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Activity 9: Install, Configure, and Manage Performance Monitoring tools	
1. Objectives	
Create and design a workflow that installs, configure and manage enterprise performance tools using Ansible as an Infrastructure as Code (IaC) tool.	
2. Discussion	
<p>Performance monitoring is a type of monitoring tool that identifies current resource consumption of the workload, in this page we will discuss multiple performance monitoring tool.</p> <p>Prometheus</p> <p>Prometheus fundamentally stores all data as timeseries: streams of timestamped values belonging to the same metric and the same set of labeled dimensions. Besides stored time series, Prometheus may generate temporary derived time series as the result of queries. Source: Prometheus - Monitoring system & time series database</p> <p>Cacti</p> <p>Cacti is a complete network graphing solution designed to harness the power of RRDTool's data storage and graphing functionality. Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. All of this is wrapped in an intuitive, easy to use interface that makes sense for LAN-sized installations up to complex networks with thousands of devices. Source: Cacti® - The Complete RRDTool-based Graphing Solution</p>	
3. Tasks	
<ol style="list-style-type: none"> 1. Create a playbook that installs Prometheus in both Ubuntu and CentOS. Apply the concept of creating roles. 2. 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.) 3. Show an output of the installed Prometheus for both Ubuntu and CentOS. 4. Make sure to create a new repository in GitHub for this activity. 	
4. Output (screenshots and explanations)	

Git clone the repository that you had made through your workstation.

```
daniela@workstation:~$ git clone https://github.com/danielarabang/CPE232_RABANG_H0A9.git
Cloning into 'CPE232_RABANG_H0A9'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
daniela@workstation:~$ cd CPE232_RABANG_H0A9
daniela@workstation:~/CPE232_RABANG_H0A9$
```

- I had cloned my repository into my workstation so that I would be able to access it through my workstation.

Create an inventory file.

```
GNU nano 6.2 inventory
[Ubuntu]
192.168.56.110 ansible_python_interpreter=/usr/bin/python3
[CentOS]
192.168.56.112 ansible_python_interpreter=/usr/bin/python
```

- I had created an inventory file that I had modified with the ip address of my Ubuntu server and the CentOS server.

Create an ansible.cfg file.

```
GNU nano 6.2 ansible.cfg
[defaults]

inventory = inventory
host_key checking = False

deprecation_warning = False

remote_user = daniela
private_key_file = ~/.ssh/
```

- I had created a ansible.cfg file.

Create a directory for roles.

```
daniela@workstation:~/CPE232_RABANG_H0A9$ mkdir roles
```

```
daniela@workstation:~/CPE232_RABANG_HOA9$ cd roles
daniela@workstation:~/CPE232_RABANG_HOA9/roles$ mkdir Ubuntu
daniela@workstation:~/CPE232_RABANG_HOA9/roles$ mkdir CentOS
```

- I had created a directory for roles, and in that directory I created another directory which is the two roles, Ubuntu and CentOS.

In every roles directory create a main.yml

```
daniela@workstation: ~/CPE232_RABANG_HOA9/roles/Ubuntu/tasks
GNU nano 6.2 main.yml
--
- name: Install Prometheus (Ubuntu)
  apt:
    name: prometheus
    state: latest

- name: Prometheus Start/Enable Check service
  service:
    name: prometheus
    state: restarted
    enabled: true

- name: Apache Start/Enable Check
  service:
    name: prometheus
    state: restarted
    enabled: true
```

```
daniela@workstation: ~/CPE232_RABANG_HOA9/roles/CentOS/tasks
GNU nano 6.2 main.yml *
- name: Prometheus PATH directory
  file:
    path: ~/prometheus
    state: directory

- name: Creating directory for Prometheus files
  file:
    path: "{{ item }}"
    state: directory
    mode: '0777'
  with_items:
    - /etc/prometheus
    - /var/lib/prometheus

- name: Install Prometheus (CentOS)
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.8.1/prometheus-2.8.1.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: '0777'
    owner: root
    group: root

- name: Add Prometheus user
  user:
    name: prometheus
    state: present

- name: Configuring Prometheus
  shell: |
    cd ~/prometheus/prometheus*
    cp -r . /usr/local/bin/prometheus
```

- I created a main.yml file for the tasks in every role directory. This playbook is used to install prometheus in both Ubuntu and CentOS.

Create a playbook in the main.

```
daniela@workstation: ~/CPE232_RABANG_H0A9
GNU nano 6.2 prometheus.yml
hosts: all
become: true
pre_tasks:

- name: install updates (CentOS)
  dnf:
    update_only: yes
    update_cache: yes
  when: ansible_distribution == "Centos"

- name: install updates (Ubuntu)
  apt:
    upgrade: dist
    update_cache: yes
  when: ansible_distribution == "Ubuntu"

- hosts: Ubuntu
  become: true
  roles:
    - Ubuntu

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

- I had created a playbook in the main where I can play it to make the tasks run for the following roles that are assigned.

The tree of my repository:

```
daniela@workstation:~/CPE232_RABANG_H0A9$ tree
.
├── ansible.cfg
├── file
├── inventory
├── prometheus
├── prometheus.yml
├── README.md
├── roles
│   ├── CentOS
│   │   ├── main.yml
│   │   └── tasks
│   │       └── main.yml
│   ├── main
│   │   ├── tasks
│   │   └── main.yml
│   └── Ubuntu
│       ├── tasks
│       │   ├── main.yml
│       │   └── z
└── 7 directories, 11 files
```

- In this part I show all the directories and files that I had created inside this repository. There are files that are not needed and I accidentally made them.

Then run the playbook.

```
daniela@workstation:~/CPE232_RABANG_HOA9$ ansible-playbook --ask-become-pass prometheus.yml
[DEPRECATION WARNING]: Ansible will require Python 3.8 or newer on the controller starting with Ansible 2.12. Current version: 3.6.9 (default, Mar 10 2023, 16:46:00)
[GCC 8.4.0]. This feature will be removed from ansible-core in version 2.12. Deprecation warnings can be disabled by setting deprecation_warnings=False in ansible.cfg
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.110]
ok: [192.168.56.112]

TASK [install updates (CentOS)] *****
ok: [192.168.56.110]
skipping: [192.168.56.112]

TASK [install updates (Ubuntu)] *****
skipping: [192.168.56.112]
ok: [192.168.56.110]

PLAY [Ubuntu] *****

TASK [Gathering Facts] *****
ok: [192.168.56.110]

TASK [Ubuntu : Install Prometheus (Ubuntu)] *****
ok: [192.168.56.110]

TASK [Ubuntu : Prometheus Start/Enable Check service] *****
ok: [192.168.56.110]

TASK [Ubuntu : Apache Start/Enable Check] *****
changed: [192.168.56.110]

PLAY [CentOS] *****

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

TASK [CentOS : Prometheus PATH directory] *****
ok: [192.168.56.112]

TASK [CentOS : Creating directory for Prometheus files] *****
ok: [192.168.56.112] => (item=/etc/prometheus)
ok: [192.168.56.112] => (item=/var/lib/prometheus)

TASK [CentOS : Install Prometheus (CentOS)] *****
ok: [192.168.56.112]

TASK [CentOS : Add Prometheus user] *****
ok: [192.168.56.112]

TASK [CentOS : Configuring Prometheus] *****
changed: [192.168.56.112]

PLAY RECAP *****
192.168.56.110      : ok=6    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
192.168.56.112      : ok=7    changed=1    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
```

- I had run the playbook and the installation of prometheus in both servers had been successful.

Verify if the Prometheus package is installed in both Ubuntu and CentOS server.

```
daniela@server1:~$ sudo systemctl status prometheus
[sudo] password for daniela:
● prometheus.service - Monitoring system and time series database
   Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-10-23 13:09:36 PST; 6min ago
     Docs: https://prometheus.io/docs/introduction/overview/
   Main PID: 12925 (prometheus)
      Tasks: 8 (limit: 2318)
   CGroup: /system.slice/prometheus.service
           └─12925 /usr/bin/prometheus

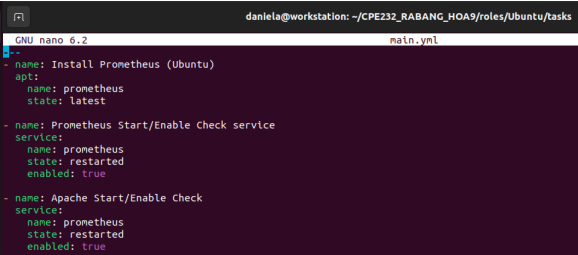
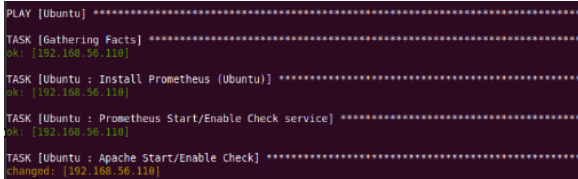
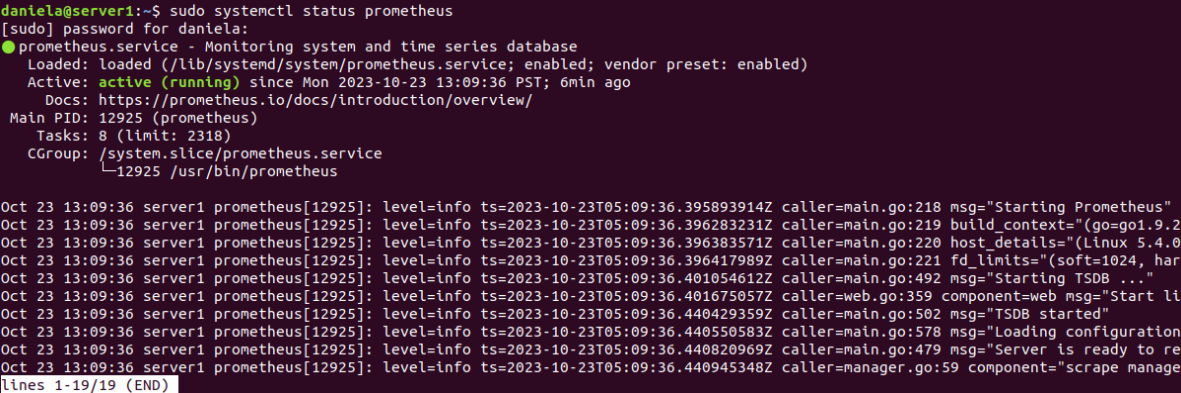
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.395893914Z caller=main.go:218 msg="Starting Prometheus"
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.396283231Z caller=main.go:219 build_context="(go=go1.9.2
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.396383571Z caller=main.go:220 host_details="(Linux 5.4.0
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.396417989Z caller=main.go:221 fd_limits="(soft=1024, har
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.401054612Z caller=main.go:492 msg="Starting TSDB ..."
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.401675057Z caller=web.go:359 component=web msg="Start li
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.440429359Z caller=main.go:502 msg="TSDB started"
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.440550583Z caller=main.go:578 msg="Loading configuration
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.440820969Z caller=main.go:479 msg="Server is ready to re
Oct 23 13:09:36 server1 prometheus[12925]: level=info ts=2023-10-23T05:09:36.440945348Z caller=manager.go:59 component="scrape manage
lines 1-19/19 (END)
```

```
[daniela@localhost ~]$ sudo systemctl status prometheus
[sudo] password for daniela:
● prometheus.service - Monitoring system and time series database
   Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-10-23 13:09:36 PST; 6min ago
     Docs: https://prometheus.io/docs/introduction/overview/
   Main PID: 12925 (prometheus)
      Tasks: 8 (limit: 2318)
    CGroup: /system.slice/prometheus.service
            └─12925 /usr/bin/prometheus

Oct 23 13:09:36 localhost.localdomain systemd[1]: Started The Prometheus monitoring...
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396283231Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396383571Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396417989Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.401054612Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.401675057Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440429359Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440550583Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440820969Z ci
Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440945348Z ci
```

- I had verified that the prometheus package had been installed on the two servers.

IPO of Ubuntu

Input	Process
	
Output	
	

- In this section it shows the input codes that are used to install the prometheus package in the Ubuntu server same as the process when you run the playbook and the output where it shows the evidence that the prometheus is installed.

IPO of CentOS

Input	Process
<pre>GNU nano 6.2 main.yml - name: Prometheus PATH directory file: path: ~/prometheus state: directory - name: Creating directory for Prometheus files file: path: '{{ item }}' state: directory mode: '0777' with_items: - /etc/prometheus - /var/lib/prometheus - name: Install Prometheus (CentOS) unarchive: src: https://github.com/prometheus/prometheus/releases/download/v2.8.1/prometheus-2.8.1.linux-amd64.tar.gz dest: ~/prometheus remote_src: yes mode: '0777' owner: root group: root - name: Add Prometheus user user: name: prometheus state: present - name: Configuring Prometheus shell: cd ~/prometheus/prometheus* cp -r . /usr/local/bin/prometheus</pre>	<pre>PLAY [CentOS] ***** TASK [Gathering Facts] ***** ok: [192.168.56.112] TASK [CentOS : Prometheus PATH directory] ***** ok: [192.168.56.112] TASK [CentOS : Creating directory for Prometheus files] ***** ok: [192.168.56.112] => (item=/etc/prometheus) ok: [192.168.56.112] => (item=/var/lib/prometheus) TASK [CentOS : Install Prometheus (CentOS)] ***** ok: [192.168.56.112] TASK [CentOS : Add Prometheus user] ***** ok: [192.168.56.112] TASK [CentOS : Configuring Prometheus] ***** changed: [192.168.56.112]</pre>
Output	
<pre>[daniela@localhost ~]\$ sudo systemctl status prometheus [sudo] password for daniela: ● prometheus.service - Monitoring system and time series database Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor preset: enabled) Active: active (running) since Mon 2023-10-23 13:09:36 PST; 6min ago Docs: https://prometheus.io/docs/introduction/overview/ Main PID: 12925 (prometheus) Tasks: 8 (limit: 2318) CGroup: /system.slice/prometheus.service └─12925 /usr/bin/prometheus Oct 23 13:09:36 localhost.localdomain systemd[1]: Started The Prometheus monitoring... Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396283231Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396383571Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.396417989Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.401054612Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.401675057Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440429359Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440550583Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440820969Z c Oct 23 13:09:36 localhost.localdomain prometheus[29381]: ts=2023-10-23T05:09:36.440945348Z c</pre>	

- In this section it shows the input codes that are used to install the prometheus package in the CentOS server, same as the process when you run the playbook and the output where it shows the evidence that the prometheus is installed.

Then push all the progress or finish output into the repository.

```

daniela@workstation:~/CPE232_RABANG_HOA9$ git add *
daniela@workstation:~/CPE232_RABANG_HOA9$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

        new file:   ansible.cfg
        new file:   file
        new file:   inventory
        new file:   prometheus
        new file:   prometheus.yml
        new file:   roles/CentOS/main.yml
        new file:   roles/CentOS/tasks/main.yml
        new file:   roles/Ubuntu/tasks/main.yml
        new file:   roles/Ubuntu/tasks/z
        new file:   roles/main/tasks/main.yml

daniela@workstation:~/CPE232_RABANG_HOA9$ git commit
Aborting commit due to empty commit message.
daniela@workstation:~/CPE232_RABANG_HOA9$ git commit -m "first"
[main ebb6127] first
10 files changed, 240 insertions(+)
create mode 100644 ansible.cfg
create mode 100644 file
create mode 100644 inventory
create mode 100644 prometheus
create mode 100644 prometheus.yml
create mode 100644 roles/CentOS/main.yml
create mode 100644 roles/CentOS/tasks/main.yml
create mode 100644 roles/Ubuntu/tasks/main.yml
create mode 100644 roles/Ubuntu/tasks/z
create mode 100644 roles/main/tasks/main.yml
daniela@workstation:~/CPE232_RABANG_HOA9$ git push origin main
Username for 'https://github.com': daniela
Password for 'https://daniela@github.com':
Counting objects: 19, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (14/14), done.
Writing objects: 100% (19/19), 2.77 KiB | 2.77 MiB/s, done.
Total 19 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), done.
To https://github.com/danielarabang/CPE232_RABANG_HOA9.git
 a38a182..ebb6127  main -> main

```

Reflections:

Answer the following:

1. What are the benefits of having a performance monitoring tool?

- The benefits of a performance monitoring tool can be seen in creating it more operationally efficient and the improved overall performance so it can be efficient for the users.

Conclusions:

In this hands-on activity that focuses on the installation, configuration, and managing performance monitoring tools. In the procedure part of this activity it shows a brief discussion about this topic. Then I am tasked to create a playbook where it uses roles to install the prometheus for both servers which is the Ubuntu and CentOS server. Before I started creating a playbook, I created a repository in my github account for this hands-on activity, then I cloned the repository into my workstation so I can manage the codes, and files that we are going to create. After cloning the repository and changing the directory to CPE232_RABANG_HOA9 I created a file inventory, ansible.cfg, prometheus.yml, and a directory for the roles that I will assign. These are the two roles which are the Ubuntu and the CentOS inside this directory. I also created a dir task where I created the main.yml or the playbook where the codes for installing prometheus are imputed. In the prometheus.yml in the main I had input all the assignments of the roles. Then when I was already okay for the codes, I had run the playbook prometheus.yml and in the firsts try I encountered errors and I had fixed it already until the installation for both servers are finished.