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| **Instructor: Dr. Taylar** | **Semester and SY: 2023-2024** |

**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**

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.

**Prometheus**

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

**Cacti**

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

**3. Tasks**

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)

| INPUT | |
|---|---|

```
GNU nano 2.9.3                    install.yml

---
- hosts: prometheus
  become: true
  roles:
    - prometheus
```

```
GNU nano 2.9.3                    main.yml

---
    - name: Install dependencies
      package:
        name: "{{ item }}"
        state: present
      loop:
        - wget
        - tar

    - name: Download Prometheus tarball
      command: "wget https://github.com/prometheus/prometheus/re$
      args:
        creates: /tmp/prometheus.tar.gz

    - name: Copy Prometheus tarball to target machines
      copy:
        src: /tmp/prometheus.tar.gz
        dest: /tmp/prometheus.tar.gz
        mode: 0755

    - name: Extract Prometheus
      command: "tar -xvf /tmp/prometheus.tar.gz -C /tmp/"

    - name: Create Prometheus group
      group:
        name: prometheus
        state: present

    - name: Create Prometheus user
      user:
        name: prometheus
        groups: prometheus
```

```yaml
      shell: /bin/false
      system: yes
  - name: Remove existing Prometheus directory
    file:
      path: /etc/prometheus
      state: absent

  - name: Move Prometheus files
    command: "mv /tmp/prometheus-2.30.3.linux-amd64/ /etc/prom$

  - name: Create Prometheus directories
    file:
      path: "{{ item }}"
      state: directory
    loop:
      - /etc/prometheus/data
      - /etc/prometheus/rules
      - /etc/prometheus/wal
```

```yaml
  - name: Copy Prometheus configuration
    copy:
      src: /etc/prometheus/prometheus.yml
      dest: /etc/prometheus/prometheus.yml
      mode: '0644'
      remote_src: yes

  - name: Set ownership and permissions
    file:
      path: "{{ item }}"
      owner: prometheus
      group: prometheus
      recurse: yes
    loop:
      - /etc/prometheus/
      - /etc/prometheus/data/
      - /etc/prometheus/rules/
      - /etc/prometheus/wal/

  - name: Create systemd service
    template:
      src: prometheus.service.j2
      dest: /etc/systemd/system/prometheus.service

  - name: Reload systemd
    systemd:
      name: prometheus
      enabled: yes
      state: restarted
```

**Explanation:** In this playbook it will install the package prometheus on Ubuntu
server 2 and also on CentOS.

| **PROCESS**: | ```
andayalyka@managenode:~/HOA9.1$ ansible-playbook --ask-become-pas
s install.yml
BECOME password:

PLAY [prometheus] **********************************************
***************

TASK [Gathering Facts] *****************************************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Install dependencies] **********************
***************
ok: [192.168.56.104] => (item=wget)
ok: [192.168.56.103] => (item=wget)
ok: [192.168.56.104] => (item=tar)
ok: [192.168.56.103] => (item=tar)

TASK [prometheus : Download Prometheus tarball] ***************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Copy Prometheus tarball to target machines] **
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Extract Prometheus] ************************
***************
changed: [192.168.56.103]
changed: [192.168.56.104]
``` |

```
TASK [prometheus : Create Prometheus group] *********************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Create Prometheus user] **********************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Remove existing Prometheus directory] ********
***************
changed: [192.168.56.103]
changed: [192.168.56.104]

TASK [prometheus : Move Prometheus files] ***********************
***************
changed: [192.168.56.103]
changed: [192.168.56.104]

TASK [prometheus : Create Prometheus directories] ***************
***************
changed: [192.168.56.103] => (item=/etc/prometheus/data)
changed: [192.168.56.104] => (item=/etc/prometheus/data)
changed: [192.168.56.103] => (item=/etc/prometheus/rules)
changed: [192.168.56.103] => (item=/etc/prometheus/wal)
changed: [192.168.56.104] => (item=/etc/prometheus/rules)
changed: [192.168.56.104] => (item=/etc/prometheus/wal)

TASK [prometheus : Copy Prometheus configuration] ***************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]
```

```
TASK [prometheus : Set ownership and permissions] ***************
***************
changed: [192.168.56.103] => (item=/etc/prometheus/)
changed: [192.168.56.104] => (item=/etc/prometheus/)
ok: [192.168.56.103] => (item=/etc/prometheus/data/)
ok: [192.168.56.103] => (item=/etc/prometheus/rules/)
ok: [192.168.56.103] => (item=/etc/prometheus/wal/)
ok: [192.168.56.104] => (item=/etc/prometheus/data/)
ok: [192.168.56.104] => (item=/etc/prometheus/rules/)
ok: [192.168.56.104] => (item=/etc/prometheus/wal/)

TASK [prometheus : Create systemd service] *********************
***************
ok: [192.168.56.103]
ok: [192.168.56.104]

TASK [prometheus : Reload systemd] ****************************
***************
changed: [192.168.56.103]
changed: [192.168.56.104]

PLAY RECAP ***************************************************
***************
192.168.56.103            : ok=14   changed=6    unreachable=0
  failed=0    skipped=0    rescued=0    ignored=0
192.168.56.104            : ok=14   changed=6    unreachable=0
  failed=0    skipped=0    rescued=0    ignored=0
```

**Explanation:** It shows that is executed the instructions in the tasks of the playbook that I created

**OUTPUT**

| | |
|---|---|
| **Ubuntu** | ```
andayalyka@controlnode2:~$ prometheus --version
prometheus, version 2.1.0+ds (branch: debian/sid, revision: 2.1.0+ds-1)
  build user:       pkg-go-maintainers@lists.alioth.debian.org
  build date:       20180121-21:30:42
  go version:       go1.9.2
andayalyka@controlnode2:~$ systemctl status prometheus
● prometheus.service - Monitoring system and time series database
   Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor pres
   Active: active (running) since Mon 2023-10-23 12:54:14 PST; 30s ago
     Docs: https://prometheus.io/docs/introduction/overview/
 Main PID: 14775 (prometheus)
    Tasks: 10 (limit: 2374)
   CGroup: /system.slice/prometheus.service
           └─14775 /usr/bin/prometheus

Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
Oct 23 12:54:14 controlnode2 prometheus[14775]: level=info ts=2023-10-23T04:54:
``` |
| **CentOS** | ```
[andayalyka@CentOS ~]$ sudo systemctl status prometheus
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2023-10-13 10:50:24 EDT; 1 weeks 2 days ago
 Main PID: 1353 (prometheus)
   CGroup: /system.slice/prometheus.service
           └─1353 /usr/local/prometheus/prometheus --config.file=/usr/local/prometheus/pro...

Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.646Z caller=...le"
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.646Z caller=...t=0
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.646Z caller=…572µs
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.648Z caller=...GIC
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.648Z caller=...ed"
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.648Z caller=...yml
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.649Z caller=mai…µs
Oct 13 10:50:24 CentOS prometheus[1353]: level=info ts=2023-10-13T14:50:24.649Z caller=...s."
Oct 23 09:01:10 CentOS prometheus[1353]: level=info ts=2023-10-23T13:01:10.835Z caller=...2ms
Oct 23 09:01:10 CentOS prometheus[1353]: level=info ts=2023-10-23T13:01:10.836Z caller=…875µs
``` |

**Explanation:** In Ubuntu, it indicates that prometheus is installed and the service is currently active and running. Meanwhile, in CentOS, prometheus is installed and its service is also active and running.

```
lykaandaya@managenode:~/HOA9$ git commit -m "HOA9"
[main 42769da] HOA9
 5 files changed, 100 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install.yml
 create mode 100644 inventory
 create mode 100644 roles/prometheus/tasks/main.yml
 create mode 100644 roles/prometheus/templates/prometheus.service.j2
lykaandaya@managenode:~/HOA9$ git push
Enumerating objects: 12, done.
Counting objects: 100% (12/12), done.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (11/11), 1.54 KiB | 788.00 KiB/s, done.
Total 11 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:andayalyka/HOA9.git
   182cb00..42769da  main -> main
```

**Reflections:**

Answer the following:

1. What are the benefits of having a performance monitoring tool?
   - A performance monitoring instrument offers crucial understanding of system well-being and resource usage, allowing for early detection and resolution of issues. It pinpoints obstacles, enabling precise optimization and effective resource distribution. Organizations can adapt their infrastructure fittingly through capacity planning. It eases the process of identifying and stopping recurring problems by conducting thorough root cause analysis. Developers gain from recognizing inefficiencies in applications, resulting in enhancements to code and queries. These tools elevate user satisfaction by detecting and fixing performance hitches. Additionally, they aid in compliance adherence and deliver reports to stakeholders. Ultimately, they foster economical operations and guarantee consistent, dependable service provision.

**Conclusions:**

**I have learned proficiency in the fundamental principles of Ansible, an open-source automation platform. This encompasses comprehending its architecture, handling inventory, and creating basic playbooks. Armed with this knowledge, I will advance to more sophisticated subjects, emphasizing Ansible's role in Infrastructure as Code, where I will define infrastructure using code to ensure uniformity and replicability.**

**Subsequently, the course will delve into performance tools. I'll investigate a range of high-level solutions for monitoring and enhancing system performance. This encompasses tools like Prometheus for gathering metrics, Grafana for visual representation, and potentially others like Nagios, Zabbix, or**

New Relic. Proficiency in comprehending their functionalities, installation, and setup will be pivotal in this section.

With progression, I'll become adept at crafting efficient workflows. This entails orchestrating the deployment, configuration, and administration of these performance tools across diverse systems and environments. I'll gain expertise in managing dependencies, employing conditionals, and implementing loops, enabling me to devise workflows adaptable to various scenarios.

Furthermore, I'll address security considerations, integrating best practices for safeguarding sensitive information within my Ansible playbooks. This encompasses the utilization of Ansible Vault for encrypting and securely storing credentials.

Upon completion of the course, I will have honed the skill of crafting resilient, automated workflows capable of seamlessly deploying and overseeing enterprise performance tools. This ensures that systems are consistently monitored and optimized for peak performance. This proficiency is indispensable for any organization aiming to streamline their performance monitoring procedures and uphold elevated levels of system dependability.