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Midterm Skills Exam: Install, Configure, and Manage Log Monitoring tools

1. Objectives

Create and design a workflow that installs, configure and manage enterprise availability, performance and log monitoring tools using Ansible as an Infrastructure as Code (IaC) tool.

2. Instructions

1. Create a repository in your GitHub account and label it CPE_MIDEXAM_SURNAME.

2. Clone the repository and do the following:
   2.1. Create an Ansible playbook that does the following with an input of a config.yaml file and arranged Inventory file:

   2.2. Install and configure Elastic Stack in separate hosts (Elastic Search, Kibana, Logstash) • Install Nagios in one host

   2.3. Install Grafana,Prometheus and Influxdb in seperate hosts (Influxdb,Grafana,Prometheus)

   2.4. Install Lamp Stack in separate hosts (Httpd + Php,Mariadb)

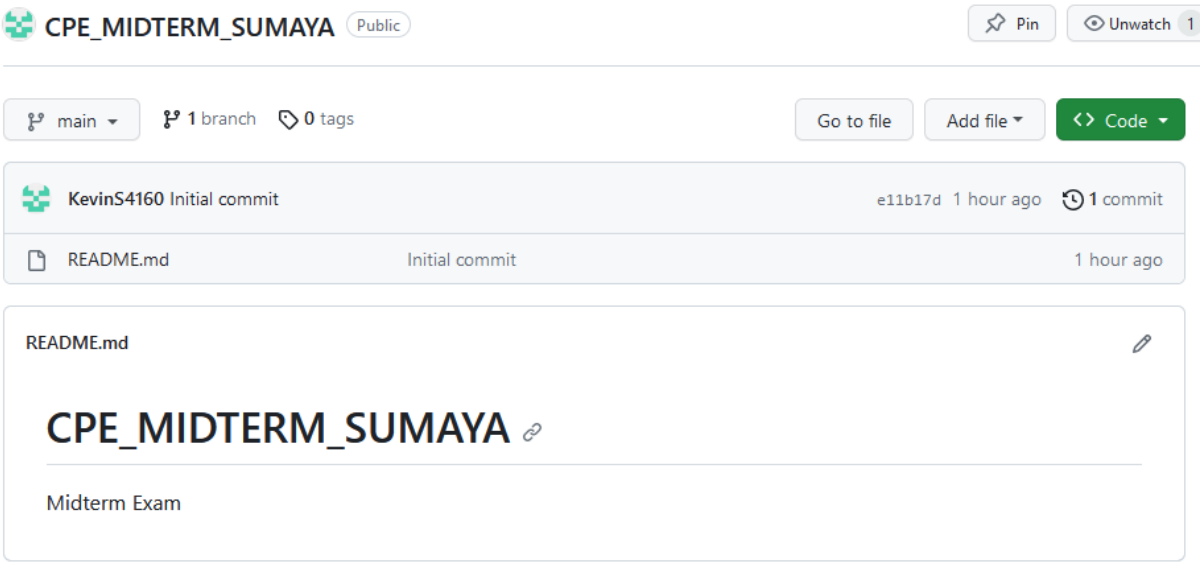
3. Document all your tasks using this document. Provide proofs of all the ansible playbooks codes and successful installations.

4. Document the push and commit from the local repository to GitHub.

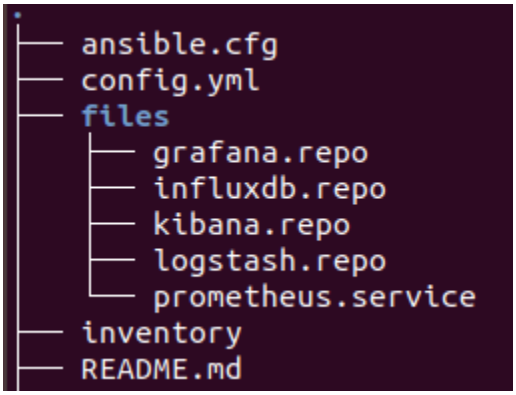
5. Finally, paste also the link of your GitHub repository in the documentation.

3. **Output** (screenshots and explanations)

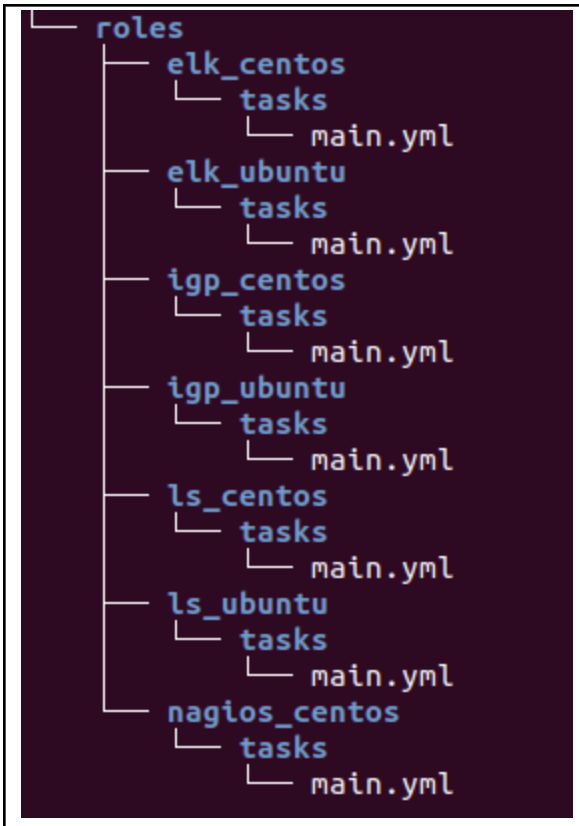
    1. First I created a Repository of the Exam



    2. 2nd I created different sudo commands and installation commands to ready my things up



    3. I created different Roles for me to install the things to be installed.



4. After creating their directories I put my previous codes in it and also found how to install both influx and grafana.

5. This is my code for my Elasticsearch

CENTOS

```
1
2   # ------- ELASTICSEARCH -------
3
4   - name: Downloading the source file of Elasticsearch
5     tags: es_ubuntu
6     get_url:
7       url: https://artifacts.elastic.co/downloads/elasticsearch/elasticsearch-8.4.3-x86_64.rpm
8       dest: /tmp/elasticsearch-8.4.3-x86_64.rpm
9
10  - name: Installing Elasticsearch
11    tags: es_ubuntu
12    yum:
13      name: /tmp/elasticsearch-8.4.3-x86_64.rpm
14      state: present
15
16  - name: Enabling Elasticsearch service
17    tags: es_ubuntu
18    service:
19      name: elasticsearch
20      enabled: yes
21
22  - name: Modifying service file
23    tags: es_ubuntu
24    replace:
25      path: /usr/lib/systemd/system/elasticsearch.service
26      regexp: "TimeoutStartSec=75"
27      replace: "TimeoutStartSec=300"
28
29  - name: Opening port for elastic search
30    tags: es_ubuntu
31    shell: |
32      sudo firewall-cmd --permanent --zone=public --add-port=9200/tcp
33      sleep 10
34      sudo firewall-cmd --reload
35
36  - name: Enabling elastic search service
37    tags: es_ubuntu
38    shell: |
39      systemctl enable elasticsearch.service
40      sleep 10
41      systemctl start elasticsearch.service
42    ignore_errors: yes
43
```

LOGSTASH

```
45    # ------- LOGSTASH -------
46
47    - name: Downloading and installing public signing key
48      tags: logstash_ubuntu
49      rpm_key:
50        state: present
51        key: https://artifacts.elastic.co/GPG-KEY-elasticsearch
52
53    - name: Creeating a repo file for Logstash
54      tags: logstash_ubuntu
55      copy:
56        src: logstash.repo
57        dest: /etc/yum.repos.d/logstash.repo
58        owner: root
59        group: root
60        mode: 0777
61
62    - name: Updating repo
63      tags: logstash_ubuntu
64      dnf:
65        update_cache: yes
66
67    - name: Installing Logstash and its dependencies
68      tags: logstash_ubuntu
69      dnf:
70        name:
71          - logstash
72        state: latest
73
74    - name: Opening port for Logstash
75      tags: logstash_ubuntul, elk_install
76      shell: |
77        sudo firewall-cmd --permanent --zone=public --add-port=9600/tcp
78        sleep 10
79        sudo firewall-cmd --reload
80
81    - name: Making sure that logstash is stared and enabled
82      tags: logstash_ubuntu, service, logstash_service, elk_service
83      service:
84        name: logstash

85          state: restarted
86          enabled: true
```

KIBANA

```
89      # ------- KIBANA --------
90
91      - name: Downloading and installing public signing key
92        tags: kibana_ubuntu, kibana_install, elk_install
93        rpm_key:
94          state: present
95          key: https://artifacts.elastic.co/GPG-KEY-elasticsearch
96
97      - name: Adding Kibana to the RPM repository
98        tags: kibana_ubuntu, kibana_install, elk_install
99        copy:
100         src: kibana.repo
101         dest: /etc/yum.repos.d/kibana.repo
102         owner: root
103         group: root
104         mode: 777
105
106     - name: Updating the repository once again
107       tags: kibana_ubuntu, kibana_install, elk_install
108       yum:
109         name:
110           - kibana
111         state: latest
112
113     - name: Opening port for Kibana
114       tags: kibana_ubuntu, kibana_installl, elk_install
115       firewalld:
116         port: 5601/tcp
117         zone: public
118         permanent: yes
119         state: enabled
120
121     - name: Making sure that Kibana is started and enabled
122       tags: kibana_ubuntu, elk_service, kibana_service, service
123       service:
124         name: kibana
125         state: restarted
126         enabled: true
```

6. This is for ElasticSearch Ubuntu

```
1
2     # ------- DEPDENCIES -------
3
4     - name: Installing dependencies
5       apt:
6         name:
7           - apt-transport-https
8           - openjdk-8-jdk
9         state: latest
10
11    # -------- LOGSTASH --------
12
13    - name: Downloading in the Logstash package
14      tags: logstash_ubuntu
15      get_url:
16        url: https://artifacts.elastic.co/downloads/logstash/logstash-8.4.3-amd64.deb
17        dest: /tmp/logstash-8.4.3-amd64.deb
18
19    - name: Installing package
20      tags: logstash_ubuntu
21      apt:
22        deb: /tmp/logstash-8.4.3-amd64.deb
23
24    - name: Reloading the daemon
25      tags: logstash_ubuntu
26      command: /bin/systemctl daemon-reload
27
28    - name: Starting and enabling the service
29      tags: logstash_ubuntu
30      service:
31        name: logstash
32        state: restarted
33        enabled: true
34
35
36    # -------- KIBANA --------
37
38    - name: Downloading in the Kibana package
```

```
    get_url:
      url: https://artifacts.elastic.co/downloads/kibana/kibana-8.4.3-amd64.deb
      dest: /tmp/kibana-8.4.3-amd64.deb

  - name: Installing Kibana
    apt:
      deb: /tmp/kibana-8.4.3-amd64.deb

  - name: Reloading the daemon
    command: /bin/systemctl daemon-reload

  - name: Making sure that Kibana service is started and enabled
    service:
      name: kibana
      state: restarted
      enabled: true


  # -------- ELASTICSEARCH --------

  - name: Downloading in the elastic search package
    get_url:
      url: https://artifacts.elastic.co/downloads/elasticsearch/elasticsearch-8.4.3-amd64.deb
      dest: /tmp/elasticsearch-8.4.3-amd64.deb

  - name: Installing package
    apt:
      deb: /tmp/elasticsearch-8.4.3-amd64.deb

  - name: Enabling elastic search service
    tags: es_ubuntu
    service:
      name: elasticsearch
      enabled: yes

  - name: Modifying service file
    tags: es_ubuntu
    replace:
      path: /usr/lib/systemd/system/elasticsearch.service
      regexp: "TimeoutStartSec=75"
      replace: "TimeoutStartSec=500"


  - name: Starting and enabling the deamon
    shell: |
      sudo systemctl enable elasticsearch.service
      sleep 10
      sudo systemctl start elasticsearch.service
    ignore_errors: yes
```

7. This is for Influxdb CENTOS

INFLUX

```
1
2     # ------- INFLUXDB -------
3
4     - name: Copying the Influxdb repository file
5       unarchive:
6         src: https://dl.influxdata.com/influxdb/releases/influxdb2-2.4.0-linux-amd64.tar.gz
7         dest: /tmp/
8         remote_src: yes
9         mode: 0777
10        owner: root
11        group: root
12
13    - name: Adding the executables to the PATH
14      shell:
15        cd /tmp/influxdb2*
16        sudo cp influxdb2-2.4.0-linux-amd64/influxd /usr/local/bin/
17
```

GRAFANA

```
19      # ------- GRAFANA -------
20
21      - name: Downloading Grafana package
22        get_url:
23          url: https://dl.grafana.com/enterprise/release/grafana-enterprise-9.2.2-1.x86_64.rpm
24          dest: /tmp/grafana-enterprise-9.2.2-1.x86_64.rpm
25
26      - name: Installing Grafana
27        yum:
28          name: /tmp/grafana-enterprise-9.2.2-1.x86_64.rpm
29
30      - name: Enabling Grafana service
31        service:
32          name: grafana-server
33          enabled: yes
34
35      - name: Modifying service file
36        tags: es_ubuntu
37        replace:
38          path: /usr/lib/systemd/system/grafana-server.service
39          regexp: "TimeoutStartSec=75"
40          replace: "TimeoutStartSec=500"
41
42      - name: Making sure that Grafana service is started and enabled
43        service:
44          name: grafana-server
45          enabled: true
46          state: started
47
```

PROMETHEUS

```
49    # -------- PROMETHEUS ---------
50
51    - name: Creating a directory for Prometheus package
52      tags: directory
53      file:
54        path: ~/prometheus
55        state: directory
56
57    - name: Downloading and extracting Prometheus
58      tags: source
59      unarchive:
60        src: https://github.com/prometheus/prometheus/releases/download/v2.39.1/prometheus-2.39.1.linux-amd64.tar.gz
61        dest: ~/prometheus
62        remote_src: yes
63        mode: 0777
64        owner: root
65        group: root
66
67    - name: Stopping the Prometheus service if exists
68      shell:
69        sudo systemctl stop prometheus >> /dev/null
70      ignore_errors: yes
71
72    - name: Adding the Prometheus executables to a PATH
73      tags: executables
74      shell: |
75        cd ~/prometheus/prometheus*
76        cp -r . /usr/local/bin/prometheus
77      ignore_errors: yes
78
79
80    - name: Copying the Prometheus service file
81      tags: servicefile
82      copy:
83        src: prometheus.service
84        dest: /etc/systemd/system/
85        owner: root
86        group: root
87        mode: 777
```

```
88
89      - name: Making sure that Prometheus service is started and enabled
90        service:
91          name: prometheus
92          state: restarted
93          enabled: true
```

8. This is for the Influx Ubuntu

INFLUX

```
# ------- DEPENDENCIES --------
- name: Installing dependencies
  apt:
    name:
      - apt-transport-https
      - software-properties-common
      - wget
    state: latest


# ------- INFLUXDB --------

- name: Adding Influxdb in the repository
  shell: |
    wget -q https://repos.influxdata.com/influxdb.key
    sleep 5
    echo '23a1c8836f0afc5ed24e0486339d7cc8f6790b83886c4c96995b88a061c5bb5d influxdb.key' | sha256sum -c && cat influxdb.key | gpg --dearmor | sudo tee /etc/apt/trusted.gpg
    sleep 5
    echo 'deb [signed-by=/etc/apt/trusted.gpg.d/influxdb.gpg] https://repos.influxdata.com/debian stable main' | sudo tee /etc/apt/sources.list.d/influxdata.list

- name: Installing Influxdb
  apt:
    name:
      - influxdb

- name: Making sure that the Influxd is enabled and started
  service:
    name: influxdb
    state: started
    enabled: true
```

GRAFANA

```
    # -------- GRAFANA ---------

    - name: Adding Grafana Repo
      shell: |
        sudo wget -q -O /usr/share/keyrings/grafana.key https://packages.grafana.com/gpg.key

    - name: Update repo
      shell: |
        sudo apt-get update

    - name: Updating the repo and isntalling grafana
      apt:
        name:
          - grafana

    - name: Reloading the daemon
      shell: |
        sudo systemctl daemon-reload

    - name: Making sure that the Grafana server is started and enabled
      service:
        name: grafana-server
        state: restarted
        enabled: true
```

PROMETHEUS

```
59    # ------- Prometheus --------
60
61    - name: Creating a directory (where the downloaded files will be stored)
62      tags: directory
63      file:
64        path: ~/prometheus
65        state: directory
66
67    - name: Downloading and extracting Prometheus
68      tags: source
69      unarchive:
70        src: https://github.com/prometheus/prometheus/releases/download/v2.39.1/prometheus-2.39.1.linux-amd64.tar.gz
71        dest: ~/prometheus
72        remote_src: yes
73        mode: 0777
74        owner: root
75        group: root
76
77    - name: Stopping the Prometheus service if its exist
78      shell: |
79        sudo systemctl stop prometheus >> /dev/null
80      ignore_errors: yes
81
82    - name: Adding the Prometheus executables to a PATH
83      tags: executables
84      shell: |
85        cd ~/prometheus/prometheus*
86        cp -r . /usr/local/bin/prometheus
87
88    - name: Copying the Prometheus service file
89      tags: servicefile
90      copy:
91        src: prometheus.service
92        dest: /etc/systemd/system/
93        owner: root
94        group: root
95        mode: 777
```

```
96
97      - name: Making sure that Prometheus service is started and enabled
98        tags: serviceon
99        service:
100         name: prometheus
101         state: started
102         enabled: true
```

9. This is the code of my Lampstack CENTOS

```yaml
- name: Installing Lamp Stack dependencies
  dnf:
    name:
      - httpd
      - mariadb-server
      - mariadb
      - php
      - php-mysql
    state: latest

- name: Opening needed ports for Lamp Stack
  shell: |
    sudo firewall-cmd --permanent --zone=public --add-service=http
    sudo firewall-cmd --permanent --zone=public --add-service=https
    sudo firewall-cmd --reload

- name: Starting Apache service
  service:
    name: httpd
    state: started
    enabled: true

- name: Starting Mariadb services
  service:
    name: mariadb
    state: started
    enabled: true
```

10. This is the code for my Lampstacks Ubuntu

```
1   - name: Installing depedncies
2     apt:
3       name:
4         - apache2
5         - mysql-server
6         - php
7         - libapache2-mod-php
8         - php-mysql
9       state: latest
10
11  - name: Starting the services
12    service:
13      name: apache2
14      state: started
15      enabled: true
```

11. This is the way to install my Nagios on CENTOS

Nagios

```
- name: Installing nagios dependecies and libraries
  tags: dependecies, libraries
  yum:
    name:
      - gcc
      - glibc
      - glibc-common
      - perl
      - httpd
      - php
      - wget
      - gd
      - gd-devel
      - openssl-devel
      - gcc
      - glibc
      - glibc-common
      - make
      - gettext
      - automake
      - autoconf
      - wget
      - openssl-devel
      - net-snmp
      - net-snmp-utils
      - python2-pip
    state: latest

- name: Install passlib python package
  pip:
    name: passlib

- name: Creating a directory (where the downloaded files will be stored)
  file:
    path: ~/nagios
    state: directory

- name: Downloading and extracting Nagios
  unarchive:
    src: https://github.com/NagiosEnterprises/nagioscore/archive/nagios-4.4.6.tar.gz
    dest: ~/nagios
```

```
42          remote_src: yes
43          mode: 0777
44          owner: root
45          group: root
46
47      - name: Compiling, installing, and adding users and groups in nagios
48        shell: |
49          cd ~/nagios/nagioscore-**
50          ./configure
51          make all
52          make install-groups-users
53          usermod -a -G nagios apache
54          make install
55          make install-daemoninit
56          make install-commandmode
57          make install-config
58          make install-webconf
59      - name: Downloading and extracting Nagios plugins
60        unarchive:
61          src: https://github.com/nagios-plugins/nagios-plugins/archive/release-2.3.3.tar.gz
62          dest: ~/nagios
63          remote_src: yes
64          mode: 0777
65          owner: root
66          group: root
67
68      - name: Compiling and installing plugins
69        shell: |
70          cd ~/nagios/nagios-plugins*
71          ./tools/setup
72          ./configure
73          make
74          make install
75      - name: Add a user to a password file and ensure permissions are set
76        community.general.htpasswd:
```

```
77          path: /usr/local/nagios/etc/htpasswd.users
78          name: adminnagios
79          password: server12345
80
81      - name: Making sure that nagios is started and enabled
82        service:
83          name: nagios
84          state: restarted
85          enabled: true
86
87      - name: Making sure that httpd is started and enabled
88        service:
89          name: httpd
90          state: restarted
91          enabled: true
```

12. I also created a file directories for me to input different repo for me to install my things carefully.

Grafana Repo

CPE_MIDTERM_SUMAYA / files / **grafana.repo**

KevinS4160 Testing sana gumana

Code | Blame | 9 lines (9 loc) · 204 Bytes | Code 55% faster with GitHub Copilot

```
1   [grafana]
2   name=grafana
3   baseurl=https://packages.grafana.com/oss/rpm
4   repo_gpgcheck=1
5   enabled=1
6   gpgcheck=1
7   gpgkey=https://packages.grafana.com/gpg.key
8   sslverify=1
9   sslcacert=/etc/pki/tls/certs/ca-bundle.crt
```

Influxdb repo

KevinS4160 Testing sana gumana

Code | Blame | 7 lines (7 loc) · 210 Bytes | Code 55% faster with GitHub Copilot

```
1  [influxdb]
2  name = InfluxDB Repository - RHEL \$releasever
3  baseurl =
4  https://repos.influxdata.com/rhel/\$releasever/\$basearch/stable
5  enabled = 1
6  gpgcheck = 1
7  gpgkey = https://repos.influxdata.com/influxdb.key
```

Kibana Repo

CPE_MIDTERM_SUMAYA / files / **kibana.repo**

KevinS4160 Testing sana gumana

Code | Blame | 9 lines (8 loc) · 213 Bytes | Code 55% faster with GitHub Copilot

```
1  [kibana-8.x]
2  name=Kibana repository for 8.x packages
3  baseurl=https://artifacts.elastic.co/packages/8.x/yum
4  gpgcheck=1
5  gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
6  enabled=1
7  autorefresh=1
8  type=rpm-md
```

Logstash Repo

KevinS4160 Testing sana gumana

Code | Blame | 8 lines (8 loc) · 215 Bytes | Code 55% faster with GitHub Copilot

```
1  [logstash-8.x]
2  name=Elastic repository for 8.x packages
3  baseurl=https://artifacts.elastic.co/packages/8.x/yum
4  gpgcheck=1
5  gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
6  enabled=1
7  autorefresh=1
8  type=rpm-md
```

Prometheus Repo

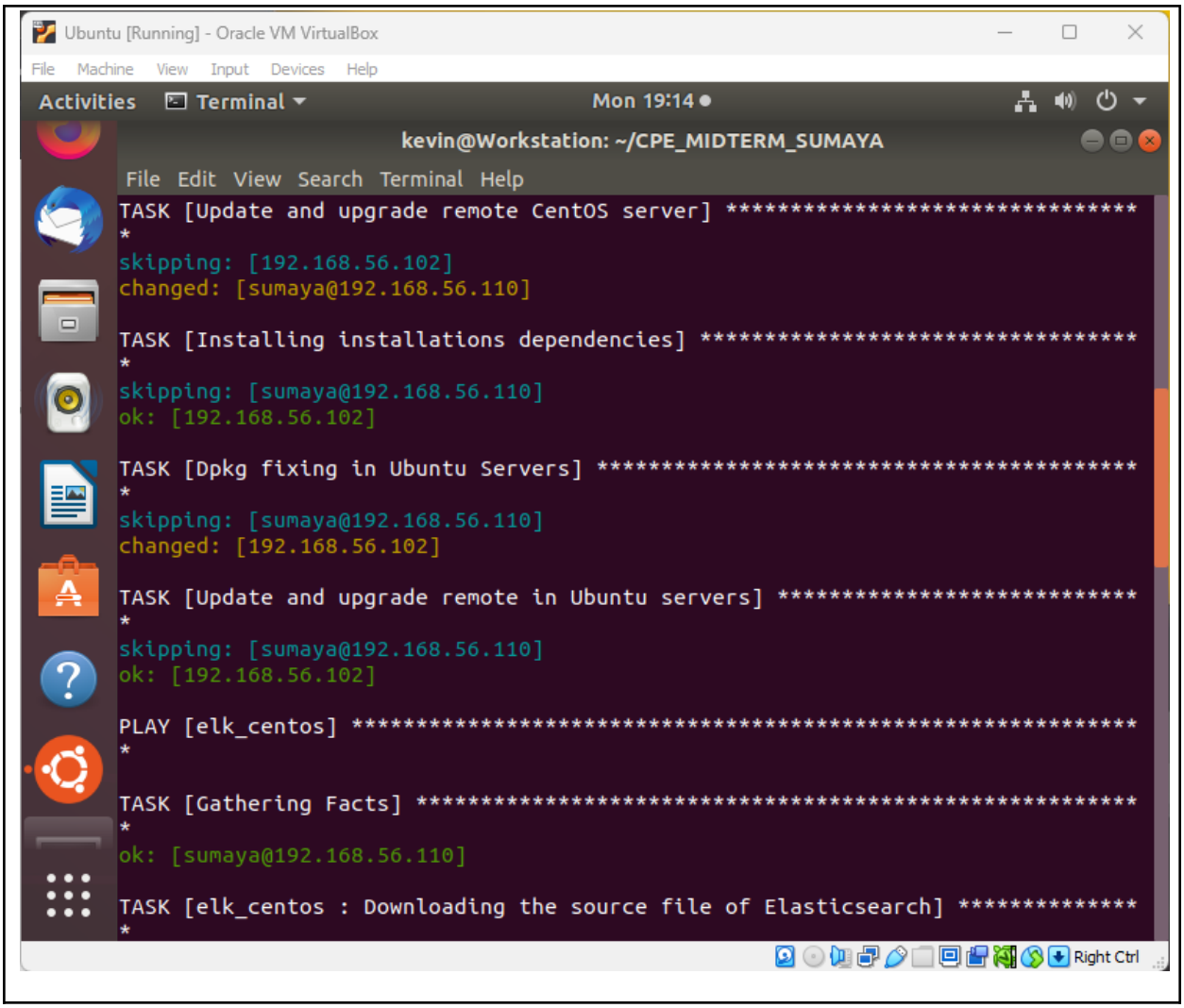
KevinS4160 Testing sana gumana

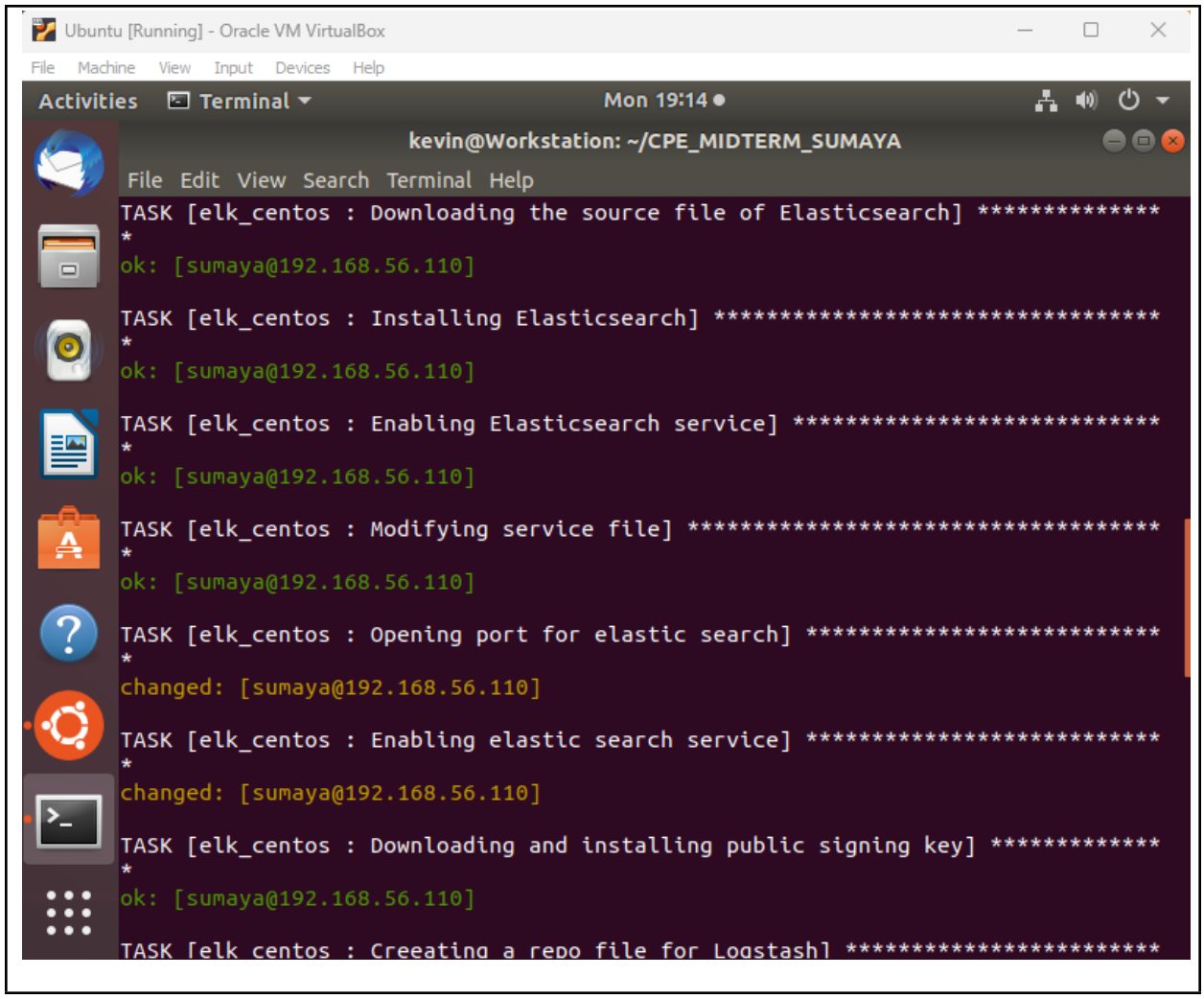
Code | Blame | 10 lines (8 loc) · 222 Bytes | Code 55% faster with GitHub Copilot

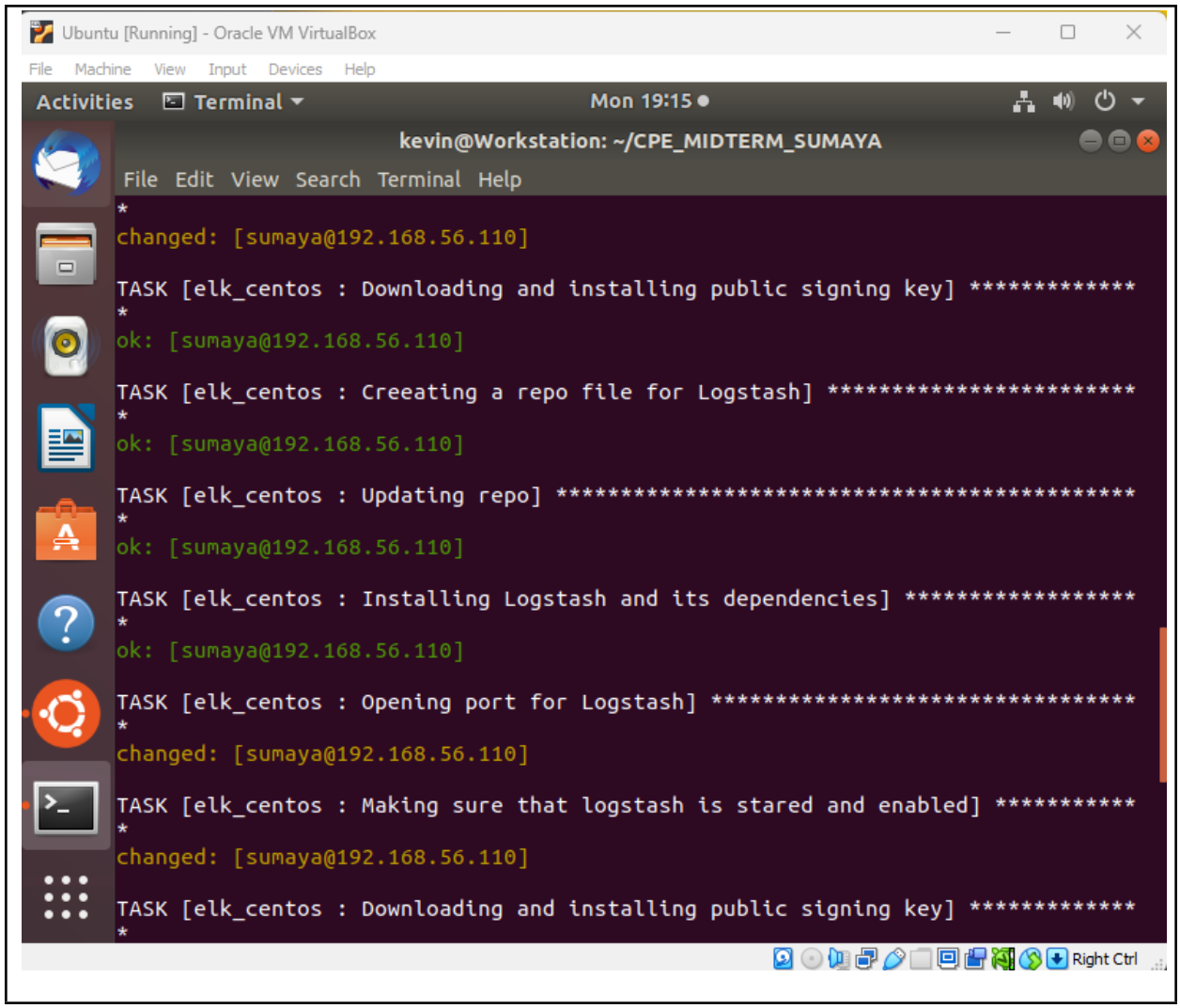
```
1  [Unit]
2  Description=Prometheus Service
3  After=network.target
4
5  [Service]
6  Type=simple
7  ExecStart=/usr/local/bin/prometheus/prometheus --config.file=/usr/local/bin/prometheus/prometheus.yml
8
9  [Install]
10 WantedBy=multi-user.target
```

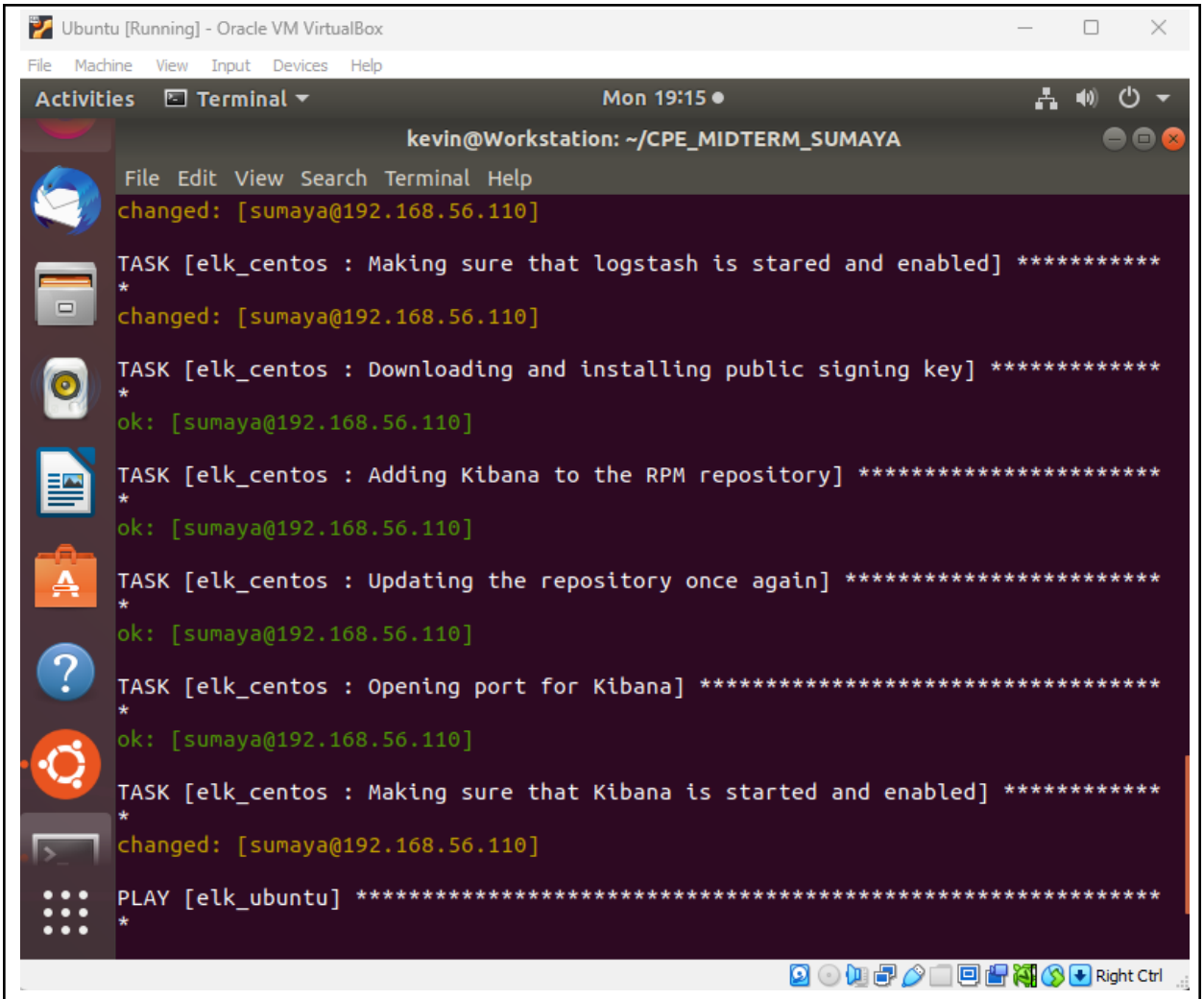
RESULTS PROOF THAT ITS WORKING:

```
kevin@Workstation:~$ cd CPE_MIDTERM_SUMAYA
kevin@Workstation:~/CPE_MIDTERM_SUMAYA$ ansible-playbook --ask-become-pass conf
ig.yml
BECOME password:

PLAY [all] *********************************************************************
*

TASK [Gathering Facts] *********************************************************
*
ok: [sumaya@192.168.56.110]
ok: [192.168.56.102]

TASK [Installing dnf and epel-release] *****************************************
*
skipping: [192.168.56.102]
ok: [sumaya@192.168.56.110]

TASK [Update and upgrade remote CentOS server] *********************************
*
skipping: [192.168.56.102]
changed: [sumaya@192.168.56.110]

TASK [Installing installations dependencies] ***********************************
*
skipping: [sumaya@192.168.56.110]
ok: [192.168.56.102]
```


Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Mon 19:14
kevin@Workstation: ~/CPE_MIDTERM_SUMAYA
File Edit View Search Terminal Help
TASK [Update and upgrade remote CentOS server] ********************************
*
skipping: [192.168.56.102]
changed: [sumaya@192.168.56.110]
TASK [Installing installations dependencies] **********************************
*
skipping: [sumaya@192.168.56.110]
ok: [192.168.56.102]
TASK [Dpkg fixing in Ubuntu Servers] **
*
skipping: [sumaya@192.168.56.110]
changed: [192.168.56.102]
TASK [Update and upgrade remote in Ubuntu servers] ****************************
*
skipping: [sumaya@192.168.56.110]
ok: [192.168.56.102]
PLAY [elk_centos] ***
*
TASK [Gathering Facts] **
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Downloading the source file of Elasticsearch] **************
*
Right Ctrl


Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Mon 19:14
kevin@Workstation: ~/CPE_MIDTERM_SUMAYA
File Edit View Search Terminal Help
TASK [elk_centos : Downloading the source file of Elasticsearch] **********
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Installing Elasticsearch] ***********************************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Enabling Elasticsearch service] *****************************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Modifying service file] **************************************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Opening port for elastic search] *****************************
*
changed: [sumaya@192.168.56.110]
TASK [elk_centos : Enabling elastic search service] *****************************
*
changed: [sumaya@192.168.56.110]
TASK [elk_centos : Downloading and installing public signing key] *************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Creeating a repo file for Logstash] **********************


Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 19:15
kevin@Workstation: ~/CPE_MIDTERM_SUMAYA
File Edit View Search Terminal Help
*
changed: [sumaya@192.168.56.110]
TASK [elk_centos : Downloading and installing public signing key] *************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Creeating a repo file for Logstash] ************************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Updating repo] ***
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Installing Logstash and its dependencies] ******************
*
ok: [sumaya@192.168.56.110]
TASK [elk_centos : Opening port for Logstash] *********************************
*
changed: [sumaya@192.168.56.110]
TASK [elk_centos : Making sure that logstash is stared and enabled] ***********
*
changed: [sumaya@192.168.56.110]
TASK [elk_centos : Downloading and installing public signing key] *************
*
Right Ctrl




```
TASK [elk_centos : Making sure that Kibana is started and enabled] ************
*
changed: [sumaya@192.168.56.110]

PLAY [elk_ubuntu] *************************************************************
*

TASK [Gathering Facts] ********************************************************
*
ok: [192.168.56.102]

TASK [elk_ubuntu : Installing dependencies] ***********************************
*
```

GitHub link: https://github.com/KevinS4160/CPE_MIDTERM_SUMAYA.git

Conclusions:

After taking the exam I learned that it is important in developing reliable and consistent IT operation automation. This is crucial for minimizing downtime and maximizing return on investment. Through the use of simple Ansible playbooks, the comprehensive Automation Platform platform can help you validate change requests, manage system installations and upgrades, and create target baselines for systems.