End-to-End Micro-Segmentation & Agent Security Part 1:

Zero Trust in the Campus

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Cisco Segmentation Specialists – US Commercial

Helping customers simplify and scale segmentation across identity, network, and workload.

Chase Abrams –

Principal Advisor, Segmentation

- 11 years @ Cisco, 19 years in Enterprise Security & Networking Sales
- Deep experience across US Commercial, Global Enterprise, & Service Provider
- Specializes in Zero Trust, Segmentation, and Unified Security Architecture
- Background in Security & DC solutions
- Based in Boulder, CO

Jacob Schnieder–

Segmentation Solutions Architect

- 22+ years of experience designing & deploying Cisco Security & Networking solutions
- 12 years @ Cisco
- Cisco Live Distinguished Speaker & recognized CCIE (#24940)
- Deep Background in Service Provider & Security architectures
- Based in Miami, FL

Cisco Live 2025 *Pre-Event Customer Survey*

Top Business Priorities

1. Improving Cybersecurity
2. Automation
3. Cost Reduction & Efficiency
4. Customer Experience
5. Digital Transformation

Cisco Value Proposition Familiarity

81%
are somewhat-not at all familiar with Cisco's strategy around **AI-ready data centers**.

68%
are somewhat-not at all familiar with Cisco's strategy around **future-proofed workplaces**.

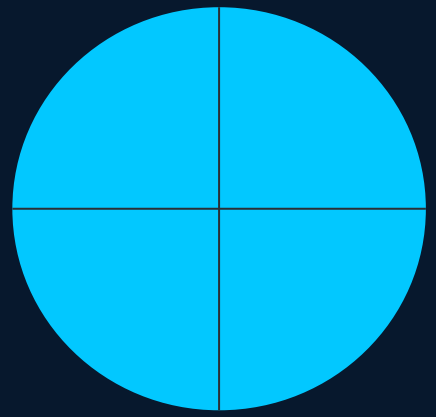
60%
are somewhat-not at all familiar with Cisco's strategy around **digital resilience**.

IT Strategy & Roadmap Focus Areas

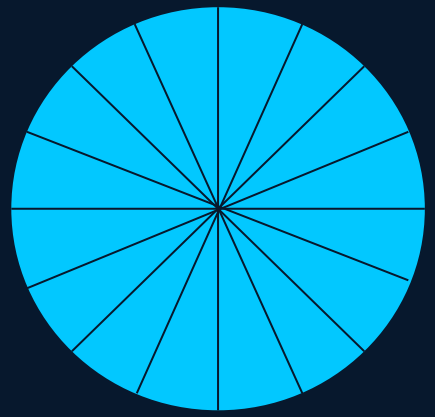
What is Segmentation?

“ Segmentation is the practice of dividing a larger system into smaller, isolated parts to improve control, security, and performance.” - CIRCUIT (a.k.a BridgeIT).

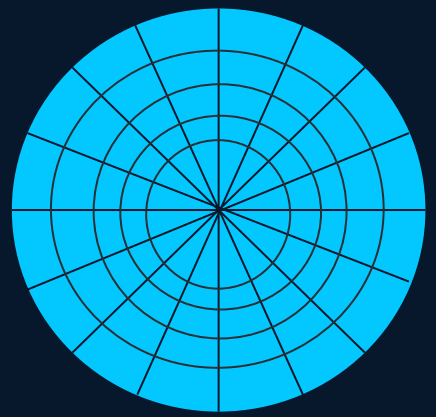
No Segmentation



Macro Segmentation

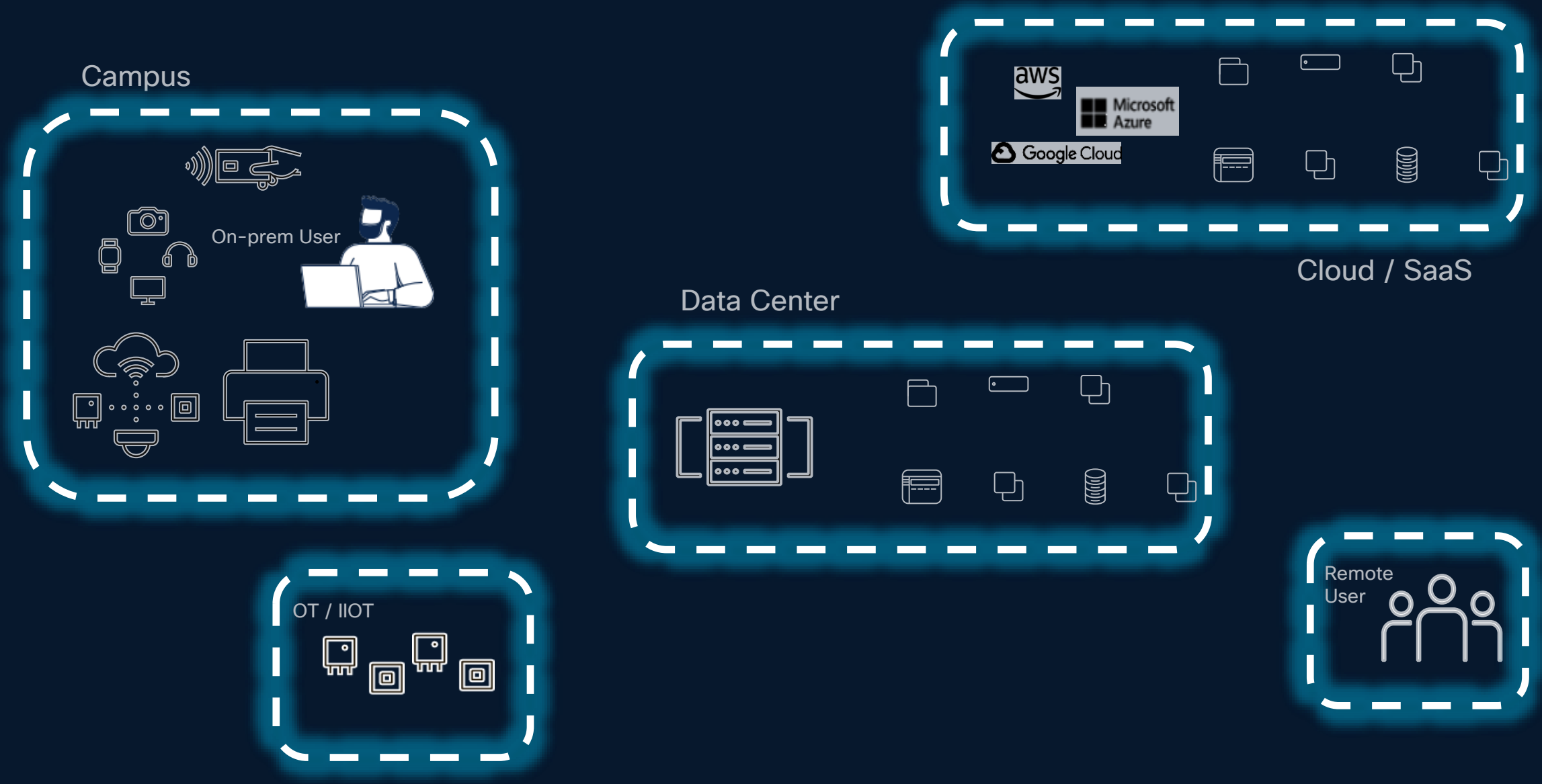


Micro Segmentation



Nano Segmentation??

Segmentation Domains




Lookout
Ping Identity
Troj.ai
Prove
CHECK POINT
Vize.ai
okta
proofpoint
Guardian
DARKTRACE
Security is a **patchwork**
Exabeam
axio
KnowBe4
CROWDSTRIKE
VARONIS
deepwatch
NowSecure

Segmentation is a solution, but it is complex.

Cisco is dedicated to solving customers' needs

People, process and technology

Scale, speed and granularity

Customers need flexibility and choice to address unique scenarios

Why it matters to our customers

- App modernization and multicloud adoption
- Ransomware threat – contain lateral movement
- Meet compliance requirement
- Automation at scale
- Visibility

Cisco innovations

1998	2008	2014	2016	2022	2023	2024
VRF, PVLAN	Cisco TrustSec (SGT)	Cisco ACI and VXLAN – EVPN	Cisco Secure Workload (Tetration)	Cisco Multicloud Defense (Valtix)	Cisco Secure Access	Cisco HyperShield

Cisco intent-based access in the Campus

Cisco's campus intent-based access that lets you:

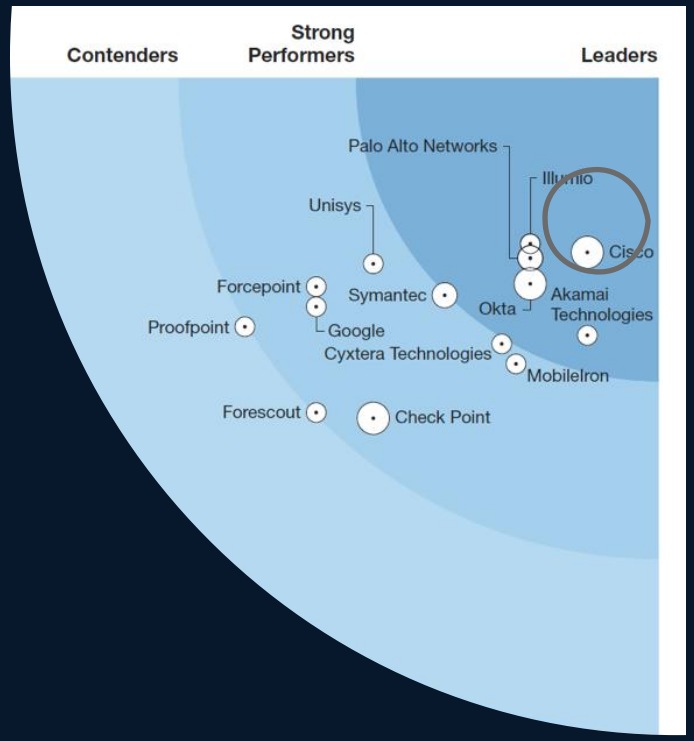
See
Users, endpoints and applications

Secure
By controlling network access and segmentation

Share
Context with partners for enhanced operations

ISE is the access control and policy enforcement market leader

#1 in Forrester Wave ZT ranking



ISE Market Maturity

10+yrs
of market leadership

75,000+
Deployments

48%
Market Share
-Gartner

ISE as a Control Point

Secure Networking
ISE is the enabler of Segmentation for Catalyst and Meraki

Zero Trust
ISE is a critical control point.

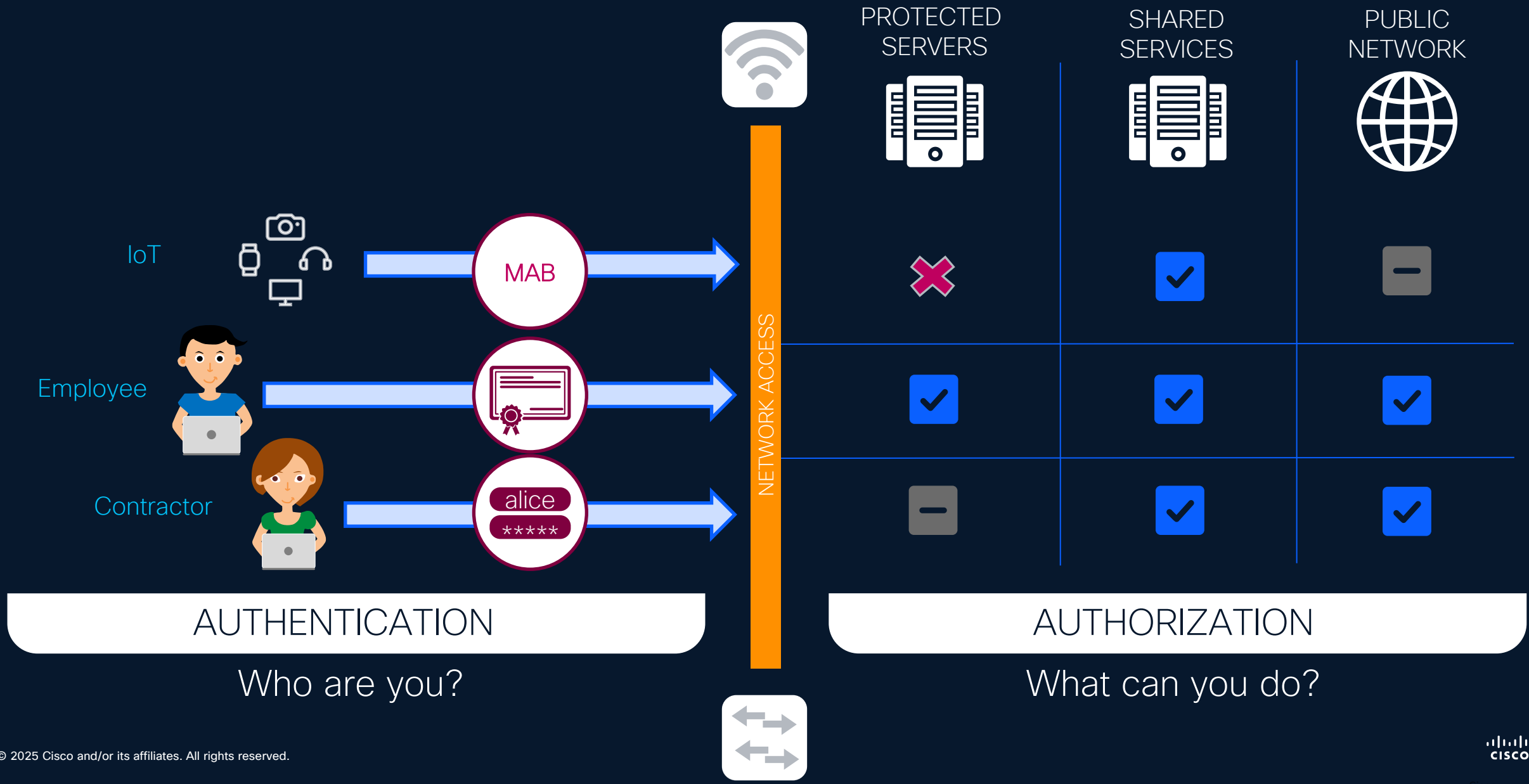
ISE is the Bridge
ISE sits between Networking and Security

Why Customers Buy ISE

Device Administration	TACACS+ Allows for secure, identity-based access to the network devices	https://cs.co/ise-tacacs
Secure Access	Secure wired, wireless, or VPN access using industry standard protocols RADIUS and 802.1X	https://cs.co/ise-wired
Guest Access	Choose from Hotspot, Self-Registered Guest, and Sponsored Guest access options	https://cs.co/ise-guest
Asset Visibility	Use the probes in ISE and Cisco devices to classify endpoints and authorize them	https://cs.co/ise-profiling
Compliance & Posture	Use agentless posture, Cisco Secure Client, MDM, or EMM to check endpoints' posture	https://cs.co/ise-posture
Context Exchange	Integrate applications and vendors with ISE for endpoint identity, context, and automated Enforcement	https://cs.co/ise-pxgrid
Segmentation	Group-based Policy with Security Group Tags (SGT) and Security Group ACLs (SGACL) instead of VLAN/ACLs	https://cs.co/segmentation-resources
Cisco Catalyst Center	ISE integrates with Catalyst Center to automate the network fabric and policies using SDA	https://cs.co/ise-ccc
EMM/MDM	Endpoint Management is required for provisioning endpoints with certificates and controls for secure network access	https://cs.co/ise-mdm
Threat Containment	Use Threat Analysis tools to grade an endpoint's threat score and automatically quarantine it if	https://cs.co/ise-tcnac

Campus Segmentation

Authentication and Authorization

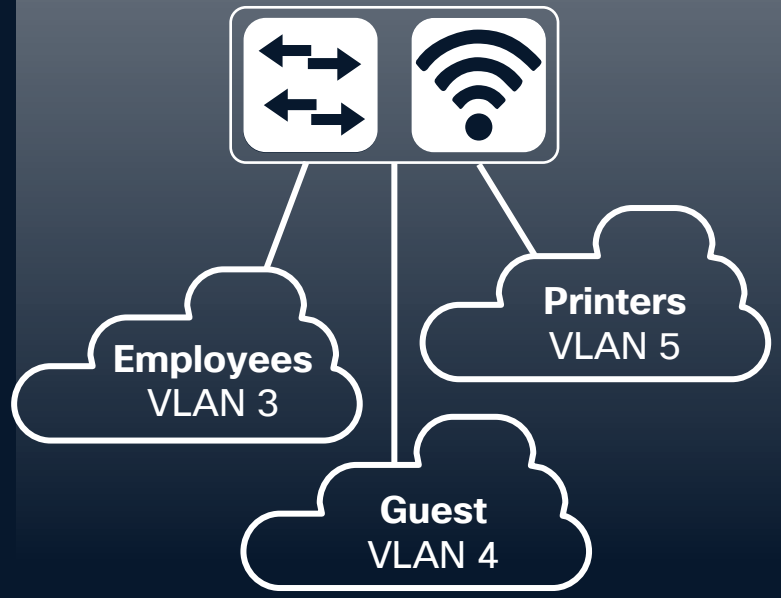


ISE Segmentation Options

Beyond RADIUS Access-Accept / Access-Reject

VLANs

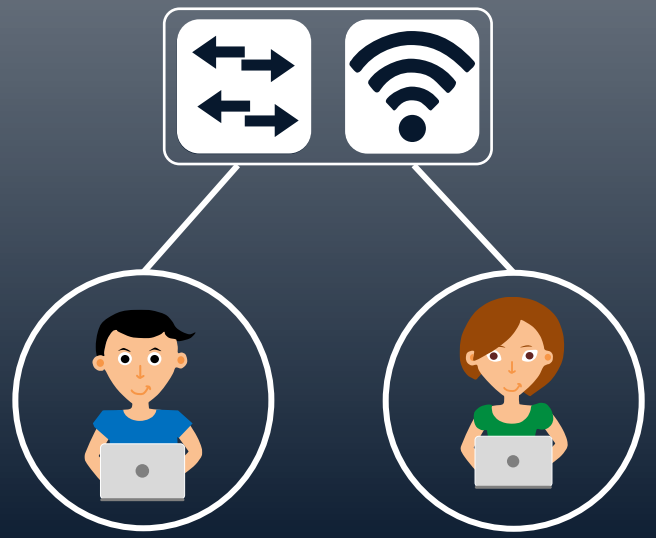
Dynamic VLAN Assignments



Per port / Per Domain / Per MAC

ACLs: DL, Named, DNS

Downloadable ACL (Wired) or
Named ACL (Wired + Wireless)



Employee

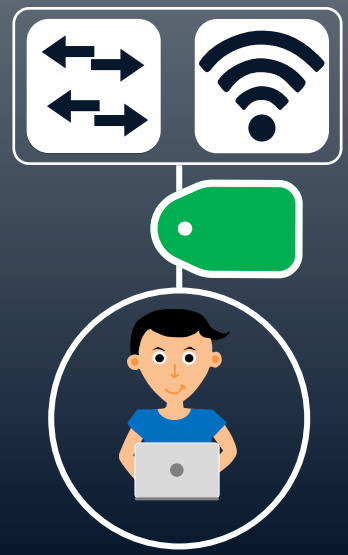
```
permit ip any any
```

Contractor

```
deny ip host <critical>
permit ip any any
```

Security Group Tags

Cisco Group-Based Policy

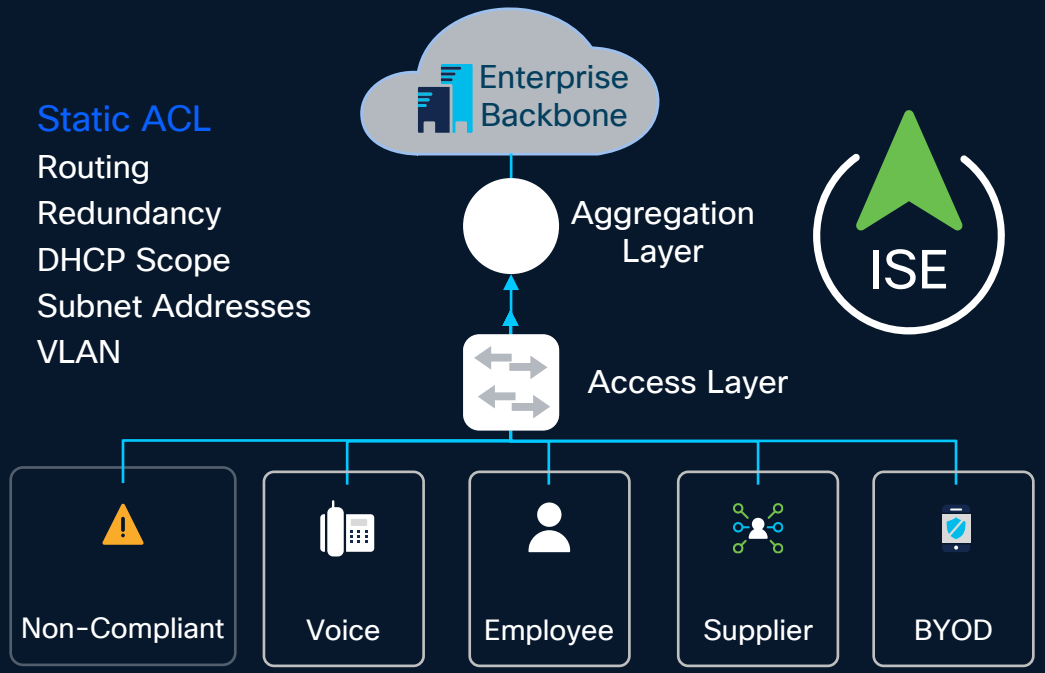


16-bit SGT assignment and
SGT based Access Control

Group Based Policy Simplifies Segmentation

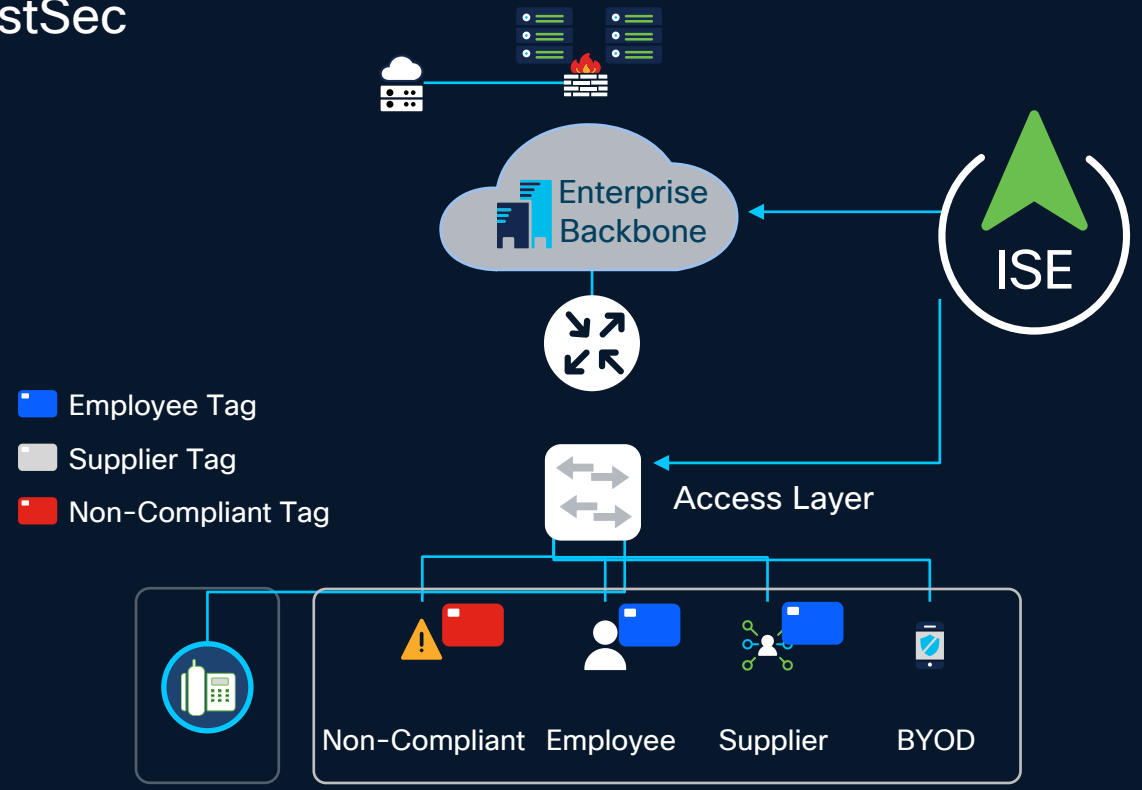
Traditional Segmentation

Static ACL
Routing
Redundancy
DHCP Scope
Subnet Addresses
VLAN



Security Policy based on Topology
High cost and complex maintenance

TrustSec

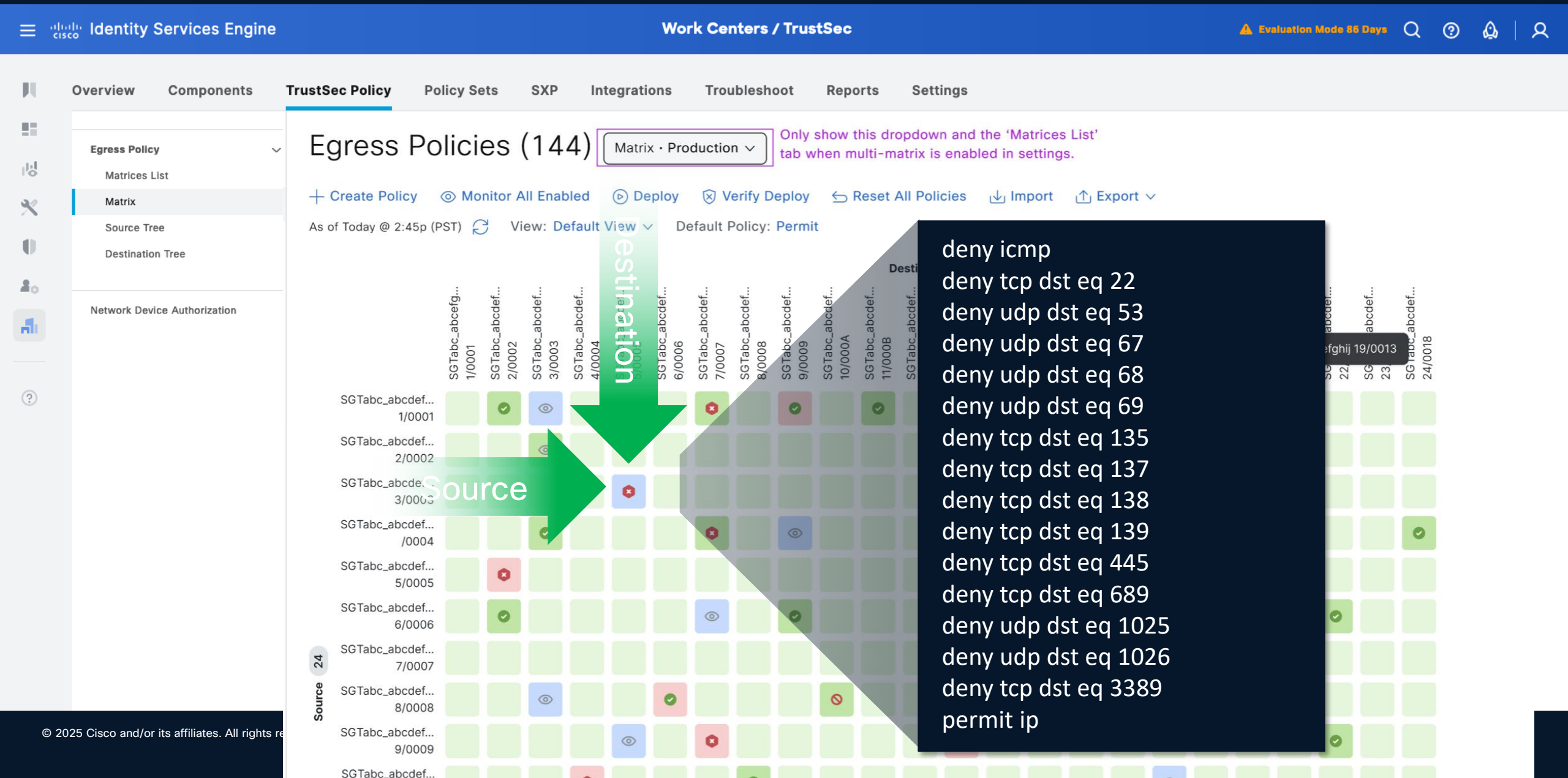


Use existing topology and automate
security policy to reduce OpEx

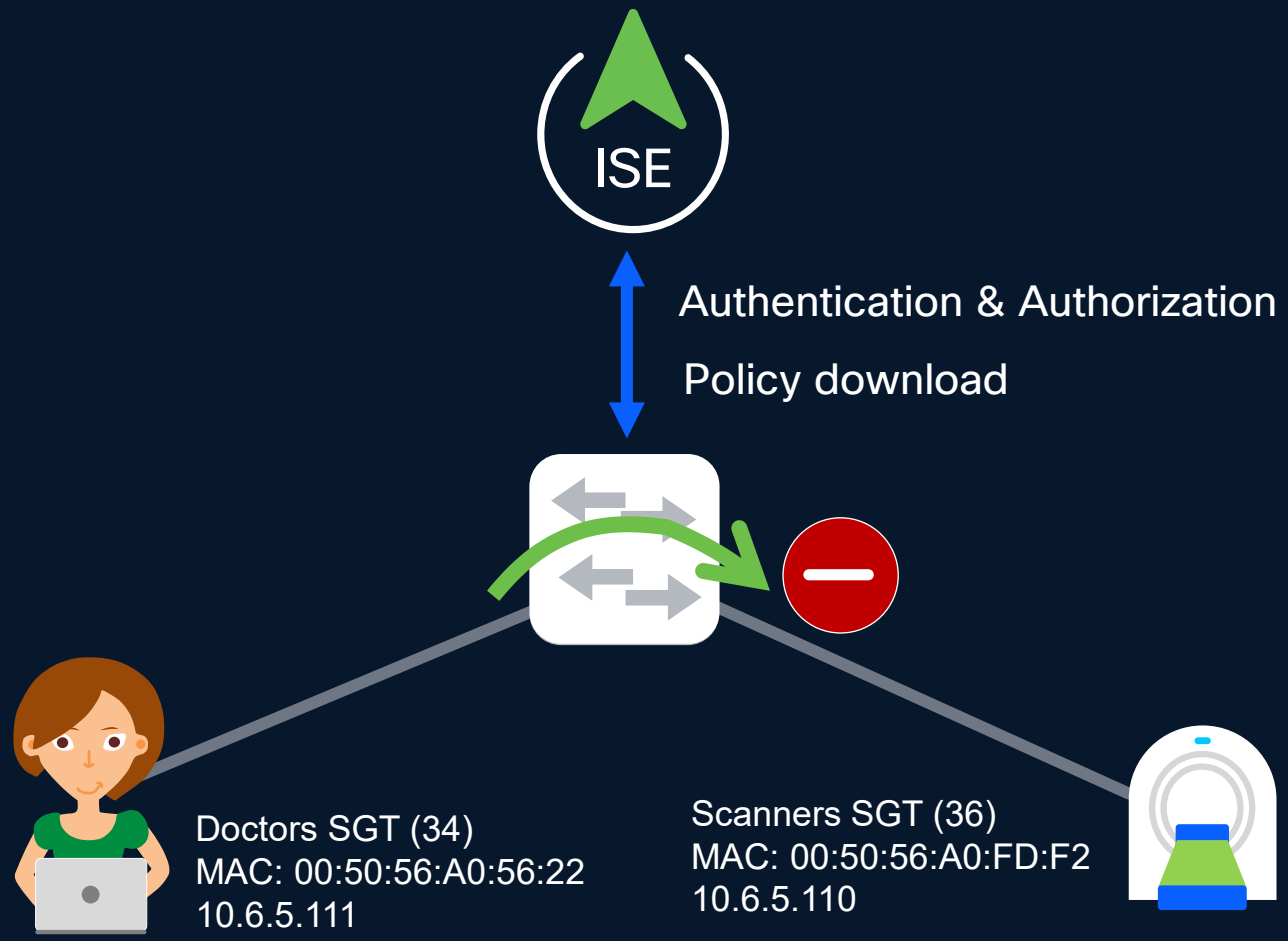
Can You See the Business Intent Here?

```
access-list 102 permit tcp 131.249.33.123 0.0.0.127 lt 4765 71.219.207.89 0.255.255.255 eq 606
access-list 102 deny tcp 112.174.162.193 0.255.255.255 gt 368 4.151.192.136 0.0.0.255 gt 4005
access-list 102 permit ip 189.71.213.162 0.0.0.127 gt 2282 74.67.181.47 0.0.0.127 eq 199
access-list 102 deny udp 130.237.66.56 255.255.255.255 lt 3943 141.68.48.108 0.0.0.255 gt 3782
access-list 102 deny ip 193.250.210.122 0.0.1.255 lt 2297 130.113.139.130 0.255.255.255 gt 526
access-list 102 permit ip 178.97.113.59 255.255.255.255 gt 178 111.184.163.103 255.255.255.255 gt 959
access-list 102 deny ip 164.149.136.73 0.0.0.127 gt 1624 163.41.181.145 0.0.0.255 eq 810
access-list 102 permit icmp 207.221.157.104 0.0.0.255 eq 1979 99.78.135.112 0.255.255.255 gt 3231
access-list 102 permit tcp 100.126.4.49 0.255.255.255 lt 1449 28.237.88.171 0.0.0.127 lt 3679
access-list 102 deny icmp 157.219.157.249 255.255.255.255 gt 1354 60.126.167.112 0.0.31.255 gt 1025
access-list 102 deny icmp 76.176.66.41 0.255.255.255 lt 278 169.48.105.37 0.0.1.255 gt 968
access-list 102 permit ip 8.88.141.113 0.0.0.127 lt 2437 105.145.196.67 0.0.1.255 lt 4167
access-list 102 permit udp 60.242.95.62 0.0.31.255 eq 3181 33.191.71.166 255.255.255.255 lt 2422
access-list 102 permit icmp 186.246.40.245 0.255.255.255 eq 3508 191.139.67.54 0.0.1.255 eq 1479
access-list 102 permit ip 209.111.254.187 0.0.1.255 gt 4640 93.99.173.34 255.255.255.255 gt 28
access-list 102 permit ip 184.232.88.41 0.0.31.255 lt 2247 186.33.104.31 255.255.255.255 lt 4481
access-list 102 deny ip 106.79.247.50 0.0.31.255 gt 1441 96.62.207.209 0.0.0.255 gt 631
access-list 102 permit ip 39.136.60.170 0.0.1.255 eq 4647 96.129.185.116 255.255.255.255 lt 3663
access-list 102 permit tcp 30.175.189.93 0.0.31.255 gt 228 48.33.30.91 0.0.0.255 gt 1388
access-list 102 permit ip 167.100.52.185 0.0.1.255 lt 4379 254.202.200.26 255.255.255.255 gt 4652
access-list 102 permit udp 172.16.184.148 0.255.255.255 gt 4163 124.38.159.247 0.0.0.127 lt 3851
access-list 102 deny icmp 206.107.73.252 0.255.255.255 lt 2465 171.213.183.230 0.0.31.255 gt 1392
access-list 102 permit ip 96.174.38.79 0.255.255.255 eq 1917 1.156.181.180 0.0.31.255 eq 1861
access-list 102 deny icmp 236.123.67.53 0.0.31.255 gt 1181 31.115.75.19 0.0.1.255 gt 2794
access-list 102 deny udp 14.45.208.20 0.0.0.255 lt 419 161.24.159.166 0.0.0.255 lt 2748
access-list 102 permit udp 252.40.175.155 0.0.31.255 lt 4548 87.112.10.20 0.0.1.255 gt 356
access-list 102 deny tcp 124.102.192.59 0.0.0.255 eq 2169 153.233.253.100 0.255.255.255 gt 327
access-list 102 permit icmp 68.14.62.179 255.255.255.255 lt 2985 235.228.242.243 255.255.255.255 lt 2286
access-list 102 deny tcp 91.198.213.34 0.0.0.255 eq 1274 206.136.32.135 0.255.255.255 eq 4191
access-list 102 deny udp 76.150.135.234 255.255.255.255 lt 3573 15.233.106.211 255.255.255.255 eq 3721
access-list 102 permit tcp 126.97.113.32 0.0.1.255 eq 4644 2.216.105.40 0.0.31.255 eq 3716
access-list 102 permit icmp 147.31.93.130 0.0.0.255 gt 968 154.44.194.206 255.255.255.255 eq 4533
access-list 102 deny tcp 154.57.128.91 0.0.0.255 lt 1290 106.233.205.111 0.0.31.255 gt 539
access-list 102 deny ip 9.148.176.48 0.0.1.255 eq 1310 64.61.88.73 0.0.1.255 lt 4570
```

Business Intent is Clear with TrustSec



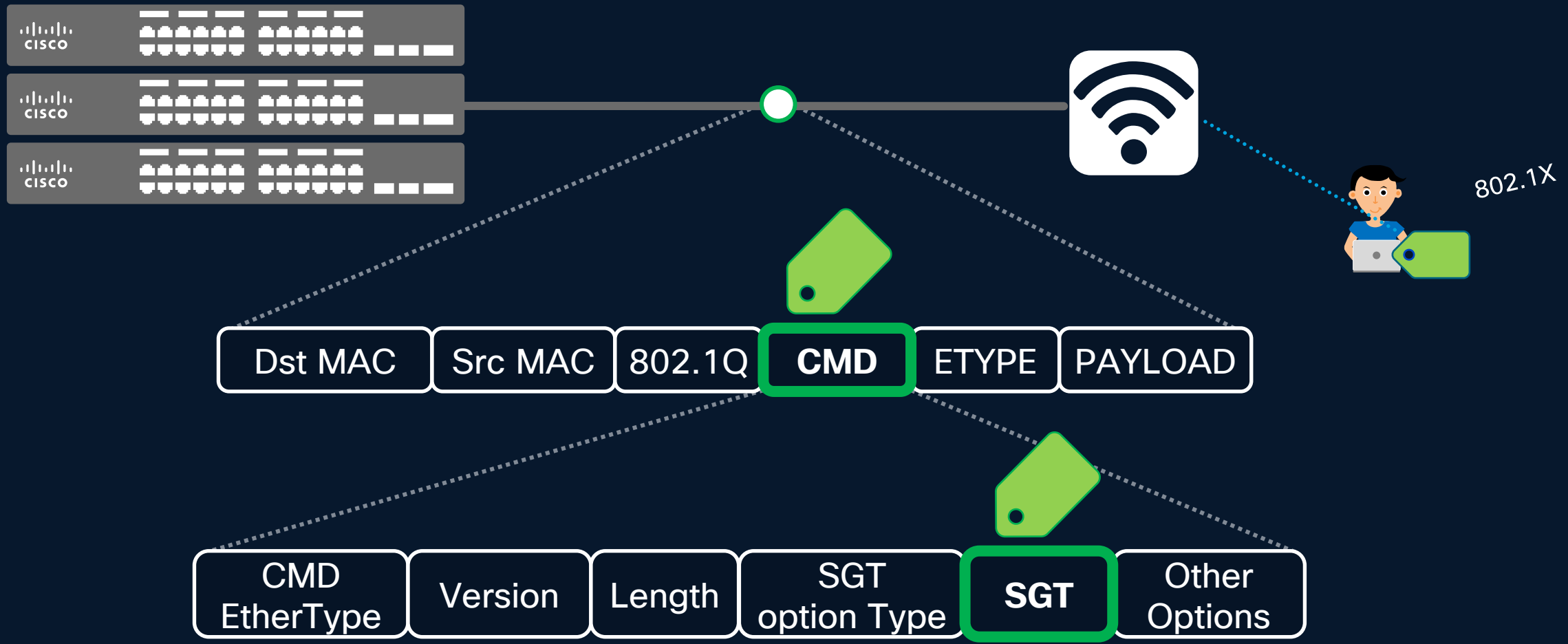
Classification, SGT Lookup and Enforcement



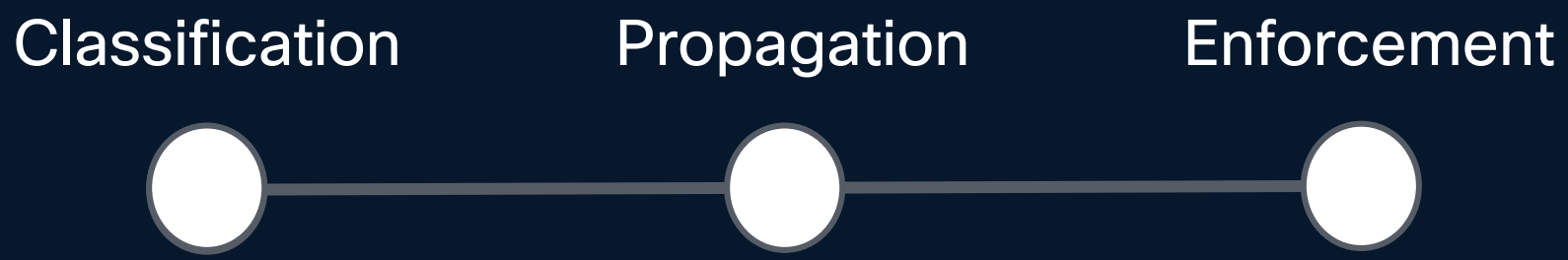
- Classification: Dynamic/ISE
- Src SGT found, Dst SGT found
- Enforcement: At Egress

Source \ Destination	Doctors	Scanners
Doctors	Permit All	Deny All
Guests	Deny All	Deny All
Scanners	Deny All	Permit All

TrustSec Security Group Tags (SGTs)

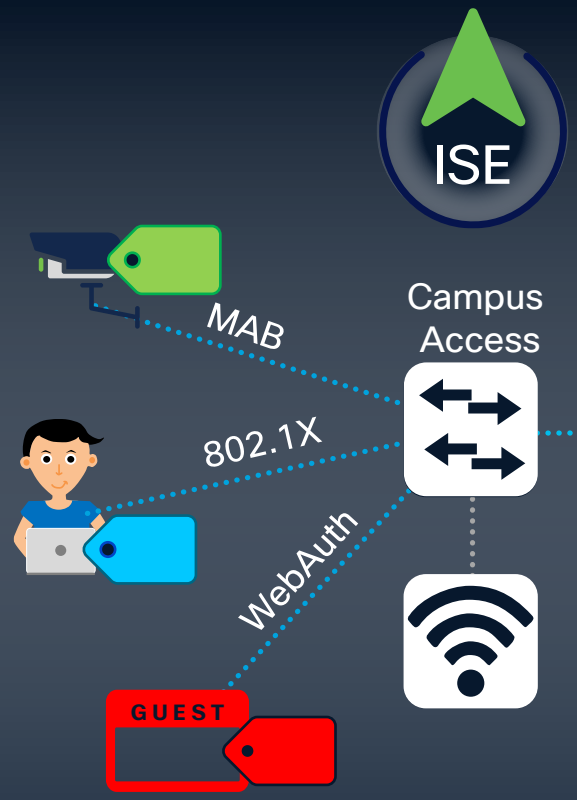


TrustSec Security Group Tags (SGTs)



Classification Mechanisms

Dynamic Classification



Static Classification

L3 Interface (SVI) to SGT

IP to SGT

L2 Port to SGT

Distribution

Core

Enterprise Backbone

DC Core

DC Access

WLC

Firewall

Hypervisor SW

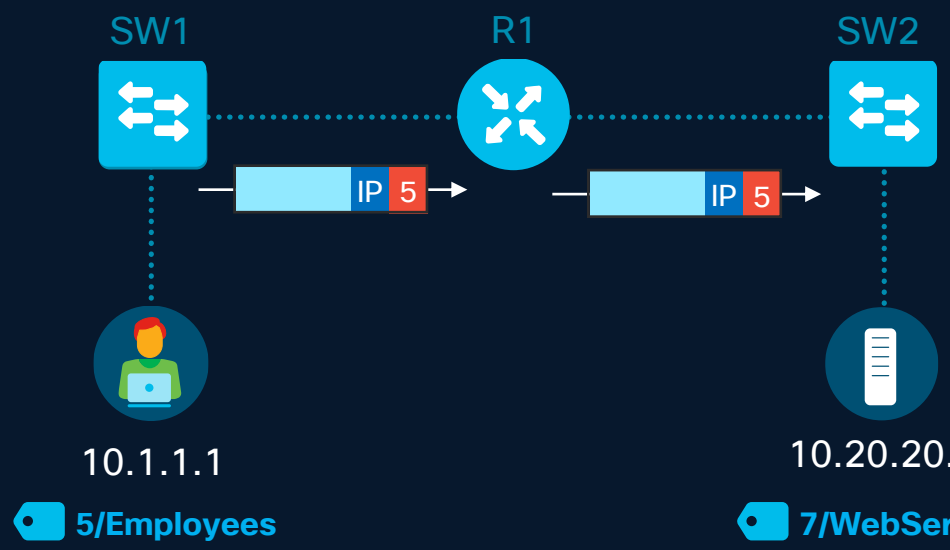
VLAN to SGT

Subnet to SGT

VM (Port Profile) to SGT

TrustSec Propagation

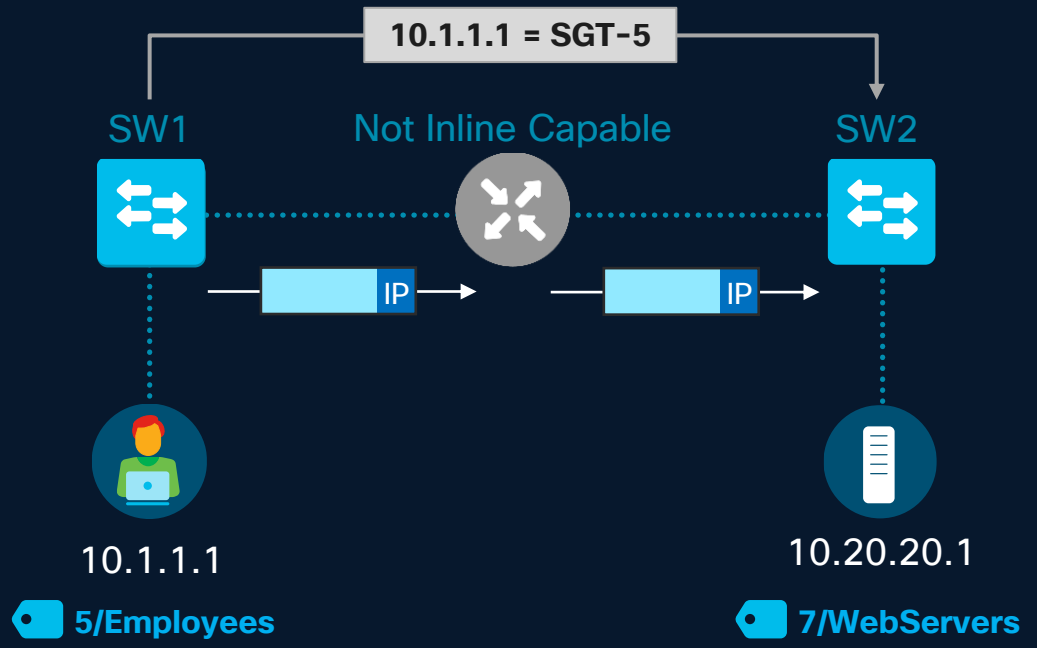
DATA PLANE PROPAGATION (INLINE TAGGING)



SGT carried inline in the data traffic. Methods include, SGT over:

- Ethernet
- MACSec
- LISP/VxLAN
- IPSec
- DMVPN
- GETVPN

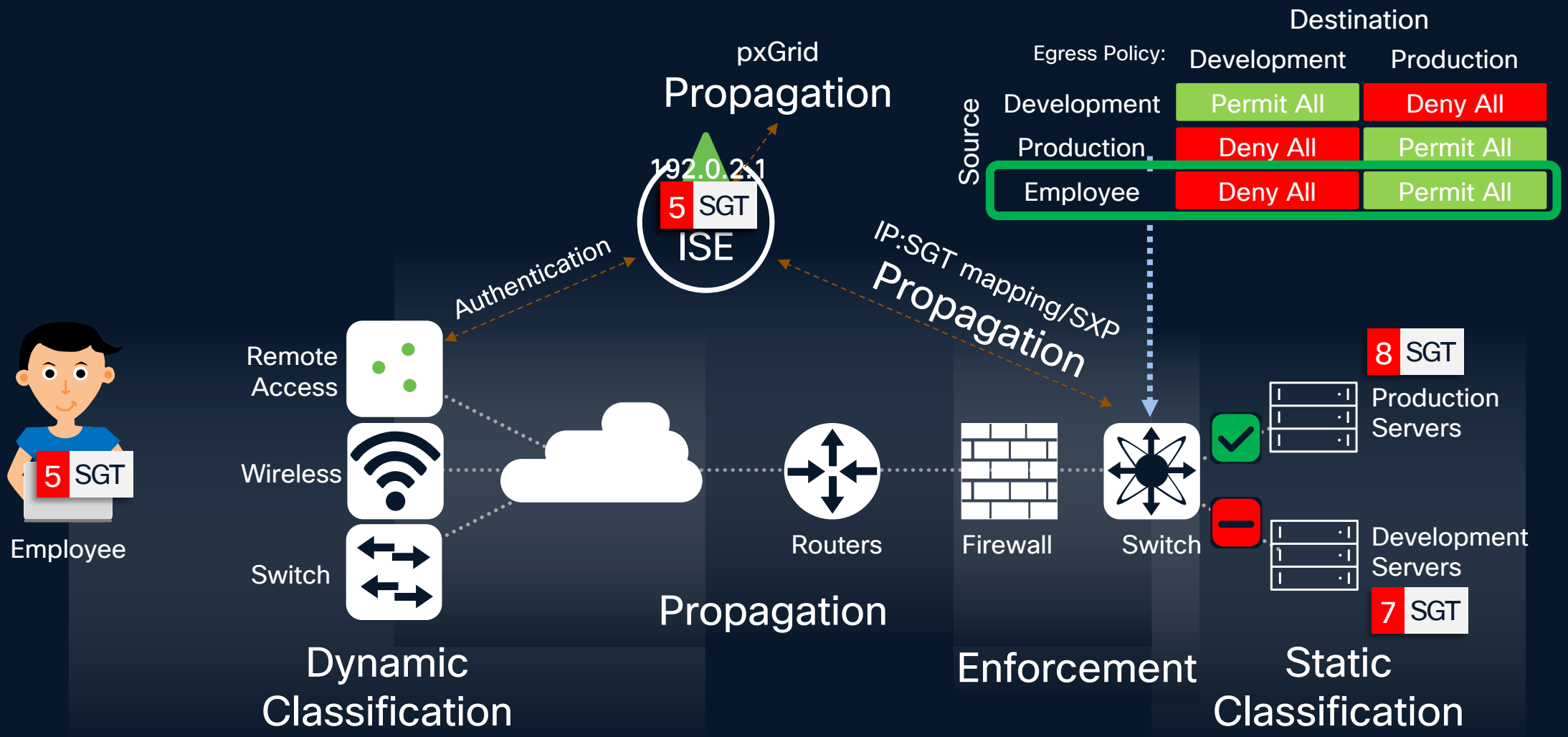
CONTROL PLANE PROPAGATION (SXP)



IP-to-SGT data shared over control protocol. No SGT in the data plane. Methods include, IP-to-SGT exchange over:

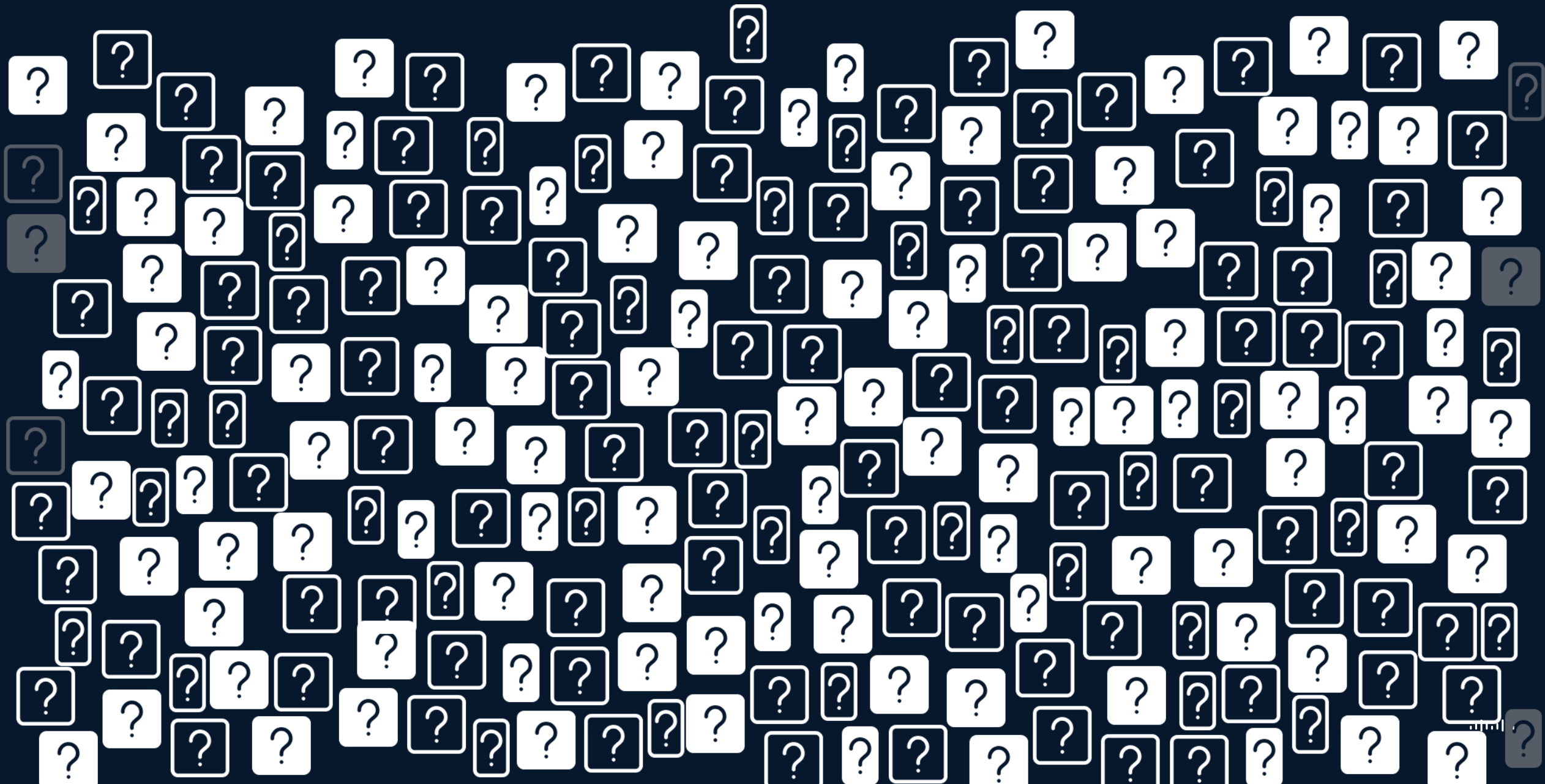
- SXP
- pxGrid

Cisco SGT Propagation & Enforcement



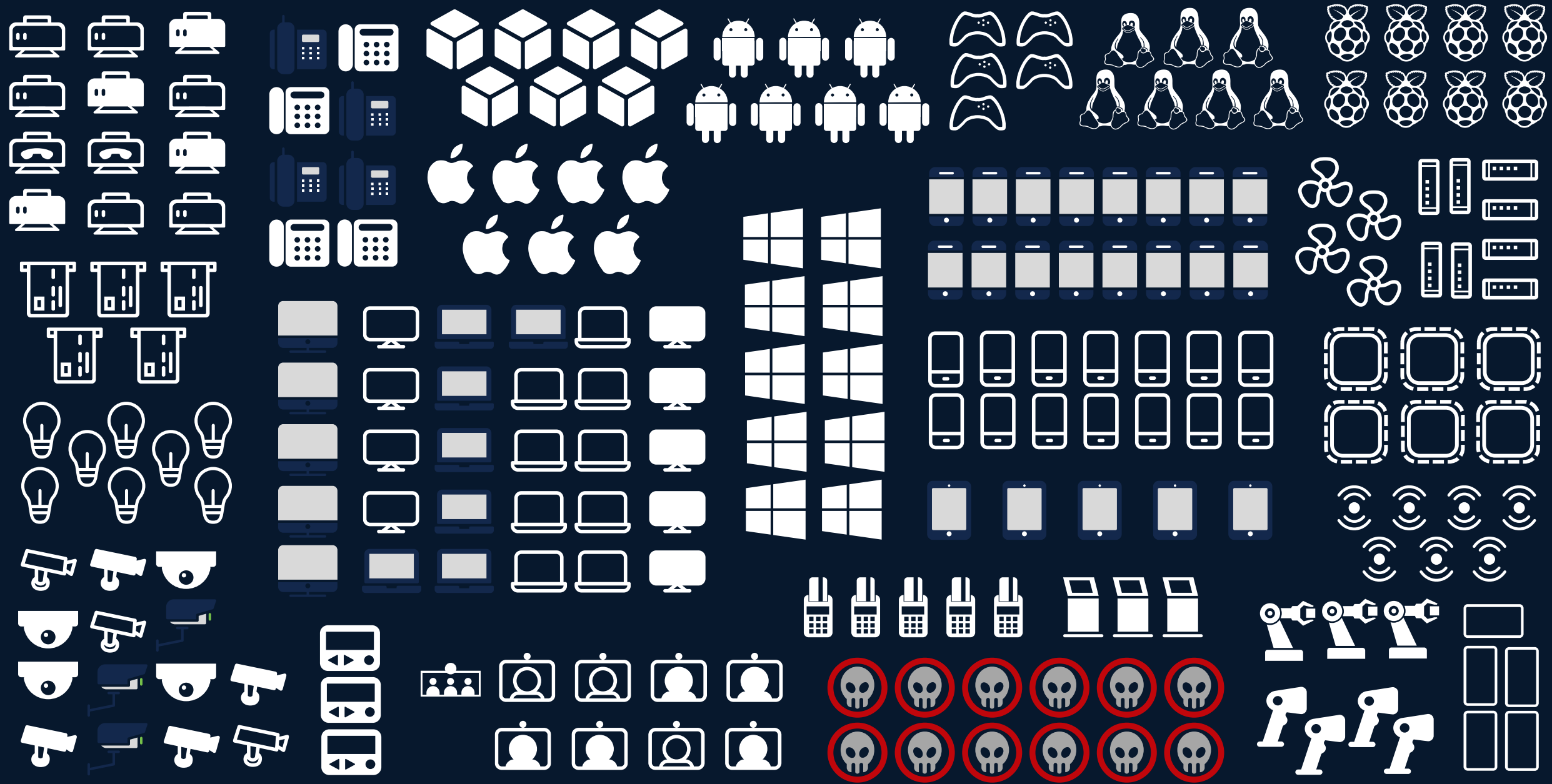
Dynamic Classification

The Challenge: Unknowns ...

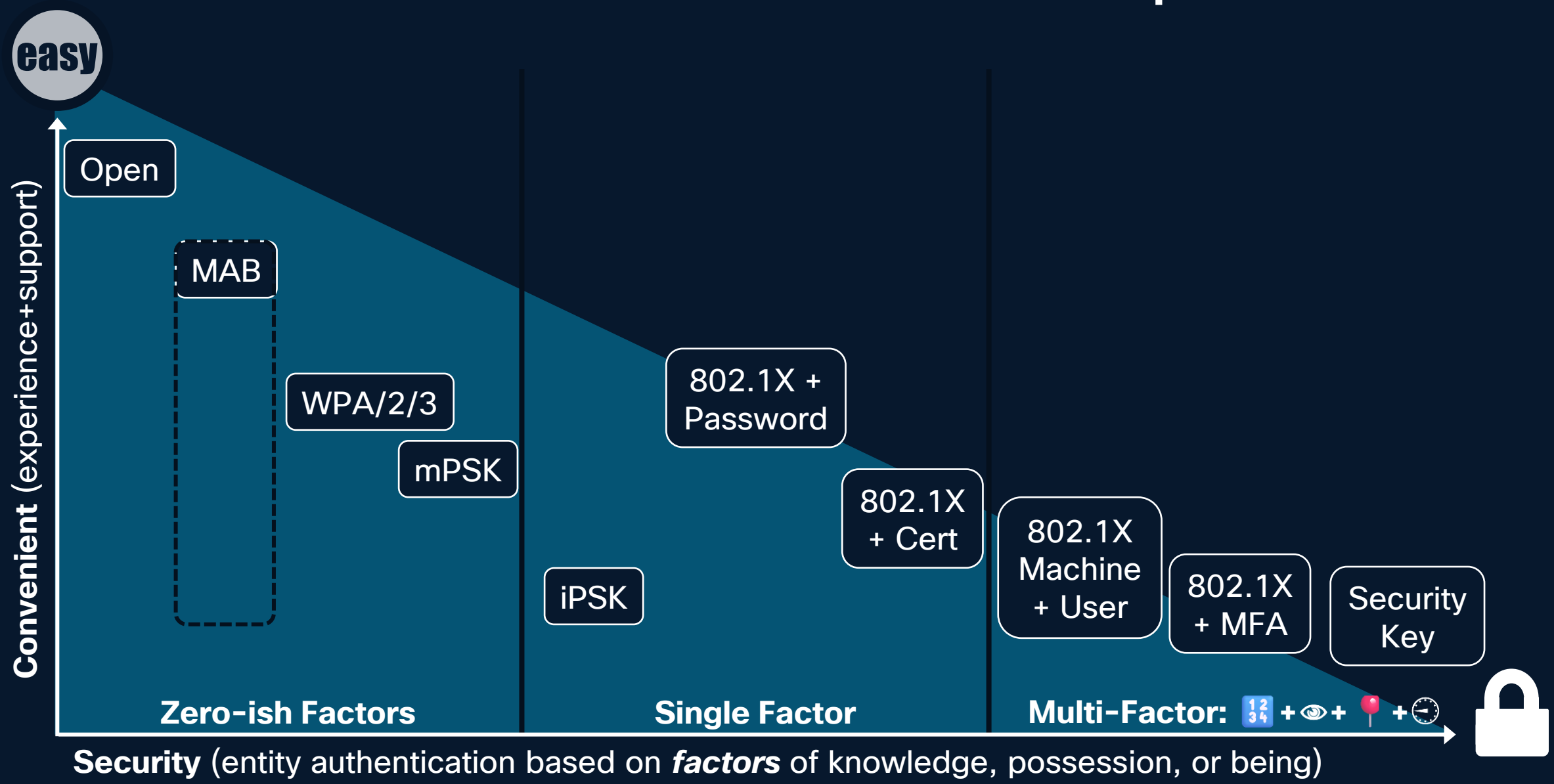


The Challenge: Unknowns to Known ...

The Challenge: Unknowns to Known to Classified

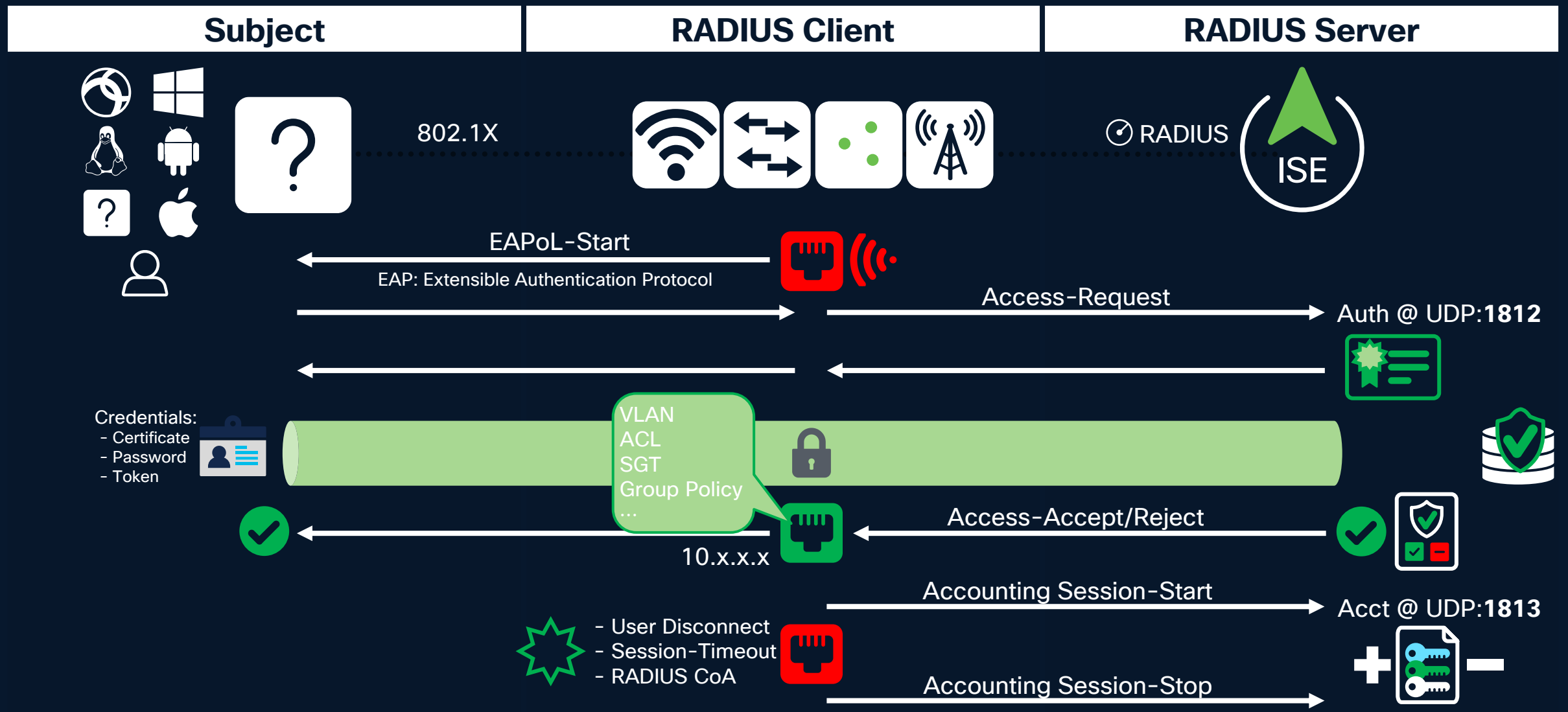


Network Access Authentication is a Spectrum



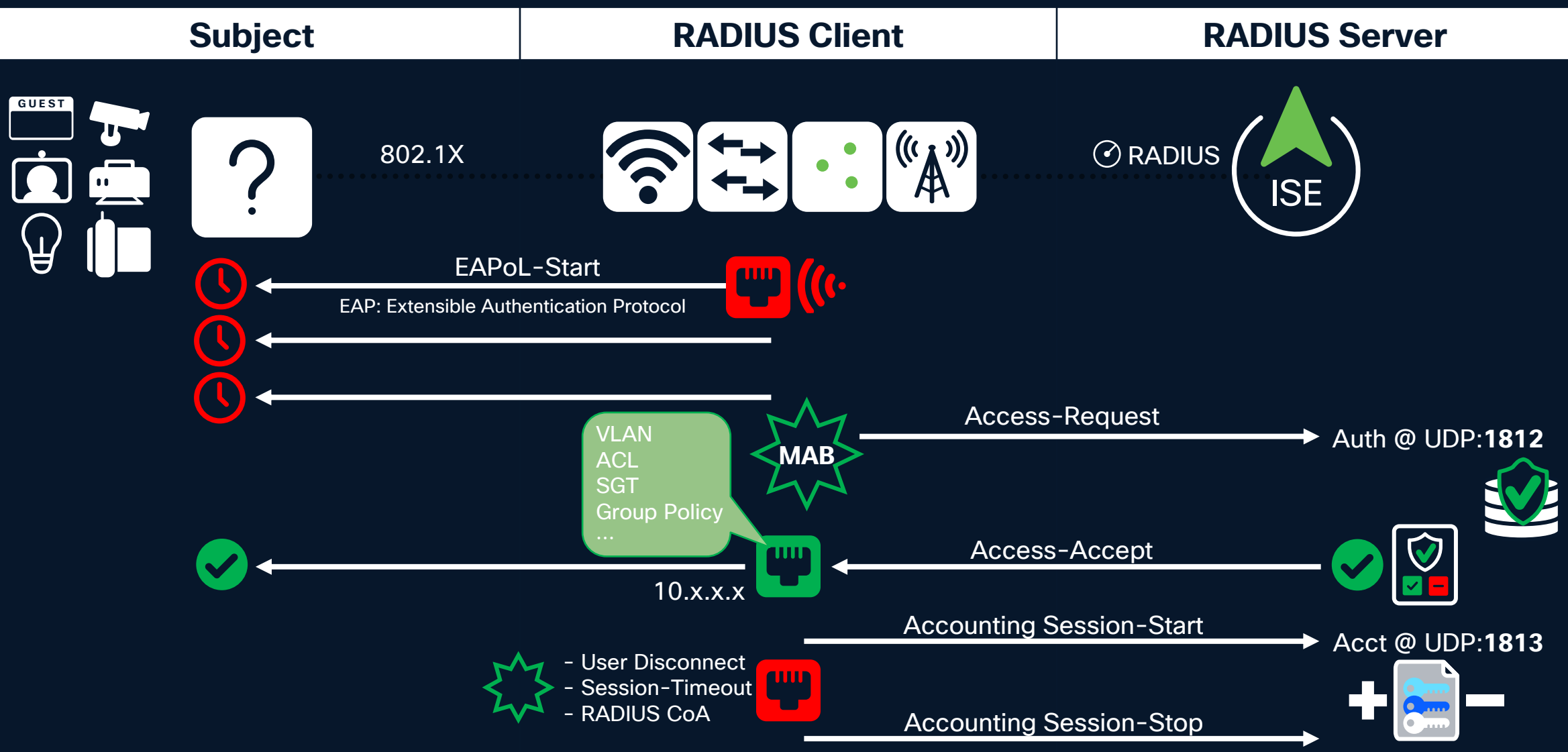
RADIUS : 802.1X

RFC2865 : RADIUS
RFC2866 : Accounting
RFC3579 : EAP Support
RFC5176 : CoA Support

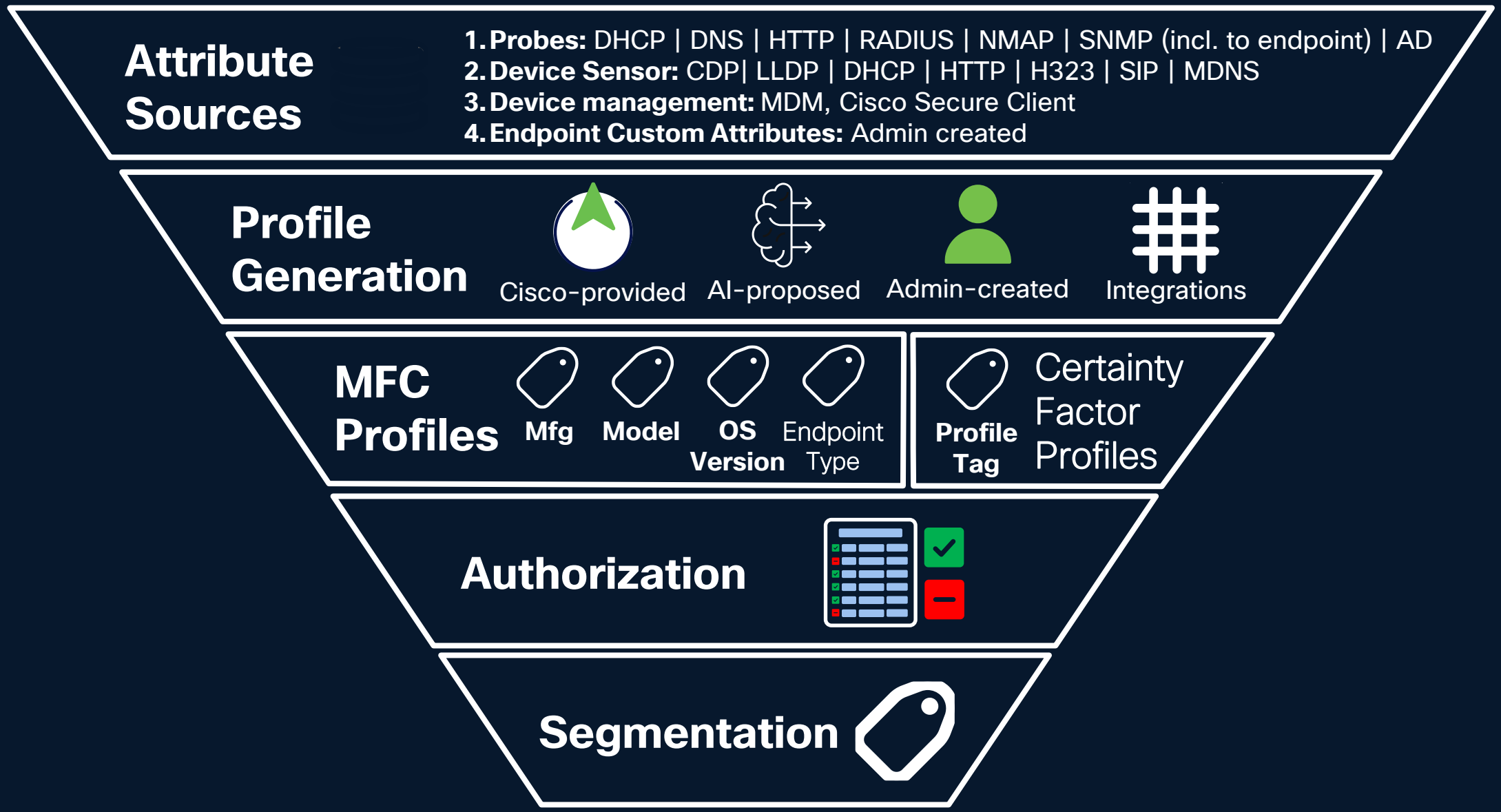


801.X Requires a Supplicant - MFA Requires a Finger

RADIUS : MAC Authentication Bypass (MAB)

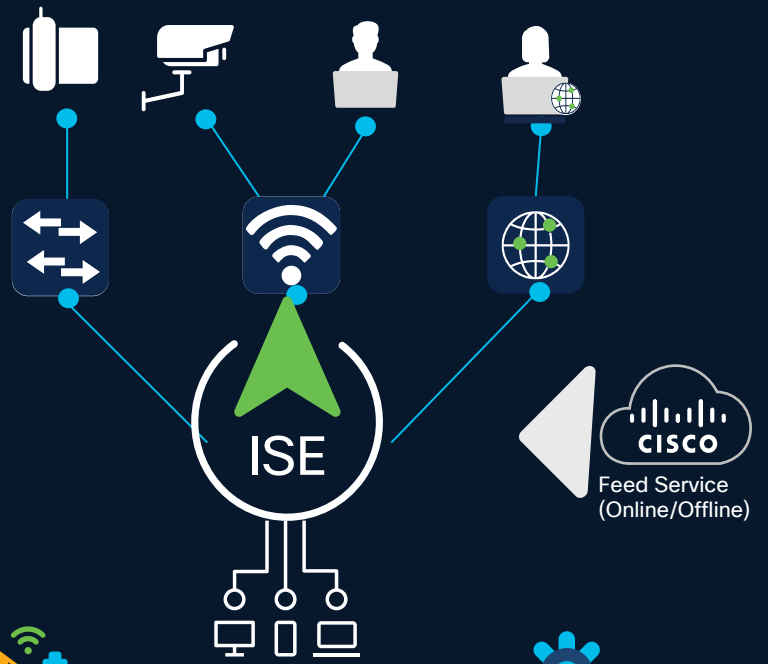


Turning Attributes Into Profiles, Profiles Into Protection



Multi-Factor Classification on ISE

MFC-Manufacturer: Cisco
MFC-EndpointType: IP-Phone
MFC-Model: IP Phone 7980
MFC-OS: IOS



MFC-Manufacturer

Cisco
Arlo
Apple
Lenovo

MFC-EndpointType

IP-Phone
Camera
Laptop
Laptop

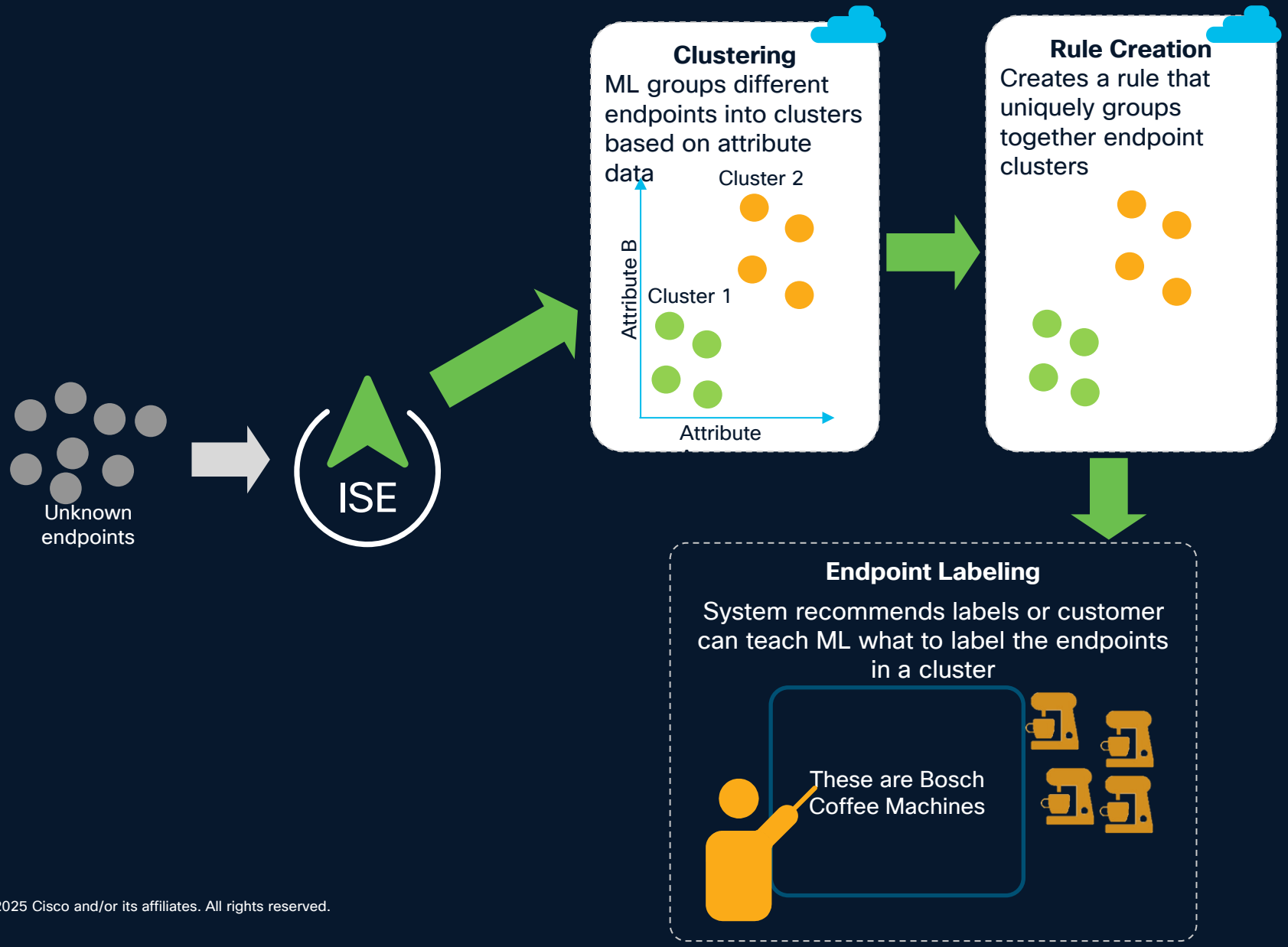
MFC-Model

IP Phone 7980
Pro Wireless Cam
MacBook Pro
Thinkpad 540

MFC-OS

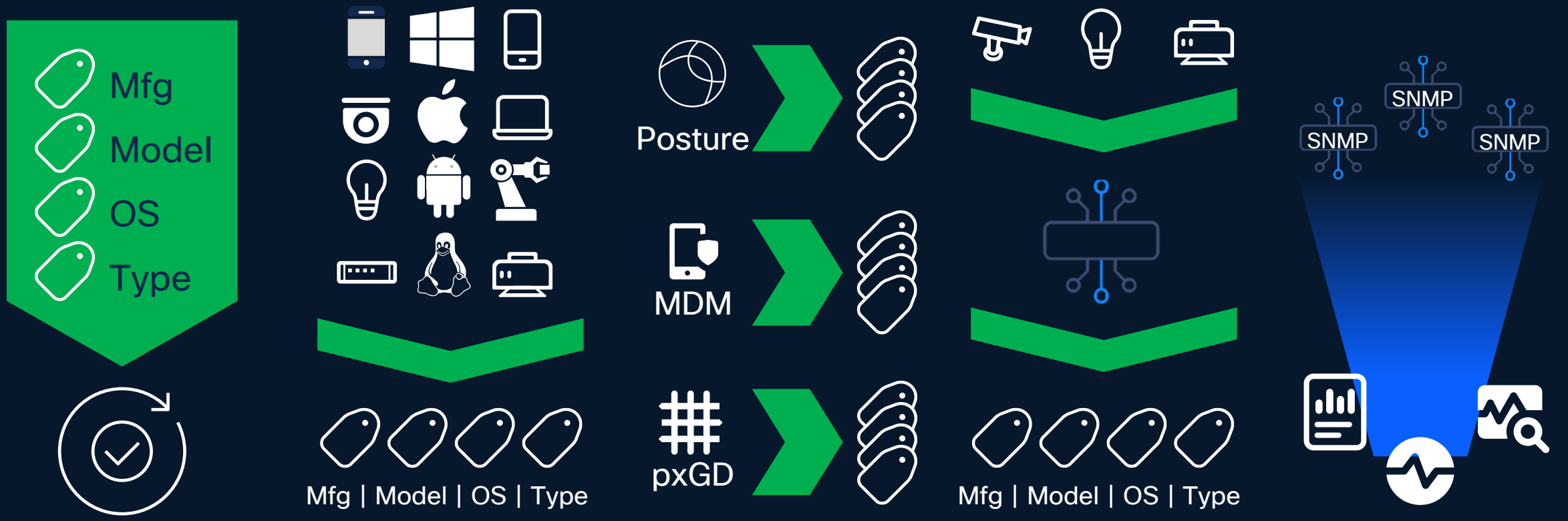
IOS
Linux
macOS 12.0.1
Windows Enterprise

Cisco AI Machine Learning Profiling



ISE 3.5 Profiler Features

ISE 3.5



New Classification Engine and Rules based on MFCs	Use Multi-Factor Classification MFCs to Label Endpoints	Map Authoritative Source Attributes to MFCs	SNMP Endpoint Scanning for Profiling to MFCs	SNMP Probe Status Summary of Insights

cisco

Cisco

Multi-Factor Classification (MFC) Profiles

ISE 3.5

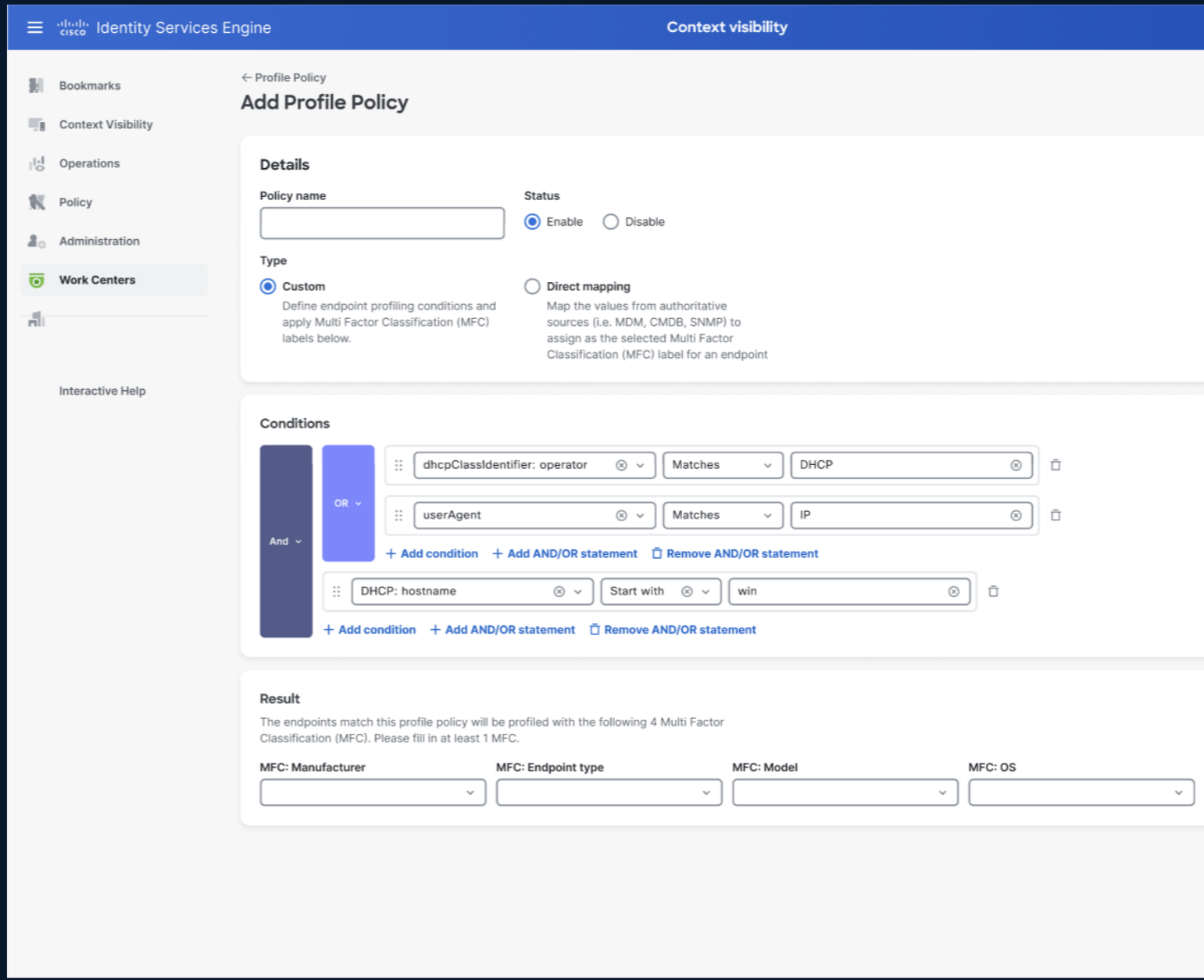
Problem

Custom profiling using Certainty factor required creating conditions in a separate flow, returning to profiling, then determining the minimum certainty factor

Solution

Use “if/and/or” logic with standard operators (contains, equals, etc.) and then manage profiles in a redesigned screen

New profiling experience enables greater flexibility, more dictionaries and attributes, and therefore more granular profiling and authorization



New Context Visibility UI

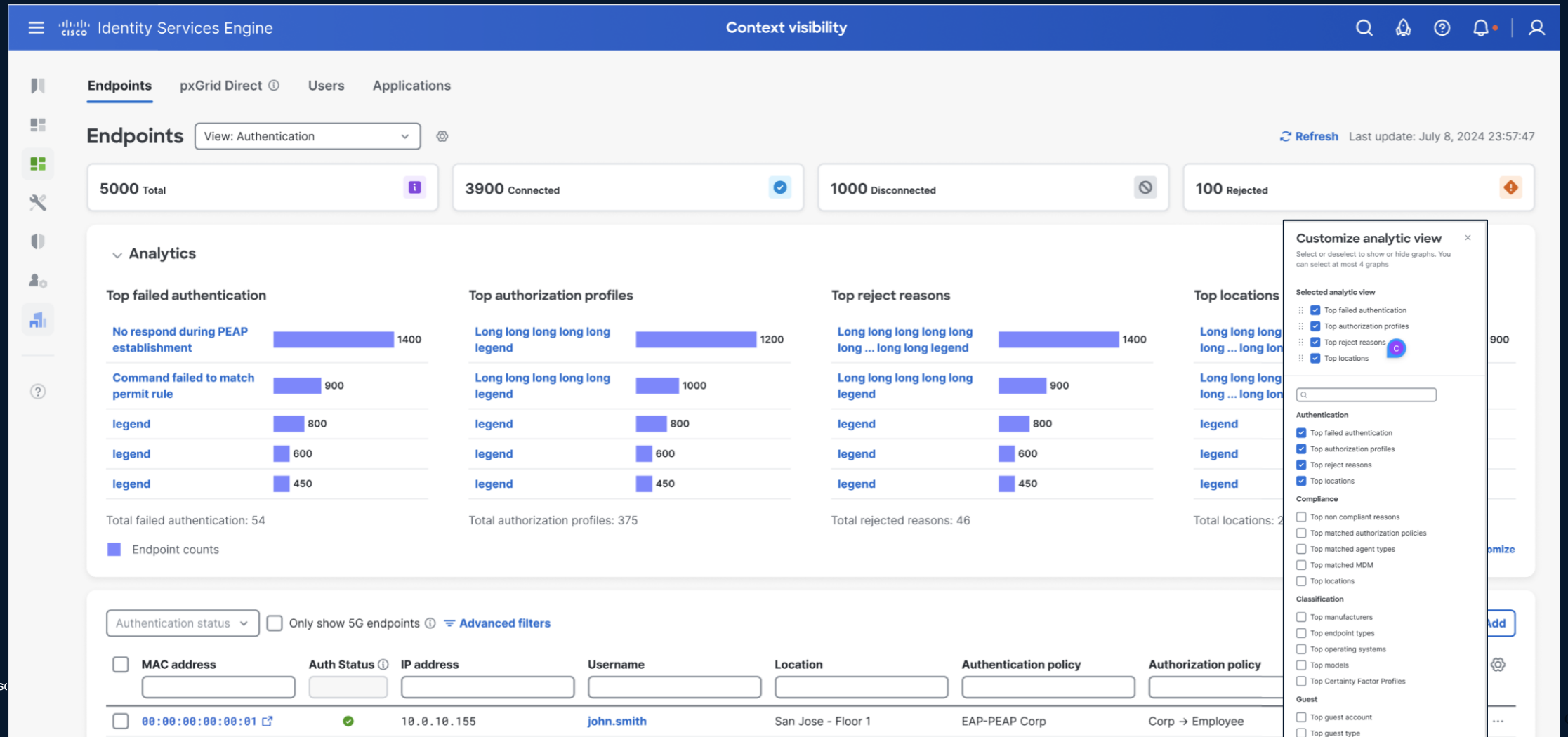
ISE 3.5

Problem

Information most needed by admins was either hard to find or not available in UI

Solution

Streamlined UI with updated charts, analytics, customizations, and endpoint data



Improved Profiling Policy Management

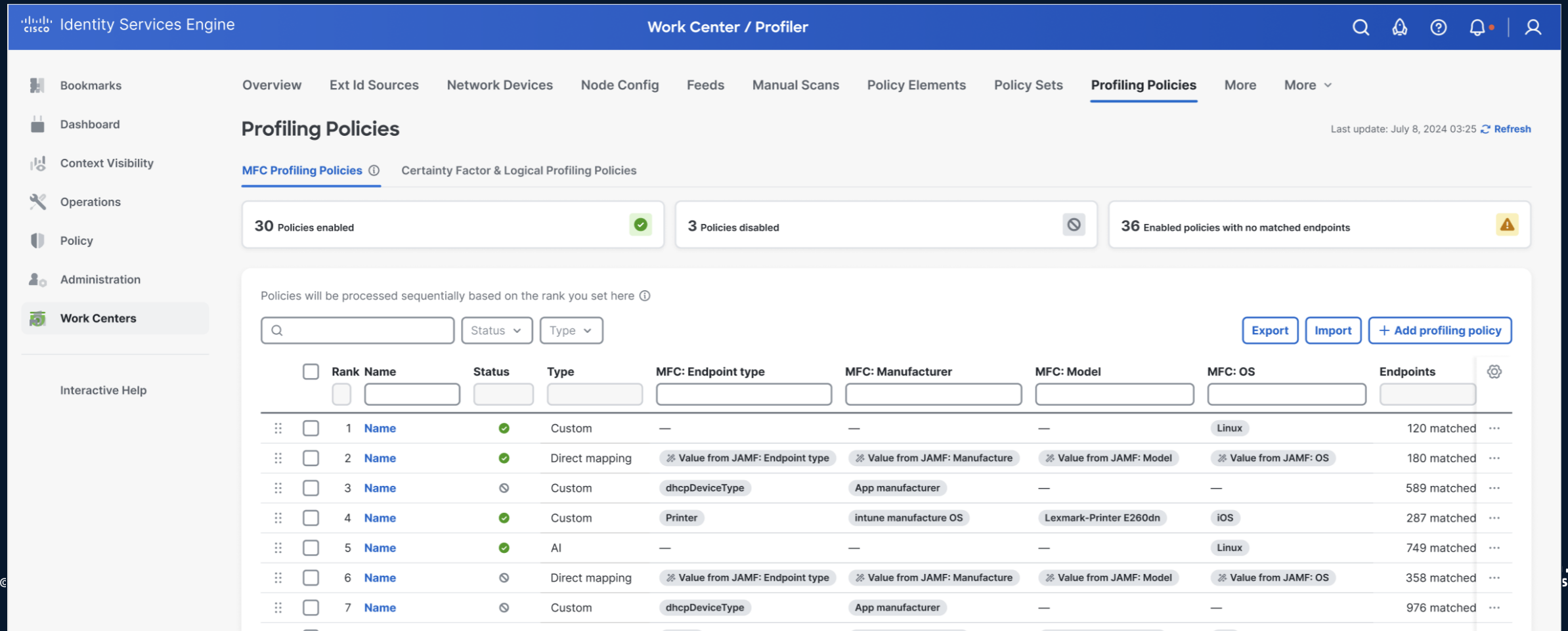
ISE 3.5

Problem

Need to know how many endpoints match a profiling policy, which policies are enabled or disabled, and which attributes define a policy

Solution

New profiling policy management enables insights into endpoints per policy, better policy creation workflow, and endpoint filtering

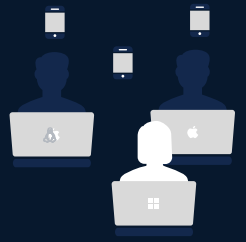


Posture and Compliance

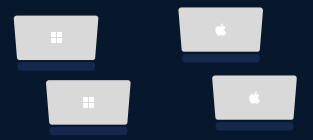
Seeing beyond who and what your are with Posture

ISE Posture with Cisco Secure Client/ Agentless

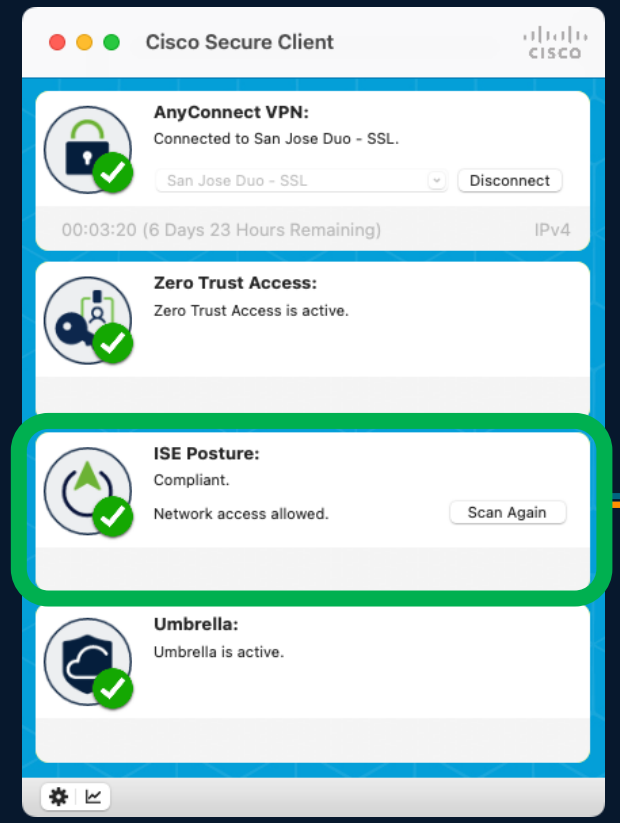
EMM/MDM Integrations



Threat Centric NAC – Integration with Vulnerability Scan/Threat Collection



ISE Posture with Cisco Secure Client



System Checks

- Hardware Inventory
- USB Checks
- File Checks
- Registry Checks
- Service Checks
- Disk Encryption

Software/ Application Checks

- Application Checks
- Application Inventory
- Anti-Malware Checks
- Firewall Installation Checks

Custom Scripts and external Conditions

- Custom scripts
- External Conditions (AD, Location)
- Compound condition support

Script Remediation

Windows updates Patch Management

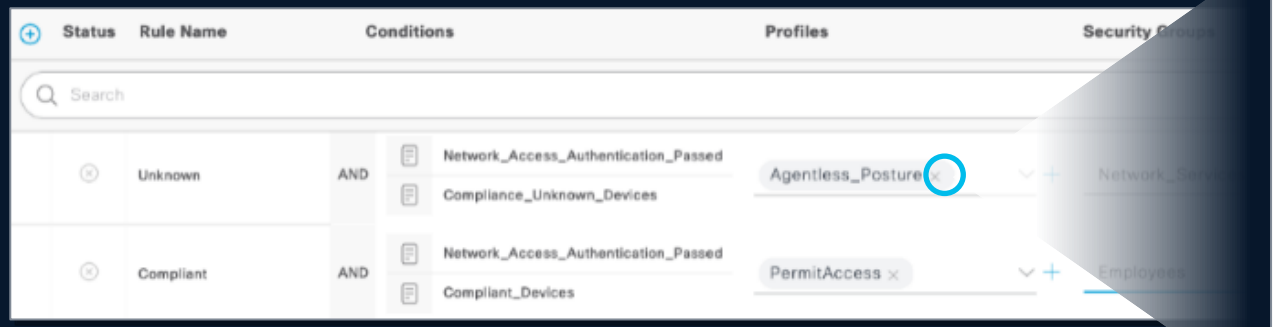
- Patch Management – MS SCCM
- Windows Update
- WSUS remediation (legacy)

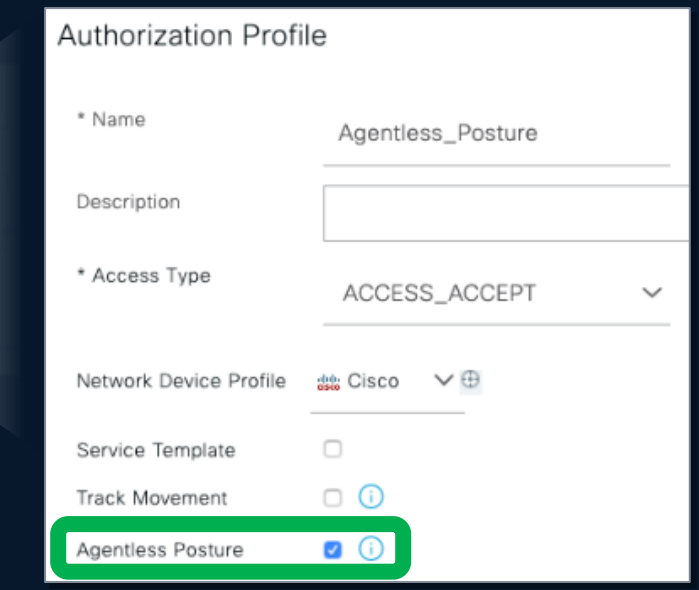
Remediation/ Reassessment

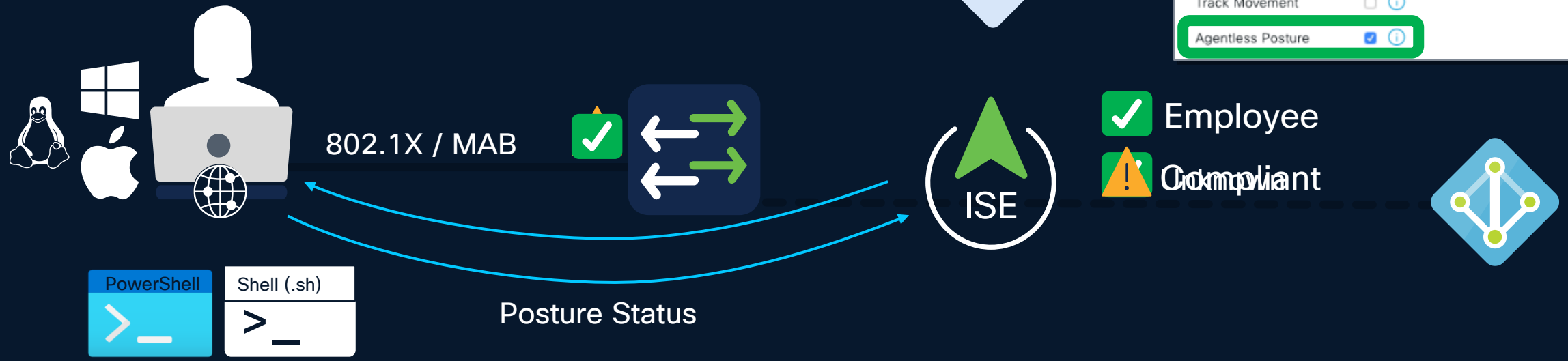
- Application, Antimalware, File, Firewall, USB Block, Link
- Passive Reassessment

Agentless Posture

ISE 3.0+







Posture Deployment Options

✅ Supported
❗ Limitations
❌ Not Supported

ISE 3.3

Capability	Cisco Secure Client			AC Stealth		Temporal		Agentless	
Anti-Malware Checks	✅	✅	✅	✅	✅	✅	✅	✅	✅
Firewall Installation Checks	✅	✅	❌	✅	✅	✅	✅	✅	✅
Application Inventory	✅	✅	❌	✅	✅	✅	✅	✅	✅
Hardware Inventory	✅	✅	❌	✅	✅	✅	✅	✅	✅
Process Checks	✅	✅	✅	✅	✅	✅	✅	✅	✅
Dictionary Conditions	✅	✅	✅	✅	✅	✅	✅	✅	✅
Application Checks	✅	✅	❌	✅	✅	✅	✅	✅	✅
File Checks	✅	✅	❗	✅	✅	✅	✅	❗	✅
Service Checks	✅	✅	❌	✅	✅	✅	❗	✅	❗
Disk Encryption	✅	✅	❌	✅	✅	❗	❗	❗	❗
Patch Management	✅	✅	❗	✅	✅	❗	❗	❗	❗
Registry Checks	✅	N/A	N/A	✅	N/A	✅	N/A	❗	N/A
USB Checks	✅	❌	❌	✅	❌	✅	❌	✅	❌
WSUS remediation (legacy)	✅	N/A	N/A	✅	N/A	❌	❌	❌	❌
Remediation	Auto, Manual	Partial	Partial	Part Auto	Partial	Text	Text	❌	❌
Reassessment	✅	✅	✅	✅	✅	❌	❌	❌	❌

Visibility (Less Effort)

Experience (Less Time)

Security (More Protection)

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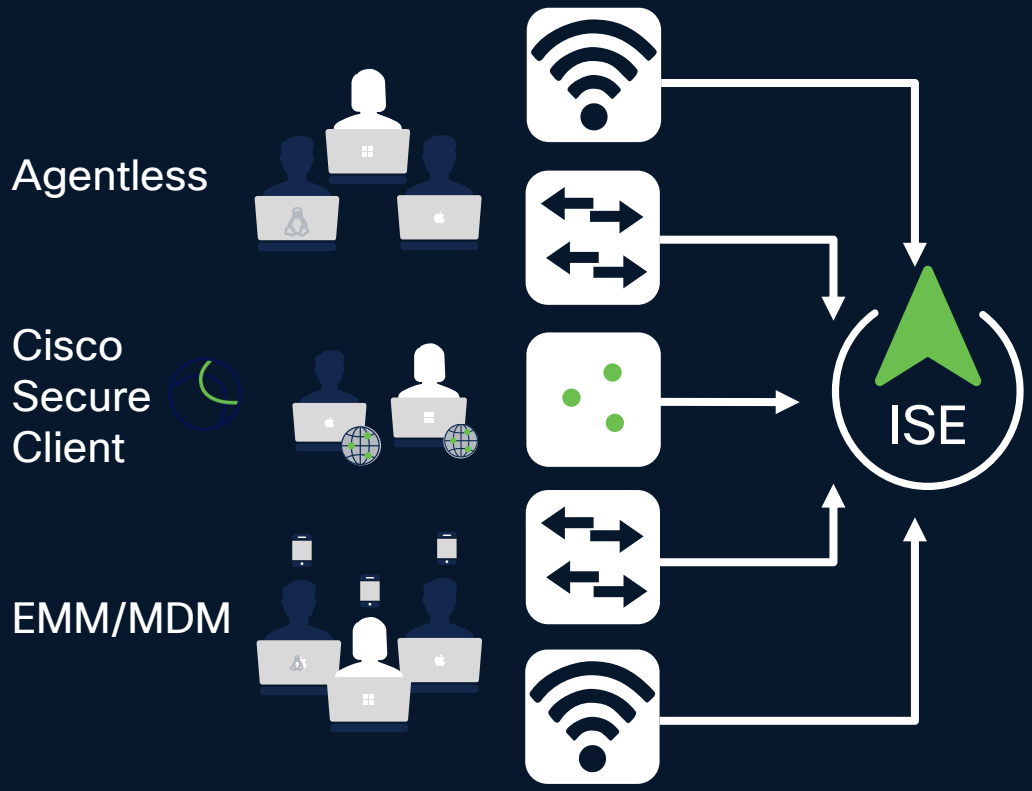
Posture & Compliance

cisco.com/go/csta



Authorization Policy

IF JailBroken is No
AND PinLock is Yes
THEN Compliant

AbsoluteSoftware
SOPHOS
GLOBO
IBM Security
Microsoft
SOTI
tangoe
cisco Meraki
CITRIX XenMobile
jamf
SAP
MobileIron
Symantec
airwatch by vmware

MDM Attributes

ActivityType
AdminAction
AdminActionUUID
AnyConnectVersion
DaysSinceLastCheckin
DetailedInfo
DeviceID
DeviceName
DeviceType
DiskEncryption
EndPointMatchedProfile
FailureReason
IdentityGroup
IMEI
IpAddress
JailBroken
LastCheckInTimeStamp
MacAddress
Manufacturer
MDMCompliantStatus
MDMFailureReason
MDMServerName
MEID
Model
OperatingSystem
PhoneNumber
PinLock
PolicyMatched
RegisterStatus
SerialNumber
ServerType
SessionId
UDID
UserName
UserNotified

Integrations

Power of pxGrid Integration

Enabling a platform approach into the Cloud

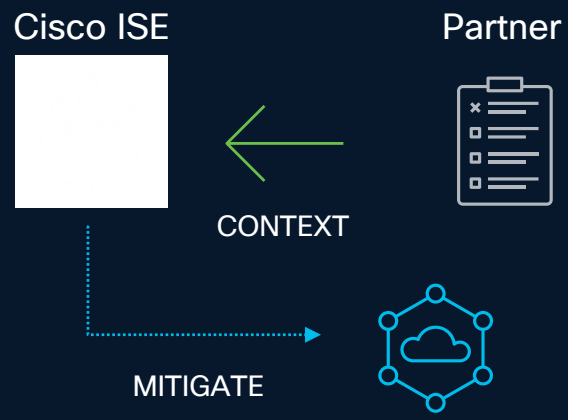
ISE Context OUT

ISE makes Customer IT Platforms User/Identity, Device and Network Aware

ISE Context IN

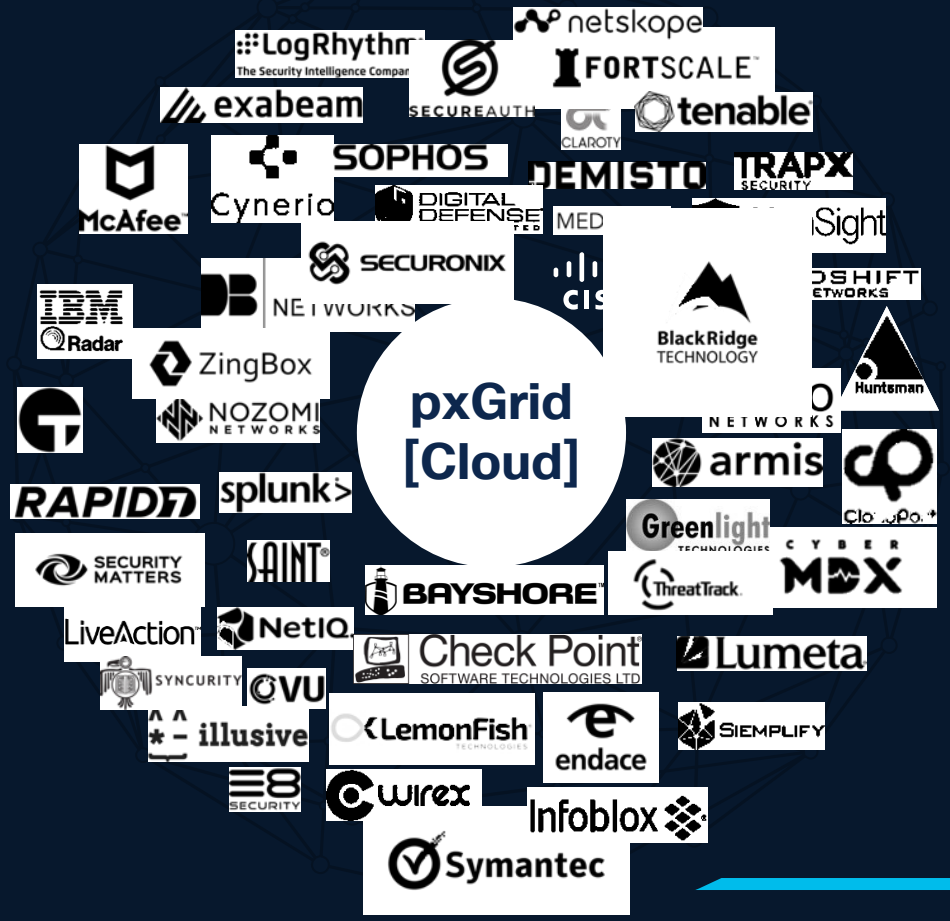
Enrich ISE context. Make ISE a better Policy Enforcement Platform

Rapid Threat Containment



Enforce dynamic policies into the network based on Partner's request

The power of integration with operational simplicity



More Cross-Team Use Cases Simplified with Visibility and Automation

Cisco Security

- Network
- Applications
- Endpoint
- Cloud

More Integrated Products Across Partner Ecosystem and Beyond

Your infrastructure

- 3rd Party/ITSM
- Intelligence
- Identity
- SIEM/SOAR

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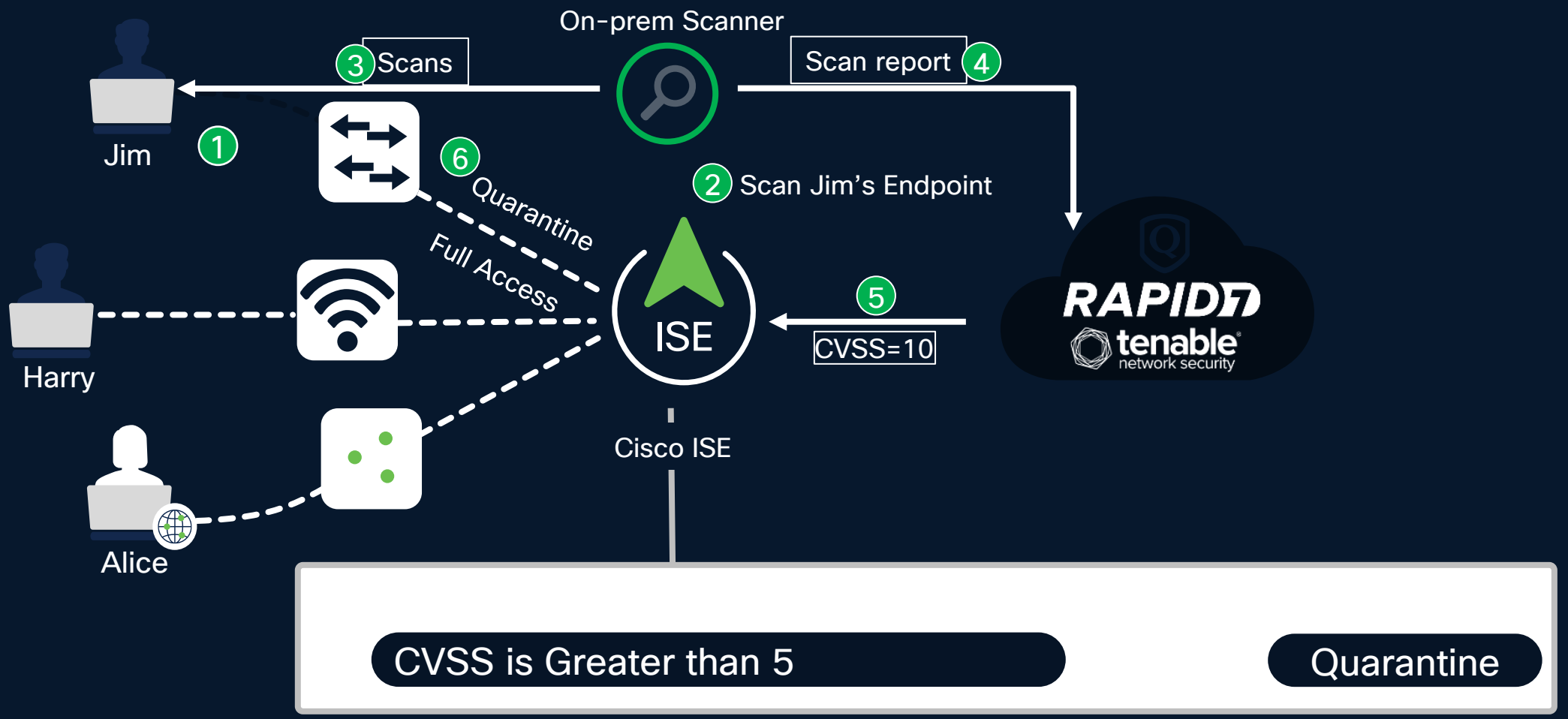
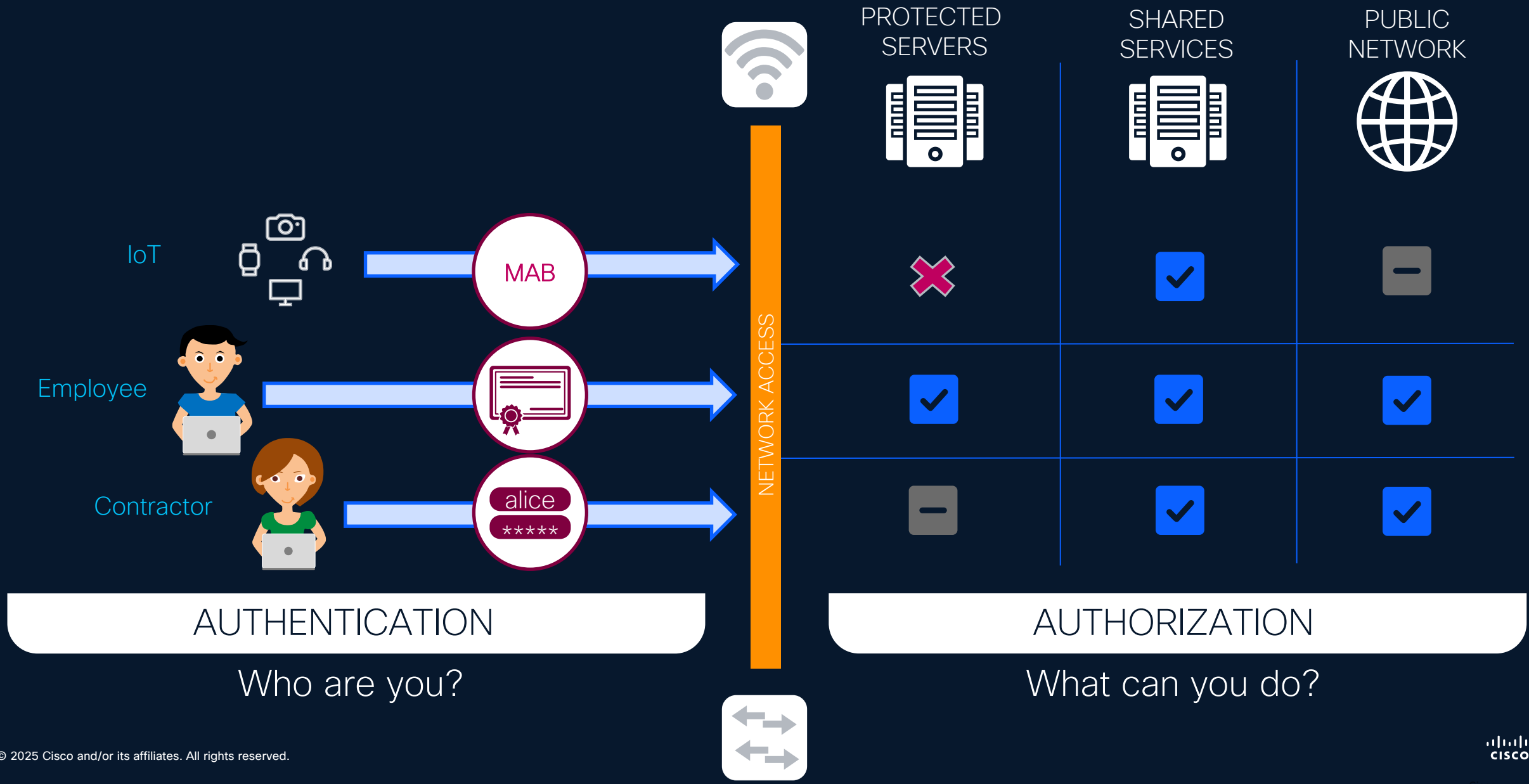
Vulnerability Assessment (Threat-Centric NAC)



CVSS: Common Vulnerability Scoring System

Let’s bring this home!!

Authentication and Authorization



Get ready for part 2 – Segmentation Beyond the Campus