COMMUNITY ANNOUNCEMENT PORTAL

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Sai Kiran

COMMUNITY ANNOUNCEMENT PORTAL

TODAY'S AGENDA

- Problem statement
- Project Objectives
- Technology
- Features
- Multi Development Environment
- Problem With Single Development Environment
- Tools
- Infrastructure as Code
- CI/CD Pipeline
- Future Developments

PROBLEM STATEMENT

- To provide communication, integration, automation, and close cooperation among all the people needed to plan, develop, test, deploy, release, and maintain a Solution.

- Application for making Announcements within an team & organization to stay updated.

PROJECT OBJECTIVES

COMMUNITY ANNOUNCEMENT PORTAL

- Collaboration
- Speed
- Innovation
- Customer Satisfaction
- Agility
- Quality and Reliability
- Costs Reduction
- Automation

Technical Benfits

- Continuous software delivery
- Less complexity to manage
- Faster resolution of problems

Cultural Benefits

- Happier, more productive teams
- Higher employee engagement
- Greater professional development opportunities

Business Benefits

- Faster delivery of features
- More stable operating environments
- Improved communication and collaboration
- More time to innovate (rather than fix/maintain)

Community Announcement Portal Technology

Front-End :

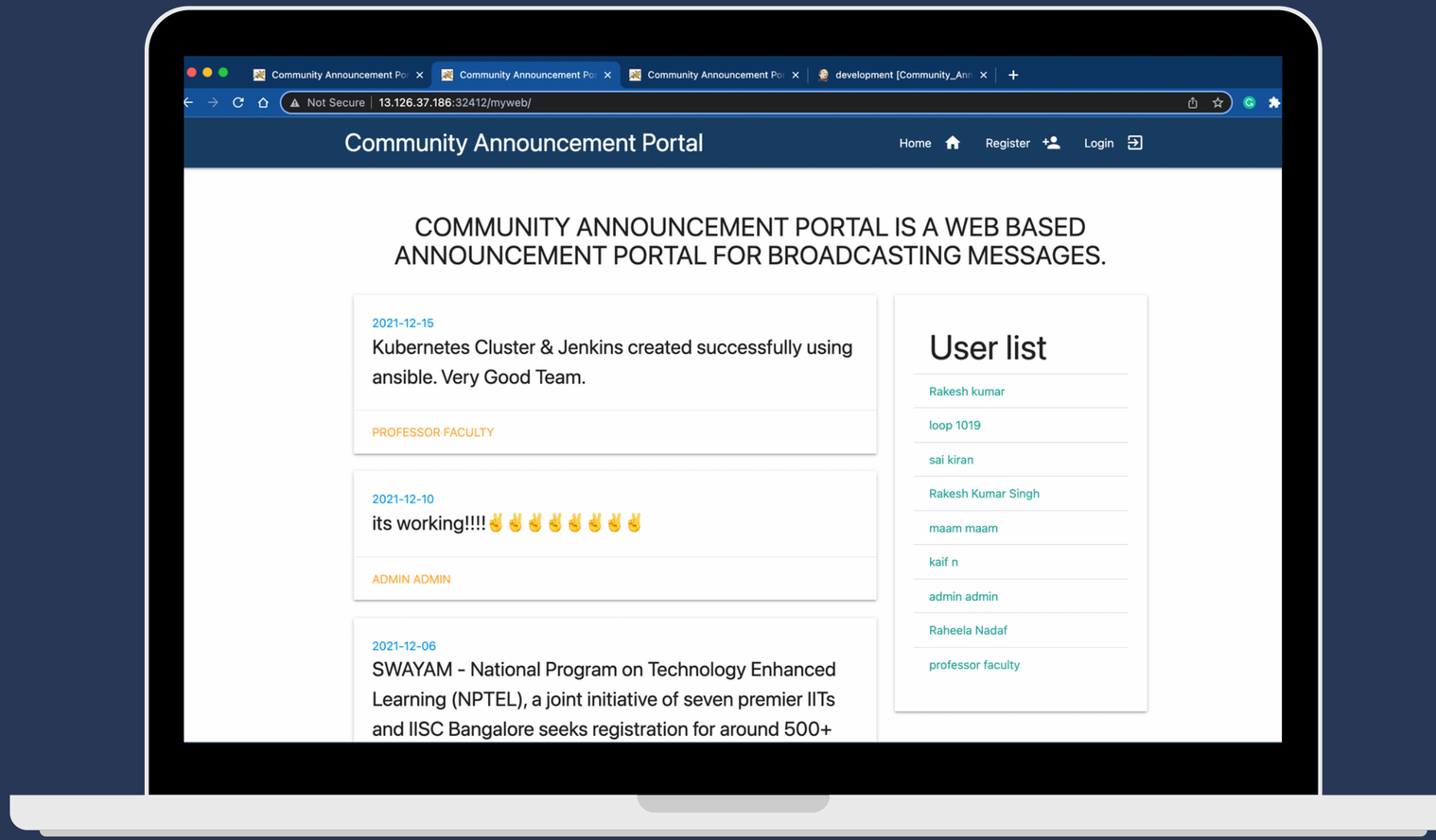
- HTML / CSS
- Bootstrap

Back-End:

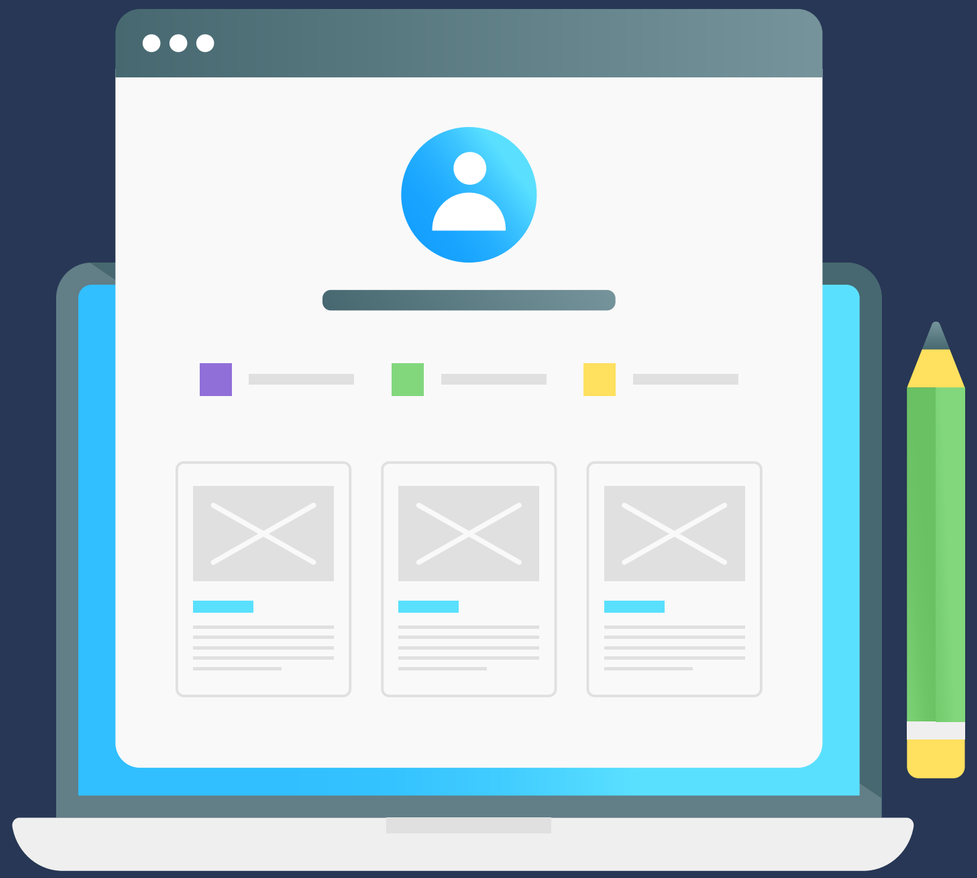
- Java

DataBase:

- MySQL



Community Announcement Portal Features



Registration

- First Name
- Last Name
- Email
- Password

Login

- Email
- Password

Announcement

- Create
- Edit
- Delete
- Hide

View Announcement

- All Users
- Individuals Users
- All Announcements
- Individuals Announcements

Multi Development Environment

01

DEVELOPMENT

www.dev.domain.com

- This is the environment that's on your computer.
- Here is where you'll do all of your code updates.
- It's where all of your commits and branches live along with those of your co-workers.

02

STAGING

www.stag.domain.com

- The staging environment is as similar to the production environment as it can be.
- All of the hardcore testings happens here.
- find and fix any issues that come up too.
- Give a demo of how things work and look to clients .

03

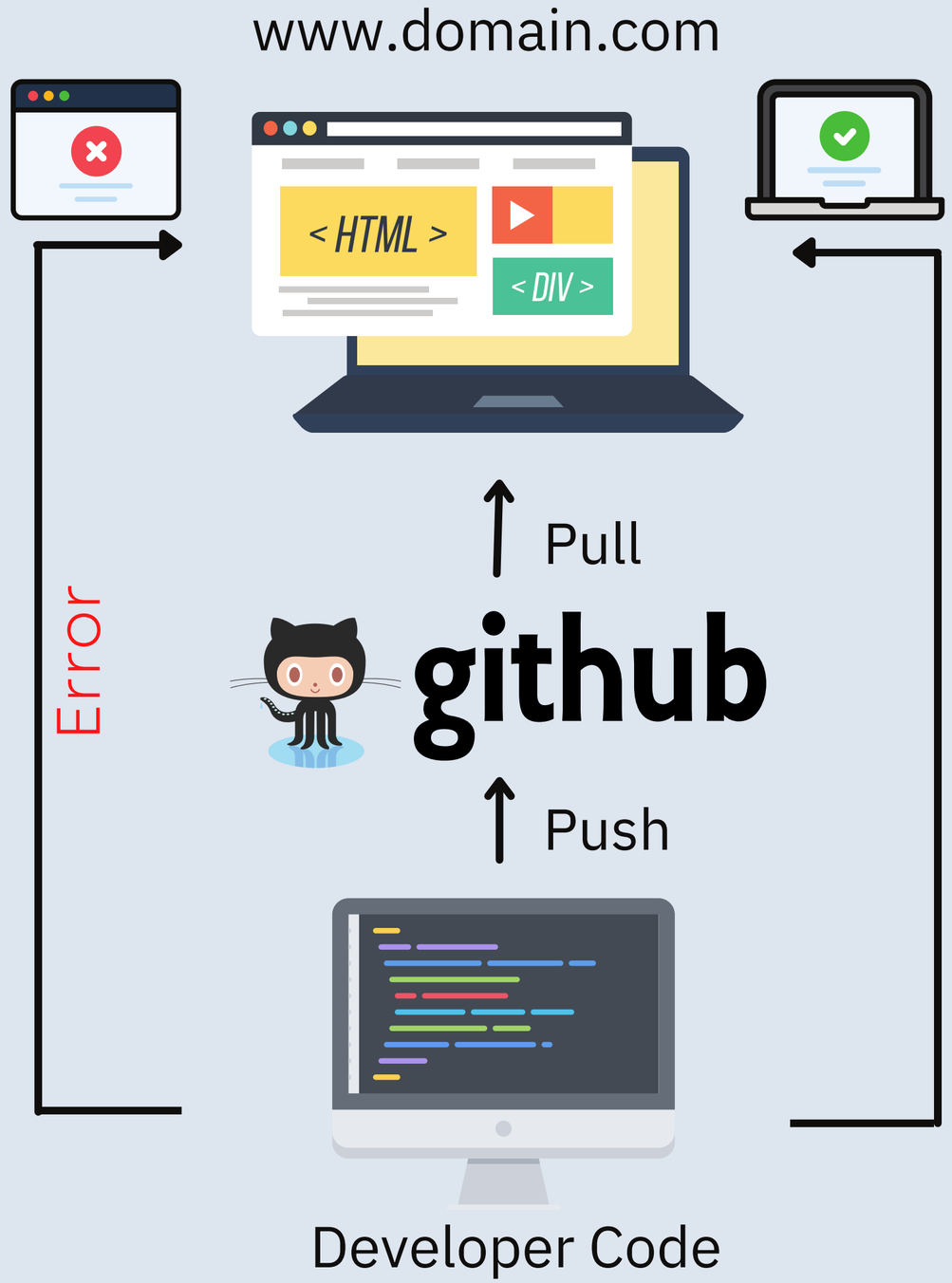
PRODUCTION

www.domain.com

- Every time we talk about making your project live, this is the environment we are talking about.
- The production environment is where users access the final code after all of the updates and testing
- Of all the environments, this one is the most important.

Problem With Single Development Environment

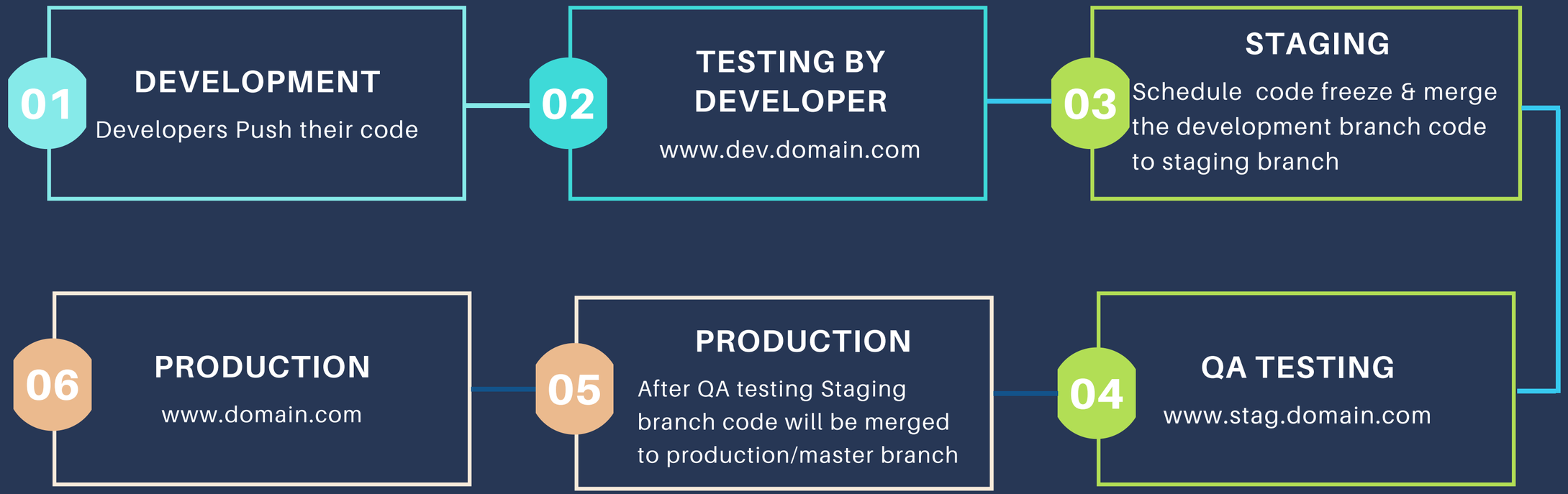
- Developers makes daily so many commits if any one of the commites have error in the code makes the application down.
- Half build features will be visible to customers.
- Competitors Knows what we are building.
- Time Consuming
- Waste of Human Resources
- Complex & Inefficient



How Multi Deployment Environment workes

Git Branch with domain name

Master	www.domain.com
Staging	www.stag.domain.com
Development	www.dev.domain.com



Multi Deployment Environment Example

www.dev.domain.com

www.stag.domain.com

www.domain.com

Developers team

QA team

Git Branch : Development

Git Branch : Staging

Git Branch : Production

New Features

By Developers

NEW YEAR
SALES FEATURE
IN ECOMMERCE APPLICATION

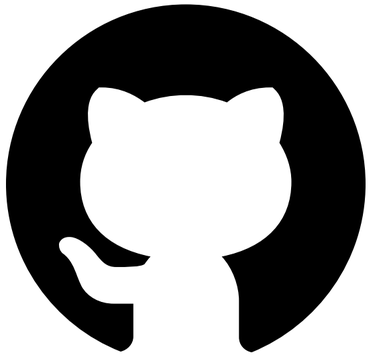
DevOps Tools

GitHub

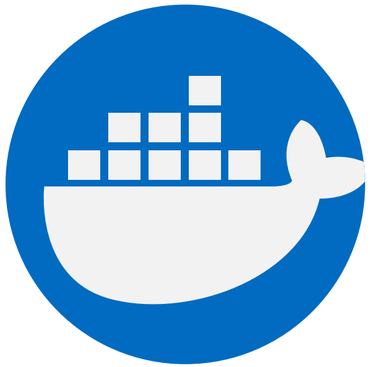
- open-source code hosting platform for version control and collaboration.

Jenkins

- open-source automation tool is written in Java with plugins built for Continuous Integration purposes.



Github



Docker

Ansible

Jenkins

Apache Maven™

kubernetes

HashiCorp Terraform

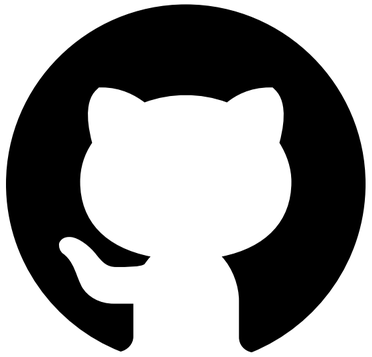
DevOps Tools

Maven

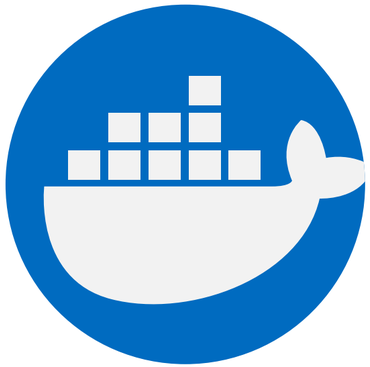
- Maven is a build automation tool used primarily for Java projects.
- Maven dynamically downloads Java libraries and Maven plugins .

Ansible

- Ansible is an open-source software provisioning, configuration management, and application-deployment tool enabling infrastructure as code.



Github



Docker

Ansible

Jenkins

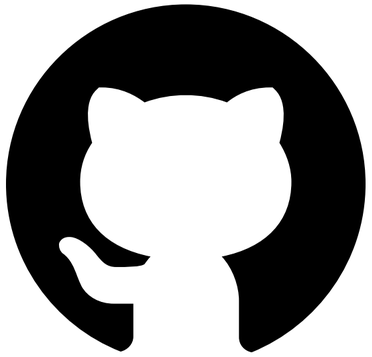
kubernetes

HashiCorp
Terraform

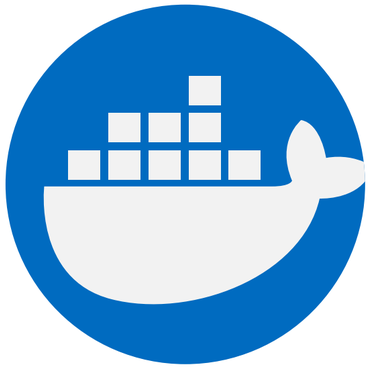
DevOps Tools

Docker

- Docker is an open platform for developing, shipping, and running applications.
- Docker enables you to separate your applications from your infrastructure so you can deliver software quickly.
- shipping, testing, and deploying code quickly, we can significantly reduce the delay between writing code and running it in production.



Github



Docker

Ansible

Jenkins

Apache Maven™

kubernetes

HashiCorp Terraform

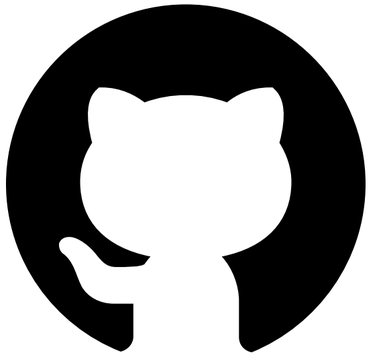
DevOps Tools

Kubernetes

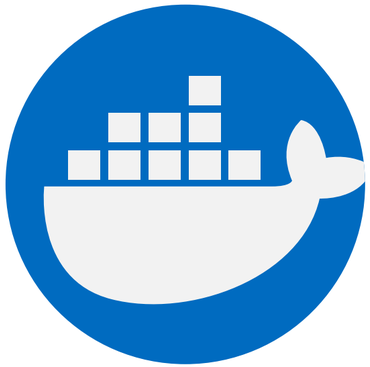
- Kubernetes is an open-source container-orchestration system for automating computer application deployment, scaling, and management.

Terraform

- Terraform is an infrastructure as code (IaC) tool that allows you to build, change, and version infrastructure safely and efficiently.



Github



Docker

Ansible

Jenkins

kubernetes

HashiCorp
Terraform

Terraform for creating resources

terraform init
terraform plan
terraform apply
terraform destroy

13 EC2

1 RDS(MySQL)

Infrastructure Configuration

OS. : Centos
AMI. : ami-026f33d38b6410e30
TYPE. : t2.micro
Storage : 8 GB
Machine :kubernetes

- K8Master1Node1
- K8Master1Node2
- K8Master2Node1
- K8Master2Node2
- K8Master3Node1
- K8Master3Node2

OS. : Centos
AMI. : ami- 026f33d38b6410e30
TYPE. : t2.medium
Storage : 30 GB
Machine :kubernetes

- K8Master1
- k8Master2
- k8Master3

OS. : Ubuntu
AMI. : ami-0567e0d2b4b2169ae
TYPE. : t2.medium
Storage : 8 GB
Machine :jenkins

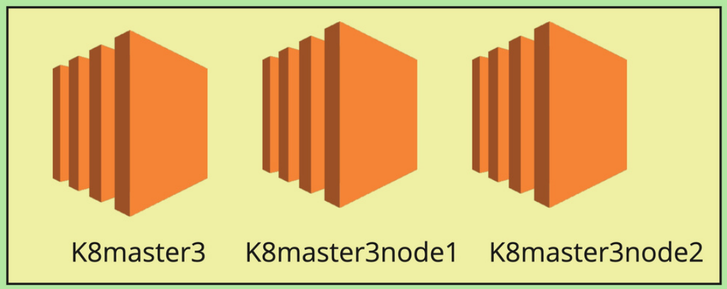
- Production
- Staging
- Development

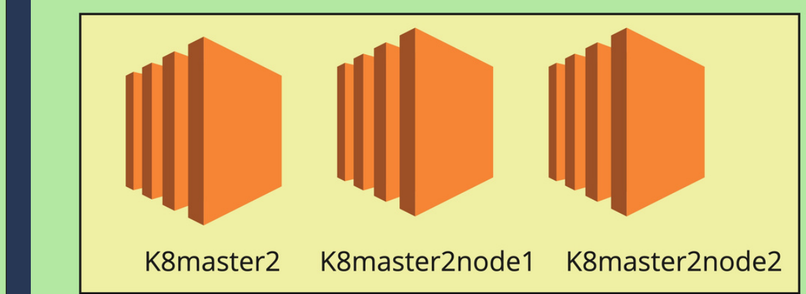
OS. : Ubuntu
AMI. : ami-026f33d38b6410e30
TYPE. : t2.micro
Storage : 8 GB
Machine :db server

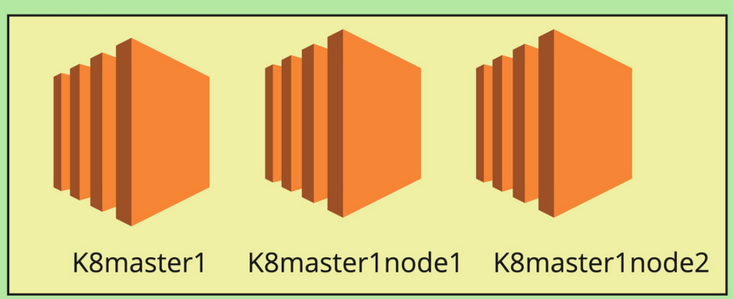
- DB Server

Infrastructure & Clusters

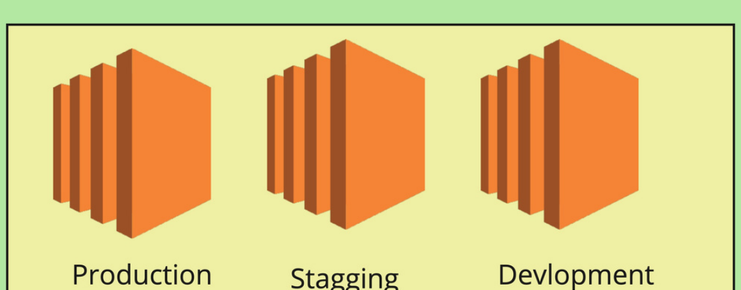
KUBERNETES



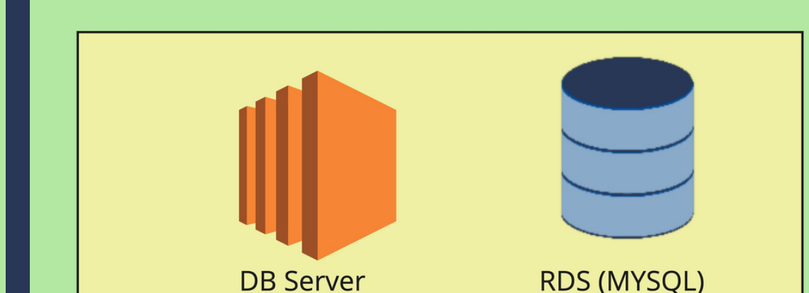




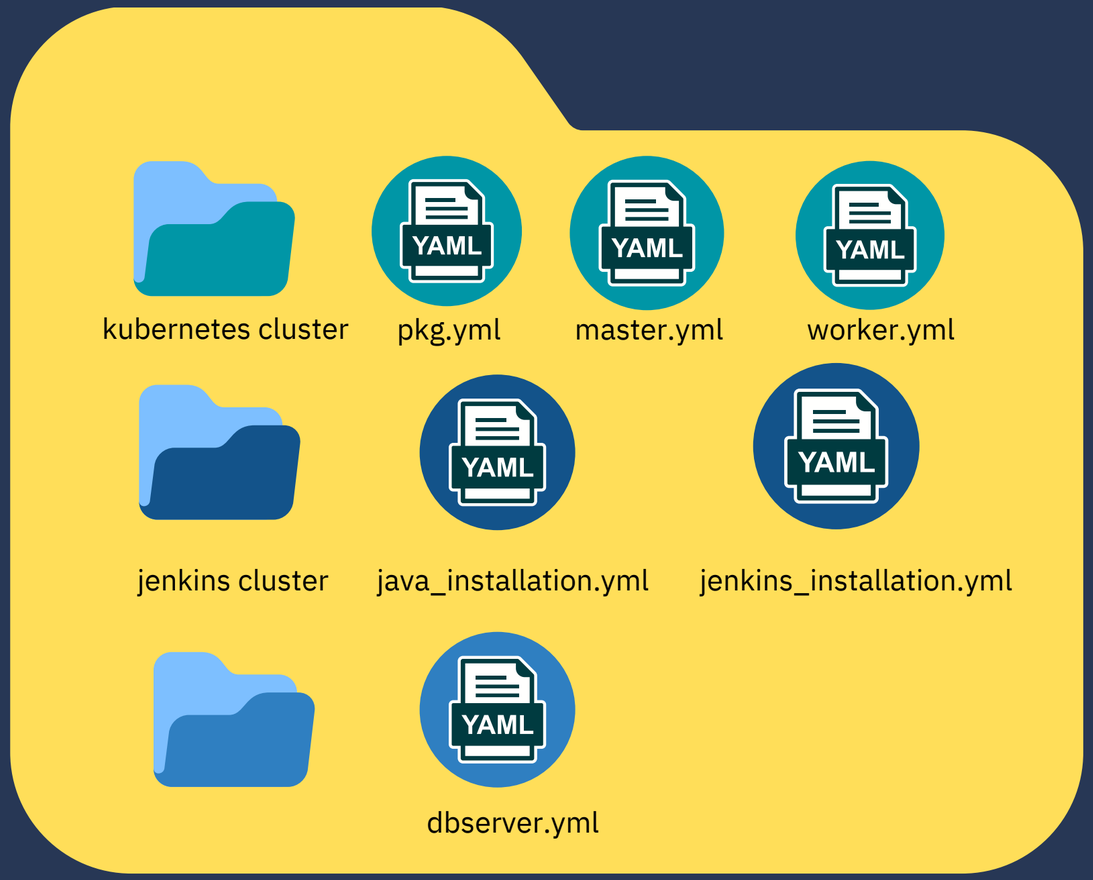
JENKINS



DB SERVER



Ansible for Installing & Starting Services



Repositories Structure

pkg.yml
Packages:
- docker
- kubeadm
- kubectl
- kubelet

master.yml
Command:
- kubeadm init

To generate token

worker.yml
Command:
- kubeadm join

To establish connections b/w master node

java_installation.yml
Packages:
- java

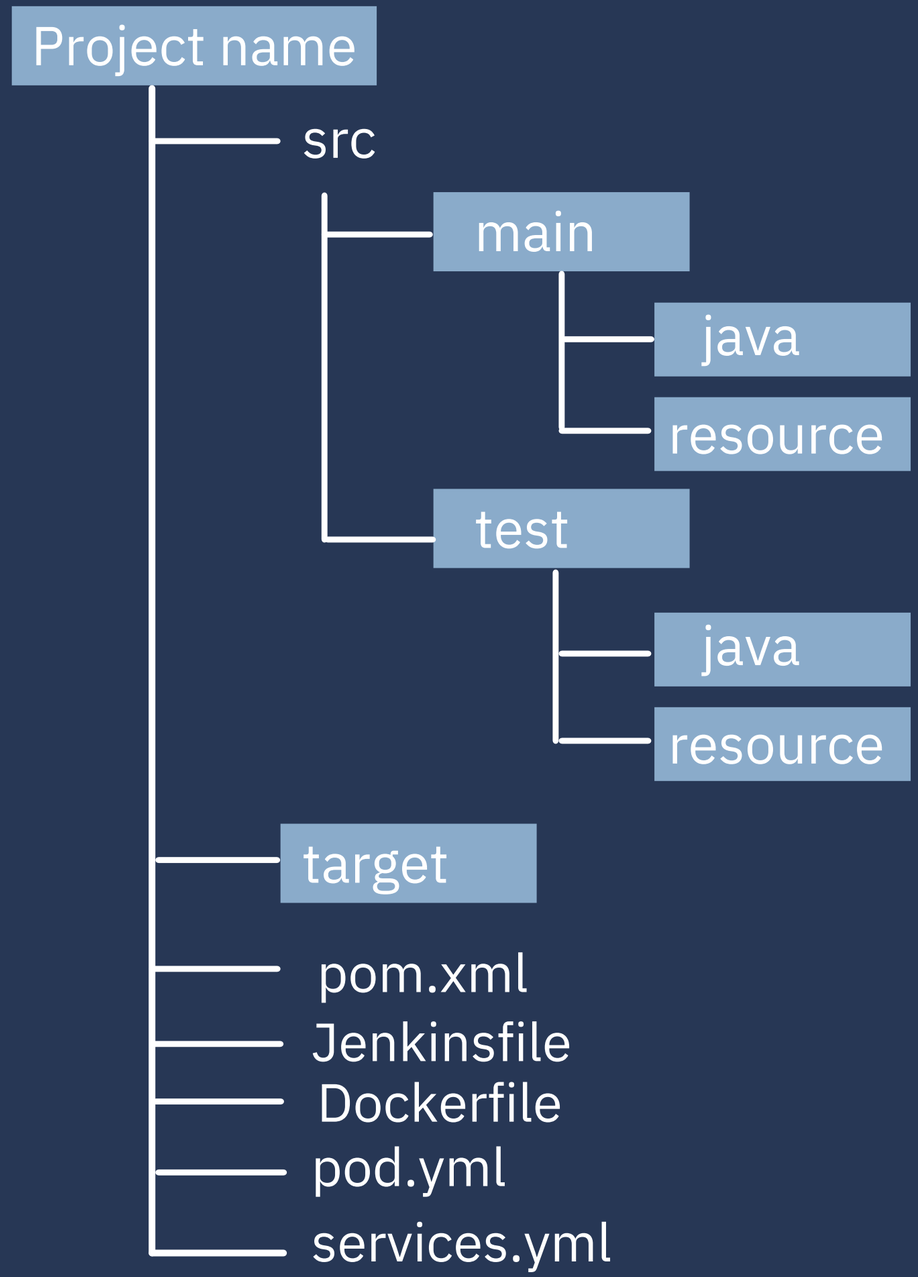
jenkins_installation .yml
Packages:
- jenkins

dbserver.yml
Packages:
- mysql

Java Based Maven Project Structure & GitHub

Git Branches

- Master / Production
  www.domain.com
- Staging
  www.stag.domain.com
- Development
  www.dev.domain.com



pod.yml

```
apiVersion: apps/v1
kind: Deployment
metadata:
    name: announcement-deployment
spec:
      replicas: 2
      strategy:
        type: Recreate
      selector:
        matchLabels:
            app: announce-app
      template:
            metadata:
              labels:
                app: announce-app
                env: prod
            spec:
             containers:
             - name: my-deployment-container
               image: rakesh1019/javahome:tagVersion
```

services.yml

```
apiVersion: v1
kind: Service
metadata:
      name: announcement-prod
spec:
    type: NodePort
    selector:
        app: announce-app
        env: prod
    ports:
     -  nodePort: 32412
        protocol: TCP
        port: 8080
        targetPort: 8080
```

DOCKER & KUBERNETES

http://localhost:32412

Dockerfile

```
FROM tomcat:8.5.47-jdk8-openjdk
COPY /target/myweb.war /usr/local/tomcat/webapps
EXPOSE 8080
CMD ["catalina.sh","run"]
```

Push

Pull

port : 32412

port : 8080

Tomcat Server

Docker Image Build

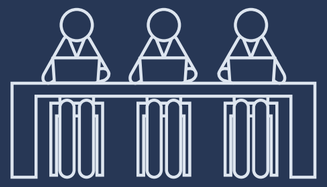
Docker Hub

Kubernetes

CI /CD PIPLINE (Jenkinsfile)

Pull Code

Push Code



Developers write Codes

Code Build

Docker Image Build
Using Dockerfile

Image Push

Docker Hub

Image Pull

Deploy
using
pod & service file

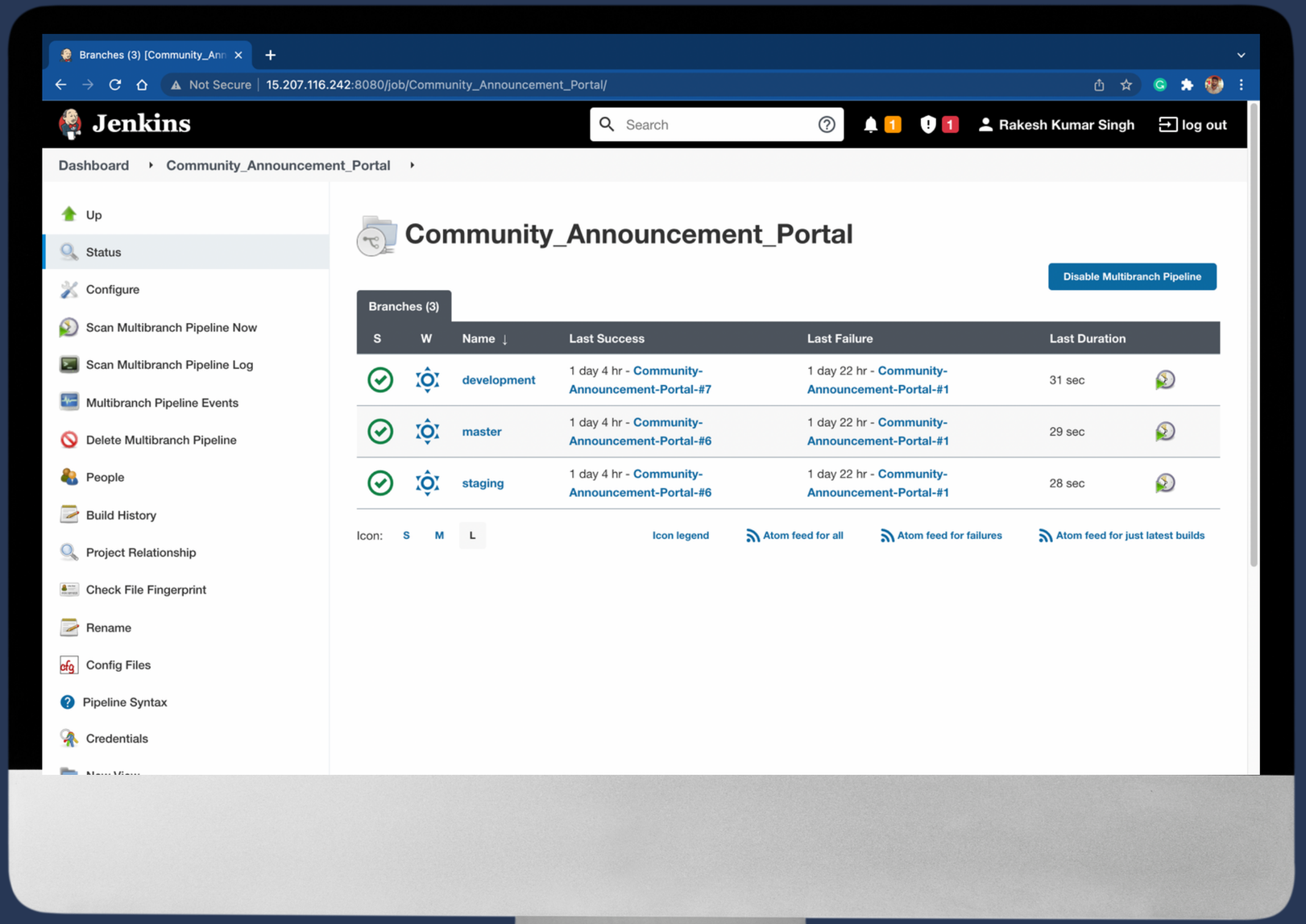
Tomcat server
inside K8's

Jenkins Multi Branch Pipeline

Master / Production
- www.domain.com

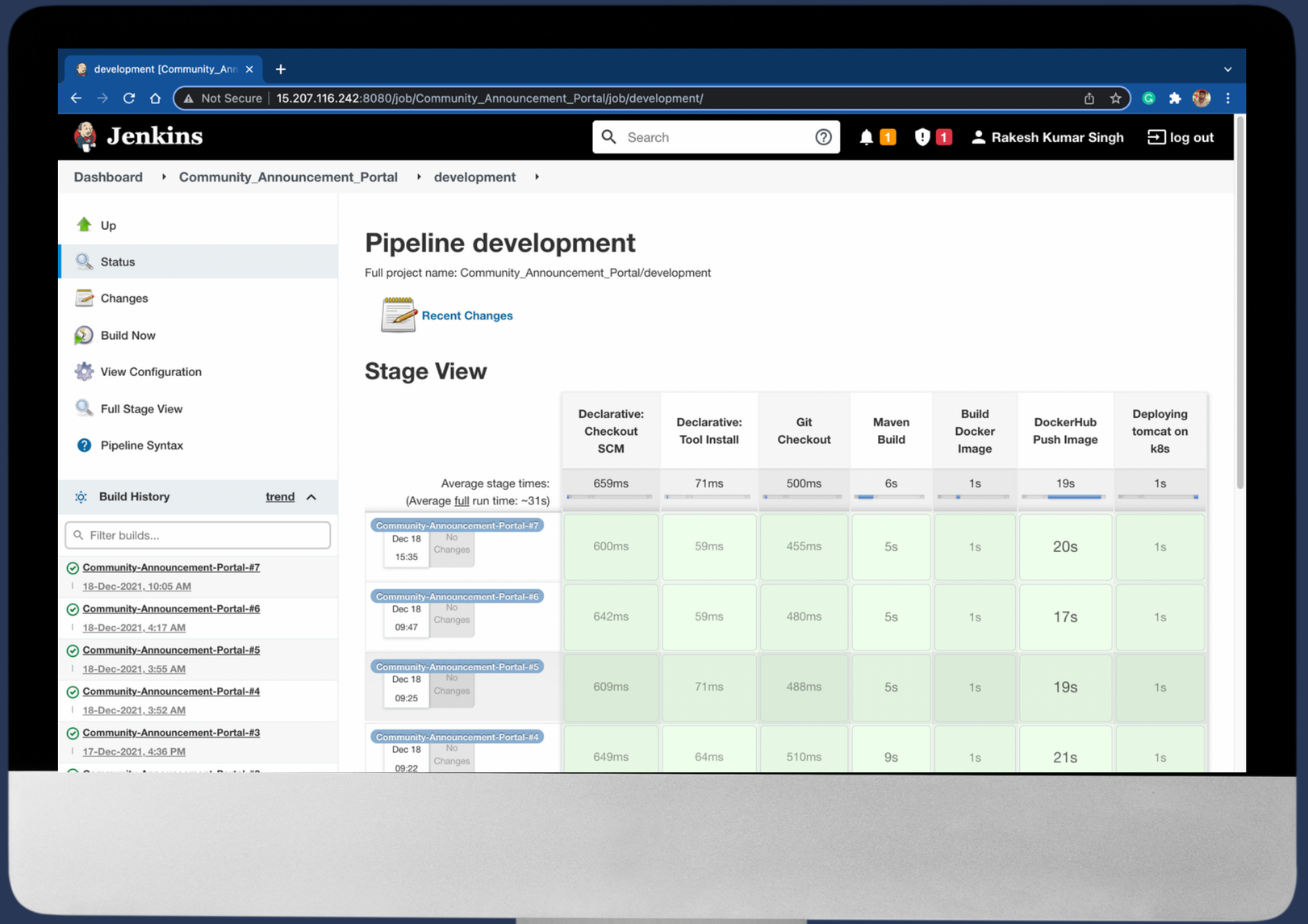
Staging
- www.stag.domain.com

Development
- www.dev.domain.com



Jenkins CI / CD Multi Branch Pipeline (Development) Stage View

www.dev.domian.com

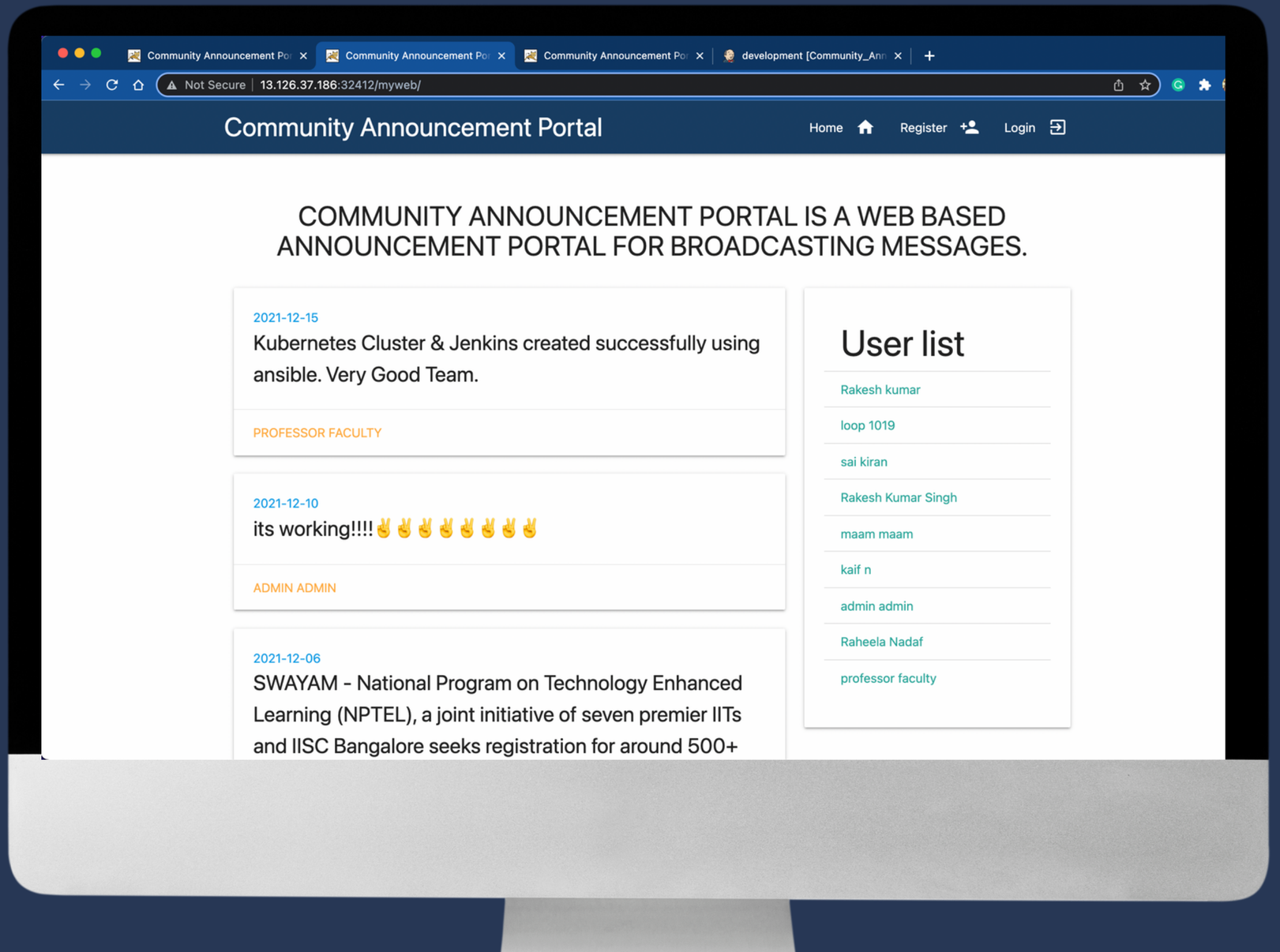


Development Environment Application

www.dev.domian.com

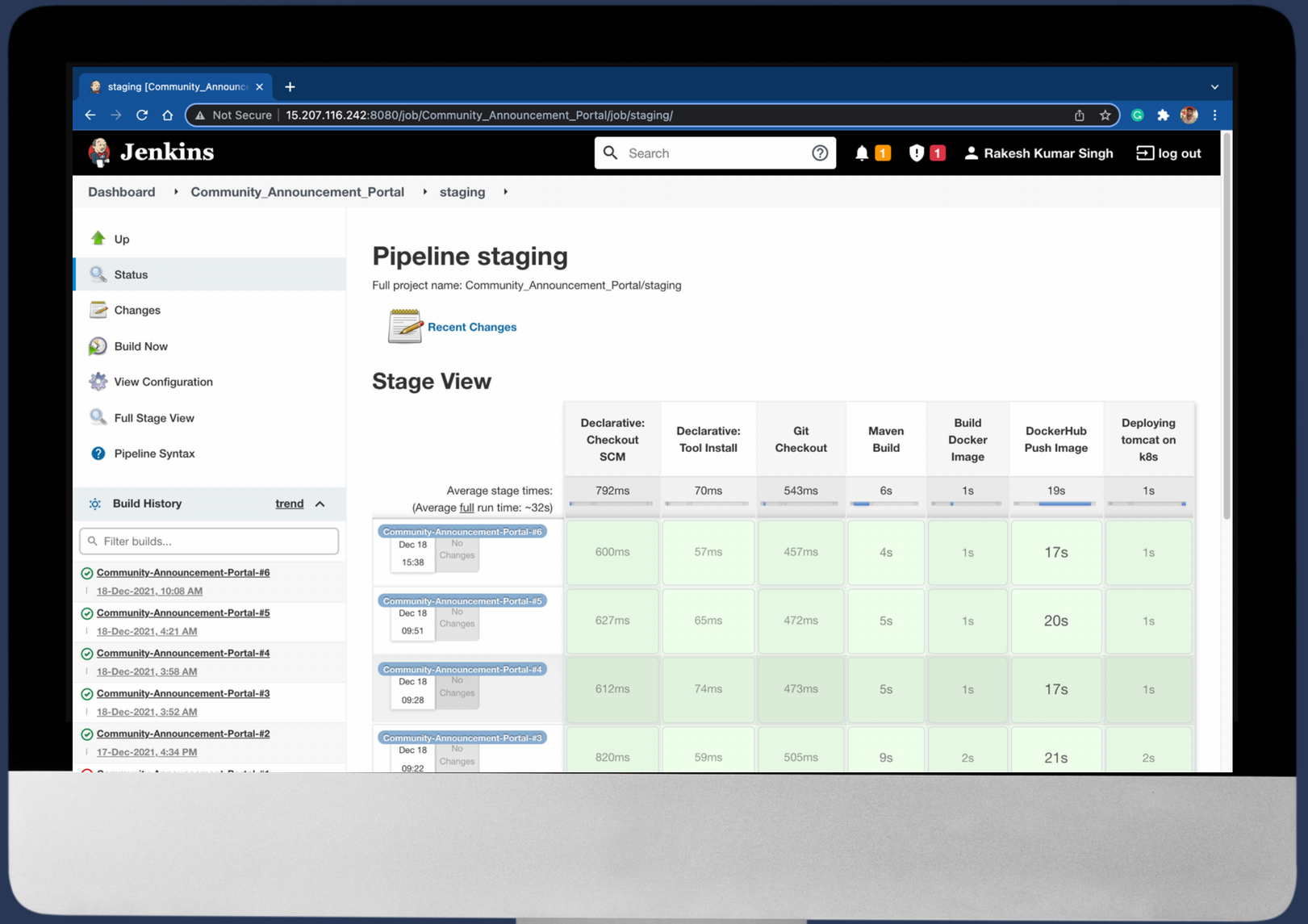
13.126.37.186:32412/myweb

Developers test their code here & learn how its looks & works in production Environment



Jenkins CI / CD Multi Branch Pipeline (Staging) Stage View

www.stag.domian.com

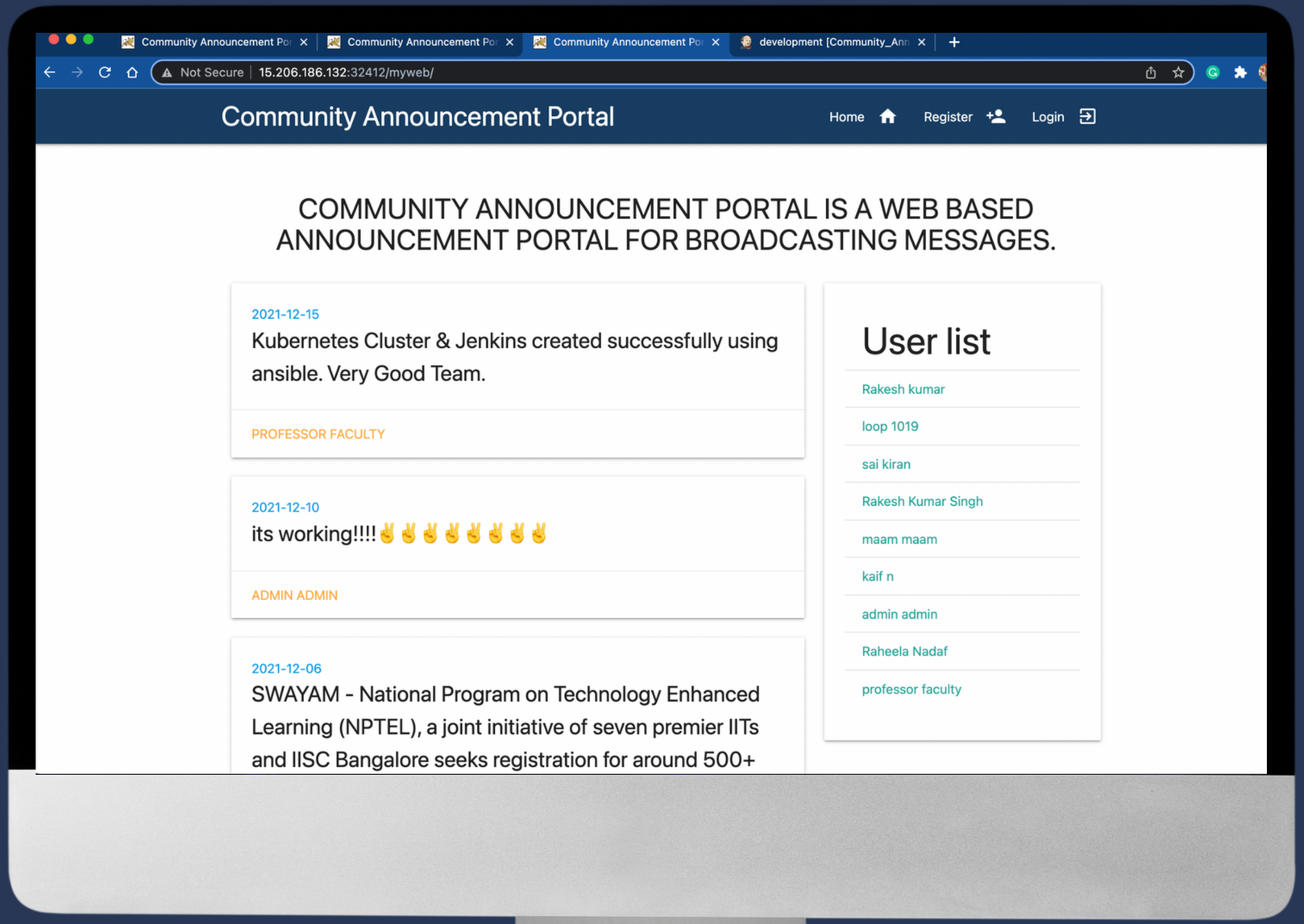


Staging Environment Application

www.stag.domian.com

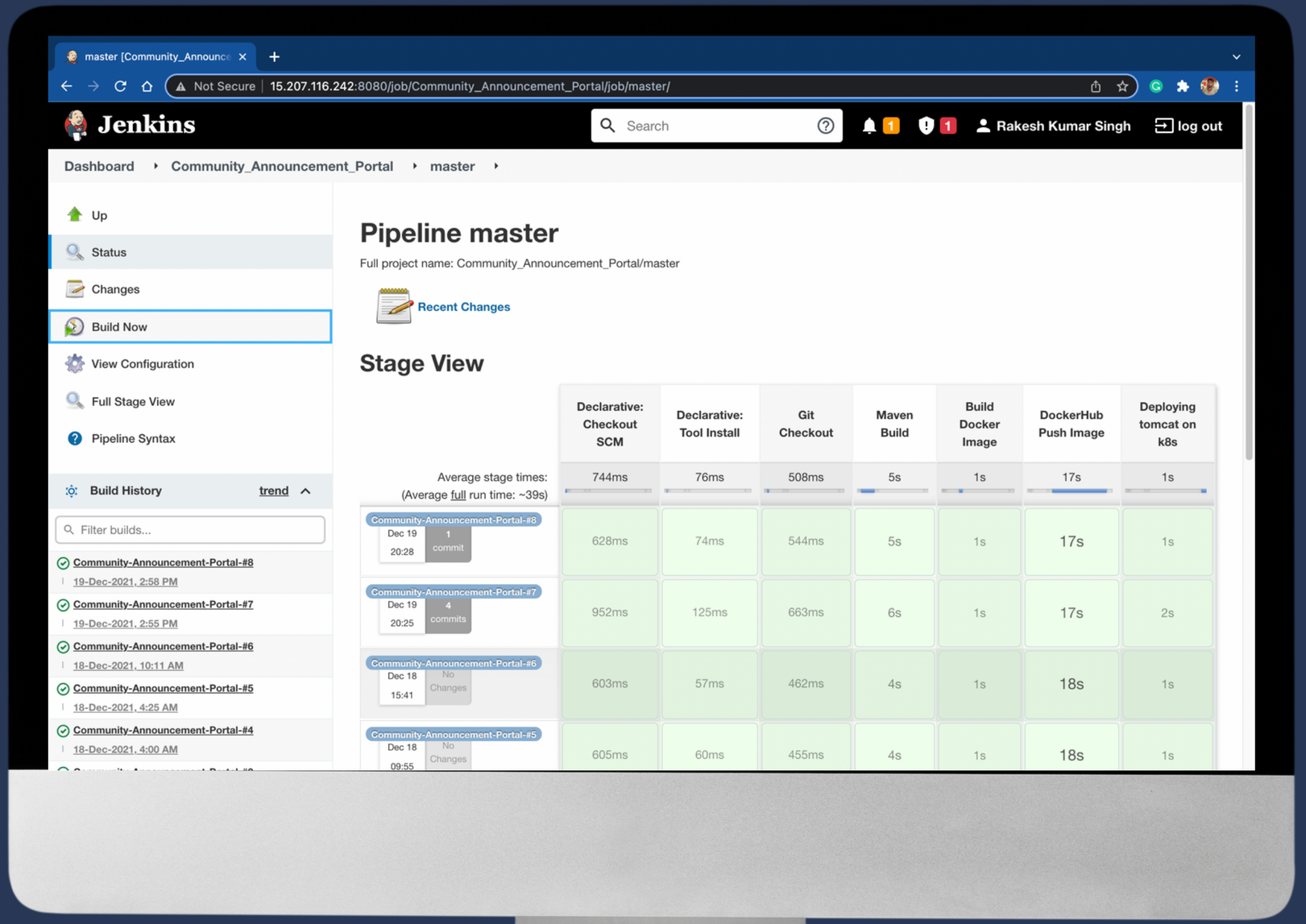
15.206.186.132:32412/myweb

QA team test developers code here & when all the bugs are removed then code will be merged to production



Jenkins CI / CD Multi Branch Pipeline (Master / Production) Stage View

www.domian.com

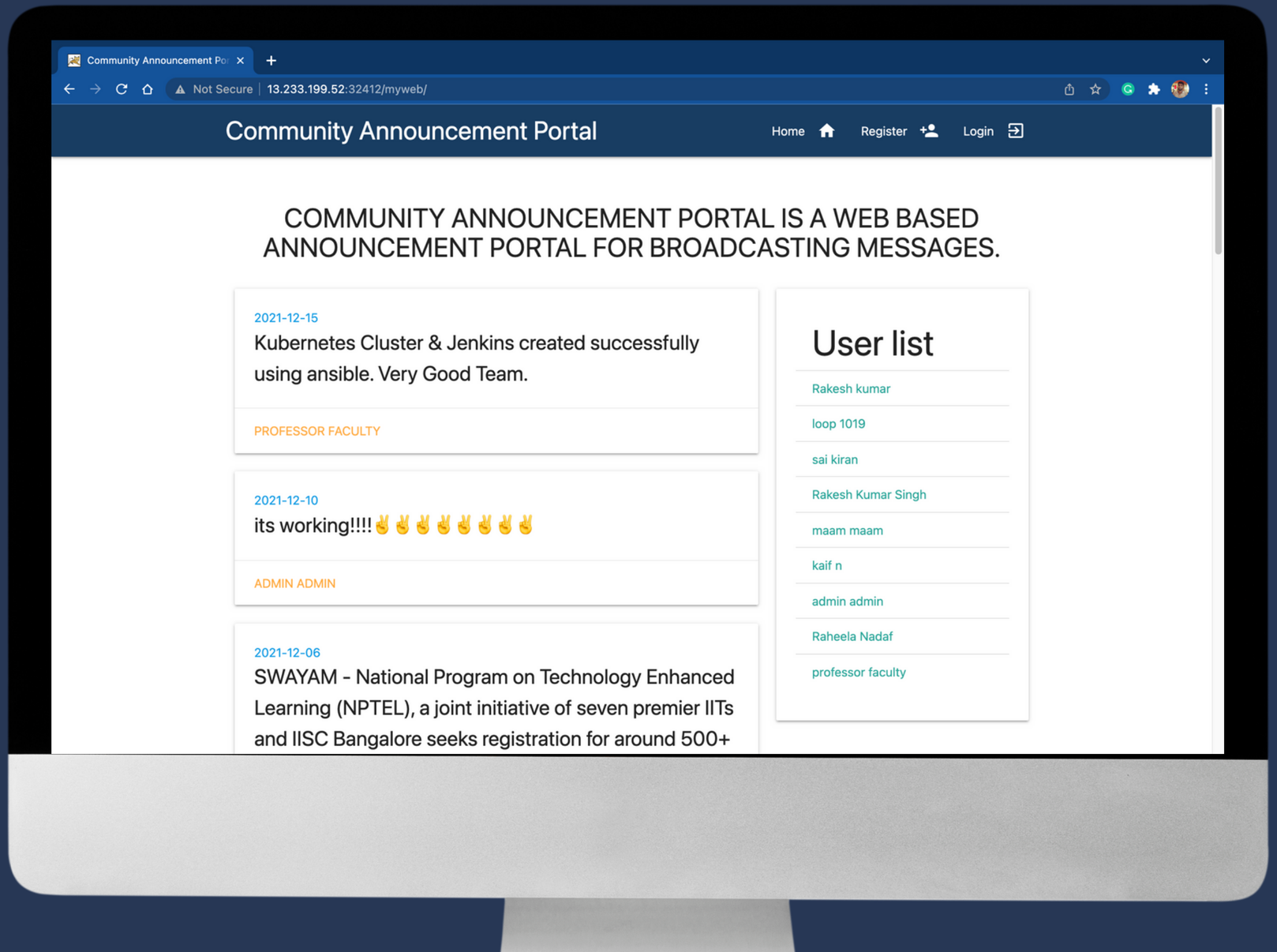


Production Environment Application

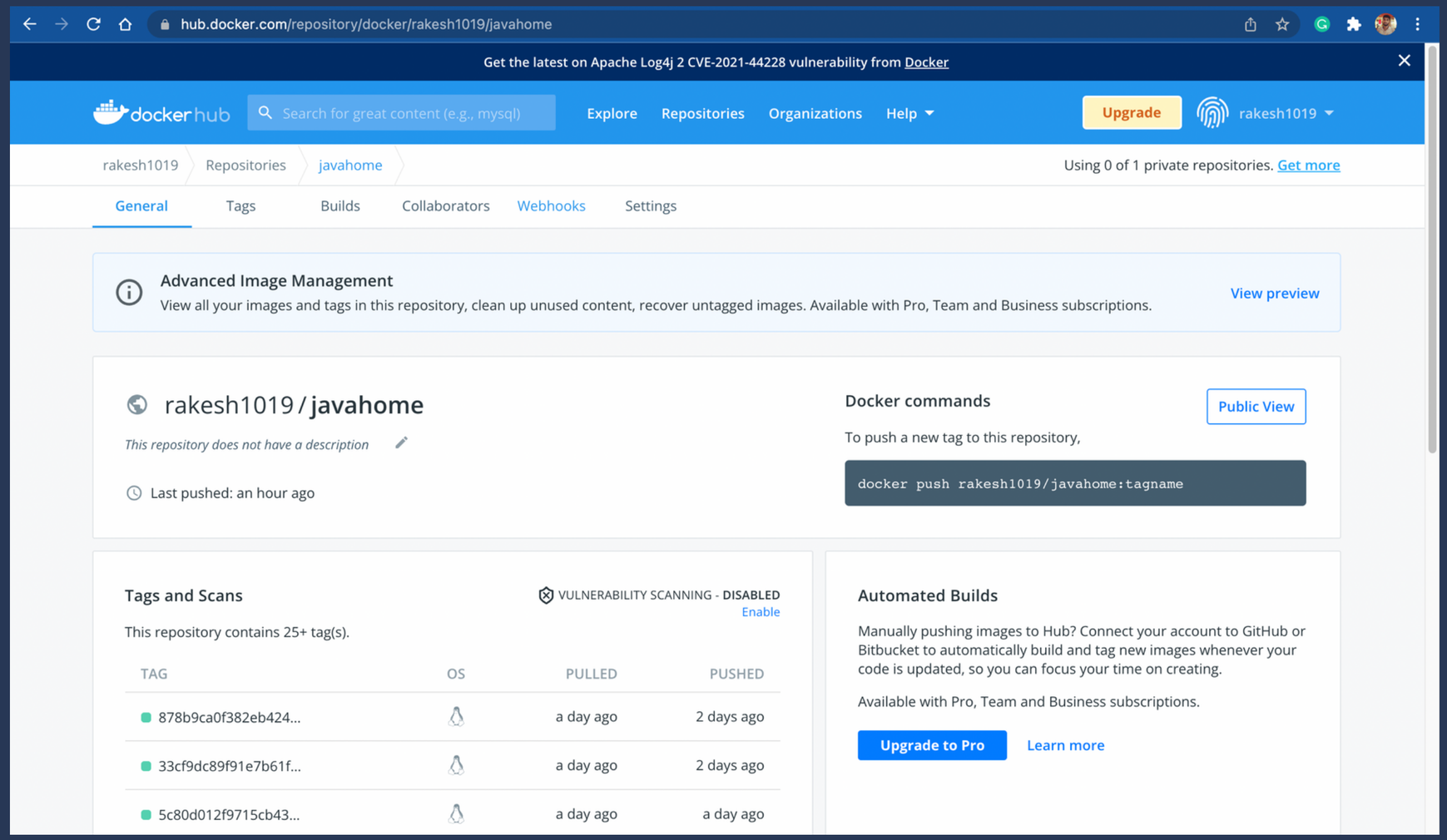
www.domian.com

13.233.199.52:32412/myweb

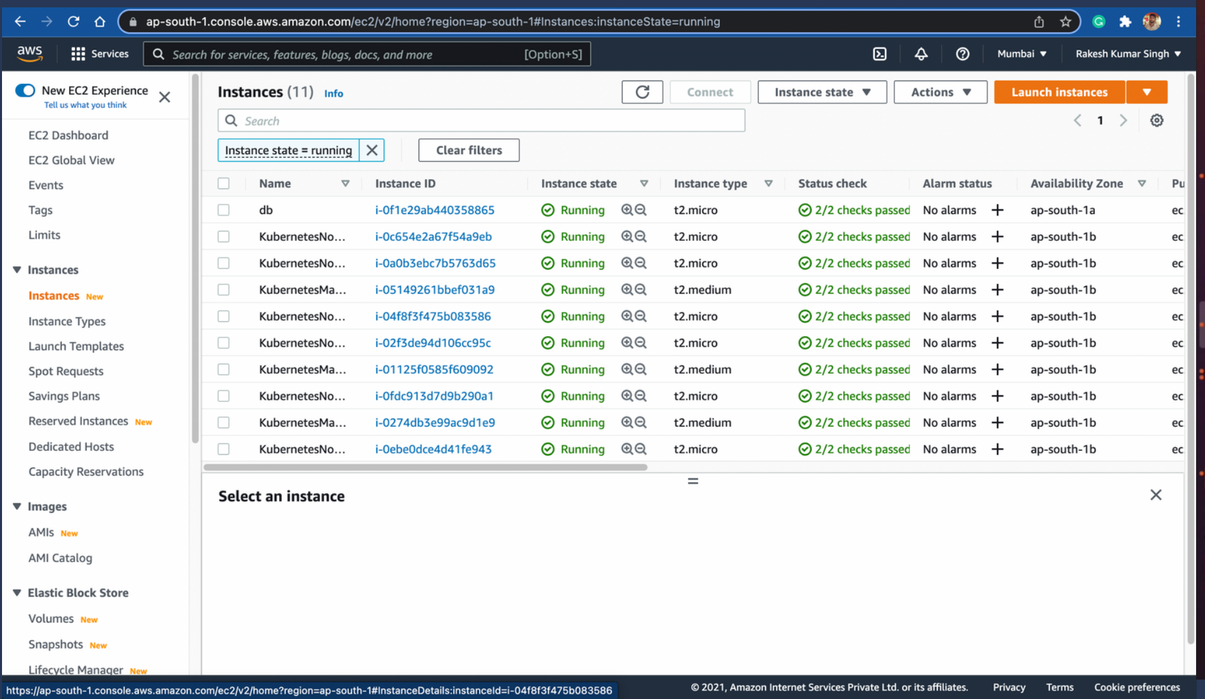
This environment will be available for public to use. before code reaching here its goes form dev & stag environment to ensure that
all feature is bug free & efficient.



Docker Hub
Image screenshots

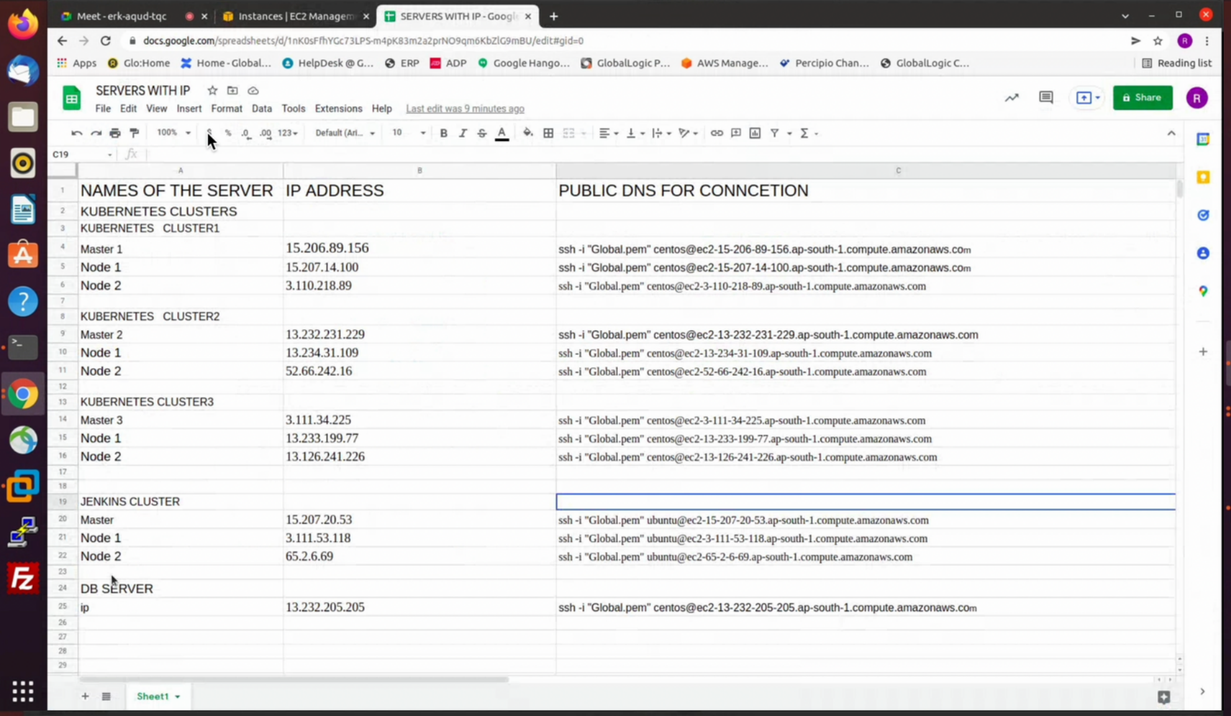


Terraform Execution Screenshots




```
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.

Enter a value: yes

aws_instance.k8Master[0]: Creating...
aws_instance.JenkinsMaster[2]: Creating...
aws_instance.JenkinsMaster[1]: Creating...
aws_instance.k8[1]: Creating...
aws_instance.dbserver[0]: Creating...
aws_db_instance.default: Creating...
aws_instance.JenkinsMaster[0]: Creating...
aws_instance.k8[2]: Creating...
aws_instance.k8Master[1]: Creating...
aws_instance.k8Master[2]: Creating...
aws_instance.k8Master[0]: Still creating... [10s elapsed]
aws_instance.dbserver[0]: Still creating... [10s elapsed]
aws_instance.JenkinsMaster[2]: Still creating... [10s elapsed]
aws_instance.JenkinsMaster[1]: Still creating... [10s elapsed]
aws_instance.k8[1]: Still creating... [10s elapsed]
aws_db_instance.default: Still creating... [10s elapsed]
aws_instance.JenkinsMaster[0]: Still creating... [10s elapsed]
aws_instance.k8[2]: Still creating... [10s elapsed]
aws_instance.k8Master[1]: Still creating... [10s elapsed]
aws_instance.k8Master[2]: Still creating... [10s elapsed]
```

```
aws_instance.k8Master[2]: Creation complete after 1m3s [id=i-05149261bbef031a9]
aws_instance.k8[4]: Creation complete after 33s [id=i-04f8f3f475b083586]
aws_instance.k8[3]: Creation complete after 33s [id=i-0a0b3ebc7b5763d65]
aws_db_instance.default: Still creating... [1m10s elapsed]
aws_instance.k8[5]: Still creating... [50s elapsed]
aws_instance.k8[0]: Still creating... [50s elapsed]
aws_instance.k8[5]: Creation complete after 53s [id=i-02f3de94d106cc95c]
aws_instance.k8[0]: Creation complete after 53s [id=i-0ebe0dce4d41fe943]
aws_db_instance.default: Still creating... [1m20s elapsed]
aws_db_instance.default: Still creating... [1m30s elapsed]
aws_db_instance.default: Still creating... [1m40s elapsed]
aws_db_instance.default: Still creating... [1m50s elapsed]
aws_db_instance.default: Still creating... [2m0s elapsed]
aws_db_instance.default: Still creating... [2m10s elapsed]
aws_db_instance.default: Still creating... [2m20s elapsed]
aws_db_instance.default: Still creating... [2m30s elapsed]
aws_db_instance.default: Still creating... [2m40s elapsed]
aws_db_instance.default: Still creating... [2m50s elapsed]
aws_db_instance.default: Still creating... [3m0s elapsed]
aws_db_instance.default: Still creating... [3m10s elapsed]
aws_db_instance.default: Still creating... [3m20s elapsed]
aws_db_instance.default: Still creating... [3m30s elapsed]
aws_db_instance.default: Creation complete after 3m36s [id=terraform-20211217055222573400000001]

Apply complete! Resources: 14 added, 0 changed, 0 destroyed.
```



SERVERS WITH IP

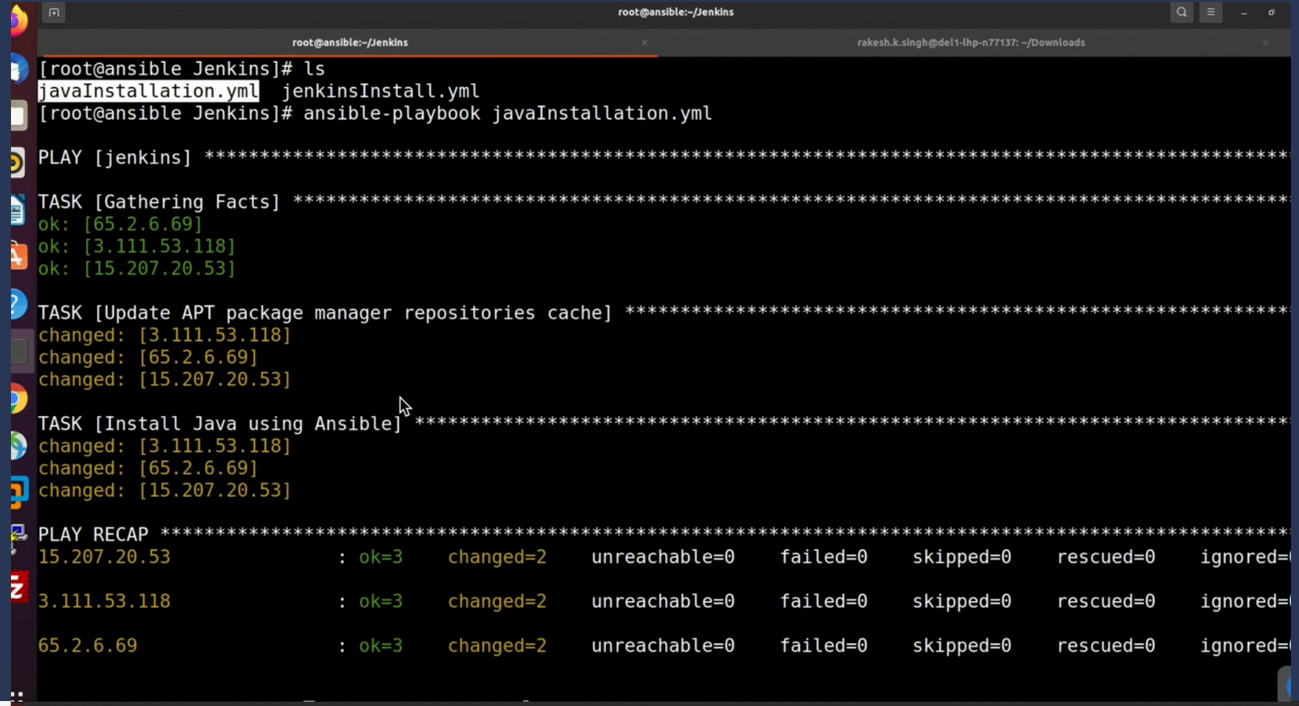
NAMES OF THE SERVER	IP ADDRESS	PUBLIC DNS FOR CONNCETION
KUBERNETES CLUSTERS		
KUBERNETES CLUSTER1		
Master 1	15.206.89.156	ssh -i "Global.pem" centos@ec2-15-206-89-156.ap-south-1.compute.amazonaws.com
Node 1	15.207.14.100	ssh -i "Global.pem" centos@ec2-15-207-14-100.ap-south-1.compute.amazonaws.com
Node 2	3.110.218.89	ssh -i "Global.pem" centos@ec2-3-110-218-89.ap-south-1.compute.amazonaws.com
KUBERNETES CLUSTER2		
Master 2	13.232.231.229	ssh -i "Global.pem" centos@ec2-13-232-231-229.ap-south-1.compute.amazonaws.com
Node 1	13.234.31.109	ssh -i "Global.pem" centos@ec2-13-234-31-109.ap-south-1.compute.amazonaws.com
Node 2	52.66.242.16	ssh -i "Global.pem" centos@ec2-52-66-242-16.ap-south-1.compute.amazonaws.com
KUBERNETES CLUSTER3		
Master 3	3.111.34.225	ssh -i "Global.pem" centos@ec2-3-111-34-225.ap-south-1.compute.amazonaws.com
Node 1	13.233.199.77	ssh -i "Global.pem" centos@ec2-13-233-199-77.ap-south-1.compute.amazonaws.com
Node 2	13.126.241.226	ssh -i "Global.pem" centos@ec2-13-126-241-226.ap-south-1.compute.amazonaws.com
JENKINS CLUSTER		
Master	15.207.20.53	ssh -i "Global.pem" ubuntu@ec2-15-207-20-53.ap-south-1.compute.amazonaws.com
Node 1	3.111.53.118	ssh -i "Global.pem" ubuntu@ec2-3-111-53-118.ap-south-1.compute.amazonaws.com
Node 2	65.2.6.69	ssh -i "Global.pem" ubuntu@ec2-65-2-6-69.ap-south-1.compute.amazonaws.com
DB SERVER		
ip	13.232.205.205	ssh -i "Global.pem" centos@ec2-13-232-205-205.ap-south-1.compute.amazonaws.com

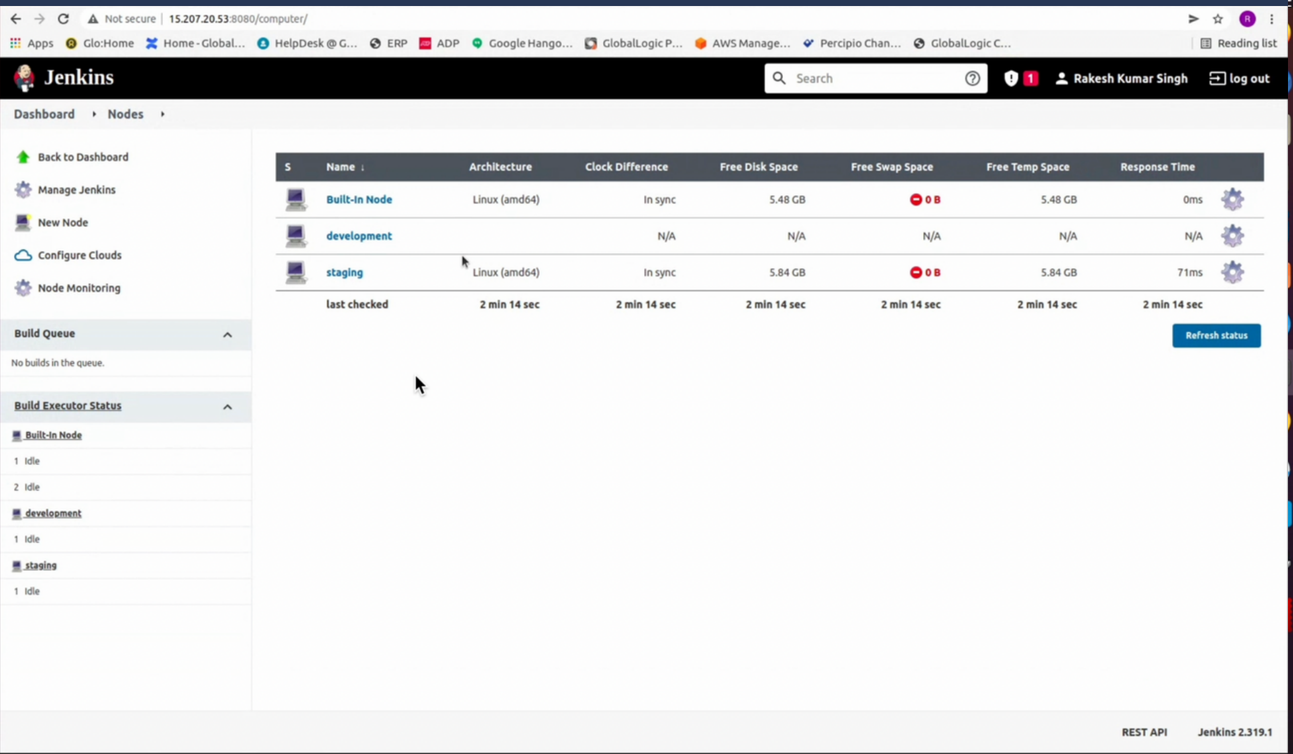
```
root@ansible:~/ansible-k8s-setup
[root@ansible ansible-k8s-setup]# ls
ansible.cfg  hosts  k8s-master.yml  k8s-pkg.yml  k8s-workers.yml  README.md  terraform.tfstate
[root@ansible ansible-k8s-setup]# ansible-playbook k8s-workers.yml

PLAY [masters] *****************************************************************

TASK [get join command] ********************************************************
changed: [3.111.34.225]

TASK [set join command] ********************************************************
ok: [3.111.34.225]

PLAY [workers] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [13.126.241.226]
ok: [13.233.199.77]

TASK [join cluster] ************************************************************
changed: [13.126.241.226]
changed: [13.233.199.77]

PLAY RECAP *********************************************************************
13.126.241.226             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ig

13.233.199.77              : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ig

3.111.34.225               : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ig


[root@ansible ansible-k8s-setup]#
```

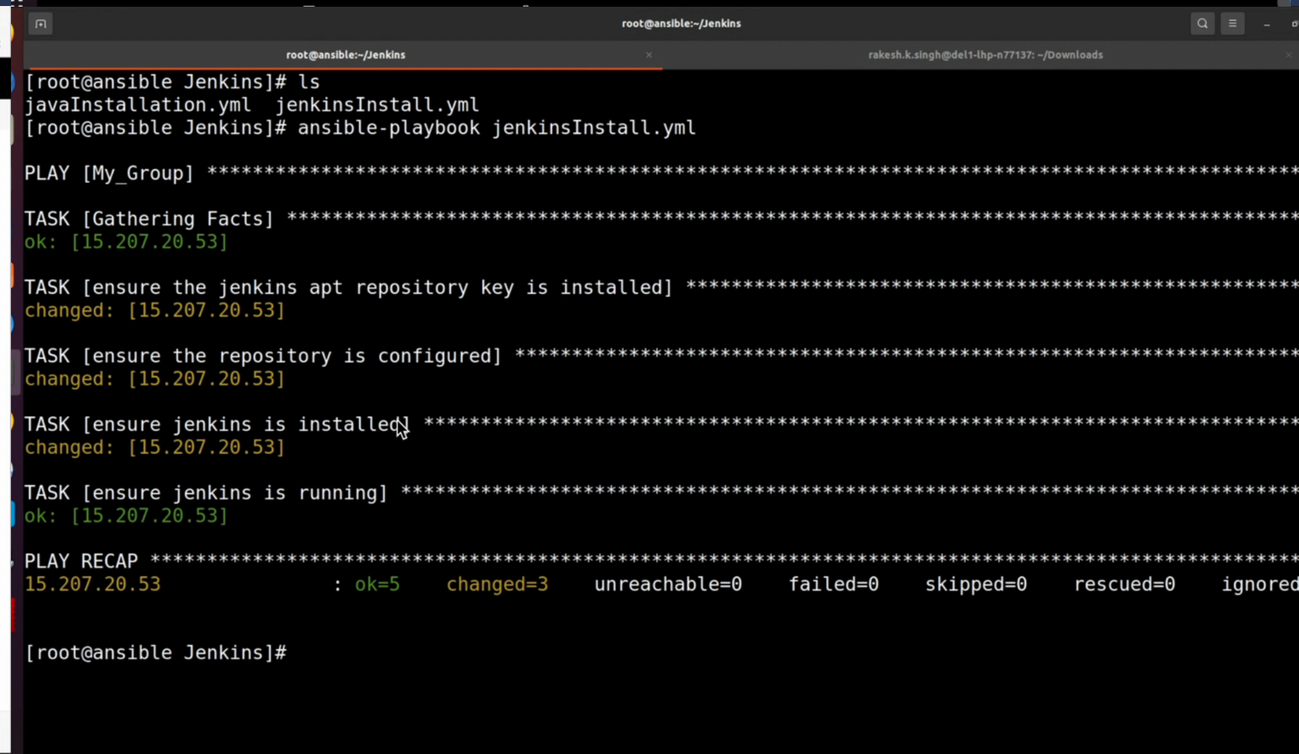
```
root@ansible:~/ansible-k8s-setup
root@ansible:~/ansible-k8s-setup                rakesh.k.singh@del1-lhp-n77137: ~/Downloads

TASK [Gathering Facts] *********************************************************
ok: [15.206.89.156]

TASK [install kubectl] *********************************************************
changed: [15.206.89.156]

PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [15.206.89.156]
ok: [3.110.218.89]
ok: [15.207.14.100]

TASK [reboot ALL machines] *****************************************************
changed: [15.206.89.156]
changed: [3.110.218.89]
changed: [15.207.14.100]

PLAY RECAP *********************************************************************
15.206.89.156              : ok=17   changed=13   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

15.207.14.100              : ok=15   changed=12   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

3.110.218.89               : ok=15   changed=12   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0


[root@ansible ansible-k8s-setup]# ls
ansible.cfg  hosts  k8s-master.yml  k8s-pkg.yml  k8s-workers.yml  README.md  terraform.tfstate
[root@ansible ansible-k8s-setup]#
```

```
root@ansible:~/ansible-k8s-setup
root@ansible:~/ansible-k8s-setup                rakesh.k.singh@del1-lhp-n77137: ~/Downloads
[root@ansible ansible-k8s-setup]# ls
ansible.cfg  hosts  k8s-master.yml  k8s-pkg.yml  k8s-workers.yml  README.md  terraform.tfstate
[root@ansible ansible-k8s-setup]# ansible-playbook k8s-master.yml

PLAY [masters] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [3.111.34.225]

TASK [initialize K8S cluster] **************************************************
changed: [3.111.34.225]

TASK [create .kube directory] **************************************************
changed: [3.111.34.225]

TASK [copy admin.conf to user's kube config] ***********************************
changed: [3.111.34.225]

TASK [install Pod network] *****************************************************
changed: [3.111.34.225]

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

[root@ansible ansible-k8s-setup]#
```

Java & Jenkins Installation Screenshots





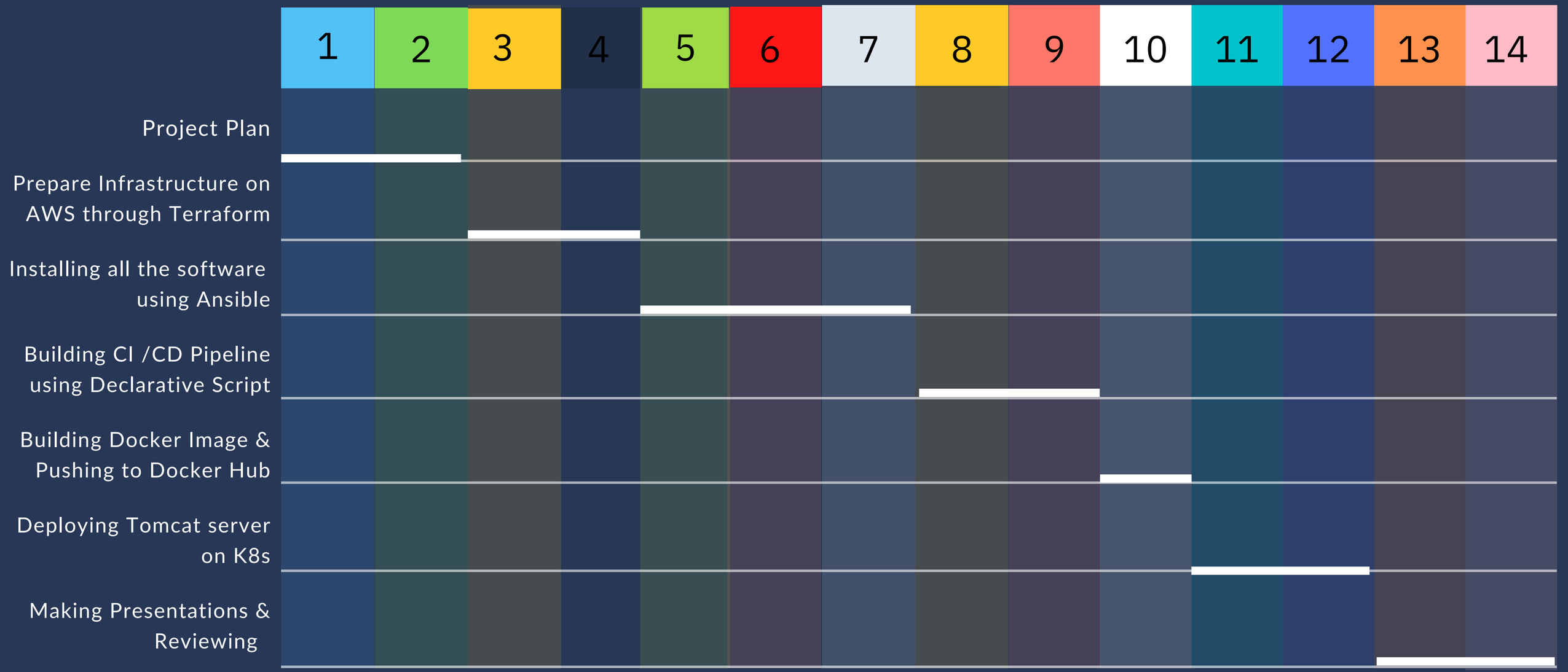


To promotes a culture of shared responsibility, enhanced communication, transparency, flexibility and faster feedback.

Future Developments

- improve security.
- Better communication and cooperation.
- Faster development & deployment
- Fewer mistakes
- Lower costs

Gantt Chart


1
2
3
4
5
6
7
8
9
10
11
12
13
14
Project Plan
Prepare Infrastructure on AWS through Terraform
Installing all the software using Ansible
Building CI /CD Pipeline using Declarative Script
Building Docker Image & Pushing to Docker Hub
Deploying Tomcat server on K8s
Making Presentations & Reviewing

Contact Us

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Github

https://github.com/rakeshkumar1019/java-jsp-diary.git

Thank you!

Any Questions ?