Finals Hands-On Exam	
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CPE 212 - CPE31S2	**Engr. Robin Valenzuela**

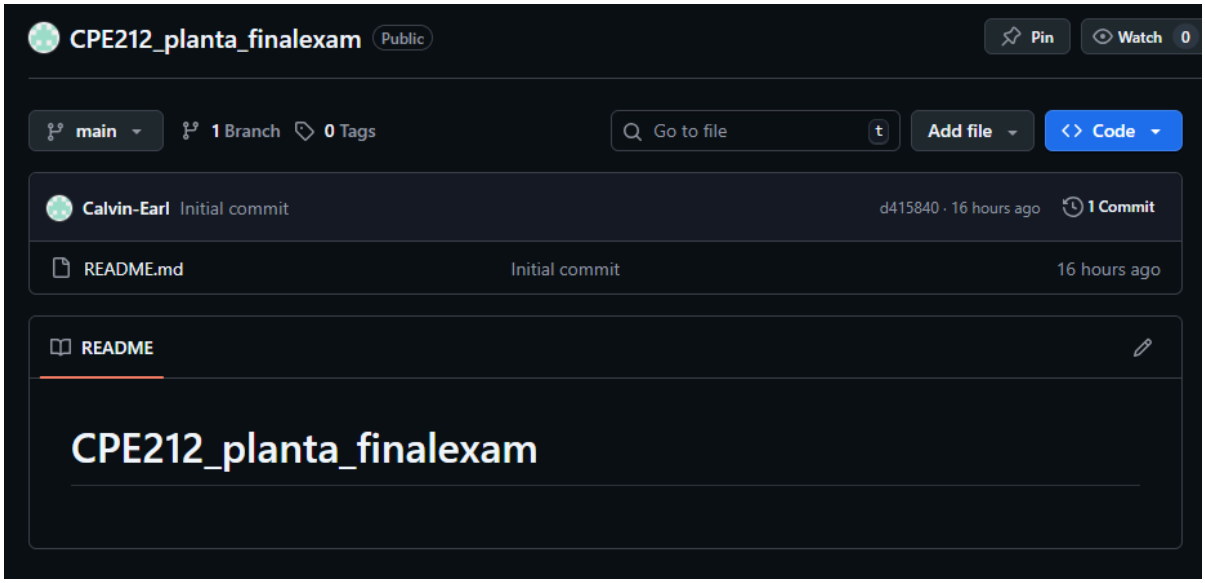
Tools Needed:

1. VM with Ubuntu, CentOS and Ansible installed

2. Web browser

Procedure and Output:

1. Create a repository and label it as "Final_Exam_Surname"



2. Clone your new repository in your VM

```
vbearl@workstation:~$ git clone git@github.com:Calvin-Earl/CPE212planta_finalexam.git
```

3. Create an Ansible playbook that does the following with an input of a config.yaml file and structure inventory file.

ansible.cfg

ansible.cfg U | inventory.yaml U | main.yml ubuntu/... U

ansible.cfg

```
1  [defaults]
2  inventory= inventory.yaml
3  private_key_file= ~/.ssh/ansible
```

inventory.yaml

ansible.cfg U | inventory.yaml U | main.yml ubuntu/... U

inventory.yaml

```
1   [workstations]
2   192.168.56.108
3
4   [ubuntu]
5   192.168.56.107 ansible_user=vbearl
6   192.168.56.108 ansible_user=vbearl
7
8   [centos]
9   192.168.56.117 ansible_user=vbearl
```

3.1 Install and configure one enterprise service that can be installed in Debian and Centos servers

ubuntu/tasks/main.yml

main.yml ubuntu/... U | install_motd.yml U | README.md | main.yml cent

ubuntu > tasks > main.yml

```
1   ---
2   - name: install enterprise tool (apache2, libapache2-mod-php)
3     apt:
4       name:
5         - apache2
6         - libapache2-mod-php
7       state: present
8     when: ansible_os_family == "Debian"
```

```
16    - name: start enterprise tool
17      service:
18        name: apache2
19        state: started
20        enabled: true
21      when: ansible_os_family == "Debian"
```

I chose apache2 as the enterprise tool to be installed in my Debian server. To install, the package names are “apache2” and its php support is called “libapache2-mod-php”. To ensure that this task only runs on Debian servers, I specified the OS family to be targeted to “Debian”.

centos/tasks/main.yml

```
1   ---
2   - name: install enterprise tool (httpd, php)
3     yum:
4       name:
5         - httpd
6         - php
7       state: present
8     when: ansible_os_family == "RedHat"
```

```
30  - name: start enterprise tool
31    service:
32      name: httpd
33      state: started
34      enabled: true
35    when: ansible_os_family == "RedHat"
```

I chose httpd (same as apache2 in Ubuntu) as the enterprise tool to be installed in my RedHat server. To install, the package names are “httpd” and its php support is called “php”. To ensure that this task only runs on RedHat servers, I specified the OS family to be targeted to “RedHat”.

3.2 Install and configure one monitoring tool that can be installed in Debian and Centos servers (if it is a stack there should be option of different host)

ubuntu/tasks/main.yml

```
10  - name: install monitoring tool (nagios4)
11    apt:
12      name: nagios4
13      state: present
14    when: ansible_os_family == "Debian"
```

```
23  - name: start monitoring tool
24    service:
25      name: nagios4
26      state: started
27      enabled: true
28    when: ansible_os_family == "Debian"
```

I chose Nagios4 for the monitoring tool to be installed in my Debian server. For installation, the package name is called “nagios4”, which is available in the system’s default repository index. No additional configurations are needed upon installation, so the last thing to do is to simply enable and start the service.

centos/tasks/main.yml

```
10  - name: enable epel repository
11    yum:
12      name: epel-release
13      state: present
14    when: ansible_os_family == "RedHat"
15
16  - name: install nagios and necessary plugins
17    yum:
18      name:
19        - nagios
20        - nagios-plugins
21        - nagios-plugins-disk
22        - nagios-plugins-http
23        - nagios-plugins-load
24        - nagios-plugins-ping
25        - nagios-plugins-procs
26        - nagios-plugins-users
27      state: latest
28    when: ansible_os_family == "RedHat"
```

```
37  - name: start monitoring tool
38    service:
39      name: nagios
40      state: started
41      enabled: true
42    when: ansible_os_family == "RedHat"
```

```
44  - name: create nagios group
45    tags: group, nagios, centos
46    group:
47      name: nagios
48      state: present
49
50  - name: add current user to the nagios group
51    tags: user, nagios, centos
52    user:
53      name: vbearl
54      groups: nagios
55      append: yes
56
57  - name: configure nagios login
58    command: sudo htpasswd -bc /etc/nagios/passwd vbearl 123123
```

I chose to install Nagios for the monitoring tool to be installed in my RedHat server. To install, its repository is needed to be imported, in order for the package to be identified by the system. Next is to install the package itself along with its necessary plugins, which are as shown above. After installing, we need to create a group for the configuration of the monitoring tool. Lastly, we need to create a login in order to access the Nagios homepage.

4.4 Change Motd as "Ansible Managed by <username>"

ubuntu/tasks/main.yml

```
30  - name: set MOTD
31    copy:
32      content: "Ansible Managed by {{ ansible_user }}"
33      dest: /etc/motd
34      owner: root
35      group: root
36      mode: 0644
```

This is the MOTD that I set in my Debian server, which reads “Ansible Managed by” following the ansible username that I inputted in my inventory file. This message can be read by either viewing the contents of /etc/motd or logging in to the server via SSH.

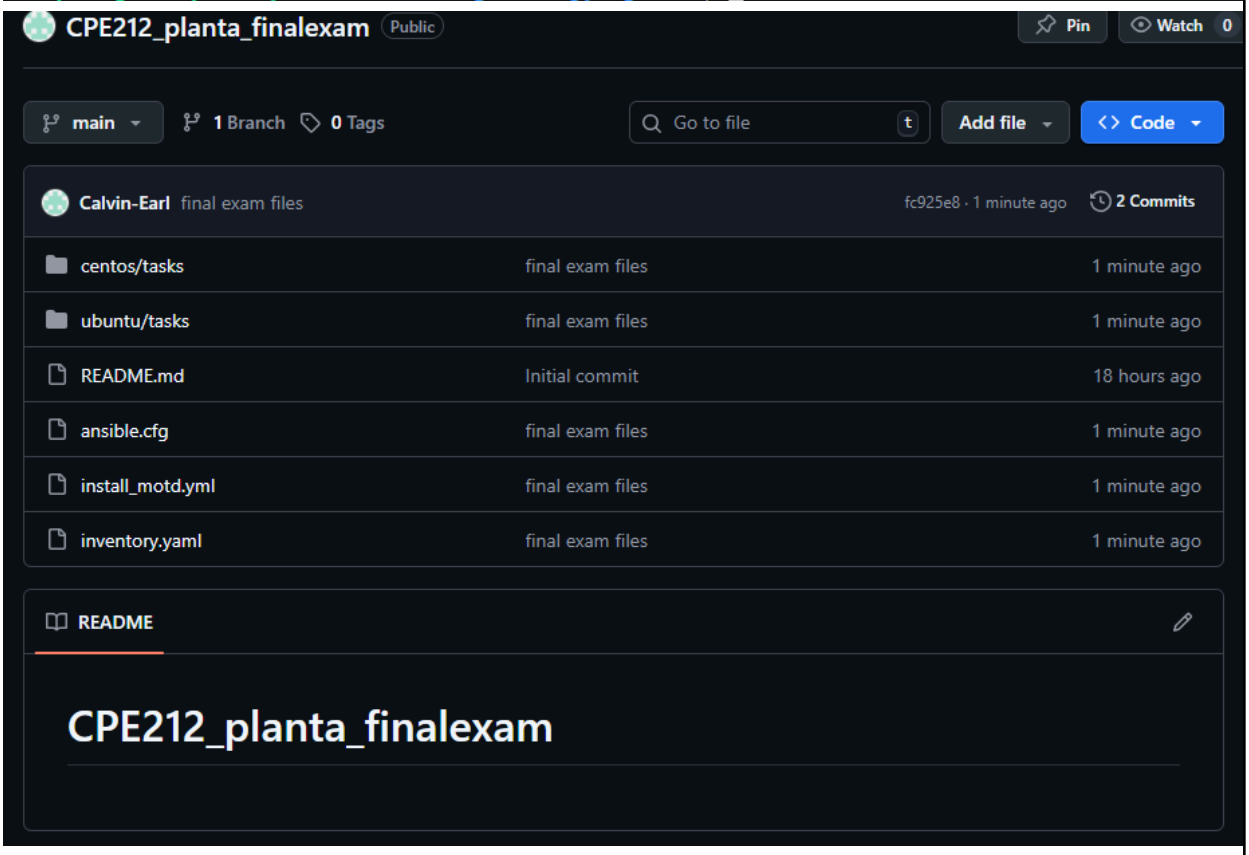
centos/tasks/main.yml

```
60  - name: set MOTD
61    copy:
62      content: "Ansible Managed by {{ ansible_user }}"
63      dest: /etc/MOTD
64      owner: root
65      group: root
66      mode: 0644
```

This is the MOTD that I set in my RedHat server, which reads “Ansible Managed by” following the ansible username that I inputted in my inventory file. This message can be read by either viewing the contents of /etc/motd or logging in to the server via SSH.

4. Push and commit your files in GitHub

```
vbearl@workstation:~/CPE212_planta_finalexam$ git add .
vbearl@workstation:~/CPE212_planta_finalexam$ git commit -m "final exam files"
[main fc925e8] final exam files
 5 files changed, 124 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 centos/tasks/main.yml
 create mode 100644 install_motd.yml
 create mode 100644 inventory.yaml
 create mode 100644 ubuntu/tasks/main.yml
vbearl@workstation:~/CPE212_planta_finalexam$ git push origin main
Enumerating objects: 12, done.
Counting objects: 100% (12/12), done.
Delta compression using up to 5 threads
Compressing objects: 100% (7/7), done.
Writing objects: 100% (11/11), 1.39 KiB | 1.39 MiB/s, done.
Total 11 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:Calvin-Earl/CPE212_planta_finalexam.git
   d415840..fc925e8  main -> main
```



5. Make sure to show evidence of input (codes) process (codes successfully running) and output (evidence of installation)

INPUT

ubuntu/tasks/main.yml

```yaml
---
- name: install enterprise tool (apache2, libapache2-mod-php)
  apt:
    name:
      - apache2
      - libapache2-mod-php
    state: present
  when: ansible_os_family == "Debian"

- name: install monitoring tool (nagios4)
  apt:
    name: nagios4
    state: present
  when: ansible_os_family == "Debian"

- name: start enterprise tool
  service:
    name: apache2
    state: started
    enabled: true
  when: ansible_os_family == "Debian"

- name: start monitoring tool
  service:
    name: nagios4
    state: started
    enabled: true
  when: ansible_os_family == "Debian"

- name: set MOTD
  copy:
    content: "Ansible Managed by {{ ansible_user }}"
    dest: /etc/motd
    owner: root
    group: root
    mode: 0644
```

centos/tasks/main.yml

centos > tasks > ! main.yml

```yaml
---
- name: install enterprise tool (httpd, php)
  yum:
    name:
      - httpd
      - php
    state: present
  when: ansible_os_family == "RedHat"

- name: enable epel repository
  yum:
    name: epel-release
    state: present
  when: ansible_os_family == "RedHat"

- name: install nagios and necessary plugins
  yum:
    name:
      - nagios
      - nagios-plugins
      - nagios-plugins-disk
      - nagios-plugins-http
      - nagios-plugins-load
      - nagios-plugins-ping
      - nagios-plugins-procs
      - nagios-plugins-users
    state: latest
  when: ansible_os_family == "RedHat"
```

```
30  - name: start enterprise tool
31    service:
32      name: httpd
33      state: started
34      enabled: true
35    when: ansible_os_family == "RedHat"
36
37  - name: start monitoring tool
38    service:
39      name: nagios
40      state: started
41      enabled: true
42    when: ansible_os_family == "RedHat"
43
44  - name: create nagios group
45    tags: group, nagios, centos
46    group:
47      name: nagios
48      state: present
49
50  - name: add current user to the nagios group
51    tags: user, nagios, centos
52    user:
53      name: vbearl
54      groups: nagios
55      append: yes
```

```
57  - name: configure nagios login
58    command: sudo htpasswd -bc /etc/nagios/passwd vbearl 123123
59
60  - name: set MOTD
61    copy:
62      content: "Ansible Managed by {{ ansible_user }}"
63      dest: /etc/MOTD
64      owner: root
65      group: root
66      mode: 0644
```

install_motd.yml

install_motd.yml

```yaml
---
- hosts: ubuntu
  become: true
  roles:
    - ubuntu

- hosts: centos
  become: true
  roles:
    - centos
```

This is the main yml file to be run. This playbook will call the roles and it will run the tasks written in the main.yml files in their respective directories.

PROCESS

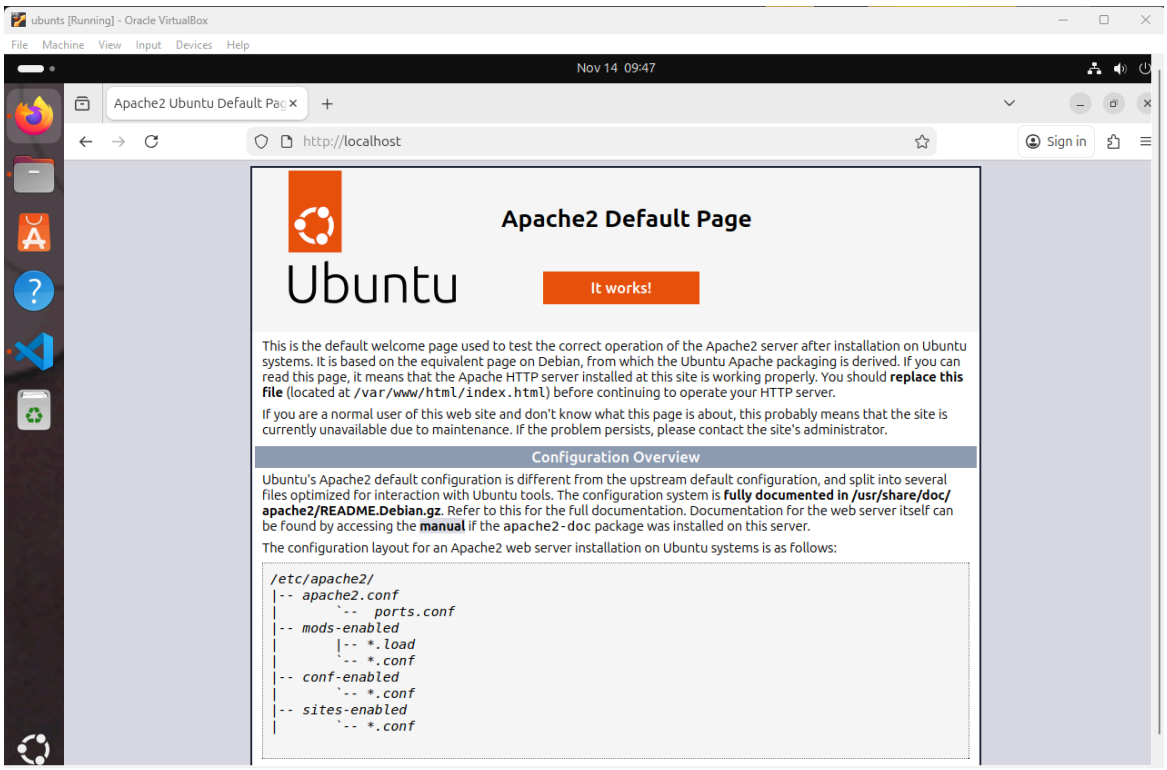
```
vbearl@workstation:~/CPE212_planta_finalexam$ ansible-playbook install_motd.yml -K
BECOME password:

PLAY [ubuntu] ******************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.108]
ok: [192.168.56.107]

TASK [ubuntu : install enterprise tool (apache2, libapache2-mod-php)] **********
ok: [192.168.56.108]
ok: [192.168.56.107]

TASK [ubuntu : install monitoring tool (nagios4)] ******************************
ok: [192.168.56.108]
ok: [192.168.56.107]

TASK [ubuntu : start enterprise tool] ******************************************
ok: [192.168.56.108]
ok: [192.168.56.107]

TASK [ubuntu : start monitoring tool] ******************************************
ok: [192.168.56.108]
ok: [192.168.56.107]

TASK [ubuntu : set MOTD] *******************************************************
changed: [192.168.56.108]
changed: [192.168.56.107]
```

```
PLAY [centos] ******************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.117]

TASK [centos : install enterprise tool (httpd, php)] ***************************
ok: [192.168.56.117]

TASK [centos : enable epel repository] *****************************************
ok: [192.168.56.117]

TASK [centos : install nagios and necessary plugins] ***************************
ok: [192.168.56.117]

TASK [centos : start enterprise tool] ******************************************
ok: [192.168.56.117]

TASK [centos : start monitoring tool] ******************************************
ok: [192.168.56.117]

TASK [centos : create nagios group] ********************************************
ok: [192.168.56.117]

TASK [centos : add current user to the nagios group] ***************************
ok: [192.168.56.117]

TASK [centos : configure nagios login] *****************************************
changed: [192.168.56.117]

TASK [centos : set MOTD] *******************************************************
changed: [192.168.56.117]
```

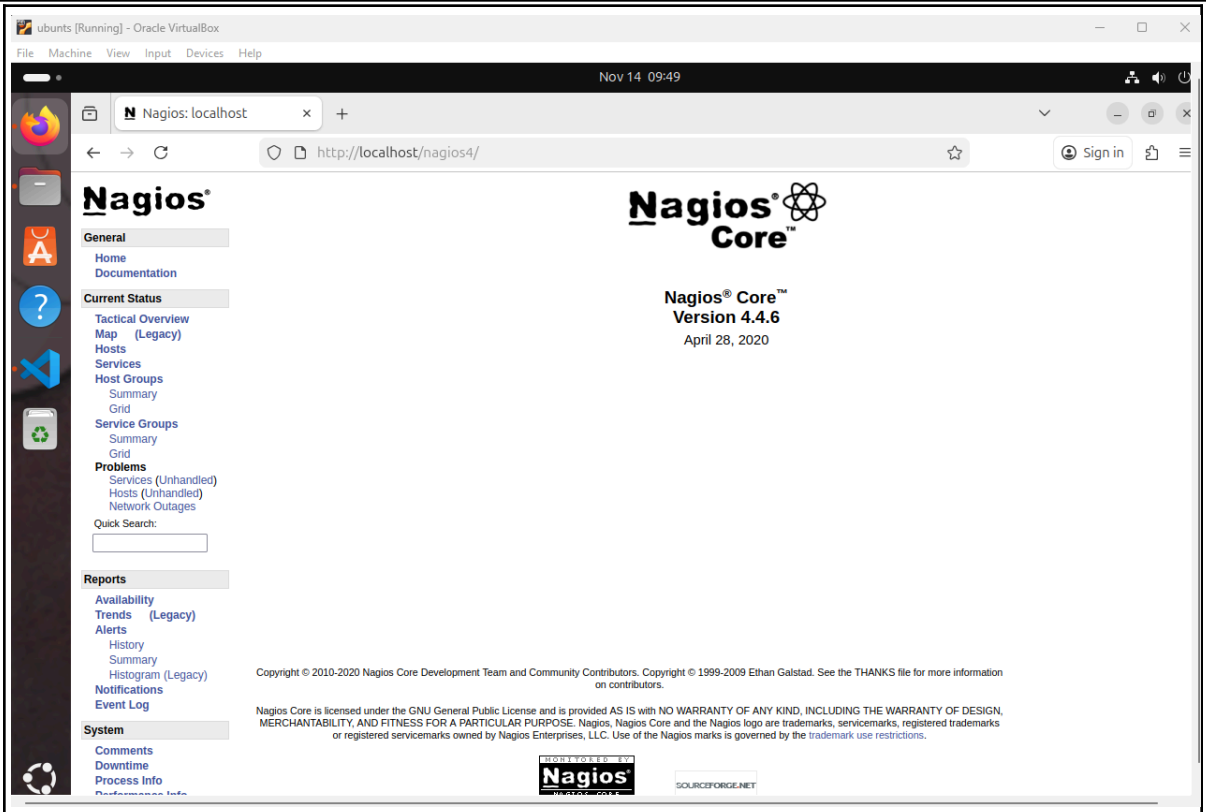
```
PLAY RECAP *********************************************************************
192.168.56.107             : ok=6    changed=1    unreachable=0    failed=0    ski
pped=0    rescued=0    ignored=0
192.168.56.108             : ok=6    changed=1    unreachable=0    failed=0    ski
pped=0    rescued=0    ignored=0
192.168.56.117             : ok=10   changed=2    unreachable=0    failed=0    ski
pped=0    rescued=0    ignored=0
```

OUTPUT

Debian Server



When inputting your IP address (or “localhost”) in the browser search bar, it redirects you to the Apache2 default page, confirming that the enterprise tool has been successfully installed and configured in my Debian server.

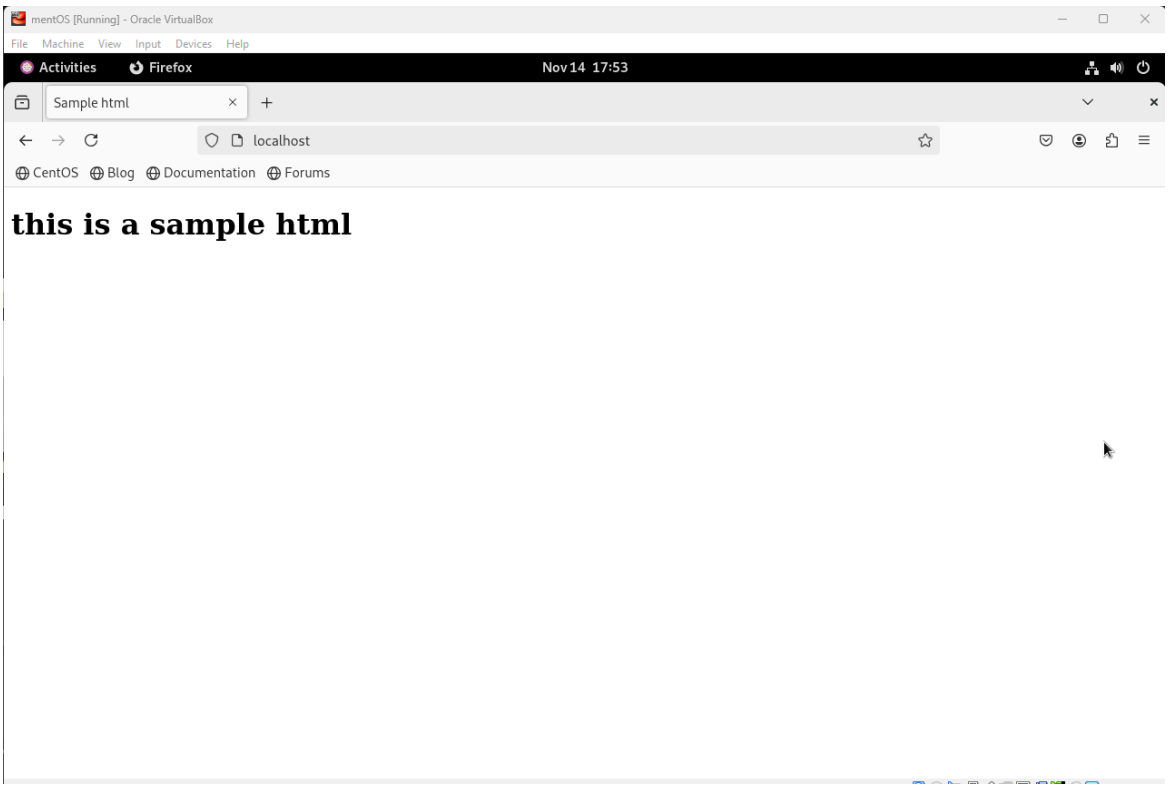


When inputting “localhost/nagios4/” in the browser search bar, it takes you to the Nagios4 homepage, confirming that the monitoring tool has been successfully installed and configured correctly in my Debian server.

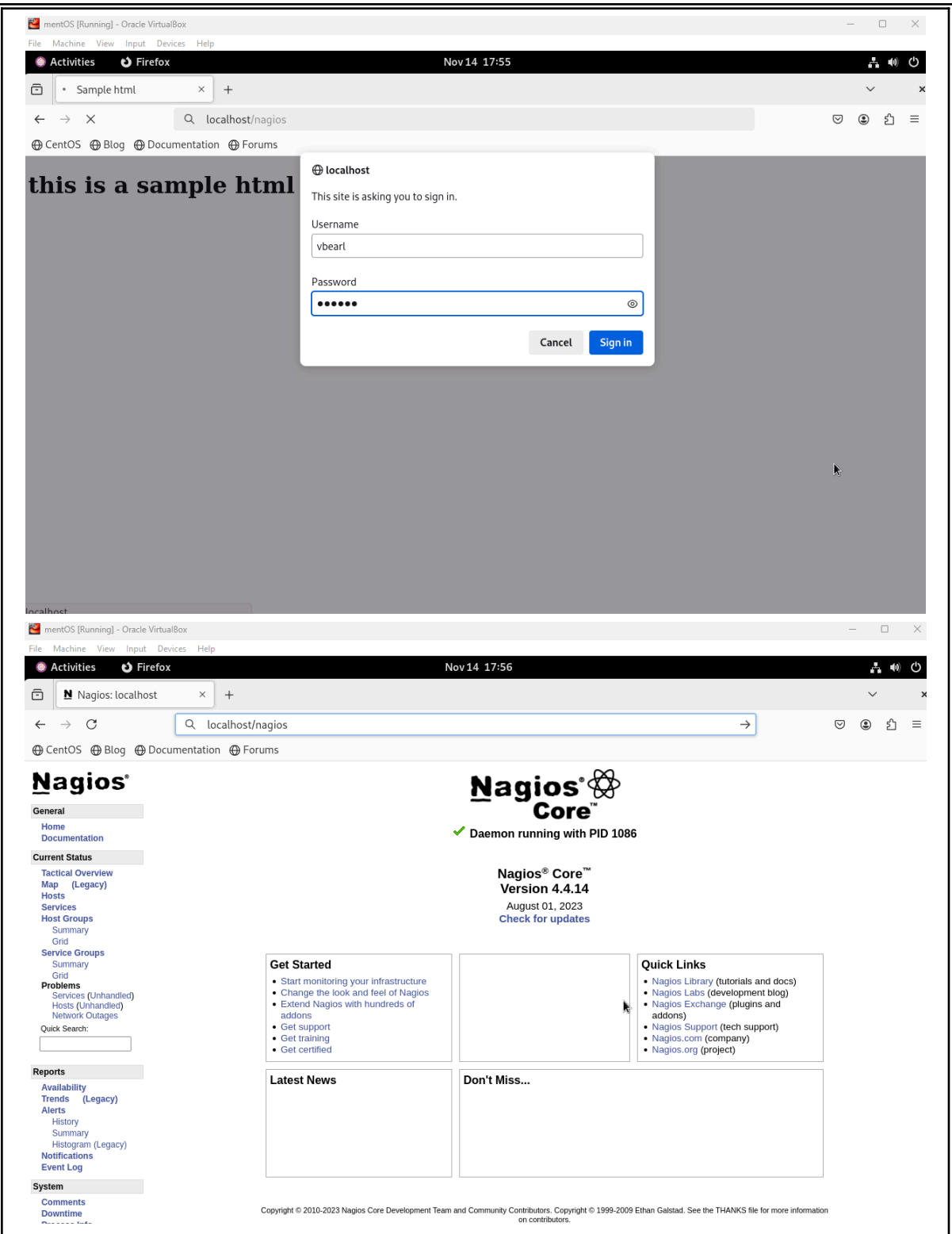
```
vbearl@workstation:~/CPE212_planta_finalexam$ ssh vbearl@server1

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

1 additional security update can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

*** System restart required ***
Ansible Managed by vbearl
Last login: Fri Nov 14 09:20:13 2025 from 192.168.56.108
```

When I tried to SSH to my Ubuntu Server, a message appeared that read “Ansible Managed by vbearl”. This is the MOTD that I had created and copied into /etc/motd.

RedHat server



When I entered “localhost” into the browser search bar, It redirected me to this website, which is the httpd default page. In my previous lab activities, I had customized the default page for httpd in CentOS to this, which explains why this text showed up instead of the apache2 homepage. Nevertheless, this confirms that the enterprise tool has been successfully installed and configured correctly in my RedHat server.



When I entered “localhost/nagios” into the browser search bar, it prompted for a login before redirecting to the site. After I entered my login credentials which I had previously set in my ansible playbook, it took me to the Nagios homepage. This confirms that the monitoring tool has been successfully installed and configured correctly in my RedHat server.

```
vbearl@workstation:~/CPE212_planta_finalexam$ ssh vbearl@centOS
Ansible Managed by vbearl
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Nov 14 18:07:28 2025 from 192.168.56.108
```

When I tried to SSH to my Ubuntu Server, a message appeared that read “Ansible Managed by vbearl”. This is the MOTD that I had created and copied into /etc/motd.

5. For your final exam to be counted, please paste your repository link as an answer in this exam.

https://github.com/Calvin-Earl/CPE212_planta_finalexam

Note: Extra points if you will implement the said services via containerization.