

Azure VM Migration with Grafana and Prometheus Setup: Step-by-Step Guide

Prerequisite:

1. **Download Azure CLI:**
 - Go to the official Azure CLI download page: [Azure CLI Download](#).
 - Follow the installation instructions for your operating system.
2. Open PowerShell.
3. Run `az login` to authenticate.

1st VM Setup

To begin, we create the first virtual machine (VM1) in Azure.

Step 1: Create Resource Group

```
az group create --name MyResourceGroup --location eastus
```

Step 2: Create the First Virtual Machine (VM1)

```
az vm create --resource-group MyResourceGroup --name VM1 --image Ubuntu2204 --size Standard_B1s --admin-username azureuser --generate-ssh-keys
```

Step 3: SSH into VM1

```
ssh azureuser@<Public_IP>
```

1st VM: Installing Prometheus and Grafana

To monitor the VM's health, we install **Prometheus** and **Grafana**.

Step 1: Update and Upgrade System

```
sudo apt update
sudo apt upgrade -y
```

Note: If you encounter any errors while installing Prometheus, you can share the output of your PowerShell console with GPT.

Step 2: Install Prometheus

```
sudo apt install prometheus -y
sudo systemctl status prometheus
```

Step 3: Allow Prometheus Port (3000) via UFW

```
sudo ufw enable
sudo ufw allow 3000
sudo ufw status
```

Step 4: Install Grafana

```
sudo apt-get install -y software-properties-common
sudo add-apt-repository "deb https://packages.grafana.com/oss/deb stable
main"
sudo apt-get update
sudo apt-get install grafana -y
```

Note: If you encounter any errors during Grafana installation, run the following commands to resolve them:

```
sudo wget -q -O - https://packages.grafana.com/gpg.key | sudo apt-key add -
sudo apt-get update
sudo apt-get install grafana -y
```

Step 5: Start Grafana Service

```
sudo systemctl start grafana-server
sudo systemctl enable grafana-server
sudo systemctl status grafana-server
```

Step 6: Allow Grafana Port (9090) via UFW

```
sudo ufw allow 9090
sudo ufw status
```

Accessing Dashboards

Prometheus Dashboard (Port 9090)

Prometheus metrics allow us to monitor system health. Use the following queries to monitor key metrics:

- **CPU Usage:**

```
rate(node_cpu_seconds_total{mode="idle"}[5m])
rate(node_cpu_seconds_total{mode="user"}[5m])
rate(node_cpu_seconds_total{mode="system"}[5m])
```

- **Memory Usage:**

```
node_memory_MemTotal_bytes - node_memory_MemFree_bytes
node_memory_MemTotal_bytes - (node_memory_MemFree_bytes +
node_memory_Buffers_bytes + node_memory_Cached_bytes)
```

```
(node_memory_MemTotal_bytes - node_memory_MemFree_bytes) /  
node_memory_MemTotal_bytes * 100
```

- **Uptime:**

```
node_time_seconds - node_boot_time_seconds
```

Grafana Dashboard (Port 3000)

Step 1: Add Prometheus as a Data Source in Grafana

Access the Grafana dashboard via port 3000.

http://<VM1_IP>:3000

1. The default credentials are:

- **Username:** admin
- **Password:** admin

You will be prompted to change the password on your first login.

2. **Add Data Source:**

- On the **left sidebar**, click the **gear icon** (⚙) for **Configuration**.
- Click **Data Sources**, then **Add Data Source**.
- Select **Prometheus** from the list of data sources.

3. **Configure Prometheus Data Source:**

- In the **HTTP** section, under **URL**, enter the URL for your Prometheus server. This should point to `http://<VM1_IP>:9090` (or wherever Prometheus is running).
- Click **Save & Test** to verify the connection between Grafana and Prometheus. You should see a message that the connection was successful.

Step 2: Create a Dashboard in Grafana

1. **Create New Dashboard:**

- In the **left sidebar**, click the "+" icon and select **Dashboard**.
- Click **Add new panel** to begin adding your first visualization.

2. **Add Prometheus Queries to Panels:**

- In the **Query** section, ensure that **Prometheus** is selected as the data source.
- Write your **Prometheus query** to fetch metrics. Below are some common Prometheus queries for system monitoring:

CPU Usage (Idle, User, and System):

```
rate(node_cpu_seconds_total{mode="idle"}[5m])  
rate(node_cpu_seconds_total{mode="user"}[5m])  
rate(node_cpu_seconds_total{mode="system"}[5m])
```

Memory Usage:

```
node_memory_MemTotal_bytes - node_memory_MemFree_bytes  
node_memory_MemTotal_bytes - (node_memory_MemFree_bytes +  
node_memory_Buffers_bytes + node_memory_Cached_bytes)  
(node_memory_MemTotal_bytes - node_memory_MemFree_bytes) /  
node_memory_MemTotal_bytes * 100
```

Disk Usage:

```
rate(node_disk_bytes_read_total[5m])
```

Uptime:

```
node_time_seconds - node_boot_time_seconds
```

3. Customize the Panel:

- Choose the **visualization** type for each panel (Graph, Table, Gauge, etc.) based on the data type.
- You can adjust the **time range**, **legend**, **axes**, and **color** options to customize the look of the visualization.

4. Apply Panel:

After configuring the panel, click **Apply** to add it to your dashboard.

Step 3: Save the Dashboard

Once your panels are added, save the dashboard:

- Click the **disk icon** at the top right to save the dashboard.
- Give the dashboard a name, such as "**System Monitoring Dashboard**", and click **Save**.

2nd VM Setup

Open new powershell:

Step 1: Create the Second Virtual Machine (VM2)

```
az vm create --resource-group MyResourceGroup --name VM2 --image Ubuntu2204 -  
-size Standard_B1s --admin-username azureuser --generate-ssh-keys
```

Step 2: SSH into VM2

```
ssh azureuser@<Public_IP>
```

Migrating Resources from VM2 to VM1

In this section, we will migrate the resources from **VM2** to **VM1**.

Step 1: Deallocate VM2

To begin the migration process, deallocate VM2.

```
az vm deallocate --resource-group MyResourceGroup --name VM2
```

Step 2: Identify the Disk ID of VM2

```
az vm show --resource-group MyResourceGroup --name VM2 --query  
"storageProfile.osDisk.managedDisk.id" --output tsv
```

Step 3: Create a Snapshot of VM2 Disk

Use the disk ID from the previous step to create a snapshot of VM2's disk.

```
az snapshot create --resource-group MyResourceGroup --name VM2_Snapshot --  
source <VM2_disk_id>
```

Step 4: Create a New Disk for VM1 from the Snapshot

```
az disk create --resource-group MyResourceGroup --name NewDiskForVM1 --source  
<VM2_Snapshot_ID>
```

Step 5: Attach the New Disk to VM1

```
az vm disk attach --resource-group MyResourceGroup --vm-name VM1 --name  
NewDiskForVM1
```

Step 6: Verify Disk Attachment to VM1

```
az vm show --resource-group MyResourceGroup --name VM1 --query  
"storageProfile.dataDisks"
```