Mastering Intrusion Prevention Systems

Configuration, Components, and Best Practices

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BRKSEC-2861

About your speaker

Anita Quintero

- Customer Success Technical Leader
- Focused on Security Portfolio
- CCIE Security
- Cisco employee since 2015

Free Time:

- Skiing, Photography
- Creating artwork with epoxy resin

Common Challenges When Deploying IPS

- High volume of alerts and false positives
- Risk of blocking legitimate traffic
- Performance concerns
- Limited visibility into encrypted traffic
- Zero-day attacks

Scope of the Session

We will cover:

- Cisco Secure IPS components
- Cisco Secure IPS deployment best practices
- What's new in Cisco Secure IPS
- FMC managed deployment

We will NOT cover:

- IPS events analysis
- Troubleshooting
- Writing custom snort rules
- IPS in Snort2
- Cisco Secure Firewall initial deployment

You are in the right room if:

- New to Cisco **Secure** IPS; interested in deployment and functionality
- Have deployed Cisco IPS; want to learn what's new and best practices

Agenda

01 Cisco Secure IPS Deployment

02 SnortML

03 Day-2 Operations

04 Summary

Webex App

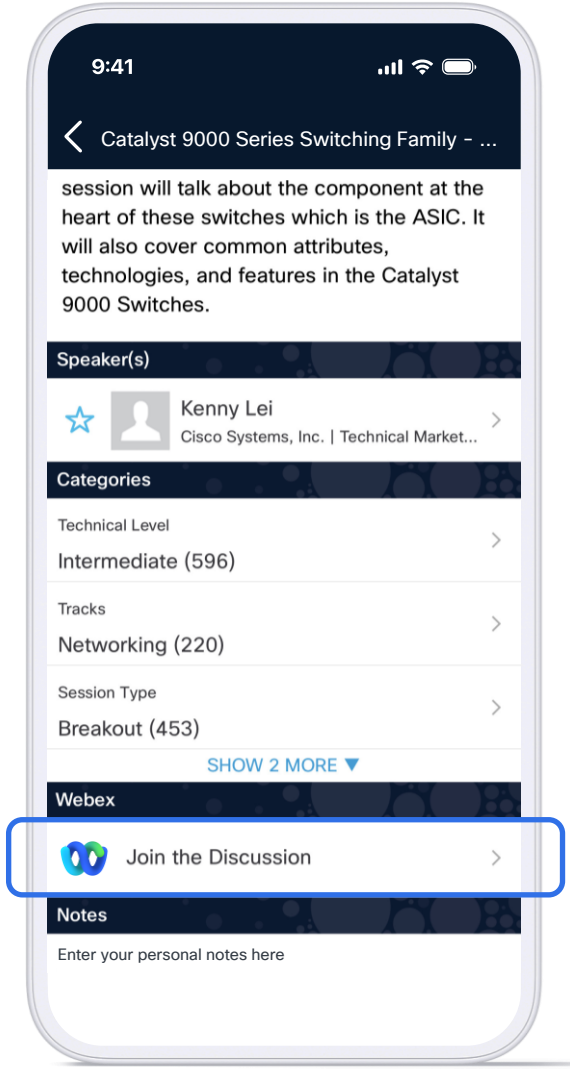
Questions?

Use Webex App to chat with the speaker after the session

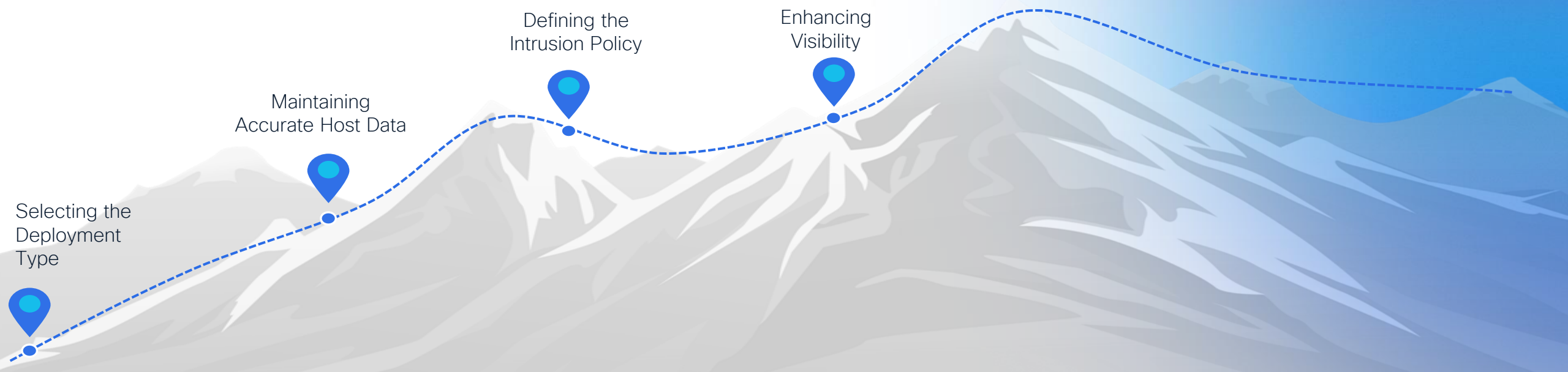
How

1. Find this session in the Cisco Events App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

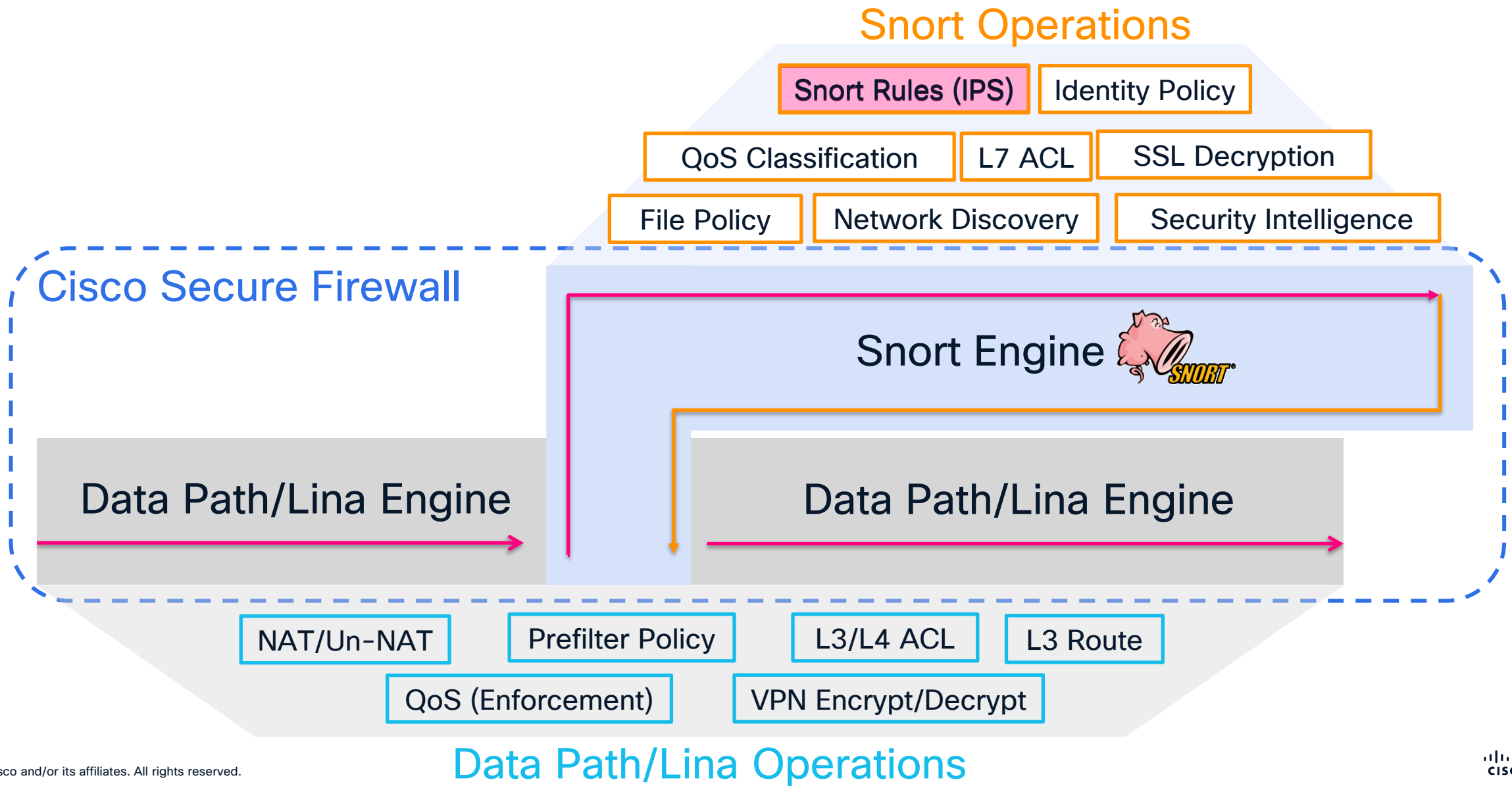
Webex spaces will be moderated by the speaker until February 27, 2026.



Cisco Secure IPS Deployment

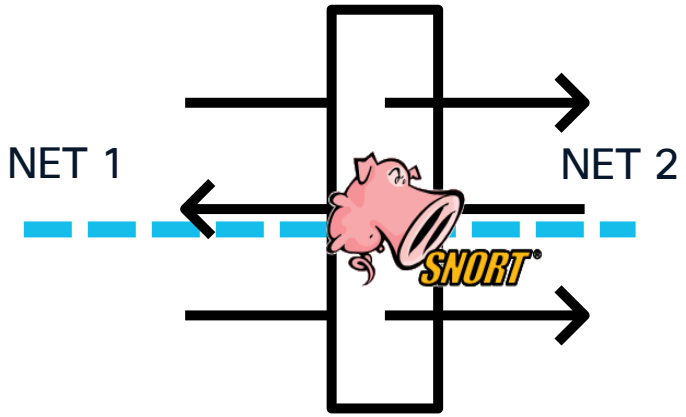


Cisco Secure Firewall Components and Operations



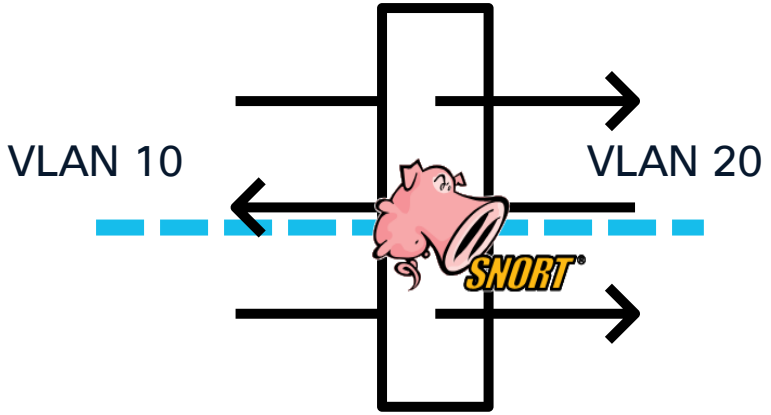
Cisco Secure Firewall Mode

Routed



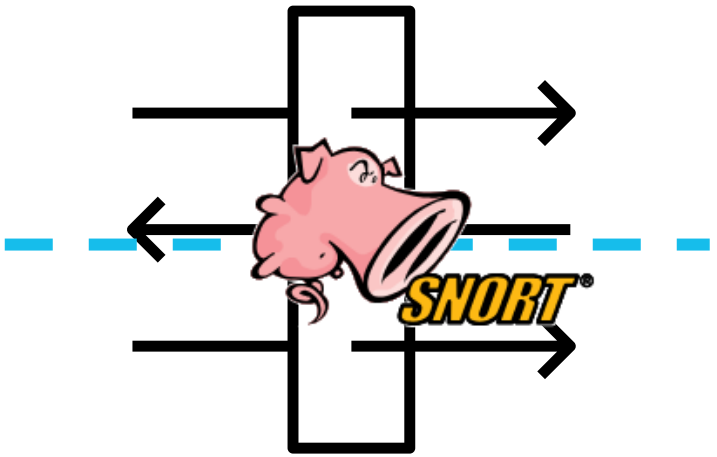
The firewall acts as a router hop, with each interface on a different subnet, routing traffic between bridge groups and routed interfaces.

Transparent



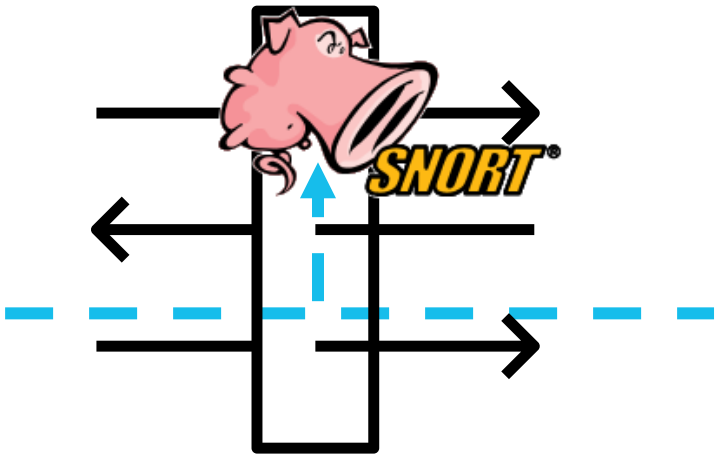
The firewall acts as a Layer 2 bridge, passing traffic between grouped interfaces without routing or appearing as a router hop.

IDS/IPS-only Mode



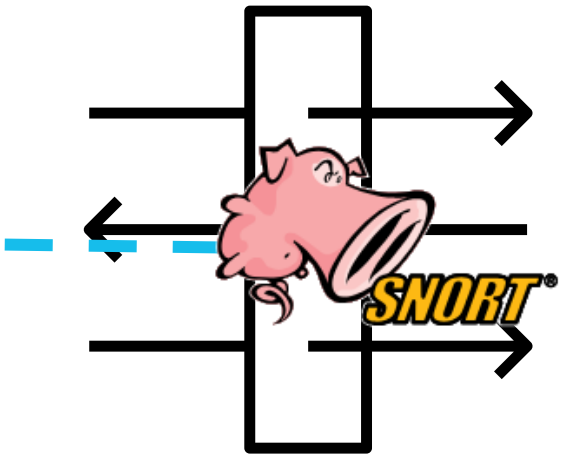
Inline

Pairs of interfaces that transparently forward all traffic through the device enabling inspection.



Inline Tap

Packets are copied for transmission, allowing analysis without impacting the network.



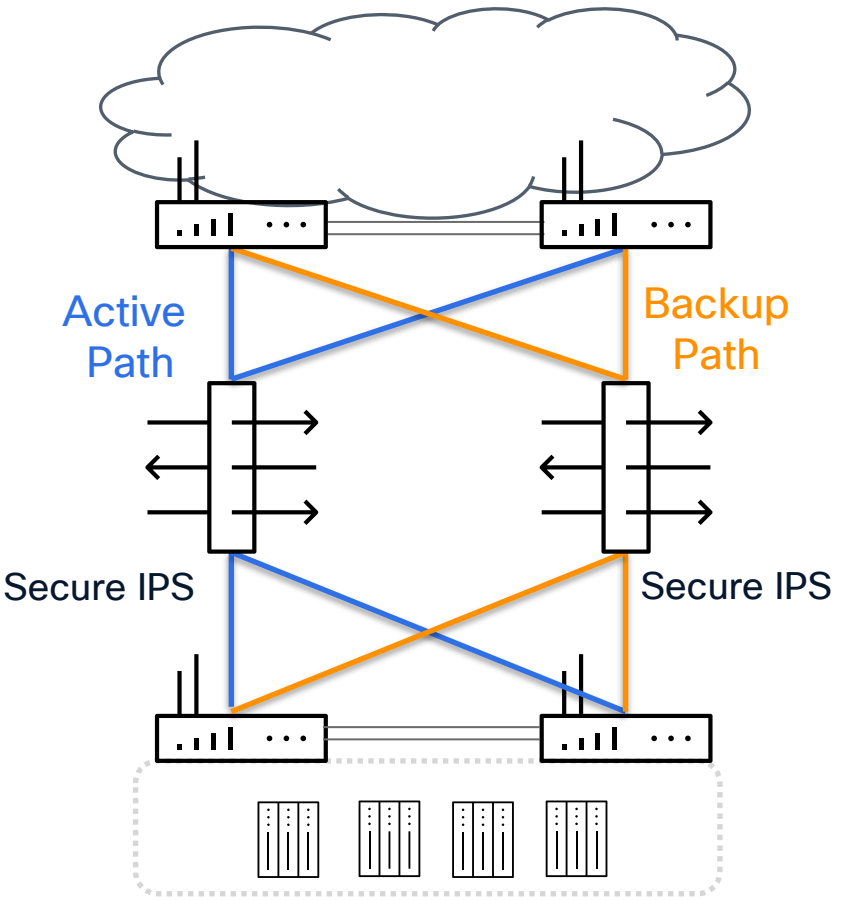
Passive

Monitoring traffic across a network using a switch SPAN port.

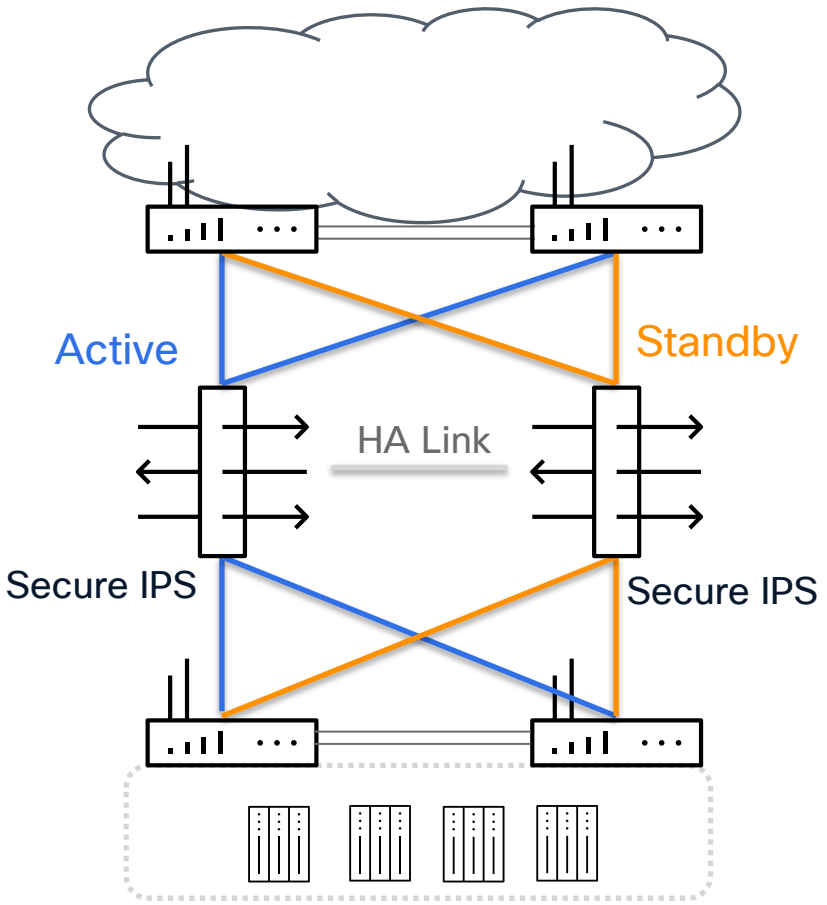
Interface Modes and Operations

	Routed	Bridge group	IPS-only
Route Lookup	✓		
MAC Lookup		✓	
NAT/PAT	✓	✓	
Dynamic Routing	✓		
VPN Features	✓		
Deep packet inspection	✓	✓	✓
Clustering	✓	✓	✓
High-Availability	✓	✓	✓

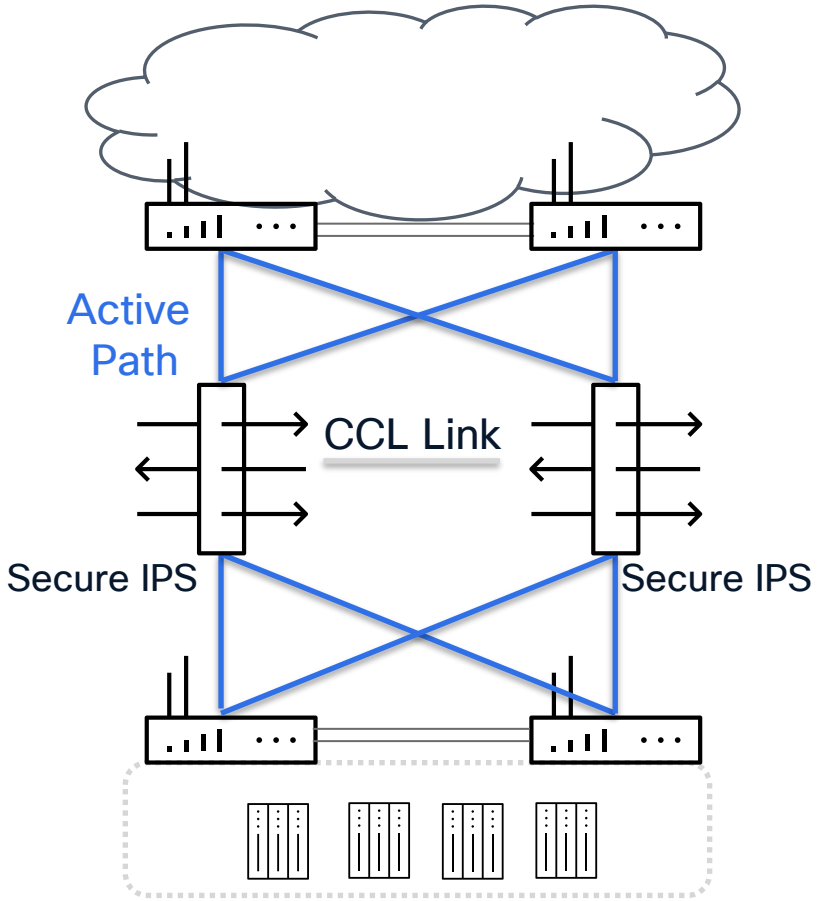
IPS Insertion Options



Standalone (FTW) – no HA



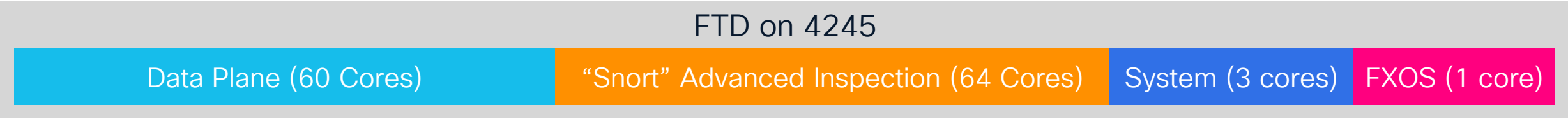
High-Availability



Clustering

Performance Profiling for CPU Allocation

- FTD had a default CPU core allocation between Data Plane and Snort



- Tailor FTD to a specific use case with a configurable allocation
- Supported since FTD 7.3 (FTDv, 4100, 9300) and FTD 7.4.1 (3100, 4200)

Name	Core allocation
Default	CPU cores allocated based on platform
VPN heavy with prefilter	90% cores for data plane, 10% for Snort
VPN heavy	60% cores for data plane, 40% for Snort
IPS heavy	**30% cores for data plane, 70% for Snort**

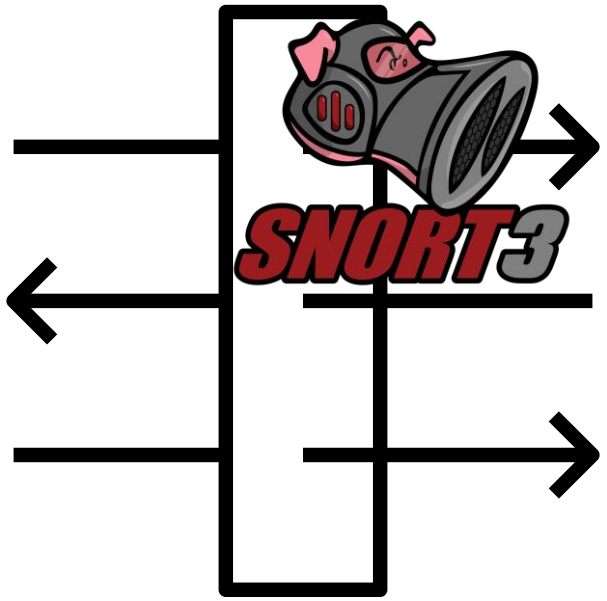
License Requirements

License	Duration	Subscription Options	Granted Capabilities
Essentials	Perpetual or Subscription Note Essentials subscription licenses are supported only on FTDv.		• User and application control • Switching and routing • NAT
IPS	Subscription	• stand-alone subscription (T) • combination with URL Filtering (TC) • Malware defense (TM) • both (TMC)	• Intrusion detection and prevention • File control • Security Intelligence filtering

Demo Details

Pre-configuration

- FTD and FMC initial configuration
- FTD registered in the FMC
- License enabled
- FTD basic configuration
  - Interfaces
  - NAT
  - Routing
  - ACP



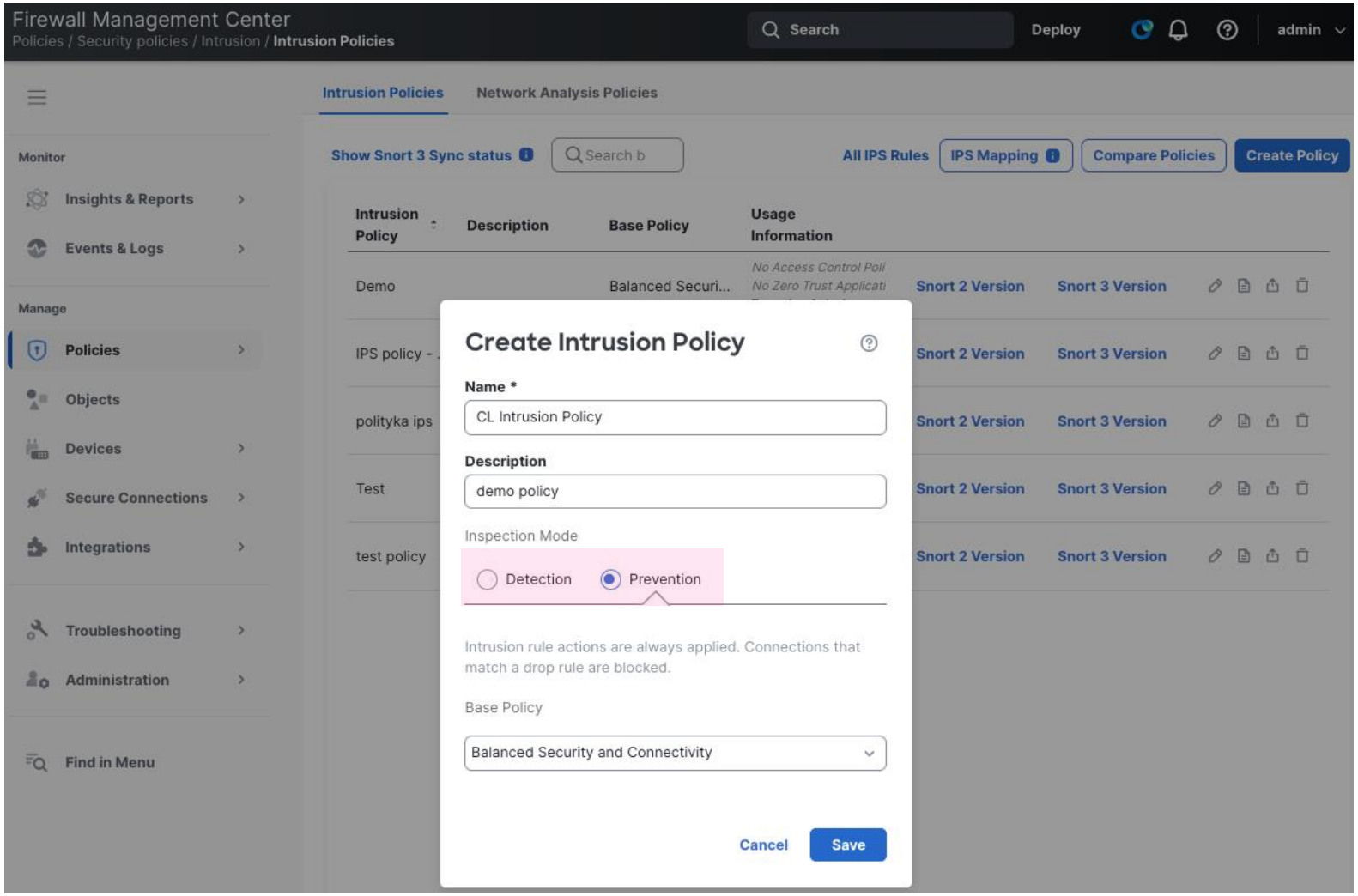
FMCv – version 10.0

FTDv – version 10.0

Demo

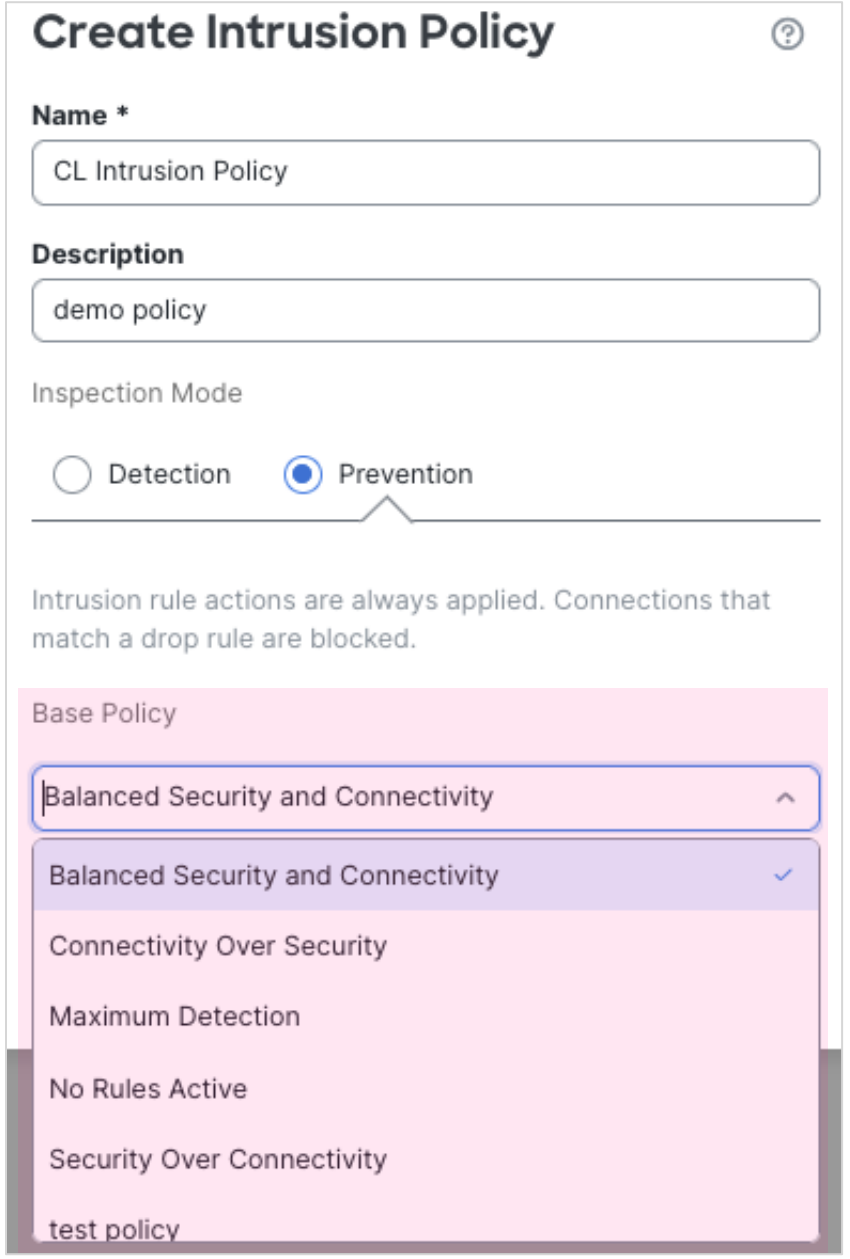
Intrusion Policy Creation – Inspection Mode

- **Detection:**
  - Performs detection and generates alerts only.
  - No traffic is blocked in this mode.
  - Recommended for initial deployment and baseline testing.
- **Prevention:**
  - Actively takes action on traffic (e.g., dropping or blocking).
  - Deploy only after testing and verifying the intrusion policy in Detection mode.



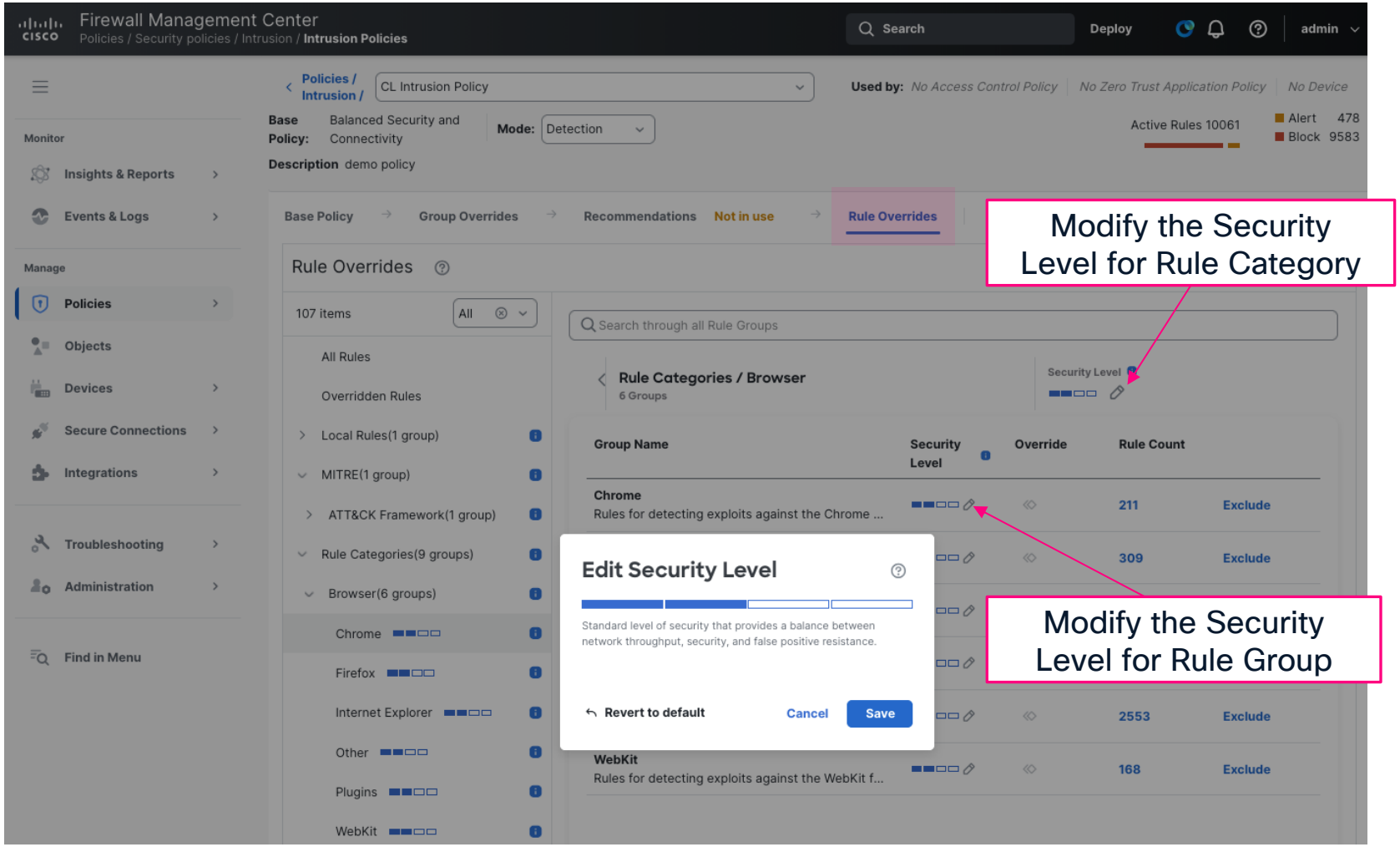
Intrusion Policy Creation – Base Policy

Policy	Description
Connectivity Over Security	Minimal active rules (~600) prioritizing connectivity over security.
Balanced Security and Connectivity	The most popular policy balancing security and connectivity with ~10,000 active rules.
Security Over Connectivity	Provides the strongest security with ~23,000 active rules. Note: This may require tuning, increase firewall load, and reduce overall throughput.
Maximum Detection	Policy includes over 42,000 active rules; we recommend that you review and test this setting before deploying it into a production environment.



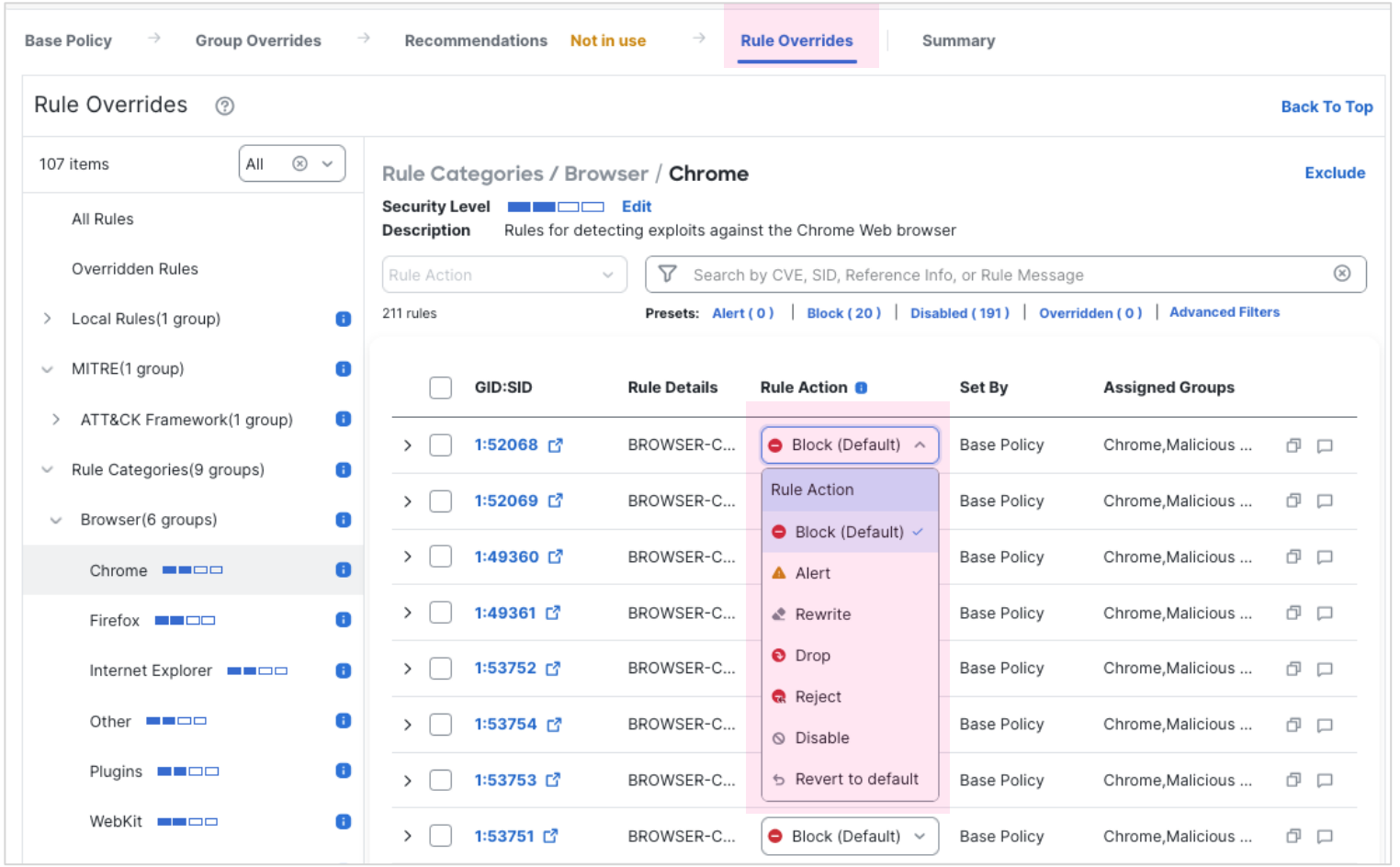
Group Overrides and Security Level

- Security levels correspond with the base policies.
  - **Level 1** – Connectivity Over Security
  - **Level 2** – Balanced Security and Connectivity
  - **Level 3** – Security Over Connectivity
  - **Level 4** – Maximum Detection
- Security level for a rule group can be customized based on security needs.



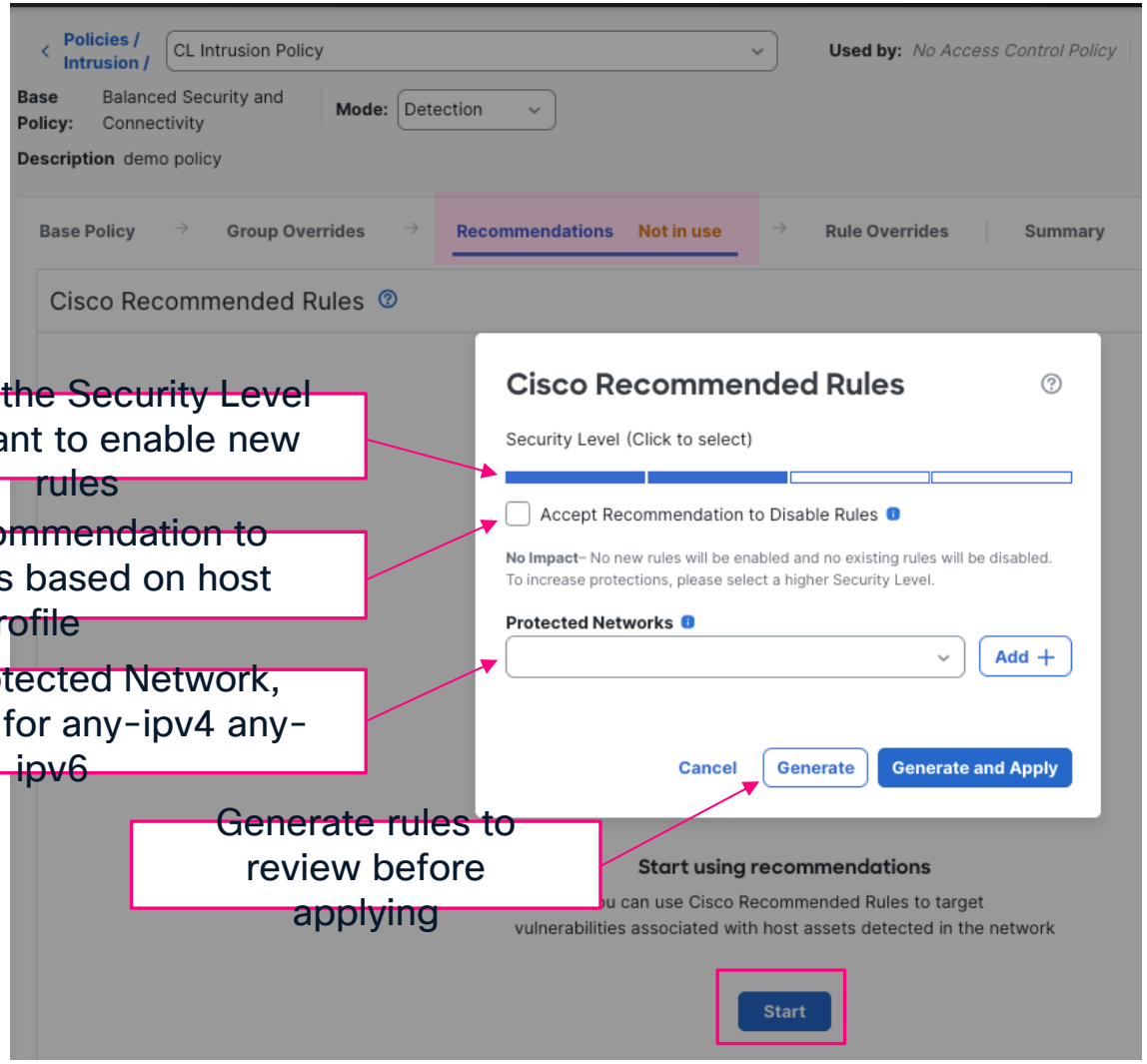
Rule Actions

Rule Action	Description
alert	generate an alert on the current packet
block	block the current packet and all the subsequent packets in this flow
drop	drop the current packet
reject	send response to client and terminate session.
rewrite	enables overwrite packet contents based on a "replace" option in the rules
disable	disable the rule
revert to default	revert to default action



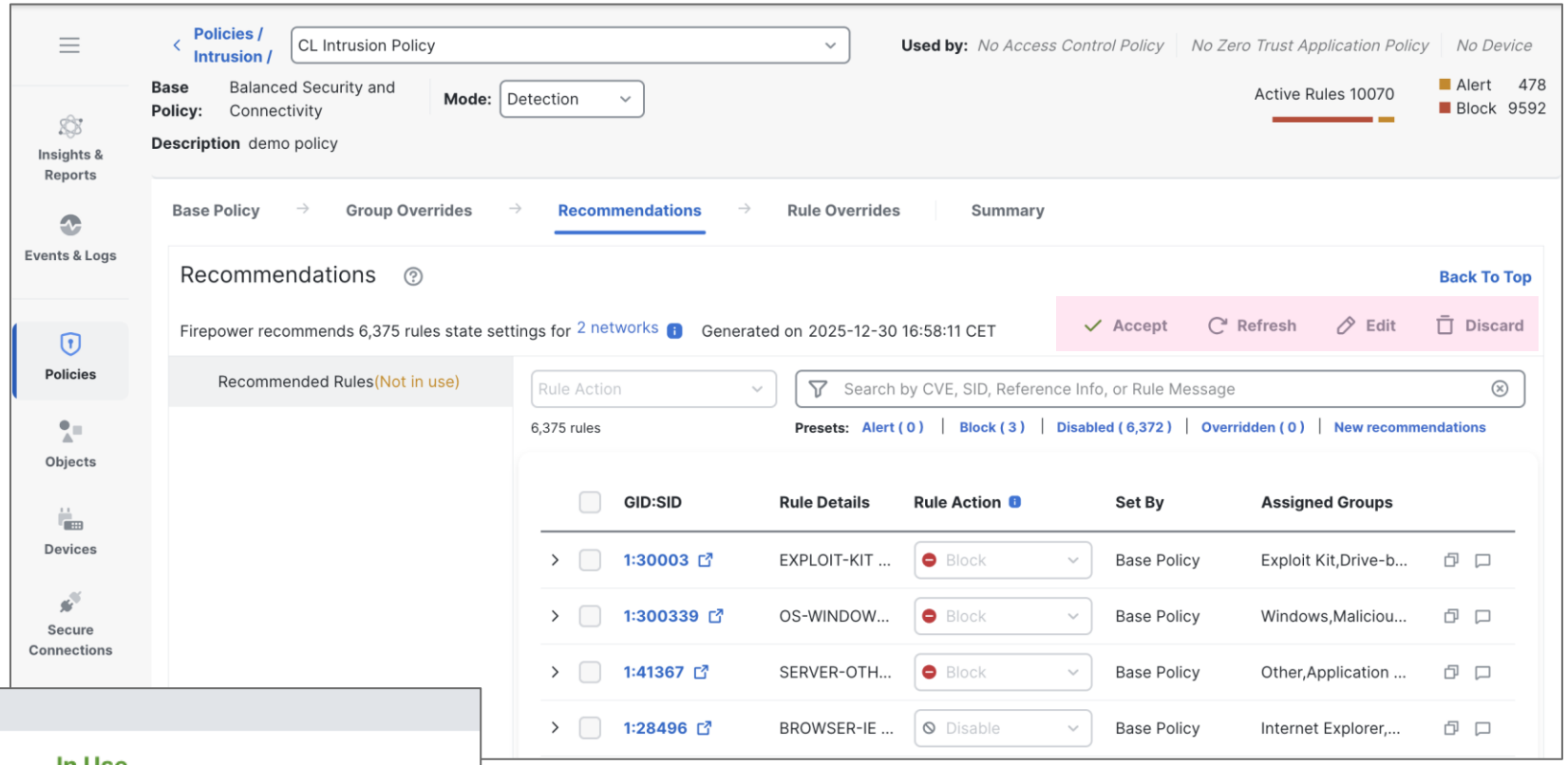
Recommended Rules

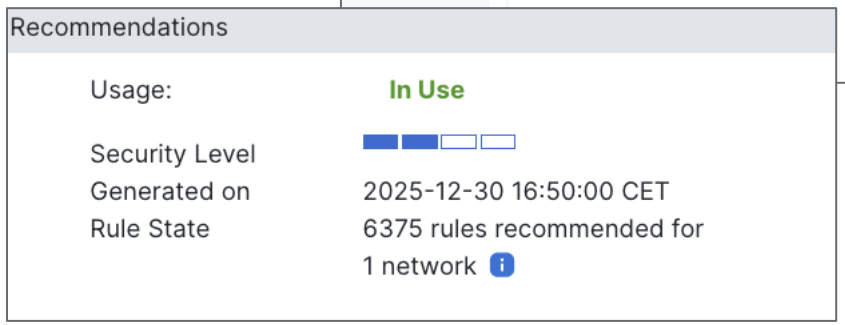
- Recommended Rules automatically tune your Snort rules for the applications, servers, and hosts in your network.
- They enable additional rules or optimize the current rule set by disabling rules for vulnerabilities that are not present in the network.
- Rule tuning is performed based on **host data** collected through passive and/or active discovery.



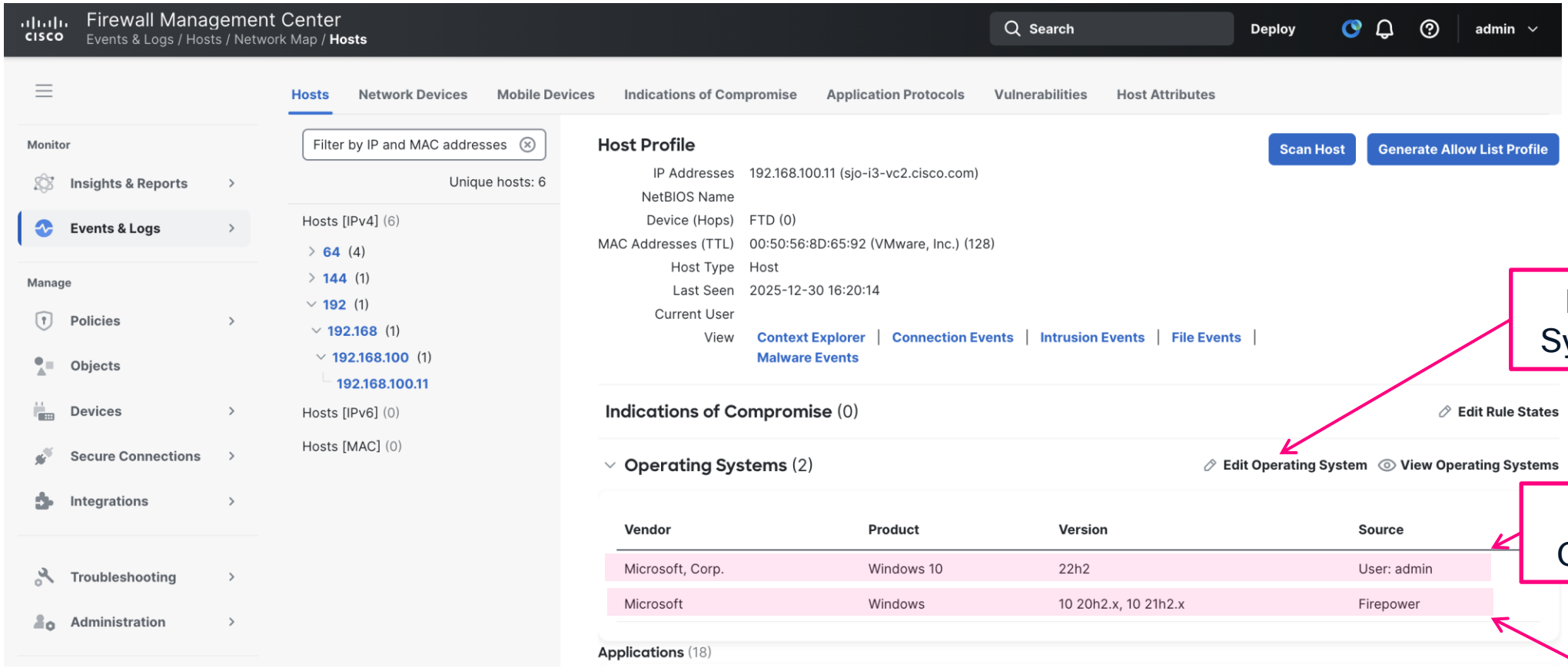
Recommended Rules

- After generating Recommended Rules:
  - Accept – to use Recommended Rules
  - Refresh – to re-generate Recommended Rules
  - Edit – to edit Networks and Security Level for which the Recommended Rules are generated
  - Discard – to discard Recommended Rules usage





Host Data for Recommended Rules



Edit Operating System if needed

Manually edited Operating System

Automatically detected Operating System

- Discovered Hosts can be reviewed from the FMC **Events & Logs > Hosts > Network Map.**
- Based on these information Recommended Rules are generated.
- Information can be manually modified.

Asset Discovery and Enrichment

Passive Detection

A non-intrusive monitoring method where the firewall observes traffic to identify assets and ports without using probes or interfering with data flow.

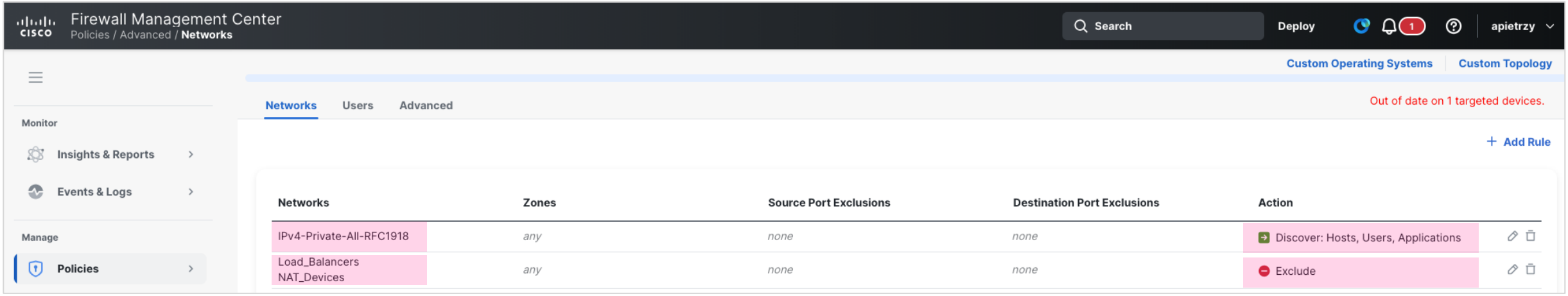
Active Detection

The firewall sends probes directly to devices to elicit responses, enabling the identification of operating systems, services, and vulnerabilities not visible via passive monitoring.

Network Discovery Policy – Passive Detection

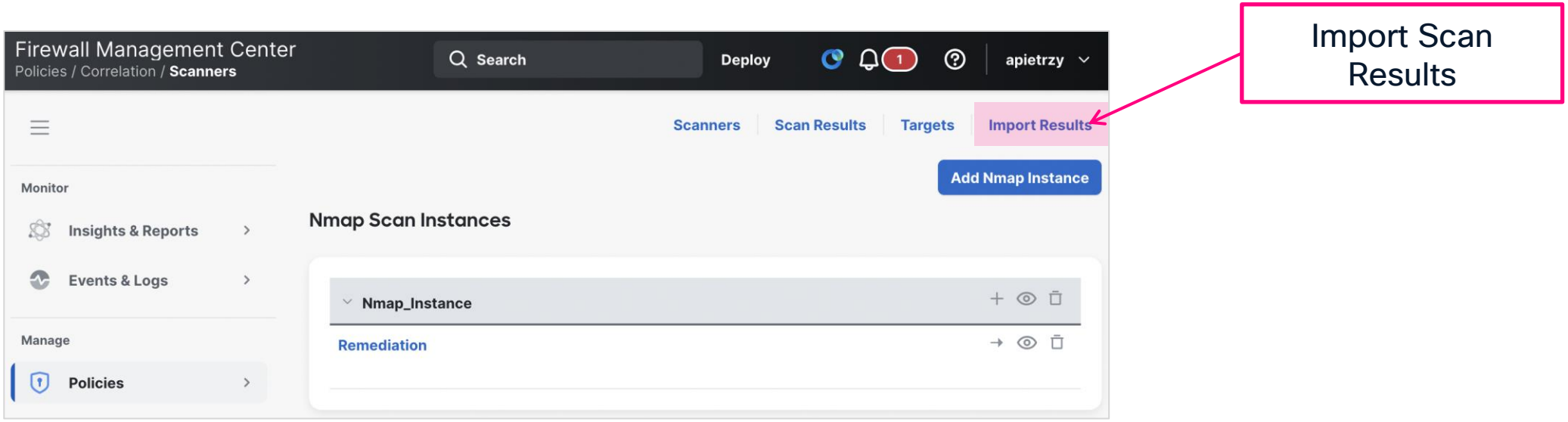
Best Practices:

- Remove the default discovery rule, which includes the 0.0.0.0/0 and ::/0 subnets.
- Precisely define your company's internal network.
- The IPv4-Private-All-RFC1918 network object may be suitable initially if the networks in use are unknown or for identifying rogue networks.
- Exclude load balancers and NAT devices from discovery.



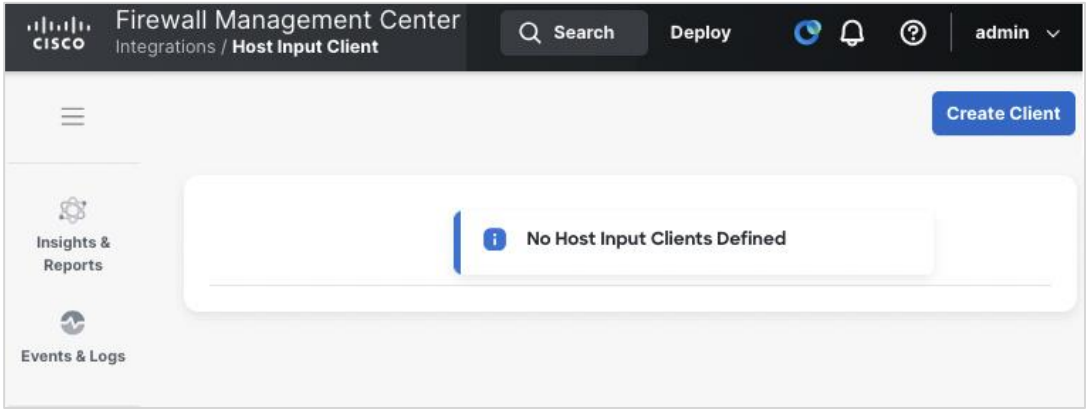
Nmap Scanning – Active Detection

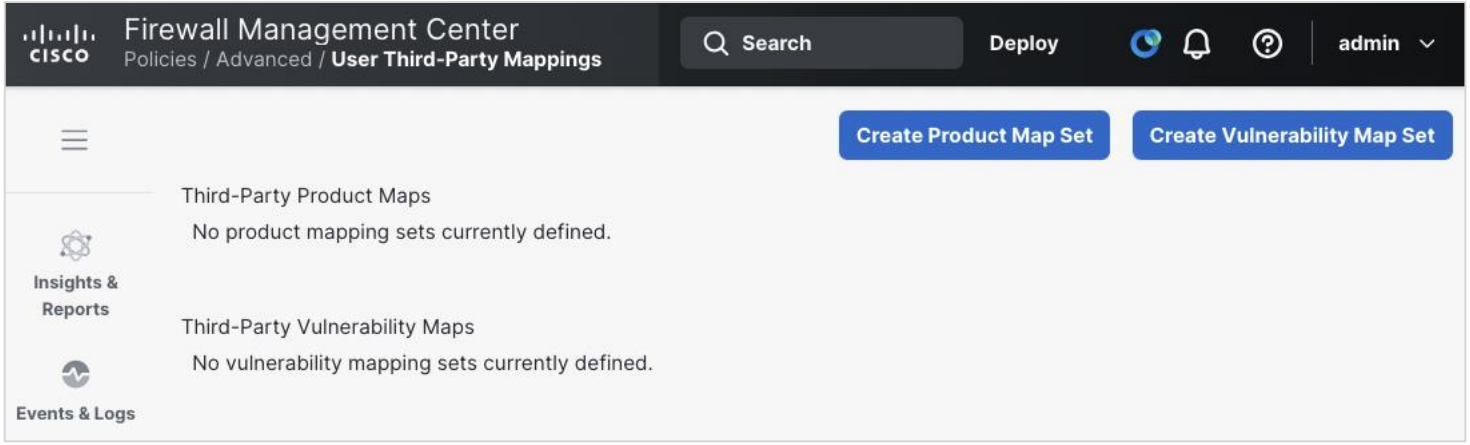
- You can use the embedded Nmap scanner within the FMC or FTD for network exploration.
- A strategic scanning plan is essential to ensure only necessary hosts and ports are targeted.
- Best Practice: Import Nmap scan results from a dedicated external scanner.



Enriching Network Map with Third-Party Data

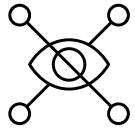
- The **Host Input** feature allows you to import discovery data from third-party systems on your network.
- There are two methods for using the Host Input API to submit network map information: running the **nmimport tool** on the Management Center or using a **remote client**.
- To enable Cisco Recommended Rules, you must map the third-party vendor, product, and version to the corresponding Cisco product definitions.





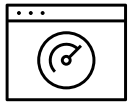
The Importance of Precise Host Data

Accurate Asset Identification

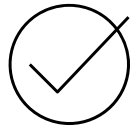


Effective Vulnerability Mapping

Optimized Recommended Rules

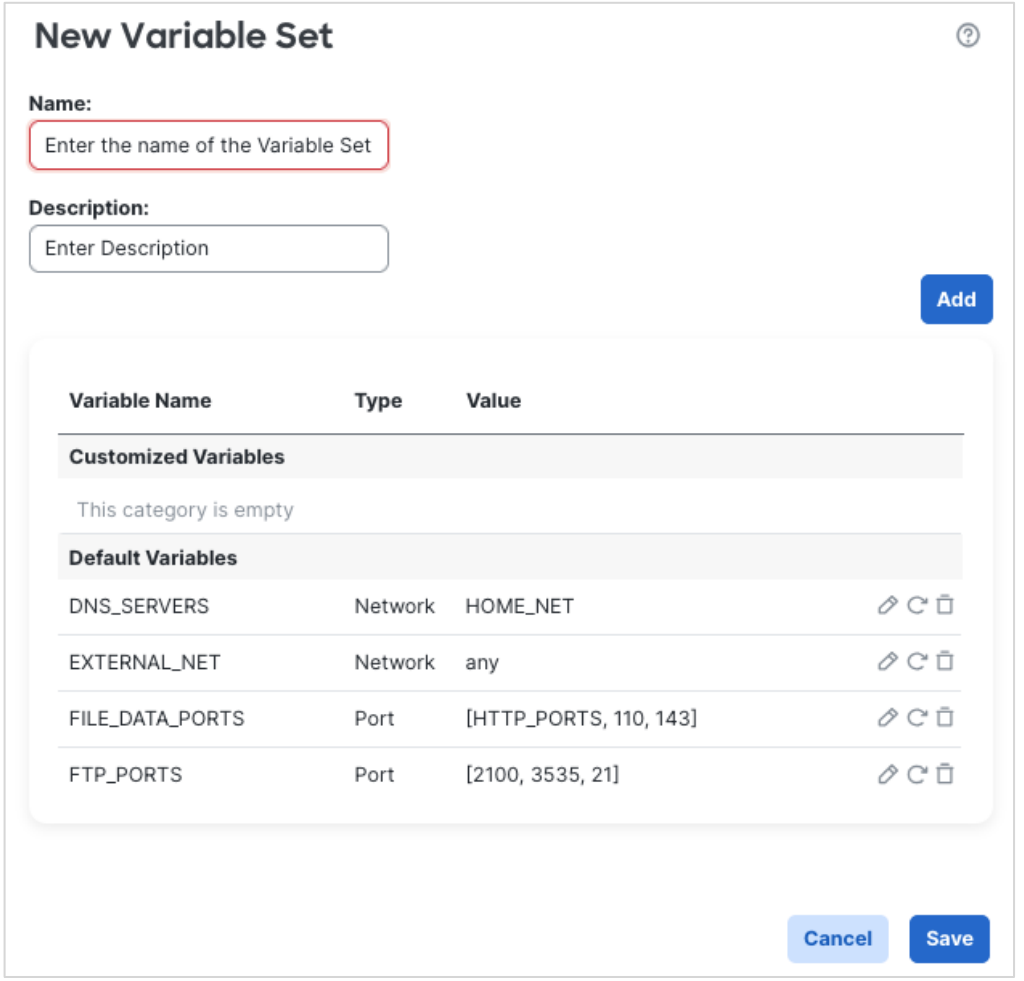


Better Protection and Less False Positive Events



Variable Sets

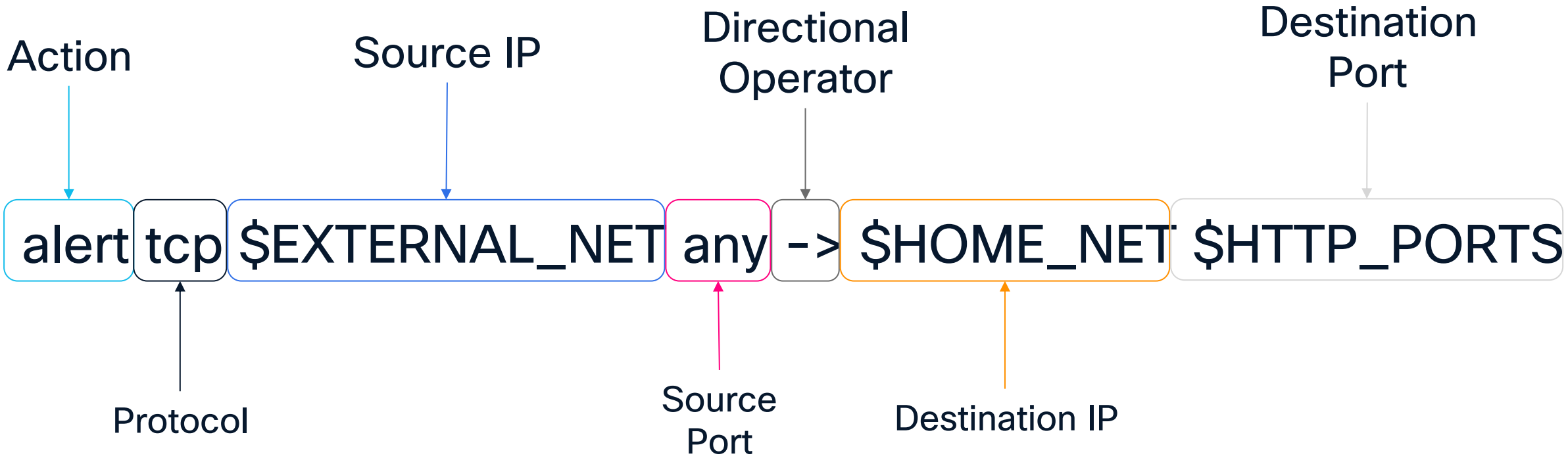
- Variables are used in Snort rule headers to define specific traffic inspection criteria.
- The **$HOME_NET** and **$EXTERNAL_NET** variables are utilized in the majority of Cisco Talos rules.
  - **$HOME_NET** represents the protected network and the primary target of threat actors.
  - **$EXTERNAL_NET** represents the source or destination of threat-related traffic.
- Best Practice: Create custom Variable Sets rather than modifying the Default-Set.



Rule Example

```
alert tcp $EXTERNAL_NET any -> $HOME_NET 143 ( msg:"PROTOCOL-IMAP login brute force attempt";
flow:to_server,established,no_stream; content:"LOGIN",fast_pattern,nocase; detection_filter:track by_dst,count 30,seconds 30;
metadata:ruleset community; service:imap; reference:url,attack.mitre.org/techniques/T1110; classtype:suspicious-login; sid:2273;
rev:12; )
```

Why Variable Sets Matters?

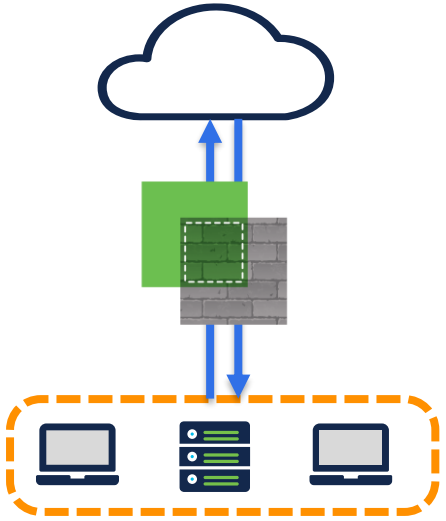


Variable Sets Recommendations

Internet Perimeter Deployment (North/South)

If your team requires a simple IPS deployment with a minimal number of alerts:

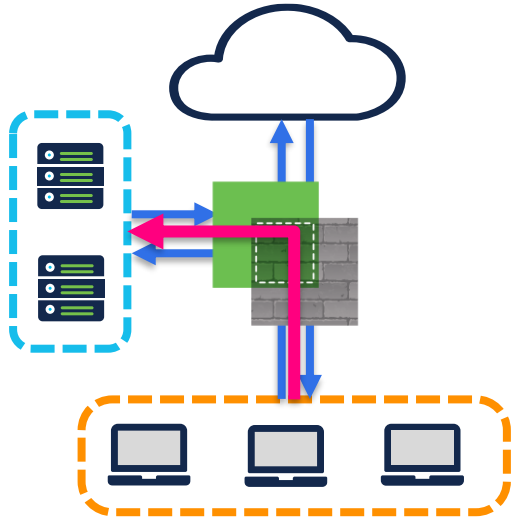
- **$HOME_NET** specify the protected network
- **$EXTERNAL_NET** configure as !HOME_NET



Internal IPS (East/West)

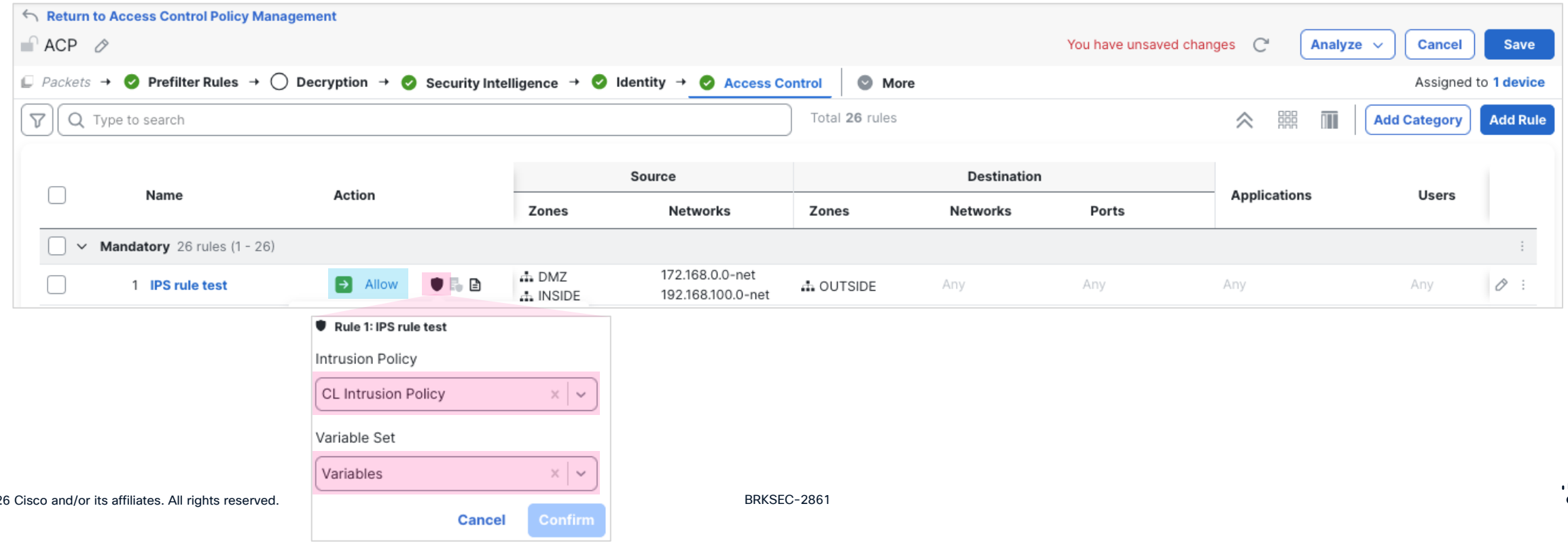
If your team is focused on threat hunting and is prepared to invest time in policy tuning

- **$HOME_NET** specify the protected network
- **$EXTERNAL_NET** configure as “any”.



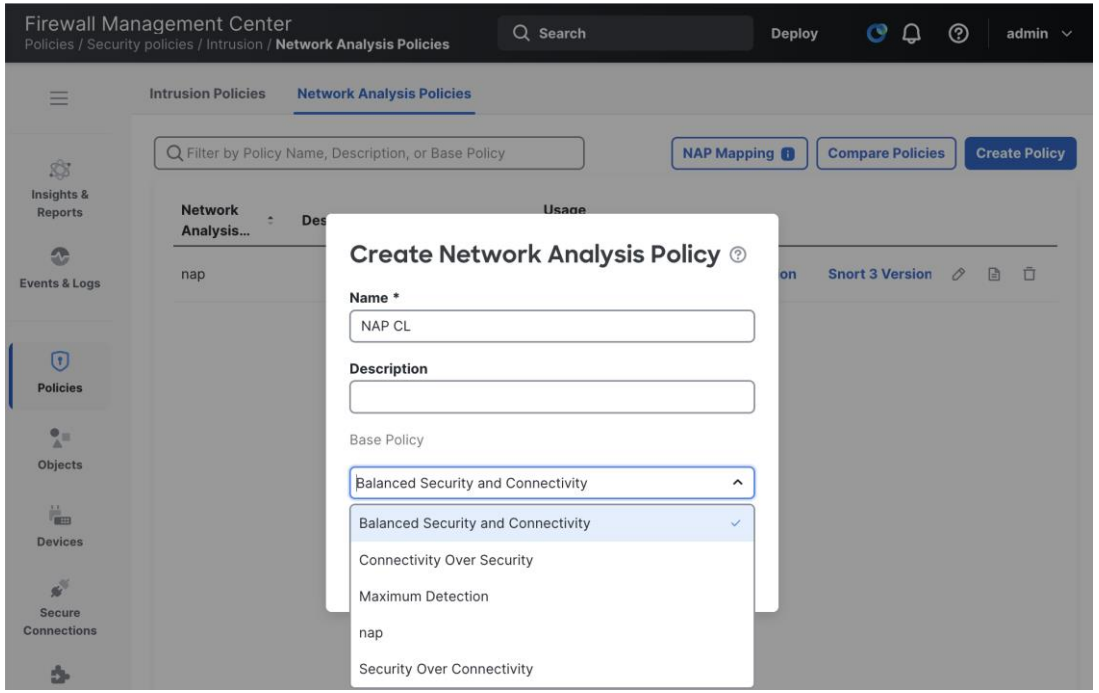
Selecting Network Traffic for Inspection

- To inspect traffic using an intrusion policy, you must attach it to an **Access Control** rule.
- An intrusion policy applies to various traffic flows through **Allow** action within the Access Control policy.
- You can apply different IPS policies on the device giving you capabilities of tuning the level of security based on the use case.



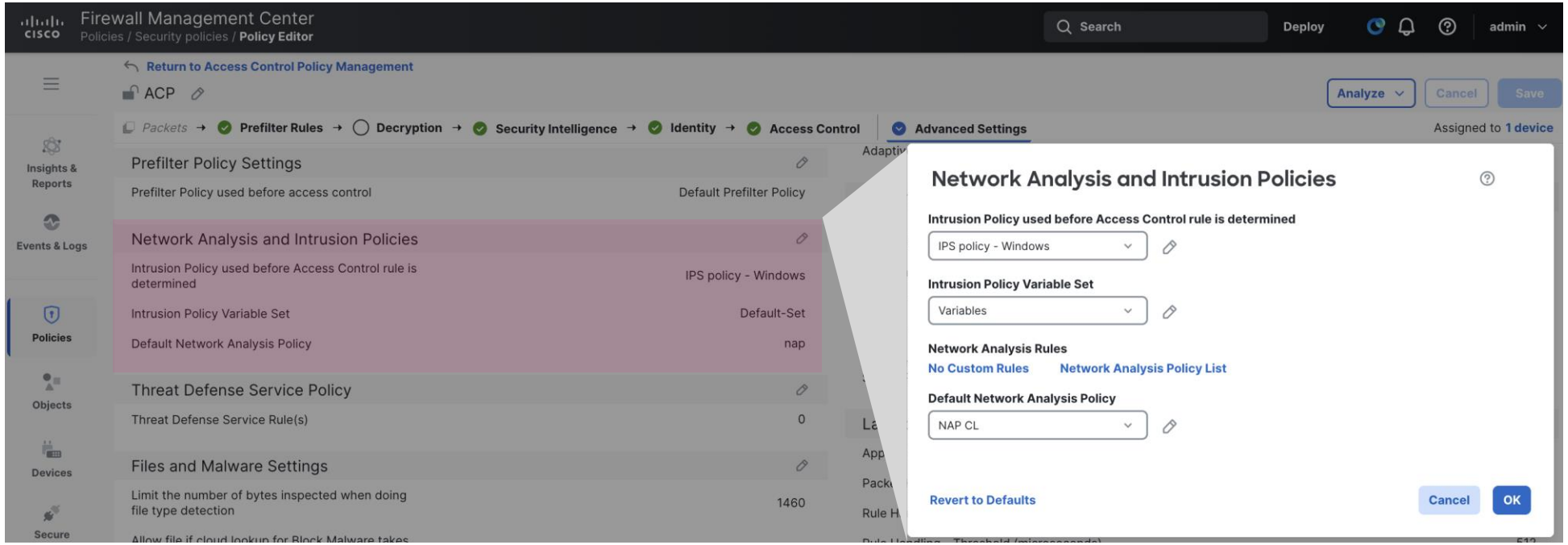
Network Analysis Policy

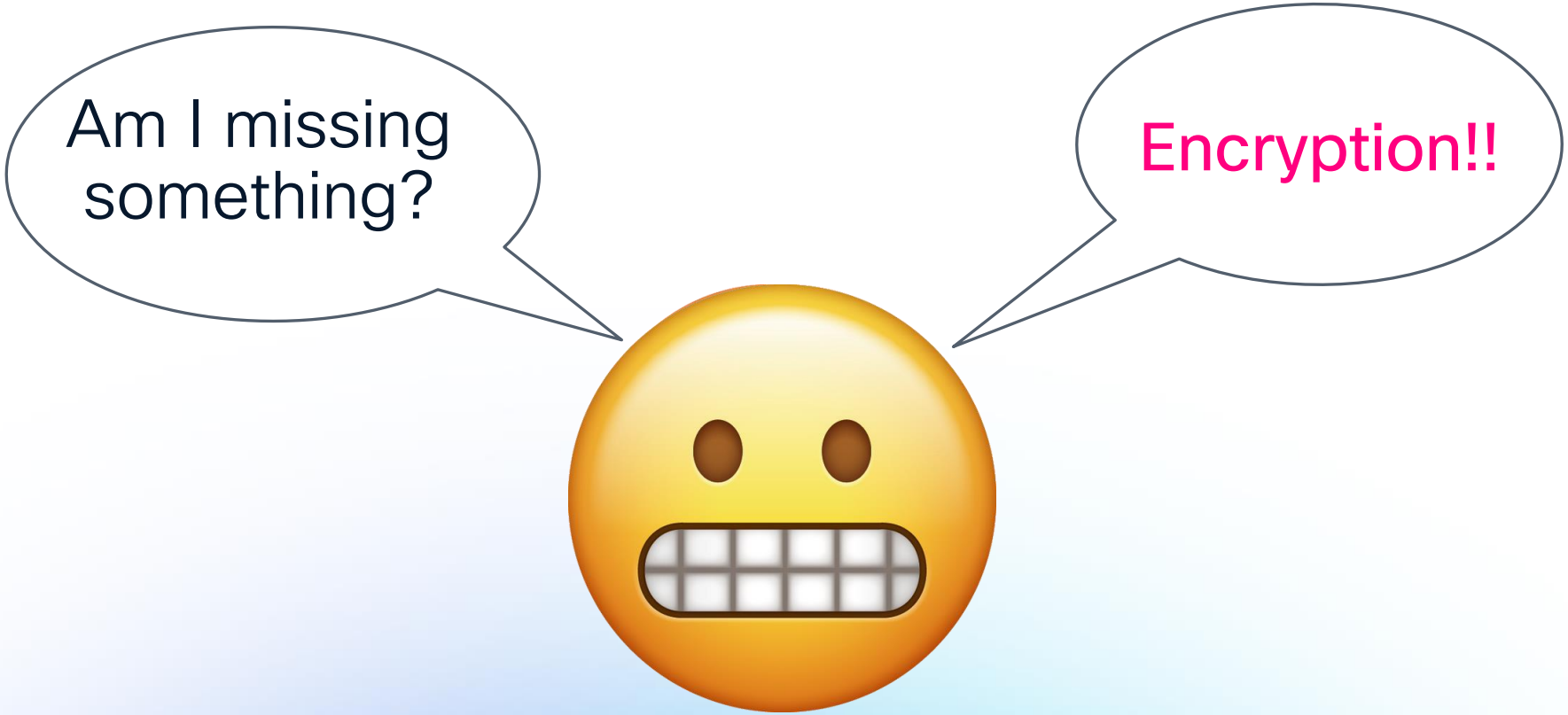
- The Network Analysis Policy (NAP) controls advanced settings such as preprocessors (Snort 2) or inspectors (Snort 3).
- Inspectors decode and normalize network traffic in preparation for Snort inspection.
- The Network Analysis Policy should use **the same base policy** as your intrusion policy.
- **Caution:** Customizing the Network Analysis Policy is an advanced feature intended for expert users. Be aware that modifying a NAP can significantly impact traffic flow and system performance.



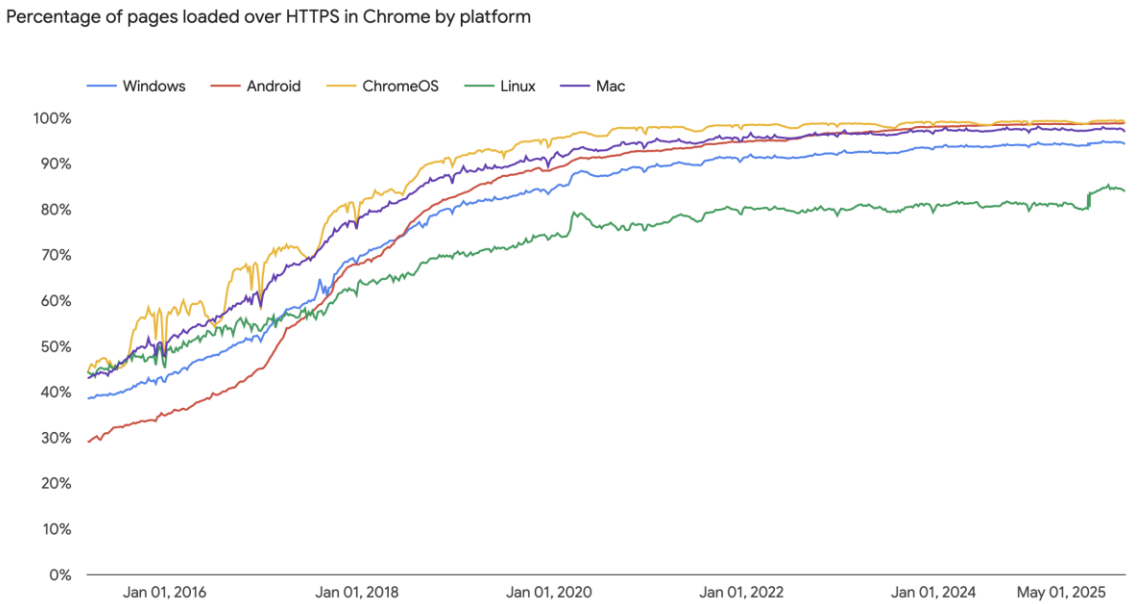
Access Control Policy – Advanced Settings

- In the **Network Analysis and Intrusion Policies** section under the **Advanced Settings** of the Access Control Policy:
  - Select the **Intrusion Policy used before Access Control rule is determined** and associate the relevant Variable Sets. This policy inspects traffic while the system performs application identification.
  - Select a user-created Network Analysis Policy (NAP).





Encryption Has Become the Internet Standard



https://transparencyreport.google.com/https/overview

"In October 2026, we will change the default settings of Chrome to enable "Always Use Secure Connections". This means Chrome will ask for the user's permission before the first access to any public site without HTTPS."

https://security.googleblog.com/2025/10/https-by-default.html

"Roughly 95% of all web traffic is encrypted."

Cisco Secure Network Analytics (formerly Stealthwatch) Data Sheet

"Over 70% of attacks are expected to use encryption."

Cisco Secure Network Analytics (formerly Stealthwatch) Data Sheet

cisco

How quickly does Snort stop inspecting connections?

Without decryption, the inspection stops after only 4 packets.

Event Type	Action	Source IP	Destination IP	Destination Port / ICMP Code	TLS Client SNI	Inspected Packets	TLS Actual Action	EVE Process Name
Connection	Allow	172.16.136.96	18.239.83.46	**443** (https) / tcp	www.onet.pl	4	Do Not Decrypt	chromium browser
Connection	Allow	172.16.136.96	18.239.83.46	**443** (https) / tcp	www.onet.pl	4	Do Not Decrypt	chromium browser

... and the firewall looks at the TCP handshake the initial TLS message from the client:

	Time	Source	SPORT	Destination	DPORT	Protocol	Length	Info
1	0.000000	172.16.136.96	49934	18.239.83.46	443	TCP	66	49934 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460
2	0.000500	18.239.83.46	443	172.16.136.96	49934	TCP	66	443 → 49934 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=
3	0.000547	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1 Ack=1 Win=2097408 Len=0
4	0.000780	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	585	Client Hello (SNI=www.onet.pl)

With decryption enabled, Snort continued inspection (column available in 7.7+) for 10s of packets.

Event Type	Action	Source IP	Destination IP	Destination Port / ICMP Code	TLS Client SNI	Inspected Packets	TLS Actual Action	EVE Process Name
Connection	Allow	172.16.136.96	18.239.83.82	**443** (https) / tcp	www.onet.pl	21	Decrypt (Resign)	chromium browser
Connection	Allow	172.16.136.96	18.239.83.82	**443** (https) / tcp	www.onet.pl	76	Decrypt (Resign)	chromium browser

Without decryption, we are essentially blind after the initial handshake...

Inspection scope without TLS/QUIC decryption.

(4 packets ...)

Wireshark packet capture (HTTPs connection to https://onet.pl)

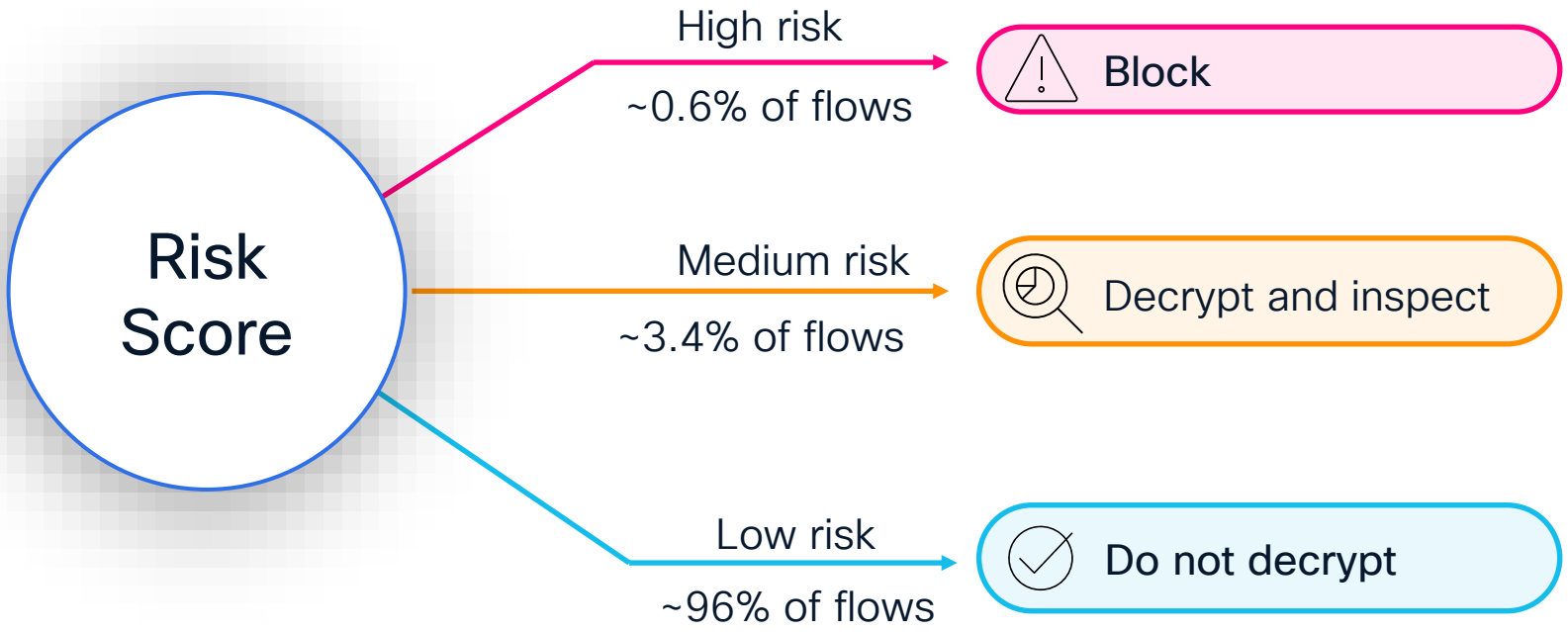
	Time	Source	SPORT	Destination	DPORT	Protocol	Length	Info
1	0.000000	172.16.136.96	49934	18.239.83.46	443	TCP	66	49934 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2	0.000500	18.239.83.46	443	172.16.136.96	49934	TCP	66	443 → 49934 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 WS=64 SACK_PERM
3	0.000547	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1 Ack=1 Win=2097408 Len=0
4	0.000780	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	585	Client Hello (SNI=www.onet.pl)
5	0.002136	18.239.83.46	443	172.16.136.96	49934	TCP	60	443 → 49934 [ACK] Seq=1 Ack=532 Win=64960 Len=0
6	0.142588	18.239.83.46	443	172.16.136.96	49934	TLSv1.3	1414	Server Hello, Change Cipher Spec, Application Data
7	0.142588	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=1361 Ack=532 Win=64960 Len=1360 [TCP PDU reassembled in 8]
8	0.142588	18.239.83.46	443	172.16.136.96	49934	TLSv1.3	800	Application Data, Application Data, Application Data
9	0.142630	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=532 Ack=3467 Win=2097408 Len=0
10	0.144132	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	118	Change Cipher Spec, Application Data
11	0.144272	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	146	Application Data
12	0.144402	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	538	Application Data
13	0.145355	18.239.83.46	443	172.16.136.96	49934	TCP	60	443 → 49934 [ACK] Seq=3467 Ack=596 Win=64896 Len=0
14	0.145433	18.239.83.46	443	172.16.136.96	49934	TCP	60	443 → 49934 [ACK] Seq=3467 Ack=688 Win=64832 Len=0
15	0.145433	18.239.83.46	443	172.16.136.96	49934	TCP	60	443 → 49934 [ACK] Seq=3467 Ack=1172 Win=64320 Len=0
16	0.156974	18.239.83.46	443	172.16.136.96	49934	TLSv1.3	304	Application Data, Application Data
17	0.157080	172.16.136.96	49934	18.239.83.46	443	TLSv1.3	85	Application Data
18	0.157585	18.239.83.46	443	172.16.136.96	49934	TCP	60	443 → 49934 [ACK] Seq=3717 Ack=1203 Win=64320 Len=0
19	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=3717 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
20	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=5077 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
21	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=6437 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
22	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=7797 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
23	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=9157 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
24	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=10517 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
25	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	222	443 → 49934 [PSH, ACK] Seq=11877 Ack=1203 Win=64320 Len=168 [TCP PDU reassembled in 33]
26	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=12045 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
27	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=13405 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
28	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1294	443 → 49934 [PSH, ACK] Seq=14765 Ack=1203 Win=64320 Len=1240 [TCP PDU reassembled in 33]
29	0.166547	18.239.83.46	443	172.16.136.96	49934	TCP	1053	443 → 49934 [PSH, ACK] Seq=16005 Ack=1203 Win=64320 Len=999 [TCP PDU reassembled in 33]
30	0.166594	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=17004 Win=2097408 Len=0
31	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=17004 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
32	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=18364 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 33]
33	0.174644	18.239.83.46	443	172.16.136.96	49934	TLSv1.3	1414	Application Data
34	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=21084 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
35	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=22444 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
36	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	382	443 → 49934 [PSH, ACK] Seq=23804 Ack=1203 Win=64320 Len=328 [TCP PDU reassembled in 48]
37	0.174644	18.239.83.46	443	172.16.136.96	49934	TCP	1242	443 → 49934 [PSH, ACK] Seq=24132 Ack=1203 Win=64320 Len=1188 [TCP PDU reassembled in 48]
38	0.174679	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=25320 Win=2097408 Len=0
39	0.175164	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=25320 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
40	0.175301	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=26680 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
41	0.175301	18.239.83.46	443	172.16.136.96	49934	TCP	898	443 → 49934 [PSH, ACK] Seq=28040 Ack=1203 Win=64320 Len=844 [TCP PDU reassembled in 48]
42	0.175320	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=28884 Win=2097408 Len=0
43	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=28884 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
44	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=30244 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
45	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1180	443 → 49934 [PSH, ACK] Seq=31604 Ack=1203 Win=64320 Len=1126 [TCP PDU reassembled in 48]
46	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=32730 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
47	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=34090 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 48]
48	0.183471	18.239.83.46	443	172.16.136.96	49934	TLSv1.3	1414	Application Data
49	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	444	443 → 49934 [PSH, ACK] Seq=36810 Ack=1203 Win=64320 Len=390 [TCP PDU reassembled in 66]
50	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1242	443 → 49934 [PSH, ACK] Seq=37200 Ack=1203 Win=64320 Len=1188 [TCP PDU reassembled in 66]
51	0.183471	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=38388 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]
52	0.183514	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=39748 Win=2097408 Len=0
53	0.183541	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=39748 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]
54	0.183541	18.239.83.46	443	172.16.136.96	49934	TCP	898	443 → 49934 [PSH, ACK] Seq=41108 Ack=1203 Win=64320 Len=844 [TCP PDU reassembled in 66]
55	0.183551	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=41952 Win=2097408 Len=0
56	0.191339	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=41952 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]
57	0.191339	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=43312 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]
58	0.191362	172.16.136.96	49934	18.239.83.46	443	TCP	54	49934 → 443 [ACK] Seq=1203 Ack=44672 Win=2097408 Len=0
59	0.191418	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=44672 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]
60	0.191418	18.239.83.46	443	172.16.136.96	49934	TCP	1414	443 → 49934 [ACK] Seq=46032 Ack=1203 Win=64320 Len=1360 [TCP PDU reassembled in 66]

With decryption, Snort disengages after preempting all checks.

(as many packets as needed)

Cisco Encrypted Visibility Engine (EVE)

Encrypted Visibility Engine (EVE) provides visibility into encrypted traffic without decryption, using metadata and traffic patterns to detect and block malicious activity while preserving data privacy.



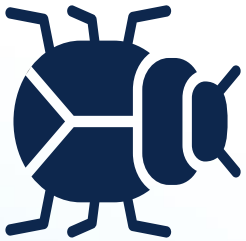
FTD 7.7+

Intelligent Decryption Bypass utilizes EVE and Talos reputation to assess risk in real time, enabling low-risk encrypted connections to bypass the decryption process.

BRKSEC-3320 - Pig-in-the-middle -TLS Decryption and Encrypted Visibility Engine Deep Dive on Cisco Secure Firewall

The IPS is deployed, rules are patched, encryption is handled, and the firewall is double-checked! Now it's time to relax.

Unless....



...a zero-day's about to crash the party!

The Unseen Threat - Zero-Day Attacks

No Warning
They strike before anyone knows there's a problem.

High Impact
Can lead to massive data breaches, significant financial losses, operational disruption, and even compromise critical infrastructure.

No Immediate Fix
Since the vulnerability is unknown, there's no official patch or security update to prevent exploitation.

SnortML


Selecting the Deployment Type
Maintaining Accurate Host Data
Defining the Intrusion Policy
Enhancing Visibility
Enhancing Detection

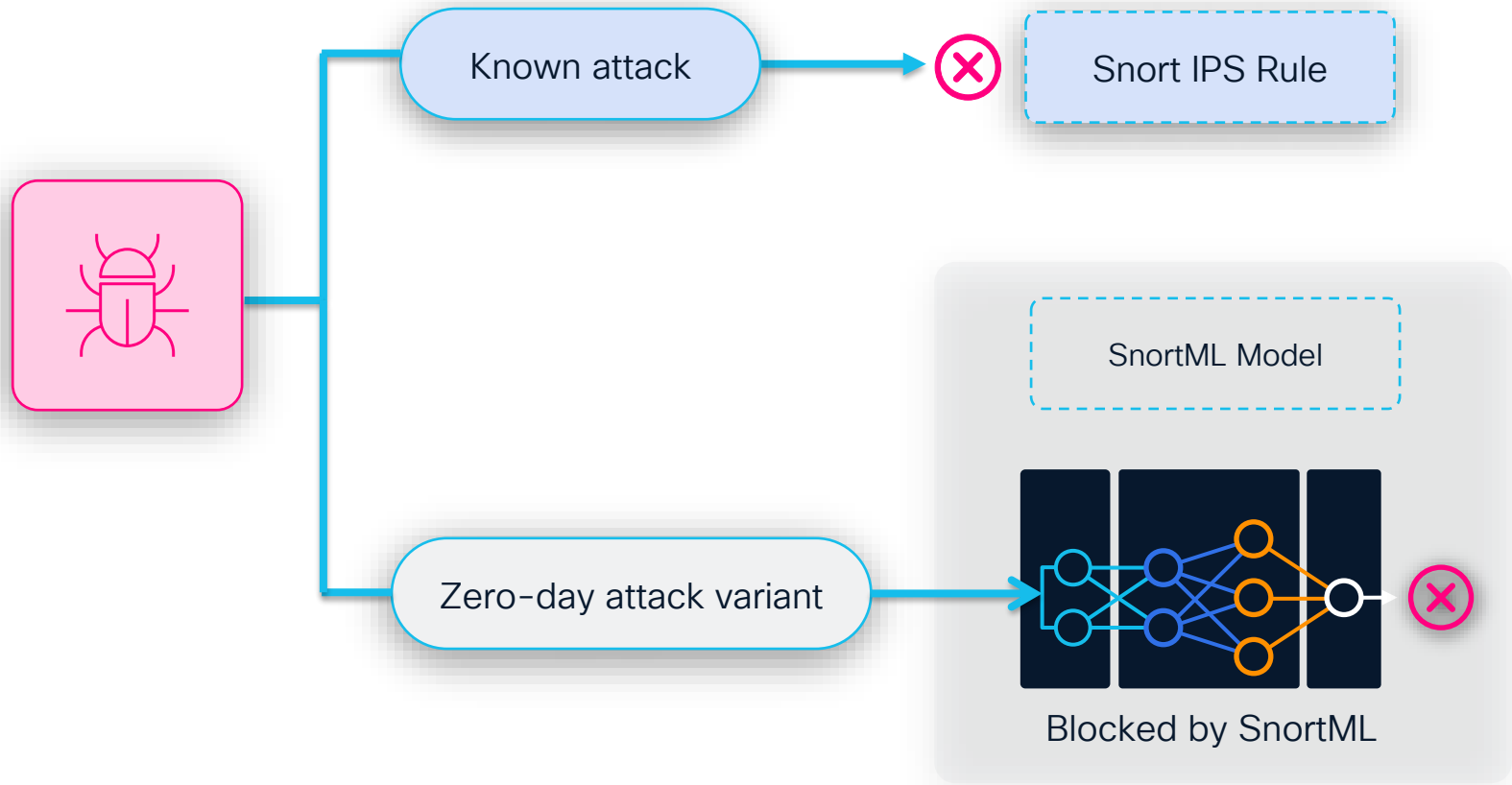
SnortML – Neural Network-Based Exploit Detector

SnortML is a machine learning-based detection engine designed to identify zero-day attacks; it functions in parallel with standard Snort IPS signatures

SnortML protects against:

- SQL Injection (7.6+)
- HTTP command injection

FTD 10.0



SnortML - Components

snort_ml_engine

The core management module responsible for the "intelligence" of the detection system.

- Loads pre-trained machine learning models.
- Instantiates neural network classifiers.
- Makes classifiers available for inspection.

snort_ml_inspector

The operational module that interfaces directly with network data and acts on findings.

- Subscribes to Snort service inspector data.
- Passes data to classifiers for analysis.
- Triggers alerts or blocks malicious traffic.

Detection Workflow: From Data to Alert

1. Data Subscription

Inspector subscribes to HTTP data, through the publish/subscribe interface

2. Classification

Data is passed to the engine's neural Classifier for analysis

3. Probability Score

The engine calculates the probability of an exploit.

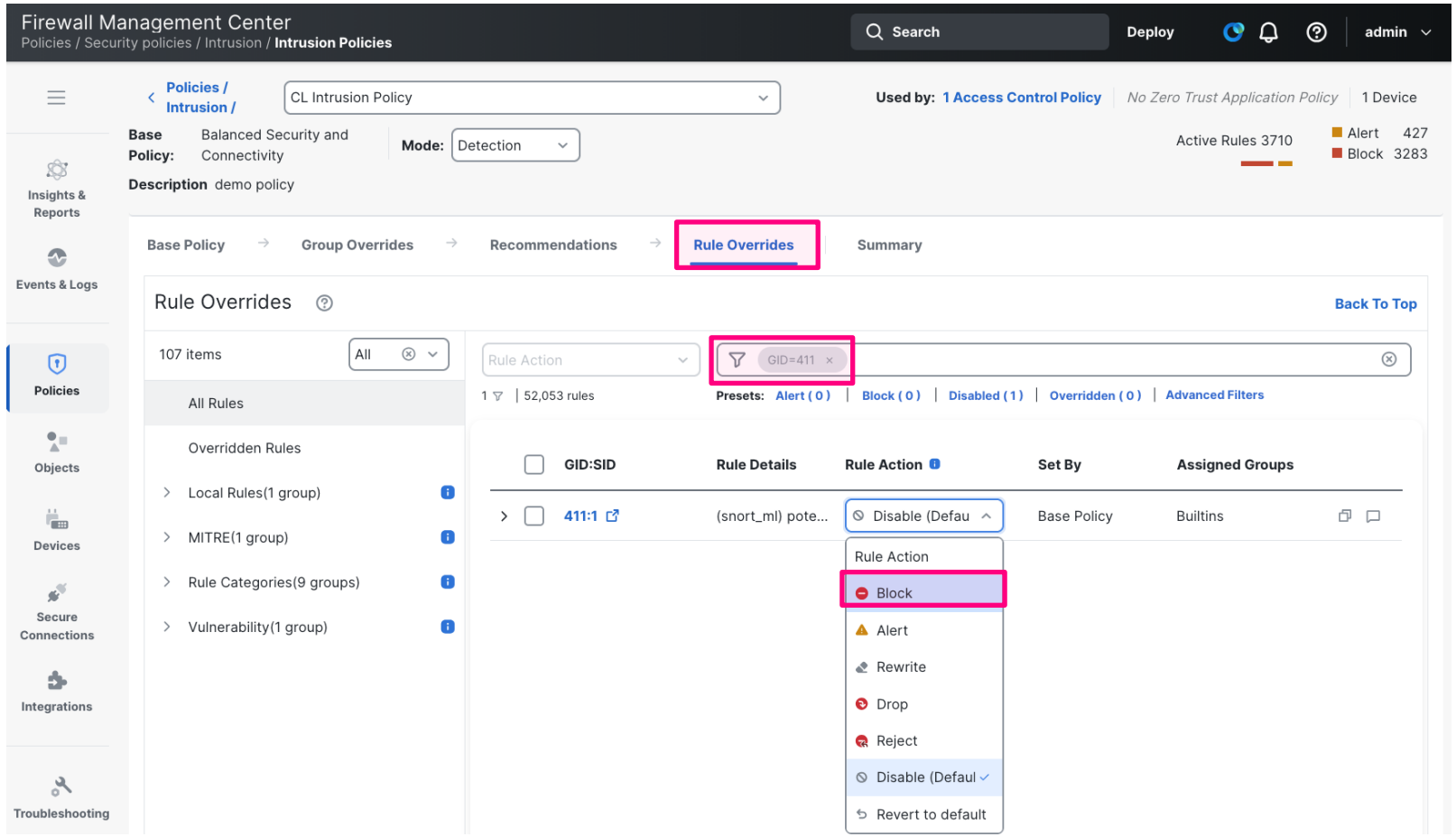
4. Action & Alert

Generates alerts or blocks the malicious traffic

Demo

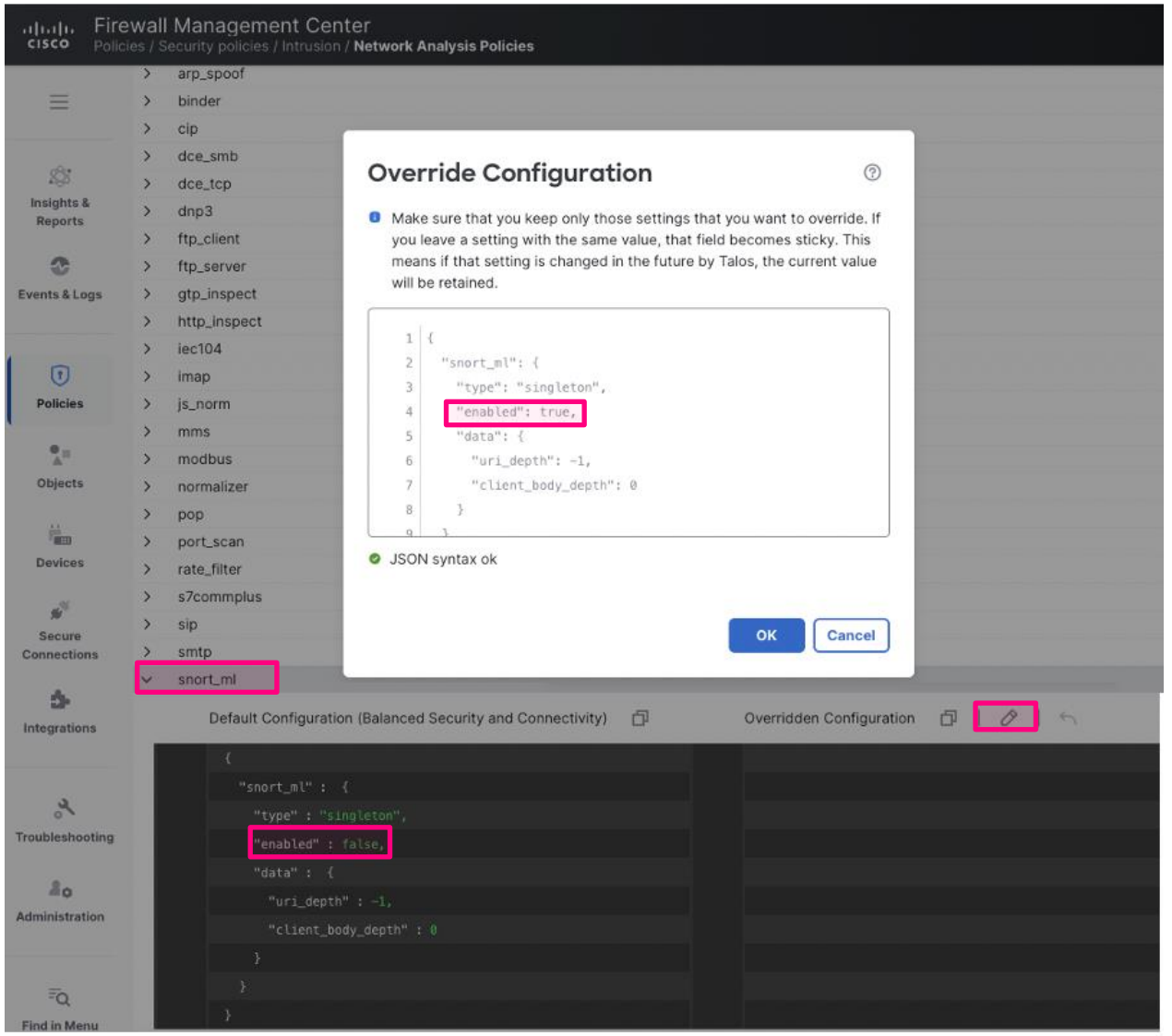
Enabling the SnortML – Intrusion Policy

- To use SnortML the relevant Snort rule must be enabled.
- The SnortML IPS rules have the following characteristics:
  - **GID**: 411
  - **Rule message:** prepended with '(snort_ml)'
  - **Enabled** by default only in **Maximum Detection** IPS policy. For other base policies SnortML rule is disabled by default.



Enabling the SnortML – NAP Policy

- The **snort_ml** inspector must be enabled in the Network Analysis Policy to utilize SnortML.
- This inspector is **enabled** by default in the "**Maximum Detection**" base policy but is disabled in all other base policy configurations.



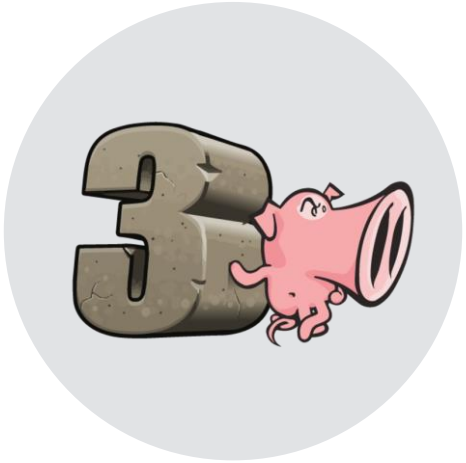
SnortML

SnortML matches

Intrusion Message snort_ml

0 | 0 | 631 | 0 | 0 | 631 events | Last 1 month

Time	Event Type	Action	Source IP	Destination IP	Source Port / ICMP Type	Destination Port / ICM...	Intrusion Message	Other Enrichment
2024-08-01 03:55:45	Intrusion	Block	10.0.104.100	10.0.105.100	16458 / tcp	4430 / tcp	(snort_ml) potential threat found in HTTP parameters via Neural Net...	Rule Categories: Protocol: Builtins
2024-08-01 03:55:38	Intrusion	Block	10.0.104.100	10.0.105.100	16259 / tcp	4430 / tcp	(snort_ml) potential threat found in HTTP parameters via Neural Net...	Rule Categories: Protocol: Builtins
2024-08-01 03:54:43	Intrusion	Block	10.0.104.100	10.0.105.100	14641 / tcp	4430 / tcp	(snort_ml) potential threat found in HTTP parameters via Neural Net...	Rule Categories: Protocol: Builtins
2024-08-01 03:54:38	Intrusion	Block	10.0.104.100	10.0.105.100	14495 / tcp	4430 / tcp	(snort_ml) potential threat found in HTTP parameters via Neural Net...	Rule Categories: Protocol: Builtins



SnortML rule

URL metadata

Snort ID 411:1:1

Snort Version 3

Snort Rule

```
alert ( gid:411; sid:1; rev:1; msg:"(snort_ml)
potential threat found in HTTP parameters via Neural
Network Based Exploit Detection"; metadata: policy
max-detect-ips alert, rule-type preproc;
classtype:unknown;)
```

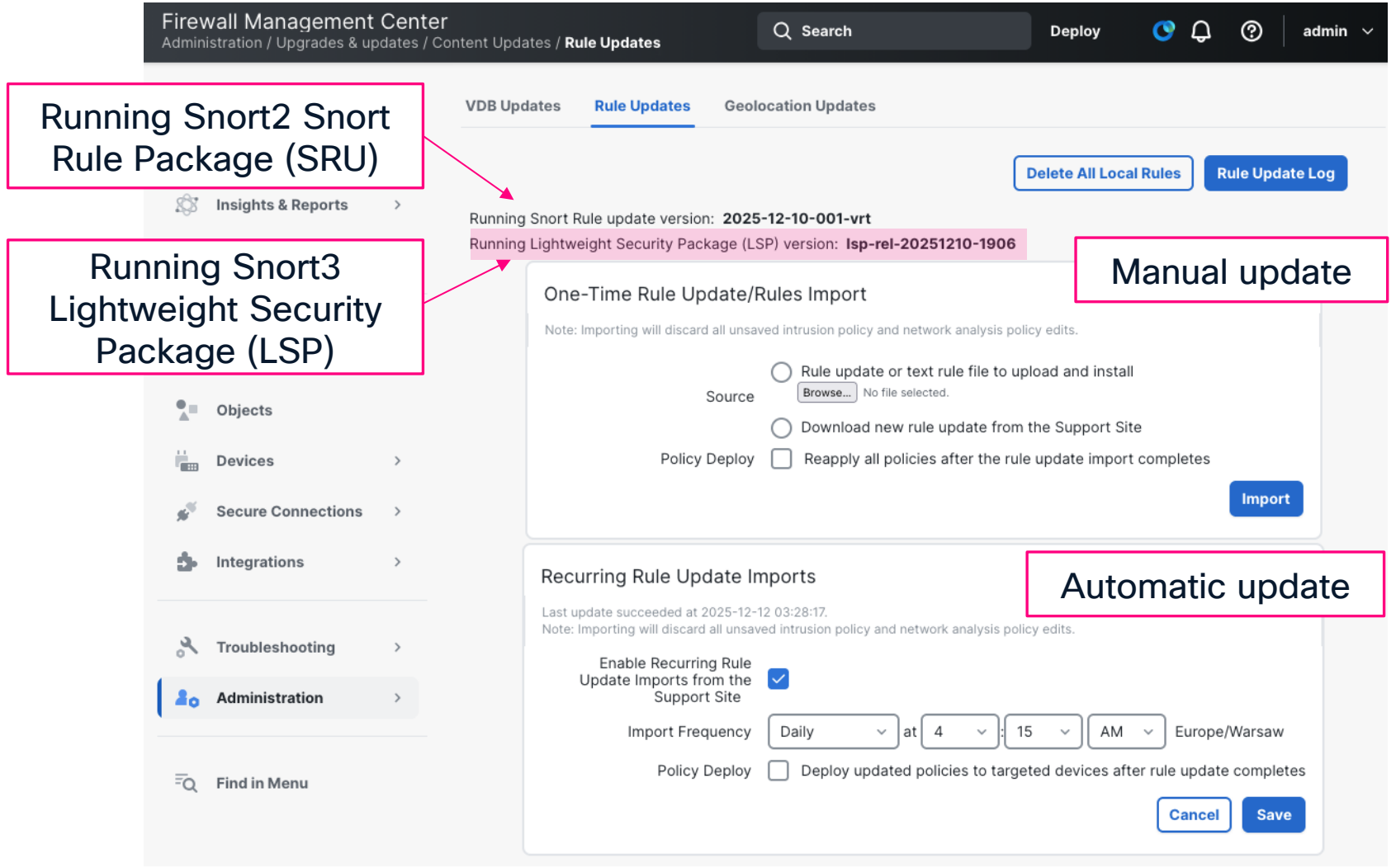
File

URL /admin/user/action/index.php?n=guest&c=0&m=search&s=forum&wert=-1%25%22%20U...

Day-2 Operations

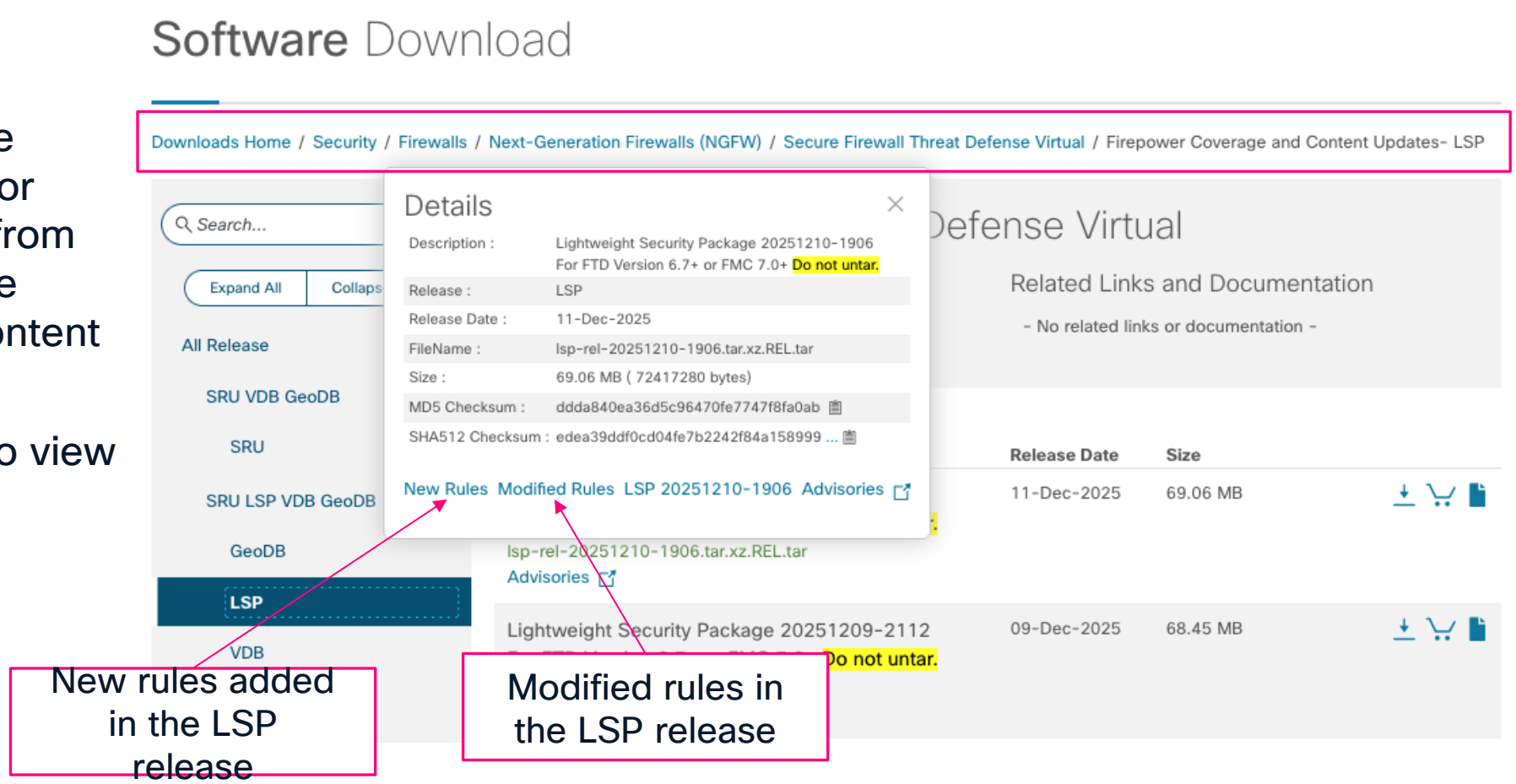
Snort Rule Updates

- Update Snort rules regularly to ensure the latest Cisco Talos CVE coverage.
- Use Recurring Rule Updates for timely and consistent updates.
- Use manual rule updates for air-gapped deployments.
- Snort rules are **NOT** released on a fixed schedule; instead, updates are provided as new threats and vulnerabilities are identified.



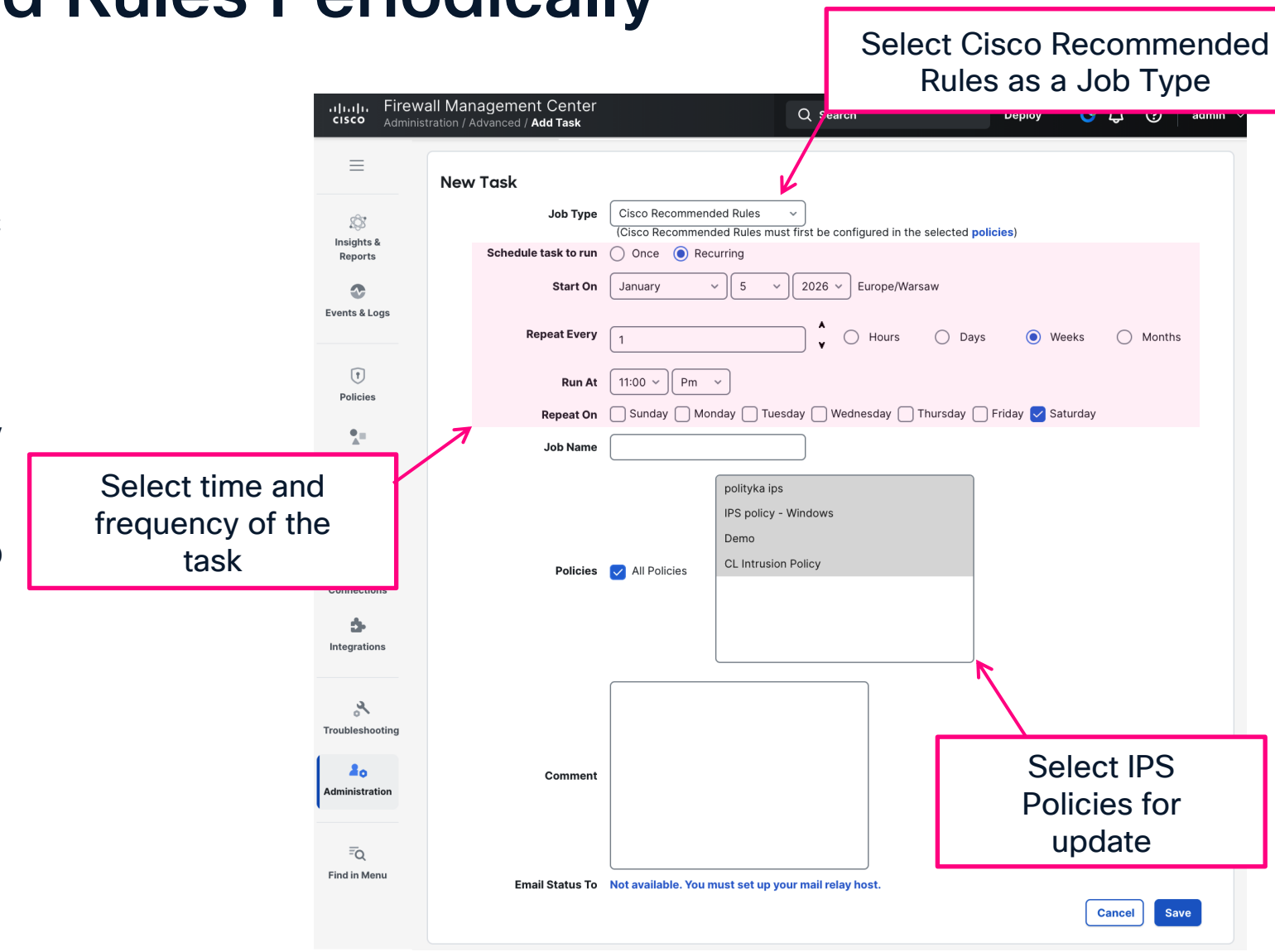
Where to find Snort3 Rule Updates?

- Lightweight Security Package (LSP) updates are available for download for each platform from software.cisco.com under the "Firepower Coverage and Content Updates" software type.
- Click on the package name to view additional details.



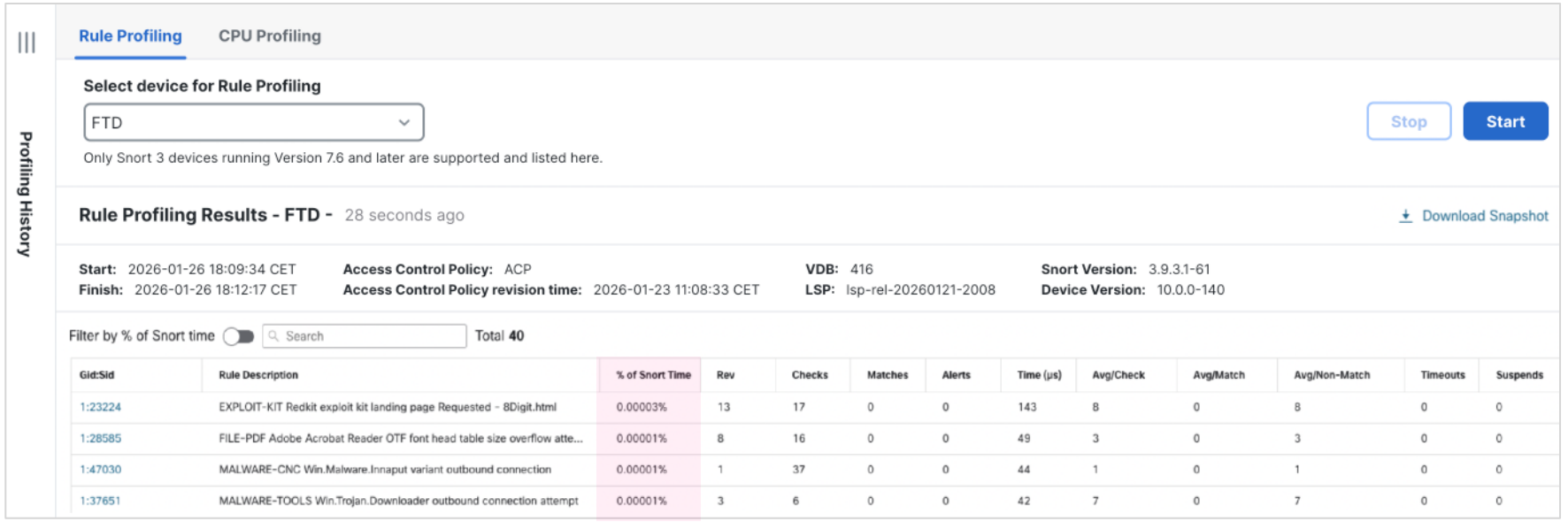
Update Recommended Rules Periodically

- Recommended Rules rely on dynamic data, such as Snort rules, vulnerabilities, and host attributes.
- Update Recommended Rules periodically to maintain their accuracy and effectiveness.
- Best Practice: Use scheduled tasks to automate the update process for recommendations.



Performance Analysis and Optimization

- The **Snort3 Rule Profiling** helps administrators optimize IPS policies by pinpointing rules causing performance issues without needing Snort 3 reload or restart.
- Identifies and analyzes the performance impact of individual IPS rules within Snort 3.
- Collects data on processing time for the top 100 IPS rules, highlighting those with the highest resource use.
- Saves profiling results in JSON format for review and historical analysis, supporting targeted rule management and tuning efforts to maintain optimal IPS performance

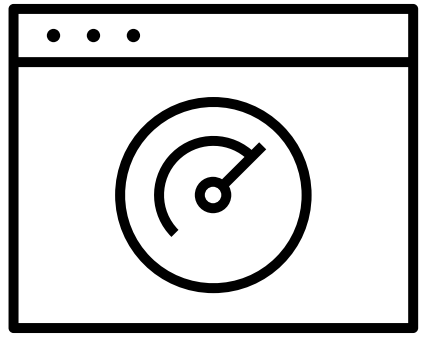


Inspect Everything? Think Again

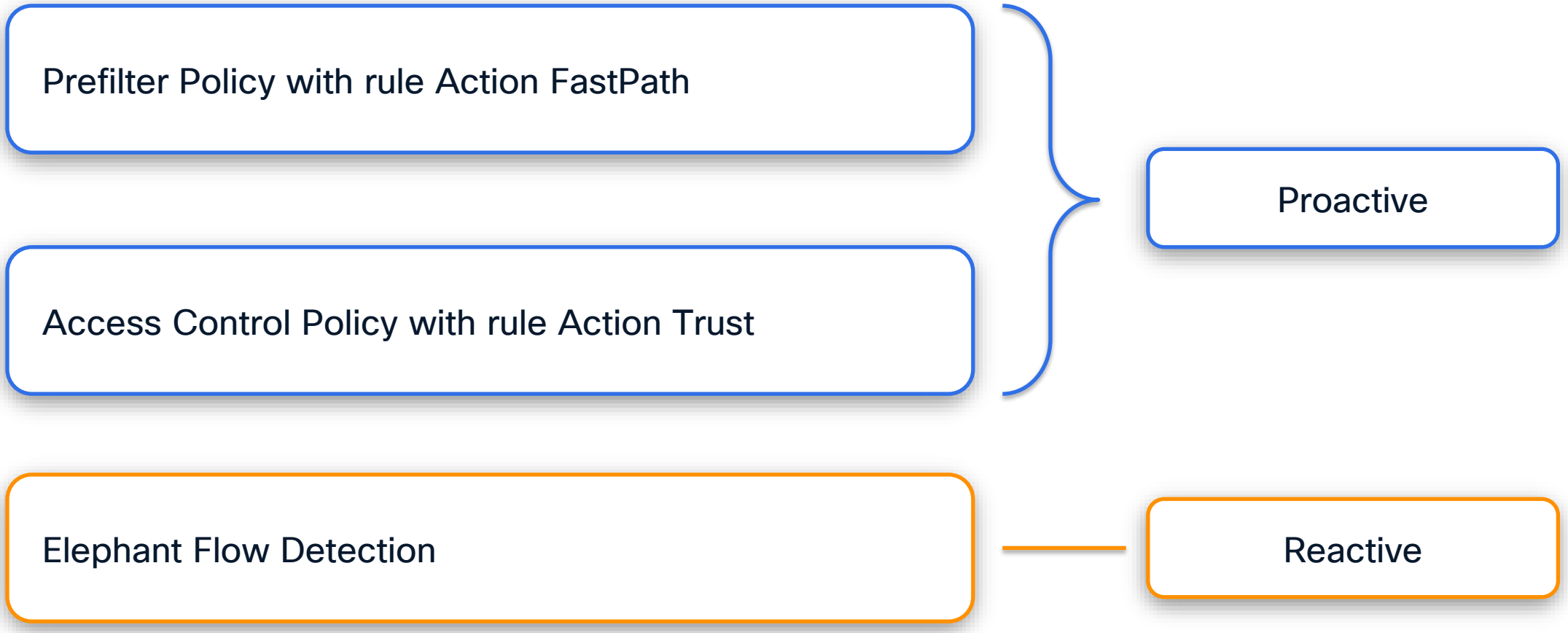
Enabling **Intrusion Prevention** inspection can impact system performance, depending on the traffic profile, enabled rules, and hardware resources. It is important to selectively inspect traffic rather than inspecting everything.

Traffic Candidates for IPS Inspection Exclusion:

- VPN traffic that is going through the device
- SQL traffic between trusted endpoints on the internal network
- Scanner traffic
- Voice/video
- Backups
- Management traffic (sftunnel) that traverses FTD



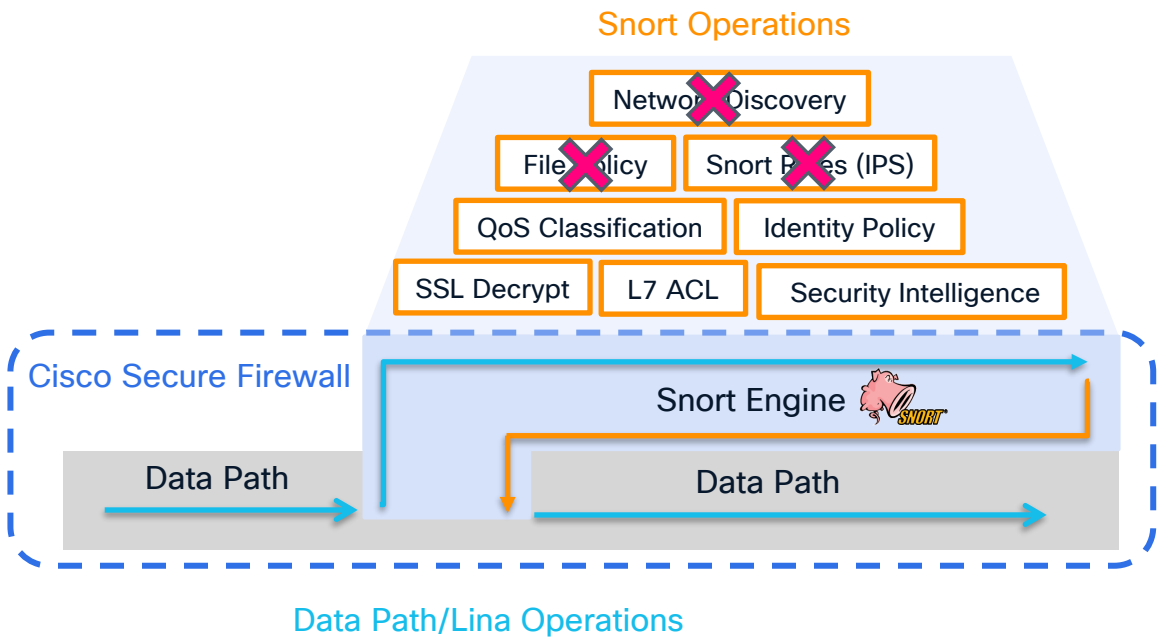
Ways to Exclude Traffic from IPS



Proactive Exclusion – Trust vs FastPath

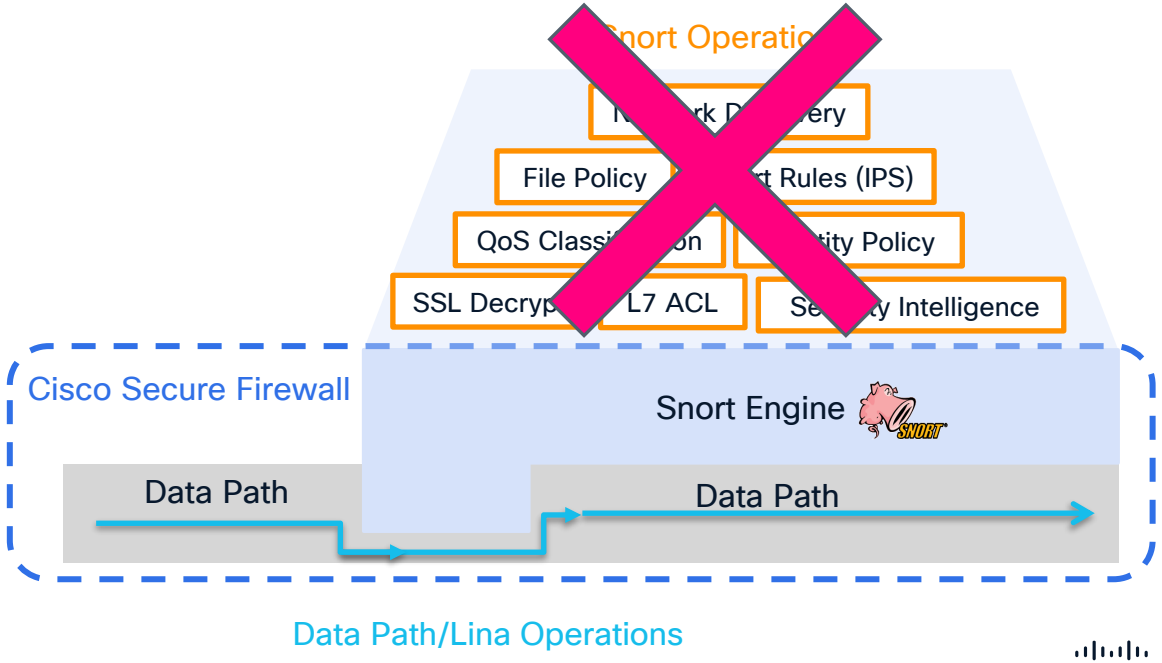
Trust Action

- The Trust action allows traffic to pass without deep inspection (IPS and File) or Network Discovery.
- Other Snort Operation will be still performed.



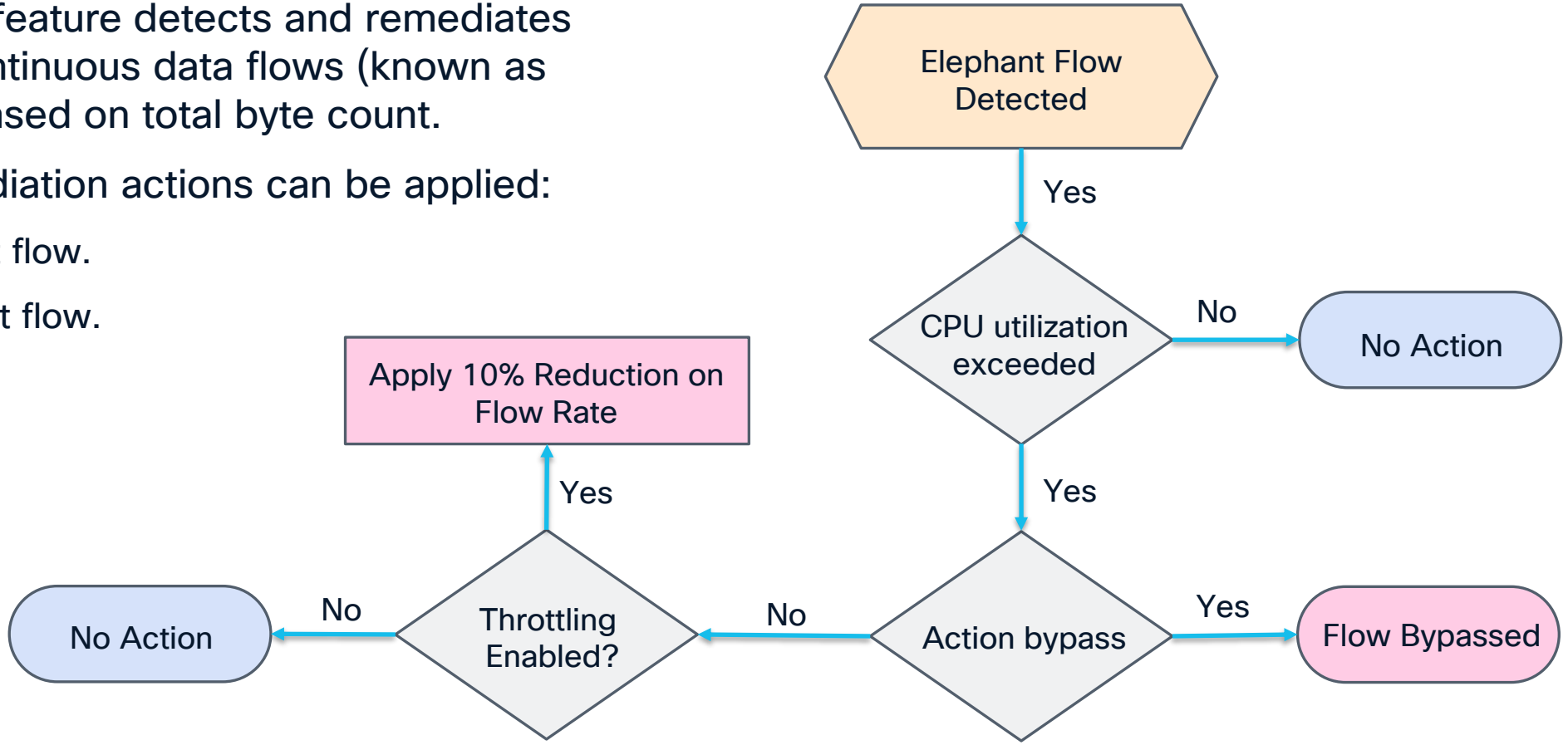
FastPath Action

- Fastpathing traffic in the prefilter stage bypasses all further inspection and handling.
- No traffic sent to Snort.



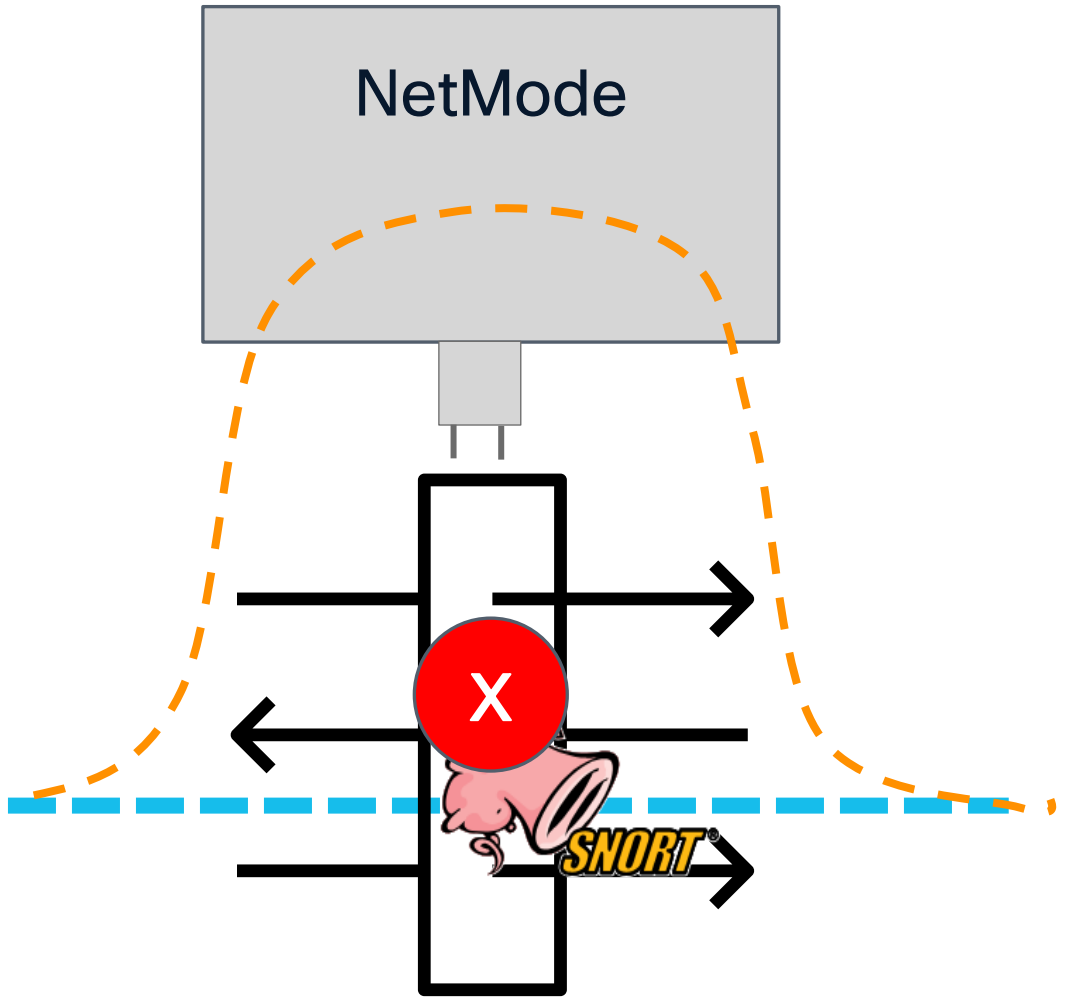
Elephant Flow Detection

- The **Elephant Flow** feature detects and remediates extremely large, continuous data flows (known as "elephant flows") based on total byte count.
- The following remediation actions can be applied:
  - **Bypass** the elephant flow.
  - **Throttle** the elephant flow.



Hardware Bypass

- **Hardware Bypass** ensures that traffic continues to flow between an inline interface pair during a catastrophic outage. This feature is used to maintain network connectivity in the event of software or hardware failures.
- Hardware Bypass can be **triggered** in the following scenarios:
  - Firewall Threat Defense crash
  - Firewall Threat Defense reboot
  - Security Module reboot
  - Chassis crash
  - Chassis reboot
  - Manual trigger
  - Chassis power loss
  - Security Module power loss

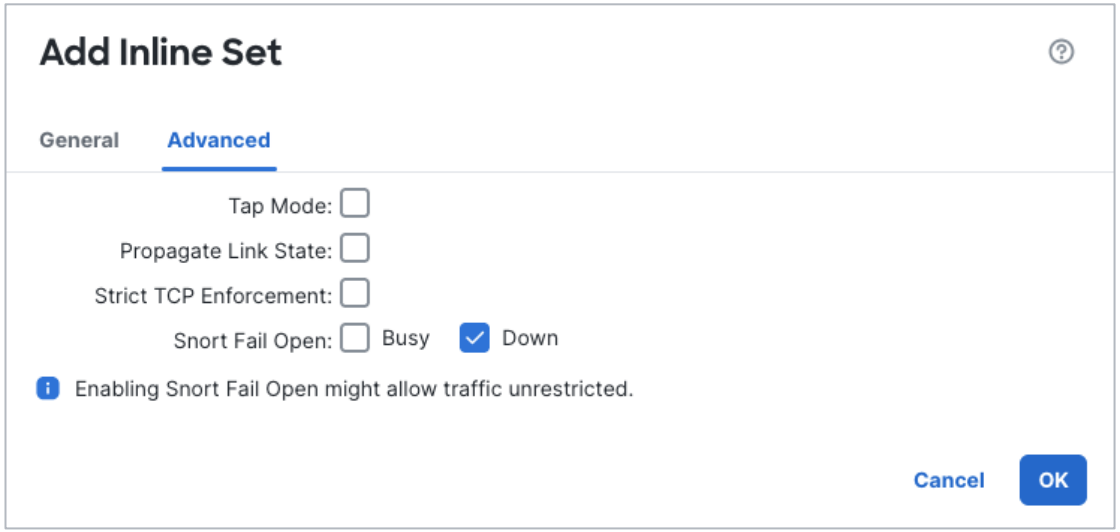


Available on 2100, 3100, 4100, 4200, 9300 and 6100

Software Bypass

Snort Fail Open

- In inline **fail-open** deployments, traffic is passed uninspected through the software bridge when Snort is busy or down.
- Once Snort recovers, it performs a mid-session pickup on existing traffic.
- This feature is exclusively available for **inline pairs**.



Snort Bypass – CLI

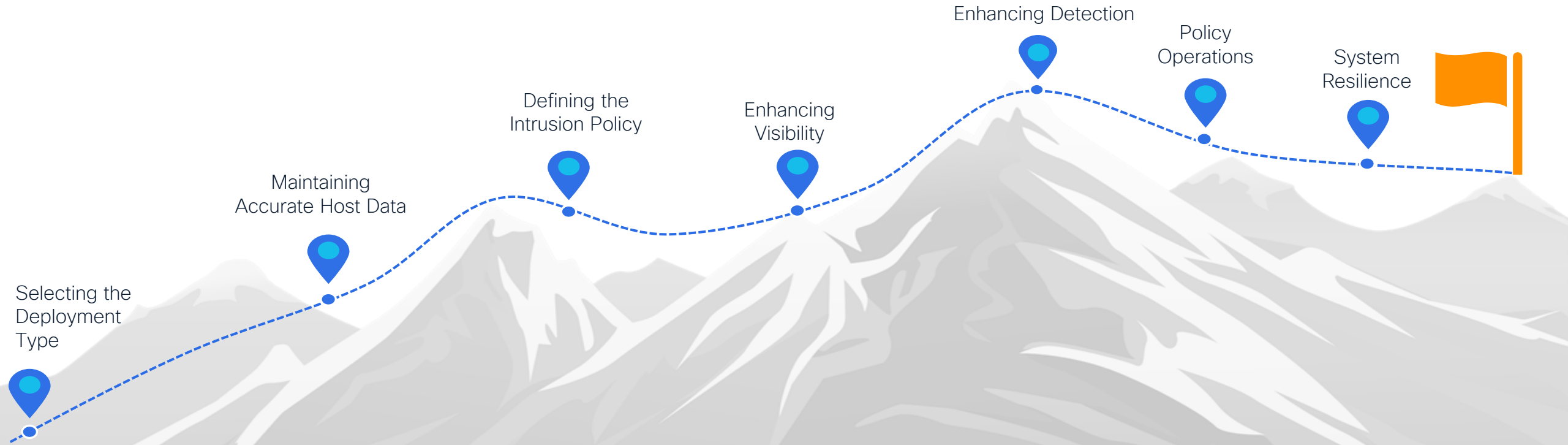
- Enable Snort bypass via the FTD CLI using this command: **configure snort snort-bypass-enable**
- Once enabled, packets will bypass Snort and will no longer be sent for processing.
- **Caution:** Use it **only** under TAC supervision.

```
> configure snort snort-bypass-enable
----------------------------------------------------------------------------------------------------
Executing this command will circumvent the firewall, allowing traffic that would typically be blocked.
Please be cautioned: this command is not intended for customer use.
Enable behaviour is not persistent across [reboots /restarts /reloads]
These utilities are designed solely for troubleshooting purposes.
----------------------------------------------------------------------------------------------------
Do you still want to continue?
Please enter 'YES' or 'NO': YES

Enable command executed successfully .
If enabled inadvertently, use the following command to disable:
        >configure snort3 snort-bypass-disable
Current state: ENABLED
```

Summary

IPS Deployment Journey



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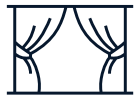

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