



The bridge to possible

Taking ACI towards Lightspeed

AI Powered ACI Automation – Less Complexity, More Magic!

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@anjain
DEVNET-2105

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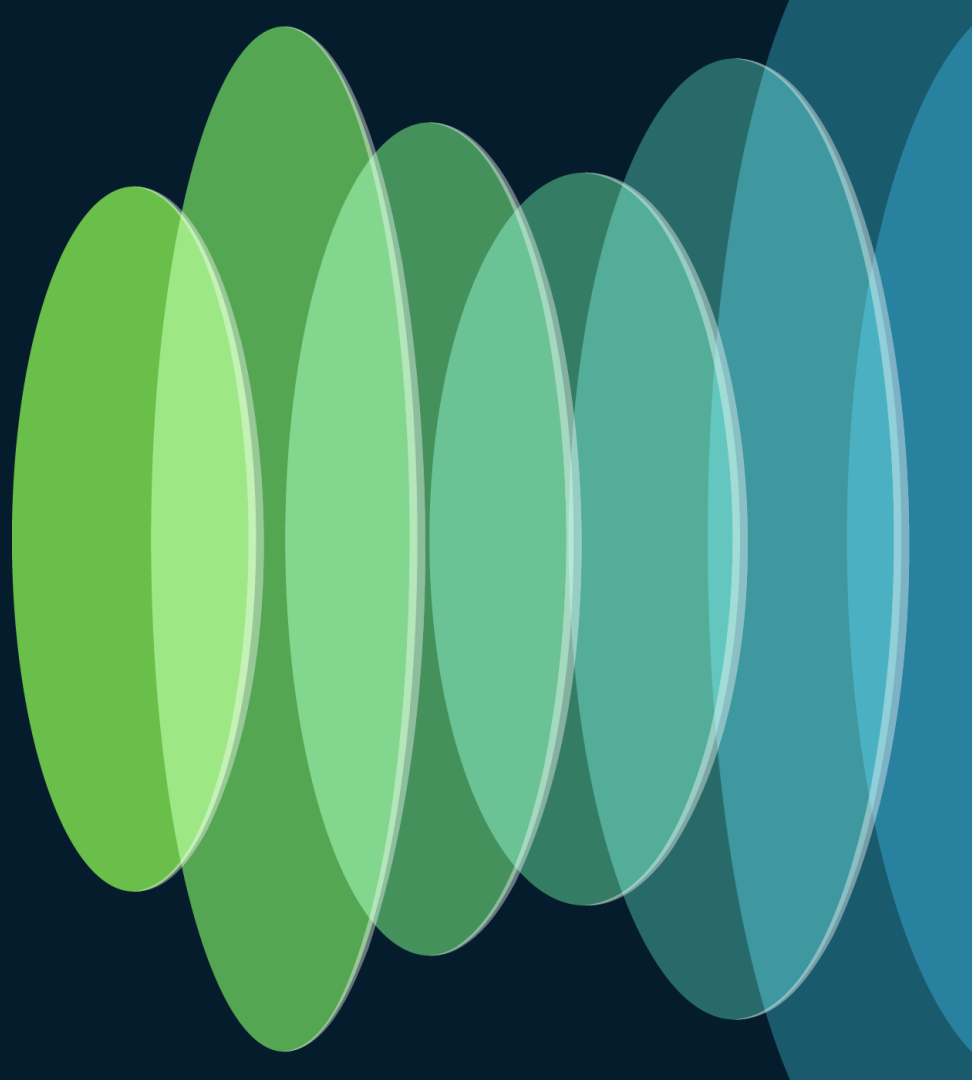




Agenda

- Cisco ACI
 - Ansible with ACI
- AI-Powered Code Recommendation
- Ansible LightSpeed
- Prompt Engineering
- Exploring other options
- Summary

Cisco ACI



Cisco ACI: Turnkey integrated DC SDN solution

- Zero-touch provisioning
- Auto deployment of the Underlay and the Overlay
- Managed like a single large switch
- Single management point
- API access



How to automate Cisco ACI ?



ANSIBLE

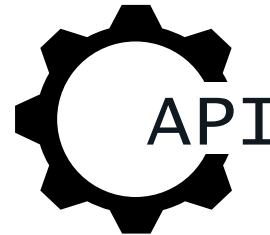


HashiCorp

Terraform



python



Ansible

- Open-source Configuration Management Tool
- Commercial support from RedHat
- Declarative (when possible) and idempotent
- Can manage a wide range of systems:
 - VMs, network devices, cloud instances, etc.
- Agentless



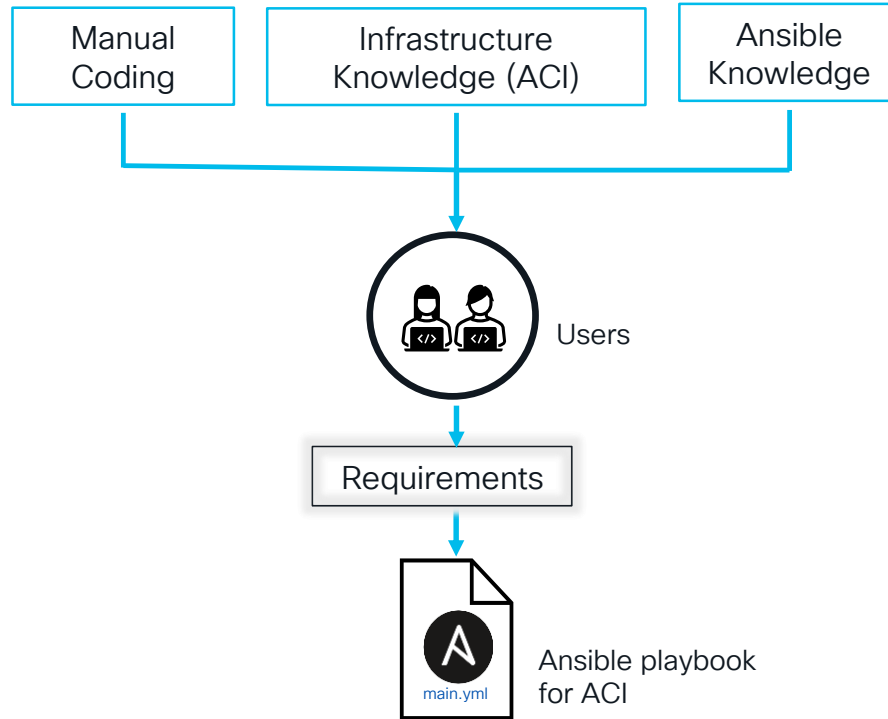
How to use Ansible with Cisco ACI ?

- ACI ansible collection
 - Ansible wrapper for ACI
 - Support all common use cases
 - Generic aci_rest module

<https://galaxy.ansible.com/ui/repo/published/cisco/aci/>

```
aci_playbook.yml
1  ---
2  - name: Create a new ACI Tenant and VRF
3    hosts: apic
4    gather_facts: no
5
6    vars:
7      apic_credentials:
8        host: "{{ apic_host }}"
9        username: "{{ apic_username }}"
10       password: "{{ apic_password }}"
11       validate_certs: no
12
13    tasks:
14      - name: Ensure the Tenant exists
15        cisco.aci.aci_tenant:
16          <<: *apic_credentials
17          tenant: my_tenant
18          state: present
19          delegate_to: localhost
20
21      - name: Ensure the VRF exists
22        cisco.aci.aci_vrf:
23          <<: *apic_credentials
24          tenant: my_tenant
25          vrf: my_vrf
26          state: present
27          delegate_to: localhost
28
```

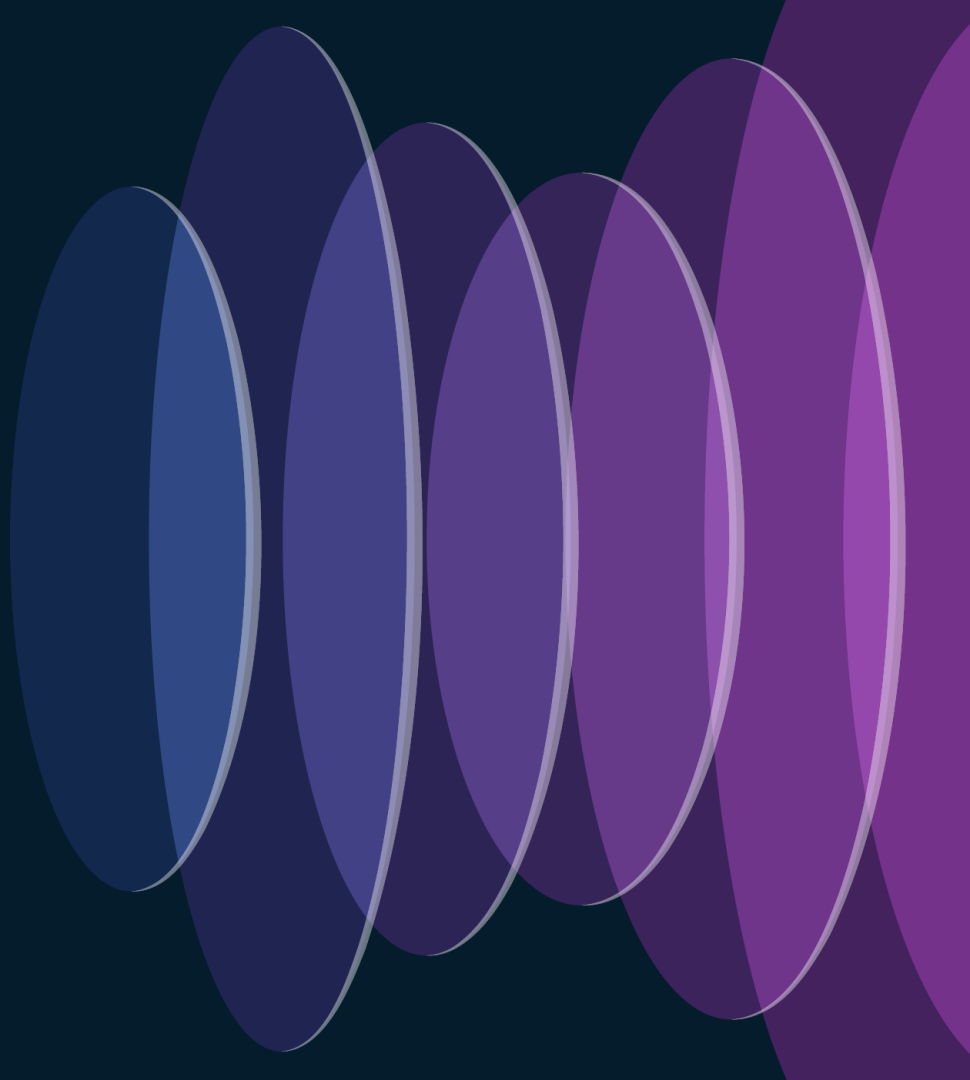

Current ACI playbook creation process



The Current challenges in Automation

- Skills gap
- Time consuming playbook development
- Lack of uniformity in playbook coding structure

AI-Powered Code Recommendation



AI-powered Code Recommendation

What

- Analyzes code
- Provides relevant suggestions
- Recommendation

AI-powered Code Recommendation

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- Provides relevant suggestions
- Recommendation

Why

- Increases Productivity
- Enhances Quality
- Learning New Techniques
- Promotes Consistency across projects

AI-powered Code Recommendation

What

- Analyzes code
- Provides relevant suggestions
- Recommendation

Why

- Increases Productivity
- Enhances Quality
- Learning New Techniques
- Promotes Consistency across projects

How

- Pattern Recognition
- Context Understanding
- Machine Learning Models
- User Feedback Loop

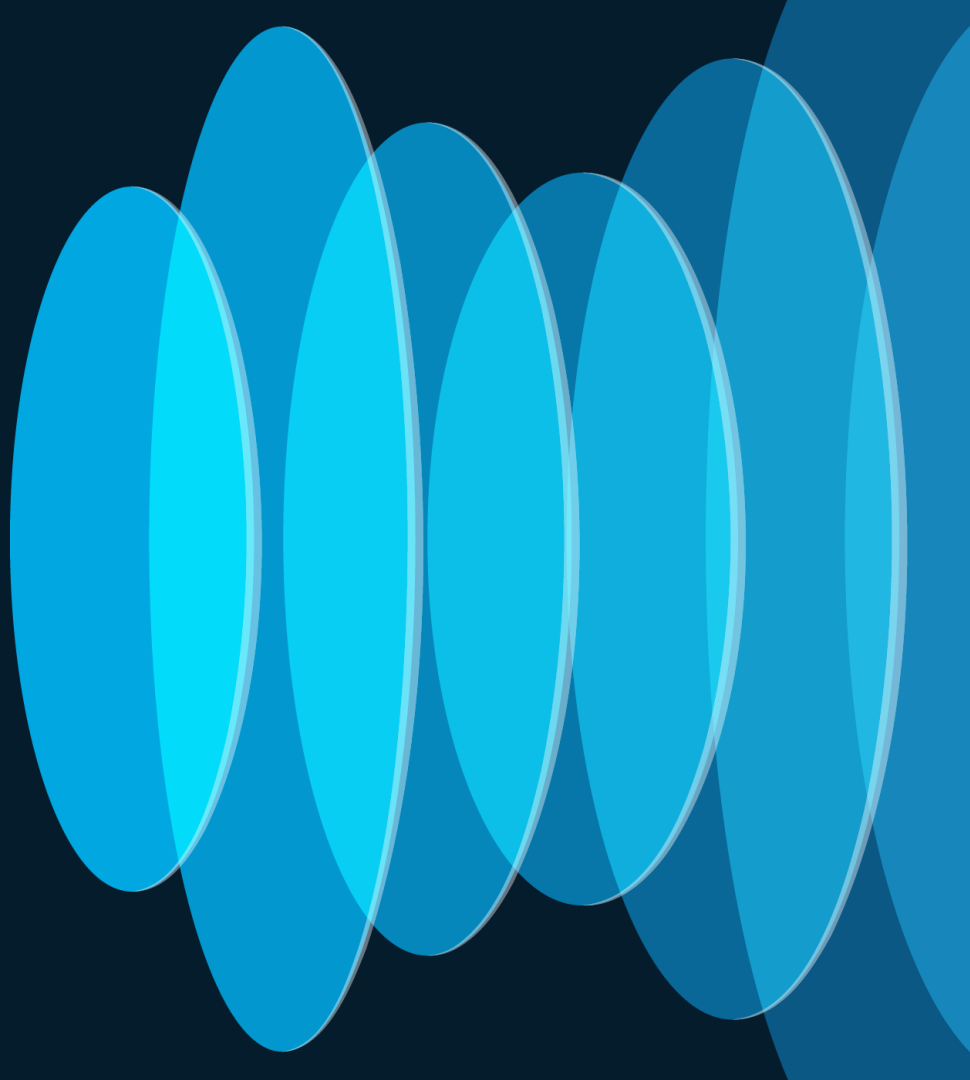


Less Complexity,
More Magic!



Ansible Lightspeed

Unleash the power of AI in your Playbooks!





Ansible Lightspeed



Generate Ansible Code from natural language description.



Recommends Ansible content based on context.

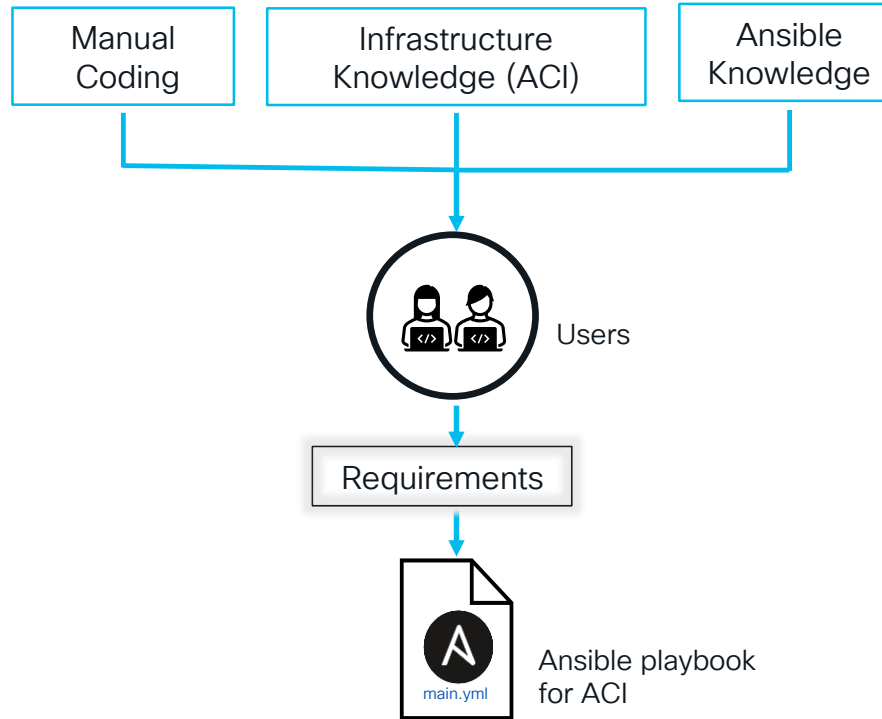


Maintain Code Quality and Consistency.

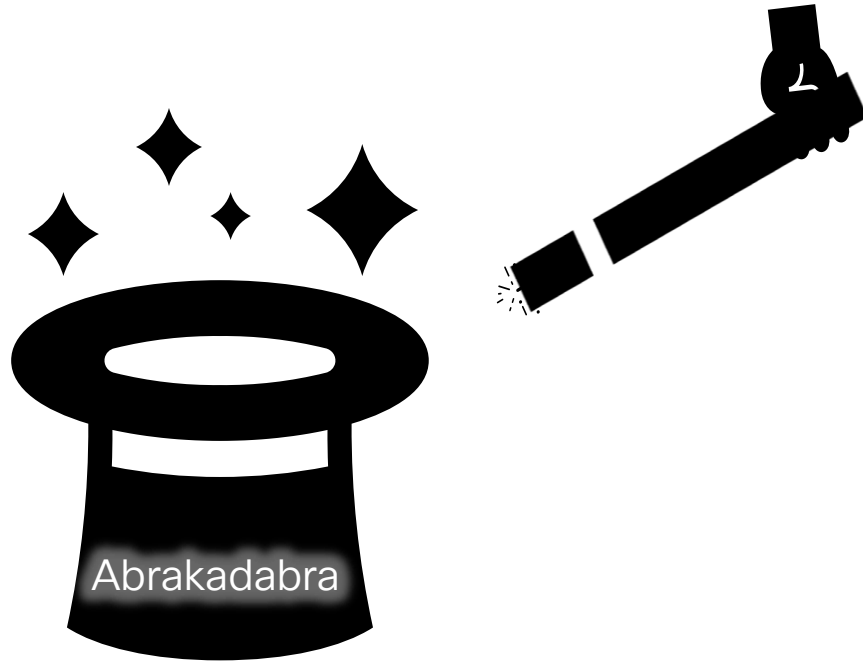


Expand who can create automation content.

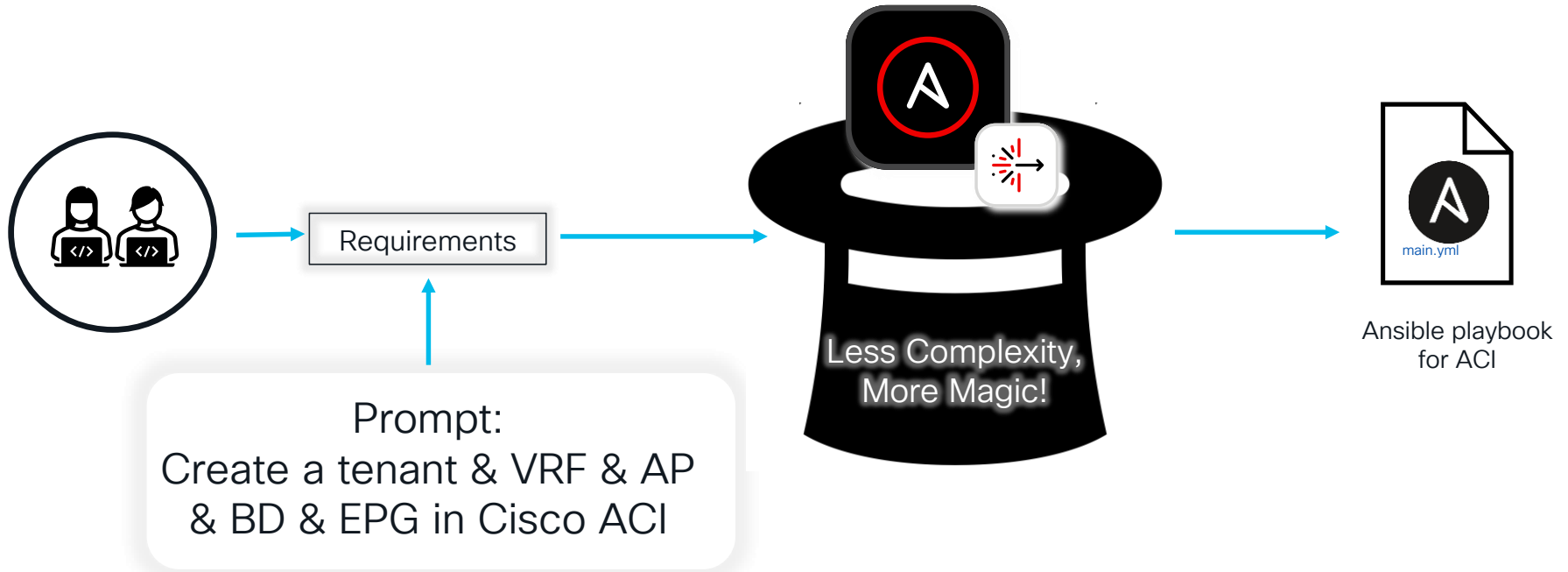
Current ACI playbook creation process



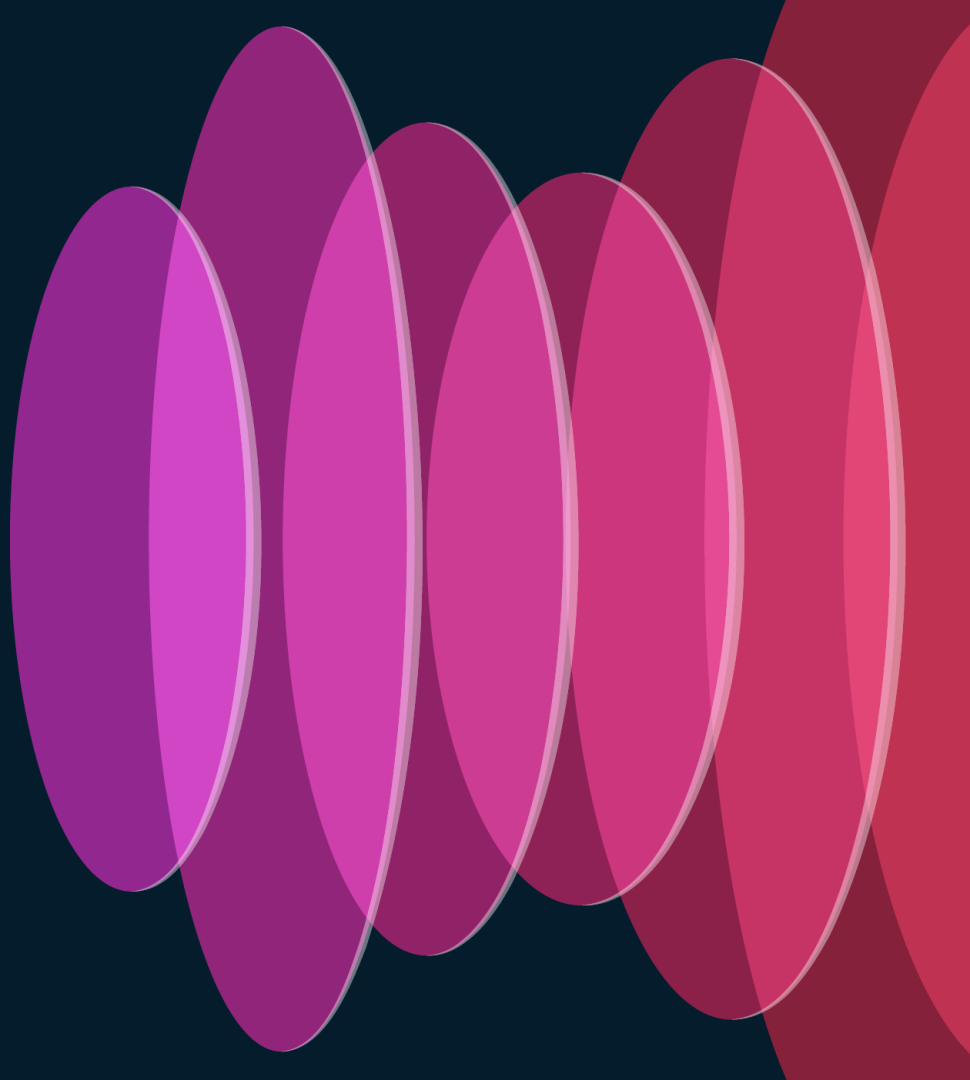
AI Powered Code Generation



AI Powered Code Generation



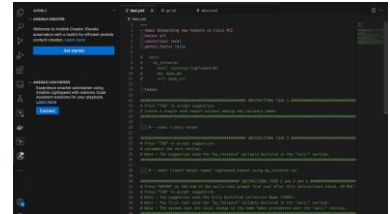
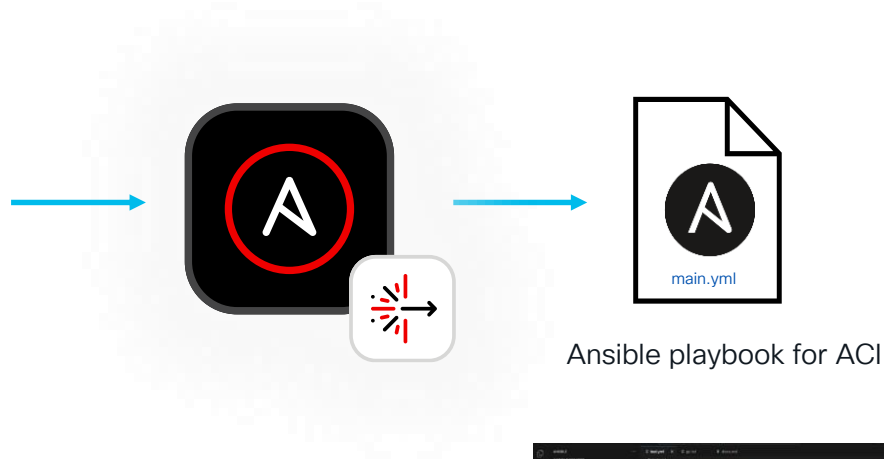
Demo



Demo : Create Single and Multiple tasks in a playbook

Prompt

Create a tenant, VRF, AP, BD and EPG in Cisco ACI



Video

Prompt Engineering

Process of structuring an instruction that can be interpreted and understood by a generative AI model.

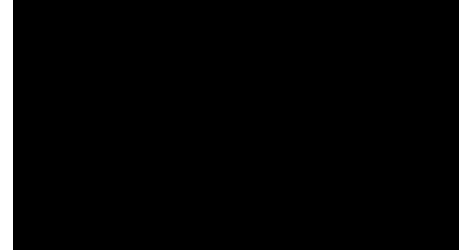
- Specificity
- Contextual Information
- Descriptive Names
- Sample Code
- Iterative Refinement

Prompt

Create a playbook for tenant onboarding

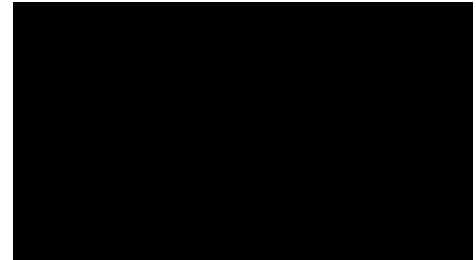
v/s

Prompt 1



Create an ansible playbook for cisco ACI tenant onboarding

Prompt 2



Prompt Engineering

Lightspeed

Create a tenant named ai_tenant and attach it to VRF ai_vrf, BD ai_bd, application profile ai_ap and EPG ai_epg and bind ai_epg to vmware vmm domain in Cisco ACI

Copilot Chat

Create an **ansible** **playbook** with a tenant named ai_tenant and attach it to VRF ai_vrf, BD ai_bd, application profile ai_ap and EPG ai_epg and bind ai_epg to vmware vmm domain in Cisco ACI

ChatGPT

Context: You are a Cisco ACI expert...

Instruction: Create a tenant named ai_tenant and attach it to VRF ai_vrf, BD ai_bd, application profile ai_ap and EPG ai_epg and bind ai_epg to vmware vmm domain in Cisco ACI

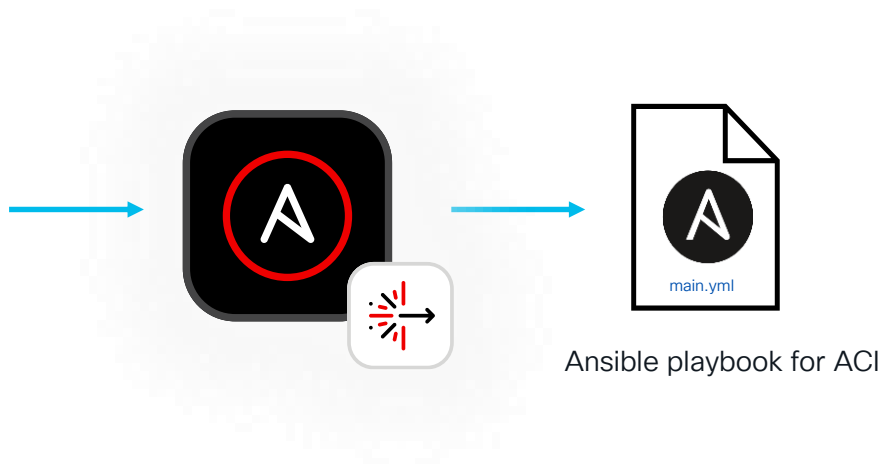
Coming soon...

Complete Playbook generation

Create entire playbook

Prompt

What do you want the
playbook to accomplish?



EXPLORED

REMIATION-PROJECT

> .devcontainer

> .gitbackup

> .github

> .vscode

> collections

> inventory

Ansible development tools

ansible-navigator.yml

ansible.cfg

catalog-info.yml

devfile.yml

linux_playbook.yml

network_playbook.yml

README.md

remediate_playbook.yml

site.yml

OUTLINE

TIMELINE

Ansible development tools

Generate a playbook X

Generate a playbook with Ansible Lightspeed

What do you want the playbook to accomplish?

Describe the goal in your own words.

Examples

Create IIS websites on port 8080 and 8081 and open firewall

Create a RHEL 9.2 Azure virtual machine named RHEL-VM in resource group named RH attached to the VNET my-vnet and subnet my-subnet with a public ip address and a security group to allow traffic over port 22.

Create a t2.micro EC2 instance using image id ami-01cc36e92a4e9a428 in region east-us-1 in the tenancy B918A05F-B0C1-46C7-A85F-CB4B12472970 using subnet-0a908847e7212345 with a public ip and with key name test-servers and with security group ssh-servers and a tag "env:develop", then output the public ip and the private ip address through a debug message.

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EXPLORER

REMIEDIATION-PROJECT

- > .devcontainer
- > .gitbackup
- > .github
- > .vscode
- > collections
- > inventory
- Ansible development tools
 - / ansible-navigator.yml
 - ansible.cfg
 - / catalog-info.yaml
 - / devfile.yaml
 - linux_playbook.yml
 - network_playbook.yml
 - README.md
 - remediate_playbook.yml
 - site.yml

OUTLINE

TIMELINE

Ansible development tools

Generate a playbook ✕

Search

Generate a playbook with Ansible Lightspeed

What do you want the playbook to accomplish?

Upgrade the Python version to 3.9.18-1.el9_3.1 for Red Hat Enterprise Linux

Examples

Create IIS websites on port 8080 and 8081 and open firewall

Create a RHEL 9.2 Azure virtual machine named RHEL-VM in resource group named RH attached to the VNET my-vnet and subnet my-subnet with a public ip address and a security group to allow traffic over port 22.

Create a t2.micro EC2 instance using image id ami-01cc36e92a4e9a428 in region east-us-1 in the tenancy B018A05F-80C1-46C7-A85F-CB4B12472970 using subnet-0a908847e7212345 with a public ip and with key name test-servers and with security group ssh-servers and a tag "env:develop", then output the public ip and the private ip address through a debug message.

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EXPLORER

REMEDIATION-PROJECT

- > .devcontainer
- > .gitbackup
- > .github
- > .vscode
- > collections
- > inventory
- Ansible development tools
 - / ansible-navigator.yml
- ansible.cfg
 - / catalog-info.yml
 - / devfile.yml
- linux_playbook.yml
- network_playbook.yml
- README.md
- remediate_playbook.yml
- site.yml

Generate a playbook X

Generate a playbook with Ansible Lightspeed

Do the following steps look right to you?

The steps this playbook will perform is as follows:

- 1) Check the current version of Python
- 2) Display the Current Python Version
- 3) Install Specific Version of python39-3.9.18-1.el9_3.1
- 4) Verify the Installed Python Version
- 5) Display the New Python Version

Reset

Generate playbook Back

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EXPLORER

REMIEDIATION-PROJECT

- > .devcontainer
- > .gitbackup
- > .github
- > .vscode
- > collections
- > inventory
- Ansible development tools
 - / ansible-navigator.yml
 - @ ansible.cfg
 - / catalog-info.yml
 - / devfile.yml
 - linux_playbook.yml
 - network_playbook.yml
 - README.md
 - remediate_playbook.yml
 - sita.yml

Ansible development tools

remediate_playbook.yml

```
1
2 - name: Upgrade Python to specific version on RHEL
3   hosts: all
4   become: true # Use sudo to gain root privileges
5   tasks:
6     - name: Check the current version of Python
7       ansible.builtin.command: python3 --version
8       register: python_version
9       changed_when: false
10      failed_when: false
11
12    - name: Display the current Python version
13      ansible.builtin.debug:
14        msg: "The current version of Python is {{ python_version.stdout }}"
15
16    - name: Install specific version of Python
17      ansible.builtin.dnf:
18        name: python39-3.9.18-1.el9_3.1
19        state: present
20        update_cache: true
21      when: "'3.9.18-1.el9_3.1' not in python_version.stdout"
22
23    - name: Verify the installed Python version
24      ansible.builtin.command: python3 --version
25      register: new_python_version
26      changed_when: false
27      failed_when: "'3.9.18-1.el9_3.1' not in new_python_version.stdout"
28
29    - name: Display the new Python version
30      ansible.builtin.debug:
31        msg: "The upgraded version of Python is {{ new_python_version.stdout }}"
32
```

Ansible Lightspeed

Explain Ansible Playbook: "remediate_playbook.yml"

This Ansible Playbook is designed to automate the upgrade of Python to a specific version on systems running RHEL (Red Hat Enterprise Linux). Here's a breakdown of what each part of the playbook does:

1) Play stanza

hosts: all: The playbook targets all hosts in your Ansible inventory.

become: true: Uses sudo to gain root privileges on the target hosts, necessary for installing software packages.

2) Task One "Check the current version of Python"

Runs the command python3 --version to check the existing version of Python. Uses the `ansible.builtin.command` module.

register: python_version: Saves the output of the command into a variable called python_version.

changed_when: false: Tells Ansible that this task does not make changes to the system.

failed_when: false: Ensures that the playbook does not fail if the command encounters an error.

Ln 2, Col 51 Spaces: 2 UTF-8 LF Ansible 2.15.5 Lightspeed (licensed) Python 3.11.6

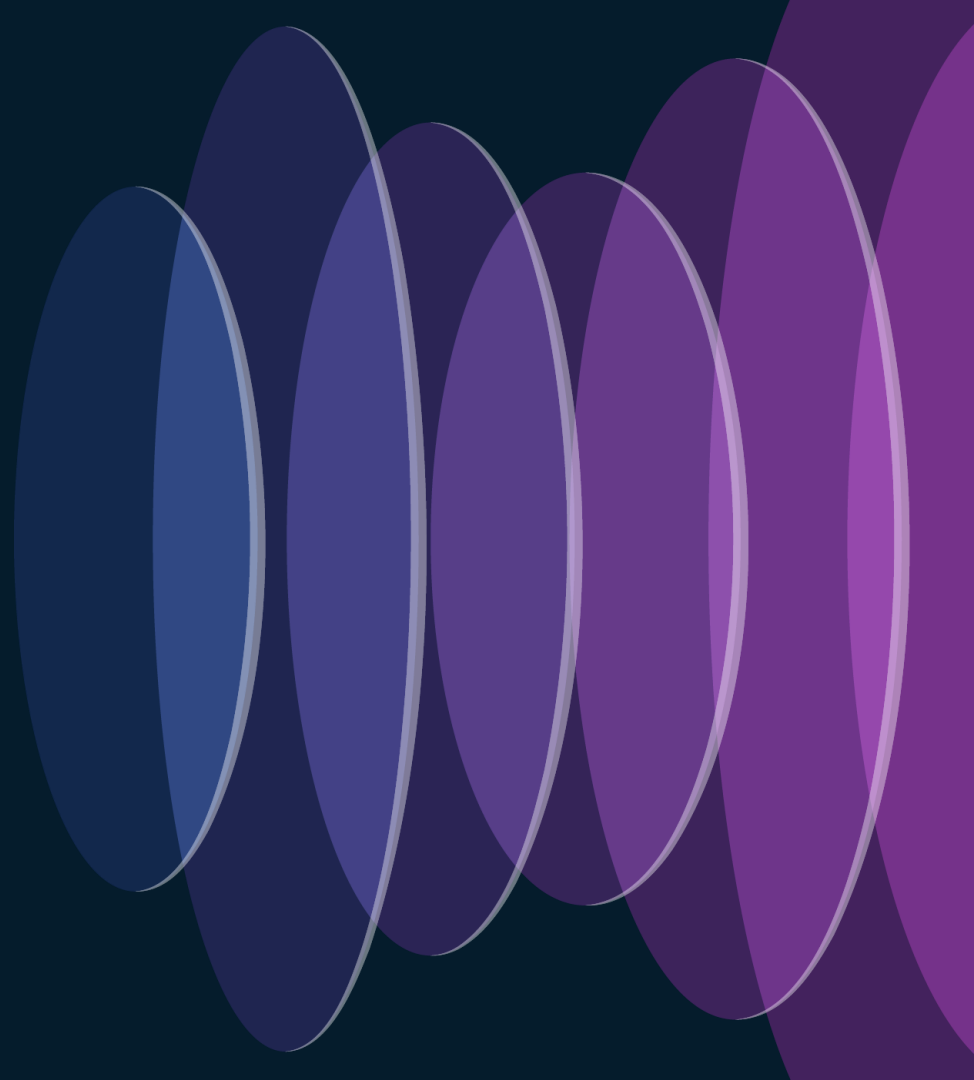
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Exploring other options



Exploring other AI alternatives

GitHub Copilot



- General programming
- Broad understanding of various programming languages and syntax
- Suggests code snippets, comments, and function definitions
- GitHub editor and IDE extension
- Public GitHub repositories and open-source code

Chat GPT

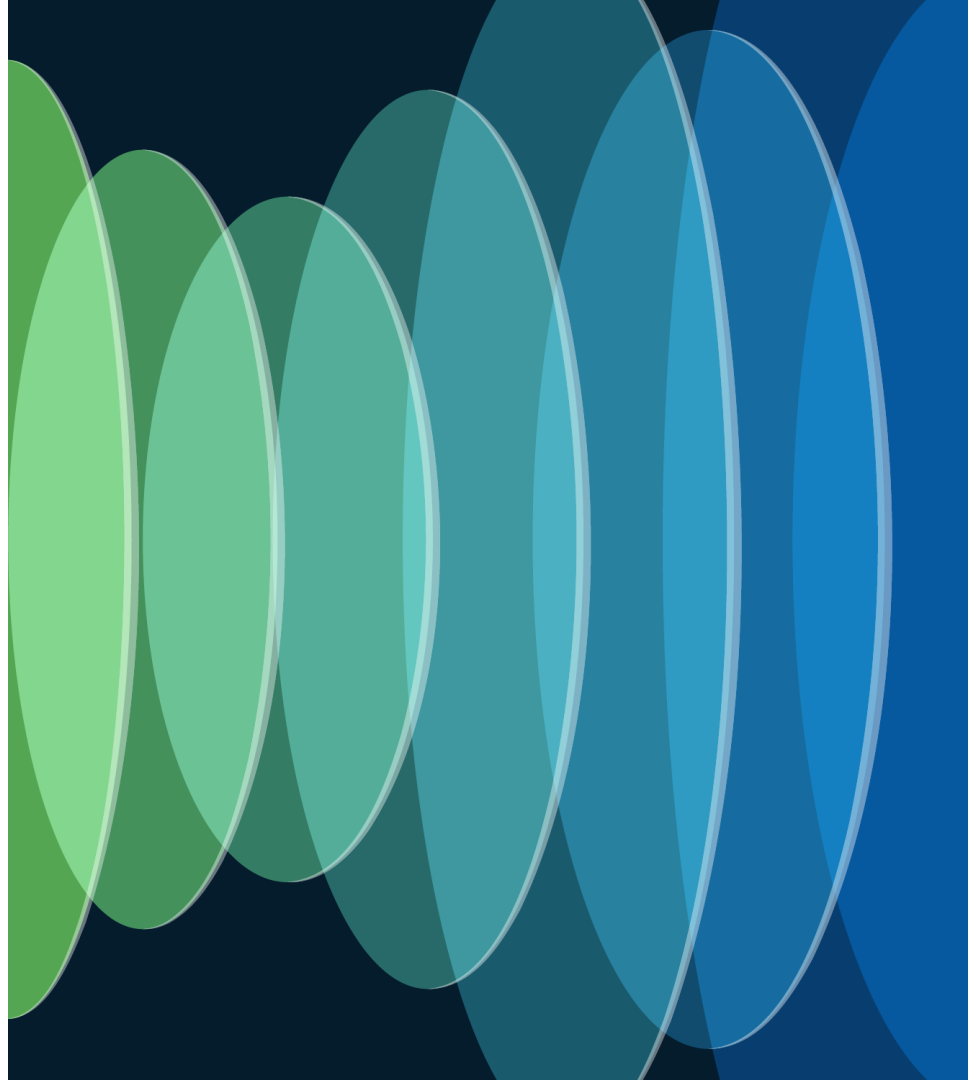


- Conversational AI
- Limited understanding of IT automation concepts
- Generates text responses, not directly executable code
- Standalone web app and API
- Massive dataset of text and code, including conversational data

Why Embrace AI-Powered Code Generation ?

1. Efficiency and Speed
2. Reduce the time to learn everything
3. Staying Ahead of the Curve

Summary



Summary



Makes code generation easier and faster by integrating AI with Cisco solutions

Ansible Lightspeed is specifically for automation code generation

Better the prompt, better the code

Test the code before deploying to production environment

More Information

- Sessions related to this topics
 - WOSOUT-2011 : Can We Develop Faster Using ChatGPT, Co-Pilot, and Co?
 - DEVNET-2159 : AI-Powered Scripting with GitHub Copilot
- To learn more about ACI and Automation
 - <https://developer.cisco.com/learning/>
 - Start automating Cisco ACI with Ansible – [DevNet Labs](#)

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