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Pre-Requisites

Ansible Pre-Requisites

Ansible for the Absolute Beginners

- **Setup Basic Lab**
- **YAML**
- **Inventory**
- **Playbooks**
- **Variables**
- **Modules**
- **Loops**

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www.kodekloud.com

Linux Pre-Requisites

- SSH Keys, Authorized Keys
- Users, Groups
- Package Managers
- Services
- Cron
- SELinux
- Devices, Filesystems, LVM
- Firewalls
- Archiving

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
  - ✓ Inventories
  - ✓ Modules
  - ✓ Variables
  - ● Facts
  - ✓ Plays
  - ✓ Playbooks
  - ● Configuration Files
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files

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Notes

- Do not use the code in the slides as is (Things are hidden at times). Refer to the references and git repo for the actual code and working samples.
- Code might get copied in a different format.

```
- name: Deploy web application
  hosts: server1
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components

✓ Inventories	✓ Plays
✓ Modules	✓ Playbooks
✓ Variables	● Configuration Files
✓ Facts	

- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
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- Customized Configuration Files

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Ansible

Configuration Files

Ansible Configuration Files

/etc/ansible/ansible.cfg

```
[defaults]

[inventory]

[privilege_escalation]

[paramiko_connection]

[ssh_connection]

[persistent_connection]

[colors]
```

Ansible Configuration Files

/etc/ansible/ansible.cfg

```
[defaults]

inventory                 = /etc/ansible/hosts
log_path                  = /var/log/ansible.log

library                   = /usr/share/my_modules/
roles_path                = /etc/ansible/roles
action_plugins            = /usr/share/ansible/plugins/action

gathering                 = implicit

# SSH timeout
timeout                   = 10
forks                     = 5


[inventory]
enable_plugins            = host_list, virtualbox, yaml, constructed
```

Ansible Configuration Files

`/etc/ansible/ansible.cfg`

`/opt/web-playbooks`

`/opt/web-playbooks/ansible.cfg`

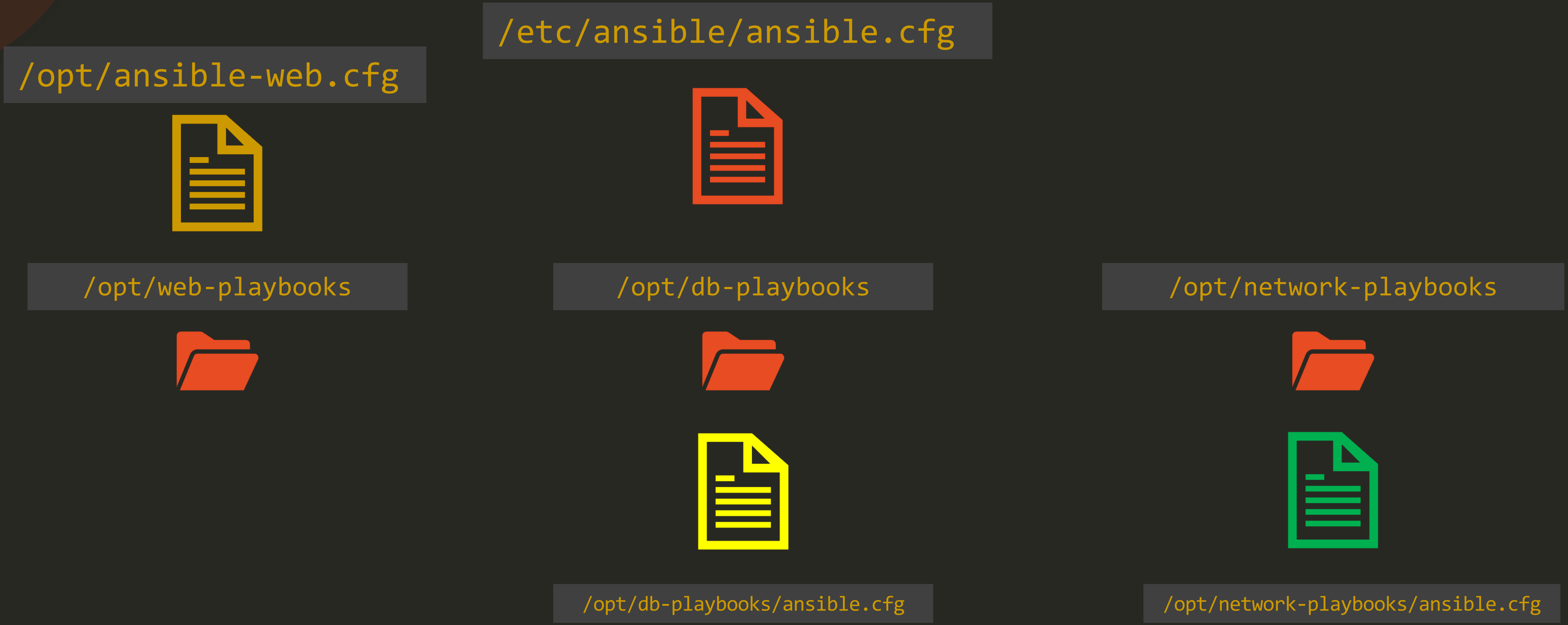
`/opt/db-playbooks`

`/opt/db-playbooks/ansible.cfg`

`/opt/network-playbooks`

`/opt/network-playbooks/ansible.cfg`

Ansible Configuration Files



```
$ANSIBLE_CONFIG=/opt/ansible-web.cfg ansible-playbook playbook.yml
```

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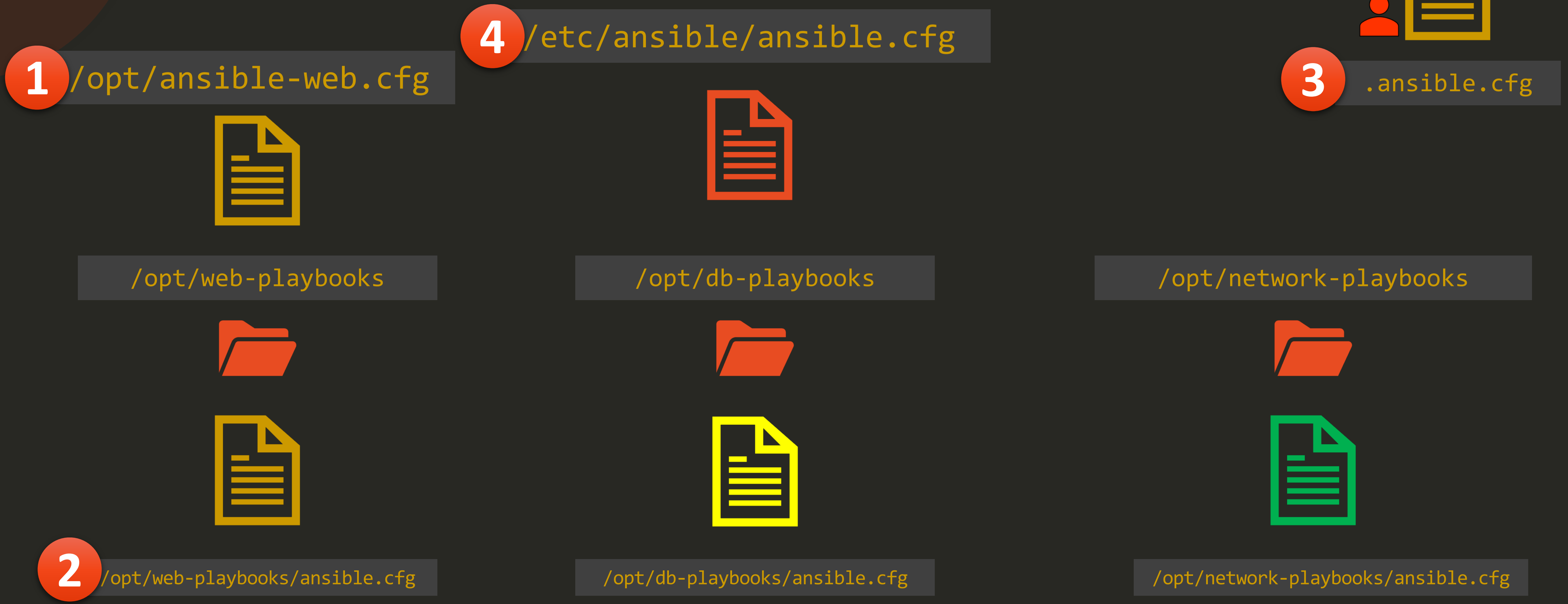
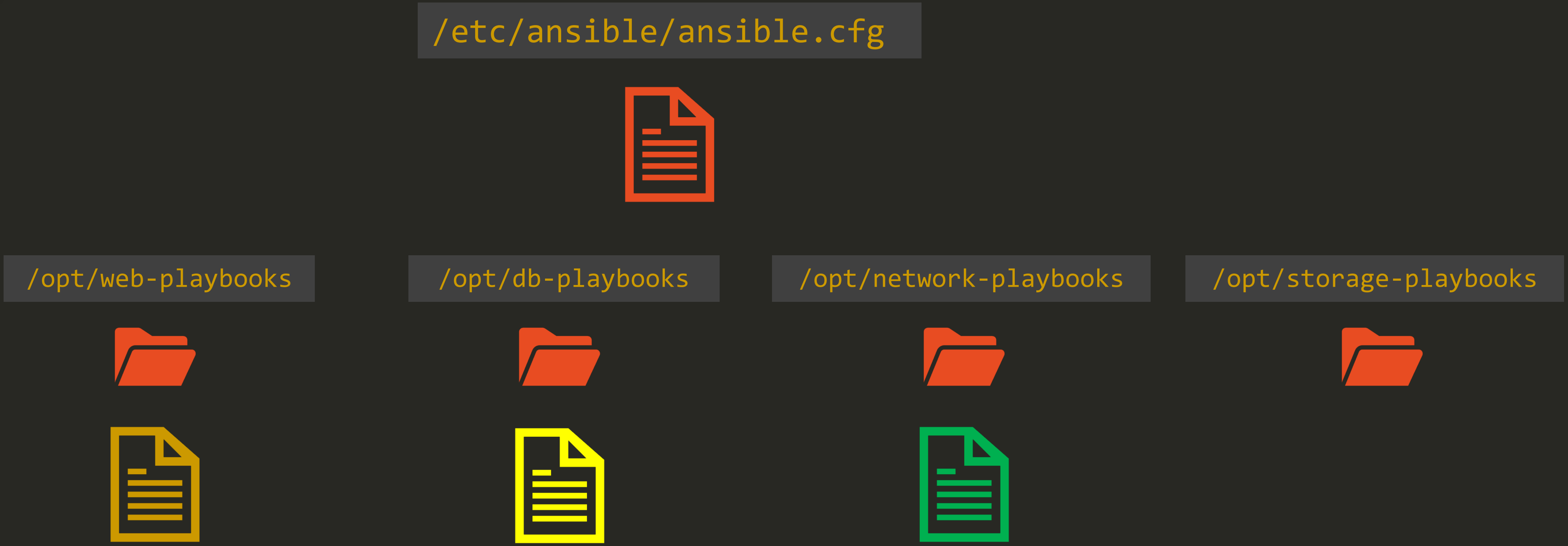
Ansible Configuration Files


4 /etc/ansible/ansible.cfg
1 /opt/ansible-web.cfg
3 .ansible.cfg
/opt/web-playbooks
/opt/db-playbooks
/opt/network-playbooks
2 /opt/web-playbooks/ansible.cfg
/opt/db-playbooks/ansible.cfg
/opt/network-playbooks/ansible.cfg

1
```
$ANSIBLE_CONFIG=/opt/ansible-web.cfg
```

Ansible Configuration Files



/etc/ansible/ansible.cfg

```
gathering                 = implicit
```

```
ANSIBLE_GATHERING=explicit
```

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Ansible Configuration Variables

```
$ ANSIBLE_GATHERING=explicit   ansible-playbook playbook.yml
```

```
$ export ANSIBLE_GATHERING=explicit
$ ansible-playbook playbook.yml
```

```
/opt/web-playbooks/ansible.cfg
gathering              = explicit
```

View Configuration

```
$ ansible-config list        # Lists all configurations
```

```
$ ansible-config view        # Shows the current config file
```

```
$ ansible-config dump        # Shows the current settings
```

```
$ export ANSIBLE_GATHERING=explicit
$ ansible-config dump | grep GATHERING
  DEFAULT_GATHERING(env: ANSIBLE_GATHERING) = explicit
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
    - ✓ Inventories
    - ✓ Modules
    - ✓ Variables
    - Facts
    - ✓ Plays
    - ✓ Playbooks
    - Configuration Files
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files

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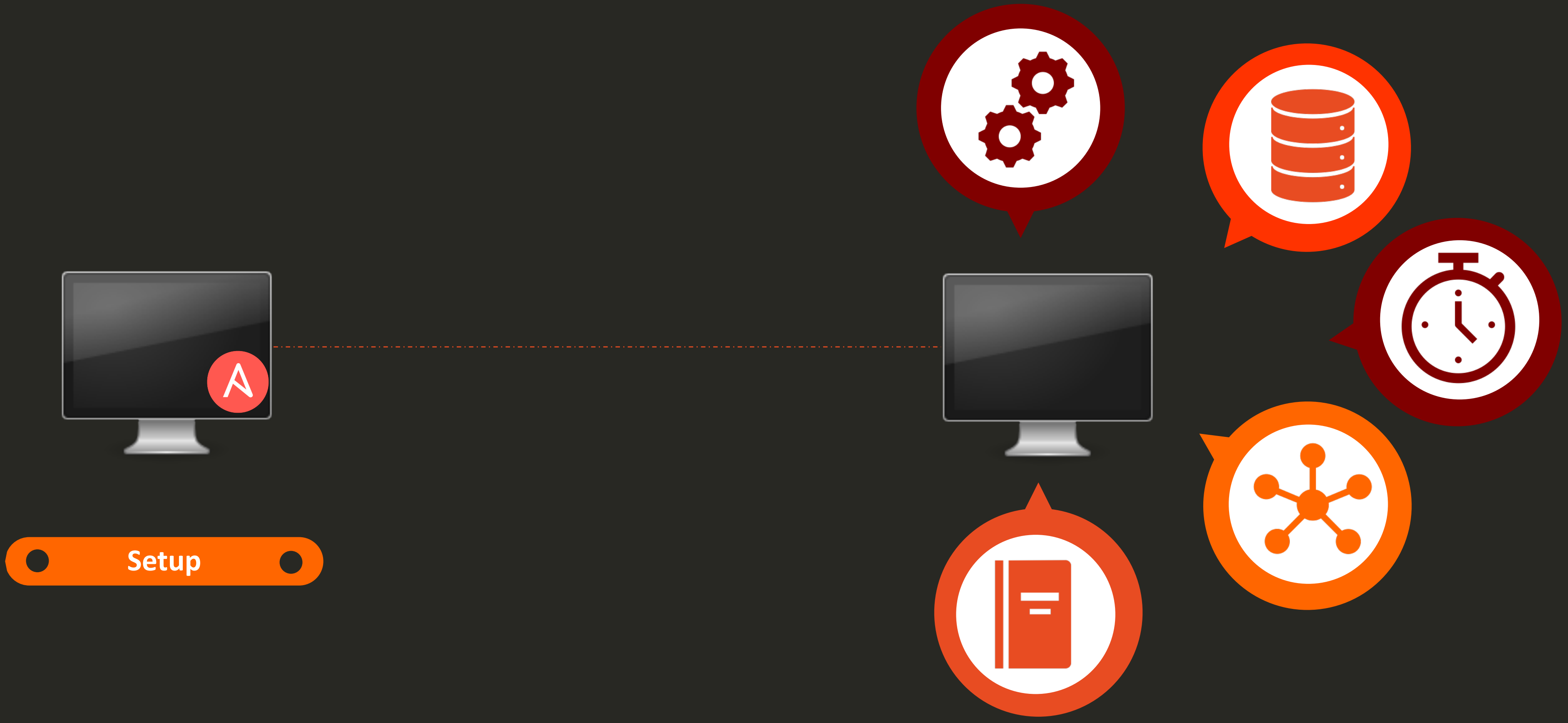
Ansible

FACTS

FACTS



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```yaml
---
- name: Print hello message
  hosts: all
  tasks:
  - debug:
      msg: Hello from Ansible!
```

```
PLAY [Print hello message]
**********************************************************


TASK [Gathering Facts]
**************************************************************
ok: [web2]
ok: [web1]


TASK [debug]
*********************************************************************
ok: [web1] => {
    "msg": "Hello from Ansible!"
}
ok: [web2] => {
    "msg": "Hello from Ansible!"
}
```

```yaml
---
- name: Print hello message
  hosts: all
  tasks:
  - debug:
      var: ansible_facts
```

```
PLAY [Reset nodes to previous state]
************************************************


TASK [Gathering Facts]
**************************************************************
ok: [web2]
ok: [web1]


TASK [debug] *******************************************************
ok: [web1] => {
    "ansible_facts": {
        "all_ipv4_addresses": [
            "172.20.1.100"
        ],
        "architecture": "x86_64",
        "date_time": {
            "date": "2019-09-07",
        },
        "distribution": "Ubuntu",
        "distribution_file_variety": "Debian",
        "distribution_major_version": "16",
        "distribution_release": "xenial",
        "distribution_version": "16.04",
        "dns": {
            "nameservers": [
                "127.0.0.11"
            ],
        },
        "fqdn": "web1",
        "hostname": "web1",
        "interfaces": [
            "lo",
            "eth0"
        ],
        "machine": "x86_64",
        "memfree_mb": 72,
        "memory_mb": {
            "real": {
                "free": 72,
                "total": 985,
                "used": 913
```

```yaml
---
- name: Print hello message
  hosts: all
  tasks:
  - debug:
      var: ansible_facts
```

```
        "interfaces": [
            "lo",
            "eth0"
        ],
        "machine": "x86_64",
        "memfree_mb": 72,
        "memory_mb": {
            "real": {
                "free": 72,
                "total": 985,
                "used": 913
            },
        },
        "memtotal_mb": 985,
        "module_setup": true,
        "mounts": [
            {
                "block_available": 45040,
                "block_size": 4096,
                "block_total": 2524608,
                "block_used": 2479568,
            },
        ],
        "nodename": "web1",
        "os_family": "Debian",
        "processor": [
            "0",
            "GenuineIntel",
            "Intel(R) Core(TM) i9-9980HK CPU @ 2.40GHz",
        ],
        "processor_cores": 2,
        "processor_count": 1,
        "processor_threads_per_core": 1,
        "processor_vcpus": 2,
        "product_name": "VirtualBox",
        "product_serial": "0",
        "product_uuid": "18A31B5D-FAC9-445F-9B6F-95B4B587F485",
        "product_version": "1.2",

    }
}
```

```yaml
---
- name: Print hello message
  hosts: all
  gather_facts: no
  tasks:
  - debug:
      var: ansible_facts
```

```
PLAY [Print hello message]
**********************************************************


TASK [debug]
******************************************************************
ok: [web1] => {
    "ansible_facts": {}
}
ok: [web2] => {
    "ansible_facts": {}
}
```

```yaml
---
- name: Print hello message
  hosts: all
  gather_facts: no
  tasks:
  - debug:
      var: ansible_facts
```

```
PLAY [Print hello message]
**************************************************************


TASK [debug]
**********************************************************************
ok: [web1] => {
    "ansible_facts": {}
}
ok: [web2] => {
    "ansible_facts": {}
}
```

/etc/ansible/ansible.cfg

```
# plays will gather facts by default, which contain information about
# smart - gather by default, but don't regather if already gathered
# implicit - gather by default, turn off with gather_facts: False
# explicit - do not gather by default, must say gather_facts: True
gathering             = implicit
```

```yaml
---
- name: Print hello message
  hosts: web1
  tasks:
  - debug: ansible_facts
```

/etc/ansible/hosts

```
web1
web2
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
- Install and Configure Ansible Control Node
    - Install Required Packages
    - Create a Static Host Inventory File
    - Create a Configuration File
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files
- Variables and Facts
- Roles

Ansible

Install

Control Node

Redhat or CentOS –

```
$ sudo yum install ansible
```

Fedora –

```
$ sudo dnf install ansible
```

Ubuntu –

```
$ sudo apt-get install ansible
```

PIP –

```
$ sudo pip install ansible
```

Additional Options:

- Install from source on GIT
- Build RPM yourself

Ansible Control Machine

- Playbooks
- Inventory
- Modules

Control Machine - Linux Only

https://docs.ansible.com/ansible/latest/installation_guide/

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Install Control Node on Redhat or CentOS

Redhat or CentOS –
```
$ sudo yum install ansible
```

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Install via PIP

Install pip if not present

```
$ sudo yum install epel-release
```

```
$ sudo yum install python-pip
```

Install Ansible using pip

```
$ sudo pip install ansible
```

Upgrade Ansible using pip

```
$ sudo pip install --upgrade ansible
```

Install Specific Version of Ansible using pip

```
$ sudo pip install ansible==2.4
```

Ansible Inventory

Redhat or CentOS – `sudo yum install ansible`

/etc/ansible/hosts

```
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - Groups of hosts are delimited by [header] elements
#   - You can enter hostnames or ip addresses
#   - A hostname/ip can be a member of multiple groups


# Ex 1: Ungrouped hosts, specify before any group headers.


## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10


# Ex 2: A collection of hosts belonging to the 'webservers' group


## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
```

/opt/my-playbook/hosts

```
web1 ansible_host=192.168.1.100
web2 ansible_host=192.168.1.101
```

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Ansible Configuration File

Redhat or CentOS –

```
sudo yum install ansible
```

/etc/ansible/ansible.cfg

```
[defaults]
inventory                 = /etc/ansible/hosts
log_path                  = /var/log/ansible.log

library                   = /usr/share/my_modules/
roles_path                = /etc/ansible/roles
action_plugins            = /usr/share/ansible/plugins/action

gathering                 = implicit

# SSH timeout
timeout                   = 10

display_skipped_hosts = True
nocolor                   = 1

forks                     = 5
```

/opt/my-playbook/ansible.cfg

```
[defaults]
gathering                 = explicit
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
  - Create and Distribute SSH Keys
  - Configure Privilege Escalation on Managed Nodes
  - Validate using Adhoc Commands
- Create simple shell scripts that run ad hoc Ansible commands
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- Variables and Facts
- Roles

Ansible

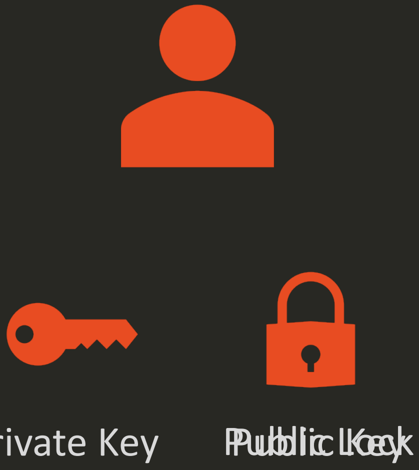
Creating and Distributing SSH Keys

Inventory File

/etc/ansible/hosts

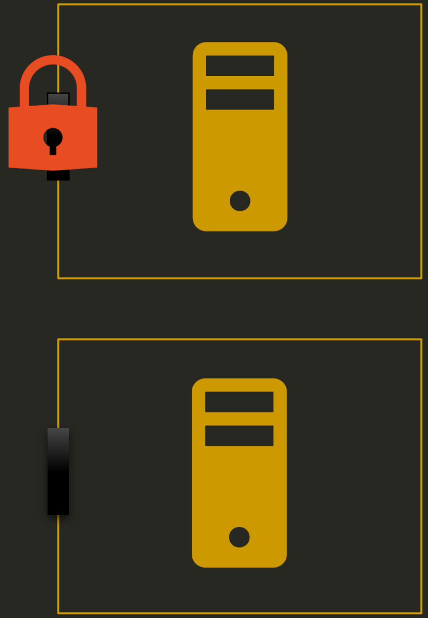
```
web1 ansible_host=172.20.1.100 ansible_ssh_pass=Passw0rd
web2 ansible_host=172.20.1.101 ansible_ssh_pass=Passw0rd
```

```
ssh-keygen
id_rsa   id_rsa.pub
```



```
ssh -i id_ras user1@server1
Successfully Logged In!
```

```
cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc…KhtUBfoTzlBqR
V1NThvOo4opzEwRQo1mWx user1
```



```
ssh-keygen
id_rsa   id_rsa.pub
```

Private Key   Public Lock

```
cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc…KhtUBfoTzlBqR
V1NThvOo4opzEwRQo1mWx user1
```

```
ssh-copy-id -i id_ras user1@server1
Number of key(s) added: 1
```

```
ssh -i id_ras user1@server1
Successfully Logged In!
```

Inventory File

```
/etc/ansible/hosts
```

```
web1 ansible_host=172.20.1.100 ansible_user=user1  ansible_ssh_private_key_file=/some-path/private-key
web2 ansible_host=172.20.1.101 ansible_user=user1  ansible_ssh_private_key_file=/some-path/private-key
```

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The Curriculum

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Ansible

AdHoc Commands

playbook.yml

```yaml
---
- name: Ping Servers
  hosts: all
  tasks:
  -      :
```

```
ansible-playbook playbook.yml
```

```
ansible -m  ping
```

playbook.yml

```yaml
---
- name: Ping Servers
  hosts:
  tasks:
  -      :
```

```
ansible-playbook playbook.yml
```

```
ansible -m ping all
```

```
web2 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
web1 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

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```
ansible -m ping all
```

```
web2 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
web1 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

```
ansible -a ‘cat /etc/hosts’ all
```

```
web1 | CHANGED | rc=0 >>
127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.20.1.100 web1


web2 | CHANGED | rc=0 >>
127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

```
ansible -a ‘yum install nginx’ all
        --become
        --become-user nginx
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files
- Variables and Facts
- Roles
- Ansible Vault
- Documentation

Ansible

Shell Scripts

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```
$ ansible -m ping all
```

```
$ ansible -a ‘cat /etc/hosts’ all
```

```
$ export ANSIBLE_GATHERING=explicit
$ ansible-playbook playbook.yml
```

shell-script.sh

```
export ANSIBLE_GATHERING=explicit

ansible -m ping all

ansible -a 'cat /etc/hosts' all

ansible-playbook playbook.yml
```

```
sh shell-script.sh
```

```
chmod 755 shell-script.sh
```

```
./shell-script.sh
```

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The Curriculum

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Ansible

Privilege Escalation

KODEKLOUD

Users

root

admin

admin

developer

nginx

monitor

mysql

Users Workflow

root

Install Packages

admin

```
ssh -i id_ras admin@server1
Successfully Logged In!
```

```
sudo  yum install nginx
Package Installed!
```

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

nginx

```
su nginx
```

```
# Configure nginx
```

mysql

```
su mysql
```

Become another user

```
# Configure MySQL
```

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Users Workflow

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin
```

playbook

```
---
- name: Install nginx
  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

```
Permission Denied
```

Install Packages

root

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

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Become Super User

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin
```

playbook

```
---
- name: Install nginx
  become: yes
  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

```
Package Installed!
```

Install Packages

root

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

KODEKLOUD

Become Method

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin
```

playbook

```
---
- name: Install nginx
  become: yes
  become_method: doas
  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

```
Package Installed!
```

Install Packages

root

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

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Become Another User

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin
```

playbook

```
---
- name: Install nginx
  become: yes
  become_user: nginx
  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

```
Package Installed!
```

Install Packages

root

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

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Inventory File

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin ansible_become=yes  ansible_become_user=nginx
```

playbook

```
---
- name: Install nginx


  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

```
Package Installed!
```

Install Packages

root

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

Configuration File

/etc/ansible/ansible.cfg

```
become                  = True
become_method           = doas
become_user             = nginx
```

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin ansible_become=yes  ansible_become_user=nginx
```

playbook

```
---
- name: Install nginx


  hosts: all
  tasks:
  - yum:
      name: nginx
      state: latest
```

Install Packages

Become Super user (sudo)

Become Method – sudo (pfexec, doas, ksu, runas)

Become another user

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Command Line

Install Packages

root

/etc/ansible/ansible.cfg

```
become                        = True
become_method                 = doas
become_user                   = nginx
```

inventory

```
lamp-dev1 ansible_host=172.20.1.100 ansible_user=admin ansible_become=yes  ansible_become_user=nginx
```

playbook

command line

```
$ ansible-playbook --become --become-method=doas --become-user=nginx --ask-become-pass
```

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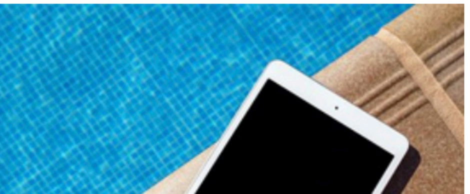
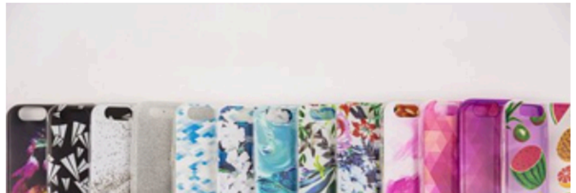
ook Pro
ase MB at the lowest price **100$**

Drone
Purchase Multifunctional drones**200$**

VR
Explore our VR Devices

Macbook air
Purchase MB at the lowest price **500$**





Linux Apache MariaDB Php

1

Install Firewall

2

Install httpd
Configure httpd
Configure Firewall
Start httpd

3

Install MariaDB
Configure MariaDB
Start MariaDB
Configure Firewall
Configure Database
Load Data

4

Install Php
Configure Code

Install Firewall

Install httpd

Configure httpd

Configure Firewall

Start httpd

Install MariaDB

Configure MariaDB

Start MariaDB

Configure Firewall

Configure Database

Load Data

Install php

Download Code

Test

KODEKLOUD

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Start MariaDB

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Test

Install Firewall

```
$ sudo yum install firewalld
```

```
$ sudo service firewalld start
```

```
$ sudo systemctl enable firewalld
```

Install MariaDB

```
$ sudo yum install mariadb-server
```

Configure MariaDB

```
$ sudo vi /etc/my.cnf # configure the file with the right port
```

Start MariaDB

```
$ sudo service mariadb start
```

```
$ sudo systemctl enable mariadb
```

Configure Firewall

```
$ sudo firewall-cmd --permanent --zone=public --add-port=3306/tcp
```

```
$ sudo firewall-cmd --reload
```

Configure Database

```
$ mysql
MariaDB > CREATE DATABASE ecomdb;
MariaDB > CREATE USER 'ecomuser'@'localhost' IDENTIFIED BY 'ecompassword’;
MariaDB > GRANT ALL PRIVILEGES ON *.* TO 'ecomuser'@'localhost';
MariaDB > FLUSH PRIVILEGES;
```

Load Data

```
$ mysql < db-load-script.sql
```

Install httpd

Install php

Configure Firewall

```
$ sudo yum install -y httpd php php-mysql
```

```
$ sudo firewall-cmd --permanent --zone=public --add-port=80/tcp
```

```
$ sudo firewall-cmd --reload
```

Configure httpd

```
$ sudo vi /etc/httpd/conf/httpd.conf #
  # configure DirectoryIndex to use index.php instead of index.html
```

Start httpd

```
$ sudo service httpd start
```

```
$ sudo systemctl enable httpd
```

Download Code

```
$ sudo yum install -y git
```

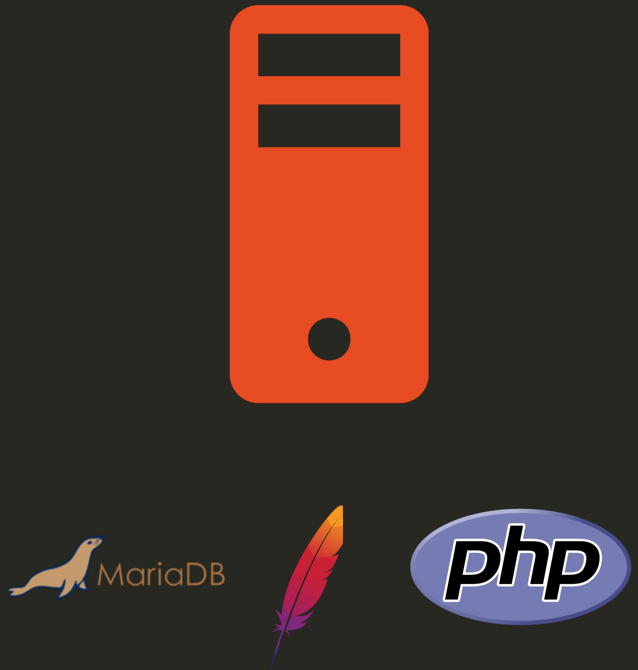
```
$ git clone https://github.com/<application>.git /var/www/html/

# Update index.php to use the right database address, name and credentials
```

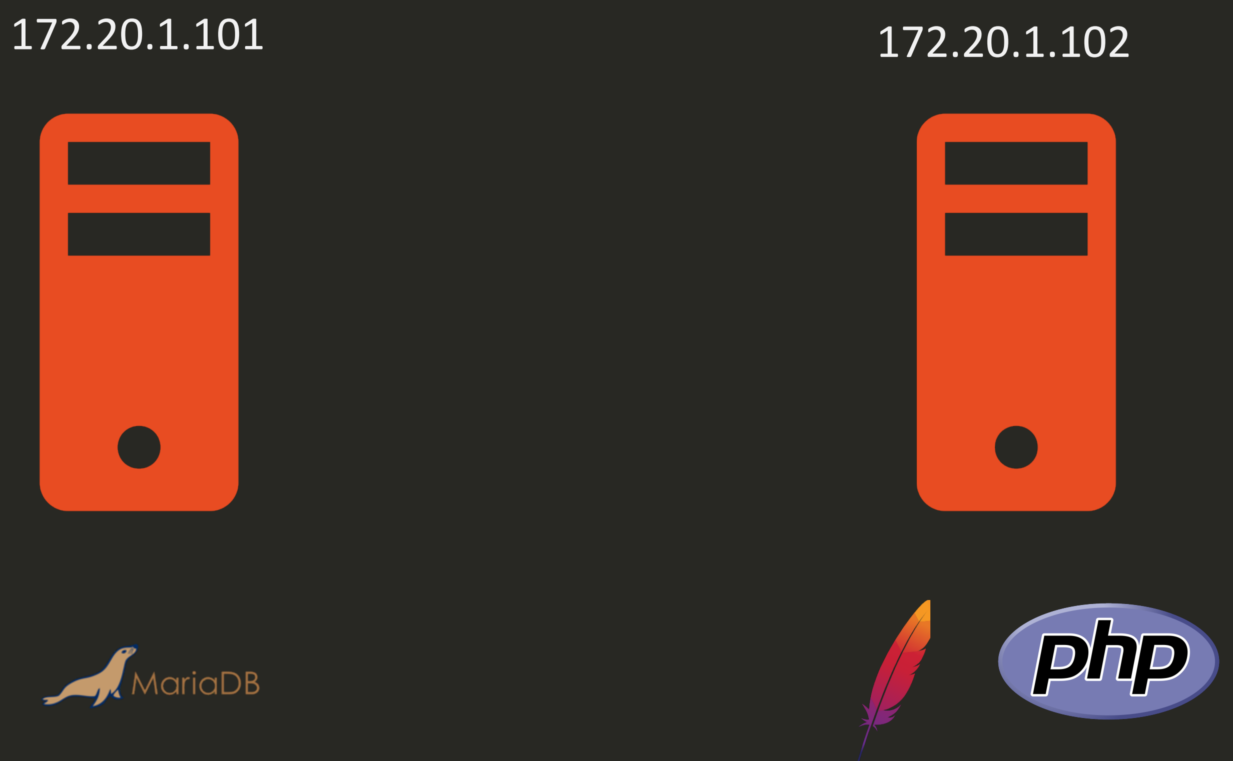
Test

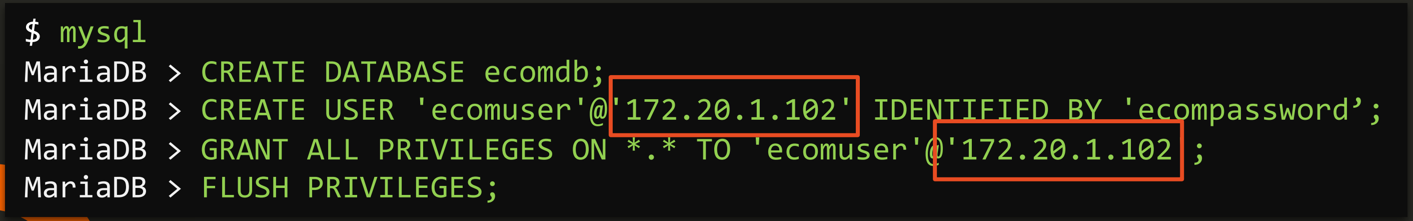
```
$ curl http://localhost
```

Deployment Model- Single Node

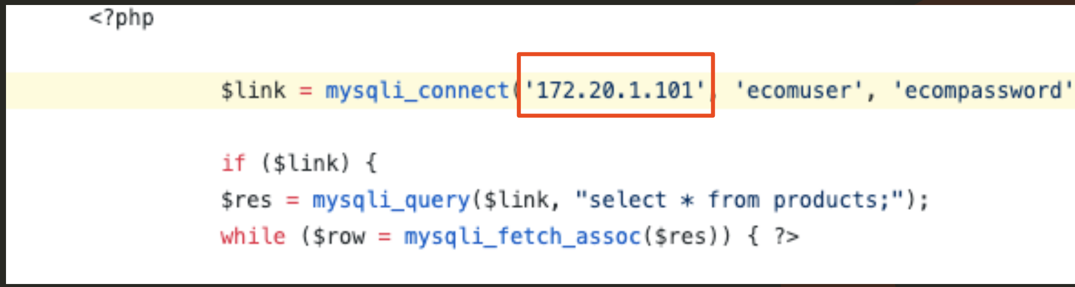


Deployment Model- Multi Node





```
$ mysql
MariaDB > CREATE DATABASE ecomdb;
MariaDB > CREATE USER 'ecomuser'@'172.20.1.102' IDENTIFIED BY 'ecompassword’;
MariaDB > GRANT ALL PRIVILEGES ON *.* TO 'ecomuser'@'172.20.1.102 ;
MariaDB > FLUSH PRIVILEGES;
```

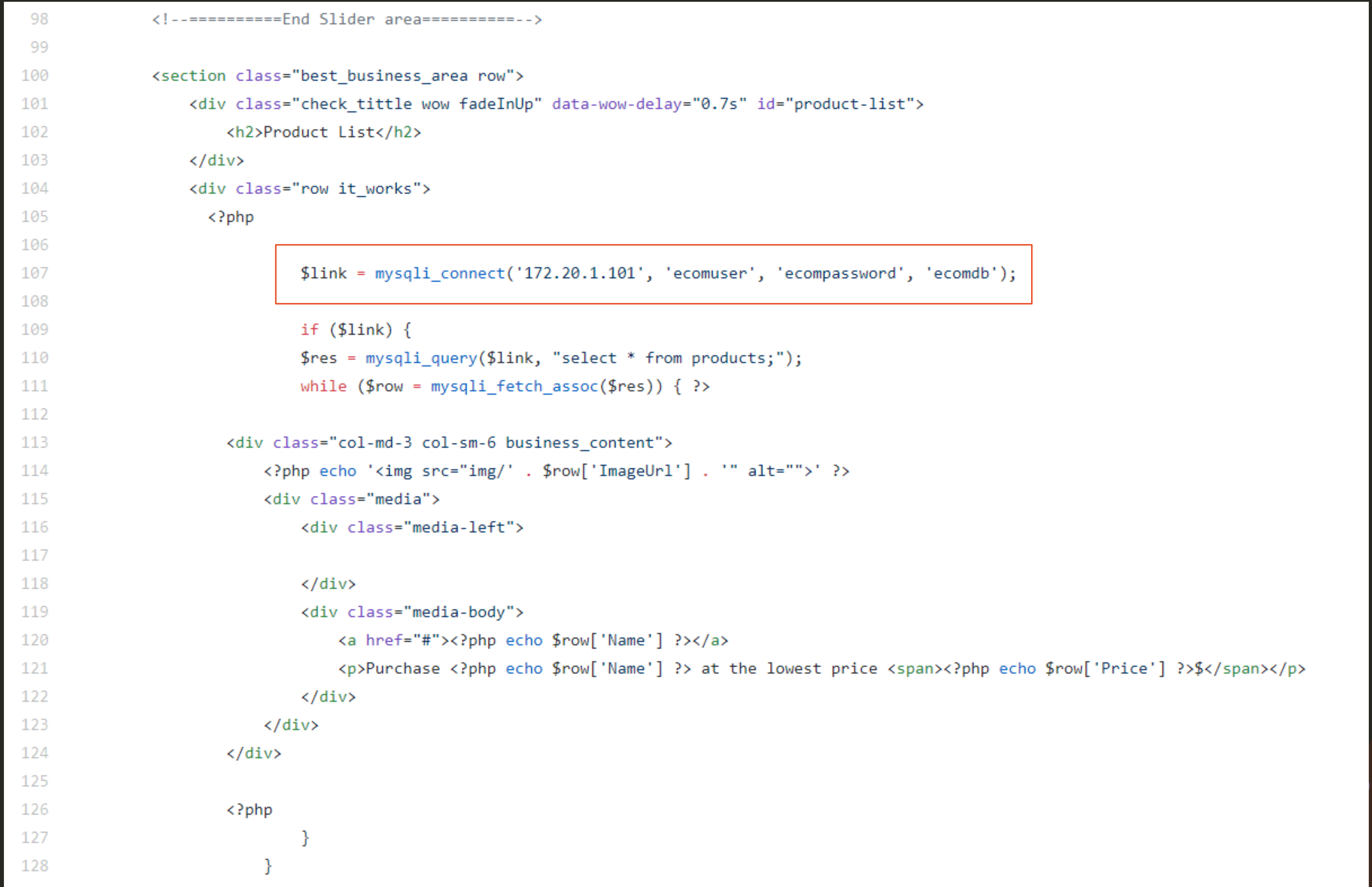


```
<?php

        $link = mysqli_connect('172.20.1.101', 'ecomuser', 'ecompassword'

        if ($link) {
        $res = mysqli_query($link, "select * from products;");
        while ($row = mysqli_fetch_assoc($res)) { ?>
```

HTML



```
        <!--==========End Slider area==========-->

        <section class="best_business_area row">
            <div class="check_tittle wow fadeInUp" data-wow-delay="0.7s" id="product-list">
                <h2>Product List</h2>
            </div>
            <div class="row it_works">
              <?php

                        $link = mysqli_connect('172.20.1.101', 'ecomuser', 'ecompassword', 'ecomdb');

                        if ($link) {
                        $res = mysqli_query($link, "select * from products;");
                        while ($row = mysqli_fetch_assoc($res)) { ?>

                <div class="col-md-3 col-sm-6 business_content">
                    <?php echo '<img src="img/' . $row['ImageUrl'] . '" alt="">' ?>
                    <div class="media">
                        <div class="media-left">

                        </div>
                        <div class="media-body">
                            <a href="#"><?php echo $row['Name'] ?></a>
                            <p>Purchase <?php echo $row['Name'] ?> at the lowest price <span><?php echo $row['Price'] ?>$</span></p>
                        </div>
                    </div>
                </div>

                <?php
                        }
                    }
```

KODEKLOUD

KodeKloud Project

Ansible

Complete Playbook

KODEKLOUD

Laptops Drones Gadgets Phones VR Contact us

Product List

ook Pro

ase MB at the lowest price **100$**

Drone

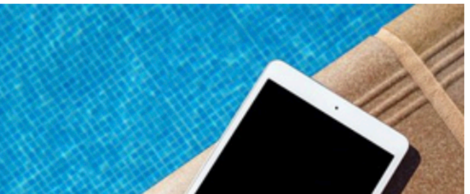
Purchase Multifunctional drones **200$**

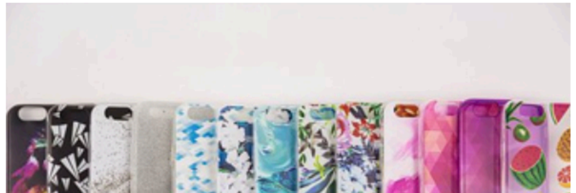
VR

Explore our VR Devices

Macbook air

Purchase MB at the lowest price **500$**





Web application

- Web Server
- MySQL Database

https://github.com/mmumshad/simple-webapp

Web application

1. Identify Server
2. Python
3. Install
   Configure
   Start
4. Install Flask
5. Source Code
6. Run

KODEKLOUD

Ansible

Playbook Visualization

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

KODEKLOUD

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

Variable Interpolation

Gather Facts

Execute Playbook

Create Subprocess

```
inventory_hostname=web1
ansible_host=172.20.1.100

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

web1

```
inventory_hostname=web2
ansible_host=172.20.1.101

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

web2

```
inventory_hostname=web3
ansible_host=172.20.1.102

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

web3

KODEKLOUD

Ansible

FAQ

YAML

```
- name: Gather facts

  gather_facts: yes          no

  gather_facts: true         false

  gather_facts: TRUE         FALSE

  gather_facts: True         False
```

YAML

```yaml
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
      msg: Hello
```

{{ }}

```
- name: Print dns server
  hosts: all
  tasks:
  - debug:
      msg: “{{ dns_server_ip }}”
      var: dns_server_ip

    when: ansible_host != ‘web’

    with_items: “{{ db_servers }}”
```

```
msg: “{{ dns_server_ip }}”

msg: The DNS server is {{ dns_server_ip }}
```

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ansible_ssh_pass or ansible_password

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100 ansible_ssh_pass=Passw0rd
web2 ansible_host=172.20.1.101 ansible_ssh_pass=Passw0rd
```

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100 ansible_password=Passw0rd
web2 ansible_host=172.20.1.101 ansible_password=Passw0rd
```

KODEKLOUD

Ansible

Playbook Run Options

Check Mode or Dry Run

```yaml
---
- name: Install httpd
  hosts: all
  tasks:
  - yum:
      name: httpd
      state: installed
```

```
$ ansible-playbook playbook.yml --check
```

Start at

```yaml
---
- name: Install httpd

  hosts: all
  tasks:
  - name: Install httpd
    yum:
      name: httpd
      state: installed

  - name: Start httpd service
    service:
      name: httpd
      state: started
```

```
$ ansible-playbook playbook.yml --start-at-task “Start httpd service”
```

Tags

```yaml
---
- name: Install httpd
  tags: install and start
  hosts: all
  tasks:
  - yum:
      name: httpd
      state: installed
    tags: install
  - service:
      name: httpd
      state: started

     tags: start httpd service
```

```
$ ansible-playbook playbook.yml --tags “install”
```

```
$ ansible-playbook playbook.yml --skip-tags “install”
```

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Ansible

Modules

Packages

playbook

```yaml
---
- name: Install web on CentOS
  hosts: all
  tasks:
  - yum:
      name: httpd
      state: installed
```

playbook

```yaml
---
- name: Install web on Ubuntu
  hosts: all
  tasks:
  - apt:
      name: apache2
      state: installed
```

playbook

```yaml
---
- name: Install web on Any Host
  hosts: all
  tasks:
  - package:
      name: httpd
      state: installed
```

Service

playbook

```
---
- name: Start httpd service
  hosts: all
  tasks:
  - service:
      name: httpd
      state: started
      enabled: yes
```

Firewall Rules

playbook

```yaml
---
- name: Add Firewalld rule
  hosts: all
  tasks:
  - firewalld:

      port: 8080/tcp
      service: http
      source: 192.0.0.0/24

      zone: public

      state: enabled

      permanent: yes
      immediate: yes
```

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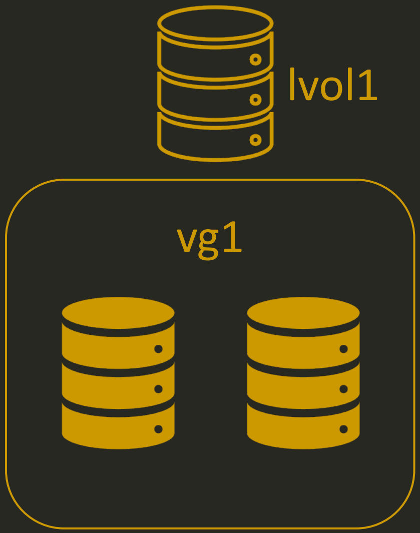
Storage

playbook

```yaml
---
- hosts: all
  tasks:
  - name: Create LVM Volume Group
    lvg:
      vg: vg1
      pvs: /dev/sdb1,/dev/sdb2


  - name: Create LVM Volume
    lvol:
      vg: vg1
      lv: lvol1
      size: 2g
```



Filesystem

playbook

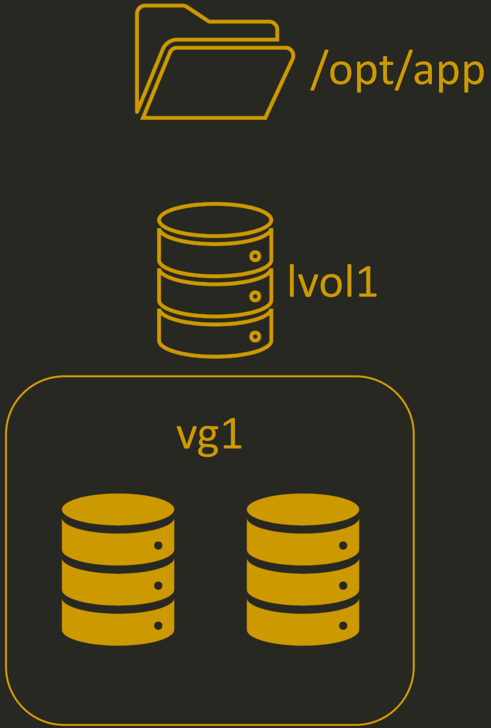
```yaml
---
- hosts: all
  tasks:
  - name: Create Filesystem
    filesystem:

      fstype: ext4
      dev: /dev/vg1/lvol1

      opts: -cc

  - name: Mount Filesystem
    mount:

      fstype: ext4
      src: /dev/vg1/lvol1
      path: /opt/app
      state: mounted
```



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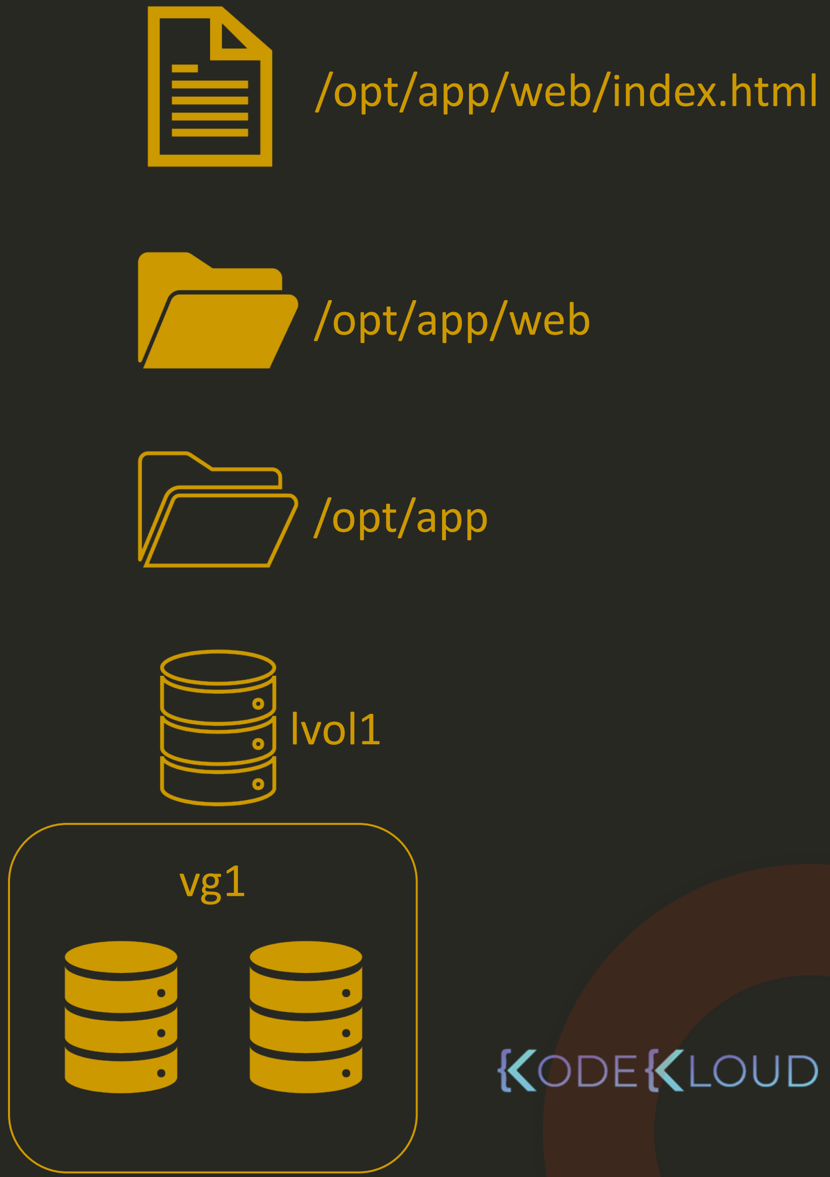
File

playbook

```yaml
---
- hosts: all
  tasks:
  - name: Create Directory
    file:
      path: /opt/app/web
      state: directory

  - name: Create File
    file:
      path: /opt/app/web/index.html
      state: touch
      owner: app-owner
      group: app-owner
      mode: '0644'
```



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Archive

playbook

```yaml
---
- hosts: all
  tasks:
  - name: Compress a folder
    archive:
      path: /opt/app/web
      dest: /tmp/web.gz

      format: zip|tar|bz2|xz|gz


  - name: Uncompress a folder
    unarchive:
      src: /tmp/web.gz
      dest: /opt/app/web

      remote_src: yes
```

Cron

playbook

```yaml
---
- hosts: all
  tasks:
  - name: Create a scheduled task
    cron:
      name: Run daily health report
      job: sh /opt/scripts/health.sh

      month: 2
      day: 19
      hour: 8
      minute: 10
```

Cron

playbook

```
---
- hosts: all
  tasks:
  - name: Create a scheduled task
    cron:
      name: Run daily health report
      job: sh /opt/scripts/health.sh

      month:  *
      day:  *
      hour: *
      minute:  */2
      weekday:  *
```

```
  */2      *       *       *        *
minute   hour    day    month   weekday
```

Users and Groups

playbook

```
---
- hosts: all
  tasks:
  - name: Create a user Maria
    user:
      name: maria
      uid: 1001
      group: developers
      shell: /bin/bash


  - name: Create a group
    group:
      name: developers
```

playbook

```
---
- hosts: all
  tasks:
  - name: Configure ssh keys
    authorized_keys:
      user: maria
      state: present
      key: |
      ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAA
BAQC4WKn4K2G3iWg9HdCGo34gh+……root@97a1b9c3a
```

KODEKLOUD

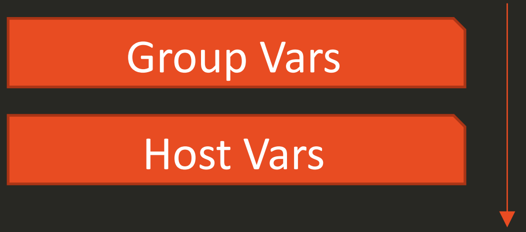
Ansible

Variable Precedence

Variable Precedence

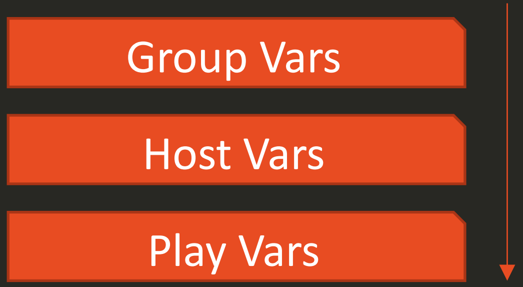
/etc/ansible/hosts

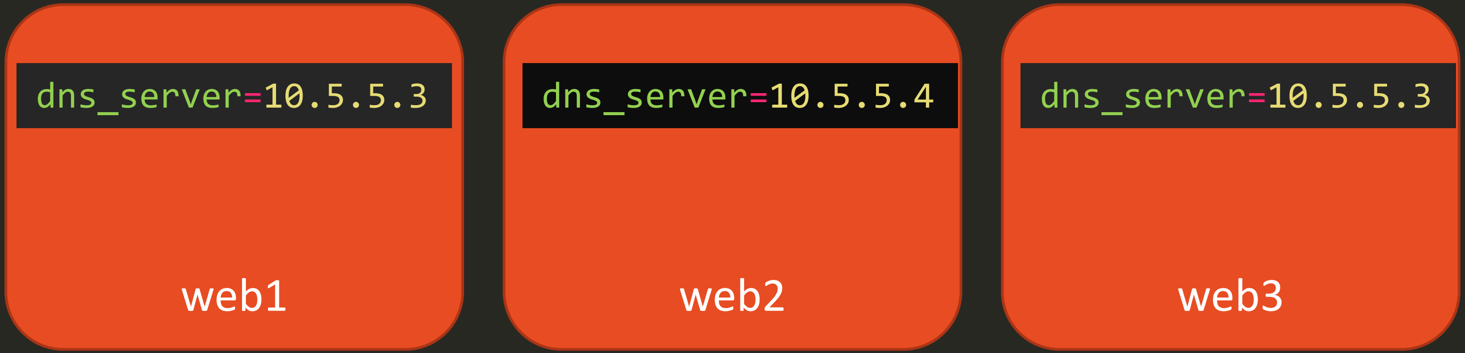
```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101   dns_server=10.5.5.4
web3 ansible_host=172.20.1.102


[web_servers]
web1
Web2
web3

[web_servers:vars]
 dns_server=10.5.5.3
```



Variable Precedence

```
---
- name: Configure DNS Server
  hosts: all
  vars:
    dn: dns_server: 10.5.5.5
  tasks:
  - nsupdate:
      server: '{{ dns_server }}'
```





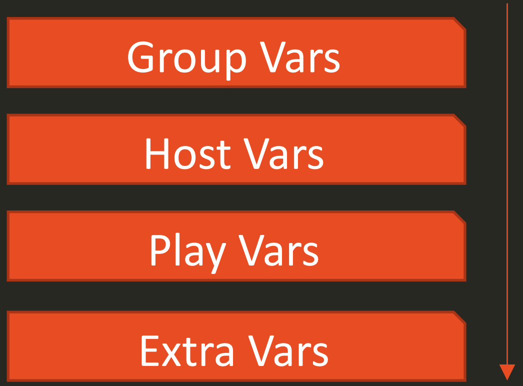
```
dns_server=10.5.5.3
```

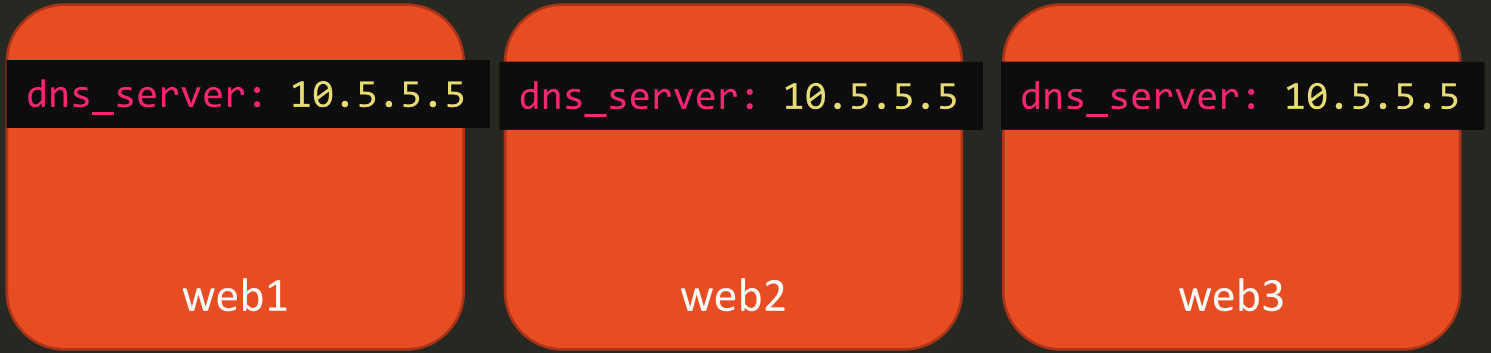
```
dns_server=10.5.5.4
```

```
dns_server=10.5.5.3
```

Variable Precedence

```
$ ansible-playbook playbook.yml --extra-vars dns_server=10.5.5.6
```



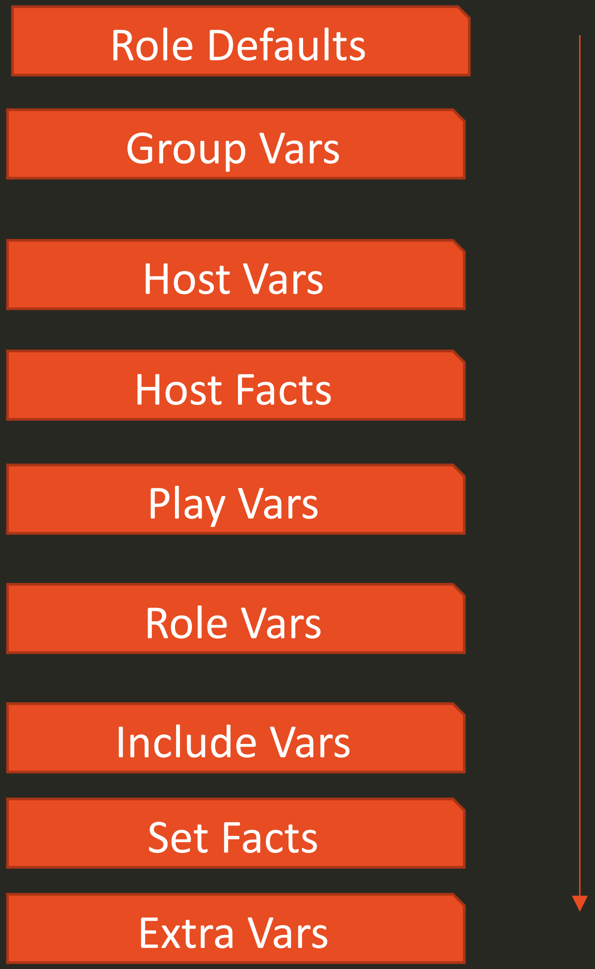


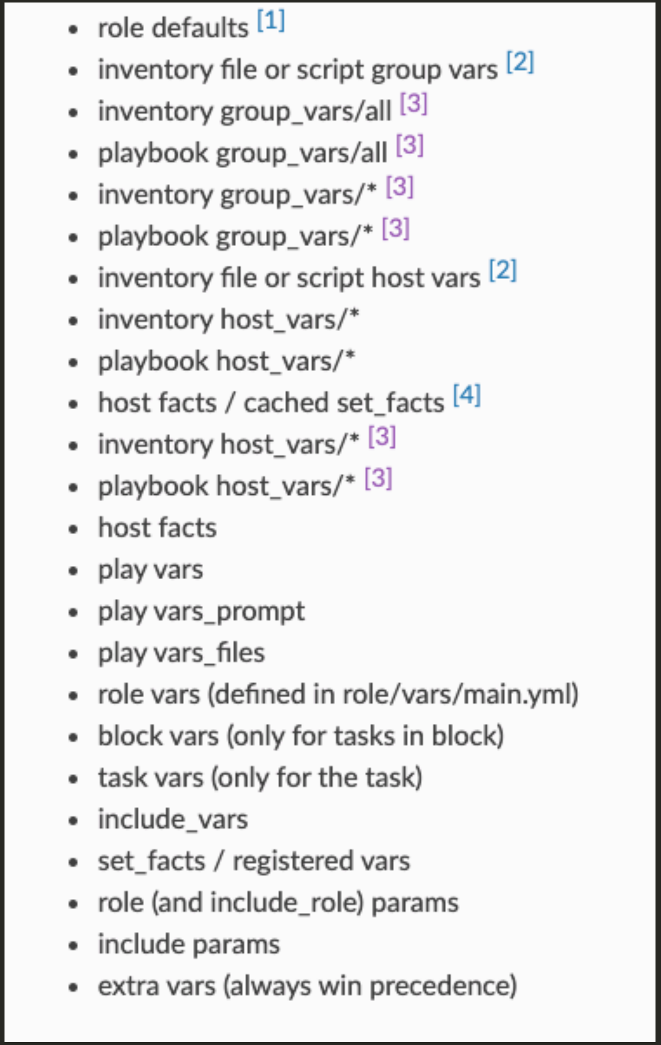
```
dns_server: 10.5.5.5
```

```
dns_server: 10.5.5.5
```

```
dns_server: 10.5.5.5
```

Variable Precedence





- role defaults [1]
- inventory file or script group vars [2]
- inventory group_vars/all [3]
- playbook group_vars/all [3]
- inventory group_vars/* [3]
- playbook group_vars/* [3]
- inventory file or script host vars [2]
- inventory host_vars/*
- playbook host_vars/*
- host facts / cached set_facts [4]
- inventory host_vars/* [3]
- playbook host_vars/* [3]
- host facts
- play vars
- play vars_prompt
- play vars_files
- role vars (defined in role/vars/main.yml)
- block vars (only for tasks in block)
- task vars (only for the task)
- include_vars
- set_facts / registered vars
- role (and include_role) params
- include params
- extra vars (always win precedence)

https://docs.ansible.com/ansible/2.5/user_guide/playbooks_variables.htm

KODEKLOUD

Ansible

Variable Scopes

Variable Scopes

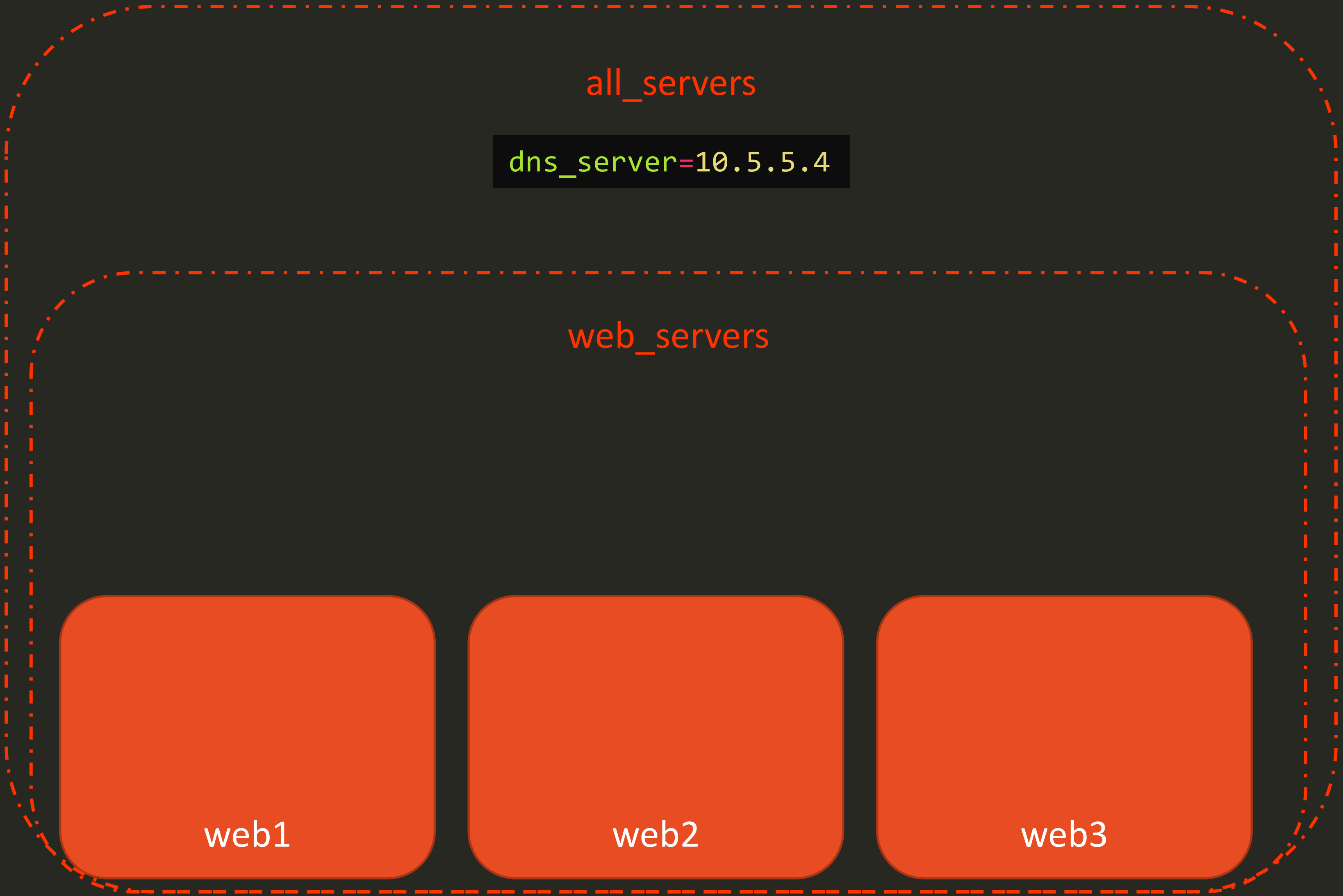
/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101 dns_server=10.5.5.4
web3 ansible_host=172.20.1.102
```

```
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
      msg: '{{ dns_server }}'
```

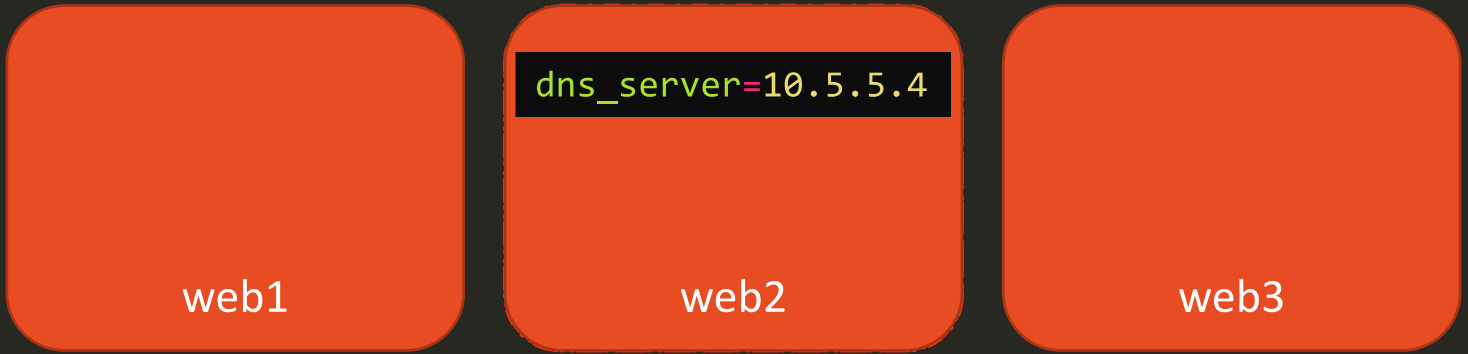
```
PLAY [Check /etc/hosts file]
*****************************************************


TASK [debug] ****************************************
ok: [web1] => {
    "dns_server": "VARIABLE IS NOT DEFINED!"
}
ok: [web2] => {
    "dns_server": "10.5.5.4"
}
ok: [web3] => {
    "dns_server": "VARIABLE IS NOT DEFINED!"
}
```

Variable Scopes - Host



```
dns_server=10.5.5.4
```

Variable Scopes - Host


```
dns_server=10.5.5.4
```

Variable Scopes - Play

```yaml
---
- name: Play1
  hosts: web1
  vars:
    ntp_server: 10.1.1.1
  tasks:
  - debug:
      var: ntp_server

- name: Play2
  hosts: web1
  tasks:
  - debug:
      var: ntp_server
```

```
PLAY [Play1]
*********************************************************


TASK [debug]
*********************************************************
ok: [web1] => {
    "ntp_server": "10.1.1.1"
}


PLAY [Play2] ********************************************

TASK [debug]
*********************************************************
ok: [web1] => {
    "ntp_server": "VARIABLE IS NOT DEFINED!"
}
```

Variable Scopes - Global

```
$ ansible-playbook playbook.yml --extra-vars “ntp_server=10.1.1.1”
```

```
---
- name: Play1
  hosts: web1
  vars:
    ntp_server: 10.1.1.1
  tasks:
  - debug:
      var: ntp_server

- name: Play2
  hosts: web1
  tasks:
  - debug:
      var: ntp_server
```

```
PLAY [Play1]
*******************************************************


TASK [debug]
*******************************************************
ok: [web1] => {
    "ntp_server": "10.1.1.1"
}


PLAY [Play2] ******************************************

TASK [debug]
*******************************************************
ok: [web1] => {
    "ntp_server": "10.1.1.1"
}
```

KODEKLOUD

Ansible

Register Variables

playbook

```yaml
---
- name: Check /etc/hosts file
  hosts: all
  tasks:
  - shell: cat /etc/hosts
    register: result

  - debug:
      var:
```

```
PLAY [Check /etc/hosts file] ***************************************************

TASK [shell] *******************************************************************
changed: [web1]
changed: [web2]


PLAY RECAP *********************************************************************
web1                           :
ok=1    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
web2                           :
ok=1    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Register Output

playbook

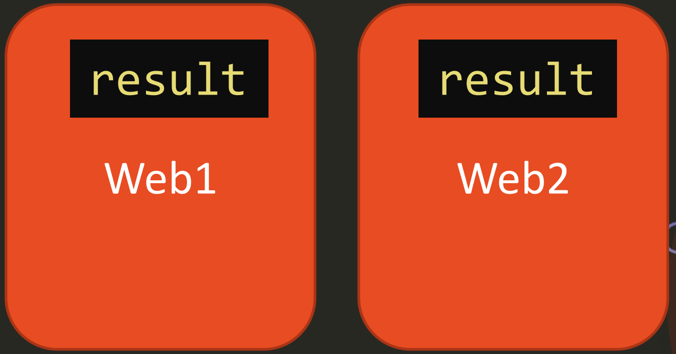
```yaml
---
- name: Check /etc/hosts file
  hosts: all
  tasks:
  - shell: cat /etc/hosts
    register: result

  - debug:
      var: result
```

```
ok: [web2] => {
    "output": {
        "ansible_facts": {
            "discovered_interpreter_python": "/usr/bi
        },
        "changed": true,
        "cmd": "cat /etc/hosts",
        "failed": false,
   .rc": 0,
   "start"tart": "2019-09-12 05:25:34.158877",
   "end""end": "2019-09-12 05:25:34.161974",
   "delta"elta": "0:00:00.003097",
        "stderr": "",
        "stderr_lines": [],
  .stdout"dout": "127.0.0.1\tlocalhost\n::1\tlocalho
loopback\nfe00::0\tip6-localnet\nff00::0\tip6-mcastpr
allnodes\nff02::2\tip6-allrouters\n172.20.1.101\tweb2
        "stdout_lines": [
            "127.0.0.1\tlocalhost",
            "::1\tlocalhost ip6-localhost ip6-loopbac
            "fe00::0\tip6-localnet",
            "ff00::0\tip6-mcastprefix",
            "ff02::1\tip6-allnodes",
            "ff02::2\tip6-allrouters",
            "172.20.1.101\tweb2"
        ]
    }
}
```

Register Output Scope

playbook

```
---
- name: Check /etc/hosts file
  hosts: all
  tasks:
  - shell: cat /etc/hosts
    register: result

  - debug:
      var: result.rc


- name: Play2
  hosts: all
  tasks:
  - debug:
      var: result.rc
```



playbook

```yaml
---
- name: Check /etc/hosts file
  hosts: all
  tasks:
  - shell: cat /etc/hosts
```

```
$ ansible-playbook -i inventory playbook.yml -v
```

```
PLAY [localhost] ***********************************************************

TASK [Gathering Facts] *****************************************************
ok: [localhost]

TASK [shell] ***************************************************************
changed: [localhost] => {"changed": true, "cmd": "cat /etc/hosts", "delta": "0:00:00.282432", "end": "2019-09-24 07:37:26.440478", "rc": 0,
"start": "2019-09-24 07:37:26.158046", "stderr": "", "stderr_lines": [], "stdout": "127.0.0.1\tlocalhost\n::1\tlocalhost ip6-localhost ip6-
loopback\nfe00::0\tip6-localnet\nff00::0\tip6-mcastprefix\nff02::1\tip6-allnodes\nff02::2\tip6-allrouters\n172.20.1.2\tf6d0e5fbbc0d",
"stdout_lines": ["127.0.0.1\tlocalhost", "::1\tlocalhost ip6-localhost ip6-loopback", "fe00::0\tip6-localnet", "ff00::0\tip6-mcastprefix",
"ff02::1\tip6-allnodes", "ff02::2\tip6-allrouters", "172.20.1.2\tf6d0e5fbbc0d"]}

PLAY RECAP *****************************************************************
localhost                  : ok=2    changed=1    unreachable=0    failed=0
```

KODEKLOUD

Ansible

Magic Variables

Variable Scopes

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101  dns_server=10.5.5.4
web3 ansible_host=172.20.1.102
```

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101  dns_server=10.5.5.4
web3 ansible_host=172.20.1.102
```

```
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
        msg: '{{ dns_server }}'
```

```
PLAY [Check /etc/hosts file]
*****************************************************


TASK [debug] ****************************************
ok: [web1] => {
    "dns_server": "VARIABLE IS NOT DEFINED!"
}
ok: [web2] => {
    "dns_server": "10.5.5.4"
}
ok: [web3] => {
    "dns_server": "VARIABLE IS NOT DEFINED!"
}
```

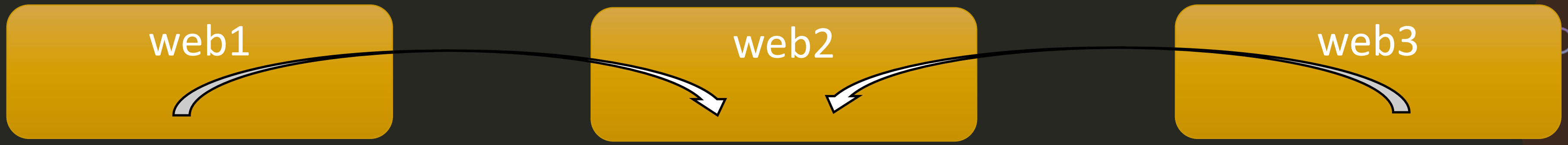
Variable Interpolation

```
inventory_hostname=web1
ansible_host=172.20.1.100
```

```
inventory_hostname=web2
ansible_host=172.20.1.101
dns_server=10.5.5.4
```

```
inventory_hostname=web3
ansible_host=172.20.1.102
```

Create Subprocess



```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101  dns_server=10.5.5.4
web3 ansible_host=172.20.1.102
```

```
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
      msg: ‘{{    hostvars['web2'].dns_server }}’
```

```
PLAY [Check /etc/hosts file]
*********************************************************


TASK [debug] ***************************************
ok: [web1] => {
    "dns_server": "10.5.5.4"
}
ok: [web2] => {
    "dns_server": "10.5.5.4"
}
ok: [web3] => {
    "dns_server": "10.5.5.4"
}
```

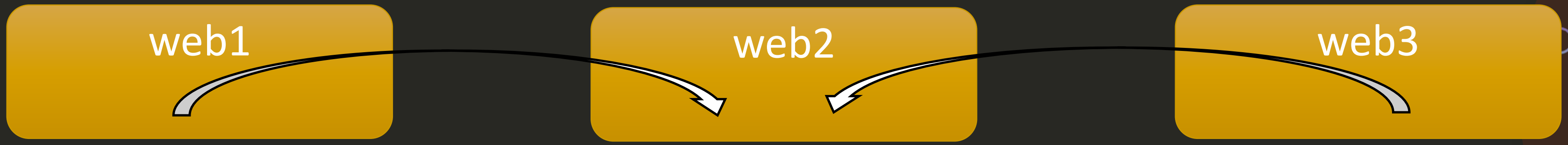
Variable Interpolation

```
inventory_hostname=web1
ansible_host=172.20.1.100
```

```
inventory_hostname=web2
ansible_host=172.20.1.101
dns_server=10.5.5.4
```

```
inventory_hostname=web3
ansible_host=172.20.1.102
```

Create Subprocess



```
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
       msg: ‘{{    hostvars['web2'].dns_server }}’
```

```
       msg: ‘{{ hostvars['web2'].ansible_host }}’
```

```
       msg: ‘{{ hostvars['web2'].ansible_facts.architecture }}’
```

```
       msg: ‘{{ hostvars['web2'].ansible_facts.devices }}’
```

```
       msg: ‘{{ hostvars['web2'].ansible_facts.mounts }}’
```

```
       msg: ‘{{ hostvars['web2'].ansible_facts.processor }}’
```

```
---
- name: Print dns server
  hosts: all
  tasks:
  - debug:
       msg: ‘{{    hostvars['web2'].dns_server }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_host }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.architecture }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.devices }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.mounts }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.processor }}’
```

=

```
msg: ‘{{ hostvars['web2']['ansible_facts']['processor'] }}’
```

Magic Variable - hostvars

```
msg: ‘{{ hostvars['web2'].ansible_host }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.architecture }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.devices }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.mounts }}’
```

```
msg: ‘{{ hostvars['web2'].ansible_facts.processor }}’
```

=

```
msg: ‘{{ hostvars['web2']['ansible_facts']['processor'] }}’
```

Magic Variable - groups

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102


[web_servers]
web1
Web2
web3

[americas]
web1
web2

[asia]
web3
```

```
msg: '{{ groups['americas'] }}'
web1
web2
```

Magic Variable – group_names

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102


[web_servers]
web1
Web2
web3

[americas]
web1
web2

[asia]
web3
```

```
msg: '{{ group_names }}'  # web1
```

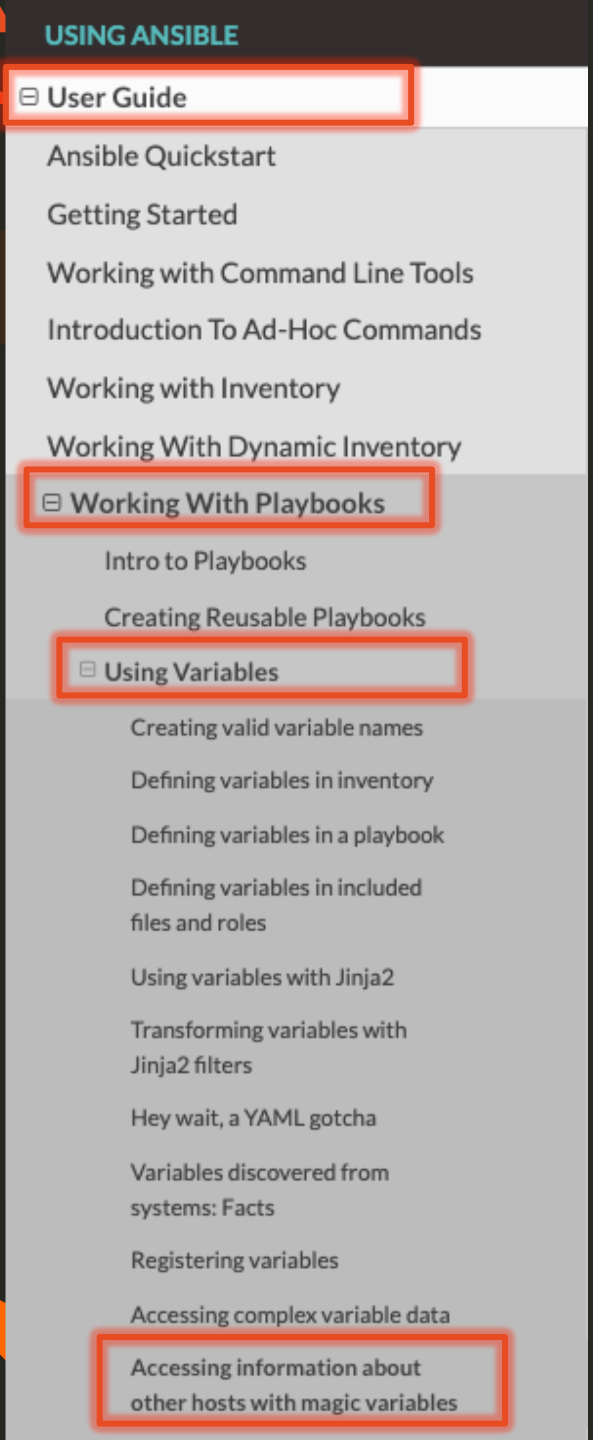
```
web_servers
americas
```

Magic Variable – inventory_hostname

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102


[web_servers]
web1
Web2
web3

[americas]
web1
web2

[asia]
web3
```

```
msg: '{{ inventory_hostname }}'  # web1
web1
```



USING ANSIBLE

⊟ User Guide

Ansible Quickstart

Getting Started

Working with Command Line Tools

Introduction To Ad-Hoc Commands

Working with Inventory

Working With Dynamic Inventory

⊟ Working With Playbooks

Intro to Playbooks

Creating Reusable Playbooks

⊟ Using Variables

Creating valid variable names

Defining variables in inventory

Defining variables in a playbook

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Using variables with Jinja2

Transforming variables with Jinja2 filters

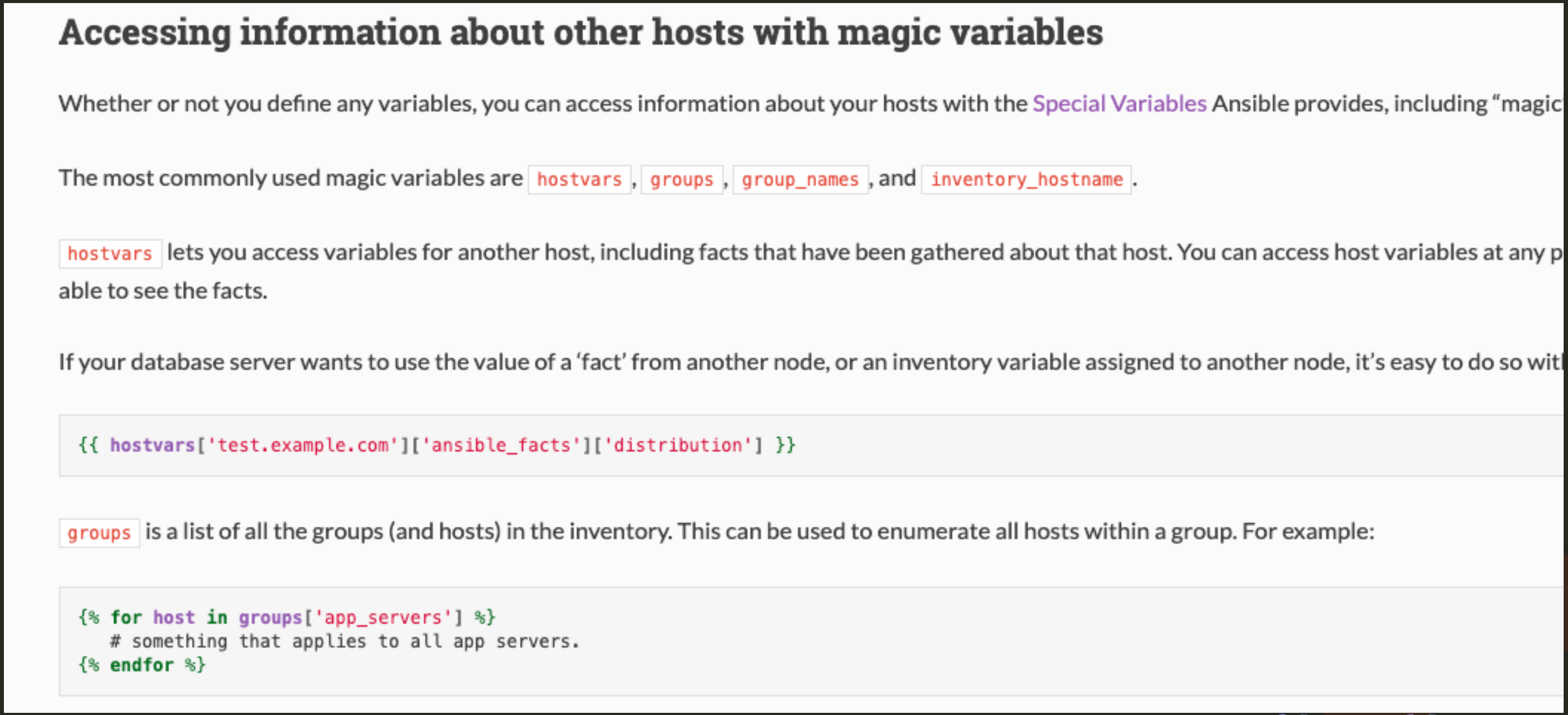
Hey wait, a YAML gotcha

Variables discovered from systems: Facts

Registering variables

Accessing complex variable data

Accessing information about other hosts with magic variables



Accessing information about other hosts with magic variables

Whether or not you define any variables, you can access information about your hosts with the Special Variables Ansible provides, including "magic

The most commonly used magic variables are `hostvars`, `groups`, `group_names`, and `inventory_hostname`.

`hostvars` lets you access variables for another host, including facts that have been gathered about that host. You can access host variables at any p able to see the facts.

If your database server wants to use the value of a 'fact' from another node, or an inventory variable assigned to another node, it's easy to do so wit

```
{{ hostvars['test.example.com']['ansible_facts']['distribution'] }}
```

`groups` is a list of all the groups (and hosts) in the inventory. This can be used to enumerate all hosts within a group. For example:

```
{% for host in groups['app_servers'] %}
   # something that applies to all app servers.
{% endfor %}
```

KODEKLOUD

KODEKLOUD

Ansible

Conditionals

```yaml
---
- name: Install NGINX
  hosts: debian_hosts
  tasks:
  - name: Install NGINX on Debian
    apt:
      name: nginx
      state: present
```

```yaml
---
- name: Install NGINX
  hosts: redhat_hosts
  tasks:
  - name: Install NGINX on Redhat
    yum:
      name: nginx
      state: present
```

KODEKLOUD

NOTE: PARTS OF CODE HIDDEN FOR BREVITY

Conditional - when

```
---
- name: Install NGINX
  hosts: all
  tasks:
  - name: Install NGINX on Debian
    apt:
      name: nginx
      state: present
    when:  ansible_os_family == “Debian”

  - name: Install NGINX on Redhat
    yum:
      name: nginx
      state: present
    when:  ansible_os_family == “RedHat”
```

Operator - or

```yaml
---
- name: Install NGINX
  hosts: all
  tasks:
  - name: Install NGINX on Debian
    apt:
      name: nginx
      state: present
    when:  ansible_os_family == “Debian”

  - name: Install NGINX on Redhat
    yum:
      name: nginx
      state: present
    when:  ansible_os_family == “RedHat”  or
           ansible_os_family == “SUSE”
```

Operator - and

```
---
- name: Install NGINX
  hosts: all
  tasks:
  - name: Install NGINX on Debian
    apt:
      name: nginx
      state: present
    when:  ansible_os_family == “Debian”    and
           ansible_distribution_version == “16.04”

  - name: Install NGINX on Redhat
    yum:
      name: nginx
      state: present
    when:  ansible_os_family == “RedHat”  or
           ansible_os_family == “SUSE”
```

Conditionals in Loops

```
---
- name: Install Softwares
  hosts: all
  vars:
     packages:
        - name: nginx
          required: True
        - name: mysql
          required : True
        - name: apache
          required : False
  tasks:
  - name: Install “{{ item.name }}” on Debian
    apt:
      name: “{{ item.name }}”
      state: present


    loop: "{{ packages }}"
```

Conditionals in Loops

```yaml
---
- name: Install Softwares
  hosts: all
  vars:
      packages:
          - name: nginx
            required: True
          - name: mysql
            required : True
          - name: apache
            required : False
  tasks:
  - name: Install  “{{ item.name }}”  on Debian
    apt:
      name: “{{ item.name }}”
      state: present


   loop: "{{ packages }}"
```

```yaml
- name: Install “{{ item.name }}” on Debian
  vars:
   item:
    name: nginx
    required: True
  apt:
    name: “{{ item.name }}”
    state: present
   when:   item.required == True
```

```yaml
- name: Install “{{ item.name }}” on Debian
  vars:
   item:
    name: mysql
    required: True
  apt:
    name: “{{ item.name }}”
    state: present
   when:   item.required == True
```

```yaml
-  name: Install “{{ item.name }}” on Debian
   vars:
    item:
     name: apache
     required: False
   apt:
    name: “{{ item.name }}”
    state: present
   when:   item.required == True
```

Conditionals in Loops

```
---
- name: Install Softwares
  hosts: all
  vars:
     packages:
        - name: nginx
          required: True
        - name: mysql
          required : True
        - name: apache
          required : False
  tasks:
  - name: Install “{{ item.name }}” on Debian
    apt:
      name: “{{ item.name }}”
      state: present

    when:   item.required == True

    loop: "{{ packages }}"
```

Conditionals & Register

```yaml
- name: Check status of a service and email if its down
  hosts: localhost
  tasks:
    - command: service httpd status

      register: result

    -  mail:
        to: admin@company.com
        subject: Service Alert
        body: Httpd Service is down

       when: result.stdout.find('down') != -1
```

KODEKLOUD

Ansible

Blocks

```yaml
-
  hosts: server1
  tasks:
    - name: Install MySQL
      yum: name=mysql-server state=present
      become_user: db-user
      when: ansible_facts['distribution'] == 'CentOS'

    - name: Start MySQL Service
      service: name=mysql-server state=started
      become_user: db-user
      when: ansible_facts['distribution'] == 'CentOS'

    - name: Install Nginx
      yum: name=nginx state=present
      become_user: web-user
      when: ansible_facts['distribution'] == 'CentOS'

    - name: Start Nginx Service
      service: name=nginx state=started
      become_user: web-user
      when: ansible_facts['distribution'] == 'CentOS'
```

NOTE: PARTS OF CODE HIDDEN FOR BREVITY

```yaml
-
  hosts: server1
  tasks:
   -  block:
        - name: Install MySQL
          yum: name=mysql-server state=present
          become_user: db-user
          when: ansible_facts['distribution'] == 'CentOS'

        - name: Start MySQL Service
          service: name=mysql-server state=started
          become_user: db-user
          when: ansible_facts['distribution'] == 'CentOS'

   -  block:
        - name: Install Nginx
          yum: name=nginx state=present
          become_user: web-user
          when: ansible_facts['distribution'] == 'CentOS'

        - name: Start Nginx Service
          service: name=nginx state=started
          become_user: web-user
          when: ansible_facts['distribution'] == 'CentOS'
```

NOTE: PARTS OF CODE HIDDEN FOR BREVITY

```yaml
-
  hosts: server1
  tasks:

   -  block:

        - name: Install MySQL
          yum: name=mysql-server state=present
        - name: Start MySQL Service
          service: name=mysql-server state=started

      become_user: db-user
      when: ansible_facts['distribution'] == 'CentOS'



   -  block:
        - name: Install Nginx
          yum: name=nginx state=present
          become_user: web-user
          when: ansible_facts['distribution'] == 'CentOS'

        - name: Start Nginx Service
          service: name=nginx state=started
          become_user: web-user
          when: ansible_facts['distribution'] == 'CentOS'
```

NOTE: PARTS OF CODE HIDDEN FOR BREVITY

```yaml
-
  hosts: server1
  tasks:

   -  block:

        - name: Install MySQL
          yum: name=mysql-server state=present
        - name: Start MySQL Service
          service: name=mysql-server state=started

      become_user: db-user
      when: ansible_facts['distribution'] == 'CentOS'



   -  block:
        - name: Install Nginx
          yum: name=nginx state=present
        - name: Start Nginx Service
          service: name=nginx state=started

      become_user: web-user
      when: ansible_facts['distribution'] == 'CentOS'
```

NOTE: PARTS OF CODE HIDDEN FOR BREVITY

Error Handling

```
-
  hosts: server1
  tasks:

   -  block:
        - name: Install MySQL
          yum: name=mysql-server state=present
        - name: Start MySQL Service
          service: name=mysql-server state=started

      become_user: db-user
      when: ansible_facts['distribution'] == 'CentOS'
      rescue:
        - mail:
            to: admin@company.com
            subject: Installation Failed
            body: DB Install Failed at {{ ansible_failed_task.name }}

      always:
        - mail:
            to: admin@company.com
            subject: Installation Status
            body: DB Install Status - {{ ansible_failed_result }}
```

KODEKLOUD

Ansible

Error Handling

Task failure

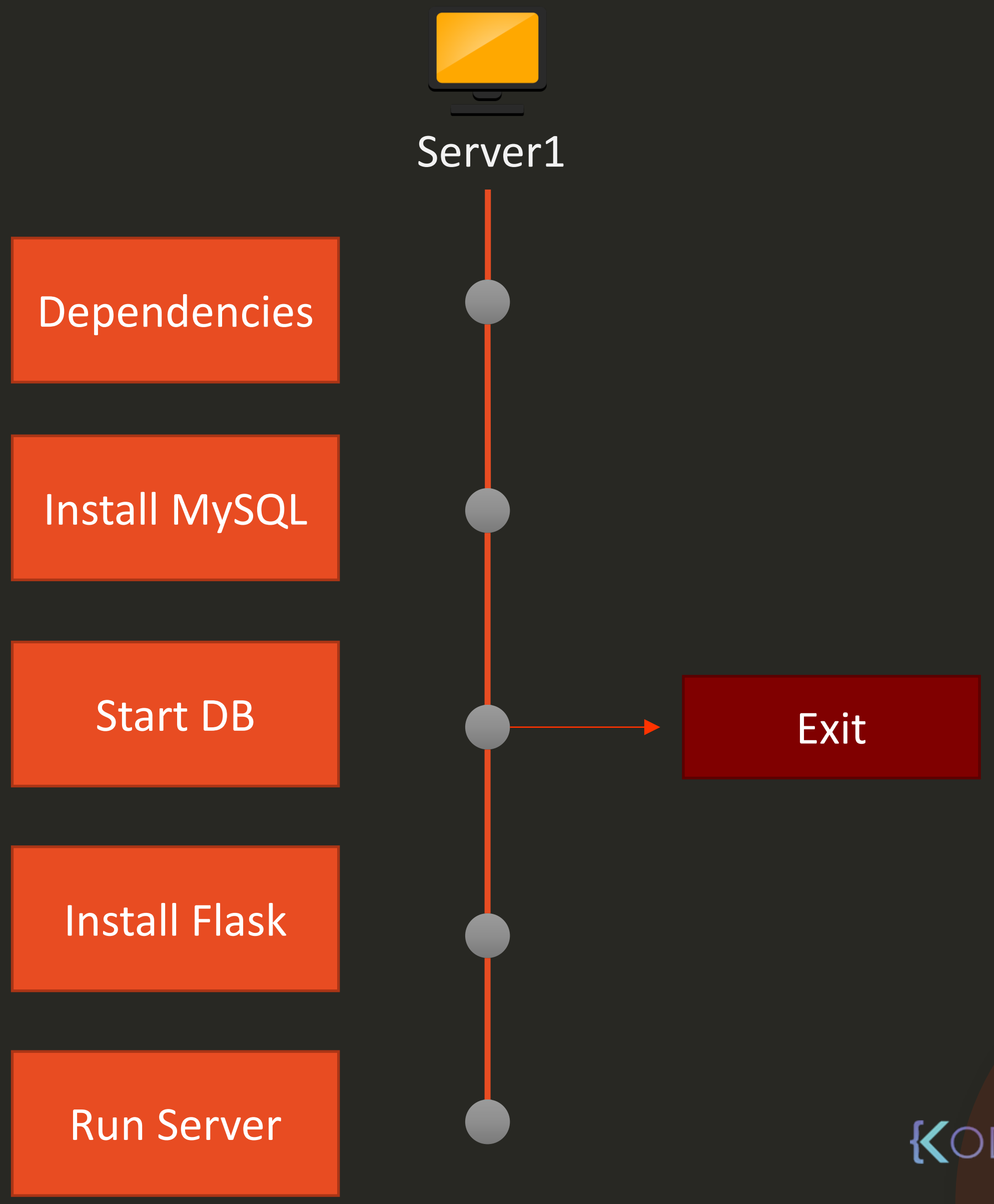
```
- name: Deploy web application
  hosts: server1
  tasks:
    - name: Install dependencies
       << code hidden >>

    - name: Install MySQL Database
       << code hidden >>

    - name: Start MySQL Service
       << code hidden >>

    - name: Install Python Flask Dependencies
       << code hidden >>

    - name: Run web-server
       << code hidden >>
```



Task failure

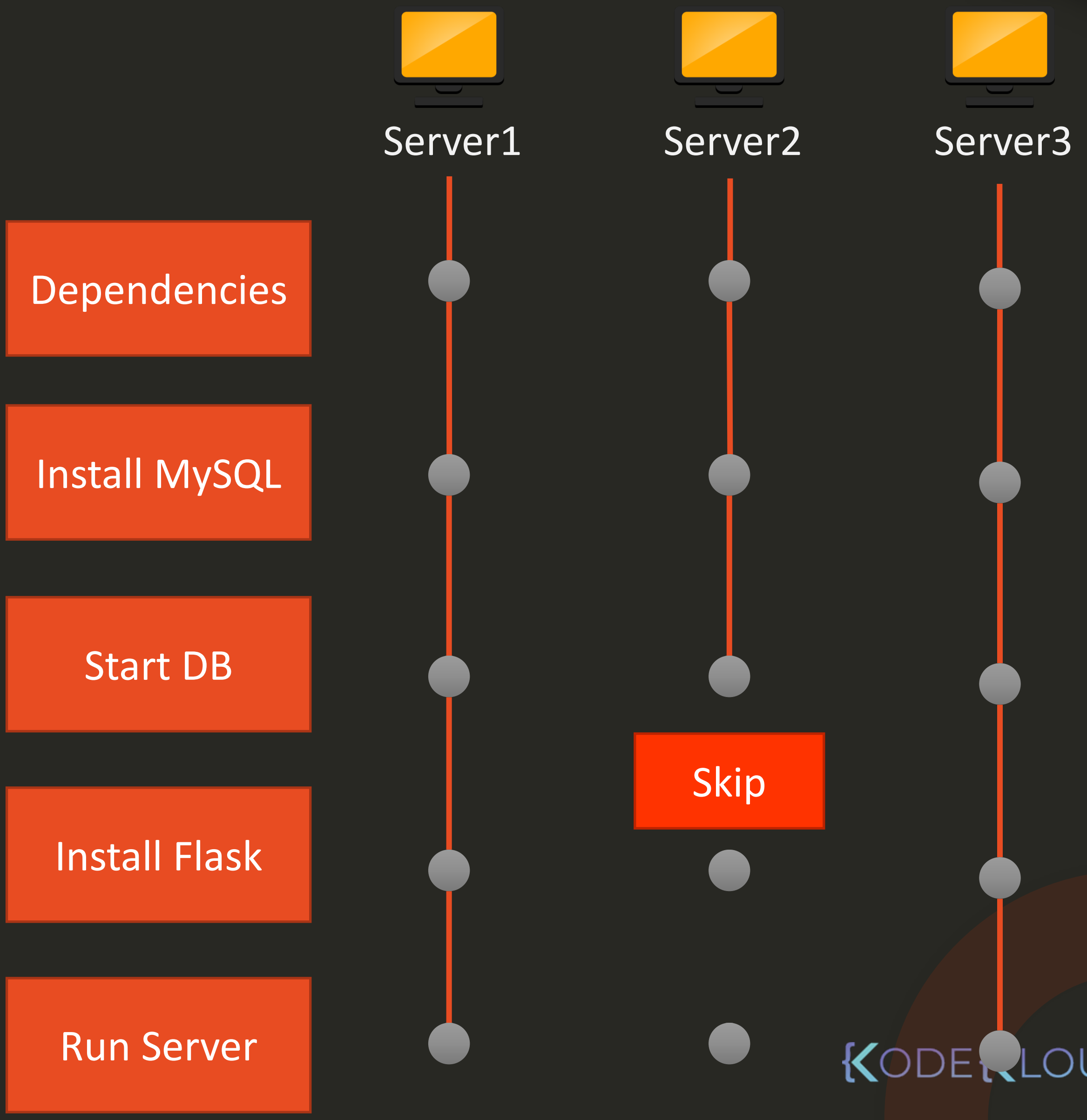
```
- name: Deploy web application
  hosts: server1,server2,server3
  tasks:
    - name: Install dependencies
      << code hidden >>

    - name: Install MySQL Database
      << code hidden >>

    - name: Start MySQL Service
      << code hidden >>

    - name: Install Python Flask Dependencies
      << code hidden >>

    - name: Run web-server
      << code hidden >>
```



Task failure

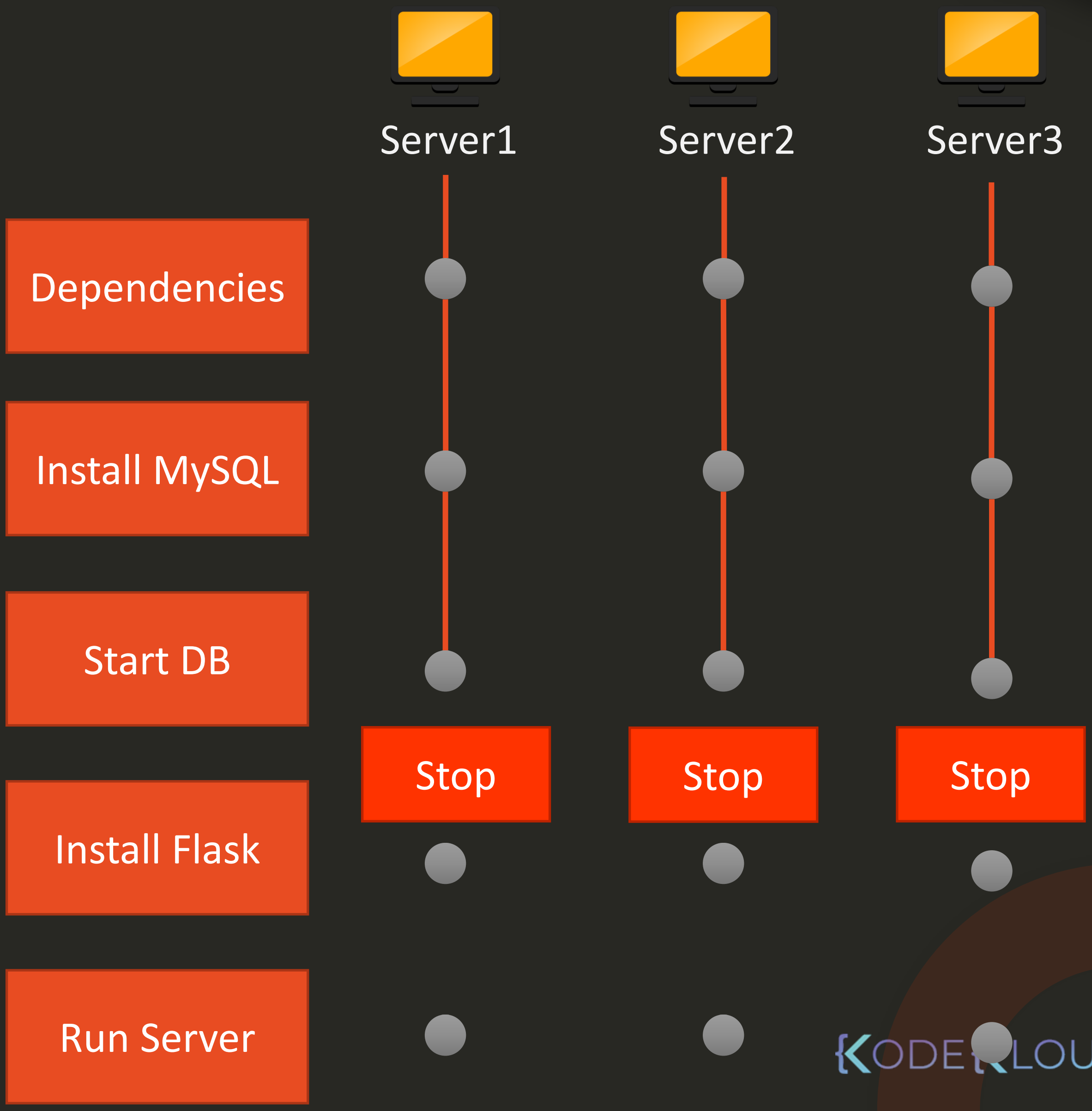
```
- name: Deploy web application
  hosts: server1,server2,server3
  any_errors_fatal: true
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```



Task failure

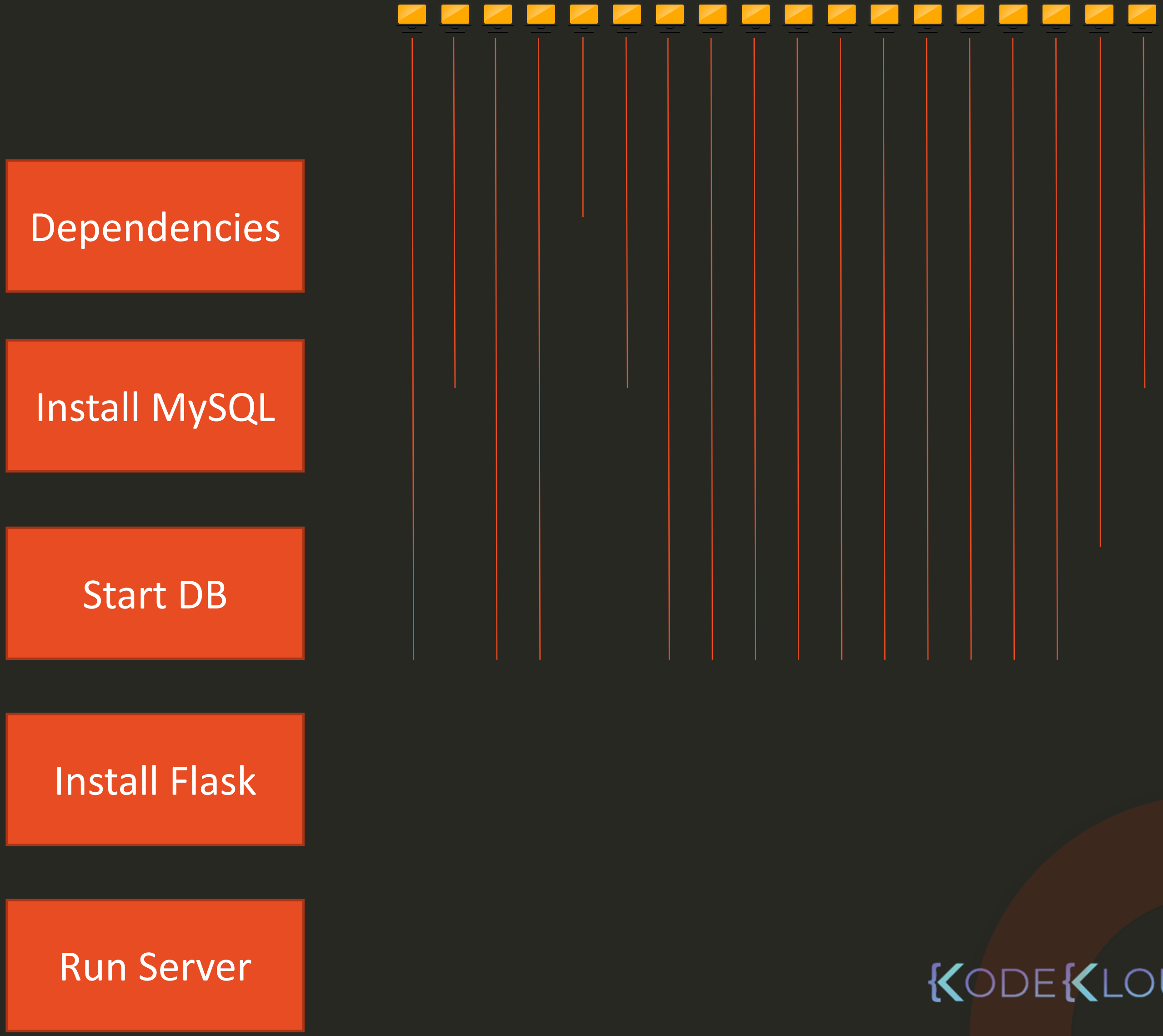
```yaml
- name: Deploy web application
  hosts: server1,server2,server3
  max_fail_percentage: 30
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```



KODEKLOUD

Ignore errors

```yaml
- name: Deploy web application
  hosts: server1,server2,server3
  any_errors_fatal: true
  tasks:
    - name: Install dependencies
        << code hidden >>
    - name: Install MySQL Database
        << code hidden >>
    - name: Start MySQL Service
        << code hidden >>
    - name: Install Python Flask Dependencies
        << code hidden >>
    - name: Run web-server
        << code hidden >>

    - mail:
        to: admin@company.com
        subject: Server Configured
        body: Web server has been configured

      ignore_errors: yes
```

failed_when

```yaml
- name: Deploy web application
  hosts: server1,server2,server3
  any_errors_fatal: true
  tasks:
    - name: Install dependencies
        << code hidden >>
    - name: Install MySQL Database
        << code hidden >>
    - name: Start MySQL Service
        << code hidden >>
    - name: Install Python Flask Dependencies
        << code hidden >>
    - name: Run web-server
        << code hidden >>

    - command: cat /var/log/server.log
      register: command_output
      failed_when: 'ERROR' in command_output.stdout

    - mail:
        to: admin@company.com
        subject: Server Configured
        body: Web server has been configured
```

Blocks

```
- name: Deploy web application
  hosts: server1,server2,server3
  any_errors_fatal: true
  tasks:
   - name: Install web Application
     block:

       - name: Install dependencies
           << code hidden >>
       - name: Install MySQL Database
           << code hidden >>
       - name: Start MySQL Service
           << code hidden >>
       - name: Install Python Flask Dependencies
           << code hidden >>
       - name: Run web-server
           << code hidden >>
     rescue:
     - mail:
         to: admin@company.com
         subject: Playbook Failed
         body: Web server configuration failed
```

KODEKLOUD

Jinja2

Templating?

Template

```
Hi     ,


I am glad to invite you along with your
family members -             , to attend
the party arranged by us on the
completion of 10 successful years of our
company. We would be happy to mark your
presence along with family at the party
and would love to celebrate the success
together.


Sincerely,


Andrews,
CEO
```

Variables

```
Sam
Mary and Adam
Anil
Achu and George
Michelle
Sarah
Shabab
Aliah and Medina
```

Templating Engine

```
Hi Sam,


I am glad to invite you along with your
family members - Mary and Adam, to attend
the party arranged by us on the
completion of 10 successful years of our
company. We would be happy to mark your
presence along with family at the party
and would love to celebrate the success
together.


Sincerely,

Andrews,
CEO
```

```
Hi Anil ,


I am glad to invite you along with your
family members - Achu and George, to
attend the party arranged by us on the
completion of 10 successful years of our
company. We would be happy to mark your
presence along with family at the party
and would love to celebrate the success
together.


Sincerely,

Andrews,
CEO
```

```
Hi Michelle ,


I am glad to invite you along with your
family members - Sarah, to attend the
party arranged by us on the completion of
10 successful years of our company. We
would be happy to mark your presence
along with family at the party and would
love to celebrate the success together.
```

```
Hi Shabab ,


I am glad to invite you along with your
family members - Aliah and Medina, to
attend the party arranged by us on the
completion of 10 successful years of our
company. We would be happy to mark your
presence along with family at the party
and would love to celebrate the success
together.
```

HTML

Template

```
<!DOCTYPE html>
<html>
  <head>
    <title>{{ title }}</title>
  </head>
  <body>
     {{ msg }}
  </body>
</html>
```

Variables

```
title: Our Site

msg: Welcome!
```

Outcome

```
<!DOCTYPE html>
<html>
  <head>
    <title>Our Site</title>
  </head>
  <body>
     Welcome!
  </body>
</html>
```

ANSIBLE

Template

```
- hosts: web1
  tasks:
    -
      file:
        path: {{ file }}
        state: touch
```

Variables

```
file: /tmp/1.txt
```

Outcome

```
- hosts: web1
  tasks:
    -
      file:
        path: /tmp/1.txt
        state: touch
```

Template

```
[mysqld]
innodb-buffer-pool-size={{ pool_size }}
datadir={{ datadir }}
user={{ mysql_user }}
symbolic-links={{ link_id }}
port={{ mysql_port }}
```

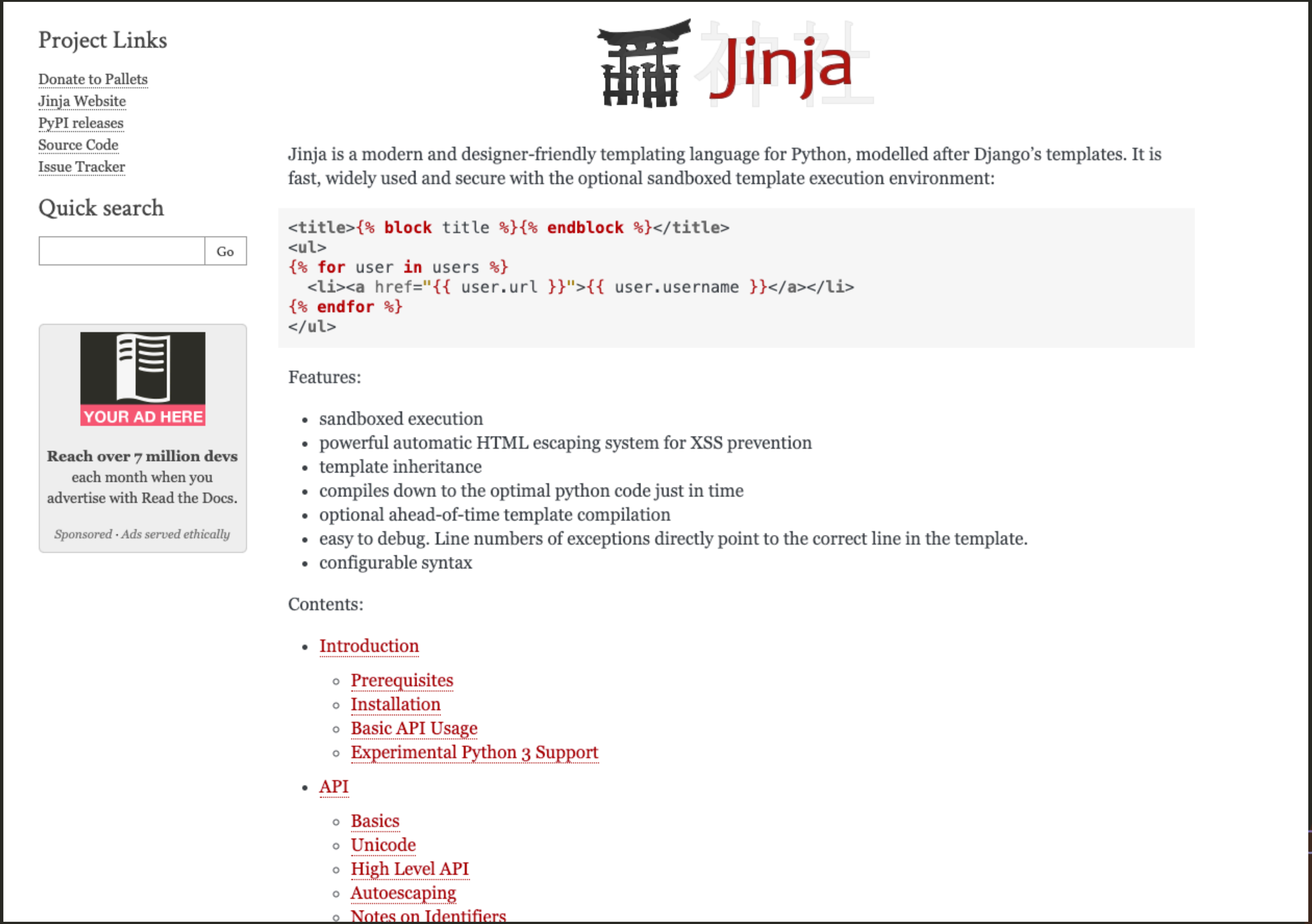
Variables

```
pool_size: 5242880
datadir: /var/lib/mysql
mysql_user: mysql
link_id: 0
mysql_port: 3306
```

Outcome

```
[mysqld]
innodb-buffer-pool-size=5242880
datadir=/var/lib/mysql
user=mysql
symbolic-links=0
port=3306
```

jinja2



Project Links

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Jinja

Jinja is a modern and designer-friendly templating language for Python, modelled after Django's templates. It is fast, widely used and secure with the optional sandboxed template execution environment:

```
<title>{% block title %}{% endblock %}</title>
<ul>
{% for user in users %}
  <li><a href="{{ user.url }}">{{ user.username }}</a></li>
{% endfor %}
</ul>
```

Features:

- sandboxed execution
- powerful automatic HTML escaping system for XSS prevention
- template inheritance
- compiles down to the optimal python code just in time
- optional ahead-of-time template compilation
- easy to debug. Line numbers of exceptions directly point to the correct line in the template.
- configurable syntax

Contents:

String manipulation - FILTERS

```
The name is {{ my_name }} => The name is Bond

The name is {{ my_name | upper }} => The name is BOND

The name is {{ my_name | lower }} => The name is bond

The name is {{ my_name | title }} => The name is Bond

The name is {{ my_name | replace (“Bond”, “Bourne”) }} => The name is Bourne

The name is {{ first_name | default(“James”) }} {{ my_name }} => The name is James Bond
```

- Substitute
- Upper
- Lower
- Title
- replace
- default

Filters - List and set

```
{{  [ 1, 2, 3 ] | min }}                              => 1
{{  [ 1, 2, 3 ] | max }}                              => 3
{{  [ 1, 2, 3, 2 ] | unique }}                        => 1, 2, 3
{{  [ 1, 2, 3, 4 ] | union( [ 4, 5 ] ) }}             => 1, 2, 3, 4, 5
{{  [ 1, 2, 3, 4 ] | intersect( [ 4, 5 ] ) }}         => 4
{{  100 | random }}                                   => Random number
{{  [“The”, “name”, “is”, “Bond”] | join(“ “) }}      => The name is Bond
```

- min
- max
- unique
- union
- intersect
- random
- join

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Loops

```
{% for number in [0,1,2,3,4] %}
{{ number }}
{% endfor %}
```

```
0

1

2

3

4
```

Conditions

```
{% for number in [0,1,2,3,4] %}

    {% if number == 2 %}
        {{ number }}
    {% endif %}

{% endfor %}
```

```


2
```

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Ansible

Jinja2 in Ansible

Ansible Filters

abs()	float()	lower()	round()	tojson()
attr()	forceescape()	map()	safe()	trim()
batch()	format()	max()	select()	truncate()
capitalize()	groupby()	min()	selectattr()	unique()
center()	indent()	pprint()	slice()	upper()
default()	int()	random()	sort()	urlencode()
dictsort()	join()	reject()	string()	urlize()
escape()	last()	rejectattr()	striptags()	wordcount()
filesizeformat()	length()	replace()	sum()	wordwrap()
first()	list()	reverse()	title()	xmlattr()

b64decode()	basename()	combine()
b64encode()	dirname()	extract()
to_uuid()	expanduser()	flatten()
to_json()	expandvars()	dict2items()
to_nice_json()	realpath()	items2dict()
from_json()	relpath()	subelements()
to_yaml()	splitext()	random_mac()
to_nice_yaml()	win_basename()	rejectattr()
from_yaml()	win_dirnameh()	comment()
from_yaml_all()	win_splitdrive()	mandatory()

Filters - file

```
{{ “/etc/hosts” | basename }}                         => hosts
{{ “c:\windows\hosts” | win_basename }}               => hosts
{{ “c:\windows\hosts” | win_splitdrive }}             => [“c:”, “\windows\hosts”]
{{ “c:\windows\hosts” | win_splitdrive | first }}     => “c:”
{{ “c:\windows\hosts” | win_splitdrive | last }}      => “\windows\hosts”
```

Jinja2 in Playbooks

/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100 dns_server=10.5.5.4
web2 ansible_host=172.20.1.101 dns_server=10.5.5.4
web3 ansible_host=172.20.1.102 dns_server=10.5.5.4
```

+

```
---
- name: Update dns server
  hosts: all
  tasks:
  - nsupdate:
      server: '{{ dns_server }}'
```

```
---
- name: Update dns server
  hosts: all
  tasks:
  - nsupdate:
      server: 10.5.5.4
```

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The Curriculum

RedHat Certified Ansible Specialist

- Core Components
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files with Jinja2
- Variables and Facts
- Roles
- Ansible Vault
- Documentation

Ansible

Templates

Templates

/etc/ansible/hosts

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
</html>
```

Templates

/etc/ansible/hosts

```
[web_servers]
web1 ansible_host=1
web2 ansible_host=1
```

```
      src: index.
      dest: /var/
```

This is a Web Server

This is web1 server

This is web2 server

This is web3 server

web1

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
```

web2

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
```

web3

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
```

Templates

/etc/ansible/hosts

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
</ht
```

web1

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web1 Server

</body>
</html>
```

web2

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web2 Server

</body>
</html>
```

web3

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web3 Server

</body>
</html>
```

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Templates

/etc/ansible/hosts

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

index.html

```
<!DOCTYPE html>
<html>
<body>

This is a Web Server

</body>
</html>
```

web3

index.html

```
<!DOCTYPE html>
<html>
<body>

This is {{ name }} Server

</body>
</html>
```

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Templates

/etc/ansible/hosts

```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      template:
        src: index.html.j2
        dest: /var/www/nginx-default/index.html
```

index.html.j2

```
<!DOCTYPE html>
<html>
<body>

This is {{ inventory_hostname }} Server

</body>
</html>
```

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```
[web_servers]
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101
web3 ansible_host=172.20.1.102
```

Variable Interpolation

Gather Facts

Execute Playbook

Create file from Template

Copy to target host

Create Subprocess

```
inventory_hostname=web1
ansible_host=172.20.1.100

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

```
inventory_hostname=web2
ansible_host=172.20.1.101

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

```
inventory_hostname=web3
ansible_host=172.20.1.102

ansible_facts=<Host Facts>
```

playbook.yml

```
-
  hosts: web_servers
  tasks:
    - name: Copy index.html to remote servers
      copy:
        src: index.html
        dest: /var/www/nginx-default/index.html
```

web1

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web1 Server

</body>
</html>
```

web2

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web2 Server

</body>
</html>
```

web3

index.html

```
<!DOCTYPE html>
<html>
<body>

This is web3 Server

</body>
</html>
```

Template Examples

nginx.conf.j2

```
server {
    location / {
        fastcgi_pass  {{host}}:{{port}};
        fastcgi_param QUERY_STRING    $query_string;
    }

    location ~ \  gif|jpg|png $ {
        root {{ image_path }};
    }
}
```

nginx.conf

```
server {
    location / {
        fastcgi_pass  localhost:9000
        fastcgi_param QUERY_STRING    $query_string;
    }

    location ~ \  gif|jpg|png $ {
        root /data/images;
    }
}
```

Template Examples

redis.conf.j2

```
bind {{ ip_address }}

protected-mode yes

port {{ redis_port | default('6379') }}

tcp-backlog 511

# Unix socket.
timeout 0

# TCP keepalive.
tcp-keepalive {{tcp_keepalive | default('300') }}

daemonize no

supervised no
```

redis.conf

```
bind 192.168.1.100

protected-mode yes

port 6379

tcp-backlog 511

# Unix socket.
timeout 0

# TCP keepalive.
tcp-keepalive 300

daemonize no

supervised no
```

Template Examples

/etc/resolv.conf.j2

```
{% for name_server in name_servers %}
nameserver    name_server
{% endfor %}
```

/etc/resolv.conf

```
nameserver 10.1.1.2
nameserver 10.1.1.3
nameserver 8.8.8.8
```

variable

```
name_servers:
  - 10.1.1.2
  - 10.1.1.3
  - 8.8.8.8
```

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Templates in Roles

```
mysql
├── README.md
├── templates
│   ├── resolv.conf.j2
│   └── redis.conf.j2
├── tasks
├── handlers
├── vars
├── defaults
└── meta
```

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Ansible

Includes

inventory

```
[web_servers]
web1 ansible_host=172.20.1.100  dns_server=10.1.1.5
web2 ansible_host=172.20.1.101  dns_server=10.1.1.5
web3 ansible_host=172.20.1.102  dns_server=10.1.1.5
```

web1.yml

web2.yml

web3.yml

```
playbook.yml
inventory
host_vars
    web1.yml
    web2.yml
    web3.yml
```

inventory

```
[web_servers]
web1
web2
web3
```

web1.yml

```
ansible_host: 172.20.1.100
dns_server: 10.1.1.5
```

web2.yml

```
ansible_host: 172.20.1.101
dns_server: 10.1.1.5
```

web3.yml

```
ansible_host: 172.20.1.103
dns_server: 10.1.1.5
```

web_servers.yml

```
playbook.yml
inventory
host_vars
   |
   ├── web1.yml
   ├── web2.yml
   └── web3.yml
group_vars
   |
   └── web_servers.yml
```

inventory

```
[web_servers]
web1
web2
web3
```

web1.yml

```
ansible_host: 172.20.1.100
```

web2.yml

```
ansible_host: 172.20.1.101
```

web3.yml

```
ansible_host: 172.20.1.103
```

web_servers.yml

```
dns_server: 10.1.1.5
```

```
playbook.yml
inventory
host_vars
  └── web1.yml
  └── web2.yml
  └── web3.yml
group_vars
  └── web_servers.yml
```

inventory
```
[web_servers]
web1
web2
web3
```

web1.yml
```
ansible_host: 172.20.1.100
```

web2.yml
```
ansible_host: 172.20.1.101
```

web3.yml
```
ansible_host: 172.20.1.103
```

web_servers.yml
```
dns_server: 10.1.1.5
```

```
playbook.yml
inventory
├── inventory
├── host_vars
│   ├── web1.yml
│   ├── web2.yml
│   └── web3.yml
└── group_vars
    └── web_servers.yml
```

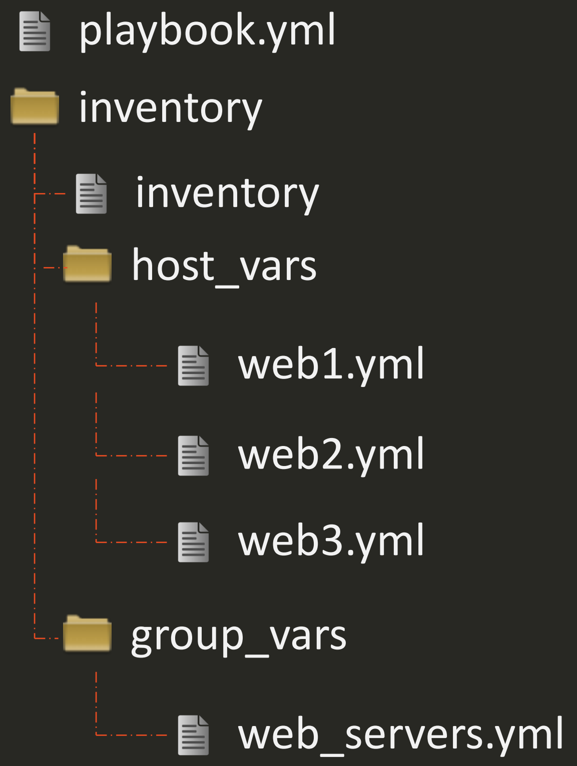
Include Vars

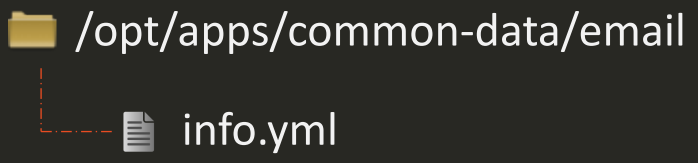
playbook.yml

```
- name: Deploy Web & DB Server
  hosts: web-db-server
  tasks:
   - mail:
        to: admin@company.com
        subject: Service Alert
        body: Httpd Service is down
```

/opt/apps/common-data/email/info.yml

```
admin_email: admin@company.com
```





Include Vars

playbook.yml

```
- name: Deploy Web & DB Server
  hosts: web-db-server
  tasks:
   - include_vars:
         file: /opt/apps/common-data/email/info.yml
         name: email_data

    - mail:
        to: {{ email_data.admin_email  }}
        subject: Service Alert
        body: Httpd Service is down
```

/opt/apps/common-data/email/info.yml

```
admin_email: admin@company.com
```

```
playbook.yml
inventory
  ├── inventory
  ├── host_vars
  │     ├── web1.yml
  │     ├── web2.yml
  │     └── web3.yml
  └── group_vars
        └── web_servers.yml

/opt/apps/common-data/email
  └── info.yml
```

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Ansible-Inventory

```
$ ansible-inventory -i inventory/ -y
all:
  children:
    ungrouped: {}
    web_servers:
      hosts:
        web1:
          ansible_host: 172.20.1.100
          ansible_ssh_pass: Passw0rd
          dns_server: 8.8.8.8
          size: big
        web2:
          ansible_host: 172.20.1.101
          ansible_ssh_pass: Passw0rd
          dns_server: 8.8.8.8
          size: small
```

```
playbook.yml
inventory
├── inventory
├── host_vars
│   ├── web1.yml
│   ├── web2.yml
│   └── web3.yml
└── group_vars
    └── web_servers.yml
```

```
/opt/apps/common-data/email
└── info.yml
```

Include Tasks

playbook.yml

```
- name: Deploy Web & DB Server
  hosts: web-db-server
  tasks:

   - name: Install MySQL Packages
       << code hidden >>

   - name: Start MySQL Service
       << code hidden >>

   - name: Configure Database
       << code hidden >>

   - name: Install Python Flask Dependencies
       << code hidden >>

   - name: Run web-server
       << code hidden >>
```

tasks/db.yml

tasks/web.yml

Include Tasks

playbook.yml

```
- name: Deploy Web & DB Server
  hosts: web-db-server
  tasks:

   - include_tasks: tasks/db.yml
   - include_tasks: tasks/web.yml
```

tasks/db.yml

```
- name: Install MySQL Packages
    << code hidden >>

- name: Start MySQL Service
    << code hidden >>

- name: Configure Database
    << code hidden >>
```

tasks/web.yml

```
- name: Install Python Flask Dependencies
    << code hidden >>

- name: Run web-server
    << code hidden >>
```

Include Tasks

playbook.yml

```yaml
- name: Deploy Web & DB Server
  hosts: web-db-server
  tasks:

   - include_tasks: tasks/db.yml
   - include_tasks: tasks/web.yml
```

playbook-db.yml

```yaml
- name: Deploy a DB Server
  hosts: db-server
  tasks:
  - include_tasks: tasks/db.yml
```

playbook-web.yml

```yaml
- name: Deploy a Web Server
  hosts: web-server
  tasks:
  - include_tasks: tasks/web.yml
```

tasks/db.yml

```yaml
- name: Install MySQL Packages
    << code hidden >>

- name: Start MySQL Service
    << code hidden >>

- name: Configure Database
    << code hidden >>
```

tasks/web.yml

```yaml
- name: Install Python Flask Dependencies
    << code hidden >>

- name: Run web-server
    << code hidden >>
```

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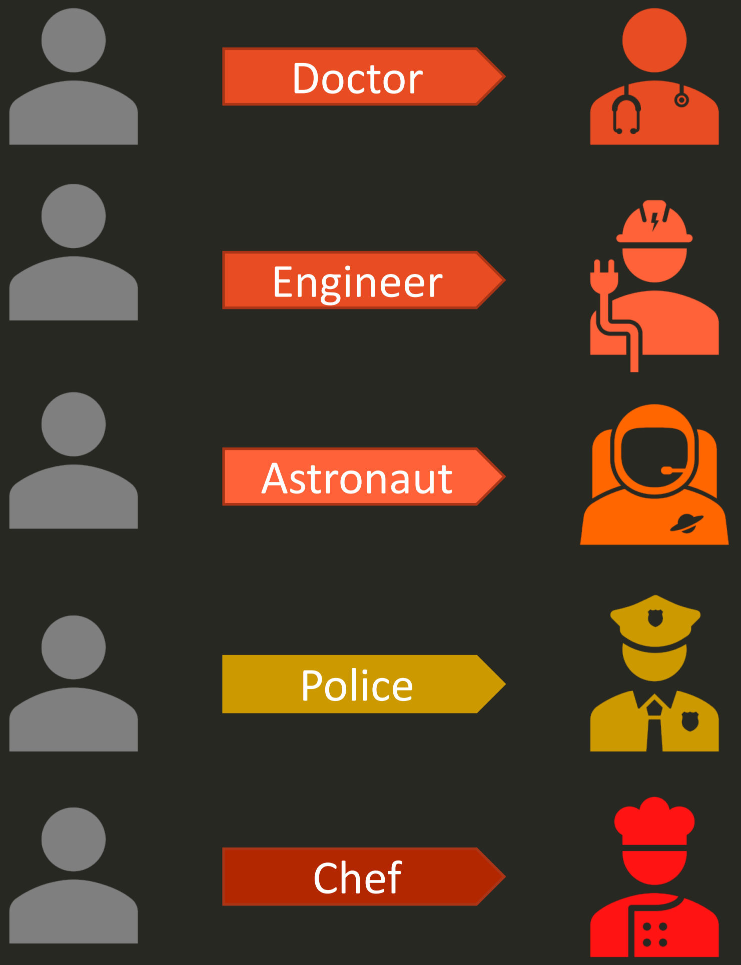
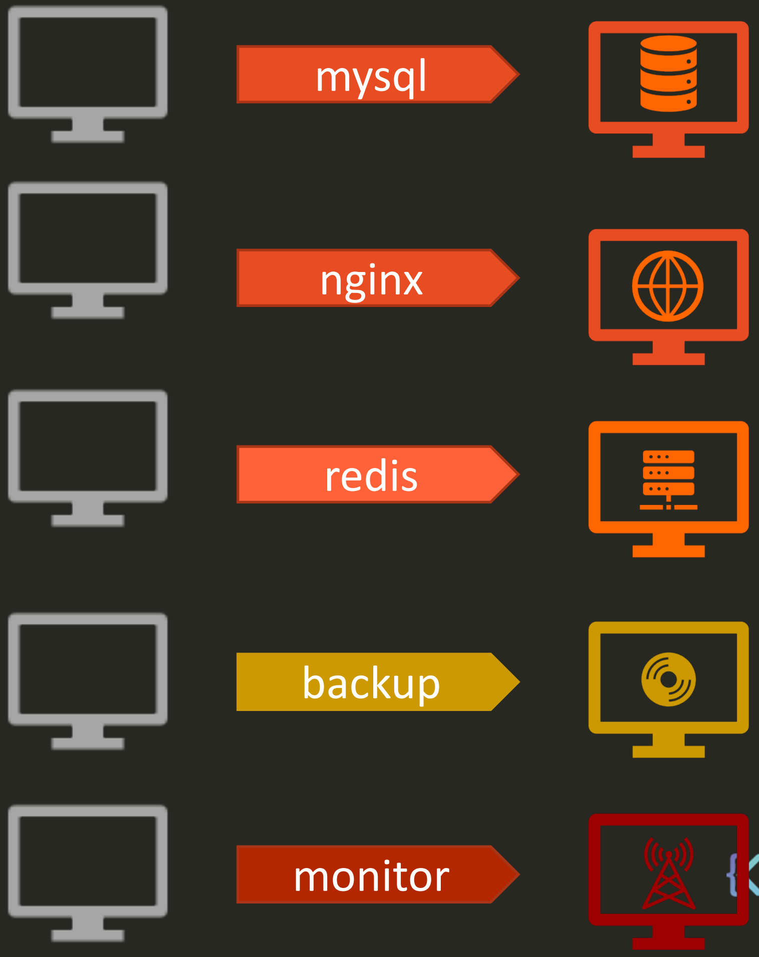
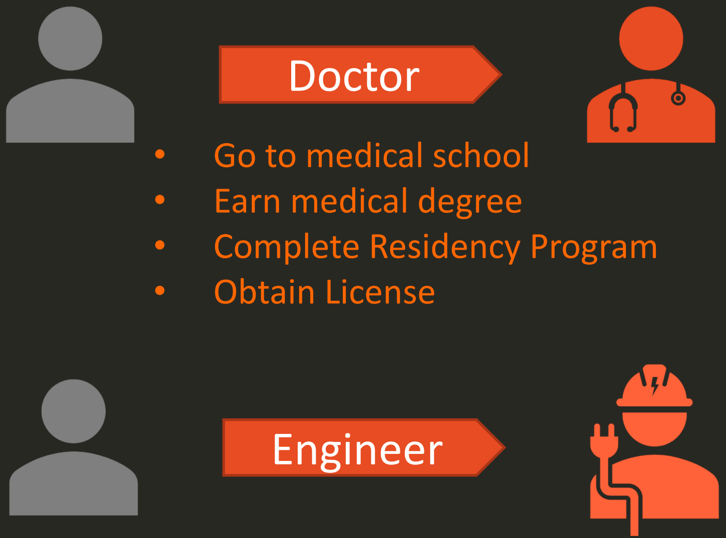
Ansible

Roles

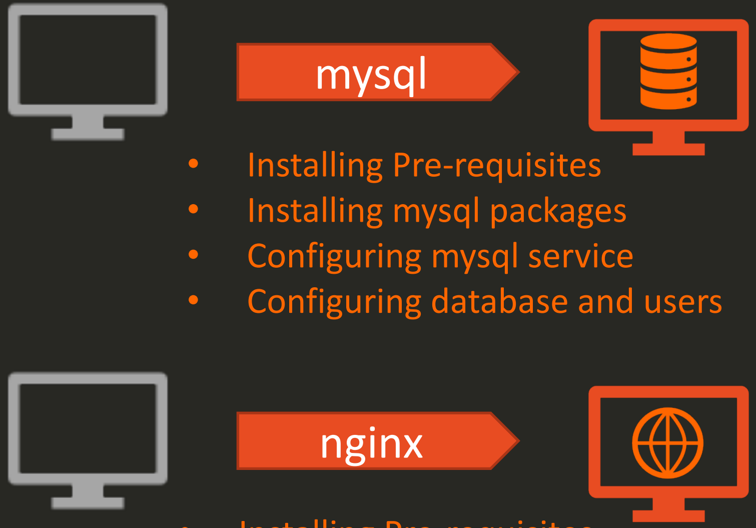

Doctor
Engineer
Astronaut
Police
Chef


mysql
nginx
redis
backup
monitor



- Go to medical school
- Earn medical degree
- Complete Residency Program
- Obtain License

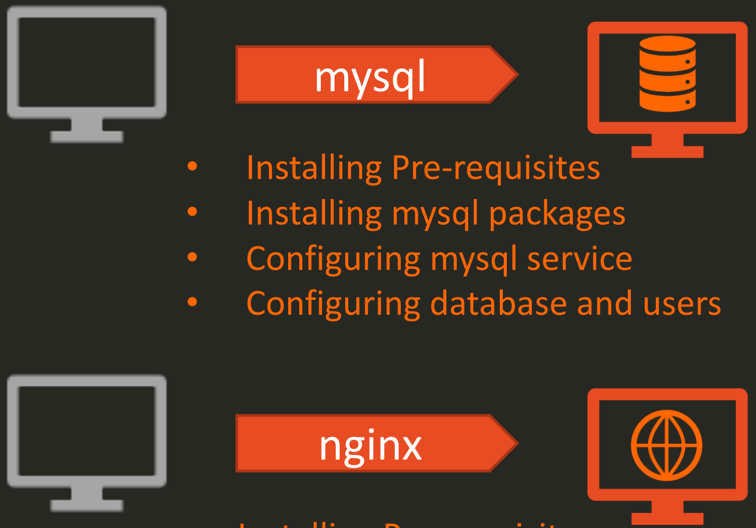
- Go to engineering school
- Earn bachelor’s degree
- Gain field experience
- Gain postgraduate degree



- Installing Pre-requisites
- Installing mysql packages
- Configuring mysql service
- Configuring database and users

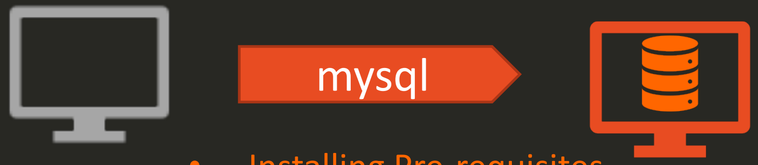
- Installing Pre-requisites
- Installing nginx packages
- Configuring nginx service
- Configuring custom web pages

```yaml
- name: Install and Configure MySQL
  hosts: db-server
  tasks:
     - name: Install Pre-Requisites
       yum: name=pre-req-packages state=present

     - name: Install MySQL Packages
       yum: name=mysql state=present

     - name: Start MySQL Service
       service: name=mysql state=started

     - name: Configure Database
       mysql_db: name=db1 state=present
```



- Installing Pre-requisites
- Installing mysql packages
- Configuring mysql service
- Configuring database and users

- Installing Pre-requisites
- Installing nginx packages
- Configuring nginx service
- Configuring custom web pages



- Installing Pre-requisites
- Installing mysql packages
- Configuring mysql service
- Configuring database and users

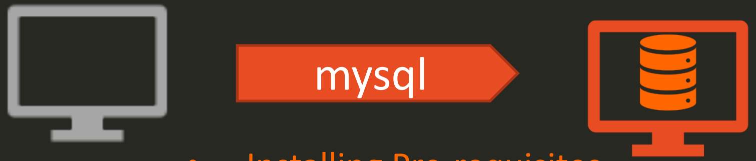
```
- name: Install and Configure MySQL
  hosts: db-server1……db-server100
  roles:
      - mysql
```

MySQL-Role

```
tasks:
    - name: Install Pre-Requisites
      yum: name=pre-req-packages state=present

    - name: Install MySQL Packages
      yum: name=mysql state=present

    - name: Start MySQL Service
      service: name=mysql state=started

    - name: Configure Database
      mysql_db: name=db1 state=present
```

Organize

Re-Use



- Installing Pre-requisites
- Installing mysql packages
- Configuring mysql service
- Configuring database and users

MySQL-Role

tasks

```
tasks:
   - name: Install Pre-Requisites
     yum: name=pre-req-packages state=present

   - name: Install MySQL Packages
     yum: name=mysql state=present

   - name: Start MySQL Service
     service: name=mysql state=started

   - name: Configure Database
     mysql_db: name=db1 state=present
```

vars

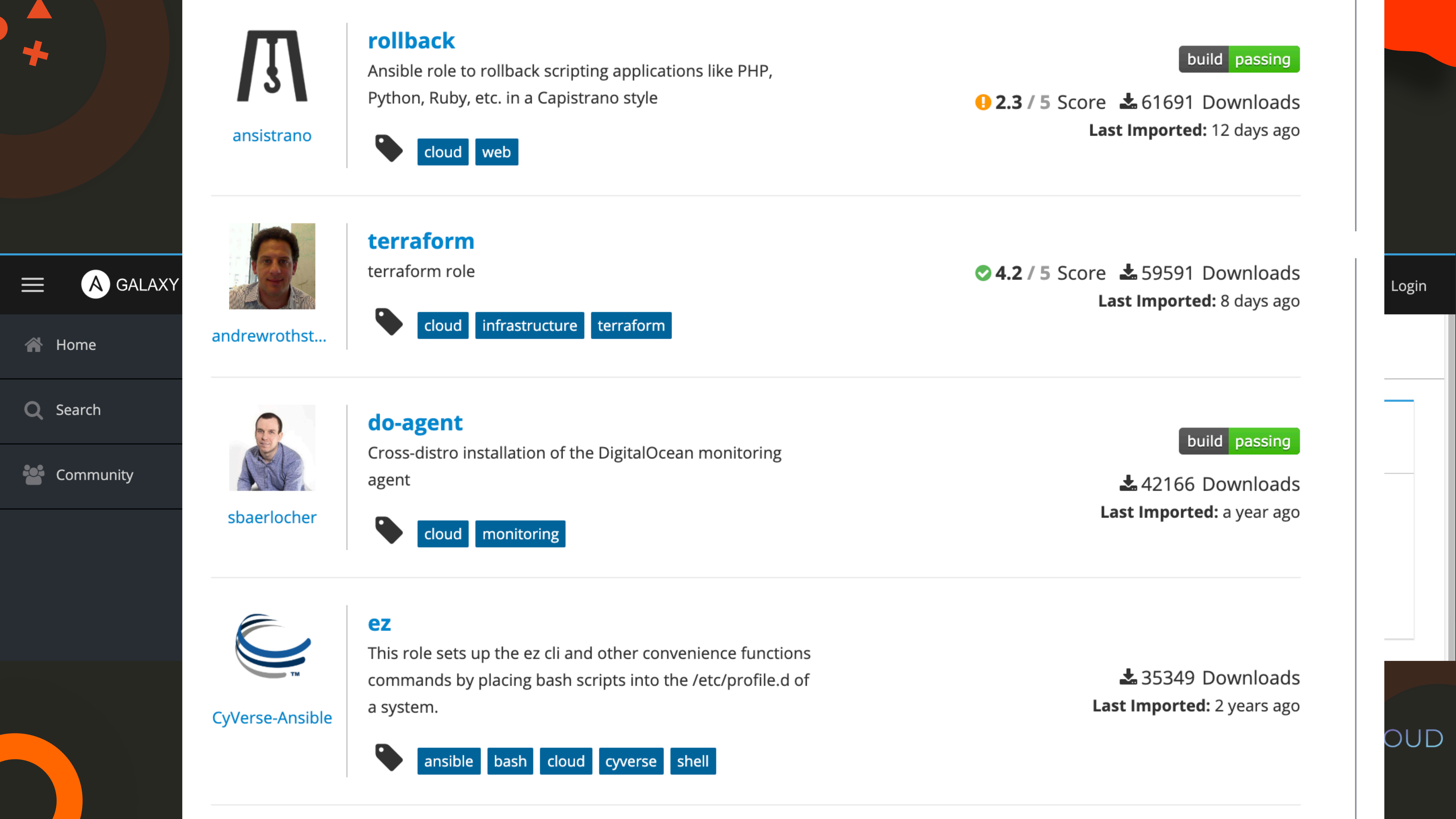
```
mysql_packages:
  - mysql
  - mysql-server
db_config:
   db_name: db1
```

defaults

```
mysql_user_name: root
mysql_user_password: root
```

handlers

templates



rollback
Ansible role to rollback scripting applications like PHP, Python, Ruby, etc. in a Capistrano style
ansistrano
cloud web
build passing
2.3 / 5 Score 61691 Downloads
Last Imported: 12 days ago

terraform
terraform role
andrewrothst...
cloud infrastructure terraform
4.2 / 5 Score 59591 Downloads
Last Imported: 8 days ago

do-agent
Cross-distro installation of the DigitalOcean monitoring agent
sbaerlocher
cloud monitoring
build passing
42166 Downloads
Last Imported: a year ago

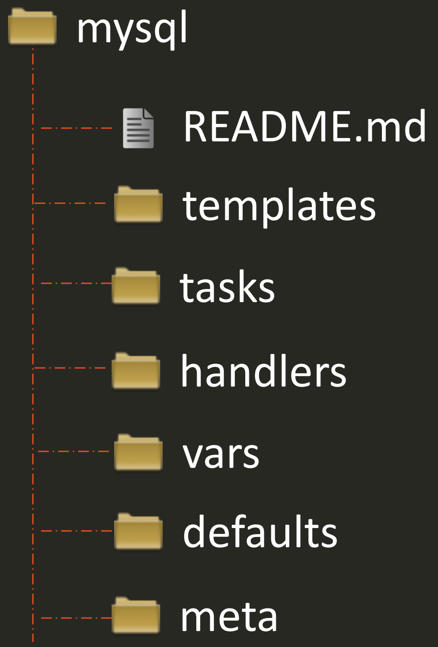
ez
This role sets up the ez cli and other convenience functions commands by placing bash scripts into the /etc/profile.d of a system.
CyVerse-Ansible
ansible bash cloud cyverse shell
35349 Downloads
Last Imported: 2 years ago

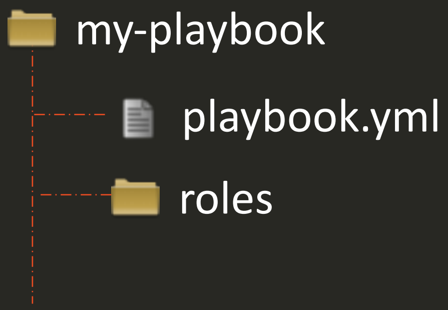
Organize

Re-Use

Share

```
$ ansible-galaxy init mysql
```





playbook.yml

```
- name: Install and Configure MySQL
  hosts: db-server
  roles:
      - mysql
```

Organize

Re-Use

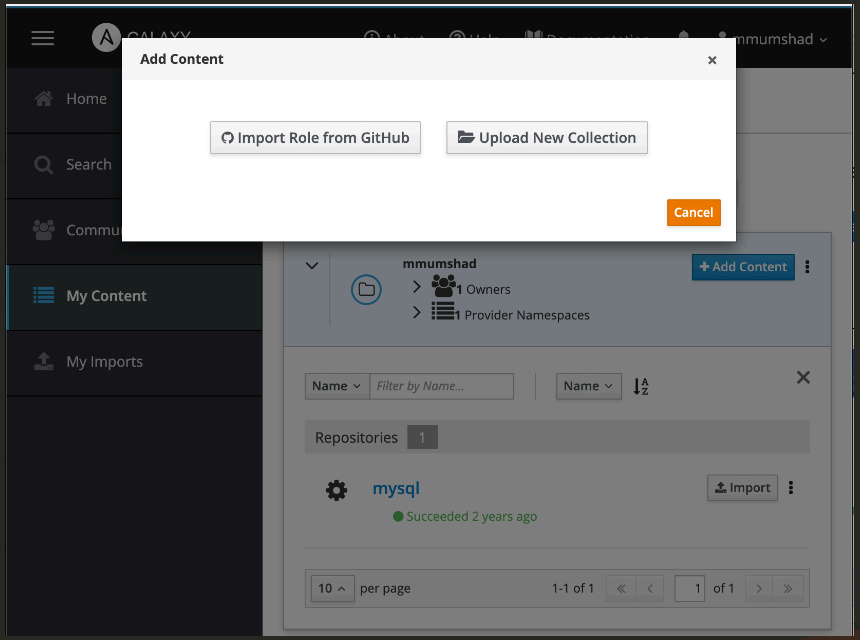
Share

```
$ ansible-galaxy init mysql
```

```
my-playbook
├── playbook.yml
└── roles
    └── mysql
        ├── README.md
        ├── templates
        ├── tasks
        ├── handlers
        ├── vars
        ├── defaults
        └── meta
```

playbook.yml

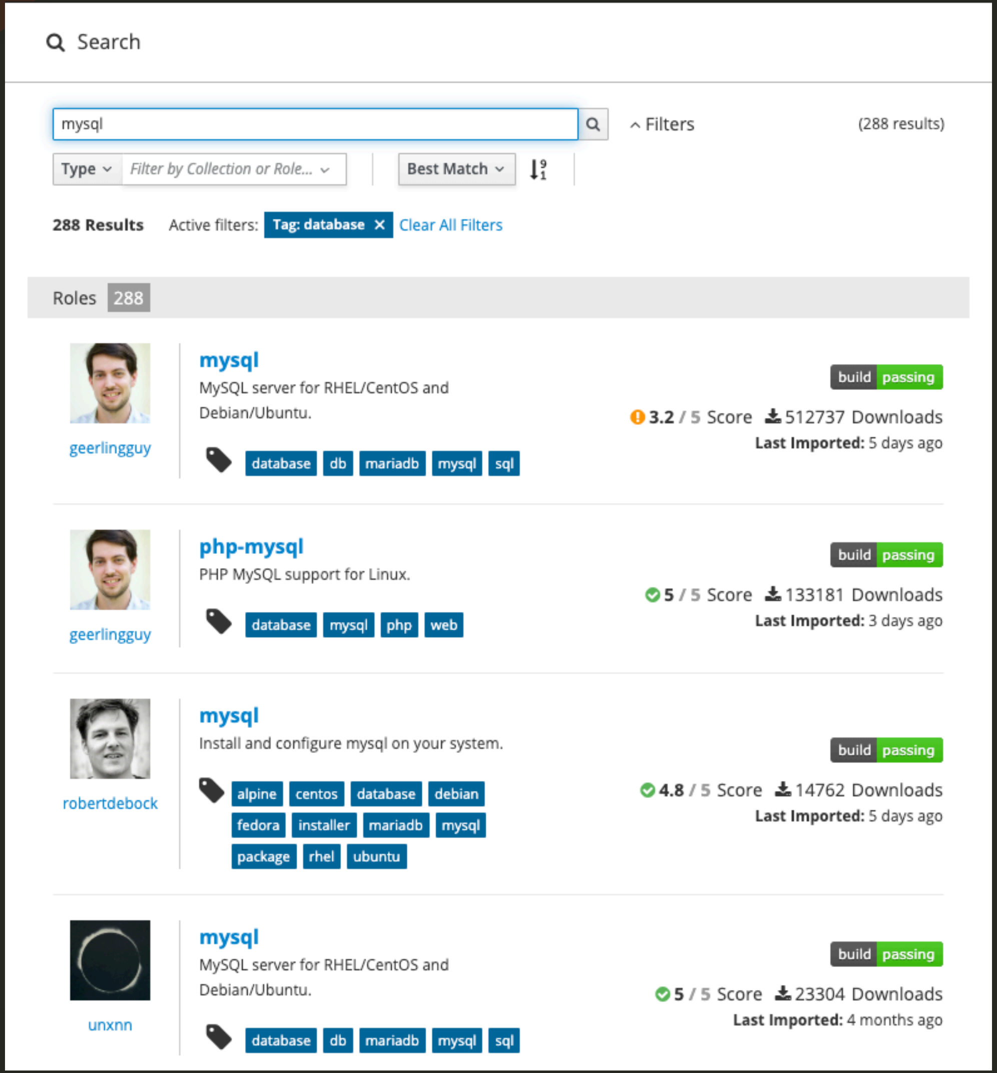
```yaml
-  name: Install and Configure MySQL
   hosts: db-server
   roles:
      - mysql
```



Succeeded 2 years ago

KODEKLOUD

Find Roles



Search

mysql

Filters (288 results)

Type Filter by Collection or Role... Best Match

288 Results Active filters: Tag: database ✕ Clear All Filters

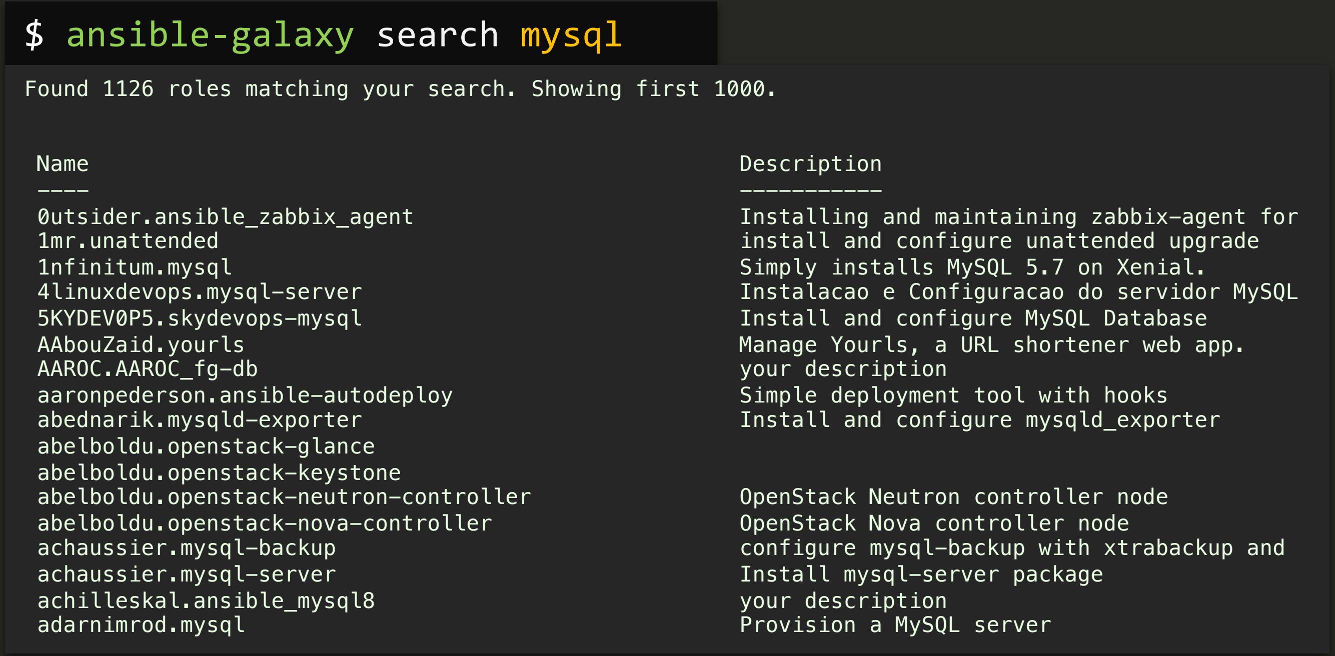
Roles 288

mysql
MySQL server for RHEL/CentOS and Debian/Ubuntu.
geerlingguy
database db mariadb mysql sql
build passing
3.2 / 5 Score 512737 Downloads
Last Imported: 5 days ago

php-mysql
PHP MySQL support for Linux.
geerlingguy
database mysql php web
build passing
5 / 5 Score 133181 Downloads
Last Imported: 3 days ago

mysql
Install and configure mysql on your system.
robertdebock
alpine centos database debian fedora installer mariadb mysql package rhel ubuntu
build passing
4.8 / 5 Score 14762 Downloads
Last Imported: 5 days ago

mysql
MySQL server for RHEL/CentOS and Debian/Ubuntu.
unxnn
database db mariadb mysql sql
build passing
5 / 5 Score 23304 Downloads
Last Imported: 4 months ago



```
$ ansible-galaxy search mysql
Found 1126 roles matching your search. Showing first 1000.

 Name                                                  Description
 ----                                                  -----------
 0utsider.ansible_zabbix_agent                         Installing and maintaining zabbix-agent for
 1mr.unattended                                        install and configure unattended upgrade
 1nfinitum.mysql                                       Simply installs MySQL 5.7 on Xenial.
 4linuxdevops.mysql-server                             Instalacao e Configuracao do servidor MySQL
 5KYDEV0P5.skydevops-mysql                             Install and configure MySQL Database
 AAbouZaid.yourls                                      Manage Yourls, a URL shortener web app.
 AAROC.AAROC_fg-db                                     your description
 aaronpederson.ansible-autodeploy                      Simple deployment tool with hooks
 abednarik.mysqld-exporter                             Install and configure mysqld_exporter
 abelboldu.openstack-glance
 abelboldu.openstack-keystone
 abelboldu.openstack-neutron-controller                OpenStack Neutron controller node
 abelboldu.openstack-nova-controller                   OpenStack Nova controller node
 achaussier.mysql-backup                               configure mysql-backup with xtrabackup and
 achaussier.mysql-server                               Install mysql-server package
 achilleskal.ansible_mysql8                            your description
 adarnimrod.mysql                                      Provision a MySQL server
```

Use Role

```
$ ansible-galaxy install geerlingguy.mysql
```

```
– downloading role 'mysql', owned by geerlingguy
– downloading role from https://github.com/geerlingguy/ansible-role-mysql/archive/2.9.5.tar.gz
– extracting geerlingguy.mysql to /etc/ansible/roles/geerlingguy.mysql
– geerlingguy.mysql (2.9.5) was installed successfully
```

playbook.yml

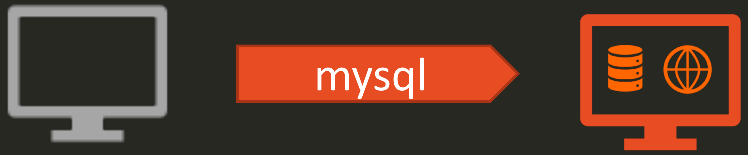
```
-
  name: Install and Configure MySQL
  hosts: db-server
  roles:
    - geerlingguy.mysql
```

```
-
  name: Install and Configure MySQL
  hosts: db-server
  roles:
    - role: geerlingguy.mysql
      become: yes
      vars:
        mysql_user_name: db-user
```

Use Role

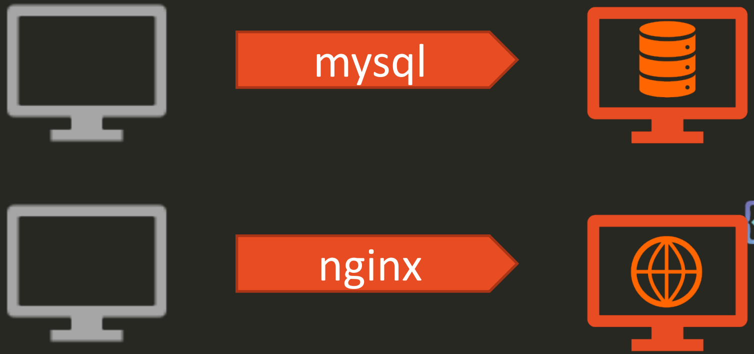
Playbook-all-in-one.yml

```yaml
-
  name: Install and Configure MySQL
  hosts: db-and-webserver
  roles:
    - geerlingguy.mysql
    - nginx
```



Playbook-distributed.yml

```yaml
-
  name: Install and Configure MySQL
  hosts: db-server
  roles:
    - geerlingguy.mysql

-
  name: Install and Configure Web Server
  hosts: web-server
  roles:
    - nginx
```



KODEKLOUD

List Roles

```
$ ansible-galaxy list
```

```
- geerlingguy.mysql
- kodekloud1.mysql
```

```
$ ansible-config dump | grep ROLE
```

```
EFAULT_PRIVATE_ROLE_VARS(default) = False
DEFAULT_ROLES_PATH(default) = [u'/root/.ansible/roles', u'/usr/share/ansible/roles', u'/etc/ansible/roles']
GALAXY_ROLE_SKELETON(default) = None
GALAXY_ROLE_SKELETON_IGNORE(default) = ['^.git$', '^.*/.git_keep$']
```

```
$ ansible-galaxy install geerlingguy.mysql -p ./roles
```

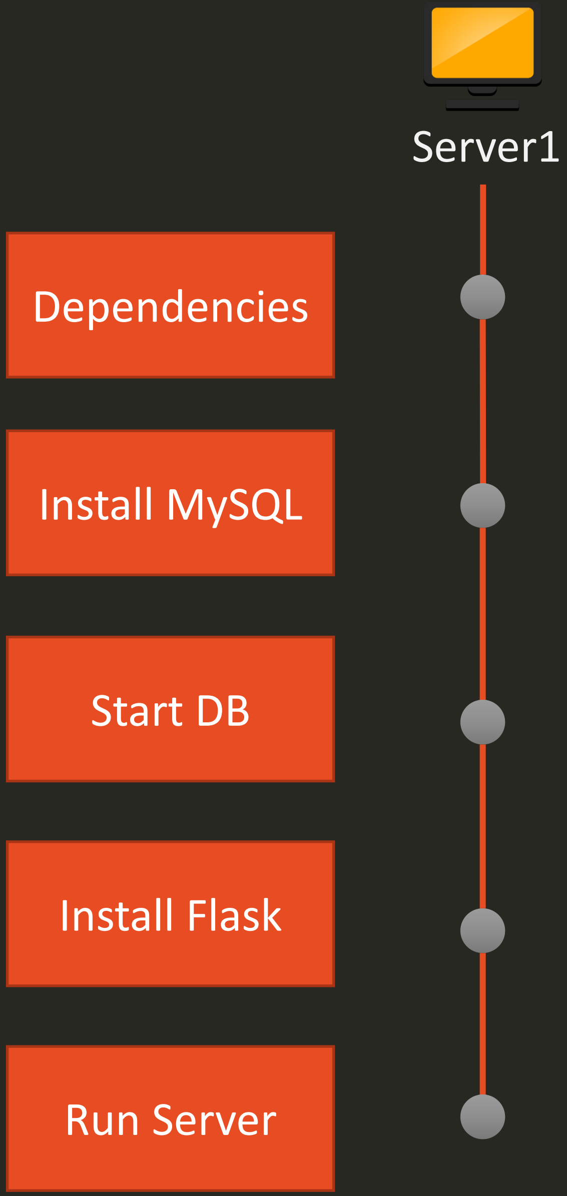
KODEKLOUD

Ansible

Strategy

Strategy

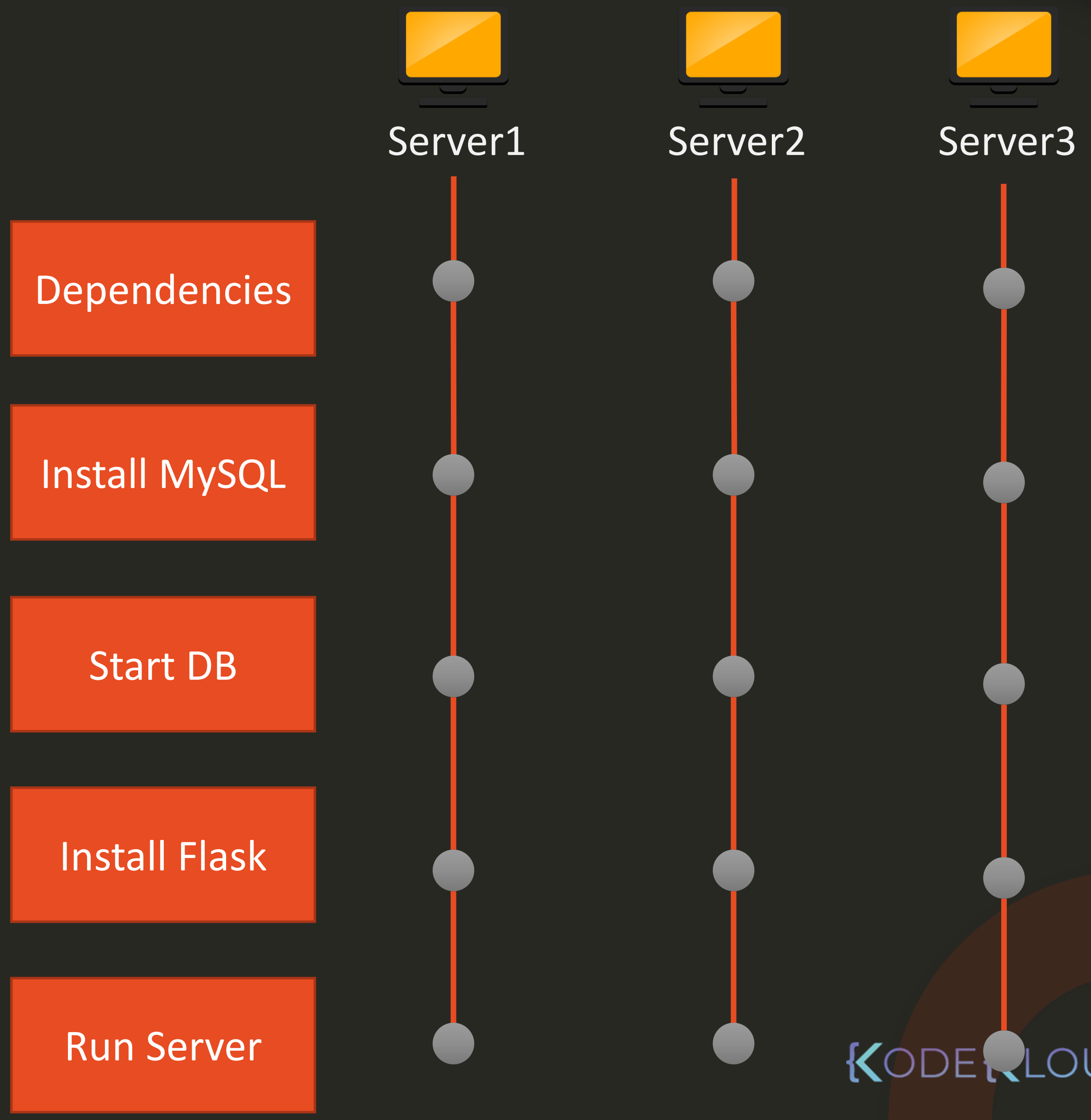
```yaml
- name: Deploy web application
  hosts: server1
  tasks:
    - name: Install dependencies
      << code hidden >>

    - name: Install MySQL Database
      << code hidden >>

    - name: Start MySQL Service
      << code hidden >>

    - name: Install Python Flask Dependencies
      << code hidden >>

    - name: Run web-server
      << code hidden >>
```



KODEKLOUD

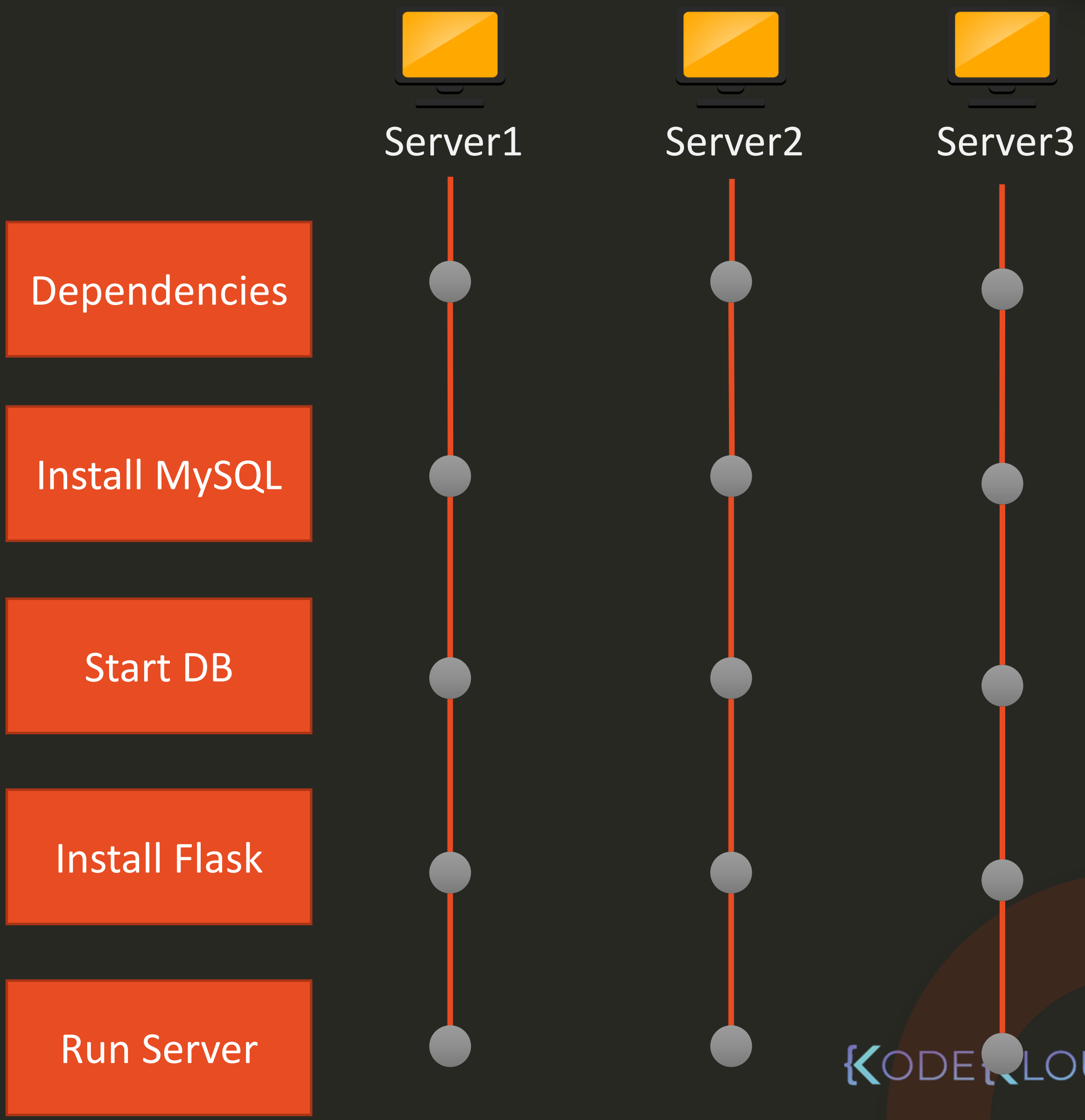
Strategy - LINEAR

```
- name: Deploy web application
  hosts: server1,server2,server3
  tasks:
    - name: Install dependencies
      << code hidden >>

    - name: Install MySQL Database
      << code hidden >>

    - name: Start MySQL Service
      << code hidden >>

    - name: Install Python Flask Dependencies
      << code hidden >>

    - name: Run web-server
      << code hidden >>
```



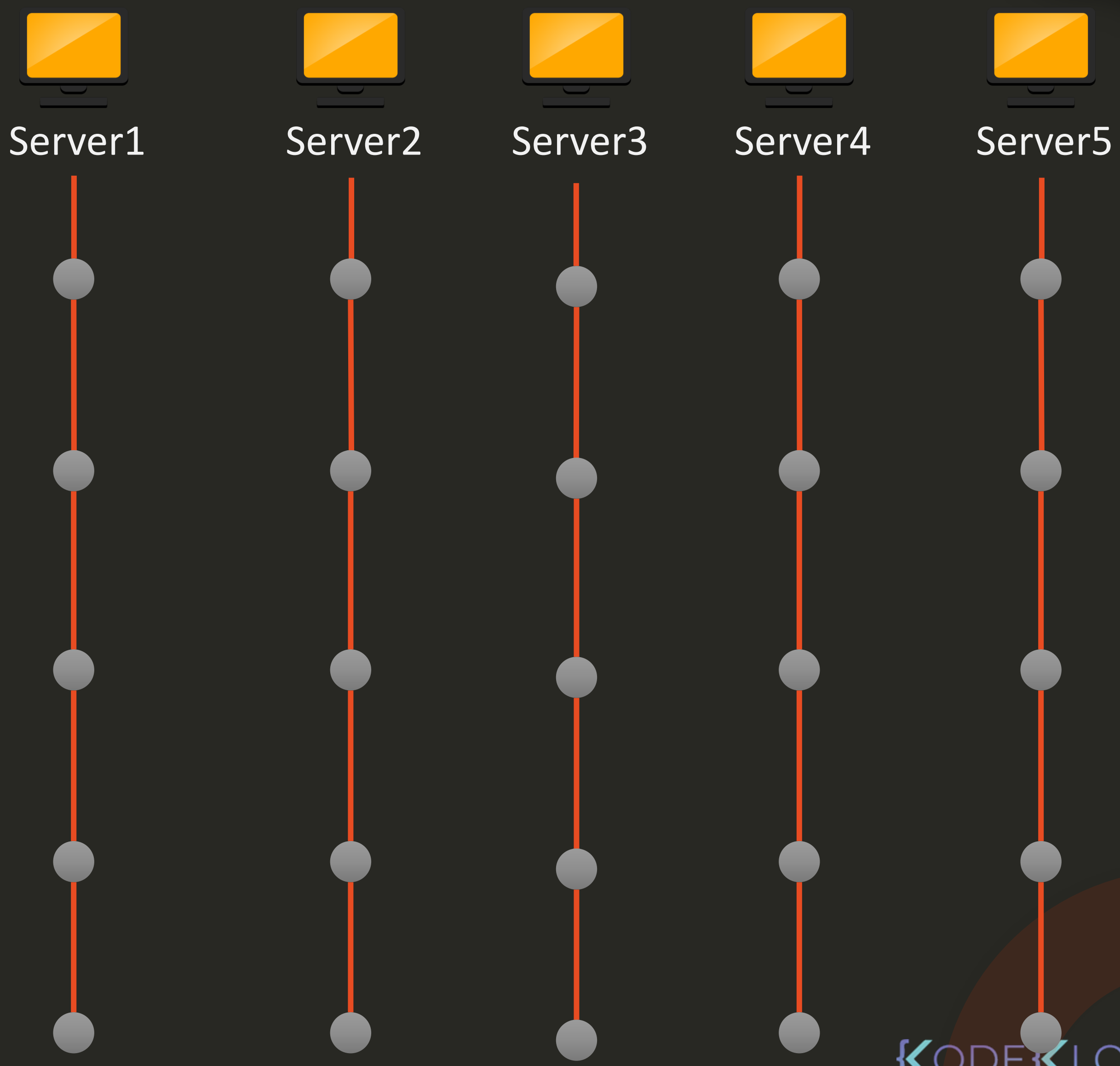
Strategy - FREE

```yaml
- name: Deploy web application
  hosts: server1,server2,server3
  strategy: free
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```



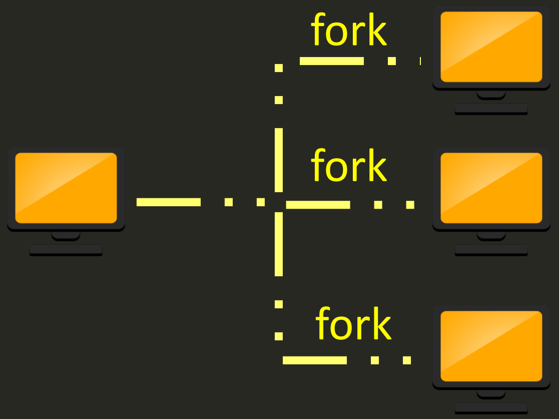
Strategy - BATCH

```
- name: Deploy web application
  hosts: server1,server2,server3,server4,server5
  serial: 3
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```



forks

```yaml
- name: Deploy web application
  hosts: server1,server2,server3... server100
  serial: 3
  tasks:
    - name: Install dependencies
        << code hidden >>

    - name: Install MySQL Database
        << code hidden >>

    - name: Start MySQL Service
        << code hidden >>

    - name: Install Python Flask Dependencies
        << code hidden >>

    - name: Run web-server
        << code hidden >>
```



/etc/ansible/ansible.cfg

```
forks                                    = 5
```

KODEKLOUD

Ansible

Vault

inventory

```
web1 ansible_host=172.20.1.100 ansible_ssh_pass=Passw0rd
web2 ansible_host=172.20.1.101 ansible_ssh_pass=Passw0rd
```

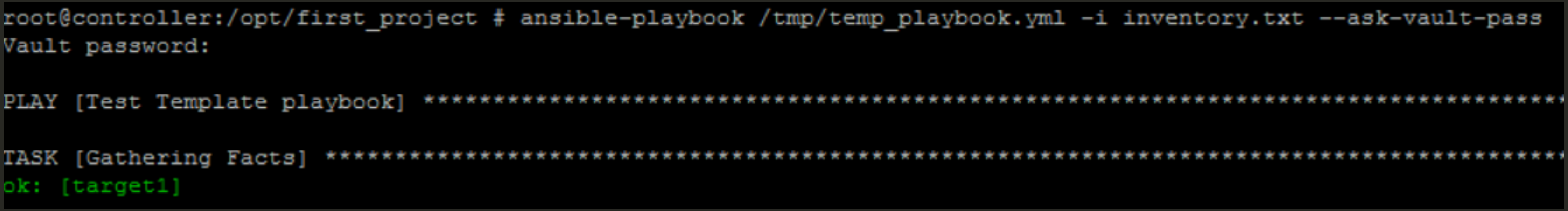
```
$ ansible-vault encrypt inventory
```

inventory

```
$ANSIBLE_VAULT;1.1;AES256
61383464383939633238383239356239666432313565333463636435326462363863323263636261
6432623864313032636434613931316262646534633165340a323664333661323961666361326430
62636562333738636638376631326233646130386133646438633739623362646238626438356265
6534663335386138370a623133653339356138623831306638383838363839303866303031643038
33373061653863303664383935316662623065316137343361313435313761303332633637333932
64623362623565396665393237356430653966616339643666393832346333636632663136306633
61343865376362643166356466653836613937666236626235646130633238393361396633613162
65633033386663383638323265646365363465366533313161313166323133633830306263663039
66633239633832366339336137336564646434343831323134323037356265386431643233346631
62636133653530393866666638643133636564366530366663633565386363366236323763363837
3638356566383562396664373966623762626435333363464346665333731323265623530353736
62343266386138336563356164333030616238306132666537623963393361363336313138633238
6137
```

```
$ ansible-playbook playbook.yml -i inventory
ERROR! Attempted to read "inventory.txt" as ini file: Decryption failed on inventory.txt
```

```
$ ansible-playbook playbook.yml -i inventory --ask-vault-pass
```



```
root@controller:/opt/first_project # ansible-playbook /tmp/temp_playbook.yml -i inventory.txt --ask-vault-pass
Vault password:

PLAY [Test Template playbook] ******************************************************************************

TASK [Gathering Facts] *************************************************************************************
ok: [target1]
```

```
$ ansible-playbook playbook.yml -i inventory -vault-password-file ~./vault_pass.txt
```

```
$ ansible-playbook playbook.yml -i inventory -vault-password-file ~./vault_pass.py
```

```
$ ansible-vault view inventory
```

```
$ ansible-vault create inventory
```

KODEKLOUD

The Curriculum

RedHat Certified Ansible Specialist

- Core Components
- Install and Configure Ansible Control Node
- Configure Ansible Managed Nodes
- Create simple shell scripts that run ad hoc Ansible commands
- Dynamic inventories
- Ansible Plays and Playbooks
- Ansible Modules
- Customized Configuration Files
- Variables and Facts
- Roles
- Ansible Vault
- Documentation

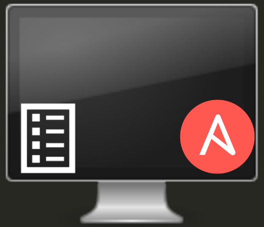
Ansible

Dynamic Inventory

Static Inventory

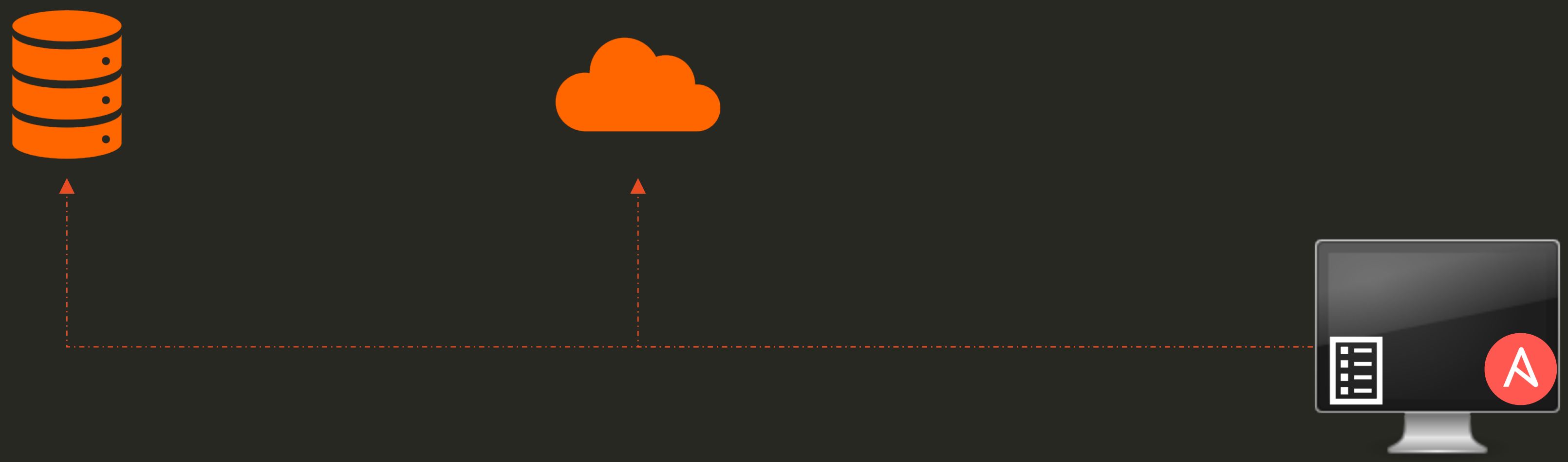
/etc/ansible/hosts

```
web1 ansible_host=172.20.1.100 ansible_ssh_pass=Passw0rd
web2 ansible_host=172.20.1.101 ansible_ssh_pass=Passw0rd


[web_servers]
web1
web2
```



KODEKLOUD

Dynamic Inventory



inventory.txt

```
web1 ansible_host=172.20.1.100 ansible_ssh_pass=Passw0rd
web2 ansible_host=172.20.1.101 ansible_ssh_pass=Passw0rd


[web_servers]
web1
web2
```

```
$ ansible-playbook playbook.yml -i inventory.txt
```

```
$ ansible-playbook playbook.yml -i inventory.py
```

inventory.py

```
#!/usr/bin/env python

import json
import argparse

# Get inventory data from source - CMDB or any other API

def get_inventory_data():
    return {
        "web_servers": {
          "hosts": ["web1", "web2"]
        },
          "_meta": {
            "hostvars": {
                "web1": {
                    "ansible_host": "172.20.1.100",
                    "ansible_ssh_pass": "Passw0rd"
                },
                "web2": {
                    "ansible_host": "172.20.1.101",
                    "ansible_ssh_pass": "Passw0rd"
                }
            }
          }
    }

# Default main function

if __name__ == "__main__":
    read_cli_args();
    inventory_data = get_inventory_data()
    if args.list:
       print(json.dumps(inventory_data))
    <Code Hidden>
```

Test Inventory Script

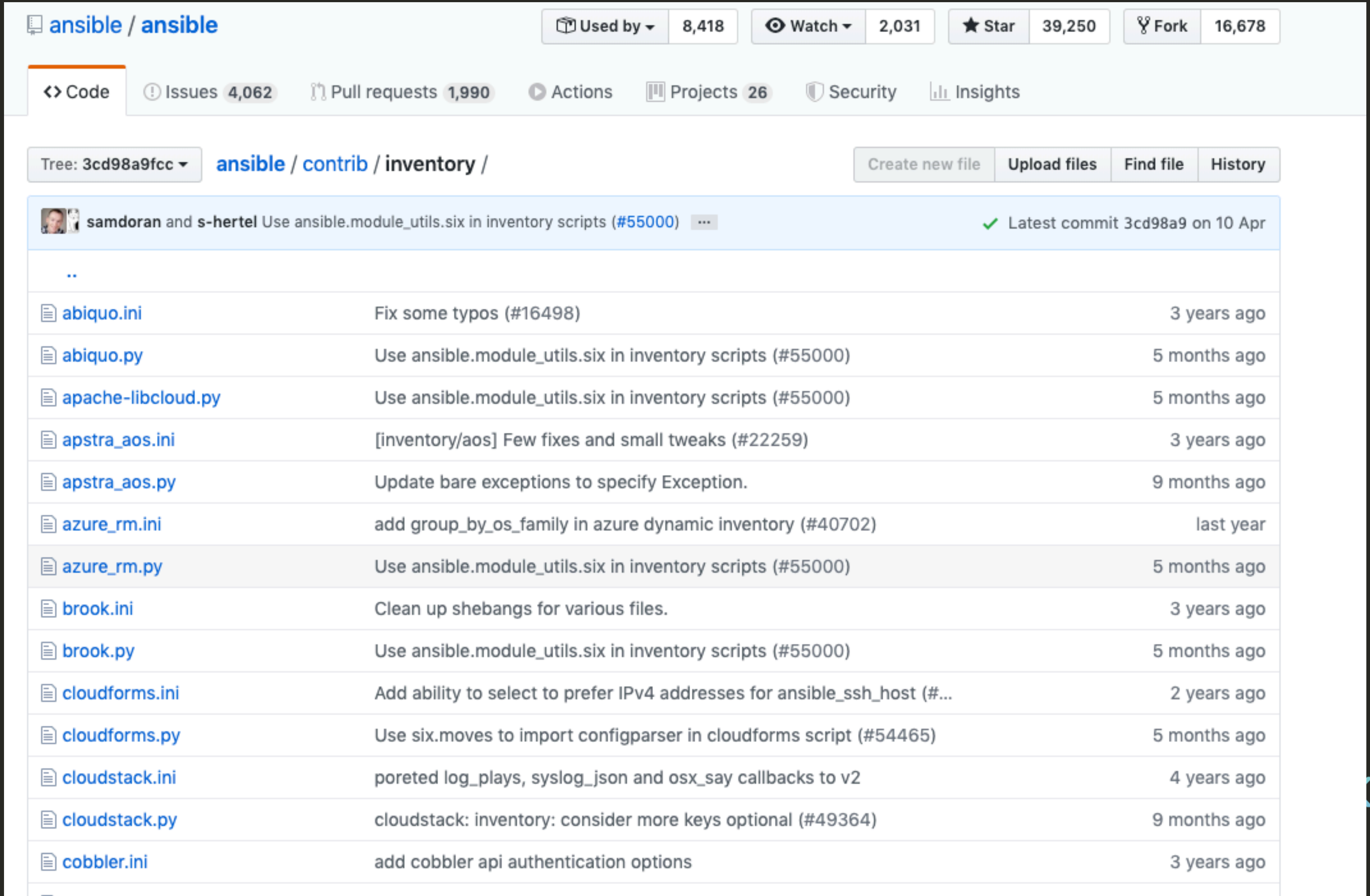
```
$ ./inventory.py --list
{
  "web_servers": {
    "hosts": [
      "web1",
      "web2"
    ]
  },
  "_meta": {
    "hostvars": {
      "web2": {
        "ansible_host": "172.20.1.101",
        "ansible_ssh_pass": "Passw0rd"
      },
      "web1": {
        "ansible_host": "172.20.1.100",
        "ansible_ssh_pass": "Passw0rd"
      }
    }
  }
}
```

```
$ ./inventory.py --host web1
{
        "ansible_host": "172.20.1.100",
        "ansible_ssh_pass": "Passw0rd"
}
```

inventory.py

```python
#!/usr/bin/env python

import json
import argparse

# Get inventory data from source - CMDB or any other API

def get_inventory_data():
    return {
        "web_servers": {
          "hosts": ["web1", "web2"]
        },
          "_meta": {
            "hostvars": {
                "web1": {
                    "ansible_host": "172.20.1.100",
                    "ansible_ssh_pass": "Passw0rd"
                },
                "web2": {
                    "ansible_host": "172.20.1.101",
                    "ansible_ssh_pass": "Passw0rd"
                }
            }
        }
    }

# Default main function

if __name__ == "__main__":
    read_cli_args();
    inventory_data = get_inventory_data()
    if args.list:
       print(json.dumps(inventory_data))
    <Code Hidden>
```

Inventory Scripts



ansible / contrib / inventory /

samdoran and s-hertel Use ansible.module_utils.six in inventory scripts (#55000) ··· ✓ Latest commit 3cd98a9 on 10 Apr

..		
abiquo.ini	Fix some typos (#16498)	3 years ago
abiquo.py	Use ansible.module_utils.six in inventory scripts (#55000)	5 months ago
apache-libcloud.py	Use ansible.module_utils.six in inventory scripts (#55000)	5 months ago
apstra_aos.ini	[inventory/aos] Few fixes and small tweaks (#22259)	3 years ago
apstra_aos.py	Update bare exceptions to specify Exception.	9 months ago
azure_rm.ini	add group_by_os_family in azure dynamic inventory (#40702)	last year
azure_rm.py	Use ansible.module_utils.six in inventory scripts (#55000)	5 months ago
brook.ini	Clean up shebangs for various files.	3 years ago
brook.py	Use ansible.module_utils.six in inventory scripts (#55000)	5 months ago
cloudforms.ini	Add ability to select to prefer IPv4 addresses for ansible_ssh_host (#...	2 years ago
cloudforms.py	Use six.moves to import configparser in cloudforms script (#54465)	5 months ago
cloudstack.ini	poreted log_plays, syslog_json and osx_say callbacks to v2	4 years ago
cloudstack.py	cloudstack: inventory: consider more keys optional (#49364)	9 months ago
cobbler.ini	add cobbler api authentication options	3 years ago

KODEKLOUD

EC2 Inventory Script

```
$ export AWS_ACCESS_KEY_ID=AK123
$ export AWS_SECRET_ACCESS_KEY_ID=ABC123
```

```
$ ansible-playbook playbook.yml –i ec2.py
```

Ansible INI

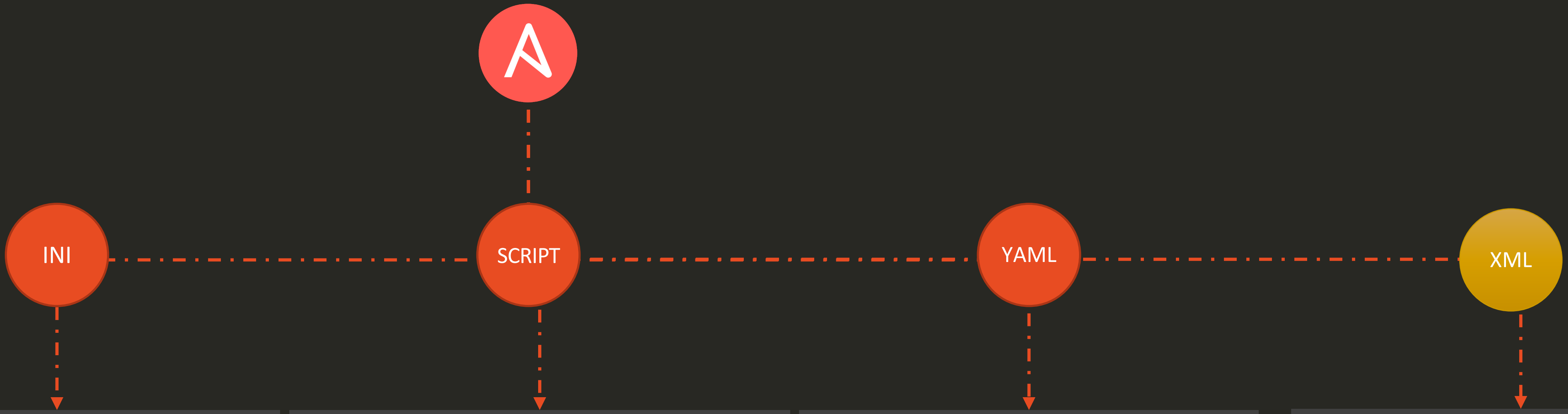
```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101


[web_servers]
web1
web2
```

Script

```
#!/usr/bin/env python

import json
import argparse

# Get inventory data from source - CMDB or
any other API

def get_inventory_data():
    return {
       "web_servers": {
         "hosts": ["web1", "web2"]
       },
        "_meta": {
          "hostvars": {
              "web1": {
             "ansible_host": "172.20.1.100",
             "ansible_ssh_pass": "Passw0rd"
              },
              "web2": {
             "ansible_host": "172.20.1.101",
             "ansible_ssh_pass": "Passw0rd"
              }
          }
        }
    }

# Default main function

if __name__ == "__main__":
    read_cli_args();
    inventory_data = get_inventory_data()
    if args.list:
```

YAML

```
web_servers:
    hosts:
        web1:
            ansible_host: 172.20.1.100
            ansible_ssh_pass: Passw0rd
        web2:
            ansible_host: 172.20.1.101
            ansible_ssh_pass: Passw0rd
```



Ansible INI

```
web1 ansible_host=172.20.1.100
web2 ansible_host=172.20.1.101


[web_servers]
web1
web2
```

Script

```
#!/usr/bin/env python

import json
import argparse

# Get inventory data from source - CMDB or
any other API

def get_inventory_data():
    return {
        "web_servers": {
          "hosts": ["web1", "web2"]
        },
         "_meta": {
           "hostvars": {
               "web1": {
             "ansible_host": "172.20.1.100",
             "ansible_ssh_pass": "Passw0rd"
               },
               "web2": {
             "ansible_host": "172.20.1.101",
             "ansible_ssh_pass": "Passw0rd"
               }
          }
```

YAML

```
web_servers:
    hosts:
        web1:
            ansible_host: 172.20.1.100
            ansible_ssh_pass: Passw0rd
        web2:
            ansible_host: 172.20.1.101
            ansible_ssh_pass: Passw0rd
```

XML

```
<web_servers>>
  <hosts>:
        web1:
            ansible_host: 172.20.1.100
            ansible_ssh_pass: Passw0rd
        web2:
            ansible_host: 172.20.1.101
            ansible_ssh_pass: Passw0rd
  </
  <web_servers>>
```

KODEKLOUD

Inventory Plugin Configuration

/etc/ansible/ansible.cfg

```
[inventory]
enable_plugins          = host_list, script, auto, yaml, ini
```

Inventory Scripts vs Plugins

Script

```
#!/usr/bin/env python

import json
import argparse

# Get inventory data from source - CMDB or
any other API

def get_inventory_data():
    return {
        "web_servers": {
          "hosts": ["web1", "web2"]
        },
         "_meta": {
          "hostvars": {
              "web1": {
            "ansible_host": "172.20.1.100",
            "ansible_ssh_pass": "Passw0rd"
              },
              "web2": {
            "ansible_host": "172.20.1.101",
            "ansible_ssh_pass": "Passw0rd"
              }
          }
        }
    }

# Default main function

if __name__ == "__main__":
    read_cli_args();
    inventory_data = get_inventory_data()
    if args.list:
       print(json.dumps(inventory_data))
    <Code Hidden>
```

Plugins

```
# Make coding more python3-ish
from __future__ import (absolute_import, division, print_function)
__metaclass__ = type

import hashlib
import os
import string

from ansible.errors import AnsibleError, AnsibleParserError
from ansible.inventory.group import to_safe_group_name as original_safe
from ansible.parsing.utils.addresses import parse_address
from ansible.plugins import AnsiblePlugin
from ansible.plugins.cache import CachePluginAdjudicator as CacheObject
from ansible.module_utils._text import to_bytes, to_native

display = Display()


def expand_hostname_range(line=None):
  all_hosts = []
  if line:

     (head, nrange, tail) = line.replace('[', '|', 1).replace(']', '|', 1).split('|')
     bounds = nrange.split(":")
     if len(bounds) != 2 and len(bounds) != 3:
        raise AnsibleError("host range must be begin:end or begin:end:step")
     beg = bounds[0]
     end = bounds[1]
     if len(bounds) == 2:
        step = 1
     else:
        step = bounds[2]
     <Code Hidden>
```

Ansible-Inventory

```
$ ansible-inventory -i ec2.py
```

```
{
  "_meta" {
    "hostvars" {
      "172.20.1.109" {
        "ansible_ssh_pass"  "Passw0rd"
        "ansible_ssh_user"  "root"
        "ec2_region"  "ca-central-1"
        "ec2_state"  "Running"
      }
      "172.20.1.110" {
        "ansible_ssh_pass"  "Passw0rd"
        "ansible_ssh_user"  "root"
        "ec2_region"  "us-east-1"
        "ec2_state"  "Running"
      }
    }
  }
  "all" {
    "children"
      "group"
      "ungrouped"

  }
  "group" {
    "hosts"
      "172.20.1.109"
      "172.20.1.110"

  }
  "ungrouped" {}
}
```