

Project

Banking and Finance Domain

[Ajay Gaur]

FinanceMe is a Global leading Banking and Financial services provider based out of Germany. The company offers products and services like Banking, Funds Management, Loans, Debit Cards and Credits Cards, Investment Banking etc. Initially the company was using a Monolithic application architecture, As the company grown, It started facing difficulties in managing the application infrastructure and application deployments and Scaling of application when the traffic load increases.

FinanceMe has decided to opt for microservice architecture for its applications and decided to go DevOps by implementing necessary automations using CICD. **FinanceMe** has decided to use AWS as primary cloud services provider to create servers, databases and application deployments.

The company's goal is to deliver the product updates frequently to production automatically with High quality & Reliability. They also want to accelerate software delivery speed, quality and reducing feedback time between developers and testers.

Currently, they are facing following problems, because of various technologies involved in the project.

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

In order to implement a POC, you are requested to develop a mavenized microservice using spring boot and in memory h2 database.

1. a microservice which exposes below mentioned endpoints as APIs and uses pre- configured AWS RDS – mysql database to store the data.
 - a. /createAccount (HTTP Method: POST) (Request Body: JSON)
 - b. /updateAccount/{account no.} (HTTP Method : PUT) (Request Body : JSON)
 - c. /viewPolicy/{account no.} (HTTP Method : GET) (No Request Body)
 - d. /deletePolicy/{account no.} (HTTP Method : DELETE) (No Request Body)
2. Write necessary Junit testcase.
3. Generate HTML report using TestNG.
4. Push your code into your GitHub Repository.

Note: Preload some data into the database.

Later, you need to implement Continuous Integration & Continuous Deployment using following tools:

- ✓ Git - For version control for tracking changes in the code files
- ✓ Maven – For Continuous Build
- ✓ Jenkins - For continuous integration and continuous deployment
- ✓ Docker - For deploying containerized applications
- ✓ Ansible - Configuration management tools
- ✓ Selenium - For automating tests on the deployed web application
- ✓ Terraform - For creation of infrastructure.
- ✓ Prometheus and Grafana – For Automated Monitoring and Report Visualization

This project will be about how to test the services and deploy code to dev/stage/prod etc, just on a click of button.

Business challenge/requirement

As soon as the developer pushes the updated code on the GIT master branch, the code should be checked out, compiled, tested, packaged and containerized. A new test-server should be provisioned using terraform and should be automatically configured using Ansible with all the required software's and as soon as the server is available, the application must be deployed to the test-server automatically.

The deployment should then be tested using a test automation tool, and if the build is Successful, Prod server must be configured with all the software it should be pushed to the prod server. All this should happen automatically and should be triggered from a push to the GitHub master branch.

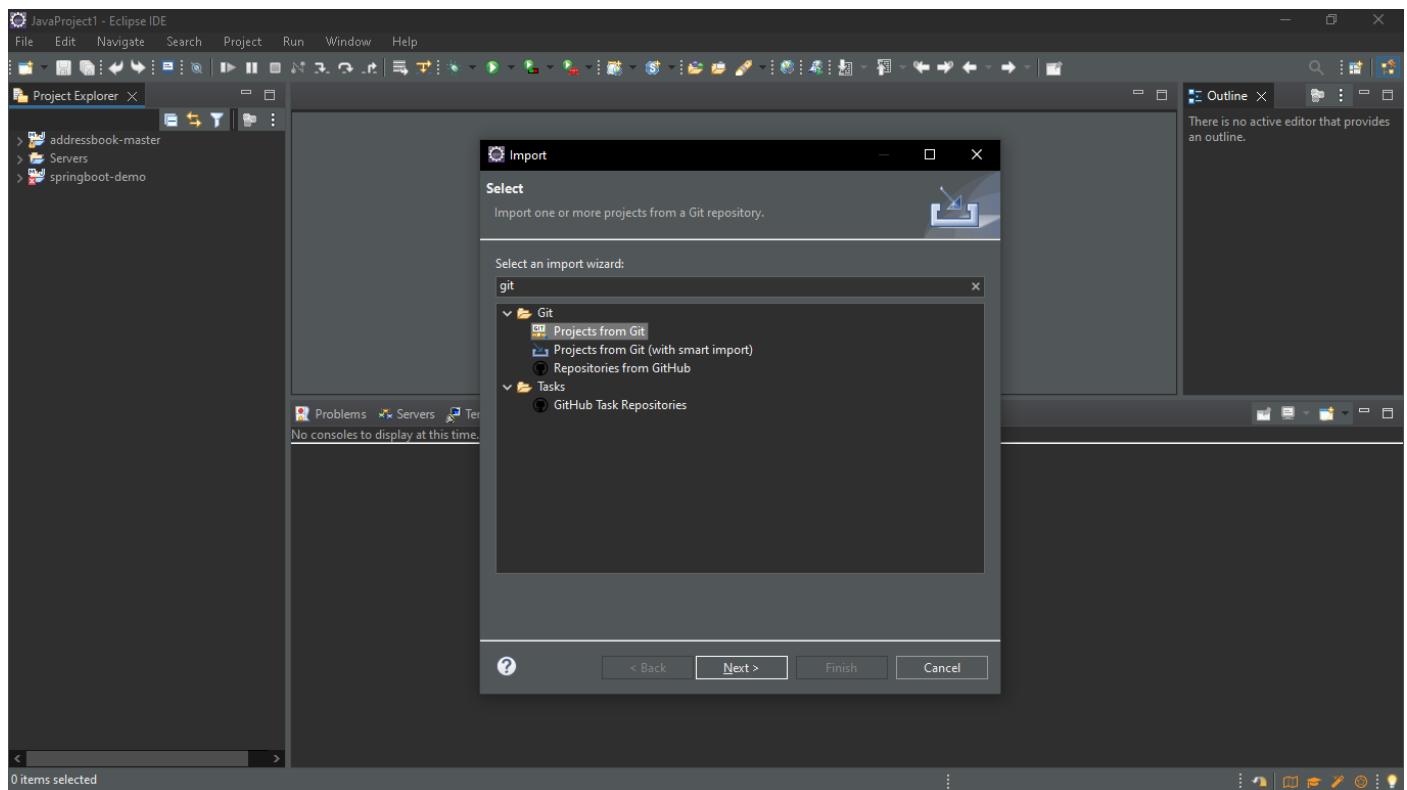
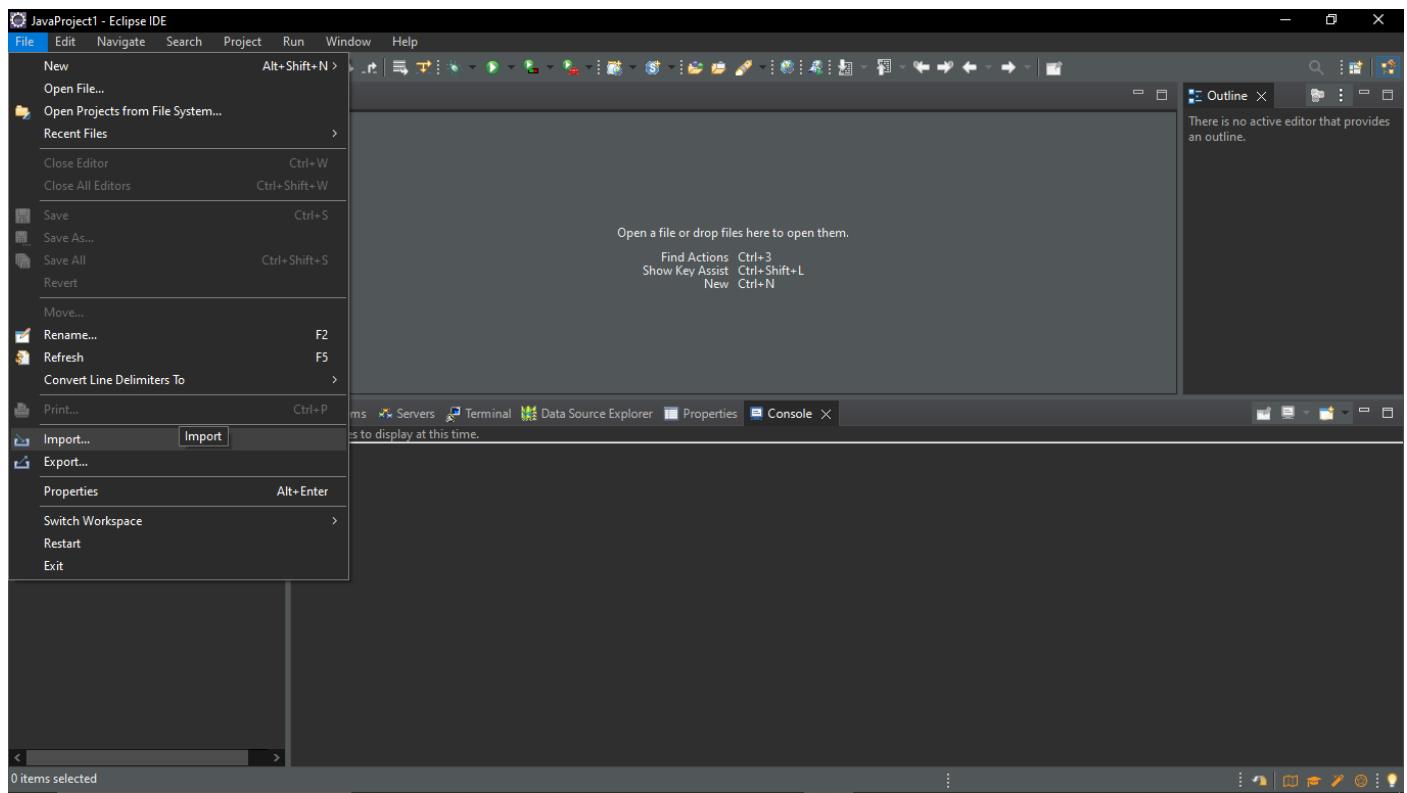
Continuous monitoring server must be configured to monitor the test as well as prod server using Prometheus and Grafana should be configured to display a dashboard with following metrics.

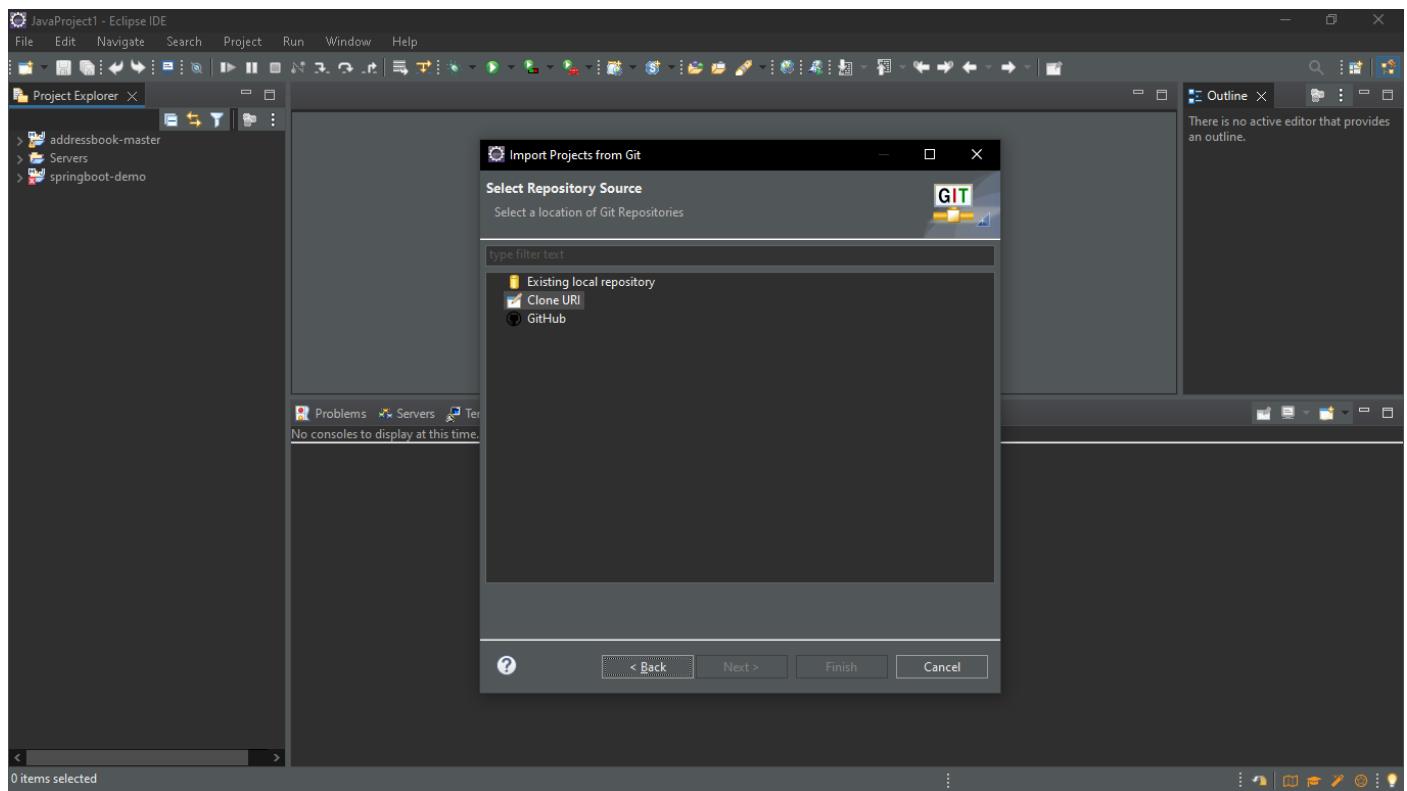
1. CPU utilization
2. Disk Space Utilization
3. Total Available Memory

Link for the Solution of **FinanceMe** project code is attached below. Use it to validate your solution.

<https://github.com/StarAgileDevOpsTraining/star-agile-banking-finance.git>

Note: To have a detailed information about running the application and exposed APIs, Input/Output format, Refer to the README.md in the GitHub repository.

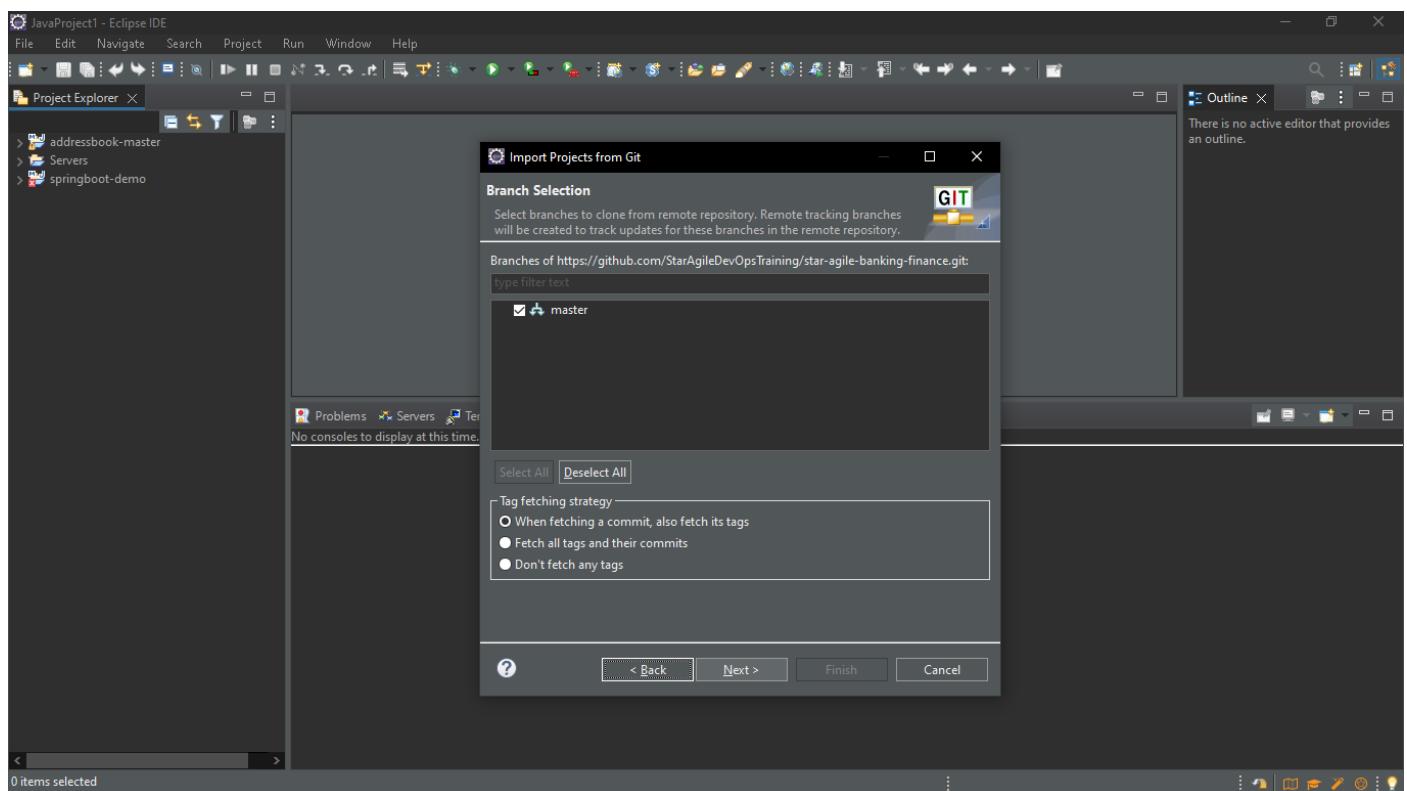
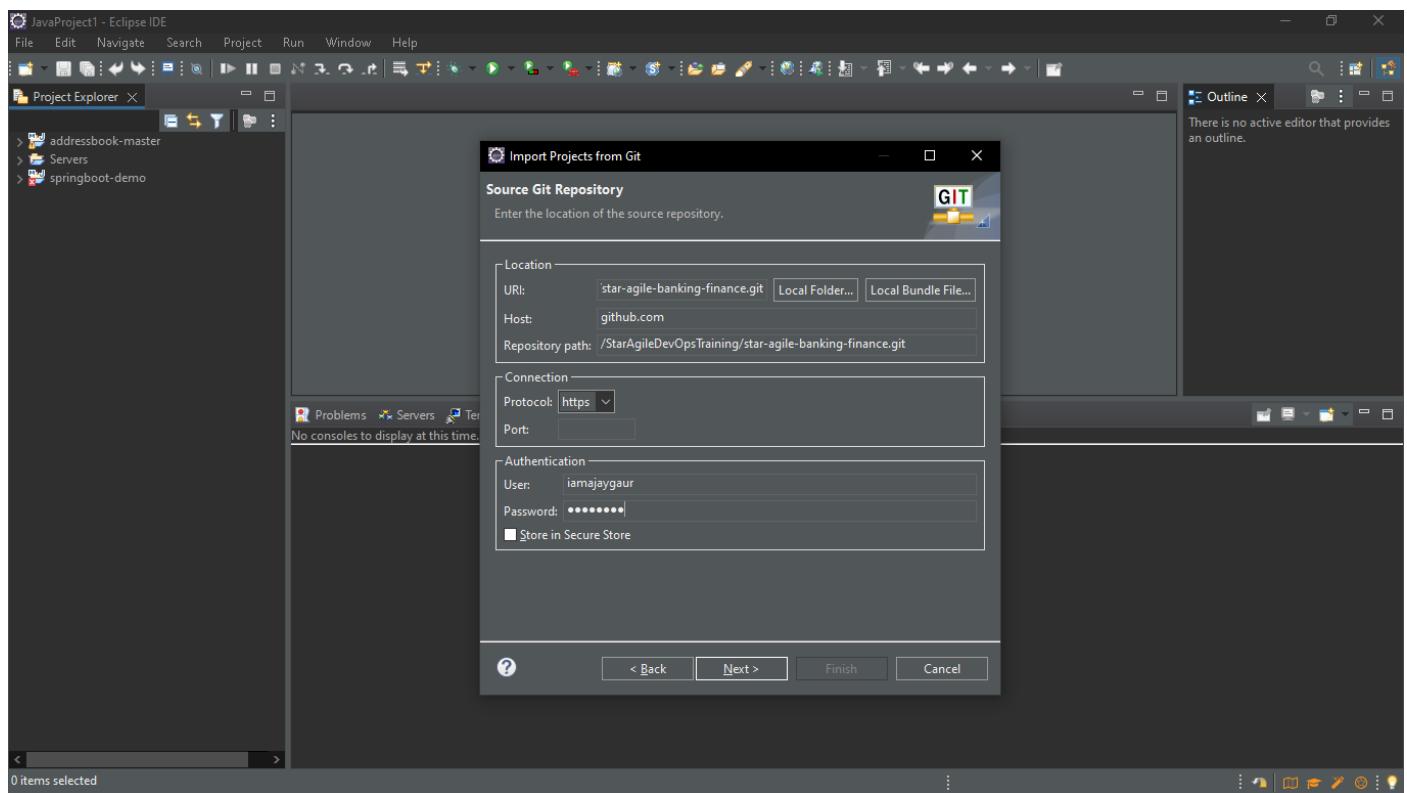




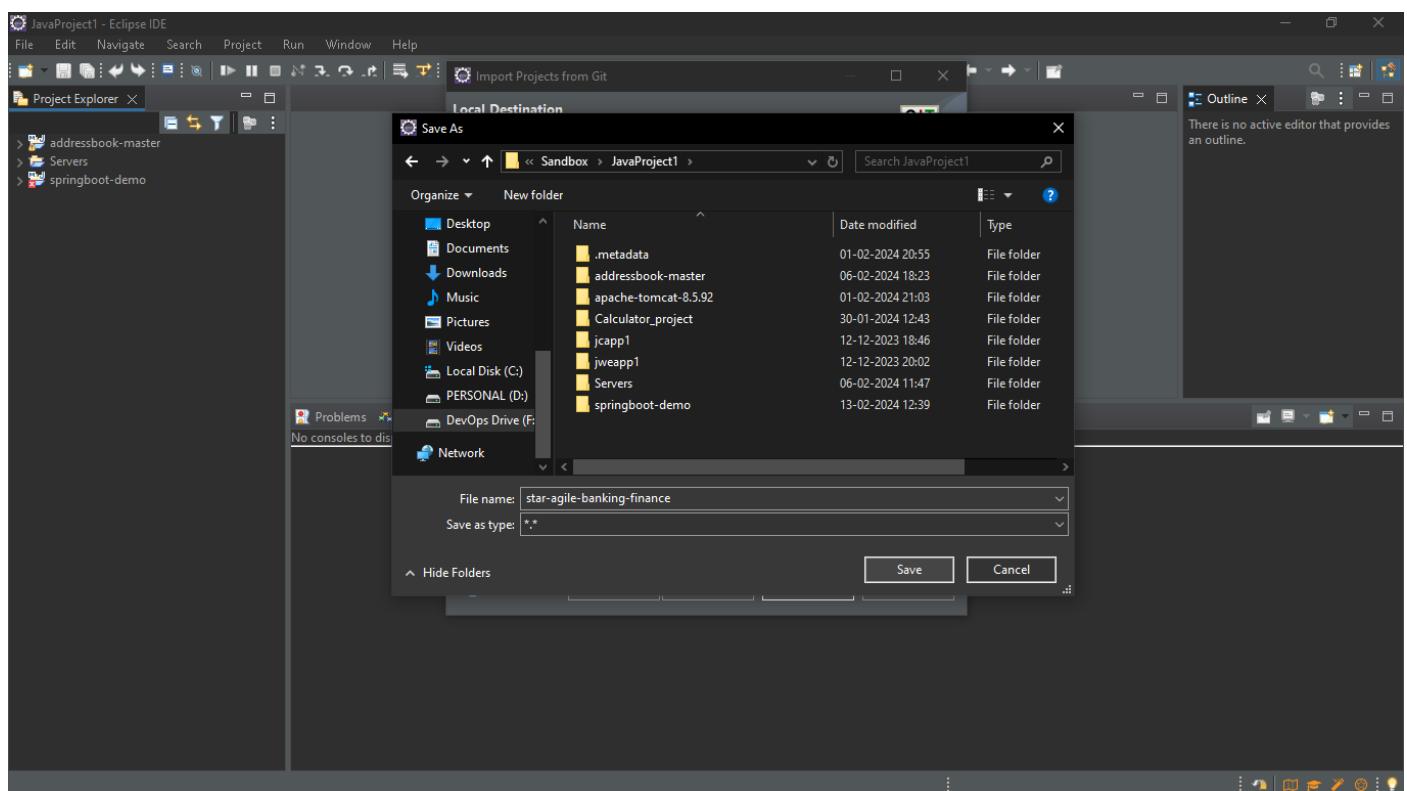
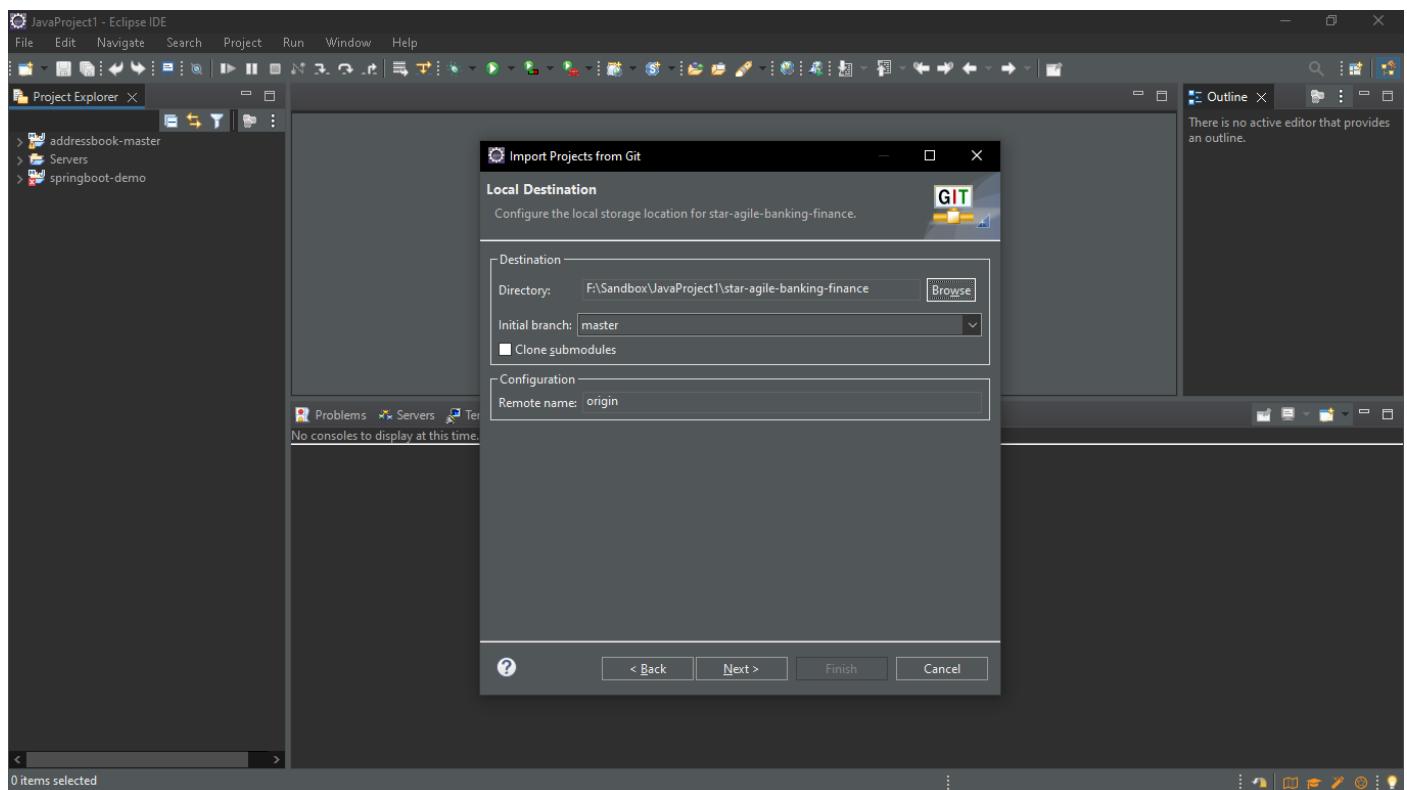
→ <https://github.com/StarAgileDevOpsTraining/star-agile-banking-finance>

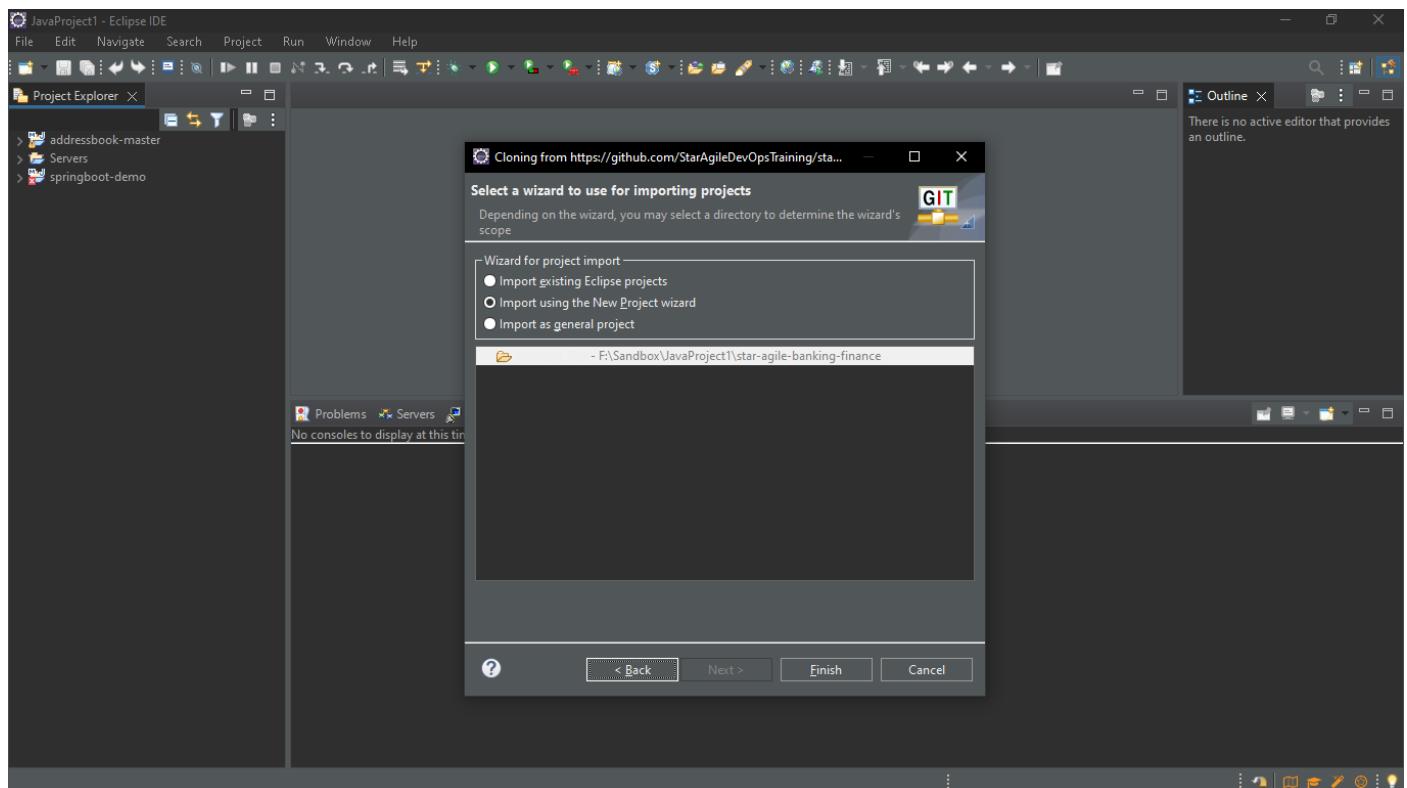
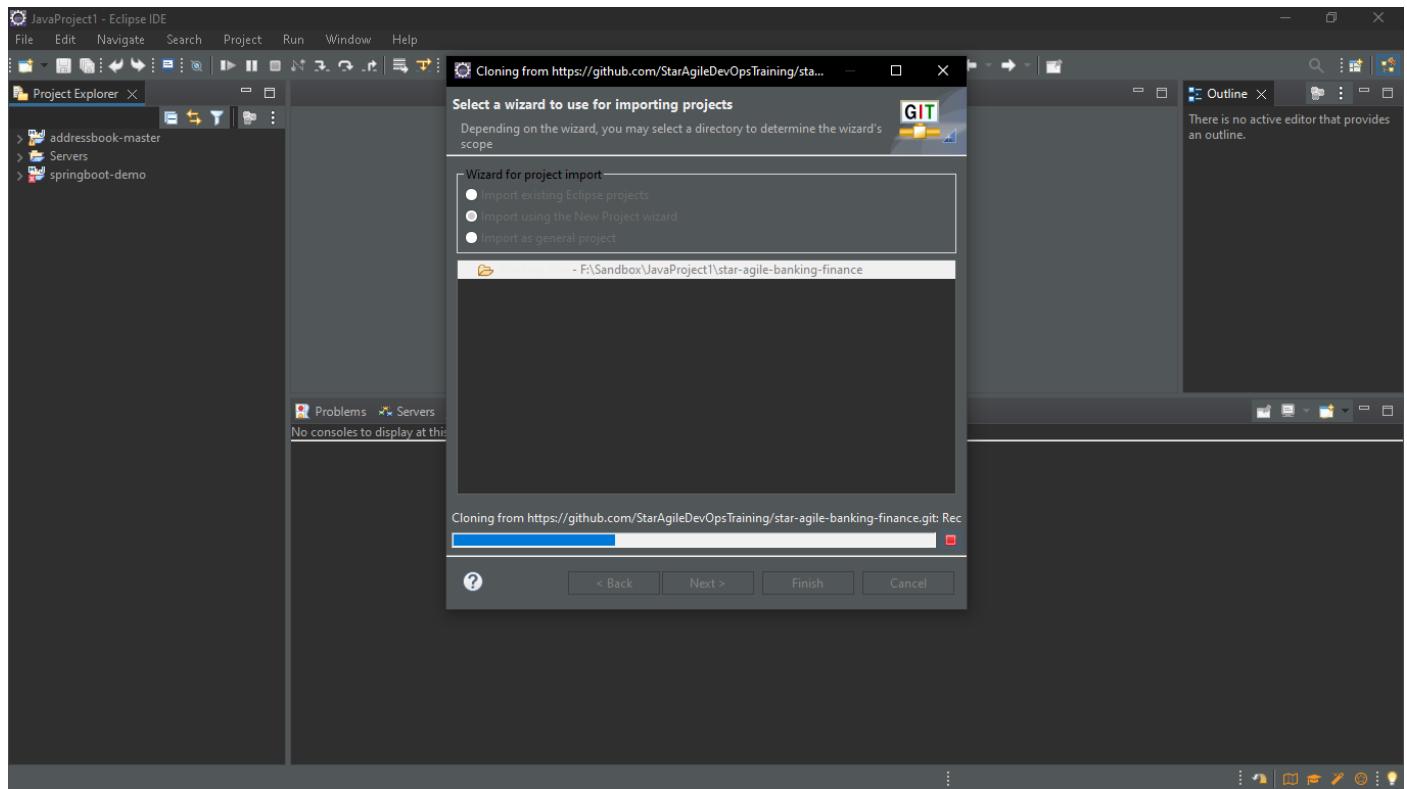
A screenshot of a web browser window showing a GitHub repository page. The URL in the address bar is 'github.com/StarAgileDevOpsTraining/star-agile-banking-finance'. The page title is 'star-agile-banking-finance' and it is described as a 'Public' repository forked from 'shubhamkushwah123/star-agile-banking-finance'. The repository has 1 branch ('master') and 0 tags. A dropdown menu is open over the repository details, specifically the 'Clone' section. It shows three cloning options: 'HTTPS' (selected), 'SSH', and 'GitHub CLI'. The 'HTTPS' URL is highlighted with a blue border. Other options shown include 'Copy url to clipboard', 'Clone using the web URL', 'Open with GitHub Desktop', 'Open with Visual Studio', and 'Download ZIP'. To the right of the repository details, there are sections for 'About', 'Activity', 'Releases', 'Packages', and 'Languages'. The 'About' section notes 'No description, website, or topics provided.'. The 'Languages' section shows a bar chart with Java at 55.1% and CSS at 26.9%.

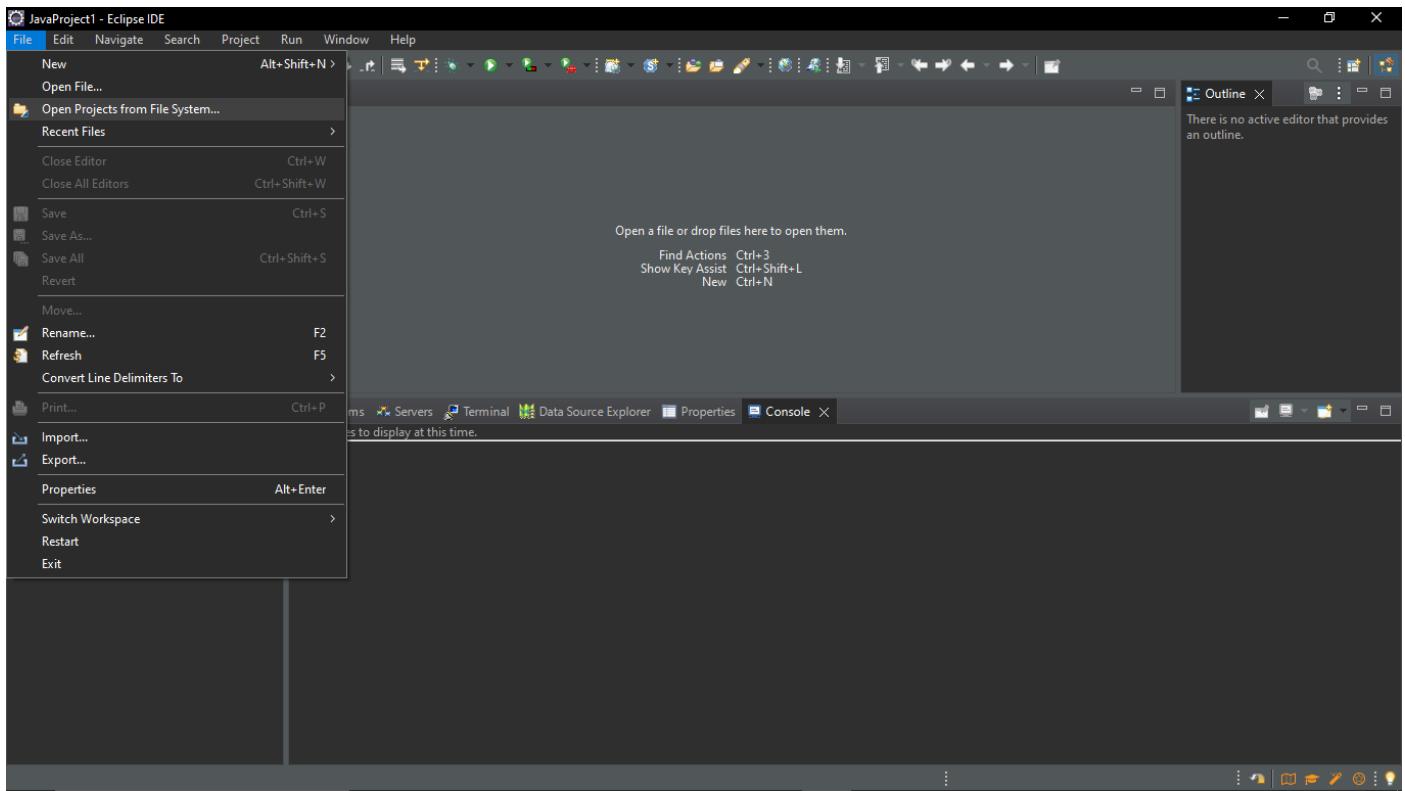
→ <https://github.com/StarAgileDevOpsTraining/star-agile-banking-finance.git>



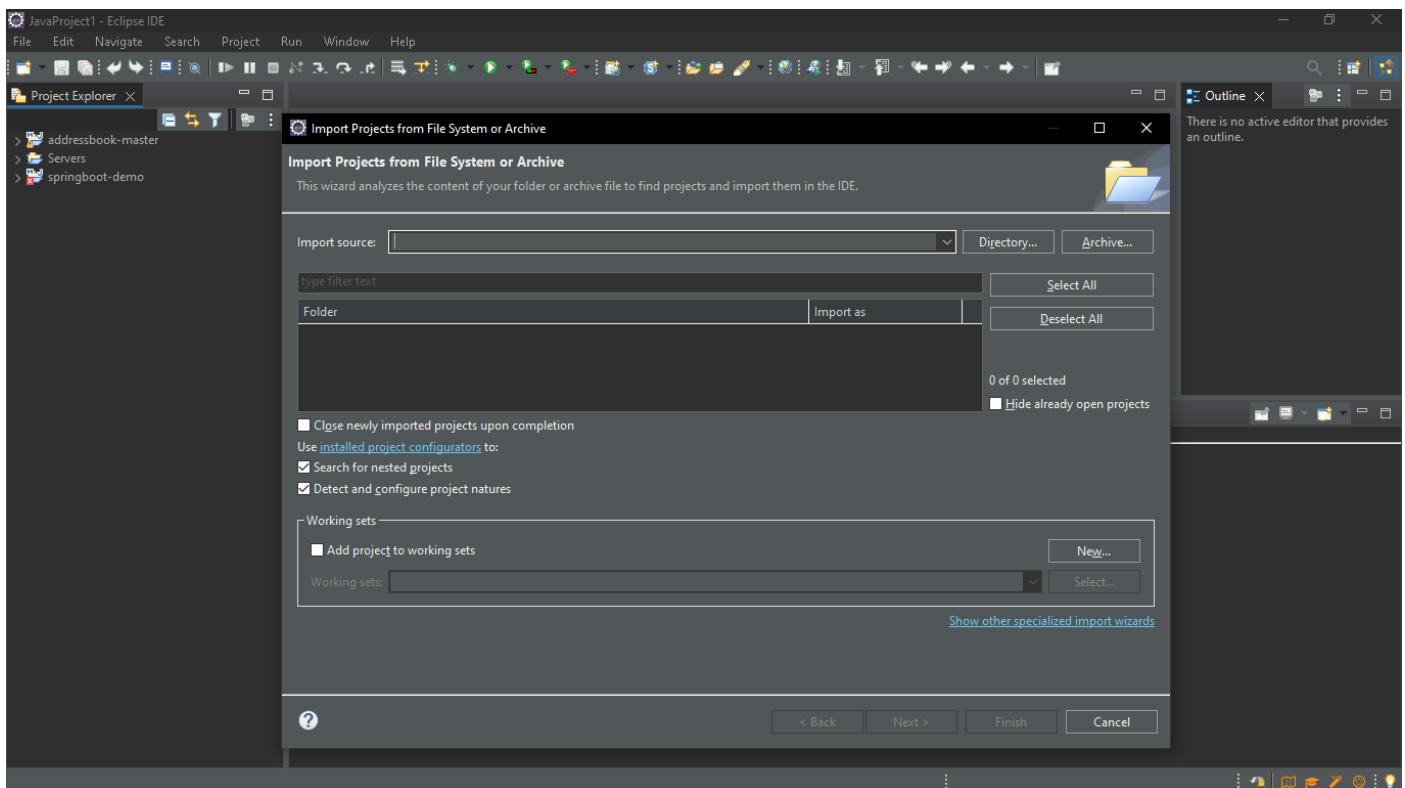
→ Select your Destination where to place the project.

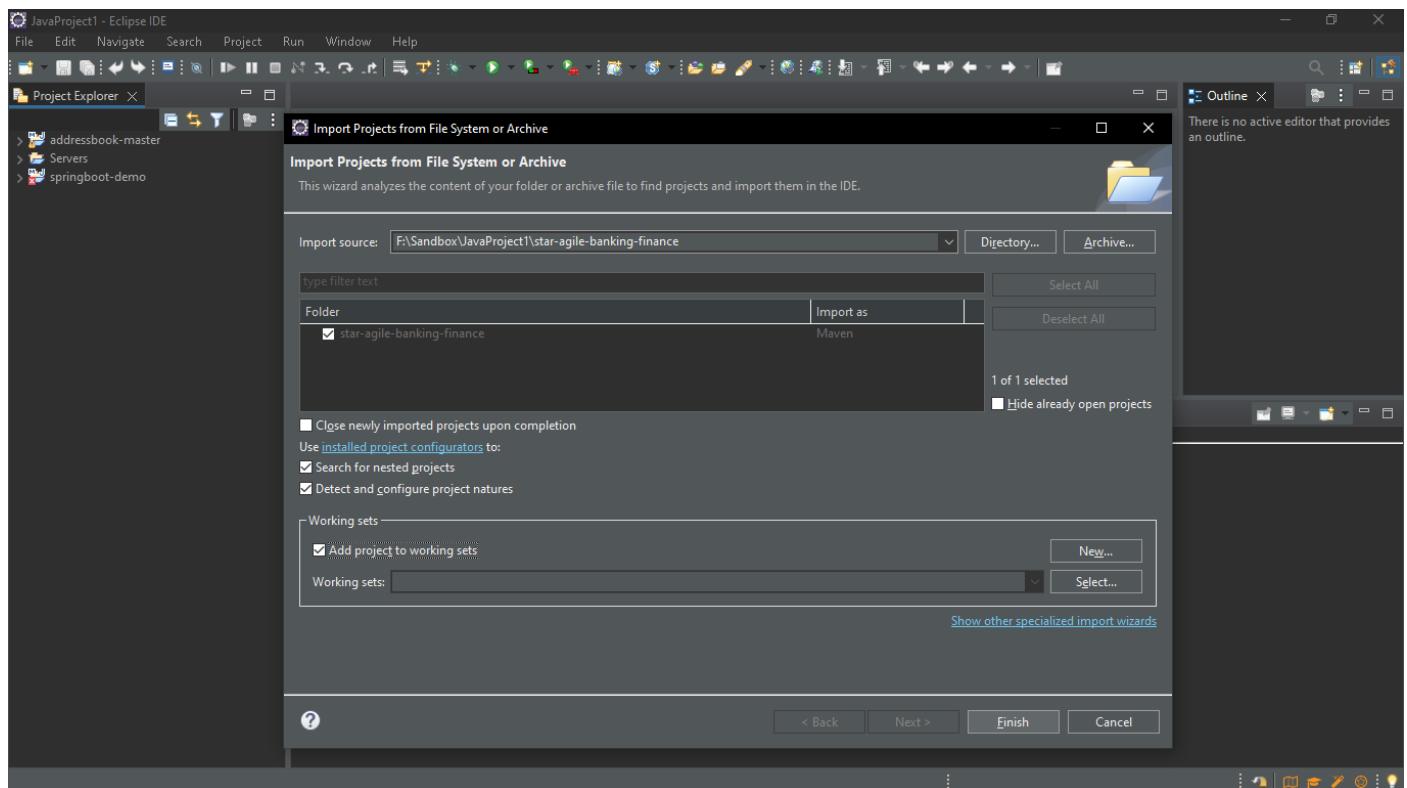
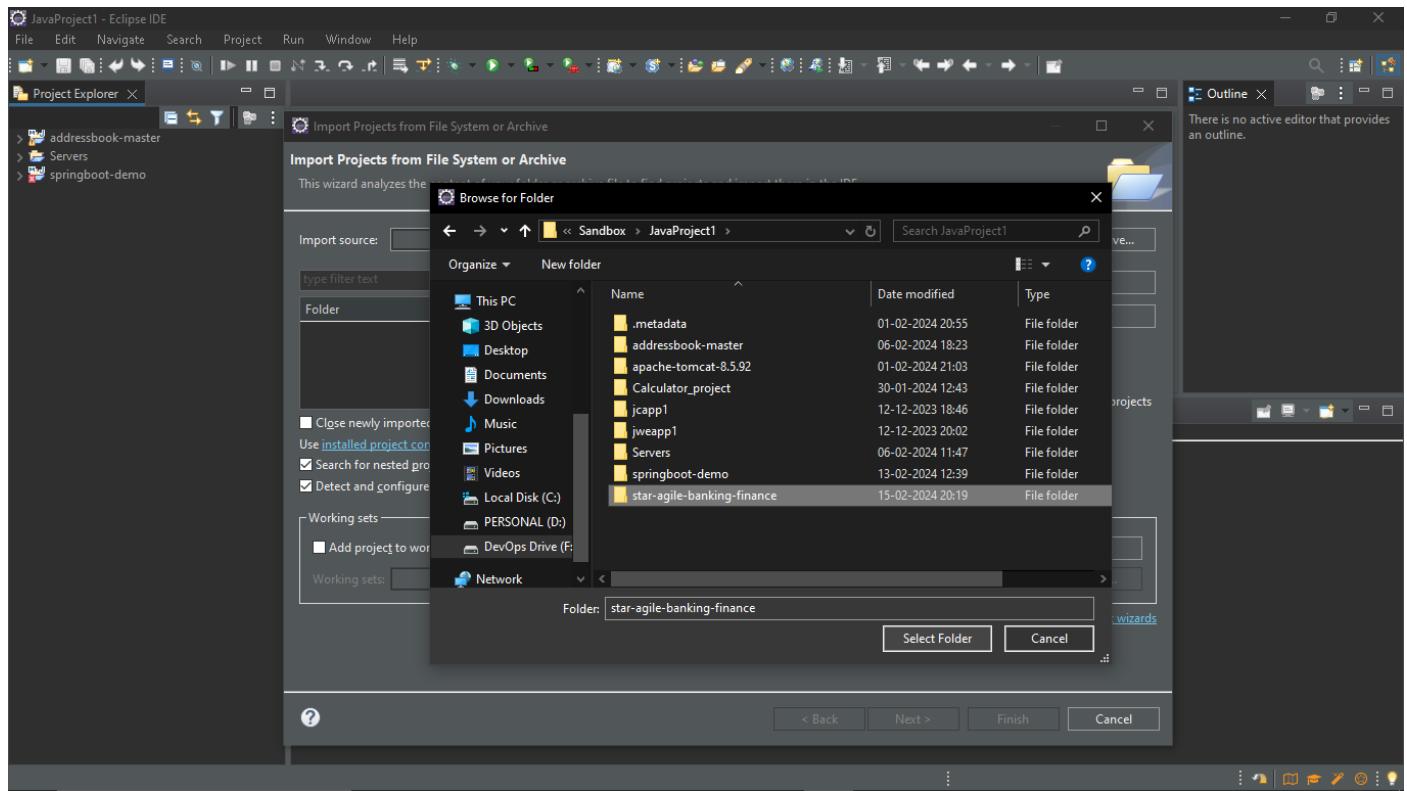


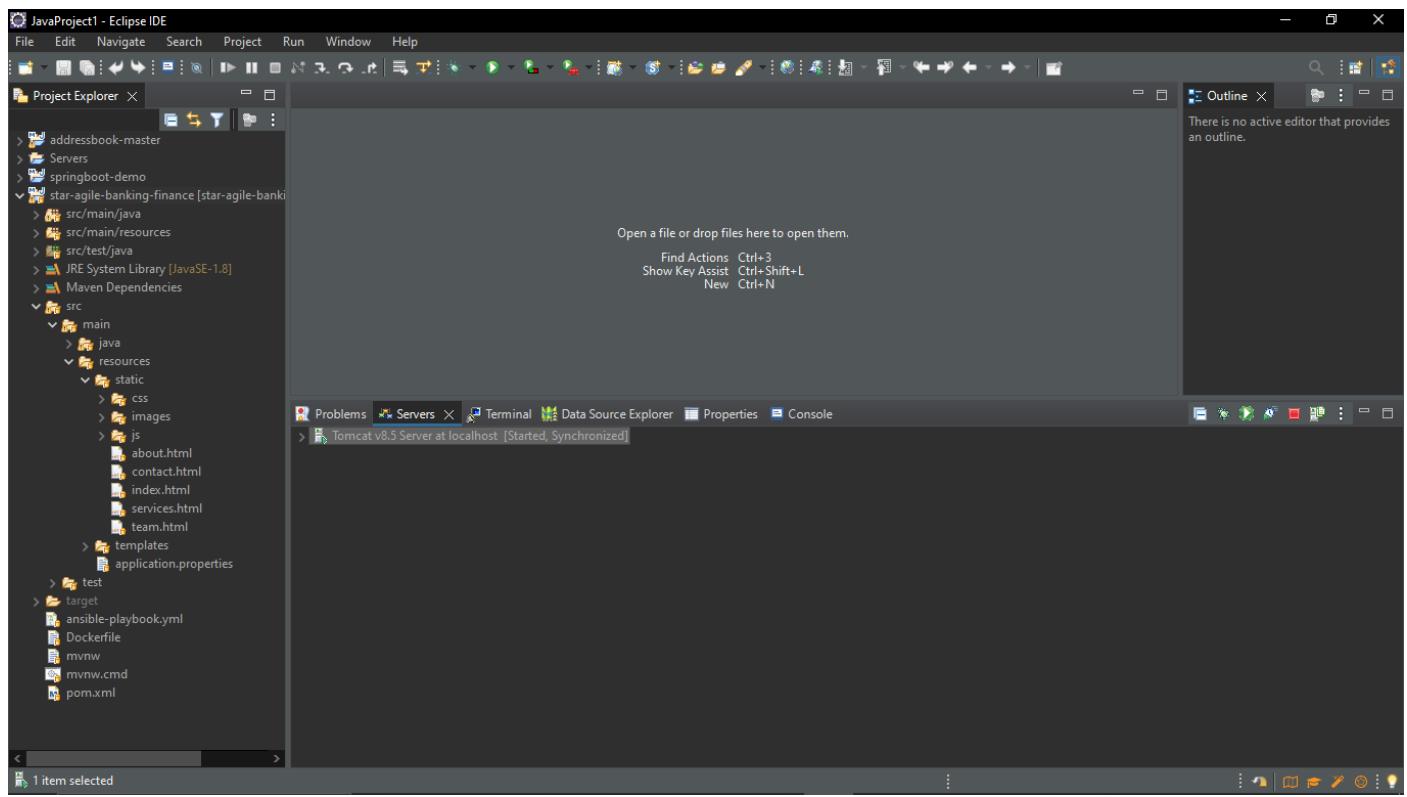
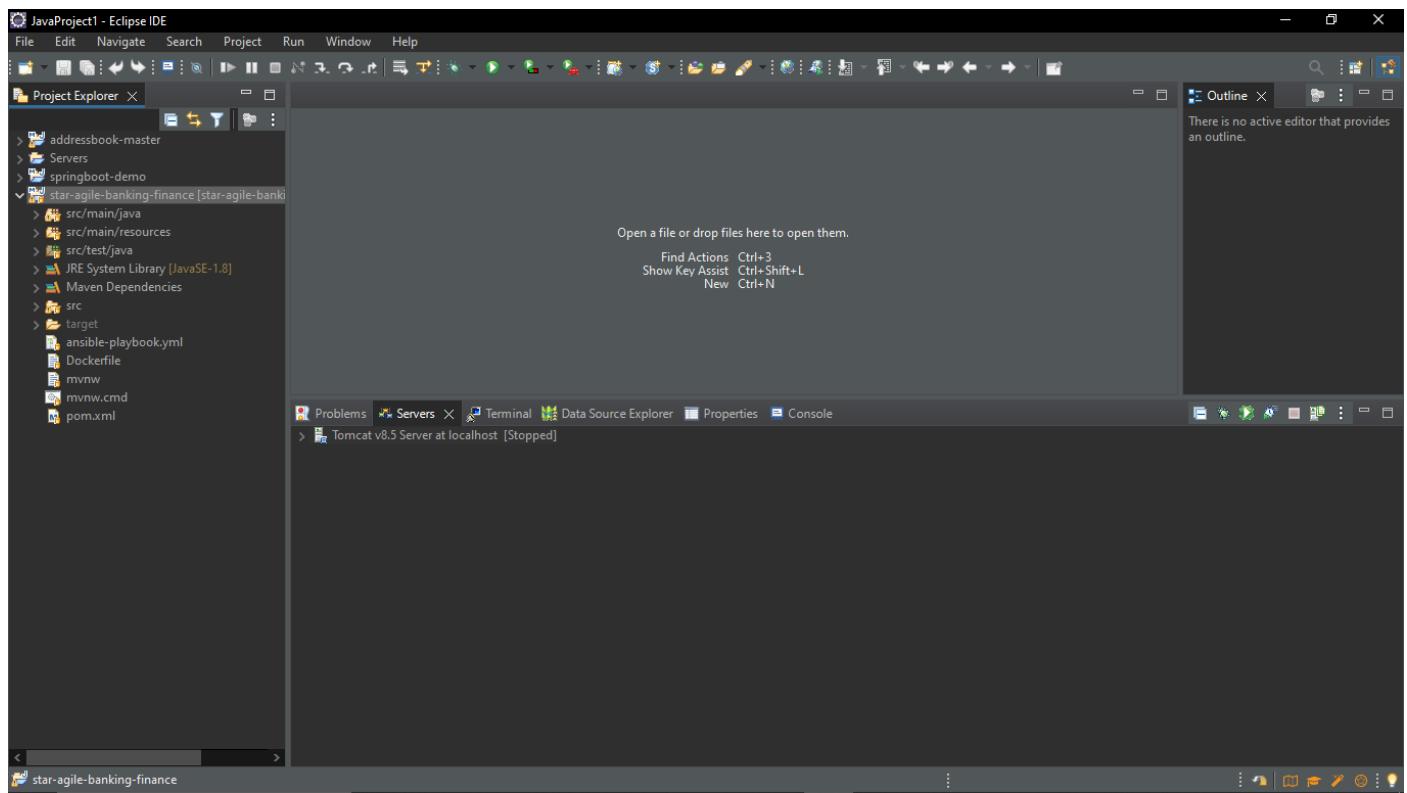


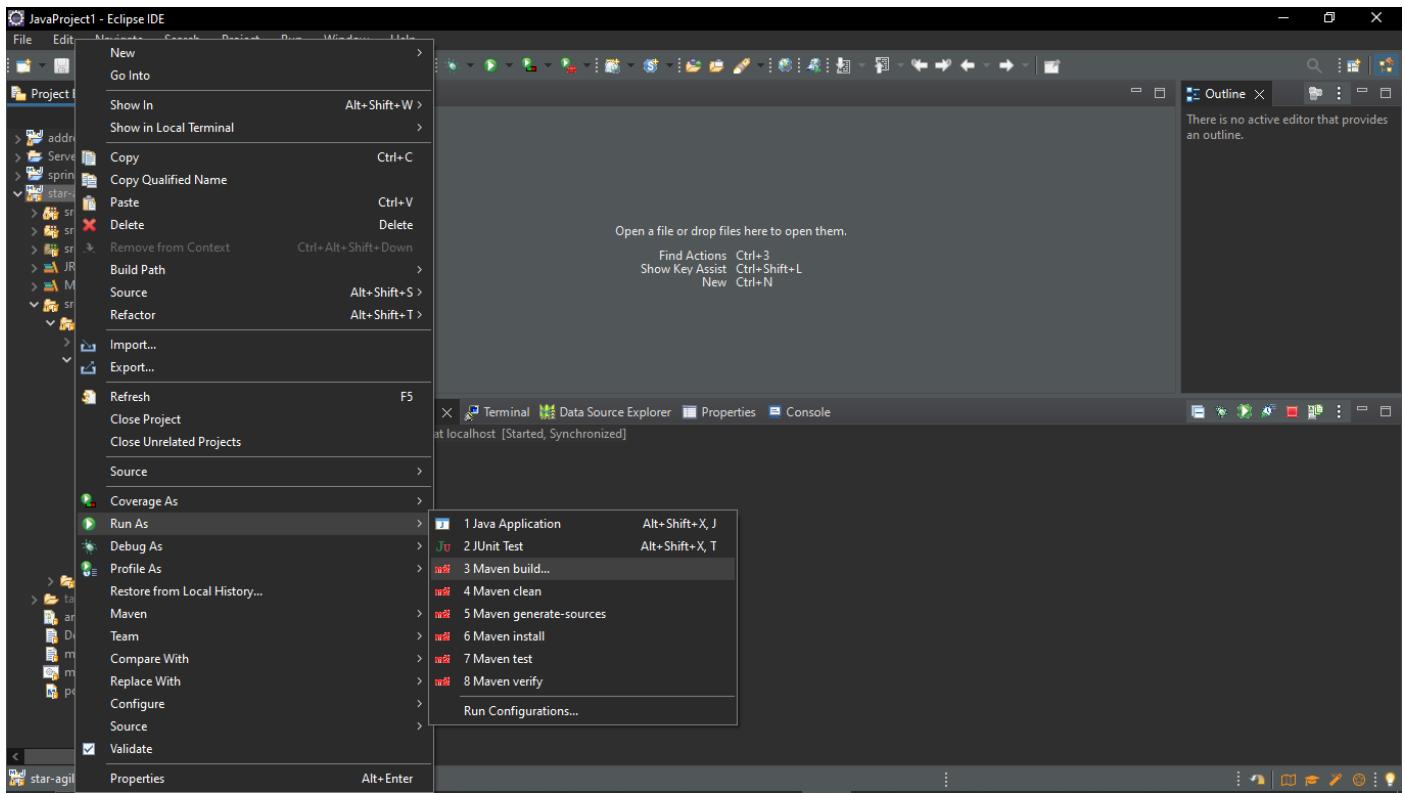
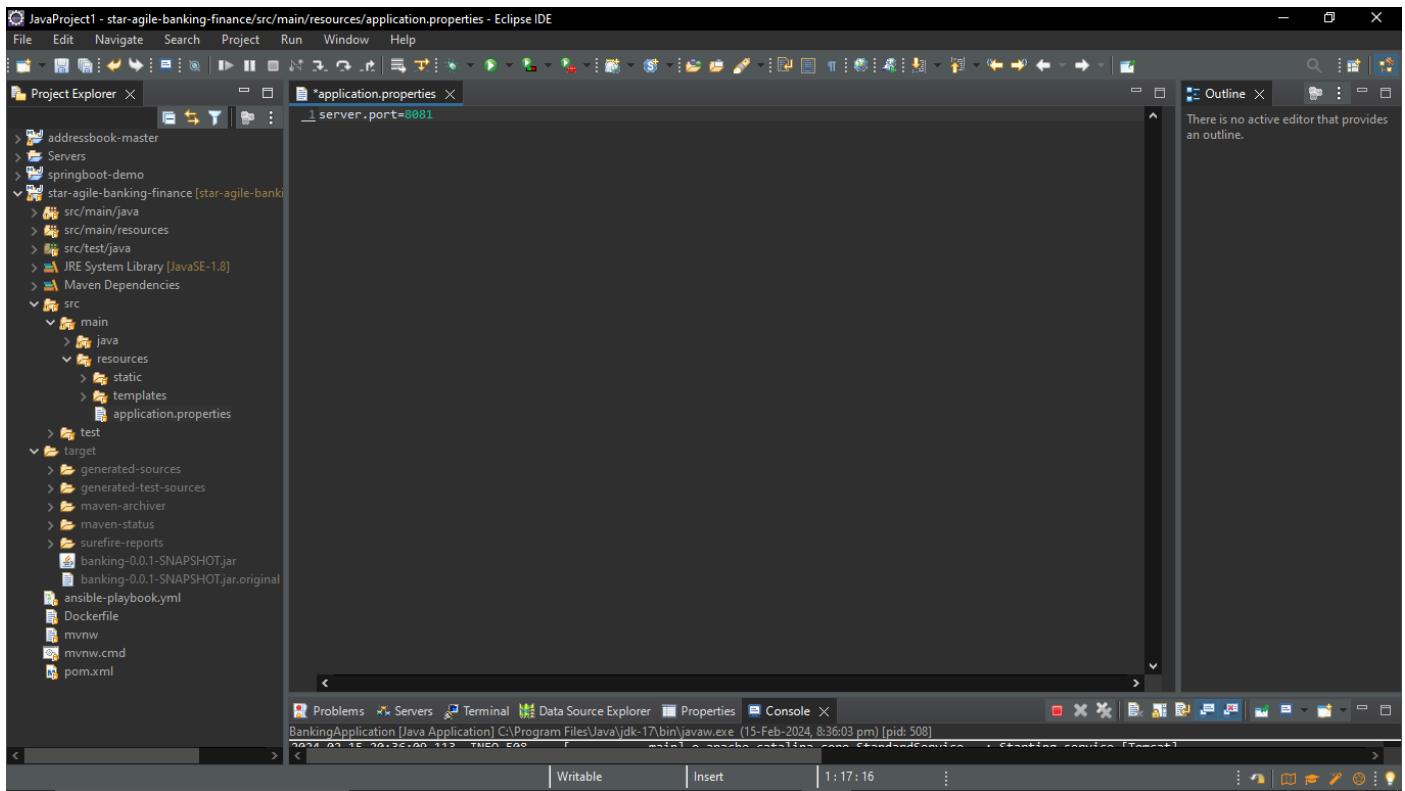


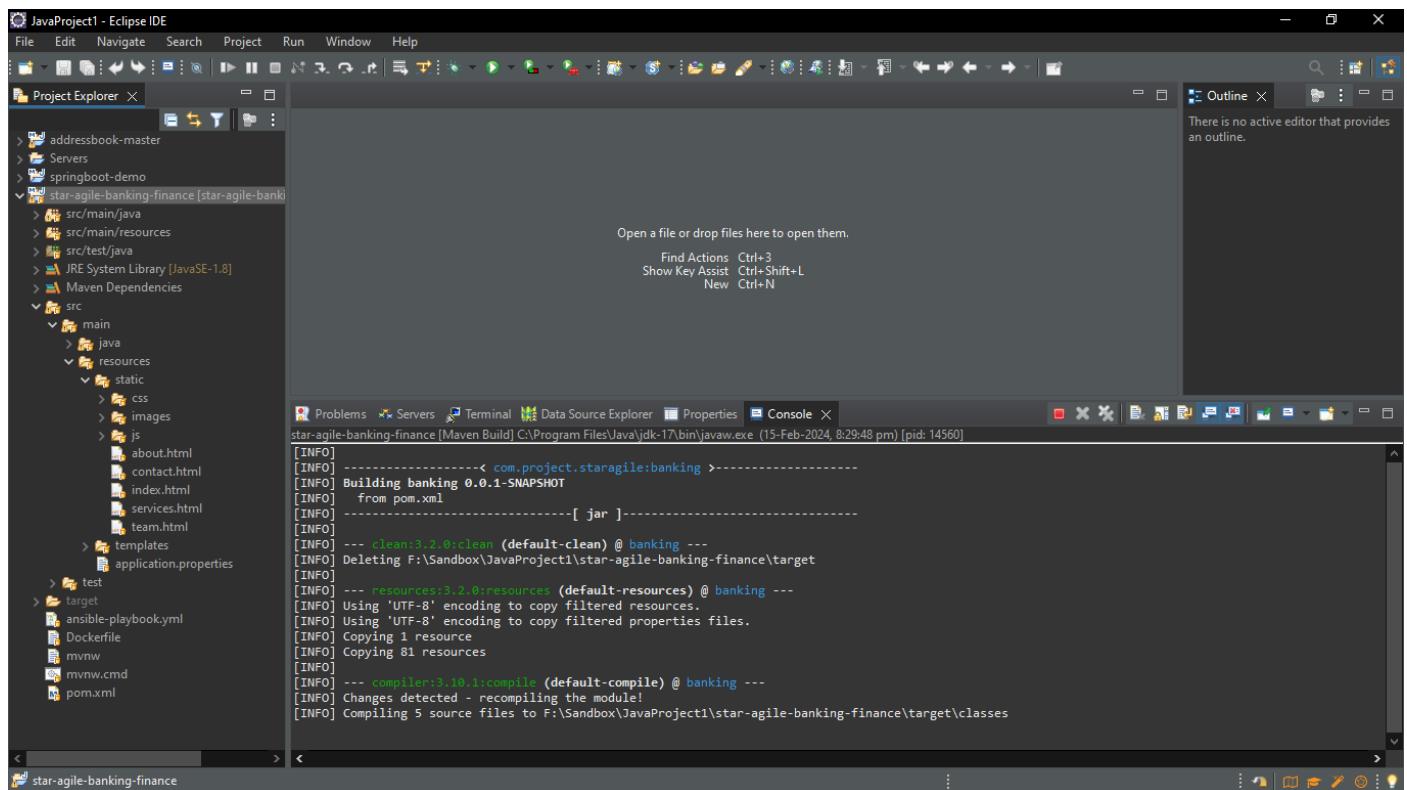
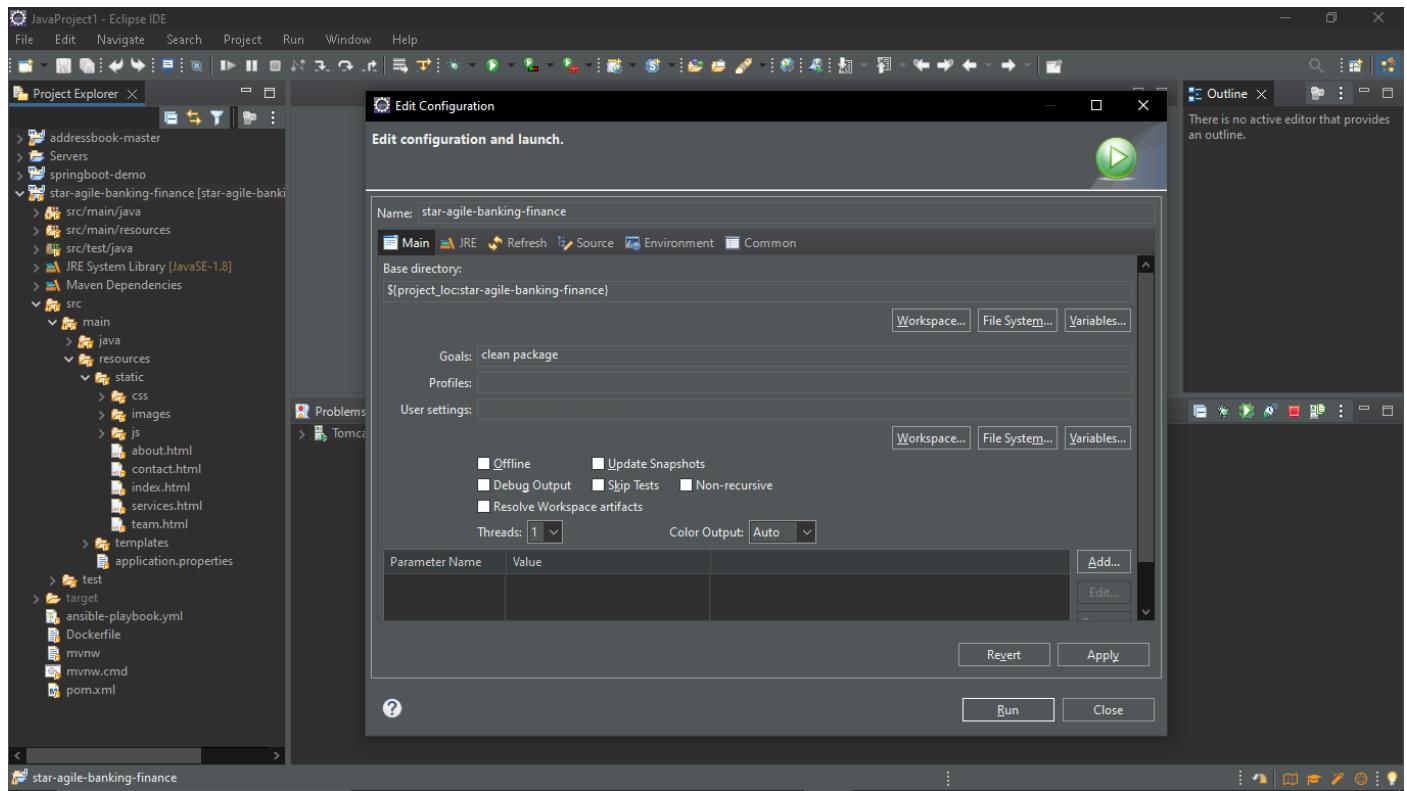
→ Select the project directory











JavaProject1 - Eclipse IDE

File Edit Navigate Search Project Run Window Help

Project Explorer X

- addressbook-master
- Servers
- springboot-demo
- star-agile-banking-finance [star-agile-bank]**
- src/main/java
- src/main/resources
- src/test/java
- JRE System Library [JavaSE-1.8]
- Maven Dependencies
- src
 - main
 - java
 - resources
 - static
 - css
 - images
 - js
 - about.html
 - contact.html
 - index.html
 - services.html
 - team.html
 - templates
 - application.properties
 - test
- target
- ansible-playbook.yml
- Dockerfile
- mvnw
- mvnw.cmd
- pom.xml

Outline X

There is no active editor that provides an outline.

Open a file or drop files here to open them.

Find Actions Ctrl+3
Show Key Assist Ctrl+Shift+L
New Ctrl+N

Problems Servers Terminal Data Source Explorer Properties Console X

star-agile-banking-finance [Maven Build] C:\Program Files\Java\jdk-17\bin\javaw.exe (15-Feb-2024, 8:29:48 pm) [pid: 14560]

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  \\` | | | | | | | | | | | | | | | |
  ======| ======| | | | | | | | | | |
  :: Spring Boot :: : (v2.7.4)

2024-02-15 20:30:08.935 INFO 7944 --- [           main] c.p.s.banking.BankingApplicationTests : Starting BankingApplicationTests using Java 17.0.7 or
2024-02-15 20:30:08.946 INFO 7944 --- [           main] c.p.s.banking.BankingApplicationTests : No active profile set, falling back to 1 default prof
2024-02-15 20:30:11.092 INFO 7944 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in DEFAULT
2024-02-15 20:30:11.269 INFO 7944 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 150 ms. F
2024-02-15 20:30:13.273 INFO 7944 --- [           main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2024-02-15 20:30:13.736 INFO 7944 --- [           main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2024-02-15 20:30:13.982 INFO 7944 --- [           main] o.hibernate.jpa.internal.util.LogHelper : HHH000204: Processing PersistenceUnitInfo [name: defa
2024-02-15 20:30:14.078 INFO 7944 --- [           main] org.hibernate.Version : HHH000412: Hibernate ORM core version 5.6.11.Final
2024-02-15 20:30:14.609 INFO 7944 --- [           main] org.hibernate.annotations.common.Version : HCANN000001: Hibernate Commons Annotations (5.1.2.Fir
2024-02-15 20:30:14.958 INFO 7944 --- [           main] org.hibernate.dialect.Dialect : HHH000400: Using dialect: org.hibernate.dialect.H2Dialect

```

star-agile-banking-finance

JavaProject1 - Eclipse IDE

File Edit Navigate Search Project Run Window Help

Project Explorer X

- addressbook-master
- Servers
- springboot-demo
- star-agile-banking-finance [star-agile-bank]**
- src/main/java
- src/main/resources
- src/test/java
- JRE System Library [JavaSE-1.8]
- Maven Dependencies
- src
 - main
 - java
 - resources
 - static
 - css
 - images
 - js
 - about.html
 - contact.html
 - index.html
 - services.html
 - team.html
 - templates
 - application.properties
 - test
- target
- ansible-playbook.yml
- Dockerfile
- mvnw
- mvnw.cmd
- pom.xml

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Problems Servers Terminal Data Source Explorer Properties Console X

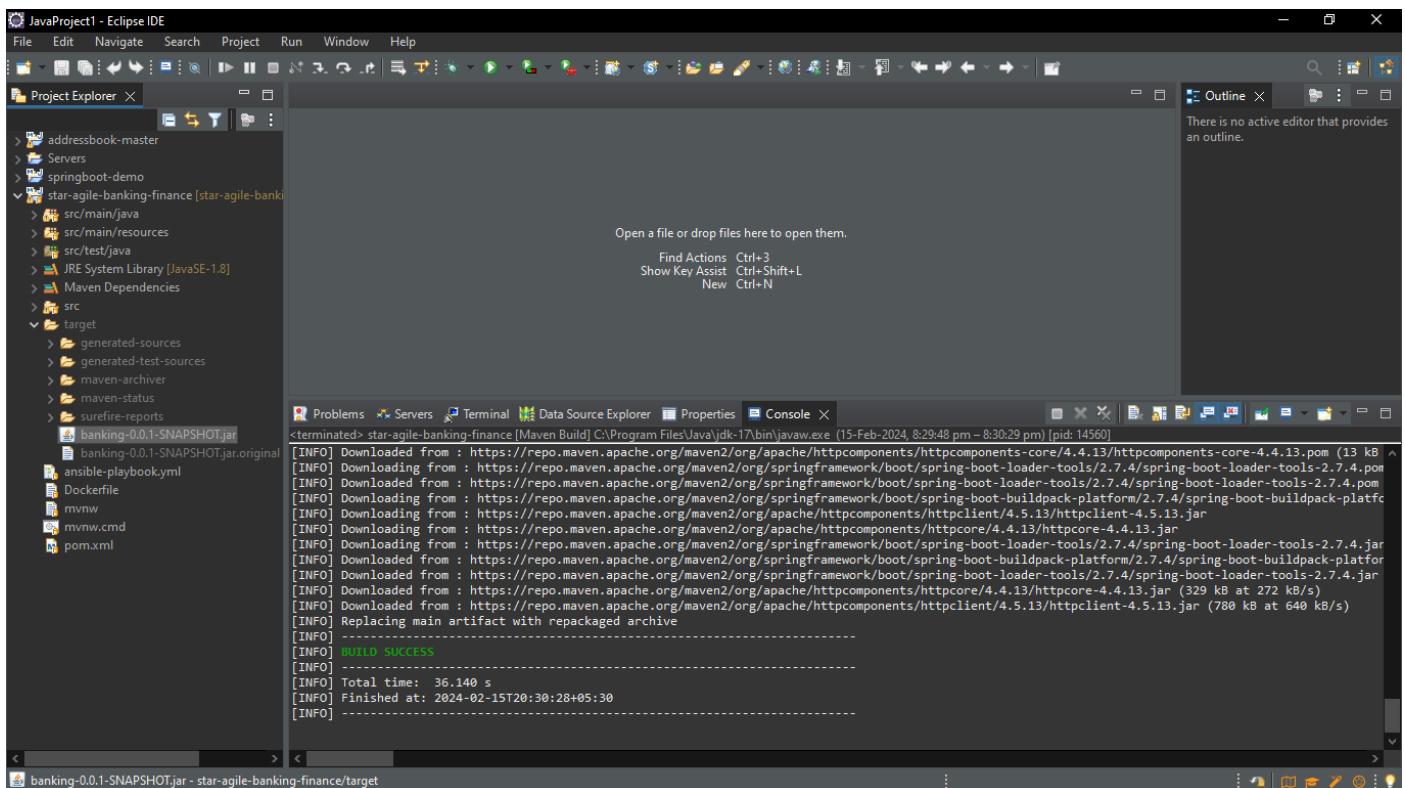
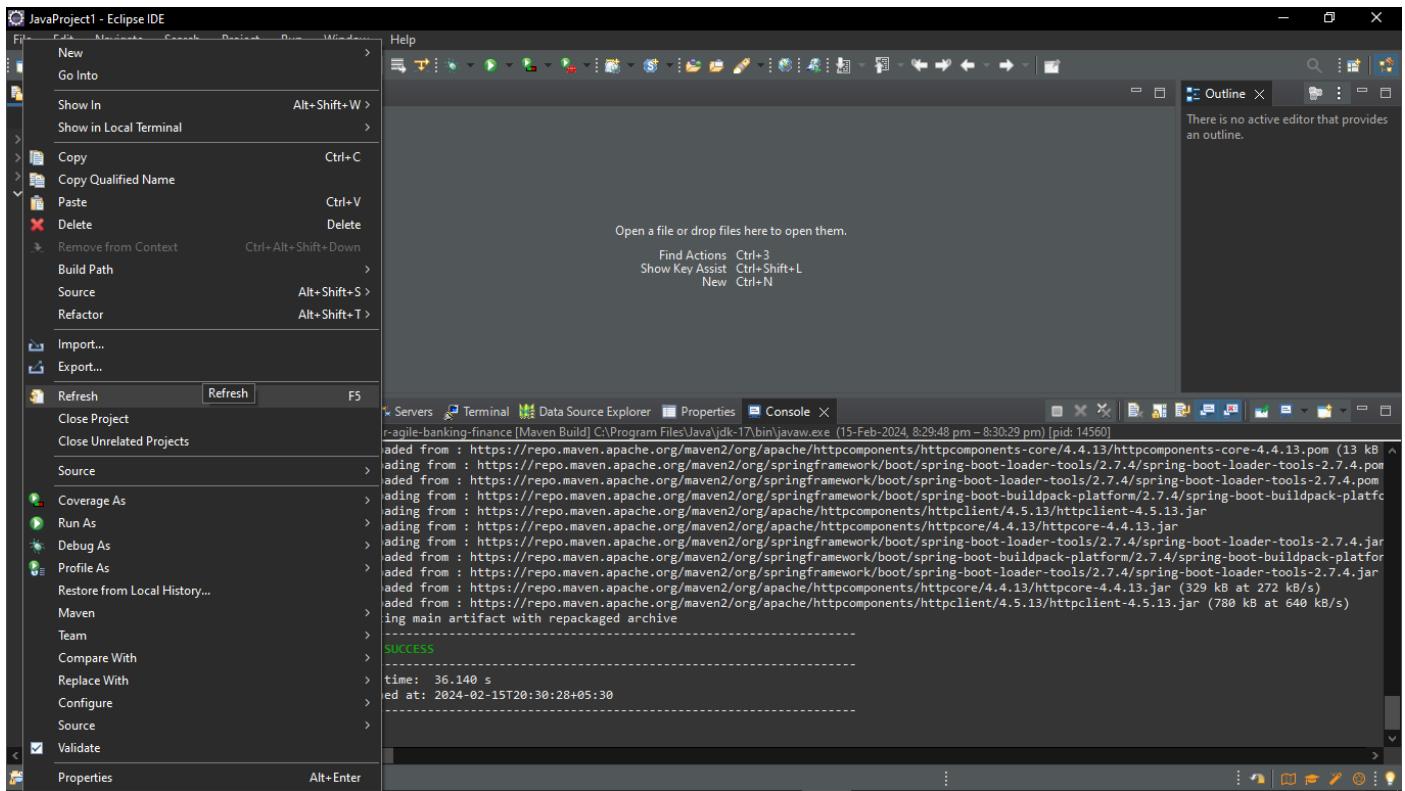
<terminated> star-agile-banking-finance [Maven Build] C:\Program Files\Java\jdk-17\bin\javaw.exe (15-Feb-2024, 8:29:48 pm – 8:30:29 pm) [pid: 14560]

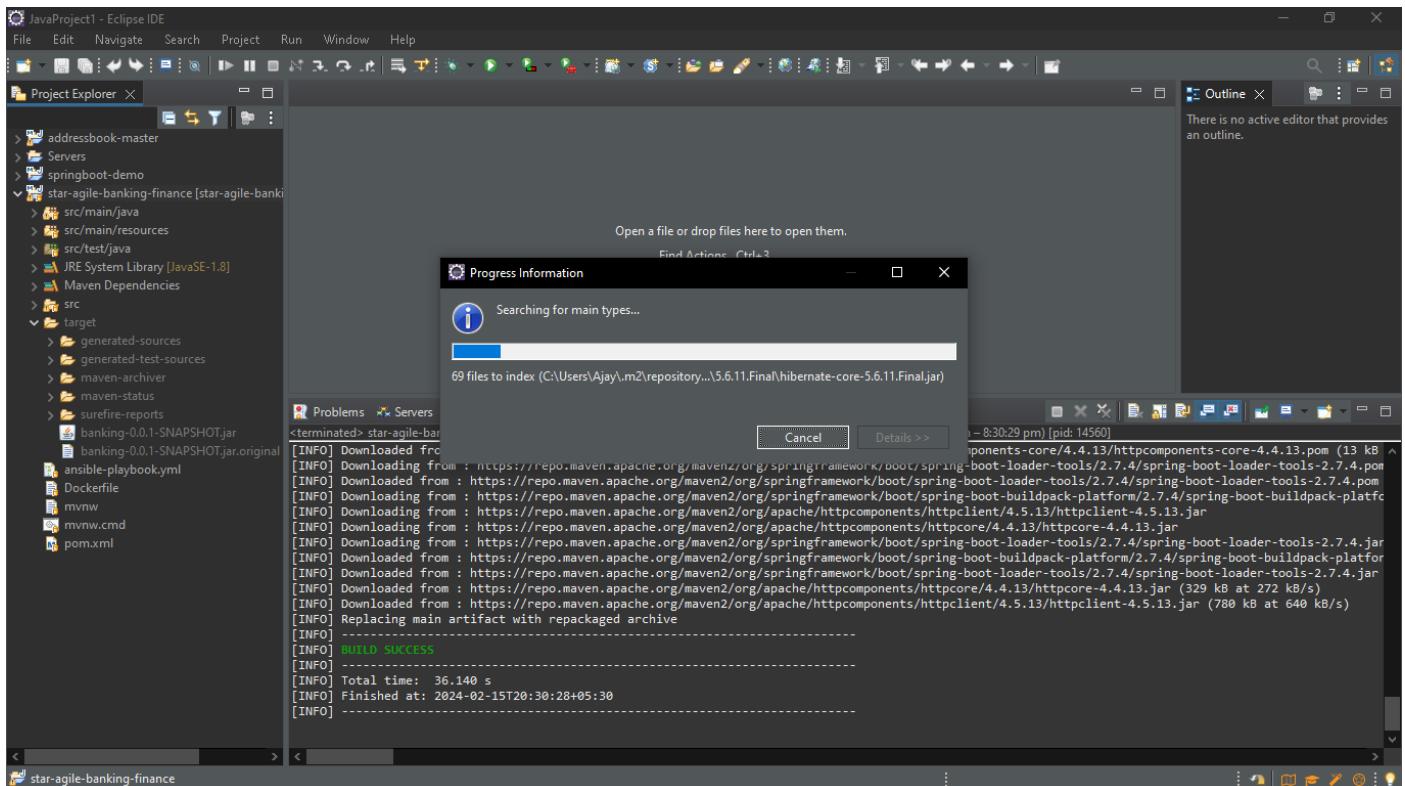
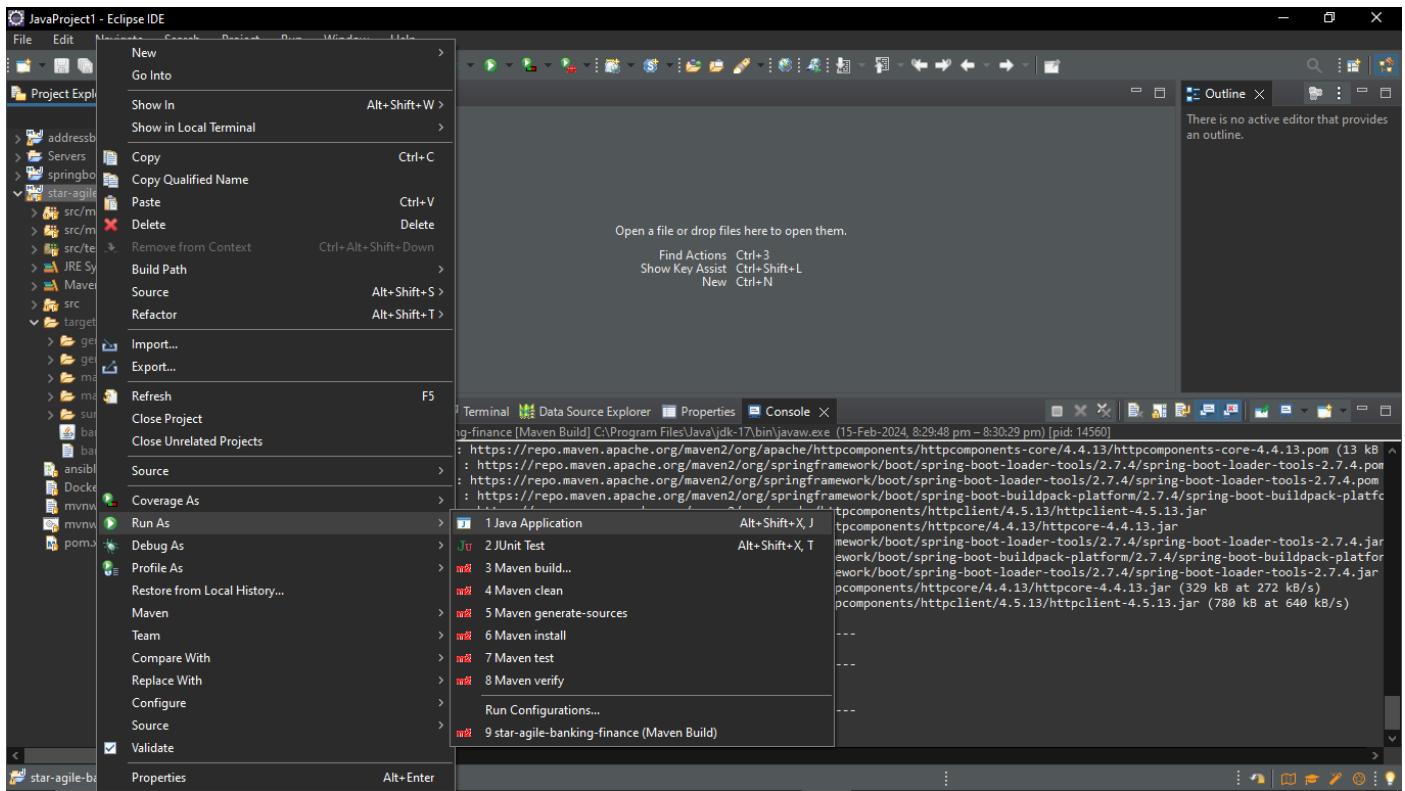
```

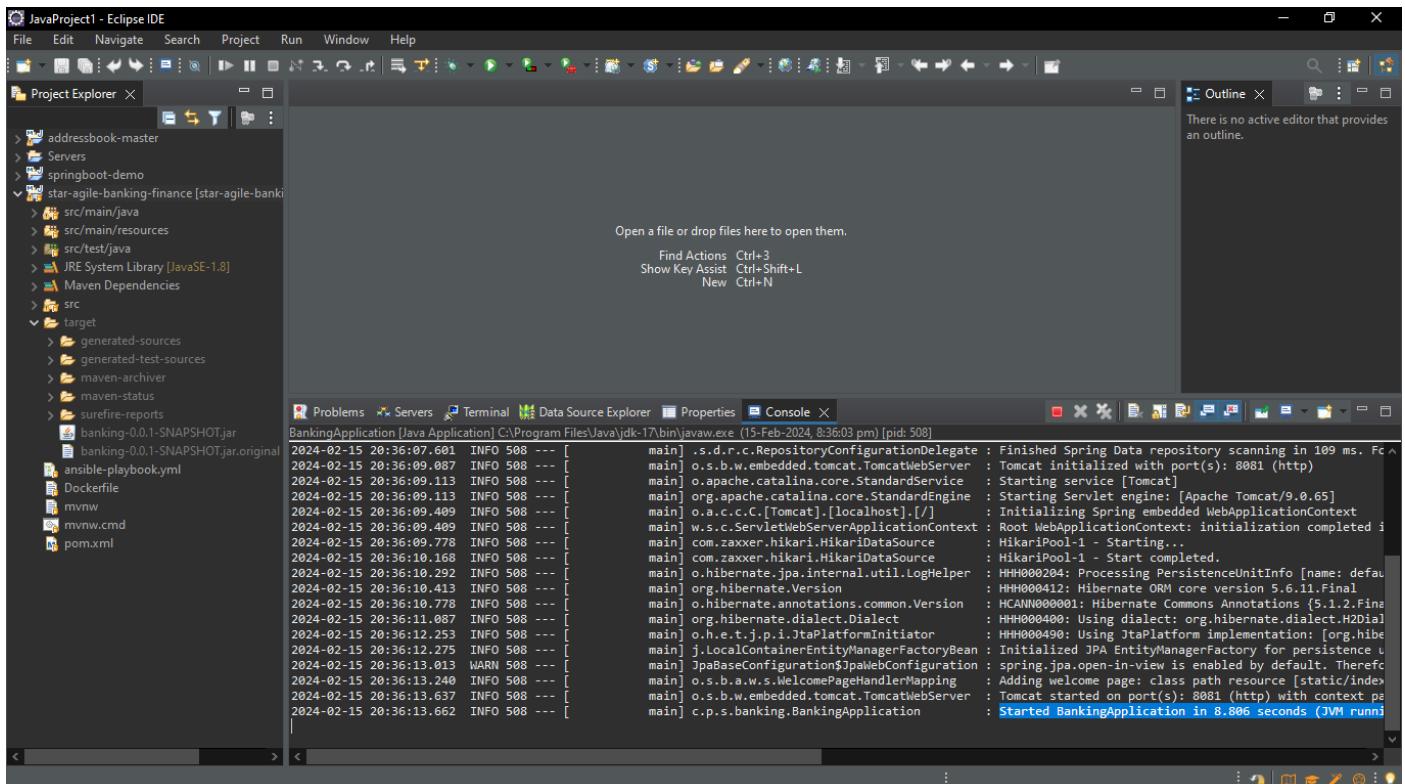
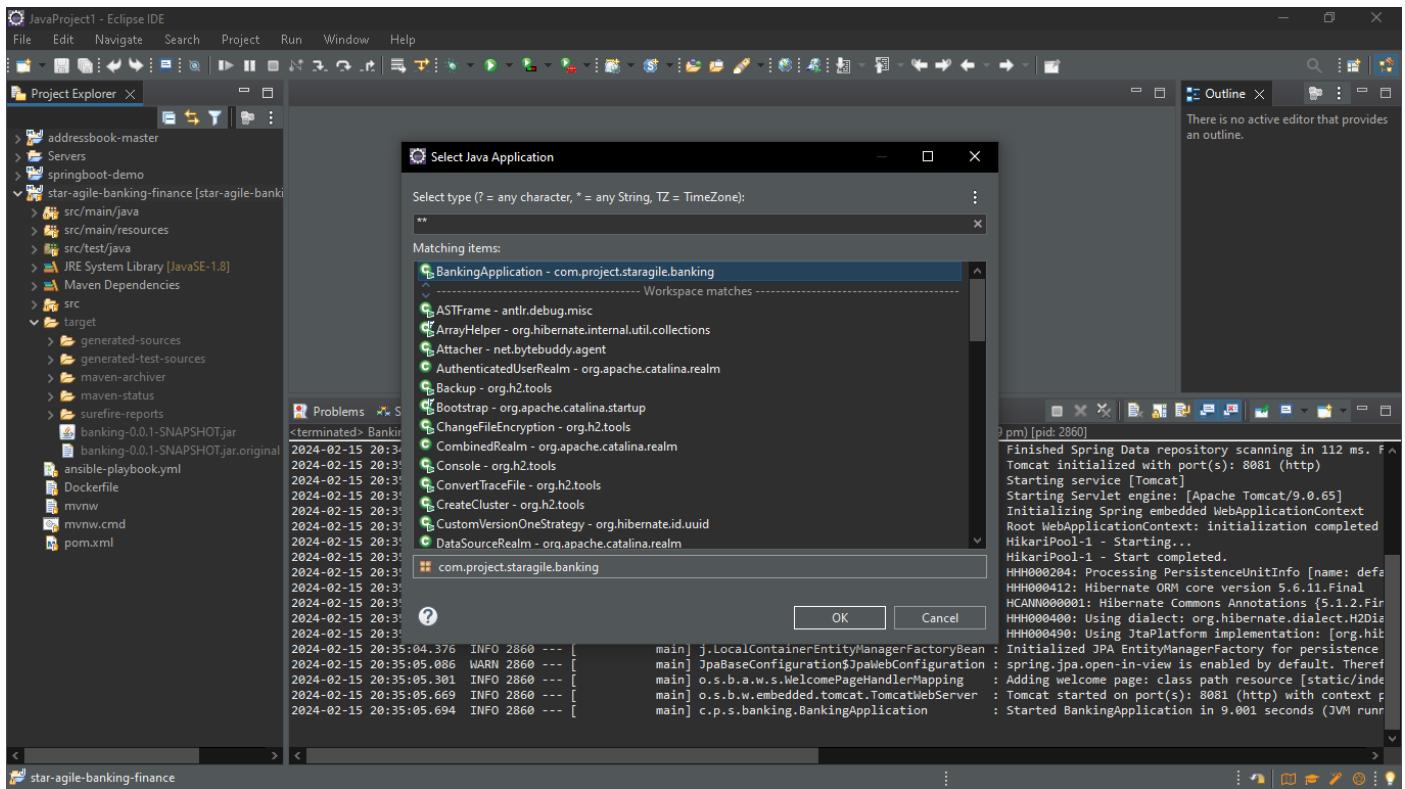
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/apache/httpcomponents/httpcomponents-core/4.4.13/httpcomponents-core-4.4.13.pom (13 kB)
[INFO] Downloading from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-loader-tools/2.7.4/spring-boot-loader-tools-2.7.4.pom
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-loader-tools/2.7.4/spring-boot-loader-tools-2.7.4.pom
[INFO] Downloading from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-buildpack-platform/2.7.4/spring-boot-buildpack-platform-2.7.4.pom
[INFO] Downloading from : https://repo.maven.apache.org/maven2/org/apache/httpcomponents/httpclient/4.5.13/httpclient-4.5.13.jar
[INFO] Downloading from : https://repo.maven.apache.org/maven2/org/apache/httpcomponents/httpclient/4.5.13/httpclient-4.5.13.jar
[INFO] Downloading from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-loader-tools/2.7.4/spring-boot-loader-tools-2.7.4.jar
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-buildpack-platform/2.7.4/spring-boot-buildpack-platform-2.7.4.pom
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-loader-tools/2.7.4/spring-boot-loader-tools-2.7.4.jar
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/apache/httpcomponents/httpcore/4.4.13/httpcore-4.4.13.jar (329 kB at 272 kB/s)
[INFO] Downloaded from : https://repo.maven.apache.org/maven2/org/apache/httpcomponents/httpclient/4.5.13/httpclient-4.5.13.jar (780 kB at 640 kB/s)
[INFO] Replacing main artifact with repackaged archive
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 36.140 s
[INFO] Finished at: 2024-02-15T20:30:28+05:30
[INFO] -----

```

star-agile-banking-finance







→ <http://localhost:8081/index.html>

The screenshot shows a web browser window with the URL localhost:8081 in the address bar. The page title is "Customer Banking Services". The header includes a logo with the letters "CIAL", navigation links for "HOME", "ABOUT", "SERVICES", "TEAM", and "CONTACT US", and a search bar. Below the header, there is a large central graphic featuring a circular background with abstract blue and green shapes. Inside the circle, there are three people: one person sitting at a desk working on a computer, another person standing and looking at a laptop, and a third person standing partially visible on the right. To the left of the graphic, there is a text block: "We provide the World's best in class Banking Solutions and Services." Below this text are two buttons: "READ MORE" (in red) and "CONTACT US" (in blue). The overall design is clean and professional.

→ <http://localhost:8081/about.html>

The screenshot shows a web browser window with the URL localhost:8081 in the address bar. The page title is "WELCOME TO CUSTOMER BANKING SERVICES". The main content area contains a paragraph about the services provided: "The world class banking services that we provide are current and savings accounts, loan and mortgage services, wealth management, providing Credit and Debit Cards, Overdraft services." Below this text is a "Read More" button. To the right of the text, there is an illustration of two people: one standing and holding a newspaper, and another sitting on a stack of coins. The overall design is clean and professional.

WHAT WE DO

World's best in class banking services and solutions

<http://localhost:8081/services.html>

The screenshot shows a web browser window with the URL localhost:8081/services.html in the address bar. The page content is as follows:

WHAT WE DO

World's best in class banking services ad solutionsn

ACCOUNTING

[Read More](#)

ADVISOR

[Read More](#)

INVESTMENT

[Read More](#)

FINANCIAL

[Read More](#)

OUR TEAM AND EXPERTS

It is a long established fact that a reader will be distracted by the readable content of a

<http://localhost:8081/team.html>

The screenshot shows a web browser window with the URL localhost:8081/team.html in the address bar. The page content is as follows:

OUR TEAM AND EXPERTS

It is a long established fact that a reader will be distracted by the readable content of a

Readable

Follow Us

[f](#) [t](#) [in](#)

Content

Follow Us

[f](#) [t](#) [in](#)

Readable

Follow Us

[f](#) [t](#) [in](#)

Content

Follow Us

[f](#) [t](#) [in](#)

StarAgileDevOpsTraining/star- x | DevOps | SA2310021 | Training x CBS - +

localhost:8081

Apps WhatsApp Gmail Google Drive Google Keep One Drive Amazon Web Service... StarAgile LMS (Ajay Gaur) iamajaygaur/DevOp... All Bookmarks

WHAT IS SYAS OUR CLIENTS



It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

About Financial About Financial Instagram Newsletter



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About Financial About Financial Instagram Newsletter

Locations +01 9876543210 demo@gmail.com

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→ http://localhost:8081/contact.html

The screenshot shows a contact form on a web browser. At the top, it says "CONTACT US". Below that, a message reads: "We are working 24*7 to deliver you the world's best services, Please reach out us using below form." To the left, there are input fields for "Name", "Phone Number", "Email", and "Message", each with a red "SEND" button below them. To the right, there is a map of the Eiffel Tower area in Paris, showing the Seine River, the Eiffel Tower, and surrounding landmarks like the Arc de Triomphe and Louvre.

→ Make Changes on Home Page **WELCOME TO CUSTOMER BANKING SERVICES** to CIAL **Customer Banking Services**

The screenshot shows a home page for "Customer Banking Services" (CBS). At the top, it says "WELCOME TO CUSTOMER BANKING SERVICES". Below that, a paragraph of text describes the services: "The world class banking services that we provide are current and savings accounts, loan and mortgage services, wealth management, providing Credit and Debit Cards, Overdraft services." There is a "Read More" button. To the right, there is an illustration of two people: one standing holding a newspaper and another sitting on a stack of coins. At the bottom, it says "WHAT WE DO" and "World's best in class banking services ad solutionsn".

→ At index.html

The screenshot shows the Eclipse IDE interface with the following details:

- Project Explorer:** Shows the project structure for "JavaProject1 - star-agile-banking-finance".
- Code Editor:** Displays the "index.html" file with the following content changes:

```
<div class="contact_bt"><a href="#">Contact Us</a></div>
<div class="header_right">
    
</div>
<!--header section end -->
<!--about section start -->
<div class="services_section layout_padding">
    <div class="container">
        <div class="row">
            <div class="col-md-8">
                <h1 class="services_taital">CIAL Customer Banking Services</h1>
                <p class="services_text">The world class banking services that we provide are current and savings acc...
                <div class="moremore_bt"><a href="#">Read More </a></div>
            </div>
            <div class="col-md-4">
                <div></div>
            </div>
        </div>
    </div>
<!--about section end -->
<!--services section start -->
<div class="what_we_do_section layout_padding">
    <div class="container">
        <h1 class="what_taital">WHAT WE DO</h1>
        <p class="what_text">World's best in class banking services ad solutionsn </p>
    </div>
<div class="what_we_do_section_2">
    <div class="row">
```
- Outline View:** Shows the outline of the HTML document structure.
- Problems View:** Shows no problems.
- Console View:** Shows application logs from "BankingApplication [Java Application]".

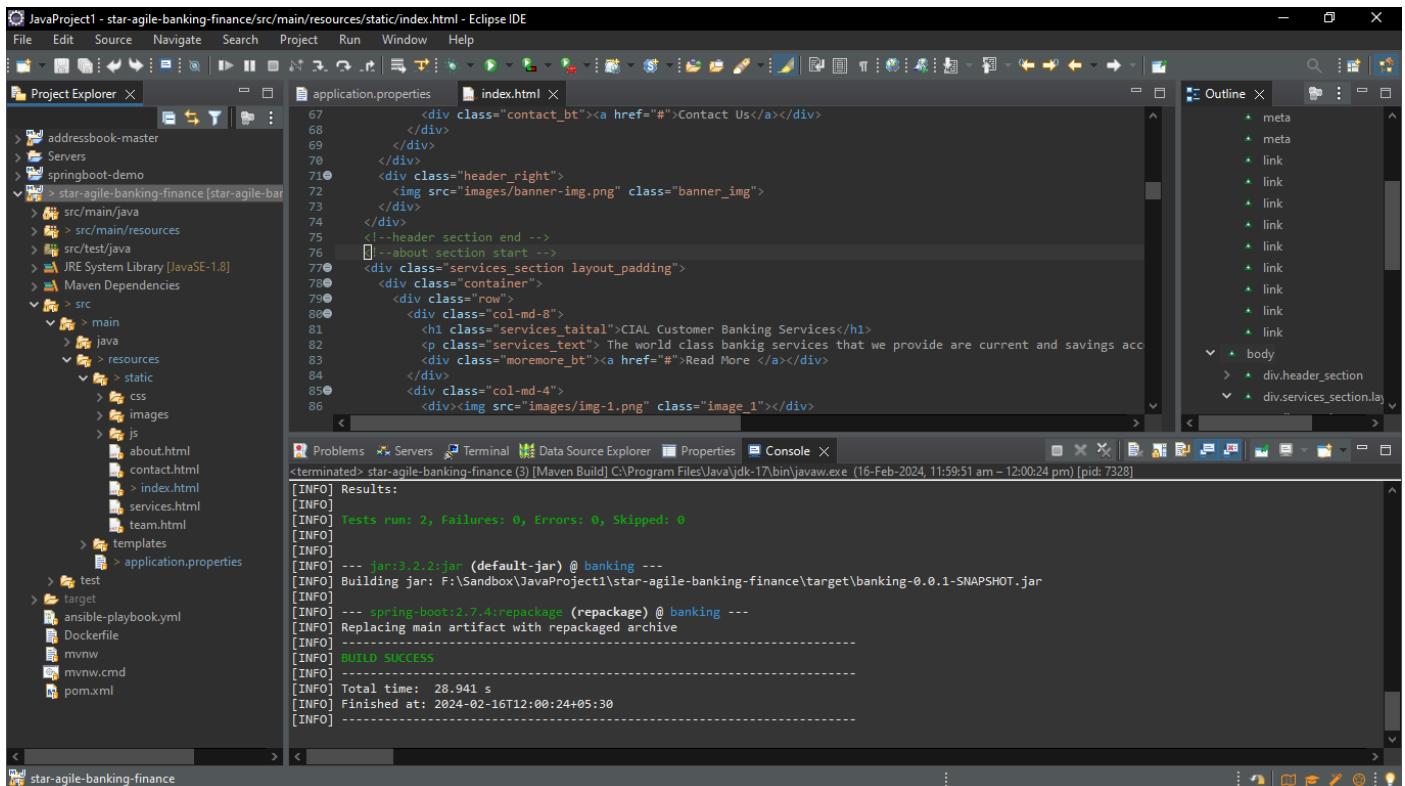
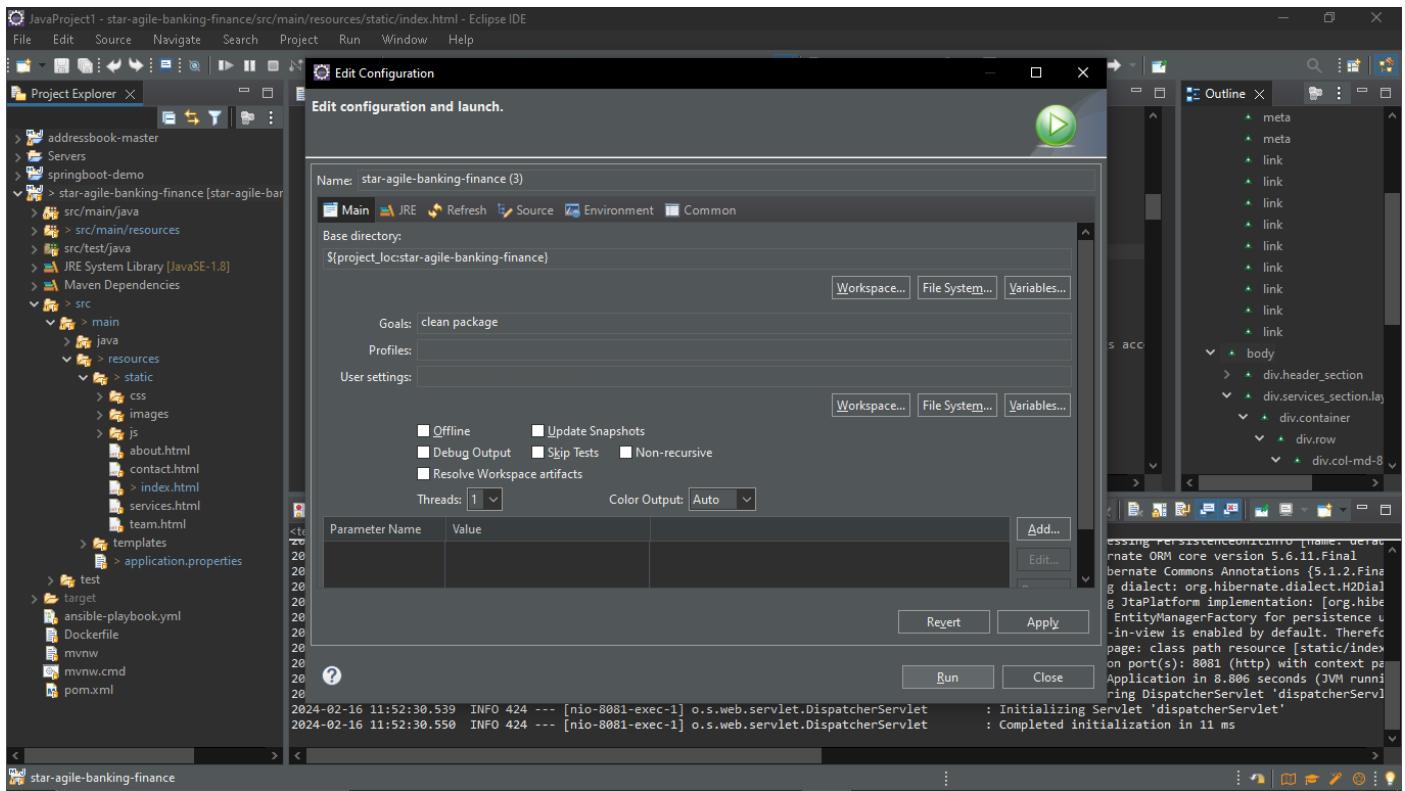
→ Save the changes and build the war file and run the application to verify the changes.

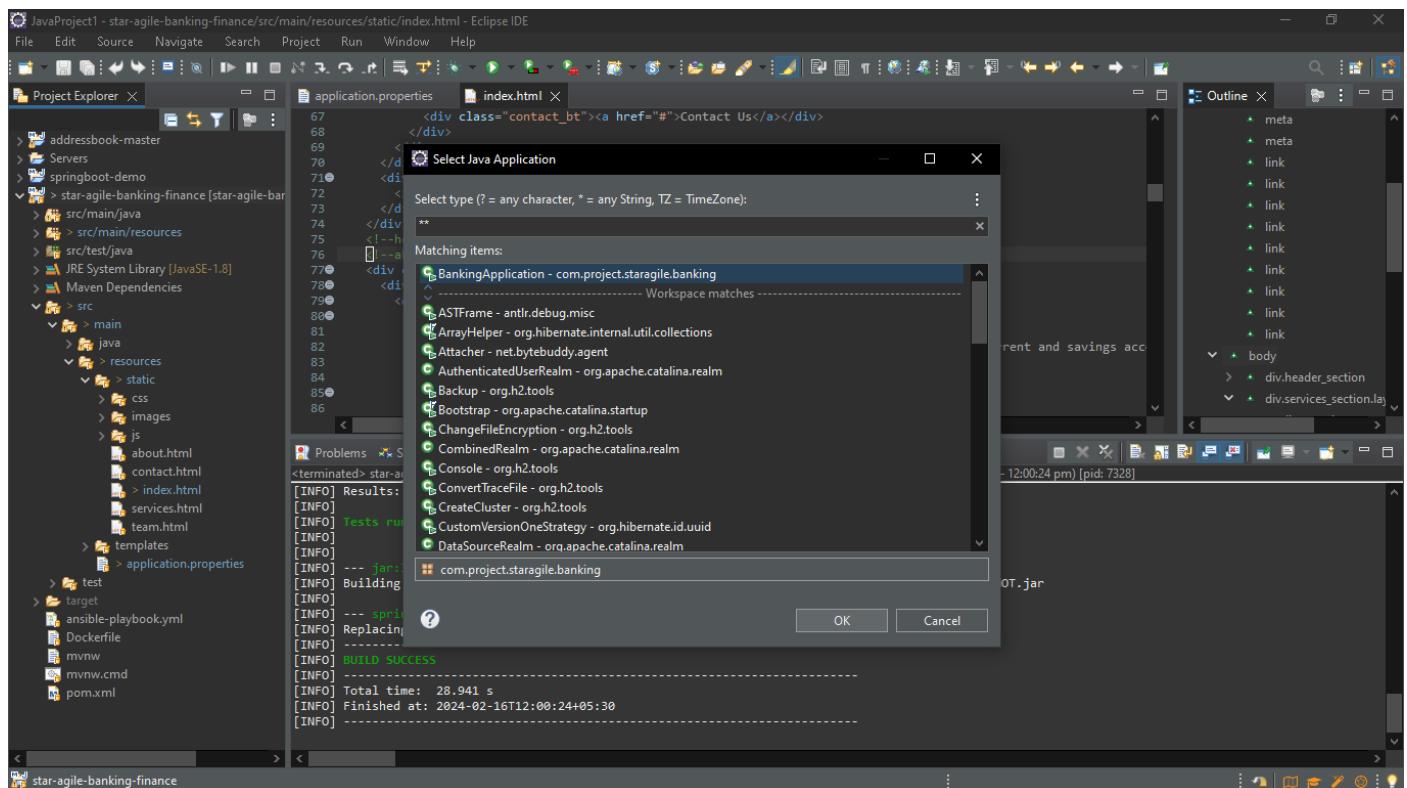
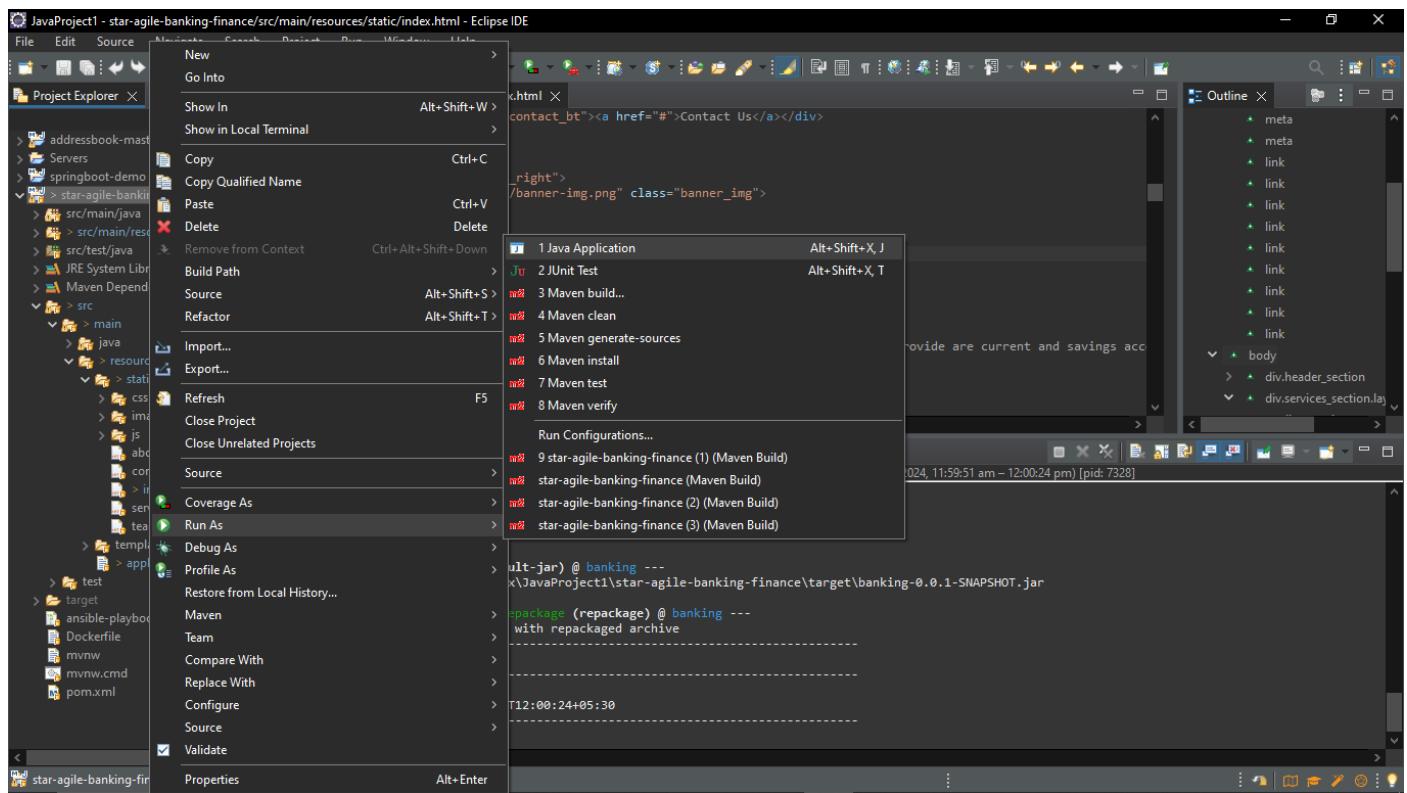
The screenshot shows the Eclipse IDE interface with the following details:

- Project Explorer:** Shows the project structure for "JavaProject1 - star-agile-banking-finance".
- Context Menu:** Opened for the "index.html" file in the code editor, showing options like New, Go Into, Show In, Copy, Paste, Delete, etc.
- Code Editor:** Displays the "index.html" file with the same content changes as the previous screenshot.
- Run As Submenu:** Shows the "Run As" option selected, with a list of available configurations:

 - 1 Java Application
 - 2 JUnit Test
 - 3 Maven build...
 - 4 Maven clean
 - 5 Maven generate-sources
 - 6 Maven install
 - 7 Maven test
 - 8 Maven verify
 - Run Configurations...
 - 9 star-agile-banking-finance (1) (Maven Build)
 - star-agile-banking-finance (Maven Build)
 - star-agile-banking-finance (2) (Maven Build)

- Outline View:** Shows the outline of the HTML document structure.
- Problems View:** Shows no problems.
- Console View:** Shows application logs from "BankingApplication [Java Application]".





JavaProject1 - star-agile-banking-finance/src/main/resources/static/index.html - Eclipse IDE

File Edit Source Navigate Project Run Window Help

Project Explorer X

application.properties index.html

```

67      <div class="contact_bt"><a href="#">Contact Us</a></div>
68      </div>
69  </div>
70  <div class="header_right">
71    
72  </div>
73  </div>
74  </div>
75  <!--header section end -->
76  <div class="services_section layout_padding">
77    <div class="container">
78      <div class="row">
79        <div class="col-md-8">
80          <h1 class="services_taital">CIAL Customer Banking Services</h1>
81          <p class="services_text">The world class bankig services that we provide are current and savings acc
82          <div class="moremore_bt"><a href="#">Read More </a></div>
83        </div>
84        <div class="col-md-4">
85          <div></div>

```

Problems Servers Terminal Data Source Explorer Properties Console X

BankingApplication [Java Application] [pid: 14432]

```

2024-02-16 12:01:11.727 INFO 14432 --- [           main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2024-02-16 12:01:11.727 INFO 14432 --- [           main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.65]
2024-02-16 12:01:12.168 INFO 14432 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[] : Initializing Spring embedded WebApplicationContext
2024-02-16 12:01:12.168 INFO 14432 --- [           main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed
2024-02-16 12:01:12.579 INFO 14432 --- [           main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2024-02-16 12:01:13.098 INFO 14432 --- [           main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2024-02-16 12:01:13.292 INFO 14432 --- [           main] o.h.hibernate.jpa.internal.util.LogHelper : HHHH000204: Processing PersistenceUnitInfo [name: def
2024-02-16 12:01:13.472 INFO 14432 --- [           main] org.hibernate.Version : HHHH000412: Hibernate ORM core version 5.6.11.Final
2024-02-16 12:01:13.987 INFO 14432 --- [           main] o.hibernate.annotations.common.Version : HCANN000001: Hibernate Commons Annotations {5.1.2.F
2024-02-16 12:01:14.347 INFO 14432 --- [           main] org.hibernate.dialect.Dialect : HHHH000400: Using dialect: org.hibernate.dialect.H2Di
2024-02-16 12:01:15.660 INFO 14432 --- [           main] o.h.e.t.j.p.i.JtaPlatformInitiator : HHHH000490: Using JtaPlatform implementation: [org.hi
2024-02-16 12:01:15.683 INFO 14432 --- [           main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence
2024-02-16 12:01:16.626 WARN 14432 --- [           main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. There
2024-02-16 12:01:16.863 INFO 14432 --- [           main] o.s.b.a.welcomePageHandlerMapping : Adding welcome page: class path resource [static/inc
2024-02-16 12:01:17.266 INFO 14432 --- [           main] o.s.b.a.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8081 (http) with context
2024-02-16 12:01:17.292 INFO 14432 --- [           main] c.p.s.banking.BankingApplication : Started BankingApplication in 10.393 seconds (JVM ru

```

star-agile-banking-finance

Course: Phase 1 Training , Topic x DevOps_Training_Docs/Phase-1 x CBS

localhost:8081

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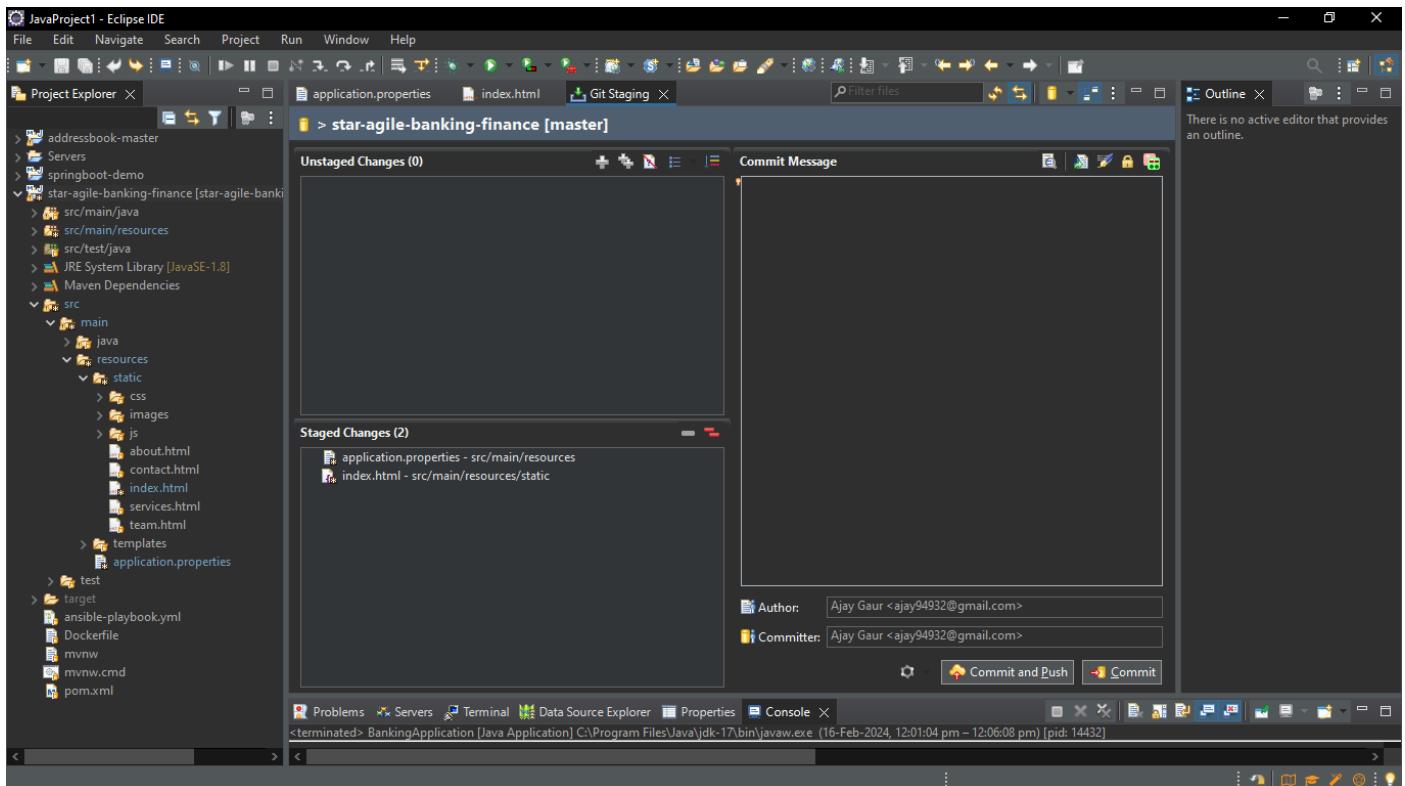
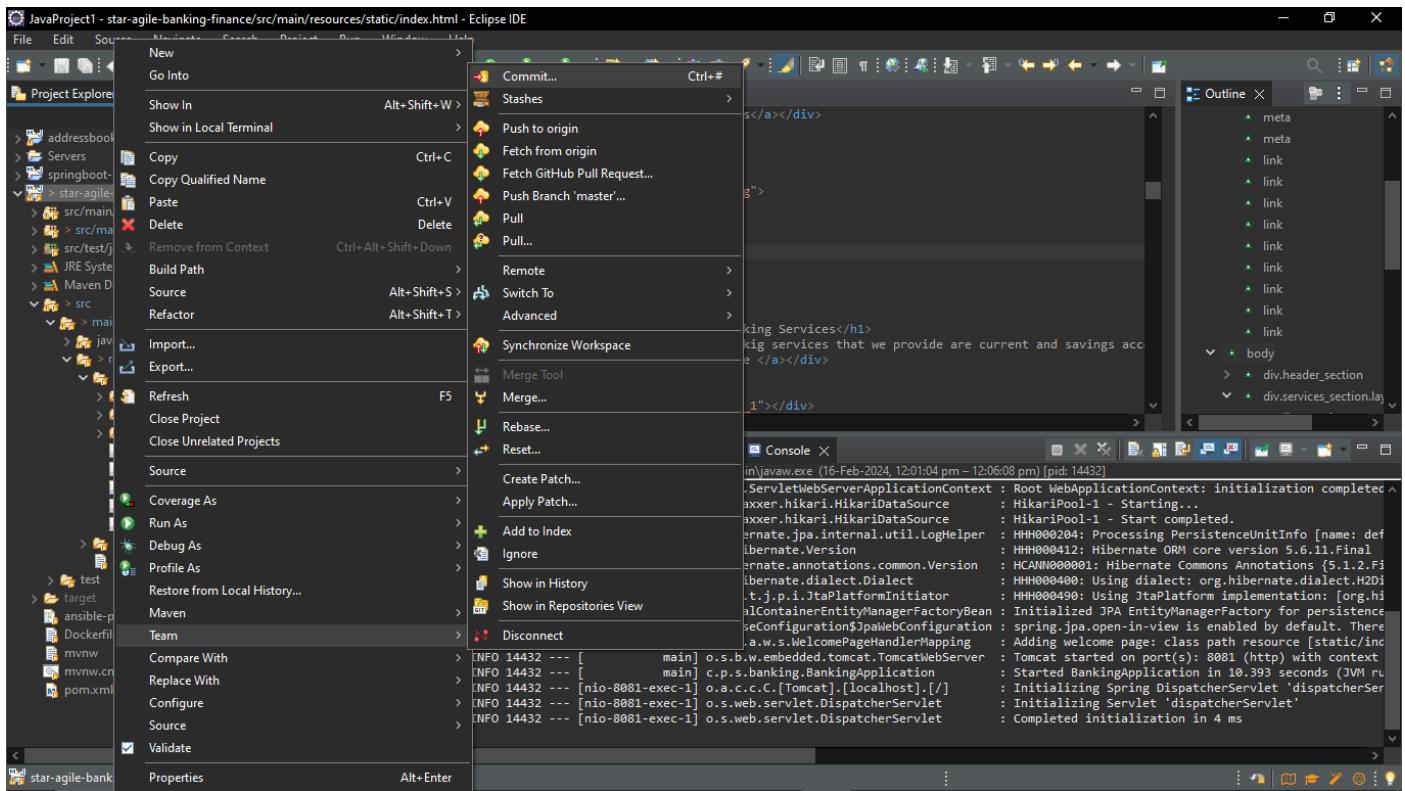
CIAL CUSTOMER BANKING SERVICES

The world class bankig services that we provide are current and savings accounts, loan and mortgage services, wealth management, providing Credit and Debit Cards, Overdraft services.

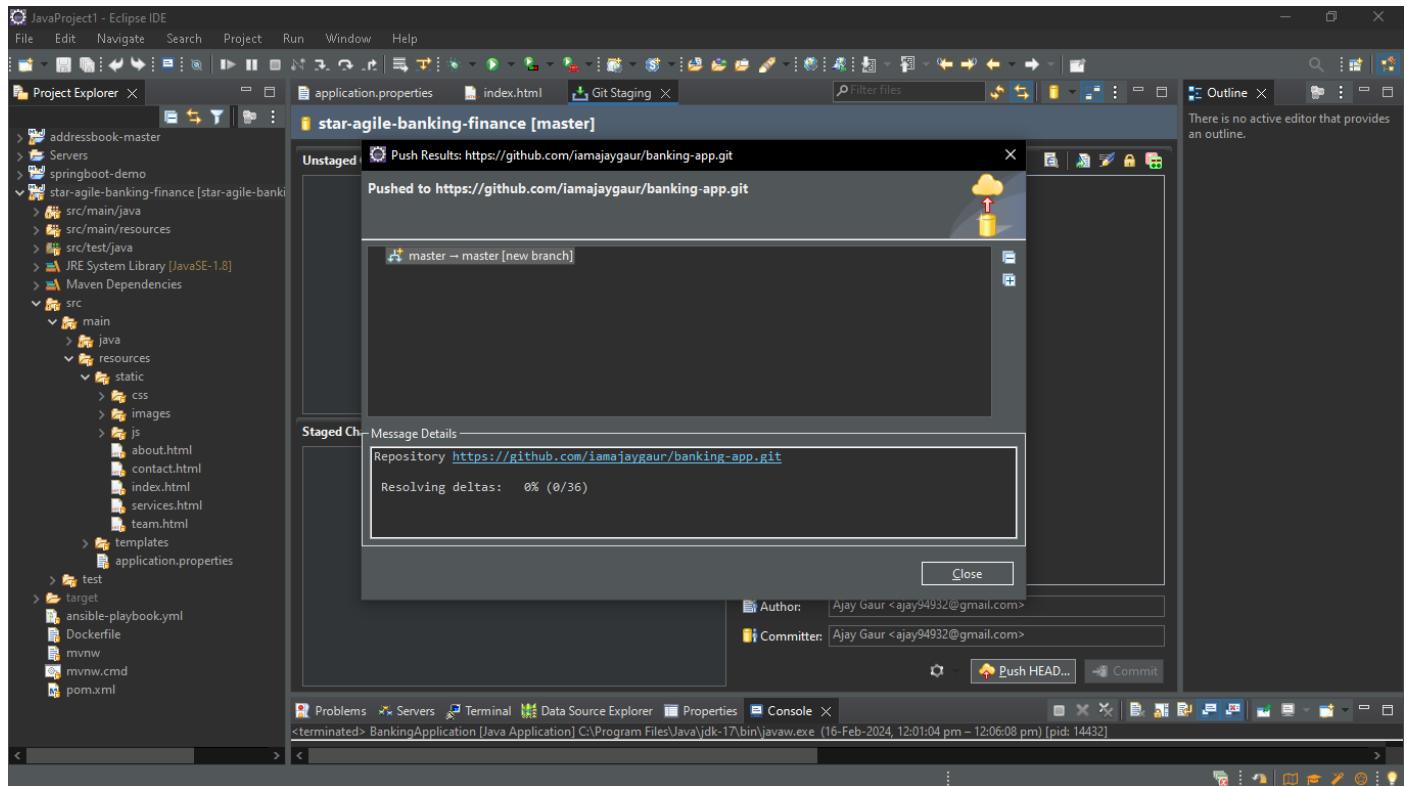
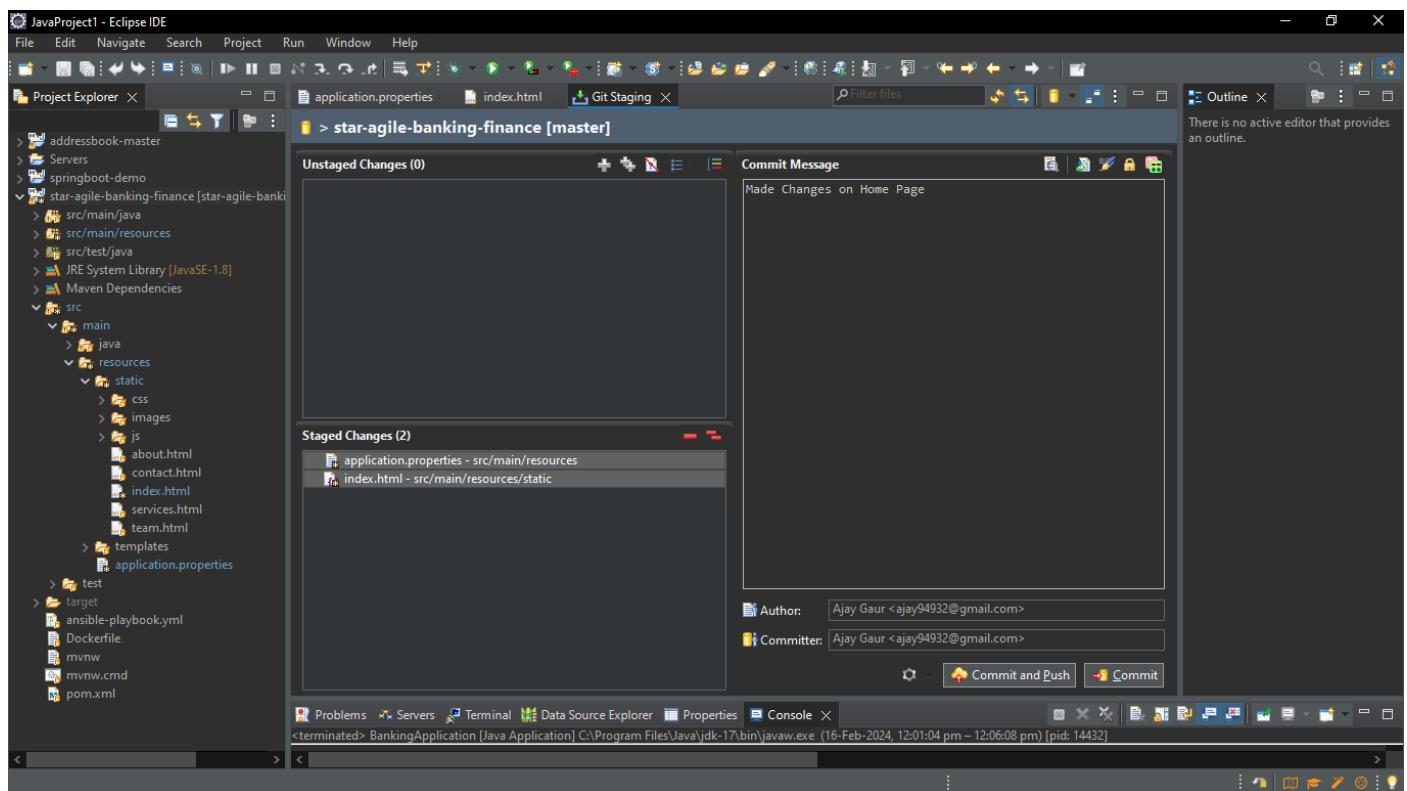
[Read More](#)

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→ Commit and Push the changes to the repository



Launch the VM Instances Configure and Integrate them :

1. jenkins-master: Used to create the jenkins pipeline projects and schedule.

Jenkins-slave: Used to perform Application Build & Create artifacts - *.war & Build Container Image

2. k8s-master: Deployment of Pods

K8s_worker_node-1

K8s_worker_node-1

Tools required in above VM Instances:

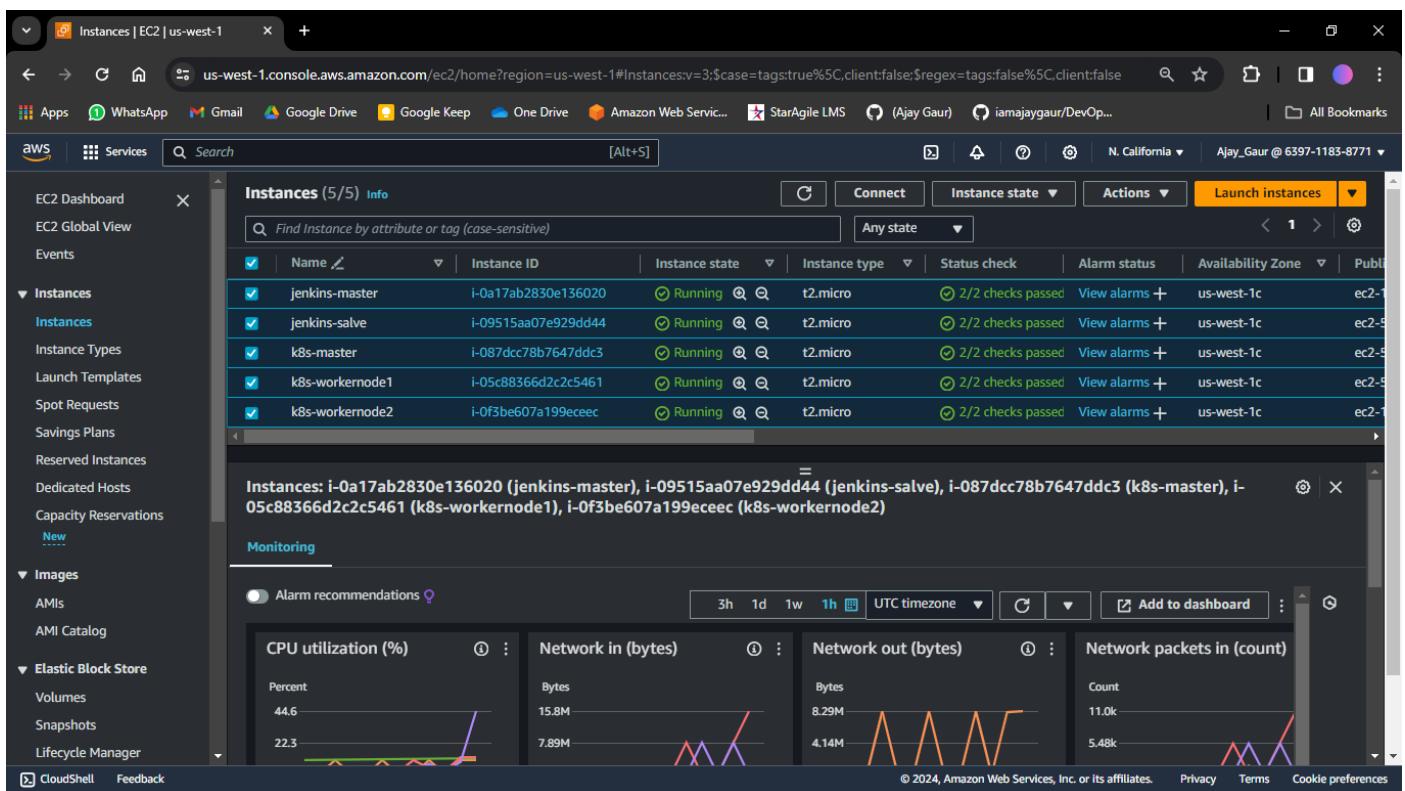
1. jenkins-master: git, jdk, jenkins

Jenkins-slave: git, jdk, maven, docker

2. k8s-master: CRI-ContainD, Kubectl, Kubeadm, Kubelet.....

K8s_worker_node-1

K8s_worker_node-1



Stages for project:

1. SCM Checkout

2. Application Build - # Create *.war and perform Unit Testing

3. Docker Build

4. Push the Container Image to Dockerhub

5. Deploy to Kubernetes

→ Login to Jenkins

The screenshot shows the Jenkins dashboard at <http://13.56.209.198:8080>. The main content area displays the 'banking-app-project' build status. The build is marked as 'Success' (green checkmark) and is currently running ('W'). It was last successful 7 minutes and 58 seconds ago. The project has 3 builds. The 'Last Failure' status is 'N/A'. The 'Last Duration' is 42 seconds. Below the table, there are links for 'Atom feed for all', 'Atom feed for failures', and 'Atom feed for just latest builds'. On the left sidebar, there are links for 'New Item', 'People', 'Build History', 'Project Relationship', 'Check File Fingerprint', 'Manage Jenkins', and 'My Views'. A 'Build Queue' section indicates 'No builds in the queue'. A 'Build Executor Status' section shows 'Built-In Node'.

The screenshot shows the 'New Item' creation dialog at <http://13.56.209.198:8080/view/all/newJob>. The user has entered 'banking-app-projectt' into the 'Enter an item name' field. The 'Freestyle project' option is selected, indicated by a blue border around its icon and text. Below it, other project types are listed: 'Maven project' and 'Pipeline'. At the bottom, there is an 'OK' button. A tooltip for 'Freestyle project' explains it as a central feature for building projects using any SCM and build system. A tooltip for 'Pipeline' explains it as suitable for building pipelines or workflows. A tooltip for 'Multi-configuration project' explains it for complex environments like testing across multiple environments.

→ Create the pipeline Project

The screenshot shows the Jenkins Pipeline configuration screen. The title bar indicates the URL is 13.56.209.198:8080/job/banking-app-project/configure. The left sidebar has tabs for General, Advanced Project Options, and Pipeline, with Pipeline selected. The main area is titled 'Pipeline' and 'Configure'. Under 'Definition', there is a 'Pipeline script' text area containing the following Groovy code:

```
1 pipeline {
2     agent { label 'slave1' }
3 
4     tools {
5         // Install the Maven version configured as "M3" and add it to the path.
6         maven "maven-3.6.3"
7     }
8 
9     environment {
10        DOCKERHUB_CREDENTIALS=credentials('dockerloginid')
11    }
12 
13     stages {
14         stage('SCM Checkout') {
15             steps {
16                 // Get some code from a GitHub repository
17                 git 'https://github.com/iamajaygaur/BankingApp.git'
18             }
19         }
20         stage('Maven Build') {
21             steps {
22                 // Run Maven on a Unix agent.
23             }
24         }
25     }
26 }
```

At the bottom are 'Save' and 'Apply' buttons.

The screenshot shows the Jenkins Pipeline configuration screen with the same URL and sidebar as the previous screenshot. The main area is titled 'Pipeline' and 'Configure'. The 'Pipeline script' text area now contains a more complex Groovy script that includes Docker commands:

```
1 pipeline {
2     agent { label 'slave1' }
3 
4     tools {
5         // Install the Maven version configured as "M3" and add it to the path.
6         maven "maven-3.6.3"
7     }
8 
9     environment {
10        DOCKERHUB_CREDENTIALS=credentials('dockerloginid')
11    }
12 
13     stages {
14         stage('SCM Checkout') {
15             steps {
16                 // Get some code from a GitHub repository
17                 git 'https://github.com/iamajaygaur/BankingApp.git'
18             }
19         }
20         stage('Maven Build') {
21             steps {
22                 // Run Maven on a Unix agent.
23                 sh "mvn -Dmaven.test.failure.ignore=true clean package"
24             }
25         }
26         stage("Docker build") {
27             steps {
28                 sh 'docker version'
29                 sh "docker build -t iamajaygaur/bankapp-eta-app:${BUILD_NUMBER} ."
30                 sh "docker image list"
31                 sh "docker tag iamajaygaur/bankapp-eta-app:${BUILD_NUMBER} iamajaygaur/bankapp-eta-app:latest"
32             }
33         }
34         stage('Login2DockerHub') {
35             steps {
36                 sh '$DOCKERHUB_CREDENTIALS_PSW | docker login -u $DOCKERHUB_CREDENTIALS_USR --password-stdin'
37             }
38         }
39         stage('Push2DockerHub') {
40             steps {
41                 sh "docker push iamajaygaur/bankapp-eta-app:latest"
42             }
43         }
44     }
45 }
```

At the bottom are 'Save' and 'Apply' buttons.

Instances | EC2 | us-west-1 X banking-app-project Config [Jenkins] +

Not secure 13.56.209.198:8080/job/banking-app-project/configure

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Dashboard > banking-app-project > Configuration

Configure Pipeline

Definition

General

Advanced Project Options

Pipeline

```

33
34 stage('Login2DockerHub') {
35     steps {
36         sh 'echo $DOCKERHUB_CREDENTIALS_PSW | docker login -u $DOCKERHUB_CREDENTIALS_USR --password-stdin'
37     }
38 }
39
40 stage('Push2DockerHub') {
41     steps {
42         sh "docker push iamajaygaur/bankapp-eta-app:latest"
43     }
44 }
45 stage('Deploy to Kubernetes Dev Environment') {
46     steps {
47         script {
48             sshPublisher(publishers: [sshPublisherDesc(configName: 'Kubernetes_Cluster', transfers: [sshTransfer(cleanRemote: true, remoteDir: '/var/www/html', slaveName: 'k8s-slave', type: 'SCP'), sshPublisherDesc(configName: 'Kubernetes_Cluster', transfers: [sshTransfer(cleanRemote: true, remoteDir: '/var/www/html', slaveName: 'k8s-slave', type: 'SCP')])], usepty: true)
49         }
50     }
51 }
52
53 }
54

```

Save **Apply**

→ Click on Build Now

Instances | EC2 | us-west-1 X banking-app-project [Jenkins] +

Not secure 13.56.209.198:8080/job/banking-app-project/

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Dashboard > banking-app-project >

Status **banking-app-project**

Changes **Add description**

Build Now **Disable Project**

Configure

Delete Pipeline

Full Stage View

Rename

Pipeline Syntax

Build History **trend** **Atom feed for all** **Atom feed for failures**

Filter builds...

	Declarative: Tool Install	SCM Checkout	Maven Build	Docker build	Login2DockerHub	Push2DockerHub	Deploy to Kubernetes Dev Environment
Average stage times:	78ms	1s	25s	3s	1s	8s	2s
(Average full run time: ~43s)							
#3 Feb 19 13:43 No Changes	78ms	874ms	25s	4s	1s	8s	2s
#2 Feb 19 13:35 1 commit	80ms	963ms	25s	3s	1s	8s	2s
#1 Feb 19 13:27 No Changes	76ms	4s	25s	4s	1s	9s	1s

Stage View

Permalinks

Last build (#3), 10 min ago

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

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Jenkins

Dashboard > banking-app-project > #3

Status Changes Console Output View as plain text Edit Build Information Delete build #3 Git Build Data Restart from Stage Replay Pipeline Steps Workspaces Previous Build

Console Output

```
Started by user Ajay Gaur
[Pipeline] Start of Pipeline
[Pipeline] node
Running on BankingApp-Build_Server in /home/devopsadmin/workspace/banking-app-project
[Pipeline] {
[Pipeline] withCredentials
Masking supported pattern matches of $DOCKERHUB_CREDENTIALS or $DOCKERHUB_CREDENTIALS_PSW
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Tool Install)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (SCM Checkout)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] git
The recommended git tool is: NONE
No credentials specified
Fetching changes from the remote Git repository
Checking out Revision 59a238dd094a566c71d2f53fb3ee76750600ca69 (refs/remotes/origin/master)
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

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Dashboard > banking-app-project > #3

```
Commit message: "Update index.html"
> git rev-parse --resolve-git-dir /home/devopsadmin/workspace/banking-app-project/.git # timeout=10
> git config remote.origin.url https://github.com/iamajaygaur/BankingApp.git # timeout=10
Fetching upstream changes from https://github.com/iamajaygaur/BankingApp.git
> git --version # timeout=10
> git --version # git version 2.25.1'
> git fetch --tags --force --progress .. https://github.com/iamajaygaur/BankingApp.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
> git config core.sparsecheckout # timeout=10
> git checkout -f 59a238dd094a566c71d2f53fb3ee76750600ca69 # timeout=10
> git branch -a -v --no-abbrev # timeout=10
> git branch -D master 59a238dd094a566c71d2f53fb3ee76750600ca69 # timeout=10
> git checkout -b master 59a238dd094a566c71d2f53fb3ee76750600ca69 # timeout=10
> git rev-list --no-walk 59a238dd094a566c71d2f53fb3ee76750600ca69 # timeout=10
[Pipeline]
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Maven Build)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] sh
+ mvn -Dmaven.test.failure.ignore=true clean package
[0;1;34mINFO[m Scanning for projects...
[0;1;34mINFO[m
[0;1;34mINFO[m @[1m-----< @[0;36mcom.project.staragile:banking@[0;1m -----@[m
[0;1;34mINFO[m @[1mbuilding banking 0.0.1-SNAPSHOT@[m
[0;1;34mINFO[m @[1m-----[ jar ]-----@[m
[0;1;34mINFO[m]
```



Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

Dashboard > banking-app-project > #3

```
[0;1;34mINFO[m] @[1m-----< @[@;36mcom.project.staragile:banking@;1m >-----@[m
[0;1;34mINFO[m] @[1mBuilding banking 0.0.1-SNAPSHOT@m
[0;1;34mINFO[m] @[1m-----[ jar ]-----@[m
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[1m-- @[@;32mmaven-clean-plugin:3.2.0:clean@m @[@;1m(default-clean)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m] Deleting /home/devopsadmin/workspace/banking-app-project/target
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[@;1m-- @[@;32mmaven-resources-plugin:3.2.0:resources@m @[@;1m(default-resources)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m] Using 'UTF-8' encoding to copy filtered resources.
[0;1;34mINFO[m] Using 'UTF-8' encoding to copy filtered properties files.
[0;1;34mINFO[m] Copying 1 resource
[0;1;34mINFO[m] Copying 81 resources
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[@;1m-- @[@;32mmaven-compiler-plugin:3.10.1:compile@m @[@;1m(default-compile)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m] Changes detected - recompiling the module!
[0;1;34mINFO[m] Compiling 5 source files to /home/devopsadmin/workspace/banking-app-project/target/classes
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[@;1m-- @[@;32mmaven-resources-plugin:3.2.0:testResources@m @[@;1m(default-testResources)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m] Using 'UTF-8' encoding to copy filtered resources.
[0;1;34mINFO[m] Using 'UTF-8' encoding to copy filtered properties files.
[0;1;34mINFO[m] skip non existing resourceDirectory /home/devopsadmin/workspace/banking-app-project/src/test/resources
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[@;1m-- @[@;32mmaven-compiler-plugin:3.10.1:testCompile@m @[@;1m(default-testCompile)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m] Changes detected - recompiling the module!
[0;1;34mINFO[m] Compiling 2 source files to /home/devopsadmin/workspace/banking-app-project/target/test-classes
[0;1;34mINFO[m]
[0;1;34mINFO[m] @[@;1m-- @[@;32mmaven-surefire-plugin:2.22.2:test@m @[@;1m(default-test)@[@;1m @ @[@;36mbanking@;1m --@[@;m
[0;1;34mINFO[m]
[0;1;34mINFO[m] -----
[0;1;34mINFO[m] T E S T S
[0;1;34mINFO[m] -----
[0;1;34mINFO[m] Running com.project.staragile.banking.BankingApplicationTests@m
08:13:21.584 [main] DEBUG org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate - Instantiating CacheAwareContextLoaderDelegate from class [org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate]
[0;1;34mINFO[m] -----
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

Dashboard > banking-app-project > #3

```
[0;1;34mINFO[m] -----
[0;1;34mINFO[m] T E S T S
[0;1;34mINFO[m] -----
[0;1;34mINFO[m] Running com.project.staragile.banking.BankingApplicationTests@m
08:13:21.584 [main] DEBUG org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate - Instantiating CacheAwareContextLoaderDelegate from class [org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate]
08:13:21.608 [main] DEBUG org.springframework.test.context.BootstrapUtils - Instantiating BootstrapContext using constructor [public org.springframework.test.context.support.DefaultBootstrapContext(java.lang.Class,org.springframework.test.context.CacheAwareContextLoaderDelegate)]
08:13:21.673 [main] DEBUG org.springframework.test.context.BootstrapUtils - Instantiating TestContextBootstrapper for test class [com.project.staragile.banking.BankingApplicationTests] from class [org.springframework.boot.test.context.SpringBootTestBootstrapper]
08:13:21.689 [main] INFO org.springframework.boot.test.context.SpringBootTestBootstrapper - Neither @ContextConfiguration nor @ContextHierarchy found for test class [com.project.staragile.banking.BankingApplicationTests], using SpringBootTestContextLoader
08:13:21.698 [main] DEBUG org.springframework.test.context.support.AbstractContextLoader - Did not detect default resource location for test class [com.project.staragile.banking.BankingApplicationTests]; class path resource [com/project/staragile/banking/BankingApplicationTests-context.xml] does not exist
08:13:21.702 [main] DEBUG org.springframework.test.context.support.AbstractContextLoader - Did not detect default resource location for test class [com.project.staragile.banking.BankingApplicationTests]; class path resource [com/project/staragile/banking/BankingApplicationTestsContext.groovy] does not exist
08:13:21.705 [main] INFO org.springframework.test.context.support.AbstractContextLoader - Could not detect default resource locations for test class [com.project.staragile.banking.BankingApplicationTests]; no resource found for suffixes {-context.xml, context.groovy}.
08:13:21.708 [main] INFO org.springframework.test.context.support.AnnotationConfigContextLoaderUtils - Could not detect default configuration classes for test class [com.project.staragile.banking.BankingApplicationTests]; BankingApplicationTests does not declare any static, non-private, non-final, nested classes annotated with @Configuration.
08:13:21.819 [main] DEBUG org.springframework.test.context.support.ActiveProfilesUtils - Could not find an 'annotation declaring class' for annotation type [org.springframework.test.context.ActiveProfiles] and class [com.project.staragile.banking.BankingApplicationTests]
08:13:21.984 [main] DEBUG org.springframework.context.annotation.ClassPathScanningCandidateComponentProvider - Identified candidate component class: file [/home/devopsadmin/workspace/banking-app-project/target/classes/com/project/staragile/banking/BankingApplication.class]
08:13:21.987 [main] INFO org.springframework.boot.test.context.SpringBootTestBootstrapper - Found @SpringBootConfiguration com.project.staragile.banking.BankingApplication for test class [com.project.staragile.banking.BankingApplicationTests]
08:13:22.194 [main] DEBUG org.springframework.boot.test.context.SpringBootTestBootstrapper - @TestExecutionListeners is not present for class [com.project.staragile.banking.BankingApplicationTests]; using defaults.
08:13:22.210 [main] INFO org.springframework.boot.test.context.SpringBootTestBootstrapper - Loaded default TestExecutionListener class names from location [META-INF/spring.factories]: [org.springframework.boot.test.mock.mockito.MockitoTestExecutionListener, org.springframework.boot.mock.mockito.ResetMocksTestExecutionListener, org.springframework.boot.test.autoconfigure.restdocs.RestDocsTestExecutionListener, org.springframework.boot.test.autoconfigure.web.client.MockRestServiceServerResetTestExecutionListener, org.springframework.boot.test.autoconfigure.web.servlet.MockMvcPrintonlyOnFailureTestExecutionListener, org.springframework.boot.test.autoconfigure.web.servlet.WebDriverTestExecutionListener]
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

Dashboard > banking-app-project > #3

```
org.springframework.boot.test.autoconfigure.web.servlet.WebMvcTestExecutionListener$Customizer@6cd28fa7, org.springframework.boot.test.context.SpringBootTestTestArgs@1, org.springframework.boot.test.context.SpringBootTestEnvironment@9aa3d1d], resourceBasePath = 'src/main/webapp', contextLoader = 'org.springframework.boot.test.context.SpringBootContextLoader', parent = [null], attributes = map['org.springframework.boot.test.context.web.ServletTestExecutionListener.activateListener' -> true]], class annotated with @DirtiesContext [false] with mode [null].
```

```
-----  
/\ / ---|---(_)_---/_\ \_ /  
( ()---|---_|---_|\_ \_||\_\ _ / / /  
\_ \_---|---|_||_||_||\_|_ ) ) ) )  
` |____| ._.|_||_||_\_|| / / / /  
=====|_====|_====|/_\=/\_/\_/  
:: Spring Boot :: (v2.7.4)
```

```
2024-02-19 08:13:23.082 INFO 25070 --- [main] c.p.s.banking.BankingApplicationTests : Starting BankingApplicationTests using Java 11.0.21 on ip-172-31-19-155 with PID 25070 (started by devopsadmin in /home/devopsadmin/workspace/banking-app-project)  
2024-02-19 08:13:23.088 INFO 25070 --- [main] c.p.s.banking.BankingApplicationTests : No active profile set, falling back to 1 default profile: "default"  
2024-02-19 08:13:24.629 INFO 25070 --- [main] s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in DEFAULT mode.  
2024-02-19 08:13:24.732 INFO 25070 --- [main] s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 88 ms. Found 1 JPA repository interfaces.  
2024-02-19 08:13:26.043 INFO 25070 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...  
2024-02-19 08:13:26.572 INFO 25070 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.  
2024-02-19 08:13:26.747 INFO 25070 --- [main] o.hibernate.jpa.internal.util.LogHelper : HHH000204: Processing PersistenceUnitInfo [name: default]  
2024-02-19 08:13:26.871 INFO 25070 --- [main] org.hibernate.Version : HHH000412: Hibernate ORM core version 5.6.11.Final  
2024-02-19 08:13:27.331 INFO 25070 --- [main] o.hibernate.annotations.common.Version : HCAW0000001: Hibernate Commons Annotations (5.1.2.Final)  
2024-02-19 08:13:27.667 INFO 25070 --- [main] org.hibernate.dialect.Dialect : HHH000400: Using dialect: org.hibernate.dialect.H2Dialect  
2024-02-19 08:13:28.054 INFO 25070 --- [main] o.h.e.t.j.p.i.JtaPlatformInitiator : HHH000490: Using JtaPlatform implementation:  
[org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]  
2024-02-19 08:13:28.064 INFO 25070 --- [main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'  
2024-02-19 08:13:30.665 WARN 25070 --- [main] jpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be performed during view rendering. Explicitly configure spring.jpa.open-in-view to disable this warning  
2024-02-19 08:13:31.137 INFO 25070 --- [main] o.s.b.a.w.s.WelcomePageHandlerMapping : Adding welcome page: class path resource [static/index.html]  
2024-02-19 08:13:31.787 INFO 25070 --- [main] c.p.s.banking.BankingApplicationTests : Started BankingApplicationTests in 9.386 seconds (JVM running for 11.934)  
[0@1:34mINFO@m [B@1;32mTests run: 0@1;32m, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 10.901 s - in
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

Dashboard > banking-app-project > #3

```
org.springframework.test.context.event.EventPublishingTestExecutionListener@2148b47e, org.springframework.boot.test.mock.mockito.ResetMocksTestExecutionListener@410f1452, org.springframework.boot.test.autoconfigure.restdocs.RestDocsTestExecutionListener@463a1f47, org.springframework.boot.test.autoconfigure.web.client.MockRestServiceServerTestExecutionListener@23ade612, org.springframework.boot.test.autoconfigure.web.servlet.MockMvcPrintOnlyOnFailureTestExecutionListener@47224d5d, org.springframework.boot.test.autoconfigure.web.servlet.WebDriverTestExecutionListener@e7e66cf, org.springframework.boot.test.autoconfigure.webservices.client.MockWebServiceServerTestExecutionListener@8e094c9]  
[0@1:34mINFO@m [B@1;32mTests run: 0@1;32m, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.041 s - in com.project.staragile.banking.B@1mTestAccountService@m  
2024-02-19 08:13:32.393 INFO 25070 --- [ionShutdownHook] j.LocalContainerEntityManagerFactoryBean : Closing JPA EntityManagerFactory for persistence unit 'default'  
2024-02-19 08:13:32.393 INFO 25070 --- [ionShutdownHook] .SchemaDropperImpl$DelayedDropActionImpl : HHH000477: Starting delayed evictData of schema as part of SessionFactory shut-down'  
2024-02-19 08:13:32.412 INFO 25070 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Shutdown initiated...  
2024-02-19 08:13:32.422 INFO 25070 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Shutdown completed.  
[0@1:34mINFO@m]  
[0@1:34mINFO@m] Results:  
[0@1:34mINFO@m]  
[0@1:34mINFO@m] 0@1;32mTests run: 2, Failures: 0, Errors: 0, Skipped: 0@1m  
[0@1:34mINFO@m]  
[0@1:34mINFO@m]  
[0@1:34mINFO@m] B@1m-- 0@1;32mmaven-jar-plugin:3.2.2:jar@1[m @ 1m(default-jar)@1[m @ B@1m@1m --B@m  
[0@1:34mINFO@m] Building jar: /home/devopsadmin/workspace/banking-app-project/target/banking-0.0.1-SNAPSHOT.jar  
[0@1:34mINFO@m]  
[0@1:34mINFO@m] B@1m-- 0@1;32mspring-boot-maven-plugin:2.7.4:repackage@1[m(repackage)@1[m @ B@1m@1m@1m --B@m  
[0@1:34mINFO@m] Replacing main artifact with repackaged archive  
[0@1:34mINFO@m] B@1m----B@m  
[0@1:34mINFO@m] B@1;32mBUILD SUCCESS@1[m  
[0@1:34mINFO@m] B@1m----B@m  
[0@1:34mINFO@m] Total time: 21.859 s  
[0@1:34mINFO@m] Finished at: 2024-02-19T08:13:35Z  
[0@1:34mINFO@m] B@1m----B@m  
[Pipeline] }  
[Pipeline] // withEnv  
[Pipeline] }  
[Pipeline] // stage  
[Pipeline] stage
```

```
Instances | EC2 | us-west-1 X banking-app-project #3 Console +  
Not secure 13.56.209.198:8080/job/banking-app-project/3/console  
Apps WhatsApp Gmail Google Drive Google Keep One Drive Amazon Web Service... StarAgile LMS (Ajay Gaur) iamajaygaur/DevOp... All Bookmarks  
Dashboard > banking-app-project > #3  
[0;1;34mINFO[m] @[1m-----@[m  
[Pipeline] }  
[Pipeline] // withEnv  
[Pipeline] }  
[Pipeline] // stage  
[Pipeline] stage  
[Pipeline] { (Docker build)  
[Pipeline] tool  
[Pipeline] envVarsForTool  
[Pipeline] withEnv  
[Pipeline] {  
[Pipeline] sh  
+ docker version  
Client:  
Version: 24.0.5  
API version: 1.43  
Go version: go1.20.3  
Git commit: 24.0.5-0ubuntu1~20.04.1  
Built: Mon Aug 21 19:50:14 2023  
OS/Arch: linux/amd64  
Context: default  
  
Server:  
Engine:  
Version: 24.0.5  
API version: 1.43 (minimum version 1.12)  
Go version: go1.20.3  
Git commit: 24.0.5-0ubuntu1~20.04.1  
Built: Mon Aug 21 19:50:14 2023  
OS/Arch: linux/amd64  
Experimental: false  
containerd:  
Version: 1.7.2  
GitCommit:  
runc:
```

```
Instances | EC2 | us-west-1 X banking-app-project #3 Console +  
Not secure 13.56.209.198:8080/job/banking-app-project/3/console  
Apps WhatsApp Gmail Google Drive Google Keep One Drive Amazon Web Service... StarAgile LMS (Ajay Gaur) iamajaygaur/DevOp... All Bookmarks  
Dashboard > banking-app-project > #3  
Engine:  
Version: 24.0.5  
API version: 1.43 (minimum version 1.12)  
Go version: go1.20.3  
Git commit: 24.0.5-0ubuntu1~20.04.1  
Built: Mon Aug 21 19:50:14 2023  
OS/Arch: linux/amd64  
Experimental: false  
containerd:  
Version: 1.7.2  
GitCommit:  
runc:  
Version: 1.1.7-0ubuntu1~20.04.2  
GitCommit:  
docker-init:  
Version: 0.19.0  
GitCommit:  
[Pipeline] sh  
+ docker build -t iamajaygaur/bankapp-eta-app:3 .  
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.  
Install the buildx component to build images with BuildKit:  
https://docs.docker.com/go/buildx/  
Sending build context to Docker daemon 64.81MB  
  
Step 1/5 : FROM openjdk:11  
--> 47a932d999b07  
Step 2/5 : ARG JAR_FILE=target/*.jar  
--> Using cache  
--> 15457d378f38  
Step 3/5 : COPY ${JAR_FILE} app.jar  
--> bcf7315ee203  
Step 4/5 : ENTRYPOINT ["java","-jar","/app.jar"]  
--> Running in 9bd6d50feae18
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

Apps WhatsApp Gmail Google Drive Google Keep One Drive Amazon Web Services StarAgile LMS (Ajay Gaur) iamajaygaur/DevOp... All Bookmarks

Dashboard > banking-app-project > #3

```
---> Using cache
---> 15457d378f38
Step 3/5 : COPY ${JAR_FILE} app.jar
---> bcf7315ee203
Step 4/5 : ENTRYPOINT ["java","-jar","/app.jar"]
---> Running in 8b7d650fae18
Removing intermediate container 8b7d650fae18
---> fa91a445bd19
Step 5/5 : EXPOSE 8082
---> Running in ec3b04b14734
Removing intermediate container ec3b04b14734
---> 3803c537c165
Successfully built 3803c537c165
Successfully tagged iamajaygaur/bankapp-eta-app:3
[Pipeline] sh
+ docker image list
REPOSITORY          TAG      IMAGE ID      CREATED        SIZE
iamajaygaur/bankapp-eta-app  3       3803c537c165  Less than a second ago  696MB
iamajaygaur/bankapp-eta-app  2       66168c629a22  7 minutes ago   696MB
iamajaygaur/bankapp-eta-app  latest   66168c629a22  7 minutes ago   696MB
iamajaygaur/bankapp-eta-app  1       6703035e716d  15 minutes ago   696MB
iamajaygaur/bankingapp     4       e4c32a43d7e1  30 minutes ago   696MB
iamajaygaur/bankingapp     latest   e4c32a43d7e1  30 minutes ago   696MB
iamajaygaur/bankingapp     3       d6396c74bf6c6  44 minutes ago   696MB
iamajaygaur/bankingapp     2       6c1fdb635866  About an hour ago  696MB
loksaieta/loksai-eta-app   1       705a5e2eacff  About an hour ago  357MB
loksaieta/loksai-eta-app   latest   705a5e2eacff  About an hour ago  357MB
openjdk                   11      47a932d98087  18 months ago   654MB
tomcat                     8.0     ef6a7c98d192  5 years ago    356MB
[Pipeline] sh
+ docker tag iamajaygaur/bankapp-eta-app:3 iamajaygaur/bankapp-eta-app:latest
[Pipeline]
[Pipeline] // withEnv
[Pipeline]
[Pipeline] // stage
```

Instances | EC2 | us-west-1 banking-app-project #3 Console

Not secure 13.56.209.198:8080/job/banking-app-project/3/console

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Dashboard > banking-app-project > #3

```
[Pipeline] {
[Pipeline] sh
+ docker login -u iamajaygaur --password-stdin
+ echo ****
WARNING! Your password will be stored unencrypted in /home/devopsadmin/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] {
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] sh
+ docker push iamajaygaur/bankapp-eta-app:latest
The push refers to repository [docker.io/iamajaygaur/bankapp-eta-app]
46a1bbde8d19: Preparing
7b7f3a078e10d0: Preparing
826c3ddbb29c: Preparing
b626401ef603: Preparing
9b55156af26: Preparing
29305db30c9f: Preparing
03127cdb4790: Preparing
9c742cd6c785: Preparing
29305db30c9f: Waiting
03127cdb4790: Waiting
9c742cd6c785: Waiting
7b7f3a078e10d0: Layer already exists
```

```
b626401ef603: Layer already exists
826c3dd0b29c: Layer already exists
9b55156a0f26: Layer already exists
03127cdb479b: Layer already exists
293d5db30c9f: Layer already exists
9c742cde67a5: Layer already exists
46a1bbde65d19: Pushed
latest: digest: sha256:d50ecb8a6f373ff0b89f8b178af372f51d785d1b19d805faa1f1f93746b90d22 size: 2007
[Pipeline]
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] stage
[Pipeline] {
  (Deploy to Kubernetes Dev Environment)
[Pipeline] tool
[Pipeline] enVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] script
[Pipeline] {
[Pipeline] sshPublisher
SSH: Connecting from host [ip-172-31-19-155]
SSH: Connecting with configuration [kubernetes_cluster] ...
[Pipeline]
[Pipeline] // script
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withCredentials
[Pipeline] EXEC: completed after 601 ms
```

```
L: APPLIANCE // jenkins
[Pipeline] stage
[Pipeline] {
  (Deploy to Kubernetes Dev Environment)
[Pipeline] tool
[Pipeline] enVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] script
[Pipeline] {
[Pipeline] sshPublisher
SSH: Connecting from host [ip-172-31-19-155]
SSH: Connecting with configuration [kubernetes_cluster] ...
[Pipeline]
[Pipeline] // script
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withCredentials
SSH: EXEC: completed after 601 ms
SSH: Disconnecting configuration [kubernetes_cluster] ...
SSH: Transferred 1 file(s)
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

REST API Jenkins 2.426.3

Screenshot of a Docker Hub repository page for 'iamajaygaur/bankapp-eta-app'.

General Tab:

- Description:** Add a short description for this repository. (The short description is used to index your content on Docker Hub and in search engines. It's visible to users in search results.)
- Docker commands:** docker push iamajaygaur/bankapp-eta-app:tagname
- Tags:** This repository contains 1 tag(s).

Tag	OS	Type	Pulled	Pushed
1.0.0				

Automated Builds: Manually pushing images to Hub? Connect your account to GitHub or Bitbucket to automatically build and tag new images whenever your code is updated, so you can focus your time on creating.

Screenshot of MobaXterm showing a terminal session connected to a Kubernetes master node ('k8s-master').

```
devopsadmin@kmaster-node:~$ kubectl get nodes
NAME           STATUS   ROLES      AGE    VERSION
kmaster-node   Ready    control-plane   166m   v1.28.2
worker-node1   Ready    <none>     164m   v1.28.2
worker-node2   Ready    <none>     164m   v1.28.2
devopsadmin@kmaster-node:~$ kubectl get pods
NAME                               READY   STATUS    RESTARTS   AGE
bankapp-eta-deploy-d466b85c8-9fjhw 1/1     Running   0          42m
bankapp-eta-deploy-d466b85c8-d56kg 1/1     Running   0          42m
bankapp-eta-deploy-d466b85c8-q9s88 1/1     Running   0          42m
bankingapp-deploy-5fd9b56dd9-nqwmz 0/1     ImagePullBackOff   0          42m
bankingapp-deploy-5fd9b56dd9-t5srm 0/1     ImagePullBackOff   0          42m
bankingapp-deploy-5fd9b56dd9-x8sc6 0/1     ImagePullBackOff   0          42m
devopsadmin@kmaster-node:~$ kubectl get svc
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
bankapp-eta   NodePort   10.99.168.2  <none>       8082:31032/TCP   52m
kubernetes   ClusterIP  10.96.0.1   <none>       443/TCP   167m
devopsadmin@kmaster-node:~$
```

The terminal also displays system monitoring information at the bottom:

- kmaster-node
- 9% CPU usage
- 0.77 GB / 0.93 GB memory usage
- 0.06 Mb/s upload speed
- 0.02 Mb/s download speed
- 160 min idle time
- ubuntu user
- /: 45% disk usage
- /boot/efi: 6% disk usage

→http://54.241.206.127:31032/

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Instances | EC2 | us-west-1 | banking-app-project [Jenkins] | iamajaygaur/bankapp-eta-app | CBS

Not secure 54.241.206.127:31032

Apps WhatsApp Gmail Google Drive Google Keep One Drive Amazon Web Services StarAgile LMS (Ajay Gaur) iamajaygaur/DevOp... All Bookmarks

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A screenshot of a web browser window. The address bar shows 'Not secure 54.241.206.127:31032'. The bookmarks bar includes 'Instances | EC2 | us-west-1', 'banking-app-project [Jenkins]', 'iamajaygaur/bankapp-eta-app...', and 'CBS'. Below the address bar, there's a row of icons for various apps like WhatsApp, Gmail, Google Drive, etc.

WHAT IS SYAS OUR CLIENTS



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A dark header section containing four links: 'About Financial' (in white), 'Instagram' (in white), and 'Newsletter' (in white). The first 'About Financial' link is underlined, indicating it is the active page.

A screenshot of a web browser showing a user profile picture (a man's face) and a decorative bar below it consisting of three colored rectangles.

It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem



A dark footer section divided into four columns:

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SEND

→ Launch the Monitoring Server in VM and Install and Configure Prometheus and Grafana

AWS Services Dashboard

Instances (1/7) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
jenkins-master	i-0a17ab2830e136020	Running	t2.micro	2/2 checks passed	View alarms	us-west-1c
jenkins-slave	i-0951aa07e929dd44	Running	t2.micro	2/2 checks passed	View alarms	us-west-1c
k8s-master	i-087dcc78b7647ddc3	Running	t2.micro	2/2 checks passed	View alarms	us-west-1c
k8s-worker-node1	i-05c88366d2c2c5461	Running	t2.micro	2/2 checks passed	View alarms	us-west-1c
k8s-worker-node2	i-0f3be607a199ec0ec	Running	t2.micro	2/2 checks passed	View alarms	us-west-1c
monitoring-server	i-032eb6bdfcb2008f8	Running	t2.micro	Initializing	View alarms	us-west-1c

Instance: i-032eb6bdfcb2008f8 (monitoring-server)

Details **Status and alarms** [New](#) **Monitoring** **Security** **Networking** **Storage** **Tags**

Instance summary

Instance ID	i-032eb6bdfcb2008f8 (monitoring-server)	Public IPv4 address	54.153.102.186 open address	Private IPv4 addresses	172.31.19.226
IPv6 address	-	Instance state	Running	Public IPv4 DNS	ec2-54-153-102-186.us-west-1.compute.amazonaws.com open address
Hostname type		Private IP DNS name (IPv4 only)			

```
[root@ip-172-31-19-226 ~]# sudo systemctl enable prometheus
[root@ip-172-31-19-226 ~]# sudo systemctl restart prometheus
[root@ip-172-31-19-226 ~]# sudo systemctl status prometheus
● prometheus.service - Prometheus Server
    Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: disabled)
    Active: active (running) since Mon 2024-02-19 09:51:18 UTC; 3s ago
      Docs: https://prometheus.io/docs/introduction/overview/
        Main PID: 9108 (prometheus)
           Tasks: 5 (limit: 1114)
         Memory: 17.0M
            CPU: 63ms
          CGroup: /system.slice/prometheus.service
                  └─9108 /root/prometheus-2.49.0-rc.1.linux-amd64/prometheus --config.file=/root/prometheus-2.49.0-r

Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.744Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.747Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.749Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.749Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.755Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.755Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.756Z calle>
Feb 19 09:51:18 ip-172-31-19-226.us-west-1.compute.internal prometheus[9108]: ts=2024-02-19T09:51:18.760Z calle>
```

```
Complete!
[root@ip-172-31-19-226 ~]# sudo /bin/systemctl enable grafana-server.service
Synchronizing state of grafana-server.service with /usr/lib/systemd/systemd-sysv-install...
Executing: /usr/lib/systemd/systemd-sysv-install enable grafana-server
Created symlink /etc/systemd/system/multi-user.target.wants/grafana-server.service → /usr/lib/systemd/system/grafana-server.service.
[root@ip-172-31-19-226 ~]# sudo /bin/systemctl start grafana-server.service
[root@ip-172-31-19-226 ~]# sudo /bin/systemctl status grafana-server.service
● grafana-server.service - Grafana instance
    Loaded: loaded (/usr/lib/systemd/system/grafana-server.service; enabled; preset: disabled)
    Active: active (running) since Mon 2024-02-19 09:56:38 UTC; 8s ago
      Docs: http://docs.grafana.org
        Main PID: 34325 (grafana-server)
           Tasks: 7 (limit: 1114)
         Memory: 74.5M
            CPU: 799ms
          CGroup: /system.slice/grafana-server.service
                  └─34325 /usr/sbin/grafana-server --config=/etc/grafana/grafana.ini --pidfile=/var/run/grafana/grafan>

Feb 19 09:56:37 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=ticker t=2024-02-19T09:56:37Z>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=infra.usagestats.collect>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=server t=2024-02-19T09:56:38Z>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=provisioning.alerting>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=provisioning.alerting>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=systemd[1]: Started grafana-server.service - Grafana>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=http.server t=2024-02-19T09:56:38Z>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=ngalert t=2024-02-19T09:56:38Z>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=grafanaStorageLogger>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=ngalert.multiorg.alerts>
Feb 19 09:56:38 ip-172-31-19-226.us-west-1.compute.internal grafana-server[34325]: logger=ngalert.t=2024-02-19T09:56:38Z>
```

The screenshot shows the Prometheus Query Editor interface. At the top, there are several tabs: Instances | EC2, banking-app-pr, CBS, DevOps_Training, Prometheus Tim..., Home - Dashboard, ChatGPT, and All Bookmarks. Below the tabs, the URL is 54.153.102.186:9090/graph?g0.expr=up&g0.tab=1&g0.display_mode=lines&g0.show_exemplars=0&g0.range_input=1h. The main area has two tabs: Table and Graph. The Table tab is selected, showing a single row of data. The query used is up{instance="172.31.19.99:9100", job="prometheus"} and up{instance="localhost:9090", job="prometheus"}. The results show two rows with the value '1'. There are also buttons for 'Add Panel' and 'Remove Panel'.

The screenshot shows the Grafana Settings page for a Prometheus data source. The URL is 54.153.102.186:3000/datasources/edit/B20gVZoSk. The left sidebar has icons for Home, Search, Dashboards, and Settings (which is currently selected). The main area shows the 'Data Sources / Prometheus' configuration. It says 'Type: Prometheus' and has a note: 'Configure your Prometheus data source below' and 'Or skip the effort and get Prometheus (and Loki) as fully-managed, scalable, and hosted data sources from Grafana Labs with the free-forever Grafana Cloud plan.' The 'Name' field is set to 'Prometheus' and is marked as 'Default'. Under the 'HTTP' section, the 'URL' is set to 'http://54.153.102.186:9090/'. The 'Auth' section includes 'Basic auth' and 'With Credentials' options.

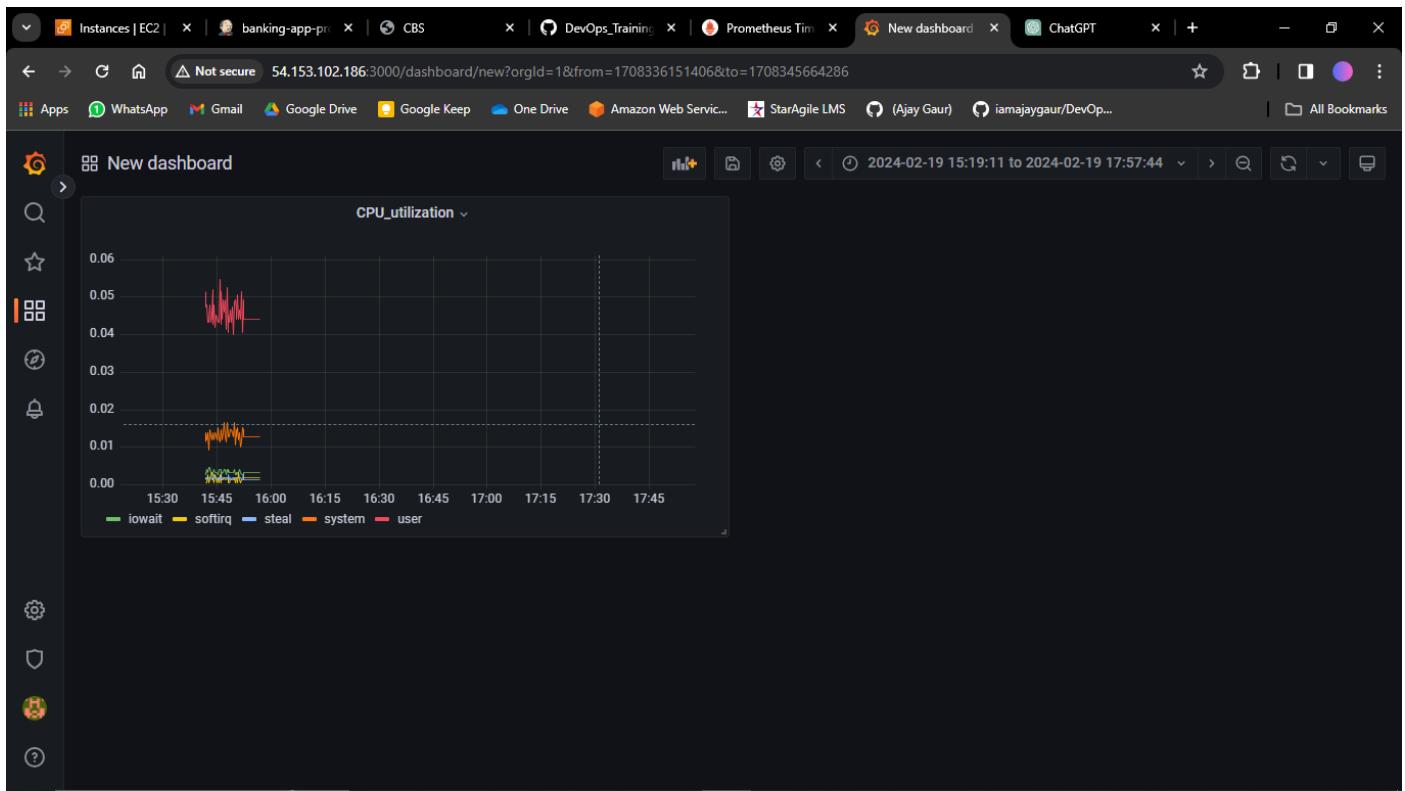
The screenshot shows the Prometheus Alertmanager configuration interface. It includes sections for 'Alertmanager data source' (Scrape interval: 15s, Query timeout: 60s, HTTP Method: POST), 'Misc' (Disable metrics lookup: off, Custom query parameters: max_source_resolution=5m&timeout=10), and 'Exemplars' (+ Add). A status message indicates 'Data source is working'. Navigation buttons at the bottom include Back, Explore, Delete, and Save & test.

→ Add Panel Title as CPU_utilization

→ Select Data source as Prometheus

→ Run Query - sum by(mode)(rate(node_cpu_seconds_total{mode!="idle"}[5m])) > 0

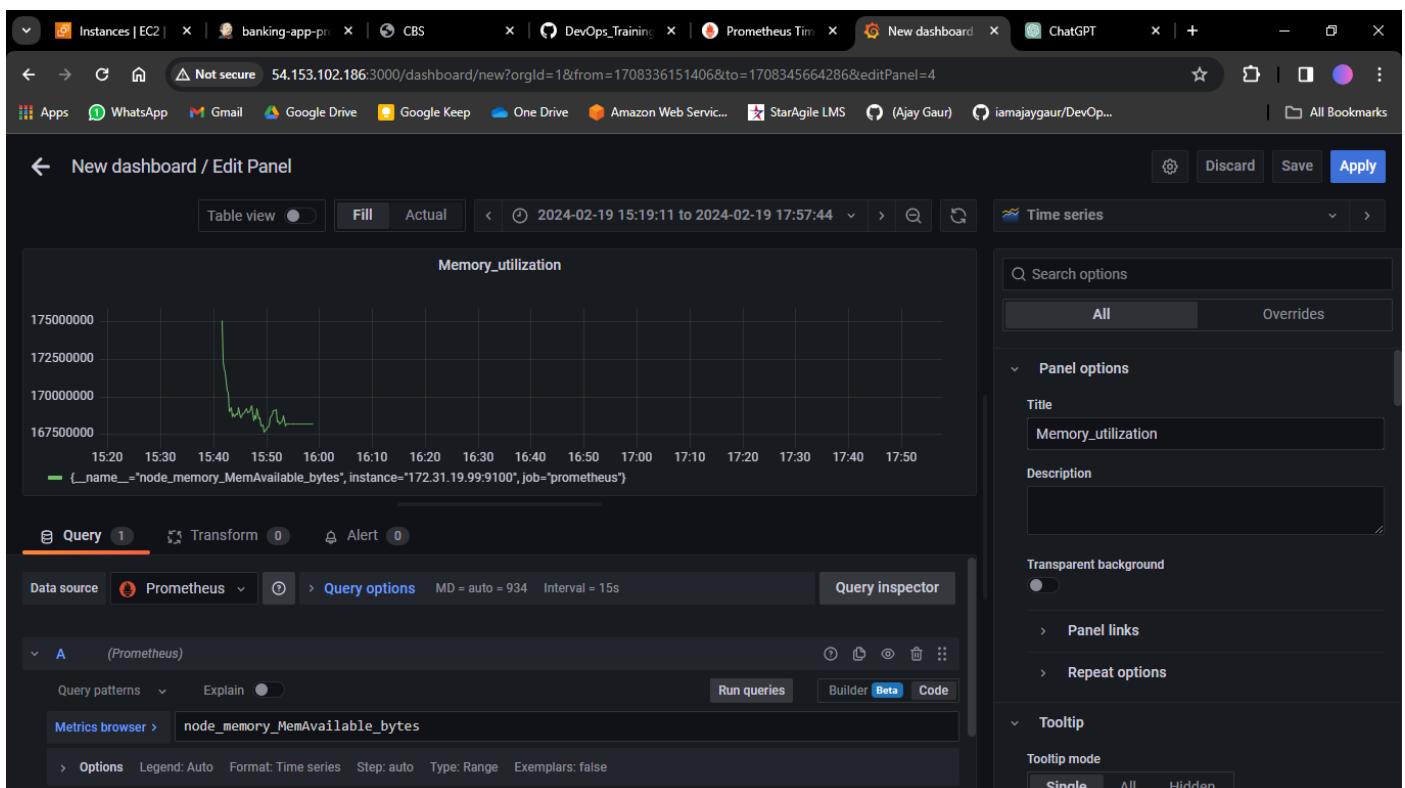
The screenshot shows the Grafana dashboard editor. On the left is a time series chart titled 'CPU_utilization' with a Y-axis from 0.00 to 0.06 and an X-axis from 10:00 to 15:30. The chart displays four CPU modes: iowait (green), softirq (yellow), steal (blue), and system+user (orange/red). Below the chart are 'Query' (1), 'Transform' (0), and 'Alert' (0) buttons. The 'Metrics browser' shows the query: `sum by(mode)(rate(node_cpu_seconds_total{mode!="idle"}[5m])) > 0`. On the right is a configuration panel with 'Panel options' (Title: CPU_utilization, Description: blank) and 'Tooltip' (mode: Single). Buttons for Discard, Save, and Apply are at the top right.

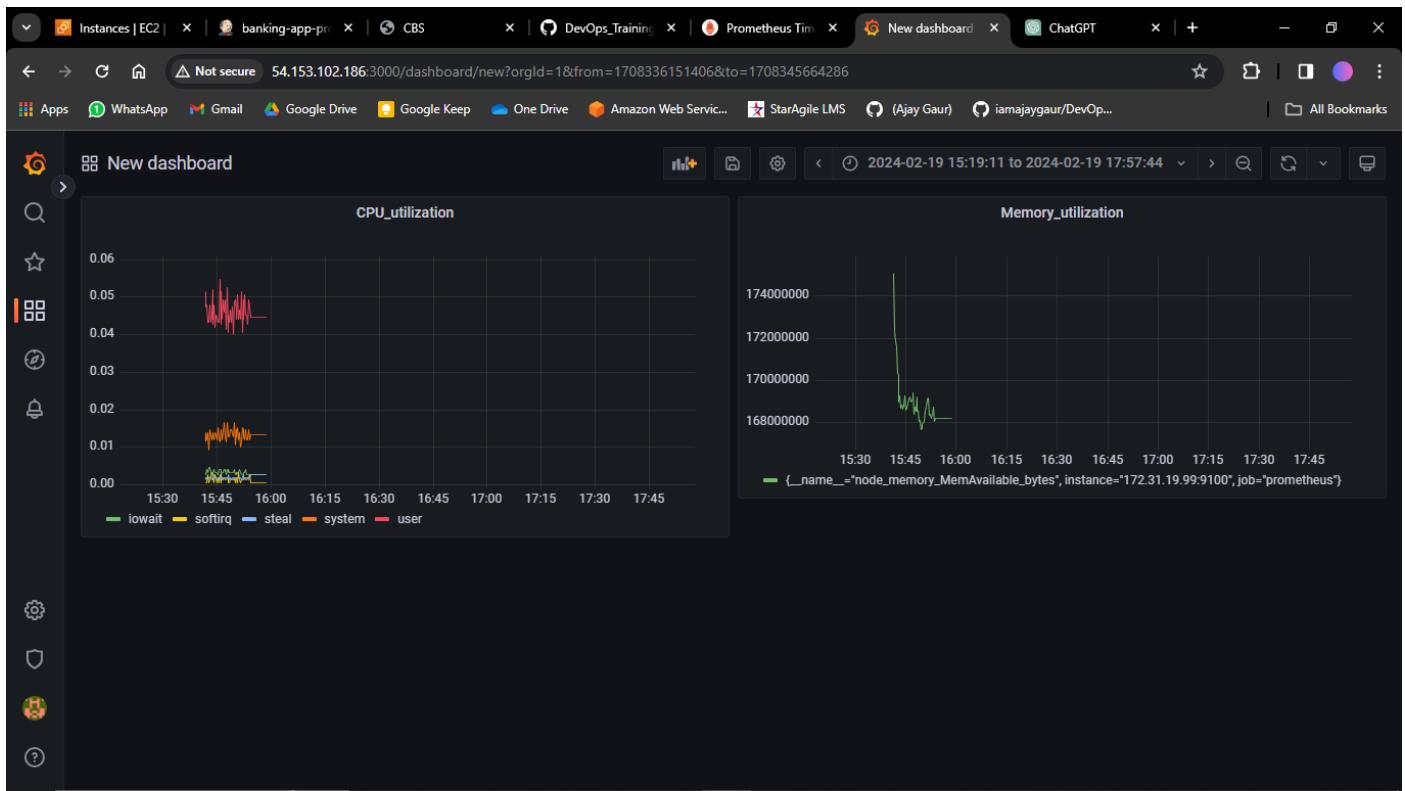


→ Add new Panel as Memory_utilization

→ Select Data source as Prometheus

→ Run Query - node_memory_MemAvailable_bytes

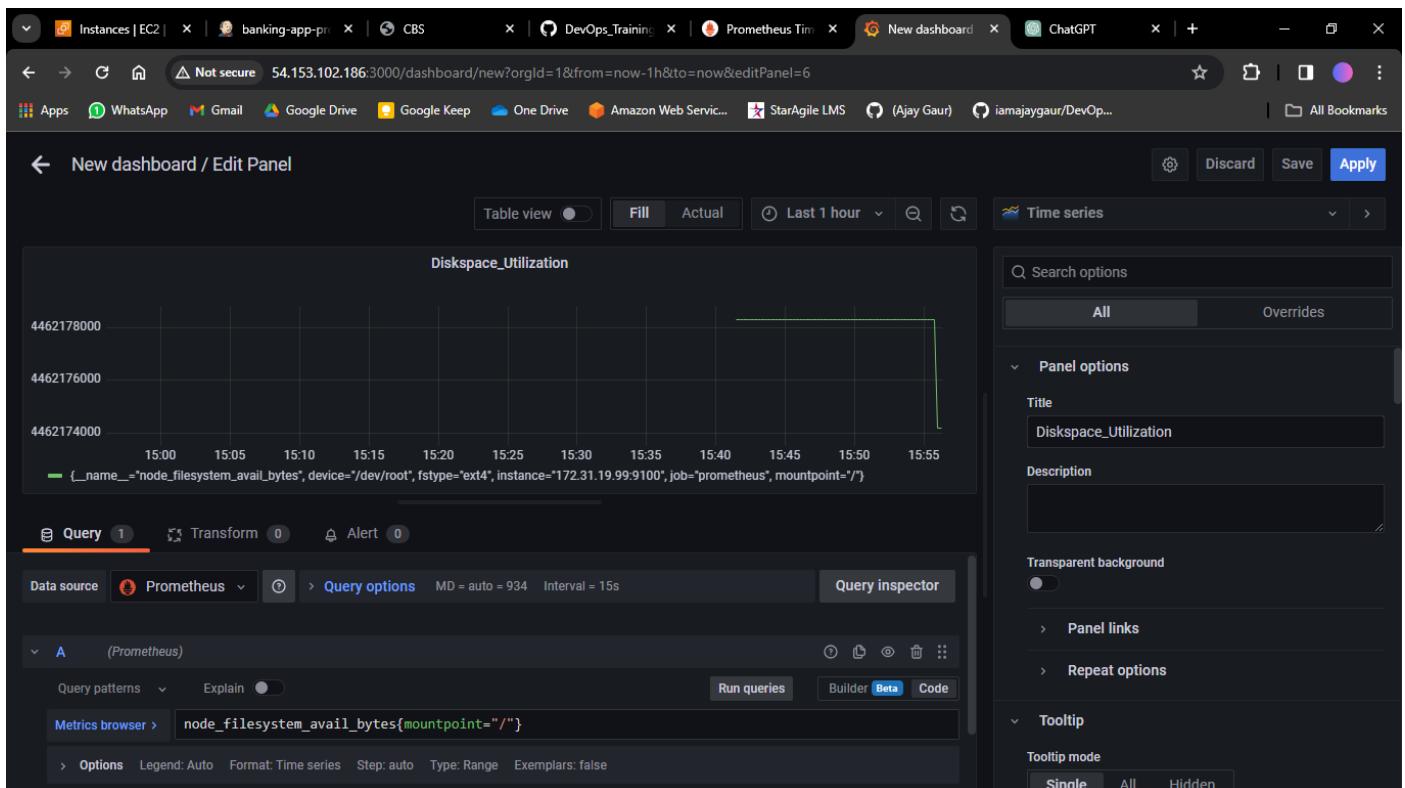


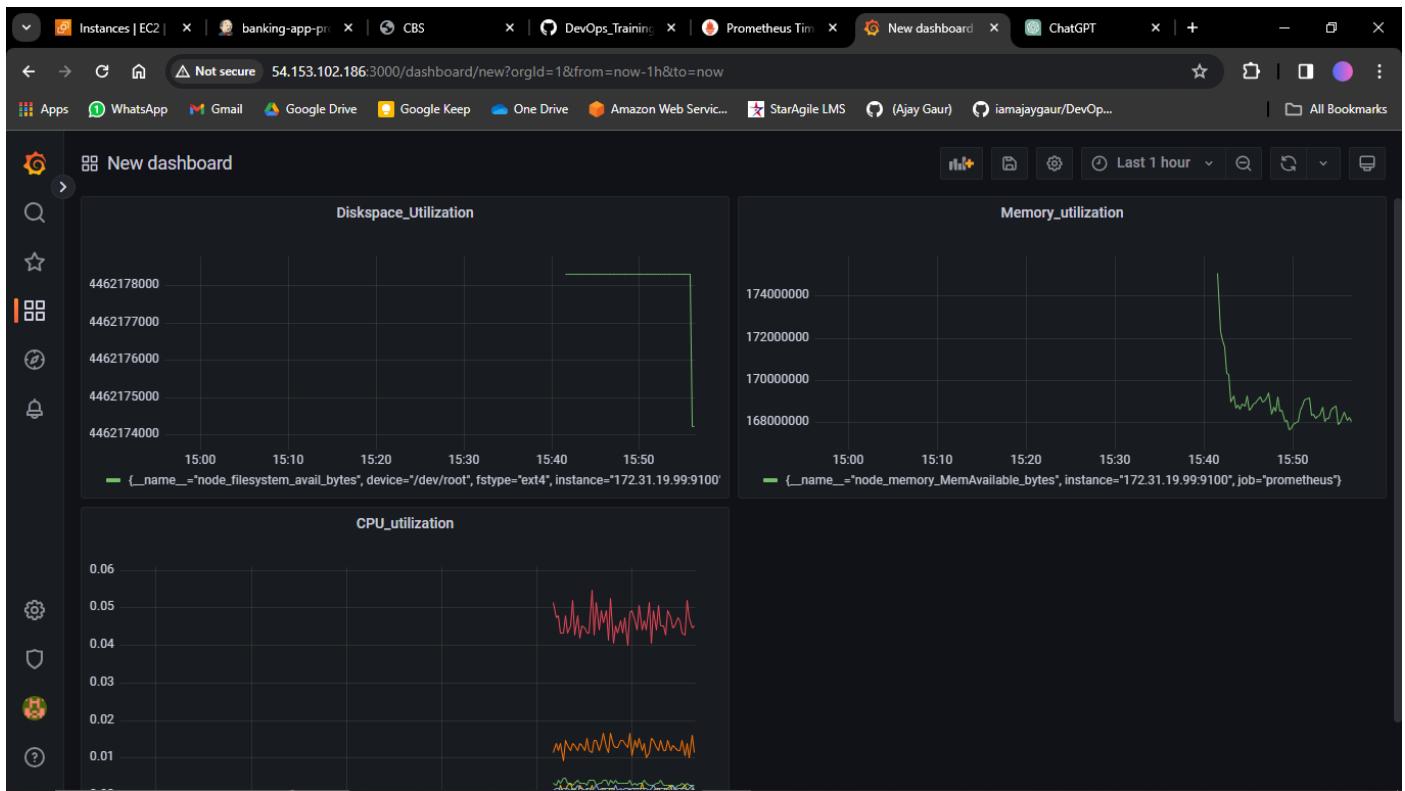


→ Add new Panel as Diskspace_Utilization

→ Select Data source as Prometheus

→ Run Query - `node_filesystem_avail_bytes{mountpoint="/"}`





→ Add new Panel as Containermemory_Utilization

→ Select Data source as Prometheus

→ Run Query - `node_cpu_guest_seconds_total`

