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Let's go

#CiscoLiveAPJC



The bridge to possible

ISE Deployment Staging and Planning

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“Reconciliation” - Dustin Koa Art

Cisco Webex App

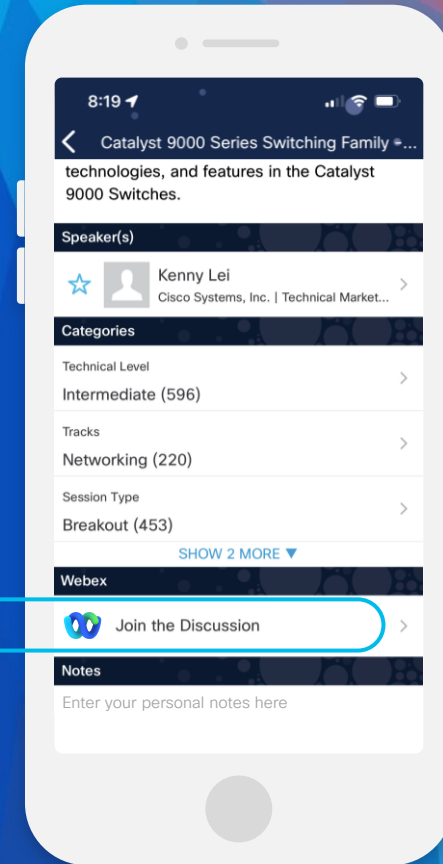
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

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

Webex spaces will be moderated by the speaker until December 22, 2023.



<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKSEC-2705>

Agenda

- Introduction
- **Challenges:** Organizations, Endpoints, Network Devices, Policy
- **Planning:** Platforms, Sizing & Scale, Lab, Monitor => Enforced
- **Staging:** Nodes, Certificates, Patching, Policy
- **Operations:** Automation, Monitoring, Backups
- Resources

Getting Started with ISE Profiling

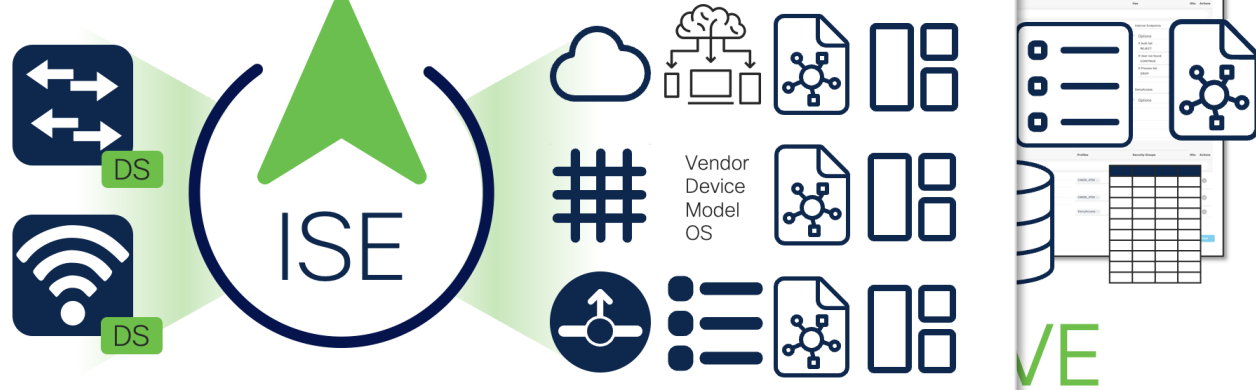


youtu.be/OKPGBEMb0w4

Introduction to Exchange



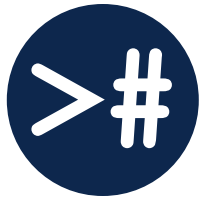
MAC Authentication Bypass (MAB)



youtu.be/xoTwxIDux8Y

ISE Deployment Challenges

Why Customers Buy ISE



TACACS+ Migrating from Cisco Secure ACS or building a new Device Administration Policy Server, this allows for secure, identity-based access to the network devices



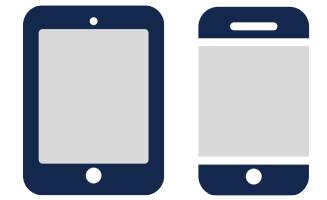
Differentiate between **Corporate and Guest** users and devices. Choose from Hotspot, Self-Registered Guest, and Sponsored Guest access options



Use **agentless posture**, **AnyConnect**, **MDM**, or **EMM** to check endpoints to verify compliance with policies (Patches, AV, AM, USB, etc.) before allowing network access



Group-based Policy allows for segmentation of the network through the use of Scalable Group Tags (SGT) and Scalable Group ACLs (SGACL) instead of VLAN/ACL segmentation.



Allow employees to **Bring their Own Devices** to access network resources by registering their device and downloading certificates for authentication through a simple **onboarding** process



Allow wired, wireless, or VPN access to network resources based upon the identity of the user and/or endpoint. Use **RADIUS** with **802.1X**, **MAB**, **Easy Connect**, or **Passive ID**



Use the probes in ISE and Cisco network devices to classify endpoints and authorize them appropriately with **Device Profiling**. Automate access for many different IoT devices



pxGrid is an ecosystem that allows any application or vendor to integrate with ISE for endpoint identity and context to increase **Network Visibility** and facilitate automated Enforcement.



ISE integrates with **DNA Center** to automate the network fabric and enforces the policies throughout the entire network infrastructure using Software-Defined Access (SDA)



Using a **Threat Analysis** tool, such as Cisco Cognitive Threat Analytics, to grade an endpoints threat score and allow network access based upon the results

“ISE is complex.”

Every ISE Customer

ISE Provides Zero Trust for the Workplace



Endpoints

- Users
- Devices
- Things

Network Devices

- Switches
- WLCs / APs
- VPN

Cisco ISE

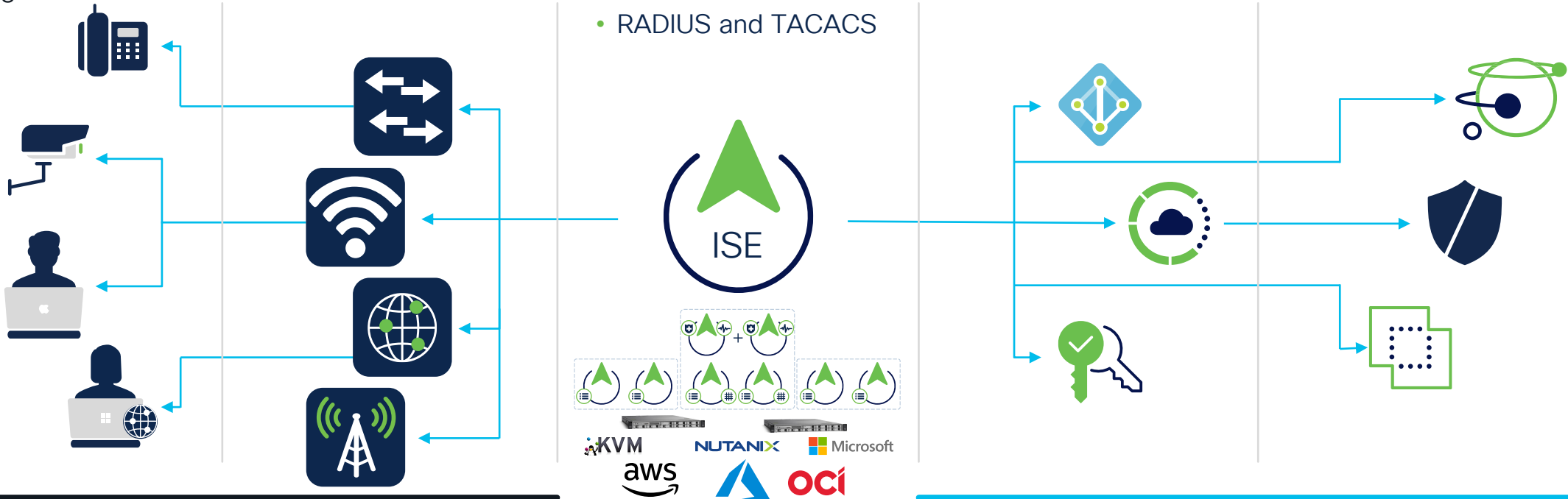
- Shared or Distributed
- VM/Appliance/Cloud
- Up to 2M Endpoints
- RADIUS and TACACS

Identity Services

- Azure/AD/LDAP
- MDM
- SAML/MFA

Security Services

- Cloud Analytics
- Secure Firewall
- Partners

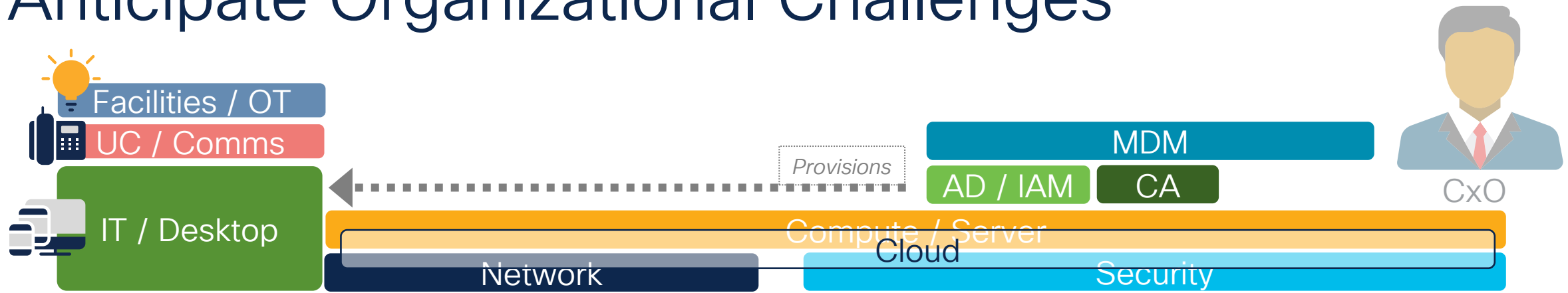


Enterprise

Security



Anticipate Organizational Challenges



Enterprise

Security



Understand Your Needs and Situation



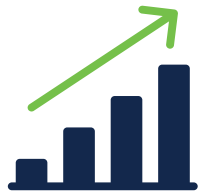
Objectives / Risk / Priorities

- Brand Trust
- Customer/Patient Data
- Hospitality: Fast & Easy
- IT/OT Segmentation
- Protect Intellectual Property



Environment

- Wired / Wireless / VPN
- Multi-Vendor
- Hardware & Software
- Network Device Capabilities



Scaling

- Concurrent Active Endpoints
- Network Devices
- Scale Horizontally (discovery)
- Scale Vertically (user+device)
- Geography



Management & Operations

- Top Down / Bottom Up?
- Orgs / Regions / Departments
- Collaboration or Siloes
- Scheduling Config Changes
- Tooling & Automation

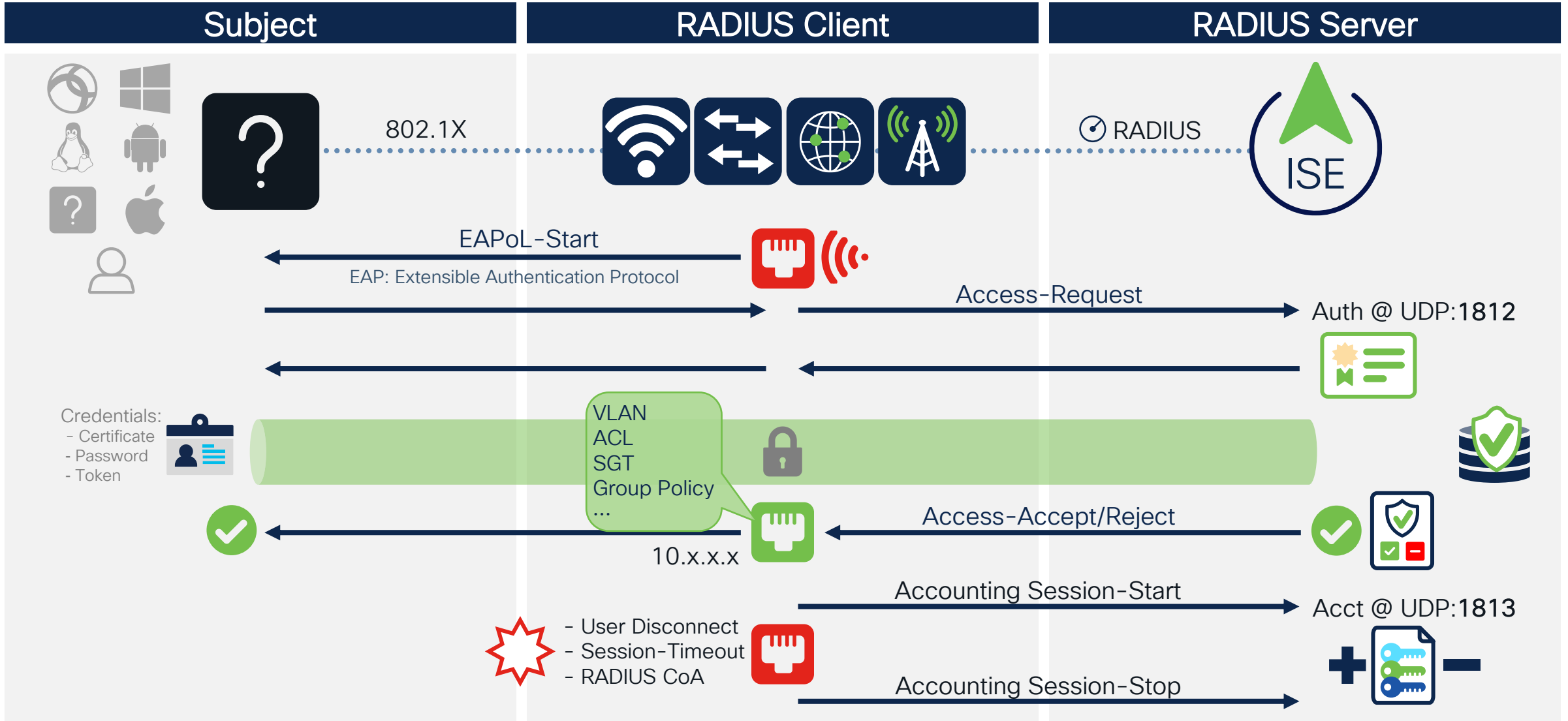
Challenges: Endpoints

RADIUS : 802.1X

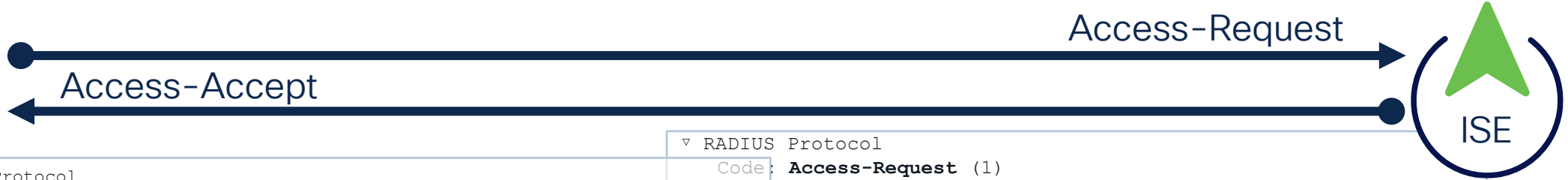


RFC2865 : RADIUS
RFC2866 : Accounting

RFC3579 : EAP Support
RFC5176 : CoA Support



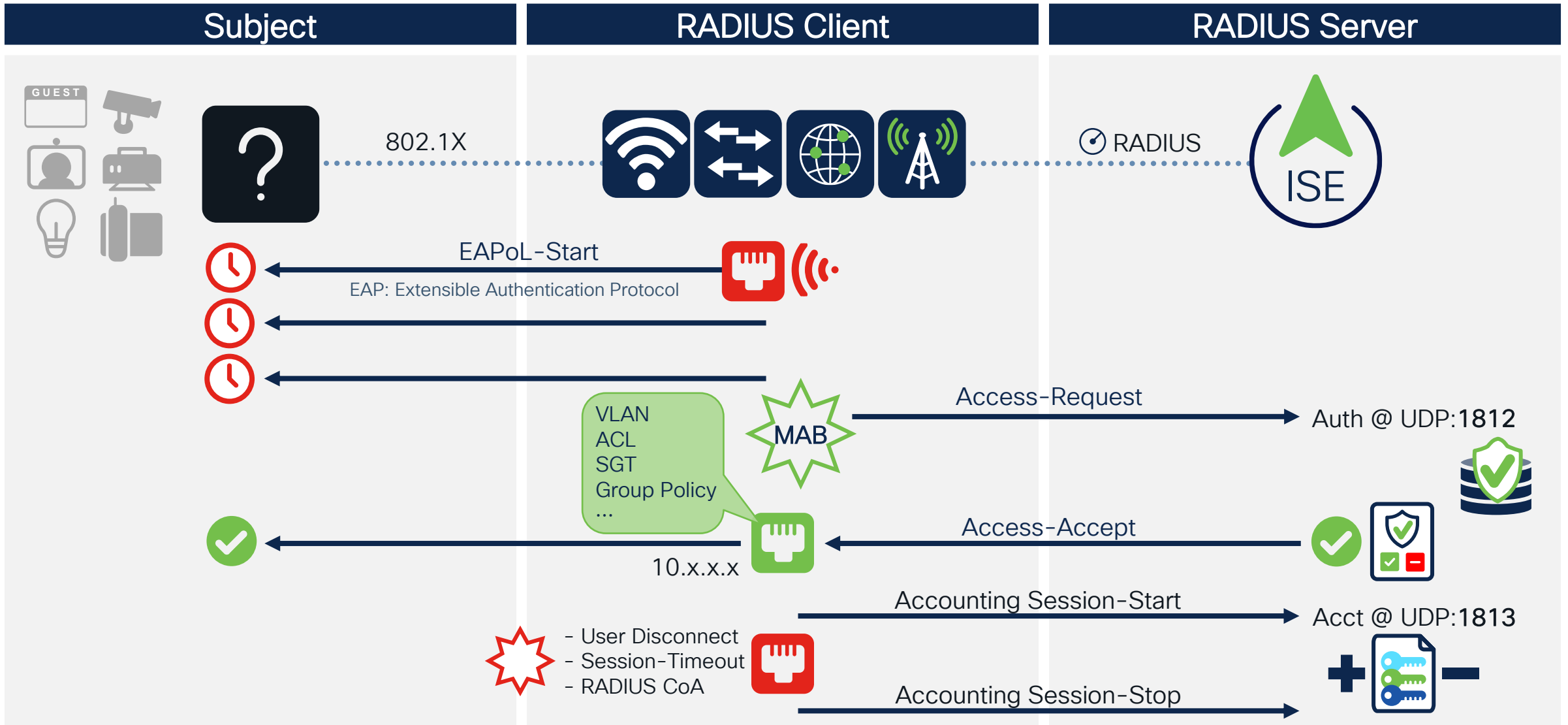
RADIUS : Access-Request + Access-Accept



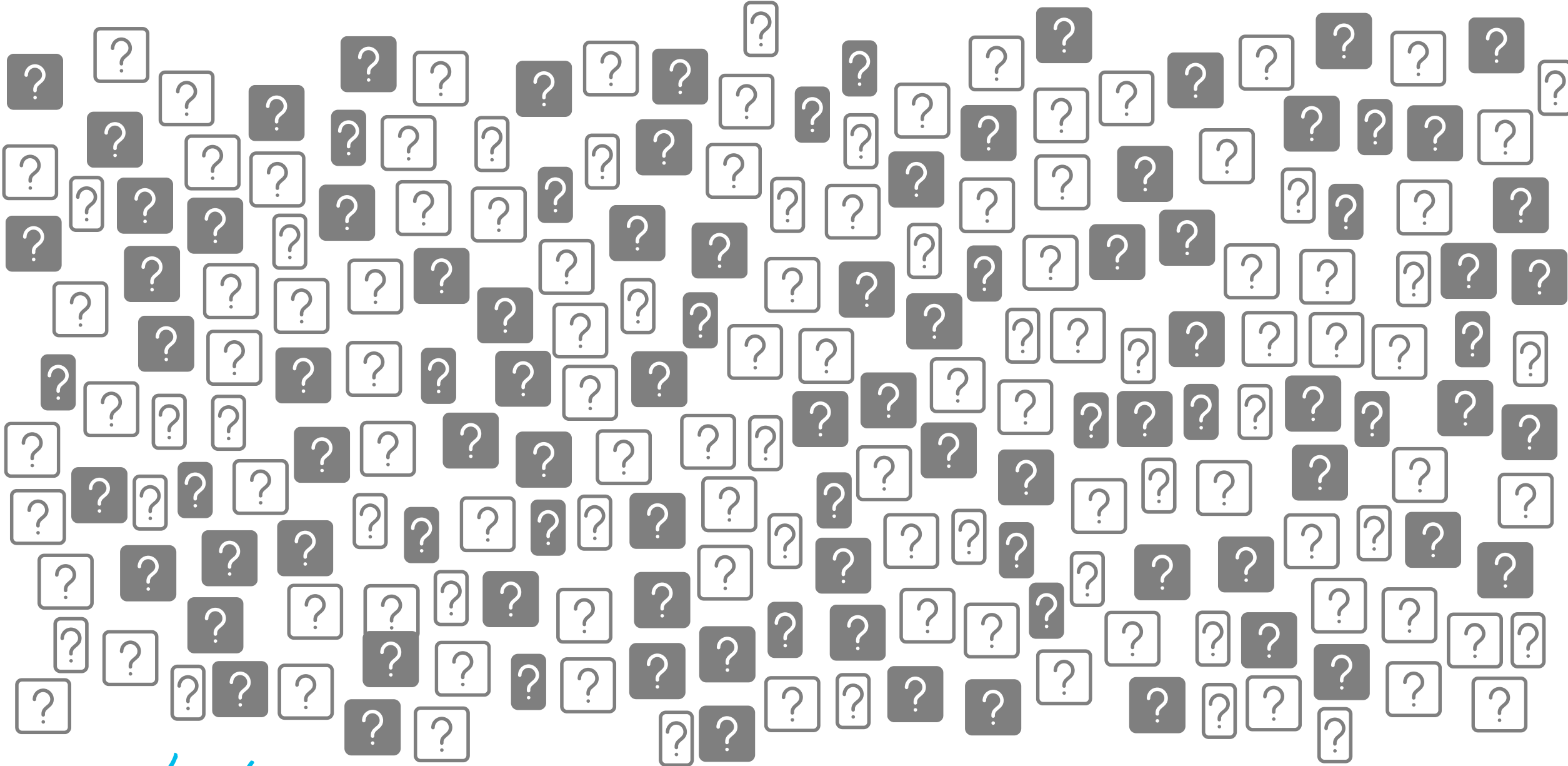
```
∇RADIUS Protocol
  Code: Access-Accept (2)
  Packet identifier: Oxd (13)
  Length: 428
  Authenticator: 66403608336c3e77859116d46cd0d65f
  ∇Attribute Value Pairs
    > AVP: t=User-Name (1) 1=8 val=thomas
    > AVP: t=Class (25) 1=75 val=434143533a6336313238353162724344a2f7767443633147
    > AVP: t=Session-Timeout (27) 1=6 val=1800
    > AVP: t=Termination-Action(29) (=6 val=RADIUS-Request (1)
    > AVP: t=Tunnel-Type (64) (=6 Tag=0x01 val=VLAN (13)
    > AVP: t=Tunnel-Medium-Type(65) 1=6 Tag=0x01 val=IEEE-802 (6)
    > AVP: t=EAP-Message (79) 1=6 Last Segment [1]
    > AVP: t=Message-Authenticator (80) (=18 val=1cb417480820021d54882fcaea90308e
    > AVP: t=Tunnel-Private-Group-Id(81) (=7 Tag=0x01 val=DATA
  ∇ AVP: t=Vendor-Specific (26) 1=36 vnd=ciscoSystems (9)
    Type: 26
    Length: 36
    Vendor ID: ciscoSystems (9)
    > VSA: t=Cisco-AVPair(1) (=30 val=linksec-policy=should-secure
  ∇ AVP: t=Vendor-Specific(26) 1=80 vnd=ciscoSystems(9)
    Type: 26
    Length: 80
    Vendor ID: ciscoSystems (9)
    > VSA: t=Cisco-AVPair(1) (=74 val=ACS: CiscoSecure-Defined-ACL=#ACSACL#-IP-
PERMIT_ALL_IPV4 TRAFFIC-57f6b0d3
  ∇ AVP: t=Vendor-Specific(26) (=38 vnd=ciscoSystems(9)
    Type: 26
    Length: 38
    Vendor ID: ciscoSystems (9)
    > VSA: t=Cisco-AVPair(1) (=32 val=cts:security-group-taq=0004-00
  > AVP: t=Vendor-Specific(26) 1=58 vnd=Microsoft (311)
```

```
∇ RADIUS Protocol
  Code: Access-Request (1)
  Packet identifier: x0 (0)
  Length: 153
  Authenticator:29eb293b3a40ea740a8fd33bdb18f1d7
  ∇Attribute Value Pairs
    > AVP: t=User-Name (1) 1=8 val=thomas
    > AVP: t=NAS-IP-Address(4) (=6 val=6.86.227.108
    > AVP: t=Calling-Station-Id(31) 1=19 val=02-00-00-00-00-01
    > AVP: t=Called-Station-Id(30) 1=27 val=2C-3F-0B-56-E3-6C: Corp
    > AVP: t=Framed-MTU(12) (=6 val=1400
    > AVP: t=NAS-Port-Type(61) (=6 val=Wireless-802.11 (19)
    > AVP: t=Service-Type(6) 1=6 val=Framed (2)
    > AVP: t=Connect-Info(77) (=24 val=CONNECT 11Mbps 802.11b
    > AVP: t=EAP-Message (79) 1=13 Last Segment [1]
    > AVP: t=Message-Authenticator(80) 1=18
    val=26f047af6a9a82279dfd6d19b477c31b
```

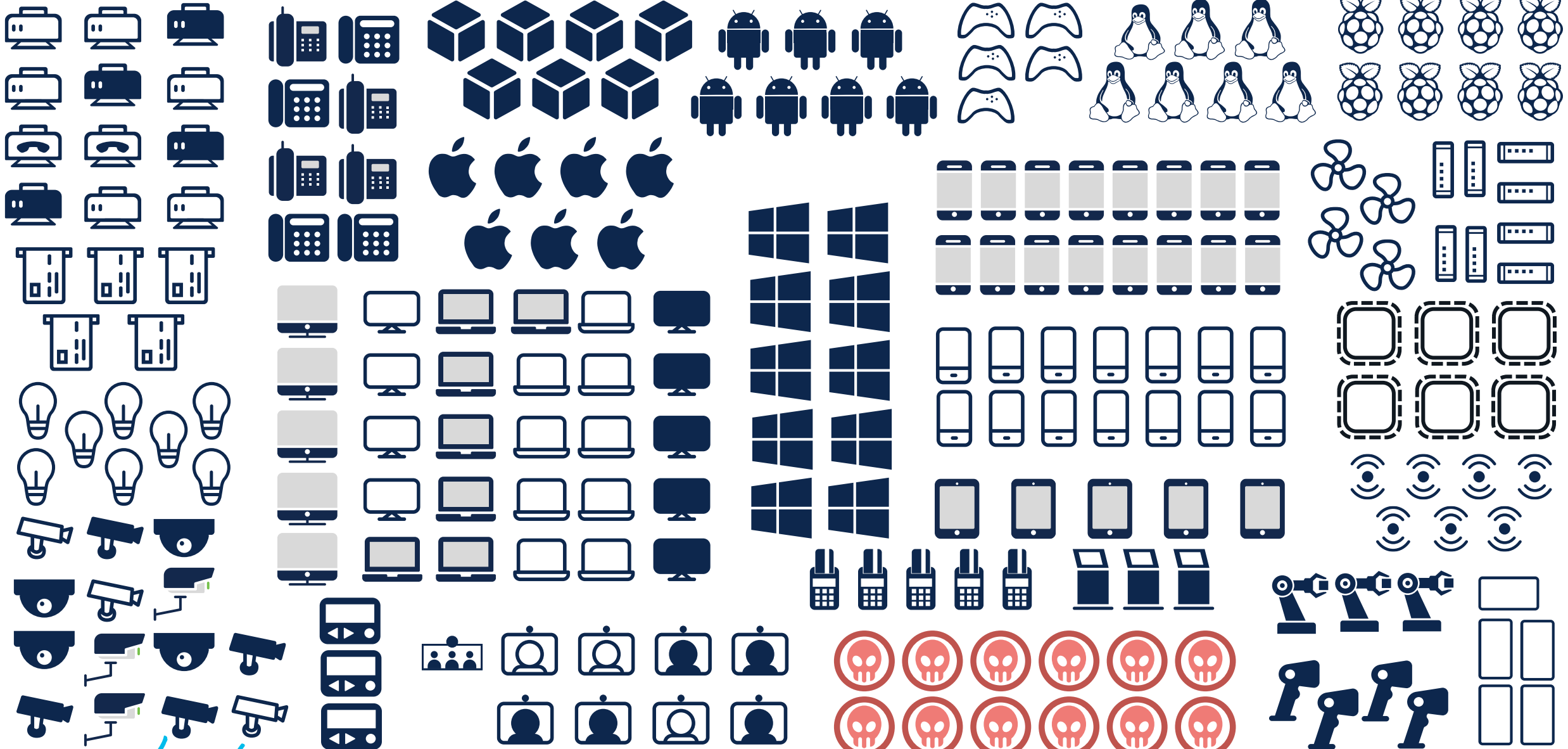
RADIUS : MAC Authentication Bypass (MAB)



Unknowns



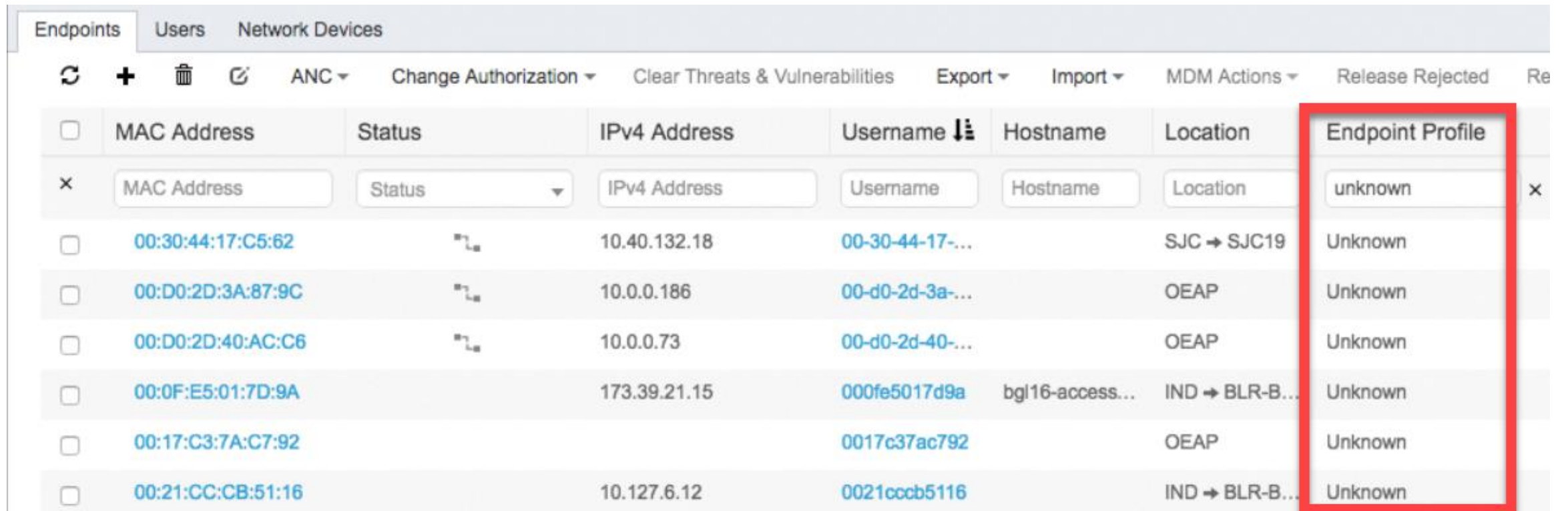
Unknowns... to Knowns... to Classified



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What about Unknowns?

- There will be endpoints that don't have pre-built profiles
- Endpoint profiles will show as "Unknown"
- View your unknown endpoints under Context Visibility>Endpoints

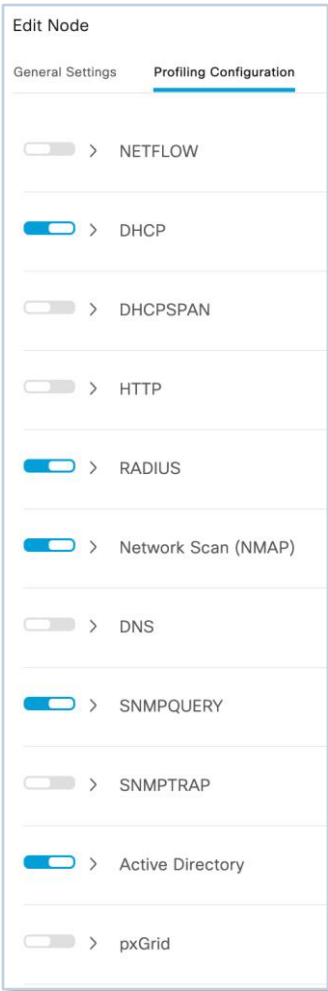


The screenshot shows the Cisco Context Visibility interface for Endpoints. The table lists various endpoints with their MAC addresses, status, IPv4 addresses, usernames, hostnames, and locations. The 'Endpoint Profile' column for all listed endpoints is 'Unknown', which is highlighted by a red rectangular box. The interface includes navigation tabs for Endpoints, Users, and Network Devices, and various action buttons like Refresh, Add, Delete, and Export.

MAC Address	Status	IPv4 Address	Username	Hostname	Location	Endpoint Profile
00:30:44:17:C5:62		10.40.132.18	00-30-44-17-...		SJC → SJC19	Unknown
00:D0:2D:3A:87:9C		10.0.0.186	00-d0-2d-3a-...		OEAP	Unknown
00:D0:2D:40:AC:C6		10.0.0.73	00-d0-2d-40-...		OEAP	Unknown
00:0F:E5:01:7D:9A		173.39.21.15	000fe5017d9a	bgl16-access...	IND → BLR-B...	Unknown
00:17:C3:7A:C7:92			0017c37ac792		OEAP	Unknown
00:21:CC:CB:51:16		10.127.6.12	0021cccb5116		IND → BLR-B...	Unknown

Classifying Endpoints without Authentication

Profiling

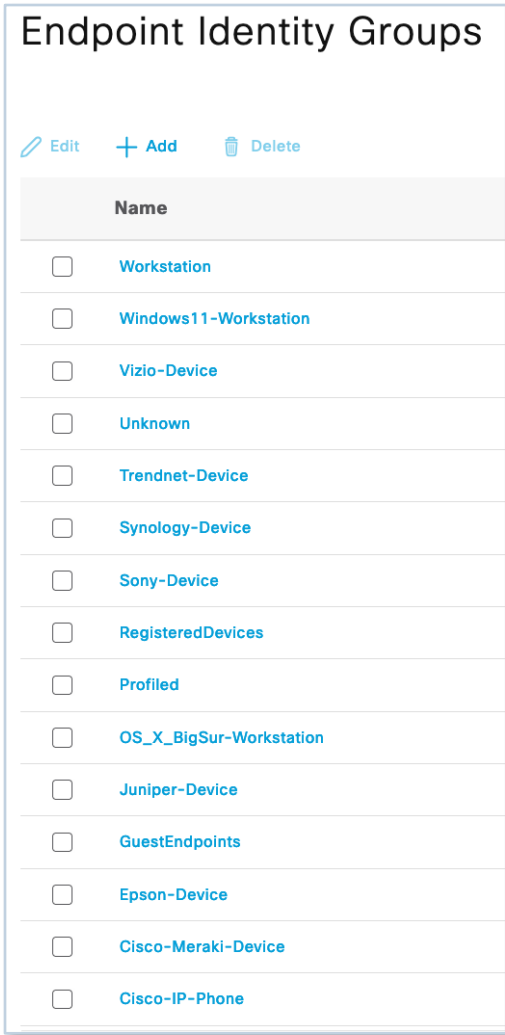


Edit Node

General Settings **Profiling Configuration**

- > NETFLOW
- > DHCP
- > DHCPSPAN
- > HTTP
- > RADIUS
- > Network Scan (NMAP)
- > DNS
- > SNMPQUERY
- > SNMPTRAP
- > Active Directory
- > pxGrid

Static Groups

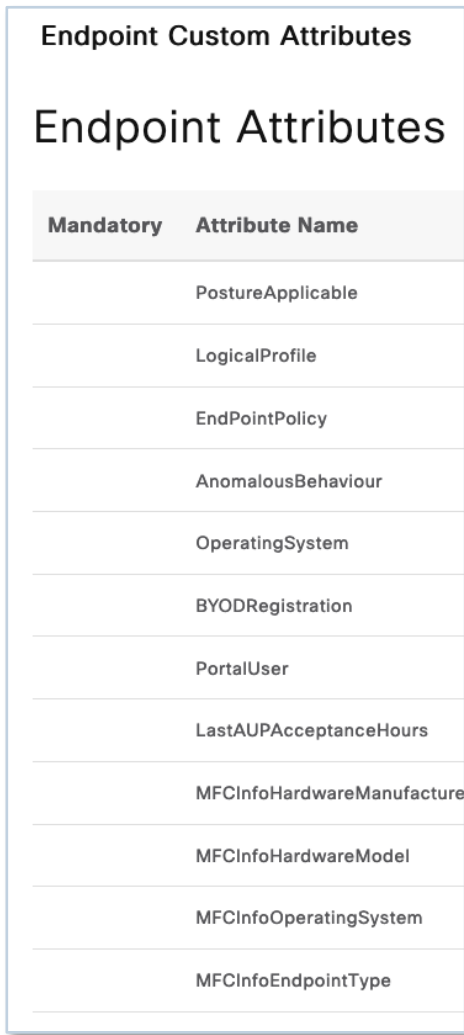


Endpoint Identity Groups

[Edit](#) [+ Add](#) [Delete](#)

Name
<input type="checkbox"/> Workstation
<input type="checkbox"/> Windows11-Workstation
<input type="checkbox"/> Vizio-Device
<input type="checkbox"/> Unknown
<input type="checkbox"/> Trendnet-Device
<input type="checkbox"/> Synology-Device
<input type="checkbox"/> Sony-Device
<input type="checkbox"/> RegisteredDevices
<input type="checkbox"/> Profiled
<input type="checkbox"/> OS_X_BigSur-Workstation
<input type="checkbox"/> Juniper-Device
<input type="checkbox"/> GuestEndpoints
<input type="checkbox"/> Epson-Device
<input type="checkbox"/> Cisco-Meraki-Device
<input type="checkbox"/> Cisco-IP-Phone

Custom Attributes

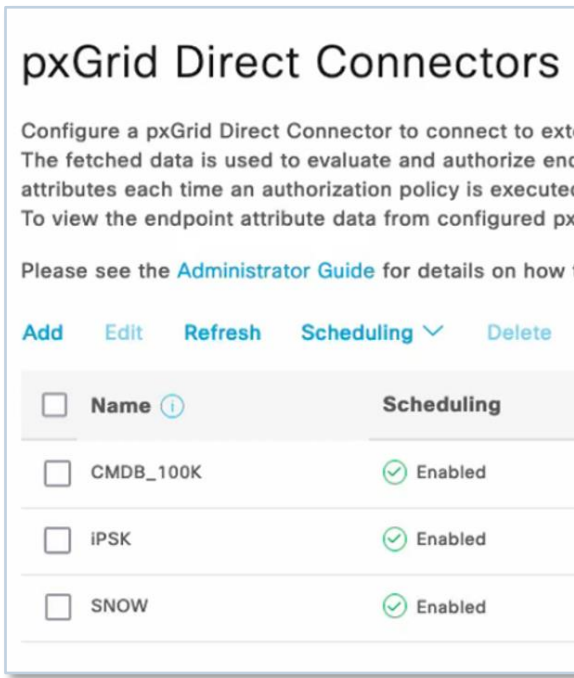


Endpoint Custom Attributes

Endpoint Attributes

Mandatory	Attribute Name
<input type="checkbox"/>	PostureApplicable
<input type="checkbox"/>	LogicalProfile
<input type="checkbox"/>	EndPointPolicy
<input type="checkbox"/>	AnomalousBehaviour
<input type="checkbox"/>	OperatingSystem
<input type="checkbox"/>	BYODRegistration
<input type="checkbox"/>	PortalUser
<input type="checkbox"/>	LastAUPAcceptanceHours
<input type="checkbox"/>	MFCInfoHardwareManufacture
<input type="checkbox"/>	MFCInfoHardwareModel
<input type="checkbox"/>	MFCInfoOperatingSystem
<input type="checkbox"/>	MFCInfoEndpointType

CMDBs



pxGrid Direct Connectors

Configure a pxGrid Direct Connector to connect to external CMDBs. The fetched data is used to evaluate and authorize endpoints each time an authorization policy is executed. To view the endpoint attribute data from configured pxGrid Direct Connectors, click on the connector name.

Please see the [Administrator Guide](#) for details on how to configure pxGrid Direct Connectors.

[Add](#) [Edit](#) [Refresh](#) [Scheduling](#) [Delete](#)

<input type="checkbox"/> Name i	Scheduling
<input type="checkbox"/> CMDB_100K	<input checked="" type="checkbox"/> Enabled
<input type="checkbox"/> iPSK	<input checked="" type="checkbox"/> Enabled
<input type="checkbox"/> SNOW	<input checked="" type="checkbox"/> Enabled

Static Endpoint Groups from MAC Inventories

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy
- Administration**
- Work Centers

Identity Groups

Endpoint Identity Groups

- Blocked List
- GuestEndpoints
- Profiled
- RegisteredDevices
- Unknown
- User Identity Groups

Endpoint Identity Groups

Selected 0 Total 20

Edit Add Delete

All

Name	Description
<input type="checkbox"/> Android	Identity Group for Profile: Android
<input type="checkbox"/> Apple-iDevice	Identity Group for Profile: Apple-iDevice
<input type="checkbox"/> Axis-Device	Identity Group for Profile: Axis-Device
<input type="checkbox"/> BlackBerry	Identity Group for Profile: BlackBerry
<input type="checkbox"/> Blocked List	Blocked List Identity Group
<input type="checkbox"/> Cisco-IP-Phone	Identity Group for Profile: Cisco-IP-Phone
<input type="checkbox"/> Cisco-Meraki-Device	Identity Group for Profile: Cisco-Meraki-Device
<input type="checkbox"/> Epson-Device	Identity Group for Profile: Epson-Device
<input type="checkbox"/> GuestEndpoints	Guest Endpoints Identitv Group



Endpoint Custom Attributes

Administration > Identity Management > Settings > Endpoint Custom Attributes

cs.co/ise-api#endpoint

cs.co/ise-api#custom-attributes-openapi

Examples

Attribute Name	Type
----------------	------

Created	Date
Expires	Date
Owner	String
Department	String
iPSK	String
Authorization	String
DeviceType	String
Manufacturer	String
Model	String

... ..

Mandatory	Attribute Name	Data Type
	PostureApplicable	STRING
	LogicalProfile	STRING
	EndPointPolicy	
	AnomalousBehaviour	
	OperatingSystem	
	BYODRegistration	
	PortalUser	
	LastAUPAcceptanceHours	

ISE pxGrid Direct with CMDBs

ISE 3.2P2 / 3.3

The screenshot shows the Cisco Identity Services Engine (ISE) Administration console. The main navigation bar includes 'Identity Services Engine' and 'Administration / Network Resources'. The left sidebar contains navigation options like Bookmarks, Dashboard, Context Visibility, Operations, Policy, Administration (highlighted), and Work Centers. The main content area is titled 'pxGrid Direct Connectors' and includes a warning about proxy settings. Below the warning is a table of connectors. A modal window titled 'Dictionary Attributes' is open, showing a list of attributes for the 'ipsk' dictionary.

pxGrid Direct Connectors

Configure a pxGrid Direct Connector to connect to external REST APIs that provide JSON data. The fetched data is used to evaluate and authorize endpoints faster without requiring attributes each time an authorization policy is executed for an endpoint. To view the endpoint attribute data from configured pxgrid Direct Connectors, go to the [Endpoint Attributes](#) page.

Please see the [Administrator Guide](#) for details on how to use this feature.

[Add](#) [Edit](#) [Refresh](#) [Scheduling](#) [Delete](#)

<input type="checkbox"/> Name ⓘ	Scheduling	Connector Type
<input type="checkbox"/> CMDB_100K	✔ Enabled	URLFETCHER
<input type="checkbox"/> IPSK	✔ Enabled	URLFETCHER
<input type="checkbox"/> SNOW	✔ Enabled	URLFETCHER

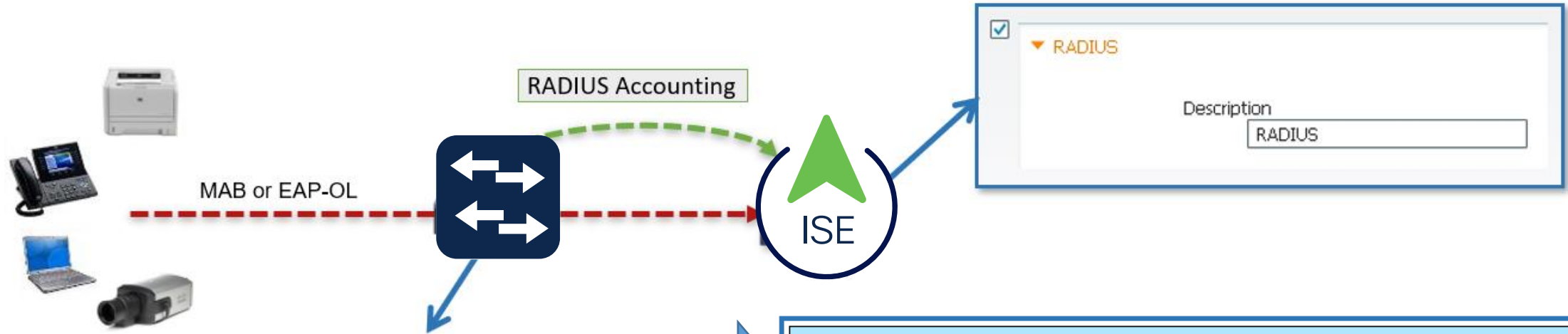
Dictionary Attributes

Name	Internal Name	Description
<input type="checkbox"/> created	created	Dictionary attribute for p...
<input type="checkbox"/> department	department	Dictionary attribute for p...
<input type="checkbox"/> description	description	Dictionary attribute for p...
<input type="checkbox"/> expires	expires	Dictionary attribute for p...
<input type="checkbox"/> ipsk	ipsk	Dictionary attribute for p...
<input type="checkbox"/> mac_address	mac_address	Dictionary attribute for p...
<input type="checkbox"/> owner	owner	Dictionary attribute for p...
<input type="checkbox"/> status	status	Dictionary attribute for p...

ISE Profiling Probes

The screenshot shows the Cisco ISE Administration console. The top navigation bar includes 'Identity Services Engine' and 'Administration / System'. The main menu on the left lists various sections like Bookmarks, Dashboard, Context Visibility, Operations, Policy, Administration (highlighted), and Work Centers. The main content area is titled 'Deployment' and shows 'Edit Node' for a node named 'iseee'. Under 'Profiling Configuration', several probes are listed with toggle switches: NETFLOW (off), DHCP (on), DHCPSPAN (off), HTTP (off), RADIUS (on), Network Scan (NMAP) (on), DNS (off), SNMPQUERY (on), and others. A large orange warning banner is overlaid across the bottom of the console, containing a warning icon and the text: 'Do not turn on all probes thinking “more is better” without understanding their potential performance impact!’

Device Sensor for Wired



- 1) Filter DHCP, CDP, and LLDP options/TLVs
- 2) Enable sensor data to be sent in RADIUS Accounting including all changes

```
device-sensor accounting  
device-sensor notify all-changes
```

- 3) Disable local analyzer if sending sensor updates to ISE (central analyzer)

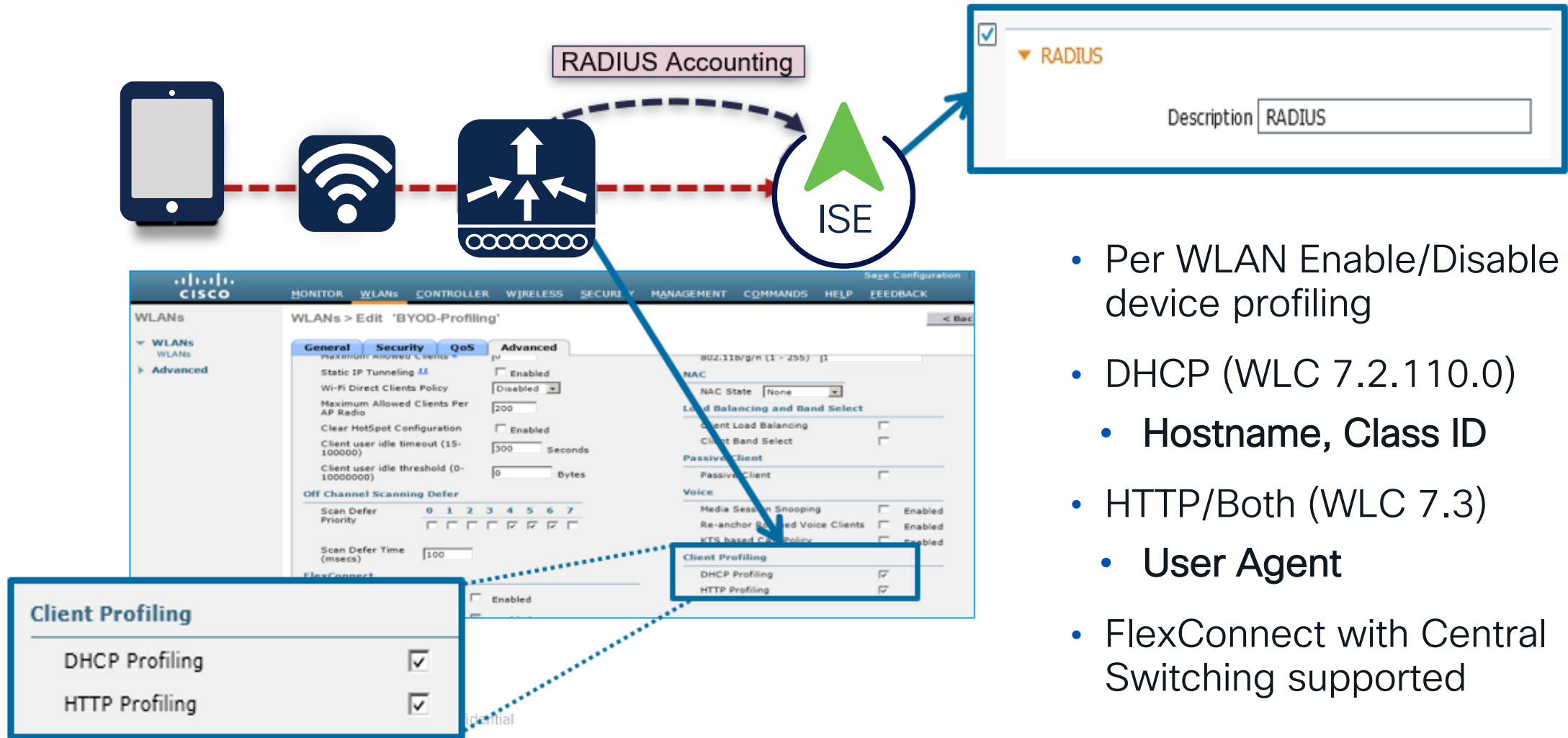
```
no macro auto monitor  
access-session template monitor
```

```
device-sensor filter-list cdp list my_cdp_list  
  tlv name device-name  
  tlv name platform-type  
device-sensor filter-spec cdp include list my_cdp_list
```

```
device-sensor filter-list lldp list my_lldp_list  
  tlv name system-name  
  tlv name system-description  
device-sensor filter-spec lldp include list my_lldp_list
```

```
device-sensor filter-list dhcp list my_dhcp_list  
  option name host-name  
  option name class-identifier  
  option name client-identifier  
device-sensor filter-spec dhcp include list my_dhcp_list
```

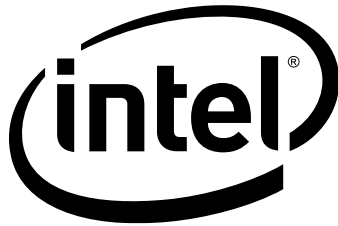
Wireless Device Sensor



- Per WLAN Enable/Disable device profiling
- DHCP (WLC 7.2.110.0)
 - Hostname, Class ID
- HTTP/Both (WLC 7.3)
 - User Agent
- FlexConnect with Central Switching supported

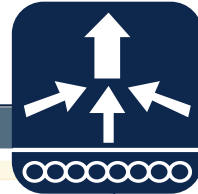
WiFi Device Analytics

ISE 3.3



SAMSUNG

IOS-XE 17.10+



Enable

RADIUS Profiling	<input checked="" type="checkbox"/>
HTTP TLV Caching	<input checked="" type="checkbox"/>
DHCP TLV Caching	<input checked="" type="checkbox"/>

Edit Policy Profile

General **Access Policies** QOS and AVC Mobility Advanced

WLAN Local Profiling

Global State of Device Classification **Enabled** ⓘ

Local Subscriber Policy Name ⓘ

VLAN

VLAN/VLAN Group ⓘ

Multicast VLAN

WLAN ACL

IPv4 ACL ⓘ

IPv6 ACL ⓘ

URL Filters ⓘ

Pre Auth ⓘ

Post Auth ⓘ

Wifi_Device_Analytics

Dictionary Dictionary Attributes



Dictionary Attributes

Name	
<input type="checkbox"/>	DEVICE_INFO_FIRMWARE_VERSION
<input type="checkbox"/>	DEVICE_INFO_HW_MODEL
<input type="checkbox"/>	DEVICE_INFO_MANUFACTURER_NAME
<input type="checkbox"/>	DEVICE_INFO_MODEL_NAME
<input type="checkbox"/>	DEVICE_INFO_MODEL_NUM
<input type="checkbox"/>	DEVICE_INFO_OS_VERSION
<input type="checkbox"/>	DEVICE_INFO_VENDOR_TYPE

Creating a Custom Profile

Under Attributes, you can see all the attributes for the unknown endpoint

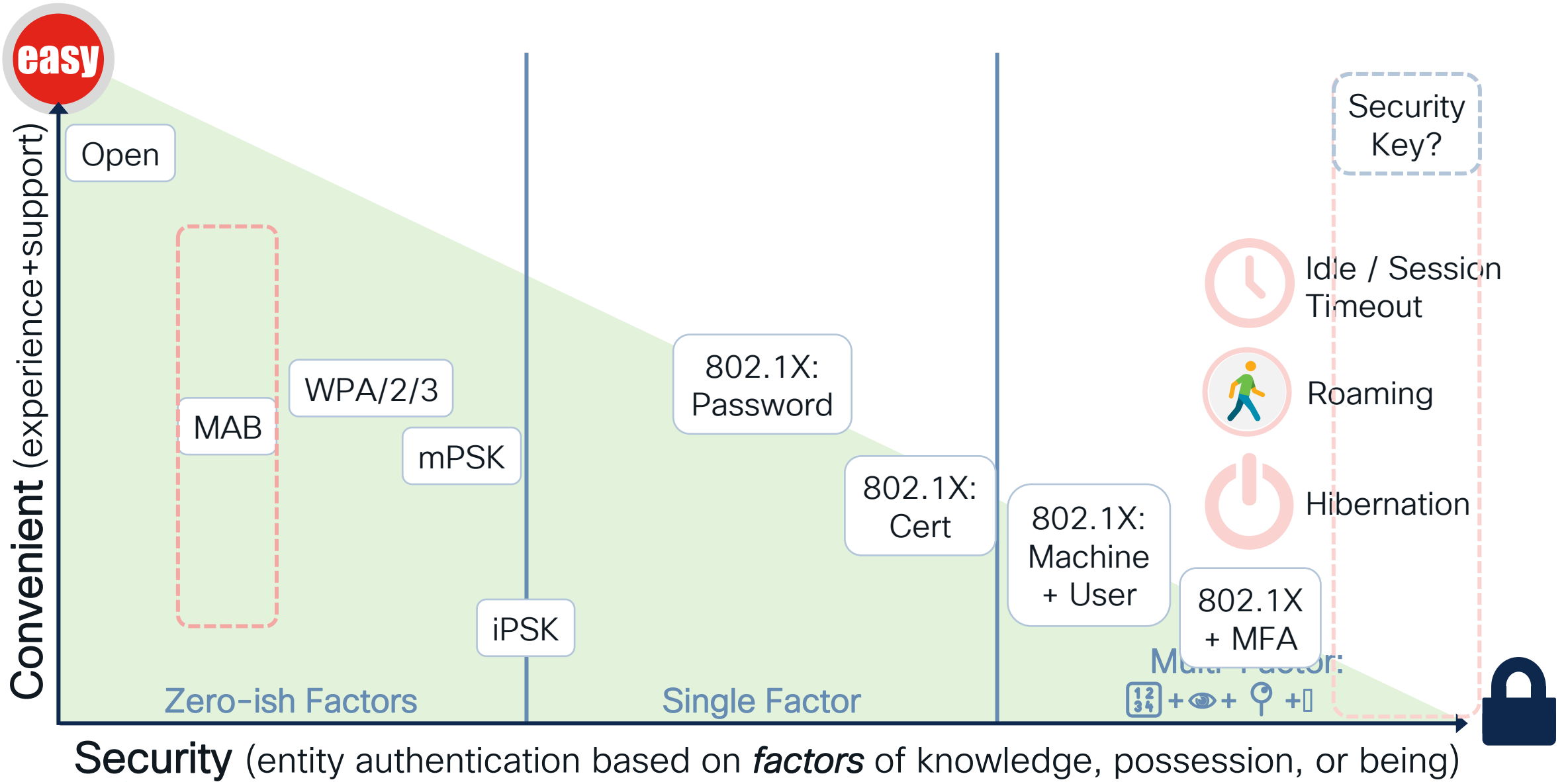
Other Attributes					
5060-tcp	sip	OUI	Inventec Multimedia & Telecom Corporation	dhcp-class-identifier	udhcp 0.9.7
80-tcp	http	OriginalUserName	00144800308c	dhcp-client-identifier	01:00:14:48:00:30:8c
AAA-Server	ise	PolicyVersion	8	dhcp-message-type	DHCPREQUEST
AuthenticationIdentityStore	Internal Endpoints	PostureApplicable	Yes	dhcp-parameter-request-list	1, 3, 6, 12, 15, 28
AuthenticationMethod	Lookup	PostureAssessmentStatus	NotApplicable	dhcp-requested-address	10.1.100.103
AuthenticationStatus	AuthenticationPassed	RadiusFlowType	WiredMAB	dot1xAuthAuthControlledPortControl	2
AuthorizationPolicyMatchedRule	Default	SSID	C0-67-AF-EE-09-AB	dot1xAuthAuthControlledPortStatus	2
BYODRegistration	Unknown	SelectedAccessService	PEAP-EAP	dot1xAuthSessionUserName	00-14-48-00-30-8C
Called-Station-ID	C0-67-AF-EE-09-AB	SelectedAuthenticationIdentityStores	Internal Endpoints	flags	0x0000
Calling-Station-ID	00-14-48-00-30-8C	SelectedAuthorizationProfiles	PermitAccess	giaddr	10.1.100.75
DTLSSupport	Unknown	Service-Type	Call Check	hlen	6
DestinationIPAddress	10.1.100.21	StaticAssignment	false	htype	Ethernet (10Mb)
DestinationPort	1812	StaticGroupAssignment	false	ifDescr	GigabitEthernet1/0/43
Device IP Address	10.1.100.75	StepData	5= DEVICE.Location, 6= DEVICE.Device Type, 7= DEVICE.Mode, 8= DEVICE.1 Radius.RadiusFlowType, 11=Internal Endpoints, 17= Session.ANCPolicy, 18= S	ifIndex	50
Device Type	Device Type#All Device Types#Switches	Total Certainty Factor	0	ifOperStatus	1
DeviceRegistrationStatus	NotRegistered	TrustSec-Enabled	TrustSec-Enabled#TrustSec-Enabled#Non-TrustSec	ip	10.1.100.103
ElapsedDays	0	UseCase	Host Lookup	op	BOOTREQUEST
EndPointMACAddress	00-14-48-00-30-8C	User-AD-Last-Fetch-Time	1543131931802	operating-system	Linux 2.4.9 - 2.4.18 (likely embedded)
EndPointPolicy	Unknown	User-Fetch-User-Name	00144800308c	operating-system-result	Linux 2.4.9 - 2.4.18 (likely embedded)
EndPointProfilerServer	ise.securitydemo.net	User-Name	00144800308c	yiaddr	0.0.0.0
EndPointSource	SNMPQuery Probe	UserType	Host		
FailureReason	-	allowEasyWiredSession	false		
Framed-IP-Address	10.1.100.103	chaddr	00:14:48:00:30:8c		
IPSEC	IPSEC#Is IPSEC Device#No	ciaddr	0.0.0.0		
IdentityGroup	Unknown				
IdentityPolicyMatchedRule	MAB				
InactiveDays	0				

Profiling Probe Selection Best Practices

Probe	Key Profiling Attributes
RADIUS	MAC Address (OUI), IP Address, NDG values
RADIUS w/Device Sensor	CDP/LLDP, DHCP, User-Agent, mDNS, H323/SIP
RADIUS w/ACIDex	MAC Address (OUI), UDID, Operating System, Platform/Device Type
SNMP	MAC Address (OUI), CDP/LLDP, ARP tables
DHCP	DHCP
DNS	FQDN
HTTP	User-Agent
NetFlow	Protocol, Source/Dest IP, Source/DestPorts
NMAP	OS, Common and custom ports, Service Version Info, SMB & SNMP data
AD	Operating System and Version, AD Domain
pxGrid	IoT Asset, Custom Attributes
Endpoint Custom Attributes	<i>Customer defined</i>

ISE Profiling Design Guide cs.co/ise-profiling

Network Access Authentication is a Spectrum



ISE Supported EAP Methods

Identity Services Engine Policy / Policy Elements

Bookmarks Dashboard Context Visibility Operations Policy Administration Work Centers Interactive Help

Authentication Allowed Protocols Authorization Profiling Posture Client Provisioning

Allowed Protocols Services List > New Allowed Protocols Service

Allowed Protocols

Name: All_The_EAPs

Description: [Empty text box]

Allowed Protocols

- Authentication Bypass
 - Process Host Lookup ⓘ
- Authentication Protocols
 - Allow PAP/ASCII
 - Allow CHAP
 - Allow MS-CHAPv1
 - Allow MS-CHAPv2
 - Allow EAP-MD5
 - Allow EAP-TLS
 - Allow LEAP
 - Allow PEAP
 - Allow EAP-FAST
 - Allow EAP-TTLS
 - Allow TEAP
- Preferred EAP Protocol: LEAP ⓘ
- EAP-TLS L-bit ⓘ

Allowed Protocols

Authentication Bypass

- Process Host Lookup ⓘ

Authentication Protocols

- Allow PAP/ASCII
- Allow CHAP
- Allow MS-CHAPv1
- Allow MS-CHAPv2
- Allow EAP-MD5
- Allow EAP-TLS
- Allow Authentication of expired certificates to allow certificate renewal in Authorization Policy ⓘ
- Enable Stateless Session Resume
- Session ticket time to live: 2 Hours
- Proactive session ticket update will occur after: 10 % of Time To Live has expired

Allow LEAP

Allow PEAP

PEAP Inner Methods

- Allow EAP-MS-CHAPv2
- Allow Password Change Retries: 1 (Valid Range 0 to 3)
- Allow EAP-GTC
- Allow Password Change Retries: 1 (Valid Range 0 to 3)
- Allow EAP-TLS
- Allow Authentication of expired certificates to allow certificate renewal in Authorization Policy ⓘ
- Require cryptobinding TLV ⓘ
- Allow PEAPv0 only for legacy clients

Allow EAP-FAST

EAP-FAST Inner Methods

- Allow EAP-MS-CHAPv2
- Allow Password Change Retries: 1 (Valid Range 0 to 3)
- Allow EAP-GTC
- Allow Password Change Retries: 1 (Valid Range 0 to 3)
- Allow EAP-TLS
- Allow Authentication of expired certificates to allow certificate renewal in Authorization Policy ⓘ
- Use PACs Don't Use PACs
- Tunnel PAC Time To Live: 90 Days
- Proactive PAC update will occur after: 10 % of PAC Time To Live has expired
- Allow Anonymous In-Band PAC Provisioning
- Allow Authenticated In-Band PAC Provisioning
 - Server Returns Access Accept After Authenticated Provisioning
 - Accept Client Certificate For Provisioning
- Allow Machine Authentication
 - Machine PAC Time To Live: 1 Weeks
- Enable Stateless Session Resume
 - Authorization PAC Time To Live: 1 Hours ⓘ
- Enable EAP Chaining

Allow EAP-TTLS

EAP-TTLS Inner Methods

- Allow PAP/ASCII
- Allow CHAP
- Allow MS-CHAPv1
- Allow MS-CHAPv2
- Allow EAP-MD5
- Allow EAP-MS-CHAPv2
- Allow Password Change Retries: 1 (Valid Range 0 to 3)

Allow TEAP

TEAP Inner Methods

- Allow EAP-MS-CHAPv2
- Allow Password Change Retries: 3 (Valid Range 0 to 3) ⓘ
- Allow EAP-TLS
- Allow Authentication of expired certificates to allow certificate renewal in Authorization Policy ⓘ
- Allow downgrade to MSK ⓘ
- Accept client certificate during tunnel establishment ⓘ
- Enable EAP Chaining ⓘ
- Preferred EAP Protocol: LEAP ⓘ
- EAP-TLS L-bit ⓘ
- Allow weak ciphers for EAP ⓘ
- Require Message-Authenticator for all RADIUS Requests ⓘ
- Allow 5G

Federal Information Processing Standard (FIPS) Mode



 cs.co/ise-fips

FIPS mode configures ISE to use only FIPS approved cryptographic modules

- All non-FIPS compliant cipher suites will be disabled in EAP-TLS, PEAP and EAP-FAST
- Certificates and private keys must use only FIPS compliant hash and encryption algorithms
 - RSA Private keys must be of 2048 bits or greater
 - ECDSA Private keys must be of 224 bits or greater
 - DHE ciphers work with DH param of 2048 bits or greater
 - SHA1 is not allowed to generate ISE local server certificates
 - The anonymous PAC provisioning option in EAP-FAST is disabled
- Local SSH server will operate in FIPS mode
- The following protocols are ***not supported*** in FIPS mode for RADIUS: EAP-MD5, PAP, CHAP, MS-CHAPv1, MS-CHAPv2, LEAP

FIPS mode changes require a restart of all ISE nodes in the deployment

Context Visibility

- Single pane for all endpoints:
 - Which endpoints are connected
 - Which profiles are assigned to which endpoints
 - IP to Mac address associations
 - Attributes, attributes, attributes!

ANC Change Authorization Clear Threats & Vulnerabilities Export Import MDM Actions Release

MAC Address	Status	IP Address	Username	Hostname	Endpoint Profile
24:7E:12:66:C1:98	🟢	192.168.10.2	24-7E-12-66-C1-98	SEP247E1266C198	Cisco-IP-Phone-8865
00:50:56:A8:B1:B2	🟢	10.62.148.138	EXAMPLE0\alice	ekorneyc-Win10	Windows10-Workstation
00:50:56:A8:96:0E	🟢	10.62.148.140	alice	ekorneyc-win11	Windows11-Workstation

Endpoints > 00:50:56:A8:B1:B2

MAC ADDRESS: 00:50:56:A8:B1:B2

Username: EXAMPLE0\alice

Endpoint Profile: Windows10-Workstation

Current IP Address: 10.62.148.138

Location: Location → All Locations

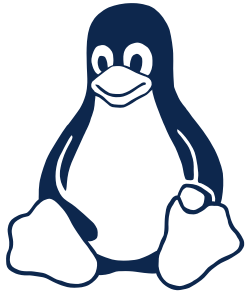
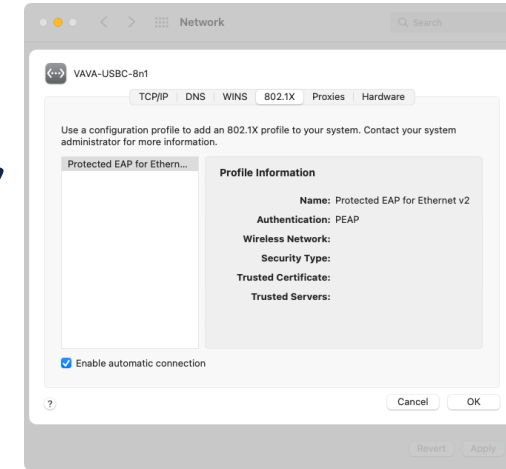
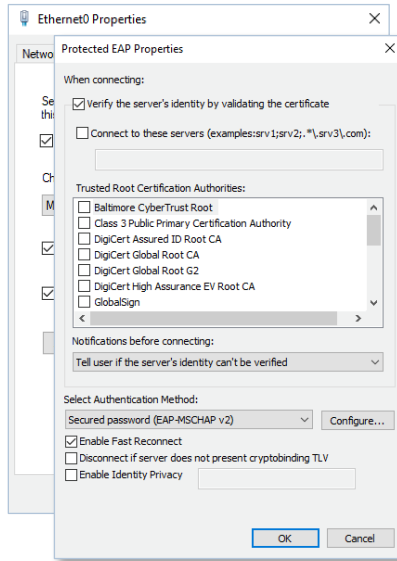
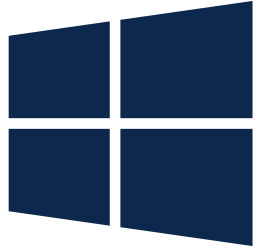
Applications | **Attributes** | Authentication

General Attributes | Custom Attributes | Other Attributes

Description

Static Assignment	false
Endpoint Policy	Windows10-Workstation
Static Group Assignment	false
Identity Group Assignment	Workstation

Endpoint 802.1X Supplicant Configuration

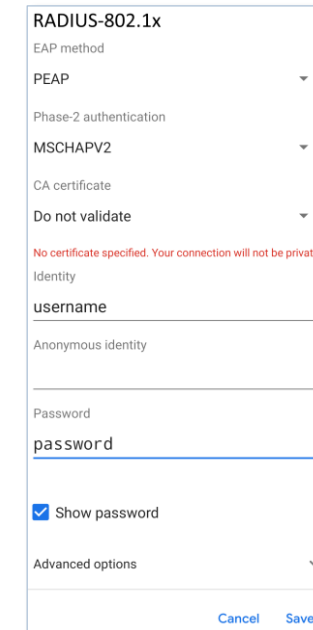


```
wpa_supplicant

NAME
wpa_supplicant - Wi-Fi Protected Access client and IEEE
802.1X supplicant

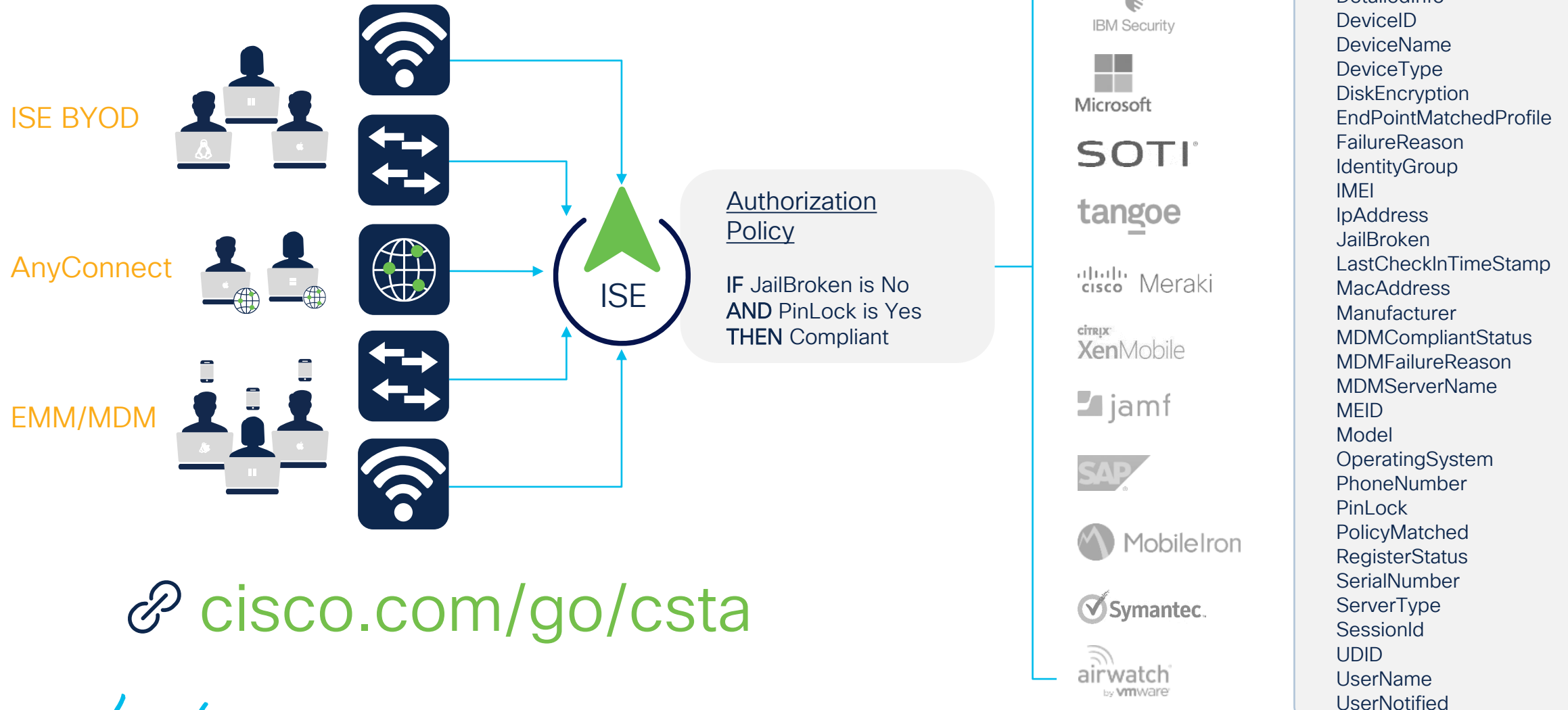
SYNOPSIS
wpa_supplicant [ -BddfhhKLqqsttuwW ] [ -iifname ] [ -
cconfig file ] [ -Ddriver ] [ -PPID_file ] [ -foutput
file ]

OVERVIEW
Wireless networks do not require physical access to the
network equipment in the same way as wired networks.
This makes it easier for unauthorized users to passively
monitor a network and capture all transmitted frames.
In addition, unauthorized use of the network is much
easier. In many cases, this can happen even
without user's explicit knowledge since the wireless
LAN adapter may have been configured to automatically
join any available network.
Link-layer encryption can be used to provide a layer of security
for wireless networks. The original wireless LAN standard,
```



BYOD / EMM / MDM

For Provisioning and Compliance



cisco.com/go/csta

Provision Profiles

Apple iOS

Apple macOS

Apple tvOS

Chrome

Windows

Cisco Meraki

Network Lab

Network-wide

Security & SD-WAN

Switching

Wireless

Systems Manager

Insight

Organization



Profiles list / New profile

New profile

Profile configuration

+ Add settings

Add new settings payload

Device type All types Apple iOS Apple macOS

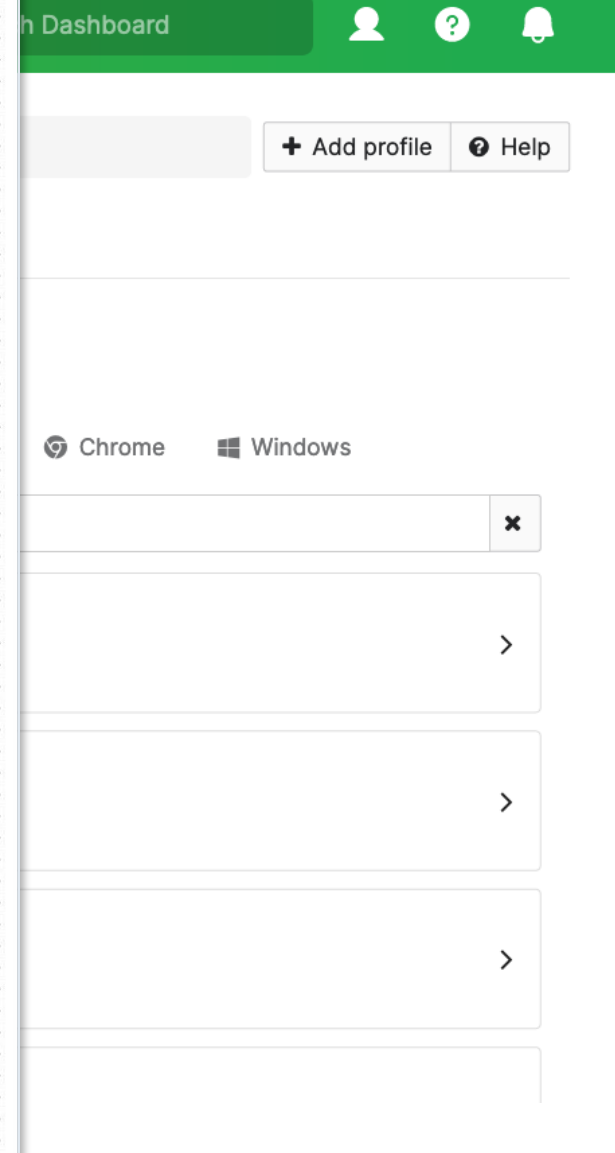
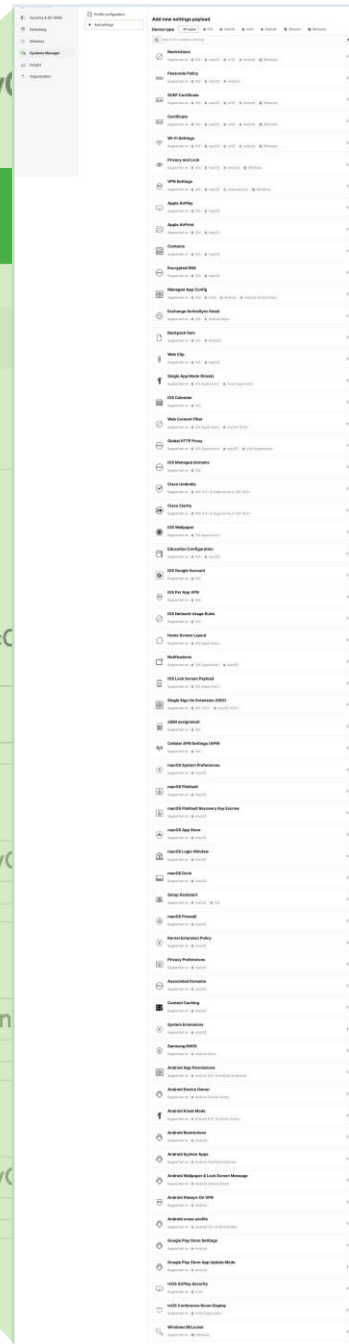
Search 60 available settings

Restrictions
Supported on Apple iOS Apple macOS Apple tvOS

Passcode Policy
Supported on Apple iOS Apple macOS Android

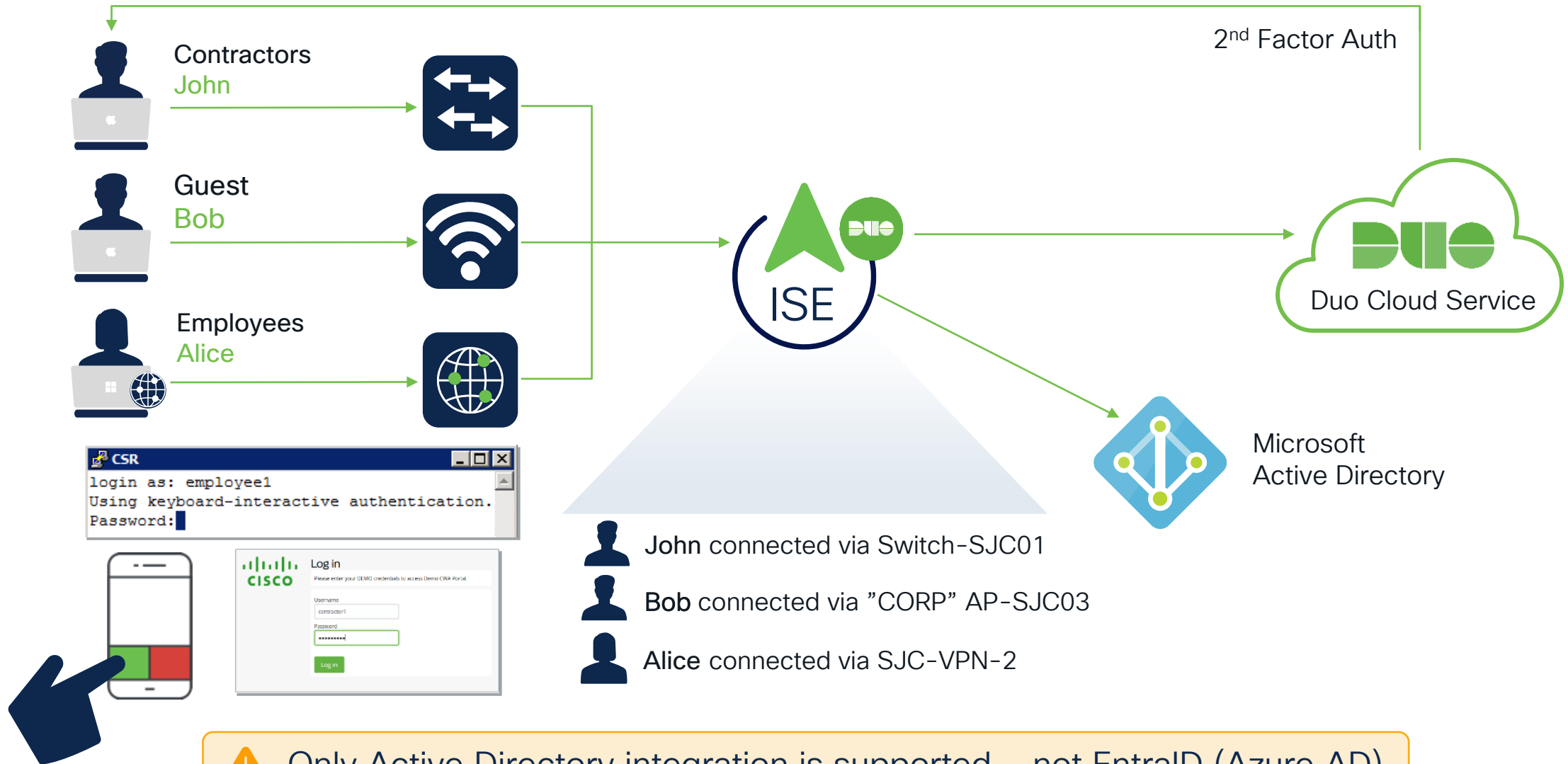
SCEP Certificate
Supported on Apple iOS Apple macOS Apple tvOS

Certificate



Enhanced ISE + Duo Integration for MFA

ISE 3.3.1



⚠ Only Active Directory integration is supported – not EntraID (Azure AD)

MFA Requires a Finger and a Phone



Solve Identity for Zero Trust with Duo *and* ISE

Access Problem



Cisco ISE



Cisco Duo




Cisco ISE + Duo

Access Problem	Cisco ISE	Cisco Duo	Cisco ISE + Duo
User + Device (On-Premise) → On-Premise Applications	No MFA	Web Only	
IOT Device (On-Premise) → On-Premise Applications			
User + Device (Off-Premise) → On-Premise Applications	VPN Based	Web Only	
User / Device (On-Premise) → User / Device (On-Premise)			
User + Device (On-Premise) → Cloud Applications	No MFA	No network security	
User + Device (Off-Premise) → Cloud Applications			



Challenges: Network Devices

ISE Compatibility

 cs.co/ise-compatibility



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

Cisco ISE supports protocol standards like RADIUS, its associated RFC Standards, and TACACS+. For more information, see the [ISE Community Resources](#).

Cisco ISE supports interoperability with any Cisco or non-Cisco RADIUS client network access device (NAD) that implements common RADIUS behavior for standards-based authentication.

Cisco ISE interoperates fully with third-party TACACS+ client devices that adhere to the governing protocols. Support for TACACS+ functions depends on the device-specific implementation.

Network Device Capabilities

cs.co/nad-capabilities

✓ : Fully supported
 X : Not supported
 ! : Limited support, some functionalities are not supported

The following notations are used to mark the device support:

- ✓ : Fully supported
- X : Not supported
- ! : Limited support, some functionalities are not supported.

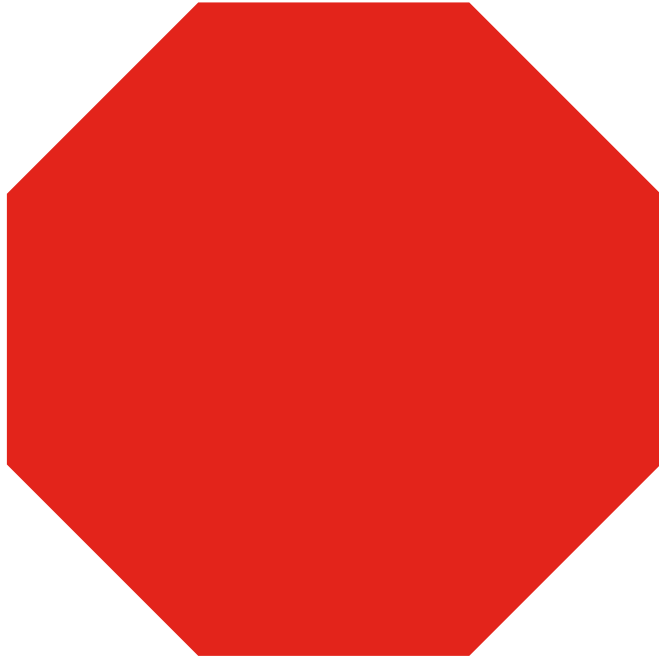
Device	Validated OS ¹	Minimum OS ³	AAA	Profiling	BYOD	Guest	Guest Originating URL	Posture	MDM	TrustSec ²
IE2000	Cisco IOS 15.2(2)E4		✓	✓	✓	✓	✓	✓	✓	✓
IE3000	Cisco IOS 15.2(4)EA6		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.0(2)EB		✓	✓	✓	X	✓	✓	✓	✓
IE-3400-8P2S	Cisco IOS XE 17.9.1		✓	✓	✓	✓	✓	✓	✓	✓
IE4000	Cisco IOS 15.2(2)E5		✓	✓	✓	✓	✓	✓	✓	✓
IE5000	Cisco IOS 15.2(4)E2		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(4)EA6		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.0.2A-EX5		✓	✓	✓	✓	✓	✓	✓	✓
IE4010	Cisco IOS 15.2(2)E5		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(4)E2		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.0.2A-EX5		✓	✓	✓	✓	✓	✓	✓	✓
IR1101-K9	Cisco IOS XE 17.9.1		✓	Not validated	Not validated	Not validated	Not validated	Not validated	Not validated	✓
CGS 2520	Cisco IOS 15.2(3)E3		✓	✓	✓	✓	X	✓	✓	✓
	Cisco IOS 15.2(3)E3		✓	✓	✓	✓	X	✓	✓	✓
Catalyst 1000	Cisco IOS 15.2(7)E3		✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(7)E3		✓	✓	✓	✓	✓	✓	✓	✓
Catalyst 2960 LAN Base	Cisco IOS 15.0(2)SE11		✓	✓	✓	✓	X	✓	✓	X
	Cisco IOS v12.2(5)SE5		✓	✓	✓	!	X	!	!	X
Catalyst 2960-C	Cisco IOS 15.2(2)E4		✓	✓	✓	✓	✓	✓	✓	✓
Catalyst 2960-K9	Cisco IOS 12.2(5)EX3		✓	✓	✓	✓	✓	✓	✓	✓

Device	Validated OS ¹	AAA	Profiling	BYOD	Guest	Guest Originating URL	Posture	MDM	TrustSec ²
	Minimum OS ³								
IE2000 IE3000	Cisco IOS 15.2(2)E4	✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(4)EA6								
	Cisco IOS 15.0(2)EB	✓	✓	✓	✓	X	✓	✓	✓
IE-3400-8P2S	Cisco IOS XE 17.9.1	✓	✓	✓	✓	✓	✓	✓	✓
IE4000 IE5000	Cisco IOS 15.2(2)E5	✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(4)E2								
	Cisco IOS 15.2(4)EA6								
	Cisco IOS 15.0.2A-EX5	✓	✓	✓	✓	✓	✓	✓	✓
IE4010	Cisco IOS 15.2(2)E5	✓	✓	✓	✓	✓	✓	✓	✓
	Cisco IOS 15.2(4)E2								
	Cisco IOS 15.0.2A-EX5	✓	✓	✓	✓	✓	✓	✓	✓
IR1101-K9	Cisco IOS XE 17.9.1	✓	Not validated	Not validated	Not validated	Not validated	Not validated	Not validated	✓

Cisco Meraki Access Control Capabilities with ISE

Model	802.1X	MAB	VLAN	GPACL	Adaptive Policy	URL Redirect	CoA	Profiling
Wireless								
MR20, MR70, MR28, MR78	☑	☑	☑	☑	-	☑	☑	-
MR30H, MR36, MR42/E, MR44, MR45, MR46/E, MR52, MR53E, MR56, MR57, MR74, MR76, MR86, CW916x	☑	☑	☑	☑	☑ 802.11ac Wave2 or higher. Min 27.6	☑	☑	-
Teleworker								
Z3/C	☑	☑	-	-	☑ Transport MX18.1+	-	-	-
Switching								
MS120, MS125, MS130	☑	☑	☑	-	-	-	☑	CDP+LLDP
MS210, MS225, MS250	☑	☑	☑	☑	-	☑	☑	CDP+LLDP
MS350, MS355	☑	☑	☑	☑	-	☑	☑	CDP+LLDP
MS390, 9300-M	☑	☑	☑	☑	☑ 14.2+	☑	☑	Device Sensor CDP/LLDP/ DHCP/HTTP
MS410, MS425, MS450 (aggregation)	☑	☑	☑	☑	-	☑	☑	CDP+LLDP
Security & SD-WAN								
MX64/W, MX67/C/W, MX68/CW/W, MX75, MX84, MX85, MX95, MX100, MX105, MX250, MX450	☑ 802.1X or MAB	☑ 802.1X or MAB	-	-	☑ Transport MX18.1+	-	-	-
vMX, vMX100	-	-	-	-	-	-	-	-

No/Missing Network Device(s)?



A network device that is not defined in ISE will not receive AAA services from ISE!

Relevant Errors in Syslogs or ISE LiveLogs :

11007 Could not locate Network Device or AAA Client

5405 RADIUS Request dropped

5413 RADIUS Accounting-Request dropped

ISE Network Device Groups (NDGs)

Network Devices

Network Device Groups

Network Device Profiles

External RADIUS Servers

RADIUS Server Sequences

More ▾

Network Device Groups

Refresh Add Duplicate Edit Trash Show group members Import Export Flat Table Expand All Collapse All

<input type="checkbox"/> Name	Description	No. of Network Devices
<input type="checkbox"/> > All Device Types	All Device Types	--
<input type="checkbox"/> ▾ All Locations	All Locations	--
<input type="checkbox"/> ▾ AMER		0
<input type="checkbox"/> ▾ US		0
<input type="checkbox"/> ▾ San Jose		0
<input type="checkbox"/> ▾ Building		0
<input type="checkbox"/> Floor		0
<input type="checkbox"/> > Countries		--
<input type="checkbox"/> > Departments		--

Maximum 6 NDG Levels

Create Your Own Root NDGs!

Network Device Group: Import from CSV

template.csv

Name:String(100):Required	Description:String(1024)	Type:String(64):Required	Is Root:Boolean(true false):Required

Import CSV file

Select file to import: (Use a comma-delimited text file)

Choose File

* File: No file selected.

[Generate a Template](#)

Missing NDGs Deleted

Overwrite existing data with new data. [i](#)

Choose File

Stop import on first error.

 **UTF-8 Not Supported**

Close

Network Device Profiles

Network Devices Network Device Groups Network

Network Device Profiles

Edit Add Duplicate Import Cisco Comr

Name	Description
<input type="checkbox"/> AlcatelWired	Profile for
<input type="checkbox"/> ArubaWireless	Profile for
<input type="checkbox"/> BrocadeWired	Profile for
<input type="checkbox"/> Cisco	Generic p
<input type="checkbox"/> HPWired	Profile for
<input type="checkbox"/> HPWired_SNMP_CoA	Profile for
<input type="checkbox"/> HPWireless	Profile for
<input type="checkbox"/> MotorolaWireless	Profile for
<input type="checkbox"/> RuckusWireless	Profile for

* Name: ArubaWireless
Description: Profile for Aruba wireless network access devices
Icon: Change Icon... Set To Default
Vendor: Aruba

Supported Protocols
RADIUS
TACACS+
TrustSec
RADIUS Dictionaries: Aruba

Templates
Expand All / Collapse All

Authentication/Authorization
Flow Type Conditions
Attribute Aliasing
Host Lookup (MAB)
Permissions
Change of Authorization (CoA)
Redirect
Advanced

Summary
Based on this configuration, the following are supported:
Services: Radius, TACACS, MAB, 802.1X
CoA: RFC (default CoA port: 3799, default DT
Native URL Redirect: Static

RADIUS Server Sequences More

Permissions
 Set VLAN
 IETF 802.1X Attributes
 Unique Attributes
ID: Aruba:Aruba-User-Vlan Name: Aruba:Aruba-Named-User-Vlan

Redirect
Type: Static URL
Redirect URL Parameter Names
Client IP Address: ip
Client MAC Address: mac
Originating URL: url
Session ID
SSID: essid

Name	Description
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided
<input type="checkbox"/> Cisco Provided	Cisco Provided

Create ISE Network Access Device Profiles

- [Network Access Device Profiles](#)
 - [About Network Access Device Profiles](#)
 - [Custom Network Access Device Profiles](#)
- [Steps To Create Custom Profiles](#)
 - [Overview](#)
 - [Gather Information](#)
 - [Device Configuration](#)
 - [Profile Creation and Assignment](#)
 - [Policy Configuration](#)
- [RADIUS Dictionaries](#)
 - [Determine if you need to import a dictionary](#)
 - [Importing RADIUS dictionaries](#)
- [Defining The Custom Profile](#)
 - [Create New Profile Entry](#)
 - [Supported Protocols](#)
 - [RADIUS Dictionaries](#)
 - [Flow Type Conditions](#)
 - [Attribute Aliasing](#)
 - [Host Lookup](#)
 - [Permissions](#)
 - [Change of Authorization \(CoA\)](#)
 - [URL Redirect](#)
 - [Generate Policy Elements](#)
 - [Summary](#)
- [Using your Network Device Profile](#)
 - [Assign the NAD Profile](#)
 - [Authentication/Authorization Conditions](#)
 - [Authorization Profiles](#)
 - [Verify Behavior](#)

The screenshot shows the Cisco Community forum page for the article 'How to Create ISE Network Access Device Profiles'. The page is titled 'How to Create ISE Network Access Device Profiles' and is categorized under 'Security Documents'. It has 37621 views, 13 helpful votes, and 2 comments. The author is 'thomas' and the post was made on 2016-06-20 11:19 AM, with the last edit on 02-21-2020 10:01 PM. The article includes a 'Table of Contents' with the following items:

- Network Access Device Profiles
 - About Network Access Device Profiles
 - Custom Network Access Device Profiles
- Steps To Create Custom Profiles
 - Overview
 - Gather Information
 - Device Configuration
 - Profile Creation and Assignment
 - Policy Configuration
- RADIUS Dictionaries
 - Determine if you need to import a dictionary
 - Importing RADIUS dictionaries
- Defining The Custom Profile
 - Create New Profile Entry
 - Supported Protocols
 - RADIUS Dictionaries
 - Flow Type Conditions
 - Attribute Aliasing
 - Host Lookup
 - Permissions
 - Change of Authorization (CoA)
 - URL Redirect
 - Generate Policy Elements
 - Summary
- Using your Network Device Profile
 - Assign the NAD Profile
 - Authentication/Authorization Conditions

The right sidebar contains an 'Ask a Question' button, a 'Find more resources' section with links to Discussions, Videos, Blogs, Events, and Project Gallery, and a 'Recognize Your Peers Spotlight Award Nomination' button. There are also promotional banners for 'Get Closer to Cisco' and 'Review Cisco Products'.

RADIUS Vendor Specific Attributes (VSAs)



RFC 2865 RADIUS June 2000

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≡ > Policy > Policy Elements > Dictionaries

The screenshot shows the Cisco ISE interface for managing RADIUS Vendors. The breadcrumb navigation is Policy > Policy Elements > Dictionaries. The 'RADIUS Vendors' section is active, displaying a list of vendors with their names and Vendor IDs. A green arrow points from the '5.26 Vendor-Specific' entry in the Table of Contents to the 'RADIUS Vendors' section in the interface.

Name	Vendor ID
Airespace	14179
Alcatel-Lucent	800
Aruba	14823
Brocade	1588
Cisco	9
Cisco-BBSM	5263
Cisco-VPN3000	3076
H3C	25506
HP	11
Juniper	2636
Microsoft	311
Motorola-Symbol	388
Ruckus	25053
WISPr	14122

RADIUS Vendor Dictionaries for 3rd Parties

The screenshot shows a forum post on the Cisco Community website. The post title is "For download: RADIUS Vendor Dictionaries for 3rd Parties". The author is "katmcnam" and the post was made on 2018-11-10. The post content describes the author's process of importing and updating RADIUS vendor dictionaries for 3rd party vendors into ISE. A list of vendors is provided at the bottom of the post. The right sidebar contains various community features like "Ask a Question", "Find more resources", and "Recognize Your Peers".

For download: RADIUS Vendor Dictionaries for 3rd Parties

Identity Services Engine (L...)

6780 Views 75 Helpful 5 Comments

2018-11-10 06:18 PM
Edited On: 06-23-2020 11:43 AM

I took some time to import and update quite a bit of RADIUS vendor dictionaries for 3rd party vendors into ISE. I grabbed this information from various community and open source sites but I obviously can't test it against every vendor out there since I don't have a selection of 140+ 3rd party NADs sitting in my lab. After I imported them to ISE, I exported them and have uploaded them here.

Note: If any of these don't work or I need to update some of the attributes, please shoot me a PM and I'll make the necessary adjustments. Also if there are any vendors I should be adding, let me know.

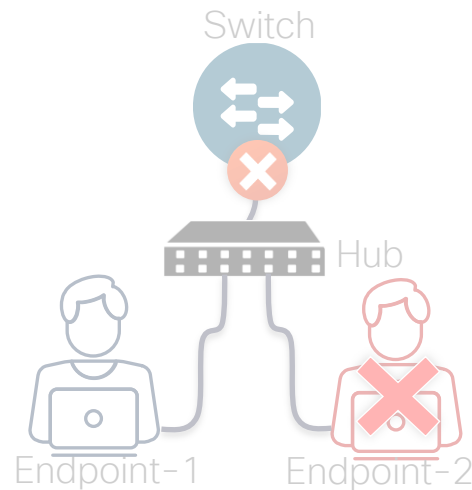
- 3com
- 3GPP
- 3GPP2
- Acc
- Acme
- Actelis
- Adtran
- Alcatel
- Alcatel-Service-Router
- Alcatel-Lucent AAA
- Alteon
- Alvarion
- APC
- Aptilo
- Arbor
- Arista
- Aruba
- Azaire
- Ascend

- [3com](#)
- [3GPP](#)
- [3GPP2](#)
- [Acc](#)
- [Acme](#)
- [Actelis](#)
- [Adtran](#)
- [Alcatel](#)
- [Alcatel-Service-Router](#)
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- [Bay Networks](#)
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- [Extreme](#)
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- [FreeRADIUS](#)
- [FreeSwitch](#)
- [Fortinet](#)
- [Foundry](#)
- [Gandalf](#)
- [Gemtek](#)
- [H3C](#)
- [Hillstone](#)
- [HP](#)
- [Huawei](#)
- [IEA Software](#)
- [Infonet](#)
- [Issanni](#)
- [ITK](#)
- [IP Unplugged](#)
- [Juniper](#)
- [Karlnet](#)
- [Kineto](#)
- [Lancom](#)
- [Lantronix](#)
- [Livingston](#)
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- [Lucent](#)
- [Manzara](#)
- [Meinberg](#)
- [Meraki](#)
- [Meru](#)
- [Microsemi](#)
- [Microsoft](#)
- [Mikrotik](#)
- [Mimosa](#)
- [Motorola](#)
- [Motorola-Symbol](#)
- [Navini](#)
- [NetBorder](#)
- [Netscreen](#)
- [Network Physics](#)
- [Nexans](#)
- [NTUA](#)
- [Nokia](#)
- [Nomadix, Inc](#)
- [Nortel](#)
- [Packeteer \(Later acquired by Blue Coat\)](#)
- [Palo Alto Networks](#)
- [Patton IADs](#)
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- [Ruckus](#)
- [Shasta](#)
- [SG-1 Systems by Runcom Technologies](#)
- [Siemens](#)
- [Slipstream](#)
- [Softbank](#)
- [SonicWall](#)
- [SpringTide](#)
- [Starent](#)
- [SurfNet](#)
- [Telebit](#)
- [Terena](#)
- [Trapeze/Juniper](#)
- [Travelping](#)
- [Tropos](#)
- [T-Systems-Nova](#)
- [Ukerna](#)
- [Unix](#)
- [USR Robotics](#)
- [UT Starcom](#)
- [Valemount Networks](#)
- [VersaNet Communications](#)
- [Waverider](#)
- [Walabi](#)
- [Wichorus](#)
- [WiFi-Alliance](#)
- [WiMAX](#)
- [WISPr](#)
- [Xedia](#)
- [Yubico](#)
- [Zeus Packet](#)
- [ZTE](#)
- [Zyxel](#)

Endpoint Host Modes

Single Host Mode

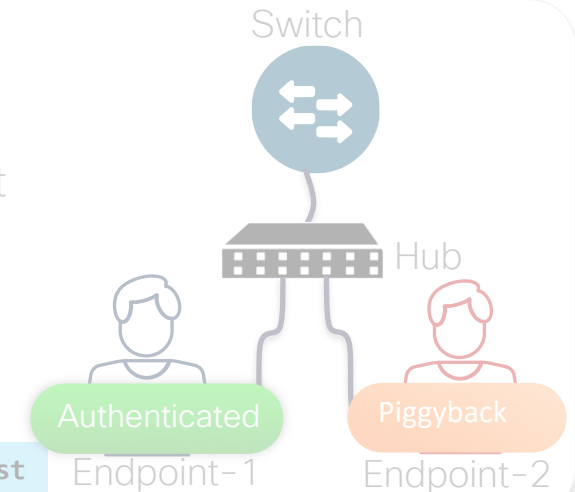
Only 'one' MAC Address is allowed. Second MAC Address causes **Security Violation**



authentication host-mode single-host

Multi-Host Mode

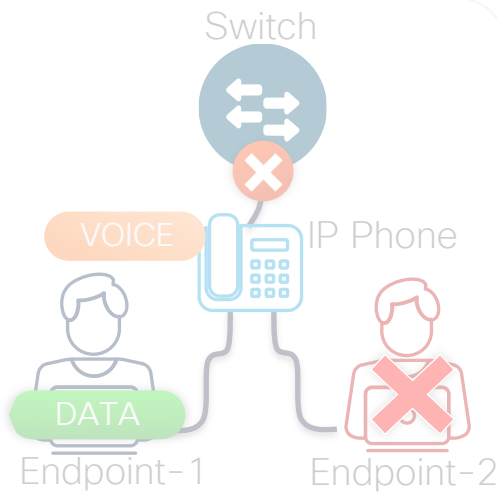
1st MAC Address is authenticated. 2nd endpoint piggybacks on 1st MAC Address authentication and bypasses authentication



authentication host-mode multi-host

Multi-Domain Mode

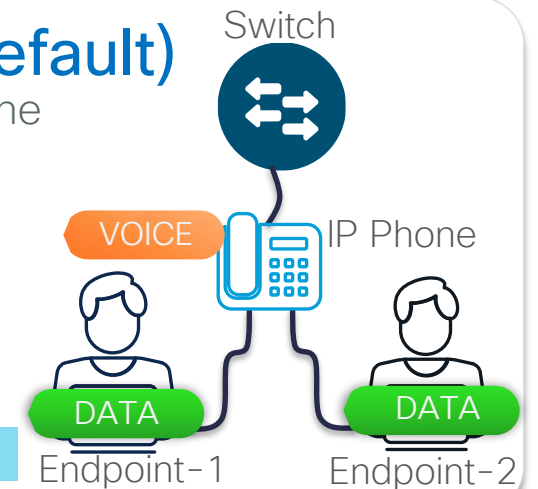
Each domain (Voice or Data) authenticates one MAC address. 2nd MAC address on each domain causes **security violation**



authentication host-mode multi-domain

Multi-Auth Mode(Default)

Voice domain authenticates one MAC address. Data domain authenticates multiple MAC addresses. dACL or **single VLAN Assignment** for all devices are supported



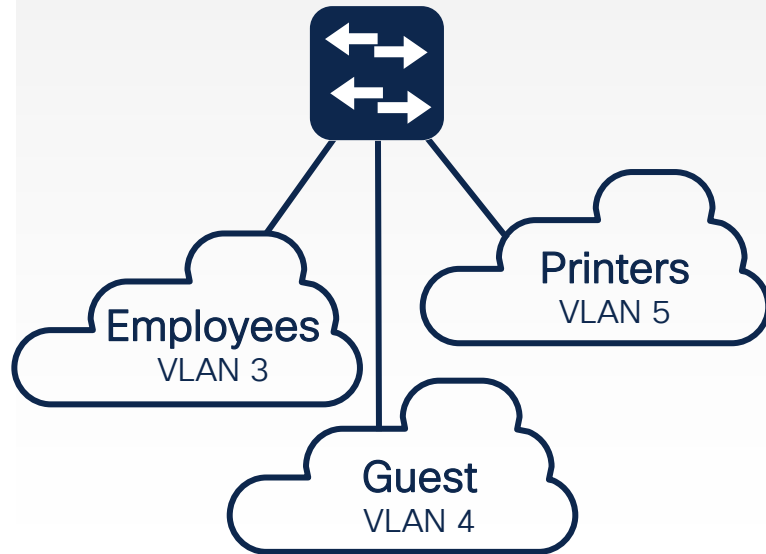
authentication host-mode multi-auth

Authorization Enforcement Options

Beyond RADIUS Access-Accept / Access-Reject

VLANs

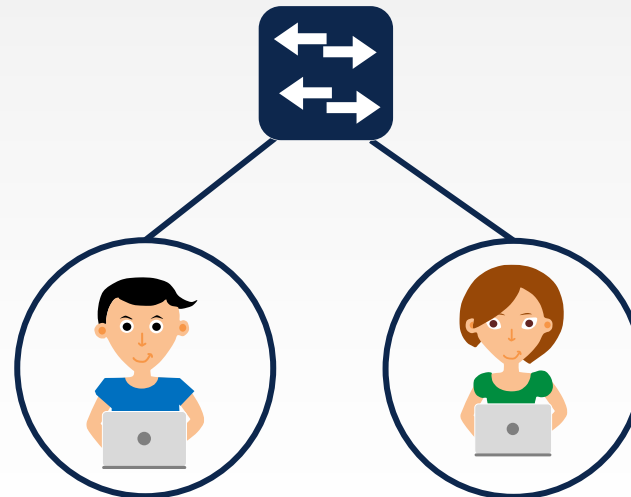
Dynamic VLAN Assignments



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

Scalable Group Tags

Cisco Group-Based Policy



16-bit SGT assignment and
SGT based Access Control

 cs.co/trustsec-compatibility

ISE Secure Wired Access Prescriptive Deployment Guide

 cs.co/ise-wired

- Define
 - AAA Components & Terminology
- Design
 - Phased Deployments
- Deploy
 - Monitoring (Open Mode)
 - Low Impact (Pre-Authentication)
 - Restricted (Closed Mode)
- Operate
 - Troubleshooting

ISE Secure Wired Access Prescriptive Deployment Guide



hariholla Cisco Employee

on 2021-01-21 12:41 PM - edited on 2021-09-10 03:06 PM by hslai

Cisco ISE Secure Wired Access Prescriptive Deployment Guide



Authors: Hariprasad Holla (until June 2018), Mahesh Nagireddy (until Dec 2018)



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 - Cisco Meraki Switching
 - Identity-Based Networking Services (IBNS) 1.0 vs. 2.0
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- Deploy
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 - Validating Basic Settings
 - Monitoring Authentications with Open Access
 - Integrate ISE with Active Directory

How To: Integrate Meraki Networks with ISE

 cs.co/ise-meraki

How To: Integrate Meraki Networks with ISE



thomas Cisco Employee

on 06-20-2016 10:04 AM - edited on 04-09-2021 12:40 PM by alburger



Contributors: [Name], [Name], Alex Burger, Victor Cho, Tony Carmichael

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- Allowed Protocols
- ISE AAA Configuration

Challenges: Policy

Default Policy Set

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy**
- Administration
- Work Centers
- Interactive Help

Policy Sets

Status	Policy Set Name	Description
✓	Default	Default policy set

Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits	
✓	Default	Default policy set		Default Network Access	0	
Authentication Policy(3)						
Status	Rule Name	Conditions	Use	Hits	Actions	
✓	MAB	OR Wired_MAB Wireless_MAB	Internal Endpoints > Options	55		
✓	Dot1X	OR Wired_802.1X Wireless_802.1X	All_User_ID_Stores > Options	113		
✓	Default		All_User_ID_Stores > Options	0		
Authorization Policy - Local Exceptions						
Authorization Policy - Global Exceptions						
Authorization Policy(12)						
Status	Rule Name	Conditions	Profiles	Security Groups	Hits	Actions
✓	Wireless Block List Default	AND Wireless_Access IdentityGroup-Name EQUALS Endpoint Identity Groups:Blocked List	Block_Wireless_Access	Select from list	0	
✓	Profiled Cisco IP Phones	IdentityGroup-Name EQUALS Endpoint Identity Groups:Profiled:Cisco-IP-Phone	Cisco_IP_Phones	Select from list	0	
✓	Profiled Non Cisco IP Phones	Non_Cisco_Profiled_Phones	Non_Cisco_IP_Phones	Select from list	0	
○	Unknown_Compliance_Redirect	AND Network_Access_Authentication_Passed Compliance_Unknown_Devices	Cisco_Temporal_Onboard	Select from list	0	
○	NonCompliant_Devices_Redirect	AND Network_Access_Authentication_Passed Non_Compliant_Devices	Cisco_Temporal_Onboard	Select from list	0	
○	Compliant_Devices_Access	AND Network_Access_Authentication_Passed Compliant_Devices	PermitAccess	Select from list	0	
○	Employee_EAP-TLS	AND Wireless_802.1X BYOD_is_Registered EAP-TLS MAC_in_SAN	PermitAccess	BYOD	0	
○	Employee_Onboarding	AND Wireless_802.1X EAP-MSCHAPv2	NSP_Onboard	BYOD	0	
○	Wi-Fi_Guest_Access	AND Guest_Flow Wireless_MAB	PermitAccess	Guests	0	
○	Wi-Fi_Redirect_to_Guest_Login	Wireless_MAB	Cisco_WebAuth	Select from list	0	
✓	Basic_Authenticated_Access	Network_Access_Authentication_Passed	PermitAccess	Select from list	146	
✓	Default		DenyAccess	Select from list	22	

Policyset Hitcounts


Save

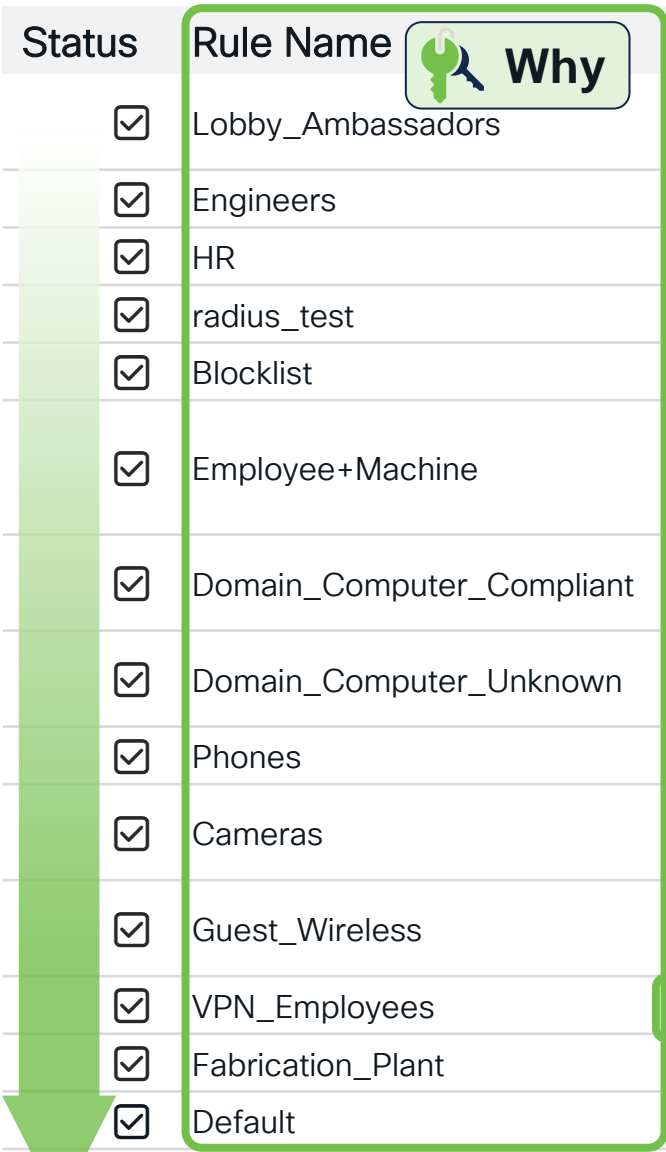
Sequence Hits Actions View

Reset Save



Policy Set Authorization Rules

Status	Rule Name 	Conditions 	Profiles 
<input checked="" type="checkbox"/>	Lobby_Ambassadors	<code>domain.com:ExternalGroups EQUALS domain.com/Users/Ambassadors</code> AND <code>Work_Hours</code>	PermitAccess & Ambassadors
<input checked="" type="checkbox"/>	Engineers	<code>domain.com:ExternalGroups EQUALS domain.com/Users/Engineering</code>	PermitAccess & Engineering
<input checked="" type="checkbox"/>	HR	<code>domain.com:ExternalGroups EQUALS domain.com/Users/HR</code>	PermitAccess & HR
<input checked="" type="checkbox"/>	radius_test	Network Access:Username EQUALS <code>radius_test</code>	DenyAccess
<input checked="" type="checkbox"/>	Blocklist	IdentityGroup-Name EQUALS Endpoint Identity Groups:Blocklist	DenyAccess
<input checked="" type="checkbox"/>	Employee+Machine	Network Access:EAP Tunnel EQUALS TEAP AND <code>domain.com:ExternalGroups EQUALS domain.com/Users/Domain Users</code> AND Network Access EapChainingResult EQUALS User and machine both succeeded	PermitAccess
<input checked="" type="checkbox"/>	Domain_Computer_Compliant	<code>domain.com:ExternalGroups EQUALS domain.com/Users/Domain Computers</code> AND Session:PostureStatus == Compliant	Domain_Computer
<input checked="" type="checkbox"/>	Domain_Computer_Unknown	<code>domain.com:ExternalGroups EQUALS domain.com/Users/Domain Computers</code> AND Session:PostureStatus == Unknown	Quarantine
<input checked="" type="checkbox"/>	Phones	IdentityGroup-Name == Endpoint Identity Groups:Cisco-IP-Phone	Phone & Phone
<input checked="" type="checkbox"/>	Cameras	Wireless_MAB AND IdentityGroup-Name EQUALS Endpoint Identity Groups:Cameras	Surveillance
<input checked="" type="checkbox"/>	Guest_Wireless	<code>RADIUS:Called-Station-ID ENDS WITH Guest</code> AND Guest_Flow	Internet_Only & Guest
<input checked="" type="checkbox"/>	VPN_Employees	Radius:NAS-Port-Type EQUALS Virtual	PermitAccess
<input checked="" type="checkbox"/>	Fabrication_Plant	Device:Location EQUALS All Locations:Fabrication	Manufacturing
<input checked="" type="checkbox"/>	Default		DenyAccess



Why

When

Who

What


Where

How Much

Monitoring Authorization Rules

Status	Rule Name	Conditions	Profiles	Security Groups	Hits	Actions
✖	rect	AND Non_Compliant_Devices	Cisco_Temporal_Unbo... x	Select from list	0	⚙️
✔	Devices_Access	AND Network_Access_Authentication_Passed Compliant_Devices	PermitAccess x	Select from list	0	⚙️
✔	Empri	AND Wireless_802.1X BYOD_is_Registered EAP-TLS MAC_in_SAN	PermitAccess x	BYOD	0	⚙️
✔	Employee_Onboarding	AND Wireless_802.1X EAP-MSCHAPv2	NSP_Onboard x	BYOD	0	⚙️
✔	Wi-Fi_Guest_Access	AND Guest_Flow Wireless_MAB	PermitAccess x	Guests	0	⚙️
✔	Wi-Fi_Redirect_to_Guest_Login	Wireless_MAB	Cisco_WebAuth x	Select from list	0	⚙️
✔	Basic_Authenticated_Access	Network_Access_Authentication_Passed	PermitAccess x	Select from list	0	⚙️
✔	Default		DenyAccess x	Select from list	0	⚙️

- Enabled
- Disabled
- Monitor



Organizing Your Network Devices and Policies



Network Access Type

- Wired
- Wireless
- VPN
- Branch

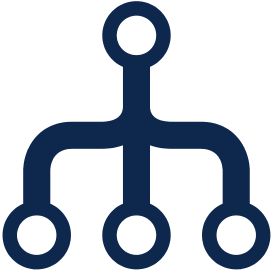
Location

- Theaters
- Country
- City
- Building / Floor / Room



Organization

- Regions
- Line of Business
- Departments
- IT / OT



Vendor / Model

- Cisco
 - Catalyst
 - Meraki
- Aruba
- Juniper









































































“Always be labbing.”

Katherine McNamara

ISE Cisco Security Technical Alliance (CSTA)

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 <p>Cisco Secure and Acalvio Learn more about Cisco Secure and Acalvio</p>	 <p>Cisco Secure and Amazon Web Services (AWS) By focusing on security, simplicity, and transformation, Cisco Secure solutions on AWS help protect and secure customer workloads on AWS.</p>	 <p>Cisco Secure and ArcSight Learn more about Cisco and ArcSight</p>	 <p>Cisco Secure and CyberMDX Learn more about Cisco Secure and CyberMDX</p>	 <p>Cisco Secure and Cylera Learn more about Cisco Secure and Cylera</p>	 <p>Cisco Secure and Cynerio Learn more about Cisco Secure and Cynerio</p>	 <p>Cisco Secure and Illusive Learn more about Cisco Secure and Illusive</p>	 <p>Cisco Secure and Infoblox Learn more about Cisco and Infoblox</p>	 <p>Cisco Secure and Ivanti MobileIron Learn more about Cisco Secure and Ivanti MobileIron</p>	 <p>Cisco Secure and Nutanix Learn more about Cisco and Nutanix</p>	 <p>Cisco Secure and Nyansa Learn more about Cisco and Nyansa</p>	 <p>Cisco Secure and Ordr Learn more about Cisco Secure and Ordr</p>	 <p>Cisco Secure and Sumo Logic Learn more about Cisco Secure and Sumo Logic</p>	 <p>Cisco Secure and Swimlane Swimlane is the leader in cloud-scale, low-code security automation. Supporting use cases beyond the SOC, it enables security teams to overcome process and</p>	 <p>Cisco Secure and Symantec Learn more about Cisco and Symantec</p>
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 cs.co/ise-guides#tag

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[42Gears](#) | [AAD](#) | [AD](#) | [Acalvio](#) | [ACI](#) | [Active-Directory](#) | [ANC](#) | [adaptive-network-control](#) | [adaptive-policy](#) | [AIEA](#) | [AirWatch](#) | [Alef](#) | [Amazon](#) | [AMP](#) | [analytics](#) | [Android](#) | [Ansible](#) | [AnyConnect](#) | [API](#) | [APIs](#) | [APIC-DC](#) | [APIC](#) | [APICDC](#) | [Apple](#) | [appliance](#) | [Arista](#) | [Armis](#) | [Aruba](#) | [ASA](#) | [Asimily](#) | [ASR](#) | [Avaya](#) | [AWS](#) | [Azure](#) | [AzureAD](#) | [Bayshore](#) | [Blusapphire](#) | [Brocade](#) | [BYOD](#) | [CAIEA](#) | [Catalyst](#) | [Catalyst-Center](#) | [CC](#) | [CCC](#) | [CCV](#) | [Certego](#) | [certificate](#) | [certificates](#) | [certs](#) | [Checkpoint](#) | [Chromebook](#) | [CIMC](#) | [Cisco](#) | [Claroty](#) | [Cognitive](#) | [compliance](#) | [CSC](#) | [CSE](#) | [CSM](#) | [CTA](#) | [CyberArk](#) | [CyberObserver](#) | [CyberVision](#) | [Cylera](#) | [Cynerio](#) | [data-connect](#) | [DataConnect](#) | [DeceptionGrid](#) | [deployment](#) | [developer](#) | [DevNet](#) | [DFLabs](#) | [DNA](#) | [DNAC](#) | [Duo](#) | [EA](#) | [EAP-FAST](#) | [EAP-TLS](#) | [EAP](#) | [eduroam](#) | [ELK](#) | [EntraID](#) | [Envoy](#) | [errors](#) | [ExtraHop](#) | [Extreme](#) | [F5](#) | [FAST](#) | [features](#) | [Firepower](#) | [FMC](#) | [Firewall](#) | [FTD](#) | [ForeScout](#) | [Fortinet](#) | [FTD](#) | [FW](#) | [Good](#) | [Google](#) | [guides](#) | [HP](#) | [Huawei](#) | [Hyper-V](#) | [IBM](#) | [IBNS](#) | [icons](#) | [Incman](#) | [IND](#) | [InfoBlox](#) | [instance](#) | [intro](#) | [introduction](#) | [Intune](#) | [iPad](#) | [iPadOS](#) | [iPhone](#) | [ip-phones](#) | [ipsec](#) | [ipsk](#) | [ISE](#) | [Ivanti](#) | [JAMF](#) | [JumpCloud](#) | [Juniper](#) | [Kibana](#) | [KVM](#) | [labs](#) | [LDAP](#) | [LinkShadow](#) | [LiveAction](#) | [Ib](#) | [load-balancing](#) | [log-analytics](#) | [logging](#) | [logs](#) | [Logzilla](#) | [MaaS360](#) | [macOS](#) | [MAB](#) | [McAfee](#) | [MDM](#) | [Medigate](#) | [MEM](#) | [Meraki](#) | [Microsoft](#) | [EntraID](#) | [MicroTik](#) | [MobileIron](#) | [mobility](#) | [Motorola](#) | [MR](#) | [MS](#) | [MX](#) | [MySQL](#) | [Nessus](#) | [NetScaler](#) | [network-analytics](#) | [NGFW](#) | [Nozomi](#) | [Nutanix](#) | [OCI](#) | [ODBC](#) | [Okta](#) | [operations](#) | [Oracle](#) | [OracleCloud](#) | [ORDR](#) | [PAN](#) | [Palo-Alto](#) | [partners](#) | [passive](#) | [passive-id](#) | [PEAP](#) | [pfSense](#) | [phones](#) | [PI](#) | [PIC](#) | [Ping](#) | [PKI](#) | [PNG](#) | [Postman](#) | [posture](#) | [prescriptive](#) | [Prime](#) | [products](#) | [proxy](#) | [PXG](#) | [PXGC](#) | [PXGD](#) | [pxgrid-cloud](#) | [pxgrid-direct](#) | [pxGrid](#) | [QRadar](#) | [Qualys](#) | [Radiflow](#) | [RADIUS_CLI](#) | [RADIUS_Proxy](#) | [radius-simulation](#) | [RADIUS](#) | [Rapid7](#) | [REST](#) | [Rockwell](#) | [RSA](#) | [Ruckus](#) | [SCCM](#) | [sd-access](#) | [SD-Access](#) | [SDA](#) | [secure-access](#) | [secure-client](#) | [secure-endpoint](#) | [secure-network-analytics](#) | [secure-workload](#) | [security](#) | [Securonix](#) | [segmentation](#) | [ServiceNow](#) | [simulation](#) | [SM](#) | [Smokescreen](#) | [SMS](#) | [SMTP](#) | [SNA](#) | [SOTI](#) | [Splunk](#) | [Stealthwatch](#) | [stencils](#) | [SVG](#) | [SWA](#) | [switch](#) | [switches](#) | [switching](#) | [Symantec](#) | [syslogs](#) | [Systems-Manager](#) | [TACACS](#) | [Tanium](#) | [TEAP](#) | [Tenable](#) | [Terraform](#) | [Tetration](#) | [third-party](#) | [ThreatConnect](#) | [TLS](#) | [TrapX](#) | [troubleshoot](#) | [troubleshooting](#) | [trustsec](#) | [TrustSec](#) | [UCS](#) | [Umbrella](#) | [upgrade](#) | [split-upgrade](#) | [vCenter](#) | [Visio](#) | [VM](#) | [VMware](#) | [VOIP](#) | [web-appliance](#) | [Webex](#) | [WebexRoomNavigator](#) | [windows](#) | [wireless](#) | [WLC](#) | [Workload](#) | [WSA](#) | [WSUS](#) | [XenMobile](#) | [XTENDISE](#) | [zero-touch](#) | [ZTP](#)

Planning: Platforms

ISE Nodes – Mix and Match

cs.co/ise-scale

Physical Appliances



- SNS-3795
- SNS-3755
- SNS-3715
- SNS-3695
- SNS-3655
- SNS-3615
- SNS-3595

Virtual Machines



Cloud Instances



Free, 90-day ISE Evaluation Licenses!

cs.co/ise-licensing

The screenshot shows the Cisco Identity Services Engine (ISE) dashboard. At the top, the navigation bar includes the Cisco logo, 'Identity Services Engine', and 'Dashboard'. A notification banner at the top right states 'Evaluation Mode 89 Day'. A prominent warning message in the center reads 'Your Evaluation license expires in 89 days. You will have limited administrative access to Cisco ISE after the expiration date.' Below this, a large '100 X' is overlaid on the 'Active Endpoints' section, which currently shows '0'. To the right, a license selection menu is visible, with 'Premier' selected. Below the license menu, a 'Device Admin Appliance License' is highlighted, with 'TACACS+' listed as an option. The dashboard also shows sections for 'AUTHENTIFICATIONS' and 'NETWORK DEVICES', both of which currently display 'No data available.' and a '1 X' multiplier.



Appliance versus VM



Appliance

Virtual Machine

👍 Pros

- Dedicated HW Resources
- “Network Device” vs Compute

- Rapid deployment
- Flexible HW resources
- 10X+ R/W with SSD for MnT
- MnT Storage up to 2.4TB

👎 Cons

- Static HW Resources
- No SSD – spinning disks only
- Ordering, Shipping, Racking
- Remote management

- Resource Reservation Failure!!

[🔗 ISE Appliances vs VMs vs Cloud Deployment Comparison](#)

On-Premises versus Cloud



On-Premises

Cloud

👍 Pros

- Control

- Rapid deployment
- Flexible HW resources
- Simple, pay-as-you-go billing
- Automation

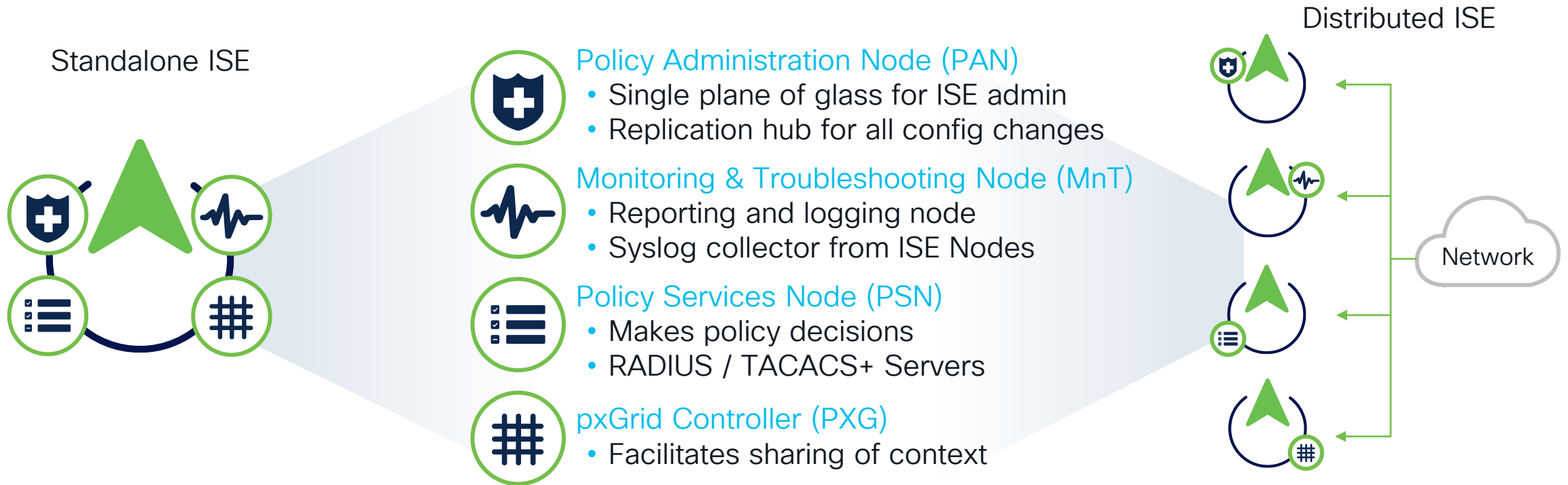
👎 Cons

- Plan ahead
- Procurement
- Automation?

- Learning curve
- Security
- Surprise bills

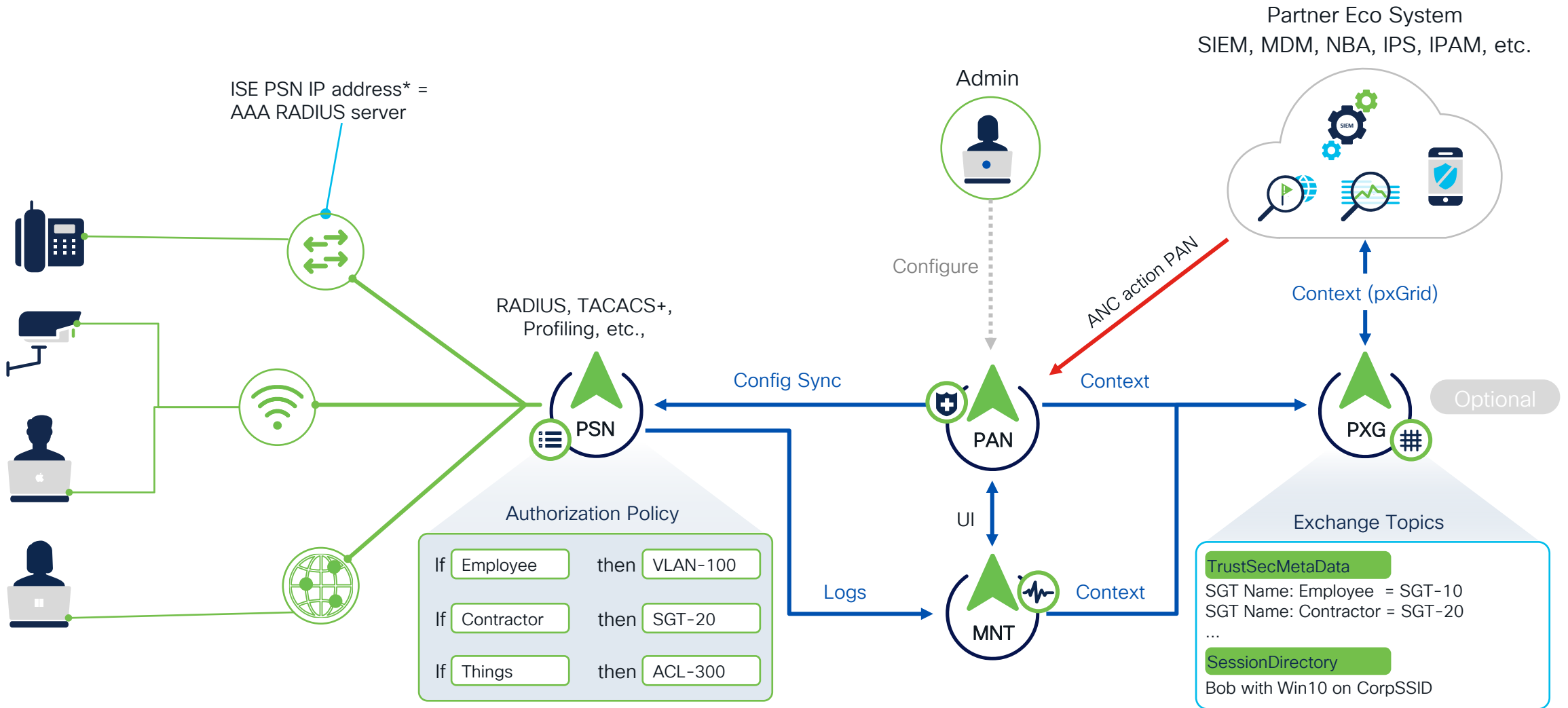
[!\[\]\(2339302de7b15298e81aeabe8f02f140_img.jpg\) ISE Appliances vs VMs vs Cloud Deployment Comparison](#)

ISE Architecture



Single Node (Virtual/Appliance)		Multiple Nodes (Virtual/Appliance)
Up to 50,000 concurrent endpoints	3700	Up to 2,000,000 concurrent endpoints
Up to 50,000 concurrent endpoints	3600	Up to 2,000,000 concurrent endpoints
Up to 20,000 concurrent endpoints	3500	Up to 500,000 concurrent endpoints

ISE Node Personas... Explained

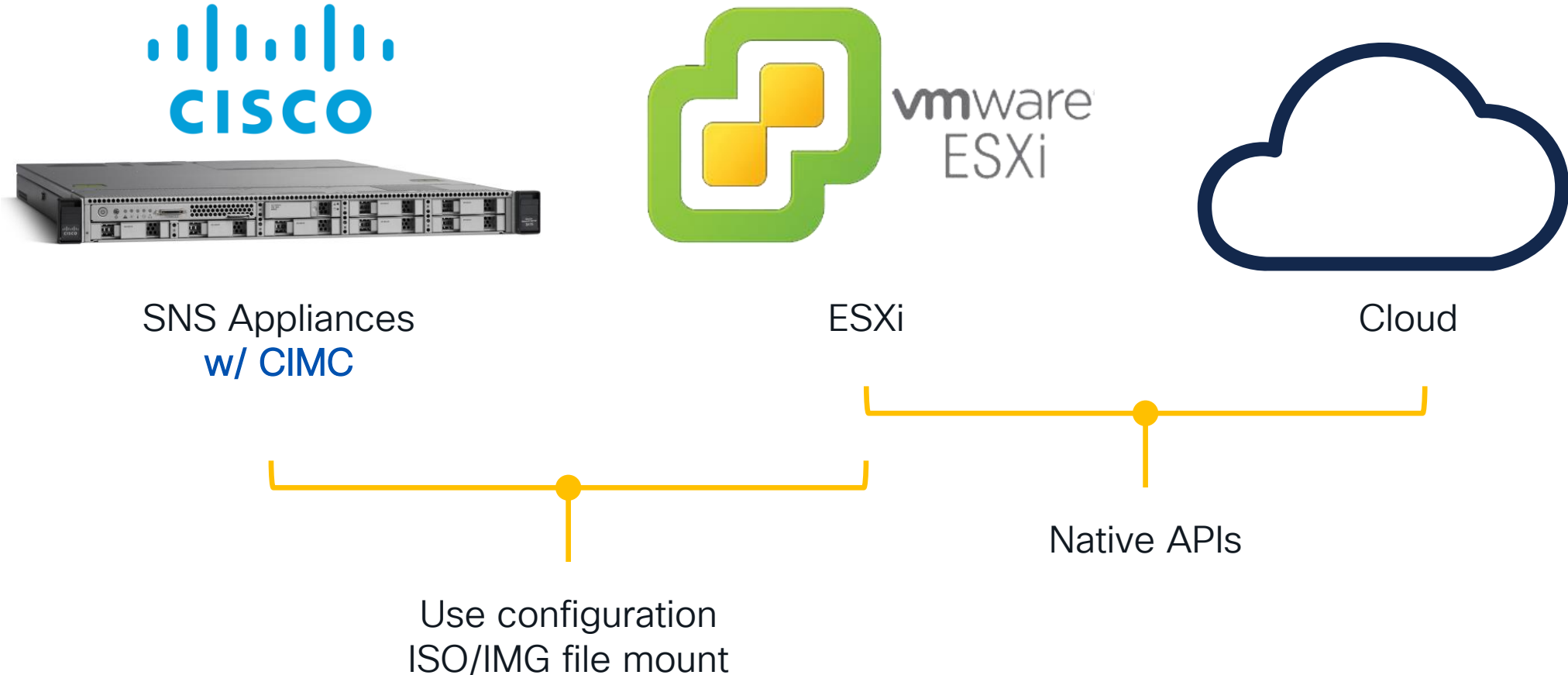


*PSNs can optionally be behind a load-balancer and can be accessed via Load Balancer Virtual IP address (VIPs)

Zero Touch Provisioning

cs.co/ise-ztp

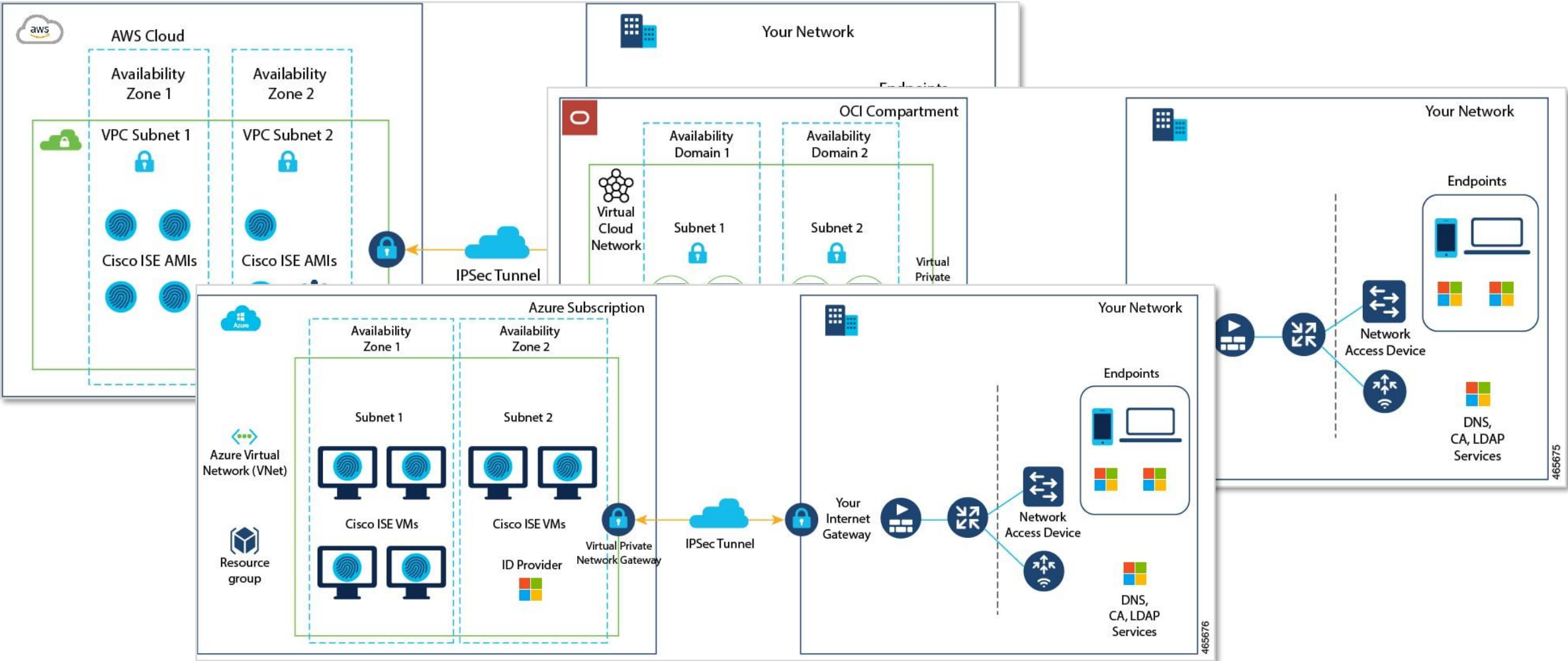
ISE 3.1



CIMC – Cisco Integrated Management Controller

Deploy Cisco ISE Natively on Cloud Platforms

cs.co/ise-on-cloud

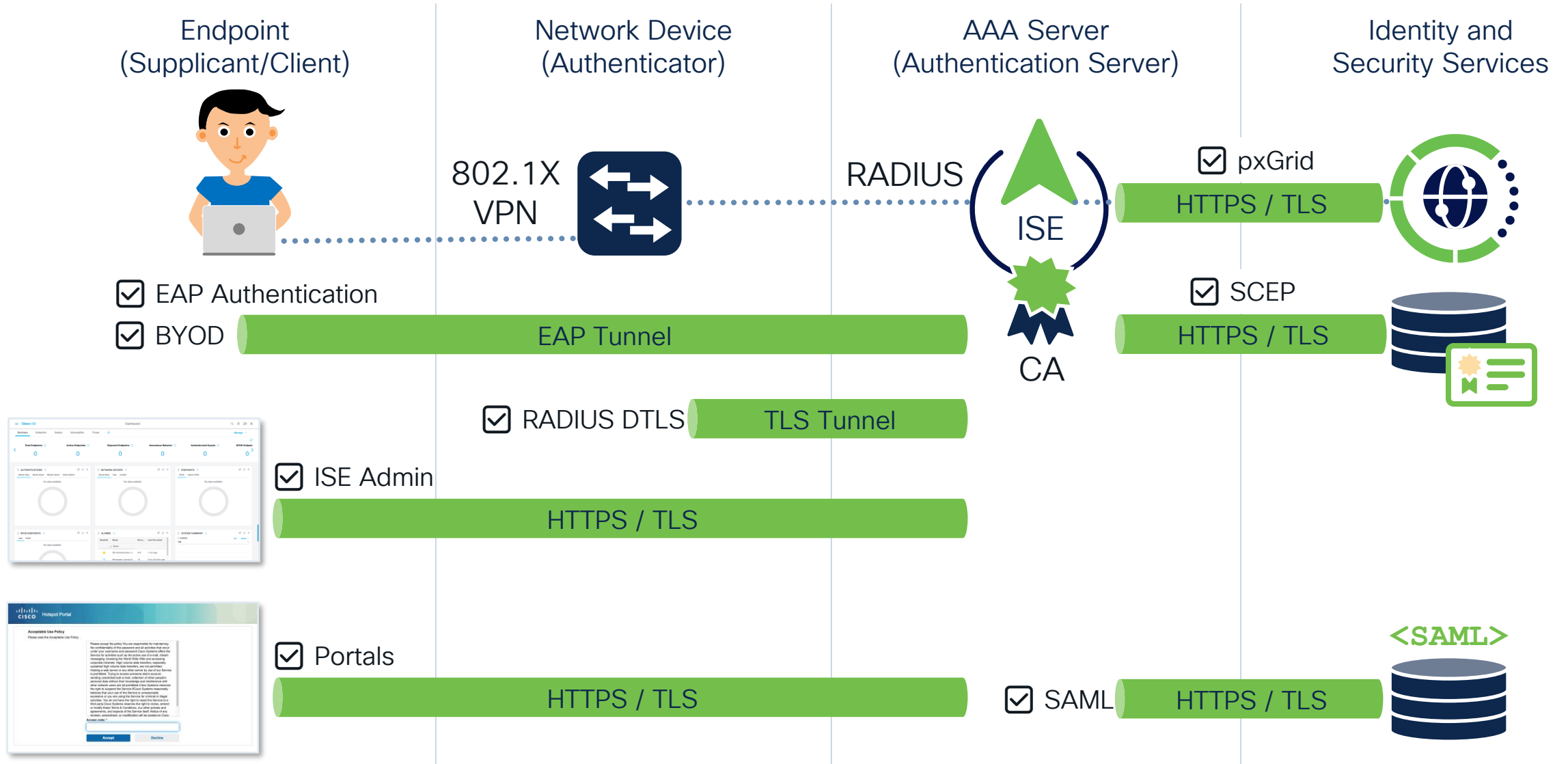


Enforcement Options



	Monitor	Low-Impact	Closed
Why?	Visibility: profiling, supplicant configuration, bad credentials, certs	Differentiate access with ISE authorization policy	IEEE 802.1X specification
Switchport	authentication host-mode multi-auth authentication open	authentication host-mode multi-auth	authentication host-mode multi-auth
Before Authentication	Port Open Unconditionally	Traffic subject to Pre-Auth ACL: DNS, DHCP, PXE, etc.	EAP Only
After Authentication	Port Open Unconditionally (Access-Reject ignored)	ISE response	ISE response
Profiling?	Yes	Yes	After Authentication
Guests?	Yes	Yes, redirect to hotspot or self-registration	Requires Sponsor

Digital Certificates are ⚠ CRITICAL ⚠



Planning: Sizing & Scale

ISE Deployment Scale

cs.co/ise-scale

Standalone to Distributed

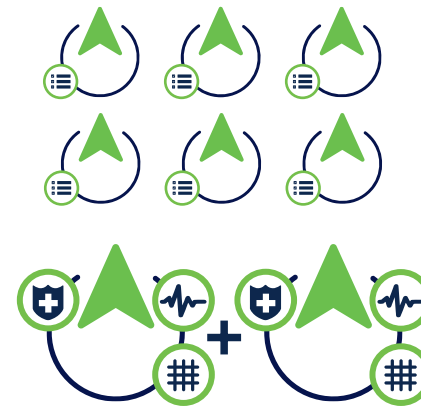
- Same for physical and virtual deployments
- Compatible with load balancers
- No changes to current Licensing Model



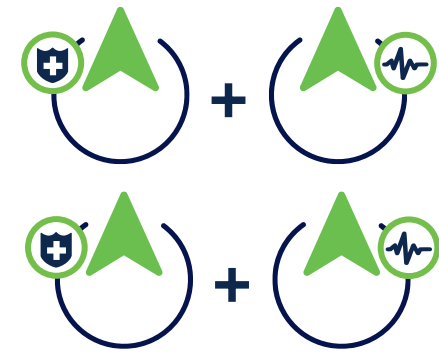
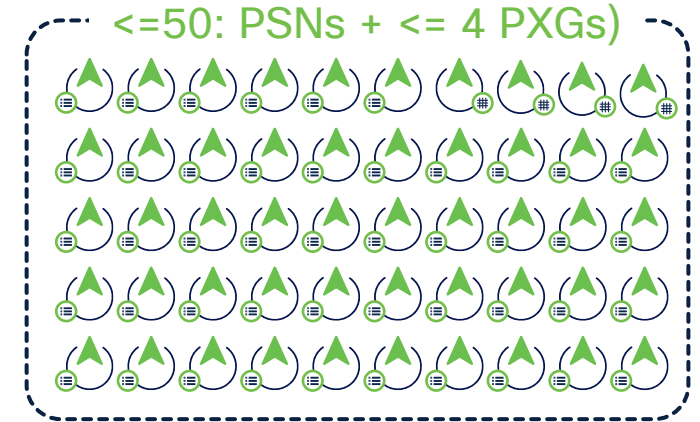
Eval / Demo / Lab



Small HA Deployment
2 x (PAN+MNT+PSN) + 1 x PSN



Medium Multi-node Deployment
2 x (PAN+MNT+PXG), <= 6 PSN



Large Deployment
2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs

3700	100 Endpoints	Up to 50,000 Endpoints	Up to 2,000,000 Endpoints
3600	100 Endpoints	Up to 50,000 Endpoints	Up to 2,000,000 Endpoints
3595	100 Endpoints	Up to 20,000 Endpoints	Up to 500,000 Endpoints

ISE Performance & Scale

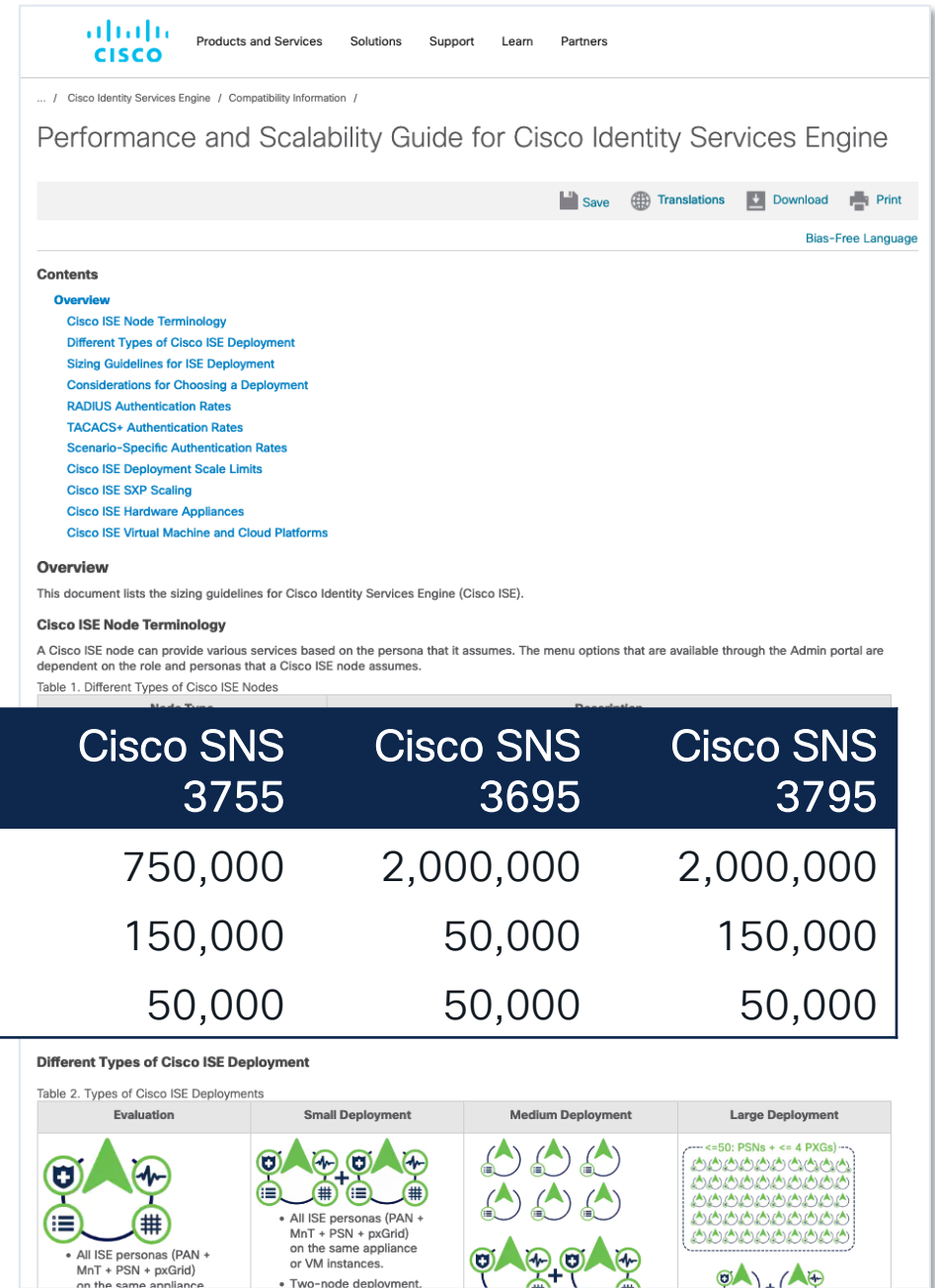
Maximum Concurrent Active Sessions

- ISE Licensing counts *active endpoint sessions*
- RADIUS Accounting defines session Start & Stop events
- Sessions **Start** upon RADIUS Authorization
- Sessions **Stop** upon :
 - 1) Disconnect
 - 2) Session Expiration
 - 3) Idle Timeout

Table 3. Maximum Concurrent Active Sessions for Deployments

Deployment	Cisco SNS 3595	Cisco SNS 3615	Cisco SNS 3715	Cisco SNS 3655	Cisco SNS 3755	Cisco SNS 3695	Cisco SNS 3795
Large	500,000	Unsupported	Unsupported	500,000	750,000	2,000,000	2,000,000
Medium	20,000	12,500	75,000	25,000	150,000	50,000	150,000
Small	20,000	12,500	25,000	25,000	50,000	50,000	50,000

 cs.co/ise-scale



Steady State versus Peak Demand

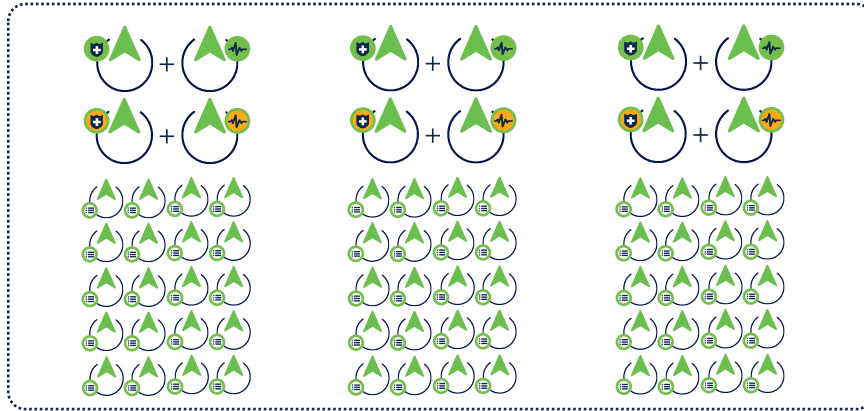
- You will have a mix of **static** and **mobile** endpoints
- Some endpoints are always on with long (8+ hours) session expirations
- Usage patterns will cause regional and periodic **ebbs, flows, and spikes**
 - Increased regional activity “follows the sun”
 - Wireless roaming spikes on the hour to change classrooms and meetings
- Mobile endpoints hibernate & roam causing a **3-10X+ larger load**
- Misconfigured devices can have **100-1000X** larger than average auth load

Table 4. Maximum Concurrent Active Sessions for Different ISE Appliances Acting as PSNs

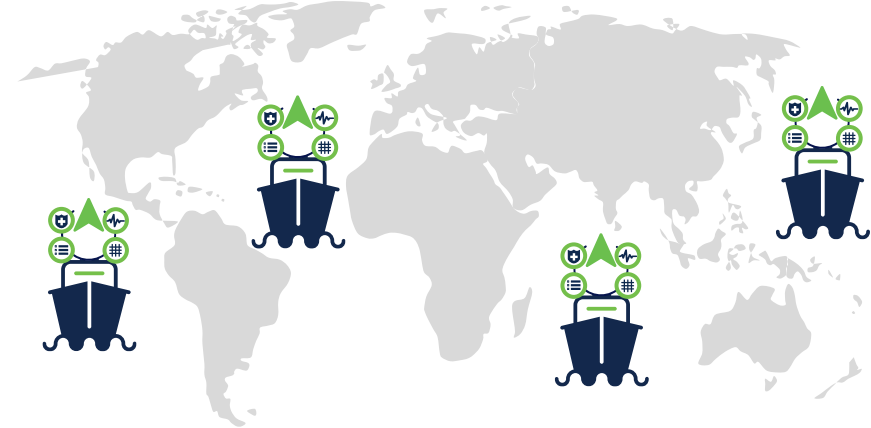
PSN Type	Cisco SNS 3595	Cisco SNS 3615	Cisco SNS 3715	Cisco SNS 3655	Cisco SNS 3755	Cisco SNS 3695	Cisco SNS 3795
Dedicated PSN (only PSN persona)	40,000	25,000	50,000	50,000	100,000	100,000	100,000
Shared PSN (multiple personas)	20,000	12,500	25,000	25,000	50,000	50,000	50,000

Multiple ISE Deployments?

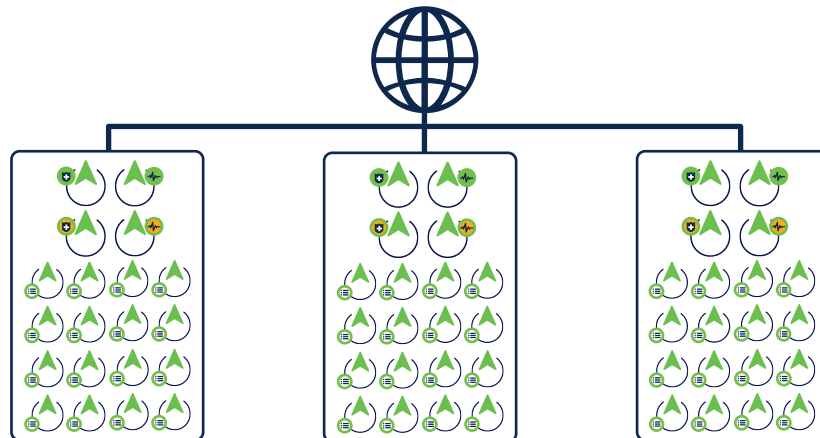
Scale (>2M endpoints)



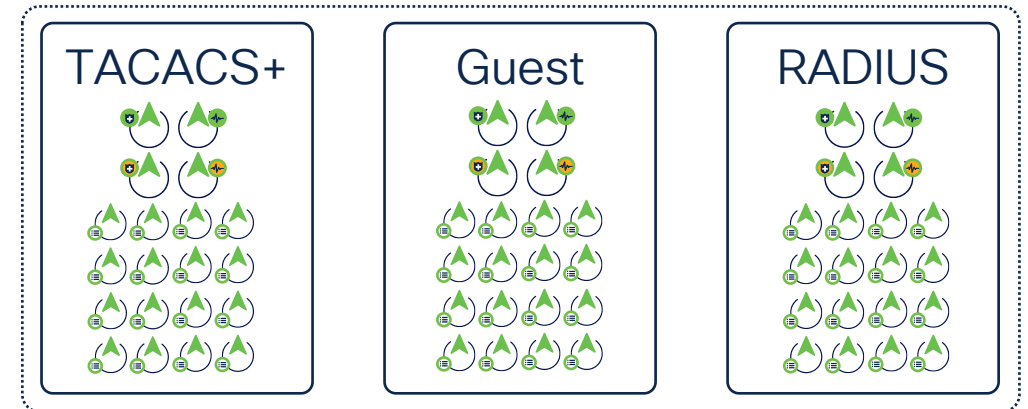
Latency (>300ms)



Regional / Organizational



Services (security / reliability)



No ISE “Manager of Managers” (MOM)!

Other Scaling Considerations



- ISE PAN: Policy Sets and Authorization Rule Optimization, AuthzProfiles
- ISE MNT: Log Filtering
- ISE PSNs: EAP Protocols, Profiling Probes, Node Groups, Collection Filters
- Network Devices: Load Balancing, Identity Stores, Misconfiguration, Accounting, Timers, Timeouts, EAP/Stateless Session Resume, Fast Reconnect, ACLs, SGTs/SGACLs, Bugs
- Mobile Endpoints: High re-auth rates (hibernation and roaming), misconfigured passwords, untrusted certificates
- Automation: TACACS for Admins vs Tools
- Bugs

Planning: Lab

Cisco ISE High Level Design (HLD)

 cs.co/ise-hld

- ✓ Business Objectives
- ✓ Environment
- ✓ Scenarios
- ✓ Policy Details
- ✓ Operations & Management
- ✓ Scale & High Availability

ISE High Level Design (HLD)

AAA AnyConnect Identity Services Engine (...)
Policy and Access TrustSec VPN

48001★ 77 0
VIEWS HELPFUL COMMENTS

thomas

05-07-2018 09:40 AM
Edited On: 02-04-2021 01:42 PM

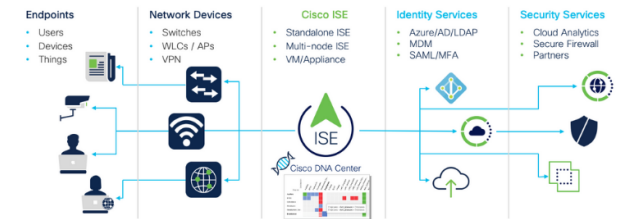


Introduction

An ISE High Level Design (HLD) is recommended to assist you with the design and planning of your ISE deployment. Having a clearly written security policy - whether aspirational or active - is the first step in assessing, planning and deploying network access security. Without this, it is hard to break down the deployment into phases by location or capabilities. When seeking outside help, the HLD provides a huge time savings for education other teams, partners, Cisco Sales representative, Technical Assistance Center (TAC) representative or even the ISE product and engineering teams. Clearly state the desired solution capabilities, hardware and software environment and integrations can quickly allow people to understand what you want and how to configure it or troubleshoot it.

Enterprise

Security



Business Objectives

Identify the Customer Business Objectives that ISE must solve. Typically this involves regulations and compliance or identified security threats and risks to smooth operation of the business or brand. But it also involves mitigating risks with controlled network access for everyday IT processes. This is how you begin to craft your network access control policy. The more specific you can be, the better.

Consider the following example business objectives that must translate into access control policy :

- We want to provide sponsored guest access to our visitors
- All network device administration commands must be authorized and logged for potential audit
- We want to identify all endpoints on our network so we can begin to apply access control policies
- We do not want our employees personal devices on our corporate network
- We want our employees to any device they want but we want to manage it to ensure it and any information on it is properly secured

Deployment by Location vs Scenario



ISE Deployment: Standalone

Role: Standalone

- May run *all* ISE services
- Not joined to a deployment



ISE Deployment: Small

Role STANDALONE

Make Primary

General Settings Profiling Configuration

Hostname ise-server
FQDN ise-server.aws.local
IP Address 172.31.2.15
Node Type Identity Services Engine (ISE)

Role STANDALONE Make Primary

Administration

Monitoring

Role PRIMARY

Other Monitoring Node

Dedicated MnT

Policy Service

Enable Session Services

Include Node in Node Group

None

Enable Profiling Service

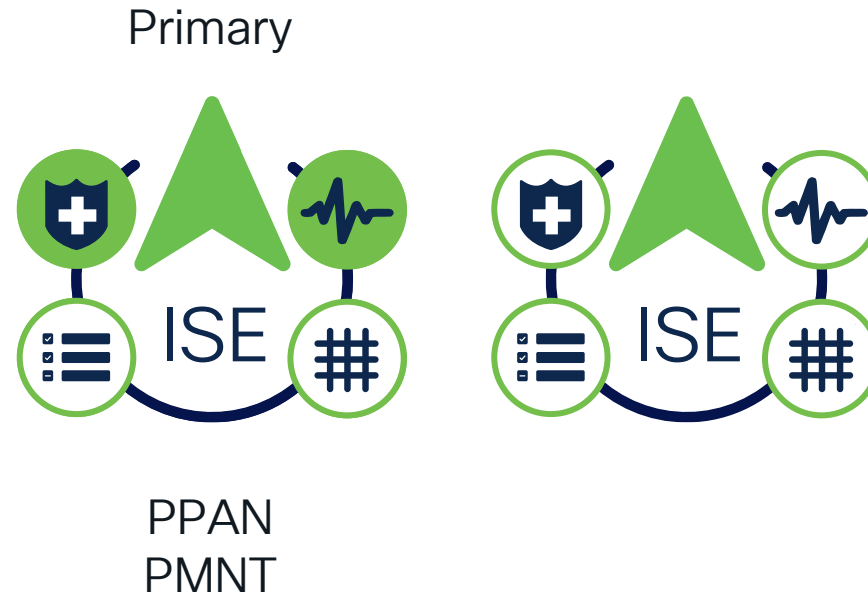
Enable Threat Centric NAC Service

Enable SXP Service

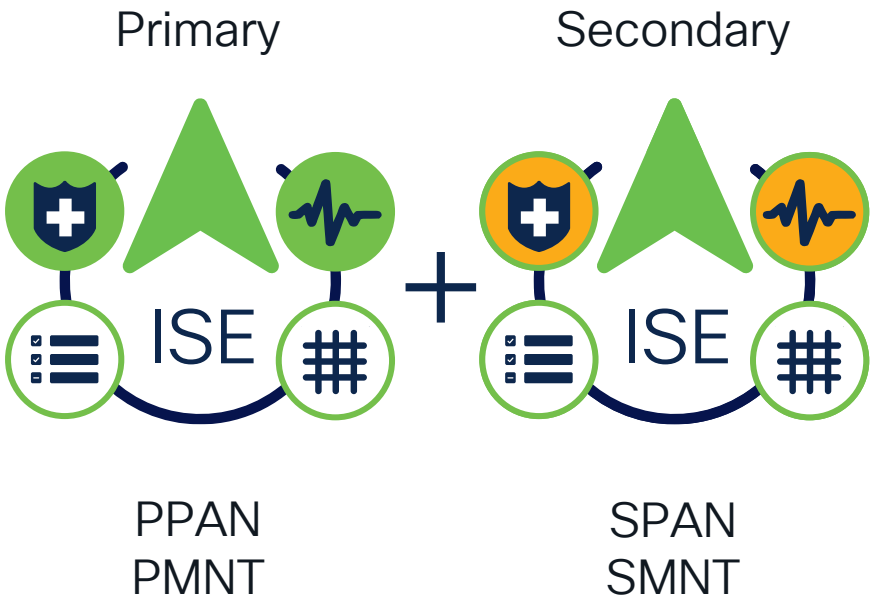
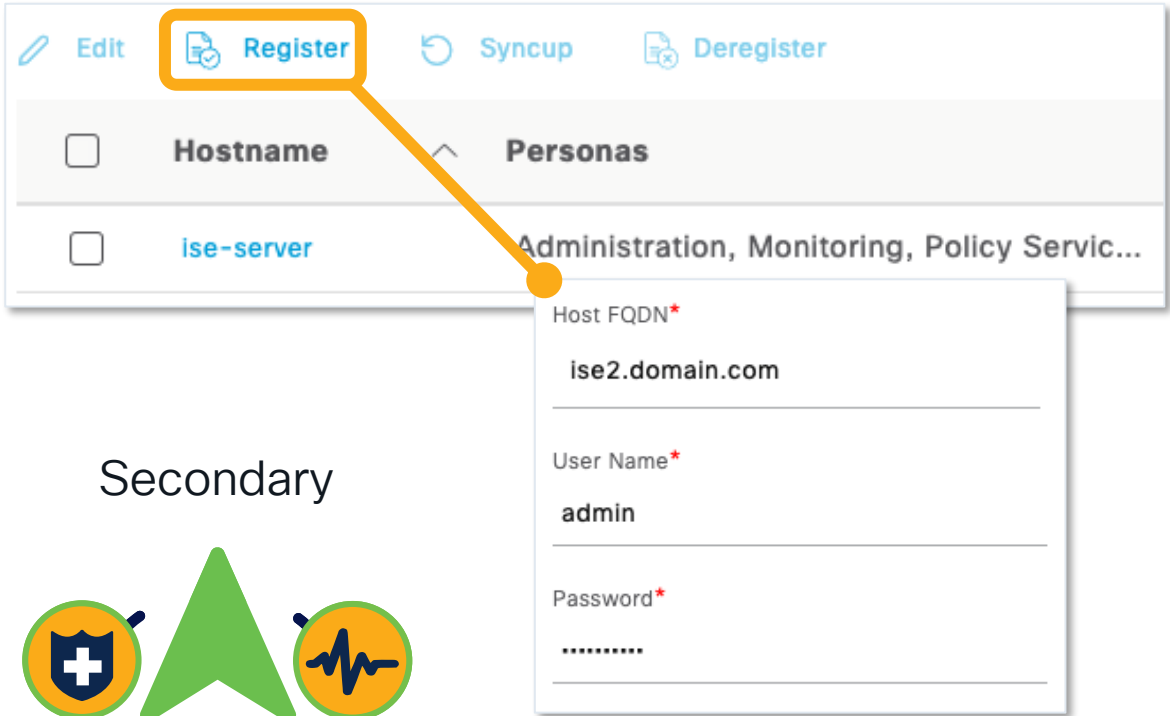
Enable Device Admin Service

Enable Passive Identity Service

pxGrid



ISE Deployment: Small



ISE Deployment: Small 3 Node



ISE Deployment: Medium

2 x (PAN+MNT+PXG), <= 6 PSN



ISE Deployment: Medium

2 x (PAN+MNT+PXG), <= 6 PSN



ISE Deployment: Medium

2 x (PAN+MNT+PXG), <= 6 PSN



ISE Deployment: Medium

2 x (PAN+MNT+PXG), <= 6 PSN



ISE Deployment: Medium => Large



ISE Deployment: Medium => Large

Primary PAN



Primary MNT

Secondary PAN

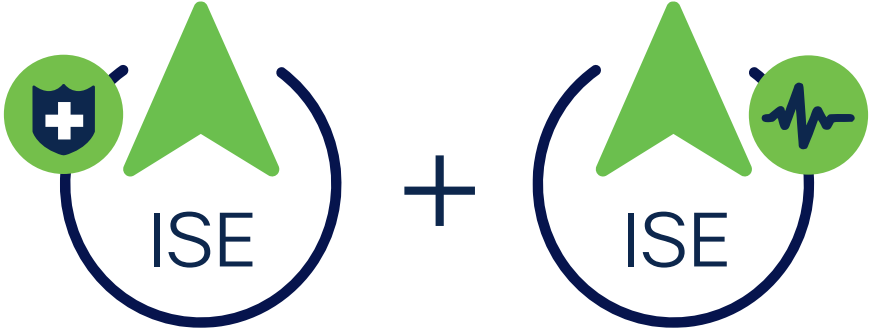


Secondary MNT



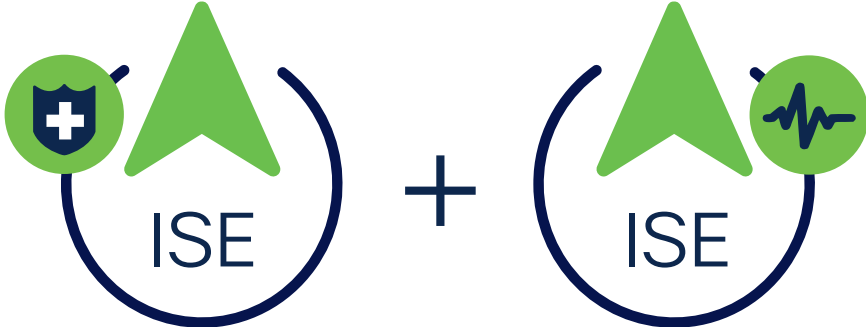
ISE Deployment: Large

2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs



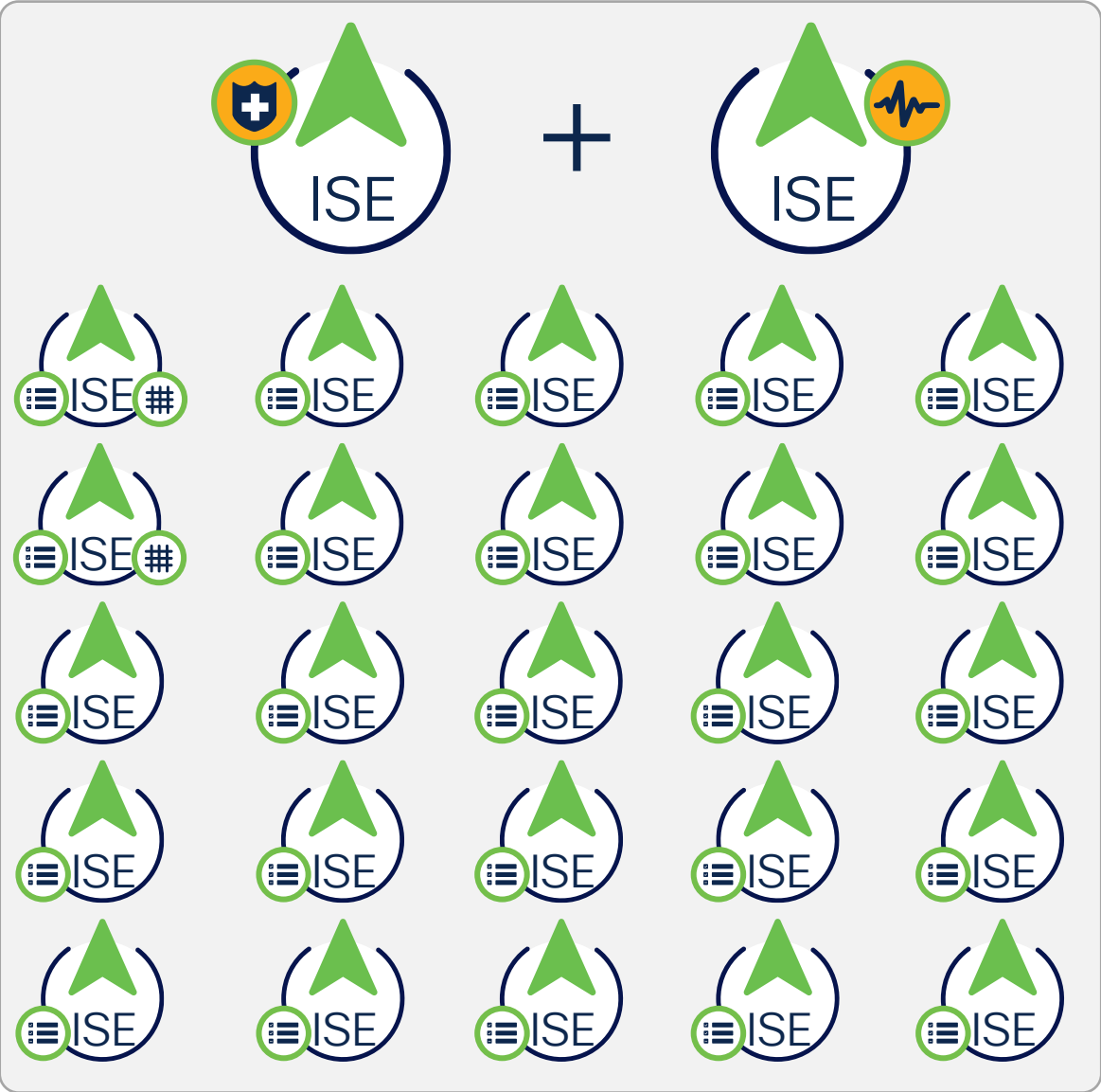
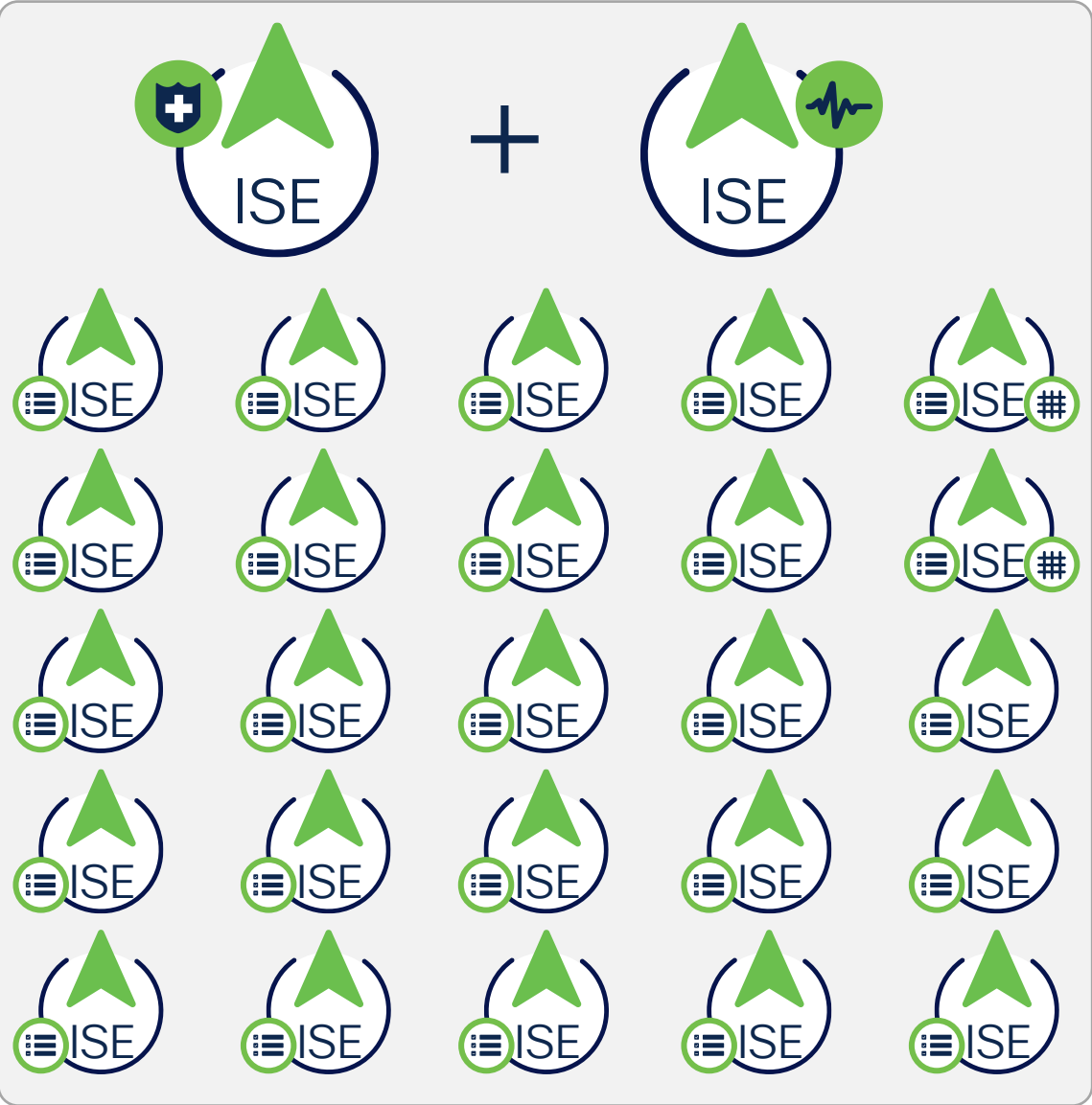
ISE Deployment: Large

2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs



ISE Deployment: Large

2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs



ISE Deployment: Large

2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs

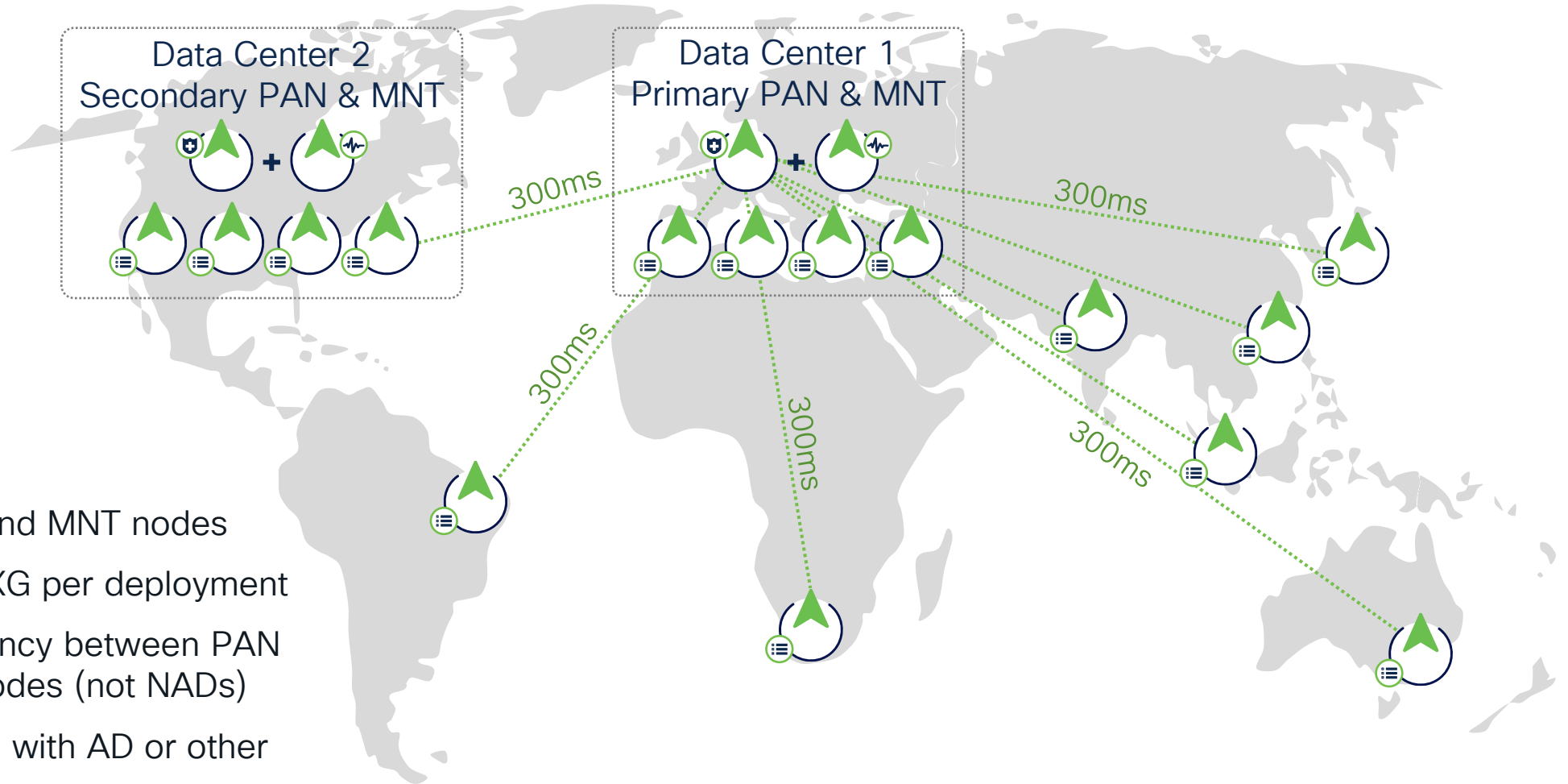


ISE Deployment: Large

2 PAN, 2 MNT, <=50: PSNs + <= 4 PXGs



Large Deployment: Centralized or Distributed



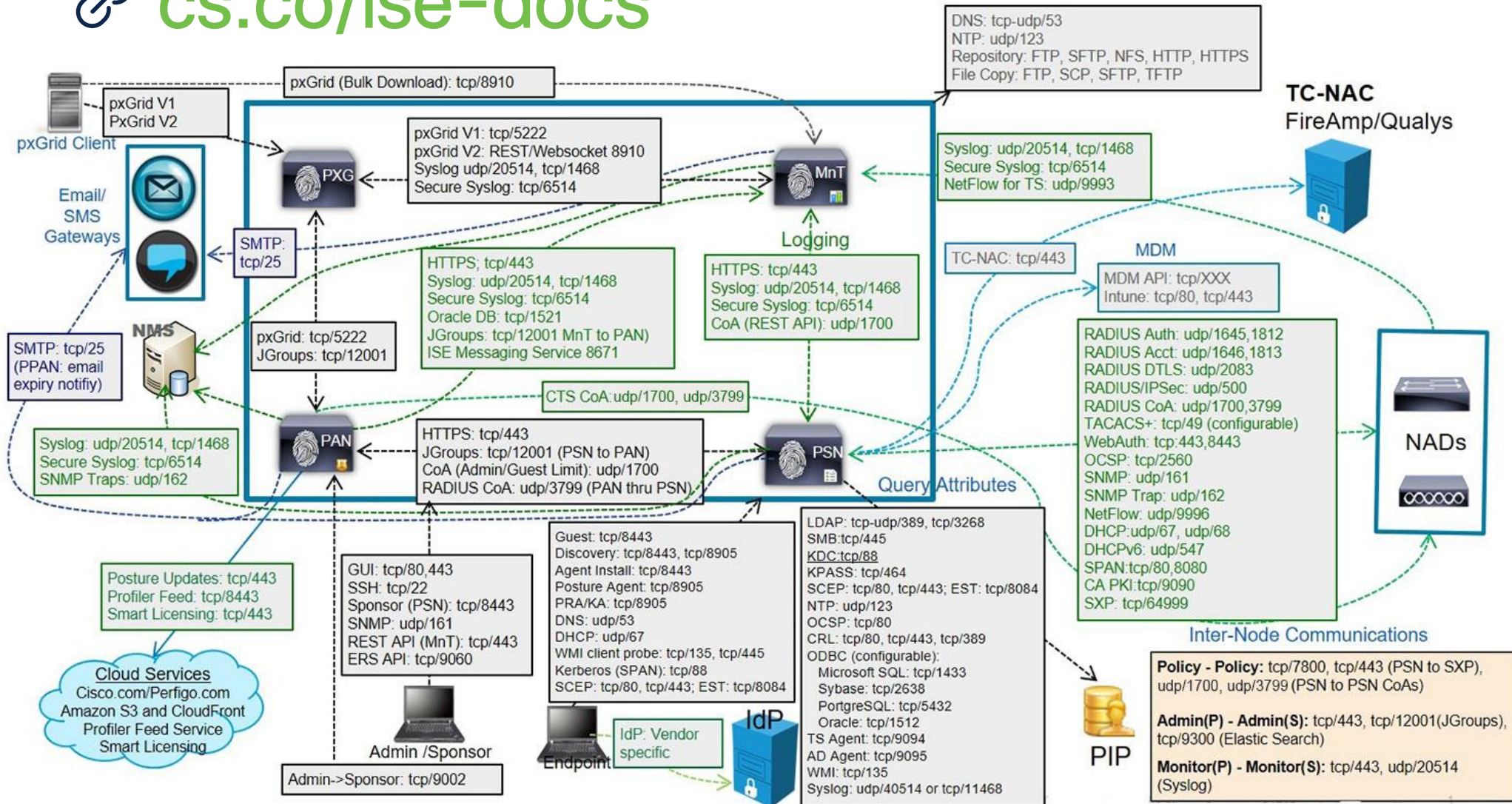
- Separate PAN and MNT nodes
- Max 50 PSN+PXG per deployment
- Max 300ms latency between PAN and other ISE nodes (not NADs)
- Co-locate PSNs with AD or other dependencies

Primary PAN is Required for Many Operations...

Feature	Available When Primary PAN is Down?
Internal user RADIUS authentication	<input checked="" type="checkbox"/>
RADIUS authentication reliant on identity stores	<input checked="" type="checkbox"/>
New endpoint learned through profiling.	<input type="checkbox"/>
Existing endpoint with profile change	<input type="checkbox"/>
Existing endpoint with no profile change	<input checked="" type="checkbox"/>
Guest: Local Web Authentication (LWA)	<input checked="" type="checkbox"/>
Guest: Central Web Authentication (CWA)	<input checked="" type="checkbox"/> Except flows with device registration: Hotspot, BYOD, and CWA
New Guest (Sponsored or Self-registered)	<input type="checkbox"/>
Guest: Change password	<input type="checkbox"/>
Guest: AUP	<input type="checkbox"/>
Guest: Max Failed Login Enforcement	<input type="checkbox"/>
Posture (lease unable to fetch timer)	<input checked="" type="checkbox"/>
BYOD with Internal CA	<input type="checkbox"/>
Existing Registered Devices	<input checked="" type="checkbox"/>
MDM on-boarding	<input type="checkbox"/>
pxGrid: New registrations or sessions	<input type="checkbox"/>
Log in to GUI of secondary nodes	<input checked="" type="checkbox"/> Login <i>delayed</i> due to call to PAN for last login details

ISE Installation Guide: Node Communications

cs.co/ise-docs



Staging: Patching

Patching

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy
- Administration**
- Work Centers
- Interactive Help

- Deployment
- Licensing
- Certificates
- Logging
- Maintenance**
- Upgrade
- Health Checks
- Backup & Restore
- More

- Patch Management**
- Repository
- Operational Data Purging
- Localdisk Management

Installed Patches

Selected 0 Total 0

- Install
- Rollback
- Show Node Status

Patch Version

No data available

Release Notes for Patch Features & Fixes!

The screenshot shows the Cisco Identity Services Engine (ISE) Release Notes page for Release 3.2. The page is titled "Release Notes for Cisco Identity Services Engine, Release 3.2" and is dated August 16, 2022. It features a navigation menu with options like "Products and Services", "Solutions", "Support", and "Learn". The main content area is divided into sections: "Contents" (listing various topics like "Introduction to Cisco Identity Services Engine", "What is New in Cisco ISE, Release 3.2?", "Cisco Private 5G", etc.), "Was this Document Helpful?" (with "Yes" and "No" buttons), "Feedback", "Customers Also Viewed" (listing "Cisco Identity Services Engine Installation Guide, Release 3.2" and "Cisco Secure Network Server Series Appliances and Virtual Machine Requirements"), "Contact Cisco" (with an "Open a Support Case" button), and "This Document Applies to These Products" (listing "Identity Services Engine 3.2").

Caveats

New Features in Cisco ISE Release 3.2 - Cumulative Patch 4

[Customer Experience Surveys](#)

[Microsoft Intune Ends Support for UDID-Based Queries for Its MDM Integrations](#)

[Wi-Fi Device Analytics Data from Cisco Catalyst 9800 Wireless LAN Controller](#)

Resolved Caveats in Cisco ISE Release 3.2 - Cumulative Patch 4

New Features in Cisco ISE Release 3.2 - Cumulative Patch 3

[Link External LDAP Users to Cisco ISE Endpoint Groups](#)

[Split Upgrade of Cisco ISE Deployment from GUI](#)

[Ukrainian Language Support in Portals](#)

Resolved Caveats in Cisco ISE Release 3.2 - Cumulative Patch 3

Open Caveats in Cisco ISE Release 3.2 - Cumulative Patch 3

New Features in Cisco ISE, Release 3.2 - Cumulative Patch 2

[Bulk Update and Bulk Delete Support for Context-In API in pxGrid Cloud](#)

[pxGrid Direct Enhancements](#)

[Support for Cisco Secure Network Server 3700 Series Appliance](#)

Resolved Caveats in Cisco ISE Release 3.2 - Cumulative Patch 2

Open Caveats in Cisco ISE Release 3.2 - Cumulative Patch 2

New Features in Cisco ISE, Release 3.2 - Cumulative Patch 1

[Extended Support for Cisco Secure Client](#)

[Meraki Connector for Cisco ISE](#)

[pxGrid Cloud Support for Context-in](#)

[Support for Cisco AI Analytics](#)

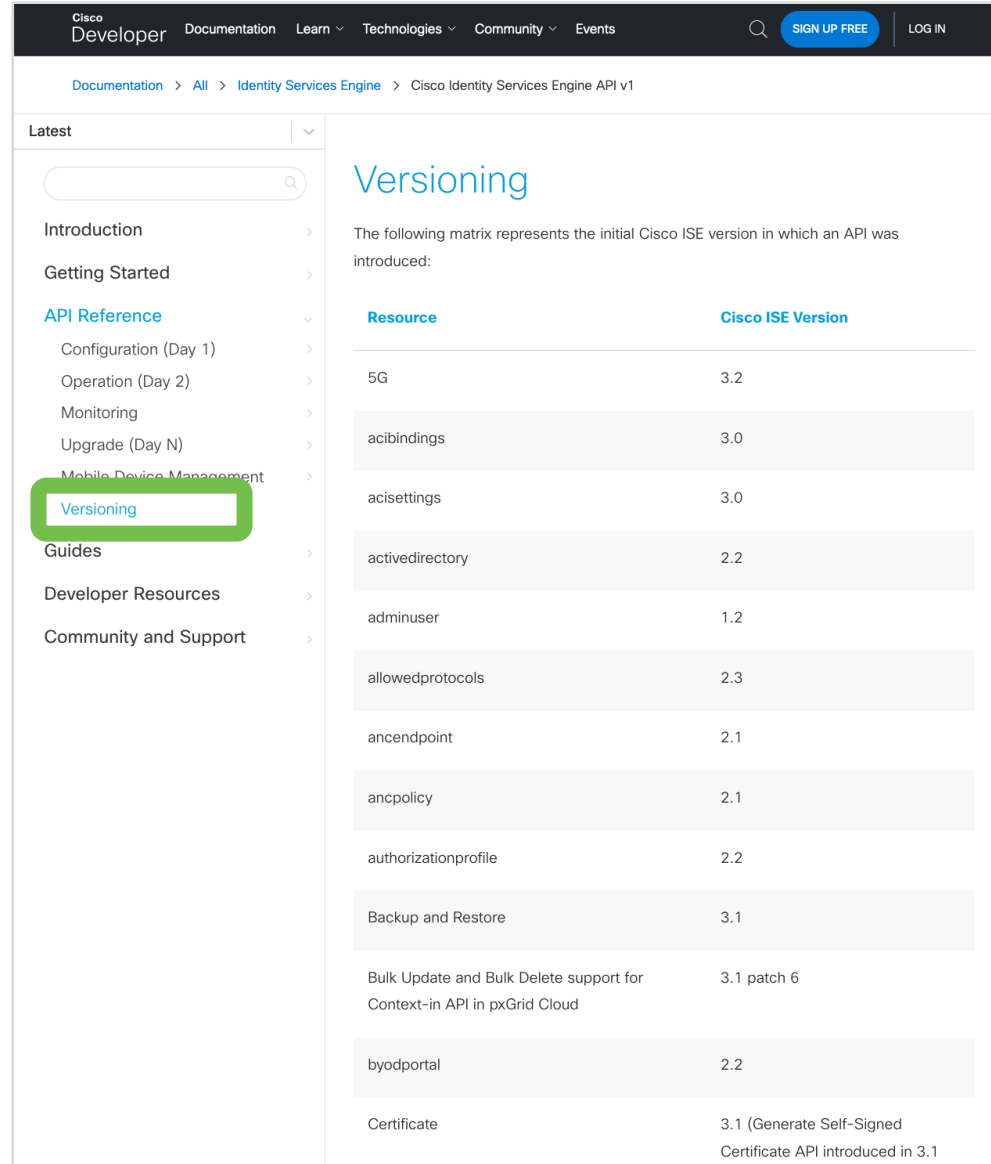
[SGT Reservation using OpenAPI](#)

Resolved Caveats in Cisco ISE Release 3.2 - Cumulative Patch 1

Operations: Automation

ISE 3.3 APIs on DevNet

5G	hotspotportal	sgmapping
acibindings	identitygroup	sgmappinggroup
acisettings	idstoresequence	Sgt
activedirectory	internaluser	SGT Reservation
adminuser	Ipsec	sgtvnvlan
allowedprotocols	Iseversion	smsprovider
ancendpoint	LDAP	sponsoredguestportal
ancpolicy	License	sponsorgroup
authorizationprofile	LSD Settings	sponsorgroupmember
Backup and Restore	sendmessage	sponsorportal
byodportal	mydeviceportal	supportbundle
Certificate	networkdevice	supportbundledownload
certificateprofile	networkdevicegroup	supportbundlestatus
certificatemplate	node	sxpconnections
Custom Attributes	nspprofile	sxplocalbindings
Data Connect	Patch and Hot Patch	sxpvps
Deployment	Policy	systemcertificate
deploymentinfo	portal	System Settings
downloadableacl	portalglobalsetting	tacacscommandsets
egressmatrixcell	portaltheme	tacacsexternalservers
endpoint	profilerprofile	tacacsprofile
Endpoint Replication	pxGrid Direct	tacacsreversesequence
endpointcert	pxgridnode	Task Service
endpointgroup	pxgridsettings	telemetryinfo
externalradiusserver	radiusreversesequence	TrustSec
filterpolicy	Repository	Upgrade
guestlocation	restidstore	
guestsmtpnotificationsettings	selfregportal	
guestssid	service	
guesttype	session servicenode	
guestuser	sgacl	



Documentation > All > Identity Services Engine > Cisco Identity Services Engine API v1

Latest

Introduction >

Getting Started >

API Reference >

- Configuration (Day 1) >
- Operation (Day 2) >
- Monitoring >
- Upgrade (Day N) >
- Mobile Device Management >

Versioning

Guides >

Developer Resources >

Community and Support >

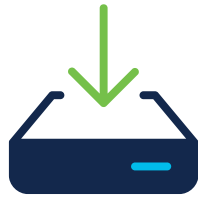
The following matrix represents the initial Cisco ISE version in which an API was introduced:

Resource	Cisco ISE Version
5G	3.2
acibindings	3.0
acisettings	3.0
activedirectory	2.2
adminuser	1.2
allowedprotocols	2.3
ancendpoint	2.1
ancpolicy	2.1
authorizationprofile	2.2
Backup and Restore	3.1
Bulk Update and Bulk Delete support for Context-in API in pxGrid Cloud	3.1 patch 6
byodportal	2.2
Certificate	3.1 (Generate Self-Signed Certificate API introduced in 3.1)

ISE Lifecycle Orchestration & Policy Management



Zero Touch
Deployment



Patch
Installation



License
Management



Certificate
Management



Configuration
Management



Policy
Management

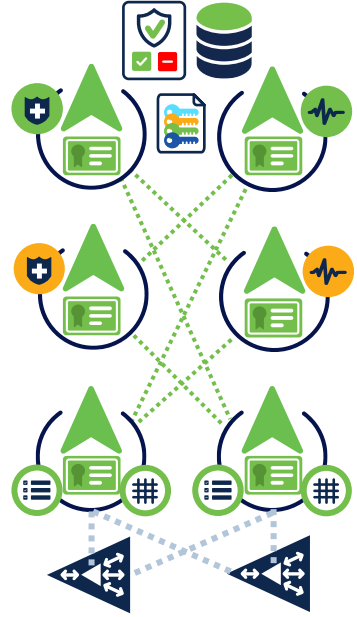
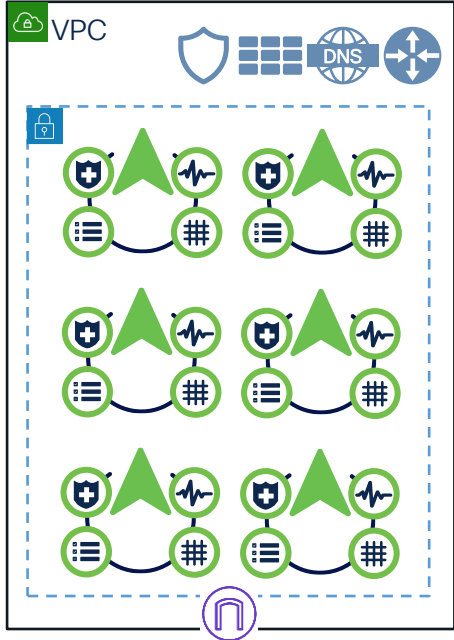


Operations
Automation



ISE 3.1 Patch 1 or later

ISE Deployment and Operational Lifecycle



Provision

Deploy

Configure

Operate

Destroy

VPC(s)
 Networks
 VPNs
 ISE Nodes
 Repository(s)
 Patch + Hotpatches
 ...

Certificates
 Roles
 Services
 Licensing
 Load Balancers
 ...

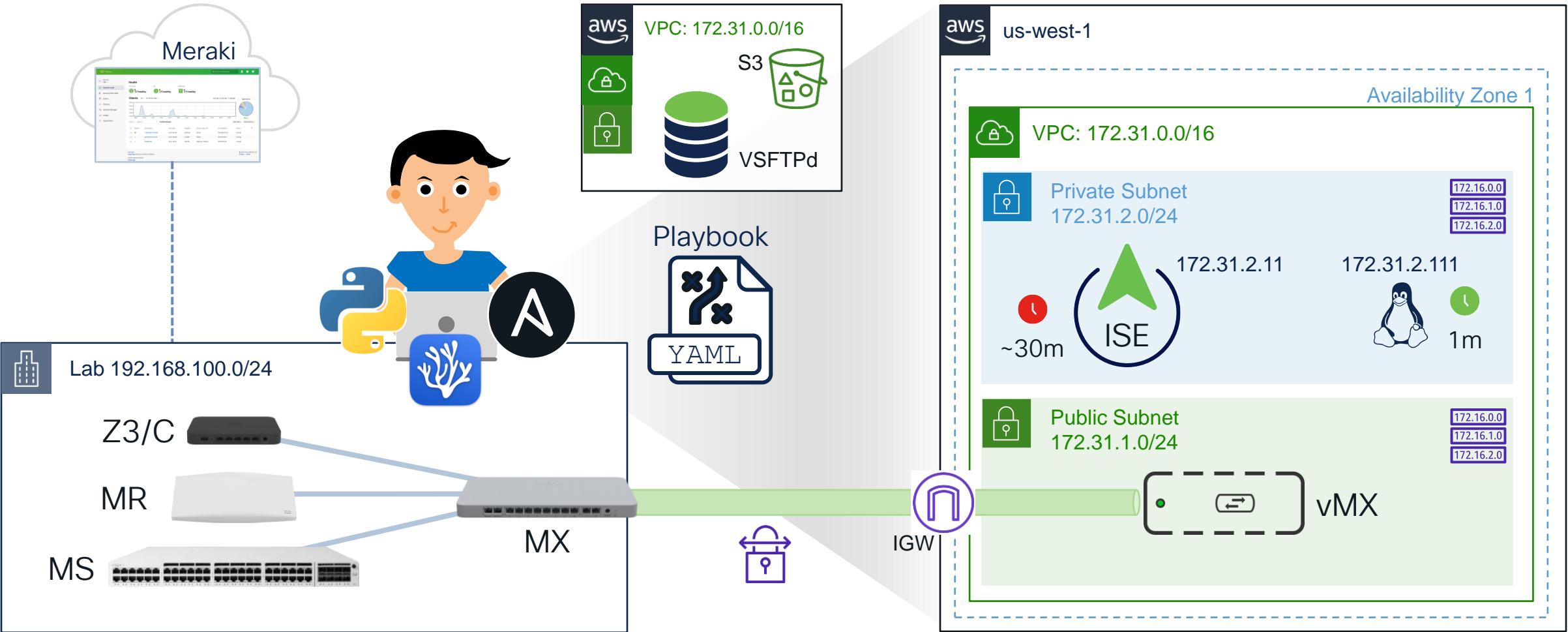
Identity Stores
 Network Devices
 Policy Sets
 Endpoints
 Portals
 ...

Manage Endpoints
 Reporting
 Performance
 pxGrid / Events
 Backup/Restore
 Patch
 ...

Terminate
 ...

ISE with Meraki in AWS

github.com/1thomas/ISE_with_Meraki_in_AWS





Data Connect

Introduction

Getting Started

Requirements

From Java Code

From Python Code

From Oracle SQL Developer

From Microsoft Excel on Windows

Guides

Changelog

Database Views

Data Connect

Introduction

Getting Started

Guides

Changelog

Database Views

- AAA_DIAGNOSTICS_VIEW
- ADAPTER_STATUS
- ADAPTIVE_NETWORK_CONTROL
- ADMINISTRATOR_LOGINS
- ADMIN_USERS
- AUP_ACCEPTANCE_STATUS
- AUTHORIZATION_PROFILES
- CHANGE_CONFIGURATION_AUDIT
- COA_EVENTS
- ENDPOINTS_DATA**
- ENDPOINT_IDENTITY_GROUPS
- ENDPOINT_PURGE_VIEW
- EXT_ID_SRC_ACTIVE_DIRECTORY
- EXT_ID_SRC_CERT_AUTH_PROFILE
- EXT_ID_SRC_LDAP
- EXT_ID_SRC_ODBC
- EXT_ID_SRC_RADIUS_TOKEN
- EXT_ID_SRC_REST

ENDPOINTS_DATA

Collection of all data related to endpoint that ISE collects

Type: View

Column name	Data Type	Column Description
ENDPOINT_POLICY_ID	VARCHAR2	Specifies the unique ID of the endpoint policy used
MATCHED_POLICY_ID	VARCHAR2	Specifies the ID of profiling used
NMAP_SUBNET_SCANID	NUMBER	NMAP subnet can ID of end points
PORTAL_USER	VARCHAR2	Specifies the portal user
AUTH_STORE_ID	VARCHAR2	Specifies the auth store ID
DEVICE_REGISTRATIONS_STATUS	NUMBER	Specifies if device is registered
REG_TIMESTAMP	NUMBER	Specifies the registered timestamp
POSTURE_APPLICABLE	NUMBER	Specifies if Posture is Applicable

Operations: Monitoring

ISE Admin Role Based Access Control (RBAC)

Identity Services Engine Administration / System

Deployment Licensing Certificates Logging Maintenance Upgrade Health Checks Backup & Restore **Admin Access** Settings

Authentication
Authorization >
Administrators >
Admin Users
Admin Groups
Settings >

Admin Groups

Selected 0 Total 15

Edit Add Duplicate Delete Reset All Ext. groups Reset Selected Ext. groups All

<input type="checkbox"/>	Name	External Groups Mapped	Description
<input type="checkbox"/>	Customization Admin	0	Access Permission to Guest Menu and Device Portal Manage...
<input type="checkbox"/>	ERS Admin	0	Full access permission to External RESTful Services (ERS) A...
<input type="checkbox"/>	ERS Operator	0	Read-only access permission to the External RESTful Servic...
<input type="checkbox"/>	Elevated System Admin	0	Access permission for Operations tab. Includes System and ...
<input type="checkbox"/>	Helpdesk Admin	0	Access permission for Operations tab.
<input type="checkbox"/>	Identity Admin	0	Access permission for Operations tab. Includes Identity Man...
<input type="checkbox"/>	MnT Admin	0	Access permission for Operations tab.
<input type="checkbox"/>	Network Device Admin	0	Access permission for Operations tab. Includes Network Res...
<input type="checkbox"/>	Policy Admin	0	Access permission for Operations and Policy tabs. Includes ...
<input type="checkbox"/>	RBAC Admin	0	Access permission for Operations tab. Includes System and ...

Remote Logging Targets (Syslog Servers)

Identity Services Engine Administration / System

Deployment Licensing Certificates **Logging** Maintenance Upgrade Health Checks Backup & Restore Admin Access Settings

Log Settings
Remote Logging Targets
Logging Categories
Message Catalog
Collection Filters

Remote Logging Targets

Selected 0 Total 4

Edit Add Duplicate Delete

Name	IP Address	Port	Type	Description	Status
<input type="radio"/> LogCollector	127.0.0.1	20514	UDP SysLog	Syslog Target for Log Collector	<input checked="" type="checkbox"/> Enabled
<input type="radio"/> ProfilerRadiusProbe	127.0.0.1	30514	Profiler SysLog	Syslog Target for Profiler RADIU...	<input checked="" type="checkbox"/> Enabled
<input type="radio"/> SecureSyslogCollector	127.0.0.1	6514	Secure SysLog	Secure Syslog Collector	<input type="checkbox"/> Disabled
<input type="radio"/> TCPLogCollector	127.0.0.1	1468	TCP SysLog	TCP SysLog collector	<input type="checkbox"/> Disabled

ISE Message Catalog

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy
- Administration**
- Work Centers
- Interactive Help

- Deployment
- Licensing
- Certificates
- Logging**
- Maintenance
- Upgrade
- Health Checks
- Backup & Restore
- Admin Access
- Settings

- Log Settings
- Remote Logging Targets
- Logging Categories
- Message Catalog**
- Collection Filters

Message Catalog

Total 2883

[Export](#)

All

Category Name	Message Class	Message ...	Message Text	Message Description	Severity
ACI Binding	TrustSec	92001	ACI binding created	Got ACI binding create message	INFO
ACI Binding	TrustSec	92002	ACI binding updated	Got ACI binding update message	INFO
ACI Binding	TrustSec	92003	ACI binding deleted	Got ACI binding delete message	INFO
ACI Binding	TrustSec	92004	ISE informed ACI about binding created	ISE informed ACI about binding created	INFO
ACI Binding	TrustSec	92005	ISE informed ACI about binding updated	ISE informed ACI about binding updated	INFO
ACI Binding	TrustSec	92006	ISE informed ACI about binding deleted	ISE informed ACI about binding deleted	INFO
AD Connector	External-REST	25100	Connecting to external REST ID store s...	ISE is going to establish a new connect...	DEBUG
AD Connector	External-REST	25101	Successfully connected to external RE...	ISE successfully connect to external RE...	DEBUG
AD Connector	External-REST	25102	Connection to external REST database ...	ISE failed to establish a new connectio...	DEBUG
AD Connector	External-REST	25103	Perform plain text password authentica...	ISE is starting plain text password auth...	DEBUG
AD Connector	External-REST	25104	Plain text password authentication in e...	Plain text password authentication in e...	DEBUG
AD Connector	External-REST	25105	Plain text password authentication in e...	Plain text password authentication in e...	DEBUG



ISE System 360

ISE 3.2

The screenshot displays the Cisco Identity Services Engine (ISE) System 360 dashboard. The top navigation bar includes the Cisco logo, 'Identity Services Engine', and 'Dashboard'. A search bar and notification icons are on the right. The main content area features a 'Summary' tab with several key metrics: Total Endpoints (133), Active Endpoints (11), Rejected Endpoints (0), Anomalous Behavior (0), and Authenticated Guests (0). A central menu is open, highlighting 'System 360' with a green border. Other menu items include RADIUS, Troubleshoot, Reports, Live Logs, Live Sessions, Download Logs, Debug Wizard, Threat-Centric NAC, Adaptive Network Control, Policy List, Endpoint Assignment, and TACACS. The dashboard also includes charts for 'BYOD ENDPOINTS', 'ALARMS', and 'SYSTEM SUMMARY'.

Summary | Endpoints | Guests | Vulnerability | Threat

Total Endpoints 133 | **Active Endpoints** 11 | **Rejected Endpoints** 0 | **Anomalous Behavior** 0 | **Authenticated Guests** 0

System 360
Settings
Monitoring
Log Analytics

ENDPOINTS 133
Profile | Logical Profile
unknown - 97.74%
3com-device - 2.26%

BYOD ENDPOINTS
Type | Profile

ALARMS
Severity | Name | Occu... | Last Occurred

SYSTEM SUMMARY
1 node(s)
ISE

System 360: Monitoring

ISE 3.2

Identity Services Engine Operations / System 360

Settings **Monitoring** Log Analytics

General / ISE-Dashboards

Host: node_ISE

NOTE: 15 seconds metrics scrape duration

System	CPU	RAM	Network	Disk
Uptime 4.4 day	Cores 16	Used% 68%	Traffic - Received 1.65 MB/s	Read IOPS 3.50 io/s
Load 0.400 (1m) 0.380 (5m) 0.420 (15m)	Usage % 2.71%	Usage RAM Total: 31.2 GB RAM Used: 21.1 GB	Traffic - Transmitted 2.62 MB/s	Write IOPS 10.5 io/s
				Disk space used 23.6%
				Free space 250 GB
				IO Reads 57.3 kB/s
				IO Writes 265 kB/s

CPU Utilization

	Min	Last *
System	8.20%	14.0%
User	9.07%	22.2%
Nice	0%	0%



System 360: Log Analytics

ISE 3.2

Identity Services Engine Operations / System 360

Settings Monitoring **Log Analytics**

elastic Search Elastic

Dashboard

Dashboards

Create dashboard

Search... Tags

<input type="checkbox"/> Title	Description	Tags	Actions
<input type="checkbox"/> ISE Observability Dashboard			
<input type="checkbox"/> ISE Overview Dashboard			
<input type="checkbox"/> ISE Processes Summary			
<input type="checkbox"/> ISE Troubleshooting Dashboard			
<input type="checkbox"/> Profiler Performance			
<input type="checkbox"/> Profiler Summary			
<input type="checkbox"/> RADIUS Accounting Summary			
<input type="checkbox"/> RADIUS Authentication Summary			
<input type="checkbox"/> RADIUS Performance			

System 360: Log Analytics

ISE 3.2

Identity Services Engine Operations / System 360

Settings Monitoring **Log Analytics**

elastic Search Elastic

Dashboard ISE Overview Dashboard Full screen Share Clone Edit

Search Lucene Today Show dates Refresh

+ Add filter

time series overview count

Time (per 10 minutes)	Count
09:00-09:10	1
09:10-09:20	1
09:20-09:30	1
09:30-09:40	1
09:40-09:50	3
09:50-10:00	1
10:00-10:10	2
10:10-10:20	2
15:00-15:10	1

Total Hit Count

13

failed

Category	Percentage
Failed	100.0%

Top Hit Service Type

Framed
Top Hit Service Type

Most use NAD Profile

-
Most use NAD Profile

Operations: Backups

ISE Repositories

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy
- Administration**
- Work Centers
- Interactive Help

- Deployment
- Licensing
- Certificates
- Logging
- Maintenance**
- Upgrade
- Health Checks
- Backup & Restore
- More

- Patch Management
- Repository**
- Operational Data Purging
- Localdisk Management

[Repository List](#) > Add Repository

Repository Configuration

* Repository Name

* Protocol

Location

* Server Name

* Path

Credentials

* Enable PKI authentication

* User Name

* Password

- Disk
- FTP
- SFTP
- TFTP
- NFS
- CDROM
- HTTP
- HTTPS

Localdisk Management

Localdisk Management

ISE 3.1

- Bookmarks
- Dashboard
- Context Visibility
- Operations
- Policy
- Administration**
- Work Centers
- Interactive Help

- Deployment
 - Licensing
 - Certificates
 - Logging
 - Maintenance**
 - Upgrade
- Patch Management
 - Repository
 - Operational Data Purging
 - Localdisk Management**

Local Disk Management > ISE


Files

Files from the table below will be used for Localdisk Management. The files must be downloaded or deleted one at a time.

	Upload	Download	Delete
File Name			
>	corefileanalysis(0)		
<input type="checkbox"/>	upgraderpms.log		
>	corefiles(0)		
>	CSD-config-backup(0)		
>	gc(6)		

Upload File

Please drag and drop or select the file that you want to use in the wizard.



Choose file or drag and drop to upload.
Accepted files: All
Accepted sizes: up to 20GB

[Select File](#) [Start Upload](#)

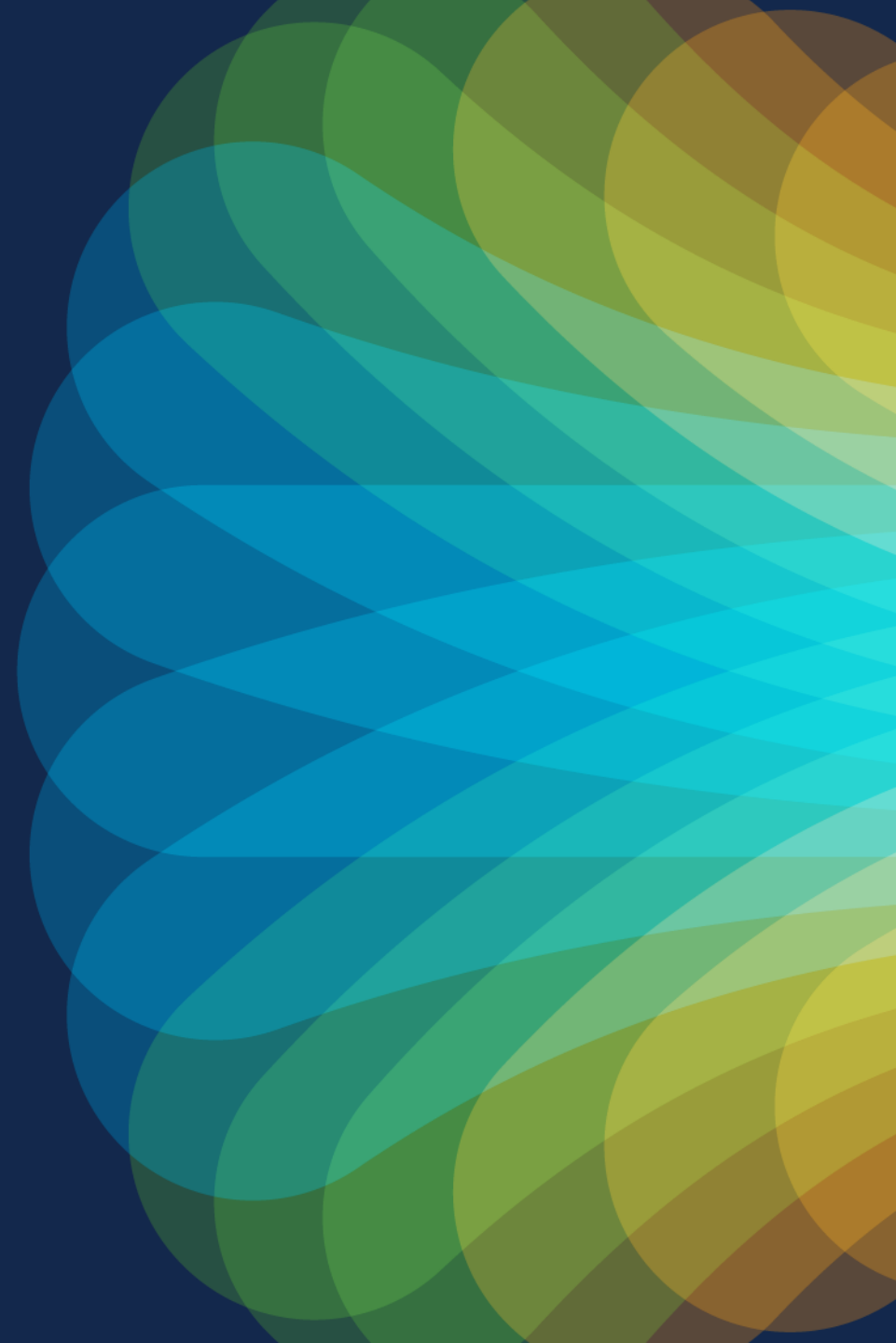
[Close](#)

Administration > System > Backup & Restore

The screenshot displays the Cisco Identity Services Engine (ISE) Administration console. The main navigation bar includes 'Administration / System' and various utility icons. The left sidebar lists navigation options such as 'Bookmarks', 'Dashboard', 'Context Visibility', 'Operations', 'Policy', 'Administration', and 'Work Centers'. The main content area is divided into tabs: 'Deployment', 'Licensing', 'Certificates', 'Logging', and 'Maintenance'. Under the 'Maintenance' tab, the 'Backup & Restore' section is active, showing options for 'Backup Now' and 'Schedule Backup'. A 'Backup Now' button is highlighted with a green border. A modal window titled 'Backup Configuration Data' is open, containing the following fields and options:

- *Backup Name: Text input field.
- *Repository Name: Dropdown menu.
- *Encryption Key: Text input field.
- *Re-Enter Encryption Key: Text input field.
- Informational message: Internal CA Certificate Store is not in this backup. It is recommend to export it using "application configure ise" CLI command.
- Buttons: 'Backup' and 'Cancel'.

Conclusion

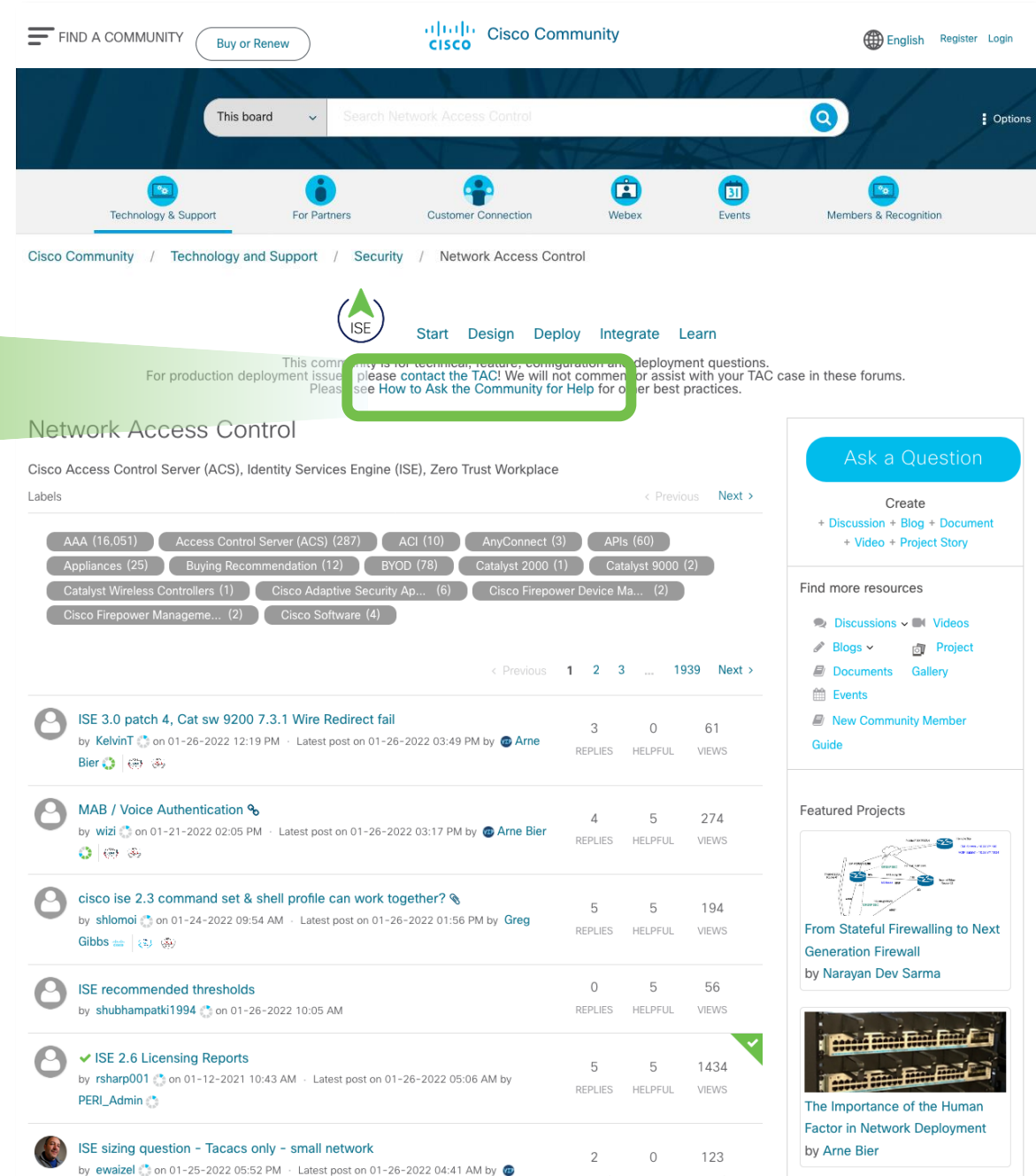


Ask The Community

 cs.co/ise-community

How to Ask the Community for Help

- The Community is Not TAC
- No Comment on Roadmaps or Fixes
- New Features and Feedback
- Provide Details
 - Goal/Scenario?
 - NAD Hardware & Software?
 - Endpoint OS(es)?
 - Browser(s)?
- Reproducibility (expected vs actual)
- Use Pictures or even Video!



Find A Community Buy or Renew Cisco Community English Register Login

This board Search Network Access Control Options

Technology & Support For Partners Customer Connection Webex Events Members & Recognition

Cisco Community / Technology and Support / Security / Network Access Control

ISE Start Design Deploy Integrate Learn

This community is for technical feature, configuration and deployment questions. For production deployment issues, please contact the TAC! We will not comment or assist with your TAC case in these forums. Please see How to Ask the Community for Help for our best practices.

Network Access Control

Cisco Access Control Server (ACS), Identity Services Engine (ISE), Zero Trust Workplace

Labels < Previous Next >

AAA (16,051) Access Control Server (ACS) (287) ACI (10) AnyConnect (3) APIs (60) Appliances (25) Buying Recommendation (12) BYOD (78) Catalyst 2000 (1) Catalyst 9000 (2) Catalyst Wireless Controllers (1) Cisco Adaptive Security Ap... (6) Cisco Firepower Device Ma... (2) Cisco Firepower Managem... (2) Cisco Software (4)

< Previous 1 2 3 ... 1939 Next >

Post Title	Author	Replies	Helpful	Views
ISE 3.0 patch 4, Cat sw 9200 7.3.1 Wire Redirect fail	by KelvinT on 01-26-2022 12:19 PM · Latest post on 01-26-2022 03:49 PM by Arne Bier	3	0	61
MAB / Voice Authentication	by wizi on 01-21-2022 02:05 PM · Latest post on 01-26-2022 03:17 PM by Arne Bier	4	5	274
cisco ise 2.3 command set & shell profile can work together?	by shlmoi on 01-24-2022 09:54 AM · Latest post on 01-26-2022 01:56 PM by Greg Gibbs	5	5	194
ISE recommended thresholds	by shubhampatki1994 on 01-26-2022 10:05 AM	0	5	56
ISE 2.6 Licensing Reports	by rsharp001 on 01-12-2021 10:43 AM · Latest post on 01-26-2022 05:06 AM by PERL_Admin	5	5	1434
ISE sizing question - Tacacs only - small network	by ewaizel on 01-25-2022 05:52 PM · Latest post on 01-26-2022 04:41 AM by	2	0	123

Ask a Question

Create + Discussion + Blog + Document + Video + Project Story

Find more resources

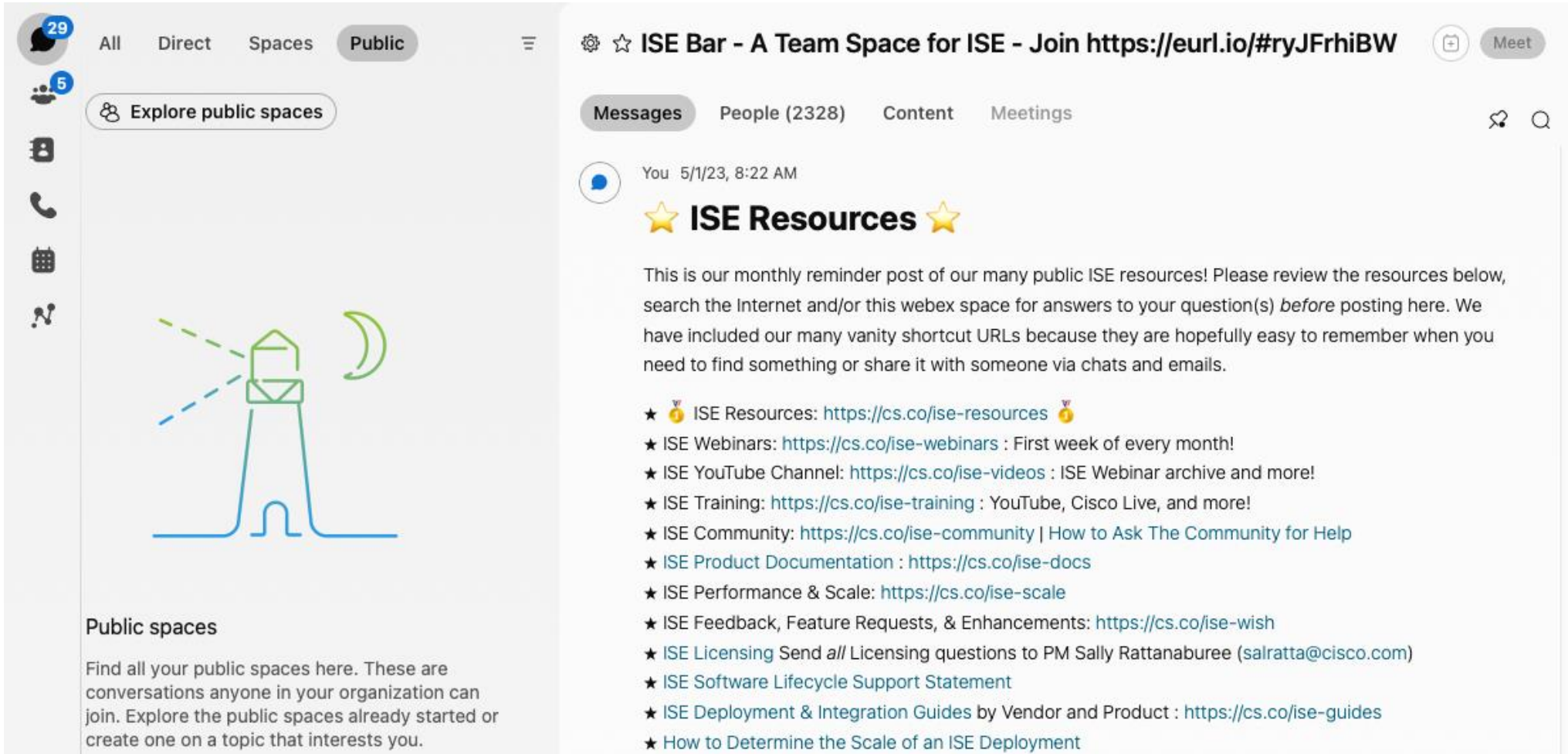
- Discussions
- Videos
- Blogs
- Project
- Documents
- Gallery
- Events
- New Community Member
- Guide

Featured Projects

- From Stateful Firewalling to Next Generation Firewall by Narayan Dev Sarma
- The Importance of the Human Factor in Network Deployment by Arne Bier

ISE Bar: A Webex Team Space for ISE

 eurl.io/#ryJFrhiBW



Public spaces

Find all your public spaces here. These are conversations anyone in your organization can join. Explore the public spaces already started or create one on a topic that interests you.

ISE Bar - A Team Space for ISE - Join <https://eurl.io/#ryJFrhiBW>

Messages People (2328) Content Meetings

You 5/1/23, 8:22 AM

★ **ISE Resources** ★

This is our monthly reminder post of our many public ISE resources! Please review the resources below, search the Internet and/or this webex space for answers to your question(s) *before* posting here. We have included our many vanity shortcut URLs because they are hopefully easy to remember when you need to find something or share it with someone via chats and emails.

- ★ 🏆 ISE Resources: <https://cs.co/ise-resources> 🏆
- ★ ISE Webinars: <https://cs.co/ise-webinars> : First week of every month!
- ★ ISE YouTube Channel: <https://cs.co/ise-videos> : ISE Webinar archive and more!
- ★ ISE Training: <https://cs.co/ise-training> : YouTube, Cisco Live, and more!
- ★ ISE Community: <https://cs.co/ise-community> | [How to Ask The Community for Help](#)
- ★ ISE Product Documentation : <https://cs.co/ise-docs>
- ★ ISE Performance & Scale: <https://cs.co/ise-scale>
- ★ ISE Feedback, Feature Requests, & Enhancements: <https://cs.co/ise-wish>
- ★ ISE Licensing Send *all* Licensing questions to PM Sally Rattanaburee (salratta@cisco.com)
- ★ ISE Software Lifecycle Support Statement
- ★ ISE Deployment & Integration Guides by Vendor and Product : <https://cs.co/ise-guides>
- ★ [How to Determine the Scale of an ISE Deployment](#)

Resources

- cs.co/ise-resources
- cs.co/ise-training
- cs.co/ise-guides#tag
- cs.co/ise-community
- cs.co/nad-capabilities
- github.com/1thomas/
- github.com/ISEDemoLab/
- woland.com
- ise-support.com
- network-node.com
- securityccie.net/
- labminutes.com/video/sec/ISE

CISCO *Live!*

Did you know?

You can have a one-on-one session with a technical expert!

Visit Meet the Expert in The HUB to meet, greet, whiteboard & gain insights about your unique questions with the best of the best.



Meet the Expert Opening Hours:

Tuesday	3:00pm – 7:00pm
Wednesday	11:15am – 7:00pm
Thursday	9:30am – 4:00pm
Friday	10:30am – 1:30pm

Session Surveys

We would love to know your feedback on this session!

- Complete a minimum of four session surveys and the overall event surveys to claim a Cisco Live T-Shirt



Continue your education

CISCO *Live!*

- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Expert meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



The bridge to possible

Thank you

CISCO *Live!*

#CiscoLiveAPJC

CISCO *Live!*

Let's go

#CiscoLiveAPJC