Problem Statement -

Setup a CI/CD pipeline using the tools your choice(or preferably the mentioned tools).

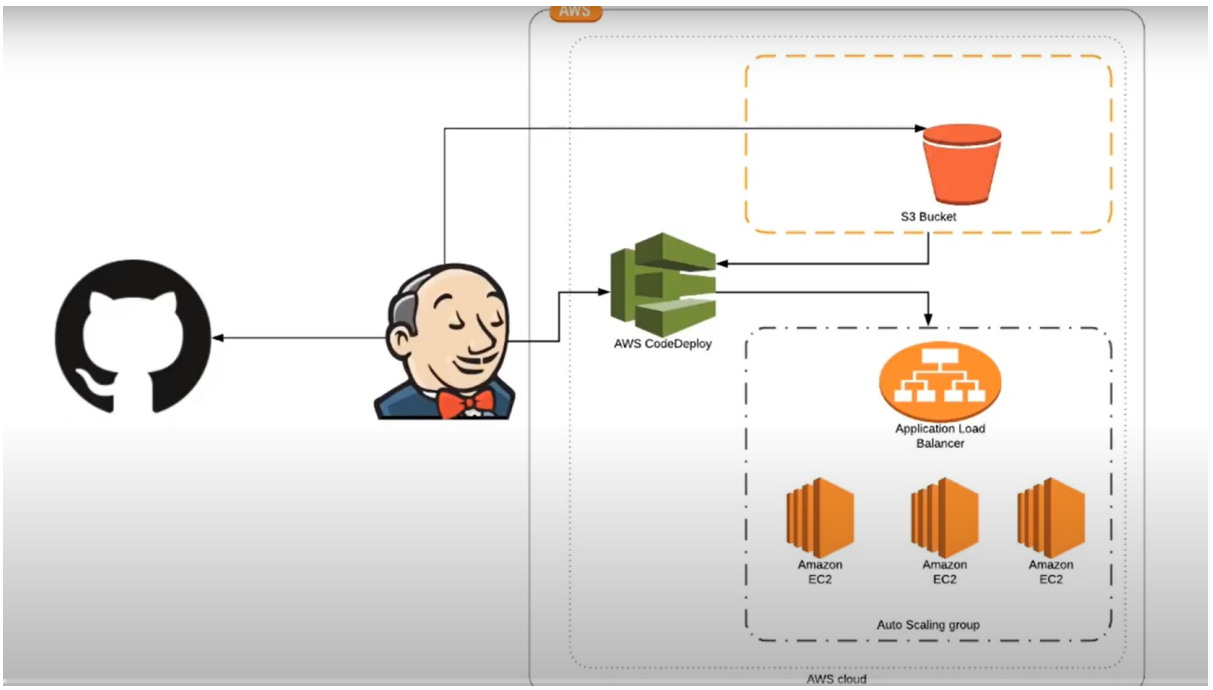
1. It should deploy a simple web application to a server on a code push to a repository.
2. The deployed web application should be reachable on any web browser.
3. Make it scalable such that when load increases the number of servers scale up and down making sure the new servers have the updated code.

Additional requirements

1. Setup to be done using AWS, Jenkins, CodeDeploy
2. Jenkins should not be on the same server as the application being deployed to

Tools 1. Jenkins 2. Git/Bitbucket 3. AWS EC2 4. AWS CodeDeploy

Solution -

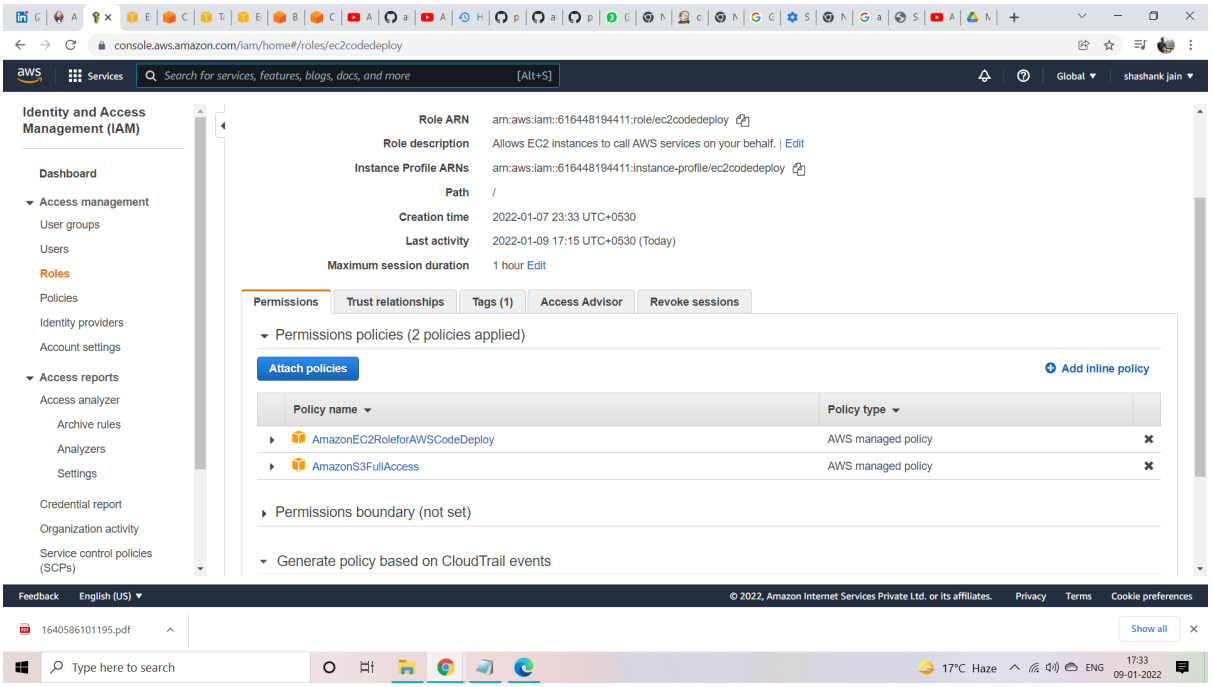


Step 1 - Create Two IAM roles as -

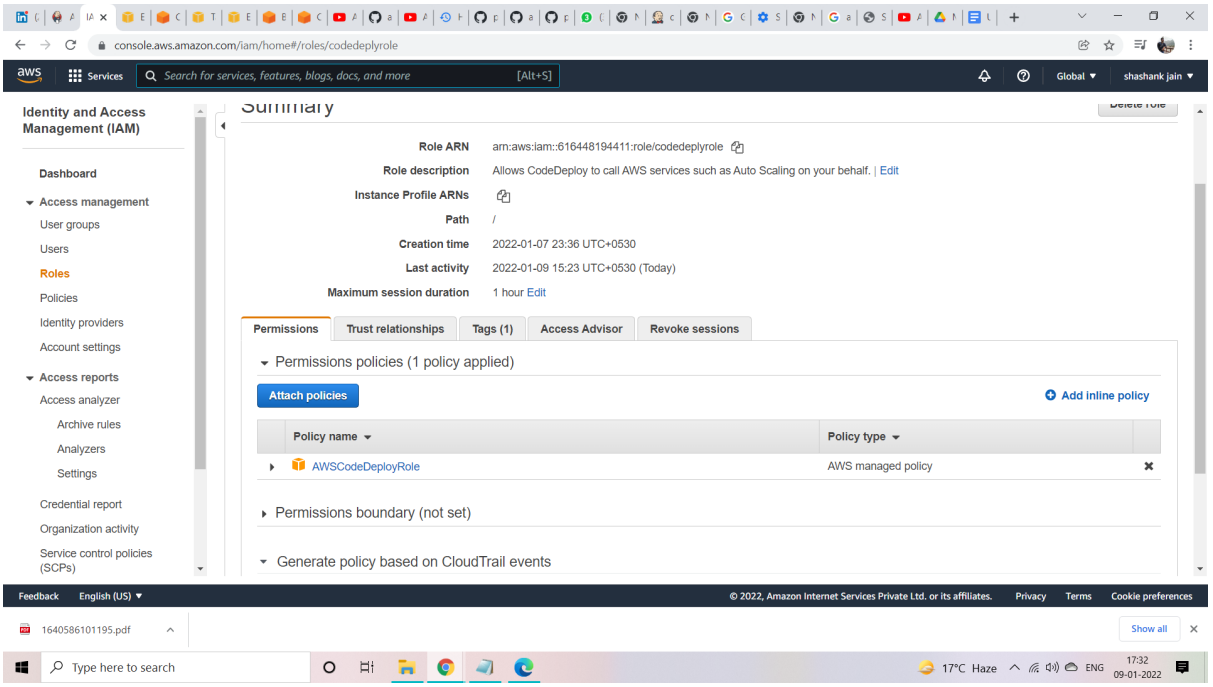
1. In first provide AmazonEC2RoleforAWSCodeDeploy and AmazonS3FullAccess
2. In second provide codedeplyrole role.

This roles will be used further.

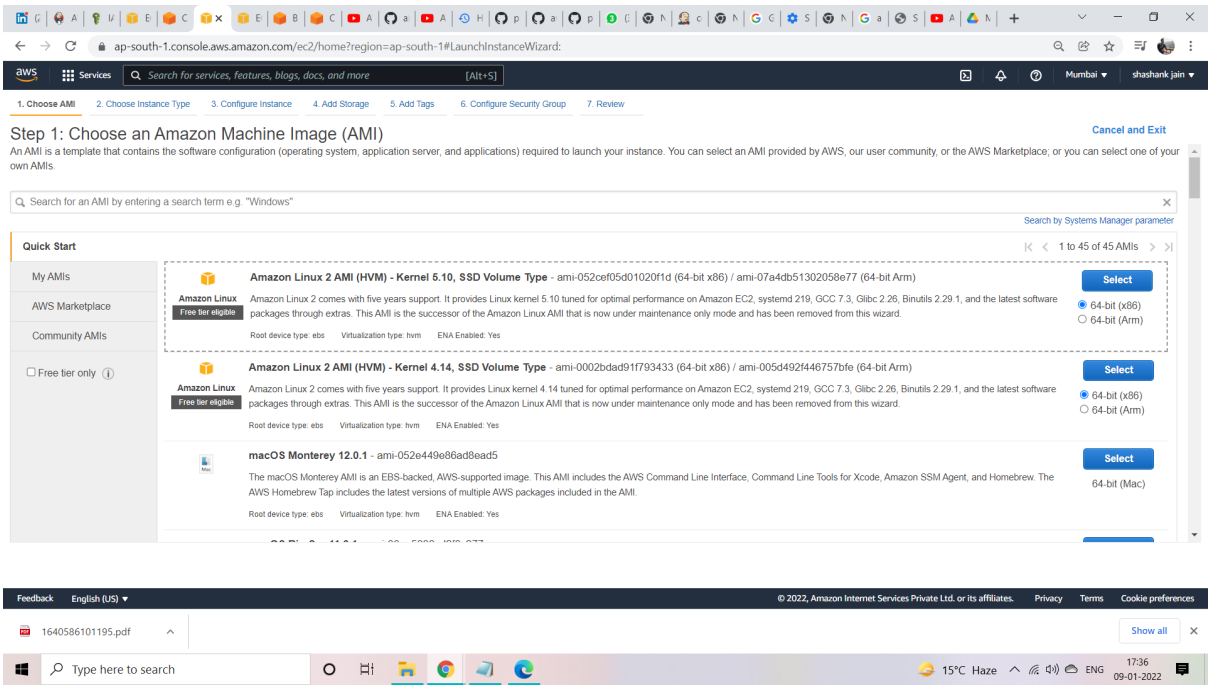
1.

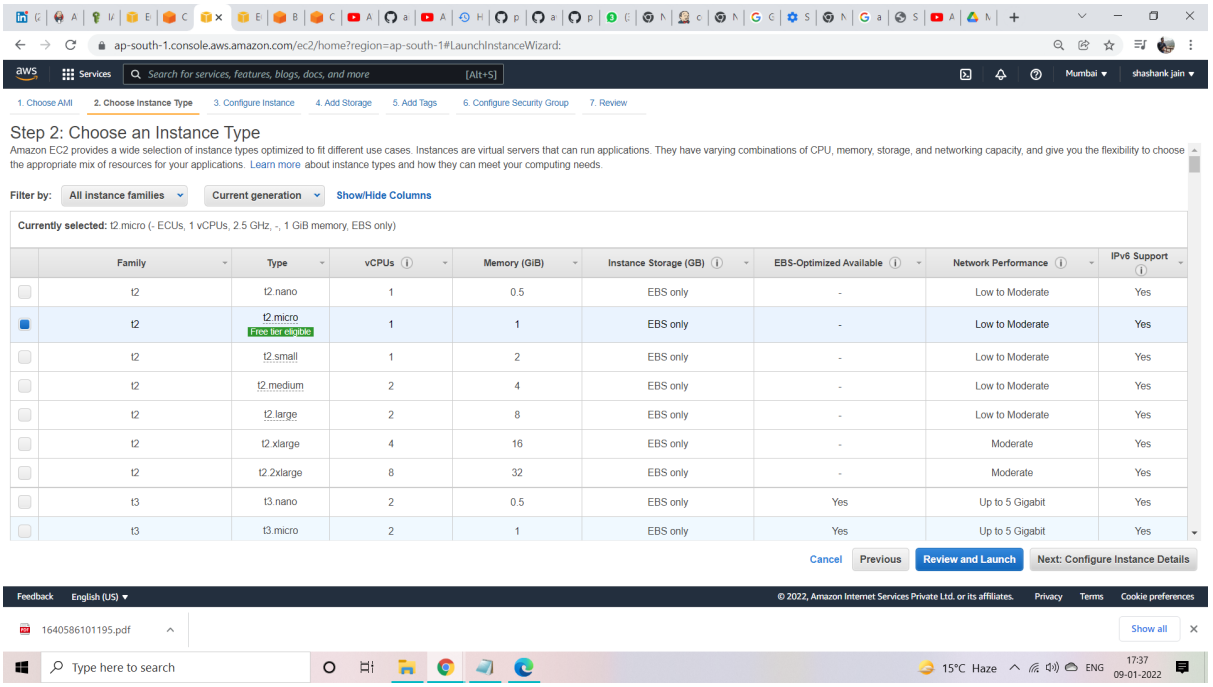


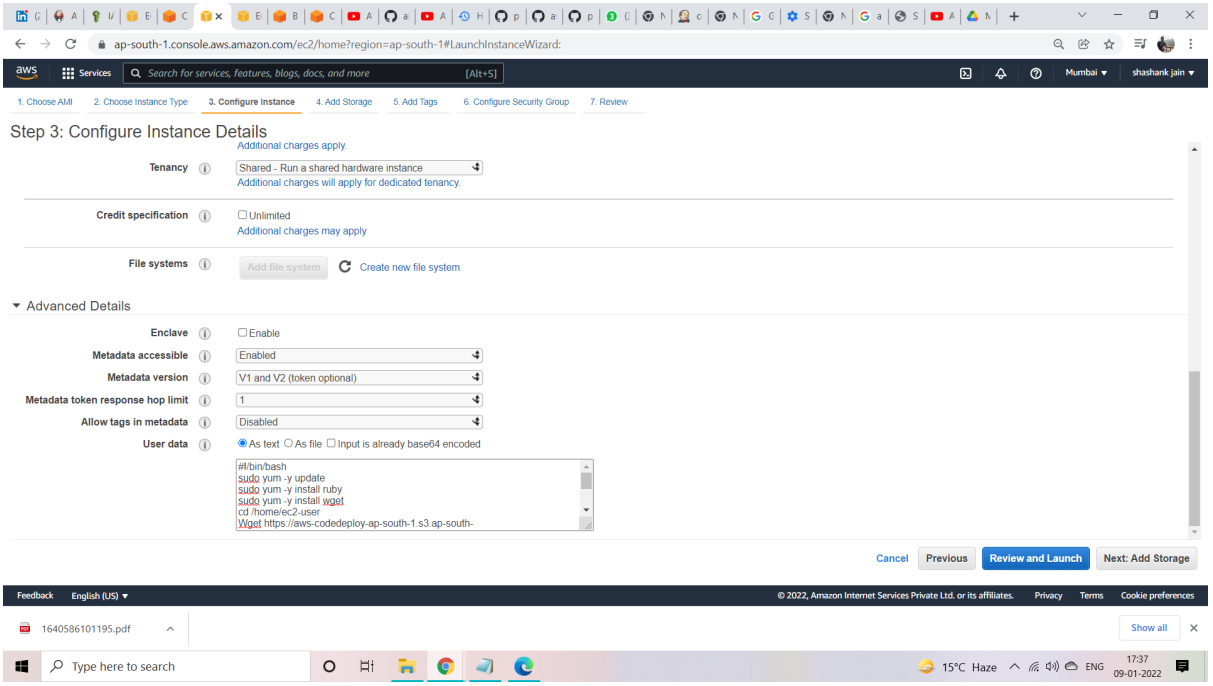
2.



Step 2 - Create 4 ec2 instances and put user data in it -






ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#LaunchInstanceWizard:
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
shashank jain
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 3: Configure Instance Details
Additional charges apply.
Tenancy
Shared - Run a shared hardware instance
Additional charges will apply for dedicated tenancy.
Credit specification
Unlimited
Additional charges may apply
File systems
Add file system
Create new file system
Advanced Details
Enclave
Enable
Metadata accessible
Enabled
Metadata version
V1 and V2 (token optional)
Metadata token response hop limit
1
Allow tags in metadata
Disabled
User data
As text
As file
Input is already base64 encoded
#!/bin/bash
sudo yum -y update
sudo yum -y install ruby
sudo yum -y install wget
cd /home/ec2-user
Wget https://aws-codedeploy-ap-south-1.s3.ap-south-
Cancel
Previous
Review and Launch
Next: Add Storage
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences
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Show all
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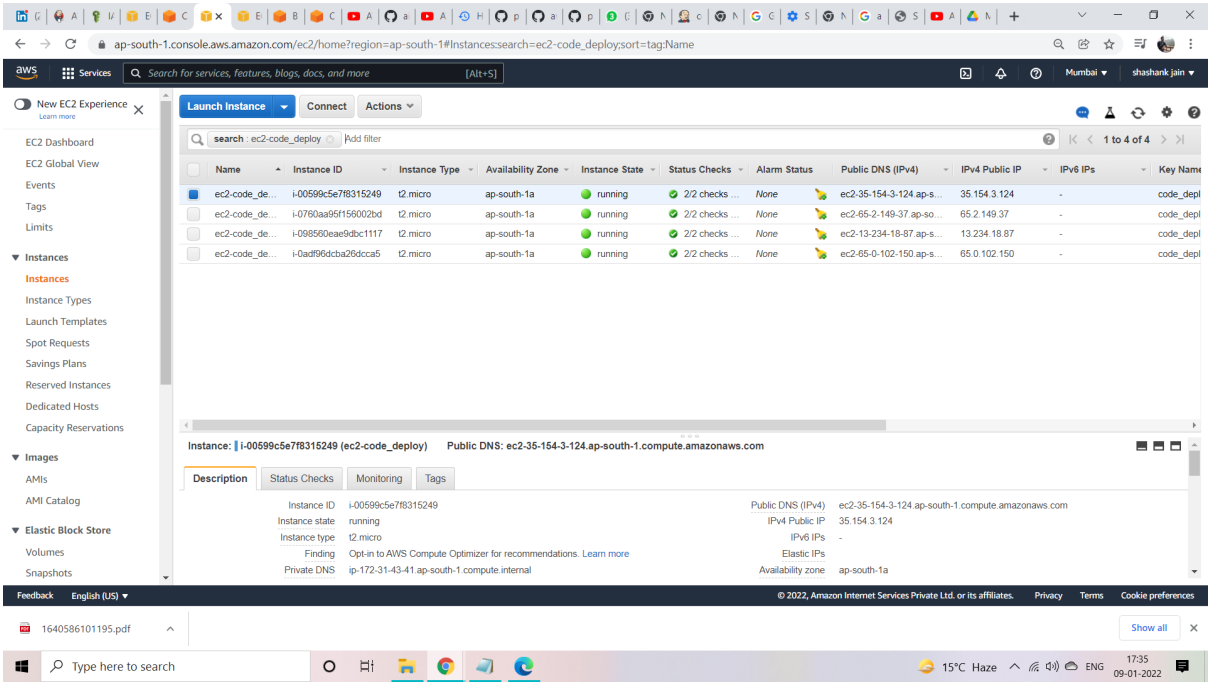
ENG
17:37
09-01-2022


ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Instances:search=ec2-code_deploy;sort=tag:Name
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
shashank jain
New EC2 Experience
Learn more
EC2 Dashboard
EC2 Global View
Events
Tags
Limits
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Launch Instance
Connect
Actions
search : ec2-code_deploy
Add filter
1 to 4 of 4
Name
Instance ID
Instance Type
Availability Zone
Instance State
Status Checks
Alarm Status
Public DNS (IPv4)
IPv4 Public IP
IPv6 IPs
Key Name
ec2-code_de... i-00599c5e7f8315249 t2.micro ap-south-1a running 2/2 checks ... None ec2-35-154-3-124.ap-s... 35.154.3.124 - code_depl
ec2-code_de... i-0760aa95f156002bd t2.micro ap-south-1a running 2/2 checks ... None ec2-65-2-149-37.ap-so... 65.2.149.37 - code_depl
ec2-code_de... i-098560eae9dbc1117 t2.micro ap-south-1a running 2/2 checks ... None ec2-13-234-18-87.ap-s... 13.234.18.87 - code_depl
ec2-code_de... i-0adf96dcba26dcca5 t2.micro ap-south-1a running 2/2 checks ... None ec2-65-0-102-150.ap-s... 65.0.102.150 - code_depl
Instance: i-00599c5e7f8315249 (ec2-code_deploy) Public DNS: ec2-35-154-3-124.ap-south-1.compute.amazonaws.com
Description
Status Checks
Monitoring
Tags
Instance ID i-00599c5e7f8315249
Instance state running
Instance type t2.micro
Finding Opt-in to AWS Compute Optimizer for recommendations. Learn more
Private DNS ip-172-31-43-41.ap-south-1.compute.internal
Public DNS (IPv4) ec2-35-154-3-124.ap-south-1.compute.amazonaws.com
IPv4 Public IP 35.154.3.124
IPv6 IPs -
Elastic IPs
Availability zone ap-south-1a
Feedback
English (US)
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Terms
Cookie preferences
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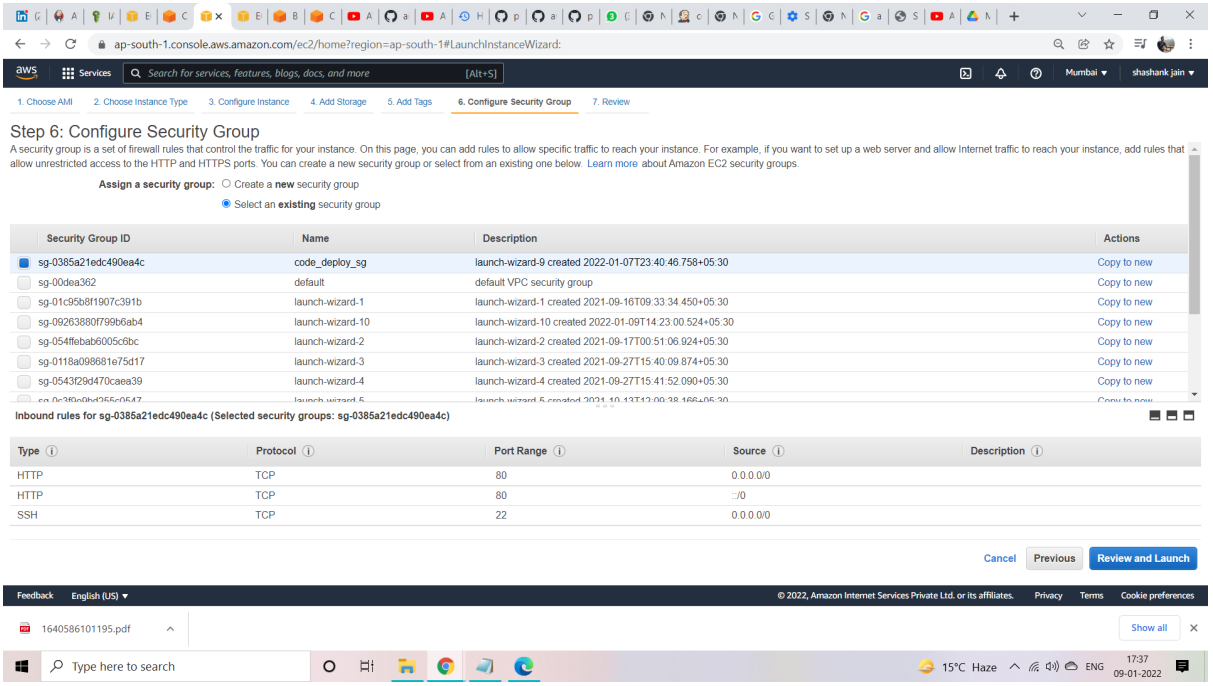
09-01-2022

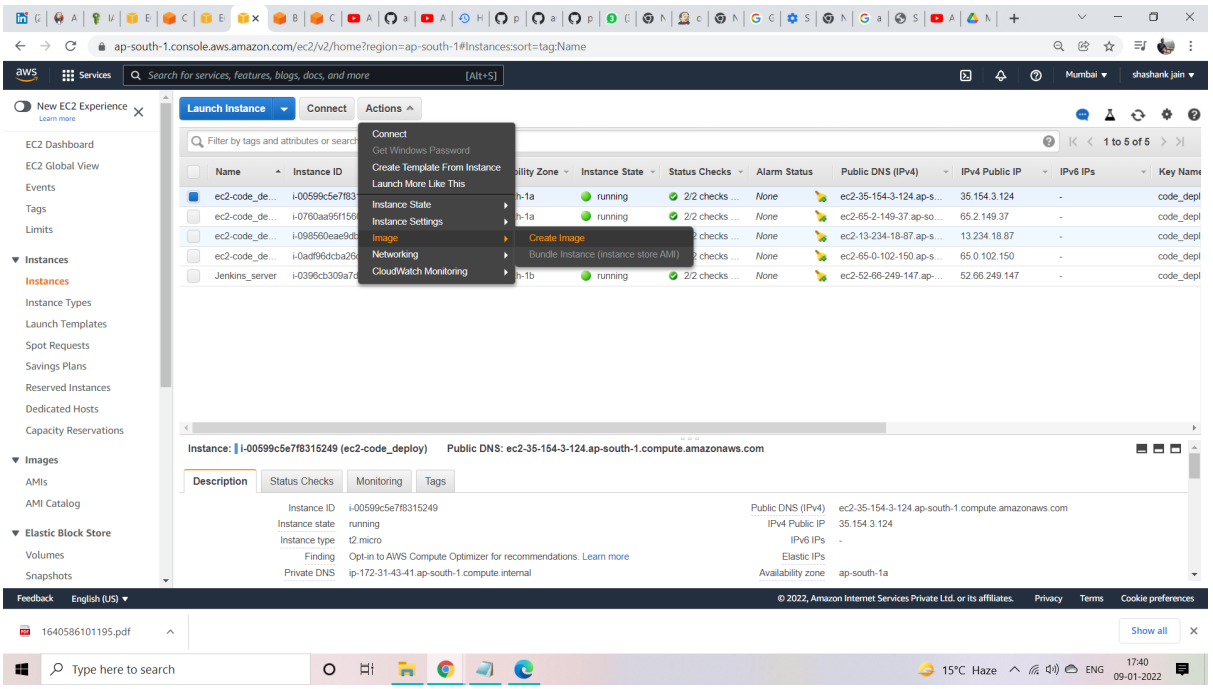


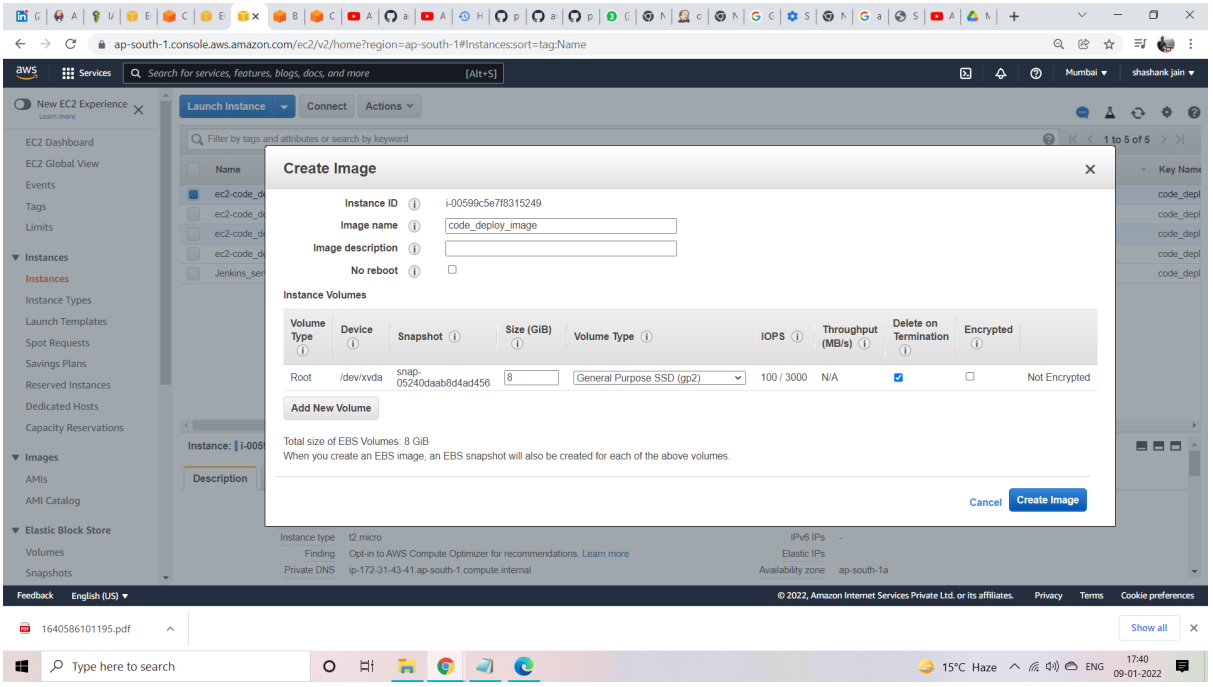
User data i have used -

#!/bin/bash
sudo yum -y update
sudo yum -y install ruby
sudo yum -y install wget
cd /home/ec2-user
Wget https://aws-codedeploy-ap-south-1.s3.ap-south-1.amazonaws.com/latest/install
sudo chmod +x ./install
sudo ./install auto
sudo yum install -y python-pip
sudo pip install awscli

- This user data includes installation of some software like aws codedeploy , aws cli etc.
- add first IAM role to the instances .
- Create Security Group and provide http 80 and ssh 22 rules.
- Than create instances.

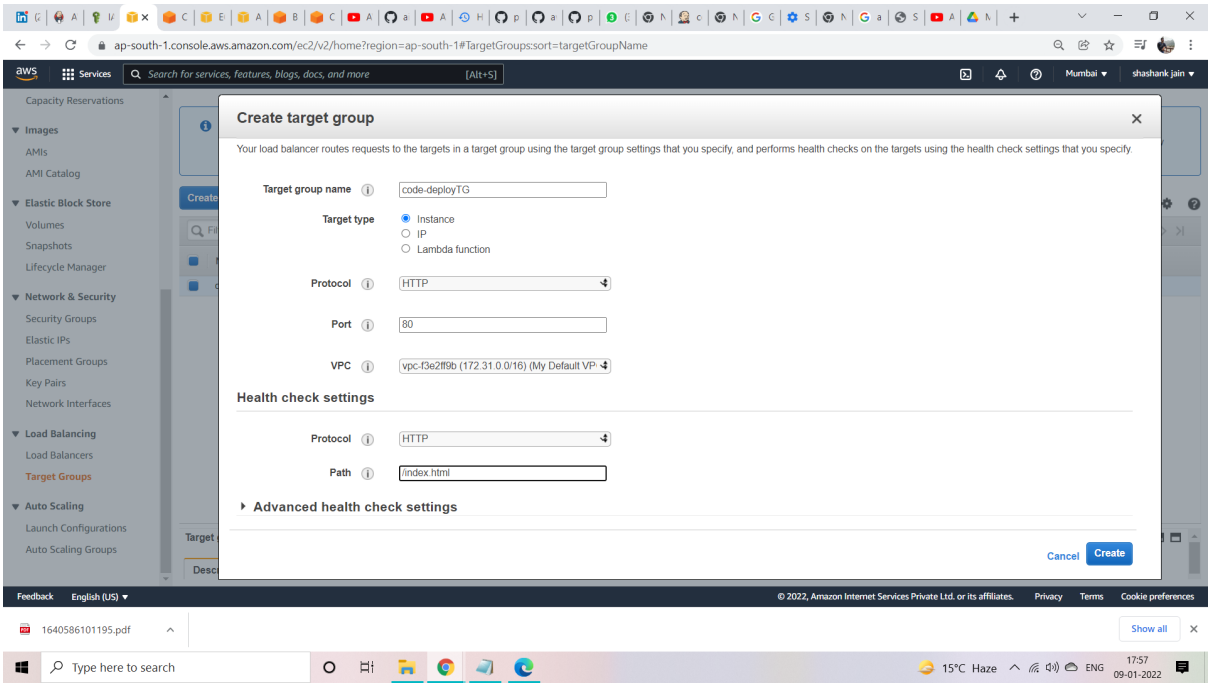
Step 3 - Create an of any of the instance which we will use in AutoScalingGroup.



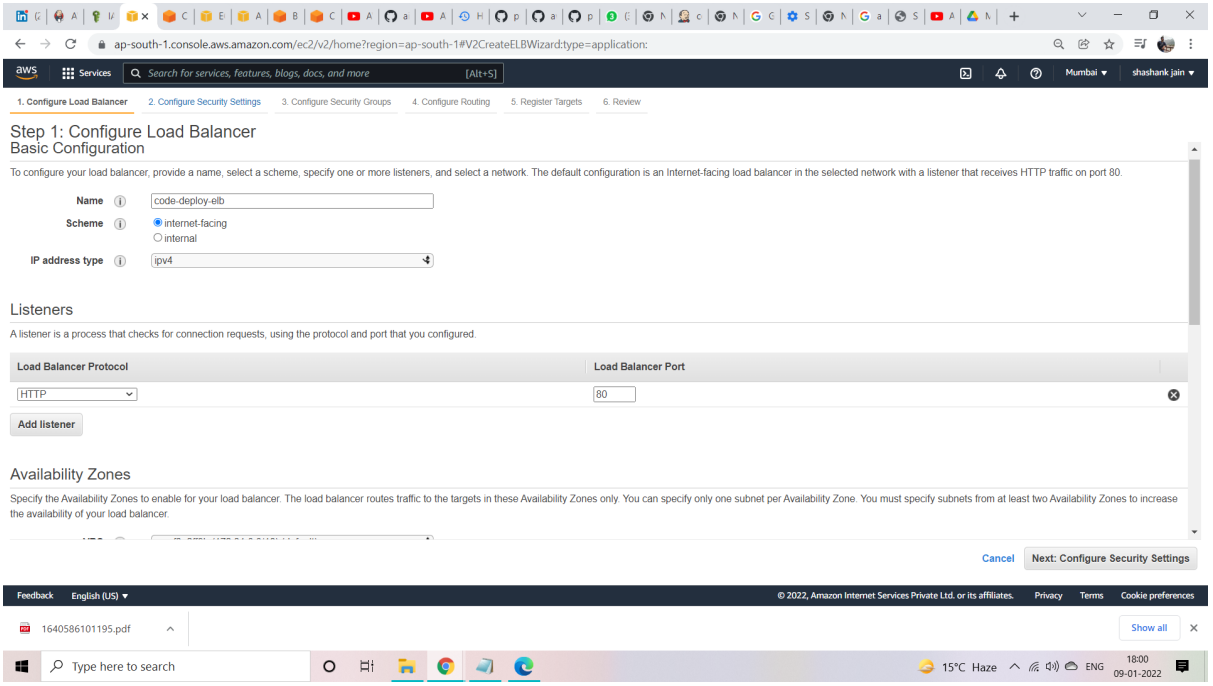


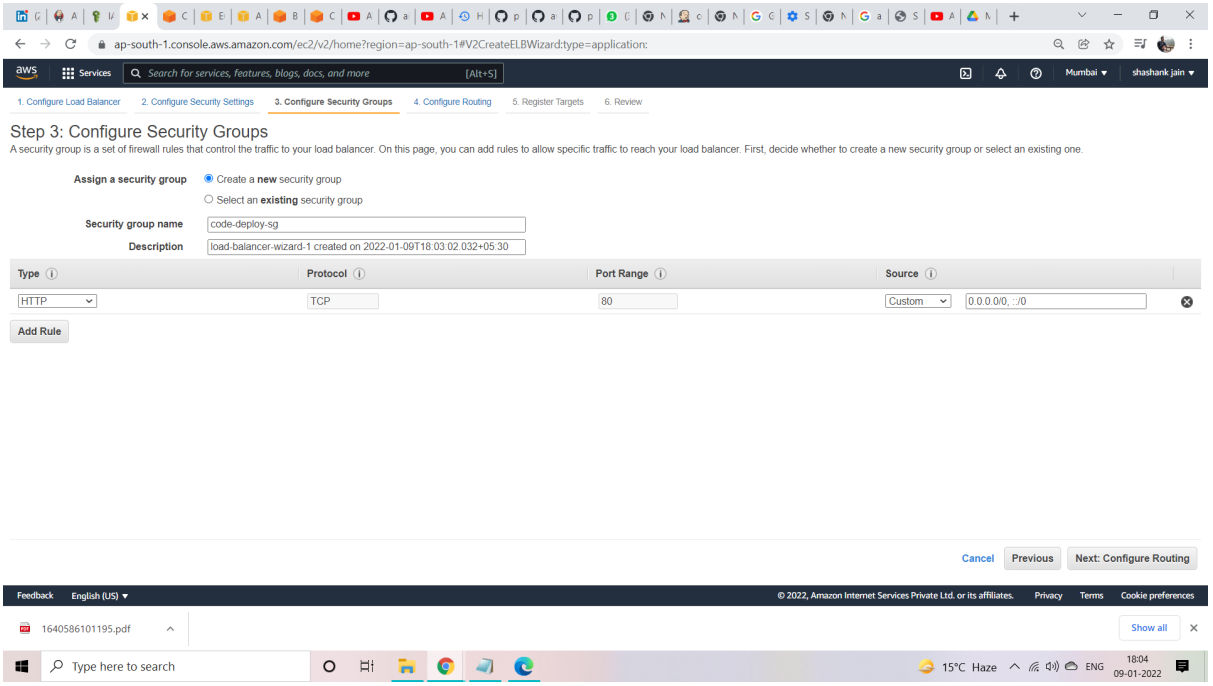
Step 4 - Create Application Load Balancer.

1. Create target group than load balancer , in target group give path to /index.html , which is the app file containing code over git.



Now Create Application Load Balancer -




ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#V2CreateELBWizard:type=application:
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
shashank jain
1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 3: Configure Security Groups
A security group is a set of firewall rules that control the traffic to your load balancer. On this page, you can add rules to allow specific traffic to reach your load balancer. First, decide whether to create a new security group or select an existing one.
Assign a security group
Create a new security group
Select an existing security group
Security group name
code-deploy-sg
Description
load-balancer-wizard-1 created on 2022-01-09T18:03:02.032+05:30
Type
Protocol
Port Range
Source
HTTP
TCP
80
Custom
0.0.0.0/0, ::/0
Add Rule
Cancel
Previous
Next: Configure Routing
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences
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Type here to search
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ENG
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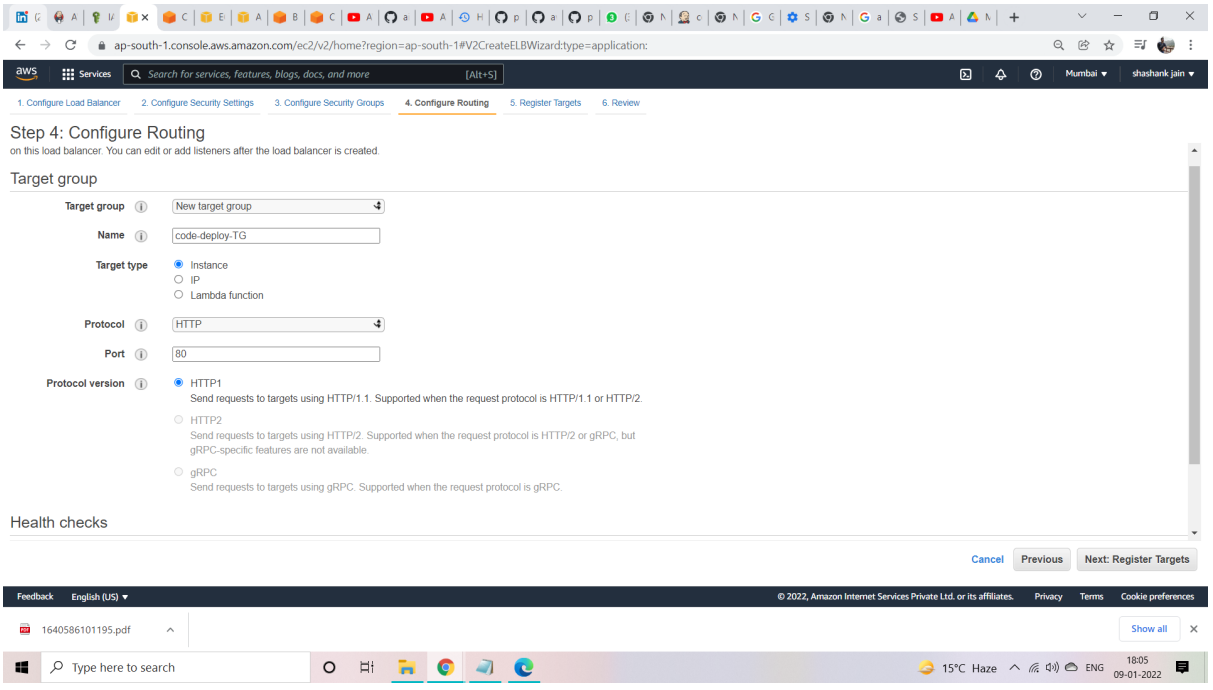
09-01-2022


ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#V2CreateELBWizard:type=application:
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
shashank jain
1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 4: Configure Routing
on this load balancer. You can edit or add listeners after the load balancer is created.
Target group
Target group
New target group
Name
code-deploy-TG
Target type
Instance
IP
Lambda function
Protocol
HTTP
Port
80
Protocol version
HTTP1
Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.
HTTP2
Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.
gRPC
Send requests to targets using gRPC. Supported when the request protocol is gRPC.
Health checks
Cancel
Previous
Next: Register Targets
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences
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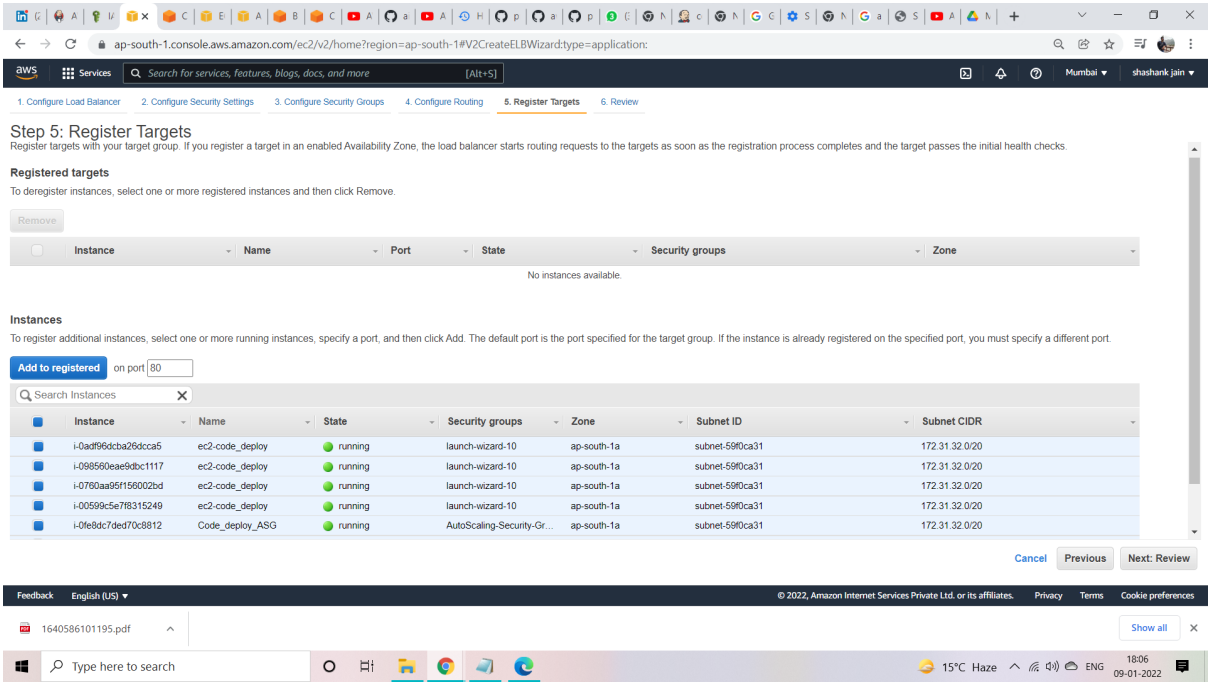
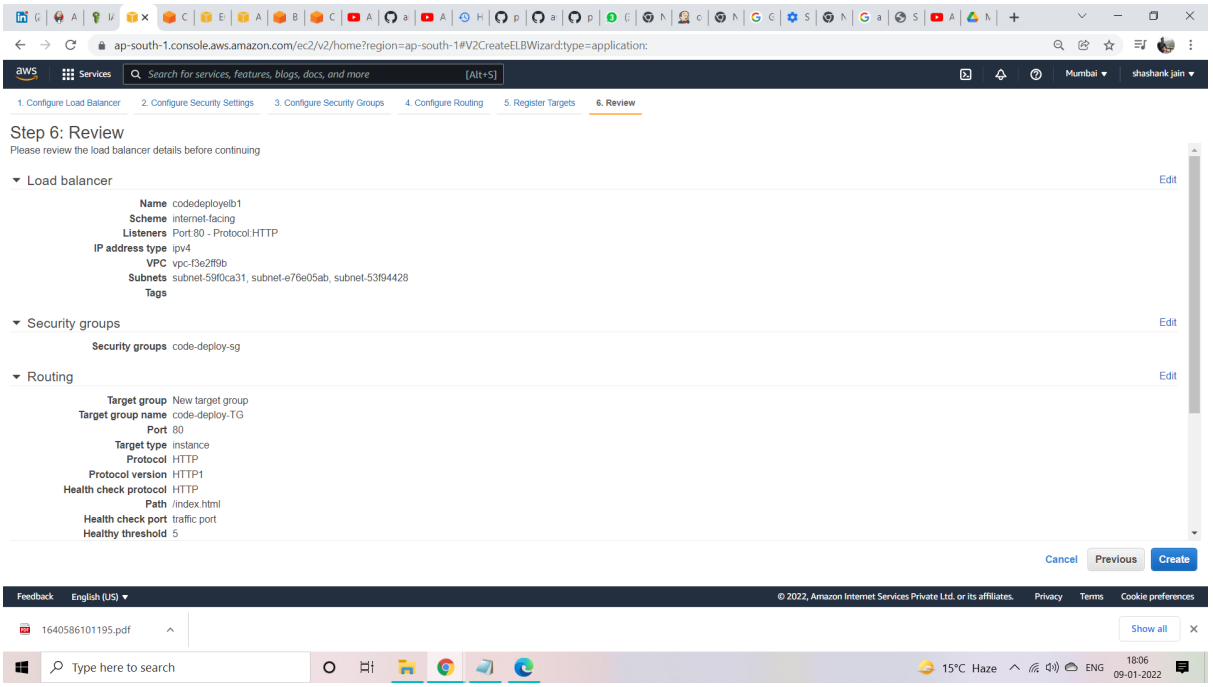
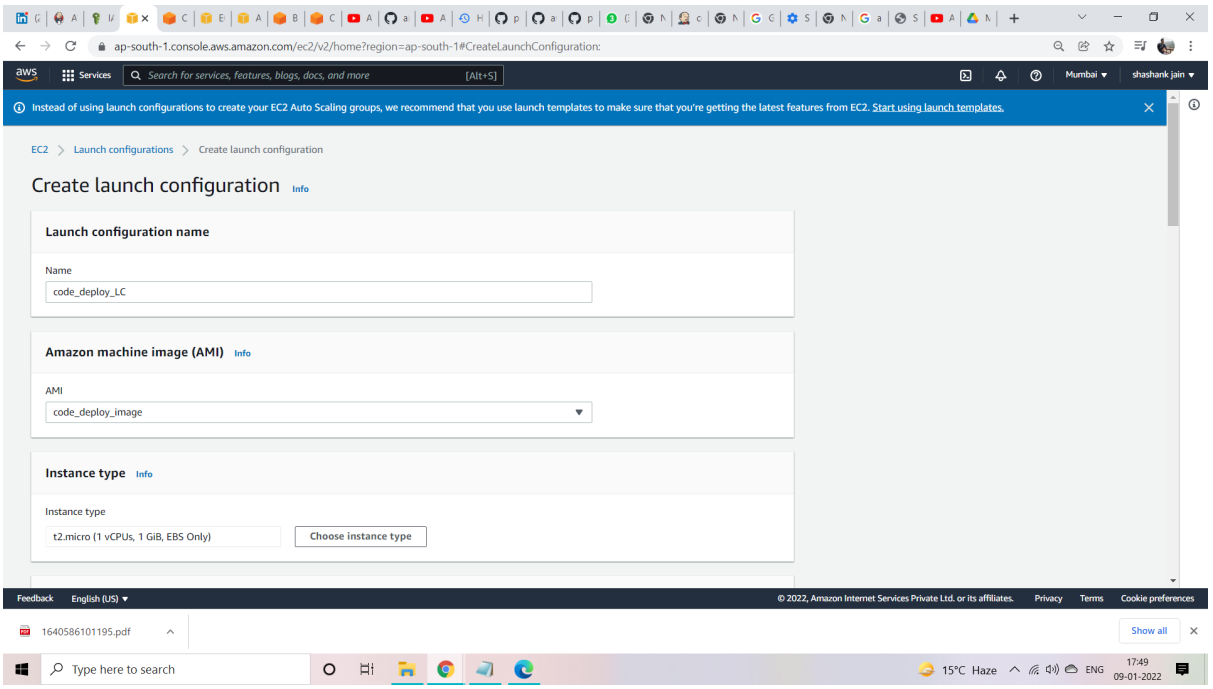
Show all
Type here to search
15°C Haze
ENG
18:05
09-01-2022

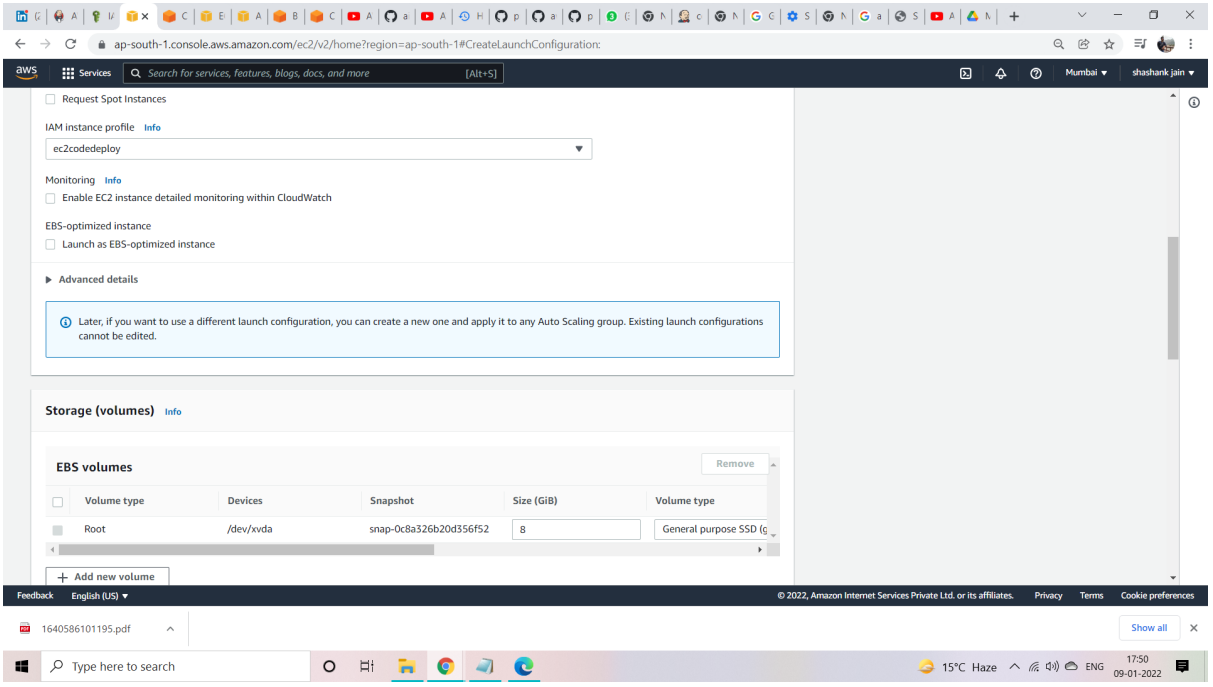


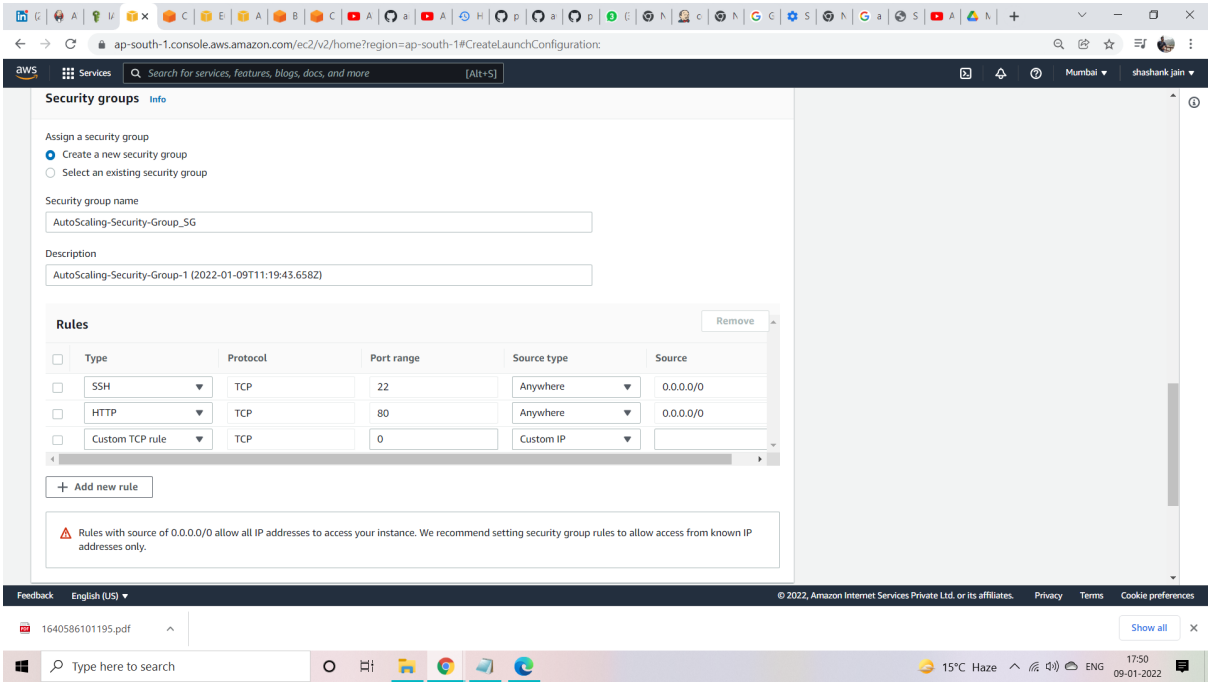
We have added the targets to already created instances.



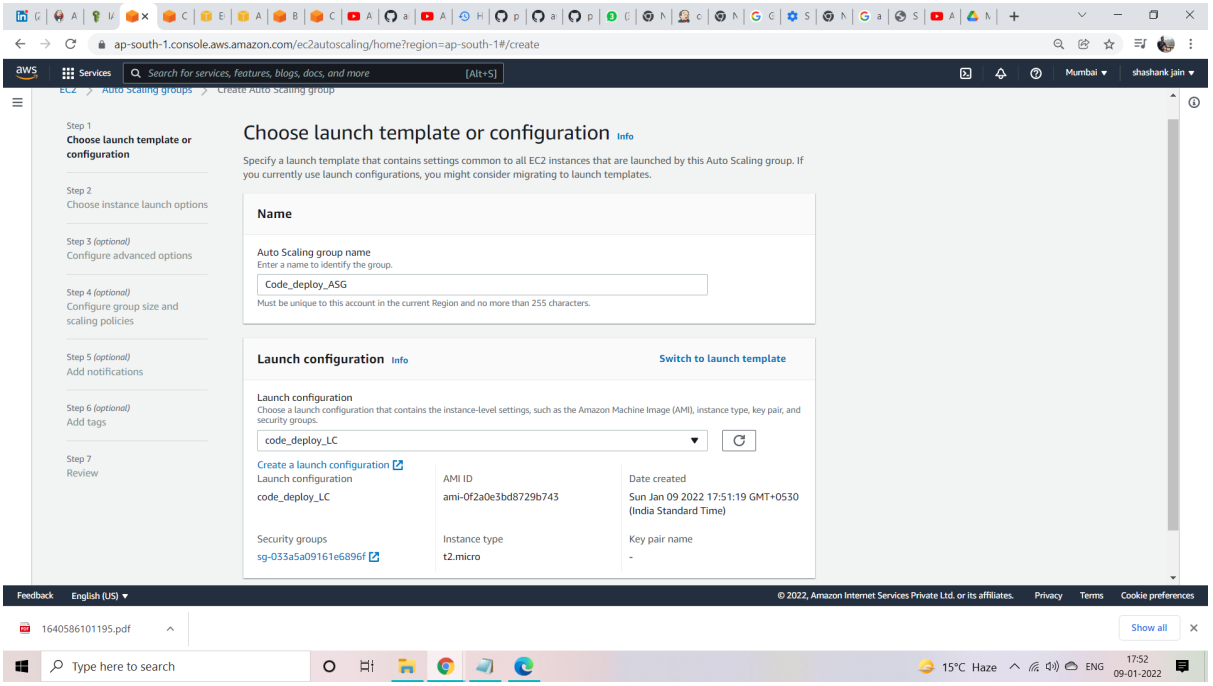
Step 5 - Create Launch Configurations and than create Auto scaling group.

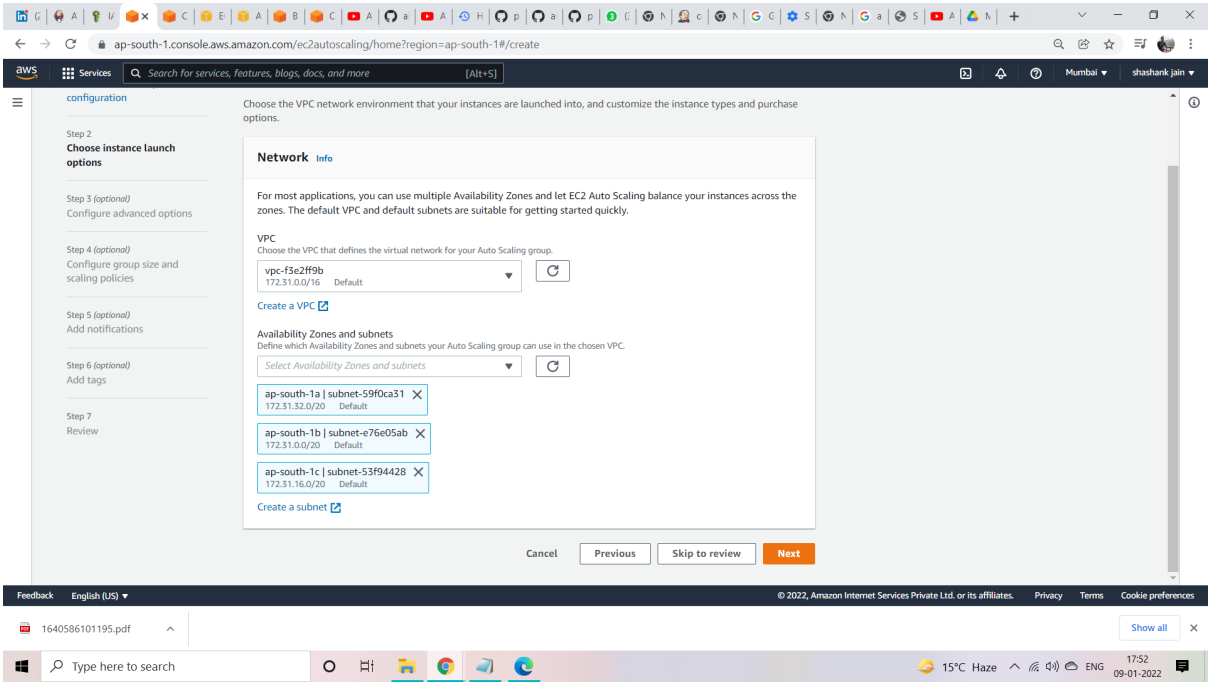


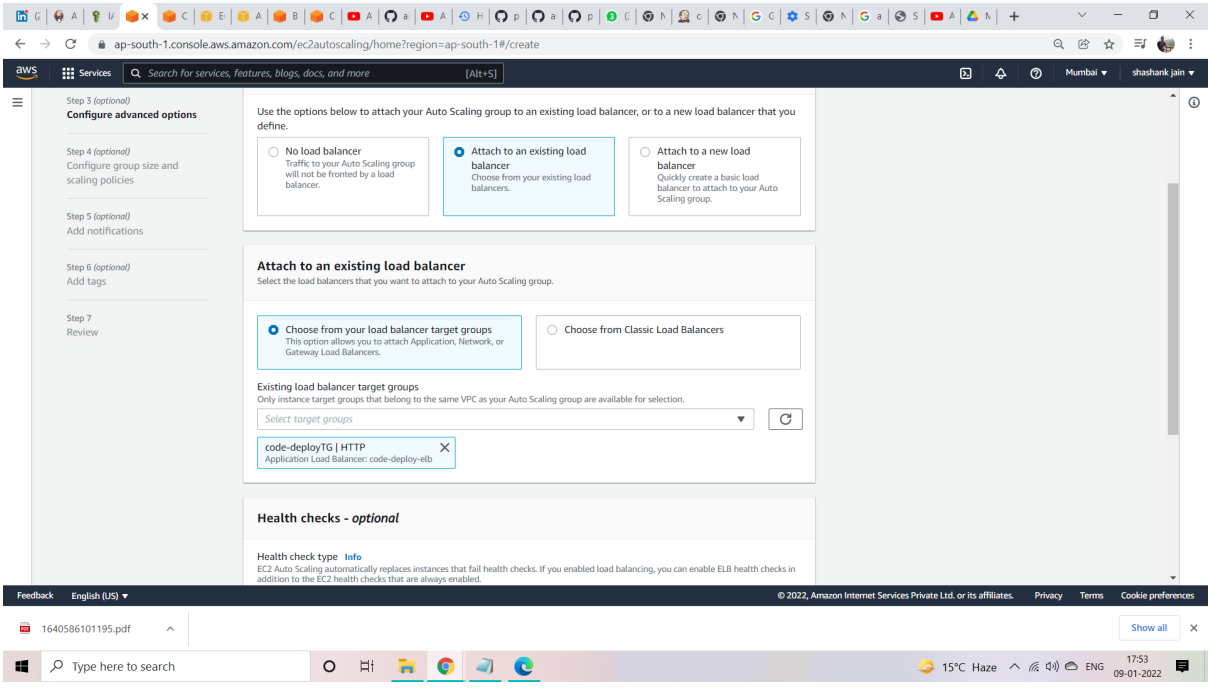




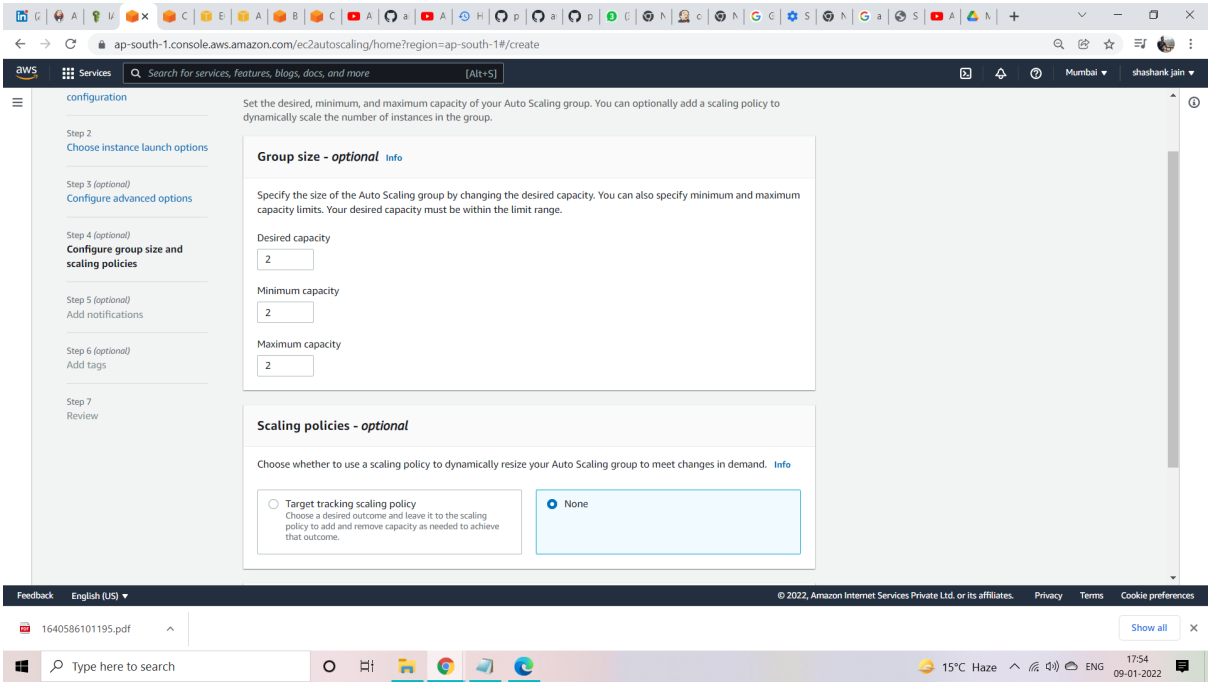
Launch Configuration created.
Now create AutoScalingGroup



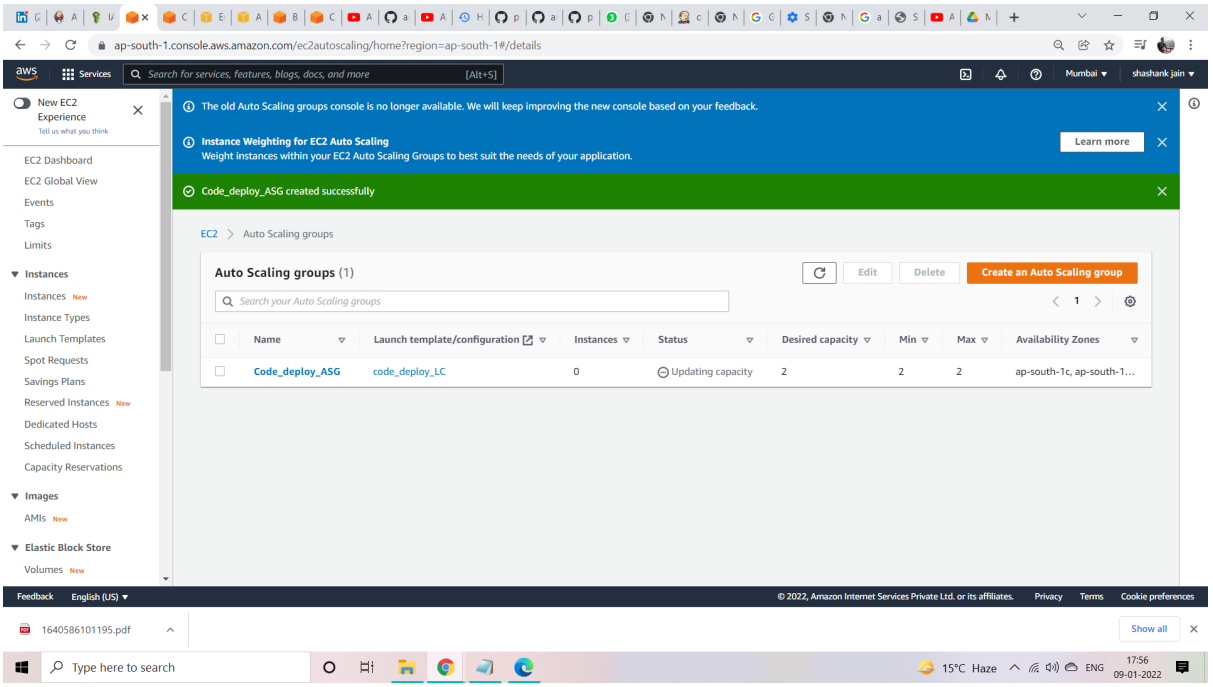




I have attached Application Load Balancer to it which is already Created

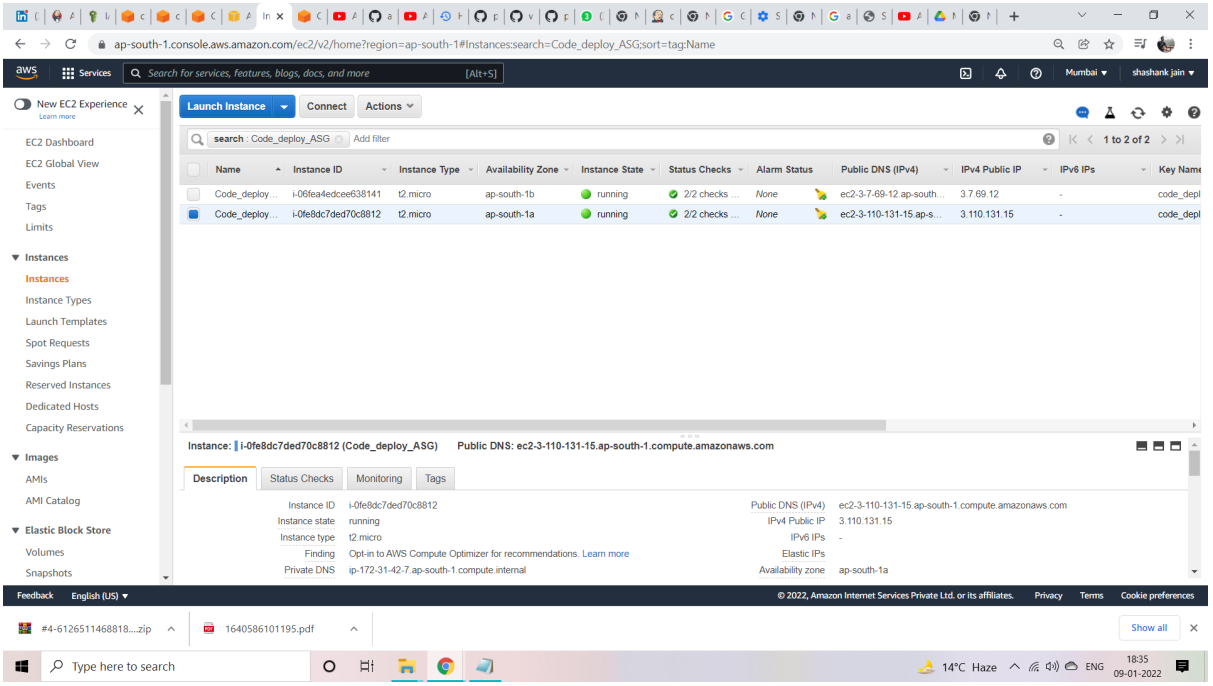


Give Desired and max capacity to 2



Auto Scaling Group is created.

We can see as soon as ASG created , the two instances are up.


ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#Instances:search=Code_deploy_ASG;sort=tag:Name
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
shashank jain
New EC2 Experience
Learn more
EC2 Dashboard
EC2 Global View
Events
Tags
Limits
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Launch Instance
Connect
Actions
search : Code_deploy_ASG
Add filter
1 to 2 of 2
Name
Instance ID
Instance Type
Availability Zone
Instance State
Status Checks
Alarm Status
Public DNS (IPv4)
IPv4 Public IP
IPv6 IPs
Key Name
Code_deploy...
i-06fea4edcee638141
t2.micro
ap-south-1b
running
2/2 checks ...
None
ec2-3-7-69-12.ap-south...
3.7.69.12
-
code_depl
Code_deploy...
i-0fe8dc7ded70c8812
t2.micro
ap-south-1a
running
2/2 checks ...
None
ec2-3-110-131-15.ap-s...
3.110.131.15
-
code_depl
Instance: i-0fe8dc7ded70c8812 (Code_deploy_ASG)
Public DNS: ec2-3-110-131-15.ap-south-1.compute.amazonaws.com
Description
Status Checks
Monitoring
Tags
Instance ID
i-0fe8dc7ded70c8812
Instance state
running
Instance type
t2.micro
Finding
Opt-in to AWS Compute Optimizer for recommendations. Learn more
Private DNS
ip-172-31-42-7.ap-south-1.compute.internal
Public DNS (IPv4)
ec2-3-110-131-15.ap-south-1.compute.amazonaws.com
IPv4 Public IP
3.110.131.15
IPv6 IPs
-
Elastic IPs
Availability zone
ap-south-1a
Feedback
English (US)
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#4-6126511468818....zip
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Type here to search
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18:35
09-01-2022

Step 6 - Create one Jenkins Instance and install jenkins software in it.

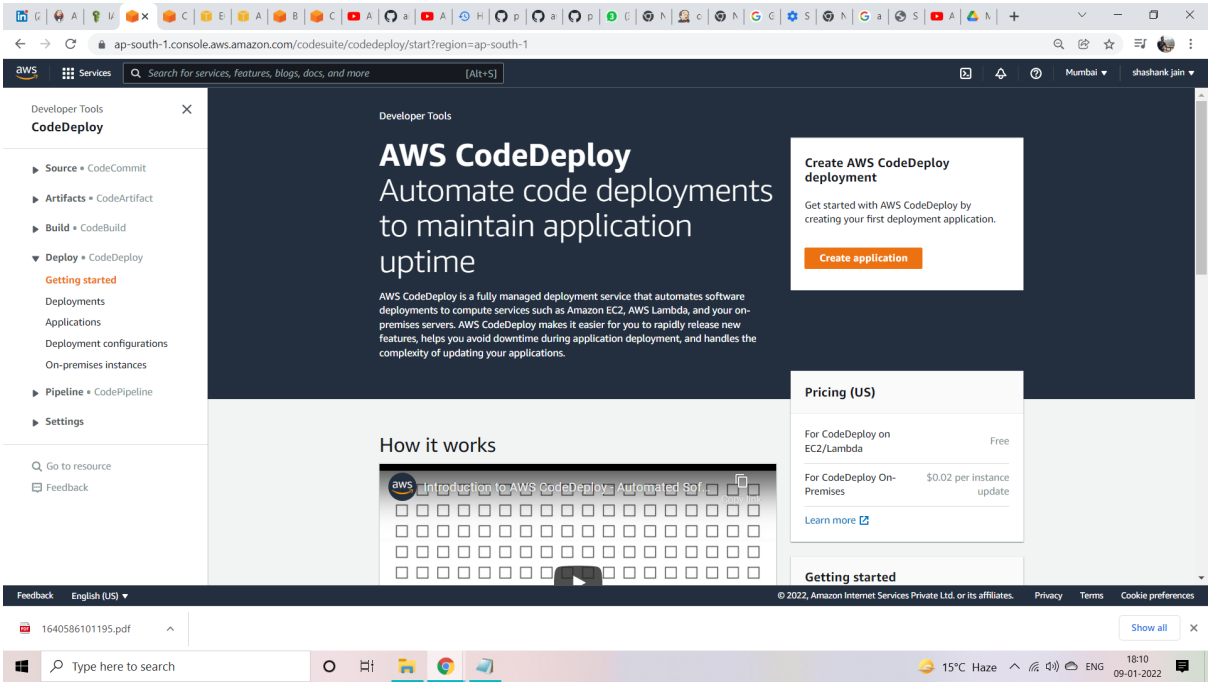
I have used the below link to install JENKINS server into the ec2 instance -

https://www.jenkins.io/doc/tutorials/tutorial-for-installing-jenkins-on-AWS/

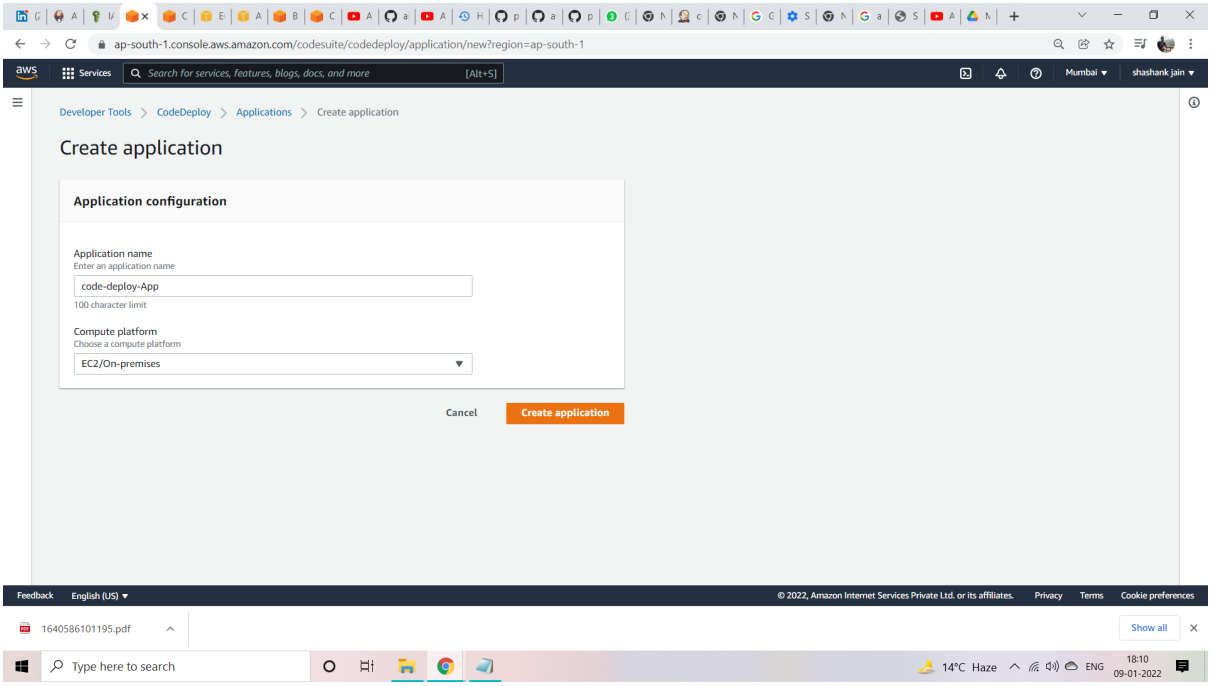
NOTE - i have also installed git in it , using Command -

- yum install git -y

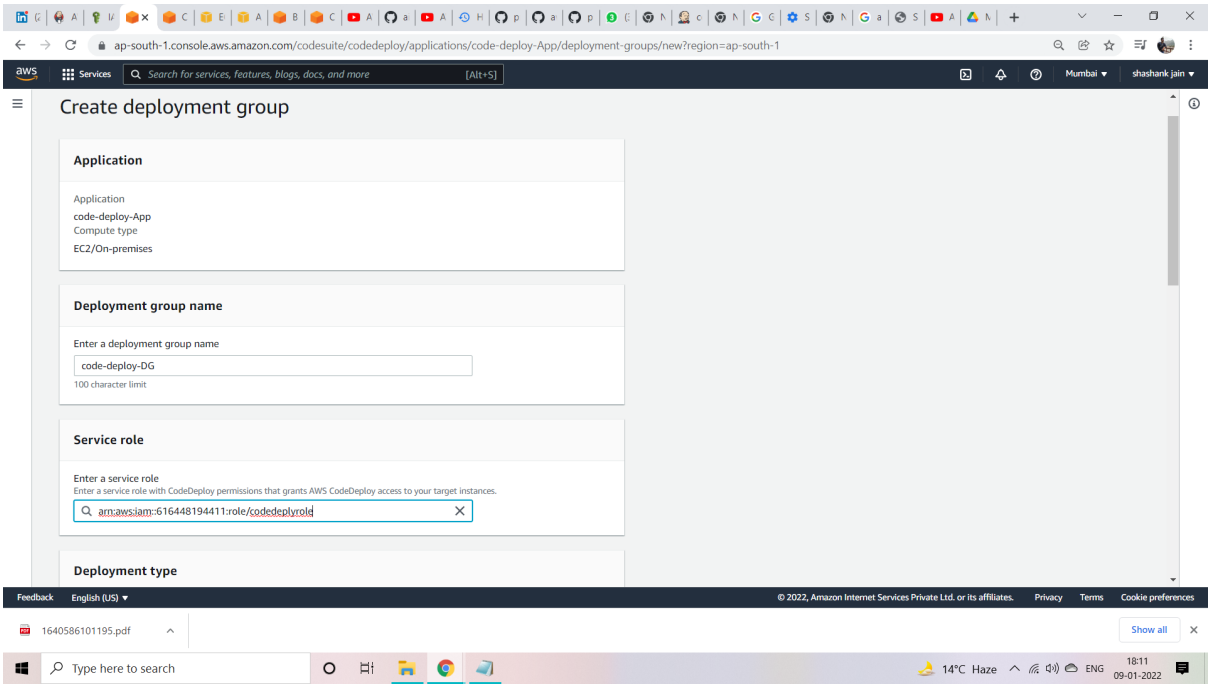
Step 7 - Create CodeDeploy



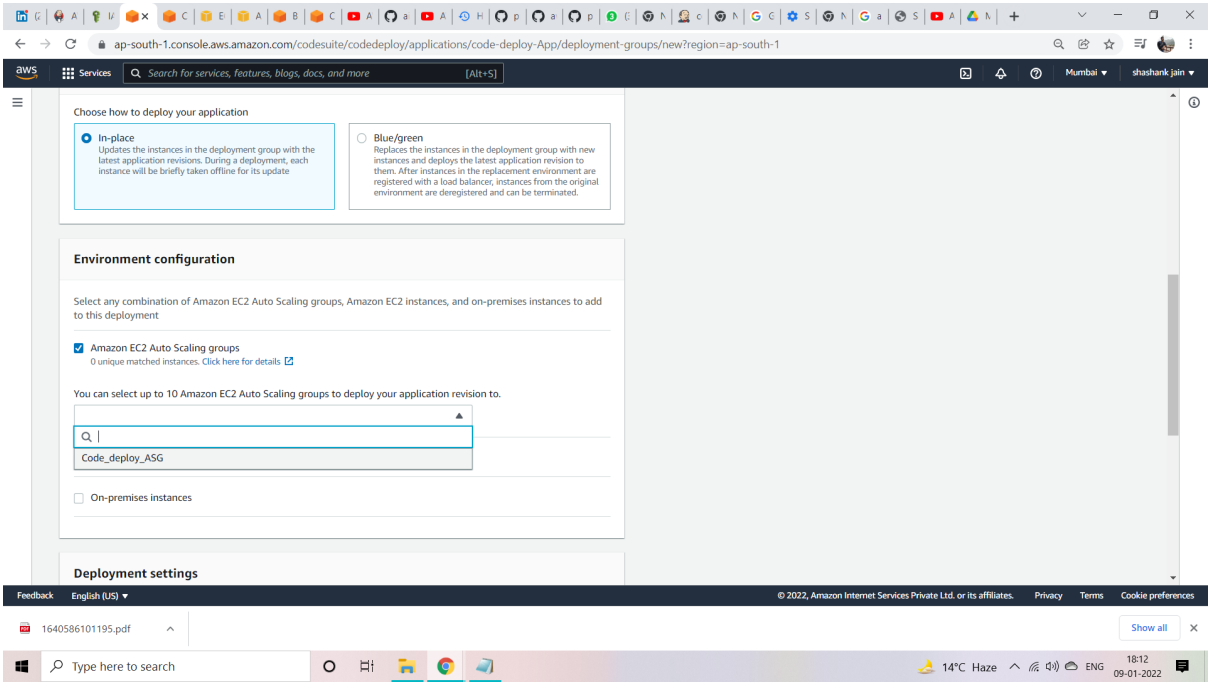
Create Application



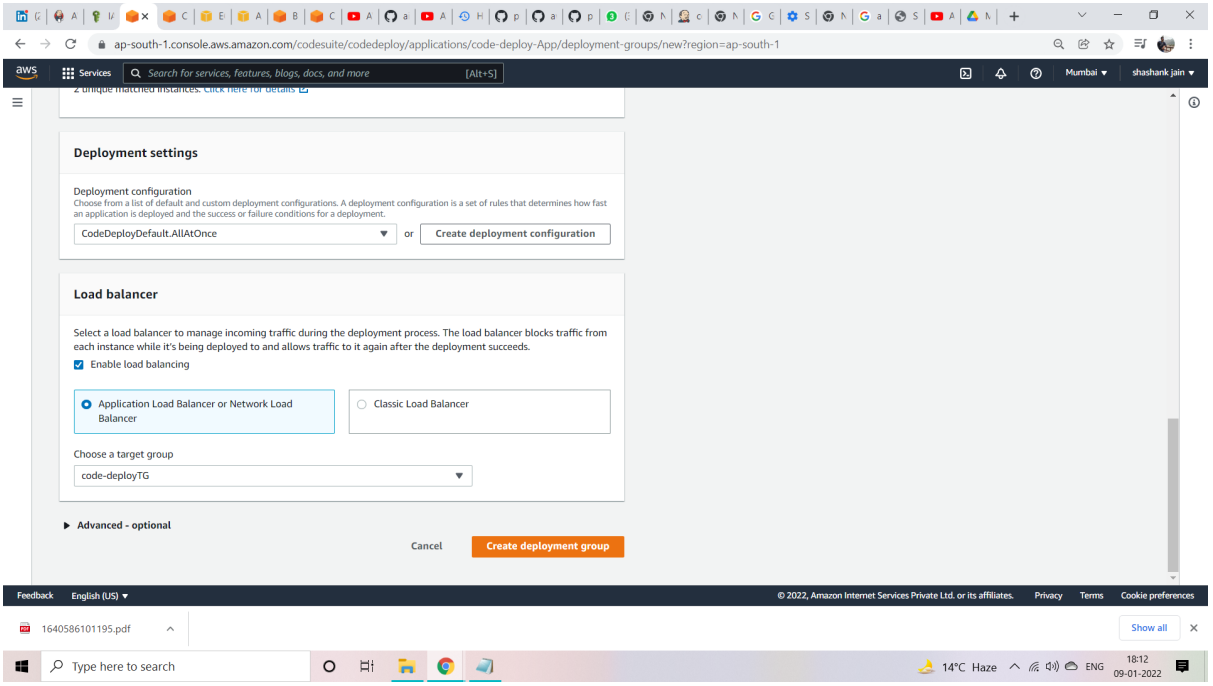
Now Create Deployment Group.



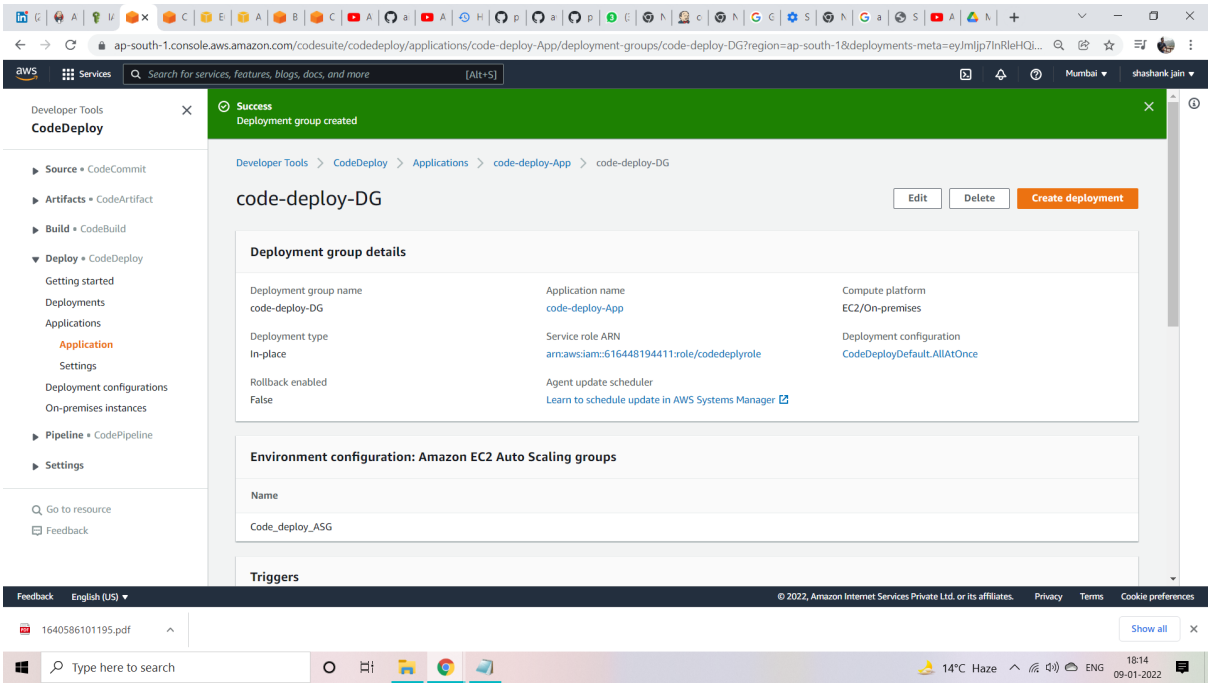
Now Choose Amazon Ec2 ASG which we have Created earlier.



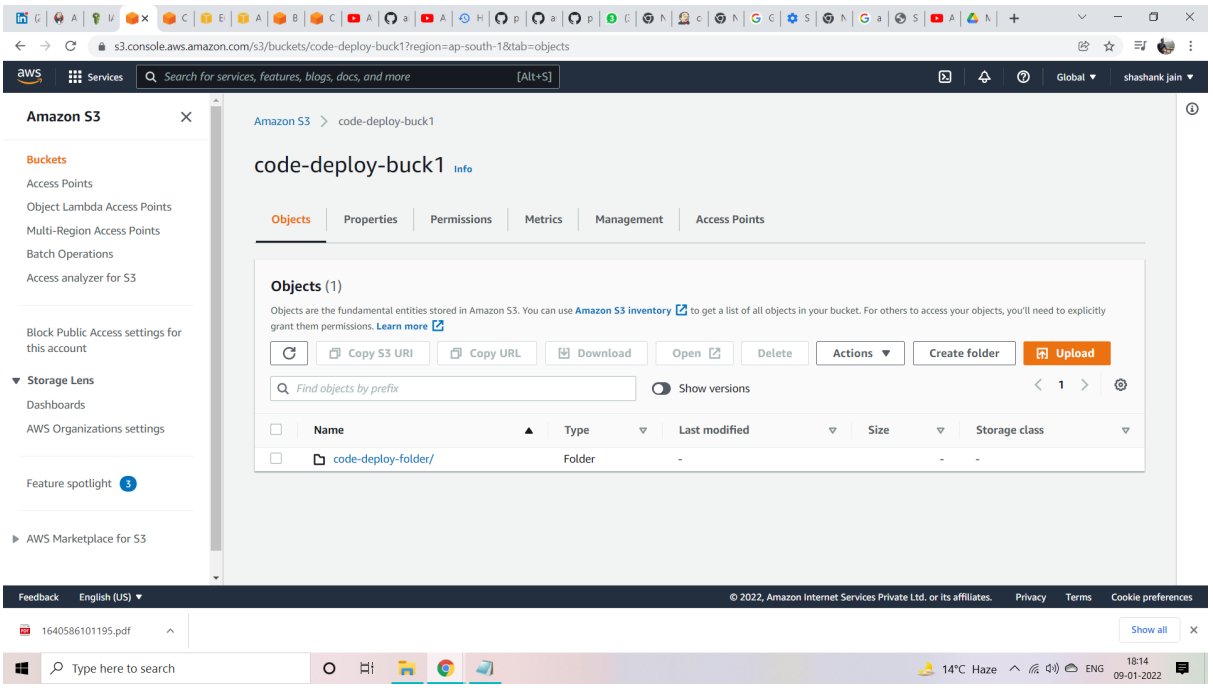
Now choose Application Load balancer which we have created earlier.



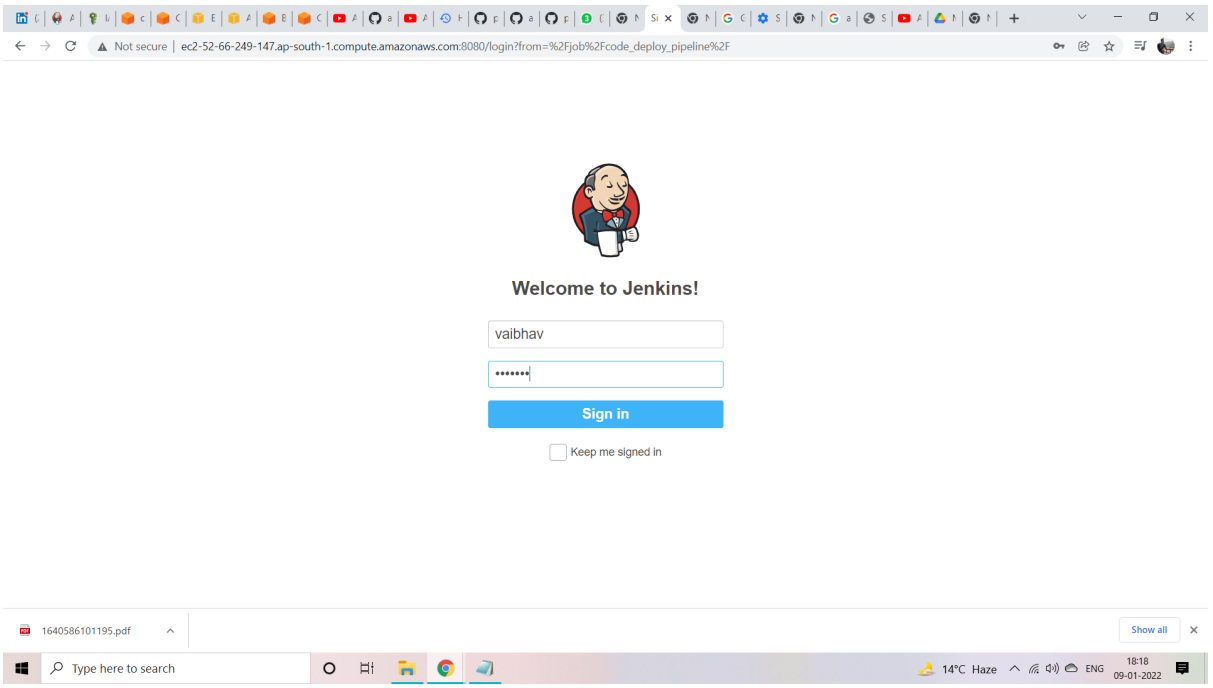
Deployment Group Is Created.
Now we will use Jenkins for Creating a pipeline that will use git as a source and will run the CodeDeploy.



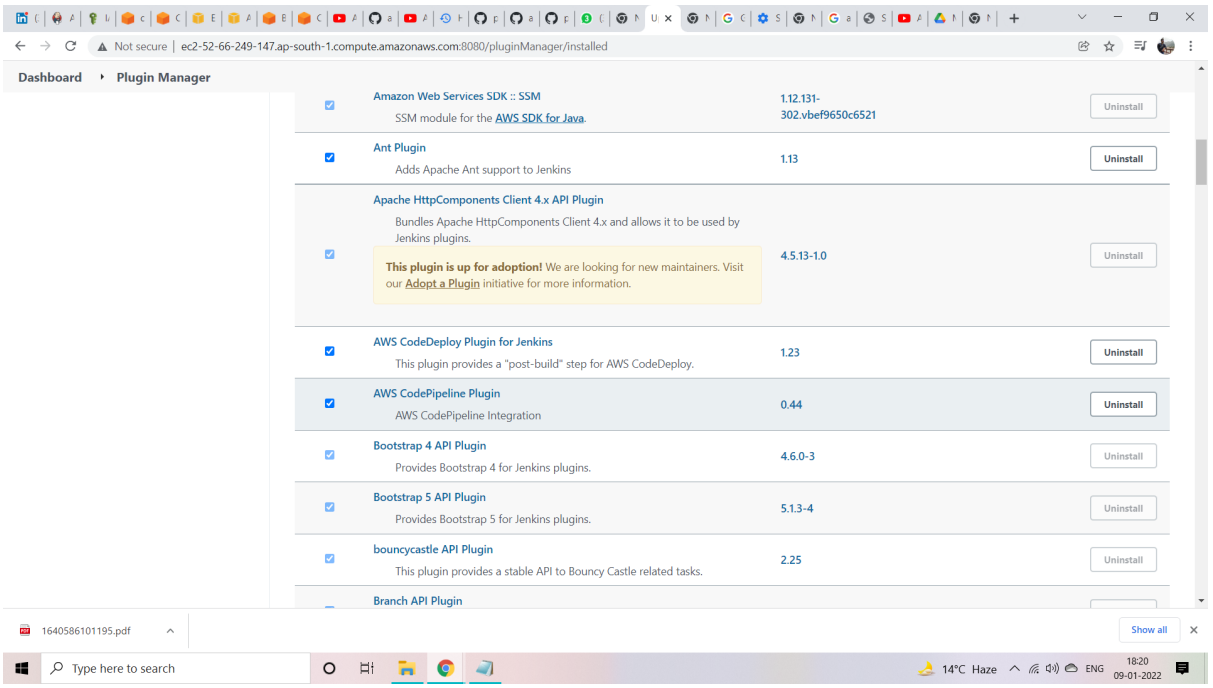
Step 8 - Create an S3 bucket.

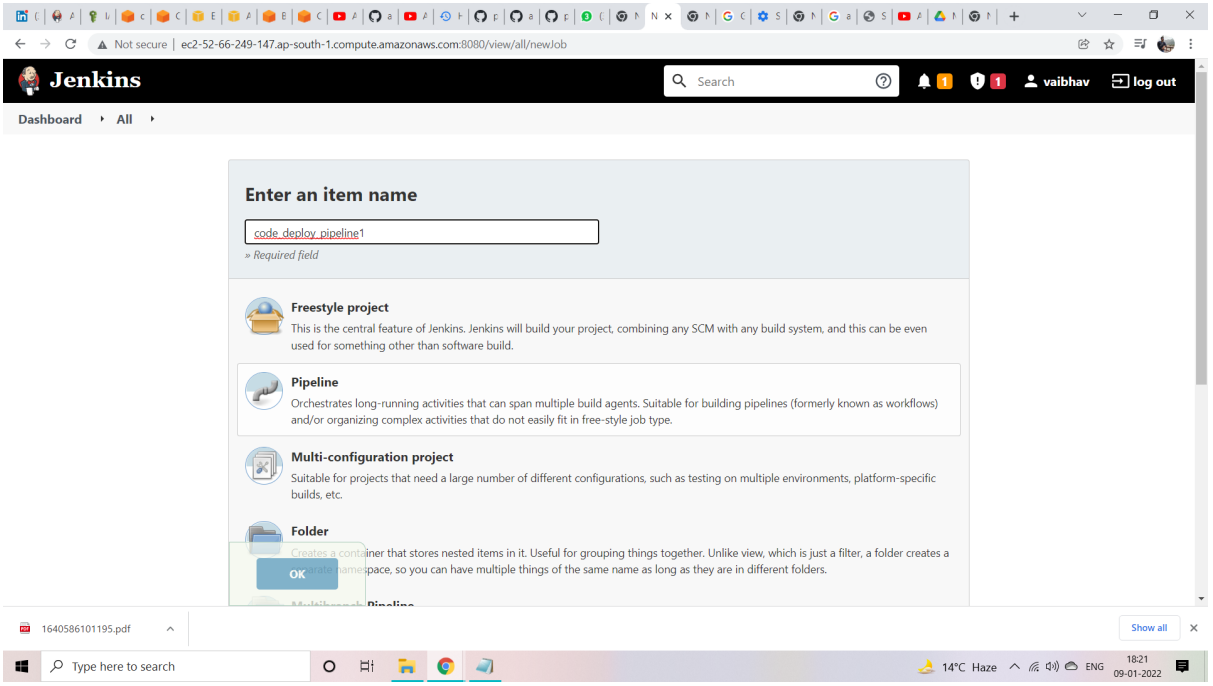


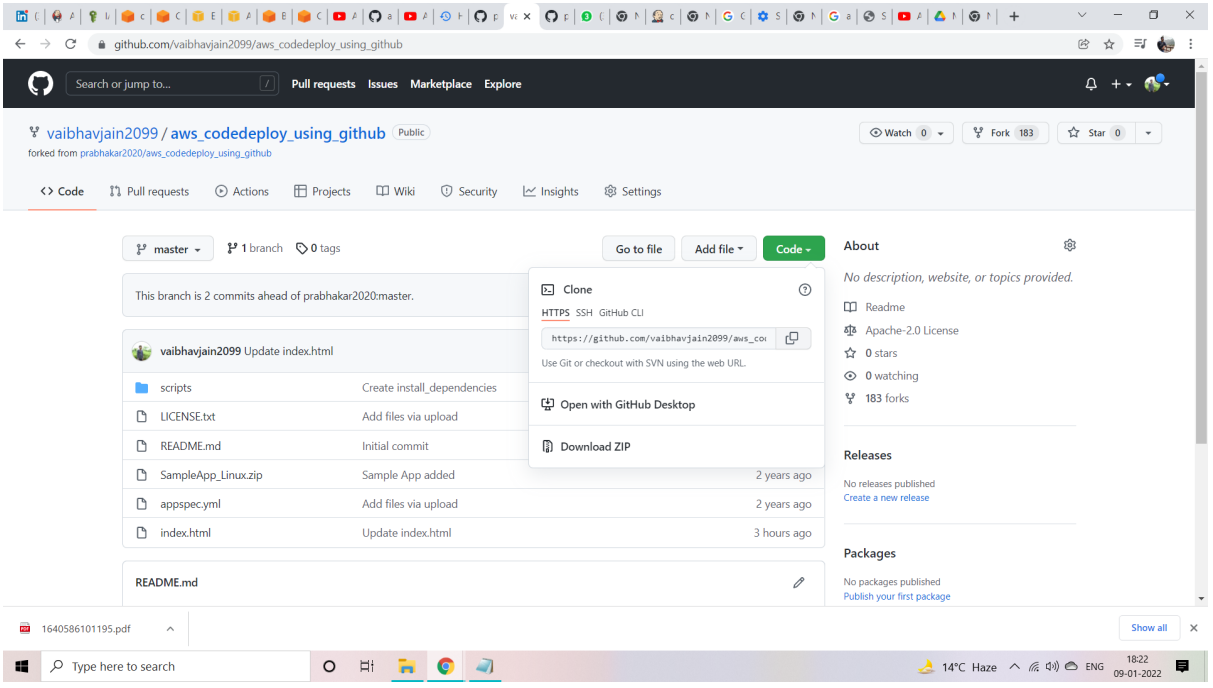
Step 9 - Go to Jenkins Server



- Install AWS Code Deploy plugin in it

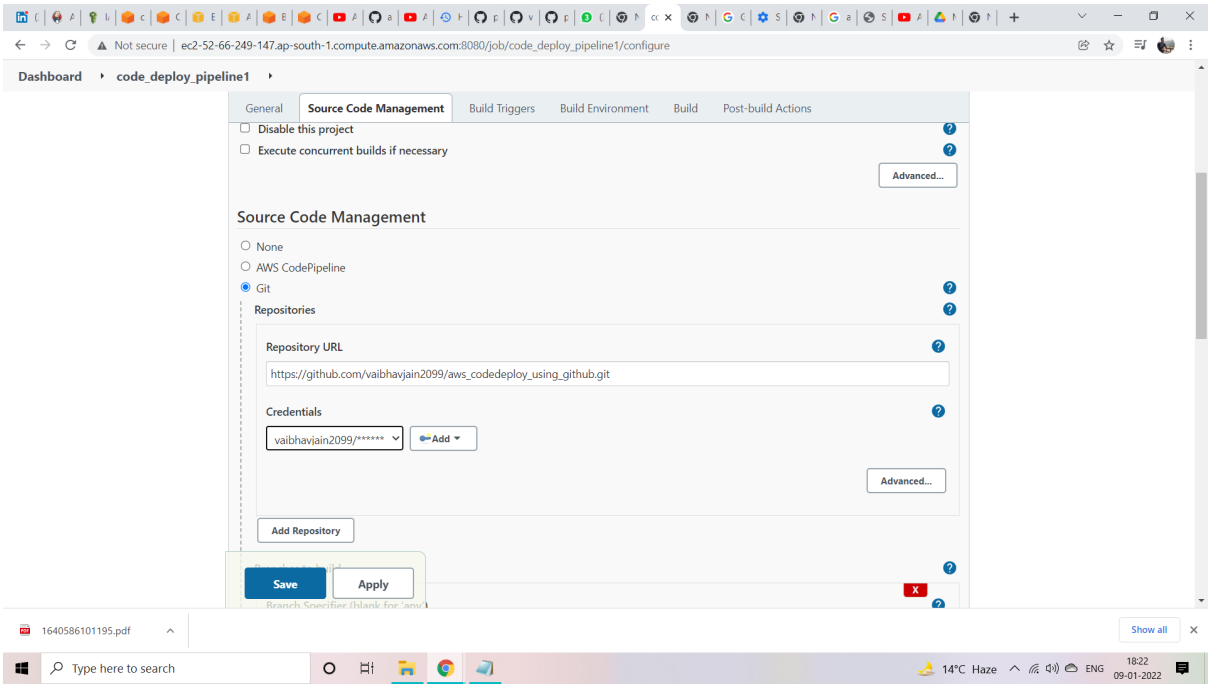


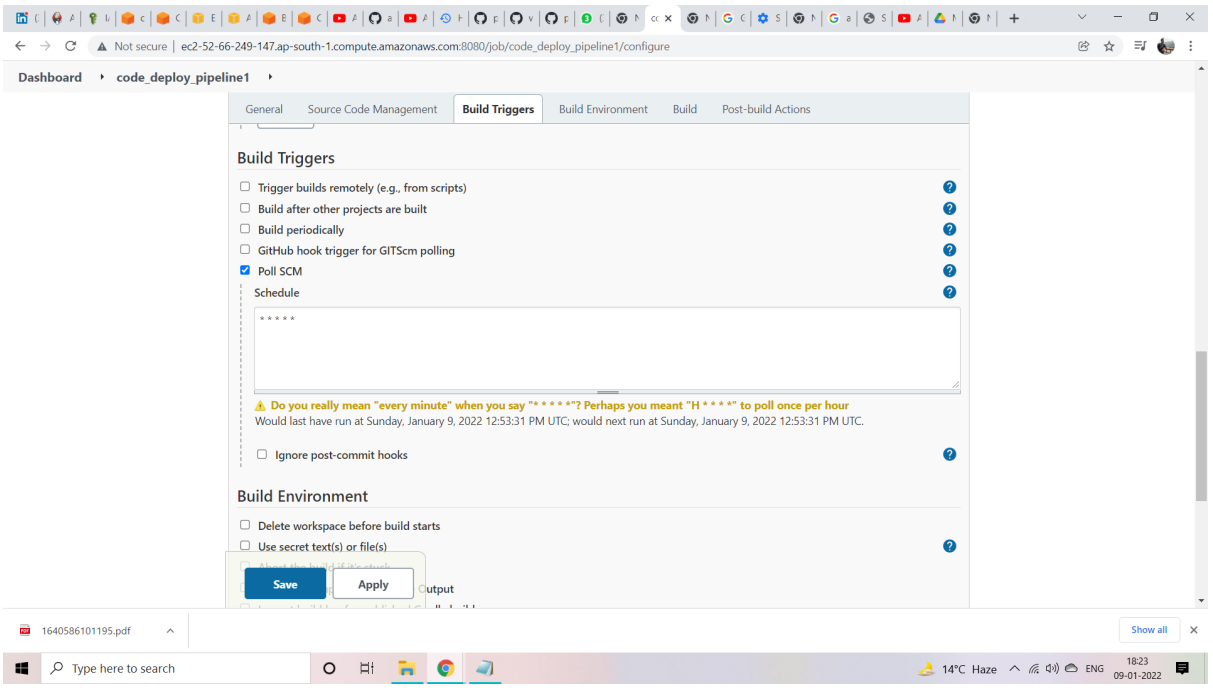




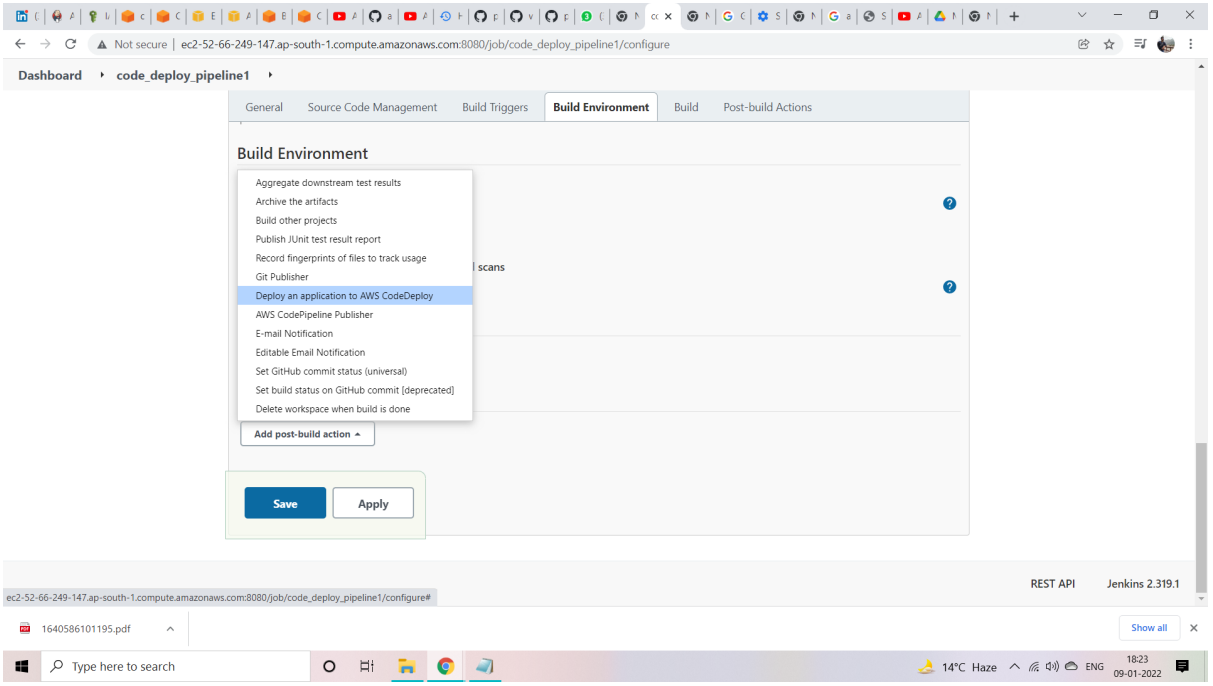
https://github.com/vaibhavjain2099/aws_codedeploy_using_github.git

Create a jenkins pipeline by taking GIT as a source , Trigger - Poll SCM (* * * * *) which means it will run job in every minute.
Put S3 Bucket name etc.

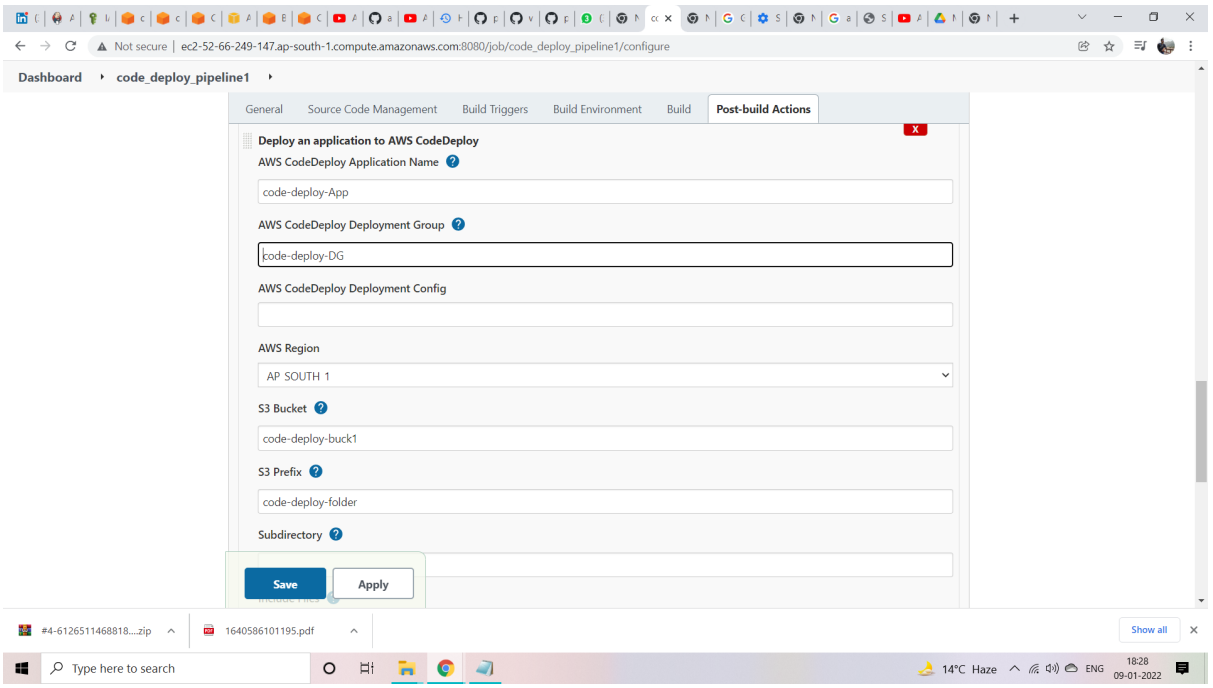




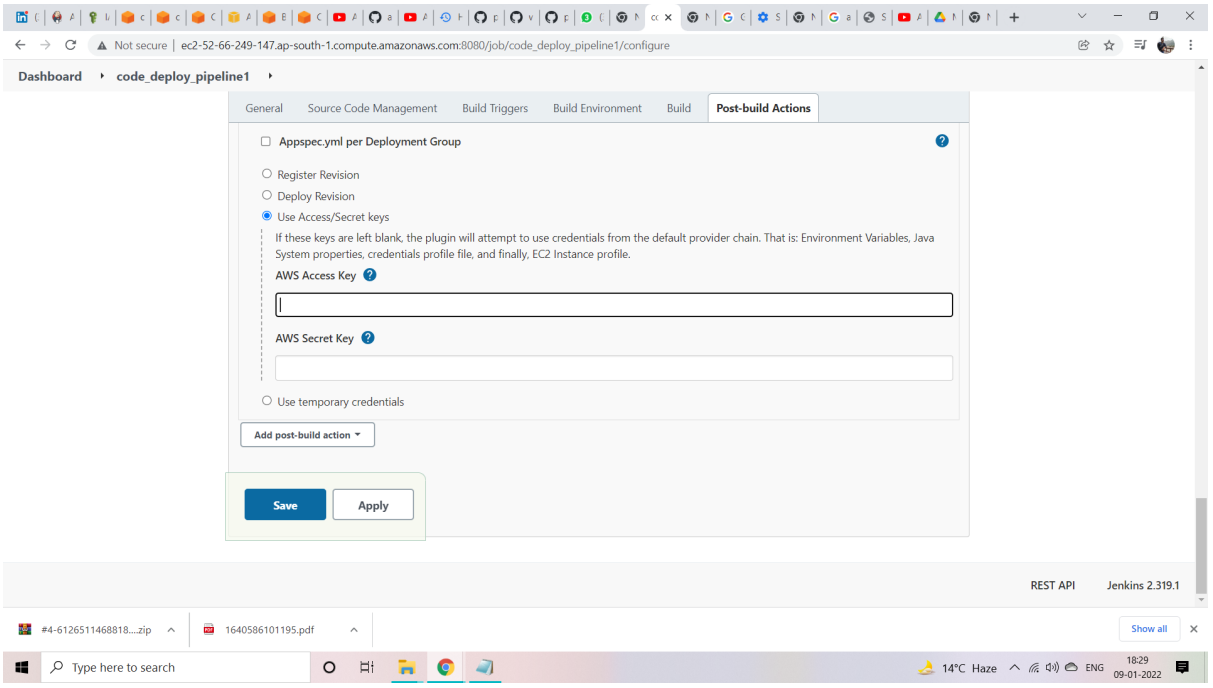
Choose post-build-action as deploy an application AWS CodeDeploy



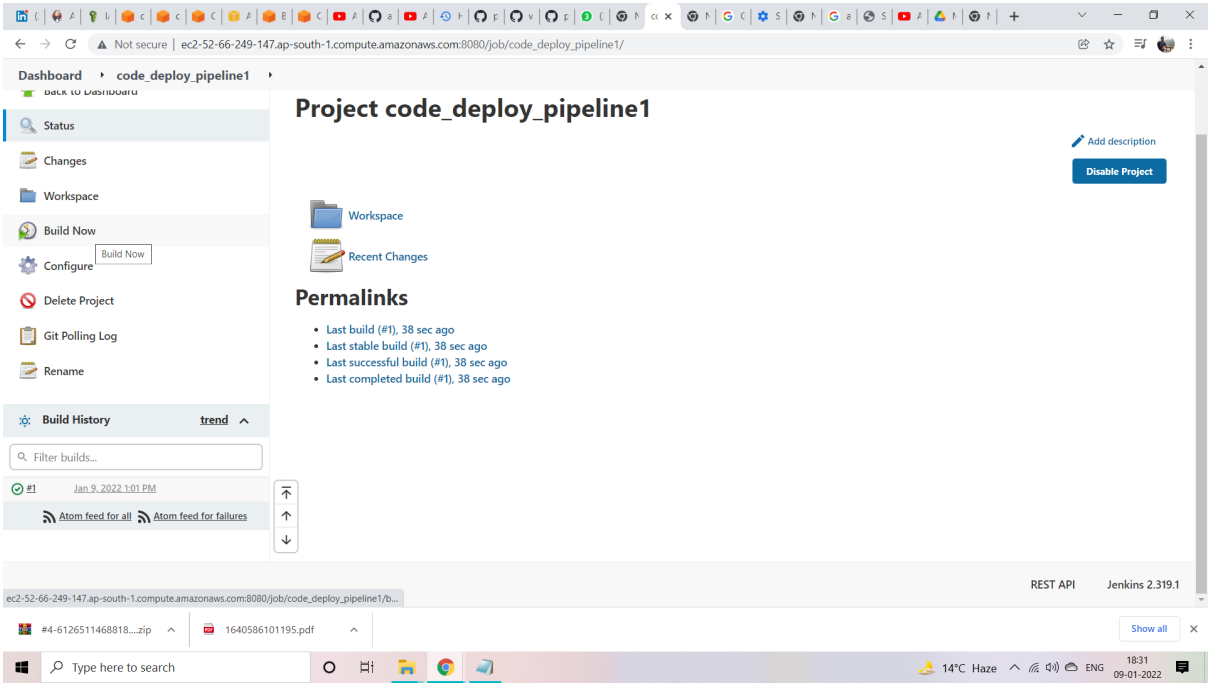
Than give all info of CodeDeploy like app name , deployment group name , s3 bucket and prefix name.



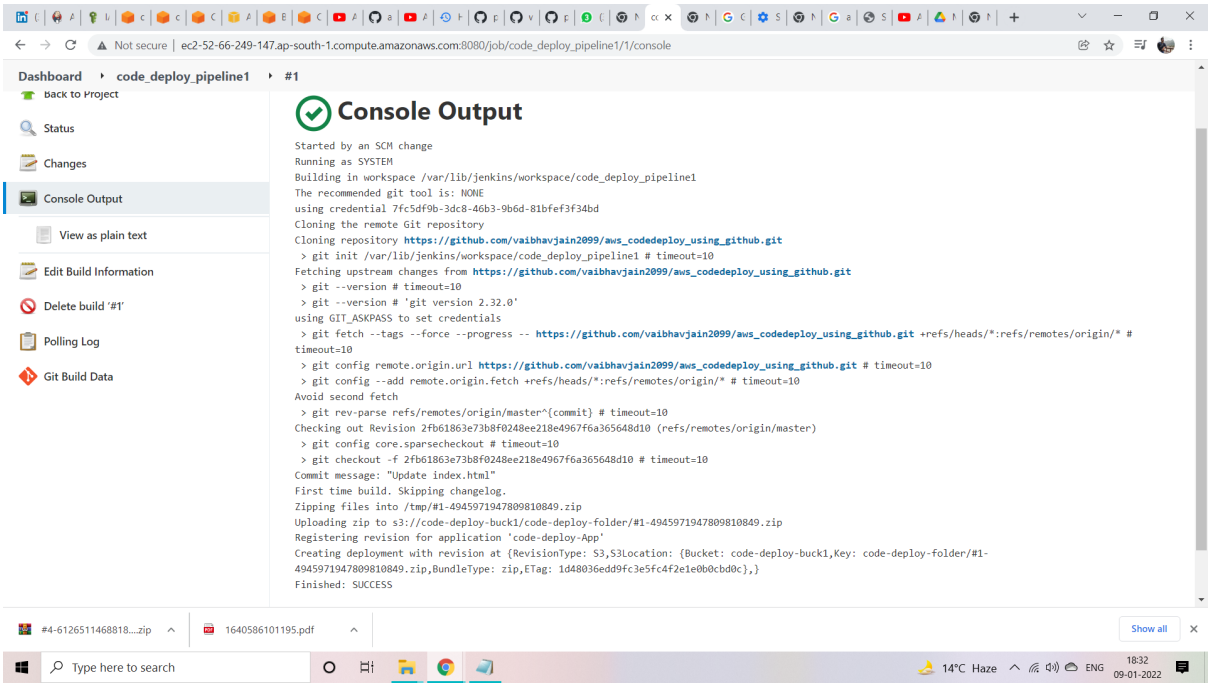
Than for Authorization we can use Aws Acess keys and Secret keys.



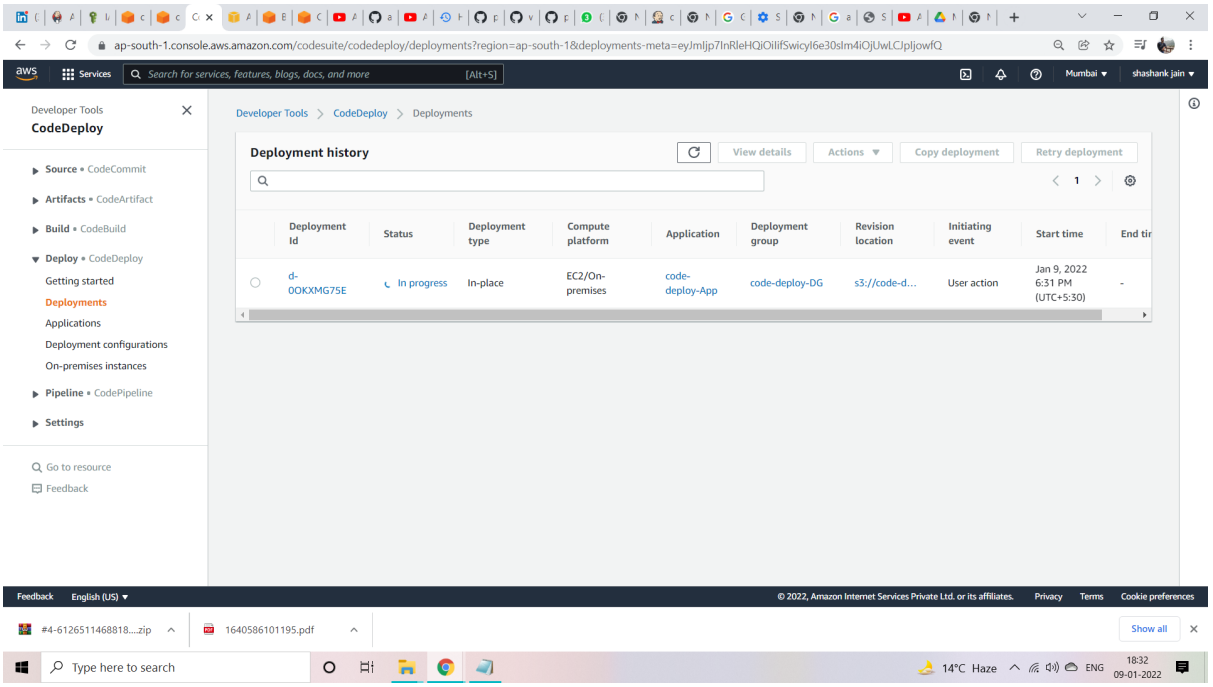
Step 10 - Build Jenkins Pipeline

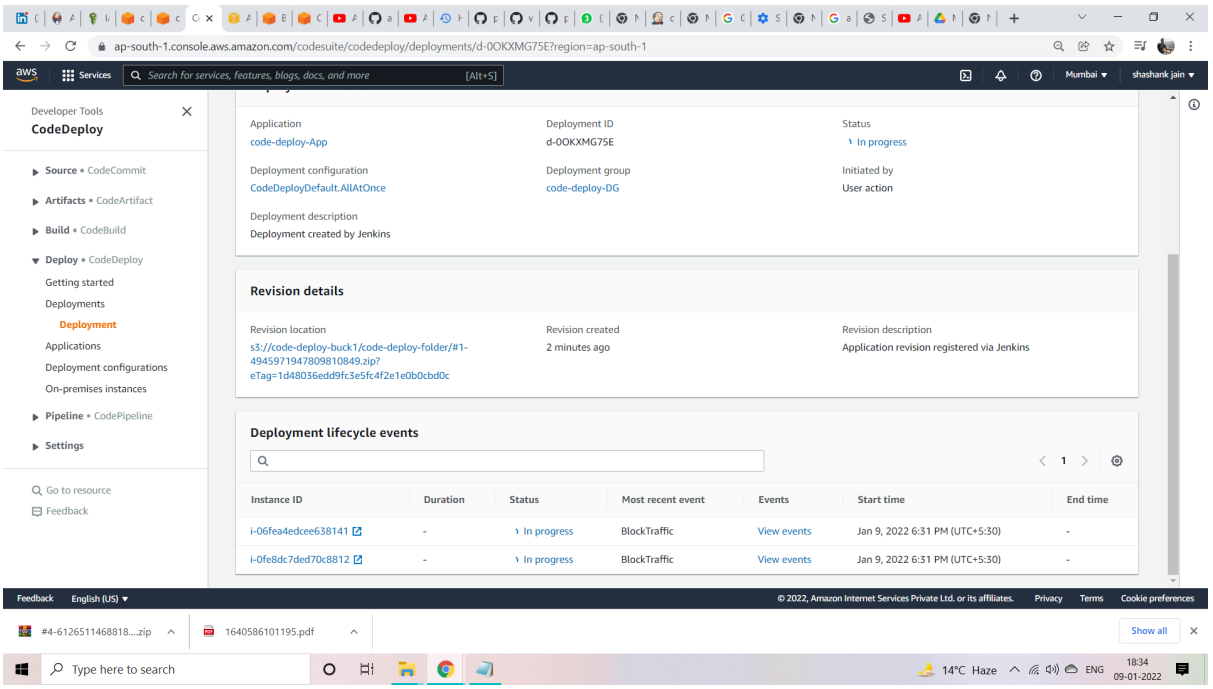


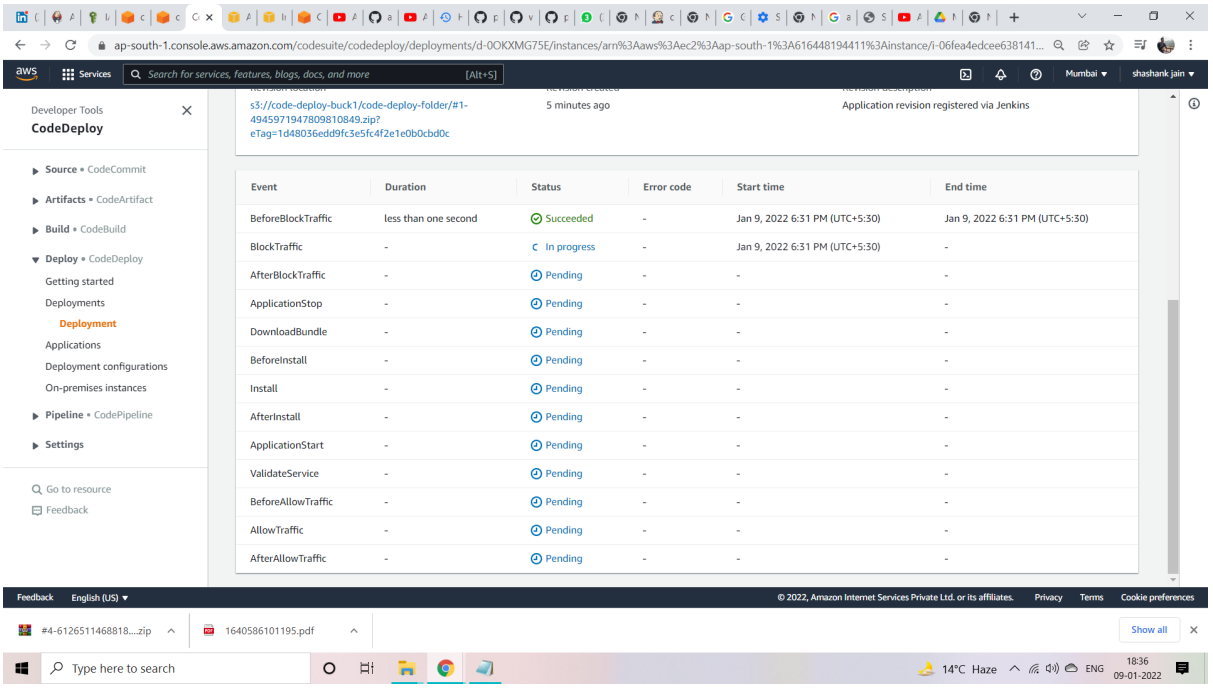
Check console output.



As soon as we will hit the Build Now button the job will run and trigger for code deploy deployment . we can see here it is in progress.



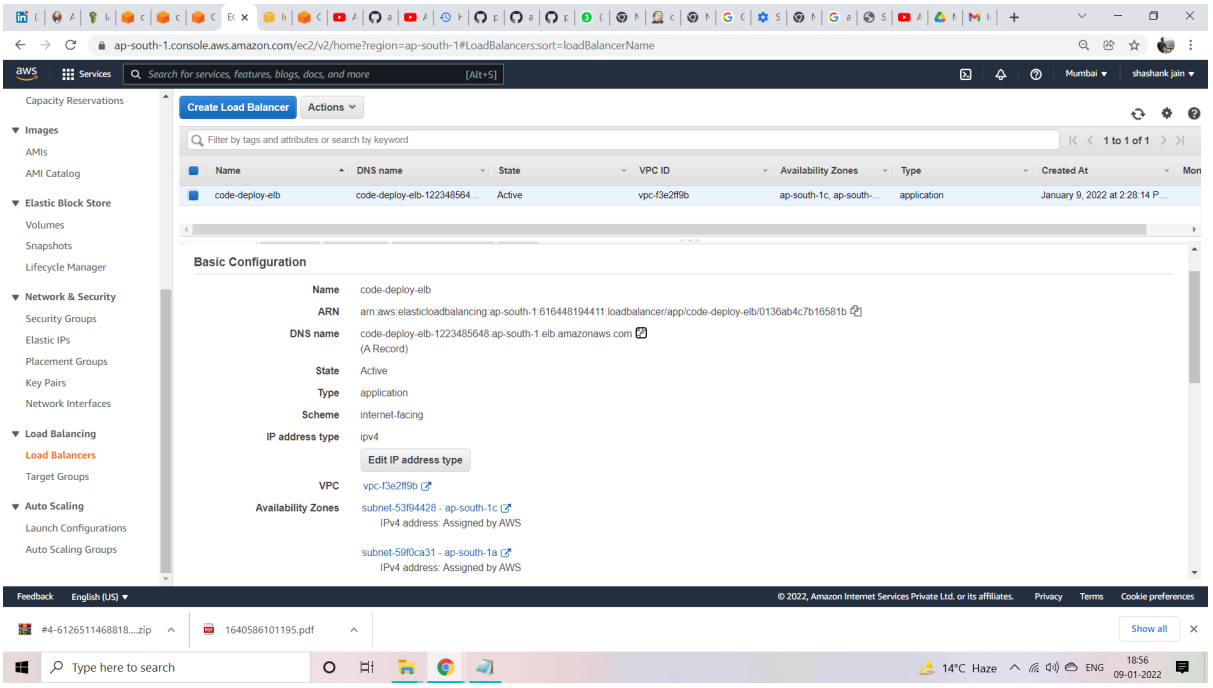




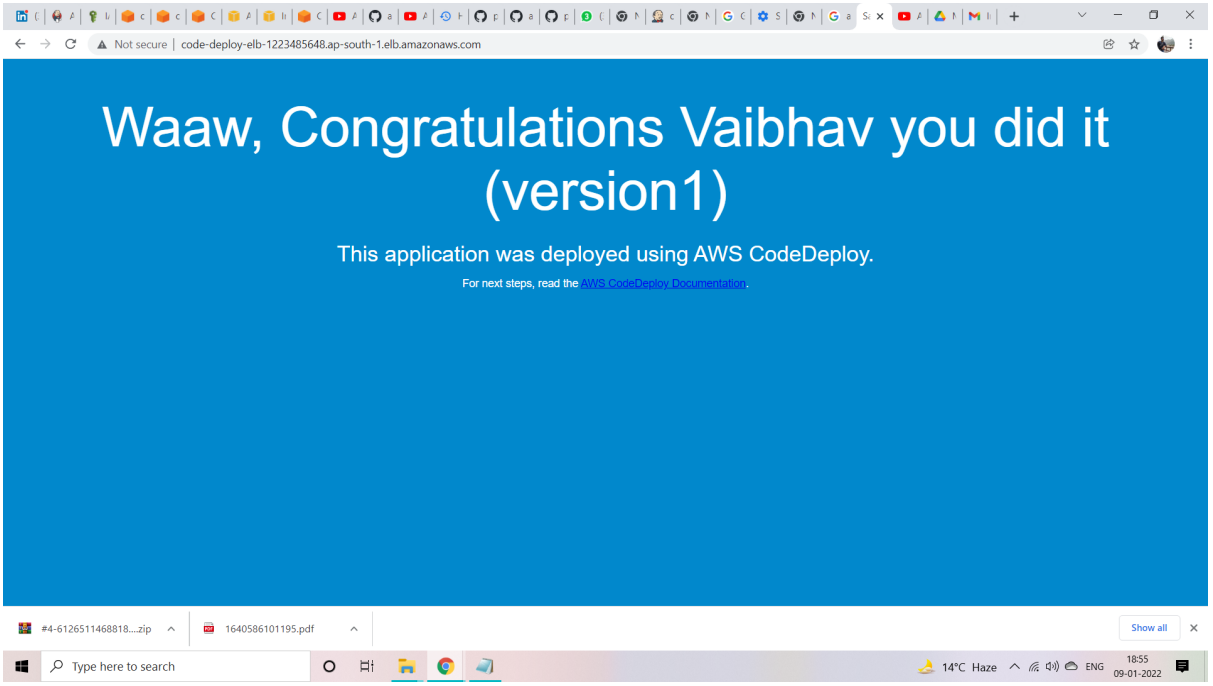
Here we can see , it take time , as we have choosed the option of build all at once.

Step 11 -

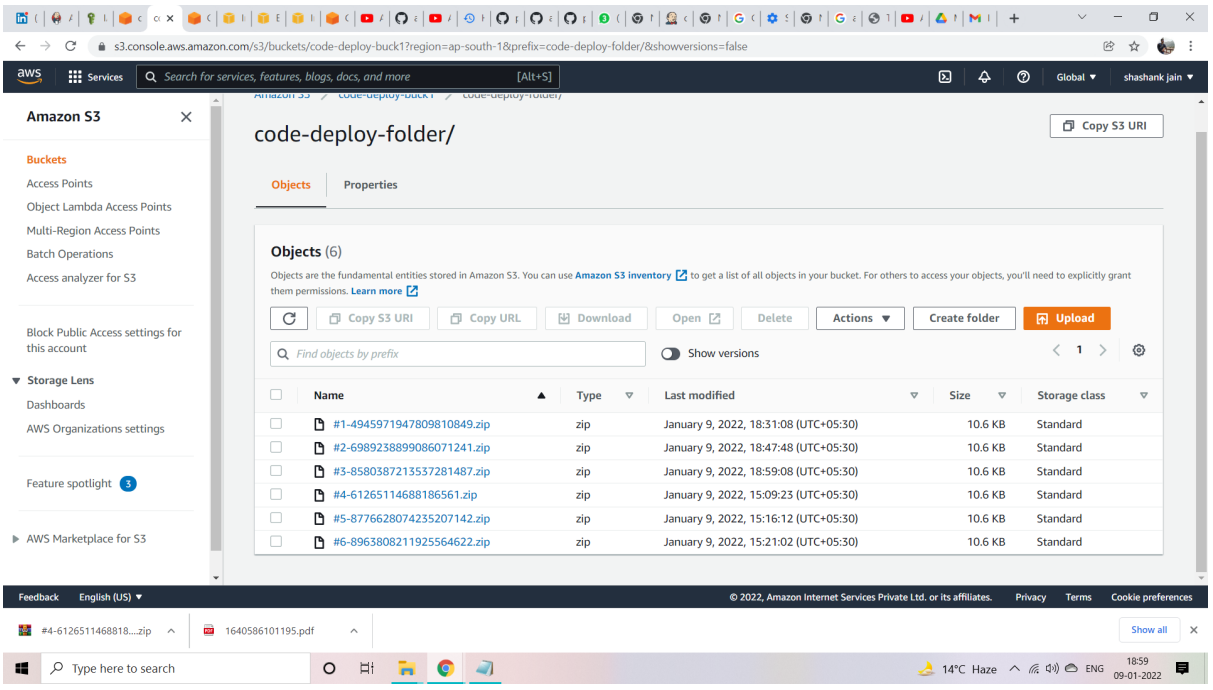
Go to AWS Load balancer portal and go to that particular ELB you have Created and copy the DNS and paste it on browser , your application will be running .

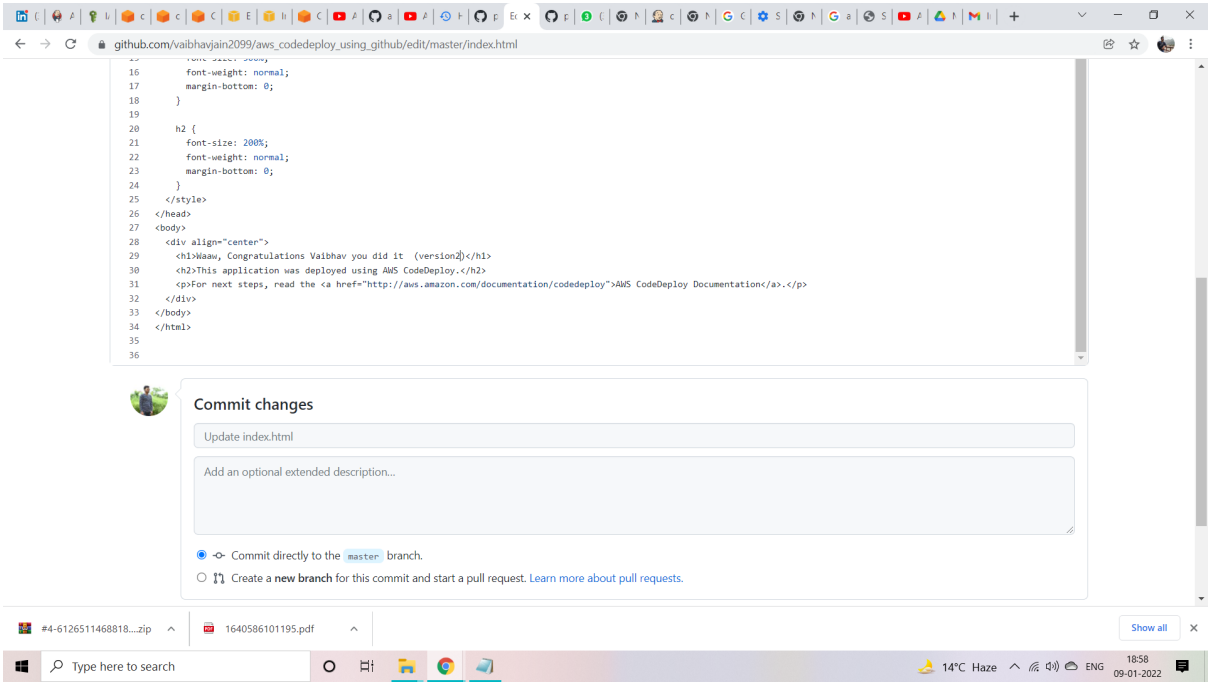


This is the first version of application. Now if i made any change to the code it will automatically reflect to the Web browser within some minutes.

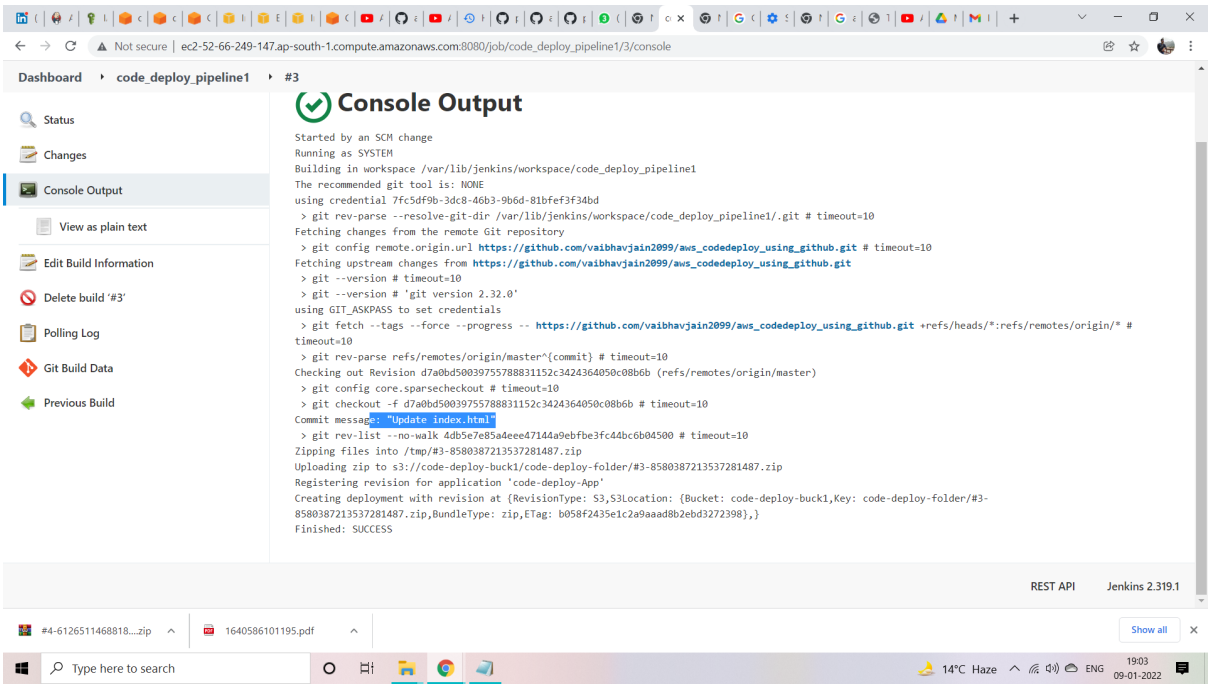


We can check that as soon as we run the jenkins job it run the deployment the data will get stored in s3 bucket.

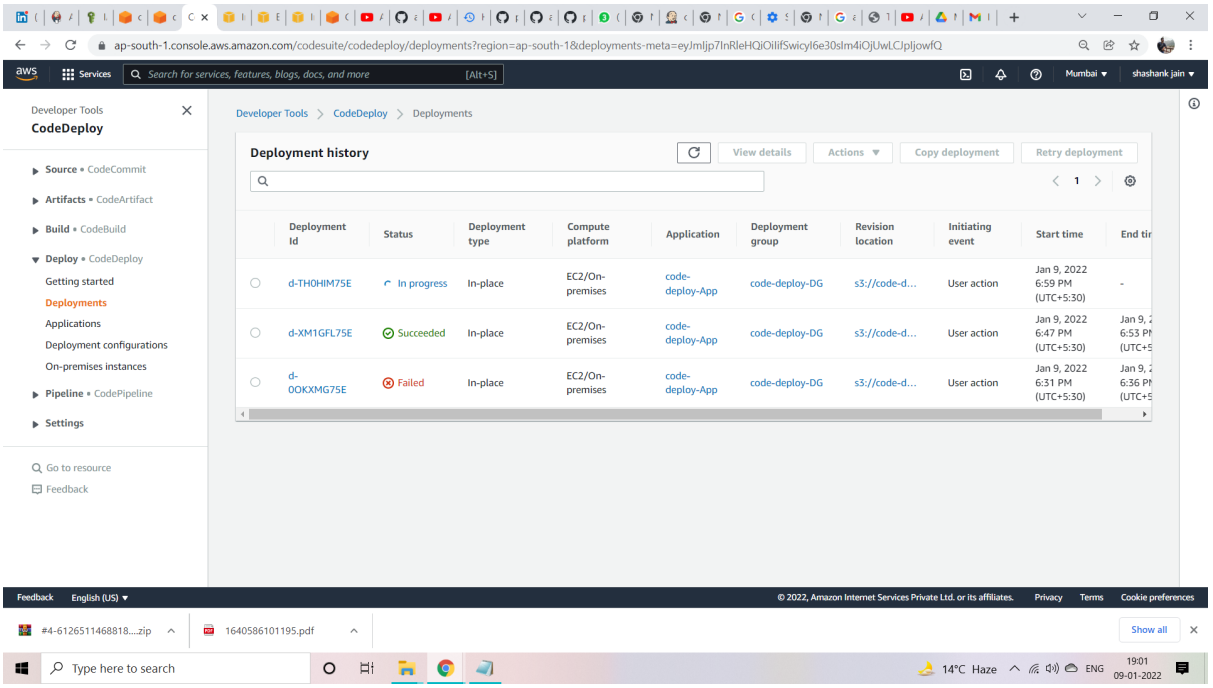




We can see as soon as we changed the code in index.html file , a new deployment will be triggered by jenkins job .



In progress


ap-south-1.console.aws.amazon.com/codesuite/codedeploy/deployments?region=ap-south-1&deployments-meta=eyJmIjp7InRleHQiOiIifSwicyI6e30sIm4iOjUwLCJpIjowfQ
Developer Tools
CodeDeploy
Source • CodeCommit
Artifacts • CodeArtifact
Build • CodeBuild
Deploy • CodeDeploy
Getting started
Deployments
Applications
Deployment configurations
On-premises instances
Pipeline • CodePipeline
Settings
Developer Tools > CodeDeploy > Deployments
Deployment history
View details
Actions
Copy deployment
Retry deployment
Deployment Id
Status
Deployment type
Compute platform
Application
Deployment group
Revision location
Initiating event
Start time
d-TH0HIM75E
In progress
In-place
EC2/On-premises
code-deploy-App
code-deploy-DG
User action
Jan 9, 2022 6:59 PM (UTC+5:30)
d-XM1GFL75E
Succeeded
Jan 9, 2022 6:47 PM (UTC+5:30)
d-0OKXMG75E
Failed
Jan 9, 2022 6:31 PM (UTC+5:30)
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences
#4-6126511468818....zip
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Show all
Type here to search
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ENG
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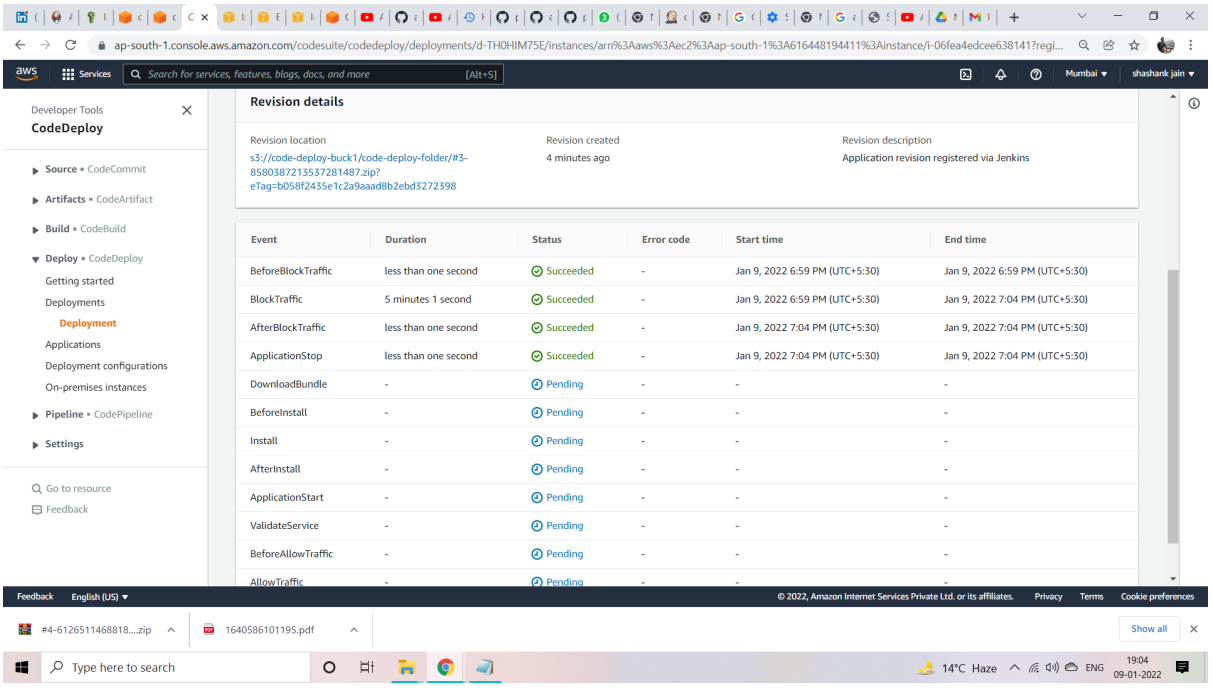
ap-south-1.console.aws.amazon.com/codesuite/codedeploy/deployments/d-TH0HIM75E/instances/arn%3Aaws%3Aec2%3Aap-south-1%3A616448194411%3Ainstance/i-06fea4edcee638141?regi...
Developer Tools
CodeDeploy
Source • CodeCommit
Artifacts • CodeArtifact
Build • CodeBuild
Deploy • CodeDeploy
Getting started
Deployments
Deployment
Applications
Deployment configurations
On-premises instances
Pipeline • CodePipeline
Settings
Revision details
Revision location
s3://code-deploy-buck1/code-deploy-folder/#3-85803872135372814 87.zip?eTag=b058f2435e1c2a9aaad8b2ebd3272398
Revision created
4 minutes ago
Revision description
Application revision registered via Jenkins
Event
Duration
Status
Error code
Start time
End time
BeforeBlockTraffic
less than one second
Succeeded
Jan 9, 2022 6:59 PM (UTC+5:30)
BlockTraffic
5 minutes 1 second
Jan 9, 2022 7:04 PM (UTC+5:30)
AfterBlockTraffic
ApplicationStop
DownloadBundle
Pending
BeforeInstall
Install
AfterInstall
ApplicationStart
ValidateService
BeforeAllowTraffic
AllowTraffic
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences
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Type here to search
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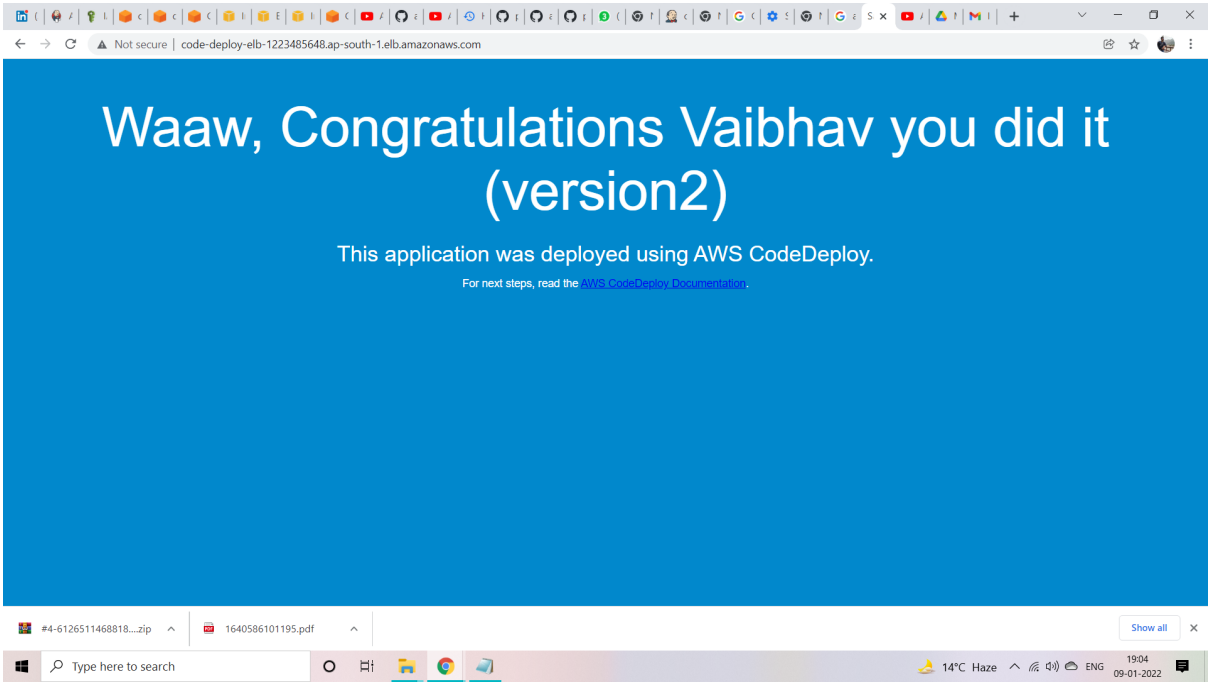

And here is the Our Final Output .

We can see that it shows the recent changed done by us in the html file.

Since we have used Auto Scaling Group and using ELB and its url to access the application , we can confirm that it scalable such that when load increases the number of servers scale up and down making sure the new servers have the updated code.

Github repo used - https://github.com/vaibhavjain2099/aws_codedeploy_using_github.git

Pardon me if i missed any step in between.

Thank You