

🚀 Live industry capstone DevOps Project 01



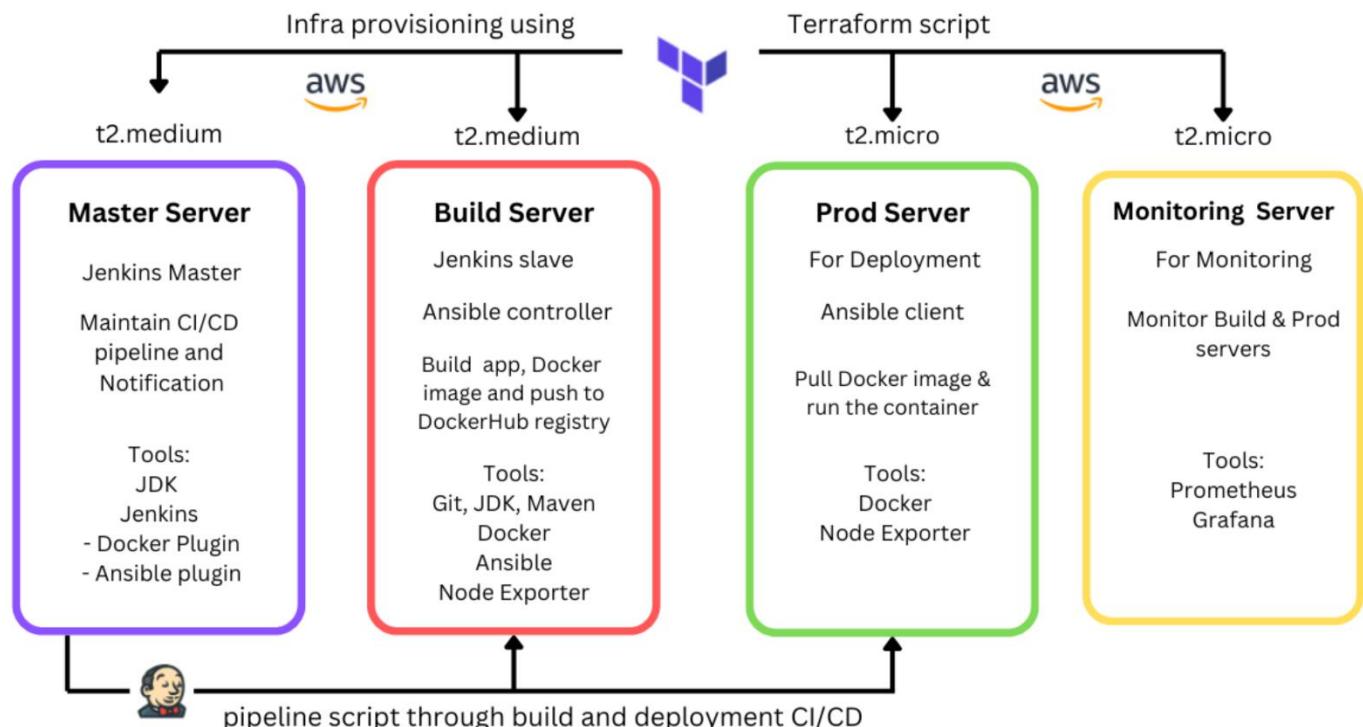
FinanceMe: Java Maven project



Banking & Finance domain



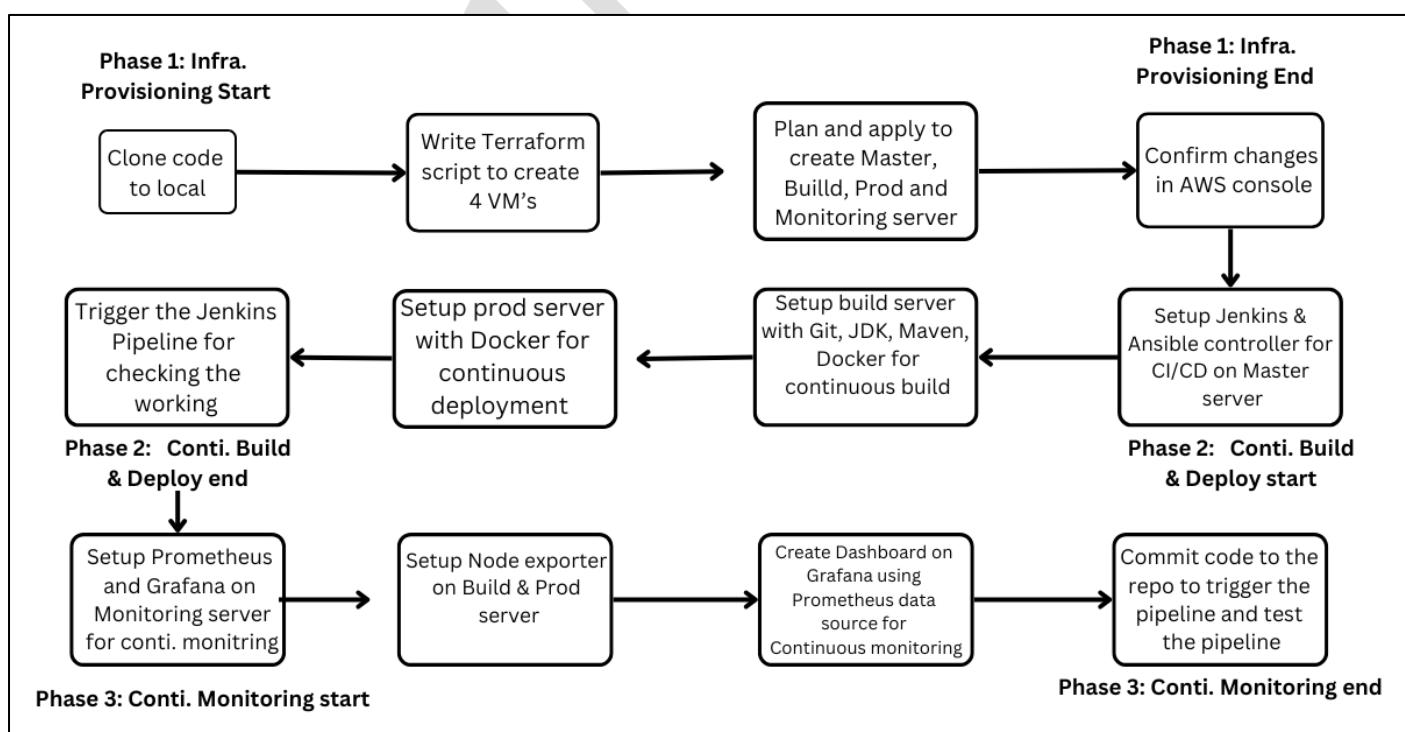
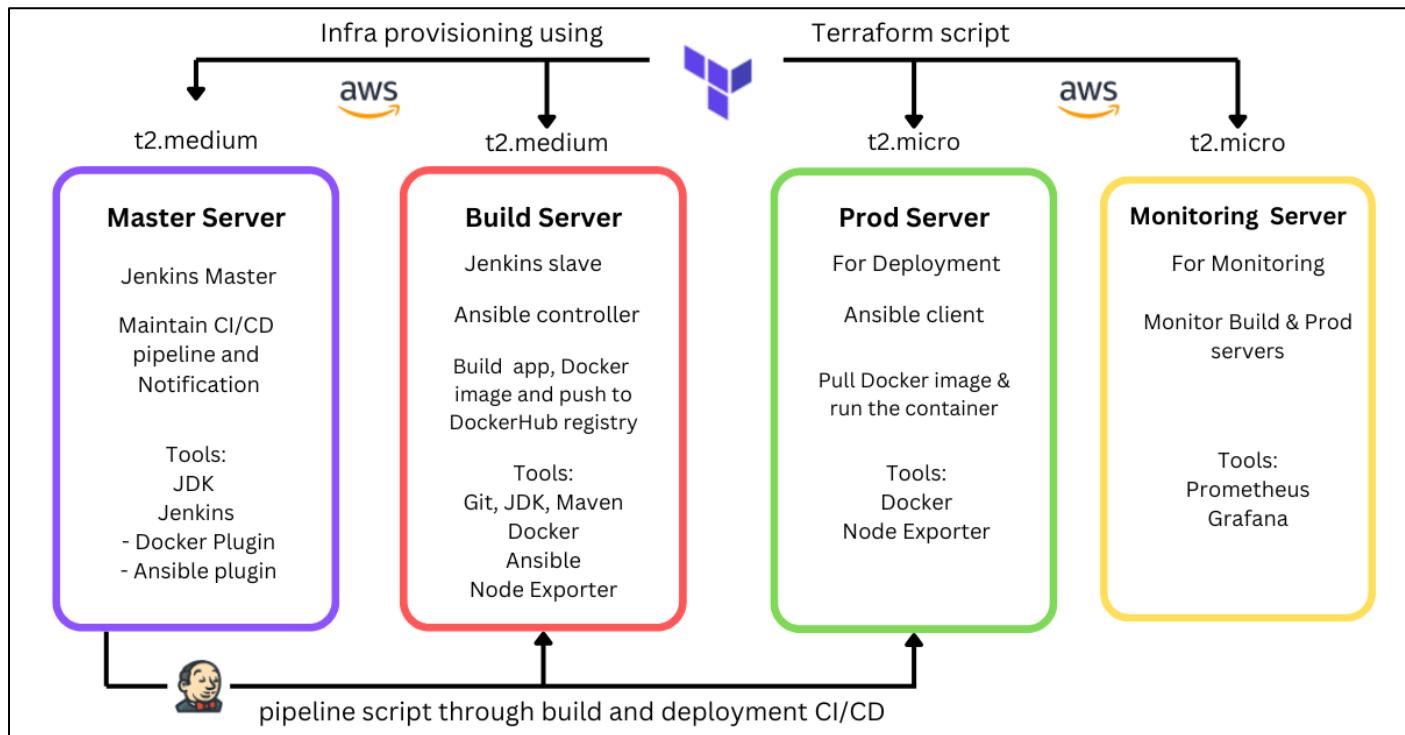
DevOps Masterclass by Abhijit Zende



🔥 <https://github.com/Abhiz2411/FinanceMe-Devops-Project-01/> 🔥



Maven



Capstone Project: FinanceMe

Domain: Banking and Finance

Submitted by: Abhijit Lalasaheb Zende

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1. Problem statement:

FinanceMe, a leading Banking and Financial Services provider, is currently facing significant challenges with its existing monolithic application architecture. As the company expanded its offerings—such as Banking, Funds Management, Loans, Debit and Credit Cards, and Investment Banking—the scalability, reliability, and manageability of its infrastructure have become increasingly complex. Specific issues include:

- **Scalability Constraints:** The monolithic architecture makes it difficult to scale individual application components, impacting performance during high-traffic periods.
- **High Manual Effort:** Testing, building, and deploying various modules require extensive manual effort, slowing down release cycles and increasing the risk of human error.
- **Difficulty with Incremental Builds:** The monolithic setup complicates incremental builds, making it challenging to isolate, test, and deploy changes in a controlled manner.
- **Inefficiency in Infrastructure Management:** The manual configuration and management of infrastructure are time-consuming, introducing delays and reducing agility.

Given these challenges, FinanceMe has decided to transition to a **microservices architecture** and implement **DevOps practices** to automate workflows and improve application reliability, scalability, and deployment efficiency.

2. Objective

To address FinanceMe's operational challenges, this project aims to transform the existing monolithic application into a microservices-based architecture, leveraging DevOps methodologies and automation. The key objectives include:

- **Implementing CI/CD Pipelines:** To enable automated build, test, and deployment processes, reducing manual intervention and improving consistency.

- **Infrastructure Automation:** Using Infrastructure-as-Code (IaC) principles, specifically through Terraform, to provision and manage cloud resources efficiently on AWS.
- **Automated Monitoring and Alerting:** Deploy a monitoring stack (Prometheus and Grafana) to track and alert on resource utilization across build and production servers.
- **Efficient Release Management:** Streamline release cycles, allowing for frequent, reliable, and fast deployment of new features and updates.

3. Goal

The primary goal of this project is to enable FinanceMe to deploy frequent, high-quality product updates in an automated, reliable, and scalable manner. Key goals include:

1. **Accelerate Deployment Frequency:** By automating builds, tests, and deployments, the project aims to reduce the time between development and production release, enabling faster feature delivery.
2. **Enhance Application Quality and Reliability:** Automation in testing, monitoring, and alerting will help catch and resolve issues earlier, ensuring robust and stable releases.
3. **Improve Feedback Loops:** Implementing CI/CD enables continuous feedback to developers and testers, fostering a collaborative environment where issues are identified and resolved quickly.
4. **Reduce Operational Overhead:** Automating infrastructure provisioning and monitoring will reduce manual work and operational costs, allowing the team to focus on innovation rather than maintenance.

4. Architecture diagram

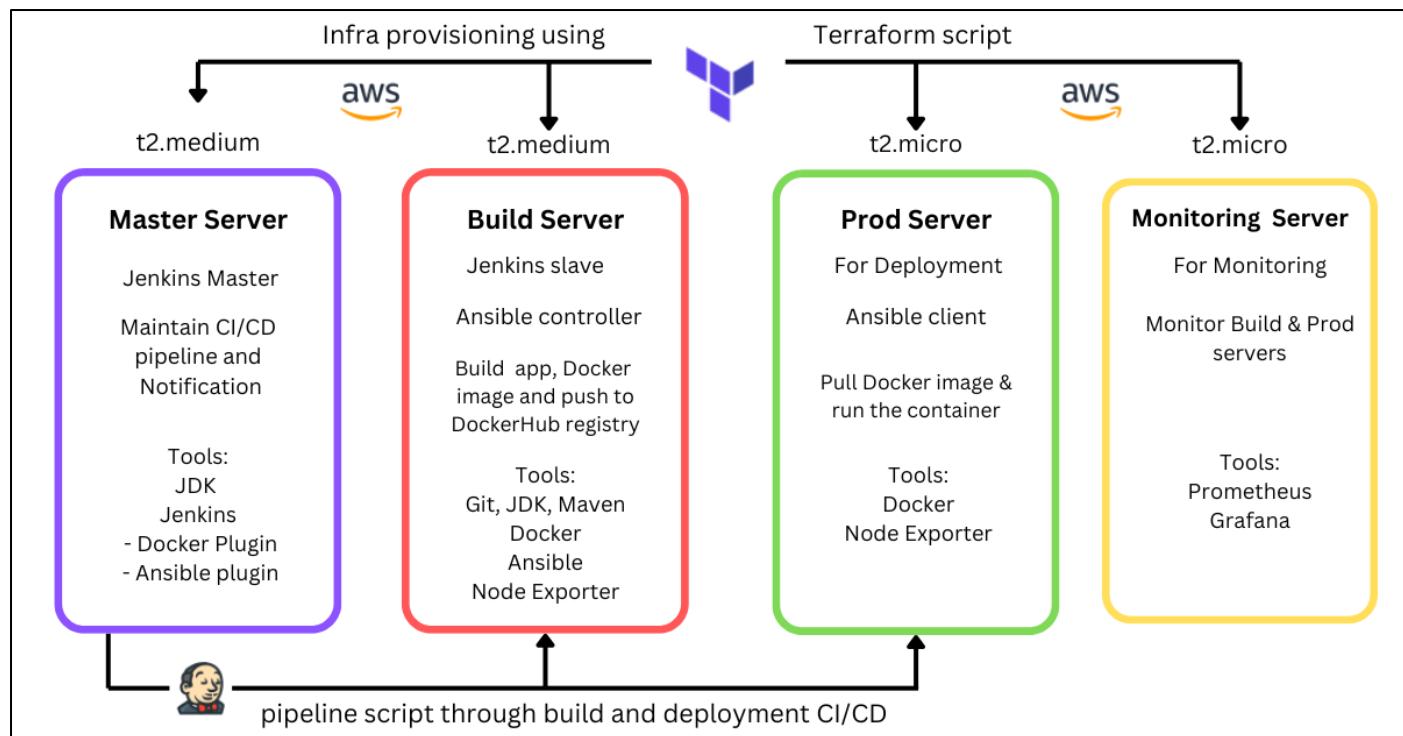


Fig. 4.01: Architecture diagram

5. Flow diagram

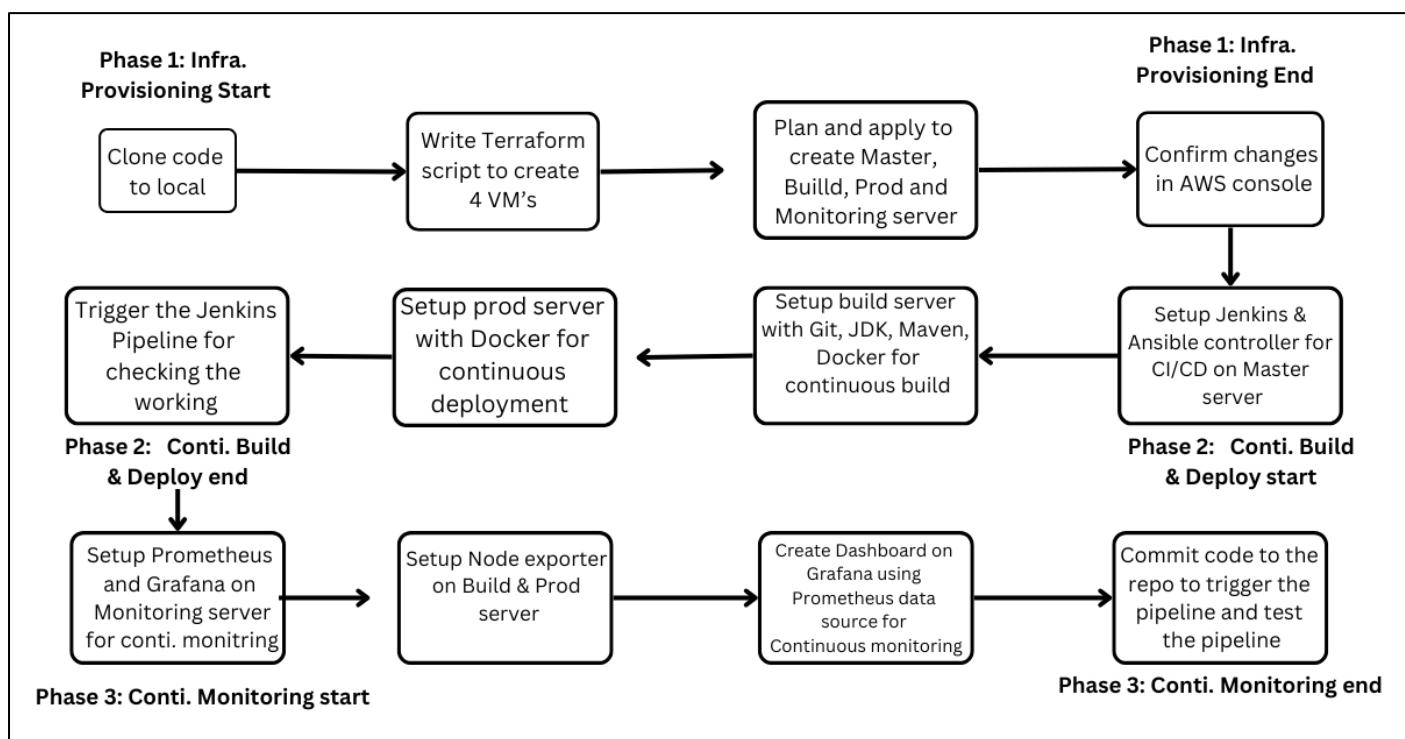


Fig.5.02: Flow diagram

6. Solution

As depicted in the flow chart diagram 5.01 [5 above] the project is divided into 3 main phases i.e. **1) Automating Infrastructure Provisioning phase, 2) Automating Build and Deployment phase and 3) Continuous monitoring phase**

1) Automating Infrastructure Provisioning phase:

- Automate infrastructure
- Create 4 AWS EC2 server instance using Terraform
- First **Master server** for Jenkins master node
- Second **Build server** for application and docker image build
- Third **Prod server** for deploying the docker image application
- Fourth **Monitoring server** for monitoring Build and Prod server

2) Automating Build and Deployment phase:

- Configure **Master** server as Jenkins master node to create a CI/CD pipeline project
- Configure **Build** server as Jenkins slave node to perform all the application builds and Docker image builds
- Configure **Build** server as **Ansible controller** to push the ansible-playbook desired tasks to the ansible client nodes for deployment
- Configure **Prod** server as **Ansible client** node as Build server will use Ansible controller with **Push** mechanism to deploy the application in the Prod server

3) Continuous monitoring phase

- Configure **Monitoring** server with **Prometheus** and **Grafana** for continuous monitoring
- Install **Node Exporter** on **Build** and **Prod** server to get metrics from both the servers
- Create a **New Dashboard** on Grafana with Prometheus as data source to continuously monitor **CPU utilization, Disk space utilization** and **Total available memory**

Phase 1- Automating Infrastructure Provisioning:

Steps:

Step 1: Clone the remote code repository to local

1. In our case we will be using '[Github](#)' as our remote source code repository
2. First fork the repository to our GitHub account.
 - a. If you don't have an GitHub account you can create one by following the link <https://docs.github.com/en/get-started/start-your-journey/creating-an-account-on-github>.
 - b. The code is present at the remote repo: <https://github.com/StarAgileDevOpsTraining/star-agile-banking-finance>
 - c. To fork the repository simply visit the remote repo. and click on **fork** option on top right to fork it in our own account by giving it a relevant name and description(optional)

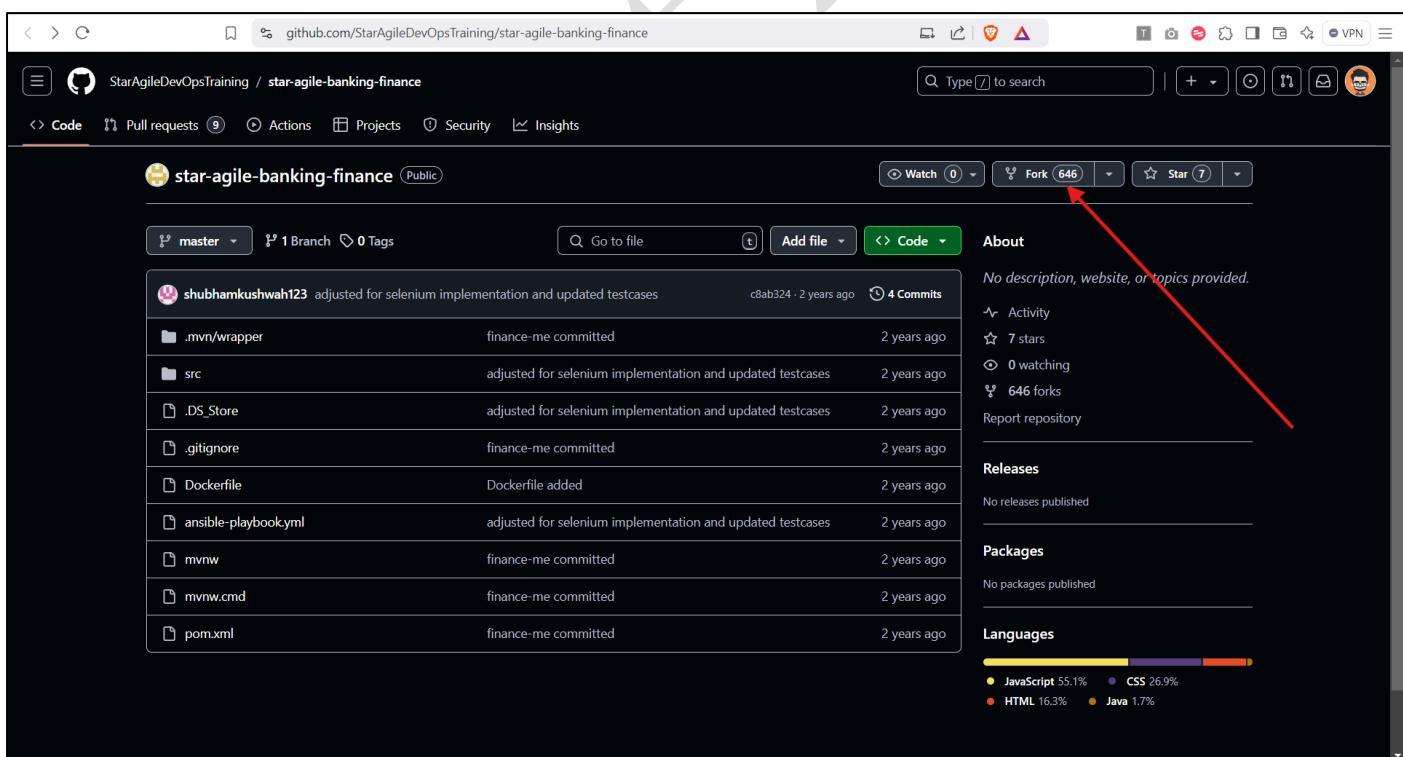


Fig. 1.01: Fork the repository

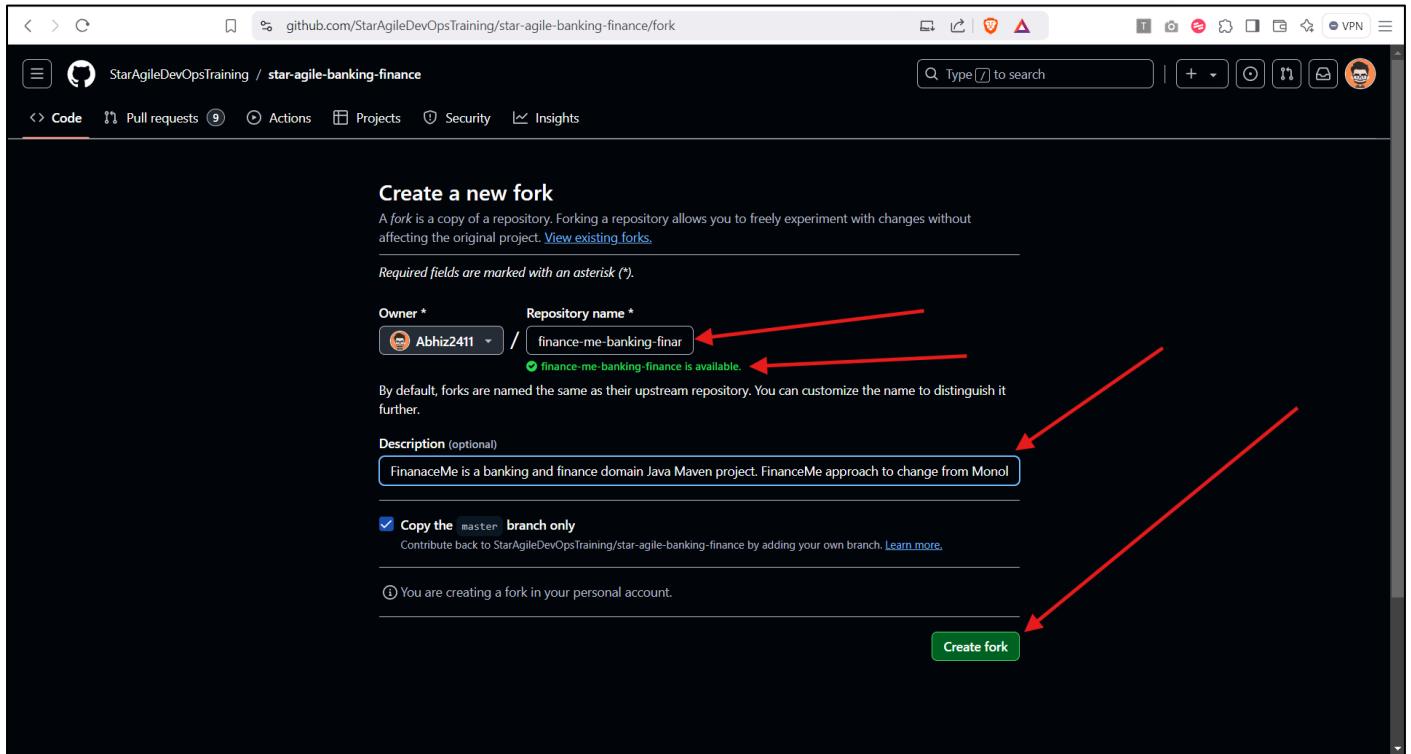


Fig. 1.02: Forking details

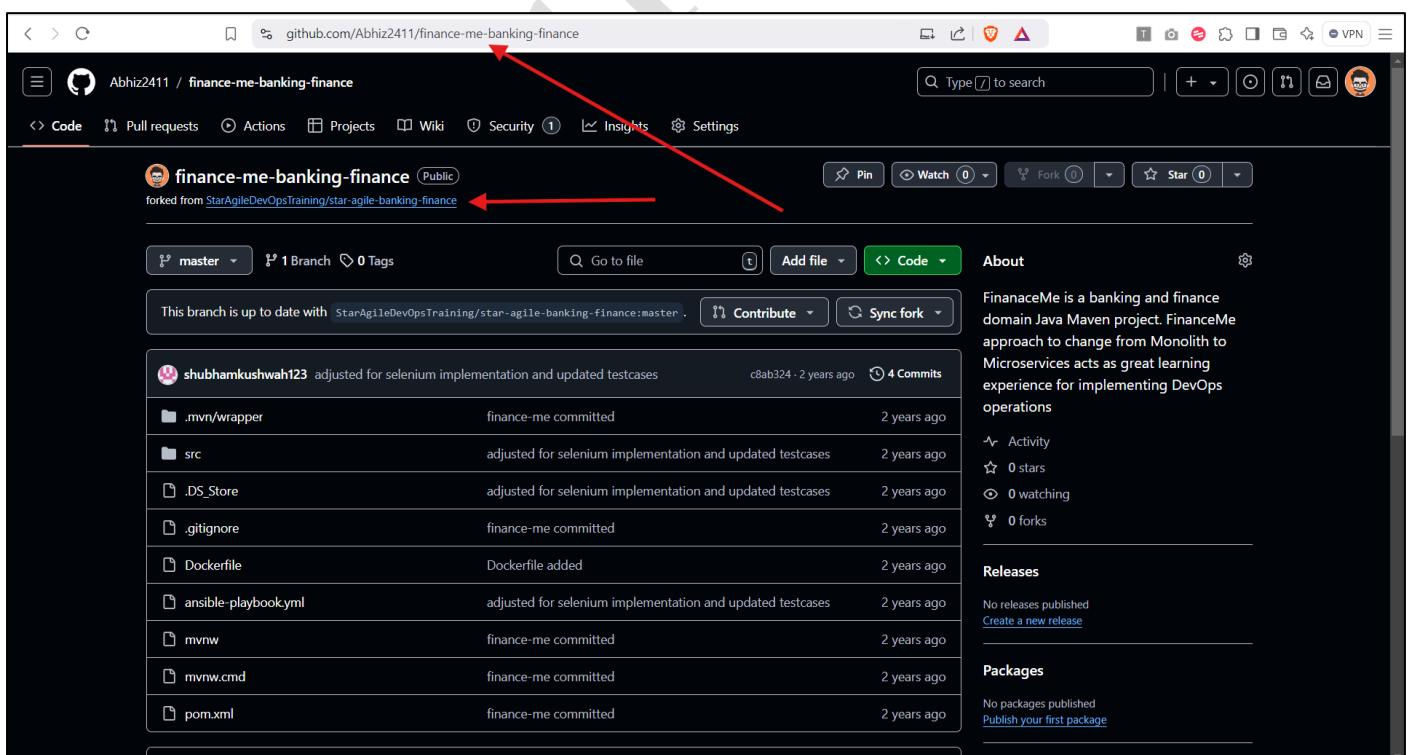


Fig. 1.03: Fork success

3. To clone the repository to our local machine and writing the code we will be using **VS Code IDE(Integrated Development Environment)**

- a. If VS Code is not installed in your machine then you can follow: <https://code.visualstudio.com/download>. Verify if **Git** is installed in your machine if not then install by following: <https://git-scm.com/downloads>.
- b. Copy the address of the remote repo by clicking on ‘**Code**’ option on GitHub repo and then ‘**HTTPS**’ and copy the address
- c. Once VS Code is installed open the inbuilt terminal using ‘**Ctrl + ~**’
- d. To clone the repo simply enter the command ‘`git clone <https_address_of_repo.git>`’
- e. Change working directory to the cloned repo. by using command ‘`cd <directory_name>`’

The screenshot shows the VS Code interface with the following details:

- EXPLORER** sidebar: Shows a folder named "CODE" containing "finance-me-banking-finance".
- TERMINAL** tab: Displays a PowerShell session with the following commands and output:
 - `git clone https://github.com/Abhizz2411/finance-me-banking-finance.git`
 - Cloning into 'finance-me-banking-finance'...
 - remote: Enumerating objects: 163, done.
 - remote: Total 163 (delta 0), reused 0 (delta 0), pack-reused 163 (from 1)
 - Receiving objects: 100% (163/163), 2.12 MiB | 1.93 MiB/s, done.
 - Resolving deltas: 100% (35/35), done.
- WALKTHROUGHS**: A sidebar with several "Get Started" links for various development environments.
- STATUS BAR**: Shows the current branch as "master", the file count as "0 △ 0", and other status indicators.

Two red arrows point to the "git clone" command in the terminal and the "cd" command that follows it, highlighting the steps described in the text above.

Fig. 1.04: Git clone to local repository

Step 2: Install and Configure Terraform for infrastructure provisioning:

1. [Terraform](https://developer.hashicorp.com/terraform/install) is an **IAC(Infrastructure as Code)** tool used for Automating infrastructure provisioning. If Terraform is not installed and configured with VS Code then you can follow the link:
<https://developer.hashicorp.com/terraform/install>
2. Once Terraform is installed and system path for terraform is set also install Terraform extension for VS code
3. We will be using **AWS** as our cloud service provider. So first configure AWS with our local.
 - a. To open account on AWS follow the link:
<https://aws.amazon.com/resources/create-account/>
 - b. To Configure first create **Access token** from your **IAM user**
 - c. Then enter '**aws configure**' command in your local terminal to configure your aws with local

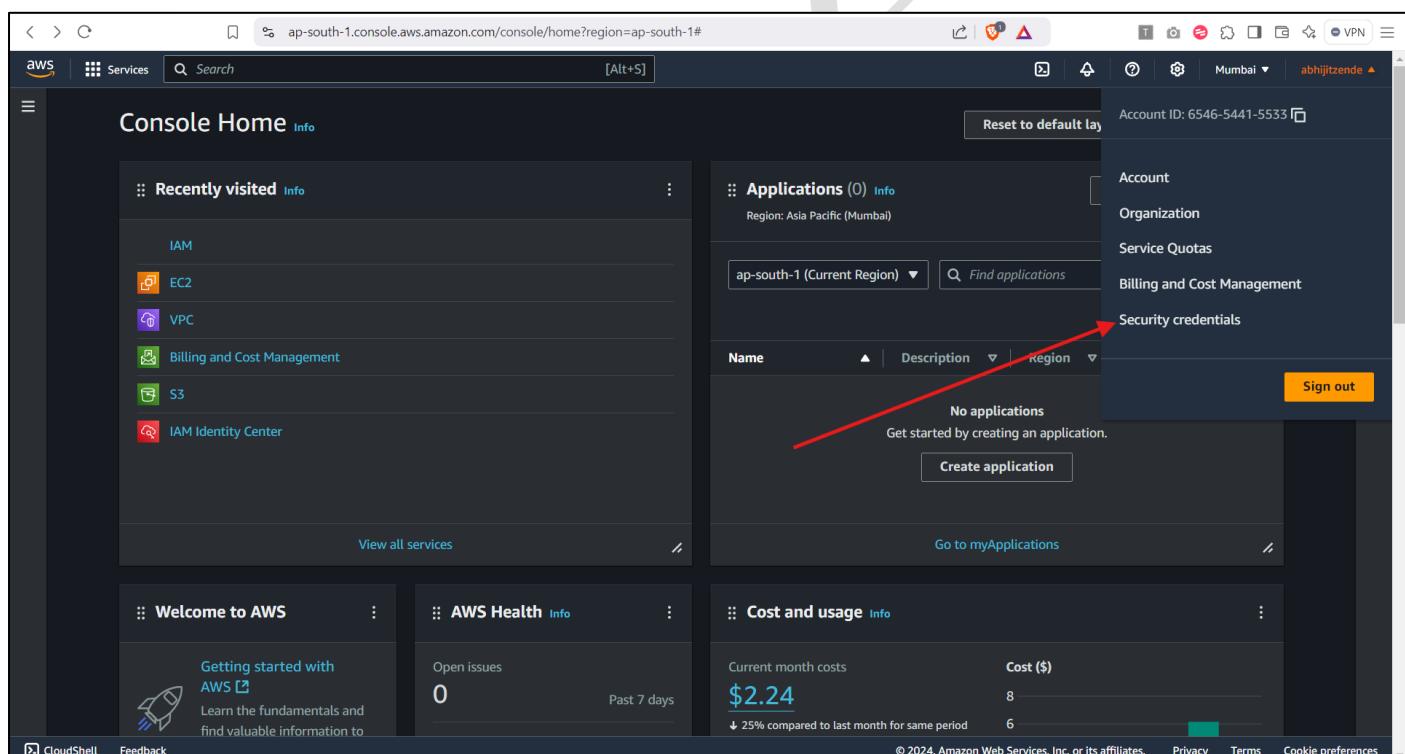


Fig. 2.01: AWS IAM account login

Multi-factor authentication (MFA) (2)

Type	Identifier	Certifications	Created on
Virtual	arn:aws:iam::65465441533:mfa/Gauthenticator	Not Applicable	Thu Jul 25 2024
Passkeys and security keys	arn:aws:iam::65465441533:u2f/root/myauthdevice-7OXZDIWPZFFALBZCUTPOCRYKE	0	Tue Jul 23 2024

Access keys (0)

No access keys

As a best practice, avoid using long-term credentials like access keys. Instead, use tools which provide short term credentials.[Learn more](#)

Create access key

CloudFront key pairs (0)

No CloudFront key pairs

Actions ▾ Upload Create CloudFront key pair

Fig. 2.02: Create Access key

Access key created

This is the only time that the secret access key can be viewed or downloaded. You cannot recover it later. However, you can create a new access key any time.

Step 1
Alternatives to root user access keys

Step 2
Retrieve access key

Retrieve access key [Info](#)

Access key

If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key	Secret access key
[REDACTED]	[REDACTED] Show

Access key best practices

- Never store your access key in plain text, in a code repository, or in code.
- Disable or delete access key when no longer needed.
- Enable least-privilege permissions.
- Rotate access keys regularly.

For more details about managing access keys, see the [best practices for managing AWS access keys](#).

[Download .csv file](#) [Done](#)

Fig. 2.03: Copy access key token

A screenshot of the Visual Studio Code interface. The left sidebar shows a project structure under 'EXPLORER' with a folder named 'finance-me-banking-finance' containing files like '.mvn', 'src', '.gitignore', 'ansible-playbook.yml', 'Dockerfile', 'mvnw', 'mvnw.cmd', and 'pom.xml'. The 'CODE' section is expanded. The main area shows the 'Welcome' screen with 'Start' and 'Recent' sections. On the right, there's a 'Walkthroughs' sidebar with links to GitLens, Python Development, Jupyter Notebooks, WSL, and C++ Development. Below the 'Walkthroughs' is a terminal window titled 'powershell - finance-me-banking-finance'. The terminal output shows the command 'aws configure' being run, followed by prompts for AWS Access Key ID and AWS Secret Access Key, both of which are redacted. The terminal also shows the default region name as 'ap-south-1' and the default output format as 'json'. The status bar at the bottom indicates the current branch is 'master'.

Fig. 2.04: AWS configure

A screenshot of the Visual Studio Code interface, similar to Fig. 2.04. The left sidebar shows the same project structure. The main area shows the 'Welcome' screen with 'Start' and 'Recent' sections. On the right, there's a 'Walkthroughs' sidebar with links to GitLens, Python Development, Jupyter Notebooks, WSL, and C++ Development. Below the 'Walkthroughs' is a terminal window titled 'powershell - finance-me-banking-finance'. The terminal output shows the command 'terraform --version' being run, followed by the output 'Terraform v1.9.8 on windows_amd64'. The status bar at the bottom indicates the current branch is 'master'.

Fig. 2.05: Terraform installation verification

Step 3: Write terraform code to plan and provision resources:

1. Create a new folder ‘Terraform’ inside the root directory to write the terraform code
2. Change directory to ‘Terraform’ using cmd `cd Terraform`
3. Create a new file ‘main.tf’ to write the terraform code to create **2 t2.medium Ubuntu 22.04 EC2 instances** for ‘Master’ and ‘Build’ server and **2 t2.micro Ubuntu 22.04 EC2 instances** for ‘Prod’ and ‘Monitoring’ server
 - a. **Master server security group allowed inbound rule ports:**
 - i. SSH Port: **22**
 - ii. To Access Jenkins: **8080**
 - b. **Build server security group allowed inbound rule ports:**
 - i. SSH port: **22**
 - ii. Node Exporter port: **9100**
 - c. **Prod server security group allowed inbound rule ports:**
 - i. SSH port: **22**
 - ii. Node Exporter port: **9100**
 - iii. Docker Open port for Maven app: **8084** (Can be config. of our own)
 - d. **Monitoring server security group allowed inbound rule ports:**
 - i. SSH port: **22**
 - ii. Prometheus server port: **9090**
 - iii. Grafana server port: **3000**
4. Enter command `terraform init` to start a terraform project
5. Enter cmd’s `terraform fmt` and `terraform validate` to format and validate our code syntax
6. Enter command `terraform plan` to review our changes
7. Enter command `terraform apply` to apply the changes once reviewed the plan
8. Verify the resources on the AWS console

Security Groups (16) Info

Inbound rules (2)

Name	Security group rule...	IP version	Type	Protocol	Port range
sgr-0fa7d2d8ed8148d...	IPv6	SSH	TCP	22	22
sgr-04549e710ecd26d...	IPv4	SSH	TCP	22	22

Fig. 3.01: SSH security group

Security Groups (1/16) Info

Inbound rules (2)

Name	Security group rule...	IP version	Type	Protocol	Port range
sgr-0758265b9b1fe50ce	IPv4	Custom TCP	TCP	8080	8080
sgr-0c837b4788a5e01...	IPv6	Custom TCP	TCP	8080	8080

Fig. 3.02: Jenkins security group

The screenshot shows the AWS EC2 Security Groups page. The left sidebar is collapsed. The main area displays a table of security groups. One row is selected, highlighted with a red box and labeled "sg-0adb293d4dbc07a23 - My_NodeExporter_Security_Group". Below the table, there are tabs for Details, Inbound rules, Outbound rules, Sharing - new, VPC associations - new, and Tags. The Inbound rules tab is active, showing a table with one rule. A red arrow points to the "Port range" column, which contains the value "9100".

Name	Security group ID	Security group name	VPC ID	Description
-	sg-08dc488ac40ad7704	default	vpc-067c947592b5dacbe	default VPC s
-	sg-0a094ee29507ff006	MyWindowsRDPConnectionGroup	vpc-067c947592b5dacbe	Allow remote
-	sg-022986061da6af01d	My_Prometheus_monitoring_server_g...	vpc-067c947592b5dacbe	Allow traffic t

Name	Security group rule...	IP version	Type	Protocol	Port range
-	sgr-04fd273bd085a3cdb	IPv4	Custom TCP	TCP	9100

Fig. 3.03: Node Exporter security group

The screenshot shows the AWS EC2 Security Groups page. The left sidebar is collapsed. The main area displays a table of security groups. One row is selected, highlighted with a red box and labeled "sg-022986061da6af01d - My_Prometheus_monitoring_server_group". Below the table, there are tabs for Details, Inbound rules, Outbound rules, Sharing - new, VPC associations - new, and Tags. The Inbound rules tab is active, showing a table with one rule. A red arrow points to the "Port range" column, which contains the value "9090".

Name	Security group ID	Security group name	VPC ID	Description
-	sg-08dc488ac40ad7704	default	vpc-067c947592b5dacbe	default VPC s
-	sg-0a094ee29507ff006	MyWindowsRDPConnectionGroup	vpc-067c947592b5dacbe	Allow remote
-	sg-022986061da6af01d	My_Prometheus_monitoring_server_g...	vpc-067c947592b5dacbe	Allow traffic t

Name	Security group rule...	IP version	Type	Protocol	Port range
-	sgr-03730cb4f4ea5b00d	IPv4	Custom TCP	TCP	9090

Fig. 3.04: Prometheus security group

The screenshot shows the AWS EC2 Security Groups page. On the left, the navigation menu includes 'Instances', 'Security Groups' (which is selected and highlighted in blue), and 'Network & Security'. The main table lists three security groups:

Name	Security group ID	Security group name	VPC ID	Description
-	sg-0ba48ff68fd9e9eb0	MyKubernetesNodePortDefaultGroup	vpc-067c947592b5dacbe	Allowing traffic
-	sg-096ee8a1bc2bd54d6	MySSHSecurityGroup	vpc-067c947592b5dacbe	Allows SSH access
-	sg-08938f291fbe3f987	MyTomcatServerGroup8080	vpc-067c947592b5dacbe	Allow all traffic

The 'Inbound rules' tab is selected for the 'My_Grafana_Visualization_Server_Group'. A single rule is listed with a port range of 3000.

Fig. 3.05: Grafana security group

The screenshot shows the AWS EC2 Security Groups page. The 'Security Groups' section indicates 17 groups. The 'Inbound rules' tab is selected for the 'MyDemoDockerOpenPortMavenApp' group, which has one rule allowing traffic on port 8084.

Fig. 3.06: Docker open port for project security group

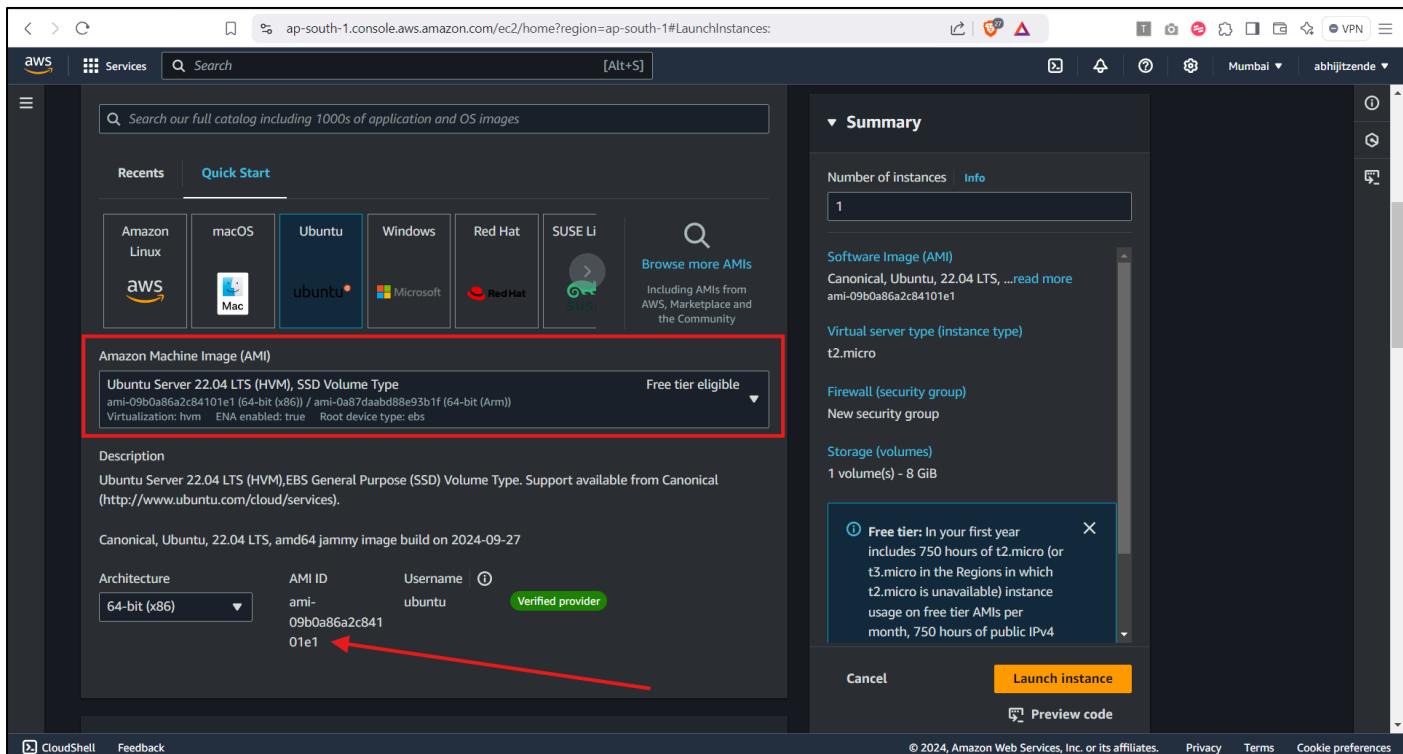


Fig. 3.07: AMI ID of Ubuntu 22.04 LTS

```

File Edit Selection View Go Run ...
              finance-me-banking-finance

EXPLORER
> FINANCE-ME-BANKING-FINANCE
  > .mvn
  > src
  > target
  > terraform
    main.tf
      .gitignore
      ! ansible-playbook.yml
      Dockerfile
      mvnw
      mvnw.cmd
      pom.xml

main.tf
resource "aws_instance" "monitoring_server" {
  ami = "ami-09b0a86a2c84101e1"
  instance_type = "t2.medium"
  key_name = "aws_instance_safe_key_pair"

  # Attached security group: SSH security group(Port:22) and Jenkins server group(Port:8080)
  vpc_security_group_ids = [ "sg-096ee8a1bc2bd54d6", "sg-0093eca06d11a0491" ]

  tags = {
    Name = "master_server"
  }
}

resource "aws_instance" "build_server" {
  ami = "ami-09b0a86a2c84101e1"
  instance_type = "t2.medium"
  key_name = "aws_instance_safe_key_pair"

  # Attached security group: SSH security group(Port:22) and Node Exporter server group(Port:9100)
  vpc_security_group_ids = [ "sg-096ee8a1bc2bd54d6", "sg-0adb293d4dbc07a23" ]

  tags = {
    Name = "build_server"
  }
}

resource "aws_instance" "prod_server" {
  ami = "ami-09b0a86a2c84101e1"
  instance_type = "t2.micro"
  key_name = "aws_instance_safe_key_pair"

  # Attached security group: SSH security group(Port:22), Node Exporter server group(Port:9100) and
}

```

Fig. 3.08: Terraform code

```

resource "aws_instance" "prod_server" {
    ami = "ami-09b0a86a2c84101e1"
    instance_type = "t2.micro"
    key_name = "aws_instance_safe_key_pair"

    # Attached security group: SSH security group(Port:22), Node Exporter server group(Port:9100) and
    # Docker open port security group(Port: 8084)
    vpc_security_group_ids = [ "sg-096ee8a1bc2bd54d6", "sg-0adb293d4dbc07a23", "sg-0d2dcc9ae075a030d" ]

    tags = {
        Name = "prod_server"
    }
}

resource "aws_instance" "monitoring_server" {
    ami = "ami-09b0a86a2c84101e1"
    instance_type = "t2.micro"
    key_name = "aws_instance_safe_key_pair"

    # Attached security group: SSH security group(Port:22), Prometheus server group(Port:9090) and
    # Grafana server group(Port:3000)
    vpc_security_group_ids = [ "sg-096ee8a1bc2bd54d6", "sg-022986061da6af01d", "sg-0cc3b0a96f4da0c68" ]

    tags = {
        Name = "monitoring_server"
    }
}

```

Fig. 3.09: Terraform code

```

PS E:\Softwares\DevOps\StarAgile DevOPS\Capstone project\Banking and Finance Domain project - FinanceMe\Solution\Code\finance-me-bank> terraform init
● ing-finance> terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v5.75.1...
- Installed hashicorp/aws v5.75.1 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

```

Fig. 3.10: Terraform init command

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows the project structure under "FINANCE-ME-BANKING-FINANCE" with files like ".mvn", "src", "target", "terraform", "main.tf", ".gitignore", "ansible-playbook.yml", "Dockerfile", "mvnw", "mvnw.cmd", and "pom.xml".
- Editor:** The main editor window displays the Terraform configuration file "main.tf". The code defines an "aws_instance" resource named "prod_server" with specific parameters like AMI, instance type, key name, and security group.
- Terminal:** The bottom right terminal window shows the command-line interface for Terraform:
 - "terraform fmt" command is run, followed by a red arrow pointing to it.
 - "terraform validate" command is run, followed by another red arrow pointing to it.
 - The output shows "Success! The configuration is valid."
- Status Bar:** Shows the current branch as "master", file count as 4, and other status indicators.

Fig. 3.11: Terraform fmt and terraform validate

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows the project structure under "FINANCE-ME-BANKING-FINANCE" with files like ".mvn", "src", "target", "terraform", "main.tf", ".gitignore", "ansible-playbook.yml", "Dockerfile", "mvnw", "mvnw.cmd", and "pom.xml".
- Editor:** The main editor window displays the Terraform configuration file "main.tf". The code defines an "aws_instance" resource named "prod_server" with specific parameters like AMI, instance type, key name, and security group.
- Terminal:** The bottom right terminal window shows the command-line interface for Terraform:
 - "terraform plan" command is run, indicated by a red arrow pointing to it.
 - The output shows the execution plan generated by Terraform, listing actions such as creating a new AWS instance.
- Status Bar:** Shows the current branch as "master", file count as 4, and other status indicators.

Fig. 3.12: terraform plan

The screenshot shows the VS Code interface with the terminal tab active. A red arrow points from the terminal output back up to the command line where 'terraform apply' was entered.

```

finance-me-banking-finance
PS E:\Softwares\DevOps\StarAgile DevOPS\Capstone project\Banking and Finance Domain project - FinanceMe\Solution\Code\finance-me-banking-finance> terraform apply
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

# aws_instance.build_server will be created
+ resource "aws_instance" "build_server" {
    + ami                               = "ami-09b0a86a2c84101e1"
    + arn                             = (known after apply)
    + associate_public_ip_address      = (known after apply)
    + availability_zone                = (known after apply)
    + cpu_core_count                  = (known after apply)
}

```

Fig. 3.13: terraform apply

The screenshot shows the VS Code interface with the terminal tab active. A red arrow points from the success message in the terminal back up to the command line where 'terraform apply' was entered.

```

aws_instance.master_server: Creating...
aws_instance.master_server: Still creating... [10s elapsed]
aws_instance.monitoring_server: Still creating... [10s elapsed]
aws_instance.prod_server: Still creating... [10s elapsed]
aws_instance.build_server: Still creating... [10s elapsed]
aws_instance.monitoring_server: Creation complete after 13s [id=i-0eb6c8a29dfaee88]
aws_instance.prod_server: Creation complete after 13s [id=i-0b19d37b829491a34]
aws_instance.build_server: Still creating... [20s elapsed]
aws_instance.master_server: Still creating... [20s elapsed]
aws_instance.master_server: Still creating... [30s elapsed]
aws_instance.build_server: Still creating... [30s elapsed]
aws_instance.master_server: Creation complete after 33s [id=i-091912f1fc5419060]
aws_instance.build_server: Creation complete after 33s [id=i-09a1c99ed46ef5e0b]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed

```

Fig. 3.14: Instance creation success

The screenshot shows the AWS EC2 Instances page. The left sidebar includes options like Dashboard, EC2 Global View, Events, Instances (with sub-options for Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity, and Reservations), Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), and Network & Security (Security Groups). The main content area displays a table of instances. The columns include Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Availability. Four instances are listed: build_server (t2.medium, 2/2 checks passed, ap-south-1), master_server (t2.medium, 2/2 checks passed, ap-south-1), monitoring_server (t2.micro, 2/2 checks passed, ap-south-1), and prod_server (t2.micro, Initializing, ap-south-1). The master_server row is highlighted with a red box.

Fig. 3.15: AWS console

The screenshot shows the AWS EC2 Instances page with the master_server instance selected. The left sidebar is identical to Fig. 3.15. The main content area shows the master_server instance details. Below the instance table, a modal window titled "i-091912f1fc5419060 (master_server)" displays its security group rules. The table has columns for Name, Security group rule ID, Port range, Protocol, Source, and Security groups. Four rules are listed: one for port 22 (TCP, ::/0, MySSHSecurity), one for port 8080 (TCP, 0.0.0.0/0, MyJenkinsServer), and two others for port 8080 (TCP, ::/0, MyJenkinsServer). Two specific rules (port 22 and port 8080) are highlighted with red arrows.

Fig. 3.16: Master server

Screenshot of the AWS EC2 Instances page showing the build_server instance. The instance is running and assigned to the t2.medium instance type. The Inbound rules table shows three entries, with the fourth row (port 9100) highlighted by a red arrow.

Name	Security group rule ID	Port range	Protocol	Source	Security groups
-	sgr-0fa7d2d8ed8148d4b	22	TCP	::/0	MySSHSecurity
-	sgr-04549e710ecd26d33	22	TCP	0.0.0.0/0	MySSHSecurity
-	sgr-04fd273bd085a3cdb	9100	TCP	0.0.0.0/0	My_NodeExport

Fig. 3.17: Build server

Screenshot of the AWS EC2 Instances page showing the prod_server instance. The instance is initializing and assigned to the t2.micro instance type. The Inbound rules table shows four entries, with the Port range column highlighted by a red box.

Name	Security group rule ID	Port range	Protocol	Source	Security groups
-	sgr-0fa7d2d8ed8148d4b	22	TCP	::/0	MySSHSecurity
-	sgr-04549e710ecd26d33	22	TCP	0.0.0.0/0	MySSHSecurity
-	sgr-04fd273bd085a3cdb	9100	TCP	0.0.0.0/0	My_NodeExport
-	sgr-0cd03f72f67a0b0a8	8084	TCP	0.0.0.0/0	MyDemoDocker

Fig. 3.18: Prod server

The screenshot shows the AWS EC2 Instances page. The left sidebar is collapsed. The main area displays a table of instances. One row for the 'monitoring_server' instance is selected and highlighted with a blue background. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Availability. Below the table, a detailed view for the selected instance is shown, specifically for the security group 'My_Prometheus'. The 'Outbound rules' section is expanded, showing four rules. The 'Port range' column for these rules is highlighted with a red box. The rules are as follows:

Name	Security group rule ID	Port range	Protocol	Source	Security groups
-	sgr-03730cb4f4ea5b00d	9090	TCP	0.0.0.0/0	My_Prometheus
-	sgr-0fa7d2d8ed8148d4b	22	TCP	::/0	MySSHSecurity
-	sgr-04549e710ecd26d33	22	TCP	0.0.0.0/0	MySSHSecurity
-	sgr-094c8599a130e0a55	3000	TCP	0.0.0.0/0	My_Grafana_Vis

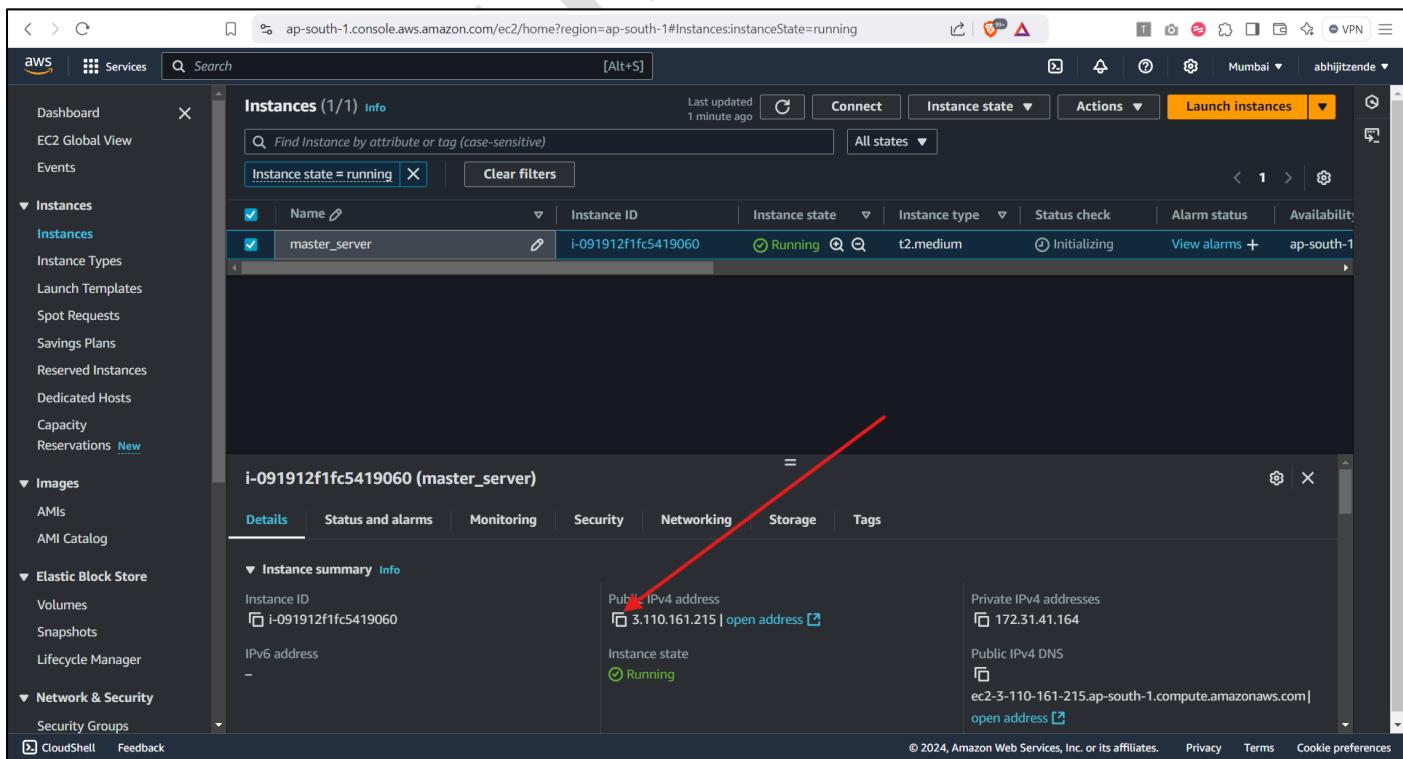
Fig. 3.19: Monitoring server

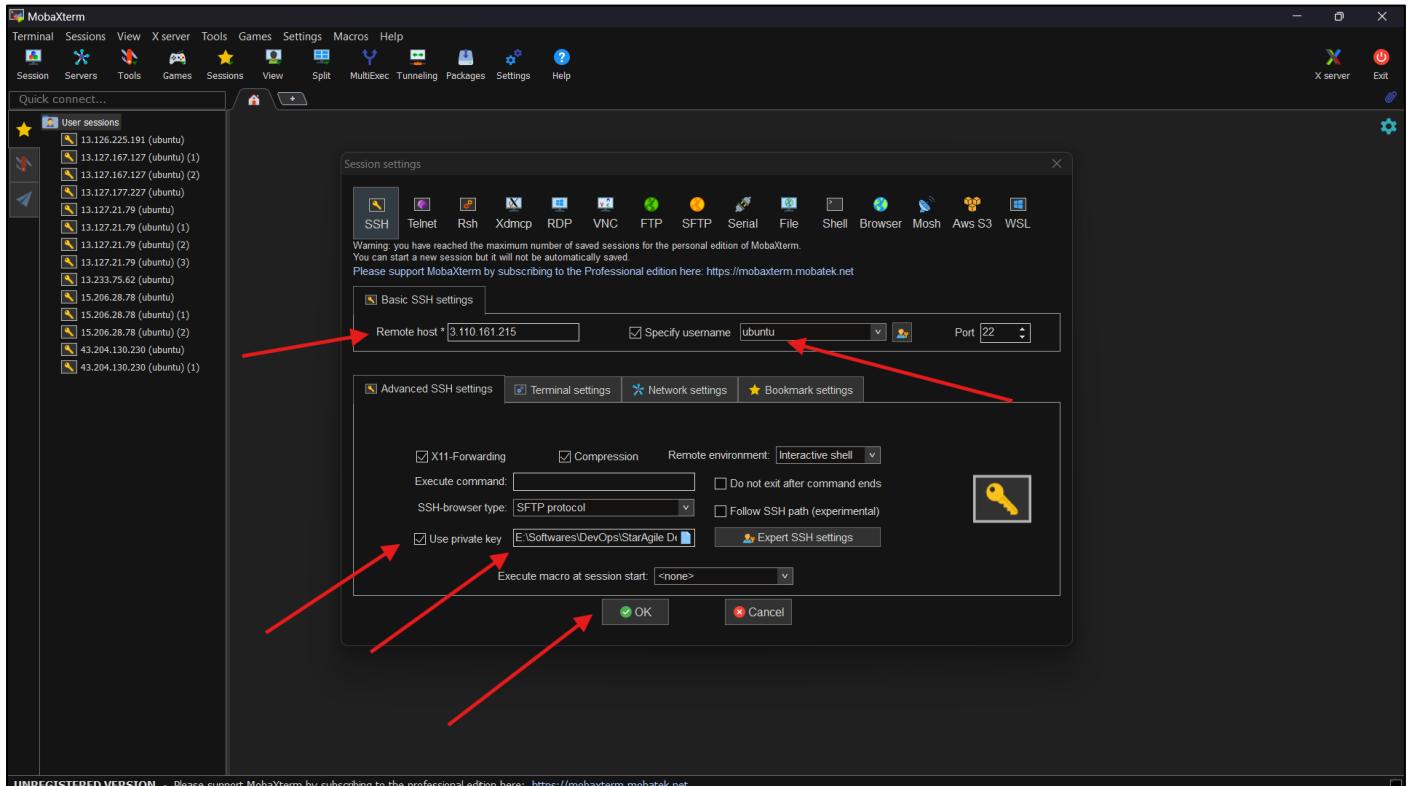
Phase 2 - Automating Build and Deployment phase:

Steps:

Step 1: Install and Setup Jenkins on Master server:

1. Download and Setup Jenkins on Master server
 - a. SSH into the master server. If MobaXterm is not installed you can follow the link: <https://mobaxterm.mobatek.net/download.html>
 - b. Install latest version of Git
 - c. Install latest version of JDK
 - d. Install latest version of Jenkins
 - e. Create a user for handling Jenkins and elevate the privileges of that user
 - f. Setup Jenkins Master-Slave architecture with Build server as slave node
 - g. For more detailed guide follow:
https://github.com/Abhiz2411/Jenkins-Jedi-CICD/blob/Main/Module-04-Continuous-Integration-using-Jenkins-Abhijit_Zende_GitHub_DevOps_Notes.pdf





```
root@ip-172-31-41-164:~# apt update -y
Hit:1 http://ppa-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://ppa-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://ppa-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
root@ip-172-31-41-164:~# apt install fontconfig openjdk-17-jdk
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
adwaita-icon-theme alsacoretopology alsacoretopology-conf alsavumconf at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service fontconfig-config
fonts-dejavu-core fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2
libasound2-data libatkbridge2.0-0 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0 libatk1.0-data libatspi2.0-0 libavahi-client
libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcupsc2 libdatrie1 libdcnf1 libdeflate0 libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2
libdrm-radeon1 libfontconfig1 libfontenc1 libgail-common libgail1 libgd-pixbuf2.0-0 libgd-pixbuf2.0-0-bin libgdk-pixbuf2.0-common libgif7 libgl1
libgl1-amber-dri libgl1-mesa-dri libglapi-mesa libglvnd0 libglx-mesa libglx0 libglraphite2-3 libgtk2.0-0 libgtk2.0-0-bin libgtk2.0-0-common libharfbuzz0b
libice-dev libice6 libjbig libjpeg-turbo0 libjpegb8 liblcms2-2 liblwm15 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpicasse0 libpcsslide1
libpixman-1-0 libpthread-stubs0-dev librsvg2-2 librsvg2-common libssensors-config libssensors5 libsm-dev libsm6 libthai-data libthai0 libtiff5 libwebp7
libxcb-1-dev libx11-xcb libxau-dev libxaw7 libxcb-drivers libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-render0 libxcb-shape0 libxcb-shm0
libxcb-sync1 libxcb-xfixes0 libxcb1-dev libxcomposite1 libxcursor1 libxdamage1 libxdmcp-dev libxfices3 libxt2 libxi6 libxinerama1 libxbkf1 libxmu6
libxpm4 libxrandr2 libxrender1 libxshmfence1 libxt-dev libxt6 libxv1 libxf86dg1 libxf86vm1 openjdk-17-jdk-headless openjdk-17-jre
openjdk-17-jre-headless session-migration ubuntu-mono x11-common x11-utils x11proto-dev xorg-sgml-doctools xtrans-dev
Suggested packages:
default-jre libasound2-plugins alsacoretopology alsavumconf at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service fontconfig-config
fonts-dejavu-core fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2
libasound2-data libatkbridge2.0-0 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0 libatk1.0-data libatspi2.0-0 libavahi-client
libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcupsc2 libdatrie1 libdcnf1 libdeflate0 libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2
libdrm-radeon1 libfontconfig1 libfontenc1 libgail-common libgail1 libgd-pixbuf2.0-0 libgd-pixbuf2.0-0-bin libgdk-pixbuf2.0-common libgif7 libgl1
libgl1-amber-dri libgl1-mesa-dri libglapi-mesa libglvnd0 libglx-mesa libglx0 libglraphite2-3 libgtk2.0-0 libgtk2.0-0-bin libgtk2.0-0-common libharfbuzz0b
libice-dev libice6 libjbig libjpeg-turbo0 libjpegb8 liblcms2-2 liblwm15 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpicasse0 libpcsslide1
libpixman-1-0 libpthread-stubs0-dev librsvg2-2 librsvg2-common libssensors-config libssensors5 libsm-dev libsm6 libthai-data libthai0 libtiff5 libwebp7
libxcb-1-dev libx11-xcb libxau-dev libxaw7 libxcb-drivers libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-render0 libxcb-shape0 libxcb-shm0
libxcb-sync1 libxcb-xfixes0 libxcb1-dev libxcomposite1 libxcursor1 libxdamage1 libxdmcp-dev libxfices3 libxt2 libxi6 libxinerama1 libxbkf1 libxmu6
libxpm4 libxrandr2 libxrender1 libxshmfence1 libxt-dev libxt6 libxv1 libxf86dg1 libxf86vm1 openjdk-17-jdk-headless openjdk-17-jre
openjdk-17-jre-headless session-migration ubuntu-mono x11-common x11-utils x11proto-dev xorg-sgml-doctools xtrans-dev
0 upgraded, 127 newly installed, 0 to remove and 0 not upgraded.
```

The screenshot shows the MobaXterm interface with a session list on the left and a terminal window on the right. The terminal window is titled '3 Master server' and shows a root shell on an Ubuntu system. The user runs several commands: 'apt update -y', 'apt install fontconfig openjdk-17-jdk', and then lists newly installed packages. Red arrows highlight the 'apt update -y' command, the 'apt install' command, and the output of the package list command.

```

root@ip-172-31-41-164:~# java --version
openjdk 17.0.13 2024-10-15
OpenJDK Runtime Environment (build 17.0.13+11-Ubuntu-2ubuntu122.04)
OpenJDK 64-Bit Server VM (build 17.0.13+11-Ubuntu-2ubuntu122.04, mixed mode, sharing)

root@ip-172-31-41-164:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
-- 2024-11-12 20:34:32 - https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
Resolving pkg.jenkins.io (pkg.jenkins.io)... 151.101.154.133, 2a04:4e42:24::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|151.101.154.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3175 (3.1K) [application/pgp-keys]
Saving to: '/usr/share/keyrings/jenkins-keyring.asc'

/usr/share/keyrings/jenkins-keyring.asc 100%[=====] 3.10K ---.KB/s   in 0s

2024-11-12 20:34:32 (67.6 MB/s) - '/usr/share/keyrings/jenkins-keyring.asc' saved [3175/3175]

root@ip-172-31-41-164:~# 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
root@ip-172-31-41-164:~# apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Ign:4 https://pkg.jenkins.io/debian-stable binary/ InRelease
Get:5 https://pkg.jenkins.io/debian-stable binary/ Release [2044 B]
Hit:6 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:7 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Get:8 https://pkg.jenkins.io/debian-stable binary/ Packages [28.0 kB]
Fetched 30.9 kB in 1s (26.7 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  net-tools
The following NEW packages will be installed:
  jenkins net-tools
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 94.3 MB of archives.
After this operation, 96.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 net-tools amd64 1.60+git20181103.0eebece-1ubuntu5 [204 kB]
Get:2 https://pkg.jenkins.io/debian-stable binary/ jenkins 2.479.1 [94.1 MB]

```

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

```

root@ip-172-31-41-164:~# git --version
git version 2.34.1
root@ip-172-31-41-164:~# java --version
openjdk 17.0.13 2024-10-15
OpenJDK Runtime Environment (build 17.0.13+11-Ubuntu-2ubuntu122.04)
OpenJDK 64-Bit Server VM (build 17.0.13+11-Ubuntu-2ubuntu122.04, mixed mode, sharing)
root@ip-172-31-41-164:~# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2024-11-12 20:35:58 UTC; 1min 21s ago
       Main PID: 15866 (java)
          Tasks: 45 (limit: 4676)
         Memory: 780.8M
            CPU: 17.984s
           CGroup: /system.slice/jenkins.service
                   └─15866 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: fcdc3282c6d746f5beea292db7fc3995
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.553+0000 [id=49]      INFO      h.m.DownloadService$Downloadable#load: Obtained the
Nov 12 20:35:52 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.553+0000 [id=48]      INFO      hudson.util.Retrier#start: Performed the action chec
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.937+0000 [id=30]      INFO      jenkins.InitReactorRunner$1#onAttained: Completed up
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.950+0000 [id=23]      INFO      hudson.lifecycle.Lifecycle#onReady: Jenkins is fully
Nov 12 20:35:58 ip-172-31-41-164 systemd[1]: Started Jenkins Continuous Integration Server.

lines 1-20/20 (END)

```

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```

#LoginGraceTime 2m
#PermitRootLogin prohibit-password
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile    .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
#PasswordAuthentication yes -----
#PermitEmptyPasswords no

# Change to yes to enable challenge-response passwords (beware issues with
# some PAM modules and threads)
KbdInteractiveAuthentication no

# Kerberos options
#KerberosAuthentication no
#KerberosOrLocalPasswd yes
#KerberosTicketCleanup yes
#KerberosGetAFSToken no

# GSSAPI options
#GSSAPIAuthentication no
#GSSAPICleanupCredentials yes
#GSSAPITrustedAcceptorCheck yes
#GSSAPIKeyExchange no
-- INSERT --

```

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

```

GNU nano 6.2          /etc/sudoers.tmp *
# equivalent users (group sudo)
Defaults:%sudo env_keep += "http_proxy https_proxy ftp_proxy all_proxy no_proxy"
# This allows running arbitrary commands, but so does ALL, and it means
# different sudoers have their choice of editor respected.
Defaults:%sudo env_keep += "$EDITOR"

# Completely harmless preservation of a user preference.
Defaults:%sudo env_keep += "GREP_COLOR"

# While you shouldn't normally run git as root, you need to with etckeeper
Defaults:%sudo env_keep += "GIT_AUTHOR_* GIT_COMMITTER_"

# Per-user preferences; root won't have sensible values for them.
Defaults:%sudo env_keep += "EMAIL DEBEMAIL DEBUGFULLNAME"

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

# Ditto for GPG agent
Defaults:%sudo env_keep += "GPG_AGENT_INFO"

# Host alias specification
# User alias specification
# Cmd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
master  ALL=(ALL) NOPASSWD: ALL -----

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

```

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

```

Master server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
3. Master server
root@ip-172-31-41-164:~# git --version
git version 2.34.1
root@ip-172-31-41-164:~# java --version
openjdk 17.0.13 2024-10-15
OpenJDK Runtime Environment (build 17.0.13+11-Ubuntu-2ubuntu122.04)
OpenJDK 64-Bit Server VM (build 17.0.13+11-Ubuntu-2ubuntu122.04, mixed mode, sharing)
root@ip-172-31-41-164:~# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
    Active: active (running) since Tue 2024-11-12 20:35:58 UTC; 1min 21s ago
      Main PID: 15866 (java)
        Tasks: 45 (limit: 4676)
       Memory: 780.8M
          CPU: 17.984s
         CGroup: /system.slice/jenkins.service
             └─15866 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: fcdc3282c6d746f5beaa292db7fc3905
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.552+0000 [id=48] INFO h.m.DownloadService$Downloadable#load: Obtained the >
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.553+0000 [id=48] INFO hudson.util.Retriger#start: Performed the action chec
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.937+0000 [id=30] INFO jenkins.InitReactorRunner$1#onAttained: Completed in
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.950+0000 [id=23] INFO hudson.lifecycle.Lifecycle#onReady: Jenkins is fully
Nov 12 20:35:58 ip-172-31-41-164 systemd[1]: Started Jenkins Continuous Integration Server.

root@ip-172-31-41-164:~# useradd master -s /bin/bash -m -d /home/master
root@ip-172-31-41-164:~# passwd master
New password:
Retype new password:
passwd: password updated successfully
root@ip-172-31-41-164:~# vi /etc/ssh/sshd_config
root@ip-172-31-41-164:~# service ssh reload
root@ip-172-31-41-164:~# visudo
root@ip-172-31-41-164:~# sudo usermod -aG jenkins master
root@ip-172-31-41-164:~# groups master
master : master jenkins
root@ip-172-31-41-164:~# su - master
master@ip-172-31-41-164:~$ 
```

```

Master server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
3. Master server
master@ip-172-31-41-164:~$ sudo systemctl enable jenkins
Synchronizing state of jenkins.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable jenkins
master@ip-172-31-41-164:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
    Active: active (running) since Tue 2024-11-12 20:35:58 UTC; 10min ago
      Main PID: 15866 (java)
        Tasks: 45 (limit: 4676)
       Memory: 782.3M
          CPU: 19.091s
         CGroup: /system.slice/jenkins.service
             └─15866 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: fcdc3282c6d746f5beaa292db7fc3905
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.552+0000 [id=48] INFO h.m.DownloadService$Downloadable#load: Obtained the >
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.553+0000 [id=48] INFO hudson.util.Retriger#start: Performed the action chec
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.937+0000 [id=30] INFO jenkins.InitReactorRunner$1#onAttained: Completed in
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.950+0000 [id=23] INFO hudson.lifecycle.Lifecycle#onReady: Jenkins is fully
Nov 12 20:35:58 ip-172-31-41-164 systemd[1]: Started Jenkins Continuous Integration Server.

master@ip-172-31-41-164:~$ 
```

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

```

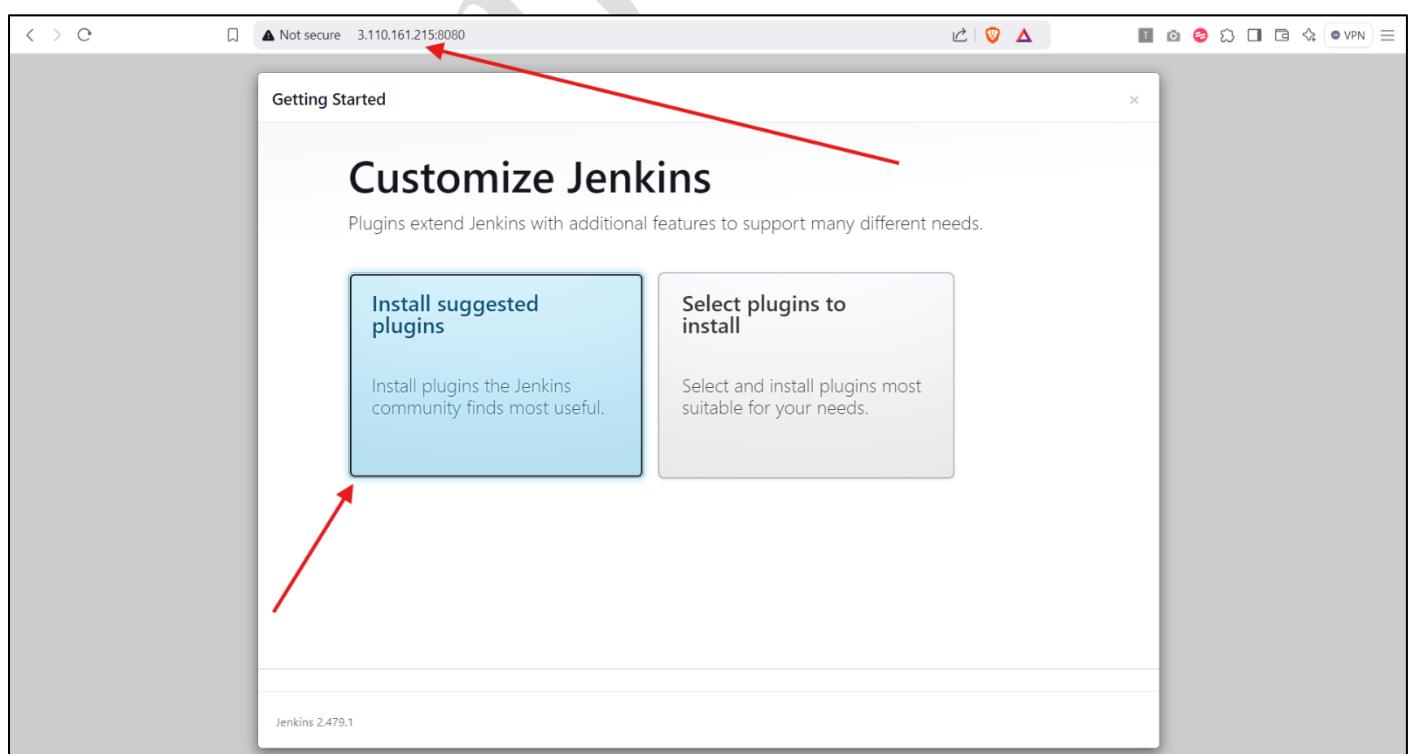
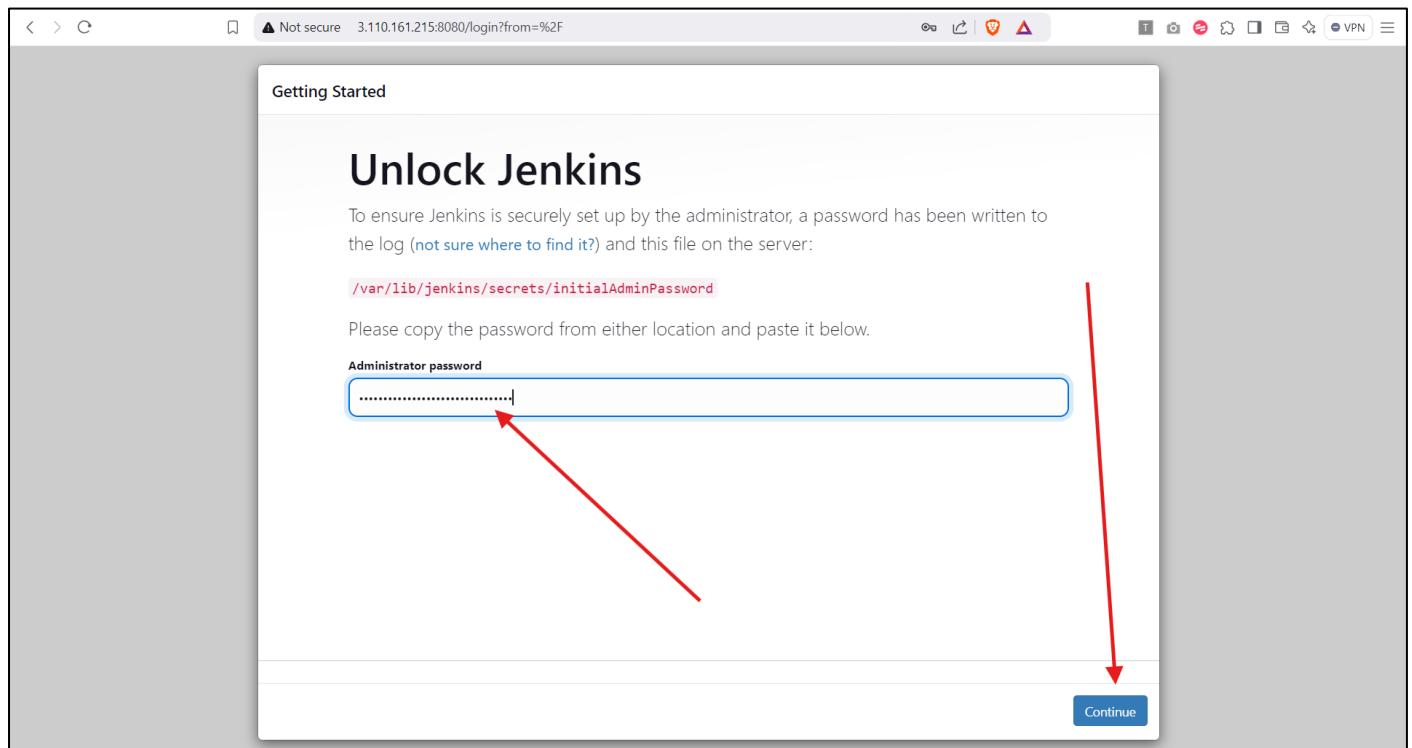
Master server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
3 Master server
master@ip-172-31-41-164:~$ sudo systemctl enable jenkins
Synchronizing state of jenkins.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable jenkins
master@ip-172-31-41-164:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
      Active: active (running) since Tue 2024-11-12 20:35:58 UTC; 10min ago
        Main PID: 15866 (java)
           Tasks: 49 (limit: 4676)
         Memory: 782.3M
            CPU: 19.09ts
          CGroup: /system.slice/jenkins.service
              └─15866 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: fcdc3282c6d746f5beaa292db7fc3905
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Nov 12 20:35:29 ip-172-31-41-164 jenkins[15866]: ****
Nov 12 20:35:52 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.552+0000 [id=48]      INFO  h.m.DownloadService$Downloadable#load: Obtained the >
Nov 12 20:35:52 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:52.553+0000 [id=48]      INFO  hudson.util.Retriger#start: Performed the action chec
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.937+0000 [id=30]      INFO  jenkins.InitReactorRunner$1#onAttained: Completed in
Nov 12 20:35:58 ip-172-31-41-164 jenkins[15866]: 2024-11-12 20:35:58.950+0000 [id=23]      INFO  hudson.lifecycle.Lifecycle#onReady: Jenkins is fully
Nov 12 20:35:58 ip-172-31-41-164 systemd[1]: Started Jenkins Continuous Integration Server.
master@ip-172-31-41-164:~$ cat /var/lib/jenkins/secrets/initialAdminPassword
cat: /var/lib/jenkins/secrets/initialAdminPassword: Permission denied
master@ip-172-31-41-164:~$ sudo !
sudo cat /var/lib/jenkins/secrets/initialAdminPassword
fcdc3282c6d746f5beaa292db7fc3905
master@ip-172-31-41-164:~$ 
```

Remote monitoring

Follow terminal folder

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Not secure 3.110.161.215:8080

Create First Admin User

Username
admin

Password
.....

Confirm password
.....

Full name
Abhijit Zende

E-mail address
abhijitzende75@gmail.com

Jenkins 2.479.1

Skip and continue as admin Save and Continue

Not secure 3.110.161.215:8080

Instance Configuration

Jenkins URL: http://3.110.161.215:8080/

The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for proper operation of many Jenkins features including email notifications, PR status updates, and the BUILD_URL environment variable provided to build steps.

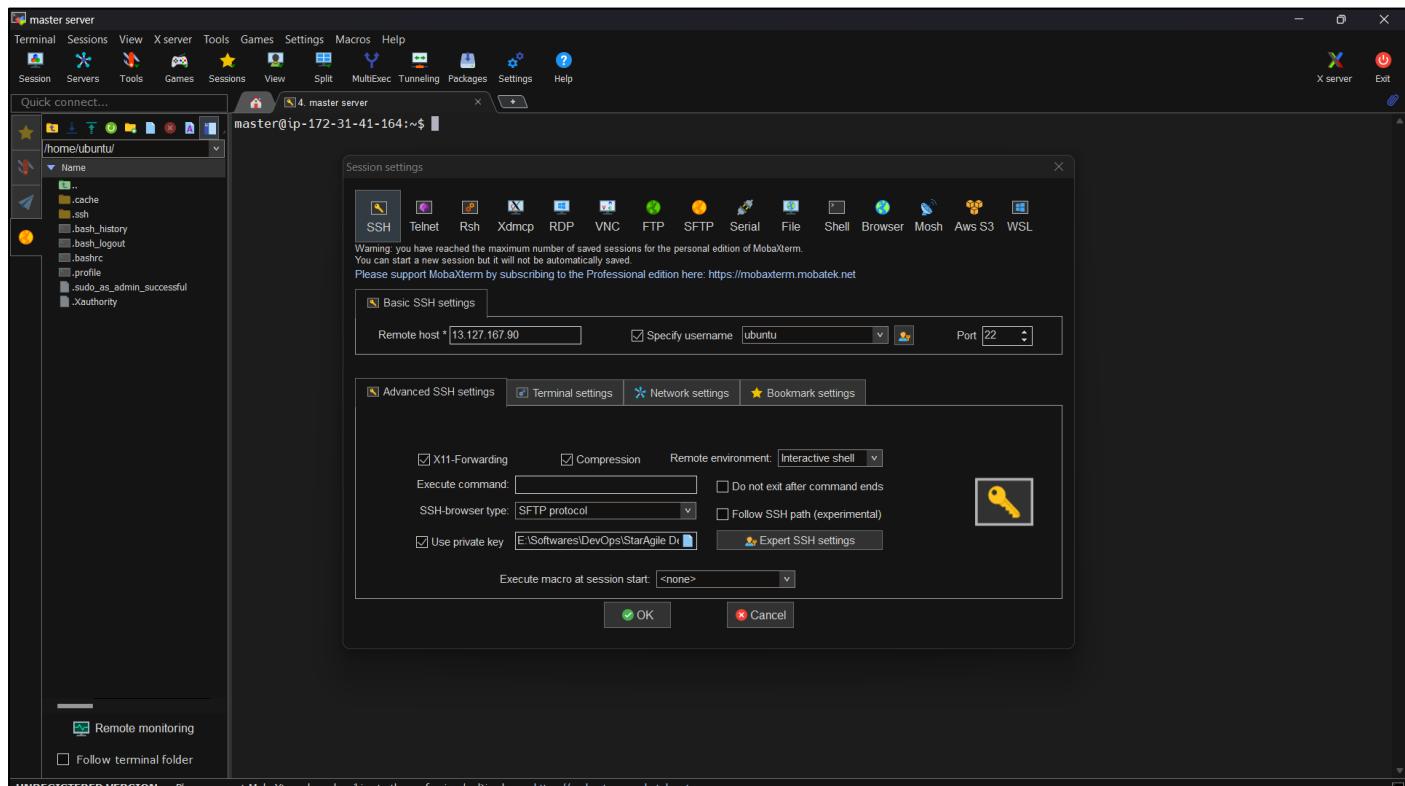
The proposed default value shown is **not saved yet** and is generated from the current request, if possible. The best practice is to set this value to the URL that users are expected to use. This will avoid confusion when sharing or viewing links.

Jenkins 2.479.1

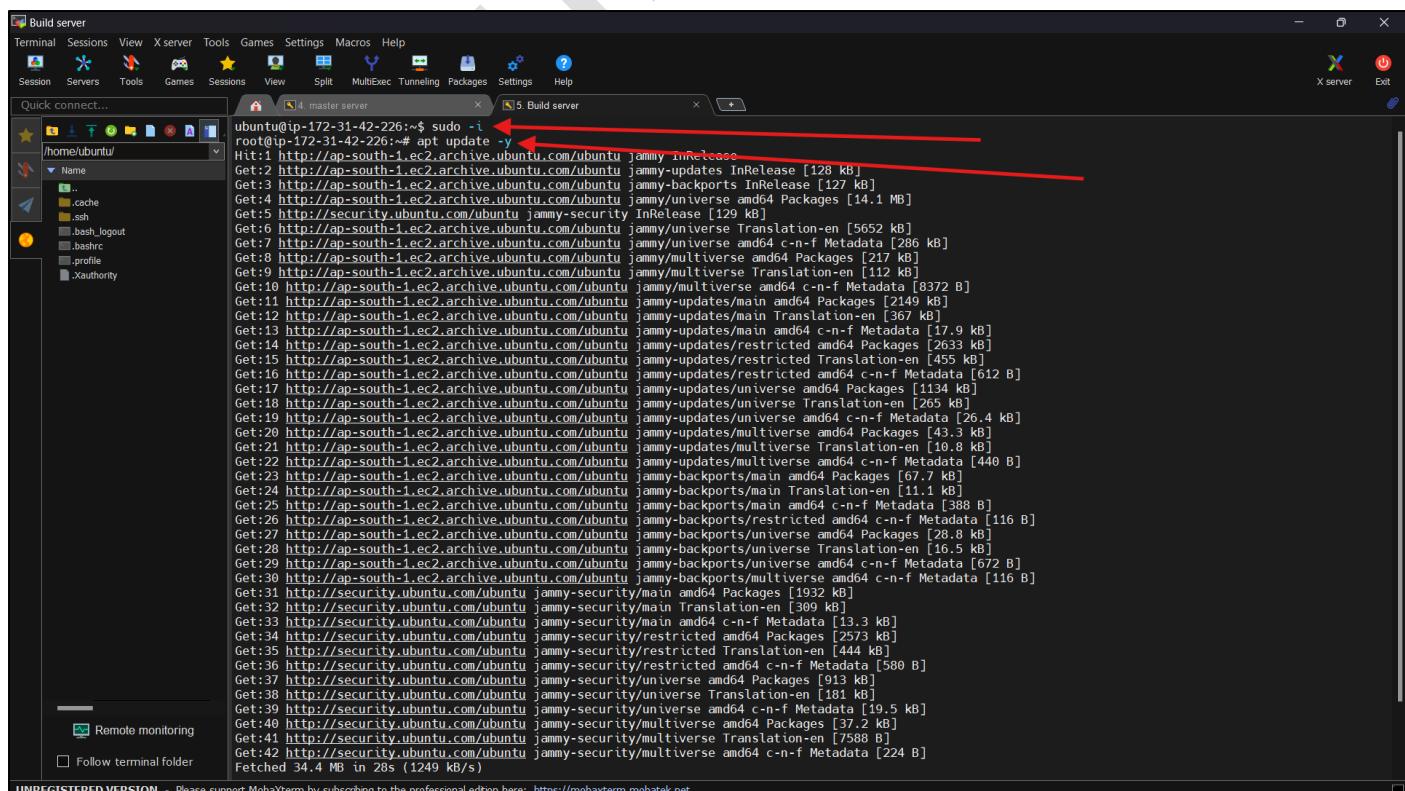
Not now Save and Finish

The screenshot shows the Jenkins dashboard at 3.110.161.215:8080. The top navigation bar includes links for 'Not secure', 'Search (CTRL+K)', 'VPN', and user 'Abhijit Zende'. The main content area features a 'Welcome to Jenkins!' message and a 'Start building your software project' section. On the left, there's a sidebar with 'Build Queue' (No builds in the queue) and 'Build Executor Status' (0/2). A central 'Create a job' button is available, along with links for 'Set up a distributed build', 'Set up an agent', 'Configure a cloud', and 'Learn more about distributed builds'. The bottom right corner shows 'REST API' and 'Jenkins 2.479.1'.

The screenshot shows the AWS EC2 Instances page at ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Instances:instanceState=running. The left sidebar lists various EC2-related services like Instances, Instance Types, Launch Templates, and Network & Security. The main table displays two instances: 'build_server' (Instance ID: i-09a1c99ed46e7f4bb, State: Running, Type: t2.medium) and 'master_server' (Instance ID: i-091912f1fc5419060, State: Running, Type: t2.medium). A red arrow points to the 'Public IPv4 address' field for the 'build_server' instance, which is listed as '13.127.167.90 | open address'. The bottom right corner includes copyright information for Amazon Web Services and links for CloudShell and Feedback.



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```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ubuntu/ 4 master server 5 Build server
root@ip-172-31-42-226:~# apt install fontconfig openjdk-17-jdk
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
adwaita-icon-theme alsa-ucm-conf at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service fontconfig-config
fonts-dejavu-core fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2
libasound2-data libatk-bridge2.0-0 libatk-wrapper-java-jni libatk1.0-0 libatk1.0-data libatspi2.0-0 libavahi-client3
libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcurl5 libdconf1 libdeflate0 libdrm-amdgpu libdrm-intel libdrm-nouveau2
libdrm-radeon1 libfontconfig1 libgbal-common libgail18 libgd-pixbuf2.0-0 libgd-pixbuf2.0-common libglibf7 libgl1
libgl1-amber-dri libgl1-mesa-dri libglapi-mesa libglvnd0 libglx-mesa libglx0 libgraphite2-3 libgtk2.0-0 libgtk2.0-common libharfbuzz0b
libice-dev libice6 libjbig libjpeg-turbo0 libjpeg8 liblcms2-2 liblomm15 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpctaccess0 libpccslite1
libpixman-1-0 libpthread-stubs0-dev librsvg2-2 librsvg2-common libsensors-config libsensors5 libsm-dev libsm6 libthai-data libthai0 libtiff5 libwebp7
libx11-dev libx11-xcb1 libxau-dev libxaw7 libxcb-drivers0 libxcb-drivers3 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0
libxcb-sync1 libxcb-xfixes0 libxcb1-dev libcomposite1 libcursor1 libxdamage1 libxdmcp-dev libxfixes3 libxf2 libx16 libxinerama1 libxbkbfile1 libxmu6
libxpm4 libxrandr2 libxrender1 libxshmfence1 libxt-dev libxt6 libxtst6 libxv1 libxxf86gal libxxf86vm1 openjdk-17-jdk-headless openjdk-17-jre
openjdk-17-jre-headless session-migration ubuntu-mono x11-common x11-utils xi1proto-dev xorg-sgml-doctools xtrans-dev
Suggested packages:
default-jre libasound2-plugins alsamixer cups-common gvfs libice-doc liblcms2-utils pscd librsvg2-bin lm-sensors libsm-doc libx11-doc libxcb-doc
libxt-doc openjdk-17-demo openjdk-17-source visualvm libnss-mdns fonts-ipafont-gothic fonts-ipafont-mincho fonts-wqy-microhei | fonts-wqy-zenhei
fonts-indic mesa-utils
The following NEW packages will be installed:
adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service fontconfig fontconfig-config
fonts-dejavu-common fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2
libasound2-data libatk-bridge2.0-0 libatk-wrapper-java-jni libatk1.0-0 libatk1.0-data libatspi2.0-0 libavahi-client3
libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcurl5 libdconf1 libdeflate0 libdrm-amdgpu libdrm-intel libdrm-nouveau2
libdrm-radeon1 libfontconfig1 libgbal-common libgail18 libgd-pixbuf2.0-0 libgd-pixbuf2.0-common libglibf7 libgl1
libgl1-amber-dri libgl1-mesa-dri libglapi-mesa libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libgtk2.0-0 libgtk2.0-common libharfbuzz0b
libice-dev libice6 libjbig libjpeg-turbo0 libjpeg8 liblcms2-2 liblomm15 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpctaccess0 libpccslite1
libpixman-1-0 libpthread-stubs0-dev librsvg2-2 librsvg2-common libsensors-config libsensors5 libsm-dev libsm6 libthai-data libthai0 libtiff5 libwebp7
libx11-dev libx11-xcb1 libxau-dev libxaw7 libxcb-drivers0 libxcb-drivers3 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0
libxcb-sync1 libxcb-xfixes0 libxcb1-dev libcomposite1 libcursor1 libxdamage1 libxdmcp-dev libxfixes3 libxf2 libx16 libxinerama1 libxbkbfile1 libxmu6
libxpm4 libxrandr2 libxrender1 libxshmfence1 libxt-dev libxt6 libxtst6 libxv1 libxxf86gal libxxf86vm1 openjdk-17-jdk openjdk-17-jre-headless
openjdk-17-jre openjdk-17-jre-headless session-migration ubuntu-mono x11-common x11-utils xi1proto-dev xorg-sgml-doctools xtrans-dev
0 upgraded, 127 newly installed, 0 to remove and 16 not upgraded.
Need to get 182 MB of archives.
After this operation, 532 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 hicolor-icon-theme all 0.17-2 [9976 B]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgd-pixbuf2.0-common all 2.42.8+dfsg-1ubuntu0.3 [5630 B]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libjpeg-turbo8 amd64 2.1.2-0ubuntu1 [134 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libjpeg8 amd64 8c-2ubuntu10 [2264 B]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libdeflate0 amd64 1.10-2 [70.9 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libjbig0 amd64 2.1-3.1ubuntu0.22.04.1 [29.2 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libwebp7 amd64 1.2.2-2ubuntu0.22.04.2 [206 kB]

```

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```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ubuntu/ 4 master server 5 Build server
root@ip-172-31-42-226:~# useradd slaveuser -s /bin/bash -m -d /home/slaveuser
root@ip-172-31-42-226:~# passwd slaveuser
New password:
Retype new password:
passwd: password updated successfully
root@ip-172-31-42-226:~# vi /etc/ssh/sshd_config
root@ip-172-31-42-226:~# service ssh reload
root@ip-172-31-42-226:~# visudo

```

```

# HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key
#HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
#LogLevel INFO

# Authentication:

#LoginGraceTime 2m
#PermitRootLogin prohibit-password
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile    .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes ←
#PermitEmptyPasswords no

# Change to yes to enable challenge-response passwords (beware issues with
# some PAM modules and threads)
#KbdInteractiveAuthentication no
:wq

```

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```

GNU nano 6.2
/etc/sudoers.tmp *
# equivalent users (group sudo)
Defaults:%sudo env_keep += "http_proxy https_proxy ftp_proxy all_proxy no_proxy"
# This allows running arbitrary commands, but so does ALL, and it means
# different sudoers have their choice of editor respected.
Defaults:%sudo env_keep += "EDITOR"
# Completely harmless preservation of a user preference.
Defaults:%sudo env_keep += "GREP_COLOR"
# While you shouldn't normally run git as root, you need to with etckeeper
Defaults:%sudo env_keep += "GIT_AUTHOR_* GIT_COMMITTER_"
# Per-user preferences; root won't have sensible values for them.
Defaults:%sudo env_keep += "EMAIL DEBEMAIL DEBFULLNAME"
# "sudo scp" or "sudo rsync" should be able to use your SSH agent.
Defaults:%sudo env_keep += "SSH_AGENT_PID SSH_AUTH_SOCK"
# Ditto for GPG agent
Defaults:%sudo env_keep += "GPG_AGENT_INFO"
# Host alias specification
# User alias specification
# Cmnd alias specification
# User privilege specification
root    ALL=(ALL:ALL) ALL
slaveuser 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

```

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```

root@ip-172-31-42-226:~# service ssh reload
root@ip-172-31-42-226:~# visudo
slaveuser@ip-172-31-42-226:~$ su slaveuser
Generating public/private ecdsa key pair.
Enter file in which to save the key (/home/slaveuser/.ssh/id_ecdsa):
Created directory '/home/slaveuser/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/slaveuser/.ssh/id_ecdsa
Your public key has been saved in /home/slaveuser/.ssh/id_ecdsa.pub
The key fingerprint is:
SHA256:XJMY8aXPgZSE0Ymeu+R4gQLc+bC20hCnpA4ML7DW1Kw slaveuser@ip-172-31-42-226
The key's randomart image is:
+---[ECDSA 521]---+
|          o=.
|         +o=o
|        .o...*o
|o o.+o+.o=.
|+=o+..+S..+
|=o+E+o+o
|+. . . o+o.
|. . . .
|. . .
+----[SHA256]----+
slaveuser@ip-172-31-42-226:~$ ls .ssh/
id_ecdsa pub
slaveuser@ip-172-31-42-226:~$ cd .ssh/
slaveuser@ip-172-31-42-226:~/ssh$ cat id_ecdsa.pub > authorized_keys
slaveuser@ip-172-31-42-226:~/ssh$ ll
total 20
drwx----- 2 slaveuser slaveuser 4096 Nov 12 21:15 .
drwxr-x--- 3 slaveuser slaveuser 4096 Nov 12 21:13 ../
-rw-rw-r-- 1 slaveuser slaveuser 280 Nov 12 21:15 authorized_keys
-rw-r----- 1 slaveuser slaveuser 748 Nov 12 21:13 id_ecdsa
-rw-r----- 1 slaveuser slaveuser 280 Nov 12 21:13 id_ecdsa.pub
slaveuser@ip-172-31-42-226:~/ssh$ chmod 600 /home/slaveuser/.ssh/*
slaveuser@ip-172-31-42-226:~/ssh$ ll
total 20
drwx----- 2 slaveuser slaveuser 4096 Nov 12 21:15 .
drwxr-x--- 3 slaveuser slaveuser 4096 Nov 12 21:13 ../
-rw-r----- 1 slaveuser slaveuser 280 Nov 12 21:15 authorized_keys
-rw-r----- 1 slaveuser slaveuser 748 Nov 12 21:13 id_ecdsa
-rw-r----- 1 slaveuser slaveuser 280 Nov 12 21:13 id_ecdsa.pub
slaveuser@ip-172-31-42-226:~/ssh$ 

```

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Manage Jenkins

Building on the built-in node can be a security issue. You should set up distributed builds. See the [documentation](#).

[Set up agent](#) [Set up cloud](#) [Dismiss](#)

System Configuration

- System**: Configure global settings and paths.
- Tools**: Configure tools, their locations and automatic installers.
- Nodes**: Add, remove, control and monitor the various nodes that Jenkins runs jobs on.
- Clouds**: Add, remove, and configure cloud instances to provision agents on-demand.
- Plugins**: Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
- Appearance**: Configure the look and feel of Jenkins.
- Credential Providers**: Configure the credential providers and types.

Security

- Security**: Secure Jenkins; define who is allowed to access/use the system.
- Credentials**: Configure credentials.
- Users**: Create/delete/modify users that can log in.

The screenshot shows the Jenkins 'Nodes' page. At the top right, there is a blue button labeled '+ New Node'. A red arrow points from this button towards the 'New node' form in the second screenshot. The table below lists one node:

S	Name ↓	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
💻	Built-In Node	Linux (amd64)	In sync	4.41 GiB	0 B	4.41 GiB	0ms
		last checked	41 min	41 min	41 min	41 min	41 min

On the left side, there are sections for 'Build Queue' (No builds in the queue) and 'Build Executor Status' (0/2). A legend at the bottom right indicates icons for Slave (S), Master (M), and Label (L).

The screenshot shows the 'New node' creation form. A red arrow points from the '+ New Node' button in the first screenshot to the 'Node name' input field here. Another red arrow points from the 'Type' section to the 'Permanent Agent' radio button, which is selected. A third red arrow points from the 'Create' button at the bottom left towards the bottom center of the screen.

New node

Node name

Type

Permanent Agent

Create

Jenkins

Dashboard > Manage Jenkins > Nodes >

Name ? slave

Description ? Slave node using slaveuser in Build server

Plain text Preview

Number of executors ? 2

Remote root directory ? /home/slaveuser

Labels ? slave

Usage ? Use this node as much as possible

Launch method ? Launch agents via SSH

Save

Instances (1/2) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	Initializing	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1

i-09a1c99ed46e7f4bb (build_server)

Details Status and alarms Monitoring Security Networking Storage Tags

Instance summary

Instance ID	i-09a1c99ed46e7f4bb	Public IPv4 address	13.127.167.90 open address
IPv6 address	-	Instance state	Running
		Private IPv4 addresses	172.31.42.226
		Public IPv4 DNS	ec2-13-127-167-90.ap-south-1.compute.amazonaws.com open address

Not secure 3.110.161.215:8080/manage/computer/createlitem

Labels ? slave

Usage ? Use this node as much as possible

Launch method ? Launch agents via SSH

Host ? 172.31.42.226

Credentials ? - none - + Add **The selected credentials cannot be found**

Host Key Verification Strategy ? Known hosts file Verification Strategy

Save

A screenshot of the Jenkins 'Manage Jenkins > Nodes' page. The 'Host' field contains '172.31.42.226'. The 'Credentials' dropdown is set to '- none -' and has a red arrow pointing to the error message 'The selected credentials cannot be found'. A blue button labeled '+ Add' is also highlighted with a red arrow.

Not secure 3.110.161.215:8080/manage/computer/createlitem

Labels ? slave

Usage ? Use this node as much as possible

Launch method ? Launch agents via SSH

Host ? 172.31.42.226

Credentials ? Jenkins Credentials Provider: Jenkins

Domain Global credentials (unrestricted)

Kind SSH Username with private key

ID ? slavenodecred

Scope ? Global (Jenkins, nodes, items, all child items, etc)

Description ? credentials for slave node(slaveuser of Build server)

Username slaveuser1

Treat username as secret ?

Save

A screenshot of the Jenkins 'Jenkins Credentials Provider: Jenkins' dialog. It shows a 'Kind' selection of 'SSH Username with private key', an 'ID' of 'slavenodecred', a 'Username' of 'slaveuser1', and a 'Description' of 'credentials for slave node(slaveuser of Build server)'. Red arrows point from the 'Kind' field, the 'ID' field, and the 'Username' field to their respective input boxes.

Jenkins Credentials Provider: Jenkins

Description: credentials for slave node(slaveuser of Build server)

Username: slaveuser

Treat username as secret

Private Key:

- Enter directly ←
- Key

Passphrase:

Enter New Secret Below

Save

```
ubuntu@ip-172-31-42-226:~$ sudo -i
slaveuser@ip-172-31-42-226:~# su - slaveuser
slaveuser@ip-172-31-42-226:~/.ssh$ cat id_ecdsa
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzaC1rZXktdjEAAAABG5vbmUAAAEBm9uZ0AAAAAAAABAAAArAAAABnLY2RzYS
1zaGEylW5pc3RwNTIxAAAACG5pc3RwNTIxAAAAb0QbsTasmFJkdvn6sxX2M0LBAnGvWnZ
3dd5ba563f+L688j+6a90mlJLx3M1PeD2zE/cPsz3pdalM/M41tc3jeWEtC/NBLy6K1
y83ejEjX9403eU8r8M)sBEcu2tWHxB0PxzaAgn3)JuVSeqe4dwCd1o1kX)T36cqA7lVnr
1o1LxmMMAEY+lzvrPpc76wAAATZWNkc2Etc2hM1uaXN0cDUwMQAAAAbuaXN0cDUyM0
AAATUEab2rJhSZ75+rLF9jDw0KJxlc1Wd3xbAWuet3/+vPCfumvUJizcdzFt3BHdh
P6wqls96W15vzYe1bXM43sBAbXPz0SBuiosvHoxI1/eNN3lPK/D17ARHLtrVhx80UD12
m00p94yb1UnqmuhcAnYtJS1409+nKg041Z6yj4i15;AAAQWhq0Do14eb89iYEAX/V8Gp6
BM77rpqaMZU0st1PcNWkxxai0YRhgA4SP6bgdkcr7H1QMpT8cGu5JCstlsF6/HXJLAAAAGn
NsYX2ldXN1ckBpcC0xH2itHzEtbt1tMj12AQ==
-----END OPENSSH PRIVATE KEY-----
```

slaveuser@ip-172-31-42-226:~/.ssh\$

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Jenkins Credentials Provider: Jenkins

Username: slaveuser

Treat username as secret

Private Key:

Enter directly

Key:

```
mQOp94yb1UnqmuHcAnYtJS1409+nKg04lZ6yJ4115jAAAAQWnqODo14eB89jYEa2/V8Gp6
M7rpqaMZUostPcNwkkXxai0YRhgA4SP6bgdNcr7Hl10MpT8cGu5jCstisF6/HXJLAAAAGn
NsV2ldXNlcBpcC0xNzItMzEtNDItMj12AQ==
-----END OPENSSH PRIVATE KEY-----
```

Passphrase:

Add

Launch method: Launch agents via SSH

Host: 172.31.42.226

Credentials: slaveuser (credentials for slave node(slaveuser of Build server))

Host Key Verification Strategy: Manually trusted key Verification Strategy

Require manual verification of initial connection

Availability: Keep this agent online as much as possible

Node Properties

Save

The screenshot shows the Jenkins 'Nodes' page at 3.110.161.215:8080/manage/computer/. A red arrow points from the 'slave' node entry in the table to its name in the table header.

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
1	Built-In Node	Linux (amd64)	In sync	4.41 GiB	0 B	4.41 GiB	0ms
2	slave		N/A	N/A	N/A	N/A	N/A

last checked

Icon: S M L

Legend

REST API Jenkins 2.479.1

The screenshot shows the 'Agent slave' page for the 'slave' node at 3.110.161.215:8080/computer/slave/. A red arrow points to the 'Trust SSH Host Key' checkbox.

Status

- Delete Agent
- Configure
- Build History
- Load Statistics
- Log
- Trust SSH Host Key

Agent slave

Slave node using slaveuser in Build server

This node is being launched. [See log for more details](#)

Monitoring Data

Projects tied to slave

None

Build Executor Status

slave (launching...)

Edit description Relaunch agent Mark this node temporarily offline

REST API Jenkins 2.479.1

The screenshot shows the Jenkins dashboard for a slave node. On the left, there's a sidebar with links: Status, Delete Agent, Configure, Build History, Load Statistics, Log, and Trust SSH Host Key (which is highlighted). Below the sidebar, a 'Build Executor Status' section shows 0/2 executors for the 'slave' node, which is currently launching. At the top, a message asks if you want to trust the SSH Host Key with a specific fingerprint. A red arrow points from the bottom right towards the 'Yes' button.

Do you want to trust the SSH Host Key with fingerprint 59:f5:cd:de:46:8e:7b:39:76:40:03:58:38:0a:96:0e for future connections to this host?

Yes No

The screenshot shows the 'Nodes' page under 'Manage Jenkins'. The left sidebar has sections for Nodes (selected), Clouds, Build Queue (empty), and Build Executor Status (empty). The main area displays a table of nodes:

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
1	Built-In Node	Linux (amd64)	In sync	4.25 GiB	0 B	4.25 GiB	0ms
2	slave	Linux (amd64)	In sync	5.09 GiB	0 B	5.09 GiB	37ms

Icons for sorting (S), monitoring (M), and last checked (L) are at the bottom of the table. A legend is located on the right side of the table.

Step 2: Install all required build tools on build server:

1. Install all mentioned below tools:

- a. JDK
 - i. Already installed for Jenkins
- b. Maven
 - i. Install Maven using cmd ``
- c. Docker
 - i. Install Docker using command `sudo apt install docker.io`
 - ii. Add docker user to slaveuser group using command `sudo usermod -aG docker slaveuser`
 - iii. Add Jenkins user to docker group using cmd `sudo usermod -aG docker jenkins`
- d. Ansible
 - i. For more detailed installation guide you can follow the documentation: https://github.com/SA-AWS-DevOps-July24/Training_Documents/blob/main/Ansible/Ansible_Installation_Configs_Practise.txt
 - ii. Install ansible using below commands:
```  
sudo apt install software-properties-common -y  
sudo add-apt-repository --yes --update ppa:ansible/ansible  
sudo apt update -y  
sudo apt install ansible -y  
```

```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12. master server 16. Build server 13. Prod server 15. Prod server

slaveuser@ip-172-31-42-226:~$ sudo apt install maven
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libapolliance-java libapache-pom-java libatinject-jsr330-api-java libcdi-api-java libcommons-cli-java libcommons-io-java libcommons-lang3-java
libcommons-parent-java liberonimo-annotation-1.3-spec-java liberonimo-interceptor-3.0-spec-java libguava-java libguice-java libhawtjni-runtime-java
libansi-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-util2s-java libtsu-inject-java libtsu-plexus-java libtslf4j-java libwagon-file-java libwagon-http-shaded-java libwagon-provider-api-java
Suggested packages:
libapolliance-java-doc libatinject-jsr330-api-java-doc libel-api-java libcommons-io-java-doc libcommons-lang3-java-doc libasm-java libcglib-java
libjsr305-java-doc libmaven-util4-java-doc liblogback-java libplexus-classworlds-java-doc libplexus-sec-dispatcher-java-doc
libplexus-util2s-java-doc junit4 testing libcommons-logging-java liblog4j1.2-java
The following NEW packages will be installed:
libapolliance-java libapache-pom-java libatinject-jsr330-api-java libcdi-api-java libcommons-cli-java libcommons-io-java libcommons-lang3-java
libcommons-parent-java liberonimo-annotation-1.3-spec-java liberonimo-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-util2s-java libtsu-inject-java libtsu-plexus-java libtslf4j-java libwagon-file-java libwagon-http-shaded-java libwagon-provider-api-java maven
0 upgraded, 33 newly installed, 0 to remove and 16 not upgraded.
Need to get 10.2 MB of additional disk space will be used.
After this operation, 13.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java all 18-1 [4720 B]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libatinject-jsr330-api-java all 1.0+ds1-5 [5348 B]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 liberonimo-interceptor-3.0-spec-java all 1.0.1-4faresync [8616 B]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libcdi-api-java all 1.2-3 [54.3 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-cli-java all 1.4-2 [55.8 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-java all 43-1 [10.8 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-io-java all 2.11.0-2 [297 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libguava-java all 3.11-1 [526 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 liberonimo-annotation-1.3-spec-java all 1.3-1 [11.2 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libjsr305-java all 0.1+svn49-11 [27.0 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libguava-java all 29.0-6 [2418 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libhawtjni-runtime-java all 20978526-6 [9084 B]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libguice-java all 4.2.3-2 [1434 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libhawtjni-runtime-java all 1.17-1 [28.8 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libjansi-native-java all 1.8-1 [23.8 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libjansi-java all 1.18-1 [56.8 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libmaven-parent-java all 31-2 [5149 B]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libplexus-util2s-java all 3.3.0-1 [250 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libwagon-provider-api-java all 3.3.4-1 [48.5 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 libmaven-resolver-java all 1.4.2-3build1 [555 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libmaven-shared-utils-java all 3.3.0-1ubuntu0.22.04.1 [148 kB]

```

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Fig. 2.01: Install maven

```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
9. master server 16. Build server 13. Prod server 15. Prod server

root@ip-172-31-42-226:~# apt install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 16 not upgraded.
Need to get 75.5 MB of additional disk space.
After this operation, 284 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 pigz amd64 2.6.1 [63.6 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 bridge-utils amd64 1.7-1ubuntu3 [34.4 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 runc amd64 1.1.12-0ubuntu2~22.04.1 [8405 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 containerd amd64 1.7.12-0ubuntu2~22.04.1 [37.8 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 dns-root-data all 2023112702~ubuntu0.22.04.1 [5136 B]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 dnsmasq-base amd64 2.99-0ubuntu0.22.04.1 [374 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 docker.io amd64 24.0.7-0ubuntu2~22.04.1 [26.8 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 ubuntu-fan all 0.12.16 [35.2 kB]
Fetched 75.5 MB in (87.1 MB/s)
Preconfiguring packages...
Selecting previously unselected package pigz.
(Reading database ... 82136 files and directories currently installed.)
Preparing to unpack .../0-pigz_2.6.1_amd64.deb ...
Unpacking pigz (2.6.1) ...
Selecting previously unselected package bridge-utils.
Preparing to unpack .../1-bridge-utils_1.7-1ubuntu3_amd64.deb ...
Unpacking bridge-utils (1.7-1ubuntu3) ...
Selecting previously unselected package runc.
Preparing to unpack .../2-runc_1.1.12-0ubuntu2~22.04.1_amd64.deb ...
Unpacking runc (1.1.12-0ubuntu2~22.04.1) ...
Selecting previously unselected package containerd.
Preparing to unpack .../3-containerd_1.7.12-0ubuntu2~22.04.1_amd64.deb ...
Unpacking containerd (1.7.12-0ubuntu2~22.04.1) ...
Selecting previously unselected package dns-root-data.
Preparing to unpack .../4-dns-root-data_2023112702~ubuntu0.22.04.1_all.deb ...
Unpacking dns-root-data (2023112702~ubuntu0.22.04.1) ...
Selecting previously unselected package dnsmasq-base.
Preparing to unpack .../5-dnsmasq-base_2.99-0ubuntu0.22.04.1_amd64.deb ...
Unpacking dnsmasq-base (2.99-0ubuntu0.22.04.1) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../6-docker.io_24.0.7-0ubuntu2~22.04.1_amd64.deb ...

```

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Fig. 2.01: Install Docker

Build server

Terminal Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

Quick connect... 9 master server 8 Build server

```
root@ip-172-31-42-226:~# usermod -aG docker slaveuser
root@ip-172-31-42-226:~# groups slaveuser
slaveuser : slaveuser docker
root@ip-172-31-42-226:~#
```

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

Name

- ..
- .cache
- .ssh
- .bash_logout
- .bashrc
- .profile
- .sudo_as_admin_successful
- .xauthority

Remote monitoring Follow terminal folder

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Fig. 2.02: Add docker to slaveuser group

Build server

Terminal Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

Quick connect... 9 master server 10 Build server

```
root@ip-172-31-42-226:~# sudo apt install software-properties-common -y
root@ip-172-31-42-226:~# sudo add-apt-repository --yes --update ppa:ansible/ansible
root@ip-172-31-42-226:~# sudo apt update -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
software-properties-common is already the newest version (0.99.22.9).
software-properties-common set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 16 not upgraded.
Repository: 'deb https://ppa.launchpadcontent.net/ansible/ansible/ubuntu/ jammy main'
Description:
Ansible is a radically simple IT automation platform that makes your applications and systems easier to deploy. Avoid writing scripts or custom code to deploy and update your applications—automate in a language that approaches plain English, using SSH, with no agents to install on remote systems.

http://ansible.com/
If you face any issues while installing Ansible PPA, file an issue here:
https://github.com/ansible-community/ppa/issues
More info: https://launchpad.net/~ansible/+archive/ubuntu/ansible
Adding repository...
Adding deb entry to /etc/apt/sources.list.d/ansible-ubuntu-ansible-jammy.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/ansible-ubuntu-ansible-jammy.list
Adding key to /etc/apt/trusted.gpg.d/ansible-ubuntu-ansible.gpg with fingerprint 6125E2A8C77F2818FB7BD15B93C4A3FD7BB9C367
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [129 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:5 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy InRelease [18.0 kB]
Get:6 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy/main amd64 Packages [1112 B]
Get:7 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy/main Translation-en [752 B]
Fetched 277 kB in 1s (254 kB/s)
Reading package lists... Done
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
16 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

Name

- ..
- .cache
- .ssh
- .bash_logout
- .bashrc
- .profile
- .sudo_as_admin_successful
- .xauthority

Remote monitoring Follow terminal folder

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Fig. 2.03: Install ansible

```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ubuntu/
Name
.. .cache .ssh .bashrc .profile .sudo_as_admin_successful .Xauthority
root@ip-172-31-42-226:~# java --version
openjdk 17.0.13 2024-10-15
OpenJDK Runtime Environment (build 17.0.13+11-Ubuntu-2ubuntu122.04)
OpenJDK 64-Bit Server VM (build 17.0.13+11-Ubuntu-2ubuntu122.04, mixed mode, sharing)
root@ip-172-31-42-226:~# docker --version
Docker version 24.0.7, build 24.0.7-0ubuntu2~22.04.1
root@ip-172-31-42-226:~# ansible --version
ansible [core 2.17.6]
  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, Sep 11 2024, 15:47:36) [GCC 11.4.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
root@ip-172-31-42-226:~#

```

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Fig. 2.04: Installed tool list

Step 3: Configure Prod server with Ansible controller present in build server:

1. SSH into the **prod** server
2. Create a new user for e.g. '**ansibleadmin**'. Set the password for that user using commands:

```

**sudo -i**

**useradd ansibleadmin -s /bin/bash -m -d /home/ansibleadmin**  
**passwd ansibleadmin**

```

3. Enable Password Authentication for that user

```

**vi /etc/ssh/sshd\_config**

```

4. Reload SSH service using command: '**sudo service ssh reload**'

5. As a root user edit the file using cmd:

```

**visudo**

**ansibleadmin ALL=(ALL) NOPASSWD: ALL**

```

6. Login to the newly created user using command: `su - ansibleadmin`
7. Create a new directory ‘.ssh’ for ssh access for Ansible controller using command: `mkdir .ssh`
8. Change directory to ‘.ssh’ usinf cmd: `cd .ssh`
9. Create ‘**authorized_keys**’ file in the pwd using cmd:
`vi authorized_keys`
10. Paste the ‘**id_ecdsa.pub**’ of the ‘**slaveuser**’ user into the **authorized_keys** of **ansibleadmin** user in the **prod** server
11. Change the permission of the authorized_keys using cmd:
`...`
chmod 600 /home/ansibleadmin/.ssh/*
`...`
12. Change the owner of ‘/etc/ansible/hosts’ using cmd: `chown -R slaveuser:slaveuser /etc/ansible`
13. Inside **slaveuser** in **Build** server update the ‘etc/ansible/hosts’ file with below content:
`...`
[prod]
prodserver1 ansible_ssh_host=<Private_IP_of_prod_s>
ansible_ssh_user=ansibleadmin
`...`
14. Check the connection using cmd: `ansible prod -m ping`

AWS EC2 Instances (1/3) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
prod_server	i-0b19d37b829491a34	Running	t2.micro	Initializing	View alarms +	ap-south-1

i-0b19d37b829491a34 (prod_server)

Details Status and alarms Monitoring Security Networking Storage Tags

Instance summary

Instance ID: i-0b19d37b829491a34	Public IPv4 address copied: 13.233.152.24 open address
IPv6 address: -	Instance state: Running
	Private IPv4 addresses: 172.31.6.141
	Public IPv4 DNS: ec2-13-233-152-24.ap-south-1.compute.amazonaws.com open address

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MobaXterm

Build server

Session settings

SSH Telnet Rsh Xdmcp RDP VNC FTP SFTP Serial File Shell Browser Mosh Aws S3 WSL

Warning: you have reached the maximum number of saved sessions for the personal edition of MobaXterm.
You can start a new session but it will not be automatically saved.
Please support MobaXterm by subscribing to the Professional edition here: <https://mobaxterm.mobatek.net>

Basic SSH settings

Remote host: 13.233.152.24 | Specify username: ubuntu | Port: 22

Advanced SSH settings Terminal settings Network settings Bookmark settings

X11-Forwarding Compression Remote environment: Interactive shell
Execute command: | Do not exit after command ends
SSH-browser type: SFTP protocol | Follow SSH path (experimental)
Use private key: E:\Software\DevOps\StarAgile D | Expert SSH settings
Execute macro at session start: <none>

OK Cancel

Remote monitoring Follow terminal folder

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```

Prod server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12 master server 11 Build server 13 Prod server
ubuntu@ip-172-31-6-141:~$ sudo -i
root@ip-172-31-6-141:~# apt update -y

```

The terminal window shows a user session on 'Prod server'. A red arrow points to the command 'sudo -i' which has been entered. The output of the 'apt update -y' command follows, listing numerous package updates from the 'jammy' repository.

```

Prod server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12 master server 11 Build server 13 Prod server
# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
#LogLevel INFO

# Authentication:
#LoginGraceTime 2m
#PermitRootLogin prohibit-password
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile    .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no

# Change to yes to enable challenge-response passwords (beware issues with
# some PAM modules and threads)
#KbdInteractiveAuthentication no

# Kerberos options
#KerberosAuthentication no
-- INSERT --

```

The terminal window shows a user session on 'Prod server'. A red arrow points to the 'PasswordAuthentication yes' line in the sshd_config file. The file contains various SSH configuration settings, including authentication methods and host-based authentication parameters.

```

Prod server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12. master server 11. Build server 13. Prod server
GNU nano 6.2
/etc/sudoers.tmp *
# equivalent users (group sudo)
Defaults:env_keep += "http_proxy https_proxy ftp_proxy all_proxy no_proxy"
# This allows running arbitrary commands, but so does ALL, and it means
# different sudoers have their choice of editor respected.
Defaults:env_keep += "EDITOR"
# Completely harmless preservation of a user preference.
Defaults:env_keep += "GREP_COLOR"
# While you shouldn't normally run git as root, you need to with etckeeper
Defaults:env_keep += "GIT_AUTHOR_* GIT_COMMITTER_"
# Per-user preferences; root won't have sensible values for them.
Defaults:env_keep += "EMAIL DEBEMAIL DEBUGNAME"
# "sudo scp" or "sudo rsync" should be able to use your SSH agent.
Defaults:env_keep += "SSH_AGENT_PID SSH_AUTH_SOCK"
# Ditto for GPG agent
Defaults:env_keep += "GPG_AGENT_INFO"
# Host alias specification
# User alias specification
# Cmd alias specification
# User privilege specification
root    ALL=(ALL:ALL) ALL
ansibleadmin 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:
@include /etc/sudoers.d

```

Remote monitoring

Follow terminal folder

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```

Prod server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12. master server 11. Build server 13. Prod server
root@ip-172-31-6-141:~# useradd ansibleadmin -s /bin/bash -m -d /home/ansibleadmin
New password:
Retype new password:
passwd: password updated successfully
root@ip-172-31-6-141:~# vi /etc/ssh/sshd_config
root@ip-172-31-6-141:~# service ssh reload
root@ip-172-31-6-141:~# visudo
root@ip-172-31-6-141:~# su - ansibleadmin
ansibleadmin@ip-172-31-6-141:~$ pwd
/home/ansibleadmin
ansibleadmin@ip-172-31-6-141:~$ ls
ansibleadmin@ip-172-31-6-141:~$ ll
total 20
drwxr-x--- 2 ansibleadmin ansibleadmin 4096 Nov 12 23:20 .
drwxr-xr-x  4 root          root      4096 Nov 12 23:20 ..
-rw-r--r--  1 ansibleadmin ansibleadmin  220 Jan  6  2022 .bash_logout
-rw-r--r--  1 ansibleadmin ansibleadmin 3771 Jan  6  2022 .bashrc
-rw-r--r--  1 ansibleadmin ansibleadmin  807 Jan  6  2022 .profile
ansibleadmin@ip-172-31-6-141:~$ mkdir .ssh
ansibleadmin@ip-172-31-6-141:~$ cd .ssh/
ansibleadmin@ip-172-31-6-141:~/ssh$ 

```

Remote monitoring

Follow terminal folder

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slaveuser@ip-172-31-42-226:~\$ ll

```
total 1396
drwxr-x--- 5 slaveuser slaveuser 4096 Nov 12 21:39 ./
drwxr-xr-x  4 root      root     4096 Nov 12 21:09 ../
-rw-r--r--  1 slaveuser slaveuser   229 Jan  6 2022 .bash_logout
-rw-r--r--  1 slaveuser slaveuser   3771 Jan  6 2022 .bashrc
drwx----- 3 slaveuser slaveuser 4096 Nov 12 21:39 .cache/
-rw-r--r--  1 slaveuser slaveuser   807 Jan  6 2022 .profile
drwx----- 2 slaveuser slaveuser 4096 Nov 12 21:15 .ssh/
drwxrwxr-x  4 slaveuser slaveuser 4096 Nov 12 21:39 remotng/
-rw-rw-r--  1 slaveuser slaveuser 1393683 Nov 12 21:39 remotng.jar
```

slaveuser@ip-172-31-42-226:~\$ cd .ssh/

slaveuser@ip-172-31-42-226:~/ssh\$ cat id_ecdsa.pub

```
ecdsa-sha2-nistp521 AAAE2VjZHNhLXNoYT1tbmlzdHA1MjEAAAIBmlzdHA1MjEAAACFBAGxNqyYUuQ0+fqyxYw4sECicZXFnd12wFrnd/4vrzwn7pr1CYmXHcxbU9wR3YT+sKLLPeIoub82HiW1zeN/AUG1z80EvLoqLyxbMSNf3jTd5Tywy0wERy/a1YcfEFAdpk0qfeMm5VJ6prh3AJ2LSUpeneNPFpyoDuJWesteiteYw== slaveuser@ip-172-31-42-226
```

slaveuser@ip-172-31-42-226:~/ssh\$

slaveuser@ip-172-31-42-226:~/ssh\$ cat id_ecdsa.pub

```
ecdsa-sha2-nistp521 AAAE2VjZHNhLXNoYT1tbmlzdHA1MjEAAAIBmlzdHA1MjEAAACFBAGxNqyYUuQ0+fqyxYw4sECicZXFnd12wFrnd/4vrzwn7pr1CYmXHcxbU9wR3YT+sKLLPeIoub82HiW1zeN/AUG1z80EvLoqLyxbMSNf3jTd5Tywy0wERy/a1YcfEFAdpk0qfeMm5VJ6prh3AJ2LSUpeneNPFpyoDuJWesteiteYw== slaveuser@ip-172-31-42-226
```

:wq

```

root@ip-172-31-6-141:~# useradd ansibleadmin -s /bin/bash -m -d /home/ansibleadmin
root@ip-172-31-6-141:~# passwd ansibleadmin
New password:
Retype new password:
passwd: password updated successfully
root@ip-172-31-6-141:~# vi /etc/ssh/sshd_config
root@ip-172-31-6-141:~# service ssh reload
root@ip-172-31-6-141:~# visudo
root@ip-172-31-6-141:~# su - ansibleadmin
ansibleadmin@ip-172-31-6-141:~$ pwd
/home/ansibleadmin
ansibleadmin@ip-172-31-6-141:~$ ls
ansibleadmin@ip-172-31-6-141:~$ ll
total 20
drwxr-x--- 2 ansibleadmin ansibleadmin 4096 Nov 12 23:26 .
drwxr-xr-x 4 root      root      4096 Nov 12 23:26 ..
-rw-r--r-- 1 ansibleadmin ansibleadmin 220 Jan  6 2022 .bash_logout
-rw-r--r-- 1 ansibleadmin ansibleadmin 3771 Jan  6 2022 .bashrc
-rw-r--r-- 1 ansibleadmin ansibleadmin 807 Jan  6 2022 .profile
ansibleadmin@ip-172-31-6-141:~$ mkdir .ssh
ansibleadmin@ip-172-31-6-141:~$ cd .ssh/
ansibleadmin@ip-172-31-6-141:~/ssh$ vi authorized_keys
ansibleadmin@ip-172-31-6-141:~/ssh$ chmod 600 /home/ansibleadmin/.ssh/*
ansibleadmin@ip-172-31-6-141:~/ssh$ 

```

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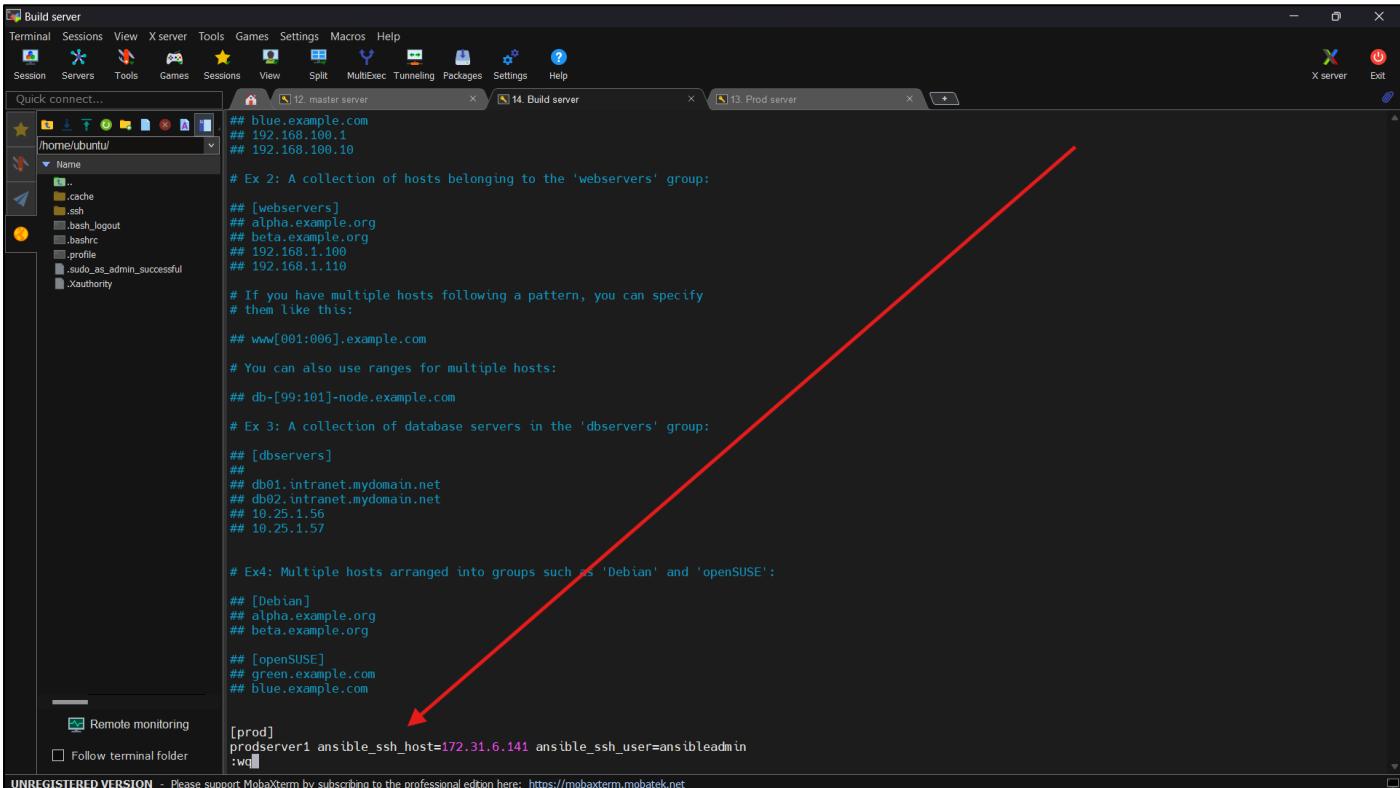
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
prod_server	i-0b19d37b829491a34	Running	t2.micro	Initializing	View alarms +	ap-south-1

i-0b19d37b829491a34 (prod_server)

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

Instance summary

Instance ID i-0b19d37b829491a34	Public IPv4 address 13.233.152.24 open address	Private IPv4 addresses 172.31.6.141
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-13-233-152-24.ap-south-1.compute.amazonaws.com open address

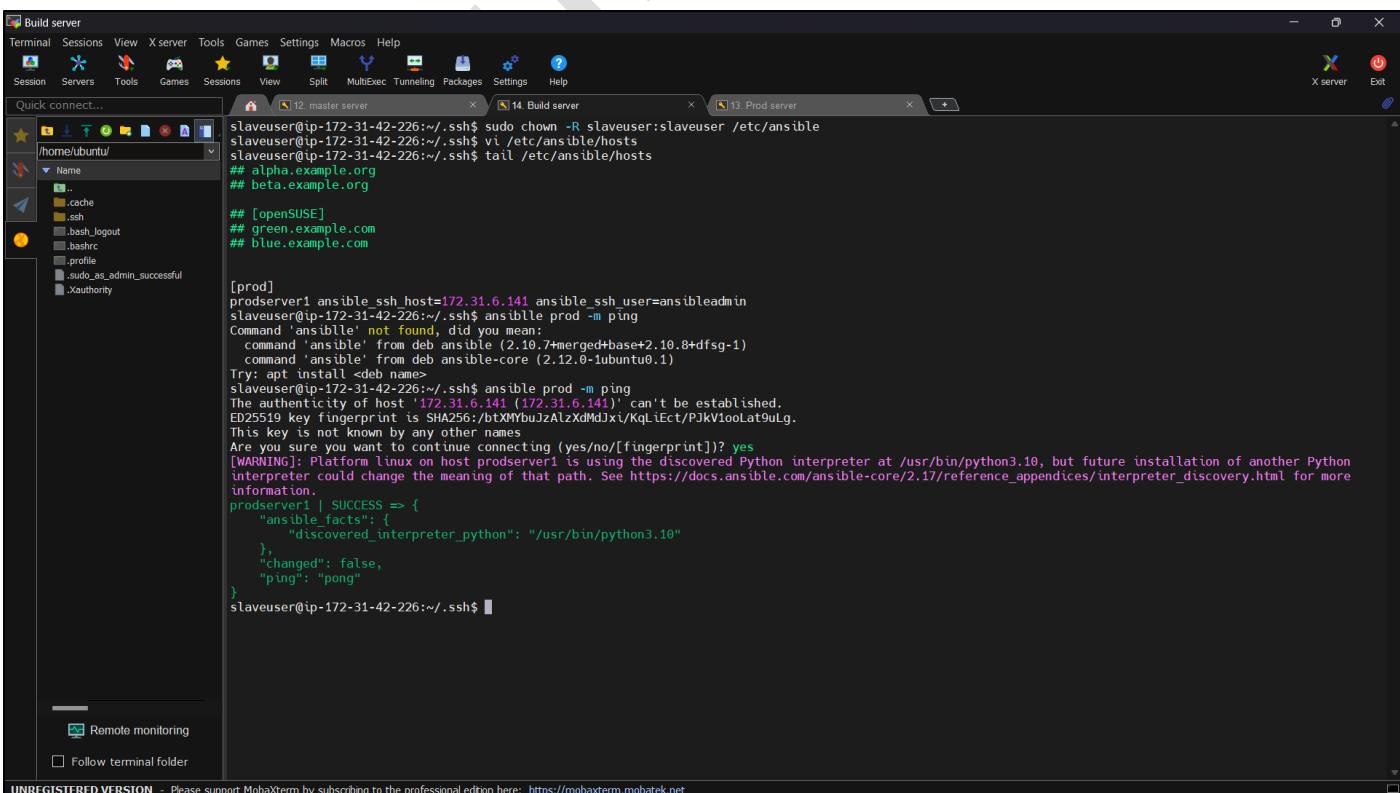


```

Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12. master server 14. Build server 13. Prod server
/home/ubuntu/
Name
.. .cache .ssh .bash_logout .bashrc .profile .sudo_as_admin_successful .Xauthority
## blue.example.com
## 192.168.100.1
## 192.168.100.10
# Ex 2: A collection of hosts belonging to the 'webservers' group:
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
# If you have multiple hosts following a pattern, you can specify
# them like this:
## www[001:006].example.com
# You can also use ranges for multiple hosts:
## db-[99:101]-node.example.com
# Ex 3: A collection of database servers in the 'dbservers' group:
## [dbservers]
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
# Ex4: Multiple hosts arranged into groups such as 'Debian' and 'openSUSE':
## [Debian]
## alpha.example.org
## beta.example.org
## [openSUSE]
## green.example.com
## blue.example.com
[prod]
prodserver1 ansible_ssh_host=172.31.6.141 ansible_ssh_user=ansibleadmin
:wq

```

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```

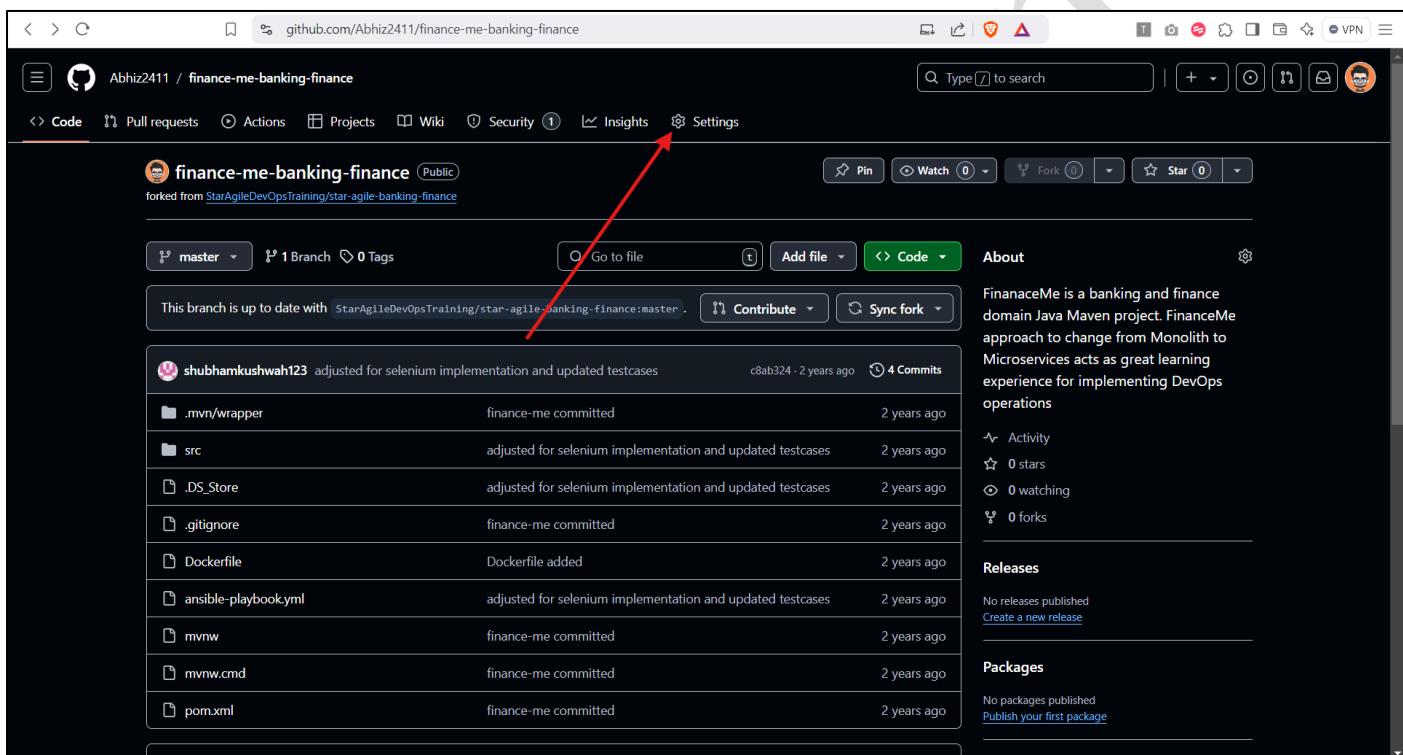
Build server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
12. master server 14. Build server 13. Prod server
/home/ubuntu/
Name
.. .cache .ssh .bash_logout .bashrc .profile .sudo_as_admin_successful .Xauthority
slaveuser@ip-172-31-42-226:~/ssh$ sudo chown -R slaveuser:slaveuser /etc/ansible
slaveuser@ip-172-31-42-226:~/ssh$ vi /etc/ansible/hosts
slaveuser@ip-172-31-42-226:~/ssh$ tail /etc/ansible/hosts
## alpha.example.org
## beta.example.org
## [openSUSE]
## green.example.com
## blue.example.com
[prod]
prodserver1 ansible_ssh_host=172.31.6.141 ansible_ssh_user=ansibleadmin
slaveuser@ip-172-31-42-226:~/ssh$ ansible prod -m ping
Command 'ansible' not found, did you mean:
  command 'ansible' from deb ansible (2.10.7+merged+base+2.10.8+dfsg-1)
  command 'ansible' from deb ansible-core (2.12.0-1ubuntu0.1)
Try: apt install <deb name>
slaveuser@ip-172-31-42-226:~/ssh$ ansible prod -m ping
The authenticity of host '172.31.6.141 (172.31.6.141)' can't be established.
ED25519 key fingerprint is SHA256:/btXMybuJzAlzXdMdJxi/KqLiEct/PJKV1ooLat9uLg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint]): yes
[WARNING]: Platform linux on host prodserver1 is using the discovered Python interpreter at /usr/bin/python3.10, but future installation of another Python interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
prodserver1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.10"
    },
    "changed": false,
    "ping": "pong"
}
slaveuser@ip-172-31-42-226:~/ssh$ 

```

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Step 4: Setup GitHub webhook with Ansible:

1. Open the Github repository in the browser
2. Go to **Settings** of the repository
3. Click on **Webhook** option on left pane and click on **Add webhook**
4. Fill in the required info
5. For more detailed guide follow the documentation:
https://github.com/Abhiz2411/Jenkins-Jedi-CICD/blob/Main/Module-04-Continuous-Integration-using-Jenkins-Abhijit_Zende_GitHub_DevOps_Notes.pdf



A screenshot of a web browser displaying the GitHub settings page for a repository named "finance-me-banking-finance". The URL is github.com/Abhiz2411/finance-me-banking-finance/settings/hooks. The page has a dark theme. On the left, there is a sidebar with various settings categories like General, Access, Collaborators, etc. The "Webhooks" category is highlighted with a blue bar and has a red arrow pointing to it from the bottom-left. At the top right, there is a button labeled "Add webhook" with a red arrow pointing to it from the top-right.

A screenshot of a web browser displaying the Jenkins dashboard. The URL in the address bar is 3.110.161.215:8080. The page has a light gray background. On the left, there is a sidebar with links like New Item, Build History, Project Relationship, etc. The main area is titled "Welcome to Jenkins!" and contains a message about starting a software project. There is a "Create a job" button with a plus sign. A red arrow points from the "Add webhook" button in the GitHub screenshot to the Jenkins URL in the browser's address bar.

github.com/Abhiz2411/finance-me-banking-finance/settings/hooks/new

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://3.110.161.215:8080/github-webhook/

Content type *
application/json

Secret
[Redacted]

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

github.com/Abhiz2411/finance-me-banking-finance/settings/hooks

Webhooks

Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our [Webhooks Guide](#).

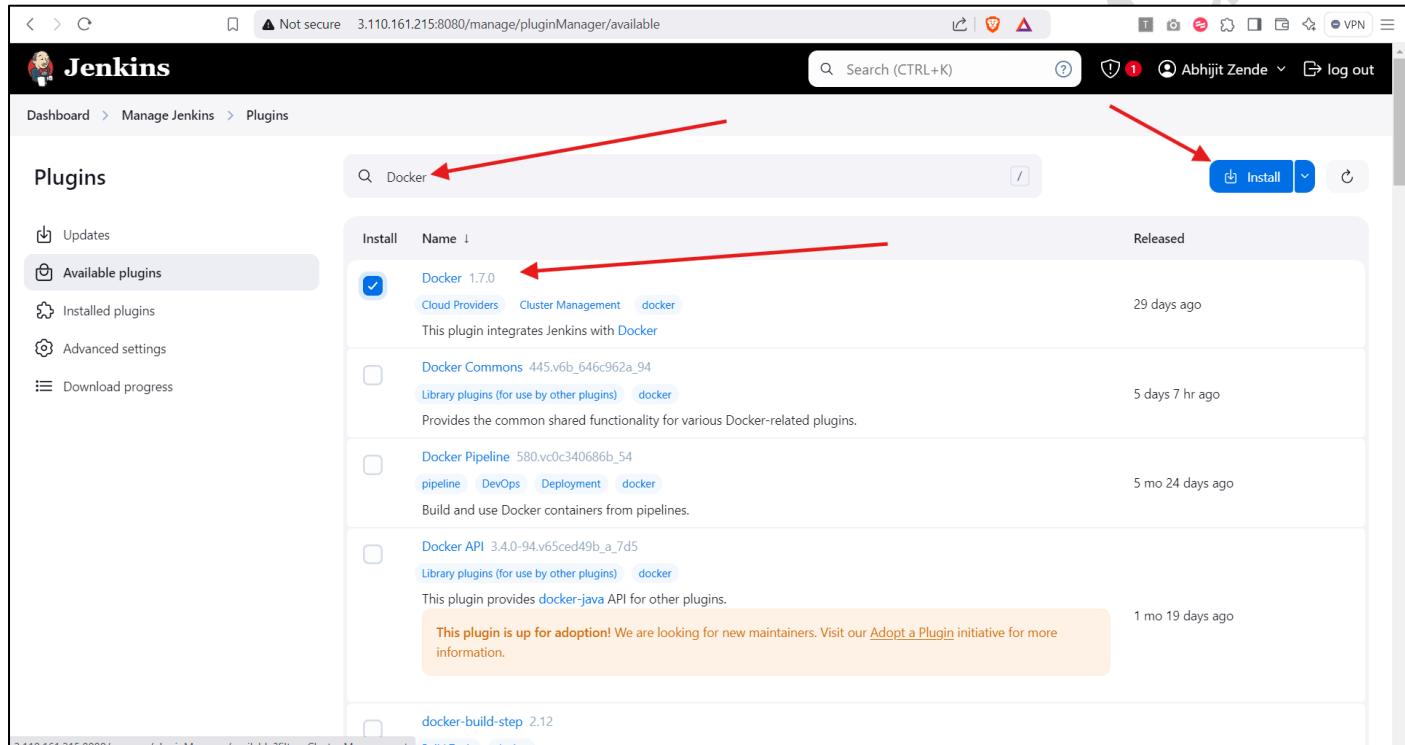
✓ http://3.110.161.215:8080/github-w... (push)
Last delivery was successful.

Edit | **Delete**

Add webhook

Step 5: Install Docker plugin and setup DockerHub credentials:

1. Install Docker plugin in Jenkins
2. Create a **Access token** from your **DockerHub** account and save it in the Jenkins Global Credentials manager
3. This will be used to login and push image to DockerHub from build server



The screenshot shows the Jenkins 'Plugins' page. On the left sidebar, 'Installed plugins' is selected, indicated by a red arrow. The main area displays three installed Docker-related plugins:

- Docker API Plugin** (3.4.0-94.v65ced49b_a_7d5): Provides the `docker-java` API for other plugins. Status: Enabled.
- Docker Commons Plugin** (445.v6b_646c962a_94): Provides the common shared functionality for various Docker-related plugins. Status: Enabled.
- Docker plugin** (1.7.0): Integrates Jenkins with Docker. Status: Enabled.

A message at the top of the list states: "This plugin is up for adoption! We are looking for new maintainers. Visit our [Adopt a Plugin](#) initiative for more information."

At the bottom right of the page, it says "REST API Jenkins 2.479.1".

The screenshot shows the Docker Hub 'Repositories' page for user 'abhiz2411'. Two repositories are listed:

- abhiz2411 / tomcat_web_img**: Contains: Image • Last pushed: 6 days ago.
- abhiz2411 / mywebapp**: Contains: Image • Last pushed: 29 days ago.

To the right, a sidebar shows the user profile 'abhiz2411' and a list of account settings. A red arrow points to the 'Account settings' link in the sidebar.

The screenshot shows the Docker settings page at app.docker.com/settings. The main section is titled "General". It includes "Account information" (with a note to add account information), "Email" (showing abhijitzende75@gmail.com with a verified checkmark), "Password" (with a note to change via email and a "Reset password" link), and "Security" (with a note that two-factor authentication is disabled). Below these are "Personal access tokens" (with a note about five tokens associated with the account), "Connected accounts" (with a note to connect to Google or GitHub), and "Account management" (with a note to convert the account to an organization). A red arrow points from the text "There are 5 personal access tokens associated with your account." to the "Personal access tokens" section.

The screenshot shows the "Create access token" form at app.docker.com/settings/personal-access-tokens/create. The title is "Create access token". It explains that a personal access token is similar to a password and can be revoked. The form fields include "Access token description" (set to "finance-me-project-jenkins-cred-mang-token"), "Expiration date" (set to "None"), and "Optional Access permissions" (set to "Read, Write, Delete"). A note below states that Read, Write, Delete tokens allow managing repositories. At the bottom are "Cancel" and "Generate" buttons. Red arrows highlight the "Access token description" field, the "Access permissions" dropdown, and the "Generate" button.

The screenshot shows the Docker Personal Access Tokens page. A red arrow points from the 'Copy' button in the first code snippet area to the 'Copy' button in the second code snippet area. Both areas contain placeholder text for a Docker CLI command.

Copy access token

Use this token as a password when you sign in from the Docker CLI client. [Learn more](#)

Make sure you copy your personal access token now. Your personal access token is only displayed once. It isn't stored and can't be retrieved later.

Access token description
finance-me-project-jenkins-cred-mang-token

Expires on
Never

Access permissions
Read, Write, Delete

To use the access token from your Docker CLI client:

1. Run
\$ docker login -u abhiz2411 **Copy**
2. At the password prompt, enter the personal access token.
[REDACTED] **Copy**

[Back to access tokens](#)

The screenshot shows the Jenkins Global credentials (unrestricted) page. Red arrows highlight several fields: the 'Kind' dropdown set to 'Username with password', the 'Scope' dropdown set to 'Global (Jenkins, nodes, items, all child items, etc.)', the 'Username' field containing 'abhiz2411', the 'Password' field containing a masked value, and the 'ID' field containing 'dockerhublogincred'. The 'Create' button at the bottom is also highlighted with a red arrow.

New credentials

Kind: Username with password

Scope: Global (Jenkins, nodes, items, all child items, etc.)

Username: abhiz2411

Treat username as secret

Password: [REDACTED]

ID: dockerhublogincred

Create

Step 6 - Install and configure Ansible plugin in Jenkins:

1. Install Ansible plugin from available plugins section in Jenkins
2. Set '**Install automatically**' option true in the manage tools for ansible as it will use the ansible installed the machine for further operations

The screenshot shows the Jenkins Plugin Manager interface. The URL is 3.110.161.215:8080/manage/pluginManager/available. The search bar at the top contains 'Ansible'. On the left sidebar, 'Available plugins' is selected. In the main area, the 'Ansible' plugin is listed under the 'Released' tab. It has a checked checkbox in the 'Install' column. The plugin details show: Name: Ansible 403.v8d0ca_dcb_b_502, Version: 0.16.0, Pipeline, External Site/Tool Integrations, DevOps, Build Tools, Deployment. A note says 'Invoke Ansible Ad-Hoc commands and playbooks.' Below this, a message states 'This plugin is up for adoption! We are looking for new maintainers. Visit our Adopt a Plugin initiative for more information.' The timestamp is 4 mo 27 days ago. Another plugin, 'Ansible Tower 0.16.0', is also listed with a timestamp of 4 yr 5 mo ago.

The screenshot shows the Jenkins Plugin Manager interface. The URL is 3.110.161.215:8080/manage/pluginManager/installed. The search bar at the top contains 'Ansible'. On the left sidebar, 'Installed plugins' is selected. In the main area, the 'Ansible plugin' is listed under the 'Enabled' tab. It has a checked checkbox in the 'Enabled' column. The plugin details show: Name: Ansible plugin 403.v8d0ca_dcb_b_502, Version: 0.16.0, Pipeline, External Site/Tool Integrations, DevOps, Build Tools, Deployment. A note says 'Invoke Ansible Ad-Hoc commands and playbooks.' Below this, a message states 'Report an issue with this plugin' and 'This plugin is up for adoption! We are looking for new maintainers. Visit our Adopt a Plugin initiative for more information.' The timestamp is 4 mo 27 days ago. The bottom right corner shows 'REST API' and 'Jenkins 2.479.1'.

The screenshot shows the Jenkins management interface under the 'Tools' section. It displays the 'Ansible installations' configuration. A red arrow points to the 'Name' field, which contains the value 'ansible'. Another red arrow points to the 'Install automatically' checkbox, which is checked. Below the configuration area are 'Add Ansible' and 'Docker installations' buttons, along with 'Save' and 'Apply' buttons.

Step 7 – Setup Gmail SMTP server on Jenkins:

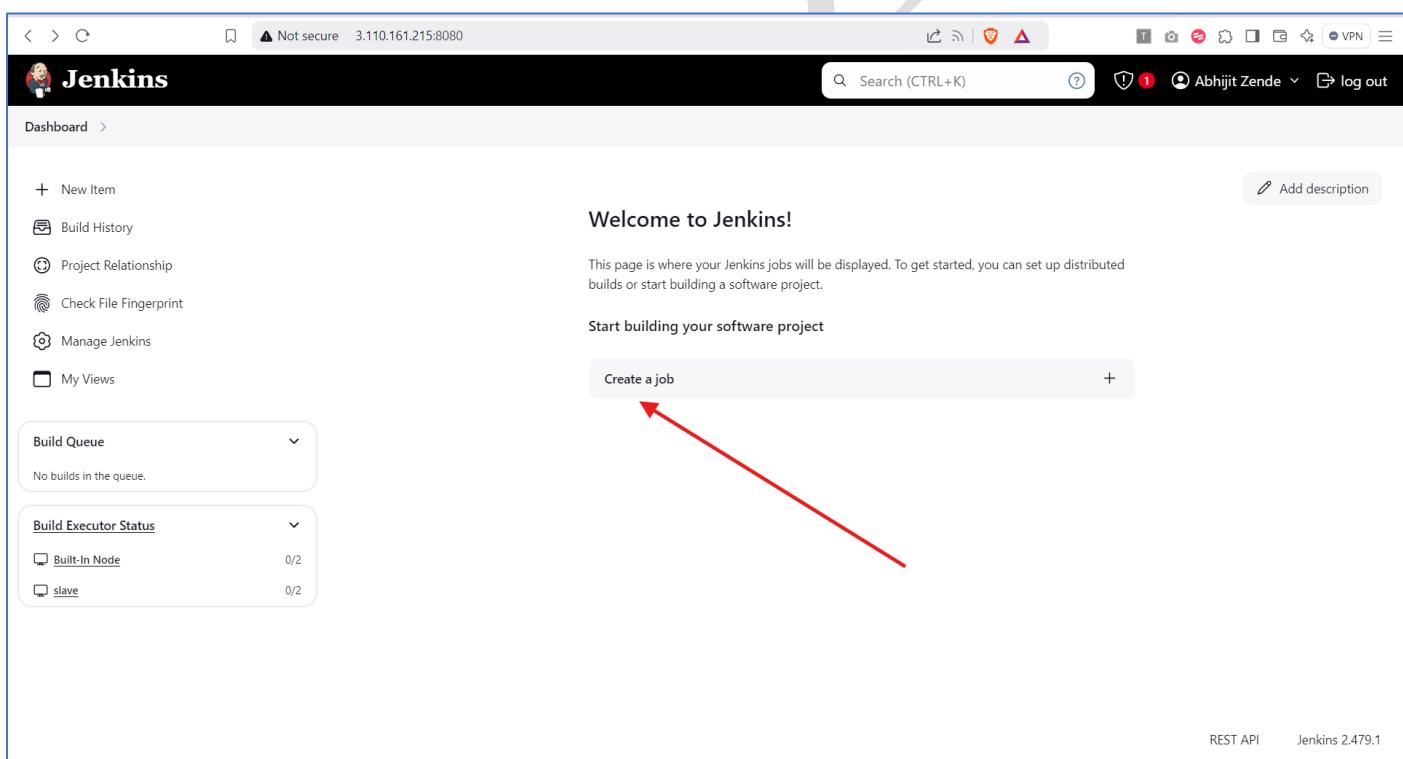
The screenshot shows the Google Account 'App passwords' page. It explains that app passwords help sign into accounts on older apps and services. It also notes that they are less secure than modern standards. A 'Learn more' link is provided. The main area lists two existing app passwords: 'Jenkins Gmail Server' and 'Finance Me Jenkins Mail', both created on Sep 25. A form at the bottom allows creating a new password, with fields for 'App name' and a 'Create' button.

The screenshot shows the Jenkins 'System' configuration page under 'Manage Jenkins'. The 'E-mail Notification' section is displayed. A red arrow points to the breadcrumb navigation bar at the top left, which reads 'Dashboard > Manage Jenkins > System >'. The 'SMTP server' field contains 'smtp.gmail.com'. The 'Default user e-mail suffix' field contains '@gmail.com'. Below these fields are 'Advanced' and 'Edited' buttons. Under 'Advanced', there are three sections: 'Use SMTP Authentication' (checked), 'User Name' (abhijitzende75@gmail.com), and 'Password' (redacted). An orange warning message states: '⚠️ For security when using authentication it is recommended to enable either TLS or SSL'. There are two checkboxes: 'Use SSL' (checked) and 'Use TLS' (unchecked). At the bottom are 'Save' and 'Apply' buttons.

This screenshot shows the same Jenkins 'System' configuration page after changes have been saved. The 'Password' field now contains '.....'. The 'Use SSL' checkbox is checked, while 'Use TLS' is unchecked. The 'SMTP Port' field contains '465'. The 'Reply-To Address' field is empty. The 'Charset' field contains 'UTF-8'. The 'Test configuration by sending test e-mail' checkbox is checked, and the 'Test e-mail recipient' field contains 'abhijitzende75@gmail.com'. A message at the bottom states 'Email was successfully sent' next to a 'Test configuration' button. The 'Save' and 'Apply' buttons are visible at the bottom.

Step 8: Create a pipeline project and write the groovy script for the CI/CD:

1. Create a pipeline project
2. Write a groovy script to perform below tasks:
 - a. SCM checkout
 - b. Application build
 - c. Build Docker image
 - d. Login to Docker
 - e. Push the image to DockerHub
 - f. Deploy the application on the **Prod** server using Ansible plugin
 - g. Get **mail notification** after success/failure of the pipeline
 - h. Enable **GitHub Poll SCM** for complete CI/CD process



 Jenkins

Not secure 3.110.161.215:8080/newJob

Search (CTRL+K) ? Abhijit Zende log out

Dashboard > New Item

New Item

Enter an item name

Select an item type

 **Freestyle project**
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

 **Pipeline**
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

 **Multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

 **Folder**
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

OK

 Jenkins

Not secure 3.109.185.224:8080/job/finance-me-pipeline/configure

Search (CTRL+K) ? Abhijit Zende log out

Dashboard > finance-me-pipeline > Configuration

Configure

General

Enabled

 General

Description

 Advanced Project Options

 Pipeline

Plain text [Preview](#)

Discard old builds ?

Do not allow concurrent builds

Do not allow the pipeline to resume if the controller restarts

GitHub project

Project url ?

Advanced ▾

Save Apply

The screenshot shows the Jenkins Pipeline configuration page for the 'finance-me-pipeline' job. The 'General' tab is selected. Under 'Build Triggers', two options are checked: 'GitHub hook trigger for GITScm polling' and 'Poll SCM'. The 'Poll SCM' trigger is set to run every minute, indicated by the schedule entry '*****'. A warning message at the bottom states: '⚠ Do you really mean "every minute" when you say "*****"? Perhaps you meant "H * * * *" to poll once per hour'. Red arrows point from the text 'every minute' in the warning to the '*****' in the schedule field.

The screenshot shows the Jenkins Pipeline configuration page for the 'finance-me-pipeline' job. The 'Advanced Project Options' tab is selected. Under 'Pipeline', the 'Definition' dropdown is set to 'Pipeline script'. The script editor contains the following Groovy code:

```
1 * pipeline {
2     agent { label 'slave' }
3     environment {
4         DOCKERHUB_CREDENTIALS = credentials('dockerhublogincred')
5     }
6     stages {
7         stage('SCM_checkout') {
8             steps {
9                 echo '---- Perform SCM checkout ----'
10                git 'https://github.com/Abhiz2411/finance-me-banking-finance.git'
11                echo '---- SCM Checkout Done ----'
12            }
13        }
14    }
15 }
```

A 'try sample Pipeline...' button is visible next to the script editor. The 'Use Groovy Sandbox' checkbox is checked. At the bottom, there are 'Save' and 'Apply' buttons.

Configure Advanced

General Advanced Project Options Pipeline

Definition Pipeline script

Script ?

```
14
15
16+
17+
18+
19+
20+
21+
22+
23+
24+
25+
26+
27+ } echo '---- Sun Checkout Done ----'
} stage('Application_Build') {
steps {
echo '---- Perform application build ----'
sh 'mvn clean package'
echo '---- Application build complete ----'
}
stage('Docker_build') {
steps {
echo '---- Perform Docker build ----'
sh 'docker build -t abhiz2411/bankapp1:${BUILD_NUMBER} .'
}
}
```

try sample Pipeline... ▾

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

Configure Advanced

General Advanced Project Options Pipeline

Definition Pipeline script

Script ?

```
22+
23+
24+
25+
26+
27+
28+
29+
30+
31+
32+
33+
34+
35+ } stage('Docker_build') {
steps {
echo '---- Perform Docker build ----'
sh 'docker build -t abhiz2411/bankapp1:${BUILD_NUMBER} .'
sh 'docker tag abhiz2411/bankapp1:${BUILD_NUMBER} abhiz2411/bankapp1:latest'
sh 'docker images'
echo '---- Docker build complete ----'
}
stage('DockerHub_login') {
steps {
echo '---- Login to DockerHub ----'
}
}
```

try sample Pipeline... ▾

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

Configure

Advanced

General

Advanced Project Options

Pipeline

Definition

Pipeline script

Script ?

```
30 }
31 }
32 }
33 }
34 }
35 }
36 }
37 }
38 }
39 }
40 }
41 }
42 }
43 }
44 }
```

try sample Pipeline...

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

Configure

General

Advanced Project Options

Pipeline

Definition

Pipeline script

Script ?

```
30 }
31 }
32 }
33 }
34 }
35 }
36 }
37 }
38 }
39 }
40 }
41 }
42 }
43 }
44 }
45 }
46 }
47 }
48 }
49 }
50 }
51 }
52 }
53 }
```

echo '---- Logged in to DockerHub ----'

stage('DockerHub login') {
 steps {
 echo '---- Login to DockerHub ----'
 sh "echo \${DOCKERHUB_CREDENTIALS_PSW} | docker login -u \${DOCKERHUB_CREDENTIALS_USR} --password-stdin"
 echo '---- Logged in to DockerHub ----'
 }
}

stage('Publish image to DockerHub') {
 steps {
 echo '---- Push Docker images to DockerHub ----'
 sh 'docker push abhil2411/bankapp1:latest'
 echo '---- Imaged Pushed to DockerHub ----'
 }
}

stage('Deploy application to production server') {
 steps {
 echo '---- Deploying the application ----'
 ansiblePlaybook become: true, credentialsId: 'slaveuser', disableHostKeyChecking: true, installation: 'ansible', inventory: 'inventory'
 echo '---- Application Deployed ----'
 }
}

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

REST API Jenkins 2.479.1

Configure

Advanced

General

Advanced Project Options

Pipeline

Definition

Pipeline script

Script ?

```
51
52
53
54+
55+ post{
56+     failure{
57+         sh "echo 'Send mail on failure'"
58+         mail bcc: 'abhijitzende75@gmail.com', body: 'Jenkins-${JOB_NAME}-${BUILD_NUMBER} status', cc: 'abhijitzende75@gmail.com', fr
59+
60+     success{
61+         sh "echo 'Send mail on Successful'"
62+         mail bcc: 'abhijitzende75@gmail.com', body: "jenkins-${JOB_NAME}-${BUILD_NUMBER} status", cc: 'abhijitzende75@gmail.com', fr
63+
64+ }
```

try sample Pipeline...

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

Configure

Advanced

General

Advanced Project Options

Pipeline

Definition

Pipeline script

Script ?

```
51
52
53
54+
55+ post{
56+     failure{
57+         sh "echo 'Send mail on failure'"
58+         mail bcc: 'abhijitzende75@gmail.com', body: 'Jenkins-${JOB_NAME}-${BUILD_NUMBER} status', cc: 'abhijitzende75@gmail.com', fr
59+
60+     success{
61+         sh "echo 'Send mail on Successful'"
62+         mail bcc: 'abhijitzende75@gmail.com', body: "jenkins-${JOB_NAME}-${BUILD_NUMBER} status", cc: 'abhijitzende75@gmail.com', fr
63+
64+ }
```

try sample Pipeline...

Use Groovy Sandbox ?

Pipeline Syntax

Save Apply

The screenshot shows a web-based pipeline configuration interface. On the left, there's a sidebar with tabs for General, Advanced Project Options, and Pipeline, with Pipeline currently selected. The main area is titled 'Pipeline' and has a 'Definition' section labeled 'Pipeline script'. Below it is a code editor window titled 'Script' containing Groovy code. The code includes lines like 'king: true, installation: 'ansible'', 'inventory: '/etc/ansible/hosts'', 'playbook: 'ansible-playbook.yml'', 'sudoUser: null'', and 'vaultTmpPath: '''. A checkbox labeled 'Use Groovy Sandbox' is checked. At the bottom of the editor are 'Save' and 'Apply' buttons.

The screenshot shows a MobaXterm window with three terminal sessions open. The leftmost session, titled '16. Master Server', shows a file browser with a directory tree for '/home/ubuntu/'. The middle session, titled '27. Build server', has a red arrow pointing to its tab bar, and its terminal window shows the command 'tail /etc/ansible/hosts' being run. The rightmost session, titled '28. Prod server', shows a terminal window with the command 'prodserver1 ansible_ssh_host=172.31.6.141 ansible_ssh_user=ansibleleadadmin' being run. The status bar at the bottom of the MobaXterm window indicates 'UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net'.

Not secure 3.109.185.224:8080/job/finance-me-pipeline/1/

Jenkins

Dashboard > finance-me-pipeline > #1

Status #1 (13 Nov 2024, 20:25:07)

⌚ Started by an SCM change

⌚ This run spent:

- 7.2 sec waiting;
- 1 min 42 sec build duration;
- 1 min 49 sec total from scheduled to completion.

⚡ git Revision: 2334014d25acbeb424c9f4ddfb8f596dc80769a
Repository: <https://github.com/Abhijit2411/finance-me-banking-finance.git>

- refs/remotes/origin/master

</> No changes.

🔗 Changes 📝 Console Output 📝 Edit Build Information 🗑 Delete build '#1' 📋 Polling Log ⌚ Timings ⚡ Git Build Data 🌐 Pipeline Overview 🔗 Pipeline Console ⟳ Restart from Stage Replay Pipeline Steps 📁 Workspaces

Add description Keep this build forever

Started 3 min 24 sec ago Took 1 min 42 sec

REST API Jenkins 2.479.1

Not secure 3.109.185.224:8080/job/finance-me-pipeline/1/pipeline-graph/

Jenkins

Dashboard > finance-me-pipeline > #1 > Pipeline Overview

Build #1

✓ Pipeline

```
graph LR; Start((Start)) --> SCM_checkout((SCM_checkout)); SCM_checkout --> Application_Build((Application_Build)); Application_Build --> DockerHub_login((DockerHub login)); DockerHub_login --> Publish_image((Publish image t...)); Publish_image --> Deploy_application((Deploy applicati...)); Deploy_application --> PostActions((Post Actions)); PostActions --> End((End))
```

↻ Rebuild 🔗 Console Configure

Details

- ⌚ Started 5 min 39 sec ago
- ⌚ Queued 7.2 sec
- ⌚ Took 1 min 42 sec

Jenkins 2.479.1

Dashboard > finance-me-pipeline > #1

```
changed: [prodserver1]

TASK [Deploy Docker Container] *****
changed: [prodserver1]

PLAY RECAP *****
prodserver1 : ok=5    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[Pipeline] echo
---- Application Deployed ----
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] sh
+ echo Send mail on Successful
Send mail on Successful
[Pipeline] mail
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withCredentials
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

REST API Jenkins 2.479.1

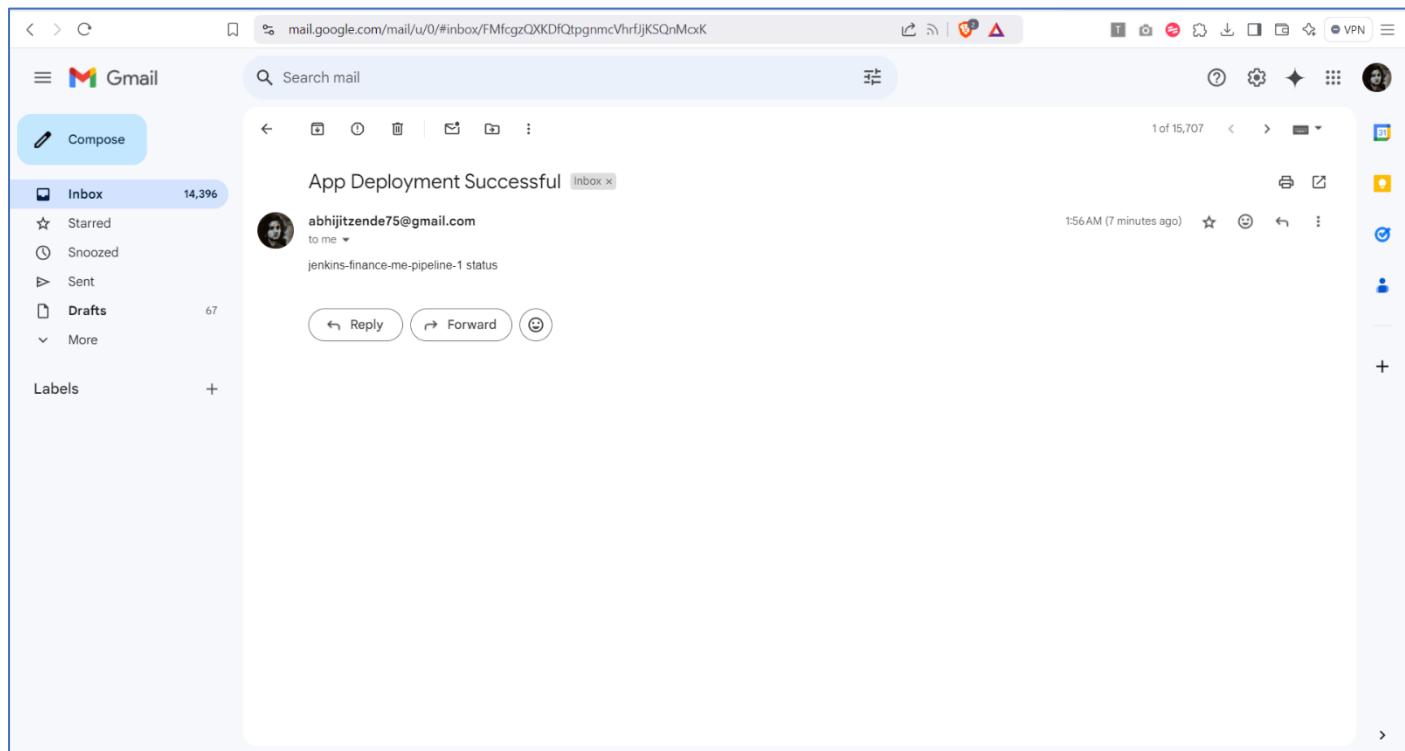
Dashboard > finance-me-pipeline > #1

</> Changes

Console Output

- Edit Build Information
- Delete build '#1'
- Polling Log
- Timings
- Git Build Data
- Pipeline Overview
- Pipeline Console
- Restart from Stage
- Replay
- Pipeline Steps
- Workspaces

```
Started by an SCM change
[Pipeline] Start of Pipeline
[Pipeline] node
Running on slave in /home/slaveuser/workspace/finance-me-pipeline
[Pipeline] {
[Pipeline] withCredentials
Masking supported pattern matches of $DOCKERHUB_CREDENTIALS or $DOCKERHUB_CREDENTIALS_PSW
[Pipeline] {
[Pipeline] stage
[Pipeline] { (SCM_checkout)
[Pipeline] echo
---- Perform SCM checkout ----
[Pipeline] git
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/Abhizz2411/finance-me-banking-finance.git
> git init /home/slaveuser/workspace/finance-me-pipeline # timeout=10
Fetching upstream changes from https://github.com/Abhizz2411/finance-me-banking-finance.git
> git --version # timeout=10
> git --version # 'git version 2.34.1'
> git fetch --tags --force --progress -- https://github.com/Abhizz2411/finance-me-banking-finance.git +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
Checking out Revision 233401d25acbebe424c9f4ddfb8f596dc80769a (refs/remotes/origin/master)
Commit message: "Update/Change docker img and terraform file"
First time build. Skipping changelog.
[Pipeline] echo
---- SCM Checkout Done ----
[Pipeline] }
```



A screenshot of the AWS EC2 Instances page. The sidebar shows navigation options like Dashboard, EC2 Global View, Events, Instances, Images, Elastic Block Store, and Network & Security. The main table lists three instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	Initializing	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	Initializing	View alarms +	ap-south-1
prod_server	i-0b19d37b829491a34	Running	t2.micro	Initializing	View alarms +	ap-south-1

The 'prod_server' row is highlighted with a blue selection bar. A red arrow points to the detailed view for the 'prod_server' instance. The detailed view shows the instance ID 'i-0b19d37b829491a34' and the public IPv4 address '13.234.21.13'.

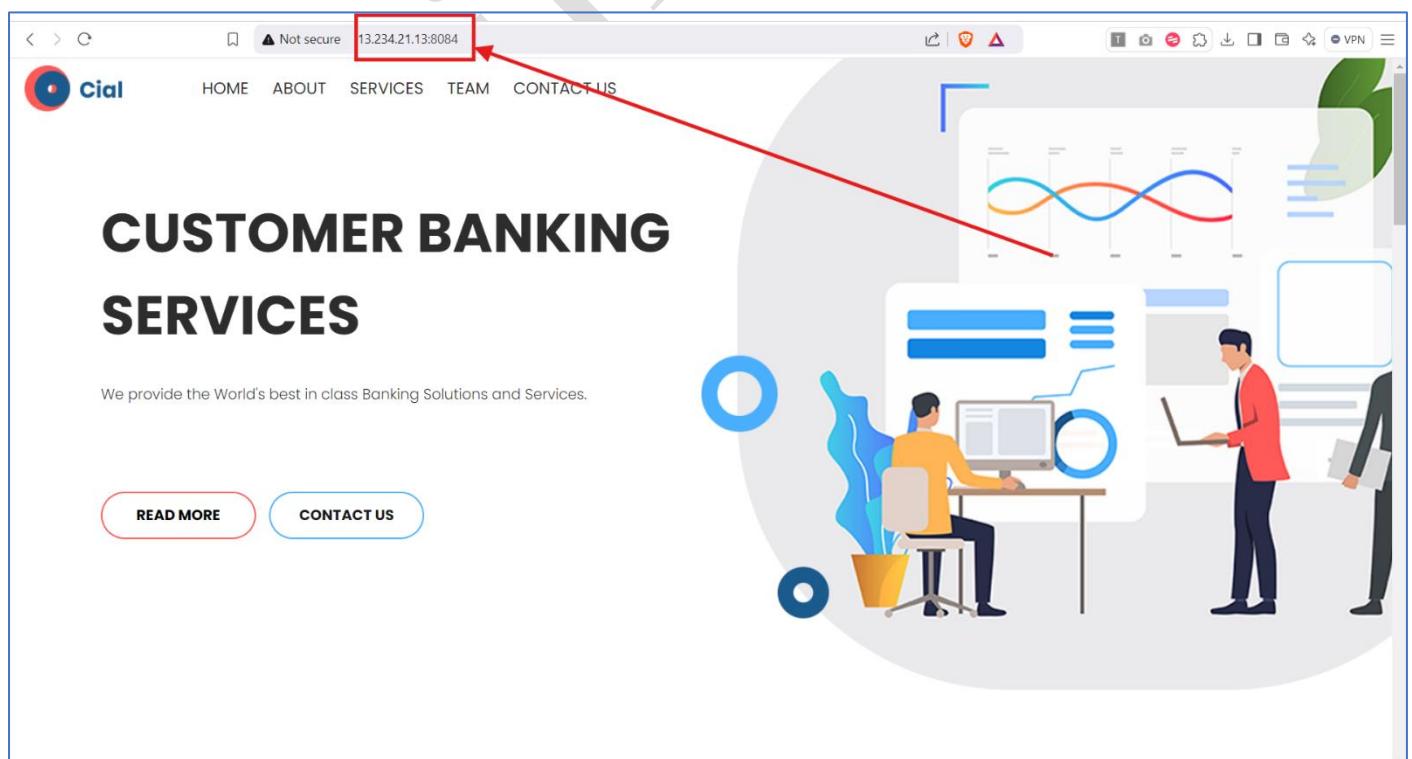
```
slaveuser@ip-172-31-42-226:~$ cat /home/slaveuser/workspace/finance-me-pipeline/ansible-playbook.yml
- hosts : all
  become: true
  connection : ssh
  tasks :
    - name: updating apt
      command : sudo apt-get update

    - name : Install Docker
      command : sudo apt-get install -y docker.io

    - name : Start Docker Service
      command : sudo systemctl start docker

    - name: Deploy Docker Container
      command: docker run -tid -p 8084:8081 abhiz2411/bankapp1
slaveuser@ip-172-31-42-226:~$
```

A screenshot of a terminal window titled "Build server" showing Ansible playbook code. The code configures Docker on EC2 instances, installs Docker, starts the service, and deploys a container. A red arrow points from the terminal window to the IP address "13.234.21.13:8084" in the browser's address bar.

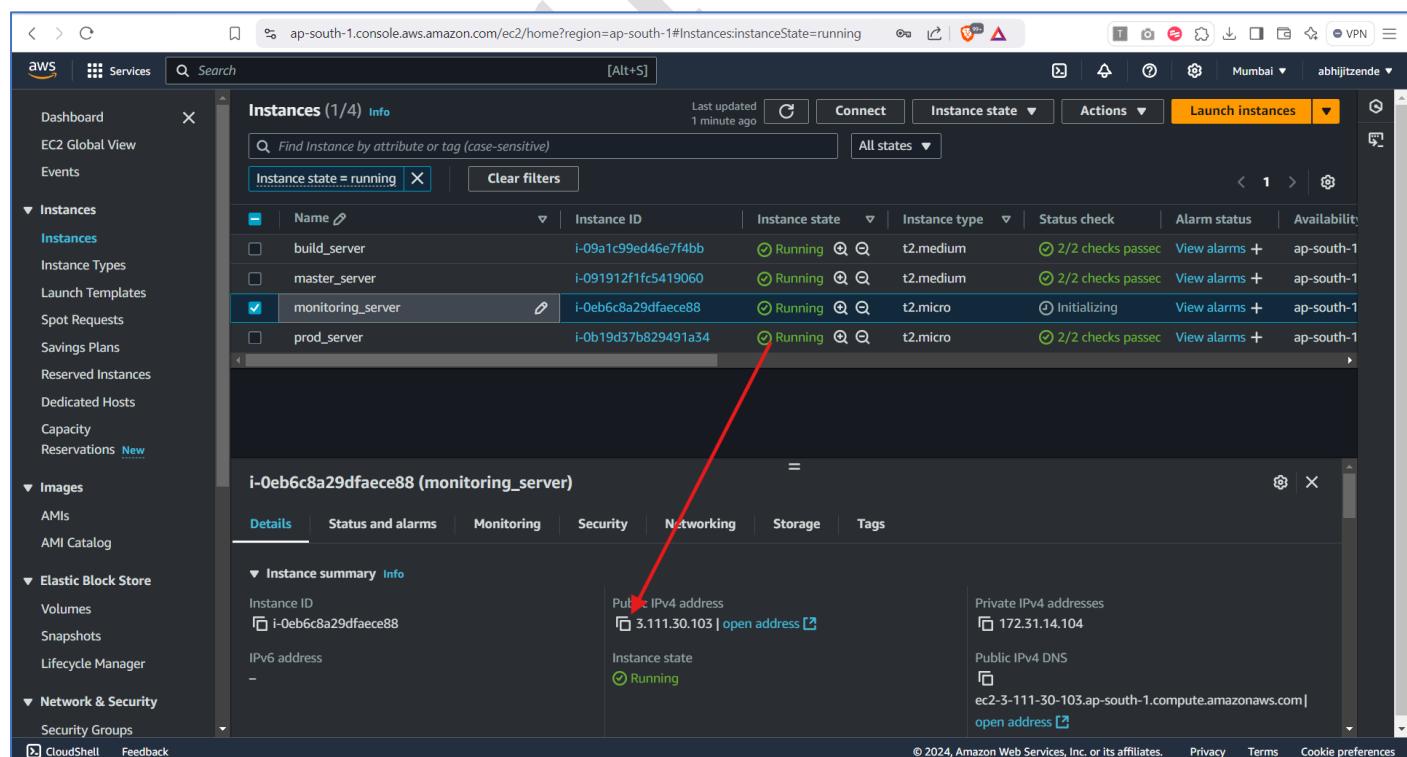


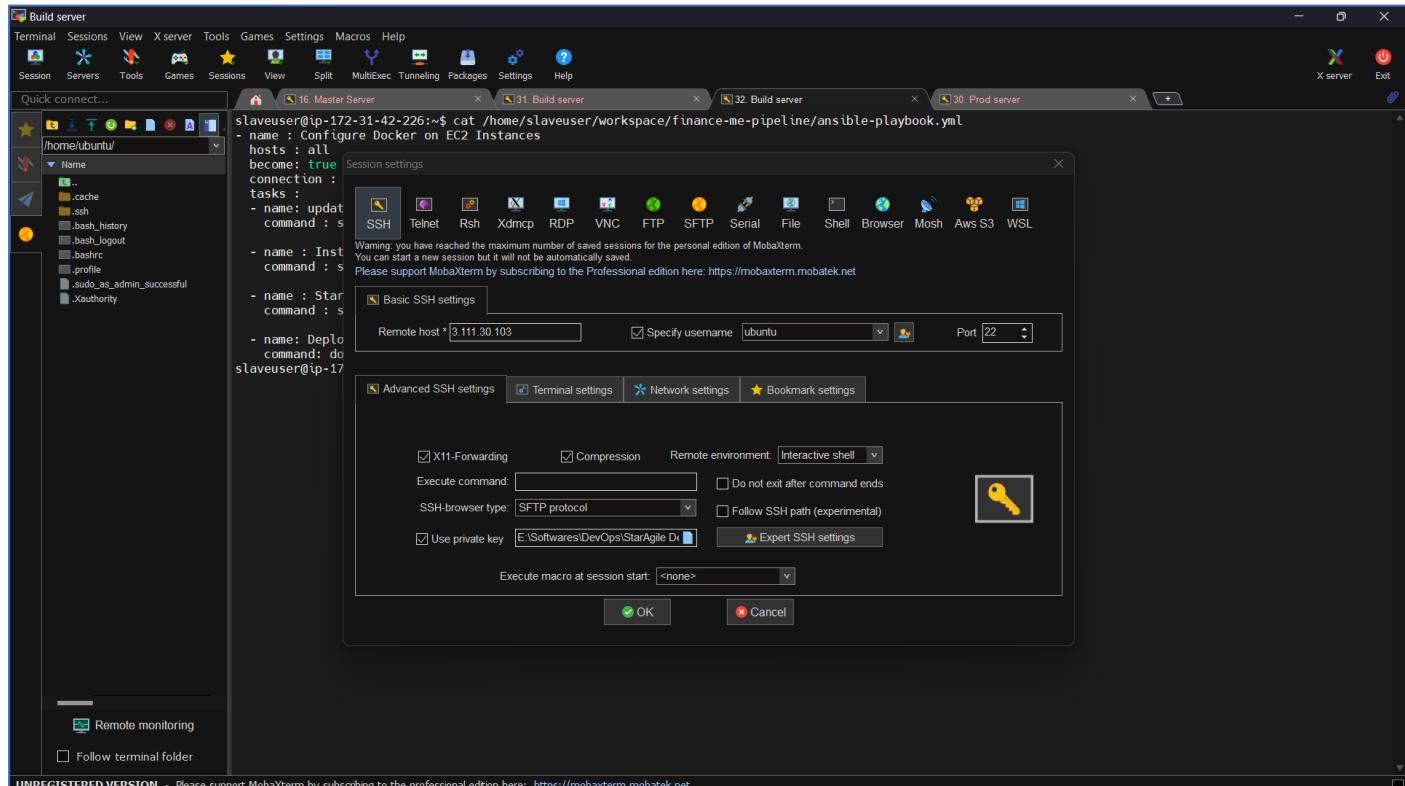
Phase 3 - Continuous monitoring:

Steps:

Step 1: Install Prometheus on Monitoring server:

1. SSH into the monitoring server
2. Download the Prometheus installation tar file from the official repository [Pre-compiled Binary download link](https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz) using command
```  
`wget https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz`  
```
3. Extract the tar file using command: `tar -zxvf prometheus-3.0.0-rc.1.linux-amd64.tar.gz`
4. Make Prometheus system service by creating **Prometheus.service** file in '**/etc/systemd/system**'
5. Restart shell deamon `sudo systemctl daemon-reload`
6. Enable Prometheus on startup `systemctl enable prometheus`
7. Open the Prometheus server on <public_IP>:9090





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prometheus.io/download/

The Prometheus monitoring system and time series database. [prometheus/prometheus](https://github.com/prometheus/prometheus)

3.0.0-rc.1 / 2024-11-11 [Pre-release](#) [Release notes](#)

File name	OS	Arch	Size	SHA256 Checksum
prometheus-3.0.0-rc.1.darwin-amd64.tar.gz	darwin	amd64	108.36 MiB	2bbc57e59417fe9f7cc640c990558146272ffdf6b09fa710e00a85f30310f0
prometheus-3.0.0-rc.1.darwin-arm64.tar.gz	darwin	arm64	104.86 MiB	f497a1ce9661b0c2fd47bc0dc2b2625350f70fe61b950c21d81948f484f1d8a
prometheus-3.0.0-rc.1.linux-amd64.tar.gz	linux	amd64	107.76 MiB	493567874ce6dd64c06c380c0e95d851acd33e9e1b618d80971a36164c4107
prometheus-3.0.0-rc.1.windows-amd64.zip	windows	amd64	110.30 MiB	5bb2cf07b0f06089a640d825232799ff17caf180c67898955f33cf54f180fc

2.55.1 / 2024-11-04 [Release notes](#)

File name	OS	Arch	Size	SHA256 Checksum
prometheus-2.55.1.darwin-amd64.tar.gz	darwin	amd64	107.05 MiB	ba915f45b680566646fc824f2b09793dbcd2741c157e5a5990e2cb4665b38b498
prometheus-2.55.1.darwin-arm64.tar.gz	darwin	arm64	103.55 MiB	551d557d8b4e5e5ed4fdbfea9622034f6e9ee760986d876736ced885b764bae9
prometheus-2.55.1.linux-amd64.tar.gz	linux	amd64	106.45 MiB	1970bbd42ec31ee162e4079ebda4c08a44432df4dea637141bdbea4b1cd8927
prometheus-2.55.1.windows-amd64.zip	windows	amd64	108.00 MiB	c1a3b1b8cde-308c744d8a44234235efc3104e4ed4d430ab3311d8fa4ad0776d8fb8

```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server x 32. Build server x 30. Prod server x 33. Monitoring server x
root@ip-172-31-14-104:~# wget https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz
2024-11-13 21:34:47 - https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz
Connecting to github.com (github.com) ... 20.207.73.82:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/7c2f993c-acc9-4ba5-ab3e-2c9350f8e0957X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20241113%2Fus-east-1%2F5%2Faws4_request&X-Amz-Date=20241113T12134477X-Amz-Expires=300SX-Amz-Signature=e999da7ec89f3143ebfab7f181ce899072b4faaf260e7321a75ec82b5047ee6b6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-3.0.0-rc.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-11-13 21:34:48 - https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/7c2f993c-acc9-4ba5-ab3e-2c9350f8e0957X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20241113%2Fus-east-1%2F5%2Faws4_request&X-Amz-Date=20241113T12134477X-Amz-Expires=300SX-Amz-Signature=e999da7ec89f3143ebfab7f181ce899072b4faaf260e7321a75ec82b5047ee6b6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-3.0.0-rc.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.110.133, 185.199.111.133, 185.199.108.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)[185.199.110.133]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 112992848 (108MB) [application/octet-stream]
Saving to: 'prometheus-3.0.0-rc.1.linux-amd64.tar.gz'

prometheus-3.0.0-rc.1.linux-amd64.tar.gz 100%[=====] 107.76M 36.1MB/s in 3.0s
2024-11-13 21:34:52 (36.1 MB/s) - 'prometheus-3.0.0-rc.1.linux-amd64.tar.gz' saved [112992848/112992848]

root@ip-172-31-14-104:#

```

```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server x 32. Build server x 30. Prod server x 33. Monitoring server x
root@ip-172-31-14-104:~# wget https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz
2024-11-13 21:34:47 - https://github.com/prometheus/prometheus/releases/download/v3.0.0-rc.1/prometheus-3.0.0-rc.1.linux-amd64.tar.gz
Connecting to github.com (github.com) ... 20.207.73.82:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/7c2f993c-acc9-4ba5-ab3e-2c9350f8e0957X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20241113%2Fus-east-1%2F5%2Faws4_request&X-Amz-Date=20241113T12134477X-Amz-Expires=300SX-Amz-Signature=e999da7ec89f3143ebfab7f181ce899072b4faaf260e7321a75ec82b5047ee6b6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-3.0.0-rc.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-11-13 21:34:48 - https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/7c2f993c-acc9-4ba5-ab3e-2c9350f8e0957X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20241113%2Fus-east-1%2F5%2Faws4_request&X-Amz-Date=20241113T12134477X-Amz-Expires=300SX-Amz-Signature=e999da7ec89f3143ebfab7f181ce899072b4faaf260e7321a75ec82b5047ee6b6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-3.0.0-rc.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.110.133, 185.199.111.133, 185.199.108.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)[185.199.110.133]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 112992848 (108MB) [application/octet-stream]
Saving to: 'prometheus-3.0.0-rc.1.linux-amd64.tar.gz'

prometheus-3.0.0-rc.1.linux-amd64.tar.gz 100%[=====] 107.76M 36.1MB/s in 3.0s
2024-11-13 21:34:52 (36.1 MB/s) - 'prometheus-3.0.0-rc.1.linux-amd64.tar.gz' saved [112992848/112992848]

root@ip-172-31-14-104:~# tar -xvf prometheus-3.0.0-rc.1.linux-amd64.tar.gz
prometheus-3.0.0-rc.1.linux-amd64/
prometheus-3.0.0-rc.1.linux-amd64/promtool
prometheus-3.0.0-rc.1.linux-amd64/LICENSE
prometheus-3.0.0-rc.1.linux-amd64/prometheus
prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml
prometheus-3.0.0-rc.1.linux-amd64/NOTICE
root@ip-172-31-14-104:~# echo 'yes'
yes
root@ip-172-31-14-104:~# sudo vi /etc/systemd/system/prometheus.service

```

MobaXterm session titled 'Monitoring server' showing the configuration file for the 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-3.0.0-rc.1.linux-amd64/prometheus --config.file=/root/prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml

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

The terminal window shows the configuration file for the Prometheus service. The configuration includes the service's description, user (root), restart policy (on failure), and the command to start it (ExecStart). It also specifies the wanted by target (multi-user.target).

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MobaXterm session titled 'Monitoring server' showing the terminal output of the Prometheus service setup.

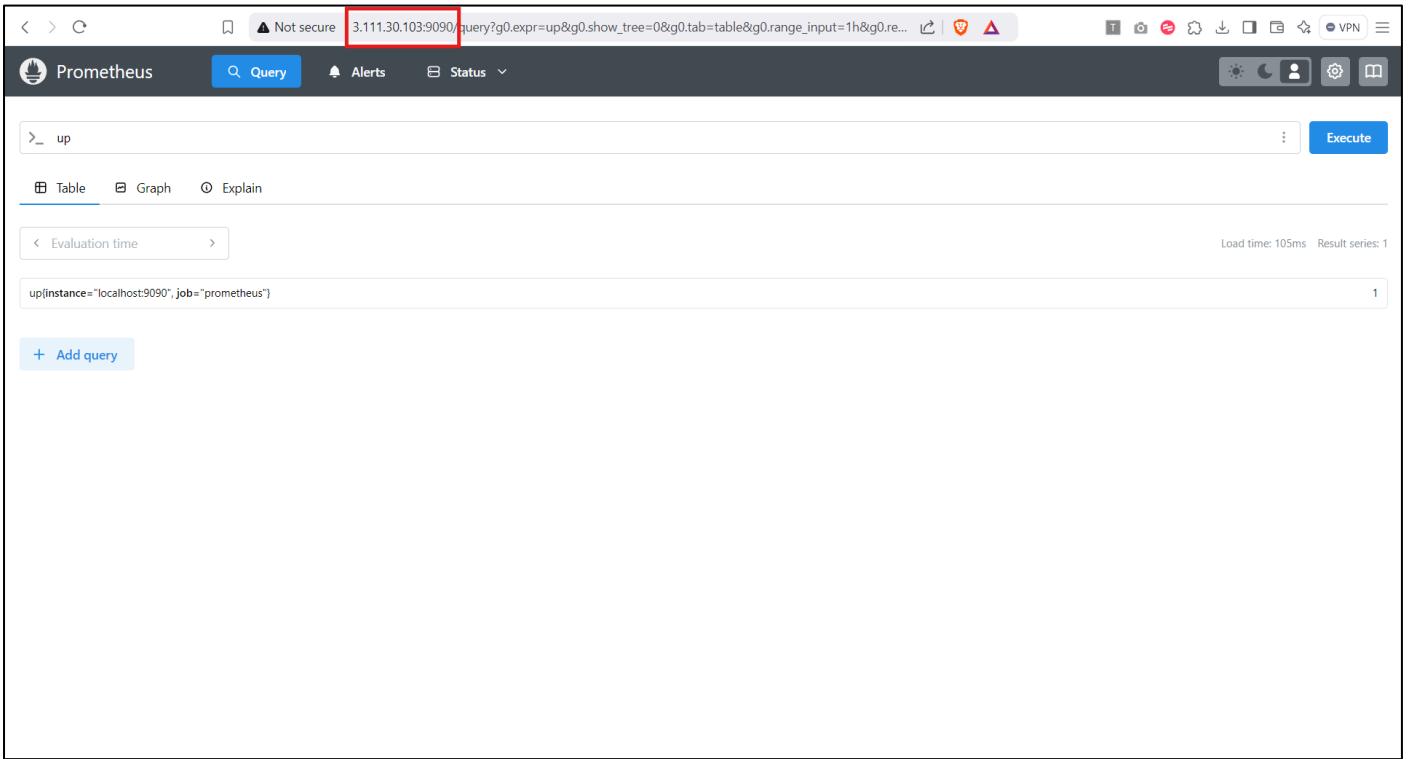
```
2024-11-13 21:34:52 (36.1 MB/s) - 'prometheus-3.0.0-rc.1.linux-amd64.tar.gz' saved [112992848/112992848]

root@ip-172-31-14-104:~# tar -zxf prometheus-3.0.0-rc.1.linux-amd64.tar.gz
prometheus-3.0.0-rc.1.linux-amd64/
prometheus-3.0.0-rc.1.linux-amd64/promtool
prometheus-3.0.0-rc.1.linux-amd64/LICENSE
prometheus-3.0.0-rc.1.linux-amd64/prometheus
prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml
prometheus-3.0.0-rc.1.linux-amd64/NOTICE
root@ip-172-31-14-104:~# echo 'yes'
yes
root@ip-172-31-14-104:~# sudo vi /etc/systemd/system/prometheus.service
root@ip-172-31-14-104:~# sudo systemctl daemon-reload
root@ip-172-31-14-104:~# sudo systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; disabled; vendor preset: enabled)
     Active: inactive (dead)
       Docs: https://prometheus.io/docs/introduction/overview/
root@ip-172-31-14-104:~# sudo systemctl start prometheus
root@ip-172-31-14-104:~# sudo systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; disabled; vendor preset: enabled)
   Active: active (running) since Wed 2024-11-13 21:43:53 UTC; 3s ago
     Docs: https://prometheus.io/docs/introduction/overview/
      Main PID: 1052 (prometheus)
         Tasks: 6 (limit: 1130)
        Memory: 15.4M
           CPU: 49ms
          CGroup: /system.slice/prometheus.service
                  └─1052 /root/prometheus-3.0.0-rc.1.linux-amd64/prometheus --config.file=/root/prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml

Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.699Z level=INFO source=head.go:723 msg="Playing WAL, this may take a while" component=tldb segment=0
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.699Z level=INFO source=head.go:795 msg="WAL segment loaded" component=tldb segment=0
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.699Z level=INFO source=head.go:832 msg="WAL replay completed" component=tldb check=0
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.701Z level=INFO source=main.go:1261 msg="Filesystem information" fs_type=EXT4_SUPP
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.701Z level=INFO source=main.go:1264 msg="TSDs started"
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.701Z level=INFO source=main.go:1447 msg="Loading configuration file" filename=/root/prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.705Z level=INFO source=main.go:1486 msg="Updated GOGC" old=100 new=75
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.705Z level=INFO source=main.go:1496 msg="Completed loading of configuration file"
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.705Z level=INFO source=main.go:1225 msg="Server is ready to receive web requests."
Nov 13 21:43:53 ip-172-31-14-104 prometheus[1052]: time=2024-11-13T21:43:53.705Z level=INFO source=manager.go:168 msg="Starting rule manager..." component=ruler
root@ip-172-31-14-104:~# systemctl enable prometheus
Created symlink /etc/systemd/system/multi-user.target.wants/prometheus.service → /etc/systemd/system/prometheus.service.
```

The terminal output shows the extraction of the Prometheus tarball, editing of the service configuration, reloading of the systemd daemon, and starting of the Prometheus service. It also shows the initial log output where the server is playing the WAL and loading its configuration file. Finally, it enables the service to start at boot.

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Step 2: Install Grafana on Monitoring server:

1. Follow the official guide at: <https://grafana.com/docs/grafana/latest/setup-grafana/installation/debian/>
2. Install the prerequisite packages ` sudo apt-get install -y apt-transport-https software-properties-common wget`
3. Import the GPG key ` sudo mkdir -p /etc/apt/keyrings/ wget -q -O - https://apt.grafana.com/gpg.key | gpg --dearmor | sudo tee /etc/apt/keyrings/grafana.gpg > /dev/null`
4. To add a repository for stable releases, run the following command:
```  
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  
```
5. Run the following command to update the list of available packages:
`sudo apt-get update`
6. To install Grafana OSS, run the following command:
`sudo apt-get install grafana`
7. Enable Grafana service `systemctl enable grafana-server.service`

8. Open Grafana server on <IP_Address>:3000

9. Default Username: **admin** Default Password: **admin**. Use this to Login

10. Set new password

```
root@ip-172-31-14-104:~# sudo apt-get install -y apt-transport-https software-properties-common wget
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'apt' instead of 'apt-transport-https'
apt is already the newest version (2.4.13).
apt set to manually installed.
software-properties-common is already the newest version (0.99.22.9).
software-properties-common set to manually installed.
wget is already the newest version (1.21.2-2ubuntu1.1).
wget set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@ip-172-31-14-104:~# sudo mkdir -p /etc/apt/keyrings
wget -q -O https://apt.grafana.com/gpg.key | gpg --dearmor | sudo tee /etc/apt/keyrings/grafana.gpg > /dev/null
root@ip-172-31-14-104:~# 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
deb [signed-by=/etc/apt/keyrings/grafana.gpg] https://apt.grafana.com stable main
root@ip-172-31-14-104:~# Updates the list of available packages
sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:4 https://apt.grafana.com stable InRelease [7661 B]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:8 https://apt.grafana.com stable/main amd64 Packages [312 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2149 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [367 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [17.9 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2633 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [612 B]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1134 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [265 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [10.8 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [43.3 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.1 kB]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Translation-en [11.1 kB]
```

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```
root@ip-172-31-14-104:~# # Updates the list of available packages
sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 https://apt.grafana.com stable InRelease [7661 B]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:8 https://apt.grafana.com stable/main amd64 Packages [312 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2149 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [367 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [17.9 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2633 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [455 kB]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [612 B]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1134 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [265 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [43.3 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [10.8 kB]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.1 kB]
Get:27 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:28 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:29 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [28.8 kB]
Get:30 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.5 kB]
Get:31 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:32 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1932 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [399 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [13.3 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2573 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [444 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [580 B]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [913 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [181 kB]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.2 kB]
```

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```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server 32. Build server 30. Prod server 34. Monitoring server
Get:43 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [7588 B]
Get:44 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 34.7 MB in 40s (863 kB/s)
Reading package lists... Done
root@ip-172-31-14-104:~# # Installs the latest OSS release:
sudo apt-get install grafana
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  musl
The following NEW packages will be installed:
  grafana musl
0 upgraded, 2 newly installed, 0 to remove and 16 not upgraded.
Need to get 127 MB of archives.
After this operation, 470 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 musl amd64 1.2.2-4 [407 kB]
Get:2 https://apt.grafana.com/stable/main amd64 grafana amd64 11.3.0-01 [126 MB]
Fetched 127 MB in 18s (6887 kB/s)
Selecting previously unselected package musl:amd64.
(Reading database ... 65783 files and directories currently installed.)
Preparing to unpack .../musl_1.2.2-4_amd64.deb ...
Unpacking musl:amd64 (1.2.2-4) ...
Selecting previously unselected package grafana.
Preparing to unpack .../grafana_11.3.0-01_amd64.deb ...
Unpacking grafana (11.3.0-01) ...
Setting up musl:amd64 (1.2.2-4) ...
Setting up grafana (11.3.0-01) ...
Adding system user 'grafana' (UID 115) ...
Adding new user 'grafana' (UID 115) with group 'grafana' ...
Not creating home directory '/usr/share/grafana'.
## 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
## You can start grafana-server by executing
sudo /bin/systemctl start grafana-server
Processing triggers for man-db (2.10.2-1) ...
Scanning processes...
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.

```

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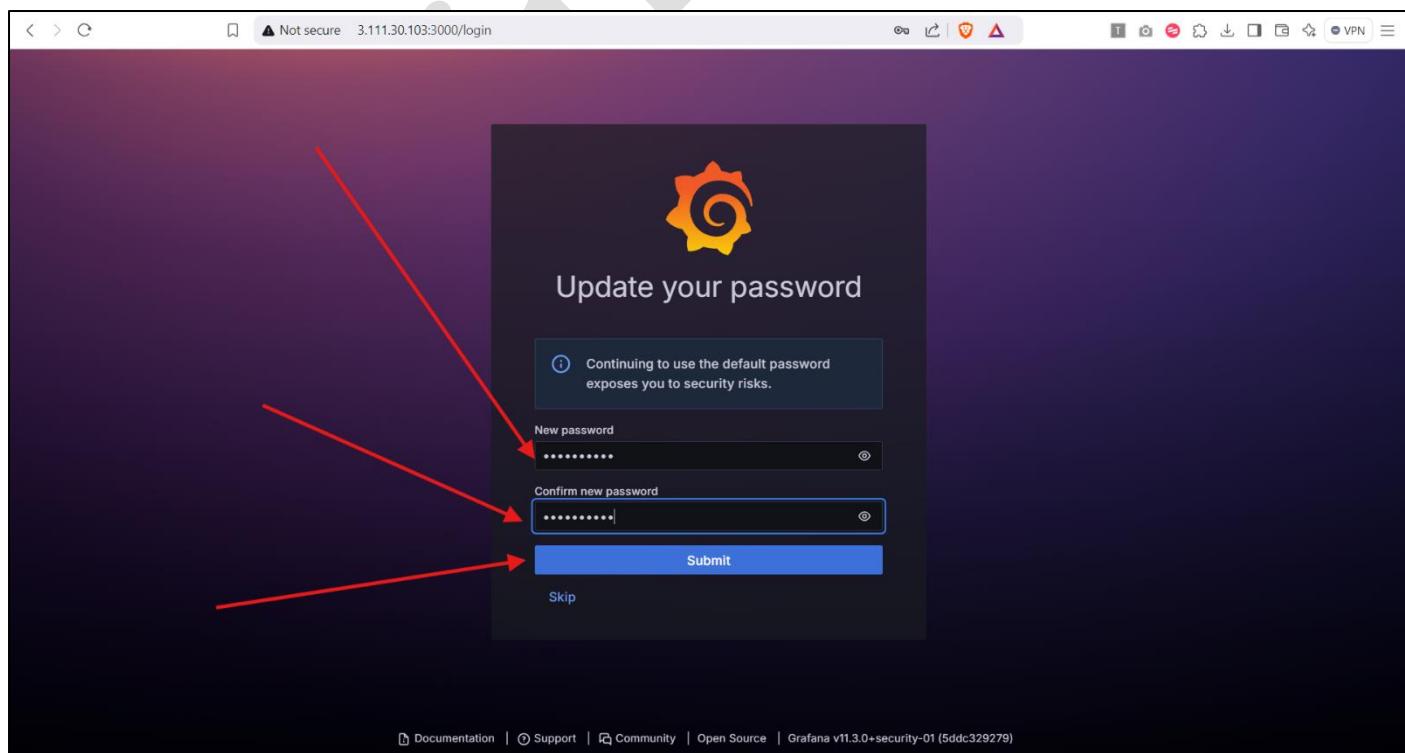
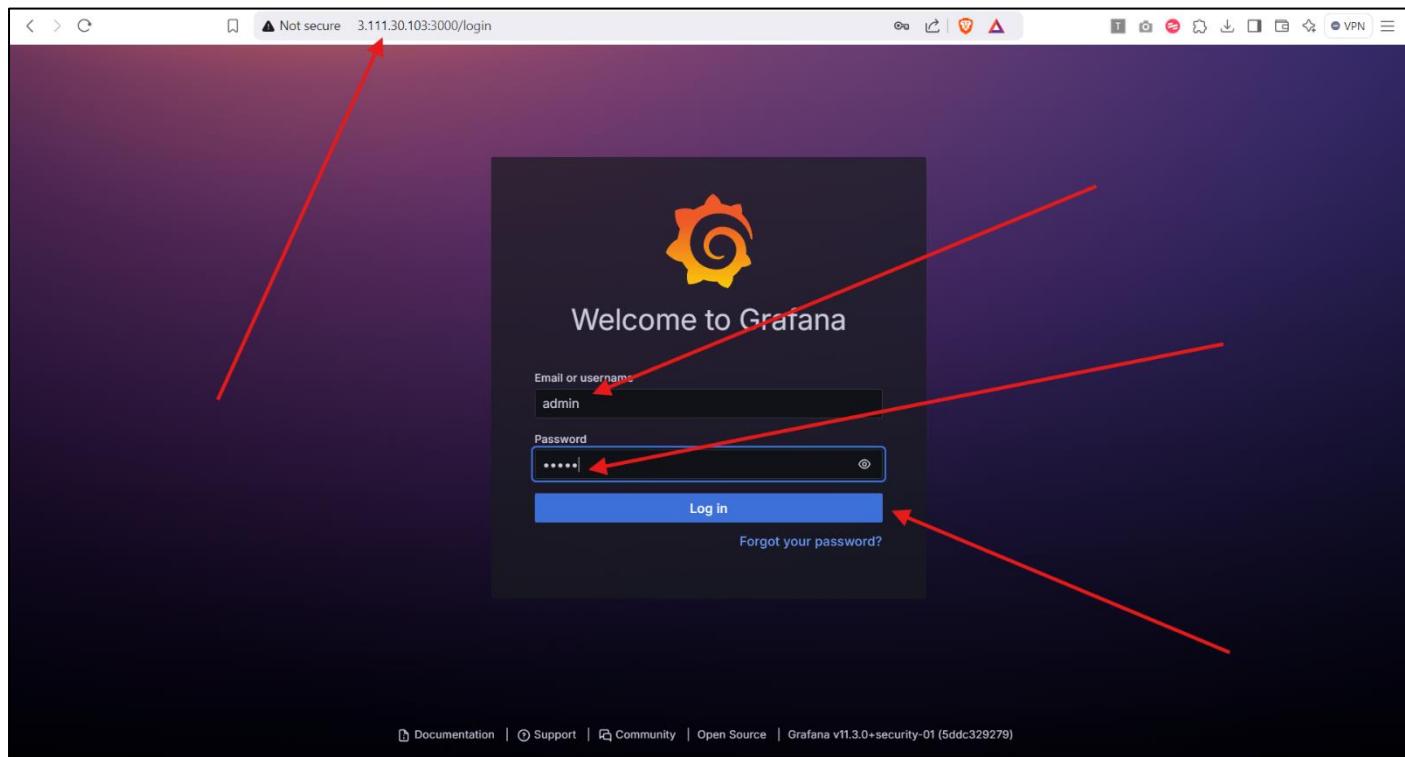
```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server 32. Build server 30. Prod server 34. Monitoring server
root@ip-172-31-14-104:~# systemctl enable grafana-server.service
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-172-31-14-104:~# systemctl status grafana-server
● grafana-server.service - Grafana instance
   Loaded: loaded (/lib/systemd/system/grafana-server.service; enabled; vendor preset: enabled)
     Active: inactive (dead)
       Docs: http://docs.grafana.org
root@ip-172-31-14-104:~# systemctl start grafana-server.service
root@ip-172-31-14-104:~# 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 Wed 2024-11-13 22:02:56 UTC; 5s ago
       Docs: http://docs.grafana.org
         Main PID: 2427 (grafana)
            Tasks: 6 (limit: 1130)
           Memory: 155.3M
              CPU: 1.261s
             CGroup: /system.slice/grafana-server.service
                     └─2427 /usr/share/grafana/bin/grafana server --config=/etc/grafana/grafana.ini --pidfile=/run/grafana/grafana-server.pid --packaging=deb cfg=def

Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.160406579Z level=info msg="Migration successfully executed" id="Add and Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.168304323Z level=info msg="Executing migration" id="update group index Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.168822554Z level=info msg="Migration successfully executed" id="update Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.175184525Z level=info msg="Executing migration" id="managed folder permission Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.175493662Z level=info msg="Migration successfully executed" id="managed folder Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.181909935Z level=info msg="Executing migration" id="admin only folder" Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.182497657Z level=info msg="Migration successfully executed" id="admin only folder Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.188797253Z level=info msg="Executing migration" id="add action column" Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.195464801Z level=info msg="Migration successfully executed" id="add action column Nov 13 22:03:02 ip-172-31-14-104 grafana[2427]: logger=migrator t=2024-11-13T22:03:02.203263362Z level=info msg="Executing migration" id="add scope column to >
root@ip-172-31-14-104:~#

```

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Step 3: Install Node exporter on both Build and Prod server:

1. SSH into both the instances
2. Download the pre-compile tar file from official repository https://github.com/prometheus/node_exporter/releases/download/v1.8.2/node_exporter-1.8.2.linux-amd64.tar.gz using command:
`wget https://github.com/prometheus/node_exporter/releases/download/v1.8.2/node_exporter-1.8.2.linux-amd64.tar.gz`
3. Extract the tar file using command:
`tar -zxvf node_exporter-1.8.2.linux-amd64.tar.gz`
4. Make Node exporter as a system service
5. Reload system daemon
6. Start the Node exporter service
7. Enable Node exporter service
8. Add both the servers(**Build & Prod**) as targets inside the **prometheus.yml** file in the Monitoring server
9. Restart Prometheus server
10. Check if both the servers are sending metrics or metrics are pulled by node exporter and being collected in **Prometheus** server

The screenshot shows a MobaXterm window with three tabs: 'Master Server', 'Build server', and 'Prod server'. The 'Build server' tab is active, displaying a terminal session. Red arrows highlight several lines of the terminal output:

- An arrow points to the command `root@ip-172-31-42-226:~\$ sudo -i`.
- An arrow points to the command `root@ip-172-31-42-226:# wget https://github.com/prometheus/node_exporter/releases/download/v1.8.2/node_exporter-1.8.2.linux-amd64.tar.gz`.
- An arrow points to the progress bar at the bottom of the terminal window, indicating the download of the tar file.
- An arrow points to the command `root@ip-172-31-42-226:# tar -zxvf node_exporter-1.8.2.linux-amd64.tar.gz`.

The terminal also shows the user navigating through the directory structure and listing files.

```

Prod server
terminal Sessions View Xserver Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16 Master Server x 35 Build server x 36 Prod server x 34 Monitoring server x
ubuntu@ip-172-31-6-141:~$ sudo -i
root@ip-172-31-6-141:# wget https://github.com/prometheus/node_exporter/releases/download/v1.8.2/node_exporter-1.8.2.linux-amd64.tar.gz
--2024-11-13 22:21:53-- https://github.com/prometheus/node_exporter/releases/download/v1.8.2/node_exporter-1.8.2.linux-amd64.tar.gz
Resolving github.com (github.com)... 20.207.73.82
Connecting to github.com (github.com)|20.207.73.82|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/a7e04f41-5543-40e2-9060-26fe32bb4b?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseasetprod0n%2F20241113%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20241113T221547Z&X-Amz-Expires=300s&X-Amz-Signature=fdf8b8872cd7daa5289caeb3e4b9d39ff69f21daa823ffcb9eb40ff7367ff144&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.8.2.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-11-13 22:21:54-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/a7e04f41-5543-40e2-9060-26fe32bb4b?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseasetprod0n%2F20241113%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20241113T221547Z&X-Amz-Expires=300s&X-Amz-Signature=fdf8b8872cd7daa5289caeb3e4b9d39ff69f21daa823ffcb9eb40ff7367ff144&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.8.2.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.111.133, 185.199.108.133, 185.199.109.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.111.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10676343 (10M) [application/octet-stream]
Saving to: 'node_exporter-1.8.2.linux-amd64.tar.gz' [=====]

node_exporter-1.8.2.linux-amd64.tar.gz 100%[=====] 10.18M --KB/s in 0.1s

2024-11-13 22:21:55 (68.7 MB/s) - 'node_exporter-1.8.2.linux-amd64.tar.gz' saved [10676343/10676343]

root@ip-172-31-6-141:# tar -zxfv
tar: option requires an argument -- 'f'
Try 'tar --help' or 'tar --usage' for more information.
root@ip-172-31-6-141:# tar -zxfv node_exporter-1.8.2.linux-amd64.tar.gz
node_exporter-1.8.2.linux-amd64/
node_exporter-1.8.2.linux-amd64/node_exporter
node_exporter-1.8.2.linux-amd64/LICENSE
root@ip-172-31-6-141:~#
```

Remote monitoring

Follow terminal folder

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```

Build server
Terminal Sessions View Xserver Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16 Master Server x 35 Build server x 36 Prod server x 34 Monitoring server x
[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-1.8.2.linux-amd64/node_exporter

[Install]
WantedBy=multi-user.target
~

:wq!
```

Remote monitoring

Follow terminal folder

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The screenshot shows the Prod server application interface with the following details:

- Top Bar:** Prod server, Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help.
- Left Sidebar:** Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, Help.
- File Browser:** Quick connect..., /home/ubuntu/. Namei (selected). The tree view shows the following structure:
 - ..
 - .ansible
 - .cache
 - .ssh
 - .bash_history
 - .bash_logout
 - .bshrc
 - .profile
 - .sudo_as_admin_successful
 - .Xauthority
- Terminal Tabs:** 16 Master Server, 35 Build server, 36 Prod server, 34 Monitoring server.
- Bottom Status Bar:** Remote monitoring, Follow terminal folder, :wc.
- Bottom Footer:** UNREGISTERED VERSION, Prod server 2.0.0.0-RC1, Copyright © 2018-2020.

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```
Build server
Terminal Sessions View Xserver Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 16. Master Server 35. Build server 36. Prod server 34. Monitoring server ...
Length: 10676343 (10M) [application/octet-stream]
Saving to: 'node_exporter-1.8.2.linux-amd64.tar.gz'
node_exporter-1.8.2.linux-amd64.tar.gz 100%[=====] 10.18M 30.6MB/s in 0.3s
2024-11-13 22:21:52 (30.6 MB/s) - 'node_exporter-1.8.2.linux-amd64.tar.gz' saved [10676343/10676343]
root@ip-172-31-42-226:~# tar -zxf node_exporter-1.8.2.linux-amd64.tar.gz
node_exporter-1.8.2.linux-amd64/
node_exporter-1.8.2.linux-amd64/NOTICE
node_exporter-1.8.2.linux-amd64/node_exporter
node_exporter-1.8.2.linux-amd64/LICENSE
root@ip-172-31-42-226:~# sudo vi /etc/systemd/system/node_exporter.service
root@ip-172-31-42-226:~# sudo systemctl daemon-reload
root@ip-172-31-42-226:~# sudo 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-172-31-42-226:~# sudo systemctl start node_exporter
root@ip-172-31-42-226:~# sudo 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 Wed 2024-11-13 22:28:32 UTC; 14s ago
      Docs: https://prometheus.io/docs/introduction/overview/
    Main PID: 6251 (node_exporter)
       Tasks: 5 (limit: 4676)
      Memory: 2.6M
        CPU: 7ms
       CGroup: /system.slice/node_exporter.service
               └─6251 /root/node_exporter-1.8.2.linux-amd64/node_exporter

Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=ttime
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=tmem
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=queues
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=uname
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=vmstat
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=zfs
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=node_exporter.go:118 level=info collector=zfs
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=tls_config.go:313 level=info msg="Listening on address=[::]:9100"
Nov 13 22:28:32 ip-172-31-42-226 node_exporter[6251]: ts=2024-11-13T22:28:32.523Z caller=tls_config.go:316 level=info msg="TLS is disabled." http2=false addr=
root@ip-172-31-42-226:~# sudo systemctl enable node_exporter
Created symlink /etc/systemd/system/multi-user.target.wants/node_exporter.service.
root@ip-172-31-42-226:~#
```

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```

root@ip-172-31-6-141:~# tar -zxf node_exporter-1.8.2.linux-amd64.tar.gz
node_exporter-1.8.2.linux-amd64/
node_exporter-1.8.2.linux-amd64/NOTICE
node_exporter-1.8.2.linux-amd64/node_exporter
node_exporter-1.8.2.linux-amd64/LICENSE
root@ip-172-31-6-141:~# sudo vi /etc/systemd/system/node_exporter.service
root@ip-172-31-6-141:~# sudo systemctl daemon-reload
root@ip-172-31-6-141:~# sudo systemctl status node_exporter
● node_exporter.service
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: inactive (dead)

Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:1: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:2: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:3: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:4: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:1: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:2: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:3: Assignment outside of section. Ignoring.
Nov 13 22:28:09 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:4: Assignment outside of section. Ignoring.
root@ip-172-31-6-141:~# sudo systemctl start node_exporter
root@ip-172-31-6-141:~# sudo systemctl status node_exporter
● node_exporter.service
    Loaded: loaded (/etc/systemd/system/node_exporter.service; disabled; vendor preset: enabled)
      Active: active (running) since Wed 2024-11-13 22:28:39 UTC; 12s ago
        Tasks: 3 (limit: 1130)
       Memory: 2.0M
         CPU: 7ms
      CGroup: /system.slice/node_exporter.service
              └─9021 /root/node_exporter-1.8.2.linux-amd64/node_exporter

Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.983Z caller=node_exporter.go:118 level=info collector=vmsstat
Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.983Z caller=node_exporter.go:118 level=info collector=watchdog
Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.983Z caller=node_exporter.go:118 level=info collector=xfs
Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.983Z caller=node_exporter.go:118 level=info collector=zfs
Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.984Z caller=tls_config.go:316 level=info msg="Listening on" address=[::]:9100
Nov 13 22:28:39 ip-172-31-6-141 node_exporter[9021]: ts=2024-11-13T22:28:39.984Z caller=tls_config.go:316 level=info msg="TLS is disabled." http2=false address=[::]
Nov 13 22:28:52 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:1: Assignment outside of section. Ignoring.
Nov 13 22:28:52 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:2: Assignment outside of section. Ignoring.
Nov 13 22:28:52 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:3: Assignment outside of section. Ignoring.
Nov 13 22:28:52 ip-172-31-6-141 systemd[1]: /etc/systemd/system/node_exporter.service:4: Assignment outside of section. Ignoring.
root@ip-172-31-6-141:~# sudo systemctl enable node_exporter
Created symlink /etc/systemd/system/multi-user.target.wants/node_exporter.service → /etc/systemd/system/node_exporter.service.
root@ip-172-31-6-141:~#

```

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

- Instances (1/4) Info**: Shows 1 instance running.
- Filter**: Instance state = running.
- Instances Table**:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
monitoring_server	i-0eb6c8a29dfaee88	Running	t2.micro	Initializing	View alarms +	ap-south-1
prod_server	i-0b19d37b029491a34	Running	t2.micro	2/2 checks passed	View alarms +	ap-south-1
- Instance Details for build_server (i-09a1c99ed46e7f4bb)**:
 - Public IPv4 address**: 13.232.17.86 | [open address](#)
 - Private IPv4 addresses**: 172.31.42.226
 - Public IPv4 DNS**: ec2-13-232-17-86.ap-south-1.compute.amazonaws.com | [open address](#)

A screenshot of a web browser displaying the Prometheus Node Exporter metrics page. The URL in the address bar is `13.232.17.86:9100`. The page has an orange header with the text "Node Exporter". Below the header, it says "Prometheus Node Exporter" and "Version: (version=1.8.2, branch=HEAD, revision=f1e0e8360aa60b6cb5e5cc1560bed348fc2c1895)". There is a single link labeled "Metrics". A red arrow points from the top of the image towards the URL in the address bar.

A screenshot of the AWS Management Console EC2 Instances page. The URL is `ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Instances:instanceState=running`. The left sidebar shows navigation options like Dashboard, Services, Events, Instances, Images, Elastic Block Store, and Network & Security. The main area displays a table of running instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
build_server	i-09a1c99ed46e7f4bb	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
master_server	i-091912f1fc5419060	Running	t2.medium	2/2 checks passed	View alarms +	ap-south-1
monitoring_server	i-0eb6c8a29dfaece88	Running	t2.micro	Initializing	View alarms +	ap-south-1
prod_server	i-0b19d37b829491a34	Running	t2.micro	2/2 checks passed	View alarms +	ap-south-1

Below the table, the details for the **i-0b19d37b829491a34 (prod_server)** instance are shown. A red arrow points from the top of the image towards the Public IPv4 address field, which contains `13.234.21.13`.

Not secure 13.234.21.13:9100

Node Exporter

Prometheus Node Exporter

Version: (version=1.8.2, branch=HEAD, revision=f1e0e8360aa60b6cb5e5cc1560bed348fc2c1895)

- [Metrics](#)

Monitoring server

Session Servers Tools Sessions View X server Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

ubuntu@ip-172-31-14-104:~\$ sudo -i
root@ip-172-31-14-104:~# cd /root/prometheus-3.0.0-rc.1.linux-amd64/
root@ip-172-31-14-104:~/prometheus-3.0.0-rc.1.linux-amd64# vi prometheus.yml

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```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server 35. Build server 36. Prod server 38. Monitoring server
/home/ubuntu/
# 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"]

    - job_name: "node_exporter"

      static_configs:
        - targets: ["13.232.17.86:9100"]
        - targets: ["13.234.21.13:9100"]

```

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```

Monitoring server
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
16. Master Server 35. Build server 36. Prod server 37. Monitoring server
/home/ubuntu/
ubuntu@ip-172-31-14-104:~$ sudo -i
root@ip-172-31-14-104:~# cd /root/prometheus-3.0.0-rc.1.linux-amd64/
root@ip-172-31-14-104:~/prometheus-3.0.0-rc.1.linux-amd64# vi prometheus.yml
root@ip-172-31-14-104:~/prometheus-3.0.0-rc.1.linux-amd64# sudo systemctl restart prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2024-11-13 22:37:28 UTC; 31s ago
       Docs: https://prometheus.io/docs/introduction/overview/
     Main PID: 2635 (prometheus)
       Tasks: 6 (limit: 1130)
      Memory: 27.0M
         CPU: 165ms
        CGroup: /system.slice/prometheus.service
                └─2635 /root/prometheus-3.0.0-rc.1.linux-amd64/prometheus --config.file=/root/prometheus-3.0.0-rc.1.linux-amd64/prometheus.yml

Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.935Z level=INFO source=head.go:795 msg=WAL segment loaded" component=tedb segment
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.935Z level=INFO source=head.go:795 msg=WAL segment loaded" component=tedb segment
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.935Z level=INFO source=head.go:832 msg=WAL replay completed" component=tedb check
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.937Z level=INFO source=main.go:1261 msg="filesystem information" fs_type=EXT4_SUPP
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.937Z level=INFO source=main.go:1264 msg="TSDB started"
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.942Z level=INFO source=main.go:1447 msg="Loading configuration file" filename=/ro
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.942Z level=INFO source=main.go:1496 msg="Updated GOGC" old=100 new=75
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.942Z level=INFO source=main.go:1496 msg="Completed loading of configuration file"
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.942Z level=INFO source=main.go:1225 msg="Server is ready to receive web requests"
Nov 13 22:37:28 ip-172-31-14-104 prometheus[2635]: time=2024-11-13T22:37:28.942Z level=INFO source=manager.go:168 msg="Starting rule manager..." components=r
root@ip-172-31-14-104:~/prometheus-3.0.0-rc.1.linux-amd64#

```

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The screenshot shows the Prometheus Query interface. The URL is 3.111.30.103:9090/query?g0.expr=up&g0.show_tree=0&g0.tab=table&g0.range_input=1h&g0.refId=1. The query bar contains '>_ up'. Below it are 'Table', 'Graph', and 'Explain' buttons, with 'Table' selected. The results table has three rows:

up{instance="localhost:9090",job="prometheus"}	1
up{instance="13.234.21.13:9100",job="node_exporter"}	1
up{instance="13.232.17.86:9100",job="node_exporter"}	1

Load time: 118ms Result series: 3

Buttons at the bottom include '+ Add query'.

The screenshot shows the Prometheus Targets interface. The URL is 3.111.30.103:9090/targets. The top navigation bar includes 'Status > Target health'. The main area displays two groups of targets:

node_exporter

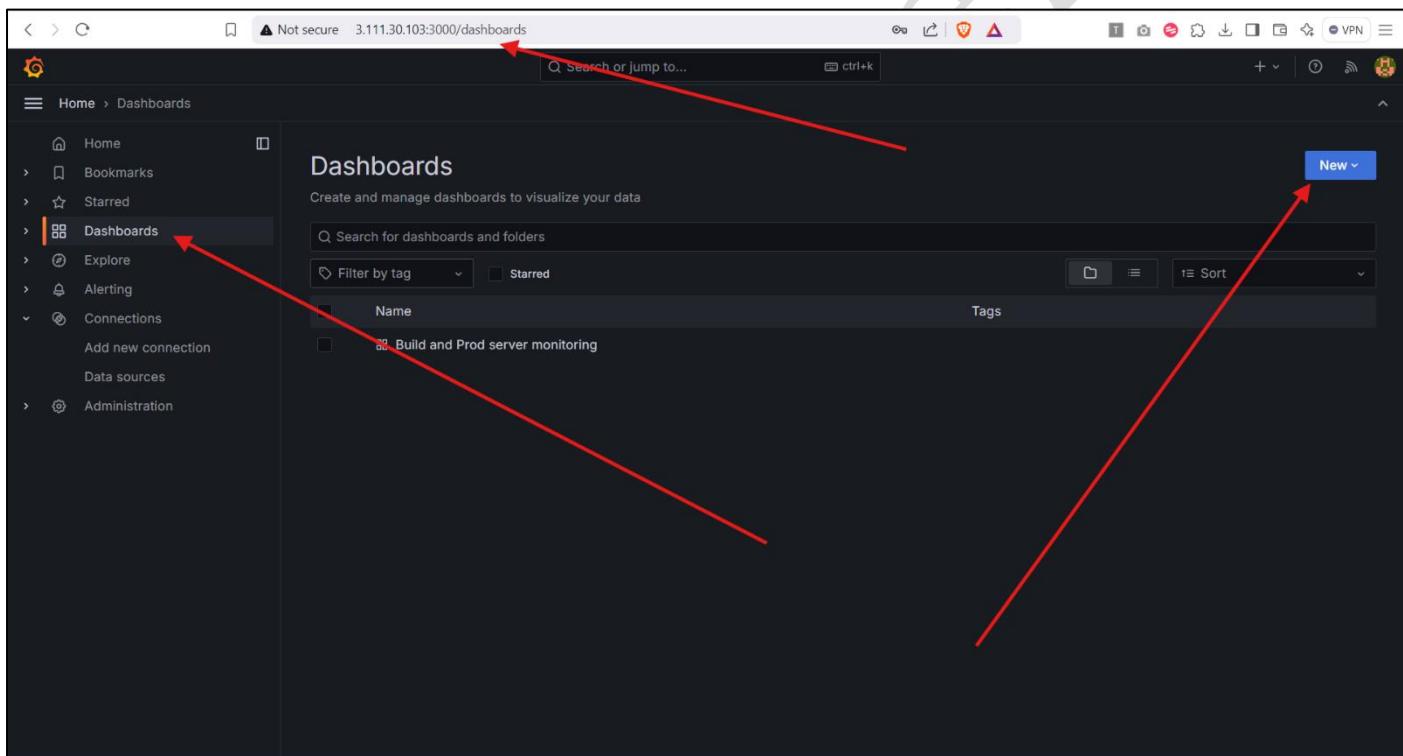
Endpoint	Labels	Last scrape	State
http://13.232.17.86:9100/metrics	instance="13.232.17.86:9100" job="node_exporter"	3.889s ago	10ms UP
http://13.234.21.13:9100/metrics	instance="13.234.21.13:9100" job="node_exporter"	11.176s ago	12ms UP

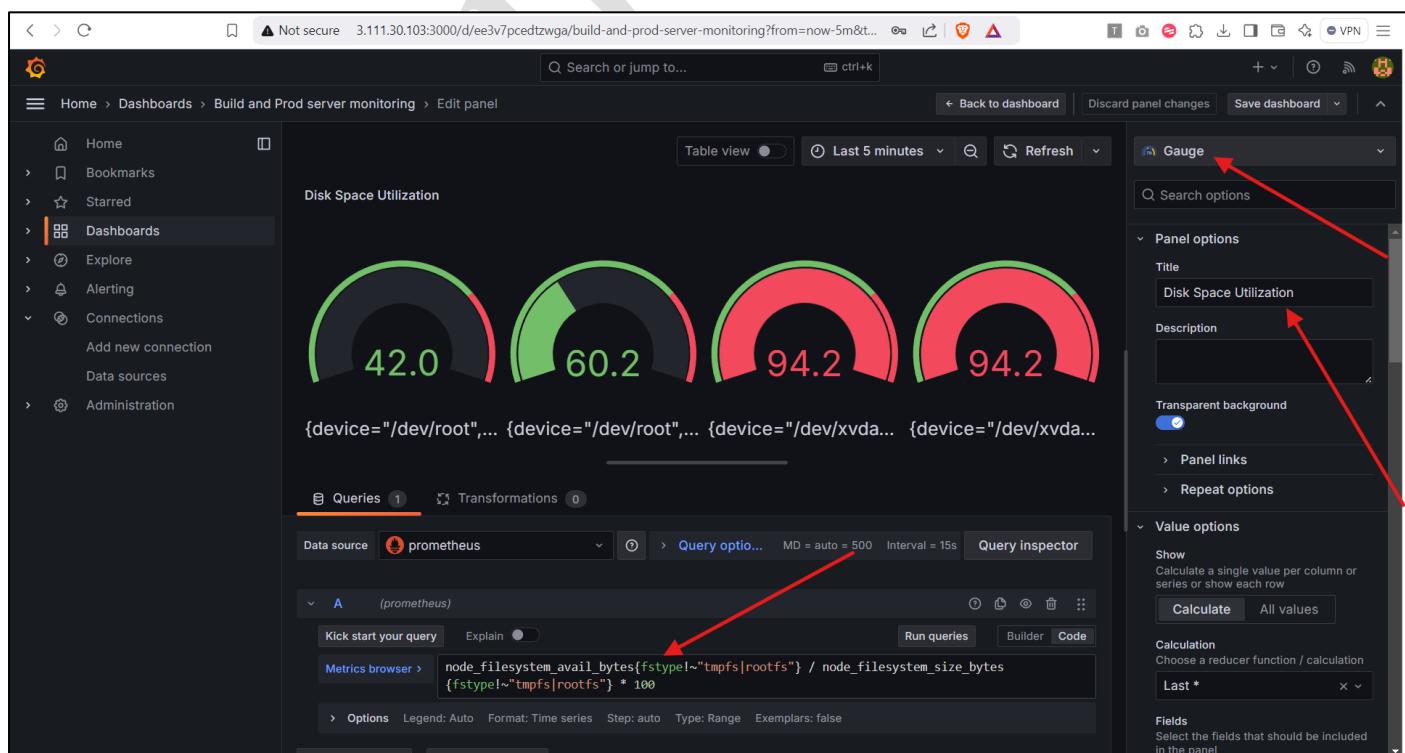
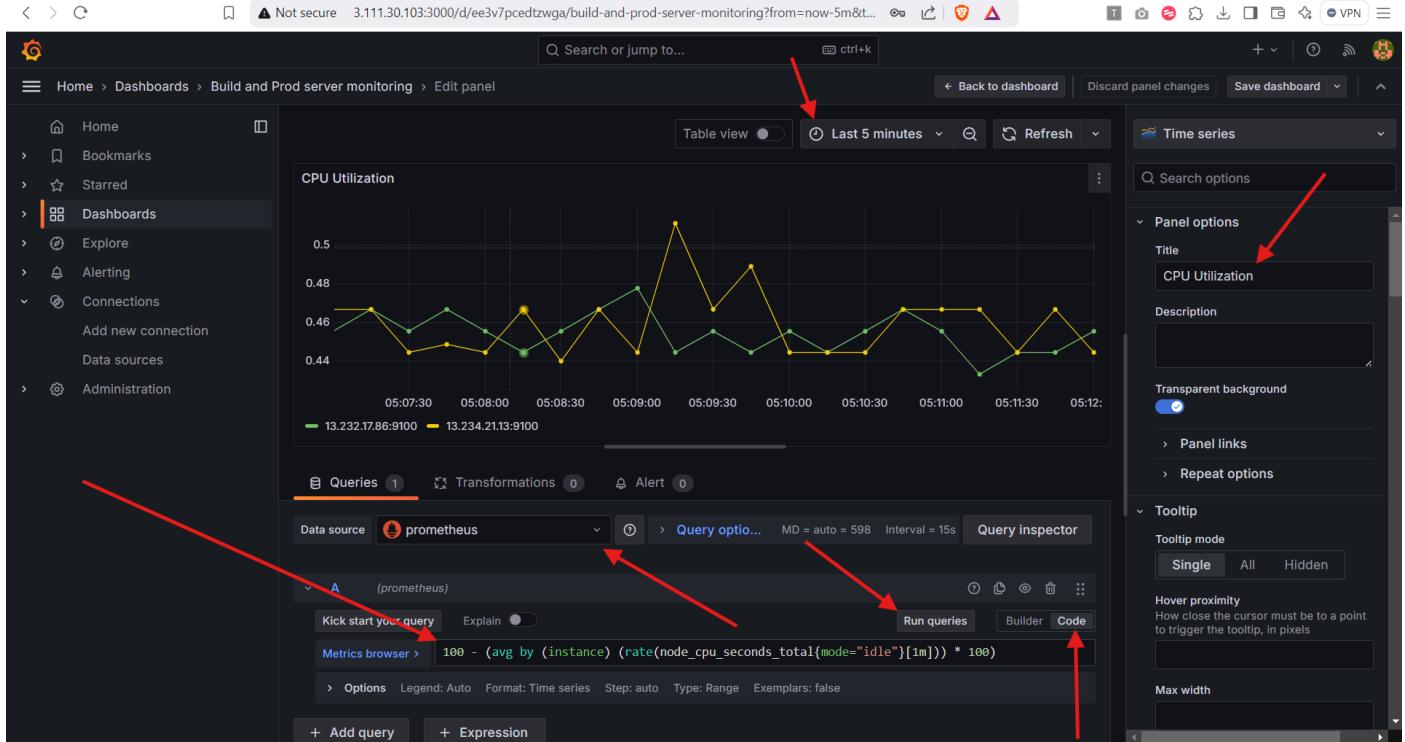
prometheus

Endpoint	Labels	Last scrape	State
http://localhost:9090/metrics	instance="localhost:9090" job="prometheus"	668ms ago	4ms UP

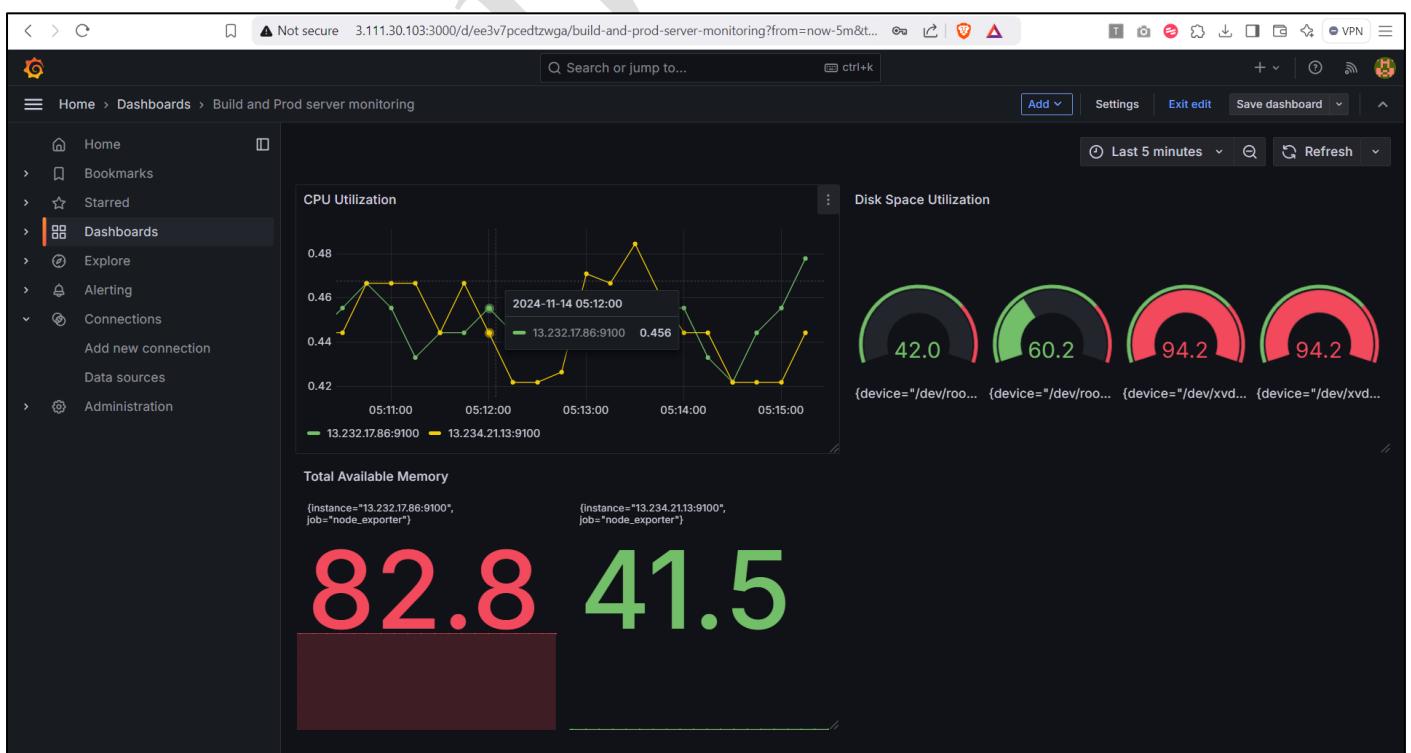
Step 4: Monitor by visualizing metrics data fetched from Prometheus & Node exporter into Grafana dashboard:

1. Add **Prometheus** as **Data Source** in Grafana
2. Create a **New Dashboard**
3. Configure **Panels** for metrics:
 - a. Panel 1: **CPU Utilization**
 - b. Panel 2: **Disk Space Utilization**
 - c. Panel 3: **Total Available Memory**





The screenshot shows the Grafana interface in 'Edit panel' mode. On the left is a sidebar with navigation links like Home, Dashboards, Explore, Alerting, Connections, Data sources, and Administration. The main area displays two large numerical values: '82.8' in red and '41.5' in green, each with a corresponding dark bar chart below it. A red arrow points from the top right towards the 'Stat' icon in the top right corner of the panel header. Another red arrow points from the bottom right towards the 'Title' field in the 'Panel options' section, which contains the text 'Total Available Memory'. Below the main values is a 'Queries' section with one entry. The query details are shown in a modal: 'Data source: prometheus', 'Query: (node_memory_MemAvailable_bytes / node_memory_MemTotal_bytes) * 100', and 'Interval: 15s'. A third red arrow points from the bottom right towards the 'Calculation' dropdown menu, which is set to 'Last *'.



References:

1. Complete Code reference(Terraform + Jenkins Pipeline Groovy script + Ansible playbook + Grafana Dashboard)
<https://github.com/Abhiz2411/finance-me-banking-finance>