**DevOps Project**

**Problem Statement:**

Create an end-to-end CI/CD pipeline in AWS platform using Jenkins as the orchestration tool, GitHub as scm, maven as the build tool, deploy in a docker instance and create a docker image, store the docker image in ECR, Kubernetes deployment using ECR image. Build sample java web app using maven.

**Approach:**

**Requirements:**

* CI/CD pipeline System
* Git - local version control system.
* GitHub - As Distributed version control system.
* Jenkins - Continuous Integration tool.
* Maven - As a Build Tool.
* docker -Containerization
* Kubernetes - As Container Management Tool

Step-1:

➢ Setup CI/CD with GitHub, Jenkins, Maven & Tomcat.

➢ Setup Jenkins

➢ Setup & Configure Maven, Git.

➢ Setup Tomcat Server.

➢ Integrating GitHub, Maven, Tomcat Server with Jenkins

➢ Create a CI and CD Job.

➢ Test the Deployment

Step-2:

➢ Setup CI/CD with GitHub, Jenkins, Maven & Docker.

➢ Setting up the docker Environment.

➢ Create an Image and Container on Docker Host.

➢ Integrate Docker Host with Jenkins.

➢ Create CI/CD Job on Jenkins to build and deploy on container.

Step-3:

➢ Build and Deploy on Container.

➢ CI/CD with GitHub, Jenkins, Maven & Kubernetes.

➢ Setting up the Kubernetes (EKS).

➢ Write pod service and deployment manifest file.

➢ CI/CD Job to build code on Jenkins & Deploy it on Kubernetes.

Step-4:

➢ Deploy artifacts on the Kubernetes

➢ Write codes in the artifacts of docker and Kubernetes which we want to run.

➢ Now build the code in Jenkins.

➢ Check in Kubernetes the pods are getting created or not.

➢ Now copy the service IP and paste it in the browser and check the output.

Launched an ec2 instance to host Jenkins.

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Installed Jenkins and started the service on the terminal.

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Accessed Jenkins from the browser successfully

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Encountered disk space issue.

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Extended the /tmp storage to resolve the issue.

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Jenkins started running normally after space extension.

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Configured GitHub webhooks to trigger Jenkins builds automatically.

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Added Webhooks to make connection between jenkins and my repo.

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Installed plugins: Deploy to Container, Maven Integration, GitHub Integration.A screenshot of a computer

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Installed Maven on the server via terminal.

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Configured Maven path inside Jenkins global settings.

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Set up a new Jenkins project for the pipeline.

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Launched an EC2 instance for Apache Tomcat server.

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Installed Tomcat and configured it in the terminal.

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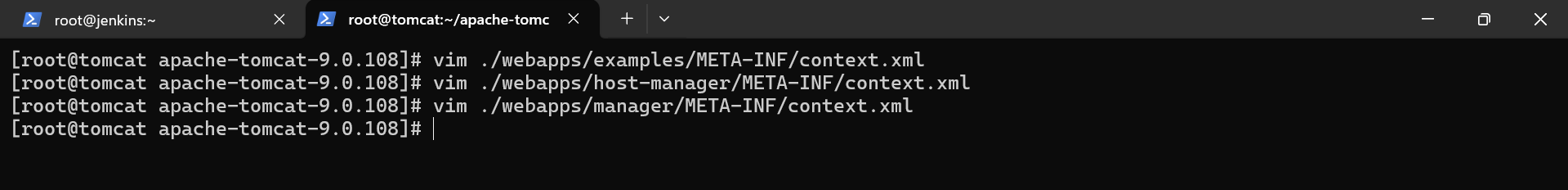
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Added Tomcat server credentials in Jenkins.

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Configured Jenkins to deploy builds on the Tomcat instance.

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Triggered a successful Jenkins build and deployment to Tomcat.

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Installed Docker on a new EC2 instance.

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Configured Docker environment and verified installation.

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Enabled root login and password-based authentication in both Docker and Jenkins servers.

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Created SSH keys in the Docker node for secure connection.

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Exchanged SSH keys between Jenkins and Docker nodes.

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Installed the Publish Over SSH plugin in Jenkins.

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Configured Docker node inside Jenkins system settings.

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Created an IAM user in AWS with admin policy and generated access keys.

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Configured AWS CLI on Docker instance using IAM access keys.

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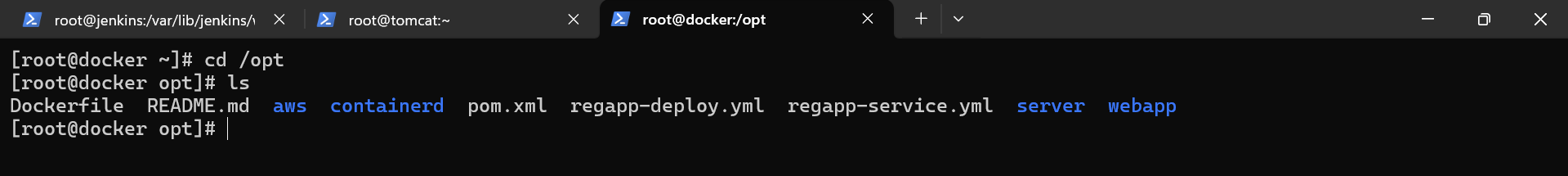
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Set Jenkins to transfer files automatically to Docker after build.

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It’s done



Automated creation of AWS Elastic Container Registry (ECR) through Jenkins.

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Launched an EC2 instance for EKS setup and configured AWS CLI.

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Installed eksctl and kubectl on the EKS node.

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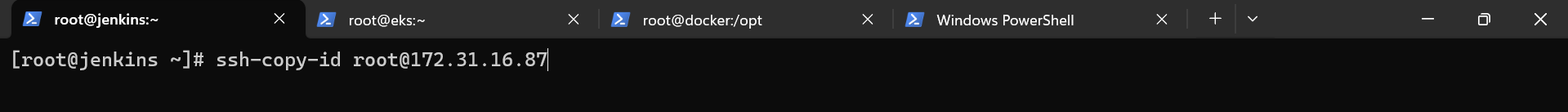
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Established secure communication between EKS and Docker nodes.

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Deployed an EKS cluster and added a node group.

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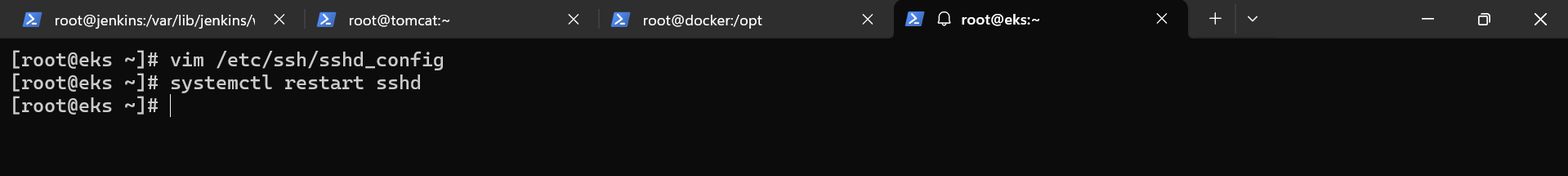
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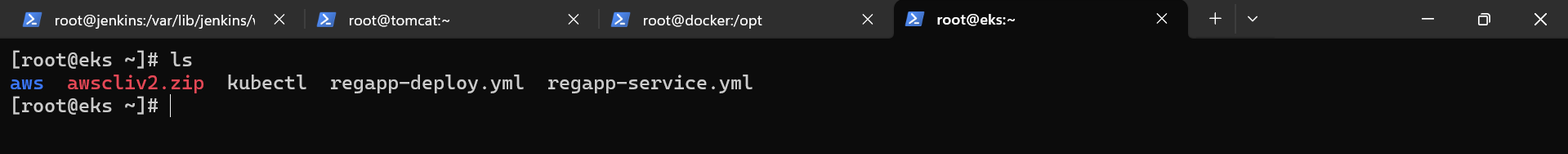
Enabled root login and password authentication on EKS node.



Transferred Kubernetes deployment and service YML files to the EKS instance.

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Retrieved the ECR image URL.

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Updated Kubernetes deployment file with the ECR image URL.

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Added EKS cluster details inside Jenkins.

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Configured Jenkins to deploy applications to EKS after build.

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Pipeline executed successfullyA screenshot of a computer

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Ran kubectl get svc, copied external link, and accessed application on port 8080 via browser.

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**By –**

**Asmit Kumar**