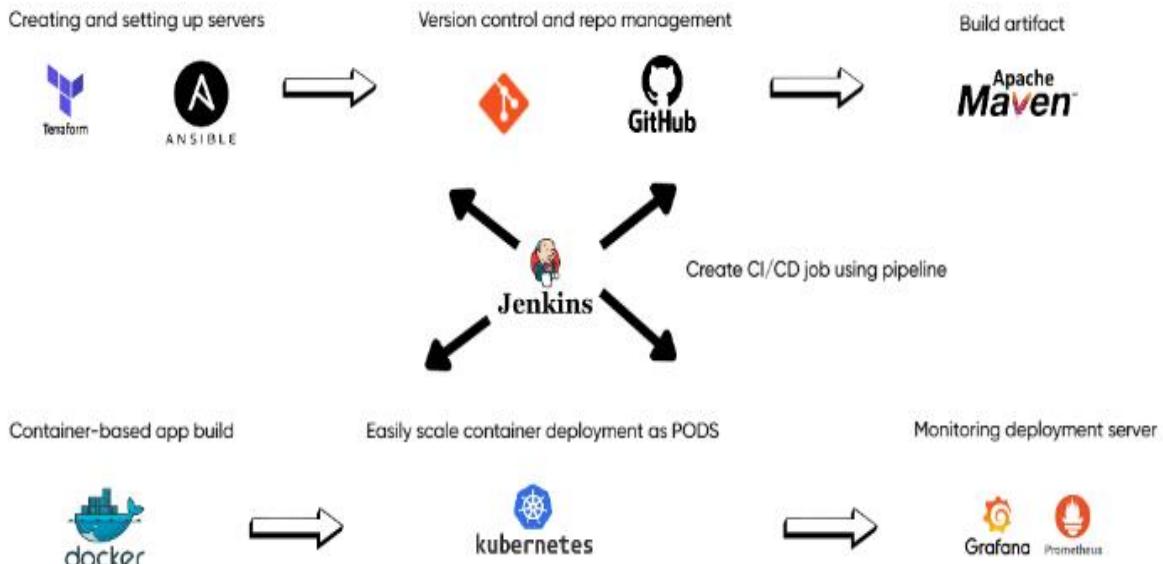
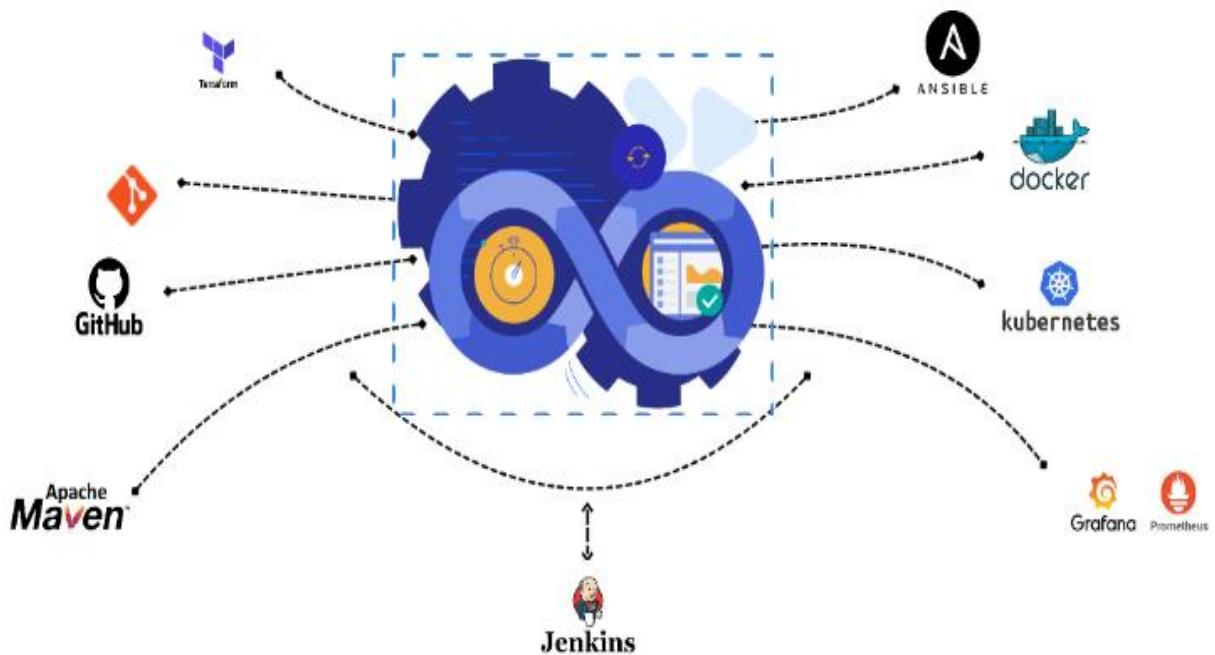


DEVOPS PROJECT

DEVOPS-PROJECT OUTLINE



Requirements : CI / CD Pipeline System

Problem statement :

1. Building Complex Monolithic Application is difficult.
2. Manual efforts to test various components/modules of the project
3. Incremental builds are difficult to manage, test and deploy.
4. It was not possible to scale up individual modules independently.
5. Creation of infrastructure and configure it manually is very time consuming
6. Continuous manual monitoring the application is quite challenging.

Mitigation:

1. **Microservices Architecture** – Instead of a monolithic structure, consider breaking down the application into smaller, independent services. This allows for better scalability, independent deployment, and improved maintainability.
2. **Automated Testing & CI/CD Pipelines** – Implement automated testing (unit, integration, and end-to-end tests) with CI/CD pipelines to reduce manual efforts in testing and deployment. Tool like **Jenkins** can help.
3. **Containerization & Orchestration** – Use **Docker** for containerization and **Kubernetes** for orchestration to enable better modularization, scalability, and ease of deployment.
4. **Infrastructure as Code (IaC)** – Automate infrastructure provisioning with tool like **Terraform** to avoid manual configuration and speed up deployment.

5. **Monitoring & Observability** – Utilize monitoring tools like **Prometheus, Grafana**, for real-time application monitoring, logging, and performance tracking.

Tools implemented in this Project:

1. Infrastructure Provisioning & Management

- **Tool: Terraform**
- **Use Case:** Automate cloud infrastructure provisioning AWS using Infrastructure as Code (IaC).
- **Benefits:**
 - Eliminates manual infrastructure setup.
 - Ensures version-controlled, repeatable deployments.

2. Build Automation & Dependency Management

- **Tool: Maven**
- **Use Case:** Manage dependencies, automate builds, and package Java applications.
- **Benefits:**
 - Standardized build process for Java-based applications.
 - Simplifies dependency management and project structure.

3. Continuous Integration & Deployment (CI/CD)

- **Tool:** Jenkins
- **Use Case:** Automate building, testing, and deploying applications through pipelines.
- **Benefits:**
 - Ensures frequent integration and fast feedback loops.
 - Enables automated deployments with rollback capabilities.

4. Containerization & Deployment

- **Tool:** Docker
- **Use Case:** Containerize applications for consistent runtime environments.
- **Benefits:**
 - Removes environment dependency issues.
 - Simplifies deployment across different environments.

5. Container Orchestration & Scaling

- **Tool:** Kubernetes
- **Use Case:** Deploy, manage, and scale containerized applications using Kubernetes pods.
- **Benefits:**
 - Enables microservices architecture for better scalability.
 - Provides automated load balancing, self-healing, and networking.

6. Monitoring & Observability

- **Tools: Prometheus & Grafana**
- **Use Case:**
 - **Prometheus** collects and stores time-series monitoring data.
 - **Grafana** visualizes metrics through interactive dashboards.
- **Benefits:**
 - Real-time application monitoring and alerting.
 - Improves visibility into system health and performance.

CI/CD Workflow with Tools Flow

1. Infrastructure Setup → Terraform

- Define infrastructure as code (IaC).
- Provision cloud resources like VMs, networking, databases, etc.

2. Version Control → Git & GitHub

- Developers push source code to **GitHub** repository.
- Git tracks changes and enables collaboration.

3. Build & Package → Maven

- Cleans project and compiles source code.
- Generates a .war file for the web application.

4. Jenkins Triggers the Pipeline

- The Jenkins **Pipeline** starts automatically when a new commit is detected.
- Jenkins fetches the latest source code from GitHub.

5. Containerization → Docker

- Creates a **Docker image** using a Dockerfile.
- Ensures the application runs consistently across different environments.
- Version controls executable containers.

6. Orchestration & Deployment → Kubernetes (K8s)

- Deploys containers as **Pods** in a **Kubernetes cluster**.
- Manages **scalability, self-healing, and load balancing**.

Terraform Cloud Resource Configuration :

- Install VS-CODE on your local machine
- Install Terraform Extension for Visual Studio Code
- Create Terraform Project and Add <filename>.tf file to create script for resource config
- Enter the below script

```
provider "aws" {
  region      = "us-east-1"
  access_key  = "xxxxxxxxxxxxxxxxxxxx"
  secret_key  = "xxxxxxxxxxxxxxxxxxxxxxxxxxxx"
}

resource "aws_vpc" "terra" {
  cidr_block      = "10.0.0.0/16"
  instance_tenancy = "default"

  tags = {
    Name = "terra"
  }
}

# Create Subnet

resource "aws_subnet" "terrasub" {
  vpc_id      = aws_vpc.terra.id
```

```
•   cidr_block = "10.0.1.0/24"
•
•   tags = {
•     Name = "terrasub"
•   }
• }

• # Internet Gateway
•
• resource "aws_internet_gateway" "terra_gw" {
•   vpc_id = aws_vpc.terra.id
•
•   tags = {
•     Name = "terra_gw"
•   }
• }

• # Route Table
•
• resource "aws_route_table" "myrt9" {
•   vpc_id = aws_vpc.terra.id
•
•   route {
•     cidr_block = "0.0.0.0/0"
•     gateway_id = aws_internet_gateway.terra_gw.id
•   }
•
•   tags = {
•     Name = "myrt9"
•   }
• }

• # Route Table Association
•
• resource "aws_route_table_association" "myrta9" {
•   subnet_id      = aws_subnet.terrasub.id
•   route_table_id = aws_route_table.myrt9.id
• }

• # Security Groups
•
• resource "aws_security_group" "mysg9" {
•   name          = "mysg9"
•   description   = "Allow inbound traffic"
•   vpc_id        = aws_vpc.terra.id
```

```

•
•     ingress {
•         description      = "HTTP"
•         from_port        = 80
•         to_port          = 80
•         protocol         = "tcp"
•         cidr_blocks      = ["0.0.0.0/0"]
•     }
•
•     ingress {
•         description      = "SSH"
•         from_port        = 22
•         to_port          = 22
•         protocol         = "tcp"
•         cidr_blocks      = ["0.0.0.0/0"]
•     }
•
•     egress {
•         from_port        = 0
•         to_port          = 0
•         protocol         = "-1"
•         cidr_blocks      = ["0.0.0.0/0"]
•         ipv6_cidr_blocks = [":/:0"]
•     }
•
•     tags = {
•         Name = "mysg9"
•     }
• }
•
• # Create Instance
•
• resource "aws_instance" "terra_Ec2" {
•     ami              = "ami-0e1bed4f06a3b463d"
•     instance_type   = "t2.micro"
•     associate_public_ip_address = true
•     subnet_id       = aws_subnet.terrasub.id
•     vpc_security_group_ids = [aws_security_group.mysg9.id]
•     key_name        = "abc"
•     count           = 6
•
•     tags = {
•         Name = var.server_names[count.index]
•     }
• }
```

```
•
•   # Output for Public IP addresses
•   # Output for details of all EC2 instances (Name, Public IP, Private IP)
•   output "instance_details" {
•     description = "Details of all EC2 instances with their names, public and
private IPs"
•     value = [
•       for instance in aws_instance.terra_Ec2 : {
•         name      = instance.tags["Name"]
•         public_ip = instance.public_ip
•         private_ip = instance.private_ip
•       }
•     ]
•   }
```

- This script create 6 instance with necessary elements needed for an server like security groups etc and give output of server created with IP's
- use terraform init – to initialize terraform within the folder
- use terraform plan – for terraform to plan how may objects need to added , destroyed or changes
- use terraform apply – to apply all changes need as per the script

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

- File Explorer:** Shows a folder named "TERRA" containing ".terraform", ".terraform.lock.hcl", "new.tf", "terraform.tfstate", "terraform.tfstate.backup", and "variable.tf".
- Code Editor:** Displays Terraform configuration code for creating an Internet Gateway and a Route Table.
- Output Panel:** Shows the message "Welcome to Copilot".
- Bottom Bar:** Includes a search bar, pinned icons for GitHub, Git, and the terminal, and the status bar showing "Ln 4, Col 57", "Spaces: 4", "UTF-8", "CRLF", "(.) Terraform", and the date/time "5:19 PM 2/20/2025".

```
26 # Internet Gateway
27
28 resource "aws_internet_gateway" "terra_gw" {
29   vpc_id = aws_vpc.terra.id
30
31   tags = {
32     Name = "terra_gw"
33   }
34 }
35
36 # Route Table
37
38 resource "aws_route_table" "myrt9" {
39   vpc_id = aws_vpc.terra.id
40
41   route {
42     cidr_block = "0.0.0.0/0"
43     gateway_id = aws_internet_gateway.terra_gw.id
44   }
45
46   tags = {
47     Name = "myrt9"
48   }
49 }
50
51 # Route Table Association
52
53 resource "aws_route_table_association" "myrta9" {
54   subnet_id    = aws_subnet.terrasubnet.id
55   route_table_id = aws_route_table.myrt9.id
56 }
```

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

- File Explorer:** Shows a folder named "TERRA" containing ".terraform", ".terraform.lock.hcl", "new.tf", "terraform.tfstate", "terraform.tfstate.backup", and "variable.tf".
- Code Editor:** Displays Terraform configuration code for creating an AWS Security Group with specific ingress and egress rules.
- Output Panel:** Shows the message "Welcome to Copilot".
- Bottom Bar:** Includes a search bar, pinned icons for GitHub, Git, and the terminal, and the status bar showing "Ln 4, Col 57", "Spaces: 4", "UTF-8", "CRLF", "(.) Terraform", and the date/time "5:19 PM 2/20/2025".

```
59
60 resource "aws_security_group" "mysg9" {
61   name          = "mysg9"
62   description   = "Allow inbound traffic"
63   vpc_id        = aws_vpc.terra.id
64
65   ingress {
66     description = "HTTP"
67     from_port   = 80
68     to_port     = 80
69     protocol    = "tcp"
70     cidr_blocks = ["0.0.0.0/0"]
71   }
72
73   ingress {
74     description = "SSH"
75     from_port   = 22
76     to_port     = 22
77     protocol    = "tcp"
78     cidr_blocks = ["0.0.0.0/0"]
79   }
80
81   egress {
82     from_port   = 0
83     to_port     = 0
84     protocol    = "-1"
85     cidr_blocks = ["0.0.0.0/0"]
86     ipv6_cidr_blocks = [":/:0"]
87   }
88 }
```

The screenshot shows the Visual Studio Code interface with a dark theme. The left sidebar has a tree view under 'EXPLORER' labeled 'TERRA' containing files: '.terraform', '.terraform.lock.hcl', 'new.tf', 'terraform.tfstate', 'terraform.tfstate.backup', and 'variable.tf'. The main editor window displays 'new.tf' with the following Terraform code:

```
60   resource "aws_security_group" "mysg9" {
61     ingress {
62       from_port    = 0
63       to_port      = 0
64       protocol     = "-1"
65       cidr_blocks  = ["0.0.0.0/0"]
66       ipv6_cidr_blocks = ["::/0"]
67     }
68
69     egress {
70       from_port    = 0
71       to_port      = 0
72       protocol     = "-1"
73       cidr_blocks  = ["0.0.0.0/0"]
74       ipv6_cidr_blocks = ["::/0"]
75     }
76
77     tags = {
78       Name = "mysg9"
79     }
80
81   # Create Instance
82
83   resource "aws_instance" "terra_Ec2" {
84     ami           = "ami-0e1bed4f06a3b463d"
85     instance_type = "t2.micro"
86     associate_public_ip_address = true
87     subnet_id    = aws_subnet.terrsubnet.id
88     vpc_security_group_ids = [aws_security_group.mysg9.id]
89     key_name     = "ubuntu"
90     count        = 6
91
92     tags = {
93       Name = var.server_names[count.index]
94     }
95   }
96 }
```

The status bar at the bottom shows: Ln 4, Col 57, Spaces: 4, UTF-8, CRLF, Terraform, 5:19 PM, ENG, 2/20/2025, 34.

The right sidebar features the 'Copilot' extension with a 'Welcome to Copilot' message, a 'Code faster with Completions' section, a 'Build features with Copilot Edits' section, and a 'Explore your codebase with Chat' section. It also includes a 'Use Copilot for Free' button and a note about terms and privacy policy.

This screenshot is identical to the first one, showing the same VS Code interface, file structure, and Terraform code for creating an EC2 instance and security group. The main difference is the content of the 'new.tf' file, which now includes an 'output' block:

```
108 }
109
110 # Output for Public IP addresses
111 # Output for details of all EC2 instances (Name, Public IP, Private IP)
112 output "instance_details" {
113   description = "Details of all EC2 instances with their names, public and private IPs"
114   value = [
115     for instance in aws_instance.terra_Ec2 : {
116       name      = instance.tags["Name"]
117       public_ip = instance.public_ip
118       private_ip = instance.private_ip
119     }
120   ]
121 }
```

The status bar at the bottom shows: Ln 4, Col 57, Spaces: 4, UTF-8, CRLF, Terraform, 5:19 PM, ENG, 2/20/2025, 34.

The right sidebar features the 'Copilot' extension with a 'Welcome to Copilot' message, a 'Code faster with Completions' section, a 'Build features with Copilot Edits' section, and a 'Explore your codebase with Chat' section. It also includes a 'Use Copilot for Free' button and a note about terms and privacy policy.

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

- File Explorer:** Shows a folder structure under "TERRA" containing ".terraform", ".terraform.lock.hcl", "new.tf" (selected), "terraform.tfstate", "terraform.tfstate.backup", and "variable.tf".
- Editor:** Displays the contents of "new.tf". The code defines an AWS provider and creates an VPC resource with a single subnet.
- Terminal:** Shows the command "powershell" and other terminal-related icons.
- Bottom Status Bar:** Shows "Ln 4, Col 57", "Spaces: 4", "UTF-8", "CRLF", "Terraform", and a file icon.
- Copilot Sidebar:** A large sidebar on the right with the title "Welcome to Copilot". It includes sections for "Copilot is your AI pair programmer.", "Code faster with Completions", "Build features with Copilot Edits", "Explore your codebase with Chat", and "We now offer Copilot for free." A "screenrec" watermark is visible in the bottom right corner.

The screenshot shows a Microsoft Visual Studio Code (VS Code) interface with the following details:

- File Explorer (Left):** Shows the project structure with files: `.terraform`, `.terraform.lock.hcl`, `new.tf` (selected), `variable.tf`, `terraform.tfstate`, `terraform.tfstate.backup`, and `variable.tf`.
- Code Editor (Center):** Displays the `new.tf` Terraform configuration file. The code defines an AWS provider and a VPC resource named "terra". It also includes a comment "# Create Subnet" followed by incomplete code for creating a subnet.
- Terminal (Bottom):** Shows the command `PS C:\AWS\terraform\terra> terraform apply`.
- Copilot Sidebar (Right):** A sidebar titled "Welcome to Copilot" with the following sections:
 - Code faster with Completions**
 - Build features with Copilot Edits**
 - Explore your codebase with Chat**
- Bottom Status Bar:** Shows "Ln 4, Col 57", "Spaces: 4", "UTF-8", "CRLF", "Terraform", "5:20 PM", "ENG", and the date "2/20/2025".

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

- File Explorer (Left):** Shows files in the current workspace, including `.terraform`, `.terraform.lock.hcl`, `.terraform.tfstate.lock.info`, `new.tf`, `variable.tf`, `terraformer.tfstate`, `terraformer.tfstate.backup`.
- Code Editor (Center):** Displays `new.tf` Terraform configuration. The code defines an AWS provider and creates a VPC with a subnet. A completion suggestion for a new resource is shown at the bottom of the editor.
- Terminal (Bottom):** Shows the command `terraform` followed by several status icons.
- Right Panel:** The "Welcome to Copilot" panel is open, featuring a "Copilot" icon, a brief introduction, and three cards: "Code faster with Completions", "Build features with Copilot Edits", and "Explore your codebase with Chat". It also includes a "Use Copilot for Free" button and a note about terms and privacy.
- Bottom Status Bar:** Shows the current line (Ln 4, Col 57), spaces (Spaces: 4), encoding (UTF-8), and file type (CRLF). It also displays the date and time (2/20/2025, 5:21 PM).

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

- File Explorer (Left):** Shows files in the current workspace, including `.terraform`, `.terraform.lock.hcl`, `.terraform.tfstate.lock.info`, `new.tf`, `variable.tf`, `terraformer.tfstate`, `terraformer.tfstate.backup`.
- Code Editor (Center):** Displays `new.tf` Terraform configuration. The code defines an AWS provider and creates multiple EC2 instances. A completion suggestion for a new resource is shown at the bottom of the editor.
- Terminal (Bottom):** Shows the command `terraform` followed by several status icons.
- Bottom Status Bar:** Shows the current line (Ln 102, Col 18), spaces (Spaces: 4), encoding (UTF-8), and file type (CRLF). It also displays the date and time (2/20/2025, 5:25 PM).

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

- File Explorer:** Shows the project structure under the "TERRA" folder, including ".terraform", ".terraform.lock.hcl", "new.tf", "variable.tf", "terraform.tfstate", "terraform.tfstate.backup", and ".vscode".
- Code Editor:** Displays the "new.tf" file content. The code defines a resource block for an AWS instance named "terra_Ec2" with specific configurations like subnet ID, security group, and key name. It then defines a list of instances with their names, private IP addresses, and public IP addresses.
- Terminal:** Shows the command "PS C:\AWS\terraform\terra>" indicating the current working directory.
- Status Bar:** Provides information such as "Ln 102, Col 18", "Spaces: 4", "UTF-8", "CRLF", "Terraform", and the date/time "5:25 PM 2/20/2025".

This screenshot is nearly identical to the first one, showing the same VS Code interface and Terraform configuration for creating multiple EC2 instances. The main difference is in the terminal output, which now includes the command "terraform apply" followed by a long hash string, indicating that the resources have been successfully provisioned.

- Check all resources were created in the AWS console according to configuration mentioned

The screenshot shows the AWS EC2 Instances page. The left sidebar navigation includes 'Instances' (selected), 'Images', and 'Elastic Block Store'. The main content area displays a table titled 'Instances (6) Info' with columns: Name, Instance ID, Instance state, Instance type, Status check, and Alarm status. The table lists six instances, all of which are currently 'Running'. The status check for most instances is 'Initializing', except for K8_Master which is 'Not checked'. The instance types are all 't2.micro'. A search bar at the top allows filtering by attribute or tag.

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status |
|----------------|---------------------|----------------|---------------|--------------|-------------------------------|
| K8_client1 | i-08c3ccf7f3418ce79 | Running | t2.micro | Initializing | View alarms + |
| K8_client2 | i-0dc409ac81b41e568 | Running | t2.micro | Initializing | View alarms + |
| K8_client3 | i-020b00aa0d24f4ee5 | Running | t2.micro | Initializing | View alarms + |
| Jenkins_slave | i-0139f17f845e573b5 | Running | t2.micro | Initializing | View alarms + |
| Jenkins_Master | i-0e5fe760c1a653e5a | Running | t2.micro | Initializing | View alarms + |
| K8_Master | i-062rf131fc71a01a0 | Running | t2.micro | Not checked | View alarms + |

Setup and Configuration Jenkins :

Pre-requisite to install jenkins

- sudo -i**
- sudo apt update -y**
- sudo apt install git -y**
- sudo apt install openjdk-17-jre -y**
- java -version**
- sudo wget -O /usr/share/keyrings/jenkins-keyring.asc **
<https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key>
- echo deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] **

```
https://pkg.jenkins.io/debian-stable binary/ | sudo tee \  
/etc/apt/sources.list.d/jenkins.list > /dev/null
```

- **sudo apt-get update**
- **sudo apt-get install jenkins -y**

Post Installation activity run the below commands

- **systemctl status jenkins**
- **systemctl stop jenkins**
- **systemctl start jenkins**
- **systemctl restart jenkins**
- **systemctl enable jenkins**

Open web browser : http://<Public_IP_Address>:8080/

**# once configuration of master was done , now its time to configure
jenkins worker node as we are going to every work on worker node**

- **sudo -i**
- **apt update -y**
- **sudo apt update -y**
- **sudo apt install openjdk-17-jre -y**
- **java -version**
- **sudo apt install git -y**
- **git --version**
- **sudo apt install maven -y**
- **mvn --version**
- **apt install docker.io -y**

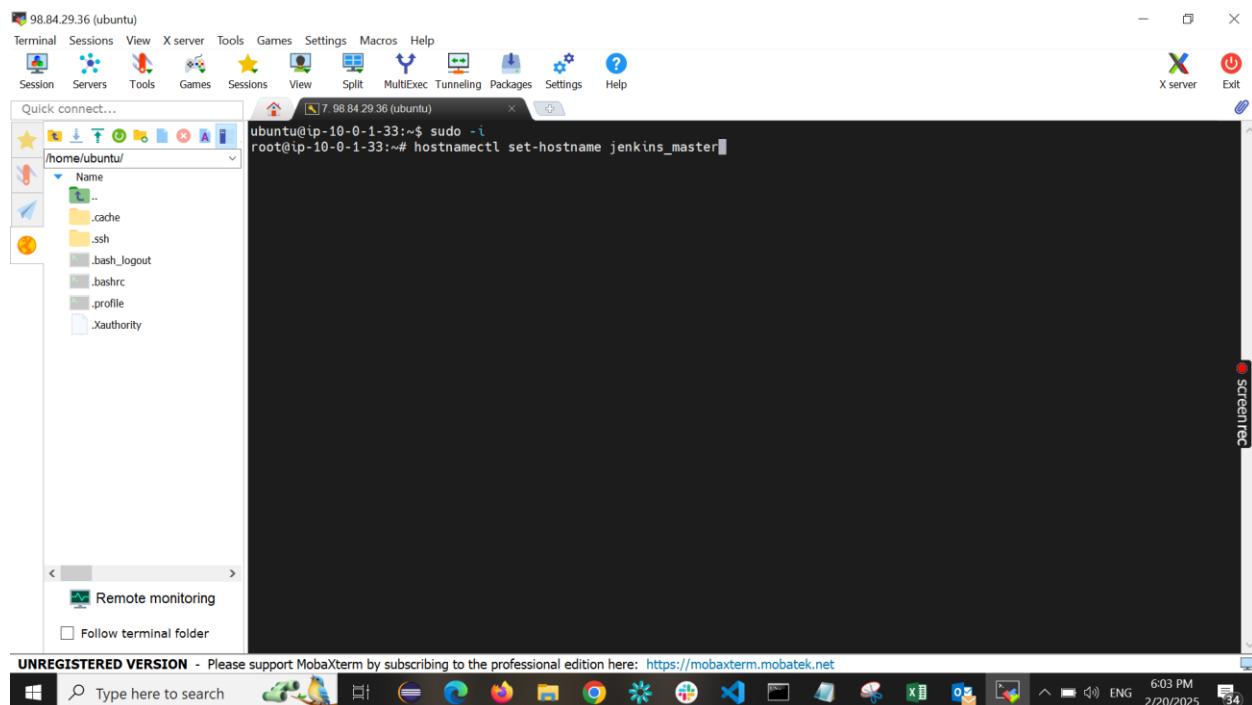
**# Jenkins Slave Node Configuration to Create SSH connection to
Master Node.**

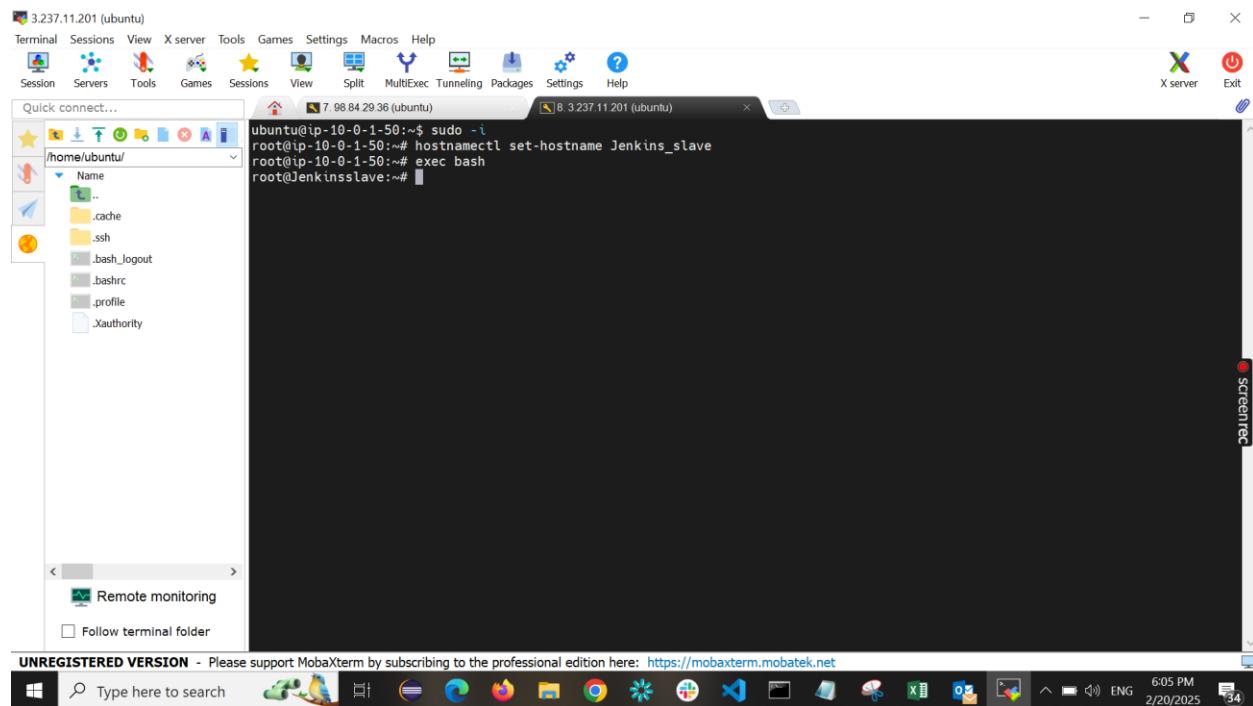
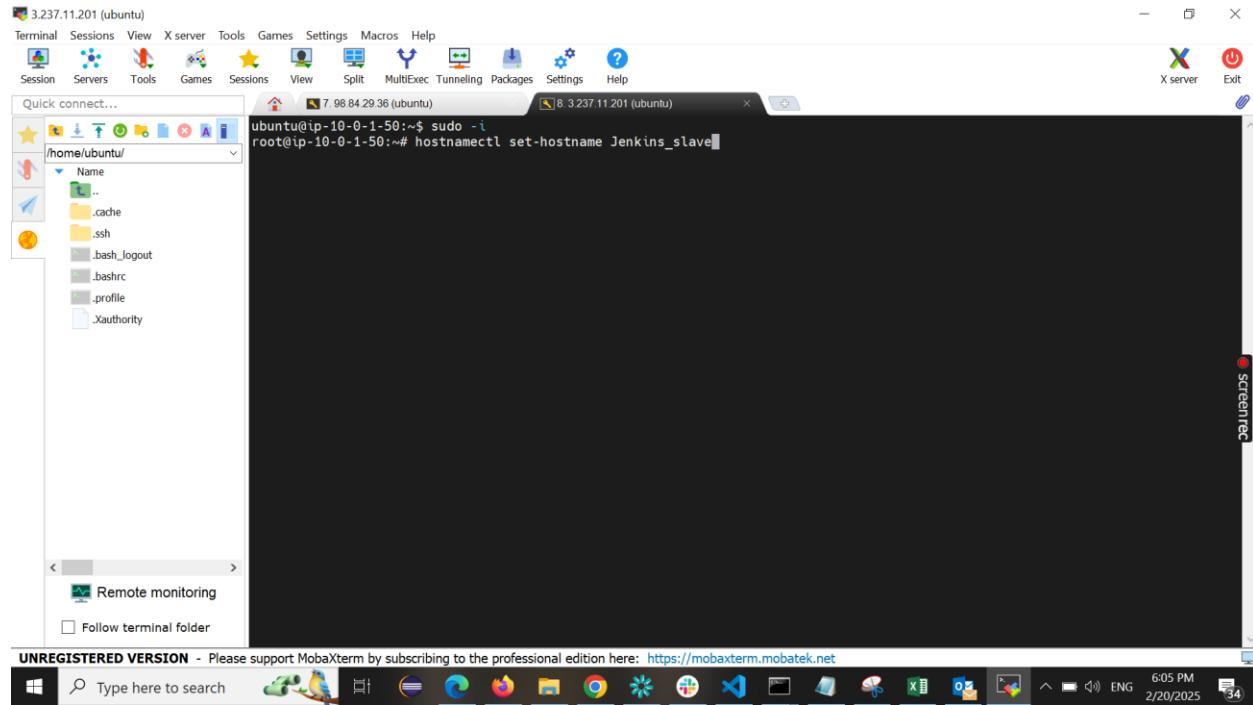
- **useradd devopsadmin -s /bin/bash -m -d /home/devopsadmin**
- **su – devopsadmin**
- **ssh-keygen**

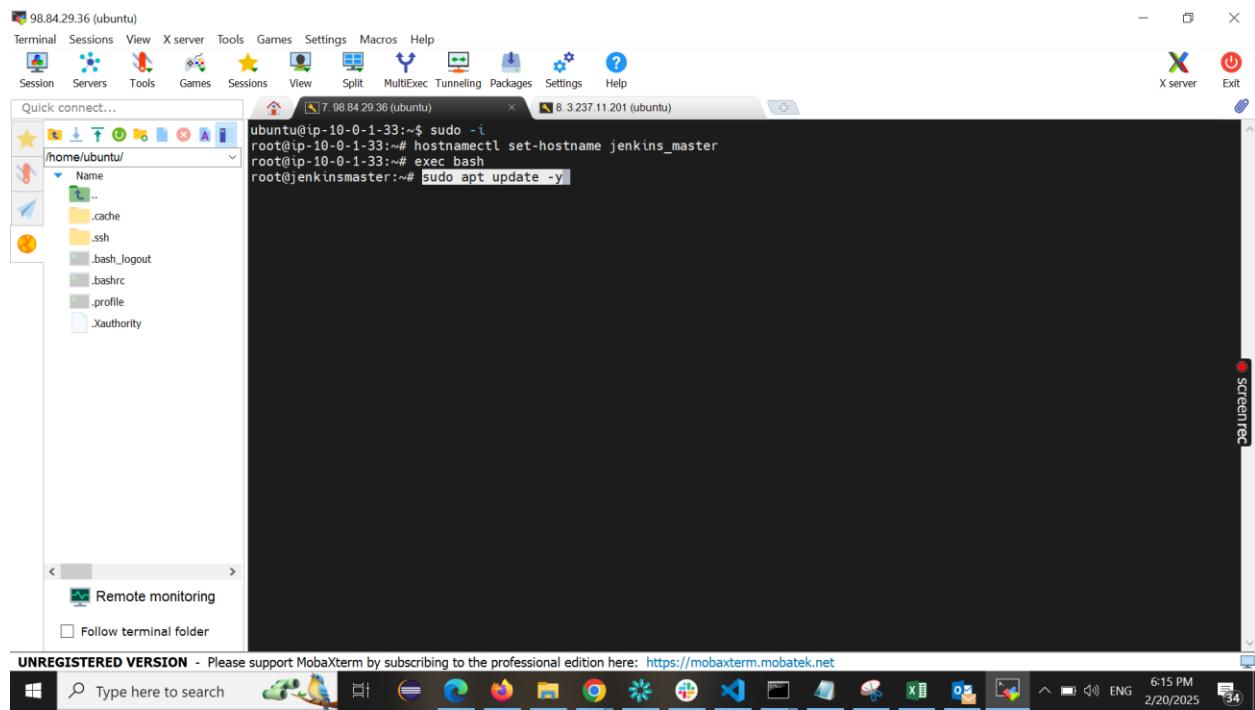
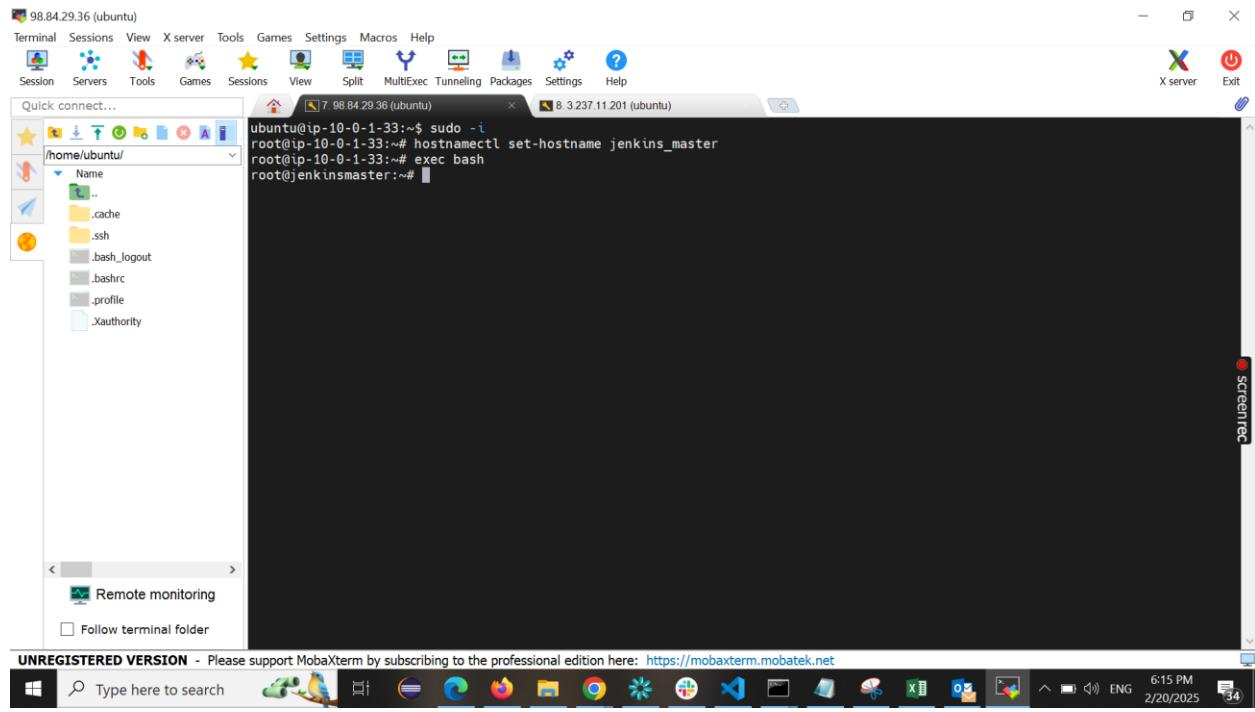
- **ssh-keygen -t ecdsa -b 521**
- **ls ~/.ssh**
- **id_ecdsa - private key**
- **id_ecdsa.pub – public**
- **cat id_ecdsa.pub > authorized_keys**
- **chmod 600 /home/devopsadmin/.ssh/***
- **usermod -aG docker devopsadmin - run this command as root user**

Login to Jenkins - Manage Jenkins - Attach the Slave Node to jenkins Master

- **Goto to Manage Jenkins**
- **Select Nodes**
- **On Nodes Dashboard, Click on New Node**
- **Give Node Name, and choose permanent agent.**





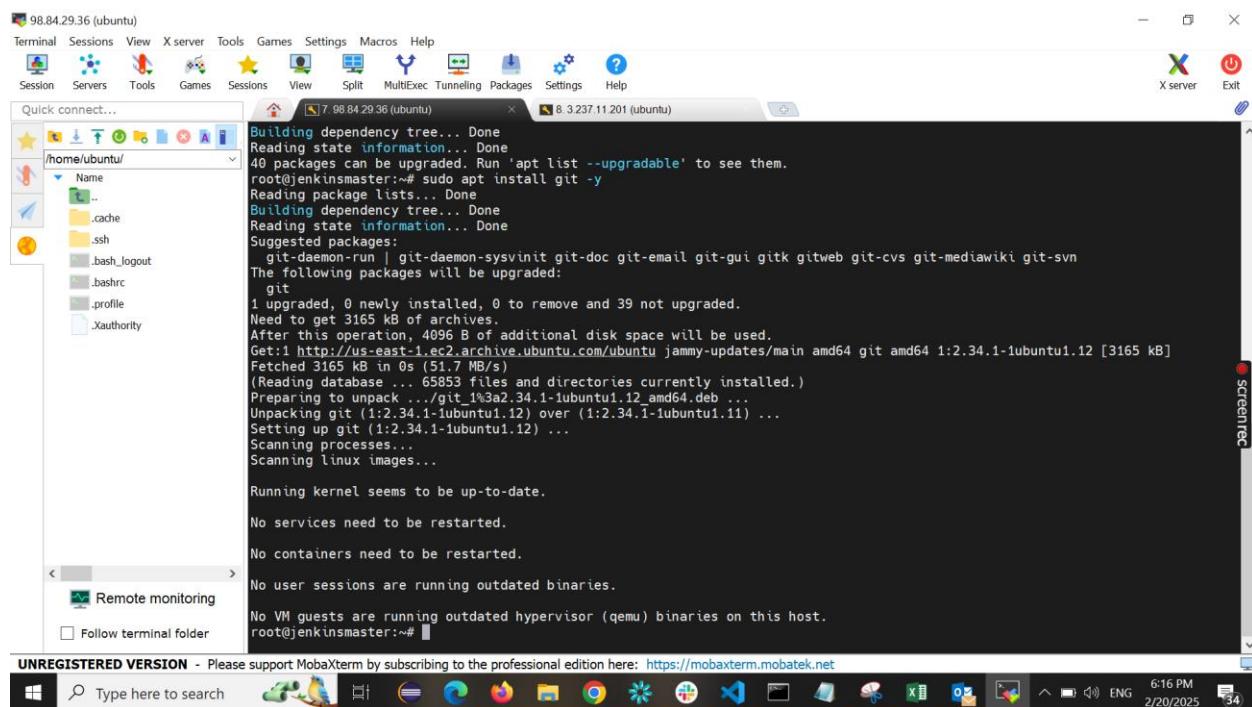
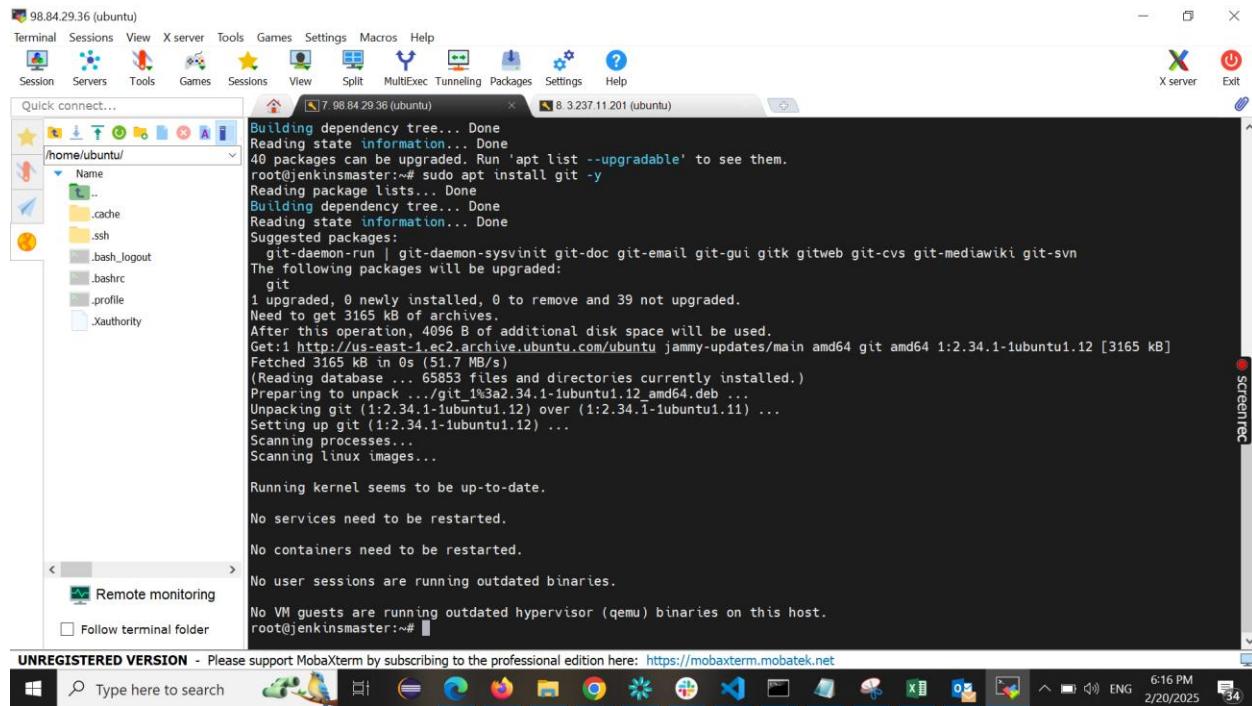


```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [521 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [291 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2080 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [97 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:30 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [326 kB]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2839 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [497 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [962 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [205 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.6 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [8260 B]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 35.6 MB in 17s (2158 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@jenkinsmaster:~#
```

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```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [521 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [291 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2080 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [97 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [30.0 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [224 B]
Get:30 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [326 kB]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2839 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [497 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [962 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [205 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.6 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [8260 B]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 35.6 MB in 17s (2158 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@jenkinsmaster:~# sudo apt install git -y
```

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98.84.29.36 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 7.98.84.29.36 (ubuntu) 8.3.237.11.201 (ubuntu)

Building dependency tree... Done
Reading state information... Done
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@jenkinsmaster:~# sudo apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
 git-daemon-runit git-daemon-sysvinit git-doc git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following packages will be upgraded:
 git
1 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
Need to get 3165 kB of archives.
After this operation, 4096 B of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 git amd64 1:2.34.1-1ubuntu1.12 [3165 kB]
Fetched 3165 kB in 0s (51.7 MB/s)
(Reading database ... 65853 files and directories currently installed.)
Preparing to unpack .../git_1%3a.34.1-1ubuntu1.12_amd64.deb ...
Unpacking git (1:2.34.1-1ubuntu1.12) over (1:2.34.1-1ubuntu1.11) ...
Setting up git (1:2.34.1-1ubuntu1.12) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~# sudo apt install openjdk-17-jre -y

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Windows Type here to search 6:16 PM 2/20/2025 34

98.84.29.36 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 7.98.84.29.36 (ubuntu) 8.3.237.11.201 (ubuntu)

me) in auto mode
Setting up libgtk2.0-0:amd64 (2.24.33-2ubuntu2.1) ...
Setting up humanity-icon-theme (0.6.16) ...
Setting up libgail18:amd64 (2.24.33-2ubuntu2.1) ...
Setting up libgtk2.0-bin (2.24.33-2ubuntu2.1) ...
Setting up libgail-common:amd64 (2.24.33-2ubuntu2.1) ...
Setting up openjdk-17-jre:amd64 (17.0.14+7-1~22.04.1) ...
Setting up ubuntu-mono (20.10-0ubuntu2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ca-certificates (20240203~22.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
Processing triggers for libglib2.0-0:amd64 (2.72.4-0ubuntu2.4) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Setting up at-sp2-core (2.44.0-3) ...
Processing triggers for libgdk-pixbuf2.0-0:amd64 (2.42.8+dfsg-1ubuntu0.3) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

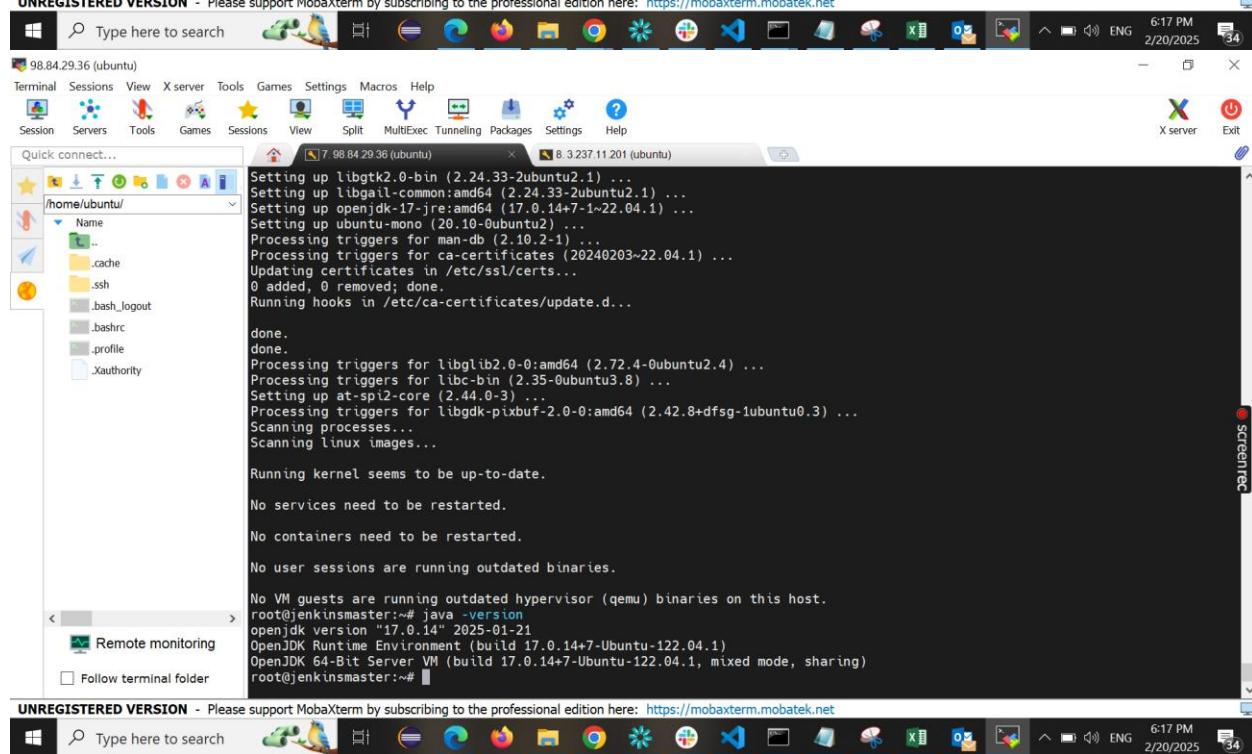
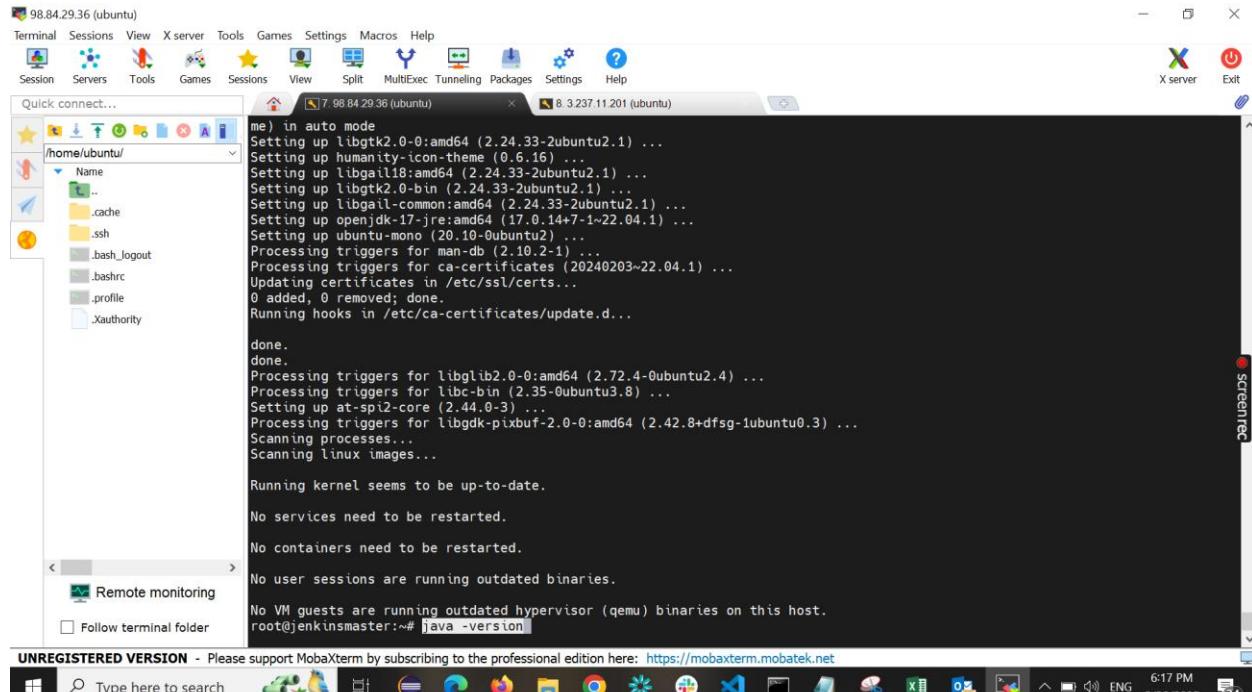
No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~#

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Windows Type here to search 6:17 PM 2/20/2025 34



```
Setting up libgail-common:amd64 (2.24.33-2ubuntu2.1) ...
Setting up openjdk-17-jre:amd64 (17.0.14+7~22.04.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ca-certificates (20240203~22.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
Processing triggers for libglib2.0-0:amd64 (2.72.4-0ubuntu2.4) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Setting up at-spi2-core (2.44.0-3) ...
Processing triggers for libgdk-pixbuf2.0-0:amd64 (2.42.8+dfsg-1ubuntu0.3) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

root@jenkinsmaster:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@jenkinsmaster:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
```

```
Processing triggers for libgdk-pixbuf2.0-0:amd64 (2.42.8+dfsg-1ubuntu0.3) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

root@jenkinsmaster:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@jenkinsmaster:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
--2025-02-20 12:48:37- https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
Resolving pkg.jenkins.io (pkg.jenkins.io)... 146.75.34.133, 2a04:4e42:78::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|146.75.34.133|: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-key 100%[=====] 3.10K --.KB/s in 0s

2025-02-20 12:48:37 (67.3 MB/s) - '/usr/share/keyrings/jenkins-keyring.asc' saved [3175/3175]

root@jenkinsmaster:~# 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
```

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

```
Scanning processes...
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@jenkinsmaster:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
    https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
--2025-02-20 12:48:37- https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
Resolving pkg.jenkins.io (pkg.jenkins.io)... 146.75.34.133, 2a04:4e42:78::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|146.75.34.133|: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-key 100%[=====] 3.10K ---KB/s in 0s
2025-02-20 12:48:37 (67.3 MB/s) - '/usr/share/keyrings/jenkins-keyring.asc' saved [3175/3175]

root@jenkinsmaster:~# 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@jenkinsmaster:~# sudo apt-get update
```

```
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Type here to search  6:19 PM 2/20/2025 34

Scanning processes...
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@jenkinsmaster:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
    https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
--2025-02-20 12:48:37- https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
Resolving pkg.jenkins.io (pkg.jenkins.io)... 146.75.34.133, 2a04:4e42:78::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|146.75.34.133|: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-key 100%[=====] 3.10K ---KB/s in 0s
2025-02-20 12:48:37 (67.3 MB/s) - '/usr/share/keyrings/jenkins-keyring.asc' saved [3175/3175]

root@jenkinsmaster:~# 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@jenkinsmaster:~# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-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]
Get:6 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Hit:7 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:8 https://pkg.jenkins.io/debian-stable binary/ Packages [28.5 kB]
Fetched 31.4 kB in 1s (41.0 kB/s)
Reading package lists... Done
root@jenkinsmaster:~#
```

98.84.29.36 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 7.98.84.29.36 (ubuntu) 8.3.237.11.201 (ubuntu)

No VM guests are running outdated hypervisor (qemu) binaries on this host.

```
root@jenkinsmaster:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@jenkinsmaster:~# sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
--2025-02-20 12:48:37. ... https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
Resolving pkg.jenkins.io (pkg.jenkins.io)... 146.75.34.133, 2a04:4e42:78::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|146.75.34.133|: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-key 100%[=====] 3.10K --.-KB/s in 0s

2025-02-20 12:48:37 (67.3 MB/s) - '/usr/share/keyrings/jenkins-keyring.asc' saved [3175/3175]

root@jenkinsmaster:~# 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@jenkinsmaster:~# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-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]
Get:6 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Get:7 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:8 https://pkg.jenkins.io/debian-stable binary/ Packages [28.5 kB]
Fetched 31.4 kB in 1s (41.0 kB/s)
Reading package lists... Done
root@jenkinsmaster:~# sudo apt-get install jenkins -y
```

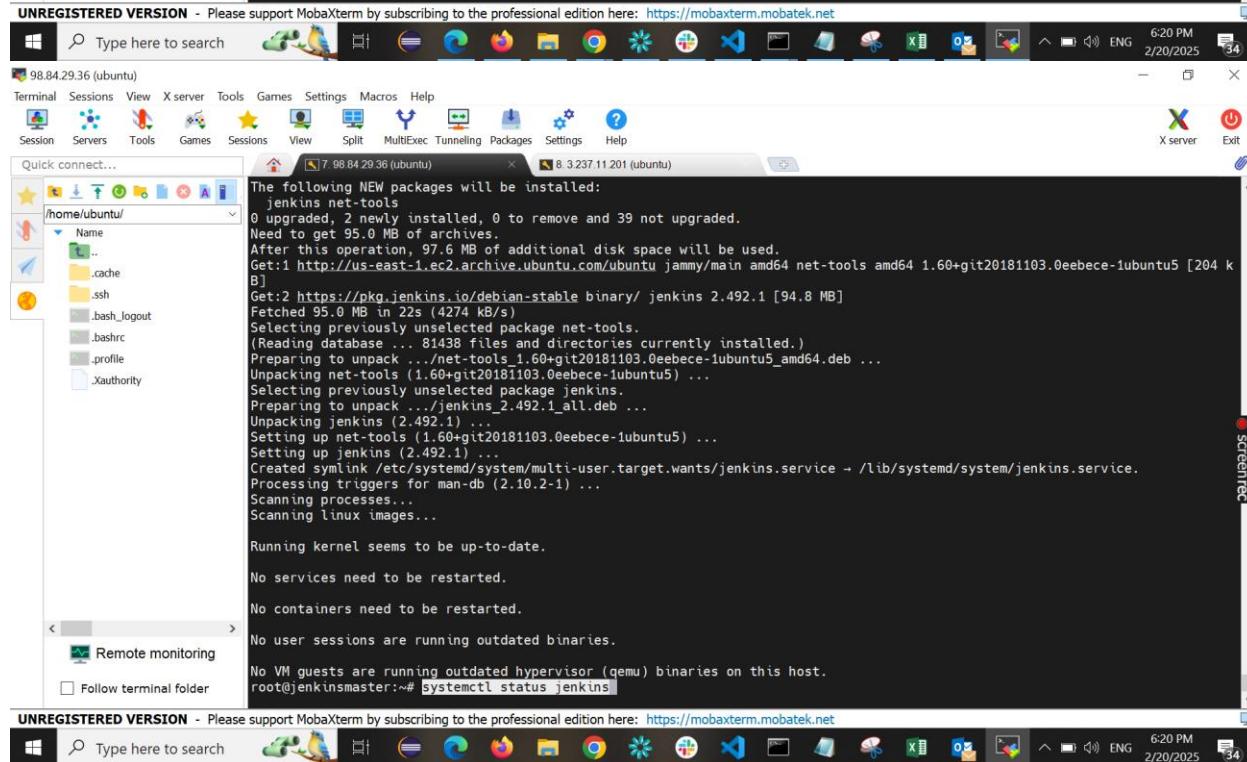
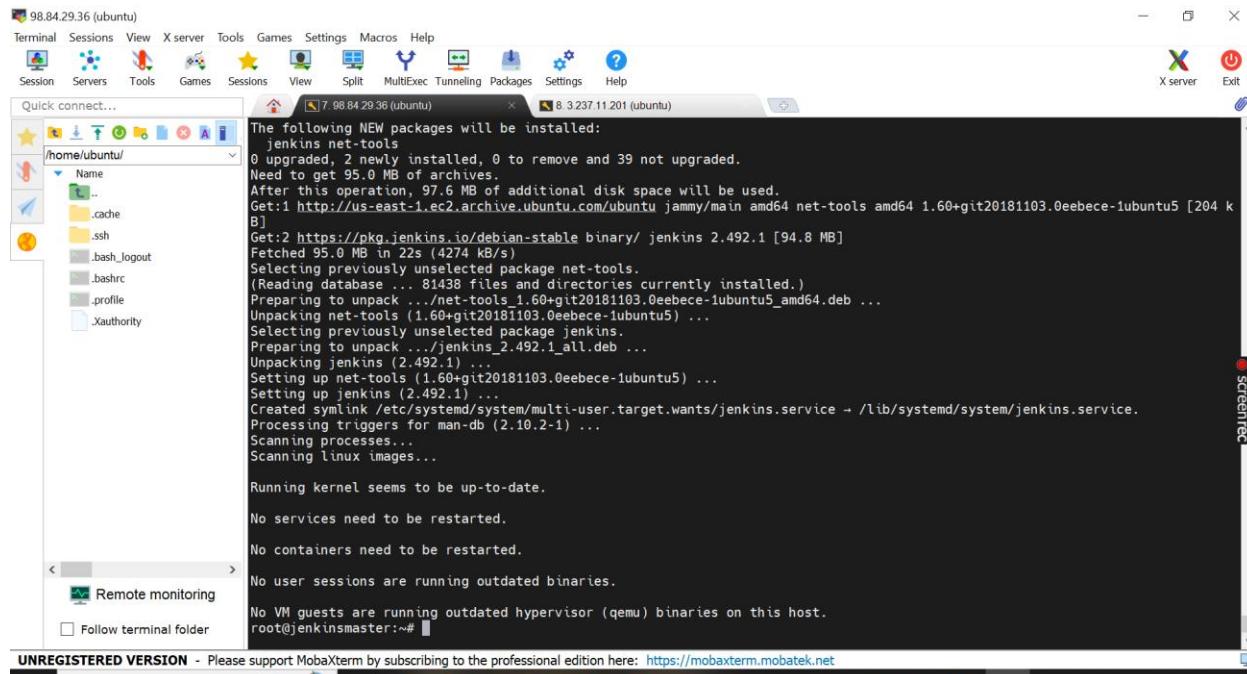
Remote monitoring Follow terminal folder

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98.84.29.36 (ubuntu)

Type here to search

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```
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
    Active: active (running) since Thu 2025-02-20 12:50:23 UTC; 24s ago
      Main PID: 5481 (java)
        Tasks: 42 (limit: 1130)
       Memory: 279.4M
          CPU: 15.992s
         CGroup: /system.slice/jenkins.service
                 └─5481 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war

Feb 20 12:50:17 jenkinsmaster jenkins[5481]: 73e3193534e24c0eb571ba18d54c2c81
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.653+0000 [id=30]           INFO  jenkins.InitReactorRunner>
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.680+0000 [id=23]           INFO  hudson.lifecycle.Lifecyc>
Feb 20 12:50:23 jenkinsmaster systemd[1]: Started Jenkins Continuous Integration Server.
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46]           INFO  h.m.DownloadService$Down>
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46]           INFO  hudson.util.Retrier#star>
Lines 1-20/20 (END)
```

```
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net
Type here to search  2/20/2025 6:21 PM
98.84.29.36 (ubuntu)
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 .bash_logout .bashrc .profile .Xauthority
Remote monitoring Follow terminal folder
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

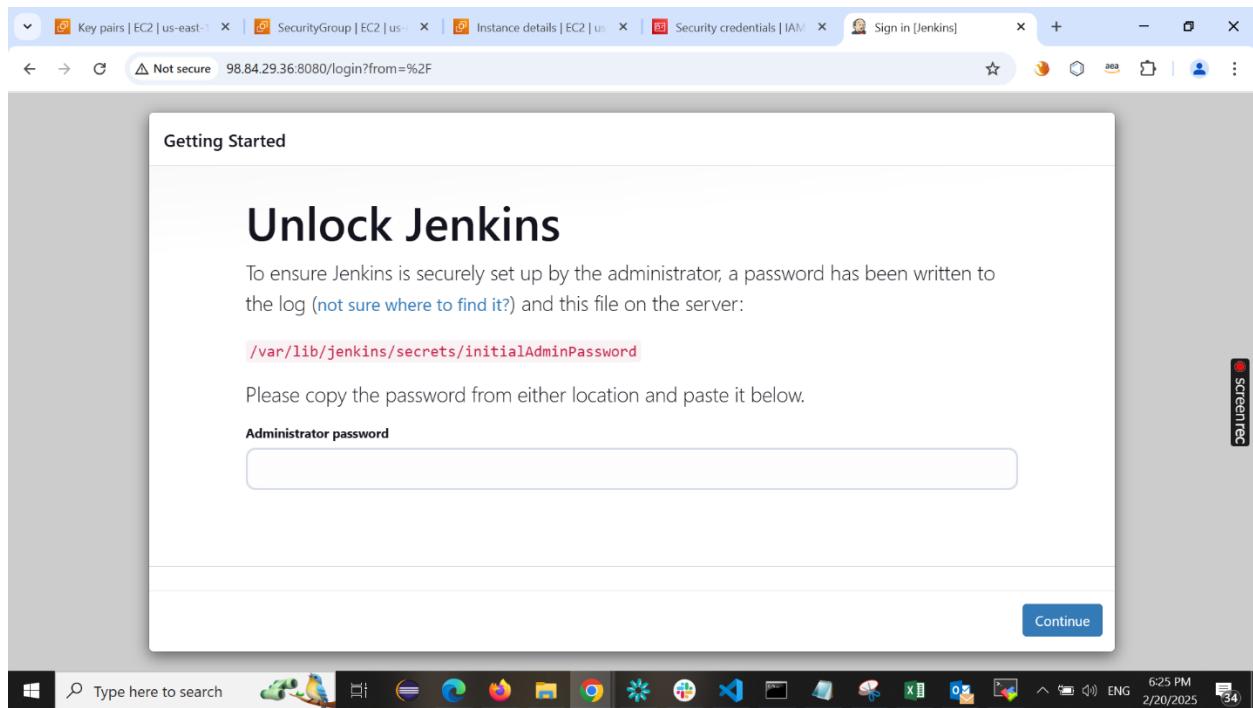
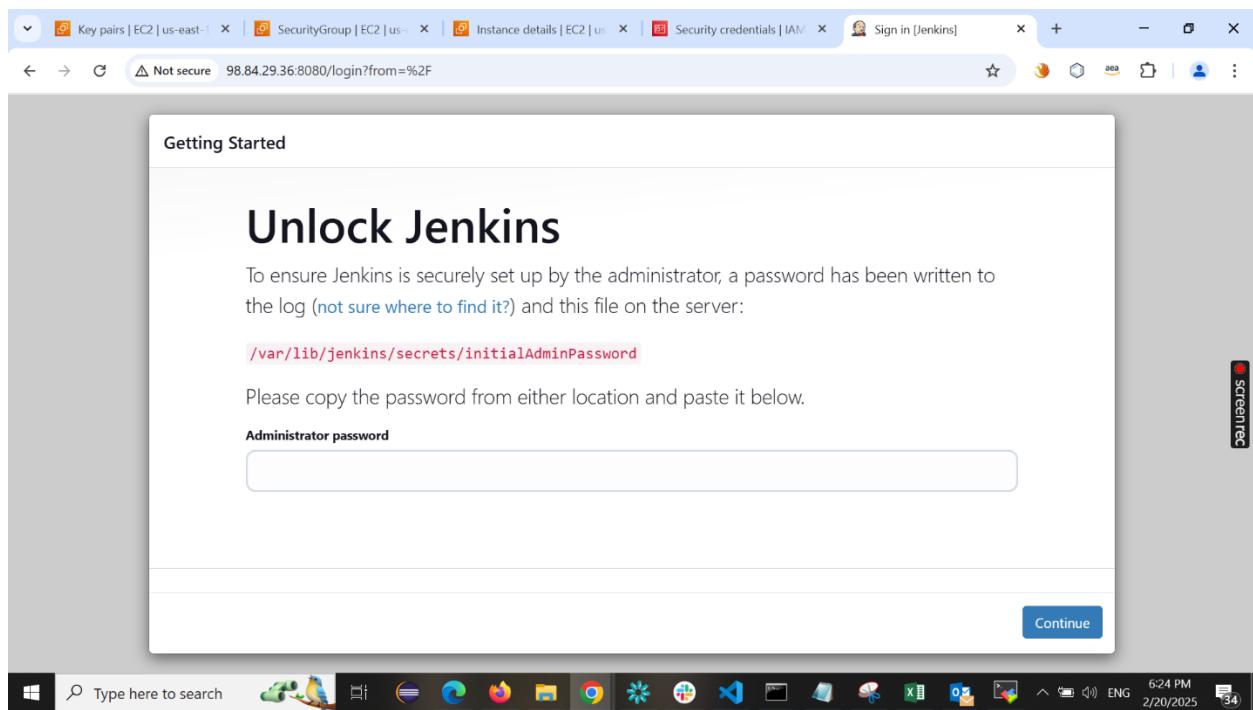
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@jenkinsmaster:~# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
    Active: active (running) since Thu 2025-02-20 12:50:23 UTC; 24s ago
      Main PID: 5481 (java)
        Tasks: 42 (limit: 1130)
       Memory: 279.4M
          CPU: 15.992s
         CGroup: /system.slice/jenkins.service
                 └─5481 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war

Feb 20 12:50:17 jenkinsmaster jenkins[5481]: 73e3193534e24c0eb571ba18d54c2c81
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.653+0000 [id=30]           INFO  jenkins.InitReactorRunner>
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.680+0000 [id=23]           INFO  hudson.lifecycle.Lifecyc>
Feb 20 12:50:23 jenkinsmaster systemd[1]: Started Jenkins Continuous Integration Server.
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46]           INFO  h.m.DownloadService$Down>
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46]           INFO  hudson.util.Retrier#star>
Lines 1-20/20 (END)

root@jenkinsmaster:~# systemctl enable jenkins
```

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2/20/2025 6:21 PM



98.84.29.36 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

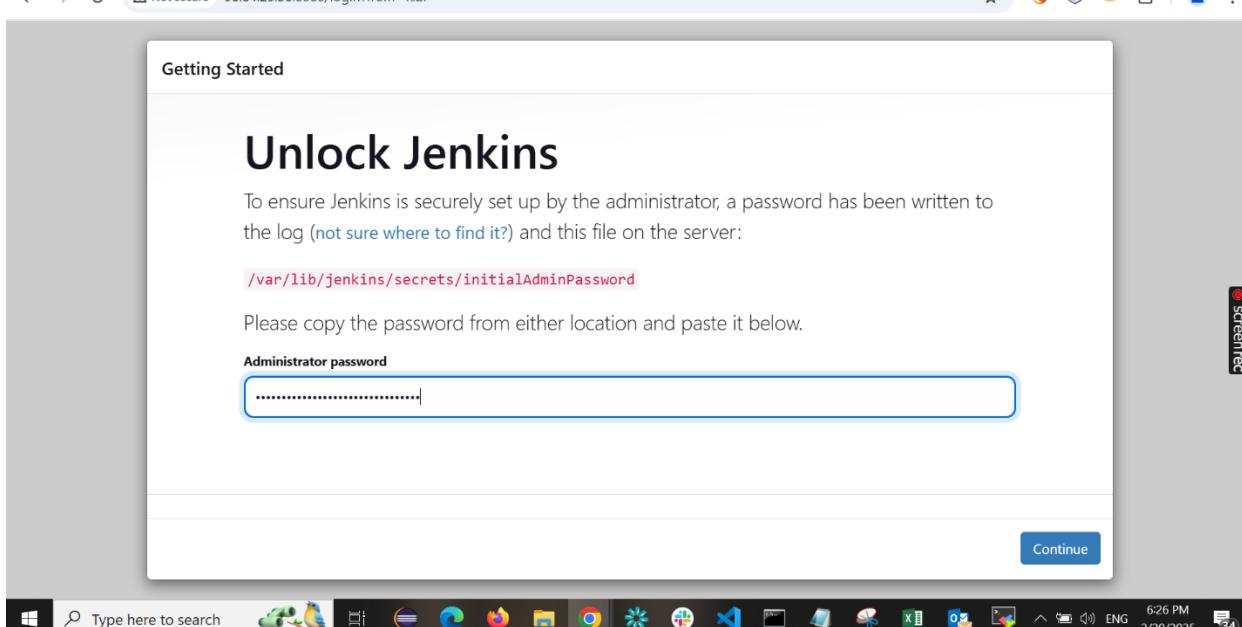
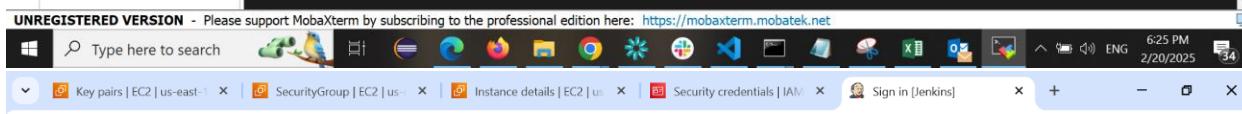
Quick connect... 7 98.84.29.36 (ubuntu) 8.3.237.11.201 (ubuntu)

No user sessions are running outdated binaries.

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.  
root@jenkinsmaster:~# systemctl status jenkins  
● jenkins.service - Jenkins Continuous Integration Server  
  Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)  
  Active: active (running) since Thu 2025-02-20 12:50:23 UTC; 24s ago  
    Main PID: 5481 (java)  
      Tasks: 42 (limit: 1130)  
     Memory: 279.4M  
        CPU: 15.992s  
       CGroup: /system.slice/jenkins.service  
           └─5481 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war  
  
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: 73e3193534e24c0eb571ba18d54c281  
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword  
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****  
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****  
Feb 20 12:50:17 jenkinsmaster jenkins[5481]: ****  
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.653+0000 [id=30] INFO jenkins.InitReactorRunner  
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.680+0000 [id=23] INFO hudson.lifecycle.Lifecycle  
Feb 20 12:50:23 jenkinsmaster systemd[1]: Started Jenkins Continuous Integration Server.  
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46] INFO h.m.DownloadService$Down  
Feb 20 12:50:23 jenkinsmaster jenkins[5481]: 2025-02-20 12:50:23.929+0000 [id=46] INFO hudson.util.Retrive#star  
Lines 1-20 (END)  
^C  
root@jenkinsmaster:~# 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  
root@jenkinsmaster:~# cat /var/lib/jenkins/secrets/initialAdminPassword  
bash: cat /var/lib/jenkins/secrets/initialAdminPassword: No such file or directory  
root@jenkinsmaster:~# cat /var/lib/jenkins/secrets/initialAdminPassword
```

Remote monitoring

Follow terminal folder



The screenshot shows the Jenkins 'Getting Started' page. At the top, there are two main options: 'Install suggested plugins' (highlighted in blue) and 'Select plugins to install'. Both options have descriptive text below them. The Jenkins version 'Jenkins 2.492.1' is visible at the bottom left of the page. The browser address bar shows the URL '98.84.29.36:8080'.

The screenshot shows the Jenkins 'Create First Admin User' page. It has three input fields: 'Username' (deepakmani607), 'Password' (redacted), and 'Confirm password' (redacted). Below the fields are two buttons: 'Skip and continue as admin' and 'Save and Continue'. The Jenkins version 'Jenkins 2.492.1' is visible at the bottom left. The browser address bar shows the URL '98.84.29.36:8080'.

Key pairs | EC2 | us-east-... x SecurityGroup | EC2 | us-... x Instance details | EC2 | us-... x Security credentials | IAM | us-... x Dashboard [Jenkins] x

Not secure 98.84.29.36:8080

Jenkins

Dashboard >

+ New Item

Build History

Manage Jenkins

My Views

Welcome to Jenkins!

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

Start building your software project

Build Queue

No builds in the queue.

Create a job +

Set up a distributed build

Set up an agent

Configure a cloud

Build Executor Status 0/2

Add description

Learn more about distributed builds

screenrec

Key pairs | EC2 | us-east-... x SecurityGroup | EC2 | us-... x Instance details | EC2 | us-... x Security credentials | IAM | us-... x Dashboard [Jenkins] x

Not secure 98.84.29.36:8080

Jenkins

Dashboard >

+ New Item

Build History

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Build Queue

No builds in the queue.

Create a job +

Set up a distributed build

Set up an agent

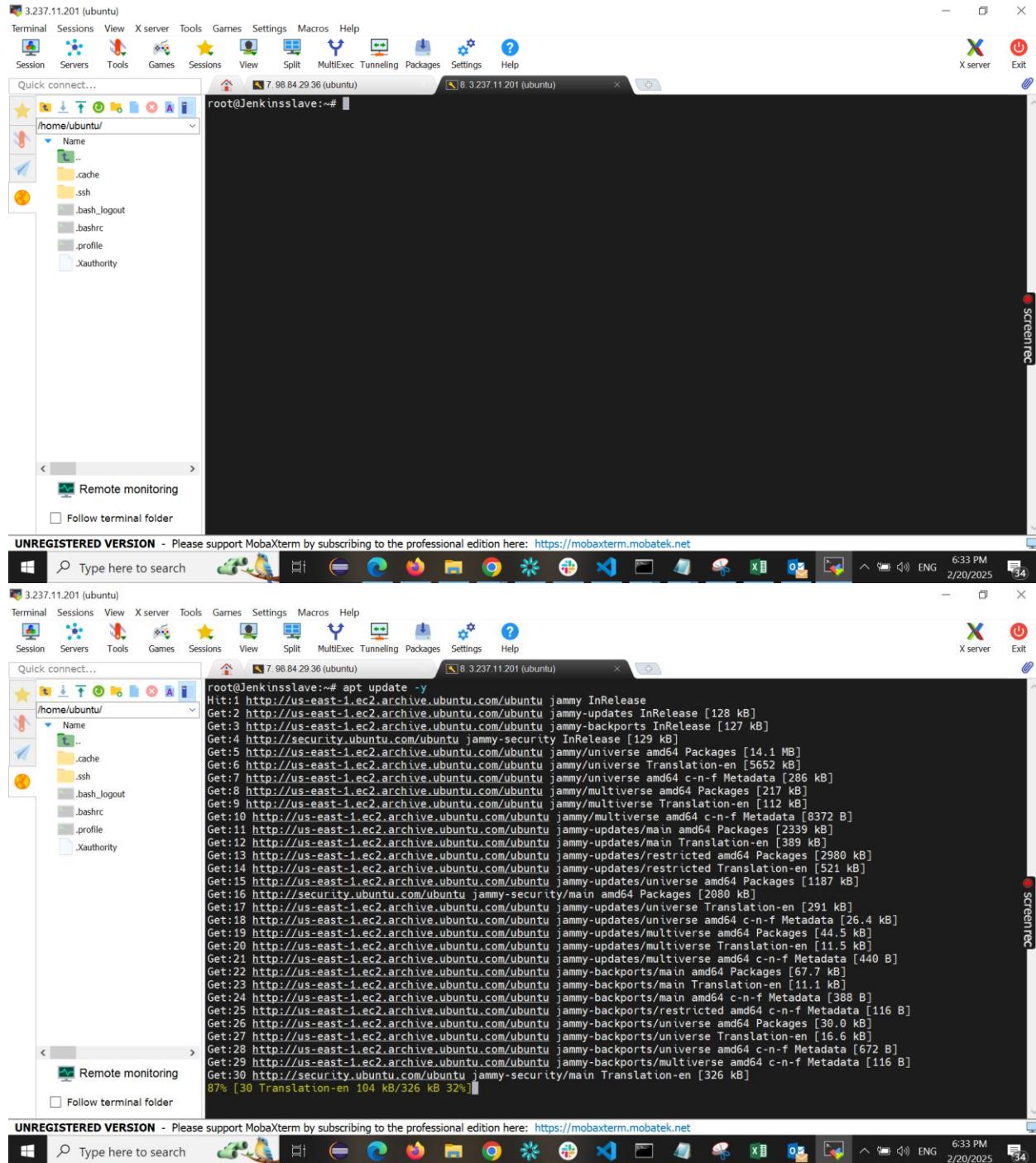
Configure a cloud

Build Executor Status 0/2

Add description

Learn more about distributed builds

screenrec



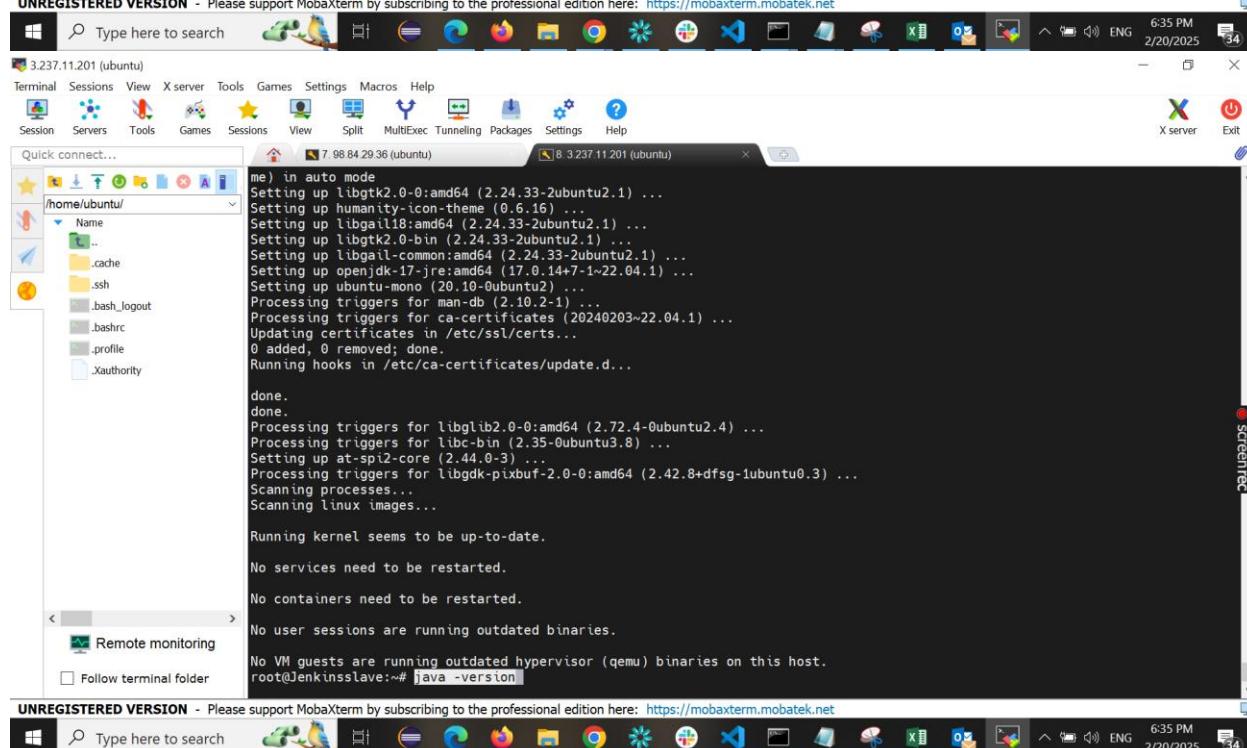
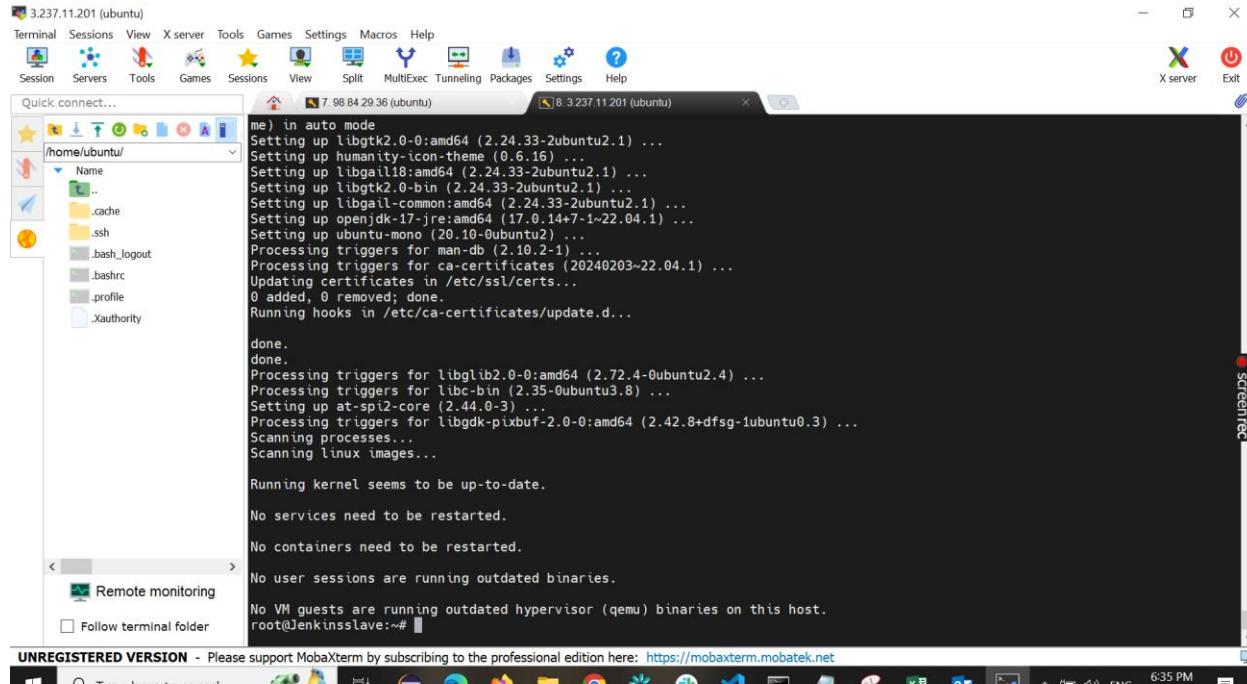
```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [521 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2080 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [291 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [440 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:30 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [326 kB]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2839 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [497 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [962 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [205 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.6 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [8260 B]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 35.6 MB in 17s (2126 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@JenkinsSlave:~#
```

```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
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Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
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Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
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40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@JenkinsSlave:~# sudo apt update -y
```

```
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net
Type here to search 6:34 PM 2/20/2025 34
```

```
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.1 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
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Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@JenkinsSlave:# sudo apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-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
40 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@JenkinsSlave:# sudo apt install openjdk-17-jre -y
```

```
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net
Type here to search 2/20/2025 6:34 PM
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ubuntu/
Name
.. cache ssh .bash_logout .bashrc .profile .Xauthority
Unpacking libavahi-client3:amd64 (0.8-Subuntu5.2) ...
Selecting previously unselected package libcups2:amd64.
Preparing to unpack .../031-libcups2_2.4.10p1-1ubuntu4.11_amd64.deb ...
Unpacking libcups2:amd64 (2.4.10p1-1ubuntu4.11) ...
Selecting previously unselected package fonts-dejavu-core.
Preparing to unpack .../032-fonts-dejavu-core_2.37-2build1_all.deb ...
Unpacking fonts-dejavu-core (2.37-2build1) ...
Selecting previously unselected package fontconfig-config.
Preparing to unpack .../033-fontconfig-config_2.13.1-4.2ubuntu5 ...
Unpacking fontconfig-config (2.13.1-4.2ubuntu5) ...
Selecting previously unselected package libfontconfig1:amd64.
Preparing to unpack .../034-libfontconfig1_2.13.1-4.2ubuntu5_amd64.deb ...
Unpacking libfontconfig1:amd64 (2.13.1-4.2ubuntu5) ...
Selecting previously unselected package liblcms2-2:amd64.
Preparing to unpack .../035-liblcms2-2_2.12-rc1-2build2_amd64.deb ...
Unpacking liblcms2-2:amd64 (2.12-rc1-2build2) ...
Selecting previously unselected package libgraphite2-3:amd64.
Preparing to unpack .../036-libgraphite2-3_1.3.14-1build2_amd64.deb ...
Unpacking libgraphite2-3:amd64 (1.3.14-1build2) ...
Selecting previously unselected package libharfbuzz0b:amd64.
Preparing to unpack .../037-libharfbuzz0b_2.7.4-1ubuntu3.2_amd64.deb ...
Unpacking libharfbuzz0b:amd64 (2.7.4-1ubuntu3.2) ...
Selecting previously unselected package libpcslite1:amd64.
Preparing to unpack .../038-libpcslite1_1.9.5-Subuntu1_amd64.deb ...
Unpacking libpcslite1:amd64 (1.9.5-Subuntu1) ...
Selecting previously unselected package openjdk-17-jre-headless:amd64.
Preparing to unpack .../039-openjdk-17-jre-headless_17.0.14+7-1-22.04.1_amd64.deb ...
Unpacking openjdk-17-jre-headless:amd64 (17.0.14+7-1-22.04.1) ...
Selecting previously unselected package ca-certificates-java.
Preparing to unpack .../040-ca-certificates-java_20190909ubuntu1.2_all.deb ...
Unpacking ca-certificates-java (20190909ubuntu1.2) ...
Progress: [ 17% ] [ ##### ]
```



```
Setting up libgtk2.0-bin (2.24.33-2ubuntu2.1) ...
Setting up libgail-common:amd64 (2.24.33-2ubuntu2.1) ...
Setting up ubuntu-mono (20.10-0ubuntu2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ca-certificates (20240203-22.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
Processing triggers for libglib2.0-0:amd64 (2.72.4-0ubuntu2.4) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Setting up at-spi2-core (2.44.0-3) ...
Processing triggers for libgdk-pixbuf2.0-0:amd64 (2.42.8+dfsg-1ubuntu0.3) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@JenkinsSlave:~# java -version
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@JenkinsSlave:~# sudo apt install git -y
```

```
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@JenkinsSlave:~# sudo apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following packages will be upgraded:
  git
1 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
Need to get 3165 kB of archives.
After this operation, 4096 B of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 git amd64 1:2.34.1-1ubuntu1.12 [3165 kB]
Fetched 3165 kB in 0s (46.4 MB/s)
(Reading database ... 81438 files and directories currently installed.)
Preparing to unpack .../git_1%3a2.34.1-1ubuntu1.12_amd64.deb ...
Unpacking git (1:2.34.1-1ubuntu1.12) over (1:2.34.1-1ubuntu1.11) ...
Setting up git (1:2.34.1-1ubuntu1.12) ...
Scanning processes...
Scanning linux images...

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No containers need to be restarted.

No user sessions are running outdated binaries.

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root@JenkinsSlave:~#
```

```
openjdk version "17.0.14" 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-122.04.1)
root@JenkinsSlave:~# sudo apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
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Unpacking git (1:2.34.1-1ubuntu1.12) over (1:2.34.1-1ubuntu1.11) ...
Setting up git (1:2.34.1-1ubuntu1.12) ...
Scanning processes...
Scanning linux images...

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No containers need to be restarted.

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No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@JenkinsSlave:~# git --version
```

```
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-122.04.1, mixed mode, sharing)
root@JenkinsSlave:~# sudo apt install git -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following packages will be upgraded:
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1 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
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Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 git amd64 1:2.34.1-1ubuntu1.12 [3165 kB]
Fetched 3165 kB in 0s (46.4 MB/s)
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Preparing to unpack .../git_1%3a2.34.1-1ubuntu1.12_amd64.deb ...
Unpacking git (1:2.34.1-1ubuntu1.12) over (1:2.34.1-1ubuntu1.11) ...
Setting up git (1:2.34.1-1ubuntu1.12) ...
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Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@JenkinsSlave:~# git --version
git version 2.34.1
root@JenkinsSlave:~#
```

```
Setting up libwagon-http-shaded-java (3.3.4-1) ...
Setting up libcdi-api-java (1.2-3) ...
Setting up libhawtjni-runtime-java (1.17-1) ...
Setting up libwagon-provider-api-java (3.3.4-1) ...
Setting up libmaven-parent-java (31-2) ...
Setting up libcommons-parent-java (43-1) ...
Setting up libsisu-inject-java (0.3.4-2) ...
Setting up libsisu-plexus-java (0.3.4-3) ...
Setting up libmaven-resolver-java (1.4.2-3build1) ...
Setting up libguava-java (29.0-6) ...
Setting up libcommons-lang3-java (3.11-1) ...
Setting up libjansi-native-java (1.8-1) ...
Setting up libwagon-file-java (3.3.4-1) ...
Setting up libcommons-io-java (2.11.0-2) ...
Setting up libguice-java (4.2.3-2) ...
Setting up libjansi-java (1.18-1) ...
Setting up libmaven-shared-utils-java (3.3.0-1ubuntu0.22.04.1) ...
Setting up libmaven3-core-java (3.6.3-5) ...
Setting up maven (3.6.3-5) ...
update-alternatives: using /usr/share/maven/bin/mvn to provide /usr/bin/mvn (mvn) in auto mode
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@JenkinsSlave:~#
```

```
Setting up libwagon-http-shaded-java (3.3.4-1) ...
Setting up libcdi-api-java (1.2-3) ...
Setting up libhawtjni-runtime-java (1.17-1) ...
Setting up libwagon-provider-api-java (3.3.4-1) ...
Setting up libmaven-parent-java (31-2) ...
Setting up libcommons-parent-java (43-1) ...
Setting up libsisu-inject-java (0.3.4-2) ...
Setting up libsisu-plexus-java (0.3.4-3) ...
Setting up libmaven-resolver-java (1.4.2-3build1) ...
Setting up libguava-java (29.0-6) ...
Setting up libcommons-lang3-java (3.11-1) ...
Setting up libjansi-native-java (1.8-1) ...
Setting up libwagon-file-java (3.3.4-1) ...
Setting up libcommons-io-java (2.11.0-2) ...
Setting up libguice-java (4.2.3-2) ...
Setting up libjansi-java (1.18-1) ...
Setting up libmaven-shared-utils-java (3.3.0-1ubuntu0.22.04.1) ...
Setting up libmaven3-core-java (3.6.3-5) ...
Setting up maven (3.6.3-5) ...
update-alternatives: using /usr/share/maven/bin/mvn to provide /usr/bin/mvn (mvn) in auto mode
Scanning processes...
Scanning linux images...

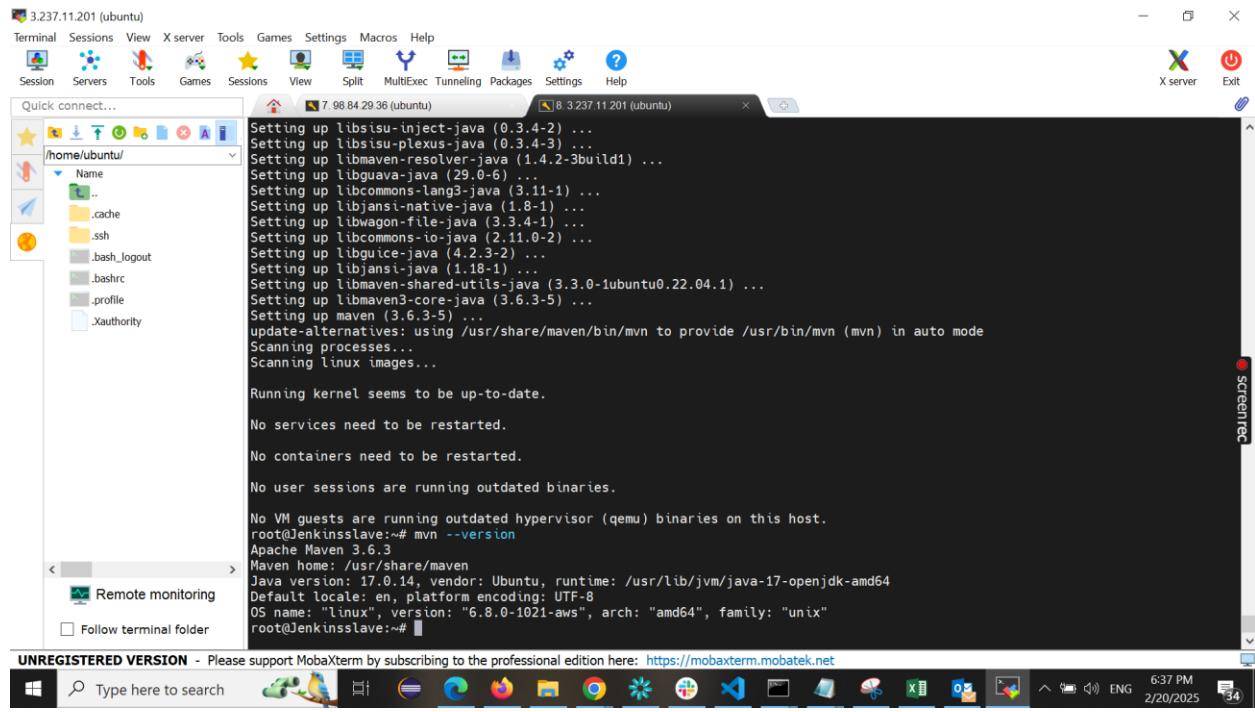
Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@JenkinsSlave:~# mvn --version
```



Now successfully Setting up a **Jenkins Master-Slave** architecture helps distribute workloads across multiple nodes, improving performance and scalability.

Setup and Configuration K8 (Kubernetes) :

Following Configuration is common for both master and worker nodes

- **sudo -i**
- **apt update -y**
- **sudo swapoff -a**
- **sudo sed -i '/ swap / s/^\(\.*\)\\$/#\1/g' /etc/fstab**
- **apt install docker.io -y**
- **Load the br_netfilter module required for networking**

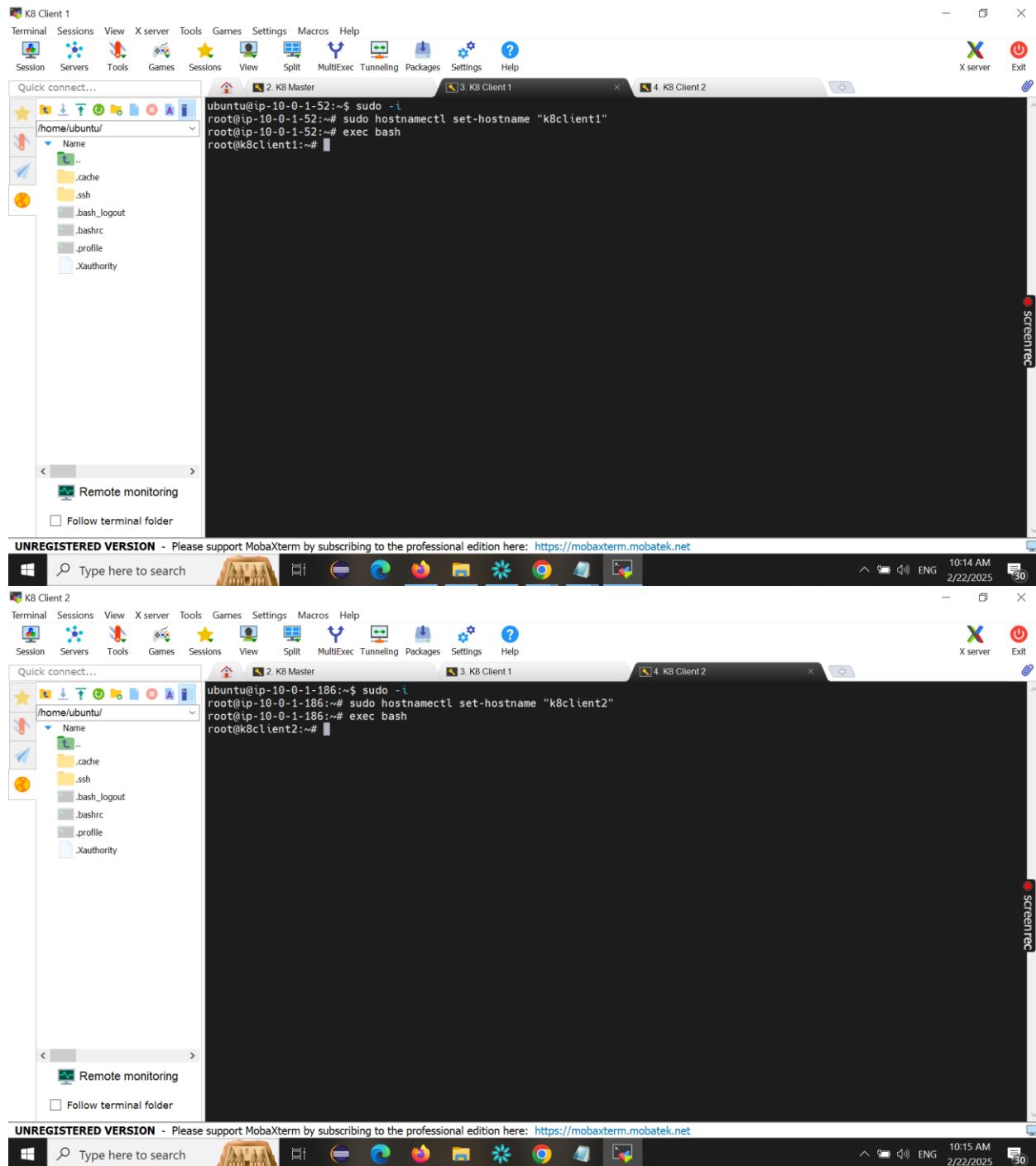
- To allow iptables to see bridged traffic, as required by Kubernetes, we need to set the values of certain fields to 1
- `sudo sysctl -system`
- Install curl
- `sudo apt install curl -y`
- `curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"`
- `sudo apt update -y`
- `sudo apt install -y containerd.io`
- `sudo mkdir -p /etc/containerd`
- `sudo containerd config default | sudo tee /etc/containerd/config.toml`
- `sudo systemctl restart containerd`
- `sudo systemctl status containerd`

Install Kubernetes

- `sudo apt-get update`
- `sudo apt-get install -y apt-transport-https ca-certificates curl gpg`
- `sudo mkdir -p -m 755 /etc/apt/keyrings`
- `curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.29/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg`
- `echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.29/deb/ /' | sudo tee /etc/apt/sources.list.d/kubernetes.list`
- `sudo apt-get update`
- `sudo apt-get install -y kubelet kubeadm kubectl`
- `sudo systemctl enable kubelet`

Following Installation should be performed on K8 Master

- **sudo kubeadm config images pull**
- **sudo kubeadm init --pod-network-cidr=10.244.0.0/16 --ignore-preflight-errors=NumCPU --ignore-preflight-errors=Mem**
- **mkdir -p \$HOME/.kube**
sudo cp -i /etc/kubernetes/admin.conf \$HOME/.kube/config
sudo chown \$(id -u):\$(id -g) \$HOME/.kube/config
- **kubectl apply -f**
<https://github.com/coreos/flannel/raw/master/Documentation/kube-flannel.yml>
- **Use the get nodes command to verify that our master node is ready**
- **kubectl get nodes**
- **check whether all the default pods are running**
- **kubectl get pods --all-namespaces**
- **kubectl get nodes**
- **sudo kubeadm token create --print-join-command # To generate New Token along with Kubeadm Join Command**
- **With the help of this Tokken used to join the worker node to Master**
- **On Each Worker Node, Run the Join Command from Master's Output**



K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
root@ip-10-0-1-227:~# sudo hostnamectl set-hostname "k8master"
root@k8master:~# apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:4 http://us-east-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://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2339 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [521 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [291 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.1 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:29 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2080 kB]
77% [4 Packages store 0 B] [29 Packages 260 kB/2080 kB 13%]
```

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K8 Master

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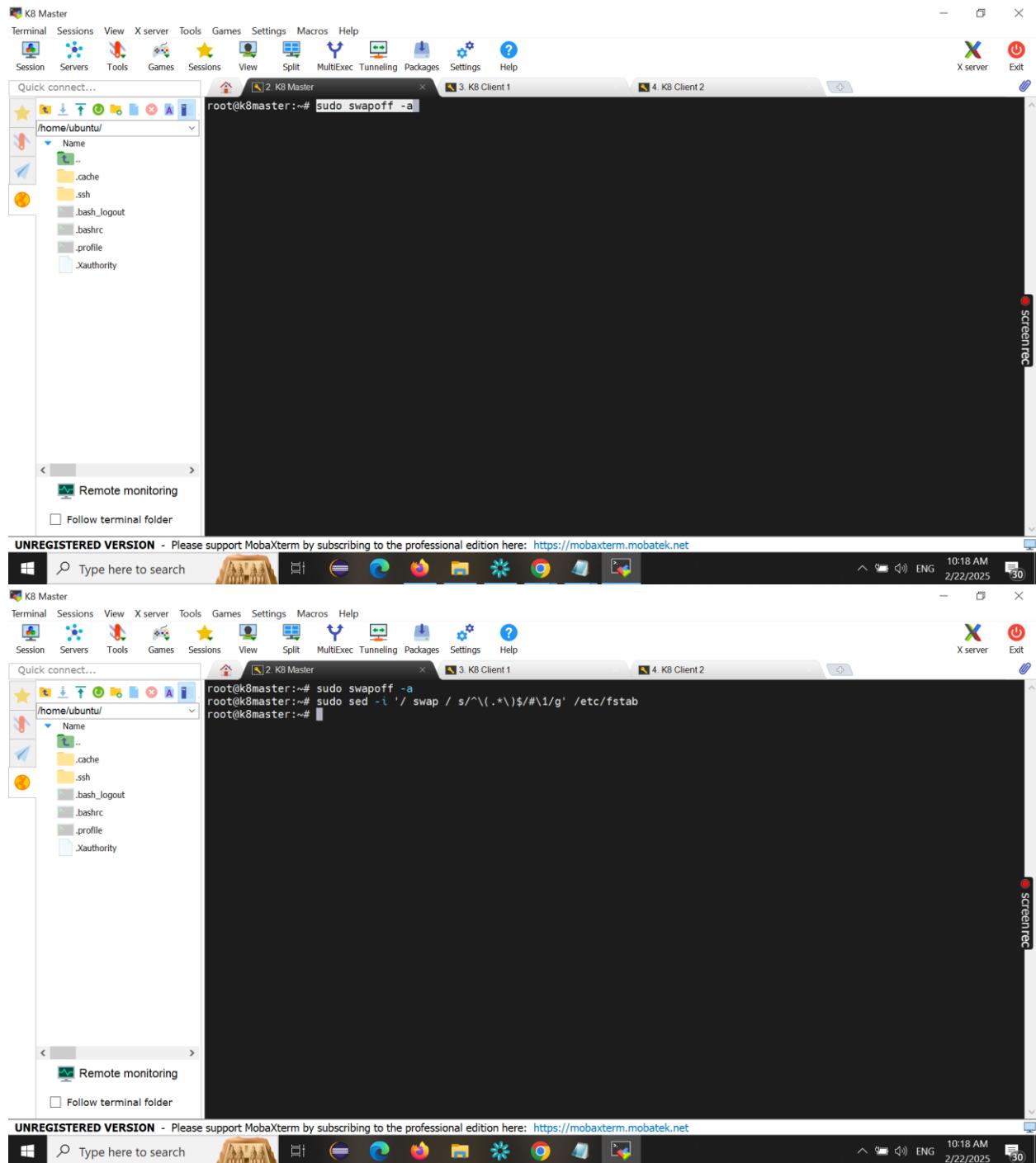
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

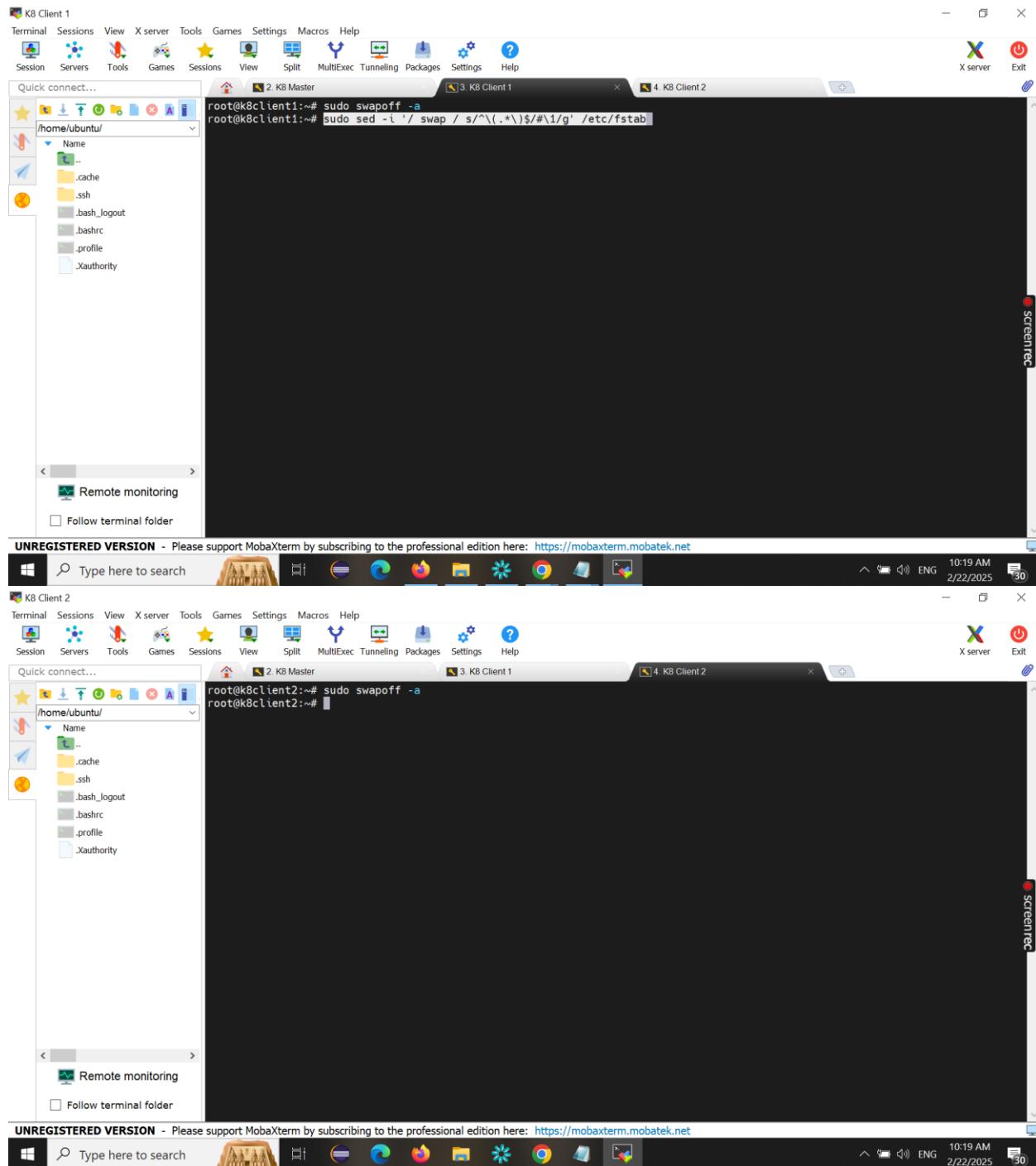
Quick connect... 2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [389 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2980 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [521 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [291 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [26.4 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [44.5 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.5 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [440 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [67.7 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.1 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:29 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2080 kB]
Get:30 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [326 kB]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2839 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [497 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [961 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [205 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.6 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [8260 B]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 35.6 MB in 30s (1177 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
46 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

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K8 Client 1

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

K8 Master

```
root@k8client1:~# sudo swapoff -a
root@k8client1:~# sudo sed -i '/ swap / s/^.*$/#\1/g' /etc/fstab
root@k8client1:~# apt install docker.io -y
```

/home/ubuntu/

- Name
 - ..
 - .cache
 - .ssh
 - .bash_logout
 - .bashrc
 - .profile
 - .Xauthority

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

K8 Master

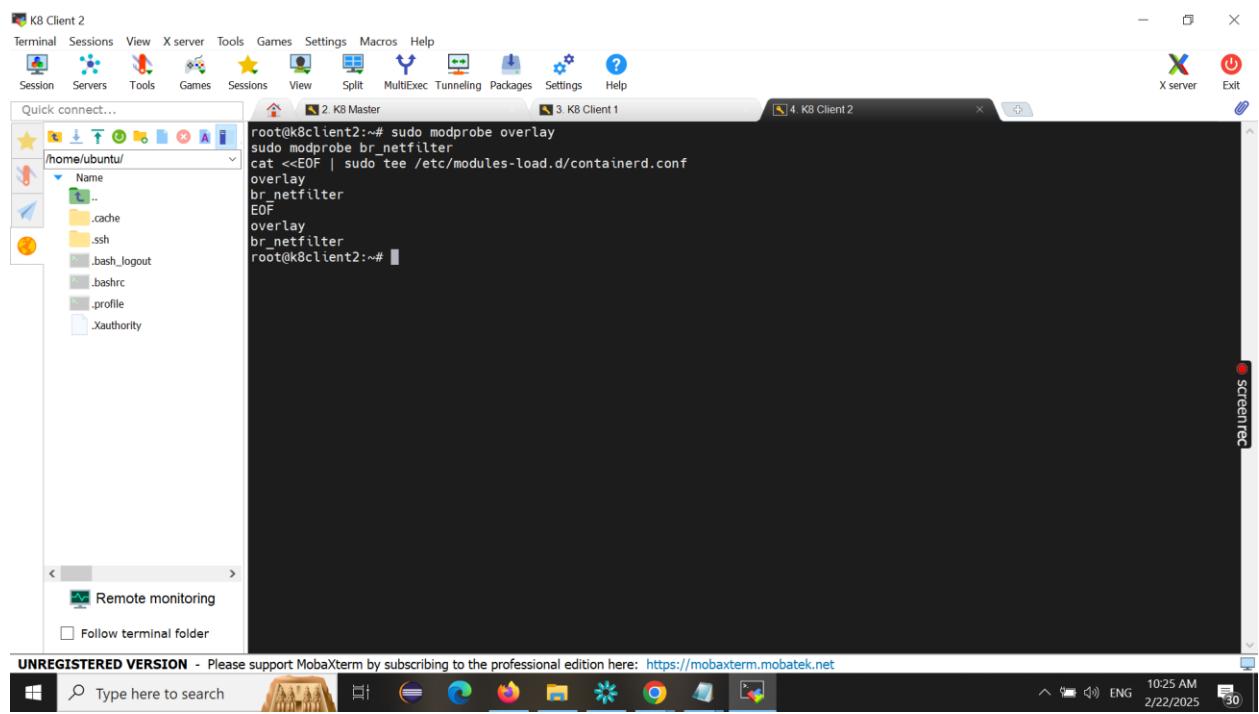
```
root@k8client2:~# sudo swapoff -a
root@k8client2:~# sudo sed -i '/ swap / s/^.*$/#\1/g' /etc/fstab
root@k8client2:~# apt install docker.io -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 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 46 not upgraded.
Need to get 78.7 MB of archives.
After this operation, 301 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 pigz amd64 2.6-1 [63.6 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 bridge-utils amd64 1.7-1ubuntu3 [34.4 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 runc amd64 1.1.12-0ubuntu2~22.04.1 [8405 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 containerd amd64 1.7.24-0ubuntu1~22.04.1 [37.3 MB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 dns-root-data all 2023112702-ubuntu0.22.04.1 [5136 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 dnsmasq-base amd64 2.90-0ubuntu0.22.04.1 [374 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 docker.io amd64 26.1.3-0ubuntu1~22.04.1 [32.5 MB]
62% [7 docker.io 17.7 kB/32.5 MB 0%]
```

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

/home/ubuntu/

Name .. .cache .ssh .bash_logout .bashrc .profile .Xauthority

```
root@k8master:~# sudo modprobe overlay
cat <<EOF | sudo tee /etc/modules-load.d/containerd.conf
overlay
br_netfilter
EOF
overlay
br_netfilter
root@k8master:~#
```

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K8 Client 2

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

/home/ubuntu/

Name .. .cache .ssh .bash_logout .bashrc .profile .Xauthority

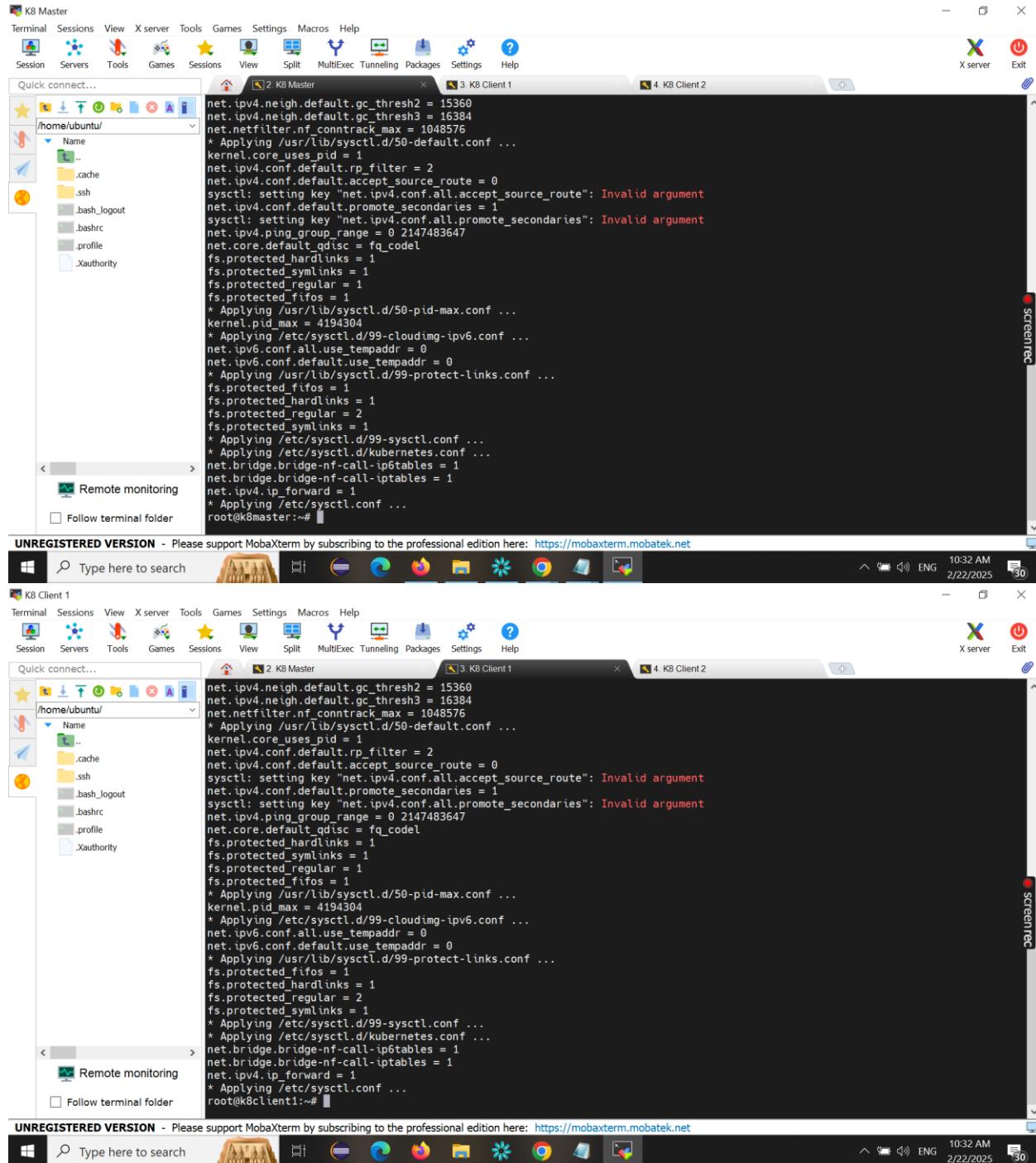
```
root@k8client2:~# sudo modprobe overlay
cat <<EOF | sudo tee /etc/modules-load.d/containerd.conf
overlay
br_netfilter
EOF
overlay
br_netfilter
root@k8client2:~# sudo tee /etc/sysctl.d/kubernetes.conf<<EOF
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-call-iptables = 1
net.ipv4.ip_forward = 1
EOF
```

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

2 K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8client2:~# sudo modprobe overlay
sudo modprobe br_netfilter
cat <<EOF | sudo tee /etc/modules-load.d/containerd.conf
overlay
br_netfilter
EOF
overlay
br_netfilter
root@k8client2:~# sudo tee /etc/sysctl.d/kubernetes.conf<<EOF
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-call-iptables = 1
net.ipv4.ip_forward = 1
EOF
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-call-iptables = 1
net.ipv4.ip_forward = 1
root@k8client2:~# sudo sysctl --system
```

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screenrec

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

2 K8 Master 3. K8 Client 1 4. K8 Client 2

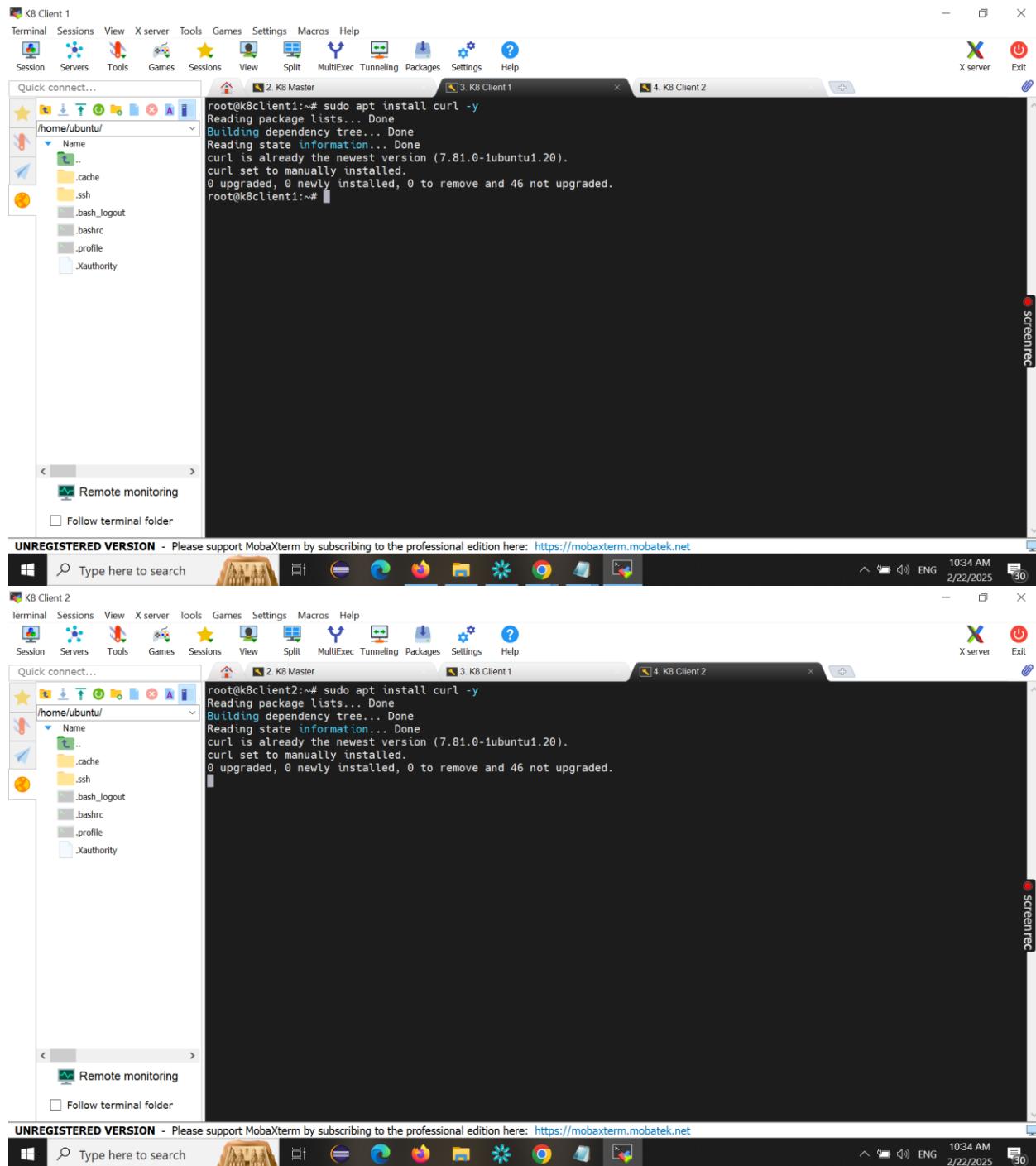
```
root@k8master:~# sudo apt install curl -y
```

Remote monitoring Follow terminal folder

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screenrec



K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

/home/ubuntu/

Name .. .cache .ssh .bash_logout .bashrc .profile .Xauthority

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.81.0-1ubuntu1.20).
curl set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 46 not upgraded.
root@k8master:~# curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu \$(lsb_release -cs) stable"

Remote monitoring Follow terminal folder

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K8 Client 1

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

/home/ubuntu/

Name .. .cache .ssh .bash_logout .bashrc .profile .Xauthority

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.81.0-1ubuntu1.20).
curl set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 46 not upgraded.
root@k8client1:~# curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu \$(lsb_release -cs) stable"

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K8 Client 1

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8client1:~# sudo apt install curl -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.81.0-1ubuntu1.20).
curl set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 46 not upgraded.
root@k8client1:~# curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository 'deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable'
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
Repository: 'deb [arch=amd64] https://download.docker.com/linux/ubuntu jammy stable'
Description:
Archive for codename: jammy components: stable
More info: https://download.docker.com/linux/ubuntu
Adding repository.
Press [ENTER] to continue or Ctrl-c to cancel.
Adding deb entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:4 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Hit:5 https://security.ubuntu.com/ubuntu jammy-security InRelease
Get:6 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [44.8 kB]
Fetched 93.7 kB in 1s (115 kB/s)
```

Remote monitoring Follow terminal folder

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1035 AM 2/22/2025

K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... K8 Master 3. K8 Client 1 4. K8 Client 2

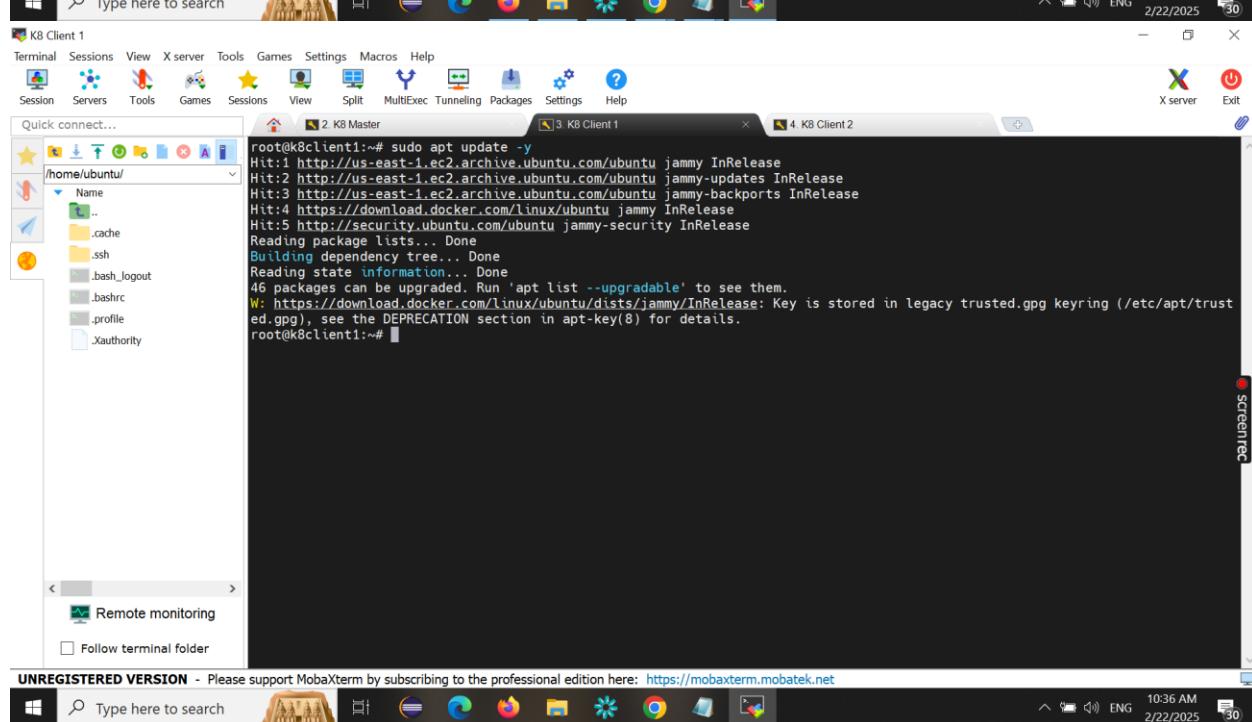
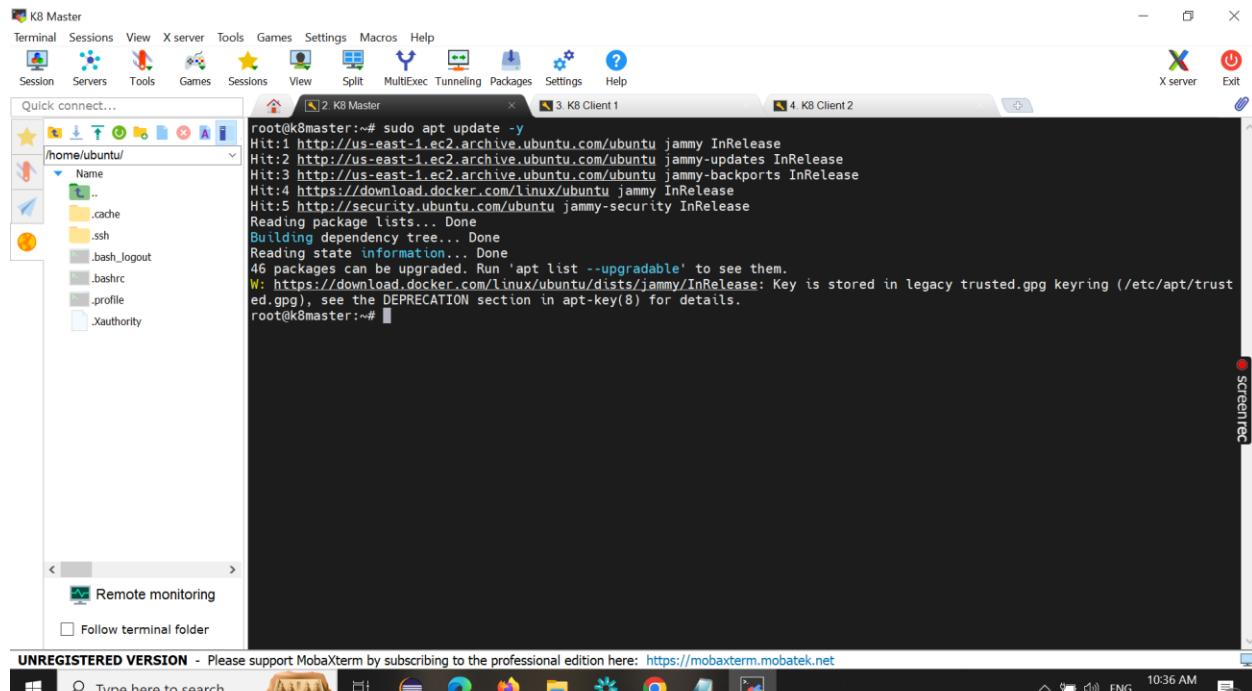
```
root@k8client2:~# sudo apt install curl -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.81.0-1ubuntu1.20).
curl set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 46 not upgraded.
root@k8client2:~# curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository 'deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable'
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
Repository: 'deb [arch=amd64] https://download.docker.com/linux/ubuntu jammy stable'
Description:
Archive for codename: jammy components: stable
More info: https://download.docker.com/linux/ubuntu
Adding repository.
Press [ENTER] to continue or Ctrl-c to cancel.
Adding deb entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:4 https://security.ubuntu.com/ubuntu jammy-security InRelease
Get:5 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Get:6 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [44.8 kB]
Fetched 93.7 kB in 1s (117 kB/s)
```

Remote monitoring Follow terminal folder

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1036 AM 2/22/2025



K8 Client 2

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. K8 Client 1 4. K8 Client 2

```
root@k8client2:~# sudo apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu jammy InRelease
Hit:5 https://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
46 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: https://download.docker.com/linux/ubuntu/dists/jammy/InRelease: Key is stored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in apt-key(8) for details.
root@k8client2:~#
```

screenrec

Remote monitoring Follow terminal folder

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10:37 AM 2/22/2025

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
The following NEW packages will be installed:
  containerd.io
  0 upgraded, 1 newly installed, 3 to remove and 46 not upgraded.
  Need to get 29.6 MB of archives.
  After this operation, 178 MB disk space will be freed.
  Get:1 https://download.docker.com/linux/ubuntu jammy/stable amd64 containerd.io amd64 1.7.25-1 [29.6 MB]
  Fetched 29.6 MB in 0s (72.7 MB/s)
  (Reading database ... 66219 files and directories currently installed.)
  Removing docker.io (26.1.3~Ubuntu1~22.04.1) ...
  '/usr/share/docker.io/contrib/nuke-graph-directory.sh' -> '/var/lib/docker/nuke-graph-directory.sh'
  Warning: Stopping docker.service, but it can still be activated by:
    docker.socket
  Removing containerd (1.7.24~Ubuntu1~22.04.1) ...
  Removing runc (1.1.12~Ubuntu2~22.04.1) ...
  Selecting previously unselected package containerd.io.
  (Reading database ... 65945 files and directories currently installed.)
  Preparing to unpack .../containerd.io_1.7.25-1_amd64.deb ...
  Unpacking containerd.io (1.7.25-1) ...
  Setting up containerd.io (1.7.25-1) ...
  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.

  No containers need to be restarted.

  No user sessions are running outdated binaries.

  No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@k8master:~#
```

screenrec

Remote monitoring Follow terminal folder

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K8 Client 1

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

1 K8 Master 2 K8 Client 1 3 K8 Client 1 4 K8 Client 2

```
root@k8client1:~# sudo apt update -y
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:4 https://download.docker.com/linux/ubuntu jammy InRelease
Hit:5 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
46 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: https://download.docker.com/linux/ubuntu/dists/jammy/InRelease: Key is stored in legacy trusted.gpg keyring (/etc/apt/trust
ed.gpg), see the DEPRECATION section in apt-key(8) for details.
root@k8client1:~#
sudo apt install -y containerd.io^C
root@k8client1:~# sudo apt install -y containerd.io
Reading package lists... Done
Building dependency tree... Done
The following packages were automatically installed and are no longer required:
  bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  containerd docker.io runc
The following NEW packages will be installed:
  containerd.io
0 upgraded, 1 newly installed, 3 to remove and 46 not upgraded.
Need to get 29.6 MB of archives.
After this operation, 178 MB disk space will be freed.
Get:1 https://download.docker.com/linux/ubuntu jammy/stable amd64 containerd.io amd64 1.7.25-1 [29.6 MB]
Fetched 29.6 MB in 0s (73.8 MB/s)
[Reading database ... 85%
```

Follow terminal folder

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

1 K8 Master 2 K8 Client 1 3 K8 Client 1 4 K8 Client 2

```
The following NEW packages will be installed:
  containerd.io
0 upgraded, 1 newly installed, 3 to remove and 46 not upgraded.
Need to get 29.6 MB of archives.
After this operation, 178 MB disk space will be freed.
Get:1 https://download.docker.com/linux/ubuntu jammy/stable amd64 containerd.io amd64 1.7.25-1 [29.6 MB]
Fetched 29.6 MB in 0s (71.7 MB/s)
[Reading database ... 66219 files and directories currently installed.]
Removing docker.io (26.1.3~Ubuntu1~22.04.1) ...
  '/usr/share/docker.io/contrib/nuke-graph-directory.sh' -> '/var/lib/docker/nuke-graph-directory.sh'
Warning: Stopping docker.service, but it can still be activated by:
  docker.socket
Removing containerd (1.7.24~Ubuntu1~22.04.1) ...
Removing runc (1.1.12~Ubuntu2~22.04.1) ...
Selecting previously unselected package containerd.io.
(Reading database ... 65945 files and directories currently installed.)
Preparing to unpack .../containerd.io_1.7.25-1_amd64.deb ...
Unpacking containerd.io (1.7.25-1) ...
Setting up containerd.io (1.7.25-1) ...
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.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@k8client2:~#
```

Follow terminal folder

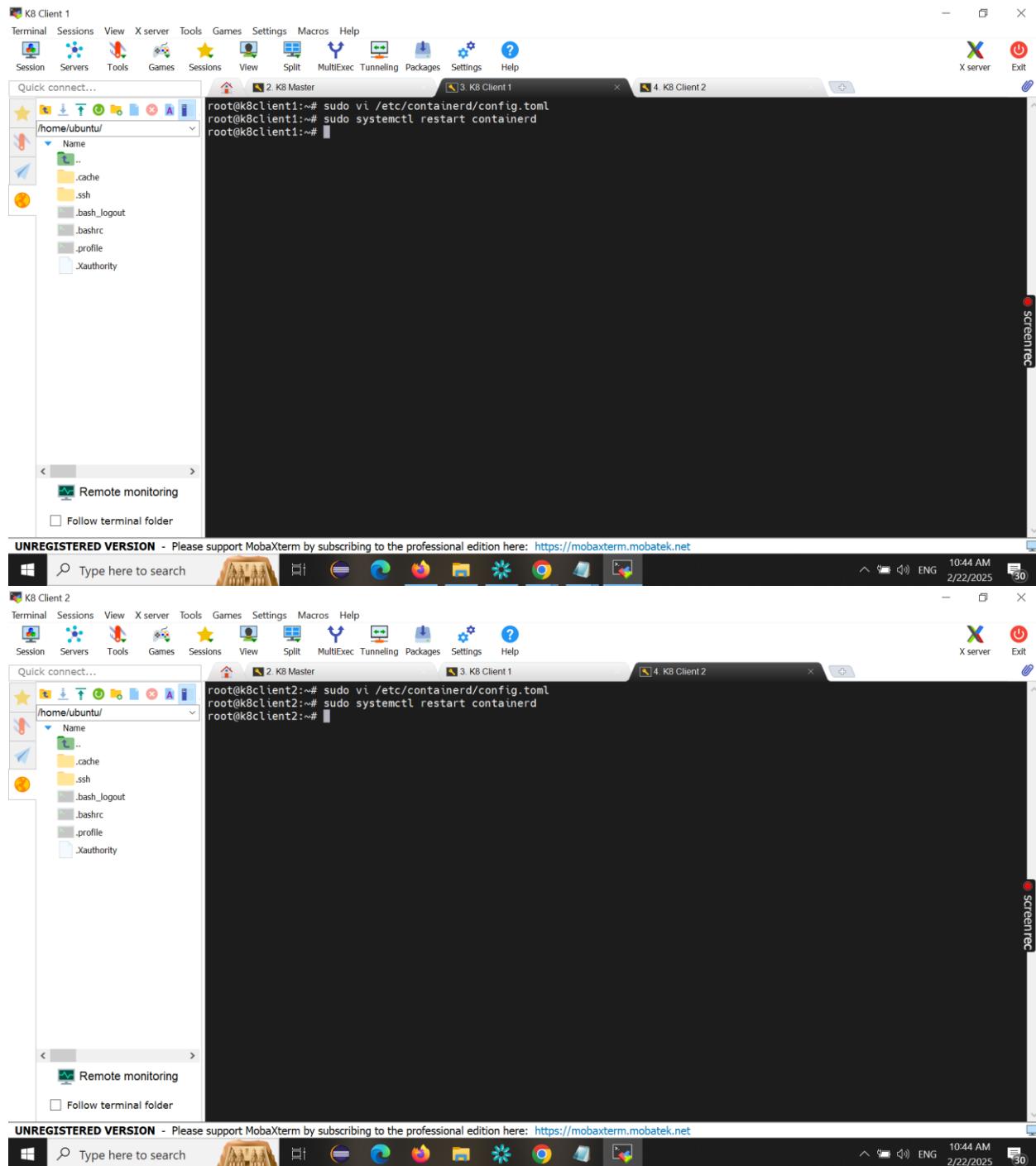
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```
2. K8 Master
snapshottor = "overlayfs"
[proxy_plugins]
[stream_processors]
[stream_processors."io.containerd.ocicrypt.decoder.v1.tar"]
accepts = ["application/vnd.oci.image.layer.v1.tar+encrypted"]
args = ["--description-keys-path", "/etc/containerd/ocicrypt/keys"]
env = [{"OCICRYPT_KEYPROVIDER_CONFIG=/etc/containerd/ocicrypt/ocicrypt_keyprovider.conf"}]
path = "ctd-decoder"
returns = "application/vnd.oci.image.layer.v1.tar"
[stream_processors."io.containerd.ocicrypt.decoder.v1.tar.gzip"]
accepts = ["application/vnd.oci.image.layer.v1.tar-gzip+encrypted"]
args = ["--description-keys-path", "/etc/containerd/ocicrypt/keys"]
env = [{"OCICRYPT_KEYPROVIDER_CONFIG=/etc/containerd/ocicrypt/ocicrypt_keyprovider.conf"}]
path = "ctd-decoder"
returns = "application/vnd.oci.image.layer.v1.tar+gzip"
[timeouts]
"io.containerd.timeout.bolt.open" = "0s"
"io.containerd.timeout.metrics.shimstats" = "2s"
"io.containerd.timeout.shim.cleanup" = "5s"
"io.containerd.timeout.shim.load" = "5s"
"io.containerd.timeout.shim.shutdown" = "3s"
"io.containerd.timeout.task.state" = "2s"
[ttrpc]
address = ""
gid = 0
uid = 0
root@k8master:~#
```

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```
2. K8 Master
root@k8client2:~# sudo vi /etc/containerd/config.toml
root@k8client2:~#
```

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8master:~# sudo vi /etc/containerd/config.toml
root@k8master:~# sudo systemctl restart containerd
root@k8master:~# sudo systemctl status containerd
● containerd.service - containerd container runtime
   Loaded: loaded (/lib/systemd/system/containerd.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2025-02-22 05:14:00 UTC; 35s ago
     Docs: https://containerd.io
  Process: 3771 ExecStartPre=/sbin/modprobe overlay (code=exited, status=0/SUCCESS)
 Main PID: 3774 (containerd)
    Tasks: 6
   Memory: 13.7M
      CPU: 89ms
      CGroup: /system.slice/containerd.service
             └─3774 /usr/bin/containerd

Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.051696127Z" level=info msg="serving..." address=/run/containerd/containerd.sock
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.051839819Z" level=info msg="serving..." address=/run/containerd/containerd.sock
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052000340Z" level=info msg="Start subscribing containerd socket"
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052038887Z" level=info msg="Start recovering state"
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052117145Z" level=info msg="Start event monitor"
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052129498Z" level=info msg="Start snapshots syncer"
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052144508Z" level=info msg="Start cni network conf sync"
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.052137665Z" level=info msg="Start streaming server"
Feb 22 05:14:00 k8master systemd[1]: Started containerd container runtime.
Feb 22 05:14:00 k8master containerd[3774]: time="2025-02-22T05:14:00.055604000Z" level=info msg="containerd successfully booted"
lines 1-22/22 (END)
```

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K8 Client 1

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8client1:~# sudo vi /etc/containerd/config.toml
root@k8client1:~# sudo systemctl restart containerd
root@k8client1:~#
^C
root@k8client1:~# sudo systemctl status containerd
● containerd.service - containerd container runtime
   Loaded: loaded (/lib/systemd/system/containerd.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2025-02-22 05:14:04 UTC; 45s ago
     Docs: https://containerd.io
  Process: 3807 ExecStartPre=/sbin/modprobe overlay (code=exited, status=0/SUCCESS)
 Main PID: 3809 (containerd)
    Tasks: 6
   Memory: 13.5M
      CPU: 90ms
      CGroup: /system.slice/containerd.service
             └─3809 /usr/bin/containerd

Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.693815616Z" level=error msg="failed to load cni during startup"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694206468Z" level=info msg="serving..." address=/run/containerd/containerd.sock
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694238900Z" level=info msg="serving..." address=/run/containerd/containerd.sock
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694310491Z" level=info msg="Start subscribing containerd socket"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694336562Z" level=info msg="Start recovering state"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694372711Z" level=info msg="Start event monitor"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694383786Z" level=info msg="Start snapshots syncer"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694391373Z" level=info msg="Start cni network conf sync"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.694397352Z" level=info msg="Start streaming server"
Feb 22 05:14:04 k8client1 containerd[3809]: time="2025-02-22T05:14:04.698659483Z" level=info msg="containerd successfully booted"
lines 1-22/22 (END)
```

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

/home/ubuntu/

Name

- ..
- .cache
- .ssh
- .bash_logout
- .bashrc
- .profile
- Xauthority

root@K8client2:~# sudo vi /etc/containerd/config.toml

root@K8client2:~# sudo systemctl restart containerd

root@K8client2:~# sudo systemctl status containerd

● containerd.service - containerd container runtime

 Loaded: loaded (/lib/systemd/system/containerd.service; enabled; vendor preset: enabled)

 Active: active (running) since Sat 2025-02-22 05:14:22 UTC; 41s ago

 Docs: <https://containerd.io>

 Process: 3729 ExecStartPre=/sbin/modprobe overlay (code=exited, status=0/SUCCESS)

 Main PID: 3732 (containerd)

 Tasks: 6

 Memory: 13.3M

 CPU: 88ms

 CGroup: /system.slice/containerd.service

 └─3732 /usr/bin/containerd

Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.060931906Z" level=error msg="failed to load cni during Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061520150Z" level=info msg=serving... address=/run/cont Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061553236Z" level=info msg=serving... address=/run/cont Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061622877Z" level=info msg="Start subscribing containerd" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061648261Z" level=info msg="Start recovering state" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061696784Z" level=info msg="Start event monitor" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061696784Z" level=info msg="Start snapshots syncer" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061703929Z" level=info msg="Start cni network conf sync" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.061709736Z" level=info msg="Start streaming server" Feb 22 05:14:22 K8client2 containerd[3732]: time="2025-02-22T05:14:22.067098479Z" level=info msg="containerd successfully boos Lines 1-22/22 (END)

Remote monitoring

Follow terminal folder

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

/home/ubuntu/

Name

- ..
- .cache
- .ssh
- .bash_logout
- .bashrc
- .profile
- Xauthority

root@K8master:~# containerd.service - containerd container runtime

 Loaded: loaded (/lib/systemd/system/containerd.service; enabled; vendor preset: enabled)

 Active: active (running) since Sat 2025-02-22 05:14:00 UTC; 35s ago

 Docs: <https://containerd.io>

 Process: 3771 ExecStartPre=/sbin/modprobe overlay (code=exited, status=0/SUCCESS)

 Main PID: 3774 (containerd)

 Tasks: 6

 Memory: 13.7M

 CPU: 89ms

 CGroup: /system.slice/containerd.service

 └─3774 /usr/bin/containerd

Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.051696127Z" level=info msg=serving... address=/run/conta Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.051839819Z" level=info msg=serving... address=/run/conta Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.052000340Z" level=info msg="Start subscribing containerd" Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.052038887Z" level=info msg="Start recovering state" Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.052117145Z" level=info msg="Start event monitor" Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.0521259498Z" level=info msg="Start snapshots syncer" Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.052137665Z" level=info msg="Start cni network conf sync" Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.052144508Z" level=info msg="Start streaming server" Feb 22 05:14:00 K8master systemd[1]: Started containerd container runtime.

Feb 22 05:14:00 K8master containerd[3774]: time="2025-02-22T05:14:00.055604000Z" level=info msg="containerd successfully boots Lines 1-22/22 (END)

root@K8master:~# sudo apt-get update

Hit:1 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu> jammy InRelease

Hit:2 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu> jammy-updates InRelease

Hit:3 <http://us-east-1.ec2.archive.ubuntu.com/ubuntu> jammy-backports InRelease

Hit:4 <https://download.docker.com/linux/ubuntu> jammy InRelease

Hit:5 <http://security.ubuntu.com/ubuntu> jammy-security InRelease

Reading package lists... Done

W: <https://download.docker.com/linux/ubuntu/dists/jammy/InRelease>: Key is stored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in apt-key(8) for details.

root@K8master:~#

Remote monitoring

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

3. K8 Client 1 4. K8 Client 2

```
root@k8client2:~# sudo vi /etc/containerd/config.toml
root@k8client2:~# sudo systemctl restart containerd
root@k8client2:~# sudo systemctl status containerd
● containerd.service - containerd container runtime
   Loaded: loaded (/lib/systemd/system/containerd.service; enabled; vendor preset: enabled)
     Active: active (running) since Sat 2025-02-22 05:14:22 UTC; 41s ago
       Docs: https://containerd.io
    Process: 3729 ExecStartPre=/sbin/modprobe overlay (code=exited, status=0/SUCCESS)
      Main PID: 3732 (containerd)
        Tasks: 6
         Memory: 13.3M
            CPU: 88ms
          CGroup: /system.slice/containerd.service
                  └─3732 /usr/bin/containerd

Feb 22 05:14:22 k8client2 containerd[3732]: time="2025-02-22T05:14:22.060931906Z" level=error msg="failed to load cni during
Feb 22 05:14:22 k8client2 containerd[3732]: time="2025-02-22T05:14:22.061520150Z" level=info msg=serving... address=/run/cont
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061553236Z level=info msg=serving... address=/run/cont
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061622877Z level=info msg=Start subscribing container
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061648261Z level=info msg=Start recovering state"
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061648405Z level=info msg=Start event monitor"
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061696784Z level=info msg=Start snapshots syncer"
Feb 22 05:14:22 k8client2 containerd[3732]: time= 2025-02-22T05:14:22.061703929Z level=info msg=Start cnf network conf sync
Feb 22 05:14:22 k8client2 containerd[3732]: time="2025-02-22T05:14:22.061709736Z" level=info msg=Start streaming server"
Feb 22 05:14:22 k8client2 containerd[3732]: time="2025-02-22T05:14:22.060709479Z" level=info msg="containerd successfully boos

root@k8client2:~# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu jammy InRelease
Hit:5 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... 57%
```

Remote monitoring Follow terminal folder

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1046 AM 2/22/2025

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8master:~# sudo apt-get install -y apt-transport-https ca-certificates curl gpg
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20240203~22.04.1).
ca-certificates set to manually installed.
curl is already the newest version (7.81.0-1ubuntu1.20).
gpg is already the newest version (2.2.27-3ubuntu2.1).
gpg set to manually installed.
The following packages were automatically installed and are no longer required:
  bridge-utils dns-root-data dnsmasq-base pizg ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 46 not upgraded.
Need to get 1510 B of archives.
After this operation, 170 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 apt-transport-https all 2.4.13 [1510 B]
Fetched 1510 B in 0s (95.3 kB/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 65961 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.4.13_all.deb ...
Unpacking apt-transport-https (2.4.13) ...
Setting up apt-transport-https (2.4.13) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.
No services need to be restarted.
```

Remote monitoring Follow terminal folder

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1046 AM 2/22/2025

K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

2 K8 Master 3 K8 Client 1 4 K8 Client 2

ca-certificates is already the newest version (20240203~22.04.1).
curl is already the newest version (7.81.0-1ubuntu1.20).
gpg is already the newest version (2.2.27-3ubuntu2.1).
gpg set to manually installed.
The following packages were automatically installed and are no longer required:
bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 46 not upgraded.
Need to get 1510 B of archives.
After this operation, 170 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 apt-transport-https all 2.4.13 [1510 B]
Fetched 1510 B in 0s (76.7 kB/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 65961 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.4.13_all.deb ...
Unpacking apt-transport-https (2.4.13) ...
Setting up apt-transport-https (2.4.13) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

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1047 AM 2/22/2025

K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

2 K8 Master 3 K8 Client 1 4 K8 Client 2

ca-certificates is already the newest version (20240203~22.04.1).
curl is already the newest version (7.81.0-1ubuntu1.20).
gpg is already the newest version (2.2.27-3ubuntu2.1).
gpg set to manually installed.
The following packages were automatically installed and are no longer required:
bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 46 not upgraded.
Need to get 1510 B of archives.
After this operation, 170 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 apt-transport-https all 2.4.13 [1510 B]
Fetched 1510 B in 0s (76.7 kB/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 65961 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.4.13_all.deb ...
Unpacking apt-transport-https (2.4.13) ...
Setting up apt-transport-https (2.4.13) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

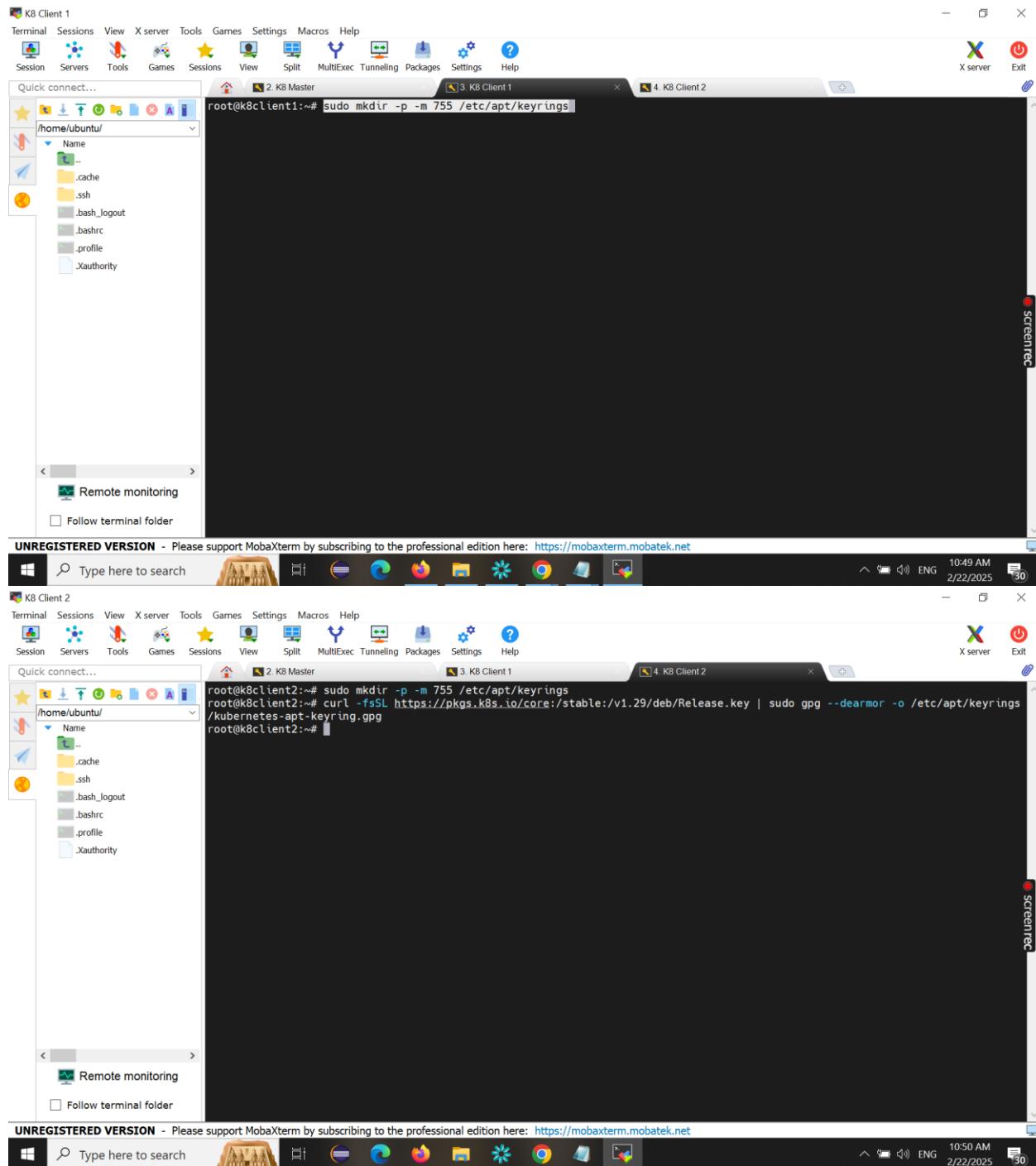
No services need to be restarted.

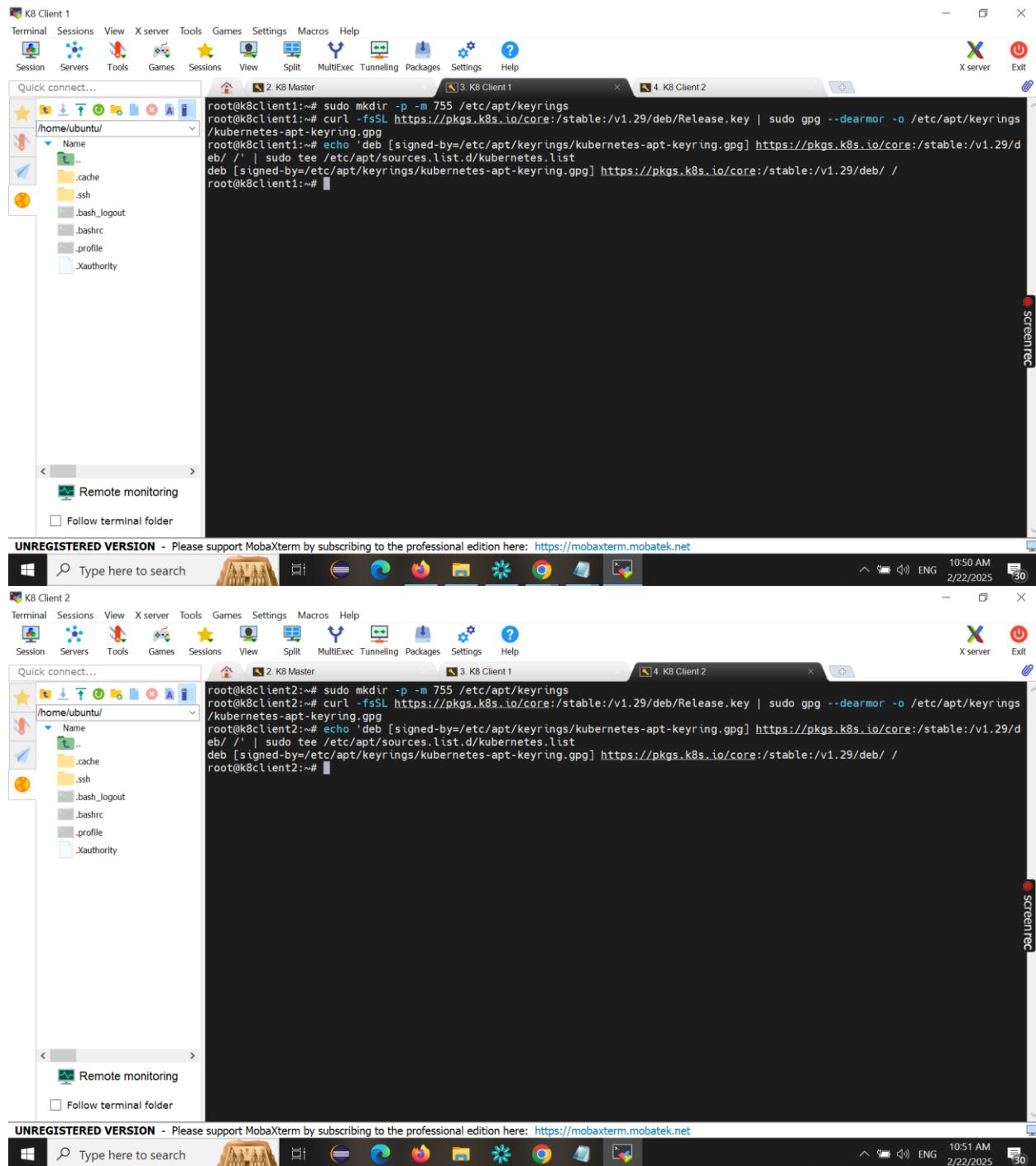
No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

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```
root@k8client1:~# sudo mkdir -p -m 755 /etc/apt/keyrings
root@k8client1:~# curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.29/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
root@k8client1:~# echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.29/deb/ /' | sudo tee /etc/apt/sources.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.29/deb/
root@k8client1:~# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Hit:5 https://download.docker.com/linux/ubuntu jammy InRelease
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.29/deb InRelease [1192 B]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2338 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:11 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.29/deb Packages [20.1 kB]
Fetched 3849 kB in 2s (2436 kB/s)
Reading package lists... 4%
```

```
root@k8client2:~# sudo mkdir -p -m 755 /etc/apt/keyrings
root@k8client2:~# curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.29/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
root@k8client2:~# echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.29/deb/ /' | sudo tee /etc/apt/sources.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.29/deb/
root@k8client2:~# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Hit:5 https://download.docker.com/linux/ubuntu jammy InRelease
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.29/deb InRelease [1192 B]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2338 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:11 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.29/deb Packages [20.1 kB]
Fetched 3849 kB in 2s (2427 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/jammy/InRelease: Key is stored in legacy trusted.gpg keyring (/etc/apt/trusted.gpg), see the DEPRECATION section in apt-key(8) for details.
root@k8client2:~#
```

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb InRelease [1192 B]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2338 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1187 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.6 kB]
Get:11 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb Packages [20.1 kB]
Fetched 3849 kB in 2s (2359 kB/s)
Reading package lists... Done
W: https://download.docker.com/linux/ubuntu/dists/jammy/InRelease: Key is stored in legacy trusted.gpg keyring (/etc/apt/trust
ed.gpg), see the DEPRECATION section in apt-key(8) for details.
root@k8master:~# sudo apt-get install -y kubelet kubeadm kubectl
Building dependency tree... Done
Reading package lists... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubectl kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 46 not upgraded.
Need to get 92.2 MB of archives.
After this operation, 346 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 conntrack amd64 1:1.4.6-2build2 [33.5 kB]
Get:2 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb cri-tools 1.29.0-1.1 [20.1 kB]
Get:3 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubernetes-cni 1.3.0-1.1 [31.4 kB]
Get:4 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubelet 1.29.14-1.1 [19.9 MB]
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubectl 1.29.14-1.1 [10.6 MB]
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubeadm 1.29.14-1.1 [10.2 MB]
Fetched 92.2 MB in 1s (86.3 MB/s)
```

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K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
root@k8client2:~# sudo apt-get install -y kubelet kubeadm kubectl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  conntrack cri-tools kubernetes-cni
The following NEW packages will be installed:
  conntrack cri-tools kubeadm kubectl kubernetes-cni
0 upgraded, 6 newly installed, 0 to remove and 46 not upgraded.
Need to get 92.2 MB of archives.
After this operation, 346 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 conntrack amd64 1:1.4.6-2build2 [33.5 kB]
Get:2 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb cri-tools 1.29.0-1.1 [20.1 kB]
Get:3 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubernetes-cni 1.3.0-1.1 [31.4 kB]
Get:4 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubelet 1.29.14-1.1 [19.9 MB]
Get:5 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubectl 1.29.14-1.1 [10.6 MB]
Get:6 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes/core:/stable:/v1.29/deb kubeadm 1.29.14-1.1 [10.2 MB]
Fetched 92.2 MB in 1s (87.6 MB/s)
Selecting previously unselected package conntrack.
(Reading database ... 65965 files and directories currently installed.)
Preparing to unpack .../0-conntrack_1%3a1.4.6-2build2_amd64.deb ...
Unpacking conntrack (1:1.4.6-2build2) ...
Selecting previously unselected package cri-tools.
Preparing to unpack .../1-cri-tools_1.29.0-1.1_amd64.deb ...
Unpacking cri-tools (1.29.0-1.1) ...
Selecting previously unselected package kubernetes-cni.
Preparing to unpack .../2-kubernetes-cni_1.3.0-1.1_amd64.deb ...
Unpacking kubernetes-cni (1.3.0-1.1) ...
```

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

root@k8master:~# sudo kubeadm config images pull

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... 2. K8 Master 3. K8 Client 1 4. K8 Client 2

root@k8master:~# sudo kubeadm config images pull

```
I0222 05:22:58.716829    4990 version.go:256] remote version is much newer: v1.32.2; falling back to: stable-1.29
[config/images] Pulled registry.k8s.io/kube-apiserver:v1.29.14
[config/images] Pulled registry.k8s.io/kube-controller-manager:v1.29.14
[config/images] Pulled registry.k8s.io/kube-scheduler:v1.29.14
[config/images] Pulled registry.k8s.io/kube-proxy:v1.29.14
[config/images] Pulled registry.k8s.io/coredns/coredns:v1.11.1
[config/images] Pulled registry.k8s.io/pause:3.9
[config/images] Pulled registry.k8s.io/etcd:3.5.16-0
```

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K8 Master

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

X server Exit

Quick connect...

2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
[certs] Using certificateDir folder "/etc/kubernetes/pki"
[certs] Generating "ca" certificate and key
[certs] Generating "apiserver" certificate and key
[certs] apiserver serving cert is signed for DNS names [k8master kubernetes kubernetes.default kubernetes.default.svc kubernetes.default.svc.cluster.local] and IPs [10.96.0.1 10.0.1.227]
[certs] Generating "apiserver-kubelet-client" certificate and key
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-client" certificate and key
[certs] Generating "etcd/ca" certificate and key
[certs] Generating "etcd/server" certificate and key
[certs] etcd/server serving cert is signed for DNS names [k8master localhost] and IPs [10.0.1.227 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [k8master localhost] and IPs [10.0.1.227 127.0.0.1 ::1]
[certs] Generating "etcd/healthcheck-client" certificate and key
[certs] Generating "apiserver-etcd-client" certificate and key
[certs] Generating "sa" key and public key
[kubeconfig] Using kubeconfig folder "/etc/kubernetes"
[kubeconfig] Writing "admin.conf" kubeconfig file
[kubeconfig] Writing "super-admin.conf" kubeconfig file
[kubeconfig] Writing "kubelet.conf" kubeconfig file
[kubeconfig] Writing "controller-manager.conf" kubeconfig file
[kubeconfig] Writing "scheduler.conf" kubeconfig file
[etcd] Creating static Pod manifest for local etcd in "/etc/kubernetes/manifests"
[control-plane] Using manifest folder "/etc/kubernetes/manifests"
[control-plane] Creating static Pod manifest for "kube-apiserver"
[control-plane] Creating static Pod manifest for "kube-controller-manager"
[control-plane] Creating static Pod manifest for "kube-scheduler"
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"
[kubelet-start] Starting the kubelet
[kubelet-start] Waiting for the kubelet to boot up the control plane as static Pods from directory "/etc/kubernetes/manifests". This can take up to 4m0s
```

Remote monitoring

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K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

2 K8 Master 3 K8 Client 1 4 K8 Client 2

```
[bootstrap-token] Configuring bootstrap tokens, cluster-info ConfigMap, RBAC Roles
[bootstrap-token] Configured RBAC rules to allow Node Bootstrap tokens to get nodes
[bootstrap-token] Configured RBAC rules to allow Node Bootstrap tokens to post CSRs in order for nodes to get long term certificates
[bootstrap-token] Configured RBAC rules to allow the csrapprover controller automatically approve CSRs from a Node Bootstrap Token
[bootstrap-token] Configured RBAC rules to allow certificate rotation for all node client certificates in the cluster
[bootstrap-token] Creating the "cluster-info" ConfigMap in the "kube-public" namespace
[kubelet-finalize] Updating "/etc/kubernetes/kubelet.conf" to point to a rotatable kubelet client certificate and key
[addons] Applied essential addon: CoreDNS
[addons] Applied essential addon: kube-proxy

Your Kubernetes control-plane has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown ${id:-0}:$(id -g) $HOME/.kube/config

Alternatively, if you are the root user, you can run:

export KUBECONFIG=/etc/kubernetes/admin.conf

You should now deploy a pod network to the cluster.
Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:
  https://kubernetes.io/docs/concepts/cluster-administration/addons/

Then you can join any number of worker nodes by running the following on each as root:
Kubeadm join 10.0.1.227:6443 --token ihq1d9.kmwhctvhbyeb7j \
--discovery-token-ca-cert-hash sha256:c5ed5a48253fb867c5e517a0a693ca6d1acfbcfb236dcabb0ab2114602a06
root@k8master:~# export KUBECONFIG=/etc/kubernetes/admin.conf
```

Remote monitoring

Follow terminal folder

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11:00 AM 2/22/2025

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8master:~# kubeadm token create --print-join-command
kubeadm join 10.0.1.227:6443 --token 9xsnwn.xg5uy462vkfehq2d --discovery-token-ca-cert-hash sha256:ced5a48253fb8667c5e517a0a69
3ca6d1acfbcfb236dcaebb0ab2114602a06
root@k8master:~#
```

Remote monitoring

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K8 Client 1

Type here to search

ENG 11:09 AM 2/22/2025

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

X server Exit

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8client1:~# kubeadm join 10.0.1.227:6443 --token 9xsnwn.xg5uy462vkfehq2d --discovery-token-ca-cert-hash sha256:ced5a48253fb8667c5e517a0a69
3fb8667c5e517a0a693ca6d1acfbcfb236dcaebb0ab2114602a06
[preflight] Running pre-flight checks
[preflight] Reading configuration from the cluster...
[preflight] FYI: You can look at this config file with 'kubectl -n kube-system get cm kubeadm-config -o yaml'
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"
[kubelet-start] Starting the kubelet
[kubelet-start] Waiting for the kubelet to perform the TLS Bootstrap...

This node has joined the cluster:
* Certificate signing request was sent to apiserver and a response was received.
* The Kubelet was informed of the new secure connection details.

Run 'kubectl get nodes' on the control-plane to see this node join the cluster.
root@k8client1:~#
```

Remote monitoring

Follow terminal folder

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ENG 11:10 AM 2/22/2025

K8 Client 2

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

```
root@k8client2:~# kubeadm join 10.0.1.227:6443 --token 9xsnw.xg5uy462vkfehq2d --discovery-token-ca-cert-hash sha256:ced5a4825
3fb8667c5e517a0a693ca6d1acfbcfbc236dcaeb0ab2114602a06
[preflight] Running pre-flight checks
[preflight] Reading configuration from the cluster...
[preflight] FYI: You can look at this config file with 'kubectl -n kube-system get cm kubeadm-config -o yaml'
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"
[kubelet-start] Starting the kubelet
[kubelet-start] Waiting for the kubelet to perform the TLS Bootstrap...

This node has joined the cluster:
* Certificate signing request was sent to apiserver and a response was received.
* The Kubelet was informed of the new secure connection details.

Run 'kubectl get nodes' on the control-plane to see this node join the cluster.

root@k8client2:~#
```

Remote monitoring

Follow terminal folder

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Windows Type here to search ENG 11:10 AM 2/22/2025

K8 Master

Terminal Sessions View X server Tools Games Settings Macros Help

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

X server Exit

Quick connect...

2. K8 Master 3. K8 Client 1 4. K8 Client 2

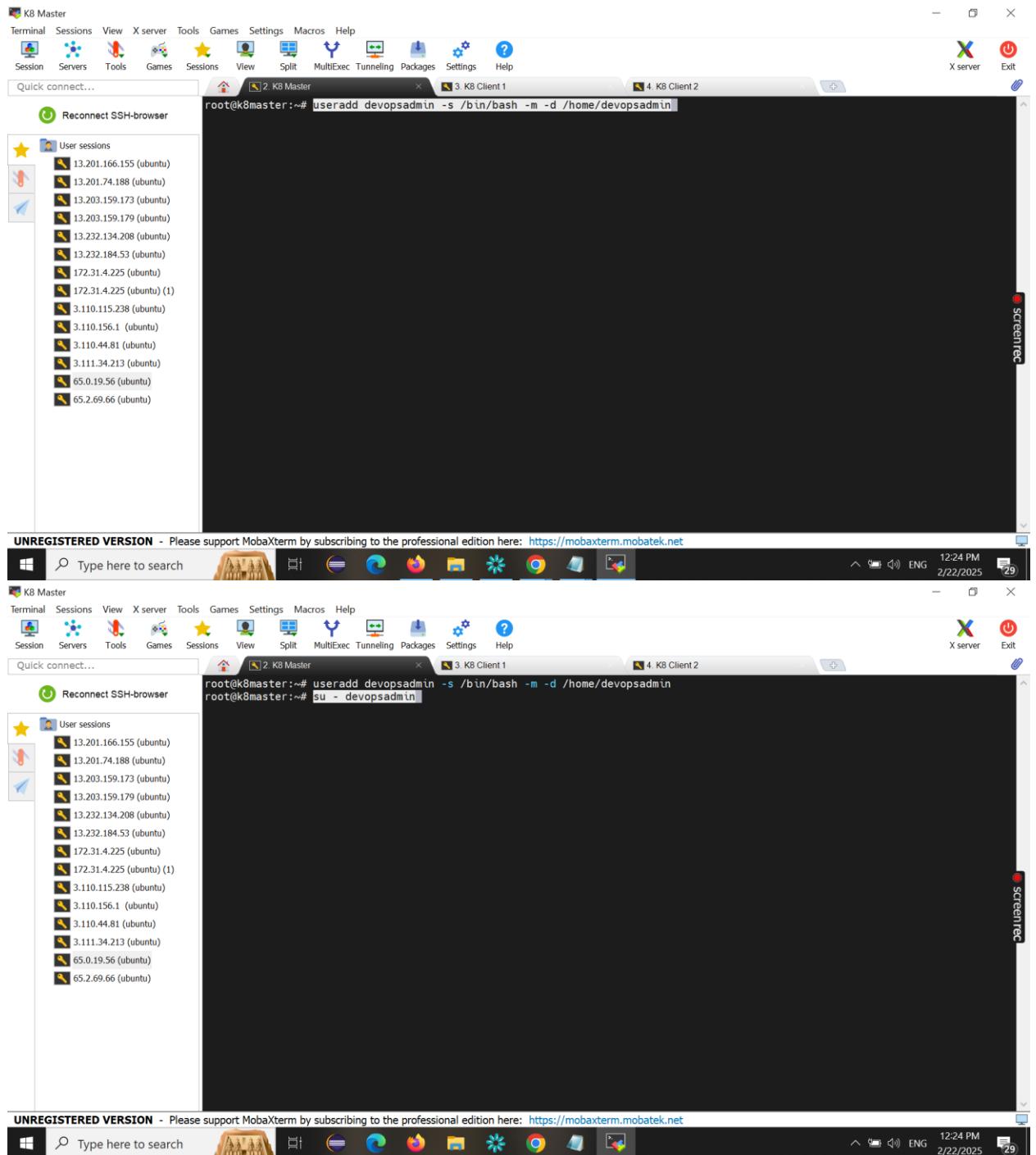
```
root@k8master:~# kubeadm token create --print-join-command
kubeadm join 10.0.1.227:6443 --token 9xsnw.xg5uy462vkfehq2d --discovery-token-ca-cert-hash sha256:ced5a48253fb8667c5e517a0a69
3ca6d1acfbcfbc236dcaeb0ab2114602a06
root@k8master:~# °C
root@k8master:~# °C
root@k8master:~# kubectl get nodes
NAME      STATUS   ROLES      AGE     VERSION
k8client1  NotReady <none>    43m    v1.29.14
k8client2  NotReady <none>    42m    v1.29.14
k8master   NotReady control-plane 59m    v1.29.14
root@k8master:~# kubectl apply -f https://github.com/coreos/flannel/raw/master/Documentation/kube-flannel.yml
namespace/kube-flannel created
clusterrole,rbac.authorization.k8s.io/flannel created
clusterrolebinding,rbac.authorization.k8s.io/flannel created
serviceaccount/flannel created
configmap/kube-flannel-cfg created
daemonset.apps/kube-flannel-ds created
root@k8master:~# kubectl get pods --all-namespaces
```

User sessions

- 13.201.166.155 (ubuntu)
- 13.201.74.188 (ubuntu)
- 13.203.159.173 (ubuntu)
- 13.203.159.179 (ubuntu)
- 13.232.134.208 (ubuntu)
- 13.232.184.53 (ubuntu)
- 17.231.4.225 (ubuntu)
- 17.231.4.225 (ubuntu) (1)
- 3.110.115.238 (ubuntu)
- 3.110.156.1 (ubuntu)
- 3.110.44.81 (ubuntu)
- 3.111.34.213 (ubuntu)
- 65.0.19.56 (ubuntu)
- 65.2.69.66 (ubuntu)

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Windows Type here to search ENG 12:07 PM 2/22/2025



```
root@k8master:~# useradd devopsadmin -s /bin/bash -m -d /home/devopsadmin
root@k8master:~$ su - devopsadmin
devopsadmin@k8master:~$ ssh-keygen -t ecdsa -b 521
Generating public/private ecdsa key pair.
Enter file in which to save the key (/home/devopsadmin/.ssh/id_ecdsa):
Created directory '/home/devopsadmin/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/devopsadmin/.ssh/id_ecdsa
Your public key has been saved in /home/devopsadmin/.ssh/id_ecdsa.pub
The key's fingerprint is:
SHA256:46q3D7zwNOpXBFDT9LItE/KyvNPqzwmABVBwtMm0Eo devopsadmin@k8master
The key's randomart image is:
+---[ECDSA 521]---+
|.+o+o |
|E=+ . |
|.. = o+ |
|.. . B+ |
|. . +SX |
....0.o |
=o*o. |
. @=+. |
. +=B+=o |
+---[SHA256]---+
devopsadmin@k8master:~$ ls ~/.ssh
```

```
root@k8master:~# useradd devopsadmin -s /bin/bash -m -d /home/devopsadmin
root@k8master:~$ su - devopsadmin
devopsadmin@k8master:~$ ssh-keygen -t ecdsa -b 521
Generating public/private ecdsa key pair.
Enter file in which to save the key (/home/devopsadmin/.ssh/id_ecdsa):
Created directory '/home/devopsadmin/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/devopsadmin/.ssh/id_ecdsa
Your public key has been saved in /home/devopsadmin/.ssh/id_ecdsa.pub
The key's fingerprint is:
SHA256:46q3D7zwNOpXBFDT9LItE/KyvNPqzwmABVBwtMm0Eo devopsadmin@k8master
The key's randomart image is:
+---[ECDSA 521]---+
|.+o+o |
|E=+ . |
|.. = o+ |
|.. . B+ |
|. . +SX |
....0.o |
=o*o. |
. @=+. |
. +=B+=o |
+---[SHA256]---+
devopsadmin@k8master:~$ ls ~/.ssh
id_ecdsa id_ecdsa.pub
devopsadmin@k8master:~$ cat id_ecdsa.pub > authorized_keys
cat: id_ecdsa.pub: No such file or directory
devopsadmin@k8master:~$ cd /home/devopsadmin/.ssh
devopsadmin@k8master:~/.ssh$
```

```
Your public key has been saved in /home/devopsadmin/.ssh/id_ecdsa.pub
The key fingerprint is:
SHA256:46q3D7zwNOpXBFDT9LItE/KyvNPqzwmABVwrtMm0Eo devopsadmin@k8master
The key's randomart image is:
+---[ECDSA 521]---+
|+.o+o |
|E=+ . |
|... = o+ |
|.. . B+ |
|. . +SX |
....O.o |
=o*o. |
. @+=. |
. +=B+=o |
+---[SHA256]---+
devopsadmin@k8master:~$ ls ~/.ssh
id_ecdsa id_ecdsa.pub
devopsadmin@k8master:~$ cat id_ecdsa.pub > authorized_keys
cat: id_ecdsa.pub: No such file or directory
devopsadmin@k8master:~$ cd /home/devopsadmin/.ssh
devopsadmin@k8master:~/ssh$ cat id_ecdsa.pub > authorized_keys
devopsadmin@k8master:~/ssh$ chmod 600 /home/devopsadmin/.ssh/*
devopsadmin@k8master:~/ssh$ usermod -aG docker devopsadmin
usermod: Permission denied.
usermod: cannot lock /etc/passwd; try again later.
devopsadmin@k8master:~/ssh$ exit
logout
root@k8master:~# usermod -aG docker devopsadmin
root@k8master:~# visudo
root@k8master:~# visudo
visudo: /etc/sudoers.tmp unchanged
root@k8master:~# su - devopsadmin
devopsadmin@k8master:~$
```

```
The key's randomart image is:
+---[ECDSA 521]---+
|+.o+o |
|E=+ . |
|... = o+ |
|.. . B+ |
|. . +SX |
....O.o |
=o*o. |
. @+=. |
. +=B+=o |
+---[SHA256]---+
devopsadmin@k8master:~$ ls ~/.ssh
id_ecdsa id_ecdsa.pub
devopsadmin@k8master:~$ cat id_ecdsa.pub > authorized_keys
cat: id_ecdsa.pub: No such file or directory
devopsadmin@k8master:~$ cd /home/devopsadmin/.ssh
devopsadmin@k8master:~/ssh$ cat id_ecdsa.pub > authorized_keys
devopsadmin@k8master:~/ssh$ chmod 600 /home/devopsadmin/.ssh/*
devopsadmin@k8master:~/ssh$ usermod -aG docker devopsadmin
usermod: Permission denied.
usermod: cannot lock /etc/passwd; try again later.
devopsadmin@k8master:~/ssh$ exit
logout
root@k8master:~# usermod -aG docker devopsadmin
root@k8master:~# visudo
root@k8master:~# visudo
visudo: /etc/sudoers.tmp unchanged
root@k8master:~# su - devopsadmin
devopsadmin@k8master:~$ mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
devopsadmin@k8master:~$
```

#Log in to Docker and create access token

The screenshot shows a browser window with multiple tabs open at the top. The active tab is 'app.docker.com/settings/personal-access-tokens/create'. On the left, there's a sidebar with options: 2FA, Personal access tokens (which is selected and highlighted in grey), Connected accounts, Convert, and Deactivate. The main area has a form titled 'Create access token'. It includes fields for 'Access token description' (containing 'Jenkins_capestone'), 'Expiration date' (set to '30 days'), and 'Access permissions' (set to 'Read, Write, Delete'). Below the form is a note: 'Read, Write, Delete tokens allow you to manage your repositories.' At the bottom are 'Cancel' and 'Generate' buttons. The Docker logo is visible in the top left of the main content area.

The screenshot shows a browser window with multiple tabs open at the top. The active tab is '44.202.231.132:8080/job/Capestone_project/pipeline-syntax/'. The URL bar shows 'Not secure'. The page title is 'Pipeline Syntax'. On the left, there's a sidebar with links: Global Variables Reference, Online Documentation, Examples Reference, and IntelliJ IDEA GDSL. The main content area shows a 'Sample Step' section with a dropdown menu containing 'sshPublisher: Send build artifacts over SSH'. Below it is a 'SSH Publishers' section. Under 'SSH Server', there's a 'Name' field set to 'capestone_k8master'. Under 'Transfers', there's a 'Transfer Set' section with a 'Source files' field. The Docker logo is visible in the top left of the main content area.

```
# And configure global cred on Jenkins as we are loggin into docker  
hub to push image created  
  
# Use snippet generator to create ssh publish to tranfer artifacts over  
SSH to k8 server  
  
# Now , we are all set to create pipeline as we done with all pre-  
requisite on all configuration and integration
```

Setup and Configuration Grafana & prometheus For Monitoring & Observability

Prometheus installation

- Goto <https://prometheus.io/download/> #this is to get link address
 - wget <https://github.com/prometheus/prometheus/releases/download/v2.48.0-rc.0/prometheus-2.48.0-rc.0.linux-amd64.tar.gz>
 - tar -zxvf prometheus-2.48.0-rc.0.linux-amd64.tar.gz
 - Create following file: sudo vi /etc/systemd/system/prometheus.service
-

[Unit]

Description=Prometheus Server

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

After=network-online.target

[Service]

User=root

Restart=on-failure

ExecStart=/root/prometheus-2.48.0-rc.0.linux-amd64/prometheus --config.file=/root/prometheus-2.48.0-rc.0.linux-amd64/prometheus.yml

[Install]

WantedBy=multi-user.target

- **sudo systemctl daemon-reload**
- **sudo systemctl status prometheus**
- **sudo systemctl start prometheus**
- **systemctl enable Prometheus**

grafana installation :

- **wget https://dl.grafana.com/oss/release/grafana-9.1.2-1.x86_64.rpm**
- **sudo yum install grafana-9.1.2-1.x86_64.rpm -y**
- **sudo /bin/systemctl enable grafana-server.service**
- **sudo /bin/systemctl start grafana-server.service**
- **sudo /bin/systemctl status grafana-server.service**

<grafana external / public ip>:3000 -- to create exposure on internet

node exporter installation

- To be installed on node which we wish to monitor
- wget
https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
- tar -zxvf node_exporter-1.4.0-rc.0.linux-amd64.tar.gz -----to unzip the package
- create the following file

`sudo vi /etc/systemd/system/node_exporter.service`

[Unit]

Description=Prometheus Server

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

After=network-online.target

[Service]

User=root

Restart=on-failure

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

[Install]

WantedBy=multi-user.target

- **sudo systemctl daemon-reload**
- **sudo systemctl status node_exporter**
- **sudo systemctl start node_exporter -- to enable and start node exporter**
- **copy the IP address of the server that want to monitor**
- **navigate to PROMETHEUS server and go to installation path of Prometheus**
- **vi prometheus.yml**
- **Add the target with valid node_exporter port**
- **sudo systemctl restart prometheus**
- **sudo systemctl status Prometheus**
- **Goto Prometheus server -- <prometheus-external-ip>:9090**
- **in the query field type up and click on execute to see the list of servers up for monitoring**

Grafana Portal

- **<grafana-external-ip>:3000**
- **Click on settings button --> Data Source --> Add Data Source --> Select Prometheus**
- **paste the prometheus link**
- **See the Prometheus Data Source Created**

```
52.87.152.66 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
Reconnect SSH-browser
/home/ubuntu/
Name
.. .cache .ssh .bash_logout .bashrc .profile .Xauthority
10.52.87.152.66 (ubuntu) 12.54.166.50.143 (ubuntu)
root@kmaster-node:~# wget https://github.com/prometheus/prometheus/releases/download/v2.48.0-rc.0/prometheus-2.48.0-rc.0.linux-amd64.tar.gz
--2025-02-24 15:15:12-- https://github.com/prometheus/prometheus/releases/download/v2.48.0-rc.0/prometheus-2.48.0-rc.0.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.112.3
Connecting to github.com (github.com)|140.82.112.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/775a75c9-96dd-4710-a60c-380eb442a52X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20250224%2Fus-east-1%2Faws4_request%2X-Amz-SignedHeaders=host%2ResponseContentDisposition=attachment%3B%20filename%3Dprometheus-2.48.0-rc.0.linux-amd64.tar.gz%2Content-Type=application%2Foctet-stream [following]
--2025-02-24 15:15:12-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/775a75c9-96dd-4710-a60c-380eb442a52X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%F20250224%2Fus-east-1%2Faws4_request%2X-Amz-Date=20250224T151512ZAmz-Expires=3006X-Amz-Signature=3db0b56fafbeb95a99ed5edde16b7386bf815c067996f32997303712f5b70986X-Amz-SignedHeaders=host%2ResponseContentDisposition=attachment%3B%20filename%3Dprometheus-2.48.0-rc.0.linux-amd64.tar.gz%2Content-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: 96353225 (92M) [application/octet-stream]
Saving to: 'prometheus-2.48.0-rc.0.linux-amd64.tar.gz'

prometheus-2.48.0-rc.0.linux-am 100%[=====] 91.89M 80.3MB/s in 1.1s
2025-02-24 15:15:13 (80.3 MB/s) - 'prometheus-2.48.0-rc.0.linux-amd64.tar.gz' saved [96353225/96353225]

root@kmaster-node:~#
```

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```
52.87.152.66 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
Reconnect SSH-browser
/home/ubuntu/
Name
.. .cache .ssh .bash_logout .bashrc .profile .Xauthority
10.52.87.152.66 (ubuntu) 12.54.166.50.143 (ubuntu)
...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.110.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 96353225 (92M) [application/octet-stream]
Saving to: 'prometheus-2.48.0-rc.0.linux-amd64.tar.gz'

prometheus-2.48.0-rc.0.linux-am 100%[=====] 91.89M 80.3MB/s in 1.1s
2025-02-24 15:15:13 (80.3 MB/s) - 'prometheus-2.48.0-rc.0.linux-amd64.tar.gz' saved [96353225/96353225]

root@kmaster-node:~# tar -xvzf prometheus-2.48.0-rc.0.linux-amd64.tar.gz
prometheus-2.48.0-rc.0.linux-amd64/
prometheus-2.48.0-rc.0.linux-amd64/LICENSE
prometheus-2.48.0-rc.0.linux-amd64/NOTICE
prometheus-2.48.0-rc.0.linux-amd64/prometheus.yml
prometheus-2.48.0-rc.0.linux-amd64/consoles/
prometheus-2.48.0-rc.0.linux-amd64/consoles/prometheus.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/prometheus-overview.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/node-cpu.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/index.html.example
prometheus-2.48.0-rc.0.linux-amd64/consoles/node.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/node-disk.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/node-overview.html
prometheus-2.48.0-rc.0.linux-amd64/promtool
prometheus-2.48.0-rc.0.linux-amd64/console/libraries/
prometheus-2.48.0-rc.0.linux-amd64/console/libraries/prom.lib
prometheus-2.48.0-rc.0.linux-amd64/console/libraries/menu.lib
prometheus-2.48.0-rc.0.linux-amd64/prometheus
root@kmaster-node:~# prometheus-3.0.0-beta.0.linux-amd64.tar.gz: command not found
root@kmaster-node:~# sudo vi /etc/systemd/system/prometheus.service
root@kmaster-node:~# sudo systemctl daemon-reload
root@kmaster-node:~#
```

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The screenshot shows a Prometheus dashboard with the following details:

- Header:** Dashboard | EC2 | Instances | EC2 | Your Repositories | Project_plan_development | Project_plan_development | Prometheus Time
- Address Bar:** Not secure 52.87.152.66:9090/graph?g0.expr=&g0.tab=1&g0.stacked=0&g0.show_exemplars=0&g0.range_input=1h
- Toolbar:** Use local time, Enable query history, Enable autocomplete, Enable highlighting, Enable linter.
- Search Bar:** Expression (press Shift+Enter for newlines)
- Panel Selection:** Table, Graph (selected)
- Time Range:** Evaluation time (with arrows for navigation)
- Message:** No data queried yet
- Right Panel:** Remove Pane, screenrec
- Bottom Buttons:** Add Panel



The terminal window in MobaXterm displays the following command and its output:

```
root@k8-client:~$ sudo -i
ubuntu@k8-client:~$ wget https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
--2025-02-24 15:21:12-- https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.114.3
Connecting to github.com (github.com)|140.82.114.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a2ea2a-4a82-412b-b6f5-e6ba22d045127X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%2F20250224%2Fus-east-1%2Fs3%2Faws4_requestX-Amz-Date=20250224T152112ZSX-Amz-Expires=300SX-Amz-Signature=eadcabff4cfbea682359626c7709c198319c02d00878e8ae21d7b09d80bcc0e0X-Amz-SignedHeaders=hostX-response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&X-Amz-Content-Type=application%2Foctet-stream [following]
--2025-02-24 15:21:12-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a2ea2a-4a82-412b-b6f5-e6ba22d045127X-Amz-Algorithm=AWS4-HMAC-SHA256X-Amz-Credential=releaseassetproduction%2F20250224%2Fus-east-1%2Fs3%2Faws4_requestX-Amz-Date=20250224T152112ZSX-Amz-Expires=300SX-Amz-Signature=eadcabff4cfbea682359626c7709c198319c02d00878e8ae21d7b09d80bcc0e0X-Amz-SignedHeaders=hostX-response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&X-Amz-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: 9735268 (9.3M) [application/octet-stream]
Saving to: 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz'

node_exporter-1.4.0-rc.0.linux- 100%[=====] 9.28M --KB/s in 0.1s
2025-02-24 15:21:13 (78.3 MB/s) - 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz' saved [9735268/9735268]

root@k8-client:~#
```

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

```

54.166.50.143 (ubuntu)
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/
x-amd64.tar.gz
--2025-02-24 21:12:10 -- https://github.com/prometheus/node_exporter/releases/download/v1.4.0-rc.0/node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
Resolving github.com (github.com)... 140.82.114.3
Connecting to github.com (github.com)|140.82.114.3|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-412b-b6f5-e6ba22d045127X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250224%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250224T152112Z&X-Amz-Expires=3006X-Amz-Signature=eeadcabf4cfbea682359626c7709c198319c02d00878e8ae21d7b09d80bcc0eb0X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2025-02-24 21:12:10 -- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/8a22ea2a-4a82-412b-b6f5-e6ba22d045127X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250224%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250224T152112Z&X-Amz-Expires=3006X-Amz-Signature=eeadcabf4cfbea682359626c7709c198319c02d00878e8ae21d7b09d80bcc0eb0X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.4.0-rc.0.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: 9735268 (9.3M) [application/octet-stream]
Saving to: 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz'

node_exporter-1.4.0-rc.0.linux- 100%[=====] 9.28M -.- KB/s in 0.1s
2025-02-24 15:21:13 (78.3 MB/s) - 'node_exporter-1.4.0-rc.0.linux-amd64.tar.gz' saved [9735268/9735268]

root@k8-client:~# tar -zvxf node_exporter-1.4.0-rc.0.linux-amd64.tar.gz
node_exporter-1.4.0-rc.0.linux-amd64/
node_exporter-1.4.0-rc.0.linux-amd64/LICENSE
node_exporter-1.4.0-rc.0.linux-amd64/NOTICE
node_exporter-1.4.0-rc.0.linux-amd64/node_exporter
root@k8-client:~#

```

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```

54.166.50.143 (ubuntu)
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/
[Unit]
Description=Prometheus Server
Documentation=https://prometheus.io/docs/introduction/overview/
After=network-online.target

[Service]
User=root
Restart=on-failure
ExecStart=/root/node_exporter-1.4.0-rc.0.linux-amd64/node_exporter

[Install]
WantedBy=multi-user.target

```

-- INSERT --

13,27 All

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52.87.152.66 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

Reconnect SSH-browser

/home/ubuntu/

- Name
- ..
- .cache
- ssh
- .bash_logout
- .bashrc
- .profile
- Xauthority

```

prometheus-2.48.0-rc.0.linux-amd64/consoles/node-cpu.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/index.html.example
prometheus-2.48.0-rc.0.linux-amd64/consoles/node.html
prometheus-2.48.0-rc.0.linux-amd64/consoles/node-disk.html
prometheus-2.48.0-rc.0.linux-amd64/promtool
prometheus-2.48.0-rc.0.linux-amd64/console_libraries/
prometheus-2.48.0-rc.0.linux-amd64/console_libraries/prom.lib
prometheus-2.48.0-rc.0.linux-amd64/console_libraries/menu.lib
prometheus-2.48.0-rc.0.linux-amd64/prometheus
root@kmaster-node:~# prometheus-3.0.0-beta.0.linux-amd64.tar.gz - final package to get
prometheus-3.0.0-beta.0.linux-amd64.tar.gz: command not found
root@kmaster-node:~# sudo vi /etc/systemd/system/prometheus.service
root@kmaster-node:~# sudo systemctl daemon-reload
root@kmaster-node:~# 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@kmaster-node:~# sudo systemctl start prometheus
root@kmaster-node:~# systemctl enable prometheus
Created symlink /etc/systemd/system/multi-user.target.wants/prometheus.service → /etc/systemd/system/prometheus.service.
root@kmaster-node:~# vi prometheus.yml
root@kmaster-node:~# cd
root@kmaster-node:~# cd/root
root@kmaster-node:~# cd/root
bash: cd/root: No such file or directory
root@kmaster-node:~# cd /root/prometheus-2.38.0.linux-amd64
bash: cd: /root/prometheus-2.38.0.linux-amd64: No such file or directory
root@kmaster-node:~# ls
prometheus-2.48.0-rc.0.linux-amd64  prometheus-2.48.0-rc.0.linux-amd64.tar.gz  snap
root@kmaster-node:~# cd /root/prometheus-2.48.0-rc.0.linux-amd64
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64# vi prometheus.yml
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64#
```

Remote monitoring

Follow terminal folder

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Type here to search

9:00 PM 2/24/2025

52.87.152.66 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect...

Reconnect SSH-browser

/home/ubuntu/

- Name
- ..
- .cache
- ssh
- .bash_logout
- .bashrc
- .profile
- Xauthority

```

bash: cd/root: No such file or directory
root@kmaster-node:~# cd /root/prometheus-2.38.0.linux-amd64
bash: cd: /root/prometheus-2.38.0.linux-amd64: No such file or directory
root@kmaster-node:~# ls
prometheus-2.48.0-rc.0.linux-amd64  prometheus-2.48.0-rc.0.linux-amd64.tar.gz  snap
root@kmaster-node:~# cd /root/prometheus-2.48.0-rc.0.linux-amd64
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64# vi prometheus.yml
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64# sudo systemctl restart Prometheus
Failed to restart Prometheus.service: Unit Prometheus.service not found.
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64# sudo systemctl restart prometheus
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64# sudo systemctl status prometheus
● prometheus.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: enabled)
      Active: active (running) since Mon 2025-02-24 15:31:01 UTC; 18s ago
        Docs: https://prometheus.io/docs/introduction/overview/
          Main PID: 42135 (prometheus)
            Tasks: 6 (limit: 1130)
              Memory: 71.5M
                CPU: 114ms
              CGroup: /system.slice/prometheus.service
                  └─ 42135 /root/prometheus-2.48.0-rc.0.linux-amd64/prometheus --config.file=/root/prometheus-2.48.0-rc.0.linux-amd64/prometheus --storage.tsdb.path=/root/prometheus-2.48.0-rc.0.linux-amd64/prometheus/storage
```

Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.896Z caller=head.go:690 level=info component=tsdb msg="TSDB started"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.912Z caller=head.go:761 level=info component=tsdb msg="Completed loading configuration"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.912Z caller=head.go:761 level=info component=tsdb msg="Server is ready"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.913Z caller=head.go:798 level=info component=tsdb msg="TSDB started"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.915Z caller=main.go:1048 level=info msg="TSDB started"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.916Z caller=main.go:1048 level=info msg="TSDB started"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.916Z caller=main.go:1229 level=info msg="Loading configuration"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.924Z caller=main.go:1261 level=info msg="Completed loading configuration"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.924Z caller=main.go:1009 level=info msg="Server is ready"
Feb 24 15:31:01 kmaster-node prometheus[42135]: ts=2025-02-24T15:31:01.924Z caller=manager.go:1012 level=info component="rule evaluation"

1 lines 1-21/21 (END)

Remote monitoring

Follow terminal folder

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

Type here to search

9:01 PM 2/24/2025

The screenshot shows the Prometheus web interface. The URL in the address bar is `52.87.152.66:9090/graph?g0.expr=&g0.tab=1&g0.stacked=0&g0.show_exemplars=0&g0.range_input=1h`. The interface includes a navigation bar with tabs for Dashboard, Instances, Your Repositories, Project_plan_devo, and Prometheus Time. Below the navigation bar is a toolbar with checkboxes for 'Use local time', 'Enable query history', 'Enable autocomplete' (checked), 'Enable highlighting' (checked), and 'Enable linter'. A search bar contains the placeholder 'Expression (press Shift+Enter for newlines)'. To the right of the search bar are buttons for 'Table' (selected), 'Graph' (highlighted in blue), and 'List'. An 'Evaluate time' dropdown is shown between the Table and Graph tabs. The main content area displays the message 'No data queried yet'. On the far right, there are 'Remove Panel' and 'screenrec' buttons.



The screenshot shows the Prometheus web interface again, with the URL `52.87.152.66:9090/graph?g0.expr=up&g0.tab=1&g0.stacked=0&g0.show_exemplars=0&g0.range_input=1h`. The interface is identical to the first screenshot, with the 'Graph' tab selected. The search bar contains the query 'up'. The results show two series: 'up{instance="172.31.81.197:9100",job="prometheus"}' with a value of 1, and 'up{instance="localhost:9090",job="prometheus"}' with a value of 1. The bottom right corner features 'Remove Panel' and 'screenrec' buttons.



52.87.152.66 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... X server Exit

Reconnect SSH-browser

Reading state information... Done
adduser is already the newest version (3.118ubuntu5).
adduser set to manually installed.

The following packages were automatically installed and are no longer required:
bridge-utils dns-root-data dnsmasq-base pigz ubuntu-fan
Use 'sudo apt autoremove' to remove them.

The following additional packages will be installed:
fontconfig-config fonts-dejavu-core

The following NEW packages will be installed:
fontconfig-config fonts-dejavu-core libfontconfig1 musl
0 upgraded, 4 newly installed, 0 to remove and 46 not upgraded.
Need to get 1609 kB of archives.
After this operation, 4319 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 fonts-dejavu-core all 2.37-2build1 [1041 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 fontconfig-config all 2.13.1-4.2ubuntu5 [29.1 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libfontconfig1 amd64 2.13.1-4.2ubuntu5 [131 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 musl amd64 1.2.2-4 [407 kB]
Fetched 1609 kB in 0s (32.2 MB/s)
Selecting previously unselected package fonts-dejavu-core.
(Reading database ... 66022 files and directories currently installed.)
Preparing to unpack .../fonts-dejavu-core_2.37-2build1_all.deb ...
Unpacking fonts-dejavu-core (2.37-2build1) ...
Selecting previously unselected package fontconfig-config.
Preparing to unpack .../fontconfig-config_2.13.1-4.2ubuntu5_all.deb ...
Unpacking fontconfig-config (2.13.1-4.2ubuntu5) ...
Selecting previously unselected package libfontconfig1:amd64.
Preparing to unpack .../libfontconfig1_2.13.1-4.2ubuntu5_amd64.deb ...
Unpacking libfontconfig1:amd64 (2.13.1-4.2ubuntu5) ...
Selecting previously unselected package musl:amd64.
Preparing to unpack .../musl_1.2.2-4_amd64.deb ...
Unpacking musl:amd64 (1.2.2-4) ...
Setting up fonts-dejavu-core (2.37-2build1) ...

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Type here to search ENG 9:02 PM 2/24/2025

52.87.152.66 (ubuntu)

Terminal Sessions View X server Tools Games Settings Macros Help

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

Quick connect... X server Exit

Reconnect SSH-browser

No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
--2025-02-24 15:33:05-- https://dl.grafana.com/enterprise/release/grafana-enterprise_11.5.2_amd64.deb
Resolving dl.grafana.com (dl.grafana.com)... 146.75.30.217, 2a04:4e42:77::729
Connecting to dl.grafana.com (dl.grafana.com)|146.75.30.217|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 145024678 (138M) [application/octet-stream]
Saving to: 'grafana-enterprise_11.5.2_amd64.deb'

grafana-enterprise_11.5.2_amd64 100%[=====] 138.31M 43.9MB/s in 3.1s
2025-02-24 15:33:08 (43.9 MB/s) - 'grafana-enterprise_11.5.2_amd64.deb' saved [145024678/145024678]

Selecting previously unselected package grafana-enterprise.
(Reading database ... 66150 files and directories currently installed.)
Preparing to unpack grafana-enterprise_11.5.2_amd64.deb ...
Unpacking grafana-enterprise (11.5.2) ...
Setting up grafana-enterprise (11.5.2) ...
Adding system user 'grafana' (UID 116) ...
Adding new user 'grafana' (UID 116) 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 systemctl
sudo /bin/systemctl daemon-reload
sudo /bin/systemctl enable grafana-server
You can start grafana-server by executing
sudo /bin/systemctl start grafana-server
root@kmaster-node:~/prometheus-2.48.0-rc.0.linux-amd64#

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Type here to search ENG 9:03 PM 2/24/2025

```

52.87.152.66 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
Reconnect SSH-browser
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
-- 2025-02-24 15:33:05 -- https://dl.grafana.com/enterprise/release/grafana-enterprise_11.5.2_amd64.deb
Resolving dl.grafana.com (dl.grafana.com)... 146.75.30.217, 2a04:4e42:77::729
Connecting to dl.grafana.com (dl.grafana.com)[146.75.30.217]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 145024678 (138M) [application/octet-stream]
Saving to: 'grafana-enterprise_11.5.2_amd64.deb'

grafana-enterprise_11.5.2_amd64 100%[=====] 138.31M 43.9MB/s in 3.1s
2025-02-24 15:33:08 (43.9 MB/s) - 'grafana-enterprise_11.5.2_amd64.deb' saved [145024678/145024678]

Selecting previously unselected package grafana-enterprise.
(Reading database ... 66150 files and directories currently installed.)
Preparing to unpack grafana-enterprise_11.5.2_amd64.deb ...
Unpacking grafana-enterprise (11.5.2) ...
Setting up grafana-enterprise (11.5.2) ...
Adding system user 'grafana' (UID 116) ...
Adding new user 'grafana' (UID 116) 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
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# ^C
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# sudo /bin/systemctl daemon-reload
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# 

```

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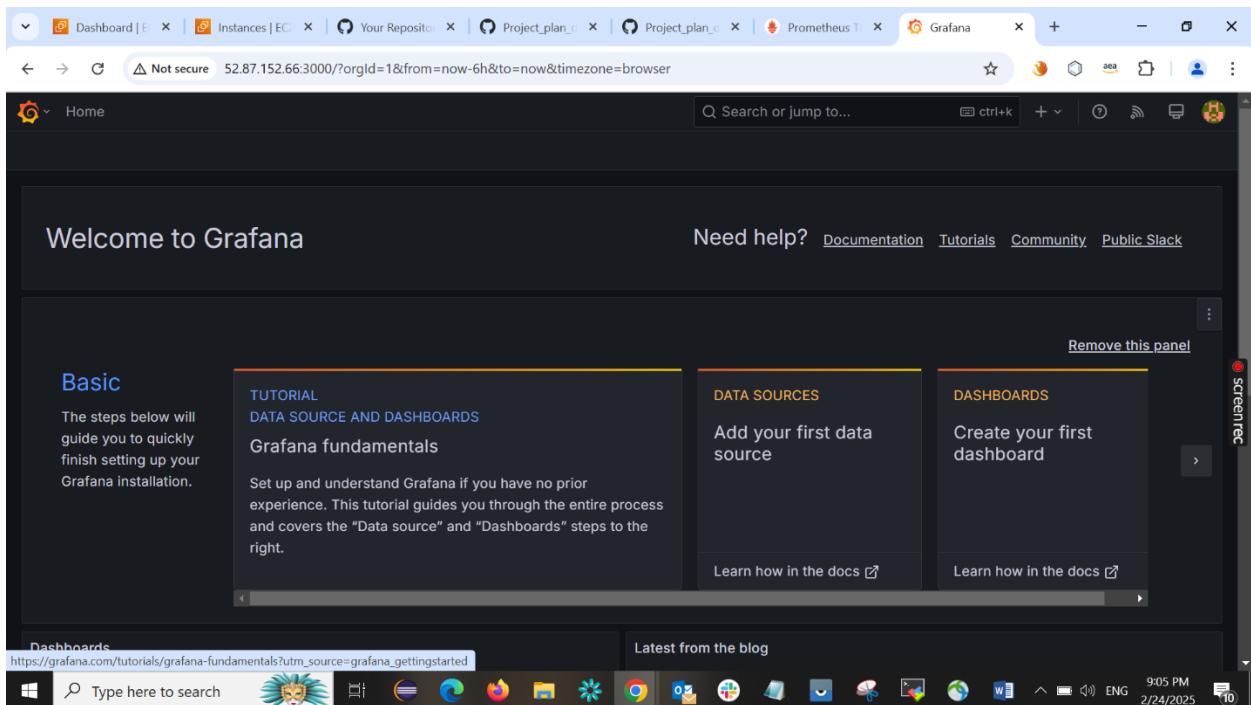
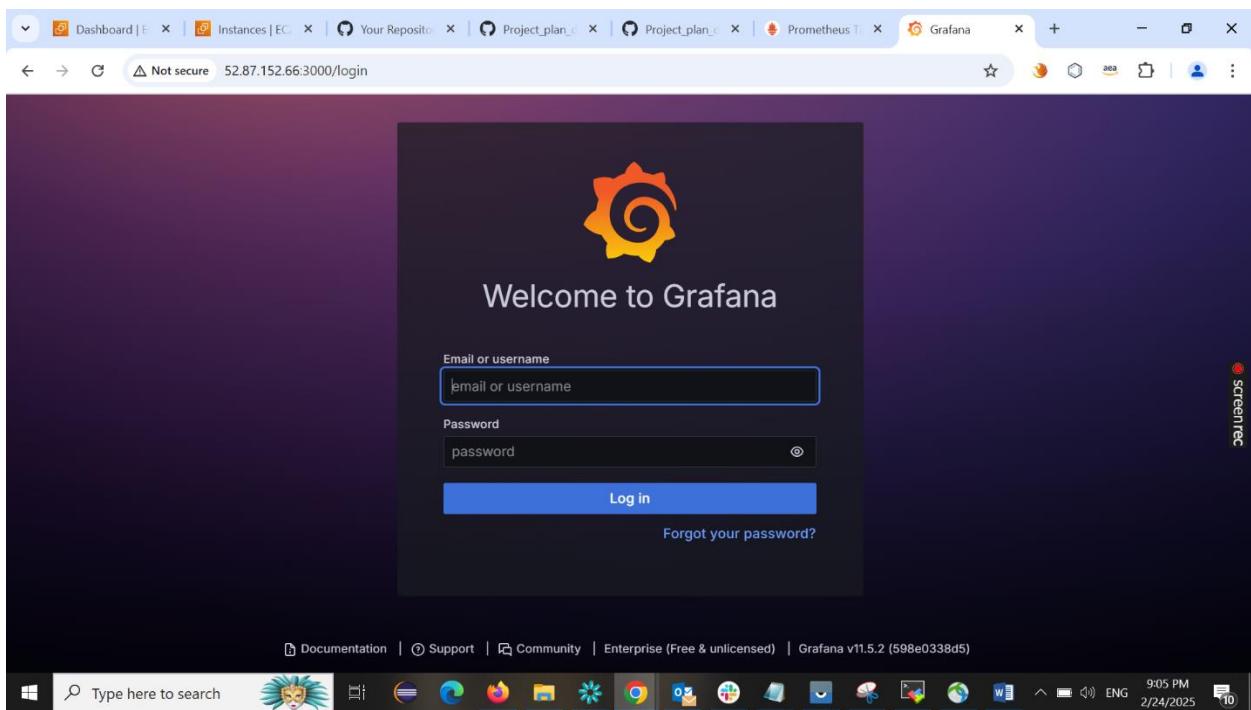
```

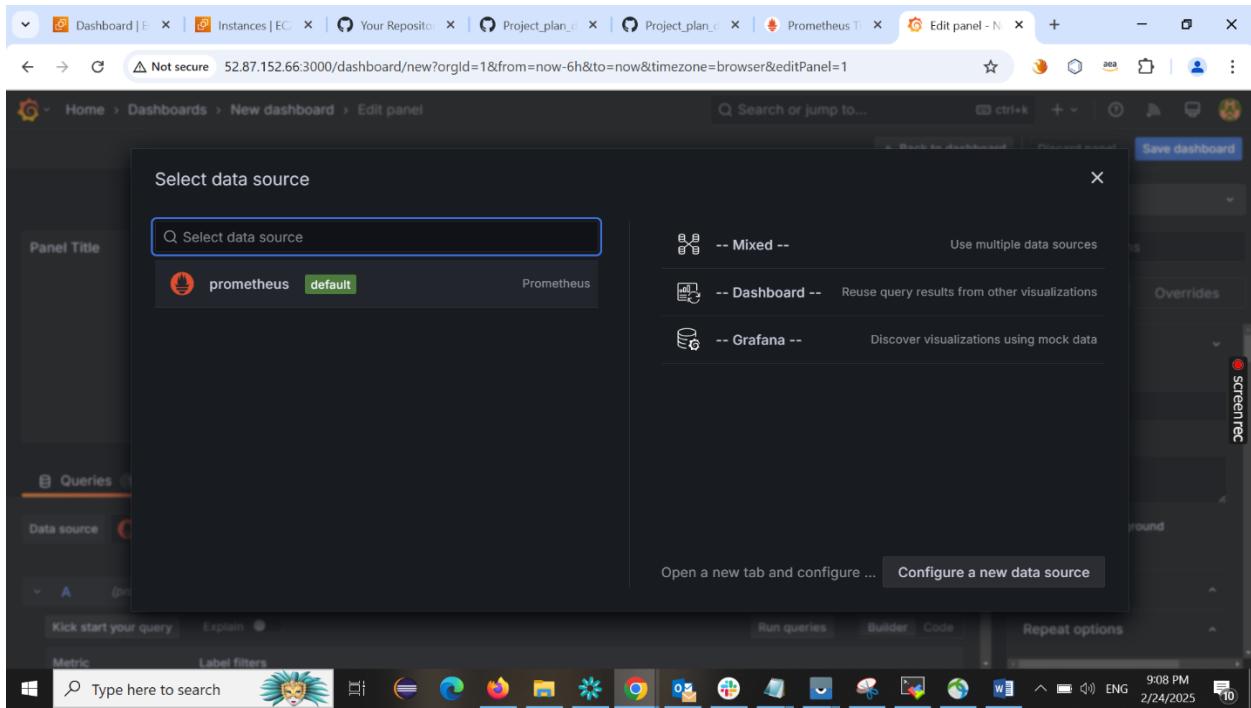
52.87.152.66 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
Reconnect SSH-browser
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# sudo /bin/systemctl daemon-reload
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# ^C
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# sudo /bin/systemctl enable grafana-server
Synchronizing state of grafana-server.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable grafana-server
Created symlink /etc/systemd/system/multi-user.target.wants/grafana-server.service → /lib/systemd/system/grafana-server.service.
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# ^C
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# sudo /bin/systemctl start grafana-server
root@kmaster-node:/~prometheus-2.48.0-rc.0.linux-amd64# sudo /bin/systemctl status grafana-server
● grafana-server.service - Grafana instance
   Loaded: loaded (/lib/systemd/system/grafana-server.service; enabled; vendor preset: enabled)
     Active: active (running) since Mon 2025-02-24 15:34:04 UTC; 22s ago
       Docs: http://docs.grafana.org
         Main PID: 43283 (grafana)
            Tasks: 15 (limit: 1130)
           Memory: 78.3M
              CPU: 3.727s
             CGroup: /system.slice/grafana-server.service
                     └─ 43283 /usr/share/grafana/bin/grafana server --config=/etc/grafana/grafana.ini --pidfile=/run/grafana/grafana-server.pid

Feb 24 15:34:17 kmaster-node grafana[43283]: logger=app-registry t=2025-02-24T15:34:17.030Z level=info msg="app registered"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugin.installer t=2025-02-24T15:34:17.322Z level=info msg="Installer"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=uninstaller.fs t=2025-02-24T15:34:17.462Z level=info msg="Downloaded >
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugins.registration t=2025-02-24T15:34:17.572Z level=info msg="Plugin"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugin.backgroundinstaller t=2025-02-24T15:34:17.572Z level=info msg="Background Installer"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugin.backgroundinstaller t=2025-02-24T15:34:17.572Z level=info msg="Background Installer"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugin.installer.t=2025-02-24T15:34:17.804Z level=info msg="Installer"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=installer.fs t=2025-02-24T15:34:17.804Z level=info msg="Downloaded >
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugins.registration t=2025-02-24T15:34:17.902Z level=info msg="Plugin"
Feb 24 15:34:17 kmaster-node grafana[43283]: logger=plugin.backgroundinstaller t=2025-02-24T15:34:17.902Z level=info msg="Background Installer"

```

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Build Deployment Through Jenkins CI /CD Pipeline:

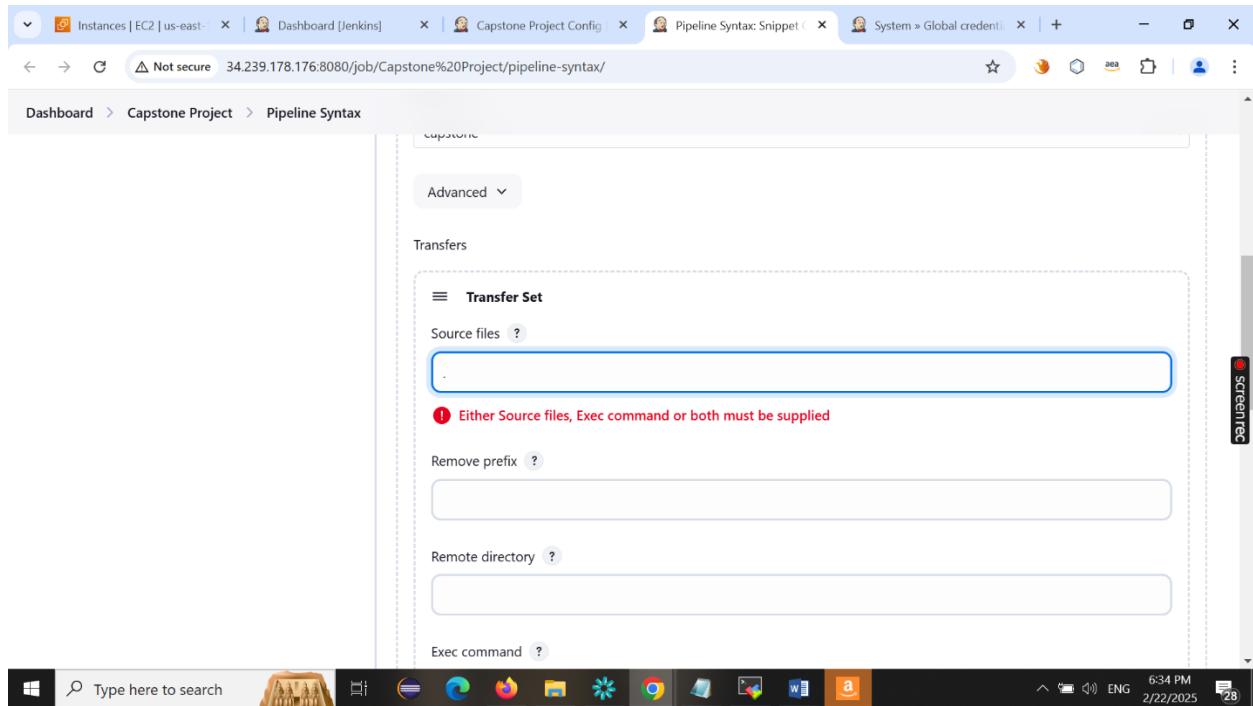
Navigate to jenkins > new_job and give name for your project and choose pipeline

The screenshot shows a Jenkins interface titled 'New Item [Jenkins]'. The main title bar includes the URL '34.239.178.176.8080/newJob'. The Jenkins logo is at the top left, and the user 'Deppak' is logged in at the top right. Below the header, the page title is 'New Item' under 'Dashboard > New Item'. The main content area is titled 'New Item' and contains a form to 'Enter an item name' with the value 'Capstone Project'. A section for 'Select an item type' lists three options: 'Freestyle project' (selected), 'Pipeline' (with a detailed description of orchestrating long-running activities across multiple build agents), and 'Multi-configuration project'. At the bottom of the dialog is an 'OK' button.

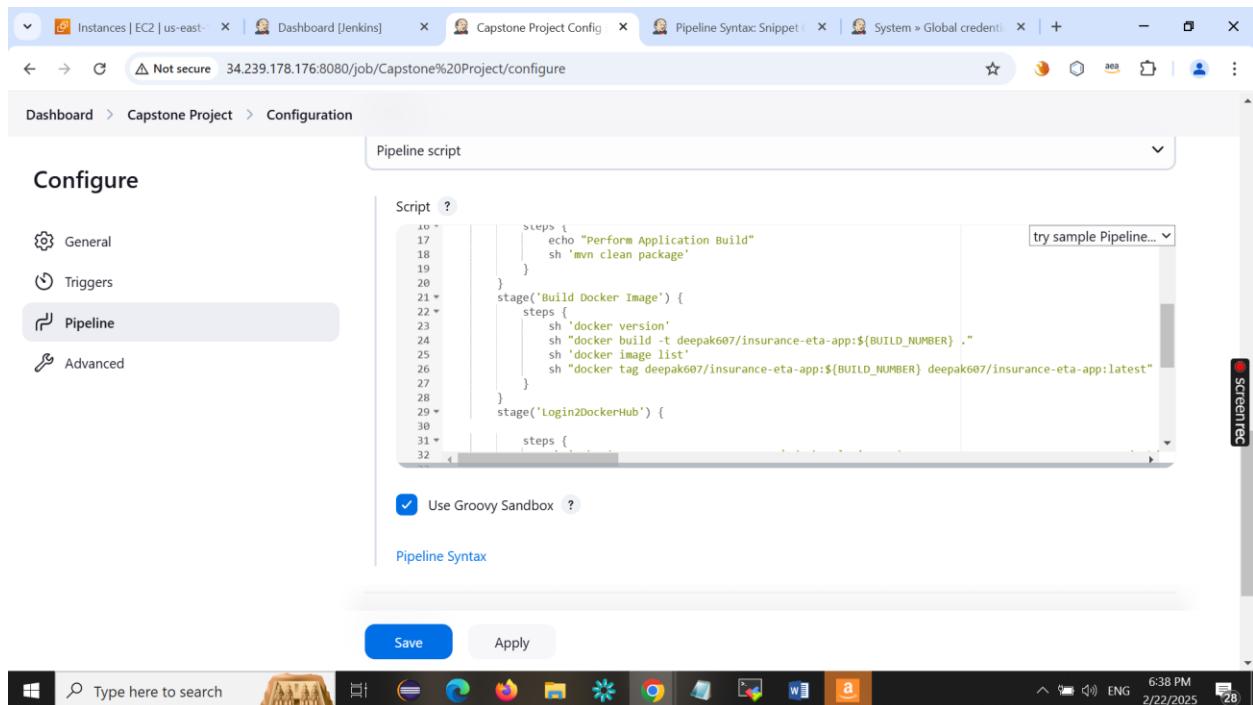
The screenshot shows the Jenkins System configuration page under the Manage Jenkins > System section. The current view is the SSH Servers page. A search bar at the top right contains the text "ssh". Below it, a table lists one server entry:

| Name | Hostname | Username | Remote Directory |
|----------|----------|----------|------------------|
| capstone | | | |

Below the table are four input fields with placeholder text: "Name", "Hostname", "Username", and "Remote Directory". At the bottom are "Save" and "Apply" buttons.



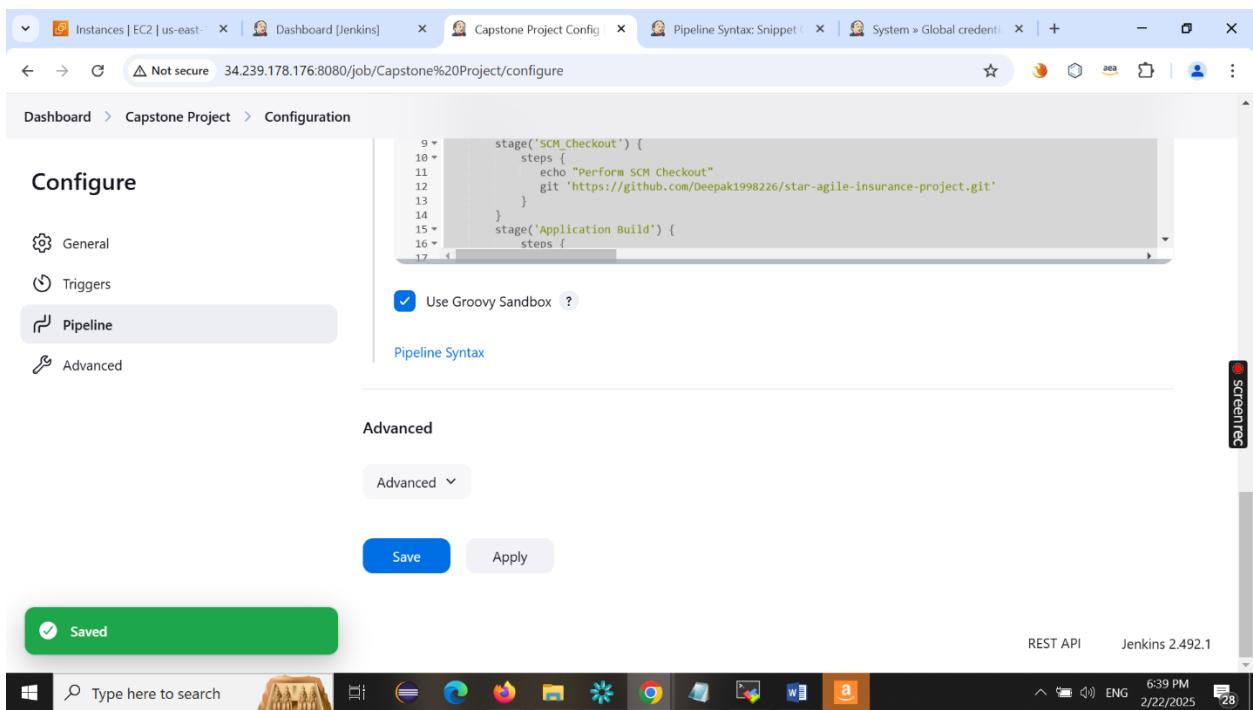
The screenshot shows the Jenkins Pipeline Syntax Snippet configuration page. The URL is 34.239.178.176:8080/job/Capstone%20Project/pipeline-syntax/. The page title is "Pipeline Syntax: Snippet". The main content area is titled "Transfers" and contains a "Transfer Set" section. It includes fields for "Source files" (with a red error message: "Either Source files, Exec command or both must be supplied"), "Remove prefix", "Remote directory", and "Exec command". The status bar at the bottom shows "screenrec" and a timestamp of "6:34 PM 2/22/2025".



The screenshot shows the Jenkins Pipeline configuration page. The URL is 34.239.178.176:8080/job/Capstone%20Project/configure. The page title is "Pipeline script". The left sidebar has tabs: General, Triggers, Pipeline (which is selected), and Advanced. The main content area shows a Groovy script editor with the following code:

```
steps {
    echo "Perform Application Build"
    sh 'mvn clean package'
}
stage('Build Docker Image') {
    steps {
        sh 'docker version'
        sh "docker build -t deepak607/insurance-eta-app:${BUILD_NUMBER} ."
        sh 'docker image list'
        sh "docker tag deepak607/insurance-eta-app:${BUILD_NUMBER} deepak607/insurance-eta-app:latest"
    }
}
stage('Login2DockerHub') {
    steps {
    }
}
```

Below the script editor is a checkbox "Use Groovy Sandbox" which is checked. At the bottom are "Save" and "Apply" buttons. The status bar at the bottom shows "screenrec" and a timestamp of "6:38 PM 2/22/2025".



Pipeline Script :

```
pipeline {  
    agent { label 'Jenkins_worker_2' }  
}
```

```
environment {  
    DOCKERHUB_CREDENTIALS=credentials('capestone_docker')  
}
```

```
stages {  
    stage('SCM_Checkout') {  
        steps {  
            echo "Perform SCM Checkout"  
        }  
    }  
}
```

```
        git 'https://github.com/Deepak1998226/star-agile-insurance-
project.git'

    }

}

stage('Application Build') {

    steps {

        echo "Perform Application Build"

        sh 'mvn clean package'

    }

}

stage('Build Docker Image') {

    steps {

        sh 'docker version' // Check Docker version first to ensure
Docker is installed

        sh "docker build -t deepak607/insurance-eta-
app:${BUILD_NUMBER} ."

        sh 'docker image list' // List images to verify the image was
built successfully

        sh "docker tag deepak607/insurance-eta-
app:${BUILD_NUMBER} deepak607/healthcare-eta-app:latest"

    }

}
```

```
}
```

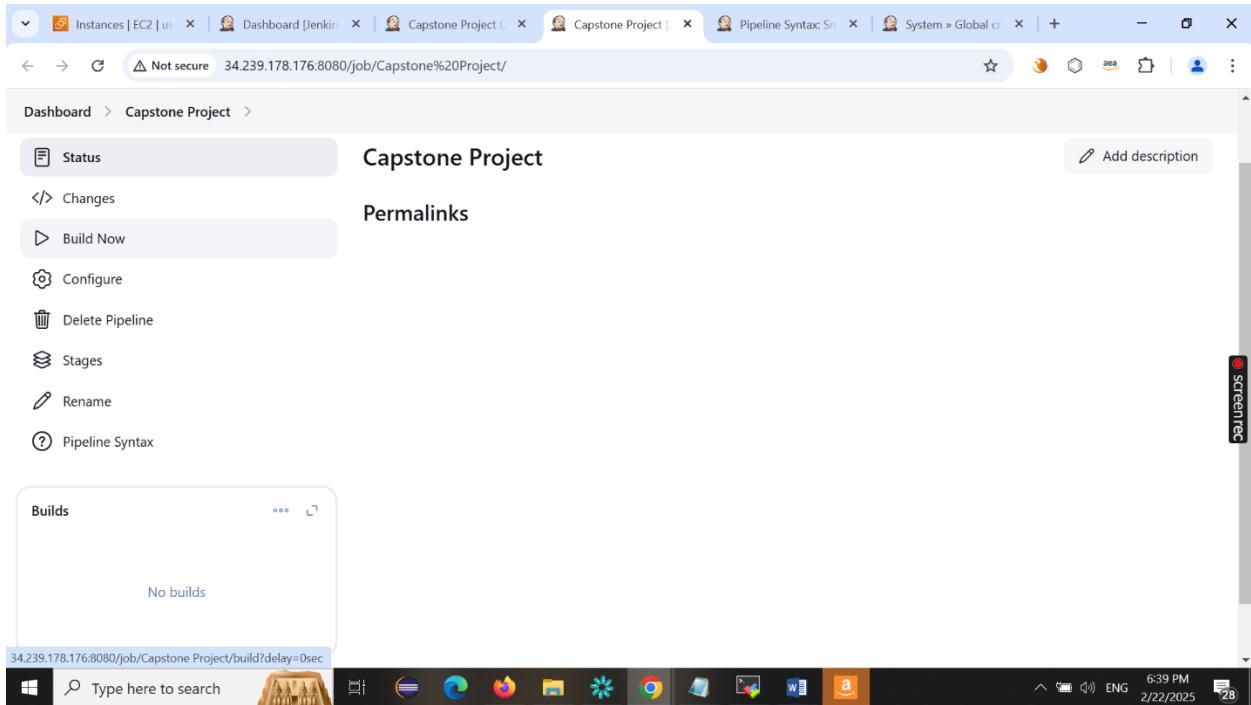
```
stage('Login2DockerHub') {
    steps {
        script {
            withCredentials([usernamePassword(credentialsId:
'capestone_docker', usernameVariable:
'DOCKERHUB_CREDENTIALS_USR', passwordVariable:
'DOCKERHUB_CREDENTIALS_PSW')]) {
                sh 'echo $DOCKERHUB_CREDENTIALS_PSW | docker
login -u $DOCKERHUB_CREDENTIALS_USR --password-stdin'
            }
        }
    }
}
```

```
stage('Publish_to_Docker_Registry') {
    steps {
        sh "docker push deepak607/insurance-eta-
app:${BUILD_NUMBER}"
        sh "docker push deepak607/insurance-eta-app:latest"
    }
}
```

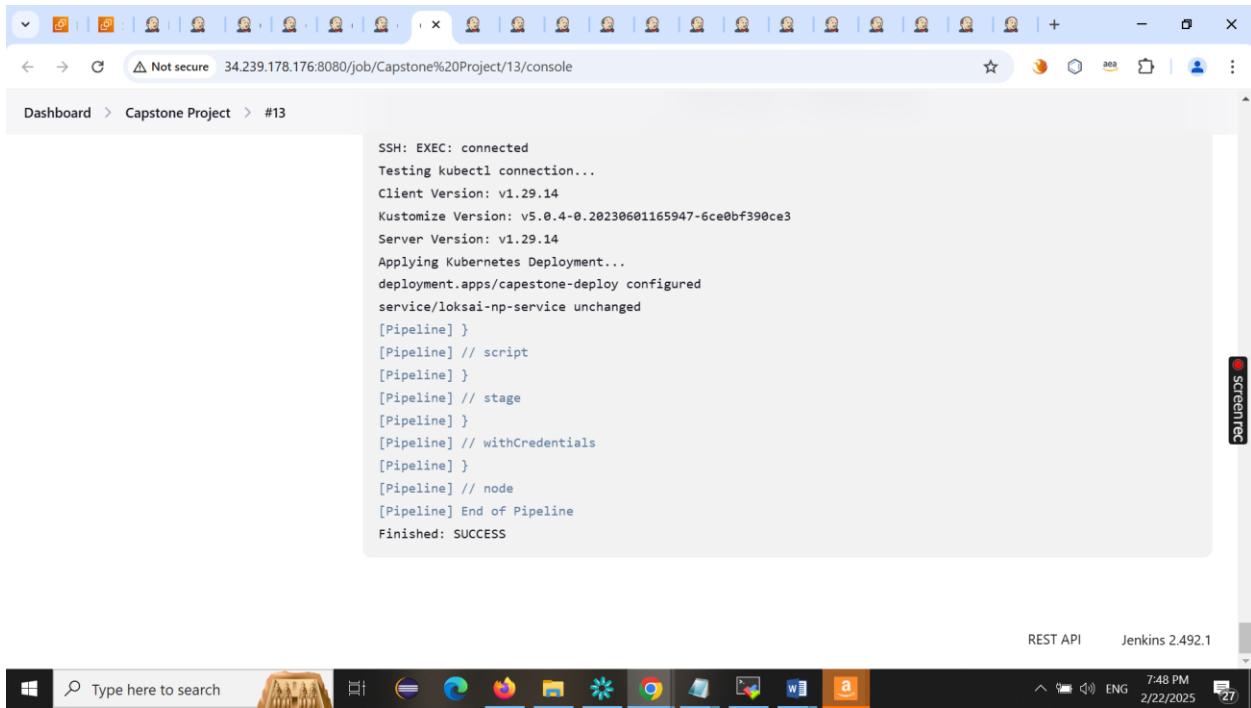
```
stage('Deploy to Kubernetes Cluster') {  
    steps {  
        script {  
            sshPublisher(publishers: [  
                sshPublisherDesc(  
                    configName: 'deepak',  
                    transfers: [  
                        sshTransfer(  
                            cleanRemote: false,  
                            excludes: "",  
                            execCommand: ""  
                                echo "Testing kubectl connection..."  
                                kubectl version  
                                if [ $? -ne 0 ]; then  
                                    echo "kubectl is not working. Exiting."  
                                    exit 1  
                                fi  
                                echo "Applying Kubernetes Deployment..."  
                                kubectl apply -f kubedeploy.yaml  
                            "",  
                            execTimeout: 120000,  
                        )  
                    ]  
                )  
            )  
        }  
    }  
}
```

```
        flatten: false,  
        makeEmptyDirs: false,  
        noDefaultExcludes: false,  
        patternSeparator: '[, ]+',  
        remoteDirectory: '.',  
        remoteDirectorySDF: false,  
        removePrefix: "",  
        sourceFiles: '*.yaml'  
    )  
],  
usePromotionTimestamp: false,  
useWorkspaceInPromotion: false,  
verbose: true  
)  
])  
}  
}  
}  
}  
}
```

Navigate back to pipeline project page and click on Build Now option and verify that build is been scheduled



Verify console output as “SUCCESS” , means your pipeline has been executed properly

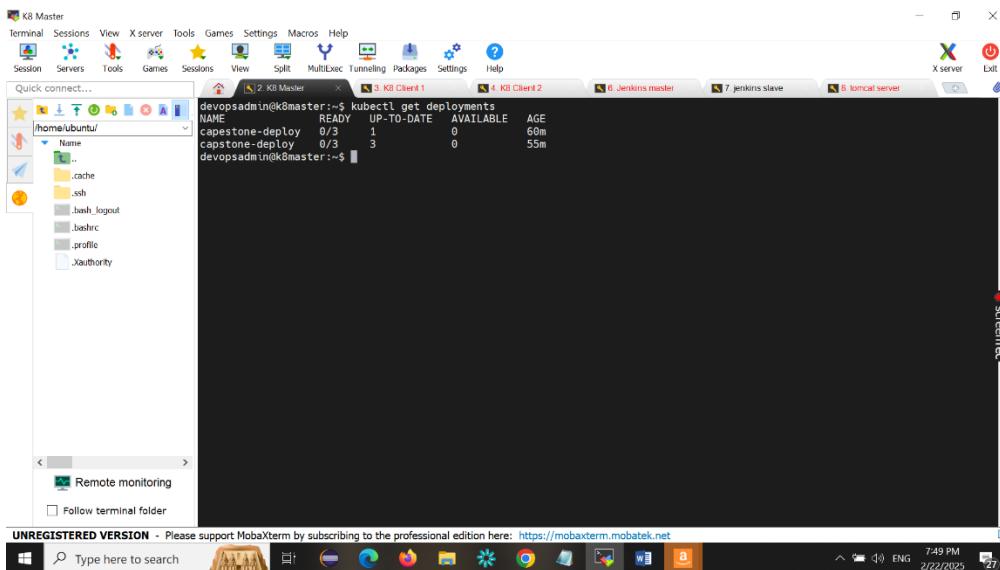


The screenshot shows a web browser window with the URL `34.239.178.176:8080/job/Capstone%20Project/13/console`. The page displays the Jenkins pipeline console output. The output shows the following sequence of events:

```
SSH: EXEC: connected
Testing kubectl connection...
Client Version: v1.29.14
Kustomize Version: v5.0.4-0.20230601165947-6ce0bf390ce3
Server Version: v1.29.14
Applying Kubernetes Deployment...
deployment.apps/capecstone-deploy configured
service/lokhai-np-service unchanged
[Pipeline]
[Pipeline] // script
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // withCredentials
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

At the bottom right of the browser window, there is a red circular icon with the text "screenrec".

Now we can go to k8 master server and check that our deployment has been made and nodeport service has been created to expose to web browser and replica set been created according to yaml script provided on github repo



The screenshot shows a MobaXterm window titled "K8 Master". The terminal session is running on a Ubuntu system. The user has run the command `kubectl get deployments`, which outputs the following table:

| NAME | READY | UP-TO-DATE | AVAILABLE | AGE |
|-------------------|-------|------------|-----------|-----|
| capecstone-deploy | 0/3 | 1 | 0 | 60m |
| capstone-deploy | 0/3 | 3 | 0 | 55m |

At the bottom left of the terminal window, there is a "Remote monitoring" checkbox. At the bottom right, there is a red circular icon with the text "screenrec".

Now its time to expose to internet with
<public_ip>:nodeport number in my case its 31001 as I
created it for banking application deploy



The screenshot shows a web browser window with a title bar containing multiple tabs. The main content area displays four cards, each representing a type of insurance:

- HOME INSURANCE**: Home insurance also known as property insurance or homeowner insurance covers the structure as well as the content of the home. [Read More](#)
- HEALTH INSURANCE**: A medical insurance also called as health insurance, covers medical expenses for illnesses. It reimburses your medical bills. [Read More](#)
- CAR INSURANCE**: Car Insurance, is a type of vehicle insurance policy that protects you and your car from any risks of accidents and property damages. [Read More](#)
- LIFE INSURANCE**: Life Insurance not only provides for financial support in the event of untimely death but also acts as a long term investment. [Read More](#)

A central button labeled "View All" is positioned below the cards.

The screenshot shows a Windows desktop environment. At the top is the taskbar with various pinned icons and a search bar. Below it is a screenshot of a web page titled "ABOUT US". The page features a large image of a person's face in the background. The main content includes the "INSURE-ME" logo and the text "PROTECT YOUR FAMILY AND YOUR FUTURE". A paragraph explains the benefits of life insurance, and a "Contact Us" button is visible. The taskbar at the bottom shows the date and time as 2/24/2025, 7:34 PM.

The screenshot shows a web browser window displaying the homepage of the "INSURE-ME" website. The header features the "INSURE-ME" logo and a navigation menu with links to HOME, ABOUT, SERVICES, and CONTACT US. The main visual is a large, stylized globe composed of hexagonal tiles, each containing a different insurance-related icon (e.g., handshake, clipboard, heart, shield). Below the globe is a large hand holding it. The text "PROTECT YOUR FAMILY AND YOUR FUTURE" is prominently displayed. A paragraph about life insurance and a "Contact Us" button are also present. The taskbar at the bottom shows the date and time as 2/24/2025, 7:34 PM.

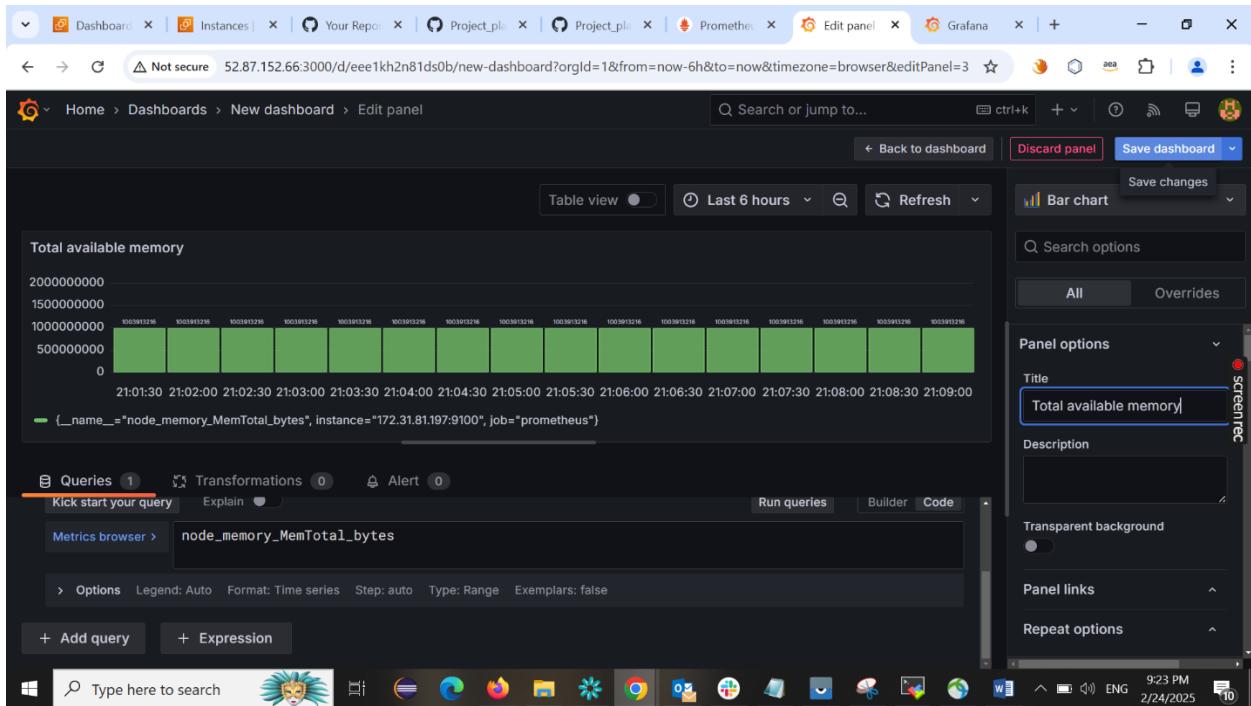
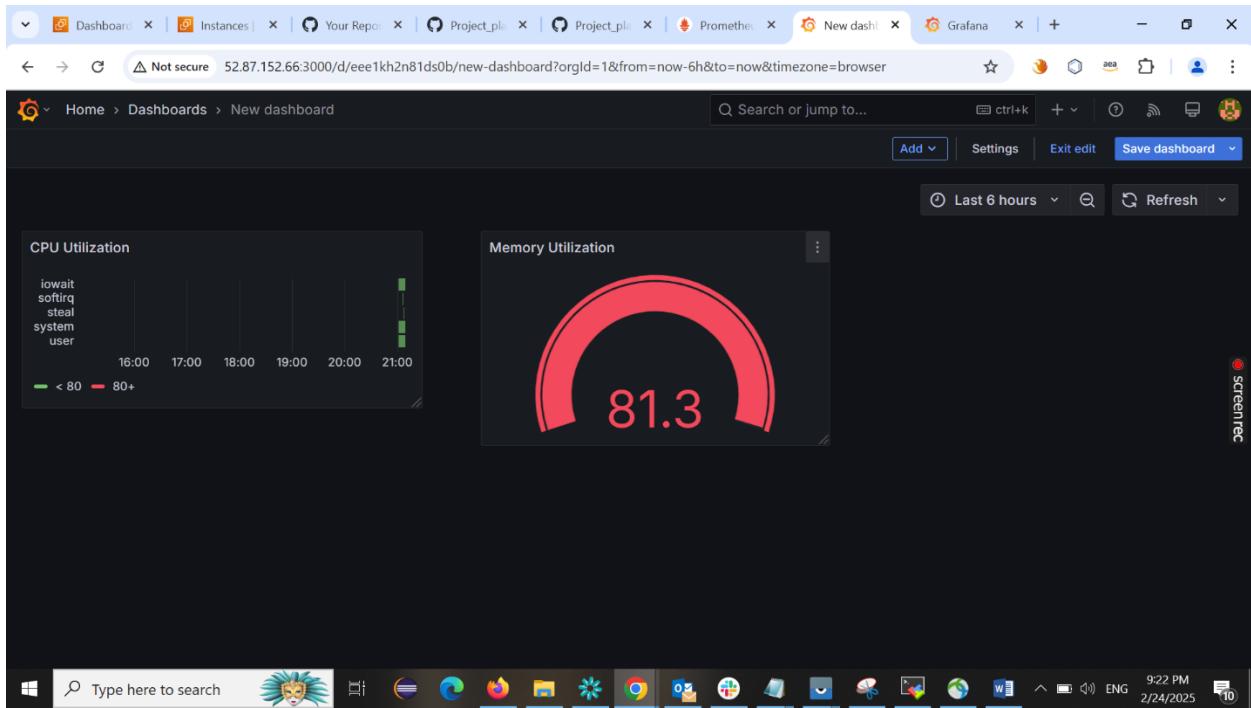
As a post deployment activity we need to continuously monitor our server , as it may always lead to over CPU utilization or any problem that can disrupt deployment server , for monitoring we are going to use Prometheus and Grafana Prometheus – for collecting sources from our target server Grafana – to visualize all source and set trigger mechanism Install Prometheus from where you want to monitor , in my case I want monitor all my k8 worker nodes from master node as it handle all deployment builds

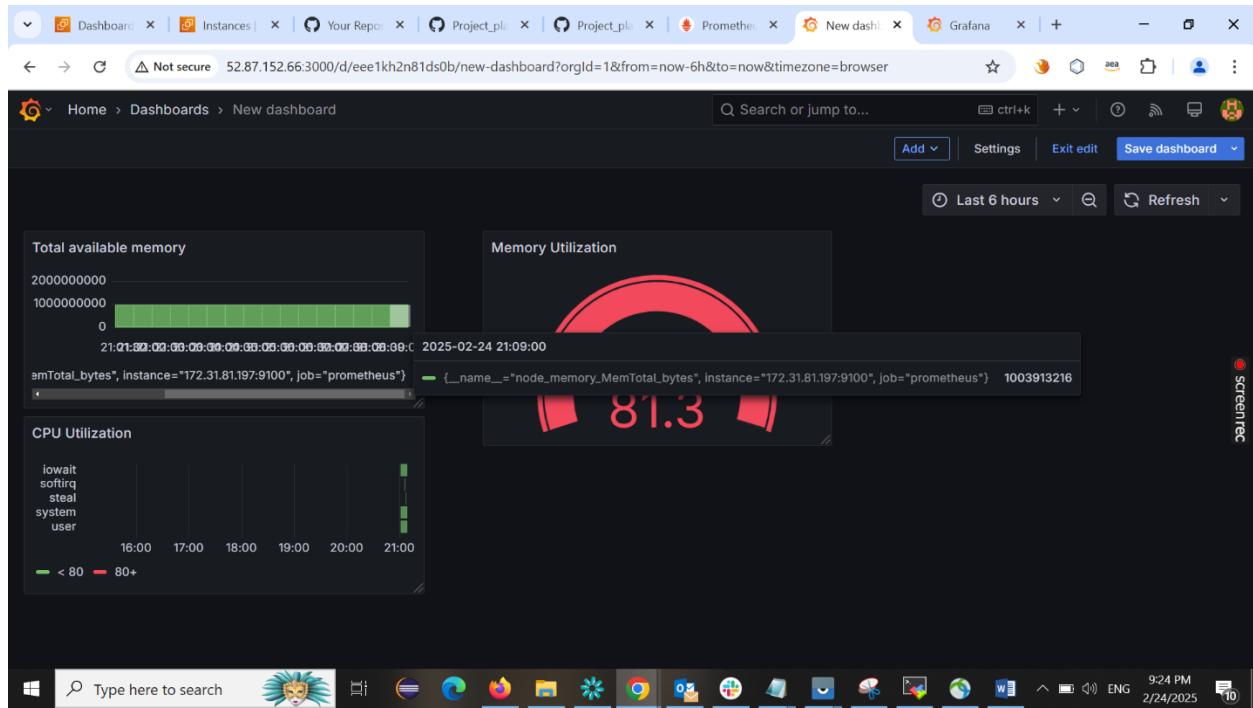
And enter promql queries on which you want monitor

In my case I wish to monitor

1. CPU utilization - 100 - (avg by (instance)
(rate(node_cpu_seconds_total{mode="idle"}[5m])) * 100)
2. Disk Space Utilization - (1 -
(node_filesystem_avail_bytes{fstype!="tmpfs", mountpoint="/"}/
node_filesystem_size_bytes{fstype!="tmpfs", mountpoint="/"})) * 100
3. Total Available Memory - node_memory_MemAvailable_bytes /
node_memory_MemTotal_bytes * 100

And create dash board and club those to visualize better output





So we got output successfully and our deployment are done seamlessly with all devops tool integrated and implemented properly.

