Name: Aaron Martin P. Caro	**Date Performed: 26/10/2023**
Course/Section: CPE232-CPE31S5	**Date Submitted: 26/10/2023**
Instructor: Prof. Roman Richard	**Semester and SY: 1st sem 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 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)

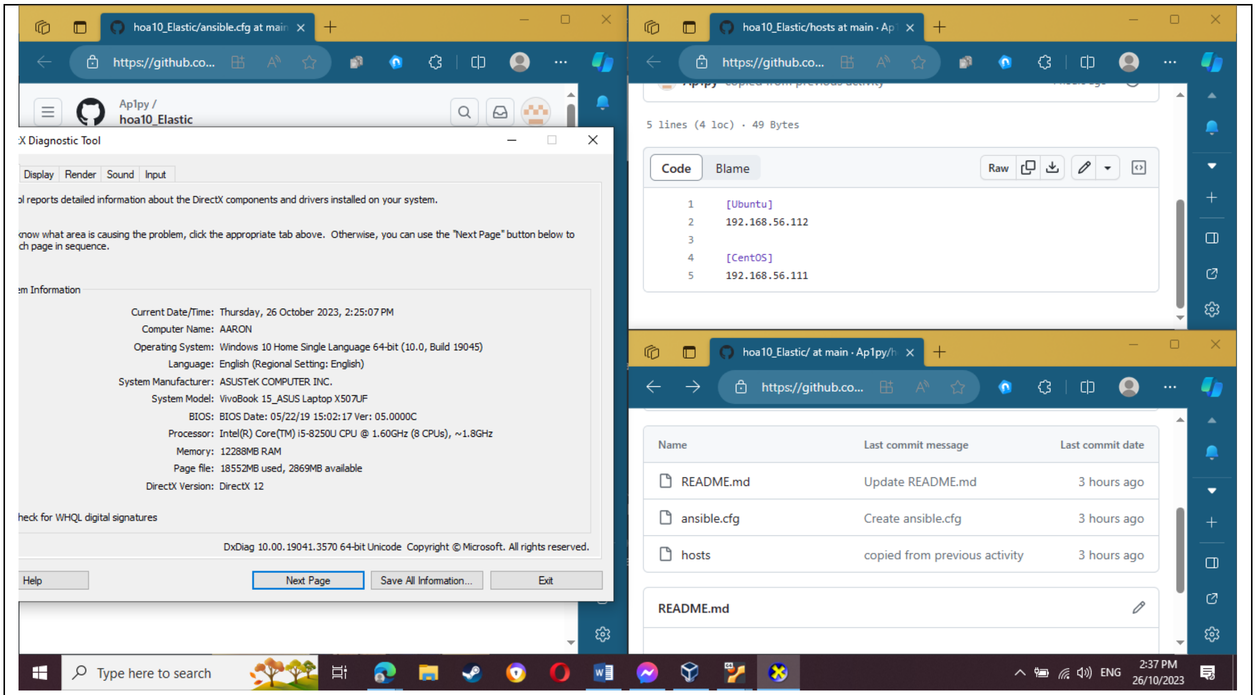
2. Apply the concept of creating roles.

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)



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em Information

```
   Current Date/Time: Thursday, 26 October 2023, 2:25:07 PM
       Computer Name: AARON
    Operating System: Windows 10 Home Single Language 64-bit (10.0, Build 19045)
            Language: English (Regional Setting: English)
 System Manufacturer: ASUSTeK COMPUTER INC.
        System Model: VivoBook 15_ASUS Laptop X507UF
                BIOS: BIOS Date: 05/22/19 15:02:17 Ver: 05.0000C
           Processor: Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz (8 CPUs), ~1.8GHz
              Memory: 12288MB RAM
           Page file: 18552MB used, 2869MB available
     DirectX Version: DirectX 12
```

heck for WHQL digital signatures

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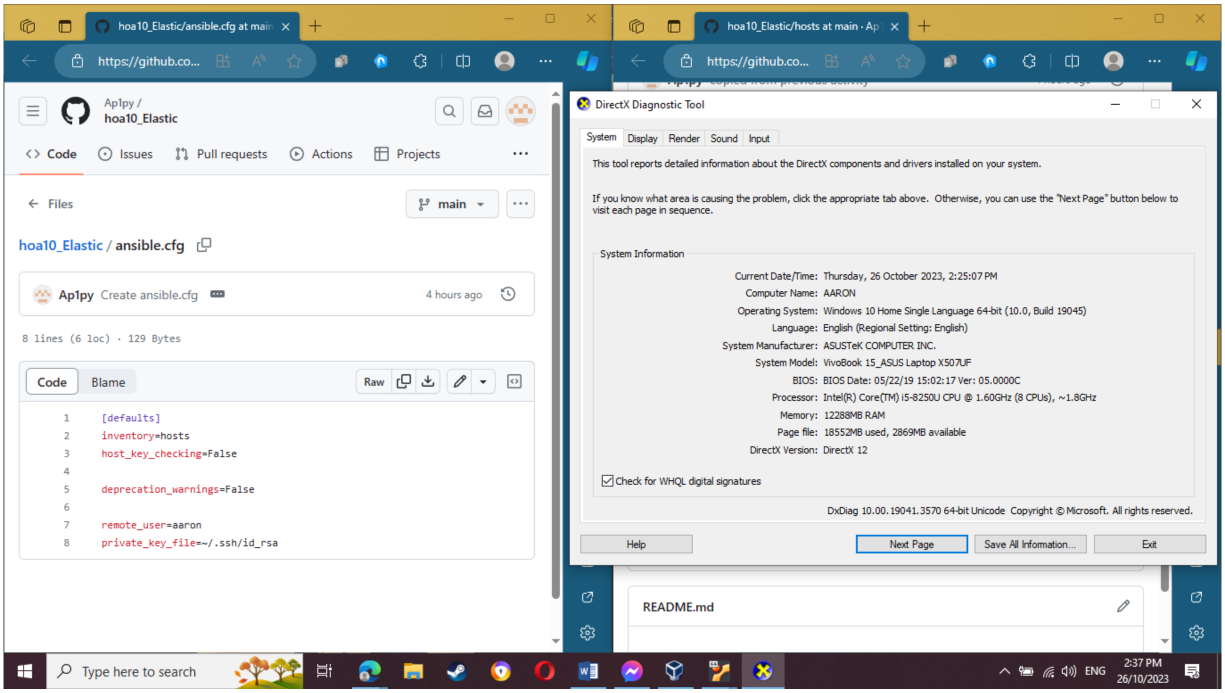
5 lines (4 loc) · 49 Bytes

```
[Ubuntu]
192.168.56.112

[CentOS]
192.168.56.111
```

Name	Last commit message	Last commit date
README.md	Update README.md	3 hours ago
ansible.cfg	Create ansible.cfg	3 hours ago
hosts	copied from previous activity	3 hours ago



hoa10_Elastic / ansible.cfg

Ap1py Create ansible.cfg 4 hours ago

8 lines (6 loc) · 129 Bytes

```
[defaults]
inventory=hosts
host_key_checking=False

deprecation_warnings=False

remote_user=aaron
private_key_file=~/.ssh/id_rsa
```

hoa10_Elastic/hosts at main · Ap
DirectX Diagnostic Tool
System Display Render Sound 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

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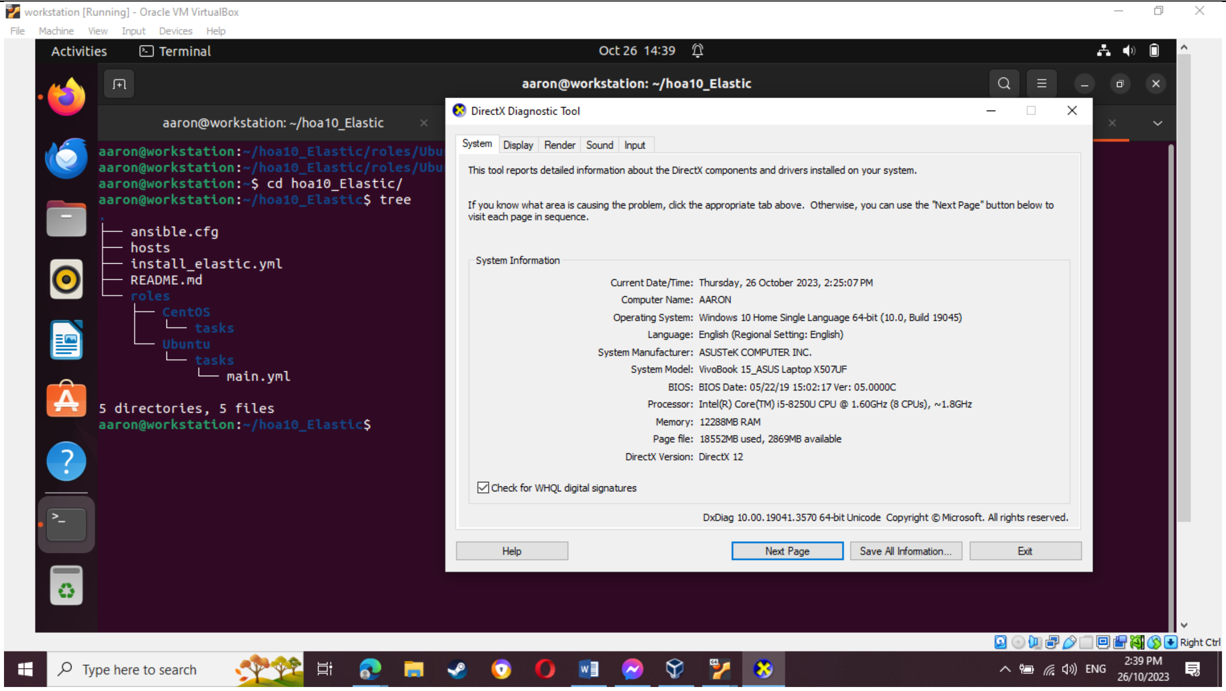
Copy the previous activity setup and clone it to the workstation



```
aaron@workstation:~/hoa10_Elastic/roles/Ubu
aaron@workstation:~/hoa10_Elastic/roles/Ubu
aaron@workstation:~$ cd hoa10_Elastic/
aaron@workstation:~/hoa10_Elastic$ tree
.
├── ansible.cfg
├── hosts
├── install_elastic.yml
├── README.md
└── roles
    ├── CentOS
    │   └── tasks
    └── Ubuntu
        └── tasks
            └── main.yml

5 directories, 5 files
aaron@workstation:~/hoa10_Elastic$
```

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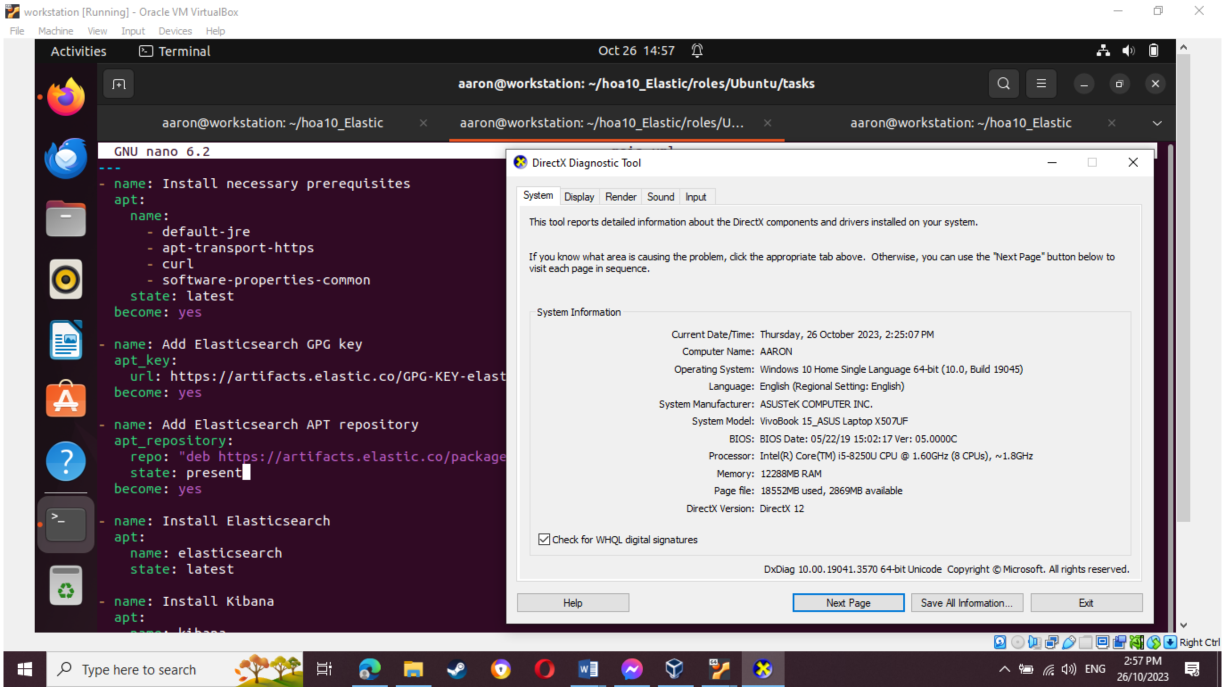
Create a structure like this within the repository using the mkdir command.


workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Oct 26 14:57
aaron@workstation: ~/hoa10_Elastic/roles/Ubuntu/tasks
aaron@workstation: ~/hoa10_Elastic
aaron@workstation: ~/hoa10_Elastic/roles/U...
aaron@workstation: ~/hoa10_Elastic
DirectX Diagnostic Tool
System
Display
Render
Sound
Input
Help
Next Page
Save All Information...
Exit
Right Ctrl
Type here to search
ENG
2:57 PM
26/10/2023

```
GNU nano 6.2
---
- name: Install necessary prerequisites
  apt:
    name:
      - default-jre
      - apt-transport-https
      - curl
      - software-properties-common
    state: latest
  become: yes

- name: Add Elasticsearch GPG key
  apt_key:
    url: https://artifacts.elastic.co/GPG-KEY-elast
  become: yes

- name: Add Elasticsearch APT repository
  apt_repository:
    repo: "deb https://artifacts.elastic.co/package
    state: present
  become: yes

- name: Install Elasticsearch
  apt:
    name: elasticsearch
    state: latest

- name: Install Kibana
  apt:
```

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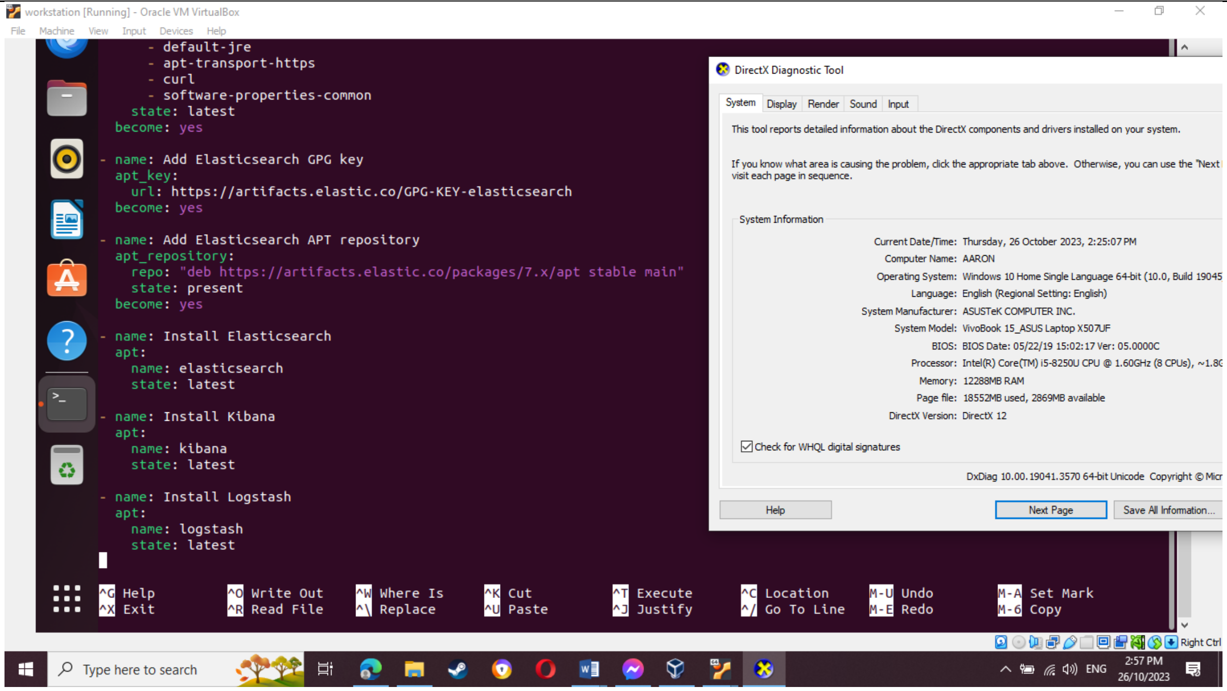
workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Right Ctrl
Type here to search
ENG
2:57 PM
26/10/2023

```
      - default-jre
      - apt-transport-https
      - curl
      - software-properties-common
    state: latest
  become: yes

- name: Add Elasticsearch GPG key
  apt_key:
    url: https://artifacts.elastic.co/GPG-KEY-elasticsearch
  become: yes

- name: Add Elasticsearch APT repository
  apt_repository:
    repo: "deb https://artifacts.elastic.co/packages/7.x/apt stable main"
    state: present
  become: yes

- name: Install Elasticsearch
  apt:
    name: elasticsearch
    state: latest

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

- name: Install Logstash
  apt:
    name: logstash
    state: latest

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy
```

DirectX Diagnostic Tool

System | Display | Render | Sound | Input

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```

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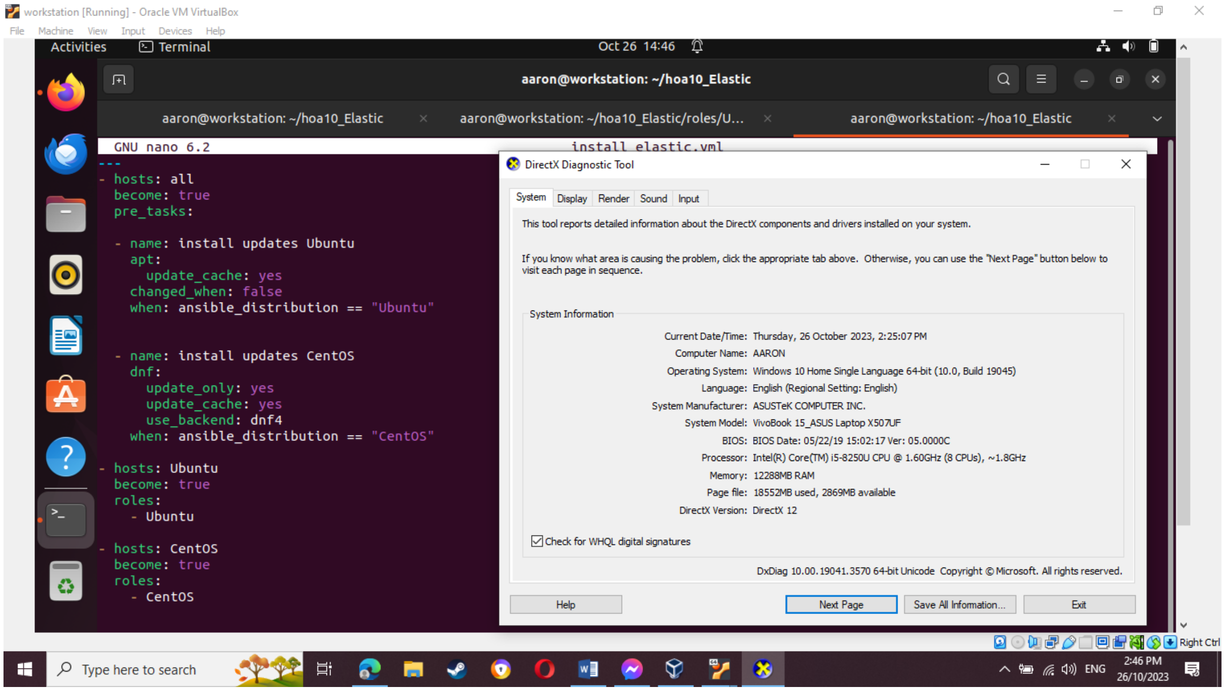
Help | Next Page | Save All Information...

First we configure the playbook for the task in the Ubuntu


workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Oct 26 14:46
aaron@workstation: ~/hoa10_Elastic
aaron@workstation: ~/hoa10_Elastic
aaron@workstation: ~/hoa10_Elastic/roles/U...
aaron@workstation: ~/hoa10_Elastic
Right Ctrl
Type here to search
ENG
2:46 PM
26/10/2023

```
GNU nano 6.2                          install_elastic.yml
---
- hosts: all
  become: true
  pre_tasks:

  - name: install updates Ubuntu
    apt:
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "Ubuntu"


  - name: install updates CentOS
    dnf:
      update_only: yes
      update_cache: yes
      use_backend: dnf4
    when: ansible_distribution == "CentOS"

- hosts: Ubuntu
  become: true
  roles:
    - Ubuntu

- hosts: CentOS
  become: true
  roles:
    - CentOS
```

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System | Display | Render | Sound | Input

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```

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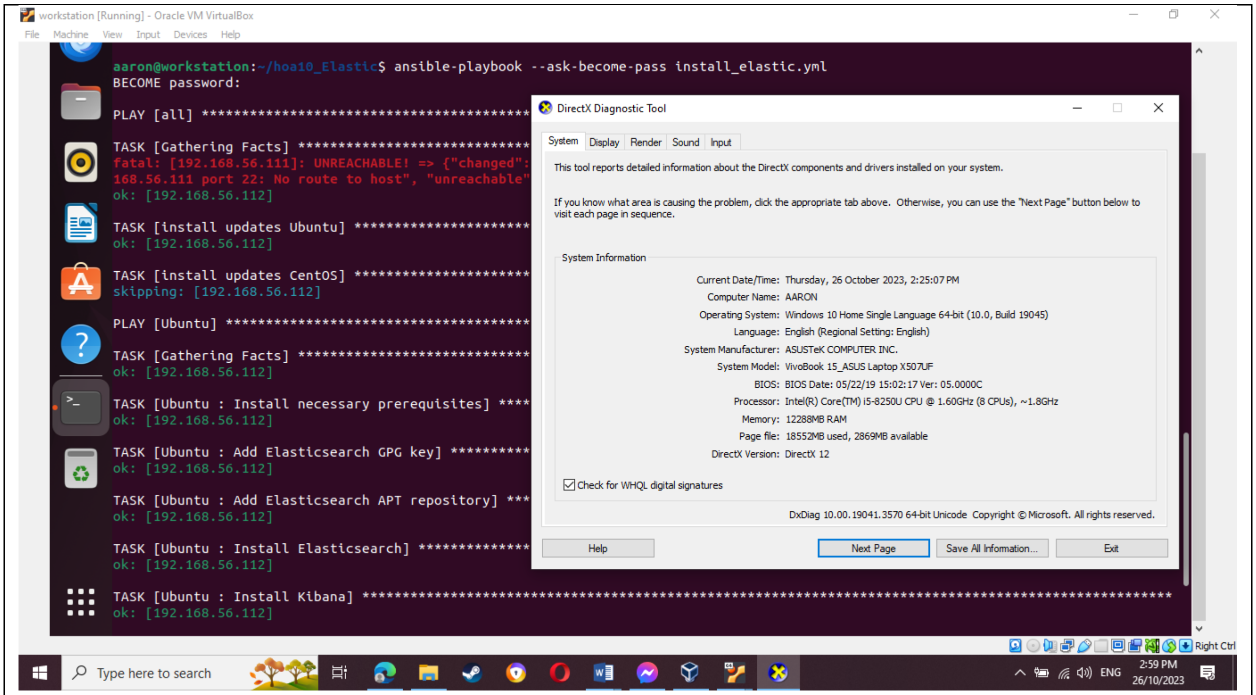
Help | Next Page | Save All Information... | Exit

Create a play book that will callback the roles.



workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Right Ctrl
Type here to search
ENG
2:59 PM
26/10/2023

```
aaron@workstation:~/hoa10_Elastic$ ansible-playbook --ask-become-pass install_elastic.yml
BECOME password:

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

TASK [Gathering Facts] *****************************
fatal: [192.168.56.111]: UNREACHABLE! => {"changed":
168.56.111 port 22: No route to host", "unreachable"
ok: [192.168.56.112]

TASK [install updates Ubuntu] **********************
ok: [192.168.56.112]

TASK [install updates CentOS] **********************
skipping: [192.168.56.112]

PLAY [Ubuntu] **************************************

TASK [Gathering Facts] *****************************
ok: [192.168.56.112]

TASK [Ubuntu : Install necessary prerequisites] ****
ok: [192.168.56.112]

TASK [Ubuntu : Add Elasticsearch GPG key] **********
ok: [192.168.56.112]

TASK [Ubuntu : Add Elasticsearch APT repository] ***
ok: [192.168.56.112]

TASK [Ubuntu : Install Elasticsearch] **************
ok: [192.168.56.112]

TASK [Ubuntu : Install Kibana] ***********************************************************************************
ok: [192.168.56.112]
```

DirectX Diagnostic Tool

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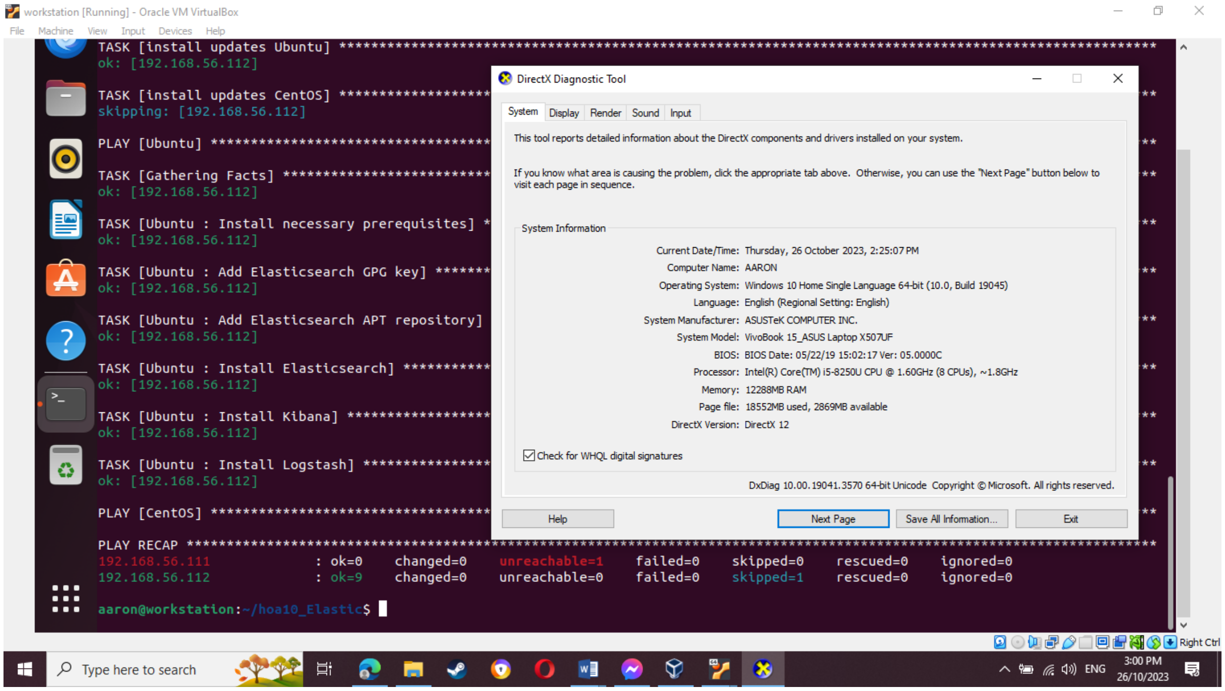

workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Right Ctrl
Type here to search
ENG
3:00 PM
26/10/2023

```
TASK [install updates Ubuntu] ***********************************************************************************
ok: [192.168.56.112]

TASK [install updates CentOS] ***********************
skipping: [192.168.56.112]

PLAY [Ubuntu] ***************************************

TASK [Gathering Facts] ******************************
ok: [192.168.56.112]

TASK [Ubuntu : Install necessary prerequisites] *
ok: [192.168.56.112]

TASK [Ubuntu : Add Elasticsearch GPG key] *******
ok: [192.168.56.112]

TASK [Ubuntu : Add Elasticsearch APT repository]
ok: [192.168.56.112]

TASK [Ubuntu : Install Elasticsearch] ***********
ok: [192.168.56.112]

TASK [Ubuntu : Install Kibana] ******************
ok: [192.168.56.112]

TASK [Ubuntu : Install Logstash] ****************
ok: [192.168.56.112]

PLAY [CentOS] ***********************************

PLAY RECAP ******************************************************************************************************
192.168.56.111             : ok=0    changed=0    unreachable=1    failed=0    skipped=0    rescued=0    ignored=0
192.168.56.112             : ok=9    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0

aaron@workstation:~/hoa10_Elastic$
```

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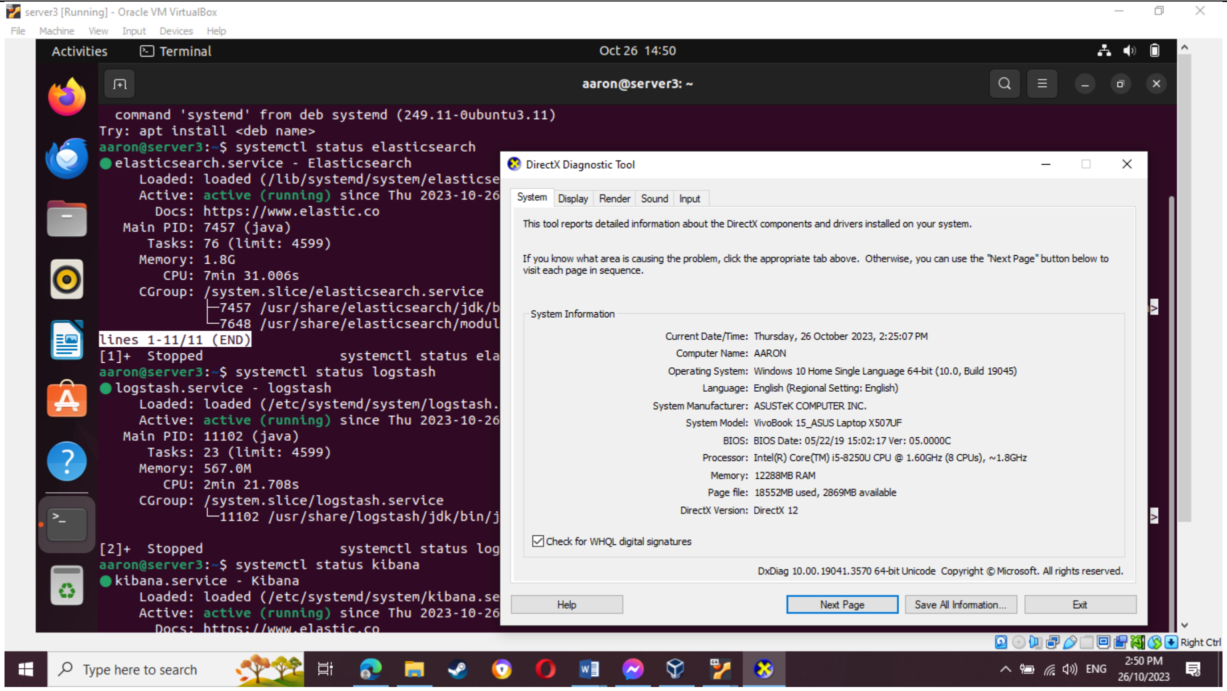
After running the playbook since we have not yet created a task for the CentOS you will see that it failed. If the workstation is slowing down I recommend to do things one play at a time since my end device is on the slow side.



```
  command 'systemd' from deb systemd (249.11-0ubuntu3.11)
Try: apt install <deb name>
aaron@server3:~$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
     Loaded: loaded (/lib/systemd/system/elasticse
     Active: active (running) since Thu 2023-10-26
       Docs: https://www.elastic.co
   Main PID: 7457 (java)
      Tasks: 76 (limit: 4599)
     Memory: 1.8G
        CPU: 7min 31.006s
     CGroup: /system.slice/elasticsearch.service
             ├─7457 /usr/share/elasticsearch/jdk/b
             └─7648 /usr/share/elasticsearch/modul
lines 1-11/11 (END)
[1]+  Stopped                 systemctl status ela
aaron@server3:~$ systemctl status logstash
● logstash.service - logstash
     Loaded: loaded (/etc/systemd/system/logstash.
     Active: active (running) since Thu 2023-10-26
   Main PID: 11102 (java)
      Tasks: 23 (limit: 4599)
     Memory: 567.0M
        CPU: 2min 21.708s
     CGroup: /system.slice/logstash.service
             └─11102 /usr/share/logstash/jdk/bin/j

[2]+  Stopped                 systemctl status log
aaron@server3:~$ systemctl status kibana
● kibana.service - Kibana
     Loaded: loaded (/etc/systemd/system/kibana.se
     Active: active (running) since Thu 2023-10-26
       Docs: https://www.elastic.co
```

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DirectX Version:	DirectX 12

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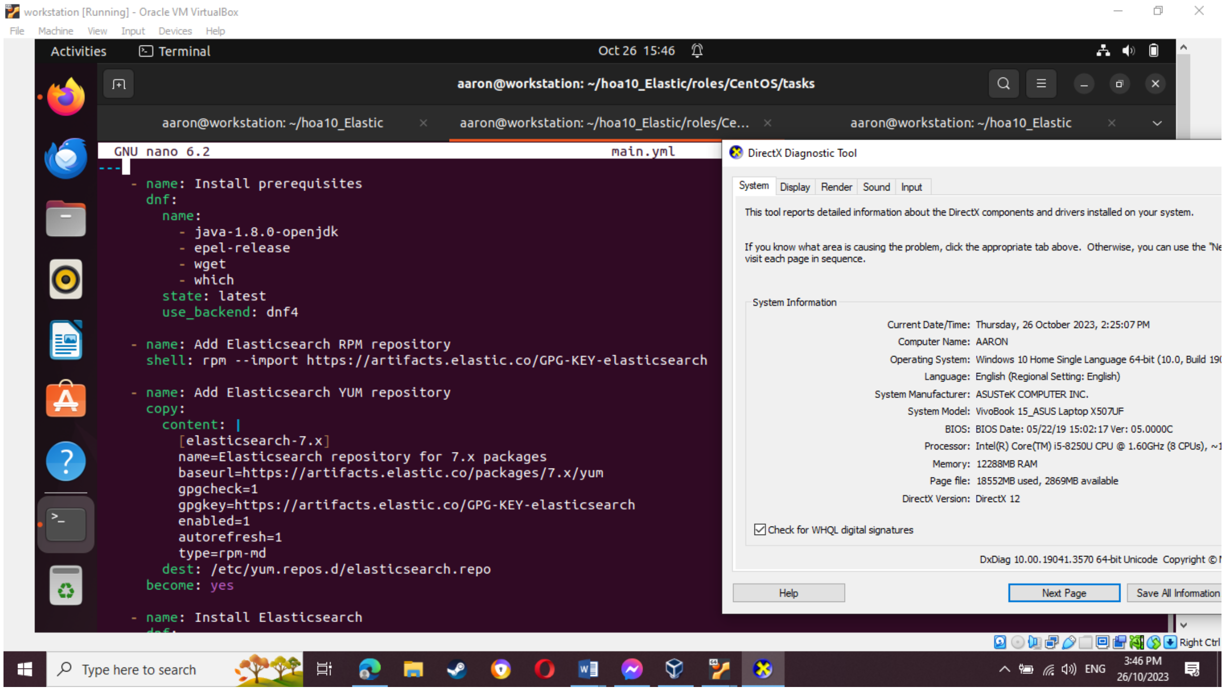
Use systemctl command enable and verify the status of the installed packages.


workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Oct 26 15:46
aaron@workstation: ~/hoa10_Elastic/roles/CentOS/tasks
aaron@workstation: ~/hoa10_Elastic
aaron@workstation: ~/hoa10_Elastic/roles/Ce...
aaron@workstation: ~/hoa10_Elastic
GNU nano 6.2
main.yml
DirectX Diagnostic Tool
System Display Render Sound Input
Help
Next Page
Save All Information
Right Ctrl
Type here to search
3:46 PM
26/10/2023
ENG

```
---
  - name: Install prerequisites
    dnf:
      name:
        - java-1.8.0-openjdk
        - epel-release
        - wget
        - which
      state: latest
      use_backend: dnf4

  - name: Add Elasticsearch RPM repository
    shell: rpm --import https://artifacts.elastic.co/GPG-KEY-elasticsearch

  - name: Add Elasticsearch YUM repository
    copy:
      content: |
        [elasticsearch-7.x]
        name=Elasticsearch repository for 7.x packages
        baseurl=https://artifacts.elastic.co/packages/7.x/yum
        gpgcheck=1
        gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
        enabled=1
        autorefresh=1
        type=rpm-md
      dest: /etc/yum.repos.d/elasticsearch.repo
    become: yes

  - name: Install Elasticsearch
```

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Processor: Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz (8 CPUs), ~1
Memory: 12288MB RAM
Page file: 18552MB used, 2869MB available
DirectX Version: DirectX 12

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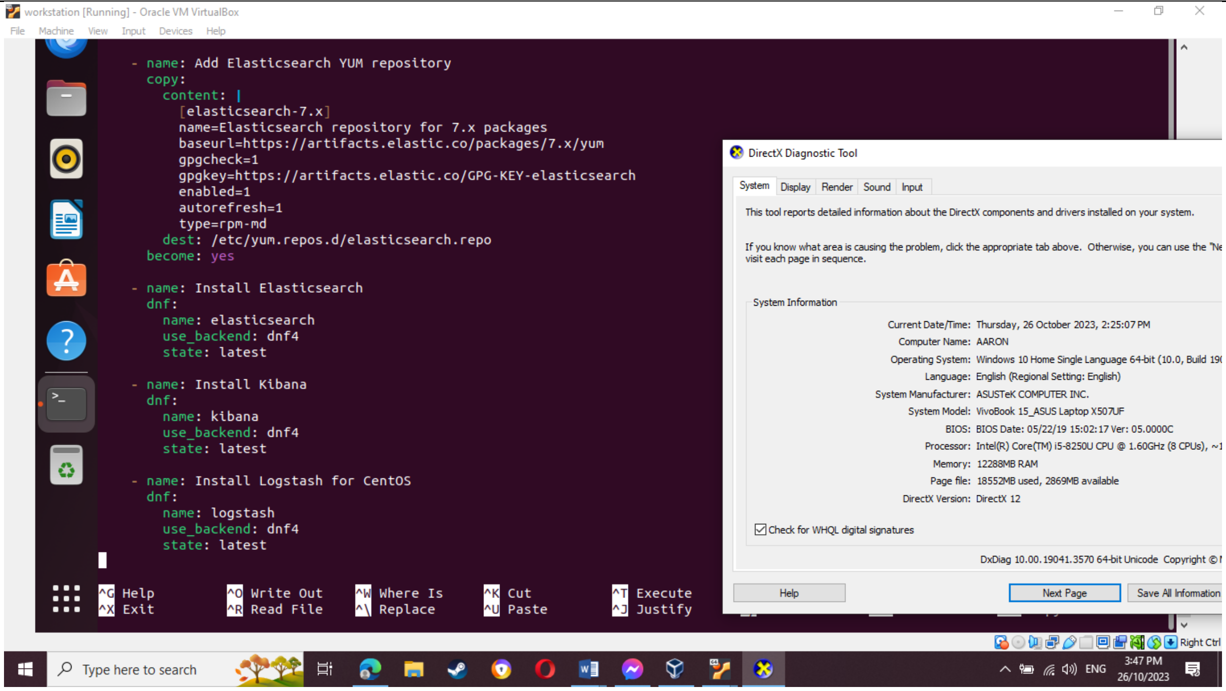

```
  - name: Add Elasticsearch YUM repository
    copy:
      content: |
        [elasticsearch-7.x]
        name=Elasticsearch repository for 7.x packages
        baseurl=https://artifacts.elastic.co/packages/7.x/yum
        gpgcheck=1
        gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
        enabled=1
        autorefresh=1
        type=rpm-md
      dest: /etc/yum.repos.d/elasticsearch.repo
    become: yes

  - name: Install Elasticsearch
    dnf:
      name: elasticsearch
      use_backend: dnf4
      state: latest

  - name: Install Kibana
    dnf:
      name: kibana
      use_backend: dnf4
      state: latest

  - name: Install Logstash for CentOS
    dnf:
      name: logstash
      use_backend: dnf4
      state: latest

^G Help      ^O Write Out  ^W Where Is  ^K Cut    ^T Execute
^X Exit      ^R Read File  ^\ Replace   ^U Paste  ^J Justify
```

DirectX Diagnostic Tool

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 "Ne
visit each page in sequence.

System Information

Current Date/Time: Thursday, 26 October 2023, 2:25:07 PM
Computer Name: AARON
Operating System: Windows 10 Home Single Language 64-bit (10.0, Build 19
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: VivoBook 15_ASUS Laptop X507UF
BIOS: BIOS Date: 05/22/19 15:02:17 Ver: 05.0000C
Processor: Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz (8 CPUs), ~1
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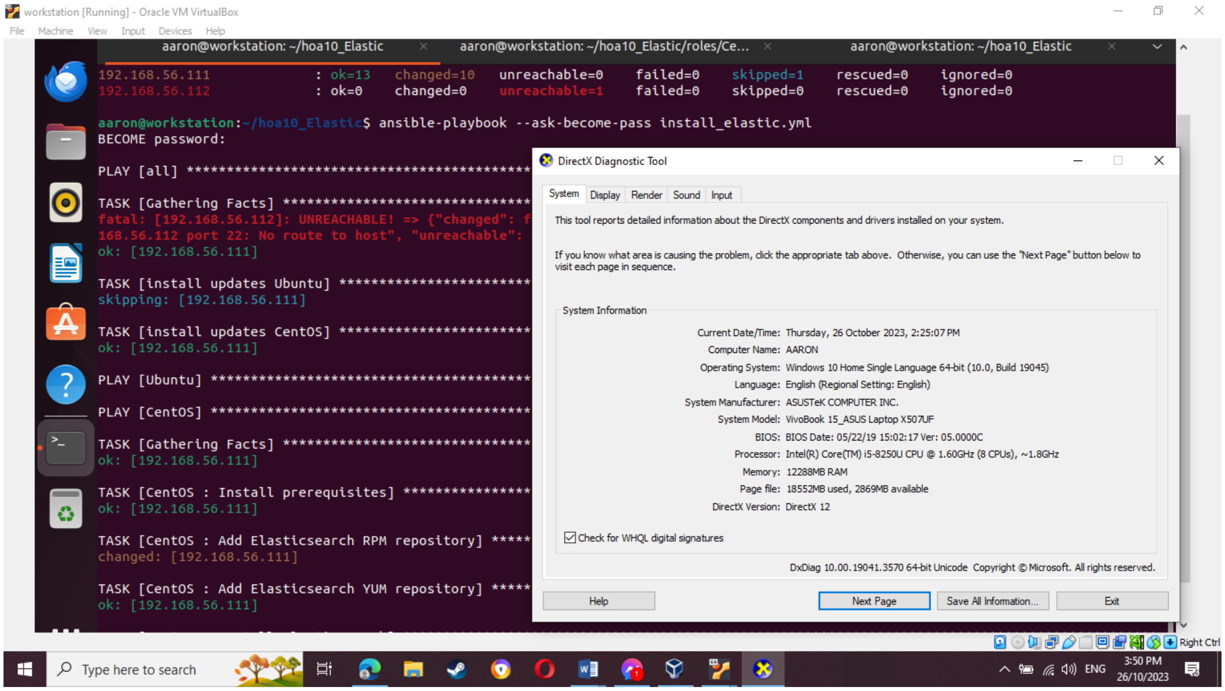
The set up for the Centos playbook



```
192.168.56.111             : ok=13   changed=10   unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.112             : ok=0    changed=0    unreachable=1    failed=0    skipped=0    rescued=0    ignored=0

aaron@workstation:~/hoa10_Elastic$ ansible-playbook --ask-become-pass install_elastic.yml
BECOME password:

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

TASK [Gathering Facts] ******************************
fatal: [192.168.56.112]: UNREACHABLE! => {"changed": f
168.56.112 port 22: No route to host", "unreachable":
ok: [192.168.56.111]

TASK [install updates Ubuntu] ***********************
skipping: [192.168.56.111]

TASK [install updates CentOS] ***********************
ok: [192.168.56.111]

PLAY [Ubuntu] ***************************************

PLAY [CentOS] ***************************************

TASK [Gathering Facts] ******************************
ok: [192.168.56.111]

TASK [CentOS : Install prerequisites] ***************
ok: [192.168.56.111]

TASK [CentOS : Add Elasticsearch RPM repository] *****
changed: [192.168.56.111]

TASK [CentOS : Add Elasticsearch YUM repository] *****
ok: [192.168.56.111]
```

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System Information

Current Date/Time: Thursday, 26 October 2023, 2:25:07 PM
Computer Name: AARON
Operating System: Windows 10 Home Single Language 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: VivoBook 15_ASUS Laptop X507UF
BIOS: BIOS Date: 05/22/19 15:02:17 Ver: 05.0000C
Processor: Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz (8 CPUs), ~1.8GHz
Memory: 12288MB RAM
Page file: 18552MB used, 2869MB available
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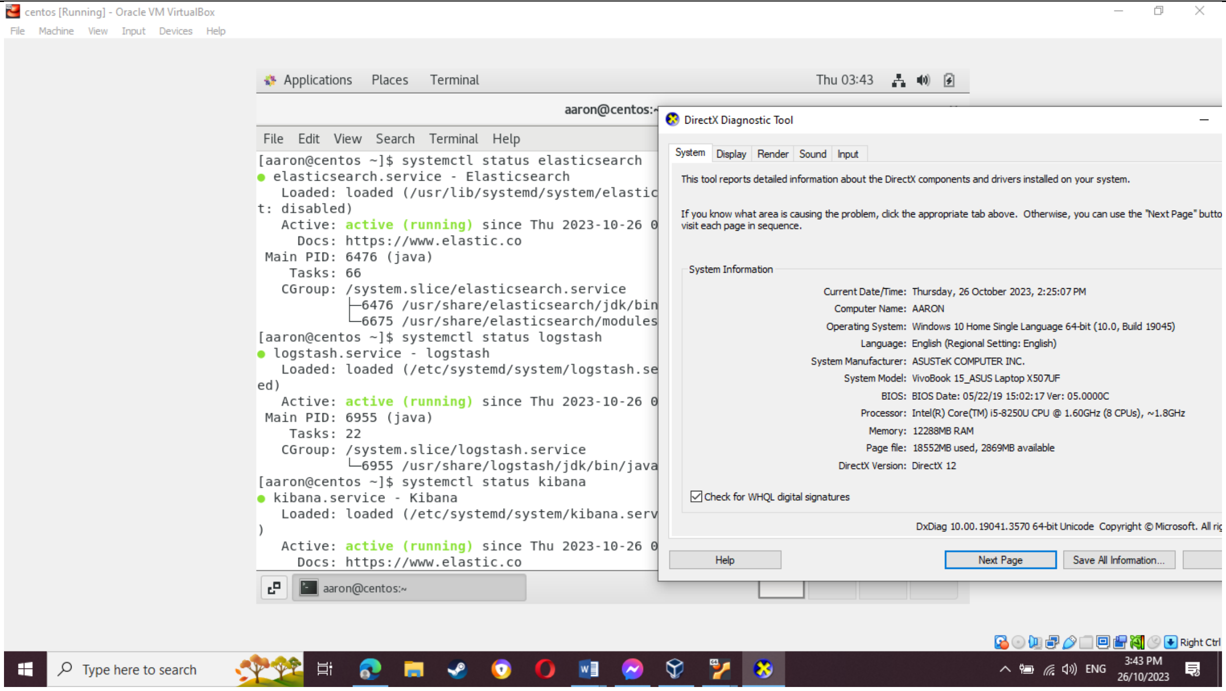
workstation [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
aaron@workstation: ~/hoa10_Elastic
aaron@workstation: ~/hoa10_Elastic/roles/Ce...
aaron@workstation: ~/hoa10_Elastic
System
Display
Render
Sound
Input
Help
Next Page
Save All Information...
Exit
Right Ctrl
Type here to search
ENG
3:50 PM
26/10/2023

Running the playbook but the Ubuntu ip is turned off to prevent lag



centos [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Thu 03:43
aaron@centos:~
File Edit View Search Terminal Help
aaron@centos:~
Type here to search
Right Ctrl
ENG
3:43 PM
26/10/2023

```
[aaron@centos ~]$ systemctl status elasticsearch
● elasticsearch.service - Elasticsearch
   Loaded: loaded (/usr/lib/systemd/system/elastic
t: disabled)
   Active: active (running) since Thu 2023-10-26 0
     Docs: https://www.elastic.co
 Main PID: 6476 (java)
    Tasks: 66
   CGroup: /system.slice/elasticsearch.service
           ├─6476 /usr/share/elasticsearch/jdk/bin
           └─6675 /usr/share/elasticsearch/modules
[aaron@centos ~]$ systemctl status logstash
● logstash.service - logstash
   Loaded: loaded (/etc/systemd/system/logstash.se
ed)
   Active: active (running) since Thu 2023-10-26 0
 Main PID: 6955 (java)
    Tasks: 22
   CGroup: /system.slice/logstash.service
           └─6955 /usr/share/logstash/jdk/bin/java
[aaron@centos ~]$ systemctl status kibana
● kibana.service - Kibana
   Loaded: loaded (/etc/systemd/system/kibana.serv
)
   Active: active (running) since Thu 2023-10-26 0
     Docs: https://www.elastic.co
```

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Use systemctl command enable and verify the status of the installed packages.

Reflections:

Answer the following:

1. **What are the benefits of having log monitoring tool?**

   A log monitoring tool gives a few advantages, including continuous perceivability into framework and application logs, empowering the fast identification and conclusion of issues or irregularities, in this manner diminishing margin time and further developing framework unwavering quality. It supports security by distinguishing expected dangers and dubious exercises, helping associations proactively safeguard their information and frameworks. Furthermore, log observing apparatuses aid execution improvement by following patterns and examples, working with information driven navigation, and guaranteeing consistence with administrative prerequisites through extensive log stockpiling and investigation abilities.

Conclusions:

In conclusion, a log monitoring tool is a significant resource for associations, offering ongoing knowledge into framework tasks, upgrading security, streamlining execution, and supporting consistence endeavors. By amassing, examining, and alarming on log information, it enables organizations to proactively address issues, decrease personal time, safeguard against dangers, and go with informed choices, eventually adding to worked on functional proficiency and the general soundness of their IT framework.