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:

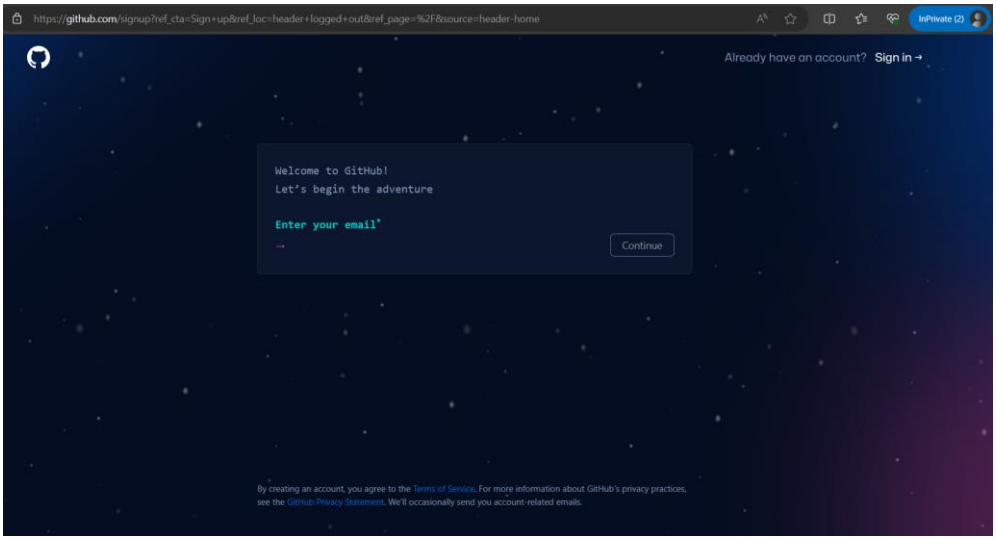
- Jenkins
- Nginx
- Prometheus & Grafana

Implementation:

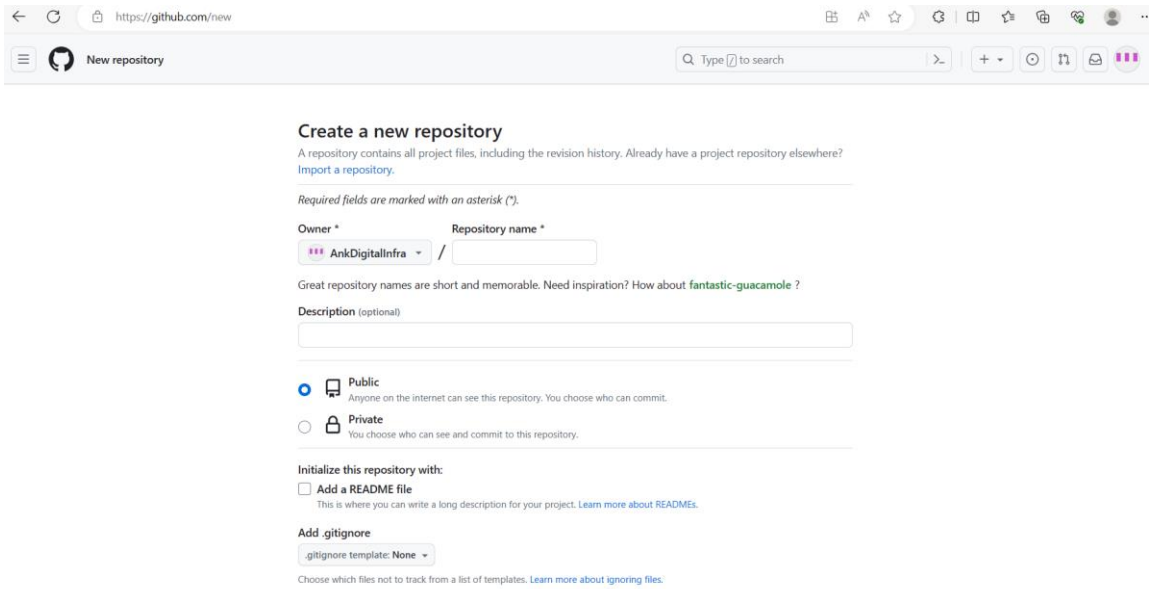
Step-1: Create GitHub Account & Push code to repository

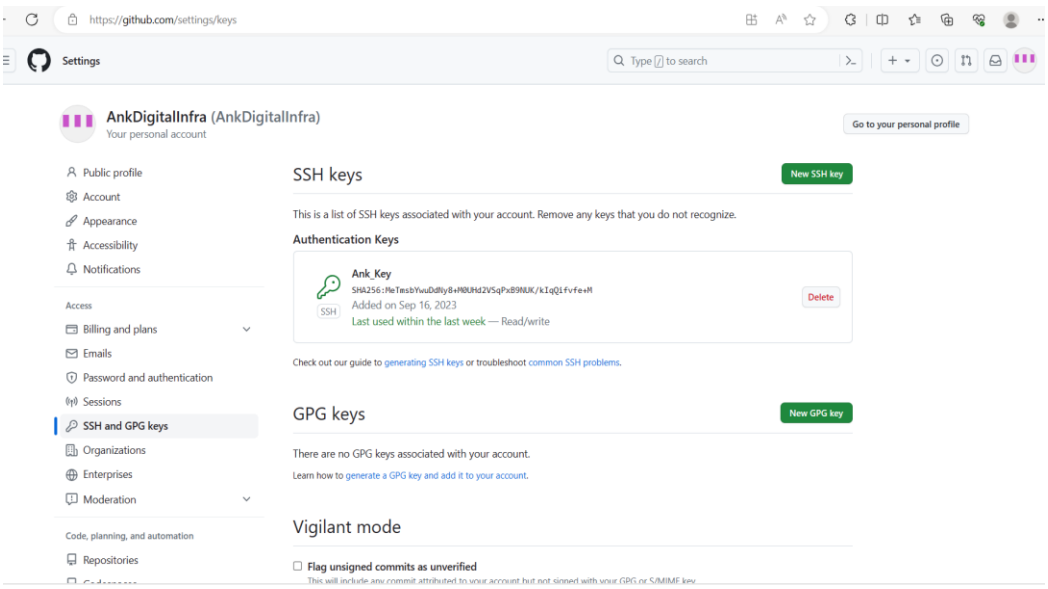
Step-1.1: Create GitHub account using following link

https://github.com



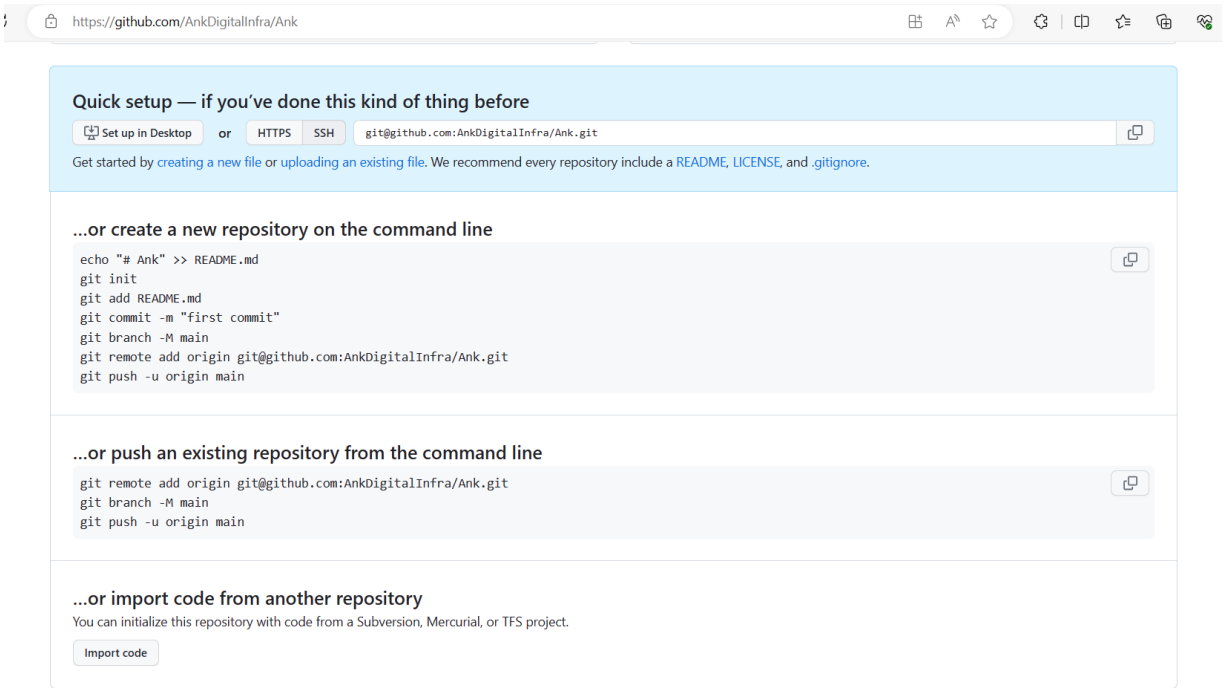
Step-1.2: Create New GitHub Repository & Setup SSH connection with local computer



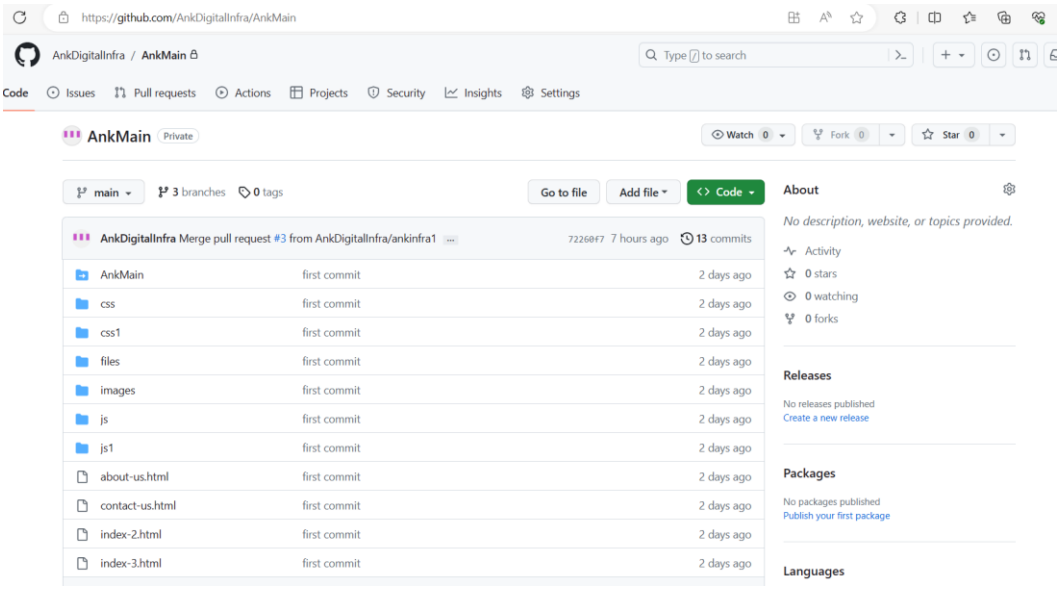


Step-1.3: Push code to GitHub repository from local computer by executing following commands on GitBassh command prompt.

- 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



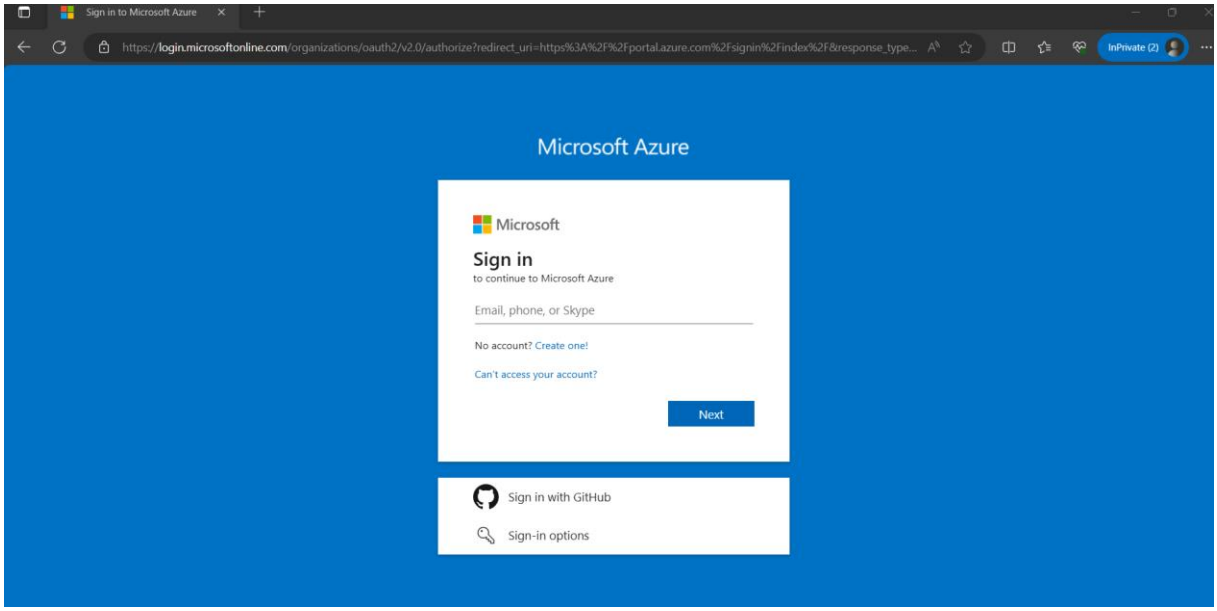
Step-1.4: GitHub repository Output



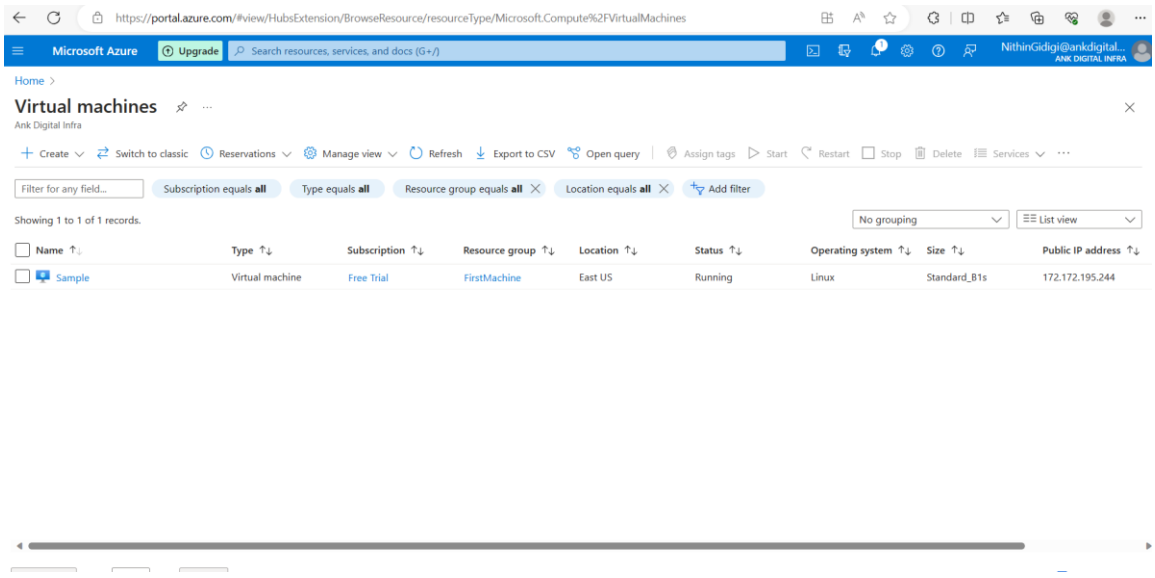
Step-2: Create Azure Account & Connect to VM

Step-2.1: Create Azure Account using following link

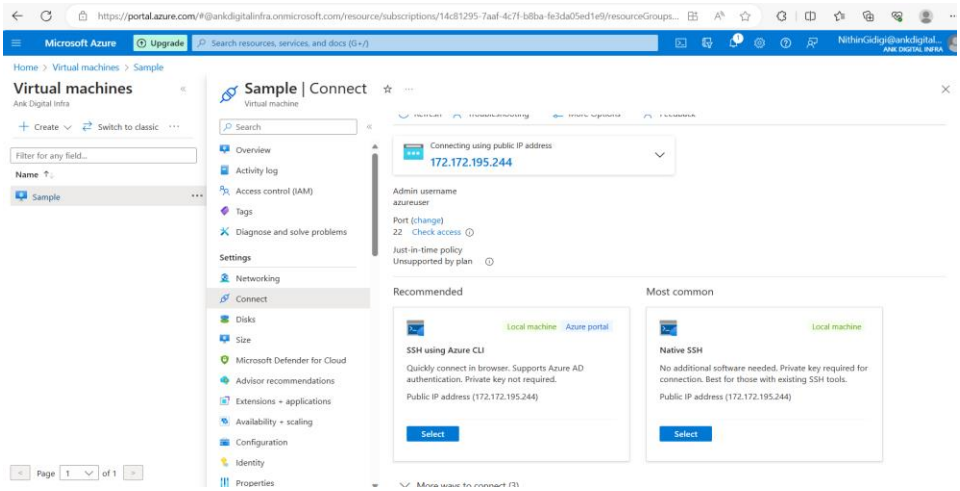
https://portal.azure.com



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:~$
```

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Step-3.2: Install Jenkins

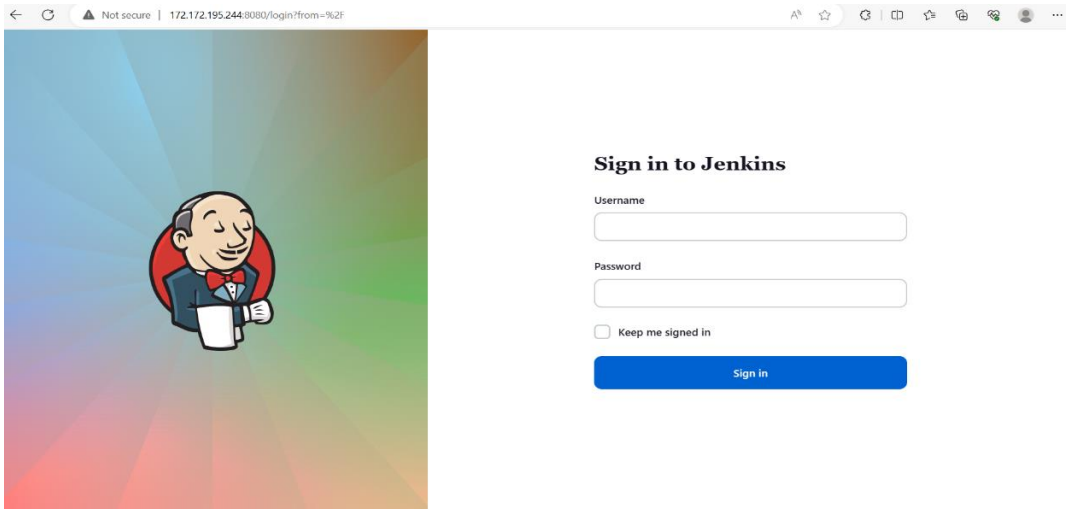
- Java version 11 or 17 is required for Jenkins
- Install Java by executing following commands
- sudo apt-get update
- sudo apt install openjdk-11-jdk
- sudo java -version

```
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, 90.6 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.
```

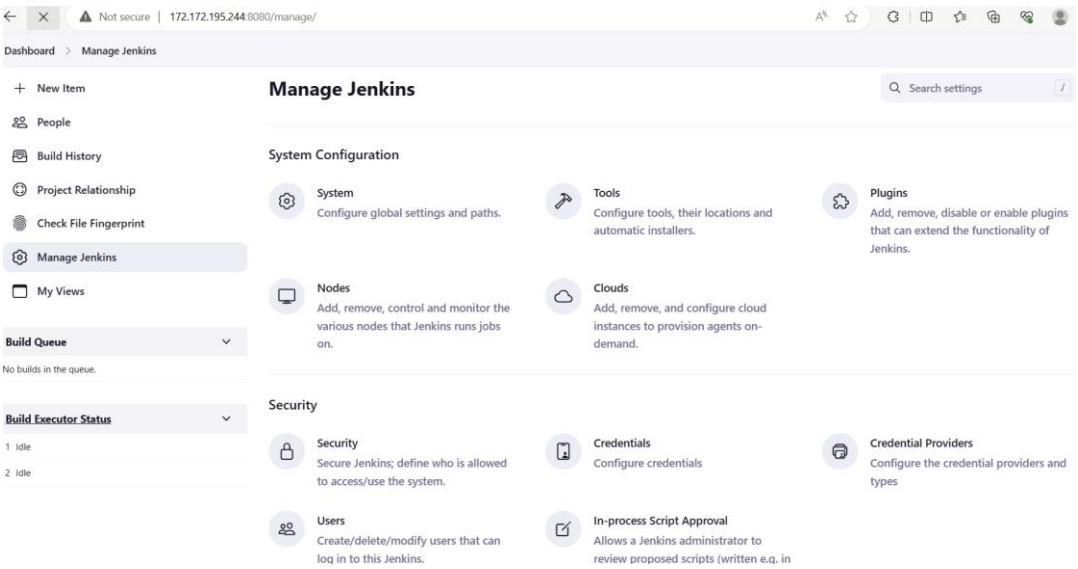
- Login to Jenkins using http://Azure-vm-public-ip:8080



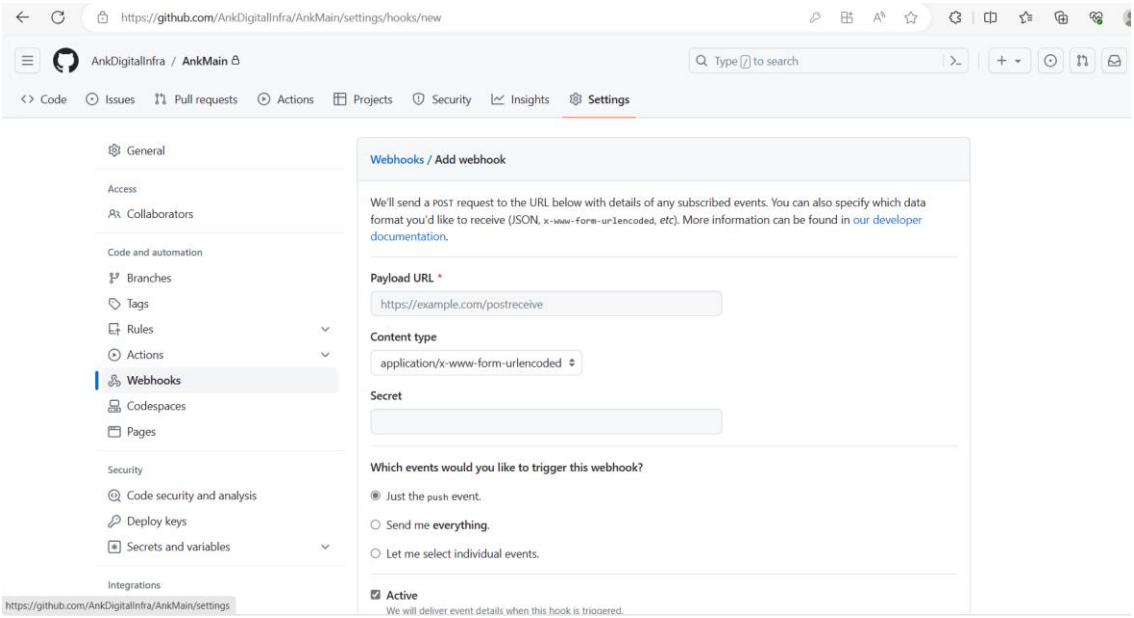
Step-4: Configure Jenkins and Setup CI/CD

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)

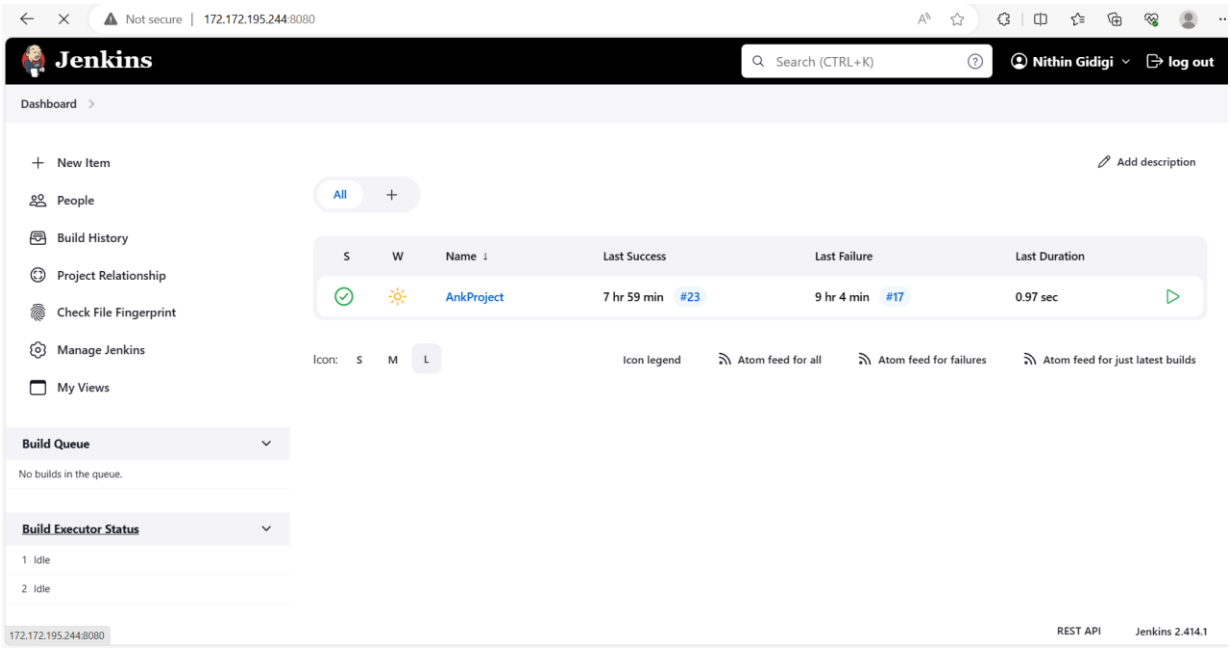


Step-4.3: Create a job(project) in Jenkins to deploy application and to automate process

- 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/

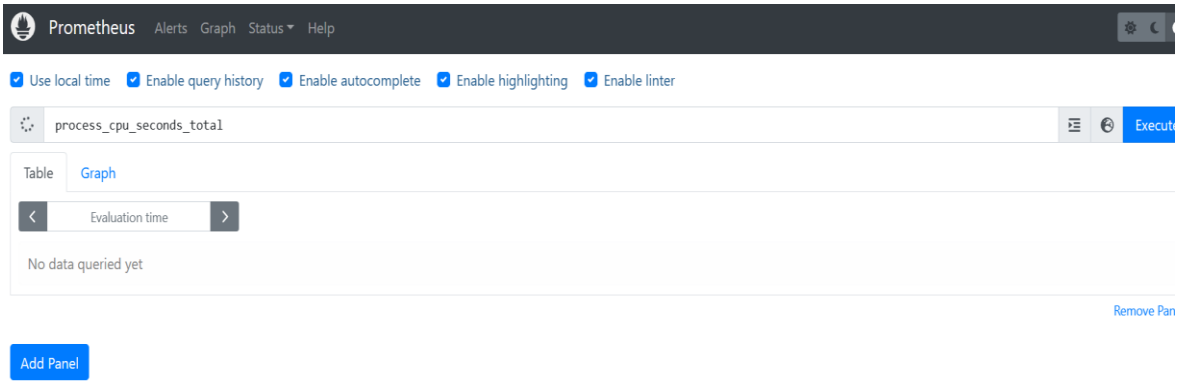


Step-5: Install Prometheus, Grafana and set up monitoring

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

- wget https://github.com/prometheus/prometheus/releases/download/ 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/system/system/prometheus.service
- Sudo systemctl start prometheus
- Sudo systemctl enable prometheus
- Access Prometheus UI at http://VM-Public-IP:9090

- Output



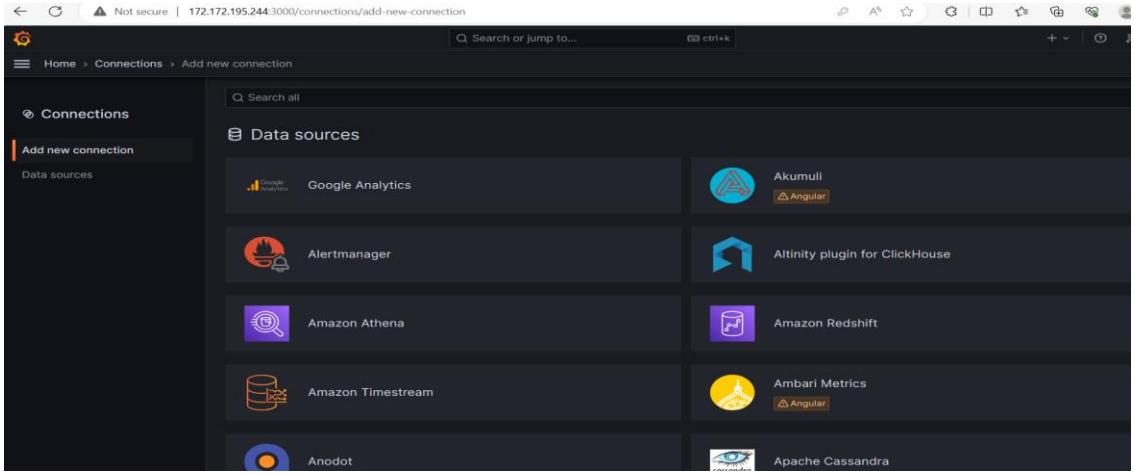
Step-5.2: Install Grafana by executing following commands

- Sudo apt-get update
- sudo apt-get install -y apt-transport-https software-properties-common wgetsudo 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.listsudo
- echo "deb [signed-by=/etc/apt/keyrings/grafana.gpg] https://apt.grafana.com beta main" | sudo tee -a /etc/apt/sources.list.d/grafana.listsudo 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