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Let's go



The bridge to possible

Ansible Zero to Hero – Network Automation

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LTROPS-2409

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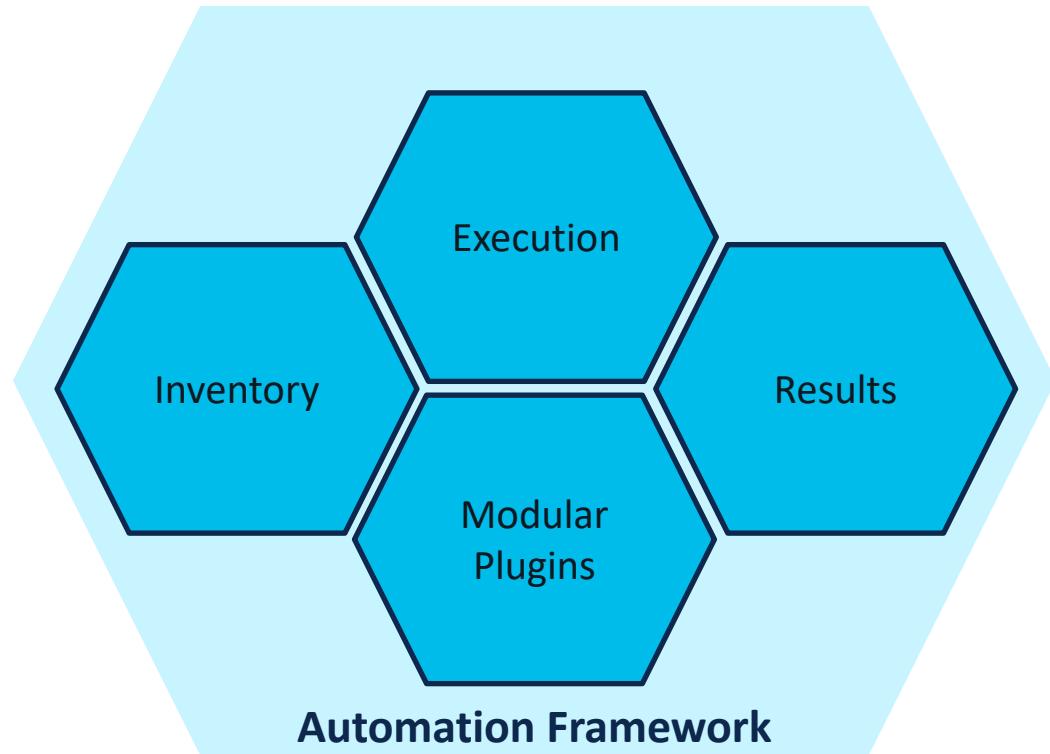
Agenda

- [What](#) is Ansible
- [Why](#) Ansible
- [Lab](#) Introduction
- Lab [Hands-on](#)
 - Lab-1: Familiarize with Ansible [Env](#)
 - Lab-2: Basic Ansible [Commands](#)
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 - Lab-4: [Advanced](#) Topics
- Ansible vs other Tools [Comparison](#)
- Ansible vs [NSO](#)
- Conclusion

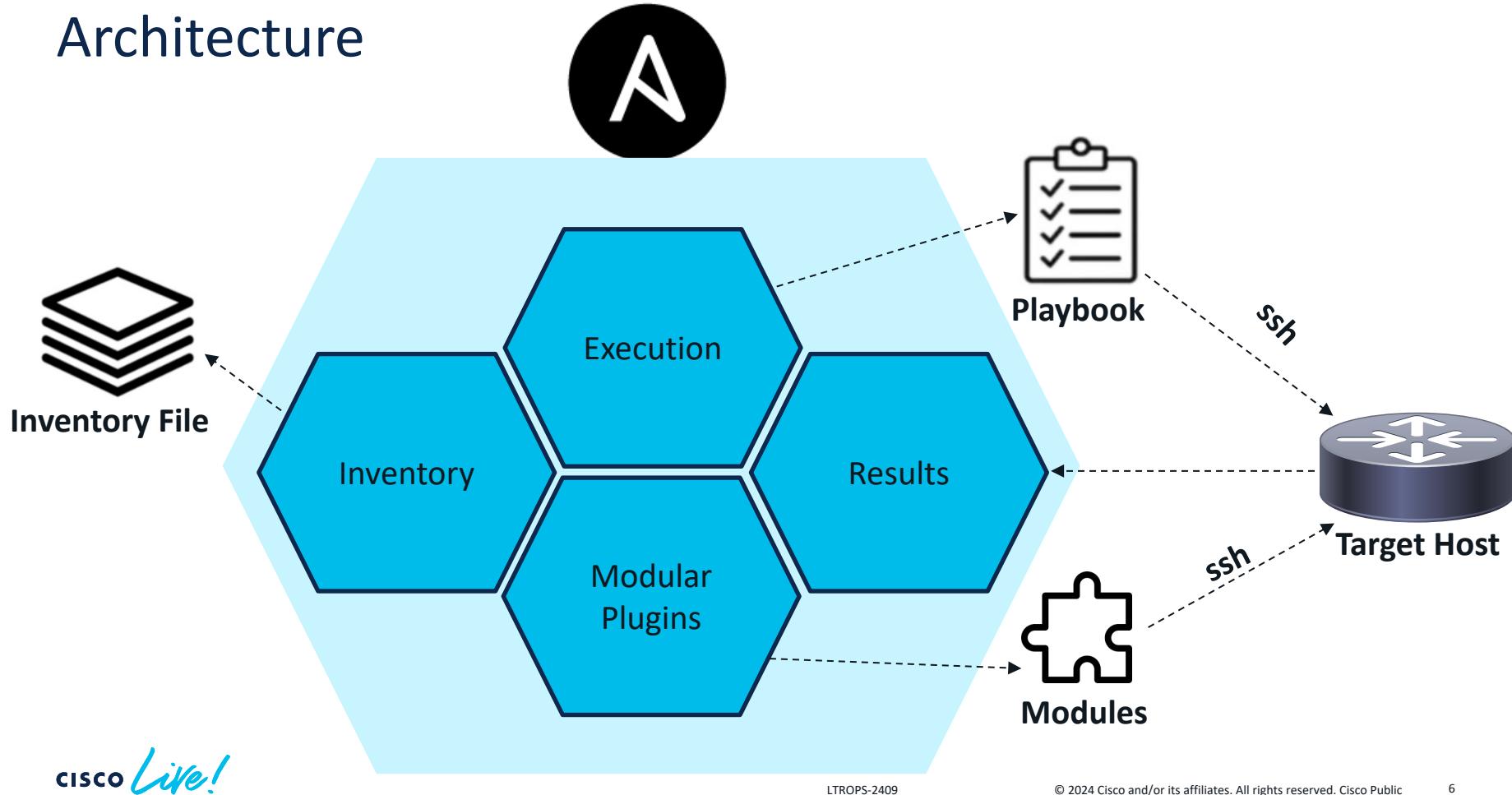
What is Ansible?

What is Ansible

- An [open-source](#)
- Automation [Framework](#)
- Founded in 2013, bought by Red Hat
in 2015
- Controls all the target nodes/hosts
from single machine([ansible controller](#))
- Uses standard [ssh](#) for communication



Architecture



Ansible Packaging

- Ansible consists basically of 2 packages
 - ansible-core
 - ansible
- ‘ansible-core’
 - runtime
 - fundamental modules & plugins
- ‘ansible’
 - Community developed modules

Ansible Installation

- **On Fedora:**

```
$ sudo dnf install ansible
```

- **On RHEL and CentOS:**

```
$ sudo yum install ansible
```

- **Ubuntu**

```
$ sudo apt update  
$ sudo apt install software-properties-common  
$ sudo apt-add-repository --yes --update ppa:ansible/ansible  
$ sudo apt install ansible
```

- **MacOS:**

```
$ pip3 install ansible
```

Upgrade from v2.9 and earlier not possible!

```
pip3 uninstall ansible  
pip3 install ansible
```

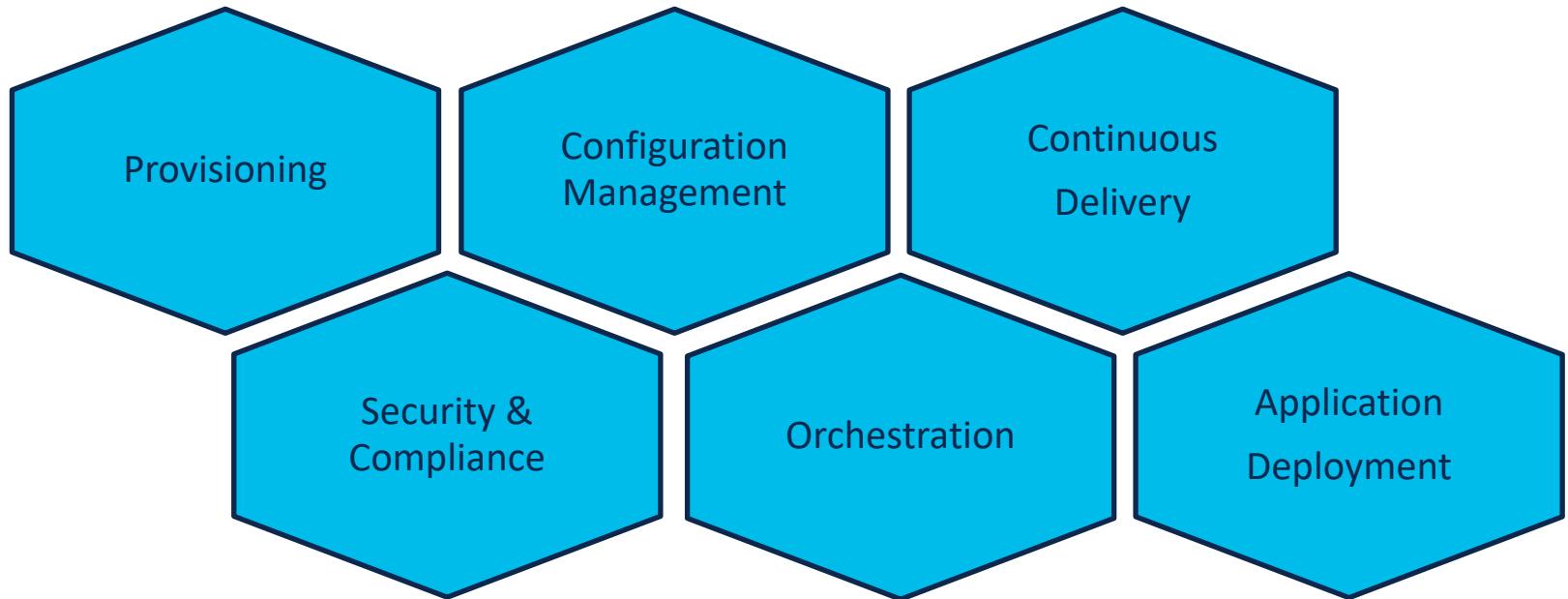
- **Windows is not supported as controller**

Why Ansible?

Why Ansible

- Simple
 - Uses simple syntax written in **YAML** (*YAML Ain't Markup Language*)
 - ‘No Code Low’ Code philosophy, YAML is just enough
- Agentless
 - No Agents or software required to be installed on target hosts.
 - No special firewall ports needs to be opened as ansible uses ssh.
- Powerful
 - Features that enables to model even complex workflows.

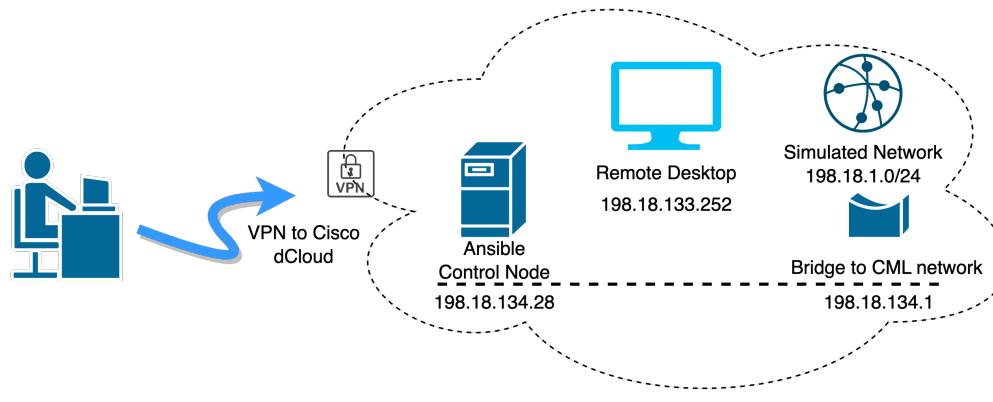
Use Cases



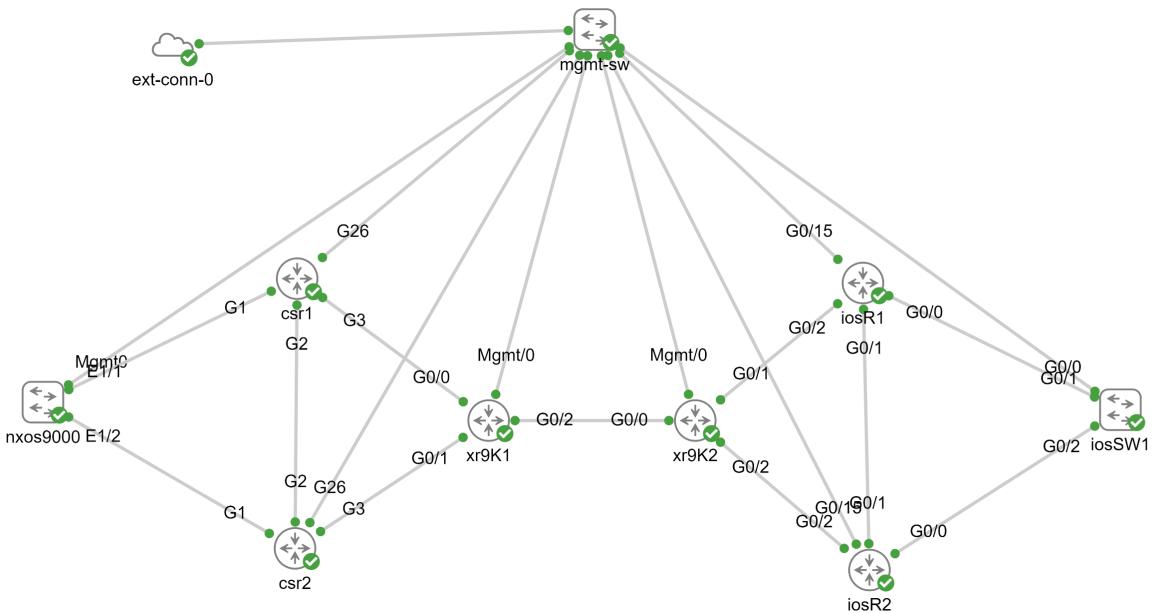
Lab Introduction

dCloud Lab Setup

- **Control node:** Ansible VM based on Ubuntu
- **Managed nodes:** 2 XRv9K core router, 2 IOS & CSR1kv branch routers each, 2 NX-OSv switches
- **Windows Jump host:** Windows with Visual Studio editor, Putty SSH client

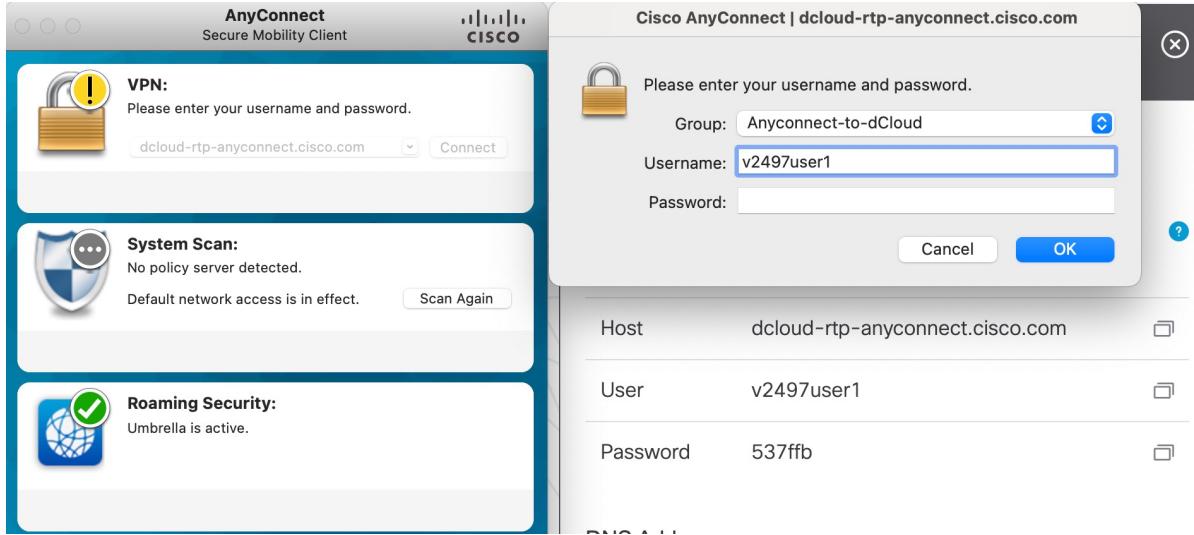


Network Topology



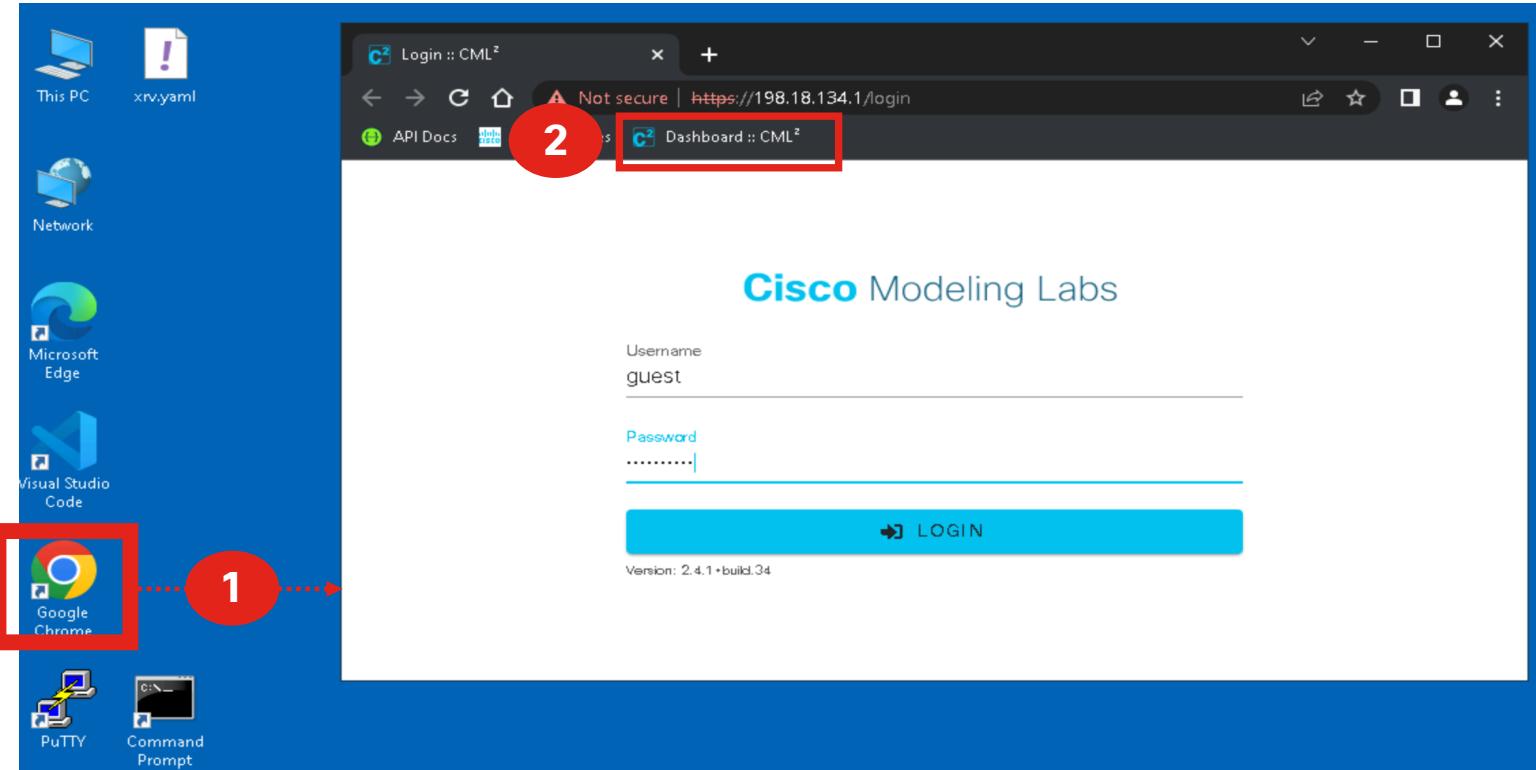
Lab Access

- Use the **Cisco AnyConnect Client** and your provided VPN username and password to connect to your lab instance

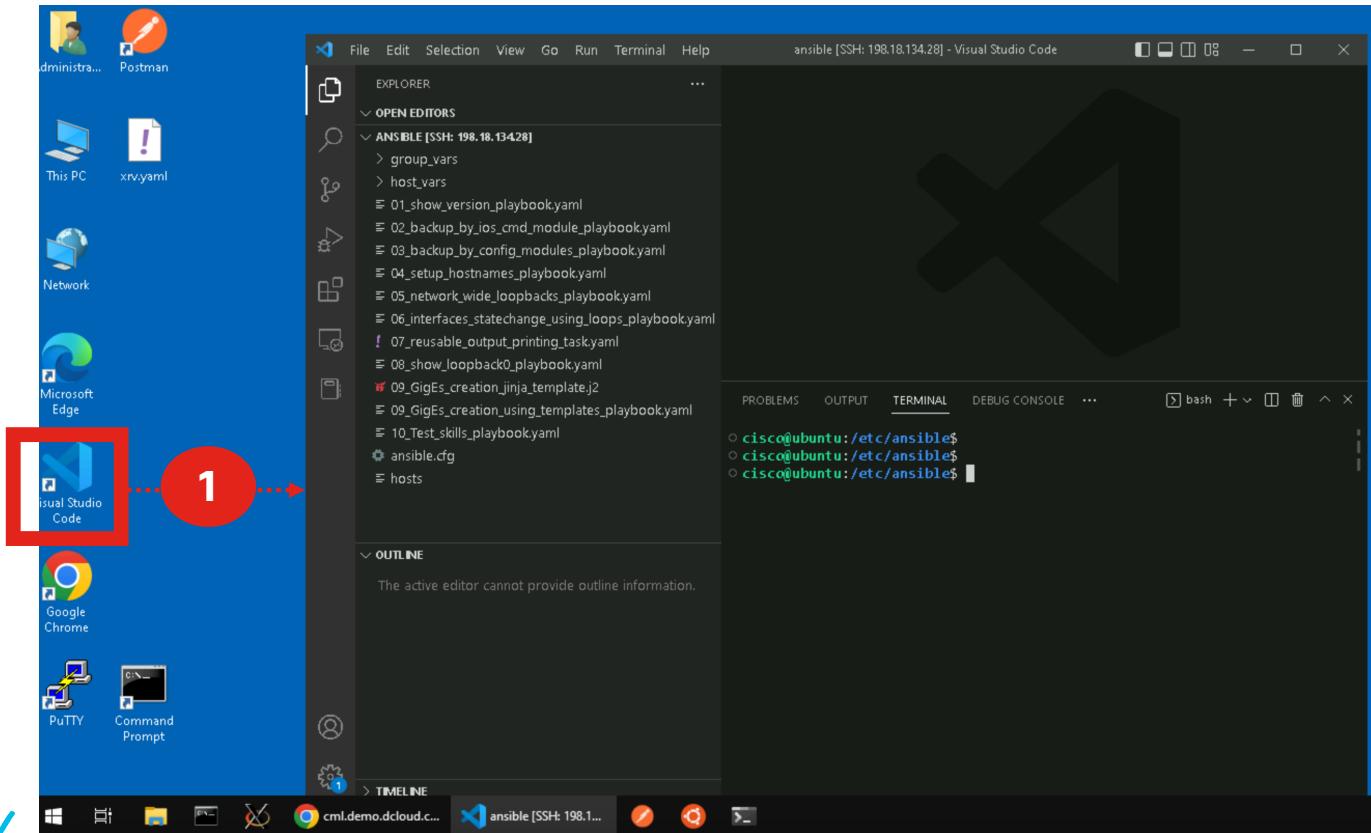


- Connect to the Windows jump host using RDP client to address **198.18.133.252**

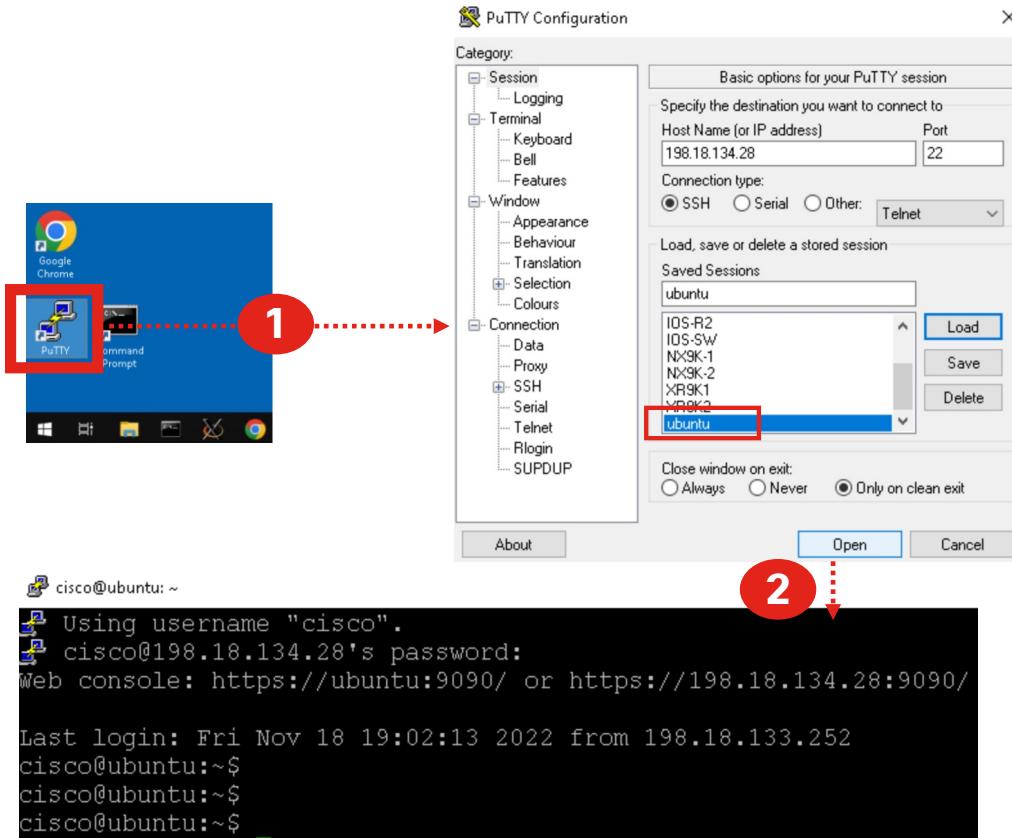
Windows Jump host – CML



Windows Jump host – Visual Studio (Visio)



Windows Jump host – Ansible Controller (Ubuntu)



Hands-on Lab

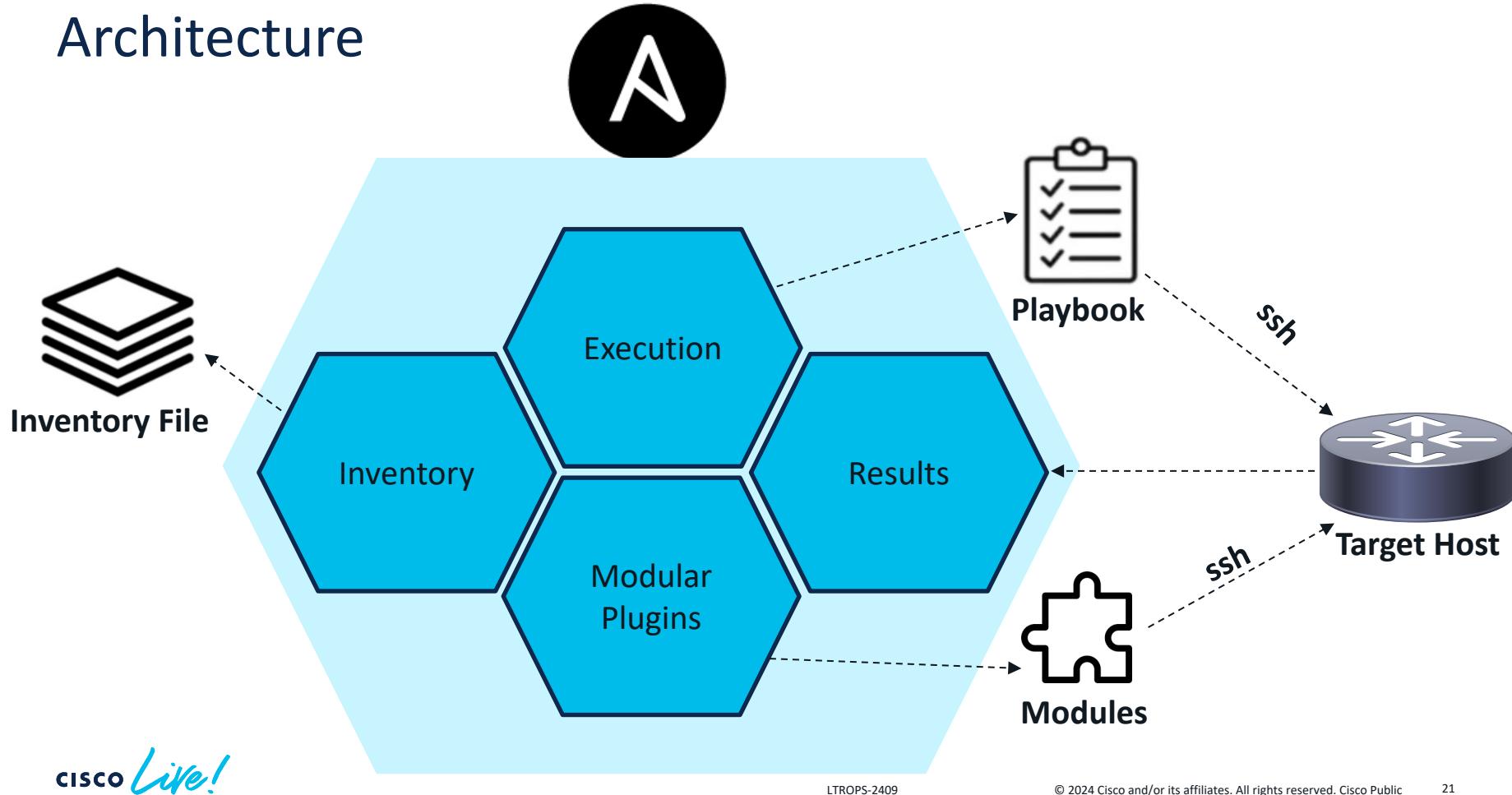
LAB1:

Familiarize with

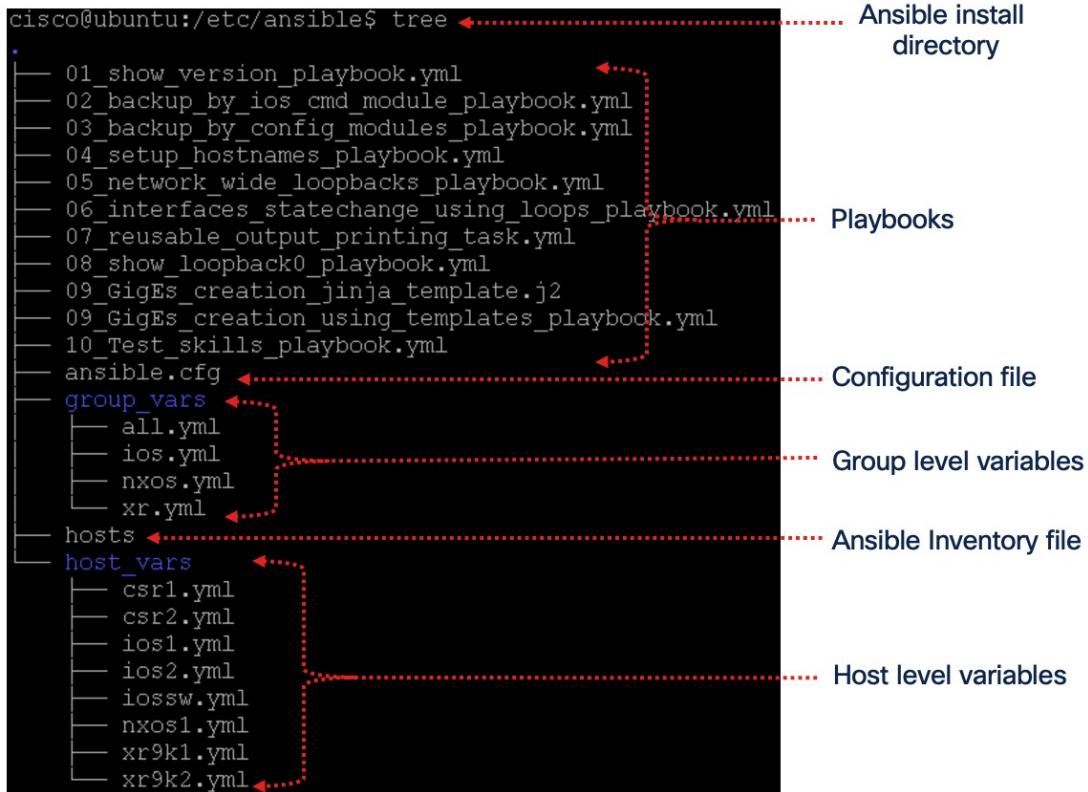
Ansible

Environment

Architecture



Ansible Directory Structure (LAB)

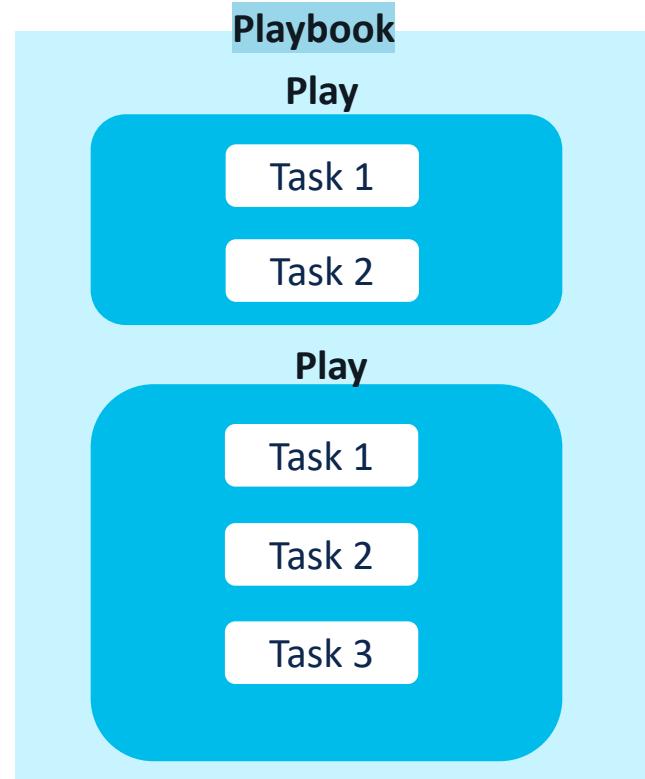


Ansible Inventory

- Written in [INI](#) or [YAML](#).
- Default location [/etc/ansible/hosts](#)
 - Can be changed in [/etc/ansible/ansible.cfg](#)
- Contains [target hosts details](#) like hostname, IP, protocol, credentials
- Allows [Grouping](#) of target hosts for collative reference
 - Two default groups: all & ungrouped
- Can also stores [variables](#), specific per host or per group or for all.
- Separate file can also be used for variable, but this file must be located in subfolder [group_vars](#) or [host_vars](#) in same directory of inventory/host file

Ansible Playbook

- Written in [YAML](#).
- Contains one or multiple [plays](#) in a playbook
- Each play further contains one or multiple [tasks](#).
- Task is a [single action](#) to be performed by ansible



Ansible Modules

- Reusable or standalone script written in any programming language (usually python) that can return JSON in response.
- Modules expose functions with acceptable inputs and perform desired execution on target host
- Modules abstract the underlying complexity and simplify user tasks



Lab-2: Basic Ansible Commands

Further reading:

https://docs.ansible.com/ansible/latest/user_guide/intro_adhoc.html

https://docs.ansible.com/ansible/latest/modules/ping_module.html

Ad-hoc Commands

- Allows you to execute tasks quickly without saving steps
 - Useful to understand the basics of how Ansible works
-
- `ansible -m <module> [-a <arguments>] <hosts_section>`
 - Default module is “command” (“`-m command`” can be omitted)
 - “`-m ping`” is the ‘Hello World’ of Ansible

```
$ ansible -a "date" all
localhost | SUCCESS | rc=0 >>
Wed Nov 25 05:52:52 CET 2022
$ ansible -m ping csr1
198.18.134.28 | SUCCESS => {
    "changed": false,
    "failed": false,
    "ping": "pong"
}
```

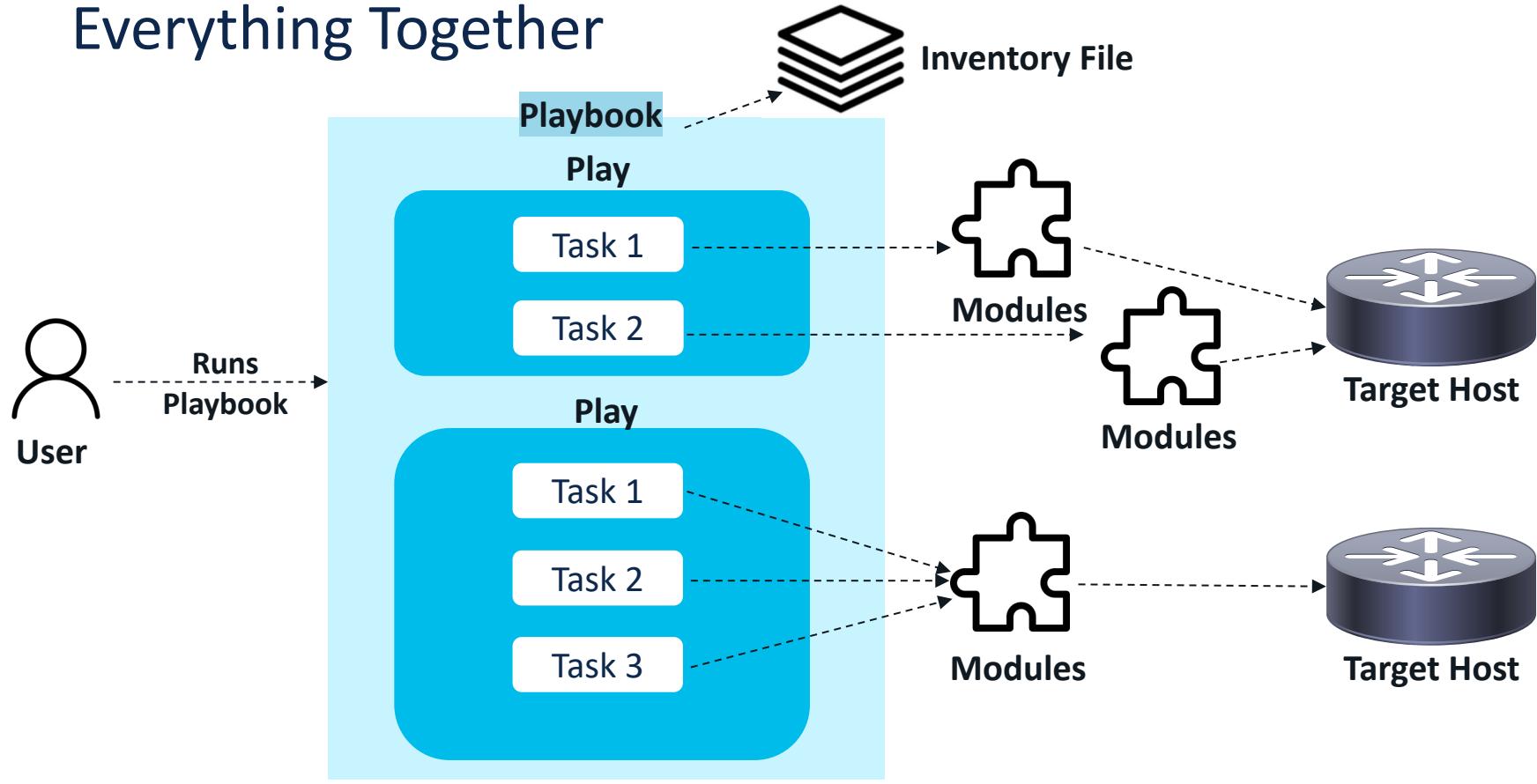
Playbooks

- Ansible's method of procedures (MoP)

```
1 --- ← Starts with three “-”
2
3 # Play book to show version of all IOS & XRs ← “#” used for comments
4 - name: Get Device versions ← Name of Play
5 hosts: all,!nxos ← Target device/groups
6 tasks:
7   # First Task to get the versions from devices
8   - name: Running 'show version' command ← Task to run CLI on target
9     # Using ios_command module
10    ios_command: ← Network Module being used
11      commands: ← Function of network module
12        - show version ← Parameters to the function
13      # Saving the output of above CLI to a variable named show_ver_output
14      register: show_ver_output ← Saving task output to variable
15
16    # Second Task to parse returned JSON and extract only relevant information for user
17    - name: Extracting only relevant information from 'show version' response ← Task to parse CLI output
18      debug: ← Module to print to screen
19        # Extracting Only the first line for show version CLI output
20        var: show_ver_output.stdout_lines[0][0] ← Parameter to print
```

```
cisco@ubuntu:/etc/ansible$ ansible-playbook 01_show_version_playbook.yaml
```

Everything Together



Ansible Building Blocks

Inventory
+
Playbooks
+
Modules

1. Inventory of target hosts
2. Playbook to group the actions to be executed
3. Each action is a task
4. Each Task may or may not use modules.

LAB-3

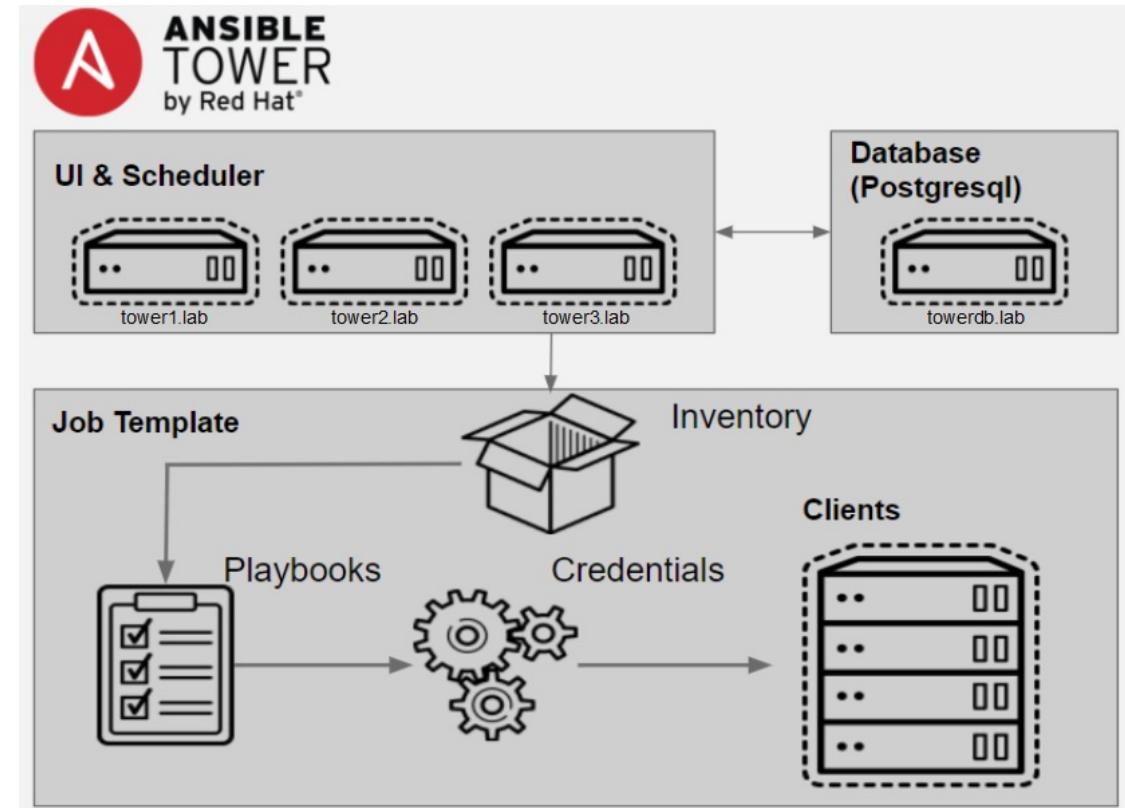
DEEP DIVE

LAB-4

Advanced Topics

Ansible Tower/AWX

- Web Interface for ansible
- Exposes Rest APIs
- User control
- Audit logs (**Most important)



Ansible & Other Tools Comparison

Ansible & Other Tools Comparison

Tools	Architecture	Agentless	Communication
Puppet	Master/Agent	No	Pull Mode
Chef	Master/Agent	No	Pull Mode
Salt	Master/Minion	No	Push Mode
NorNir	Python Automation Framework, Code Centric	<input checked="" type="checkbox"/>	SSH
NetPalm	REST APIs Broker for network automation	<input checked="" type="checkbox"/>	REST/SSH
Ansible	YAML based	<input checked="" type="checkbox"/>	SSH

Ansible vs NSO

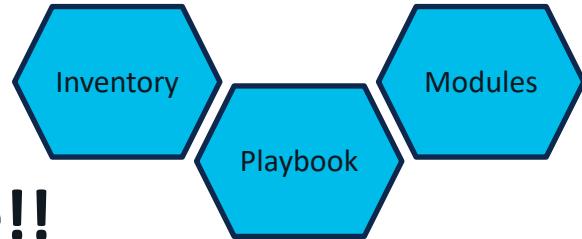
- Similarities:
 - Both are **Agentless**, works in **Push Mode**
- Not so similar:

Criteria	Ansible	NSO
Protocols	Mainly SSH/ but increasing	NED based (CLI, Netconf, Rest, TAPI & ...)
Transactional	Run till Completion with Errors	All or Nothing
Rollback	Not supported	Built-in Rollback
Use cases Scope	Device lifecycle, DevOps	Service Lifecycle Management (YANG based)
North Bound Interfaces	CLI, REST (TOWER)	CLI, Rest, JSON RPC, Netconf

Conclusion

Ansible + Cisco = Unlimited Potential

- Simple, Stateless, Powerful yet open-source automation Framework
- Quick Win scenarios for automation
- Best suited for large size automation teams than other dev-ops options like python, NorNir etc. YAML is the key.
- Limited desire or skills to adopt python programming
- Multi-vendor support utilizing vendor developed & maintained network modules.
- All that you need is a workstation/VM and start with



Happy Automating with Ansible!!

Cisco Webex App

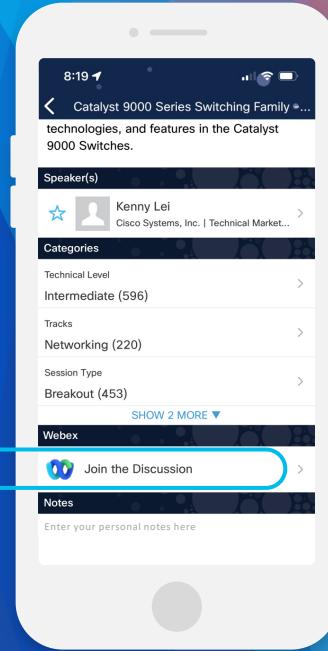
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Use Cisco Webex App to chat with the speaker after the session

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 February 23, 2024.



<https://cislive.ciscoevents.com/cislivebot/#BRKXXX-xxxx>

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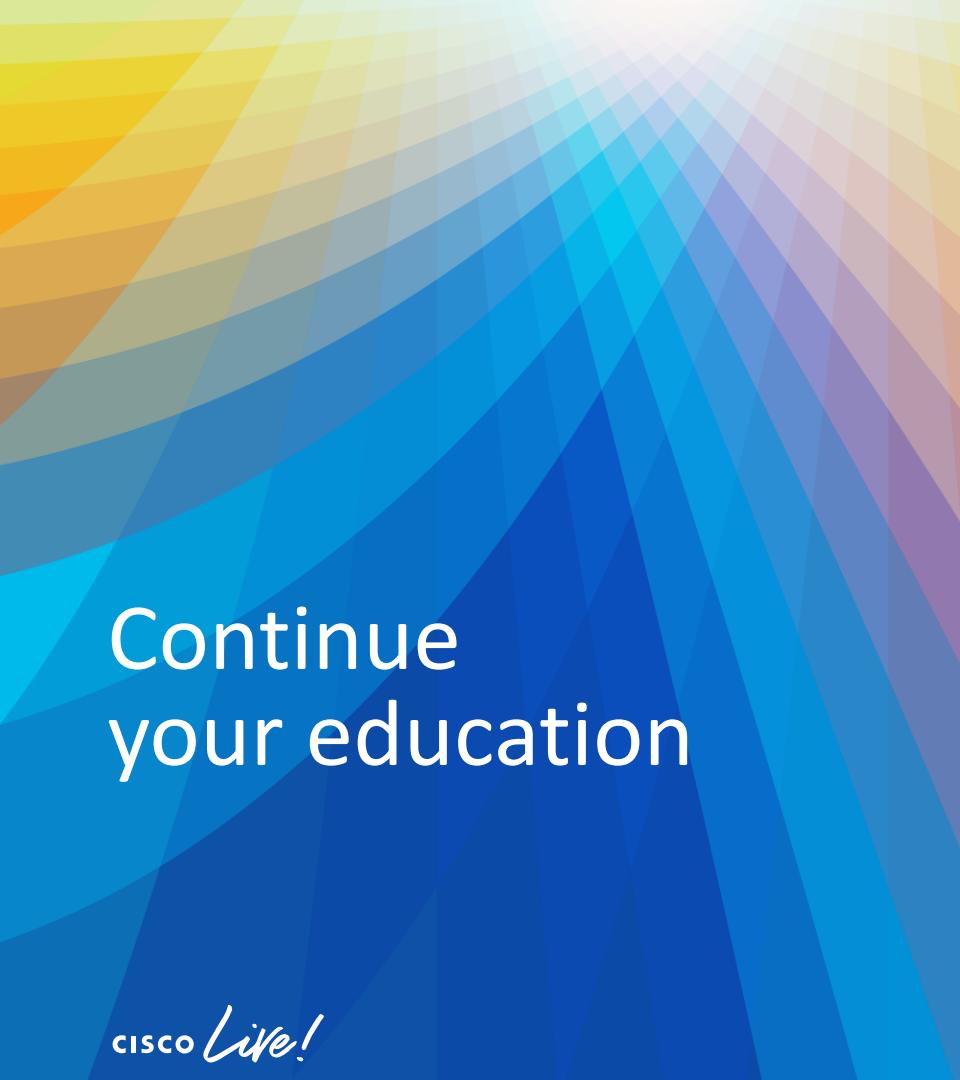


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Thank you

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