

Application Deployment & Monitoring

Overview:

1. Create open-source project on GitHub,
2. Deploy it on Azure, using NGINX, Jenkins,
3. Setup Monitoring,

Prerequisites:

- GitHub Account
- Azure Account
- Local Computer

Tools Required:

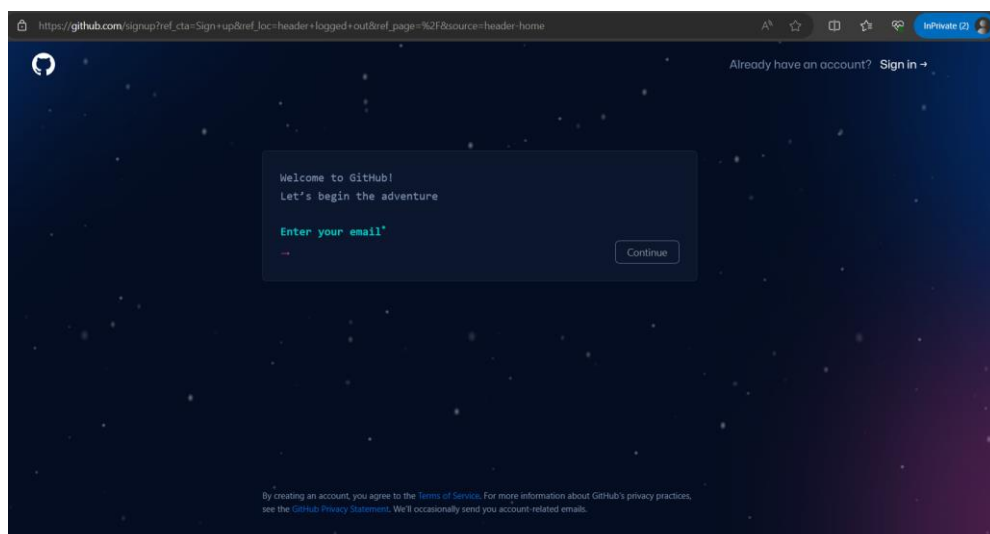
- Jenkins
- Nginx
- Prometheus & Grafana

Implementation:

Step-1: Create GitHub Account & Push code to repository

Step-1.1: Create GitHub account using following link

<https://github.com>



Step-1.2: Create New GitHub Repository & Setup SSH connection with local computer

The image shows two screenshots from the GitHub website. The top screenshot is the 'Create a new repository' page. It has a header with the URL 'https://github.com/new' and a search bar. The main content area is titled 'Create a new repository' and includes a sub-header 'A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)'. Below this, it says 'Required fields are marked with an asterisk (*)'. There are two required fields: 'Owner *' with a dropdown menu showing 'AnkDigitalInfra' and 'Repository name *' with a text input field. A hint text says 'Great repository names are short and memorable. Need inspiration? How about [fantastic-guacamole](#) ?'. There is an optional 'Description' text area. Below these are two radio buttons for 'Public' (selected) and 'Private'. Under 'Public' is the text 'Anyone on the internet can see this repository. You choose who can commit.' Under 'Private' is 'You choose who can see and commit to this repository.' Below the radio buttons is a section 'Initialize this repository with:' with a checkbox 'Add a README file' and a link 'Learn more about READMEs.'. There is also a section 'Add .gitignore' with a dropdown menu 'None' and a link 'Learn more about ignoring files.'. The bottom screenshot is the 'Settings' page for the user 'AnkDigitalInfra'. It has a sidebar with navigation links: 'Public profile', 'Account', 'Appearance', 'Accessibility', 'Notifications', 'Access', 'Billing and plans', 'Emails', 'Password and authentication', 'Sessions', 'SSH and GPG keys' (selected), 'Organizations', 'Enterprises', 'Moderation', 'Code, planning, and automation', 'Repositories', and 'Code scanning'. The main content area is titled 'SSH keys' and has a 'New SSH key' button. It says 'This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.' Below this is a section 'Authentication Keys' with a table showing one key: 'Ank_Key' with a green lock icon, the key string 'SHA256:HeTesiYwUdDlly8+H0UH2V5qPx89MUK/KLqLfvFe+H', 'Added on Sep 16, 2023', and 'Last used within the last week — Read/write'. There is a 'Delete' button next to the key. Below the table is a link 'Check out our guide to [generating SSH keys](#) or troubleshoot [common SSH problems](#).' Below this is a section 'GPG keys' with a 'New GPG key' button. It says 'There are no GPG keys associated with your account. Learn how to [generate a GPG key](#) and [add it to your account](#).' Below this is a section 'Vigilant mode' with a checkbox 'Flag unsigned commits as unverified' and a link 'This will include any commit attributed to your account but not signed with your GPG or S/MIME key.'

Step-1.3: Push code to GitHub repository from local computer by executing following commands on GitBassh command prompt.

- git init
- git add README.md
- git commit -m "first commit"
- git branch -M main
- git remote add origin git@github.com:AnkDigitalInfra/Ank.git
- git push -u origin main

https://github.com/AnkDigitalInfra/Ank

Quick setup — if you've done this kind of thing before

Set up in Desktop or **HTTPS** SSH git@github.com:AnkDigitalInfra/Ank.git

Get started by [creating a new file](#) or [uploading an existing file](#). We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

...or create a new repository on the command line

```
echo "# Ank" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin git@github.com:AnkDigitalInfra/Ank.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin git@github.com:AnkDigitalInfra/Ank.git
git branch -M main
git push -u origin main
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

[Import code](#)

Step-1.4: GitHub repository Output

https://github.com/AnkDigitalInfra/AnkMain

AnkDigitalInfra / AnkMain

Code Issues Pull requests Actions Projects Security Insights Settings

AnkMain Private Watch 0 Fork 0 Star 0

main 3 branches 0 tags Go to file Add file Code

AnkDigitalInfra Merge pull request #3 from AnkDigitalInfra/ankinfra1 72268f7 7 hours ago 13 commits

📁 AnkMain	first commit	2 days ago
📁 css	first commit	2 days ago
📁 css1	first commit	2 days ago
📁 files	first commit	2 days ago
📁 images	first commit	2 days ago
📁 js	first commit	2 days ago
📁 js1	first commit	2 days ago
📄 about-us.html	first commit	2 days ago
📄 contact-us.html	first commit	2 days ago
📄 index-2.html	first commit	2 days ago
📄 index-3.html	first commit	2 days ago

About

No description, website, or topics provided.

Activity

0 stars

0 watching

0 forks

Releases

No releases published

[Create a new release](#)

Packages

No packages published

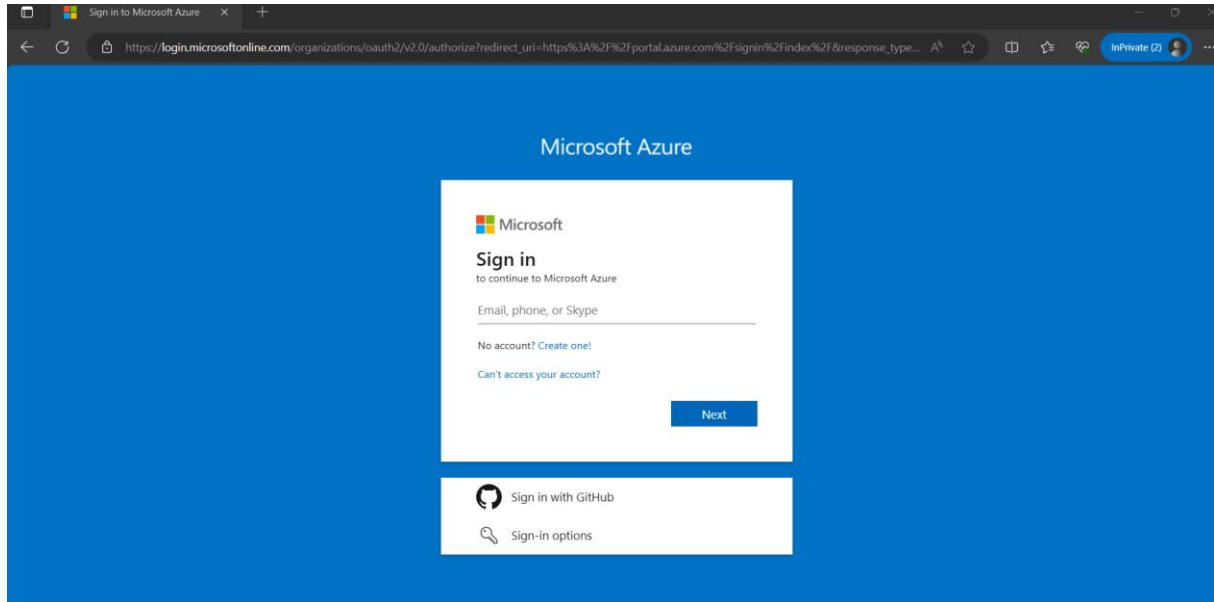
[Publish your first package](#)

Languages

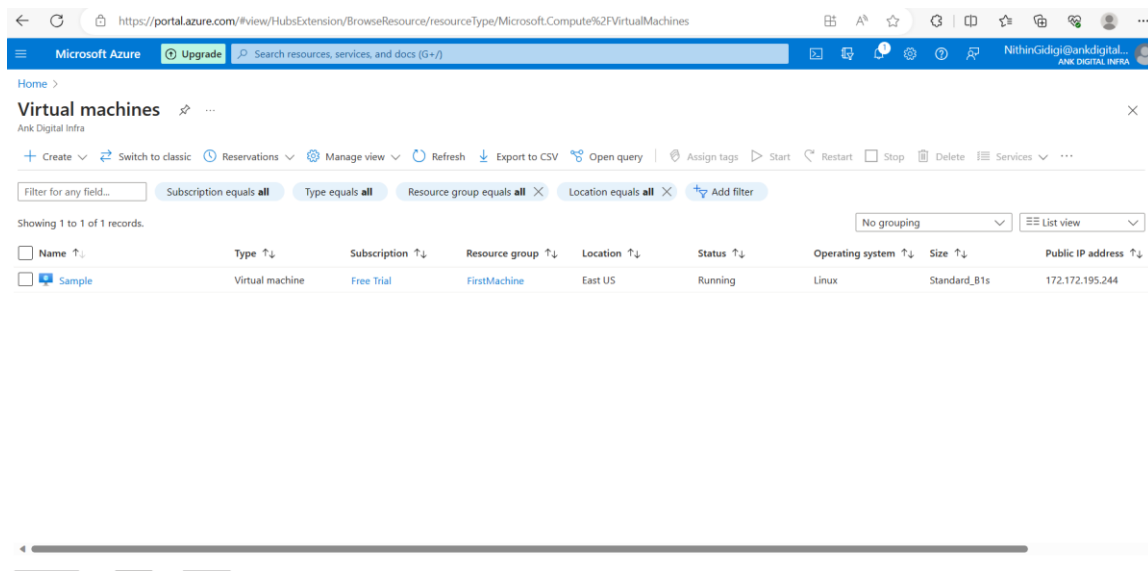
Step-2: Create Azure Account & Connect to VM

Step-2.1: Create Azure Account using following link

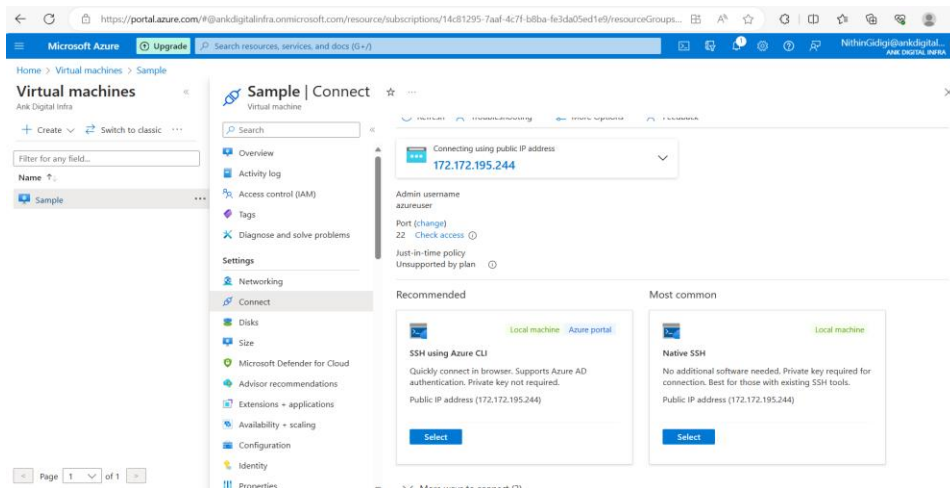
<https://portal.azure.com>



Step-2.2: Launch Virtual Machine



Step-2.3: Connect to VM by using Azure CLI or Native SSH



Step-3: Install Nginx and Jenkins

Step-3.1: Install Nginx by executing following commands

- sudo apt-get update
- sudo apt install nginx

```
nithingidigi@ankdigitalinfra.onmicrosoft.com@Sample:~$ sudo apt install nginx
Reading package lists... Done
Building dependency tree
Reading state information... Done
nginx is already the newest version (1.18.0-0ubuntu1.4).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
nithingidigi@ankdigitalinfra.onmicrosoft.com@Sample:~$
```

-

Step-3.2: Install Jenkins

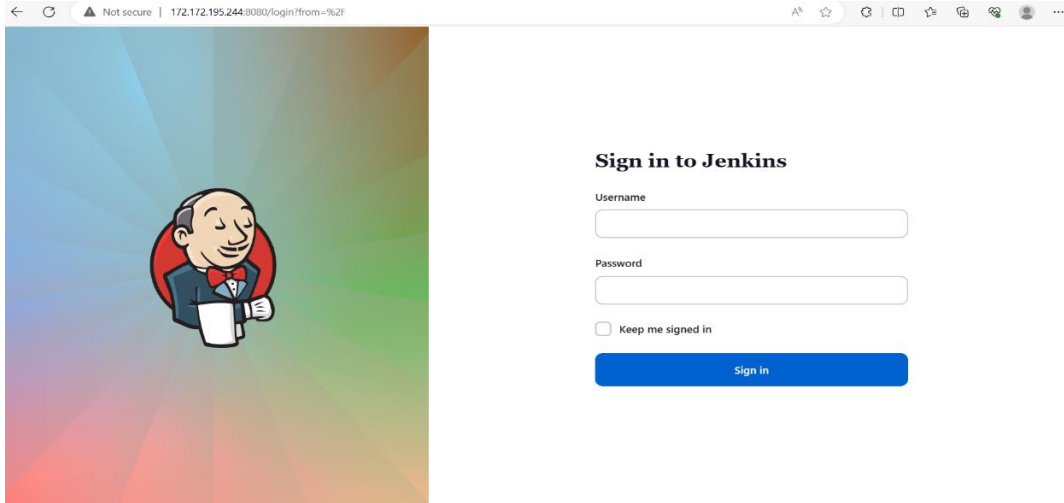
- Java version 11 or 17 is required for Jenkins
- Install Java by executing following commands
- sudo apt-get update
- sudo apt install openjdk-11-jdk
- sudo java -version

```
nithingidigi@ankdigitalinfra.onmicrosoft.com@Sample:~$ sudo apt install openjdk-11-jdk
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libice-dev libpthread-stubs0-dev libsm-dev libx11-dev libxau-dev libxcb1-dev libxdmcp-dev libxt-dev openjdk-11-jdk-headless x11proto-core-dev x11proto-dev
  xorg-sgml-doctools xtrans-dev
Suggested packages:
  libice-doc libsm-doc libx11-doc libxcb-doc libxt-doc openjdk-11-demo openjdk-11-source visualvm
The following NEW packages will be installed:
  libice-dev libpthread-stubs0-dev libsm-dev libx11-dev libxau-dev libxcb1-dev libxdmcp-dev libxt-dev openjdk-11-jdk openjdk-11-jdk-headless x11proto-core-dev
  x11proto-dev xorg-sgml-doctools xtrans-dev
0 upgraded, 14 newly installed, 0 to remove and 1 not upgraded.
Need to get 76.9 MB of archives.
After this operation, 99.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 xorg-sgml-doctools all 1:1.11-1 [12.9 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 x11proto-dev all 2019.2-1ubuntu1 [594 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 x11proto-core-dev all 2019.2-1ubuntu1 [2620 B]
Get:4 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 libice-dev amd64 2:1.0.10-0ubuntu1 [47.8 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 libpthread-stubs0-dev amd64 0.4-1 [5384 B]
Get:6 http://azure.archive.ubuntu.com/ubuntu focal/main amd64 libsm-dev amd64 2:1.2.3-1 [17.0 kB]
```

- Install Jenkins

```
nithingidigi@ankdigitalinfra.onmicrosoft.com@Sample:~$ sudo apt install jenkins
Reading package lists... Done
Building dependency tree
Reading state information... Done
jenkins is already the newest version (2.414.1).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
```

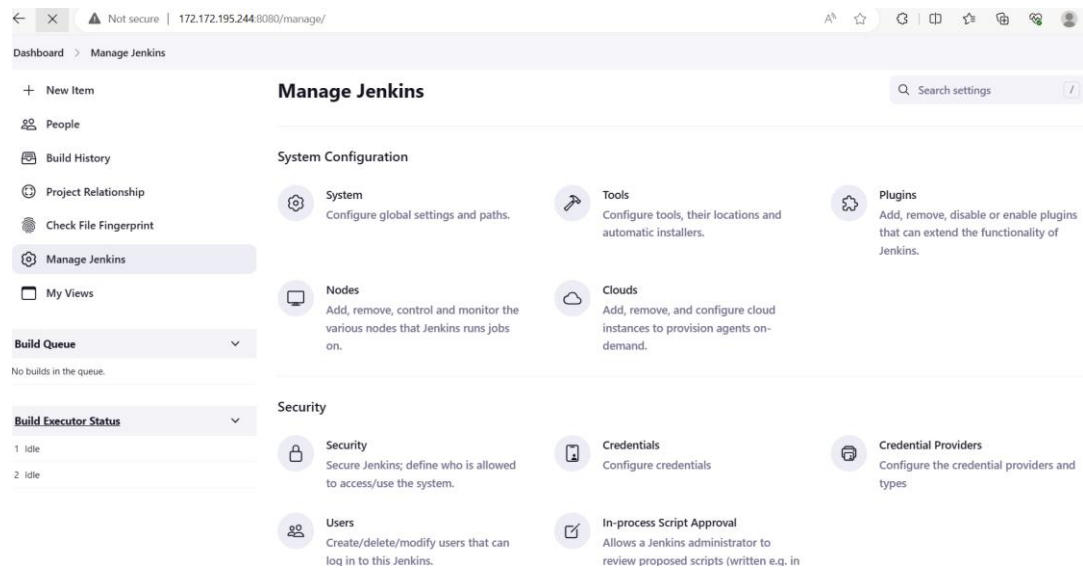
- Login to Jenkins using <http://Azure-vm-public-ip:8080>



Step-4: Configure Jenkins and Setup CI/CD

Step-4.1: Setup Global configuration (Manage Jenkins – System – Global Configurations)

- Add GitHub credentials (Username & Access token)



Step-4.2: Setup GitHub webhook to Jenkins (It will trigger Jenkins job in every update to GitHub)

The screenshot shows the GitHub repository settings for 'AnkDigitalInfra / AnkMain'. The 'Webhooks' section is selected in the left sidebar. The 'Add webhook' form is displayed with the following fields:

- Payload URL:** `https://example.com/postreceive`
- Content type:** `application/x-www-form-urlencoded`
- Secret:** (Empty text box)
- Which events would you like to trigger this webhook?**
 - ☒ Just the push event.
 - ☐ Send me everything.
 - ☐ Let me select individual events.
- Active:** ☒ (We will deliver event details when this hook is triggered.)

Step-4.3: Create a job(project) in Jenkins to deploy application and to automate process

- Create free style job
- Source code – GitHub Repository
- Trigger – GitHub
- Build – Execute shell script

```
Sudo -S rm /var/www/html/*
Sudo -S mv /var/lib/Jenkins/workspace/AnkDigitalInfra/ /var/www/html/
```

The screenshot shows the Jenkins dashboard with the following components:

- Dashboard:** Overview of the Jenkins environment.
- Left Sidebar:** Navigation menu including 'New Item', 'People', 'Build History', 'Project Relationship', 'Check File Fingerprint', 'Manage Jenkins', and 'My Views'.
- Job List Table:** A table showing the status of Jenkins jobs.

S	W	Name ↓	Last Success	Last Failure	Last Duration
✓	☀	AnkProject	7 hr 59 min #23	9 hr 4 min #17	0.97 sec

Below the table, there is an 'Icon legend' and three 'Atom feed' links: 'Atom feed for all', 'Atom feed for failures', and 'Atom feed for just latest builds'.

The 'Build Queue' section shows 'No builds in the queue.' and the 'Build Executor Status' section shows two executors in an 'Idle' state.

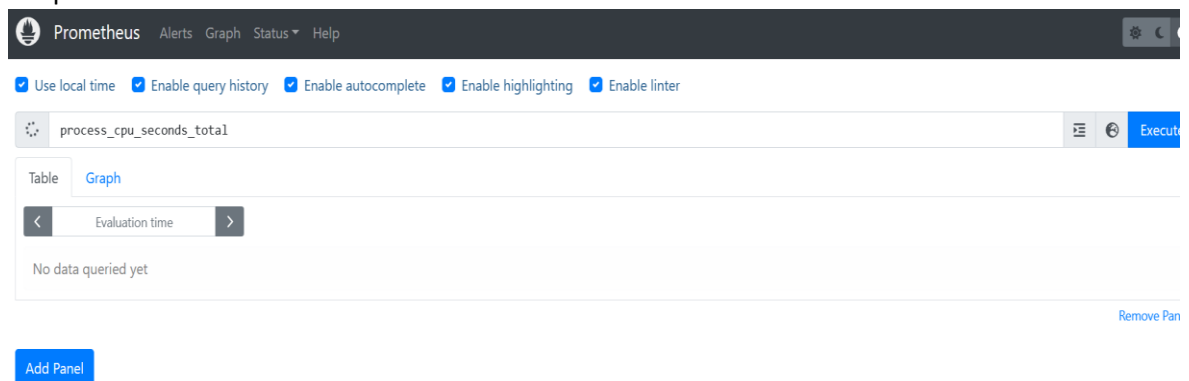
Step-5: Install Prometheus, Grafana and set up monitoring

Step-5.1: Install Prometheus on VM by executing following commands

- `wget https://github.com/prometheus/prometheus/releases/download/v2.47.0/prometheus-2.47.0.linux-amd64`
- `tar xvfz prometheus-2.47.0.linux-amd64`
- `sudo mv /home/user/prometheus-2.47.0.linux-amd64/prometheus/ /user/local/bin/`
- `sudo cp /home/user/prometheus-2.47.0.linux-amd64/prometheus.yml /etc/prometheus/prometheus.yml`
- Edit Prometheus.yml to add targets
- Create system unit file at `/etc/systemd/system/prometheus.service`
- `Sudo systemctl start prometheus`
- `Sudo systemctl enable prometheus`
- Access Prometheus UI at `http://VM-Public-IP:9090`

```
nithingidigi@ankdigitalinfra.onmicrosoft.com$ wget https://github.com/prometheus/prometheus/releases/download/v2.33.1/prometheus-2.33.1.linux-amd64.tar.gz
--2023-09-18 15:29:46-- https://github.com/prometheus/prometheus/releases/download/v2.33.1/prometheus-2.33.1.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.114.3
Connecting to github.com (github.com)|140.82.114.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/7f42d8c6-ddc6-4bd8-8d4c-e79ec24b5870?X-Amz-Algorithm=AWS4-HMAC-SHA256
-X-Amz-Credential=AKIAIWNJYAX4CSVEH53A2F20230918%2Fus-east-1%2F%3Faws4_request&X-Amz-Date=20230918T152950Z&X-Amz-Expires=300&X-Amz-Signature=307509270bd3546f98bfe7
1ad0d5855f4261ef43273835bcb5670ab4c357a98X-Amz-SignedHeaders=host&actor-id=88&key-id=68389218&response-content-disposition=attachment%3B%20filename%3Dpromet
```

Output



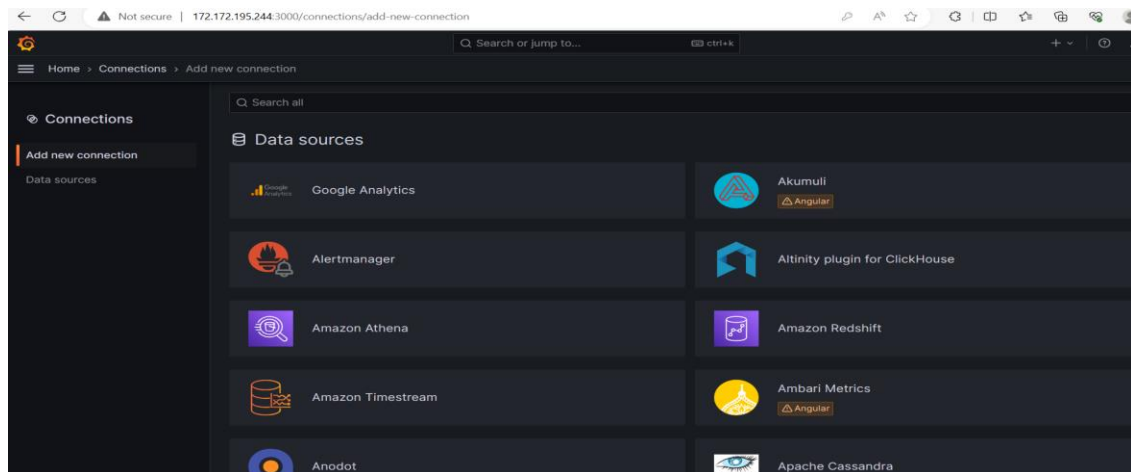
Step-5.2: Install Grafana by executing following commands

- `Sudo apt-get update`
- `sudo apt-get install -y apt-transport-https software-properties-common wget`
- `sudo add-apt-repository "deb https://packages.grafana.com/oss/deb stable main"`
- `sudo mkdir -p /etc/apt/keyrings/`
- `echo "deb [signed-by=/etc/apt/keyrings/grafana.gpg] https://apt.grafana.com stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list`
- `sudo systemctl enable grafana-server`
- `# Updates the list of available packages`

- sudo apt-get update
- sudo apt-get install Grafana
- sudo systemctl start grafana-server
- sudo systemctl enable grafana-server
- Access Grafana UI at http:// VM-Public-IP:3000

Step-5.3: Monitoring

Add data source - prometheus



Create dashboard – Select metrics

