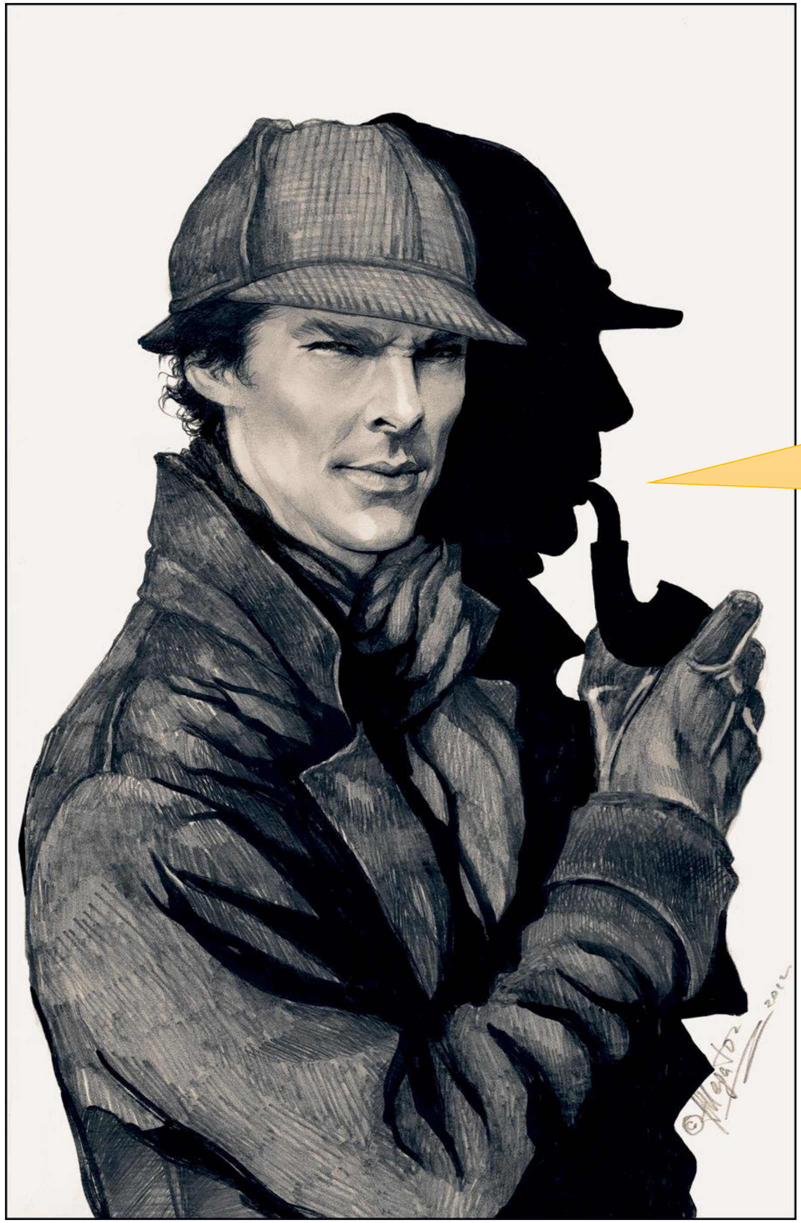
Three Friends in Security : Identity, Visibility and Enforcement

Stop the bad guys immediately

György Ács
Cisco Systems



“The world is full of obvious things which nobody by any chance observes.”

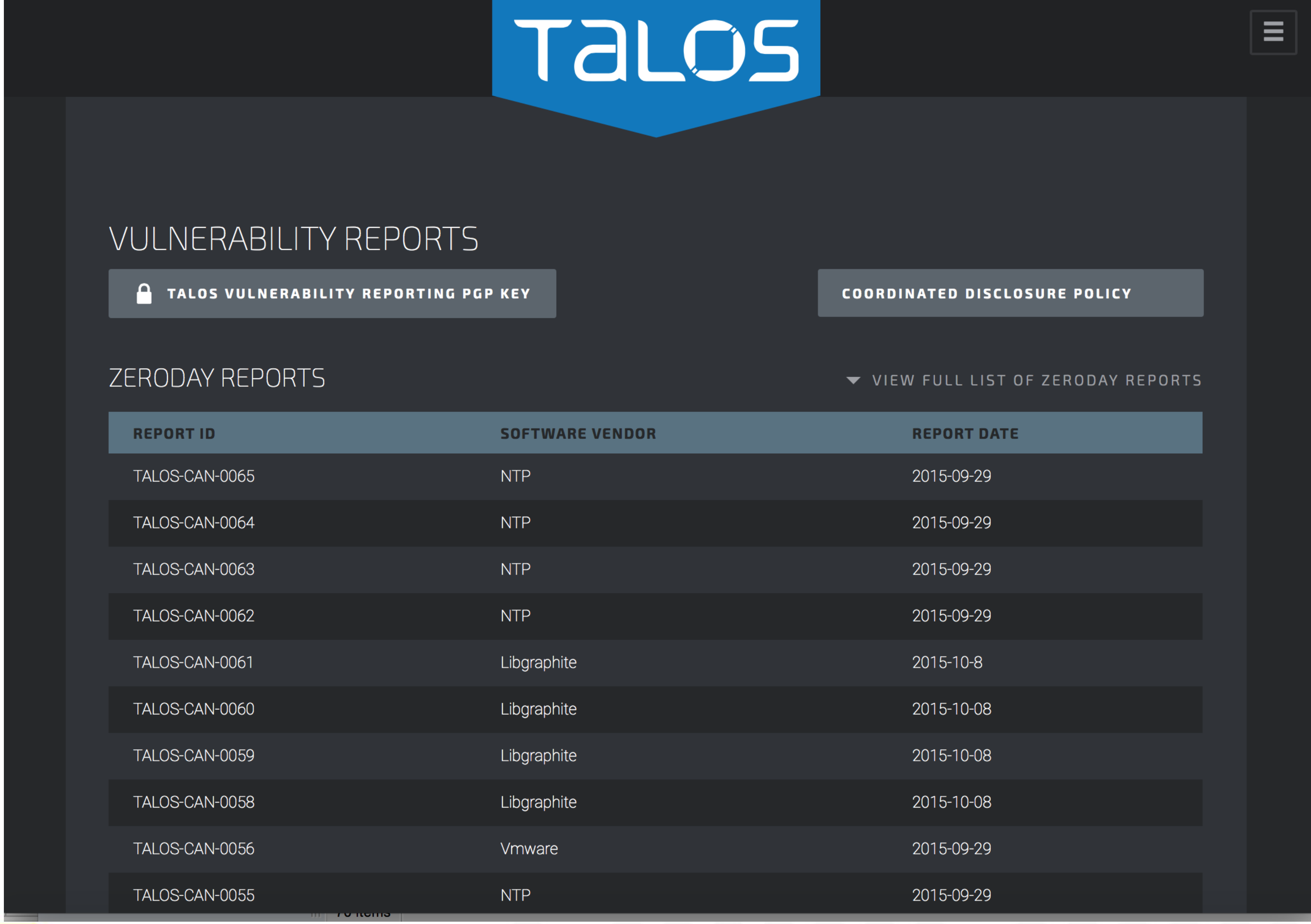
Sherlock Holmes, *The Hound of the Baskervilles*

This session is about using network analysis (our obvious things) to observe and mitigate an attack.

Agenda

- The Problem is Threats
- Network as a Sensor / Enforcer
  - Identity
  - Visibility
  - Policy and Indication of Compromise, IoC
  - Enforcement
- Summary

The Problem is Threats



VULNERABILITY REPORTS

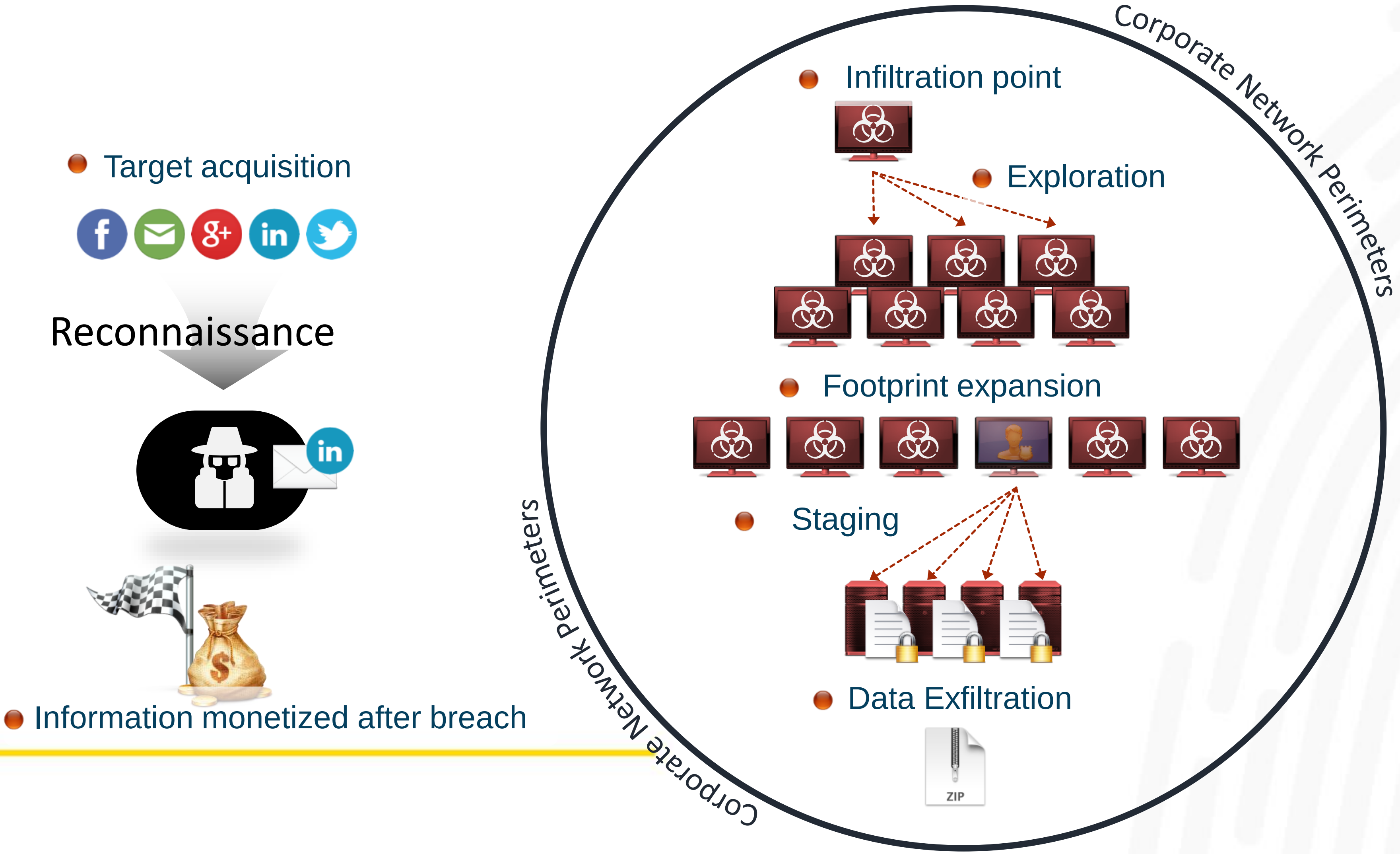
TALOS VULNERABILITY REPORTING PGP KEY
COORDINATED DISCLOSURE POLICY

ZERODAY REPORTS

VIEW FULL LIST OF ZERODAY REPORTS

REPORT ID	SOFTWARE VENDOR	REPORT DATE
TALOS-CAN-0065	NTP	2015-09-29
TALOS-CAN-0064	NTP	2015-09-29
TALOS-CAN-0063	NTP	2015-09-29
TALOS-CAN-0062	NTP	2015-09-29
TALOS-CAN-0061	Libgraphite	2015-10-8
TALOS-CAN-0060	Libgraphite	2015-10-08
TALOS-CAN-0059	Libgraphite	2015-10-08
TALOS-CAN-0058	Libgraphite	2015-10-08
TALOS-CAN-0056	Vmware	2015-09-29
TALOS-CAN-0055	NTP	2015-09-29

Dissecting a Data Breach (Kill Chain)
You Can’t Protect What You Don’t See !



- Target acquisition

Reconnaissance

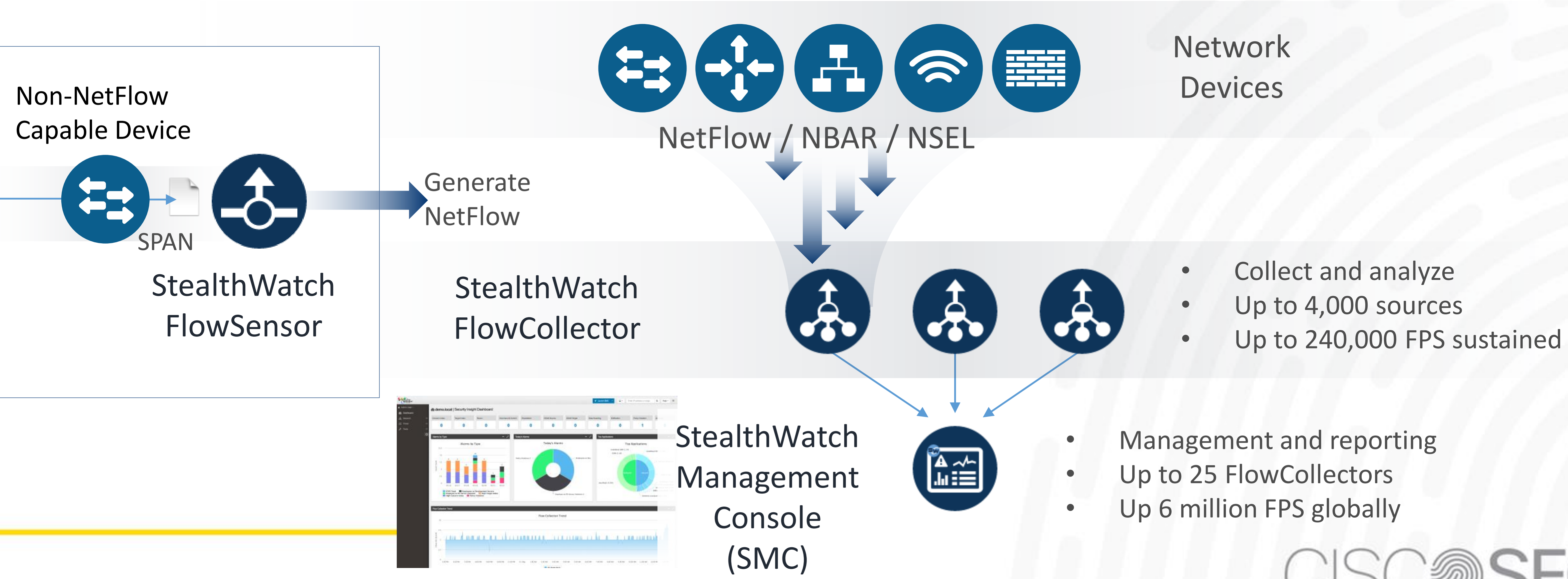
- Information monetized after breach

- Infiltration point
- Exploration
- Footprint expansion
- Staging
- Data Exfiltration

New ransomware abuses Windows PowerShell, Word document macros

Network as a Sensor / Enforcer

Cisco StealthWatch: System Overview



Network Devices

NetFlow / NBAR / NSEL

Non-NetFlow Capable Device

SPAN

StealthWatch FlowSensor

Generate NetFlow

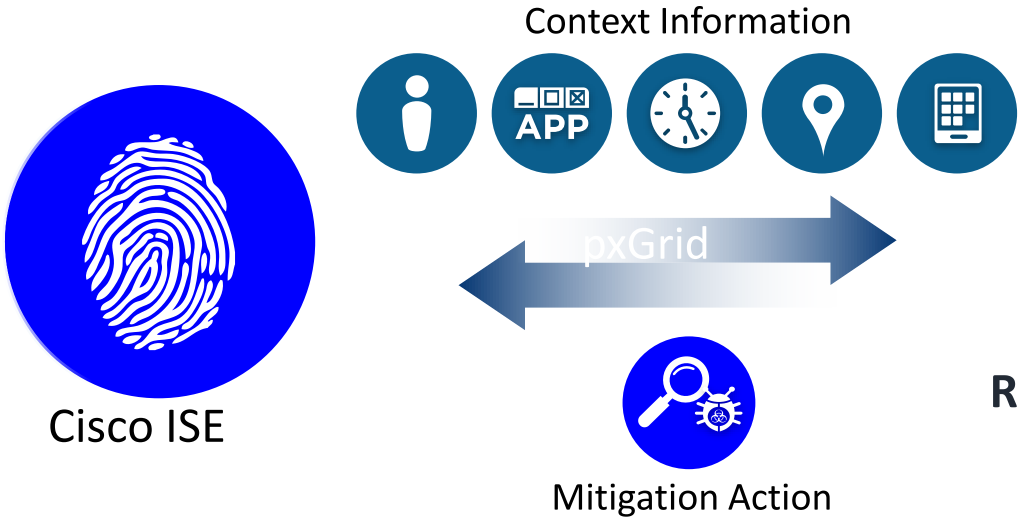
StealthWatch FlowCollector

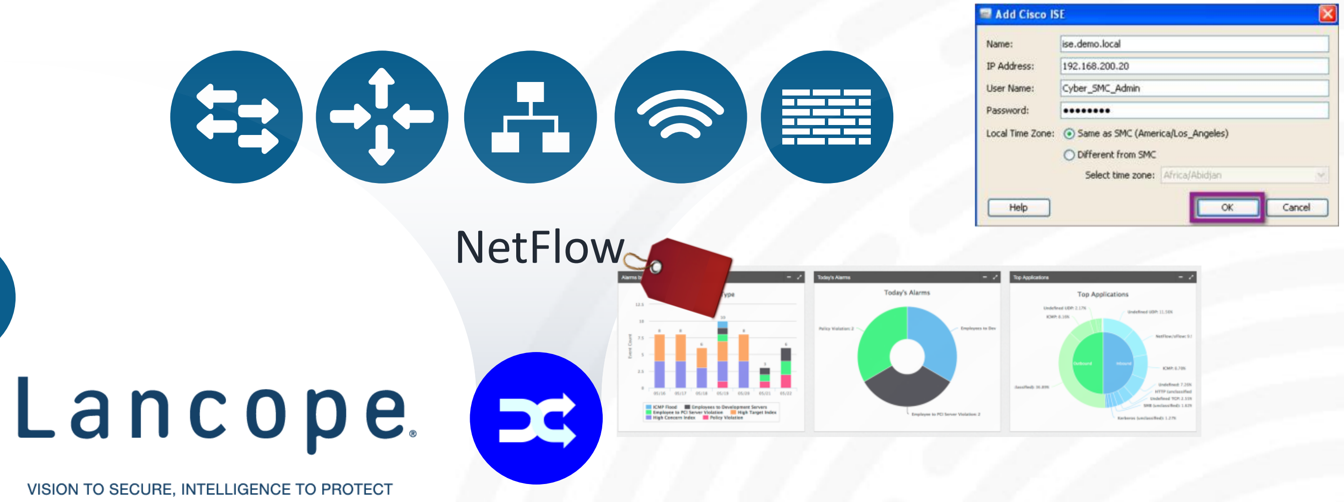
- Collect and analyze
- Up to 4,000 sources
- Up to 240,000 FPS sustained

StealthWatch Management Console (SMC)

- Management and reporting
- Up to 25 FlowCollectors
- Up 6 million FPS globally

Network as a Sensor: Cisco StealthWatch





Add Cisco ISE

Name: ise.demo.local
IP Address: 192.168.200.20
User Name: Cyber_SMC_Admin
Password: •••••••••
Local Time Zone: ● Same as SMC (America/Los_Angeles)
○ Different from SMC
Select time zone: Africa/Abidjan

ISE pxgrid for
Remediation

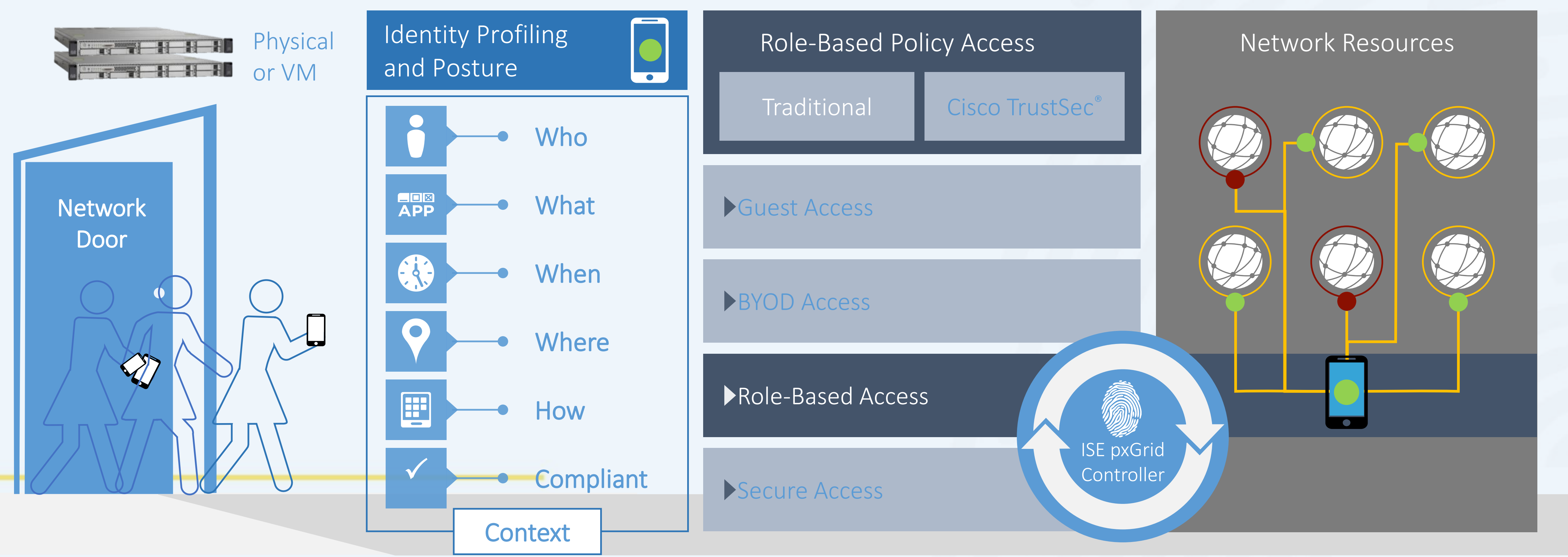
Real-time visibility at all network layers

- Data Intelligence throughout network
- Assets discovery
- Network profile
- Security policy monitoring
- Anomaly detection
- Accelerated incident response

Identity

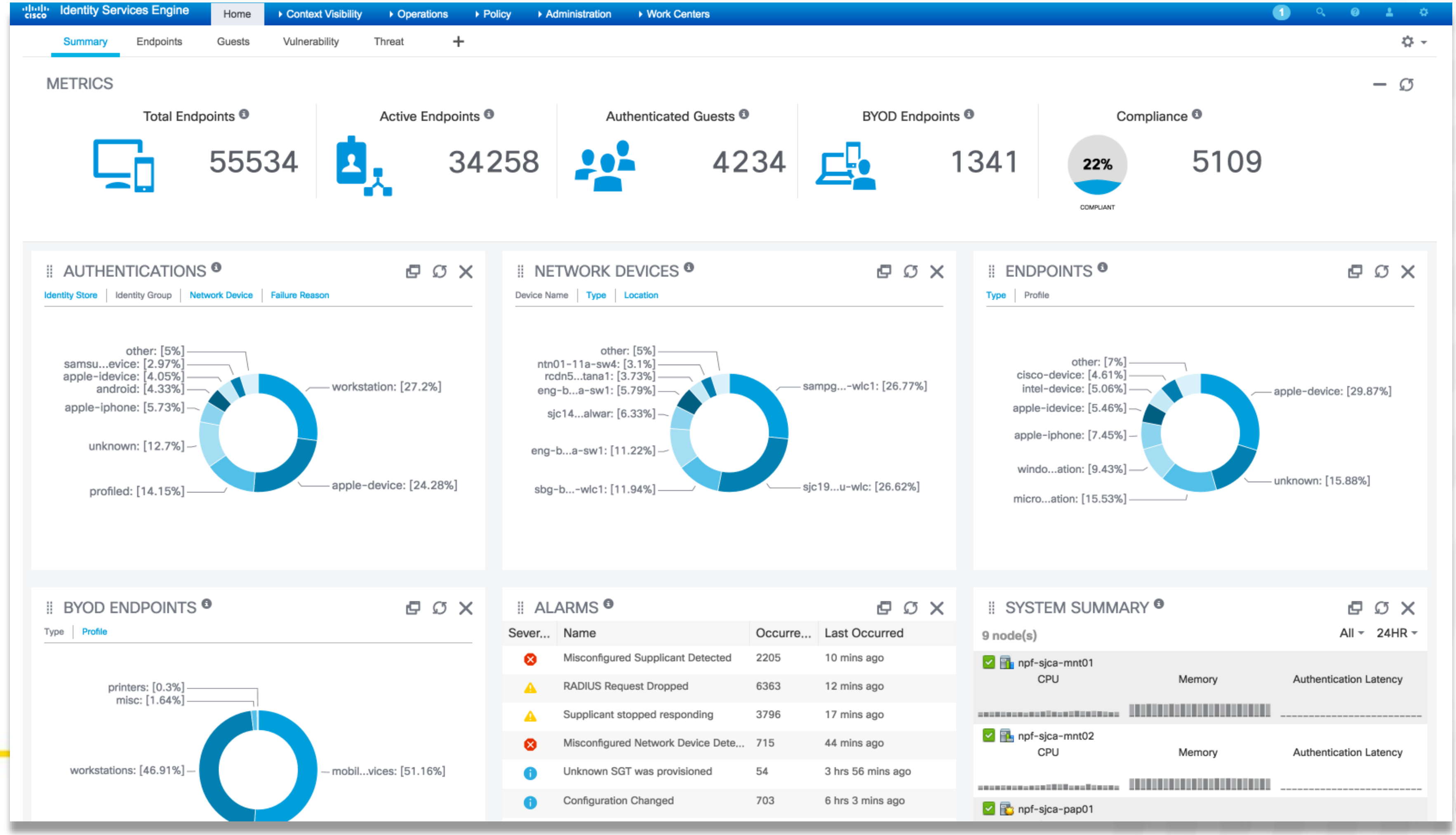
Cisco Identity Services Engine

A centralized security solution that automates context-aware access to network resources and shares contextual data



Asset Visibility

Security starts with 'Visibility'



Total Endpoints	Active Endpoints	Authenticated Guests	BYOD Endpoints	Compliance
55534	34258	4234	1341	22% 5109

Sever...	Name	Occurre...	Last Occurred
⊗	Misconfigured Supplicant Detected	2205	10 mins ago
⚠	RADIUS Request Dropped	6363	12 mins ago
⚠	Supplicant stopped responding	3796	17 mins ago
⊗	Misconfigured Network Device Dete...	715	44 mins ago
ⓘ	Unknown SGT was provisioned	54	3 hrs 56 mins ago
ⓘ	Configuration Changed	703	6 hrs 3 mins ago

☑ npf-sjca-mnt01
CPU Memory Authentication Latency

☑ npf-sjca-mnt02
CPU Memory Authentication Latency

☑ npf-sjca-pap01

Role-Based Access

TACACS+ Device Administration Support for Cisco ISE 2.0

What's New for Cisco ISE 2.0?

Customers can now use TACACS+ with Cisco® ISE to simplify device administration and enhance security through flexible, granular control of access to network devices.

Benefits

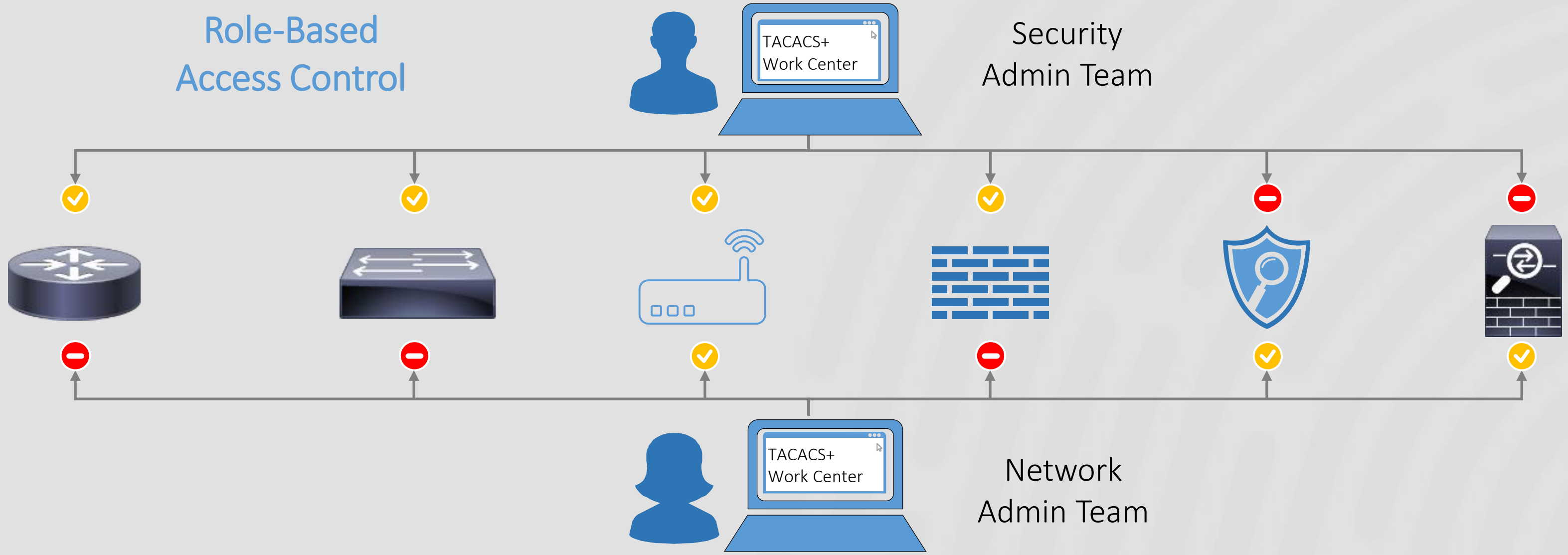
Simplified, Centralized Device Administration
Increase security, compliance, and auditing for a full range of administration use cases

Flexible, Granular Control
Control and audit the configuration of network devices

Holistic, Centralized Visibility
Get a comprehensive view of TACACS+ configurations with the TACACS+ administrator work center

TACACS+ Device Administration

Role-Based Access Control



Capabilities

- Role-based access control
- Flow-based user experience
- Command-level authorization with detailed logs for auditing
- Dedicated TACACS+ work center for network administrators
- Support for core Cisco Secure Access Control System 5 (ACS5) features

Visibility

Versions of NetFlow

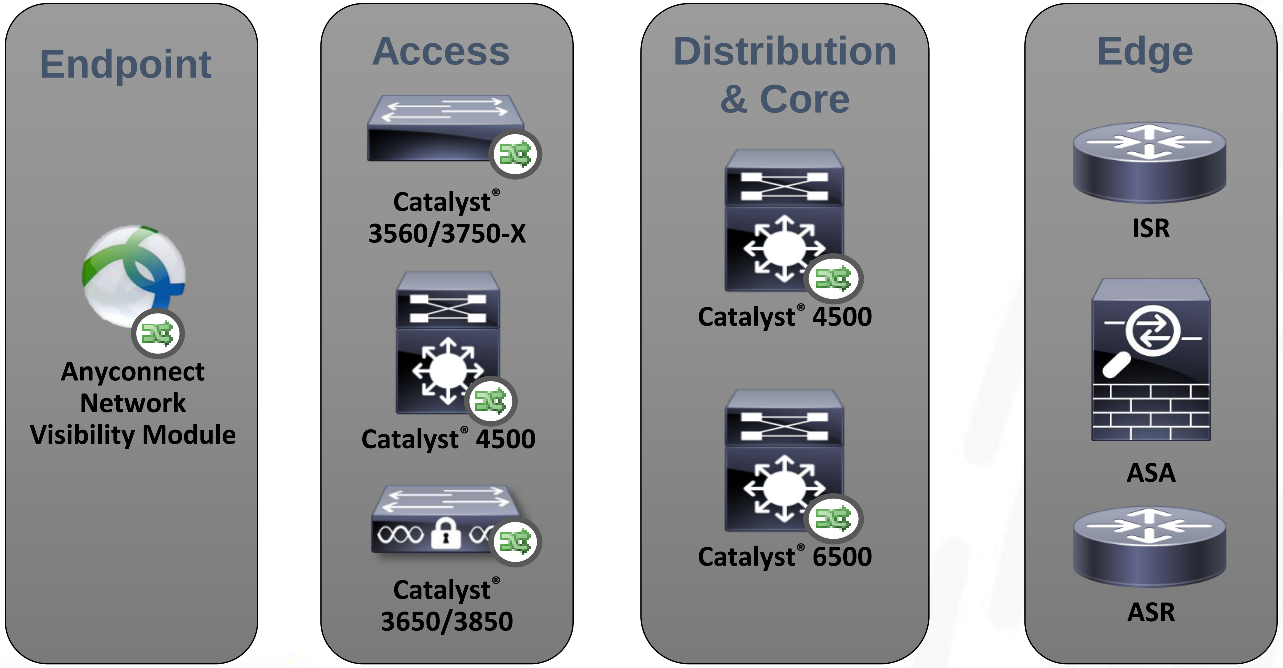
Version 5
Fixed Format
18 Defined Entities

Version 9
Template Based
108 Defined Entities

IPFIX
Standardized
Template Based
Variable Length Fields
450+ Defined Entities

NetFlow Deployment

Each network layer offers unique telemetry capabilities



Endpoint

Anyconnect Network Visibility Module

Access

Catalyst® 3560/3750-X

Catalyst® 4500

Catalyst® 3650/3850

Distribution & Core

Catalyst® 4500

Catalyst® 6500

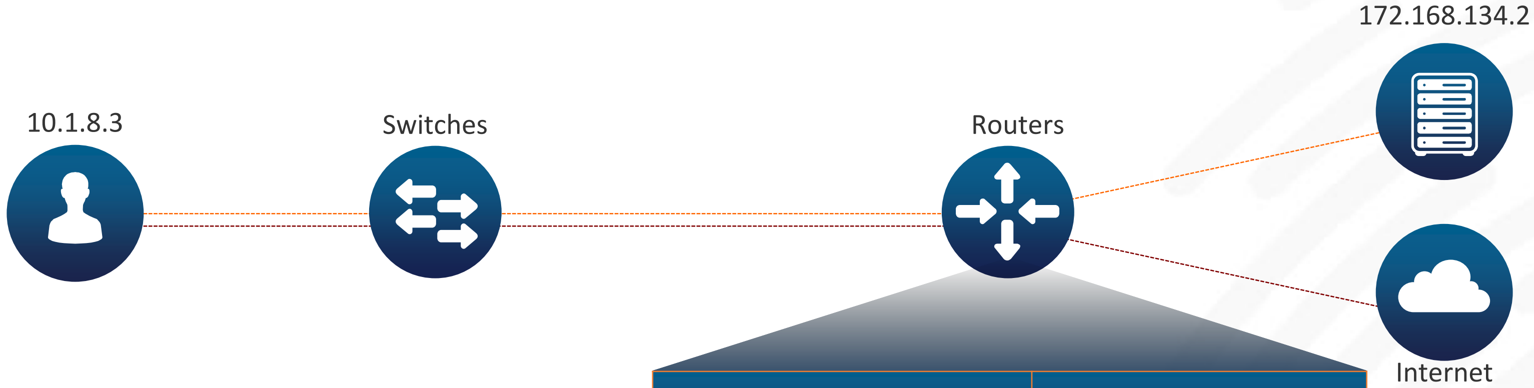
Edge

ISR

ASA

ASR

Visibility through NetFlow

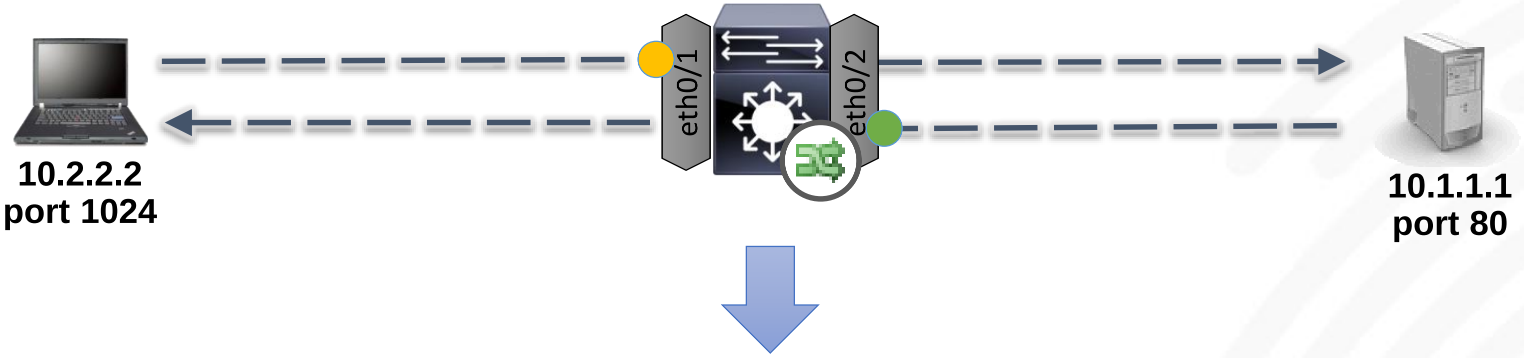


NetFlow provides

- Trace of every conversation in your network
- An ability to collect record everywhere in your network (switch, router, or firewall)
- Network usage measurement
- An ability to find north-south as well as east-west communication
- Light weight visibility compared to SPAN based traffic analysis
- Indications of Compromise (IOC)
- Security Group Information

Flow Information	Packets
SOURCE ADDRESS	10.1.8.3
DESTINATION ADDRESS	172.168.134.2
SOURCE PORT	47321
DESTINATION PORT	443
INTERFACE	Gi0/0/0
IP TOS	0x00
IP PROTOCOL	6
NEXT HOP	172.168.25.1
TCP FLAGS	0x1A
SOURCE SGT	**100**
:	:
APPLICATION NAME	NBAR SECURE-HTTP

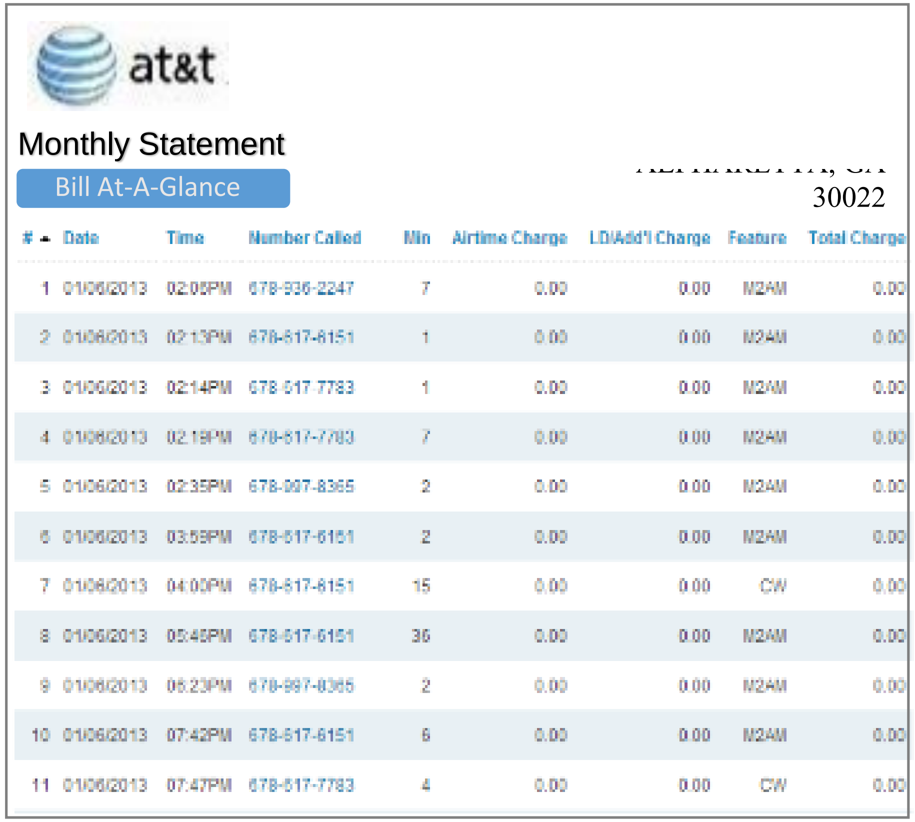
NetFlow



Start Time	Interface	Src IP	Src Port	Dest IP	Dest Port	Proto	Pkts Sent	Bytes Sent	SGT	DGT	TCP Flags
10:20:12.221	eth0/1	10.2.2.2	1024	10.1.1.1	80	TCP	5	1025	100	1010	SYN,ACK,PSH
10:20:12.871	eth0/2	10.1.1.1	80	10.2.2.2	1024	TCP	17	28712	1010	100	SYN,ACK,FIN

NetFlow - The Network Phone Bill

Telephone Bill



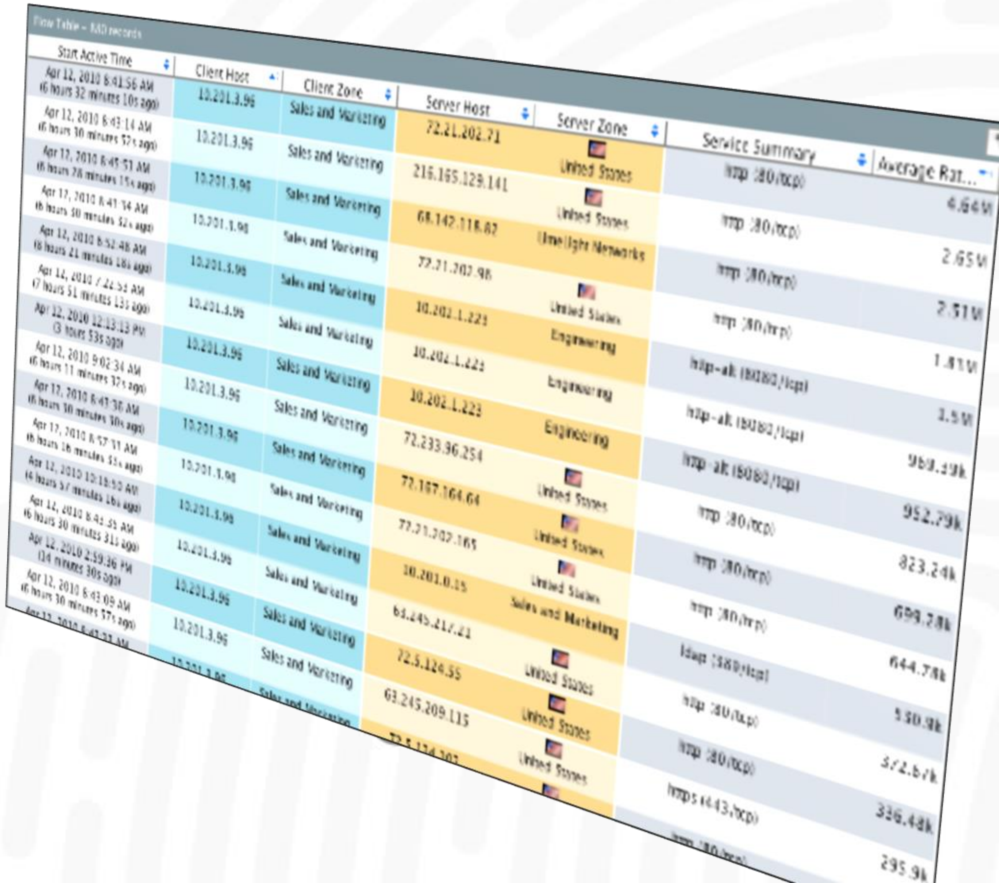
Monthly Statement

Bill At-A-Glance

30022

#	Date	Time	Number Called	Min	Airtime Charge	LD/Add'l Charge	Feature	Total Charge
1	01/06/2013	02:05PM	678-936-2247	7	0.00	0.00	M2AM	0.00
2	01/06/2013	02:13PM	678-617-6151	1	0.00	0.00	M2AM	0.00
3	01/06/2013	02:14PM	678-617-7783	1	0.00	0.00	M2AM	0.00
4	01/06/2013	02:19PM	678-617-7783	7	0.00	0.00	M2AM	0.00
5	01/06/2013	02:35PM	678-997-8365	2	0.00	0.00	M2AM	0.00
6	01/06/2013	03:59PM	678-617-6151	2	0.00	0.00	M2AM	0.00
7	01/06/2013	04:00PM	678-617-6151	15	0.00	0.00	CW	0.00
8	01/06/2013	05:45PM	678-617-6151	36	0.00	0.00	M2AM	0.00
9	01/06/2013	06:23PM	678-997-8365	2	0.00	0.00	M2AM	0.00
10	01/06/2013	07:42PM	678-617-6151	6	0.00	0.00	M2AM	0.00
11	01/06/2013	07:47PM	678-617-7783	4	0.00	0.00	CW	0.00

NetFlow = shows you the **who, what, where and when**. It's a phone bill, which we use to look for out of the ordinary behaviour.



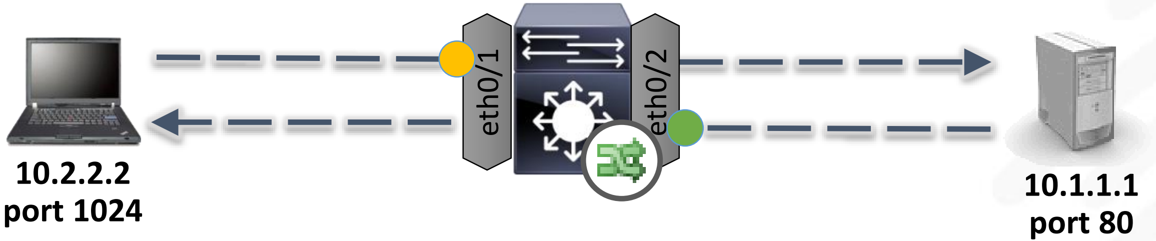
Flow Table – [illegible] records

Start Active Time	Client Host	Client Zone	Server Host	Server Zone	Service Summary	Average Rat...
Apr 12, 2010 6:41:56 AM (6 hours 32 minutes 10s ago)	10.201.3.96	Sales and Marketing	72.21.202.71	United States	http (80/tcp)	4.64M
Apr 12, 2010 6:43:14 AM (6 hours 30 minutes 52s ago)	10.201.3.96	Sales and Marketing	216.165.129.141	United States	http (80/tcp)	2.65M
Apr 12, 2010 6:45:51 AM (6 hours 28 minutes 15s ago)	10.201.3.96	Sales and Marketing	68.142.118.82	Limelight Networks	http (80/tcp)	2.51M
Apr 12, 2010 6:41:34 AM (6 hours 30 minutes 52s ago)	10.201.3.96	Sales and Marketing	72.21.202.98	United States	http (80/tcp)	1.81M
Apr 12, 2010 6:52:48 AM (6 hours 21 minutes 18s ago)	10.201.3.96	Sales and Marketing	10.202.1.223	Engineering	http-alt (8080/tcp)	1.5M
Apr 12, 2010 7:22:53 AM (7 hours 51 minutes 13s ago)	10.201.3.96	Sales and Marketing	10.202.1.223	Engineering	http-alt (8080/tcp)	969.39k
Apr 12, 2010 12:13:13 PM (3 hours 53s ago)	10.201.3.96	Sales and Marketing	10.202.1.223	Engineering	http-alt (8080/tcp)	952.79k
Apr 12, 2010 9:02:34 AM (6 hours 11 minutes 32s ago)	10.201.3.96	Sales and Marketing	72.233.96.254	United States	http (80/tcp)	823.24k
Apr 12, 2010 6:43:36 AM (6 hours 30 minutes 30s ago)	10.201.3.96	Sales and Marketing	72.167.164.64	United States	http (80/tcp)	699.78k
Apr 12, 2010 6:57:31 AM (6 hours 16 minutes 35s ago)	10.201.3.96	Sales and Marketing	72.21.202.165	United States	http (80/tcp)	644.78k
Apr 12, 2010 10:18:50 AM (4 hours 57 minutes 16s ago)	10.201.3.96	Sales and Marketing	10.201.0.15	Sales and Marketing	ldap (389/tcp)	550.9k
Apr 12, 2010 6:43:35 AM (6 hours 30 minutes 31s ago)	10.201.3.96	Sales and Marketing	63.245.217.21	United States	http (80/tcp)	372.67k
Apr 12, 2010 2:59:36 PM (14 minutes 30s ago)	10.201.3.96	Sales and Marketing	72.5.124.55	United States	http (80/tcp)	336.48k
Apr 12, 2010 6:43:09 AM (6 hours 30 minutes 57s ago)	10.201.3.96	Sales and Marketing	63.245.209.115	United States	https (443/tcp)	295.9k

Flow Record

NetFlow Collection: Flow Stitching

Uni-directional flow records



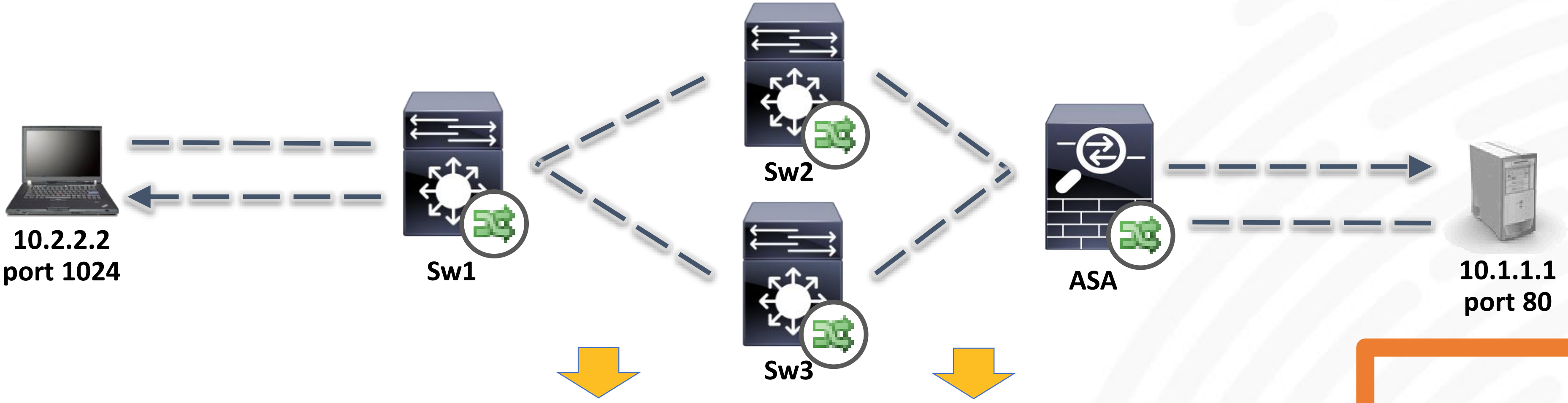
Start Time	Interface	Src IP	Src Port	Dest IP	Dest Port	Proto	Pkts Sent	Bytes Sent	SGT	DGT
10:20:12.221	eth0/1	10.2.2.2	1024	10.1.1.1	80	TCP	5	1025	100	1010
10:20:12.871	eth0/2	10.1.1.1	80	10.2.2.2	1024	TCP	17	28712	1010	100

Start Time	Client IP	Client Port	Server IP	Server Port	Proto	Client Bytes	Client Pkts	Server Bytes	Server Pkts	Client SGT	Server SGT	Interfaces
10:20:12.221	10.2.2.2	1024	10.1.1.1	80	TCP	1025	5	28712	17	100	1010	eth0/1 eth0/2

Bi-directional:

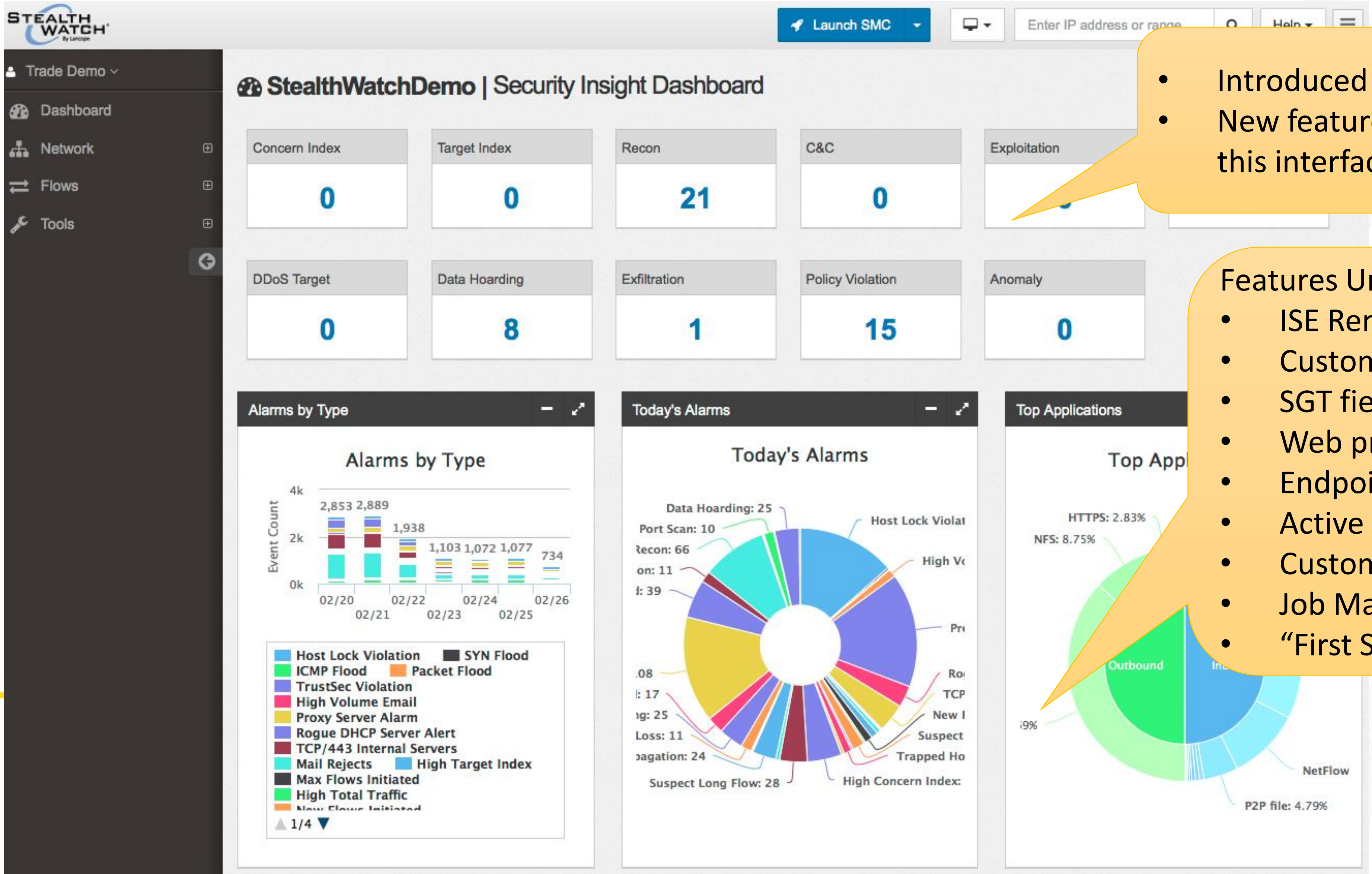
- Conversation flow record
- Allows easy visualization and analysis

NetFlow Collection: De-duplication



Start Time	Client IP	Client Port	Server IP	Server Port	Proto	Client Bytes	Client Pkts	Server Bytes	Server Pkts	App	Client SGT	Server SGT	Exporter, Interface, Direction, Action
10:20:12.221	10.2.2.2	1024	10.1.1.1	80	TCP	1025	5	28712	17	HTTP	100	1010	Sw1, eth0, in Sw1, eth1, out Sw2, eth0, in Sw2, eth1, out ASA, eth1, in ASA, eth0, out, Permitted ASA eth0, in, Permitted ASA, eth1, out Sw3, eth1, in Sw3, eth0, out Sw1, eth1, in Sw1, eth0, out

Aside: SMC Interface 1: “Web” Interface

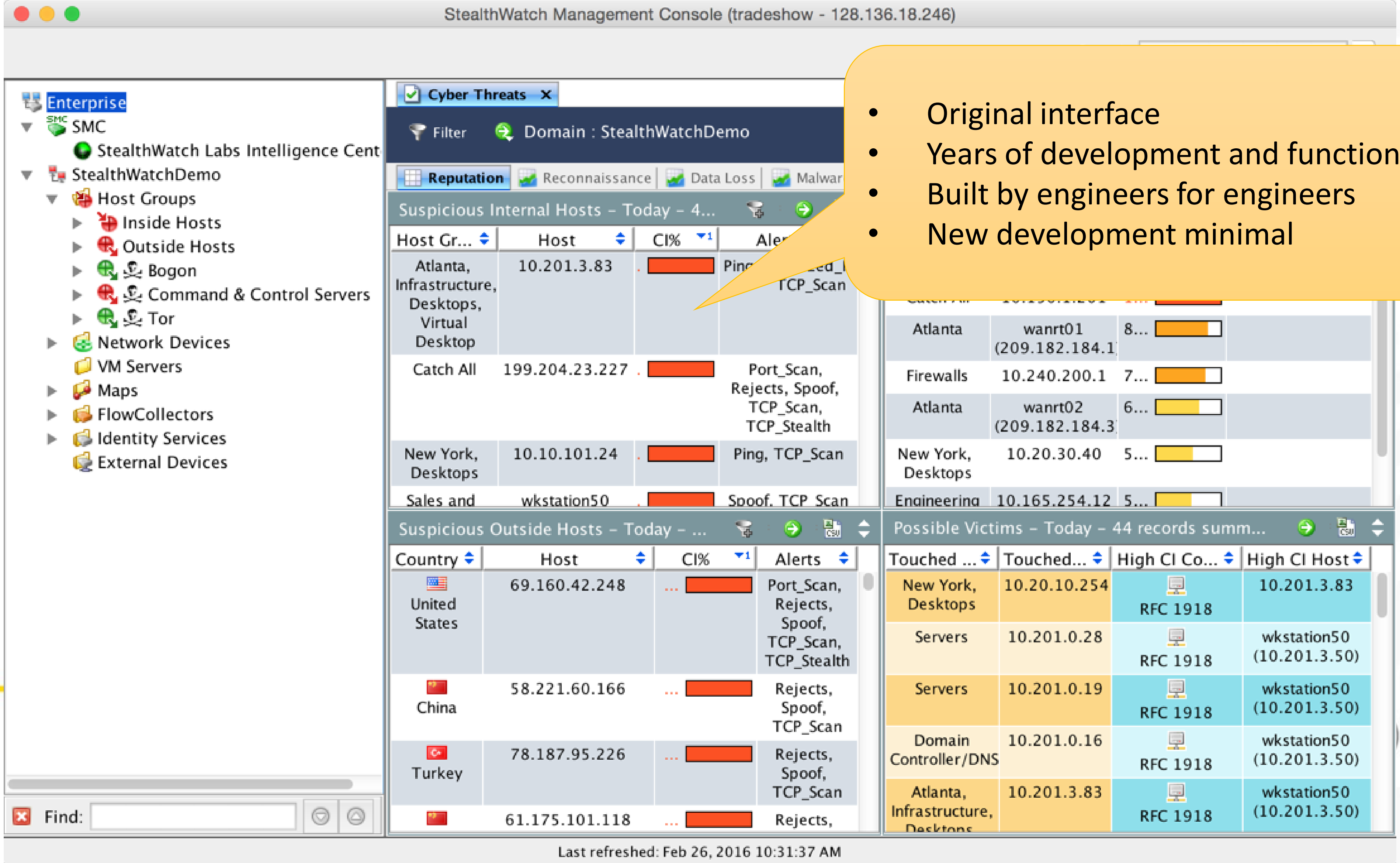


- Introduced in Stealthwatch 6.5
- New features/functionality is added to this interface

Features Unique to Web Interface:

- ISE Remediation
- Custom Events
- SGT fields in Flow Record
- Web proxy data
- Endpoint data
- Active Directory Configuration
- Custom Applications
- Job Management
- “First Seen”

Aside: SMC Interface 2: Java (Swing) Client



StealthWatch Management Console (tradeshow - 128.136.18.246)

- Enterprise
  - SMC
    - StealthWatch Labs Intelligence Cent
  - StealthWatchDemo
    - Host Groups
      - Inside Hosts
      - Outside Hosts
      - Bogon
      - Command & Control Servers
      - Tor
    - Network Devices
    - VM Servers
    - Maps
    - FlowCollectors
    - Identity Services
    - External Devices

Find:

Cyber Threats ✕

Filter | Domain : StealthWatchDemo

Reputation | Reconnaissance | Data Loss | Malwar

Suspicious Internal Hosts – Today – 4...

Host Gr...	Host	CI%	Aler
Atlanta, Infrastructure, Desktops, Virtual Desktop	10.201.3.83	🟥	Pin TCP_Scan
Catch All	199.204.23.227	🟥	Port_Scan, Rejects, Spoof, TCP_Scan, TCP_Stealth
New York, Desktops	10.10.101.24	🟥	Ping, TCP_Scan
Sales and	wkstation50	🟥	Spoof, TCP_Scan

Atlanta	wanrt01 (209.182.184.1	8... 🟧	
Firewalls	10.240.200.1	7... 🟧	
Atlanta	wanrt02 (209.182.184.3	6... 🟨	
New York, Desktops	10.20.30.40	5... 🟨	
Engineering	10.165.254.12	5... 🟨	

Suspicious Outside Hosts – Today – ...

Country	Host	CI%	Alerts
United States	69.160.42.248	... 🟥	Port_Scan, Rejects, Spoof, TCP_Scan, TCP_Stealth
China	58.221.60.166	... 🟥	Rejects, Spoof, TCP_Scan
Turkey	78.187.95.226	... 🟥	Rejects, Spoof, TCP_Scan
	61.175.101.118	... 🟥	Rejects,

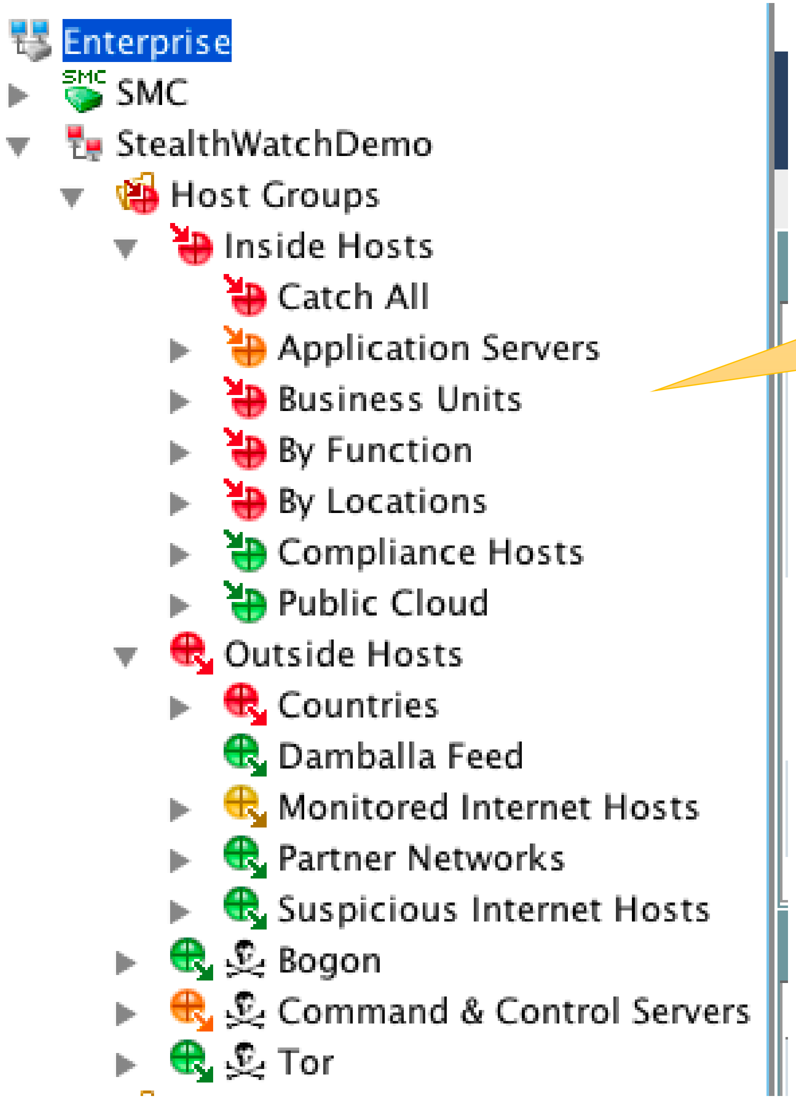
Possible Victims – Today – 44 records summ...

Touched ...	Touched...	High CI Co...	High CI Host
New York, Desktops	10.20.10.254	RFC 1918	10.201.3.83
Servers	10.201.0.28	RFC 1918	wkstation50 (10.201.3.50)
Servers	10.201.0.19	RFC 1918	wkstation50 (10.201.3.50)
Domain Controller/DNS	10.201.0.16	RFC 1918	wkstation50 (10.201.3.50)
Atlanta, Infrastructure,	10.201.3.83	RFC 1918	wkstation50 (10.201.3.50)

Last refreshed: Feb 26, 2016 10:31:37 AM

- Original interface
- Years of development and functionality
- Built by engineers for engineers
- New development minimal

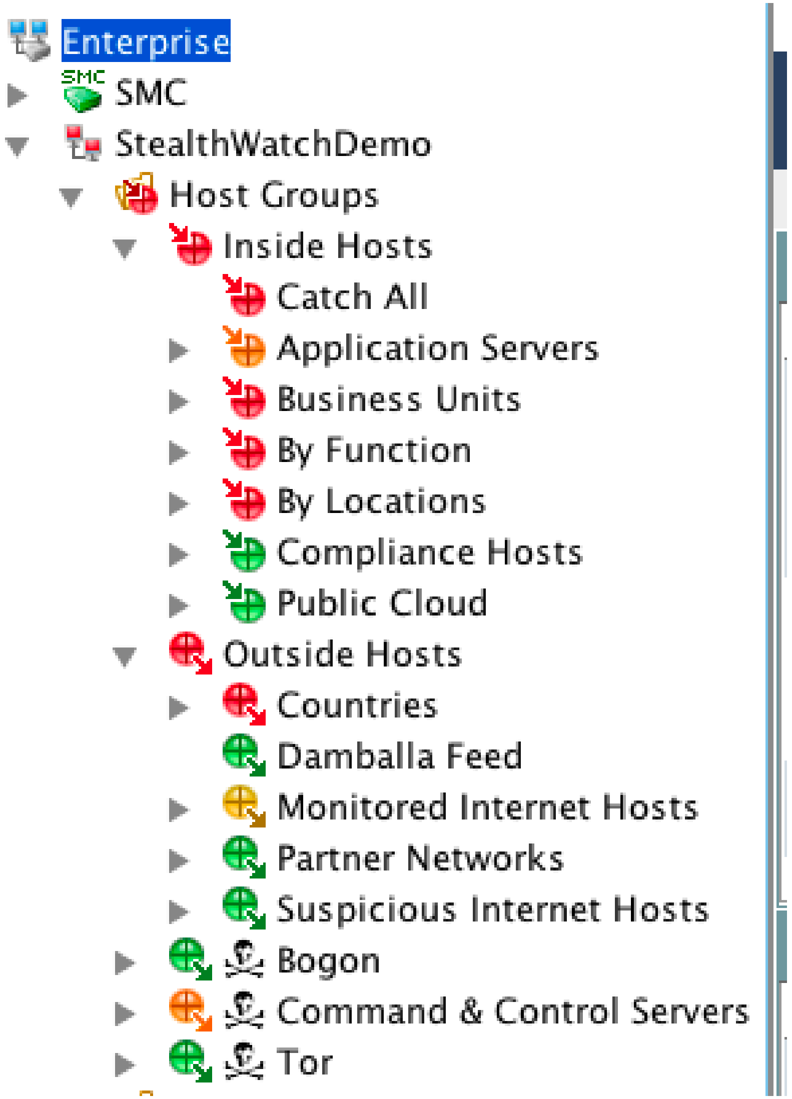
Concept: Host Groups



- Enterprise
  - SMC
  - StealthWatchDemo
    - Host Groups
      - Inside Hosts
        - Catch All
        - Application Servers
        - Business Units
        - By Function
        - By Locations
        - Compliance Hosts
        - Public Cloud
      - Outside Hosts
        - Countries
        - Damballa Feed
        - Monitored Internet Hosts
        - Partner Networks
        - Suspicious Internet Hosts
      - Bogon
      - Command & Control Servers
      - Tor

- Virtual Container of IP Addresses
- User defined
- Similar attributes
- Model any Process/Application

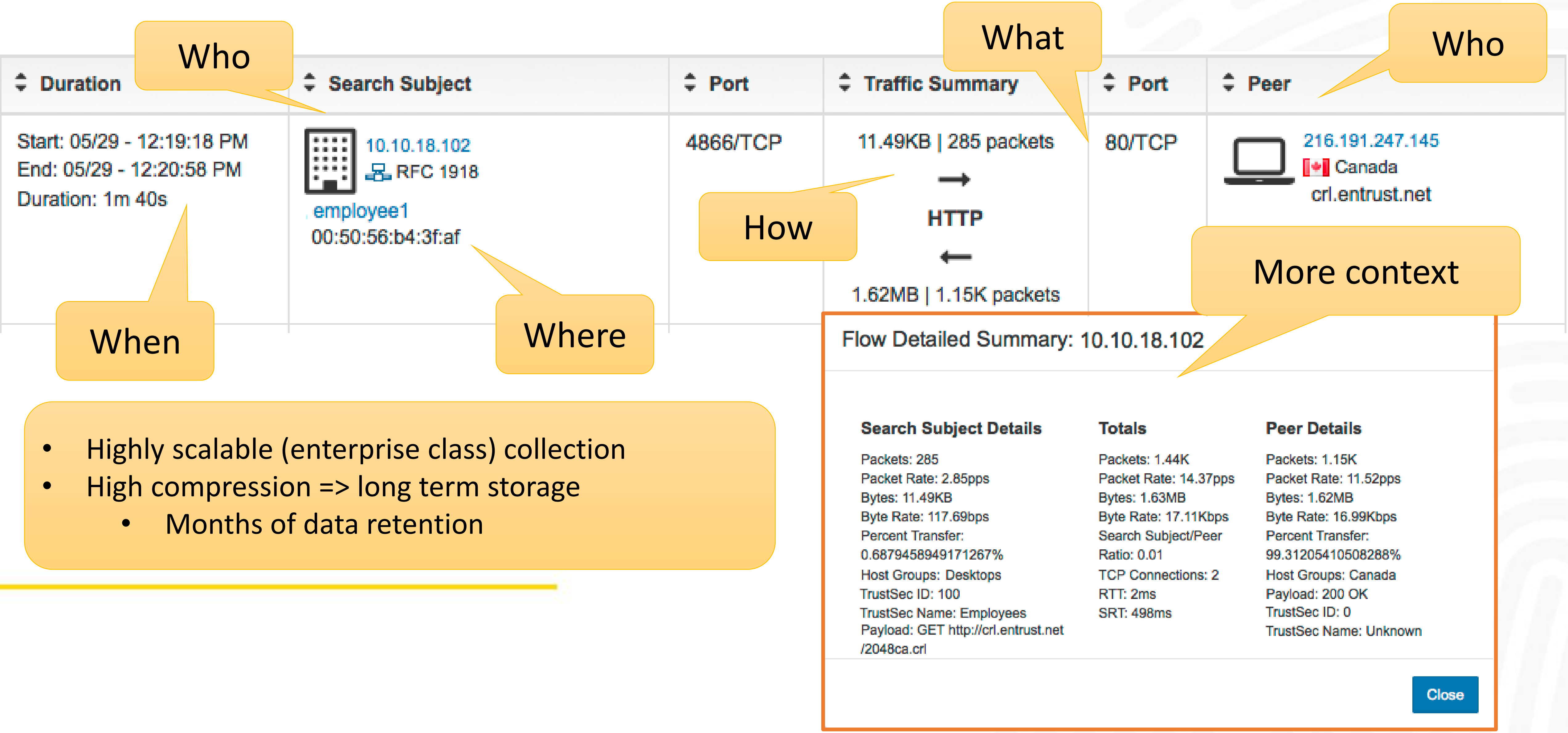
Types of Host Groups



Enterprise
SMC
StealthWatchDemo
Host Groups
Inside Hosts
Catch All
Application Servers
Business Units
By Function
By Locations
Compliance Hosts
Public Cloud
Outside Hosts
Countries
Damballa Feed
Monitored Internet Hosts
Partner Networks
Suspicious Internet Hosts
Bogon
Command & Control Servers
Tor

- **Inside Hosts:**
  - All Hosts specifically defined as part of the network
  - By Default – "Catch All"
- **Outside Hosts**
  - All Hosts not specifically defined as part of the network
  - Countries – GEO-IP
- **SLIC Created**
  - Bogon
  - Command & Control Servers
  - Tor

Conversational Flow Record



Who

What

Who

How

When

Where

More context

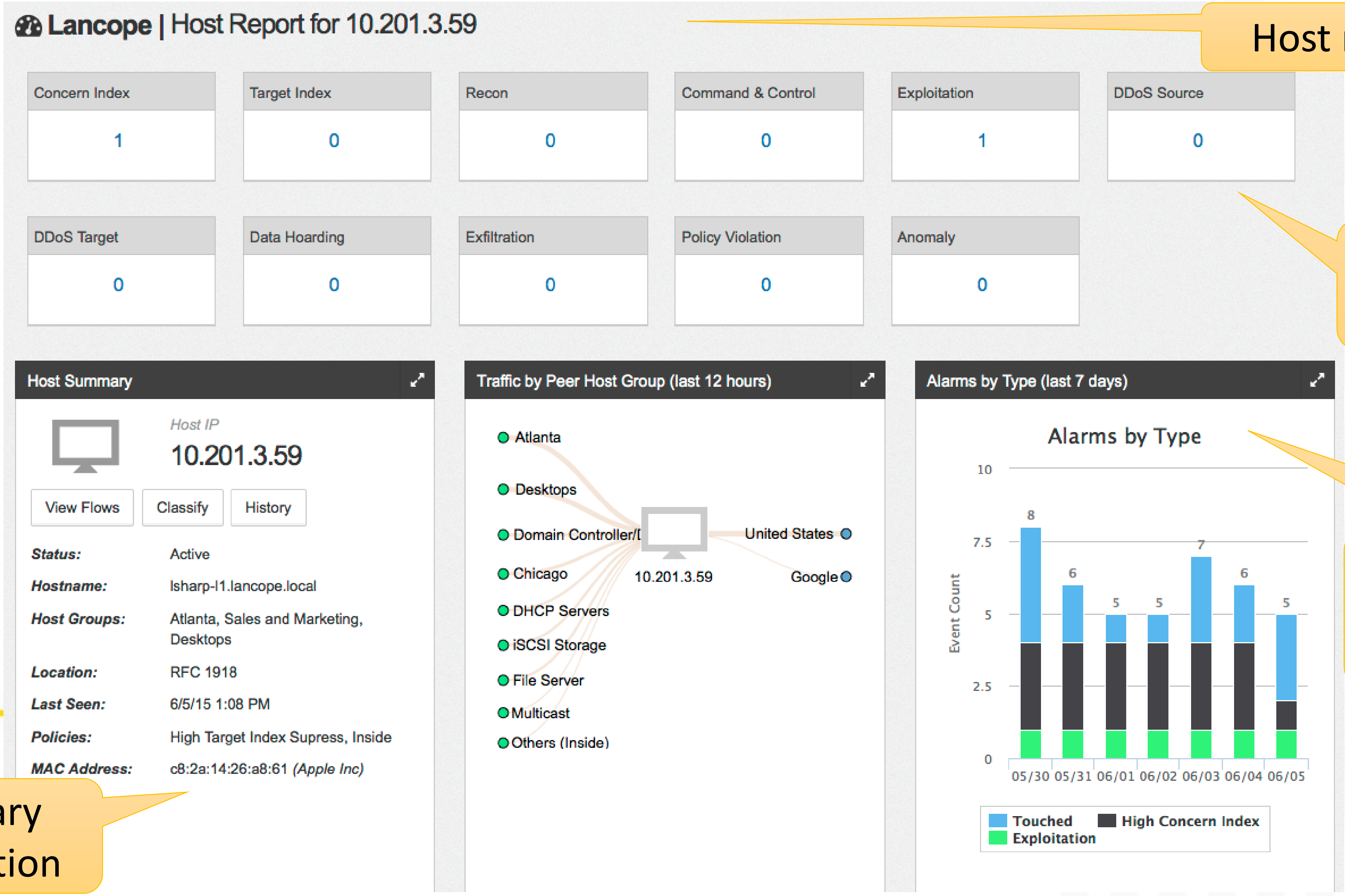
Duration	Search Subject	Port	Traffic Summary	Port	Peer
Start: 05/29 - 12:19:18 PM End: 05/29 - 12:20:58 PM Duration: 1m 40s	10.10.18.102 RFC 1918 employee1 00:50:56:b4:3f:af	4866/TCP	11.49KB | 285 packets → HTTP ← 1.62MB | 1.15K packets	80/TCP	216.191.247.145 Canada crl.entrust.net

Flow Detailed Summary: 10.10.18.102

Search Subject Details	Totals	Peer Details
Packets: 285	Packets: 1.44K	Packets: 1.15K
Packet Rate: 2.85pps	Packet Rate: 14.37pps	Packet Rate: 11.52pps
Bytes: 11.49KB	Bytes: 1.63MB	Bytes: 1.62MB
Byte Rate: 117.69bps	Byte Rate: 17.11Kbps	Byte Rate: 16.99Kbps
Percent Transfer: 0.6879458949171267%	Search Subject/Peer Ratio: 0.01	Percent Transfer: 99.31205410508288%
Host Groups: Desktops	TCP Connections: 2	Host Groups: Canada
TrustSec ID: 100	RTT: 2ms	Payload: 200 OK
TrustSec Name: Employees	SRT: 498ms	TrustSec ID: 0
Payload: GET http://crl.entrust.net/2048ca.crl		TrustSec Name: Unknown

- Highly scalable (enterprise class) collection
- High compression => long term storage
    - Months of data retention

Profiling a Host



Lancope | Host Report for 10.201.3.59

Concern Index	Target Index	Recon	Command & Control	Exploitation	DDoS Source
1	0	0	0	1	0

DDoS Target	Data Hoarding	Exfiltration	Policy Violation	Anomaly
0	0	0	0	0

Host Summary

Host IP

10.201.3.59

View Flows | Classify | History

Status: Active

Hostname: lsharp-l1.lancope.local

Host Groups: Atlanta, Sales and Marketing, Desktops

Location: RFC 1918

Last Seen: 6/5/15 1:08 PM

Policies: High Target Index Supress, Inside

MAC Address: c8:2a:14:26:a8:61 *(Apple Inc)*

Traffic by Peer Host Group (last 12 hours)

Alarms by Type (last 7 days)

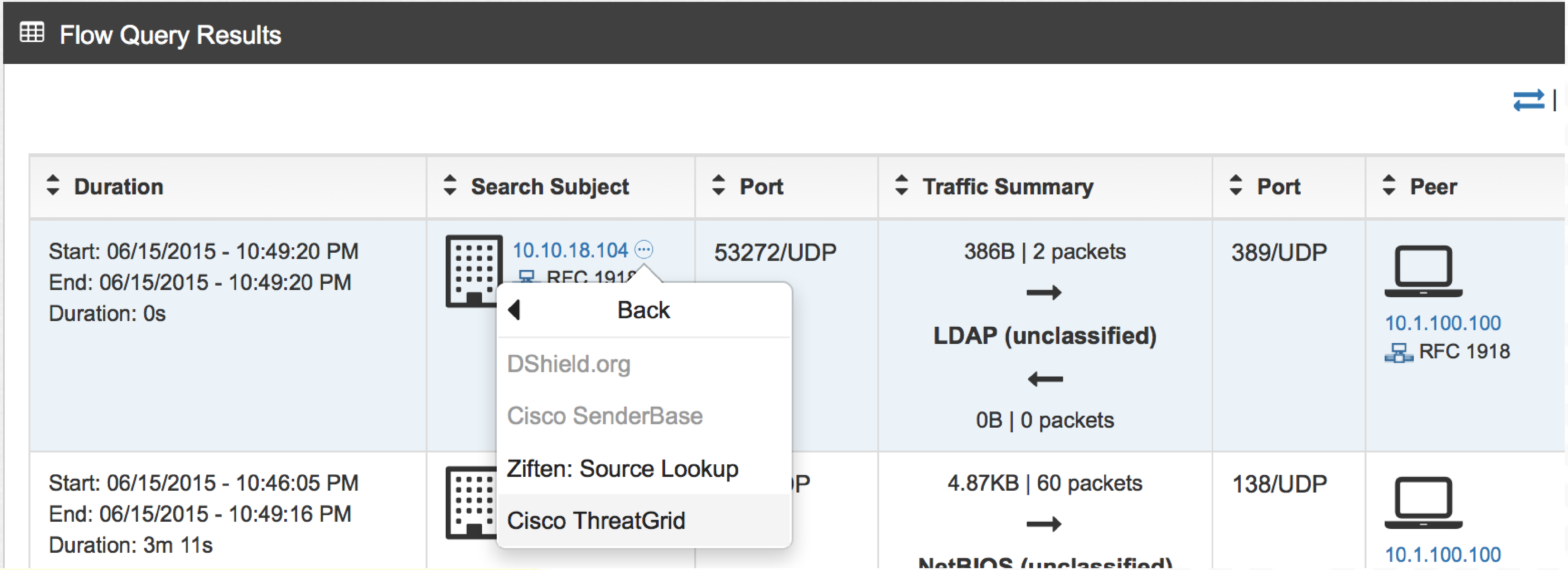
Host report for 10.201.3.59

Behavior alarms

Quick view of host group communication

Summary information

New: StealthWatch to ThreatGrid External Lookup

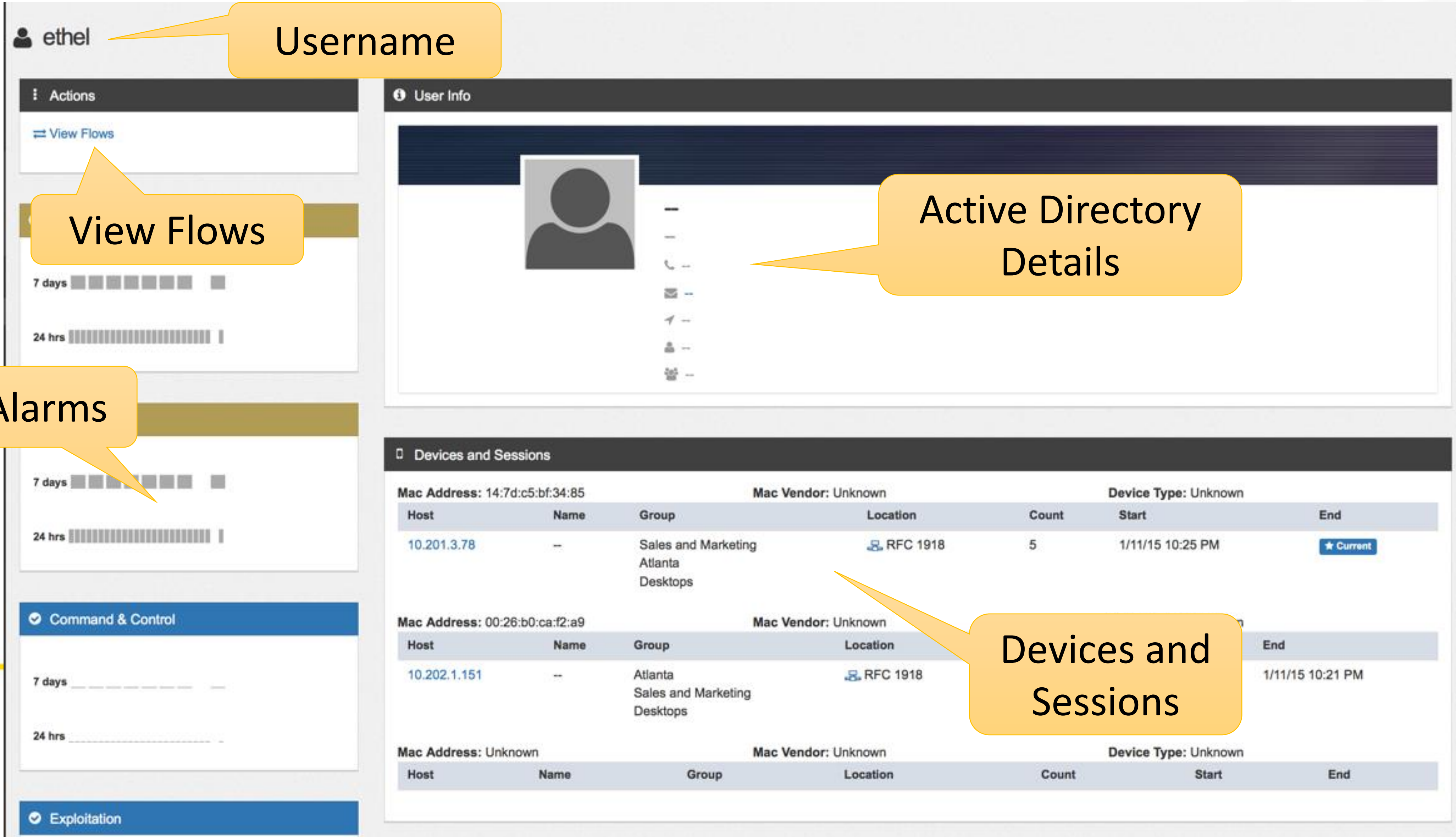


Flow Query Results

Duration	Search Subject	Port	Traffic Summary	Port	Peer
Start: 06/15/2015 - 10:49:20 PM End: 06/15/2015 - 10:49:20 PM Duration: 0s	10.10.18.104 RFC 191	53272/UDP	386B | 2 packets → **LDAP (unclassified)** ← 0B | 0 packets	389/UDP	10.1.100.100 RFC 1918
Start: 06/15/2015 - 10:46:05 PM End: 06/15/2015 - 10:49:16 PM Duration: 3m 11s		P	4.87KB | 60 packets → **NetBIOS (unclassified)**	138/UDP	10.1.100.100

Dynamic Analysis lookup

Extrapolating to a User



ethel

Username

Actions

View Flows

View Flows

7 days

24 hrs

Alarms

7 days

24 hrs

Command & Control

7 days

24 hrs

Exploitation

User Info

--

--

--

--

--

--

--

Active Directory Details

Devices and Sessions

Mac Address: 14:7d:c5:bf:34:85 **Mac Vendor:** Unknown **Device Type:** Unknown

Host	Name	Group	Location	Count	Start	End
10.201.3.78	--	Sales and Marketing Atlanta Desktops	RFC 1918	5	1/11/15 10:25 PM	★ Current

Mac Address: 00:26:b0:ca:f2:a9 **Mac Vendor:** Unknown

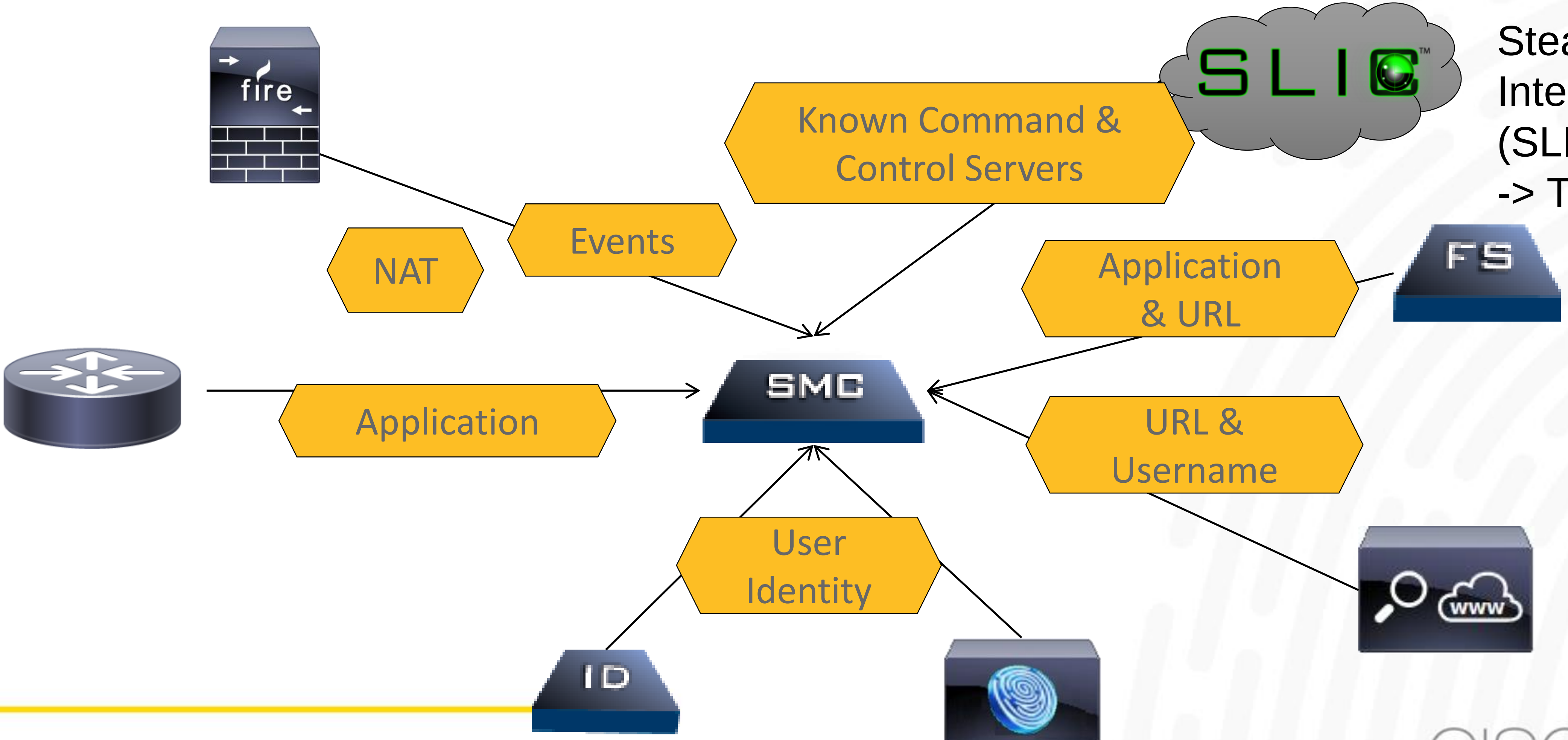
Host	Name	Group	Location	End
10.202.1.151	--	Atlanta Sales and Marketing Desktops	RFC 1918	1/11/15 10:21 PM

Mac Address: Unknown **Mac Vendor:** Unknown **Device Type:** Unknown

Host	Name	Group	Location	Count	Start	End

Devices and Sessions

Adding Context and Situation Awareness



StealthWatch Labs Intelligence Center (SLIC) Threat Feed -> TALOS

Policy and
Indication of Compromise IoC

NetFlow Analysis with StealthWatch can help:

Discovery

- Identify business critical applications and services across the network

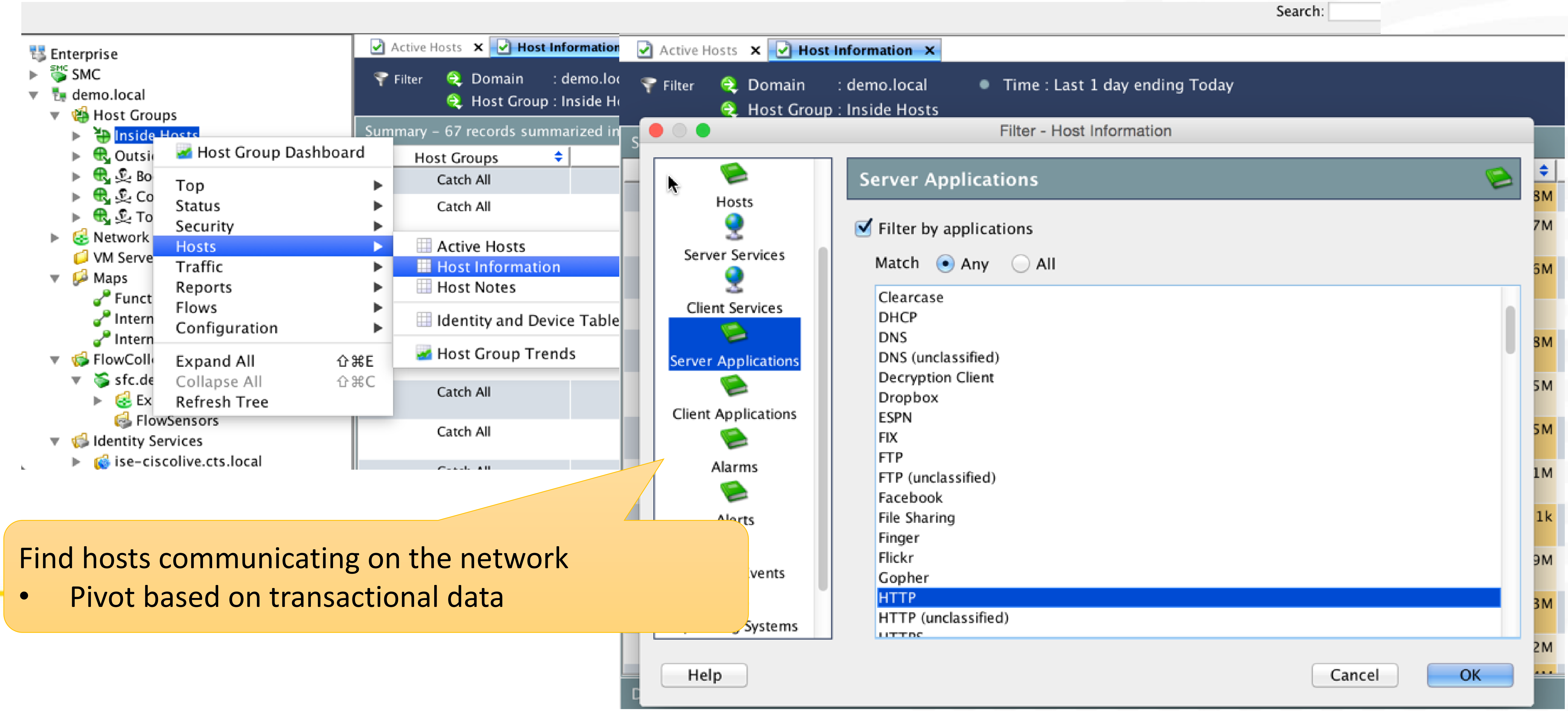
Identify additional IOCs

- Policy & Segmentation
- Network Behaviour & Anomaly Detection (NBAD)

Better understand / respond to an IOC:

- Audit trail of all host-to-host communication

Locate Assets – Discovery



Filter Domain : demo.local Time : Last 1 day ending Today
Host Group : Inside Hosts

Summary – 67 records summarized in

Filter - Host Information

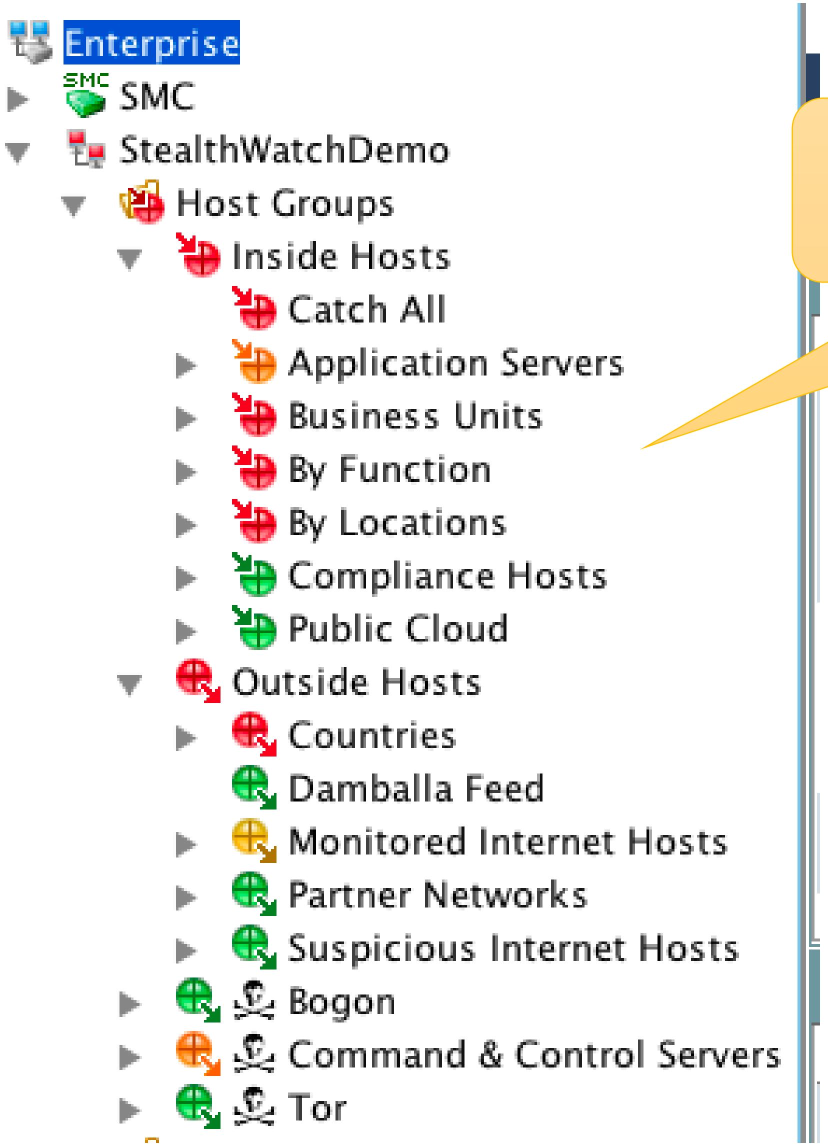
Server Applications

☑ Filter by applications

Match ● Any ○ All

Find hosts communicating on the network

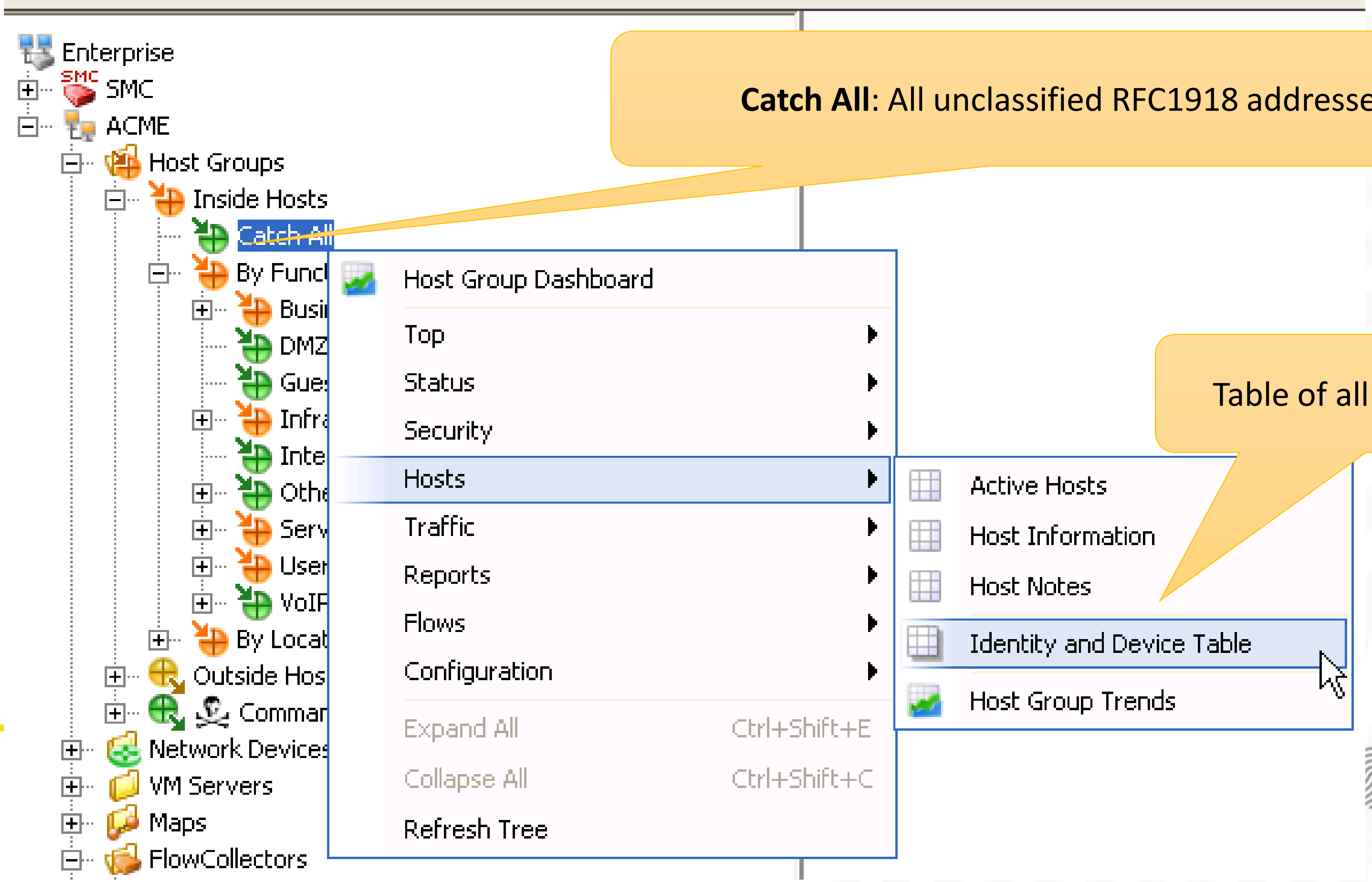
- Pivot based on transactional data



- Enterprise
  - SMC
  - StealthWatchDemo
    - Host Groups
      - Inside Hosts
        - Catch All
        - Application Servers
        - Business Units
        - By Function
        - By Locations
        - Compliance Hosts
        - Public Cloud
      - Outside Hosts
        - Countries
        - Damballa Feed
        - Monitored Internet Hosts
        - Partner Networks
        - Suspicious Internet Hosts
      - Bogon
      - Command & Control Servers
      - Tor

Host groups and reports make it easier to hunt

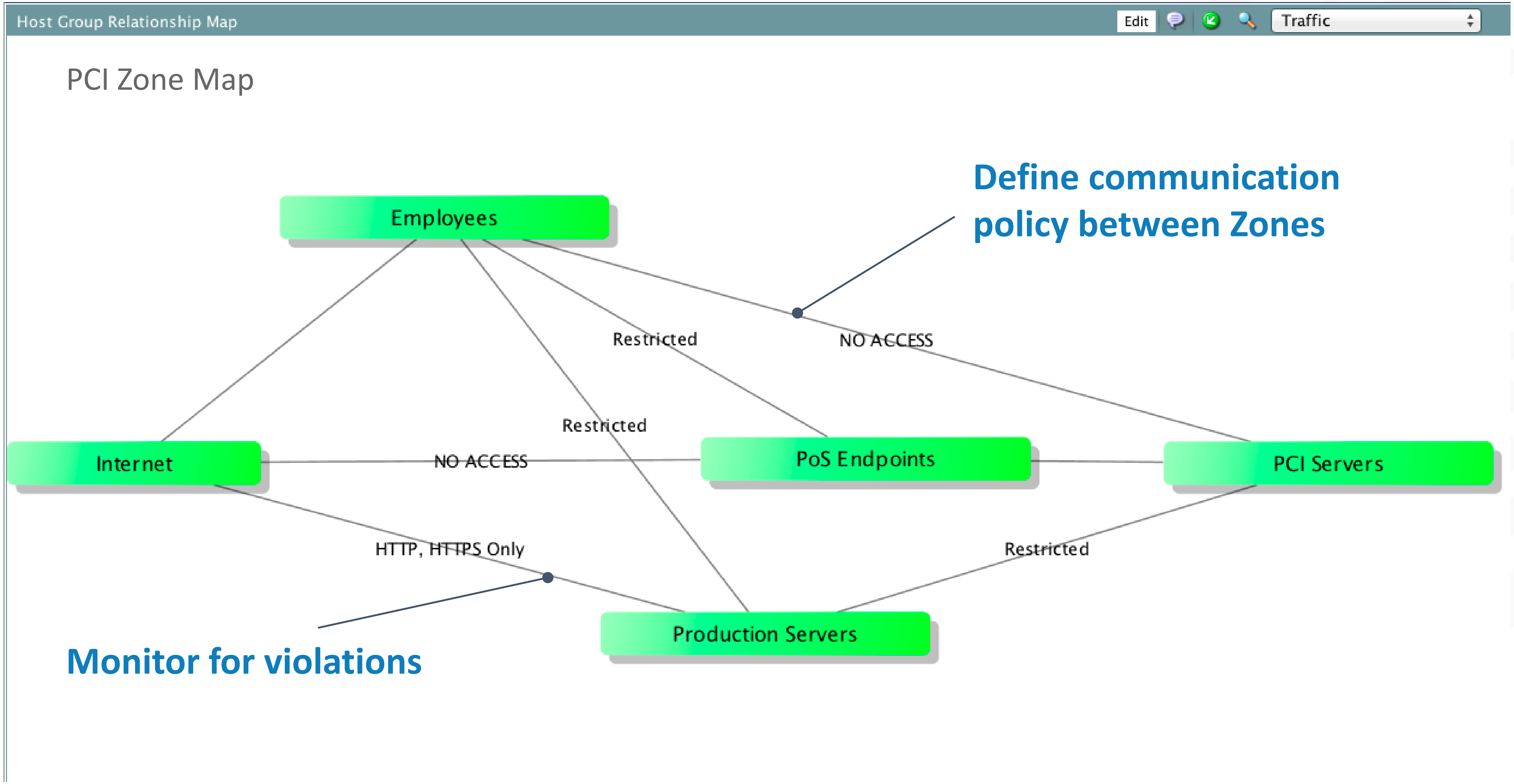
Host Groups – Discovering Rogue Hosts



Catch All: All unclassified RFC1918 addresses

Table of all individual hosts

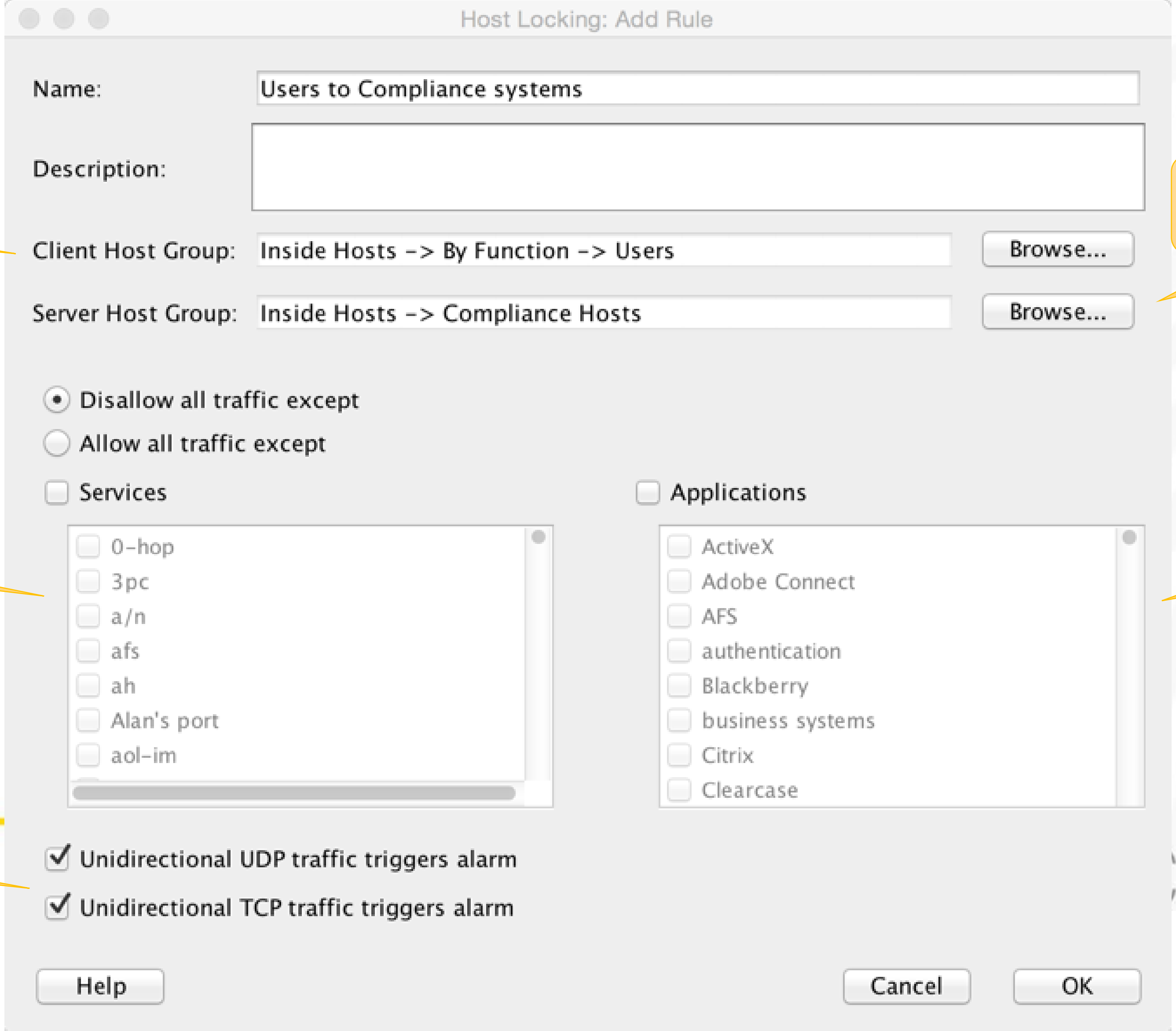
Policy & Segmentation with StealthWatch



Define communication policy between Zones

Monitor for violations

Policy Violation: Host Locking



Name: Users to Compliance systems

Description:

Client Host Group: Inside Hosts -> By Function -> Users

Server Host Group: Inside Hosts -> Compliance Hosts

● Disallow all traffic except
○ Allow all traffic except

☐ Services
☐ 0-hop
☐ 3pc
☐ a/n
☐ afs
☐ ah
☐ Alan's port
☐ aol-im

☐ Applications
☐ ActiveX
☐ Adobe Connect
☐ AFS
☐ authentication
☐ Blackberry
☐ business systems
☐ Citrix
☐ Clearcase

☑ Unidirectional UDP traffic triggers alarm
☑ Unidirectional TCP traffic triggers alarm

Client group

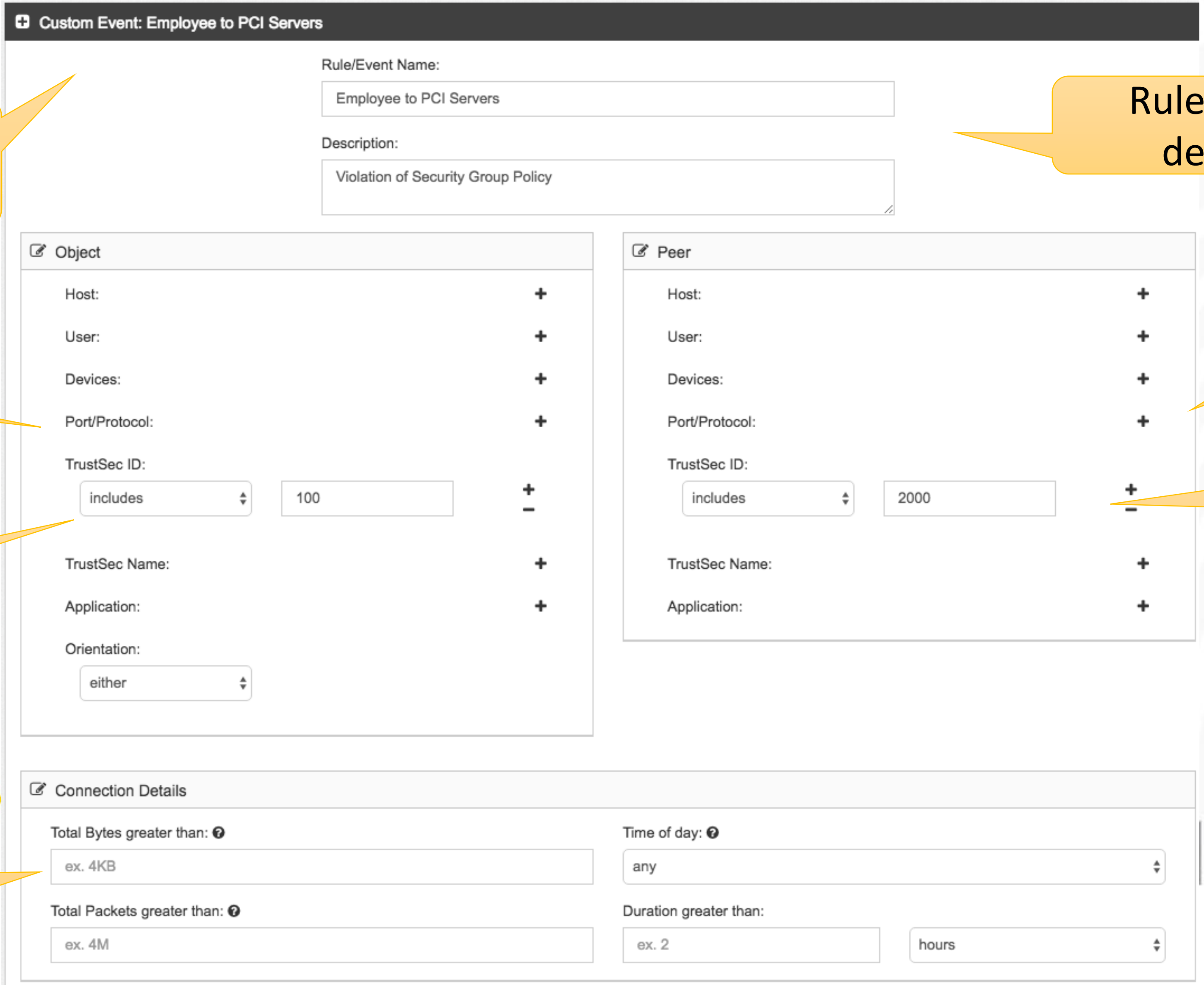
Server group

Client traffic conditions

Server traffic conditions

Successful or unsuccessful

Policy Violation: Custom Security Events



Custom Event: Employee to PCI Servers

Rule/Event Name: Employee to PCI Servers

Description: Violation of Security Group Policy

Object

Host: +
User: +
Devices: +
Port/Protocol: +
TrustSec ID: includes 100 + −
TrustSec Name: +
Application: +
Orientation: either

Peer

Host: +
User: +
Devices: +
Port/Protocol: +
TrustSec ID: includes 2000 + −
TrustSec Name: +
Application: +

Connection Details

Total Bytes greater than: ex. 4KB
Time of day: any
Total Packets greater than: ex. 4M
Duration greater than: ex. 2 hours

Custom event triggers on traffic condition

Rule name and description

Object conditions

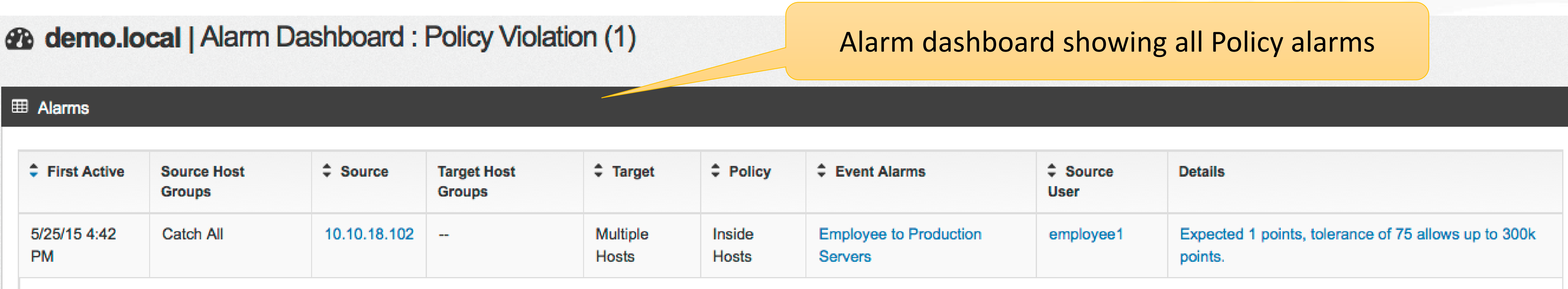
Peer conditions

Destination Tag

Source Tag

Connection conditions

Policy Violation: Custom Security Events

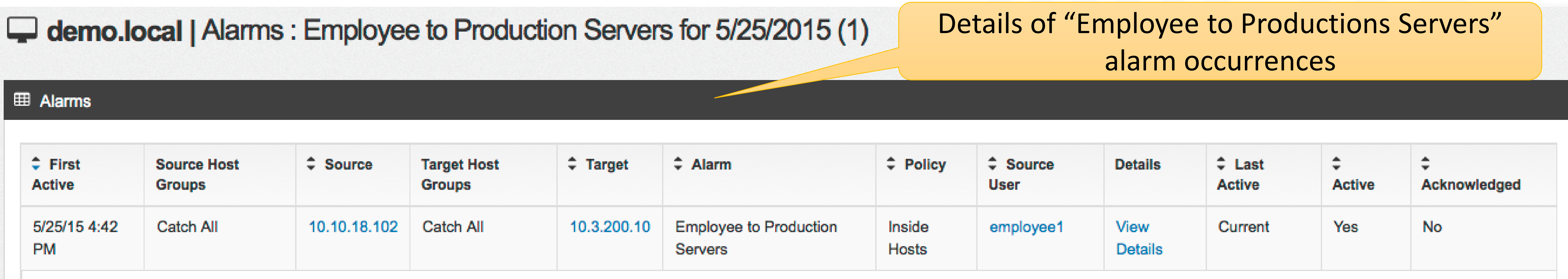


demo.local | Alarm Dashboard : Policy Violation (1)

Alarms

First Active	Source Host Groups	Source	Target Host Groups	Target	Policy	Event Alarms	Source User	Details
5/25/15 4:42 PM	Catch All	10.10.18.102	--	Multiple Hosts	Inside Hosts	Employee to Production Servers	employee1	Expected 1 points, tolerance of 75 allows up to 300k points.

Alarm dashboard showing all Policy alarms



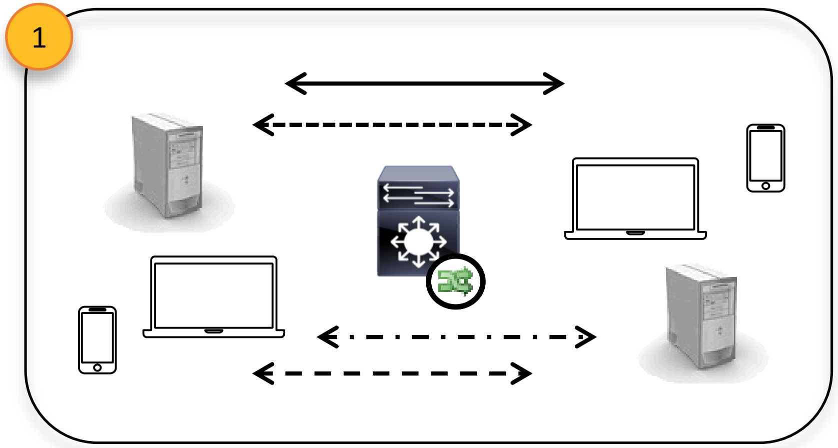
demo.local | Alarms : Employee to Production Servers for 5/25/2015 (1)

Alarms

First Active	Source Host Groups	Source	Target Host Groups	Target	Alarm	Policy	Source User	Details	Last Active	Active	Acknowledged
5/25/15 4:42 PM	Catch All	10.10.18.102	Catch All	10.3.200.10	Employee to Production Servers	Inside Hosts	employee1	View Details	Current	Yes	No

Details of “Employee to Productions Servers” alarm occurrences

Flow-based Anomaly Detection

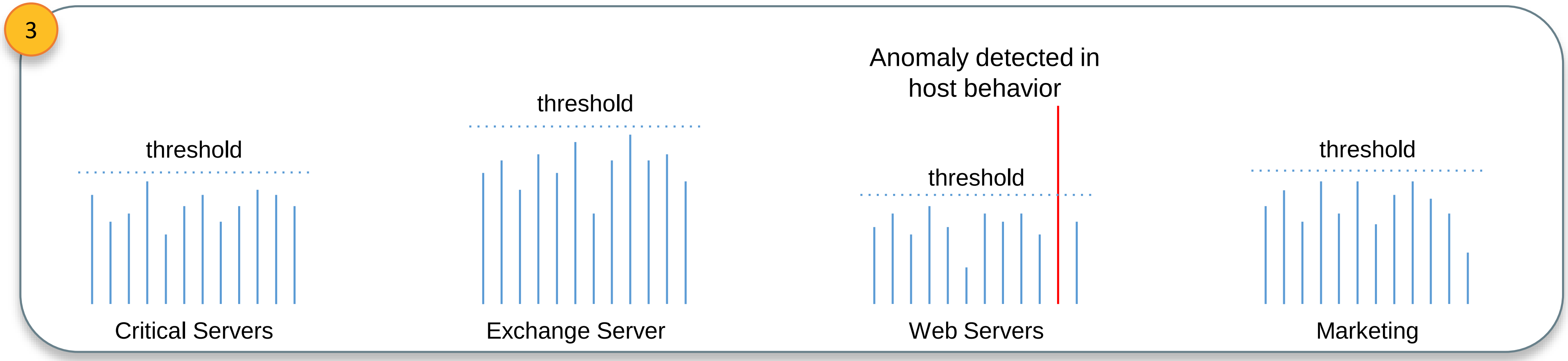


Collect & Analyze Flows

2

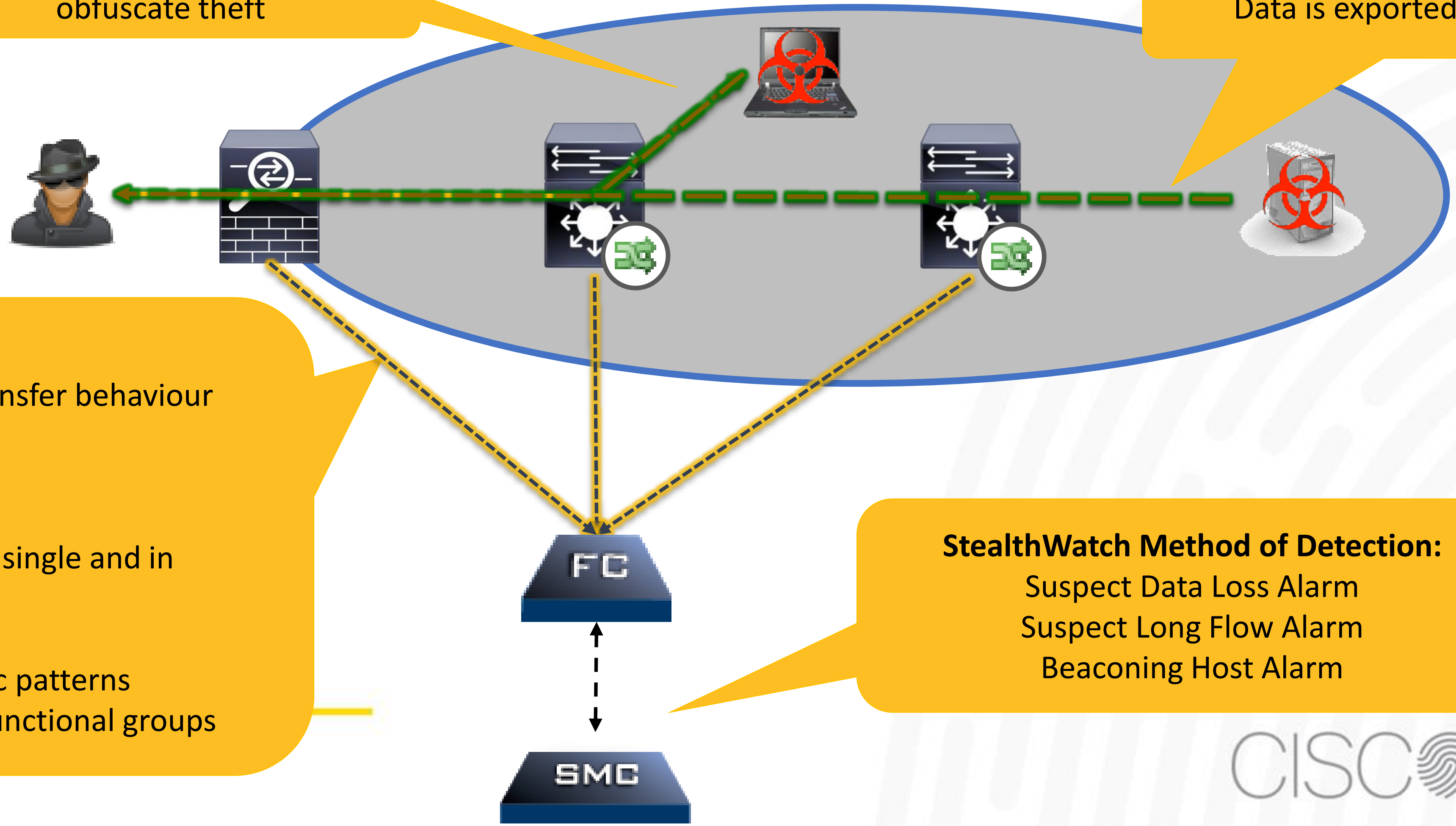
- # Concurrent flows
- Packets per second
- Bits per second
- New flows created
- Number of SYNs sent
- Time of day
- Number of SYNs received
- Rate of connection resets
- Duration of the flow
- Over 80+ other attributes

Establish Baseline of Behaviors



Alarm on Anomalies & Changes in Behavior

Detecting Data Loss



Intermediary resource used to obfuscate theft

Data is exported off resource

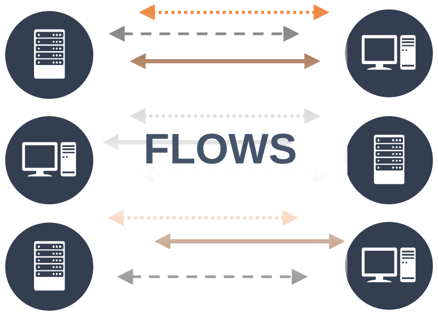
What to analyze:

- Historical data transfer behaviour
- Applications
- Time of day
- Countries
- Amount of data – single and in aggregate
- Time frames
- Asymmetric traffic patterns
- Traffic between functional groups

StealthWatch Method of Detection:
Suspect Data Loss Alarm
Suspect Long Flow Alarm
Beaconing Host Alarm

Behavioral Algorithms Are Applied to Build “Security Events”

COLLECT AND ANALYZE FLOWS



SECURITY EVENTS (94 +)

Addr_Scan/tcp
Addr_Scan/udp
Bad_Flag_ACK**
Beaconing Host
Bot Command Control Server
Bot Infected Host - Attempted
Bot Infected Host - Successful
Flow_Denied
.
.
ICMP Flood
.
.
Max Flows Initiated
Max Flows Served
.
Suspect Long Flow
Suspect UDP Activity
SYN Flood
.

ALARM CATEGORY

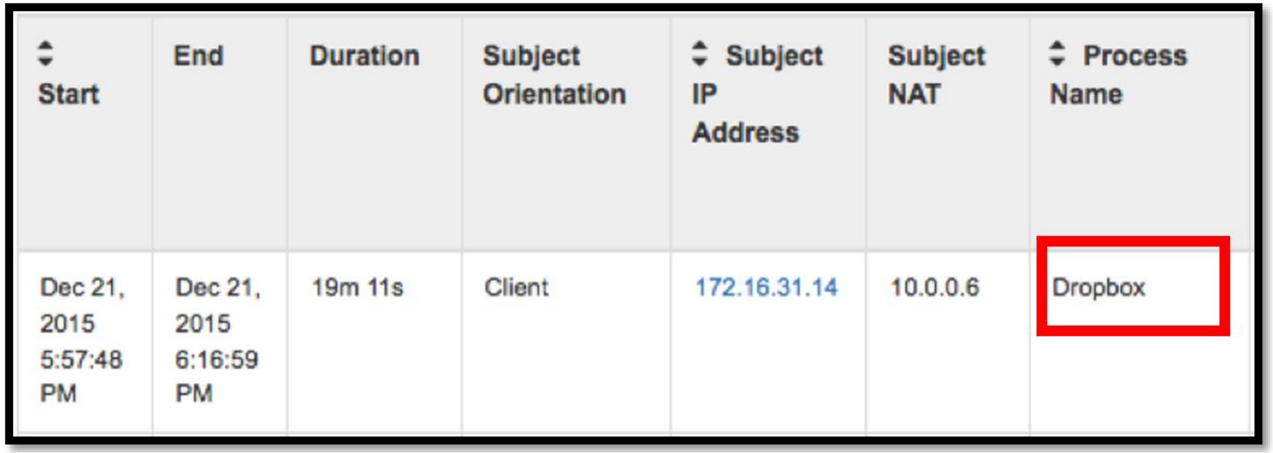
- Concern
- Recon
- C&C
- Exploitation
- Data Hoarding
- Exfiltration
- DDoS Target

RESPONSE

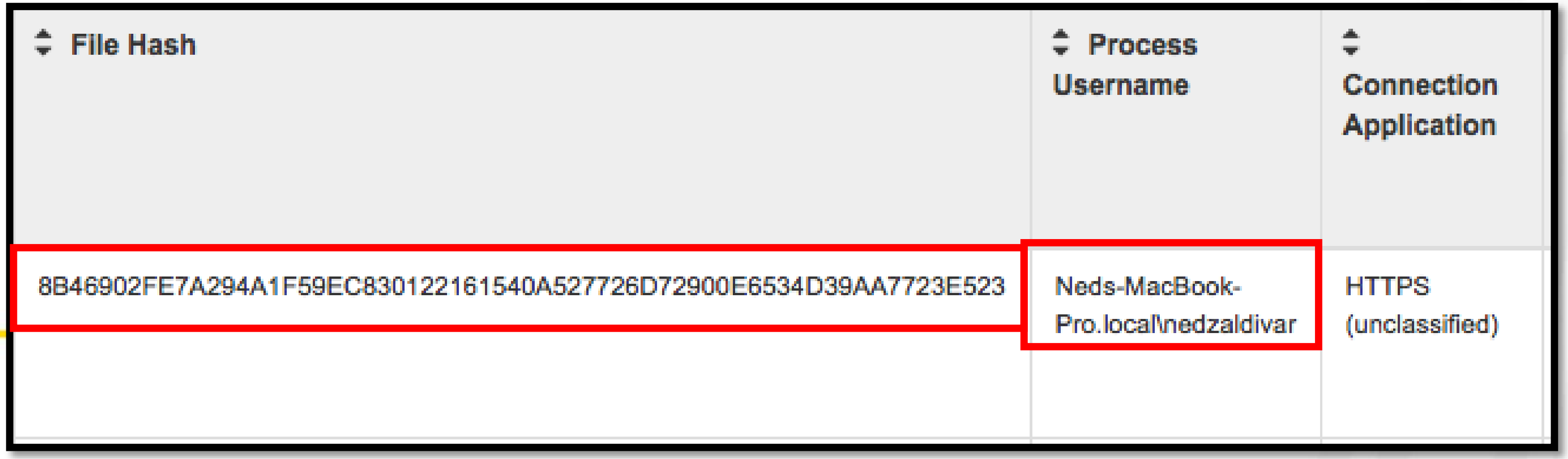
- Alarm Table
- Host Snapshot
- Email
- Syslog / SIEM
- Mitigation

HTTPS Unclassified now Known

- AnyConnect NVM with Cisco Stealthwatch



Start	End	Duration	Subject Orientation	Subject IP Address	Subject NAT	Process Name
Dec 21, 2015 5:57:48 PM	Dec 21, 2015 6:16:59 PM	19m 11s	Client	172.16.31.14	10.0.0.6	Dropbox



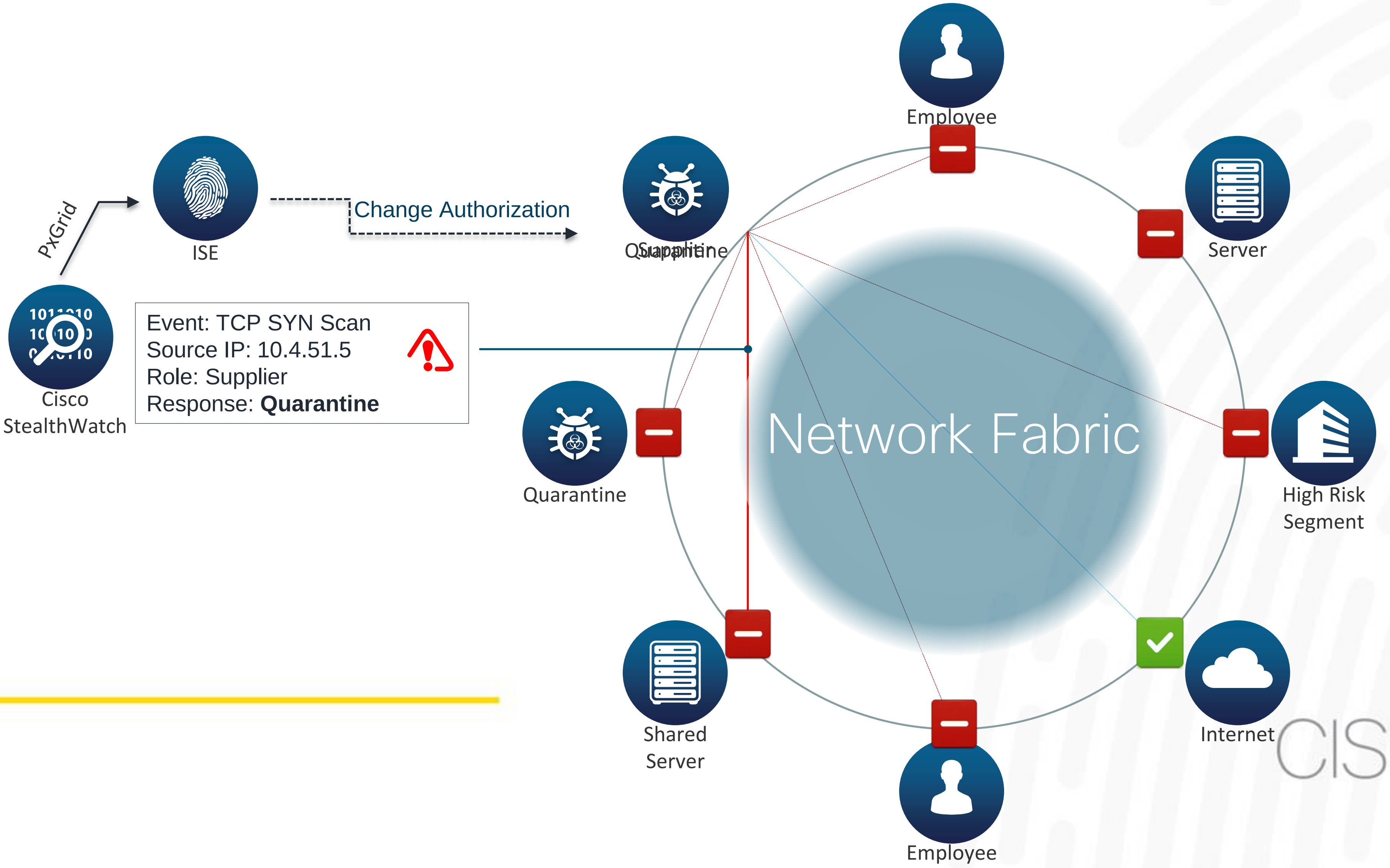
File Hash	Process Username	Connection Application
8B46902FE7A294A1F59EC830122161540A527726D72900E6534D39AA7723E523	Neds-MacBook-Pro.local\nedzaldivar	HTTPS (unclassified)

- Application Identified – Dropbox
- Application Hash – Who else is running?
- Identity – nedzaldivar (even without ISE or Identity, from non domain asset)

Demo

Enforcement

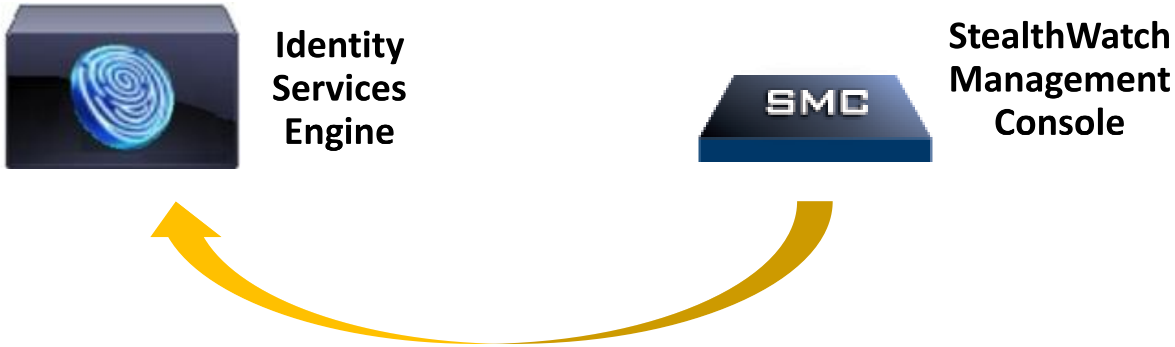
Integrated Threat Defense
(Detection & Containment)



Event: TCP SYN Scan
Source IP: 10.4.51.5
Role: Supplier
Response: **Quarantine**

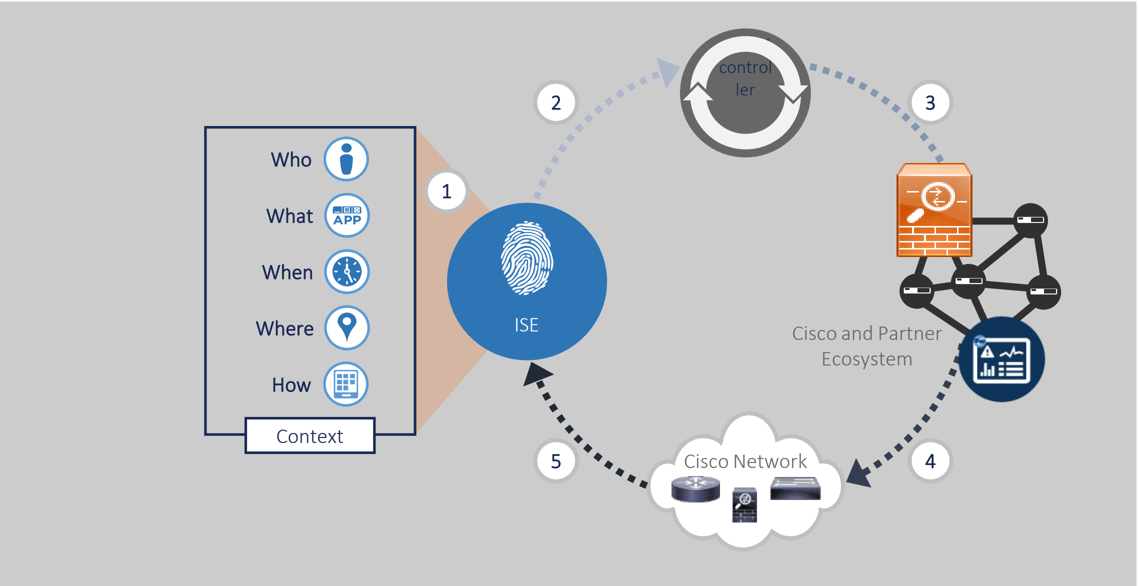
Adaptive Network Control

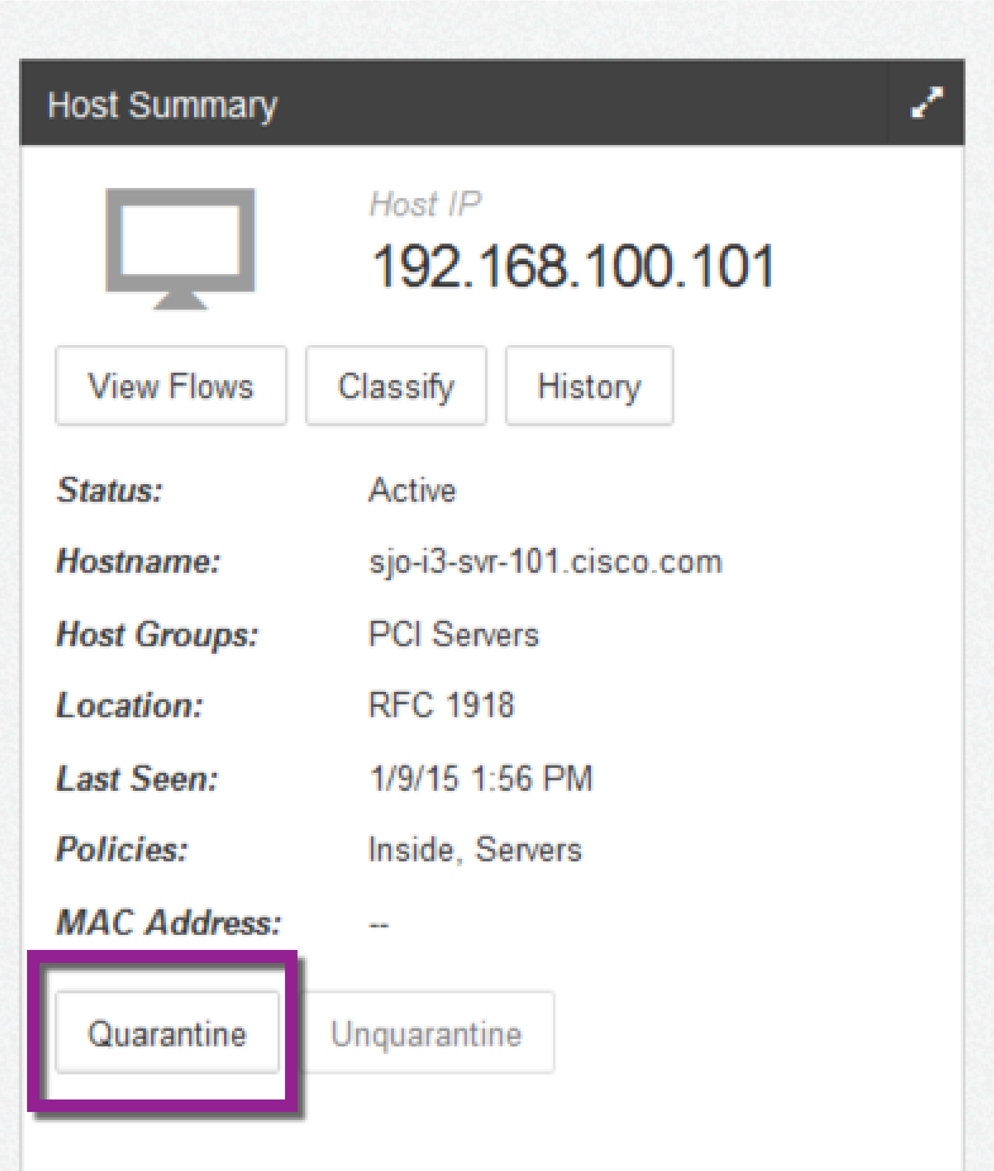
Quarantine/Unquarantine via pxGrid



Identity Services Engine

StealthWatch Management Console



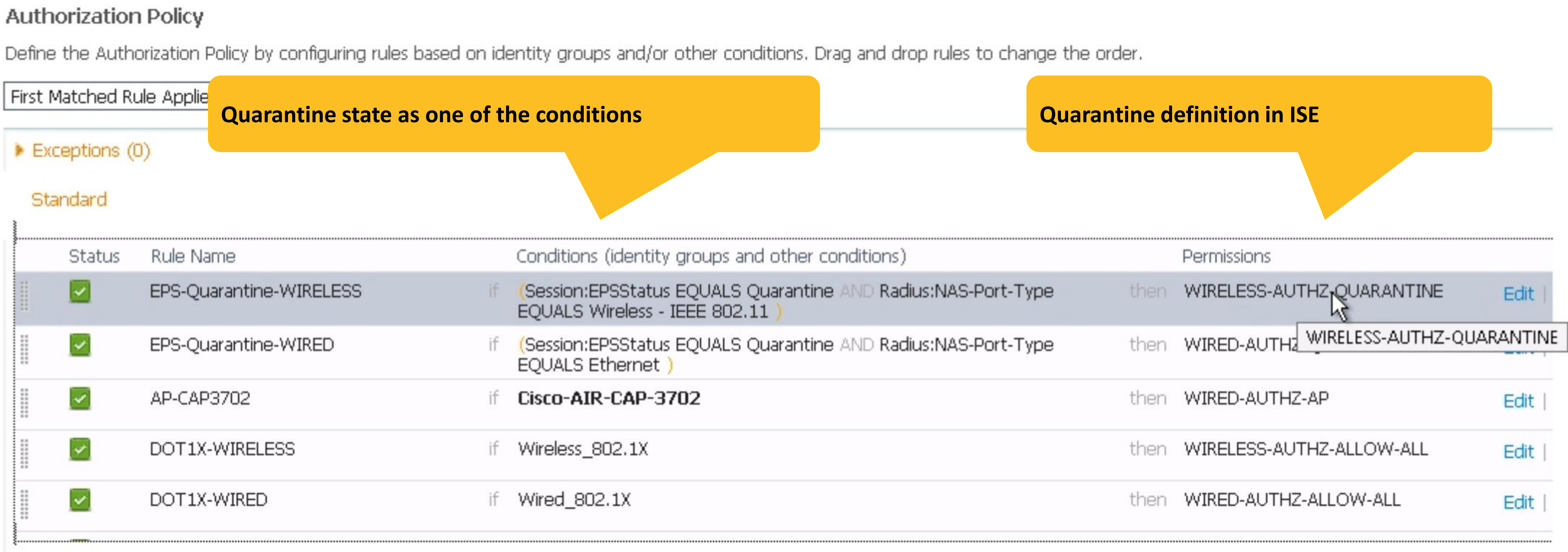


Host Summary

Host IP
192.168.100.101

Status:	Active
Hostname:	sjo-i3-svr-101.cisco.com
Host Groups:	PCI Servers
Location:	RFC 1918
Last Seen:	1/9/15 1:56 PM
Policies:	Inside, Servers
MAC Address:	--

Authorization Policy in ISE using Quarantine Service



Quarantine state as one of the conditions

Quarantine definition in ISE

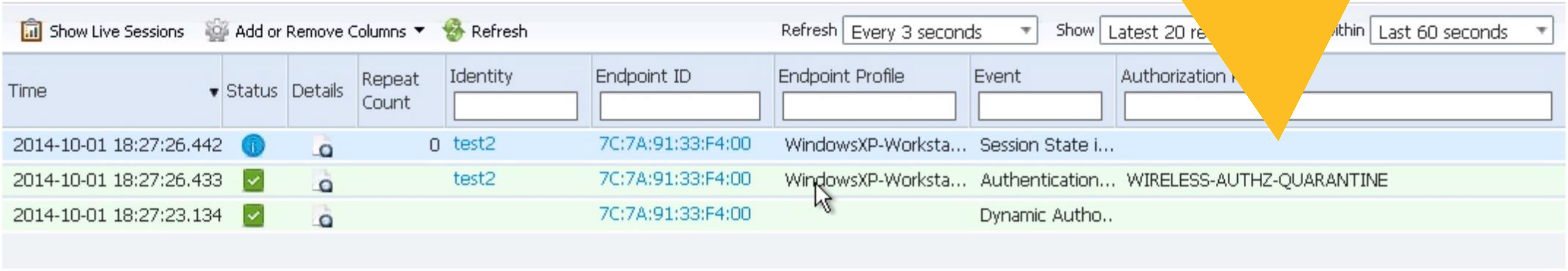
Authorization Policy

Define the Authorization Policy by configuring rules based on identity groups and/or other conditions. Drag and drop rules to change the order.

Status	Rule Name		Conditions (identity groups and other conditions)		Permissions	
☑	EPS-Quarantine-WIRELESS	if	(Session:EPSStatus EQUALS Quarantine AND Radius:NAS-Port-Type EQUALS Wireless - IEEE 802.11)	then	WIRELESS-AUTHZ-QUARANTINE	Edit |
☑	EPS-Quarantine-WIRED	if	(Session:EPSStatus EQUALS Quarantine AND Radius:NAS-Port-Type EQUALS Ethernet)	then	WIRED-AUTHZ	
☑	AP-CAP3702	if	**Cisco-AIR-CAP-3702**	then	WIRED-AUTHZ-AP	Edit |
☑	DOT1X-WIRELESS	if	Wireless_802.1X	then	WIRELESS-AUTHZ-ALLOW-ALL	Edit |
☑	DOT1X-WIRED	if	Wired_802.1X	then	WIRED-AUTHZ-ALLOW-ALL	Edit |

Monitoring Devices

Quarantine state change => Quarantine authorization profile



Refresh: Every 3 seconds
Show: Latest 20 re
ithin Last 60 seconds

Time	Status	Details	Repeat Count	Identity	Endpoint ID	Endpoint Profile	Event	Authorization
2014-10-01 18:27:26.442	ℹ		0	test2	7C:7A:91:33:F4:00	WindowsXP-Worksta...	Session State i...	
2014-10-01 18:27:26.433	✓			test2	7C:7A:91:33:F4:00	WindowsXP-Worksta...	Authentication...	WIRELESS-AUTHZ-QUARANTINE
2014-10-01 18:27:23.134	✓				7C:7A:91:33:F4:00		Dynamic Autho..	

Summary

Three Friends in Security : Identity, Visibility and Enforcement

The network is a key asset for threat detection and control

NetFlow and Cisco StealthWatch provides visibility and intelligence

TrustSec provides software defined (micro) segmentation

Thank you

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