Name: John Renzo L. Mendoza	**Date Performed:** October 26, 2023
Course/Section: CPE 31S5	**Date Submitted:** October 28, 2023
Instructor: Engr. Roman Richard	**Semester and SY:** 1st Semester 2023 - 2024

Activity 10: Install, Configure, and Manage Log Monitoring tools

1. Objectives

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

2. Discussion

Log monitoring software scans and monitors log files generated by servers, applications, and networks. By detecting and alerting users to patterns in these log files, log monitoring software helps solve performance and security issues. System administrators use log monitoring software to detect common important events indicated by log files.

Log monitoring software helps maintain IT infrastructure performance and pinpoints issues to prevent downtime and mitigate risks. These tools will often integrate with IT alerting software, log analysis software, and other IT issue resolution products to more aptly flesh out the IT infrastructure maintenance ecosystem.

To qualify for inclusion in the Log Monitoring category, a product must:

- Monitor the log files generated by servers, applications, or networks
- Alert users when important events are detected
- Provide reporting capabilities for log files

Elastic Stack

ELK suite stands for Elasticsearch, Kibana, Beats, and Logstash (also known as the ELK Stack). Source: https://www.elastic.co/elastic-stack

The Elastic Stack is a group of open source products from Elastic designed to help users take data from any type of source and in any format, and search, analyze and visualize that data in real time. The product group was formerly known as the ELK Stack for the core products in the group -- Elasticsearch, Logstash and Kibana -- but has been rebranded as the Elastic Stack. A fourth product, Beats, was subsequently added to the stack. The Elastic Stack can be deployed on premises or made available as software as a service (SaaS). Elasticsearch supports Amazon Web Services (AWS), Google Cloud Platform and Microsoft Azure.

GrayLog

Graylog is a powerful platform that allows for easy log management of both structured and unstructured data along with debugging applications.

It is based on Elasticsearch, MongoDB, and Scala. Graylog has a main server, which receives data from its clients installed on different servers, and a web interface, which visualizes the data and allows it to work with logs aggregated by the main server.

We use Graylog primarily as the stash for the logs of the web applications we build. However, it is also effective when working with raw strings (i.e. syslog): the tool parses it into the structured data we need. It also allows advanced custom search in the logs using structured queries. In other words, when integrated properly with a web app, Graylog helps engineers to analyze the system behavior on almost per code line basis.

Source: https://www.graylog.org/products/open-source

3. Tasks

1. Create a playbook that:
    a. Install and configure Elastic Stack in separate hosts (Elastic Search, Kibana, Logstash)
2. Apply the concept of creating roles.
3. Describe how you did step 1. (Provide screenshots and explanations in your report. Make your report detailed such that it will look like a manual.)
4. Show an output of the installed Elastic Stack for both Ubuntu and CentOS.
5. Make sure to create a new repository in GitHub for this activity.

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

Creation of a new repository to be used on this activity, as required.

Observation:

- I have created a new repository CPE232_MendozaExperiment10 by making one in the GitHub website.

Cloning the created GitHub repository to the Control Node.

Observation:

- Using the `git clone` command, I have imported the created repository to the local control node.

Creation of the inventory file “`myHosts`” under the cloned repository.

Observation:

- I have created `myHosts` as my inventory file which stores the ip addresses of the managed nodes.

Creation of the ansible configuration file `ansible.cfg`.

Observation:

- I have also created an ansible configuration file that stores the configuration needed for running ansible.

1. Create a playbook that:
    a. Install and configure Elastic Stack in separate hosts (Elastic Search, Kibana, Logstash)

    Main playbook file:

Observation:

- This playbook file is to update and upgrade both of the remote servers. This also imports the `main.yml` on the role Elastic Stack.

`main.yml` file which imports tasks from `install_Elastic_Stack_Ubuntu.yml` and `install_Elastic_Stack_CentOS.yml`

Observation:

- This playbook is defined under the role Elastic Stack. This basically imports the tasks from `install_Elastic_Stack_Ubuntu.yml` and `install_Elastic_Stack_CentOS.yml`.

Tasks from: `install_Elastic_Stack_Ubuntu.yml`

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox
Activities
Terminal
Oct 26 16:32
jhanzmendoza@workstation: ~/CPE232_MendozaExperiment10
GNU nano 6.2
roles/elastic_stack/tasks/install_Elastic_Stack_Ubuntu.yml
- name: Install Elastic Stack
apt:
name: elasticsearch
state: present
become: yes
when: ansible_distribution == "Ubuntu"
- name: Enable Elastic Stack Log Monitoring Tool
systemd:
name: elasticsearch
enabled: yes
state: started
become: yes
when: ansible_distribution == "Ubuntu"
- name: Install Kibana
apt:
name: kibana
state: present
become: yes
when: ansible_distribution == "Ubuntu"
- name: Enable Kibana Service
systemd:
name: kibana
enabled: yes
^G Help
^X Exit
^O Write Out
^R Read File
^W Where Is
^\ Replace
DirectX Diagnostic Tool
System
Display
Sound 1
Sound 2
Sound 3
Input
This tool reports detailed information about the DirectX components and drivers installed on your system.
If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.
System Information
Current Date/Time: Thursday, October 26, 2023, 4:31:57 PM
Computer Name: DESKTOP-DP133J6
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: System manufacturer
System Model: System Product Name
BIOS: 5602
Processor: AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory: 16384MB RAM
Page file: 20985MB used, 4651MB available
DirectX Version: DirectX 12
Check for WHQL digital signatures
DxDiag 10.00.19041.3570 64-bit Unicode Copyright © Microsoft. All rights reserved.
Help
Next Page
Save All Information...
Exit

Observation:

- These are the tasks which are responsible for installing the required packages for Elastic Stack, Kibana, and Logstash on Ubuntu remote server.

Tasks from: `install_Elastic_Stack_CentOS.yml`

GNU nano 6.2 roles/elastic_stack/tasks/install_Elastic_Stack_CentOS.yml
type=rpm-md
dest: /etc/yum.repos.d/elasticsearch.repo
become: yes
when: ansible_distribution == "CentOS"
- name: Installing Elastic Stack
yum:
name: elasticsearch
state: present
become: yes
when: ansible_distribution == "CentOS"
- name: Enabling Elastic Stack Log Monitoring Tool
systemd:
name: elasticsearch
enabled: yes
state: started
become: yes
when: ansible_distribution == "CentOS"
- name: Installing Kibana
yum:
name: kibana
state: present
become: yes
when: ansible_distribution == "CentOS"
^G Help ^O Write Out ^W Where Is
^X Exit ^R Read File ^\ Replace
DirectX Diagnostic Tool
System Display Sound 1 Sound 2 Sound 3 Input
This tool reports detailed information about the DirectX components and drivers installed on your system.
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Help
Next Page
Save All Information...
Exit

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox
GNU nano 6.2 roles/elastic_stack/tasks/install_Elastic_Stack_CentOS.yml
name: kibana
state: present
become: yes
when: ansible_distribution == "CentOS"
- name: Enabling Kibana Service
systemd:
name: kibana
enabled: yes
state: started
become: yes
when: ansible_distribution == "CentOS"
- name: Installing Logstash Service
yum:
name: logstash
state: present
become: yes
when: ansible_distribution == "CentOS"
- name: Enabling Logstash Service
systemd:
name: logstash
enabled: yes
state: started
become: yes
when: ansible_distribution == "CentOS"
^G Help
^X Exit
^O Write Out
^R Read File
^W Where Is
^\ Replace
DirectX Diagnostic Tool
System
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Sound 1
Sound 2
Sound 3
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Exit

Observation:

- These are the tasks which are responsible for installing the required packages for Elastic Stack, Kibana, and Logstash on CentOS remote server.

2. Apply the concept of creating roles.

Observation:

- I have used the command `ansible-galaxy` in order to create the role `elastic_stack`. This role will be responsible for having the playbook files required to install Elastic Stack on Ubuntu and CentOS remote servers.
- The command `tree roles` is to show the created directories for the role in tree format.

3. Describe how you did step 1. (Provide screenshots and explanations in your report. Make your report detailed such that it will look like a manual.)

   a. Creation of ansible roles to be implemented in this experiment using the `ansible_galaxy` command.

Observation:

- I have used the command `ansible-galaxy` in order to create the role `elastic_stack`. This role will be responsible for having the playbook files required to install Elastic Stack on Ubuntu and CentOS remote servers.
- The command `tree roles` is to show the created directories for the role in tree format.

b. Creation of the playbook file that installs the Elastic Stack on the roles.

Tasks from: `install_Elastic_Stack_Ubuntu.yml`

Observation:

- This playbook file has the task needed to install Elastic Stack, Kibana, and LogStash which will be imported by the `main.yml` file in the role Elastic Stack.
- The first task is responsible for installing packages needed for Elastic Stack such as default-jre, apt-transport-https, curl, and software-properties-common
- The second task is responsible for importing the repository key so that we can open the external repository on the third task.
- The third task is responsible for importing the repository to be used to install ElasticSearch.

Observation:

- The fourth task is responsible for installing ElasticSearch from the imported external file based on the third task.
- The fifth task is responsible for starting and enabling the ElasticSearch service on the remote Ubuntu server.
- The sixth task is responsible for installing Kibana package on the remote Ubuntu server.
- The seventh task is responsible for starting and enabling the Kibana service on the remote Ubuntu server.

Observation:

- The eight task is responsible for installing Logstash on the remote Ubuntu server.
- The ninth task is responsible for starting and enabling the Logstash service on the remote Ubuntu server.
- The tenth task is responsible for restarting the kernel of the remote Ubuntu server so that the installed packages would be able to be used by the remote server.

Tasks from: `install_Elastic_Stack_CentOS.yml`

Observation:

- This playbook file has the task needed to install Elastic Stack, Kibana, and LogStash which will be imported by the `main.yml` file in the role Elastic Stack.
- The first task is responsible for installing packages needed for Elastic Stack such as java-1.8.0-openjdk, epel-release, wget, and which.
- The second task is responsible for importing the repository key so that we can open the external repository on the third task.
- The third task is responsible for importing the repository to be used to install ElasticSearch.

Observation:

- The fourth task is responsible for installing ElasticSearch from the imported external file based on the third task.
- The fifth task is responsible for starting and enabling the ElasticSearch service on the remote CentOS server.
- The sixth task is responsible for installing Kibana package on the remote CentOS server.

Observation:

- The seventh task is responsible for starting and enabling the Kibana service on the remote CentOS server.
- The eight task is responsible for installing Logstash on the remote CentOS server.
- The ninth task is responsible for starting and enabling the Logstash service on the remote CentOS server.

Observation:

- The tenth task is responsible for restarting the kernel of the remote CentOS server so that the installed packages would be able to be used by the remote server.

c. Configuring the `main.yml` to execute the created playbook.

Observation:

- This `main.yml` file will import and execute the task from Step B which are `install_Elastic_Stack_Ubuntu.yml` and `install_Elastic_Stack_CentOS.yml`. This `main.yml` is defined under the role Elastic Stack.

d. Creation of the playbook file that executes the roles.

Observation:

- This playbook file is the ansible playbook that will be executed by the system administrator. This playbook file essentially updates and upgrades the remote servers. Lastly, this playbook file also runs the `main.yml` under the role Elastic Stack.

4. Show an output of the installed Elastic Stack for both Ubuntu and CentOS.
   Playbook Output:

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Oct 26 16:41

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment10

```
included: /home/jhnrnzmendoza/CPE232_MendozaExperiment10/roles/elastic_stack/tasks/install_Elastic_Stack_Ubuntu.ym
l for 192.168.56.105, 192.168.56.101

TASK [roles/elastic_stack : Install Packages needed for Elastic Stack] ******************************************
skipping: [192.168.56.101]
ok: [192.168.56.105]

TASK [roles/elastic_stack : Import Repository Key] *************************************************************
skipping: [192.168.56.101]
ok: [192.168.56.105]

TASK [roles/elastic_stack : Import Elastic Stack Installation Repository] **************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Install Elastic Stack] *************************************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Enable Elastic Stack Log Monitoring Tool] ******************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Install Kibana] ********************************************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Enable Kibana Service] *************************************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]
```

5. Make sure to create a new

Reflections:
Answer the following:
1. What are the benefits of having

Conclusions:

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time:	Thursday, October 26, 2023, 2:00:28 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	19148MB used, 2798MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Oct 26 16:41

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment10

```
TASK [roles/elastic_stack : Install Logstash] ***********************************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Enable Logstash Service] ****************************************************
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [roles/elastic_stack : Restart Elasticsearch and Kibana] *******************************************
skipping: [192.168.56.101] => (item=elasticsearch)
skipping: [192.168.56.101] => (item=kibana)
skipping: [192.168.56.101]
changed: [192.168.56.105] => (item=elasticsearch)
changed: [192.168.56.105] => (item=kibana)

TASK [roles/elastic_stack : Execute install_Elastic_Stack_CentOS.yml] ***********************************
included: /home/jhnrnzmendoza/CPE232_MendozaExperiment10/roles/elastic_stack/tasks/install_Elastic_Stack_CentOS.ym
l for 192.168.56.105, 192.168.56.101

TASK [roles/elastic_stack : Install Packages needed for Elastic Stack] **********************************
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [roles/elastic_stack : Import Elastic Stack Repository Key] ****************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Import Elastic Stack Installation Repository] *******************************
skipping: [192.168.56.105]
changed: [192.168.56.101]
```

5. Make sure to create a new

Reflections:
Answer the following:
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DirectX Diagnostic Tool

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CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Oct 26 16:41

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment10

```
TASK [roles/elastic_stack : Installing Elastic Stack] ************************************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Enabling Elastic Stack Log Monitoring Tool] ******************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Installing Kibana] *******************************************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Enabling Kibana Service] *************************************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Installing Logstash Service] *********************************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Enabling Logstash Service] ***********************************************************
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [roles/elastic_stack : Restart Elastic Stack and Kibana] ****************************************************
skipping: [192.168.56.105] => (item=elasticsearch)
skipping: [192.168.56.105] => (item=kibana)
skipping: [192.168.56.105]
changed: [192.168.56.101] => (item=elasticsearch)
changed: [192.168.56.101] => (item=k
```

5. Make sure to create a new

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time:	Thursday, October 26, 2023, 2:00:28 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	19148MB used, 2798MB available
DirectX Version:	DirectX 12

Observation:

- This is the output of the ansible playbook `installation.yml` which executed the `main.yml` under the role Elastic Stack which also imports the tasks found from `install_Elastic_Stack_Ubuntu.yml` and `install_Elastic_Stack_CentOS.yml` which are both also under the role Elastic Stack.

Verification: Ubuntu Remote Server

Observation:

- As expected, the services Elastic Stack, Kibana, and Logstash are installed and running on the Ubuntu remote server.

Verification: CentOS Remote Server

CPE31S5 CentOs_Mendoza [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Sat 07:56
jhnrnzmendoza@CentOS:~
File Edit View Search Terminal Help
CGroup: /system.slice/elasticsearch.service
├1244 /usr/share/elasticsearch/jdk/bin/java -Xshare:auto -Des.net...
└2529 /usr/share/elasticsearch/modules/x-pack-ml/platform/linux-x...
Oct 28 07:23:33 CentOS systemd[1]: Starting Elasticsearch...
Oct 28 07:24:22 CentOS systemd-entrypoint[1244]: Oct 28, 2023 7:24:22 AM sun...>
Oct 28 07:24:22 CentOS systemd-entrypoint[1244]: WARNING: COMPAT locale prov...e
Oct 28 07:27:05 CentOS systemd[1]: Started Elasticsearch.
Hint: Some lines were ellipsized, use -l to show in full.
[jhnrnzmendoza@CentOS ~]$ systemctl status kibana
● kibana.service - Kibana
Loaded: loaded (/etc/systemd/system/kibana.service; enabled; vendor preset: d
isabled)
Active: active (running) since Sat 2023-10-28 07:23:33 EDT; 32min ago
Docs: https://www.elastic.co
Main PID: 1243 (node)
Tasks: 11
CGroup: /system.slice/kibana.service
└1243 /usr/share/kibana/bin/../node/bin/node /usr/share/kibana/bi...
Oct 28 07:23:33 CentOS systemd[1]: Star
Oct 28 07:23:50 CentOS kibana[1243]: Ki
Hint: Some lines were ellipsized, use
[jhnrnzmendoza@CentOS ~]$
Table options
DirectX Diagnostic Tool
System Display Sound 1 Sound 2 Sound 3 Input
This tool reports detailed information about the DirectX components and drivers installed on your system.
If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.
System Information
Current Date/Time: Saturday, October 28, 2023, 6:20:46 PM
Computer Name: DESKTOP-DP133J6
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: System manufacturer
System Model: System Product Name
BIOS: 5602
Processor: AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory: 16384MB RAM
Page file: 10107MB used, 12607MB available
DirectX Version: DirectX 12
Check for WHQL digital signatures
DxDiag 10.00.19041.3570 64-bit Unicode Copyright © Microsoft. All rights reserved.
Help
Next Page
Save All Information...
Exit

Observation:

- As expected, the services Elastic Stack, Kibana, and Logstash are installed and running on the CentOS remote server.

5. Make sure to create a new repository in GitHub for this activity.

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Oct 26 16:43

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment10

```
jhnrnzmendoza@workstation:~/CPE232_MendozaExperiment10$ git add ~/CPE232_MendozaExperiment10
jhnrnzmendoza@workstation:~/CPE232_MendozaExperiment10$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   ansible.cfg
        new file:   installation.yml
        new file:   myHosts
        new file:   roles/elastic_stack/README.md
        new file:   roles/elastic_stack/defaults/main.yml
        new file:   roles/elastic_stack/handlers/main.yml
        new file:   roles/elastic_stack/meta/main.yml
        new file:   roles/elastic_stack/tasks/install_Elastic_Stack_CentOS.yml
        new file:   roles/elastic_stack/tasks/install_Elastic_Stack_Ubuntu.yml
        new file:   roles/elastic_stack/tasks/main.yml
        new file:   roles/elastic_stack/tests/inventory
        new file:   roles/elastic_stack/tests/test.yml
        new file:   roles/elastic_stack/vars/main.yml

jhnrnzmendoza@workstation:~/CPE232_
[main 57f65e8] Experiment 10 Instal
 13 files changed, 306 insertions(+
 create mode 100644 ansible.cfg
 create mode 100644 installation.ym
 create mode 100644 myHosts
 create mode 100644 roles/elastic_s
 create mode 100644 roles/elastic_s
 create mode 100644 roles/elastic_s
 create mode 100644 roles/elastic_s
```

Reflections:

Answer the following:

1. What are the benefits of havi

Conclusions:

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | Input

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☐ Check for WHQL digital signatures

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Help | Next Page | Save All Information... | Exit

Observation:

- Using the Git commands, I have successfully added, committed, and pushed the changes of the repository from the local terminal to the cloud GitHub repository.

Observation:

- On the GitHub cloud repository, we can observe that the changes are successfully exported.

Github Link:
https://github.com/MendozaJRL/CPE232_MendozaExperiment10.git

Reflections:

Answer the following:

1. What are the benefits of having a log monitoring tool?
   - Log monitoring tools specialize in monitoring user's activities including the errors that have been made on the system by identifying the errors that could have been happened through the use of log. Essentially, it will help the system administrator identify which, where, and when an error occurred. In this experiment, Elastic Stack was the log monitoring tool that was introduced, specifically, Kibana is the one responsible in the form of time-series analytics. In addition, Logstash, Elastic Search, and Kibana are log monitoring services that help one another in order to monitor the performance of the system in real time.

Conclusions:

In this experiment, the students have been introduced to log monitoring tools, specifically ElasticSearch, Kibana, and Logstash. These log monitoring tools help the system administrator to monitor the user's activities in the form of time-series analytics/logs. With this kind of tool, the system administrator will ensure that his/her systems would run with a higher security. The students were able to implement this log monitoring tool using the previously learned concepts about ansible playbooks, ansible roles, and git commands. The students were also able to understand how the ansible playbook and ansible roles work since this experiment provides the students how ansible can be used in real applications. Moreover, the ansible roles simply makes the playbook execution much organized in a way that the tasks needed are just loaded to the main playbook file when needed. Furthermore, the students would be able to use the understood concepts covered on this experiment such as the essence of log monitoring tools in the future experiments