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Course/Section: CPE 212 - CPE31S2	**Date Submitted: 06/11/2024**
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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 separate 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)

- Create a repository in your GitHub account and label it CPE_MIDEXAM_NICOLAS.

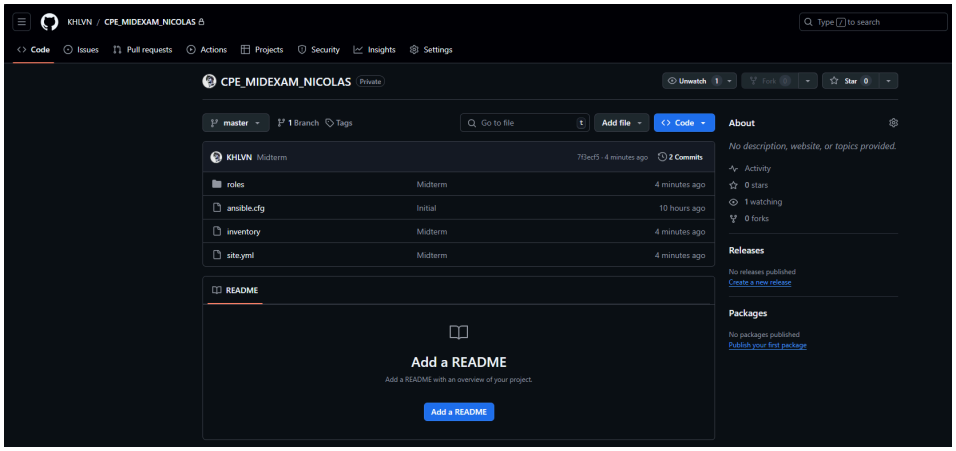

Figure 1.1: GitHub repository for the Midterm Exam

In the inventory file, I have assigned both server1 and centos machine to the managed role, and only the server1 to the web role.

```
punopaughey@workstation:~/CPE_MIDEXAM_NICOLAS$ cat inventory
[managed]
server1
centos    ansible_user=khlvn

[web]
server1
```

Figure 1.2:Inventory file that I've used

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

ELK Stack Installation in Managed Role

```
TASK [managed : Allow Port 9200 through Firewall (CentOS)] **********************
skipping: [server1]
ok: [centos]

TASK [managed : Allow Port 9200 through Firewall (Ubuntu)] **********************
skipping: [centos]
[WARNING]: The value 9200 (type int) in a string field was converted to u'9200'
(type string). If this does not look like what you expect, quote the entire
value to ensure it does not change.
ok: [server1]

TASK [managed : Add GPG key for ELK Stack (Ubuntu)] ****************************
skipping: [centos]
ok: [server1]

TASK [managed : Add ELK Stack to Yum repository (CentOS)] **********************
skipping: [server1]
ok: [centos]

TASK [managed : Add ELK Stack to APT repository (Ubuntu)] **********************
skipping: [centos]
ok: [server1]
```

```
TASK [managed : Configure Elasticsearch] ************************************
ok: [server1]
ok: [centos]

TASK [managed : Add GPG key for ElasticSearch (Ubuntu)] *********************
skipping: [centos]
ok: [server1]

TASK [managed : Install Elk stack (Ubuntu & Centos)] ************************
ok: [server1]
ok: [centos]

TASK [managed : Enable ELK Stack service (Ubuntu & Centos)] *****************
ok: [server1] => (item=elasticsearch)
ok: [centos] => (item=elasticsearch)
ok: [server1] => (item=kibana)
ok: [server1] => (item=logstash)
ok: [centos] => (item=kibana)
ok: [centos] => (item=logstash)
```

Figure 2.1: Installation and Configuration of Elk Stack services to managed role using ansible playbook

VERIFYING THE SERVICES FOR TASK 1

[MANAGED] UBUNTU

```
punopaughey@server1:~$ sudo systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
   Loaded: loaded (/usr/lib/systemd/system/elasticsearch.service; enabled; vendo
   Active: active (running) since Mon 2024-11-04 08:33:05 +08; 2 days ago
     Docs: https://www.elastic.co
 Main PID: 1121 (java)
    Tasks: 76 (limit: 4656)
   CGroup: /system.slice/elasticsearch.service
           ├─1121 /usr/share/elasticsearch/jdk/bin/java -Xshare:auto -Des.networ
           └─2470 /usr/share/elasticsearch/modules/x-pack-ml/platform/linux-x86_

Nov 04 08:30:49 server1 systemd[1]: Starting Elasticsearch...
Nov 04 08:32:05 server1 systemd-entrypoint[1121]: Nov 04, 2024 8:32:05 AM sun.ut
Nov 04 08:32:05 server1 systemd-entrypoint[1121]: WARNING: COMPAT locale provide
Nov 04 08:33:05 server1 systemd[1]: Started Elasticsearch.
punopaughey@server1:~$
```

Figure 2.2.1: verifying elasticsearch service in managed ubuntu

```
punopaughey@server1:~$ sudo systemctl status kibana
● kibana.service - Kibana
   Loaded: loaded (/etc/systemd/system/kibana.service; enabled; vendor preset: e
   Active: active (running) since Mon 2024-11-04 08:43:33 +08; 2 days ago
     Docs: https://www.elastic.co
 Main PID: 4816 (node)
    Tasks: 11 (limit: 4656)
   CGroup: /system.slice/kibana.service
           └─4816 /usr/share/kibana/bin/../node/bin/node /usr/share/kibana/bin/.

Nov 04 08:43:33 server1 systemd[1]: Started Kibana.
Nov 04 08:43:36 server1 kibana[4816]: Kibana is currently running with legacy Op
```

Figure 2.2.2: verifying kibana service in managed ubuntu

```
punopaughey@server1:~$ sudo systemctl status logstash
● logstash.service - logstash
   Loaded: loaded (/etc/systemd/system/logstash.service; enabled; vendor preset:
   Active: active (running) since Wed 2024-11-06 09:47:00 +08; 8s ago
 Main PID: 5300 (java)
    Tasks: 18 (limit: 4656)
   CGroup: /system.slice/logstash.service
           └─5300 /usr/share/logstash/jdk/bin/java -Xms1g -Xmx1g -XX:+UseConcMar

Nov 06 09:47:00 server1 systemd[1]: Started logstash.
Nov 06 09:47:00 server1 logstash[5300]: Using bundled JDK: /usr/share/logstash/j
Nov 06 09:47:00 server1 logstash[5300]: OpenJDK 64-Bit Server VM warning: Option
punopaughey@server1:~$
```

Figure 2.2.3 : verifying logstash service in managed ubuntu

[MANAGED] CENTOS

```
[khlvn@centos ~]$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
   Loaded: loaded (/usr/lib/systemd/system/elasticsearch.service; enabled; vendo
r preset: disabled)
   Active: active (running) since Tue 2024-11-05 18:51:46 EST; 1h 58min ago
     Docs: https://www.elastic.co
 Main PID: 1307 (java)
    Tasks: 78
   CGroup: /system.slice/elasticsearch.service
           ├─1307 /usr/share/elasticsearch/jdk/bin/java -Xshare:auto -Des.net...
           └─2642 /usr/share/elasticsearch/modules/x-pack-ml/platform/linux-x...

Nov 05 18:49:24 centos systemd[1]: Starting Elasticsearch...
Nov 05 18:50:06 centos systemd-entrypoint[1307]: Nov 05, 2024 6:50:06 PM sun...>
Nov 05 18:50:06 centos systemd-entrypoint[1307]: WARNING: COMPAT locale prov...e
Nov 05 18:51:46 centos systemd[1]: Started Elasticsearch.
Hint: Some lines were ellipsized, use -l to show in full.
```

Figure 2.3.1: verifying elasticsearch service in managed centos

```
[khlvn@centos ~]$ systemctl status kibana
● kibana.service - Kibana
   Loaded: loaded (/etc/systemd/system/kibana.service; enabled; vendor preset: d
isabled)
   Active: active (running) since Tue 2024-11-05 18:49:24 EST; 2h 0min ago
     Docs: https://www.elastic.co
 Main PID: 1303 (node)
    Tasks: 11
   CGroup: /system.slice/kibana.service
           └─1303 /usr/share/kibana/bin/../node/bin/node /usr/share/kibana/bi...

Nov 05 18:49:24 centos systemd[1]: Started Kibana.
Nov 05 18:49:55 centos kibana[1303]: Kibana is currently running with legac...er
Hint: Some lines were ellipsized, use -l to show in full.
```

Figure 2.3.2: verifying kibana service in managed centos

```
[khlvn@centos ~]$ systemctl status logstash
● logstash.service - logstash
   Loaded: loaded (/etc/systemd/system/logstash.service; enabled; vendor preset:
 disabled)
   Active: active (running) since Tue 2024-11-05 19:26:02 EST; 1h 24min ago
 Main PID: 10628 (java)
    Tasks: 24
   CGroup: /system.slice/logstash.service
           └─10628 /usr/share/logstash/jdk/bin/java -Xms1g -Xmx1g -XX:+UseCon...

Nov 05 19:26:02 centos systemd[1]: Started logstash.
Nov 05 19:26:02 centos logstash[10628]: Using bundled JDK: /usr/share/logsta...k
Nov 05 19:26:02 centos logstash[10628]: OpenJDK 64-Bit Server VM warning: Op....
Nov 05 19:26:14 centos logstash[10628]: Sending Logstash logs to /var/log/lo...s
Nov 05 19:26:14 centos logstash[10628]: [2024-11-05T19:26:14,629][INFO ][log...s
Nov 05 19:26:14 centos logstash[10628]: [2024-11-05T19:26:14,639][INFO ][log...}
Nov 05 19:26:14 centos logstash[10628]: [2024-11-05T19:26:14,641][INFO ][logs...
Nov 05 19:26:15 centos logstash[10628]: [2024-11-05T19:26:15,647][INFO ][log...}
Nov 05 19:26:15 centos logstash[10628]: [2024-11-05T19:26:15,648][INFO ][log...}
Nov 05 19:26:15 centos logstash[10628]: [2024-11-05T19:26:15,656][ERROR][log....
Hint: Some lines were ellipsized, use -l to show in full.
```

Figure 2.3.3: verifying logstash service in managed centos

Nagios Installation in Web Role

[WEB] UBUNTU

```
PLAY [web] *********************************************************************

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

TASK [web : install Nagios Prereq (Ubuntu)] ************************************
ok: [server1]

TASK [web : install Nagios Prereq (Centos)] ************************************
skipping: [server1]

TASK [web : Install Nagios (CentOS)] *******************************************
skipping: [server1]

TASK [web : Install Nagios (Ubuntu)] *******************************************
ok: [server1]

TASK [web : Enable Nagios Service (Centos)] ************************************
skipping: [server1]

TASK [web : Enable Nagios Service (Ubuntu)] ************************************
ok: [server1]
```

Figure 2.4: Installation of Nagios in web role using ansible playbook

VERIFYING NAGIOS SERVICE IN WEB

```
punopaughey@server1:~$ systemctl status nagios3
● nagios3.service - LSB: nagios host/service/network monitoring and management s
   Loaded: loaded (/etc/init.d/nagios3; generated)
   Active: active (running) since Mon 2024-11-04 08:30:53 +08; 2 days ago
     Docs: man:systemd-sysv-generator(8)
    Tasks: 1 (limit: 4656)
   CGroup: /system.slice/nagios3.service
           └─1265 /usr/sbin/nagios3 -d /etc/nagios3/nagios.cfg

Warning: Journal has been rotated since unit was started. Log output is incomple
punopaughey@server1:~$
```

Figure 2.4.1: verifying nagios in web role

- Install Grafana,Prometheus and Influxdb in separate hosts (Influxdb,Grafana,Prometheus)

GRAFANA AND CO. INSTALLATION

```
[khlvn@centos ~]$ sudo systemctl status prometheus
[sudo] password for khlvn:
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor prese
t: disabled)
   Active: active (running) since Tue 2024-11-05 18:49:24 EST; 2h 34min ago
 Main PID: 1308 (prometheus)
    Tasks: 10
   CGroup: /system.slice/prometheus.service
           └─1308 /usr/local/bin/prometheus --config.file /etc/prometheus/pro...

Nov 05 18:50:11 centos prometheus[1308]: level=info ts=2024-11-05T23:50:11.5...s
Nov 05 18:50:11 centos prometheus[1308]: level=info ts=2024-11-05T23:50:11.5…3µs
Nov 05 18:50:11 centos prometheus[1308]: level=info ts=2024-11-05T23:50:11.5...0
Nov 05 18:50:11 centos prometheus[1308]: level=info ts=2024-11-05T23:50:11.9...s
Nov 05 20:50:24 centos prometheus[1308]: level=info ts=2024-11-06T01:50:24.5...s
Nov 05 20:50:24 centos prometheus[1308]: level=info ts=2024-11-06T01:50:24.6...7
Nov 05 20:50:24 centos prometheus[1308]: level=info ts=2024-11-06T01:50:24.6...s
Nov 05 20:50:25 centos prometheus[1308]: level=info ts=2024-11-06T01:50:25.1...s
Nov 05 20:50:25 centos prometheus[1308]: level=info ts=2024-11-06T01:50:25.2...5
Nov 05 20:50:25 centos prometheus[1308]: level=info ts=2024-11-06T01:50:25.2...X
Hint: Some lines were ellipsized, use -l to show in full.
[khlvn@centos ~]$
```

Figure 3.1: Prometheus service verification in centos

```
punopaughey@server1:~$ systemctl status prometheus
● prometheus.service - Monitoring system and time series database
   Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor prese
   Active: active (running) since Mon 2024-11-04 08:30:38 +08; 2 days ago
     Docs: https://prometheus.io/docs/introduction/overview/
 Main PID: 747 (prometheus)
    Tasks: 11 (limit: 4656)
   CGroup: /system.slice/prometheus.service
           └─747 /usr/bin/prometheus
```

Figure 3.2: Prometheus service verifying in server1

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

```
TASK [managed : Install Lamp Stack (httpd, php, mariadb) (Ubuntu)] *************
skipping: [centos]
ok: [server1]

TASK [managed : Install Lamp Stack (httpd, php, mariadb) (Centos)] *************
skipping: [server1]
ok: [centos]

TASK [managed : Enable Lamp Stack service (Ubuntu)] ****************************
skipping: [centos] => (item=apache2)
skipping: [centos] => (item=mariadb)
ok: [server1] => (item=apache2)
ok: [server1] => (item=mariadb)

TASK [managed : Enable Lamp Stack service (Centos)] ****************************
skipping: [server1] => (item=httpd)
skipping: [server1] => (item=mariadb)
ok: [centos] => (item=httpd)
ok: [centos] => (item=mariadb)
```

Figure 4.1: Installation of Lamp Stack in managed role using ansible playbook

VERIFYING THE SERVICES TASK 3

```
punopaughey@server1:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset:
  Drop-In: /lib/systemd/system/apache2.service.d
           └─apache2-systemd.conf
   Active: active (running) since Mon 2024-11-04 08:30:52 +08; 2 days ago
  Process: 6844 ExecReload=/usr/sbin/apachectl graceful (code=exited, status=0/S
 Main PID: 1203 (apache2)
    Tasks: 6 (limit: 4656)
   CGroup: /system.slice/apache2.service
           ├─1203 /usr/sbin/apache2 -k start
           ├─6856 /usr/sbin/apache2 -k start
           ├─6857 /usr/sbin/apache2 -k start
           ├─6858 /usr/sbin/apache2 -k start
           ├─6859 /usr/sbin/apache2 -k start
           └─6860 /usr/sbin/apache2 -k start

Warning: Journal has been rotated since unit was started. Log output is incomple
punopaughey@server1:~$ systemctl status mariadb
● mariadb.service - MariaDB 10.1.48 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset:
   Active: active (running) since Mon 2024-11-04 08:31:03 +08; 2 days ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
 Main PID: 1016 (mysqld)
   Status: "Taking your SQL requests now..."
    Tasks: 27 (limit: 4656)
   CGroup: /system.slice/mariadb.service
           └─1016 /usr/sbin/mysqld
```

Figure 4.2: verifying apache2 and mariadb services in managed ubuntu

```
[khlvn@centos ~]$ 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 2024-11-05 18:49:34 EST; 2h 11min ago
     Docs: man:httpd(8)
           man:apachectl(8)
  Process: 10830 ExecReload=/usr/sbin/httpd $OPTIONS -k graceful (code=exited, s
tatus=0/SUCCESS)
 Main PID: 1341 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic:   0 B/s
ec"
    Tasks: 6
   CGroup: /system.slice/httpd.service
           ├─ 1341 /usr/sbin/httpd -DFOREGROUND
           ├─10846 /usr/sbin/httpd -DFOREGROUND
           ├─10847 /usr/sbin/httpd -DFOREGROUND
           ├─10848 /usr/sbin/httpd -DFOREGROUND
           ├─10849 /usr/sbin/httpd -DFOREGROUND
           └─10850 /usr/sbin/httpd -DFOREGROUND

Nov 05 18:49:25 centos systemd[1]: Starting The Apache HTTP Server...
Nov 05 18:49:31 centos httpd[1341]: AH00558: httpd: Could not reliably dete...ge
Nov 05 18:49:34 centos systemd[1]: Started The Apache HTTP Server.
Nov 05 19:32:02 centos systemd[1]: Reloading The Apache HTTP Server.
Nov 05 19:32:03 centos httpd[10830]: AH00558: httpd: Could not reliably det...ge
Nov 05 19:32:03 centos systemd[1]: Reloaded The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
```

```
[khlvn@centos ~]$ systemctl status mariadb
● mariadb.service - MariaDB database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; vendor pres
et: disabled)
   Active: active (running) since Tue 2024-11-05 18:49:43 EST; 2h 10min ago
  Process: 1476 ExecStartPost=/usr/libexec/mariadb-wait-ready $MAINPID (code=exi
ted, status=0/SUCCESS)
  Process: 1301 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir %n (code=exited
, status=0/SUCCESS)
 Main PID: 1475 (mysqld_safe)
    Tasks: 20
   CGroup: /system.slice/mariadb.service
           ├─1475 /bin/sh /usr/bin/mysqld_safe --basedir=/usr
           └─1690 /usr/libexec/mysqld --basedir=/usr --datadir=/var/lib/mysql...

Nov 05 18:49:24 centos systemd[1]: Starting MariaDB database server...
Nov 05 18:49:26 centos mariadb-prepare-db-dir[1301]: Database MariaDB is prob...
Nov 05 18:49:26 centos mariadb-prepare-db-dir[1301]: If this is not the case,...
Nov 05 18:49:27 centos mysqld_safe[1475]: 241105 18:49:27 mysqld_safe Loggin....
Nov 05 18:49:27 centos mysqld_safe[1475]: 241105 18:49:27 mysqld_safe Starti...l
Nov 05 18:49:43 centos systemd[1]: Started MariaDB database server.
Hint: Some lines were ellipsized, use -l to show in full.
```

Figure 4.3: verifying apache2 and mariadb services in managed centos

OUTPUT ANSIBLE PLAYBOOK

```
PLAY RECAP *********************************************************************
centos                     : ok=10   changed=0    unreachable=0    failed=0    s
kipped=7    rescued=0    ignored=0
server1                    : ok=6    changed=0    unreachable=0    failed=0    s
kipped=4    rescued=0    ignored=0

punopaughey@workstation:~/CPE_MIDEXAM_NICOLAS$
```

site.yml

```
---
 - hosts: all
   become: true
   pre_tasks:

   - name: update repository index (CentOS)
     dnf:
       update_cache: yes
     changed_when: false
     when: ansible_distribution == "CentOS"

   - name: update repository index (Ubuntu)
     apt:
       update_cache: yes
     changed_when: false
     when: ansible_distribution == "Ubuntu"

 - hosts: managed
   become: true
   roles:
     - managed

 - hosts: web
   become: true
   roles:
     - web
```

managed/tasks/main.yml

```
---
# Elk Stack
 - name: Allow Port 9200 through Firewall (CentOS)
   tags: centos
   firewalld:
     zone: public
     port: 9200/tcp
     permanent: yes
     state: enabled
```

```
    immediate: yes
  when: ansible_distribution == "CentOS"

- name: Allow Port 9200 through Firewall (Ubuntu)
  tags: ubuntu
  ufw:
    rule: allow
    port: 9200
    proto: tcp
  when: ansible_distribution == "Ubuntu"

- name: Add GPG key for ELK Stack (Ubuntu)
  tags: ubuntu, elk
  apt_key:
    url: https://artifacts.elastic.co/GPG-KEY-elasticsearch
    state: present
  when: ansible_distribution == "Ubuntu"

- name: Add ELK Stack to Yum repository (CentOS)
  tags: centos, elk
  yum_repository:
    name: elasticsearch
    description: ElasticSearch Repository
    baseurl: https://artifacts.elastic.co/packages/7.x/yum
    gpgcheck: yes
    gpgkey: https://artifacts.elastic.co/GPG-KEY-elasticsearch
    enabled: yes
  when: ansible_distribution == "CentOS"

- name: Add ELK Stack to APT repository (Ubuntu)
  tags: ubuntu, elk
  apt_repository:
    repo: "deb https://artifacts.elastic.co/packages/7.x/apt stable main"
  when: ansible_distribution == "Ubuntu"

- name: Configure Elasticsearch
  tags: centos, ubuntu, elk
  blockinfile:
    path: /etc/elasticsearch/elasticsearch.yml
    block: |
      # Elasticsearch config file

      cluster.name: my-cluster
      node.name: dev-node-1
      network.host: 0.0.0.0
      http.port: 9200
      discovery.type: single-node
      path.data: /var/lib/elasticsearch
      path.logs: /var/log/elasticsearch
      bootstrap.memory_lock: true
```

```
    state: present
    create: yes

- name: Add GPG key for ElasticSearch (Ubuntu)
  tags: ubuntu
  apt_key:
    url: https://artifacts.elastic.co/GPG-KEY-elasticsearch
    state: present
  when: ansible_distribution == "Ubuntu"

- name: Install Elk stack (Ubuntu & Centos)
  tags: ubuntu, centos, elk
  package:
    name:
      - elasticsearch
      - kibana
      - logstash
    state: latest

- name: Enable ELK Stack service (Ubuntu & Centos)
  tags: ubuntu, centos, elk
  vars:
    elk_stack:
      - elasticsearch
      - kibana
      - logstash
  service:
    name: "{{ item }}"
    enabled: yes
    state: started
  loop: "{{ elk_stack }}"

# Grafana n co
# - name: Install Grafana, Prometheus, and InfluxDB (Ubuntu)
# - name: Install Grafana, Prometheus, and InfluxDB (Centos)

# - name: Enable Grafana, Prometheus, and InfluxDB service

# Lamp Stack
- name: Install Lamp Stack (httpd, php, mariadb) (Ubuntu)
  tags: ubuntu, lamp
  package:
    name:
      - apache2
      - php
      - mariadb-client
      - mariadb-server
    state: latest
  when: ansible_distribution == "Ubuntu"
```

```
 - name: Install Lamp Stack (httpd, php, mariadb) (Centos)
   tags: centos, lamp
   package:
     name:
       - httpd
       - php
       - mariadb-server
     state: latest
   when: ansible_distribution == "CentOS"

 - name: Enable Lamp Stack service (Ubuntu)
   tags: ubuntu, lamp
   vars:
     lamp_stack_u:
       - apache2
       - mariadb
   service:
     name: "{{ item }}"
     enabled: yes
     state: started
   loop: "{{ lamp_stack_u }}"
   when: ansible_distribution == "Ubuntu"

 - name: Enable Lamp Stack service (Centos)
   tags: centos, lamp
   vars:
     lamp_stack_c:
       - httpd
       - mariadb
   service:
     name: "{{ item }}"
     enabled: yes
     state: started
   loop: "{{ lamp_stack_c }}"
   when: ansible_distribution == "CentOS"
```

web/tasks/main.yml (Nagios)

```
---
# Nagios

 - name: install Nagios Prereq (Ubuntu)
   tags: ubuntu, nagios
   package:
     name:
       - gcc
       - libc6-dev
       - libpng-dev
       - libfreetype6-dev
```

```
      - libgd-dev
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: install Nagios Prereq (Centos)
  tags: centos, nagios
  package:
    name:
      - epel-release
      - freetype-devel
      - gd-devel
      - gcc
      - glibc
      - libpng-devel
    state: latest
  when: ansible_distribution == "CentOS"

- name: Install Nagios (CentOS)
  tags: centos nagios
  package:
    name: nagios
    state: latest
  when: ansible_distribution == "CentOS"

- name: Install Nagios (Ubuntu)
  tags: ubuntu, nagios
  apt:
    name: nagios3
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: Enable Nagios Service (Centos)
  tags: centos, nagios
  service:
    name: nagios
    enabled: yes
    state: started
  when: ansible_distribution == "CentOS"

- name: Enable Nagios Service (Ubuntu)
  tags: ubuntu, nagios
  service:
    name: nagios3
    enabled: yes
    state: started
  when: ansible_distribution == "Ubuntu"
```

GitHub link:

KHLVN/CPE_MIDEXAM_NICOLAS
Conclusions: (link your conclusion from the objective) **In this examination, I have performed tasks that we have done in the earlier hands on activities. This examination solidifies our knowledge of installing different third-party services and web applications that are not present in the application package managers of several linux distributions. Although the activities we've performed during the midterm period were done in the lab separately, this time we installed all the packages at the same time which was stressful since the YAML files are getting longer and bigger in size.**