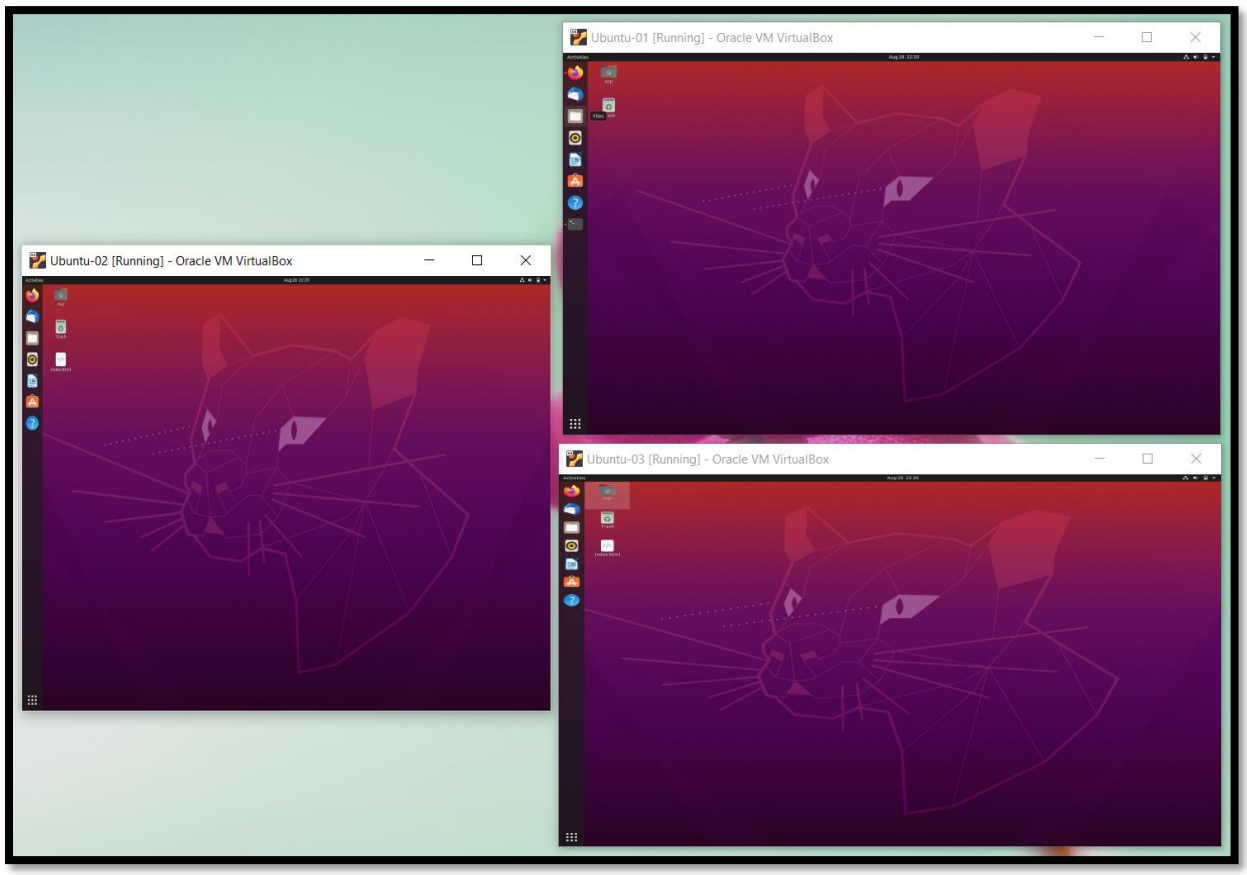
**Assignment 01 – Ansible**

- Deploy three (3) Virtual Machines
- Configure Ansible server on ***VM 1*** to deploy a webserver *to* ***VM2*** and ***VM3*** on port 8080 that displays the message: "Hello World from SJSU"
- Include in the Ansible playbook, plays to **deploy** and **un-deploy** all the webserver resources
- Due 9/12 (Sunday) at 11:59PM
- Submit a Word document via Canvas, with screenshots showing your work, and all ansible code/scripts via GitHub.

**Source-Code for assignment is at GitHub repo:**
https://github.com/poojashreeNS/Assignments/tree/main/HW%231_Ansible/HW%231_By_Pooja

## Deploy three (3) Virtual Machines:

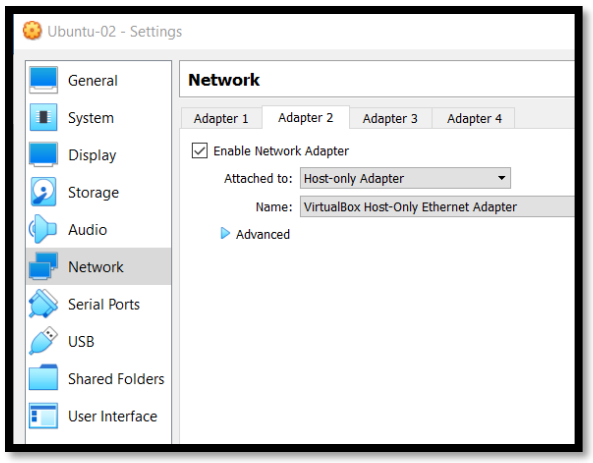
Deployed 3 virtual machines using Oracle VirtualBox. Ubuntu-01, Ubuntu-02 and Ubuntu-03 (each having 4MB RAM and 10GB ROM).

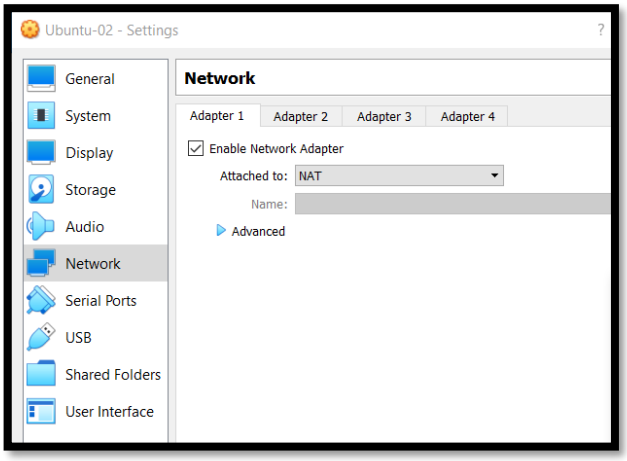



## Assigning Static IP's for Virtual Machines:

Using the article, I have assigned IPs to all the virtual as follows:

192.168.56.102, 192.168.56.103 and 192.168.56.104



**SSH Generation:**

Generate SSH key on the controller machine and copy them to the webserver machines.

**Commands-**

*To generate secret key: ssh-keygen -t rsa -b 4096*

*To copy to the server machines: ssh-copy-id username@server_name*

```
nsp@nsp-Host:~/Documents/Ansible$ ssh-keygen -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (/home/nsp/.ssh/id_rsa):
Created directory '/home/nsp/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/nsp/.ssh/id_rsa
Your public key has been saved in /home/nsp/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:QNiDor+RStLkKerjp7o0PEYk/DyJpm2FP6W/UfDhqrg nsp@nsp-Host
The key's randomart image is:
+---[RSA 4096]----+
|     +.          |
|. . o.o          |
|.+ .  o..        |
|+ =..  = .       |
| O.B. . S        |
|BoBo.o o         |
|=Ooo+ o          |
|=o+o + .         |
|*=E.. o.         |
+----[SHA256]-----+
nsp@nsp-Host:~/Documents/Ansible$
```

```
nsp@nsp-Host:~/Documents/Ansible$ ssh-copy-id nsp@nsp-Slave1
The authenticity of host 'nsp-slave1 (192.168.56.103)' can't be established.
ECDSA key fingerprint is SHA256:Sr2cq8ULWMeu4zbiN/dvFz6XoZdHlKS6lsX3jbw+/DM.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
nsp@nsp-slave1's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'nsp@nsp-Slave1'"
and check to make sure that only the key(s) you wanted were added.

nsp@nsp-Host:~/Documents/Ansible$ ssh-copy-id nsp@nsp-Slave2
The authenticity of host 'nsp-slave2 (192.168.56.104)' can't be established.
ECDSA key fingerprint is SHA256:b5Jt32RWVUv44yFkYnAilMxKFWFtu+XFM8J+knTcWVQ.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
nsp@nsp-slave2's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'nsp@nsp-Slave2'"
and check to make sure that only the key(s) you wanted were added.

nsp@nsp-Host:~/Documents/Ansible$
```

**Configuring Ansible on Ubuntu-01:**

Install Ansible on Controller machine (Ubuntu - 01) using command: *sudo apt install ansible*

```
nsp@nsp-Host:~/Documents/Ansible$ sudo apt install ansible
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth python3-requests-kerberos
  python3-requests-ntlm python3-selinux python3-winrm python3-xmltodict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth python3-requests-kerberos
  python3-requests-ntlm python3-selinux python3-winrm python3-xmltodict
0 upgraded, 17 newly installed, 0 to remove and 7 not upgraded.
Need to get 9,865 kB of archives.
After this operation, 92.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Upon successful installation, we can view *hosts* and *ansible.cfg* files in */etc/ansible*. Edit the hosts and add the required webserver machine details such as IP address and hostnames along with the domain name. Run the following command to check the inventory: *ansible-inventory –list -y*.

```
nsp@nsp-Host:/etc/ansible$ ansible-inventory --list -y
all:
  children:
    ungrouped: {}
    webServers:
      hosts:
        server1:
          ansible_host: 192.168.56.103
          ansible_python_interpreter: /usr/bin/python3
        server2:
          ansible_host: 192.168.56.104
          ansible_python_interpreter: /usr/bin/python3
nsp@nsp-Host:/etc/ansible$
```

Once the inventory has the required servers, perform test connection between the control machine and the webservers using the following command:

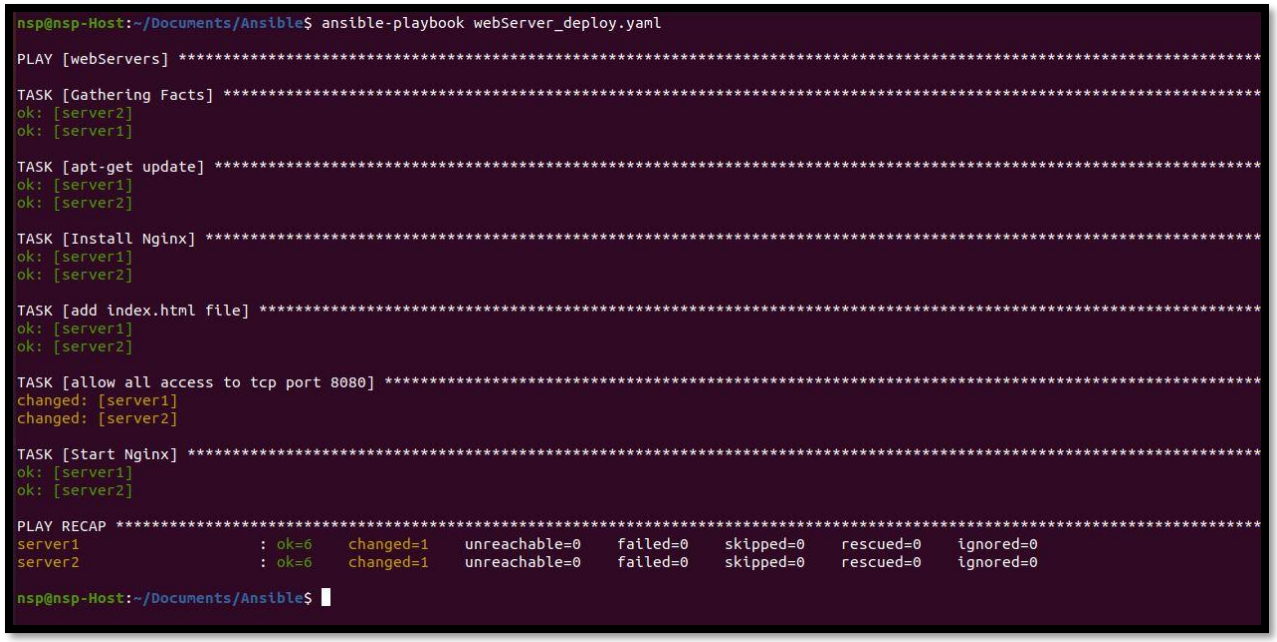
*ansible all -m ping -u <USER>*

```
nsp@nsp-Host:/etc/ansible$ ansible all -m ping -u nsp
server1 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
server2 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
nsp@nsp-Host:/etc/ansible$
```

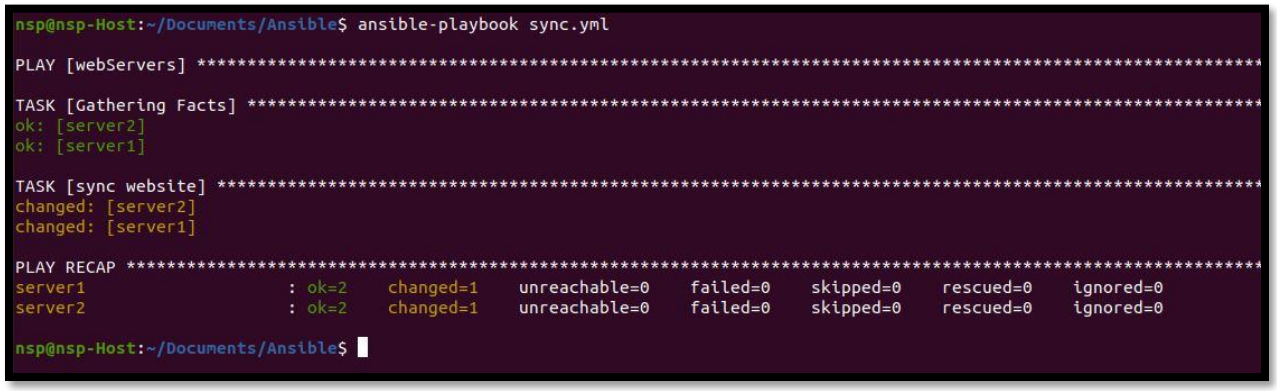
**Deploying Webserver on Ubuntu-02 and Ubuntu-03:**

Install Nginx server, enable port 8080 and launch the index.html (which contains the contents of the web page) on the webserver using webserver_deploy.yaml file upon execution all the required files present in controller machine are transferred to target machines through playbook.

**Command:** *ansible-playbook webserver_deploy. yaml*




Sync the website using sync.yaml

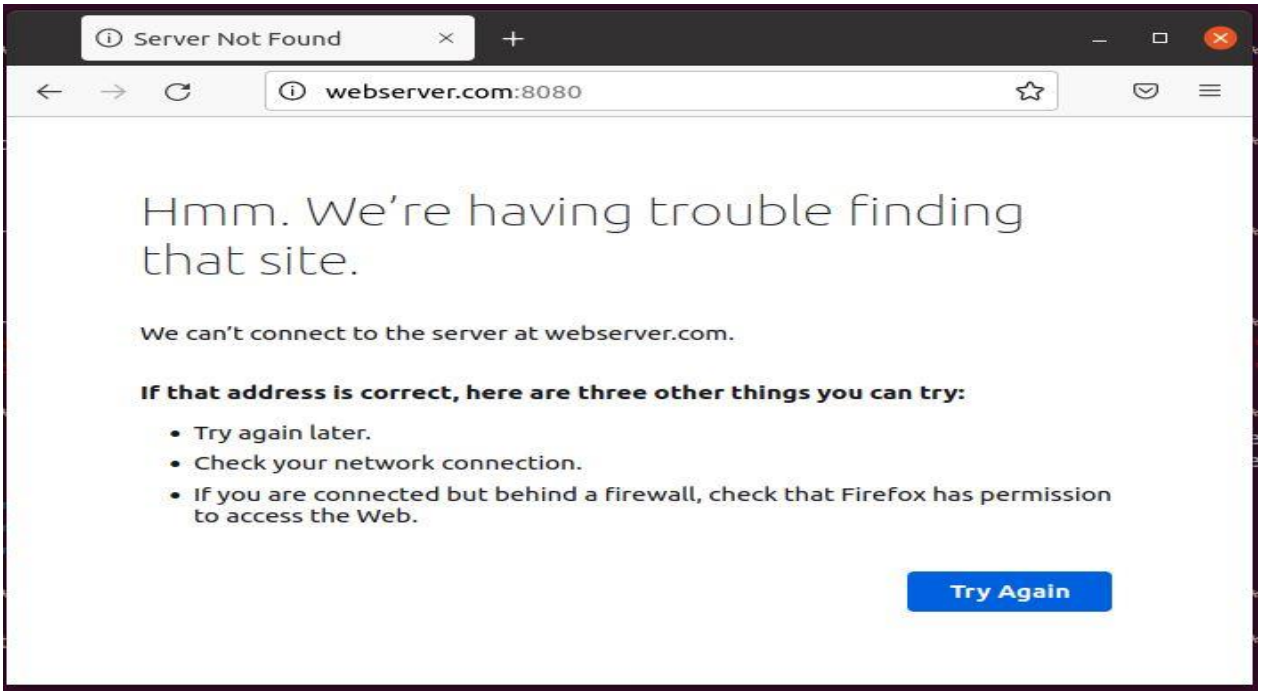



webserver.com:8080/
webserver.com:8080
Hello World from SJSU
192.168.56.103:8080/
ibreOffice Writer
192.168.56.103:8080
Hello World from SJSU
192.168.56.104:8080/
192.168.56.104:8080
Hello World from SJSU

## Un-deploying webserver from VMs:

Upon execution of webserver_undeploy.yaml script all the files copied from the controller machine will be removed, it also stops and uninstalls the Nginx service.

```
nsp@nsp-Host:~/Documents/Ansible$ vim webServer_undeploy.yaml
nsp@nsp-Host:~/Documents/Ansible$ ansible-playbook webServer_undeploy.yaml

PLAY [webServers] ***************************************************************************************************************************************************

TASK [Gathering Facts] **********************************************************************************************************************************************
ok: [server1]
ok: [server2]

TASK [Stop nginx] ***************************************************************************************************************************************************
ok: [server2]
ok: [server1]

TASK [Delete site.conf.j2] ******************************************************************************************************************************************
ok: [server1]
ok: [server2]

TASK [Delete www directory] ******************************************************************************************************************************************
ok: [server1]
ok: [server2]

TASK [Delete index.html file] ***************************************************************************************************************************************
changed: [server1]
changed: [server2]

TASK [Uninstall Nginx] **********************************************************************************************************************************************
changed: [server1]
changed: [server2]

TASK [allow all access to tcp port 8080] ****************************************************************************************************************************
changed: [server2]
changed: [server1]

TASK [Restart firewall] *********************************************************************************************************************************************
changed: [server1]
changed: [server2]

PLAY RECAP **********************************************************************************************************************************************************
server1                    : ok=8    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
server2                    : ok=8    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

nsp@nsp-Host:~/Documents/Ansible$
```



**References:**

https://www.digitalocean.com/community/tutorials/how-to-install-and-configure-ansible-on-ubuntu-18-04

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

https://marcus.4christies.com/2019/01/how-to-create-a-virtualbox-vm-with-a-static-ip-and-internet-access/