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The bridge to possible

ISE Deployments in the Cloud

Automate ISE Deployments in AWS

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LTRSEC-2000

Cisco Webex App

Questions?

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with the speaker after the session

How

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4. Enter messages/questions in the Webex space

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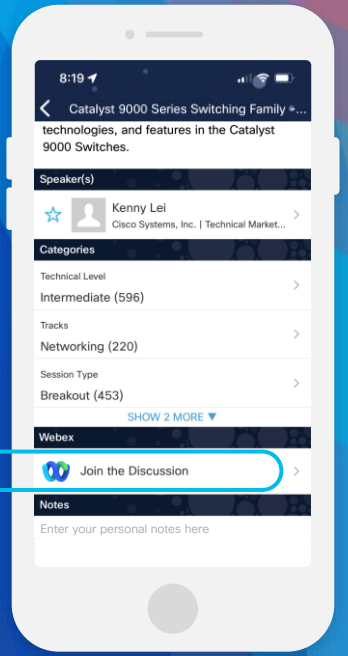

https://ciscolive.ciscoevents.com/ciscolivebot/#LTRSEC-2000

Agenda

- Introduction
- Overview: ISE in AWS
- Overview: Ansible
- Deployment Caveats and Topology
- Integrations
- Conclusion

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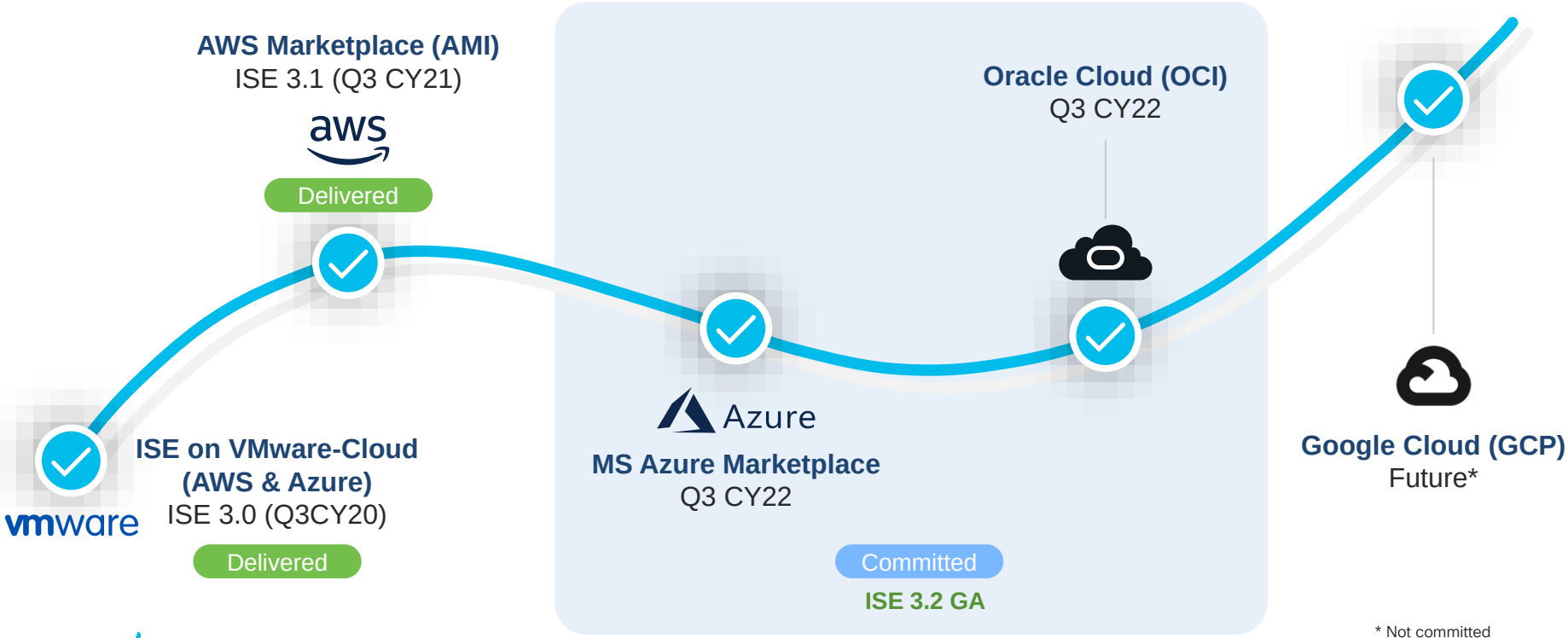
ISE journey on public cloud



* Not committed

Zero Touch Provisioning

SNS Appliances w/ CIMC

ESXi

AWS/Azure/OCI

Use configuration ISO/IMG file mount

Native APIs

CIMC – Cisco Integrated Management Controller

ISE Architecture

Standalone ISE

Policy Administration Node (PAN)
- Single plane of glass for ISE admin
- Replication hub for all config changes

Monitoring & Troubleshooting Node (MnT)
- Reporting and logging node
- Syslog collector from ISE Nodes

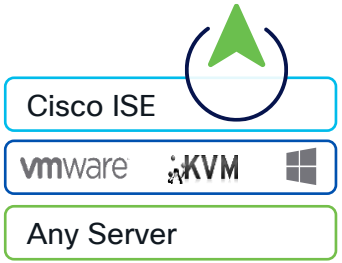
Policy Services Node (PSN)
- Makes policy decisions
- RADIUS / TACACS+ Servers

pxGrid Controller
- Facilitates sharing of context

Distributed ISE

Single Node (Virtual/Appliance)		Multiple Nodes (Virtual/Appliance)
Up to 20,000 concurrent endpoints	3500	Up to 500,000 concurrent endpoints
Up to 100,000 concurrent endpoints	3600/3700	Up to 2,000,000 concurrent endpoints

ISE 3.1 Supported AWS Platforms



AWS Instance Type	Standalone Sessions	PSN Sessions	PAN/MNT Total Sessions	Cores	Memory	Disk
c5.4xlarge	10,000	40,000	-	16	32 GB	300 GB – 2.4 TB
c5.9xlarge	25,000	100,000	-	36	72 GB	300 GB – 2.4 TB
m5.4xlarge	-	-	500,000	16	64 GB	300 GB – 2.4 TB

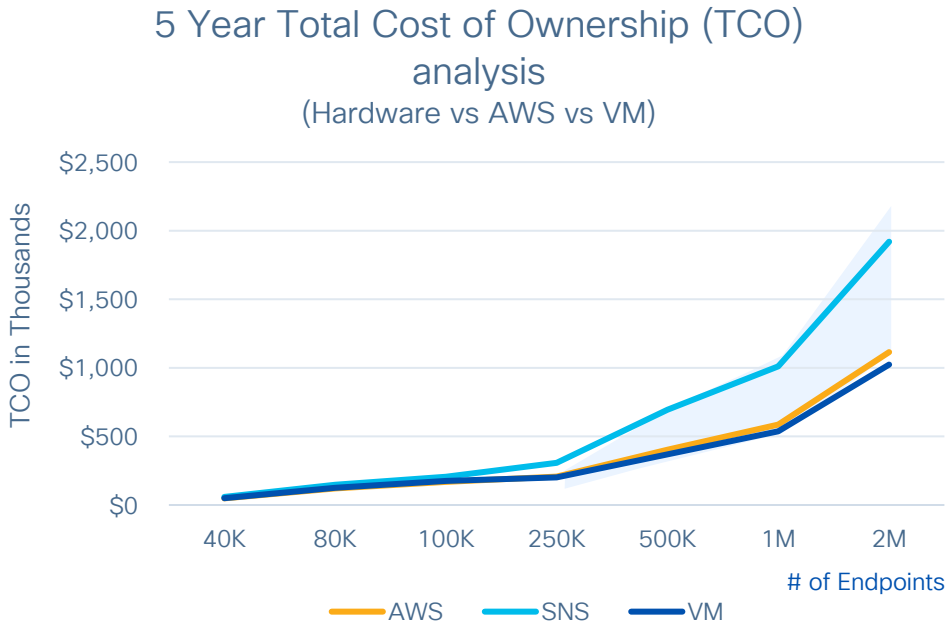
ISE on AWS TCO

Discount Assumptions

- Hardware and VM appliance/solution support with 65% discount.
- AWS costing is calculated for 3 years reserved EC2 and all upfront pay.

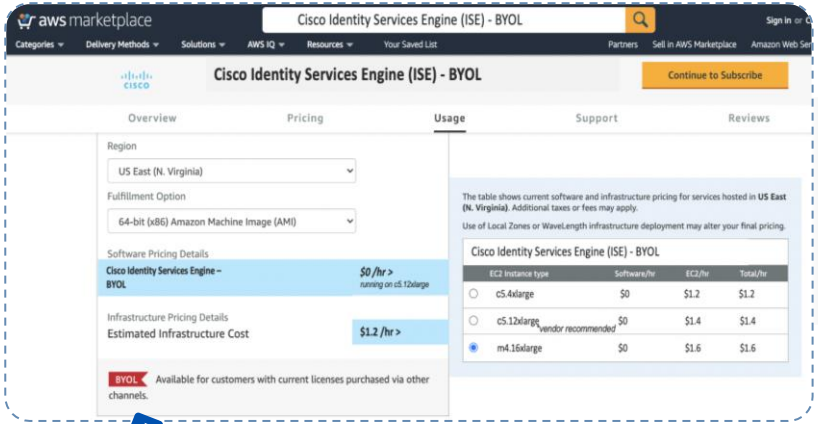
Conclusion

- AWS is significantly cheaper than hardware for S/M/L deployments.
- AWS marginally costlier than VM deployments for larger deployments.

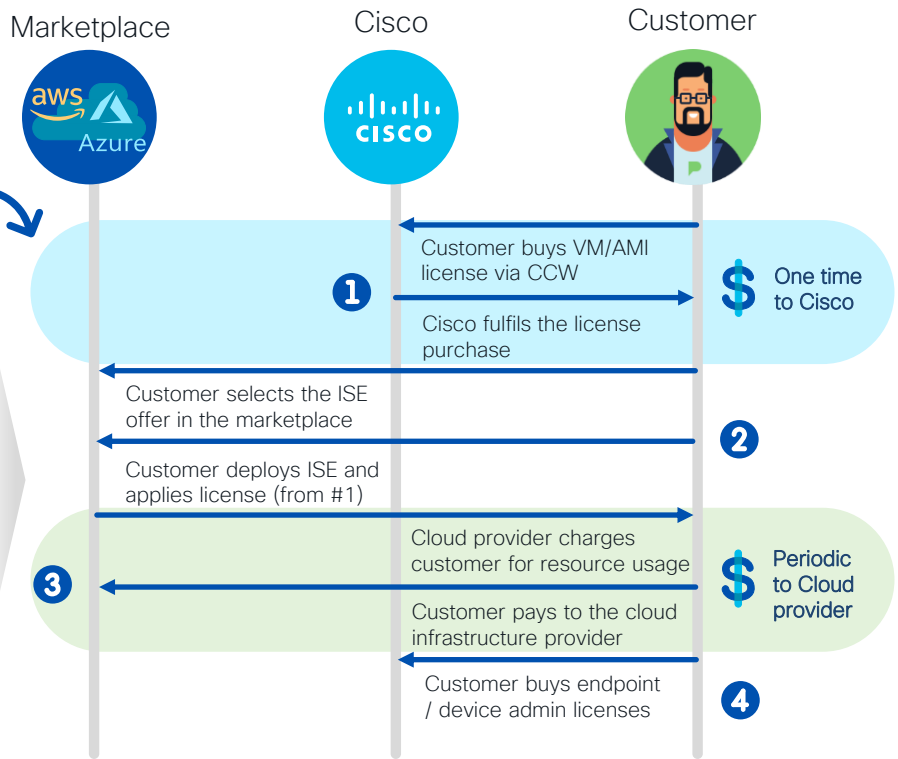


ISE Cloud Instance Buying Experience

Flexibility to move from virtual appliances to AWS/Azure without license transaction.



BYOL – Bring Your Own License
Customer will purchase VM license from Cisco and use it in either in VM or Cloud IaaS.



ISE Setup Options

AWS Marketplace

AWS CloudFormation Template

Amazon Elastic Compute Cloud AMI (Amazon Machine Image)

Infrastructure as Code (IoC) tools

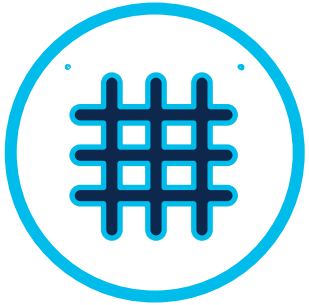
Jumpstart

Bring up ISE node one at a time

Bring up multiple ISE nodes at the same time*

ISE APIs

New in ISE 3.1

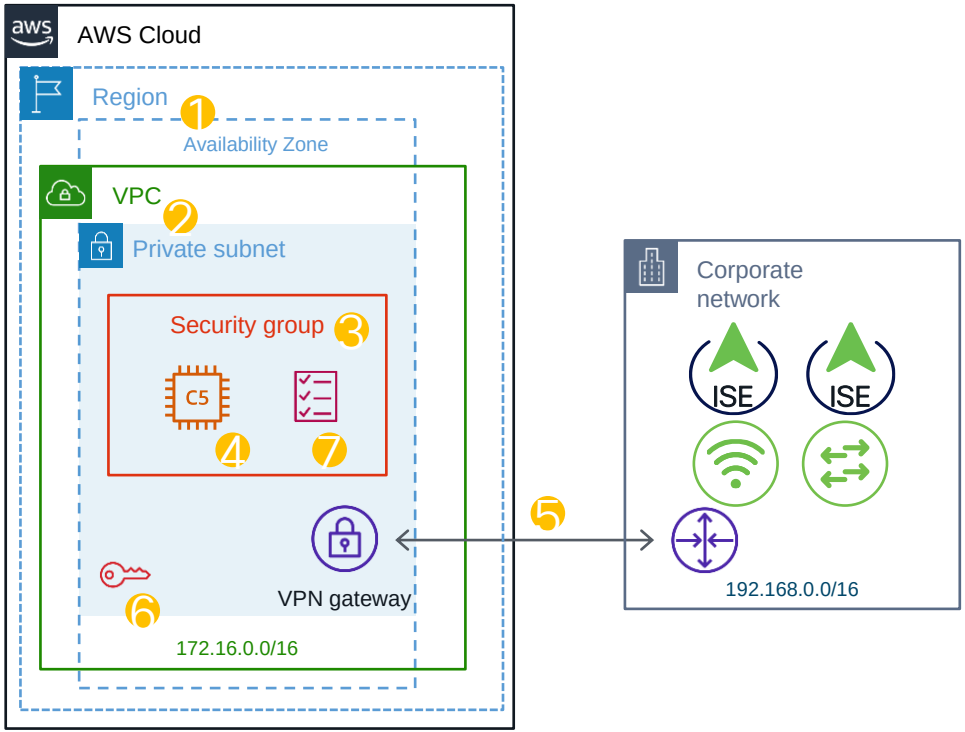


OpenAPIs	ERS	MNT	pxGrid
configuration	configuration	sessions	asynchronous endpoint context

cs.co/ise-api

github.com/
cisco-pxgrid/pxgrid-rest-ws

ISE Installation Prerequisites



1. Decide on Region and Availability zones
2. Create VPC & Subnet
3. Create Security Group
4. Decide on Instance Type
5. Setup VPN between AWS and on-prem network
6. Create Key pair for SSH
7. Collect ISE setup information: hostname, domain, DNS, NTP, Timezone, Admin credentials

{JSON}

```
{
  "object": {
    "hostname": "ise.securitydemo.net",
    "port": 443,
    "auth": {
      "username": "admin",
      "password": "C1sco12345"
    },
    ”verify": true
  }
}
```

YAML

```
---
object:
  hostname: ise.securitydemo.net
  port: 443
  auth:
    username: admin
    password: C1sco12345
  verify: true

# YAML supports Comments!!!
```

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ANSIBLE

Simple	Flexible	Agentless
• human-readable • declarative configs • ordered tasks • no coding required • start small and scale	• config management • workstations • servers / containers • applications • networks • security services • workflows	• SSH (Linux, macOS) • REST (ISE) • WinRM (Windows) • others as needed • efficient • secure

Terminology

galaxy.ansible.com

Collections

cisco.ios.*

...

cisco.ise.*

Modules

endpoint

network_device

...

Roles

Playbooks

YAML

1. Task
2. Task
3. Task
4. Task

Control Node

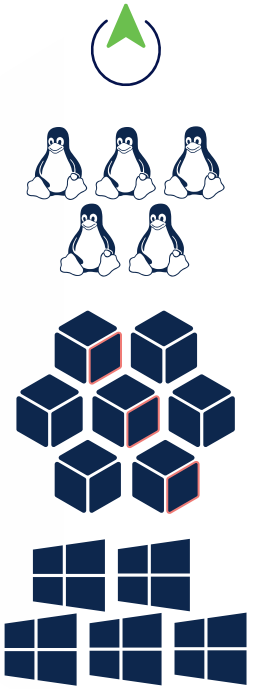
Inventory

nodes

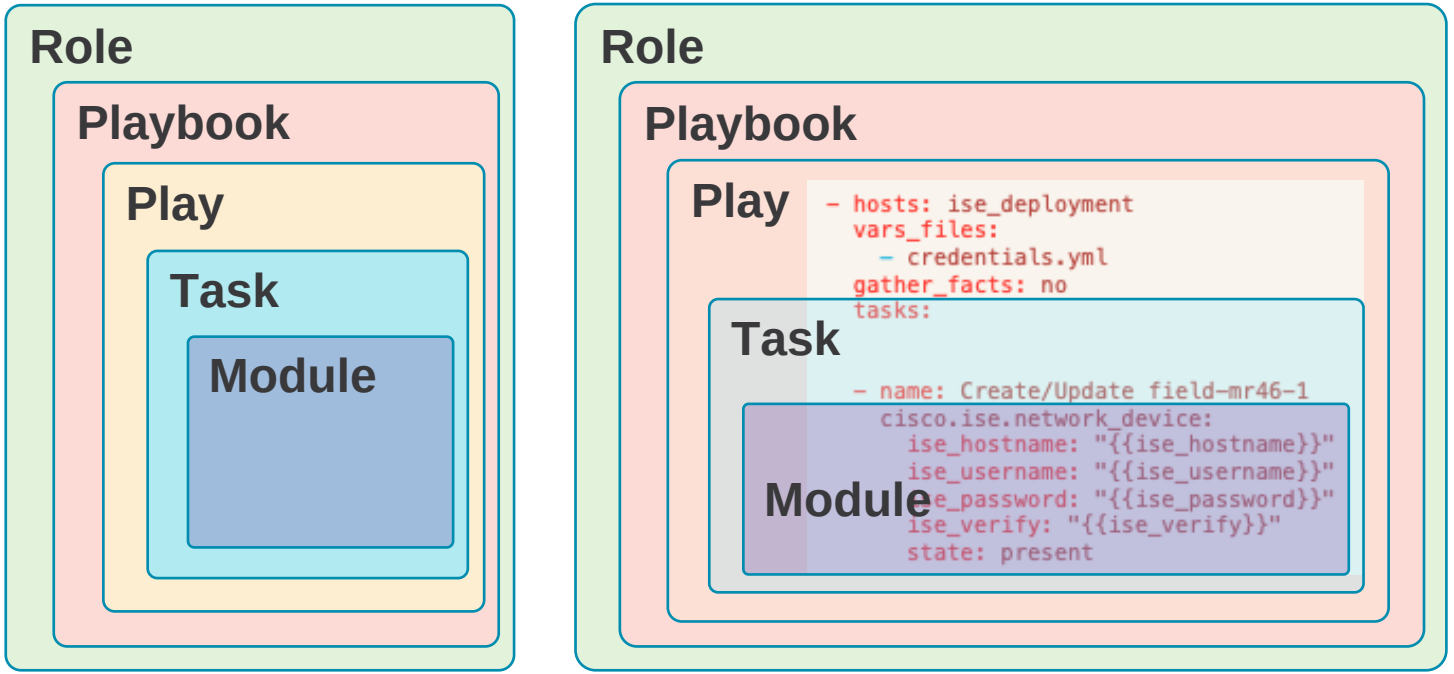
INI

hosts

Managed Nodes



Ansible Taxonomy



```
pip3 install --upgrade pip
pip3 install pipenv
pipenv install --python 3.9
pipenv install ciscoisesdk
pipenv install ansible
pipenv install jmespath
pipenv shell

ansible-galaxy collection install cisco.ise
ansible-galaxy collection install cisco.ise --upgrade

ansible-galaxy collection install community.general
```

Ansible Collections

amazon.aws	cisco.ise	community.hashi_vault	community.windows	hetzner.hcloud	ngine_io.cloudstack
ansible.builtin	cisco.meraki	community.hrobot	community.zabbix	hpe.nimble	ngine_io.exoscale
ansible.netcommon	cisco.mso	community.kubernetes	containers.podman	ibm.qradar	ngine_io.vultr
ansible.posix	cisco.nso	community.kubevirt	cyberark.conjur	infinidat.infinibox	openstack.cloud
ansible.utils	cisco.nxos	community.libvirt	cyberark.pas	inspur.sm	openvswitch.openvswitch
ansible.windows	cisco.ucs	community.mongodb	dellemc.enterprise_sonic	junipernetworks.junos	ovirt.ovirt
arista.eos	cloudscale_ch.cloud	community.mysql	dellemc.openmanage	kubernetes.core	purestorage.flasharray
awx.awx	community.aws	community.network	dellemc.os10	mellanox.onyx	purestorage.flashblade
azure.azcollection	community.azure	community.okd	dellemc.os6	netapp.aws	sensu.sensu_go
check_point.mgmt	community.crypto	community.postgresql	dellemc.os9	netapp.azure	servicenow.servicenow
chocolatey.chocolatey	community.digitalocean	community.proxysql	f5networks.f5_modules	netapp.cloudmanager	splunk.es
cisco.aci	community.docker	community.rabbitmq	fortinet.fortimanager	netapp.elementsw	t_systems_mms.icinga_director
cisco.asa	community.fortios	community.routeros	fortinet.fortios	netapp.ontap	theforeman.foreman
cisco.intersight	community.general	community.skydive	frr.frr	netapp.um_info	vyos.vyos
cisco.ios	community.google	community.sops	gluster.gluster	netapp_eseries.santricity	wti.remote
cisco.iosxr	community.grafana	community.vmware	google.cloud	netbox.netbox	

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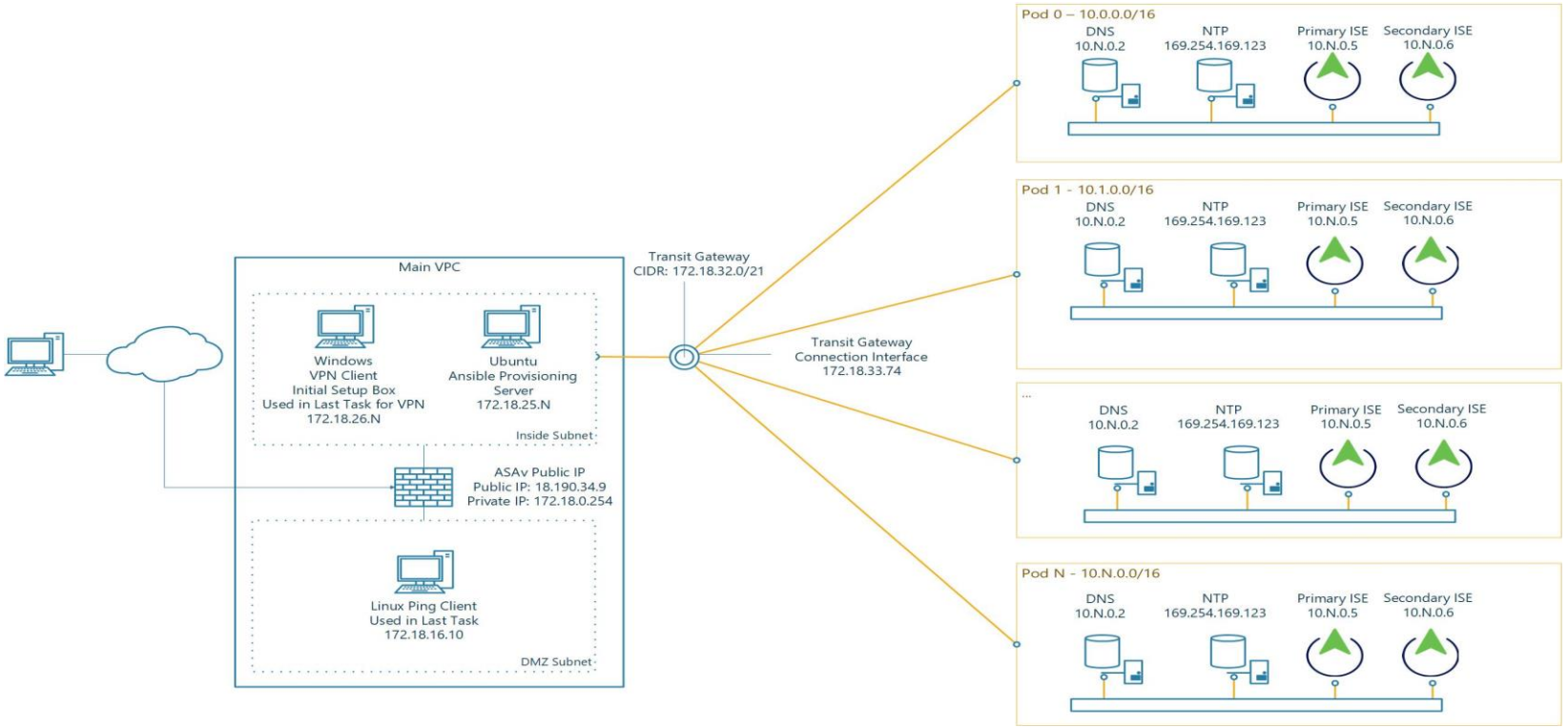
What Are We Doing?

- If you were to deploy this manually, the following tasks would be accomplished:
  - Create an SSH Key Pair
  - Create AWS VPC
  - Create Subnets
  - Create Route Tables
  - Edit Route Tables
  - Create a Linux Test Instance for Pinging

Topology

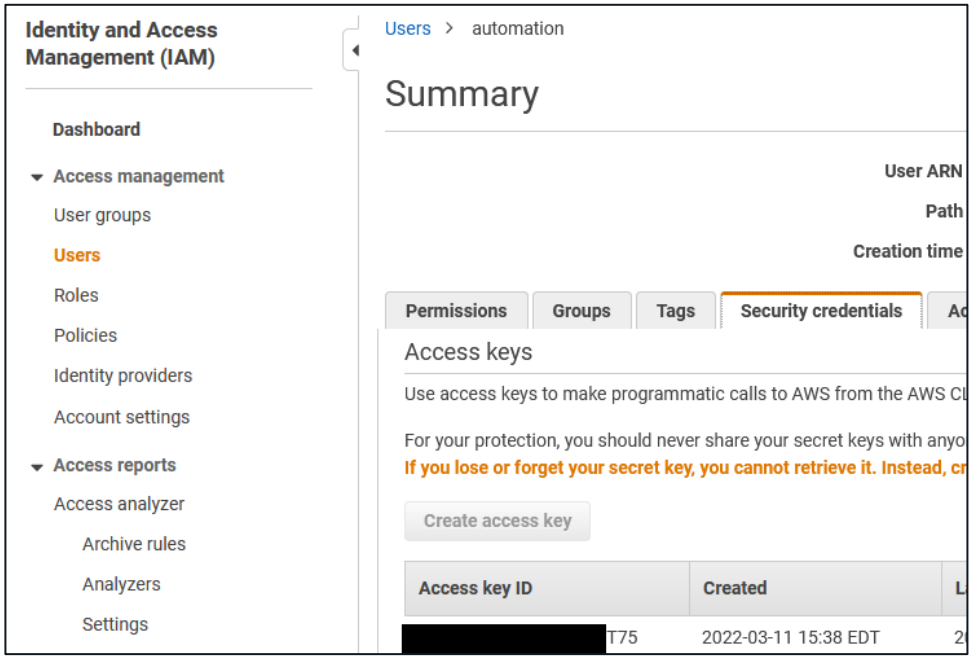


What You'll Need

- An AWS Account (and preferably budget to run that AWS instance!)
- A Linux Deployment Machine
  - Access to Git
  - Ansible Installed
- Knowledge of your Deployment
  - AWS Region
  - AWS Access Key
  - AWS Secret Key
  - Expected ISE Credentials

What You'll Need

- An AWS Account with Programmatic Access
- Don't be like Patrick!
  - Save files and hidden files
  - Search for secrets with Linux Utilities
  - find ./ -type f -exec grep -H 'YOUR_SECRET_KEY' {} \;



Amazon Web Services has opened case [redacted] on your behalf.

The details of the case are as follows:

Case ID: [redacted]
Subject: ACTION REQUIRED: Your AWS Access Key is Exposed for AWS Account [redacted]
Severity: Urgent
Correspondence: Dear AWS customer,

```
ubuntu@ip-10-0-1-217:~/CiscoLive_ISE_in_AWS/ISE_with_Meraki_in_AWS$ find ./ -type f -exec grep -H '[redacted]T75' {} \;
./vars/main.yaml.save:AWS_ACCESS_KEY: [redacted]T75
./vars/main.yaml.save:export AWS_ACCESS_KEY=[redacted]T75
```

What You'll Need

- An Ubuntu Deployment Machine
  - Routing tables must be present for addressing!
  - Separate Region Model (Public address)
  - Same Region Model (Private address)

```
---
#
# Tasks to enable and confirm ISE APIs
#

  - name: Enable ISE OpenAPIs (ISE 3.1+)
    delegate_to: localhost
    ansible.builtin.uri:
# note that the following all references the private IP address
# if this script sits outside of the region or subnet, use public
#     url: "https://{{ item.private_ip }}/admin/API/apiService/update"
      url: "https://{{ item.public_ip }}/admin/API/apiService/update"
      method: POST
```

What You'll Need

- Knowledge of your Deployment
  - AWS Region
  - AWS Access Key
  - AWS Secret Key
  - Expected ISE Credentials

```
pod_id:4
#set this to your ip used to access ise, or a hostname if DNS configured
#called in tasks/radius_probes.create.yaml
inventory_hostname: 18.218.29.225
ise_hostname: test-hostname.palloyd.xyz
ise_username: admin
ise_password: Cis12345!
AWS_REGION: us-east-2
ise_verify: false
```

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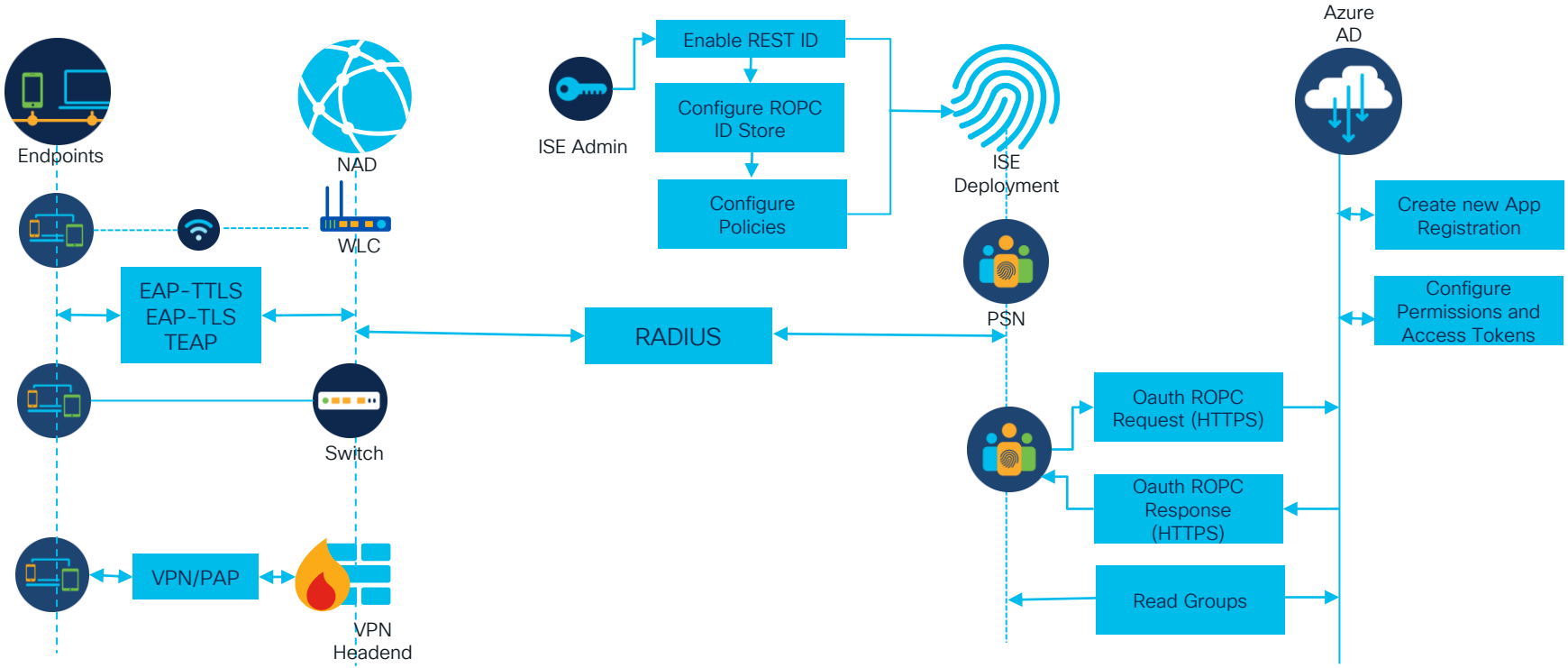
Azure AD / ROPC

- Resource Owner Password Credentials (ROPC) allows Cisco ISE to carry out authorization and authentication in a network with cloud-based identity providers.
- Controlled Access Introduction Feature
- Supports EAP-TTLS and PAP authentications with ISE 3.0+
- Supports EAP-TLS and TEAP with ISE 3.2+
- Introduced with new REST Auth Service

```
ISE PROCESS NAME                       STATE            PROCESS ID
--------------------------------------------------------------------
Database Listener                      running          8864
Database Server                        running          115 PROCESSES
Application Server                     running          26777
Profiler Database                      running          17001
ISE Indexing Engine                    running          28790
AD Connector                           running          30324
M&T Session Database                   running          23085
M&T Log Processor                      running          27013
Certificate Authority Service          running          30113
EST Service                            running          74954
SXP Engine Service                     running          3497002
TC-NAC MongoDB Container               running          3508280
TC-NAC Core Engine Container           running          3509361
VA Database                            running          3511016
VA Service                             running          3511272
PassiveID WMI Service                  running          3486473
PassiveID Syslog Service               running          3487203
PassiveID API Service                  running          3488149
PassiveID Agent Service                running          3489868
PassiveID Endpoint Service             running          3493221
PassiveID SPAN Service                 running          3495802
DHCP Server (dhcpd)                    disabled
DNS Server (named)                     disabled
ISE Messaging Service                  running          12100
ISE API Gateway Database Service       running          15723
ISE API Gateway Service                running          21553
ISE EDDA Service                       running          51664
REST Auth Service                      running          1486625
Hermes (pxGrid Cloud Agent)            disabled
ISE Node Exporter                      running          40606
ISE Prometheus Service                 running          43036
ISE Grafana Service                    running          49934
ISE MNT LogAnalytics Elasticsearch     disabled
ISE Logstash Service                   disabled
ISE Kibana Service                     disabled
```

Azure AD Integration with ISE – High Level Flow Overview



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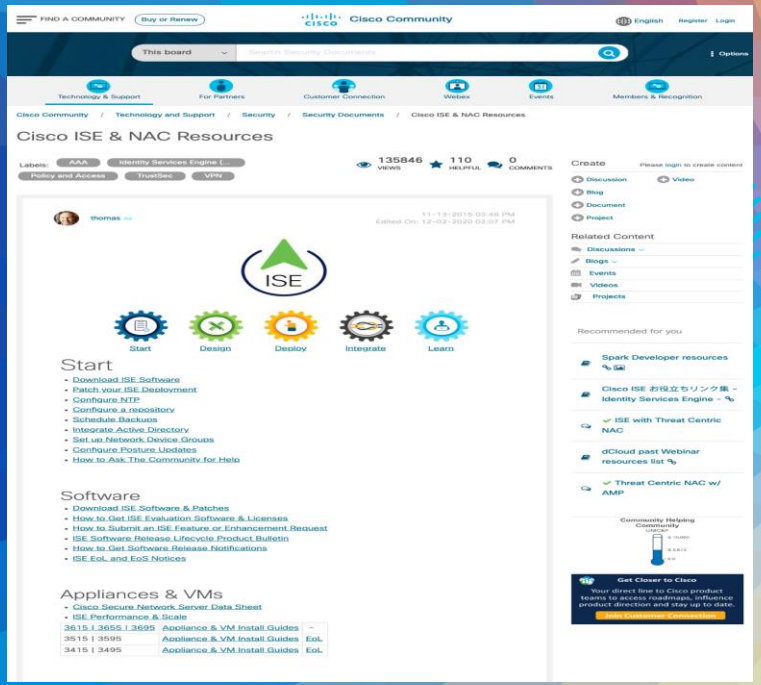
ISE Customer Resources



- Resources cs.co/ise-resources
- Community cs.co/ise-community
- YouTube Channel cs.co/ise-videos
- Licensing Guide cs.co/ise-licensing
- API SDK cs.co/ise-api
- Future webinars! cs.co/ise-webinars
- Devnet https://cs.co/ise-devnet
- ISE Github https://github.com/CiscoISE
- Patrick Lloyd's GitHub https://github.com/plloyd44

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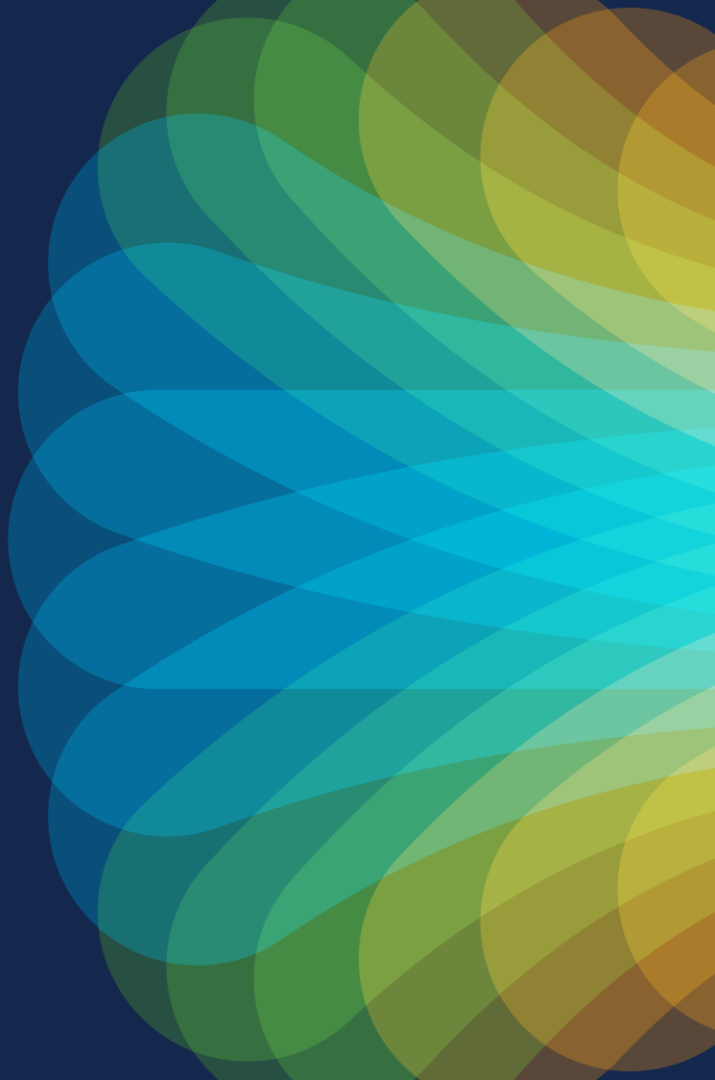
The bridge to possible

Thank you

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