The bridge to possible

Next-Gen Segmentation: A Deep Dive into Group-Based Policy, SXPv5 and PxGrid Direct

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BRKSEC-2154

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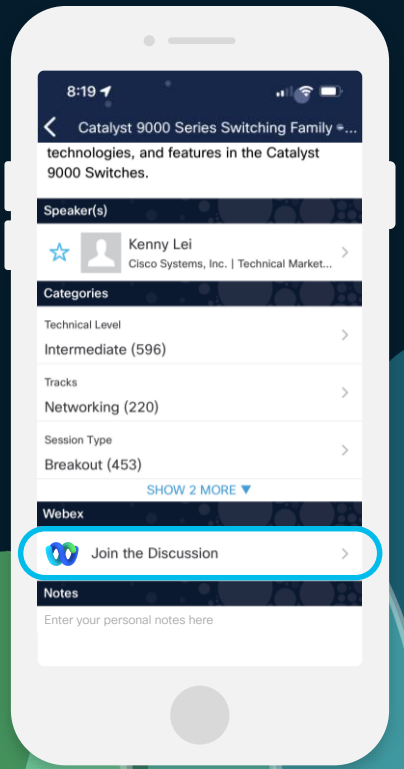


About me

- Been at Cisco for 6 years
- Escalation Engineer AAA
- Second time. in CLUS
- Favorite activities:
  - Friends and Family
  - Car guy
  - Walking/Landscapes
  - Videogames

About me

- Security TAC Technical Leader
- 7+ years working with AAA technologies
- 15+ published documents
- Favorite activities
  - Family time
  - Music
  - Astrophotography

Session Objectives

Session will cover:

- Overview of TrustSec fundamentals and latest innovations
- Configuration examples
- Advanced troubleshooting tips
- Demo

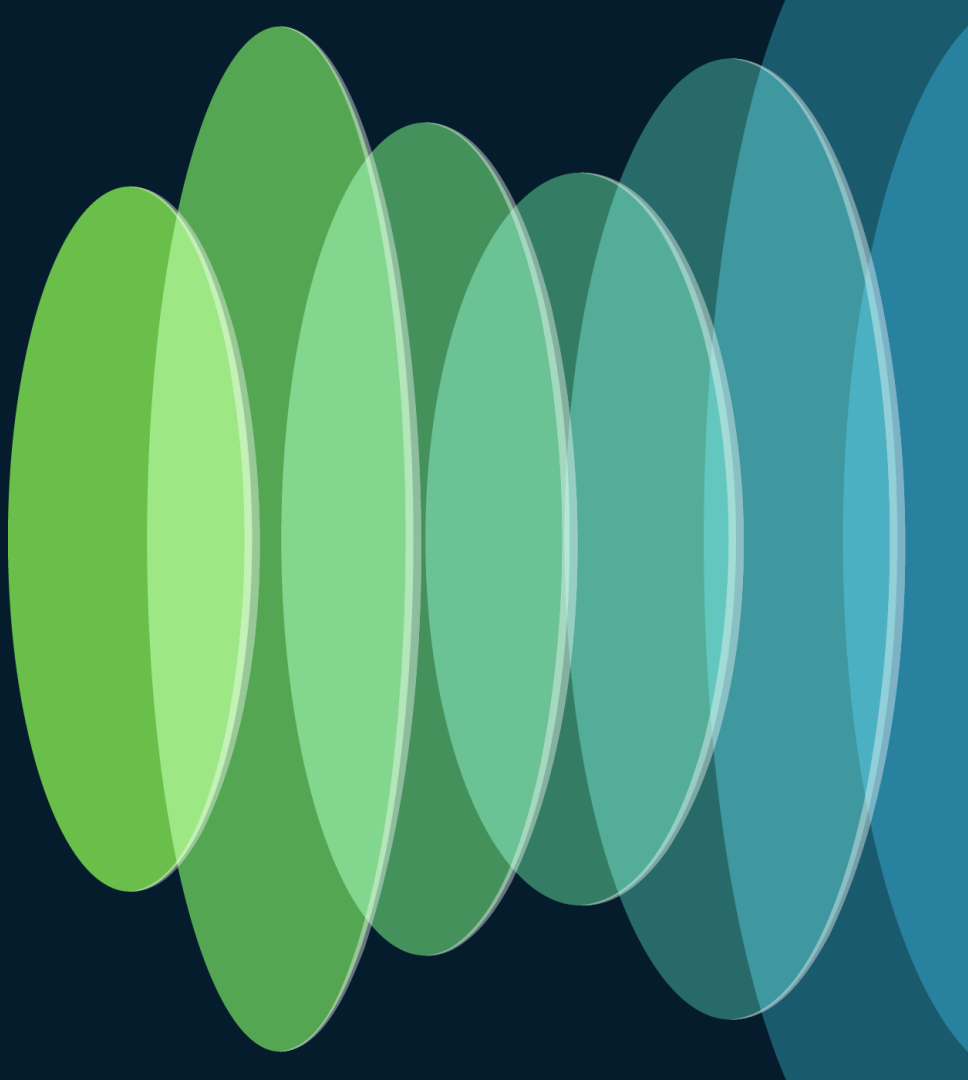
Session will not cover:

- Detailed aspects of TrustSec related to Catalyst Center
- TAC cases discussion
- Marketing
- Roadmaps

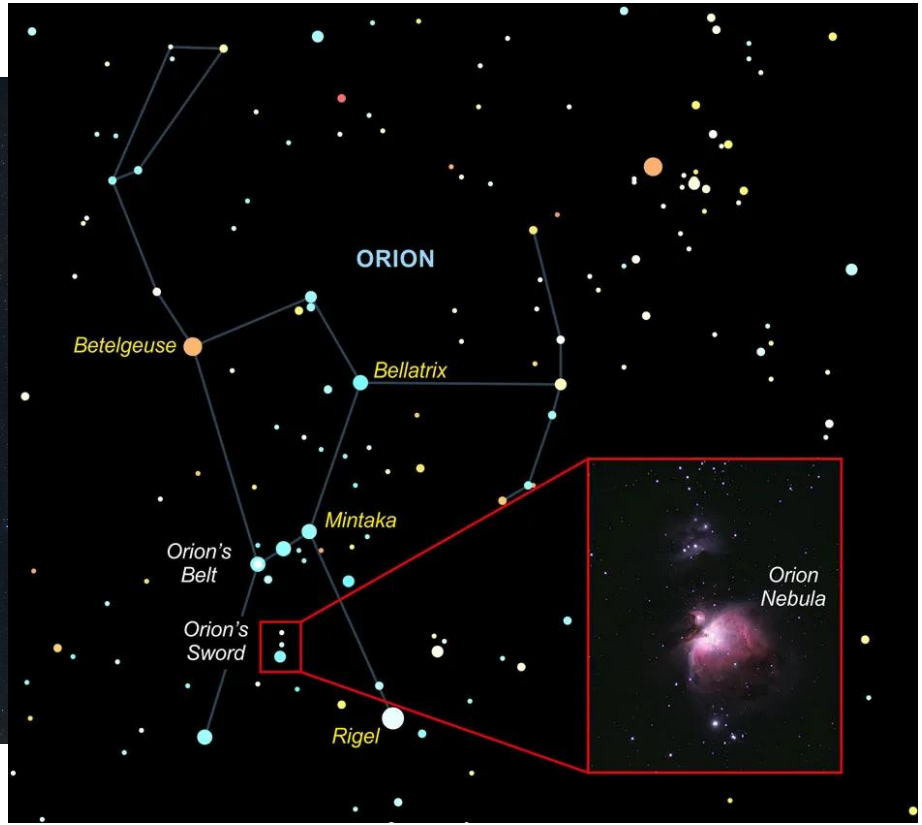
Agenda

- Introduction
- The Pillars of Trustsec
  - Demo
- PxGrid Direct
- Demo
- Key Takeaways
- The path forward
- Q&A

Introduction



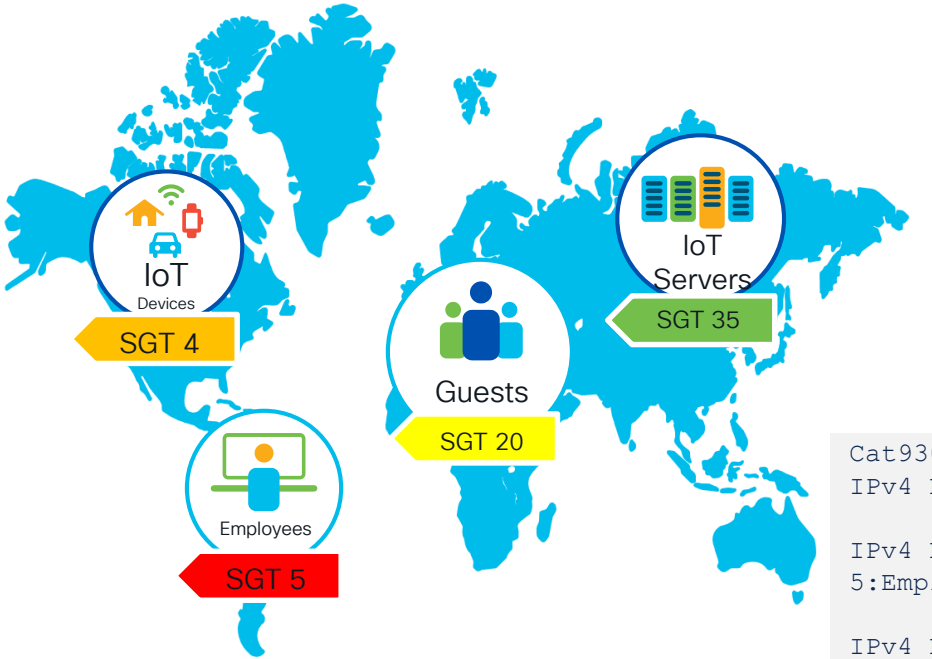
Simplify complexity



The scalability challenge


```
access-list 02 permit tcp…
access-list 02 permit udp…
access-list 02 permit icmp…
access-list 02 deny ip…
access-list 02 permit ucp…
access-list 02 deny ip…
access-list 02 deny icmp…
access-list 02 permit tcp…
access-list 02 permit tcp…
access-list 02 permit ip…
access-list 02 permit ip…
access-list 02 deny icmp…
access-list 02 permit udp…
access-list 02 permit icmp…
access-list 02 permit ip…
access-list 02 permit ip…
..
..
..
```

The solution

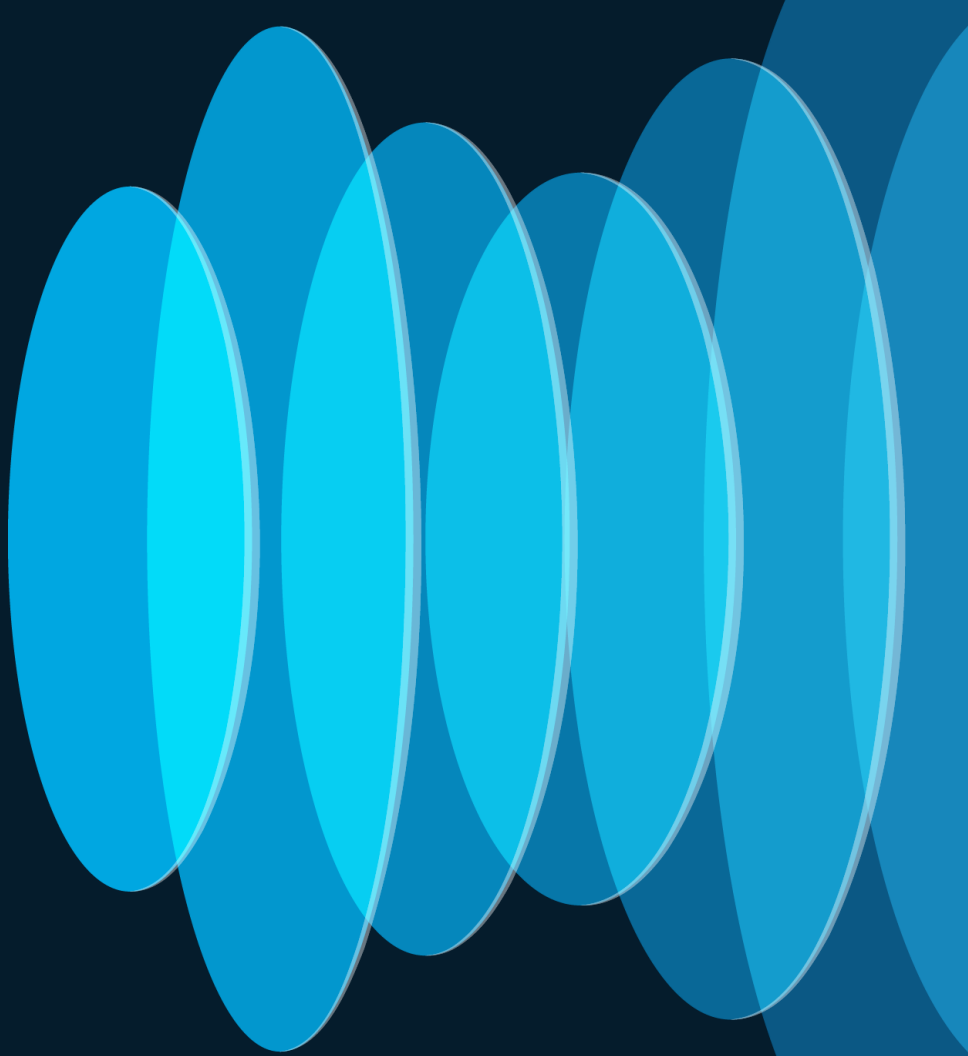


Group tag management

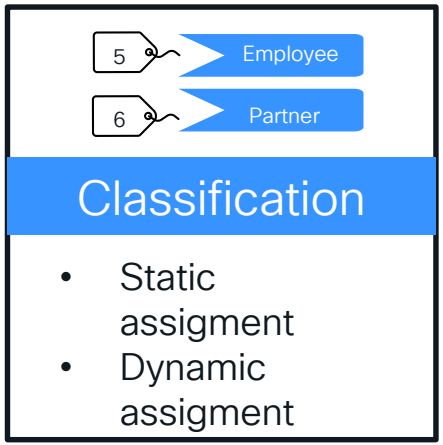
Group policy management

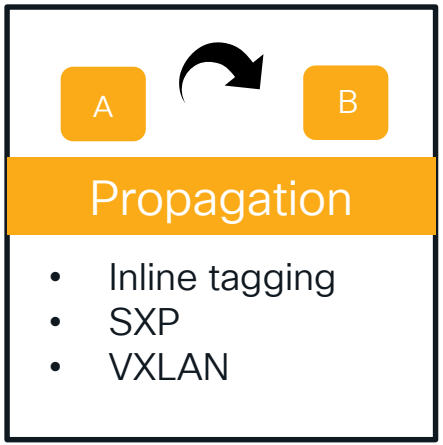
```
Cat9300#show cts role-based permissions
IPv4 Role-based permissions default:
      Permit IP-00
IPv4 Role-based permissions from group 4:Iot to group
5:Employees:
      Permit_IP_Log-01
IPv4 Role-based permissions from group 20:Guests to
group 4:Iot:
      Deny_IP_Log-00
```

The Pillars of Trustsec

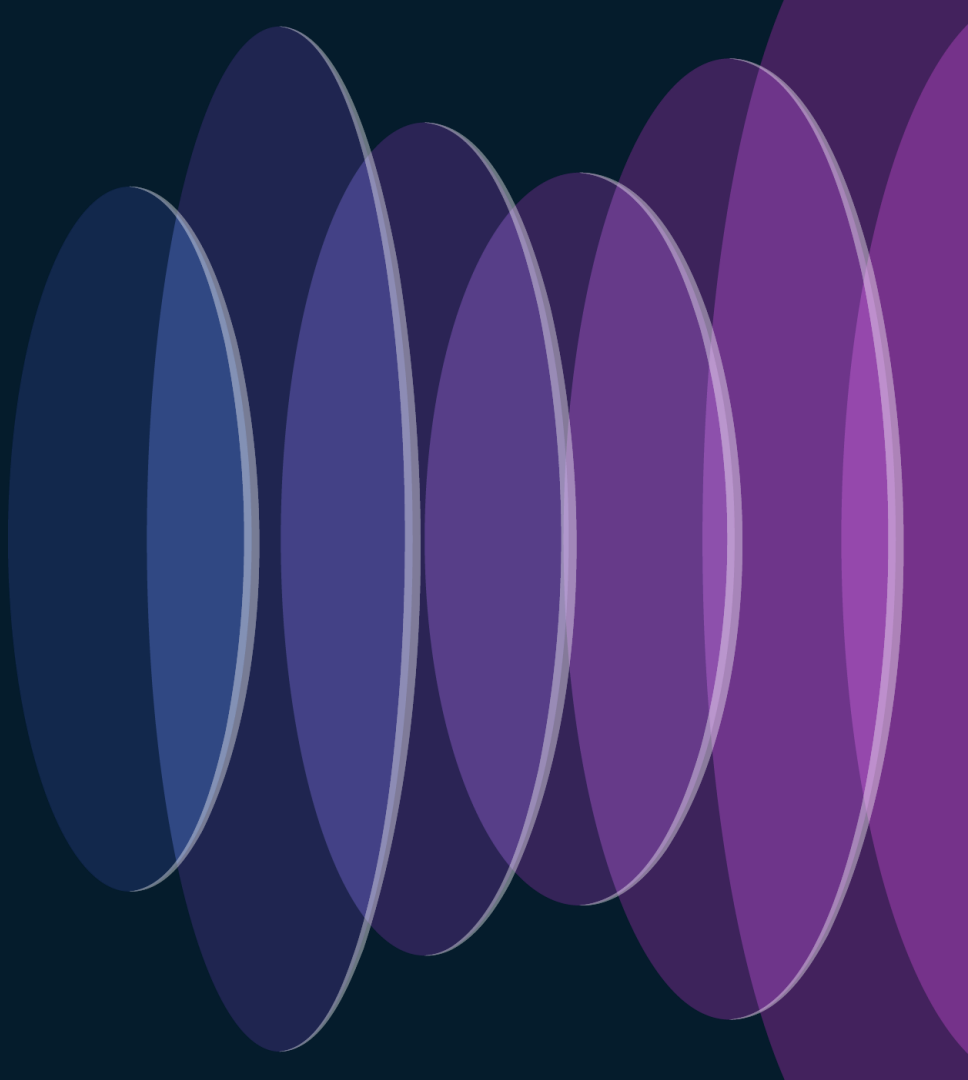


Three pillars

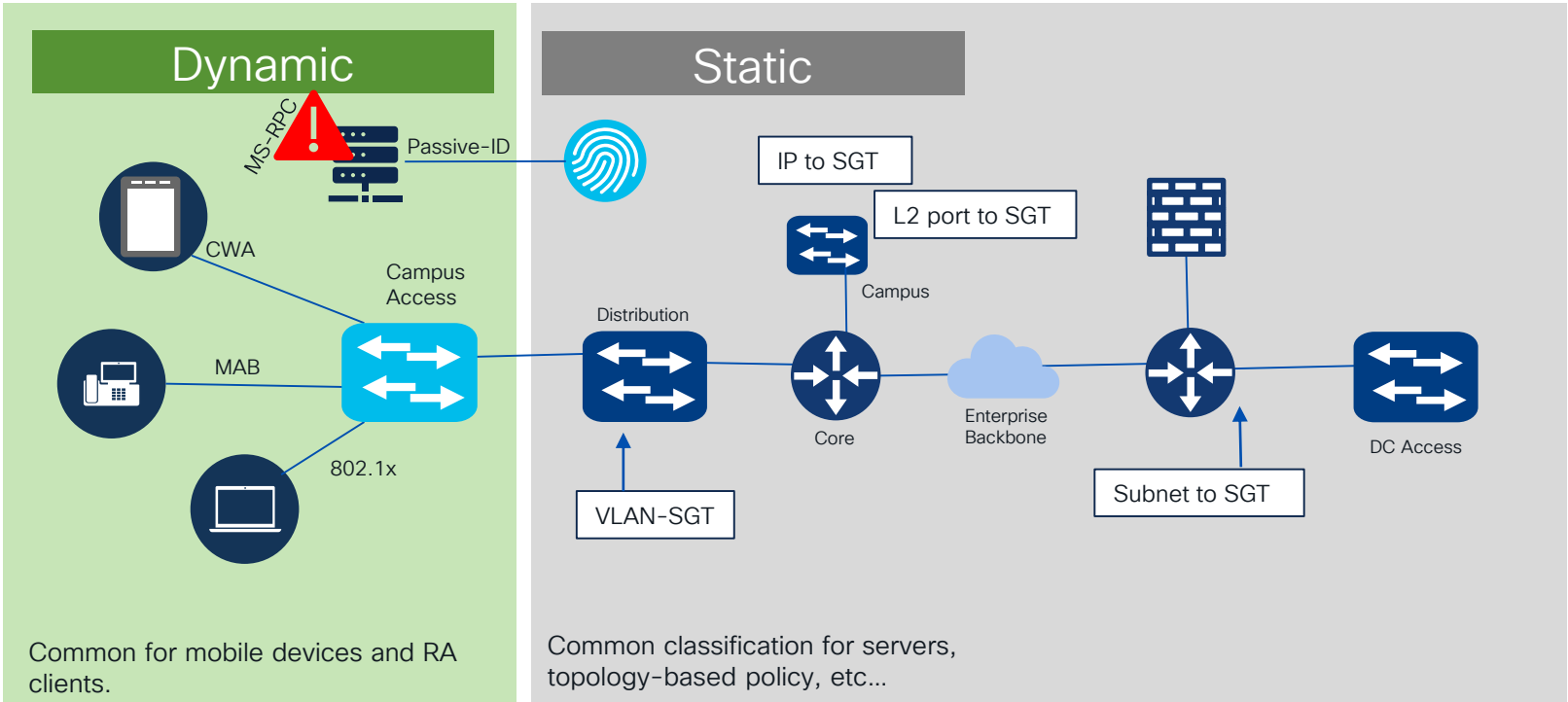




Classification



Classification types



Static classification configuration

IOS CLI Example

Reference

IP to SGT mapping

```
cts role-based sgt-map
A.B.C.D sgt SGT
```

VLAN to SGT mapping

```
cts role-based sgt-map vlan-list
VLAN sgt SGT
```

Subnet to SGT mapping

```
cts role-based sgt-map
A.B.C.D/nn sgt SGT
```

L2IF to SGT mapping

```
(config-if-cts-manual)#policy
static sgt SGT
```

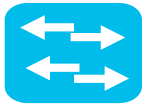
L3IF to SGT mapping

```
cts role-based sgt-map
interface name sgt SGT
```

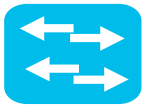
L3ID to Port Mapping

```
(config-if-cts-manual)#policy
dynamic identity name
```

Static classification – Considerations



- 3560X
- 3560-CX
- 3750X
- Industrial Ethernet



- 3650
- 3850
- C6K
- C9K

Reference

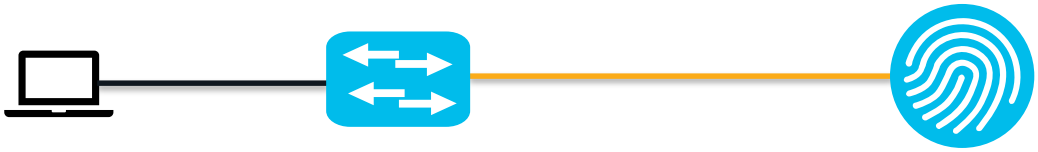
Port/VLAN (adjacent)

- Requires the MAC address of the endpoint to be learned for successful classification.
- These devices are better suited to classification only.

IP/Subnet

- Enforcement decisions are layer-3 specific and use the FIB table to determine destination SGT information.

Dynamic classification



RADIUS Access-Request

RADIUS Access-Accept

cisco-av-pair="cts:security-group-tag=16-00"

```
Switch#sh auth sess int Tw1/0/3 det
            Interface:  TwoGigabitEthernet1/0/3
              IIF-ID:  0x17494F04
         MAC Address:  c85b.768f.51b4
        IPv6 Address:  fe80::9eb:a795:7e46:ffaf
        IPv4 Address:  10.4.18.167
           User-Name:  C8-5B-76-8F-51-B4
              Status:  Authorized
              Domain:  DATA
      Oper host mode:  multi-host
    Oper control dir:  both
     Session timeout:  N/A
   Common Session ID:  28781F0A0000000C28913AE3
     Acct Session ID:  0x00000004
              Handle:  0x2f000002
      Current Policy:  POLICY_Tw1/0/3


Local Policies:
       Service Template: DEFAULT_LINKSEC_POLICY_
     Security Policy:  Should Secure

Server Policies:
           SGT Value:  16
```

NAS IPv4 Address	10.31.120.40
NAS Port Id	TwoGigabitEthernet1/0/3
NAS Port Type	Ethernet
Authorization Profile	PermitAccess
Security Group	PCA
Response Time	40 milliseconds

PCA		16/0010

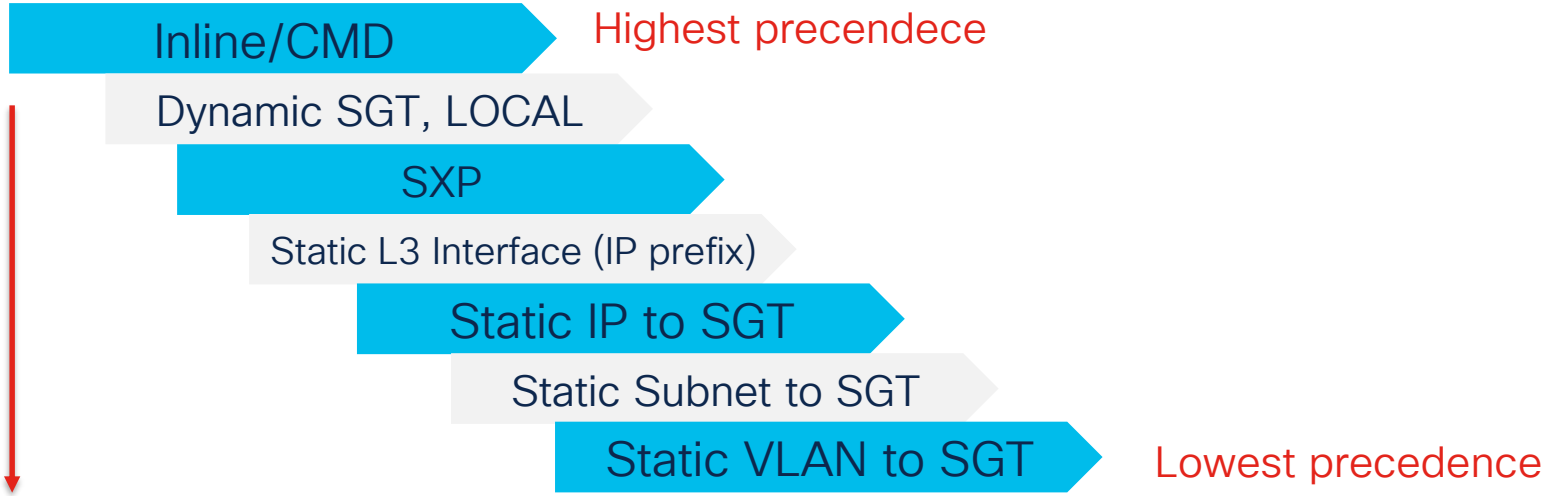
Dynamic classification, considerations

```
Switch#sh auth sess int Tw1/0/3 det
            Interface:  TwoGigabitEthernet1/0/3
              IIF-ID:  0x17494F04
         MAC Address:  c85b.768f.51b4
        IPv6 Address:  fe80::9eb:a795:7e46:ffaf
        IPv4 Address:  10.4.18.167
           User-Name:  C8-5B-76-8F-51-B4
              Status:  Authorized
              Domain:  DATA
     Oper host mode:  multi-host
   Oper control dir:  both
    Session timeout:  N/A
  Common Session ID:  28781F0A0000000C28913AE3
    Acct Session ID:  0x00000004
             Handle:  0x2f000002
     Current Policy:  POLICY_Tw1/0/3


Local Policies:
       Service Template: DEFAULT_LINKSEC_POLICY_
    Security Policy:  Should Secure

Server Policies:
            SGT Value:  16
```

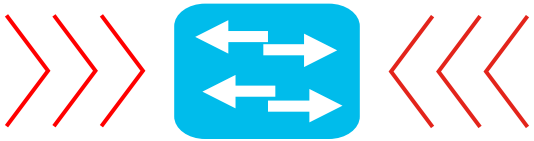
- SISF is turned ON
- Classification doesn't require PAC/env-data download.
- One IP-SGT table per VRF

```
Switch# sh cts role-based sgt-map all
Active IPv4-SGT Bindings Information

IP Address              SGT     Source
============================================
10.4.18.167             16      LOCAL
10.10.10.10             9       SXP
10.31.120.40            2       INTERNAL

IP-SGT Active Bindings Summary
```

Order of precedence



Classification entries



Reference

```
#show cts role-based sgt-map all
Active IPv4-SGT Bindings Information

IP Address       SGT                    Source
 ============================================
14.36.148.251     2                     INTERNAL
172.18.249.66     2                     LOCAL
192.168.45.164    15                    VLAN
192.168.199.10    5                     CLI
192.168.15.160    10                    L3IF
192.168.15.161    8                     L2IF
192.168.15.123    7                     SXP
```

Locally configured IP address

Learned dynamically from ISE

Learned from VLAN-SGT mapping

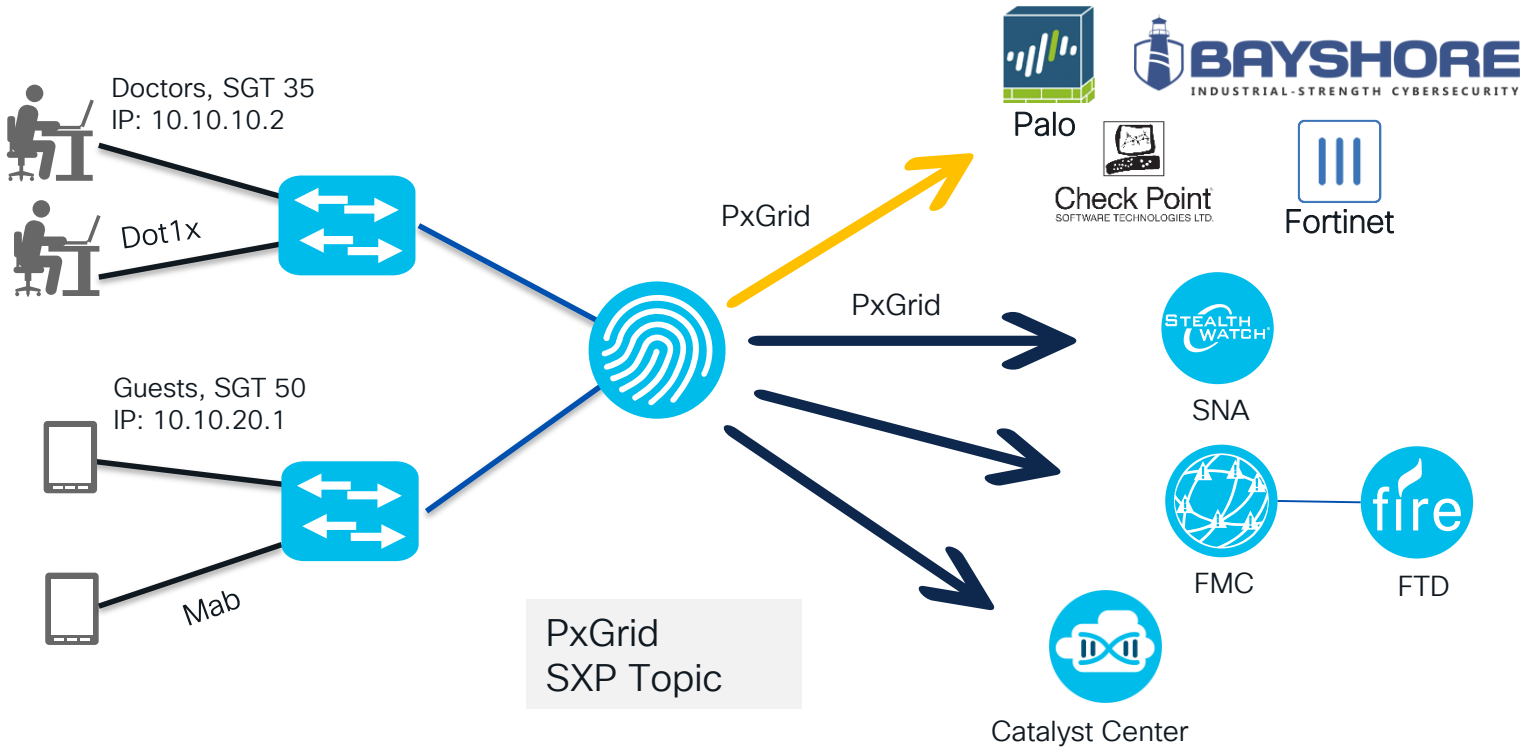
Configured using ”cts role-based sgt-map"

FIB entries that have a path through that interface

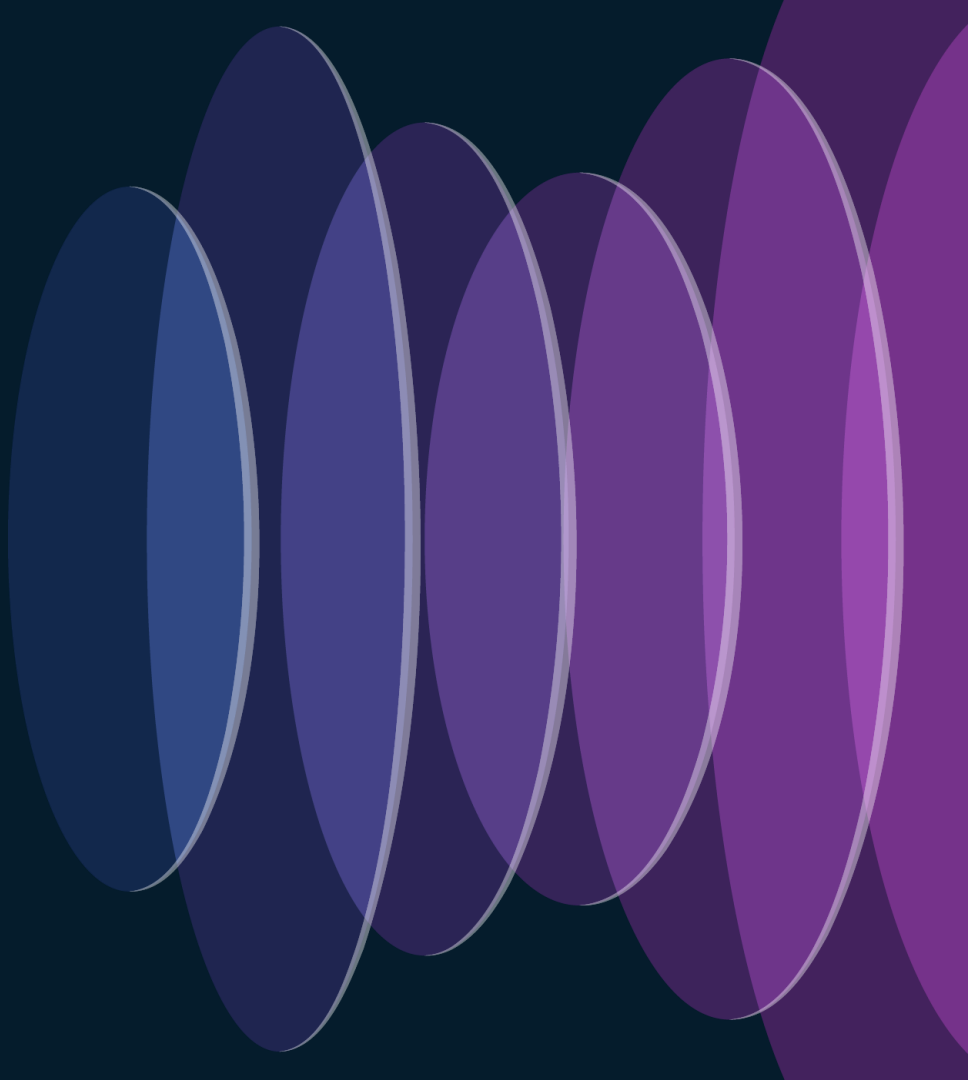
Statically configured using “interface <interface> sgt manual policy static sgt <sgt-number>”

Learned through SXP peers

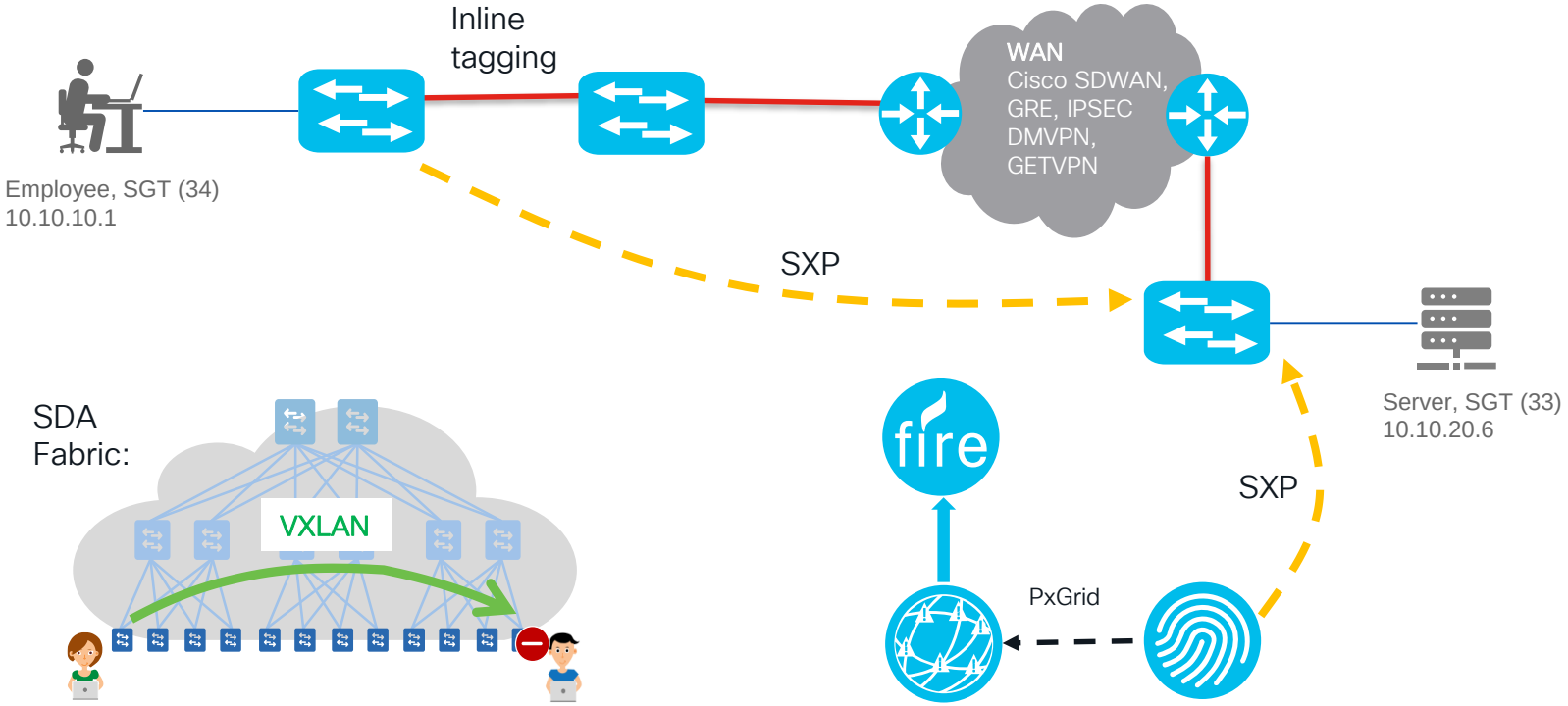
Use case: Dynamic Classification



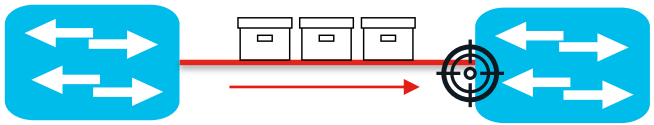
Propagation



Propagation



Inline tagging

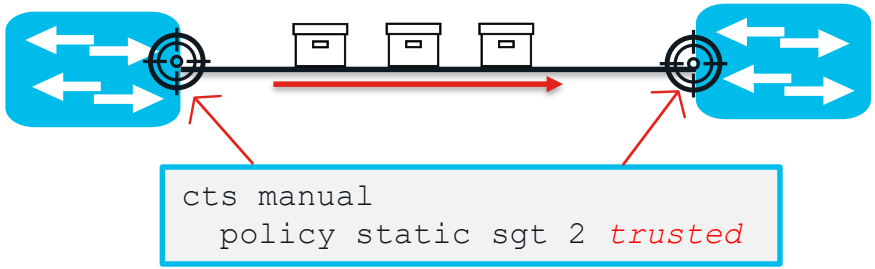


Easy to confiure
Its hardware-dependent

Tagging process prior to other L2 services such as QoS

No impact IP MTU/Fragmentation ~ 20 bytes

Inline tagging, configuration



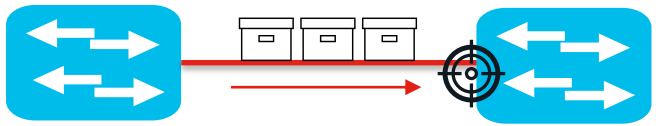
With *trusted,*
trust ingress SGT on wire

SGT 2 does nothing

Without *trusted,*
classify traffic with SGT 2

=Port:SGT classification

Inline tagging, troubleshooting



Bindings from inline tagging are not displayed in the mapping table (unless you configure SGT caching)

Instead, to see the tags take a pcap at the ingress interface.

OR you can use NetFlow instead.

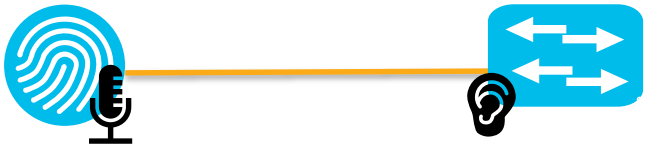
```
(config)# flow monitor cts-monitor-ipv4
Switch(config-flow-monitor)#record cts-record-ipv4
Switch(config)# interface TenGigabitEthernet 8/1
Switch(config-if)# ip flow monitor cts-monitor-ipv4
layer2-switched input
```

Example of CMD header in a pcap

6	2021-02-02 11:25:41	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x001f, seq=0/0, ttl=254 (reply in 7)
7	2021-02-02 11:25:41	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x001f, seq=0/0, ttl=255 (request in 6)
8	2021-02-02 11:25:41	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x001f, seq=1/256, ttl=254 (reply in 9)
9	2021-02-02 11:25:41	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x001f, seq=1/256, ttl=255 (request in 8)
10	2021-02-02 11:25:41	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x001f, seq=2/512, ttl=254 (reply in 11)
11	2021-02-02 11:25:41	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x001f, seq=2/512, ttl=255 (request in 10)
12	2021-02-02 11:25:41	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x001f, seq=3/768, ttl=254 (reply in 13)
13	2021-02-02 11:25:41	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x001f, seq=3/768, ttl=255 (request in 12)
14	2021-02-02 11:25:41	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x001f, seq=4/1024, ttl=254 (reply in 15)
15	2021-02-02 11:25:41	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x001f, seq=4/1024, ttl=255 (request in 14)
16	2021-02-02 11:25:43	172.16.100.20	172.16.100.1	ICMP	122	Echo (ping) request id=0x0020, seq=0/0, ttl=254 (reply in 17)
17	2021-02-02 11:25:43	172.16.100.1	172.16.100.20	ICMP	114	Echo (ping) reply id=0x0020, seq=0/0, ttl=255 (request in 16)

```
Frame 6: 122 bytes on wire (976 bits), 122 bytes captured (976 bits)
Ethernet II, Src: Cisco_d1:fd:46 (00:3c:10:d1:fd:46), Dst: Cisco_5d:f0:7d (6c:b2:ae:5d:f0:7d)
Cisco MetaData
    Version: 1
    Length: 1
    Options: 0x0001
    SGT: 6
    Type: IPv4 (0x0800)
Internet Protocol Version 4, Src: 172.16.100.20, Dst: 172.16.100.1
Internet Control Message Protocol
```

Security Group Tag Exchange Protocol, SXP



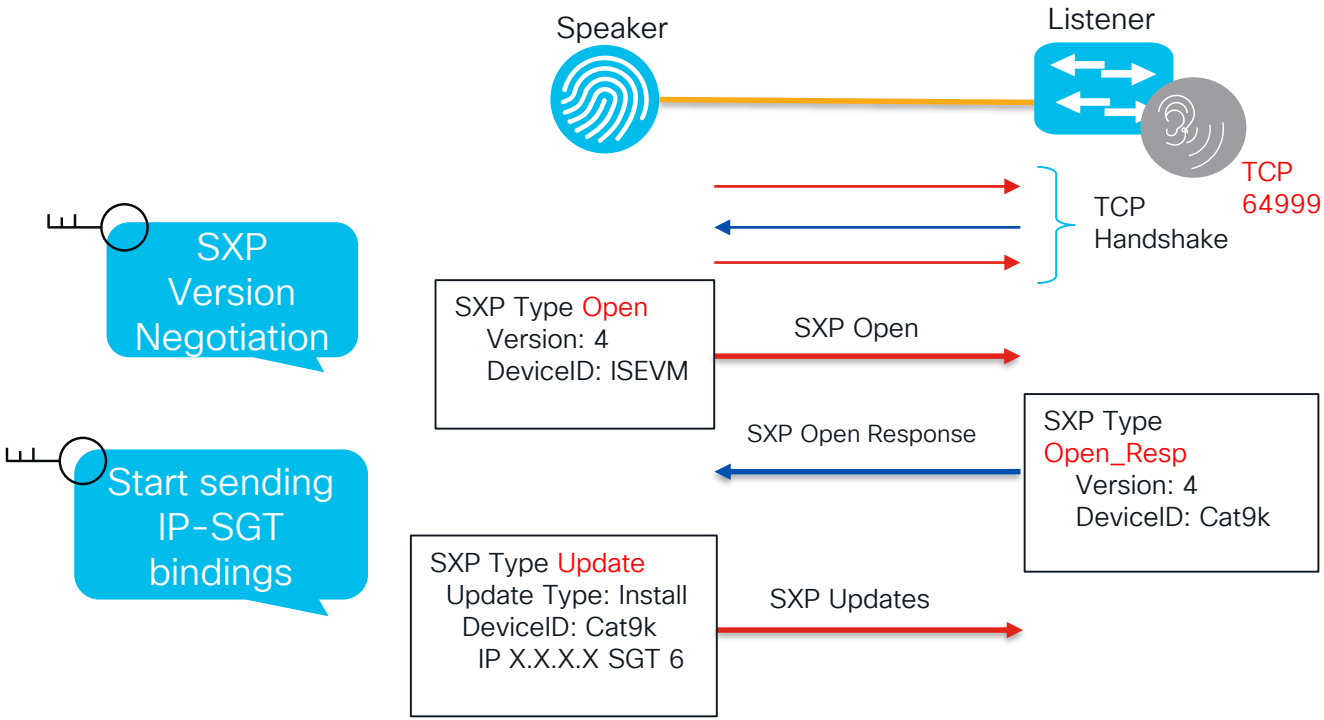
SXP very simple to enable
- No hardware dependencies

Uses MD5 for authentication and integrity check

Uses TCP for transport protocol
- TCP 6499

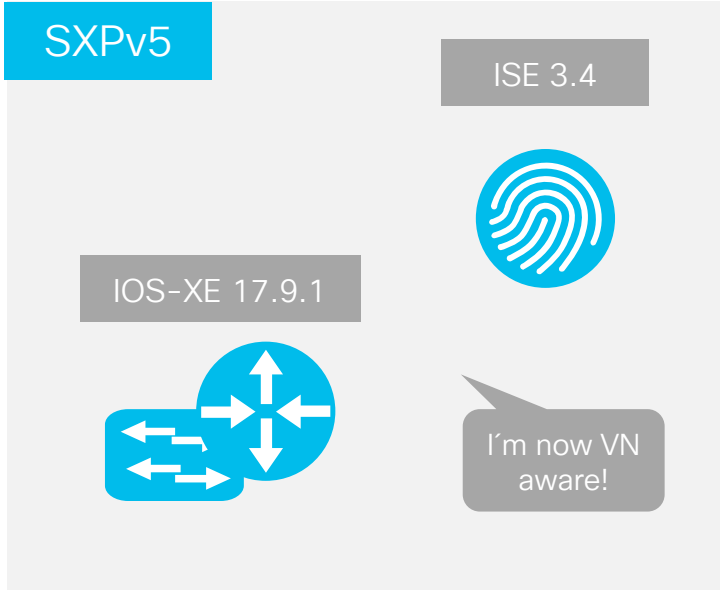
SXP roles
- Speaker
- Listener
- Both

SXP flow

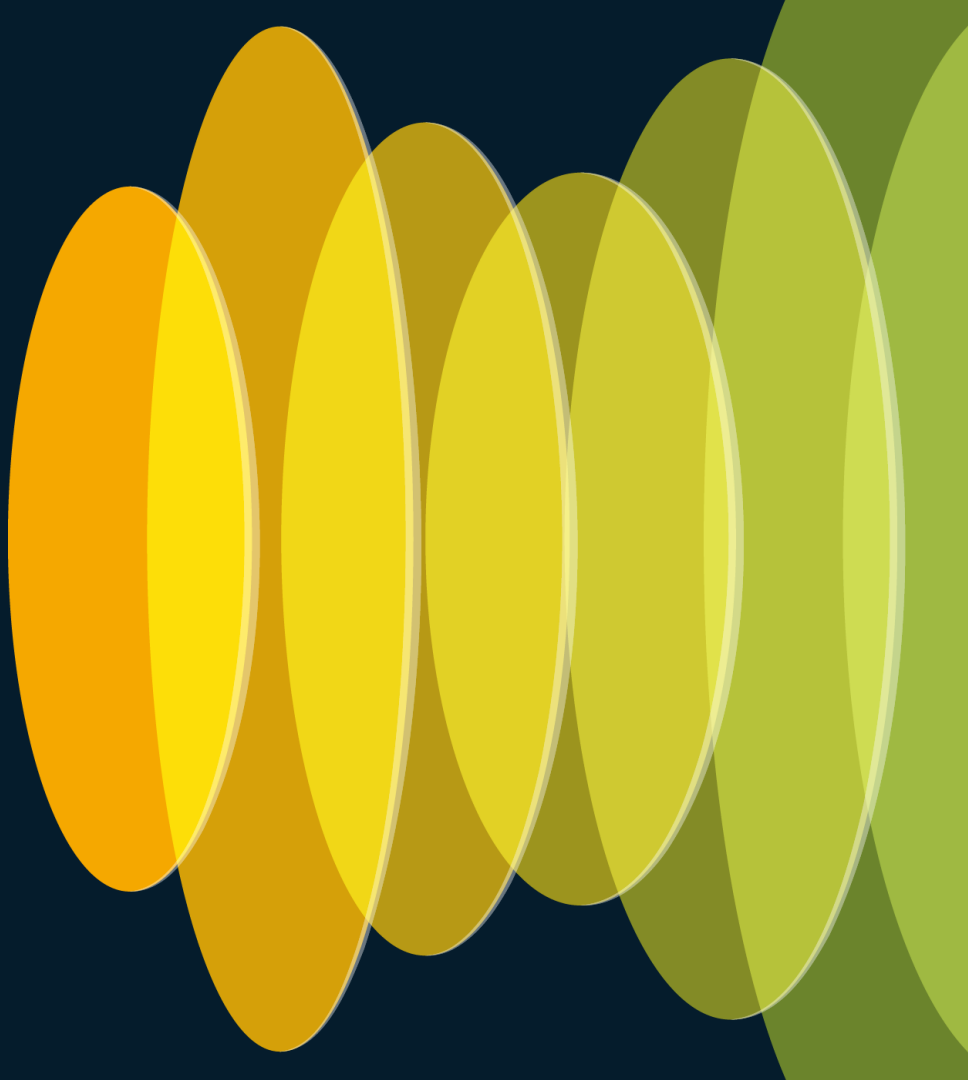


SXP versions

SXP Version 1	Initial SXP version supporting IPv4 binding propagation.
SXP Version 2	Includes support for IPv6 binding propagation and version negotiation.
SXP Version 3	Adds support for Subnet-SGT binding propagation.
SXP Version 4	Loop detection and prevention, capability exchange and built-in keep-alive mechanism.



Discover SXPv5



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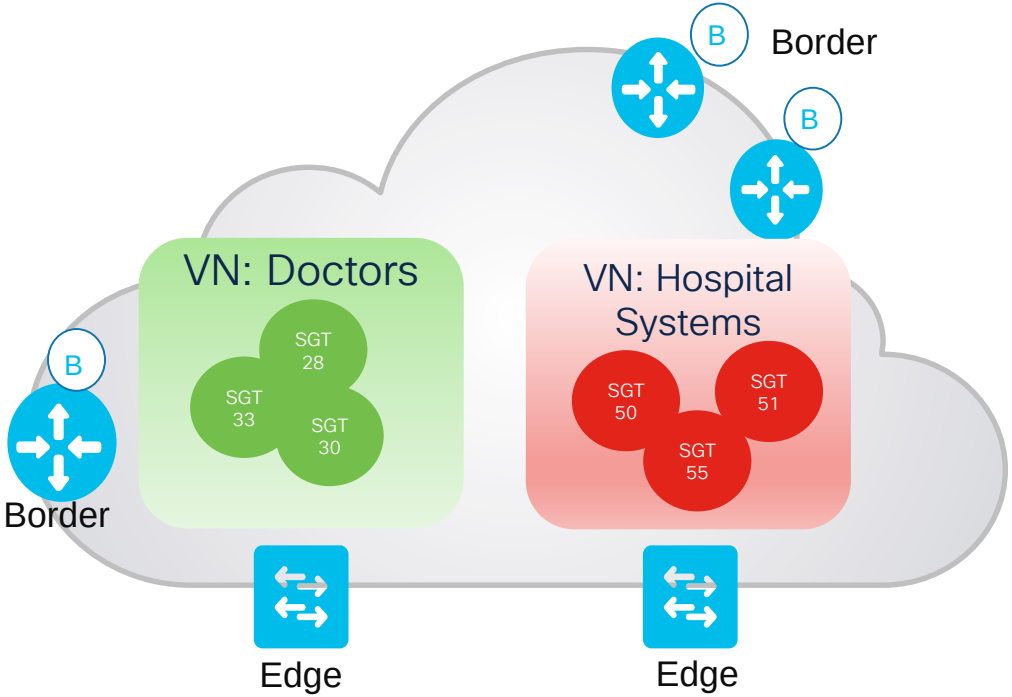
SDA Fabric Segmentation



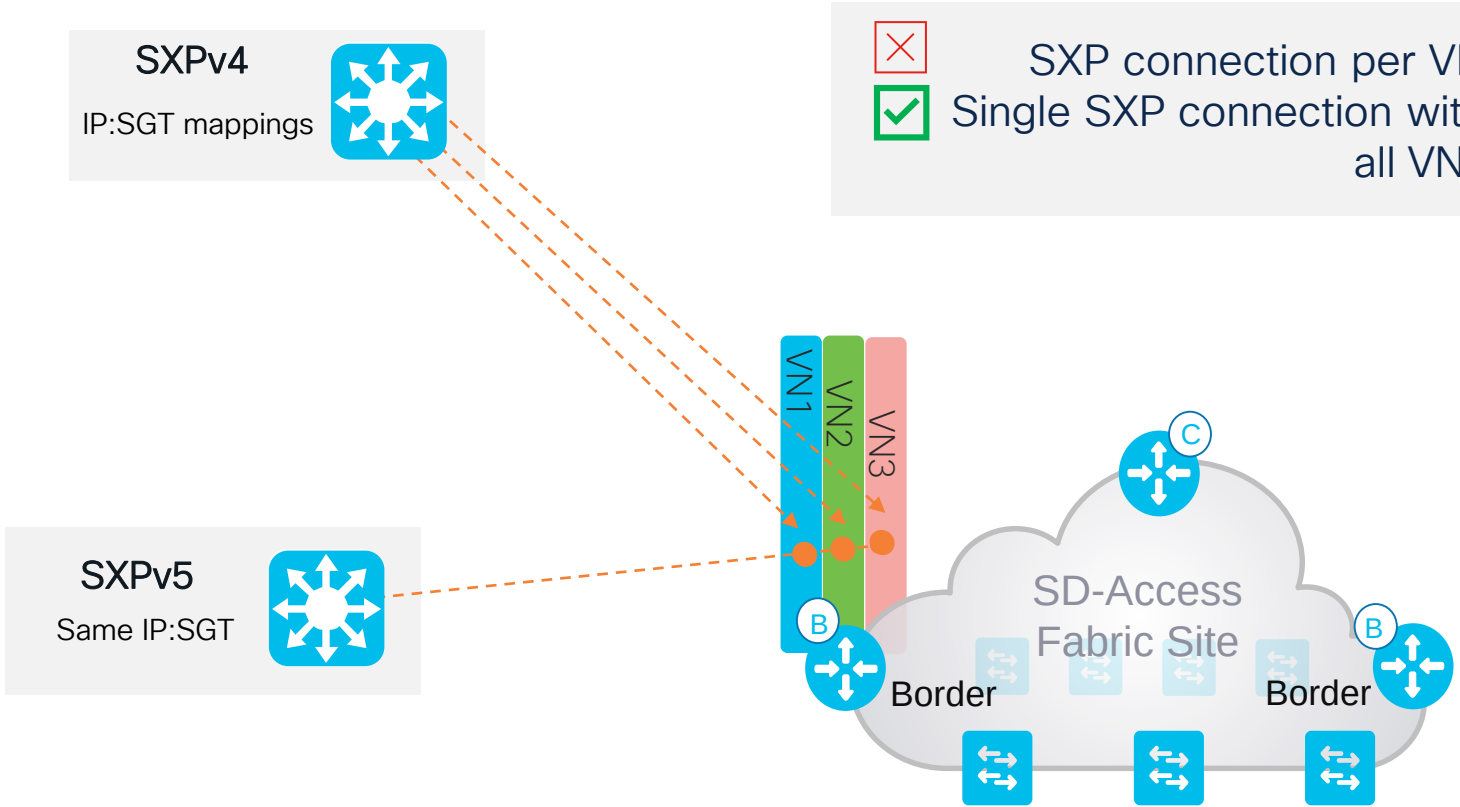
Macro-Segmentation

- Virtual Network level
- Based on VRF
- Hosts in differnet VNs should not communicate

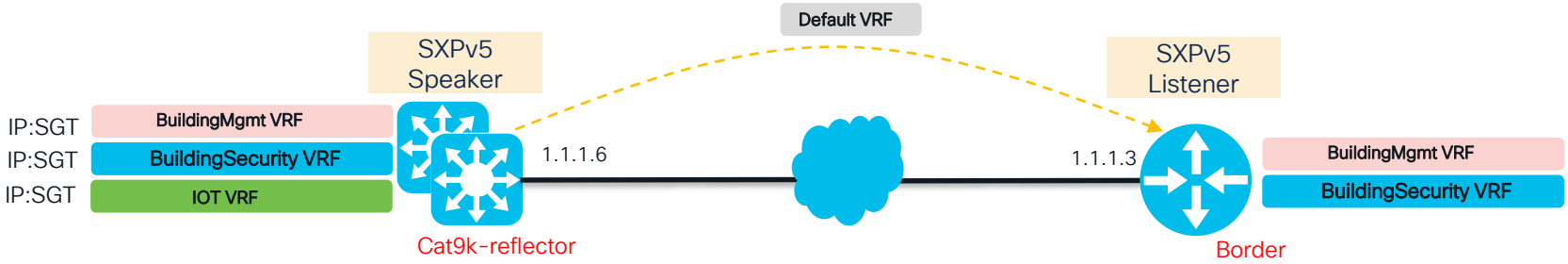
Micro-Segmentation

- Within one Virtual Network
- Based on SGTs
- Hosts communicate based on role-based permissions

Why SXPv5?



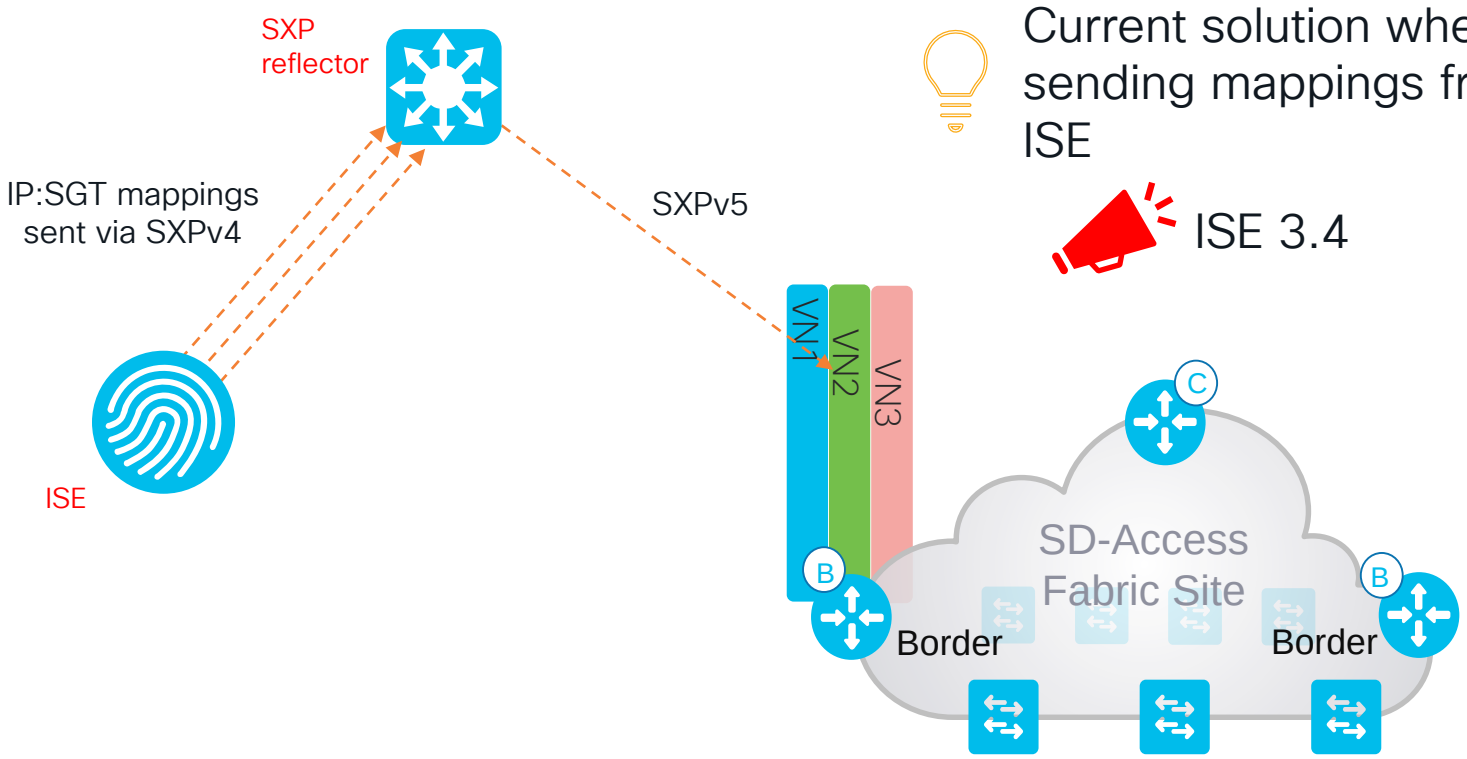
SXPv5 configuration




```
cts sxp export-list SXPv5-export-VRFs-to-Border
 vrf BuildingMgmt
 vrf BuildingSecurity
!
cts sxp export-import-group speaker SXPv5-
speaker-grp-to-Border
 export-list SXPv5-export-VRFs-to-Border
 peer 1.1.1.3
```

```
cts sxp import-list SXPv5-import-from-Reflector
vrf
!
cts sxp export-import-group listener SXPv5-import-grp-
from-Reflector
 import-list SXPv5-import-from-Reflector
 peer 1.1.1.6
```

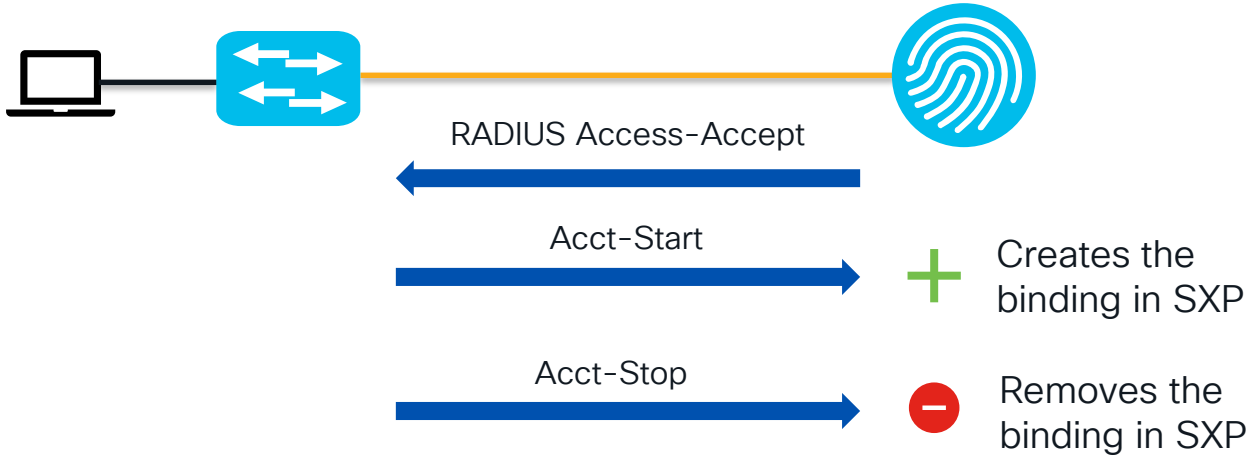
SXP reflector



Current solution when sending mappings from ISE

ISE 3.4

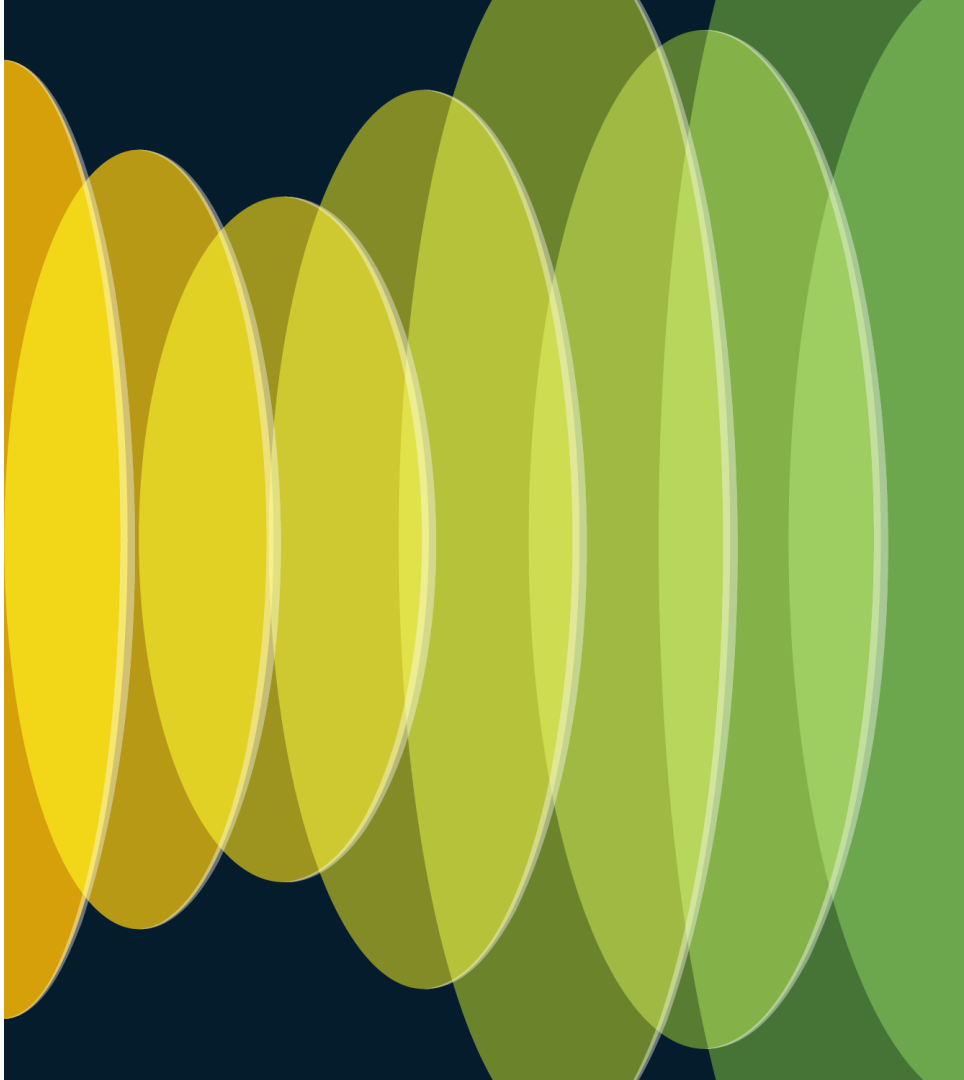
Use case: Dynamic classification and SXP



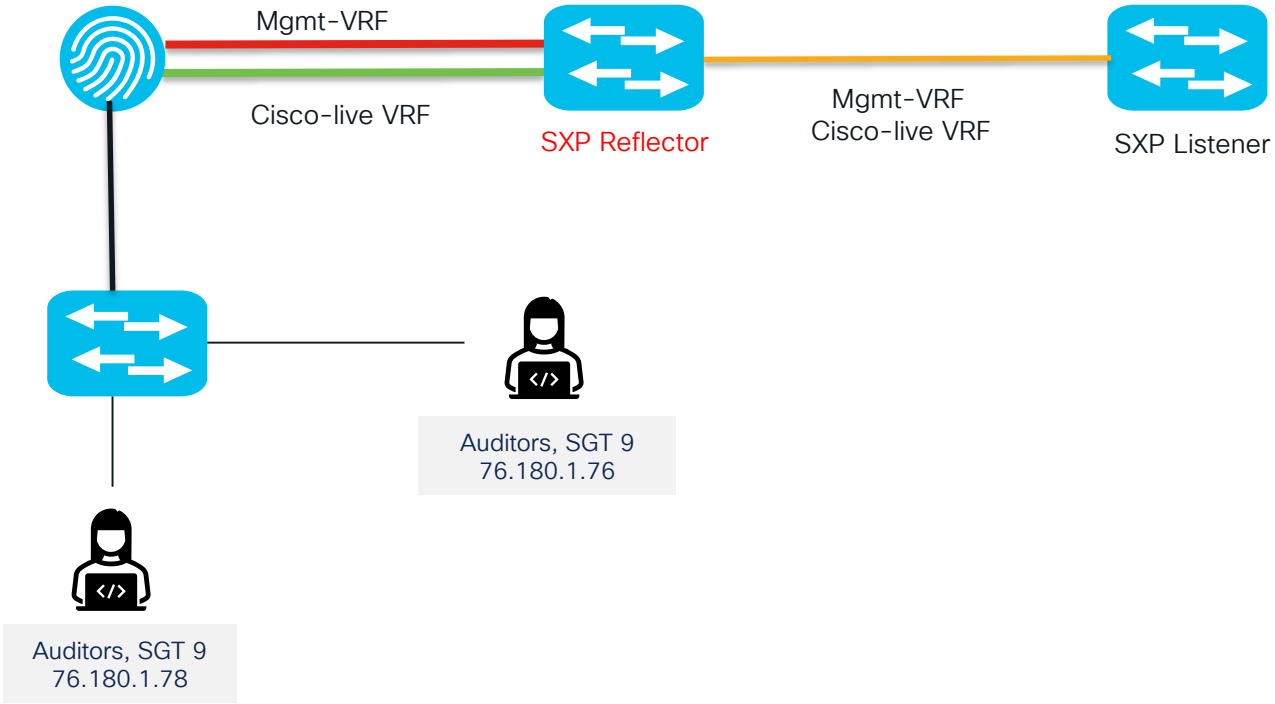
IP-SGT mapping in ISE SXP table is maintained with Accouting packets.

If a binding doesn't get an interim-acct/stop ISE will remove it after 5 days.

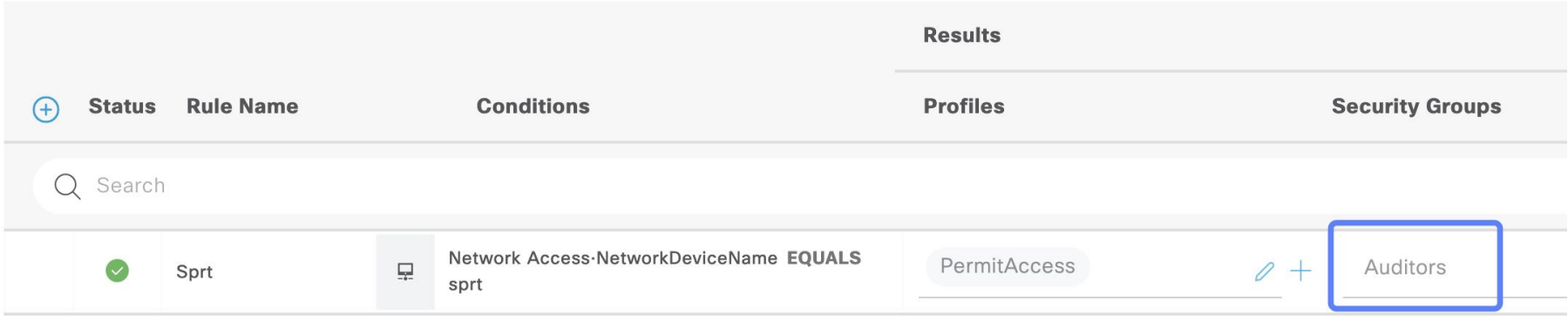
Demo



SXPv5 Reflector



Authorization Policy(15)



	Status	Rule Name	Conditions	Results: Profiles	Results: Security Groups
	Search				
	✓	Sprt	Network Access·NetworkDeviceName EQUALS sprt	PermitAccess	Auditors

Reset Repeat Counts | Export To | Filter

us	Details	Identity	Security Group	Authentication Policy	Authorization Policy	Authorizatio...	IP Address	Network Device
		Identity	Security Group	Authentication Policy	Authorization Policy	Authorization Pro	IP Address	Network Device
		8C:C1:4A:A4:12:78	Auditors	Default >> MAB	Default >> Sprt	PermitAccess	10.20.30.40	
		E9:18:22:65:A8:42	Auditors	Default >> MAB	Default >> Sprt	PermitAccess	10.20.30.204	
		96:C0:D0:C4:DC:B9	Auditors	Default >> MAB	Default >> Sprt	PermitAccess	10.20.30.8	
		3D:2A:99:DA:22:82	Auditors	Default >> MAB	Default >> Sprt	PermitAccess	10.20.30.108	
		E9:18:22:65:A8:42		Default >> MAB	Default >> Sprt	PermitAccess		SPRT
		8C:C1:4A:A4:12:78		Default >> MAB	Default >> Sprt	PermitAccess		SPRT
		96:C0:D0:C4:DC:B9		Default >> MAB	Default >> Sprt	PermitAccess		SPRT
		3D:2A:99:DA:22:82		Default >> MAB	Default >> Sprt	PermitAccess		SPRT

SXP Devices

Rows/Page 1 1

Add Trash Edit Assign SXP Domain

Name	IP Address	Status	Peer Ro...	SXP Do...	SXP Version	Neg...	Pass...	Connected To	Duration ...
9300-09	10.31.121.160	ON	LISTENER	cisco-live	V4	V4	DEFA...	ise33a	00:00:57:06

All SXP Mappings

Rows/Page 4 1

Add SXP Domain filter Manage SXP Domain filters

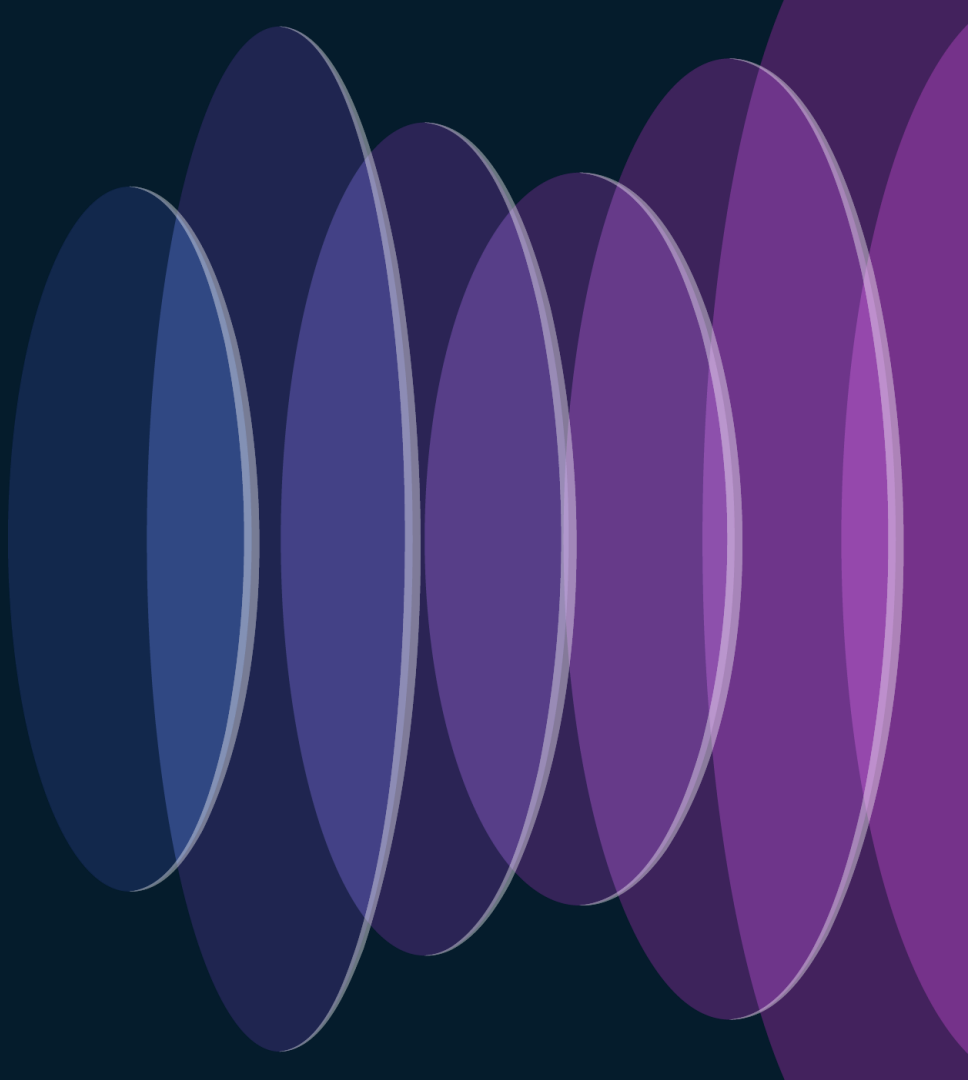
IP Address	SGT	VN	Learned From	Learned ...	SXP Domain	PSNs Involve
10.20.30.8/32	Auditors (9/0009)		10.31.126.181,10.31.126.245	Session	cisco-live	ise33a
10.20.30.40/32	Auditors (9/0009)		10.31.126.181,10.31.126.245	Session	cisco-live	ise33a
10.20.30.108/32	Auditors (9/0009)		10.31.126.181,10.31.126.245	Session	cisco-live	ise33a
10.20.30.204/32	Auditors (9/0009)		10.31.126.181,10.31.126.245	Session	cisco-live	ise33a

```
MXC.TAC.N.04-9300-09#show cts role-based sgt-map vrf cisco-live all
%IPv6 protocol is not enabled in VRF cisco-live
Active IPv4-SGT Bindings Information

IP Address              SGT     Source
============================================
10.20.30.8              9       SXP
10.20.30.40             9       SXP
10.20.30.108            9       SXP
10.20.30.204            9       SXP

IP-SGT Active Bindings Summary
============================================
Total number of SXP      bindings = 4
Total number of active   bindings = 4
```

Enforcement



CTS concepts

CTS Credentials

Protected-access Credential PAC

PAC Provisioning

Environmental data

1. Network device security group
2. CTS server list
3. Security Group List
4. Refresh timers

CTS Request process

- Device discovery
- Plug n Play
- Manual Configuration

1

CTS Credentials

Configure

Request

CTS Pac

2

```
show cts pac
AID:
2545A5CB09E8EA76E905977C39D94D7F
PAC-Info:
  PAC-type = Cisco Trustsec
  AID:
2545A5CB09E8EA76E905977C39D94D7F
..
..
```

```
#show cts environment-data
CTS Environment Data
====================
Current state = COMPLETE
-omitted--
Security Group Name Table:
    0-00:Unknown
    2-00:TrustSec_Devices
    3-00:Network_Services
    4-06:Employees
    5-00:Contractors
```

3

CTS Env-Data

Request

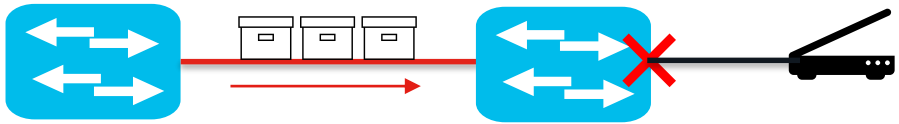
Request

CTS SGACLs

4

```
#show cts role-based
permissions
IPv4 Role-based
permissions default:
        Permit IP-00
IPv4 Role-based
permissions from group
16:Kris to group
8:Developers:
        Deny IP-00
..
..
```

Enforcement, considerations



SGACL/RBACL
NO source/destination IP info
ONLY permitted/denied traffic based on protocols, ports,etc.

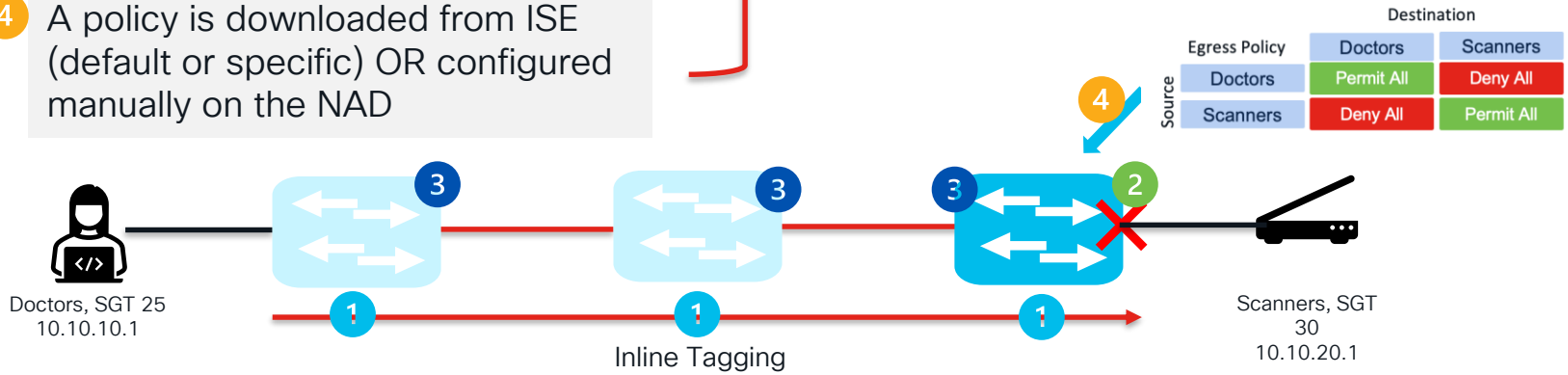
Switch downloads only the SGACL associated with the IP-SGT bindings that it has.

Traffic tagged with SGT 0 (unknown) will hit the default configured action.

Where does enforcement occur?

1. Source IP:SGT binding
2. Destination IP:SGT binding
3. Platfrom and VLAN has enforcement enabled
4. A policy is downloaded from ISE (default or specific) OR configured manually on the NAD

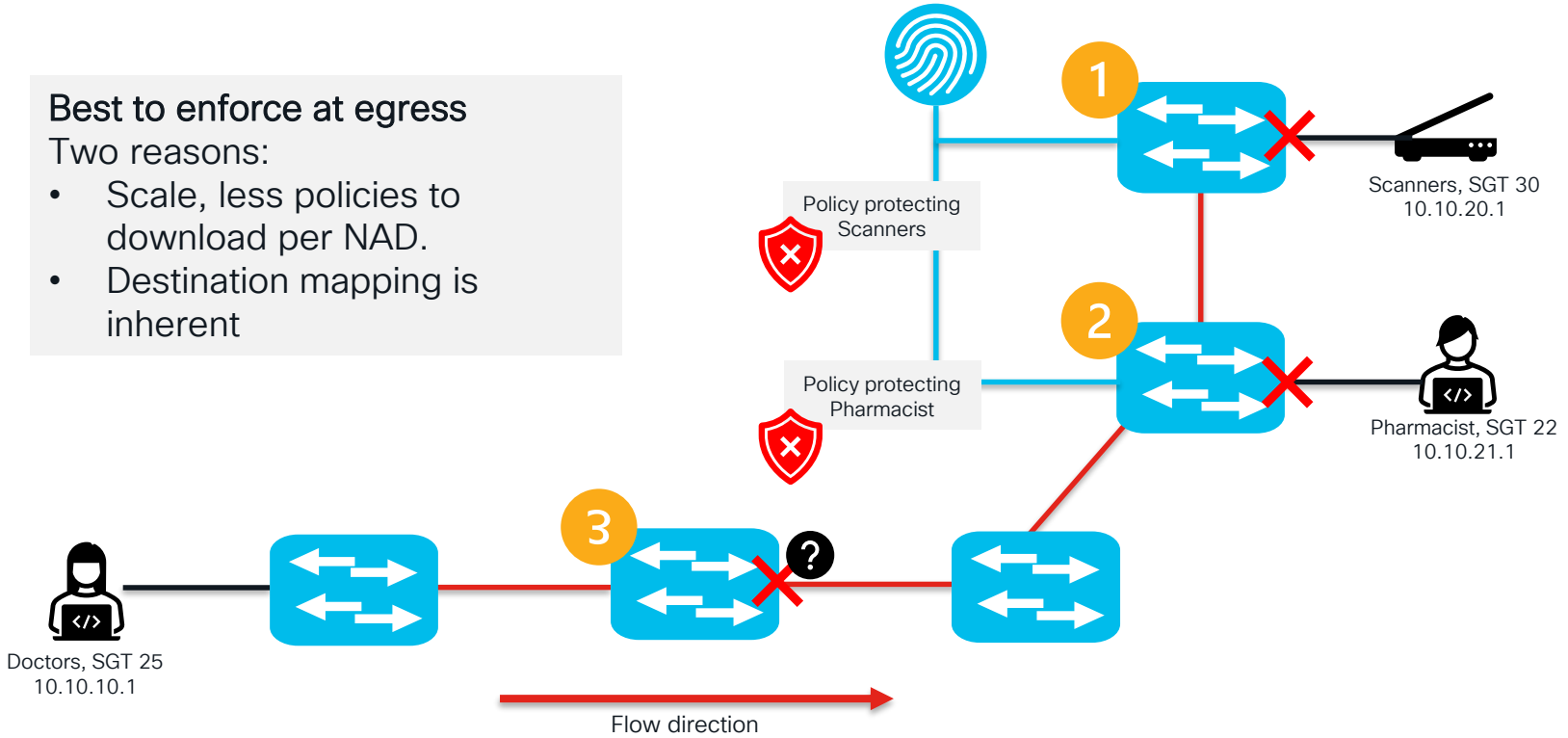
"Enforcement is conducted at the primary platform along the traffic route that meets all of the following conditions"



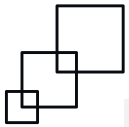
Where is best to enforce?

Best to enforce at egress
Two reasons:

- Scale, less policies to download per NAD.
- Destination mapping is inherent

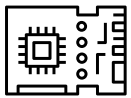


Enforcement, troubleshooting



SGACL downloaded correctly

```
Switch#show cts role-based permissions
IPv4 Role-based permissions default:
        Permit IP-00
IPv4 Role-based permissions from group 30:Doctors
to group 22:Scanners:
        SGACL_01
IPv4 Role-based permissions from group 30:Doctors
to group 50:Health_servers:
        SGACL_02
```



TCAM usage

```
#show platform hardware fed active sgacl resource
usage
…                          Max     Used
  Policy Entries    :      256       2   ──►  SGACL
…
 Output SGACL :           2560       9   ──►  ACEs
```

SGACL content

```
#show access-list SGACL_01
Role-based IP access list SGACL_9151_1016-01 (downloaded)
    10 permit icmp……..1 slot in TCAM
    20 permit udp src range 5246 5247 5247……2 slots in TCAM
    30 permit ip log……1 slot in TCAM

#show access-list SGACL_02
Role-based IP access list SGACL_1016_9151-01 (downloaded)
    10 permit icmp
    20 permit udp dst range 5246 5247
    30 permit ip log
```

Troubleshooting tips

SGACLs downloaded correctly

```
#show cts role-based permissions
IPv4 Role-based permissions default:
        Permit IP-00
IPv4 Role-based permissions from group 30:Doctors to group 22:Scanners:
        SGACL_01
IPv4 Role-based permissions from group 30:Doctors to group 50:Health_servers:
        SGACL_02
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

- NAD only downloads the bindings that it learned.
- Default action for unmatched traffic is: Permit All
- Monitor mode is Turned Off

Enforcement, troubleshooting

SGACL content

```
#show access-list SGACL_01
Role-based IP access list SGACL_9151_1016-01 (downloaded)
    10 permit icmp.....1 slot in TCAM
    20 permit udp src range 5246 5247 5247.....2 slots in TCAM
    30 permit ip log.....1 slot in TCAM

#show access-list SGACL_02
Role-based IP access list SGACL_1016_9151-01 (downloaded)
    10 permit icmp
    20 permit udp dst range 5246 5247
    30 permit ip log
```

TCAM Usage

```
#show platform hardware fed active sgacl resource usage
…                          Max     Used
  Policy Entries   :       256     2        → SGACL
…
 Output SGACL :            2560    9        → ACEs
```

+1 Default action

More ACEs and less SGACL to improve resource utilization

Cisco Group Based Policy Platfrom and Capability Matrix

Enforcement, troubleshooting

Role-based counters

```
#show cts role-based counters from 30 to 22
Role-based IPv4 counters
From  To       SW-Denied     HW-Denied     SW-Permitted        HW-Permitted
30    22         0           1              0                    22
```

- Ensure that counters are enabled **#cts role-based counters enabled**
- HW-Denied, HW-Permitted
  - Used in modern NADs
  - RBACL enforcement happens on the ASIC.
- SW-Denied, SW- Permitted
  - Common in NADs that lack dedicated hardware.
  - RBACL happens on CPU

Enforcement, troubleshooting

CTS Liveness Auto-test

```
#show cts server-list
CTS Server Radius Load Balance = DISABLED
Server Group Deadtime = 20 secs (default)
Global Server Liveness Automated Test Deadtime = 20 secs
Global Server Liveness Automated IDLE Time = 60 mins
Global Server Liveness Automated Test = ENABLED (default)
Installed list: CTSServerList1-0005, 2 server(s):
   *Server: 10.31.126.220, port 1812, A-ID  E8F71A3AE317511F27904B503414490C
      Status = ALIVE
      auto-test = TRUE, keywrap-enable = FALSE, idle-time = 60 mins, deadtime = 20
secs
   *Server: 10.31.126.222, port 1812, A-ID E8F71A3AE317511F27904B503414490C
      Status = ALIVE
      auto-test = TRUE, keywrap-enable = FALSE, idle-time = 60 mins, deadtime = 20
secs
```

Enforcement, troubleshooting

debug radius

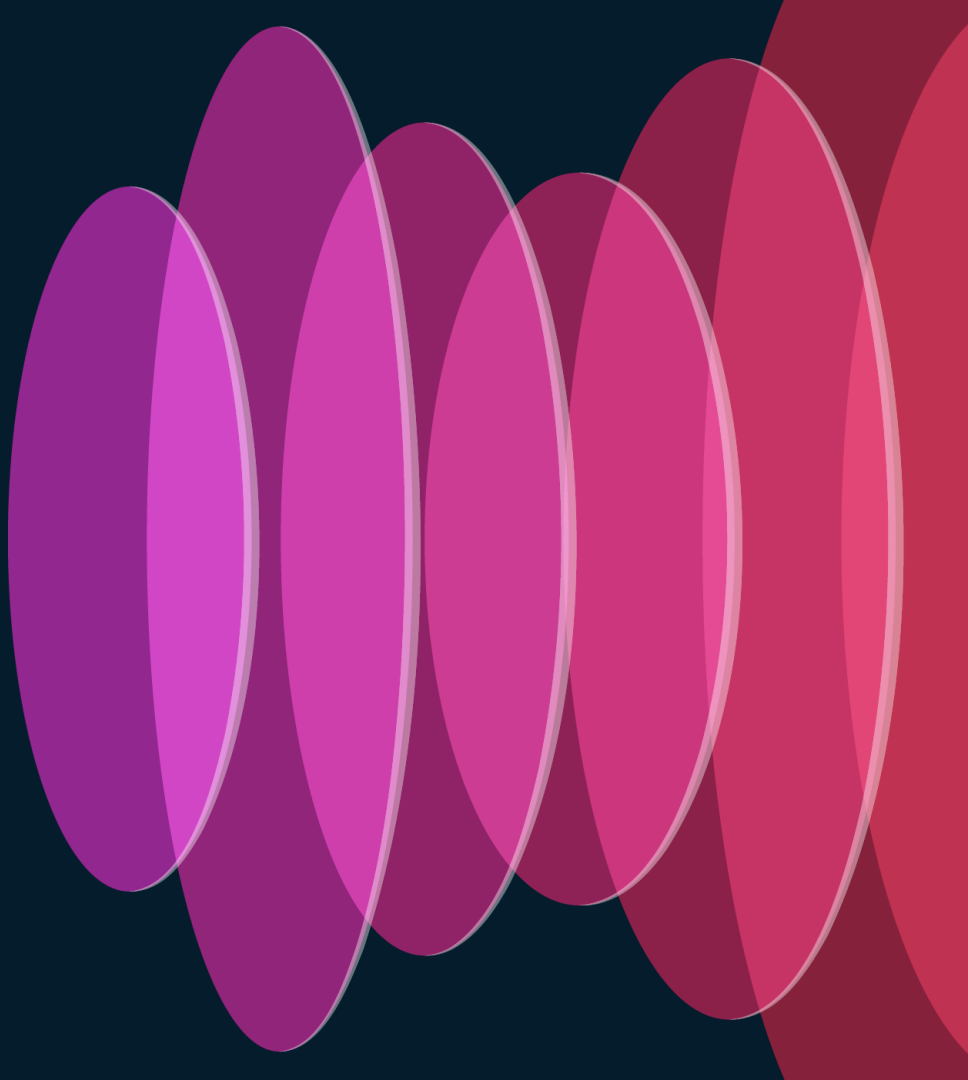
```
Mar 31 19:45:37.237: RADIUS: Vendor, Cisco [26] 211
Mar 31 19:45:37.237: RADIUS: Cisco AVpair [1] 205 "cts-pac-
opaque= "
Mar 31 19:45:37.237: RADIUS: User-Password [2] 18 *
Mar 31 19:45:37.237: RADIUS: User-Name [1] 17 "CTS-Test-
Server"
Mar 31 19:45:37.238: RADIUS: Service-Type [6] 6 Login [1]
Mar 31 19:45:37.238: RADIUS: NAS-IP-Address [4] 6 x.x.x.x
```

When the server is marked as DEAD, the switch sends radius test with user “CTS-Test-Server”

Radius automate-tester configuration along with CTS may impact env-data/SGACL downloads.

```
radius server ISE_3
address ipv4 x.x.x.x auth-port 1812 acct-port
1813
timeout 10
retransmit 3
automate-tester username RADIUS_TEST_USER
probe-on
pac key 7 <removed>
```

PxGrid Direct



PxGrid Direct in a nutshell

- DB entries on remote server retrieved by ISE
- You can use the fetched data in the authorization policies
- Eliminates the need to query for endpoint data during authZ


```
",
"checked_in":"", {"result":[{
"owned_by":”joncasil",
"operational_status":"Operational",
"sys_updated_on":"2024-05-22 16:44:52",
"sys_created_by":”joncasil",
"warranty_expiration":"",
"cpu_name":"",
"cpu_speed":"",
"checked_out":"",
"maintenance_schedule":"",
"u_segmentation_group_tag":"cts:security-group-
tag=12-00",
"managed_by":”joncasil",
"sys_class_name":"Computer",
"assigned_to":”joncasil@example.org",
"department":"Marketing",
"os":null,
"ip_address":”10.1.16.2",
"model_id":"Unknown",
…
```

PxGrid Direct, considerations

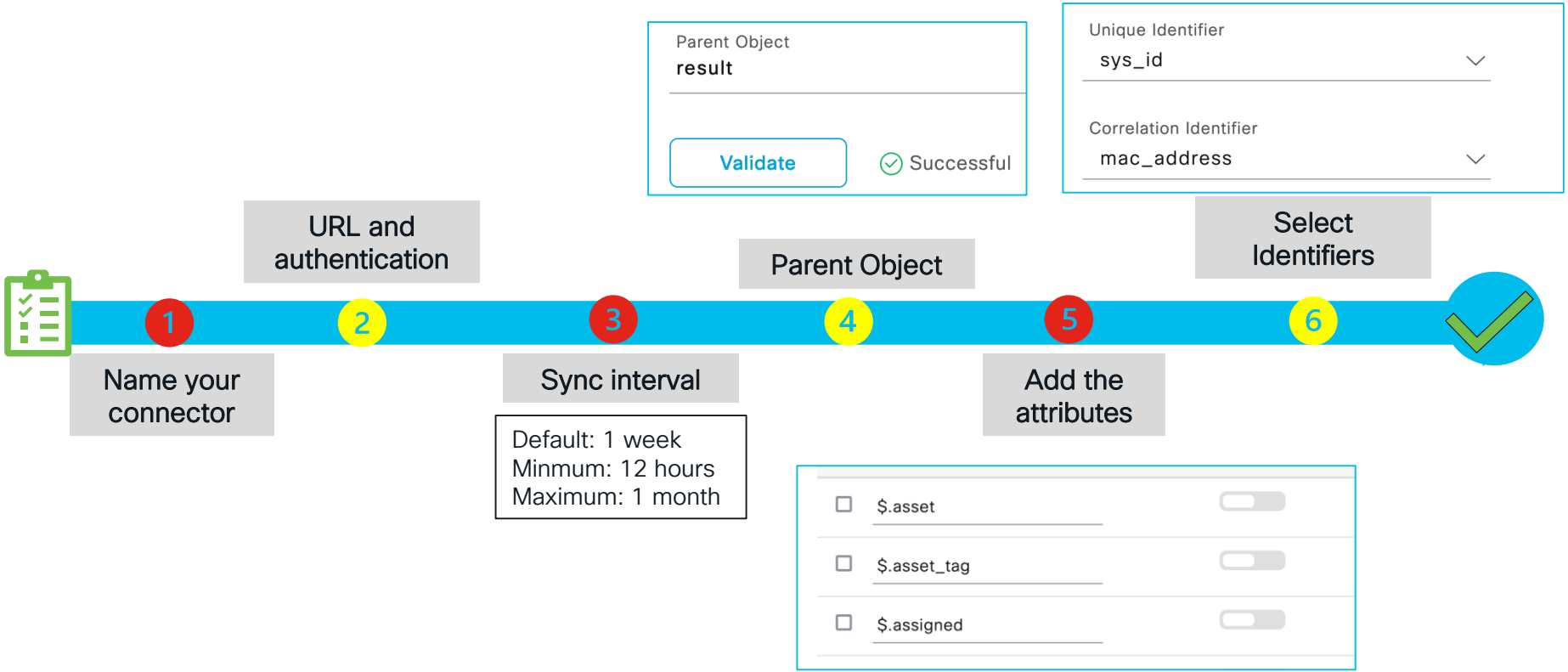
Advantage license to manage PxGrid Direct connectors

Recommended to use a maximum of 10 connectors

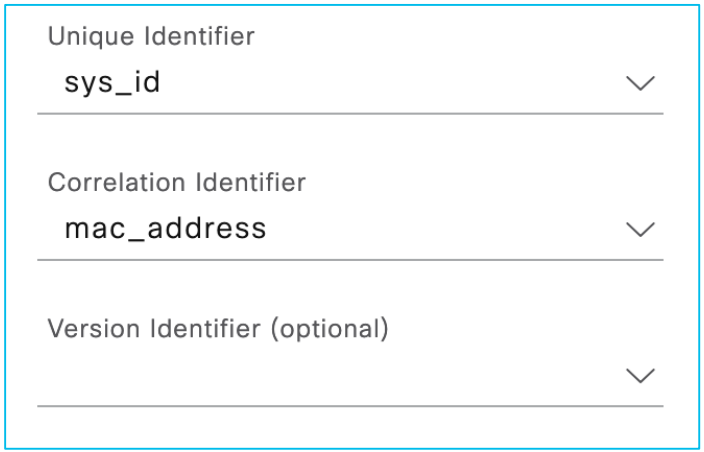
PxGrid Direct runs on the PAN and data fetched available on all PSNs

You can create/manage a connector via UI or using Open API

PxGrid Direct, configuration



PxGrid Direct Identifiers

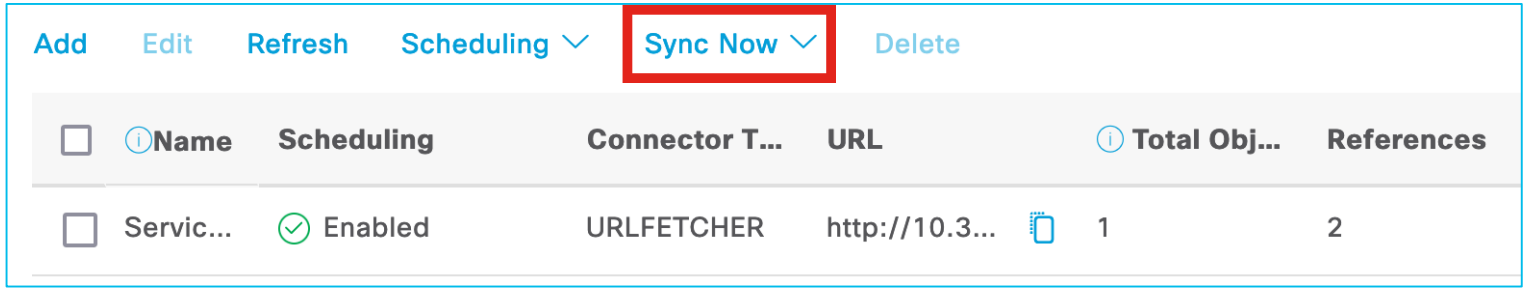


Unique identifier is used as a tie breaker in cases where the mac address is duplicated

Correlation identifier is used as a primary key to fetch endpoint data

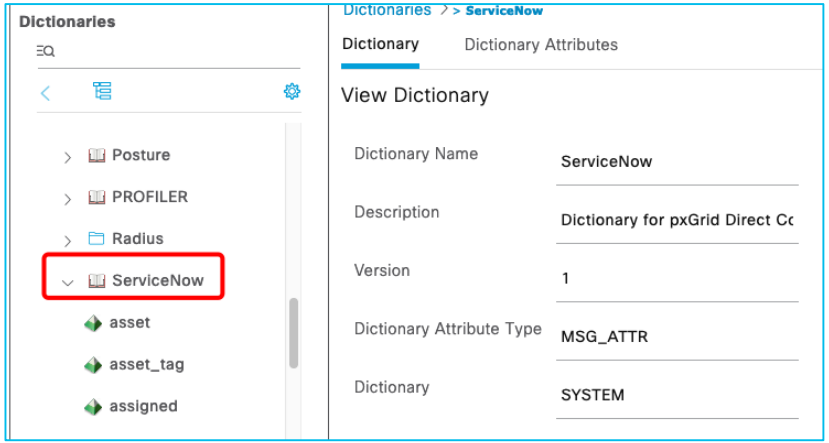
Version identifier is used to differentiate connector updates

Configuration summary

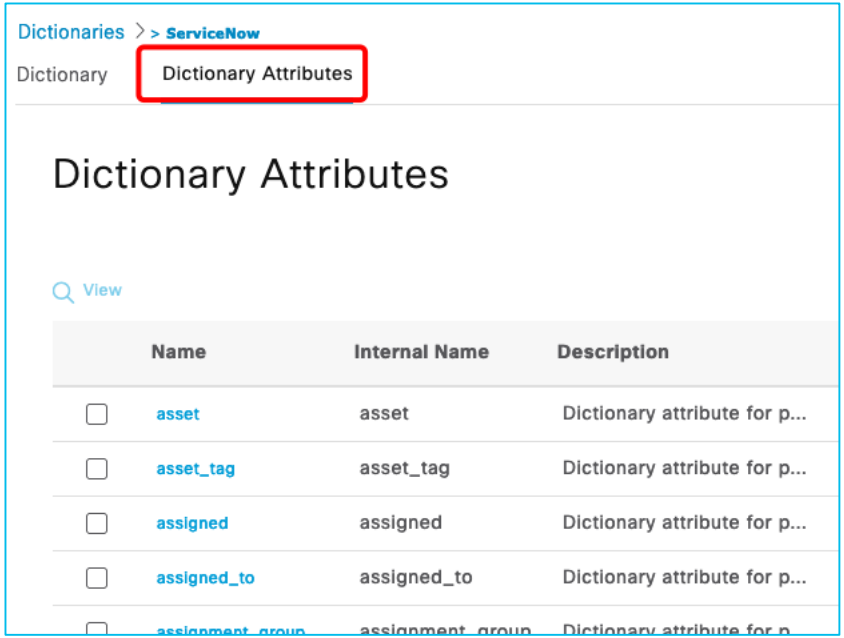


From ISE 3.2P5, 3.3P2 you can use the Sync Now feature for on-demand sync from PxGrid Connectors.

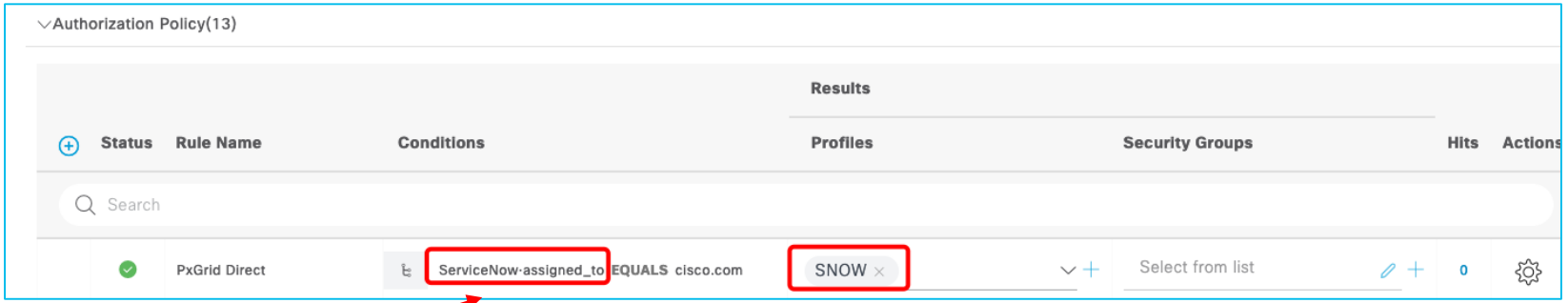
PxGrid Direct Dictionary



Policy>Policy Elements>Dictionaries

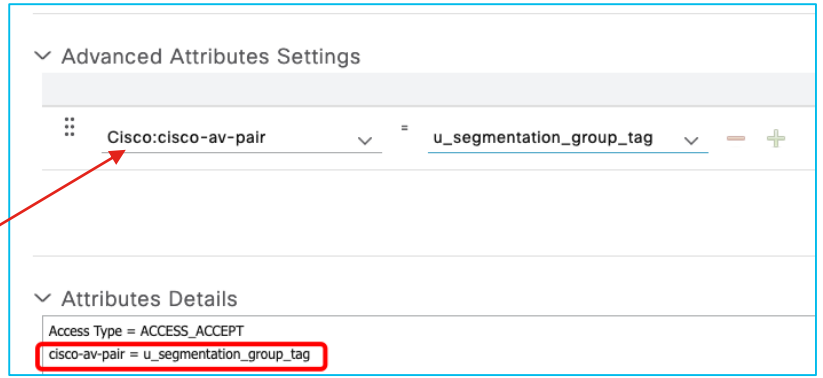


PxGrid Direct attributes used in policy

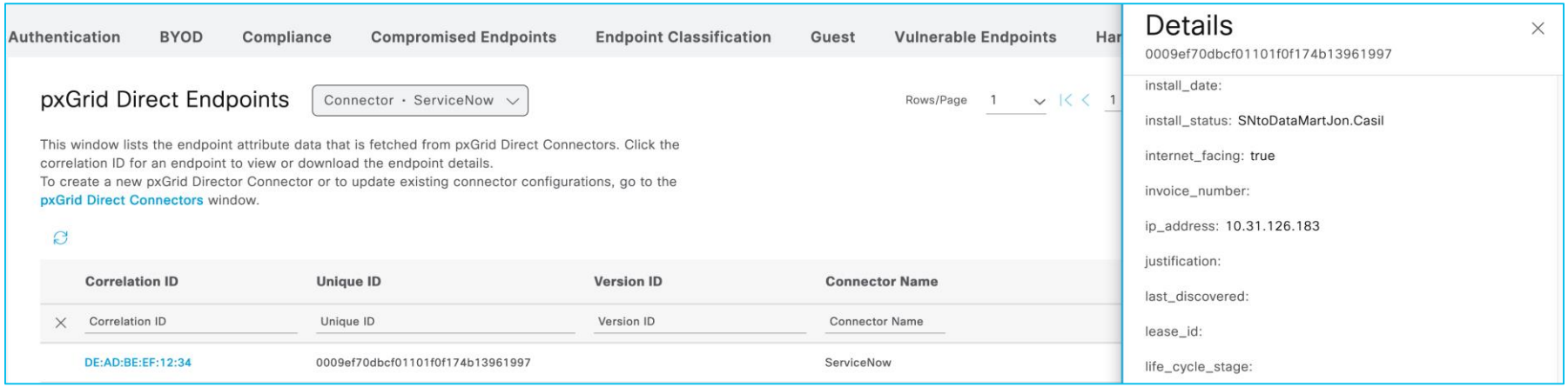


AuthZ conditions can use PxGrid Direct attributes

Authz profile can assign PxGrid Direct attributes



Visibility



Context Visibility > Endpoints > pxGrid Direct Endpoints

PxGrid Direct, troubleshooting


```
#show logging application
pxgriddirect-service.log
```

Contains information related to whether fetched endpoint data has been received and saved to the Cisco ISE database.

```
#show logging application
pxgriddirect-connector.log
```

Contains information that indicate whether a pxGrid Directed connector is successfully added to Cisco ISE.

Assign SGT with PxGrid Direct

RADIUS Access-Request

RADIUS Access-Accept

cisco-av-pair="cts:security-group-tag=12-00"

AuthZ Condition:

ServiceNow·assigned_to **EQUALS** cisco.com

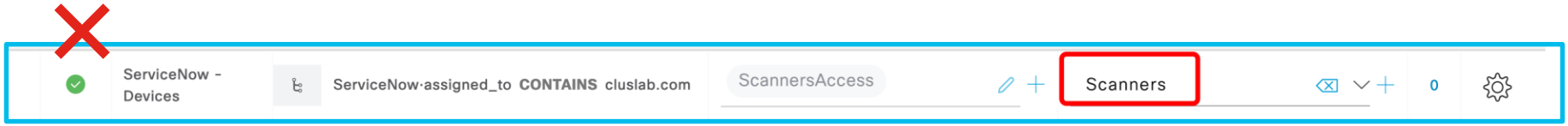
AuthZ Result:

Access Type = ACCESS_ACCEPT
cisco-av-pair = ServiceNow:u_segmentation_group_tag

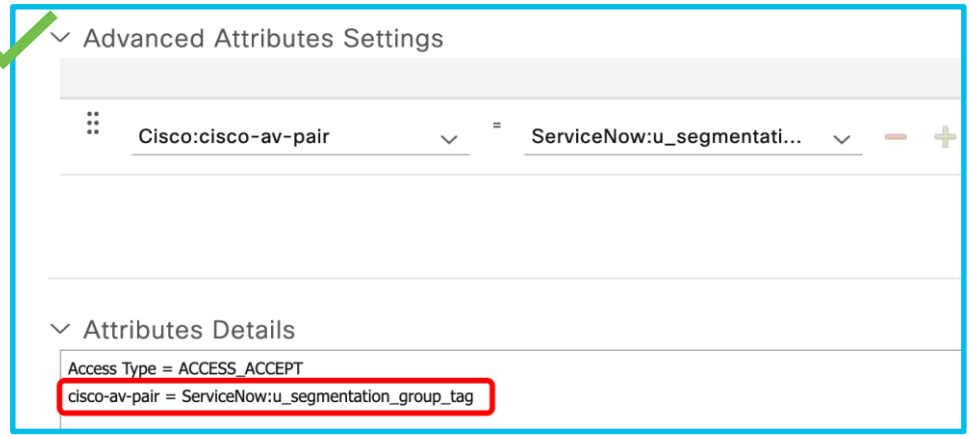
Attribute previously imported from external DB

```
sys_updated_by:              "joncasil"
sys_updated_on:              "2024-03-11 19:44:52"
u_segmentation_group_tag:    "cts:security-group-tag=0020-00"
```

Considerations



DO assign the SGT from the authZ profile
DO NOT assignt the SGT from the policy



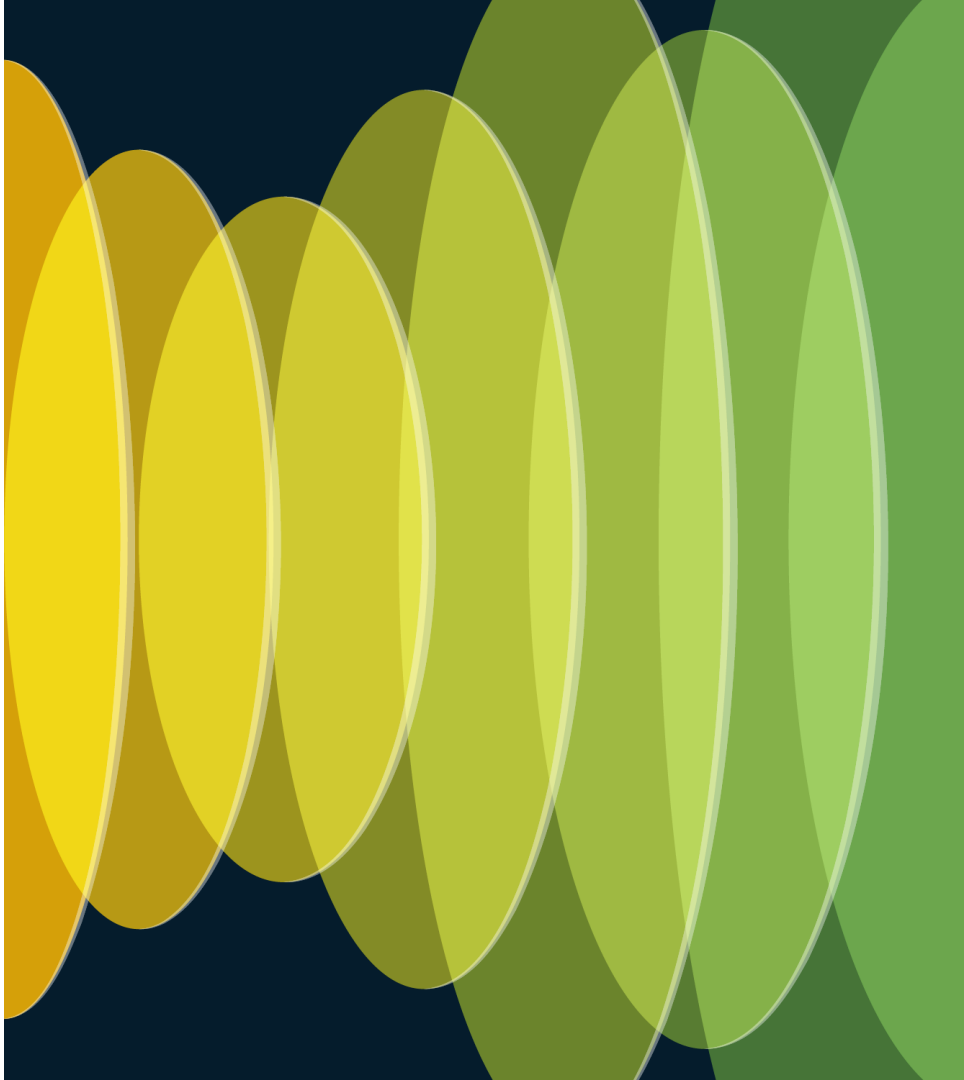
Radius Live log

22037	Authentication Passed	1
15036	Evaluating Authorization Policy	0
15048	Queried PIP - ServiceNow.assigned_to	46
15016	Selected Authorization Profile - SNOW	9
15048	Queried PIP - Network Access.EndPointMACAddress	19
15048	Queried PIP - ServiceNow.u_segmentation_group_tag	4
24209	Looking up Endpoint in Internal Endpoints IDStore - DE:AD:BE:EF:12:34	5
24211	Found Endpoint in Internal Endpoints IDStore	5
11002	Returned RADIUS Access-Accept	

Result

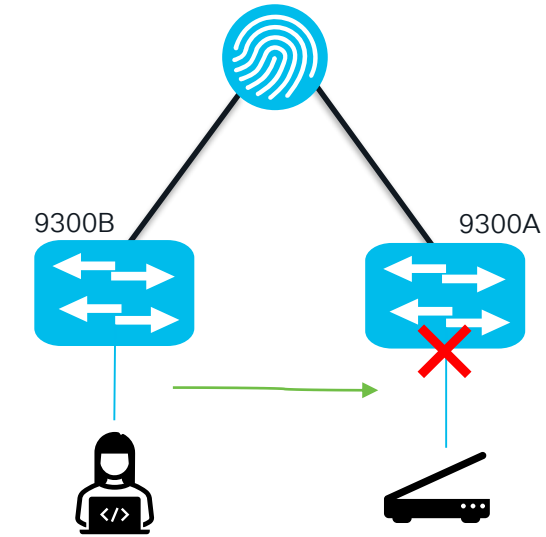
UserName	DE:AD:BE:EF:12:34
User-Name	DE-AD-BE-EF-12-34
Class	CACS:0a1f7eb5qBB/uxMVp_Oi8I6kZeWwDlbdnCuNotKtPtTQvSh6DN4:ise33a/502160790/16
cisco-av-pair	cts:security-group-tag=0020-00

Demo



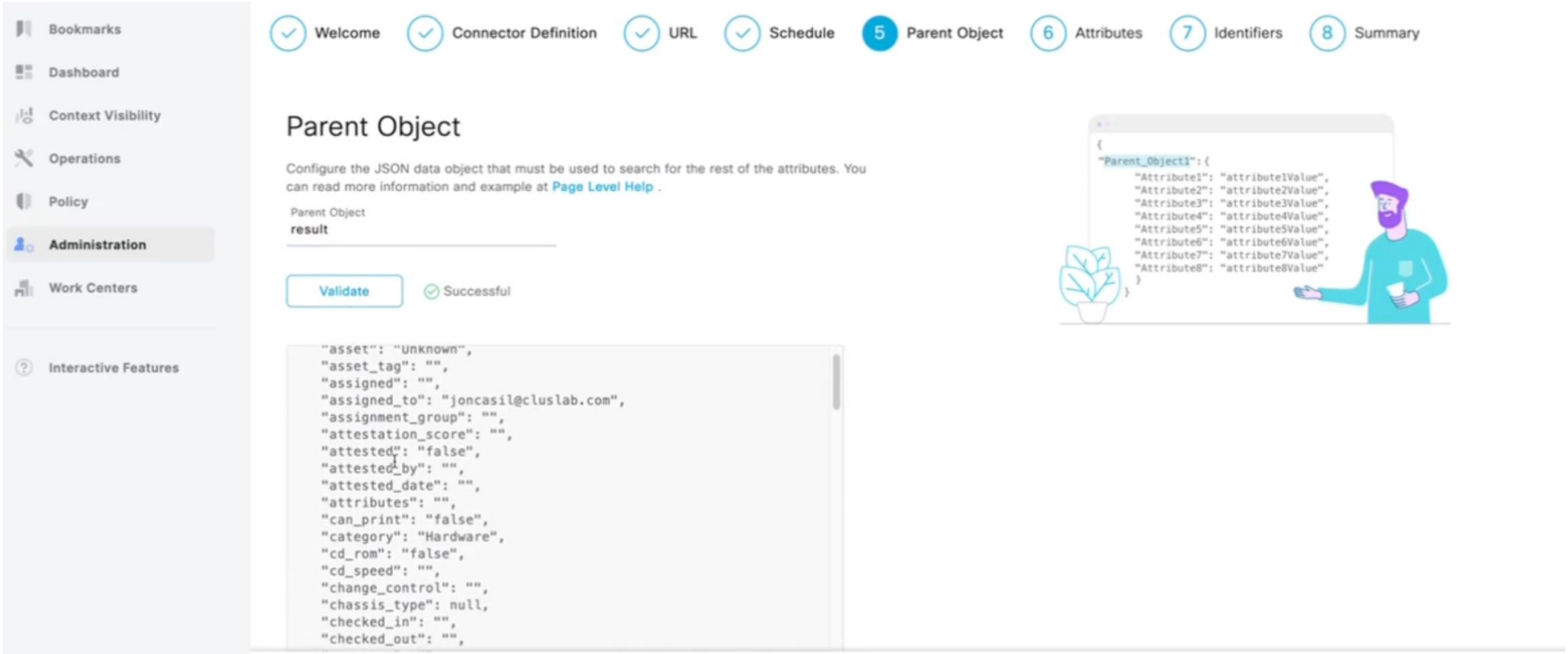
Use case

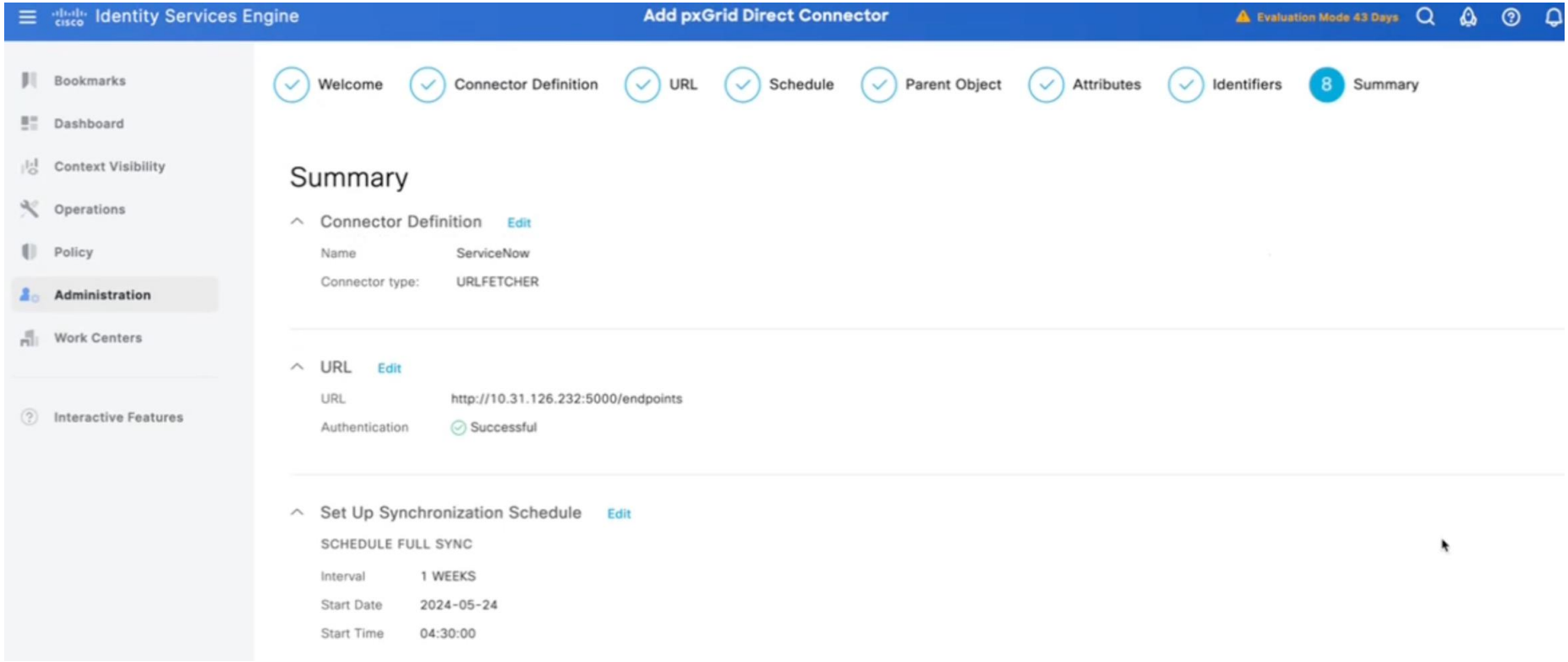
	SGT
Doctors	30
Scanners	22

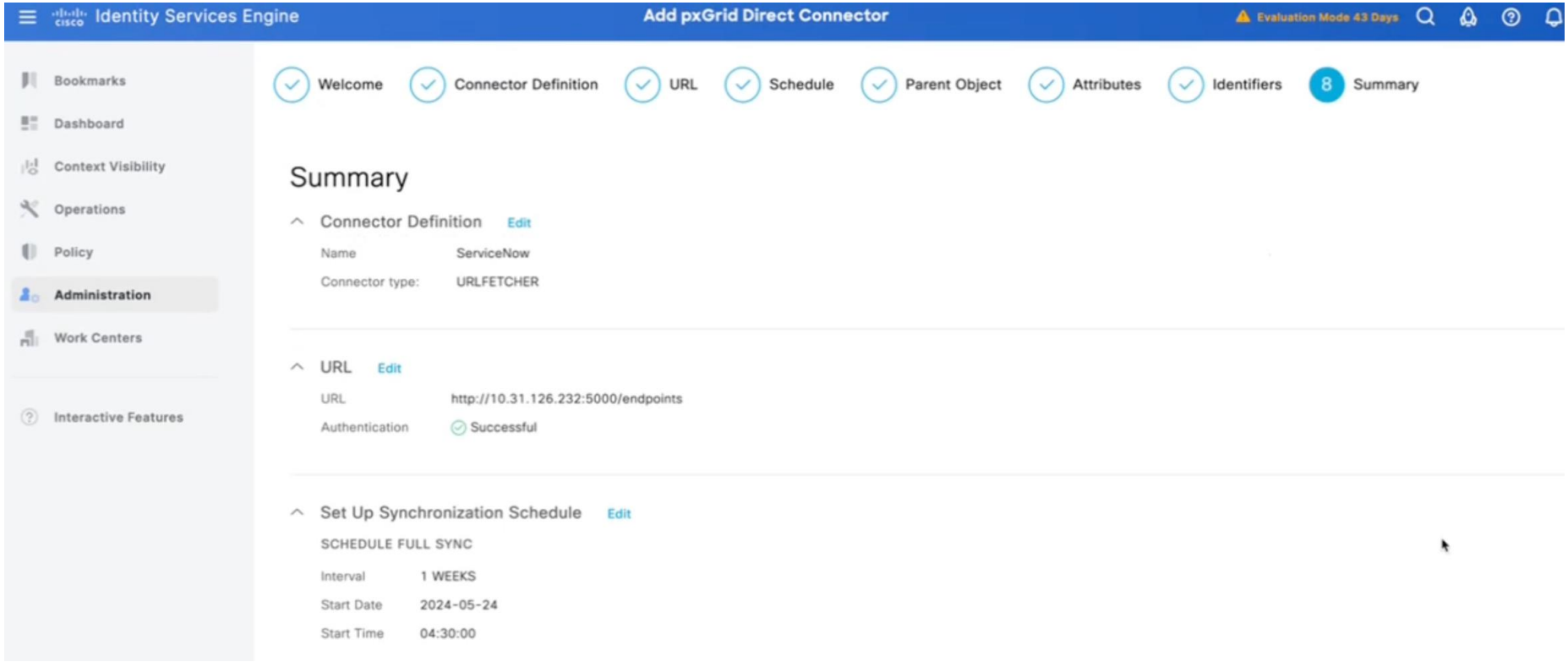


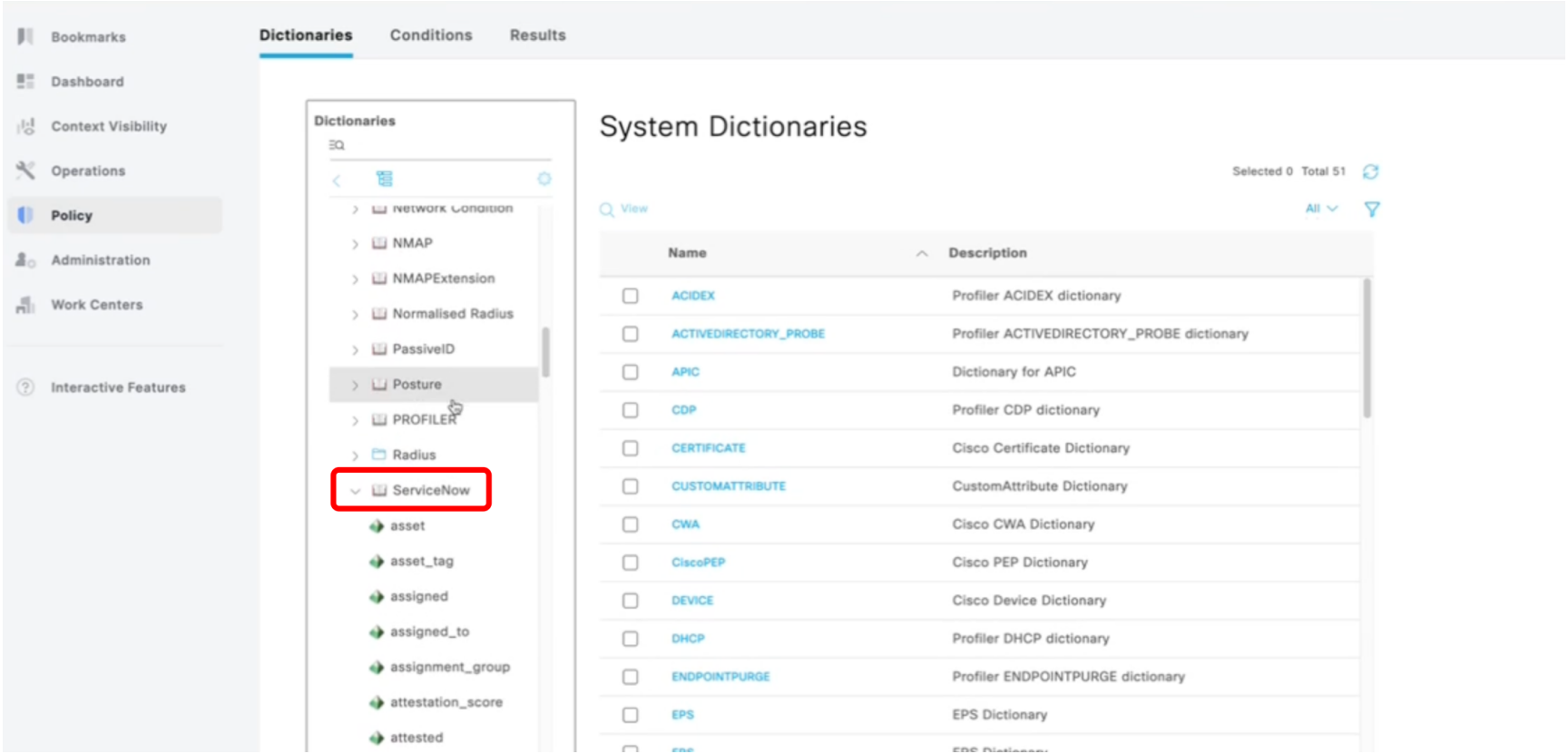
Requirement:
Block ICMP
Allow UDP/TCP

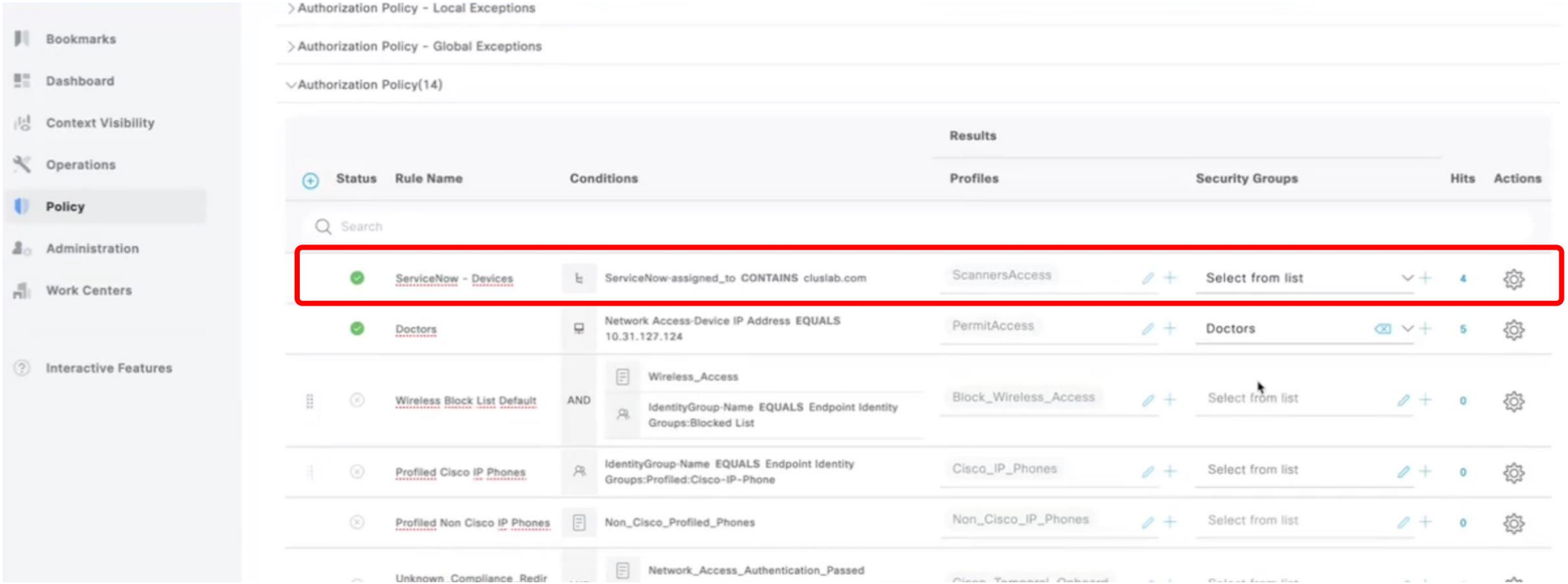
Egress Policy	Destination: Doctors	Destination: Scanners
Source: Doctors	Permit All	Deny All
Source: Scanners	Deny All	Permit All

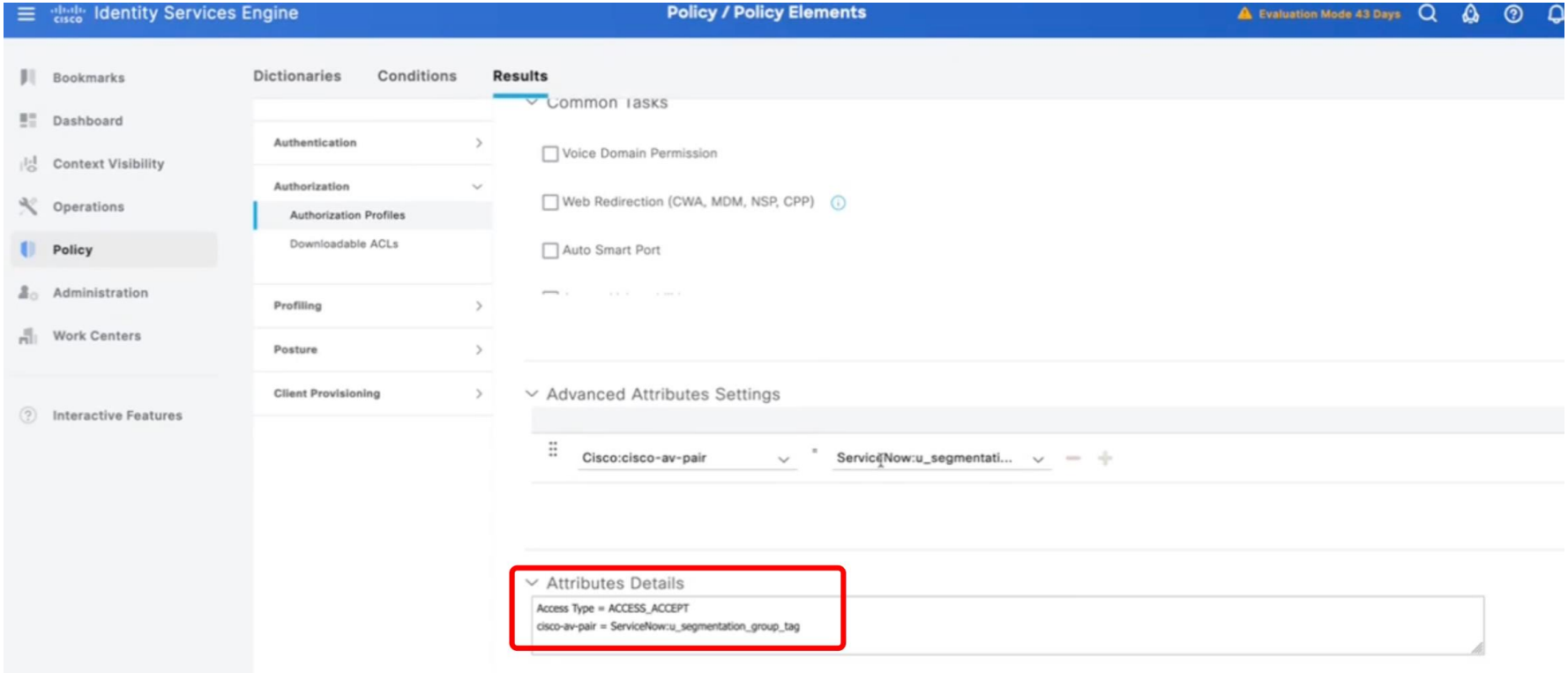












Cisco ISE

Overview

Event	5200 Authentication succeeded
Username	8C:16:45:11:23:3A
Endpoint Id	8C:16:45:11:23:3A
Endpoint Profile	Unknown
Authentication Policy	Default >> MAB
Authorization Policy	Default >> ServiceNow - Devices
Authorization Result	ScannersAccess

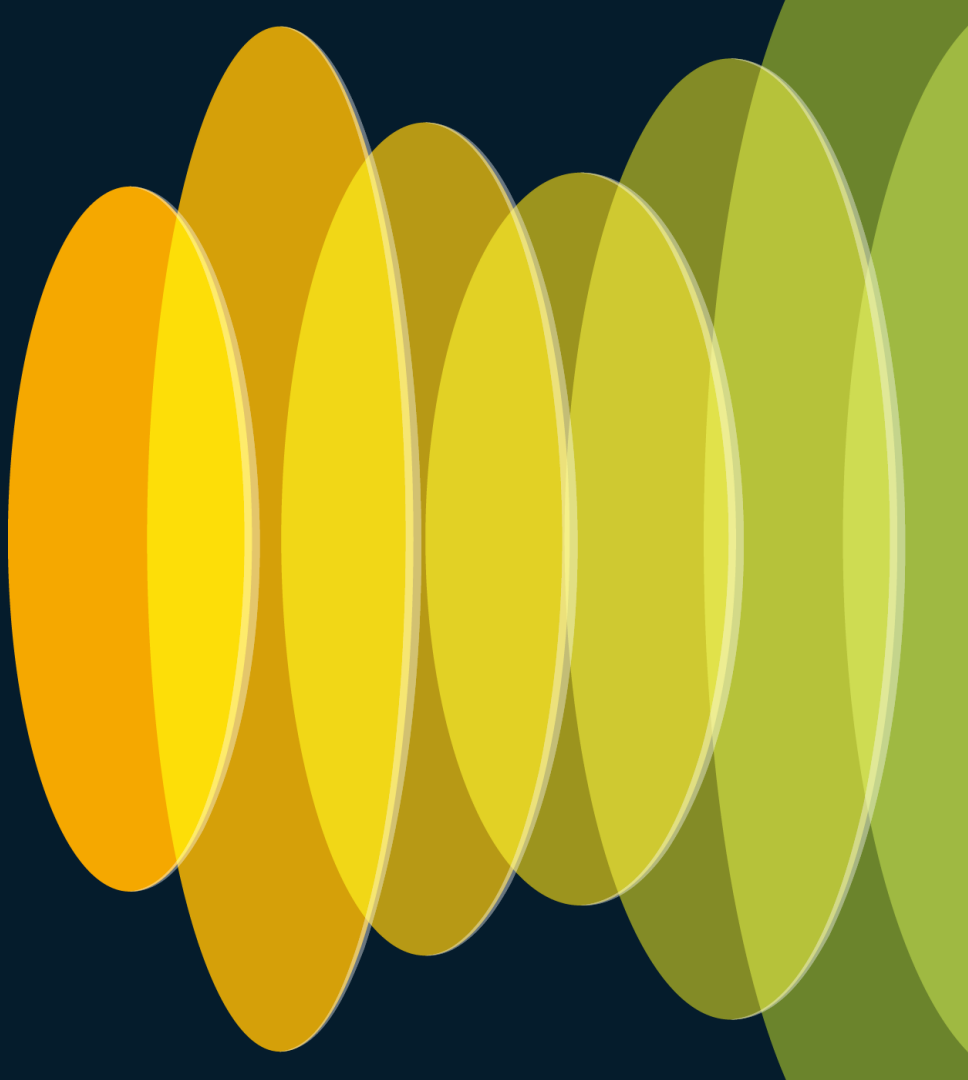
Authentication Details

Source Timestamp	2024-05-24 04:17:26.315
Received Timestamp	2024-05-24 04:17:26.315
Policy Server	ise33a
Event	5200 Authentication succeeded
Username	8C:16:45:11:23:3A
User Type	Host
Endpoint Id	8C:16:45:11:23:3A
Calling Station Id	8C-16-45-11-23-3A

Steps

Step ID	Description	Latency (ms)
11001	Received RADIUS Access-Request	
11017	RADIUS created a new session	0
11027	Detected Host Lookup UseCase (Service-Type = Call Check (10))	1
15049	Evaluating Policy Group	0
15008	Evaluating Service Selection Policy	0
15041	Evaluating Identity Policy	4
15048	Queried PIP - Normalised Radius.RadiusFlowType	1
15013	Selected Identity Source - Internal Endpoints	16
24209	Looking up Endpoint in Internal Endpoints IDStore - 8C:16:45:11:23:3A	0
24211	Found Endpoint in Internal Endpoints IDStore	2
22037	Authentication Passed	0
15036	Evaluating Authorization Policy	0
15048	Queried PIP - ServiceNow.assigned_to	39
15016	Selected Authorization Profile - ScannersAccess	4
15048	Queried PIP - Network Access.EndPointMACAddress	21
15048	Queried PIP - ServiceNow.u_segmentation_group_tag	2
24209	Looking up Endpoint in Internal Endpoints IDStore - 8C:16:45:11:23:3A	2
24211	Found Endpoint in Internal Endpoints IDStore	0
11002	Returned RADIUS Access-Accept	1

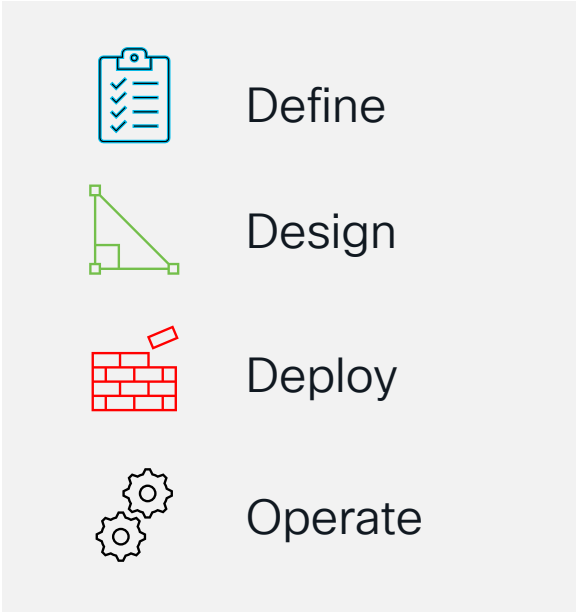
Wrap up time

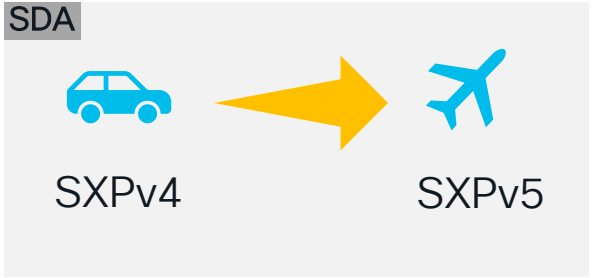


Key Takeaways

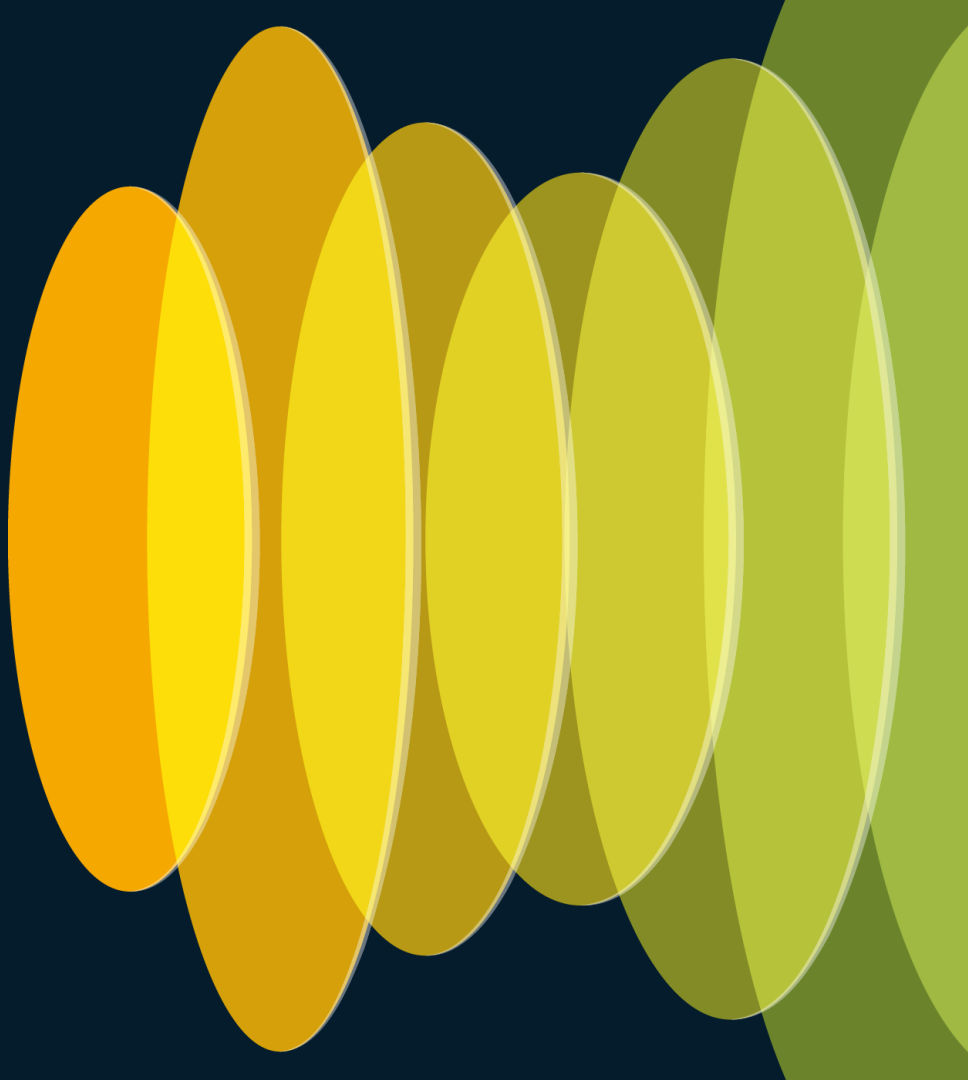
- Making Cisco TrustSec easy to manage and deploy.
- SXPv5 leverages VRF aware communication, enabling a single SXP connection to handle all VNs.
- PxGrid Direct provides flexibility and accuracy to your segmentation strategy leveraging information from CMDBS.
  - PxGrid Direct eliminates the need to query for endpoint attribute data each time that requires authorization.

The path forward





Q&A



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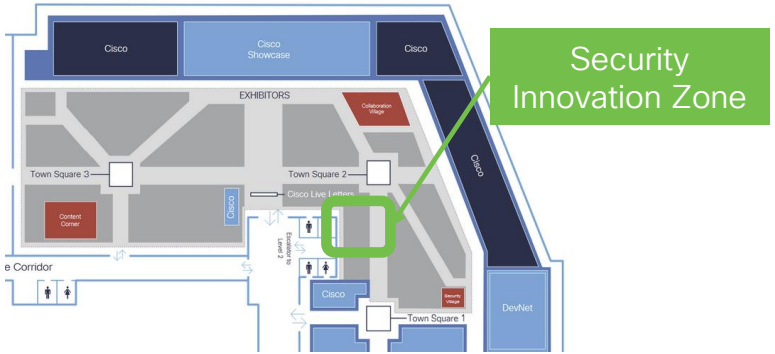

Thank you