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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

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

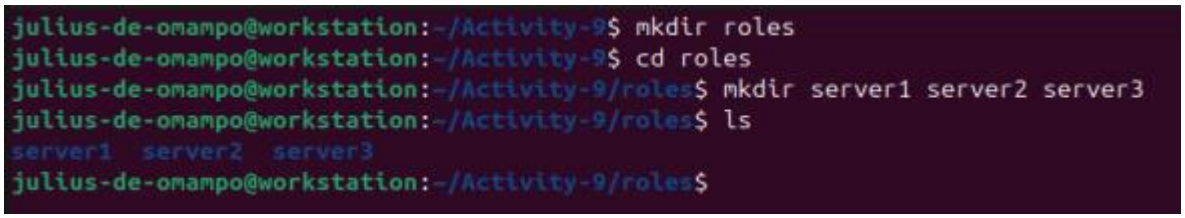
Cacti is a complete network graphing solution designed to harness the power of RRDTool's data storage and graphing functionality. Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. All of this is wrapped in an intuitive, 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)

inventory.yaml



server roles creation

roles tasks directories

```
GNU nano 7.2                                    install.yml
---

- hosts: all
  become: true
  pre_tasks:

  - name: Install Updates (Ubuntu)
    tags: always
    apt:
      upgrade: dist
      update_cache: yes
    when: ansible_distribution == "Ubuntu"

  - name: Install Updates (CentOS)
    tags: always
    dnf:
      update_cache: yes
    when: ansible_distribution == "CentOS"

- hosts: server1
  become: true
  roles:
    - server1

- hosts: server2
  become: ture
  roles:
    - server2
```

main playbook install.yml (1)

```
- hosts: server3
  become: true
  roles:
    - server3
```

main playbook install.yml (2)

```yaml
---

- name: Check the distribution
  ansible.builtin.setup:
    gather_subset:
      - 'os_family'

- name: Install dependencies on Ubuntu
  ansible.builtin.apt:
    name:
      - wget
      - tar
      - curl
    state: present
  when: ansible_facts['os_family'] == 'Debian'

- name: Create Prometheus user
  user:
    name: prometheus
    shell: /sbin/nologin

- name: Create necessary directories
  file:
    path: "{{ item }}"
    state: directory
    owner: prometheus
    group: prometheus
    mode: '0755'
```

server1 and server2 main.yml (1)

```yaml
  with_items:
    - /etc/prometheus
    - /var/lib/prometheus

- name: Download Prometheus
  get_url:
    url: https://github.com/prometheus/prometheus/releases/download/v2.46.0/prometheus-2.46.0.linux-amd64.tar.gz
    dest: /tmp/prometheus.tar.gz

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

- name: Move Prometheus binaries to /usr/local/bin
  command: mv /opt/prometheus-2.46.0.linux-amd64/prometheus /usr/local/bin/

- name: Move Prometheus cofnig to /etc/prometheus
  command: mv /opt/prometheus-2.46.0.linux-amd64/prometheus.yml /etc/prometheus

- name: Set Prometheus binary permissions
  file:
    path: /usr/local/bin/prometheus
    owner: prometheus
```

server1 and server2 main.yml (2)

```
    mode: '0755'

- name: Create Prometheus systemd service file
  copy:
    dest: /etc/systemd/system/prometheus.service
    content: |
      [Unit]
      Description=Prometheus
      Wants=network-online.target
      After=network-online.target

      [Service]
      User=prometheus
      ExecStart=/usr/local/bin/prometheus --config.file /etc/prometheus/prometheus.yml --storage.tsdb.path /var/lib/pro

      [Install]
      WantedBy=multi-user.target

- name: Reload systemd
  systemd:
    daemon_reload: yes

- name: Enable and restart Prometheus service
  systemd:
    name: prometheus
    enabled: yes
    state: started
```

server1 and server2 main.yml (3)

```
---

- name: Check the distribution
  ansible.builtin.setup:
    gather_subset:
      - 'os_family'

- name: Install dpendencies on CentOS
  ansible.builtin.yum:
    name:
      - wget
      - tar
      - curl
    state: present
  when: ansible_facts['os_family'] == 'RedHat'

- name: Create Prometheus user
  user:
    name: prometheus
    shell: /sbin/nologin

- name: Create necessary directories
  file:
    path: "{{ item }}"
    state: directory
    owner: prometheus
    group: prometheus
    mode: '0755'
```

server3 main.yml (1)

```
  with_items:
    - /etc/prometheus
    - /var/lib/prometheus

- name: Download Prometheus
  get_url:
    url: https://github.com/prometheus/prometheus/releases/download/v2.46.0/prometheus-2.46.0.linux-amd64.tar.gz
    dest: /tmp/prometheus.tar.gz

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

- name: Move Prometheus binaries to /usr/local/bin
  command: mv /opt/prometheus-2.46.0.linux-amd64/prometheus /usr/local/bin/

- name: Move Prometheus cofnig to /etc/prometheus
  command: mv /opt/prometheus-2.46.0.linux-amd64/prometheus.yml /etc/prometheus

- name: Set Prometheus binary permissions
  file:
    path: /usr/local/bin/prometheus
    owner: prometheus
```

server3 main.yml (2)

```
    mode: '0755'

- name: Create Prometheus systemd service file
  copy:
    dest: /etc/systemd/system/prometheus.service
    content: |
      [Unit]
      Description=Prometheus
      Wants=network-online.target
      After=network-online.target

      [Service]
      User=prometheus
      ExecStart=/usr/local/bin/prometheus --config.file /etc/prometheus/prometheus.yml --storage.tsdb.path /var/lib/pro>

      [Install]
      WantedBy=multi-user.target

- name: Reload systemd
  systemd:
    daemon_reload: yes

- name: Enable and restart Prometheus service
  systemd:
    name: prometheus
    enabled: yes
    state: started
```

server3 main.yml (3)

```
julius-de-omampo@workstation:~/Activity-9$ ansible-playbook --ask-become-pass install.yml
BECOME password:

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

TASK [Gathering Facts] *********************************************************************************************
ok: [192.168.56.106]
ok: [192.168.56.104]
ok: [192.168.56.108]

TASK [Install Updates (Ubuntu)] ************************************************************************************
skipping: [192.168.56.108]
ok: [192.168.56.106]
ok: [192.168.56.104]

TASK [Install Updates (CentOS)] ************************************************************************************
skipping: [192.168.56.104]
skipping: [192.168.56.106]
ok: [192.168.56.108]

PLAY [server1] *****************************************************************************************************

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

TASK [server1 : Check the distribution] ****************************************************************************
ok: [192.168.56.104]

TASK [server1 : Install dependencies on Ubuntu] ********************************************************************
ok: [192.168.56.104]
```

playbook logs (1)

```
TASK [server1 : Create Prometheus user] ****************************************************************************
ok: [192.168.56.104]

TASK [server1 : Create necessary directories] **********************************************************************
ok: [192.168.56.104] => (item=/etc/prometheus)
ok: [192.168.56.104] => (item=/var/lib/prometheus)

TASK [server1 : Download Prometheus] *******************************************************************************
ok: [192.168.56.104]

TASK [server1 : Extract Prometheus] ********************************************************************************
changed: [192.168.56.104]

TASK [server1 : Move Prometheus binaries to /usr/local/bin] ********************************************************
changed: [192.168.56.104]

TASK [server1 : Move Prometheus cofnig to /etc/prometheus] *********************************************************
changed: [192.168.56.104]

TASK [server1 : Set Prometheus binary permissions] *****************************************************************
changed: [192.168.56.104]

TASK [server1 : Create Prometheus systemd service file] ************************************************************
ok: [192.168.56.104]

TASK [server1 : Reload systemd] ************************************************************************************
ok: [192.168.56.104]

TASK [server1 : Enable and restart Prometheus service] *************************************************************
ok: [192.168.56.104]
```

playbook logs (2)

```
PLAY [server2] ***************************************************************************************************

TASK [Gathering Facts] *******************************************************************************************
ok: [192.168.56.106]

TASK [server2 : Check the distribution] **************************************************************************
ok: [192.168.56.106]

TASK [server2 : Install dependencies on Ubuntu] ******************************************************************
ok: [192.168.56.106]

TASK [server2 : Create Prometheus user] **************************************************************************
ok: [192.168.56.106]

TASK [server2 : Create necessary directories] ********************************************************************
ok: [192.168.56.106] => (item=/etc/prometheus)
ok: [192.168.56.106] => (item=/var/lib/prometheus)

TASK [server2 : Download Prometheus] *****************************************************************************
ok: [192.168.56.106]

TASK [server2 : Extract Prometheus] ******************************************************************************
changed: [192.168.56.106]

TASK [server2 : Move Prometheus binaries to /usr/local/bin] ******************************************************
changed: [192.168.56.106]

TASK [server2 : Move Prometheus cofnig to /etc/prometheus] *******************************************************
changed: [192.168.56.106]

TASK [server2 : Set Prometheus binary permissions] ***************************************************************
changed: [192.168.56.106]
```

playbook logs (3)

```
TASK [server2 : Create Prometheus systemd service file] **********************************************************
ok: [192.168.56.106]

TASK [server2 : Reload systemd] **********************************************************************************
ok: [192.168.56.106]

TASK [server2 : Enable and restart Prometheus service] ***********************************************************
ok: [192.168.56.106]

PLAY [server3] ***************************************************************************************************

TASK [Gathering Facts] *******************************************************************************************
ok: [192.168.56.108]

TASK [server3 : Check the distribution] **************************************************************************
ok: [192.168.56.108]

TASK [server3 : Install dpendencies on CentOS] *******************************************************************
ok: [192.168.56.108]

TASK [server3 : Create Prometheus user] **************************************************************************
changed: [192.168.56.108]

TASK [server3 : Create necessary directories] ********************************************************************
changed: [192.168.56.108] => (item=/etc/prometheus)
changed: [192.168.56.108] => (item=/var/lib/prometheus)

TASK [server3 : Download Prometheus] *****************************************************************************
changed: [192.168.56.108]
```

playbook logs (4)

```
TASK [server3 : Extract Prometheus] ********************************************************************************
changed: [192.168.56.108]

TASK [server3 : Move Prometheus binaries to /usr/local/bin] ********************************************************
changed: [192.168.56.108]

TASK [server3 : Move Prometheus cofnig to /etc/prometheus] *********************************************************
changed: [192.168.56.108]

TASK [server3 : Set Prometheus binary permissions] *****************************************************************
changed: [192.168.56.108]

TASK [server3 : Create Prometheus systemd service file] ************************************************************
changed: [192.168.56.108]

TASK [server3 : Reload systemd] ************************************************************************************
ok: [192.168.56.108]

TASK [server3 : Enable and restart Prometheus service] *************************************************************
changed: [192.168.56.108]

PLAY RECAP *********************************************************************************************************
192.168.56.104             : ok=15   changed=4    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.106             : ok=15   changed=4    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.108             : ok=15   changed=9    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```

playbook logs (5)

```
julius-de-omampo@server1:~$ prometheus --version
prometheus, version 2.46.0 (branch: HEAD, revision: cbb69e51423565ec40f46e74f4ff2dbb3b7fb4f0)
  build user:       root@42454fc0f41e
  build date:       20230725-12:31:24
  go version:       go1.20.6
  platform:         linux/amd64
  tags:             netgo,builtinassets,stringlabels
```

server1 Prometheus version check

```
julius-de-omampo@server2:~$ prometheus --version
prometheus, version 2.46.0 (branch: HEAD, revision: cbb69e51423565ec40f46e74f4ff2dbb3b7fb4f0)
  build user:       root@42454fc0f41e
  build date:       20230725-12:31:24
  go version:       go1.20.6
  platform:         linux/amd64
  tags:             netgo,builtinassets,stringlabels
```

server2 Prometheus version check

```
[julius-de-omampo@localhost ~]$ prometheus --version
prometheus, version 2.46.0 (branch: HEAD, revision: cbb69e51423565ec40f46e74f4ff
2dbb3b7fb4f0)
  build user:       root@42454fc0f41e
  build date:       20230725-12:31:24
  go version:       go1.20.6
  platform:         linux/amd64
  tags:             netgo,builtinassets,stringlabels
```

server3 Prometheus version check

```
julius-de-omampo@workstation:~/Activity-9$ git add .
julius-de-omampo@workstation:~/Activity-9$ 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:   install.yml
        new file:   inventory.yaml
        new file:   roles/server1/tasks/main.yml
        new file:   roles/server2/tasks/main.yml
        new file:   roles/server3/tasks/main.yml

julius-de-omampo@workstation:~/Activity-9$ git commit -m "Activity 9"
[main d174034] Activity 9
 6 files changed, 288 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install.yml
 create mode 100644 inventory.yaml
 create mode 100644 roles/server1/tasks/main.yml
 create mode 100644 roles/server2/tasks/main.yml
 create mode 100644 roles/server3/tasks/main.yml
```

Push to GitHub repository (1)

```
julius-de-omampo@workstation:~/Activity-9$ git push origin main
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 3 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (12/12), 1.76 KiB | 1.76 MiB/s, done.
Total 12 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:jmado-biscoff/Activity-9.git
   564361c..d174034  main -> main
julius-de-omampo@workstation:~/Activity-9$
```

Push to GitHub repository (2)

GitHub Link:

https://github.com/jmado-biscoff/Activity-9.git

Reflections:

Answer the following:

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

A performance monitoring tool provides several key benefits, including real-time insights into system health, resource utilization, and application performance. It helps identify bottlenecks, potential failures, and underperforming components, enabling proactive maintenance and troubleshooting. These tools improve system reliability, optimize resource usage, and enhance decision-making by offering data-driven insights, leading to reduced downtime, improved efficiency, and a better end-user experience. Additionally, they support capacity planning and scaling decisions based on historical performance trends.

Conclusions:

The activity of setting up a performance monitoring tool, like Prometheus, across different operating systems using Ansible demonstrates the importance of automation and cross-platform compatibility in system administration. It highlights the efficiency of using infrastructure-as-code to streamline installations, ensure consistency, and reduce manual errors. Moreover, it reinforces the value of performance monitoring in maintaining system health, proactively addressing issues, and optimizing resources for both Ubuntu and CentOS environments.