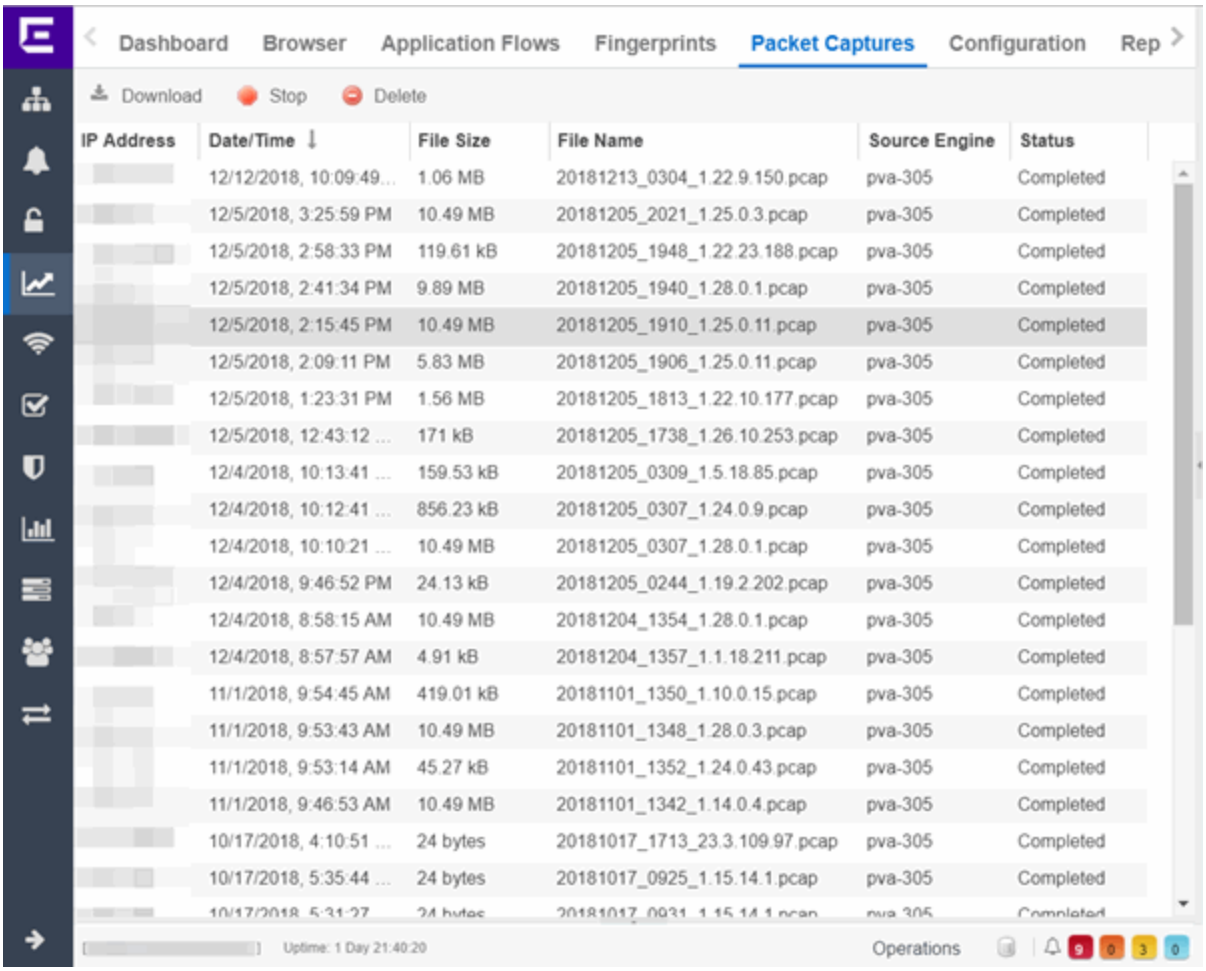
6. Use the drop-down list to select matching the "yahoo ads" host.
7. Set the **Application Name** to **Yahoo Ads**.
8. Set the **Application Group** to **Advertising**.
9. Set the **Confidence** level to **60** (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select **OK** to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

- ExtremeAnalytics tab

ExtremeAnalytics Packet Captures

Packet Captures (pcaps) consist of data included in flows collected by the ExtremeAnalytics engine you can use to analyze and assess the activity and traffic flow to and from IP addresses accessing devices in your network.

The **Packet Captures** tab displays a table with detailed information about pcaps you create from flows on the **Application Flows** tab. Use the **Download** button to download a pcap file you select in the table you can analyze using a packet analyzer. Use the **Stop** button to stop a currently running packet capture. Use the **Delete** button to remove selected pcap(s) from the table. You can also select **Download** and **Delete** by right-clicking on the pcap file in the table.



IP Address

The IP address of the client accessing the packet.

Date/Time

The date and time of the packet capture.

File Size
The file size of the captured packet, in bytes.

File Name
The file name and path of the captured packet.

Source Engine
The ExtremeAnalytics engine that captured the packet.

- ExtremeAnalytics tab

ExtremeAnalytics Configuration Overview

Use the Configuration tab to view detailed information on the ExtremeAnalytics engines you configure. You can also use the tab to add and enforce your engines, and access engine reports and diagnostics. You must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability to view the Configuration tab.

Use the left panel in the Configuration view to access various engine administrative options and reports. This Help topic provides information on the following operations available in the left panel:

- Engines
    - Status
    - Configuration
- Virtual Sensors
- Fingerprints
- Licenses
- Status
- Configuration

Engines

View engine status information, configure web credentials, and configure advanced options for an individual engine.

Add
Adds a new ExtremeAnalytics engine to ExtremeCloud IQ - Site Engine.

Delete
Delete the selected engine.

Enforce
Enforce the selected engine.

Enforce All
Enforces all of the ExtremeAnalytics engines added to ExtremeCloud IQ - Site Engine.

Poll
Poll the selected engine.

Restart Collector
Restarts the ExtremeAnalytics engine's collector process.

Status

Select an engine and expand the menu to select Status, where you can view engine status including flow collector, application sensor, CPU and memory, flow sources, and diagnostic information.

Configuration

Select an engine and expand the menu to select **Configuration**, where you can configure advanced options for the selected ExtremeAnalyticsengine:

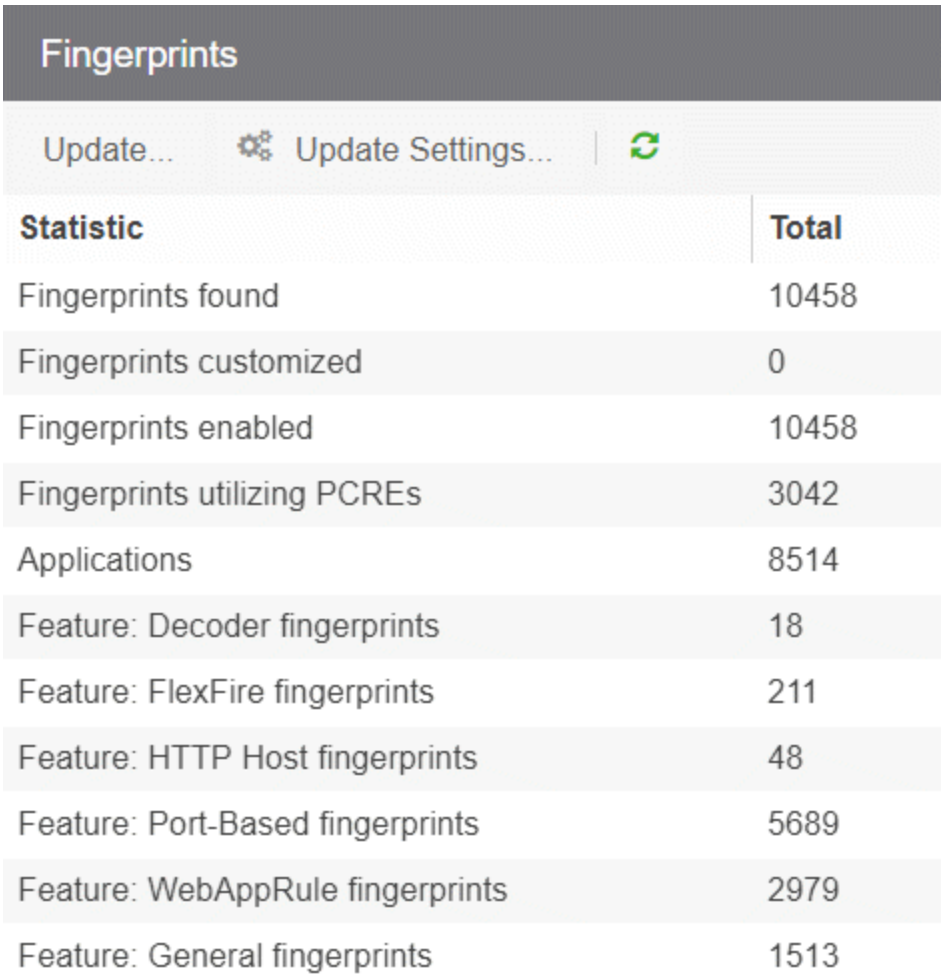
- Set privacy levels.
- Add and enforce Engines.
- Enable ExtremeControl Integration.
- Add advanced configuration properties.
- Enable sensor modules and sensor module logging.
- Add or remove devices as Application Telemetry flow sources.

Virtual Sensors

Select to display the Virtual Sensors tab, which lists all of the available Virtual Machines on your network as well as those configured as Virtual Sensors.

Fingerprints

View data for the application fingerprints in use.



Statistic	Total
Fingerprints found	10458
Fingerprints customized	0
Fingerprints enabled	10458
Fingerprints utilizing PCREs	3042
Applications	8514
Feature: Decoder fingerprints	18
Feature: FlexFire fingerprints	211
Feature: HTTP Host fingerprints	48
Feature: Port-Based fingerprints	5689
Feature: WebAppRule fingerprints	2979
Feature: General fingerprints	1513

Use the Menu icon (☰) to access the following system fingerprint actions:

Update
Perform a manual one-time update of the fingerprint database.

Update Settings
Schedule fingerprint updates to be performed automatically on a daily or weekly basis.

Licenses

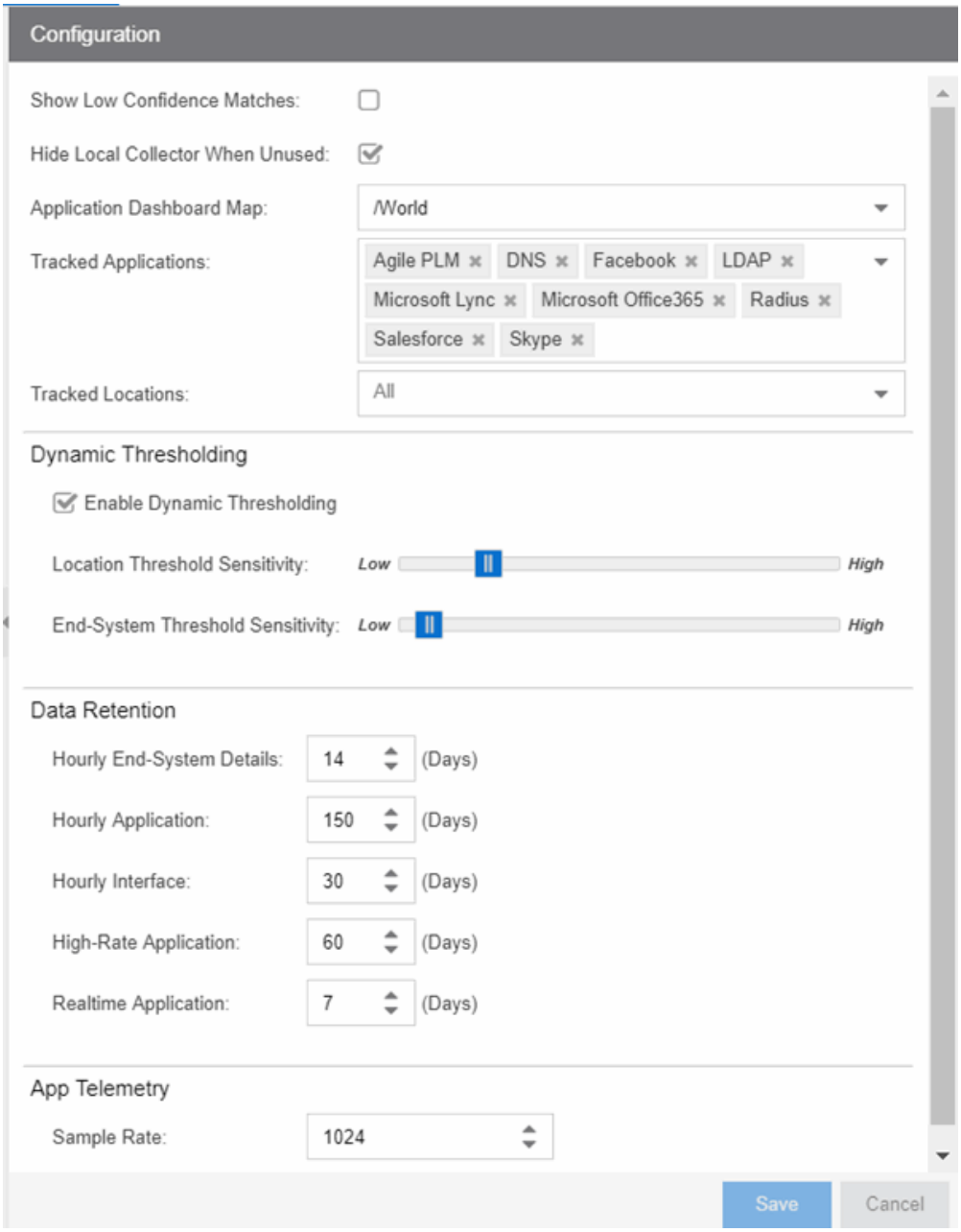
The Licenses window displays data for each license listed, including flow and end-system capacity totals. Select the Add button (⊕) to increase licensing capacity.

Status

View a collection of ExtremeAnalytics system statistics, including Disk Usage and Approximate Row Counts, as well as Device Families and Profiles.

Configuration

Use the Configuration window to configure the application information displayed in the ExtremeAnalytics tab.



Show Low Confidence Matches

Check the box to display flows for which ExtremeCloud IQ - Site Engine has low confidence.

Hide Local Collector When Unused

Check the box to hide local collector information when not in use.

Application Dashboard Map

Select from the drop-down list the map from which to draw application dashboard data.

Tracked Applications

Select the applications to track in the ExtremeAnalytics tab.

Tracked Sites

Select the sites to track on the ExtremeAnalytics tab. Tracked sites are also indicated on the Network > Devices > Sites > Endpoint Locations tab in the right panel.

Dynamic Thresholding

Use the Dynamic Thresholding section of the window to indicate whether to enable dynamic threshold functionality for the Network Service and Tracked Applications dashboards.

When this functionality is enabled, the expected range for application response time is calculated based on past observed response times and a dynamic threshold is assigned. An alarm occurs when any network service or tracked application has a response time measured above its dynamic threshold.

The sliders enable you to adjust the sensitivity of the dynamic threshold by increasing or decreasing the size of the expected response time range. Selecting a lower sensitivity means more time is required for an alarm to occur. Alarms are displayed on the Alarms & Events > Alarms tab.

Data Retention

Use this section of the tab to configure the amount of time ExtremeCloud IQ - Site Engine saves flow data.

App Telemetry

This section enables you to configure the default sample rate ExtremeAnalytics uses when configuring ExtremeXOS/Switch Engine devices on which Application Telemetry is enabled.

- ExtremeAnalytics tab
- Advanced Configuration View
- Add or Enforce Engines in Configuration View
- Add or Remove Devices as Application Telemetry Sources

Virtual Sensors

The Virtual Sensors tab displays all of the available Virtual Machines on your network as well as those configured as Virtual Sensors. The ExtremeAnalytics Virtual Sensor is a virtual machine that monitors application flows across virtual environments.

Virtual Sensors

Use the Virtual Sensors section at the top of the tab to view all of the virtual sensors installed on your network. Select the **Install** button to open the **Install Virtual Sensor on Hypervisor Host** window from which you can add a new virtual sensor. Select a distributed virtual switch from the Virtual Machines section of the window to add it as a virtual sensor. Select a virtual sensor and select **Uninstall** to remove an installed virtual sensor.

Virtual Machines

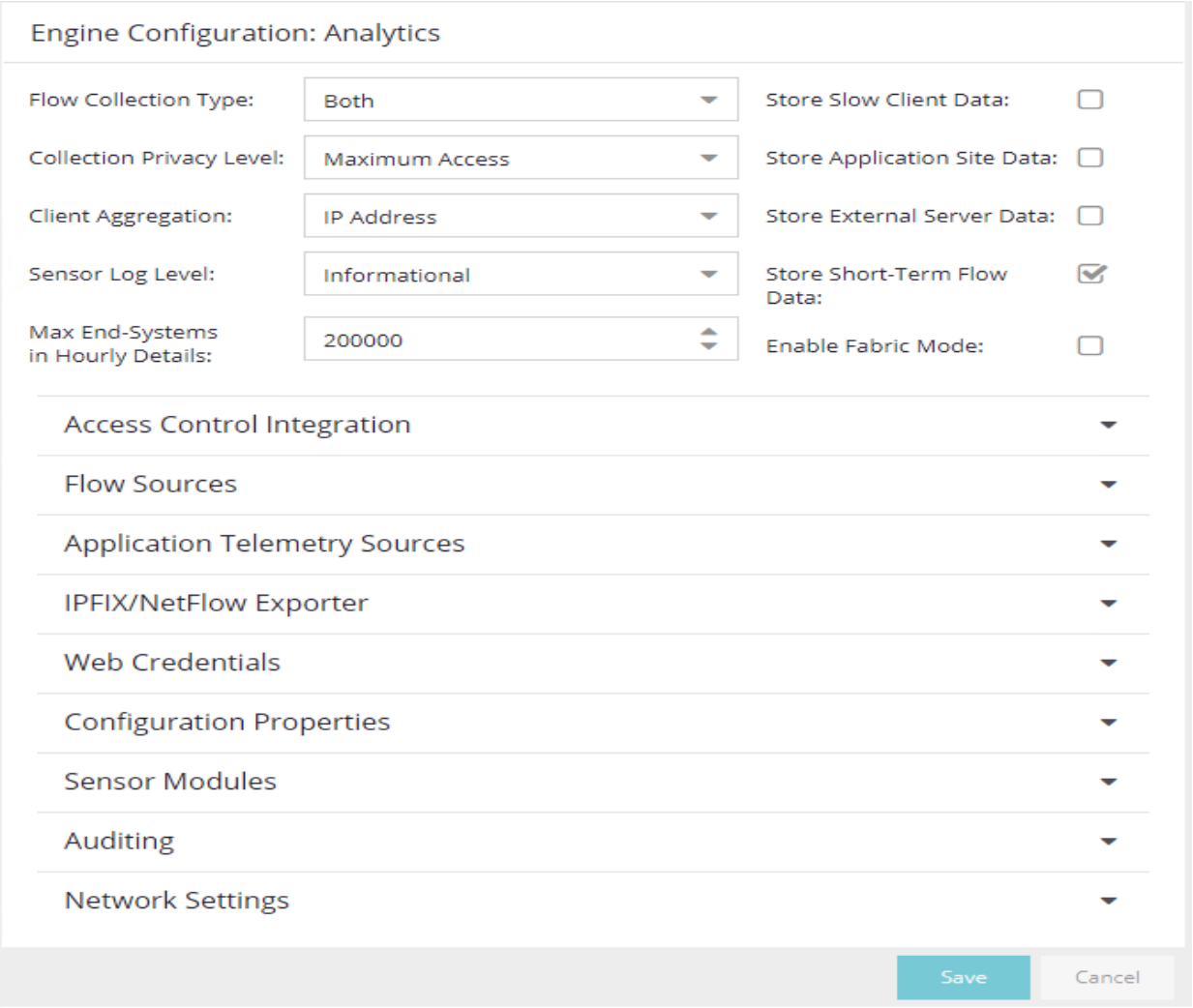
Use the Virtual Machines section at the bottom of the tab to view all of the virtual machines (VMs) discovered by ExtremeCloud IQ - Site Engine on your network.

- ExtremeAnalytics Virtual Sensor Configuration in ExtremeCloud IQ - Site Engine
- Virtual Sensor Installation Guide

ExtremeAnalytics Engine Advanced Configuration

Use the **Advanced Configuration** panel to configure advanced options for the selected ExtremeAnalytics engine. To access this panel, select the **Configuration** view in the **Analytics** tab in the ExtremeCloud IQ - Site Engine. In the left-panel tree, expand an engine and select **Configuration**.

If you make any changes in this window, be sure to select **Save** and then enforce the engine.



Flow Collection Type

Select from **IPFIX/NetFlow**, **App Telemetry** or **Both** from the drop-down list to choose the flow data you are using. Selecting **SFlow** changes the Flow Sources table to an Application

Telemetry Sources table. These tables allow you to select the devices that collect application telemetry data flow by entering the name, IP and device family for that device.

NOTE: Changing an ExtremeAnalytics engine to **Application Telemetry** or **Both** does not update the configuration on the engine. Run the `dnetconfig` process on the engine to change the configuration.

Collection Privacy Levels

Collection privacy level settings restrict the amount of identifying information collected by the ExtremeAnalytics engine and displayed in the Application Information column of the Application Flows report. (Access this report from the **Analytics** tab. In the Application Flows report, hover over the Application Information column to view the collected information.) This information is also displayed in the Flow Summary window.

Increasing the privacy level protects the end user's identifying information from being viewed by IT staff with access to the Application Flows report. The default privacy level allows maximum access to the information. Increasing the privacy level allows you to restrict the information that is collected and displayed.

There are three privacy levels. For all three levels, passwords are **not** collected or displayed.

- Maximum Access — The ExtremeAnalytics engine collects both identifying information and sensitive information. The information displays in the Application Information column.
- Medium Privacy — The ExtremeAnalytics engine collects identifying information, but not sensitive information. Identifying information displays in the Application Information column.
- Maximum Privacy — The ExtremeAnalytics engine does not collect identifying information or sensitive information. Information does not display in the Application Information column.

Identifying information is data that identifies the end user, such as a username. The ExtremeAnalytics engine collects identifying information when the privacy level is set to Maximum Access or Medium Privacy.

Sensitive information is data an end user may not want to share, such as the caller ID or contact information from an end user's SIP voice call. The ExtremeAnalytics engine collects sensitive information when the privacy level is set to Maximum Access.

Client Aggregation

Use this field to determine how client information is aggregated by the ExtremeAnalytics engine, either by **IP Address** or **MAC Address**.

Slow Client Data

Select Enabled in the drop-down list to collect additional information about clients with poor response times by the ExtremeAnalytics engine.

Max End-Systems in Hourly Details

Enter the maximum number of client end-systems stored in the ExtremeCloud IQ - Site Engine database for the ExtremeAnalytics engine. This ensures your client limit is not collected from one engine. When the value set in this field is met, additional end-system data is not collected from the engine.

Sensor Log Levels

The ExtremeAnalytics sensor runs on the ExtremeAnalytics engine and inspects network traffic to identify applications and other information. The sensor log file records diagnostic information about sensor operations, which is useful for troubleshooting engine issues.

In the Configuration view, you can enable different levels of logging for the selected engine. Each logging level is inclusive of the levels above it. The five levels are:

- Informational
- Debug
- Verbose Debug
- Trace
- All

The sensor log level should be set to Informational unless you are troubleshooting an engine issue. When troubleshooting an issue, Extreme Networks Support may ask you to change the logging level to provide additional information.

To view the log file directly, log into the engine and navigate to the file /opt/appid/logs/appid.log.

You can also use the engine administration web page to view the sensor log. Access the web page using the following URL: https://<EngineIP or hostname>:8443/Admin. The default user name and password is "admin/Extreme@pp." When you have accessed the web page, navigate to the Log Files/Sensor Log page.

Store Application Site Data

Select this checkbox to allow the high-rate collector to store client count, flow count, bytes, received bytes, sent bytes, application response time, and network response time by application for a site. If this checkbox is selected, the Application/Site option is available as a Target in the

Applications Browser when **Data Table** is **Application Data - High-rate** to display the information.

Enable Fabric Mode

Select this checkbox when unidirectional flows for the same communication come from different switches. Enable if SLX/VOSS/Fabric Engine switches are part of the fabric.

ExtremeControl Integration

If your network configuration includes ExtremeControl, ExtremeControl data can be integrated with flow data to provide additional information. ExtremeControl integration is only useful if you are collecting flows for end-systems managed by ExtremeControl. For additional information, see Enabling ExtremeControl Integration.

- To enable ExtremeControl Integration for the engine, select the **Enable ExtremeControl Integration** checkbox.
- If your ExtremeControl engines are using Communication Channels, select the **ExtremeControl Communication Channel** option and enter the channel name. The ExtremeAnalytics engine is only able to access end-systems in its channel.

Flow Sources/Application Telemetry Sources

Use these sections to display the devices configured as flow sources or application telemetry sources in ExtremeAnalytics.

To add or remove a device as a flow source or an application telemetry source, see Adding and Removing Devices as Flow Sources Using the ExtremeAnalytics Advanced Configuration View.

Additional information about Application Telemetry ACL mirror definition

The definition of the ACL mirror is present in the file `/usr/local/Extreme_Networks/NetSight/appdata/Purview/Fingerprints/telemetry.pol` (if you are using the default installation directory).

The `telemetry.pol` file is transferred and activated in the telemetry source when you add **Application Telemetry Sources**.

- **On Switch Engine/EXOS**: Application Telemetry uses the `telemetry.pol` and `telemetryegress.pol` files.
- **On Fabric Engine/VOSS**: Application Telemetry uses the `apptelemetry.pol` or the `sflow.pol` file. The filter rules can exist in either file. The `sflow.pol` file is the default file and is included with the switch firmware image. This file contains the default filter rules.

The `apptelemetry.pol` file is the user-defined file, which can be updated by the ExtremeCloud IQ - Site Engine through script `Factory script to update app-telemetry policy file`.

What you need to know about the `telemetry.pol` file:

NOTES:

- It is a standard EXOS/Switch Engine policy file. See the Switch Engine documentation for syntax and details.
- Custom changes to the file are overwritten when ExtremeCloud IQ - Site Engine is upgraded.
- Custom changes to file are not part of the application backup.
- Changing the file does not require a reboot.
- Changes to the file are not automatically propagated to switches that are already configured.
- It is recommended that you make a backup of the file before any custom modifications are made.
- Custom modifications to the file have an impact on switch resources (ACLs).
- Custom modifications to the file have an impact on the ExtremeAnalytics engine resources (NIC card and CPU).
- Custom modifications to the file have an impact on network utilization (transport of the mirrored traffic).

This is an example of custom addition to `telemetry.pol`.

```
entry smtp {
if match all {
    protocol tcp ;
    destination-port 25 ;
}
then {
    mirror EAN ;
    count smtpcnt ;
}
}
```

Where:

- SMTP is a unique identifier
- Protocol and destination-port are traffic conditions.
- EAN is the name of the ACL mirror used by ExtremeAnalytics.
- SMTPCNT is the name of the ACL counter (configurable).

Web Credentials

Enter a new Username and Password for web service requests between the ExtremeCloud IQ - Site Engine server and the ExtremeAnalytics engine. Select the Show Password checkbox to display the Password field unencrypted.

NOTE: By default, the Username and Password are admin and Extreme@pp, respectively.

Configuration Properties

Use this section to add properties that provide a solution for a specific problem or task. These properties are supplied directly by Extreme Networks Support. Contact Extreme Networks Technical Support for guidance on using this section.

Sensor Modules

The ExtremeAnalytics sensor uses sensor modules to analyze different types of network traffic. For example, the HTTP decoder decodes HTTP traffic to acquire data needed to match fingerprints against that traffic.

In most cases, it is best to leave the decoders and detectors enabled. For better sensor performance, you can disable decoders for traffic rarely seen on the network; however, doing so prevents some fingerprints from triggering.

You can enable logging for any of the decoders and detectors for debugging purposes. As logging can impact disk space and performance, turn it on only for troubleshooting purposes. Do not enable logging during normal operation.

Auditing

Use this section to enable auditing of users connected to the ExtremeAnalytics engine CLI via SSH.

Enable Auditing
Selecting the Enable Auditing option enables the Auditing Rules field, where you can configure ExtremeCloud IQ - Site Engine to store all commands entered by a user connected to the ExtremeAnalytics engine CLI via SSH in the engine's local syslog file.

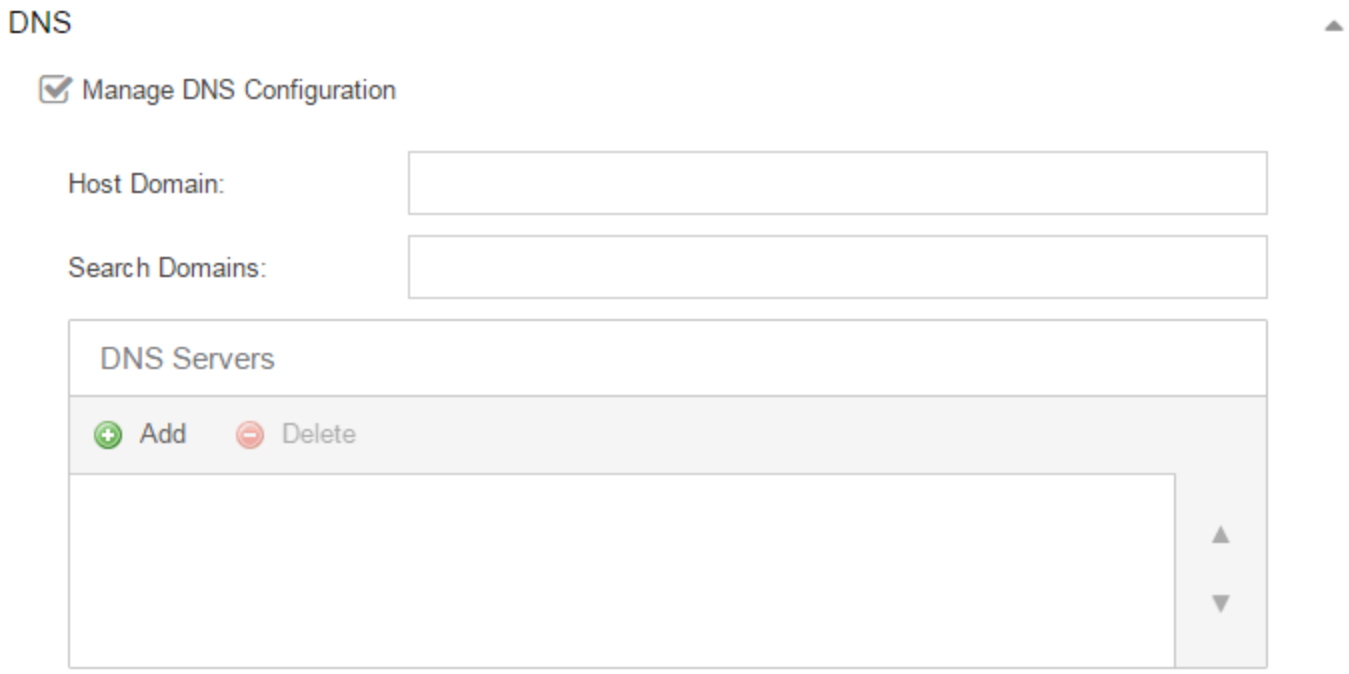
Auditing Rules
Remove the # symbol from the beginning of a command line to enable the command and store user commands entered using the ExtremeAnalytics engine CLI.

Network Settings

Use the Network Settings section of the window to configure the network settings on an ExtremeAnalytics engine. Selecting a checkbox opens a new section from which you can configure the options for the setting. Select the **Save** button and the bottom of the panel to save your changes.

DNS

Select the **Manage DNS Configuration** checkbox to open the DNS Servers area. This allows you to enter a search domain or add or remove search domains and DNS server IP addresses.

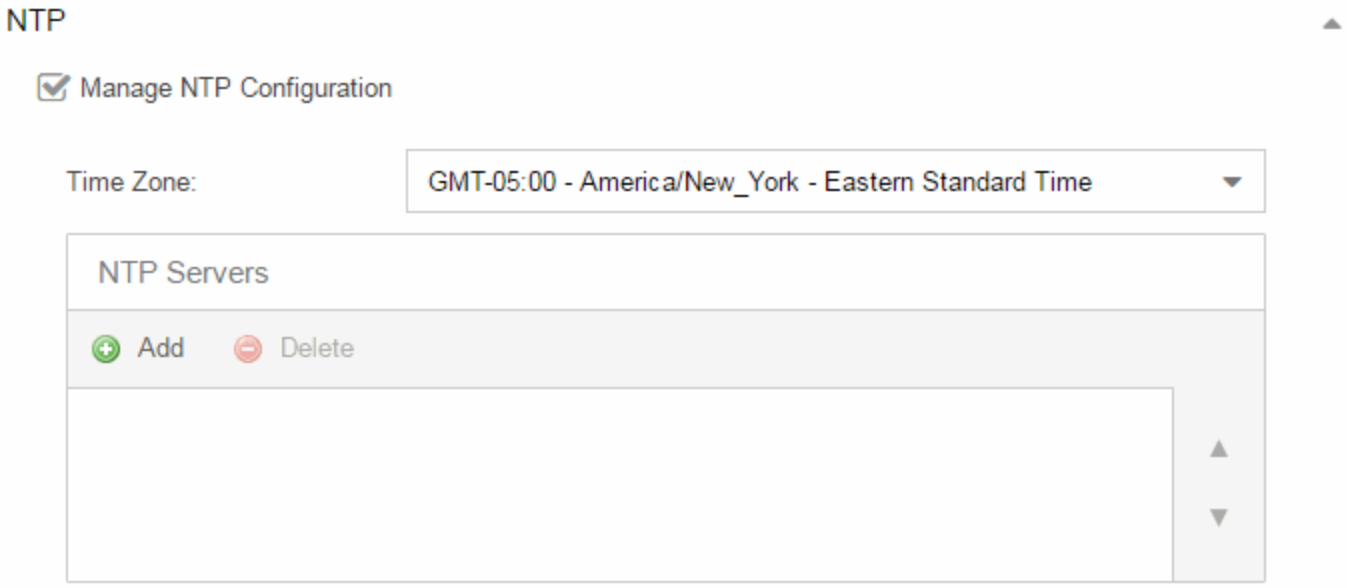


Search Domains
A list of search domains used by the ExtremeAnalytics engine when doing lookups by hostname. When an attempt to resolve a hostname is made, these domain suffixes are appended to the hostname of the device. For example, if someone does a ping to server1, ExtremeAnalytics appends the search domains in an attempt to resolve the name: server1.domain1 server1.domain2, and so on.

DNS Servers
A list of DNS servers the ExtremeAnalytics engine sends DNS lookups to for name resolution. The list is used by both hostname resolution and by the DNS proxy. Select the **Add** button to open a blank box in which you can enter an IP address. Select an IP address in the table and select the **Delete** button to remove an IP address. You can enter multiple servers for redundancy. Use the **Up** and **Down** arrows to list the servers in the order they should be used.

NTP

Select the **Manage NTP Configuration** checkbox to open the NTP (Network Time Protocol) Servers area. NTP configuration is important for protocols such as SNMPv3 and RFC3576 which incorporate playback protection. In addition, having accurate time configured on the ExtremeAnalytics engine is essential for event logging and troubleshooting.

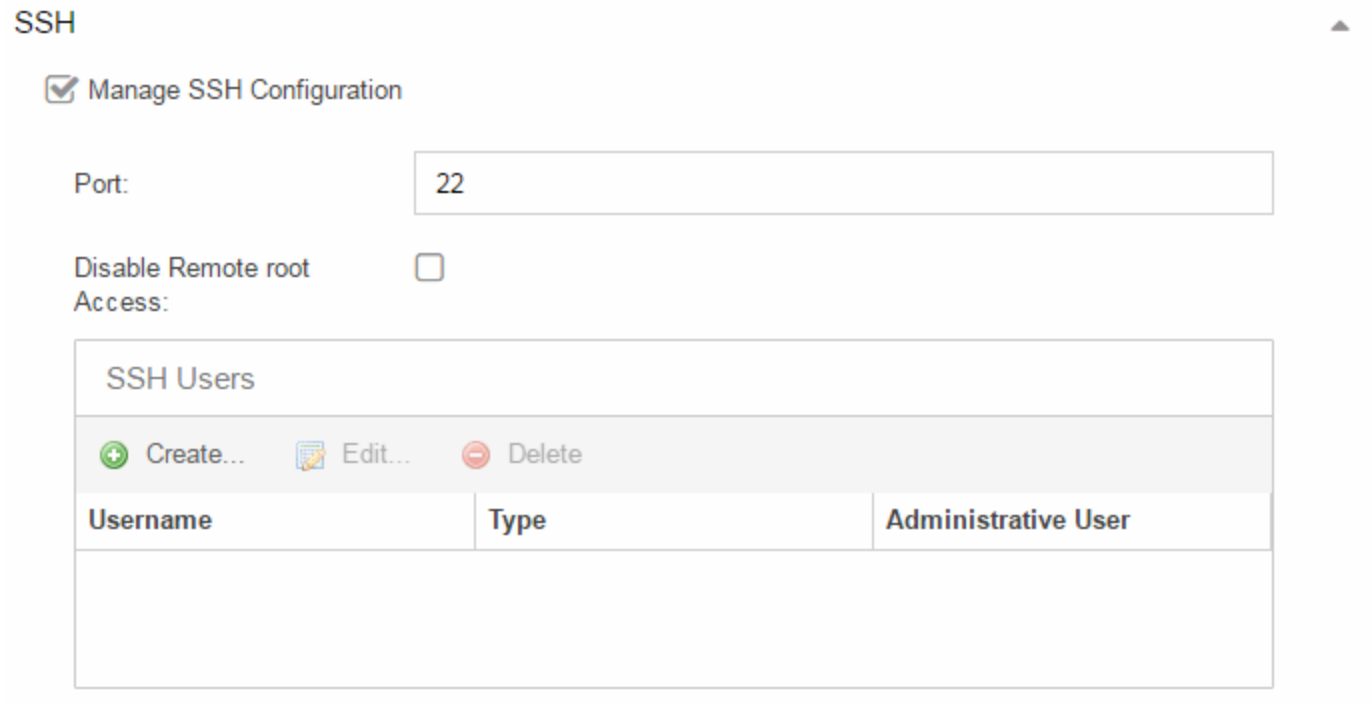


Time Zone
Select the appropriate **Time Zone** from the drop-down list to allow ExtremeAnalytics to manage date/time settings.

NTP Servers
A list of NTP servers. You can enter multiple servers for redundancy. Select the **Add** button to open a blank box in which you can enter an IP address. Select an IP address in the table and select the **Delete** button to remove an IP address. Use the **Up** and **Down** arrows to list the servers in the order they should be used.

SSH

Select the **Manage SSH Configuration** checkbox to open the SSH Users area. SSH configuration provides additional security features for the ExtremeAnalytics engine.



Port
The port field allows you to configure a custom port used when launching SSH to the engine. The standard default port number is 22.

Disable Remote root Access
Select this option to disable remote root access via SSH to the engine and force a user to first log in with a real user account and then su to root (or use sudo) to perform an action. When remote root access is allowed, there is no way to determine who is accessing the engine. With remote root access disabled, the /var/log/message file displays users who log in and su to root. The log messages looks like these two examples:

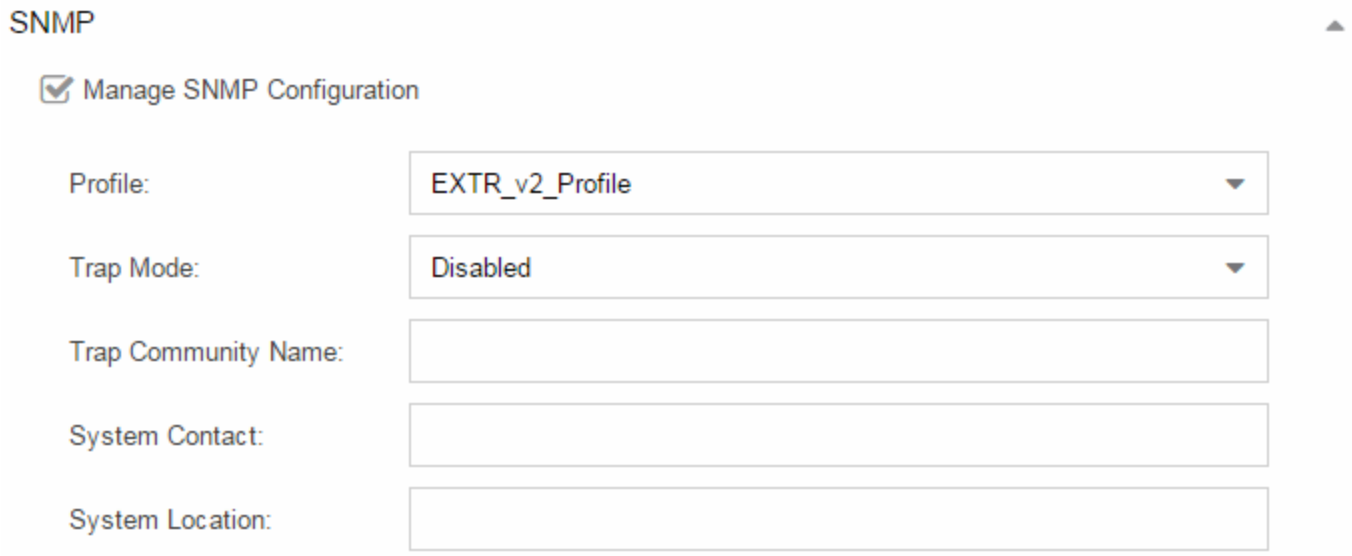
sshd[19735]: Accepted password for <username> from 10.20.30.40 port 36777 ssh2
su[19762]: + pts/2 <username>-root

Enabling this option does not disable root access via the console. Make sure that you don't disable root access unless you have configured RADIUS authentication or this disables remote access to the ExtremeAnalytics engine.

SSH Users
Use the toolbar buttons to create a list of users allowed to log in to the ExtremeAnalytics engine using SSH. Select the **Add** button to open a blank box in which you can enter an IP address. Select an IP address in the table and select the **Delete** button to remove an IP address. You can add Local and RADIUS users and grant the user Administrative privileges, if appropriate. A user that is granted administrative rights can run sudo commands and commands that only a root user would be able to run.

SNMP

Use the SNMP configuration section to deploy SNMP credentials for the ExtremeAnalytics engine. The credentials can include different read/write credentials, for example, use "public" as the read credential and "private" as the write credential. In addition, basic host traps can be enabled from the ExtremeAnalytics engine. Select the Manage SNMP Configuration checkbox and provide the following SSH information.



Profile
Use the drop-down list to select a device access profile to use for the ExtremeAnalytics engine.

Trap Mode
Use the drop-down list to set the trap mode.

Trap Community Name
Enter the trap community name.

Interfaces

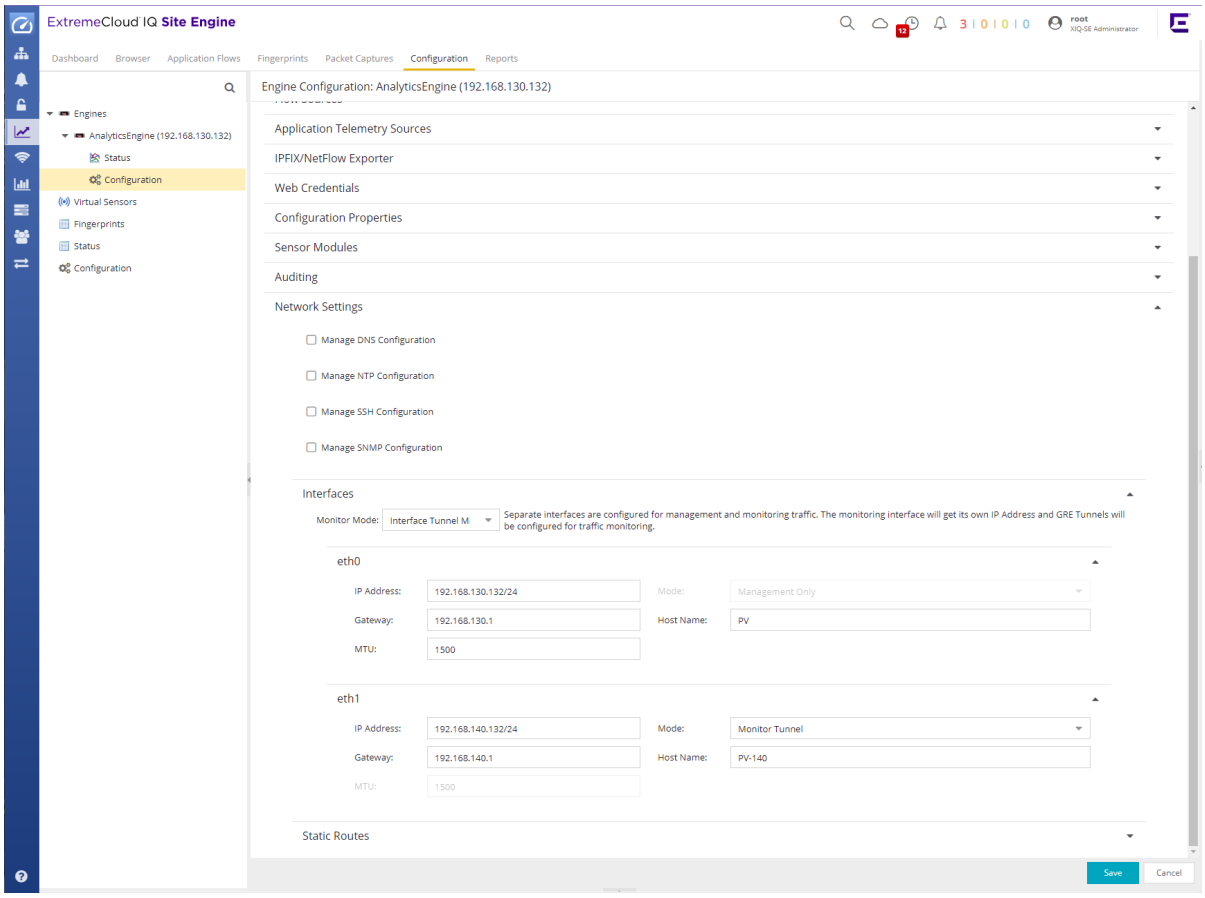
Select a Monitor Mode from the drop-down list.

- **Single ERSPAN**
  A single interface is configured for management and ERSPAN traffic.
- **Single Interface**
  A single interface is configured for both management and monitoring traffic. A Generic Routing Encapsulation (GRE) Tunnel is configured for traffic monitoring.

- **Dual Tap Mirror-N**
  Separate interfaces are configured for management and monitoring traffic. The monitoring interface is put into tap mode for traffic monitoring.
- **Dual Tunnel Mirror-N**
  Separate interfaces are configured for management and monitoring traffic. The monitoring interface gets its own IP Address and GRE Tunnels are configured for traffic monitoring.
- **Manual Mode**
  The interface and tunneling configuration is not modified by this script. You can manually edit the configurations.

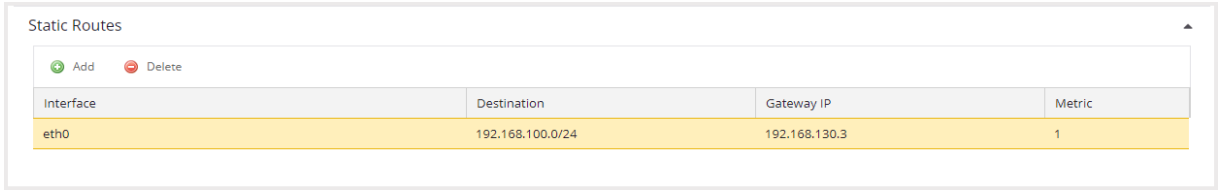
After you choose a Monitor Mode, at least one Ethernet port (typically eth0) must be configured. The Mode choices for Ethernet ports depend on the value of the Monitor Mode; eth0 defaults to either Management Only or Management and Monitor. If you have added any additional Ethernet ports, the available Mode options are also dependent on the Monitor Mode. The Modes are defined as follows:

- **Management Only**
  The mode is used for the communication with ExtremeCloud IQ - Site Engine.
- **Management and Monitor**
  This mode is used for the communication with ExtremeCloud IQ - Site Engine and the GRE Tunnels with flow/ telemetry sources.
- **Monitor Tap**
  The mode is used for raw data from the first N mirror.
- **Disabled**
  This mode is administratively down.
- **Listen Only**
  This mode is up and listens for the traffic.
- **Monitor Tunnel**
  This mode is used for GRE Tunnels with flow sources.



Static Routes

Static Routes defines additional static routes if the default route is not to be used for some destinations.



ExtremeAnalytics Reports

The Analytics tab lets you view and customize ExtremeAnalytics reports and application flow data, as well as manage and configure your ExtremeAnalytics engines.

NOTE: ExtremeAnalytics reports and application flow data is not available unless an ExtremeAnalytics engine is configured and you are a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read Access or Read/Write Access capability.

Reports

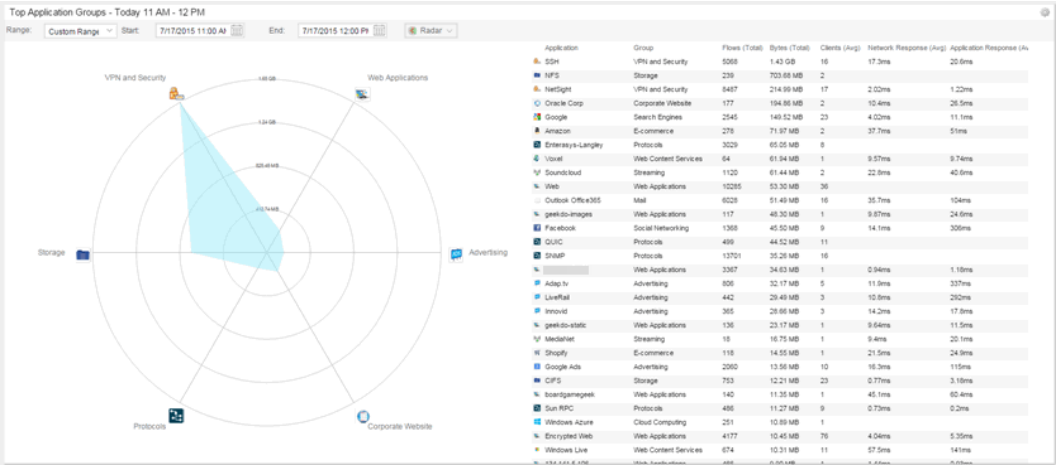
In the Reports tab, you can access a selection of reports that provide detailed information on application usage on your network, as well as network activity statistics based on application, user name, client, and site. For many of the reports, you can select an item in the report to view details or right-click an item to select from other focused reports.

If you have multiple ExtremeAnalytics engines, use the Engine drop-down list to select an engine to use as the source for the report data. Then use the Report drop-down list to the right to access the different reports:

- Analytics Events
- Bandwidth for a Client Over Time
- Interface Top Applications Tree Map
- Sites Using the Most Bandwidth
- Most Popular Applications
- Most Used Applications for a Client
- Most Used Applications for a User Name
- Network Activity by Site
- Network Activity by Client
- Network Activity by Application
- Slowest Application by Site
- Top Applications Group Radar
- Top Applications Radar
- Top Applications Tree Map
- Top Clients by Interface
- Top Interfaces by Application
- Top N Applications

- Top N Clients
- Top N Servers

In most of the reports, use the **Gear** button (on the right side of the view) to display a **Start Time** option that allows you to change the length of the reporting period displayed. Depending on the report, you can also change the type and/or format of the data reported, and the number of results to return.



Some of the reports are based on a specific object (target), such as a user name, client, application, or site. In those reports, enter the required information and then select the **Submit** button to generate the report. You can enter a partial value in the text field or use the SQL wildcard "%" (as a substitute for multiple characters) or "_" (as a substitute for a single character) to generate a report with multiple matches.

NOTE: Values entered in the text fields that contain multiple, non-alphanumeric characters can cause issues with the returned results. If this happens, use alternate values.

- ExtremeAnalytics tab

ExtremeAnalytics Report Descriptions

The **Analytics** tab lets you view and customize ExtremeAnalytics reports and application flow data, as well as manage and configure your ExtremeAnalytics engines.

NOTE: ExtremeAnalytics reports and application flow data is not available unless an ExtremeAnalytics engine is configured and you are a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read Access or Read/Write Access capability.

Report Descriptions

In the Reports tab, you can access a selection of reports that provide detailed information on application usage on your network, as well as network activity statistics based on application, user name, client, and site. For many of the reports, you can select an item in the report to view details or right-click an item to select from other focused reports.

If you have multiple ExtremeAnalytics engines, use the **Engine** drop-down list to select an engine to use as the source for the report data. Then use the Report drop-down list to the right to access the different reports:

- Analytics Events
- Bandwidth for a Client Over Time
- Interface Top Applications
- Sites Using the Most Bandwidth
- Most Popular Applications
- Most Used Applications for a Client
- Most Used Applications for a User Name
- Network Activity by Site
- Network Activity by Client
- Network Activity by Application
- Slowest Application by Site
- Top Applications Group Radar
- Top Applications Radar
- Top Applications Tree Map
- Top Applications for Interface
- Top Applications for Server
- Top Clients by Interface
- Top Interfaces by Application

- Top N Applications
- Top N Clients
- Top N Servers

Analytics Events

This report displays the event log filtered to show only the events related to ExtremeAnalytics.

Bandwidth for a Client Over Time

This report displays the bandwidth used by the specified client, provided as a line chart showing average bytes used over time. Enter a client's IP address or hostname and then select the **Submit** button to generate the report.

Interface Top Applications Treemap

This report displays the top applications for the top switch interfaces (devices) with application telemetry enabled.

NOTE: You need to first enable the application telemetry feature on ExtremeXOS/Switch Engine switches from the **Analytics > Configuration** tab.

Sites Using the Most Bandwidth

This report displays the network sites with the highest bandwidth, provided as a bubble map.

Most Popular Applications

This report displays the applications used the most, based on the number of unique client IP addresses associated with them. Select on an application name to open a report showing the top clients for that application. Select a client from the report to display an End-System Applications Summary for that client

Most Used Applications for a Client

This report displays the applications used the most by the specified client, based on bandwidth. Enter a client's IP address or hostname and then select the **Submit** button to generate the report.

Most Used Applications for a User Name

This report displays the applications used the most by the specified user, based on bandwidth. Enter a client's user name and then select the **Submit** button to generate the report.

Network Activity by Site

This report displays network traffic statistics and application and network response time for each site.

Network Activity by Client

This report displays network traffic statistics for the specified client. Enter a client's IP address or hostname and then select the **Submit** button to generate the report.

Network Activity by Application

This report displays network traffic statistics for the specified application. Enter an application name and then select the **Submit** button to generate the report.

Slowest Applications by Site

This report displays the applications with the highest application response times for the specified site. Select a site from the drop-down list to match or select All and then select the **Submit** button to generate the report. If a site has been added to a map, you also see a selection for that map. If you select custom, you can enter a partial site name or use the SQL wildcard characters to match one or more sites.

Top Applications Group Radar

In the **Top Applications Group Radar** report, the info bar provides an overview of application group usage in a radar format. Use the **Start** calendar to select the start date and time and the format to display.

Top Applications Radar

In the **Top Applications Radar** report, the info bar provides an overview of application usage in a radar format. Use the **Start** calendar to select the start date and time and the format to display.

Top Applications TreeMap

This report displays hierarchical data on application bandwidth usage, grouped by application group and displayed in sets of colored nested rectangles. This design allows you to easily see patterns of bandwidth usage that might otherwise be difficult to spot. Select an application group to zoom in and view data for that group. Hover over an application cell to view bandwidth for a particular application. Right-click on an application cell to access additional reports for that application.

Use the **Gear** button to change the start date and time to display. Set the scale to Linear to view the data scaled proportionately; set the scale to Log to make smaller rectangles of data more visible. Use the combo box to change how the data is displayed: by bandwidth, client count, or flow count.

Top Applications for Interface

This report displays the top applications for a specified interface (device) with application telemetry enabled (wildcards allowed).

NOTE: You need to first enable the application telemetry feature on ExtremeXOS/Switch Engine switches from the Analytics > Configuration tab.

Top Applications for Server

This report displays the top applications for a device configured as a server with application telemetry enabled (wildcards allowed).

NOTE: You need to first enable the application telemetry feature on ExtremeXOS/Switch Engine switches from the Analytics > Configuration tab.

Top Clients by Interface

This report displays the top clients for a specified switch interface (device) with application telemetry enabled (wildcards allowed).

NOTE: You need to first enable the application telemetry feature on ExtremeXOS/Switch Engine switches from the Analytics > Configuration tab.

Top Interfaces by Application

This report displays the top interfaces (device) for a specified application with application telemetry enabled (wildcards allowed).

NOTE: You need to first enable the application telemetry feature on ExtremeXOS/Switch Engine switches from the Analytics > Configuration tab.

Top N Applications

This report displays application information, provided as a bar graph. Use the fields in the menu to configure the information displayed in the report:

- Top N — Select the number of clients displayed in the chart.
- Start — Select the start date and time.
- # Hours — Select the amount of time for which data is displayed from the date and time selected in Start.
- Statistic — Select the statistic by which the top clients are listed.
    - Bandwidth
    - Flows

- Client Count

Top N Clients

This report displays client information, provided as a bar graph. Use the fields in the menu to configure the information displayed in the report:

- Top N — Select the number of clients displayed in the chart.
- Start — Select the start date and time.
- # Hours — Select the amount of time for which data is displayed from the date and time selected in Start.
- Statistic — Select the statistic by which the top clients are listed.
    - Bandwidth
    - Flows
    - Number of Applications

Top N Servers

This report displays server information, provided as a bar graph. Use the fields in the menu to configure the information displayed in the report:

- Top N — Select the number of clients displayed in the chart.
- Start — Select the start date and time.
- # Hours — Select the amount of time for which data is displayed from the date and time selected in Start.
- Statistic — Select the statistic by which the top clients are listed.
    - Bandwidth
    - Flows
- ExtremeAnalytics tab

Add and Modify Fingerprints

ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

For additional information, see Getting Started with ExtremeAnalytics.

This Help topic provides the following information:

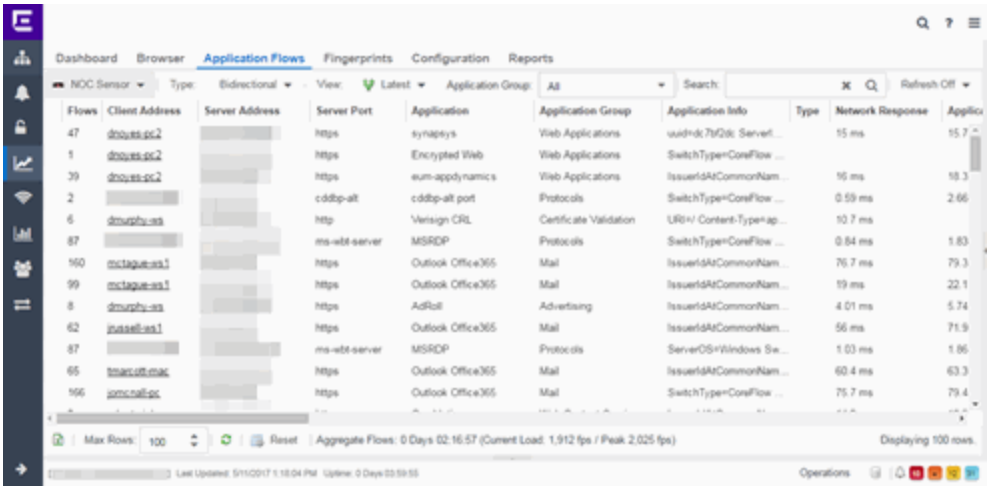
- Adding a Fingerprint
- Modifying a Fingerprint
- Enabling or Disabling a Fingerprint
- Deleting a Custom Fingerprint
- Updating Fingerprints

In order to add and modify fingerprints, you must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability.

Adding a Fingerprint

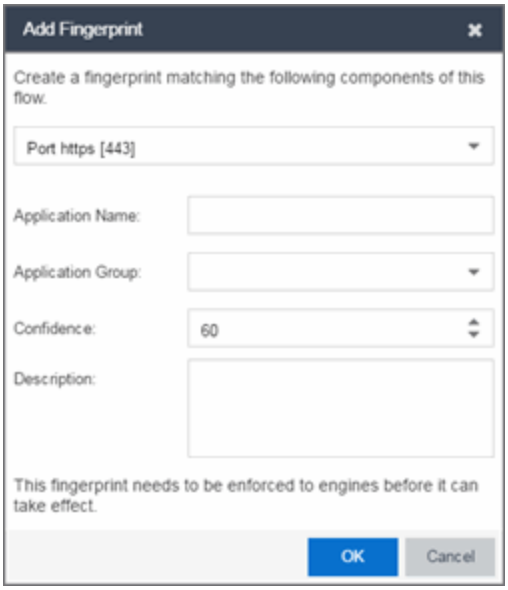
Use the following steps to add a new custom fingerprint based on an existing flow in the Applications Flows view.

1. Select the **Analytics** tab and then select the **Application Flows** view.



2. Select the flow in the table that you want to base your new custom fingerprint on.

3. Right-click on the flow and select the **Fingerprints** > **Add Fingerprint** option. The Add Fingerprint window opens.



4. Use the drop-down list to select the flow components on which to base the fingerprint. The options vary depending on the fingerprint you initially selected.
    - **Port <port number>** — Creates a fingerprint that identifies traffic either coming from or going to the specified port.
    - **Address <IP address> on port <port number>** — Creates a fingerprint that identifies traffic either coming from or going to this IP address on the specified port.
    - **Address <IP address> with mask on port <port number>** — Creates a fingerprint that identifies traffic either coming from or going to the specified subnet on the specified port. For example, an IP address of 192.168.0.0 with a mask of 16 would result in all traffic either coming from or going to the 192.168 subnet on the specified port to be identified by the fingerprint.
    - **Host <host name>** — Creates a fingerprint that identifies a specific hostname in the URI of web traffic.
    - **HTTP Header** — Creates a fingerprint that identifies traffic containing specified HTTP header information, if HTTP header information is included in the flow's metadata.

    Note that there can be two port number or IP address options listed: one for the flow's source port/IP address and one for the flow's destination port/IP address.
5. If you selected an IP address with mask option, you need to specify a subnet of IP addresses. Enter the IP CIDR mask, which is a mask on the flow IP, with 0-32 for IPv4 and 0-128 for IPv6.
6. Enter the name of the application for which the fingerprint is defined.
7. Use the drop-down list to select the application group to which the application belongs. If none of the existing groups are appropriate, you can enter a new group name and the new group is automatically created.

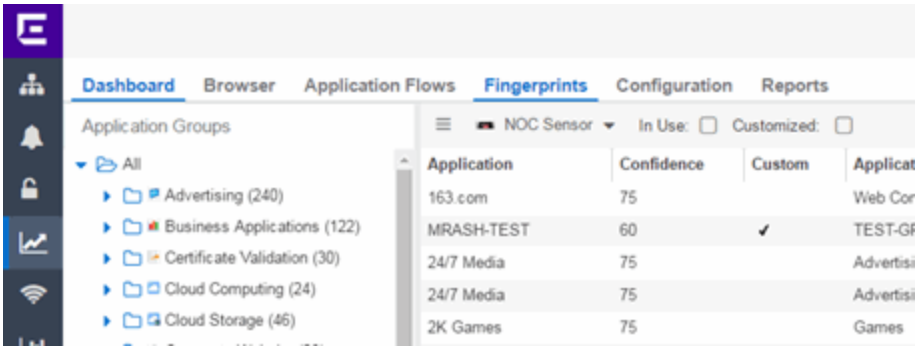
8. Select the fingerprint's confidence level. The confidence level defines the reliability of this fingerprint. Higher confidence fingerprints override lower confidence fingerprints, if multiple fingerprints match a flow. Values are 1-100, with 100 being absolutely reliable.
9. Enter a description of the fingerprint, if desired.
10. Select **Save**. The new fingerprint is created on the ExtremeCloud IQ - Site Engine server.
11. Enforce to push the new fingerprint to your engines.

TIP: You can also create a custom fingerprint from the Fingerprints tab. Select the **Menu** icon and select **Create Fingerprint**. The Add Fingerprint window opens where you can select all the flow components you want for the fingerprint. The new fingerprint is not based on an existing fingerprint and you need to enter values for all required fields such as **IP** or **Hostname**, **Application Name**, and **Application Group**. The new fingerprint must be enforced to engines before it can take effect.

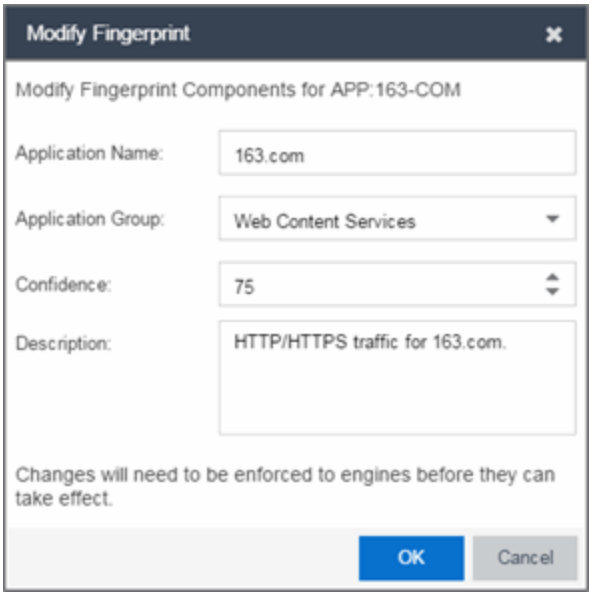
Modifying a Fingerprint

Modify a fingerprint's application name, application group, confidence level, and description from the Fingerprints tab.

1. Select the **Analytics** > **Fingerprints** tab.



2. Right-click on the desired fingerprint and select **Modify Fingerprint** from the menu. The Modify Fingerprint window opens.



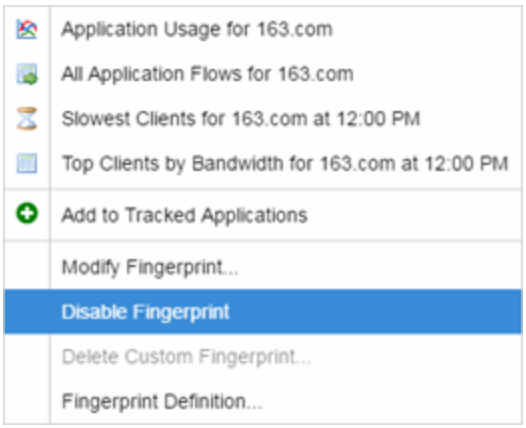
3. Make the desired changes:
    - Application Name — The name of the application that the fingerprint detects. If you change the application name, you are prompted to select whether to change the application name for only the currently selected fingerprint or for all fingerprints that have that same application name.

      NOTE: If you change both the Application Name and Application Group:
      If the new Application Name matches an existing name, the application group changes to the new group for all fingerprints with that new name, regardless of whether you choose to change the name for only the selected fingerprint or for all fingerprints with that name.
    - Application Group — Organizes fingerprints into different types of applications such as Web applications or Business applications. You can sort the Application Flows view by application group, making it easier to view the data. If you change the application group for a fingerprint, it changes the group for all fingerprints with that same application name. If none of the existing groups are appropriate, you can create a new group by entering a new group name.
    - Confidence — Defines the reliability of this fingerprint. Higher confidence fingerprints override lower confidence fingerprints, if multiple fingerprints match a flow. Values are 1-100, with 100 being absolutely reliable. The confidence level only applies to the currently selected fingerprint.
    - Description — A description of the fingerprint. The description only applies to the currently selected fingerprint.
4. Select OK.
5. Enforce to push the change to your engines.

Enabling or Disabling a Fingerprint

Enable or disable a fingerprint from the Fingerprints tab. When a fingerprint is enabled, it is used to identify applications. When it is disabled, it is ignored.

1. Select the **Analytics** > **Fingerprints** tab.
2. Right-click on the desired fingerprint in the Fingerprints table and select either **Enable Fingerprint** or **Disable Fingerprint**.



3. Enforce to push the change to your engines.

NOTE: If you disable a system fingerprint, it becomes a custom fingerprint. If you then enable the fingerprint, it remains a custom fingerprint. Deleting the custom fingerprint reloads the original system fingerprint.

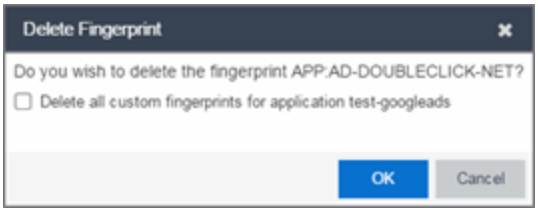
Deleting a Custom Fingerprint

Delete a custom fingerprint from the Fingerprints tab. A custom fingerprint is either a new user-defined fingerprint, a modification of a system fingerprint, or a disabled fingerprint. (Custom fingerprints can be identified by a ✓ in the Custom column.)

When you delete a custom fingerprint, it is removed entirely. If you delete a custom fingerprint overriding a system fingerprint, the original system fingerprint is reloaded. System fingerprints that have not been modified cannot be deleted, however, they can be disabled.

Use these steps to delete a custom fingerprint:

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine and then select the Fingerprints view
2. Right-click on the desired fingerprint in the Fingerprints table and select **Delete Custom Fingerprint**. The Delete Fingerprint window opens.



3. You can delete only the selected fingerprint or select the option to delete all custom fingerprints that match the application name of the selected fingerprint.
4. Select **OK**. If a custom fingerprint overrides a system fingerprint, then deleting the custom fingerprint reloads the original system fingerprint.
5. Enforce to push the change to your engines.

Updating Fingerprints

New and updated fingerprints are provided via a fingerprint update website. Perform a one-time manual update of the fingerprint database or configure a scheduled update to be performed automatically from the Configuration tab. Custom fingerprints are not overwritten when an update is performed.

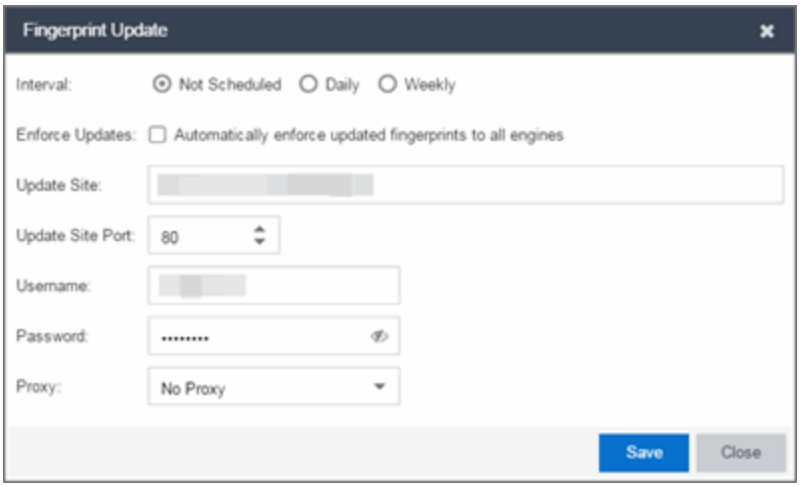
When a fingerprint update is performed, the fingerprint update server is checked for newer fingerprints than what is available on the ExtremeCloud IQ - Site Engine server. If there are newer fingerprints, they are downloaded, and the fingerprint definitions are updated with any new fingerprint definition files. You need to enforce your engines following an update to push the updated fingerprints to the engines.

Perform a Fingerprint Update

Perform a manual one-time update of the fingerprint database. To access the update website, you need to create an Extranet account at ExtremeNetworks.com and define a username and password for the account. You need the username and password in order to perform updates.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine and then select the **Configurations** view.
2. In the left-panel tree, expand the System folder and select **Fingerprints**.
3. Select the **Menu** icon (☰) and select **Update Fingerprints**. If you have already configured your Fingerprint Update settings, the update is performed immediately.

   If you have not configured your settings, the Fingerprint Update window opens.



a. Leave the **Interval** selection as **Not Scheduled**.

b. Select the **Enforce Updates** checkbox to automatically update fingerprints on all engines. Not selecting this checkbox requires you to update each engine manually.

c. The **Update Site** field displays the default path to the official fingerprint update site. Typically, this field does change unless for security reasons the system does not have access to the internet and an internal update site must be used.

d. The **Update Site Port** is the port on the update site to which the update connects. The port cannot be changed unless you are using a custom update site.

e. Enter the credentials used to access the fingerprint update website. These are the username and password credentials you defined when you created an Extranet account at ExtremeNetworks.com.

f. If your network is protected by a firewall, you need to configure proxy server settings to use when accessing the website. In the **Proxy** field, select **Use Proxy** or **Use Proxy with Credentials** and enter your proxy server address and port ID. (Consult your network administrator for this information.) If your proxy server requires authentication, enter the proxy username and password credentials. The credentials you add here must match the credentials configured on the proxy server.

g. Select **Save**. The Fingerprint Update is performed immediately.

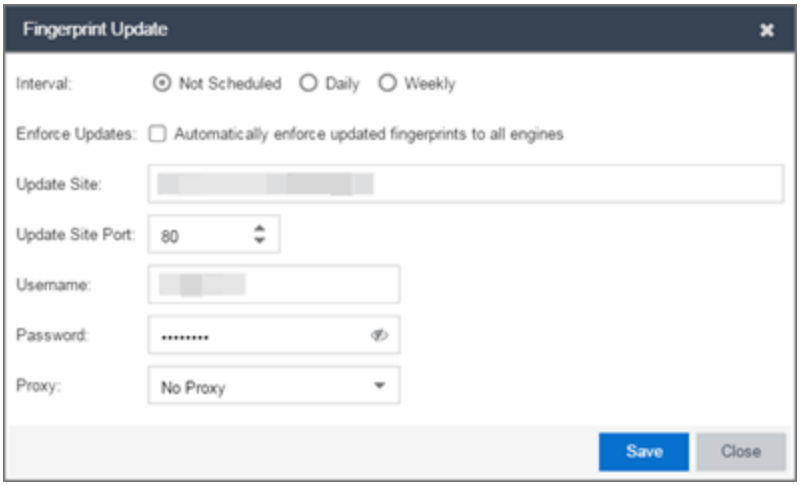
4. If you did not select the **Enforce Updates** checkbox, enforce to push the changes to your engines when the update is complete.

Schedule Fingerprint Updates

You can schedule fingerprint updates performed automatically on a daily or weekly basis.

To access the update website, you need to create an Extranet account at ExtremeNetworks.com and define a username and password for the account. You need the username and password in order to schedule updates.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine and then select the Configuration view.
2. In the left-panel tree, expand the System folder and select **Fingerprints**.
3. Select the **Menu** icon (☰) and select Fingerprint Update Settings. The Fingerprint Update window opens.



4. Select the update interval which defines how frequently the update is performed: **Daily** or **Weekly**.
5. If you have selected **Weekly**, select the day of the week you would like the update performed.
6. Enter the scheduled time you would like the update performed.
7. Select the **Enforce Updates** checkbox to automatically update fingerprints on all engines. Not selecting this checkbox requires you to update each engine manually.
8. The **Update Site** field displays the default path to the official fingerprint update site. Typically, this field does not change unless for security reasons the system does not have access to the internet and an internal update site must be used.
9. The **Update Site Port** is the port on the update site to which the update connects. The port cannot be changed unless you are using a custom update site.
10. Enter the credentials used to access the fingerprint update website. These are the username and password credentials you defined when you created an Extranet account at ExtremeNetworks.com.
11. If your network is protected by a firewall, configure proxy server settings to use when accessing the website. In the **Proxy** field, select **Use Proxy** or **Use Proxy with Credentials** and enter your proxy server address and port ID. (Consult your network administrator for this information.) If your proxy server requires authentication, enter the proxy username and password credentials. The credentials you add here must match the credentials configured on the proxy server.
12. Select **Save**.
13. If you did not select the **Enforce Updates** checkbox, enforce to push the changes to your engines when the update is complete.

Add Fingerprints

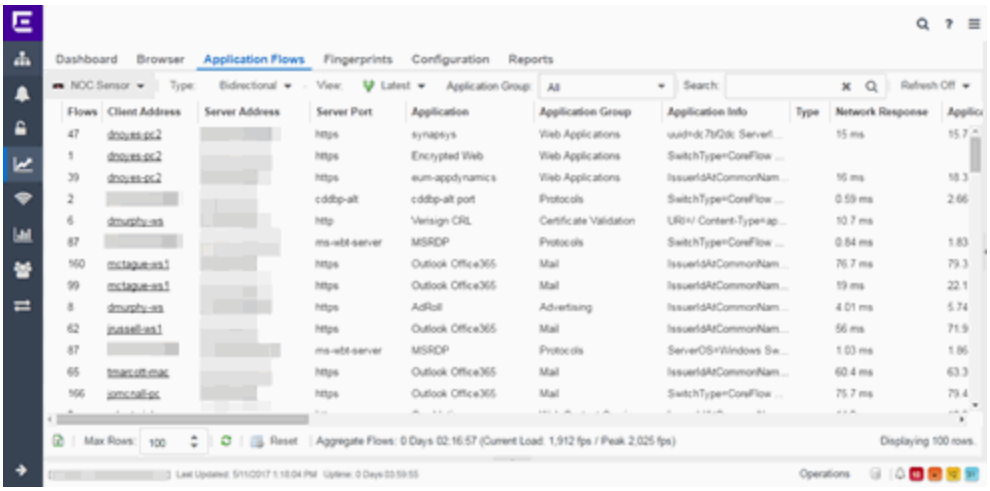
ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

In order to add and modify fingerprints, you must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability.

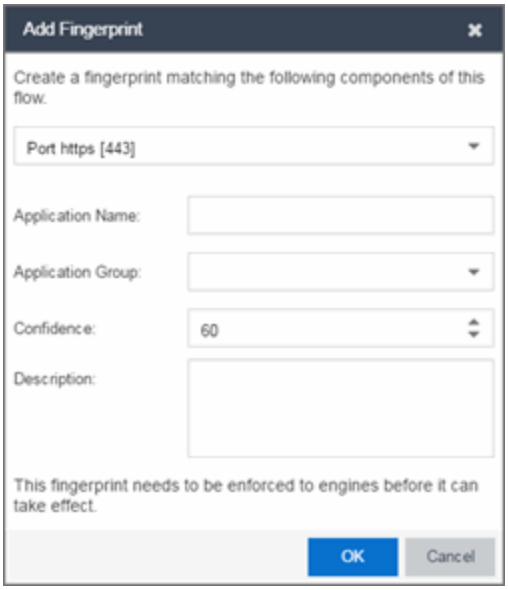
Add a Fingerprint

Use the following steps to add a new custom fingerprint based on an existing flow in the Applications Flows view. You can also create a new fingerprint based on an application or application group, or on a destination address.

1. Select **Analytics > Application Flows** view.



2. Select the flow in the table that you want to base your new custom fingerprint on.
3. Right-click on the flow and select the **Fingerprints** > **Add Fingerprint** option. The Add Fingerprint window opens.



4. Use the drop-down list to select the flow components on which to base the fingerprint. The options vary depending on the fingerprint you initially selected.
    - Port <port number> — Creates a fingerprint that identifies traffic either coming from or going to the specified port.
    - Address <IP address> on port <port number> — Creates a fingerprint that identifies traffic either coming from or going to this IP address on the specified port.
    - Address <IP address> with mask on port <port number> — Creates a fingerprint that identifies traffic either coming from or going to the specified subnet on the specified port. For example, an IP address of 192.168.0.0 with a mask of 16 would result in all traffic either coming from or going to the 192.168 subnet on the specified port to be identified by the fingerprint.
    - Host <host name> — Creates a fingerprint that identifies a specific hostname in the URI of web traffic.
    - HTTP Header — Creates a fingerprint that identifies traffic containing specified HTTP header information, if HTTP header information is included in the flow's metadata.

    Note that there can be two port number or IP address options listed: one for the flow's source port/IP address and one for the flow's destination port/IP address.
5. If you selected an IP address with mask option, you need to specify a subnet of IP addresses. Enter the IP CIDR mask, which is a mask on the flow IP, with 0-32 for IPv4 and 0-128 for IPv6.
6. Enter the name of the application for which the fingerprint is defined.
7. Use the drop-down list to select the application group to which the application belongs. If none of the existing groups are appropriate, you can enter a new group name and the new group is automatically created.

8. Select the fingerprint's confidence level. The confidence level defines the reliability of this fingerprint. Higher confidence fingerprints override lower confidence fingerprints, if multiple fingerprints match a flow. Values are 1-100, with 100 being absolutely reliable.
9. Enter a description of the fingerprint, if desired.
10. Select **Save**. The new fingerprint is created on the ExtremeCloud IQ - Site Engine server.
11. Enforce to push the new fingerprint to your engines.

TIP: You can also create a custom fingerprint from the Fingerprints tab. Select the **Menu** icon and select **Create Fingerprint**. The Add Fingerprint window opens where you can select all the flow components you want for the fingerprint. The new fingerprint is not based on an existing fingerprint and you need to enter values for all required fields such as **IP** or **Hostname**, **Application Name**, and **Application Group**. The new fingerprint must be enforced to engines before it can take effect.

- ExtremeAnalytics tab

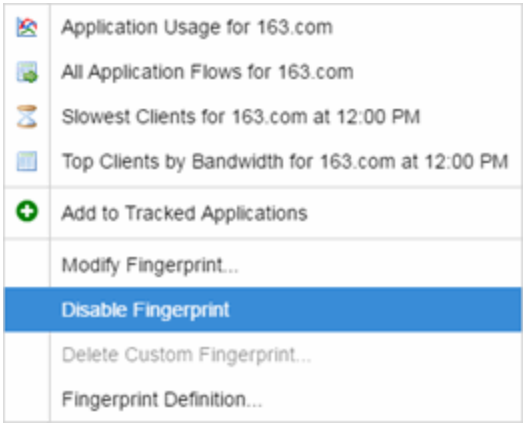
Enable or Disable Fingerprints

ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

Enabling or Disabling a Fingerprint

Enable or disable a fingerprint from the **Fingerprints** tab. When a fingerprint is enabled, it is used to identify applications. When it is disabled, it is ignored.

1. Select the **Analytics** > **Fingerprints** tab.
2. Right-click on the desired fingerprint in the Fingerprints table and select either **Enable Fingerprint** or **Disable Fingerprint**.



3. Enforce to push the change to your engines.

NOTE: If you disable a system fingerprint, it becomes a custom fingerprint. If you then enable the fingerprint, it remains a custom fingerprint. Deleting the custom fingerprint reloads the original system fingerprint.

- ExtremeAnalytics tab

Modify Fingerprints

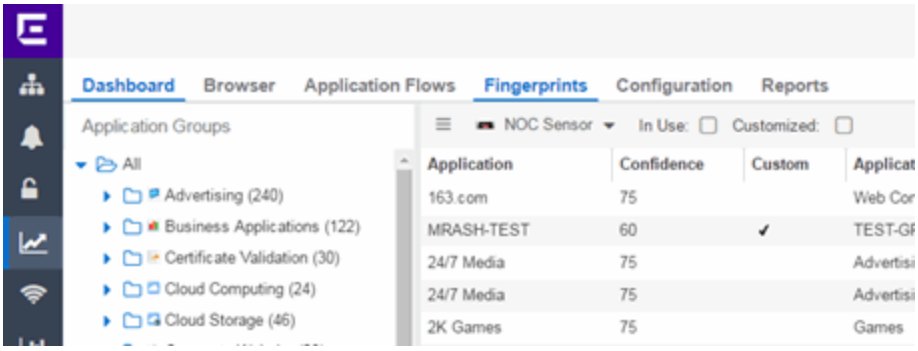
ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

In order to add and modify fingerprints, you must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability.

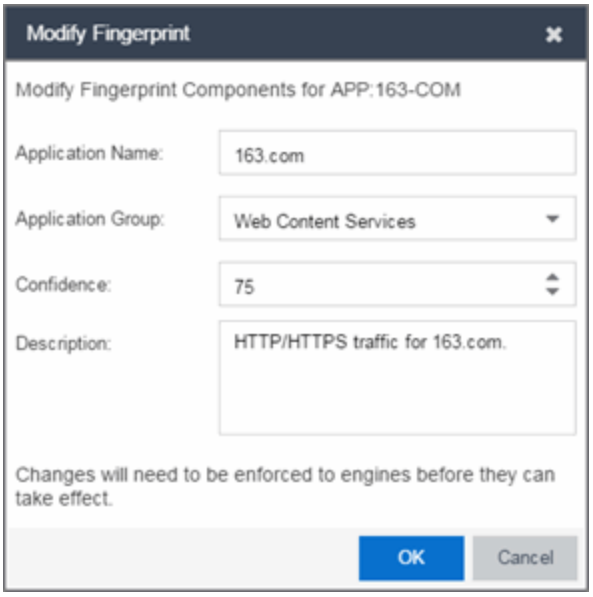
Modifying a Fingerprint

Modify a fingerprint's application name, application group, confidence level, and description from the Fingerprints tab.

1. Select the Analytics > Fingerprints tab.



2. Right-click on the desired fingerprint and select Modify Fingerprint from the menu. The Modify Fingerprint window opens.



3. Make the desired changes:
    - Application Name — The name of the application that the fingerprint detects. If you change the application name, you are prompted to select whether to change the application name for only the currently selected fingerprint or for all fingerprints that have that same application name.

      NOTE: If you change both the Application Name and Application Group:
      If the new Application Name matches an existing name, the application group changes to the new group for all fingerprints with that new name, regardless of whether you choose to change the name for only the selected fingerprint or for all fingerprints with that name.
    - Application Group — Organizes fingerprints into different types of applications such as Web applications or Business applications. You can sort the Application Flows view by application group, making it easier to view the data. If you change the application group for a fingerprint, it changes the group for all fingerprints with that same application name. If none of the existing groups are appropriate, you can create a new group by entering a new group name.
    - Confidence — Defines the reliability of this fingerprint. Higher confidence fingerprints override lower confidence fingerprints, if multiple fingerprints match a flow. Values are 1-100, with 100 being absolutely reliable. The confidence level only applies to the currently selected fingerprint.
    - Description — A description of the fingerprint. The description only applies to the currently selected fingerprint.
4. Select OK.
5. Enforce to push the change to your engines.

- ExtremeAnalytics tab

Update Fingerprints

ExtremeAnalytics uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can modify these fingerprints and create new custom fingerprints.

In order to add and modify fingerprints, you must be a member of an authorization group assigned the ExtremeCloud IQ - Site Engine ExtremeAnalytics Read/Write Access capability.

Updating Fingerprints

New and updated fingerprints are provided via a fingerprint update website. Perform a one-time manual update of the fingerprint database or configure a scheduled update to be performed automatically from the Configuration tab. Custom fingerprints are not overwritten when an update is performed.

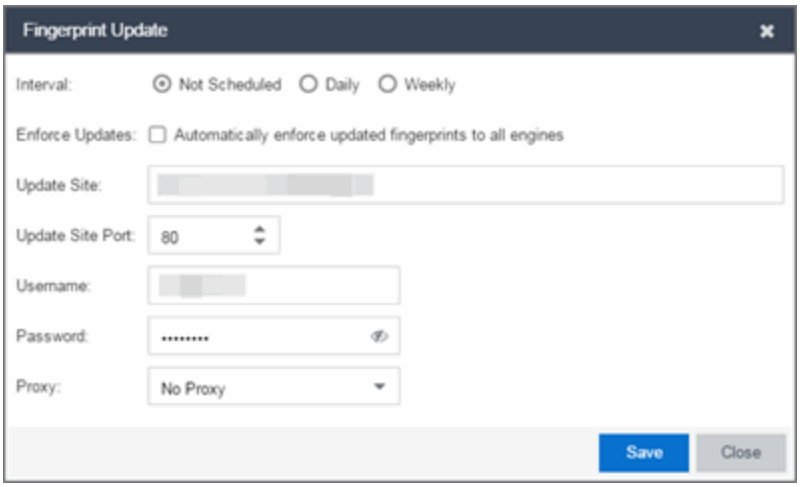
When a fingerprint update is performed, the fingerprint update server is checked for newer fingerprints than what is available on the ExtremeCloud IQ - Site Engine server. If there are newer fingerprints, they are downloaded, and the fingerprint definitions are updated with any new fingerprint definition files. You need to enforce your engines following an update to push the updated fingerprints to the engines.

Perform a Fingerprint Update

Perform a manual one-time update of the fingerprint database. To access the update website, you need to create an Extranet account at ExtremeNetworks.com and define a username and password for the account. You need the username and password in order to perform updates.

1. Select the Analytics tab in ExtremeCloud IQ - Site Engine and then select the Configurations view.
2. In the left-panel tree, expand the System folder and select Fingerprints.
3. Select the Menu icon (☰) and select Update Fingerprints. If you have already configured your Fingerprint Update settings, the update is performed immediately.

   If you have not configured your settings, the Fingerprint Update window opens.



a. Leave the **Interval** selection as **Not Scheduled**.

b. Select the **Enforce Updates** checkbox to automatically update fingerprints on all engines. Not selecting this checkbox requires you to update each engine manually.

c. The **Update Site** field displays the default path to the official fingerprint update site. Typically, this field does change unless for security reasons the system does not have access to the internet and an internal update site must be used.

d. The **Update Site Port** is the port on the update site to which the update connects. The port cannot be changed unless you are using a custom update site.

e. Enter the credentials used to access the fingerprint update website. These are the username and password credentials you defined when you created an Extranet account at ExtremeNetworks.com.

f. If your network is protected by a firewall, you need to configure proxy server settings to use when accessing the website. In the **Proxy** field, select **Use Proxy** or **Use Proxy with Credentials** and enter your proxy server address and port ID. (Consult your network administrator for this information.) If your proxy server requires authentication, enter the proxy username and password credentials. The credentials you add here must match the credentials configured on the proxy server.

g. Select **Save**. The Fingerprint Update is performed immediately.

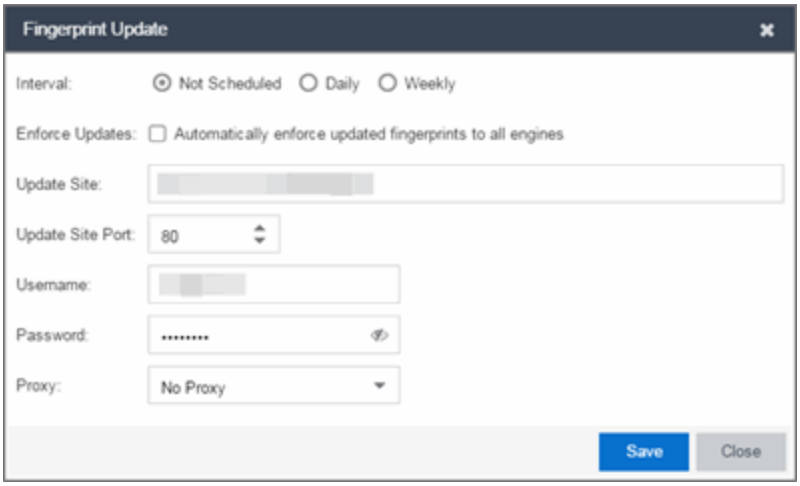
4. If you did not select the **Enforce Updates** checkbox, enforce to push the changes to your engines when the update is complete.

Schedule Fingerprint Updates

You can schedule fingerprint updates performed automatically on a daily or weekly basis.

To access the update website, you need to create an Extranet account at ExtremeNetworks.com and define a username and password for the account. You need the username and password in order to schedule updates.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine and then select the Configuration view.
2. In the left-panel tree, expand the System folder and select **Fingerprints**.
3. Select the **Menu** icon (☰) and select Fingerprint Update Settings. The Fingerprint Update window opens.



4. Select the update interval which defines how frequently the update is performed: **Daily** or **Weekly**.
5. If you have selected **Weekly**, select the day of the week you would like the update performed.
6. Enter the scheduled time you would like the update performed.
7. Select the **Enforce Updates** checkbox to automatically update fingerprints on all engines. Not selecting this checkbox requires you to update each engine manually.
8. The **Update Site** field displays the default path to the official fingerprint update site. Typically, this field does not change unless for security reasons the system does not have access to the internet and an internal update site must be used.
9. The **Update Site Port** is the port on the update site to which the update connects. The port cannot be changed unless you are using a custom update site.
10. Enter the credentials used to access the fingerprint update website. These are the username and password credentials you defined when you created an Extranet account at ExtremeNetworks.com.
11. If your network is protected by a firewall, configure proxy server settings to use when accessing the website. In the **Proxy** field, select **Use Proxy** or **Use Proxy with Credentials** and enter your proxy server address and port ID. (Consult your network administrator for this information.) If your proxy server requires authentication, enter the proxy username and password credentials. The credentials you add here must match the credentials configured on the proxy server.
12. Select **Save**.
13. If you did not select the **Enforce Updates** checkbox, enforce to push the changes to your engines when the update is complete.

- ExtremeAnalytics tab

Custom Fingerprint Examples

The ExtremeAnalytics feature uses fingerprints to identify to which application a network traffic flow belongs. A fingerprint is a description of a pattern of network traffic which can be used to identify an application. ExtremeCloud IQ - Site Engine provides thousands of system fingerprints with the ExtremeAnalytics feature. In addition, you can create new custom fingerprints.

For additional information, see Getting Started with ExtremeAnalytics.

This Help topic provides examples of three different types of custom fingerprints you can create:

- Fingerprints Based on a Flow
- Fingerprints Based on an Application or Application Group
- Fingerprints Based on a Destination Address

For additional information, see Add and Modify Fingerprints.

Fingerprints Based on a Flow

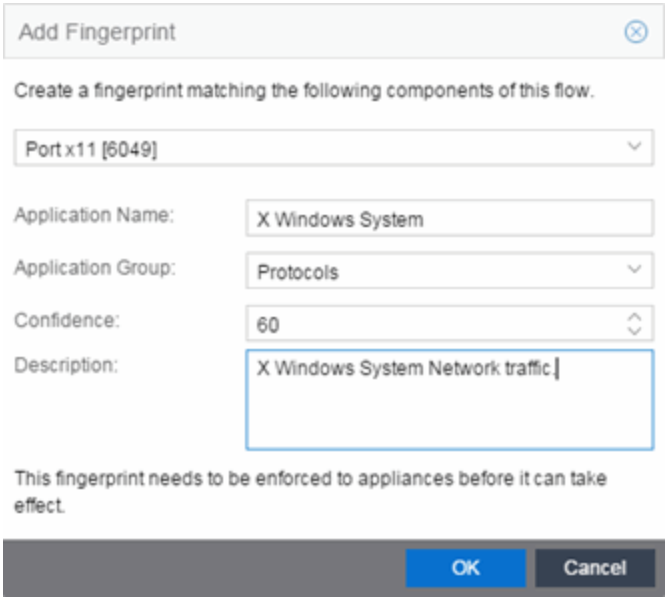
This example demonstrates how to create a custom fingerprint based on X Window System network traffic.

In the ExtremeCloud IQ - Site Engine Flows table (with the Show Unclassified View selected) you notice several flows that had an X Window System source port 6049. Since these flows are not currently identified with a fingerprint, you can create a fingerprint for those flows based on the port that x11 traffic normally runs over.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab.
2. Select the **Application Flows** tab.
3. In the table, select the **Show Unclassified View**.
4. Right-click on a flow with the **x11 Source Port** and select **Fingerprints** > **Add Fingerprint**.

5. The Add Fingerprint window opens.



6. Use the drop-down list to select matching **Portx11 [6049]**.
7. Set the **Application Name** to **X Window System**.
8. Set the **Application Group** to **Protocols**.
9. Set the **Confidence** level to **60** (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select **OK** to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

Fingerprints Based on an Application or Application Group

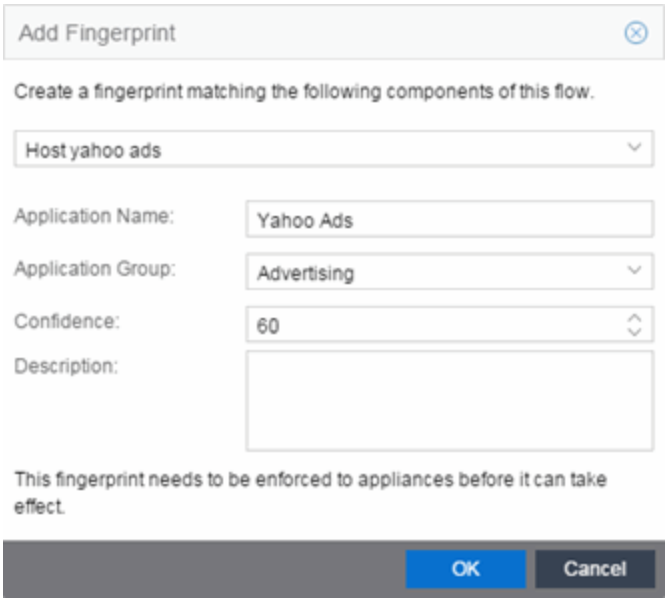
This example demonstrates how to create a fingerprint for some unclassified web traffic.

In the ExtremeCloud IQ - Site Engine Application Flows table (with the Show Unclassified Web Traffic View selected) you noticed several flows for the "yahoo ads" application that are part of the Web Applications group. You want to create a fingerprint that provides an application and application group specifically for this traffic, instead of letting it default to the Web Applications group. The new fingerprint categorizes "yahoo ads" flows into the Yahoo Ads ld application and the Advertising application group.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.

3. In the table, select the Show Unclassified Web Traffic View.
4. Right-click on a flow with the yahoo ads application and select Fingerprints > Add Fingerprint.
5. The Add Fingerprint window opens.



6. Use the drop-down list to select matching the "yahoo ads" host.
7. Set the Application Name to Yahoo Ads.
8. Set the Application Group to Advertising.
9. Set the Confidence level to 60 (the default). A fingerprint with a confidence higher than 60 can supersede this fingerprint, if it also matches the flow.
10. Select OK to create the fingerprint.
11. Enforce to push the new fingerprint to your engines.

Fingerprints Based on a Destination Address

In both of the previous examples, you created a new custom fingerprint to cover a case where no appropriate fingerprint existed. You can also create a new fingerprint for traffic flows already identified as one application, but should be categorized as something else.

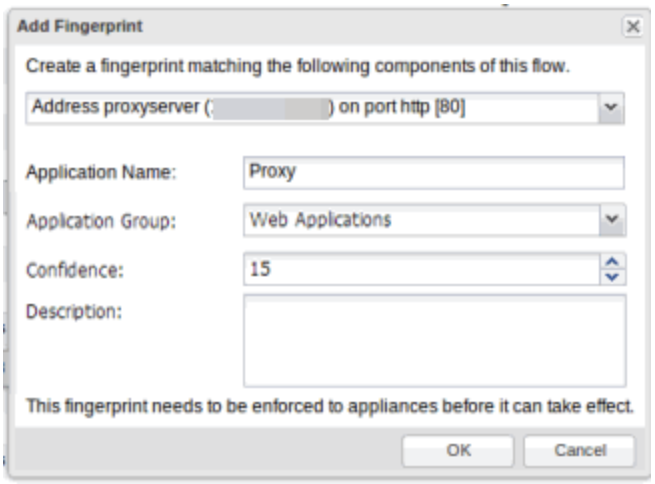
For example, let's say you have a Git repository on your network. Git repositories (a source code management system used in software development) are frequently accessed via SSH on port 22 (the standard TCP port assigned for SSH traffic). In this case, the SSH traffic flows is identified using the system SSH port-based fingerprint.

But what if you would like to more closely monitor who is accessing the Git repository? If you know you are running the Git server on a certain system (10.20.117.102 port 22, for our example), you can create a custom fingerprint to identify the Git traffic flows.

The fingerprint is based on one of the SSH flows using the IP address/port of the Git server and have a higher confidence than the system port-based fingerprint. The higher confidence fingerprint will override the lower confidence fingerprint when determining a match for the traffic flow.

Use the following steps to create the fingerprint.

1. Select the **Analytics** tab in ExtremeCloud IQ - Site Engine.
2. Select the **Application Flows** tab.
3. In the table, right-click on an SSH port-based flow with the Git server destination address and select **Fingerprints** > **Add Fingerprint**.
4. The Add Fingerprint window opens.



5. Use the drop-down list to select matching the Git server IP address and port.
6. Set the **Application Name** to **Git**.
7. Select an **Application Group** that makes the most sense for your network. It might be **Web Collaboration**, **Databases**, **Business Applications**, or **Storage**. You can also create a new **Application Group** by entering a new required value.
8. Set the **Confidence** level to **60**, which is a higher confidence than the current fingerprint which is set at 10.
9. Select **OK** to create the fingerprint.
10. Enforce to push the new fingerprint to your engines.

- Analytics
- Add and Modify Fingerprints

How to Deploy ExtremeAnalytics in an MSP or MSSP Environment

This Help topic presents instructions for deploying ExtremeAnalytics within an MSP (Managed Service Provider) or MSSP (Managed Security Service Provider) environment.

Configuring ExtremeCloud IQ - Site Engine Behind a NAT Router

If the ExtremeCloud IQ - Site Engine server is located behind a NAT (Network Address Translation) router, use the following steps to add an entry to the nat_config.txt file that defines the real IP address for the ExtremeCloud IQ - Site Engine server. This allows the ExtremeCloud IQ - Site Engine server to convert the NAT IP address received in the ExtremeAnalytics engine response to the real IP address used by the ExtremeCloud IQ - Site Engine server. Not adding the real IP address for the ExtremeCloud IQ - Site Engine server to the nat_config.txt file results in the ExtremeAnalytics engine incorrectly displaying a state of IMPAIRED (orange) rather than UP (green).

NOTE: The text in the nat_config.text file refers to a remote IP address and a local IP address. For this configuration, the NAT IP address is the remote IP address and the real IP address is the local IP address.

1. On the ExtremeCloud IQ - Site Engine server, add the following entry to the *<install directory>*`/appdata/nat_config.txt` file.
   `<NAT IP address>=<real IP address>`
2. Save the file.
3. If the ExtremeCloud IQ - Site Engine Management server IP address is not configured to use the NAT IP address of the ExtremeCloud IQ - Site Engine server, perform the following steps:
   a. Enter the following command at the engine CLI:
      `/opt/appid/configMgmtIP` *<IP address>*
      Where *<IP address>* is the NAT IP address of the ExtremeCloud IQ - Site Engine server.
      Press Enter.
   b. Restart the appidserver when the new IP address is configured by typing:
      `appidctl restart`
      Press Enter.
4. On the ExtremeCloud IQ - Site Engine server, add the following text to the *<install directory>*`/appdata/NSJBoss.properties` file. In the second to last line, specify the hostname of the ExtremeCloud IQ - Site Engine server.

NOTE: The ExtremeAnalytics engine functions as a client computer independent of the server. Both engines and clients must be able to resolve the hostname you specify.

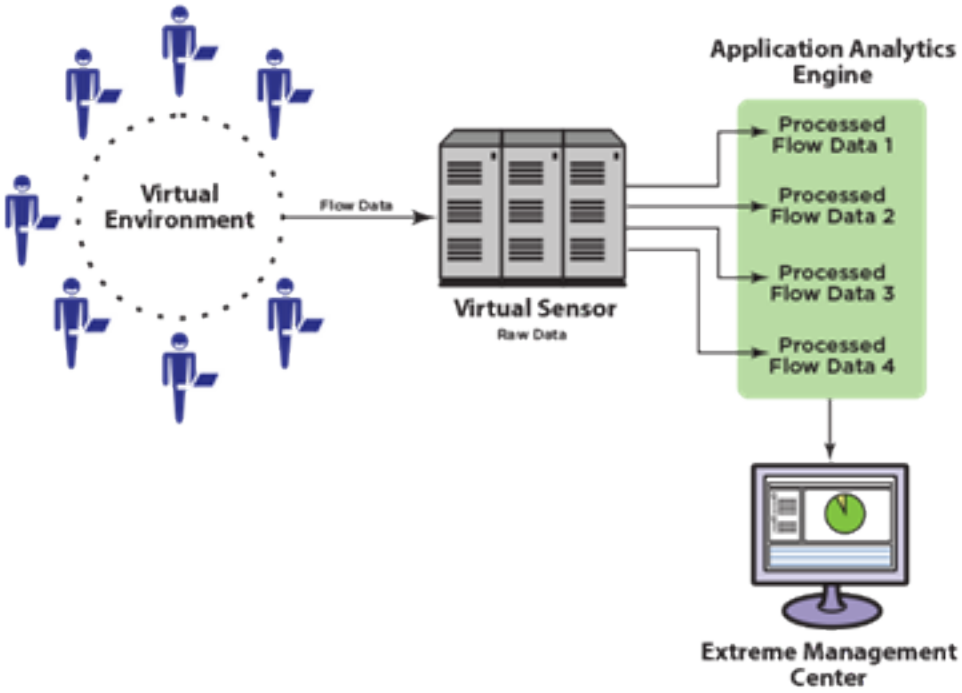
```
# In order to connect to a ExtremeCloud IQ - Site
Engine server behind a NAT firewall or a
# ExtremeCloud IQ - Site
Engine server with multiple interfaces you must define these two
# variables on the ExtremeCloud IQ - Site Engine
server. The java.rmi.server.hostname
# should be the hostname (not the IP) if multiple IPs are being used
# so that each client can resolve the hostname to the correct IP that
# they want to use as the IP to connect to.
java.rmi.server.hostname=<hostname of the server>
java.rmi.server.useLocalHostname=true
```

5. Save the file.
6. Add the ExtremeCloud IQ - Site Engine server hostname to your DNS server, if necessary.

NOTE: ExtremeAnalytics engines, remote ExtremeCloud IQ - Site Engine clients, and any ExtremeControl engines must be able to connect to ExtremeCloud IQ - Site Engine using this hostname.

ExtremeAnalytics Virtual Sensor Configuration in ExtremeCloud IQ - Site Engine

The ExtremeAnalytics Virtual Sensor is a virtual machine that monitors application flows across virtual environments. The Virtual Sensor sends network traffic information to your ExtremeAnalytics engine for processing. The ExtremeAnalytics engine then sends the processed information to ExtremeCloud IQ - Site Engine, where it is displayed on the Analytics tab.



In a typical environment, one Virtual Sensor is deployed on each physical ESX host. Each Virtual Sensor is counted as 1/10 of a device towards your ExtremeCloud IQ - Site Engine device count license.

Use these instructions to add one or more Virtual Sensors to ExtremeCloud IQ - Site Engine. While it is possible to add the Virtual Sensor without using the VMware vSphere ExtremeConnect module in ExtremeCloud IQ - Site Engine, the first method outlined in this topic is highly recommended. Refer to Virtual Sensor Installation Guide for more information about using the Virtual Sensor.

IMPORTANT: Configuration of the virtual environment via ExtremeCloud IQ - Site Engine is limited to distributed virtual switches only.

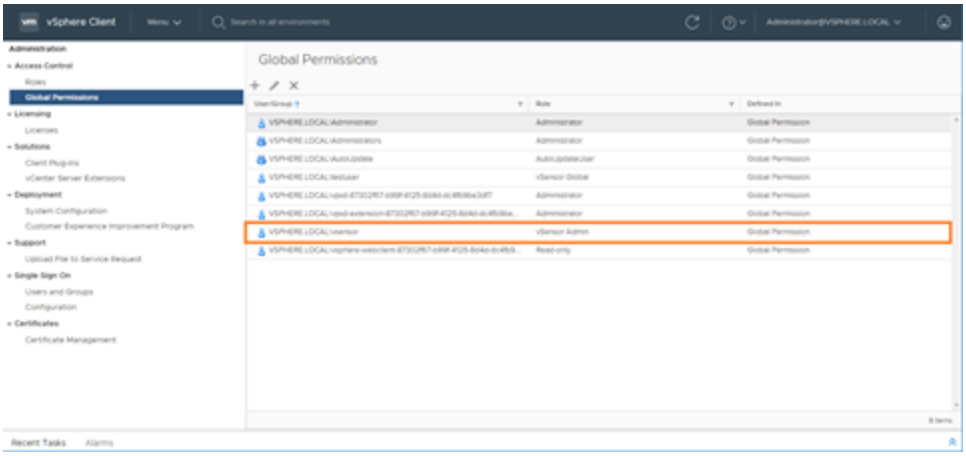
Configuring a Virtual Sensor includes the following steps:

1. Prerequisites
2. Installing the Virtual Sensor using the ExtremeCloud IQ - Site Engine Server
3. Adding the Virtual Sensor in ExtremeAnalytics
4. Configuring vCenter Settings for the Virtual Sensor

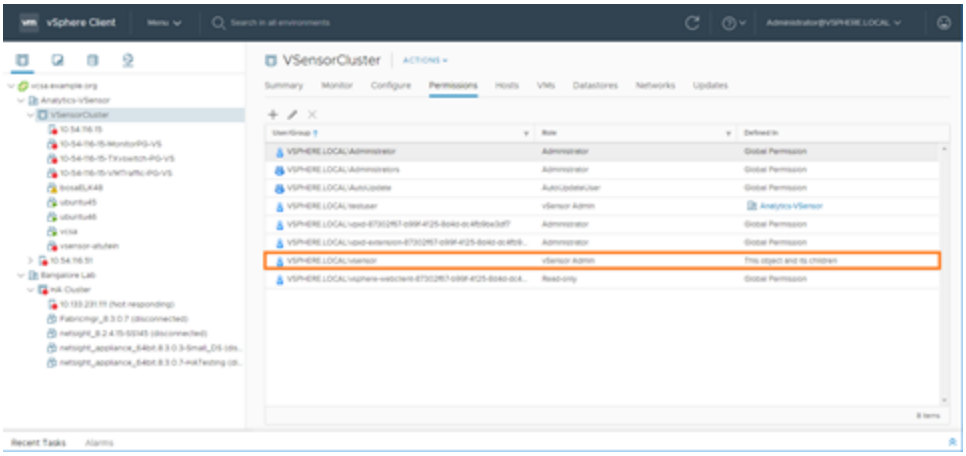
Prerequisites

Before attempting to add Virtual Sensors to ExtremeCloud IQ - Site Engine, ensure the following:

- Your vCenter vSphere login is configured with an administrative role in at least the following Global Permissions:
    - Distributed Switch — VSPAN operation
    - Datastore — Allocate space
    - Datastore — Browse datastore
    - Host — Local operations — Create virtual machine
    - Host — Local operations — Delete virtual machine
    - Host — Local operations — Reconfigure virtual machine
    - Network — Assign network
    - vApp — Import
    - vApp — View OVF environment



- Your vCenter vSphere login is configured with an administrative role in at least the following permissions in the cluster the Virtual Sensor is monitoring:
    - Distributed Switch — VSPAN operation
    - Datastore — Allocate space
    - Datastore — Browse datastore

- Datastore — Remove file
- Host — Local operations — Create virtual machine
- Host — Local operations — Delete virtual machine
- Host — Local operations — Reconfigure virtual machine
- Network — Assign network
- Tasks — Create task
- Tasks — Update task
- vApp — Import
- vApp — View OVF environment
- Virtual machine — Change Configuration — Add new disk
- Virtual machine — Change Configuration — Advanced configuration
- Virtual machine — Edit Inventory — Create new
- Virtual machine — Edit Inventory — Remove
- Virtual machine — Interaction — Power off
- Virtual machine — Interaction — Power on
- 

- The VMware Open Virtualization Format Tool (OVFTool) is installed on the ExtremeCloud IQ - Site Engine server.

NOTE: Instructions for this prerequesite are not included. You must be a VMware customer to download the OVF Tool. Consult the VMware site for download and installation instructions.

Installing the Virtual Sensor Using the ExtremeCloud IQ - Site Engine Server

The Virtual Sensor is installed as an .OVA file using your ExtremeCloud IQ - Site Engine server.

You can install the Virtual Sensor in two different ways:

- Install Using ExtremeCloud IQ - Site Engine — To install using ExtremeConnect functionality in ExtremeCloud IQ - Site Engine, use the instructions in this topic.
- Install Using the vSphere Web Client — To install using the vSphere web client, refer to the section "Installing Virtual Sensor using vSphere Web Client" in the ExtremeAnalytics Virtual Sensor 1.0.0 Software Installation Guide.

We recommend installing the Virtual Sensor using ExtremeCloud IQ - Site Engine unless you do not have the required permissions from your VMware Administrator. When installing the Virtual Sensor using the vSphere client, some information does not populate on the Analytics > Configuration > Virtual Sensors tab in ExtremeCloud IQ - Site Engine, including the **Physical Host**, **Monitored Switch**, **Port Group**, and **VMs Monitored** fields in the Virtual Sensors table at the top of the tab and the Virtual Machines table at the bottom of the tab.

Install Using ExtremeCloud IQ - Site Engine

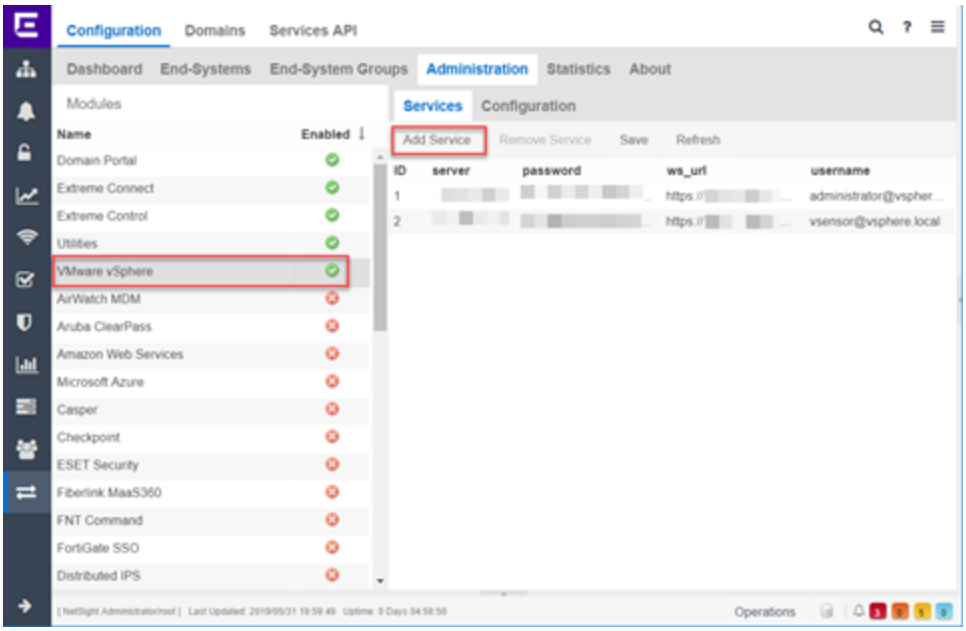
Installing the Virtual Sensor using ExtremeCloud IQ - Site Engine includes two steps:

1. Configuring the VMware vSphere Module in ExtremeConnect
2. Adding the Virtual Sensor to ExtremeCloud IQ - Site Engine

Configuring the VMware vSphere Module in ExtremeConnect

Use the following steps to configure your vCenter server:

1. Open the **Connect** > **Configuration** > Administration tab in ExtremeCloud IQ - Site Engine.
2. Select **VMware vSphere** in the Modules list in the left-panel.



3. Open the **Services** tab in the right-panel.

4. Select **Add Service**.

   A new row displays.
5. Enter the information for your vCenter server in the new row:
   - **username** — Username used to access the vCenter server.
   - **password** — Password used to access the vCenter server.
   - **server** — vCenter server IP address.
   - **ws_url** — vCenter server web service URL in the following format: **https://*<IP Address of vCenter Server>*:*<Non-Standard Port of vCenter Server>*/sdk**. For example, **https://10.20.30.40:8008/sdk**.
6. Select **Save**.
7. Open the **Configuration** tab.
8. Select **true** in the Value column of the Module enabled row.
9. Configure the other settings according to your preferences for your vCenter server.
10. Select **Save**.

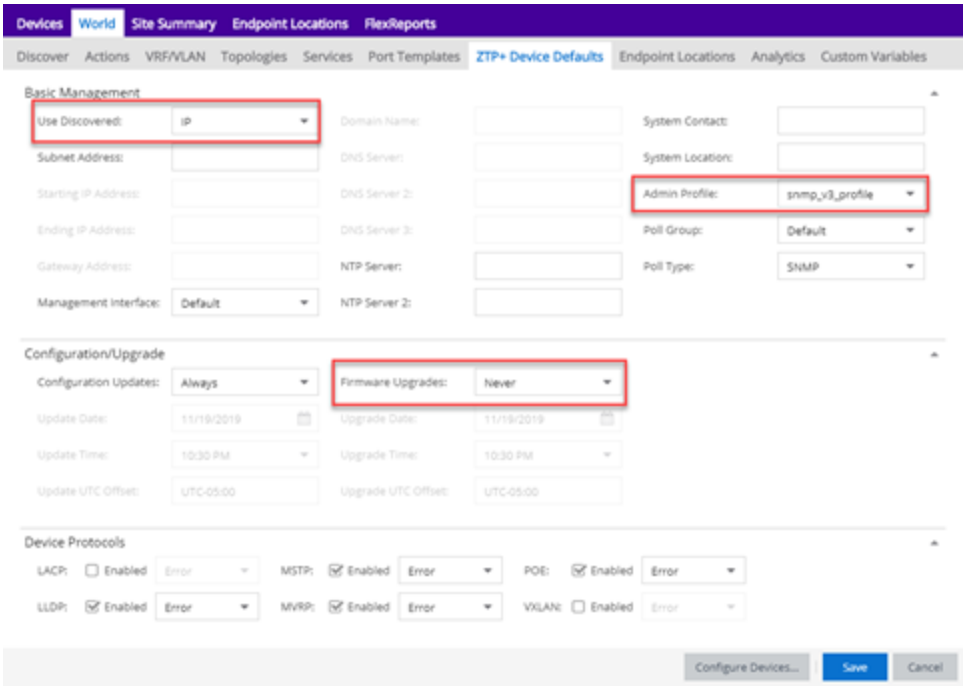
The vCenter server is configured in ExtremeConnect.

Adding the Virtual Sensor to ExtremeCloud IQ - Site Engine

After configuring the vCenter server in ExtremeConnect, download and add the Virtual Sensor .OVA file in ExtremeCloud IQ - Site Engine.

1. Access the **Network** > **Devices** > **Sites** > **World** site.
2. Open the **ZTP+ Device Defaults** tab in the right panel.
3. Select **IP** in the **Use Discovered** drop-down list.
4. Select an **Admin Profile** from the drop-down list that uses SNMPv3 and has a CLI credential password that is not empty.

5. Select **Never** in the **Firmware Upgrades** drop-down list.



6. Download the Virtual Sensor .OVA file from the Extreme Portal to your local client machine.

   You need to access this location in Step 10.

   Download the **Small** .OVA file if you are using a VS100 license or the **Medium** .OVA file if you are using a VS250 license.

   NOTE: The web browser downloads the .OVA file as a .TAR file. Change the file extension back to .OVA when the download is complete. Using Google Chrome avoids this step and downloads the file as an .OVA file.

   ---

7. Navigate back to ExtremeCloud IQ - Site Engine.
8. Open the **Network** > Firmware tab.
9. Select **Upload**.
   The **Upload Firmware to Server** window displays.
10. Add the .OVA file to the **Upload Firmware to Server** window through one of the following methods:
    - Access the location on the local client machine into which you saved the .OVA file in Step 6 and drag and drop the Virtual Sensor .OVA file into the box at the top of the window.
    - Select the box at the top of the window and browse to the location into which you saved the .OVA file in Step 6.
11. Use the default transfer type setting in **Directory**.
12. Leave the **Subdirectory** field blank.

13. Select **Upload**.

ExtremeCloud IQ - Site Engine uploads the .OVA file.

When the .OVA file is installed, proceed to Adding the Virtual Sensor in ExtremeAnalytics

Adding the Virtual Sensor in ExtremeAnalytics

After you add the Virtual Sensor .OVA file to ExtremeCloud IQ - Site Engine, install the Virtual Sensor in ExtremeAnalytics.

1. Open the **Analytics** > Configuration tab.
2. Select **Virtual Sensors** in the left-panel.
   The Virtual Sensors tab displays. All of the virtual machines configured in VMware vSphere are listed in the Virtual Machines section of the tab.
3. Select **Install** in the Virtual Sensors section of the tab.
   The **Install Virtual Sensor on Hypervisor Host** window displays.
4. Select the ellipsis button (**"**) in the **Hypervisor Host** field and select the hypervisor host on which you are installing the Virtual Sensor.
5. Select the ellipsis button (**"**) in the **Datastore** field and select the datastore, if the field does not automatically populate.
6. Select the **License Type** for your Virtual Sensor from the available license types listed:
   - VS100 — One virtual CPU core with a capacity of 1Gbps. Select this license type when installing the **Small** .OVA file.
   - VS250 — Two virtual CPU cores with a capacity of 2.5Gbps. Select this license type when installing the **Medium** .OVA file.
7. Select the Analytics Engine to which the Virtual Sensor sends flow data.
8. Select the ellipsis button (**"**) in the **Management Interface Network** field and select the network you use for management,
   The Virtual Sensor must communicate with the ExtremeCloud IQ - Site Engine server and the ExtremeAnalytics engine using this network.
9. Select the ellipsis button (**"**) in the **Monitored Interface Port Group** field and select the port group for the monitoring interface.
   The port group must be on the distributed virtual switch you are monitoring.

   IMPORTANT: Select a port group that does not include an uplink port.
10. Change the Name of the Virtual Sensor, if desired.

    NOTE: By default, the Virtual Sensor is named using the following format: *<IP Address of host><PortGroupName>*-VS.
11. Select **Use DHCP**, if using a DHCP server to dynamically assign an IP address for the Virtual Sensor.

12. Enter an **IP Address** and **Default Gateway** for the Virtual Sensor if you are not using DHCP.

    NOTE: If you enter an IP address included in a range defined in a site, the **DNS Server** and **NTP Server** are automatically populated from that site, if defined.

13. Enter the **Root Password** for the Virtual Sensor.
14. Enter the **Domain** name (for example, extremenetworks.com).
15. Enter the **DNS Server** IP address and **NTP Server** IP address, if applicable.
16. Select **Install**.

    NOTE: The installation can take several minutes. The Operations panel shows the progress of the installation. It is normal for the progress to pause at 89 or 90 percent for a short amount of time. During this time, the OVA is deployed and ExtremeCloud IQ - Site Engine is waiting for the new Virtual Sensor to be discovered via ZTP+. If ExtremeCloud IQ - Site Engine is not configured to on-board ZTP+ devices automatically, you need to access to the Network > Discovered tab, and configure the new Virtual Sensor for ExtremeCloud IQ - Site Engine.

The Virtual Sensor is installed and displays in the Virtual Sensors table at the top of the **Analytics** > **Configuration** > **Virtual Sensors** tab.

NOTE: If the installation process takes longer than five minutes, the Operation panel in ExtremeCloud IQ - Site Engine can incorrectly indicate the installation failed. If the Operations panel indicates a failure, open the Network > Discovered tab and look for the Virtual Sensor. Continue to add the Virtual Sensor via this tab. If the Virtual Sensor is NOT listed on the **Discovered** tab, the cause can be one of the following:

- ExtremeCloud IQ - Site Engine is not communicating with the management interface of the Virtual Sensor.
- The Virtual Sensor is configured with the **Use DHCP** option selected (step 11), but the DHCP process did not complete successfully.

Open the **Analytics** > Application Flows tab to ensure the Virtual Sensor is collecting flow data. Any fragmented packets the Virtual Sensor receives out of order are re-ordered for processing and then forwarded in the correct order. After flows are collected by the Virtual Sensor, you can create packet captures for those flows.

NOTES: If the Virtual Sensor receives traffic as it is initializing, packet drops (reported as mbuf allocation failure) can be observed.

Configuring vCenter Settings for the Virtual Sensor

To ensure the Virtual Sensor is performing optimally, configure the following vCenter settings for your Virtual Sensor:

1. In vCenter, power off the Virtual Sensor virtual machine.
2. Right-click the virtual machine and select **Edit Settings**.
3. On the **Virtual Hardware** tab, expand **CPU** and allocate the CPU capacity according to the size of the OVA:
   - Medium OVA — 4,594 MHz
   - Small OVA — 2,297 MHz

   The CPU capacity required (Reservation of CPU capacity) is calculated as the number of vCPUs (Small = 1, Medium = 2) * CPU speed of ESXi (2,297 MHz).
4. Select **OK**.
5. Right-click the virtual machine and select **Compatibility** > **Upgrade VM Compatibility**.

   The virtual machine is upgraded to the latest supported version.

NOTE: If the Virtual Sensor is already running the latest supported version, the **Upgrade VM Compatibility** option is not available.

Stream Flow Data from ExtremeAnalytics into Splunk

ExtremeAnalytics includes the ability to stream flow data from an Analytics engine to Splunk. To help you use Splunk with ExtremeAnalytics, we added a `Splunk` directory to the ExtremeCloud IQ - Site Engine `NetSight/appdata/Purview` directory.

The `Splunk` directory contains the following:

- A PDF with instructions describing how to add Extreme's enterprise IPFIX fields into the Splunk vocabulary and adjust the Splunk streaming app to process the Extreme IPFIX format.
- Files that you can copy to the Splunk server to facilitate integration, instead of manually editing the files.

Use the procedures in this section to send Splunk-enriched network flow data using IPFIX.

Environment

- ExtremeCloud IQ - Site Engine 23.02.10
- Extreme Management Center 8.2 and later
- Splunk 7.2.6 (single server deployment) and later
- Splunk Stream 7.1.3 and later

Overview

You can configure the Splunk Stream app to process Netflow/IPFIX flow records and add the data into the Splunk data store. Configure this partly by editing text files on the file system, and partly by using the web UI.

The instance of Splunk Stream at any site can already be configured to import one or more flow sources. Because of this, you must take care to merge the needed changes for ExtremeAnalytics with the existing file contents. After you make the file system changes, restart Splunk. Then, define a new "stream" using the user interface. Finally, enable and deploy the IPFIX exporter of ExtremeAnalytics from the ExtremeCloud IQ - Site Engine user interface.

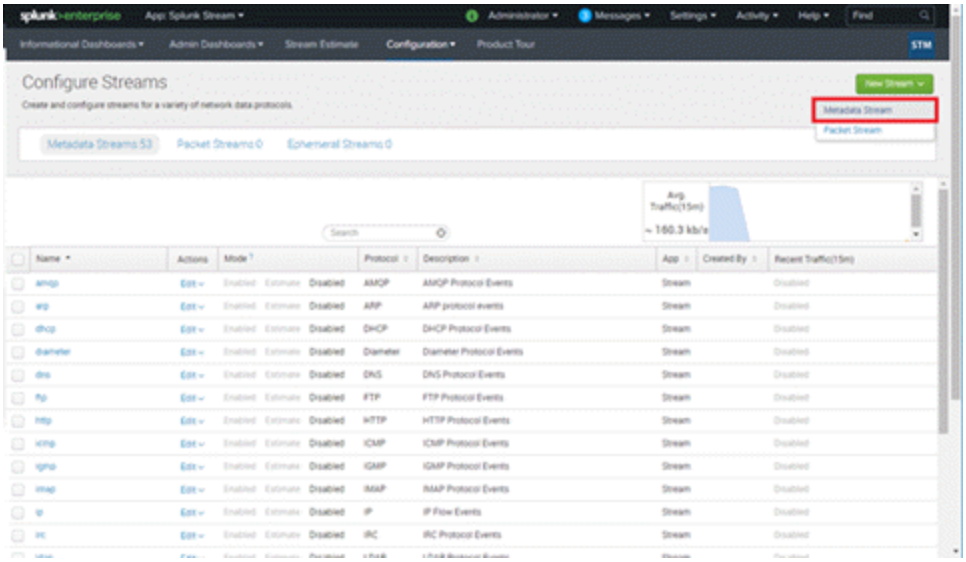
Part 1 – Making File Level Splunk Modifications

1. Connect to the Splunk server via SSH.
2. Enter `cd $SPLUNK_HOME/etc/apps/splunk_app_stream/local`.
3. Copy the `streamfwd.conf` file. (If there is no `streamfwd.conf` file present, skip this step.)
4. Copy Extreme's version of the `streamfwd.conf` file and paste it into `streamfwd.conf`. Alternately, merge Extreme's version of `streamfwd.conf` settings into the existing `streamfwd.conf` file.
5. Enter `cd $SPLUNK_HOME/etc/apps/Splunk_TA_stream/local`.

6. Copy the `streamfwd.conf` file. (If there is no `streamfwd.conf` file present, skip this step.)
7. Copy the `streamfwd.conf` file from the `splunk_app_stream/local` directory to this directory.
8. Enter `cd $SPLUNK_HOME/etc/apps/splunk_app_stream/default/vocabulary`.
9. Copy the `extr.xml` file to this directory.
10. Enter `cd $SPLUNK_HOME/etc/apps/splunk_app_stream/default/vocabulary/streams`.
11. Make a copy of the `netflow` file.
12. Merge the contents of our `extr.netflow` file to the `netflow` file.

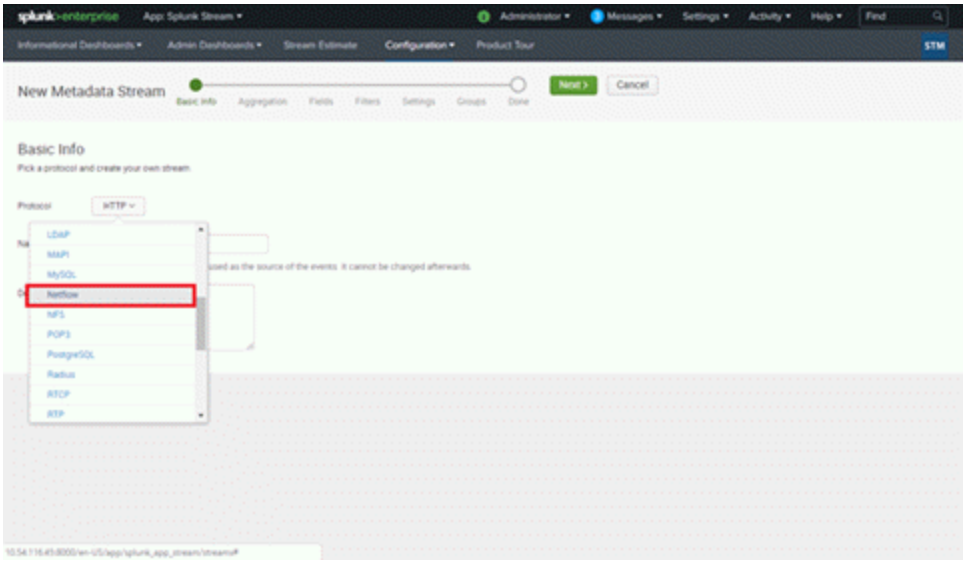
Part 2 – Creating a New Stream using the Splunk web UI

1. Log in to Splunk (by default, the web server is on port 8000).
2. Navigate to the Splunk Stream App.
3. Select **Configure Streams** from the Configuration menu.
4. Optionally, disable all existing streams if you installed Splunk Stream solely to integrate Analytics flow data.
5. Create a new stream.
    a. Select **New Stream > Metadata Stream** to start creating a stream for ExtremeAnalytics.

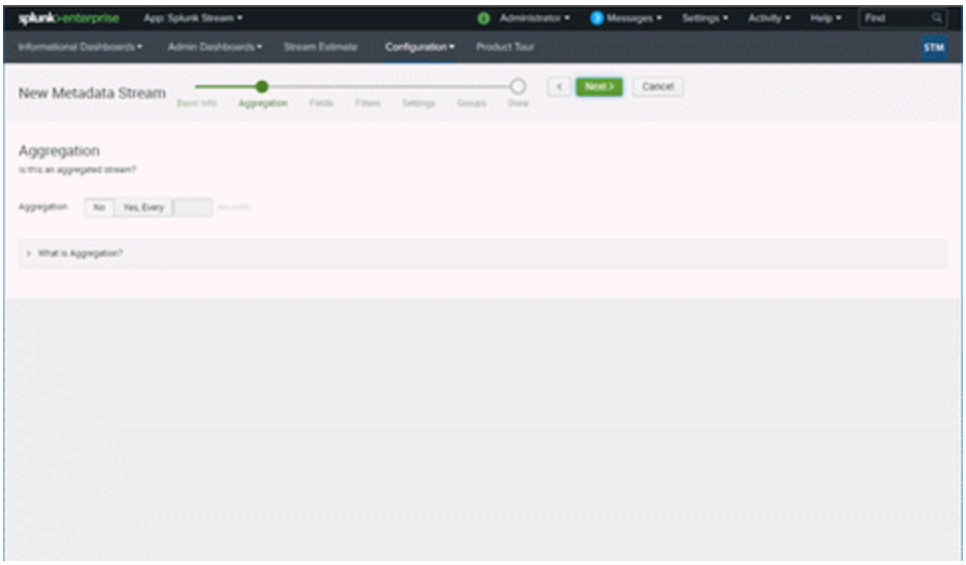


    b. Select the **Netflow** protocol.

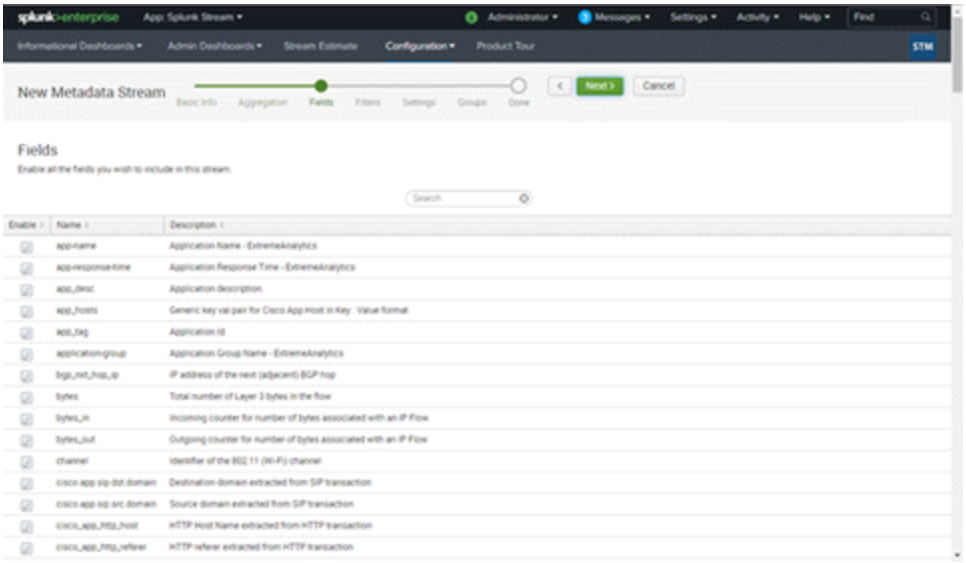
c. Type a name and description for your stream.



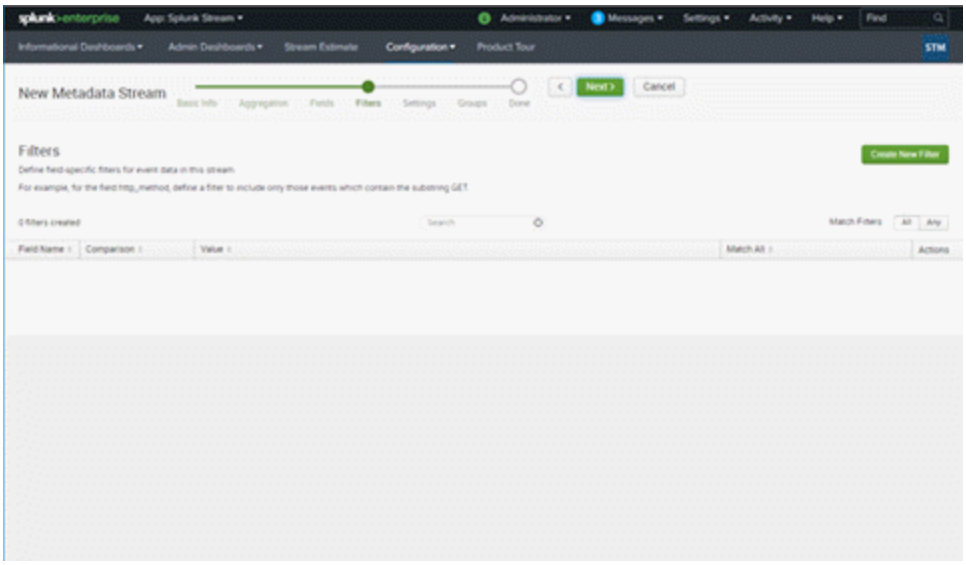
d. If you are an advanced Splunk user, you can choose an appropriate Aggregation method. This can be changed later, as well. We will leave aggregate off in this topic.



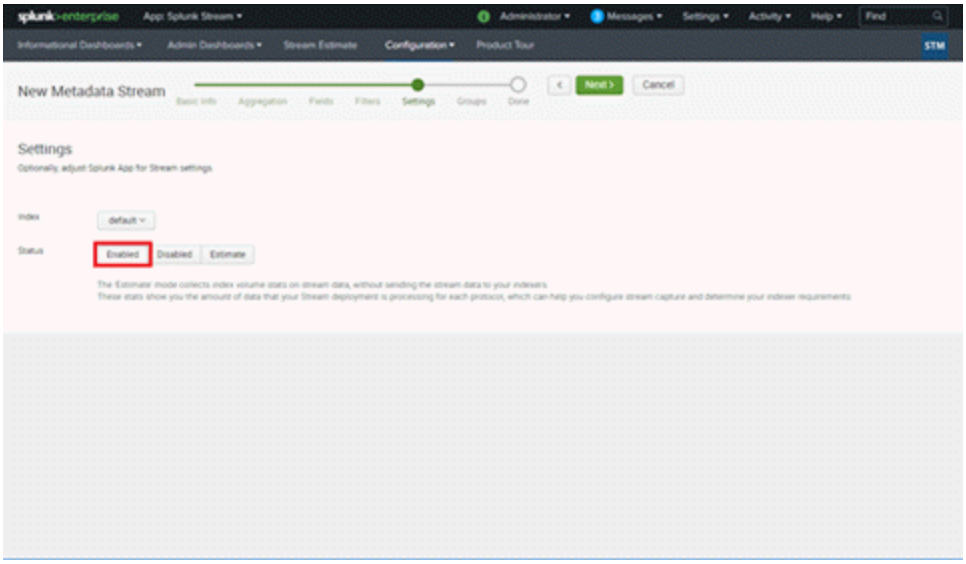
e. In the **Fields** dialog box, you do not have to deselect any filters. You can deselect any selected filters you do not need later.



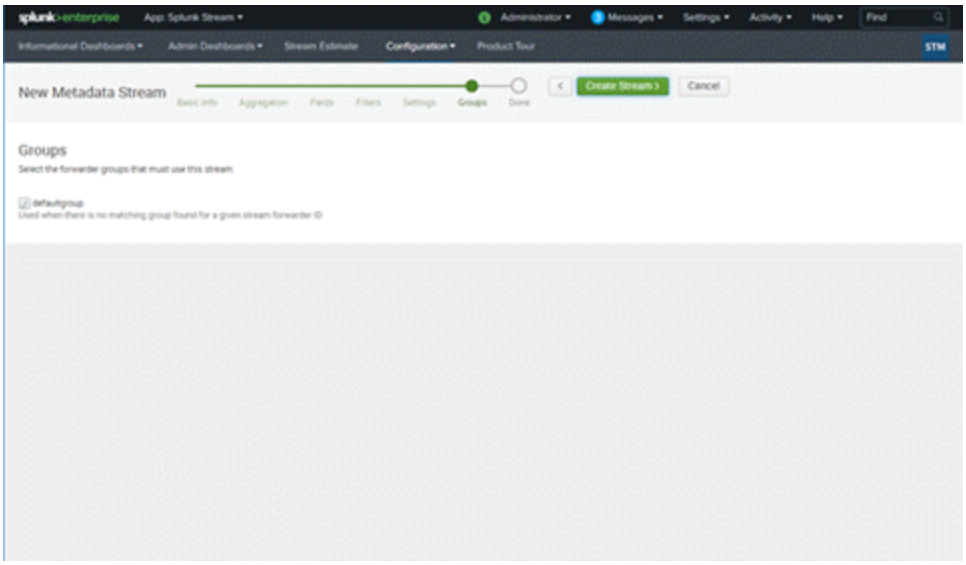
f. In the **Filters** dialog box, do not deselect any filters. You can deselect any selected filters you do not need later.



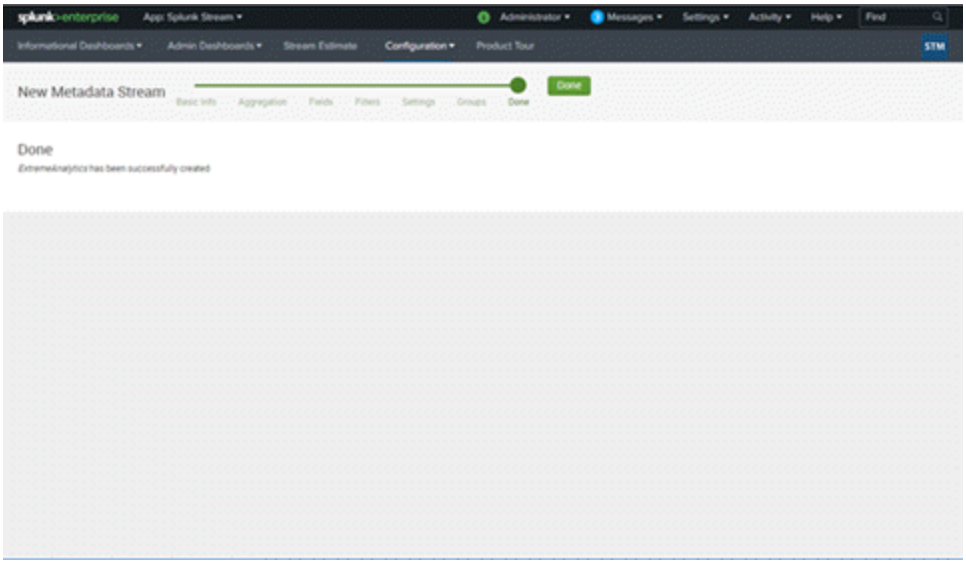
g. In the **Settings** dialog box, select **Enabled** for Status.



h. In the **Groups** dialog box, leave the default, and select **Create Stream**.



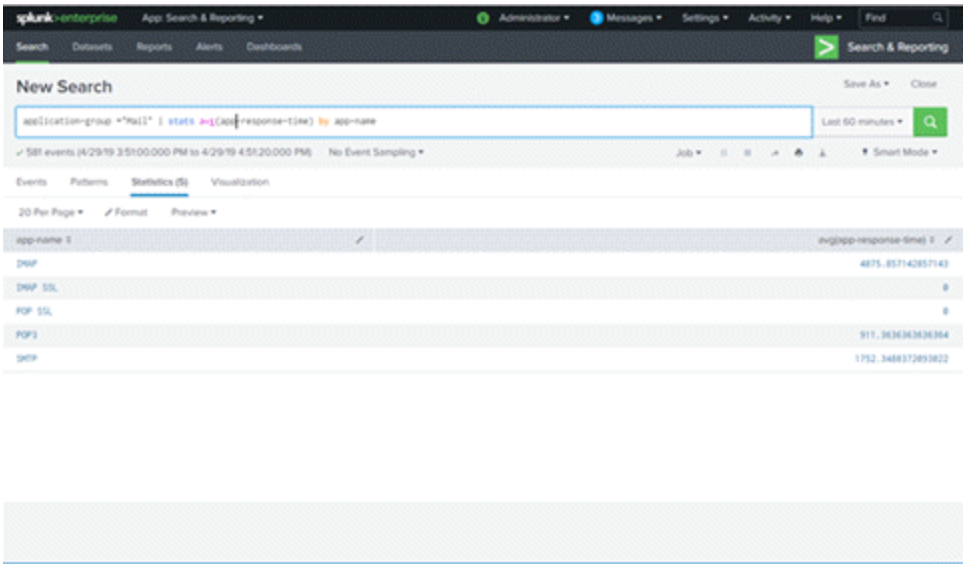
i. After you select **Create Stream**, Splunk confirms that your stream was created.



Part 3 – Configuring each Analytics Engine to Export IPFIX Data to the Splunk Server

1. Log in to **ExtremeCloud IQ - Site Engine**.
2. Navigate to **Analytics > Configuration**.
3. Use the following steps for each engine you want exporting flows to Splunk,
    a. Select its **Configuration** page.
    b. Expand the **IPFIX/Netflow Exporter** section and fill out the required fields.
    c. Ensure that **Export Enabled** is checked.
    d. Set the **Export IP** to the Splunk server IP address.
    e. Set the **Export Port** to 2055 unless this has been customized in Splunk.
    f. Set the **Protocol** to either IPFIX or IPFIX with Padded Strings.
    g. Select **Save**.

    The Metadata contains some protocol-specific data for the analysis of DNS, HTTP, etc. This additional data can double the size of the records.
4. Enforce the changes by expanding Engines in the left-panel of **Analytics > Configuration**, selecting the engine in the left-panel menu, and selecting the **Enforce** button. The Splunk Search displays "netflowdata" within a minute or two.



Appendix

Files

$SPLUNK/etc/apps/splunk_app_stream/local/streamfwd.conf
$SPLUNK/etc/apps/Splunk_TA_stream/local/streamfwd.conf

```
[streamfwd]
port = 8889
ipAddr = 127.0.0.1

netflowReceiver.0.ip = 10.54.116.45
netflowReceiver.0.port = 2055
netflowReceiver.0.decoder = netflow

#netflowElement.997.enterpriseid = 1916
netflowElement.997.id = 96
netflowElement.997.termid = extr.appName

netflowElement.998.enterpriseid = 1916
netflowElement.998.id = 371
netflowElement.998.termid = extr.userName

netflowElement.999.enterpriseid = 1916
netflowElement.999.id = 372
netflowElement.999.termid = extr.appGroupName

netflowElement.1000.enterpriseid = 1916
netflowElement.1000.id = 1000
netflowElement.1000.termid = extr.srcHostName
```

```
netflowElement.1001.enterpriseid = 1916
netflowElement.1001.id = 1001
netflowElement.1001.termid = extr.dstHostName

netflowElement.1002.enterpriseid = 1916
netflowElement.1002.id = 1002
netflowElement.1002.termid = extr.netResponseTime

netflowElement.1003.enterpriseid = 1916
netflowElement.1003.id = 1003
netflowElement.1003.termid = extr.appResponseTime

netflowElement.1004.enterpriseid = 1916
netflowElement.1004.id = 1004
netflowElement.1004.termtype = ipaddress
netflowElement.1004.termid = extr.serverAddress

netflowElement.1005.enterpriseid = 1916
netflowElement.1005.id = 1005
netflowElement.1005.termid = extr.nacProfile

netflowElement.1006.enterpriseid = 1916
netflowElement.1006.id = 1006
netflowElement.1006.termid = extr.detailedLocation

netflowElement.1007.enterpriseid = 1916
netflowElement.1007.id = 1007
netflowElement.1007.termid = extr.oneSidedFlow

netflowElement.1008.enterpriseid = 1916
netflowElement.1008.id = 1008
netflowElement.1008.termid = extr.clientLocation

netflowElement.1009.enterpriseid = 1916
netflowElement.1009.id = 1009
netflowElement.1009.termid = extr.serverLocation

netflowElement.1010.enterpriseid = 1916
netflowElement.1010.id = 1010
netflowElement.1010.termid = extr.metaData
```

$SPLUNK/etc/apps/splunk_app_stream/default/vocabulary/extreme.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<CmConfig xmlns="http://purl.org/cloudmeter/config" version="7.1.1">
<Vocabulary id="extr">
       <Locked>true</Locked>
       <Name>ExtremeAnalytics Netflow Protocol Vocabulary</Name>
       <Term id="extr.appName">
              <Type>string</Type>
```

```
        <Comment>Application Name - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.userName">
        <Type>string</Type>
        <Comment>User Name - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.appGroupName">
        <Type>string</Type>
        <Comment>Application Group Name - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.srcHostName">
        <Type>string</Type>
        <Comment>Source Host Name - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.dstHostName">
        <Type>string</Type>
        <Comment>Destination Host Name - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.netResponseTime">
        <Type>uint64</Type>
        <Comment>TCP Response Time - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.appResponseTime">
        <Type>uint64</Type>
        <Comment>Application Response Time - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.serverAddress">
        <Type>shortstring</Type>
        <Comment>Server IP Address - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.nacProfile">
        <Type>string</Type>
        <Comment>Client NAC Profile - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.detailedLocation">
        <Type>string</Type>
        <Comment>Client Detailed Location - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.oneSidedFlow">
        <Type>uint8</Type>
        <Comment>One Sided Flow Boolean - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.clientLocation">
        <Type>string</Type>
        <Comment>Client Location - ExtremeAnalytics</Comment>
</Term>
<Term id="extr.serverLocation">
        <Type>string</Type>
        <Comment>Server Location - ExtremeAnalytics</Comment>
```

```
        </Term>
        <Term id="extr.metaData">
                <Type>string</Type>
                <Comment>Extra Data - ExtremeAnalytics</Comment>
        </Term>
</Vocabulary>
</CmConfig>
```

$SPLUNK/etc/apps/splunk_app_stream/default/streams/netflow (additions)

```
{
        "aggType": "value",
        "desc": "Application Name - ExtremeAnalytics",
        "enabled": true,
        "name": "app-name",
        "term": "extr.appName"
},
{
        "aggType": "value",
        "desc": "Application Group Name - ExtremeAnalytics",
        "enabled": true,
        "name": "application-group",
        "term": "extr.appGroupName"
},
{
        "aggType": "value",
        "desc": "User Name - ExtremeAnalytics",
        "enabled": true,
        "name": "x-user-name",
        "term": "extr.userName"
},
{
        "aggType": "value",
        "desc": "Source Host Name - ExtremeAnalytics",
        "enabled": true,
        "name": "src_host_name",
        "term": "extr.srcHostName"
},
{
        "aggType": "value",
        "desc": "Destination Host Name - ExtremeAnalytics",
        "enabled": true,
        "name": "dst_host_name",
        "term": "extr.dstHostName"
},
{
        "aggType": "value",
```

```
        "desc": "TCP Response Time - ExtremeAnalytics",
        "enabled": true,
        "name": "tcp-response-time",
        "term": "extr.netResponseTime"
},
{
        "aggType": "value",
        "desc": "Application Response Time - ExtremeAnalytics",
        "enabled": true,
        "name": "app-response-time",
        "term": "extr.appResponseTime"
},
{
        "aggType": "value",
        "desc": "Server IP Address - ExtremeAnalytics",
        "enabled": true,
        "name": "server-ip-address",
        "term": "extr.serverAddress"
},
{
        "aggType": "value",
        "desc": "Client NAC Profile - ExtremeAnalytics",
        "enabled": true,
        "name": "client-nac-profile",
        "term": "extr.nacProfile"
},
{
        "aggType": "value",
        "desc": "Client Detailed Location - ExtremeAnalytics",
        "enabled": true,
        "name": "client-detailed-location",
        "term": "extr.detailedLocation"
},
{
        "aggType": "value",
        "desc": "One Sided Flow Boolean - ExtremeAnalytics",
        "enabled": true,
        "name": "one-sided-flow",
        "term": "extr.oneSidedFlow"
},
{
        "aggType": "value",
        "desc": "Client Location - ExtremeAnalytics",
        "enabled": true,
        "name": "client-location",
        "term": "extr.clientLocation"
},
{
        "aggType": "value",
```

```
        "desc": "Server Location - ExtremeAnalytics",
        "enabled": true,
        "name": "server-location",
        "term": "extr.serverLocation"
},
{
        "aggType": "value",
        "desc": "Extra Meta Data - ExtremeAnalytics",
        "enabled": true,
        "name": "meta-data",
        "term": "extr.metaData"
}
```

Stream Flow Data from ExtremeAnalytics into Elastic Stack

ExtremeAnalytics includes the ability to stream flow data from an ExtremeAnalytics engine to Elastic Stack (aka ELK stack). To help you use Elastic Stack with ExtremeAnalytics, we added an `ELK` directory to the ExtremeCloud IQ - Site Engine `NetSight/appdata/Purview` directory.

The `ELK` directory contains the following:

- A PDF describing how to add the open-source "Elastiflow" module to an ELK server and how to update this deployment to make Elastiflow aware of Extreme's IPFIX format.
- Files that you can copy to the ELK server to assist with the customization.

Use the procedures in this section to send Extreme Networks-enriched network flow data to Elastic Stack using IPFIX and ElastiFlow.

Environment

- Extreme Management Center 8.2 and later
- Elastic Stack 6.7 (single server deployment) and later
- ElastiFlow 3.4.2 and later (version compatible with Elastic Stack 6.7) running on Ubuntu Server 18.04

Overview

Use ElastiFlow to collect IPFIX flow data and visualize the results using Elastic Stack. ElastiFlow requires a working Elastic Stack and it must be configured by editing text files on the file system and by using the Kibana user interface.

The installation steps assume that IPFIX will only be sent over UDP on port 2055 from ExtremeCloud IQ - Site Engine. After making the file system and UI changes, you must restart the Elastic Stack components. Finally, enable and deploy the IPFIX exporter of ExtremeAnalytics from the ExtremeCloud IQ - Site Engine user interface.

Part 1 – Installing and Configuring ElastiFlow and Elastic Stack

ElastiFlow installation instructions can be found at:

- https://github.com/robcowart/elastiflow/blob/master/INSTALL.md

Other helpful installation links are:

- https://www.catapultsystems.com/blogs/install-elastiflow-on-ubuntu-18-04-part-1/
- https://sadsloth.net/post/elastiflow-ubuntu1804/

1. Download and install the Oracle Server JRE 8 in one of the following ways:
    a. Via the Ubuntu bundle by entering the following commands:

    ```
    $ sudo apt install openjdk-8-jre
    ```

    Verify Oracle Server JRE 8 is installed properly by entering the following:

    ```
    $ java -version
    openjdk version "1.8.0_212"
    OpenJDK Runtime Environment (build 1.8.0_212-8u212-b03-
    0ubuntu1.18.04.1-b03)
    OpenJDK 64-Bit Server VM (build 25.212-b03, mixed mode)
    ```

    b. Via the external Java web site by following the instructions at: https://www.oracle.com/technetwork/java/javase/downloads/server-jre8-downloads-2133154.html

2. Install Elastic Stack 6.7 (6.7.2 at time of writing) by entering the following commands:

```
wget -qO - https://artifacts.elastic.co/GPG-KEY-elasticsearch |
sudo apt-key add
echo "deb https://artifacts.elastic.co/packages/6.x/apt stable
main" | sudo tee -a
/etc/apt/sources.list.d/elastic-6.x.list
```

    a. Install Elastic Search:

    ```
    sudo apt update; sudo apt -y install elasticsearch
    ```

    (You might need to run **`sudo apt-get -f install`** to update packages before you can install `elasticsearch` .)

    ```
    sudo /bin/systemctl daemon-reload
    sudo /bin/systemctl enable elasticsearch.service
    sudo systemctl start elasticsearch.service
    ```

    b. Install Kibana:

    ```
    sudo apt -y install kibana

    sudo /bin/systemctl daemon-reload
    sudo /bin/systemctl enable kibana.service

    sudo systemctl start kibana.service
    ```

    c. Install Logstash:

    ```
    sudo apt -y install logstash
    ```

3. Configure Elastic Stack components.

    a. Configure Elasticsearch:

    ```
    sudo nano /etc/elasticsearch/elasticsearch.yml
    ```

    Change `#network.host: 192.168.0.1` to `network.host: localhost`
    Save the file.

    b. Configure Kibana:

    WARNING: The following changes enable external access to Kibana. You must follow best practices to restrict public access to the system.

    ```
    sudo nano /etc/kibana/kibana.yml
    ```

    Change `#server.host: "localhost"` to `server.host: "YOUR_KIBANA_SERVER_IP"`.
    Save the file.

    ```
    sudo  systemctl restart kibana
    ```

    The default port for the Kibana's server is tcp port 5601. Create a firewall rule to enable user access to the Kibana server. The rule should be something like:

    ```
    sudo ufw allow from YOUR_MANAGEMENT_SUBNET to any port 5601
    proto tcp
    ```

    c. Configure Logstash:

    Edit JVM setting in `/etc/logstash/jvm.options`.

    ```
    sudo nano /etc/logstash/jvm.options
    ```

    Change `-Xms1g` to `-Xms4g`.
    Change `-Xmx1g` to `-Xmx4g`.
    Save the file.

    Add required Logstash plugins.

    ```
    sudo /usr/share/logstash/bin/logstash-plugin update logstash-
    codec-netflow;
    sudo /usr/share/logstash/bin/logstash-plugin update logstash-
    input-udp;
    sudo /usr/share/logstash/bin/logstash-plugin update logstash-
    filter-dns;
    sudo /usr/share/logstash/bin/logstash-plugin update logstash-
    ```

```
filter-geoip;
sudo /usr/share/logstash/bin/logstash-plugin update logstash-
filter-translate
```

4. Download and extract ElastiFlow v3.4.2.`tar.gz` to `/usr/local/src`.

```
wget https://github.com/robcowart/elastiflow/archive/v3.4.2.tar.gz
sudo tar xvzf v3.4.2.tar.gz -C /usr/local/src
```

5. Copy logstash configuration.

```
cd /usr/local/src
sudo cp -arv elastiflow-3.4.2/logstash/elastiflow/.
/etc/logstash/elastiflow
```

6. Merge Extreme Networks specific IPFIX definitions with ElastiFlow.

   a. To prepare for this step, copy the `extr_elastiflow_3.4.2.tar.gz` file to the `/etc/logstash` directory.

   b.
```
cd /etc/logstash
sudo tar xvzf extr_elastiflow_3.4.2.tar.gz
```

7. Configure logstash `pipelines.yml`.

   a. `sudo nano /etc/logstash/pipelines.yml`

   b. Add:
```
- pipeline.id: elastiflow
path.config: "/etc/logstash/elastiflow/conf.d/*.conf"
```

NOTE: Be careful about spacing and extra blank lines with the following file. Make sure there are no blank lines between the main definition and the `elastiflow` definition.

```
- pipeline.id: main
path.config: "/etc/logstash/conf.d/*.conf"
- pipeline.id: elastiflow
path.config: "/etc/logstash/elastiflow/conf.d/*.conf"
```

Do not add a <CR> at the end of the file.
Save the file.

The following configuration example receives Extreme Networks-enriched IPFIX on UDP port 2055 only. We can modify the Logstash configuration and service parameters to limit the Logstash plugins that are loaded.

To prepare for this step, copy the **extr_udp_2055_logstash.tar.gz** file to the **/** directory.

```
cd /
sudo tar xvzf extr_udp_2055_logstash.tar.gz
cd /etc/logstash/elastiflow/conf.d
sudo mv 10_input_netflow_ipv4.logstash.conf 10_input_netflow_
ipv4.logstash.conf.disabled;
sudo mv 10_input_sflow_ipv4.logstash.conf 10_input_sflow_
ipv4.logstash.conf.disabled;
sudo mv 20_filter_20_netflow.logstash.conf 20_filter_20_
netflow.logstash.conf.disabled;
sudo mv 20_filter_40_sflow.logstash.conf 20_filter_40_
sflow.logstash.conf.disabled;
```

8. To prevent packet drops:
   `sudo cp -arv /usr/local/src/elastiflow-3.4.2/sysctl.d/87-elastiflow.conf /etc/sysctl.d/.`

   To apply sysctl changes without restart:
   `sudo sysctl --system`

9. Set up Kibana index patterns.

   a. Download https://github.com/robcowart/elastiflow/archive/v3.4.2.tar.gz to the computer that you will use to view ElastiFlow.

   b. Extract the files to a temporary directory.

   c. In the web browser, go to http://YOUR_KIBANA_SERVER_IP:5601.

   d. In the Kibana UI, select **Management** on the left side of the screen and then **Saved Objects**.

   e. Select **Import**.

   f. Select `elastiflow-3.4.2\kibana\elastiflow.kibana.6.7.x.json`.

   g. Select **Import**.

10. Start Logstash:

    a.
    ```
    sudo /usr/share/logstash/bin/system-install
    sudo systemctl daemon-reload
    sudo systemctl start logstash
    ```

    b. Run `sudo tail -f /var/log/logstash/logstash-plain.log` to see messages from Logstash.
    It is normal to see info messages such as the following in the log:
    `[INFO ][logstash.config.source.local.configpathloader] No`

```
config files found in path
{:path=>"/etc/logstash/conf.d/*.conf"}
```

Depending on your system, it can take a few minutes for Logstash to start up. When it starts, you should see a message that says: **`Successfully started Logstash API endpoint`**.

11. Go to https://github.com/robcowart/elastiflow/blob/master/INSTALL.md and perform "Recommended Kibana Advanced Settings."

Part 2 – Configuring each Analytics Engine to export IPFIX data to the Elastic Stack server

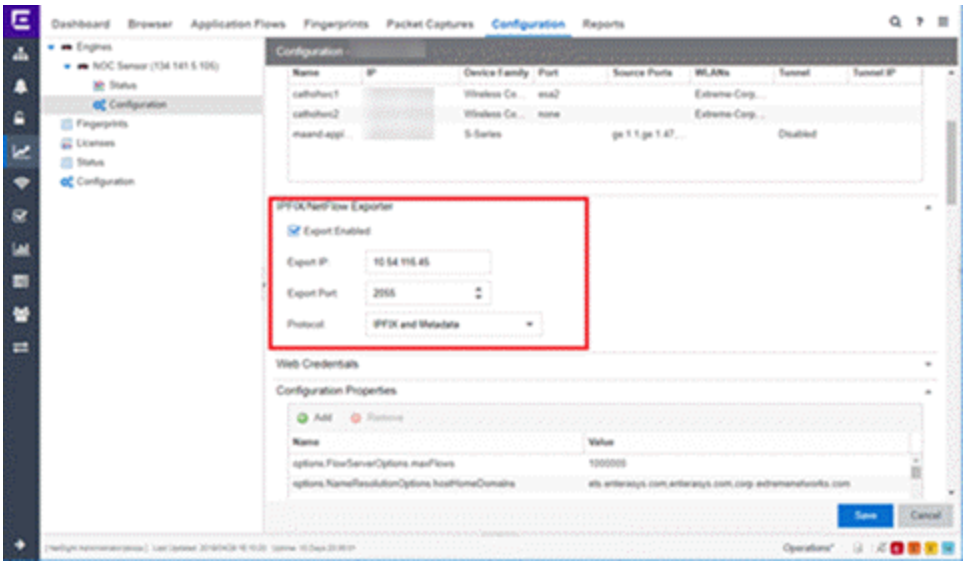
1. Log in to the ExtremeCloud IQ - Site Engine.
2. Navigate to Analytics > Configuration.
3. Use the following steps for each engine that you want exporting flows to ElastiFlow:
    a. Select the engine's Configuration page.
    b. Expand the IPFIX/Netflow Exporter section.
    c. Fill out the required fields:

        Set Export IP to the Logstash IP address.

        Set Export Port to 2055.

        Set Protocol to either IPFIX or IPFIX and Metadata.

        Metadata contains some protocol-specific data for the analysis of DNS, HTTP, etc. This additional data can double the size of the records.



4. Enforce the changes.
   You should see **`Ipfixdata`** in ElastiFlow within a minute or two.
5. Go to Kibana at http://YOUR_KIBANA_SERVER_IP:5601.
6. Select **Dashboard**.
7. Select **ElastiFlow: Overview**.
   You should see some data.
8. The Logstash log file displays the following message:
   `… [WARN ][logstash.codecs.netflow ] Can't (yet) decode flowset id xxx from observation domain id xxxx, because no template to decode it with has been received.`

   This message is normal. It goes away after one minute when Logstash receives the IPFIX data template, and this message will stop being added to the log file.

Appendix: Files

Additions to ipfix.yml in extr_elastiflow_3.4.2.tar.gz

```
# Extreme Networks (formerly 'Enterasys')

  1916:
       0:
       - :skip
       371:
```

```
        - :string
        - :extr_userName
        372:
        - :string
        - :extr_appGroupName
        1000:
        - :string
        - :extr_srcHostName
        1001:
        - :string
        - :extr_dstHostName
        1002:
        - :uint64
        - :extr_netResponseTime
        1003:
        - :uint64
        - :extr_appResponseTime
        1004:
        - :ip4_addr
        - :extr_serverAddress
        1005:
        - :string
        - :extr_nacProfile
        1006:
        - :string
        - :extr_detailedLocation
        1007:
        - :uint8
        - :extr_oneSidedFlow
        1008:
        - :string
        - :extr_clientLocation
        1009:
        - :string
        - :extr_serverLocation
        1010:
        - :string
        - :extr_metaData
```

Additions to elastiflow.template.json and elastiflow_dynamic.template.json in extr_elastiflow_3.4.2.tar.gz

```
{
        "ipfix.extr_userName": {
        "path_match": "ipfix.extr_userName",
```

```
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_appGroupName": {
      "path_match": "ipfix.extr_appGroupName",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_srcHostName": {
      "path_match": "ipfix.extr_srcHostName",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_dstHostName": {
      "path_match": "ipfix.extr_dstHostName",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_netResponseTime": {
      "path_match": "ipfix.extr_netResponseTime",
      "mapping": {
      "type": "long"
     }
   }
 },
 {
      "ipfix.extr_appResponseTime": {
      "path_match": "ipfix.extr_appResponseTime",
      "mapping": {
      "type": "long"
     }
   }
 },
 {
```

```
      "ipfix.extr_serverAddress": {
      "path_match": "ipfix.extr_serverAddress",
      "mapping": {
      "type": "ip"
     }
   }
 },
 {
      "ipfix.extr_nacProfile": {
      "path_match": "ipfix.extr_nacProfile",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_detailedLocation": {
      "path_match": "ipfix.extr_detailedLocation",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_oneSidedFlow": {
      "path_match": "ipfix.extr_oneSidedFlow",
      "mapping": {
      "type": "long"
     }
   }
 },
 {
      "ipfix.extr_clientLocation": {
      "path_match": "ipfix.extr_clientLocation",
      "mapping": {
      "type": "keyword"
     }
   }
 },
 {
      "ipfix.extr_serverLocation": {
      "path_match": "ipfix.extr_serverLocation",
      "mapping": {
      "type": "keyword"
     }
   }
```

```
},
{
     "ipfix.extr_metaData": {
     "path_match": "ipfix.extr_metaData",
     "mapping": {
     "type": "keyword"
    }
  }
},
```

Additions to elastiflow_static.template.json in extr_elastiflow_3.4.2.tar.gz

```
"extr_userName": {
     "type": "keyword"
  },
  "extr_appGroupName": {
     "type": "keyword"
  },
  "extr_srcHostName": {
     "type": "keyword"
  },
  "extr_dstHostName": {
     "type": "keyword"
  },
  "extr_netResponseTime": {
     "type": "long"
  },
  "extr_appResponseTime": {
     "type": "long"
  },
  "extr_serverAddress": {
     "type": "ip"
  },
  "extr_nacProfile": {
     "type": "keyword"
  },
  "extr_detailedLocation": {
     "type": "keyword"
  },
  "extr_oneSidedFlow": {
     "type": "long"
  },
  "extr_clientLocation": {
     "type": "keyword"
```

```
},
"extr_serverLocation": {
   "type": "keyword"
},
"extr_metaData": {
   "type": "keyword"
},
```