Final Exam Hands On	
Name: Hazel Manuel	**Date Performed: 11/20**
Course/Section: CPE31S4	**Date Submitted: 11/20**
Instructor: Engr. Valenzuela	**Semester and SY: 1st**

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.
    a. Install and configure one enterprise service that can be installed in Debian and Centos servers
    b. 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. Change Motd as "Ansible Managed by <username>"
5. Push and commit your files in GitHub
6. Make sure to show evidence of input (codes) process (codes successfully running) and output (evidence of installation)
7. 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

Figure 1
Creating a New Repository in Github

https://github.com/bluberi-obsessed/Final_Exam_Manuel.git

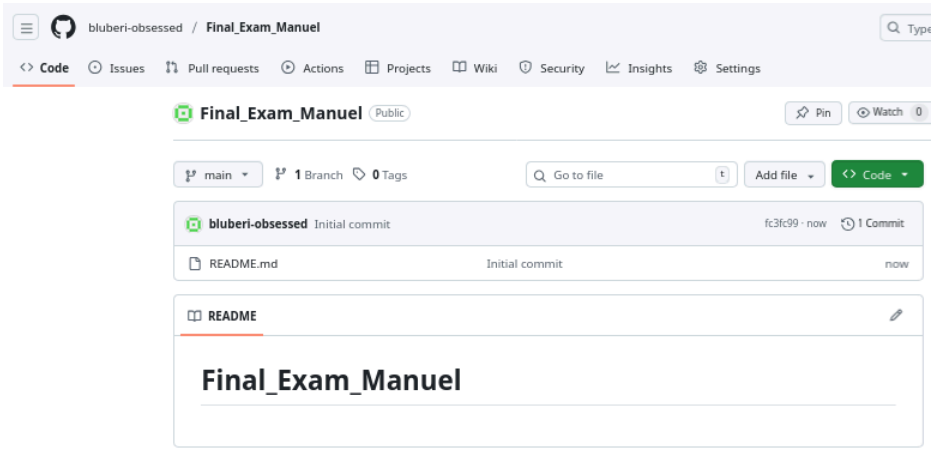
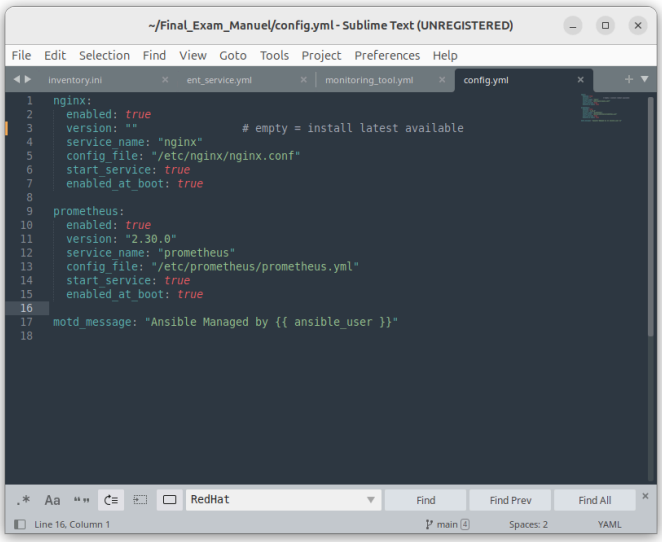


Figure 2
Cloning the Github Repository to the local VM

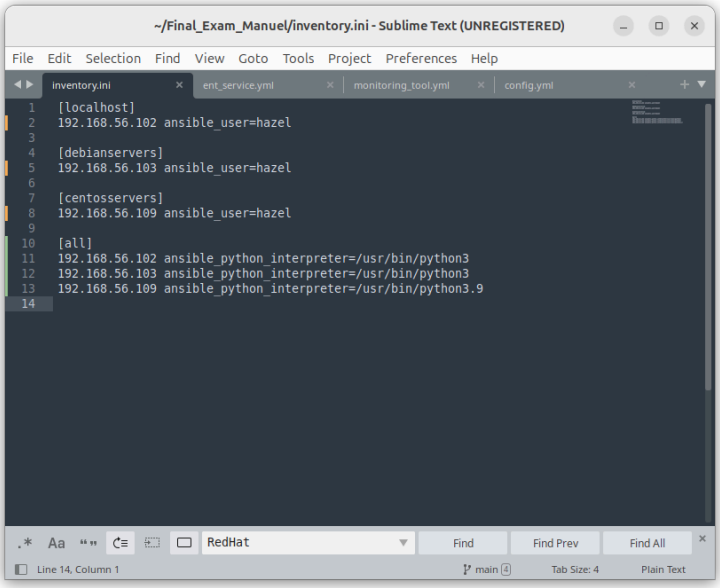
```
hazel@LocalMachine:~$ git clone git@github.com:bluberi-obsessed/Final_Exam_Manue
l.git
Cloning into 'Final_Exam_Manuel'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (3/3), done.
hazel@LocalMachine:~$ ls
CPE232_Manuel       Documents          Machine           Pictures  Templates
CPE_MIDEXAM_MANUEL  Downloads          Manuel_PrelimExam Public    Videos
Desktop             Final_Exam_Manuel  Music             snap
hazel@LocalMachine:~$
```

Figure 3
Creating an Ansible Playbook

config.yml



inventory.ini



ansible.cfg

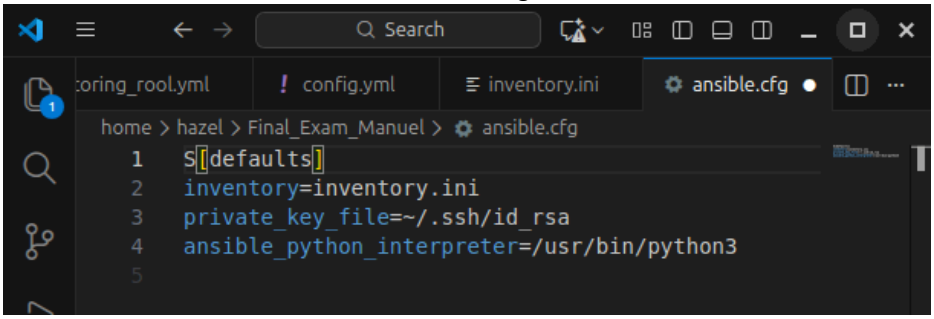


Figure 3.1 Installing and Configuring one Enterprise Service. (Can be run in Ubuntu and CentOS)

Shell

```
# ent.service.yml
- name: "Install and Configure Service (Nginx)"
  hosts: all
  become: yes
  gather_facts: yes
  vars_files:
    - config.yml

  tasks:
    - name: "Debug: show loaded nginx var"
      debug:
        var: nginx

    - name: "Ensure package name expression (Ubuntu)"
      set_fact:
        nginx_pkg_name: "{{ 'nginx=' + (nginx.version |
default('')) if (nginx.version | default('') | length) >
0 else 'nginx' }}"
      when: ansible_facts['distribution'] == 'Ubuntu' and
(nginx | default({})).get('enabled', False)

    - name: "Ensure package name expression (CentOS)"
      set_fact:
        nginx_pkg_name: "{{ 'nginx-' + (nginx.version |
default('')) if (nginx.version | default('') | length) >
0 else 'nginx' }}"
      when: ansible_facts['distribution'] == 'CentOS' and
(nginx | default({})).get('enabled', False)

    - name: "Install Nginx on Ubuntu"
      apt:
        name: "{{ nginx_pkg_name | default('nginx') }}"
        state: present
        update_cache: yes
```

```
      when: ansible_facts['distribution'] == 'Ubuntu' and
(nginx | default({})).get('enabled', False)

    - name: "Install Nginx on CentOS"
      yum:
        name: "{{ nginx_pkg_name | default('nginx') }}"
        state: present
      when: ansible_facts['distribution'] == 'CentOS' and
(nginx | default({})).get('enabled', False)

    - name: "Start Nginx service"
      service:
        name: "{{ nginx.service_name | default('nginx')
}}"
        state: started
        enabled: "{{ nginx.enabled_at_boot |
default(True) }}"
      when: (nginx | default({})).get('enabled', False)
and (nginx | default({})).get('start_service', False)
```

Figure 3.2 Installing and Configuring one Monitoring Tool (Can be run in Ubuntu and CentOS)

Shell

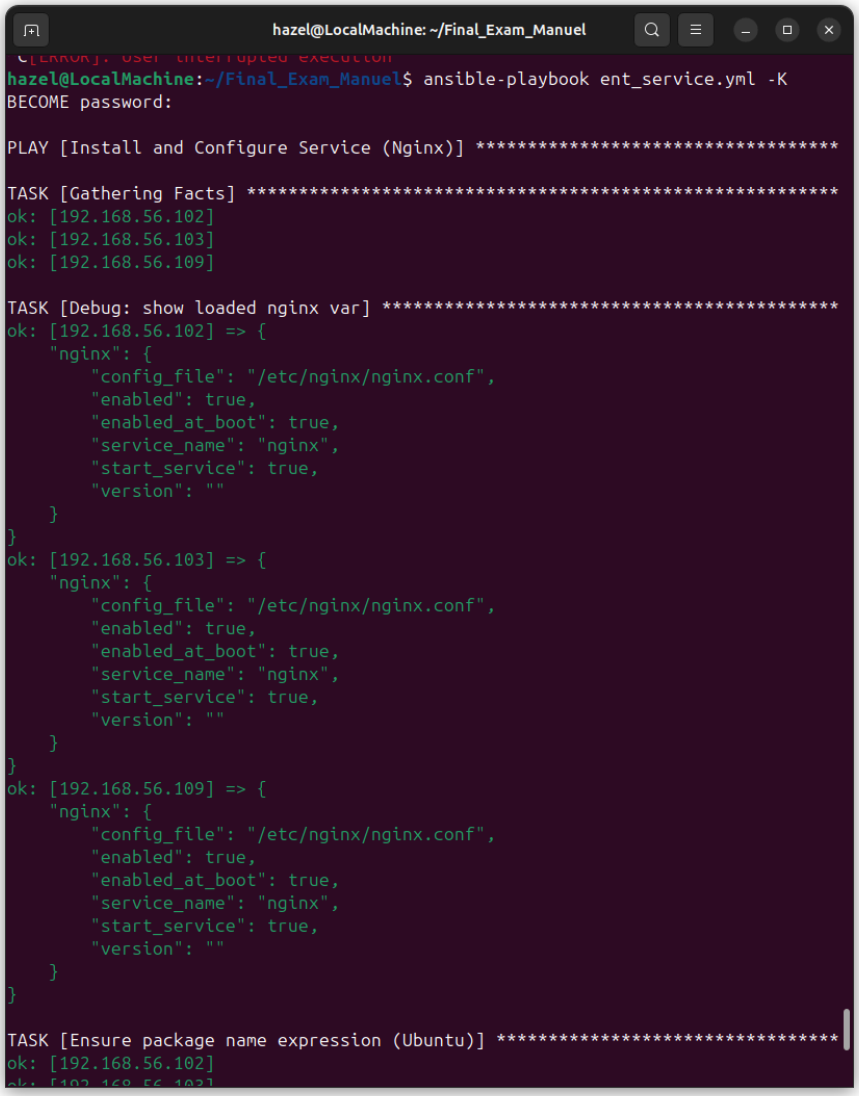
```
# monitoring_tool.yml
---
- name: Install and Configure Prometheus
  hosts: all
  become: yes
  vars_files:
    - config.yml

  tasks:

    - name: "Copy Prometheus tarball to host"
      copy:
        src: "/tmp/prometheus-{{ prometheus.version
}}.linux-amd64.tar.gz"
        dest: "/tmp/prometheus-{{ prometheus.version
}}.tar.gz"
        mode: "0644"
      when: prometheus.enabled

    - name: "Ensure /opt/prometheus directory exists"
      file:
        path: /opt/prometheus
        state: directory
        mode: "0755"
```

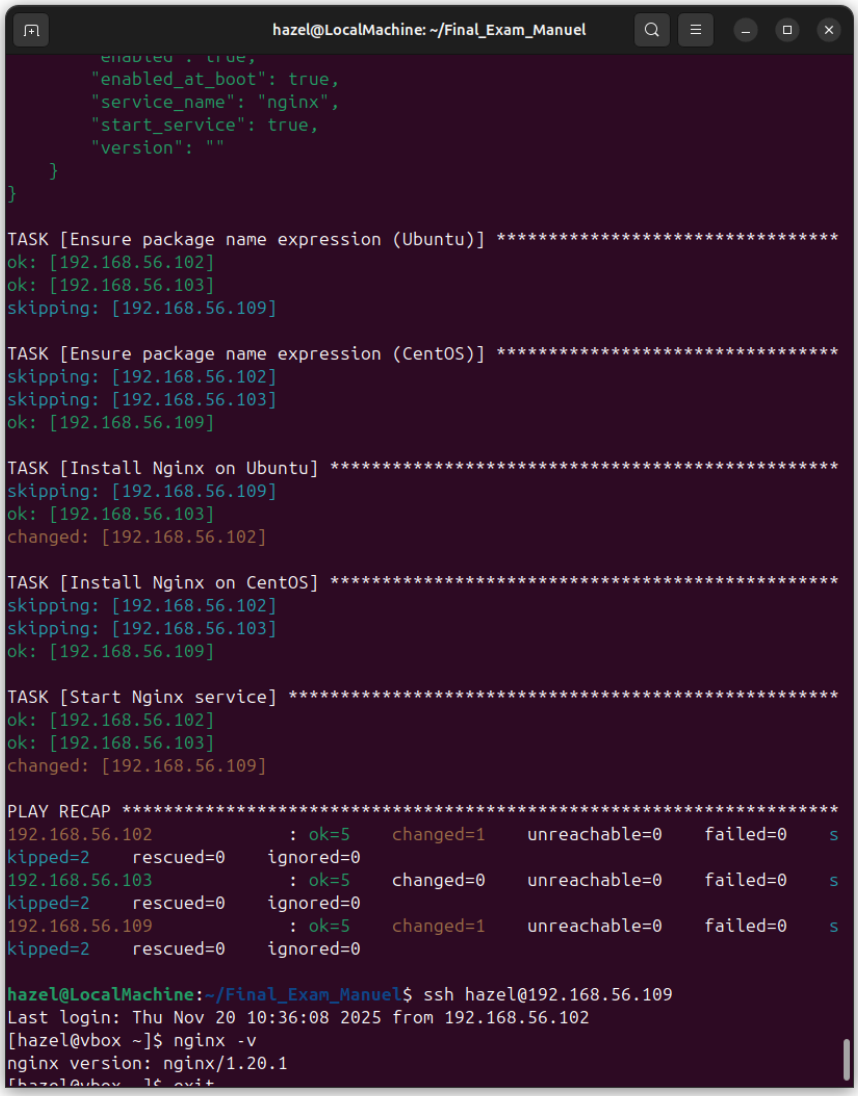
```
      when: prometheus.enabled

    - name: "Extract Prometheus"
      unarchive:
        src: "/tmp/prometheus-{{ prometheus.version
}}.tar.gz"
        dest: "/opt/prometheus/"
        remote_src: yes
        creates: "/opt/prometheus/prometheus-{{
prometheus.version }}.linux-amd64/prometheus"
      when: prometheus.enabled | default(False)

    - name: "Copy Prometheus binaries to /usr/local/bin"
      copy:
        src: "/opt/prometheus/prometheus-{{
prometheus.version }}.linux-amd64/{{ item }}"
        dest: "/usr/local/bin/{{ item }}"
        mode: "0755"
      loop:
        - prometheus
        - promtool
      when: prometheus.enabled

    - name: "Create Prometheus directories"
      file:
        path: "{{ item }}"
        state: directory
        owner: root
        group: root
        mode: "0755"
      loop:
        - /etc/prometheus
        - /var/lib/prometheus
      when: prometheus.enabled

    - name: "Copy Prometheus config and consoles"
      copy:
        src: "/opt/prometheus/prometheus-{{
prometheus.version }}.linux-amd64/{{ item }}"
        dest: "/etc/prometheus/{{ item }}"
        mode: "0644"
      loop:
        - prometheus.yml
        - consoles
        - console_libraries
      when: prometheus.enabled

    - name: "Create systemd service for Prometheus"
      copy:
```

```
        dest: /etc/systemd/system/prometheus.service
        content: |
          [Unit]
          Description=Prometheus
          Wants=network-online.target
          After=network-online.target

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

          [Install]
          WantedBy=multi-user.target
        mode: "0644"
      when: prometheus.enabled

    - name: "Reload systemd"
      systemd:
        daemon_reload: yes
      when: prometheus.enabled

    - name: "Enable and start Prometheus service"
      systemd:
        name: prometheus
        enabled: yes
        state: started
      when: prometheus.enabled and
prometheus.start_service
```

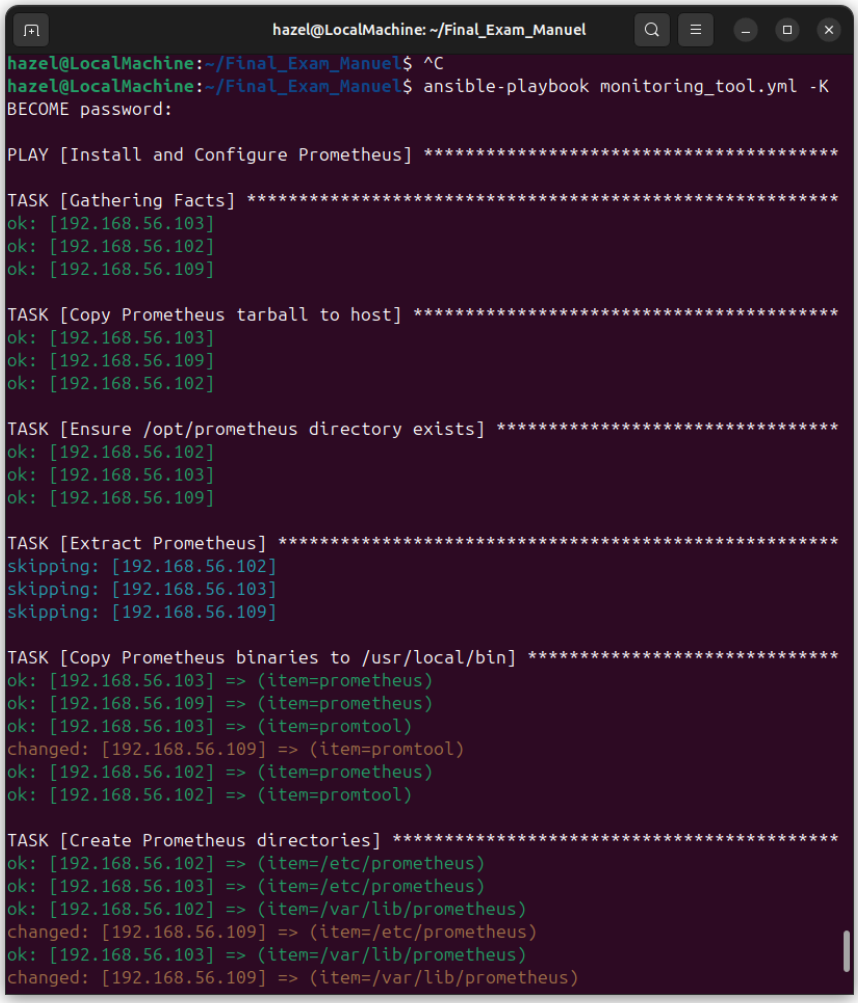
VERIFICATION

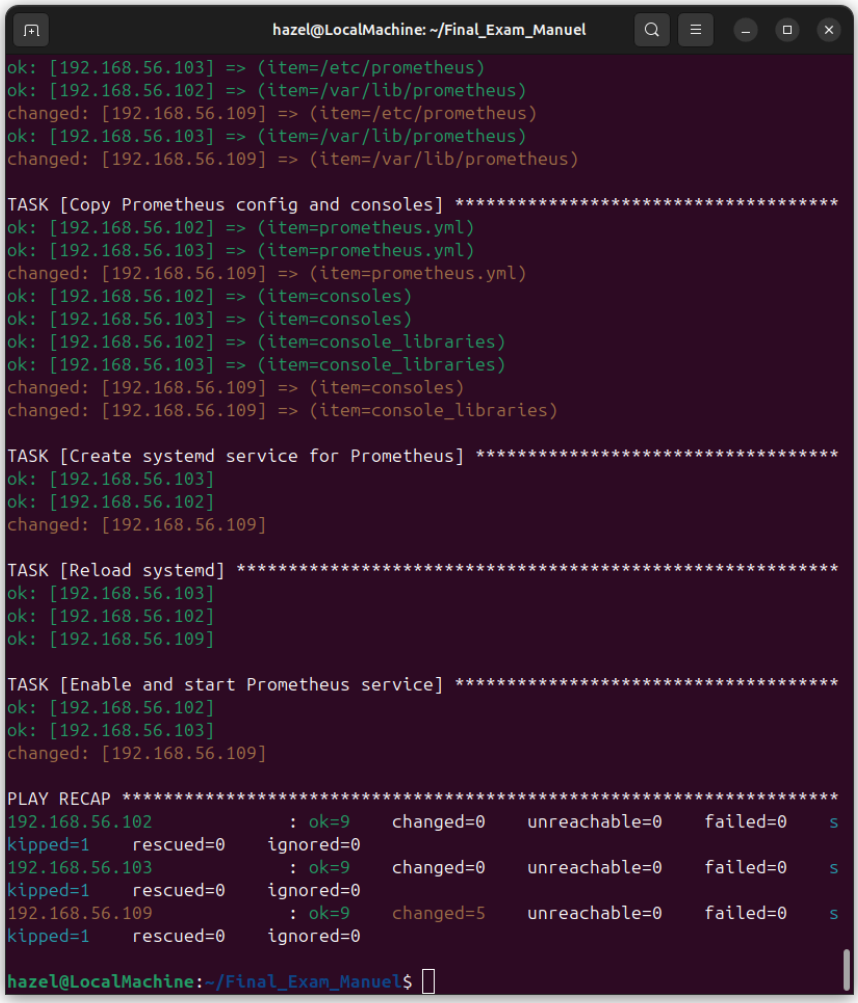
Pinging all of the remote servers

Enterprise Service	


hazel@LocalMachine: ~/Final_Exam_Manuel
"enabled_at_boot": true,
"service_name": "nginx",
"start_service": true,
"version": ""
}
}
TASK [Ensure package name expression (Ubuntu)] ********************************
ok: [192.168.56.102]
ok: [192.168.56.103]
skipping: [192.168.56.109]
TASK [Ensure package name expression (CentOS)] ********************************
skipping: [192.168.56.102]
skipping: [192.168.56.103]
ok: [192.168.56.109]
TASK [Install Nginx on Ubuntu] **
skipping: [192.168.56.109]
ok: [192.168.56.103]
changed: [192.168.56.102]
TASK [Install Nginx on CentOS] **
skipping: [192.168.56.102]
skipping: [192.168.56.103]
ok: [192.168.56.109]
TASK [Start Nginx service] **
ok: [192.168.56.102]
ok: [192.168.56.103]
changed: [192.168.56.109]
PLAY RECAP **
192.168.56.102 : ok=5 changed=1 unreachable=0 failed=0 skipped=2 rescued=0 ignored=0
192.168.56.103 : ok=5 changed=0 unreachable=0 failed=0 skipped=2 rescued=0 ignored=0
192.168.56.109 : ok=5 changed=1 unreachable=0 failed=0 skipped=2 rescued=0 ignored=0
hazel@LocalMachine:~/Final_Exam_Manuel$ ssh hazel@192.168.56.109
Last login: Thu Nov 20 10:36:08 2025 from 192.168.56.102
[hazel@vbox ~]$ nginx -v
nginx version: nginx/1.20.1

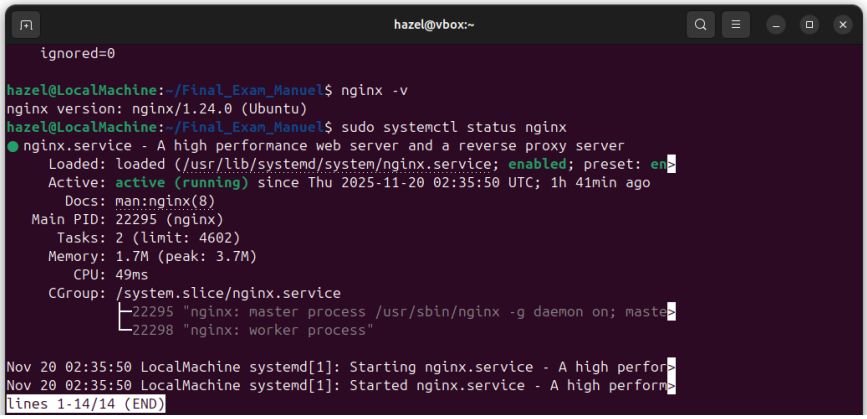
Monitoring Tool





Checking if Nginx and Prometheus is installed and started

Nginx



```
hazel@Server1:~$ nginx -v
nginx version: nginx/1.24.0 (Ubuntu)
hazel@Server1:~$ sudo systemctl status nginx
[sudo] password for hazel:
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
     Active: active (running) since Thu 2025-11-20 02:26:27 UTC; 1h 57min ago
       Docs: man:nginx(8)
   Main PID: 5263 (nginx)
      Tasks: 2 (limit: 4605)
     Memory: 1.7M (peak: 3.7M)
        CPU: 68ms
     CGroup: /system.slice/nginx.service
             ├─5263 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             └─5266 "nginx: worker process"

Nov 20 02:26:27 Server1 systemd[1]: Starting nginx.service - A high performance web server and a rev>
Nov 20 02:26:27 Server1 systemd[1]: Started nginx.service - A high performance web server and a reve>
lines 1-14/14 (END)
```

```
[hazel@vbox ~]$ nginx -v
nginx version: nginx/1.20.1
[hazel@vbox ~]$ sudo systemctl status nginx
● nginx.service - The nginx HTTP and reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: disabled)
     Active: active (running) since Thu 2025-11-20 10:36:11 PST; 1h 46min ago
   Main PID: 34933 (nginx)
      Tasks: 2 (limit: 22974)
     Memory: 2.2M (peak: 2.3M)
        CPU: 58ms
     CGroup: /system.slice/nginx.service
             ├─34933 "nginx: master process /usr/sbin/nginx"
             └─34934 "nginx: worker process"

Nov 20 10:36:10 vbox systemd[1]: Starting The nginx HTTP and reverse proxy server...
Nov 20 10:36:11 vbox nginx[34931]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
Nov 20 10:36:11 vbox nginx[34931]: nginx: configuration file /etc/nginx/nginx.conf test is successful
Nov 20 10:36:11 vbox systemd[1]: Started The nginx HTTP and reverse proxy server.
[hazel@vbox ~]$
```

Prometheus

```
hazel@LocalMachine:~/Final_Exam_Manuel$ prometheus --version
prometheus, version 2.30.0 (branch: HEAD, revision: 37468d88dce85ac507f3fb7864c7d1c078e3e27d)
  build user:       root@e913c65aa170
  build date:       20210914-09:49:24
  go version:       go1.17.1
  platform:         linux/amd64
hazel@LocalMachine:~/Final_Exam_Manuel$ sudo systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
     Active: active (running) since Thu 2025-11-20 03:04:07 UTC; 1h 24min ago
   Main PID: 26984 (prometheus)
      Tasks: 7 (limit: 4602)
     Memory: 54.2M (peak: 54.4M)
        CPU: 39.069s
     CGroup: /system.slice/prometheus.service
             └─26984 /usr/bin/prometheus

Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.418Z caller=tls_config.go:313>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.420Z caller=tls_config.go:316>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.421Z caller=head.go:755 level>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.421Z caller=head.go:792 level>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.422Z caller=main.go:1025 leve>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.422Z caller=main.go:1028 leve>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.422Z caller=main.go:1209 leve>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.436Z caller=main.go:1246 leve>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.436Z caller=main.go:989 level>
Nov 20 03:04:11 LocalMachine prometheus[26984]: ts=2025-11-20T03:04:11.437Z caller=manager.go:999 le>
lines 1-20/20 (END)
```

```
hazel@Server1:~$ prometheus --version
prometheus, version 2.30.0 (branch: HEAD, revision: 37468d88dce85ac507f3fb7864c7d1c078e3e27d)
  build user:       root@e913c65aa170
  build date:       20210914-09:49:24
  go version:       go1.17.1
  platform:         linux/amd64
hazel@Server1:~$ sudo systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
     Active: active (running) since Thu 2025-11-20 03:03:03 UTC; 1h 22min ago
   Main PID: 10183 (prometheus)
      Tasks: 7 (limit: 4605)
     Memory: 36.7M (peak: 37.0M)
        CPU: 57.199s
     CGroup: /system.slice/prometheus.service
             └─10183 /usr/bin/prometheus

Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.443Z caller=tls_config.go:313 leve>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.450Z caller=tls_config.go:316 leve>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.452Z caller=head.go:755 level=info>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.452Z caller=head.go:792 level=info>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.506Z caller=main.go:1025 level=inf>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.535Z caller=main.go:1028 level=inf>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.535Z caller=main.go:1209 level=inf>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.548Z caller=main.go:1246 level=inf>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.555Z caller=main.go:989 level=info>
Nov 20 03:03:04 Server1 prometheus[10183]: ts=2025-11-20T03:03:04.555Z caller=manager.go:999 level=i>
lines 1-20/20 (END)
```

```
[hazel@vbox ~]$ prometheus --version
prometheus, version 2.30.0 (branch: HEAD, revision: 37468d88dce85ac507f3fb7864c7d1c078e3e27d)
  build user:       root@e913c65aa170
  build date:       20210914-09:49:24
  go version:       go1.17.1
  platform:         linux/amd64
[hazel@vbox ~]$ sudo systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: disabled)
     Active: active (running) since Thu 2025-11-20 12:14:13 PST; 13min ago
   Main PID: 44074 (prometheus)
      Tasks: 6 (limit: 22974)
     Memory: 30.0M (peak: 30.3M)
        CPU: 861ms
     CGroup: /system.slice/prometheus.service
             └─44074 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storag>

Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.929Z caller=head.go:466 co>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.934Z caller=head.go:500 co>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.934Z caller=head.go:506 co>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.934Z caller=head.go:577 co>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.935Z caller=head.go:583 co>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.936Z caller=main.go:849 fs>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.939Z caller=main.go:852 ms>
Nov 20 12:14:13 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:13.939Z caller=main.go:979 ms>
Nov 20 12:14:23 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:23.941Z caller=main.go:1016 m>
Nov 20 12:14:23 vbox prometheus[44074]: level=info ts=2025-11-20T04:14:23.941Z caller=main.go:794 ms>
lines 1-20/20 (END)
```