Chapter 1: Building Blocks of Ansible


```
.
├── group_vars
│   ├── cisco.yml
│   └── juniper.yml
├── hosts
└── host_vars
    ├── csr1.yml
    ├── csr2.yml
    ├── mx1.yml
    └── mx2.yml
```
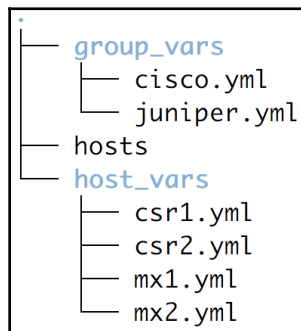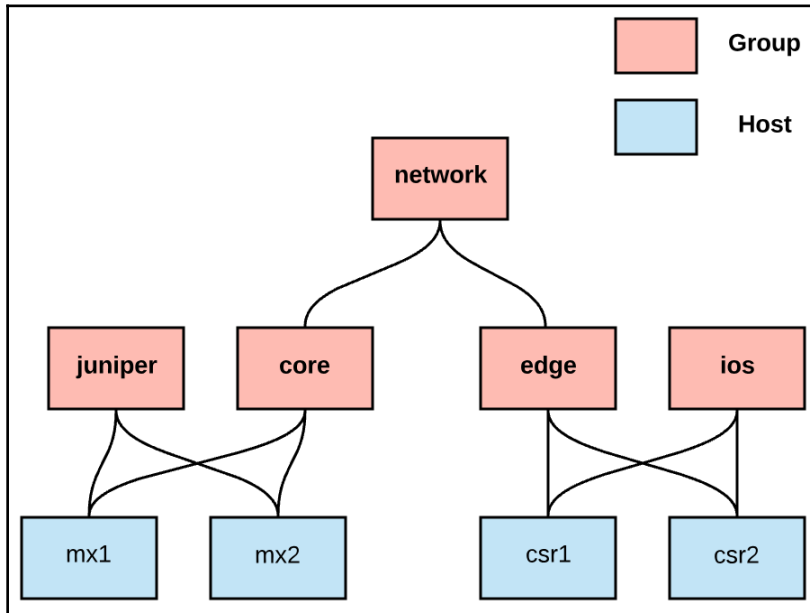
```
Playbook
Play
---
- name: Initial Playbook
  hosts: all
  gather_facts: no
  tasks:
                                        Task
  - name: Display Hostname
    debug:    Module
      msg: "Router name is {{ hostname }}"
```

```
PLAY [Initial Playbook] *********************

TASK [Display Hostname] *********************
ok: [mx1] => {
    "msg": "Router name is core-mx1"
}
ok: [mx2] => {
    "msg": "Router name is core-mx2"
}
ok: [csr1] => {
    "msg": "Router name is edge-csr1"
}
ok: [csr2] => {
    "msg": "Router name is edge-csr2"
}

TASK [Display OS] ***************************
ok: [mx1] => {
    "msg": "core-mx1 is running junos"
}
ok: [mx2] => {
    "msg": "core-mx2 is running junos"
}
ok: [csr1] => {
    "msg": "edge-csr1 is running ios"
}
ok: [csr2] => {
    "msg": "edge-csr2 is running ios"
}
```

```
PLAY [Using conditionals] ***************************************************

TASK [Run for Edge nodes Only] *********************************************
skipping: [mx1]
skipping: [mx2]
ok: [csr1] => {
    "msg": "Router name is edge-csr1"
}
ok: [csr2] => {
    "msg": "Router name is edge-csr2"
}

TASK [Run for Only MX1 node] ***********************************************
ok: [mx1] => {
    "msg": "core-mx1 is running junos"
}
skipping: [mx2]
skipping: [csr1]
skipping: [csr2]

PLAY RECAP *****************************************************************
csr1                       : ok=1    changed=0    unreachable=0    failed=0
csr2                       : ok=1    changed=0    unreachable=0    failed=0
mx1                        : ok=1    changed=0    unreachable=0    failed=0
mx2                        : ok=0    changed=0    unreachable=0    failed=0
```

```
PLAY [Ansible Loop over a List] ****************************************

TASK [Loop over SNMP Servers] ****************************************
ok: [csr1] => (item=10.1.1.1) => {
    "msg": "Router edge-csr1 with snmp server 10.1.1.1"
}
ok: [csr1] => (item=10.2.1.1) => {
    "msg": "Router edge-csr1 with snmp server 10.2.1.1"
}
ok: [csr2] => (item=10.1.1.1) => {
    "msg": "Router edge-csr2 with snmp server 10.1.1.1"
}
ok: [csr2] => (item=10.2.1.1) => {
    "msg": "Router edge-csr2 with snmp server 10.2.1.1"
}

PLAY [Ansible Loop over a Dictionary] ****************************************

TASK [Loop over Username and Passowrds] ****************************************
ok: [mx1] => (item={'value': u'admin123', 'key': u'admin'}) => {
    "msg": "Router core-mx1 with user admin password admin123"
}
ok: [mx1] => (item={'value': u'oper123', 'key': u'oper'}) => {
    "msg": "Router core-mx1 with user oper password oper123"
}
ok: [mx2] => (item={'value': u'admin123', 'key': u'admin'}) => {
    "msg": "Router core-mx2 with user admin password admin123"
}
ok: [mx2] => (item={'value': u'oper123', 'key': u'oper'}) => {
    "msg": "Router core-mx2 with user oper password oper123"
}

PLAY RECAP ****************************************************************
csr1                       : ok=1    changed=0    unreachable=0    failed=0
csr2                       : ok=1    changed=0    unreachable=0    failed=0
mx1                        : ok=1    changed=0    unreachable=0    failed=0
mx2                        : ok=1    changed=0    unreachable=0    failed=0
```

```
PLAY [Using Ansible Tags] ********************

TASK [Print OSPF] ****************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will Run OSPF"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will Run OSPF"
}

TASK [Print BGP] *****************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will Run BGP"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will Run BGP"
}

TASK [Print NTP] *****************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will run NTP"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will run NTP"
}
```

```
PLAY [Using Ansible Tags] ********************

TASK [Print OSPF] ***************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will Run OSPF"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will Run OSPF"
}
```

```
PLAY [Using Ansible Tags] ********************

TASK [Print OSPF] ***************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will Run OSPF"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will Run OSPF"
}

TASK [Print BGP] ***************************
ok: [csr1] => {
    "msg": "Router edge-csr1 will Run BGP"
}
ok: [csr2] => {
    "msg": "Router edge-csr2 will Run BGP"
}
```

Chapter 2: Managing Cisco IOS Devices Using Ansible
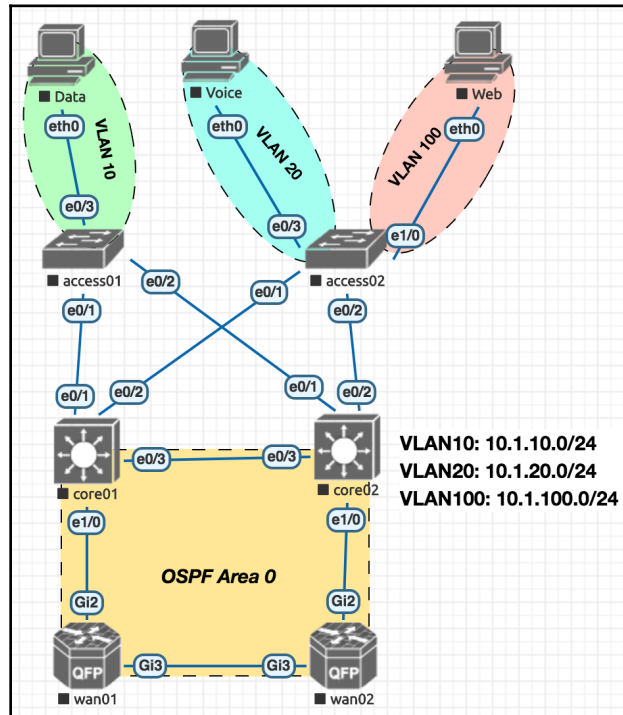
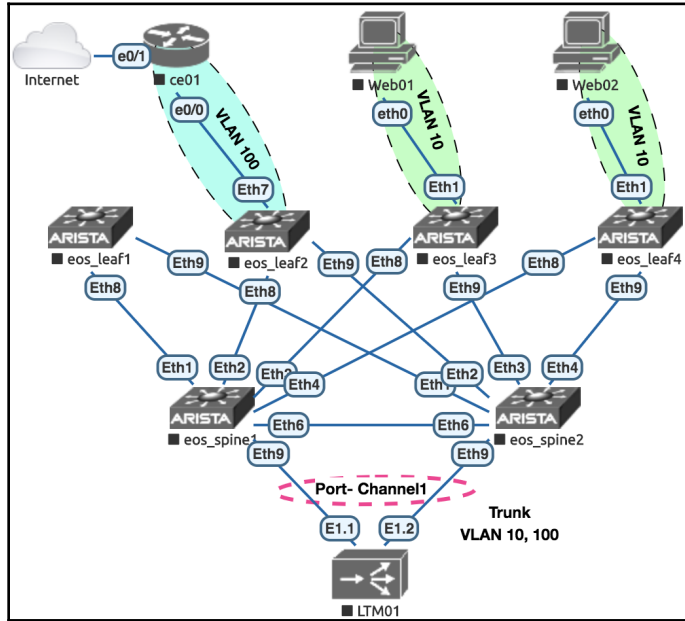# Chapter 3: Automating Juniper Devices in the Service Providers Using Ansible
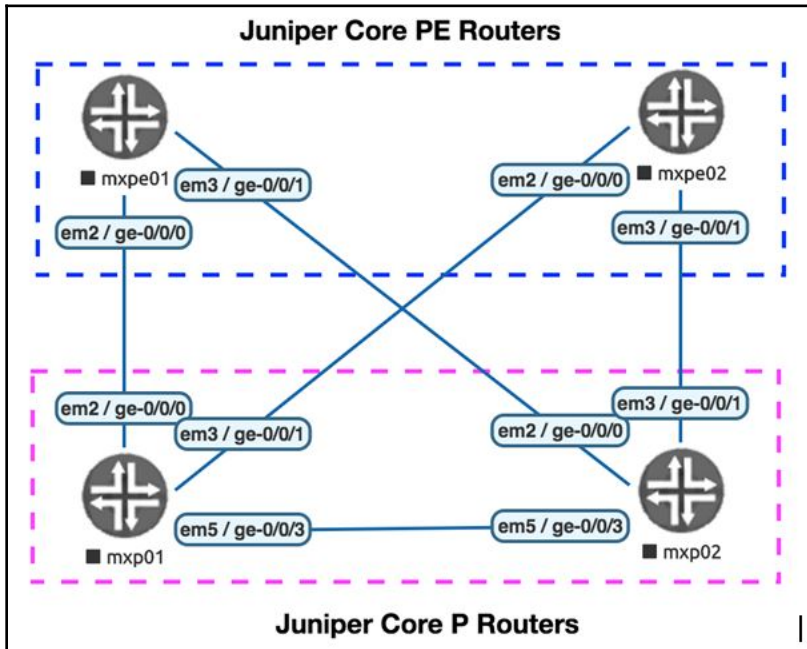
Node	Destination	Packet Loss	Delay
mxpe01	10.100.1.254/32	0%	3.75
mxpe01	10.100.1.253/32	0%	2.09
mxpe01	10.100.1.1/32	0%	0.27
mxpe01	10.100.1.2/32	0%	4.72
mxpe01	10.100.1.3/32	100%	'N/A'

Chapter 4: Building Data Center Networks with Arista and Ansible
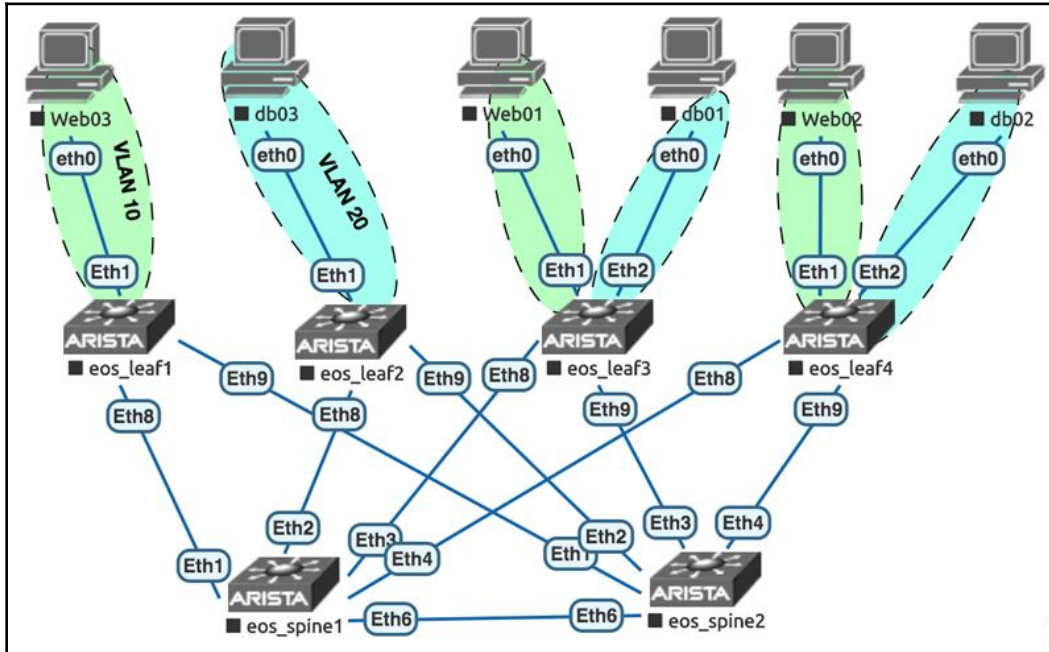
Chapter 5: Automating Application Delivery with F5 LTM and Ansible

	▲ User Name		◆ Locked Out	◆ Failed Logins	Partition Access	◆ Partition	◆ Console
☐	admin		No	0	Administrator on All Partitions	Common	Disabled
☐	ansible		No	0	Administrator on All Partitions	Common	Disabled

Account Properties

User Name	ansible
Password	Old: [_____] New: ●●●●●●●●● Confirm: ●●●●●●●●●
Partition Access	Role: [Administrator ▲▼] Partition: [All ▲▼] [Add] **Role**	**Partition** Administrator	[All] [Edit] [Delete]
Terminal Access	[Disabled ▲▼]

System ›› Configuration : Device : General

⚙ ▾	Device ▾	Local Traffic ▾	AWS ▾	OVSDB	App IQ

Properties and Operations

Host Name	ltm01.lab.net
Chassis Serial Number	33a2f8bb-8528-4528-3ade5f6ca797
Version	BIG-IP 13.1.1 Build 0.0.4 Final

System ›› Configuration : Device : NTP

⚙ ▾	Device ▾	Local Traffic ▾	AWS ▾	OVSDB	App IQ

Properties

Time Server List

Address: [   ]

[Add]

```
172.20.1.250
```

[Edit] [Delete]

System ›› Configuration : Device : DNS

⚙ ▾	Device ▾	Local Traffic ▾	AWS ▾	OVSDB	App IQ

Properties

DNS Lookup Server List

Address: [   ]

[Add]

```
172.20.1.250
```

[Edit] [Delete] [Up] [Down]

Network ›› Trunks : Trunk List ›› po1

Properties	Resources

Properties

Name	po1
MAC Address	00:50:00:00:01:01

Configuration

Interfaces	Members:		Available:
	1.1 1.2	`<<` `>>`	1.3
Link Selection Policy	Maximum Bandwid ⬍		
Frame Distribution Hash	Destination MAC address ⬍		

Network ›› VLANs : VLAN List ›› VL10

| Properties | Layer 2 Static Forwarding Table |

General Properties

Name	VL10
Partition / Path	Common
Description	Server VLAN10 (Internal)
Tag	10

Resources

Interfaces	Interface: 1.3 ⏷ Tagging: Select... ⏶⏷ Add po1* (tagged) Edit Delete

Network ›› Self IPs ›› VL10_IP

⚙ ▾ | Properties

Configuration

Name	VL10_IP
Partition / Path	Common
IP Address	10.1.10.254
Netmask	255.255.255.0
VLAN / Tunnel	VL10 ⬍
Port Lockdown	Allow None ⬍
Traffic Group	☐ Inherit traffic group from current partition / path traffic-group-local-only (non-floating) ⬍
Service Policy	None ⬍

Network ›› **Routes** ›› **default_route**

Properties

Properties

Name	default_route
Partition / Path	Common
Description	
Destination	0.0.0.0
Netmask	0.0.0.0
Resource	Use Gateway...
Gateway Address	IP Address 10.1.100.1
MTU	

Local Traffic ›› **Nodes : Node List**

Node List | Default Monitor | Statistics

*	Search							Create...

☑ ▾	Status	▲ Name	⇕ Description	⇕ Application	⇕ Address	⇕ FQDN	⇕ Ephemeral	⇕ Partition / Path
☐	■	dev01.internal.net			10.1.10.10		No	Common
☐	■	dev02.internal.net			10.1.10.11		No	Common

Local Traffic ›› **Pools : Pool List**

Pool List | Statistics

*	Search				Create...

☑ ▾	Status	▲ Name	⇕ Description	⇕ Application	Members	⇕ Partition / Path
☐	■	POOL_dev.internet.net_443			2	Common

Local Traffic ›› Pools : Pool List ›› POOL_dev.internet.net_443

⚙ ▾	Properties	Members	Statistics ⬈

Load Balancing

Load Balancing Method	Round Robin ▾
Priority Group Activation	Disabled ▾

Update

Current Members

Add...

☑ ▾	Status	⬍ Member	⬍ Address	⬍ Service Port	⬍ FQDN	⬍ Ephemeral	⬍ Ratio	⬍ Priority Group	⬍ Connection Limit	⬍ Partition / Path
☐	▪	dev01.internal.net:443	10.1.10.10	443		No	1	0 (Active)	0	Common
☐	▪	dev02.internal.net:443	10.1.10.11	443		No	1	0 (Active)	0	Common

---

Local Traffic ›› Virtual Servers : Virtual Server List ›› dev.internet.net_443_VS

⚙ ▾	Properties	Resources	Statistics ⬈

General Properties

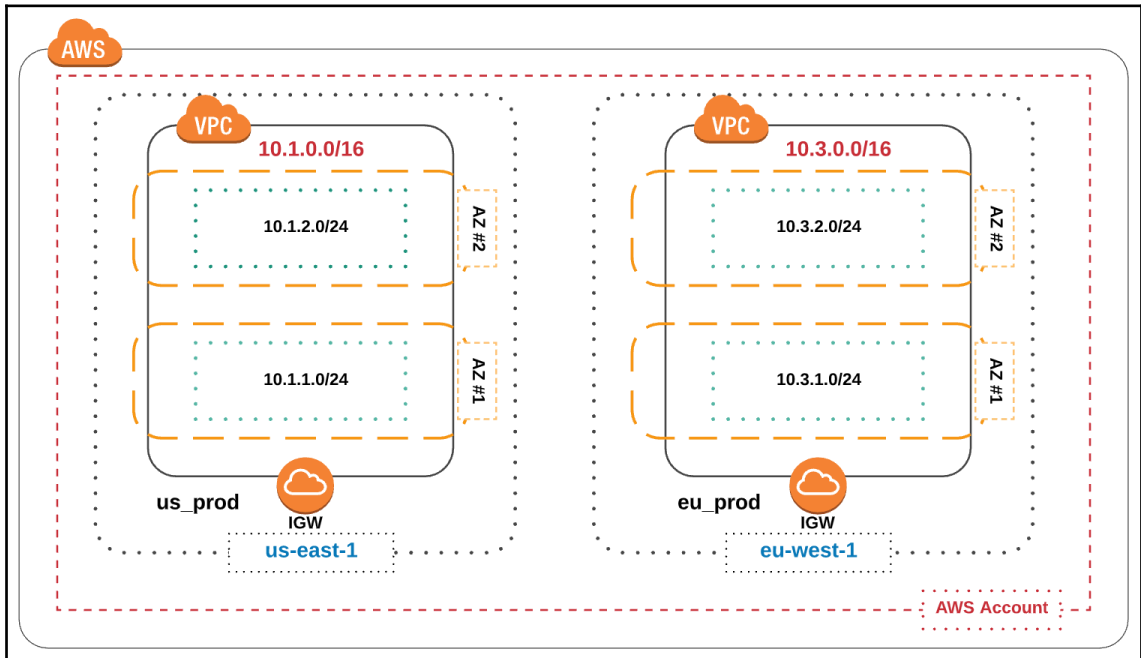| Name	dev.internet.net_443_VS
Partition / Path	Common
Description	VIP for dev.internet.net
Type	Standard ▾
Source Address	0.0.0.0/0
Destination Address/Mask	10.1.100.100
Service Port	443 HTTPS ▾
Notify Status to Virtual Address	☑
Availability	▪ Unknown (Enabled) - The children pool member(s) either don't have service checking enabled, or service check results are not available yet
Syncookie Status	Off
State	Enabled ▾

Chapter 6: Administering a Multi-Vendor Network with NAPALM and Ansible

NAPALM Modules	• napalm_get_facts • napalm_install_config			
Network OS	**Juniper JunOS**	**Cisco IOS/IOS-XE**	**Cisco Nexus-OS**	**Cisco IOS-XR**
Library	**PyeZ**	**netmiko**	**pycsco**	**pyIOSXR**
Transport/ API	**NETCONF**	**SSH**	**NX-API**	**SSH/XML-API**
Output	**XML**	**String**	**JSON**	**XML**
NAPALM Modules	• Ansible Facts (native Python data structures) common across all platforms with the same data			
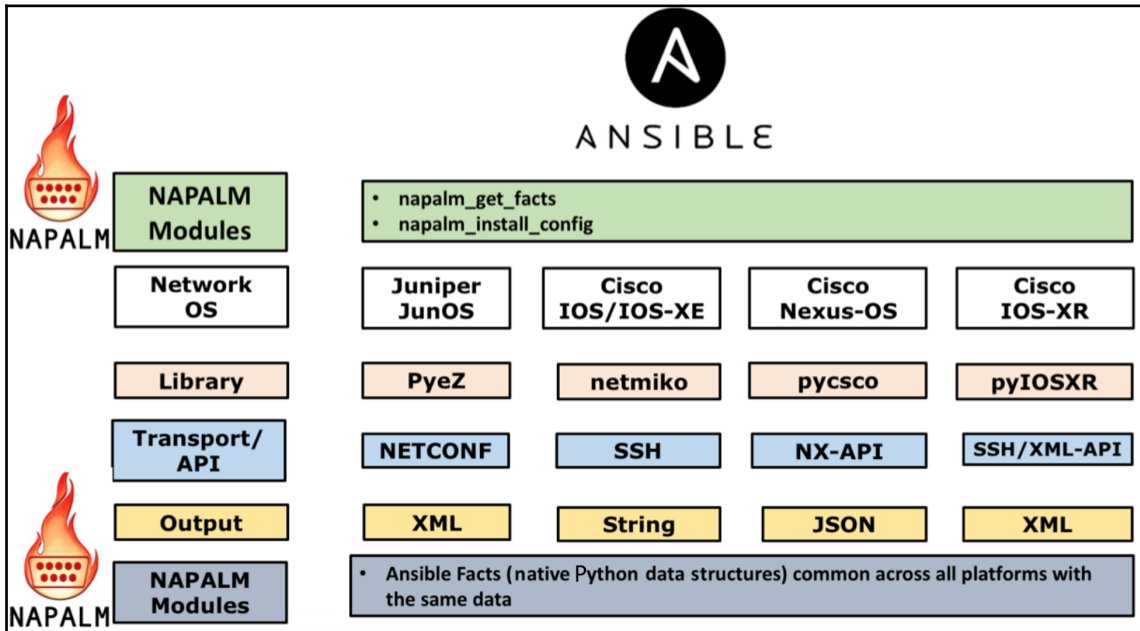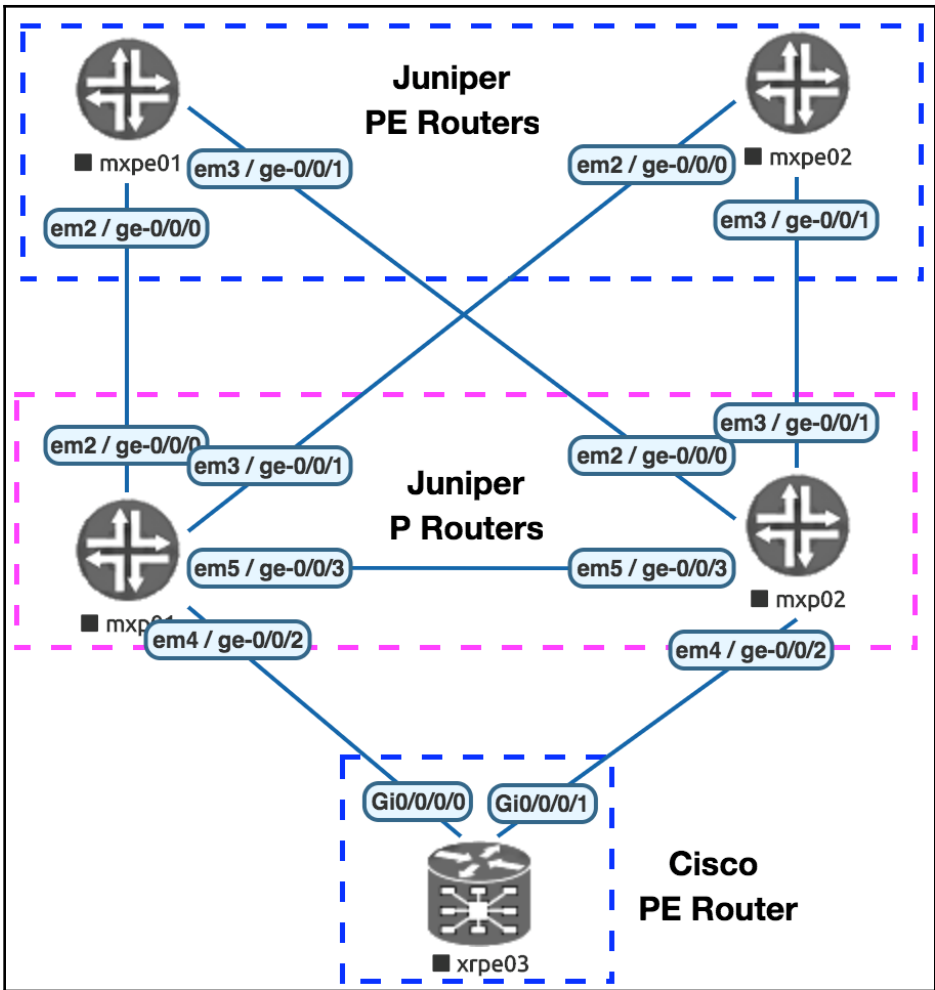
Chapter 7: Deploying and Operating AWS Networking Resources with Ansible

Add user

1 **2** 3 4 5

▾ Set permissions

Add user to group	Copy permissions from existing user	Attach existing policies directly

Create policy

Filter policies ▾   Q Search   Showing 469 results

	Policy name ▾	Type	Used as	Description
☑ ▸	📦 AdministratorAccess	Job function	Permissions policy (1)	Provides full access to AWS services and re...

Add user

1   2   3   4   **5**

✔ **Success**

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: https://955645556619.signin.aws.amazon.com/console

⬇ **Download .csv**

		User	Access key ID	Secret access key
▸	✅	ansible	AKIA55AHJ66F5A5EMOWY	********* Show

	Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set
		vpc-d77cd2ad	available	172.31.0.…	-	dopt-b983c8c2
☑	US_Prod_Public_VPC	vpc-0d179be0eb66847f3	available	10.1.0.0/16	-	dopt-b983c8c2

VPC: vpc-0d179be0eb66847f3

Description | CIDR Blocks | Flow Logs | Tags

VPC ID	vpc-0d179be0eb66847f3	**Tenancy**	default
State	available	**Default VPC**	No
IPv4 CIDR	10.1.0.0/16	**Classic link**	Disabled
IPv6 CIDR	-	**DNS resolution**	Enabled
Network ACL	acl-009bbb2b1e96df998	**DNS hostnames**	Enabled
DHCP options set	dopt-b983c8c2	**ClassicLink DNS Support**	Disabled
Route table	rtb-0409bc8b1d366f005	**Owner**	955645556619

Create subnet   Actions ▾   ↻ ⚙ ❓

🔍 Filter by tags and attributes or search by keyword |< < 1 to 8 of 8 > >|

	Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR	Availability Zone
☑	us-prod-public-a	subnet-08f1c27d7ecdc4cfc	available	vpc-078ea760afacd6078 |…	10.1.1.0/24	251	-	us-east-1a
☐	us-prod-public-b	subnet-0e35bccbc6470d22c	available	vpc-078ea760afacd6078 |…	10.1.2.0/24	251	-	us-east-1b

Key	Value
Name	us-prod-public-a
region	US
role	prod

Create route table   **Actions** ▾

🔍 Route Table ID : rtb-02819a70994c25e34 ✕   Add filter

|◁ ◁ 1 to 1 of 1 ▷ ▷|

☑	Name	Route Table ID	Expli	Main	VPC ID	Owner
☑		rtb-02819a70994c25e34	-	Yes	vpc-04b25904c511a04e2 | US_Prod_Public_VPC	955645556619

|◁ ◁ None found ▷ ▷|

Subnet ID	IPv4 CIDR	IPv6 CIDR

You do not have any subnet associations.

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

|◁ ◁ 1 to 2 of 2 ▷ ▷|

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0d1b27d20278bcc…	10.1.1.0/24	-
subnet-0e55389d026aa26…	10.1.2.0/24	-

Create route table   **Actions** ▾

🔍 Filter by tags and attributes or search by keyword

|◁ ◁ 1 to 2 of 2 ▷ ▷|

☑	Name	Route Table ID	Explicit subnet associations	Main	VPC ID	Owner
☑	us_public_rt	rtb-0b6669ba5fd9eb9c8	2 subnets	Yes	vpc-005b1dcb981791d86 | US_Prod_Public_VPC	955645556619
☐		rtb-27023758	-	Yes	vpc-d77cd2ad	955645556619

Route Table: rtb-0b6669ba5fd9eb9c8

Summary	**Routes**	Subnet Associations	Route Propagation	Tags

Edit routes

View [All routes ▾]

Destination	Target	Status	Propagated
10.1.0.0/16	local	active	No
0.0.0.0/0	igw-04e284367feb6534e	active	No

Create route table	Actions ∨					

	Name	Route Table ID	Explicit subnet associations	Main	VPC ID	Owner
☑	us_public_rt	rtb-0b6669ba5fd9eb9c8	2 subnets	Yes	vpc-005b1dcb981791d86 | US_Prod_Public_VPC	955645556619
☐		rtb-27023758	-	Yes	vpc-d77cd2ad	955645556619

Route Table: rtb-0b6669ba5fd9eb9c8

Summary | Routes | **Subnet Associations** | Route Propagation | Tags

Edit subnet associations

1 to 2 of 2

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0db36b8b010e137…	10.1.1.0/24	-
subnet-0a5bf4b0968c6ce…	10.1.2.0/24	-

Rule #	Type	Protocol	Port Range	Source	Allow / Deny
100	ALL Traffic	ALL	ALL	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

Rule #	Type	Protocol	Port Range	Destination	Allow / Deny
100	ALL Traffic	ALL	ALL	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

	Name		Network ACL ID		Associated with	Default		VPC
☑	EU_Prod_ACLs	▼	acl-051769831411982c1		2 Subnets	No	▼	vpc-0d5b01f14026c4a0e | EU_Prod_Public_VPC
☐			acl-3a54e743		3 Subnets	Yes		vpc-f0566f96
☐			acl-0473dc2ffa28e9daa		-	Yes		vpc-0d5b01f14026c4a0e | EU_Prod_Public_VPC
☐			acl-0c37c4c78034f4f37		-	Yes		vpc-01f6a708efef250f4 | AWS-Net-VPC

Network ACL: acl-051769831411982c1

Details	**Inbound Rules**	Outbound Rules	Subnet associations	Tags

Edit inbound rules

View [All rules ▼]

Rule #	Type	Protocol	Port Range	Source	Allow / Deny
100	HTTP (80)	TCP (6)	80	0.0.0.0/0	ALLOW
200	HTTPS (443)	TCP (6)	443	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

Network ACL: acl-051769831411982c1

Details	Inbound Rules	Outbound Rules	**Subnet associations**	Tags

Edit subnet associations

[🔍 Filter by tags and attributes or search by keyword]

Subnet ID	▼	IPv4 CIDR	▼	IPv6 CIDR
subnet-042b50af92…		10.3.1.0/24		-
subnet-006abffa8a…		10.3.2.0/24		-

Chapter 8: Deploying and Operating Azure Networking Resources with Ansible
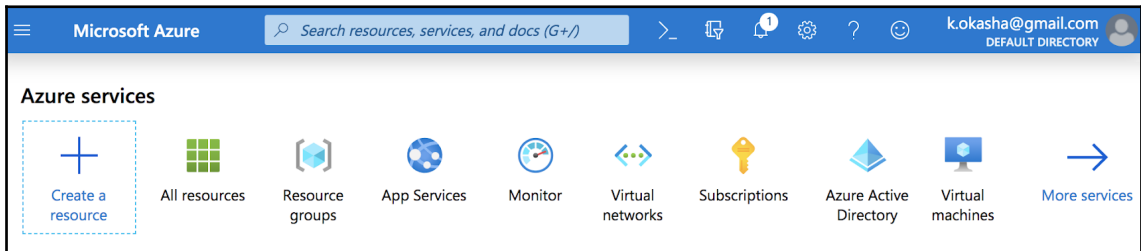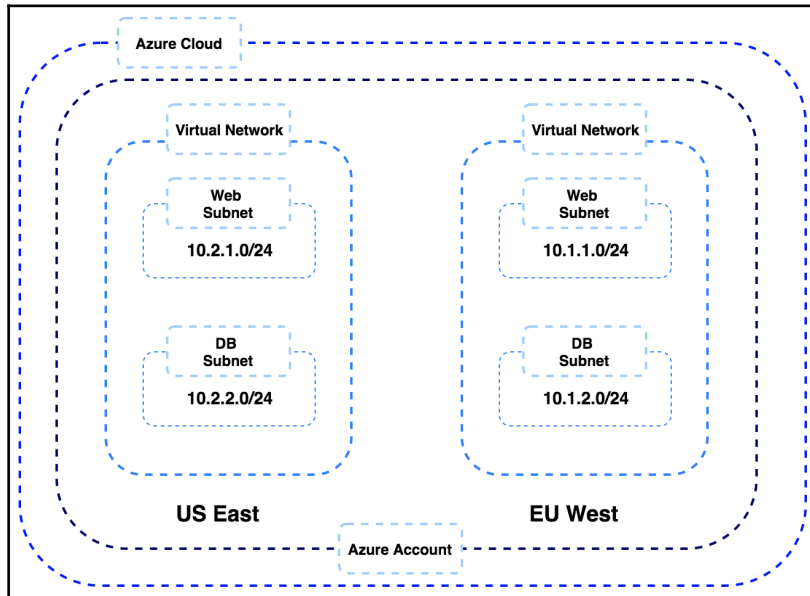
Manage

🔲 Users

🔲 Groups

🔲 Organizational relationships

🔲 Roles and administrators

🔲 Enterprise applications

🔲 Devices

🔲 App registrations

🔲 Identity Governance

🔲 Application proxy

Register an application

* Name

The user-facing display name for this application (this can be changed later).

ansible ✓

Supported account types

Who can use this application or access this API?

- ⦿ Accounts in this organizational directory only (Default Directory only - Single tenant)
- ⦿ Accounts in any organizational directory (Any Azure AD directory - Multitenant)
- ◯ Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)

Delete	Endpoints

ℹ️ Welcome to the new and improved App registrations. Looking to learn how it's changed from App registrations (Legacy)? →

Display name : ansible 📋
Application (client) ID : b346e8e0-28e7-4fbd-a0c4-e6f27ba659e5
Directory (tenant) ID : fa58e2da-0ad8-4031-99f9-8613b8cb5284
Object ID : 5e9a2bba-3780-49c1-a83b-4e3e8c951635

Supported account types : My organization only
Redirect URIs : Add a Redirect URI
Application ID URI : Add an Application ID URI
Managed application in ... : ansible

Manage

🖼️ Branding

↪️ Authentication

🔑 Certificates & secrets

Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

+ New client secret

Description	Expires	Value

No client secrets have been created for this application.

Add a client secret

Description

ansible_password|

Expires

🔘 In 1 year

⚪ In 2 years

⚪ Never

Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

+ New client secret

Description	Expires	Value
ansible_password	11/1/2020	t36UaZOc64kv_-PHaNdYI-.rwB-BUoGY

All services

🔍 Search All

Overview

Categories

All

General

Compute

Networking

Storage

Web

Mobile

Containers

GENERAL (15)

🔲 All resources	🕐 Recent
👥 Management groups	🔑 Subscriptions
📦 Resource groups	🕐 Reservations
🛍 Marketplace	🧑 Help + support
💗 Service Health	📄 Templates
🏷 Tags	ℹ️ What's new
🚀 Quickstart Center	▦ Shared dashboards
🖥 Free services	

All services > Subscriptions

Subscriptions
Default Directory

+ Add

Showing subscriptions in Default Directory. Don't see a subscription? Switch directories

My role ⓘ	Status ⓘ
8 selected ⌄	3 selected

Apply

☑ Show only subscriptions selected in the global subscriptions filter ⓘ

🔍 Search to filter items...

Subscription name ↑↓	Subscription ID ↑↓	My role ↑↓	Current cost	Status
🔵 Free Trial	bc20fdc0-70fa-46ef-9b80-3db8aa88a25c	Account admin	A$0.00	✅ Active

---

🟢 Free Trial
Subscription

« 🔍 Search (Cmd+/)

↑ Upgrade   ⬈ Manage   🗑 Cancel subscription   ✏ Rename

⚠ Your free credit expires in 30 days. Upgrade to keep going with your

🟢 Overview	Subscription ID : bc20fdc0-70fa-46ef-9b80-3db8aa88a25c 📋
▦ Activity log	Directory : Default Directory (kokashagmail.onmicrosoft.com)
👥 Access control (IAM)	My role : Account admin
🔧 Diagnose and solve problems	Offer : Free Trial
🛡 Security	Offer ID : MS-AZR-0044P
⚡ Events	

Home > Resource groups

Resource groups
Default Directory

+ Add   ⊟⊟ Edit columns   ○ Refresh   ↓ Export to CSV   ⊘ Assign tags   ♡ Feedback

| Filter by name... | Subscription == **all** | Location == **all** ⊗ | +▽ Add filter |

No grouping ∨

Showing 1 to 2 of 2 records.

☐ Name ↑↓	Subscription ↑↓	Location ↑↓
all		
☐ [⊙] **rg_eu_az_net**	**Free Trial**	West Europe ···
☐ [⊙] **rg_us_az_net**	**Free Trial**	East US ···

All services > Virtual networks

Virtual networks
Default Directory

+ Add   ⊟⊟ Edit columns   ○ Refresh   ↓ Export to CSV   ⊘ Assign tags   ♡ Feedback   ⇄ Leave preview

| Filter by name... | Subscription == **all** | Resource group == **all** ⊗ | Location == **all** ⊗ | +▽ Add filter |

No grouping ∨

Showing 1 to 2 of 2 records.

☐ Name ↑↓	Resource group ↑↓	Location ↑↓	Subscription ↑↓
☐ ‹·› **vn_eu_az_net**	**rg_eu_az_net**	West Europe	**Free Trial** ···
☐ ‹·› **vn_us_az_net**	**rg_us_az_net**	East US	**Free Trial** ···

All services > Virtual networks > vn_eu_az_net - Subnets

‹·› **vn_eu_az_net - Subnets**
Virtual network

| 🔍 Search (Cmd+/) « | + Subnet   + Gateway subnet |

‹·› Overview

■ Activity log

Pᗡ Access control (IAM)

◆ Tags

🖉 Diagnose and solve problems

🔍 Search subnets

Name ↑↓	Address range ↑↓	IPv4 available addresses ↑↓	Delegated to ↑↓	Security group ↑↓
web_tier	10.1.1.0/24	251	-	- ···
db_tier	10.1.2.0/24	251	-	- ···

Route tables
Default Directory

+ Add   ≡≡ Edit columns   ⟳ Refresh   ⇄ Try preview | ⊘ Assign tags

Subscriptions: Free Trial

| Filter by name... | All resource groups ∨ | All locations ∨ | All tags ∨ | No grouping ∨ |

2 items

Name ↑↓	Resource group ↑↓	Location ↑↓	Subscription ↑↓	
☐ 👤 db_tier_rt	rg_eu_az_net	West Europe	Free Trial	⋯
☐ 👤 db_tier_rt	rg_us_az_net	East US	Free Trial	⋯

👤 **db_tier_rt**
Route table

🔍 Search (Cmd+/)   «

→ Move   🗑 Delete   ⟳ Refresh

Overview

📋 Activity log

👥 Access control (IAM)

🏷 Tags

🩺 Diagnose and solve problems

Settings

🧰 Configuration

👤 Routes

‹·› Subnets

┃┃┃ Properties

🔒 Locks

⬇ Export template

Support + troubleshooting

Resource group (change) : rg_eu_az_net   Associations : 1 subnet associations
Location   : West Europe
Subscription (change)   : Free Trial
Subscription ID   : bc20fdc0-70fa-46ef-9b80-3db8aa88a25c
Tags (change)   : Click here to add tags

                                    ⌄

Routes

🔍 Search routes

Name	↑↓	Address prefix	↑↓	Next hop	↑↓
Default Route		0.0.0.0/0		None	⋯

Subnets

🔍 Search subnets

Name	↑↓	Address range	↑↓	Virtual network	↑↓	Security group	↑↓
db_tier		10.1.2.0/24		vn_eu_az_net		-	⋯

All services > Network security groups

Network security groups
Default Directory

+ Add   ≡≡ Edit columns   ⟳ Refresh   ⇄ Try preview   ⊗ Assign tags

Subscriptions: Free Trial

| Filter by name... | All resource groups ∨ | All locations ∨ | All tags ∨ | No grouping ∨ |

1 items

Name ↑↓	Resource group ↑↓	Location ↑↓	Subscription ↑↓	
🛡 Inbound_Web_Tier	rg_eu_az_net	West Europe	Free Trial	•••

All services > Network security groups > Inbound_Web_Tier

Inbound_Web_Tier
Network security group

🔍 Search (Cmd+/)   → Move   🗑 Delete   ⟳ Refresh

🛡 Overview	Subscription (change) : Free Trial
📋 Activity log	Subscription ID : bc20fdc0-70fa-46ef-9b80-3db8aa88a25c
👥 Access control (IAM)	Tags (change) : Click here to add tags
🏷 Tags	⌃

🔧 Diagnose and solve problems

Settings

Inbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action	
101	Allow_HTTP_Internet	80,443	TCP	Any	10.1.1.0/24	✓ Allow	•••
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow	•••
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	✓ Allow	•••
65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny	•••

Settings items (sidebar):
- ⬇ Inbound security rules
- ⬆ Outbound security rules
- 🖧 Network interfaces
- <> Subnets
- ▥ Properties
- 🔒 Locks
- 📄 Export template

Monitoring

Outbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action	
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow	•••
65001	AllowInternetOutBound	Any	Any	Any	Internet	✓ Allow	•••
65500	DenyAllOutBound	Any	Any	Any	Any	✗ Deny	•••

Home > Resource groups

Resource groups
Default Directory

+ Add   ☰☰ Edit columns   ↻ Refresh   ↓ Export to CSV   ⊘ Assign tags   ♡ Feedback

| Filter by name... | Subscription == **all** | Location == **all** ⊗ | +⊽ Add filter |

No grouping ⌄

Showing 1 to 1 of 1 records.

☐	Name ↑↓	Subscription ↑↓	Location ↑↓	
☐	NetworkWatcherRG	Free Trial	East US	•••

All services > Virtual networks (classic)

Virtual networks (classic)
Default Directory

+ Add   ☰☰ Edit columns   ↻ Refresh | ⊘ Assign tags

Subscriptions: Free Trial

| Filter by name... | All resource groups ⌄ | All locations ⌄ | All tags ⌄ | No grouping ⌄ |

0 items

Name ↑↓	Resource group ↑↓	Location ↑↓	Subscription ↑↓

‹•••›

No virtual networks (classic) to display

Try changing your filters if you don't see what you're looking for.

Create virtual network (classic)

Chapter 9: Deploying and Operating GCP Networking Resources with Ansible
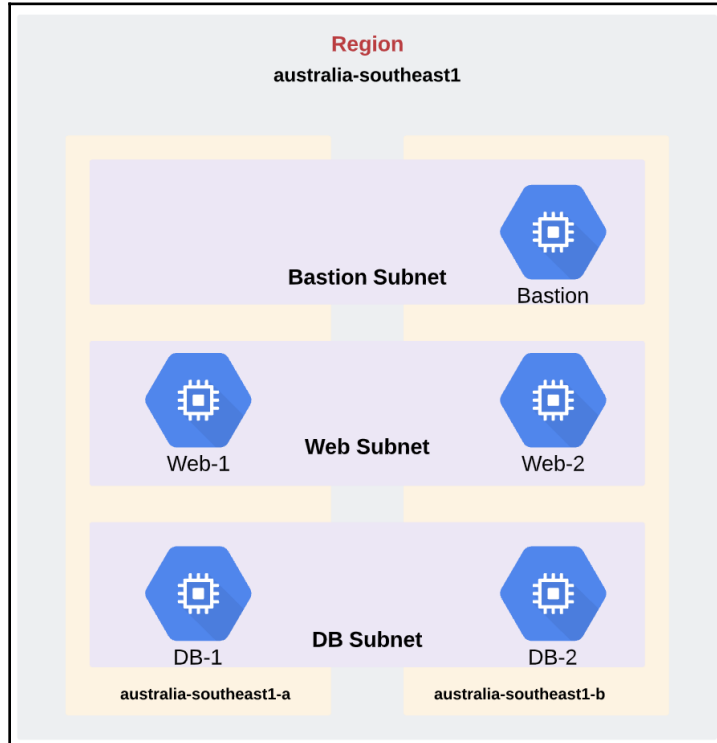
New Project

⚠ You have 19 projects remaining in your quota. Request an increase or delete projects. Learn more

MANAGE QUOTAS

Project name *
gcp-automation-demo ❓

Project ID: **gcp-automation-demo**. It cannot be changed later. **EDIT**

Location *
🏢 No organization   **BROWSE**

Parent organization or folder

☰ Google Cloud Platform ⦂⦂ gcp-automation-demo ▾ 🔍 ▾ ⊞ 🖼 ❓ ① ⦂ 👤

IAM & admin   Service accounts   + CREATE SERVICE ACCOUNT   🗑 DELETE   SHOW INFO PANEL

+👤 IAM
👤 Identity & Organization
🔧 Troubleshooter
📄 Organization policies
🖥 Quotas
🔲 Service accounts
🏷 Labels

Service accounts for project "gcp-automation-demo"

A service account represents a Google Cloud service identity, such as code running on Compute Engine VMs, App Engine apps, or systems running outside Google. Learn more

≡ Filter table   ❓ ⦀

☐ | Email | Status | Name ↑ | Description | Key ID | Key creation date | Actions

No rows to display

Create service account

Grant users access to this service account (optional)

Grant access to users or groups that need to perform actions as this service account.
Learn more

Service account users role ⑦

Grant users the permissions to deploy jobs and VMs with this service account

Service account admins role ⑦

Grant users the permission to administer this service account

Create key (optional)

Download a file that contains the private key. Store the file securely because this key can't be recovered if lost. However, if you are unsure why you need a key, skip this step for now.

+ CREATE KEY

☰ Google Cloud Platform ❖ gcp-ansible-demo ▾

← API Library

Compute Engine API
Google

Compute Engine API

MANAGE   TRY THIS API ⬏   ✓ API enabled

VPC network details

← VPC network details   ✏️ EDIT   🗑️ DELETE VPC NETWORK

ansible-demo-vpc

Subnet creation mode
Custom subnets

Dynamic routing mode
Regional

DNS server policy
None

| Subnets | Static internal IP addresses | Firewall rules | Routes | VPC Network Peering | Private service connection |

Add subnet   Flow logs ▾

| ☐ Name ∧ | Region | IP address ranges | Gateway | Private Google access | Flow logs ❓ |

☰ Google Cloud Platform   ⠿ gcp-ansible-demo ▾   🔍

VPC network   ← VPC network details   ✏️ EDIT   🗑️ DELETE VPC NETWORK

- VPC networks
- External IP addresses
- Firewall rules
- Routes
- VPC network peering
- Shared VPC
- Serverless VPC access
- Packet mirroring

default

Description
Default network for the project

Subnet creation mode
Auto subnets

Dynamic routing mode
Regional

DNS server policy
None

| Subnets | Static internal IP addresses | Firewall rules | Routes | VPC Network Peering | Private service connection |

Add subnet   Flow logs ▾

☐ Name ∧	Region	IP address ranges	Gateway	Private Google access	Flow logs ❓	
☐ default	us-central1	10.128.0.0/20	10.128.0.1	Off	Off	🗑️
☐ default	europe-west1	10.132.0.0/20	10.132.0.1	Off	Off	🗑️
☐ default	us-west1	10.138.0.0/20	10.138.0.1	Off	Off	🗑️
☐ default	asia-east1	10.140.0.0/20	10.140.0.1	Off	Off	🗑️

VPC networks

CREATE VPC NETWORK   **REFRESH**

Name ^	Region	Subnets	Mode	IP addresses ranges	Gateways	Firewall Rules	Global dynamic routing	Flow logs
ansible-demo-vpc		3	Custom			4	Off	
	australia-southeast1	anz-bastion		10.1.3.0/24	10.1.3.1			Off
	australia-southeast1	anz-db		10.1.2.0/24	10.1.2.1			Off
	australia-southeast1	anz-web		10.1.1.0/24	10.1.1.1			Off

Firewall rules

CREATE FIREWALL RULE   **REFRESH**   **DELETE**

Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more

Note: App Engine firewalls are managed here.

Filter resources   Columns ▾

Name	Type	Targets	Filters	Protocols / ports	Action	Priority	Network ^
allow-internet-to-anz-web	Ingress	anz-web	IP ranges: 0.0.0.0/0	tcp:80,443	Allow	10	ansible-demo-vpc
allow-sql-from-anz-web-to-anz-db	Ingress	anz-db	Tags: anz-web	tcp:3389	Allow	10	ansible-demo-vpc
allow-ssh-from-bastion-only	Ingress	anz-web, anz-db	Tags: anz-bastion	tcp:22	Allow	10	ansible-demo-vpc
allow-ssh-to-anz-bastion	Ingress	anz-bastion	IP ranges: 0.0.0.0/0	tcp:22	Allow	10	ansible-demo-vpc

Disks

CREATE DISK   **REFRESH**   **DELETE**

Filter table

Name ↑	Status	Type	Size	Zone(s)	In use by	Snapshot schedule	Actions
bastion-host-disk	✓	Standard persistent disk	10 GB	australia-southeast1-a	bastion-host	None	⋮
db-server-1-disk	✓	Standard persistent disk	10 GB	australia-southeast1-a	db-server-1	None	⋮
db-server-2-disk	✓	Standard persistent disk	10 GB	australia-southeast1-b	db-server-2	None	⋮
db-server-disk	✓	Standard persistent disk	10 GB	australia-southeast1-a		None	⋮
web-server-1-disk	✓	Standard persistent disk	10 GB	australia-southeast1-a	web-server-1	None	⋮
web-server-2-disk	✓	Standard persistent disk	10 GB	australia-southeast1-b	web-server-2	None	⋮
web-server-disk	✓	Standard persistent disk	10 GB	australia-southeast1-a		None	⋮

VM instances

| | CREATE INSTANCE | IMPORT VM | REFRESH | ▶ START | ■ STOP | | |

Filter VM instances

	Name ∧	Zone	Recommendation	In use by	Internal IP	External IP	Connect	
☐ ✓	bastion-host	australia-southeast1-a			10.1.3.253 (nic0)	35.189.29.156	SSH ▾	⋮
☐ ✓	db-server-1	australia-southeast1-a			10.1.2.2 (nic0)	None	SSH ▾	⋮
☐ ✓	db-server-2	australia-southeast1-b			10.1.2.3 (nic0)	None	SSH ▾	⋮
☐ ✓	web-server-1	australia-southeast1-a			10.1.1.2 (nic0)	35.244.111.17	SSH ▾	⋮
☐ ✓	web-server-2	australia-southeast1-b			10.1.1.3 (nic0)	35.189.56.151	SSH ▾	⋮

Priority
10

Direction
Ingress

Action on match
Allow

Targets

Target tags	anz-web

Source filters

IP ranges	0.0.0.0/0

Protocols and ports
tcp:80
tcp:443

Enforcement
Enabled

Applicable to instances

ⓘ The following table shows only the VM instances that you have permission to view. The "ansible-demo-vpc" network might contain other instances that aren't being displayed.

Filter by instance name, project or subnetwork

Name ∧	Subnetwork	Internal IP	Tags	Service accounts	Project	Labels	Network details
web-server-1	anz-web	10.1.1.2	anz-web	None	gcp-ansible-demo		View details
web-server-2	anz-web	10.1.1.3	anz-web	None	gcp-ansible-demo		View details

Routes

CREATE ROUTE   **REFRESH**   **DELETE**

All   Dynamic   Peering

Filter resources

	Name ∧	Description	Destination IP range	Priority	Instance tags	Next hop	Network
☐	default-route-a6de62051c14de8e	Default route to the Internet.	0.0.0.0/0	1000	None	Default internet gateway	ansible-demo-vpc
☐	default-route-a7b2ee15e3784ef7	Default local route to the subnetwork 10.1.1.0/24.	10.1.1.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc
☐	default-route-c0167ffea080d3a8	Default local route to the subnetwork 10.1.2.0/24.	10.1.2.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc
☐	default-route-f0c5ebab956bdec1	Default local route to the subnetwork 10.1.3.0/24.	10.1.3.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc

Routes

CREATE ROUTE   **REFRESH**   **DELETE**

All   Dynamic   Peering

Filter resources

	Name ∧	Description	Destination IP range	Priority	Instance tags	Next hop	Network
☐	default-route-a6de62051c14de8e	Default route to the Internet.	0.0.0.0/0	1000	None	Default internet gateway	ansible-demo-vpc
☐	default-route-a7b2ee15e3784ef7	Default local route to the subnetwork 10.1.1.0/24.	10.1.1.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc
☐	default-route-c0167ffea080d3a8	Default local route to the subnetwork 10.1.2.0/24.	10.1.2.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc
☐	default-route-f0c5ebab956bdec1	Default local route to the subnetwork 10.1.3.0/24.	10.1.3.0/24	1000	None	Virtual network ansible-demo-vpc	ansible-demo-vpc

VM instances

Compute Engine
VM instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

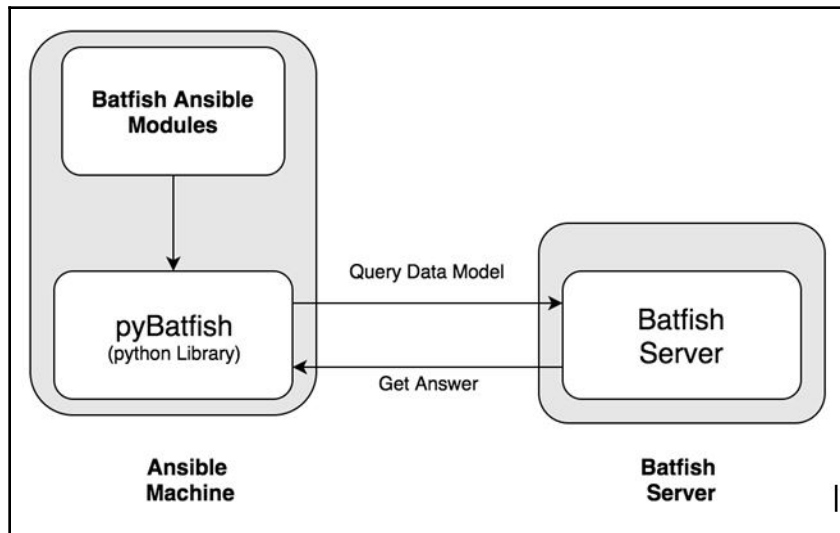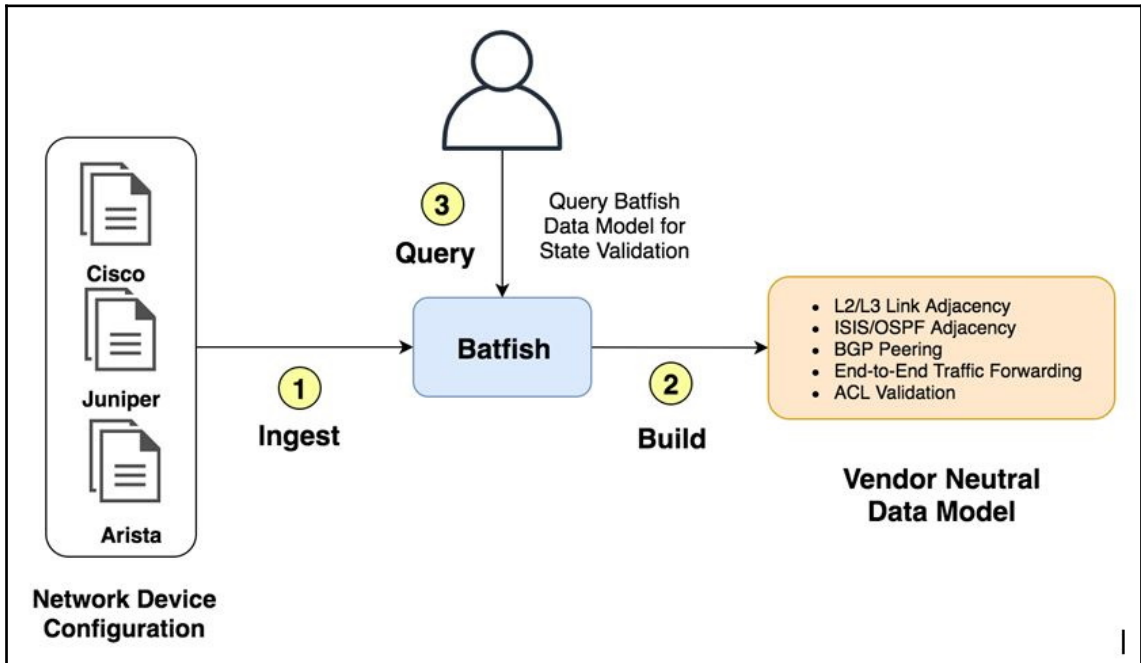**Create**   or   **Import**   or   **Take the quickstart**
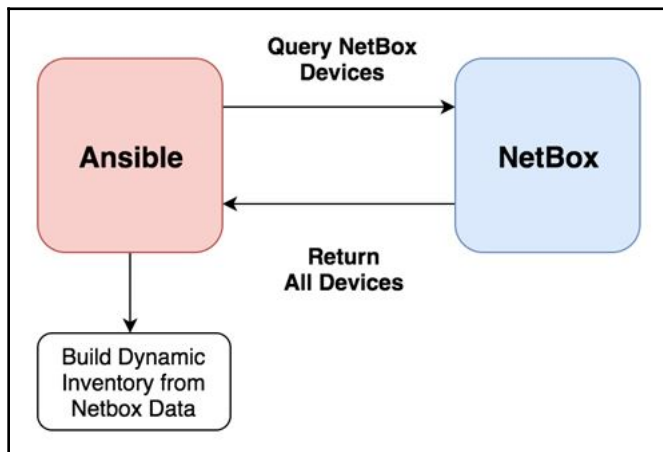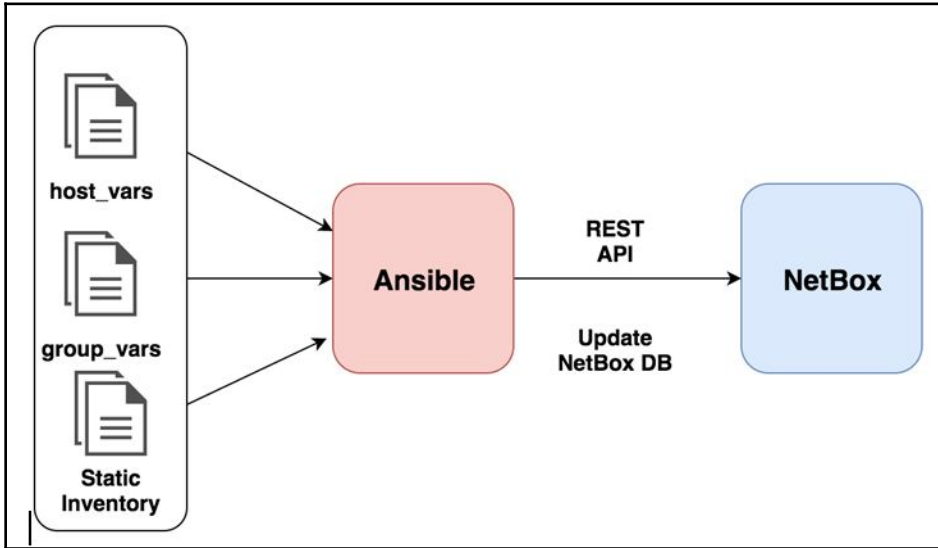
VPC networks

VPC network
VPC networks
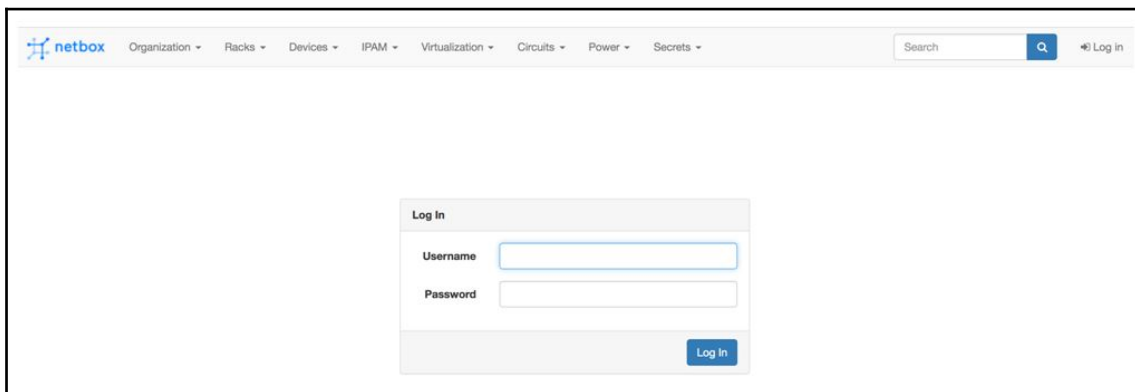
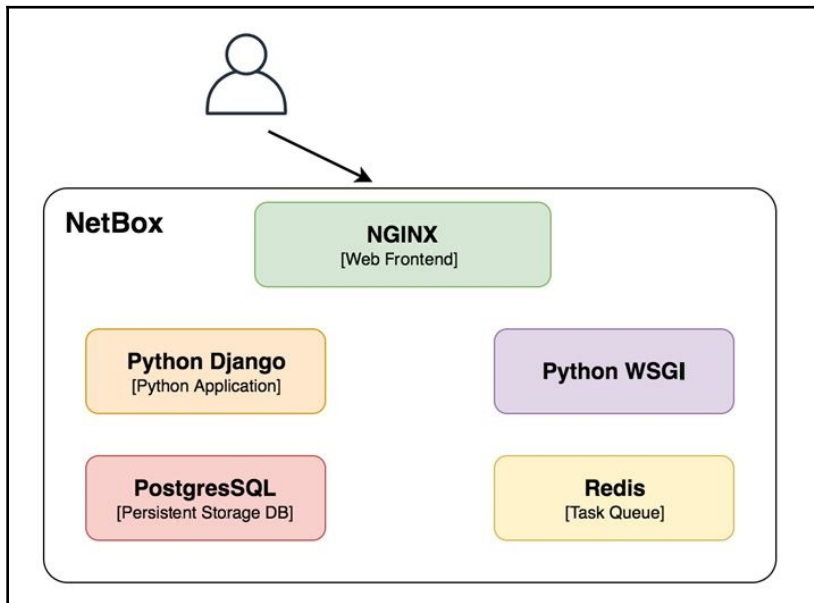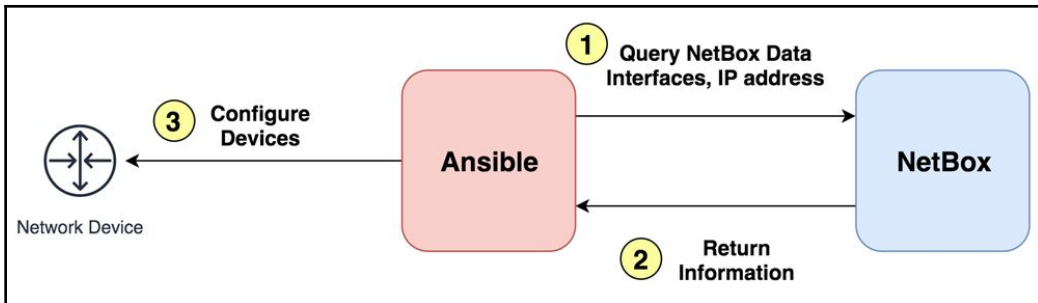There are no local VPC networks in the current project

Create VPC network

Chapter 10: Network Validation with Batfish and Ansible

Chapter 11: Building a Network Inventory with Ansible and NetBox

Sites

	Name	Status	Facility	Region	Tenant	ASN	Description
☐	dc1	Active	—	—	—	—	Main Data Center in Sydney
☐	dc2	Active	—	—	—	—	Main Data Center in KSA

Device Types

	Device Type	Manufacturer	Part number	Height (U)	Full Depth	Subdevice Role	Instances
☐	7020SR	Arista	—	1	✔	—	4
☐	7050CX3	Arista	—	2	✔	—	4

Device Roles

	Name	Devices	VMs	Label	VM Role	Slug
☐	Leaf_Switch	4	0	Leaf_Switch	✔	leaf_switch
☐	Spine_Switch	4	0	Spine_Switch	✔	spine_switch

Devices

	Name	Status	Tenant	Site	Rack	Role	Type
☐	dc1-leaf01	Active	—	dc1	—	Leaf_Switch	Arista 7020SR
☐	dc1-leaf02	Active	—	dc1	—	Leaf_Switch	Arista 7020SR
☐	dc1-spine01	Active	—	dc1	—	Spine_Switch	Arista 7050CX3
☐	dc1-spine02	Active	—	dc1	—	Spine_Switch	Arista 7050CX3
☐	dc2-leaf01	Active	—	dc2	—	Leaf_Switch	Arista 7020SR
☐	dc2-leaf02	Active	—	dc2	—	Leaf_Switch	Arista 7020SR
☐	dc2-spine01	Active	—	dc2	—	Spine_Switch	Arista 7050CX3
☐	dc2-spine02	Active	—	dc2	—	Spine_Switch	Arista 7050CX3

Interfaces

	Name	LAG	Description	MTU	Mode	Cable	Connection	
☐	⇄ Ethernet8		CORE | dc1-spine01| Ethernet1	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
☐	⇄ Ethernet9		CORE | dc1-spine02| Ethernet1	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
☐	⇄ Loopback0		Managment Interface dc1-leaf01	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
☐	🔧 Management1		Managment Interface dc1-leaf01	—	Access	—	Not connected	➕ ⤢ ✏ 🗑

✏ Rename | ✏ Edit | ⤢ Disconnect | 🗑 Delete   ➕ Add interfaces

---

Interfaces

	Name	LAG	Description	MTU	Mode	Cable	Connection	
☐	⇄ Ethernet8		CORE | dc1-spine01| Ethernet1	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
	IP Address		Status/Role	VRF			Description	
	172.10.1.1/31		Active	Global			—	✏ 🗑
☐	⇄ Ethernet9		CORE | dc1-spine02| Ethernet1	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
	IP Address		Status/Role	VRF			Description	
	172.10.1.5/31		Active	Global			—	✏ 🗑
☐	⇄ Loopback0		Managment Interface dc1-leaf01	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
	IP Address		Status/Role	VRF			Description	
	10.100.1.1/32		Active	Global			—	✏ 🗑
☐	🔧 Management1		Managment Interface dc1-leaf01	—	Access	—	Not connected	➕ ⤢ ✏ 🗑
	IP Address		Status/Role	VRF			Description	
	172.20.1.35/28		Active	Global			—	✏ 🗑

✏ Rename | ✏ Edit | ⤢ Disconnect | 🗑 Delete   ➕ Add interfaces

---

Prefixes

	Prefix	Status	VRF	Utilization	Tenant	Site	VLAN	Role	Description
☐	10.100.1.0/24	Active	Global	1%	—	dc1	—	—	—
☐	10.100.2.0/24	Active	Global	1%	—	dc2	—	—	—
☐	172.10.1.0/24	Active	Global	3%	—	dc1	—	—	—
☐	172.11.1.0/24	Active	Global	3%	—	dc2	—	—	—
☐	172.20.1.0/24	Active	Global	1%	—	dc1	—	—	—
☐	172.20.2.0/24	Active	Global	1%	—	dc2	—	—	—

Chapter 12: Simplifying Automation with AWX and Ansible
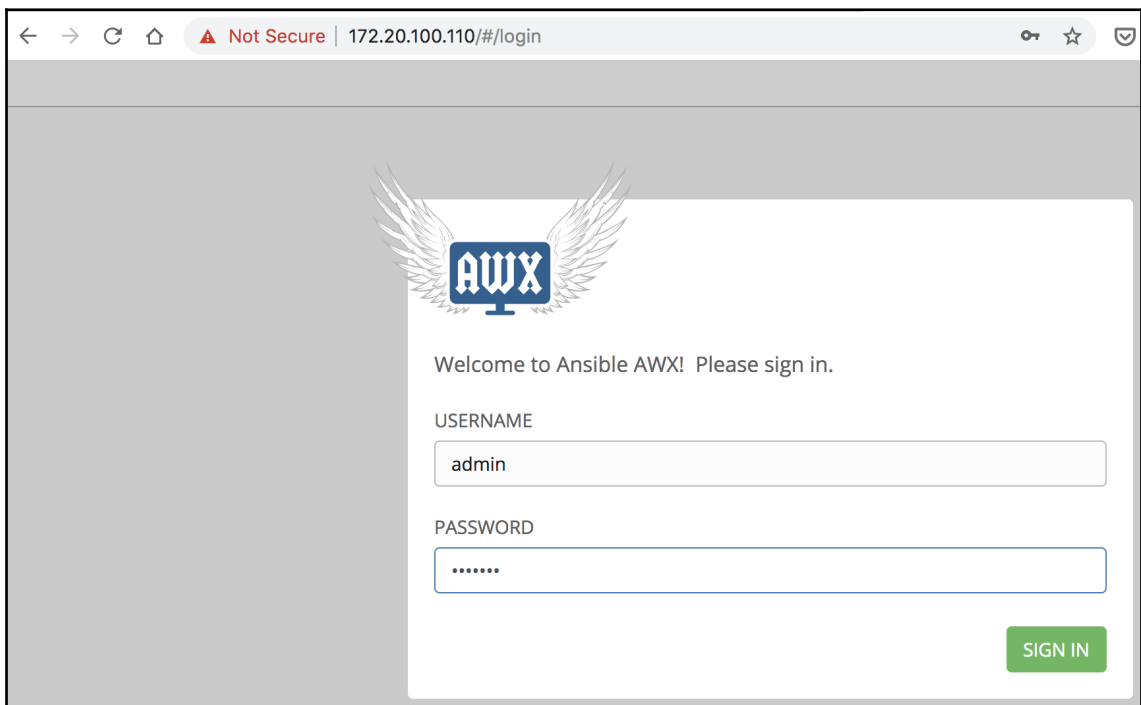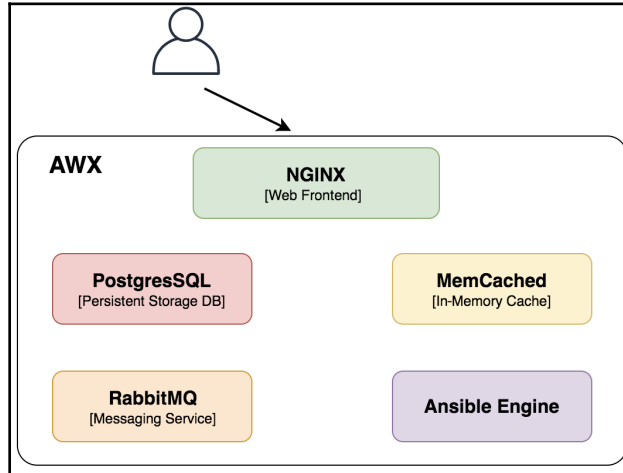
Network_Operation

DETAILS   USERS   PERMISSIONS

* NAME

Network_Operation

DESCRIPTION

Network Operation Team

* ORGANIZATION

🔍 Network

CANCEL   SAVE

USERS / CREATE USER

NEW USER

DETAILS   ORGANIZATIONS   TEAMS   PERMISSIONS

FIRST NAME

core

LAST NAME

* ORGANIZATION

🔍 Network

* EMAIL

core@example.com

* USERNAME

core

* PASSWORD

SHOW   •••••••

* CONFIRM PASSWORD

SHOW   •••••••

USER TYPE

Normal User   ▾

CANCEL   SAVE

Network_Design

DETAILS   USERS   PERMISSIONS

SEARCH 🔍   KEY   ➕

USER ▲	FIRST NAME ⇕	LAST NAME ⇕	ROLE
admin			SYSTEM ADMINISTRATOR
core	core		✖ MEMBER

ITEMS 1 - 2

Network_Design

DETAILS   USERS   PERMISSIONS

SEARCH 🔍   KEY   ➕

NAME	TYPE	ROLE	ACTIONS
Network	Organization	Project Admin	✖
Network	Organization	Inventory Admin	✖
Network	Organization	Credential Admin	✖

ITEMS 1 - 3

INVENTORIES / CREATE INVENTORY

NEW INVENTORY

| DETAILS | PERMISSIONS | GROUPS | HOSTS | SOURCES | COMPLETED JOBS |

* NAME

mpls_core

DESCRIPTION

MPLS Core Network

* ORGANIZATION

Network

INSIGHTS CREDENTIAL

INSTANCE GROUPS

INVENTORIES / mpls_core / ALL GROUPS / CREATE GROUP

CREATE GROUP

| DETAILS | GROUPS | HOSTS |

* NAME

junos

DESCRIPTION

All JunOS based devices in MPLS Core

VARIABLES   YAML JSON

```
1 ---
```

INVENTORIES / mpls_core / ALL GROUPS

mpls_core

| DETAILS | PERMISSIONS | GROUPS | HOSTS | SOURCES | COMPLETED JOBS |

SEARCH   KEY   ALL GROUPS ROOT GROUPS   RUN COMMANDS   +

GROUPS ▲		ACTIONS
☐ ○ iosxr		✏ 🗑
☐ ○ junos		✏ 🗑
☐ ○ P		✏ 🗑
☐ ○ pe		✏ 🗑

mxpe01

DETAILS | FACTS | GROUPS | COMPLETED JOBS

* HOST NAME ❓

mxpe01

DESCRIPTION

Juniper MX Node

VARIABLES ❓ **YAML** JSON   EXPAND

```
1 ---
2 ansible_host: 172.20.1.3
3 |
```

CANCEL | SAVE

---

junos

DETAILS | GROUPS | HOSTS

SEARCH 🔍 | KEY | RUN COMMANDS | +

	HOSTS ▲	DESCRIPTION ⇕	ACTIONS
☐	mxp01	Juniper MX Node	✏ ✖
☐	mxp02	Juniper MX Node	✏ ✖
☐	mxpe01		✏ ✖
☐	mxpe02		✏ ✖

TEAMS / Network_Operation / PERMISSIONS

Network_Operation

DETAILS   USERS   **PERMISSIONS**

SEARCH 🔍   KEY   +

NAME	TYPE	ROLE	ACTIONS
mpls_core	Inventory	Read	✖

INVENTORIES / mpls_core / PERMISSIONS

mpls_core

DETAILS   **PERMISSIONS**   GROUPS   HOSTS   SOURCES   COMPLETED JOBS

SEARCH 🔍   KEY   +

USER ▲	ROLE	TEAM ROLES
admin	SYSTEM ADMINISTRATOR	
core		✖ INVENTORY ADMIN 👥
noc		✖ READ 👥

ITEMS 1 - 3

CREDENTIALS / CREATE CREDENTIAL

NEW CREDENTIAL

DETAILS   PERMISSIONS

* NAME ❓

mpls_core_login

DESCRIPTION ❓

SSH Login to MPLS Core

ORGANIZATION ❓

🔍   Network

* CREDENTIAL TYPE ❓

🔍   Machine

TYPE DETAILS

USERNAME

🔍   ansible

PASSWORD   ☐ Prompt on launch

🔍   •••••••••   👁

CREDENTIALS / EDIT CREDENTIAL / PERMISSIONS

CREDENTIALS PERMISSIONS

DETAILS   **PERMISSIONS**

SEARCH   🔍   KEY

USER ▲	ROLE	TEAM ROLES
admin	ADMIN SYSTEM ADMINISTRATOR	
core		CREDENTIAL ADMIN 👥
noc		READ 👥

[59]

NEW JOB TEMPLATE

DETAILS   PERMISSIONS   COMPLETED JOBS   SCHEDULES   ADD SURVEY

* NAME

provision_iosxr_interfaces

DESCRIPTION

Provision Interfaces on IOS-XR nodes

* JOB TYPE ☐ PROMPT ON LAUNCH

Run

* INVENTORY ☐ PROMPT ON LAUNCH

🔍 mpls_core

* PROJECT

🔍 awx_sample_project

* PLAYBOOK

pb_deploy_interfaces.yml

CREDENTIAL ☐ PROMPT ON LAUNCH

🔍 🔑 mpls_core_login ✕

FORKS

0

LIMIT ☐ PROMPT ON LAUNCH

* VERBOSITY ☐ PROMPT ON LAUNCH

0 (Normal)

JOB TAGS ☐ PROMPT ON LAUNCH

SKIP TAGS ☐ PROMPT ON LAUNCH

LABELS

INSTANCE GROUPS

🔍

JOB SLICING

1

TIMEOUT

0

SHOW CHANGES ☐ PROMPT ON LAUNCH

OPTIONS

☐ ENABLE PRIVILEGE ESCALATION
☐ ALLOW PROVISIONING CALLBACKS
☐ ENABLE CONCURRENT JOBS
☐ USE FACT CACHE

---

provision_iosxr_interfaces

DETAILS   PERMISSIONS   NOTIFICATIONS   COMPLETED JOBS   SCHEDULES

SEARCH 🔍   KEY   +

USER ▲	ROLE	TEAM ROLES
admin	✕ ADMIN SYSTEM ADMINISTRATOR	
core	✕ ADMIN	
noc		✕ EXECUTE 👥

ITEMS 1 - 3

JOBS

JOBS `14`

SEARCH 🔍 | KEY

| Compact | Expanded | Finish Time (Descending) ⌄ |

● **21 - provision_iosxr_interfaces** `Playbook Run` 🚀 🗑

JOBS / 21 - provision_iosxr_interfaces

DETAILS 🚀 🗑

STATUS	● Successful
STARTED	7/10/2019 12:21:24 PM
FINISHED	7/10/2019 12:21:40 PM
JOB TEMPLATE	provision_iosxr_interfaces
JOB TYPE	Run
LAUNCHED BY	admin
INVENTORY	mpls_core
PROJECT	awx_sample_project
REVISION	08c4e26 📋
PLAYBOOK	pb_deploy_interfaces.yml
CREDENTIAL	🔑 mpls_core_login
ENVIRONMENT	/var/lib/awx/venv/ansible
EXECUTION NODE	awx
INSTANCE GROUP	tower
EXTRA VARIABLES ❓	YAML JSON EXPAND

provision_iosxr_interfaces

PLAYS `1` TASKS `2` HOSTS `1` ELAPSED `00:00:16` 📥 ⛶

SEARCH 🔍 KEY

```
       ings=False in
 11    ansible.cfg.
 12
 13    TASK [Configure IP address] ************************************  12:21:34
       *****************
 14    ok: [xrpe03] => (item={u'peer': u'mxp01', u'ip': u'10.1.1.7/31',
       u'pport': u'ge-0/0/2', u'port': u'GigabitEthernet0/0/0/0', u'peer_i
       p': u'10.1.1.6/31'})
 15    ok: [xrpe03] => (item={u'peer': u'mxp02', u'ip': u'10.1.1.13/31',
       u'pport': u'ge-0/0/2', u'port': u'GigabitEthernet0/0/0/1', u'peer_i
       p': u'10.1.1.12/31'})
 16
 17    PLAY RECAP ****************************************************  12:21:38
       *****************
 18    xrpe03                    : ok=2     changed=0     unreachable=0
       failed=0     skipped=0     rescued=0     ignored=0
 19
```

NEW WORKFLOW JOB TEMPLATE

DETAILS PERMISSIONS COMPLETED JOBS SCHEDULES ADD SURVEY WORKFLOW VISUALIZER

* NAME

Deploy_Validate_IOSXR_Interfaces

DESCRIPTION

ORGANIZATION

Default

INVENTORY

mpls_core

PROMPT ON LAUNCH

LABELS

OPTIONS

ENABLE CONCURRENT JOBS

EXTRA VARIABLES YAML JSON

PROMPT ON LAUNCH

```
1 ---
```

LAUNCH   CANCEL   SAVE

WORKFLOW VISUALIZER | Deploy_Validate_IOSXR_Interfaces

TOTAL NODES 2

START ———— provision_iosxr_interfaces ———— validate_iosxr_interfaces
JT   JT

TEMPLATES / Deploy_Validate_IOSXR_Interfaces / PERMISSIONS

Deploy_Validate_IOSXR_Interfaces

DETAILS | PERMISSIONS | NOTIFICATIONS | COMPLETED JOBS | SCHEDULES

SEARCH 🔍 | KEY | +

USER ▲	ROLE	TEAM ROLES
admin	SYSTEM ADMINISTRATOR	
core		✖ ADMIN 👥
noc		✖ EXECUTE 👥

ITEMS 1 - 3

JOBS

JOBS 24

SEARCH 🔍 | KEY

Compact | Expanded | Finish Time (Descending) ⌄

● **29 - Deploy_Validate_IOSXR_Interfaces** Workflow Job 🚀 🗑

Chapter 13: Advanced Techniques and Best Practices for Ansible

```
[vagrant@centos7 ch13_ansible_best_practice]$ tree
.
├── ansible.cfg
├── group_vars
│   ├── all.yml
│   ├── iosxr.yml
│   └── junos.yml
├── hosts
├── net_data
│   ├── common.yml
│   └── network_topology.yml
├── pb_generate_net_data.yml
└── roles
    └── build_datamodel
        ├── tasks
        │   └── main.yml
        └── templates
            ├── bgp.j2
            └── infra.j2
```

```
[vagrant@centos7 net_automation_cookbook]$ yamllint ch13_ansible_best_practice/
ch13_ansible_best_practice/pb_build_datamodel.yml
  1:4       error    wrong new line character: expected \n  (new-lines)
  4:17      warning  truthy value should be one of [false, true]  (truthy)
  7:7       error    wrong indentation: expected 8 but found 6  (indentation)
  9:19      warning  truthy value should be one of [false, true]  (truthy)
  13:19     warning  truthy value should be one of [false, true]  (truthy)
  20:1      error    too many blank lines (1 > 0)  (empty-lines)

ch13_ansible_best_practice/group_vars/junos.yml
  1:1       warning  missing document start "---"  (document-start)
  3:1       error    too many blank lines (1 > 0)  (empty-lines)

ch13_ansible_best_practice/group_vars/all.yml
  1:1       warning  missing document start "---"  (document-start)
```

```
[vagrant@centos7 ch13_ansible_best_practice]$ ansible-lint pb_build_datamodel.yml
[502] All tasks should be named
pb_build_datamodel.yml:7
Task/Handler: file state=directory path=group_vars
```

```
[vagrant@centos7 ch13_ansible_best_practice]$ yamllint net_data/
net_data/common.yml
  1:1       warning  missing document start "---"  (document-start)
  16:13     error    no new line character at the end of file  (new-line-at-end-of-file)

net_data/network_topology.yml
  1:1       warning  missing document start "---"  (document-start)
  1:6       error    wrong new line character: expected \n  (new-lines)
  3:81      error    line too long (99 > 80 characters)  (line-length)
  4:81      error    line too long (99 > 80 characters)  (line-length)
  6:81      error    line too long (99 > 80 characters)  (line-length)
  7:81      error    line too long (99 > 80 characters)  (line-length)
  7:100     error    no new line character at the end of file  (new-line-at-end-of-file)
```

```
[vagrant@centos7 ch13_ansible_best_practice]$ yamllint net_data/
net_data/common.yml
  1:1       warning  missing document start "---"  (document-start)
  16:13     error    no new line character at the end of file  (new-line-at-end-of-file)

net_data/network_topology.yml
  1:1       warning  missing document start "---"  (document-start)
  1:6       error    wrong new line character: expected \n  (new-lines)
  3:81      warning  line too long (99 > 80 characters)  (line-length)
  4:81      warning  line too long (99 > 80 characters)  (line-length)
  6:81      warning  line too long (99 > 80 characters)  (line-length)
  7:81      warning  line too long (99 > 80 characters)  (line-length)
  7:100     error    no new line character at the end of file  (new-line-at-end-of-file)
```

```
playbook: pb_generate_config.yml

  play #1 (all): Generate Device Config TAGS: []
    tasks:
      generate_config : Create Temp Directory    TAGS: []
      generate_config : Generate System Configuration   TAGS: []
      generate_config : Interface Configuration TAGS: []
      generate_config : OSPF Configuration       TAGS: []
      generate_config : MPLS Configuration       TAGS: []
      Create Configs Folder     TAGS: []
      Remove Old Assembled Config      TAGS: []
      Assemble The Final configuration  TAGS: []
      Remove Temp Folder        TAGS: []
```

```
Monday 14 October 2019  00:48:16 +0000 (0:00:00.162)      0:00:10.317 ********
===============================================================================
generate_config ------------------------------------------------------- 8.05s
file ------------------------------------------------------------------- 1.15s
assemble --------------------------------------------------------------- 1.03s
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
total ----------------------------------------------------------------- 10.23s
Monday 14 October 2019  00:48:16 +0000 (0:00:00.162)      0:00:10.317 ********
===============================================================================
generate_config : Generate System Configuration ----------------------------- 2.08s
generate_config : Interface Configuration ------------------------------------ 1.67s
generate_config : MPLS Configuration ----------------------------------------- 1.54s
generate_config : OSPF Configuration ----------------------------------------- 1.53s
generate_config : Create Temp Directory -------------------------------------- 1.24s
Assemble The Final configuration --------------------------------------------- 1.03s
Remove Old Assembled Config -------------------------------------------------- 0.84s
Remove Temp Folder ----------------------------------------------------------- 0.16s
Create Configs Folder -------------------------------------------------------- 0.14s
Playbook run took 0 days, 0 hours, 0 minutes, 10 seconds
```

```
PLAY [Configure ACL on IOS-XR] ************************************************************************

TASK [Create ACL Config] *****************************************************************************
changed: [den-core01 -> localhost]

TASK [Provision ACLs] ********************************************************************************
ok: [den-core01]

PLAY RECAP *******************************************************************************************
den-core01                 : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

```
PLAY [Configure ACL on IOS-XR] ************************************************************************

TASK [Create ACL Config] *****************************************************************************
--- before: acl_conf.cfg
+++ after: /home/vagrant/.ansible/tmp/ansible-local-24442_dsTkh/tmpV7waBS/acl.j2
@@ -2,4 +2,5 @@
 ipv4 access-list INFRA_ACL
  10 permit tcp 10.1.1.0/24 any eq ssh
  20 permit udp 10.2.1.0/24 any eq snmp
+ 30 permit tcp 10.3.2.0/24 10.2.2.0/24 eq dns
 !

changed: [den-core01 -> localhost]

TASK [Provision ACLs] ********************************************************************************
ok: [den-core01]

PLAY RECAP *******************************************************************************************
den-core01                 : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

```
[vagrant@centos7 ch13_ansible_best_practice]$ grep 'ansible_*\|napalm*\|site' fact_cache/den-core01
ansible_net_all_ipv4_addresses:
ansible_net_all_ipv6_addresses: []
ansible_net_api: cliconf
ansible_net_gather_subset:
ansible_net_hostname: den-core01
ansible_net_image: bootflash:disk0/xrvr-os-mbi-6.1.2/mbixrvr-rp.vm
ansible_net_interfaces:
ansible_net_model: IOS XRv
ansible_net_python_version: 2.7.5
ansible_net_system: iosxr
ansible_net_version: 6.1.2[Default]
napalm_interfaces:
site: Egypt
```

```
ok: [str-core02] => {
    "standard_acl": {
        "INFRA_ACL": [
            {
                "dport": "ssh",
                "dst": "any",
                "src": "10.1.1.0/24",
                "state": "PRESENT"
            },
            {
                "app": "udp",
                "dport": "snmp",
                "dst": "any",
                "src": "10.2.1.0/24",
                "state": "PRESENT"
            },
            {
                "app": "udp",
                "dport": "dns",
                "dst": "10.2.2.0/24",
                "src": "10.3.2.0/24",
                "state": "PRESENT"
            }
        ]
    }
}
```

```json
    "final_acl": {
        "INFRA_ACL": [
            {
                "dport": "SSH",
                "dst": "any",
                "src": "10.1.1.0/24",
                "state": "present"
            },
            {
                "app": "udp",
                "dport": "SNMP",
                "dst": "any",
                "src": "10.2.1.0/24",
                "state": "present"
            },
            {
                "app": "udp",
                "dport": "DNS",
                "dst": "10.2.2.0/24",
                "src": "10.3.2.0/24",
                "state": "present"
            }
        ]
    }
}
```