

Hands-on Final Exam

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Course/Section: CPE31S2	Date Submitted: December 4, 2024
Instructor: Sir Robin Valenzuela	Semester and SY: 2nd Sem, 2024-2025

Tools Needed:

1. VM with Ubuntu, CentOS and Ansible installed
2. Web browser

Procedure:

1. Create a repository and label it as "Final_Exam_Surname"
2. Clone your new repository in your VM
3. Create an Ansible playbook that does the following with an input of a config.yaml file and structure inventory file.
 - 3.1 Install and configure one enterprise service that can be installed in Debian and Centos servers
 - 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)
 - 4.4 Change Motd as "Ansible Managed by <username>"
4. Push and commit your files in GitHub
5. Make sure to show evidence of input (codes) process (codes successfully running) and output (evidence of installation)
5. For your final exam to be counted, please paste your repository link as an answer in this exam.

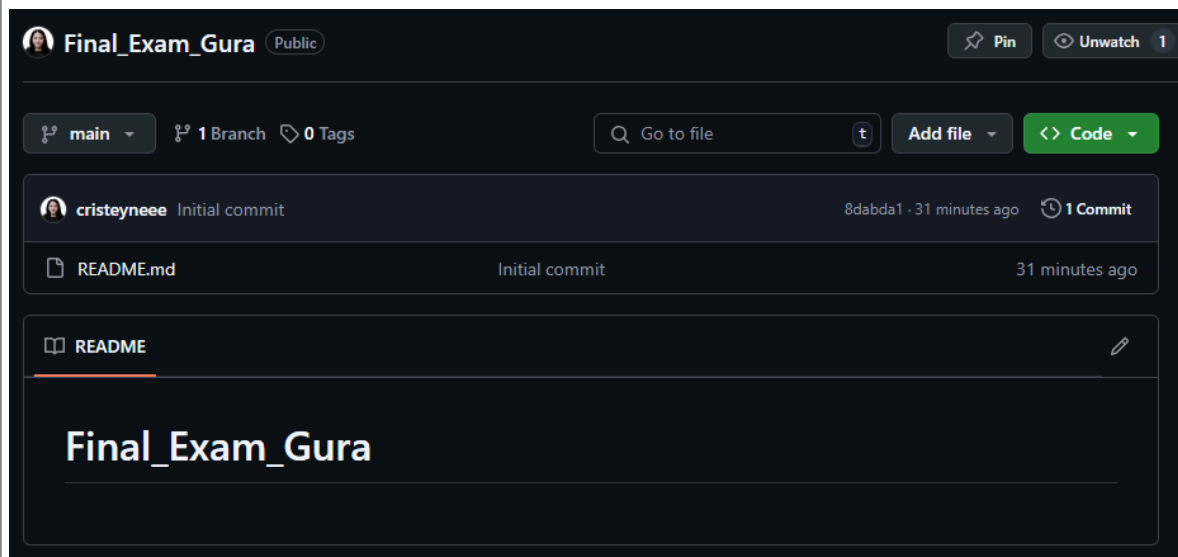
Note: Extra points if you will implement the said services via containerization.

Output:

Final_Exam_Gura

```
|— playbook.yaml
|— config.yaml
|— inventory
|— roles/
    |— common/
        |— tasks/
            |— main.yml
        |— templates/
            |— motd.j2
    |— enterprise-service/
        |— tasks/
            |— main.yml
    |— monitoring/
        |— tasks/
            |— main.yml
```

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



2. Clone your new repository in your VM

```
cristine@workstation:~$ git clone git@github.com:cristeyneee/Final_Exam_Gura.git
Cloning into 'Final_Exam_Gura'...
ssh: connect to host github.com port 22: No route to host
fatal: Could not read from remote repository.

Please make sure you have the correct access rights
and the repository exists.
cristine@workstation:~$ git clone git@github.com:cristeyneee/Final_Exam_Gura.git
Cloning into 'Final_Exam_Gura'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (3/3), done.
```

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

```
GNU nano 7.2                                playbook.yaml
--
- name: Configure servers with enterprise service and monitoring
  hosts: all
  become: true

  vars_files:
    - config.yaml

  roles:
    - role: common
    - role: enterprise_service
    - role: monitoring
```

```
GNU nano 7.2                                inventory.yaml
all:
  children:
    controller:
      hosts:
        192.168.56.114:
    compute:
      hosts:
        192.168.56.111:
        192.168.56.113:
  vars:
    ansible_user: cristine
    ansible_ssh_private_key_file: /home/cristine/.ssh/id_rsa
```

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

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)

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

common/tasks/main.yml

GNU nano 7.2

main.yml

```
--  
- name: Update package cache  
  become: yes  
  apt:  
    update_cache: true  
  when: ansible_os_family == "Debian"  
  
- name: Update package cache  
  become: yes  
  yum:  
    name: "*"   
    state: latest  
  when: ansible_os_family == "RedHat"  
  
- name: Set MOTD  
  become: yes  
  template:  
    src: motd.j2  
    dest: /etc/motd
```

enterprise_service/tasks/main.yml

GNU nano 7.2

main.yml

```
--  
- name: Install enterprise service on Debian  
  become: yes  
  apt:  
    name: "{{ enterprise_service }}"  
    state: present  
  when: ansible_os_family == "Debian"  
  
- name: Install enterprise service on CentOS  
  become: yes  
  yum:  
    name: "{{ enterprise_service }}"  
    state: present  
  when: ansible_os_family == "RedHat"  
  
- name: Start and enable enterprise service  
  become: yes  
  service:  
    name: "{{ enterprise_service }}"  
    state: started
```

```
    state: started  
    enabled: true
```

monitoring/tasks/main.yml

```
--  
- name: install prometheus  
  tags: install  
  get_url:  
    url: https://github.com/prometheus/prometheus/releases/download/v2.54.1/p>  
    dest: /tmp/prometheus.tar.gz  
  
- name: extract prometheus  
  tags: extract  
  unarchive:  
    src: /tmp/prometheus.tar.gz  
    dest: /usr/local/bin  
    remote_src: yes  
  
- name: create prometheus group  
  user:  
    name: prometheus  
    shell: /sbin/nologin  
  
- name: copy prometheus  
  copy:  
    src: /usr/local/bin/prometheus-2.54.1.linux-amd64/{{ item }}  
    dest: /usr/local/bin  
    mode: '0755'  
    remote_src: yes  
  with_items:  
    - prometheus  
    - promtool  
  
- name: create config dir prometheus  
  file:  
    path: /etc/prometheus  
    state: directory  
    owner: prometheus  
    group: prometheus  
  
- name: copy prometheus config  
  copy:  
    src: /usr/local/bin/prometheus-2.54.1.linux-amd64/prometheus.yml  
    dest: /etc/prometheus/prometheus.yml
```

```

src: /usr/local/bin/prometheus-2.54.1.linux-amd64/prometheus.yml
dest: /etc/prometheus/prometheus.yml
owner: prometheus
group: prometheus
mode: '0644'
remote_src: yes

- name: set up prometheus systemd service
  copy:
    dest: /etc/systemd/system/prometheus.service
    content: |
      [Unit]
      Description=Prometheus
      After=network.target

      [Service]
      User=Prometheus
      ExecStart=/usr/local/bin/prometheus \
        --config.file=/etc/prometheus/prometheus.yml \
        --storage.tsdb.path=/var/lib/prometheus

```

```

storage.tsdb.path=/var/lib/prometheus

Restart=always

[Install]
WantedBy=multi-user.target

- name: reload systemd and enable prometheus
  systemd:
    daemon_reload: yes
    name: prometheus
    enabled: yes
    state: started

```

monitoring/templates/main.yml

```

GNU nano 7.2                                motd.j2
{{ motd_message }}

```

4. Push and commit your files in GitHub


```

cristine@workstation:~/Final_Exam_Gura$ git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        config.yaml
        inventory.yaml
        playbook.yaml
        roles/

nothing added to commit but untracked files present (use "git add" to track)
cristine@workstation:~/Final_Exam_Gura$ git add .
cristine@workstation:~/Final_Exam_Gura$ git commit -m "done"
[main 1dc834f] done
 7 files changed, 138 insertions(+)
 create mode 100644 config.yaml
 create mode 100644 inventory.yaml
 create mode 100644 playbook.yaml
 create mode 100644 roles/common/tasks/main.yml
 create mode 100644 roles/common/templates/motd.j2
 create mode 100644 roles/enterprise_service/tasks/main.yml
 create mode 100644 roles/monitoring/tasks/main.yml

cristine@workstation:~/Final_Exam_Gura$ git push origin main
Enumerating objects: 18, done.
Counting objects: 100% (18/18), done.
Delta compression using up to 2 threads
Compressing objects: 100% (10/10), done.
Writing objects: 100% (17/17), 2.17 KiB | 445.00 KiB/s, done.
Total 17 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:cristeyneee/Final_Exam_Gura.git
   8dabda1..1dc834f  main -> main

```

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

Version and service for prometheus

```

cristine@workstation:~$ prometheus --version
prometheus, version 2.31.1 (branch: HEAD, revision: 411021ada9ab41095923b8d2df9365b632fd40c3)
 build user:      root@9419c9c2d4e0
 build date:      20211105-20:35:02
 go version:      go1.17.3
 platform:        linux/amd64

```

```
cristine@workstation:~$ sudo systemctl status prometheus.service
[sudo] password for cristine:
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: e>
   Active: active (running) since Wed 2024-11-13 09:34:01 PST; 2 weeks 6 days>
   Main PID: 1251 (prometheus)
     Tasks: 9 (limit: 8326)
    Memory: 92.9M (peak: 151.8M)
       CPU: 13.758s
    CGroup: /system.slice/prometheus.service
           └─1251 /usr/local/bin/prometheus --config.file /etc/prometheus/pro>

Dec 03 08:27:58 workstation prometheus[1251]: ts=2024-12-03T00:27:58.947Z calle>
Dec 03 08:28:13 workstation prometheus[1251]: ts=2024-12-03T00:28:13.948Z calle>
Dec 03 08:28:28 workstation prometheus[1251]: ts=2024-12-03T00:28:28.950Z calle>
Dec 03 08:28:43 workstation prometheus[1251]: ts=2024-12-03T00:28:43.948Z calle>
Dec 03 08:28:58 workstation prometheus[1251]: ts=2024-12-03T00:28:58.953Z calle>
Dec 03 08:29:13 workstation prometheus[1251]: ts=2024-12-03T00:29:13.947Z calle>
Dec 04 08:29:21 workstation prometheus[1251]: ts=2024-12-04T00:29:21.714Z calle>
Dec 04 08:29:21 workstation prometheus[1251]: ts=2024-12-04T00:29:21.730Z calle>
Dec 04 08:29:21 workstation prometheus[1251]: ts=2024-12-04T00:29:21.952Z calle>

[cristine@CENTOS7 ~]$ prometheus --version
prometheus, version 2.31.1 (branch: HEAD, revision: 411021ada9ab41095923b8d2df9365b632f
d40c3)
  build user:      root@9419c9c2d4e0
  build date:      20211105-20:35:02
  go version:      go1.17.3
  platform:        linux/amd64
```

```
cristine@Server2:~$ prometheus --version
prometheus, version 2.54.1 (branch: HEAD, revision: e6cfa720fbe6280153fab13090a483dbd40bece3)
  build user:      root@812ffd741951
  build date:      20240827-10:56:41
  go version:      go1.22.6
  platform:        linux/amd64
  tags:            netgo,builtinassets,stringlabels
```

```
cristine@Server2:~$ sudo systemctl status prometheus.service
[sudo] password for cristine:
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: e>
   Active: active (running) since Wed 2024-12-04 08:54:35 PST; 45min ago
   Main PID: 1339 (prometheus)
     Tasks: 9 (limit: 8326)
    Memory: 83.2M (peak: 86.7M)
       CPU: 2.088s
    CGroup: /system.slice/prometheus.service
            └─1339 /usr/local/bin/prometheus --config.file /etc/prometheus/pro>

Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.404Z caller=he>
Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.406Z caller=ma>
Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.406Z caller=ma>
Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.406Z caller=ma>
Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.408Z caller=ma>
Dec 04 08:54:54 Server2 prometheus[1339]: ts=2024-12-04T00:54:54.408Z caller=ma>
Dec 04 08:55:12 Server2 prometheus[1339]: ts=2024-12-04T00:55:12.861Z caller=co>
Dec 04 08:55:12 Server2 prometheus[1339]: ts=2024-12-04T00:55:12.862Z caller=he>
Dec 04 08:55:13 Server2 prometheus[1339]: ts=2024-12-04T00:55:13.107Z caller=ch>
Dec 04 08:55:13 Server2 prometheus[1339]: ts=2024-12-04T00:55:13.327Z caller=he>
lines 1-20/20 (END)
```

Motd ubuntu and centos

```
cristine@workstation:~$ ssh cristine@server2
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-49-generic x86_64)

 * 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.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your
Internet connection or proxy settings

Ansible Managed by cristine
Last login: Wed Dec  4 08:39:05 2024 from 192.168.56.114
```

```
cristine@workstation:~/Final_Exam_Gura$ ssh cristine@CENTOS7
Last login: Tue Dec  3 20:08:07 2024 from 192.168.56.114
Ansible Managed by cristine
[cristine@CENTOS7 ~]$ prometheus --version
prometheus, version 2.54.1 (branch: HEAD, revision: e6cfa720fbe6280153fab13090a483dbd40bece3)
  build user:      root@812ffd741951
  build date:      20240827-10:56:41
  go version:      go1.22.6
  platform:        linux/amd64
  tags:            netgo,builtinassets,stringlabels
[cristine@CENTOS7 ~]$ sudo systemctl status prometheus.service
[sudo] password for cristine:
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor prese
t: disabled)
   Active: active (running) since Tue 2024-12-03 18:55:16 EST; 1h 19min ago
 Main PID: 1133 (prometheus)
    Tasks: 8
   CGroup: /system.slice/prometheus.service
           └─1133 /usr/local/bin/prometheus --config.file /etc/prometheus/pro...
```

Apache2 service in ubuntu and centos

```
cristine@workstation:~/Final_Exam_Gura$ sudo service apache2 status
[sudo] password for cristine:
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset:
   Active: active (running) since Wed 2024-11-13 09:34:06 PST; 2 weeks 6 days
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1358 (apache2)
     Tasks: 7 (limit: 8326)
    Memory: 23.5M (peak: 32.9M)
       CPU: 2.079s
    CGroup: /system.slice/apache2.service
           └─ 1358 /usr/sbin/apache2 -k start
              └─ 68042 /usr/sbin/apache2 -k start
                 └─ 68044 /usr/sbin/apache2 -k start
                    └─ 68112 /usr/sbin/apache2 -k start
                       └─ 68113 /usr/sbin/apache2 -k start
                          └─ 68114 /usr/sbin/apache2 -k start
                             └─ 80586 /usr/sbin/apache2 -k start

Nov 27 10:19:00 workstation systemd[1]: Reloaded apache2.service - The Apache H
Dec 02 07:36:47 workstation systemd[1]: Reloading apache2.service - The Apache
Dec 02 07:36:47 workstation apachectl[11993]: AH00558: apache2: Could not rela
```

```
cristine@Server2:~$ sudo service apache2 status
[sudo] password for cristine:
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: >
   Active: active (running) since Wed 2024-12-04 08:54:40 PST; 37min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1603 (apache2)
    Tasks: 6 (limit: 8326)
   Memory: 22.1M (peak: 22.3M)
      CPU: 236ms
   CGroup: /system.slice/apache2.service
           └─1603 /usr/sbin/apache2 -k start
             └─1739 /usr/sbin/apache2 -k start
               └─1740 /usr/sbin/apache2 -k start
                 └─1743 /usr/sbin/apache2 -k start
                   └─1744 /usr/sbin/apache2 -k start
                     └─1747 /usr/sbin/apache2 -k start

Dec 04 08:54:36 Server2 systemd[1]: Starting apache2.service - The Apache HTTP >
Dec 04 08:54:40 Server2 apachectl[1488]: AH00558: apache2: Could not reliably d>
Dec 04 08:54:40 Server2 systemd[1]: Started apache2.service - The Apache HTTP S>
lines 1-19/19 (END)
```

```
[cristine@CENTOS7 ~]$ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2024-12-03 18:55:23 EST; 1h 38min ago
     Docs: man:httpd(8)
           man:apachectl(8)
   Main PID: 1143 (httpd)
    Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/s ec"
    Tasks: 6
   CGroup: /system.slice/httpd.service
           └─1143 /usr/sbin/httpd -DFOREGROUND
             └─1960 /usr/sbin/httpd -DFOREGROUND
               └─1961 /usr/sbin/httpd -DFOREGROUND
                 └─1962 /usr/sbin/httpd -DFOREGROUND
                   └─1963 /usr/sbin/httpd -DFOREGROUND
                     └─1964 /usr/sbin/httpd -DFOREGROUND

Dec 03 18:55:16 CENTOS7 systemd[1]: Starting The Apache HTTP Server...
Dec 03 18:55:21 CENTOS7 httpd[1143]: AH00558: httpd: Could not reliably det...ge
```

Playbook run

```
cristine@workstation:~/Final_Exam_Gura$ ansible-playbook --ask-become-pass playb  
ook.yaml  
BECOME password:
```

```
PLAY [Configure servers with enterprise service and monitoring] *****
```

```
TASK [Gathering Facts] *****
```

```
ok: [192.168.56.111]
```

```
ok: [192.168.56.114]
```

```
ok: [192.168.56.113]
```

```
TASK [common : Update package cache] *****
```

```
skipping: [192.168.56.113]
```

```
changed: [192.168.56.111]
```

```
changed: [192.168.56.114]
```

```
TASK [common : Update package cache] *****
```

```
skipping: [192.168.56.114]
```

```
skipping: [192.168.56.111]
```

```
ok: [192.168.56.113]
```

```
TASK [common : Set MOTD] *****
```

```
ok: [192.168.56.113]
```

```
ok: [192.168.56.111]
```

```
ok: [192.168.56.114]
```

```
TASK [enterprise_service : Install enterprise service on Debian] *****
```

```
skipping: [192.168.56.113]
```

```
ok: [192.168.56.111]
```

```
ok: [192.168.56.114]
```

```
TASK [enterprise_service : Install enterprise service on CentOS] *****
```

```
skipping: [192.168.56.114]
```

```
skipping: [192.168.56.111]
```

```
ok: [192.168.56.113]
```

```
TASK [enterprise_service : Start and enable enterprise service] *****
```

```
ok: [192.168.56.113]
```

```
ok: [192.168.56.111]
```

```
ok: [192.168.56.114]
```

```
TASK [monitoring : install prometheus] *****
```

```
changed: [192.168.56.111]
```

```
changed: [192.168.56.114]
```

```
changed: [192.168.56.113]
```

```
TASK [monitoring : extract prometheus] *****
```

```
changed: [192.168.56.111]
```



```
changed: [192.168.56.113]
changed: [192.168.56.114]

TASK [monitoring : create prometheus group] *****
ok: [192.168.56.114]
ok: [192.168.56.113]
ok: [192.168.56.111]

TASK [monitoring : copy prometheus] *****
changed: [192.168.56.113] => (item=prometheus)
changed: [192.168.56.113] => (item=promtool)
changed: [192.168.56.111] => (item=prometheus)
changed: [192.168.56.114] => (item=prometheus)
changed: [192.168.56.111] => (item=promtool)
changed: [192.168.56.114] => (item=promtool)

TASK [monitoring : create config dir prometheus] *****
ok: [192.168.56.111]
ok: [192.168.56.114]
ok: [192.168.56.113]

TASK [monitoring : copy prometheus config] *****
changed: [192.168.56.113]
changed: [192.168.56.114]
```

```
TASK [monitoring : copy prometheus config] *****
changed: [192.168.56.113]
changed: [192.168.56.114]
changed: [192.168.56.111]
```

```
TASK [monitoring : set up prometheus systemd service] *****
changed: [192.168.56.111]
changed: [192.168.56.113]
changed: [192.168.56.114]
```

```
TASK [monitoring : reload systemd and enable prometheus] *****
ok: [192.168.56.111]
ok: [192.168.56.113]
ok: [192.168.56.114]
```

```
PLAY RECAP *****
192.168.56.111      : ok=13   changed=6   unreachable=0    failed=0    s
kipped=2   rescued=0   ignored=0
192.168.56.113      : ok=13   changed=5   unreachable=0    failed=0    s
kipped=2   rescued=0   ignored=0
192.168.56.114      : ok=13   changed=6   unreachable=0    failed=0    s
kipped=2   rescued=0   ignored=0
```


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

[cristeyneee/Final_Exam_Gura](#)