

Project - Finance

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● **Problem Statement:**

- ❖ **FinanceMe** is a Global leading Banking and Financial services provider based out of Germany. The company offers products and services like Banking, Funds Management, Loans, Debit Cards and Credits Cards, Investment Banking etc. Initially the company was using a **Monolithic application** architecture, As the company grown, It started facing difficulties in managing the application infrastructure and application deployments and Scaling of application when the traffic load increases.
 - ❖ **FinanceMe** has decided to opt for **microservice** architecture for its applications and decided to go **DevOps** by implementing necessary automation using **CICD**. **FinanceMe** has decided to use AWS as primary cloud services provider to create servers, databases and application deployments.
 - ◆ **Building Complex Monolithic Application is difficult.**
 - ◆ **Manual efforts to test various components/modules of the project**
 - ◆ **Incremental builds are difficult to manage, test and deploy.**
 - ◆ **It was not possible to scale up individual modules independently.**
 - ◆ **Creation of infrastructure and configure it manually is very time consuming.**
 - ◆ **Continuous manual monitoring the application is quite challenging.**
-

● **Requirement:**

- As soon as the developer pushes the updated code on the GIT master branch, the code should be checked out, compiled, tested, packaged and containerized.
 - A new test-server should be provisioned using terraform and should be automatically configured using Ansible with all the required software's
 - As soon as the server is available, the application must be deployed to the test-server automatically.
-

● **Infrastructure:**

- **Server 1: Master server**

JDK	Jenkins	Ansible
GIT	Docker	
Maven	Terraform	

- **Server 2: Test server**

- **Server 3 : Monitoring**

Prometheus
Grafana

Implementation:

Server 1:

➤ Server 1: Master server

JDK	Jenkins	Ansible
GIT	Docker	
Maven	Terraform	

Steps:

Launch ec2-instance for Master(Main) Server.

EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name: Add additional tags

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Q. Search our full catalog including 1000s of application and OS images

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

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Amazon Linux  macOS  Ubuntu  Windows  Red Hat  SUSE Linux 

Browse more AMIs Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type Free tier eligible

ami-0a0e5d9c7acc3316f1 (64-bit (x86)) / ami-070f599e4b4a3f5ce (64-bit (Arm))
Virtualization: hvm EFA enabled: true Root device type: ebs

Instance type Info | Get advice

Instance type: t2.medium
Family: t2 2 vCPU 4 GiB Memory Current generation: true
On-Demand Linux base pricing: 0.0464 USD per Hour
On-Demand RHEL base pricing: 0.0752 USD per Hour
On-Demand Windows base pricing: 0.0644 USD per Hour
On-Demand SUSE base pricing: 0.1464 USD per Hour

All generations Compare instance types

Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required: awsec2

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Configure storage Info

Advanced

1x 8 GiB gp2 Root volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

0 x File systems

Summary

Number of instances: Info

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Review commands

Launch instance

● **Installation of tool:**

Java

Git

```
root@ip-172-31-25-153:~# history
 1 apt update
 2 apt install openjdk-17-jdk
 3 java --version
 4 mvn --version
 5 git --version
 6 apt install docker.io
 7 docker --version
 8 history
root@ip-172-31-25-153:~# java --version
openjdk 17.0.11 2024-04-16
OpenJDK Runtime Environment (build 17.0.11+9-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.11+9-Ubuntu-122.04.1, mixed mode, sharing)
root@ip-172-31-25-153:~# git --version
git version 2.34.1
root@ip-172-31-25-153:~#
```

Terraform:

```
root@ip-172-31-25-153:~# cat terraform.sh
#!/bin/bash
sudo apt-get update && sudo apt-get install -y gnupg software-properties-common
wget -O- https://apt.releases.hashicorp.com/gpg | \
gpg --dearmor | \
sudo tee /usr/share/keyrings/hashicorp-archive-keyring.gpg > /dev/null
echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg] \
https://apt.releases.hashicorp.com $(lsb_release -cs) main" | \
sudo tee /etc/apt/sources.list.d/hashicorp.list
sudo apt update -y
sudo apt-get install terraform -y
root@ip-172-31-25-153:~# terraform --version
Terraform v1.9.2
on linux_amd64
```

Ansible:

```
root@ip-172-31-25-153:~# cat ansible.sh
#!/bin/bash
sudo apt update
sudo apt install software-properties-common
sudo add-apt-repository --yes --update ppa:ansible/ansible
sudo apt install ansible -y
root@ip-172-31-25-153:~# ansible --version
ansible [core 2.16.8]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.10.12 (main, Nov 20 2023, 15:14:05) [GCC 11.4.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
```

Jenkins:

```
root@ip-172-31-25-153:~# cat jenkins.sh
#!/bin/bash
sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
  https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
echo "deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] \
https://pkg.jenkins.io/debian-stable binary/" | sudo tee \
  /etc/apt/sources.list.d/jenkins.list > /dev/null
sudo apt-get update
sudo apt-get install jenkins -y
root@ip-172-31-25-153:~# jenkins --version
2.452.3
```

● **Configured Jenkins:**
Provide initial password

Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

```
/var/lib/jenkins/secrets/initialAdminPassword
```

Please copy the password from either location and paste it below.

Administrator password

Continue

```
root@ip-172-31-25-153:~# cat /var/lib/jenkins/secrets/initialAdminPassword
1fd9e9e506af4881b770359d40f156c4
```

The screenshot shows a Jenkins dashboard. At the top, there's a terminal window displaying the command `cat /var/lib/jenkins/secrets/initialAdminPassword` and its output, `1fd9e9e506af4881b770359d40f156c4`. Two orange arrows point to this output and to the browser's address bar, which shows the URL `50.17.69.217:8080`. The Jenkins interface includes sections for 'Dashboard', 'New Item', 'Build History', 'Manage Jenkins', and 'My Views'. It also features sections for 'Start building your software project', 'Set up a distributed build', and 'Instances (1/1)'. The instance details show an EC2 instance named 'Master Server' with ID `i-058a0f212437db1b4`, running in the `t2.medium` instance type, and in the `us-east-1a` availability zone. The public IPv4 address listed is `50.17.69.217`.

● Adding Jenkins root privilege:

- ✓ **USE:** To prevent error as Jenkins user to run sudo task

```
GNU nano 6.2                               /etc/sudoers.tmp

# Per-user preferences; root won't have sensible values for them.
Defaults:!/usr/bin/sudo env_keep += "EMAIL DEBEMAIL DEBFULLNAME"

# "sudo scp" or "sudo rsync" should be able to use your SSH agent.
Defaults:!/usr/bin/sudo env_keep += "SSH_AGENT_PID SSH_AUTH_SOCK"

# Ditto for GPG agent
Defaults:!/usr/bin/sudo env_keep += "GPG_AGENT_INFO"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
jenkins ALL=(ALL) NOPASSWD:ALL

# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:
@includedir /etc/sudoers.d

FG Help      ^O Write Out     ^W Where Is      ^K Cut        ^T Execute      ^C Location      M-U Undo      M-A Set Mark      M-[ To Bracket
CX Exit      ^R Read File     ^N Replace      ^U Paste       ^J Justify      ^V Go To Line    M-E Redo      M-6 Copy       M-] Where Was
```

● Adding Jenkins to docker group:

- ✓ **USE:** Controls docker from Jenkins

```
docker:x:122:←
jenkins:x:123:
root@ip-172-31-25-153:~# usermod -aG docker jenkins
root@ip-172-31-25-153:~# cat /etc/group
```

After:

```
docker:x:122:jenkins
jenkins:x:123:
root@ip-172-31-25-153:~#
```

● Installing maven:

```
root@ip-172-31-25-153:~# apt install maven
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libapaliance-java libapache-pom-java libatinject-jsr30-api-java libcdi-api-java libcommons-cli-java libcommons-io-java libcommons-lang3-java
  libcommons-parent-java libgeronimo-annotation-1.3-spec-java libgeronimo-interceptor-3.0-spec-java libguava-java libguice-java libhawtjni-runtime-java
  libjansi-java libjansi-native-java libjsr305-java libmaven-parent-java libmaven-resolver-java libmaven-shared-utils-java libmaven3-core-java
  libplexus-cipher-java libplexus-classworlds-java libplexus-component-annotations-java libplexus-interpolation-java libplexus-sec-dispatcher-java
  libplexus-utils2-java libsisu-inject-java libsisu-plexus-java libslf4j-java libwagon-file-java libwagon-http-shaded-java libwagon-provider-api-java
Suggested packages:
  libapaliance-java-doc libatinject-jsr30-api-java-doc libel-api-java libcommons-io-java-doc libcommons-lang3-java-doc libasm-java libcglib-java
  libjsr305-java-doc libmaven-shared-utils-java-doc liblogback-java libplexus-classworlds-java-doc libplexus-sec-dispatcher-java-doc
  libplexus-utils2-java-doc junit4 testing libcommons-logging-java liblog4j1.2-jar
The following NEW packages will be installed:
  libapaliance-java libapache-pom-java libatinject-jsr30-api-java libcdi-api-java libcommons-cli-java libcommons-io-java libcommons-lang3-java
  libcommons-parent-java libgeronimo-annotation-1.3-spec-java libgeronimo-interceptor-3.0-spec-java libguava-java libguice-java libhawtjni-runtime-java
  libjansi-java libjansi-native-java libjsr305-java libmaven-parent-java libmaven-resolver-java libmaven-shared-utils-java libmaven3-core-java
  libplexus-cipher-java libplexus-classworlds-java libplexus-component-annotations-java libplexus-interpolation-java libplexus-sec-dispatcher-java
  libplexus-utils2-java libsisu-inject-java libsisu-plexus-java libslf4j-java libwagon-file-java libwagon-http-shaded-java libwagon-provider-api-java
maven
0 upgraded, 33 newly installed, 0 to remove and 11 not upgraded.
Need to get 10.2 MB of archives.
After this operation, 13.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
root@ip-172-31-25-153:~# mvn -version
Apache Maven 3.6.3
Maven home: /usr/share/maven
Java version: 17.0.11, vendor: Ubuntu, runtime: /usr/lib/jvm/java-17-openjdk-amd64
Default locale: en, platform encoding: UTF-8
OS name: "linux", version: "6.5.0-1022-aws", arch: "amd64", family: "unix"
root@ip-172-31-25-153:~#
```

Terraform configuration:

✓ Attaching the role to the server for provisioning infra

The screenshot shows the AWS EC2 Instances page. A single instance, 'Master Server' (i-058a0f212437db1b4), is listed as 'Running' with an 't2.medium' instance type. The 'Actions' menu is open, and the 'Modify IAM role' option is highlighted with a red box.

Create new role

The screenshot shows the AWS IAM Roles page. It lists two existing roles: 'AWSCodePipelineServiceRole-us-east-1-demo15' (AWS Service: codepipeline, Last activity: 57 days ago) and 'AWSCodePipelineServiceRole-us-east-1-pipeline-arn-on-ec2' (AWS Service: codepipeline, Last activity: 57 days ago). A red box highlights the 'Create role' button.

Select ec2:

The screenshot shows the 'Select trusted entity' step in the 'Create role' wizard. It has three sections: 'AWS service' (selected), 'SAML 2.0 provider', and 'Custom trust policy'. Under 'AWS service', 'EC2' is selected under 'Service or use case'. A red box highlights the 'Next' button.

The screenshot shows the 'Add permissions' step in the 'Create role' wizard. It displays the 'Permissions policies' section with 'AmazonEC2FullAccess' selected. A red box highlights the 'Next' button.

Provide name:

IAM > Roles > Create role

Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
terraformproject

Description
Add a short explanation for this role.
For Infra provisioning by terraform

Step 1: Select trusted entities

Trust policy
1 "Version": "2012-10-17",

Step 2: Add permissions

Permissions policy summary

Policy name	Type	Attached as
AmazonEC2FullAccess	AWS managed	Permissions policy

Step 3: Add tags

Add tags - optional
Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

No tags associated with the resource.

Add new tag
You can add up to 50 more tags.

Create role

Add role to the server:

"No need to additionally provide access key and secret key after adding IAM role"

EC2 > Instances > i-058a0f212437db1b4 > Modify IAM role

Modify IAM role

Attach an IAM role to your instance.

Instance ID
i-058a0f212437db1b4 (Master Server)

IAM role
Select an IAM role to attach to your instance or create a new role if you haven't created any. The role you select replaces any roles that are currently attached to your instance.

Choose IAM role **Create new IAM role**

No IAM Role
Choose this option to detach an IAM role

terraformproject
arn:aws:iam::891377051774:instance-profile/terraformproject

Update IAM role

Successfully attached terraformproject to instance i-058a0f212437db1b4

Instances (1/1) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4
Master Server	i-058a0f212437db1b4	Running	t2.medium	2/2 checks passed	View alarms +	us-east-1a	ec2-50-17-

Jenkins:

✓ Configure webhook for automated build when a change in source code

The screenshot shows two stacked GitHub repository pages for 'capstone-finance'.

Top Repository Page: Shows a list of commits from 'kxkdjhd'. One commit, 'Deploymentfile', was pushed 4 days ago. The 'Settings' button in the top navigation bar is highlighted with a red box.

Bottom Repository Page: Shows the 'Webhooks' section. The 'Webhooks' tab is selected, and the 'Add webhook' button is highlighted with a red box. The sidebar on the left has 'Webhooks' selected.

Payload URL= Jenkins url + default parameter(github-webhook)

[Webhooks / Add webhook](#)

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in [our developer documentation](#).

Payload URL *
http://50.17.69.217:8080/github-webhook/

Content type *
application/x-www-form-urlencoded

Secret
[Empty input field]

SSL verification
 By default, we verify SSL certificates when delivering payloads.
 Enable SSL verification Disable (not recommended)

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.

Add webhook

Create Job

 Jenkins

Dashboard >

[+ New Item](#) [Add description](#)

Welcome to Jenkins!

This page is where your Jenkins jobs will be displayed. To get started, you can set up distributed builds or start building a software project.

Start building your software project

Build Queue [Create a job](#) [+](#)

No builds in the queue.

Build Executor Status [Set up a distributed build](#)

1 Idle [Set up an agent](#) [+](#)

2 Idle [Configure a cloud](#) [+](#)

[Learn more about distributed builds](#) [?](#)

Provide Job name.

Dashboard > All >

The screenshot shows the Jenkins job creation interface. In the top left, there's a breadcrumb navigation: Dashboard > All >. Below it is a search bar labeled "Enter an item name" with the text "Project-Finance" typed in. A yellow box highlights this input field. To the right of the search bar is a list of job types: Freestyle project, Pipeline, Multi-configuration project, Folder, Multibranch Pipeline, and Organization Folder. The "Organization Folder" option is selected, indicated by a yellow box around its icon and description. At the bottom of the list is an "OK" button, also highlighted with a yellow box.

GitHub hook trigger for GITScm polling:

Dashboard > Project-Finance > Configuration

Configure

General

- Do not allow the pipeline to resume if the controller restarts
- GitHub project
- Pipeline speed/durability override ?
- Preserve stashes from completed builds ?
- This project is parameterised ?
- Throttle builds ?

Build Triggers

- Build after other projects are built ?
- Build periodically ?
- GitHub hook trigger for GITScm polling ?
- Poll SCM ?
- Quiet period ?
- Trigger builds remotely (e.g., from scripts) ?

Advanced Project Options

[Save](#) [Apply](#)

Declarative pipeline: SCM_Checkout = Pull the source code

Definition

Pipeline script

Script ?

```
1 * pipeline {
2     agent any
3
4     stages {
5         stage('SCM_Checkout') {
6             steps {
7                 git 'https://github.com/maulik2311/capstone-finance.git'
8             }
9         }
10    }
11 }
12
```

Hello World

Use Groovy Sandbox ?

Pipeline Syntax

Save

Apply

Stage2

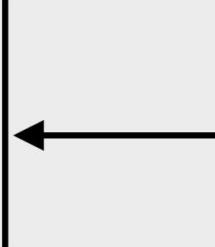
Build = Source code build ==> Building the artifacts

```
1 * pipeline {
2     agent any
3
4     stages {
5         stage('SCM_Checkout') {
6             steps {
7                 git 'https://github.com/maulik2311/capstone-finance.git'
8             }
9         }
10        stage('SourcecodeBuild') {
11            steps {
12                sh 'mvn clean package'
13            }
14        }
15    }
16 }
17
```

Stage 1 and 2:

Pull the source code and build the artifact.

```
root@ip-172-31-25-153:/var/lib/jenkins/workspace/Project-Finance# ll
total 72
drwxr-xr-x 6 jenkins jenkins 4096 Jul 12 12:42 .
drwxr-xr-x 4 jenkins jenkins 4096 Jul 12 12:42 ..
-rw-r--r-- 1 jenkins jenkins 6148 Jul 12 12:40 .DS_Store
drwxr-xr-x 8 jenkins jenkins 4096 Jul 12 12:42 .git/
-rw-r--r-- 1 jenkins jenkins 395 Jul 12 12:40 .gitignore
drwxr-xr-x 3 jenkins jenkins 4096 Jul 12 12:40 .mvn/
-rw-r--r-- 1 jenkins jenkins 105 Jul 12 12:40 Dockerfile
-rw-r--r-- 1 jenkins jenkins 419 Jul 12 12:40 ansible-playbook.yml
-rw-r--r-- 1 jenkins jenkins 572 Jul 12 12:40 financedeploy.yaml
-rwrxr-x 1 jenkins jenkins 10284 Jul 12 12:40 mvnw*
-rw-r--r-- 1 jenkins jenkins 6734 Jul 12 12:40 mvnw.cmd
-rw-r--r-- 1 jenkins jenkins 1532 Jul 12 12:40 pom.xml
drwxr-xr-x 4 jenkins jenkins 4096 Jul 12 12:40 src/
drwxr-xr-x 9 jenkins jenkins 4096 Jul 12 12:43 target/
root@ip-172-31-25-153:/var/lib/jenkins/workspace/Project-Finance# ls target/
banking-0.0.1-SNAPSHOT.jar      classes      generated-test-sources  maven-status      test-classes
banking-0.0.1-SNAPSHOT.jar.original  generated-sources  maven-archiver  surefire-reports
root@ip-172-31-25-153:/var/lib/jenkins/workspace/Project-Finance#
```



Stage-3

Docker image build

```
1 ▶ pipeline {
2     agent any
3
4     stages {
5         stage('SCM_Checkout') {
6             steps {
7                 git 'https://github.com/maulik2311/capstone-finance.git'
8             }
9         }
10        stage('SourcecodeBuild') {
11            steps {
12                sh 'mvn clean package'
13            }
14        }
15        stage('Dockerimage_build') {
16            steps {
17                sh 'docker version'
18                sh "docker build -t maulikd2397/finance:${BUILD_NUMBER} ."
19                sh "docker tag maulikd2397/finance:${BUILD_NUMBER} maulikd2397/finance:latest"
20                sh 'docker images'
21            }
22        }
23    }
24 }
25 }
```

```
root@ip-172-31-25-153:/var/lib/jenkins/workspace/Project-Finance# docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
maulikd2397/finance   6        818ef8f0d0f7  30 seconds ago  696MB
maulikd2397/finance   latest   818ef8f0d0f7  30 seconds ago  696MB
maulikd2397/finance   5        ac4deeb28414  About a minute ago  696MB
openjdk              11       47a932d998b7  23 months ago   654MB
```

Stage-4

Log in to Dockerhub => Provide credentials of Dockerhub b pipeline syntax

```
21
22
23 ▶ stage('Login2Dockerhub') {
24     steps {
25         sh 'mvn clean package'
26     }
27
28 }
29
30 }
```

Use Groovy Sandbox ?

Pipeline Syntax

Save

Apply

Select: bind credentials with variable.

Pipeline syntax:

The screenshot shows the 'Pipeline Syntax' page in a web browser. On the left, there's a sidebar with links like 'Snippet Generator', 'Declarative Directive Generator', 'Declarative Online Documentation', etc. The main content area has a heading 'Pipeline syntax:' followed by a list of steps and directives. One item, 'withCredentials: Bind credentials to variables', is highlighted with a red box. Below it, another 'withCredentials' section is shown with a note about masking secret values. At the bottom, there's a 'Generate Pipeline Script' button.

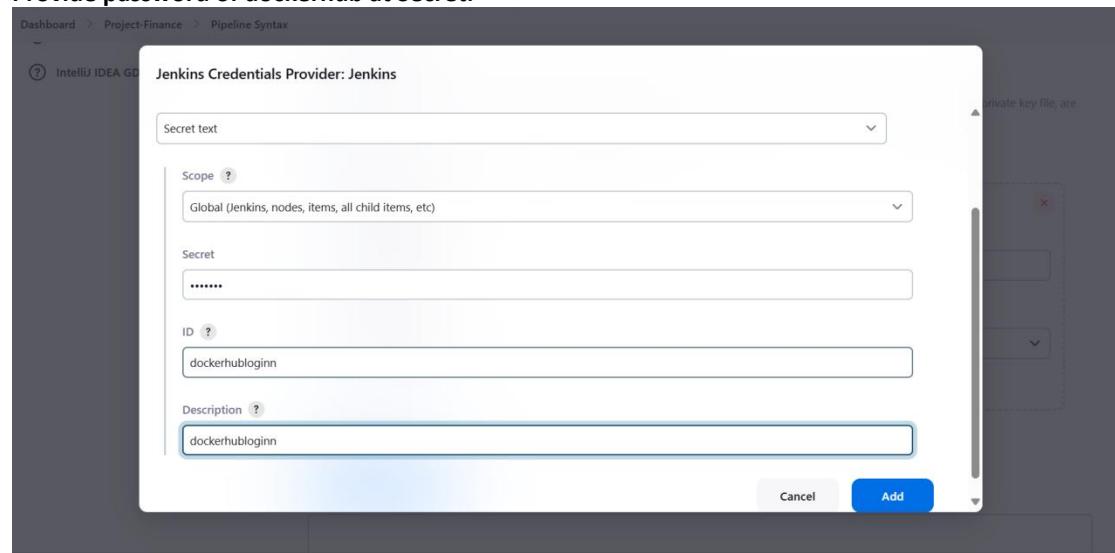
This screenshot shows the same Pipeline Syntax page, but the 'withCredentials' binding dialog is open. It lists several options: 'Certificate', 'Git Username and Password', 'SSH User Private Key', 'Secret ZIP file', 'Secret file', and 'Secret text'. The 'Secret text' option is highlighted with a red box. A note at the bottom says that many of these items are not steps and are often exposed via global variables.

Add credentials:

Bindings

The screenshot shows the 'Bindings' configuration dialog. It has a 'Variable' field containing 'dockerhublogin' and a 'Credentials' section. The 'Credentials' section is highlighted with a large red box. An orange arrow points to the '+ Add' button in this section. The dialog also includes an 'Add' dropdown and a close button.

Provide password of dockerhub at Secret.



Generate and copy the pipeline script

The screenshot shows the Pipeline Syntax generator interface. It includes the following sections:

- Secret text**: A dropdown menu showing 'Secret text'.
- Variable**: Input field containing 'dockerhublogin'.
- Credentials**: Input field containing 'dockerhublogin'.
- Add**: A button with a dropdown arrow.
- Generate Pipeline Script**: A blue button.
- Pipeline Script Preview**: A code editor containing the following Groovy script:

```
withCredentials([string(credentialsId: 'dockerhublogin', variable: 'dockerhublogin')]) {  
    // some block  
}
```

Provide variable as password “-p”

```
1 * pipeline {
2     agent any
3
4     stages {
5         stage('SCM_Checkout') {
6             steps {
7                 git 'https://github.com/maulik2311/capstone-finance.git'
8             }
9         }
10        stage('SourcecodeBuild') {
11            steps {
12                sh 'mvn clean package'
13            }
14        }
15        stage('Dockerimage_build') {
16            steps {
17                sh 'docker version'
18                sh "docker build -t maulikd2397/finance:${BUILD_NUMBER} ."
19                sh "docker tag maulikd2397/finance:${BUILD_NUMBER} maulikd2397/finance:latest"
20                sh 'docker images'
21            }
22        }
23        stage('Login2Dockerhub') {
24            steps {
25                withCredentials([string(credentialsId: 'dockerhublogin', variable: 'dockerhublogin')]) {
26                    sh "docker login -u maulikd2397 -p ${dockerhublogin}"
27                }
28            }
29        }
30    }
31}
```

```
Warning: A secret was passed to "sh" using Groovy String interpolation, which is insecure.
Affected argument(s) used the following variable(s): [dockerhublogin]
See https://jenkins.io/redirect/groovy-string-interpolation for details.
+ docker login -u maulikd2397 -p ****
WARNING! Using --password via the CLI is insecure. Use --password-stdin.
WARNING! Your password will be stored unencrypted in /var/lib/jenkins/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store
```

```
Login Succeeded
[Pipeline] }
[Pipeline] // withCredentials
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Stage - 5: Push to docker hub

```
1` pipeline {
2`     agent any
3` 
4`     stages {
5`         stage('SCM_Checkout') {
6`             steps {
7`                 git 'https://github.com/maulik2311/capstone-finance.git'
8`             }
9`         }
10`        stage('SourcecodeBuild') {
11`            steps {
12`                sh 'mvn clean package'
13`            }
14`        }
15`        stage('Dockerimage_build') {
16`            steps {
17`                sh 'docker version'
18`                sh 'docker build -t maulikd2397/finance:${BUILD_NUMBER} .'
19`                sh "docker tag maulikd2397/finance:${BUILD_NUMBER} maulikd2397/finance:latest"
20`                sh 'docker images'
21`            }
22`        }
23`        stage('Login2Dockerhub') {
24`            steps {
25`                withCredentials([string(credentialsId: 'dockerhublogin', variable: 'dockerhublogin')])
26`                sh "docker login -u maulikd2397 -p ${dockerhublogin}"
27`            }
28`        }
29`    }
30`    stage('Push2Dockerhub') {
31`        steps {
32`            sh 'docker push maulikd2397/finance:latest'
33`        }
34`    }
35` }
36` }
```

```
aad56a24b5af Pushed
latest: digest: sha256:089fac41445d8a2fe0c4ee82358ccc9a4fdb2b3e3435db1e550453fdcc92b08c size: 2007
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

maulikd2397/finance 

Updated 1 minute ago

This repository does not have a description   INCOMPLETE

This repository does not have a category   INCOMPLETE

Docker commands

To push a new tag to this repository:

```
docker push maulikd2397/finance:tagname
```

Tags

This repository contains 1 tag(s).

Tag	OS	Type	Pulled	Pushed
 latest		Image	---	a minute ago

[See all](#)

Automated Builds

Manually pushing images to Hub? Connect your account to GitHub or Bitbucket to automatically build and tag new images whenever your code is updated, so you can focus your time on creating.

Available with Pro, Team and Business subscriptions. [Read more about automated builds](#).

[Upgrade](#)

Still here:
Create pipeline for build and push the image to the dockehub

Server Provisioning using terraform

Test-server:

Aim: A new test-server should be provisioned using terraform and should be automatically configured using Ansible with all the required software's and as soon as the server is available, the application must be deployed to the test-server automatically.

● Adding terraform file.

 maulik2311	Update terraform.tf	938a4ae · 2 minutes ago	 7 Commits
 .mvn/wrapper	finance-me committed	2 years ago	
 src	adjusted for selenium implementation and updated te...	2 years ago	
 .DS_Store	adjusted for selenium implementation and updated te...	2 years ago	
 .gitignore	finance-me committed	2 years ago	
 Dockerfile	Dockerfile added	2 years ago	
 ansible-playbook.yml	adjusted for selenium implementation and updated te...	2 years ago	
 financedeploy.yaml	Deploymentfile	4 days ago	
 mvnw	finance-me committed	2 years ago	
 mvnw.cmd	 finance-me committed	2 years ago	
 pom.xml	finance-me committed	2 years ago	
 terraform.tf	Update terraform.tf	2 minutes ago	

Stage- 6

terraform apply.

```

1 * pipeline {
2     agent any
3
4     stages {
5         stage('SCM_Checkout') {
6             steps {
7                 git 'https://github.com/maulik2311/capstone-finance.git'
8             }
9         }
10        stage('SourcecodeBuild') {
11            steps {
12                sh 'mvn clean package'
13            }
14        }
15        stage('Dockerimage_build') {
16            steps {
17                sh 'docker version'
18                sh "docker build -t maulikd2397/finance:${BUILD_NUMBER} ."
19                sh "docker tag maulikd2397/finance:${BUILD_NUMBER} maulikd2397/finance:latest"
20                sh 'docker images'
21            }
22        }
23        stage('Login2Dockerhub') {
24            steps {
25                withCredentials([string(credentialsId: 'dockerhublogin', variable: 'dockerhublogin')])
26                sh "docker login -u maulikd2397 -p ${dockerhublogin}"
27            }
28        }
29    }
30    stage('Push2Dockerhub') {
31        steps {
32            sh 'docker push maulikd2397/finance:latest'
33        }
34    }
35    stage('Terrafrom apply') {
36        steps {
37            sh 'terraform init'
38            sh 'terraform plan'
39            sh 'terraform apply --auto-approve'
40        }
41    }
42 }
43 }
```

```

@[1mPlan:@[0m 0 to add, 1 to change, 0 to destroy.
@[0m@[1maws_instance.test_server: Modifying... [id=i-0767264ab6b62a493]@[0m@[0m
@[0m@[1maws_instance.test_server: Modifications complete after 2s [id=i-0767264ab6b62a493]@[0m
@[0m@[1m@[32m
Apply complete! Resources: 0 added, 1 changed, 0 destroyed.
@[0m
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Instances (1/2) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4
<input checked="" type="checkbox"/> Test-Server	i-0767264ab6b62a493	Running	t2.micro	2/2 checks passed	View alarms	us-east-1b	-
<input type="checkbox"/> Master Server	i-058a0f212437db1b4	Running	t2.medium	2/2 checks passed	View alarms	us-east-1a	ec2-50-17-

i-0767264ab6b62a493 (Test-Server)

- Details
- Status and alarms
- Monitoring
- Security
- Networking**
- Storage
- Tags

Networking details

Public IPv4 address 52.207.83.134 open address	Private IPv4 addresses 10.0.1.10	VPC ID vpc-089d72d4d6eb80a98 (demo-vpc)
Public IPv4 DNS -	Private IP DNS name (IPv4 only) ip-10-0-1-10.ec2.internal	Secondary private IPv4 addresses -
Subnet ID subnet-028c97a59d9f56c15 (demo-subnet)	IPv6 addresses -	

Configuration Test-Server using Ansible

Provide Hosts to the ansible controller.

```
root@ip-172-31-25-153:/etc/ansible# cat hosts
[testnodes]
52.207.83.134
```

Install ansible plugin.

The screenshot shows the Jenkins Plugins page. A search bar at the top contains the text "ansible". Below it, a list of available plugins is shown. One plugin, "Ansible 403.v8d0ca_dcb_b_502", is highlighted with a red box. This plugin is categorized under "pipeline", "External Site/Tool Integrations", "DevOps", "Build Tools", and "Deployment". It is described as "Invoke Ansible Ad-Hoc commands and playbooks." The "Install" button is visible next to the plugin entry. Other plugins listed include "Ansible Tower 0.16.0" which connects Jenkins with Ansible Tower.

Setup ansible tool

The screenshot shows the Jenkins Tools page under the "Manage Jenkins" section. Under "Ansible installations", there is a form to add a new Ansible tool. The "Name" field is set to "ansible". The "Install automatically" checkbox is checked. The "Add Installer" dropdown is visible. At the bottom of the form are "Save" and "Apply" buttons, with "Save" being highlighted by a red box.

Pipeline syntax for providing ssh connection keys.

The screenshot shows the Jenkins Pipeline Syntax editor. The script content is as follows:

```
32 }
33 }
34 }
35 }
36 }
37 }
38 }
39 }
40 }
41 }
42 }
43 }
44 stage('Ansible') {
45   steps {
46     sh 'ansible-playbook'
47   }
48 }
```

Below the script, there is a "Use Groovy Sandbox" checkbox and a "Pipeline Syntax" link, which is circled with a red oval. At the bottom are "Save" and "Apply" buttons.

Pipeline Syntax.

The screenshot shows the Jenkins Pipeline Syntax configuration page. On the left, there's a sidebar with links to Steps Reference, Global Variables Reference, Online Documentation, Examples Reference, and IntelliJ IDEA GDSDL. The main area is titled "Steps" and contains a "Sample Step" section with a dropdown menu set to "ansiblePlaybook: Invoke an ansible playbook". Below it, the "ansiblePlaybook" configuration is detailed:

- Ansible tool:** ansible
- Playbook file path in workspace:** ansible-playbook.yml
- Inventory file path in workspace:** /etc/ansible/hosts
- SSH connection credentials:** - none - (with a "+ Add" button)

Add SSH connection credentials. == Add

The screenshot shows the "Add Credentials" dialog for Jenkins. It's titled "Jenkins Credentials Provider: Jenkins" and has a sub-section "Add Credentials". The form fields are as follows:

- Domain:** Global credentials (unrestricted)
- Kind:** SSH Username with private key
- Scope:** Global (Jenkins, nodes, items, all child items, etc)
- ID:** ansible-test-server
- Description:** (empty field)
- ID:** ansible-test-server
- Description:** (empty field)
- Username:** ubuntu
- Treat username as secret:**
- Private Key:** Enter directly
Key:
-----BEGIN RSA PRIVATE KEY-----
MIIEogIBAAKCAQEAgfVPdKLXNcEY8L+MZ3zCUR450iL4IckEPnQHNF+h4KKePJQm
h+0ipv4w6eXrmDPPDuFGV0cdbJomFOSo2wOuAzjKPFUe2vJbRJMhpJ8rcskveF7
- Passphrase:** (empty field)

At the bottom right are "Cancel" and "Add" buttons.

Copy pipeline script.

disableHostKeyChecking: true Because directly provide ssh key

Dashboard > Project-Finance > Pipeline Syntax

ansible

Playbook file path in workspace
ansible-playbook.yml

Inventory file path in workspace
/etc/ansible/hosts

SSH connection credentials
ubuntu

- none -
ubuntu

Vault credentials
- none -

+ Add ▾

Vault tmp path

Check mode

Use become

Become username
root

Use sudo (deprecated)

Sudo username (deprecated)
root

Host subset

Tags

Tags to skip

Disable the host SSH key check

Colorized output

Extra parameters

Generate Pipeline Script

```
ansiblePlaybook become: true, credentialsId: 'ansible-test-server', disableHostKeyChecking: true, installation: 'ansible', inventory: '/etc/ansible/hosts', playbook: 'ansible-playbook.yml', vaultTmpPath: ''
```

Global Variables

There are many features of the Pipeline that are not steps. These are often exposed via global variables, which are not supported by the snippet generator. See the [Global Variables Reference](#) for details.

```
stage('Deploy with ansible') {
    steps {
        ansiblePlaybook become: true, credentialsId: 'ansible-test-server', disableHostKeyChecking: true, instal
    }
}
```

Modify ansible playbook.

maulik2311 Update ansible-playbook.yml

5c5953d · now History

Code Blame 16 lines (13 loc) · 406 Bytes

```
1      - name : Configure Docker on EC2 Instances
2        hosts : all
3        become: true
4        connection : ssh
5        tasks :
6          - name: updating apt
7            command : sudo apt-get update
8
9          - name : Install Docker
10            command : sudo apt-get install -y docker.io
11
12         - name : Start Docker Service
13           command : sudo systemctl start docker
14
15         - name: Deploy Docker Container
16           command: docker run -itd -p 8099:8081 maulikd2397/finance
```

Deploy success.

```
/var/lib/jenkins/workspace/Project-Finance/ssh15051195670194017806.key -u ubuntu

PLAY [Configure Docker on EC2 Instances] ****
TASK [Gathering Facts] ****
ok: [52.207.83.134]

TASK [updating apt] ****
changed: [52.207.83.134]

TASK [Install Docker] ****
changed: [52.207.83.134]

TASK [Start Docker Service] ****
changed: [52.207.83.134]

TASK [Deploy Docker Container] ****
changed: [52.207.83.134]

PLAY RECAP ****
52.207.83.134 : ok=5    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Application working on Test-server

The screenshot shows a web browser window with the following details:

- Address Bar:** Not secure | 52.207.83.134:8099
- Page Title:** CUSTOMER BANKING SERVICES
- Page Subtext:** We provide the World's best in class Banking Solutions and Services.
- Graphic:** A circular illustration featuring three stylized human figures (two men and one woman) working at desks with laptops and desktop monitors. The background includes abstract shapes and data visualization elements like line graphs and charts.

The screenshot shows the AWS EC2 Instances page with the following details:

Instance summary for i-0767264ab6b62a493 (Test-Server)

Updated less than a minute ago

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0767264ab6b62a493 (Test-Server)	52.207.83.134 [open address]	10.0.1.10
IPv6 address	Instance state	Public IPv4 DNS
-	Running	-
Hostname type	Private IP DNS name (IPv4 only)	Elastic IP addresses
IP name: ip-10-0-1-10.ec2.internal	ip-10-0-1-10.ec2.internal	52.207.83.134 [Public IP]
Answer private resource DNS name	Instance type	AWS Compute Optimizer finding
-	t2.micro	Opt-in to AWS Compute Optimizer for recommendations.
Auto-assigned IP address	VPC ID	Learn more
-	vpc-089d72d4d6eb80a98 (demo-vpc)	
IAM Role	Subnet ID	Auto Scaling Group name
-	subnet-028c97a59d9f56c15 (demo-subnet)	-
IMDSv2	Instance ARN	
Optional	arn:aws:ec2:us-east-1:891377051774:instance/i-0767264ab6b62a493	
⚠ EC2 recommends setting IMDSv2 to required Learn more		

Prometheus and Grafana Server-3

- **Link to download the prometheus**

<https://prometheus.io/download>

prometheus

The Prometheus monitoring system and time series database. [prometheus/prometheus](#)

2.53.1 / 2024-07-10 <small>LTS</small> Release notes				
File name	OS	Arch	Size	SHA256 Checksum
prometheus-2.53.1.darwin-amd64.tar.gz	darwin	amd64	99.83 MiB	8dd1fb8f810309f745f90b7f7e354fcddc174b0c43ea46835568d997e3a3e33
prometheus-2.53.1.linux-amd64.tar.gz	linux	amd64	99.36 MiB	2234aa08f60d9fb854144f6faaaed72a316df7a688d9dad7cb48e49a6fa5332c
prometheus-2.53.1.windows-amd64.zip	windows	amd64	101.63 MiB	4139f2c735f55abf406da1b0417d0a5608e85cdedf644ae54d8f16ec030e7ad2

2.45.6 / 2024-06-21 <small>LTS</small> Release notes				
File name	OS	Arch	Size	SHA256 Checksum
prometheus-2.45.6.darwin-amd64.tar.gz	darwin	amd64	88.70 MiB	91f820d1767cb82138b91b44697fbf231ccfb550fe57dcadfb3f3e8f30128
prometheus-2.45.6.linux-amd64.tar.gz	linux	amd64	88.43 MiB	9fea9bcadb488a8dd637acb190eecccad0525d7c61a83158e5949908ec6689716
prometheus-2.45.6.windows-amd64.zip	windows	amd64	91.39 MiB	97bd2ae5d4a8424d8a98b4a3380f3d9943b8dbd7ee5e372dedd1b2f6bdd1af61c

Download the package:

```
root@ip-172-31-94-104:~# wget https://github.com/prometheus/prometheus/releases/download/v2.53.1/prometheus-2.53.1.linux-amd64.tar.gz
--2024-07-12 15:30:07-- https://github.com/prometheus/prometheus/releases/download/v2.53.1/prometheus-2.53.1.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.113.3
Connecting to github.com (github.com)|140.82.113.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/a3bb21a2-db07-4ab5-b939-884e332bd7bf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20240712%2Fus-east-1%2Fs%2Faws4_request&X-Amz-Date=20240712T152928Z&X-Amz-Expires=300S&X-Amz-Signature=71f8460ddb98c12e32fec5ac369a2466581ac83673a1ffe0a4522442162146X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=6838921&response-content-disposition=attachment%3B%20filename%3Dprometheus-2.53.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-07-12 15:30:07-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/a3bb21a2-db07-4ab5-b939-884e332bd7bf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20240712%2Fus-east-1%2Fs%2Faws4_request&X-Amz-Date=20240712T152928Z&X-Amz-Expires=300S&X-Amz-Signature=71f8460ddb98c12e32fec5ac369a2466581ac83673a1ffe0a4522442162146X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=6838921&response-content-disposition=attachment%3B%20filename%3Dprometheus-2.53.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.109.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 104191695 (99M) [application/octet-stream]
Saving to: 'prometheus-2.53.1.linux-amd64.tar.gz'

prometheus-2.53.1.linux-amd64.tar.gz 100%[=====] 99.36M 131MB/s in 0.8s

2024-07-12 15:30:08 (131 MB/s) - 'prometheus-2.53.1.linux-amd64.tar.gz' saved [104191695/104191695]

root@ip-172-31-94-104:~# ls
prometheus-2.53.1.linux-amd64.tar.gz snap
root@ip-172-31-94-104:~#
```

Unzip:

```
root@ip-172-31-94-104:~# tar -xvf prometheus-2.53.1.linux-amd64.tar.gz
prometheus-2.53.1.linux-amd64/
prometheus-2.53.1.linux-amd64/prometheus.yml
prometheus-2.53.1.linux-amd64/prometheus
prometheus-2.53.1.linux-amd64/consoles/
prometheus-2.53.1.linux-amd64/consoles/node-disk.html
prometheus-2.53.1.linux-amd64/consoles/node-overview.html
prometheus-2.53.1.linux-amd64/consoles/node-cpu.html
prometheus-2.53.1.linux-amd64/consoles/node.html
prometheus-2.53.1.linux-amd64/consoles/prometheus-overview.html
prometheus-2.53.1.linux-amd64/consoles/index.html.example
prometheus-2.53.1.linux-amd64/consoles/prometheus.html
prometheus-2.53.1.linux-amd64/LICENSE
prometheus-2.53.1.linux-amd64/promtool
prometheus-2.53.1.linux-amd64/console_libraries/
prometheus-2.53.1.linux-amd64/console_libraries/menu.lib
prometheus-2.53.1.linux-amd64/console_libraries/prom.lib
prometheus-2.53.1.linux-amd64/NOTICE
root@ip-172-31-94-104:~# ls
prometheus-2.53.1.linux-amd64  prometheus-2.53.1.linux-amd64.tar.gz  snap
root@ip-172-31-94-104:~#
```

- **Components of Package with usage:**

- "prometheus*"- Executable as a service**
- prometheus.yml - Configuration File storage/Default properties**
- Promtool - Maintain tool and plugins**

```
root@ip-172-31-94-104:~/prometheus-2.53.1.linux-amd64# ll
total 261316
drwxr-xr-x 4 1001 127      4096 Jul 10 10:34 .
drwx----- 5 root root     4096 Jul 12 15:32 ..
-rw-r--r-- 1 1001 127    11357 Jul 10 10:31 LICENSE
-rw-r--r-- 1 1001 127     3773 Jul 10 10:31 NOTICE
drwxr-xr-x 2 1001 127     4096 Jul 10 10:31 console_libraries
drwxr-xr-x 2 1001 127     4096 Jul 10 10:31 consoles/
-rwxr-xr-x 1 1001 127 137823986 Jul 10 10:18 prometheus*
-rw-r--r-- 1 1001 127      934 Jul 10 10:31 prometheus.yml
-rwxr-xr-x 1 1001 127 129719462 Jul 10 10:18 promtool*
```

Default port:

- Prometheus : 9090
- Grafana : 3000
- Node Exporter (Agent): 9100

- Configure the prometheus service on server
- It use to run prometheus service; by default prometheus work on service

-\$ sudo vi /etc/systemd/system/prometheus.service

[Unit]

Description=Prometheus Server

Documentation=https://prometheus.io/docs/introduction/overview/

After=network-online.target

[Service]

User=root

Restart=on-failure

ExecStart=/root/prometheus-2.53.1.linux-amd64/prometheus --config.file=/root/prometheus-2.53.1.linux-amd64/prometheus.yml

[Install]

WantedBy=multi-user.target

```
root@ip-172-31-94-104:~# cat /etc/systemd/system/prometheus.service
[Unit]
Description=Prometheus Server
Documentation=https://prometheus.io/docs/introduction/overview/
After=network-online.target

[Service]
User=root
Restart=on-failure

ExecStart=/root/prometheus-2.53.1.linux-amd64/prometheus --config.file=/root/prometheus-2.53.1.linux-amd64/prometheus.yml

[Install]
WantedBy=multi-user.target
```

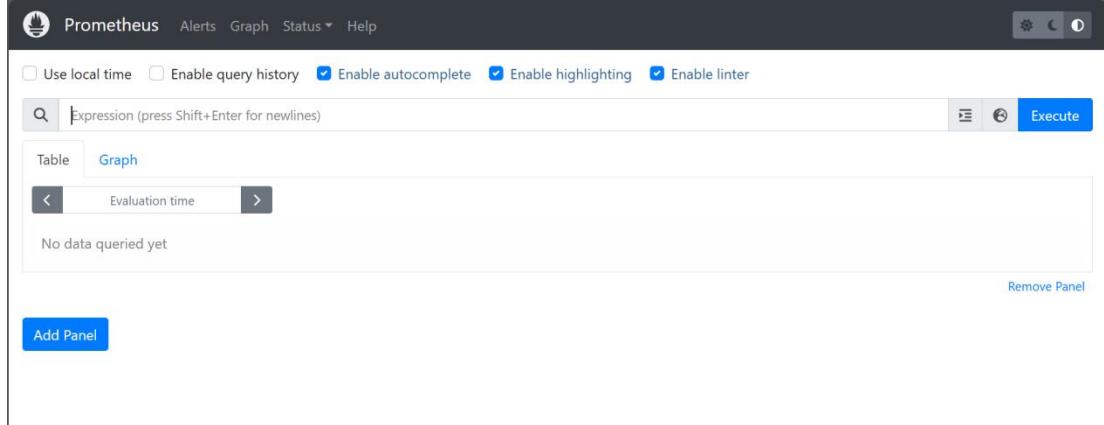
● Reload the daemon

-\$ sudo systemctl daemon-reload

```
root@ip-172-31-94-104:~# systemctl daemon-reload
root@ip-172-31-94-104:~# systemctl start prometheus
root@ip-172-31-94-104:~# systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; disabled; vendor preset: enabled)
   Active: active (running) since Fri 2024-07-12 15:43:07 UTC; 1min 9s ago
     Docs: https://prometheus.io/docs/introduction/overview/
 Main PID: 2013 (prometheus)
   Tasks: 6 (limit: 1120)
  Memory: 18.9M
    CPU: 93ms
   CGroup: /system.slice/prometheus.service
           └─2013 /root/prometheus-2.53.1.linux-amd64/prometheus --config.file=/root/prometheus-2.53.1.linux-amd64/prometheus.yml

Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.063Z caller=tls_config.go:316 level=info component=web msg="TLS is disabled."
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.064Z caller=head.go:793 level=info component=tsdb msg="WAL segment loaded" seq=1
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.064Z caller=head.go:830 level=info component=tsdb msg="WAL replay completed" c
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.066Z caller=main.go:1169 level=info fs_type=EXT4_SUPER_MAGIC
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.066Z caller=main.go:1172 level=info msg="TSDB started"
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.067Z caller=main.go:1354 level=info msg="Loading configuration file" filename=
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.073Z caller=main.go:1391 level=info msg="updated GOGC" old=100 new=75
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.073Z caller=main.go:1402 level=info msg="Completed loading of configuration fi
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.074Z caller=main.go:1133 level=info msg="Server is ready to receive web requests"
Jul 12 15:43:07 ip-172-31-94-104 prometheus[2013]: ts=2024-07-12T15:43:07.074Z caller=manager.go:164 level=info component="rule manager" msg="Starting r
lines 1-21 (END)
```

Prometheus Dashboard.



Node Exporter:

- Attach Target-Nodes.
- Install the agent on target node and node name configure on prometheus config file.
- Target node: 1>Master Server 2> Test-Server

```
$ wget https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
```

Master server.

```
root@ip-172-31-25-153:~# wget https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
--2024-07-12 15:51:10-- https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.113.4
Connecting to github.com (github.com)|140.82.113.4|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-41f1-97f0-0e1ef6e1d96f6c987cd3c01b0249b7e4863d4dbf090bc15a62d3f130563ac&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&Expires=168750e1ef6e1d96f6c987cd3c01b0249b7e4863d4dbf090bc15a62d3f130563ac&X-Amz-SignedHeaders=host&Content-Disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&response-content-type=application/x-tar
--2024-07-12 15:51:11-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-41f1-97f0-0e1ef6e1d96f6c987cd3c01b0249b7e4863d4dbf090bc15a62d3f130563ac&X-Amz-SignedHeaders=host&Content-Disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&response-content-type=application/x-tar
Algorithm=AES256&X-Amz-Credential=releaseassetproduction%2F20240712%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20240712T155111Z&X-Amz-Signature=8750e1ef6e1d96f6c987cd3c01b0249b7e4863d4dbf090bc15a62d3f130563ac&X-Amz-SignedHeaders=host&Content-Type=application/x-tar
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.108.133, 185.199.109.133, 185.199.110.133
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 9735268 (9.3M) [application/octet-stream]
Saving to: 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz'

node_exporter-1.4.0-rc.0.linux-amd64.t 100%[=====] 2024-07-12 15:51:11 (143 MB/s) - 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz' saved [9735268/9735268]

root@ip-172-31-25-153:~# ls
ansible.sh jenkins.sh node_exporter-1.4.0-rc.0.linux-amd64.tar.gz snap terraform.sh
root@ip-172-31-25-153:~# tar -xvf node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
node_exporter-1.4.0-rc.0.linux-amd64/
node_exporter-1.4.0-rc.0.linux-amd64/LICENSE
node_exporter-1.4.0-rc.0.linux-amd64/NOTICE
node_exporter-1.4.0-rc.0.linux-amd64/node_exporter
root@ip-172-31-25-153:~# ls
ansible.sh jenkins.sh node_exporter-1.4.0-rc.0.linux-amd64 node_exporter-1.4.0-rc.0.linux-amd64.tar.gz snap
root@ip-172-31-25-153:~#
```

Test-Server

```
root@ip-10-0-1-10:~# wget https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
--2024-07-12 15:51:13-- https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.113.3
Connecting to github.com (github.com)|140.82.113.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-412b-bb4e-21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&signature=dd8ae21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-Credential=releaseassetproduction%2F20240712%2Fsus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20240712T085113Z&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-SignedHeaders=host&actor_id=0&X-Amz-Signature=dd8ae21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-Credential=releaseassetproduction%2F20240712%2Fsus-east-1%2Fs3%2Faws4_request&X-Amz-Content-Disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&response-content-type=application/x-tar
--2024-07-12 15:51:13-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-412b-bb4e-21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&signature=dd8ae21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-Credential=releaseassetproduction%2F20240712%2Fsus-east-1%2Fs3%2Faws4_request&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-SignedHeaders=host&actor_id=0&X-Amz-Signature=dd8ae21d25c5163cc590c6a0aa2d7c03ec5e79a4c6961876a74c964b074b019f&X-Amz-Credential=releaseassetproduction%2F20240712%2Fsus-east-1%2Fs3%2Faws4_request&X-Amz-Content-Disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&response-content-type=application/x-tar
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.110.133, 185.199.111.133, 185.199.112.133
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.110.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 9735268 (9.3M) [application/octet-stream]
Saving to: 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz'

node_exporter-1.4.0-rc.0.linux-amd64.t 100%[=====] 2024-07-12 15:51:14 (142 MB/s) - 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz' saved [9735268/9735268]

root@ip-10-0-1-10:~# ls
node_exporter-1.4.0-rc.0.linux-amd64.tar.gz  snap
root@ip-10-0-1-10:~# tar -xvf node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
node_exporter-1.4.0-rc.0.linux-amd64/
node_exporter-1.4.0-rc.0.linux-amd64/LICENSE
node_exporter-1.4.0-rc.0.linux-amd64/NOTICE
node_exporter-1.4.0-rc.0.linux-amd64/node_exporter
root@ip-10-0-1-10:~# ls
node_exporter-1.4.0-rc.0.linux-amd64  node_exporter-1.4.0-rc.0.linux-amd64.tar.gz  snap
root@ip-10-0-1-10:~#
```

● Configure Node-Exporter service on Target servers

[Unit]

Description=Prometheus Server

Documentation=https://prometheus.io/docs/introduction/overview/

After=network-online.target

[Service]

User=root

Restart=on-failure

ExecStart=/root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter

[Install]

WantedBy=multi-user.target

On Master

```
root@ip-172-31-25-153:~# cat /etc/systemd/system/node_exporter.service
[Unit]
```

Description=Prometheus Server

Documentation=https://prometheus.io/docs/introduction/overview/

After=network-online.target

[Service]

User=root

Restart=on-failure

ExecStart=/root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter

[Install]

WantedBy=multi-user.target

On Test-Server

```
root@ip-10-0-1-10:~# cat /etc/systemd/system/node_exporter.service
[Unit]
Description=Prometheus Server
Documentation=https://prometheus.io/docs/introduction/overview/
After=network-online.target

[Service]
User=root
Restart=on-failure

ExecStart=/root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter

[Install]
WantedBy=multi-user.target
```

Reload daemon and start the service.

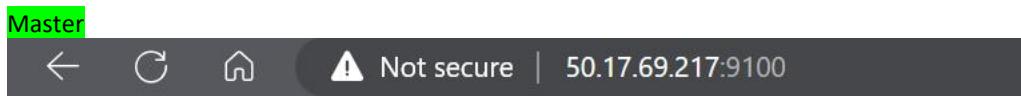
Master-server

```
root@ip-172-31-25-153:~# systemctl daemon-reload
root@ip-172-31-25-153:~# systemctl status node_exporter.service
● node_exporter.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: inactive (dead)
        Docs: https://prometheus.io/docs/introduction/overview/
root@ip-172-31-25-153:~# systemctl status node_exporter
● node_exporter.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: inactive (dead)
        Docs: https://prometheus.io/docs/introduction/overview/
root@ip-172-31-25-153:~# systemctl start node_exporter
root@ip-172-31-25-153:~# systemctl status node_exporter
● node_exporter.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: active (running) since Fri 2024-07-12 16:00:50 UTC; 2s ago
        Docs: https://prometheus.io/docs/introduction/overview/
          Main PID: 16024 (node_exporter)
            Tasks: 5 (limit: 4666)
              Memory: 2.4M
                CPU: 9ms
              CGroup: /system.slice/node_exporter.service
                        └─16024 /root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter
```

Test-server

```
root@ip-10-0-1-10:~# systemctl deamon-reload
Unknown command verb deamon-reload.
root@ip-10-0-1-10:~# systemctl daomon-reload
root@ip-10-0-1-10:~# systemctl start node_exporter
root@ip-10-0-1-10:~# systemctl status node_exporter
● node_exporter.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: active (running) since Fri 2024-07-12 16:01:09 UTC; 8s ago
        Docs: https://prometheus.io/docs/introduction/overview/
          Main PID: 3170 (node_exporter)
            Tasks: 3 (limit: 1120)
              Memory: 2.2M
                CPU: 9ms
              CGroup: /system.slice/node_exporter.service
                        └─3170 /root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter

Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.706Z caller=node_exporter.go:115 level=info collector=thermal_zone
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.706Z caller=node_exporter.go:115 level=info collector=time
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.706Z caller=node_exporter.go:115 level=info collector=timex
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.706Z caller=node_exporter.go:115 level=info collector=udp_queues
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.706Z caller=node_exporter.go:115 level=info collector=username
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.707Z caller=node_exporter.go:115 level=info collector=vmstat
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.707Z caller=node_exporter.go:115 level=info collector=xfs
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.707Z caller=node_exporter.go:115 level=info collector=zfs
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.707Z caller=node_exporter.go:199 level=info msg="Listening on" address=:9100
Jul 12 16:01:09 ip-10-0-1-10 node_exporter[3170]: ts=2024-07-12T16:01:09.708Z caller=tls_config.go:195 level=info msg="TLS is disabled." http2=false
```



On Prometheus server:

- ❖ [Configure target server ip to Prometheus server\(ConnectionString\)](#)
- Provide target server ip to prometheus.yml file

[prometheus.yml](#)

Add target node in prometheus.yml filr

```
# my global config
global:
  scrape_interval: 15s # Set the scrape interval to every 15 seconds. Default is every 1 minute.
  evaluation_interval: 15s # Evaluate rules every 15 seconds. The default is every 1 minute.
  # scrape_timeout is set to the global default (10s).

# Alertmanager configuration
alerting:
  alertmanagers:
    - static_configs:
      - targets:
          # - alertmanager:9093

# Load rules once and periodically evaluate them according to the global 'evaluation_interval'.
rule_files:
  # - "first_rules.yml"
  # - "second_rules.yml"

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.
scrape_configs:
  # The job name is added as a label `job=<job_name>` to any timeseries scraped from this config.
  - job_name: "prometheus"

    # metrics_path defaults to '/metrics'
    # scheme defaults to 'http'.

    static_configs:
      - targets: ["localhost:9090"]
      - targets: ["172.31.25.153:9100"]
      - targets: ["10.0.1.10:9100"]
~
```

Installation Grafana

- Grafana is visualization tool that helps to create interior dashboard

<https://grafana.com/grafana/download?edition=oss>

(Installing in the same server- Prometheus)

```
sudo apt-get install -y adduser libfontconfig1 musl
wget https://dl.grafana.com/oss/release/grafana_11.1.0_amd64.deb
sudo dpkg -i grafana_11.1.0_amd64.deb
```

Read the Ubuntu / Debian installation guide for more information. We also provide an APT package repository.

- Reload daemon and start the service

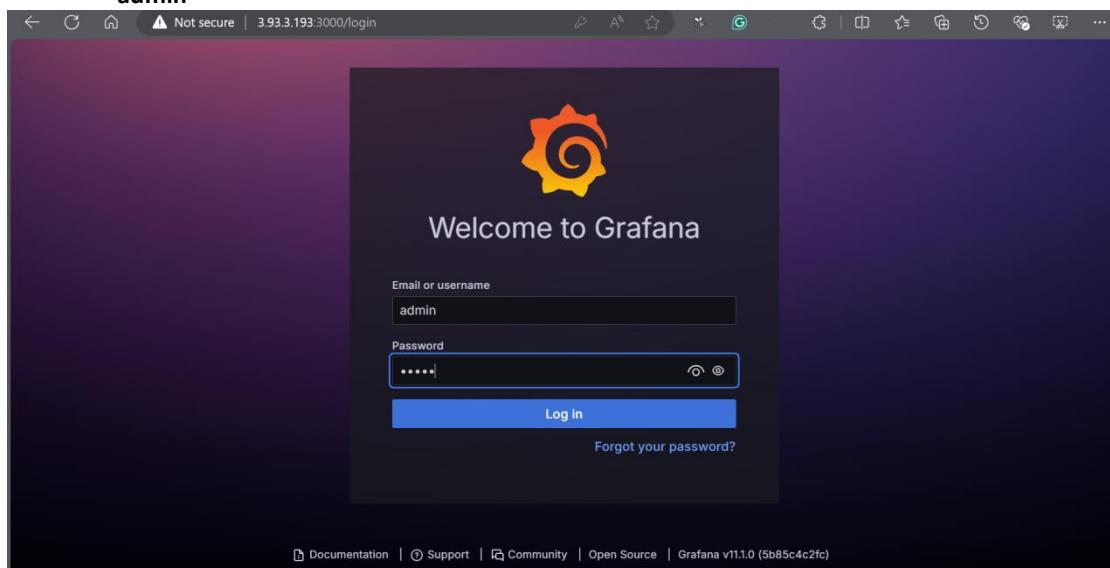
```
### NOT starting on installation, please execute the following statements to configure grafana to start automatically using systemd
sudo /bin/systemctl daemon-reload
sudo /bin/systemctl enable grafana-server
sudo /bin/systemctl start grafana-server
root@ip-172-31-94-104:~/prometheus-2.53.1.linux-amd64# sudo /bin/systemctl daemon-reload
sudo /bin/systemctl enable grafana-server
Synchronizing state of grafana-server.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable grafana-server
Created symlink /etc/systemd/system/multi-user.target.wants/grafana-server.service → /lib/systemd/system/grafana-server.service.
root@ip-172-31-94-104:~/prometheus-2.53.1.linux-amd64#
```

Start Grafana

```
root@ip-172-31-94-104:~/prometheus-2.53.1.linux-amd64# systemctl start grafana-server.service
root@ip-172-31-94-104:~/prometheus-2.53.1.linux-amd64# systemctl status grafana-server.service
● grafana-server.service - Grafana instance
   Loaded: loaded (/lib/systemd/system/grafana-server.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2024-07-12 16:19:18 UTC; 1s ago
       Docs: http://docs.grafana.org
   Main PID: 2592 (grafana)
      Tasks: 5 (limit: 1120)
     Memory: 33.1M
        CPU: 415ms
      CGroup: /system.slice/grafana-server.service
              └─2592 /usr/share/grafana/bin/grafana server --config=/etc/grafana/grafana.ini --pidfile=/run/grafana/grafana-server.pid --packaging=deb c

Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.297092426Z level=info msg="Migration successfully executed" id="cr
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.303415289Z level=info msg="Executing migration" id="add index api
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.304468162Z level=info msg="Migration successfully executed" id="ad
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.313865209Z level=info msg="Executing migration" id="add index api
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.314966982Z level=info msg="Migration successfully executed" id="ad
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.323575557Z level=info msg="Executing migration" id="add index api
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.324574588Z level=info msg="Migration successfully executed" id="ad
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.333048324Z level=info msg="Executing migration" id="drop index UOE
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.334094597Z level=info msg="Migration successfully executed" id="dr
Jul 12 16:19:20 ip-172-31-94-104 grafana[2592]: logger=migrator t=2024-07-12T16:19:20.342554963Z level=info msg="Executing migration" id="drop index UOE
https://172.31.94.104:3000
```

- **Grafana Default port: 3000**
- **Default Username- Password**
 - admin
 - admin



- **Grafana Dashboard:**

● Attach Data Source to Grafana

● Prometheus to Grafana

Welcome to Grafana

Need help? Documentation Tutorials Community Public Slack

Basic

The steps below will guide you to quickly finish setting up your Grafana installation.

TUTORIAL DATA SOURCE AND DASHBOARDS

Grafana fundamentals

Set up and understand Grafana if you have no prior experience. This tutorial guides you through the entire process and covers the "Data source" and "Dashboards" steps to the right.

DATA SOURCES

Add your first data source

DASHBOARDS

Create your first dashboard

Learn how in the docs ↗ Learn how in the docs ↗

Remove this panel

Dashboards https://grafana.com/tutorials/grafana-fundamentals?utm_source=grafana... Latest from the blog

● Provide prometheus server ip

Home > Connections > Data sources > prometheus

Before you can use the Prometheus data source, you must configure it below or in the config file. For detailed instructions, [view the documentation](#).

Fields marked with * are required

Connection

Prometheus server URL * http://localhost:9090

Authentication

Authentication methods

Choose an authentication method to access the data source

No Authentication

Home > Connections > Data sources > prometheus

Cache level Low

Incremental querying (beta)

Disable recording rules (beta)

Other

Custom query parameters Example: max_source_resolution=5m&timeout=

HTTP method POST

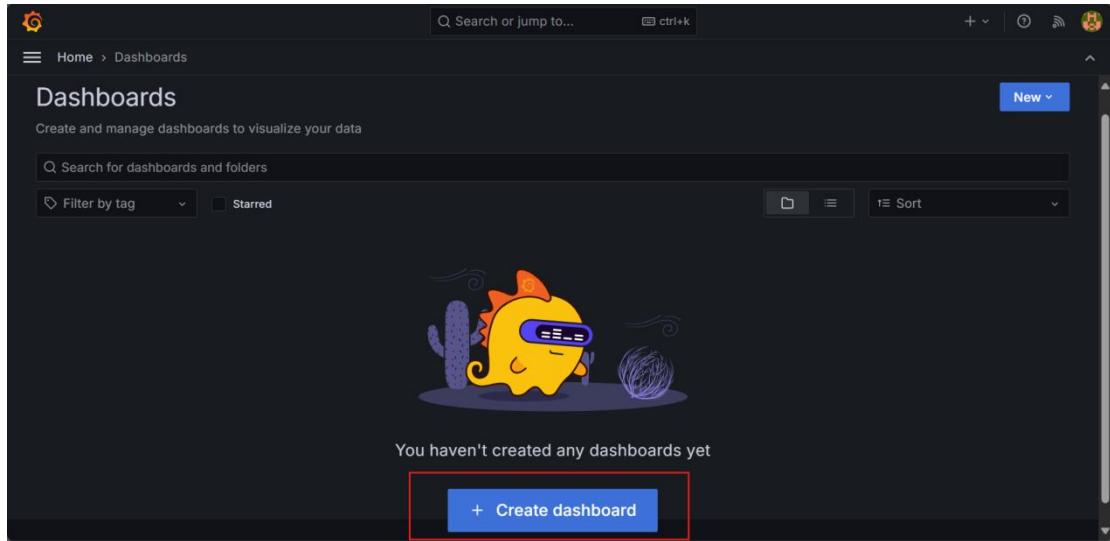
Exemplars

+ Add

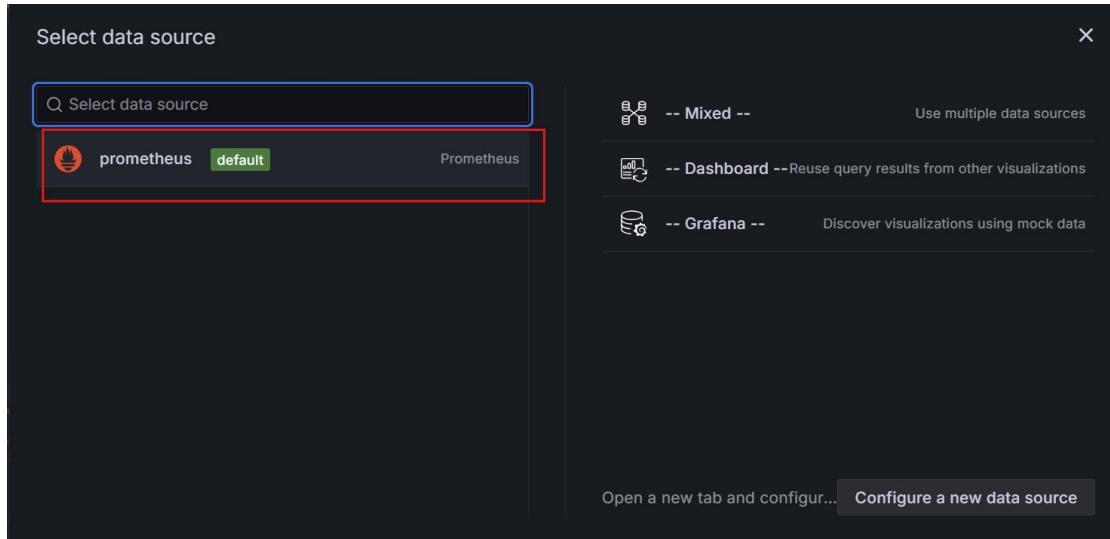
Delete Save & test

Save & Test

● Create Dash-Board



● Select data source



● Enter the query

The screenshot shows the Grafana interface with a dark theme. A panel titled "Panel Title" displays "No data". Below it, the "Query 1" section is active. The "Metrics browser" tab is selected, showing the query input field: `sum by(mode)(irate(node_cpu_seconds_total{mode!="idle"})[5m]) > 0`. The "Run queries" button is highlighted with a red box. To the right, the "Code" button is also highlighted with a red box. Other buttons like "Builder" and "Explain" are visible. The top navigation bar includes "Search or jump to..." and "ctrl+k". On the right side, there's a sidebar with "Search options" (All, Overrides), "Transparent background" toggle, "Panel links", "Repeat options", and a "Tooltip" section with "Single" mode selected.

● Run query

Promql query for cpu utilization

The screenshot shows the same Grafana interface after running the query. The "Metrics browser" panel now displays the results of the PromQL query: `sum by(mode)(irate(node_cpu_seconds_total{mode!="idle"})[5m]) > 0`. The "Run queries" button is now blue. The "Code" button is still highlighted with a red box. The "Time series" panel on the right shows two data series: a green line for host 3.84.9.83:9100 and a yellow line for host 3.89.93.24:9100. The green line has several sharp peaks, notably around 17:38:00 where it reaches approximately 0.45. The yellow line remains relatively flat near 0.15. The top navigation bar and sidebar settings remain the same.

The screenshot shows the final state of the dashboard. The "Time series" panel displays the chart for CPU Utilization. The green line (3.84.9.83:9100) shows significant spikes, particularly at 17:38:00. The yellow line (3.89.93.24:9100) is mostly flat. The "Query inspector" panel at the bottom shows the query: `100 - (avg by(instance) (rate(node_cpu_seconds_total{mode="idle"}[5m])) * 100)`. The "Data source" is set to "prometheus". The top navigation bar and sidebar settings are identical to the previous screenshots.

Queries

1. CPU Utilization

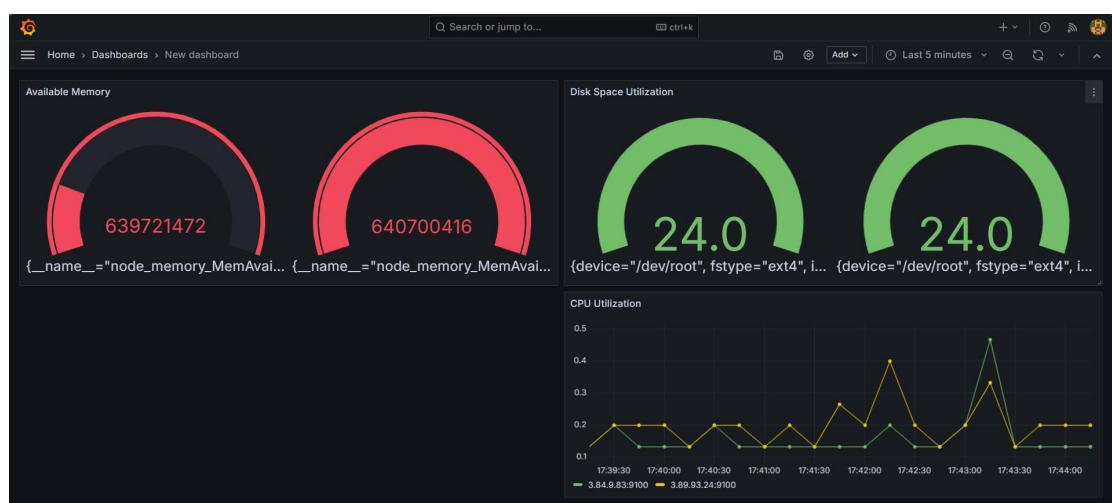
```
100 - (avg by(instance) (rate(node_cpu_seconds_total{mode="idle"}[5m])) * 100)
```

2. Disk Space Utilization

```
100 * (node_filesystem_size_bytes{fstype=~"ext4|xfs"} - node_filesystem_free_bytes{fstype=~"ext4|xfs"}) / node_filesystem_size_bytes{fstype=~"ext4|xfs"}
```

3. Total Available Memory

```
node_memory_MemAvailable_bytes
```



Jenkins Pipeline script.

```
pipeline {
    agent any

    stages {
        stage('SCM_Checkout') {
            steps {
                git 'https://github.com/maulik2311/capstone-finance.git'
            }
        }
        stage('SourcecodeBuild') {
            steps {
                sh 'mvn clean package'
            }
        }
        stage('Dockerimage_build') {
            steps {
                sh 'docker version'
                sh "docker build -t maulikd2397/finance:${BUILD_NUMBER} ."
                sh "docker tag maulikd2397/finance:${BUILD_NUMBER} maulikd2397/finance:latest"
                sh 'docker images'
            }
        }
        stage('Login2Dockerhub') {
            steps {
                withCredentials([string(credentialsId: 'dockerhublogin', variable: 'dockerhublogin')]) {
                    sh "docker login -u maulikd2397 -p ${dockerhublogin}"
                }
            }
        }
        stage('Push2Dockerhub') {
            steps {
                sh 'docker push maulikd2397/finance:latest'
            }
        }
        stage('Terrafrom apply') {
            steps {
                sh 'terraform init'
                sh 'terraform plan'
                sh 'terraform apply --auto-approve'
            }
        }
        stage('Deploy with ansible') {
            steps {
                ansiblePlaybook become: true, credentialsId: 'ansible-test-server', disableHostKeyChecking: true, installation: 'ansible', inventory: '/etc/ansible/hosts', playbook: 'ansible-playbook.yml', vaultTmpPath: "
                "
            }
        }
    }
}
```

#####Thank you #####