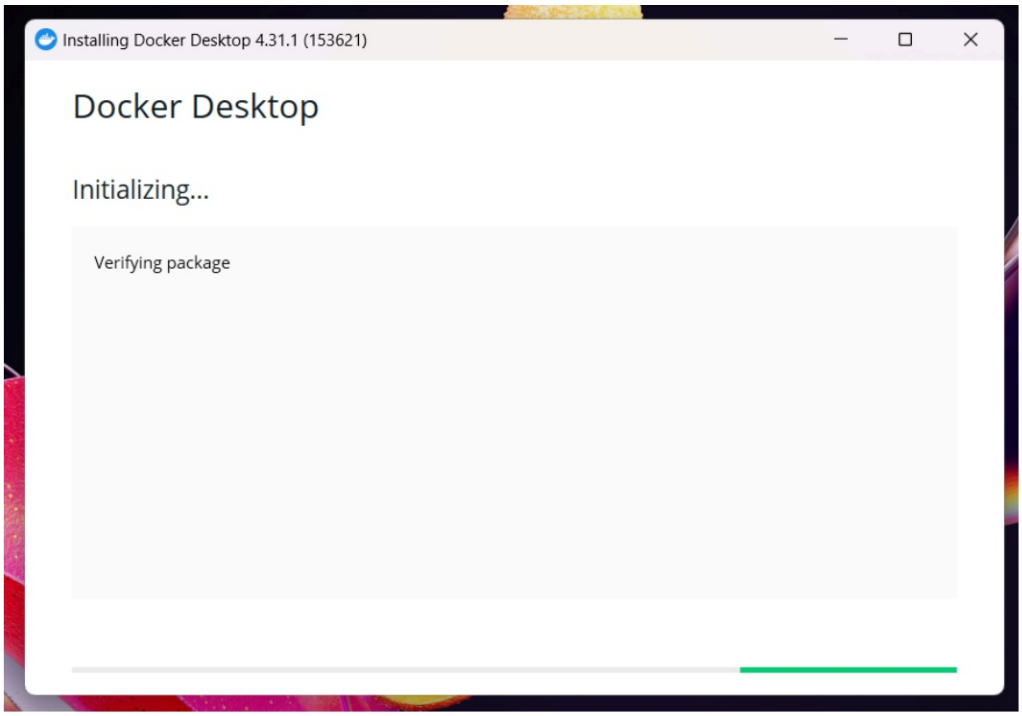
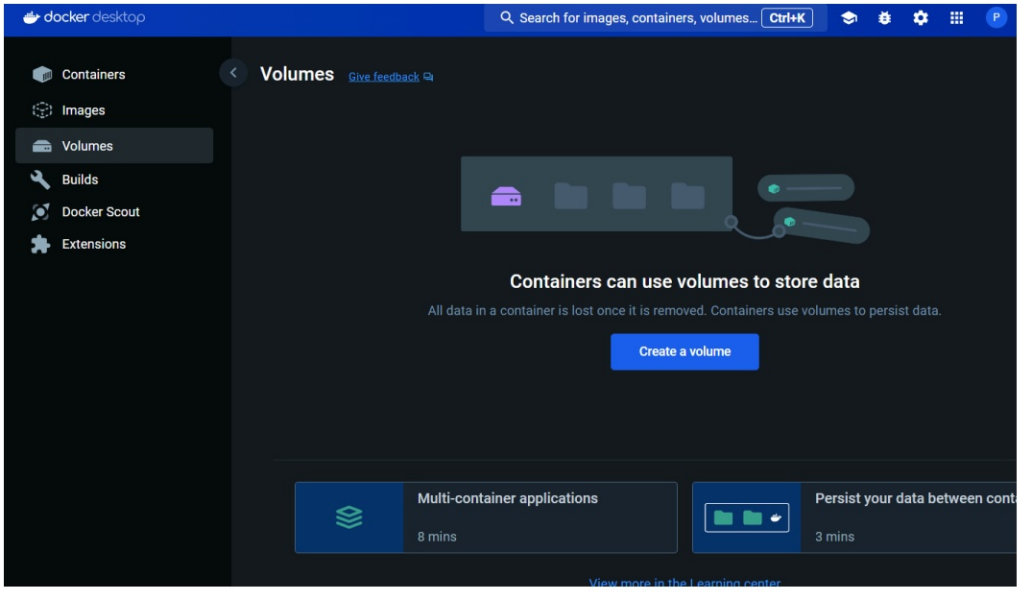
Ansible Automation and Monitoring in local environment.

1. **Setup Docker Container with ansible engine :**
   For our project the necessary thing is ansible. Which should be installed on

   1.1 Installation docker Desktop





We have completed the docker installation now we need a image that contains or we can install the ansible engine

By searching on internet i got ansible/ansible docker image that can be pulled and can run as a container. But some errors i unable to pull repo due to policy issues. So i thought alternatively is there any ansible installed container image available so let's check.

1.2 Ansible installation in docker container :

```
PS C:\Users\purus> docker pull alpinelinux/ansible
```

```
C:\Users\purus>docker search ansible
NAME                                              DESCRIPTION                                     STARS
rapidfort/ansible-ib                              RapidFort optimized, hardened image for Ansi…   0
uhligit/ansible                                   Packages Ansible as a Concourse task image      0
rancher/ansible-runner                                                                            9
rapidfort/ansible-lint-ib                         RapidFort optimized, hardened image for Ansi…   0
alpinelinux/ansible                               Ansible in docker                               20
pipelinecomponents/ansible-lint                   Ansible-lint in a container for gitlab-ci       19
webdevops/ansible                                 Ansible image for CentOS, Ubunty, Debian and…   12
librespace/ansible                                Ansible Docker image                            2
openebs/ansible-runner                                                                            3
openwhisk/ansible-runner                          Apache OpenWhisk image for running Ansible j…   0
litmuschaos/ansible-runner                                                                        1
vmware/ansible-security-hardening                                                                 1
tungstenfabric/tf-ansible-deployer-src            tungsten fabric deployer based on ansible       0
tungstenfabric/tf-openshift-ansible-src           openshit ansible deployer                       0
finalgene/ansible                                                                                 0
dockette/ansible                                  🐳 Dockette Ansible + Ansiblelint               0
tungstenfabric/tf-kolla-ansible-src               open stack andible deployer for tf              0
jitesoft/ansible                                  Ansible on alpine linux.                        1
tungstenfabric/contrail-kolla-ansible-deployer    TO_BE_DEPRECATED please start using the homo…   0
tungstenfabric/contrail-openshift-ansible-deployer TO_BE_DEPRECATED please start using the homo…  0
pipelinecomponents/ansible-lint-amd64                                                             0
allfunc/ansible                                                                                   2
sdkman/ansible-playbook                           Not for public consumption, used for sdkman …   0
abakus/ansible-deploy                                                                             0
abakus/ansible-lint                                                                               0
```

1.3 pulling alpinelinux lightweight docker image for installation.

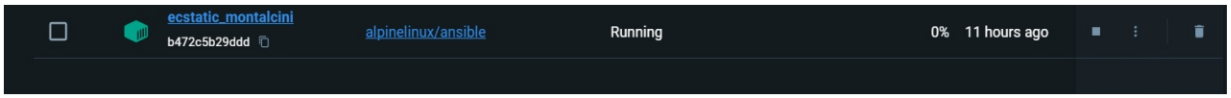
It is Ansible pre installed baseos that we pulling from docker registry

Running the pulled docker image:

```
PS C:\Users\purus> docker run -it alpinelinux/ansible /bin/sh
```

Open the shell of container installed by mentioning their ID:

```
C:\Users\purus>docker start b472c5b29ddd
```



Open the shell of container:

```
C:\Users\purus>docker exec -it b472c5b29ddd /bin/sh
/ #
```

+

1.4 Ansible-version check:

```
/ # ansible --version
ansible 2.9.7
  config file = None
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modul
  ansible python module location = /usr/lib/python3.8/site-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, May  6 2021, 14:29:04) [GCC 9.3.0]
/ #
```

2. ssh service installation setup and configuration :

Since we have 2 node's ubuntu and centos we are going to install and setup the ssh connection. To connect remotely we need following step's to do.

2.1 install ssh service in alpinelinux

```
# Install OpenSSH server on alpinelinux
apk update
apk add openssh
```

2.1.1 In both vm's ubuntu and centos Installing ssh service if not there

2.2 ssh-keygen on alpinelinux

```
/ # ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
```

Configure /etc/ssh/sshd in Managed VM"s

```
#HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key
#HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
#LogLevel INFO

# Authentication:

#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#PubkeyAuthentication yes
```

2.3 Share the ssh-key

Here we are checking have we done Passwordless authentication from Control node docker-Container_alpineLinux to ubuntu and Centos. As we shared the ssh key on the centos and ubuntu.

ssh-copy-id to purush@ubuntu, purush@centos for passwordless connection On Ubuntu and centos

```
/ # ssh-copy-id purush@192.168.118.134
```

2.4 Test the connection

```
/ # ssh purush@192.168.118.134
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Sat Jun 29 14:20:48 2024 from 192.168.118.1
[purush@centosVM ~]$
```

3. Git code version control. Git bash setup

3.1 Installation of git bash in alpinelinux

```
ask add git
git --version
```

3.2 Setup global userid and email

In order to pull and push our code to remote repository github and track our code version control.

```
/home/purush/ansible/Ansible-usecase-automation # git config --global user.email "purushnaykude@gmail.com"
/home/purush/ansible/Ansible-usecase-automation # git config --global user.name "purushottam55"
```

- clone repo from github

  /home/purush/ansible for continuous Code version control.

```
/home/purush/ansible #
/home/purush/ansible # git clone https://github.com/purushottam55/Ansible-usecase-automation.git
```

4. Ansible Nodes configuration and control node configuration

In order to edit and create text files we need editor. As alpinelinux is lightweight so there is possibility that it has not having the

4.1 vim editor installation and configuration for ansible in alpinelinux-dockerContainer

- Installation of Vim editor in installed container

```
apk update
apk add vim
vim --version
vim .vimrc
set nu ai et ts=2 cuc
```

4.2 Create localuser and set password for it in docker container alpinelinux

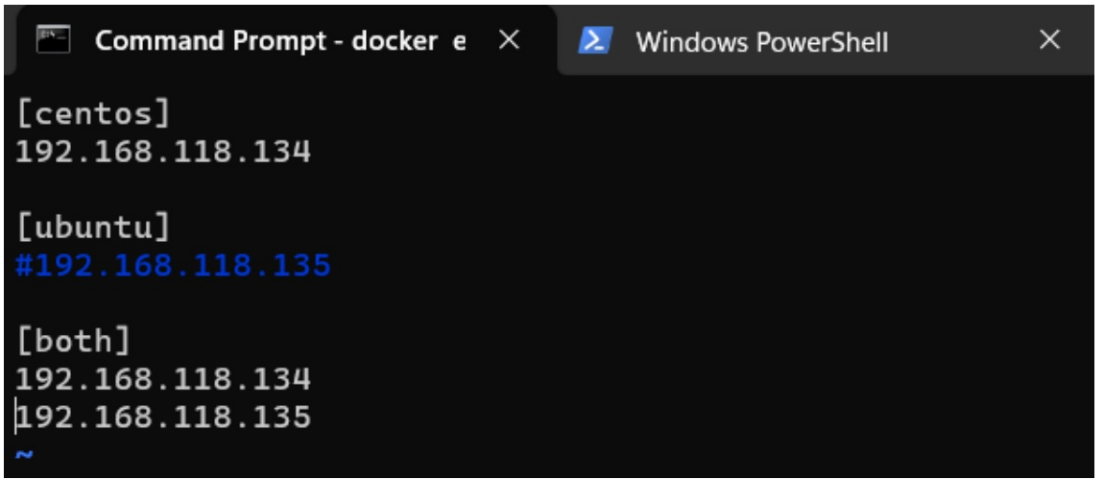
```
adduser purush
passwd purush
```

4.3 create directory ansible in home directory of purush

```
Mkdir ansible
```

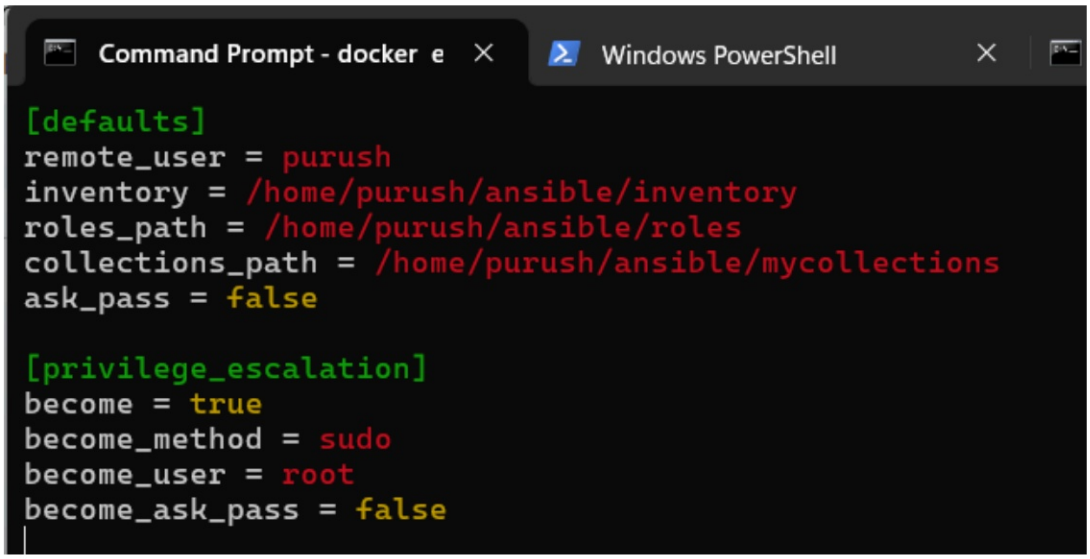
4.4 Configuration of vim editor for ansible playbooks in container Inventory file

```
vim /home/purush/ansible/inventory
```



4.5 Create and edit ansible.conf file

```
vim ansible.conf
```



4. 6 Configure/etc/sudoers : put user managed nodes users of centos, ubuntu

On centos->

```
##
## Allow root to run any commands anywhere
root    ALL=(ALL)       ALL
purush  ALL=(ALL)       ALL
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS

## Allows people in group wheel to run all commands
wheel   ALL=(ALL)       ALL

## Same thing without a password
 %wheel ALL=(ALL)       NOPASSWD: ALL
```

//similarly we are doing on ubuntu server

4.7 Connectivity of nodes : ansible playbook -m ping

```
b472c5b29ddd:~/ansible$ ansible all -m ping
[DEPRECATION WARNING]: Distribution centos 9 on host 192.168.118.134 should use
/usr/libexec/platform-python, but is using /usr/bin/python for backward
compatibility with prior Ansible releases. A future Ansible release will default
to using the discovered platform python for this host. See https://docs.ansible.co
m/ansible/2.9/reference_appendices/interpreter_discovery.html for more
information. This feature will be removed in version 2.12. Deprecation warnings
can be disabled by setting deprecation_warnings=False in ansible.cfg.
192.168.118.134 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python"
    },
    "changed": false,
    "ping": "pong"
}
192.168.118.135 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
b472c5b29ddd:~/ansible$
```

5. Playbook's writing and Running on managed node's

We have installed git bash on alpinelinux docker container. And we have cloned the repository github. And successfully done connectivity local and remote repo to commit the changes.

So our playbook directory is **/home/purush/ansible/ansible-usecase-automation/Playbooks** and in it we are writing the playbooks.

5.1 FetchCurrTimeAnsible.yml

```yaml
---
- name: Fetch current time using Ansible facts
  hosts: all
  gather_facts: yes
```

```
  tasks:
    - name: Display current time
      debug:
        msg: "Current time on {{ ansible_hostname }} is {{
ansible_date_time.date }} {{ ansible_date_time.time }}"
```

Running the play:

```
/home/purush/ansible # ansible-playbook Ansible-usecase-automation/Playbooks/FetchcurrTimeAnsibleFacts.yml

PLAY [Fetch current time using Ansible facts] **********************************************************************

TASK [Gathering Facts] *********************************************************************************************
[DEPRECATION WARNING]: Distribution centos 9 on host 192.168.118.134 should use /usr/libexec/platform-python, but is using
/usr/bin/python for backward compatibility with prior Ansible releases. A future Ansible release will default to using the
discovered platform python for this host. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html
 for more information. This feature will be removed in version 2.12. Deprecation warnings can be disabled by setting
deprecation_warnings=False in ansible.cfg.
ok: [192.168.118.134]

TASK [Display current time] ****************************************************************************************
ok: [192.168.118.134] => {
    "msg": "Current time on centosVM is 2024-06-29 14:14:45"
}
```

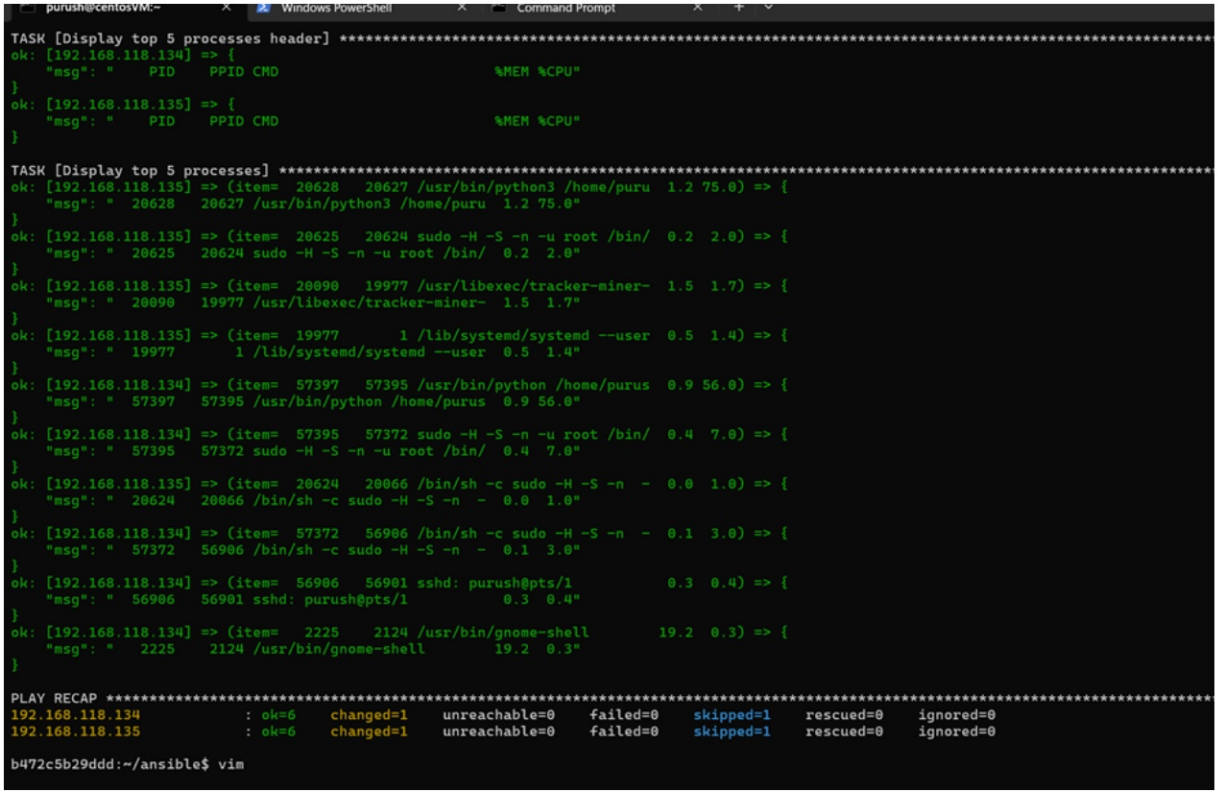
5.2 createlser.yml

```
---
- name: Create a new user and set password
  hosts: all
  become: yes

  vars:
    newuser_password: 2001

  tasks:
    - name: Create the new user
      user:
        name: newuser
        password: "{{ newuser_password }}"
        state: present
        shell: /bin/bash
```

5.3 Top5cpu.yml

```yaml
---
- name: Fetch top 5 running processes by CPU usage
  hosts: all
  gather_facts: yes
  tasks:
    - name: Ensure procps package is installed (CentOS)
      yum:
        name: procps-ng
        state: present
      when: ansible_facts['os_family'] == "RedHat"

    - name: Ensure procps package is installed (Ubuntu)
      apt:
        name: procps
        state: present
        update_cache: yes
      when: ansible_facts['os_family'] == "Debian"

    - name: Fetch top 5 processes by CPU usage
      shell: "ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%cpu | head -n 6"
      register: top_processes

    - name: Split top processes output into lines
      set_fact:
        top_processes_lines: "{{ top_processes.stdout.split('\n') }}"

    - name: Display top 5 processes for each host
      block:
        - name: Display host information
          debug:
            msg: "Top 5 processes for host: {{ inventory_hostname }}"

        - name: Display header line
          debug:
            msg: "{{ top_processes_lines[0] }}"

        - name: Display each process line
          debug:
            msg: "Process {{ item.0 }}: PID={{ item.1.split()[0] }}, PPID={{
item.1.split()[1] }}, CMD={{ ' '.join(item.1.split()[2:-2]) }}, RAM used={{
item.1.split()[-2] }}%, CPU used={{ item.1.split()[-1] }}%"
          with_indexed_items: "{{ top_processes_lines[1:] }}"
          when: item.1 != ""
```

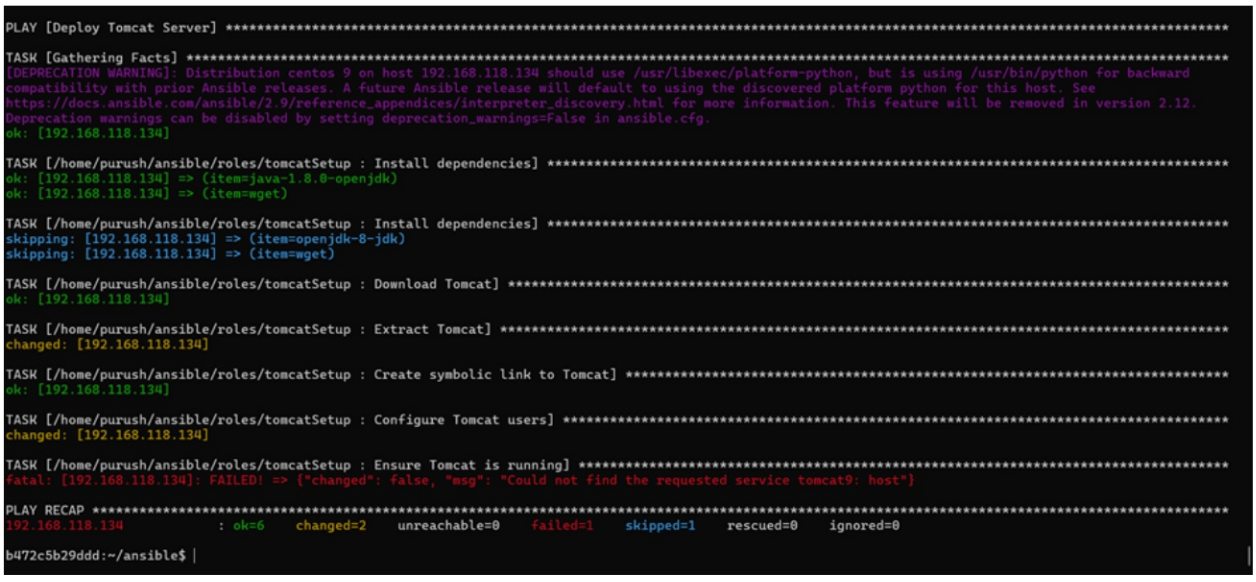
Output : top5.yml



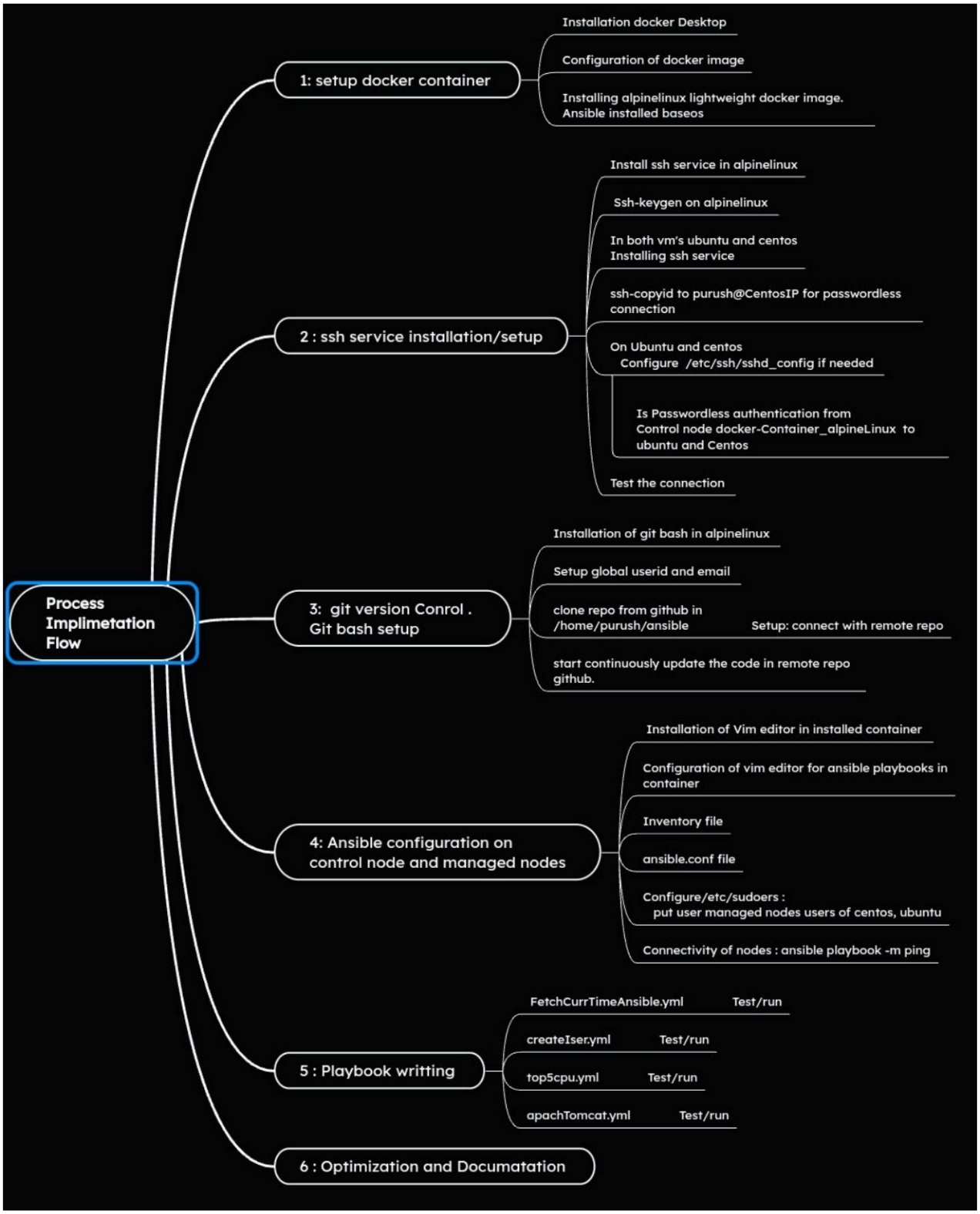
5.4 apache Tomcat installation by creating a role

```
ansible-galaxy init tomcatSetup
```

Causing some errors:



Implemented Process Flow :



References :

1. https://www.digitalocean.com/community/tutorials/how-to-configure-ssh-key-based-authentication-on-a-linux-server
2. https://www.geeksforgeeks.org/how-to-install-tomcat-using-ansible-playbook/
3. https://forum.ansible.com/t/ansible-engine-what-is-it-exactly/912/7
4. https://www.baeldung.com/tomcat#:~:text=Simply%20put%2C%20Apache%20Tomcat%20is,and%20serve%20Java%20web%20applications.