Juniper Networks | Engineering Simplicity

Data Center Next-Generation Firewall Use Case—Juniper Validated Design (JVD)

Published
2025-06-05

Table of Contents

Data Center Next-Generation Firewall Use Case—Juniper Validated Design (JVD)

Juniper Networks Validated Designs provide customers with a comprehensive, end-to-end blueprint for deploying Juniper solutions in their network. These designs are created by Juniper's expert engineers and tested to ensure they meet the customer's requirements. Using a validated design, customers can reduce the risk of costly mistakes, save time and money, and ensure that their network is optimized for maximum performance.

About this Document

This document covers the data center next-generation firewall use case with focus on optimal configuration of typical features in the data center. We also focus on the validation of each feature using a feature-based test plan and report the combined performance results delivered by these features. SRX4600 is the platform that is utilized in this validated design.

Solution Benefits

Juniper's approach to a data center security solution starts with operational efficiency, which is the most critical part of any architectural transformation. Following are the various components of this architecture:

In the data center:

- **Data center WAN gateway**—This is the main entryway to your data center where you control who and what can access your corporate resources. Using the analogy of fine art in a museum, this is where the balance between availability and security must be struck. Additionally, this is where you control who can access the data in the data center. It is your first line of defence, and access policies at the data center WAN gateway must align with user policies at your edge.
- **Cloud/Data Center Interconnect (DCI)**—This is the connection between your data center locations where information is exchanged between applications. The most important point to remember here is that the data in transit between data center locations must be secured.

- **Intra-data center**—Inside your data center, there are physical servers that house your applications and their components. There is a micro perimeter that needs to protect these resources. In a zero trust data center, segmentation between servers limiting the impact of a successful attack is a must.
- **Public Cloud**—Public Cloud offers tons of scale, redundance, and global reach. Many public cloud environments offer their own native security controls, but within the context of zero trust, access to public cloud resources must align with application access policies in your other data center environments.
- **Juniper Security Director Cloud (Management)**—Whether edge security is delivered on-premises or from the cloud, one management experience and one policy framework make it very easy to create a policy once and apply it anywhere, providing unbroken visibility regardless of architecture.

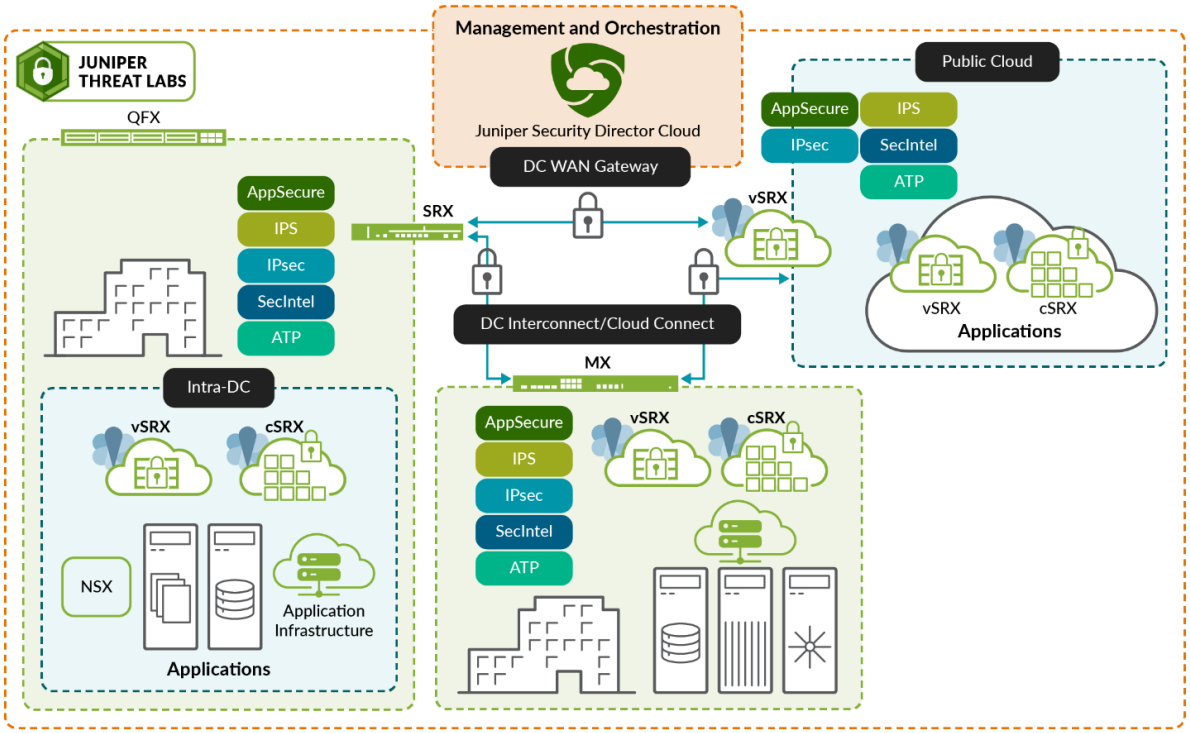
Examples of data center traffic profiles with security implemented:

- At the data center edge gateway—ensuring consistent zero trust access to private and public cloud environments.
- Traffic flow between servers (East-West traffic).
- Traffic flow between clouds (DCI).
- Traffic flow at the application level to protect data (microsegmentation).

Features provided by Juniper Security Director Cloud with the same policy framework:

- Consistent threat protection.
- Easy extension of security policies to new environments and applications, reducing misconfigurations and lowering risk.
- Scaling data center security operations. Because visibility is unbroken in a unified console, security integration between multiple environments is not necessary, and automation is built in to identify and resolve threats quickly.

Figure 1: Data Center Reference Architecture



This JVD focuses on the next-generation firewall services that are typically used in the data center. This solution benefits you by providing an example of an optimized configuration for commonly utilized security services in the data center, and a validation that the deployed solutions are working as intended.

The following features are deployed and validated in this JVD:

- Application Security
- Intrusion detection and prevention (IDP)
- Advanced Threat Prevention (ATP)
- Security Intelligence (SecIntel)
- Advanced anti-malware (AAMW)
- DNS security
- Screens
- SSL Proxy (depends on use case implementation)

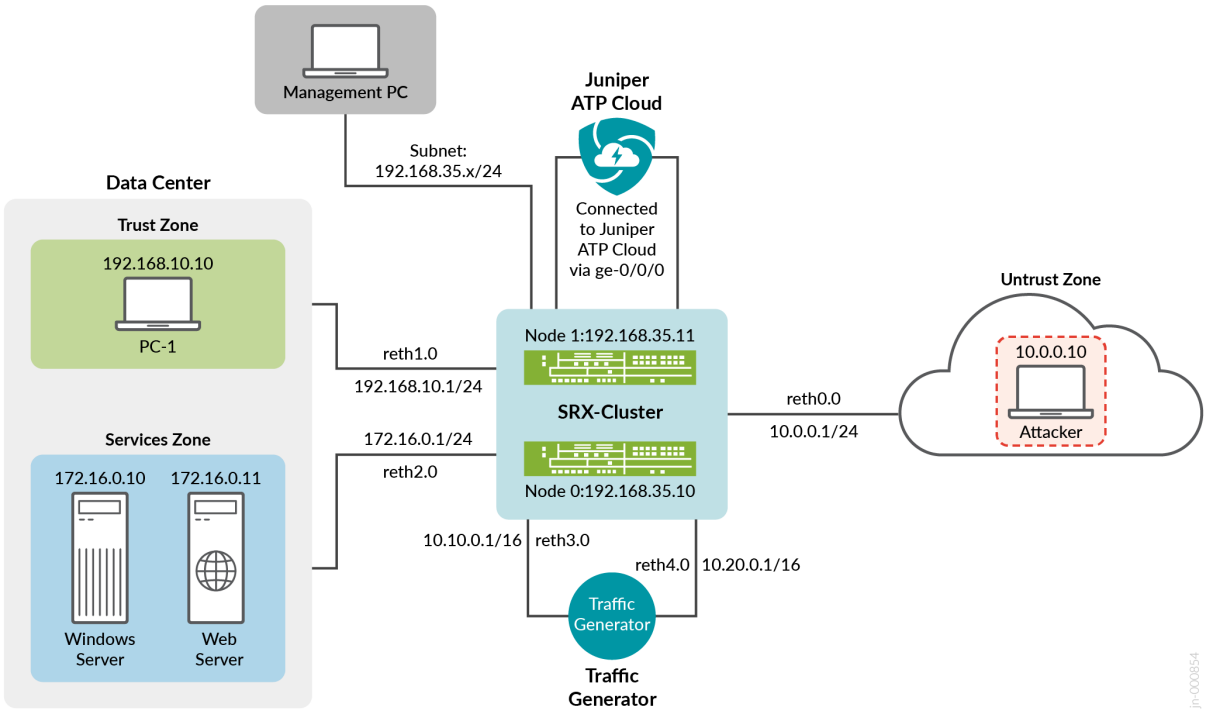
Use Case and Reference Architecture

IN THIS SECTION

In this section, we demonstrate how to implement next-generation firewall features in the data center environment. We test several use cases that present an example data center security implementation with a combination of next-generation firewall features. Each features contributes to a robust comprehensive implementation covering a holistic data center security deployment.

To test the JVD, a lab was built similar to the architecture shown in Figure 2 on page 4. The results of these tests are available in the associated Test Report document.

Figure 2: Reference Architecture



Data Center Next-Generation Firewall Use Cases

Table 1: Data Center Next-Generation Firewall Use Cases

Use Case	Purpose
Next-generation firewall and ATP.	Evaluates the usability and manageability of the firewall's ATP features and ensures the firewall can efficiently handle different types of traffic while maintaining performance. Also, detects and prevents zero-day threats through machine learning (ML) and behavioral analysis.
Validate data center traffic against threat on DNS traffic and validate DNS security features.	Protects data center traffic against common DNS exploits by employing heuristic analysis and behavior-based detection. Validates if DGA/DNS tunneling and SecIntel static blocks are effectively utilized by the SRX Series Firewall.
Effectiveness of IDP system (IDS/IPS) functionalities	Tests the effectiveness of IDP/IPS features by generating flood attacks, other attacks, and validates the effectiveness of the configured firewall settings.
Test security features with high availability use cases.	Tests security features with high availability use cases. Validates all the configured features are effective against a high availability scenario. Each security feature is tested against different failure scenarios.
Evaluate firewall performance with various traffic types and various ATP features enabled.	Evaluates the usability and manageability of the firewall's ATP features and ensures the firewall can efficiently handle different types of traffic while maintaining performance. Also detects and prevents zero-day threats through ML and behavioral analysis over constant base traffic across 20,000 users (HTTP traffic for 20,000 users).

Data Center Next-Generation Firewall Topology

The lab was configured with a basic data center architecture to emulate the following components:

- SRX Series Firewall (SRX4600) device in a Layer 2 high availability architecture.
- Baselined configuration covering:
  - Interface configuration.
  - Zone configuration.

  - Basic building blocks, such as DNS, NTP, System Logging, and so on.
  - Firewall policy enforcement between defined zones.
- Kali Linux server to emulate an attacker. This system emulates the following attack scenarios:
  - Generation of flooding attacks.
  - Generation of penetration testing attacks on webserver.
  - Generation and hosting of malware. Provides a reverse shell for exfiltration.
  - Assumes the role of C&C and hosts the malware for download.
- Linux server to host webserver services. This endpoint is protected from various attacks initiated by an attacker.
- Windows client to generate a web based traffic.
- Linux client to generate web based traffic and emulate malware download.

Validation Framework

IN THIS SECTION

Test Bed Overview

The test bed provides provision to emulate an attack environment to test all the next-generation firewall features on the SRX Series Firewall. The test bed is comprised of the following zone configurations:

Table 2: Test Bed

Test Bed		
Zone	**Emulated Role**	**Description**
untrust	Internet facing interface	Simulated untrusted zone facing the Internet edge.
services	Zone hosting services in data center environment	Simulated zone with webservers/ windows server hosting a range of services is configured.
trust	Zone hosting all trusted clients	Simulated environment with all trusted clients are connected that utilize services offered in the data center environment.

If this was a production environment, we need to configure public IP addresses on interfaces in the untrusted zone and private IP addresses on interfaces in the trust zone. NAT must be enabled for services that need access to Internet resources.

Platforms / Devices Under Test (DUT)

To review the software versions and platforms on which this JVD was validated by Juniper Networks, see the Validated Platforms and Software section in this document.

Test Bed Configuration

The appendix provides detailed next-generation firewall security configurations. Figure 3 on page 11 shows a workflow diagram regarding the high-level architecture of this JVD environment.

Test Objectives

IN THIS SECTION

Test Goals

The testing for this JVD was performed with the following goals in mind. See the Test Report for more information.

The goal for this testing was to test the following features and functions:

- Firewall configured as a data center WAN gateway.
- Implement features to protect hosted services in the services zone.
- Implement features to protect common services utilized within the data center environment.
- Implement data center WAN gateway in high availability architecture and test resiliency with different failure scenarios.
- Implement features to protect hosted services from DDoS attacks.
- Test performance of the Juniper SRX Series Firewall with long-lived and short-lived sessions and functionality of various security features with peak traffic conditions.

Test Non-Goals

The following roles were not tested in this JVD:

- Cloud/DCI
- Public Cloud
- Intra-DC

Recommendations

Ensure premium license is applied on the Juniper SRX Series Firewall to ensure availability of premium security features that are tested in the JVD.

Appendix: Next-Generation Firewall JVD Configuration

IN THIS SECTION

Generic Workflows and Operations for Creating the Data Center Next-Generation Firewall Topology

This overview illustrates how to use the Juniper SRX Series Firewall CLI and Juniper Security Director Cloud console (the GUI) to provision the data center next-generation firewall architecture. Conceptually, the Juniper SRX Series Firewall is configured on the data center edge to provide visibility and control of traffic that is originating from the following:

- Traffic originating from trusted clients outbound to the Internet. (South-North Traffic)
- Traffic originating from untrusted environment reaching inbound to services configured in the data center. (North-South Traffic)
- Traffic originating from the trusted clients using services hosted with in the data center. (East-West Traffic)

Figure 3 on page 11 illustrates the workflow for configuring the Juniper SRX Series Firewall using the Junos OS CLI and Juniper Security Director Cloud console.

Figure 3: Data Center Next-Generation Firewall Configuration Workflow

The sequence of configuration tasks in this example is as follows:

1. Configure chassis cluster through CLI: Clustering enables high availability.
2. Load baseline configuration with interface, zones, addresses, services, firewall policies, NAT, and default routing: Baseline the configuration for the device to carry traffic and able to reach out to Internet.
3. Configuring logging to an external SIEM: You can have multiple log streams configured in SRX Series Firewall and point the SRX logging mechanisms to multiple SIEMs.
4. Enable web management: Enable web management so that you can access SRX Series Firewall using the on-box management solution through J-Web.
5. Discover the device and import baseline configuration to Juniper Security Director Cloud: Discover the device and import the baseline configuration to Juniper Security Director Cloud.
6. Enable logging for Juniper Security Director Cloud: Enable logging so that the traffic is logged to Juniper Security Director Cloud from SRX Series Firewall.
7. Enroll the device to Juniper ATP Cloud: Juniper ATP Cloud is the threat intelligence component of this solution and the source of SecIntel threat feeds. It also can provide advanced malware detection.
8. Create security policies with application specific environment.

9. Create IDP profiles that cover the security landscape of the data center environment.
10. Assign the created IDP profile in a security policy.
11. Create SecIntel Profile: SecIntel Profile contains options for DNS, Command and Control (C&C), and Infected hosts.
12. Assign SecIntel Profile to rule: Assigning SecIntel Profile to rule ensures all the traffic using the rule is verified against the SecIntel feeds.
13. Create AAMW Profile: The AAMW profile allows you to select the type of traffic to be inspected for malware. Traffic includes HTTP, IMAP, SNB, and SMTP.
14. Assign AAMW Profile to Rule: Assign the profile to rule so that all traffic using the rule is inspected for malware based on the profile.
15. Create DNS security Meta Data Profile: DNS security allows you to identify DNS related threats such as DGA and DNS tunnelling.
16. Assign the DNS Meta Data to Zone Context: All the traffic between the zone set is inspected for DNS security.
17. Configure screen options to protect the untrust zone against DDoS attacks.
18. Configure reverse SSL proxy to analyze and protect webserver traffic. The traffic is subjected to advances security services.

The configuration for each tested JVD feature is as follows:

Chassis Configuration (CLI)

```
# Step 1:
cli
# Configure chassis cluster configuration and Reboot
set chassis cluster cluster-id 1 node 0 reboot
set chassis cluster cluster-id 1 node 1 reboot
# NOTE: Device would reboot and each device would assume a role either as primary or secondary.
# Step 2:
set interfaces fab0 fabric-options member-interfaces ge-0/0/3
set interfaces fab1 fabric-options member-interfaces ge-5/0/3
# Step 3:
Set the interface count to configure redundant interfaces and create the redundant interfaces.
cli
```

```
configure
set chassis cluster reth-count 5
set interfaces reth0 redundant-ether-options redundancy-group 1
set interfaces reth1 redundant-ether-options redundancy-group 1
set interfaces reth2 redundant-ether-options redundancy-group 1
set interfaces reth3 redundant-ether-options redundancy-group 1
set interfaces reth4 redundant-ether-options redundancy-group 1
# Node 0 configuration
set interfaces ge-0/0/0 gigether-options redundant-parent reth0
set interfaces ge-0/0/1 gigether-options redundant-parent reth1
set interfaces ge-0/0/2 gigether-options redundant-parent reth2
set interfaces ge-0/0/3 gigether-options redundant-parent reth3
set interfaces ge-0/0/4 gigether-options redundant-parent reth4
# Node 1 configuration
set interfaces ge-5/0/0 gigether-options redundant-parent reth0
set interfaces ge-5/0/1 gigether-options redundant-parent reth1
set interfaces ge-5/0/2 gigether-options redundant-parent reth2
set interfaces ge-5/0/3 gigether-options redundant-parent reth3
set interfaces ge-5/0/4 gigether-options redundant-parent reth4
# Step 4 - Set Hostname and Management IP:
set groups node0 system host-name SRX-NODE0
set groups node0 interfaces fxp0 unit 0 family inet address 192.16.35.10/24
set groups node1 system host-name SRX-NODE1
set groups node1 interfaces fxp0 unit 0 family inet address 192.16.35.11/24
# Step 5: Enable interface monitoring.
set chassis cluster redundancy-group 1 interface-monitor ge-0/0/0 weight 255
set chassis cluster redundancy-group 1 interface-monitor ge-0/0/1 weight 255
set chassis cluster redundancy-group 1 interface-monitor ge-0/0/2 weight 255
# Step 6: Set chassis options.
set chassis cluster redundancy-group 1 node 0 priority 150
set chassis cluster redundancy-group 1 node 1 priority 100
set chassis cluster redundancy-group 1 preempt
```

Baseline Configuration (CLI)

```
UNTRUST:
set security zones security-zone untrust screen root-screen
set security zones security-zone untrust interfaces reth0.0 host-inbound-traffic system-services
ssh
```

```
set security zones security-zone untrust interfaces reth0.0 host-inbound-traffic system-services
ping
set security zones security-zone untrust interfaces reth0.0 host-inbound-traffic system-services
all
set security zones security-zone untrust interfaces reth5.2000 host-inbound-traffic system-
services ssh
set security zones security-zone untrust interfaces reth2.0 host-inbound-traffic system-services
ping
TRUST:
set security zones security-zone trust interfaces reth1.0 host-inbound-traffic system-services
all
set security zones security-zone trust interfaces reth3.0 host-inbound-traffic system-services
all
set security zones security-zone trust interfaces reth4.1200 host-inbound-traffic system-
services all
SERVICES:
set security zones security-zone services screen root-screen
set security zones security-zone services interfaces xe-1/1/2.0 host-inbound-traffic system-
services ping
DEFAULT ROUTE:
set routing-options static route 0.0.0.0/0 next-hop 80.80.80.1
set routing-options static route 90.0.0.0/16 next-hop 21.0.0.2
set routing-options static route 190.0.0.0/16 next-hop 30.30.30.2
NAT: Outgoing Internet Traffic
set security nat source pool abc address 50.0.0.0/24
set security nat source rule-set nat_to_internet from zone services
set security nat source rule-set nat_to_internet from zone trust
set security nat source rule-set nat_to_internet to zone untrust
set security nat source rule-set nat_to_internet rule 1 match source-address 0.0.0.0/0
set security nat source rule-set nat_to_internet rule 1 match destination-address 0.0.0.0/0
set security nat source rule-set nat_to_internet rule 1 match application any
set security nat source rule-set nat_to_internet rule 1 then source-nat pool abc
NAT: Incoming destination traffic for web server:
set security nat destination pool web-svr-pool address 172.16.0.11/32
set security nat destination pool web-svr-pool address port 443
set security nat destination rule-set WS-NAT rule 1 match destination-address 10.0.0.100/32
set security nat destination rule-set WS-NAT rule 1 match destination-port 443
set security nat destination rule-set WS-NAT rule 1 then destination-nat pool web-svr-pool
Global Addresses:
set security address-book global address WebSvr-Local 7.7.7.2/32
set security address-book global address win-server 172.16.0.10/32
set security address-book global address web-server 172.16.0.11/32
set security address-book global address client1 192.168.10.10/32
```

```
Set security address-book global address web-server-ext 10.0.0.100/32
Services:
set applications application-set Internet-services application junos-http
set applications application-set Internet-services application junos-https
set applications application-set Internet-services application junos-smtp
set applications application-set Internet-services application junos-smtps
set applications application-set Internet-services application junos-imap
set applications application-set Internet-services application junos-imaps
set applications application-set Internet-services application junos-dns-udp
set applications application-set Internet-services application junos-dns-tcp
set applications application-set Internet-services application junos-icmp-all
Security Policies:
Security Policies between trust to untrust:
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
source-address any
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
destination-address any
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
application any
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
source-identity "domain08.net\ks_windows1_user_1"
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
source-identity "domain08.net\ks_user1_user_1"
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
source-identity unknown-user
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
source-identity unauthenticated-user
deactivate security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule
match source-identity
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule match
dynamic-application any
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule then permit
application-services idp-policy Recommended_WithAudit
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule then permit
application-services utm-policy junos-default-utm-policy
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule then permit
application-services security-intelligence-policy default-secintel
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule then permit
application-services advanced-anti-malware-policy default-antimalware
set security policies from-zone trust to-zone untrust policy t2u-allow_internet_rule then log
session-close
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps match source-
address any
```

```
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps match
destination-address any
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps match
application junos-defaults
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps match dynamic-
application Block_HighBW_Apps
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps then deny
set security policies from-zone trust to-zone untrust policy Block_Offending_Apps then log
session-close
set security policies from-zone trust to-zone untrust application-services security-metadata-
streaming-policy apt_services
Security Policies between services to untrust:
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule match
source-address any
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule match
destination-address any
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule match
application any
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule match
dynamic-application any
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule then
permit application-services security-intelligence-policy default-secintel
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule then
permit application-services advanced-anti-malware-policy default-antimalware
set security policies from-zone services to-zone untrust policy s2u-allow_internet_rule then log
session-close
Security Policies between trust and services:
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
source-address any
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
destination-address any
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
application junos-http
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
application junos-https
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
dynamic-application junos:HTTP
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule match
dynamic-application junos:SSL
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule then
permit application-services idp-policy CS-To-Web-Protection-Rules
set security policies from-zone trust to-zone services policy t2s-allow_web_svcs_rule then log
session-close
```

```
Security Policies between untrust to services:
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs match
source-address any
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs match
destination-address WebSvr-Local
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs match
application junos-defaults
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs match
dynamic-application junos:HTTP
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs match
dynamic-application junos:SSL
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs then permit
application-services idp-policy CS-To-Web-Protection-Rules
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs then log
session-init
set security policies from-zone untrust to-zone services policy u2s-protect_web_svcs then log
session-close
NETCONF SERVICE:
set system services ssh sftp-server
set system services rlogin
set system services netconf ssh
set system services netconf rfc-compliant
set system services web-management https system-generated-certificate
set system services web-management limits debug-level 9
set system services web-management session idle-timeout 1440
DNS SERVER:
set system name-server 8.8.8.8
```

System and Security Logging Configuration (CLI)

```
set security log utc-timestamp
set security log mode stream
set security log format sd-syslog
set security log report
set security log source-interface reth0.0
set security log transport
set security log stream sd-cloud-logs category all
set security log stream sd-cloud-logs host srx.sdcloud.juniperclouds.net
set security log stream sd-cloud-logs host port 6514
```

```
set security log stream sd-cloud-logs transport division line-based
set security log stream sd-cloud-logs transport protocol tls
set security log stream sd-cloud-logs transport tls-profile syslog-profile
```

Management Configuration (CLI)

```
HTTP:
set system services web-management http interface reth1.0
HTTPS:
set system services web-management https system-generated-certificate
set system services web-management https interface reth1.0
set system services web-management https interface fxp0.0
HTTP:
set system services rest http
HTTPS:
set system services rest https server-certificate system-generated-certificate
set system services rest enable-explorer
```

GUI driven feature configuration through Juniper Security Director Cloud:

- Discover device in Juniper Security Director Cloud and import baselined configuration.
- Onboard device in Juniper Security Director Cloud.

To onboard the SRX Series Firewall, follow the procedure below:

1. Go to **SRX** > **Device Management** > **Device** and then click **+.**
2. Select **Adopt SRX Devices**.
3. Select **SRX Clusters**.
4. Enter **1** in the Number of SRX clusters to be adopted field.
5. Click **OK** and then click **Close**.

The action above creates a temporary device and to complete the on-boarding process, click **Adopt Cluster** as seen in Figure 6 on page 20 . Copy paste the CLI commands on to the node0 of the SRX Cluster.

Figure 4: Juniper Security Director Cloud Device Page

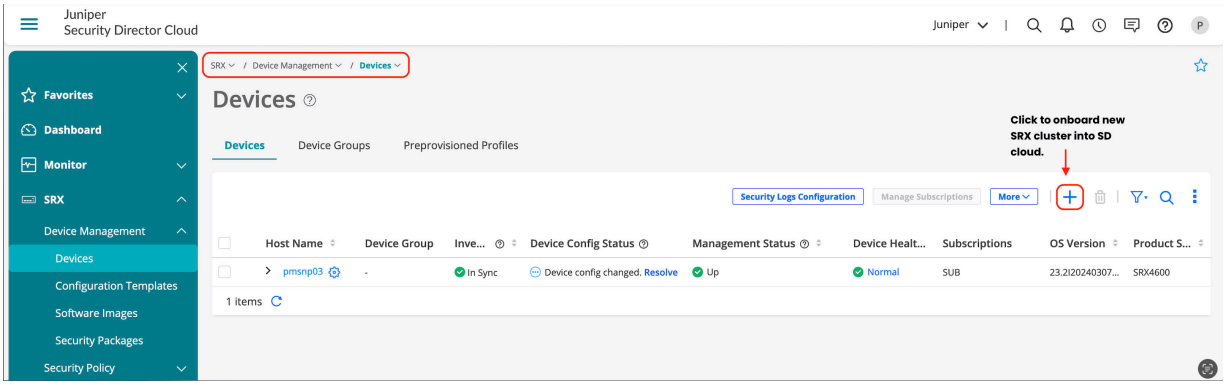


Figure 5: Juniper Security Director Cloud Device: Onboard SRX Cluster

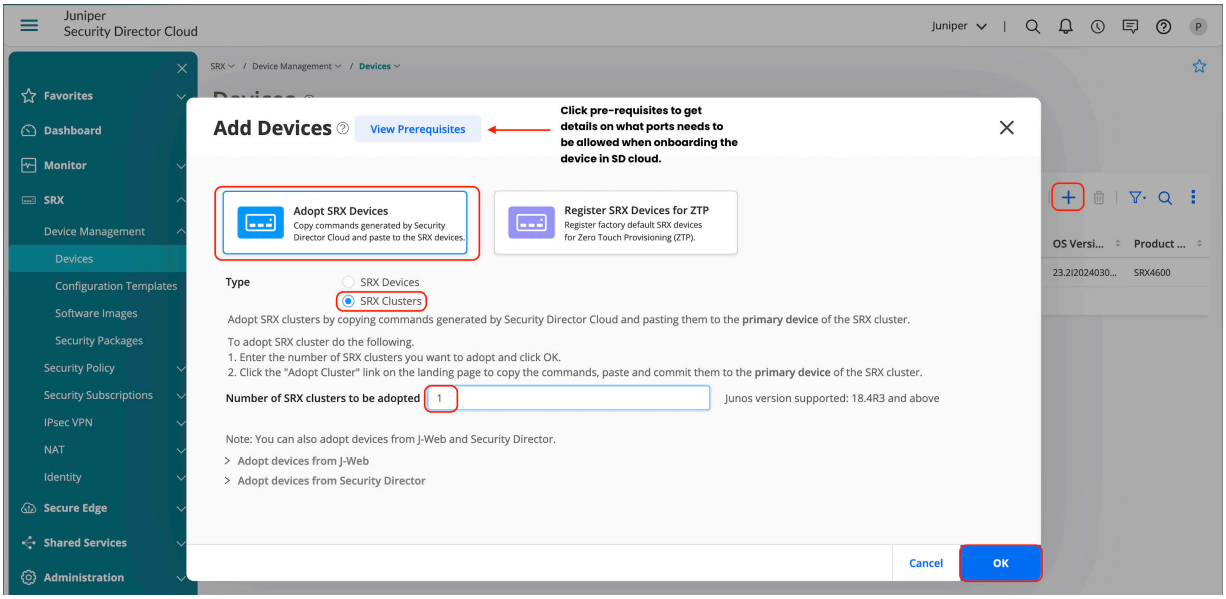


Figure 6: Juniper Security Director Cloud: Adopt Device

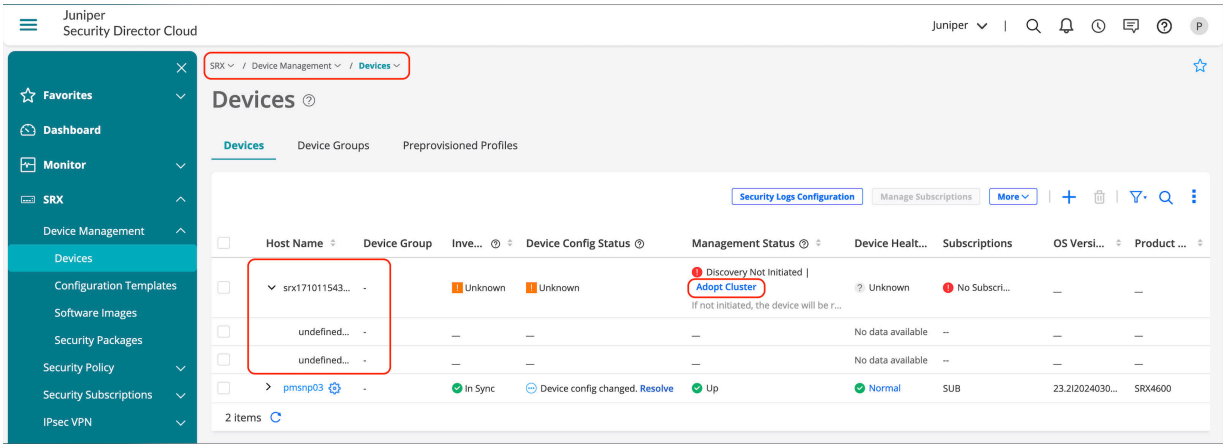
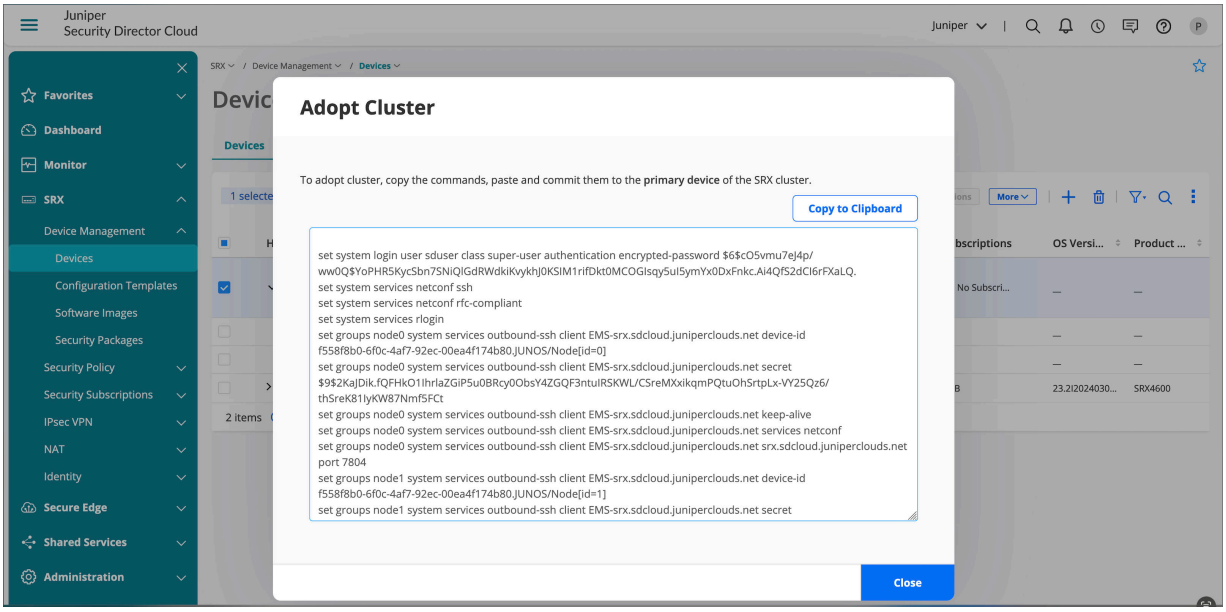


Figure 7: Juniper Security Director Cloud: Copy Paste CLI Commands to Onboard SRX Cluster



Enroll Device to Juniper ATP Cloud After Device Discovery

1. Go to **SRX** > **Device Management** > **Device**.
2. Select **Devices**.
3. Click **More** and then select **Enroll to ATP**.

4. Log on to your SRX Series Firewall and paste the command into the Junos OS CLI.

Figure 8: Juniper Security Director Cloud—ATP Enrollment

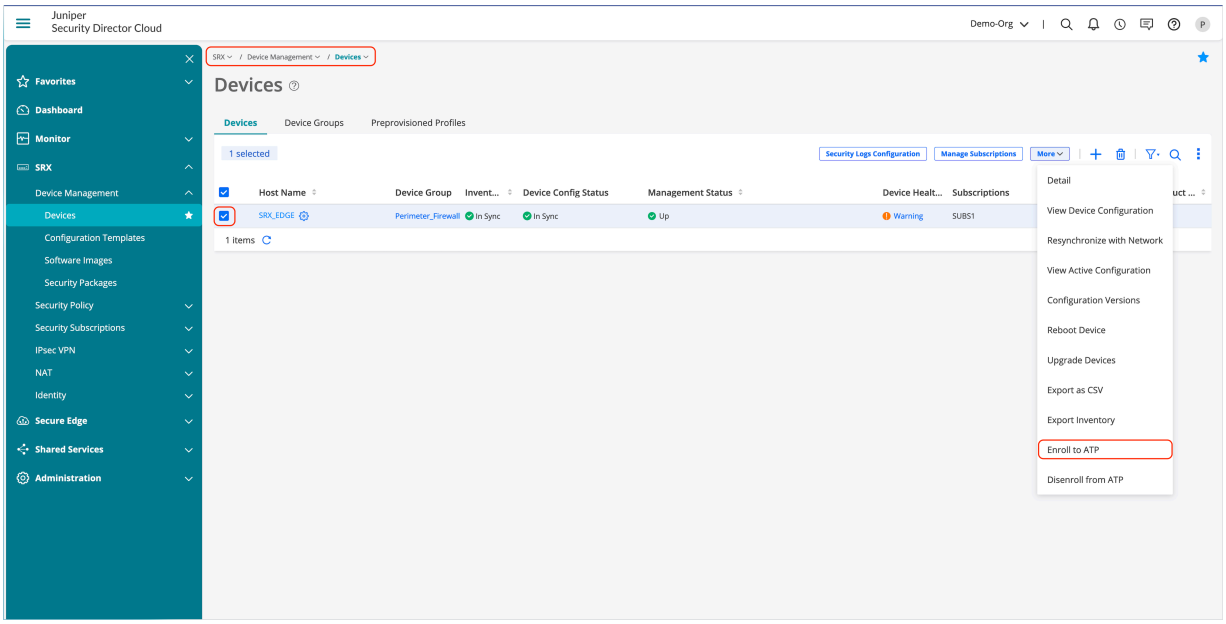
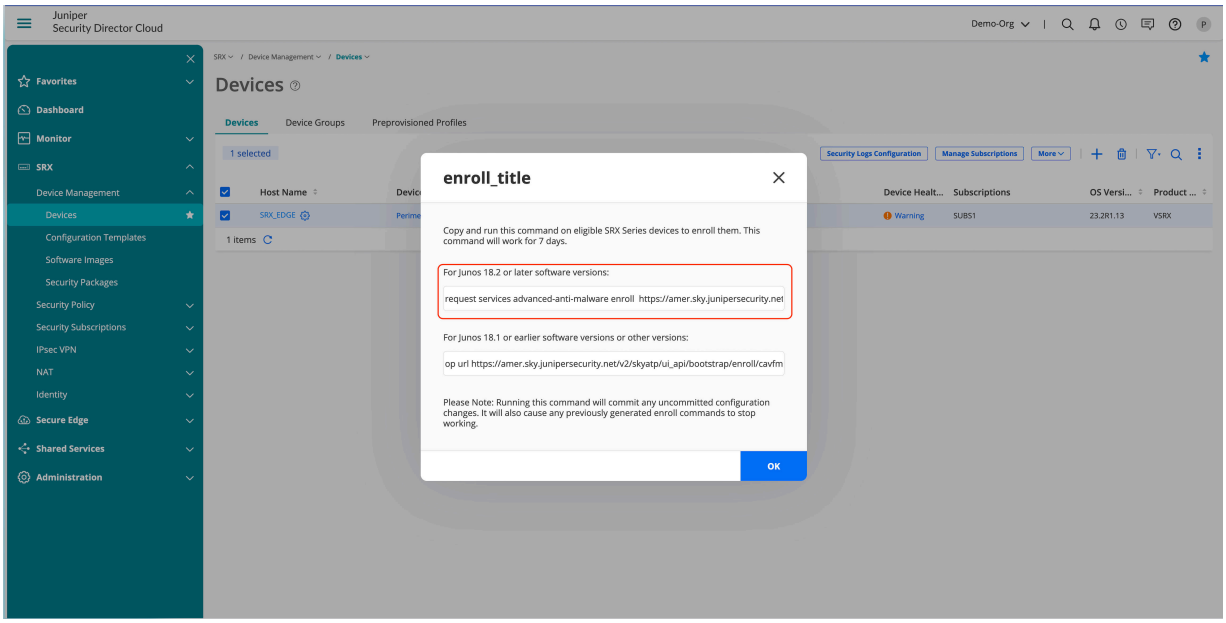
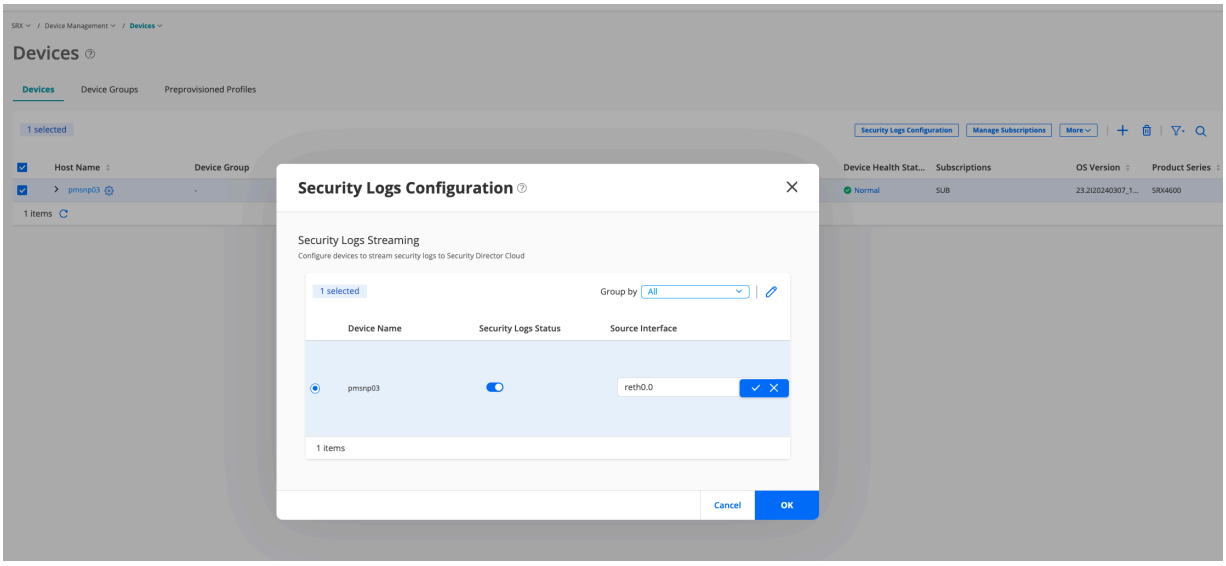


Figure 9: Juniper Security Director Cloud—ATP Enrollment



Enable Logging on SRX Series Firewall to Log the Traffic to Juniper Security Director Cloud

Figure 10: Juniper Security Director Cloud—Enable Juniper Security Director Cloud Logging



Application Security

Configure firewall policy to implement application security in a data center environment. We'll create a firewall policy to block any high bandwidth social media / shopping websites and apps (Facebook, Amazon) and video sharing websites such as YouTube, Vimeo, and so on.

Create an Application Group that you'll use in the firewall policy:

1. Go to **Shared Services** > **Applications**.
2. Click **Create** drop-down and then select **Signature group**.
3. Enter a name for the Application Group.
4. Click **+** to add all the applications that needs to be blocked.
5. Click **OK** to save the Application Group.

Figure 11: Juniper Security Director Cloud—Enable Juniper Security Director Cloud Logging

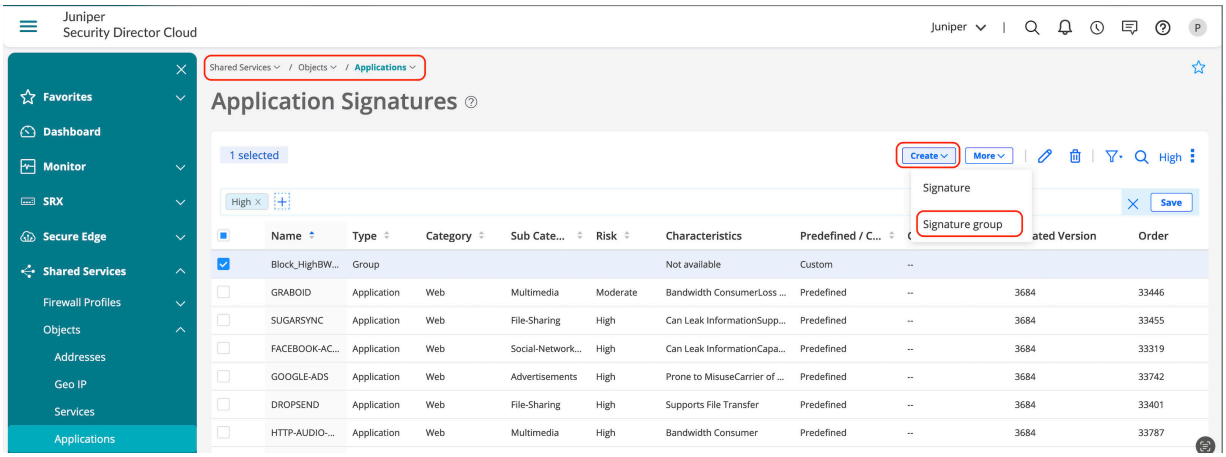
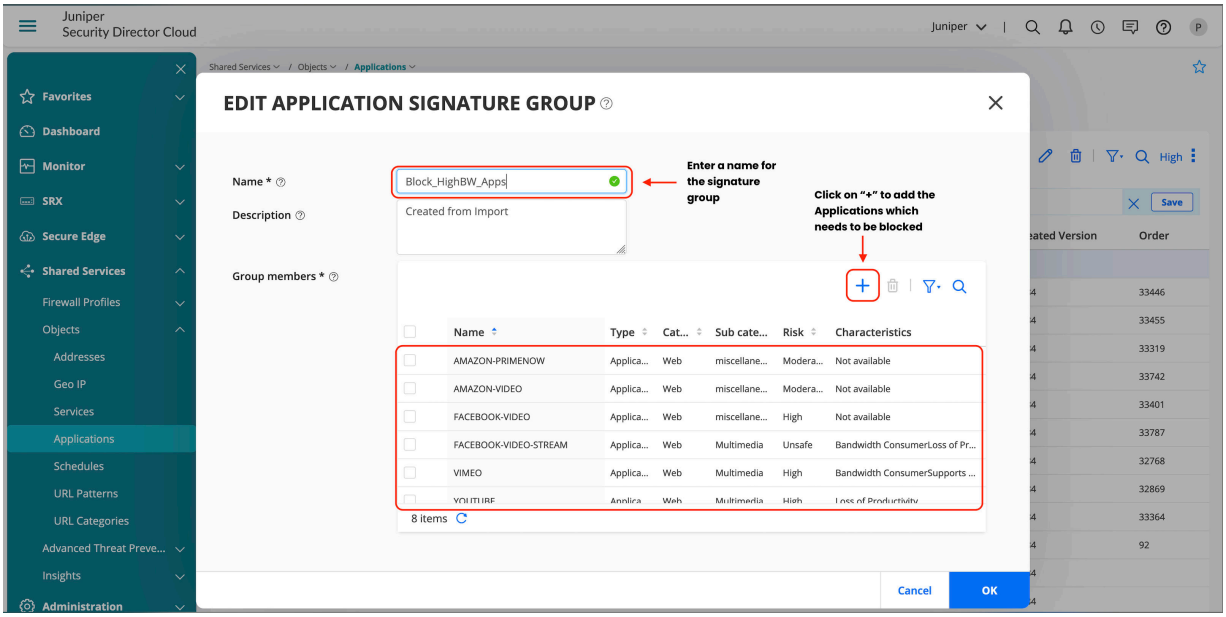


Figure 12: Juniper Security Director Cloud—Creating the Application Signature Group



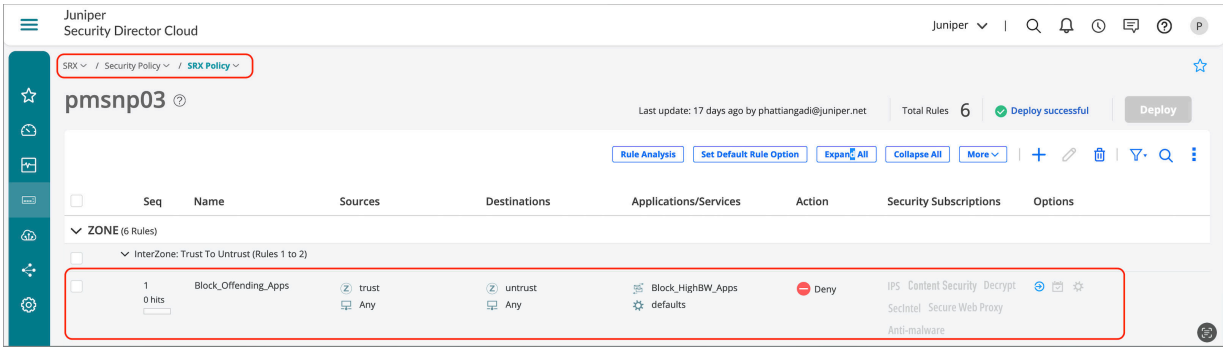
Include the Application Group in a Security Policy for enforcement:

1. Go to **SRX** > **Security Policy** > **SRX Policy**.
2. Click **+** to add new firewall rule.
3. Enter **Source Zone** and **Source Address**.
4. Enter **Destination Zone** and **Destination Address**.
5. Select **Services and Application Group** that we created with apps that need to be blocked.

6. Select **Action**.

7. Enable **Logging** if needed from Options.

Figure 13: Juniper Security Director Cloud—Deployment of SRX Policy



Intrusion Detection and Prevention (IDP)

When implementing IDP, you can consider the following settings when designing the IDP policy:

- Environment (Services running within the data center)
- Applications (Applications that are currently being served through the firewall)
- Exempt any services or protocols that are not be scanned (for example, SSH)

Based on the services implemented for this JVD, we choose to clone the client-to-server based protection and add a few rules that cater to the server-to-client based traffic.

The policy created considers the following settings:

- Services running in the data center (HTTP, HTTPS, MAIL, ICMP, DB, DNS, and so on)
- Signatures to detect malicious activity
- Signatures to detect network / services scanning
- Signatures to detect any DOS and DDOS based attacks

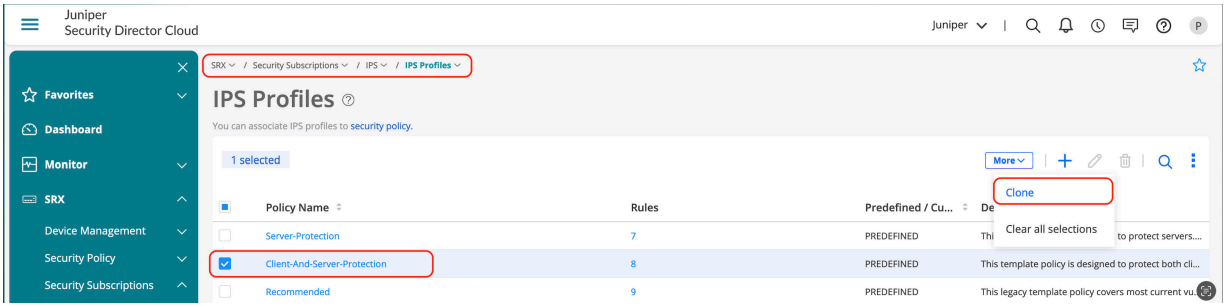
Workflow to create IDP policies and enforce the policies.

To clone predefined policy:

1. Go to **SRX** > **Security Subscription** > **IPS** > **IPS Profiles**.

2. Select the predefined policy to clone.
3. Click **More** and then select **Clone**.
4. Enter a new policy name.

Figure 14: Juniper Security Director Cloud—Creation of IPS Profile



In this JVD, we've named the policy **CS-To-Web-Protection-Rules** and added a few rules which caters to server-to-client protection.

Figure 15: Juniper Security Director Cloud—Creation of IPS Profile

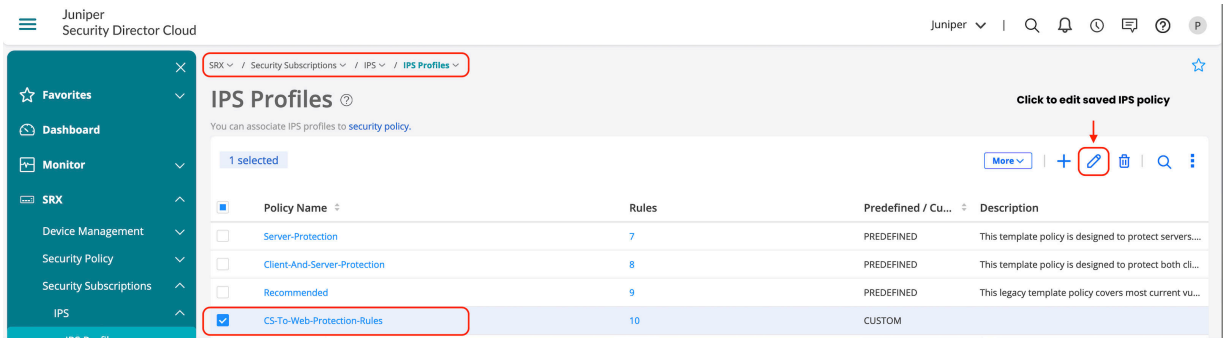
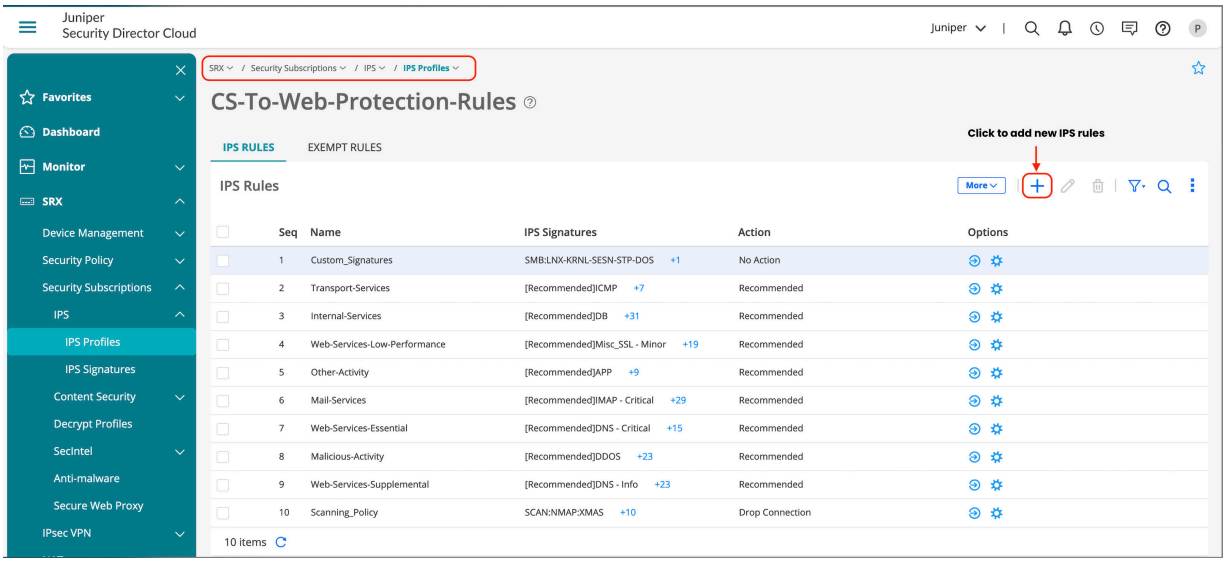


Figure 16: Juniper Security Director Cloud—Add New IPS Rule

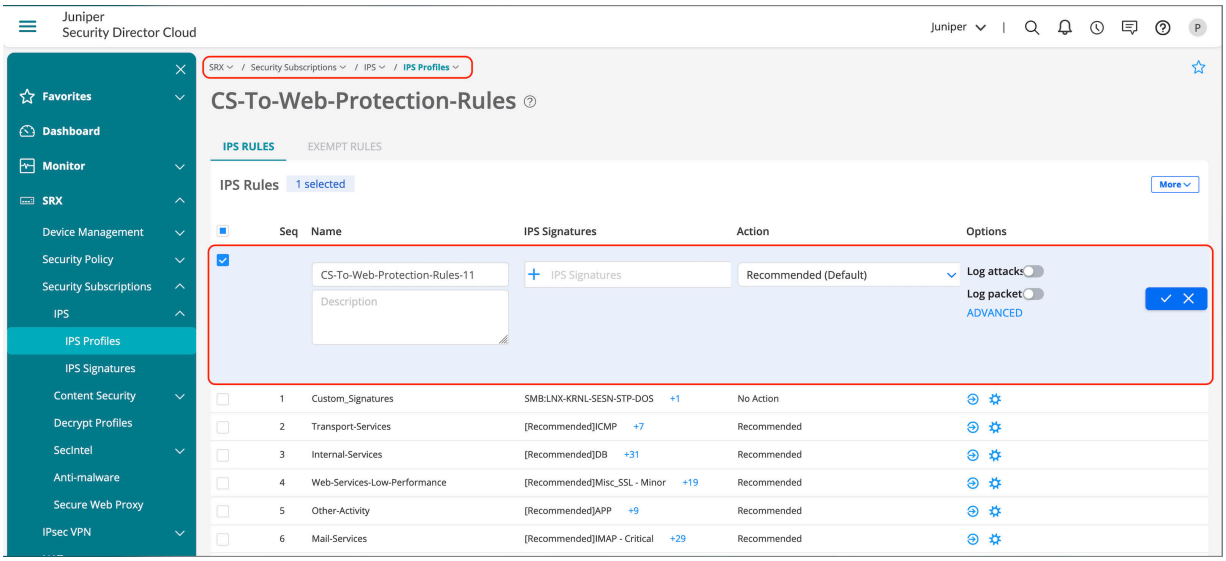


Once new IPS rule is added, update the following:

1. Name of the IPS rule.
2. Add new IDP signatures.
3. Select action if a threat is detected.
4. Optional. Log detected attacks.
5. IPS rules also have advanced options to enable IP actions on detected attacks.

NOTE: Each signature that is added comes with a recommended action to take if detected. You can set the action as Recommended. For more information on the signatures and the recommended action, see: https://threatlabs.juniper.net/home/search/#/list/ips?page_number=1&page_size=20

Figure 17: Juniper Security Director Cloud—Add New IPS Rule



Once IPS profile and rules are created, enforce the IPS profile on a security policy:

1. Click on the firewall rule where IPS needs to be enabled.
2. Click **Security Subscriptions**.
3. Either use the global options and turn on just the IPS toggle or click **Customize** to select a new policy.

Figure 18: Juniper Security Director Cloud—Deployment of Rule with IPS

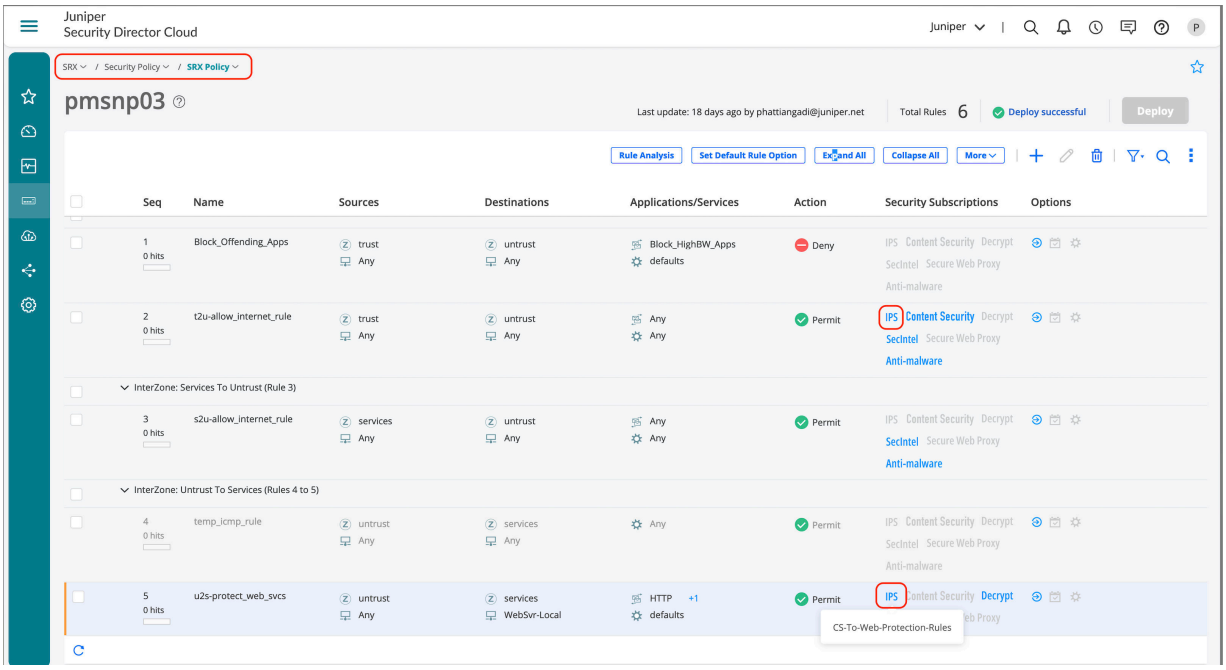
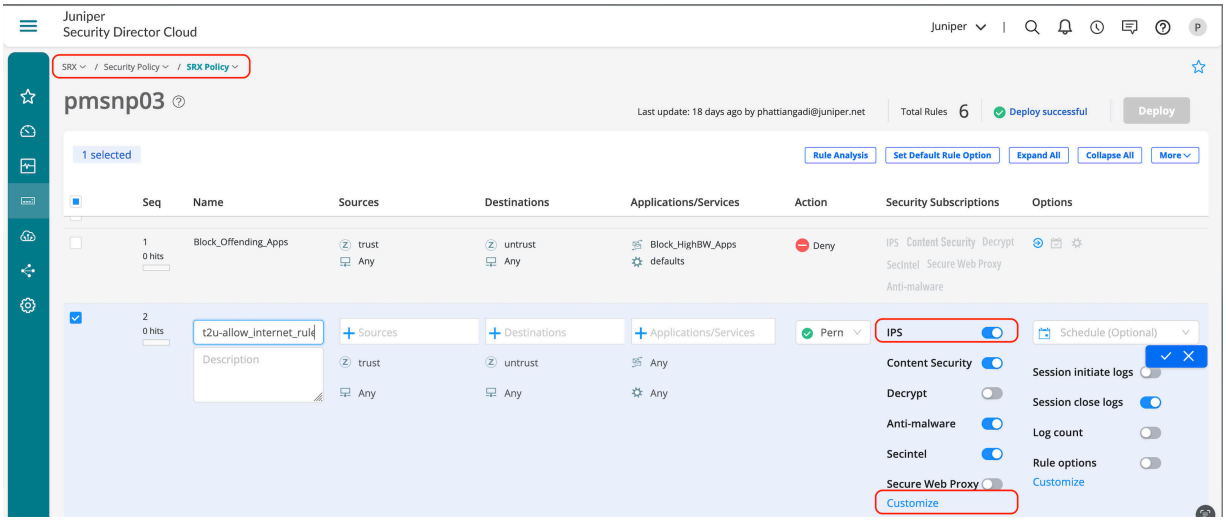


Figure 19: Juniper Security Director Cloud—Deployment of Rule with IPS



You can set the Global Options on the main SRX Policy page.

Figure 20: Juniper Security Director Cloud—Deployment of Rule with IPS

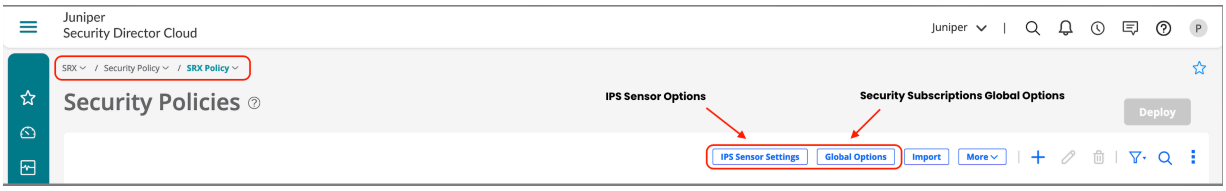
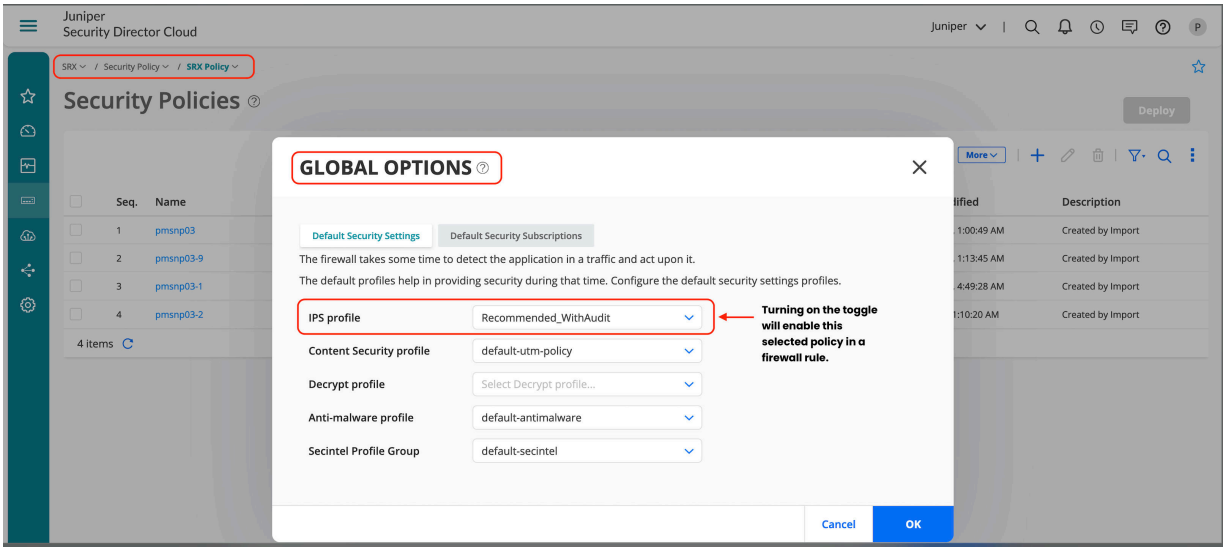


Figure 21: Juniper Security Director Cloud—Deployment of Rule with IPS



SecIntel Configuration

1. Go to **SRX** > **Security Subscriptions** > **SecIntel** > **Profiles**.
2. Click **Create**.
3. Configure the profiles for required services.

Figure 22: Juniper Security Director Cloud—SecIntel Profile Configuration

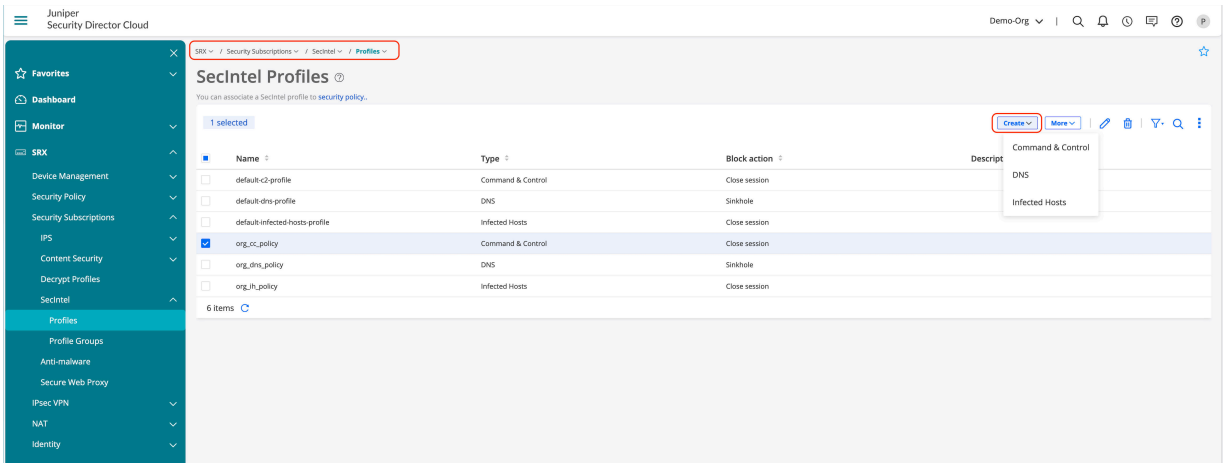


Figure 23: Juniper Security Director Cloud—SecIntel Command and Control Profile Configuration

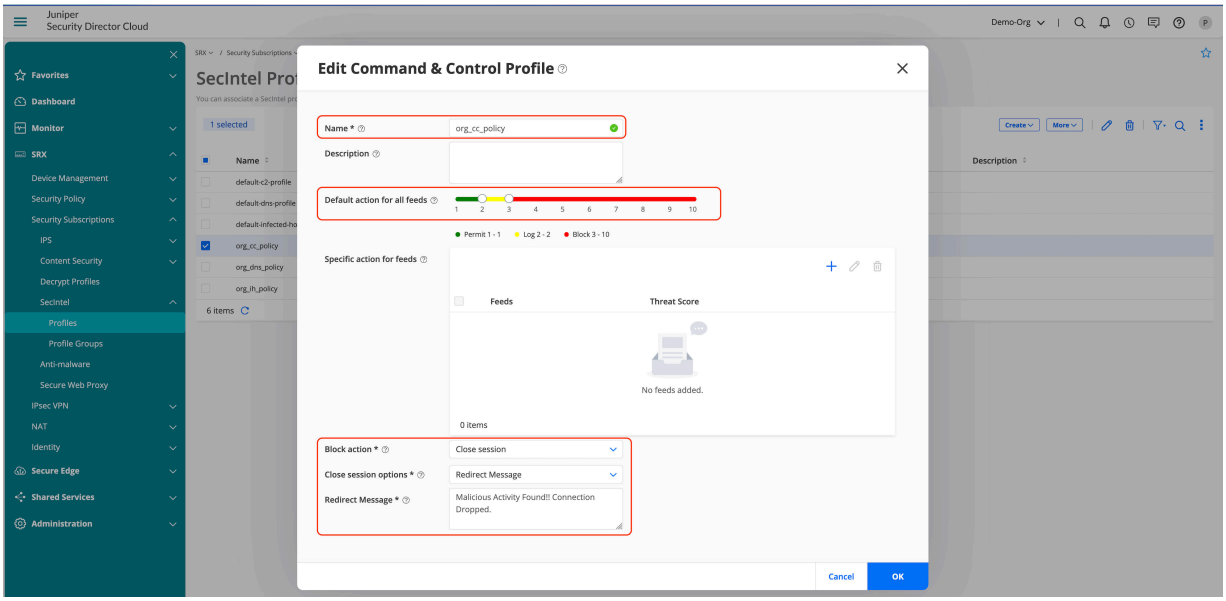


Figure 24: Juniper Security Director Cloud—SecIntel DNS Profile Configuration

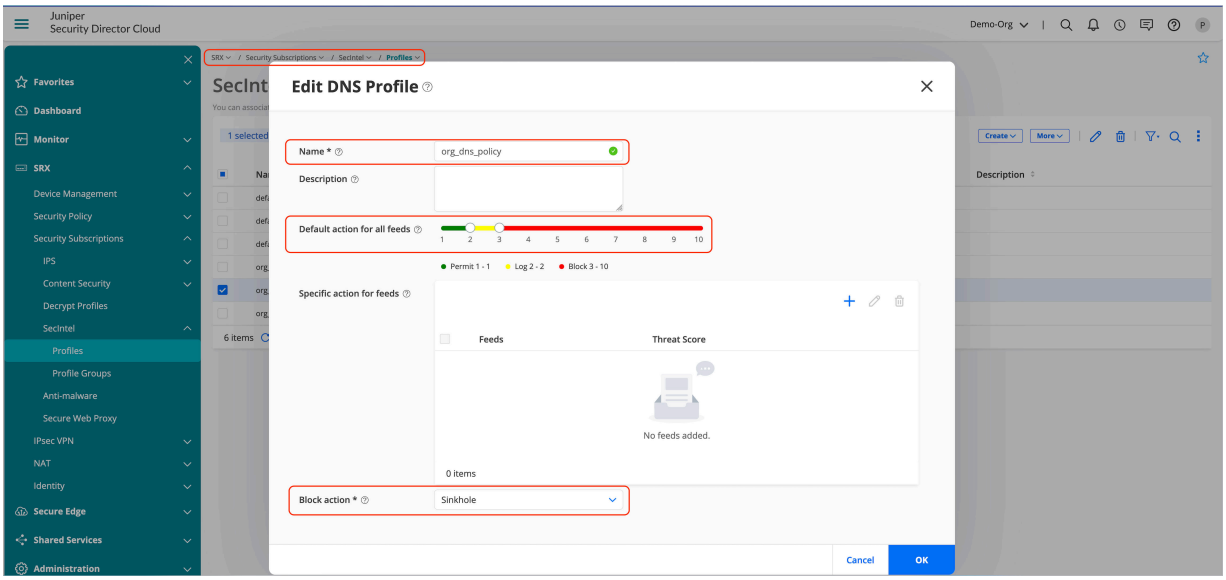
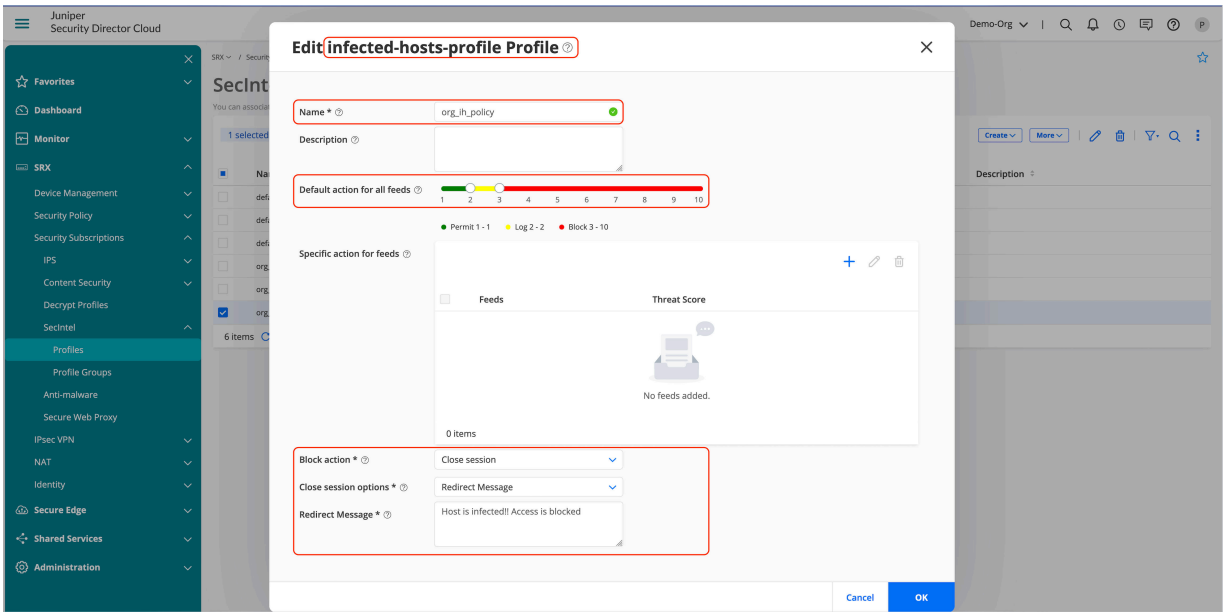


Figure 25: Juniper Security Director Cloud—SecIntel Infected-Hosts Profile Configuration



To create profile groups:

1. Go to **SRX** > **Security Subscriptions** > **SecIntel** > **Profile Groups**.
2. Click **+** to create a new profile group.

Figure 26: Juniper Security Director Cloud—SecIntel Profile Group

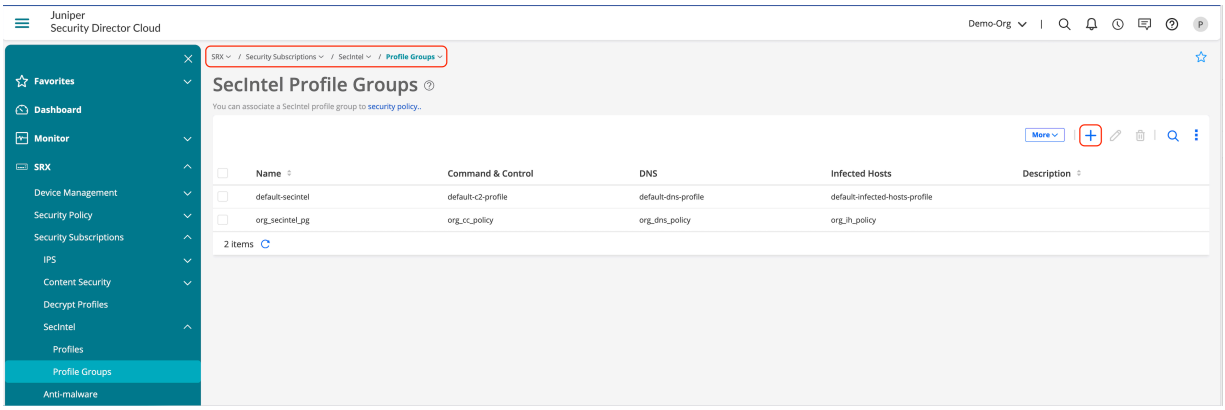
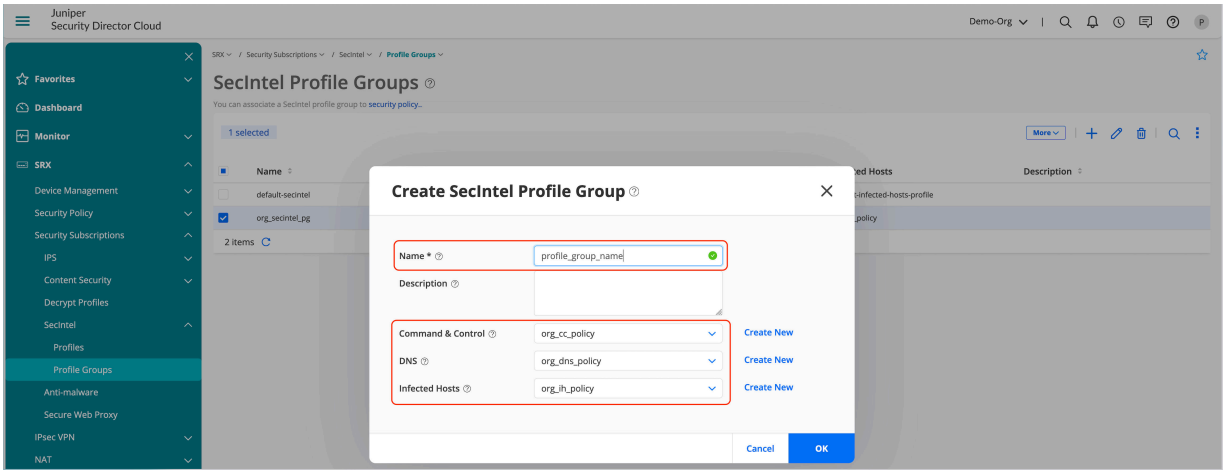


Figure 27: Juniper Security Director Cloud—SecIntel Profile Group Configuration



As a final step, let's enable the SecIntel profile group in a security policy that enforces the detection and remediation for SecIntel profiles based on reputation.

To enable SecIntel profile group in a security policy:

1. Go to **SRX** > **Security Policy** > **SRX Policy**.
2. Select the policy you want to modify and click the pencil icon.
3. Edit policy to enable SecIntel profile group or click on **Create New** to select a different profile.

Figure 28: Juniper Security Director Cloud—Assign SecIntel Profile Group

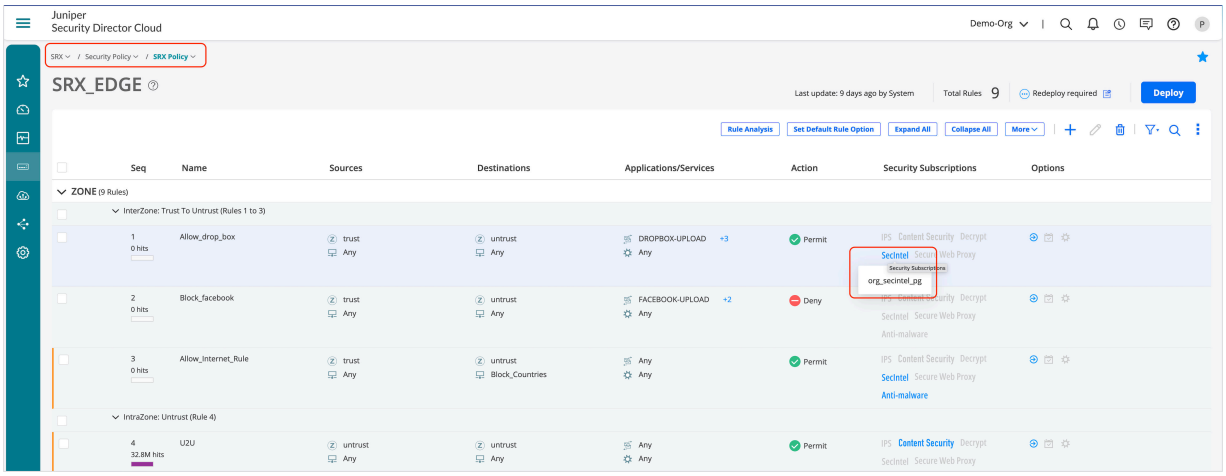
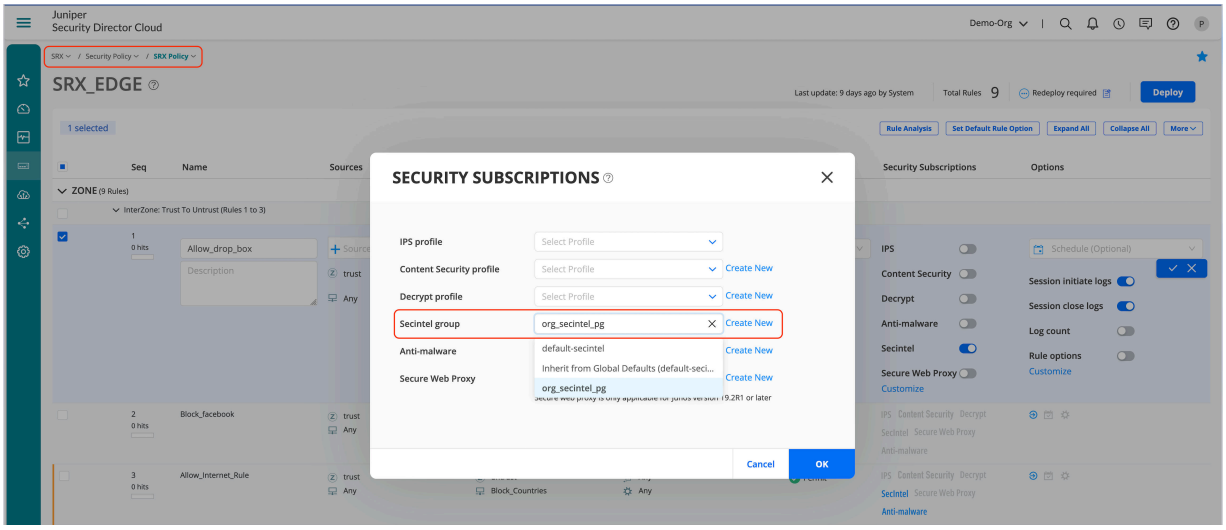


Figure 29: Juniper Security Director Cloud—Assign SecIntel Group to Security Policy



Advanced Anti-Malware

1. Go to **SRX** > **Security Subscriptions** > **Anti-malware**.
2. Click **+.**
3. Configure the protocols that you need to enable and click **OK** to save the AAMW profile.

Figure 30: Juniper Security Director Cloud—Advanced Anti-Malware Profiles

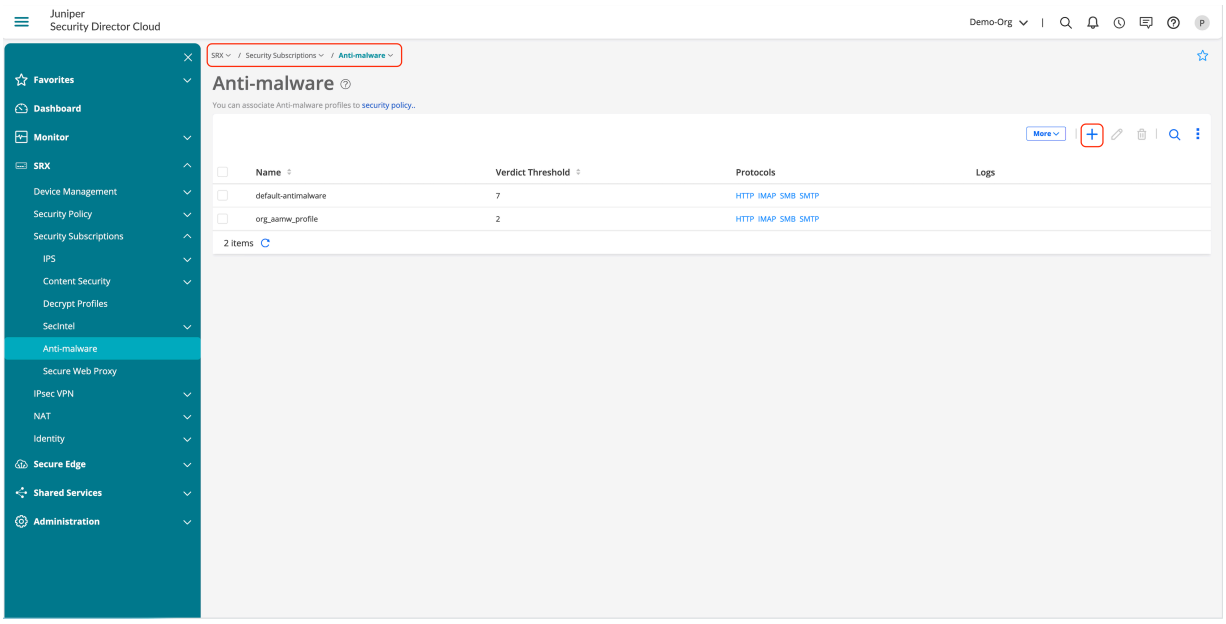


Figure 31: Juniper Security Director Cloud—Advanced Anti-Malware Profile Configuration

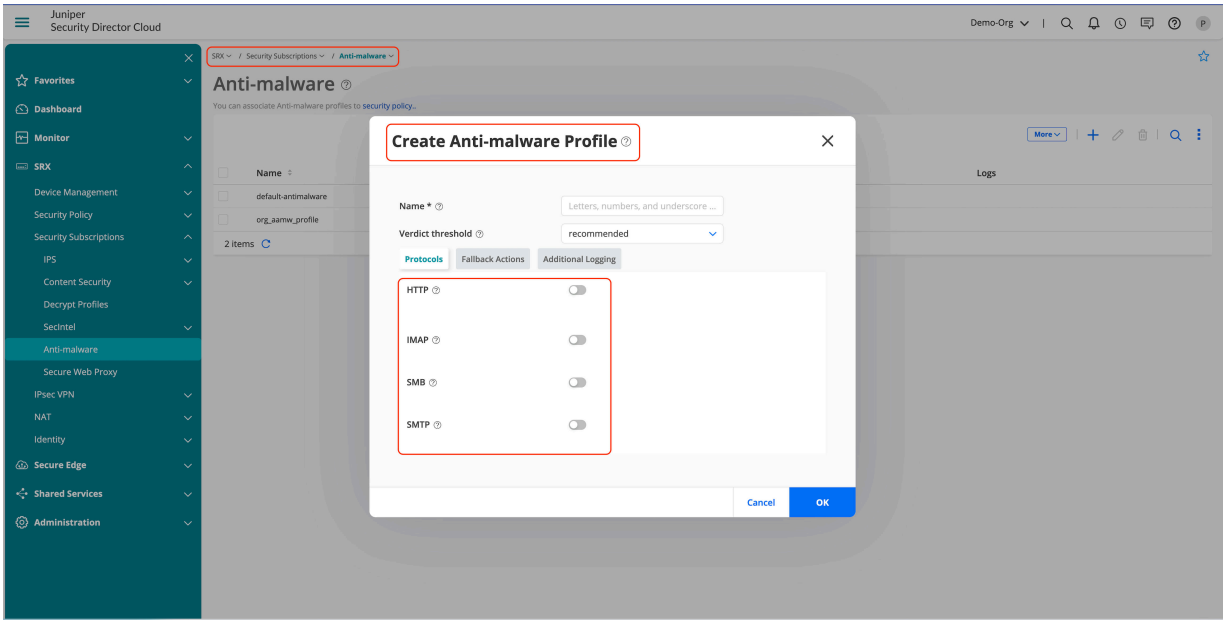
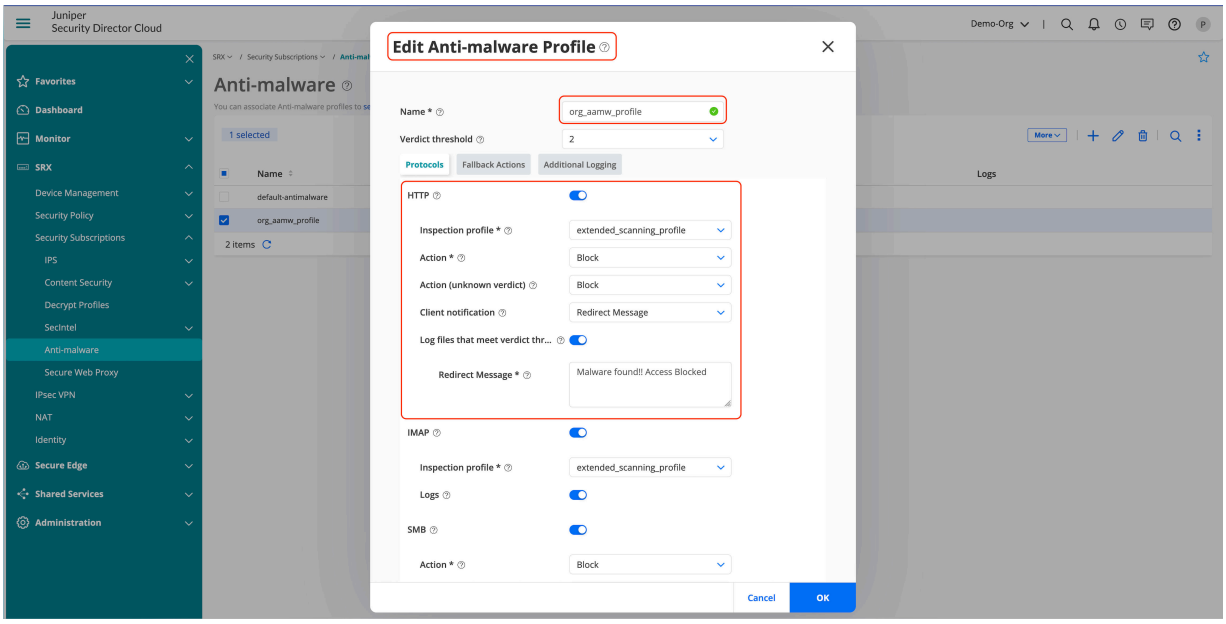


Figure 32: Juniper Security Director Cloud—Advanced Anti-Malware Profile Configuration



Created AAMW profile is configured in a security policy.

Figure 33: Juniper Security Director Cloud—Assign Advanced Anti-Malware Profile to Security Policy

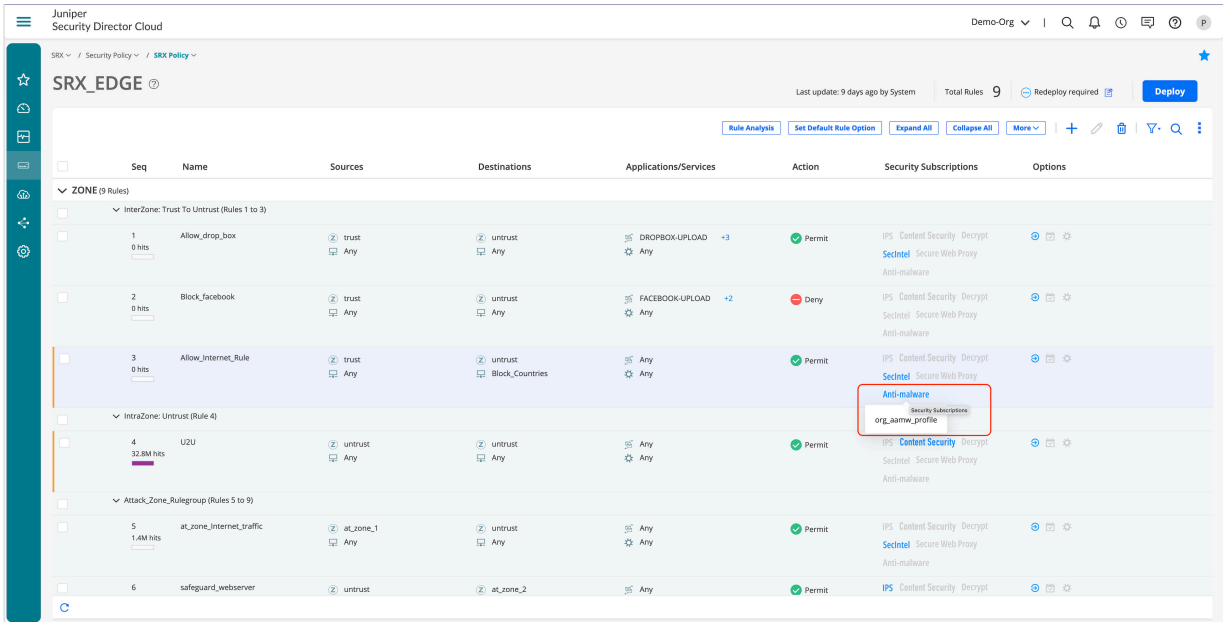
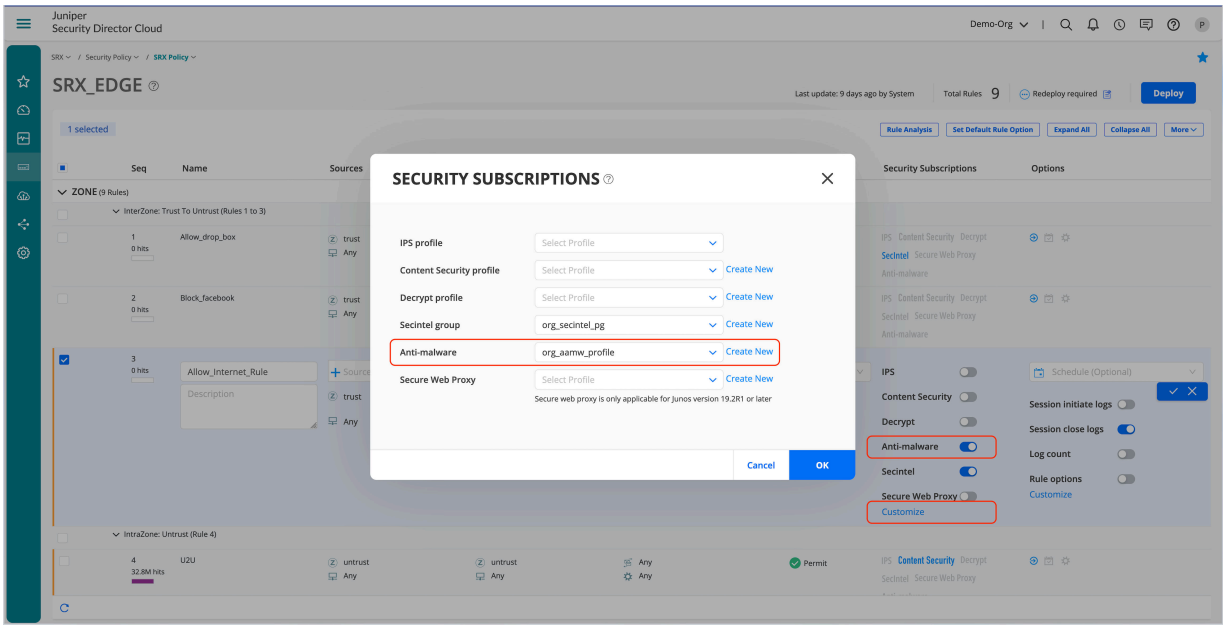


Figure 34: Juniper Security Director Cloud—Assign Advanced Anti-Malware Profile to Security Policy



DNS Security

DNS security is configured in two phases:

- Enabling SecIntel phase, which is covered under the SecIntel section.
- Enabling core DNS security features such as DNS DGA and DNS Tunneling, which are covered in this section.

To enable DNS security, follow the path to configure the settings on Juniper Security Director Cloud:

1. Go to **SRX** > **Device Management** > **Devices**.
2. Click the device we want to configure DNS security.
3. Click **Junos Detailed Configurations**.
4. Enter **DNS filtering** in the search section.
5. Select **Services** > **Dns Filtering**.
6. Enter the details.
7. Click **Save** once done.

8. Optional. Click **Preview** if you want to view saved configuration.

9. Click **Deploy** to deploy the configuration to the device.

> **NOTE**: You can always complete all the configuration sections and save before deploying the final configuration.

Also, this configuration is the same for implementing IoT Security as well.

Figure 35: Juniper Security Director Cloud—DNS Security Configuration

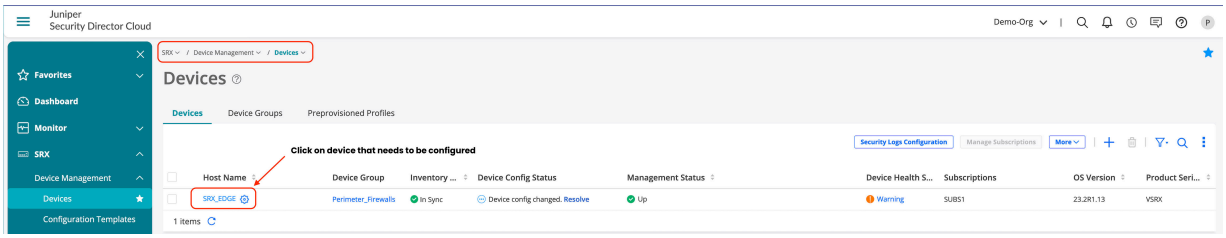


Figure 36: Juniper Security Director Cloud—Junos Detailed Configuration

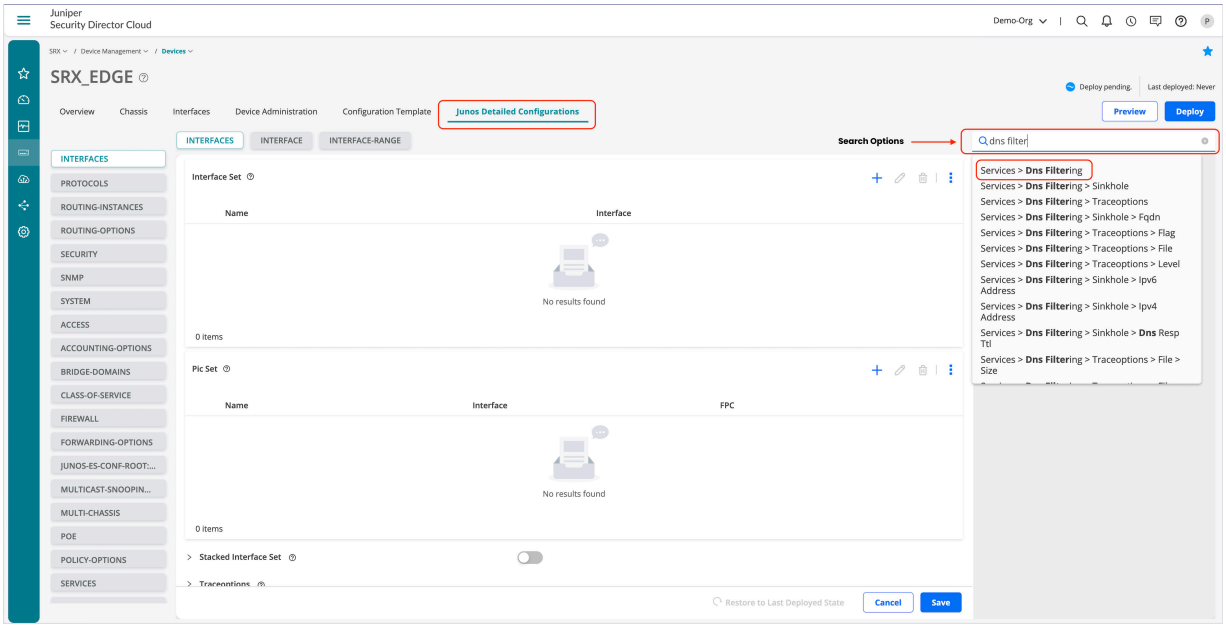
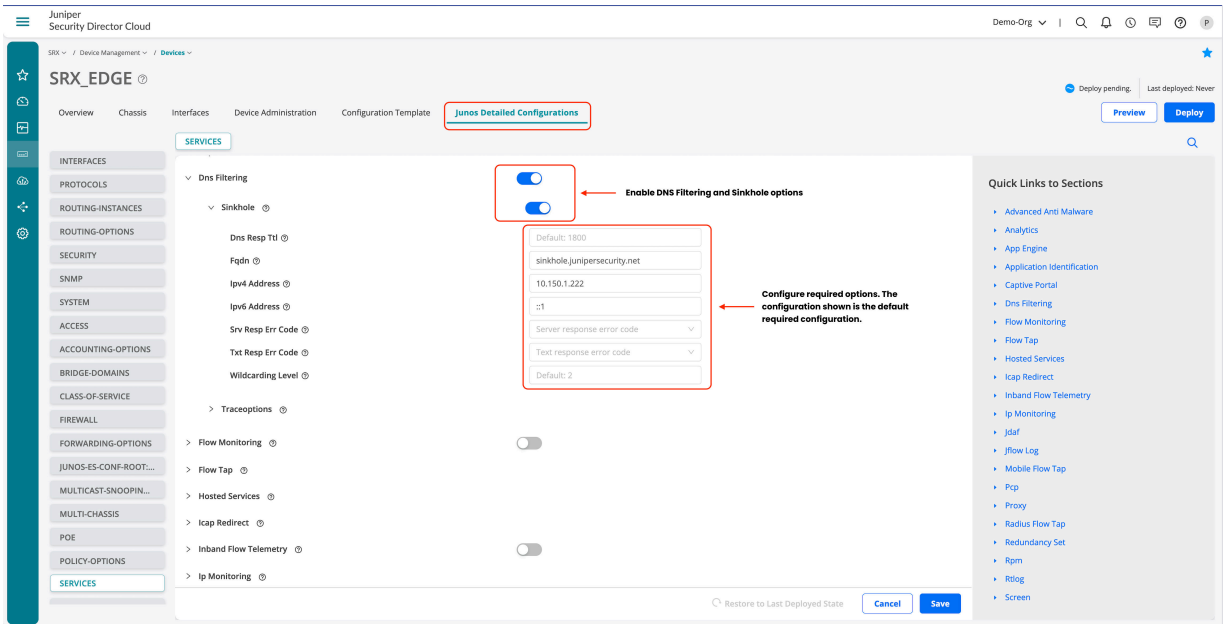


Figure 37: Juniper Security Director Cloud—Junos Detailed Configuration—DNS Filtering



Let's configure the core DNS security features:

1. Enter **metadata** in the search section.
2. Select **Services** > **Security Metadata Streaming**.
3. Click to proceed to the configuration section.
4. Click **+** to enable DNS metadata configuration.
5. Click **Save** once done.
6. Optional. Click **Preview** if you want to view saved configuration.
7. Click **Deploy** to deploy the configuration to the device.

Figure 38: Juniper Security Director Cloud—Junos Detailed Configuration—Security Metadata

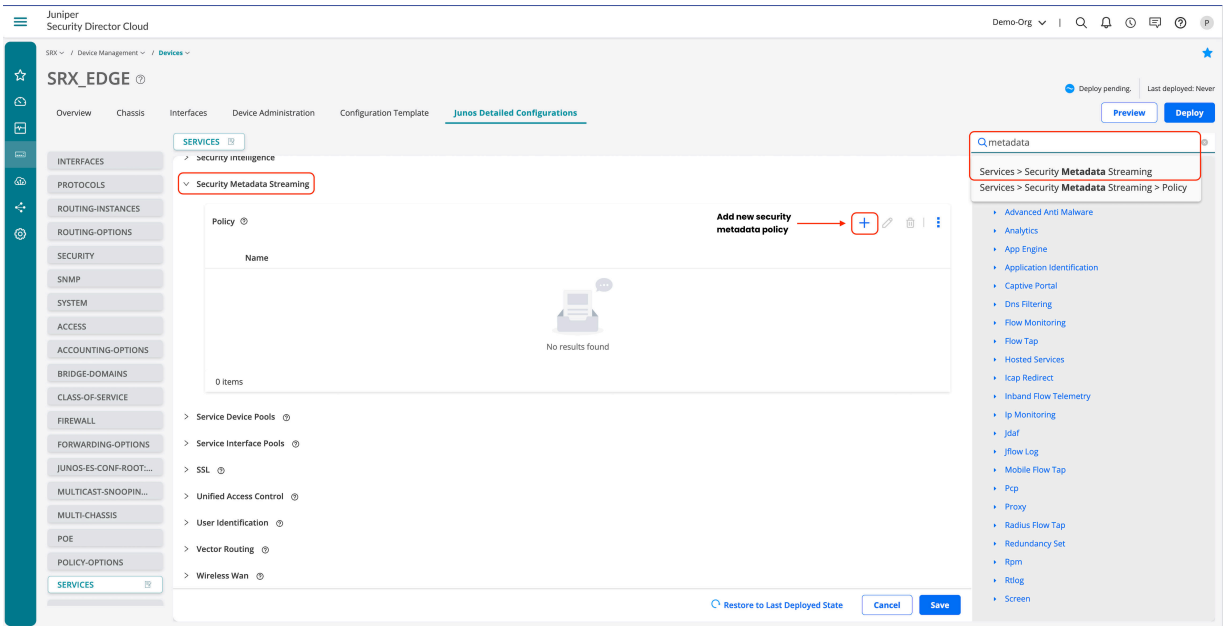


Figure 39: Juniper Security Director Cloud—Junos Detailed Configuration—Security Metadata

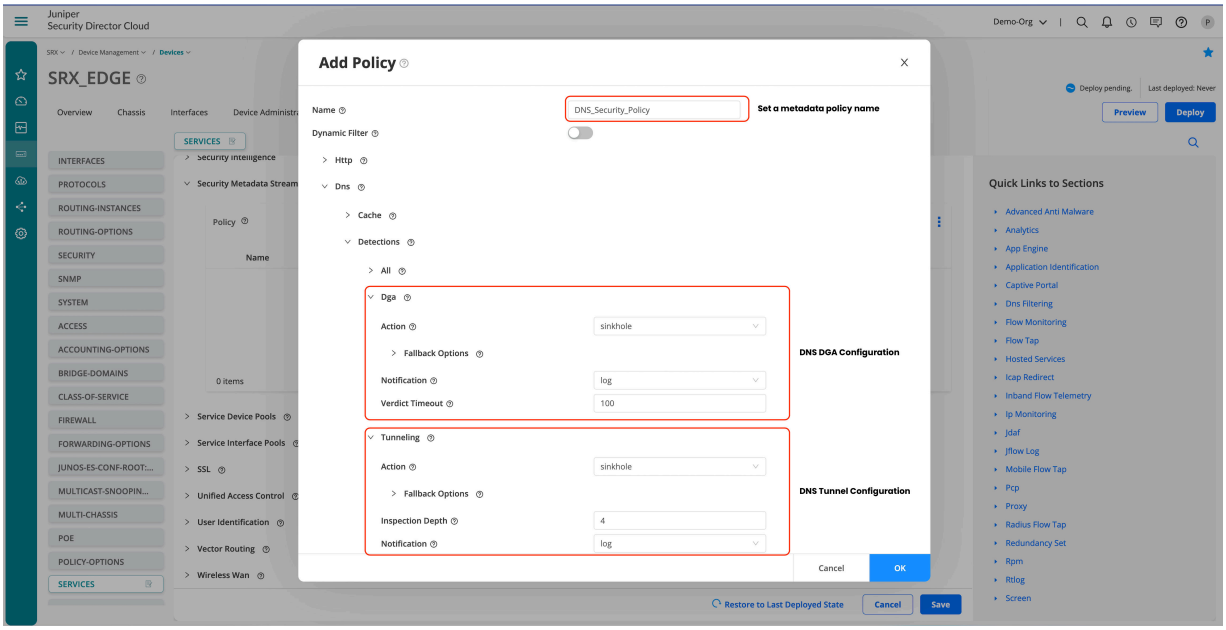
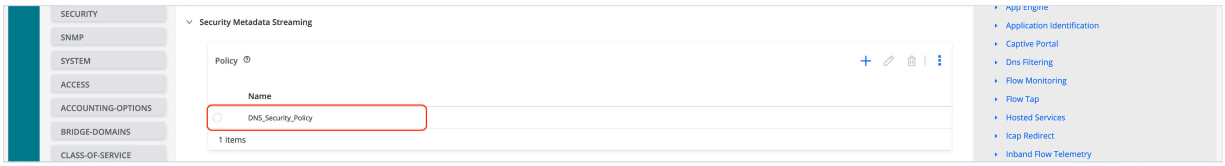


Figure 40: Juniper Security Director Cloud— Junos Detailed Configuration—Security Metadata Policy



NOTE: Ensure to save and deploy the configuration once its completed.

Let's use CLI to configure the metadata streaming policy on a zone pair to enforce DNS security settings.

Ensure that the configuration is deployed before configuring the next steps through CLI.

```
# Add the security metadata streaming policy:
set security policies from-zone trust to-zone untrust application-services security-metadata-
streaming-policy DNS_Security_Policy
```

Security Screens

To configure Security IDS Screen option on Juniper Security Director Cloud:

1. Go to **SRX** > **Device Management** > **Devices**.
2. Click on the device.
3. Click **Junos Detailed Configurations**.
4. Search for screens.
5. Select **Security** > **Screen**.
6. Click **+** to add a new profile.

Figure 41: Juniper Security Director Cloud—Screens Configuration

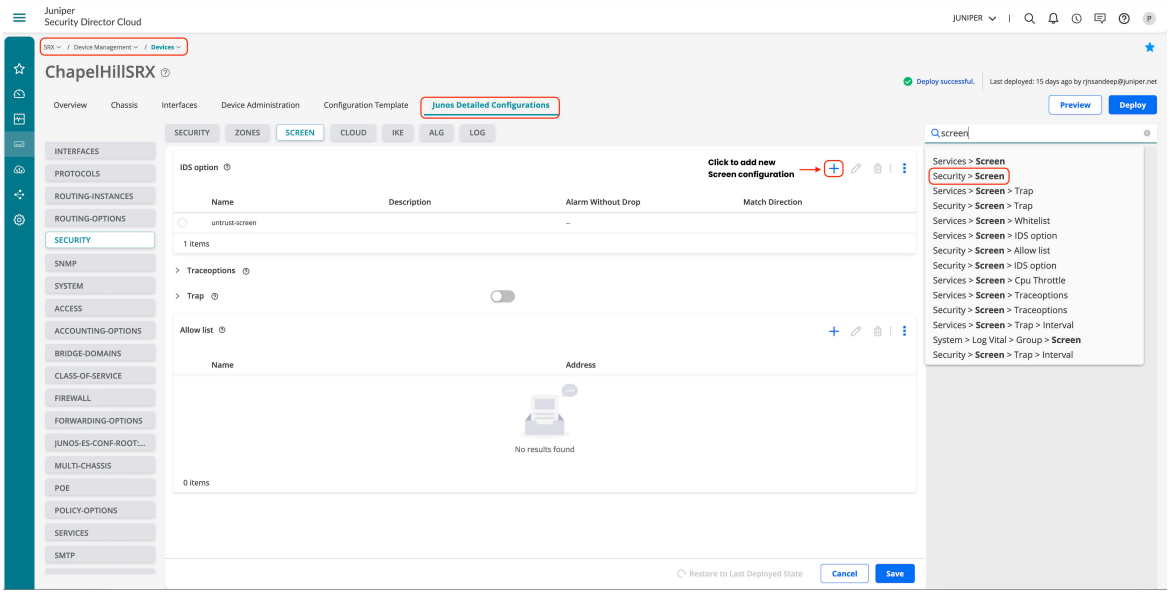
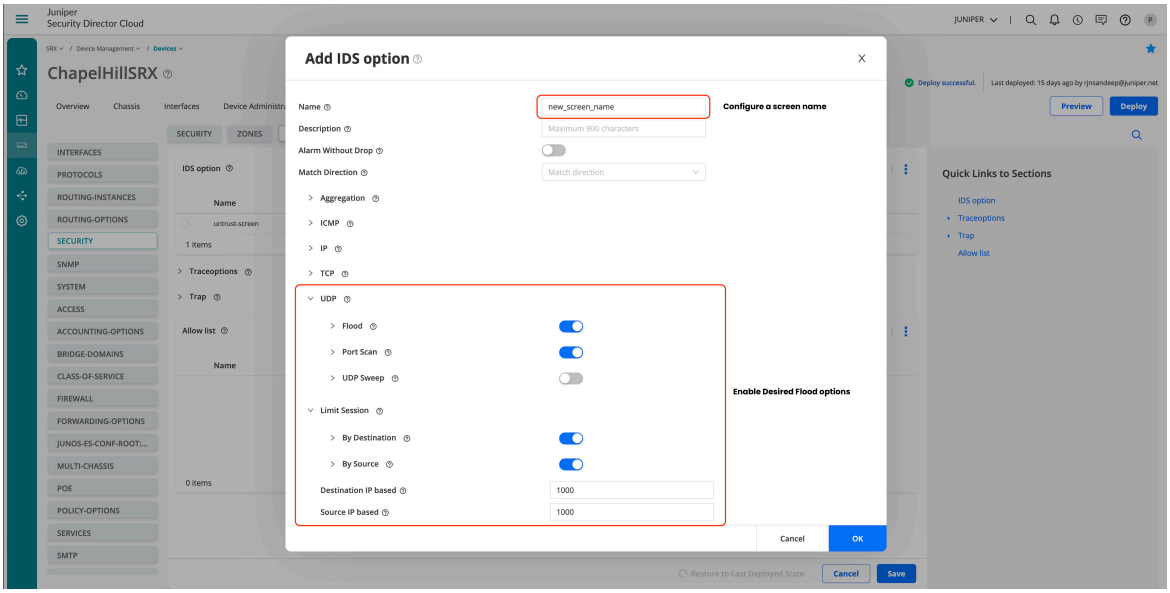


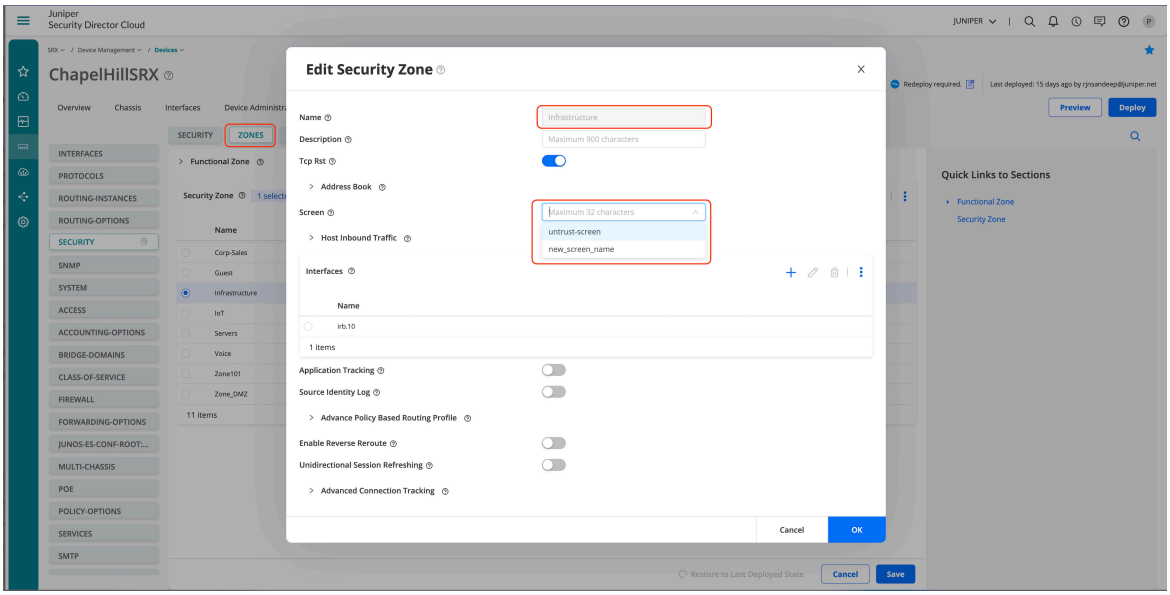
Figure 42: Juniper Security Director Cloud—Screens Flood Attack Options



7. Click **OK** to save the screen configuration once the desired configuration is completed.

8. Click **Zones** to enforce the screen on a specific zone.

Figure 43: Juniper Security Director Cloud—Assign Screens Options to Zone



9. Click **OK** to save the configuration once the new screen configuration is applied to the zone.

10. Click **Deploy** to deploy the configuration to the device.

Reverse SSL Proxy

As the data center next-generation firewall use case focuses on protecting internal resources such as webservers, we can optionally implement SSL reverse proxy. SSL reverse proxy ensures advanced services are applied to decrypted webserver traffic and inspected before leaving the firewall to gain the webserver resources.

The creation of the webserver certificates is not covered in this section. You must import this certificate into Juniper Security Director Cloud. This certificate is used when creating the SSL proxy profile.

To create the SSL reverse proxy profile:

1. Import webserver certificates.

2. Create the SSL reverse proxy profile.

3. Go to **SRX** > **Security Subscriptions** > **Decrypt Profiles**.

4. Click **+** to add a new profile.

Figure 44: Juniper Security Director Cloud—Assign Screens Options to Zone

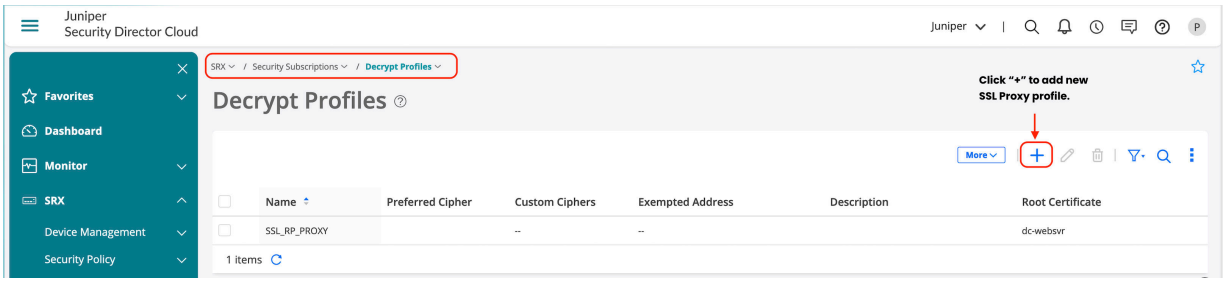
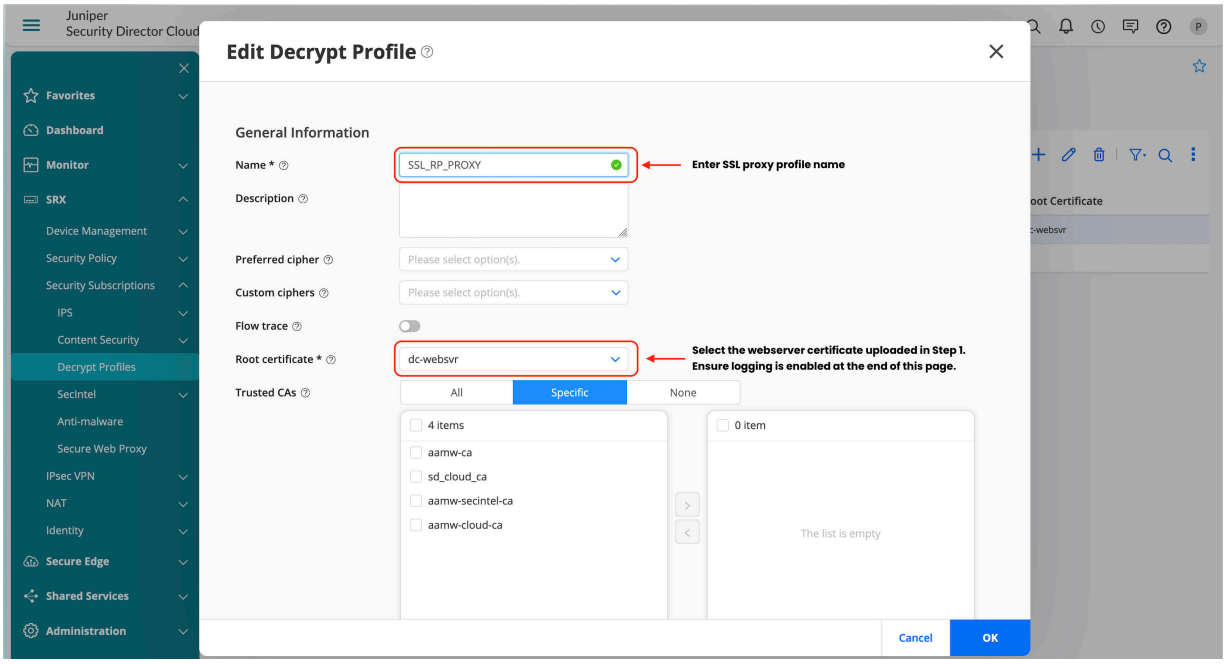


Figure 45: Juniper Security Director Cloud—Assign Screens Options to Zone

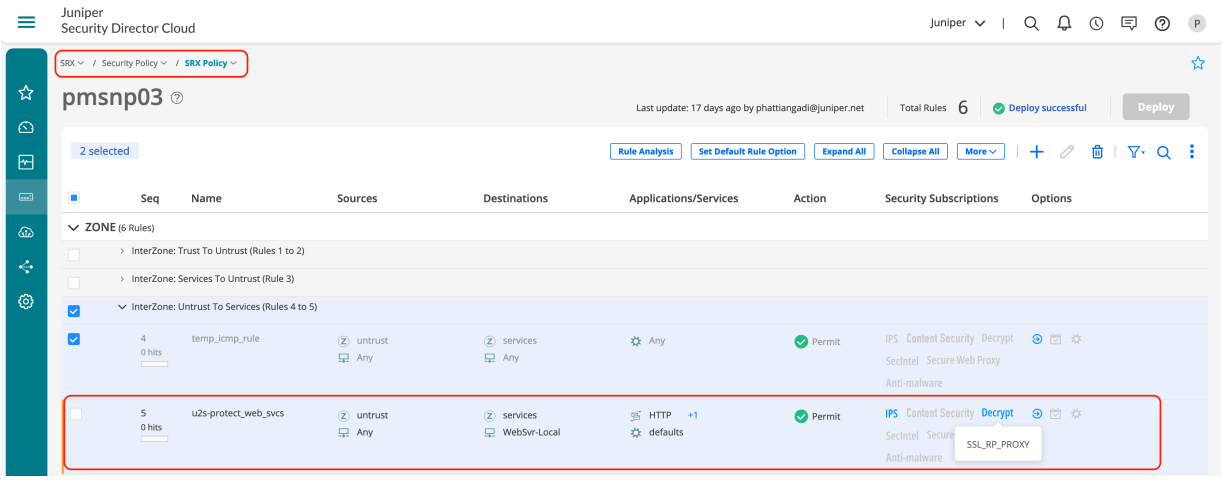


Include the profile in a firewall rule for enforcement:

1. Go to **SRX** > **Security Policy** > **SRX Policy**.
2. Click **+** to add new firewall rule.
3. Enter **Source Zone** and **Source Address**.
4. Enter **Destination Zone** and **Destination Address**.
5. Select **Services and Applications**.
6. Select **Advanced Services** under security subscriptions that must be enabled. In this example, IPS is selected.

7. Select the SSL Reverse proxy profile created in the previous step.

Figure 46: Juniper Security Director Cloud—Assign Screens Options to Zone

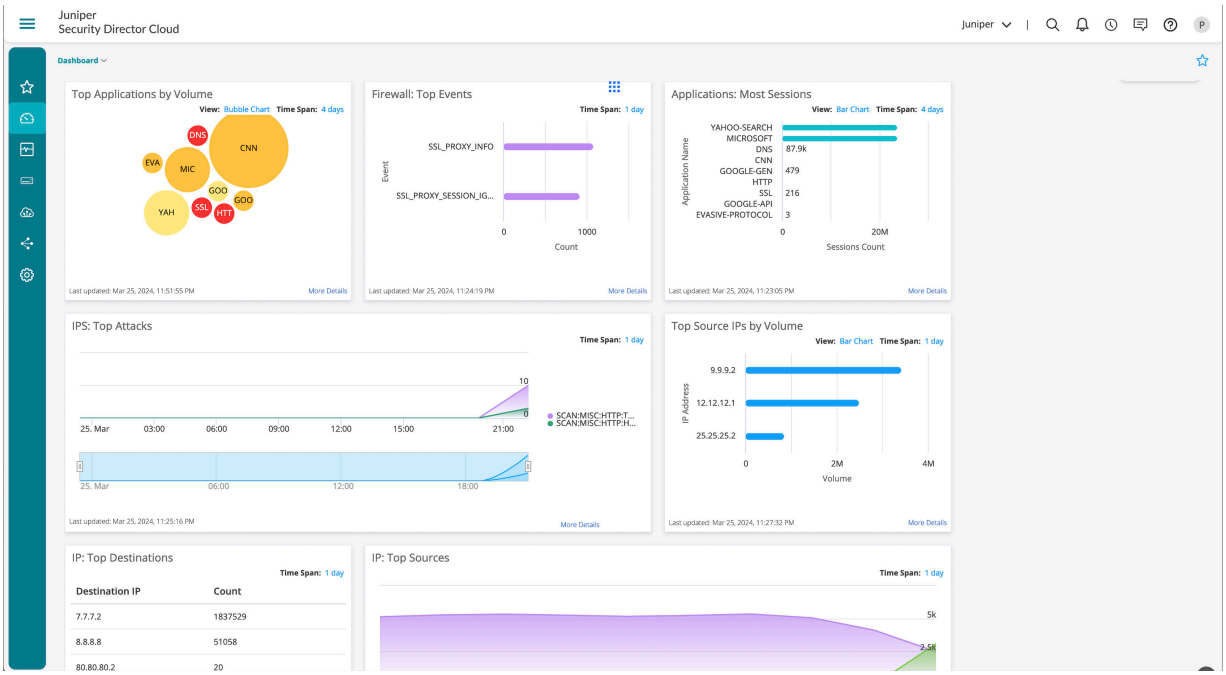


Data Center Next-Generation Firewall Solution Validation

The configuration provides advanced security services in data center environment using next-generation firewalls. In this section, we'll focus on validating the solution that is implemented with this JVD.

Let's start with the Juniper Security Director Cloud Dashboard, which is the landing page when logged in. The Dashboard page provides a landscape of what is happening in the environment through various readily available widgets.

Figure 47: Juniper Security Director Cloud—Dashboard Page



The **Monitor** > **Logs** > **Session** page provides a snapshot of the traffic flow through the environment. Using Session page, you can filter information based on various options that's provided on the page.

Table 3: Filter Options

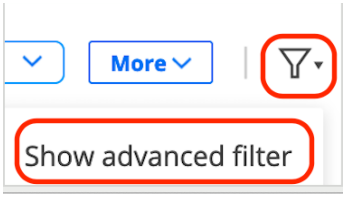
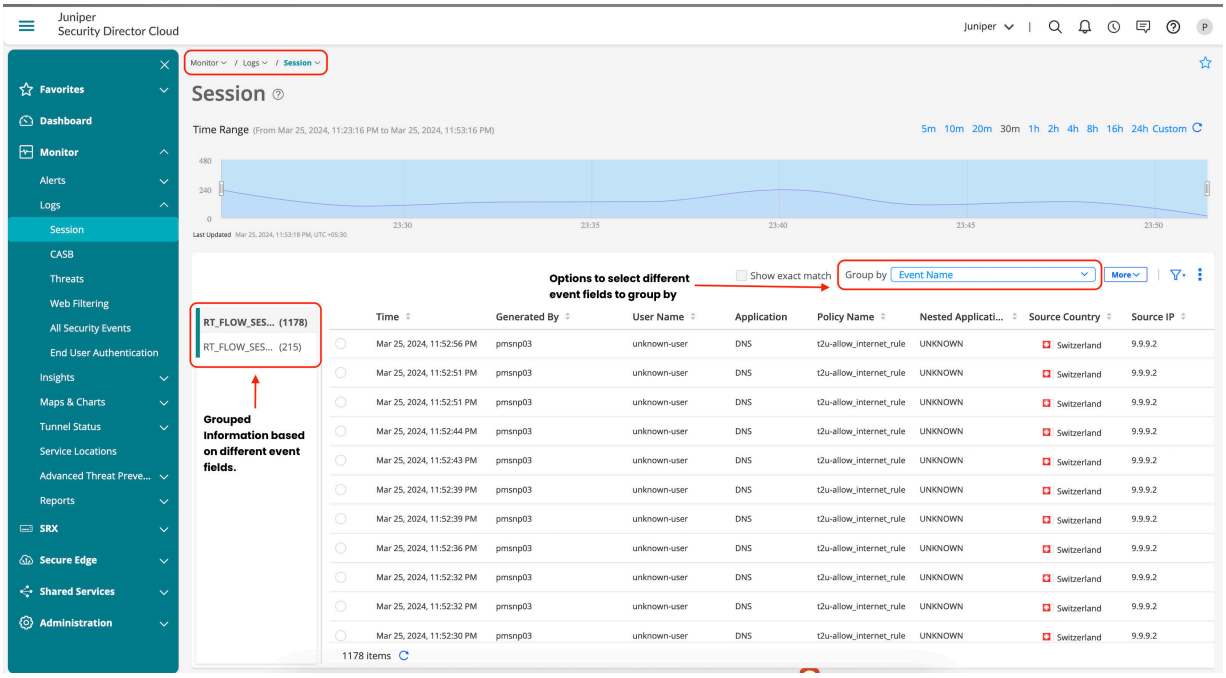
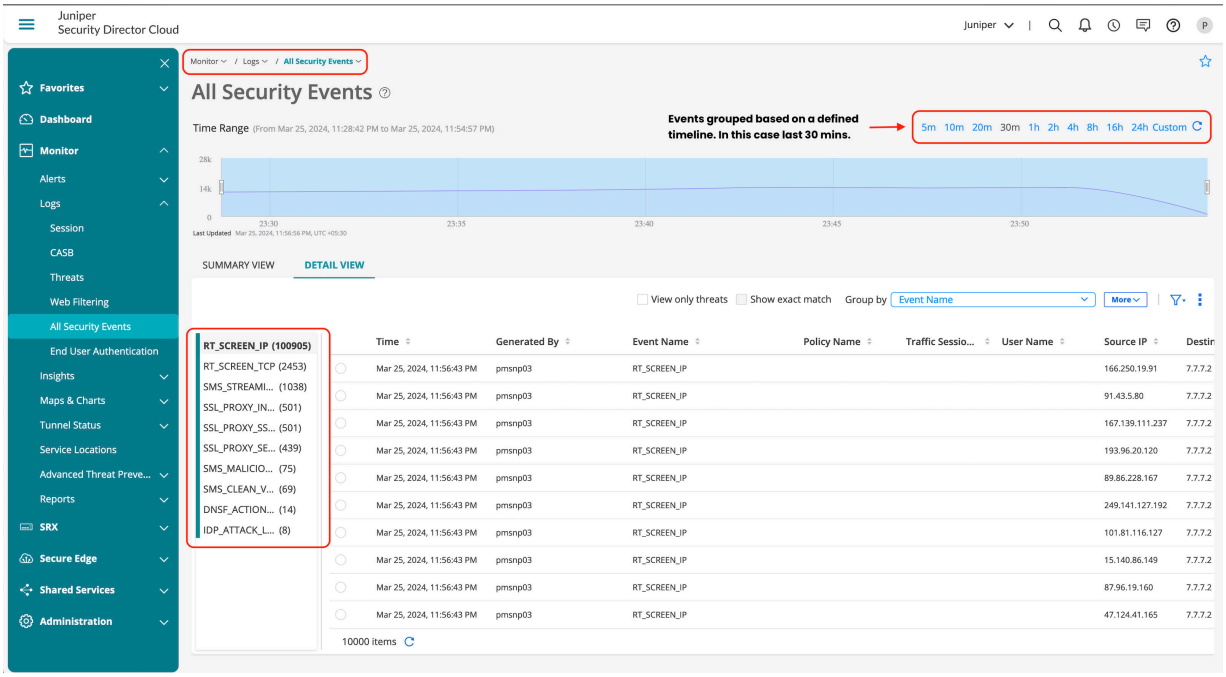
Filter Options	Description
	Use **Show advanced filter** to search through the logs. All the event fields are used to run through the search.
	Use **Group by** to sort through the logs based on predefined field. Which is shown in the next screenshots.

Figure 48: Juniper Security Director Cloud—Session Traffic Logs



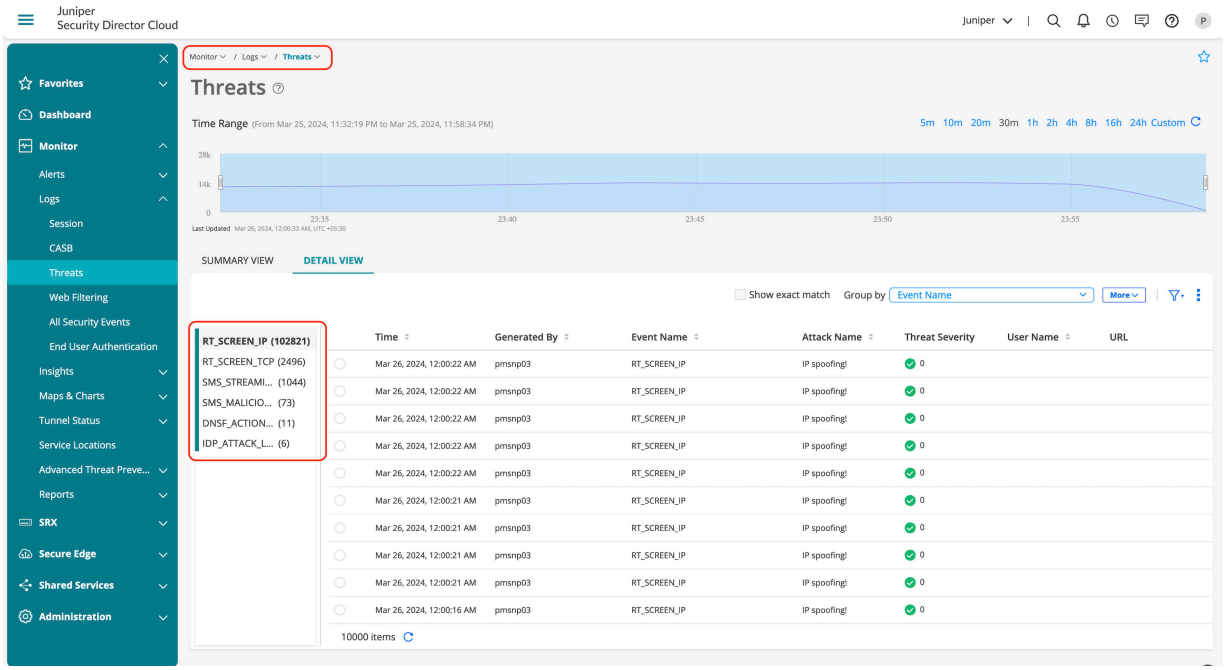
All Security Events page provide details on all the security events received from the device.

Figure 49: Juniper Security Director Cloud—Grouped Events



Threats page focuses only on the threats identified in the environment.

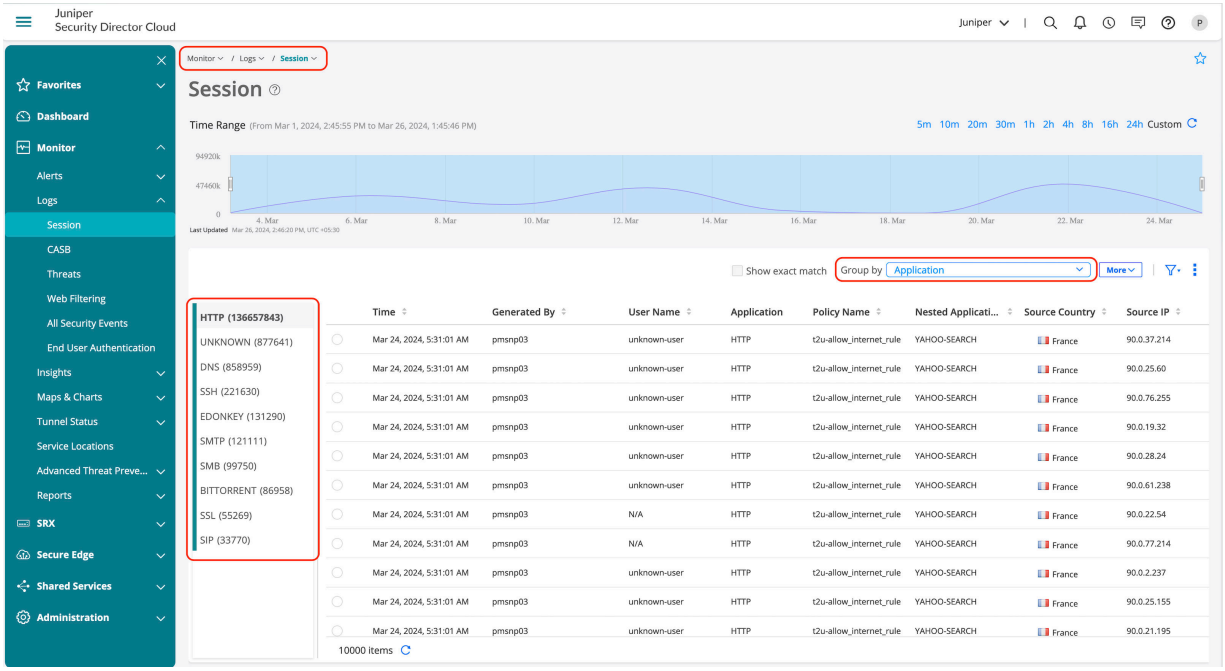
Figure 50: Juniper Security Director Cloud—Grouped Events



Application Security Validation

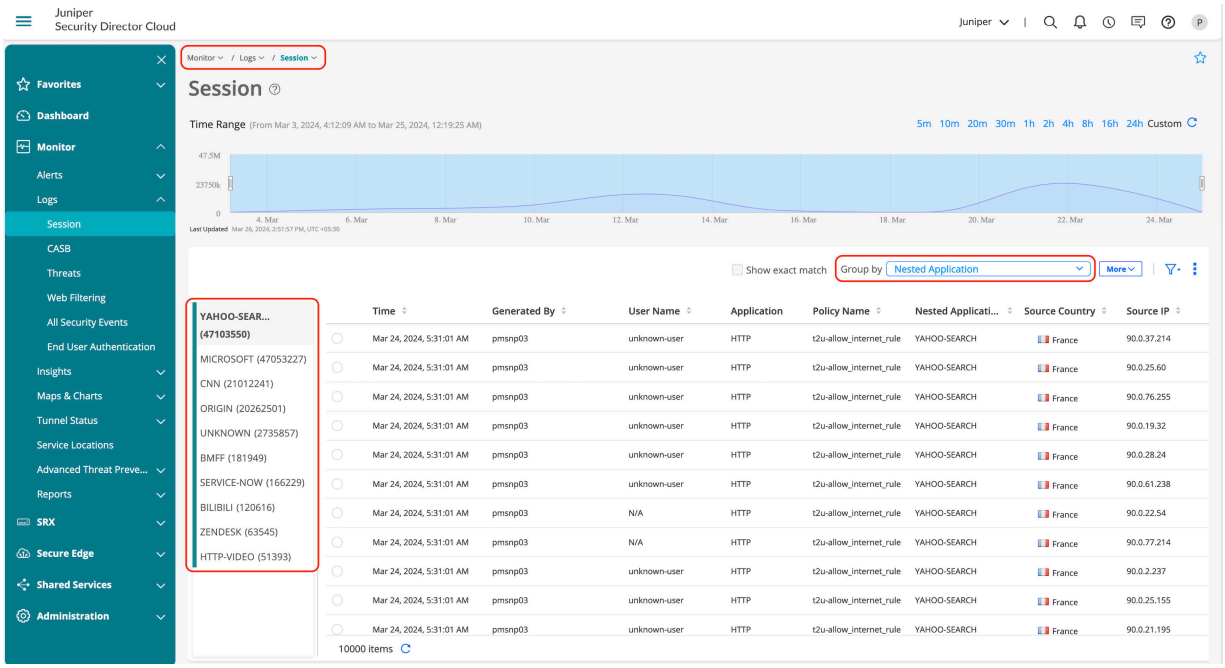
Grouped applications provide a view on identified applications from the traffic where the firewall has processed.

Figure 51: Juniper Security Director Cloud—Grouped Application View



Grouping using Nested Applications provides information on the actual applications using the applications that is shown in Figure 51 on page 48.

Figure 52: Juniper Security Director Cloud—Grouped Nested Application View

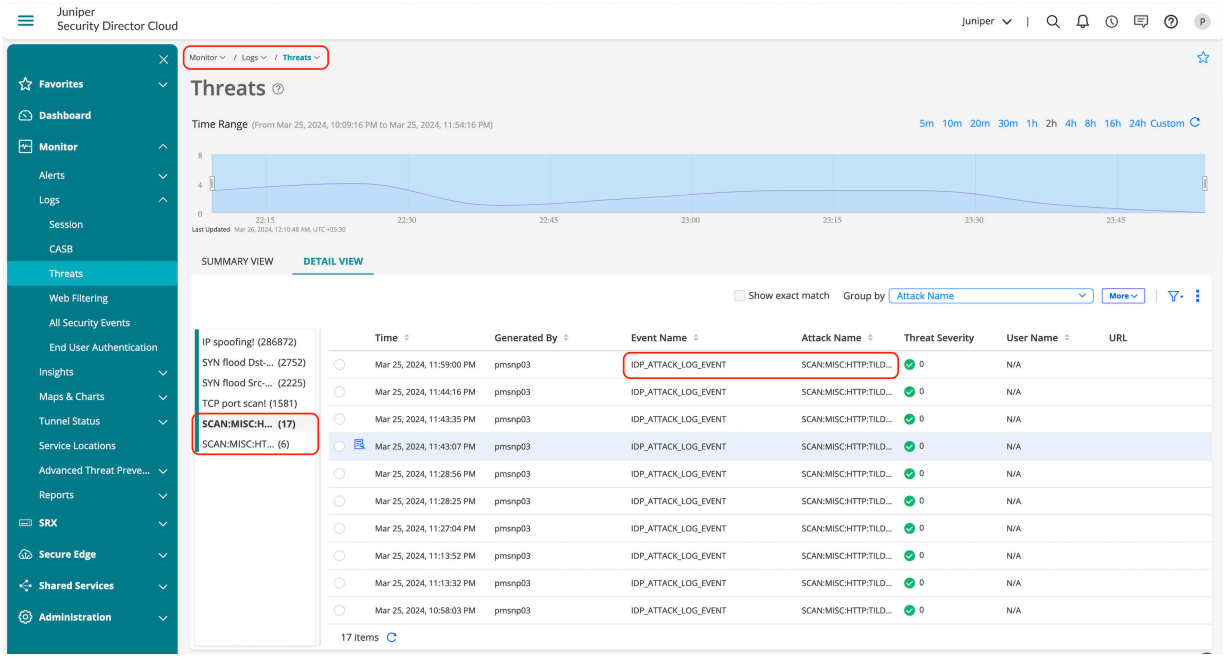


IDP Feature Validation

Threats page provides information on the detected IDP attacks in the environment. You can also view the detailed information of the following:

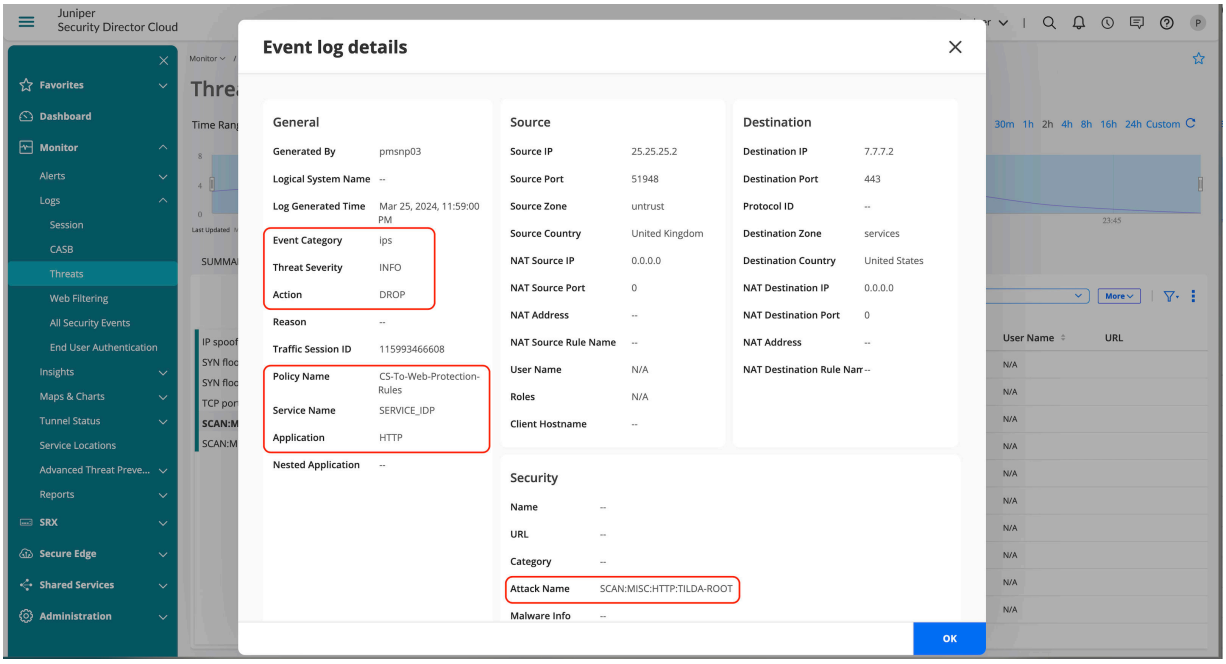
- Source and destination zone
- Source and destination IP addresses
- IDP policy and rule that triggered the detection
- Detected attack and its severity
- Action taken on the detected attack

Figure 53: Juniper Security Director Cloud—IDP Attacks



IDP Detailed Information

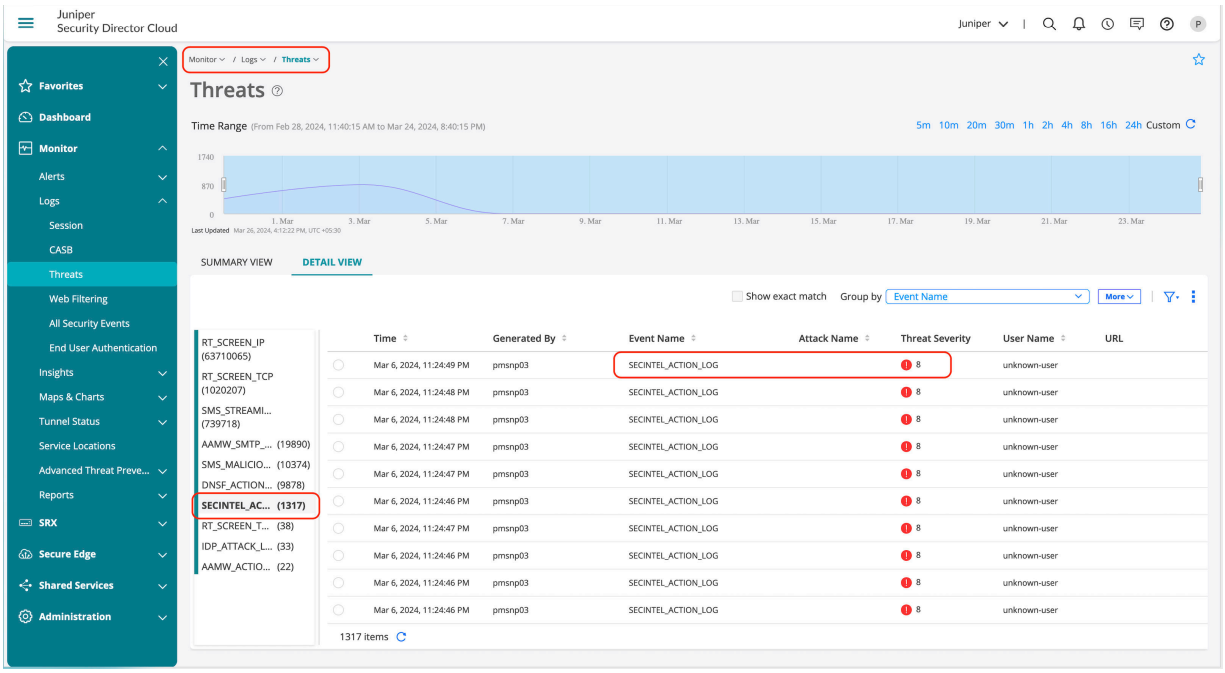
Figure 54: Juniper Security Director Cloud—IDP Attack Detail View



SecIntel Feature Validation

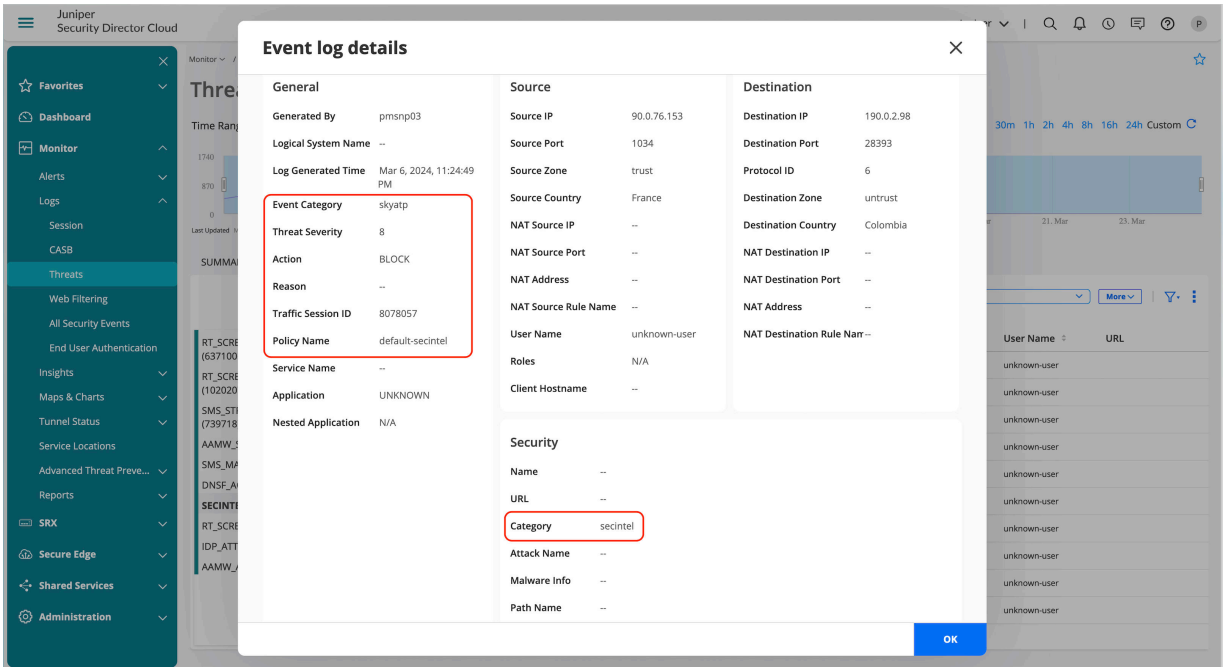
SecIntel feeds applied on the firewall policy generates logs when the traffic matches the configured risk level.

Figure 55: Juniper Security Director Cloud—SecIntel Threat Logs



Detailed view shows information on the category and SecIntel policy that enforced the action including the source, destination, and corresponding zones.

Figure 56: Juniper Security Director Cloud—SecIntel Threat Log Detail View



Advanced Threat Prevention dashboard also provides details on the client that initiated the traffic and the history of when the event occurred.

Figure 57: Juniper Security Director Cloud—SecIntel Identified Clients

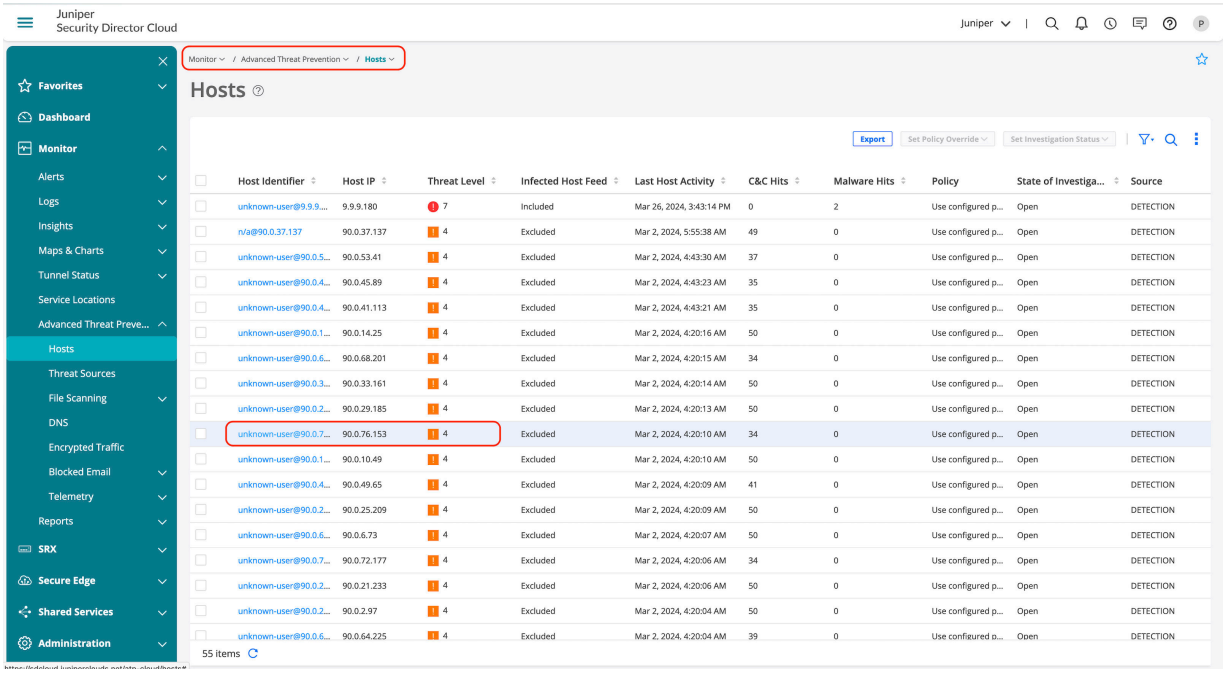
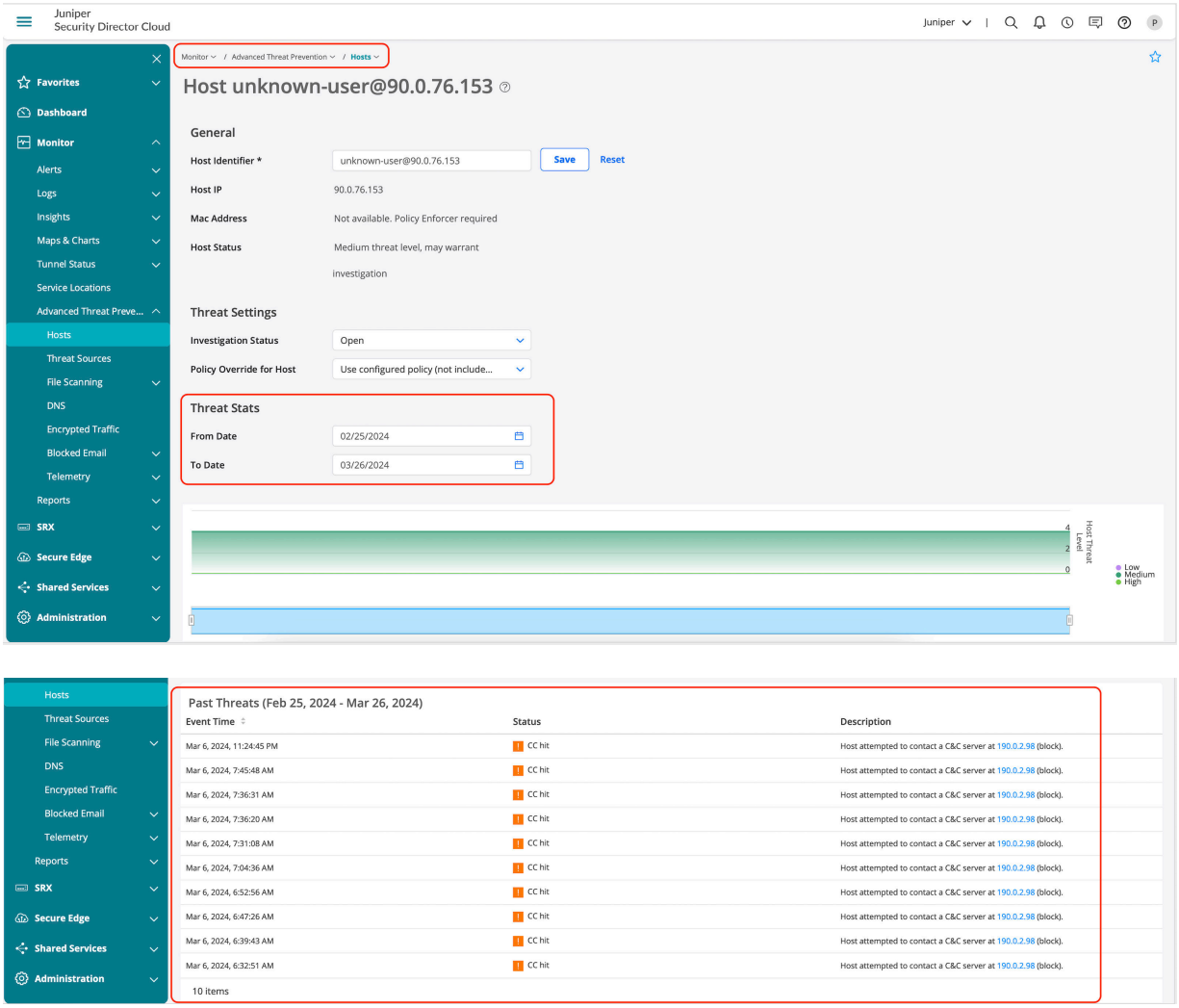


Figure 58: Juniper Security Director Cloud—SecIntel Client Details



Advanced Anti-Malware Feature Validation

Configured AAMW policy might result in several logs depending on what protocol is identified. Few key logs provide information on the action enforced by AAMW.

Table 4: Advanced Anti-Malware Logs

Log Information	Description
AAMW_ACTION_LOG	Action taken based on the verdict delivered based on the sandboxing result by Juniper ATP Cloud and defined risk profile on the SRX Series Firewall.
AAMW_HOST_INFECTED_EVENT_LOG	If the verdict found is malicious, the host infected event log is generated.
AAMW_MALWARE_EVENT_LOG	If the verdict as a result of the sandboxing is malicious, the malware event log is generated.

Figure 59: Juniper Security Director Cloud—AAMW Logs

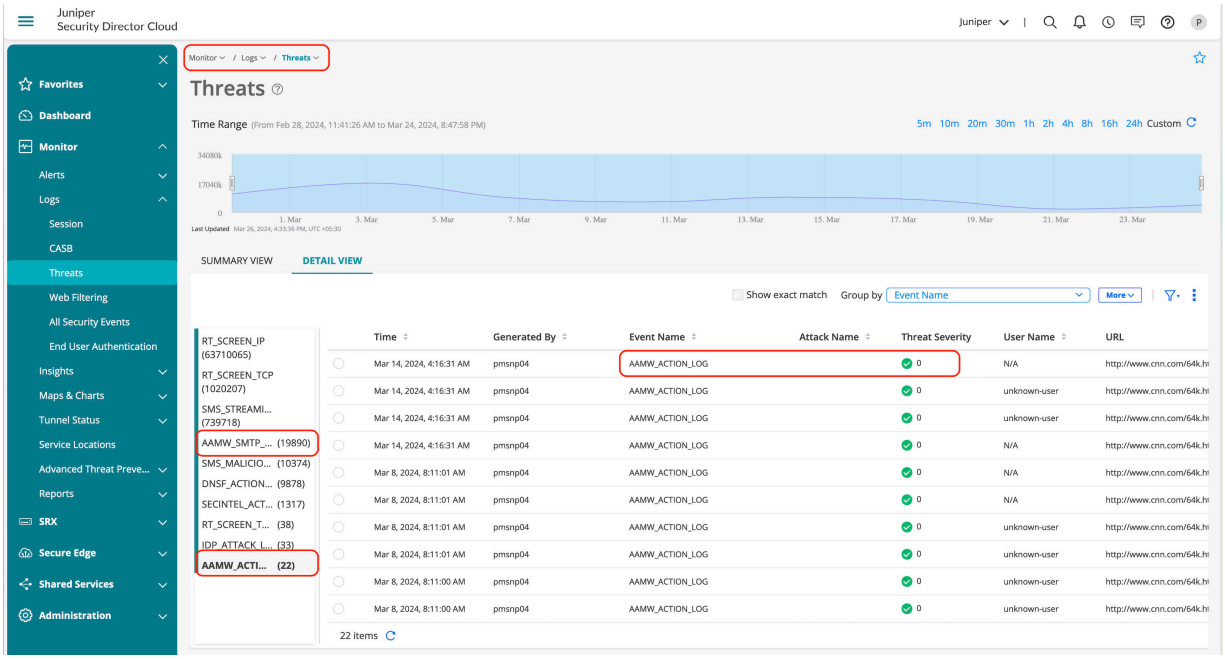


Figure 60: Juniper Security Director Cloud—AAMW Log Detail

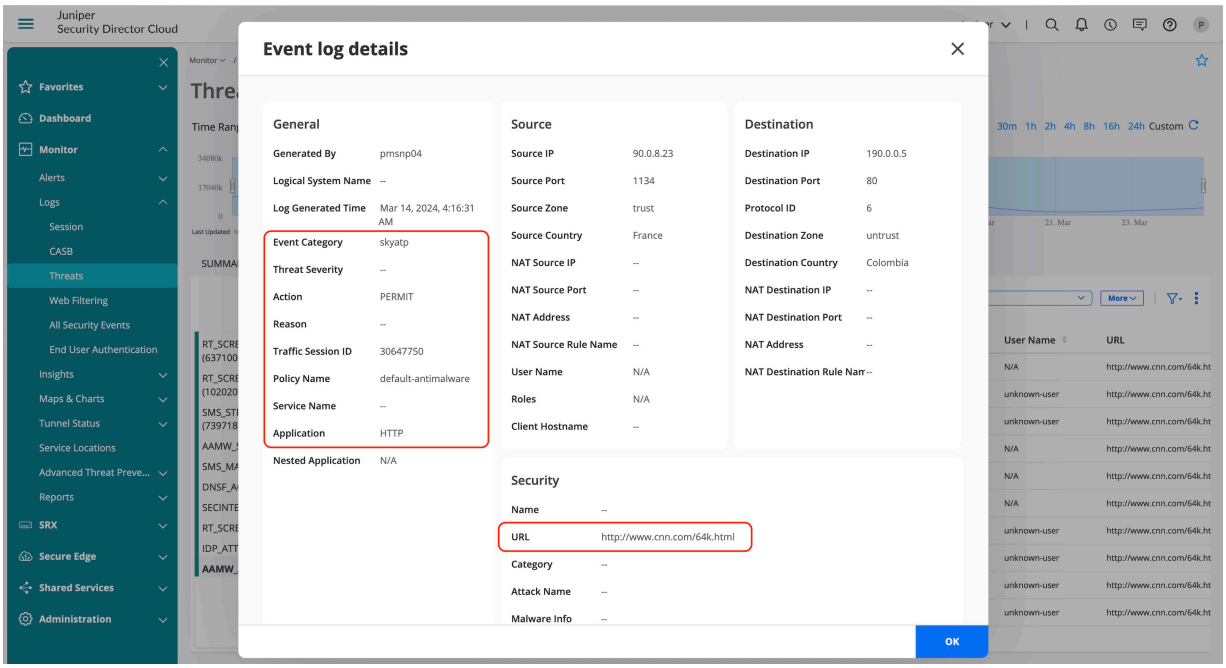


Figure 61: Juniper Security Director Cloud—ATP Infected Host

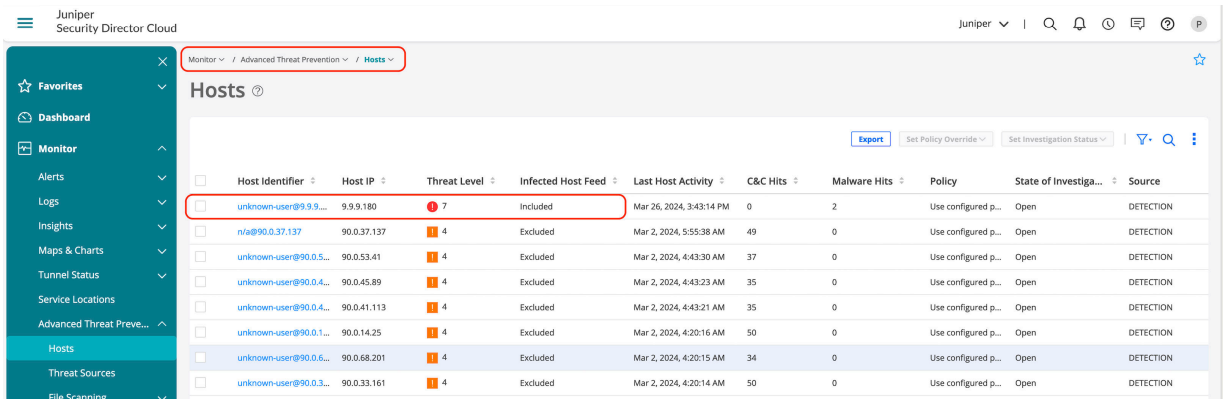
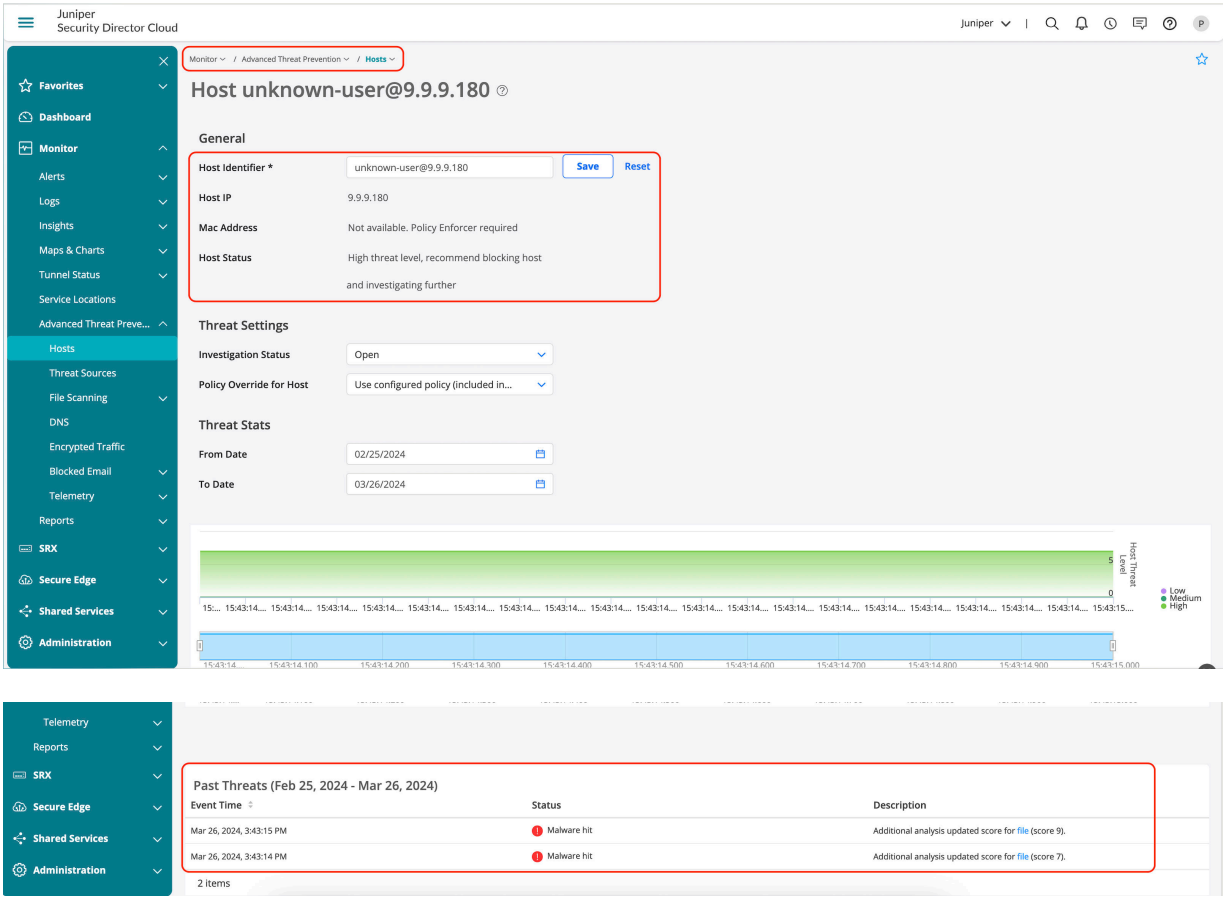


Figure 62: Juniper Security Director Cloud—ATP Infected Host Detailed View



ATP Infected host view provides the following details:

- Indicators of compromise (IOC).
- Static analysis of the identified malicious file.
- Behavior analysis to identify key behaviors based on the assigned threat level to derive how malicious is the identified file.
- Network activity provides details on the malware activity identified during sandboxing.
- Behavior details outline the behavioural steps identified during sandboxing.

Figure 63: Juniper Security Director Cloud—ATP Malware IOC

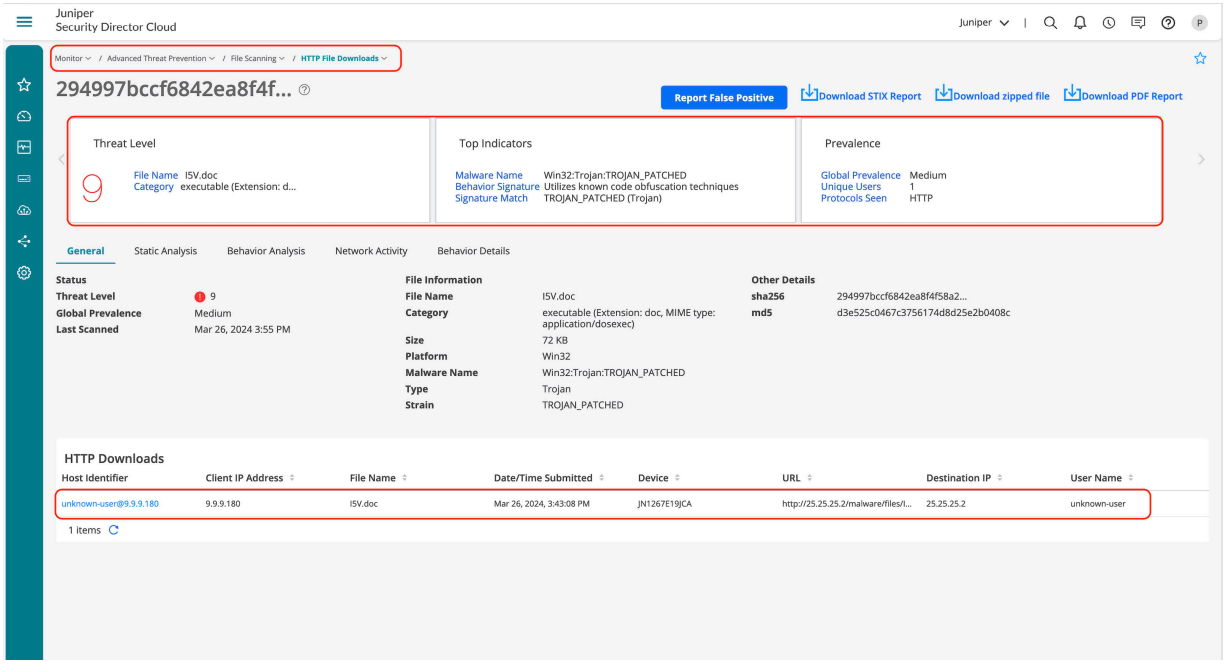


Figure 64: Juniper Security Director Cloud—ATP Malware Static Analysis

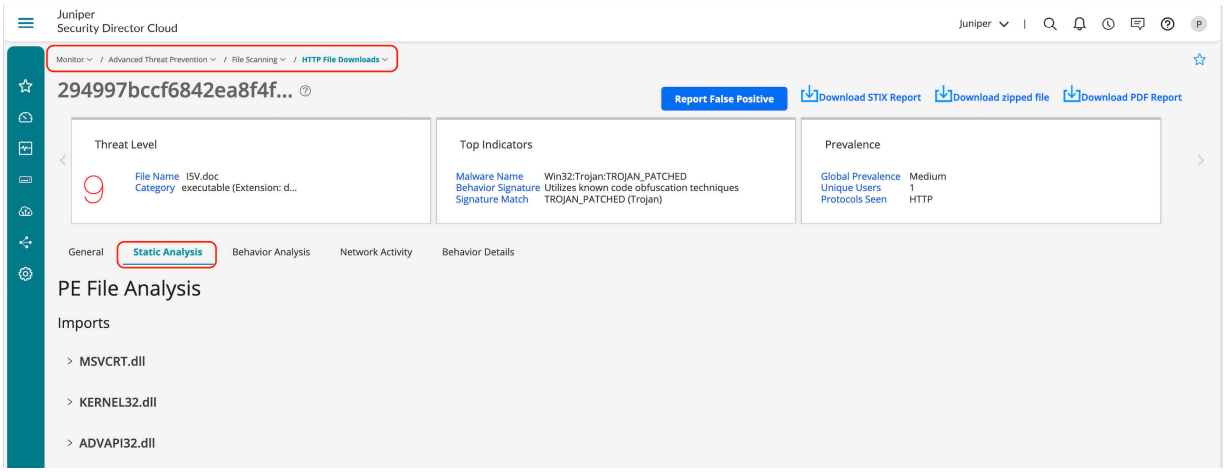


Figure 65: Juniper Security Director Cloud—ATP Malware Behavior Analysis

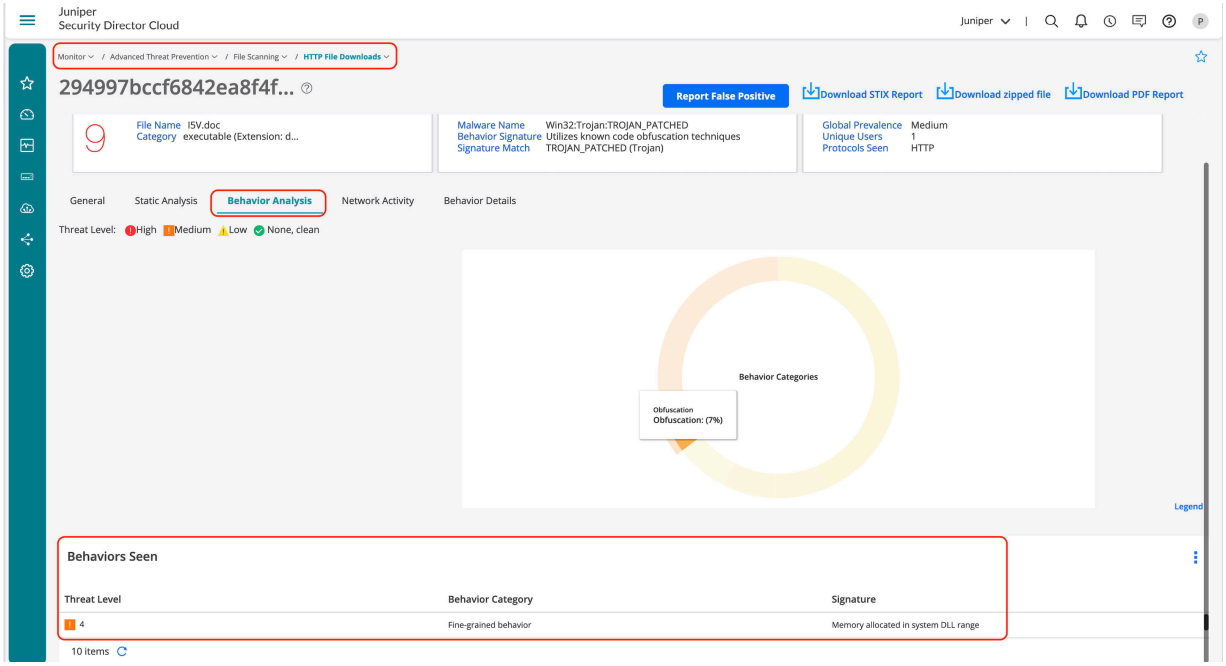


Figure 66: Juniper Security Director Cloud—ATP Malware Network Activity

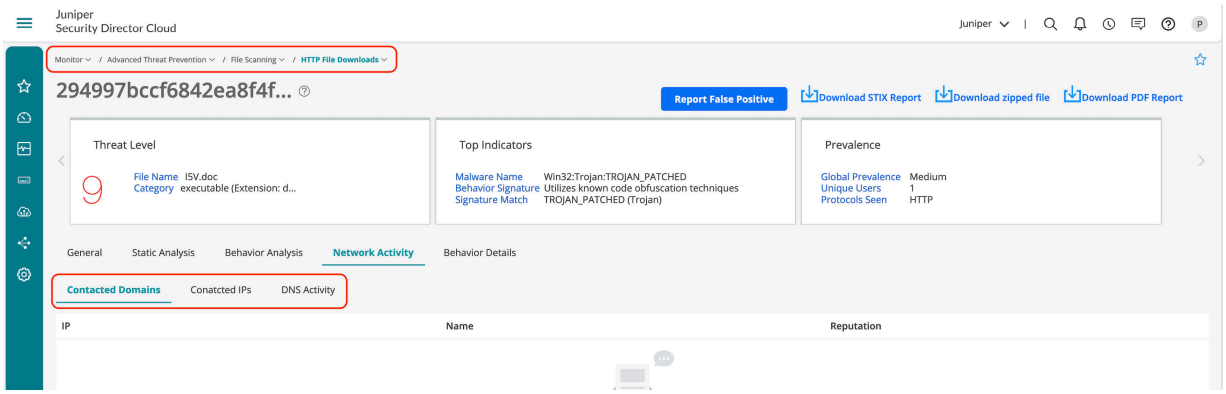
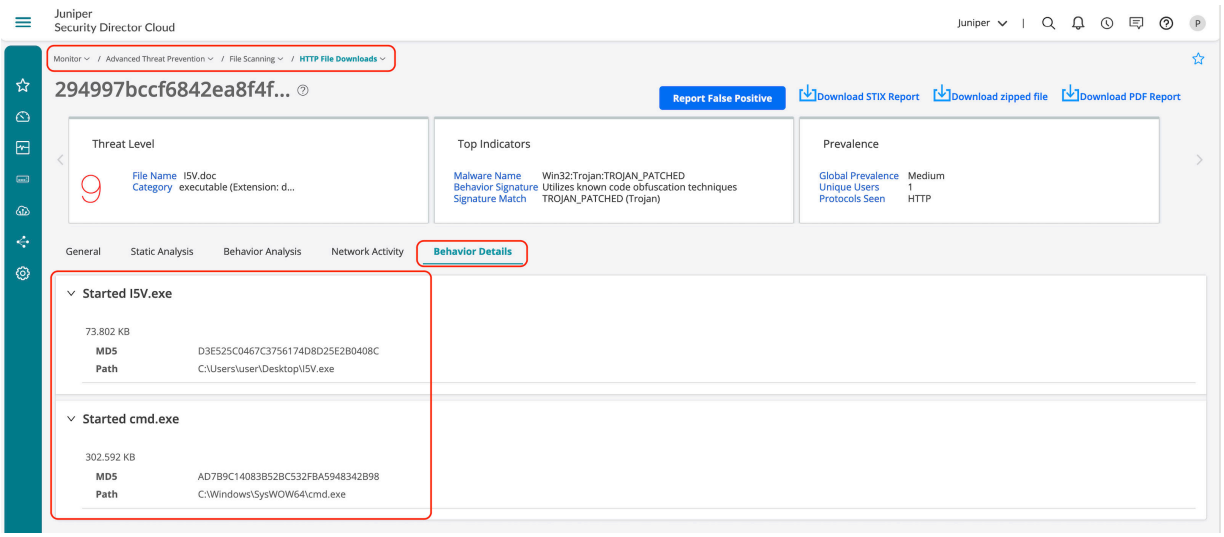


Figure 67: Juniper Security Director Cloud—ATP Malware Behavioral Details



DNS Security Feature Validation

DNS security logs are generated based on each DNS security features such as DGA and DNS tunneling, if any identified DNS traffic is found to be malicious appropriate logs are generated.

Table 5: DNS Security Logs

Log Information	Description
SMS_STREAMING	Log is generated for DNS REQ when 'notification log' is configured under any detections (dga, tunneling, and all).
SMS_CLEAN_VERDICT	Log is generated when the cloud verdict is 'clean' and 'notification log-detection' is configured under any detections (dga and all).
SMS_MALICIOUS_VERDICT	Log is generated when the cloud verdict is malicious or tunneling is detected and 'notification log-detection' is configured under any detections (dga, tunneling and all).
SMS_FALLBACK_EVENT	Log is generated when the cloud verdict is not received in verdict-timeout interval. Log is generated only when 'fallback-options notification log' is configured under any detection (dga, tunneling and all).

Apart from generated logs, you can also view the offense details from Advanced Threat Prevention section, which provides information on the following:

- Client which generated the offense.
- Offense details if its DGA or DNS Tunneling.
- Information on the IOC and exfiltration attempts.

Figure 68: Juniper Security Director Cloud—DNS Logs

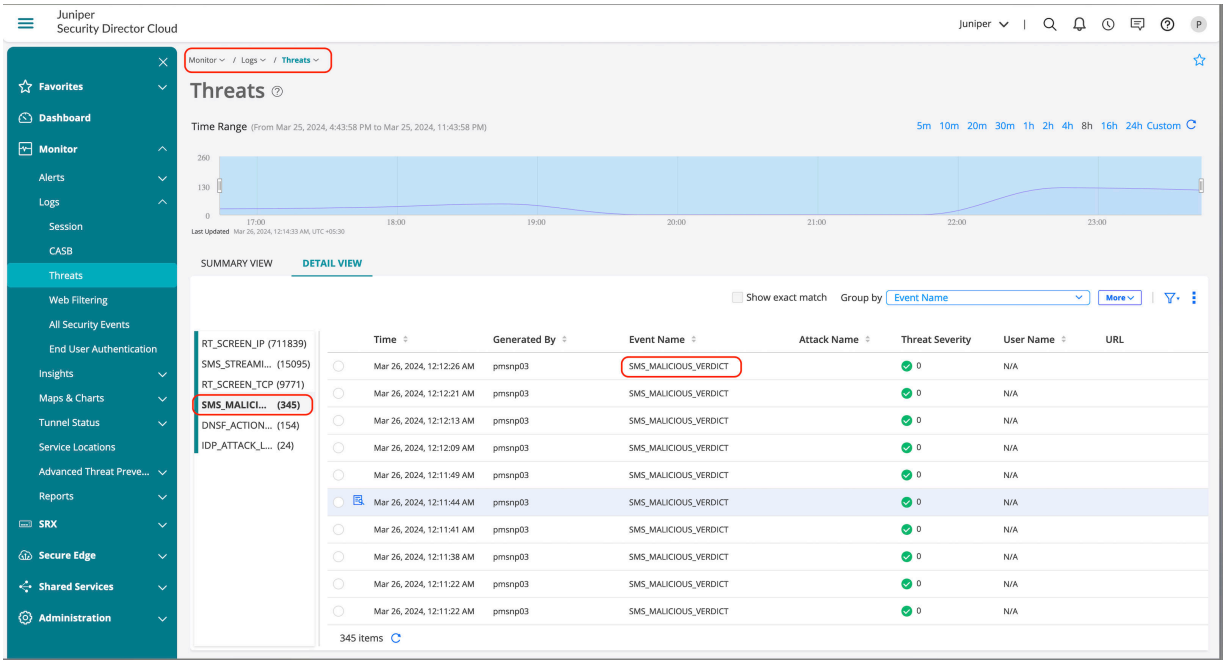


Figure 69: Juniper Security Director Cloud—DNS Log Detail

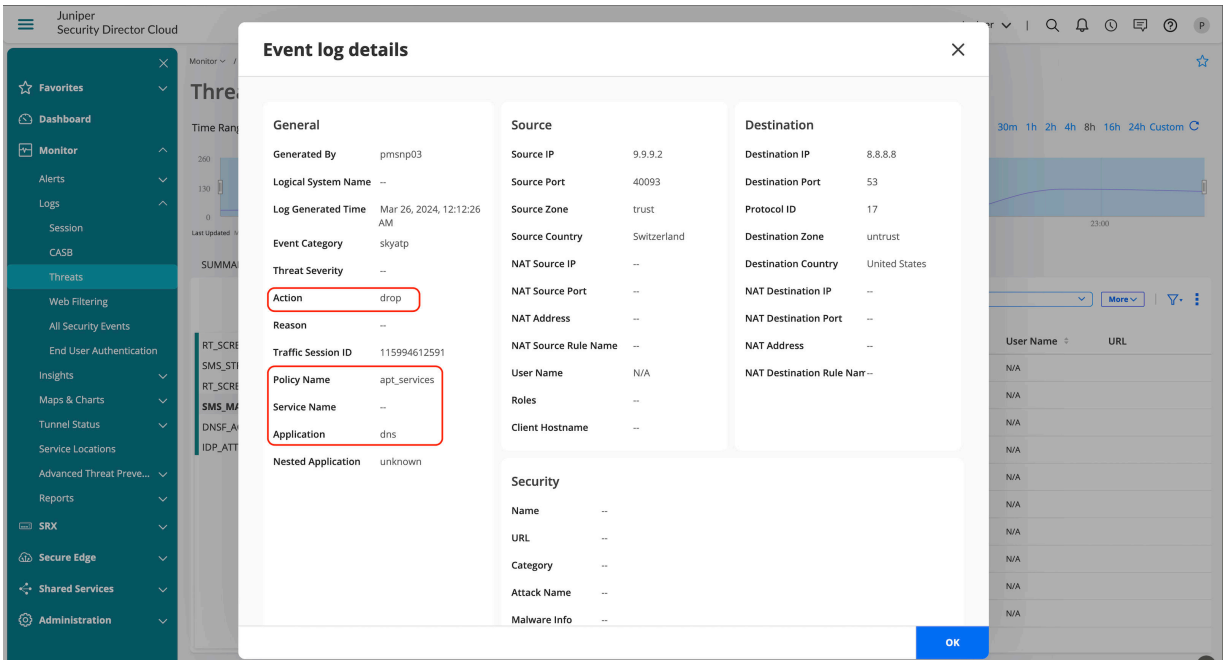


Figure 70: Juniper Security Director Cloud—SecIntel Based DNS Log

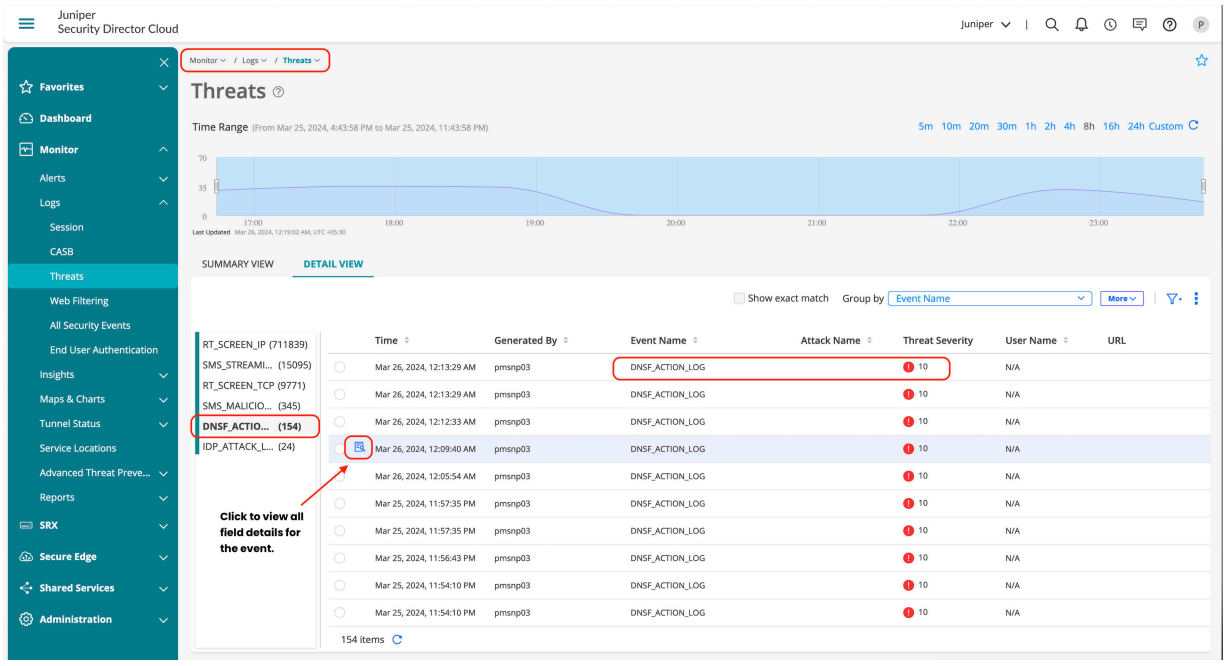


Figure 71: Juniper Security Director Cloud—SecIntel Based DNS Log Details

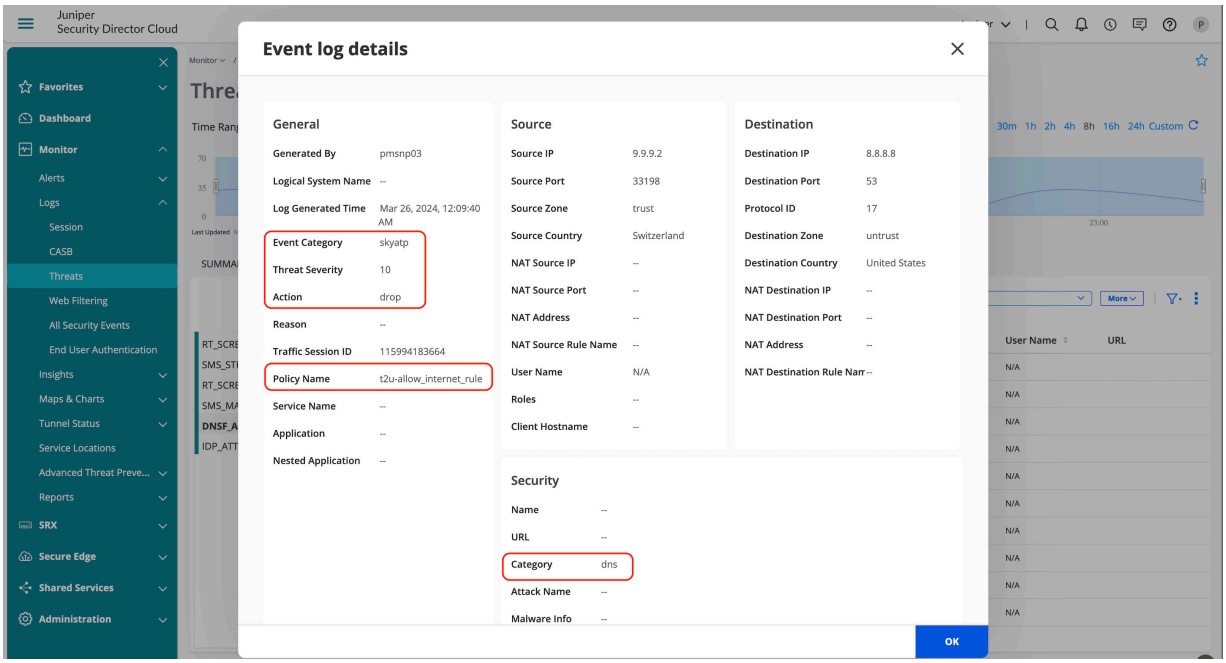


Figure 72: Juniper Security Director Cloud—ATP DNS DGA Offense

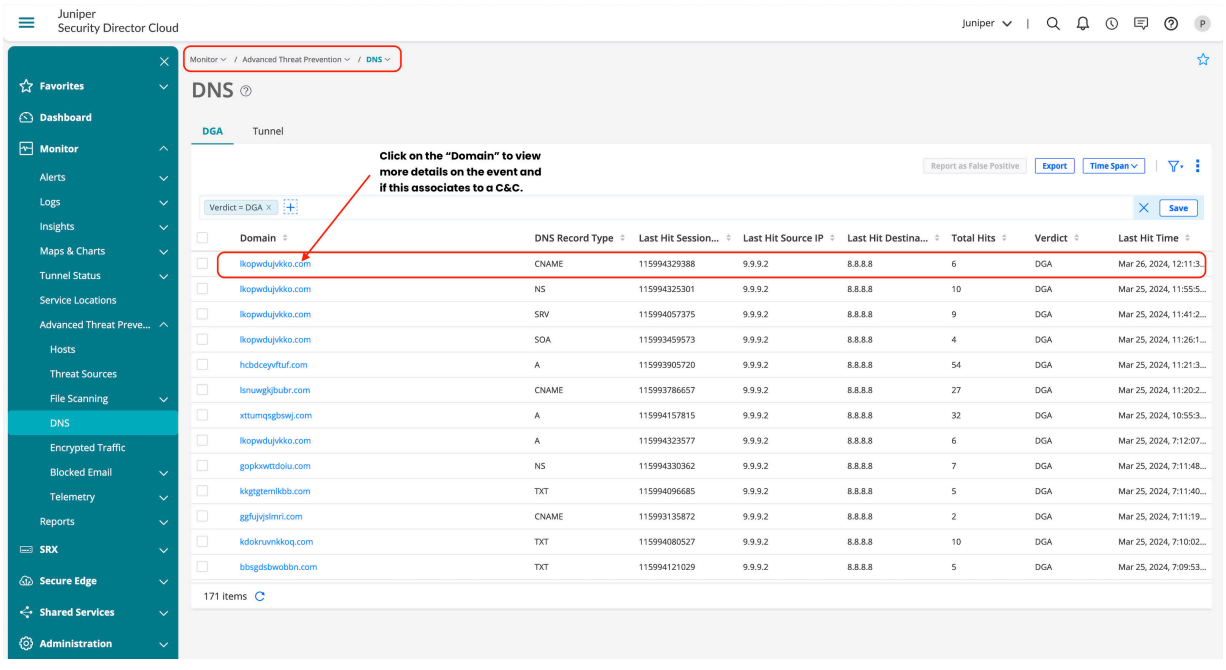


Figure 73: Juniper Security Director Cloud—ATP DNS DGA Offense Details

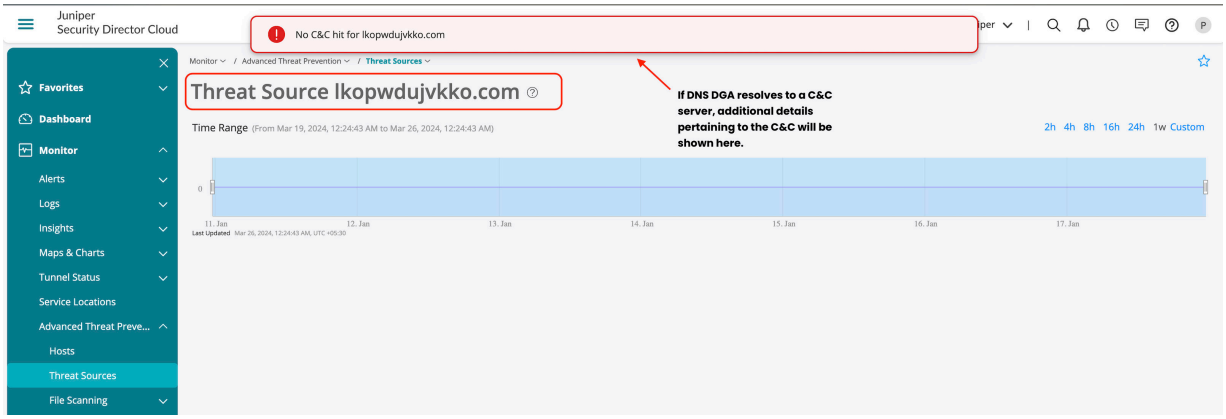


Figure 74: Security Director Clou—ATP DNS Tunnel Offense

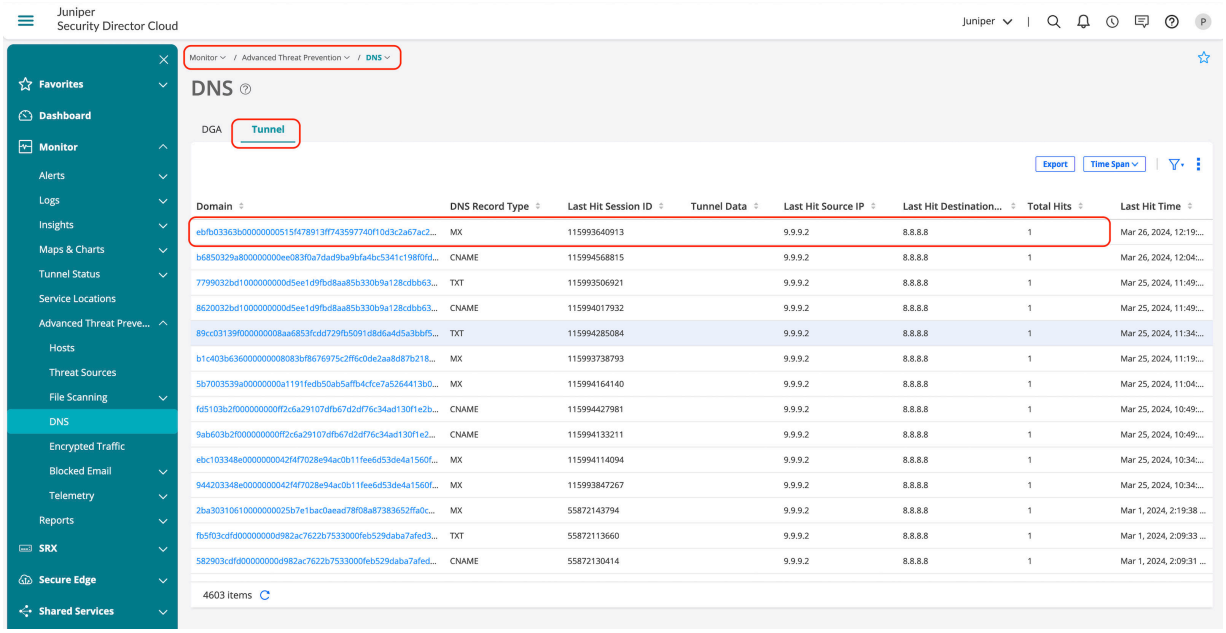


Figure 75: Juniper Security Director Cloud—ATP DNS Tunnel Offense Detail

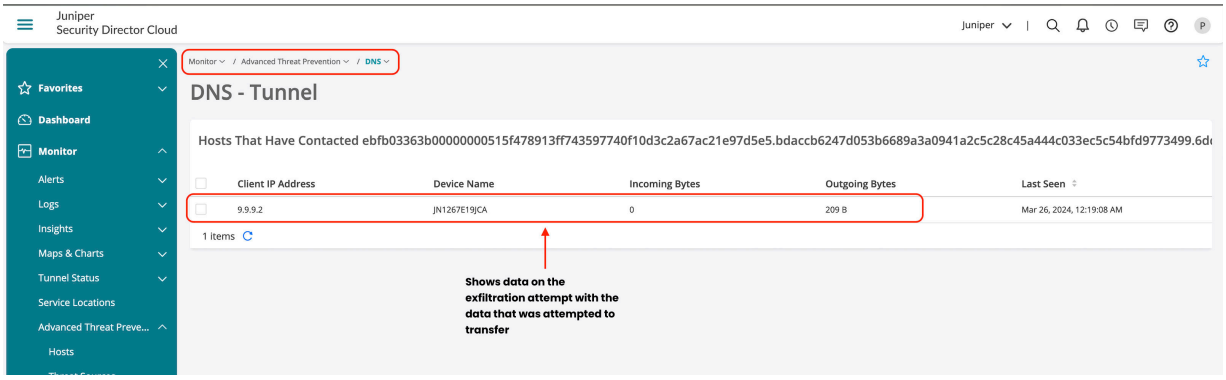


Figure 76: Juniper Security Director Cloud—SecIntel Identified DNS Offense

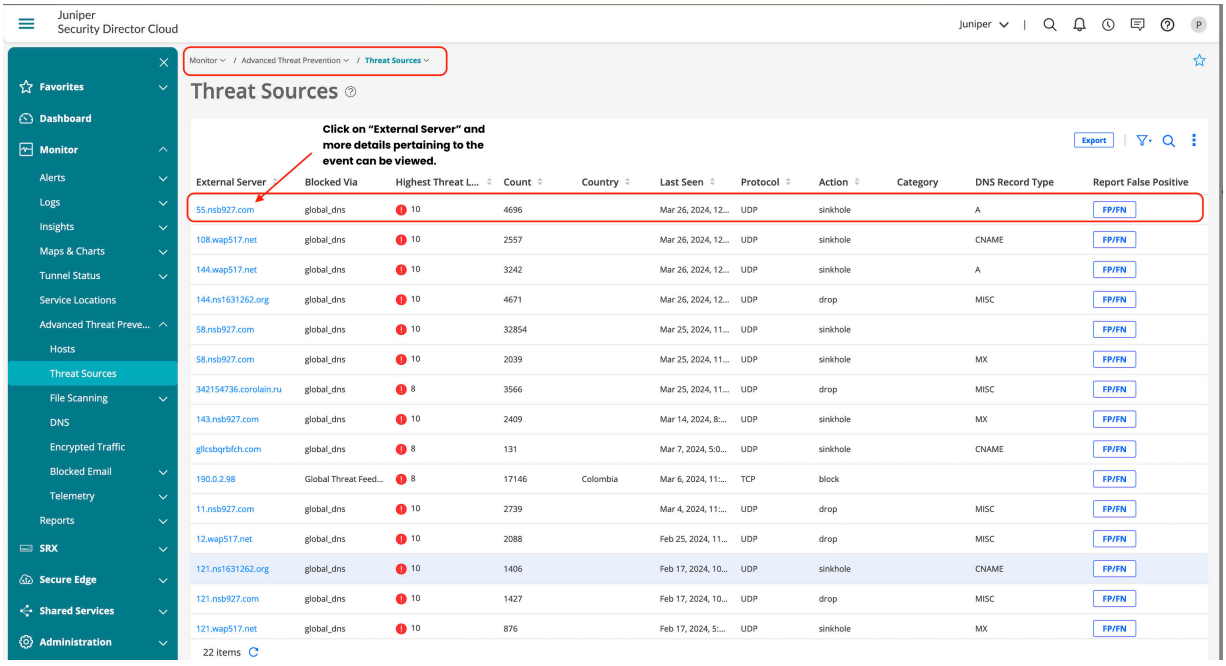
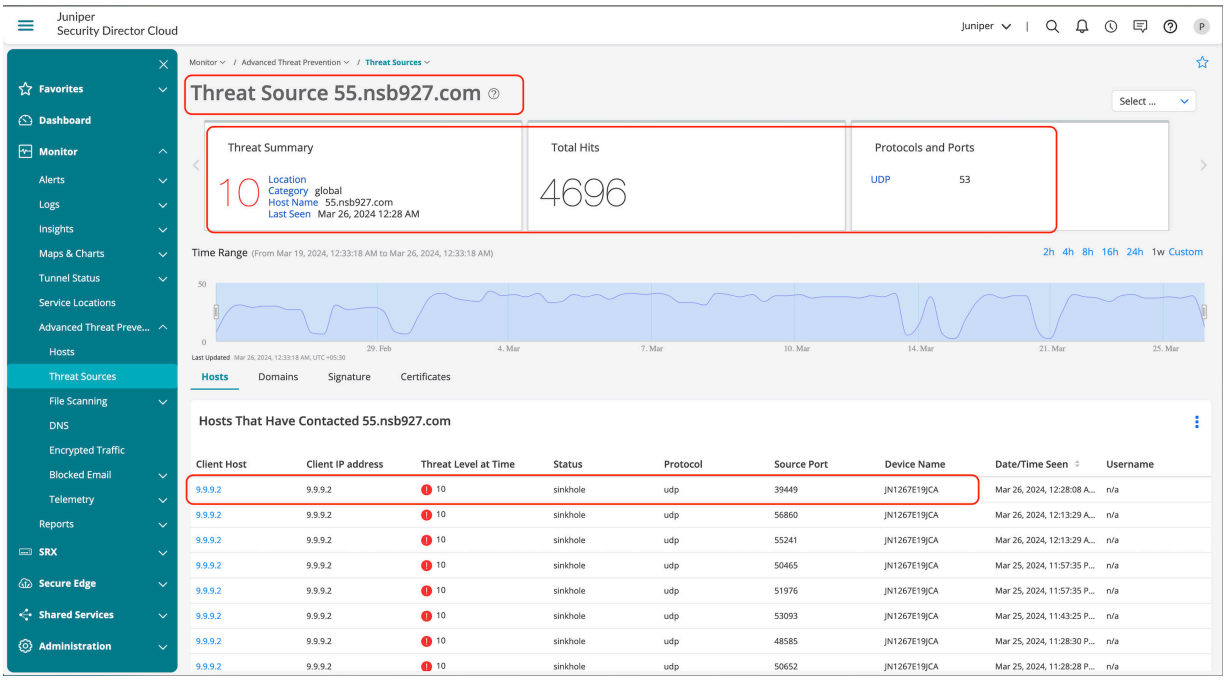


Figure 77: Juniper Security Director Cloud—SecIntel Identified DNS Offense Detail



Screens Feature Validation

IP Spoofing

Figure 78: Juniper Security Director Cloud—IP Spoofing Log

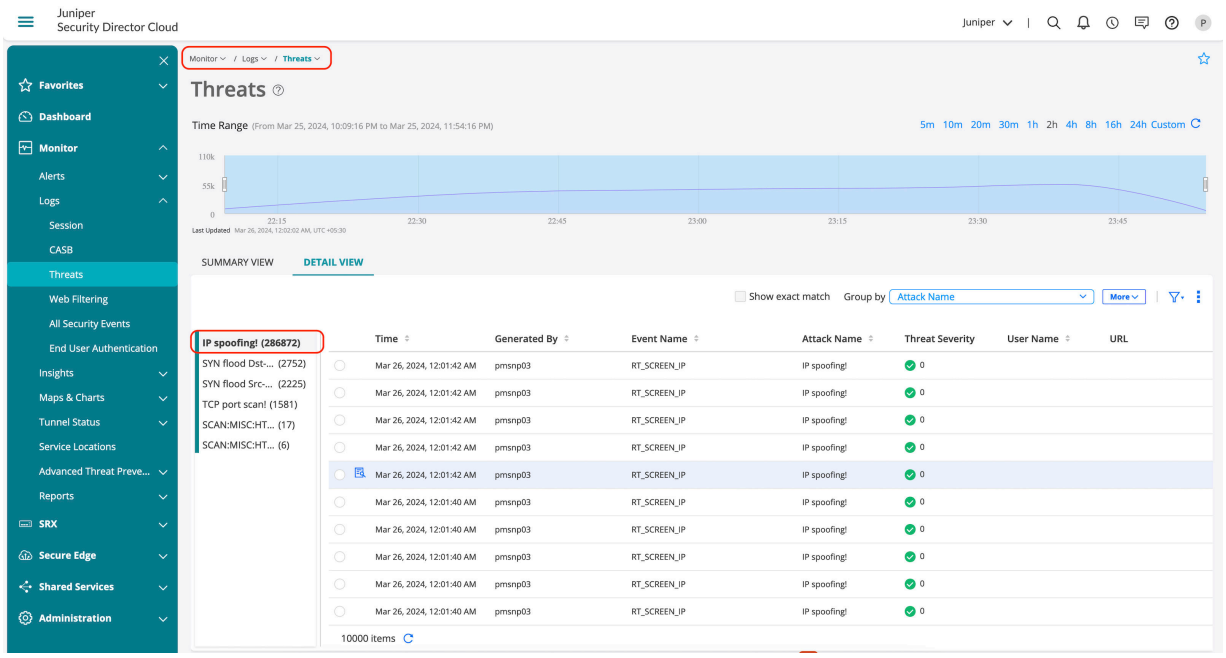
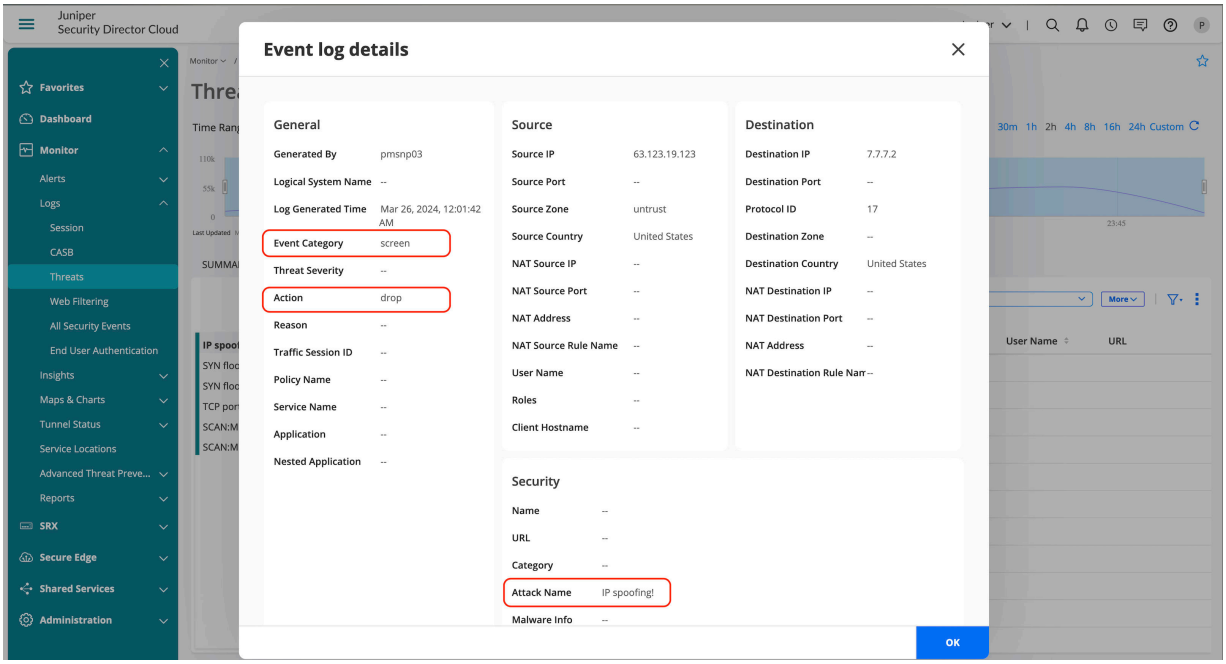


Figure 79: Juniper Security Director Cloud—IP Spoofing Log Detail



SYN Flood—(Apply Source and Destination Limits)

Figure 80: Juniiper Security Director Cloud—Syn Flood dst-ip Filter

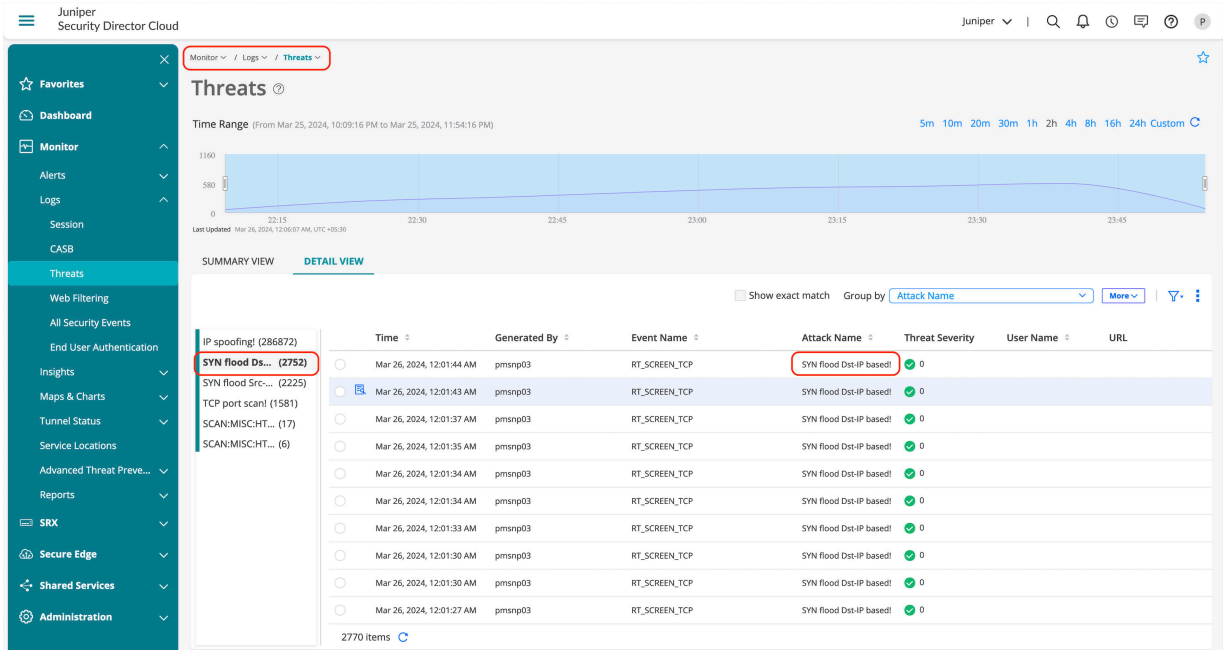


Figure 81: Juniper Security Director Cloud—Syn Flood dst-ip Filter Detail

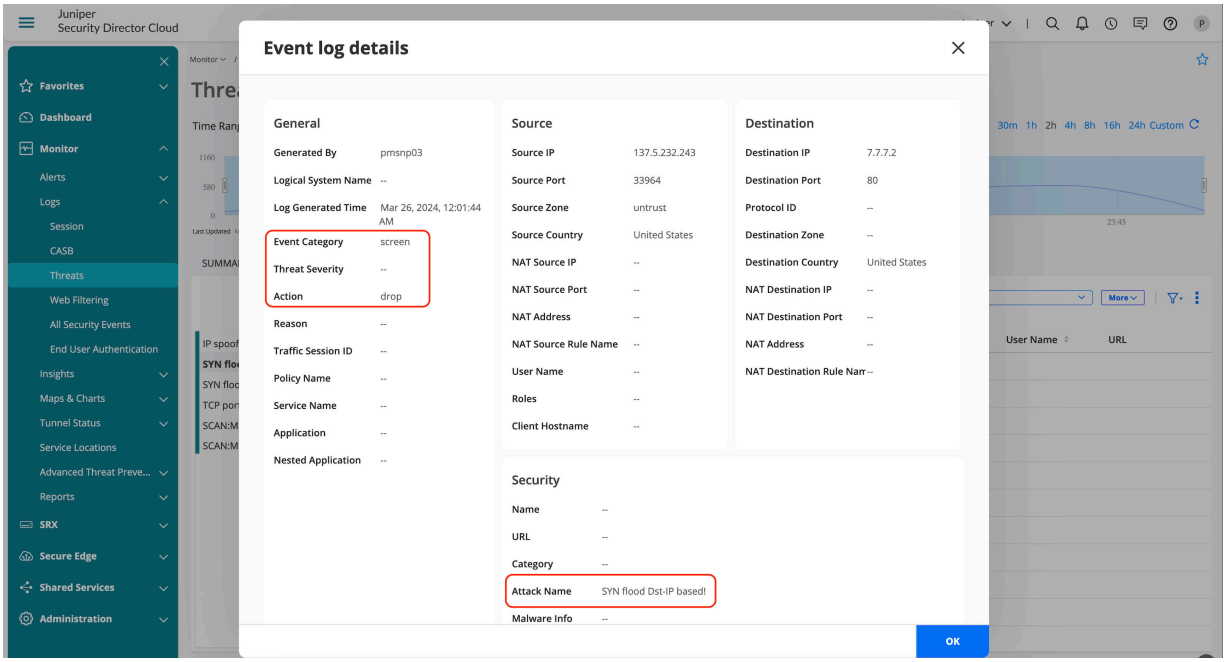
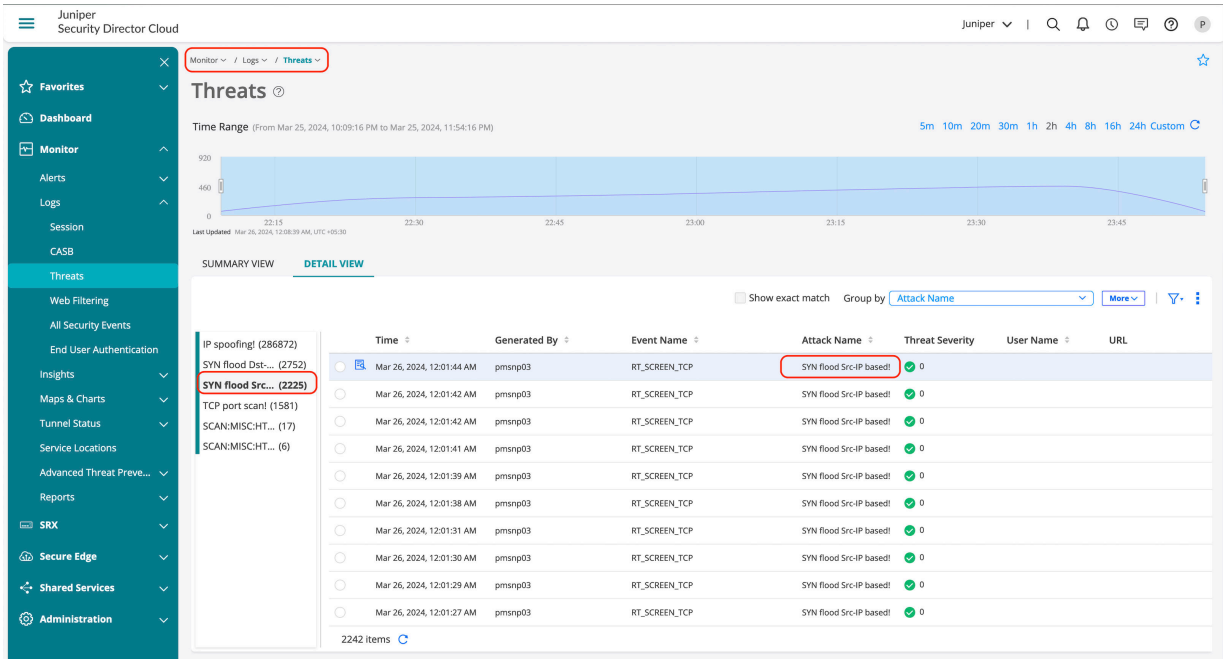
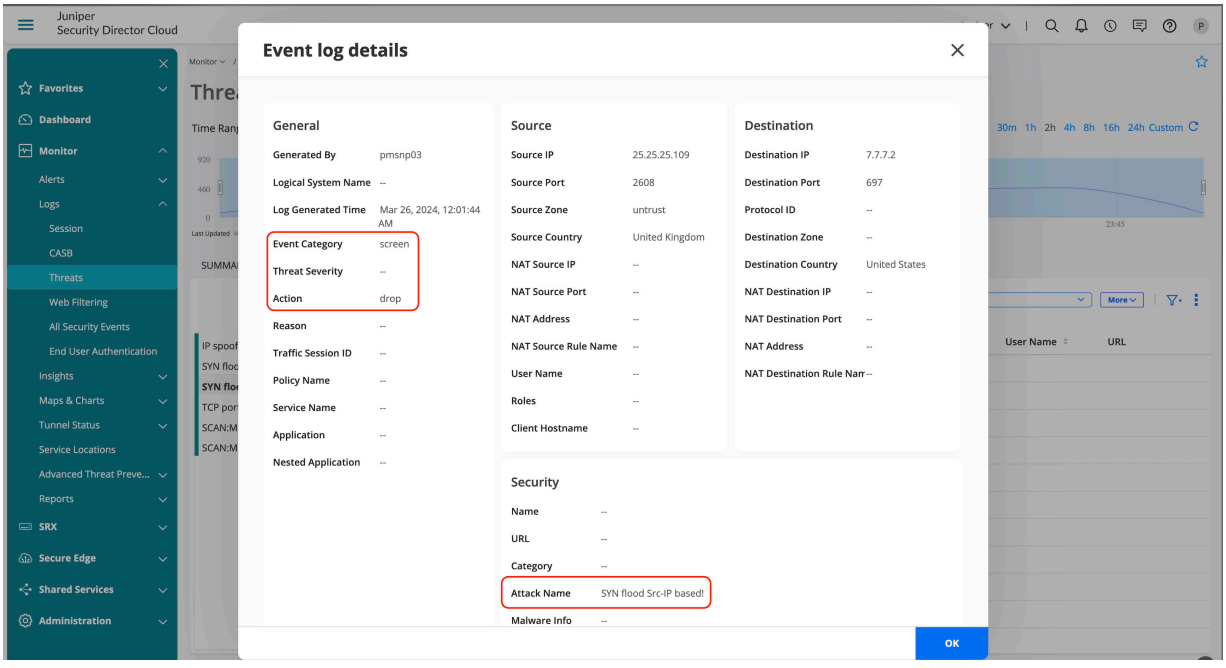


Figure 82: Juniper Security Director Cloud— Syn Flood src-ip Filter



.

Figure 83: Figure 83:Junioer Security Director Cloud – Syn Flood src-ip Filter Detail



Reverse SSL Proxy Validation

Reverse SSL proxy enables to decrypt specific traffic destined to a webserver for subjecting the traffic through advanced security services.

Once applied on a security policy, you'll notice several logs that might define the action that SSL proxy takes.

Table 6: Reverse SSL Proxy Logs

Log Information	Description
SSL_PROXY_SSL_SESSION_DROP	Log is generated when SSL proxy drop a session.
SSL_PROXY_SSL_SESSION_ALLOW	Log is generated when SSL session is processed by SSL proxy even after encountering minor errors.
SSL_PROXY_SESSION_IGNORE	Log is generated after detection of non-SSL sessions which are initially mistaken as SSL sessions.
SSL_PROXY_SESSION_WHITELIST	Log is generated when a SSL proxy session is whitelisted.
SSL_PROXY_ERROR	Log is generated for reporting errors during SSL proxy.
SSL_PROXY_WARNING	Log is generated for reporting warnings during SSL proxy.
SSL_PROXY_INFO	Log is generated for reporting general information during SSL proxy.

Figure 84: Juniper Security Director Cloud—SSL Proxy Log

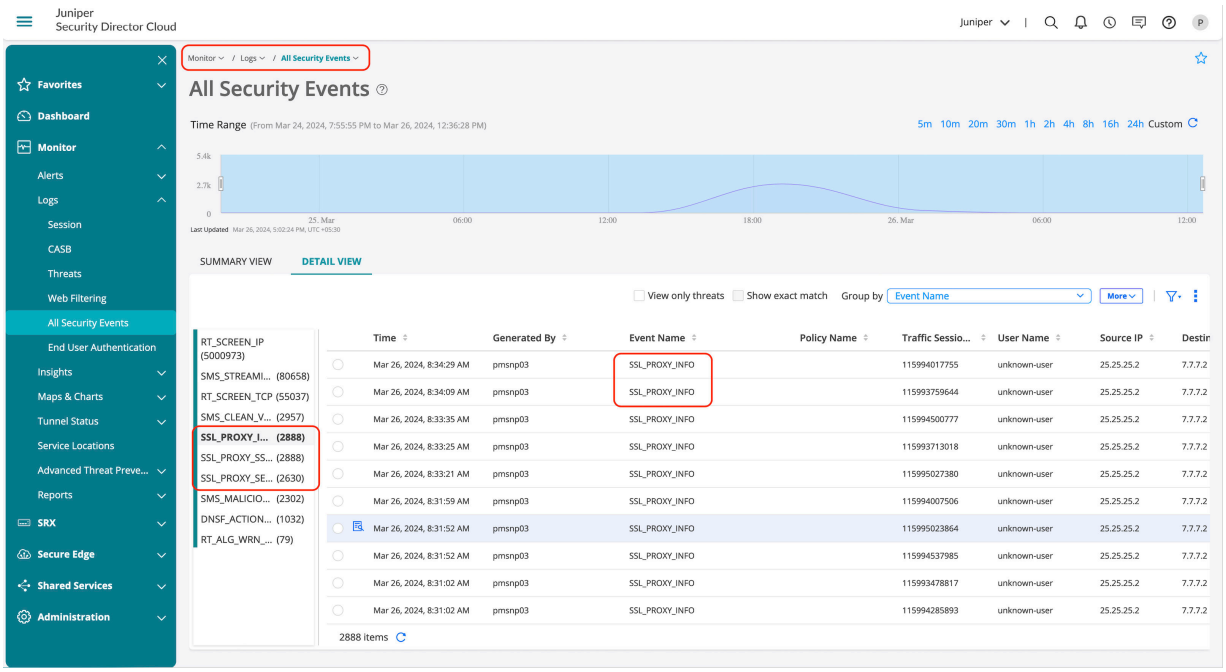


Figure 85: Juniper Security Director Cloud—SSL Proxy Log Details