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Course/Section: CPE31S2	Date Submitted: 09/20/2024
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Midterm Skills Exam: Install, Configure, and Manage Log Monitoring tools

1. Objectives

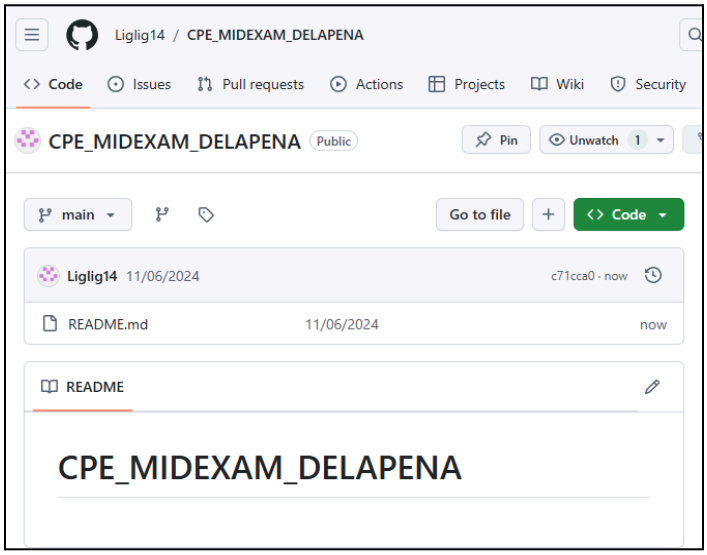
Create and design a workflow that installs, configure and manage enterprise availability, performance and log monitoring tools using Ansible as an Infrastructure as Code (IaC) tool.

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 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)

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



Clone the repository and do the following:

```
jose@workstation:~$ git clone git@github.com:Liglig14/CPE_MIDEXAM_DELAPENA.git
Cloning into 'CPE_MIDEXAM_DELAPENA'...
remote: Enumerating objects: 9, done.
remote: Counting objects: 100% (9/9), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 9 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (9/9), done.
jose@workstation:~$
```

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

```
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ ls
ansible.cfg  install.yml  inventory  README.md  roles
```

Main tasks:

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

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

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

Workstation
Elastic Stack:

```
jose@workstation:~$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
     Loaded: loaded (/usr/lib/systemd/system/elasticsearch.service; enabled;
     Active: active (running) since Wed 2024-11-06 07:34:03 PST; 23min ago
       Docs: https://www.elastic.co
   Main PID: 1378 (java)
      Tasks: 76 (limit: 4615)
     Memory: 766.8M (peak: 2.1G swap: 1.7G swap peak: 1.7G)
        CPU: 57.757s
     CGroup: /system.slice/elasticsearch.service
             ├─1378 /usr/share/elasticsearch/jdk/bin/java -Xms4m -Xmx64m -XX
             ├─2366 /usr/share/elasticsearch/jdk/bin/java -Des.networkaddres
             └─2821 /usr/share/elasticsearch/modules/x-pack-ml/platform/linu
```

```
jose@workstation:~$ systemctl status kibana
● kibana.service - Kibana
     Loaded: loaded (/usr/lib/systemd/system/kibana.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:28:47 PST; 29min ago
       Docs: https://www.elastic.co
   Main PID: 1380 (node)
      Tasks: 11 (limit: 4615)
     Memory: 349.7M (peak: 433.6M swap: 3.6M swap peak: 3.6M)
        CPU: 17.839s
     CGroup: /system.slice/kibana.service
             └─1380 /usr/share/kibana/bin/../node/glibc-217/bin/node /usr/share/kibana/
```

```
jose@workstation:~$ systemctl status logstash
● logstash.service - logstash
     Loaded: loaded (/usr/lib/systemd/system/logstash.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:58:11 PST; 17s ago
   Main PID: 6646 (java)
      Tasks: 21 (limit: 4615)
     Memory: 420.0M (peak: 420.5M)
        CPU: 30.997s
     CGroup: /system.slice/logstash.service
             └─6646 /usr/share/logstash/jdk/bin/java -Xms1g -Xmx1g -Djava.awt.headless=tr
```

Nagios:

```
jose@workstation:~$ systemctl status nagios4
● nagios4.service - nagios4
     Loaded: loaded (/usr/lib/systemd/system/nagios4.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 08:08:58 PST; 4s ago
       Docs: man:nagios4
    Process: 8829 ExecStartPre=sh -c nagiospipe=$$(sed -n "s/^command_file=\(.*\)/\1/p" $
   Main PID: 8833 (nagios4)
      Tasks: 6 (limit: 4615)
     Memory: 3.6M (peak: 4.2M)
        CPU: 50ms
     CGroup: /system.slice/nagios4.service
             ├─8833 /usr/sbin/nagios4 /etc/nagios4/nagios.cfg
             ├─8837 /usr/sbin/nagios4 --worker /var/lib/nagios4/rw/nagios.qh
             ├─8838 /usr/sbin/nagios4 --worker /var/lib/nagios4/rw/nagios.qh
             ├─8839 /usr/sbin/nagios4 --worker /var/lib/nagios4/rw/nagios.qh
             ├─8840 /usr/sbin/nagios4 --worker /var/lib/nagios4/rw/nagios.qh
             └─8841 /usr/sbin/nagios4 /etc/nagios4/nagios.cfg
```

Prometheus:

```
jose@workstation:~$ systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:28:47 PST; 43min ago
   Main PID: 1382 (prometheus)
      Tasks: 9 (limit: 4615)
     Memory: 43.6M (peak: 126.7M swap: 10.0M swap peak: 47.8M)
        CPU: 3.259s
     CGroup: /system.slice/prometheus.service
             └─1382 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.ym
```

Influxdb:

```
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ systemctl status influxdb
● influxdb.service - InfluxDB is an open-source, distributed, time series database
     Loaded: loaded (/usr/lib/systemd/system/influxdb.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 10:06:19 PST; 2min 13s ago
       Docs: man:influxd(1)
   Main PID: 46907 (influxd)
      Tasks: 9 (limit: 4615)
     Memory: 6.2M (peak: 6.4M)
        CPU: 103ms
     CGroup: /system.slice/influxdb.service
             └─46907 /usr/bin/influxd -config /etc/influxdb/influxdb.conf
```

Grafana:

Apache:

```
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:28:51 PST; 2h 12min ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1471 (apache2)
      Tasks: 6 (limit: 4615)
     Memory: 4.5M (peak: 18.8M swap: 8.7M swap peak: 8.7M)
        CPU: 458ms
     CGroup: /system.slice/apache2.service
             ├─1471 /usr/sbin/apache2 -k start
             ├─1485 /usr/sbin/apache2 -k start
             ├─1486 /usr/sbin/apache2 -k start
             ├─1487 /usr/sbin/apache2 -k start
             ├─1488 /usr/sbin/apache2 -k start
             └─1489 /usr/sbin/apache2 -k start
```

Php:

```
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ which php
/usr/bin/php
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ php --version
PHP 8.3.6 (cli) (built: Sep 30 2024 15:17:17) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.3.6, Copyright (c) Zend Technologies
    with Zend OPcache v8.3.6, Copyright (c), by Zend Technologies
jose@workstation:~/CPE_MIDEXAM_DELAPENA$
```

Mariadb:

```
jose@workstation:~/CPE_MIDEXAM_DELAPENA$ systemctl status mariadb
● mariadb.service - MariaDB 10.11.8 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 09:19:16 PST; 1min 0s ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 31528 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 11 (limit: 30464)
     Memory: 82.6M (peak: 85.7M)
        CPU: 704ms
     CGroup: /system.slice/mariadb.service
             └─31528 /usr/sbin/mariadbd
```

Ubuntu Manage Node

Elastic Stack:

```
jose@server1:~$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
     Loaded: loaded (/usr/lib/systemd/system/elasticsearch.service; enabled; preset: enab
     Active: active (running) since Wed 2024-11-06 07:40:43 PST; 22min ago
       Docs: https://www.elastic.co
   Main PID: 1228 (java)
      Tasks: 75 (limit: 4615)
     Memory: 748.1M (peak: 2.1G swap: 1.7G swap peak: 1.7G)
        CPU: 1min 2.123s
     CGroup: /system.slice/elasticsearch.service
             ├─1228 /usr/share/elasticsearch/jdk/bin/java -Xms4m -Xmx64m -XX:+UseSerialGC
             ├─2229 /usr/share/elasticsearch/jdk/bin/java -Des.networkaddress.cache.ttl=6
             └─2672 /usr/share/elasticsearch/modules/x-pack-ml/platform/linux-x86_64/bin/
```

```
jose@server1:~$ systemctl status kibana
● kibana.service - Kibana
     Loaded: loaded (/usr/lib/systemd/system/kibana.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:34:42 PST; 28min ago
       Docs: https://www.elastic.co
   Main PID: 1230 (node)
      Tasks: 11 (limit: 4615)
     Memory: 380.1M (peak: 426.5M swap: 636.0K swap peak: 636.0K)
        CPU: 19.022s
     CGroup: /system.slice/kibana.service
             └─1230 /usr/share/kibana/bin/../node/glibc-217/bin/node /usr/share/kibana/bi
```

```
jose@server1:~$ systemctl status logstash
● logstash.service - logstash
     Loaded: loaded (/usr/lib/systemd/system/logstash.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 08:03:25 PST; 11s ago
   Main PID: 6216 (java)
      Tasks: 21 (limit: 4615)
     Memory: 299.4M (peak: 299.7M)
        CPU: 19.003s
     CGroup: /system.slice/logstash.service
             └─6216 /usr/share/logstash/jdk/bin/java -Xms1g -Xmx1g -Djava.awt.headless=tr

Nov 06 08:03:25 server1 systemd[1]: logstash.service: Consumed 40.867s CPU time.
Nov 06 08:03:25 server1 systemd[1]: logstash.service: Scheduled restart job, restart coun
Nov 06 08:03:25 server1 systemd[1]: Started logstash.service - logstash.
Nov 06 08:03:25 server1 logstash[6216]: Using bundled JDK: /usr/share/logstash/jdk
```

Prometheus:

```
jose@server1:~$ systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 07:34:42 PST; 38min ago
   Main PID: 1232 (prometheus)
      Tasks: 9 (limit: 4615)
     Memory: 69.4M (peak: 119.0M swap: 11.6M swap peak: 24.6M)
        CPU: 2.915s
     CGroup: /system.slice/prometheus.service
             └─1232 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.ym
```

Influxdb:

```
jose@server1:~$ systemctl status influxdb
● influxdb.service - InfluxDB is an open-source, distributed, time series database
     Loaded: loaded (/usr/lib/systemd/system/influxdb.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 10:06:28 PST; 2min 40s ago
       Docs: man:influxd(1)
   Main PID: 14914 (influxd)
      Tasks: 8 (limit: 4615)
     Memory: 6.7M (peak: 6.9M)
        CPU: 322ms
     CGroup: /system.slice/influxdb.service
             └─14914 /usr/bin/influxd -config /etc/influxdb/influxdb.conf
```

Grafana:

Apache:

```
jose@server1:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 09:26:12 PST; 16min ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 1199 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 1373 (apache2)
      Tasks: 6 (limit: 4615)
     Memory: 4.1M (peak: 26.8M swap: 8.9M swap peak: 8.9M)
        CPU: 261ms
     CGroup: /system.slice/apache2.service
             ├─1373 /usr/sbin/apache2 -k start
             ├─1521 /usr/sbin/apache2 -k start
             ├─1522 /usr/sbin/apache2 -k start
             ├─1523 /usr/sbin/apache2 -k start
             ├─1524 /usr/sbin/apache2 -k start
             └─1525 /usr/sbin/apache2 -k start
```

Php:

```
jose@server1:~$ which php
/usr/bin/php
jose@server1:~$ php --version
PHP 8.3.6 (cli) (built: Sep 30 2024 15:17:17) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.3.6, Copyright (c) Zend Technologies
    with Zend OPcache v8.3.6, Copyright (c), by Zend Technologies
jose@server1:~$
```

Mariadb:

```
jose@server1:~$ systemctl status mariadb
● mariadb.service - MariaDB 10.11.8 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
     Active: active (running) since Wed 2024-11-06 09:26:23 PST; 4min 0s ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
    Process: 1201 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run/mysqld (code=exited, status=0/SUCCE>
    Process: 1213 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCC>
    Process: 1216 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR= ||   VAR=`cd /usr/bin/..; /usr/bin/>
    Process: 1758 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUC>
    Process: 1760 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUCCESS)
   Main PID: 1298 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 10 (limit: 30464)
     Memory: 10.8M (peak: 111.8M swap: 73.9M swap peak: 73.9M)
        CPU: 927ms
     CGroup: /system.slice/mariadb.service
             └─1298 /usr/sbin/mariadbd
```

CentOS
Elastic Stack:

```
[Jose@localhost ~]$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
   Loaded: loaded (/usr/lib/systemd/system/elasticsearch.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2024-11-05 18:54:28 EST; 11min ago
     Docs: https://www.elastic.co
 Main PID: 1231 (java)
    Tasks: 78
   CGroup: /system.slice/elasticsearch.service
           ├─1231 /usr/share/elasticsearch/jdk/bin/java -Xms4m -Xmx64m -XX:+UseSerialGC -Dcli.name=server
           ├─2370 /usr/share/elasticsearch/jdk/bin/java -Des.networkaddress.cache.ttl=60 -Des.networkaddres
           └─2419 /usr/share/elasticsearch/modules/x-pack-ml/platform/linux-x86_64/bin/controller
```

```
[Jose@localhost ~]$ systemctl status kibana
● kibana.service - Kibana
   Loaded: loaded (/usr/lib/systemd/system/kibana.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2024-11-05 18:51:11 EST; 14min ago
     Docs: https://www.elastic.co
 Main PID: 1240 (node)
    Tasks: 11
   CGroup: /system.slice/kibana.service
           └─1240 /usr/share/kibana/bin/../node/glibc-217/bin/node /usr/share/kibana/bin/../src/cli/dist
```

```
[Jose@localhost ~]$ systemctl status logstash
● logstash.service - logstash
   Loaded: loaded (/usr/lib/systemd/system/logstash.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2024-11-05 19:05:43 EST; 126ms ago
 Main PID: 5030 (logstash)
    Tasks: 19
   CGroup: /system.slice/logstash.service
           ├─5030 /bin/bash /usr/share/logstash/bin/logstash --path.settings /etc/logstash
           └─5042 /usr/share/logstash/jdk/bin/java -cp /usr/share/logstash/vendor/jruby/lib/jruby.jar:/usr/
```

Prometheus:

```
[Jose@localhost ~]$ which prometheus
/usr/local/bin/prometheus
[Jose@localhost ~]$ 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
```

Influxdb:

Grafana:

Apache:

```
[Jose@localhost ~]$ systemctl status httpd.service
● 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 18:51:21 EST; 2h 6min ago
     Docs: man:httpd(8)
           man:apachectl(8)
 Main PID: 1259 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic:   0 B/sec"
    Tasks: 6
   CGroup: /system.slice/httpd.service
           ├─1259 /usr/sbin/httpd -DFOREGROUND
           ├─1834 /usr/sbin/httpd -DFOREGROUND
           ├─1835 /usr/sbin/httpd -DFOREGROUND
           ├─1836 /usr/sbin/httpd -DFOREGROUND
           ├─1837 /usr/sbin/httpd -DFOREGROUND
           └─1838 /usr/sbin/httpd -DFOREGROUND
```

Php:

```
[Jose@localhost ~]$ php --version
PHP 5.4.16 (cli) (built: Apr  1 2020 04:07:17)
Copyright (c) 1997-2013 The PHP Group
Zend Engine v2.4.0, Copyright (c) 1998-2013 Zend Technologies
[Jose@localhost ~]$
```

Mariadb:

```
[Jose@localhost ~]$ systemctl status mariadb
● mariadb.service - MariaDB database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2024-11-05 18:51:27 EST; 1h 37min ago
  Process: 1409 ExecStartPost=/usr/libexec/mariadb-wait-ready $MAINPID (code=exited, status=0/SUCCESS)
  Process: 1222 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir %n (code=exited, status=0/SUCCESS)
 Main PID: 1408 (mysqld_safe)
    Tasks: 20
   CGroup: /system.slice/mariadb.service
           ├─1408 /bin/sh /usr/bin/mysqld_safe --basedir=/usr
           └─1580 /usr/libexec/mysqld --basedir=/usr --datadir=/var/lib/mysql --plugin-dir=/usr/lib64/m
```

Codes

Elastic Stack:

```yaml
---
    - name: Install prerequisites
      yum:
        name: "{{ item }}"
        state: present
      loop:
        - wget
        - yum-utils
        - epel-release

    - name: Add Elastic GPG key
      rpm_key:
        state: present
        key: "https://artifacts.elastic.co/GPG-KEY-elasticsearch"

    - name: Install Kibana
      yum:
        name: kibana
        state: latest

    - name: Configure Kibana
      lineinfile:
        path: /etc/kibana/kibana.yml
        regexp: '^{{ item.key }}:'
        line: '{{ item.key }}: {{ item.value }}'
      loop:
        - { key: 'server.host', value: '0.0.0.0' }  # Allow external connections
        - { key: 'elasticsearch.hosts', value: 'http://localhost:9200' }  # Update if necessary

    - name: Enable and start Kibana service
      systemd:
        name: kibana
        enabled: yes
```

Nagios:

Prometheus:

```yaml
---
- name: Install required packages
  apt:
    name:
      - wget
      - curl
      - tar
      - gnupg
    state: present

- name: Create Prometheus directory
  file:
    path: /etc/prometheus
    state: directory
    mode: '0755'

- name: Download Prometheus
  get_url:
    url: "https://github.com/prometheus/prometheus/releases/download/v2.54.1/prometheus-2.54.1.linux-amd64.tar.gz"
    dest: /tmp/prometheus.tar.gz

- name: Extract Prometheus
  unarchive:
    src: /tmp/prometheus.tar.gz
    dest: /usr/local/bin/
    remote_src: yes

- name: Move Prometheus binary to /usr/local/bin
  command: mv /usr/local/bin/prometheus-2.54.1.linux-amd64/prometheus /usr/local/bin/prometheus

- name: Move Prometheus configuration file to /etc/prometheus
  template:
    src: prometheus.yml.j2
```

```yaml
    src: prometheus.yml.j2
    dest: /etc/prometheus/prometheus.yml

- name: Create Prometheus service file
  copy:
    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 \
        --web.listen-address="0.0.0.0:9090"

      [Install]
      WantedBy=multi-user.target
    dest: /etc/systemd/system/prometheus.service

- name: Start and enable Prometheus
  systemd:
    name: prometheus
    state: started
    enabled: yes
```

Influxdb:

```
---
  - name: Install InfluxDB
    apt:
      name: influxdb
      state: latest

  - name: Enable and start InfluxDB service
    systemd:
      name: influxdb
      enabled: yes
      state: started
```

Grafana:

Lamp Stack:

```
---
  - name: install mariadb
    yum:
      name:
        - mariadb-server
      state: latest
  - name: start mariadb
    service:
      name: mariadb
      enabled: true
      state: started
```

GitHub link:
https://github.com/Liglig14/CPE212DelaPena-MidtermExam

Conclusions: (link your conclusion from the objective)

- In this course CPE212 Automating Server Management, I've had a completely different perspective of System Administration. Just like in this Examination we have installed multiple different softwares on multiple servers at once using one playbook. This developed my fundamentals, especially with utilizing Ansible as IaC tool, because I know later on job opportunities will come to me and inspect my skills if I am qualified. Installing and understanding these monitoring tools enhances my knowledge as well as my

capabilities on what to use to monitor my servers and how I can make every processes as efficient as I can.