



ExtraHop 8.9

ExtraHop System User Guide

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About this guide

This guide provides information about the ExtraHop system for the ExtraHop Discover and Command appliances.

The purpose of this guide is to help users understand the ExtraHop system architecture and functionality as well as learn how to operate the controls, fields, and options available throughout the system.


Additional resources are available through the following links:


- See information about administrator features and functions for the ExtraHop Discover and Command appliances in the [ExtraHop Admin UI Guide](#) 
- See the complete ExtraHop documentation set: <https://docs.extrahop.com> 
- See online training modules on the ExtraHop website: <https://www.extrahop.com/go/training/> 

Contact us

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Please let us know how we can improve this document. Send your comments or suggestions to documentation@extrahop.com.

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Introduction to the ExtraHop system

The ExtraHop system provides a comprehensive network detection and response solution for security threats and IT operations. You can monitor how services and devices interact with each other and how transactions flow across the data link layer (L2) to the application layer (L7) in your network. You can also perform threat hunting to look for indicators of compromise within network traffic.

This guide explains how the ExtraHop system collects and analyzes your data and how the core system components and functionalities help you access detections, metrics, transactions, and packets about the traffic on your network. Each section also provides links to additional relevant resources about the feature.

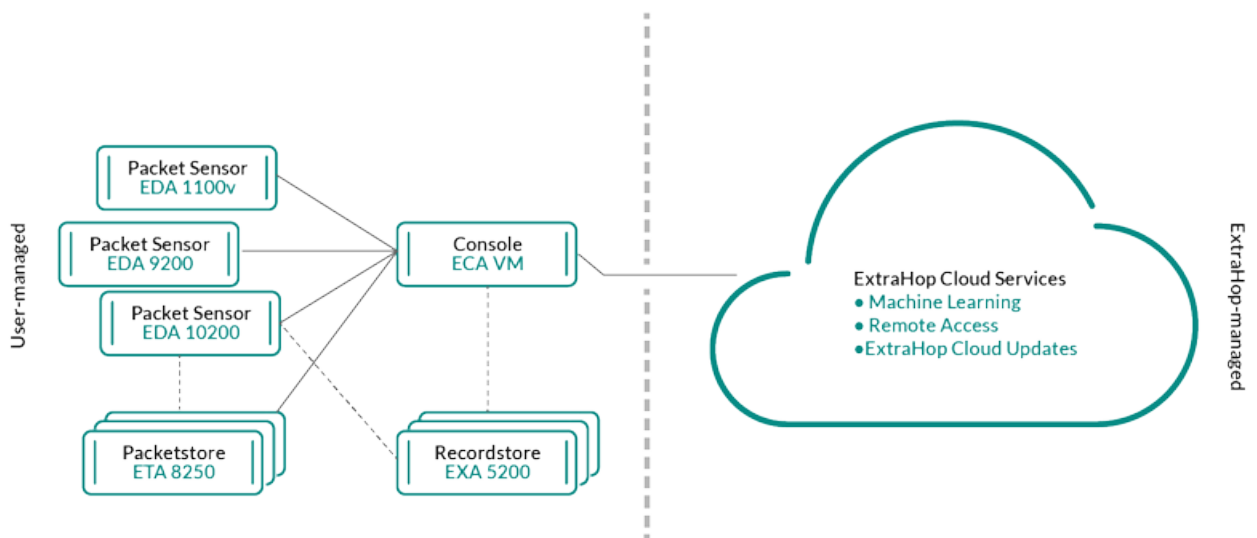
Platform Architecture

The ExtraHop system is customized with modular components that combine to satisfy your unique environmental needs.

Solutions

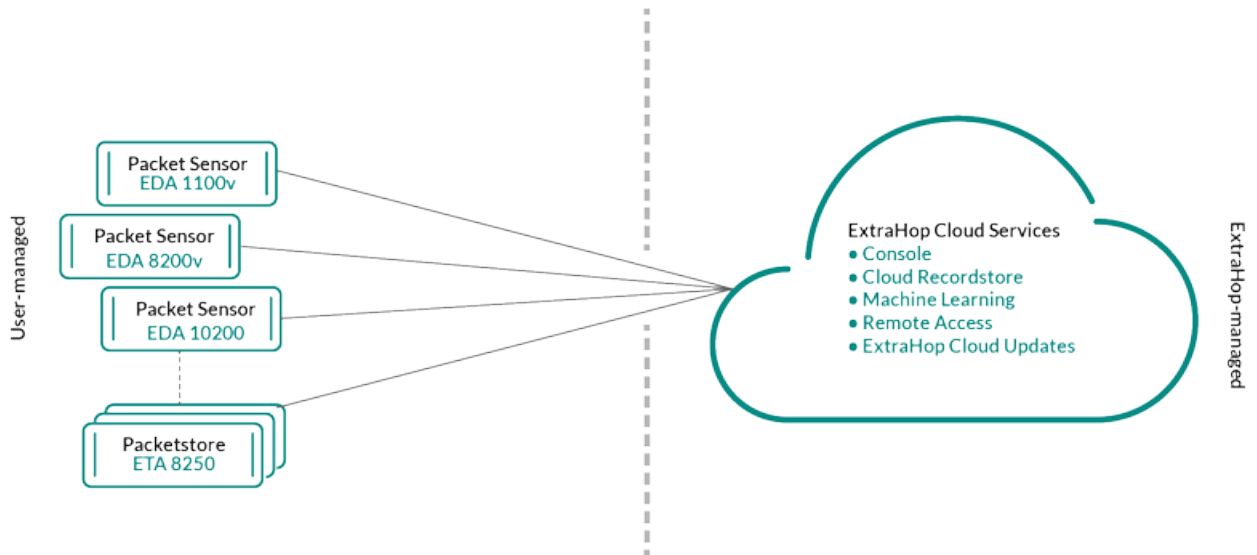
Reveal(x) Enterprise

Reveal(x) Enterprise is a self-managed solution that comprises sensors, consoles, packetstores, recordstores, and access to ExtraHop Cloud Services.



Reveal(x) 360

Reveal(x) 360 is a software-as-a-service (SaaS) solution that comprises sensors and packetstores and includes a cloud-based recordstore, a console, and access to ExtraHop Cloud Services. The type of sensors and packetstores are determined by subscription level.



Components

Each solution offers a set of components based on your environmental needs: sensors, packetstores, recordstores, and a console for centralized management and unified data views.

Packet sensors

Packet sensors capture, store, and analyze metric data about your network. Multiple levels of data analysis, collection, and storage are available by sensor size. These sensors are available as physical, virtual, and cloud-based options in sizes that are based on your analysis needs.

Flow sensors

Flow sensors are available for Reveal(x) 360 Standard subscriptions only and exclusively collect VPC flow logs so that you can see traffic managed by AWS SaaS services.

Packetstores

Packetstores integrate with sensors and consoles to provide [continuous packet capture](#) and sufficient storage for deeper investigations and forensic needs. Packetstores can be deployed as standalone physical or virtual options and are included with the Ultra subscription for Reveal(x) 360.

Recordstores

Recordstores integrate with sensors and consoles to [store transaction and flow records](#) that can be queried from throughout the ExtraHop system. Recordstores can be deployed as standalone physical or virtual options, supported as third-party connections to Splunk or BigQuery from Reveal(x) Enterprise, and are included in Premium and Ultra subscriptions for Reveal(x) 360.

Consoles

Consoles provide a browser-based interface that provides a command center for all connected components. Consoles can be deployed as standalone virtual or cloud-based options for Reveal(x) Enterprise and are included in subscriptions for Reveal(x) 360.

The following table provides an overview of the options available for each solution.

	Reveal(x) Enterprise		Reveal(x) 360	
	Physical	Virtual/Cloud	Physical	Virtual/Cloud
Packet sensor	EDA 1200	EDA 1100v AWS	EDA 1200	EDA 1100v AWS
	EDA 4200	EDA 1100v Azure	EDA 4200	EDA 1100v Azure
	EDA 6200		EDA 6200	
	EDA 8200		EDA 8200	

	Reveal(x) Enterprise		Reveal(x) 360	
	EDA 9200	EDA 1100v GCP	EDA 9200	EDA 1100v GCP
	EDA 10200	EDA 1100v Linux KVM	EDA 10200	EDA 1100v Linux KVM
		EDA 1100v VMware		EDA 1100v VMware
		EDA 6100v VMware		EDA 6100v VMware
		EDA 6100v AWS		EDA 6100v AWS
		EDA 6100v Azure		EDA 6100v Azure
		EDA 8200v AWS		EDA 8200v AWS
		Reveal(x) Ultra 1 Gbps and 10 Gbps AWS		Reveal(x) Ultra 1 Gbps and 10 Gbps AWS
		Reveal(x) Ultra 1 Gbps GCP		Reveal(x) Ultra 1 Gbps GCP
Flow Sensor	N/A	N/A	N/A	EFC 1291v
Packetstore	ETA 6150	ETA 1150v AWS	ETA 6150	ETA 1150v AWS
	ETA 8250	ETA 1150v Azure	ETA 8250	ETA 1150v Azure
		ETA 1150v GCP		ETA 1150v GCP
		ETA 1150v VMware		ETA 1150v VMware
		ETA 6150v VMware		ETA 6150v VMware
				Included with Ultra subscriptions
Recordstore	EXA 5200	EXA 5100v AWS	N/A	Included with Premium and Ultra subscriptions
		EXA 5100v Azure		
		EXA 5100v Hyper-V		
		EXA 5100v Linux KVM		
		EXA 5100v VMware		

	Reveal(x) Enterprise	Reveal(x) 360
Console	N/A	Included with all subscriptions
	ECA AWS ECA Azure ECA GCP ECA Hyper-V ECA Linux KVM ECA VMware	

ExtraHop Cloud Services

[ExtraHop Cloud Services](#) automatically updates sensors with new detections and critical threat intelligence, and feature enhancements, and enables access for your account teams for remote support and professional services.

Smart Sensor Analytics

The ExtraHop system offers a browser-based interface with tools that enable you to explore and visualize data, investigate findings in both top-down and bottom-up workflows, and customize how you collect, view, and share your network data. Advanced users can automate and script both administrative and user tasks through the [ExtraHop REST API](#) and customize data collection through the [ExtraHop Trigger API](#), which is a JavaScript IDE tool.

At the core of the ExtraHop system is a smart sensor that captures, stores, and analyzes metric data about your network—and offers different levels of data analysis, collection, and storage based on your needs. Sensors are provisioned with storage that supports 30 days of metric lookback. Note that actual lookback varies by traffic patterns, transaction rates, the number of endpoints, and the number of active protocols.

Consoles act as a command center with connections to multiple sensors, recordstores, and packetstores that are distributed across data centers and branch offices. All Reveal(x) 360 deployments include a console; Reveal(x) Enterprise can deploy virtual or cloud variations.

Consoles provide unified data views across all your sites and enable you to sync certain advanced configurations (such as [triggers](#) and [alerts](#)) and settings ([tuning parameters](#), [analysis priorities](#), and [recordstores](#)).

The following sections describe the major functional components of the ExtraHop system and how they work together.

Sensor Types

The type of sensor you deploy determines the type of data that is collected, stored, and analyzed.

Wire data

Packet sensors passively observe unstructured packets through a port mirror or tap and store the data in the local datastore. The packet data goes through real-time stream processing that transforms the packets into structured wire data through the following stages:

1. TCP state machines are recreated to perform full-stream reassembly.
2. Packets are collected and grouped into flows.
3. The structured data is analyzed and processed in the following ways:
 - Transactions are identified.
 - Devices are automatically discovered and classified by their activity.

- Metrics are generated and associated with protocols and sources, and the metric data is then aggregated into metric cycles.
4. As new metrics are generated and stored, and the datastore becomes full, the oldest existing metrics are overwritten according to the first-in first-out (FIFO) principle.

Flow data

A flow is a set of packets that are part of a single connection between two endpoints. Flow sensors are available for Reveal(x) 360 and offer continuous network visibility based on VPC flow logs to help secure AWS environments. VPC flow logs enable you to capture information about the IP traffic going to and from network interfaces in your VPC and are recorded as flow log records, which are log events that consist of fields that describe the traffic flow. This log data enables you to search for threats with advanced machine-learning detections.

Flow logs are ingested, deduplicated, and then grouped into flows. The flows are then enriched with data (such as MAC addresses) queried from AWS EC2 APIs.

The flows are then analyzed and processed in the following ways:

- Devices are automatically discovered and classified by their activity observed over specific ports.
- Basic L2-L4 metrics are generated and aggregated into metric cycles.
- ExFlow record types are generated and published.

Metrics, Records, and Packets

ExtraHop sensors collect and store multiple depths of network interaction as metrics. Metrics are aggregated observations about endpoint interactions over time. Packetstores collect and store the raw data transferred between two endpoints as packets. [Recordstores](#) collect and store records, which are structured information about transaction, message, and network flows.

You can view and query all of these interactions from individual sensors or from a console that is connected to a complex deployment of sensors, packetstores, and recordstores.

For example, when a client sends an HTTP request to a web server, here is what each data type contains:

- The packet contains the raw data that was sent and received in the interaction.
- The related record contains the time-stamped metadata about the interaction: when the request happened, the IP address of the client and server, the requested URI, any error messages.
- The related metric (HTTP Requests) contains an aggregate of that interaction with other observed interactions during the specified time period, such as how many requests occurred, how many of those requests were successful, how many clients sent requests, and how many servers received the requests.

Both metrics and records can be customized to extract and store specific metadata with JavaScript-based [triggers](#). While the ExtraHop system has over [4600 built-in metrics](#), you might want to create a [custom metric that collects and aggregates 404 errors](#) from only critical web servers. And, you might want to maximize your record storage space by only [collecting transactions that occurred over a suspicious port](#).

Device discovery

After a device is discovered, the ExtraHop system begins to collect metrics based on the analysis level configured for that device. You can [Find a device](#) by their MAC address, IP address, or name (such as a hostname observed from DNS traffic, NetBIOS name, Cisco Discovery Protocol (CDP) name, DHCP name, or a custom name that you assigned to the device).

The ExtraHop system can discover and track devices by their MAC address (L2 Discovery) or by their IP addresses (L3 Discovery). L2 Discovery offers the advantage of tracking metrics for a device even if the IP address is changed or reassigned through a DHCP request. By default, the ExtraHop system is configured for L2 Discovery.

Device IPv4 and IPv6 addresses are discovered from Address Resolution Protocol (ARP) messages, Neighbor Discovery Protocol (NDP) responses, local broadcasts, or local subnet multicast traffic. The

MAC address and IP address for devices appear in search results throughout the system with the device information.

L2 Discovery

In L2 Discovery, the ExtraHop system creates a device entry for every local MAC address discovered over the wire. IP addresses are mapped to the MAC address, but metrics are stored with the device MAC address even if the IP address changes.

IP addresses observed outside of locally-monitored broadcast domains are aggregated at one of the incoming routers in your network. If a device sends a DHCP request through a router acting as a DHCP relay agent, the ExtraHop system detects and maps the IP address to the device MAC address. If the IP address changes for the device with a subsequent request through the DHCP relay agent, the ExtraHop system updates its mapping and continues to keep track of the device metrics by the MAC address.

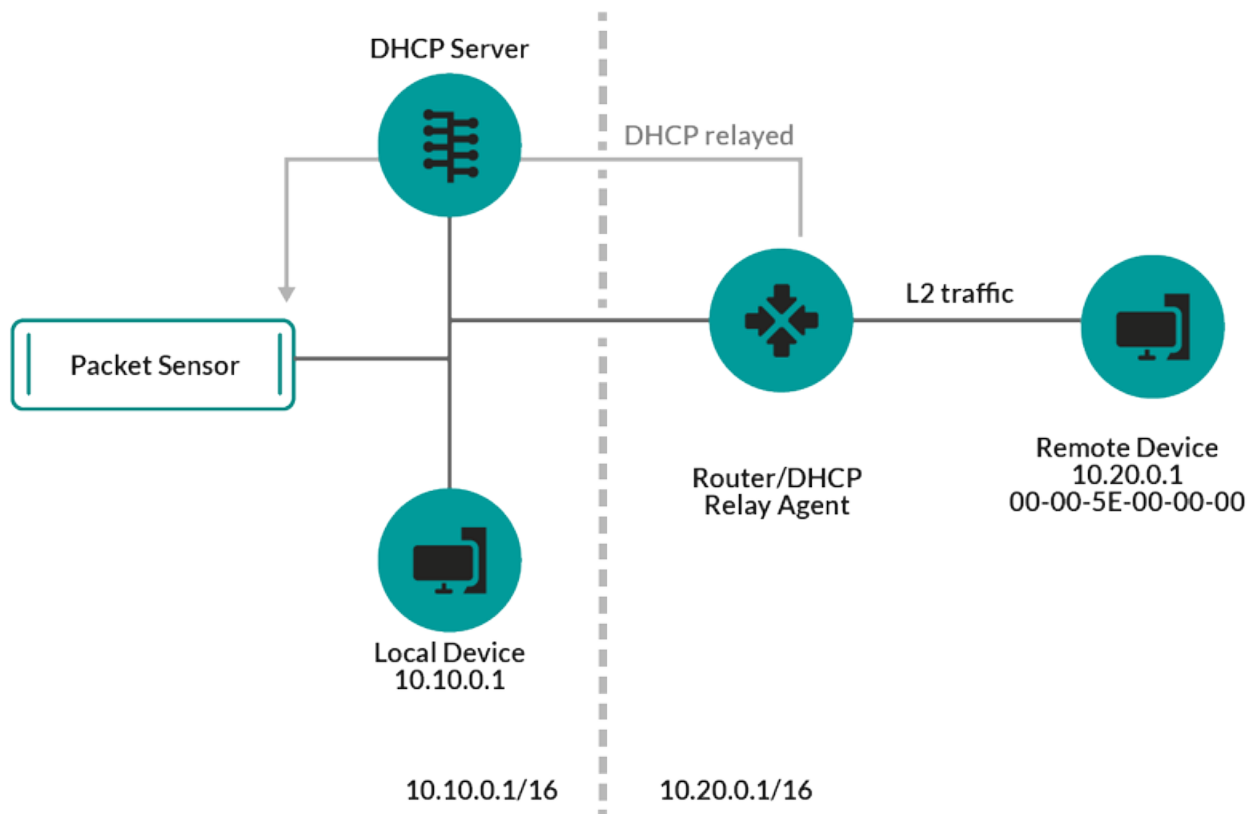


Figure 1: Both MAC address and IP address are discovered for the remote device.

If a DHCP relay agent is not configured, remote devices can be discovered by their IP addresses through [Remote L3 Discovery](#).

L3 Discovery

In L3 Discovery, the ExtraHop system creates and links two entries for each local discovered device: an L2 parent entry with a MAC address and an L3 child entry with IP addresses and the MAC address.

Here are some important considerations about L3 discovery:

- If a router has proxy ARP enabled, the ExtraHop system creates an L3 device for each IP address that the router answers ARP requests for.
- If you have a proxy ARP configured in your network, the ExtraHop system might automatically discover remote devices.

- L2 metrics that cannot be associated with a particular L3 child device (for example, L2 broadcast traffic) are associated with the L2 parent device.

Remote L3 Discovery

If the ExtraHop system detects an IP address that does not have associated ARP or NDP traffic, that device is considered a remote device. Remote devices are not automatically discovered, but you can add a remote IP address range and discover devices that are outside of the local network. A device entry is created for each IP address that is observed within the remote IP address range. (Remote devices do not have L2 parent entries.)

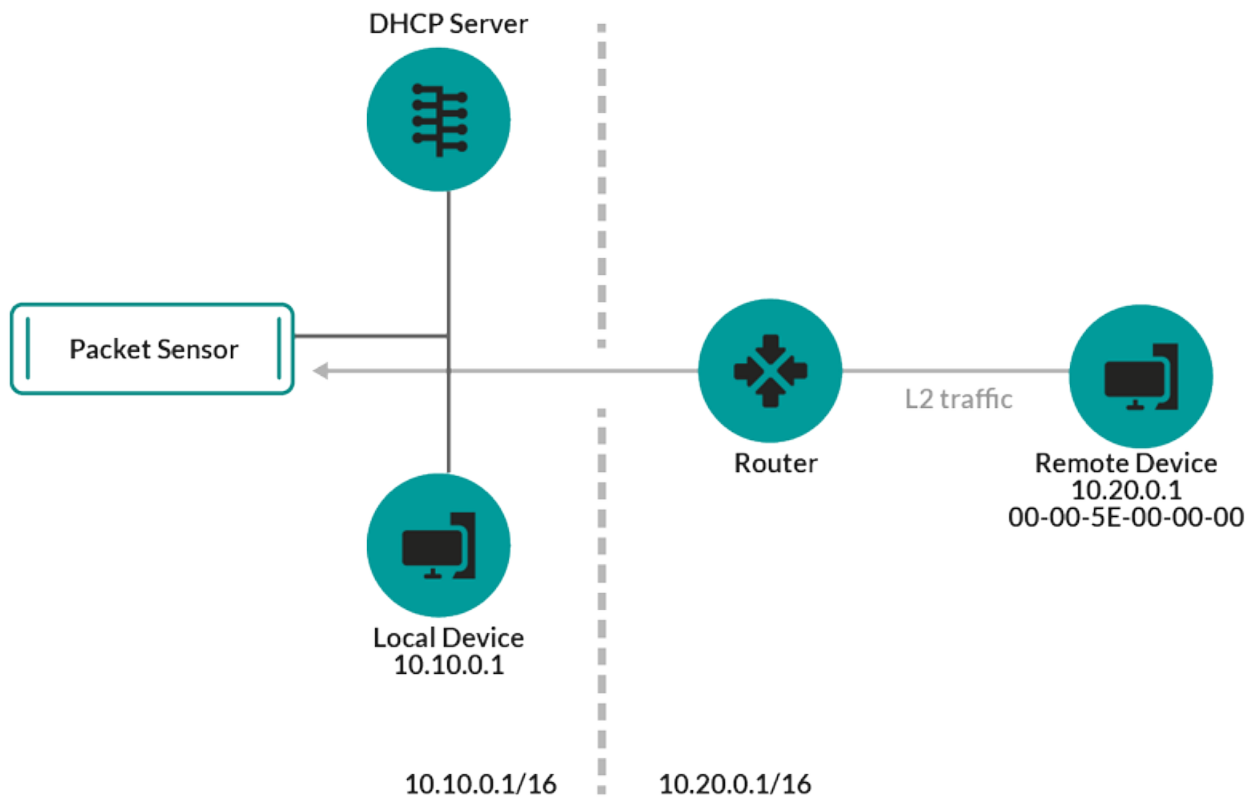


Figure 2: Only the IP address is discovered for the remote device.

Here are some recommendations about when to configure Remote L3 Discovery:

- Your client devices are on a network segment that is not directly tapped.
- Your organization has a remote office without an on-site ExtraHop system but users at that site access central data center resources that are directly monitored by an ExtraHop system. The IP addresses at the remote site can be discovered as devices.
- A cloud service or other type of off-site service hosts your remote applications and has a known IP address range. The remote servers within this IP address range can be individually tracked.

VPN Discovery

[VPN Discovery](#) enables the ExtraHop system to correlate the private, RFC-1918 IP addresses assigned to VPN clients with their public, external IP addresses. This enriched visibility into north-south traffic reduces barriers when investigating security incidents and performance issues that involve external VPN clients. (This feature requires a VPN gateway that is manually assigned by the user.)

Threat Detection

The ExtraHop system offers both machine-learning and rules-based [detections](#) that identify active or potential threats, network weaknesses that are vulnerable to exploits, and suboptimal configurations that can degrade network performance.

Additionally, [charts](#), [visualizations](#), and [device activity maps](#) enable proactive threat hunting.

Detection Tuning

[Reduce noise and surface only critical detections](#) by adding details about your network that help identify known parameters such as trusted domains and vulnerability scanners.

Additionally, you can create tuning rules that hide specific detections or participants and further reduce unwanted noise.

Network Locality

By default, any device with an RFC1918 IP address (included in a 10/8, 172.16/12, or 192.168/16 CIDR block) is classified on the system as an internal device.

However, because some network environments include non-RFC1918 IP addresses as part of their internal network, you can [change the internal or external classification for IP addresses](#) from the Network Localities page.

Threat Intelligence

The ExtraHop system includes a curated [threat intelligence](#) feed that is updated through the cloud as new threats are discovered. You can also [add threat collections](#) from a third-party or through partner [integrations with ExtraHop Reveal\(x\) 360](#).

Threat Briefings

[Threat briefings](#) provide information about imminent threats that are targeting networks. Updated detections, targeted record and packet queries, and affected devices are presented as a starting point for your investigation, accessed from the [Security Overview](#) page.

Integrations

Reveal(x) 360 provides several third-party integrations that can enhance detection and response management and provide better visibility into network traffic.

Microsoft Protocol Decryption

Enable [decryption of Microsoft protocol traffic](#) and improve detection of security attacks within your Microsoft Windows environment. ExtraHop Reveal(x) 360 synchronizes encryption keys with Windows domain controllers to decrypt and analyze network traffic over protocols such as LDAP, RPC, SMB, and WSMAN.

CrowdStrike

[Import threat intelligence from CrowdStrike Falcon X](#) into the ExtraHop system to detect and annotate indicators of compromise in your environment. You can also easily navigate from assets in the ExtraHop system that are running CrowdStrike to the CrowdStrike Falcon console.

Microsoft 365 (Beta)

Import Microsoft 365 and Azure Active Directory detections and events into the ExtraHop system. You can also monitor Microsoft 365 metrics in built-in dashboards and view risk event details in records.

Splunk

Export and view ExtraHop detections in your [Splunk](#) SIEM.

QRadar

Export and view ExtraHop detections in your [QRadar](#) SIEM.

Navigating the ExtraHop System

The ExtraHop system provides access to network activity data and detection details through a dynamic and highly customizable user interface.

This guide provides an overview of the global navigation and controls, fields, and options available throughout the system. See [Introduction to the ExtraHop system](#) to learn how the ExtraHop system collects and analyzes your data.

Supported browsers

The following browsers are compatible with all ExtraHop systems. Apply the accessibility and compatibility features provided by your browser to access content through assistive technology tools.

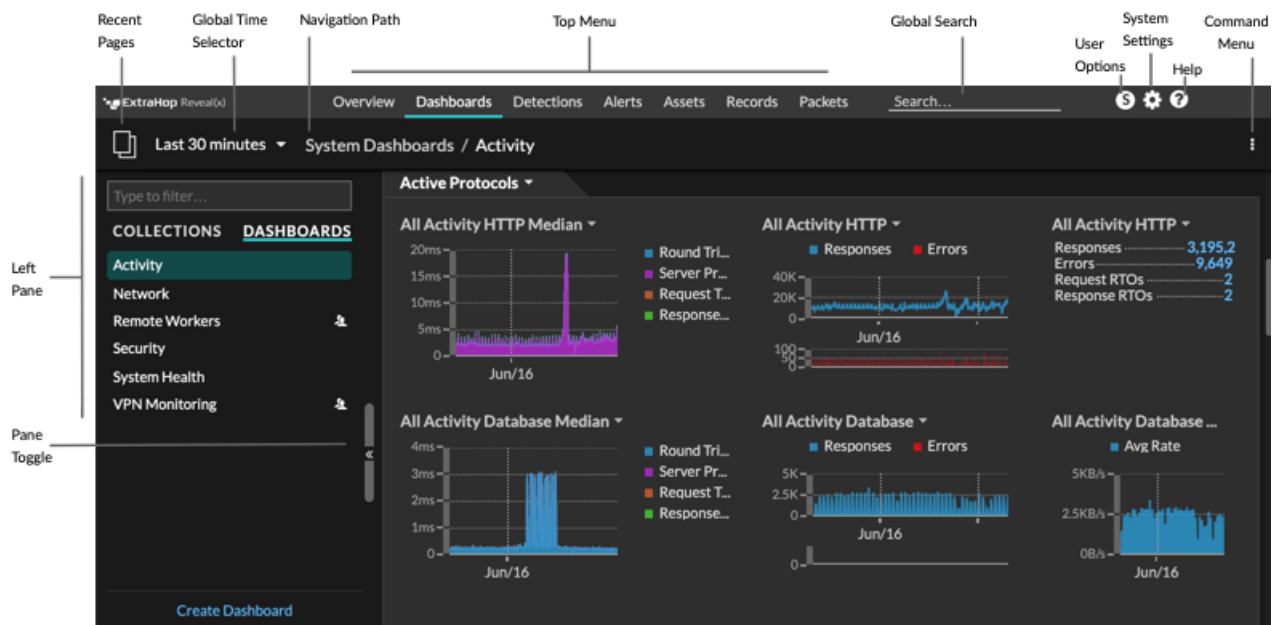
- Firefox
- Google Chrome
- Microsoft Edge
- Safari

Important: Internet Explorer 11 is no longer supported. We recommend that you install the latest version of any supported browser.

Layout and menus

Global navigation elements are located at the top of the page and contain links to the main sections of the system. Within each section, the left pane contains links to specific pages or data.

The following figure shows both global and left pane navigation elements.



Here are definitions of each global navigation element:

Overview pages

Overview pages enable you to quickly evaluate the scope of suspicious activity on your network, learn about protocol activity and device connections, and investigate inbound and outbound traffic on your network.

- View the [Security Overview](#) for information about security detections on your network.
- View the [Network Overview](#) for information about active devices on your network.
- View the [Perimeter Overview](#) for information about traffic traveling in and out of your network.

Dashboards

Click **Dashboards** to view, create, or share dashboards for monitoring any aspect of your network or applications. [System dashboards](#) give you an instant view of the activity and potential security threats on your network.

Alerts

Click **Alerts** to view information about each alert generated during the time interval.

Detections

If your packet or flow sensor is connected to the ExtraHop Machine Learning Service, the top level navigation shows the **Detections** menu. Click **Detections** to view detections identified from your wire data. You can access stored detections even if your sensor is disconnected from the Machine Learning Service.



Note: Machine learning detections require a [connection to ExtraHop Cloud Services](#).

Assets

Click **Assets** to find any application, network, or device discovered by the ExtraHop system. You can view protocol metrics for your assets, active users, or network activity by protocol.

Records

If your ExtraHop system is configured with a recordstore, the top level navigation shows the Records menu. Click **Records** to query for all stored records for the current time interval. Records are structured information about transactions, messages, and network flows.

Packets

If your ExtraHop system is configured with a packetstore, the top level navigation shows the Packets menu. Click **Packets** to query for all stored packets for the current time interval.

Global search field

Type the name of any device hostname or IP address, application, or network to find a match on your sensor or console. If you have a connected recordstore, you can search for saved records. If you have a connected packetstore, you can search for packets.

Help icon

See help information for the page that you are currently viewing. To access the most current and comprehensive set of ExtraHop documentation, visit the [ExtraHop Documentation website](#).

System Settings icon

Access system configuration options, such as Triggers, Alerts, Scheduled Reports, and Custom Devices. Click to view the ExtraHop system and version and view [system notices](#).

User option icon

Log in and log out of your sensor or console, change your password, and access API options.

Pane toggle

Collapse or expand the left pane.

Global Time Selector

[Change the time interval](#) to view application and network activity that was observed by the ExtraHop system for a specific time period. The global time interval is applied to all metrics across the system and does not change as you navigate to different pages.


Recent pages

See a list of the most recent pages you visited in a drop-down menu and make a selection to go back to a previous page. Repeated pages are deduplicated and condensed to save space.

Navigation path

View where you are in the system and click a page name in the path to navigate back to that page.

Command menu drop-down

Click to access specific actions for the page you are viewing. For example, when you click **Dashboards** at the top of the page, the command menu  provides actions for changing dashboard properties or creating a new dashboard.

Start analyzing data

Begin your data analysis journey with the ExtraHop system by following the basic workflows listed below. As you become familiar with the ExtraHop system, you can complete more advanced tasks, such as installing bundles and building triggers.

Here are some basic ways to navigate and work with the ExtraHop system to analyze network activity.

Monitor metrics and investigate interesting data

A good starting point is the [Activity dashboard](#), which shows you a summary of important metrics about application performance on your network. When you see a spike in traffic, errors, or server processing time, you can interact with dashboard data to [drill down](#) and identify which clients, servers, methods, or other factors contributed to the unusual activity.

You can then continue performance monitoring or troubleshooting by [creating a custom dashboard](#) to track a set of interesting metrics and devices.

Check out the following [walkthroughs](#) to learn more about monitoring data in dashboards:

- [Monitor website performance in a dashboard](#)
- [Monitor DNS errors in a dashboard](#)
- [Monitor database health in a dashboard](#)

Search for a specific device and investigate related metrics and transactions

If you want to investigate a slow server, you can [search for the server in the ExtraHop system by device name or IP address](#) and then investigate the server's activity on a protocol page. Was there a spike in response errors or requests? Was server processing time too high or did network latency affect the rate of data transfer? Click on different protocols on the Devices page to investigate more metric data collected by the ExtraHop system. [Drill down by peer IP addresses](#) to see which clients or applications the server talked to.

If your ExtraHop system is connected to a recordstore, you can investigate entire transactions that the server participated in by [creating a record query](#).

Check out the following [walkthroughs](#) to learn more about exploring metrics and records:

- [Explore metrics in the ExtraHop system to investigate DNS failures](#)
- [Query records to find missing web resources](#)

Get visibility into changes to your network by searching for protocol activity

You can get a top-down view of your network by looking at built-in protocol groups. A protocol group is a collection of devices automatically grouped together by the ExtraHop system based on the protocol traffic observed over the wire. For example, you can find new or decommissioned servers that are actively communicating over a protocol by [creating an activity map](#).

If you find a collection of devices that you want to continue monitoring, you can [add a device tag](#) or [custom device name](#) to make those devices easier to find in the ExtraHop system. You can also [create a custom device group](#) or a [custom dashboard](#) to monitor device group activity.

Advanced workflows for customizing your ExtraHop system

After becoming familiar with basic workflows, you can customize your ExtraHop system by setting up alert notifications, creating custom metrics, or installing bundles.

Set up alerts

Alerts track specified metrics to notify you of traffic deviations that might indicate an issue with a network device. [Configure a threshold alert](#) to notify you when a monitored metric crosses a defined value. [Configure a trend alert](#) to notify you when a monitored metric deviates from the normal trends observed by the system.

Install a bundle to enhance ExtraHop features and integrations

Bundles are a saved set of system configurations that can be uploaded to an ExtraHop system. Check out the following popular bundles:

- [Active Directory v4.0](#)
- [AppDynamics Events](#)
- [ExtraHop for ServiceNow](#)

[Install a bundle](#) on your ExtraHop system, or [create a bundle](#) that you can share with others.

Build a trigger to create custom metrics and applications

Triggers are custom scripts that perform an action upon a pre-defined event. Triggers require planning to make sure a trigger doesn't negatively impact system performance.

Check out the following [walkthroughs](#) to learn more about exploring metrics and records:

- [Build a trigger to collect custom metrics for HTTP 404 errors](#)
- [Build a trigger to monitor responses to NTP monlist requests](#)

Access keyboard shortcuts

Keyboard shortcuts help you quickly navigate across the ExtraHop system and manage dashboards with a few keystrokes.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Type one of the following keyboard combinations:

Keyboard combinations	Action
?	Show or hide the keyboard shortcuts help menu
G then S	Go to Dashboards
G then A	Go to Alerts
G then P	Go to Application metrics
G then N	Go to Network metrics
G then D	Go to Device metrics
G then G	Go to Protocol metrics
/	Global search
O then H	Toggle recent pages
J	Select the next item in recent pages
K	Select the previous item in recent pages
O then M	Open Metric Explorer

Keyboard combinations	Action
G then E	Go to System Settings
G then T	Go to Triggers
G then H	Open Help
O then Q	View system information
CTRL+S	Save widget configuration
O then L	Toggle Edit Layout Mode
O then P	Show Dashboard Properties
C then D	Copy the current dashboard
D then D	Delete the current dashboard
O then S	Toggle Descriptions
CTRL+SHIFT+F	Toggle Presentation Mode
N then D	Create a new dashboard
N then F	Create a new folder
O then D	Toggle Edit Dock
P then P	Print or Export to PDF
S then R	Open Scheduled Reports (Consoles only)
CTRL+Click or Command+Click	Open certain links to pages and views in a new browser tab. This function does not work from certain context menus and list widgets. You can also open pages in a new tab through your browser menus where applicable.

Manage dashboards with keyboard shortcuts

The following keyboard shortcuts only apply to dashboards.

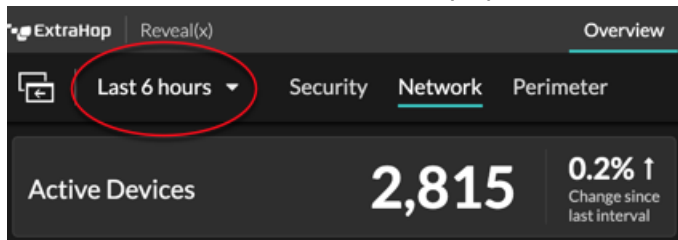
1. Log in to the ExtraHop system through <https://<extrahop-hostname-or-IP-address>>.
2. At the top of the page, click **Dashboards**.
3. Type one of the following keyboard combinations:

Keyboard combinations	Action
O then L	Toggle edit layout mode
O then P	Show dashboard properties
C then D	Copy the current dashboard
D then D	Delete the current dashboard
O then S	Toggle descriptions
CTRL+Up Arrow+F	Toggle presentation mode
N then D	Create a new dashboard
N then F	Create a new folder

Keyboard combinations	Action
O then D	Toggle dock edit mode

Time intervals

The Time Selector is displayed in the top-left corner of the navigation bar and controls the global time interval for metrics and detections displayed in the ExtraHop system.



Here are some considerations about time intervals:

- The Time Selector enables you to select a relative global time interval, such as the last day, or set a custom time range.
- The selected time interval stays the same, whether viewing metrics in a dashboard or investigating detections, until you change the interval or navigate to a page with a preset time interval, such as detection details or threat briefings.
- If a relative time interval is selected when you log out, the ExtraHop system defaults to that relative time interval when you log back in.
- If a custom time range is selected when you log out, the ExtraHop system defaults to the last relative time interval you viewed during the previous login session.
- You can access the five most recent unique time intervals from the **History** tab of the Time Selector.
- The time interval is included at the end of the URL in your browser. To share a link with others that maintains a specific time interval, copy the entire URL. To maintain a specific time interval after logging out of the ExtraHop system, bookmark the URL.
- The time interval associated with the collection and presentation of network data is determined by your local NTP server by default. You can change the system time in the ExtraHop system from the Administration settings. For more information, see [Configure the system time](#) in the ExtraHop Administrators Guide.

Change the time interval

This procedure shows you how to set the global time interval. You can also apply a time interval by dashboard or [by region](#).

1. Click the time interval in the upper left corner of the page (for example **Last 30 minutes**).
2. Select from the following interval options:
 - A preset time interval (such as **Last 30 minutes**, **Last 6 hours**, **Last day**, or **Last week**).
 - A custom unit of time.
 - A custom time range. Click a day to specify the start date for the range. One click will specify a single day. Clicking another day will specify the end date for the range.
 - [Compare metric deltas](#) from two different time intervals.
3. Click **Save**.

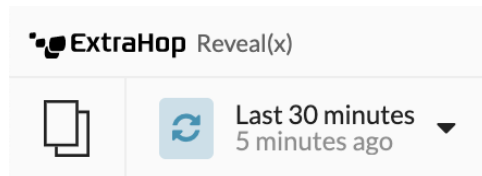


Tip: You can also set the time interval from the **History** tab by selecting from up to five recent time intervals set in a previous login session.

View the latest data for a time interval

Pages that display monitored metric data, such as dashboards and protocol pages, are continuously updated to display the latest data for the selected time interval.

Detail metrics pages, detections, records, packets, and alerts are reloaded on request by clicking the refresh data icon at the top left corner of the page.



Change chart data granularity

The ExtraHop system stores metrics in 30-second buckets of time. Metric data are then aggregated or rolled up into additional five-minute and one-hour buckets. Aggregating data helps to limit the number of data points rendered on a time-series chart so the granularity of data is easier to interpret. The time interval you select determines the best aggregation, or roll up, of data to display in a chart for the period of time you are viewing.

For example, if you select a large time interval, such as one week, metric data is aggregated into one-hour roll ups. On the x-axis of a line chart, you see a data point for every hour instead of a data point for every 30 seconds. If you want to increase the level of granularity, you can [zoom in on a chart](#) or [change the time interval](#).

The ExtraHop system includes built-in high-precision metrics with 1-second roll ups, which are the Network Bytes and Network Packets metrics. These metrics are associated with a device or network capture source. For more information on how to view these metrics in a chart, see [Display the maximum rate in a chart](#).

The ExtraHop system also includes built-in metrics for identifying the single busiest millisecond of traffic within a 1-second roll up. These metrics, which are Maximum Network Bytes per Millisecond and Maximum Packets per Millisecond, are associated with a network capture source and help you detect microbursts. Microbursts are rapid bursts of traffic that occur within milliseconds.

The following table provides information about how data is aggregated based on time interval.

Time Interval	Aggregation Roll Up (if available)	Notes
Less than six minutes	1-second	<p>A 1-second roll up is only available for custom metrics and for the following built-in metrics:</p> <ul style="list-style-type: none"> • Network source: <ul style="list-style-type: none"> • Network Bytes (total throughput) • Network Packets (total packets) • Maximum Network Bytes per Millisecond • Maximum Network Packets per Millisecond • Device source:

Time Interval	Aggregation Roll Up (if available)	Notes
		<ul style="list-style-type: none"> • Network Bytes (combined inbound and outbound throughput by device) • Network Bytes In (inbound throughput by device) • Network Bytes Out (outbound throughput by device) • Network Packets (combined inbound and outbound packets by device) • Network Packets In (inbound packets by device) • Network Packets Out (outbound packets by device)
120 minutes or less	30-second	If a 30-second roll up is not available, a 5-minute or 60-minute roll up displays.
Between 121 minutes and 24 hours	5-minute	If 5-minute roll up is not available, a 60-minute roll up displays.
Greater than 24 hours	60-minute	-



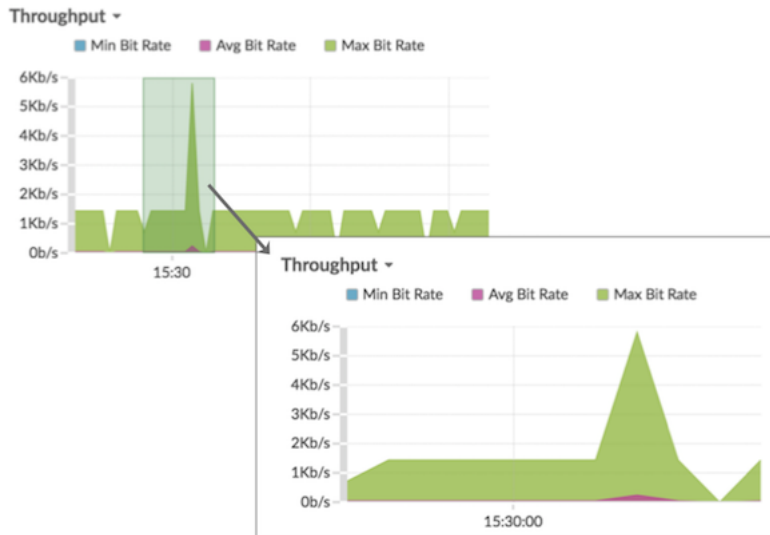
Note: If you have an extended datastore that is configured for 24-hour metrics, a specified time interval of 30 days or longer displays a 24-hour aggregation roll up.

Zoom in on a custom time range

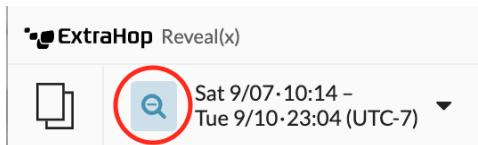
You can click-and-drag across a chart to zoom in on interesting metric activity. This custom time range is then applied across the ExtraHop system, which is useful for investigating other metric activity that occurred at the same time.

Zooming in on a time range is only available in charts with an x- and y-axis, such as line, area, candlestick, and histogram charts.

1. Click-and-drag your mouse across the chart to select a time range. If the time range is less than one minute, the time range appears red. Drag the mouse until the time range appears green.
2. Release the mouse button. The chart is redrawn to the custom time range and the time interval in the upper right corner of the navigation bar is updated.



- To revert from the custom time interval to your original time interval, click the undo icon—a magnifying glass with a minus sign—which is displayed next to the time interval in the upper right corner of the navigation bar.

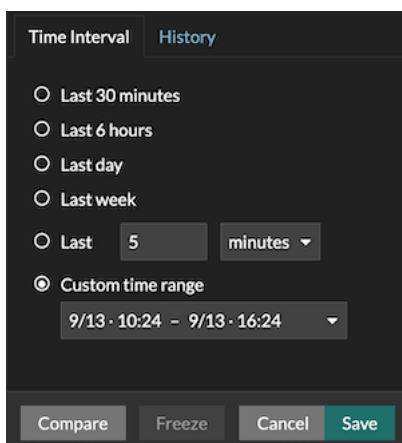


Tip: On a dashboard page, you can limit the zoom-in custom time range to a specific region. Click the region header, select **Use Region Time Selector**, and then zoom in on a chart. Each chart or widget within that region is updated to the custom time range.

Freeze the time interval to create a custom time range

If you see interesting data in an activity map, dashboard, or protocol page, you can freeze the time interval to instantly create a custom time range. Freezing the time interval is useful for creating links that you can share with others, and for investigating related metric activity that occurred at the same time.

- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- Click the time selector in the upper left corner of the page.
- Select a preset time interval.
- Click **Freeze**.
The Custom time range automatically updates as shown in the figure below. The range begins with the earliest time from the previous time interval and ends with the time that you clicked **Freeze**.



Time Interval History

Last 30 minutes

Last 6 hours

Last day

Last week

Last 5 minutes

Custom time range

9/13 - 10:24 - 9/13 - 16:24

Compare Freeze Cancel Save

5. Click **Save**.

The new custom time range will not change as you navigate across the ExtraHop system. You can share or bookmark the URL in your browser.



Note: The time interval is included at the end of the URL in your browser. To share a link with others that maintains a specific time interval, copy the entire URL. Creating a bookmark for the URL maintains the custom time range even after you log out of the ExtraHop system.

6. To remove the custom time range, [change the time interval](#).

Overview pages

Overview pages enable you to quickly evaluate the scope of suspicious activity on your network, learn about protocol activity and device connections, and investigate inbound and outbound traffic on your network.

- View the [Security Overview](#) for information about security detections on your network.
- View the [Network Overview](#) for information about active devices on your network.
- View the [Perimeter Overview](#) for information about traffic traveling in and out of your network.

Security Overview

The Security Overview displays several charts that highlight data from different perspectives about detections. These charts can help you evaluate the scope of security risks, launch investigations into unusual activity, and mitigate security threats. Detections are analyzed every 30 seconds or every hour, depending on the metric.

Site Selector

Click the site selector at the top of the page to view data for one or more sites in your environment. View combined traffic across your networks or focus on a single site to help you quickly find device data.

The site selector indicates which sites are flow sensors and when all or some sites are offline. Because data is not available from offline sites, the charts and device pages associated with offline sites might not show data or might only show limited data. The site selector is available from consoles only.

Executive Report

Click **Generate Executive Report** to create a PDF file. The Executive Report provides a summary of the top detections and risks to your network from the last week. The Executive Report only includes information for the selected sites.

Open Detections

This chart shows you a list of detections with a status other than Closed, sorted by highest risk. Click a detection to view open detections of the selected detection type. Each [detection card](#) summarizes what caused the detection; click the detection name to open the [detection detail page](#).

Detection Types

This count chart shows you the number of distinct detection types that occurred during the selected time interval. By changing the time interval, you can see how many detection types occurred during that time. Click the number to open the Detections page filtered to show detections for each type.

Detections by Attack Category

This chart provides a quick way to see the types of attacks your network might be at risk for and displays the number of detections that occurred in each category during the selected time interval. Actions on Objective detections are listed by type to help you prioritize the most severe detections. Click any number to open a filtered view of detections that match the selected [attack category](#).

Detections by Operations Category

This count chart shows you the total number of detections in three major Operations categories: Hardening, Caution, and Performance. Click any number to open a filtered view of detections that match the selected [operations category](#).

Top Offenders

This chart shows the top 20 devices or endpoints that acted as offenders in one or more detections. The ExtraHop system considers the number of distinct attack categories and detection types and the

risk scores of the detections associated with each device to determine which devices are considered top offenders.

The size of the device role icon indicates the number of distinct detection types and the position of the icon indicates the number of distinct attack categories. Click a role icon to view more information about the attack categories and detection types associated with the device. Click the device name to view [device properties](#).

Learn more about network security with the [Security dashboard](#).

Threat briefings

Threat briefings provide cloud-updated guidance about industry-wide security events. [Learn more about threat briefings](#).

Network Overview

The Network Overview displays the active devices on your network, how they are communicating, and trends in important metrics. The Network Overview refreshes activity map and network health indicator data every minute.

Site Selector

Click the site selector at the top of the page to view data for one or more sites in your environment. View combined traffic across your networks or focus on a single site to help you quickly find device data. The site selector indicates when all or some sites are offline. Because data is not available from offline sites, the charts and device pages associated with offline sites might not show data or might only show limited data. The site selector is available from a console.

Executive Report

Click **Generate Executive Report** to create a PDF file. The Executive Report provides a summary of the top detections and risks to your network from the last week. The Executive Report only includes information for the selected sites.

Active Devices

This count chart shows you the total number of [devices](#) that have been discovered by your ExtraHop system. Click the number to view a list of all discovered devices. The percentage shows you the rate of change for the selected time interval.

New Devices

This count chart shows you how many devices have been discovered within the past five days. Click the number to view a list of all of these devices.

Activity maps

An [activity map](#) cycles through the following protocols each minute when activity is detected:

- CIFS
- Database (DB)
- DNS
- FTP
- HTTP
- LDAP
- SSH
- SSL
- Telnet

Here are some ways you can interact with the activity map:

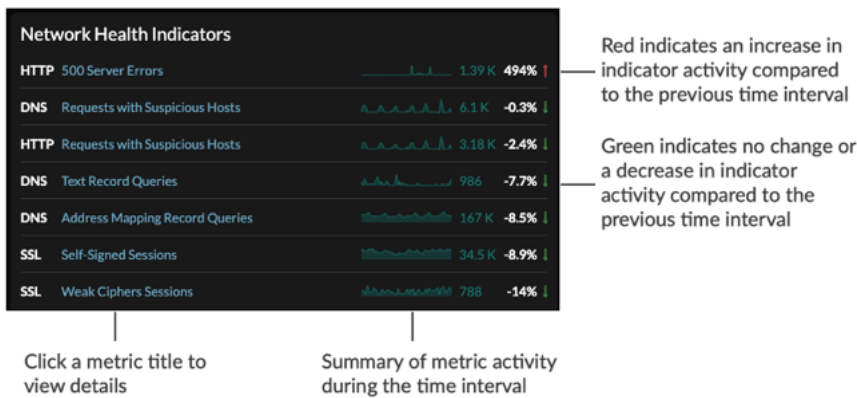
- Click the protocol name to open the activity map in a view that enables you to [add steps and group filters](#). You can then [save](#) your modified activity map to revisit.
- Click the arrows around the protocol name to cycle through the available protocols. Protocols without activity in the specified time interval do not display.
- Click controls from the lower right corner of the activity map to pause and resume cycling, toggle between 2D and 3D visualization, and to zoom in and out of the map.
- Hover over a circle to see device labels and highlight device connections.
- Click a circle and then click the device name to view a protocol page for the device.

Learn more about [navigating activity maps](#).

Network health indicators

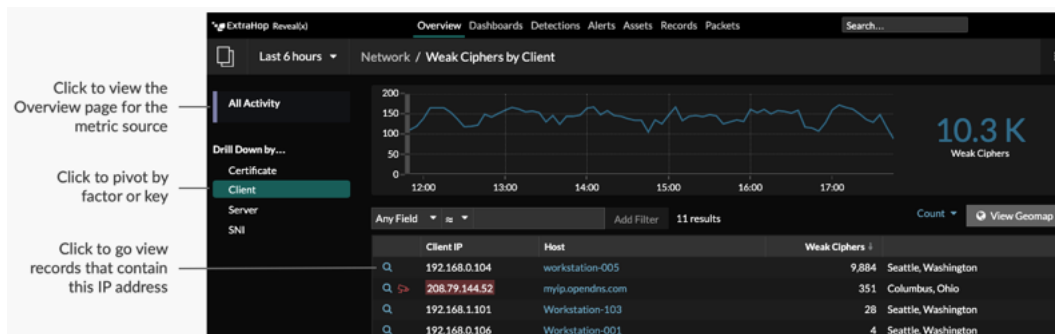
Network health indicators show you general trends related to network and security health. Network health indicators might signal weaknesses or issues in network performance or potentially suspicious activity.

Each network health indicator displays the percentage of change in network activity compared to the previous time interval. Metrics are listed in descending order, by percentage of greatest change to least. Network health indicators with no activity during the specified time interval are not displayed.



Depending on the type of network activity and the amount of change, you can launch an investigation by clicking the metric title to drill down to a detail page. You can then investigate which factors are contributing to the activity.

For example, click the title, such as Weak Ciphers Sessions. A detail page appears with all the clients, servers, certificates, and SNIs that were associated with weak cipher sessions, as shown in the following figure.




The following network health indicators can appear on the Network Overview page.

DNS - Address Mapping Record Queries

This network health indicator shows you the number of DNS requests received by DNS servers that included the A record type. An A record maps a domain name to the IP address (IPv4) of the domain host. Click the metric title to see which clients sent the most requests.

Why is this metric a security health indicator?

While DNS address mapping queries are normal, large or sudden increases can be an indicator of potential data exfiltration or a DNS tunnel. A DNS tunnel is a technique that encodes data into DNS queries for data exfiltration or command and control attacks. For example, sensitive data can be encoded into the hostname within the A record. You can view the A record by clicking the records icon  next to a client that sent a high number of DNS requests.

DNS - FTP Responses

This network health indicator shows you the number of FTP responses sent by DNS servers. Click the metric title to see which servers sent the highest number of FTP responses.

Why is this metric a security health indicator?

The primary activity for DNS servers should be to resolve hostnames instead of sending files over FTP. Attackers can exploit weaknesses in DNS servers, which often go undetected. If there is an increasing number of FTP data transfer by DNS servers, investigate this suspicious activity.


DNS - Request Timeouts

This network health indicator shows you the number of timeouts that occurred after repeated unanswered DNS query requests were sent from clients. Click the metric title to see which clients were affected and which servers were not responding.


Why is this metric a security health indicator?

DNS can be a bottleneck in your network if hostname resolution cannot take place. A spike, or large increase in request timeouts, is disruptive to your network in general, and can also be an indicator of a distributed denial of service (DDoS).

DNS - Requests with Suspicious Hosts

This network health indicator shows you the number of DNS requests that included a suspicious hostname, according to threat intelligence applied to your ExtraHop Reveal(x) system. Click the metric title to see which hosts are considered suspicious. Click the red camera icon  to see threat intelligence details about the hostname.


Why is this metric a security health indicator?

Threat intelligence provides known data about suspicious IP addresses, hostnames, and URIs. You should always investigate indicators of compromise that are identified by threat intelligence. You can view information about the entire DNS transaction by clicking the records icon  next to a suspicious host query.

DNS - Text Record Queries

This network health indicator shows you the number of DNS requests received by DNS servers that included the TXT record type. A TXT record associates human-readable text with a host. Click the metric title to see which client sent the most DNS requests with the TXT record type.

Why is this metric a security health indicator?

DNS queries that include TXT records are typically uncommon, and large increases can be an indicator of a potential DNS tunnel. A DNS tunnel is a technique that encodes data into DNS queries for data exfiltration or command and control attacks. For example, malware or sensitive data can be encoded into the TXT record. You can view the TXT record by clicking the records icon  next to a client that sent a high number of DNS requests.

HTTP - 404 Not Found Error

This network health indicator shows you the number of HTTP responses that included the 404 (Not Found) status code. Click the metric title to see which URIs were associated with the 404 status code.

Why is this metric a security health indicator?

While a certain number of 404 errors might be considered normal, a large increase in this client-side error could indicate a potential web directory scan. Attackers rely on information

about the underlying web server and associated components that are returned in the HTTP 404 status code.

HTTP - 500 Server Errors

This network health indicator shows you the number of HTTP responses sent by servers that contained the 500 (Server Error) status code. Click the metric title to see which URIs were associated with the 500 status code.


Why is this metric a security health indicator?

A large or sudden increase in this server-side error could indicate a potential web directory scan. Web penetration tools deployed by attackers rely on information about the underlying web server and associated components that are returned in the HTTP 500 status code.


HTTP - Requests with Suspicious Hosts

This network health indicator shows you the number of HTTP requests that included a suspicious hostname, according to threat intelligence found in your ExtraHop Reveal(x) system. Click the metric title to see which hosts are considered suspicious. Click the red camera icon to see related threat intelligence details about the host.


Why is this metric a security health indicator?

Threat intelligence provides known data about suspicious IP addresses, hostnames, and URIs. You should always investigate indicators of compromise that are identified by threat intelligence. You can view information about the entire HTTP transaction by clicking the records icon  next to a suspicious host.

HTTP - Requests with Suspicious URIs

This network health indicator shows you the number of HTTP requests that included a suspicious URI, according to threat intelligence found in your ExtraHop Reveal(x) system. Click the metric title to see which URIs are considered suspicious. Click the red camera icon  to see related threat intelligence details about the URI.

Why is this metric a security health indicator?

Threat intelligence provides known data about suspicious IP addresses, hostnames, and URIs. You should always investigate indicators of compromise that are identified by threat intelligence. You can view information about the entire HTTP transaction by clicking the records icon  next to a suspicious URI.

SSL - Expired Certificate Sessions

This network health indicator shows you the number of TLS/SSL sessions that were established with an expired certificate. Click the metric title to see which expired certificates had the most sessions.

Why is this metric a security health indicator?

Certificate authorities add expiration dates to certificates, which are required for establishing a secure TLS or SSL session. Sessions established with expired certificates could indicate that servers have certificate verification disabled, or that users ignored browser warnings when establishing the session. This type of activity increases the vulnerability of devices to man-in-the-middle attacks. Consider configuring your web servers to remove expired certificates.

SSL - Insecure SSLv3 Protocol Sessions

This network health indicator tells you the number of connections on your network that were established with SSL version 3.0. Click the metric title to see a list of servers and clients with SSLv3 sessions.

Why is this metric a security health indicator?

Known vulnerabilities, such as BEAST and POODLE, are associated with SSLv3. If you have a high number of SSLv3 sessions, consider configuring servers to support the latest version of TLS.

SSL - Insecure TLS 1.0 Protocol Sessions

This network health indicator tells you the number of connections on your network that were established with TLS version 1.0. Click the metric title to see a list of servers and clients with TLS 1.0 sessions.

Why is this metric a security health indicator?

Known vulnerabilities, such as BEAST and POODLE, are associated with TLS 1.0. If you have a high number of TLS 1.0 sessions, consider configuring servers to support the latest version of TLS.

SSL - Self-signed Sessions

This network health indicator shows you the number of TLS/SSL sessions that were established with self-signed certificates. Click the metric title to see which clients were associated with self-signed certificate sessions.


Why is this metric a security health indicator?

Self-signed certificates are not issued or verified by a certificate authority. The presence of self-signed certificates might indicate that software on your systems is not validating certificates, making your network vulnerable to man-in-the-middle attacks. A sudden or large increase in sessions with self-signed certificates could also indicate that an attacker is communicating with command and control servers.


SSL - Weak Cipher Sessions

This network health indicator shows you the number of the number of TLS/SSL sessions that were established with weak ciphers. Click the metric title to see which clients are associated with weak ciphers.

Why is this metric a security health indicator?

A cipher suite is a set of encryption algorithms that help secure a TLS/SSL connection. Algorithms within a cipher suite that are associated with known vulnerabilities are considered weak. You can view the cipher suite by clicking the records icon  next to a client. Consider configuring your web servers to remove weak ciphers.

TCP - Suspicious TCP Connections

This network health indicator shows you the number of the number of outbound connections to suspicious IP addresses, according to threat intelligence found in your ExtraHop Reveal(x) system. Click the metric title to see which IP addresses are considered suspicious. Click the red camera icon  to see related threat intelligence details about the IP address.

Why is this metric a security health indicator?

Threat intelligence provides known data about suspicious IP addresses, hostnames, and URIs. You should always investigate indicators of compromise that are identified by threat intelligence.

Learn more about your network with the [Network dashboard](#).

Perimeter Overview

The Perimeter Overview displays charts and interactive visualizations that help you monitor traffic that is entering and leaving your network through connections with external endpoints.

Site Selector

Click the site selector at the top of the page to view data for one or more sites in your environment. View combined traffic across your networks or focus on a single site to help you quickly find device data. The site selector indicates when all or some sites are offline. Because data is not available from offline sites, the charts and device pages associated with offline sites might not show data or might only show limited data. The site selector is only available from a console.

Executive Report

Click **Generate Executive Report** to create a PDF file. The Executive Report provides a summary of the top detections and risks to your network from the last week. The Executive Report only includes information for the selected sites.

Internal Endpoints Accepting Inbound Connections

This count chart displays the number of internal endpoints that accepted inbound connections from external endpoints during the selected time interval. Click the chart to open a filtered view of these conversations.

Suspicious Inbound Connections

This count chart displays the number of connections that were initiated by suspicious external endpoints. ExtraHop identifies suspicious endpoints through [threat intelligence](#) data. Click the chart to open a filtered view of these conversations.

Suspicious Outbound Connections

This count chart displays the number of connections that internal endpoints initiated with suspicious external endpoints. ExtraHop identifies suspicious endpoints through [threat intelligence](#) data. Click the chart to open a filtered view of these conversations.

Total External Traffic

This chart shows the rate that data is moving outbound and inbound from connections with external endpoints. Click the Inbound Traffic or Outbound Traffic data label to access menu options to create a new chart, search for related records, or drill down by conversation.

Halo visualization

The halo visualization provides three views of your network connections to external endpoints: Cloud Services, Countries, and Large Uploads.

External endpoints appear on the outer ring with connections to internal endpoints and appear as circles in the middle of the visualization. These visualizations enable you to prioritize your [investigation](#) for connections marked with high-risk detections or for high-value devices.

To help identify high-traffic endpoints, inner circles and outer rings increase in size as traffic volume increases. In some cases, the size of inner circles and outer ring segments might be increased for readability. Click an endpoint to display precise traffic information.

Click **Cloud Services** to view connections between internal endpoints and cloud service providers. Cloud service providers and the amount of sent or received data appear in the information panel to the right. You can toggle between views that show **Bytes Out** to providers and **Bytes In** to your network.

Click **Countries** to view connections between internal endpoints and countries. The connections are broken down by the geographic location of the external endpoint. Countries and the amount of sent or received data appear in the information panel to the right. You can toggle between views that show **Bytes Out** to countries and **Bytes In** to your network.

Click **Large Uploads** to view connections between internal and external endpoints where over 1 MB of data was transferred in a single transmission out of your network to an external endpoint. External endpoints and the amount of uploaded data appear in the information panel to the right.

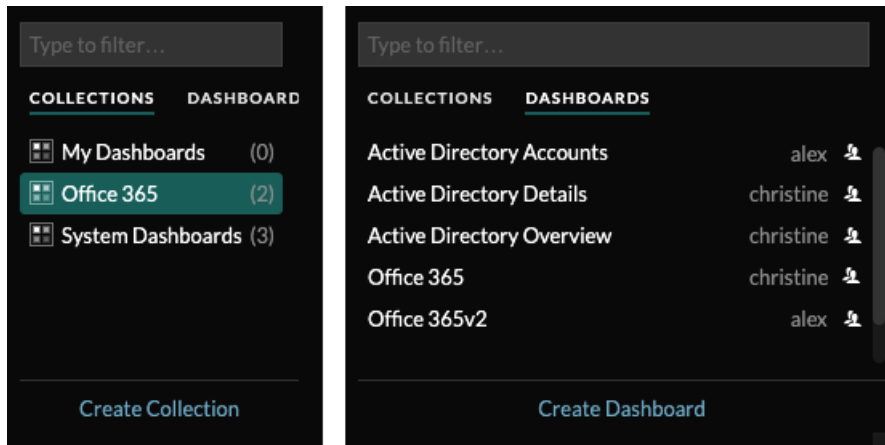
Here are some ways that you can interact with these halo visualizations:

- Hover over endpoints or connections to view available hostnames and IP addresses.
- Click endpoints or connections to hold focus and display precise traffic information and links for your selection in the information panel to the right.
- Click or hover an internal endpoint in the information panel to view device properties and access links to associated information such as detections, records, or packets.
- Adjust the time interval to view connections at specified times, such as unexpected activity during evenings or weekends.

Dashboards

Dashboards are an effective tool for monitoring high-priority network traffic or troubleshooting issues because they consolidate multiple metric charts into a central location where you can investigate and share data. You can also add text boxes, formatted through Markdown, to provide content for stakeholders.

Dashboards and collections are located in the dashboard dock.



Click **Collections** to display all of the dashboard collections you own or that have been shared with you. The number of dashboards in each collection is displayed. Click the collection name to view the owner, who the collection is shared with, and the list of dashboards in the collection.

Only the collection owner can modify or delete a collection. However, because dashboards can be added to multiple collections, you can [create a collection](#) and [share it](#) with other users and groups.

Click **Dashboards** to display an alphabetized list of all of the dashboards that you own or that have been shared with you, including dashboards shared through a collection. The owner of each dashboard is displayed. An icon next to the owner name indicates that the dashboard was shared with you.

Creating dashboards


If you want to monitor specific metrics or custom metrics, you can create a custom dashboard. Custom dashboards are stored separately for each user that accesses the ExtraHop system. After you build a custom dashboard, you can share it with other ExtraHop users.


There are several ways to create your own dashboard:

- [Create a custom dashboard](#) or [create a dashboard with dynamic sources](#) from scratch
- [Copy an existing dashboard](#), and then customize it
- [Copy an existing chart](#), and then save it to a new dashboard

New dashboards are opened in Edit Layout mode, which enables you to add, arrange, and delete components within the dashboard. After creating a dashboard, you can complete the following tasks:

- [Add or delete widgets and regions](#)
- [Edit a region](#)
- [Edit a chart](#)
- [Edit a text box](#)

Click the command menu  in the upper right corner of the page to edit the dashboard properties or delete the dashboard.

 **Note:** You cannot recover a deleted dashboard. When deleting user accounts, ExtraHop administrators can transfer dashboard ownership to another system user. Otherwise, all custom dashboards associated with the user account are also deleted. To preserve dashboards, [make a copy](#) before the account is deleted.

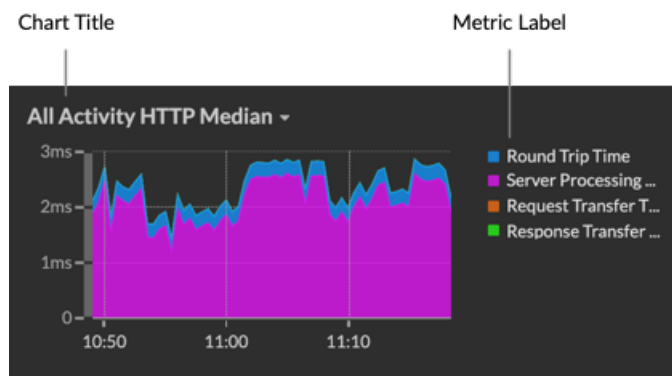
Learn how to monitor your network by [completing a dashboard walkthrough](#).

Viewing dashboards

Dashboards are composed of chart widgets, alert widgets, and text box widgets that can present a concise view about critical systems or about systems managed by a particular team.

Click within a chart to interact with the metric data:

- Click a chart title to view a list of [metric sources](#) and menu options.
- Click a metric label to [drill down](#) and [investigate](#) by a metric detail.
- Click a metric label and click Hold Focus to display only that metric in the chart.
- Click a chart title or a metric label and then click Description to learn about the source metric.
- Click a detection marker to navigate to the detection detail page



Change the time selector to observe data changes over time:

- [Change the time interval for the entire dashboard](#)
- [Change the time interval by region](#)
- [Zoom in on a time interval within a chart](#)
- [Compare the metric delta from two time intervals in one chart](#)


Export and share dashboard data

By default, all custom dashboards are private and no other ExtraHop users can view or edit your dashboard.

[Share your dashboard](#) to grant view or edit permission to other ExtraHop users and groups, or [share a collection](#) to grant view-only permission to multiple dashboards.

You can only modify a shared dashboard if the owner granted you edit permission. However, you can [copy and customize](#) a shared dashboard without edit permission.

Export data by individual chart or by the entire dashboard:

- To export individual chart data, click the chart title and select one of the following options from the drop-down menu: [Export to CSV](#) or [Export to Excel](#).
- To present or export the entire dashboard, click the command menu  in the upper right corner of the page and select one of the following options: [Presentation Mode](#), [Export to PDF](#) or [Scheduled Reports](#) (consoles only).

System dashboards

The ExtraHop system provides the following built-in dashboards that display common protocol activity about the general behavior and health of your network.

System dashboards are located in the default System Dashboards collection in the dashboard dock and cannot be added to another collection. System dashboards can be viewed by any user except for [restricted users](#).

Activity dashboard

Find top-talkers by application (L7) protocols and view recent alerts. For more information about charts in this dashboard, see [Activity dashboard](#).

Network dashboard

Identify traffic latency and bottlenecks over the data link (L2), network (L3), and transport (L4) layers. For more information about charts in this dashboard, see [Network dashboard](#).

Security dashboard (ExtraHop Reveal(x) only)

Monitor general information about potential security threats on your network. For more information about charts in this dashboard, see [Security dashboard](#).

System Health dashboard

Ensure that your ExtraHop system is running as expected, troubleshoot issues, and assess areas that are affecting performance. For more information about charts in this dashboard, see [System Health dashboard](#).

Activity dashboard

Monitor general information about application activity and performance from the transport through the application layers (L4 - L7) on your network.

The Activity dashboard is a built-in, system dashboard, and you cannot edit, delete, or add system dashboards to a collection. However, you can [copy a chart](#) from a system dashboard and add it to a [custom dashboard](#), or you can [make a copy of the dashboard](#) and edit it to monitor metrics that are relevant to you.

Each chart in the Activity dashboard contains visualizations of protocol metric data, organized by region. The following information summarizes each region and its charts.

Traffic Overview

Determine whether traffic bottlenecks are related to a specific application protocol or network latency. The Traffic Overview region contains the following charts:


- **Network Packets by L7 Protocol Avg Rate chart:** Find the protocol that has the highest volume of packet transmissions over the application layer (L7) during the selected time interval.
- **All Activity Network Round Trip Time:** The 95th percentile line shows you the upper range of the time that it took for packets to traverse the network. If this value is over 250ms, then network issues could be slowing down application performance. Round trip time is a measurement of the time between when a client or server sent a packet and received an acknowledgment.
- **Alerts:** View up to 40 of the latest alerts that were generated, and their severity levels. Alerts are user-configured conditions that establish baseline values for specific protocol metrics.

Active Protocols

Determine how application performance is affected by the protocols that are actively communicating on the ExtraHop system. For example, you can quickly glance at charts that display server processing times and the ratio of errors to responses per protocol.

There is a chart for each active protocol. If you do not see a protocol you were expecting, applications might be not communicating over that protocol for the [selected time interval](#).

For more information about protocols and to view metric definitions, see the [ExtraHop Protocol Metrics Reference](#).

 **Note:** From a console, you can display the Activity dashboard for each connected site. The site name appears in the navigation bar; click the down arrow next to the name to pivot the display to other sites.

Network dashboard

Monitor how effectively data is transmitted over the data link, network, and transport (L2 - L4) layers.

The Network dashboard is a built-in, system dashboard, and you cannot edit, delete, or add a system dashboard to a collection. However, you can [copy a chart](#) from a system dashboard and add it to a [custom dashboard](#), or you can [make a copy of the dashboard](#) and edit it to monitor metrics that are relevant to you.

Each chart in the Network dashboard contains visualizations of network metric data, organized by region. The following information summarizes each region.

Network L2 Metrics

Monitor the throughput rates over the data link (L2) layer by bits and packets, and monitor the types of frames transmitted. You can also determine how much data is sent to receivers by unicast, broadcast, or multicast distribution.

Network L4 Metrics

Monitor data transfer latency over the transport layer (L4). View TCP activity through connection, request, and response metrics. This data can indicate how effectively data is sent and received across the transport layer in your network.

Network Performance

Monitor how network performance is affecting applications. View overall network throughput by reviewing the throughput per application protocol and the magnitude of high TCP round trip times.

Network L3 Metrics


View data throughput at the network layer (L3) and see packets and traffic by TCP/IP protocols.

DSCP

View a breakdown of packets and traffic by Differentiated Services code points, which is part of the DiffServ network architecture. Every IP packet contains a field to express the priority of how the packet should be handled, which is called differentiated services. The values for the priorities are called code points.

Multicast Groups

View traffic that is sent to multiple receivers in a single transmission, and see packets and traffic by each receiver group. Multicast traffic on a network is organized into groups based on destination addresses.

 **Note:** From a console, you can display the Network dashboard for each connected site. The site name appears in the navigation bar; click the down arrow next to the name to pivot the display to other sites.

Security dashboard

Monitor general information about potential security threats on your network.

The Security dashboard is a built-in, system dashboard, and you cannot edit, delete, or add a system dashboard to a collection. However, you can [copy a chart](#) from a system dashboard and add it to a [custom dashboard](#), or you can [make a copy of the dashboard](#) and edit it to monitor metrics that are relevant to you.

Each chart in the Security dashboard contains visualizations of protocol metric data, organized by region. The following information summarizes each region and its charts.

Security Overview


Click the links to visit the [Security Overview](#) page, which can help you evaluate the scope of a suspicious activity on your network. The Security Overview page dynamically displays high-risk detections, trending security metrics, and rotating activity maps that display network activity by protocol.


 **Note:** Machine learning detections require a [connection to ExtraHop Cloud Services](#).

Alerts

See which alerts were issued most recently in your environment. For more information about configuring and interpreting alerts, see [Alerts](#).

Threat Intelligence

See the number of connections and transactions that contain suspicious hostnames, IP addresses, or URIs found in [threat intelligence](#). Click a blue metric value or metric name in the legend to drill down on a suspicious metric. A detail page appears that displays a red camera icon  next to the suspicious object. Click the red camera icon to learn about the threat intelligence source.

 **Note:** Threat intelligence metrics display a zero value for one or more of the following reasons:

- Your ExtraHop Reveal(x) subscription does not include threat intelligence.
- You have not enabled threat intelligence for your ExtraHop Reveal(x) system.
- You have not directly uploaded custom threat collections to your sensors. Contact ExtraHop Support for help uploading a custom threat collection to you ExtraHop-managed sensors.
- No suspicious objects were found.

SSL - Weak Ciphers

See the number of active SSL sessions with weak cipher suites on your network. You can also see which clients and servers are participating in those sessions along with which cipher suites those sessions are encrypted with. DES, 3DES, MD5, RC4, null, anonymous, and export cipher suites are considered to be weak because they include an encryption algorithm that is known to be vulnerable. Data encrypted with a weak cipher suite is potentially insecure.

SSL - Certificates

See which SSL certificates in your network are self-signed, wildcard, expired, and expiring soon. Self-signed certificates are signed by the entity that issues the certificate, rather than a trusted certificate authority. Although self-signed certificates are cheaper than certificates issued by a certificate authority, they are also vulnerable to man-in-the-middle attacks.

A wildcard certificate applies to all first-level subdomains of a given domain name. For example, the wildcard certificate *.company.com secures www.company.com, docs.company.com, and customer.company.com. Although wildcard certificates are cheaper than individual certificates, wildcard certificates create a greater risk if they are compromised because they can apply to any number of domains.


Vulnerability Scans

See which devices are scanning applications and systems on your network to search for weaknesses and potential targets, such as high-value devices. In the left chart, you can identify which devices are sending the most scan requests, which are HTTP requests associated with known scanner activity. In the right chart, you can see which user-agents are associated with the scan requests. The user-agent can help you determine if scan requests are associated with known vulnerability scanners such as Nessus and Qualys.

DNS


See which DNS servers are most active on your network and the total number of reverse DNS lookup failures those servers have encountered. A reverse DNS lookup failure occurs when a server issues an error in response to a client request for a pointer (PTR) record. Failures in reverse DNS

lookups are normal, but a sudden or steady increase in failures on a specific host might indicate that an attacker is scanning your network.


 **Note:** From a console, you can display the Security dashboard for each packet sensor. Click down arrow next to the name of the sensor in the navigation bar to display the Security dashboard for other sensors.

System Health dashboard

The System Health dashboard provides a large collection of charts that enable you to make sure that your ExtraHop system is running as expected, to troubleshoot issues, and to assess areas that are affecting performance. For example, you can monitor the number of packets processed by the ExtraHop system to ensure that packets are continuously captured.

 **Note:** The Administration settings page also provides [status information and diagnostic tools](#) for all ExtraHop systems.

Navigate the System Health dashboard

Access the System Health page by clicking the System Settings icon  or by clicking **Dashboards** from the top of the page. The System Health dashboard automatically displays information about the ExtraHop system you are connected to. If you are viewing the System Health dashboard from a console, you can click the site selector at the top of the page to view data for a specific site or for all sites in your environment.

Charts on the System Health dashboard are divided into the following sections:

Device Discovery [↗](#)

View the total amount of devices on your network. See which devices have been discovered and how many of those devices are currently active.

Data Feed [↗](#)

Assess the efficiency of the wire data collection process with charts related to throughput, packet rate, desyncs, and capture drops.

Records [↗](#)

View the total amount of records that are being sent to an attached recordstore..

Triggers [↗](#)

Monitor the impact of triggers on your ExtraHop system. See how often triggers are running, how often they are failing, and which triggers are placing the largest load on your CPU.

Open Data Stream and Recordstore [↗](#)

Follow the activity of open data stream (ODS) transmissions to and from your system. View the total number of remote connections, message throughput, and details related to specific remote targets.

SSL Certificates [↗](#)

Review the status information for all SSL certificates on your ExtraHop system.

Remote Packet Capture (RPCAP) [↗](#)

View the number of packets and frames that are sent and received by RPCAP peers.

Advanced Health Metrics [↗](#)

Track heap allocation related to data capture, the system datastore, triggers, and remote transmissions. Monitor write throughput, working set size, and trigger activity on the system datastore.

Create a dashboard

Dashboards provide a single location for important metrics that you care about. When you create a custom dashboard, a dashboard layout opens containing a single region with an empty chart widget and an empty

text box widget. Edit a chart to incorporate real-time metrics into your dashboard, and edit a text box to provide information. Finally adjust the layout and add more widgets to complete your dashboard and begin monitoring your network.


Before you begin

Determine which metrics you want to monitor on your dashboard. Ask yourself the following questions:

- Do I want to track if my server is offline or unavailable? Add availability metrics such as requests and responses to your dashboard charts.
- Is my server functioning properly? Add reliability metrics such as errors to your dashboard charts.
- Is my server properly resourced? Add performance metrics such as server processing time to your dashboard charts.

Create the dashboard layout

The following steps show you how to create the framework for your dashboard, which includes two empty widget types: a chart and a text box. Your new dashboard opens in Edit Layout mode (which is displayed in the upper right corner). Edit Layout mode enables you to quickly edit your chart and text box, and arrange the placement of widgets and regions on a dashboard.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. On the Dashboards page, complete one of the following steps:
 - Click **Dashboards** in the dashboard dock and then click **Create Dashboard** at the bottom of the dock.
 - Click the command menu  in the upper right corner of the page and select **New Dashboard**.
4. In the Dashboard Properties window, type a name for your dashboard.
5. Enter any other meta data for your dashboard, such as a name for the author or a description. Note that the Permalink provides a direct URL to your dashboard for any users who have [sharing privileges for your dashboard](#).
6. Click **Create**.

Edit a basic chart

The following steps show the general flow for editing a chart widget in the Metric Explorer tool. Begin by specifying sources and metrics to add data to your chart. For example, you can now add the availability, reliability, or performance metrics that you considered at the beginning of this procedure to your dashboard. Then choose a chart type to visualize the data.

1. Click the chart to launch the [Metric Explorer](#).
2. Click **Add Source**.
3. In the source search field, type the name of a source and then select the source from the search results.
4. In the metric search field, type the protocol and metric name and then select the metric you want to add to the chart from the search results. For example, to monitor the reliability of web transactions, type `HTTP errors` and then select **HTTP Errors** from the search results.
5. Select a chart type from the bottom of the Metric Explorer.

Some charts might not be compatible with your selected metrics. For example, the heatmap chart can only display dataset metric data, such as server processing time. For more information about charts and compatible metrics, see [Chart types](#).
6. (Optional) Select a drill down key to view detail metrics. Click **Drill down by <None>**, where `<None>` is the name of the detail metric key currently displayed in your chart. You can view up to 20 top key values in a chart for a specific time interval.
7. Click **Save**.

Next steps

- Learn more about charts from the [Charts FAQ](#).
- Practice building charts by completing the following walkthroughs:
 - [Monitor DNS errors in a dashboard](#)
 - [Monitor database health in a dashboard](#)
 - [Monitor web performance in a dashboard](#)

Edit a basic text box widget

The following steps show you how to display custom text in a dashboard region, which is a helpful tool for adding notes about a chart or data in a dashboard. The text box widget supports the Markdown syntax. A new text box widget contains sample text that is already formatted in Markdown to provide you with basic examples.

1. Click the text box.
2. Type and edit text in the left Editor pane. The HTML output text dynamically displays in the right Preview pane. For more formatting examples, see [Format text in Markdown](#).
3. Click **Save**.

Add more widgets and regions to your dashboard

Add and arrange the placement of regions and widgets on your dashboards.

1. Click-and-drag dashboard components, such as a region or widgets, from the bottom of the page onto the workspace.
2. To arrange dashboard components, click-and-drag the edge of a region or widget to resize them. If dashboard components overlap, they will be outlined in red. You must click and drag the sides of the widgets and regions to make room.
3. (Optional) Click **Remove Extra Space** to remove the empty vertical white space around widgets. Empty vertical white space will be removed from every region on the dashboard.
4. After making your changes, click **Exit Layout Mode**.



Note: If an error message appears, another user might be making changes. It is best practice for each ExtraHop user to have an individual account.

Next steps

Now that your dashboard is complete, you can perform the following steps:

- [Share your dashboard](#)
- Update your dashboard:
 - [Edit a dashboard layout](#)
 - [Edit dashboard properties](#)
 - [Edit a dashboard region](#)
 - [Edit a chart with the Metric Explorer](#)

Chart editing tips

The following tips help you search for and select metrics when building a chart.


- Filter search results to a specific source type or protocol by clicking **Any Type** or **Any Protocol** underneath the search fields.
- You can only select the same source type that is currently in your metric set. A metric set contains one source type and metrics. For example, if you select the All Activity application as the source, you can only add more applications to that metric set.
- Create an ad hoc group of more than one source in your chart by selecting **Combine Sources**. For example, you can combine two applications and then view a single metric value in the chart for both of these applications.

- If you select a device group as your source, you can **Drill down by Group Member** to display individual metrics for up to 20 of the devices within the group.

Create a dashboard with dynamic sources

You can create a dashboard with dynamic sources to enable users to change the source of the dashboard at any time. If you have created a large number of dashboards that all have the same metrics, but different sources, you might want to consider replacing those dashboards with a single, dynamic-source dashboard.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select a dashboard that you want to edit.
4. Set the source of each chart to a source type variable.
 - a) Click the name of a chart and then click **Edit**.
 - b) In the **Sources** field, type `$`.
The Source Type Variables list appears.
 - c) From the Source Type Variables list, select the type of source that you are replacing. For example, if you are replacing a device source, select `$device`.
5. Click **Save**.
At the top of the dashboard, the View Source drop-down menu appears.
6. From the View Source drop-down menu, select the source that you would like to view metrics for. If no data is displayed in the dashboard charts, try refreshing the page.

 **Tip:** If you want to hide the dynamic source menu from your dashboard, append the following parameter to the end of the dashboard page URL: `&hideTemplatePanel=true`.

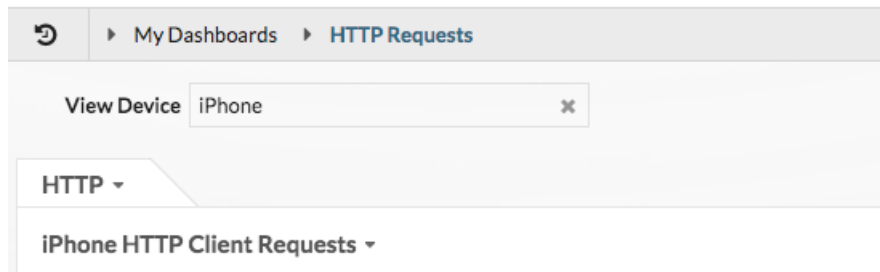


Figure 3: Before

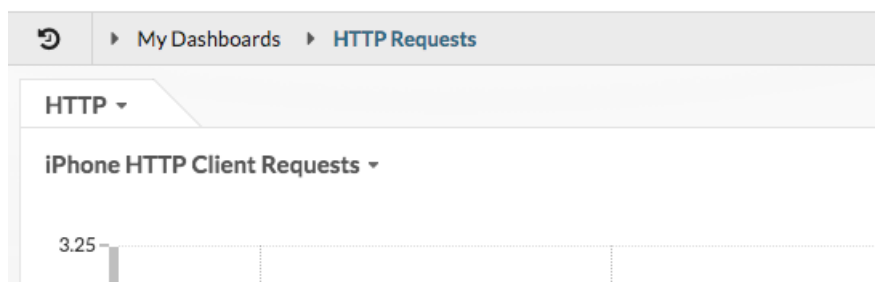


Figure 4: After

For example:


```
https://eda/extrahop/#/Dashboard/XYFwM/?
$device=16&from=30&interval_type=MIN&until=0&hideTemplatePanel=true
```


Next steps

- [Copy a dashboard](#)


Copy a dashboard

If you want to duplicate a useful dashboard, you can copy a dashboard and then replace or modify sources to display different application, device, or network data. You can only copy one dashboard at a time.

 **Note:** If you only want to copy a dashboard so you can change the source across the entire dashboard, you might want to consider [creating a dashboard with dynamic sources](#) instead of making multiple copies of a single dashboard.


1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select a dashboard that you want to copy.
4. Click the command menu  in the upper right corner of the dashboard page.
5. Click **Copy** and complete one of the following steps:


- Click **Keep Sources** to maintain the original data configurations in the new dashboard.

 **Note:** When you copy a dashboard with dynamic sources, the original data configurations are automatically maintained.

- Click **Modify Sources**, which helps you to immediately update every region, chart, and widget within the copied dashboard with another source, and then complete the following steps:
 1. In the right pane of the Modify Sources window, click a source name. A search field opens.
 2. Type the name of a new source and then select the source from the drop-down list. Repeat this step if the dashboard contains more than one source that you want to replace.
 3. Click **Create Dashboard**.

A copied dashboard with a modified version of the original title is created.

6. To rename the copied dashboard, complete the following steps:
 - a) Click the command menu  in the upper right corner and the page.
 - b) Select **Dashboard Properties**.
 - c) In the Title field, type a new name.
 - d) Click **Save**.

 **Tip:** To quickly copy a dashboard, type the keyboard shortcut `CD` and then update [Dashboard Properties](#) or modify sources.

Next steps


- [Edit a dashboard region](#)
- [Edit a chart with the Metric Explorer](#)
- [Edit dashboard layout](#)

Edit a dashboard layout

Place your dashboard into Edit Layout mode to add, delete, or rearrange the widgets and regions on your dashboard layout. You can only add or delete widgets or regions when the dashboard is in Edit Layout mode.

When you create a new dashboard, the dashboard is automatically placed into Edit Layout Mode. To edit the layout of an existing dashboard, complete the following steps:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select a dashboard that you want to edit.

4. Click the command menu  in the upper right corner of the page, and then select **Edit Layout**.
5. In Edit Layout mode, select from the following options:

Add widgets and regions

Click-and-drag a widget or region from the bottom of the page and place it onto the dashboard.

Widgets are configurable dashboard components that provide the following functions:

- **Chart:** add metrics and select chart types to visualize data
- **Text box:** add explanations, links, and images to your dashboard
- **Alerts:** scan up to 40 recent alerts, sorted by severity
- **Activity Group:** monitor devices that are grouped together automatically by protocol activity in the ExtraHop system

Regions contain and logically group widgets together. Click-and-drag widgets into a region. The width of a region can include a maximum of six widgets. The length of a region and dashboard is unlimited.

Delete widgets and regions

To delete a region, click **Delete** in the region header. To delete a widget, click the title and then select **Delete** from the drop-down menu.

Arrange the placement of widgets and regions

Click the header of a region or widget to drag them into a different location. Click and drag the edge of a region or widget to resize them.

If dashboard components overlap, they will be outlined in red. You must click and drag the sides of the widgets and regions to make room.

Duplicate charts

Click **Duplicate** to create a copy of a chart or text box in the same region.

6. (Optional) Click **Remove Extra Space** to remove the empty vertical white space around widgets. Empty vertical white space will be removed from every region on the dashboard.
7. Click **Exit Layout Mode** in the upper right corner of the page to save your changes.



Note: If an error message appears, another user might be making changes. It is best practice for each ExtraHop user to have an individual account.

Next steps

- [Edit a region](#)
- [Edit a chart with the Metric Explorer](#)
- [Edit a text box](#)

Edit a chart with the Metric Explorer

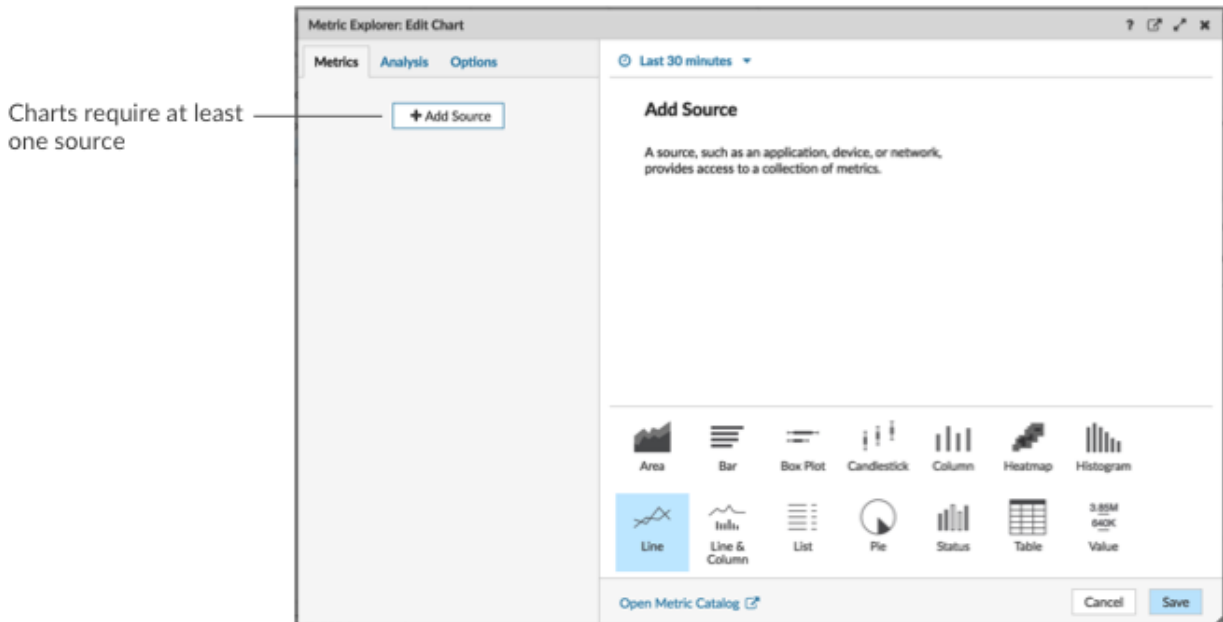
The Metric Explorer is a tool for creating and editing charts, which lets you construct dynamic visualizations of device and network behavior.

Create and edit a basic chart

With the Metric Explorer, you can edit chart components, such as sources, metrics, and data calculations, and then preview how metric data appears in different chart types. When you are satisfied with your selections, save your chart to a dashboard.

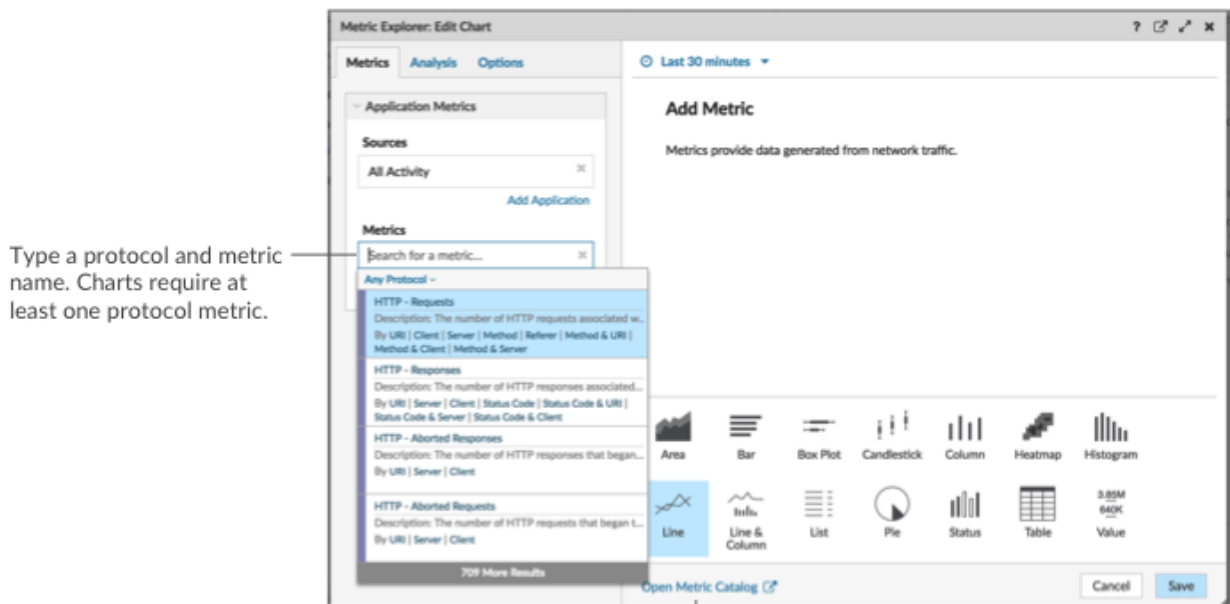
The following steps show you the basic workflow and minimum requirements for completing a new chart.

1. Click **Add Source** and then select a source.



- You can select a static source for the chart by typing the name of an application, device, or network.
- You can also select a dynamic source that can be dynamically modified by dashboard viewers by typing \$ and selecting a variable from the Source Type Variable list. For more information about source type variables and dashboard templates, see [Create a dashboard with dynamic sources](#).

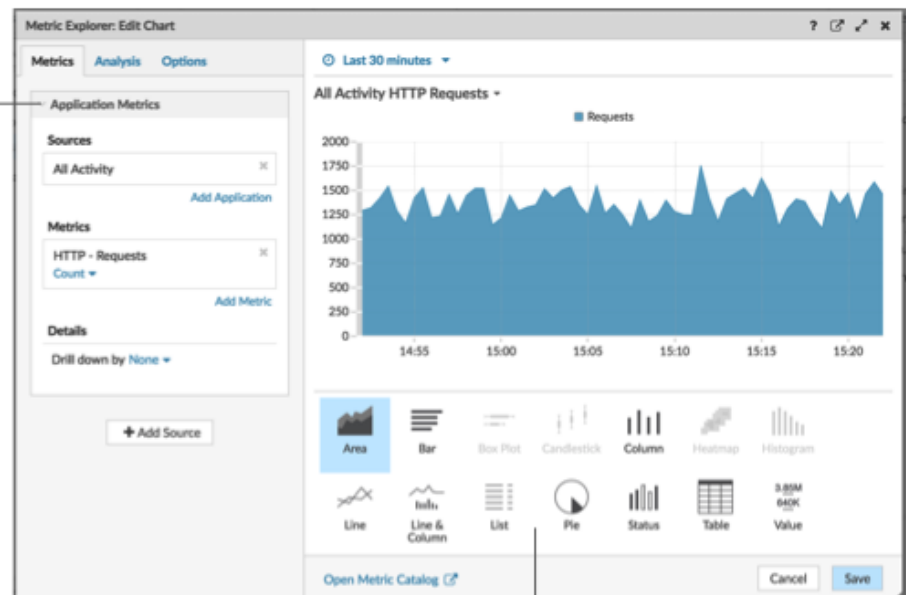
2. Select the source from the list of results.
3. In the Metrics field, type a protocol and metric name. Then select the metric from the list of results, as shown in the following figure.



If you are not sure about the name of a metric, you can search the Metric Catalog.

4. Select a chart from the bottom of the Metric Explorer, as shown in the following figure.

A single source type (such as an application) and at least one metric create a set. You can add more metrics to the set. To add another source type to your chart, click **Add Source** below the set.

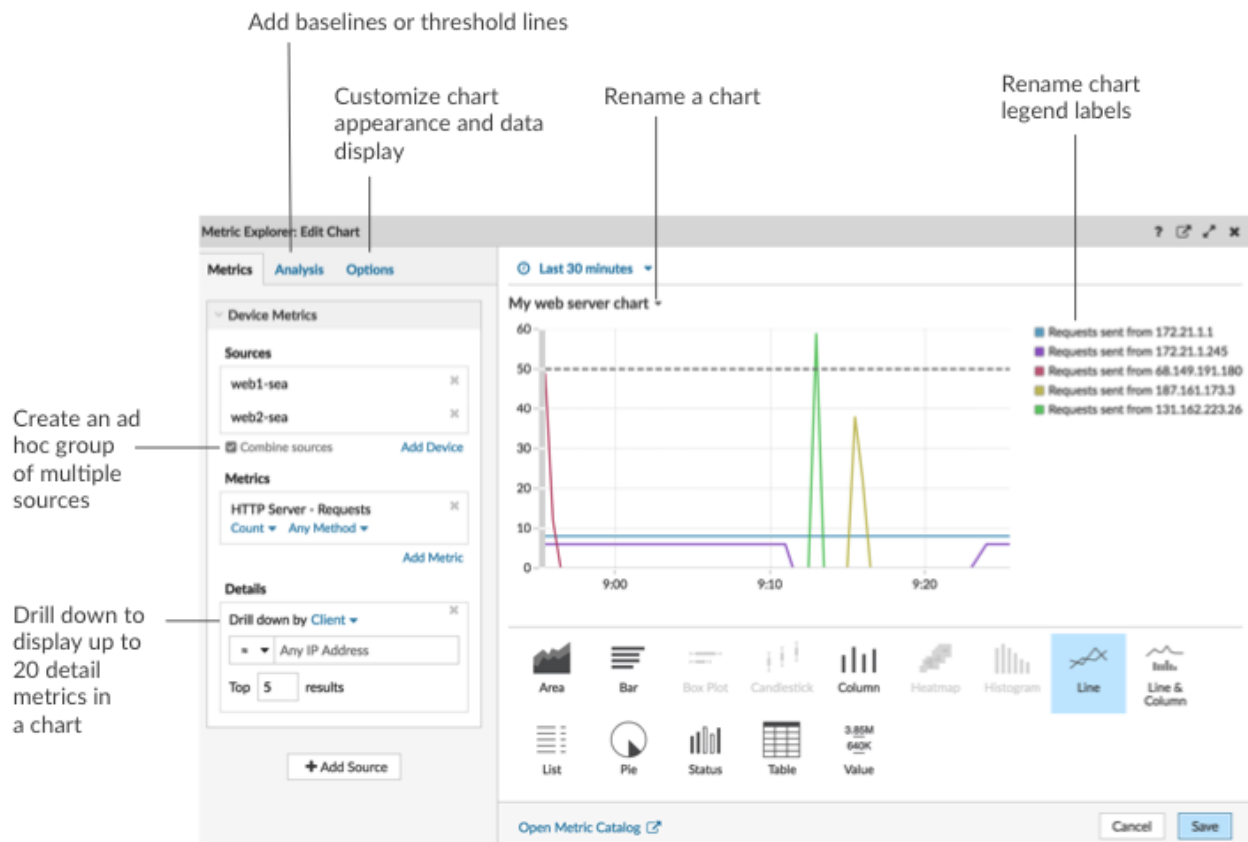


Some chart types are only compatible with specific metric types. If a chart is not compatible with selected metrics, you cannot select it.

5. (Optional) Click the drop-down link below the metric name to [display a count or rate](#) or [percentile](#).
6. Complete one of the following steps:
 - Click **Save** when creating or editing a chart from a dashboard. Your dashboard is updated with your basic chart.
 - Click **Add to Dashboard** when creating or editing a chart from a protocol page. Then select an existing dashboard from the list, or select **Create Dashboard**.

Configure advanced options for data analysis and chart customization

Depending on the metrics and chart type you select, you can configure advanced options for creating sophisticated visualizations with the Metric Explorer, as shown in the following figure.



Drill down on metric data and sources to display details

In the Details section from the Metrics tab, you can [drill down to display detail metrics](#) or [drill down on a device group](#) to display individual devices within the chart. You can also filter detail metrics for exact matches, or create a [regex filter](#).

Add a baseline or threshold line from the Analysis tab

You [add a dynamic baseline](#) or [static threshold line](#) to your chart. Baselines are calculated after the chart is saved. To see a line that represents a threshold, such as a service level agreement (SLA) value, add a static threshold line to your chart.

Rename legend labels and the chart title


For charts that display a legend, you can change a metric name in the chart legend with a [custom label](#). In the Metric Explorer, click the label in the preview pane then select **Rename**. To rename a chart, click the chart title and select **Rename**.

Customize your chart from the Options tab

You can access the following options for customizing chart properties and the display of metric data in your chart:

- Convert metric data from bytes to bits
- Convert metric data from base 2 (Ki=1024) to base 10 (K = 1000)
- Change the y-axis in a time-series chart from linear to log scale
- Abbreviate metric values in a chart (for example, abbreviate 16,130,542 bytes to 16.1 MB)
- Sort metric data in ascending or descending order in a bar, list, or value chart
- Change the percentile precision in a pie chart
- Hide or display a chart legend

- Hide inactive metrics with a zero value so that these metrics are not visible in the chart, including the legend and label
- Include sparkline in a list or value chart
- Show the alert status for data displayed in list or value charts (for more information, see [Alerts](#))
- Switch the color display for metric data to grayscale (with exception to charts that display an alert status)
- For IP address labels, display the hostname (if detected from DNS traffic in wire data) or origin IP address (if a proxy is detected from wire data)
- Show the relative time for an expiration date, such as the number of days until an SSL certificate expires.

 **Note:** Some options are only available for specific chart types. For example, the option to include a sparkline only appears in the Options tab for list and value charts.

Create an ad hoc group to combine data from multiple sources

From the Metric tab, you can create an ad hoc group of multiple sources within a set by selecting **Combine Sources**. For example, you can combine two applications and then view a single metric value in the chart for both of these applications.

Next steps

Practice building charts by completing the following walkthroughs:

- [Monitor DNS errors in a dashboard](#)
- [Monitor database health in a dashboard](#)
- [Monitor web performance in a dashboard](#)

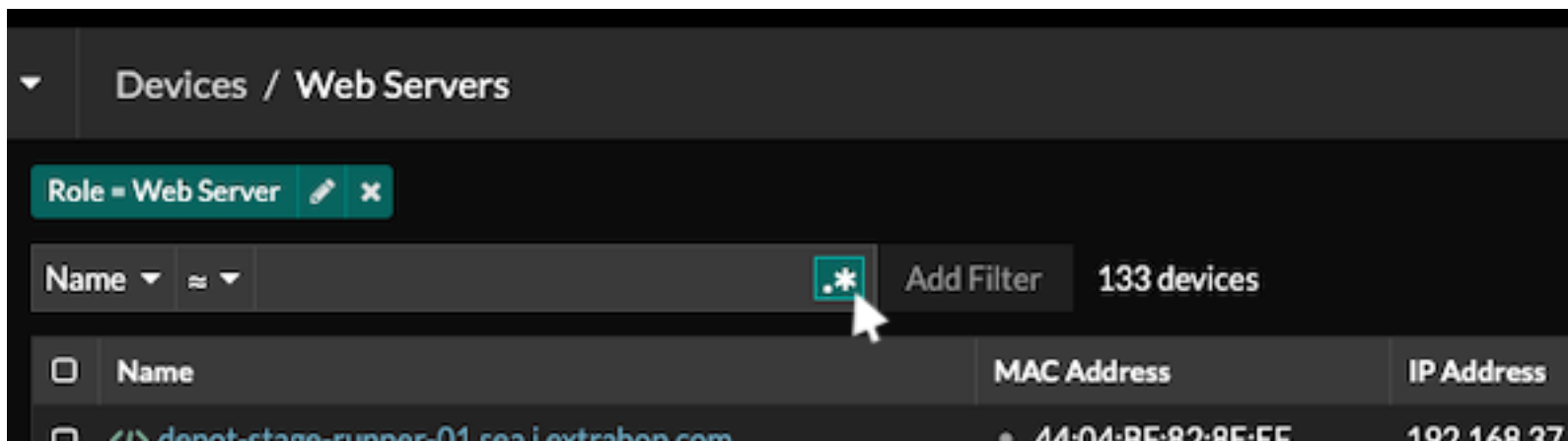
Regular expression filters

Filter your search results by writing regular expression (regex) strings in certain search fields throughout the ExtraHop system. For example, you can filter for parameters in a detail metric key, such as a number within an IP address. You can also filter by excluding specific keys or a combination of keys from charts.

Regex-capable search fields have visual indicators throughout the system and accept standard syntax.

Search fields with an asterisk

Click the asterisk to enable regex strings.

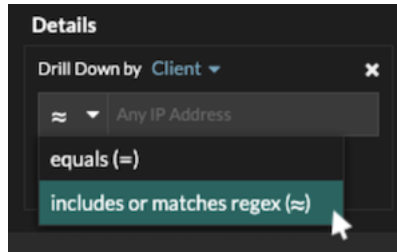


This type of field is available from the following system pages:

- Filtering a table of devices
- Creating filter criteria for a dynamic device group

Certain search fields with a trifold operator

Click the operator drop-down to select the regex option.

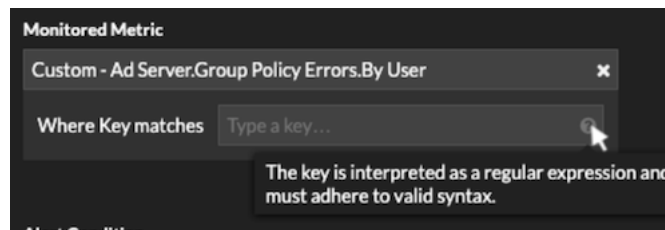


This type of field is available from the following system page:

- Editing a chart in Metric Explorer

Certain search fields with a tooltip

Hover over the tooltip in the field to see when regex is required.



This type of field is available from the following system page:

- Adding record relationships to a custom metric

The following table includes examples of standard regex syntax.

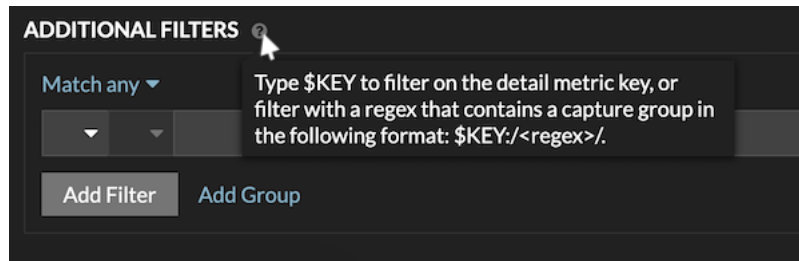
Chart Scenario	Regex filter	How it works
Compare HTTP status codes 200 to 404.	<code>(200 404)</code>	The vertical bar symbol () is the OR operator. This filter matches 200, or 404, or both status codes.
Display any HTTP status code that contains a 4.	<code>[41]</code>	Square brackets ([and]) designate a range of characters. The filter searches for every character inside the brackets, regardless of order. This filter matches any value that contains a 4 or a 1. For example, this filter can return 204, 400, 101, or 201 status codes.
Display all 500-level HTTP status codes.	<code>^[5]</code>	The caret symbol (^) outside square brackets ([and]) means "starts with." This filter matches any value that begins with a 5. For example, this filter can return 500 and 502 status codes.
Display all 400 and 500-level HTTP status codes.	<code>^[45]</code>	Multiple values inside square brackets ([and]) are searched individually, even when preceded by the caret symbol (^). This filter does not search for values that begin with 45, but matches

Chart Scenario	Regex filter	How it works
		all values that begin with a 4 or 5. For example, this filter can return 400, 403, and 500 status codes.
Display any HTTP status codes except 200-level status codes.	<code>^(?!2)</code>	A question mark (?) and exclamation point (!) inside parentheses specify a value to exclude. This filter matches all values except values beginning with a 2. For example, this filter can return 400, 500, and 302 status codes.
Display any IP address with a 187.	<code>187.</code>	Matches 1, 8, and 7 characters in the IP address. This filter will not return IP addresses that end in 187 because the trailing period designates that something must come after the values. If you want to search the period as a literal value, you must precede it with a backslash (\).
Review all IP addresses containing 187.18.	<code>187\.18.</code>	Matches 187.18 and anything that follows. The first period is treated literally because it is preceded by a backslash (\). The second period is treated as a wildcard. For example, this filter returns results for 187.18.0.0, 180.187.0.0, or 187.180.0.0/16. This filter does not return an address that ends with 187.18, because the wildcard requires that characters follow the specified values.
Display any IP address except 187.18.197.150.	<code>^(?!187\.18\.197\.150)</code>	Matches anything except 187.18.197.150, where <code>^(?!)</code> specifies the value to exclude.
Exclude a list of specific IP addresses.	<code>^(?!187\.18\.197\.15[012])</code>	Matches anything except 187.18.197.150, 187.18.197.151, and 187.18.197.152, where <code>^(?!)</code> specifies the value to exclude and the square brackets ([and]) specify multiple values.

Additional filters

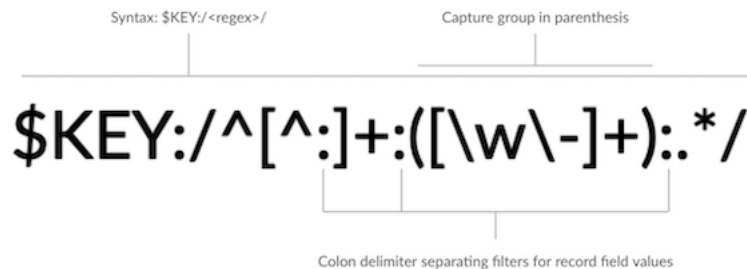
When you [create a custom detail metric](#) from the Metric Catalog, you can add advanced regex syntax to the Additional Filters search field in the Record Relationships section.

The tooltip appears after you select **Detail Metric** and is not available when **Base Metric** is selected.



The regex syntax in this field must meet the following requirements:

- If your key contains multiple values, your regex syntax must include a single capture group. A capture group is designated by parenthesis. Your capture group determines the filter value.



- If you want to return a specific value from a detail metric key that contains multiple record field values, the regex must follow this syntax:

`$KEY: /<regex> /`

For example, if your detail metric key is `ipaddr:host:cipher` and you only want to return the IP address value, you would type the following:

`$KEY: / ^ ([^ :] +) : . + /`

- If your key contains multiple record field values, the values are separated by a delimiter that is specified in the trigger that is generating the key. The placement of the delimiters in your regex syntax must match the delimiters in the detail key. For example, if you have a key with three values that are separated by a delimiter that is a colon, the three values for the key in your regex syntax must be separated by two colons.



Tip: If you want to return all record field values in a detail metric key, type `$KEY`. For example, if your detail metric key is `ipaddr:host:cipher`, type `$KEY` in the search field to return all three of those field record values (IP address, hostname, and SSL cipher suite).


Edit a text box widget

If you want to include explanatory text next to your dashboard charts or display a company logo in your dashboard, you can edit a text box widget. With the text box widget, you can display text, links, images, or sample metrics in your dashboard.

The text box widget supports Markdown, which is a simple formatting syntax that converts plain text into HTML with non-alphabetic characters, such as “#” or “*”. New text box widgets contain Markdown examples. A text box widget is automatically provided each time you [create a dashboard](#). You can also [add a text box widget to your dashboard layout](#).

To edit an existing text box widget, complete the following steps:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.

3. From the dashboard dock, select a dashboard containing the text box you want to edit.
4. Click the command menu  in the upper right corner and select **Edit Layout**.
5. Click the text box.
6. Type and edit text in the left Editor pane.
The HTML output text dynamically displays in the right Preview pane. With Markdown, you can format the following types of content:
 - [Format text](#)
 - [Add images](#)
 - [Add metric examples](#)
7. Click **Save** to close the Metric Explorer.

Format text in Markdown

The following table shows common Markdown formats that are supported in the text box widget.



Note: Additional Markdown format examples are provided in the [GitHub Guides: Mastering Markdown](#). However, not all Markdown syntax formatting options are supported in the ExtraHop [text box widget](#).

Format	Description	Example
Headings	Place a number sign (#) before your text to format headings. The level of heading is determined by the amount of number signs.	####Example H4 heading
Unordered lists	Place a single asterisk (*) before your text.	* First example * Second example
Ordered lists	Place a single number and period (1.) before your text.	1. First example 2. Second example
Bold	Place double asterisks before and after your text.	**bold text**
Italics	Place an underscore before and after your text.	<i>_italicized text_</i>
Hyperlinks	Place link text in brackets before the URL in parentheses. Or type your URL. Links to external websites open in a new browser tab. Links within the ExtraHop system, such as dashboards, open in the current browser tab.	[Visit our home page](https://www.extrahop.com) https://www.extrahop.com
Blockquotes	Place a right angle bracket and a space before your text.	On the ExtraHop website: > Access the live demo and review case studies.
Monospace font	Place a backtick (`) before and after your text.	<code>`example code block`</code>
Emojis	Adding emojis in Markdown syntax is unsupported; however,	

Format	Description	Example
	<p>you can copy and paste a Unicode emoji image into the text box.</p> <p>See the Unicode Emoji Chart website for images.</p>	

Add images in Markdown

You can add images to the text box widget by linking to them. Make sure your image is hosted on a network that is accessible to the ExtraHop system.

Links to images must be specified in the following format:

```
! [<alt_text>] (<file_path>)
```

Where *<alt_text>* is the alternative text for the image name and *<file_path>* is the path of the image. For example:

```
! [Graph] (/images/graph_1.jpg)
```



Note: You also can add images by encoding them to Base64. For more information, see the following post on the ExtraHop forum, "[Putting Images in Text Boxes](#)."

Add metric examples in Markdown

You can write a metric query to include a metric value inline with text in the text box widget. For example, to show how many web servers have returned a 404 error, you can add a metric query to a sentence and the value is updated within the text.

The following example shows the basic format for writing metric queries:

```
%%metric:{
  "metric_category": "<metric_category>",
  "object_type": "<object_type>",
  "object_ids": [object_id],
  "metric_specs": [
    {
      "name": "<metric_spec>"
    }
  ]
}%%
```

To locate the *object_type*, *metric_spec*, and *metric_category* values for a metric, complete the following steps:

1. Click **Settings**
2. Click **Metric Catalog**.
3. Type the metric name in the search field.
4. Select the metric, and note the values for *metric_category*, *object_type*, and *metric_spec* in the REST API Parameters section.

The following figure displays values for NFS Server - TCP Requests by Client.

REST API Parameters

```

{
  "metric_category": "nfs_server_detail",
  "object_type": "device",
  "metric_specs": [
    {
      "name": "tcp"
    }
  ]
}

```

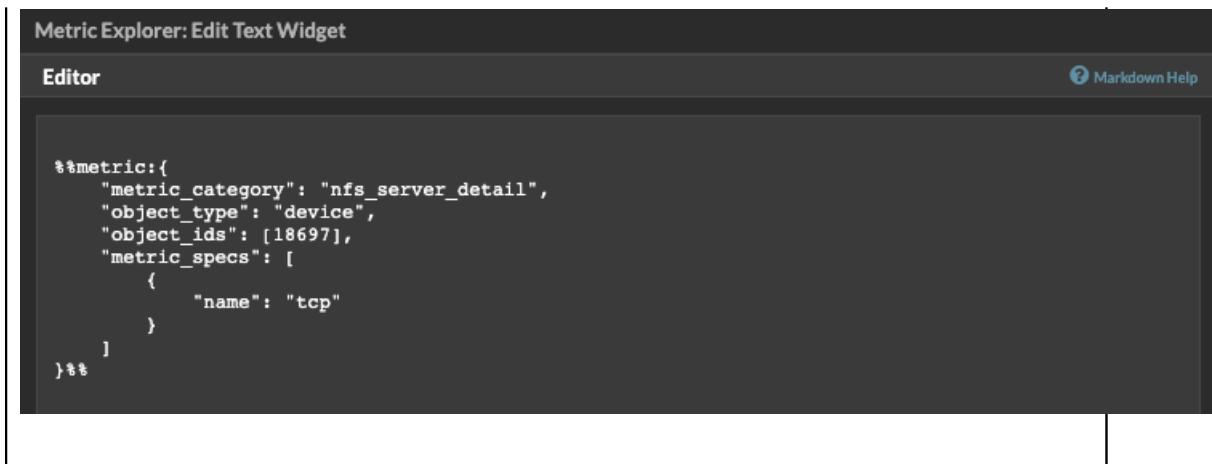
To locate the `object_id` for a device, device group, or other asset, complete the following steps:

1. Click **Assets**, and then click an asset type from the left pane.
2. Click the name of the asset you want, and then open the properties window.
3. Note the value displayed for the REST API ID.

The following figure displays the properties for a device with an ID of 18697.

After you locate the values for the metric you want to display, add them to the metric query in the text editor. The value will be displayed in the text widget.

The following example markup will display the number of TCP requests received, listed by client IP address, for an NFS server with the object ID 18697.



 **Note:** The following metric queries are unsupported in the text box widget:

- Time-series queries
- Mean calculations
- Multiple object_ids
- Multiple metric_spec
- Multiple percentiles

Metric query examples for the text box widget

The following examples show you how to write top-level, or base, metric queries for application, device, and network objects. You can also write a query for detail metrics.

Application metrics

To specify the All Activity object, the `object_ids` is "0".

This example query shows how you can retrieve HTTP metrics from the All Activity application object, and displays the following output: "Getting [value] HTTP requests and [value] HTTP responses from All Activity."

```

Getting
%%metric:{
  "object_type": "application",
  "object_ids": [0],
  "metric_category": "http",
  "metric_specs": [{"name": "req"}]
}%%HTTP requests and
%%metric:{
  "object_type": "application",
  "object_ids": [0],
  "metric_category": "http",
  "metric_specs": [{"name": "rsp"}]
}%%
HTTP responses from All Activity.

```

Device metrics

You must specify either a client ("`_client`") or server ("`_server`") in the `metric_category`. To retrieve metrics for a specific device, specify the device object ID number in `object_ids`. To retrieve the device object ID (`deviceId`), search for the device object in the ExtraHop global search. Select the device from your search results. The "`deviceId=`" value will be embedded in the URL query string.

This example query shows how to retrieve metrics from a device client object, and displays the following output: “Getting [value] CLIENT DNS response errors from a specific device.”

```
Getting
%%metric:{
  "object_type": "device",
  "object_ids": [8],
  "metric_category": "dns_client",
  "metric_specs": [{"name": "rsp_error"}]
}%%
CLIENT DNS response errors from a specific device.
```

This example query shows how to retrieve metrics from a device server object, and displays the following output: “Getting [value] SERVER DNS response errors from a specific device.”

```
Getting
%%metric:{
  "object_type": "device",
  "object_ids": [156],
  "metric_category": "dns_server",
  "metric_specs": [{"name": "rsp_error"}]
}%%
SERVER DNS response errors from a specific device.
```

Network metrics

To specify All Networks, the `object_type` is “capture” and the `object_ids` is “0.” To specify a specific VLAN, the `object_type` is “vlan” and the `object_ids` is the VLAN number.

This example query shows how to retrieve metrics for all networks, and displays the following output: “Getting [value] broadcast packets from all networks.”

```
Getting
%%metric:{
  "object_type": "capture",
  "object_ids": [0],
  "metric_category": "net", "metric_specs":
  [{"name": "frame_cast_broadcast_pkts"}]
}%%
broadcast packets from all networks.
```

This example query shows how to retrieve metrics for a specific VLAN and displays the following output: “Getting [value] broadcast packets from VLAN 3.”

```
Getting
%%metric:{
  "object_type": "vlan",
  "object_ids": [3],
  "metric_category": "net",
  "metric_specs": [{"name": "frame_cast_broadcast_pkts"}]
}%%
broadcast packets from VLAN 3.
```

Group metrics

To specify a group, the `object_type` is “device_group.” You must specify either a client (“_client”) or server (“_server”) in the `metric_category`. The `object_ids` for the specific group must be retrieved from the REST API Explorer.

This example query shows how to retrieve metrics for all networks, and displays the following output: "Getting [value] HTTP responses from the HTTP Client Device Group."


```
Getting
%%metric:{
  "object_type": "device_group",
  "object_ids": [17],
  "metric_category": "http_client",
  "metric_specs": [{"name": "req"}]
}%%
HTTP responses from the HTTP Client Device Group.
```

Detail metrics

If you want to retrieve detail metrics, your metric query should contain additional key parameters, such as `key1` and `key2`:

- `object_type`
- `object_ids`
- `metric_category`
- `metric_spec`
 - `name`
 - `key1`
 - `key2`

The key parameters act as a filter for displaying detail metric results. For non-custom detail metrics, you can retrieve detail metric parameters from the Metric Catalog. For example, type `HTTP Responses by URI`, and then look at the parameter values in the REST API Parameters section.

 **Important:** You must supply the `object_ids` in your query.

This example shows how to retrieve HTTP requests by URI for the All Activity application (`object_ids` is "0"):

```
%%metric:{
  "object_type": "application",
  "object_ids": [0],
  "metric_category": "http_uri_detail",
  "metric_specs": [{"name": "req"}]
}%%
```

This example query shows you how to retrieve HTTP requests by URIs that contain a key value for "pagead2" for the All Activity application (`object_ids` is "0"):

```
%%metric:{
  "metric_category": "http_uri_detail",
  "object_type": "application",
  "object_ids": [0],
  "metric_specs": [
    {
      "name": "req",
      "key1": "/pagead2/"
    }
  ]
}%%
```

This example query shows how to retrieve count metrics for all networks and displays the following output: "Getting [value] detail ICA metrics on all networks."

```
Getting
%%metric:{
  "object_type": "capture",
  "object_ids": [0],
  "metric_category": "custom_detail",
  "metric_specs": [{
    "name": "custom_count",
    "key1": "network-app-byte-detail-ICA"
  }]
}%%
detail ICA metrics on all networks.
```

This example query shows how to retrieve a custom dataset statistic with topn keys and percentiles, and displays the following output: "The fifth percentile is: [value]."

```
The fifth percentile is:
%%metric:{
  "object_type": "vlan",
  "object_ids": [1],
  "metric_category": "custom_detail",
  "metric_specs": [{
    "name": "custom_dset",
    "key1": "myCustomDatasetDetail",
    "key2": "/10.10.7/",
    "calc_type": "percentiles",
    "percentiles": [5]
  }]
}%%
.
```



Note: Sampleset metrics are unsupported in the text box widget. For example, adding the "calc_type": "mean" parameter to your text box query is unsupported.

Edit a dashboard region

Dashboard regions, which contain charts and widgets, are highly customizable. As you work with dashboards, you might need to frequently change or copy a region. You can only delete, resize, or rearrange a region by editing the dashboard layout.

To edit basic properties of a region in a dashboard, complete the following steps:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select a dashboard with the region you want to edit.
4. Click the region header to access the following options:

Rename a region

Add a custom name to the region.

Modify sources

Quickly replace the data sources for each chart in a region with a different source after [copying a chart](#), region, or [dashboards](#).

Copy a region

Hover over **Copy to...** and make one of the following selections:

- Select the name of an existing dashboard from the list. The dashboard page opens and displays the location of the copied region.



Tip: The dashboard list is ordered from the most recently created dashboards (at the bottom) to the oldest dashboards (at the top).

- Select **Create Dashboard**. In the Dashboard Properties window, type a name for the new dashboard.

Change the region time interval

Apply a time interval to the entire region by enabling the Region Time Selector.

Fullscreen

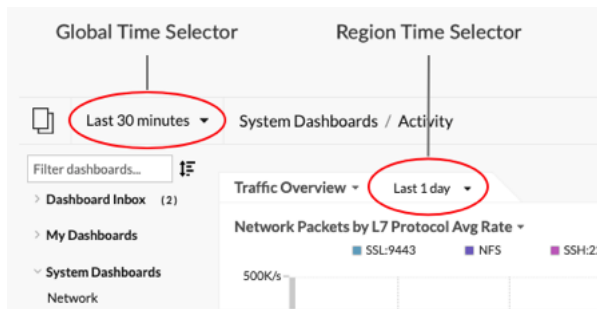
Expand region contents into a fullscreen display.

Next steps

- [Edit a dashboard layout](#)
- [Edit a chart with the Metric Explorer](#)

Change the time interval for a dashboard region

In a dashboard, you can apply a time interval to an entire dashboard with the Global Time Selector, or apply a different time interval per region with the Region Time Selector.




1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Select a dashboard.
4. Click the region header and then select **Use Region Time Selector**.
5. Click **Last 30 minutes** and complete one of the following steps:
 - From the Time Interval tab, select one of the following options:
 - Select another time interval (such as **Last 30 minutes**, **Last 6 hours**, **Last day**, or **Last week**).
 - Specify a custom unit of time.
 - Select a custom time range. Click a day to specify the start date for the range. One click will specify a single day. Click another day to specify the end date for the range.
 - [Compare metric deltas](#) from two different time intervals.
 - From the History tab, select from up to five recent time intervals selected in a previous login session.
6. Click **Save** to close the Region Time Selector.
The new time interval is applied to all charts and widgets within the region.
7. To remove the region time interval, click the region header and select **Use Global Time Selector**.
When the time interval disappears from the region header, the global time interval is applied to the region.

Edit dashboard properties

To rename a dashboard, change the theme, or change the URL, you must edit the dashboard properties. When you create a dashboard, you have an opportunity to specify dashboard properties. However, you can change dashboard properties at any time.

You can only change properties for one dashboard at a time. You cannot multi-select dashboards and change a property, such as the dashboard author.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select the dashboard that you want to edit.
4. Click the command menu  in the upper right corner of the page and then select **Dashboard Properties**.
5. In the Dashboard Properties window, you can modify the following fields:

Title

Rename the dashboard.

Author

Change the author name.

Description

Change the dashboard description. Note that the description is only seen when editing dashboard properties.

Permalink

Change the URL for the dashboard. By default, the permalink, also known as a short code, is a five-character unique identifier that appears after `/Dashboard` in the URL. You can change the permalink to a more user-friendly name.



Note: The permalink can have up to 100 characters combining letters, numbers, and the following symbols: dot (.), underscore (_), dash (-), plus sign (+), parentheses (), and brackets ([]). Other alphanumeric characters are unsupported. The permalink cannot contain spaces.

Sharing

To share a dashboard with users who can view and edit, click the link. For more information, see [Share a dashboard](#).

Editors

View the list of ExtraHop users with editing access to the dashboard. To change the users, click **Sharing**.

6. Click **Save**.

Present a dashboard


You can set your dashboard to display in fullscreen mode for presentations or for your network operation center screens.

The fullscreen mode provides the following viewing options:

- You can view and interact with the entire dashboard while in Presentation Mode.
- You can view a continuous cycle of each chart in the dashboard in a Widget Slideshow.
- You can view a [single region in fullscreen display](#).

To present an entire dashboard in fullscreen display, complete the following steps:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.

3. From the dashboard dock, select the dashboard you want to present.
4. In the upper right corner of the page, click the command menu  and select one of the following options:

Presentation Mode

The dashboard dock and top navigation menus collapse. You can interact with the time interval and dashboard components while in presentation mode.

Widget Slideshow

A continuous cycle of charts and widgets in fullscreen display begins. Select how long you want each widget to display (for example, **20 seconds**, **15 seconds**, etc.). Click the **x** icon in the upper right corner of the screen to return to the dashboard.



Tip: To open a dashboard in Presentation Mode, add `/presentation` to the end of the URL and then bookmark it. For example:


`https://<extrahop_ip>/extrahop/#/Dashboard/437/presentation`

Share a dashboard

By default, all custom dashboards you create are private, which means that no ExtraHop users can view or edit your dashboard. However, you can share your dashboard by granting view or edit access to other ExtraHop users and groups.


Here are some importance considerations about sharing dashboards:

- How a user interacts with a shared dashboard and the information they can view in the ExtraHop system is determined by user privileges. For example, you can [add a user with the Restricted read-only privilege](#), which allows that user to only view the dashboards that you share with them in the ExtraHop system. For more information, see the [User privileges](#) section in the ExtraHop Administrators Guide.
- When you grant a user edit permission, that user can modify and share the dashboard with others, and add it to a collection. However, other users cannot delete the dashboard. Only the dashboard owner can delete a dashboard.
- Group information is imported into the ExtraHop system from LDAP (such as OpenLDAP or Active Directory). User information is available after an ExtraHop user logs in to their account.
- To share a dashboard with a non-ExtraHop user, you can [create a PDF file of the dashboard](#).
- You can [create a scheduled report](#), which sends the PDF file of the dashboard to any email recipient on a regular basis. (Consoles only.)

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select a dashboard you want to share.
You cannot share system dashboards or dashboards that you do not have edit access to.
4. Click the command menu  in the upper right corner of the dashboard page and select **Share**.
5. To grant view permission to every user, select **Allow all users to view this dashboard**.
6. To grant view or edit permission to specified users and groups, complete the following steps:
 - a) Type the name of a user or group, and then select the name from the drop-down list.
 - b) Next to the name, select **Can view** or select **Can edit**.
7. Click **Save**.
If you shared your dashboard, a small gray icon will appear next to your dashboard in the dock.

Remove access to a dashboard


You can remove or modify dashboard access that you granted to users and groups.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. From the dashboard dock, select the custom dashboard that you want to modify.
4. Click the command menu  in the upper right corner of the page and select **Share**.
5. Remove access for users or groups by completing one of the following steps:
 - Remove all access for a user or group by clicking the red delete (**x**) icon next to the user or group name.
 - Remove edit access by selecting **Can view** from the drop-down list next to the user or group name.
6. Click **Save**.


Create a dashboard collection

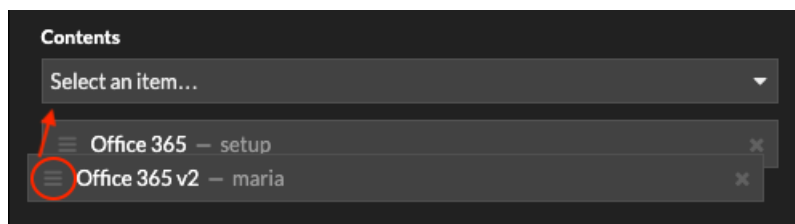
You can create a collection to organize dashboards that you own and that have been shared with you.

Here are some important considerations about dashboard collections:

- Your [user privileges](#)  determine whether you can create and share collections.
- You can add any dashboard to a collection that you own or have permission to view or edit.
- You can add a dashboard to multiple collections.
- You can share a collection if you own or have edit permission for all of the dashboards in that collection.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Click **Collections** at the top of the dashboard dock and then click **Create Collection** at the bottom of the dock.
4. In the **Name** field, type a unique name for the collection.
5. (Optional) In the **Description** field, add information about the collection.
6. (Optional) Type the name of a user or group in the **Sharing** drop-down list, select from the search results, and then click **Add**.
7. Type the name of a dashboard in the **Contents** drop-down list and then select from the search results. The name of the owner is displayed for each added dashboard.

 **Tip:** The dashboard at the top of the list is displayed by default when the collection is selected in the dashboard dock. Click and drag the icon next to a dashboard name to re-order the list.



8. Click **Save**.
The collection is added to the dashboard dock.

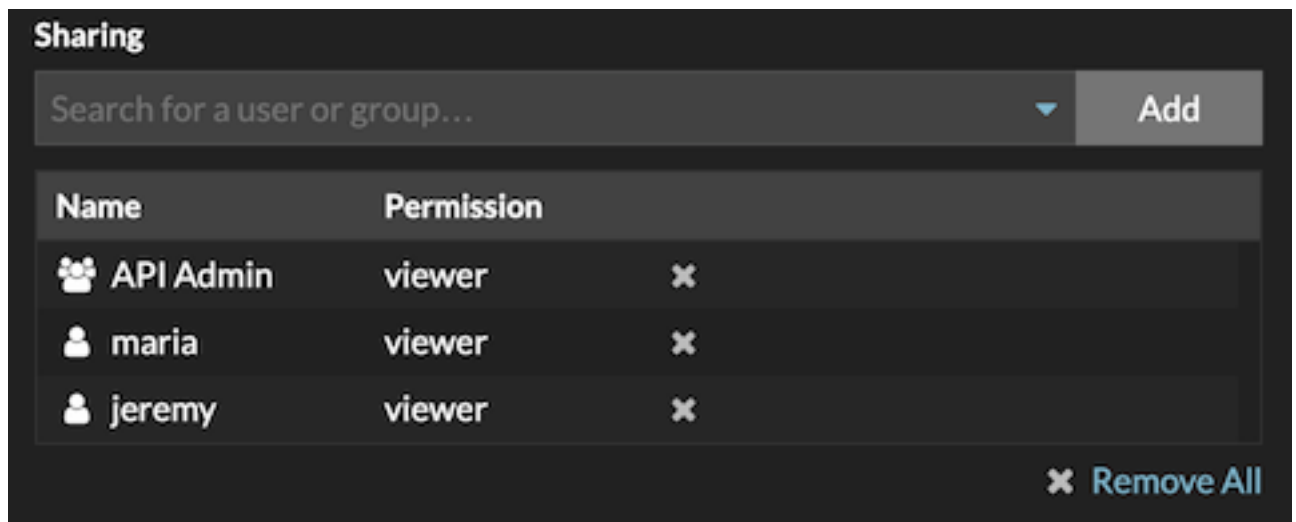
Share a dashboard collection

By default, all dashboard collections are private, which means that no other users can view or edit your collection. However, you can share your collection with other users and groups.

Here are some important considerations about sharing dashboard collections:

- You can only share a collection if you own or have permission to edit all of the dashboards in the collection.
 - Users can only view the dashboards in a shared collection; they cannot edit any collection properties.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. At the top of the page, click **Dashboards**.
 3. Click **Collections** at the top of the dashboard dock.
 4. Click the collection you want to share and then click **Edit**.
 5. Type the name of a user or group in the **Sharing** drop-down list and then select from the search results.
 6. Click **Add**.

The user or group is displayed in a list of shared users.



Tip: Remove a user or group by clicking the remove (X) icon next to the name.

7. Click **Save**.
The collection appears in the dashboard dock for each shared user.

Export data

You can export chart data from the ExtraHop system in CSV and XLSX formats.

You can also [create PDFs](#) of ExtraHop charts, pages, and dashboards.

Export data to Excel


1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Navigate to a dashboard or protocol page.
3. Right-click any chart, table, or metric and select **Export to Excel**.

Export data to CSV

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Navigate to a dashboard or protocol page.
3. Right-click any chart, table, or metric and select **Export to CSV**.

Create a PDF file

You can export data from a dashboard, protocol page, or individual chart as a PDF file.

1. Find the dashboard or protocol page that contains the data you want to export and complete one of the following steps:
 - To create a PDF file of the entire page, click the command menu  in the upper right corner of the page and select **Print** from a sensor or **Export to PDF** from a console.
 - To create a PDF file of an individual chart or widget, click the chart title and select **Print** from a sensor or select **Export to PDF** from the drop-down menu on a console.
2. A PDF preview dialog opens. Complete one of the following steps:
 - Click **Print Page** and then select **PDF** as the destination from the print settings in your browser.
 - From a sensor, click **Print Widget** and select **PDF** as the destination from the print settings in your browser.
 - From a console, select [PDF format customizations](#) and then click **Export to PDF**. The process for generating a PDF might take several seconds.



Tip: To access PDF print options through a keyboard shortcut, type `pp`.

Customize the format of a PDF file

When creating a PDF file of a dashboard or protocol page from a console, you have several options for customizing the appearance of your PDF file.

1. Type a custom name for your PDF file or accept the default name.
2. Choose one of the following page width options:

Narrow

Displays large text in chart titles and labels, but provides less space for displaying chart data. Long chart titles and labels might be truncated.

Medium

(Recommended) Displays a view of chart titles, legends, and data that is optimized for portrait page orientation.

Wide

Displays small text in chart titles and labels, but provides more space for displaying chart data.

3. Choose one of the following page break options:

Single page

Displays the entire dashboard or protocol page on a single, continuous page. This setting might generate a PDF file that is larger than standard printer page sizes.

Page break per region

Displays each chart region on an individual page.

4. Choose one of the following themes:

Light

White background with dark text.

Dark

Black background with white text.

Space

Dark background with a stylized background image and text.

5. Click **Export to PDF**.

The process for generating a PDF might take several seconds.

Next steps

The PDF file will download to your local computer. Each PDF file includes the dashboard title and time interval. Click **View report on ExtraHop** to open the original dashboard set to the time interval specified in the PDF file.

Chart types

Dashboard charts in the ExtraHop system offer multiple ways to visualize metric data, which can help you answer questions about your network behavior.

You select a chart type when you [edit a chart in the Metric Explorer](#). But how do you know which chart to select? It helps to first decide which question you want to answer:

- To learn how a metric changes over time, select a time-series chart such as the area, column, line, line & column, or status chart.
- To learn how a metric value compares to a complete set of data, select a distribution chart such as the box plot, candlestick, heatmap, or histogram chart.
- To learn the exact metric value for a time period, select a total value chart such as the bar, list, pie, table, or value chart.
- To learn the alert status of this metric, select the list, status, or value chart.

Find more answers in the [Charts FAQ](#).

The following table provides a list of chart types and descriptions. Click on the chart type to see more details and examples.

Chart Type	Description	Type
Area chart	Displays metric values as a line that connects data points over time, with the area between the line and axis filled in with color.	Time-series
Column chart	Displays metric data as vertical columns over a selected time interval.	Time-series
Line chart	Displays metric values as data points in a line over time.	Time-series
Line & Column chart	Displays metric values as a line, which connects a series of data points over time, with the option to display another metric as a column chart underneath the line chart.	Time-series
Status chart	Displays metric values in a column chart and the status of an alert assigned to both the source and metric in the chart.	Time-series
Box plot chart	Displays variability for a distribution of metric data. Each horizontal line in the box plot includes three or five data points.	Distribution
Candlestick chart	Displays variability for a distribution of metric data over time.	Distribution
Heatmap chart	Displays a distribution of metric data over time, where color	Distribution

Chart Type	Description	Type
	represents a concentration of data.	
Histogram chart	Displays a distribution of metric data as vertical bars or bins.	Distribution
Bar chart	Displays the total value of metric data as horizontal bars.	Total value
List chart	Displays metric data as a list with optional sparklines that represent data changes over time.	Total value
Pie chart	Displays metric data as a portion or percentage of a whole.	Total value
Table chart	Displays multiple metric values in a table, which can be easily sorted.	Total value
Value chart	Displays the total value for one or more metrics.	Total value

Area chart

Metric data is displayed as data points over time connected by a line, with the area between the line and the x-axis filled in with color.

If your chart contains more than one metric, data for each metric is displayed as an individual line, or a series. Each series is stacked together to illustrate the cumulative value of the data.

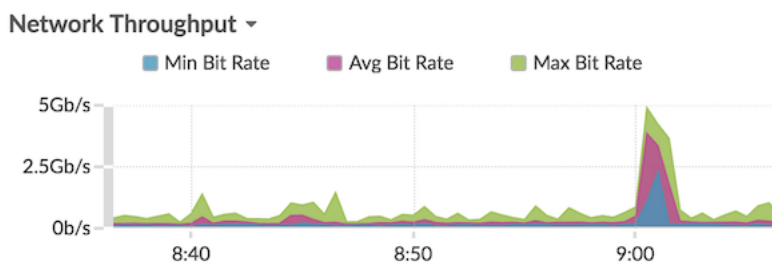
Select the area chart to see how the accumulation of multiple metric data points over time contribute to a total value. For example, an area chart can reveal how various protocols contribute to total protocol activity.

For more information about displaying rates in your chart, see the [Display rates](#) section.

 **Note:** This chart supports [detection markers](#), which indicate detections associated with chart data.

 **Note:** Machine learning detections require a [connection to ExtraHop Cloud Services](#).

The following figure shows an example of an area chart.

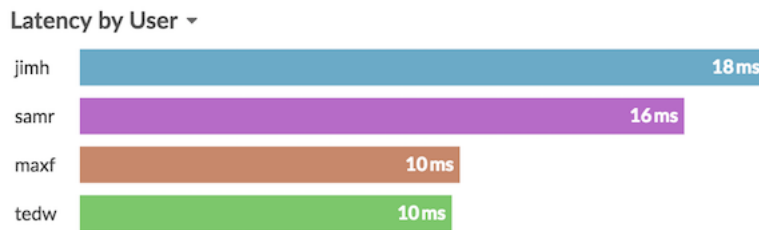


Bar chart

The total value of metric data is displayed as horizontal bars.

Select the bar chart when you want to compare the data for more than one metric for a selected time interval.

The following figure shows an example of a bar chart.

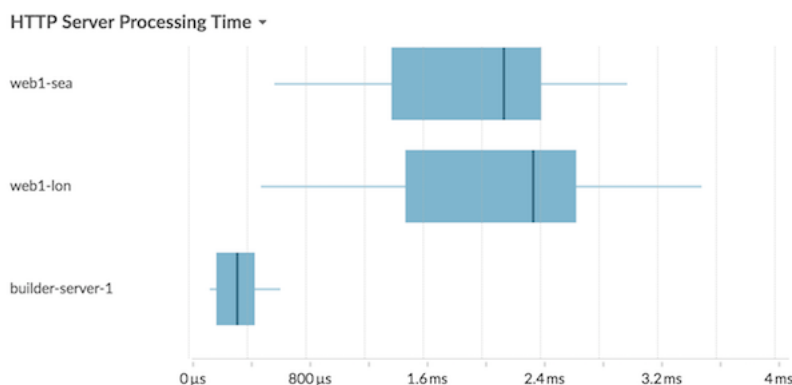


Box plot chart

The box plot chart displays variability for a distribution of metric data. You can only display data from dataset metrics, such as server processing time, in this chart.

Each horizontal line in the box plot includes three or five data points. With five data points, the line contains a body bar, a vertical tick mark, an upper shadow line, and a lower shadow line. With three data points, the line contains a vertical tick mark, an upper shadow, and lower shadow. For more information about displaying specific percentile values in your chart, see [Display percentiles](#).

The following figure shows an example of a box plot chart.



Candlestick chart

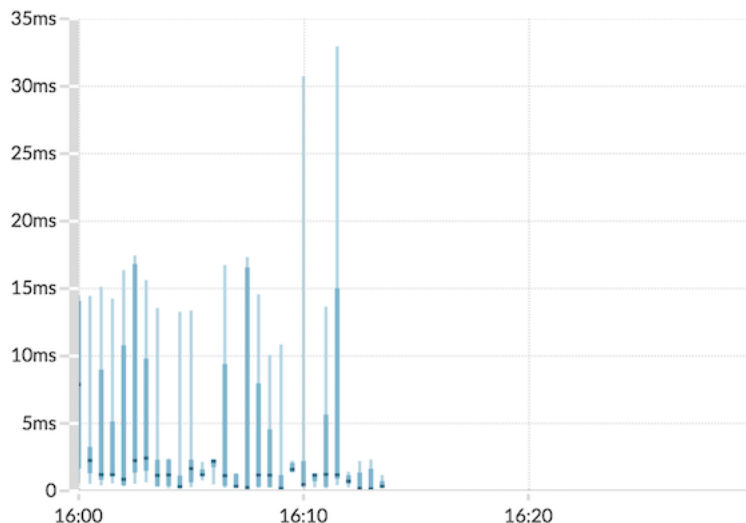
The candlestick chart displays variability for a distribution of metric data over time. You can only display data from dataset metrics or high-precision network (L2) byte and packet metrics.

Vertical lines at each time interval displays three or five data points. If the line has five data points, it contains a body, middle tick mark, an upper shadow line, and a lower shadow line. If the line has three data points, it contains a middle tick mark. For more information about displaying specific percentile values in your chart, see [Display percentiles](#).

Select the candlestick chart to view the variability of data calculations for a specific period of time.

The following figure shows an example of a candlestick chart.

Storage Network Latency ▾



Column chart

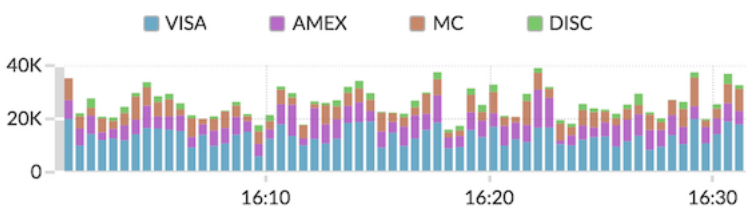
Metric data is displayed as vertical columns over time. If your chart contains more than one metric, data for each metric is displayed as an individual column or as a series. Each series is stacked together to illustrate the cumulative value of the data.

Select the column chart to compare how accumulation of multiple metric data points at a specific time contribute to the total value.

 **Note:** This chart supports [detection markers](#), which indicate detections associated with chart data.

The following figure shows an example of a column chart.

Revenue per Second by Card Brand ▾



Heatmap chart

The heatmap chart displays a distribution of metric data over time, where color represents a concentration of data. You can only select a dataset metric to display in the chart, such as server processing time or round trip time.

Select the heatmap when you want to identify patterns in the distribution of data.

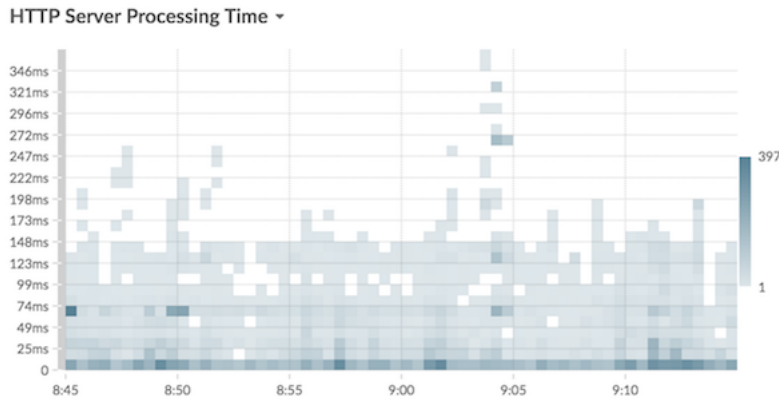
Here are some important considerations about the heatmap chart:

- The heatmap legend displays the color gradient that corresponds to the data range in the chart. For example, the darker color on the heatmap indicates a higher concentration of data points.
- The default data range is between the 5th and 95th percentiles, which filters outliers from the distribution. Outliers can skew the scale of data displayed in your chart, making it more difficult to spot

trends and patterns for the majority of your data. However, you can choose to view the full range of data by changing the default filter in the **Options** tab. For more information, see [Filter outliers](#).

- The selected theme, such as Light, Dark, or Space, affects whether a dark or light color indicates a higher concentration of data points.

The following figure shows an example of a heatmap chart.



Histogram chart

The histogram chart displays a distribution of metric data as vertical bars, or bins. You can only select a dataset metric to display in this chart, such as server processing time or round trip time.

Select the histogram chart to view the shape of how data is distributed.

Here are some important considerations about the histogram chart:

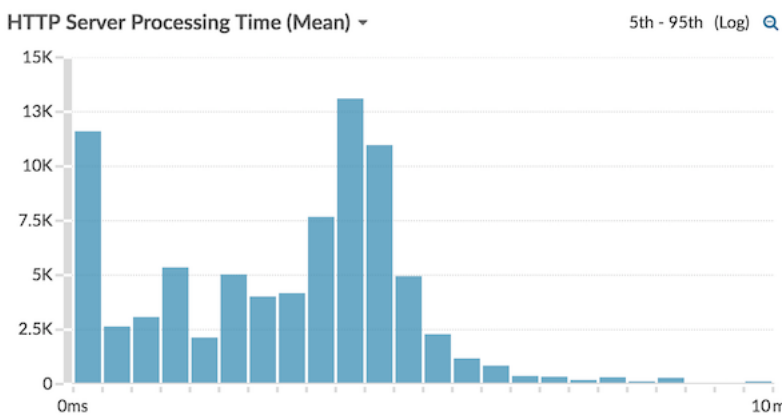
- The default data range is from the 5th to 95th percentile (5th-95th), which filters outliers from the distribution. The minimum to maximum (Min-Max) view displays the full data range. Click the magnifying glass in the upper right corner of the chart to toggle between the two views.
- Data is automatically distributed into bins on either a linear or log scale based on the data range. For example, when the data range spans several orders of magnitude, data is placed into bins on a log scale. Min-Max (log) appears in the upper right corner of the chart.
- Click-and-drag to zoom in on multiple bins or a specific bin. Click the magnifying glass again in the upper right corner of the chart to zoom out to the original view (either 5th-95th or Min to Max).




Note: Zooming in to view a custom time interval does not change the global or region time interval.

- Your toggle selection (between the 5th-95th and Min-Max views) will persist for your chart, but not for the users that you shared your dashboard and chart with. To set a persistent toggle selection before sharing a dashboard, see [Filter outliers](#).

The following figure shows an example of a histogram chart.



 **Note:** This chart does not support baselines or threshold lines.

Line chart

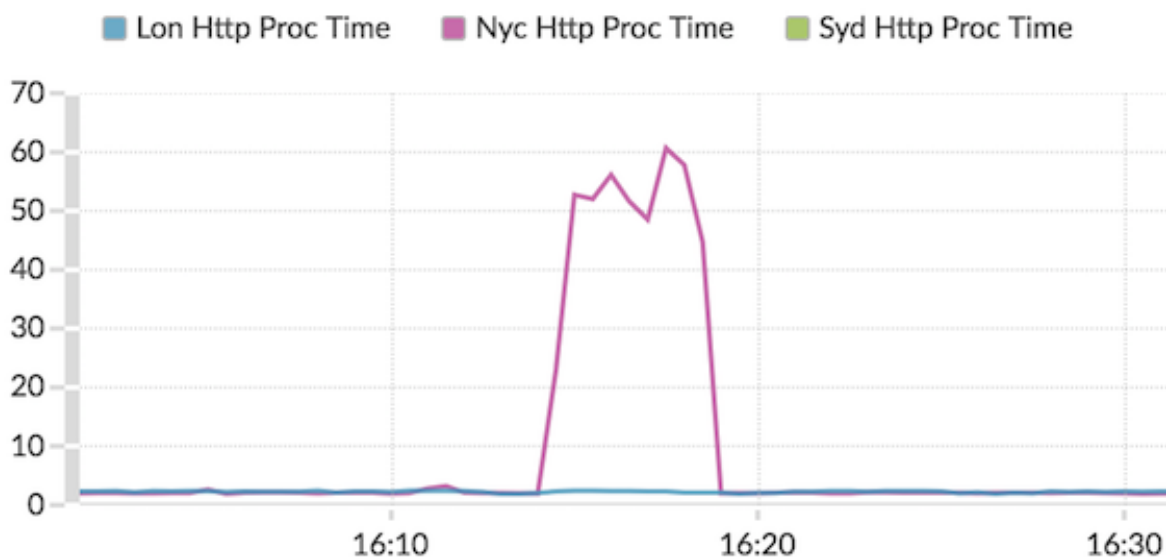
Metric data is displayed as data points over time that are connected in a line. If your chart contains more than one metric, data for each metric is displayed as an individual line or as a series. Each series overlaps.

Select the line chart to compare changes over time.

 **Note:** This chart supports [detection markers](#), which indicate detections associated with chart data.

The following figure shows an example of a line chart.

HTTP Processing Time by Region ▾



Line & column chart

Metric data is displayed as data points over time connected by a line, with the option to display a column chart underneath the line chart. For example, if your chart contains more than one metric (for example,

HTTP Requests and HTTP Errors), you can select **Display as Columns** to display one of the metrics as a column chart underneath the line chart.

Columns are displayed in the color red by default. To remove the red color, click **Options** and deselect **Display columns in red**.

Select the line & column chart to compare different metrics at different scales in one chart. For example, you can view error rates and the total number of HTTP responses in one chart.

 **Note:** This chart supports [detection markers](#), which indicate detections associated with chart data.

The following figure shows an example of a line & column chart.



List chart

Metric data is displayed as a list. Select the list chart to view long lists of metric values, such as detail metrics.

This chart includes the following options:

- Add a sparkline, which is a simple area chart placed inline with the metric name and value. A sparkline shows how data changed over time. Click the **Options** tab and select **Include sparklines**.
- Display the metric value in an alert status color. Different colors indicate the severity of the configured alert. For example, if an alert threshold is crossed for a metric that is displayed in the list chart, the value for that metric appears in red. Click the **Options** tab and select **Color indicates alert status**.

 **Note:** This chart does not support baselines or threshold lines.

The following figure shows an example of a list chart.



Pie chart

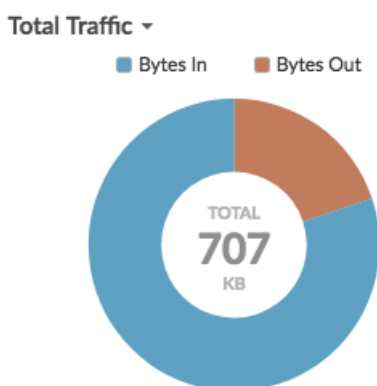
Metric data is displayed as a portion or percentage of a whole. If your chart contains more than one metric, data for each metric is represented as single slice, or series, in the pie chart.

Select the pie chart to compare the metric values that are mutually exclusive, such as status code detail metrics for the top-level HTTP Response metric.

This chart includes the following options:

- Display as a donut chart. Click the **Option** tab and select **Show total value**.
- Specify the decimal precision, or the number of digits, displayed in your chart. Percentile precision is useful for displaying ratios of data, especially for service-level agreements (SLAs) that might require precise data for reporting. Click the **Options** tab, and in the Units section, select **Show percents instead of counts**. Then select **0.00%** or **0.000%** from the drop-down list.

The following figure shows an example of a pie chart.




Status chart

Metric data is displayed in a column chart. The color of each column represents the most severe alert status of the configured alert for the metric. You can only select one source and metric to display in this chart.

To view the status of all of the alerts associated with the selected metric category, click **Show Related Alerts**. A list of alerts is then displayed below the column chart.

Select the status chart to see how data and the alert status for your metric change over time.

 **Note:** This chart does not support baselines.

The following figure shows an example of a status chart.

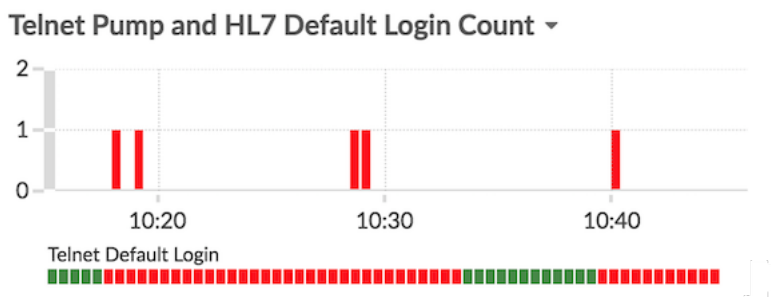



Table chart

Metric data is displayed across rows and columns in a table. Each row represents a source. Each column represents a metric. You can add multiple sources (of the same type) and metrics to a table.

Select the table chart when you want to view metric data in a grid and easily sort values across multiple metrics.

 **Note:** This chart does not support baselines or threshold lines.

The following figure shows an example of a table chart.

Web Server Transactions ▾

Device	↓ Responses	Errors	Requests
web1-lon	481,086	8	481,090
web1-sea	189,901	4	206,639
builder-server-1	14,295	0	14,295

Value chart

The total value for one or more metrics is displayed as a single value. If you select more than one metric, metric values are displayed side-by-side.

Select the value chart to see the total value of important metrics, such as the total number of HTTP errors occurring on your network.

This chart includes the following options:

- Add sparklines, which is a simple area chart placed underneath the metric value. A sparkline shows how data changed over time. Click the **Options** tab and select **Include sparklines**.
- Display the metric value in an alert status color. Different colors indicate the severity of the configured alert. For example, if an alert threshold is crossed for a metric, the value appears in red. Click the **Options** tab and select **Color indicates alert status**.

 **Note:** This chart does not support baselines or threshold lines.

The following figure shows an example of a value chart.

Throughput Summary ▾

1.04 Mb/s
Average In

2.46 Mb/s
Average Out


1.97 Mb/s
Max In

5.91 Mb/s
Max Out

Create a chart

Charts are an essential tool for visualizing, analyzing, and understanding network behavior. You can create a custom chart from a dashboard or protocol page to visualize data from any of the 4,000+ built-in metrics or custom metrics available in the ExtraHop system. For example, if you observe an interesting server metric while troubleshooting, you can create a chart to visualize and further analyze that metric. Customized charts are then saved to dashboards.

The following steps show you how to quickly create a blank custom chart:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Complete one of the following steps:
 - Click **Dashboards** at the top of the page.
 - Click **Assets** at the top of the page. Select a source from the left pane, and then click the name of an application, device, device group, or network from the center pane. A protocol page for the source appears.
3. Click the command menu  in the upper right corner of the page and then select **Create Chart**.
4. [Edit the chart in the Metric Explorer](#).
5. To save your chart, click **Add to Dashboard** and complete one of the following steps:
 - Select the name of an existing dashboard from the list. The dashboard list is ordered from the most recently created dashboards (at the bottom) to the oldest dashboards (at the top).
 - Select **Create Dashboard**. In the [Dashboard Properties](#) window, type a name for the new dashboard and then click **Create**.



Tip: Here are some other ways to create a chart:

- If you find a chart you like on a protocol page or dashboard, you can recreate and save that chart to your dashboard. Click the chart title and then select **Create Chart From...**
- You can [edit a dashboard layout](#) and click-and-drag a new chart widget onto the dashboard.

Next steps


After you create a chart, learn more about working with dashboards:

- [Edit a dashboard layout](#)
- [Share a dashboard](#)

Copy a chart


You can copy a chart from a dashboard or protocol page and then save the copied chart to a dashboard. Copied widgets are always placed into a new region on the dashboard, which you can later modify.



Tip: If you want to copy a dashboard chart or text box without creating a new region, click the command menu  in the upper right corner of the dashboard page and click **Edit Layout**. Find the chart you want to copy and then click **Duplicate**.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Select a dashboard that contains the chart or widget that you want to copy.
4. Click the title.



Note: You cannot click the title of a text box widget. To copy a text widget, you must first [edit the dashboard layout](#). Click the command menu  in the upper right corner of the text box widget, and then complete step 4.

5. Hover over **Copy to...** to expand a drop-down list and then make one of the following selections:
 - Select the name of an existing dashboard from the list. The dashboard list is ordered from the most recently created dashboards (at the bottom) to the oldest dashboards (at the top).
 - Select **Create Dashboard**. In the [Dashboard Properties](#) window, type a name for the new dashboard and then click **Create**.

Next steps

The chart is copied into a new region on the dashboard that is in Edit Layout mode. You can now edit your dashboard or chart in the following ways:

- [Edit a dashboard region](#)
- [Edit a dashboard layout](#)
- [Edit a chart with the Metric Explorer](#)

Drill down

An interesting metric naturally leads to questions about the factors associated with that metric value. For example, if you find a large number of DNS request timeouts on your network, you might wonder which DNS clients are experiencing those timeouts. In the ExtraHop system, you can easily drill down from a top-level metric to view the devices, methods, or resources associated with that metric.

When you drill down on a metric by a key (such as a client IP address, method, URI, or resource), the ExtraHop system calculates a topset of up to 1,000 key-value pairs. You can then investigate these key-value pairs, referred to as detail metrics, to learn which factors are linked to the interesting activity.

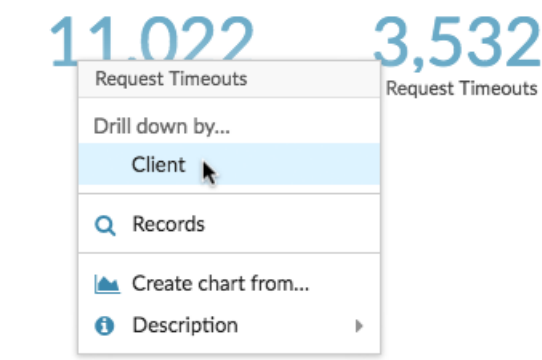
Drill down from a dashboard or protocol page

Clicking a metric in a chart or legend helps you see which key, such as client IP address, server IP address, method, or resource, contributed to that value.

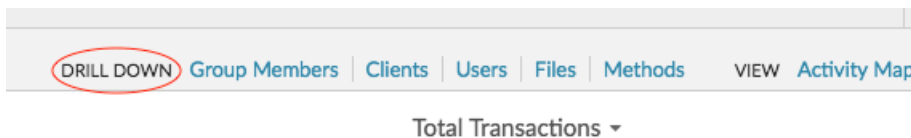
The following steps show you how to locate a metric and then drill down:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Find an interesting metric by completing one of the following steps:
 - Click **Dashboard**, and then select a dashboard from the left pane. A dashboard appears containing metrics.
 - Click **Assets**, click **Device**, **Device Group**, or **Application** in the left pane. Then select a device, group, or application. A protocol page appears containing metrics.
 - Click **Assets**, click **Networks** in the left pane, and then select a flow network. A protocol page appears containing metrics.
3. Click on a metric value or a metric label in the chart legend, as shown in the following figure. A menu appears.

Total Requests and Timeouts ▾



Tip: On a protocol page, you can also click a drill-down shortcut button in the Drill Down section, located in the upper right corner of the page. The type of shortcut buttons vary by protocol.



- In the Drill down by... section, select a key. A detail metrics page with a topset of metric values by key appears. You can view up to 1,000 key-values pairs on this page.

Tip: If available, click the **View More** link at the bottom of a chart to drill down on the metric displayed in the chart.

Next steps

- [Investigate detail metrics](#)

Drill down on network capture and VLAN metrics


Click an interesting top-level metric about network activity on a Network capture or VLAN page to identify which devices are linked to that activity.

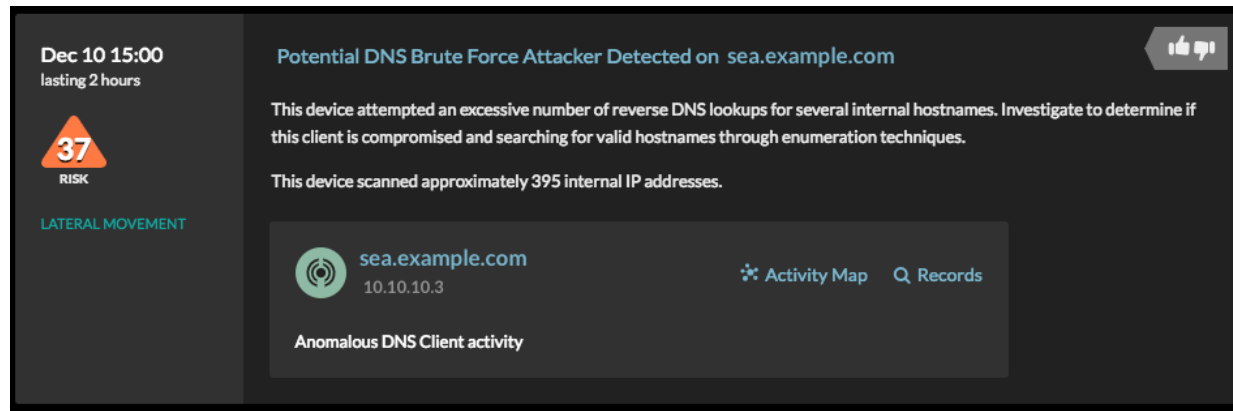
Note: For information about how to drill down on metrics from a flow network or flow network interface page, see the [Drill down from a dashboard or protocol page](#) section.

- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- Click **Assets**.
- Click **Networks** in the left pane.
- Click a network capture or VLAN interface name.
- Click a network layer in the left pane, such as **L3** or **L7 Protocols**. Charts that display metric values for the selected time interval appear. For most protocols and metrics, a Device table also appears at the bottom of the page.
- Click the chart data, which updates the list to display only the devices that are associated with the data.
- Click a device name. A Device page appears, which displays traffic and protocol activity associated with the selected device.

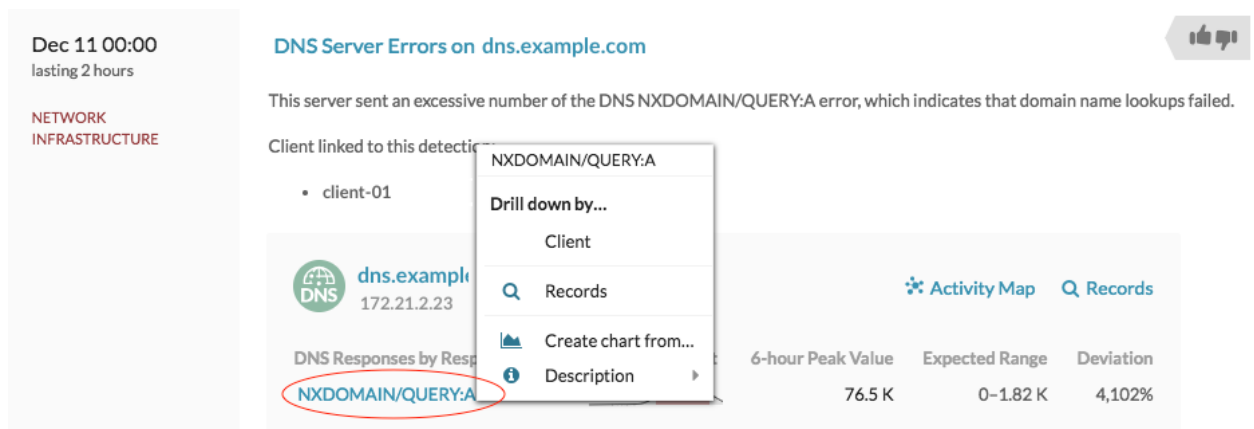
Drill down from a detection

For certain detections you can drill down to see more details about the metric or key that contributed to the unusual behavior. The metric name or key appears as a link at the bottom of an individual detection.

 **Note:** Detections with metrics or keys that do not have detail metrics do not include a drill down option. Detections that only display anomalous protocol activity instead of a metric also do not include a metric drill down option. For example, you cannot drill down on a detection for Anomalous DNS Client activity, as shown in the figure below. Instead, click the links for the device or application name, **Activity Map**, or **Records** to learn more about the anomalous activity.



1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Detections** at the top of the page.
3. Find an interesting detection that is associated with a metric and click the metric name or key. In the following figure, by clicking on the response code, we can drill down to see all of the clients that received DNS responses with NXDOMAIN/QUERY:A.



4. In the Drill down by... section, click a key such as **Client**.
A detail metric page appears, where you can [investigate metrics listed by key](#).

Drill down from an alert

Click the metric name or key in a threshold or detection alert to see which key, such as client, server, method, or resource, contributed to the metric value or unusual behavior.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Alerts** at the top of the page.

Note: You can also access alerts from an Alert widget on a dashboard or at the bottom of the following protocol pages:

- Application Overview page
- Device Group Overview page
- Network Overview page

3. Click the name of a threshold alert or a detection alert. Alert details appear.
4. Click a metric name or key, as shown in the following figure.

Alert Details

Dec 12 10:46
● ERROR

Threshold Alert

Threshold alert on [All Activity](#)

HTTP Metrics	6-hour Snapshot	Alert Value	Threshold
Requests	Requests	17616.0	2

Drill down by...

- Client
- Method
- Referer
- Server
- URI

Records

Go to application...

- All Activity - HTTP
- Create chart from...
- Description

- In the Drill Down by section, click a key, such as **Client**, **Method**, **Referer**, **Server**, or **URI**. A detail metric page appears, where you can [investigate metrics listed by key](#).

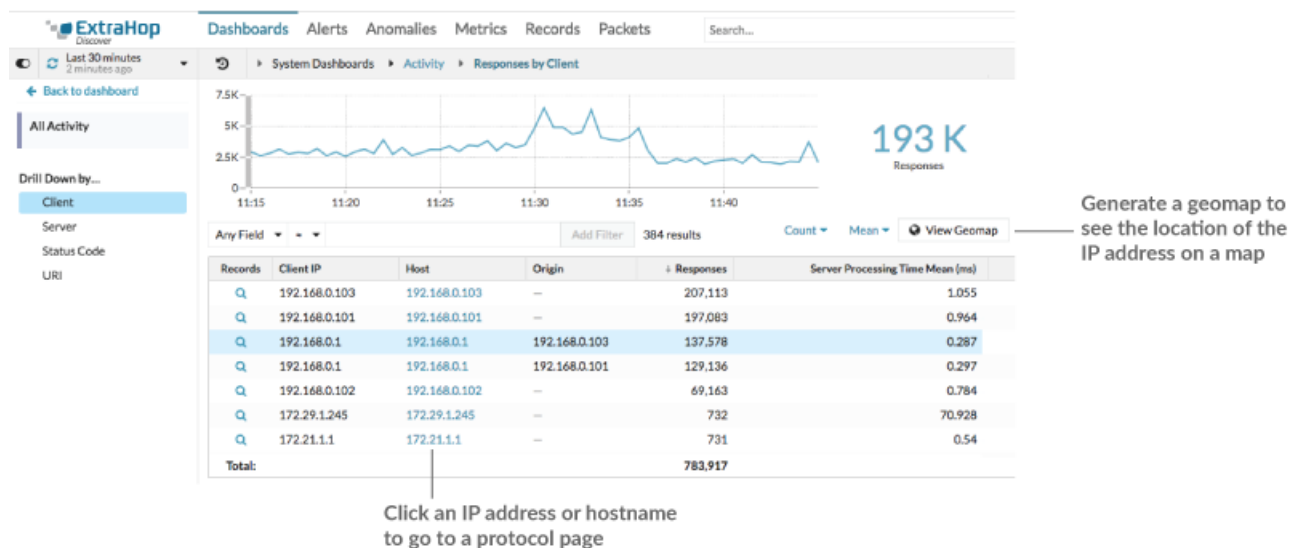
Investigate detail metrics

After you drill down on a metric from a dashboard, protocol page, detection, or alert, you can investigate metric values by key on a detail metric page. Filter metric data or select different keys, such as status codes or URIs, to view data from different perspectives.

The following figure shows you how to filter, pivot, sort, or export data on a detail metric page.



If you drilled-down on a metric by IP, Client, or Server, IP addresses and hostnames (if observed from DNS traffic) appear in the table. Additional options are now available to you. For example, you can generate a geomap or directly navigate to a client or server protocol page, as shown in the following figure.



Filter results

A detail page can contain up to 1,000 key-value pairs. There are two ways to find specific results from data: filter results or [click a key in the table to create another drill-down filter](#).

To filter results, click **Any Field**, and then select a field, which varies by key. For example, you can select **Network Locality** for Client or Server keys. Then, select one of the following operators:

- Select = to perform an exact string match.
- Select ≈ to perform an approximate string match. The ≈ operator supports regular expression.



Note: To exclude a result, enter a regular expression. For more information, see [Create regular expression filters](#).

- Select # to exclude an approximate string match from your results.
- Select > or ≥ to perform a match for values greater than (or equal to) a specified value.
- Select < or ≤ to perform a match for values less than (or equal to) a specified value.
- Click **Add filter** to save the filter settings. You can save multiple filters for one query. Saved filters are cleared if you select another key from the Details section in the left pane.

To complete the filter, enter or select a value that you want to filter results by, and then click **Add Filter**.

Investigate threat intelligence data (ExtraHop Reveal(x) Premium and Ultra only)

Click the red camera icon  to view [threat intelligence](#) details about a suspicious host, IP address, or URI found in detail metric data.

Highlight a metric value in the top chart

Select an individual row or multiple rows to change chart data in the top chart on the detail metric page. Hover over data points in the chart to view more information about each data point.

Pivot to more data by key

Click key names in the Details section to see more detail metric values, broken down by other keys. For IP address or host keys, click a device name in the table to navigate to a Device protocol page, which displays traffic and protocol activity associated with that device.

Adjust the time interval and compare data from two time intervals

By changing the time interval, you can view and compare metric data from different times in the same table. For more information, see [Compare time intervals to find the metric delta](#).



Note: The global time interval in the upper left corner of the page includes a blue refresh icon and gray text that indicates when the drill-down metrics were last polled. To reload the metrics for the specified time interval, click the refresh icon in the Global Time Selector display. For more information, see [View the latest data for a time interval](#).

Sort metric data in columns

Click the column header to sort by metrics to view which keys are associated with the largest or smallest metric values. For example, sort on processing time to see which clients experienced the longest website load times.

Change data calculation for metrics

Change the following calculations for metric values displayed in the table:


- If you have a count metric in the table, click **Count** in the Options section in the left pane and then select **Average Rate**. Learn more in the [Display a rate or count in a chart](#) topic.
- If you have a dataset metric in the table, click **Mean** in the Options section in the left pane and then select **Summary**. When you select **Summary**, you can view the mean and the standard deviation.

Export data

Right-click a metric value in the table to download a PDF, CSV, or Excel file.

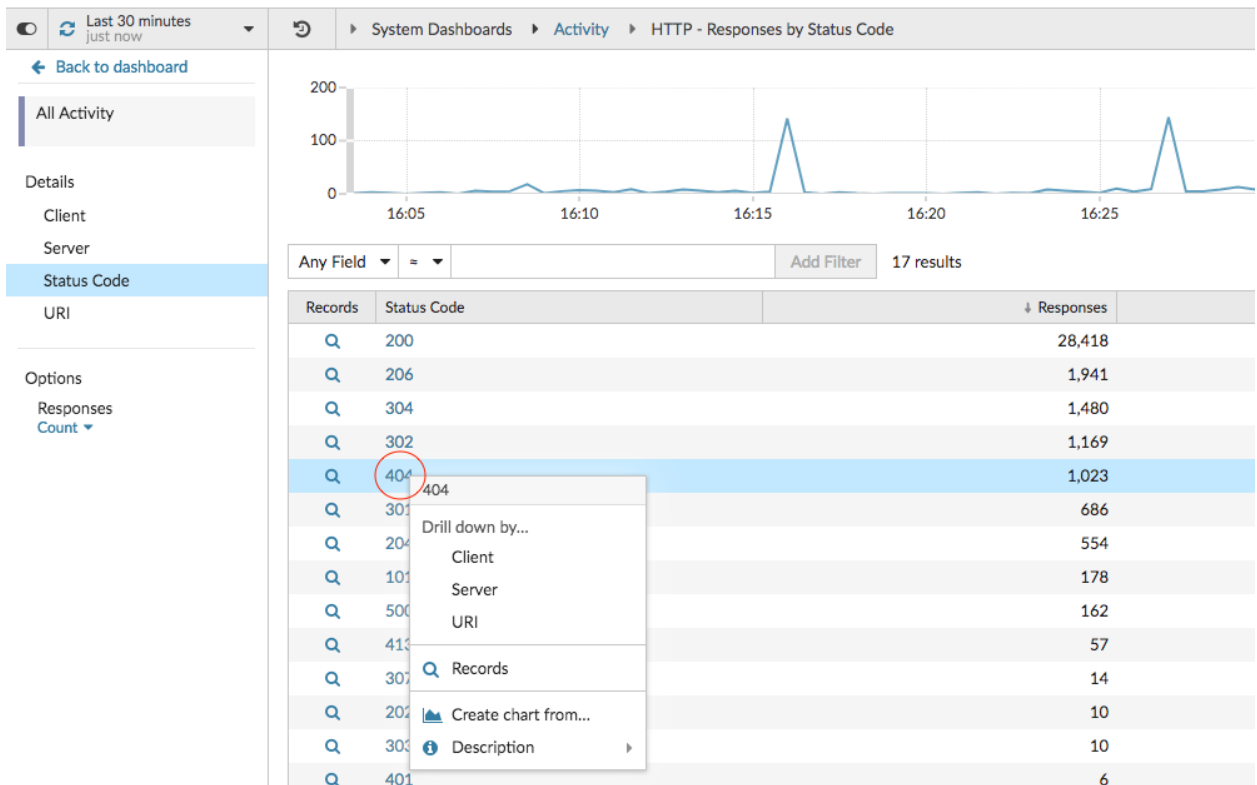
Drill-down a second time by a key filter

After you first drill down on a top-level metric by key, a detail page appears with a topset of metric values broken down by that key. You can then create a filter to drill down a second time by another key. For example, you can drill down on HTTP responses by status code, and then drill down again by the 404 status code to find more information about the servers, URIs, or clients associated with that status code.

 **Note:** The option to drill-down a second time is only available for certain topsets.

The following steps show you how to drill down from a chart and then drill down again from a detail metric page:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Navigate to a dashboard or protocol page.
3. Click a metric value or label.
4. In the Drill down by... section, select a key. A detail page appears.
5. Click a key in the table, such as a status code or method. (The key must not be an IP address or hostname.)
6. In the Drill down by... section, select a key, as shown in the following figure.



The screenshot shows the ExtraHop interface for 'HTTP - Responses by Status Code'. At the top, there's a time range of 'Last 30 minutes just now' and a breadcrumb trail: 'System Dashboards > Activity > HTTP - Responses by Status Code'. On the left, a sidebar shows navigation options like 'All Activity', 'Details' (Client, Server, Status Code, URI), and 'Options' (Responses, Count). The main area features a line chart showing response counts over time, with a peak around 16:15. Below the chart is a filter bar with 'Any Field = ' and 'Add Filter' button, showing '17 results'. A table below lists status codes and their response counts:

Records	Status Code	Responses
28,418	200	28,418
1,941	206	1,941
1,480	304	1,480
1,169	302	1,169
1,023	404	1,023
686	301	686
554	204	554
178	101	178
162	500	162
57	413	57
14	307	14
10	202	10
10	303	10
6	401	6

A context menu is open over the 404 status code row, with options: 'Drill down by...', 'Client', 'Server', 'URI', 'Records', 'Create chart from...', and 'Description'.

The key filter appears above the table. You can now view all the detail metrics associated with that single key.

7. To remove this filter from the table and then apply the filter to the top chart, click the **x** icon, as shown in the following figure.

Status Code = 404 x

Any Field =

Records	URI
	demo.example.com:8080/favicon.ico

The filter in the chart persists as you select other keys in the Details section.

Last 30 minutes 16 minutes ago

Devices web1-nyc HTTP Server Responses by URI

Back to HTTP Server

web1-nyc
IP: 172.22.1.80
MAC: 00:0C:29:94:DB:56

Details

- Client
- Content Type
- Host
- Status Code
- URI**

Options

- Responses
- Count
- Server Processing Time Mean
- Response Size Mean

Any Field = Add Filter 907 results

Records	URI	Responses	Server Processing Time Mean (ms)	Response Size Mean
	demo.example.com:8080/ecomapp/actions/Catalog.action	15,387	2.332	3,808.251
	demo.example.com:8080/ecomapp/actions/Cart.action	1,870	2.028	3,914.606
	demo.example.com:8080/ecomapp/admin/	1,450	1.868	324
	172.22.1.80:8080/index.html	242	0.517	0
	demo.example.com:8080/ecomapp/actions/Order.action	179	3.819	4,592.145
	demo.example.com:8080/ecomapp/actions/Account.action	61	2.589	5,647.6
	demo.example.com:8080/ecomapp/boomerang-beacon.html	13	0.434	14
	demo.example.com:8080/favicon.ico	5	0.676	0
	demo.example.com:8080/ecomapp/actions/Catalog.action;sessionId=31262...	2	2.564	3,255
	demo.example.com:8080/ecomapp/actions/Catalog.action;sessionId=30F68...	2	3.183	3,261
	demo.example.com:8080/ecomapp/actions/Account.action;sessionId=E5E5...	2	2.113	3,591
	demo.example.com:8080/ecomapp/actions/Cart.action;sessionId=197D459...	2	2.585	3,717
	demo.example.com:8080/ecomapp/actions/Catalog.action;sessionId=06CE0...	2	2.839	3,255
	demo.example.com:8080/ecomapp/actions/Account.action;sessionId=E1E75...	2	1.925	3,589

Add detail metrics to a chart

If you want to quickly monitor a set of detail metrics in a dashboard, without repeatedly performing the same drill-down steps, you can drill down on a metric when editing a chart in the Metric Explorer. Most charts can display up to 20 of the top detail metric values broken down by key. A key can be a client IP address, hostname, method, URI, referrer, or more. Table and list widgets can display up to 200 top detail metric values.

For example, a dashboard for monitoring web traffic might contain a chart displaying the total number of HTTP requests and responses. You can edit this chart to drill down on each metric by IP address to see the top talkers.

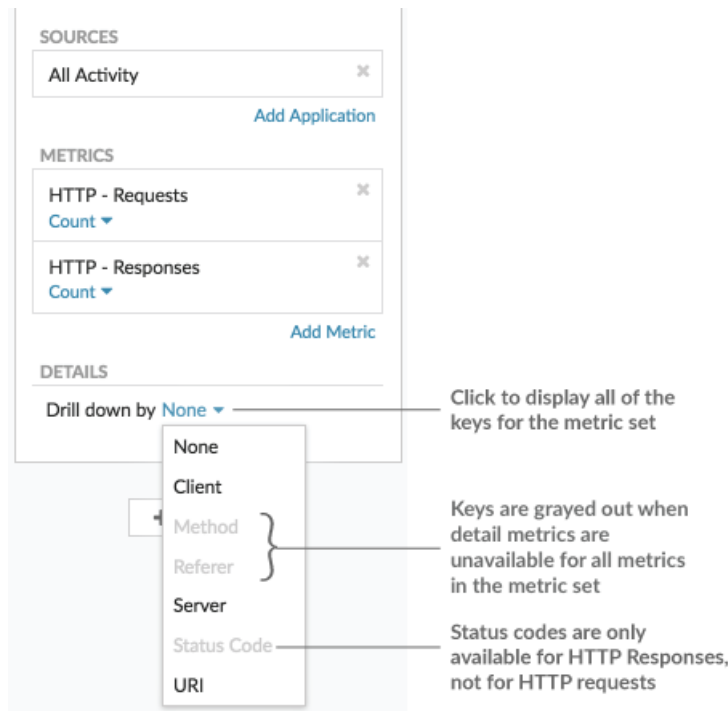
The following steps show you how to edit an existing chart and then drill down to display detail metrics:


1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Navigate to a dashboard or protocol page.
3. Click the chart title and then select **Edit**.
4. In the Details section, click **Drill down by <None>**, where *<None>* is the name of the drill-down metric key currently displayed in your chart.
5. Select a key from the drop-down list.


Note: If you have more than one source selected in your metric set, such as two devices, the sources are automatically combined into an ad hoc source group as you drill down. You cannot deselect the **Combine Sources** checkbox. To view drill-down metrics for each

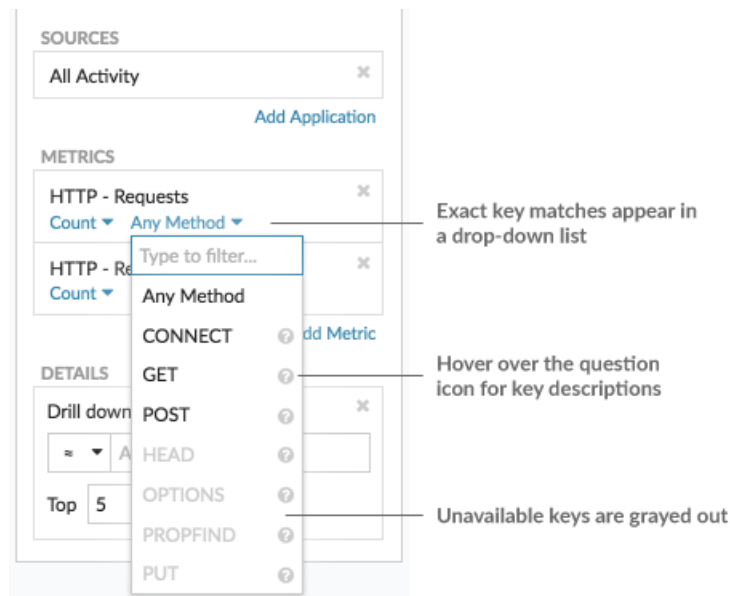
source, you must remove a source from the metric set and then click **Add Source** to create a new metric set.

If detail metric data for a common key is available for all of the metrics in a metric set, the key for the detail metric automatically appears in the drop-down list, as shown in the following figure. If a key in the list is grayed out, the detail metric associated with that key is unavailable for all of the metrics in that metric set above. For example, client, server, and URI data are available for both HTTP Requests and HTTP Responses metrics in the metric set.



6. You can filter keys with an approximate match, [regular expression \(regex\)](#), or exact match through one of the following steps:
 - In the Filter field, select the \approx operator to display keys by an approximate match or with regex. You must omit forward slashes with regex in the approximate match filter.
 -  **Note:** The # filter option to exclude results is only available on [detail pages](#). If you want to exclude results in a dashboard chart, create a [regular expression \(regex\)](#).
 - In the Filter field, select the = operator to display keys by an exact match.
7. (Optional) In the top results field, enter the number of keys that you want to display. These keys will have the highest values.
8. To remove a drill-down selection, click the **x** icon.

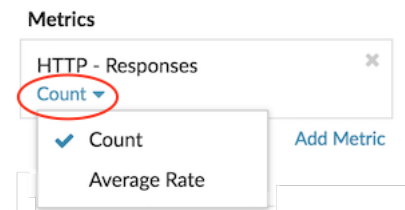
 **Note:** You can display an exact key match per metric, as shown in the following figure. Click the drill-down metric name (such as **All Methods**) to select a specific drill-down metric key (such as `GET`) from the drop-down list. If a key appears gray (such as `PROPFIND`), drill-down metric data is unavailable for that specific key. You can also type a key that is not in the drop-down list.



Display a rate or count in a chart

You can visualize errors, responses, requests, and other count metric data in a chart as a per second rate or as a total number of events over time. For high-precision Network Bytes and Network Packets metrics, you have the additional options to view the maximum, minimum, and average rate per second in a chart.

When [editing a chart in the Metric Explorer](#), you can select a count or rate by clicking the drop-down link below the metric name, as shown in the following figure.



In addition, you can select from the following options for displaying rates and counts. Note that the type of metric you select affects which rate or count is automatically displayed.

Average rate

Calculates the average metric value per second for the selected time interval. For network-related metrics, such as Response L2 Bytes or NetFlow Bytes, the average rate per second is automatically displayed.

Count

Displays the total count of events for the selected time interval. For the majority of count metrics, such as errors, requests and responses, the count is automatically displayed.

Rate summary

Calculates the maximum, minimum, and average metric value per second. For high-precision metrics, such as Network Bytes and Network Packets, these three rates are automatically displayed in the chart as a summary. You can also select to view only the maximum, minimum, or average rate in a chart. High-precision metrics are collected with a [1-second level of granularity](#) and are only available when you [configure your chart with a network or device source](#).

Display the average rate in a chart

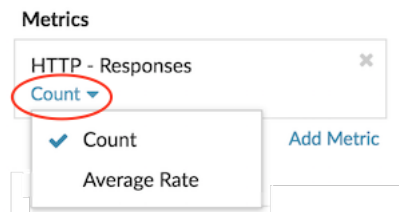
If you configured a chart with an error, response, request, or other type of count metric, then the total number of events over time is automatically displayed. You can further edit the chart to display an average rate per second for your data.

Before you begin

[Create a chart](#) and select a count metric, such as errors, requests, or responses, as your source. Save your chart to a dashboard.

The following steps show you how to add an average rate to an existing dashboard chart:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart that you want to edit.
 - b) Click the chart title and select **Edit**.
4. Click **Count** below the metric name.



5. Select **Average Rate** from the drop-down list.
The unit “/s” is applied to metric units. You can toggle back to the count at any time.
6. Click **Save** to close the Metric Explorer.




Tip: When you select more than one count metric in a chart, avoid displaying rates and counts together in the same chart. It can skew the scale of the y-axis. The y-axis will include a “/s” on tick labels only if all metrics are displaying rates.

Display the maximum rate in a chart

To display a maximum rate per second of a metric in a chart, you must configure a chart with a high-precision metric.

The following steps show you how to configure a chart that displays a maximum rate:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Complete one of the following steps:
 - To create a new chart, click the command menu  in the upper right corner of the page and then select **Create chart**.
 - To edit an existing chart, click **Dashboards** at the top of the page. From the dashboard dock, select a dashboard containing the chart that you want to edit. Click the chart title and select **Edit**.
3. Click **Add Source** and select one of the following sources:
 - A network source that is not a flow network, such as a site.
 - A device, such as a server or client.
4. Search for and select one of the following metrics:

For a network source

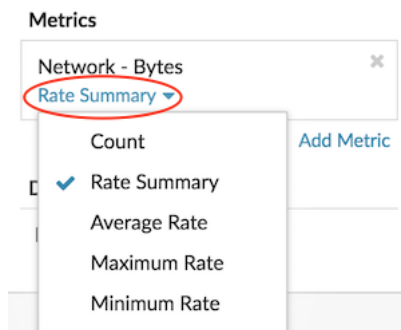
- Network Bytes (total throughput)
- Network Packets (total packets)

For a device source

- Network Bytes (combined inbound and outbound throughput by device)
 - Network Bytes In (inbound throughput by device)
 - Network Bytes Out (outbound throughput by device)
 - Network Packets (combined inbound and outbound packets by device)
 - Network Packets In (inbound packets by device)
 - Network Packets Out (outbound packets by device)
5. Select a chart type that is compatible with count metrics (includes line, value, column, bar, pie, and list charts).

The default display for a high-precision metric is a rate summary that automatically displays the maximum, average, and minimum rate.

6. Click **Rate Summary** below the metric name.



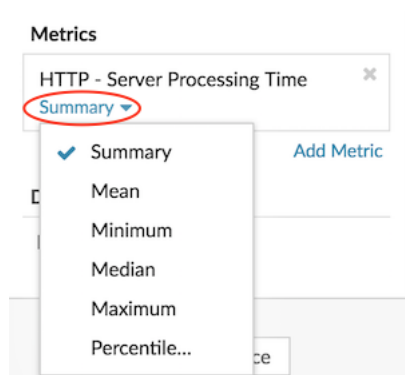
7. Select **Maximum Rate** from the drop-down menu.
8. Click **Save** to close the Metric Explorer.

Display percentiles or a mean in a chart

If you have a set of servers that are critical to your network, viewing the 95th percentile of server processing time in a chart can help you gauge how much servers are struggling. Percentiles are statistical measures that can show you how a data point compares to a total distribution over time.

You can only display percentile value and mean (average) calculations in charts that contain dataset or sampleset metrics. Dataset metrics are associated with timing and latency, such as server processing time and round trip time metrics. Sampleset metrics provide summaries of detail timing metrics, such as server processing time broken down by server, method, or URI.

When [editing a chart in the Metric Explorer](#), you can select percentiles or the mean by clicking the drop-down link below the dataset or sampleset metric name, as shown in the following figure.



The Metric Explorer provides the following calculations for displaying percentiles and the mean.

Summary

For dataset metrics, the Summary is a range that includes the 95th, 75th, 50th, 25th, and 5th percentile values.

For example, each line in a candlestick chart contains five data points. If Summary is selected, the main body of the line represents the range from the 25th percentile to the 75th percentile. The middle tick mark represents the 50th percentile (median). The upper shadow above the body line represents the 95th percentile. The lower shadow represents the 5th percentile.

For sampleset metrics, the Summary displays the +/-1 standard deviation and the mean values. In the candlestick chart, the vertical tick mark in the line represents the mean, and the upper and lower shadows represent the standard deviation values.

Mean

The calculated average of data.

Median

The 50th percentile value of a dataset metric.

Maximum

The 100th percentile value of a dataset metric.

Minimum

The 0th percentile value of a dataset metric.

Percentile

A custom range of three or five percentile values for a dataset metric.

Display a custom range of percentiles

You can display a custom range of three or five percentile values for server processing time or round trip time metrics. You cannot display custom percentiles in a pie or status chart.

The following steps show you how to add a custom percentile range to an existing dashboard chart:

Before you begin

[Create a chart](#) and select a dataset or sampleset metric, and save it to a dashboard.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart you want to edit.
 - b) Click the chart title and select **Edit**.
4. Click **Summary** below the metric name.
5. Select **Percentile...** from the drop-down list.
6. In the Set Percentiles field, type a number for each percentile value, separated by a comma. For example, to view the 10th, 30th, and 80th percentiles, type 10, 30, 80.
7. Click **Save**. Your custom range is now displayed in the chart. You can toggle between your custom range and other percentile selections, such as Summary or Maximum, at any time.
8. Click **Save** again to close the Metric Explorer.

Filter outliers in histogram or heatmap charts

Histogram and heatmap charts display a distribution of data. However, outliers can skew how the distribution displays in your chart, making it difficult to notice patterns or average values. The default filter option for these charts excludes outliers from the data range and displays the 5th-95th percentiles. You can change the filter to view the full range of data (minimums to maximums), including outliers, in your chart by completing the following procedure.

1. Click the chart title and then select **Edit** to launch the [Metric Explorer](#).

2. Click the **Options** tab.
3. From the Default filter drop-down list in the Filters section, select **Min to Max**.
4. Click **Save** to close the Metric Explorer.

Edit metric labels in a chart legend

You can change the default metric label in a chart to a custom label. For example, you can change the default label, "Network Bytes," to a custom label such as "Throughput."

Custom labels only apply to individual charts. A custom label for a metric will persist if you copy the chart to another dashboard, share a dashboard with another user, or add new metrics to your chart.

However, if you make changes to the original metric, such as updating the data calculation (from median to 95th percentile, for example) or drilling down on the metric, the custom label will automatically clear. The label clears to prevent mislabeling or potential inaccuracy of the custom label when metric data changes.

Here are some considerations about changing the label of a chart legend:

- For detail metrics, a custom label is automatically appended to all the keys displayed in the chart. However, you can change the order of the key in the label by including the variable, `$KEY`:
 - Type `$KEY errors` to display **172.21.1.1 errors**
 - Type `[$KEY] errors` to display **[172.21.1.1] errors**
- You cannot change labels in the box plot, candlestick, heatmap, table, or status charts.
- You cannot rename metric delta or dynamic baseline labels.

Before you begin

[Create a chart](#) and select a metric.


The following steps show you how to change metric labels in an existing dashboard chart:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart that you want to edit.
 - b) Click the chart title and select **Edit**.
4. In the preview pane of the Metric Explorer, click the metric label.
5. Select **Rename** from the drop-down menu.
6. In the Display custom label field, type a new label.
The label must be unique from other labels in the chart.
7. Click **Save**, and then click **Save** again to close the Metric Explorer.
The new label appears in your chart.

Add a dynamic baseline to a chart

Dynamic baselines help distinguish between normal and abnormal activity in your chart data. Baselines are only supported in the area, candlestick, column, line, and line & column charts.

The ExtraHop system calculates dynamic baselines based on historical data. To generate a new data point on a dynamic baseline, the system calculates the median value for a specified period of time.

-  **Warning:** Deleting or modifying a dynamic baseline can delete baseline data from the system. If a dynamic baseline is not referenced by any dashboards, the data will be deleted from the system to free unused system resources. You cannot recover a dynamic baseline after it is deleted.

Select a baseline type that best fits your environment. For example, if you regularly see dramatic changes from one day to another, select an hour-of-week baseline that compares activity seen on specific days of the week. If HTTP activity spikes on Saturdays, the hour-of-week baseline can help you compare the current spike in HTTP activity with the level seen on other Saturdays at the same hour. The following table describes how each type of baseline is calculated:

Baseline type	Historical data	What the baseline compares	New baseline data points added
Hour of day	10 days	Metric values from a given hour of a day. For example, every day at 2:00 PM.	Every hour
Hour of week	5 weeks	Metric values for a given hour on a specific day of the week. For example, every Wednesday at 2:00 PM.	Every hour
Short-term trend	1 hour	Metric values from each minute in one hour.	Every 30 seconds

Here are some important considerations about adding a baseline to a chart:

- Dynamic baselines calculate and store baseline data. Therefore, creating a baseline consumes system resources, and configuring too many baselines might degrade system performance.
- Deleting or modifying a dynamic baseline can delete dynamic baseline data from the system.
- Detail metrics, also referred to as topnssets, are unsupported. Sampleset, maximum rate, and minimum rate metrics are also unsupported. If any of these types of metrics are selected in your chart, you will be unable to generate a dynamic baseline for this data.
- The system can begin building a dynamic baseline only if the necessary amount of historical data is available. For example, an **Hour of day** baseline requires 10 days of historical data. If the system has only been collecting data for six days, the baseline does not begin plotting until it has four more days worth of data.
- The system does not retroactively plot a dynamic baseline for historical data. The system only plots a dynamic baseline for new data.
- If two identical dynamic baselines exist in separate dashboards, the dashboards reuse the baseline data; however, the baselines must be identical. If you select a new baseline type, the new dynamic baseline will not share data with the previous dynamic baseline.

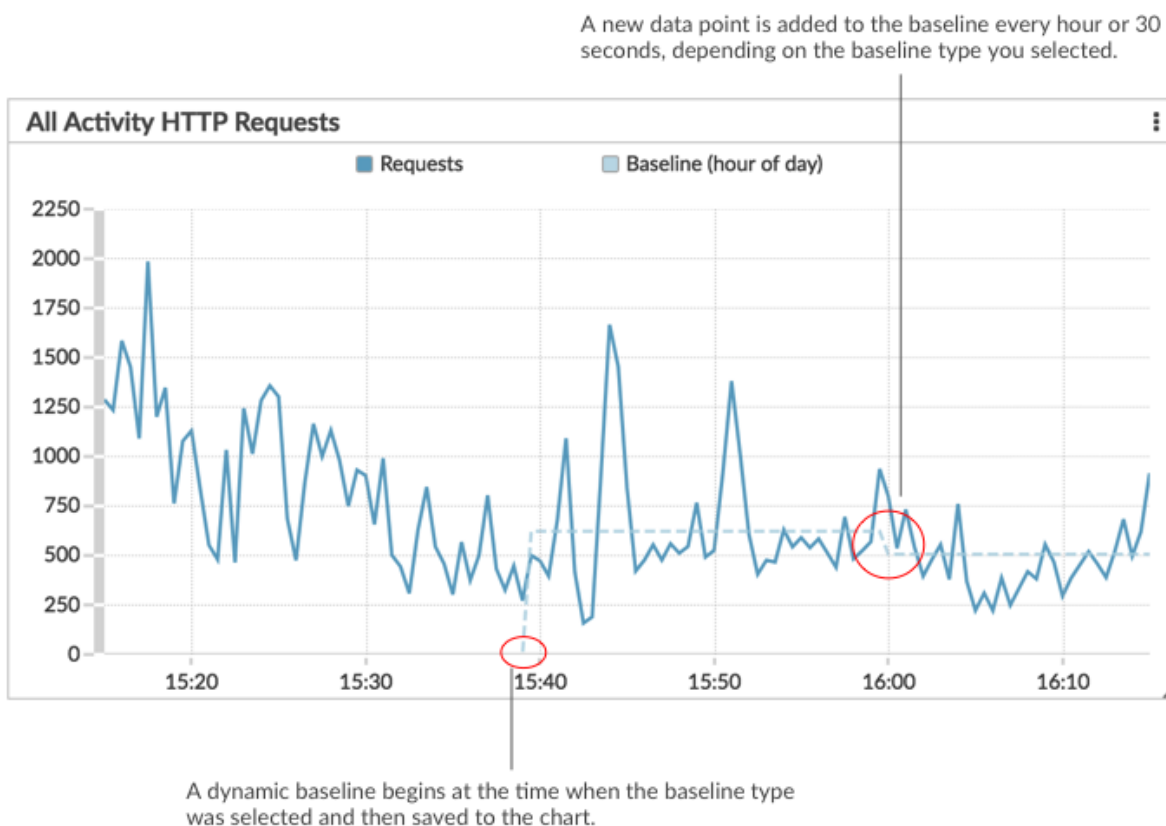
The following steps show you how to add a dynamic baseline to an existing dashboard chart:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart that you want to edit.
 - b) Click the chart title and then select **Edit**.
4. Click the **Analysis** tab.
5. In the Dynamic Baselines section, select one of the following dynamic baseline type options:

Option	Description
Hour of day	Displays the median value for a given hour of the day. This option is most useful if activity in your environment usually follows a consistent daily pattern. If you regularly see dramatically different levels of activity on different days of the week,

Option	Description
Option	this option is less useful because the baseline usually does not match the current values.
Hour of week	Displays the median value for a given hour on a specific day of the week. This option is most useful if you regularly see significantly different levels of traffic during each day of the week.
Short-term trend	Displays the median value for the last hour. This option is useful for smoothing chart data to reveal short-term trends.

- Click **Save** to close the Metric Explorer and return to the dashboard. The ExtraHop system will begin calculating the dynamic baseline. New baseline data points are added every hour or 30 seconds, as shown in the following figure.



Add a static threshold line to a chart

Displaying a static threshold line in a chart can help you determine which data points are either below or above a significant value.


For example, you can create a line chart for server processing time to help you monitor the performance of an important database in your network environment. By adding a threshold line that defines a service

level agreement (SLA) boundary of acceptable processing time, you can see when database performance is slowing down and address the issue.

You can add one or more threshold lines as you [edit a chart with the Metric Explorer](#). These lines are local to the chart and not associated with other widgets or alerts. Threshold lines are only available for area, candlestick, column, line, line & column, and status charts.

The following steps show you how to add a static threshold line to an existing dashboard chart:

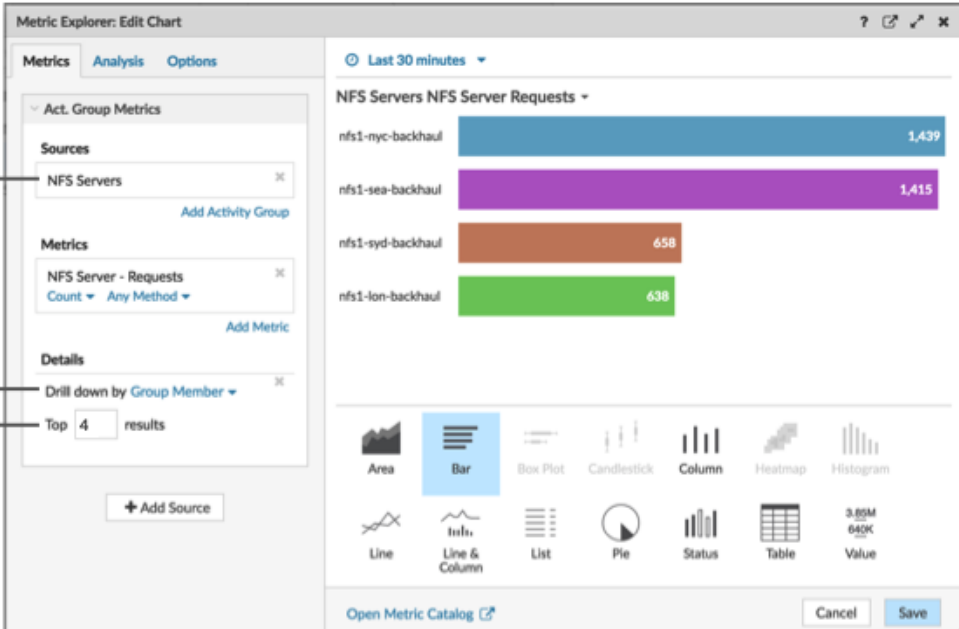
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart that you want to edit.
 - b) Click the chart title and then select **Edit**.
4. Click the **Analysis** tab.
5. In the Static Thresholds section, click **Add Threshold Line**.
6. In the Value field, type a number that indicates the threshold value for the line. This value determines where the line appears on the y-axis of your chart.



Note: For charts that display only count metrics (such as bytes, errors, and responses), the value of the threshold line automatically scales based on whether data is [displayed as a rate or count](#). When data is only displayed as a count, the threshold line value automatically scales to the roll up period (either 30 seconds, 5 minutes, 1 hour, or 1 day). The [data roll up period is determined by the time interval](#) you select.
7. In the Label field, type a name for your threshold line.
8. In the Color field, select a color (gray, red, orange, or yellow) for your threshold line.
9. Click **Save** to close the Metric Explorer.

Display device group members in a chart

If you have a chart that displays a device group, you can view metrics by top devices in the group, instead of viewing a single value for the entire device group. Drilling down by group member in the Metric Explorer lets you view up to 20 devices in the chart.



The screenshot shows the 'Metric Explorer: Edit Chart' window. On the left, there are three annotations with arrows pointing to the interface:

- Select a device group as the source, such as the NFS Servers activity group.** (Points to the 'Sources' field containing 'NFS Servers')
- Drill down by group member to see metrics by device.** (Points to the 'Drill down by Group Member' dropdown menu)
- Devices with the largest metric values are displayed. To view more devices, increase the number of results.** (Points to the 'Top 4 results' field)

The main chart area displays a bar chart titled 'NFS Servers NFS Server Requests' for the 'Last 30 minutes' interval. The chart shows the following data:

Device Group	Requests
nfs1-myc-backhaul	1,439
nfs1-sea-backhaul	1,415
nfs1-syd-backhaul	658
nfs1-lon-backhaul	638


At the bottom of the interface, there is a 'Chart Type' selector with various options: Area, Bar (selected), Box Plot, Candlestick, Column, Heatmap, Histogram, Line, Line & Column, List, Pie, Status, Table, and Value. There are also 'Open Metric Catalog', 'Cancel', and 'Save' buttons.

If you see fewer groups members in a chart than the number of results you specified, this could be because you selected a built-in device group with a small number of devices. For built-in device groups, devices are dynamically placed into a group based on the type of protocol traffic they are associated with or the role they are assigned.

Before you begin

Create a [chart](#) that contains a device group as the selected source. Save the chart to a dashboard.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Dashboards**.
3. Launch the [Metric Explorer to edit the chart](#) by completing the following steps:
 - a) From the dashboard dock, select a dashboard containing the chart that you want to edit.
 - b) Click the chart title and select **Edit**.
4. In the Details field, click **Drill down by <None>**, where *<None>* is the name of the detail metric currently displayed in your chart. Then, select **Group Member**.
5. In the top results field, enter the number of group members that you want to display. These devices will have the highest metric values. You can display up to 20 group members.
6. Click **Save** to close the Metric Explorer.

 **Note:** If you drill down by group member, you cannot perform additional drill downs to see detail metrics for each device by a key. To see detail metrics by key for a device, we recommend creating another chart with specific devices selected as the source.

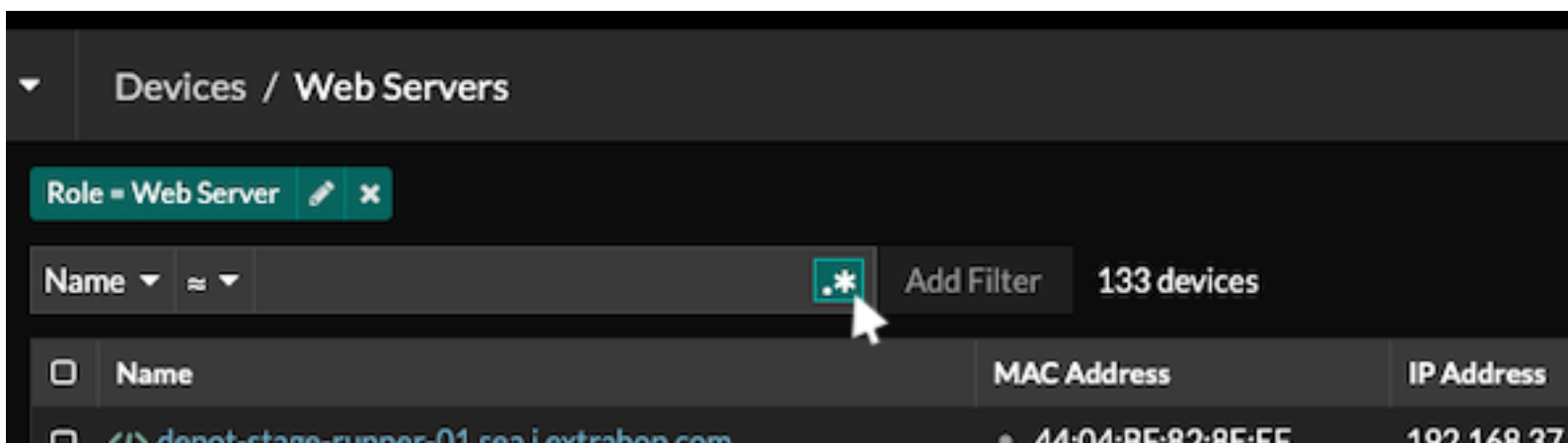
Regular expression filters

Filter your search results by writing regular expression (regex) strings in certain search fields throughout the ExtraHop system. For example, you can filter for parameters in a detail metric key, such as a number within an IP address. You can also filter by excluding specific keys or a combination of keys from charts.

Regex-capable search fields have visual indicators throughout the system and accept standard syntax.

Search fields with an asterisk

Click the asterisk to enable regex strings.

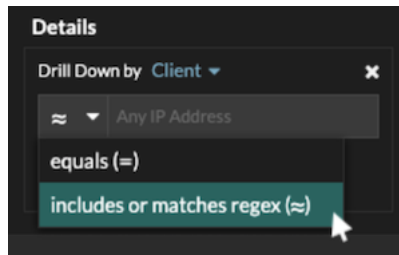


This type of field is available from the following system pages:

- Filtering a table of devices
- Creating filter criteria for a dynamic device group

Certain search fields with a trifold operator

Click the operator drop-down to select the regex option.

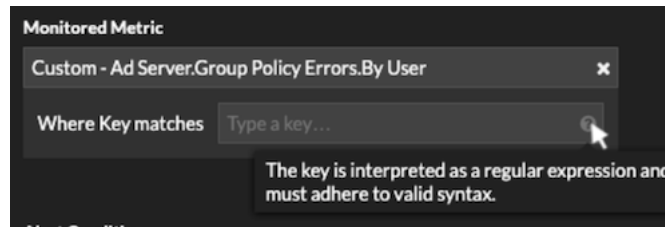


This type of field is available from the following system page:

- Editing a chart in Metric Explorer

Certain search fields with a tooltip

Hover over the tooltip in the field to see when regex is required.



This type of field is available from the following system page:

- Adding record relationships to a custom metric

The following table includes examples of standard regex syntax.

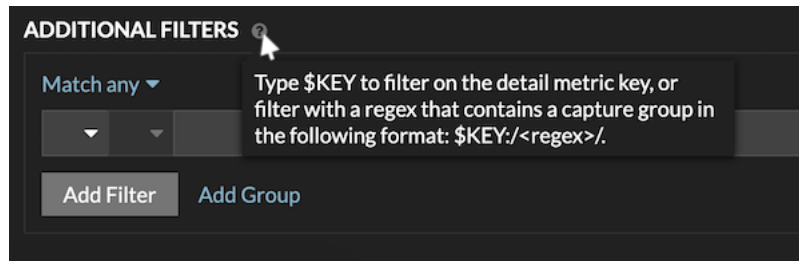
Chart Scenario	Regex filter	How it works
Compare HTTP status codes 200 to 404.	<code>(200 404)</code>	The vertical bar symbol () is the OR operator. This filter matches 200, or 404, or both status codes.
Display any HTTP status code that contains a 4.	<code>[41]</code>	Square brackets ([and]) designate a range of characters. The filter searches for every character inside the brackets, regardless of order. This filter matches any value that contains a 4 or a 1. For example, this filter can return 204, 400, 101, or 201 status codes.
Display all 500-level HTTP status codes.	<code>^[5]</code>	The caret symbol (^) outside square brackets ([and]) means "starts with." This filter matches any value that begins with a 5. For example, this filter can return 500 and 502 status codes.
Display all 400 and 500-level HTTP status codes.	<code>^[45]</code>	Multiple values inside square brackets ([and]) are searched individually, even when preceded by the caret symbol (^). This filter does not search for values that begin with 45, but matches all values that begin with a 4 or 5.

Chart Scenario	Regex filter	How it works
		For example, this filter can return 400, 403, and 500 status codes.
Display any HTTP status codes except 200-level status codes.	<code>^(?!2)</code>	A question mark (?) and exclamation point (!) inside parentheses specify a value to exclude. This filter matches all values except values beginning with a 2. For example, this filter can return 400, 500, and 302 status codes.
Display any IP address with a 187.	<code>187.</code>	Matches 1, 8, and 7 characters in the IP address. This filter will not return IP addresses that end in 187 because the trailing period designates that something must come after the values. If you want to search the period as a literal value, you must precede it with a backslash (\).
Review all IP addresses containing 187.18.	<code>187\.18.</code>	Matches 187.18 and anything that follows. The first period is treated literally because it is preceded by a backslash (\). The second period is treated as a wildcard. For example, this filter returns results for 187.18.0.0, 180.187.0.0, or 187.180.0.0/16. This filter does not return an address that ends with 187.18, because the wildcard requires that characters follow the specified values.
Display any IP address except 187.18.197.150.	<code>^(?!187\.18\.197\.150)</code>	Matches anything except 187.18.197.150, where <code>^(?!)</code> specifies the value to exclude.
Exclude a list of specific IP addresses.	<code>^(?!187\.18\.197\.15[012])</code>	Matches anything except 187.18.197.150, 187.18.197.151, and 187.18.197.152, where <code>^(?!)</code> specifies the value to exclude and the square brackets ([and]) specify multiple values.

Additional filters

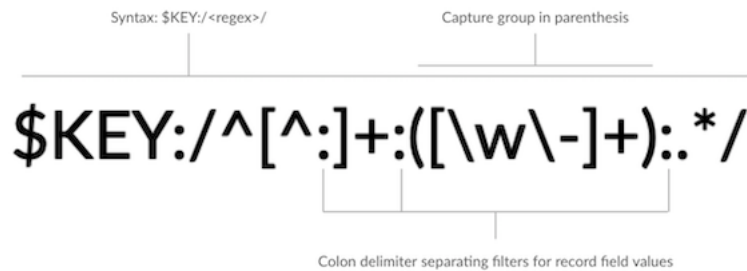
When you [create a custom detail metric](#) from the Metric Catalog, you can add advanced regex syntax to the Additional Filters search field in the Record Relationships section.

The tooltip appears after you select **Detail Metric** and is not available when **Base Metric** is selected.



The regex syntax in this field must meet the following requirements:

- If your key contains multiple values, your regex syntax must include a single capture group. A capture group is designated by parenthesis. Your capture group determines the filter value.



- If you want to return a specific value from a detail metric key that contains multiple record field values, the regex must follow this syntax:

`$KEY: /<regex> /`

For example, if your detail metric key is `ipaddr:host:cipher` and you only want to return the IP address value, you would type the following:

`$KEY: / ^ ([^ :] +) : . + /`

- If your key contains multiple record field values, the values are separated by a delimiter that is specified in the trigger that is generating the key. The placement of the delimiters in your regex syntax must match the delimiters in the detail key. For example, if you have a key with three values that are separated by a delimiter that is a colon, the three values for the key in your regex syntax must be separated by two colons.

Tip: If you want to return all record field values in a detail metric key, type `$KEY`. For example, if your detail metric key is `ipaddr:host:cipher`, type `$KEY` in the search field to return all three of those field record values (IP address, hostname, and SSL cipher suite).

Find all devices talking to external IP addresses

The following steps show you how to find all of the external IP addresses that your internal devices are talking to. You can then see if any devices are making or receiving unauthorized connections from other devices outside of your network.

Tip: By default, any device with an RFC1918 IP address (included in a 10/8, 172.16/12, or 192.168/16 CIDR block) that the ExtraHop system automatically discovers is classified as an internal device. Because some network environments include non-RFC1918 IP addresses as part of their internal network, you can [specify the locality of an IP address](#) on the Network Localities page.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Assets** at the top of the page.

The Devices page appears, which lists all the protocols with traffic in the selected time interval.

3. From Devices by Protocol Activity, click the number of TCP devices.
At the top of the page, the External Accepted and External Connected metrics display how many IP addresses outside of your internal network are actively connected to all of your network devices.
4. Click the blue metric value for either metric.
5. In the Drill Down by... section, select **Group Member**. A detail metric page appears and shows all of the names of your network devices and the number of connections to external IP addresses.
6. Click on a device name that you want to investigate. A protocol page for that device appears, which contains metrics related to the device.

Next steps

- [Search for peer devices](#)
- [Monitor a device for external IP address connections](#)

Monitor a device for external IP address connections

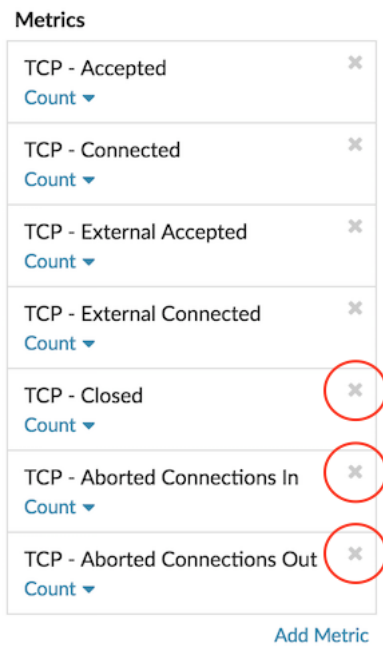
If you have an authentication server or database that should not connect to IP addresses outside of your internal network, you can create a value chart in a dashboard that tracks External Accepted and External Connected metrics. From your dashboard, you can then monitor the number of external connections for a specific device.



Tip: By default, any device with an RFC1918 IP address (included in a 10/8, 172.16/12, or 192.168/16 CIDR block) that the ExtraHop system automatically discovers is classified as an internal device. Because some network environments include non-RFC1918 IP addresses as part of their internal network, you can [specify the locality of an IP address](#) on the Network Localities page.

The following steps show you how to create a value chart for these TCP metrics and then add the chart to a dashboard.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Assets** at the top of the page.
3. Click **Devices** in the left pane.
4. [Find a device](#) and then click the device name.
5. Click **TCP** in the left pane. In the Total Connections chart in the upper left corner, the External Accepted and External Connected metrics display how many IP addresses outside of your internal network are connected to the device.
6. Click the **Total Connections** chart title.
7. From the drop-down menu, select **Create chart from....** The Metric Explorer opens with the device and TCP metrics already selected in the chart.
8. At the bottom of the Metric Explorer, click the **Value** chart.
9. In the left pane in the Metric section, click the **x** icon to delete each TCP metric that you do not want to view in the chart, as shown in the following figure.



Your dashboard now contains metrics that help you track the ratio of all accepted connections to external accepted connections, and the ratio of all initiated connections to external initiated connections.

10. (Optional) Make additional edits to the chart with the Metric Explorer.
11. Click **Add to Dashboard** and complete one of the following options:
 - Select the name of an existing dashboard from the list. The dashboard list is ordered from the most recently created dashboards (at the bottom) to the oldest dashboards (at the top).
 - Select **Create Dashboard**. In the Dashboard Properties window, type a name for the new dashboard and then click **Create**.
12. (Optional) Make additional edits to the dashboard layout.
13. Click **Exit Layout Mode**. Your dashboard is complete.

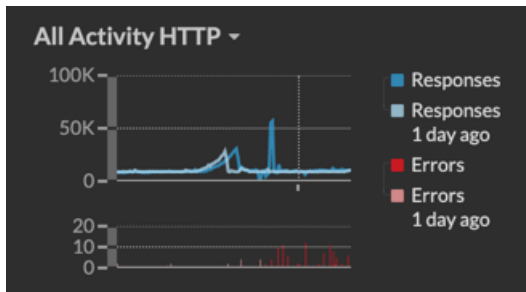
Next steps

[Share a dashboard](#)

Compare time intervals to find the metric delta

Comparing metric data between two time intervals helps you see the difference, or the delta, in metric data side-by-side in the same chart. If you create a comparison and navigate to another area of the ExtraHop system, the comparison is disabled temporarily. When you return to your original page, the comparison you saved is enabled again.

1. Find a chart with the metrics that you want to compare.
2. In the upper left hand corner of the navigation bar, click the time interval.
3. In the Time Interval tab, click **Compare**.
4. In the Previous Interval (Comparison) section, select the time interval to compare with the current time interval.
5. Click **Save**. New metric data from the comparison time interval is placed on the original chart.



6. To remove the comparison, complete the following steps:
 - a) Click the time interval.
 - b) Click **Remove Comparison**.
 - c) Click **Save**.

 **Note:** Dynamic baselines will not appear on a chart when you are comparing time intervals.

Sort metrics


On an application protocol page, if a metrics section on a protocol page contains a gear icon in the upper right corner, the metrics in that section can be sorted by key or value.

1. Navigate to a protocol page by clicking **Assets** and then select an [application](#).
2. Click the gear icon.
3. Select **Sort by Key** or **Sort by Value**.

Create a chart from a protocol page

Protocol pages contain a large amount of metrics and data. While you cannot modify the charts on protocol pages, you can create a copy of an interesting chart on a protocol page and then add the copied chart to a dashboard. Your dashboard can be then modified and shared with other team members.

1. Click **Assets** and then select a source in the left pane.
2. Find the chart that you want to copy. Click the chart title and select **Create Chart**. The Metric Explorer opens with the source and metric selected.

 **Note:** If you find a chart on an Application or Network Capture page, click **Create Chart** in the upper right corner of the page.

3. Edit the chart as needed.
4. Click **Add to Dashboard**:
 - Select **Create Dashboard** to create a dashboard, and then click **Create**.
 - Select an existing dashboard from the list, and then click **Close**.

Next steps

- [Change dashboard properties](#)
- [Share a dashboard](#)

Assets

All of the metric activity collected from the data on your network is logically grouped into sections on the Assets page, where you can navigate to find the data you need.

Devices

Devices, also known as assets and endpoints, are objects on your network with a MAC address or IP address that have been automatically discovered and classified by the ExtraHop system. Assign any device to a chart, alert, or trigger as a metric source. [Learn more about Devices.](#)

Device Groups

[Device groups](#) are user-defined sets of devices that can be collectively assigned as a metric source to a chart, alert, or trigger. You can [create a dynamic device group](#) that adds devices that matches your specified criteria or you can [create a static device group](#) and manually add or remove devices. The ExtraHop system also includes built-in dynamic device groups by role and by protocol activity that you can assign as a metric source. Click a role or protocol link from the Devices page to view metrics for a built-in device group.

Users

The Users page displays a list of all active users found on your network and the devices the user logged in to. The user name is extracted from the authentication protocol, such as LDAP or Active Directory. [Search for devices accessed by a specific user.](#)



Note: These users are not associated with user accounts for the ExtraHop system.

Applications

Applications are user-defined containers that represent distributed systems on your network. Create an application to view all of the metric activity associated with your website traffic—web transactions, DNS requests and responses, and database transactions. See the [Applications FAQ](#).

Basic applications that filter built-in metrics by protocol activity can be [created through the ExtraHop system](#). Complex applications that collect custom metrics or metrics from non-L7 traffic must be [created through a trigger](#), which requires JavaScript code. Learn more about [building Triggers](#).

Networks

Networks are sites and flow networks from which the ExtraHop system collects and analyzes data. Sites include packet sensors and flow sensors. Click an entry to see the VLANs associated with a site, or click an entry to see the interfaces associated with a flow network.

Devices

The ExtraHop system automatically discovers and classifies devices, also known as endpoints, that are actively communicating over your network, such as clients, servers, routers, load balancers, and gateways. Each device receives the highest level of analysis available, based on your system configuration.

The ExtraHop system can [discover and track devices](#) by their MAC address (L2 Discovery) or by their IP addresses (L3 Discovery). Enabling L2 Discovery offers the advantage of tracking metrics for a device even if the IP address is changed or reassigned through a DHCP request. If L3 Discovery is enabled, it is important to know that devices might not have a one-to-one correlation to the physical devices in your environment. For example, if a single physical device has multiple active network interfaces, that device is identified as multiple devices by the ExtraHop system.

After a device is discovered, the ExtraHop system begins to collect metrics based on the [analysis level](#) configured for that device. The analysis level determines the types of metrics that are generated and which features are available for organizing metric data.

Navigating devices

Click **Assets** from the top menu and then click **Devices** to display the following charts that provide insight about the active devices discovered on your network during the selected time interval:

Active Devices

Displays the total number of devices that have been discovered by the ExtraHop system. Click the number to view a list of all discovered devices. From the Active Devices list, you can [search for specific devices](#) or click a device name to view device details on the [Device Overview page](#).

New Devices

Displays the number of devices that have been discovered within the past month and the percentage rate of change. Click the number to view a list of all of these devices.

Devices by Role

Displays each device role and the number of devices assigned to each role that is active during the specified time interval. Click a device role to see a built-in Device Group Overview page that includes metric data, peer IPs, and protocol activity for that group of devices. You can also add additional filter criteria and save the group as a new dynamic device group.

Devices by Protocol Activity

Displays a list of protocol activity found on your network. Click a protocol name or device count to see a built-in Device Group Overview page with specific metric charts about that protocol activity. Click an activity map to see all device-to-device connections. You can also add additional filter criteria and save the group as a new dynamic device group.

Device Overview page

By clicking on a device name, you can view all of the information discovered about the device by the ExtraHop system on the Device Overview page. The Device Overview page is divided into three sections: a top-level summary, a properties panel, and an activity panel.

Device Summary

accounting-fileserver-01
192.168.221.21

Q Records @ Packets

- Overview
- Network
- TCP
- Server Activity
- CIFS
- NFS
- MSRPC
- Client Activity
- CIFS
- DNS
- Kerberos
- LDAP
- MSRPC

Device Activity

1.75 GB In 2.23 GB Out 3 Detections 1 Alert 5 Peer Devices

Traffic In: 150 Kb/s Bitrate In

Traffic Out: 147 Kb/s Bitrate Out

Top Protocols In

Top Protocols Out

Top Peers

IP	Host	Port	Bytes In	Bytes Out
192.168.221.102	workstation-physician-01	—	1,746,209,364	2,227,615,811
192.168.221.22	web-drupal-01	—	501,056	1,644
192.168.221.11	domain-controller-01	—	93,872	138,306
192.168.221.104	workstation-physician-03	—	41,204	45,417
192.168.221.255	192.168.221.255	138	0	4,809

Device Properties

Device summary

The device summary provides information such as the device name, the current IP address or MAC address, and the role assigned to the device. If viewing from a console, the name of the site associated with the device is also displayed.

- Click **Records** to start a [record query](#) that is filtered by this device.
- Click **Packets** to start a [packet query](#) that is filtered by this device.

Device properties

The device properties section provides the following known attributes and assignments for the device.

High Value Device

A high value icon appears if the ExtraHop system observed the device providing authentication or essential services; you can also [manually specify a device as high value](#). Risk scores are increased for detections on high value devices.

IP Addresses

A list of IP addresses observed on the device at any time during the selected time interval. If [L2 Discovery](#) is enabled, the list might display both IPv4 and IPv6 addresses that are simultaneously observed on the device, or the list might display multiple IP addresses assigned through DHCP requests at different times. A timestamp indicates when the IP address was last observed on the device. [Click an IP address](#) to view other devices where the IP address has been seen.

Associated IP Addresses

A list of IP addresses, usually outside of the network, that are associated with the device at any time during the selected time interval. For example, a VPN client on your network might be associated with an external IP address on the public internet. A timestamp indicates when the IP address was last associated with the device. [Click an associated IP address](#) to view details such as the geographic location and other devices the IP address has been associated with.

Cloud Instance Properties

The following cloud instance properties appear for the device when you configure the properties through the REST API:

- Cloud Account
- Cloud Instance Type
- Virtual Private Cloud (VPC)
- Subnet
- Cloud Instance Name (appears in the Known Alias property)
- Cloud Instance Description (instance metadata appears automatically for devices in Flow Analysis)

See [Add cloud instance properties through the ExtraHop API Explorer](#) for more information.

Users

A list of authenticated users logged into the device. [Click a user name](#) to go to the Users page and view which other devices the user is logged into.

Known Aliases

A list of alternative [device names](#) and the source program or protocol.



Note: Multiple DNS names are supported.

Hardware and Software

The hardware or vendor make and model of the device and any operating systems running on the device.

The ExtraHop system observes the network traffic on devices to automatically determine the vendor make and model, or you can [manually assign a new make and model](#).



Tip: ([CrowdStrike integration](#) on Reveal(x) 360 only) Click links from CrowdStrike devices to view device details in CrowdStrike Falcon and [initiate containment of CrowdStrike devices](#) that are participants in a security detection.

Tags

The [tags assigned to the device](#). Click a tag name to view the other devices that the tag is assigned to.

First and Last Seen

The timestamps from when the device was first discovered and when activity was last observed on the device. NEW appears if the device was discovered within the last five days

Analysis


The [level of analysis](#) that this device receives.


Here are some ways you can view and modify device properties:

- Click **View Groups** to view the [device group](#) membership for the device.
- Click **Edit Properties** to view or modify device properties such as [device role](#), device group memberships, or [device tags](#).
- Click **Edit Assignments** to view or modify which [alerts](#) and [triggers](#) are assigned to the device.

Device activity

The device activity section provides information about how the device is communicating with other devices and which detections and alerts are associated with the device.

- Click **Traffic** to view charts for protocol and peer data, and then [drill down](#) on metrics in traffic charts.
 -  **Note:** Traffic charts are not available if the device analysis level is Discovery Mode. To enable traffic charts for the device, elevate the device to [Advanced Analysis](#) or [Standard Analysis](#).
- Click **Detections** to view a list of detections, and then click a detection name to [view detection details](#).
- Click **Similar Devices** to view a list of devices with similar network traffic behavior observed by machine-learning analysis. Similar devices can help you gain insight into normal device behavior when threat hunting. This tab is only displayed if there are similar devices associated with the device.
- Click **Alerts** to view a list of alerts, and then click an alert name to [view alert details](#). This tab is only displayed if there are alerts associated with the device.
- Click **Peer Devices** to [view an activity map](#), which is a visual representation of the L4-L7 protocol activity between devices in your network. To [modify the activity map](#) with additional filters and steps, click **Open Activity Map**.

 **Tip:** You can bookmark the Device Overview page to a specific activity view by setting the `tab` URL parameter to one of the following values:

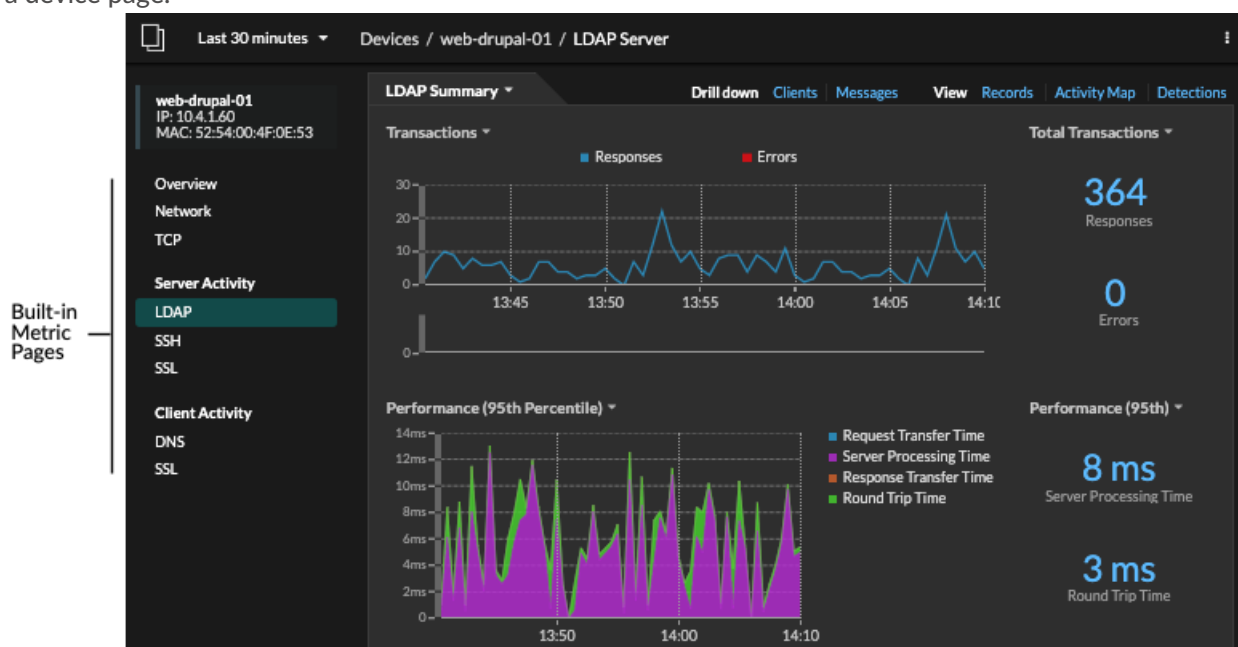
- `tab=traffic`
- `tab=detections`
- `tab=alerts`
- `tab=peers`

For example, the following URL always displays detection activity for the specified device:

```
https://example-eda/extrahop/#/metrics/devices//0026b94c03810000/overview/&tab=detections
```

Device metrics

Metrics are real-time measurements of your network traffic that the ExtraHop system calculates from network or flow data. Metrics collected from device traffic can be viewed in built-in charts and graphs from a device page.



Click a built-in metric page from the left pane to view top-level [device metrics](#) or client and server [metrics by protocol](#). Click a chart to [drill down to detail metric pages](#), which display metric values for a specific key (such as a client or server IP address).

In addition to network and TCP built-in pages, devices display built-in metric pages for associated cloud services if data is available. See the [Protocol Metrics Reference](#) for more information about what data is available on built-in device pages.

The ExtraHop system provides thousands of built-in metrics. Here are some ways you can gain further insight about your devices

- [Create a chart](#) to visualize specific metrics and save the chart to a dashboard.
- [Create an activity map](#) to view peer device relationships over specified protocols.
- [Write a trigger](#) to create [custom metrics](#) or create an [application](#) container to collect metrics for specific devices.

IP address details

Type an IP address in the global search field or click an IP address link from a Device Overview page to view details about an IP address.

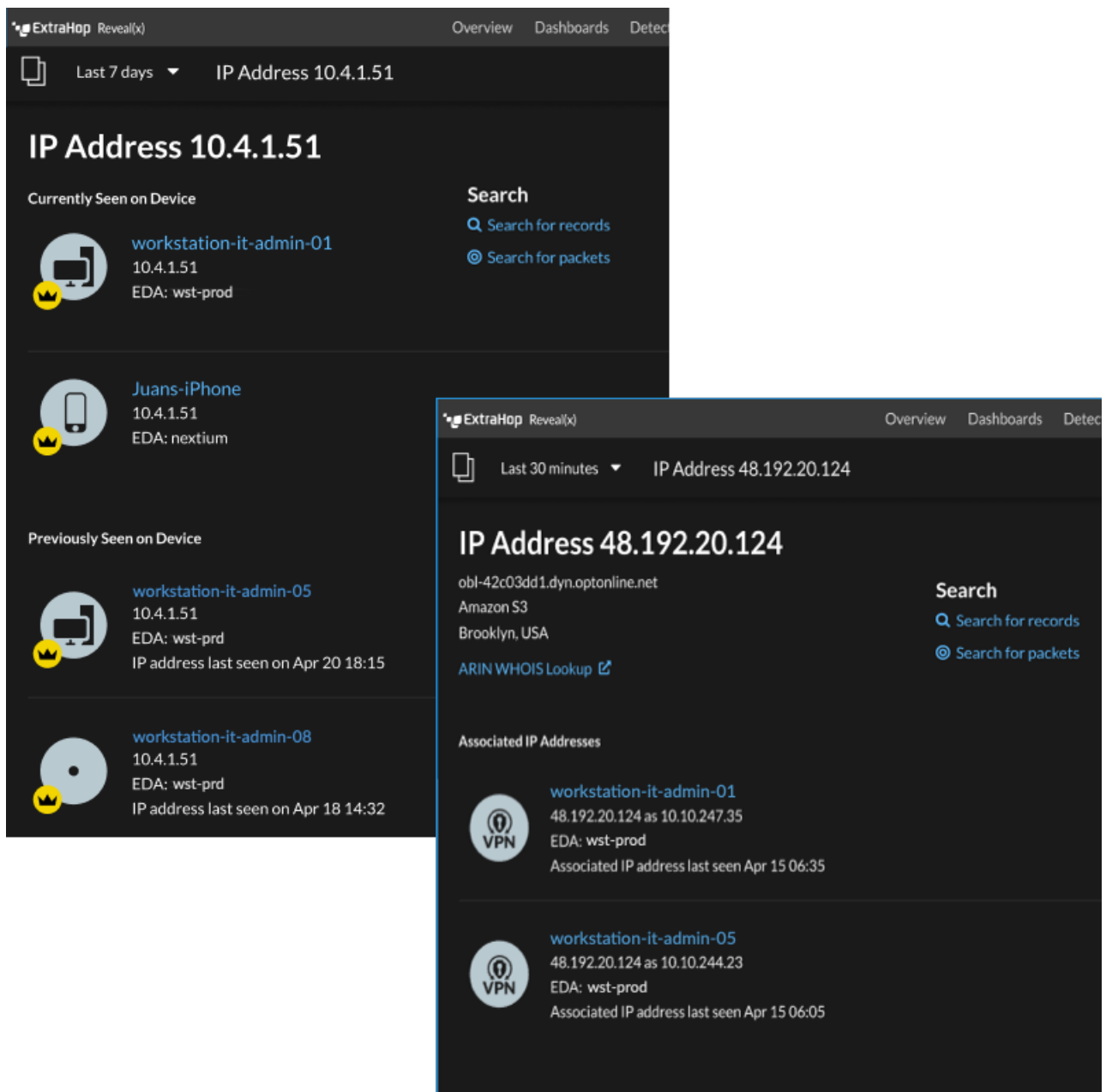
The following information appears for an IP address seen on a device:

- Each device where the IP address is currently observed, regardless of the selected time interval.
- Each device where the IP address was previously observed within the selected time interval, including the timestamp from when the IP address was last seen on the device.

If [L2 Discovery](#) is enabled, both IPv4 and IPv6 addresses might be simultaneously observed on the device, or different IP addresses might be assigned to the device by DHCP over time.

The following information appears for an IP address associated with a device:

- The geolocation of the IP address and links to the ARIN Whois website.
- Each device where the associated IP address was seen outside of the network at any time during the selected time interval. For example, a VPN client on your network might be associated with an external IP address on the public internet.
- Any cloud services associated with the IP address.
- The IP address of the device as seen by the ExtraHop system on your network.
- The timestamp when the associated IP address was last seen on the device.



Here are some ways you can view additional IP address and device information:

- Hover over a device name to view device properties.
- Click a device name to [view the Device Overview page](#).
- Click **Search for Records** to start a [record query](#) that is filtered by the IP .
- Click **Search for Packets** to start a [packet query](#) that is filtered by this device.

Grouping devices

Both custom devices and device groups are ways that you can aggregate your device metrics. Custom devices are user-created devices that collect metrics based on specified criteria, while device groups gather metrics for all of the specified devices in a group. With device groups, you can still view metrics for each individual device or group member. The metrics for a custom device are collected and displayed as if for a single device—you cannot view individual device metrics.

Both device groups and custom devices can dynamically aggregate metrics based on your specified criteria. We recommend selecting reliable criteria, such as the device IP address, MAC address, VLAN, tag, or type. While you can select devices by their name, if the DNS name is not automatically discovered, the device is not added.

	Device Groups	Custom Devices
Criteria	<ul style="list-style-type: none"> • Device names and aliases • IP address, MAC address, subnet • Source and destination port • Discovery time • Device criticality • Device role • Protocol activity • External connections • Vendor, model, software • Cloud instance properties • VLAN • Device tags 	<ul style="list-style-type: none"> • IP address • Bidirectional, inbound, or outbound traffic • Peer IP address • Source port • Destination port • VLAN
Performance cost	Comparatively low. Because device groups only combine metrics that have already been calculated, there is a relatively low effect on metric collection. However, a high number of device groups with a large number of devices and complex criteria will take more time to process.	Comparatively high. Because the metrics for custom devices are aggregated based on user-defined criteria, large numbers of custom devices, or custom devices with extremely broad criteria, require more processing. Custom devices also increase the number of system objects to which metrics are committed.
View individual device metrics	Yes	No
Best practices	Create for local devices where you want to view and compare the metrics in a single chart. Device groups can be set as a metric source.	Create for devices that are outside of your local network, or for types of traffic that you want to organize as a single source. For example, you might want to define all physical interfaces on a server as a single custom device to better view metrics for that server as a whole.

Custom devices

Custom devices enable you to collect metrics for devices that are outside of your local network or when you have a group of devices that you want to aggregate metrics for as a single device. These devices can even be different physical interfaces that are located on the same device; aggregating the metrics for these interfaces can make it easier to understand how heavily taxed your physical resources are as a whole, rather than by interface.

You might [create a custom device](#) to track individual devices outside of your local broadcast domain or to collect metrics about several known IP addresses or CIDR blocks from a remote site or cloud service. You can [collect remote site metrics for custom devices](#) to learn how remote locations consume services and to gain visibility into traffic between remote sites and a data center. See the [Protocol Metrics Reference](#) for a full list of remote site metrics and descriptions.

After you create a custom device, all of the metrics associated with the IP addresses and ports are aggregated into a single device that collects L2-L7 metrics. A single custom device counts as one device towards your licensed capacity for [Advanced Analysis](#) or [Standard Analysis](#), which enables you to [add a custom device to the watchlist](#). Any triggers or alerts are also assigned to the custom device as a single device.

While custom devices aggregate metrics based on their defined criteria, the metric calculations are not treated the same as for discovered devices. For example, you might have a trigger assigned to a custom device that commits records to a recordstore. However, the custom device is not shown as either a client or a server in any transaction records. The ExtraHop system populates those attributes with the device that corresponds to the conversation on the wire data.

Custom devices can affect the overall system performance, so you should avoid the following configurations:

- Avoid creating multiple custom devices for the same IP addresses or ports. Custom devices that are configured with overlapping criteria might degrade system performance.
- Avoid creating a custom device for a broad range of IP addresses or ports, which might degrade system performance.

If a large number of custom devices is affecting your system performance, you can [delete or disable a custom device](#). The unique Discovery ID for the custom device always remains in the system. See [Create a custom device to monitor remote office traffic](#) to familiarize yourself with custom devices.

Device groups

A device group is a user-defined collection that can help you track metrics across multiple devices that are typically grouped by shared attributes such as protocol activity.

You can [create a static device group](#) that requires you to manually add or remove a device from the group. Or, you can [create a dynamic device group](#) that includes criteria that determines which devices are automatically included in the group. For example, you can [create a dynamic device group based on the device discovery time](#) that adds devices that are discovered during a specific time interval.

By default, the Device Group page includes the following dynamic device groups that you can overwrite or delete:

New Devices (Last 24 Hours)

Includes assets and endpoints that were first seen by the ExtraHop system over the last 24 hours.

New Devices (Last 7 Days)

Includes assets and endpoints that were first seen by the ExtraHop system over the last 7 days.

The ExtraHop system also includes built-in dynamic device groups by role and by protocol. You can assign built-in device groups as a metric source for objects such as charts, alerts, triggers, and activity maps. You cannot overwrite or delete a built-in device group, but you can add filter criteria and save it as a new device group.

From the Devices page, click a device count for a role or protocol, such as Domain Controller or CIFS clients, to view the Device Group Overview page. Clicking the filter at the top of the page enables you to add additional criteria and update the page data on demand instead of requiring you to create a device group.

There is no performance impact to collecting metrics with device groups. However, we recommend that you [prioritize these groups](#) by their importance to make sure that the right devices receive the highest level of analysis.

Device groups are a good choice when you have devices that you want to collectively apply as a source. For example, you could collect and display metrics for all of your high-priority production web servers in a dashboard.

By creating a device group, you can manage all of those devices as a single metric source instead of adding them to your charts as individual sources. However, note that any assigned triggers or alerts are assigned to each group member (or individual device).

Device names and roles

After a device is discovered, the ExtraHop system tracks all of the traffic associated with the device to determine the device name and role.

Device names

The ExtraHop system discovers device names by passively monitoring naming protocols, including DNS, DHCP, NETBIOS, and Cisco Discovery Protocol (CDP).

If a name is not discovered through a naming protocol, the default name is derived from device attributes, such as MAC addresses and IP addresses. For some devices discovered on flow sensors, the ExtraHop system assigns names based on the role of the device such as Internet Gateway or Amazon DNS Server. You can also [create a custom name](#) or [set a cloud instance name](#) for a device.

A device can be identified by multiple names, which appear as Known Aliases on the Device Overview page. If a device has multiple names, the order of priority for the default display name is the custom name followed by the cloud instance name, the DHCP name, the public DNS name, and then other naming protocols. You can search by any name to [find a device](#).



Note: Custom names are not synchronized across connected ExtraHop systems. For example, a custom name created on a sensor is not available from a connected console.



If a device name does not include a hostname, the ExtraHop system has not yet observed naming protocol traffic associated with that device. The ExtraHop system does not perform DNS lookups for device names.

Device roles








Based on the type of traffic associated with the device or the device model, the ExtraHop system automatically assigns a role to the device, such as a gateway, file server, database, or load balancer. The Other role gets assigned to devices that cannot be identified.







A device can only be assigned one role at a time. You can manually [change a device role](#), or the ExtraHop system might re-assign a different role if observed traffic and behavior changes. For example, if a PC has been repurposed into a Web server, you might change the role immediately, or the change might be observed over time and the role updated by the system.

The ExtraHop system identifies the following roles:

Icon	Role	Description
	Custom Device	A user-created device that collects metrics based on specified criteria. The ExtraHop system automatically assigns this role when you create a custom device . You cannot manually assign the Custom role to a device.
	Database	A device that primarily hosts a database instance.

Icon	Role	Description
	DHCP Server	A device that primarily processes DHCP server activity.
	DNS Server	A device that primarily processes DNS server activity.
	Domain Controller	A device that acts as a domain controller for Kerberos, CIFS, and MSRPC server activity.
	File Server	A device that responds to read and write requests for files over NFS and CIFS/SMB protocols.
	Firewall	A device that monitors incoming and outgoing network traffic and blocks traffic according to security rules. The ExtraHop system does not automatically assign this role to devices.
	Gateway	A device that acts as a router or gateway. The ExtraHop system looks for devices associated with a large amount of unique IP addresses (past a certain threshold) when identifying gateways. Gateway device names include the router name such as Cisco B1B500. Unlike other L2 parent devices , you can add a gateway device to the watchlist for Advanced Analysis.
	IP Camera	A device that sends image and video data through the network. The ExtraHop system assigns this role based on the device model.

Icon	Role	Description
	Load Balancer	A device that acts as a reverse proxy for distributing traffic across multiple servers.
	Medical Device	A device designed for healthcare needs and medical environments. The ExtraHop system might assign this role if a device is a known medical make and model or if the device processes DICOM traffic.
	Mobile Device	A device that has a mobile operating system installed, such as iOS or Android.
	NAT Gateway	A device that acts as a Network Address Translation (NAT) gateway. The ExtraHop system might assign this role if a device is associated with four or more OS fingerprint families or with four or more hardware or vendor makes and models. After a device is assigned this role, device properties for software, hardware make and model, and authenticated users no longer appear for the device.
	PC	A device such as a laptop, desktop, Windows VM, or macOS device that processes DNS, HTTP, and SSL client traffic.
	Printer	A device that enables users to print text and graphics from other connected devices. The ExtraHop system assigns this role based on the device model or on traffic observed over mDNS (multicast DNS).
	VoIP Phone	A device that manages voice over IP (VoIP) phone calls.

Icon	Role	Description
	VPN Client	An internal device that communicates with a remote IP address. If VPN client discovery is enabled , the ExtraHop system automatically assigns this role to internal devices communicating with remote IP addresses through a VPN gateway. You cannot manually assign the VPN Client role to a device.
	VPN Gateway	A device that connects two or more VPN devices or networks together to bridge remote connections. The ExtraHop system assigns this role to devices with a large number of external VPN peers if automatic classification for this role is enabled in the running configuration.
	Vulnerability Scanner	A device that runs vulnerability scanner programs.
	Web Proxy Server	A device that processes HTTP requests between a device and another server.
	Web Server	A device that primarily hosts web resources and responds to HTTP requests.
	Wi-Fi Access Point	A device that creates a wireless local area network and projects a wireless network signal to a designated area. The ExtraHop system assigns this role based on the device model.

Find a device

The ExtraHop system automatically discovers devices such as clients, servers, routers, load balancers, and gateways that are actively communicating with other devices over the wire. You can search for a specific device on the system and then view traffic and protocol metrics on a protocol page.

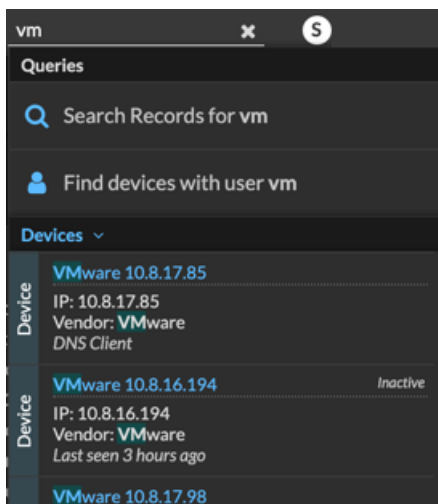
There are several ways to search for a device:

- [Find a device from a global search](#)
- [Search for a device by details](#)
- [Search for devices by protocol activity](#)
- [Search for devices accessed by a specific user](#)
- [Search for peer devices](#)

Find a device from a global search

You can search for devices from the global search field at the top of the page. Global search compares a search term to multiple device properties such as the hostname, IP address, known alias, vendor, tag, description, and device group. For example, if you search for the term `vm`, the search results might display devices that include `vm` in the device name, device vendor, or device tag.

1. Type a search term in the global search field at the top of the page.
2. Click **Any Type** and then select **Devices**.
The search results are displayed in a list below the search field. Click **More Results** to scroll through the list.



Matching devices with no activity during the specified time interval have an Inactive label.



Tip: Devices inactive for more than 90 days are excluded from global search results. However, you can immediately [exclude all devices that have been inactive for fewer than 90 days](#) through the Administration settings.

3. Click a device name to open the [Device Overview page](#) and view device properties and metrics.

Search for a device by details

You can search for devices by information observed over the wire, such as IP address, MAC address, hostname, or protocol activity. You can also search for devices by customized information such as device tags.

The trifield search filter enables you to search by multiple categories at once. For example, you can add filters for device name, IP address, and role to view results for devices that match all of the specified criteria.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets**.
3. Click **Devices** in the left pane, and then click the **Active Devices** chart.

4. In the trifield filter, click **Name** and select one of the following categories:

Option	Description
Name	Filters devices by the discovered device name. For example, a discovered device name can include the IP address or hostname.
MAC Address	Filters devices by the device MAC address.
IP Address	Filters devices by IP address in IPv4, IPv6, or CIDR block formats.
Site	Filters devices associated with a connected site. Console only.
Discovery Time	Filters devices automatically discovered by the ExtraHop system within the specified time interval. For more information, see Create a device group based on discovery time .
Analysis Level	Filters devices by analysis level, which determines what data and metrics are collected for a device. You cannot create a dynamic device group for devices filtered by analysis level.
Model	Filters devices by make and model name. The following tips can help you find the device model you want: <ul style="list-style-type: none"> • Select the exact match operator (=) to view a drop-down list of existing models and model sets. • Select the exact match operator (=) and then select Custom Models to filter all devices assigned to a custom model set.
Activity	Filters devices by protocol activity associated with the device. For example, selecting HTTP Server returns devices with HTTP server metrics, and any other device with a device role set to HTTP Server. Also filters devices that accepted or initiated an external connection, which can help you determine whether devices are engaged in suspicious activity.
Cloud Account	Filters devices by the cloud service account associated with the device.
Cloud Instance ID	Filters devices by the cloud instance ID associated with the device.
Cloud Instance Type	Filters devices by the cloud instance type associated with the device.
High Value	Filters devices that are considered high value because they provide authentication services, support essential services on your network, or are user-specified as high value.

Option	Description
Currently Active	Filters devices by activity observed on a device in the last 30 minutes.
Role	Filters devices by the assigned device role, such as gateway, firewall, load balancer, and DNS Server.
Software	Filters devices by operating system software detected on the device.
Subnet	Filters devices by the subnet associated with the device.
Tag	Filters devices by user-defined device tags.
Vendor	Filters devices by the device vendor name, as determined by the Organizationally Unique Identifier (OUI) lookup.
Virtual Private Cloud	Filters devices by the VPC associated with the device.
VLAN	Filters devices by the device VLAN tag. VLAN information is extracted from VLAN tags, if the traffic mirroring process preserves them on the mirror port. Only available if the <code>devices_accross_vlans</code> setting is set to <code>False</code> in the Running Config file.
CDP Name	Filters devices by the CDP name assigned to the device.
Cloud Instance Name	Filters devices by the cloud instance name assigned to the device.
Custom Name	Filters devices by the custom name assigned to the device.
DHCP Name	Filters devices by the DHCP name assigned to the device.
DNS Name	Filters devices by any DNS name assigned to the device.
NetBIOS Name	Filters devices by the NetBIOS name assigned to the device.


5. Select one of the following operators; the operators available are determined by the selected category:

Option	Description
=	Filters devices that are an exact match of the search field for the selected category.
≠	Filters devices that do not exactly match the search field.
≈	Filters devices that include the value of the search field for the selected category.
≈/	Filters devices that exclude the value of the search field for the selected category.

Option	Description
starts with	Filters devices that start with the value of the search field for the selected category.
exists	Filters devices that have a value for the selected category.
does not exist	Filters devices that do not have a value for the selected category.

- In the search field, type the string to be matched, or select a value from the drop-down list. The input type is based on the selected category.


For example, if you want to find devices based on Name, type the string to be matched in the search field. If you want to find devices based on Role, select from the drop-down list of roles.

 **Tip:** Depending on the selected category, you can click the Regex icon in the text field to enable matching by regular expression.



- Click **Add Filter**.
The devices list is filtered to the specified criteria.

Next steps

- Click a device name to view device properties and metrics on the [Device Overview page](#).
- Click **Create Dynamic Group** from the upper right corner to [create a dynamic device group](#) based on the filter criteria.
- Click the command menu  and then select PDF or CSV to export the device list to a file.

Search for devices by protocol activity


The Devices page displays all protocols that are actively communicating on the ExtraHop system during the selected time interval. You can quickly locate a device that is associated with a protocol, or discover a decommissioned device that is still actively communicating over a protocol.

In the following example, we show you how to search for a web server within the group of HTTP servers.

- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- At the top of the page, click **Assets**.
- From the Devices by Protocol Activity chart, click the number of HTTP servers, as shown in the following figure.

The screenshot shows the ExtraHop interface with the 'Assets' tab selected. The main content area displays a table titled 'Devices by Protocol Activity'. The table has four columns: Protocol, servers, clients, and Map. The 'HTTP' row is circled in red.

Protocol	servers	clients	Map
AAA	2 servers	7 clients	Map icon
CIFS	13 servers	77 clients	Map icon
Database	3 servers	5 clients	Map icon
DHCP	7 servers	106 clients	Map icon
DNS	26 servers	818 clients	Map icon
HTTP	110 servers	146 clients	Map icon
Kerberos	4 servers	38 clients	Map icon
LDAP	13 servers	340 clients	Map icon
MSRPC	6 servers	44 clients	Map icon

 **Note:** If you do not see the protocol you want, the ExtraHop system might not have observed that type of protocol traffic over the wire during the specified time interval, or the protocol might require a module license. For more information, see the [I don't see the protocol traffic I was expecting?](#) section in the License FAQ.

The page displays traffic and protocol metrics associated with the group of HTTP servers.

4. At the top of the page, click **Group Members**.
The page displays a table that contains all of the devices that sent HTTP responses over the wire during the selected time interval.
5. From the table, click a device name.
The page displays traffic and protocol metrics associated with that device, similar to the following image.

IP	Host	Port	Bytes In	Bytes Out	Location
192.168.221.22	web-drupal-01	-	2,328,052	205,715	-
192.168.221.11	domain-controller-01	-	28,598	25,599	-
192.168.221.104	workstation-physician-03	-	25,150	64,050	-
107.178.104.10	Cisco 954DCF	-	14,381	3,767	United States
192.168.221.101	workstation-it-admin-01	-	6,489	4,753	-
192.168.221.21	accounting-fileserver-01	-	5,034	3,808	-
192.168.221.255	192.168.221.255	138	0	687	-
192.168.221.255	192.168.221.255	137	0	234	-

Search for devices accessed by a specific user

From the Users page, you can see active users and the devices they have logged in to the ExtraHop system during the specified time interval.



Tip: You can also search for users from the global search field at the top of the page.

Protocol	Servers	Clients
AAA	2 servers	7 clients
CIFS	13 servers	77 clients
Database	3 servers	5 clients
DHCP	7 servers	106 clients
DNS	26 servers	818 clients
HTTP	110 servers	146 clients
Kerberos	4 servers	38 clients
LDAP	13 servers	340 clients
MSRPC	6 servers	44 clients

This procedure shows you how to perform a search from the Users page.

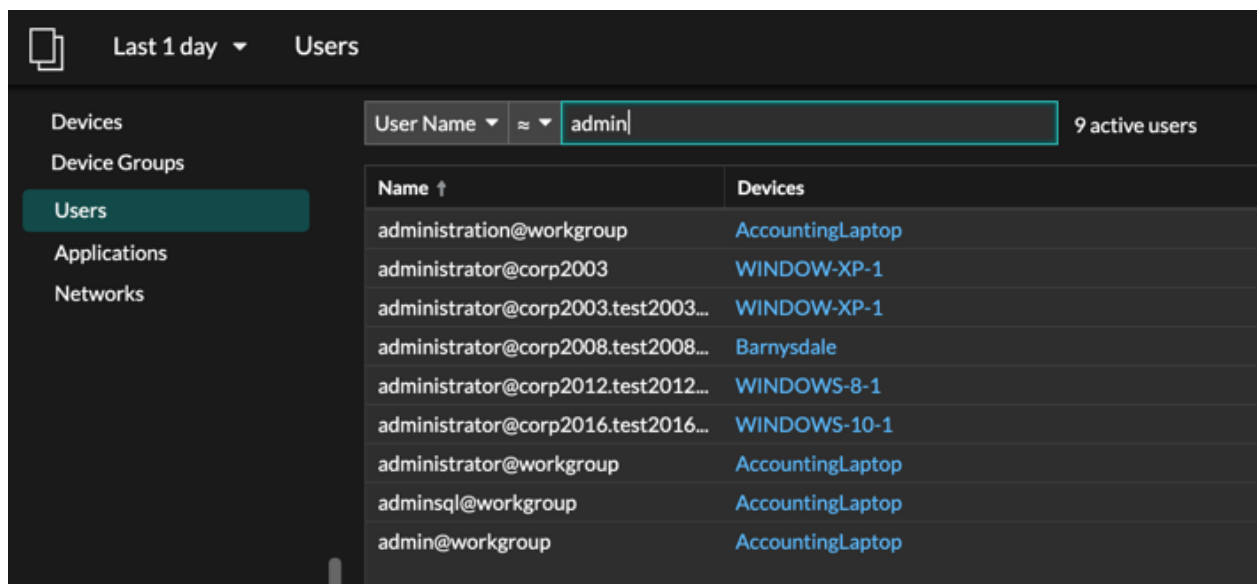
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets**.
3. Click **Users** in the left pane.
4. From the search bar, select one of the following categories from the drop-down list:

Option	Description
User Name	Search by user name to learn which devices the user has accessed. The user name is extracted from the authentication protocol, such as LDAP or Active Directory.
Protocol	Search by protocol to learn which users have accessed devices communicating over that protocol.
Device Name	Search by device name to learn which users have accessed the device.

5. Select one of the following operators from the drop-down list:

Option	Description
=	Search for a name or device that is an exact match of the text field.
≠	Search for names or devices that do not exactly match the text field.
≈ (default)	Search for a name or device that includes the value of the text field.
≈/	Search for a name or device that excludes the value of the text field.

6. In the text field, type the name of the user or device you want to match or exclude. The Users page displays a list of results similar to the following figure:



7. Click the name of a device to open the [Device Overview page](#) and view all of the users that have accessed the device during the specified time interval.

Search for peer devices

If you want to know which devices are actively talking to each other, you can drill down by Peer IPs from a device or device group protocol page.

When you [drill down](#) by Peer IP address, you can investigate a list of peer devices, view performance or throughput metrics associated with peer devices, and then click on a peer device name to view additional protocol metrics.

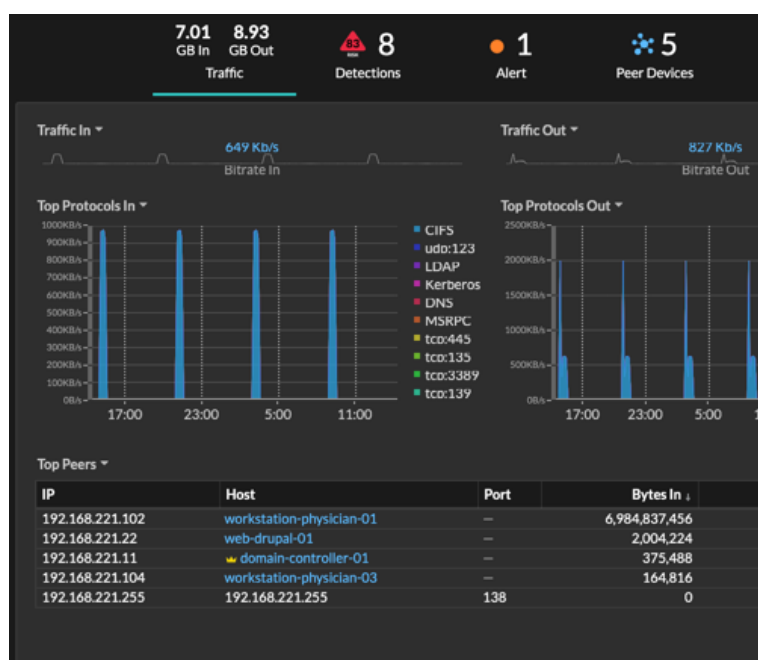
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets** and then select **Device** or **Device Group** in the left pane.
3. [Search for a device](#) or device group, and then click the name from the list of results.
4. On the Overview page for the selected device or device group, click one of the following links:

Option

For devices

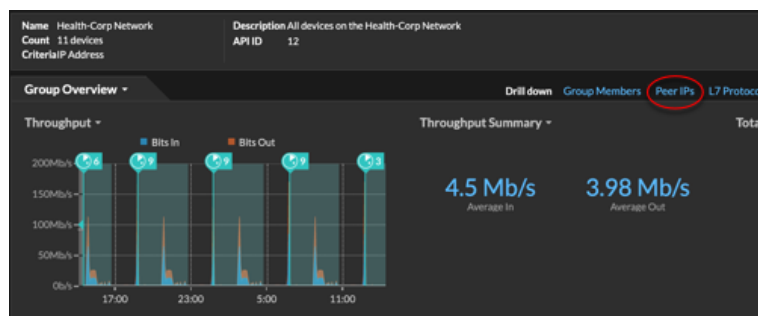
Description

Click **View More Peer IPs**, located at the bottom of the Top Peers chart.

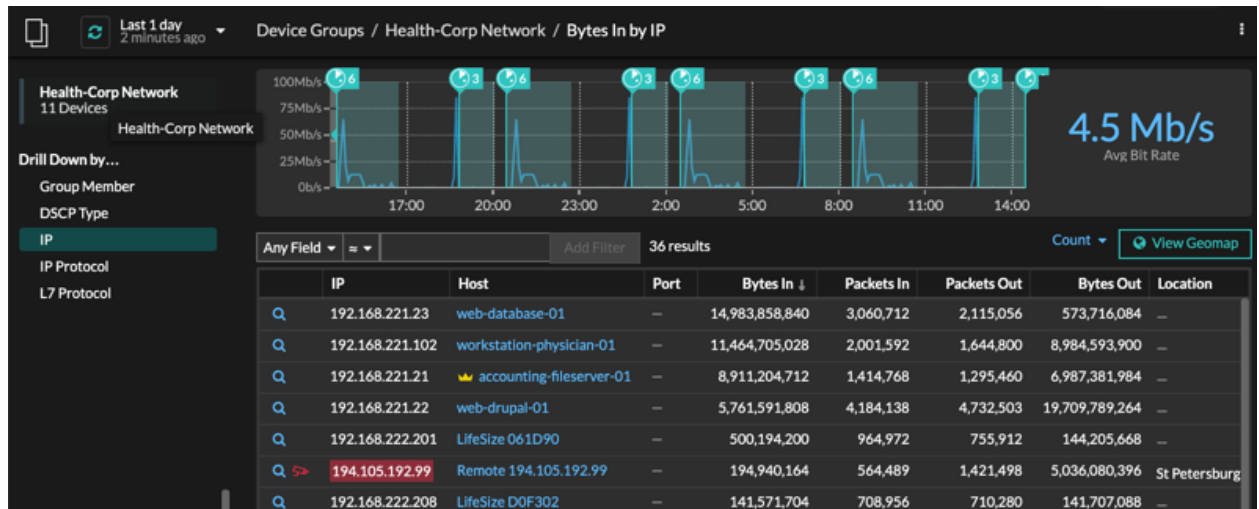


For device groups

Click **Peer IPs**, located in the Details section near the upper right corner of the page.



A list of peer devices appears, which are broken down by IP address. You can investigate network bytes and packets information for each peer device, as shown in the following figure.



View the peer device sending or receiving data from the source device. If available, click the hostname to learn about activity on that device.

View network throughput metrics for traffic associated with peer devices.

Change a device name

The ExtraHop system automatically names devices by passively monitoring naming protocol traffic (DNS, DHCP, NETBIOS, CDP). If naming protocol traffic is not observed for a device, the device name displays either the IP address or the MAC address. In either condition, you can change the automatic device name to a custom name. The custom name will appear throughout the ExtraHop system.

Here are some important considerations about changing a device name:

- Custom names are not synchronized across connected ExtraHop systems. For example, a custom name created on a sensor is not available from a connected console.
- The ExtraHop system does not perform DNS lookups for device names. The ExtraHop system derives the DNS name for a device by observing DNS traffic over wire data. For more information, see [Device discovery](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets**.
3. Click **Devices** in the left pane, and then click the **Active Devices** chart.
4. Filter the device list to find the device you want and then click the device name. The Device Overview page appears, which displays traffic and protocol activity for the selected device.
5. Click **Edit Properties**.
6. Click **Display custom name**.
7. Type a custom name in the field.
8. Click **Save**.

Change a device role

The ExtraHop system automatically discovers and classifies devices on your network based on the protocol activity or device model and assigns a role to each device, such as a gateway, file server, database, or load balancer. You can change the role assigned to a device at anytime.

Here are some important considerations about changing a device role:

- After you change the [device role](#), the device might be removed from or added to [dynamic device groups](#) that include a device role as criteria.
 - Device role changes are not synchronized across connected ExtraHop systems. For example, if you change a device role on a sensor, the role is not changed from a connected console.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. At the top of the page, click **Assets**.
 3. Click **Devices** in the left pane, and then click the **Active Devices** chart.
 4. Filter the device list to find the device you want and then click the device name. The Device Overview page appears, which displays traffic and protocol activity for the selected device.
 5. Click **Edit Properties**.
 6. In the Device Role section, click the drop-down list, and then click one of the following roles:

Role	Description
Auto	Assign the role that the ExtraHop system identified for the device, which appears in parentheses.
Database	Assign to a device that hosts a database instance.
DHCP Server	Assign to a device whose main function is processing DHCP server activity.
DNS Server	Assign to a device whose main function is processing DNS server activity.
Domain Controller	Assign to a device that acts as a domain controller for Kerberos, CIFS, and MSRPC server activity.
File Server	Assign to a device that responds to read and write requests for files over NFS and CIFS/SMB protocols.
Firewall	Assign to a device that monitors incoming and outgoing network traffic and blocks traffic according to security rules.
Gateway	Assign to a device that acts as a router or gateway.
IP Camera	Assign to a device that sends image and video data through the network, such as security cameras.
Load Balancer	Assign to a device that acts as a reverse proxy for distributing traffic across multiple servers.
Medical Device	Assign to a device that is specifically designed for healthcare needs and medical environments.
Mobile Device	Assign to a device that has a mobile operating system installed, such as iOS or Android.

Role	Description
NAT Gateway	Assign to a device that acts as a Network Address Translation (NAT) gateway. A NAT gateway is typically associated with four or more OS fingerprint families or with four or more hardware or vendor makes and models. After a device is assigned this role, device properties for software, hardware make and model, and authenticated users no longer appear for the device.
PC	Assign to a device such as a laptop, desktop, Windows VM, or macOS device.
Printer	Assign to a device that enables users to print text and graphics from other connected devices.
VoIP Phone	Assign to a device that manages voice over IP (VoIP) phone calls.
VPN Gateway	Assign to a device that connects two or more VPN devices or networks together to bridge remote connections.
Vulnerability Scanner	Assign to a device that runs vulnerability scanner programs.
Web Proxy Server	Assign to a device that processes HTTP requests between a device and another server.
Web Server	Assign to a device that hosts web resources and responds to HTTP requests.
Wi-Fi Access Point	Assign to a device that creates a wireless local area network and projects a wireless network signal to a designated area.
Other	Assign to a device when the device activity does not clearly identify a single role.

7. Click **Save**.

Change a device model

The ExtraHop system observes the network traffic on devices to automatically determine the vendor make and model, but you can manually change the device model.

Here are some important considerations about changing a device model:

- Devices are automatically added and removed from dynamic device groups with criteria based on device models.
- You can change a device model from sensors and consoles. When the device is updated on a console, the change is synchronized to connected sensors. However, the change is not synchronized from individual sensors to the connected console.

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets**.
3. Click **Devices** in the left pane, and then click the **Active Devices** chart.
4. Filter the device list to find the device you want and then click the device name.

The Device Overview page appears, which displays traffic and protocol activity for the selected device.

5. Click **Edit Properties**.

6. In the Device Model section, select one of the following options:

Option	Description
Auto	<ul style="list-style-type: none"> Select to enable the ExtraHop system to automatically determine the device make and model, which appears in parentheses.
Custom	<ol style="list-style-type: none"> Select to manually specify the device make and model. Click Specify a device make... and type the name of the make you want. The drop-down list displays matching makes. Select a make from the drop-down list or type a custom make name. Click Specify a device model... and type the name of the model you want. If you selected an existing make, the drop-down list displays matching models for that make. Select a model from the drop-down list or type a custom model name.

7. Click **Save**.

Manually identify a device as high value

While the ExtraHop system automatically identifies devices that provide authentication or essential services as high value, you can also manually identify a device as high value or not.

Here are some important considerations about identifying a device as high value:

- Risk scores are increased for detections on high value devices.
- Devices are automatically added and removed from dynamic device groups with criteria based on high value.
- You can manually identify high value devices from sensors and consoles. When the device is updated on a console, the change is synchronized to connected sensors. However, the change is not synchronized from individual sensors to the connected console.

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.

2. At the top of the page, click **Assets**.

3. Click **Devices** in the left pane, and then click the **Active Devices** chart.

4. Filter the device list to find the device you want and then click the device name.

The Device Overview page appears, which displays traffic and protocol activity for the selected device.

5. Click **Edit Properties**.


6. In the High Value section, select one of the following options:

- Select **Auto** to enable the ExtraHop system to automatically determine whether the device is high value, which appears in parentheses.
- Select **Yes** to manually identify the device as high value.
- Select **No** to manually identify that the device is not high value.


7. Click **Save**.


Create a device tag

Tags are user-defined labels that you can attach to a device. Tags can help differentiate devices on the ExtraHop system that share a common attribute or characteristic. You can then search for devices or create dynamic device groups based on the device tag.

 **Note:** You cannot rename a device tag after it is created.

 **Note:** You can also [automate this task through the REST API](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Tags**.
3. Click **Create**.
4. In the **Name** field, type a unique name for the tag.
5. (Optional) To immediately add the new tag to a device, complete the following steps:
 - a) Click **Select a device**.
 - b) Type a device name, IP address, MAC address, or hostname.
 - c) Select the device from the search results.
The device name appears in the window, indicating that the new tag will be added to this device.
6. Click **Save**.
The new tag appears in the Manage Tags window.
7. Click **Done** to close the window.

 **Tip:** You can also add a tag from a Device Overview page. [Find a device](#) and then click the device name. From the [Device Overview page](#), click **Edit Properties**, and then click **Tags**.

Next steps


- [Search for a device by tag](#)
- [Create a dynamic device group by tag](#)


Create a device group

You can create both dynamic and static device groups. Dynamic groups automatically add all devices that match specified criteria to the group, while static groups require you to manually add each device.

Create a dynamic device group

You can create dynamic device groups with complex filters, which enable you to specify multiple criteria and create nested groups of criteria.

 **Tip:** You can quickly create a dynamic device group from a filtered list of devices on the Devices page. Click **Create Dynamic Group** from the upper right corner.

You can also create a dynamic device group from a built-in device group. From the Devices page, click a role or protocol, update the filter criteria, and then click the Save  icon from the upper right corner.

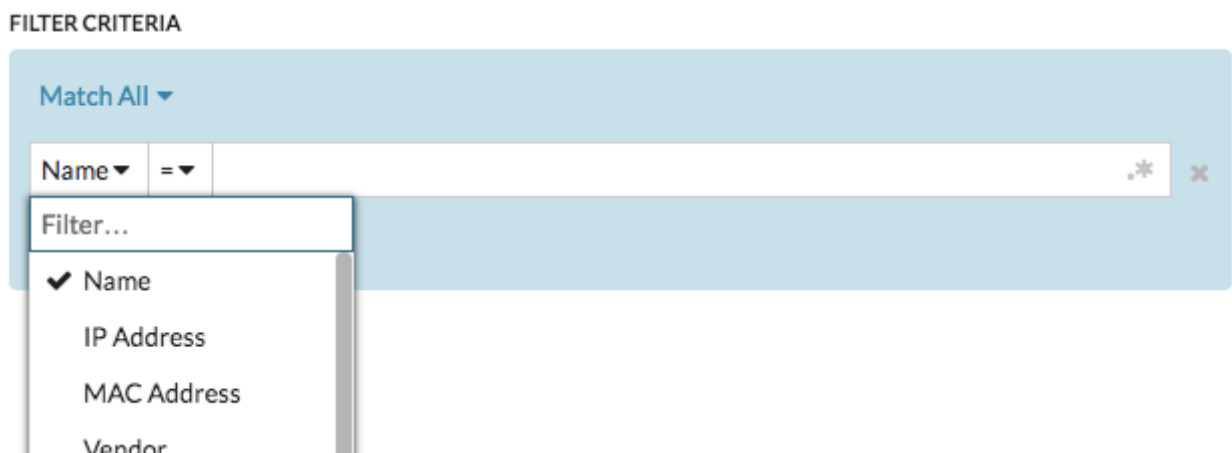
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. From the top menu, click **Assets** and then click **Device Groups** in the left pane.
3. Click **Create Device Group**.
4. In the **Group Name** field, type a descriptive name to identify the group
5. (Optional) In the **Description** field, add information about this device group.
6. In the Group Type section, click **Dynamic**.

- In the Filter Criteria section, click **Match All** and then select one of the following match operators from the drop-down list:



Option	Description
Match All	Filters only devices that match all of the specified criteria.
Match Any	Filters devices that matches any of the specified criteria.
Match None	Filters devices that do not match any of the specified criteria.

- Click **Name** and select one of the following categories from the drop-down list:



Option	Description
Name	Filters devices by the discovered device name. For example, a discovered device name can include the IP address or hostname.
MAC Address	Filters devices by the device MAC address.
IP Address	Filters devices by IP address in IPv4, IPv6, or CIDR block formats.
Site	Filters devices associated with a connected site. Console only.
Discovery Time	Filters devices automatically discovered by the ExtraHop system within the specified time interval. For more information, see Create a device group based on discovery time .
Analysis Level	Filters devices by analysis level, which determines what data and metrics are collected for a device.

Option	Description
	You cannot create a dynamic device group for devices filtered by analysis level.
Model	<p>Filters devices by make and model name. The following tips can help you find the device model you want:</p> <ul style="list-style-type: none"> • Select the exact match operator (=) to view a drop-down list of existing models and model sets. • Select the exact match operator (=) and then select Custom Models to filter all devices assigned to a custom model set.
Activity	<p>Filters devices by protocol activity associated with the device. For example, selecting HTTP Server returns devices with HTTP server metrics, and any other device with a device role set to HTTP Server.</p> <p>Also filters devices that accepted or initiated an external connection, which can help you determine whether devices are engaged in suspicious activity.</p>
Cloud Account	Filters devices by the cloud service account associated with the device.
Cloud Instance ID	Filters devices by the cloud instance ID associated with the device.
Cloud Instance Type	Filters devices by the cloud instance type associated with the device.
High Value	Filters devices that are considered high value because they provide authentication services, support essential services on your network, or are user-specified as high value.
Currently Active	Filters devices by activity observed on a device in the last 30 minutes.
Role	Filters devices by the assigned device role, such as gateway, firewall, load balancer, and DNS Server.
Software	Filters devices by operating system software detected on the device.
Subnet	Filters devices by the subnet associated with the device.
Tag	Filters devices by user-defined device tags.
Vendor	Filters devices by the device vendor name, as determined by the Organizationally Unique Identifier (OUI) lookup.
Virtual Private Cloud	Filters devices by the VPC associated with the device.

Option	Description
VLAN	Filters devices by the device VLAN tag. VLAN information is extracted from VLAN tags, if the traffic mirroring process preserves them on the mirror port. Only available if the <code>devices_accross_vlans</code> setting is set to <code>False</code> in the Running Config file.
CDP Name	Filters devices by the CDP name assigned to the device.
Cloud Instance Name	Filters devices by the cloud instance name assigned to the device.
Custom Name	Filters devices by the custom name assigned to the device.
DHCP Name	Filters devices by the DHCP name assigned to the device.
DNS Name	Filters devices by any DNS name assigned to the device.
NetBIOS Name	Filters devices by the NetBIOS name assigned to the device.

- Select one of the following operators from the drop-down list; the operators available are based on the selected category:



Option	Description
=	Filters devices that are an exact match of the search field for the selected category.
≠	Filters devices that do not exactly match the search field.
≈	Filters devices that include the value of the search field for the selected category.
≈/	Filters devices that exclude the value of the search field for the selected category.
starts with	Filters devices that start with the value of the search field for the selected category.
exists	Filters devices that have a value for the selected category.

Option	Description
does not exist	Filters devices that do not have a value for the selected category.

- In the search field, type the string to be matched, or select a value from the drop-down list. The input type is determined by the selected category.

For example, if you want to find devices based on Name, type the string to be matched in the search field. If you want to find devices based on Role, select from the drop-down list of roles.

FILTER CRITERIA

The screenshot shows a filter criteria panel with a 'Match All' dropdown. Below it is a search field with 'Name' selected, a search operator '≈', and the text 'accounting-'. A small icon with a star and asterisk is visible on the right side of the search field. Below the search field are two buttons: 'Add Filter' and 'Add Filter Group'.

FILTER CRITERIA

The screenshot shows a filter criteria panel with a 'Match All' dropdown. Below it is a search field with 'Role' selected, a search operator '=', and a dropdown menu showing 'Select an item...'. A dropdown menu is open below the search field, listing 'Filter...', 'Database', 'DHCP Server', and 'DNS Server'. Below the search field is an 'Add Filter' button.

Tip: Depending on the selected category, you can click the Regex icon in the text field to enable matching by regular expression.

FILTER CRITERIA

The screenshot shows a filter criteria panel with a 'Match All' dropdown. Below it is a search field with 'Name' selected, a search operator '=', and an empty text field. A small icon with a star and asterisk is visible on the right side of the search field. Below the search field are two buttons: 'Add Filter' and 'Add Filter Group'. A tooltip with the text 'Type regular expression' is pointing to the regex icon.

- (Optional) Click **Add Filter** to add more filter criteria.
- (Optional) Click **Add Filter Group** to add filter criteria to the results of the original filter.
For example, if you filter for devices names that start with "acct", you can add a new group of criteria that filters for a certain role or tag within the group of devices that start with "acct".
- Click **Save**.

You can change the criteria by clicking the group you want to modify from the Device Groups page, and then clicking **Properties**.

Create a static device group

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Assets** and then click **Device Groups**.
3. Click **Create Device Group**.
4. In the **Name** field, type a name for the new group.
5. In the Group Type section, select **Static**.
6. (Optional) In the **Description** field, add information about this device group.
7. Click **Save**.
Your device group is now created.
8. Add devices to your group.
 - a) Click **Devices** in the left pane.
 - b) [Find a device](#) and then select the checkbox next to the devices you want to add to your group.
 - c) At the top of the device table, click **Assign to Group**.
 - d) Select a device group from the Group drop-down list.
 - e) Click **Add to Group**.

Next steps

Remove devices from a group by selecting the checkbox next to the device name and clicking **Remove from Group** in the upper right corner.

Create a custom device


Collect metrics for a segment of traffic across multiple IP addresses and ports by creating a custom device. Custom devices are useful for monitoring traffic outside of your local broadcast domain, such as branch offices, stores, or clinics.

Here are some important considerations about custom devices:

- Custom devices only appear in the ExtraHop system after traffic that matches your specified criteria is observed.
- Avoid creating multiple custom devices for the same IP addresses or ports. Custom devices that are configured with overlapping criteria might degrade system performance.
- Avoid creating a custom device for a broad range of IP addresses or ports, which might degrade system performance.
- A single custom device counts as one device towards your licensed capacity for Advanced Analysis and Standard Analysis.
- You can also [automate this task through the REST API](#).

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Custom Devices**.
3. Click **Create**.
4. In the Name field, type a unique name for the custom device.
5. In the Discovery ID field, type a unique identifier.
If this field is left blank, a Discovery ID is generated from the custom device name. The Discovery ID cannot contain spaces and cannot be changed after the custom device is saved.
6. From the **Sensor** drop-down list, select the sensor that you want to associate with the custom device. (Consoles only.)
7. Select the **Enable custom device** checkbox to enable or disable the custom device.
8. (Optional) In the Description field, add information about the custom device.

9. Click **Add Criteria** to specify an IP address, port range, or VLAN range as match criteria for the custom device.

You can specify a single option, such as an IP address, or specify a combination of criteria options; you do not need to complete each field.

- a) In the IP Address field, type an IP address or a CIDR notation. If you specify an IP address, you can also specify the direction of traffic and a peer IP address.
 - (Optional): From the **Traffic Direction** drop-down list, select **Outbound from IP Address** or **Inbound from IP address** as a match criterion. These options enable you to create a custom device that collects metrics only from traffic sent to or sent from this IP address. The default selection is Bidirectional.
 - (Optional): In the Peer IP Address field, specify an IP address or CIDR notation that communicates with the address specified in the **IP Address** field. This option enables you to create a custom device that collects metrics only from traffic between specific source and destination IP addresses.



Note: If you specify a peer IP address, you cannot select **Bidirectional** for the traffic direction.

- b) In the Destination Port Range fields, type a minimum and a maximum destination port number. If no range is specified, all ports are considered match criteria.
10. (Optional) Click **Show Advanced Options** to configure a source port or VLAN range.
 - a) In the Source Port Range fields, type a minimum and a maximum source port number. If no range is specified, all ports are considered match criteria.
 - b) In the VLAN Range fields, type a minimum and a maximum VLAN ID.
 11. (Optional) Click **Add Criteria** to configure additional IP addresses, port ranges, or VLAN ranges.
 12. Click **Save**.



Tip: Click **Save All Changes** to save all custom devices that have unsaved configuration changes.

Next steps


- [Configure remote sites for custom devices](#)
- [Find a device](#)
- [Add a custom device to the watchlist](#)
- [Add a tag to a custom device](#)
- [Delete or disable a custom device](#)

Delete or disable a custom device

Custom devices are manually created on an ExtraHop system to collect metrics for traffic observed across multiple IP addresses and ports. If a large number of custom devices is affecting your system performance, you can delete or disable a custom device.

Before you begin

Full privileges or higher are required to [create](#) or delete a custom device.

- When you delete or disable a custom device, the device becomes inactive, which means that the system stops collecting metrics for that device.
 - When you delete or disable a custom device, the device continues to appear as an asset until all metrics collected for that device are overwritten in the local [datastore](#).
 - When you delete a custom device, the unique Discovery ID for the custom device always remains in the system and cannot be applied to a new custom device.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. Click the System Settings icon  and then click **Custom Devices**.

3. (Optional) From the filter text box, search for the custom device.
The filter text box supports substring matching by custom device name, description, status, sensor, and Discovery ID.
4. From the table, select the custom device that you want, and then complete one of the following steps:
 - From the configuration options, clear the **Custom Device Enabled** checkbox. The selected device becomes inactive and is removed from the full analysis device count. You can re-enable the custom device anytime, and you can still access custom device metrics from previous time intervals until they are overwritten in the local [datastore](#).
 - From the top of the page, click **Delete Device**, and then click **Delete Custom Device** from the confirmation window. The selected custom device is permanently removed from the ExtraHop system and cannot be restored.

Configure remote sites for custom devices

Custom devices are useful for monitoring traffic outside of your local broadcast domain, such as branch offices, stores, or clinics. You can collect remote site metrics about custom devices to easily learn how remote locations consume services and to gain visibility into traffic between remote sites and a data center.


For example, build a dashboard and add a custom device as the metric source to see remote site metrics such as inbound and outbound throughput, retransmission timeouts, round trip times, and zero windows. See the [Protocol Metrics Reference](#) for a full list of remote site metrics and descriptions.

Here are some important considerations about remote sites for custom devices:

- Remote site configuration applies to all enabled custom devices; you cannot configure remote sites for an individual custom device.
- Remote site metrics are only displayed in the Metric Catalog and the Metric Explorer if remote site metric collection is enabled.


Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Custom Devices**.
3. Click **Configure Remote Sites**.
4. Select or clear the **Collect remote site metrics** checkbox.
5. Click **Save**.

Classify IP addresses and trusted domains

By providing details about your network specifications, you can improve the metrics and detections generated by your ExtraHop system. The Network Locality page enables you to classify the locality of IP addresses and add trusted domains that your devices regularly connect to.

 **Note:** Network Locality settings must be configured on all sensors and consoles. For ExtraHop Reveal(x) 360, these settings are synchronized across all connected sensors; do not configure these settings on individual sensors.

Before you begin

You must have full write [privileges](#) to change these settings.

Specify the locality for IP addresses

By adding a CIDR block to the Network Localities page, you can classify traffic from these IP addresses as internal or external to your network.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.

2. Click the System Settings icon and then click **Network Localities**.
3. Click **Add a CIDR Block**.
4. In the Network field, type a single IP address or CIDR block. You must enter a unique range of IP addresses.
5. Select **Internal** or **External**, based on which classification you want to apply to the CIDR block.
6. (Optional) In the Description field, type information about why you are configuring the locality of this CIDR block.
7. Click **Save**.
8. To add more entries, click **Add CIDR**.

Next steps

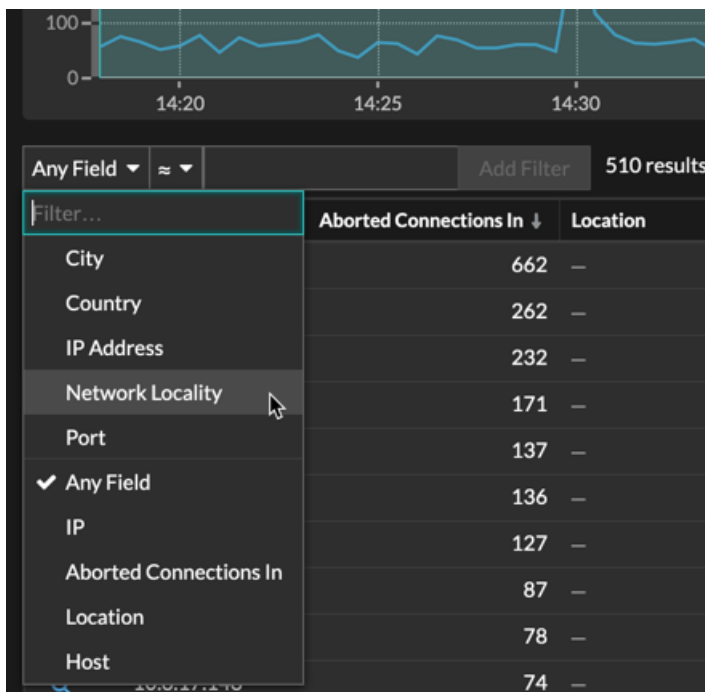
Verify that the ExtraHop system no longer classifies an IP address as an external or internal by completing the following steps:

1. Click **Assets** at the top of the page. The Devices page appears, which lists all the protocols with traffic in the selected time interval.
2. From Devices by Protocol Activity, click the device count for TCP. A protocol page appears that displays metrics for every device on your network with TCP activity.
3. In the TCP Connections section, look for changes in the number of External Accepted and External Connected metrics. For example, if you classified a large CIDR block for a remote office as **Internal**, then the number of external connections should be lower.

Filter IP addresses by locality

You can filter detail metric data by internal or external IP addresses.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. **Drill down** on a metric from a dashboard or protocol page by client, server, or IP address. A detail metric page appears that displays metric data listed by IP address.
3. In the trifield filter, click **Any Field** and then click **Network Locality**, as shown in the following figure.




4. Click **All Locations** and then select **Internal** or **External**.
5. Click **Add Filter**.

Detail metric data for internal or external devices is displayed.

Analysis priorities

The ExtraHop system analyzes traffic and collects data from all discovered devices on a single sensor. Each discovered device receives an analysis level that determines what data and metrics are collected for a device. Analysis priorities determine which analysis level a device receives.

 **Important:** Analysis priorities can be [centrally managed](#) from a console.

Prioritizing devices and groups

The ExtraHop system can analyze hundreds of thousands of devices and automatically determine which analysis level each device receives, but you can control which devices are prioritized for Advanced and Standard Analysis.

Most devices can be added to a watchlist to ensure Advanced Analysis or you can add device groups to an ordered list to prioritize them for Advanced Analysis and Standard Analysis.

Here are some important considerations about prioritizing devices through the watchlist:

- Devices remain on the watchlist even when they are inactive, but metrics are not collected for inactive devices.
- The number of devices in the watchlist cannot exceed your Advanced Analysis capacity.
- Devices can only be added to the watchlist from a device properties page or the device list page. You cannot add devices to the watchlist from the Analysis Priorities page.
- If you want to add several devices to the watchlist, we recommend that you [create a device group](#) and then [prioritize that group for Advanced Analysis](#).
- Devices receiving L2 Parent Analysis or Flow Analysis cannot be added to the watchlist.

Here are some important considerations about prioritizing devices groups:

- Order device groups from the highest to lowest priority in the list.
- Click-and-drag groups to change their order in the list.
- Make sure that each device in the group is active; groups that contain a large number of devices take up capacity and inactive devices do not generate metrics.

By default, the ExtraHop system automatically fills Advanced and Standard Analysis levels to maximum capacity. Here are some important considerations about capacity levels and the automatic fill option:

- Devices prioritized in the watchlist or through a prioritized group fill the higher analysis levels first, and then by the earliest-discovered devices.
- Devices are prioritized for Advanced Analysis if the device is associated with certain detections, if the device has accepted or initiated an external connection, or if the device is running common attack tools.
- Device properties such as the role, hardware and software, protocol activity, detection history, and high value can also determine analysis levels.
- The Automatically Fill option is enabled by default. If disabled, all devices that are not in prioritized groups or in the watchlist are removed and the ExtraHop system sets the priority for each device.
- Your ExtraHop subscription and license determine maximum capacity levels.

See the [Analysis Priorities FAQ](#) to learn about analysis level capacities.

Compare analysis levels

Analysis Level	Features	How to Receive this Level
Discovery Mode	<ul style="list-style-type: none"> • Detections • Observed protocols • IP addresses • Authenticated users • Software • Hardware make and model 	Devices automatically receive Discovery Mode if not in Standard, Advanced, or L2 Parent Analysis.
Standard Analysis	<ul style="list-style-type: none"> • L2-L3 metrics • Activity maps • Detections • Observed protocols • IP addresses • Authenticated users • Software • Hardware make and model 	Prioritize device groups for Standard Analysis.
Advanced Analysis	<ul style="list-style-type: none"> • L2-L7 metrics • Custom metrics • Activity maps • Detections • Observed protocols • IP addresses • Authenticated users • Software • Hardware make and model 	Prioritize device groups for Advanced Analysis or add individual devices to the watchlist.
L2 Parent Analysis (Only applicable if L3 Discovery is enabled)	<ul style="list-style-type: none"> • L2-L3 metrics • Activity maps 	L2 parent devices automatically receive L2 Parent Analysis, except for gateways and routers.
Flow Analysis	<ul style="list-style-type: none"> • L2-L3 metrics • Activity Maps • Observed protocols • IP Address • Cloud instance properties • Limited detection types 	Devices automatically receive Flow Analysis if discovered on a flow sensor.

Transfer management of analysis priorities


By default, each packet sensor manages its own analysis priorities, which determine which devices receive Advanced Analysis or Standard Analysis. If your sensor is connected to a console, you can transfer priority management to that console for a centralized view of these settings.

Here are some important considerations about transferring management:

- You must have full write privileges to edit analysis priorities.

- After management is transferred to a console, any further changes you make on individual sensors are inactive. See which other [settings are also transferred](#).
- Analysis Priorities settings are not available for flow sensors; management cannot be transferred.

The following steps show you how to transfer priority management to a console:

1. Log in to the ExtraHop system.
Repeat these steps on each sensor in your environment.
2. Click the System Settings icon  and then click **Analysis Priorities**.
3. At the top of the page, click the Console drop-down list and select the console that you want to transfer management to.
4. Click **Transfer**.





Tip: To avoid analysis disruptions, you can save a draft of the analysis priorities settings for each sensor before transferring management to a console.

Prioritize groups for Advanced Analysis

You can specify device groups for Advanced Analysis based on their importance to your network. Groups are ranked in an ordered list.

Here are some important considerations about [Advanced Analysis](#):

- Devices on the [watchlist](#) are guaranteed Advanced Analysis and are prioritized over device groups.
 - Devices within a device group that are inactive do not affect Advanced Analysis capacity.
 - Custom metrics are only available for devices in Advanced Analysis. If you want to see custom metrics for a specific device, prioritize a group that contains the device or add the device to the watchlist.
 - You must have full write privileges to edit analysis priorities.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
(These steps must be completed on the console or sensor that is [managing these shared settings](#).)
 2. Go to the settings for Standard Priorities.
 - On a console, click the System Settings icon  and then click **Analysis Priorities**. Then, click **Edit Priorities** next to the sensor you want to modify.
 - On a sensor, click the System Settings icon  and then click **Analysis Priorities**.
 3. Prioritize groups by completing the following steps:
 - a) In the For Advanced Analysis section, click **adding a group** to add the initial group or **Add Group** to add additional groups.

For Advanced Analysis

Prioritize devices to receive Advanced Analysis by [adding a group](#).


For Advanced Analysis

☰ GROUP ✓ ✕

HTTP Servers ✕

NOTE

Add Group

- b) In the **Group** drop-down list, type the name of a device group and then click the group name from the search results. For example, type `HTTP servers` and select the **HTTP Servers** device group.
 - c) (Optional) In the **Note** field, type information about the group.
4. In the Automatically Fill section, make sure **On** is selected.
-  **Note:** If your system is having performance issues, click **Off**. Only devices that are in prioritized groups or on the watchlist will receive Advanced Analysis.
5. At the top of the page, click **Save**.

Next steps

Here are some additional ways to manage and refine groups that receive Advanced Analysis:

- If you add multiple groups, the groups are prioritized from top to bottom. Click the upper left icon next to Group, and then drag the group to another position in the ordered list.

For Advanced Analysis

☰ GROUP ✓ ✕

HTTP Servers ▼

NOTE

☰ GROUP ✓ ✕

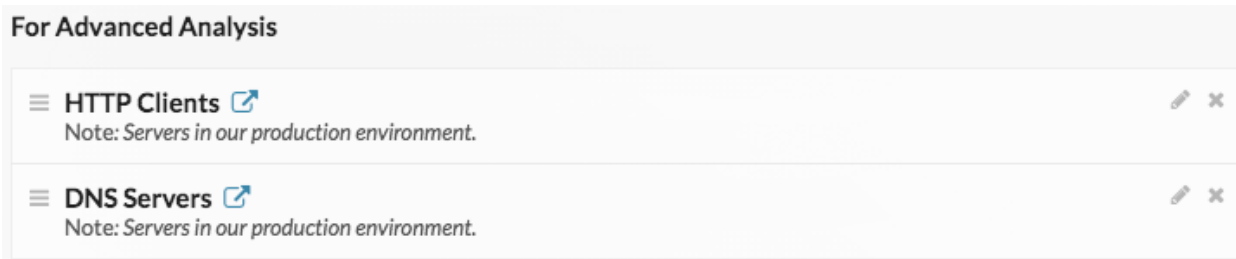
DNS Servers ▼

NOTE

- Click the check ✓ icon to collapse the group. Click the pencil ✎ icon to expand the group again, as shown in the following figure.



- Click the go to [link icon](#) next to a group name to navigate to the device group page. The device group page displays which devices and how many devices are in the group. The icon is only available when the group is



collapsed.

- Click the x icon to remove a group from the list, as shown in the following

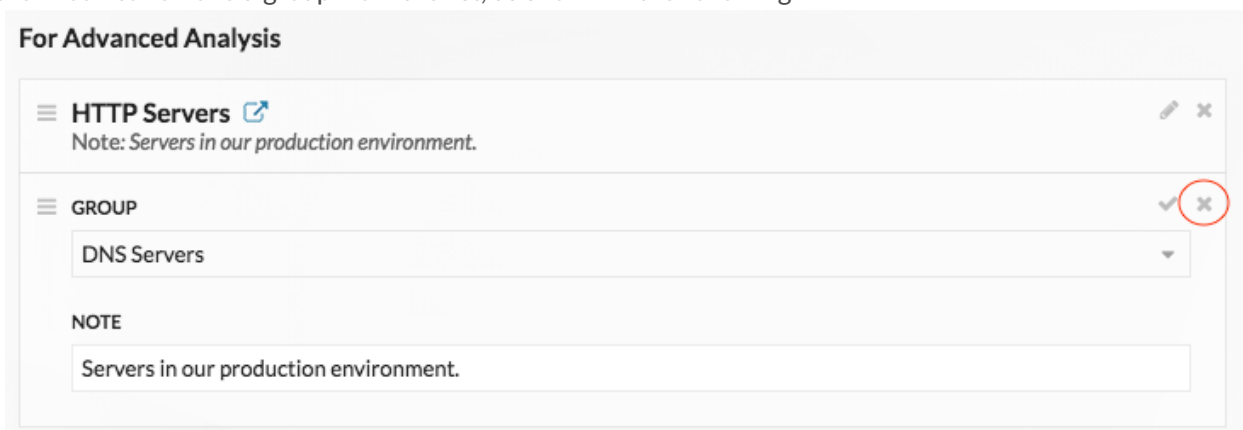


figure.

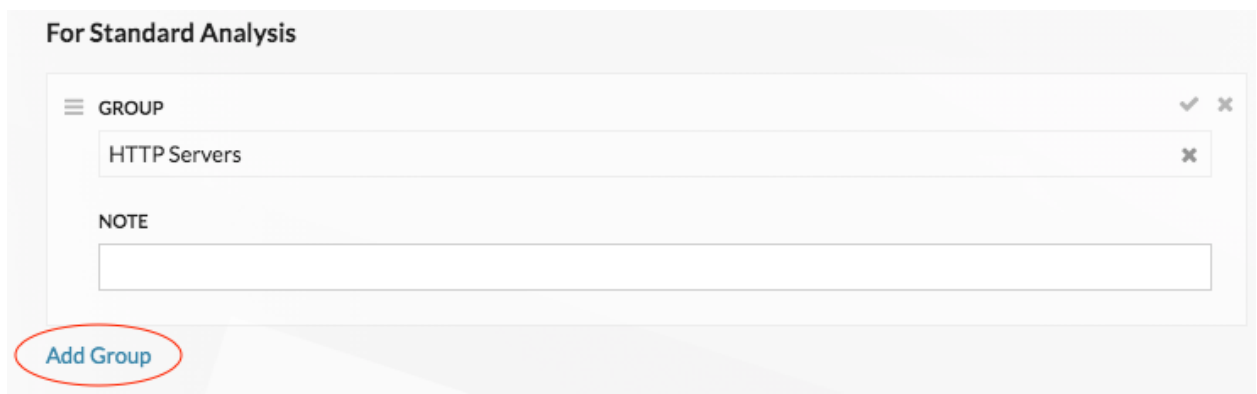
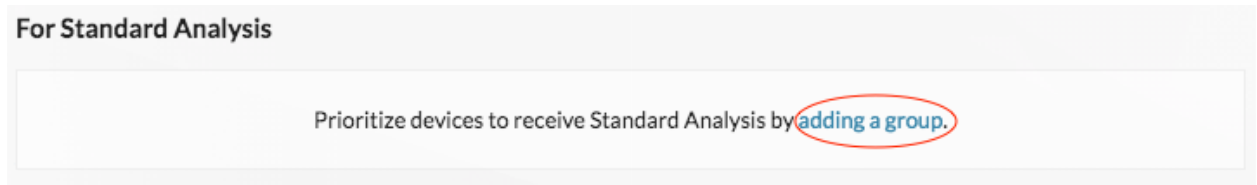
Prioritize groups for Standard Analysis

You can specify device groups for Standard Analysis based on their importance to your network. Groups are ranked in an ordered list.

Here are some important considerations about [Standard Analysis](#):

- Devices prioritized for Standard Analysis section receive Advanced Analysis when there is capacity.
 - You must have full write privileges to edit analysis priorities.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`. (These steps must be completed on the console or sensor that is [managing these shared settings](#).)
 2. Go to the settings for Standard Priorities.

- On a console, click the System Settings icon and then click **Analysis Priorities**. Then, click **Edit Priorities** next to the sensor you want to modify.
 - On a sensor, click the System Settings icon and then click **Analysis Priorities**.
3. Prioritize groups by completing the following steps:
- a) In the For Standard Analysis section, click **adding a group** to add the initial group or **Add Group** to add additional groups.

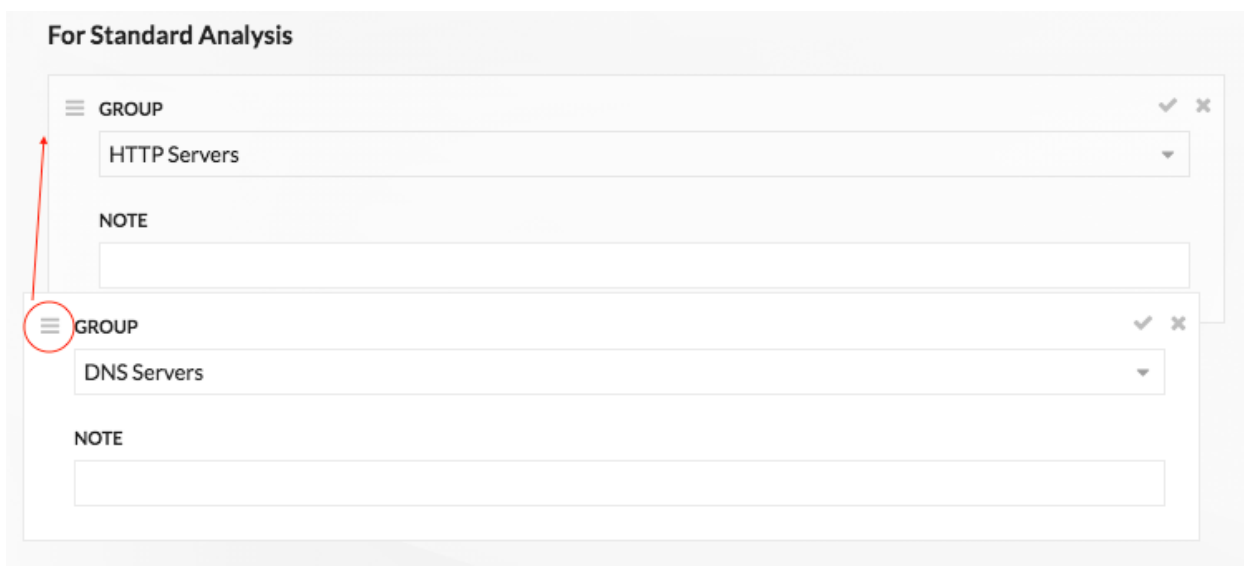


- b) In the **Group** drop-down list, type the name of a device group and then click the group name from the search results. For example, type `HTTP servers` and select the **HTTP Servers** device group.
 - c) (Optional) In the **Note** field, type information about the group.
4. In the Automatically Fill section, make sure **On** is selected.
- Note:** If your system is having performance issues, then click **Off**. Only devices that are in prioritized groups receive Standard Analysis.
5. At the top of the page, click **Save**.

Next steps

Here are some additional ways to manage and refine groups that receive Standard Analysis:

- If you add multiple groups, the groups are prioritized from top to bottom. Click the upper left icon next to Group, and then drag the group to another position in the ordered list.



- Click the check icon to collapse the group. Click the pencil icon to expand the group again, as shown in the following

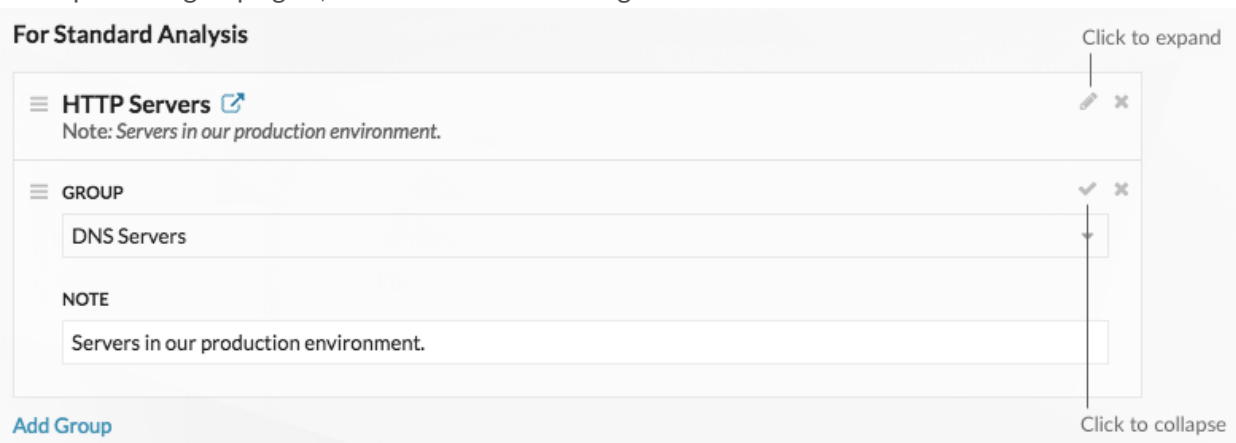
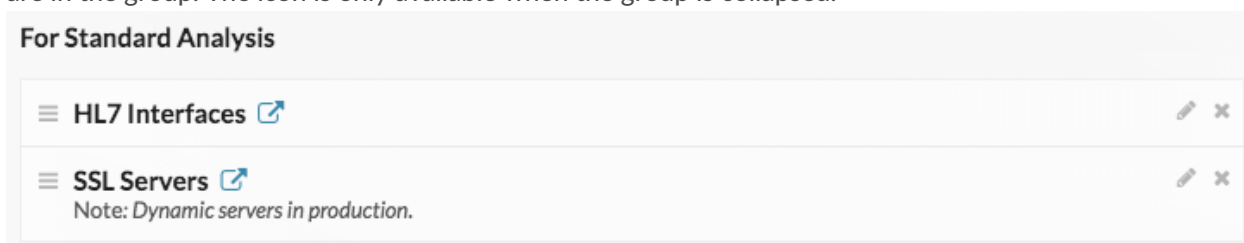


figure.

- Click the go to icon next to a group name to navigate to the device group page. The device group page displays which devices and how many devices are in the group. The icon is only available when the group is collapsed.



- Click the x icon to remove a group from the list, as shown in the following



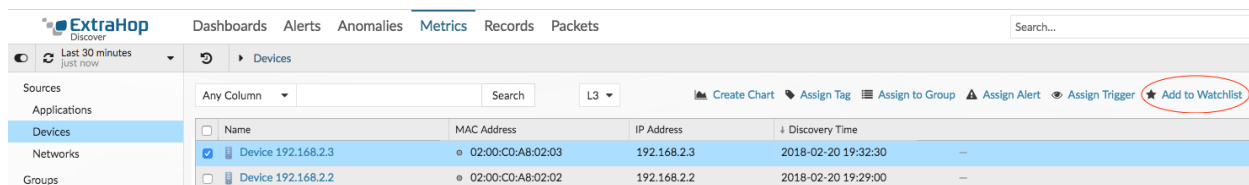
figure.

Add a device to the watchlist

Add devices to the watchlist to ensure Advanced Analysis. You can add a custom device to the watchlist, but you cannot add an L2 parent device to the watchlist, unless the device is a gateway or router, and you cannot add a device in Flow Analysis. Devices stay on the watchlist whether they are inactive or active, but a device must be active for the ExtraHop system to collect Advanced Analysis metrics.

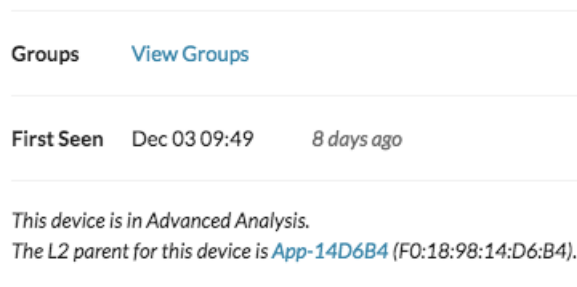


Tip: Instead of adding several devices to the watchlist, [create a device group](#) and then [prioritize that group for Advanced Analysis](#). Or add multiple devices to the watchlist from the Device list page. Click the checkbox next to one or more devices and then click the Add to Watchlist icon ★ in the upper right corner.



Learn more about [Analysis Priorities](#).

- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- Click **Assets** at the top of the page and then click **Devices** in the left pane.
- Search for the device you want and then click the device name. The Device Overview page appears, which displays traffic and protocol metrics associated with the device.
- Click **Edit Properties**.





- Click **Add this device to the watchlist**.
- Click **Done**.

Your device is now on the watchlist. Visit the Watchlist page to [remove a device from the watchlist](#).

Remove a device from the watchlist

You can remove devices that are on the watchlist from the Analysis Priorities page.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`. (These steps must be completed on the console or sensor that is [managing these shared settings](#).)
2. Go to the settings for Standard Priorities.
 - On a console, click the System Settings icon  and then click **Analysis Priorities**. Then, click **Edit Priorities** next to the sensor you want to modify.
 - On a sensor, click the System Settings icon  and then click **Analysis Priorities**.
3. At the top of page in the Advanced Analysis Watchlist section, click **View the Watchlist**. The Watchlist page appears and displays all the devices on the watchlist.
4. To remove devices from the watchlist, complete the following steps:
 - a) Select the checkbox next to the device name.
 - b) Click **Remove Devices**.
5. Click **Save**.



Note: It is possible to add devices to a blocklist, based on their unique MAC addresses, by modifying the running configuration file on the ExtraHop system. Contact your ExtraHop administrator to add devices to a blocklist.

Activity maps

An activity map is a dynamic visual representation of the L4-L7 protocol activity between devices in your network. You can see a 2D or 3D layout of device connections in real-time to learn about the traffic flow and relationships between devices.

Activity maps can help you with the following use cases:

Complete a data center or cloud migration

As part of your migration strategy, you must determine which services can be turned off and when. An activity map helps you identify which devices are still connected so you can prevent unexpected service disruptions during the migration process. For more information, see the [Plan and monitor your migration with activity maps](#) walkthrough.

Identify the root cause behind a slow application

Applications often depend on multiple tiers of services within a network. An activity map can help you identify the delivery chain of traffic to your slow application server. Click a device to investigate related metrics, which can shed more light onto the root cause of the slow-down.

Track suspicious devices or unexpected connections

During a security event, an activity map can help you identify affected devices by tracking the real-time east-west traffic associated with a suspicious device. As part of a daily security monitoring strategy, you can create an activity map to confirm that devices are not making unexpected connections with other devices.

Here are some important considerations about activity maps:

- You can [create activity maps](#) for devices in Advanced, Standard, L2 Parent Analysis, and Flow Analysis. You cannot create an activity map for devices in Discovery Mode. For more information, see [Analysis priorities](#).
- If you create an activity map for a device or device group that has no protocol activity during the selected time interval, the map appears without any data. Change the time interval or your origin selection and try again.
- You can create an activity map from a console to view device connections across all of your sensors.
- You can [save and share an activity map](#), granting view or edit access to other system users or groups. You can also [load a saved activity map](#) to modify map properties.

For more information about activity maps, see the [Activity Maps FAQ](#).


Navigate activity maps

After [creating an activity map](#), you can start investigating data. The following sections provide details about how to interact with an activity map and find information about the data you are viewing.

Layout

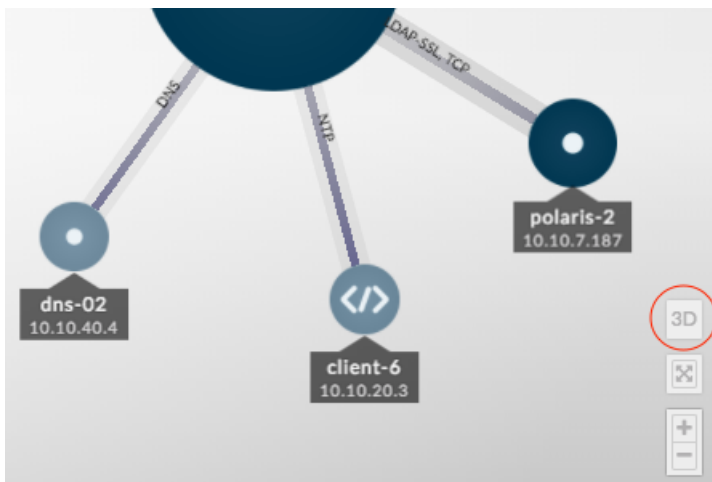
Devices are represented by circles and connections are represented by lines.

The placement of devices is optimized to display information. The layout can change as data about device activity is updated in real-time. For example, the layout is updated as new connections are observed or devices become inactive.

 **Note:** When the time interval in the upper left corner of the page is set to Last 30 minutes, Last 6 hours, or Last 1 day, activity map data continually updates every minute with real-time data. Set a custom time interval with a specific start and end time to stop real-time layout updates.

2D or 3D layout

By default, activity maps are displayed in a 2D layout, but you can click 3D to change the display to a rotating 3D model. For example, you might want to showcase 3D maps on a large screen in a network or security operations center.

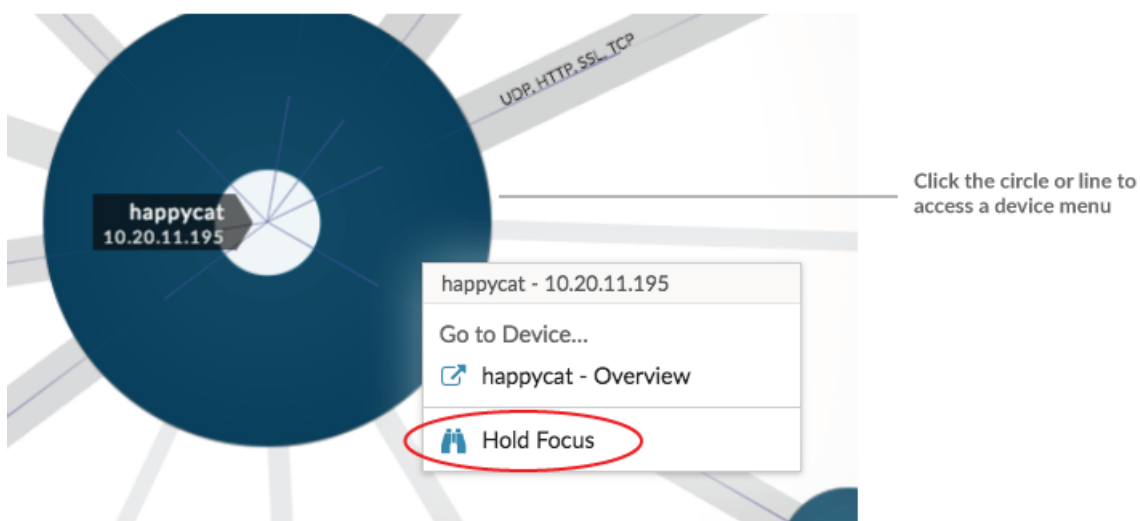


Reposition, rotate, and zoom

Zoom in and out of a map with controls located in the bottom right corner of the page or zoom with your mouse wheel. Click-and-drag your mouse to reposition a 2D map or rotate a 3D map.

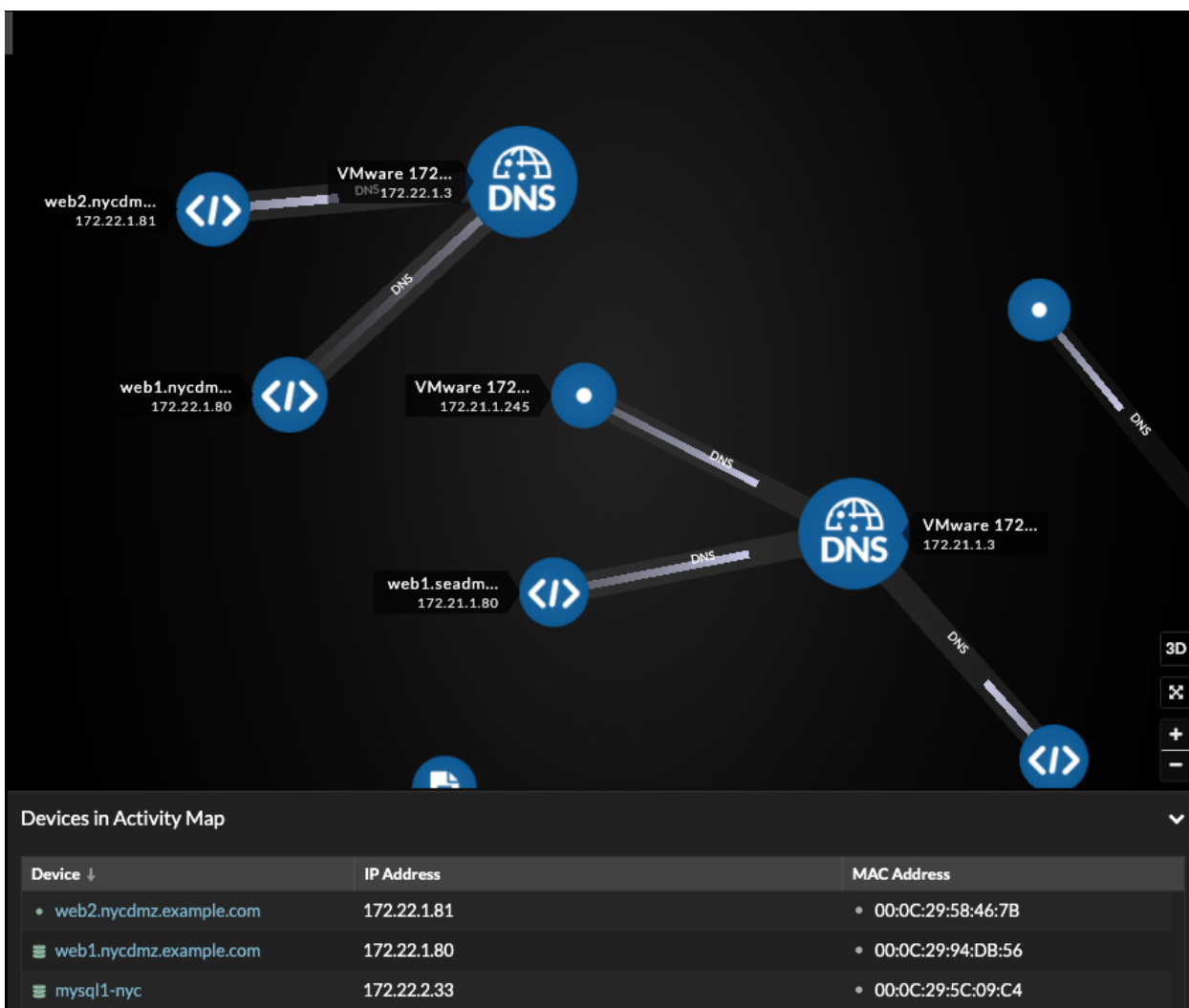
Hold focus

Click any device and select **Hold Focus**. You can then reposition or rotate, depending on your layout, and zoom in and out of the map while focusing on the selected device and its immediate peers.



View device list

Click **Devices in Activity Map** at the bottom of the page to view a list of all devices, their names, IP addresses, and MAC addresses. Click a device name to navigate to the device page.

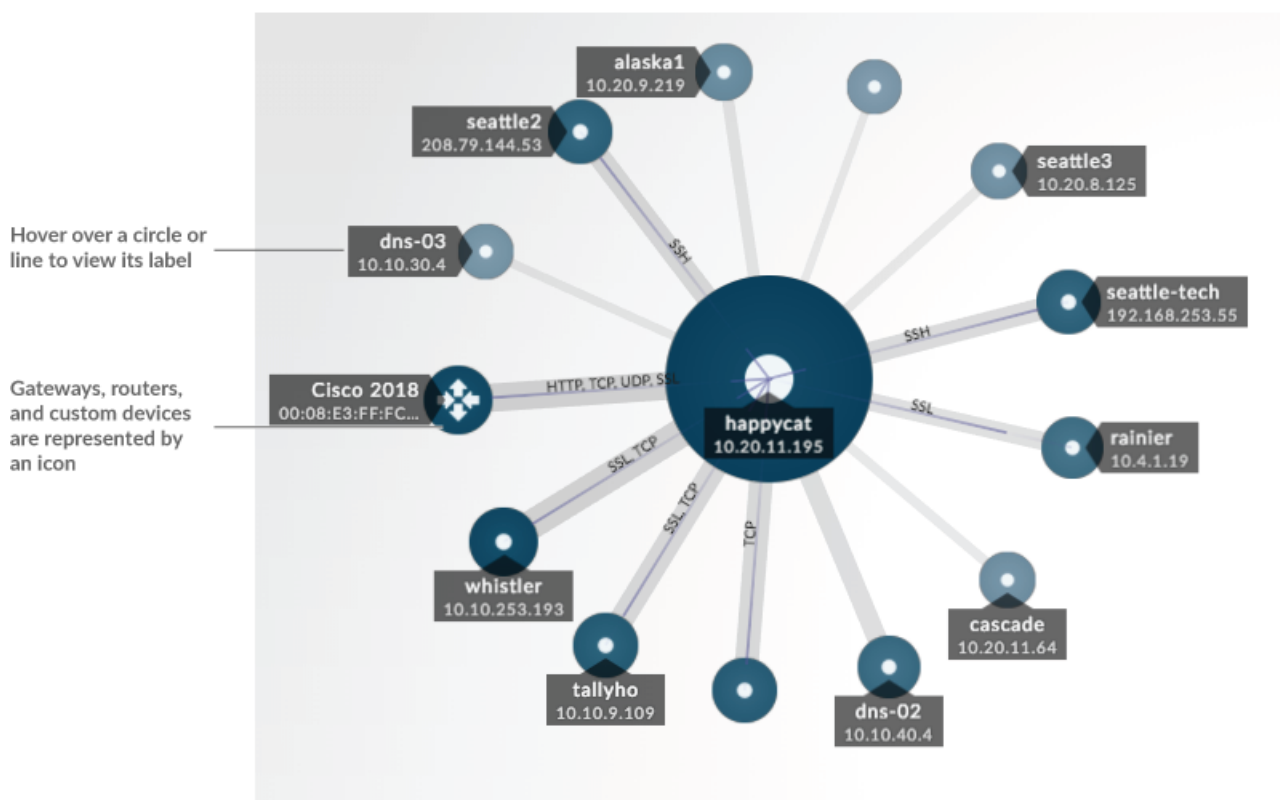



Labels and icons

Circle labels contain details such as the device hostname, IP address, or MAC address.

Line labels contain protocol names associated with the device connection and the direction of traffic flowing between the devices, which is displayed as animated pulses. Specific **device roles** are represented by an icon.

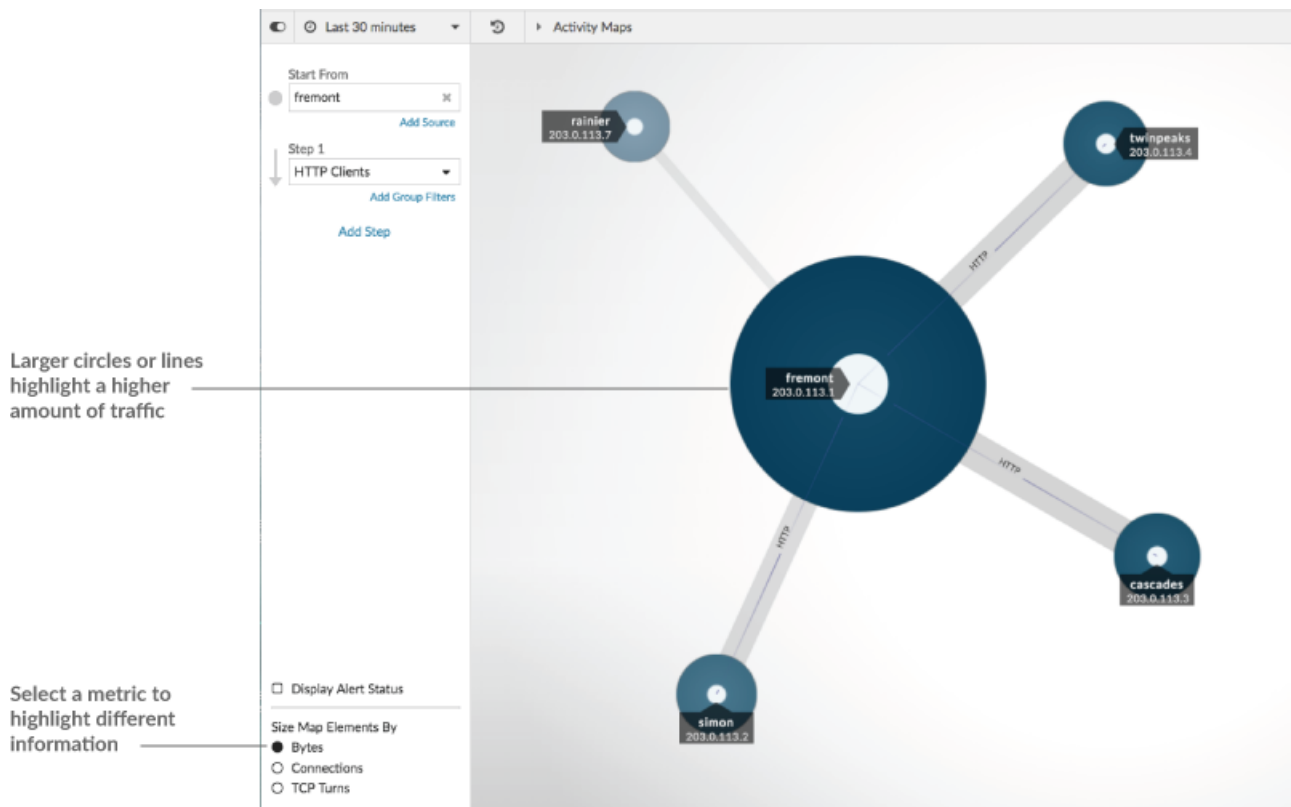
To optimize the display of information, not every label is displayed. Hover over any circle or line to display its label, as shown in the following figure.



 **Note:** Device roles are automatically assigned to a device based on the type of traffic the ExtraHop system observes for that device. For more information, see [Change a device role](#).

Circle and line size

The size of objects in the map corresponds with a metric value, which helps to highlight areas of increased activity, such as the number of bytes, or traffic volume, associated with a device connection.



At the bottom of the left pane, you can select a different metric for map elements:

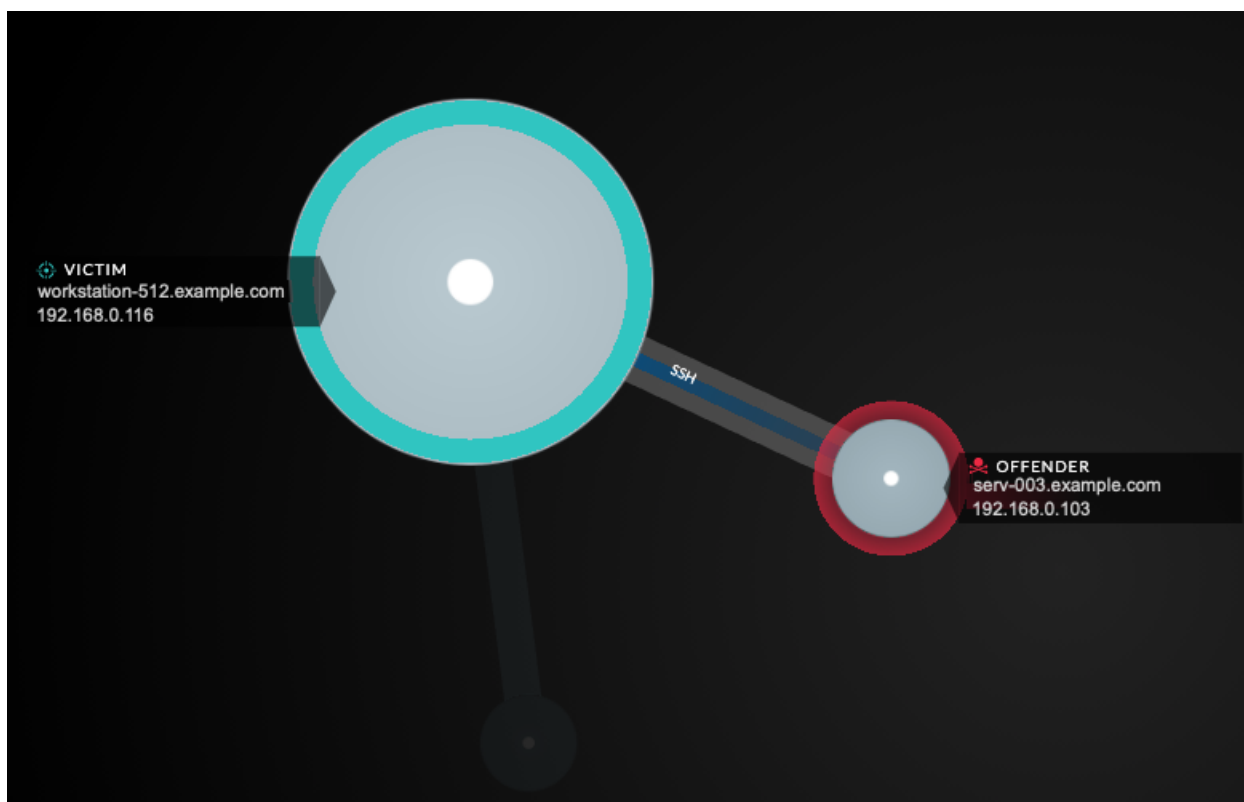
- **Bytes:** See all of the devices transmitting or receiving data during the time interval.
- **Connections:** See only the devices that have established a new connection at least once during the time interval.
- **TCP Turns:** See only the devices that switched between transmitting and receiving data at least once during the time interval.

Color

Blue and gray are default colors for circles and lines. These default colors are optimized to display information in a map. However, you can apply different colors to your map to highlight the severity level of an alert or show when a device connection was established.

Detections

Detections associated with a device on the map appear around the circle as animated pulses, known as detection markers. The color of the pulse is red if the device is the offender and teal if the device is the victim of the detection. The participant status also appears on the device label.



 **Note:** Machine learning detections require a [connection to ExtraHop Cloud Services](#).

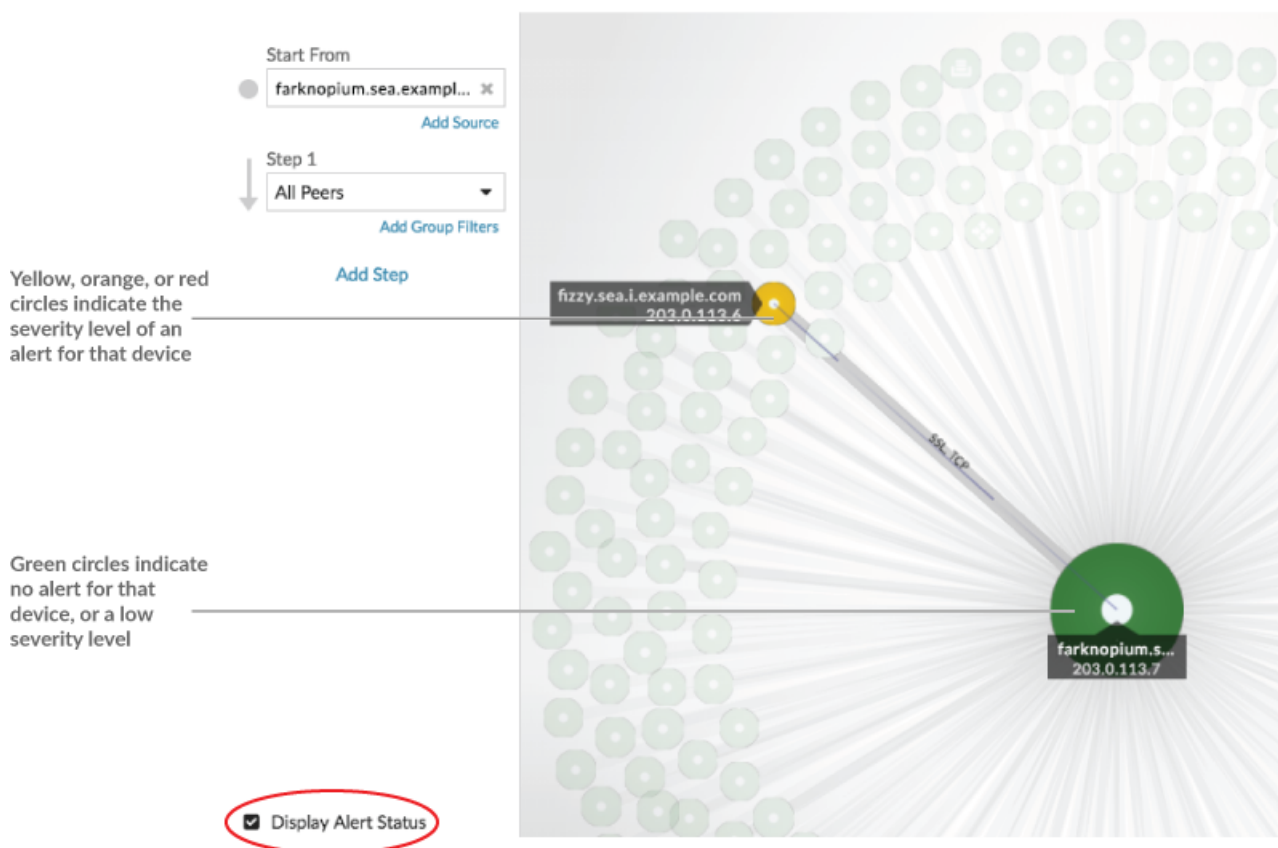
Click a circle with a detection marker to view and navigate to associated detections or the [Device Overview page](#).

If detection markers do not appear on your activity maps as expected, detection markers might be disabled. You can [enable or disable detection markers](#) from the **User** menu.

Alert status

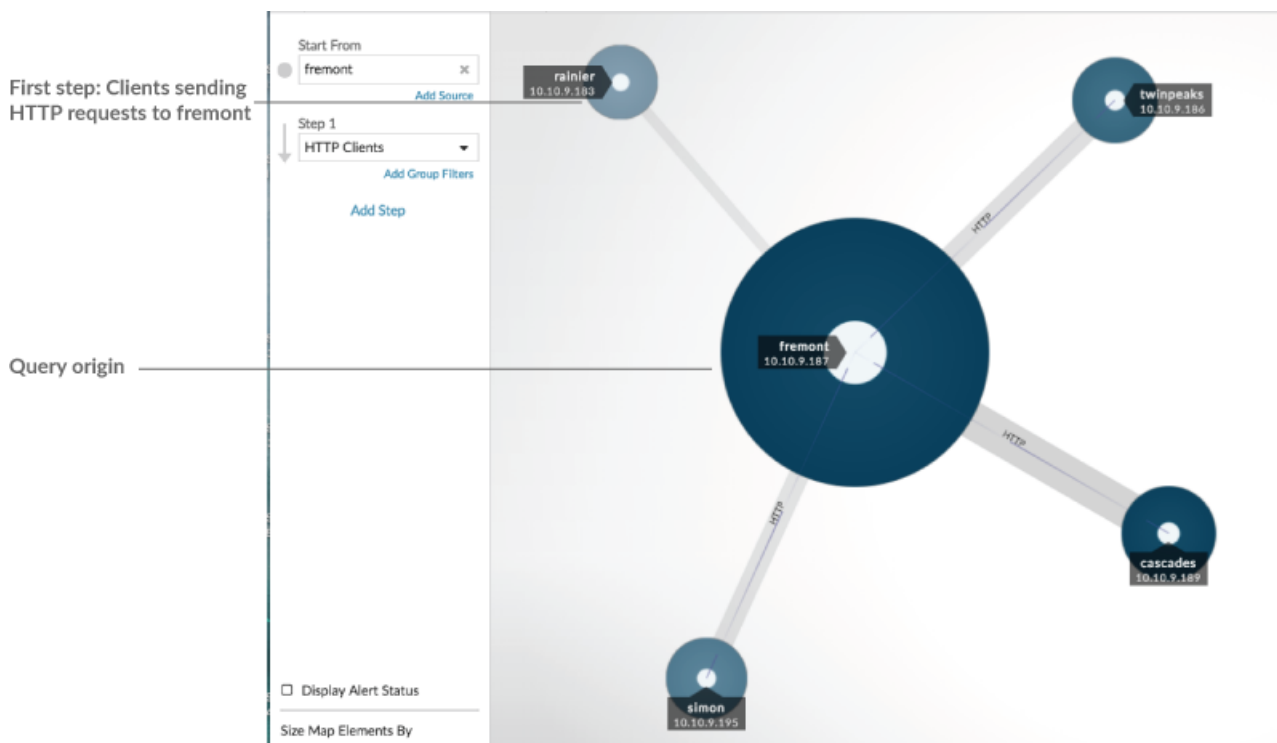
To see the severity level of an alert for a device in your map, select **Display alert status** in the lower left corner of the page, as shown in the following figure. The circle color then corresponds to the most severe status for all alerts assigned to a device during the time interval. If there is no alert assigned to a device or the alert level is informational, the default circle color is green.

To investigate the alert, click the circle and then select the device name in the Go to Device... section. On the device's protocol page, scroll down to [view the Alerts page](#).

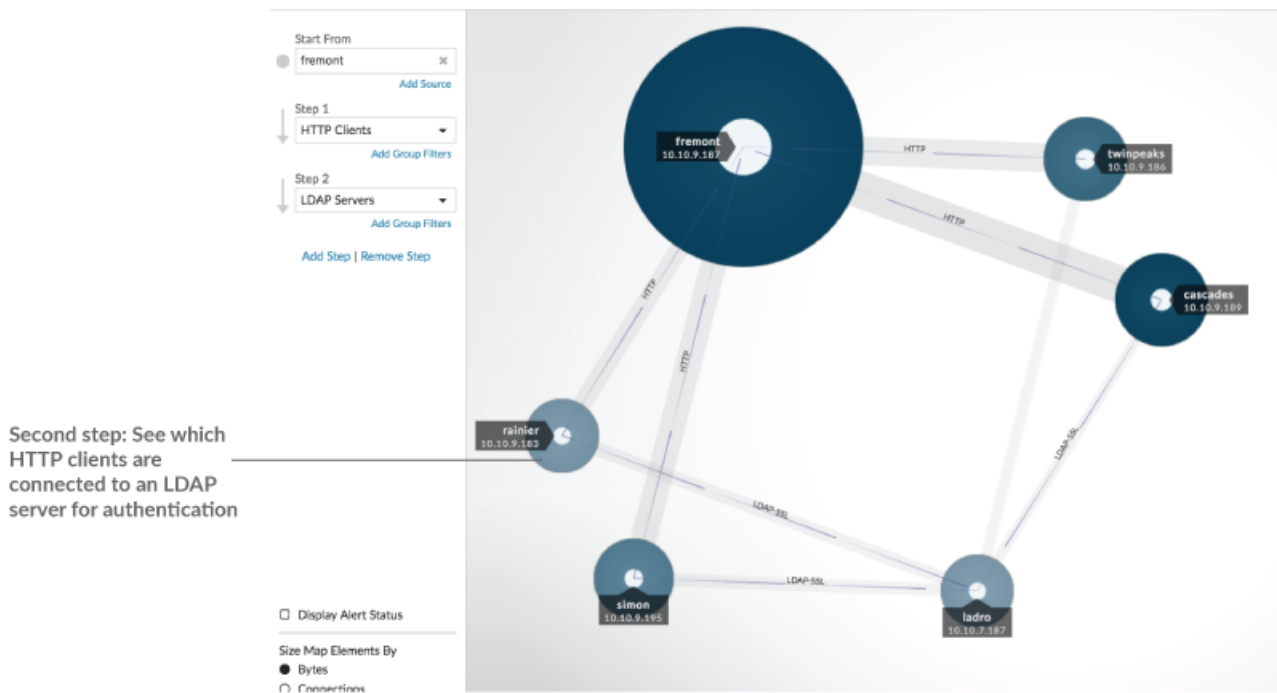


Time interval comparison

When you [compare two time intervals to find metric deltas](#), different colors in the map help you determine when device connections were established or when the protocol activity for a device changed. For example, after creating a comparison between **Yesterday** and the **Last 30 minutes**, new device connections or activity that only appear in the more recent time interval appear green. Previous device connections or activity that only appear in the earlier time interval are red. Devices connections that did not change between time intervals are blue. In the following figure, new connections that were established in the last thirty minutes are represented by green circles and lines.



Add a new step to an activity map to add another layer of information to your map. Click the drop-down list for a particular step, and then select a protocol activity.



You can also filter devices in a step by their group membership. For example, if you select HTTP Servers but only want to see your test servers in the map, you can filter HTTP Servers by a device group, such as My Test Servers.

For more information on how to add steps and filters to a map, see [Create an activity map](#).

Manage activity maps

The following options for managing your activity map are available from the command menu in the upper right corner:

- [Save and share an activity map](#)
- [Load and manage a saved activity map](#)
- Export activity map as a PDF, PNG, or SVG file

Best practices for investigating activity map data

If you find a device on your map that is worth investigating, you have several options to gather more information about that device.

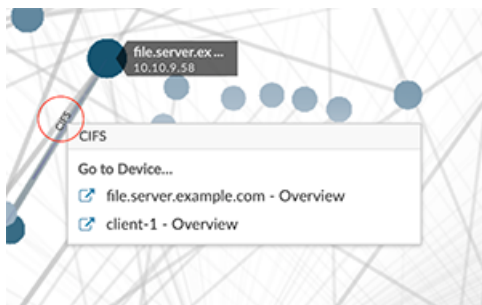
Find recently-connected devices

Click the time interval in the top left corner of the page and click **Compare**. You can see how device connections changed between two different time intervals.

For more information, see [Time interval comparison](#).

Navigate to protocol pages to find related metric activity

Click a circle or line to access a drop-down menu as shown in the following figure.



Select the device name from the menu to view the Device Overview page. From the left pane, click a protocol name to view the protocol page, which contains a summary of important protocol metrics that were observed and associated with the device. From a protocol page, you can find related metrics such as errors, requests, responses, and server processing time. You can also drill down on a metric from a protocol page to view metric details, such as server IP address, client IP address, status codes, methods, and URIs.

Navigate to detections identified on the device

Devices on an activity map that have associated detections are displayed as animated pulses around the circle label. Click a circle with this

detection marker to access a drop-down menu, as shown in the following

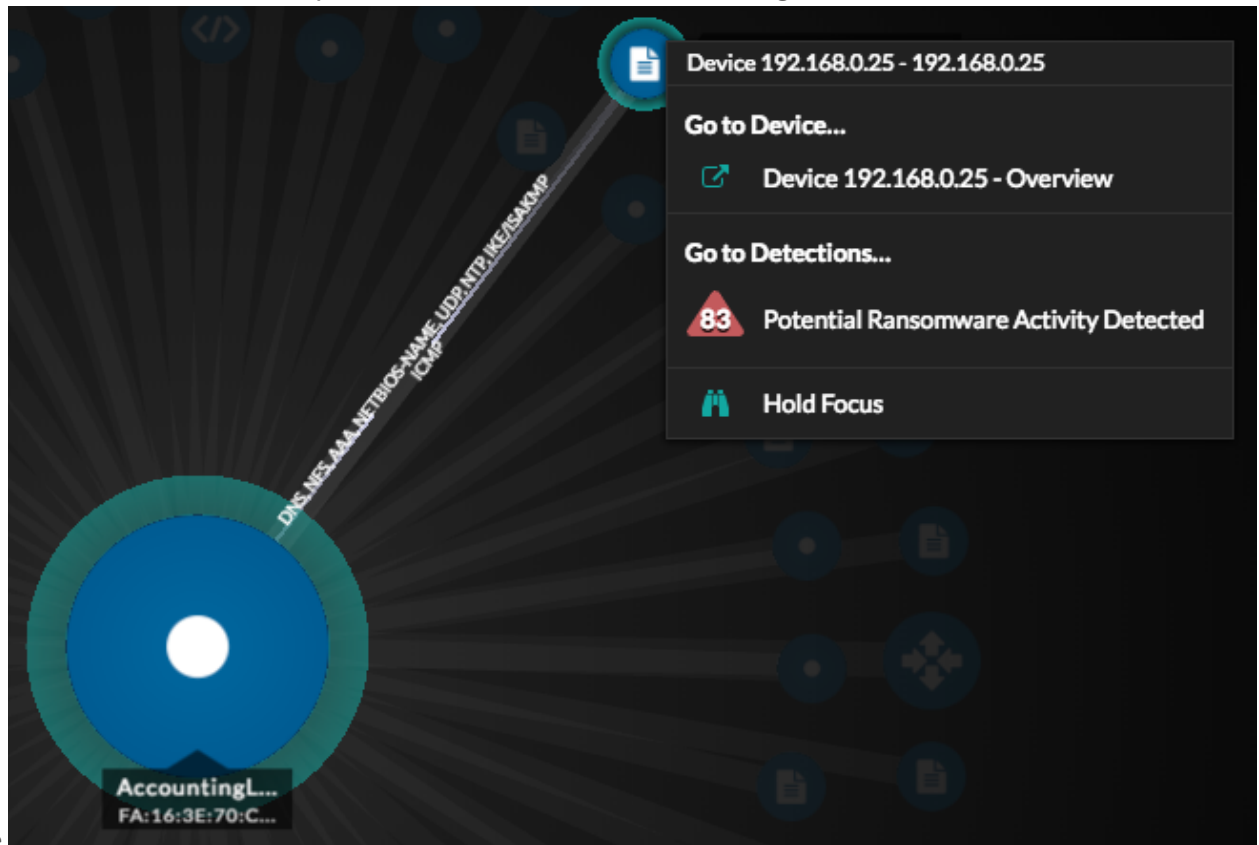


figure.

Select a detection name from the menu to navigate to the detail page for that detection. The detail page contains information about the type of detection that occurred and what it means, as well as when the detection occurred and the duration of the issue. For more information, see [Detection detail page](#).


Search for transaction records associated with a connection (Requires a configured recordstore)

Click a circle or line to access the drop-down menu. Click **Records**. A records query page opens and displays all the records from each connected device, including all record types associated with the device connection protocols.

Create an activity map


An activity map is an interactive 2D or 3D display of real-time device connections based on protocol activity between devices. Activity maps help you visualize traffic flows and kick off troubleshooting based on an interesting data point in a map.

You can create an activity map for an active single device or a device group. After generating a basic map, you can then filter devices and connections in your map.

 **Note:** You can create activity maps for devices in Advanced, Standard, L2 Parent Analysis, and Flow Analysis. You cannot create an activity map for devices in Discovery Mode. For more information, see [Analysis priorities](#).

Create a basic activity map

A basic activity map shows you a single step, or level, of device connections between origin devices and peer devices on your network.


 **Note:** You can create activity maps for devices in Advanced, Standard, L2 Parent Analysis, and Flow Analysis. You cannot create an activity map for devices in Discovery Mode. For more information, see [Analysis priorities](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Assets**.
3. Complete one of the following steps based on the origin type of the activity map:

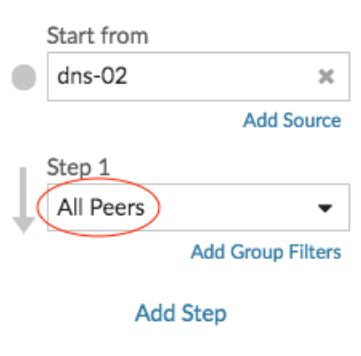
Option	Description
For a device	Click Devices in the left pane and then click an individual device name.
For a device group	Click Device Groups in the left pane and then click a device group name.
For a device group by protocol activity	Click Activity in the left pane and then click the group of clients, servers, or devices for the protocol you want.

4. Click one of the following links to create the activity map:

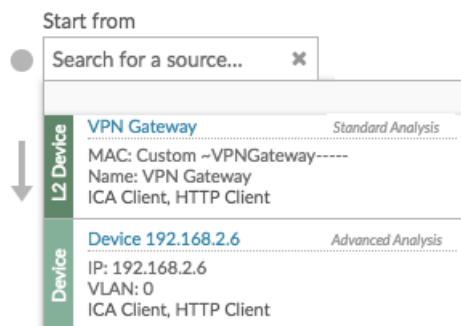
Option	Description
For a device	Click Peer devices , located at the top of the page.
For a device group	Click Activity Map , located near the upper right corner of the page.

 **Note:** If the device or device group has no protocol activity during the specified time interval, the activity map appears without any data. Change the time interval or your origin selection and try again.

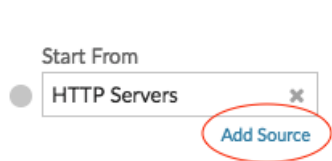
5. From the activity map, filter connections by protocol activity by completing the following steps:
 - a) Click the drop-down list in the Step 1 section of the left pane, as shown in the following figure.



- b) At the top of the drop-down list, search for and select a protocol activity and role. You can make more than one selection.
 - c) Click anywhere outside of the drop-down list.
6. (Optional) Change the primary origin device by completing the following steps:
 - a) In the Start from section in the left pane, click the device or group name. A drop-down list appears.

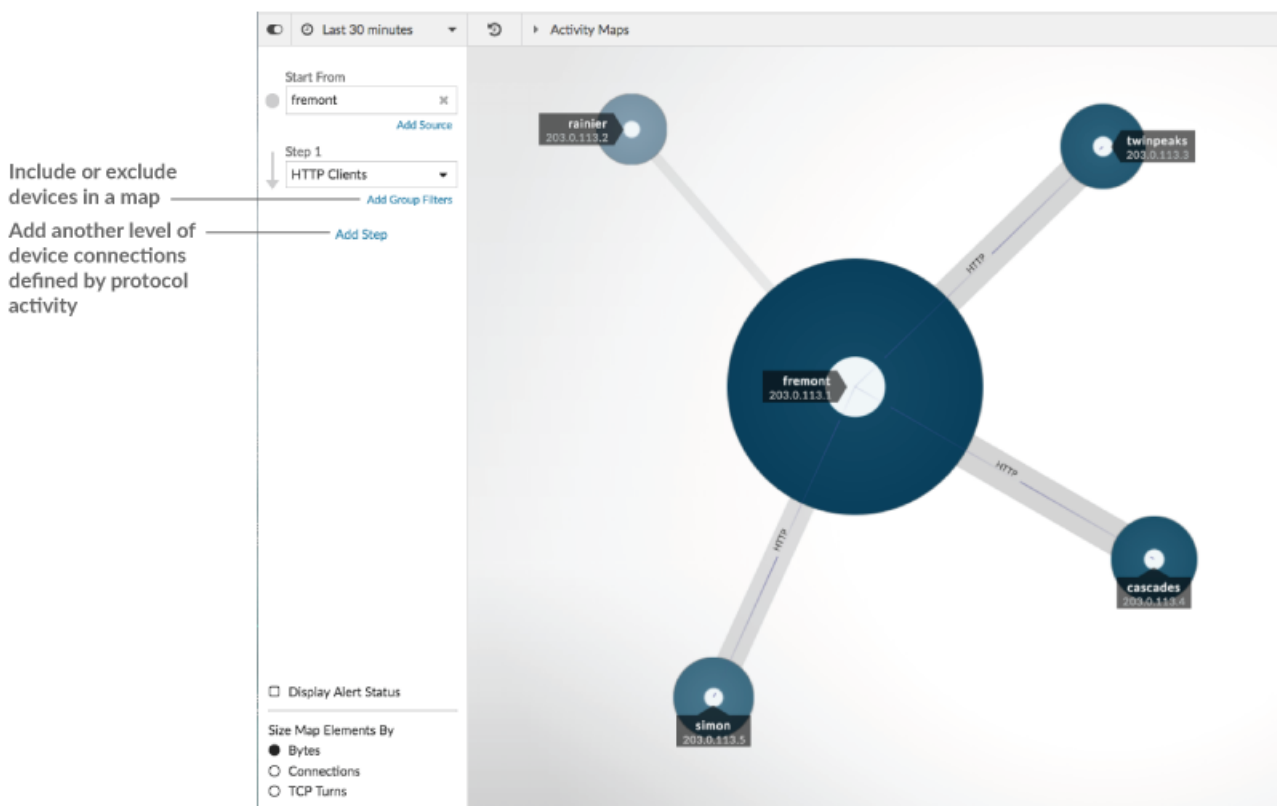


- b) Search for and select another device or group to dynamically update the map origin for the map you are viewing.
- 7. (Optional) Create an ad hoc group of sources to quickly investigate traffic originating from multiple devices in the same map. Click **Add Source**.



Add connections and filter devices in your map

To better understand the path of traffic from origin devices to downstream devices, you can add more steps to your map. You can also create filters to include or exclude devices from the map. The following figure shows you how to add steps and create filters.



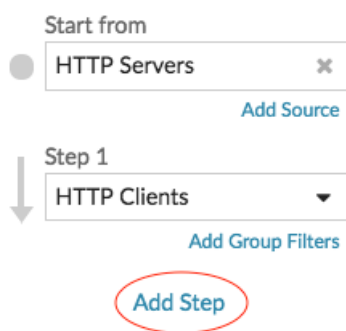
Include or exclude devices in a map

Add another level of device connections defined by protocol activity

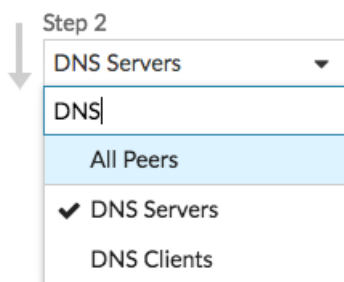
Add another level of device connections

A step defines a level of connection between devices in a map. Devices in each step have a relationship to the devices in the previous step. These relationships are defined by their protocol activity. You can add up to 5 steps to see how traffic flows from one device to another.

1. Click **Add Step**, as shown in the following figure. **All Peers** is selected by default.



2. At the top of the drop-down list, search for and select a protocol activity and role. You can make more than one selection.

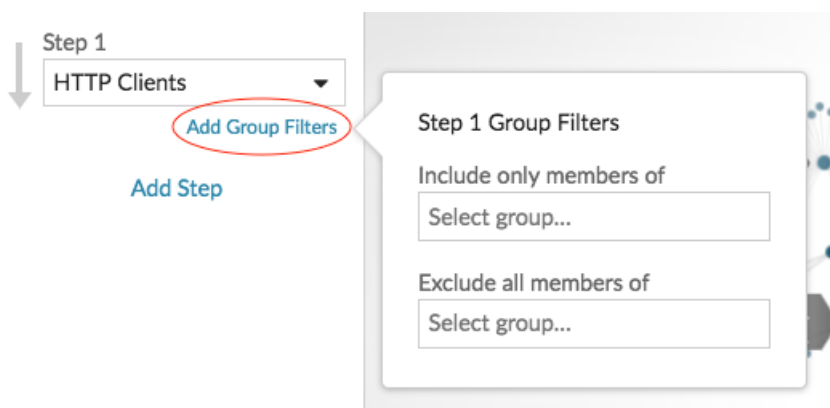


3. Click anywhere outside of the drop-down list.

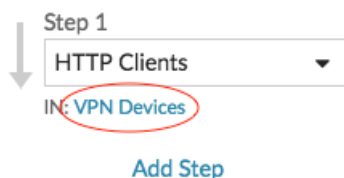
Include or exclude devices

You can filter devices within a step by their device group membership.

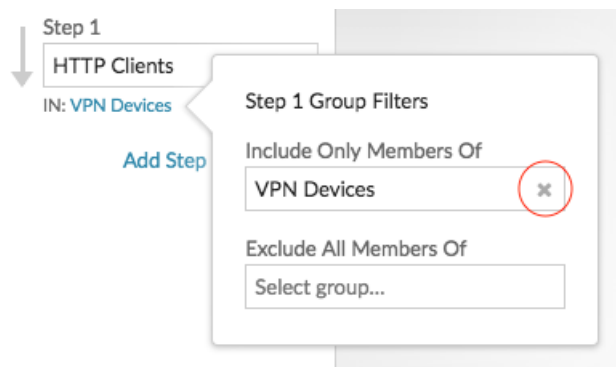
1. Click **Add Group Filter**.



2. Click a drop-down list to search for and select a device group.
3. Click anywhere outside of the filter menu to apply your filters.
4. To remove or change a filter, complete the following steps:
 - a) Click the device group name.



- b) Change the filter by clicking the drop-down list and then selecting another device group.
- c) Remove the filter by clicking the **x** icon, as shown in the following figure.



d) Click anywhere outside of the filter menu to apply your filter updates.

Next steps

- [Save and share an activity map](#)

Save and share an activity map

You can save an activity map and share it with others. By default, all activity maps that you create are private, which means that no ExtraHop users can view or edit your map. However, you can share your map when you save it by granting view or edit access to other ExtraHop users and groups.

Here are some important considerations about sharing activity maps:

- How a user interacts with an activity map and the information they can view in the ExtraHop system is determined by user privileges, which are assigned by the ExtraHop administrator. For more information, see the [User privileges](#) section in the ExtraHop Administrators Guide.
- When you grant a user edit access, that user can modify and share the activity map with others. However, other users cannot delete the activity map. Only the map owner can delete an activity map.
- Group information is imported into the ExtraHop system from LDAP (such as OpenLDAP or Active Directory). User information is available after an ExtraHop user logs in to their account.
- If you are deleting a user, you will have the option to transfer their activity maps to another user.

The following steps show you how to save and share an activity map:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. [Create an activity map](#).
3. Click the Save icon in the upper right corner of the page.
4. Type a name for your map. The name must be unique.
5. (Optional) Type a description.
6. (Optional) Change the permalink shortcode to a user-friendly name.
For example, you can configure a map to display alert statuses and append "/alerts" to the shortcode to let users know that the saved map displays alerts by default.

Note: The shortcode cannot contain spaces and the shortcode must be unique.



7. Share your activity map by completing the following steps:
 - a) Type a username or group.
 - b) Make one of the following selections:

Type of Access	Selection
ExtraHop users can view	Select Can view and then click Add .

Type of Access	Selection
ExtraHop users can both view and edit	Click Can view and then click Can edit . Click Add .

- Click **Save**.




Tip: You can also modify the properties for a saved map by clicking the command menu  and then clicking **Map Properties**. To quickly modify share permissions, click the command menu  and then click **Share**.

Next steps

- If you shared your map, copy the entire map URL from your browser and then send the URL to the users with access to your map.
- [Load and manage a saved activity map.](#)
- [Remove or change access to an activity map](#)


Remove or change access to an activity map

You can remove or modify access to an activity map that you granted to users and groups. You must first create an activity map to access options to modify saved activity maps.


- [Create an activity map](#), and then click the Open icon  in the upper right corner of the page.
- Click the activity map name.
- In the Sharing section, complete one of the following steps:
 - To remove access for users or groups, click the red delete **x** icon next to the user or group name.
 - To change access for an existing user or group, click **Can view** or **Can edit**, and make a different selection.
 - To add a new user or group, search for and click the user name. Click **Can view** or **Can edit**, and then click **Add**.
- Click **Save**.

Load and manage a saved activity map

You can view, update, or delete saved activity maps. First, you must first create a new map to access a list of saved and shared maps.


- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- [Create an activity map](#), and then click the Open icon  in the upper right corner of the page.
- Choose one of the following activity map options:
 - To load a map, click the map name. If you want to modify and then re-save the map, make your changes and then click the **Save** icon.



Tip: You can also modify the properties for a saved map by clicking the command menu  and then clicking **Map Properties**.

- To delete a map, click **Delete** next to the map name.



Note: Users must have privileges to view or interact with activity maps. See [User privileges](#)  in the ExtraHop Administrators Guide.

Detections

The ExtraHop system applies machine learning techniques and rule-based monitoring to your wire data to identify unusual behaviors and potential risks to the security and performance of your network.

Before you begin

Users must be granted [privileges](#) to view detections.

When anomalous behavior is identified, the ExtraHop system generates a detection and displays the available data and options. Controls on the Detections page help you [group](#), [filter](#), and [sort](#) your view of detections, so you can quickly triage issues with critical systems first.

Detections can help you defend your network in the following ways:

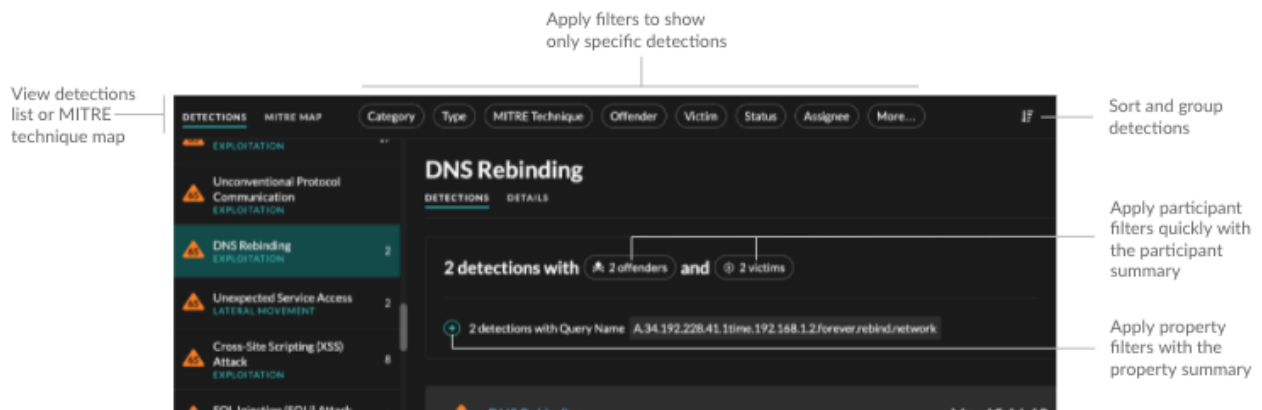
- Collect high-quality, actionable data to find the root causes behind network issues.
- Find unknown issues with performance, security, or infrastructure.
- Identify malicious behavior that is associated with different attack categories or MITRE techniques.
- View related detections or create your own [investigation](#) to group detections and track potential attack campaigns.
- Flag suspicious IP addresses, hostnames, and URIs identified by threat intelligence.
- Highlight security hardening best practices.

Learn more about [optimizing detections](#).

Important: Although detections can inform you about security risks and performance issues, detections do not replace decision-making or expertise about your network. Always review [security](#) and [performance](#) detections to determine the root cause of unusual behavior and when to take action.

Navigating detections

Detection cards appear in a sortable list that can be further grouped and filtered by multiple criteria on the main Detections page. Click any detection card to navigate to the detection detail page.



Detection cards


Each detection card identifies the cause of the detection, the detection category, when the detection occurred, and the victim and offender participants. Security detections include a risk score.

Risk score

Measures the **likelihood, complexity, and business impact** of a security detection. This score provides an estimate based on factors about the frequency and availability of certain attack vectors against the necessary skill levels of a potential hacker and the consequences of a successful attack. The icon is color coded by severity as red (80-99), orange (31-79), or yellow (1-30).

Participants

Identifies each participant (offender and victim) involved in the detection by hostname or IP address. Click on a participant to view basic details and access links. Internal endpoints display a link to the Device Overview page; external endpoints display the geolocation of the IP address and links to the ARIN Whois website and IP address detail page. If a participant has passed through another device like a load balancer or gateway, both the participant and the device are displayed on the participant card, but only the origin endpoint is considered a participant.

 **Note:** SSL/TLS decryption is required to display origin endpoints if HTTPS is enabled. Learn more about [SSL/TLS decryption](#).

When grouping the Detection page by **Type**, a participant summary appears under the detection type that breaks down detections by offender and victim and enables you to quickly **apply participant filters**.

When grouping the Detection page by **Sources**, internal device role icons are highlighted red if the device was an offender in a detection and teal if the device was a victim. You can click **Details** under the source name to view a summary of detections where that source was a participant. These device details are displayed next to the detection card on wide screens (1900 pixels or greater).

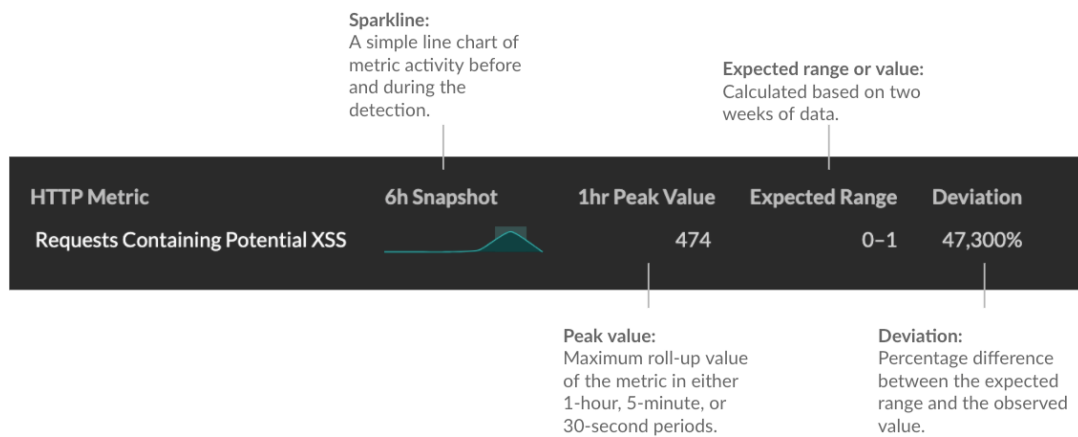
Duration

Identifies how long the unusual behavior was detected or displays ONGOING if the behavior is currently occurring.

Detections that highlight security hardening best practices display two dates: the first time and the most recent time that the violation was identified.

Metric data

Identifies additional metric data when the unusual behavior is associated with a specific metric or key. If metric data is unavailable for the detection, the type of anomalous protocol activity appears.



Detection management

You can [track](#) or [tune](#) the detection from the Actions dropdown list, or click **View Detection Details** to navigate to the detection detail page.

Detection detail page

Most of the data that you need to understand and validate a detection appears on the detection detail page: tables of relevant metric data, record transactions, and links to raw packets.

The detection card information is followed by all available sections for the detection. These sections vary depending on the type of the detection.

Track Detection

You can [track](#) or [tune](#) the detection, or click **Add to an Investigation** to include the detection in a new or existing [investigation](#).

If you have configured a [CrowdStrike integration](#) on your ExtraHop system, you can [initiate containment of CrowdStrike devices](#) that are participants in the detection. (Reveal(x) 360 only.)

Decryption badge

When the ExtraHop system identifies suspicious behavior or a potential attack in decrypted traffic records, the detection detail page displays a decryption badge to the right of the detection name.

CVE-2021-34527 Windows Print Spooler Exploit Attempt

83 RISK EXPLOITATION

Dec 8 12:17 • lasting a few seconds

dc05-west received a malicious request that matches an attempt to exploit PrintNightmare, a privilege escalation and remote code execution (RCE) vulnerability in the Windows Print Spooler service. Refer to this [Microsoft Security Update Guide](#) for patch and mitigation information

DETECTED WITH DECRYPTION

Track Detection

Status: No Status | Assignee: Unassigned

Actions: Add to an Investigation, Tune Detection

OFFENDER: externalVM, 192.168.226.68

VICTIM: dc05-west, 192.168.77.175

Learn more about [SSL/TLS decryption](#) and [decrypting traffic with a Windows domain controller](#).

Detection properties

Provides a list of properties that are relevant to the detection. For example, detection properties can include a query, URI, or hacking tool that is central to the detection.

OFFENDER: dns35.west.example.com, 192.168.46.64, Site: West1

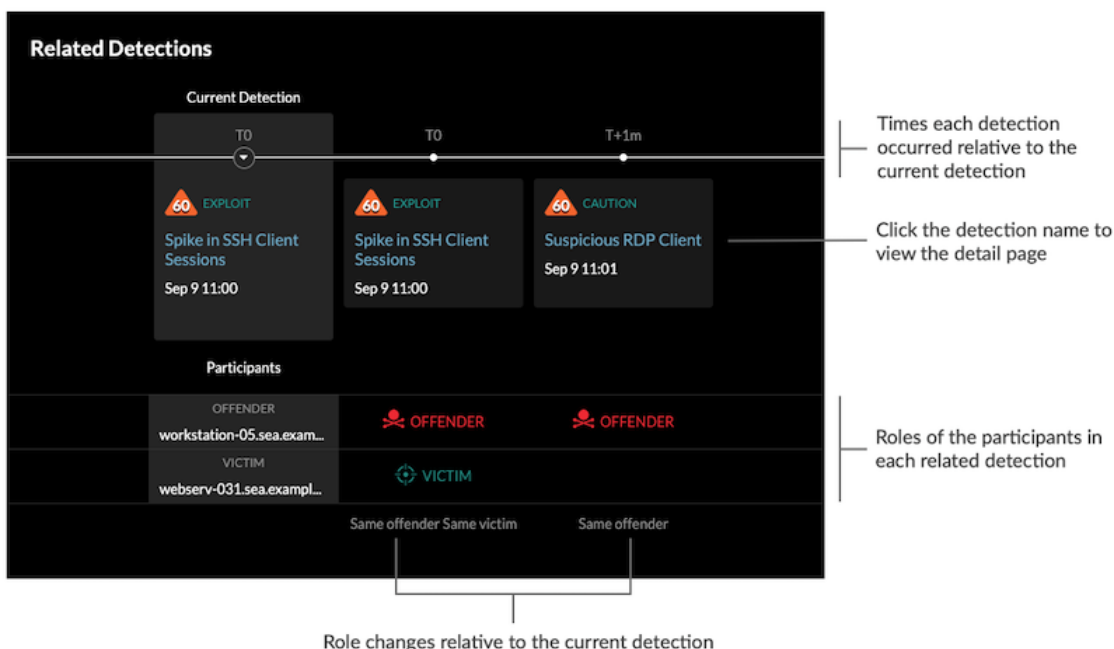
VICTIM: workstation.example.com, 192.168.114.49, Site: West1

Query Name: A.16.88.248.207.extime.192.168.187.25.east.network
 Client Port: 43673
 Server Port: 53

Related Detections

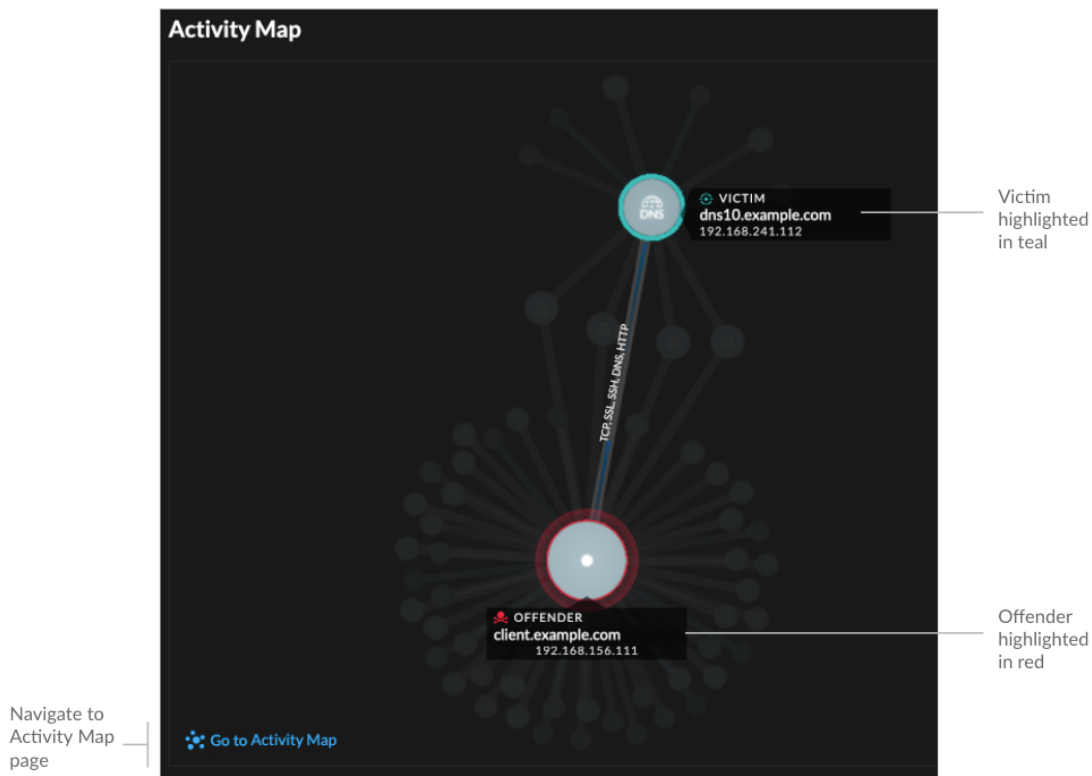
Related detections

Provides a timeline of detections related to the current detection that can help you identify a larger attack campaign. Related detections include the participant role, duration, timestamp, and any role changes if the offender in one detection becomes the victim in a different detection. Click any related detection in the timeline to view the details page for that detection.



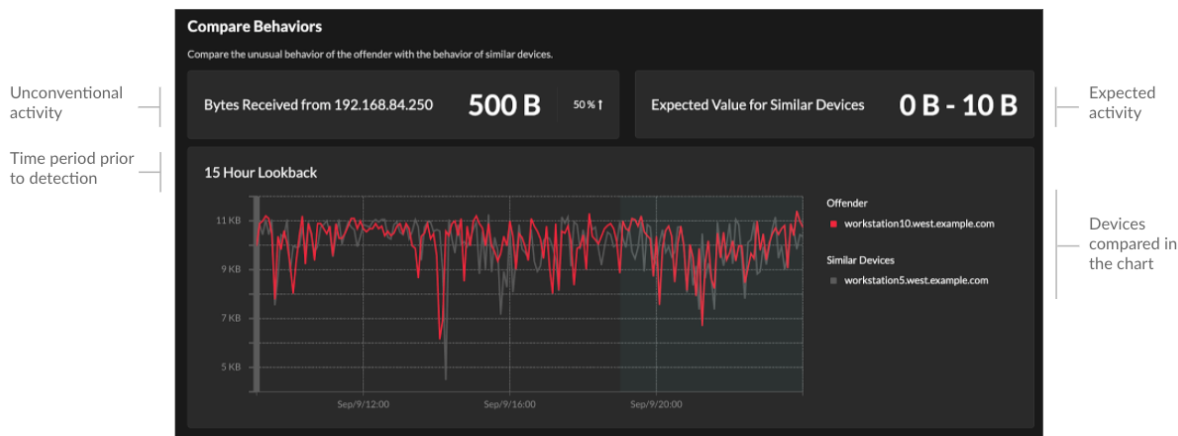
Activity map

Provides an **activity map** that highlights the participants involved in the detection. The activity map displays east-west traffic of the protocol associated with the detection to help you assess the scope of malicious activity. Click the victim or offender to access a drop-down menu with links to the Device Overview page and other detections where the device is a participant.




Compare behaviors

Provides a chart that displays the activity of the offender next to the activity of similar devices over the time period when the detection occurred. The chart appears for detections related to unconventional activity by a device, and highlights unexpected behavior by displaying it next to the behavior of devices on the network with similar properties.



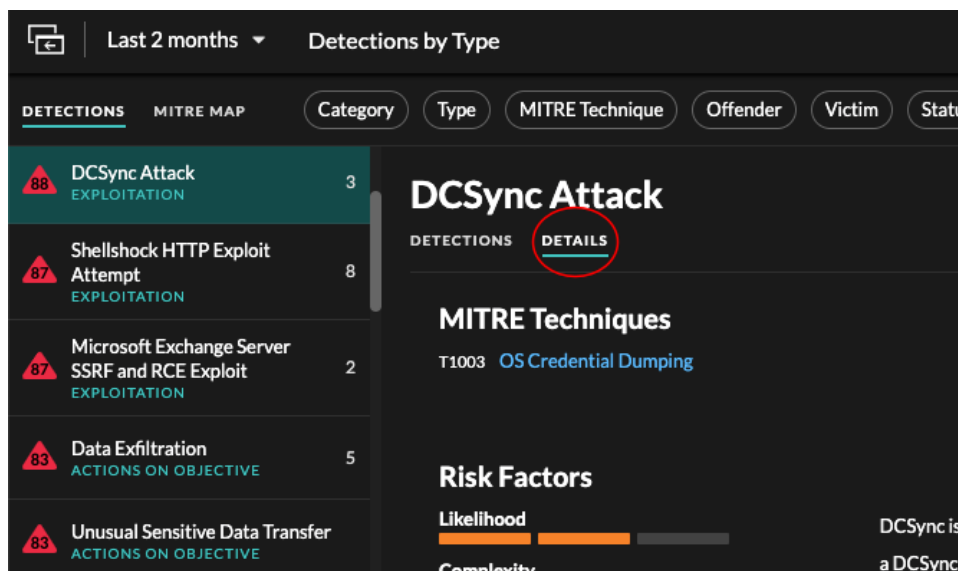
Detection data and links

Provides all available data about the detection, such as metrics from the targeted servers and clients and their [record](#) transactions. Click the icon  to view the raw [packets](#) associated with the detection.

Detection details

Provides an expanded description of the detection, such as associated MITRE techniques, risk factors, attack backgrounds and diagrams, mitigation options, and reference links to security organizations such as MITRE.

These details are displayed next to the detection card on wide screens (1900 pixels or greater), or you can access them by clicking **Details** under the detection title when grouping the Detection page by **Types**.



Tip: You can [share detection](#) detail pages with other ExtraHop users.

Viewing, filtering, and sorting detections

There are three types of controls at the top of the page that modify your Detections page: view, filters, and sort.

Viewing detections

By default, detections on the Detections page appear in a list that is grouped by detection type and sorted by highest risk.

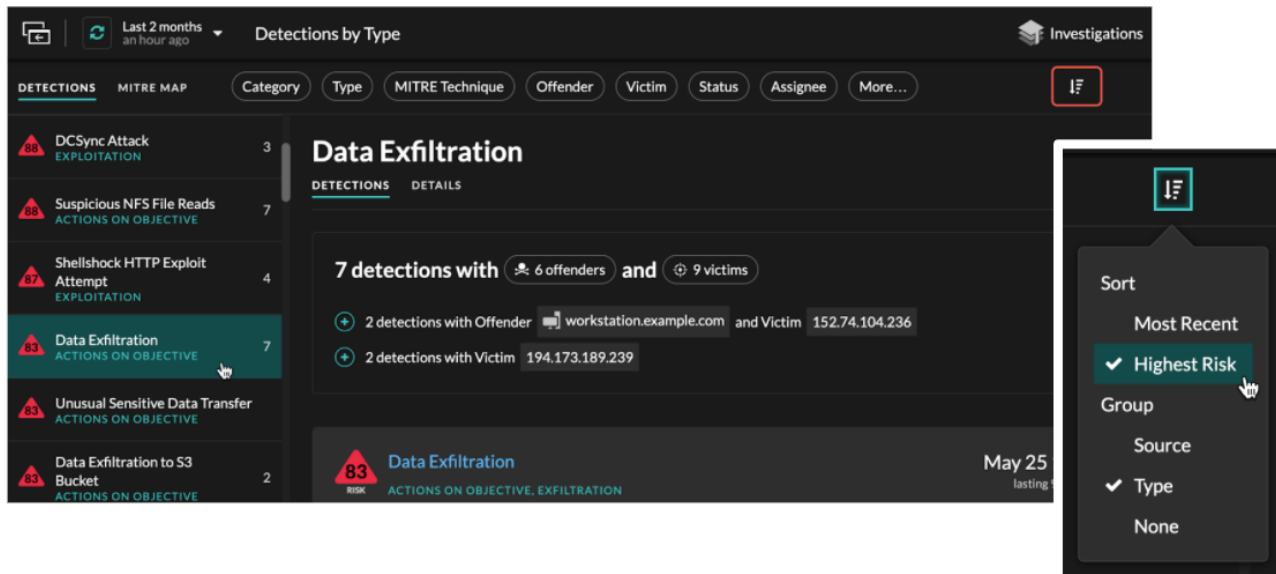
Click **MITRE Map** if you want to display your detections by attack technique. Each tile in the matrix represents an attack technique from the MITRE ATT&CK® Matrix for Enterprise. If a tile is highlighted, the detection associated with that technique occurred during the selected time interval. Click any tile to see detections that match that technique.

The screenshot shows the ExtraHop Detections interface. The top view displays a list of detections grouped by type, with 'Data Exfiltration' selected. Below the list, a summary shows '7 detections with 6 offenders and 9 victims'. A filter shows '2 detections with Offender workstation.example.com and Victim 152.74.104.236'. The bottom view shows the 'MITRE Map' matrix, which is a grid of attack techniques with their respective detection counts.

Initial Access	Execution	Persistence	Privilege Escalation	Defense Evasion	Credential Access	Discovery	Lateral Movement	Collection	Exfiltration	Command & Control
Drive-by Compromise T1189 688 Detections	Command and Scripting Interpreter T1059	Account Manipulation T1098	Boot or Logon Autostart Execution T1547	Exploitation for Defense Evasion T1211	Brute Force T1110 78 Detections	Account Discovery T1087 12 Detections	Exploitation of Remote Services T1210 25 Detections	Archive Collected Data T1560	Automated Exfiltration T1020 8 Detections	Application Layer Protocol Control T1071 116 Detections
Exploit Public-Facing Application T1190 21 Detections	Exploitation for Client Execution T1203 8 Detections	Boot or Logon Autostart Execution T1547	Boot or Logon Initialization Scripts T1037	Hijack Execution Flow T1574	Credentials from Password Stores T1555	Cloud Service Discovery T1526 164 Detections	Lateral Tool Transfer T1570	Data from Cloud Storage Object T1530	Data Transfer Size Limits T1030 8 Detections	Data Encoded in Clear Text T1132 4 Detections
External	Inter-Process Communication	Boot or Logon Initialization	Container	Impair Defenses	Exploitation for Credential Access	Domain Trust Discovery	Remote Services	Data from Information	Exfiltration Over	Data Obfuscation

Grouping detections

You can group detections by **Types** of detection (such as Spike in SSH Sessions) or by detection **Sources** (offender or victim hostname or IP address).



When grouping the Detection page by **Type**, the participant summary appears under the detection type. You can click filters in the summary title and select a single participant, or apply multiple [participant filters](#) by clicking the plus (+) icon.



For certain detections, a property summary is available when grouping by **Type**. Click a property filter to show other detections that match the property.

Timeline

When you group by **None** on the Detections page, a timeline chart displays the total number of detections identified within the selected time interval. Each horizontal bar in the chart represents the duration of a single detection and is color-coded according to the risk score.

- Click and drag to highlight an area on the chart to zoom in on a specific time range. Detections are listed for the new time interval.
- Hover over a bar to view the detection title.
- Click a bar to navigate directly to the detection detail page.


Security

Most network attacks tend to follow familiar patterns or phases. All security detections are assigned an attack category that corresponds with one of these phases.

When you group by **None** on the Detections page, a flow chart displays the number of detections that are associated with each attack category. Categories are assembled into an attack chain that characterizes the progression of steps an attacker takes to ultimately achieve their objective, such as stealing sensitive data.

Sorting detections

You can sort detections by either the highest risk score or most recent occurrence.

When sorted by **Most Recent**, detections with the most recent end time appear first. If two detections are still ongoing, the detection with the most recent update time appears first. Click the sort icon  to the far right to select an option.

Filtering detections

You can filter the Detections page to display only the detections that match your specified criteria. For example, you might only be interested in exfiltration detections that occur over HTTP, or detections associated with participants that are important servers.

Category

You can filter by Attack or Operations detections, or you can select a more specific category to further refine your view of the Detections page. When you click the Category filter, categories listed under the **All Attack Categories** and **All Operations Categories** options are sorted by the number of detections in the category.

Attack detections include the following categories that match phases of the attack chain.

Command & Control

An external server that has established and maintained connection to a compromised device on your network. C&C servers can send malware, commands, and payloads to support the attack. These detections identify when an internal device is communicating with a remote system that appears to be acting as a C&C server.

Reconnaissance

An attacker is seeking high-value targets and weaknesses to exploit. These detections identify scans and enumeration techniques.



Note: Detections might identify a known vulnerability scanner such as Nessus and Qualys. Click the device name to confirm if the device is already assigned a Vulnerability Scanner role in the ExtraHop system. To learn how to hide detections related to these devices, see [Tune detections](#).

Exploitation

An attacker is taking advantage of a known vulnerability on your network to actively exploit your assets. These detections identify unusual and suspicious behaviors associated with exploitation techniques.

Lateral Movement

An attacker has infiltrated your network and is moving from device to device in search of higher-value targets. These detections identify unusual device behavior associated with east-west corridor data transfers and connections.

Actions on Objective

The attacker is close to achieving their objective, which can vary from stealing sensitive data to encrypting files to ransom. These detections identify when an attacker is close to completing a campaign objective.

Operation detections include the following categories.

Caution

Highlight activity that does not present an imminent threat to operations, but should be addressed to sustain a healthy security posture. These detections also identify activity by suspicious participants that are associated with threat intelligence.

Hardening

Highlight security hardening best practices that should be enforced to mitigate the risk of exploitation. These detections identify opportunities to improve the security posture of your network, such as preventing credential exposure and removing expired SSL/TLS certificates from servers.

Authentication & Access Control

Highlight unsuccessful attempts by users, clients, and servers to log in or access resources. These detections identify potential WiFi issues over authentication, authorization, and audit (AAA) protocols, excessive LDAP errors, or uncover resource-constrained devices.

Database

Highlight access problems for applications or users based on analysis of database protocols. These detections identify database issues, such as database servers that are sending an excessive number of response errors that might cause slow or failed transactions.

Desktop & App Virtualization

Highlight long load times or poor quality sessions for end users. These detections identify application issues, such as an excessive number of Zero Windows, which indicates that a Citrix server is overwhelmed.

Network Infrastructure

Highlight unusual events over the TCP, DNS, and DHCP protocols. These detections might show DHCP issues that are preventing clients from obtaining an IP address from the server, or reveal that services were unable to resolve hostnames due to excessive DNS response errors.

Service Degradation

Highlight service issues or performance degradation associated with Voice over IP (VoIP), file transfer, and email communications protocols. These detections might show service degradations where VoIP calls have failed and provide the related SIP status code, or show that unauthorized callers have attempted to make several call requests.

Storage

Highlight problems with user access to specific files and shares found when evaluating network file system traffic. These detections might show that users were prevented from accessing files on Windows servers due to SMB/CIFS issues, or that network-attached storage (NAS) servers could not be reached due to NFS errors.

Web Application

Highlight poor web server performance or issues observed during traffic analysis over the HTTP protocol. These detections might show that internal server issues are causing an excessive number of 500-level errors, preventing users from reaching the applications and services they need.

Type

Filter your detection list by a specific detection type, such as Data Exfiltration or Expired SSL Server Certificates. You can also type a CVE identification number into this filter to only show detections for a specific public security vulnerability.

MITRE Technique

Highlight detections that match specific MITRE technique IDs. The MITRE framework is a widely recognized knowledgebase of attacks.

Offender and Victim

The offender and victim endpoints associated with a detection are known as participants. You can filter your detection list to only show detections for a specific participant, such as an offender that is an unknown remote IP address, or a victim that is an important server. Gateway or load balancer devices that are associated with external endpoint participants can also be specified in these filters.

Status

Show detections with a specific detection status, such as Acknowledged, In Progress, or Closed.

Assignee

Filter detections by the user assigned to the detection.

More Filters

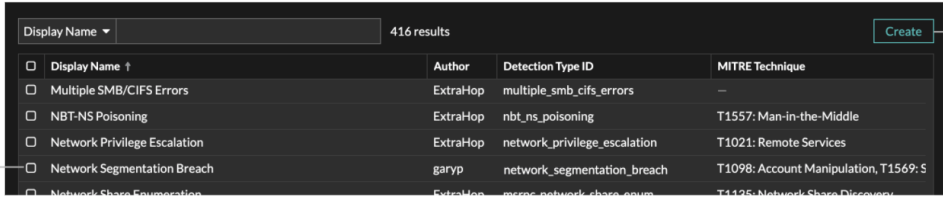
You can also filter your detections by the following criteria:

- [Device roles](#)
- Source
- Site (console only)
- Ticket ID filter ([Third-party ticketing systems](#) only)
- Minimum Risk Score

Detection Catalog

The Detection Catalog provides a complete list of all detection types available in the ExtraHop system. You can also manage custom detection types from the Detection Catalog page.

You can access the Detection Catalog page by clicking the System Settings icon .



Built-in detections with ExtraHop as the author

Custom detection with a username as the author

<input type="checkbox"/> Display Name ↑	Author	Detection Type ID	MITRE Technique
<input type="checkbox"/> Multiple SMB/CIFS Errors	ExtraHop	multiple_smb_cifs_errors	—
<input type="checkbox"/> NBT-NS Poisoning	ExtraHop	nbt_ns_poisoning	T1557: Man-in-the-Middle
<input type="checkbox"/> Network Privilege Escalation	ExtraHop	network_privilege_escalation	T1021: Remote Services
<input type="checkbox"/> Network Segmentation Breach	garyp	network_segmentation_breach	T1098: Account Manipulation, T1569: S
<input type="checkbox"/> Network Share Enumeration	ExtraHop	network_share_enum	T1125: Network Share Discovery

Create a custom detection type

In addition to the display name and author, you can filter the detection type list by detection type ID, MITRE techniques associated with the detection type, and detection types that support data from flow sensors.

To learn more about a built-in detection, click on the detection, and then click **Detection Type Details** in the Detection Type Settings panel.

Custom detections

You can view and manage custom detections from the Detection Catalog page.

- To create a custom detection type, click **Create** in the upper right corner of the page. The detection type ID for the new detection type must match the ID included in the custom detection trigger. Learn more about [creating a custom detection](#).
- To edit a custom detection, click the detection and edit the display name, author, and associated MITRE techniques in the Detection Type Settings panel. You cannot edit built-in detections where ExtraHop is listed as the author.
- To delete a custom detection, click the detection, and then click **Delete** from the Detection Type Settings panel.

Investigations

Investigations enable you to add and view multiple detections in a single timeline and map. Viewing a map of connected detections can help you determine whether suspicious behavior is a valid threat and if a threat is from a single attack, or part of a larger attack campaign.

The screenshot displays the 'Executable Downloads' investigation page. On the left, the 'Investigation timeline' lists four detections in chronological order relative to a T0 timestamp (Oct 13 11:59):

- T0 • Oct 13 11:59**: Unusual Executable File Download (CAUTION). Status: CLOSED. Action Taken. Assignee: garyp.
- T0 • Oct 13 11:59**: Unusual Executable File Download (CAUTION). Status: IN PROGRESS. Assignee: shawnk.
- T+21s • Oct 13 11:59**: Symmetrical Traffic: Possible Beacons Detected (CAUTION).
- T+3h • Oct 13 15:14**: Outbound Suspicious Connection (CAUTION).

On the right, the 'Investigation map' visualizes these detections as nodes connected by lines. The nodes include:

- An IP address node (OFFENDER: 212.201.42.11, External Endpoi...).
- A code editor icon node (VICTIM: Server3.west..., 192.168.32.271).
- A suspicious connection icon node (OFFENDER: Example1234..., 00:19:92:FF:A3...).

Labels on the map include 'UNUSUAL EXECUTABLE FILE DOWNLOAD' and 'OUTBOUND SUSPICIOUS CONNECTION'. A caption below the map reads: 'Click detections to view detection cards'.

You can create and add to investigations from a detection detail page or from the Actions menu on each detection card.

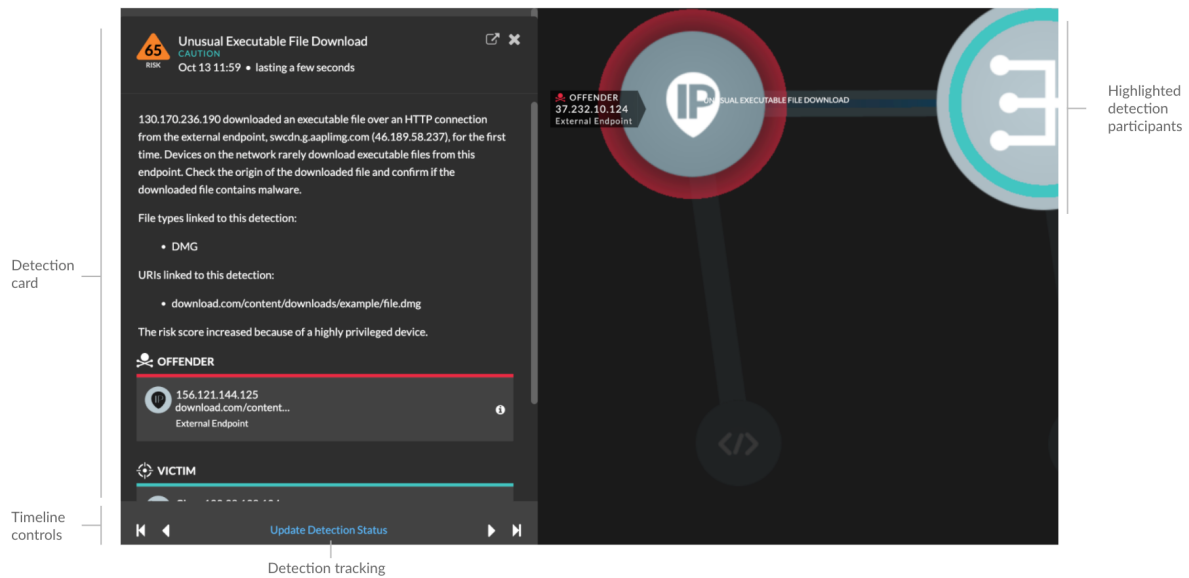
Each investigation page includes the following tools:

Investigation Timeline

The timeline appears on the left side of the page and lists the added detections in chronological order. New detections that are added appear in the timeline according to the time and date the detection occurred and relative to the earliest detection, which is labeled T0. Detection tracking information, such as assignee and status, is displayed for each detection.

Click a detection in the timeline to view the [detection card](#) and highlight the detection participants in the investigation map. Click a participant on the card or in the investigation map to view basic details and links to the Device Overview page and other detections where the device is a participant.

In the upper right corner of the detection card click the go to [🔗](#) icon to view the [detection detail page](#), or the [✕](#) icon to close the detection and return to the investigation timeline.



Below the detection card, click **Update Detection Status** to edit [detection tracking](#) information. You can click the timeline controls to view other detections in the investigation.

Investigation Map

The investigation map displays the offender and victim from every detection in the investigation. . The participants are connected by lines that are labeled with the detection type, and device roles are represented by an icon.

- Click a detection in the investigation timeline to highlight participants. Circles are highlighted red if the device is the offender and teal if the device is the victim. Highlights are updated when you click a different detection to help you identify when a participant changes from victim to offender.
- Click a circle to view details such as the device hostname, IP address, or MAC address, or to navigate to associated detections or the [Device Overview page](#).
- Hover over any circle or line to display the label.

Notes

Click **Edit Investigation** to add notes or change the investigation name. You can continue to [track individual detections](#) after you add them to an investigation.

Navigating investigations

After a detection is added to an investigation, a link to the investigation appears at the bottom of the detection card and on the detection detail page.

Click the name to open the investigation and then click the name of the detection on the investigation page to return to the detection detail page.

98 RISK
Data Exfiltration to S3 Bucket
EXFILTRATION

Jan 29 00:00
lasting 3 hours

workstation10-south performed an unusual upload to an Amazon S3 (Simple Storage Service) bucket. This behavior is unusual based on the amount of transferred data and the time of the transfer. workstation10-south might be compromised and an attacker is attempting to exfiltrate data.

The risk score is higher than normal because one of the participants is a critical device.

OFFENDER

workstation14-south
Site: south5

S3 Bytes Out by S3 Bucket Metric	6h Snapshot	1hr Peak Value	Expected Range	Deviation
168438423658-example		571 MB	0 B-1 B	57,058,367,900%

S3 Data Watcher
Investigation contains this detection.

By clicking the **Investigations** icon in the upper right corner of the Detections page you can view a list of all investigations on the system.

Last 3 days ▾ Detections by Type

Investigations

TYPES SOURCES TECHNIQUES ALL

Attack (32) Operations (748) Any (797) Type Category Technique Offender

Victim Status Assignee More Filters ▾

Apache Struts 2 Exploit Attempt
EXPLOITATION

VPN Gateway Access from an Unusual Location

DETECTIONS DETAILS

Unusual Login Time
LATERAL MOVEMENT 4

Learn how to [create an investigation](#).

Finding detections in the ExtraHop system

While the Detections page provides quick access to all detections, there are indicators and links to detections throughout the ExtraHop system.

Note: Detections remain in the system for a minimum of five weeks and then are removed if the system is no longer storing metrics related to the detection.

- From a Device Overview page, click Detections to view a list of associated detections. Click the link for an individual detection to view the detection details page.
- From a Device Group Overview page, click the Detections link to go to the Detections page. The detections list is filtered to the device group as the source.
- From a device or device group protocol page, click the Detections link to go to the Detections page. The detections list is filtered to the source and protocol.
- On an activity map, click a device that displays animated pulses around the circle label to [view a list of associated detections](#). Click the link for an individual detection to view detection details.
- From a chart on a dashboard or protocol page, hover over a [detection marker](#) to display the title of the associated detection or click the marker to view detection details.

Share a detection

You can send the URL from a detection detail page to other ExtraHop system users.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Detections**.
3. Find the detection that you want to share, and then click the detection title.
4. At the top of the browser, copy the entire URL.



Tip: Share a PDF of the detection detail page by clicking the PDF icon in the upper right corner of the page.

Next steps

- [Create a detection notification rule](#) to receive email notifications about a detection.

Create an investigation

Create an investigation to view multiple detections in a single timeline and map.

You can access the list of created investigations from the **Investigations** icon in the upper right corner of the Detections page.

Before you begin

- Users must be granted access through the [Detections Access Control global policy](#) and have limited-write [privileges](#) or higher to complete the tasks in this guide.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. At the top of the page, click **Detections**.
 3. Click **Actions** from the lower-left corner of the detection card.
 4. Click **Add to an Investigation...**
 5. Select **Add detection to a new investigation**.
 6. Click **Next**.
 7. Type a name and add notes to the new investigation.
 8. Click **Create**.

After the investigation name appears at the bottom of the detection card, you can click the investigation name to view the timeline and map.

- To add a detection to the investigation, click **Actions**, and then click **Add to an Investigation...**
- To delete a detection from an investigation, click the delete icon (X) on the detection in the investigation timeline.

Create a detection notification rule

Create a notification rule if you want to receive a notification about detections that match specific criteria.


When a detection that matches your criteria is generated, a notification is sent with information from the [detection card](#).

You can configure the system to send an email to a recipient list or call a specific webhook.

Before you begin

- Users must be granted access through the [Detections Access Control global policy](#) and have full write [privileges](#) or higher to complete the tasks in this guide.

- Reveal(x) 360 requires a [connection to ExtraHop Cloud Services](#) to send notifications through email and webhooks. Reveal(x) Enterprise requires a connection to ExtraHop Cloud Services to send notifications through email, but can send a notification through a webhook without a connection.
- Email notifications are sent through ExtraHop Cloud Services and might contain identifiable information such as IP addresses, usernames, hostnames, domain names, device names, or file names. Reveal(x) Enterprise users who have regulatory requirements that prohibit external connections can configure notifications with webhook calls to send notifications without an external connection.
- Reveal(x) 360 cannot send webhook calls to endpoints on your internal network. Webhook targets must be open to external traffic.
- Webhook targets must have a certificate signed by a certificate authority (CA) from the Mozilla CA Certificate Program. See https://wiki.mozilla.org/CA/Included_Certificates for certificates from trusted public CAs.
- Reveal(x) Enterprise must connect directly to webhook endpoints to send notifications.
- Email notifications are sent from no-reply@notify.extrahop.com. Make sure to add this address to your list of allowed senders.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Notification Rules**.
3. Click **Create**.
4. In the Name field, type a unique name for the notification rule.
5. In the Description field, add information about the notification rule.
6. In the Event section, select **Detection**.
7. In the Criteria section, click **Add Criteria** to specify criteria that will generate a notification.

- **Minimum Risk Score**
- **Type**
- **Category**
- **Technique**
- **Offender**
- **Victim**
- **Device Role**
- **Source**
- **Site**

The criteria options match the [filtering options on the Detections page](#).

8. In the Actions section, click **Add Action** to specify how the notification will be sent.
 - Click **Send Email** and specify individual email addresses, separated by a comma.
 - Click **Call Webhook** and specify the following settings:
 1. In the Payload URL field, type the URL of the webhook.
 2. In the Payload (JSON) field, type the JSON payload that will be sent to the payload URL.
See the [Webhook Notification Reference](#) for example payloads.
 3. (Optional) In the Custom Headers section, click **Add Header** to specify custom key:value pairs.
Custom headers are added to the header of the webhook HTTP POST request.
 4. Click **Save**.
 5. Click **Test Connection**.

A message titled Test Notification will be sent to the Payload URL to confirm the connection.



Note: After testing the connection, confirm that you received the notification in the target application. Reveal(x) Enterprise displays an error message if the test notification was not successful.

6. Select an authentication type.

- **No Authentication**
- **Basic Authentication**
Enter the username and password for the target application.
- **Bearer Token**
Enter the access token for the target application.

9. In the Options section, select the **Enable notification rule** checkbox to enable the notification.

When a detection matches the criteria, a notification is sent. A single detection will never generate more than one notification per notification rule.

Webhook Notification Reference

This guide provides reference information to help you write the JSON payload for webhook-based notifications. The guide contains an overview of the Payload (JSON) interface, a list of detection variables that are available for webhooks, and examples of JSON structure for common webhook targets, such as Slack, Microsoft Teams, and Google Chat.

For more information about notification rules, see [Create a detection notification rule](#).

Payload JSON

ExtraHop webhooks are formatted in JSON, powered by the [Jinja2 templating engine](#). When you create a notification rule and select the webhook option, the webhook editor opens to the right, and you can edit the payload.

You can modify the default payload with custom properties or copy a JSON template for Slack, Microsoft Teams, or Google Chat, from the [Examples](#) section.

By default, the payload contains a sample `text` property. The sample JSON in the figure below sends a notification with the text "ExtraHop Detection" followed by the detection title that replaces the variable.



```

Payload (JSON) Open Webhook Reference
1 {
2   "text": "ExtraHop Detection: {{title}}"
3 }
```

We recommend that you test your connection to the webhook URL before modifying the payload. That way you can be sure any issues are not due to a connection error.

Syntax validation

The webhook editor provides JSON and Jinja2 syntax validation. If you type a line that includes incorrect JSON or Jinja2 syntax, an error appears under the Payload field with the error.

Variables

Detection variables are added to the payload by inserting the variable name between double sets of curly braces `{{ and }}`.

For example, the sample in the payload includes a variable for the detection title:

```
"text": "ExtraHop Detection: {{title}}"
```

When a detection matches a notification rule with the variable, the variable is replaced by the detection title. For example, if the notification rule matches the detection for Network Share Enumeration, the variable is replaced with the title in the notification, similar to the following figure:



EHop Webhook Bot Wed 11:17 AM •
ExtraHop Detection: Network Share Enumeration

See a list of [detection variables](#).

Filters

Filters enable you to modify a variable.

Passing JSON

If the variable returns a value that is formatted in JSON, the value is automatically escaped and translated into a string. If you want to pass valid JSON to your webhook target, you must specify the `safe` filter:

```
{{<variable> | safe }}
```

In the following example, the variable returns JSON-formatted detection data about participants directly to the webhook target:

```
{{api.participants | safe }}
```

IF statements

An IF statement can check whether a value is available for the variable. If the variable is empty, you can specify an alternative variable.

```
{% if {{<variable>}} %}
```

In the following example, the IF statement checks if a value is available for the victim variable:

```
{% if victims %}
```

In the following example, the IF statement checks if an offender name is available. If there is no value for the offender name, the value for the offender IP address variable is returned instead.

```
{% if offender.name %}{{offender.name}}{%else%}{{offender.ipaddr}}
{% endif %}
```

FOR loops

A FOR loop can enable the notification to display an array of objects.

```
{% for <array-object-variable> in <array-variable> %}
```

In the following example, a list of offender names from the offenders array are displayed in the notification. An IF statement checks for more items in the array (`{% if not loop.last %}`) and adds a line break before printing the next value (`\n`). If an offender name is empty, the default filter returns “Unknown Name” for the value.

```
{% for offender in offenders %}
  {{offender.name | default ("Unknown Name")}}
  {% if not loop.last %}\n
  {% endif %}
{% endfor %}
```

Available detection variables

The following variables are available for webhook notifications about detections.

title: *String*

The title of the detection.

detection: *String*

A description of the detection.

type: *String*

The type of detection.

id: *Number*

The unique identifier for the detection.

url: *String*

The URL for the detection in the ExtraHop system.

risk_score: *Number*

The risk score of the detection.

site: *String*

The site where the detection occurred.

start_time_text: *String*

The time that the detection started.

end_time_text: *String*

The time that the detection ended.

categories_array: *Array of Strings*

An array of categories that the detection belongs to.

categories_string: *String*

A string that lists the categories that the detection belongs to.

mitre_tactics: *Array of Strings*

An array of MITRE tactic IDs associated with the detection.

mitre_tactics_string: *String*

A string that lists the MITRE tactic IDs associated with the detection.

mitre_techniques: *Array of Strings*

An array of MITRE technique IDs associated with the detection.

mitre_techniques_string: *String*

A string that lists the MITRE technique IDs associated with the detection.

offender_primary: *Object*

An object that identifies the primary offender and contains the following properties:

external: *Boolean*

The value is `true` if the primary offender IP address is external to your network.

ipaddr: *String*

The IP address of the primary offender.

name: *String*

The name of the primary offender.

offenders: *Array of Objects*

An array of offender objects associated with the detection. Each object contains the following properties:

external: *Boolean*

The value is `true` if the offender IP address is external to your network.

ipaddr: *String*

The IP address of the offender. Applies to detections with multiple offenders.

name: *String*

The name of the offender. Applies to detections with multiple offenders.

victim_primary: Object

An object that identifies the primary victim and contains the following properties:

external: Boolean

The value is `true` if the primary victim IP address is external to your network.

ipaddr: String

The IP address of the primary victim.

name: String

The name of the primary victim.

victims: Array of Objects

An array of victim objects associated with the detection. Each object contains the following properties:

external: Boolean

The value is `true` if the victim IP address is external to your network.

ipaddr: String

The IP address of the victim. Applies to detections with multiple victims.

name: String

The name of the victim. Applies to detections with multiple victims.

api: Object

An object that contains all fields returned by the `GET /detections/{id}` operation. For more information, see the [Introduction to the ExtraHop REST API](#).

Webhook Examples

The following sections provide JSON templates for common webhook targets.

Slack

After you create a Slack app and enable incoming webhooks for the app, you can create an incoming webhook. When you create an incoming webhook, Slack will generate the URL for you to enter in the Payload URL field in your notification rule.

The following example shows the JSON payload for a Slack webhook:

```
{
  "blocks": [
    {
      "type": "header",
      "text": {
        "type": "plain_text",
        "text": "Detection: {{ title }}"
      }
    },
    {
      "type": "section",
      "text": {
        "type": "mrkdown",
        "text": "
          • *Risk Score:* {{ risk_score }}\n
          • *Category:* {{ categories_string }}\n
          • *Site:* {{ site }}\n
          • *Primary Offender:* {{ offender_primary.name }} ({{ offender_primary.ipaddr }})\n
          • *Primary Victim:* {{ victim_primary.name }} ({{ victim_primary.ipaddr }})\n"
      }
    },
    {
      "type": "section",
      "text": {
        "type": "plain_text",

```

```

        "text": "Detection ID: {{ id }}"
    },
    "text": {
        "type": "mrkdwn",
        "text": "<{{ url }}|View Detection Details>"
    }
}
]
}

```

Microsoft Teams

You can add an incoming webhook to a Teams channel as a connector. After you configure an incoming webhook, Teams will generate the URL for you to enter in the Payload URL field in your notification rule.

The following example shows the JSON payload for a Microsoft teams webhook:

```

{
  "type": "message",
  "attachments": [
    {
      "contentType": "application/vnd.microsoft.card.adaptive",
      "contentUrl": null,
      "content": {
        "$schema": "https://adaptivecards.io/schemas/adaptive-card.json",
        "type": "AdaptiveCard",
        "body": [
          {
            "type": "ColumnSet",
            "columns": [
              {
                "type": "Column",
                "width": "16px",
                "items": [
                  {
                    "type": "Image",
                    "horizontalAlignment": "center",
                    "url": "https://assets.extrahop.com/favicon.ico",
                    "altText": "ExtraHop Logo"
                  }
                ]
              },
              {
                "type": "Column",
                "width": "stretch",
                "items": [
                  {
                    "type": "TextBlock",
                    "text": "ExtraHop Reveal(x)",
                    "weight": "bolder"
                  }
                ]
              }
            ]
          }
        ],
        "type": "TextBlock",
        "text": "***{{ title }}***"
      },
      {
        "type": "TextBlock",
        "spacing": "small",

```


Track a detection

Detection tracking enables you to assign users, set a status, and add notes to a detection card.

You can also filter your view of detections by specific status or assignee.

Before you begin

Users must have limited write [privileges](#) or higher to complete the tasks in this guide.

Here are important considerations about tracking detections:

- The Acknowledged or Closed status does not hide the detection.
- The detection status can be updated by any privileged user.
- Optionally, you can [configure detection tracking with a third-party system](#).
- If you are currently tracking detections with a third-party system, you will not see ExtraHop detection tracking until you change the setting in the [Administration](#) settings.

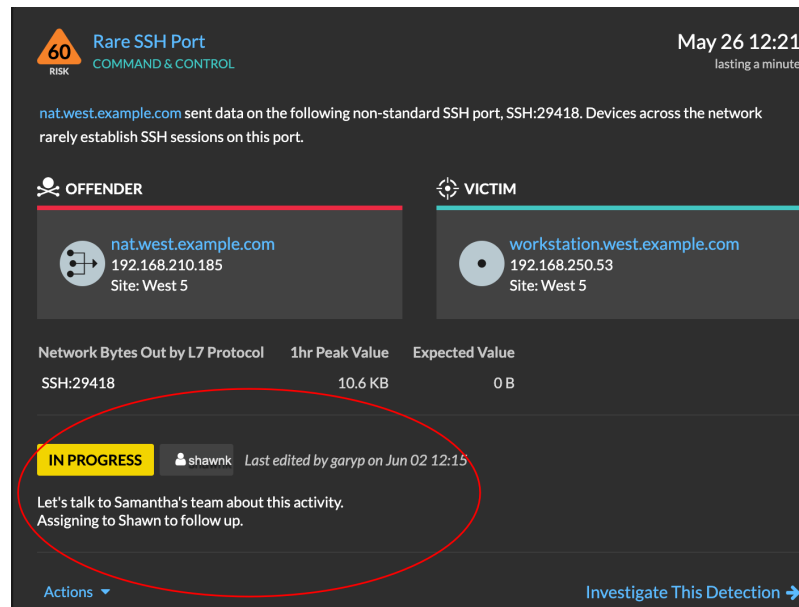
To track a detection, complete the following steps:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Detections**.
3. Click **Actions** from the lower-left corner of the detection card.
4. (Optional) Click a detection status to add it to the detection.

Option	Description
Acknowledge	The detection has been seen and should be prioritized for follow-up.
In Progress	The detection has been assigned to a team member and is being reviewed.
Closed - Action Taken	The detection was reviewed and action was taken to address the potential risk.
Closed - No Action Taken	The detection was reviewed and required no action.

The screenshot shows a detection card for 'Rare SSH Port' with a risk level of 60. The detection occurred on May 26 at 12:21, lasting a minute. The description states that 'nat.west.example.com' sent data on a non-standard SSH port (29418). The card identifies an offender IP (192.168.210.185) and a victim IP (192.168.250.53). Network statistics show 10.6 KB of bytes out for SSH:29418. The status is 'IN PROGRESS', assigned to user 'garyp', and last edited on Jun 02 at 12:05. An 'Investigate This Detection' button is visible at the bottom right.

5. Click **Update Status...** to set the detection status, assign the detection to a user, and add notes to the detection card.



From the **Actions** dropdown, select **Update Status...** and then **None** to remove the status from the detection; the assignee and notes remain visible.

Contain CrowdStrike devices from a detection

You can initiate containment of CrowdStrike devices that are participants in a security detection. Containment prevents devices from establishing connections to other devices on your network.



After you initiate containment from a detection, a request is made to CrowdStrike Falcon to contain the devices and a Containment Pending status appears next to the participant. The status is updated to Contained only after the ExtraHop system receives a response from CrowdStrike.

Before you begin



- Device containment must be enabled for the [CrowdStrike integration](#).
 - Users must be granted access through the [Detections Access Control global policy](#) and have limited-write [privileges](#) or higher to complete the tasks in this guide.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. At the top of the page, click **Detections**.
 3. Click a detection title to view the detection detail page.
The number of CrowdStrike devices that are participants in the detection appear in the Integrations section under Track Detection.

Track Detection

Status **Assignee**

No Status  Unassigned 

Integrations

 **CrowdStrike Falcon** 

4 participants are CrowdStrike devices

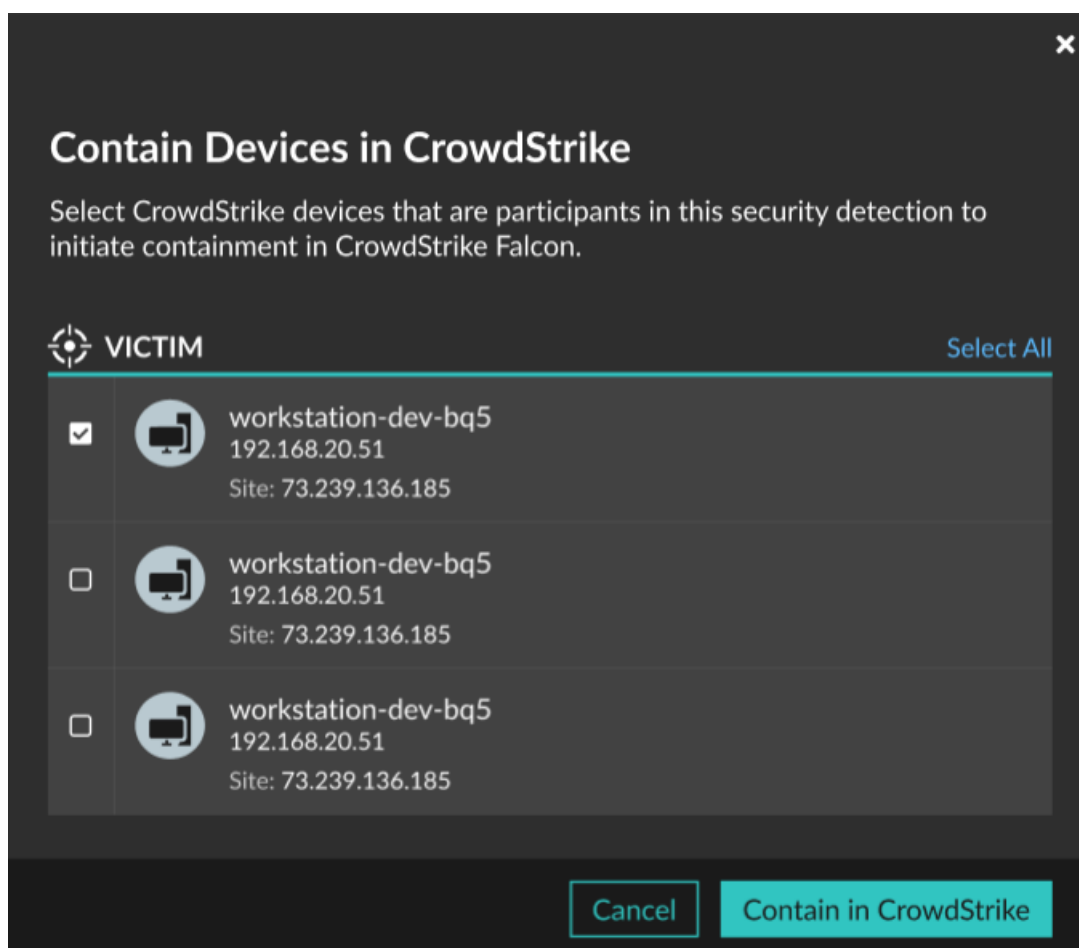
Contain Devices in CrowdStrike

Actions

[Add to an Investigation](#)

[Tune Detection](#)

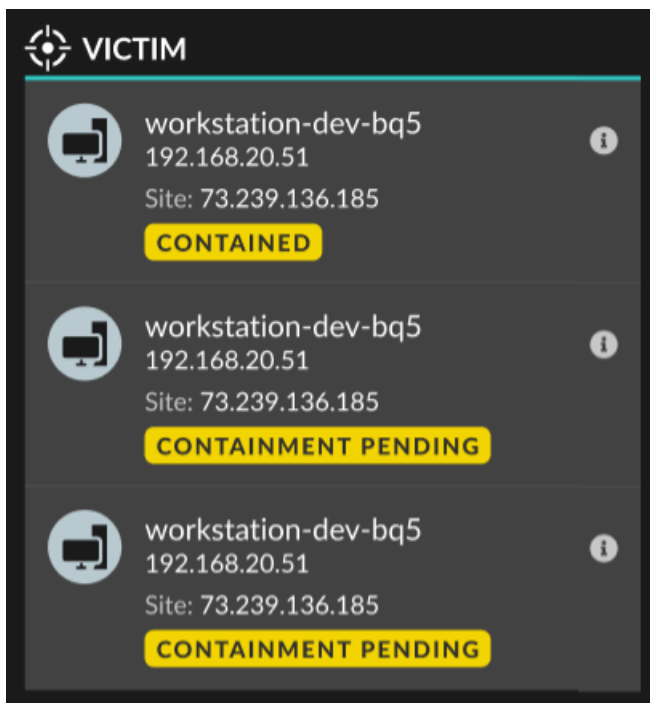
4. Click **Contain Devices in CrowdStrike**.
The dialog box displays the CrowdStrike devices associated with the detection.



5. Select the devices you want to contain and click **Contain in CrowdStrike**. A request is sent to CrowdStrike and the Containment Pending status appears next to each selected participant.

Next steps

- Verify device containment by checking the status from the detection details. The containment status also appears in the [device properties](#).



- Retry containing a device. The Containment Pending status no longer appears when a containment request to CrowdStrike is denied or expires.
- Release a device from containment from the CrowdStrike Falcon console. From the Integrations section under Track Detection, click **CrowdStrike Falcon** to open the console in a new tab. The containment status no longer appears after the ExtraHop system receives a response from CrowdStrike.

Create a custom detection

Custom detections enable you to specify criteria that generates detections on the ExtraHop system. Machine-learning and rules-based detections capture unusual behaviors and common threats, however by creating a custom detection, you can hone in on the devices and behaviors that are critical for your network.

When creating a custom detection, you must create a trigger that identifies the system event and conditions that the system should watch for, and then you can assign the trigger to the specific devices or device groups you want to monitor. When the event occurs, a detection is generated.

In this guide, we provide the steps and an example script that generates a custom detection when suspicious connections are made to specified websites through Windows PowerShell.

Before you begin

- You must have some familiarity with ExtraHop [Triggers](#). In particular, consider [these best practices](#) when writing your script and assigning triggers.
- You must have a user account with the [privileges](#) required to create triggers.
- If you have a console, create a trigger on the console and the trigger will run on all connected sensors.

Create a trigger to generate custom detections


Triggers generate custom detections by calling the `commitDetection` function in the trigger script.

In the following example, the trigger generates a custom detection when a PowerShell client reaches out to a website that is known as a staging site for exfiltrated data.

The trigger identifies PowerShell connections by looking for SSL client JA3 hashes that belong to known PowerShell clients.

If the SSL connection occurs from a PowerShell client to a suspicious host, the trigger generates a detection. The detection includes the version of PowerShell that initiated the connection, the server IP address, and the client IP address.

 **Note:** For more information about the `commitDetection` function, see the [Trigger API Reference](#).

1. Click the System Settings icon  and then click **Triggers**.
2. Click **Create**.
3. Specify the following trigger configuration settings:

Name

Type a name for your trigger. This name identifies your trigger, not the detection.

In our example, we will enter the name: `Custom Detection: PowerShell Connection to Suspicious Site`.

Description

(Optional) Type the trigger description. This description is for the trigger, not the detection.

In our example, we will enter the description: `Creates a detection every time a PowerShell client connects to pastebin, raw.githubusercontent.com, or githack. PowerShell clients are identified by JA3 hashes.`

Events

Select the event on which the trigger runs.

In our example, we will select the `SSL_OPEN` event. This event occurs when an SSL connection is first established.

Assignments

Select the device or device group that you want to monitor. Initially, assign your trigger to a single device for testing. After you have confirmed that the custom detection works properly, assign the trigger to a device group that contains all of the devices you want to monitor.

Because PowerShell is a Windows command-line tool, select a Microsoft server to test the trigger. After you confirm that the custom detection is working correctly, change the assignment to a device group that contains all your critical Microsoft servers. For more information about creating device groups, see [Create a device group](#).

4. In the right pane, type the code that determines when your custom detection is generated. In our example, the following trigger code identifies when a client initiates connection to pastebin, githubusercontent, or githack:

```
if(SSL.host.match(/pastebin/i) || SSL.host.match(/
raw.githubusercontent.com/i) || SSL.host.match(/githack/i)) {
}

```

5. Next, type the code that commits your custom detection. The `commitDetection` function must be written in the following format:

```
commitDetection('<detection type ID>', {
  title: '<title>',
  description: '<detection description>',
  categories: ['<category>'],
  riskScore: <risk score>,
  participants: [{
    object:<offender participant>,
    role: 'offender'
  }
}

```

```

    }, {
      object: <victim participant>,
      role: 'victim'
    }],
    identityKey: '<identity key>',
    identityTtl: '<time period>',
  });

```

Enter values for each of the following parameters in your script.

Value	Description
detection type ID	A unique string that identifies your custom detection. This string can only contain letters, numbers, and underscores.
title	Text that appears at the top of the detection card. Type a descriptive title that is easy to scan.
detection description	<p>Text that appears below the title and category on a detection card. Type information about the event that generates the detection.</p> <p>This field supports markdown. We recommend that you include interpolation variables to display specific information about your detection.</p> <p>For example, the variables <code>\$(Flow.client.ipaddr)</code> and <code>\$(Flow.server.ipaddr)</code> display the IP address of the client and server device in the flow and <code>\$(Flow.l7proto)</code> displays the L7 protocol. Include <code>\n</code> at the end of each line of text to make sure the description displays correctly.</p>
category	A label by which you can filter similar detections. You can add multiple categories. For a full list of category values, see the Trigger API Reference .
risk score	A number that measures the likelihood, complexity, and business impact of a security detection. The risk score icon appears at the top of the detection card and is color coded by severity as red (80-99), orange (31-79), or yellow (1-30). You can sort detections by risk .
offender participant victim participant	<p>An array of objects that identifies the participants in the detection. Define the role of the participant as either 'offender' or 'victim' and provide a reference to a device, IP address, or application object for that role.</p> <p>For example, the following array identifies the server as the offender and the client as the victim in a flow:</p>

```

participants:
[
  { role: 'offender', object:
    Flow.server.device},

```


Value	Description
	<pre data-bbox="878 205 1458 296"> { role: 'victim', object: Flow.client.device }] </pre> <p data-bbox="878 321 1458 411">For more information about device, IP address, and application objects, see the Trigger API Reference.</p>
identity key	<p data-bbox="878 443 1458 632">A string that enables the identification of ongoing detections. If multiple detections with the same identity key and detection type are generated within the time period specified by the <code>identityTtl</code> parameter, the detections are consolidated into a single ongoing detection.</p> <p data-bbox="878 653 1458 709">Create a unique identity key string by combining characteristics of the detection.</p> <p data-bbox="878 730 1458 821">For example, the following identity key is created by combining the server IP address and the client IP address:</p> <pre data-bbox="878 842 1458 953"> identityKey: [Flow.server.ipaddr, Flow.client.ipaddr].join('!!!') </pre>
time period	<p data-bbox="878 980 1458 1136">The amount of time after a detection is generated that duplicate detections are consolidated into an ongoing detection. The time period is reset, and the detection does not end until the time period expires.</p> <p data-bbox="878 1157 1458 1184">The following time periods are valid:</p> <ul data-bbox="878 1205 1458 1304" style="list-style-type: none"> • hour • day • week <p data-bbox="878 1325 1458 1352">The default time period is <code>hour</code>.</p>

The following example shows the completed script section.

```

commitDetection('powershell_ja3', {
  title:
'PowerShell / BitsAdmin Suspicious Connection',
  description:
"This SSL client matched a variant of PowerShell." + "\n"+
"Investigate other client behaviors on the victim host." + "\n"+
"- ** PowerShell/BitsAdmin JA3 client match**" + "\n"+
"- **Client IP:** " + Flow.client.ipaddr + "\n"+
"- **JA3 Client Value:** " + ja3 + "\n"+
"- **JA3 Client Match:** " + suspect_ja3_hashes[ja3],
  categories: ['sec.caution'],
  riskScore: 60,
  participants: [{
    object:Flow.client.device,
    role: 'offender'
  }],
  identityKey: [

```

```
Flow.server.ipaddr,
Flow.client.ipaddr,
hash
].join('!!!'),
    identityTtl: 'hour',
});
```

These values appear in the detection card similar to the following figure:

The screenshot shows a detection card for 'powershell_ja3'. On the left, labels point to the following fields:

- detection type ID:** powershell_ja3
- title:** powershell_ja3
- risk score:** 60 (RISK) CAUTION
- category:** powershell_ja3
- description:** This SSL client matched a variant of PowerShell. Investigate other client behaviors on the victim host.
 - ** PowerShell/BitsAdmin JA3 client match**
 - **Client IP:** 192.168.131.109
 - **JA3 Client Value:** 8c4a22651d328568ec66382a84fc505f:BitsAdmin/PowerShell 5.0 Windows 7 64 bit enterprise
 - **JA3 Client Match:** 8c4a22651d328568ec66382a84fc505f:BitsAdmin/PowerShell 5.0 Windows 7 64 bit enterprise
- participants:** workstation05.example.com (192.168.131.109)

Additional information on the card includes the timestamp 'Sep 16 10:43' and the duration 'lasting a few seconds'. An 'OFFENDER' icon is also present above the participant information.

6. Click **Save** and then click **Done**.
See [Example Custom Detection Trigger](#) for a complete annotated script.

Create a custom detection type

After you create a trigger to generate your custom detection, create the custom detection type to specify a display name and to add MITRE links, which enable your custom detection to appear in the matrix on the Group by MITRE Technique page.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Detection Catalog**.
3. Click **Create**.
4. Complete the following fields:

Display Name

Type a unique name that appears in place of the detection type ID.

Detection Type ID

Type the value that you entered for the detection type ID in the trigger. For example, if you typed: `commitDetection('network_segmentation_breach')`, the detection type ID is "network_segmentation_breach".

Author

Identify the author of the custom detection.

MITRE Technique

From the drop-down list, select one or more MITRE techniques that you want to link to the detection.

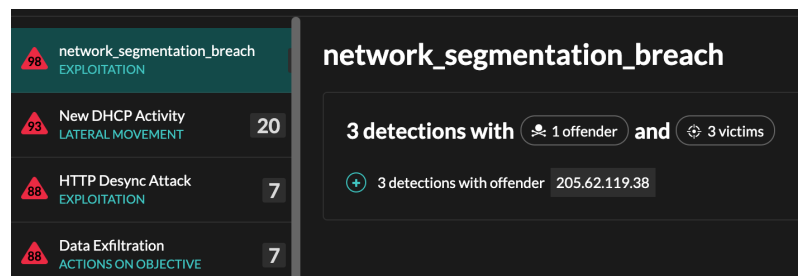
- Click **Save**.

View custom detections

When a custom detection is generated, you can view it on the Detections page.

From the top left of the page, select **Types**. Custom detections are grouped by the detection type ID or by the display name.

For example, if your detection type ID is `network_segmentation_breach`, it would appear in the detection list similar to the following figure:



From the top left of the page, select **Techniques**. The MITRE techniques that were linked to the custom detection are highlighted in the matrix.

Next steps

Generate alerts for your custom detection by [configuring detection alert settings](#). For example, you can configure the ExtraHop system to email you when your custom detection occurs.

Example Custom Detection Trigger

The following script is the complete PowerShell/JA3 example referred to throughout these instructions.

```
// If the server is internal, exit
if ( ! Flow.server.ipaddr.isExternal ) {
    return;
}
// If the SSL host name is not set, exit
if(SSL.host === null) { return; }

// Continue only if the SSL hostname belongs to one of the suspicious sites
if(SSL.host.match(/pastebin/i) || SSL.host.match(/raw.githubusercontent.com/i) || SSL.host.match(/githack/i)) {

    // List of common PowerShell JA3 hashes
    let suspect_ja3_hashes = cache('suspect_ja3_hashes', () => ({
        '13cc575f247730d3eeb8ff01e76b245f': 'PowerShell/BitsAdmin/PowerShell
4.0 Windows Server 2012RT',
        '5e12c14bda47ac941fc4e8e80d0e536f': 'PowerShell/BitsAdmin/PowerShell
4.0 Windows Server 2012RT',
        '2c14bfb3f8a2067fbc88d8345e9f97f3': 'PowerShell/BitsAdmin Windows
Server 2012RT',
        '613e01474d42e48ef52dff6a20f079': 'PowerShell/BitsAdmin Windows
Server 2012RT',
```

```

'05af1f5ca1b87cc9cc9b25185115607d': 'BitsAdmin/PowerShell 5.0 Windows
7 64 bit enterprise',
'8c4a22651d328568ec66382a84fc505f': 'BitsAdmin/PowerShell 5.0 Windows
7 64 bit enterprise',
'235a856727c14dba889ddee0a38dd2f2': 'BitsAdmin/PowerShell 5.1 Server
2016',
'17b69de9188f4c205a00fe5ae9c1151f': 'BitsAdmin/PowerShell 5.1 Server
2016',
'd0ec4b50a944b182fc10ff51f883ccf7': 'PowerShell/BitsAdmin (Microsoft
BITS/7.8) Server 2016',
'294b2fldc22c6e6c3231d2fe311d504b': 'PowerShell/BitsAdmin (Microsoft
BITS/7.8) Server 2016',
'54328bd36c14bd82ddaa0c04b25ed9ad': 'BitsAdmin/PowerShell 5.1 Windows
10',
'fc54e0d16d9764783542f0146a98b300': 'BitsAdmin/PowerShell 5.1 Windows
10',
'2863b3a96f1b530bc4f5e52f66c79285': 'BitsAdmin/PowerShell 6.0 Windows
Server 2012RT',
'40177d2da2d0f3a9014e7c83bdeee15a': 'BitsAdmin/PowerShell 6.0 Windows
Server 2012RT',
'36f7277af969a6947a61ae0b815907a1': 'PowerShell/BitsAdmin Windows 7
32 bit enterprise',
    }));
    // Store the client JA3 hash in a variable
    const hash = SSL.ja3Hash;

    // Iterate through each PowerShell JA3 hash
    for ( let ja3 in suspect_ja3_hashes ) {

        // If the client JA3 hash is from PowerShell,
        // commit the detection
        if ( hash.includes(ja3) ) {

            commitDetection('PowerShell_JA3', {
                categories: ['sec.caution'],
                title: "PowerShell / BitsAdmin Suspicious Connection",
                // Specify the offender as the device object of the client
                participants: [
                    { role: 'offender', object: Flow.client.device }
                ],
                description:
                    "This SSL client matched a variant of PowerShell." +
                    "\n" +
                    "Investigate other client behaviors on the victim host."
                    + "\n" +
                    "- ** PowerShell/BitsAdmin JA3 client match**" + "\n" +
                    "- **Client IP:** " + Flow.client.ipaddr + "\n" +
                    "- **Server IP:** " + Flow.server.ipaddr + "\n" +
                    "- **JA3 Client Value:** " + ja3 + "\n" +
                    "- **JA3 Client Match:** " + suspect_ja3_hashes[ja3],
                // Create the identity key by combining the server IP
                address, client IP address, and PowerShell JA3 hash
                identityKey: [
                    Flow.server.ipaddr,
                    Flow.client.ipaddr,
                    hash
                ].join('!!!'),
                riskScore: 60,
                identityTtl: 'hour'
            });
        }
    }
}

```

Tune detections

Detection tuning enables you to reduce noise and surfaces critical detections that require immediate attention.

There are two ways to tune detections: you can add tuning parameters that suppress detections from ever being generated, or you can create tuning rules that hide existing detections based on detection type, participants, or detection properties.


Tuning Parameters

Tuning parameters enable you to specify known and trusted domains, DNS servers, HTTP CONNECT targets, and HTTP user agents that should not generate a detection. You can also enable tuning parameters that suppress frequent and redundant detections associated with gateway devices and tor nodes.

Tuning parameters are managed from the [Tuning Parameters](#) page and [trusted domains](#) are managed from the Network Localities page.



Tuning Rules

Tuning rules enable you to specify criteria that hide detections that have been generated, but are of low-value and do not require attention.

 **Note:** Tuning rules might not hide certain detections if your packet sensors are not running the same firmware version as your console.

Tuning rules hide all past, current, and future detections and participants that match the specified criteria and affect the following system areas:

- Hidden detections do not cause related triggers and alerts to run while the rule is enabled.
- Hidden detections do not appear as detection markers in charts.
- Hidden detections do not appear on activity maps, but hidden participants will appear in investigation maps.
- Hidden detections do not appear in detection counts on related pages, such as the Device Overview page or the Activity page.
- Hidden detections and participants do not appear in the Executive Report.
- Hidden detections are not included in email and webhook notifications.

 **Note:** If you do not see detection markers for any detections, confirm that [detection markers](#)  have not been disabled.

Tuning best practices

It is better to create a single parameter or rule that is more broad instead of creating multiple overlapping parameters and rules.

Here are some recommendations to help optimize your detection tuning:

- Start by adding tuning parameters to avoid detections that involve known or trusted agents. Be sure to review the [Tuning Parameters](#) and [Network Localities](#) pages for existing parameters to avoid redundancy.
- Determine if you want to hide all detections for a specific participant, such as a vulnerability scanner, and select **All detection types**. If you want to hide by device role, increase the scope to device group.
- When **IP Address or CIDR Block** is selected in the Offender or Victim dropdown, add or remove entries from the list in the IP Addresses field to increase or reduce the scope of the tuning rule.
- By default, tuning rules expire after 8 hours. You can select a different expiration time from the dropdown or select a new expiration time after you re-enable an expired rule from the [Tuning Rules](#) page.
- When adding a tuning rule, if you identify a device that is not classified correctly, you can [change the device role](#).

- Certain detections might require a precise tuning rule based on a specific property of the detection. Under the Property heading, click the checkbox next to a property to specify a value or regular expression and add criteria for a focused tuning rule.

Learn how to [suppress detections with tuning parameters](#) and [hide detections with tuning rules](#).

Suppress detections with tuning parameters

Provide information about your network environment so that the ExtraHop system can suppress low-value or redundant detections from ever being generated.

You can add tuning parameters from the [Tuning Parameters](#) or [Network Localities](#) pages, or you can add them directly from a detection card. In addition, you can classify IP address ranges as internal or external to your network.

Learn more about [tuning detections](#).


Specify tuning parameters for detections

Specify tuning parameters to suppress detections from ever being generated.

If your ExtraHop deployment includes a console, we recommend that you [transfer management](#) of all connected sensors to the console.



Note: The fields on this page might be added, deleted, or modified over time by ExtraHop.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Tuning Parameters**.
3. Specify values for any of the following parameters available on the page.

Option	Description
Gateway Devices	<p>By default, gateway devices are ignored by rules-based detections because they can result in redundant or frequent detections.</p> <p>Select this option to identify potential issues with gateway devices such as your firewalls, routers, and NAT gateways.</p>
Inbound Tor Nodes	<p>By default, inbound connections from known Tor nodes are ignored by rules-based detections because they can result in low-value detections in environments with minimal Tor traffic.</p> <p>Select this option to identify detections on inbound connections from known Tor nodes if your environment observes substantial incoming Tor traffic.</p>
Outbound Tor Nodes	<p>By default, outbound connections to known Tor nodes are ignored by rules-based detections because they can result in low-value detections in environments with minimal Tor traffic.</p> <p>Select this option to identify detections on outbound connections to known Tor nodes if your environment observes substantial outgoing Tor traffic.</p>

Option	Description
Accelerated Beaconsing Detection	<p>By default, the ExtraHop system detects potential beaconsing events over HTTP and SSL.</p> <p>Select this option to detect beaconsing events faster than the default detection.</p> <p>Note that enabling this option can increase the detection of beaconsing events that are not malicious.</p>
Allowed DNS Sinkhole IP Addresses	<p>Specify sinkhole IP addresses that are allowed to be returned in DNS query responses that you want rules-based detections to ignore.</p> <p>Specify a valid IP address or CIDR block.</p> <p>If you do not specify a value, detections that rely on this parameter are not generated.</p>
Approved Public DNS Servers	<p>Specify public DNS servers allowed in your environment that you want rules-based detections to ignore.</p> <p>Specify a valid IP address or CIDR block.</p> <p>If you do not specify a value for this parameter or for Approved Internal DNS Servers, detections that rely on this parameter might not be generated.</p>
Approved Internal DNS Servers	<p>Specify internal DNS servers allowed in your environment that you want rules-based detections to ignore.</p> <p>From the drop-down list, start typing the name of the device, and then select a device from the filtered list.</p> <p>If you do not specify a value for this parameter or for Approved Public DNS Servers, detections that rely on this parameter might not be generated.</p>
Allowed HTTP CONNECT Targets	<p>Specify URIs that your environment can access through the HTTP CONNECT method.</p> <p>URIs must be formatted as <code><hostname>:<port number></code>. Wildcards and Regex are not supported.</p> <p>If you do not specify a value, detections that rely on this parameter are not generated.</p>
Approved User Agents	<p>Specify HTTP user agents in your environment that you want rules-based detections to ignore.</p> <p>Type a single user agent per field.</p>

4. Click **Save**.

Next steps

Click **Detections** from the top navigation menu to [view detections](#).

Add a tuning parameter or trusted domain from a detection card

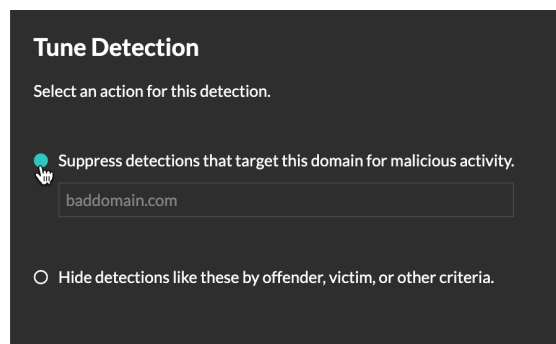
If you encounter a low-value detection, you can add tuning parameters and trusted domains directly from a detection card to keep similar detections from generating.

Before you begin

Users must have full write or higher [privileges](#) to tune a detection.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Detections**.
3. Click **Actions** from the lower-left corner of the detection card.
4. Click **Tune Detection...**

If the detection type is associated with a tuning parameter, you will see the option to suppress the detection by adding a tuning parameter or trusted domain. If the detection does not have an associated tuning parameter, you can [hide the detection with a tuning rule](#).




5. Click the **Suppress detections...** option and click **Save**.

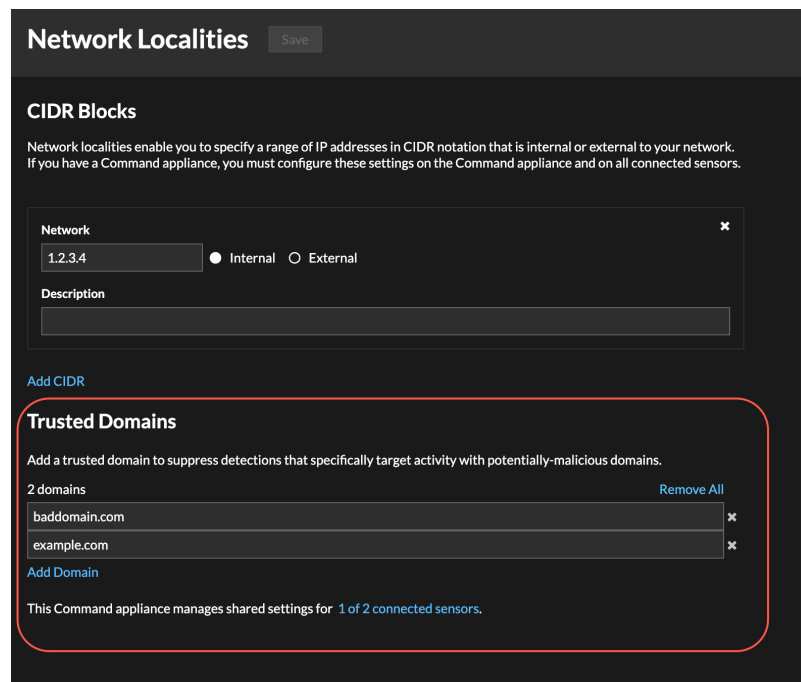
The Tuning Parameter Added confirmation appears and the new parameter is added to the [Tuning Parameters](#) page. For trusted domains, the domain is added under [Trusted Domains](#) on the Network Localities page.

Add a trusted domain

Certain detections are generated when a device makes a connection to an external domain. If you know that a domain is legitimate, add it to the Trusted Domains list, and future detections that target malicious domain activity are suppressed for that domain.

For detections that have an associated domain, you can also [add a trusted domain directly from a detection card](#).

 **Note:** If your ExtraHop system includes a console, and that system is configured to manage tuning parameters, these trusted domains will apply to all connected sensors.



1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Network Localities**.
3. Under Trusted Domains, click **Add Domain**.
4. Type a trusted domain name.
The domain name must be an exact match to the domain you want to suppress. Wildcards and Regex are not supported. To add more than one trusted domain name, click **Add Domain**. Type a single domain name per field.
5. Click **Save**.

Hide detections with tuning rules

Tuning rules enable you to hide detections that match specified criteria.

To avoid creating redundant rules, make sure to first add information about your network environment to the ExtraHop system by [specifying tuning parameters](#).

Learn more about [tuning detections](#).

Add a tuning rule from a detection card

If you encounter a low-value detection, you can create a tuning rule directly from a detection card to hide similar detections in the ExtraHop system.

Before you begin

Users must have full write or higher [privileges](#) to tune a detection.

Learn about [tuning best practices](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. At the top of the page, click **Detections**.
3. Click **Actions** from the lower-left corner of the detection card.
4. Click **Tune Detection...**

If the detection type is associated with a tuning parameter, you will see an option to [suppress the detection](#). If you still want to create a tuning rule, select the Hide detections like these... option and click Save.

- Specify the [tuning rule criteria](#) and click **Create**.

The rule is added to the Tuning Rules page. Learn more about [managing tuning rules](#).

Tuning rule criteria

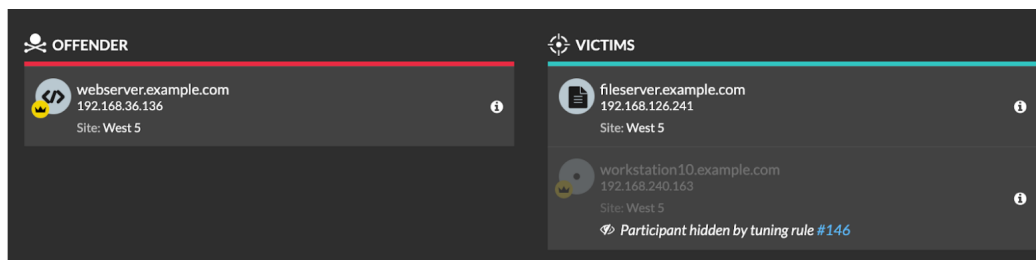
Select from the following criteria to determine which detections are hidden by a tuning rule.

Detection type

You can create a tuning rule that applies to a single detection type, or choose to have the rule apply to all detection types. Rules that encompass all detection types are typically reserved for activity associated with vulnerability scanners.

Participants

Identify participants in a tuning rule by IP address or device name. For detections with multiple offenders you can include a list of IP addresses or CIDR blocks, or reference a device group. You can also create tuning rules that hide a single participant without hiding an entire detection.



You can opt to hide all offenders or all victims. For example, you can hide the offender in a noisy scan detection regardless of the victim participants.

Detection properties

Create a tuning rule that hides detections by a specific property. For example, you can hide Rare SSH Port detections for a single port number, or Data Exfiltration to S3 Bucket detections for a specific S3 bucket.

Criteria

Detection Type

Hacking Tool Domain Access
 All detection types

Offender

webservers.example.com

Victim

IP Address or CIDR Block

Victim IP Addresses

192.168.0.72 ✕ 192.168.25.40 ✕ 192.168.217.67 ✕

Property

Hacking Tool

≈ Kali Linux

Manage Tuning Rules

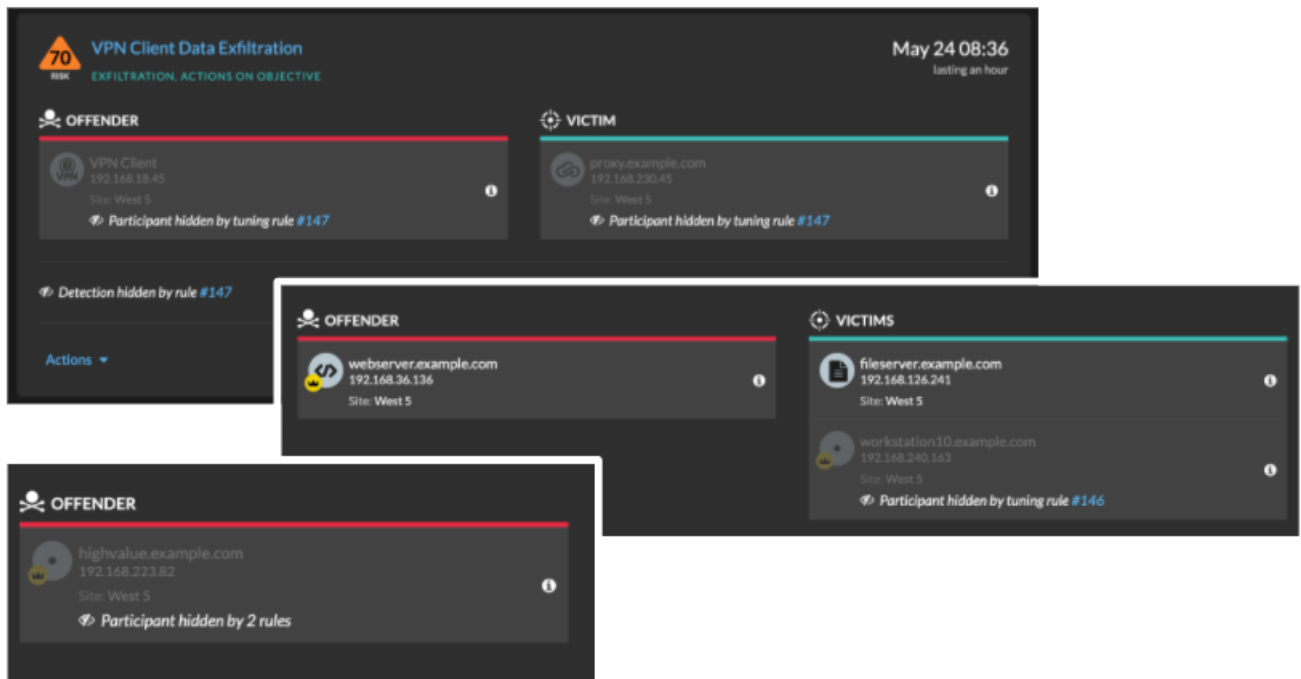
You can extend the duration of a rule, re-enable a rule, and disable or delete a rule.

At the top of the page, click the Systems Settings icon and select **Tuning Rules**.

Rule ID	Rule Status	Detection Type	Offender	Victim	Created By	Created On
167	Enabled	Data Exfiltration	workstation.example.com (West 5)	6.220.171.109	user10	2022-06-09 10:54:2
166	Disabled	Hacking Tool Domain Access	Any offender	Any victim	user11	2022-06-08 11:30:4

- After you disable or delete a rule, the rule expires immediately and associated triggers and alerts resume.
- After you disable a rule, previously hidden detections remain hidden; ongoing detections appear.
- Deleting a rule displays previously hidden detections.

You can temporarily display hidden detections and participants on the Detections page by selecting the **Show Hidden Detections** checkbox, without disabling the tuning rules. Each hidden detection or participant includes a link to the associated tuning rule, and displays the username of the user that created the rule. If the detection or participant is hidden by multiple rules, the number of rules that apply appears.



Configure ticket tracking for detections

Ticket tracking enables you to connect tickets, alarms, or cases in your work-tracking system to ExtraHop detections. Any third-party ticketing system that can accept Open Data Stream (ODS) requests, such as Jira or Salesforce, can be linked to ExtraHop detections.

Before you begin

- You must have access to an ExtraHop system with a user account that has [unlimited privileges](#).
- You must be familiar with writing ExtraHop Triggers. See [Triggers](#) and the procedures in [Build a trigger](#).
- You must create an ODS target for your ticket tracking server. See the following topics about configuring ODS targets: [HTTP](#), [Kafka](#), [MongoDB](#), [syslog](#), or [raw data](#).
- You must be familiar with writing REST API scripts and have a valid API key to complete the procedures below. See [Generate an API key](#).

Enable ticket tracking and specify a URL template

You must enable ticket tracking before REST API scripts can update ticket information on the ExtraHop system. Optionally, specify a URL template that adds an HTML link in the detection card to the ticket in your ticketing system.

1. Log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
2. In the System Configuration section, click **Detection Tracking**.
3. Select **Track detections from an external ticketing system**.
4. (Optional) In the URL field, specify the URL template for your ticketing system and add the `ticket_id` variable at the appropriate location. For example, type a complete URL such as `https://jira.example.com/browse/$ticket_id`. The `ticket_id` variable is replaced with the ticket ID associated with the detection.

Today 14:00
lasting an hour

83
RISK

LATERAL MOVEMENT

CLOSED

✓ EX-4437

hopuser

Suspicious CIFS Client File Share Access on AccountingLaptop

This device sent an excessive number of read requests over the Common Internet File System (CIFS) protocol. This anomaly indicates that the device might be compromised and is preparing files for data exfiltration.

Server linked to this anomaly:

- corpshare.example.com (192.168.6.179)

AccountingLaptop Activity Map

CIFS Metric	6-hour Snapshot	Peak Value	Expected Range	Deviation
Reads		1.13 K	0-1	112,500%

Write a trigger to create and update tickets about detections on your ticketing system

This example shows you how to create a trigger that performs the following actions:

- Create a new ticket in the ticketing system every time a new detection appears on the ExtraHop system.
- Assign new tickets to a user named `escalations_team` in the ticketing system.
- Run every time a detection is updated on the ExtraHop system.
- Send detection updates over an HTTP Open Data Stream (ODS) to the ticketing system.

The complete example script is available at the end of this topic.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Triggers**.
3. Click **New**.
4. Specify a name and optional description for the trigger.
5. From the Events list, select **DETECTION_UPDATE**.

The `DETECTION_UPDATE` event runs every time that a detection is created or updated in the ExtraHop system.

6. In the right pane, specify [Detection class](#) parameters in a JavaScript object. These parameters determine the information that is sent to your ticketing system.

The following example code adds the detection ID, description, title, categories, MITRE techniques and tactics, and risk score to a JavaScript object called `payload`:

```
const summary = "ExtraHop Detection: " + Detection.id + ": " +
  Detection.title;
const description = "ExtraHop has detected the following event on your
  network: " + Detection.description
const payload = {
  "fields": {
    "summary": summary,
    "assignee": {
      "name": "escalations_team"
    },
  },
  "reporter": {
    "name": "ExtraHop"
  },
  "priority": {
    "id": Detection.riskScore
  },
  "labels": Detection.categories,
```

```

        "mitreCategories": Detection.mitreCategories,
        "description": description
    }
};

```

- Next, define the HTTP request parameters in a JavaScript object below the previous JavaScript object. The following example code defines an HTTP request for the payload described in the previous example: defines a request with a JSON payload:

```

const req = {
  'path': '/rest/api/issue',
  'headers': {
    'Content-Type': 'application/json'
  },
  'payload': JSON.stringify(payload)
};

```

For more information about ODS request objects, see [Open data stream classes](#).

- Finally, specify the HTTP POST request that sends the information to the ODS target. The following example code sends the HTTP request described in the previous example to an ODS target named ticket-server:

```

Remote.HTTP('ticket-server').post(req);

```

The complete trigger code should look similar to the following example:

```

const summary = "ExtraHop Detection: " + Detection.id + ": " +
  Detection.title;
const description = "ExtraHop has detected the following event on your
  network: " + Detection.description
const payload = {
  "fields": {
    "summary": summary,
    "assignee": {
      "name": "escalations_team"
    },
    "reporter": {
      "name": "ExtraHop"
    },
    "priority": {
      "id": Detection.riskScore
    },
    "labels": Detection.categories,
    "mitreCategories": Detection.mitreCategories,
    "description": description
  }
};

const req = {
  'path': '/rest/api/issue',
  'headers': {
    'Content-Type': 'application/json'
  },
  'payload': JSON.stringify(payload)
};

Remote.HTTP('ticket-server').post(req);

```

Send ticket information to detections through the REST API

After you have configured a trigger to create tickets for detections in your ticket tracking system, you can update ticket information on your ExtraHop system through the REST API.

Ticket information appears in detections on the Detections page in the ExtraHop system. For more information, see the [Detections](#) topic.

The following example Python script takes ticket information from a Python array and updates the associated detections on the ExtraHop system.

```
#!/usr/bin/python3

import json
import requests
import csv

API_KEY = '123456789abcdefghijklmnop'
HOST = 'https://extrahop.example.com/'

# Method that updates detections on an ExtraHop system
def updateDetection(detection):
    url = HOST + 'api/v1/detections/' + detection['detection_id']
    del detection['detection_id']
    data = json.dumps(detection)
    headers = {'Content-Type': 'application/json',
              'Accept': 'application/json',
              'Authorization': 'ExtraHop apikey=%s' % API_KEY}
    r = requests.patch(url, data=data, headers=headers)
    print(r.status_code)
    print(r.text)

# Array of detection information
detections = [
    {
        "detection_id": "1",
        "ticket_id": "TK-16982",
        "status": "new",
        "assignee": "sally",
        "resolution": None,
    },
    {
        "detection_id": "2",
        "ticket_id": "TK-2078",
        "status": None,
        "assignee": "jim",
        "resolution": None,
    },
    {
        "detection_id": "3",
        "ticket_id": "TK-3452",
        "status": None,
        "assignee": "alex",
        "resolution": None,
    }
]

for detection in detections:
    updateDetection(detection)
```



Note: If the script returns an error message that the SSL certificate verification failed, make sure that [a trusted certificate has been added to your sensor or console](#). Alternatively, you can add the `verify=False` option to bypass certificate verification. However, this method is

not secure and not recommended. The following code sends an HTTP GET request without certificate verification:

```
requests.get(url, headers=headers, verify=False)
```

After ticket tracking is configured, ticket details are displayed in the left pane of the detection details, similar to the following figure:

Today 14:00
lasting an hour

83
RISK

LATERAL MOVEMENT

Suspicious CIFS Client File Share Access on AccountingLaptop

This device sent an excessive number of read requests over the Common Internet File System (CIFS) protocol. This anomaly indicates that the device might be compromised and is preparing files for data exfiltration.

Server linked to this anomaly:

- corpshare.example.com (192.168.6.179)

AccountingLaptop Activity Map

CIFS Metric	6-hour Snapshot	Peak Value	Expected Range	Deviation
Reads		1.13 K	0-1	112,500%

Status: **CLOSED**

Ticket ID: **EX-4437**

Assignee: **hopuser**

Status

The status of the ticket associated with the detection. Ticket tracking supports the following statuses:

- New
- In Progress
- Closed
- Closed with Action Taken
- Closed with No Action Taken

Ticket ID

The ID of the ticket in your work-tracking system that is associated with the detection. If you have configured a template URL, you can click the ticket ID to open the ticket in your work-tracking system.

Assignee

The username assigned to the ticket associated with the detection. Usernames in gray indicate a non-ExtraHop account.

Investigate security detections

When an interesting detection appears, you should investigate whether the detected behavior points to a low-priority issue or a potential security risk. You can start your investigation directly from the detection card, which provides links to data across the ExtraHop system.

There are a number of [tools that can help you filter](#) your view to see the detections that you want to prioritize for investigation. Look for the following trends to get started:

- Did any detections occur at unusual or unexpected times, such as user-activity on weekends or after hours?
- Are any detections appearing in large clusters on the timeline?
- Are there detections appearing for high-value endpoints?
- Are there detections that have high risk scores?

- Are devices in the detection also participants in other detections?
- Are indicators of compromise identified from a threat collection associated with the detection?

Start your investigation

Review the detection title and summary to learn what caused the detection.

The screenshot shows a detection card with the following details:

- Risk Level:** 65 EXPLOITATION
- Time:** Today 09:00 (lasting an hour)
- Buttons:** Acknowledge, Hide Detections Like This
- Summary:** webserv-031.sea.example.com received an unusually large number of short SSH sessions, which could be caused by planned maintenance, or could indicate a potential brute force attack. The risk score increased because of device importance.
- Offender:** workstation-05.sea.example.com (192.168.123.113)
- Victim:** webserv-031.sea.example.com (192.168.80.9)
- SSH Metric:** Short Sessions
- 6h Snapshot:** A line graph showing a spike in sessions.
- 1hr Peak Value:** 248
- Expected Range:** 0-1
- Deviation:** 24,700%

Refine your investigation

Detection detail cards present related data about the detection. The availability of the data depends on the devices and metrics associated with the detection. After you click a link, you can return to the detection card by clicking the detection name in the navigation path. Each investigation option is described in the sections below.

Review investigative data

Most of the data that you need to understand, validate, and investigate a detection is displayed on the detection detail page: tables of relevant metric data, record transactions, and links to raw packets.

Click a host name to navigate to the Device Overview page, or right-click to create a chart with that device as the source and the relevant metrics.

Investigate Servers

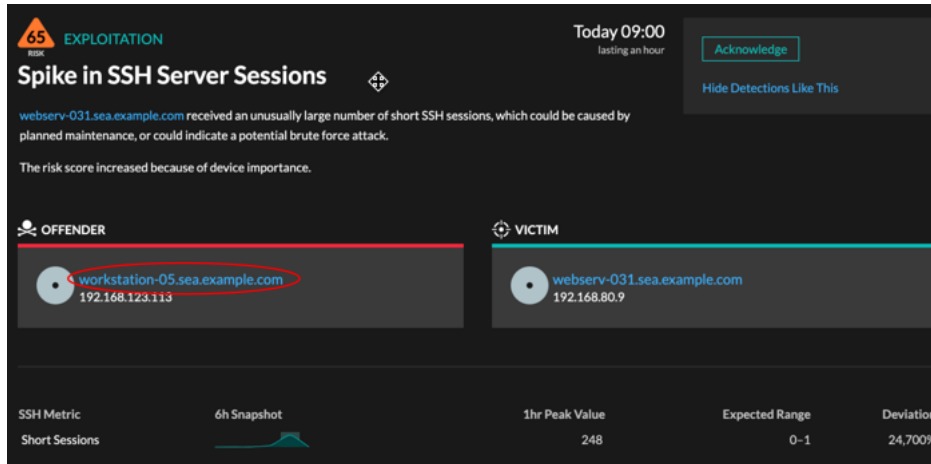
View the targeted servers

	Server IP	Host	Requests ↓
	192.168.136...	Citrix	7,947
	192.168.133...	Example-05	7,817
	192.168.254...	exds1	7,231
	192.168.227...	Citrix-55	6,695

Device name

Click a device name to navigate to the Device Overview page, which contains the role, users, and tags associated with that device. From the left pane, click a protocol name to view all of the protocol metrics associated with the device. The protocol page gives you a complete picture of what this device was doing at the time of the detection.

For example, if you get a reconnaissance scan detection, you can learn if the device associated with the scan is assigned the Vulnerability Scanner role.



Availability

Device name links are only available for devices that have been automatically discovered by the ExtraHop system. Remote devices that are located outside of your network are represented by their IP addresses.

Activity map

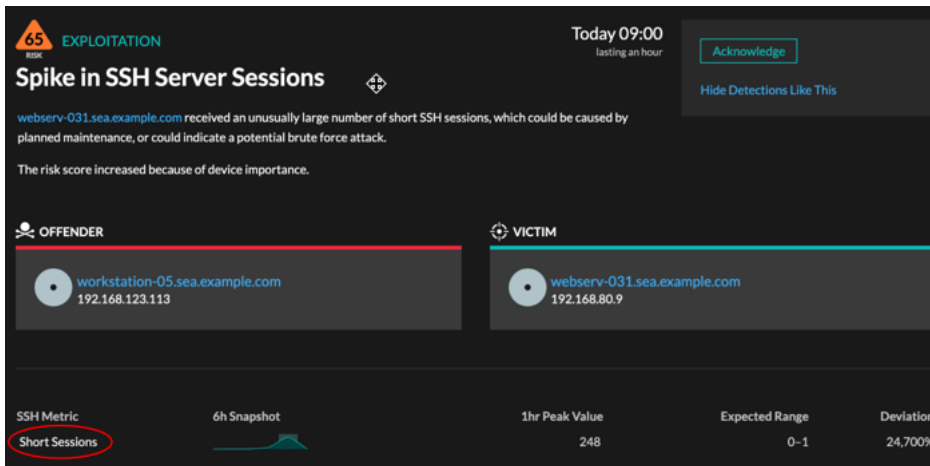
Click the Activity Map icon next to a device name to see device connections by protocol during the time of the detection. For example, if you get a lateral movement detection, you can learn if the suspicious device established connections over a remote control protocol with other clients, IT servers, or domain controllers on your network.

Availability

An activity map is available when a single client or server is associated with unusual L7 protocol activity, such as a high number of HTTP errors or DNS request timeouts.

Detail metric drill down

Click a detail metric link to drill down on a metric value. A detail metric page appears, which lists metric values by a key, such as client IP address, server IP address, method, or error. For example, if you get a reconnaissance scan detection, drill down to learn which client IP addresses were associated with the unusually high number of 404 status codes during the detection.

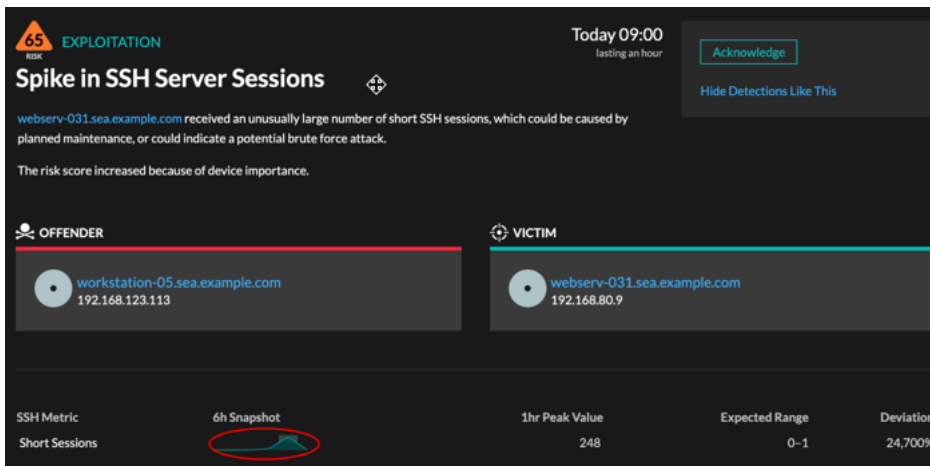


Availability

The drill-down option is available for detections associated with topset detail metrics.

Sparkline

Click the sparkline to create a chart that includes the source, time interval, and drill-down details from the detection, which you can then add to a dashboard for monitoring. For example, if you get a detection about an unusual number of remote sessions, create a chart with SSH sessions for that server and then add that chart to a dashboard about session management.

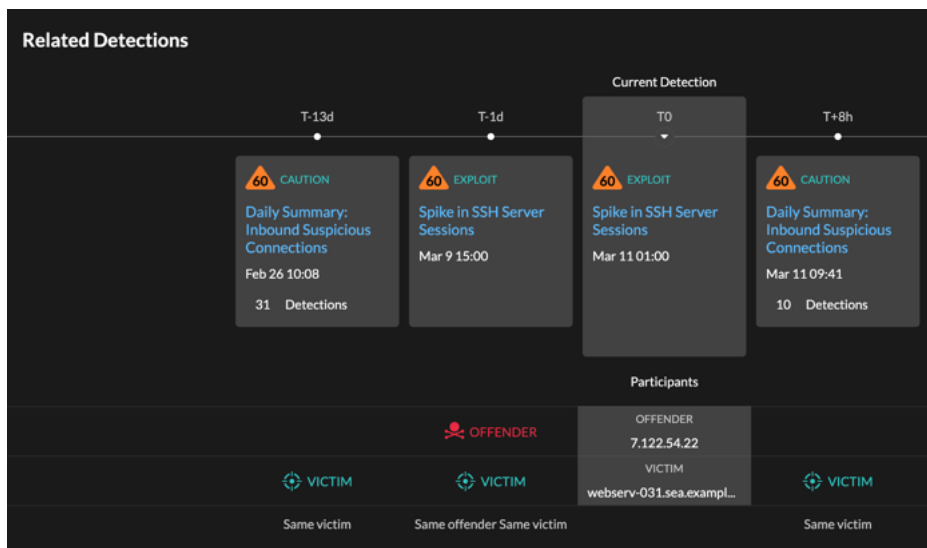


Availability

The sparkline option is available for detections that were associated with metrics and had a duration over one-hour. For 1-second metrics, a sparkline is available when the duration was over 30-seconds.

Related detections

Click a related detections to find insight about suspicious behavior and emerging attacks across multiple detections with shared participants. For example, a victim in the current detection that participates as an offender in a later detection might indicate that the device is compromised. You can view related detection details to determine if the detection events are similar and to see which other devices are involved.



Availability

The related detections timeline is available if there are detections that share the same victim or offender participants with the current detection. Related detections might have occurred before or after the current detection.

Threat Intelligence

Click a red camera icon to access detailed threat intelligence about an indicator of compromise.

Threat intelligence provides known data about suspicious IP addresses, hostnames, and URIs that can help identify risks to your organization. These data sets, called threat collections, are available by default in your Reveal(x) system and from free and commercial sources in the security community.

Availability

Threat intelligence must be enabled on your Reveal(x) system before you can see these indicators.

Investigate performance detections

When an interesting detection appears, you should investigate whether the detected behavior points to a low-priority issue or to a potential problem. You can start your investigation directly from the detection card, which provides links to data across the ExtraHop system.

There are a number of [tools that can help you filter](#) your view to see the detections that you want to prioritize for investigation. Look for the following trends to get started:

- Did any detections occur at unusual or unexpected times, such as user-activity on weekends or after hours?
- Are any detections appearing in large clusters on the timeline?
- Are there detections appearing for high-value endpoints?
- Are devices in the detection also participants in other detections?

Start your investigation

Review the detection title and summary to learn what caused the detection.

NETWORK INFRASTRUCTURE Mar 18 00:00
lasting 6 hours Acknowledge

DNS Server Errors

dns-07.sea.example.com sent an excessive number of the DNS NXDOMAIN/QUERY:PTR error, which indicates that domain name lookups failed. Hide Detections Like This

What caused this detection?

OFFENDER

ntp-01.sea.example.com
192.168.128.109
EDA: eda.sea.l.example.com

VICTIM

dns-07.sea.example.com
192.168.5.253
EDA: eda.sea.l.example.com

What should I investigate?

DNS Responses by Response Code	12h Snapshot	1hr Peak Value	Expected Range	Deviation
NXDOMAIN/QUERY:PTR		3.23 K	0-143	2,159%

Refine your investigation

Detection detail cards present related data about the detection. The availability of the data depends on the devices and metrics associated with the detection. After you click a link, you can return to the detection card by clicking the detection name in the navigation path. Each investigation option is described in the sections below.

Review investigative data

Most of the data that you need to understand, validate, and investigate a detection is displayed on the detection detail page: tables of relevant metric data, record transactions, and links to raw packets.

Click a host name to navigate to the Device Overview page, or right-click to create a chart with that device as the source and the relevant metrics.

Investigate Servers

View the targeted servers

	Server IP	Host	Requests ↓
	192.168.136...	Citrix	7,947
	192.168.133...	Example-05	7,817
	192.168.254...	exds1	7,231
	192.168.227...	Citrix-55	5,195

Device name

Click a device name to navigate to the Device Overview page, which contains the role, users, and tags associated with that device. From the left pane, click a protocol name to view all of the protocol metrics associated with the device. The protocol page gives you a complete picture of what this device was doing at the time of the detection.

For example, if you get a detection about database transaction failures, you can learn about other activity associated with the server hosting the database instance.

NETWORK INFRASTRUCTURE Mar 18 00:00
lasting 6 hours

DNS Server Errors [Acknowledge](#)
[Hide Detections Like This](#)

dns-07.sea.example.com sent an excessive number of the DNS NXDOMAIN/QUERY:PTR error, which indicates that domain name lookups failed.

OFFENDER	VICTIM
<p>ntp-01.sea.example.com 192.168.128.109 EDA: eda.sea.i.example.com</p>	<p>dns-07.sea.example.com 192.168.5.253 EDA: eda.sea.i.example.com</p>

DNS Responses by Response Code	12h Snapshot	1hr Peak Value	Expected Range	Deviation
NXDOMAIN/QUERY:PTR		3.23 K	0-143	2,159%

Availability

Device name links are only available for devices that have been automatically discovered by the ExtraHop system. Remote devices that are located outside of your network are represented by their IP addresses.

Activity map

Click the Activity Map icon next to a device name to see device connections by protocol during the time of the detection. For example, if you get a detection about LDAP authentication errors, you can create an activity map to learn which devices were connected to an LDAP server during the detection.

Availability

An activity map is available when a single client or server is associated with unusual L7 protocol activity, such as a high number of HTTP errors or DNS request timeouts.

Detail metric drill down

Click a detail metric link to drill down on a metric value. A detail metric page appears, which lists metric values by a key, such as client IP address, server IP address, method, or error. For example, if you get an authentication detection about an LDAP server, drill down to learn which client IP addresses submitted the invalid credentials that contributed to the total number of LDAP errors.

NETWORK INFRASTRUCTURE Mar 18 00:00
lasting 6 hours

DNS Server Errors [Acknowledge](#)
[Hide Detections Like This](#)

dns-07.sea.example.com sent an excessive number of the DNS NXDOMAIN/QUERY:PTR error, which indicates that domain name lookups failed.

OFFENDER	VICTIM
<p>ntp-01.sea.example.com 192.168.128.109 EDA: eda.sea.i.example.com</p>	<p>dns-07.sea.example.com 192.168.5.253 EDA: eda.sea.i.example.com</p>

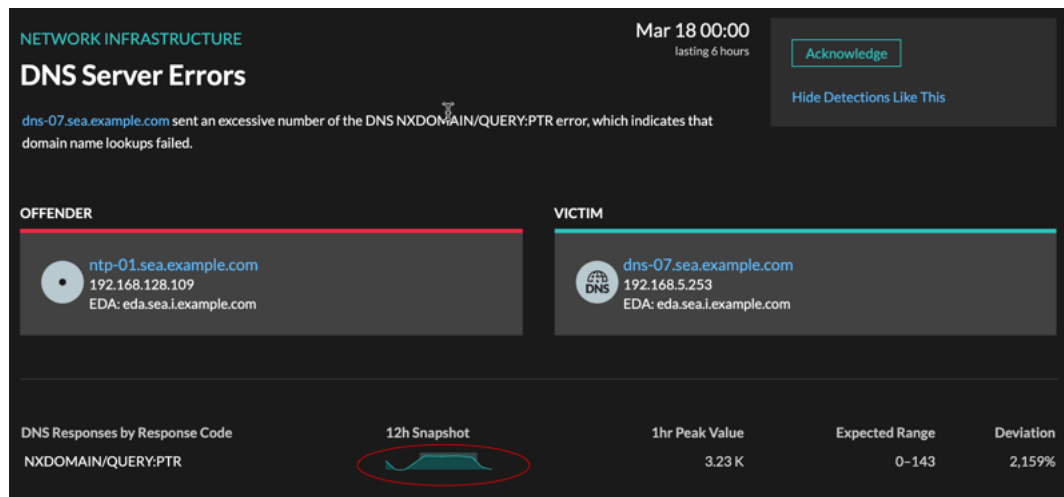
DNS Responses by Response Code	12h Snapshot	1hr Peak Value	Expected Range	Deviation
NXDOMAIN/QUERY:PTR		3.23 K	0-143	2,159%

Availability

The drill-down option is available for detections associated with topset detail metrics.

Sparkline

Click the sparkline to create a chart that includes the source, time interval, and drill-down details from the detection, which you can then add to a dashboard for additional monitoring. For example, if you get a detection about web server issues, you can create a chart with the 500 status codes sent by the web server and then add that chart to a dashboard about website performance.

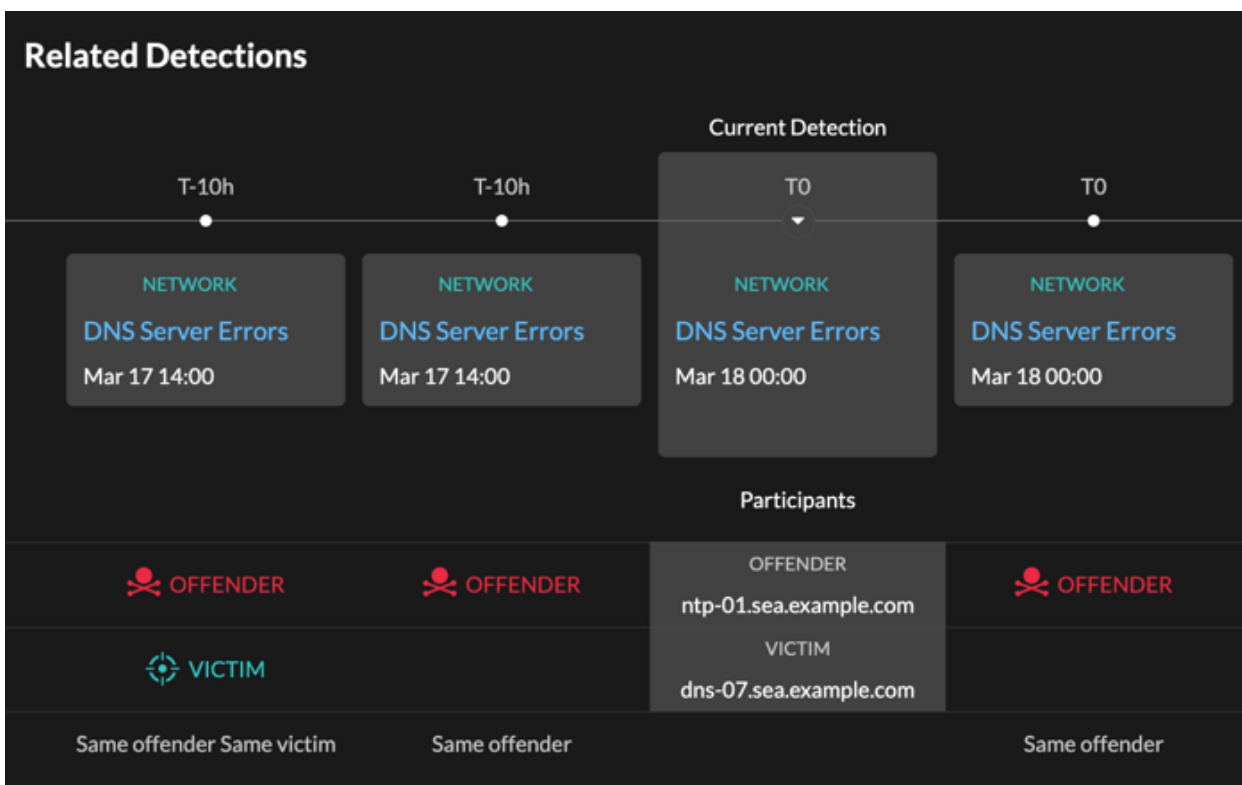


Availability

The sparkline option is available for detections that were associated with metrics.

Related detections

Click a related detection to find insight about network, application, and infrastructure problems across multiple detections with shared participants. For example, a device identified as an offender is the likely source of an issue, such as a database server sending an excessive number of response errors. A device identified as a victim is usually negatively affected by the issue, such as clients experiencing slow or failed database transactions. You can view related detection details to determine if the detection events are similar, see which other devices are involved, and to view metric data.



Availability

The related detections timeline is available if there are detections that share the same victim or offender participants with the current detection. Related detections might have occurred before or after the current detection.

Threat briefings

Threat briefings provide guidance about potential threats to your network. Threat briefings can cover an industry-wide security event, where the ExtraHop system surfaces detections related to known compromises. Threat briefings can also be specific to the results of machine-learning analysis of your network; these briefings are called Security Analysis Briefings.

Threat briefings contain detections of scans, exploits, and indicators of compromise (IOC) that are related to the threat. The information in each briefing varies depending on the type of threat. Information related to the briefing is cloud-updated as details emerge about IOC, potential attack vectors, and known risks.

Threat briefings are available from the top-left corner of the [Security Overview](#) page. Click any title to go to the detail page for that briefing. The detail page is updated as more information is discovered.


Here are some ways you can keep track of threat briefings:

- [Create a threat briefing notification rule](#) to receive emails when a new threat briefing appears.
- Click **Create Investigation** from the detail page to add the detections associated with the briefing to an investigation.
- Click **Archive Briefing** from the detail page when you no longer want to monitor the briefing; the briefing is automatically restored and a notification email is sent if the briefing is updated. You can view older briefings in the Archived section on the Threat Briefing page. Click **Restore Briefing** on the detail page to move the briefing back to the Active section of the Threat Briefing page.

Create a threat briefing notification rule

You can create a notification rule that emails a recipient list whenever a new threat briefing is published or automatically restored. Briefings are automatically restored if they are updated with content changes or new detections.


Before you begin

- Users must be granted access through the [Detections Access Control global policy](#) and have full-write [privileges](#) or higher.
 - The ExtraHop system must be [connected to ExtraHop Cloud Services](#) to send notifications through email.
 - Email notifications are sent from no-reply@notify.extrahop.com. Make sure to add this address to your list of allowed senders.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. Click the System Settings icon  and then click **Notification Rules**.
 3. Click **Create**.
 4. Type a unique name for the notification rule in the Name field.
 5. In the Description field, add information about the notification rule.
 6. In the Event section, select **Threat Briefing**.
 7. Specify individual email addresses, separated by a comma.
 8. In the Options section, click the **Enable notification rule checkbox** to enable the notification.
 9. Click **Save**.

Threat intelligence

Threat intelligence provides known data about suspicious IP addresses, domains, hostnames, and URIs that can help identify risks to your organization.

Threat intelligence data sets, called threat collections, are available by default in your ExtraHop system, from free and commercial sources in the security community, and from [partner integrations with ExtraHop Reveal\(x\) 360](#).

When the ExtraHop system observes activity that matches an entry in a threat collection (called an indicator of compromise), the suspicious entry is marked with a camera icon  or other visual cues.

Threat collections

The ExtraHop system supports threat collections from several sources.

Because cyber threat intelligence is community-driven, there are many external sources for threat collections. Data from these collections can vary in quality or relevance to your environment. To maintain accuracy and reduce noise, we recommend that you limit your uploads to high-quality threat intelligence data that focus on a specific type of intrusion, such as one collection for malware and another collection for botnets.

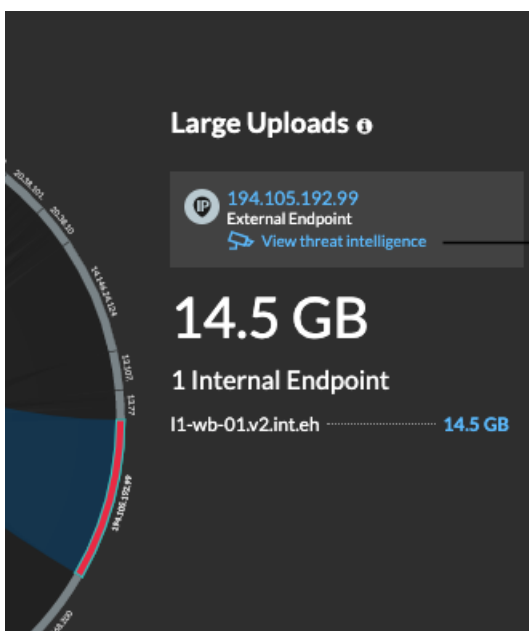
ExtraHop-curated threat collections are enabled by default and updated every 12 hours. Suspicious IP addresses, domains, hostnames, and URIs appear in system charts and records.

[Free and commercial collections offered by the security community](#) that are formatted in Structured Threat Information eXpression (STIX) as TAR or TAR.GZ files can be uploaded manually or [through the REST API](#) to ExtraHop systems. STIX version 1.0 - 1.2 are currently supported. You must upload each threat collection individually to all connected sensors.

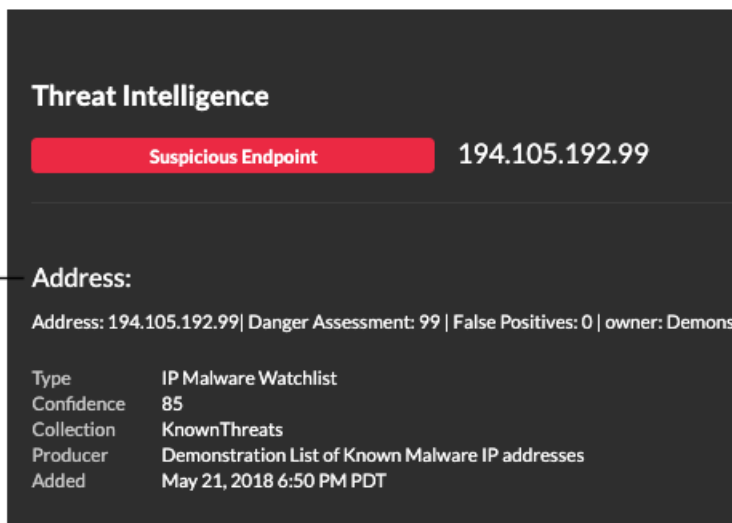
Threat collections from [partner integrations must be imported to ExtraHop Reveal\(x\) 360](#).

Investigating threats

After the Reveal(x) system observes an indicator of compromise, the suspicious IP address, domain, hostname, or URI is marked with a camera icon or other visual cue so you can investigate directly from the tables and charts you are viewing.



Click links or camera icons to view details.

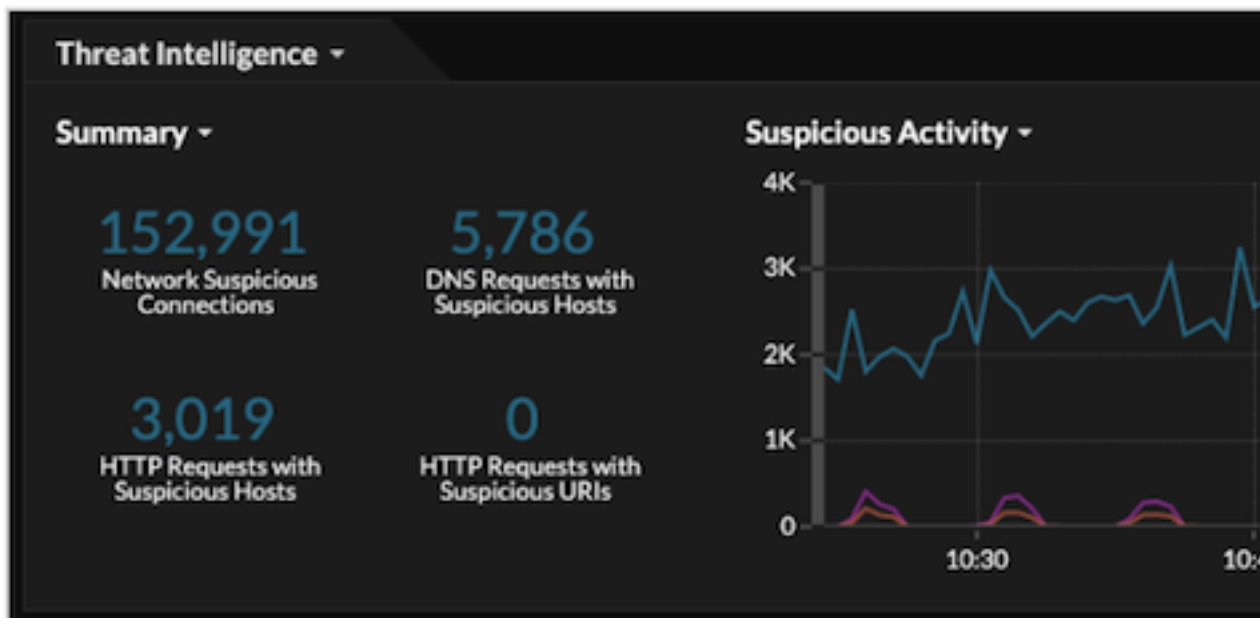


- If the threat collection is added or updated after the system has observed the suspicious activity, threat intelligence is not applied to that IP address, hostname, or URI until the suspicious activity occurs again.
- If you disable or delete a threat collection, all indicators are removed from the related metrics and records in the system.

Here are some places in the Reveal(x) system that show the indicators of compromise found in your threat collections:

Security Dashboard

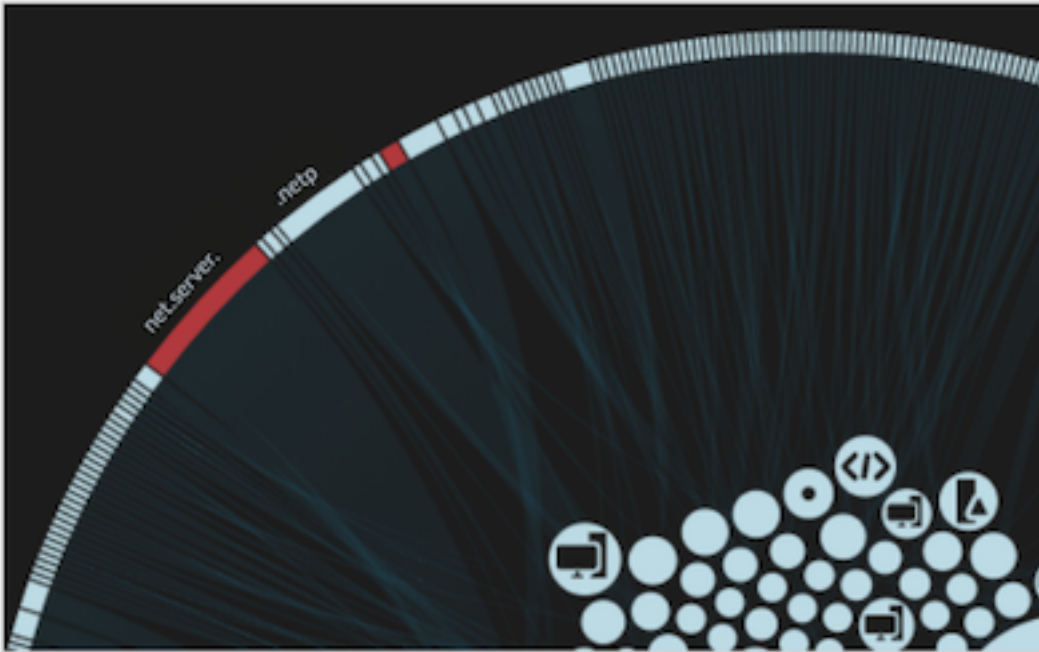
The **Threat Intelligence** region contains metrics for suspicious activity that matches the data in your threat collections. By clicking any metric, such as HTTP Requests with Suspicious Hosts, you can drill down on the metric for details or query records for related



transactions.

Perimeter Overview

In the halo visualization, any endpoints that match threat collection entries are highlighted in red.



Detections


A detection appears when an indicator of compromise from a threat collection is identified in network traffic.

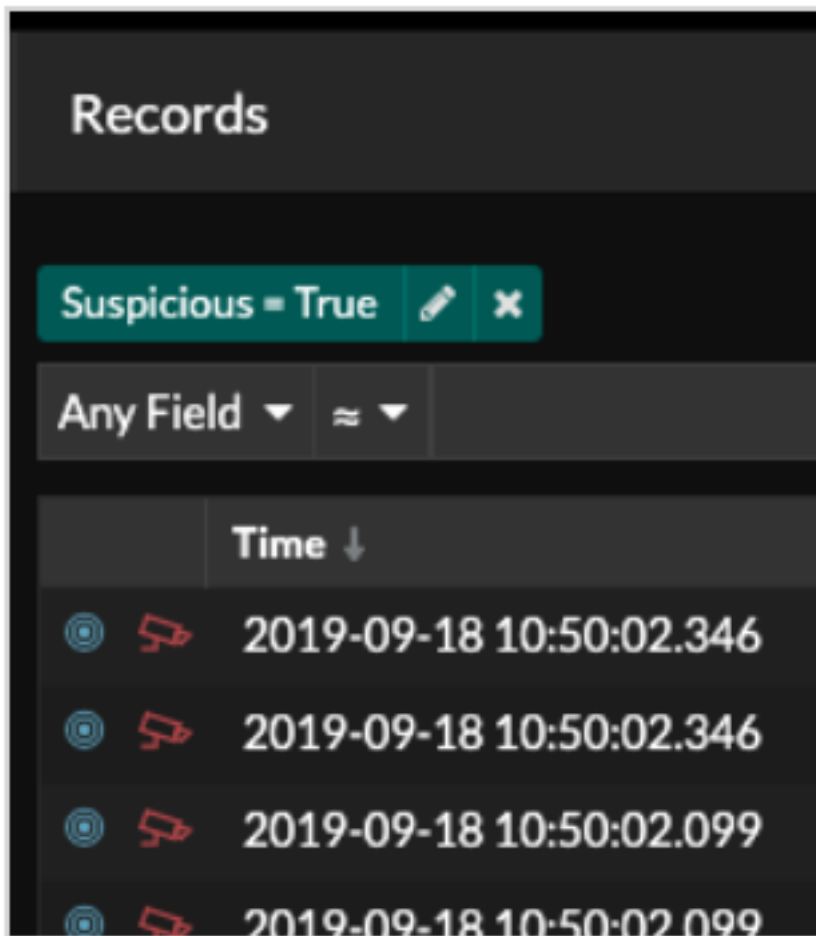
The screenshot displays a detection alert with the following components:

- Alert Icon:** A red triangle containing the number '60' and the word 'RISK' below it.
- Alert Title:** 'Outbound Suspicious Connection' in white text, with 'CAUTION' in red text below it.
- Description:** 'This client connected to a device with a suspicious IP address. This IP address is considered found in your Reveal(x) system. Investigate to determine if this client is the victim of a malw'.
- Offender Section:** A red horizontal bar with a skull and crossbones icon and the word 'OFFENDER' in white. Below this is a dark grey box containing:
 - A green circular icon with a white triangle and a red exclamation mark.
 - The text 'work-031.sea.example.com' in white.
 - The IP address '192.168.6.120' in white.
 - A small red cluster icon on the right.
- Metrics:** 'TCP Metric' and 'Suspicious Connections' are listed on the left. On the right, there is a '5m Snapshot' graph showing a peak in activity, and a '30s' time range indicator.
- Investigation Steps:** A white box with the title 'INVESTIGATION STEPS' and a red arrow pointing to the text 'View the suspicious IP address'.

Records

The Records page enables you to directly query for transactions that match threat collection entries.

- Under the Suspicious facet, click **True** to filter for all records with transactions that match suspicious IP addresses, hostnames, and URIs.
- Create a filter by selecting Suspicious, Suspicious IP, Suspicious Domain, or Suspicious URI from the trifield drop-down, an operator, and a value.
- Click the red camera icon  to view threat intelligence details.



Manage threat collections

ExtraHop Reveal(x) can apply [threat intelligence](#) to your network activity based on threat collections provided by Extrahop, partner integrations, or other free and commercial sources.

To add threat intelligence from CrowdStrike, see [Integrate Reveal\(x\) 360 with CrowdStrike](#).


Before you begin

- Learn about [threat intelligence](#).
- You must have Unlimited, System Administration, or System Access Administration [privileges](#) on each console and sensor to manage threat collections.

Enable or Disable ExtraHop-curated threat collections

ExtraHop threat collections are enabled by default and identify indicators of compromise throughout the system.

ExtraHop threat collections automatically update systems that are connected to ExtraHop Cloud Services. You can confirm connectivity on the [ExtraHop Cloud Services](#) page in the Administration settings.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Threat Intelligence**.
3. In the ExtraHop Threat Intelligence table, select or clear the **Enabled** checkbox in the Status column. The system automatically checks for updates to ExtraHop-curated threat collections every 12 hours. The Last Updated column reflects the date and time of the latest update.

ExtraHop Threat Collections			
ExtraHop-curated threat intelligence collections are available by default on your Reveal(x) system.			
Name	Last Updated	Status	
Malicious Host Names and URIs	2021-02-27 14:30:26	<input checked="" type="checkbox"/> Enabled	
Malicious Botnet IP Addresses	2021-10-25 14:54:36	<input checked="" type="checkbox"/> Enabled	
Malicious Botnet Host Names and URIs	2021-10-25 14:54:36	<input checked="" type="checkbox"/> Enabled	
Malicious Brute Force IP Addresses	2021-10-25 14:54:37	<input checked="" type="checkbox"/> Enabled	
Malicious IP Addresses from Machine Learning Service	2021-07-08 14:53:11	<input checked="" type="checkbox"/> Enabled	
Malicious Cobalt Strike C2 IP Addresses	2021-10-25 14:54:37	<input checked="" type="checkbox"/> Enabled	
Malicious IP Addresses	2021-10-25 14:54:36	<input checked="" type="checkbox"/> Enabled	
Malicious Host Names and URIs from Machine Learning Service	2021-07-23 15:25:01	<input checked="" type="checkbox"/> Enabled	
Malicious C2 IP Addresses	2021-10-25 14:54:37	<input checked="" type="checkbox"/> Enabled	


Upload a threat collection

Upload threat collections from free and commercial sources to identify indicators of compromise throughout the ExtraHop system. Because threat intelligence data is updated frequently (sometimes daily), you might need to update a threat collection with the latest data. When you update a threat collection with new data, the collection is deleted and replaced, and not appended to an existing collection.

You must upload threat collections individually to your console, and to all connected sensors.

Here are some considerations about uploading threat collections.


- Custom threat collections must be formatted in Structured Threat Information eXpression (STIX) as TAR.GZ files. Reveal(x) currently supports STIX version 1.0 - 1.2.
- You can directly upload threat collections to Reveal(x) 360 for self-managed sensors. Contact ExtraHop Support to upload a threat collection to ExtraHop-managed sensors.
- The maximum number of observables that a threat collection can contain depends on your platform and license. Contact your ExtraHop representative for more information.
- You can [upload STIX files through the REST API](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Threat Intelligence**.
3. Click **Manage custom collections**.
4. Click **Upload New Collection**.
5. In the Collection ID field, type a unique collection ID. The ID can only contain alphanumeric characters and spaces are not allowed.
6. Click **Choose file** and select a `.tgz` file that contains a STIX file.
7. Type a display name in the Display Name field.
8. Click **Upload Collection**.
9. Repeat these steps for each connected sensor and on all consoles.

Alerts

Alerts make it easy to learn when important events occur, such as security detections on high-priority devices or Software License Agreement (SLA) violations. Configured alert conditions determine when an alert is generated.

Alert conditions are a combination of settings, such as a time interval, metric value, and metric calculations that occur on assigned data sources. Threshold or trend alerts are based on the value of the monitored metric. Detection alerts are based on specified protocols and detection categories.

 **Important:** Detection alerts are deprecated and will be removed in a future release. To receive notifications about detections, [create a notification rule](#).

Configuring alerts

Configure an alert to monitor for certain conditions and generate alerts when those conditions are met on the assigned data sources.

Threshold alerts

Threshold-based alerts are generated when a monitored metric crosses a defined value within a specified time interval.

Create a threshold alert to monitor occurrences such as error rates that surpass a comfortable percentage or SLA-violations. [Learn how to configure a threshold alert](#).


Trend alerts

Trend-based alerts are generated when a monitored metric deviates from the normal trends observed by the system. Trend alerts are more complex than threshold alerts and are useful for monitoring metric trends such as unusually high round-trip times or storage servers experiencing abnormally low traffic, which might indicate a failed backup.

Create a trend alert to monitor when a metric deviates from normal behavior and where thresholds are difficult to define. [Learn how to configure a trend alert](#).

Detection alerts

Detection alerts are generated when a detection on a specified protocol or detection category occurs.

 **Important:** Detection alerts are deprecated and will be removed in a future release. We recommend that you [create a notification rule](#), which enables you to set more specific detection conditions.

In addition, you can configure an alert with the following options:

- [Set an exclusion interval](#) to suppress alerts during certain time periods, such as a maintenance window.
- [Configure notifications](#) to receive an email when an alert is generated.

Viewing alerts

The Alerts page displays a list of all alerts generated during the specified time interval.

Select from the filters at the top of the page to adjust the list or click an alert name to view details about the alert.

Source Type


Filter alerts assigned to applications or devices.

Severity

Filter alerts by severity level.

Alert Type

Filter by threshold, trend, or detection alerts.

 **Important:** Detection alerts are deprecated and will be removed in a future release. To receive notifications about detections, [create a notification rule](#).

Site

Filter by connected sites. (Only available from a console.)

The Alerts page displays the following information about each alert:

Severity

A color-coded indicator of the alert severity level. You can set the following severity levels: Emergency, Alert, Critical, Error, Warning, Notice, Info, and Debug.

Alert name

The name of the configured alert. Click the alert name to view alert details.

Source

The name of the data source on which the alert conditions occurred. Click the source name to navigate to the source Overview page.

Time

The time of the most recent occurrence of the alert conditions.

Alert type

Indicates a trend, threshold, or detection alert.

For more information about viewing alerts, see the following topics


- [Add an Alerts widget to a dashboard](#)
- [Alerts FAQ](#)

Configure a threshold alert

Configure a threshold alert to monitor when a specific metric crosses a defined boundary. For example, you can generate an alert when an HTTP 500 status code is observed more than 100 times during a ten minute period.

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Alerts**.
3. Click **Create**.
4. Type a unique name for the alert configuration in the **Name** field.
5. In the **Description** field, add information about the alert.



Tip: Alert descriptions support Markdown, which is a simple formatting syntax that converts plain text into HTML. For more information, see the [Alerts FAQ](#).

6. In the **Alert Type** section, click **Threshold Alert**.
7. In the **Assigned Sources** field, type the name of a device, device group, or application and then select from the search results.

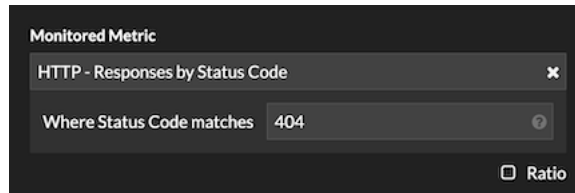
To search for a site, flow network, or flow interface, select that source type from the drop-down menu at the top of the search results.

8. (Optional) Click **Add Source** to assign the alert to multiple sources. Multiple sources must be of the same type, such as only devices and device groups or only applications.

Tip: Assign an alert to a device group to efficiently manage assignments to multiple devices.

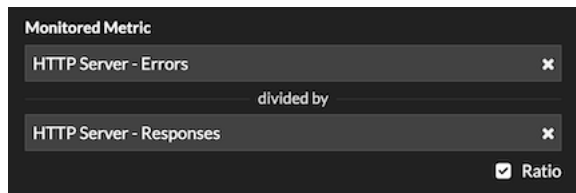
9. In the **Monitored Metric** field, type the name of a metric and then select from the search results. The metric must be compatible with the assigned sources. For example, if you assign the alert to an application, you cannot select a device metric.

Note: If you select a [detail metric](#), you can specify a key value. For example, you might select HTTP - Responses by Status Code and then specify 404 as the key value. An alert is generated only when HTTP responses with 404 status codes occur.

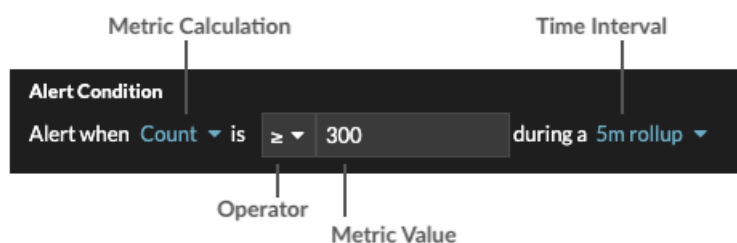


10. (Optional) To monitor the value of a metric divided by a secondary metric, click **Ratio** and then select a secondary metric.

For example, you can monitor the percentage of HTTP errors occurring on responses by dividing HTTP response errors by HTTP responses.



11. In the Alert Condition section, specify conditions for generating an alert.



- a) Select a metric calculation to specify how to calculate the metric value within the time interval. The options available depend on the data type.

Count	<ul style="list-style-type: none"> • Count • Rate per second • Rate per minute • Rate per hour
Dataset	<ul style="list-style-type: none"> • Minimum • 25th percentile • Median

	<ul style="list-style-type: none"> • 75th percentile • Maximum
Sampleset	<ul style="list-style-type: none"> • Mean • +1 to +7 standard deviations • -1 to -7 standard deviations
Maximum, Snapshot	No measurement; the operator compares the actual metric value.

- b) Select an operator to specify how to compare the metric calculation to the metric value.
- c) Specify the metric value to be compared to the metric calculation.
- d) Select the time interval over which the metric value is observed and metric data is aggregated, or rolled up. You can select a time interval from 30 seconds up to 30 minutes.

For example, to generate an alert when more than 300 HTTP response errors occur within 5 minutes, specify the following conditions:


- Metric Calculation: Count
 - Operator: >
 - Metric Value: 300
 - Time Interval: 5m rolup
12. (Optional) In the Notifications section, [add an email notification to an alert](#) to receive emails or SNMP traps when an alert is generated. (Reveal(x) Enterprise only.)
 13. In the Status section, click an option to enable or disable the alert.
 14. (Optional) [Add an exclusion interval](#) to suppress alerts during specific times.
 15. Click **Save**.

Configure a trend alert

Configure a trend alert to monitor when a specific metric deviates from normal trends. Trend alerts are useful for monitoring metric trends such as unusually high round-trip times or storage servers experiencing abnormally low traffic, which might indicate a failed backup. For example, you can configure a trend alert that generates alerts when a spike (75th percentile) in HTTP web server processing time lasts longer than 10 minutes, and where the metric value of the processing time is 100% higher than the trend.

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Alerts**.
3. Click **Create**.
4. Type a unique name for the alert configuration in the **Name** field.
5. In the **Description** field, add information about the alert.



Tip: Alert descriptions support Markdown, which is a simple formatting syntax that converts plain text into HTML. For more information, see the [Alerts FAQ](#).

6. In the **Alert Type** section, click **Trend Alert**.
7. In the **Assigned Sources** field, type the name of a device, device group, or application and then select from the search results.

To search for a site, flow network, or flow interface, select that source type from the drop-down menu at the top of the search results.

8. (Optional) Click **Add Source** to assign the alert to multiple sources. Multiple sources must be of the same type, such as only devices and device groups or only applications.

Tip: Assign an alert to a device group to efficiently manage assignments to multiple devices.

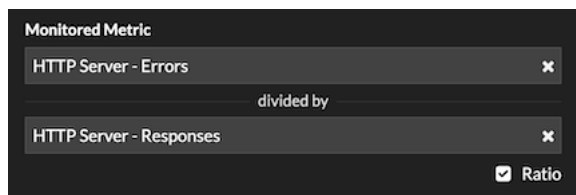
9. In the **Monitored Metric** field, type the name of a metric and then select from the search results. The metric must be compatible with the assigned sources. For example, if you assign the alert to an application, you cannot select a device metric.

If you select a dataset metric such as HTTP Server Processing Time, you must specify one of the following data aggregation methods:

Merge	Aggregate all the metric dataset values and apply the trend weighting model to one superset of data. For example, a 30-second aggregated rollup, or metric cycle, contains a single dataset for each 30-second interval. Therefore, a 30-minute interval has 60 datasets.
Mean	Aggregate the mean of each metric dataset.
Percentile	Aggregate the percentile of each metric dataset based on the value you specify for Percentile .
Absolute Standard Deviation	Aggregate the metric dataset to its standard deviation as a constant.
Relative Standard Deviation	Aggregate the metric dataset to its standard deviation relative to the mean.

10. (Optional) To monitor the value of a metric divided by a secondary metric, click **Ratio** and then select a secondary metric.

For example, divide HTTP response errors by HTTP responses to monitor trends in the percentage of HTTP errors.



11. In the Trend Definition section, specify how the trend is calculated:
 - a) From the Trend Weighting Model drop-down list, select a model. The weighting model aggregates historical metric values to calculate a trend.

Mean	Calculate a trend by averaging all metric values, weighted equally.
Minimum Value	Calculate a trend from the lowest value metrics.
Median Value	Calculate a trend from the median historical metric values.
Maximum Value	Calculate a trend from the highest value metrics.

Percentile	<p>Calculate a trend from the percentile of each metric based on the value you specify for Percentile Value.</p>
Absolute Standard Deviation	<p>Calculate a trend by comparing the standard deviation as a constant value to the current trend.</p> <p>From the Deviation Type drop-down list, select a type:</p> <ul style="list-style-type: none"> • Sample-based • Population-based
Relative Standard Deviation	<p>Calculate a trend by comparing the standard deviation as a value relative to the mean of the current trend.</p> <p>From the Deviation Type drop-down list, select a type:</p> <ul style="list-style-type: none"> • Sample-based • Population-based
Linear Regression	<p>Calculate a linear trend based on previous metric values.</p>
2nd Degree Polynomial Regression	<p>Calculate a quadratic trend by projecting a curve with the following equation: $y = ax^2 + bx + c$</p>
Single Exponential Mean	<p>Calculates a trend by averaging weight-based metric values.</p> <p>In the Recent Value Weight Calculation field, specify a large number to give more weight to the most recent metric values or specify a small number to give more weight to the oldest metric values.</p>
Double Exponential Mean	<p>Calculates a trend by averaging weight-based metric values.</p> <p>In the Recent Value Weight Calculation field, specify a large number to give more weight to the most recent metric values or specify a small number to give more weight to the oldest metric values.</p> <p>Note that double exponential mean calculations are more accurate for predicting the trend trajectory.</p>
Static Value	<p>Calculate a trend based on a static metric value compared to a metric calculation.</p> <p>Specify a static value and select a metric calculation:</p> <ul style="list-style-type: none"> • Rate per hour • Rate per minute • Count

This model is useful to plot constant lines for SLAs.

Trimean	Calculate a trend based on the weighted average of the 25th, 50th, and 75th percentile metric values.
Time Delta	Calculate a trend by comparing current metric values to historical data.
Winsorized Mean	<p>Calculate a trend by retrieving metric values at specified low and high percentages and replacing them with the lowest and highest remaining values.</p> <p>For example, metric values above the 90th percentile become the same value as the 90th, and metric values below the 10th percentile become the same value as the 10th.</p> <p>From the Winsorization drop-down list, select a percentage pair:</p> <ul style="list-style-type: none"> • 5/95th Percentile • 10/90th Percentile • 25/75th Percentile

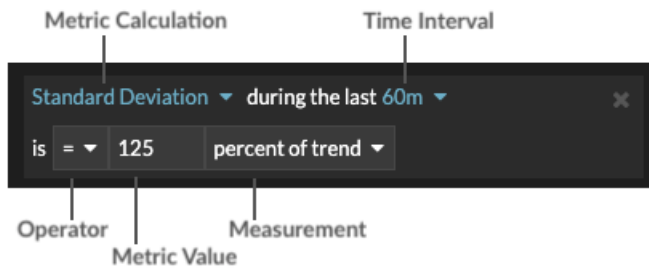
b) From the **Trend Window** drop-down list, select a calculation window.

Same Hour of Week	Calculate a trend by comparing metrics gathered from the same 1-hour window each week.
Same Hour of Day	Calculate a trend by comparing metrics gathered from the same 1-hour window each day.
Minute Rolling Average	Calculate a trend by averaging metric values gathered each minute within a specified amount of time from the present time.
Hour Rolling Average	Calculate a trend by averaging metric values gathered each hour within a specified amount of time from the present time.

c) In the **Trend Lookback** field, specify the time window of historical data the ExtraHop system will review to calculate the trend. Valid lookback values are determined by the selected Trend Window.

- Specify a value between 1-45 days if Same Hour of Day is selected.
- Specify a value between 1-15 weeks if Same Hour of Week is selected.
- Specify a value between 1-48 hours if Hour Rolling Average is selected.
- Specify a value between 1-999 minutes if Minute Rolling Average is selected.

12. In the Alert Condition section, specify conditions for generating an alert.



- a) From the **Match All** drop-down list, select an option to generate an alert when all, any, or none of the alert conditions are met.
- b) Select a metric calculation to specify how to calculate the metric value within the time interval.

Mean	Calculate the mean value of the metric.
Median	Calculate the 50th percentile value of the metric.
25th Percentile	Calculate the 25th percentile value of the metric.
75th Percentile	Calculate the 75th percentile value of the metric.
Standard Deviation	Calculate the standard deviation compared to the metric. The standard deviation is the amount of variation from the trend.
Count	Specify the absolute total of the metric. No measurement is required.


- c) Select the time interval over which the metric value is observed. You can select an interval from 30 seconds up to 30 minutes.
- d) Select an operator to specify how the metric calculation is compared to the metric value.
- e) Specify the metric value to compare to the metric calculation.
- f) Specify how to measure the metric value.
 - Percent of trend
 - Absolute
 - Per second
 - Per minute
- g) (Optional) Click **Add Condition** to add more condition criteria or click **Add Condition Group** to nest condition criteria.


For example, to generate an alert when the standard deviation of the observed metric over a 60 minute interval is equal to a trend value of 25%, specify the following conditions:


- Metric Calculation: Standard Deviation
 - Time Interval: 60m
 - Operator: =
 - Metric Value: 125
 - Measurement: percent of trend
13. (Optional) In the Notifications section, [add an email notification to an alert](#) to receive emails or SNMP traps when an alert is generated. (Reveal(x) Enterprise only.)
 14. In the Status section, click an option to enable or disable the alert.
 15. (Optional) [Add an exclusion interval](#) to suppress alerts during specific times.
 16. Click **Save**.

Configure a detection alert


Configure a detection alert to monitor when detections from a specified protocol or category occur. For example, you can configure alert settings to watch for detections that occur over SSH and assign the alert configuration to SSH servers.

 **Important:** Detection alerts are deprecated and will be removed in a future release. We recommend that you [create a notification rule](#), which enables you to set more specific detection conditions.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Alerts**.
3. Click **Create**.
4. Type a unique name for the alert configuration in the **Name** field.
5. In the **Description** field, add information about the alert.

 **Tip:** Alert descriptions support Markdown, which is a simple formatting syntax that converts plain text into HTML. For more information, see the [Alerts FAQ](#).

6. In the **Alert Type** section, click **Detection Alert**.
7. At the deprecation message, click one of the following links:
 - **Go to Notification Rules**
 - **Continue with Detection Alert**
8. In the **Assigned Sources** field, type the name of a device, device group, or application and then select from the search results.
9. (Optional) Click **Add Source** to assign the alert to multiple sources. Multiple sources must be of the same type, such as only devices and device groups or only applications.

 **Tip:** Assign an alert to a device group to efficiently manage assignments to multiple devices.

10. From the **Detection Categories** drop-down list, select one or more categories that you want the alert to monitor. The following groups of categories are also available:

Option	Description
Any category	Monitors detections on assigned sources that occur in any detection category.
IT Operations	Monitors detections that occur on assigned sources in any IT operations category.
Security	Monitors detections that occur on assigned sources in any Security category.

 **Note:** Detection categories vary by your ExtraHop system.

11. (Optional) From the **Protocols** drop-down list, select each protocol you want the alert to monitor.
12. In the Alert Behavior section, select an option to specify when to generate an alert:
 - Alert once when the alert condition is met
 - Alert every *<time interval>* while the alert condition is met

You can select a time interval from 5 minutes up to 4 hours.
13. From the Severity drop-down list, select a severity level for the alert:
 - Emergency
 - Alert
 - Critical

- Error
- Warning
- Notice
- Info
- Debug

When an alert is generated, the severity level is displayed on the Alerts page and in alert notifications.

14. (Optional) In the Notifications section, [add an email notification to an alert](#) to receive emails or SNMP traps when an alert is generated. (Reveal(x) Enterprise only.)
15. In the Status section, click an option to enable or disable the alert.
16. (Optional) [Add an exclusion interval](#) to suppress alerts during specific times.
17. Click **Save**.


Add a notification to an alert configuration

Configure an alert to send a notification by email or by SNMP when the alert occurs. You can add email notifications to an alert configuration. An email containing alert details is sent to specified addresses when an alert is generated. You can also send notifications to an SNMP listener.

Your ExtraHop system must be configured to send notifications. If you want an alert to be sent to multiple email addresses, [configure an email group](#). If you want to send notifications through SNMP, [configure the SNMP listener](#).

Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Alerts**.
3. From the Alerts table, click the alert you want.
4. In the Notifications section, specify the email groups and addresses to notify when the alert occurs.
 - Click **Select an email notification group** and click one or more email groups.
 - Type individual email addresses. Multiple addresses must be separated by a comma.
5. (Optional) Click **Send SNMP trap** to send notifications to an SNMP listener.
6. (Optional) Add additional metrics to the email notification.

The email includes the value of these metrics when the alert occurred. Additional metrics are only available for threshold and trend alerts.

- a) Click **Show Advanced Options**.
- b) In the Additional Metrics in Email Notifications section, click **Add Metric**.
- c) In the search field, type the name of a metric and then select the metric from the search results.

The metric must be compatible with the assigned source type and the monitored metric, such as devices and device metrics.
7. Click **Save**.

Add an exclusion interval to an alert

Exclusion intervals enable you to suppress one or more alerts during specific time ranges. For example, you can suppress an alert after business hours, on weekends, or during maintenance windows.

Create a new exclusion interval when you create or edit an alert. After you create an exclusion interval, you can apply it to existing and new alerts.

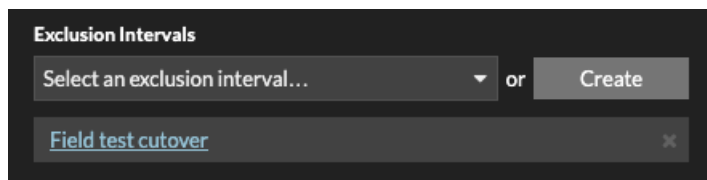
Before you begin

You must have [full write privileges](#) or higher.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Alerts**.
3. From the Alerts table, click the alert you want.
4. In the Edit Alert section, click **Show Advanced Options**.
5. In the Exclusion Intervals section, add an existing interval or create a new one.

Option	Description
Add an existing exclusion interval	<ol style="list-style-type: none"> 1. Click the exclusion interval drop-down list and select an interval. 2. Repeat to add an additional interval to the alert.
Create a new exclusion interval	<ol style="list-style-type: none"> 1. Click Create. 2. Type a unique name for the exclusion interval in the Name field. 3. In the Description field, add information about the interval. 4. In the Exclude section, specify an interval and enter a time range: <ul style="list-style-type: none"> • Click Every day from to set a daily recurring interval. • Click Every week from to set a weekly recurring interval. • Click Custom time range to set a one-time interval. 5. Optional: In the Assignments section, select a global assignment options: <ul style="list-style-type: none"> • Click Assign to all alerts to add the interval to all existing and future alert configurations. • Click Assign to all trends to exclude metric activity during the interval from trend calculations. 6. Click Save to create the interval and add it to the alert.

Tip: From the list of added exclusion intervals, click an interval name to edit properties, or click the remove (X) icon to remove the interval from the alert.



6. Click **Save** and then click **Done**.

Records

Records are structured information about transaction, message, and network flows that are generated and sent from the ExtraHop system to a recordstore. After your records are collected and stored, you can query for them throughout the ExtraHop system.

Records are collected at two protocol levels: L3 and L7. L3 (or flow) records show network-layer transactions between two devices over the IP protocol. L7 records show transactions that are message-based (such as ActiveMQ, DNS, and DHCP), transactional (such as HTTP, CIFS, and NFS), and session-based (such as SSL and ICA).

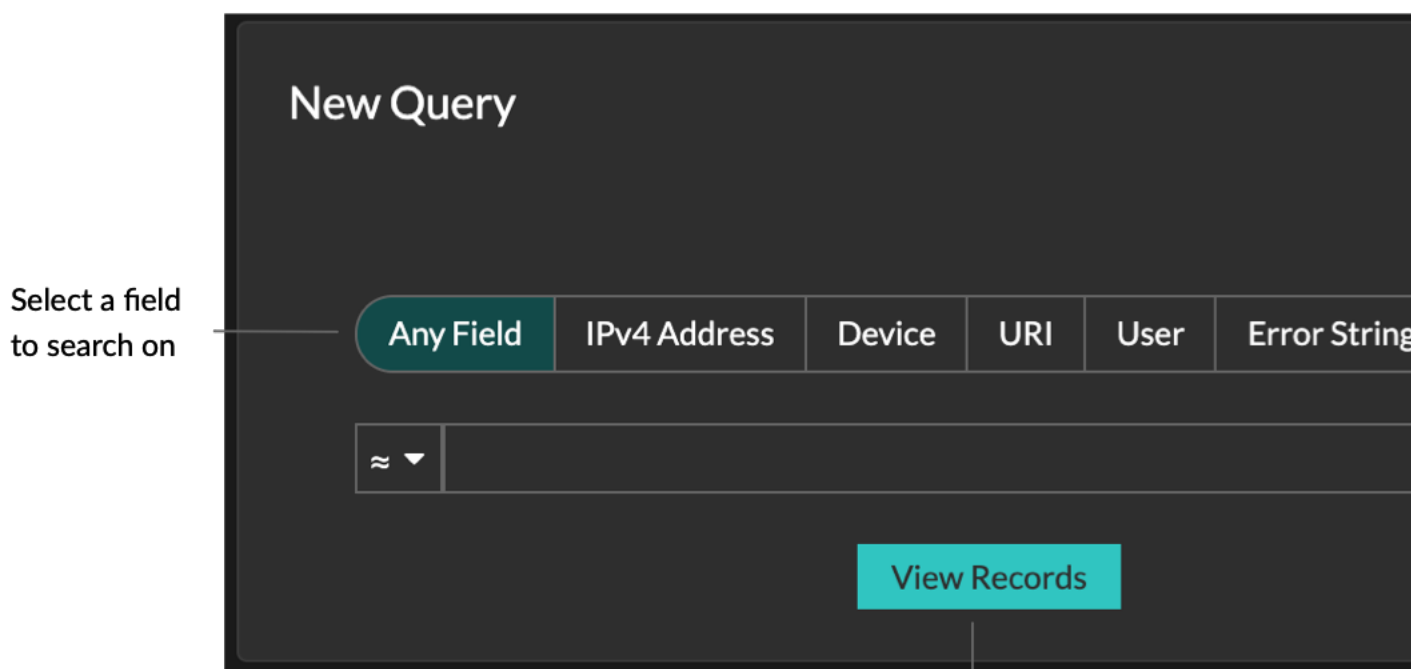
For example, if you had fifty HTTP 503 errors, the related HTTP transactions would contain details about the URL, the web server, the client that sent the request, and so on. These details can help you identify the underlying problem.

Before you begin

- You must have a configured recordstore, such as an [ExtraHop recordstore](#), [Splunk](#), or [Google BigQuery](#).
- You can only configure one recordstore for the ExtraHop system.
- Your ExtraHop system must be configured to collect and store [flow records](#) or [L7 records](#).

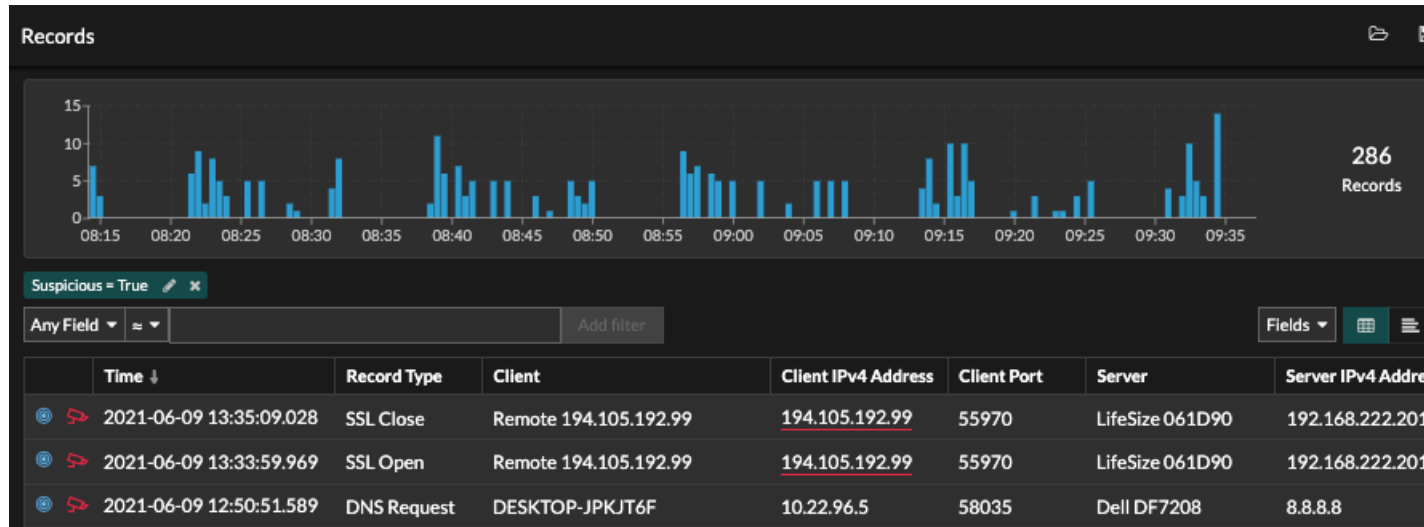
Navigating records

Click **Records** from the top menu to create a new record query. From the New Query page, you can specify a filter and record type.



Click to start a record query

The results appear on the main Records page.



Note: A query can result in millions of records based on the time interval and filter criteria. If a query exceeds the maximum number of query results, a truncated number of records appear. (ExtraHop recordstore only.)

Here are some ways you can drill down on record query results:

- From the records chart, hover over a time interval to view the number of records, or click-and-drag across the chart to narrow the record query results to a time interval.
- Click a hostname or IP address to view device or external endpoint details.
- Records that contain suspicious IP addresses, hostnames, and URIs appear with a red camera icon. Click the camera icon to view [threat intelligence](#) for the record.
- Click a packet icon to start a [packet query](#) that is filtered by this record.
- Record results appear in a table by default. Click the Table View or Verbose View icons to toggle the record view.
- A query might pause intermittently to display the most recent records first. Click **Continue Query** to display more records.
- Click the **Fields** drop-down list to add additional record information to the record view.
- In table view, click-and-drag column headers to arrange the record information.
- Apply [simple](#) or [advanced filters](#) to find potential issues, such as overly-long processing times or unusual response sizes.

Note: To create a record query for a custom metric, you must first define the record relationship by [linking the custom metric to a record type](#).

Filter your records with a simple query

There are a number of ways you can filter your record query results to find the exact transaction you are looking for. The sections below describe each method and show examples you can start with to familiarize yourself.

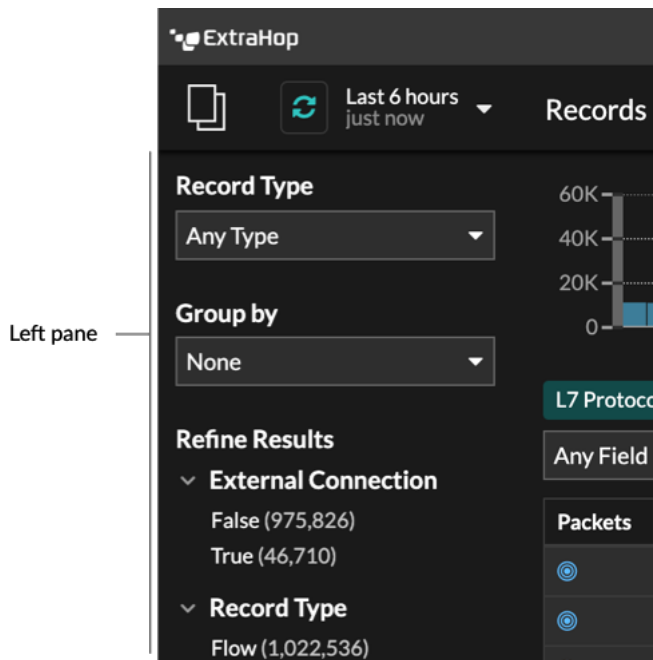
If you are trying to filter records by simple criteria (say, if you want all HTTP transactions from a single server that generated 404s), you can create a simple query in one of the following ways:

- Add a filter or refine results from the left pane
- Add a filter from the trifield
- Add a filter directly from record results


For complex filtering, see [Query records with an advanced filter](#).

Filtering record results from the left pane

When you click **Records** from the top menu, all of the available records for your selected time interval appear. You can then filter from the left pane to refine your results.



The **Record Type** drop-down menu displays a list of all of the record types that your ExtraHop system is configured to collect and store. A record type determines what data is collected and stored in the recordstore.

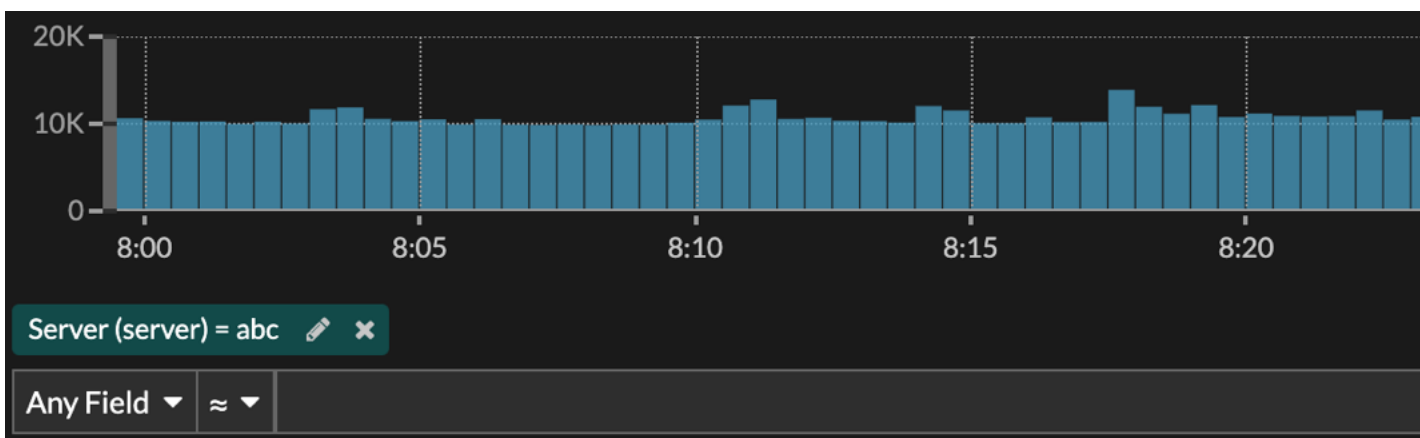
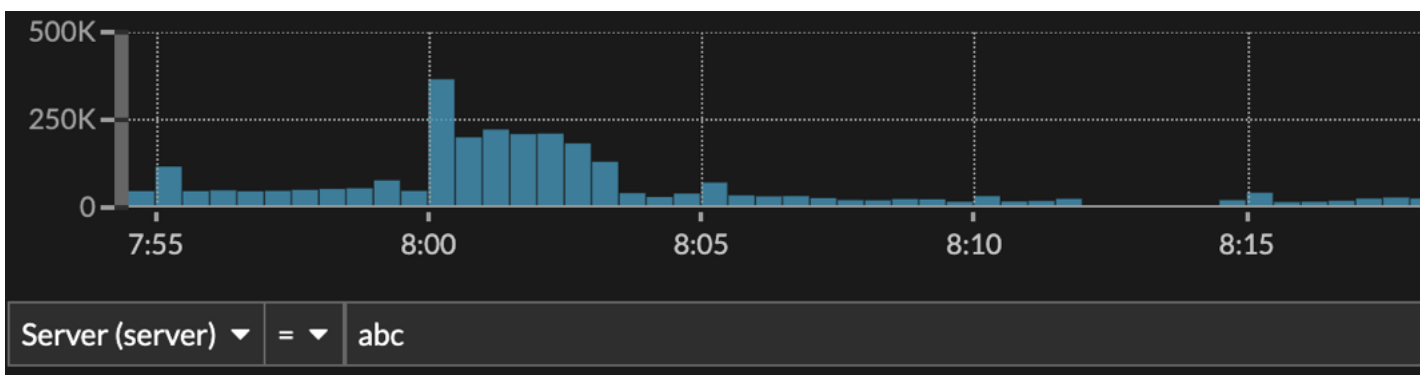
 **Note:** Because you must write a trigger to collect records, you need a way to identify the type of data you will collect. There are built-in record types, which collect all of the available known fields for a protocol. You can start with a built-in record type (such as HTTP) and write a trigger to collect only the fields for that protocol that matter to you (such as URI and status code). Or, advanced users can create a custom record type if they need to collect proprietary information that is not available through a built-in record type.

The **Group By** drop-down gives you a list of fields to further filter the record type by.

The **Refine Results** section shows you a list of common record filters for the selected record type with the number of records that match the filter in parenthesis.

Filtering record results through the trifield

Select a field from the **Any Field** drop-down (such as Server), select an operator (such as the equal sign (=)), and then type a hostname. Click **Add filter**, and the filter is added above the filter bar.



Your results only show records that match the filter; in our example this means we only see results for transactions that are for the server named abc.

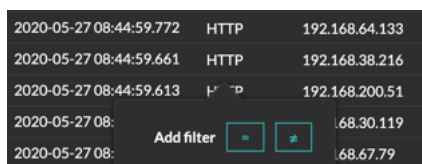
The following operators can be selected, based on the selected field name:

Operator	Description
=	Equals
≠	Does not equal
≈	Includes If records are stored on an ExtraHop recordstore, the includes operator matches whole words delineated by spaces and punctuation. For example, a search for "www.extra" would match "www.extra.com" but not "www.extrahop.com". For all other recordstores, the includes operator matches substrings, including spaces and punctuation. For example, a search for "www.extra" would match "www.extrahop.com", but a search for "www extra" would not match "www.extrahop.com". Regex and wildcard characters are not supported.
≈/	Excludes

Operator	Description
	<p>If records are stored on an ExtraHop recordstore, the excludes operator matches whole words delineated by spaces and punctuation. For example, a search for "extra" would exclude "www.extra.com" but not "www.extrahop.com".</p> <p>For all other recordstores, the excludes operator matches substrings, including spaces and punctuation. For example, a search for "www.extra" would exclude "www.extrahop.com", but a search for "www extra" would not exclude "www.extrahop.com".</p> <p>Regex and wildcard characters are not supported.</p>
<	Less than
≤	Less than or equal to
>	Greater than
≥	Greater than or equal to
starts with	Starts with
exists	Exists
does not exist	Does not exist

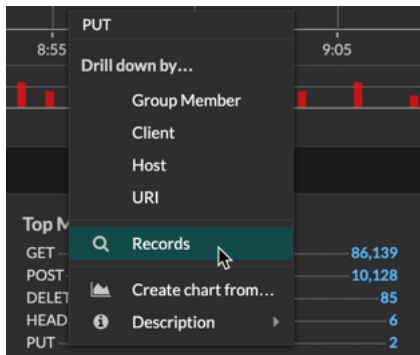
Filtering directly from record results

You can select any field entry displayed in either table view or verbose view in your record results and then click the pop-up operator to add the filter. Filters are displayed below the chart summary (except for the record type field, which is changed in the left pane).



Finding records in the ExtraHop system

- Type a search term in the global search field at the top of the screen and click Search Records to start a query across all stored records.
- From a device overview page, click **Records** to start a query filtered by that device.
- From a device group overview page, click **View Records** to start a query filtered by that device group.
- From a detection card, click View records to start a query filtered with the transactions associated with the detection.
- Click the Records icon from a chart widget, as shown in the following figure.



- Click the Records icon next to a detail metric after drilling down on a top-level metric. For example, after drilling down on HTTP Responses by Server, click the Records icon to create a query for records that contain a specific server IP address.

Collect records

Certain types of records are enabled for collection by default. You can add or remove the types of records that are collected and sent to your recordstore from the Settings / Records page. These records primarily contain information about messages, transactions, and sessions sent over common L7 protocols such as DNS, HTTP, and SSL.

If you want to collect only specific details from transactions, you can create custom records through the [ExtraHop Trigger API](#).

Note: You can [manage these settings](#) centrally from a console.

Learn more about [ExtraHop Records](#).

Before you begin

You must have a configured recordstore, such as an [ExtraHop recordstore](#), [Splunk](#), or [Google BigQuery](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Record Collection**.
3. On the Records page, select the checkbox next to the types of transactions you want to capture and store in the recordstore, and then click **Enable**.
4. Click **Records** from the top menu, and then click **View Records** to start a query.

If you do not see any records, wait a few minutes and try again. If no records appear after five minutes, review your configuration or contact [ExtraHop Support](#).

Collect flow records

You can automatically collect and store all flow records, which are network-layer communications between two devices over an IP protocol. If you enable this setting, but do not add any IP addresses or port ranges, all detected flow records are captured. Configuring flow records for automatic collection is fairly straightforward and can be a good way to test connectivity to your recordstore.

Before you begin

You must have access to an ExtraHop system with [unlimited privileges](#).

1. Log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
2. In the Records section, click **Automatic Flow Records**.

3. Select the **Enabled** checkbox.
4. In the Publish Interval field, type a number between 60 and 21600. This value determines how often records from an active flow are sent to the recordstore. The default value is 1800 seconds.
5. In the IP Address field, type a single IP address or IP address range in IPv4, IPv6, or CIDR format. Then, click the green plus (+) icon. (You can remove an entry by clicking the red delete (X) icon.)
6. In the Port Ranges field, type a single port or port range. Then, click the green plus (+) icon.
7. Click **Save**.
Flow records that meet your criteria are now automatically sent to your configured recordstore. Wait a few minutes for records to be collected.
8. In the ExtraHop system, click **Records** from the top menu, and then click **View Records** to start a query. If you do not see any records, wait a few minutes and try again. If no records appear after five minutes, review your configuration or contact [ExtraHop Support](#).

Collect L7 records with a trigger


L7 protocols can be committed (collected and stored) as a record through a global trigger function. L7 records include messages, transactions, and sessions sent over common L7 protocols such as DNS, HTTP, and SSL.

In the following steps, you will learn how to collect records for any device that sends or receives an HTTP response.

Learn more about [ExtraHop Records](#).

First, we will write a trigger to collect information from the built-in HTTP record type with the `commitRecord()` method, which is available on all [protocol classes](#). The basic trigger syntax is `<protocol>.commitRecord()`. Then, we will assign the trigger to a web server. Finally, we will verify that the records are being sent to the recordstore.

Before you begin

- You must have a configured recordstore, such as an [ExtraHop recordstore](#), [Splunk](#), or [Google BigQuery](#)
 - These instructions assume some familiarity with [ExtraHop Triggers](#), which require experience with JavaScript. Alternatively, you can [configure L7 record collection](#) through the ExtraHop system.
1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
 2. Click the System Settings icon , and then click **Triggers**.
 3. Click **Create**.
 4. In the Create Trigger pane, complete your information, similar to the following example:
 - **Name:** HTTP Responses
 - **Description:** This trigger collects HTTP responses.
 5. Select the checkbox next to **enable debug log**.
 6. From the Events drop-down list, select **HTTP_RESPONSE**.
 7. In the **Assignments** text box, search for an active web server that you want to collect records for and select the server.
 8. In the right pane, type the following example code:

```
HTTP.commitRecord();
debug ("committing HTTP responses");
```

This code generates records for the HTTP record type when the `HTTP_RESPONSE` event occurs and corresponds to the built-in record format for HTTP.

9. Click **Save**.

Next steps

Wait a few minutes for records to be collected, and then verify that your records are being collected in the next step by clicking **Records** from the top menu, and then clicking **View Records** to start a query.

If you do not see any HTTP records after 5 minutes, click the **Debug Log** tab at the bottom of the page in the Trigger Editor to see if there are any errors you can resolve. If the trigger is running, the message “committing HTTP responses” is displayed. If records do not appear after the trigger is running, contact [ExtraHop Support](#).

Collect custom records

You can customize the type of record details you generate and store on a recordstore by writing a trigger. We recommend that you also create a record format to control how the records display in the ExtraHop system.


Before you begin

- These instructions assume some familiarity with ExtraHop [Triggers](#).
- If you are connected to a Google BigQuery recordstore, there is a custom records field limit of 300.

In the following example, you will learn how to only store records for HTTP transactions that results in a 404 status code. First, we will write a trigger to collect information from the built-in HTTP record type. Then, we will assign the trigger to a web server. Finally, we will create a record format to display selected record fields in the table view for our record query results.

Write and assign a trigger

Note that the trigger must be created on each sensor that you want to collect these types of records from. You can create the trigger on a console to collect your custom records from all connected sensors.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon , and then click **Triggers**.
3. Click **Create**.
4. In the Create Trigger pane, complete your information, similar to the following example:
 - **Name:** HTTP 404 Errors
 - **Description:** Track 404 errors on primary web server.
 - **Enable debug log:** Select the checkbox to enable debugging.
 - **Events:** HTTP_RESPONSE
5. Click the **Editor** tab to write the trigger specifications.

The following figure shows an example configuration that only collects records when a 404 status code is detected. We also set a name (`web404`) for these types of records to identify them in a record query and added identifying information for debugging.

```

1  if (HTTP.statusCode === 404) {
2      commitRecord("web404", HTTP.record);
3      debug("committing web404 HTTP record");
4  }
```

In the next steps, assign the trigger to a device or device group for which you want to monitor 404 status codes.

6. Click **Assets** from the top menu.
7. Click **Devices** and then click the **Active Devices** chart.
8. Select the checkbox for a device from the list. For our example, we will select a web server called `web2-sea`.

- Click the Assign Triggers icon, select the trigger you created in the previous steps, and then click **Assign Triggers**. In the following figure, we have selected our web server, `web2-sea`.

<input type="checkbox"/>	Name	MAC Address	IP Address	Discovery Time
<input checked="" type="checkbox"/>	web-sea2	60:45:CB:72:E3:1F	192.0.2.1	2017-11-13 12:...
<input type="checkbox"/>	web-sea3	60:45:CB:72:E3:1F	—	2017-11-10 12:...

After assigning the trigger, return to the **System Settings > Trigger** page and select the trigger you created. First, make sure your device has activity. Then, click the **Debug Log** tab to see if the trigger is committing your records. For the following example, we intentionally visited unavailable web pages to generate 404 errors.

PROBLEMS 0 0 0 DEBUG LOG

- [Tue Jun 18 13:36:01] committing web404 HTTP record
- [Tue Jun 18 13:36:14] committing web404 HTTP record
- [Tue Jun 18 13:36:14] committing web404 HTTP record
- [Tue Jun 18 13:36:19] committing web404 HTTP record

Create a custom record format to display your record results in a table

Record formats are the recommended way to display your records with only the fields you want to see. Without a custom record format, the fields for your custom record will not appear in any selectable lists, such as the Group By list.

The quickest way to create a custom record format is to copy and paste the schema on read from a built-in record format into a new record format. If you have multiple sensors, you need to create the custom record format on each appliance where the record results are viewed. You can create the record format on a console to format a custom record on all connected sensors.

- Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
- Click the System Settings icon and then click **Record Formats**.
- Click on the type of record you want to copy. For our example, we will copy the HTTP record format.
- Copy the contents in the text box below Schema on Read.
- Click **New Record Format**.
- Complete the following fields:
 - **Display Name:** Type a unique name for your record format.
 - **Author:** Identify the author for the record format.
 - **Record Type:** Type the same record type ID you created in the trigger. In our example, this value is `web404`.
 - **Schema on Read:** Paste the copied contents from step 4 into the text box. Edit the box to delete any unwanted fields. For our example in the figure below, we only kept the following fields: Client, Server, Method, Status Code, URI, and Processing Time.

Create Record Format

Display Name

HTTP 404

Author

ExtraHop

Record Type

web404


Schema on Read

```

1  [
2    {
3      "display_name": "Status Code",
4      "name": "statusCode",
5      "data_type": "n",
6      "facet": true,
7      "default_visible": true
8    },
9    {
10     "display_name": "URI",
11     "name": "uri",
12     "data_type": "s",
13     "meta_type": "uri",
14     "default_visible": true
15   },
16   {
17     "display_name": "User Agent",
18     "name": "userAgent",
19     "data_type": "s"
20   },

```

Query for your custom record type

1. Click **Records** from the top menu.
2. Click the **Any Record Type** drop-down list and select your newly created record format.
3. Click **View Records**.
4. Click the **Verbose View**  icon.
5. Click **Fields** and then click **Select All**.
All of the information collected from the trigger about these records is shown in the query results.

Record format settings

The Record Format Settings page displays a list of all built-in and custom record formats that are available on your ExtraHop sensors or console. If you need to create a custom record format, we recommend that you copy and paste the schema on read information from a built-in record format. Advanced users might want to create a custom record format with their own field-value pairs, and should apply the reference material provided in this section.

Record formats consist of the following settings:

Display Name

The name displayed for the record format in the ExtraHop system. If there is no record format for the record, the record type is displayed.

Author

(Optional) The author of the record format. All built-in record formats display `ExtraHop` as the author.

Record Type

A unique alphanumeric name that identifies the type of information contained in the associated record format. The record type links the record format with the records that are sent to the recordstore. Built-in record formats have a record type that begins with a tilde (~). Custom record formats cannot have a record type that begins with a tilde (~) or an at symbol (@).

Schema on Read

A JSON-formatted array with at least one object, which consists of a field name and value pair. Each object describes a field in the record and each object must have a unique combination of name and data type for that record format. You can create the following objects for a custom record format:

name

The name of the field.

display_name

The display name for the field. If the `display_name` field is empty, the `name` field is displayed.

description

(Optional) Descriptive information about the record format. This field is limited to the Record Format Settings page and is not displayed in any record query.

default_visible

(Optional) If set to `true`, this field displays in the ExtraHop system as a column heading by default in table view.

facet

(Optional) If set to `true`, facets for this field display in the ExtraHop system. Facets are a short list of the most common values for the field that can be clicked to add a filter.

data_type

The abbreviation that identifies the type of data stored in this field. The following data types are supported:

Data Type	Abbreviation	Description
application	app	ExtraHop application ID (string)
boolean	b	Boolean value
device	dev	ExtraHop device ID (string)
flow interface	fint	Flow interface ID
flow network	fnet	Flow network ID
IPv4	addr4	An IPv4 address in dotted-quad format. Greater or less than filters are supported.
IPv6	addr6	An IPv6 address. Only string-oriented filters are supported.
number	n	Number (integer or floating point)
string	s	Generic string

meta_type

The sub-classification of the data type that further determines how the information is displayed in the ExtraHop system. The following meta-types are supported for each of the associated data types:

Data Type	Meta Type
String	<ul style="list-style-type: none"> • domain • uri • user
Number	<ul style="list-style-type: none"> • bytes • count • expiration • milliseconds • packets • timestamp

Query records with an advanced filter

You can query records that are stored in the recordstore with an advanced filter.



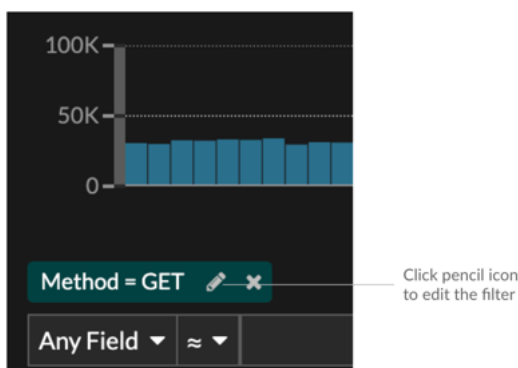
Note: To create a record query for a custom metric, you must first define the record relationship by [linking the custom metric to a record type](#).

Next steps

- To learn how to query for a specific record, see our walkthrough for [Discovering missing web resources](#).
- You can also [automate this task through the REST API](#).

Filter your records with advanced query rules

For advanced queries, you can create and modify complex filters by clicking the Add Advance Filter button or by clicking the pencil icon next to any filter that you have added.



Here are some important things to know about advanced queries:

- You can specify multiple criteria with OR (Match Any), AND (Match All), and NONE operators
- You can group filters and nest them to four levels within each group
- You can edit a filter group after you create it



- You can create a descriptive name to identify the general purpose of the query

Create a complex filter with AND and OR operators

The following example shows how you can create an advanced query to filter your records with complex criteria. We will create a filter to return results for all HTTP records that include two URIs plus a status code greater than or equal to 400 or a processing time greater than 750 milliseconds.

Important: To try this example, you must have HTTP traffic on your network.

1. Click **Records** from the top menu.
2. Click **View Records**.
3. In the left pane, select **HTTP** from the Refine Results section. Only available records are displayed in the Refine Results section. This step ensures that you have available records for this query.
 - Note:** Record types do not appear as filters; they are displayed in the left pane.
4. Click the Add Advanced Filter button . The button is on the right side of the page, above the records search results.
5. Under Filter Criteria, select **Match All** from the drop-down. Match All is an AND operator and will let us search for criteria that matches the status code and the processing time criteria.
6. Select **Status Code**, the greater than or equal to sign (\geq), and then type 400 in the number field.
7. Click **Add Filter** to add a filter for processing time.
8. Select **Processing Time**, the greater than sign ($>$), and then type 750 in the number field. In the next steps, we will add a group of criteria that applies specifically to the fields we added.
9. Click **Add Filter Group**. We are keeping **Match Any** for this group. Match Any is an OR operator and will let us search for criteria that matches either of our URIs.
10. Click **Add Filter** to add a filter to the group.
11. Click the **Any Field** drop-down and select **URI**.
12. Select the includes (\equiv) symbol.
13. Type a URI for one of your web servers in the text field. We will add `assets.example.com`.
14. Click **Add Filter** to add a second URI filter to the group.
15. Click the **Any Field** drop-down and select **URI**.
16. Select the includes (\equiv) symbol.
17. Type a URI for one of your web servers in the text field. We will add `media.example.com`.
18. In the Custom Display Name field, type a descriptive name to make the filter easy to identify on the results page, otherwise the display name shows the first filter and the number of other applied rules:

All of 'Status Code ≥ 400', and 3 other rules  

We will type “Slow and Broken Web Assets” in the field.

19. Click **Save**.

After you click **Save**, the query automatically runs, and returns records that match either URI and that have either a status code equal to or greater than 400 or a processing time that is greater than 750 milliseconds.

Next steps

You can click the Save icon  from the top right of the page to save your criteria for another time.

Enable record queries for custom metrics


Custom metrics are typically created to collect specific information about your environment. You can configure settings that enable you to query and retrieve transaction-level records associated with a custom metric. In the Metric Catalog, the Record Relationships section enables you to associate a custom metric with a record type. If you queried for records from that custom metric, you would return results for all records of that record type, regardless of the other attributes configured for your custom metric. We recommend that you add filters to return meaningful results for your record queries.

By setting a source filter in the Metric Catalog, you automatically filter records by the source that you drilled down from. For example, if you select a checkbox next to Server, when you query for records for this custom metric from a web server named `example-web-sea`, a filter is automatically added to your query that only returns results for transactions where `example-web-sea` is acting as the server.

By setting advanced filters, you automatically filter records by the specified criteria. Advanced filters are complex and can be nested to four levels.

Before you begin

[Create a custom metric](#) 

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Metric Catalog**.
3. In the upper left corner, type the name of the custom metric and then click the custom metric name in the results.
Parameters for the custom metric appear in the right pane.
4. In the right pane, scroll down to the Record Relationships section and click the RECORD TYPE drop-down list.
5. Click one or more record types in the list and then click outside of the list to apply your selections.
Additional options to filter record fields appear below the selected record types.

Specify the source filter for this custom metric. Source filters are updated based on record type.

Add advanced query rules or a regular expression (regex).

Record Relationships

Select a record type for this custom metric. Then, add filters to return only the records that you want to see when you drill down on this metric from a chart or table.

RECORD TYPE

HTTP ▾

SOURCE FILTER ⓘ

Client
 Server

ADDITIONAL FILTERS ⓘ

Match any ▾

Method ▾ = ▾ POST ✕

Add Filter
Add Group

6. (Optional) In SOURCE FILTER section, select the checkbox next to the source type, such as Client or Application. These sources dynamically update based on the selected record types.
7. (Optional) In the ADDITIONAL FILTERS field, specify multiple criteria with OR (Match Any), AND (Match All), and NONE operators to create an [advanced query filter](#) or enter a [regular expression \(regex\)](#) to filter records for custom detail metrics.
8. Click **Update**.

You can now query for records from any chart or detail page with the custom metric.

Next steps

- Create a record query for your custom metric by clicking the metric in a chart and then clicking **Records**.

Packets

A network packet is a small amount of data sent over Transmission Control Protocol/Internet Protocol (TCP/IP) networks. The ExtraHop system enables you to continuously collect, search, and download these packets with a Trace appliance, which can be useful to detect network intrusions and other suspicious activity.

You can search for and download packets from the Packets page in the ExtraHop system and through the [Packet Search](#) resource in the ExtraHop REST API. Downloaded packets can then be analyzed through a third-party tool, such as Wireshark.

Note: If you do not have a Trace appliance, you can still collect packets through [triggers](#). See [Initiate precision packet captures to analyze zero window conditions](#) for an example.

Query for packets

Launch a quick packet query by clicking **Packets** from the top menu. The ExtraHop system queries for all packets and displays the Packet Query page. If you change the time interval, the query starts again. Either end of the gray bar displays a timestamp, which is determined by the current time interval. The time on the right displays the starting point of the query and the time on the left displays the endpoint of the query. The blue bar indicates the time range during which the system found packets. You can drag to zoom on a period of time in the blue bar to run a query again for that selected time interval.

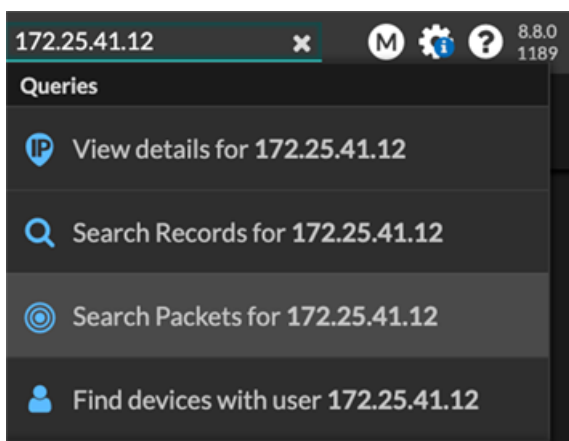
The following figure provides an overview of the Packet Query page and features:

The screenshot shows the ExtraHop interface for packet queries. At the top, there are navigation tabs: Overview, Dashboards, Detections, Alerts, Assets, Records, and Packets. A search bar is located in the top right. Below the navigation, the 'Packets' section is active, showing 'Last 5 minutes' and 'Packet Query Results'. On the left, there is a 'Refine Results' sidebar with a list of IP addresses and their corresponding data sizes. The main area features a 'Packet Query' section with a time range bar (From Feb 23, 1:51:02 pm to Until Feb 23, 1:56:02 pm) and a 'Download PCAP' button. Below this is a 'BPF' filter field and an 'Add Filter' button. A table of packet details is displayed, with columns for Time, Src IP, Dst IP, IP Proto, Src Port, Dst Port, Flags, Bytes, Src MAC, Dst MAC, EtherType, and VLAN ID. The table shows several rows of packet data, including source and destination IP addresses, protocols (TCP, UDP), ports, and MAC addresses.

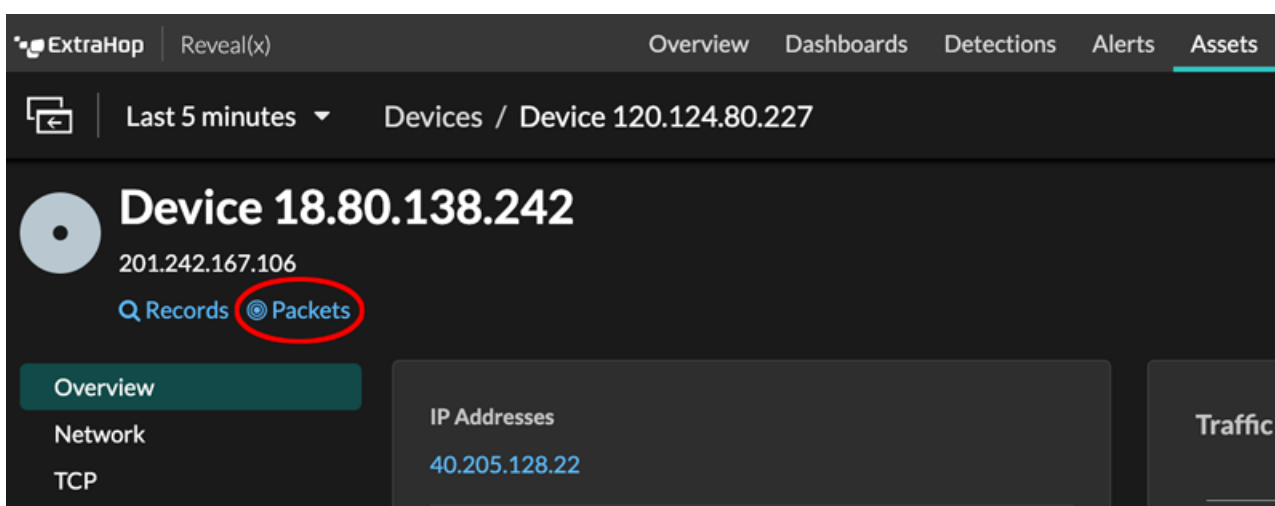
Tip: Filter packets with Berkeley Packet Filter syntax.

There are multiple locations in the ExtraHop system from which you can initiate a packet query:






- Type an IP address in the global search field and then select the Search Packets icon .




- Click **Packets** on a device page.



- Click the Packets icon  next to any record on a record query results page.

	Time ↓	Record Type
	2022-02-23 15:04:08.999	DNS Response
	2022-02-23 15:04:08.999	DNS Request
	2022-02-23 15:04:08.998	Flow
	2022-02-23 15:04:08.998	Flow
	2022-02-23 15:04:08.998	SSL Close

- Click on an IP address or hostname in any chart with metrics for network bytes or packets by IP address to see a context menu. Then, click the Packets icon  to query for the device and time interval.


The screenshot displays the ExtraHop Threat Hunting interface. At the top, navigation tabs include Overview, Dashboards, Detections, Alerts, and Assets. The main heading is 'Threat Hunting / HTTP'. A line graph on the left shows activity over time, with a y-axis from 0 to 10 and x-axis from 15:36:00 to 15:36:30. Below the graph is a search filter 'Any Field ≈'. A table lists search results for 'Client IP', with '100.152.8.59' and '192.168.23.82' visible. A dropdown menu is open over the first result, showing details for '100.152.8.59': External Endpoint 'Las Vegas, Nevada, United States', domain 'myip.opendns.com', and a 'Go To' section with options: 'ARIN Whois Lookup', 'Records', and 'Packets' (which is circled in red). A 'Go to IP Address Details' button is at the bottom of the dropdown.

Configure a global packet capture

A global packet capture collects every packet that is sent to the ExtraHop system for the duration that matches the criteria.

1. Log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
2. In the Packet Captures section, click **Global Packet Capture**.
3. In the Start Global Packet Capture section, complete the following fields. You only need to specify the criteria you want for the packet capture:
 - **Name:** A name to identify the packet capture.
 - **Max Packets:** The maximum number of packets to capture.
 - **Max Bytes:** The maximum number of bytes to capture.
 - **Max Duration (milliseconds):** The maximum duration of the packet capture in milliseconds. We recommend the default value of 1000 (1 second), or configure up to 60000 milliseconds (1 minute).
 - **Snaplen:** The maximum number of bytes copied per frame. The default value is 96 bytes, but you can set this value to a number between 1 and 65535.
4. Click **Start**.
 - 💡 **Tip:** Make a note of the time you start the capture to make it easier to locate the packets.
5. Click **Stop** to stop the packet capture before any of the maximum limits are reached.

Download your packet capture.

- On Reveal(x) Enterprise systems, click **Packets** from the top menu and then click **Download PCAP**.
To help locate your packet capture, click and drag on the Packet Query timeline to select the time range when you started the packet capture.
- On ExtraHop Performance systems, click the System Settings icon , click **All Administration**, and then click **View and Download Packet Captures** in the Packet Capture section.

Analyze a packet capture file

The offline capture mode enables administrators to upload and analyze a capture file recorded by packet analyzer software, such as Wireshark or tcpdump, in the ExtraHop system.

Here are some important considerations before enabling offline capture mode:

- When the capture is set to offline mode, the system datastore is reset. All previously recorded metrics are deleted from the datastore. When the system is set to online mode, the datastore is reset again.
- In offline mode, no metrics are collected from the capture interface until the system is set to online mode again.
- Only capture files in the pcap format are supported. Other formats such as pcapng are not supported.

Set the offline capture mode

1. Log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
2. In the System Configuration section, click **Capture**.
3. Click **Offline Capture File**.
4. Select **Upload** and then click **Save**.
5. Click **OK** to confirm the datastore reset.
The capture process is stopped, the capture state is set to offline, and the datastore is cleared of all data. When the system has set the capture to offline mode, the Offline Capture File page appears.
6. Click **Choose File**, browse to the capture file that you want to upload, select the file, and then click **Open**.
7. Click **Upload**.
The ExtraHop system displays the Offline Capture Results page when the capture file uploads successfully.
8. Click **View Results** to analyze the packet capture file as you would when the system is in live capture mode.

Return the system to live capture mode

1. In the System Configuration section, click **Capture (offline)**.
2. Click **Restart Capture**.
3. Select **Live**, and then click **Save**.

The system removes the performance metrics collected from the previous capture file and prepares the datastore for real-time analysis from the capture interface.

Filter packets with Berkeley Packet Filter syntax

Search for packets with the Berkeley Packet Filter (BPF) syntax alone, or in combination with the built-in filters.

Berkeley Packet Filters are a raw interface to data link layers and are a powerful tool for intrusion detection analysis. The BPF syntax enables users to write filters that quickly drill down on specific packets to see the essential information.

The ExtraHop system constructs a synthetic packet header from the packet index data and then runs the BPF syntax queries against the packet header to ensure that queries are much faster than scanning the full packet payload. Note that ExtraHop supports only a subset of the BPF syntax. See [Supported BPF syntax](#).

The BPF syntax consists of one or more primitives preceded by one or more qualifiers. Primitives usually consist of an ID (name or number) preceded by one or more qualifiers. There are three different kinds of qualifiers:

type

Qualifiers that indicate what type the ID name or number refers to. For example, `host`, `net`, `port`, and `portrange`. If there is no qualifier, `host` is assumed.

dir

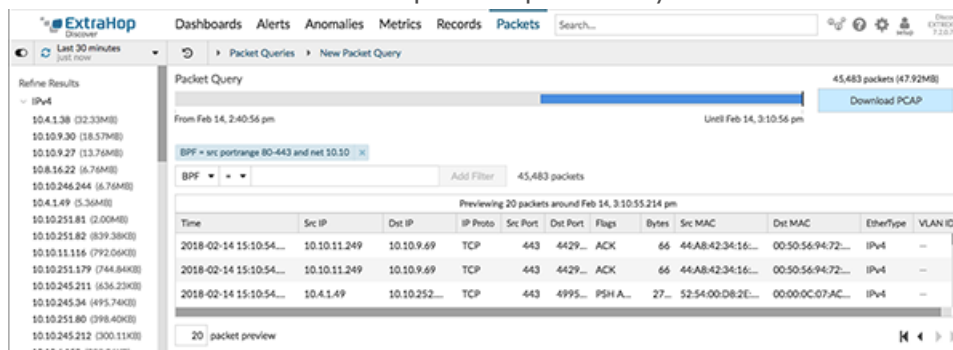
Qualifiers that specify a particular transfer direction to and or from an ID. Possible directions are `src`, `dst`, `src and dst`, and `src or dst`. For example, `dst net 128.3`.

proto

Qualifiers that restrict the match to the particular protocol. Possible protocols are `ether`, `ip`, `ip6`, `tcp`, and `udp`.

Add a filter with BPF syntax

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. From the top menu, click **Packets**.
3. In the trifield filter section, select **BPF**, and then type your filter syntax. For example, type `src portrange 80-443 and net 10.10`.
4. Click **Download PCAP** to save the packet capture with your filtered results.



Supported BPF syntax

The ExtraHop system supports the following subset of the BPF syntax for filtering packets.

- Note:**
- ExtraHop only supports numeric IP address searches. Hostnames are not allowed.
 - Indexing into headers, `[...]`, is only supported for `tcpflags` and `ip_offset`. For example, `tcp[tcpflags] & (tcp-syn|tcp-fin) != 0`
 - ExtraHop supports both numeric and hexadecimal values for VLAN ID, EtherType, and IP Protocol fields. Prefix hexadecimal values with `0x`, such as `0x11`.

Primitive	Examples	Description
<code>[src dst] host <host ip></code>	<code>host 203.0.113.50</code> <code>dst host 198.51.100.200</code>	Matches a host as the IP source, destination, or either. These host expressions can be specified in

Primitive	Examples	Description
		conjunction with other protocols like ip, arp, rarp or ip6.
ether [src dst] host <MAC>	ether host 00:00:5E:00:53:00 ether dst host 00:00:5E:00:53:00	Matches a host as the Ethernet source, destination, or either.
vlan <ID>	vlan 100	Matches a VLAN. Valid ID numbers are 0-4095. VLAN priority bits are zero. If the original packet had more than one VLAN tag, the synthetic packet the BPF matches against will only have the innermost VLAN tag.
[src dst] portrange <p1>-<p2> or [tcp udp] [src dst] portrange <p1>-<p2>	src portrange 80-88 tcp dst portrange 1501-1549	Matches packets to or from a port in the given range. Protocols can be applied to a port range to filter specific packets within the range.
[ip ip6][src dst] proto <protocol>	proto 1 src 10.4.9.40 and proto ICMP ip6 and src fe80::aebc:32ff:fe84:70b7 and proto 47 ip and src 10.4.9.40 and proto 0x0006	Matches IPv4 or IPv6 protocols other than TCP and UDP. The protocol can be a number or name.
[ip ip6][tcp udp] [src dst] port <port>	udp and src port 2005 ip6 and tcp and src port 80	Matches IPv4 or IPv6 packets on a specific port.
[src dst] net <network>	dst net 192.168.1.0 src net 10 net 192.168.1.0/24	Matches packets to or from a source or destination or either, that reside in a network. An IPv4 network number can be specified as one of the following values: <ul style="list-style-type: none"> • Dotted quad (x.x.x.x) • Dotted triple (x.x.x) • Dotted pair (x.x) • Single number (x)
[ip ip6] tcp tcpflags & (tcp-[ack fin syn rst push urg])	tcp[tcpflags] & (tcp-ack) !=0 tcp[13] & 16 !=0	Matches all packets with the specified TCP flag

Primitive	Examples	Description
	<code>ip6 and (ip6[40+13] & (tcp-syn) != 0)</code>	
Fragmented IPv4 packets (ip_offset != 0)	<code>ip[6:2] & 0x3fff != 0x0000</code>	Matches all packets with fragments.

Store SSL session keys on connected packetstores

When session key forwarding is configured on an ExtraHop system that is connected to a packetstore, the ExtraHop system can store encrypted session keys along with the collected packets.

Before you begin

Learn more about [decrypting packets with stored keys](#).

1. Log in to the Administration settings on the ExtraHop system through `https://<extrahop-hostname-or-IP-address>/admin`.
2. In the System Configuration section, click **Capture**.
3. Click **SSL Session Key Storage**.
4. Select **Enable SSL Session Key Storage**.
5. Click **Save**.

Next steps

For more information about downloading session keys, see [Download session keys with packet captures](#).

Download session keys with packet captures

You can download a keylog file that includes all captured SSL session keys for SSL packet captures. Then, you can download and open the associated packet capture file with a packet analysis tool like Wireshark that can display the decrypted payload.

Before you begin

- You must have a configured packetstore before you can download packets and session keys from a sensor or a console. See our [deployment guides](#) to get started.
- The console must be licensed for SSL Shared Secrets.
- The **SSL Session Key Storage** setting must be enabled on the sensor.
- Users must have either [unlimited privileges or limited privileges](#) with packets and session keys access to download the keylog file.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. From the top menu, click **Packets**.
3. (Optional) Apply filters to refine the packet query.
4. When the query completes, click **Download PCAP**.
5. Click **Download Session Keys**.

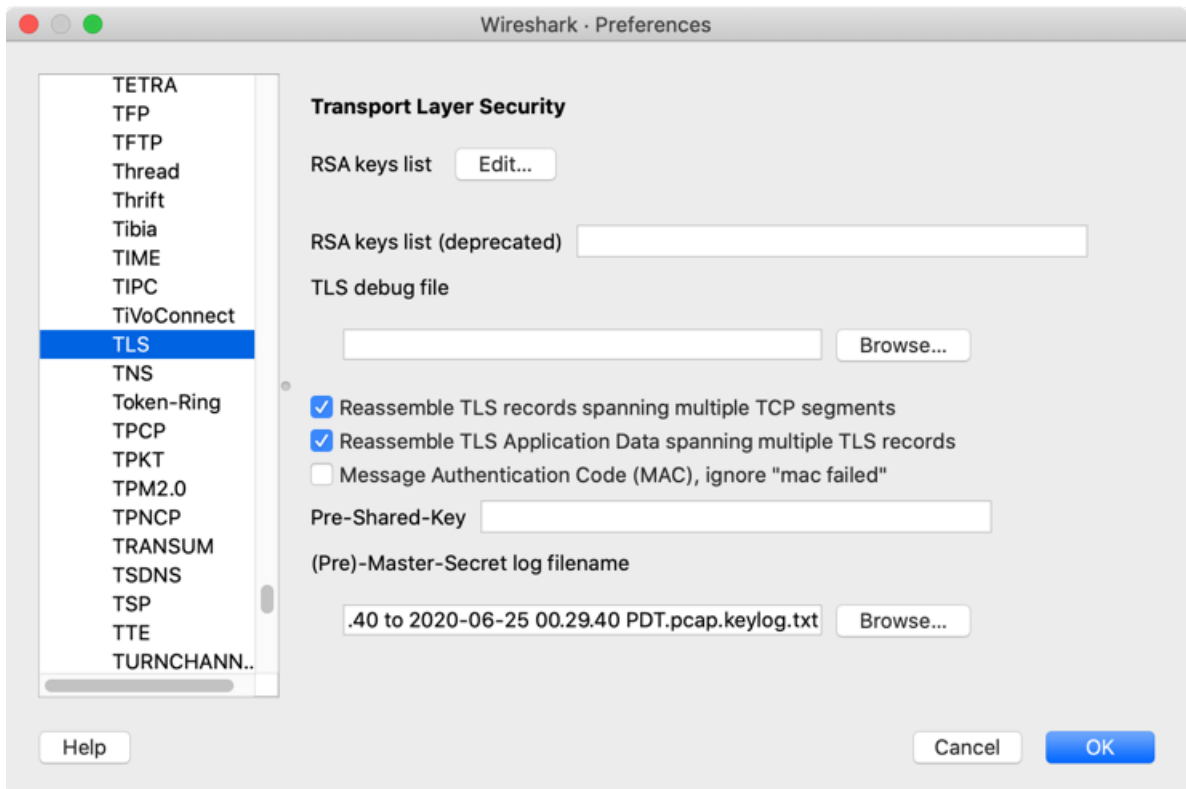
The keylog file is automatically downloaded to your computer and the session key download operation is recorded in the [audit log](#).

If there are no session keys available for the downloaded packet capture, the **Download Session Keys** button does not appear.

Configure Wireshark to view the decrypted payload

1. Start the Wireshark application.

2. Open the Wireshark Preferences pane, expand the **Protocols** section, and then click **TLS**.
3. (Optional) Click the **Browse...** button next to the TLS debug file field to create a log file.
4. Click the **Browse...** button next to the (Pre)-Master-Secret log filename field, select the *.pcap.keylog.txt file you downloaded above, and then click **Open**.



5. Click **OK** to close the Preferences window.
6. Open the downloaded packet capture file in Wireshark.

When an SSL-encrypted frame is selected, the **Decrypted SSL** tab appears at the bottom of the Wireshark window. Click the tab to see the decrypted information in the packet capture as plain text.

extrahop 2018-06-05 12.04.04 to 2018-06-06 12.04.04 PST.pcap

ssl

No.	Time	Source	Destination	Protocol	Length	Info
243	0.318036000	192.168.0.1	192.168.0.41	TLSv1.2	135	Alert (Level: Warni...
249	0.318595000	192.168.0.1	192.168.0.41	TLSv1.2	205	Client Hello
252	0.323303000	192.168.0.41	192.168.0.1	TLSv1.2	145	Server Hello, Certi...
254	0.324694000	192.168.0.1	192.168.0.41	TLSv1.2	232	Client Key Exchange...
255	0.327697000	192.168.0.41	192.168.0.1	TLSv1.2	157	Change Cipher Spec

▶ Frame 256: 231 bytes on wire (1848 bits), 231 bytes captured (1848 bits)
 ▶ Ethernet II, Src: Vmware_94:8f:96 (00:50:56:94:8f:96), Dst: Vmware_94:7d:23 (00:50:56:94:7d:23)
 ▶ Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.41
 ▶ Transmission Control Protocol, Src Port: 51590, Dst Port: 443, Seq: 306, Ack: 3067, Len: 165
 ▶ Secure Sockets Layer

```

0000  47 45 54 20 2f 20 48 54 54 50 2f 31 2e 30 0d 0a  GET / HT TP/1.0..
0010  48 6f 73 74 3a 20 70 66 73 2d 77 69 6e 32 30 31  Host: ex ample.ex
0020  32 72 32 2e 6c 61 62 2e 69 2e 65 78 74 72 61 68  trahop.c om UserA
0030  6f 70 2e 63 6f 6d 0d 0a 55 73 65 72 2d 41 67 65  gent: Ap acheBenc
0040  6e 74 3a 20 41 70 61 63 68 65 42 65 6e 63 68 2f  h/2.3..A ccept: *
0050  32 2e 33 0d 0a 41 63 63 65 70 74 3a 20 2a 2f 2a  /*....
0060  0d 0a 0d 0a
  
```

Frame (231 bytes) Decrypted SSL (100 bytes)


extrahop 2018-06-05 12 Packets: 3017 · Displayed: 1400 (46.4%) · Load time: 0:0.192 Profile: Default

Triggers

Triggers are composed of user-defined code that automatically runs on system events through the ExtraHop Trigger API. You can write a trigger, which is a block of JavaScript, through the trigger API to extract, store, and visualize custom wire data events and metrics that are specific to your business, infrastructure, network, clients, and business applications.

Some of the most common workflows that you can perform through triggers include the following operations:


- Create an [application](#) container in which metrics are collected for specific devices. Application containers augment the device-based views that the ExtraHop system constructs by default.
- Create [custom metrics](#) and save them to the ExtraHop datastore. For example, user agent data generated by an HTTP request is not a metric built into the ExtraHop system. However, the ExtraHop Trigger API provides a user agent HTTP property, which enables you to write a trigger that collects user agent data as a custom metric.
- Generate [records](#) and write them to a datastore for long-term storage and retrieval.
- Send data to syslog consumers, such as Splunk, or to third party databases, such as MongoDB or Kafka, through an [open data stream](#).
- Perform universal payload analysis (UPA) to access and parse TCP and UDP payloads from unsupported protocols.
- Initiate packet captures to record individual flows based on user-specified criteria. Your ExtraHop system must be licensed for packet capture to access this feature.

To view all triggers, click the **System Settings** icon  and then click **Triggers**. From the Triggers page, you can [create a trigger](#) or select the checkmark next to a trigger to [edit the trigger configuration](#) or [modify the trigger script](#).

Plan a trigger

Writing a trigger to collect custom metrics is a powerful way to monitor your application and network performance. However, triggers consume system resources and can affect system performance, and a poorly-written trigger can cause unnecessary system load. Before you build a trigger, evaluate what you want your trigger to accomplish, identify which events and devices are needed to extract the data you need, and determine whether a solution already exists.

- Identify the specific information you need to collect, by asking the following types of questions:
 - When will my SSL certificates expire?
 - Is my network getting connections on non-authorized ports?
 - How many slow transactions is my network experiencing?
 - What data do I want to send to Splunk through an open data stream?
- Review the Metric Catalog to determine whether a built-in metric already exists that extracts the data you need. Built-in metrics do not create additional load on the system.
- Identify which system events produce the data that you want to collect. For example, a trigger that monitors cloud application activity in your environment might run on HTTP responses and on the open and close of SSL connections. For a complete list of system events, see the [ExtraHop Trigger API Reference](#).
- Familiarize yourself with the API methods and properties available in the [ExtraHop Trigger API Reference](#). For example, before you get too far in planning your trigger, check the reference to make sure that the property you want to extract is available, or to find out what properties are collected in a default CIFS record.
- Determine how you want to visualize or store data collected by the trigger. For example, you can view metrics on a dashboard or by protocol, you can send records to the recordstore.


- Determine if a trigger already exists that meets your needs or might be easily modified; always start with a pre-existing trigger whenever possible. Search the following resources for an existing trigger:
 - [Existing triggers on the Triggers page](#)
 - [The ExtraHop Community Forums](#) 

Building triggers

If you determine that you need to build a new trigger, familiarize yourself with the following tasks that must be completed:

- [Configure the trigger](#) to provide details such as the trigger name and whether debugging is enabled. Most importantly, specify which system events the trigger will run on. For example, if you want your trigger to run each time an SSH connection is opened, you will specify `SSH_OPEN` as the trigger event.
- [Write the trigger script](#), which specifies the instructions the trigger will carry out when a system event configured for the trigger occurs. The trigger script can provide instructions for a simple task such as creating a custom device count metric called "slow_rsp" or a more complex effort such as monitoring and collecting statistics about the cloud applications accessed in your environment.

After the trigger is complete and running, it is important to check that the trigger is performing as expected.

- [View the debug log](#) for expected output from debug statements in the trigger script. The log also displays any runtime errors and exceptions that you must fix.
- [Monitor the performance cost](#) by tracking the number of cycles consumed by the trigger.
- [Check System Health charts](#) for trigger exceptions, drops from the trigger queue, and unexpected activity.
- Check that the trigger script adheres to the [Triggers Best Practices Guide](#) .

Navigate triggers

The Triggers page contains a list of current triggers with the following information:

Name

The user-defined name of the trigger.

Author

The name of the user who wrote the trigger. Default triggers display ExtraHop for this field.

Description

The user-defined description of the trigger.

Assignments

The devices or device groups the trigger is assigned to.

Status

Whether the trigger is enabled. If the trigger is enabled, the number of device assignments also displays.

Debug Log

Whether debugging is enabled. If debugging is enabled, output from debug statements in the trigger script are logged in the [debug log output](#).

Events

The system events that cause the trigger to run, such as `HTTP_RESPONSE`.

Modified

The last time that the trigger was modified.

Triggers

<input type="checkbox"/>	Name ↑	Author	Description	Assignments	Status	Debug Log	Events	Modified
<input type="checkbox"/>	Active Direct...	ExtraHop	Custom metrics for Active Direct...	0	■ ENABLED	■ DISABLED	CIFS_RESPONSE, ...	2017-11-2
<input type="checkbox"/>	AD: DNS Ser...	ExtraHop	DNS service (SRV) resource reco...	0	■ DISABLED	■ DISABLED	DNS_REQUEST, D...	2018-08-2
<input type="checkbox"/>	AD: Group Po...	ExtraHop	Group Policy custom metrics for ...	0	■ DISABLED	■ DISABLED	CIFS_RESPONSE	2018-08-2

Build a trigger

Triggers provide expanded functionality of your ExtraHop system. With triggers, you can create custom metrics, generate and store records, or send data to a third-party system. Because you write the trigger script, you control the actions taken by the trigger upon specified system events.

To build a trigger, you must create a trigger configuration, write the trigger script, and then assign the trigger to one or more metric sources. The trigger will not run until all actions are completed.

Before you begin

Log in to the ExtraHop system with a user account that has the full write [privileges](#) required to create triggers.

If you are new to triggers, [familiarize yourself with the trigger planning process](#), which will help you narrow the focus of your trigger, or determine whether you need a build a trigger at all. Then, run through the process of building a trigger by completing the [Triggers Walkthrough](#).

Configure trigger settings

The first step to building a trigger is to provide a trigger name, determine whether debugging is enabled, and most importantly, identify which system events the trigger will run on.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon and then click **Triggers**.
3. Click **Create**.
4. Specify the following trigger configuration settings:

Name

A name for the trigger.

Author

The name of the user that wrote the trigger. Default triggers display ExtraHop.

Description

An optional description of the trigger.

Assignments

The devices or device groups the trigger is assigned to. A trigger does not run until it is assigned to a device, and the trigger gathers metric data only from the devices to which it is assigned.

Warning: Running triggers on unnecessary devices and networks exhausts system resources. Minimize performance impact by assigning a trigger only to the specific sources that you need to collect data from.

Important: Triggers with the following events run whenever the event occurs. Triggers that only run on these events cannot be assigned to devices or device groups.

- ALERT_RECORD_COMMIT

- DETECTION_UPDATE
- METRIC_CYCLE_BEGIN
- METRIC_CYCLE_END
- METRIC_RECORD_COMMIT
- NEW_APPLICATION
- NEW_DEVICE
- SESSION_EXPIRE
- TIMER_30SEC

Enable debug log

A checkbox that enables or disables debugging. If you add debug statements to the trigger script, this option enables you to [view debug output](#) in the debug log when the trigger is running.

Events

The events on which the trigger runs. The trigger runs whenever one of the specified events occurs on an assigned device; therefore, you must assign at least one event to your trigger. You can click in the field or begin typing an event name to display a filtered list of available events.

Advanced options

[Advanced trigger options](#) vary by the selected events. For example, if you select the `HTTP_RESPONSE` event, you can set the number of payload bytes to buffer on those events.

Write a trigger script

The trigger script specifies the instructions the trigger will carry out when a system event configured for the trigger occurs.

Before you begin

We recommend that you open the [ExtraHop Trigger API Reference](#), which contains the events, methods, and properties you need for your trigger. A link is also available from the trigger editor window in the ExtraHop system.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon , and then click **Triggers**.
3. Click **Create**.
4. In the right pane, type the trigger script in JavaScript-like syntax with events, methods, and properties from the [ExtraHop Trigger API Reference](#).

The following figure shows a sample script entered on the Editor tab:



```

1  if (HTTP.uri.match("seattle")){
2    Application("Seattle App").commit();
3    debug (HTTP.uri);
4  }

```

The editor provides an autocomplete feature that displays a list of properties and methods based on the selected class object. For example, type a class name and then type a dot (.) to display a list of available properties and methods as shown in the following figure:

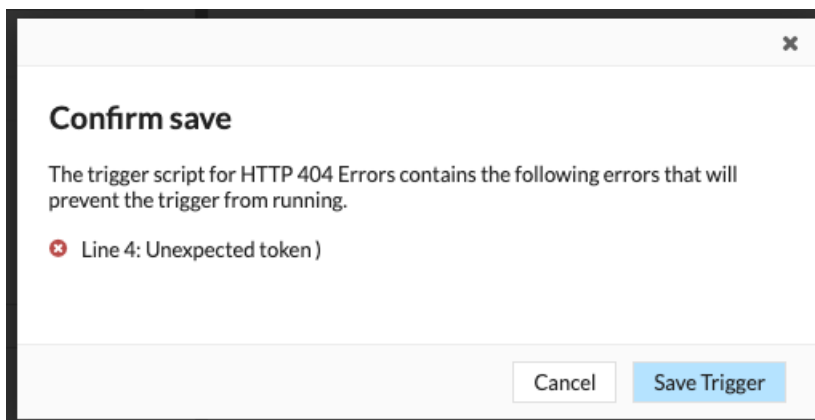


5. Click **Save**.

The editor provides syntax validation of your script. When you save the trigger, the validator calls out any invalid actions, syntax errors, or deprecated elements in the script. If available, the validator displays replacements for deprecated elements.

Warning: To avoid poor trigger performance, incorrect results, or a trigger that does not function, we strongly recommended that you fix the code or replace the deprecated element.

The following figure shows a sample error message generated by the syntax validator:




Advanced trigger options

You must configure triggers to run on at least one event. Depending on the selected event, the Create Trigger pane displays advanced configuration options. For example, selecting the `HTTP_RESPONSE` event enables you to set the number of payload bytes to buffer each time that event occurs on the system.

The following table describes available advanced options and the events that support each option.

Option	Description	Supported events
Bytes Per Packet to Capture	Specifies the number of bytes to capture per packet. The capture starts with the first byte in the packet. Specify this option only if the trigger script performs packet capture.	All events are supported except the following list: <ul style="list-style-type: none"> ALERT_RECORD_COMMIT METRIC_CYCLE_BEGIN METRIC_CYCLE_END FLOW_REPORT NEW_APPLICATION

Option	Description	Supported events
	A value of 0 specifies that the capture should collect all bytes in each packet.	<ul style="list-style-type: none"> NEW_DEVICE SESSION_EXPIRE
L7 Payload Bytes to Buffer	<p>Specifies the maximum number of payload bytes to buffer.</p> <p> Note: If multiple triggers run on the same event, the trigger with the highest L7 Payload Bytes to Buffer value determines the maximum payload for that event for each trigger.</p>	<ul style="list-style-type: none"> CIFS_REQUEST CIFS_RESPONSE HTTP_REQUEST HTTP_RESPONSE ICA_TICK LDAP_RESPONSE
Clipboard Bytes	Specifies the number of bytes to buffer on a Citrix clipboard transfer.	<ul style="list-style-type: none"> ICA_TICK
Metric cycle	<p>Specifies the length of the metric cycle, expressed in seconds. The following values are valid:</p> <ul style="list-style-type: none"> 30sec 5min 1hr 24hr 	<ul style="list-style-type: none"> METRIC_CYCLE_BEGIN METRIC_CYCLE_END METRIC_RECORD_COMMIT
Metric types	Specifies the metric type by the raw metric name, such as <code>extrahop.device.http_server</code> . Specify multiple metric types in a comma-delimited list.	<ul style="list-style-type: none"> ALERT_RECORD_COMMIT METRIC_RECORD_COMMIT
Run trigger on each flow turn	<p>Enables packet capture on each flow turn.</p> <p>Per-turn analysis continuously analyzes communication between two endpoints to extract a single payload data point from the flow.</p> <p>If this option is enabled, any values specified for the Client matching string and Server matching string options are ignored.</p>	<ul style="list-style-type: none"> SSL_PAYLOAD TCP_PAYLOAD
Client Port Range	<p>Specifies the client port range.</p> <p>Valid values are 0 to 65535.</p>	<ul style="list-style-type: none"> SSL_PAYLOAD TCP_PAYLOAD UDP_PAYLOAD
Client Bytes to Buffer	<p>Specifies the number of client bytes to buffer.</p> <p>The value of this option cannot be set to 0 if the value of the Server</p>	<ul style="list-style-type: none"> SSL_PAYLOAD TCP_PAYLOAD

Option	Description	Supported events
	bytes to buffer option is also set to 0.	
Client Buffer Search String	Specifies the format string that indicates when to begin buffering client data. Any value specified for this option is ignored if the Per Turn option is enabled.	<ul style="list-style-type: none"> • SSL_PAYLOAD • TCP_PAYLOAD • UDP_PAYLOAD
Server Port Range	Specifies the server port range. Valid values are 0 to 65535.	<ul style="list-style-type: none"> • SSL_PAYLOAD • TCP_PAYLOAD • UDP_PAYLOAD
Server Bytes to Buffer	Specifies the number of server bytes to buffer. The value of this option cannot be set to 0 if the value of the Client bytes to buffer option is also set to 0.	<ul style="list-style-type: none"> • SSL_PAYLOAD • TCP_PAYLOAD
Server Buffer Search String	Specifies the format string that indicates when to begin buffering data. Returns the entire packet upon a string match. Any value specified for this option is ignored if the Per Turn option is enabled.	<ul style="list-style-type: none"> • SSL_PAYLOAD • TCP_PAYLOAD • UDP_PAYLOAD
Run trigger on all UDP packets	Enables capture of all UDP datagrams.	<ul style="list-style-type: none"> • UDP_PAYLOAD
Run FLOW_CLASSIFY on expiring, unclassified flows	Enables running the event upon expiration to accumulate metrics for flows that were not classified before expiring.	<ul style="list-style-type: none"> • FLOW_CLASSIFY

Monitor trigger performance

After you have built a trigger, check to ensure that it is running as expected, without errors or unnecessary consumption of resources. If your trigger script includes a debug statement, check the debug log for debug output. You can also check the debug log for errors and exceptions. You can view performance information for an individual trigger and you can view several system health charts that indicate the collective impact of all of your triggers on the system.

To learn about the steps you must complete to create a trigger, see [Build a trigger](#).


Check trigger output in the debug log

After you create or edit a trigger, you can view the Debug Log tab to check that the trigger is running as expected, without issues. The debug log displays debug output, errors, and exceptions. This tab only appears after the trigger is saved.

If a trigger includes a debug statement, the output from that statement is displayed in the trigger debug log. Ensure that the logged output is expected. If you are not seeing results, check that debugging is enabled on the Configuration tab.

Note that debug output starts logging as soon as the trigger is assigned and saved; however, the log cannot display data that occurred prior to when the trigger was assigned and saved.



The following steps show you how to access the debug log:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon , and then click **Triggers**.
3. Double-click the trigger you want to view.
4. Click the **Debug Log** tab.

In the following example, the trigger monitors HTTP connections on selected devices and returns URIs that contain "seattle".



```
if (HTTP.uri.match("seattle")){
  Application("Seattle App").commit();
  debug(HTTP.uri);
}
```

When a match occurs, the URI that contains the match is written to the debug log as shown in the following figure:

PROBLEMS   DEBUG LOG

```
[Fri Jun 17 10:18:58] www.seattlefoodtruck.com/wp-content/uploads/2019/03/Nibbles.jpg
[Fri Jun 17 10:18:57] www.seattlefoodtruck.com/wp-content/themes/Impreza/framework/fonts/fontawesome-webfont.woff2
[Fri Jun 17 10:18:57] www.seattlefoodtruck.com/wp-content/uploads/2019/04/Xplosive-600x425.jpg
[Fri Jun 17 10:18:45] www.seattlefoodtruck.com/food-trucks/nibbles/
[Fri Jun 17 10:18:45] www.seattlefoodtruck.com/wp-content/uploads/2019/03/BuddhaBruddah-600x425.jpg
[Fri Jun 17 10:18:45] www.seattlefoodtruck.com/wp-content/uploads/2019/01/Thai-U-Up-600x425.jpg
[Fri Jun 17 10:18:39] www.seattlefoodtruck.com/wp-content/uploads/2019/02/MiniTheDoughnut-600x425.jpg
```


The debug log also displays any runtime errors or exceptions that occur, whether or not debugging is enabled on the Configuration tab. You should fix exceptions when they occur to minimize the performance impact on your system.

PROBLEMS   DEBUG LOG

```
[Wed Jun 12 15:50:59] Line 11: Uncaught Error: Second argument must be object
[Wed Jun 12 15:51:29] Line 11: Uncaught Error: Second argument must be object
[Wed Jun 12 15:51:59] Line 11: Uncaught Error: Second argument must be object
[Wed Jun 12 15:52:29] Line 11: Uncaught Error: Second argument must be object
```

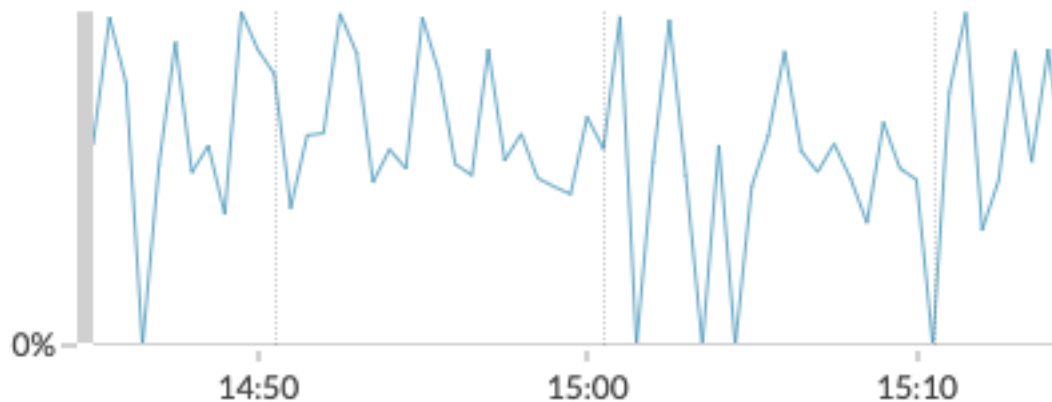
View the performance of an individual trigger

After you create or edit a trigger, you can view the Performance tab to view a graphical representation of the performance impact the trigger has on your environment. This tab only appears after the trigger is saved.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon , and then click **Triggers**.
3. Click the trigger you want to view.
4. In the Edit Trigger pane, scroll down to the Capture Trigger Load chart.

The tab displays a trigger performance graph that tracks the number of cycles the trigger has consumed within a given time interval.

Capture Trigger Load ?



Next steps

If the trigger impact is high, re-evaluate the purpose of the trigger and consider the following options:

- Ensure the trigger performs only necessary tasks and runs only on required devices or networks.
- Check for exceptions in the chart below Capture Trigger Load visit the [System Health](#) page, which provides additional trigger performance metrics such as the number of running triggers, trigger load, and trigger exceptions.
- Assess the efficiency of the trigger script and look for trigger optimization tips in the [Triggers Best Practices Guide](#).

View the performance of all triggers on the system

After you have built a trigger, view several System Health charts that indicate the collective impact of all of your triggers on the system. You can monitor these charts for problems that affect system performance or result in incorrect data.

The [System Health](#) page contains several charts that provide an at-a-glance view of the triggers running on the ExtraHop system.

1. Click the System Settings icon and then click **System Health**.
2. View the following charts:

Option	Description
Trigger Executes by Trigger	Displays all triggers running on the system. If the trigger you just created or modified is not listed, there might be an issue with the trigger script.
Trigger Executes	Displays bursts of trigger activity that might indicate inefficient behavior from one or more triggers. If any bursts of activity are displayed, view the Trigger Executes by Trigger chart to locate any trigger that is consuming higher resources than average, which can indicate that the trigger has a poorly-optimized script that is affecting performance.
Trigger Exceptions by Trigger	Displays any exceptions caused by triggers. Exceptions are a large contributor to system performance issues and should be corrected immediately.

Option	Description
Trigger Drops	Displays the number of triggers that have been dropped from the trigger queue. A common cause of dropped triggers is a long-running trigger that is dominating resource consumption. A healthy system should have 0 drops at all times.
Trigger Load	Tracks the usage of all available resources by triggers. A high load is approximately 50%. Look for spikes in consumption that can indicate that a new trigger has been introduced or that an existing trigger is having issues.

You can monitor whether your datastore triggers, also referred to as bridge triggers, are running properly with the following charts:

- Datastore trigger executes
- Datastore trigger exceptions by trigger
- Datastore trigger drops

Bundles

A bundle is a customized set of system configurations that can be saved and [uploaded](#) to an ExtraHop system.

The following system customizations can be saved as part of a bundle:

- Alerts
- Applications
- Dashboards
- Custom Detections
- Dynamic Device Groups
- Record Queries
- Record Formats
- Triggers

Learn more about creating and sharing bundles with the [Bundle Best Practices Guide](#).


Install a bundle

ExtraHop bundles enable you to add pre-configured customizations to the ExtraHop system.

Before you begin

You must have a bundle JSON file. You can download a bundle from the ExtraHop system by navigating to **System Settings > Bundles**, selecting the bundle, and then clicking **Download Bundle** from the right pane.

After you have downloaded a bundle, you can upload and install the bundle on your system.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon .
3. Click **Bundles**.
4. Click **Upload Bundle**.
5. In the Upload Bundle pane, click **Choose File**, and then select the bundle JSON file you want to upload. Details about the bundle content appear, including the minimum required firmware version.
6. In the Install Options section, select the following checkboxes:
 - a) (Console only) Select the site where you want to install the bundle.



Note: Bundle customizations such as alerts and triggers are added to the selected sites. However, you can only view, enable, and configure customizations from the ExtraHop system where the bundle was installed.

- b) Select the **Apply included assignments** checkbox.

This option assigns the bundle to the metric sources included with the bundle. In most cases, it is best to apply the default assignments.
 - c) Select the **Overwrite existing content** checkbox.


This option overwrites any objects that have the same name as objects in the bundle. If you have existing system objects with the same name that you want to preserve, you must rename those objects to avoid overwriting them with the objects in the bundle.
7. Click **Install**.

Next steps

- Enable any [triggers](#) included in the bundle.
- Configure any [alerts](#) in the bundle to notify relevant email addresses.

Create a bundle

You can save system configurations to a bundle file and then upload that file to other ExtraHop systems.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Bundles**.
3. On the Bundles page, click **Create**.
4. Complete the following information:

Name


Assign a name to the bundle.

Author

Specify the creator of the bundle. This name is applied to the author field of all objects in the bundle. If you do not specify an author, each bundle object retains its author setting.

Minimum ExtraHop Version

Specify the earliest version of ExtraHop firmware that the bundle can run on. We recommend that you specify the current version of ExtraHop firmware. Specifying the current version prevents your bundle from being accidentally installed on a system that does not support the bundle.


 **Note:** If you try to install a bundle that requires a newer firmware version, a warning message displays. However, this warning does not prevent you from uploading and applying the bundle.

Description (Optional)

Type a description about the bundle.

Add to Bundle

From the drop-down menu, select the system configurations that you want to add to the bundle, such as triggers, dashboards, and alerts. You can select multiple items to add to the bundle.

 **Note:** You can quickly select multiple bundle configurations with the following hotkeys:

OPTION + Click (Mac), ALT + Click (Windows)

Select all items but the one clicked.

SHIFT + Click

Deselect all items but the one clicked.

5. Click **Save**.

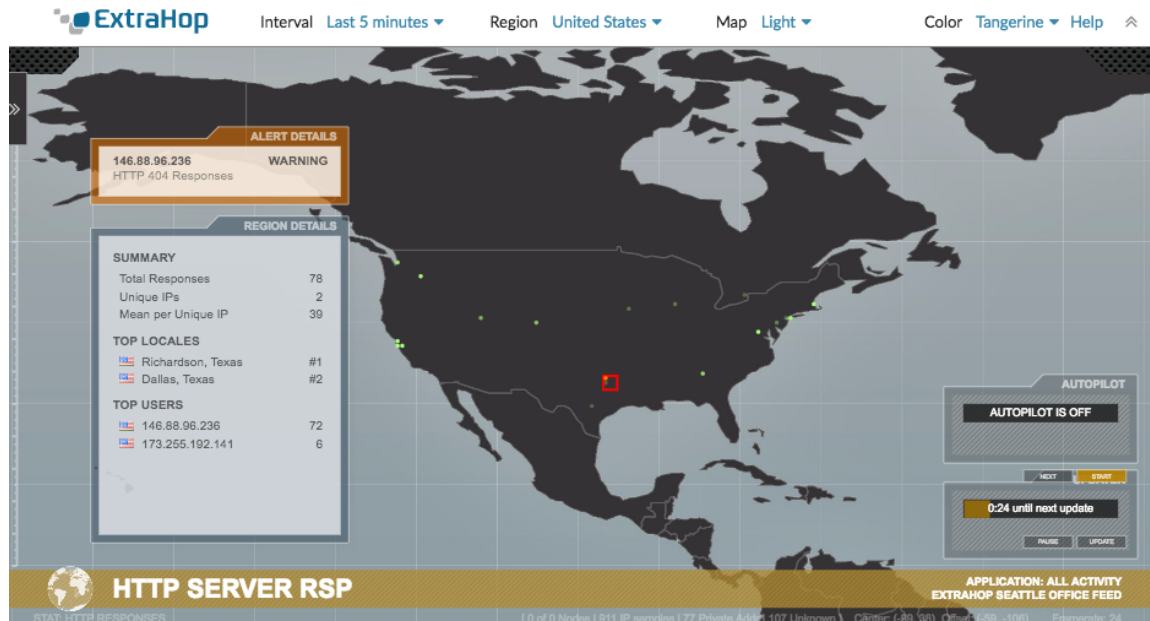
You can download the bundle JSON file you created by selecting the bundle from the list and then clicking **Download Bundle** from the right pane.

Next steps

- [Install your bundle on another ExtraHop system](#)

Geomaps

A geomap is a visual representation of worldwide activity based on a single count metric. The ExtraHop system determines the originating IP address of each metric event and plots it to a regional data point on the geomap.



Generate a [geomap](#) on-the-fly from a metric detail page. You can only generate geomaps for count metrics that can be broken down by an IP address.

View regional details

A metric tracked on a geomap displays a data point for each location from where metric data originates. For example, assign an SSH session metric to a geomap to find out if SSH attempts are coming from unauthorized locations. Each data point displays the IP addresses that sent the requests. Click a data point to view the following regional activity details:

Summary

Displays the following information about user activity in the region:

- The total number of IP addresses on which a response or a request has been made.
- The number of unique IP addresses out of the total number of addresses.
- The mean, or average, number of IP addresses per unique IP address.

Top locales

Displays the top two locales that generate the most activity in the region. Locales are cities that are geographically close together and can be summarized in one region. For example, the window might display Mountain View, California and Oakland, California as the top locales for a region.

Top users

Displays the top six users that have generated the most activity in the region. Each user is identified by IP address, and the number of responses or requests generated by each IP address is displayed.

View alert details

A metric tracked on a geomap might be associated with one or more alerts. If the metric activity meets alert conditions, the appearance of the data point indicates the severity level. Alert severity levels are represented by the following colors on the geomap:

Gray

Indicates that no user-defined alerts are configured, or the alert settings are configured to issue a single alert when conditions are met even if the condition is ongoing.

Green

Indicates that no user-defined alerts are configured, or that an alert with a severity level of Debug and Informational was generated.

Orange

Indicates that at least one alert with a severity level of Notice or Warning was generated.

Red with spinning edges

Indicates that at least one alert with a severity level of Error or Critical was generated.

Red with sonar beacons

Indicates that at least one alert with a severity level of Emergency or Alert was generated.

For example, if an alert is configured to watch HTTP responses on a group of web servers so that any time the ratio of errors exceeds 5%, a critical-level notification is sent. If your geomap tracks HTTP responses on the same web servers, data points display as red with spinning edges in each region the alert condition is met.

The behavior of an alert affects the data points on the geomap. An alert can be configured to occur once when alert condition is met, resulting in a one-time data point on the map. Or, an alert can be configured to occur at regular intervals as long as the alert condition is met, resulting in a data point that reflects the continuous state.

Click a data point to view the following alert details:

- The IP addresses that have been generated an alert.
- The alert severity level associated with each IP address.
- The name of the alert associated with each IP address.

See [Alerts](#) for more information about configuring alerts and alert severity levels.

Navigate display controls

Each geomap displays the following information and controls:

Display controls

Settings that determine the look of the geomap and the time range of the data displayed.

Activity graphs

Graphs that display user activity in smaller data sets.

Autopilot

A feature that automatically navigates between the top eight regions with the most user activity.

Updater

A timer that counts down to the next refresh of the data on the geomap.

For more information about geomaps, see the [Geomaps FAQ](#).


Generate a geomap

The ExtraHop system makes it easy for you to generate a geomap on-the-fly from a metric detail page. The ExtraHop system determines the originating IP address of each metric event and plots it to a regional data point on the geomap.

You can only generate geomaps for count metrics that can be broken down by an IP address.

To learn about how geomaps work and what information is provided, see [Geomaps](#).

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Go to the device, application, or dashboard that displays the count metric you want to track.
 - To go to a device page, click **Assets**, click **Devices** or **Device Groups** from the left pane, and then click the device you want.
 - To go to an application page, click **Assets**, click **Applications** from the left pane, and then click the application you want.
 - To go to a dashboard, click **Dashboards**, and then click the dashboard you want.

 **Note:** If there is no dashboard or source page that displays the count metric you want, [create a chart](#) and add it to a dashboard.
3. Click the label of the count metric to open a context menu, and then select the key for the detail metric you want from the **Drill down by** list.

Depending on the metric, the available keys might be client, server, or IP.
The detail page for the source of the metric appears.
4. Click the **View Geomap** button.

The geomap opens in full-screen on a new browser tab.



Tip: You can save or bookmark the geomap URL to quickly return to it.

Reports

In the ExtraHop system, you can create a report of network activity to share with others.

Reports enable you to highlight network activity for a specific time period, for a selected device, application or network, and enable you to compare changes in your network activity over a period of days, weeks, or months.

Next steps

- [Create a scheduled report](#)
- [Review frequently asked questions about reports](#)


Create a scheduled report

You can email a PDF file of selected dashboards to one or more recipients by creating a scheduled report on a console. When you create a scheduled report, you can specify how often the report is emailed and the time interval for the dashboard data included in the PDF file. Note that you can only create a report for dashboards you own or have shared access to.

Before you begin

- You must have a console that is [configured to send emails](#).
- Your user account must have limited write or higher [privileges](#).
- If you create a report for a dashboard that is later deleted or becomes inaccessible to you, an email is still sent to recipients. However, the email does not include the PDF file and includes a note that the dashboard is unavailable to the report owner.
- To stop sending a report, disable or delete the report.

Complete the following steps to create a basic scheduled report:

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click **Dashboards** at the top of the page.
3. Select the dashboard that you want to send in the report.
4. Click the command menu  in the upper right corner of the dashboard page and then click **Scheduled Reports**.
5. Click **Create**.
The dashboard name is automatically entered for the Report Name and the dashboard is listed in the Report Contents section.

If the dashboard you selected has a dynamic source, you must select a source.

6. (Optional) In the Description field, type information about the report. The description does not appear in the final report, only in the report settings.
7. In the Time Interval section, select the time frame for dashboard data that you want to send.
8. In the Report Frequency section, set the email delivery schedule by selecting one of the following options:

Option	Description
Hourly	Email the report every hour.
Daily	Specify the time you want the report to be emailed. Click Add Another Time to email the report multiple times per day.
Weekly	Specify one or more days of the week, and the time you want the report to be emailed. Click Add

- | Option | Description |
|--------|---|
| | Another Time to send report emails at multiple times per day or at different times per week. |
9. (Optional) In the Format section, set the content layout by selecting one of the following options from the first Style drop-down list:
- | Option | Description |
|---------------|---|
| Narrow | Displays large text in chart titles and labels, but provides less space for displaying chart data. Long chart titles and labels might be truncated. |
| Medium | (Recommended) Displays a view of chart titles, legends, and data that is optimized for portrait page orientation. |
| Wide | Displays small text in chart titles and labels, but provides more space for displaying chart data. |
10. (Optional) In the Format section, set the number of page breaks in the PDF by selecting one of the following options from the second Style drop-down list:
- | Option | Description |
|------------------------------|--|
| Single page | Displays the entire dashboard or protocol page on a single, continuous page. This setting might generate a PDF file that is larger than standard printer page sizes. |
| Page break per region | Displays each chart region on an individual page. Select this option if your dashboard contains a table or list that displays more than 20 detail metric values. |
11. (Optional) In the Format section, set the display theme by selecting one of the following Theme options.
- | Option | Description |
|----------------------|--|
| Light | Displays dashboard data as dark text against a light background. |
| Dark or Space | Displays dashboard data as light text against a dark background. |
12. In the Send To section, add email recipients by completing one of the following steps:
- From the Notification Groups drop-down list, select a group of recipients. If you do not see the email group that you are looking for, you can configure email groups in the ExtraHop Administration settings or through the REST API. Contact your ExtraHop administrator to add an [email notification group](#).
 - In the Email Addresses field, type the email addresses for recipients, separated by a comma.
13. In the Subject section, click **Custom** and write your own subject line for the email. The automatic subject line is the report name.
14. (Optional) In the Message field, type the information you want to send in the body of the report email. The names of the dashboards linked to the report are provided in the message by default.
15. To save your report, complete one of the following steps:
- Click **Send Now** to send a test report email to the email addresses. Your report is then saved and scheduled. Click **Done**.
 - Click **Save**. Your report is scheduled and will be sent to recipients based on the report frequency you specified.

Appendix

ExtraHop modules

The ExtraHop system provides metrics through the following types of modules:

Module Type	Protocols
L2-L3 Metrics	<ul style="list-style-type: none"> • Multicast • IP • IPv6 • ICMP • ICMPv6
L4 Metrics	<ul style="list-style-type: none"> • TCP • UDP
Naming	DNS
Directory Services	LDAP
Web	<ul style="list-style-type: none"> • HTTP/HTTPS • AMF • SSL
Middleware	<ul style="list-style-type: none"> • MS-RPC • Memcache • IBMMQ
Database	<ul style="list-style-type: none"> • IBM DB2 • IBM Informix • Microsoft SQL Server • MongoDB • MySQL • Oracle • PostgreSQL • Sybase ASE • Sybase IQ
Storage	<ul style="list-style-type: none"> • iSCSI • CIFS • NFS
File Transfer	FTP
Mail	SMTP
Citrix VDI	<ul style="list-style-type: none"> • ICA • CGP
Industry-Specific Protocols	<ul style="list-style-type: none"> • Diameter • FIX


Module Type	Protocols
	<ul style="list-style-type: none"> • HL7 • RADIUS • SMPP • Telnet
Decryption	Any protocol encrypted over end-to-end SSL channel, can be decrypted using the SSL decryption module.

For more information about ExtraHop modules, visit extrahop.com.

Supported browsers

The following browsers are compatible with all ExtraHop systems. Apply the accessibility and compatibility features provided by your browser to access content through assistive technology tools.

- Firefox
- Google Chrome
- Microsoft Edge
- Safari

 **Important:** Internet Explorer 11 is no longer supported. We recommend that you install the latest version of any supported browser.

Common acronyms

The following common computing and networking protocol acronyms are used in this guide.

Acronym	Full Name
AAA	Authentication, authorization, and accounting
AMF	Action Message Format
CIFS	Common Internet File System
CLI	Command Line Interface
CPU	Central Processing Unit
DB	Database
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
ERSPAN	Encapsulated Remote Switched Port Analyzer
FIX	Financial Information Exchange
FTP	File Transfer Protocol
HTTP	Hyper Text Transfer Protocol
IBMMQ	IBM Message Oriented Middleware
ICA	Independent Computing Architecture
IP	Internet Protocol

Acronym	Full Name
iSCSI	Internet Small Computer System Interface
L2	Layer 2
L3	Layer 3
L7	Layer 7
LDAP	Lightweight Directory Access Protocol
MAC	Media Access Control
MIB	Management Information Base
NFS	Network File System
NVRAM	Non-Volatile Random Access Memory
RADIUS	Remote Authentication Dial-In User Service
RPC	Remote Procedure Call
RPCAP	Remote Packet Capture
RSS	Resident Set Size
SMPP	Short Message Peer-to-Peer Protocol
SMTP	Simple Message Transport Protocol
SNMP	Simple Network Management Protocol
SPAN	Switched Port Analyzer
SSD	Solid-State Drive
SSH	Secure Shell
SSL	Secure Socket Layer
TACACS+	Terminal Access Controller Access-Control System Plus
TCP	Transmission Control Protocol
UI	User Interface
VLAN	Virtual Local Area Network
VM	Virtual Machine

Keyboard shortcuts

Keyboard shortcuts enable you to quickly navigate across the ExtraHop system or perform specific actions with a few keystrokes.

The following keyboard shortcuts apply across the entire ExtraHop system.

Key	Action
?	Show or hide a hot key help menu
G then S	Go to Dashboard
G then A	Go to Alerts

Key	Action
G then P	Go to Application Metrics
G then N	Go to Network Metrics
G then D	Go to Device Metrics
G then G	Go to Group Metrics
/	Global Search
O then M	Open Metric Explorer
G then E	Go to Settings
G then T	Go to Trigger Editor
G then H	Open Help
O then Q	View system information
Ctrl+S	Save widget configuration

The following keyboard shortcuts only apply to dashboards.

Key	Action
O then L	Toggle edit layout mode
O then P	Show dashboard properties
C then D	Copy the current dashboard
D then D	Delete the current dashboard
O then S	Toggle descriptions
Ctrl+Up Arrow+F	Toggle presentation mode
N then D	Create a new dashboard
N then F	Create a new folder
O then D	Toggle dock edit mode