St. Francis Institute of Technology, Mumbai-400 103

Department Of Information Technology

A.Y. 2023-2024

Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 6: a. To build pipeline of jobs in Jenkins, create a pipeline script to test and deploy an application.
b. To automatically build a job in Jenkins using webhooks (Topic Beyond Syllabus)

1. **Aim:** To build pipeline of jobs in Jenkins, create a pipeline script to test and deploy an application
2. **Objectives:** Aim of this experiment is that, the students will be able
   - To build pipeline of jobs in Jenkins, create a pipeline script to test and deploy an application
3. **Outcomes:** After study of this experiment, the students will be able
   - To understand the importance of Jenkins to Build and deploy Software Applications on server environment.
4. **Prerequisite:** Knowledge of software engineering concept of integration and deployment
5. **Requirements:** Jenkins, JDK, python, Personal Computer, Windows operating system, browser, Internet Connection, Microsoft Word.
6. **Pre-Experiment Exercise:**
   Brief Theory: Refer shared material
7. **Laboratory Exercise**
   - **A. Procedure:**
     - **a. Answer the following:**
       - What is Jenkins pipeline?

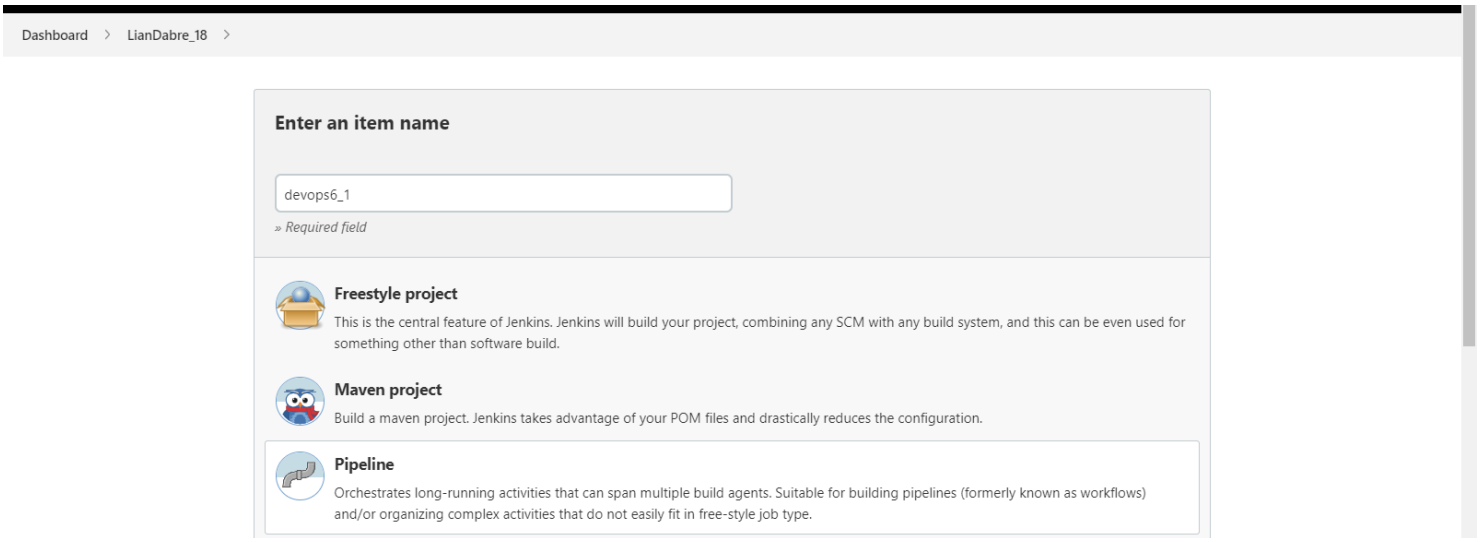
Jenkins Pipeline is a powerful automation feature within the Jenkins continuous integration and continuous delivery (CI/CD) platform. It allows you to define and manage your build, test, and deployment processes as code, enabling you to create, version, and execute complex, orchestrated workflows for software development and delivery. Jenkins Pipeline is typically defined using a domain-specific language called Groovy DSL, making it a flexible and extensible way to automate and manage your software delivery pipelines.

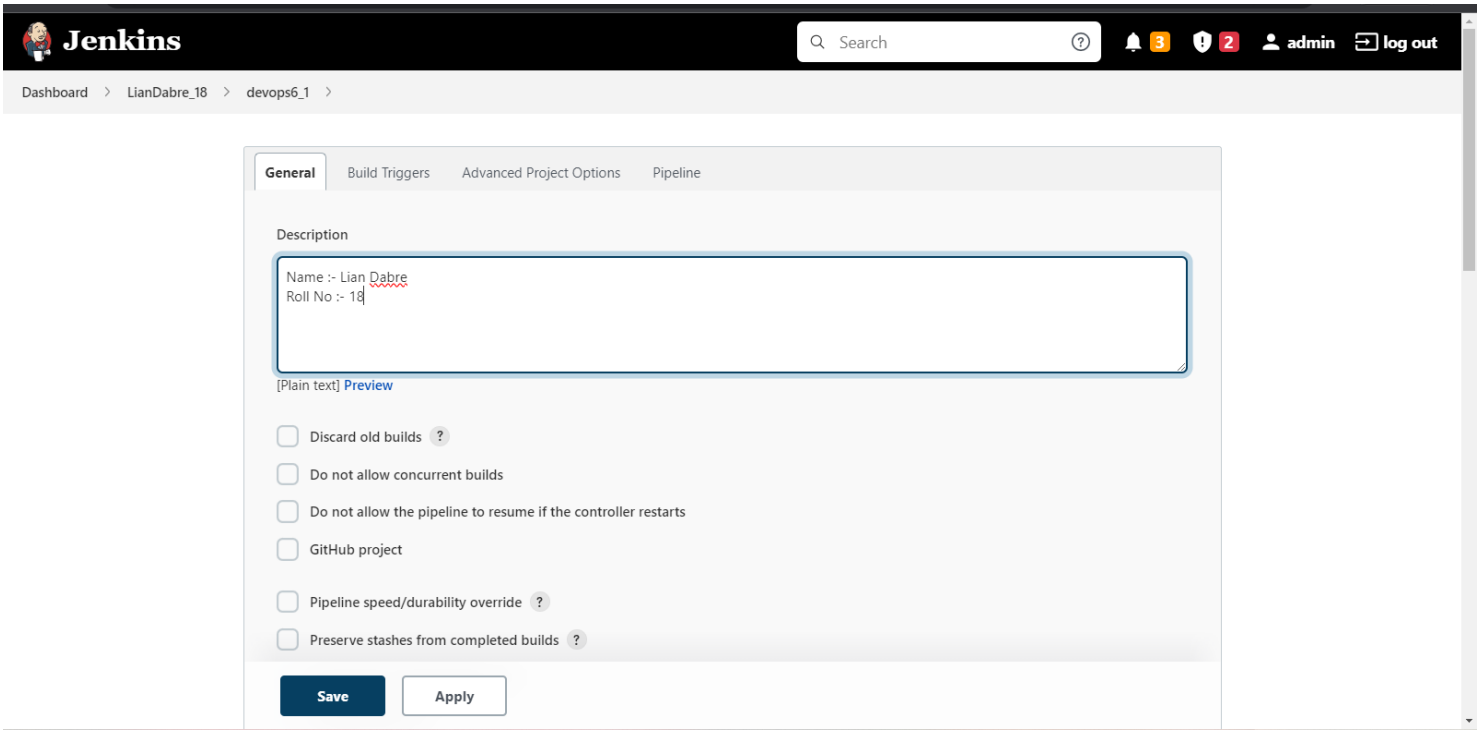
- What are the different ways to write a Jenkins pipeline?

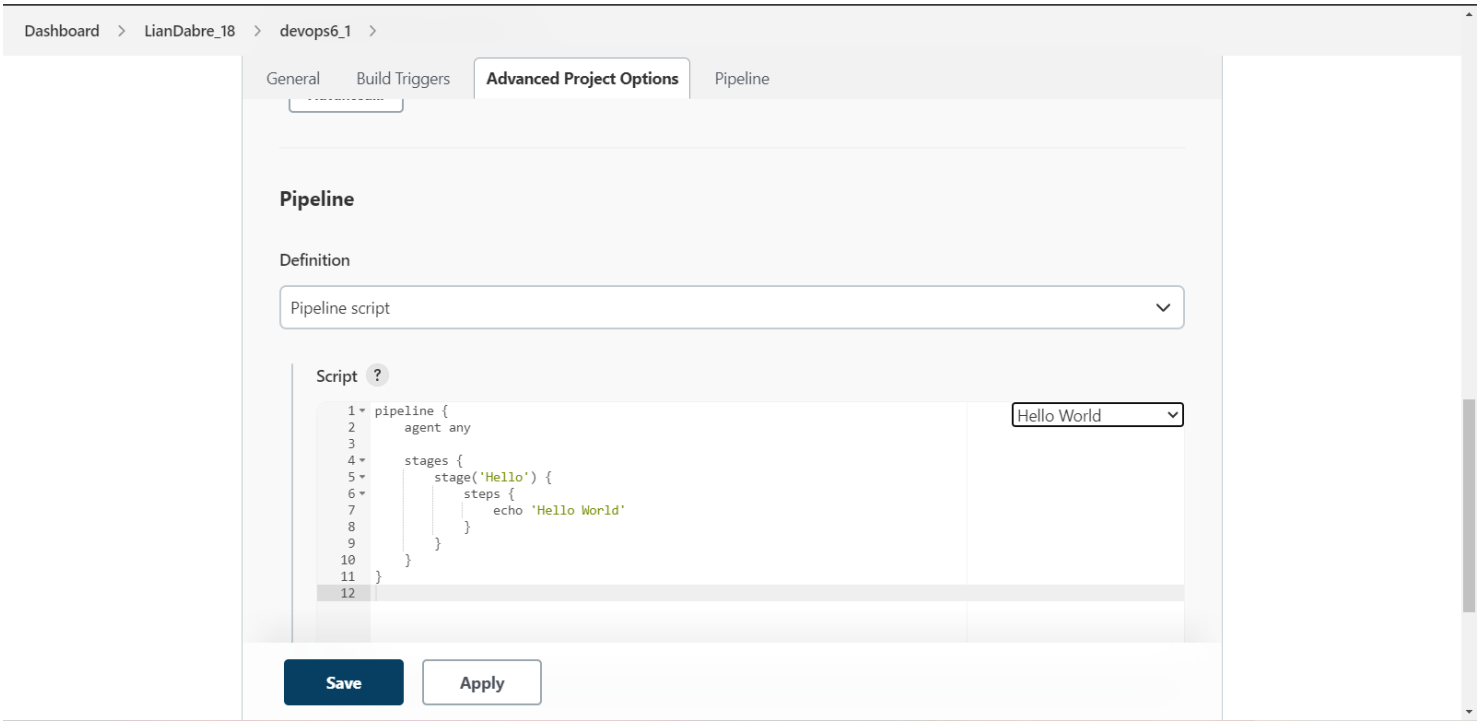
There are two primary ways to write a Jenkins Pipeline:
1. Declarative Pipeline: This is a simplified and structured way to define pipelines using a more human-readable syntax. It's ideal for straightforward, linear workflows.
2. Scripted Pipeline: This approach allows you to write pipelines using a full-fledged Groovy script, providing more flexibility and control for complex and conditional workflows.
You can choose the one that best suits your project's requirements and complexity.

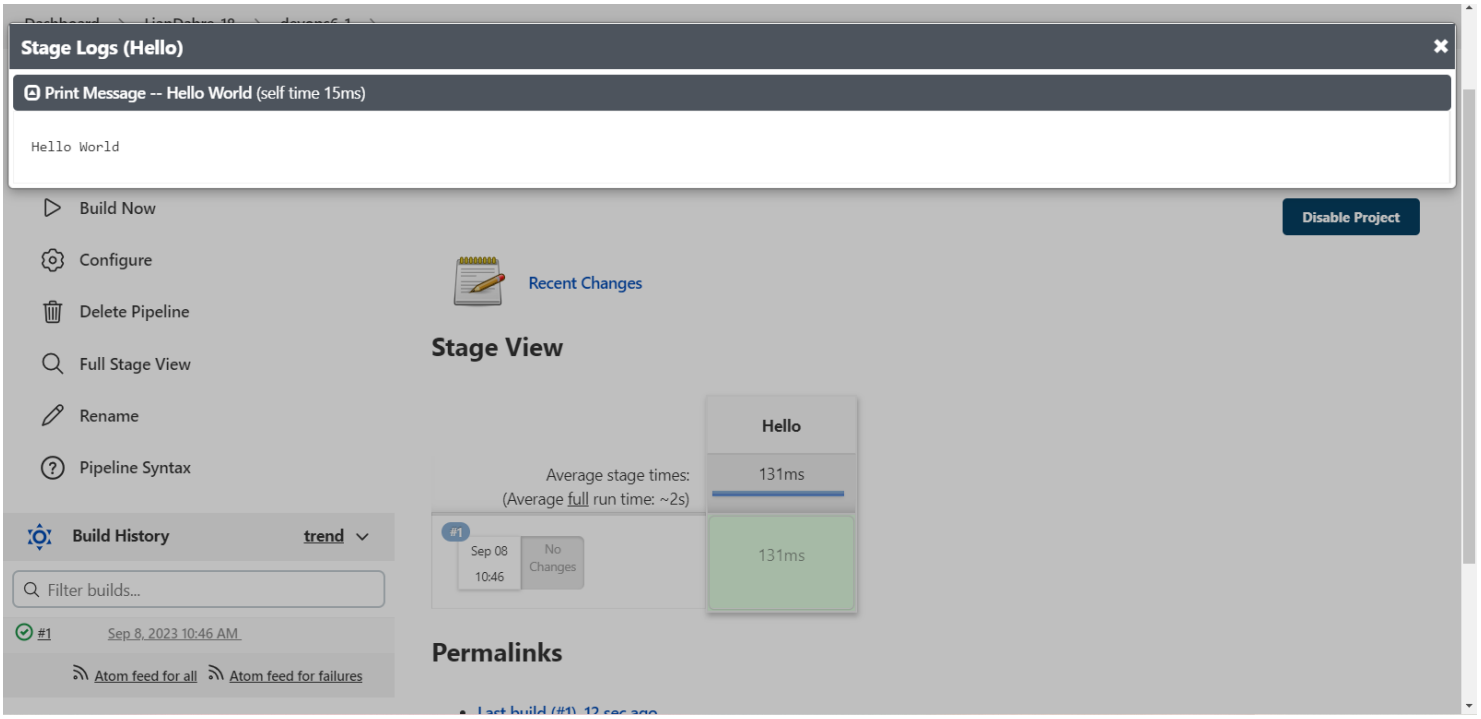
7b. Execute following (Refer the shared material) and attach screenshots:

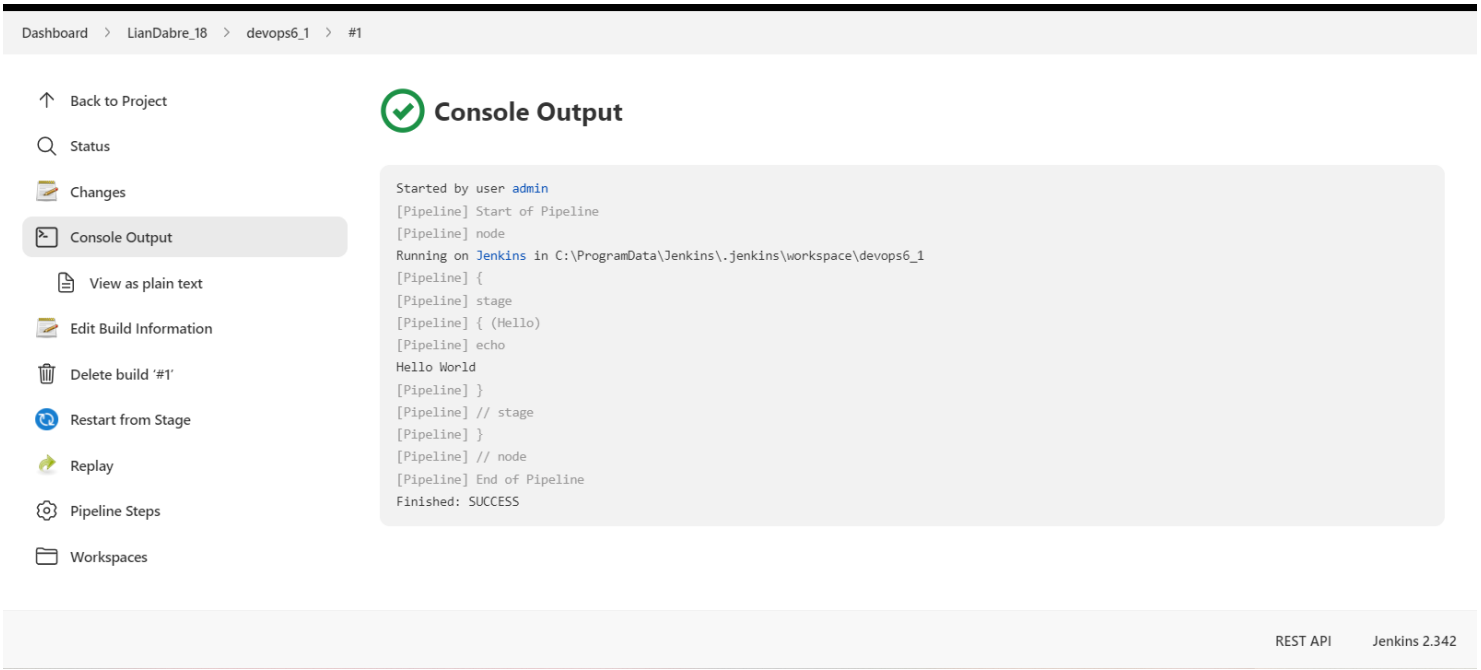
1. Create and build pipeline project with pipeline script
   - Project with Hello World pipeline script


Dashboard › LianDabre_18 ›
Enter an item name
devops6_1
» Required field
Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

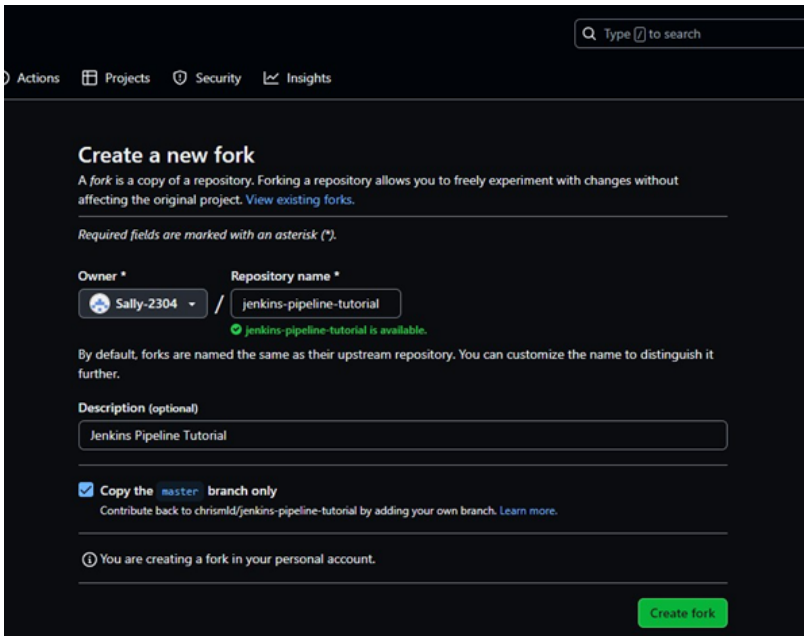

Jenkins
Search
3
2
admin
log out
Dashboard › LianDabre_18 › devops6_1 ›
General
Build Triggers
Advanced Project Options
Pipeline
Description
Name :- Lian Dabre
Roll No :- 18
[Plain text] Preview
Discard old builds
Do not allow concurrent builds
Do not allow the pipeline to resume if the controller restarts
GitHub project
Pipeline speed/durability override
Preserve stashes from completed builds
Save
Apply

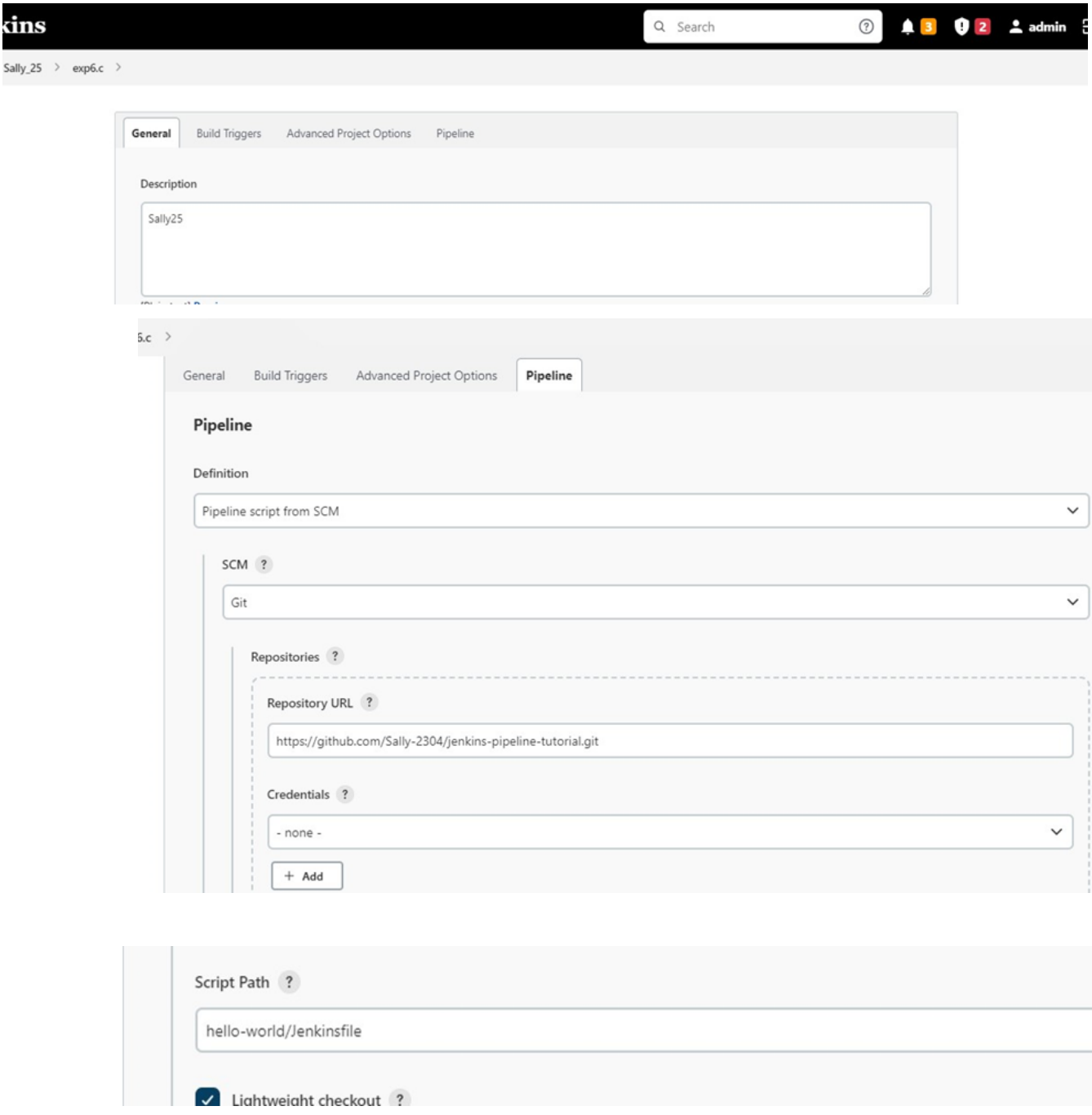

Dashboard › LianDabre_18 › devops6_1 ›
General
Build Triggers
Advanced Project Options
Pipeline
Pipeline
Definition
Pipeline script
Script
Hello World
pipeline {
agent any
stages {
stage('Hello') {
steps {
echo 'Hello World'
}
}
}
}
Save
Apply



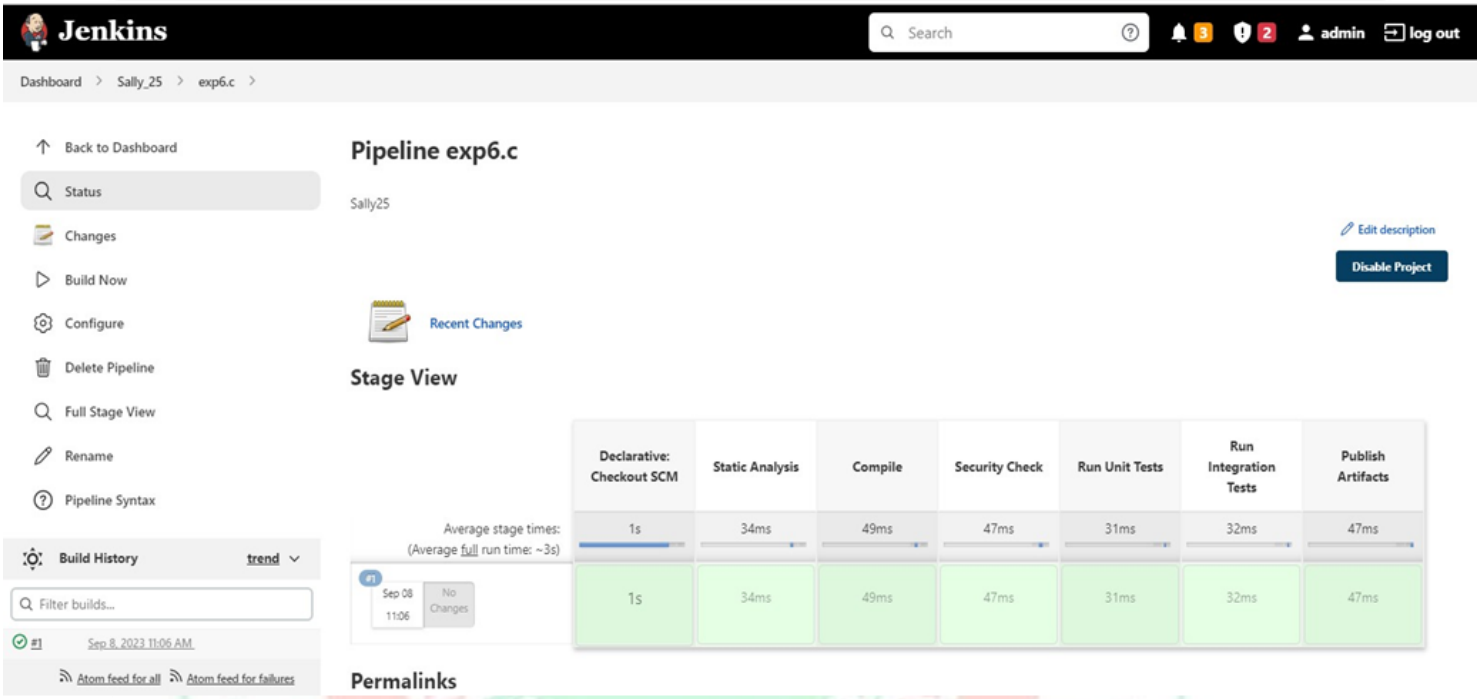


- Project with your own pipeline script



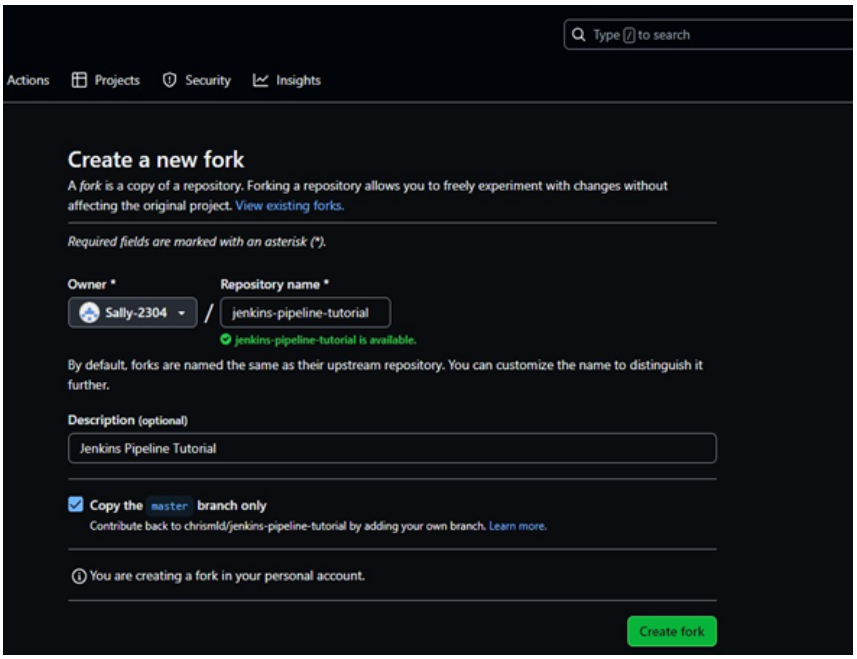


2. Create and build pipeline project with Git




```
Save the assemblies generated from the compilation
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

- Fork repository on GitHub

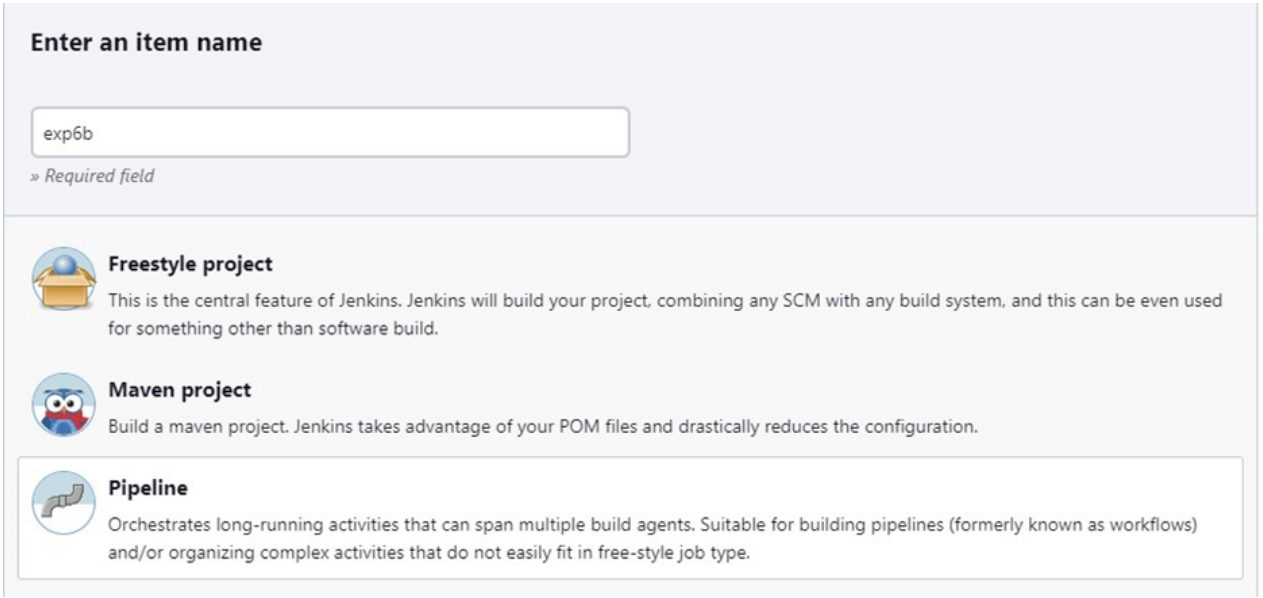


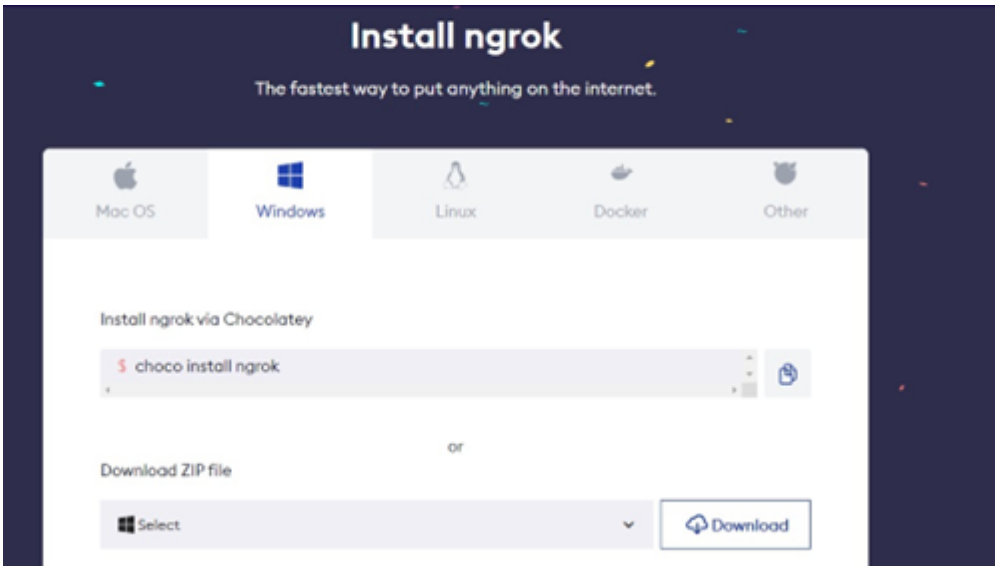
- Create pipeline project with pipeline script from SCM

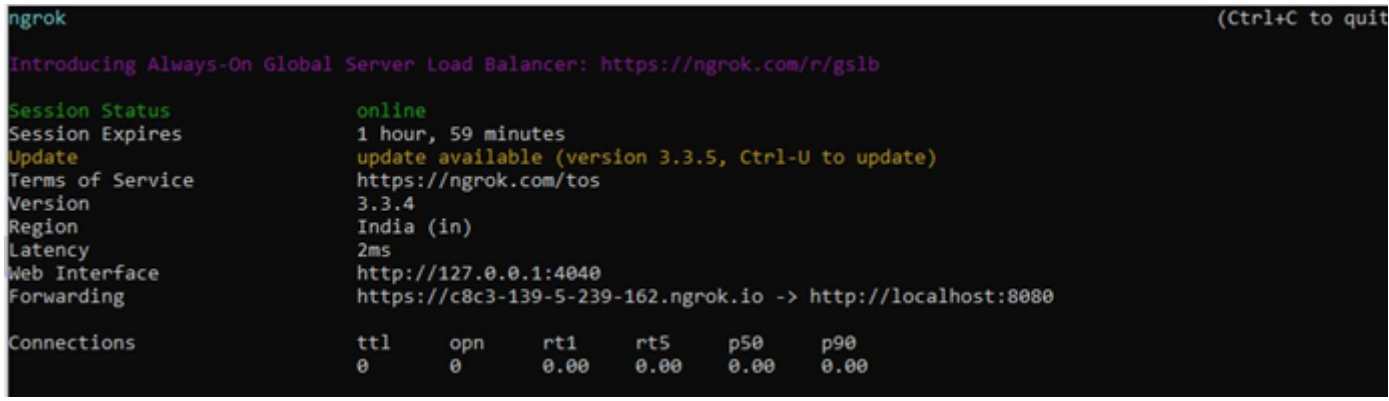
• Add webhooks to the forked repository

• Build pipeline project

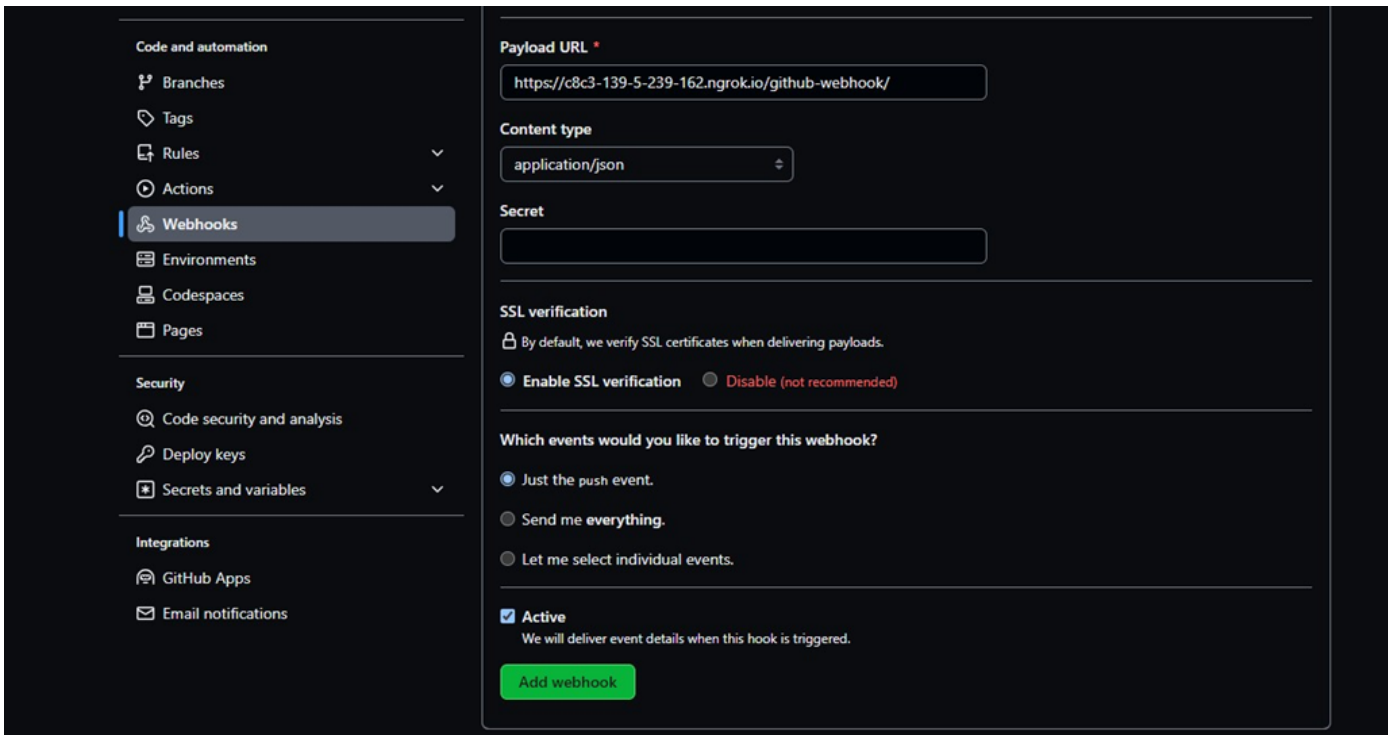
• Add file to forked repository and observe the automated build

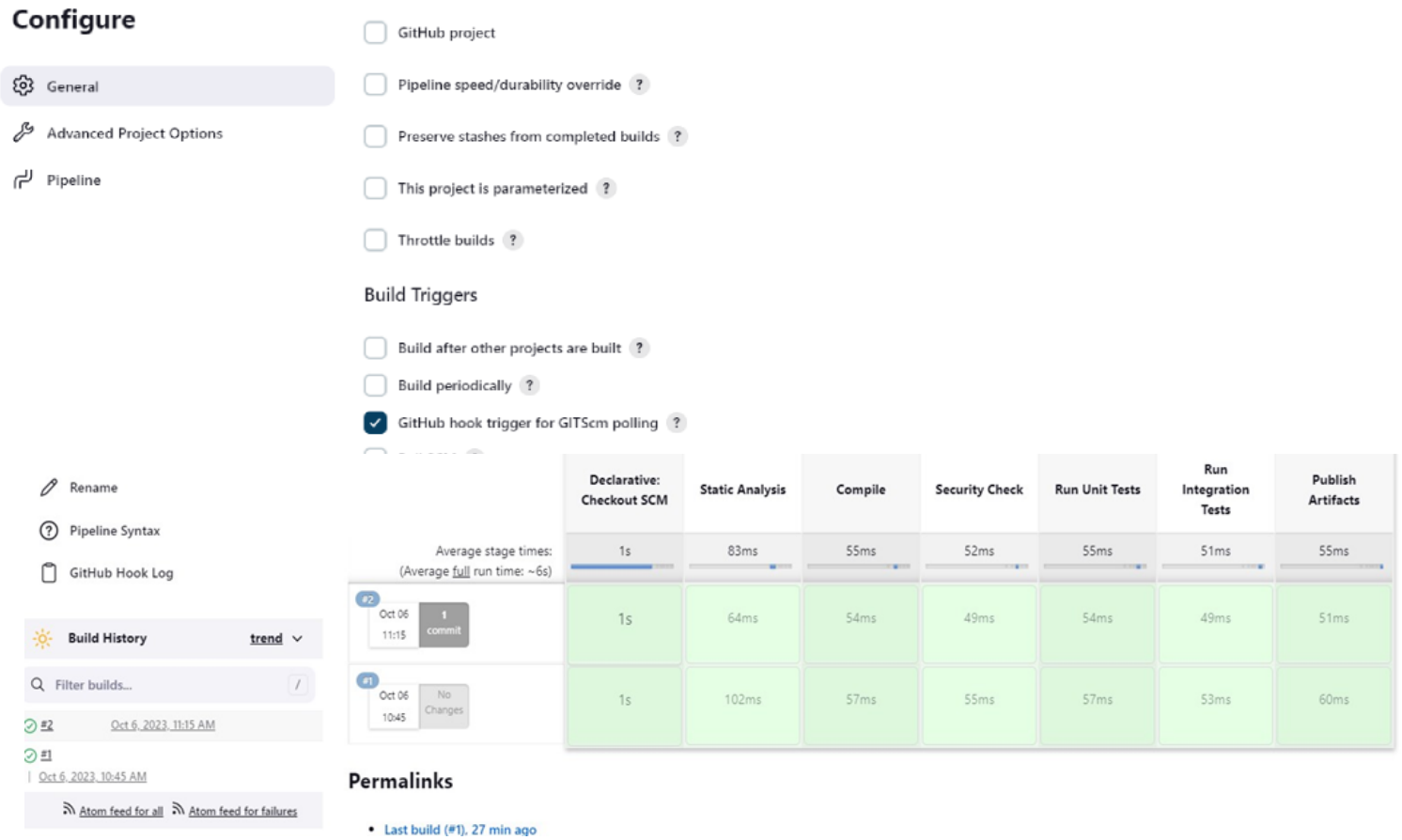


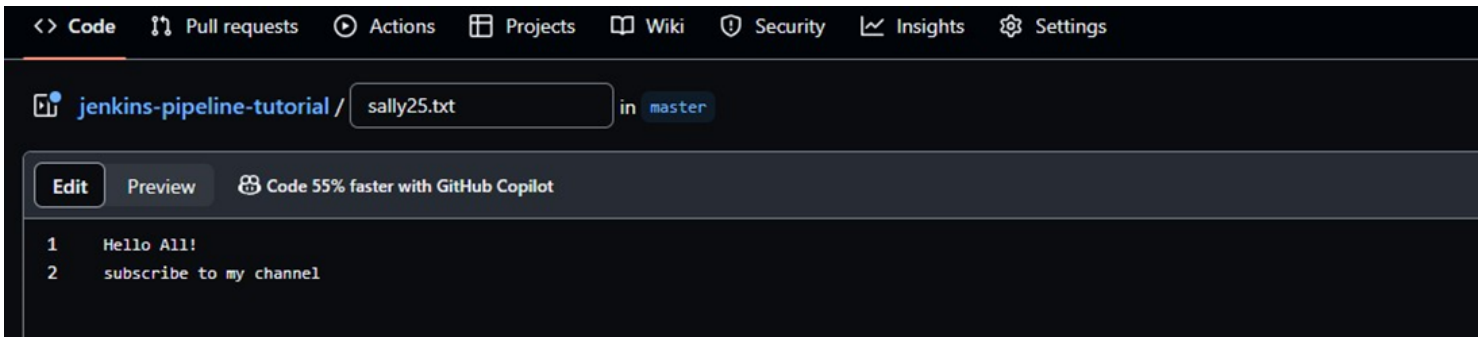



ngrok
(Ctrl+C to quit
Introducing Always-On Global Server Load Balancer: https://ngrok.com/r/gslb
Session Status online
Session Expires 1 hour, 59 minutes
Update update available (version 3.3.5, Ctrl-U to update)
Terms of Service https://ngrok.com/tos
Version 3.3.4
Region India (in)
Latency 2ms
Web Interface http://127.0.0.1:4040
Forwarding https://c8c3-139-5-239-162.ngrok.io -> http://localhost:8080
Connections ttl opn rt1 rt5 p50 p90
0 0 0.00 0.00 0.00 0.00


General
Access
Collaborators
Moderation options
Code and automation
Branches
Tags
Rules
Actions
Webhooks
Webhooks
Add webhook
Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide.
https://c8c3-139-5-239-162.ngrok.i... (push)
Edit
Delete


Code and automation
Branches
Tags
Rules
Actions
Webhooks
Environments
Codespaces
Pages
Security
Code security and analysis
Deploy keys
Secrets and variables
Integrations
GitHub Apps
Email notifications
Payload URL *
https://c8c3-139-5-239-162.ngrok.io/github-webhook/
Content type
application/json
Secret
SSL verification
By default, we verify SSL certificates when delivering payloads.
Enable SSL verification
Disable (not recommended)
Which events would you like to trigger this webhook?
Just the push event.
Send me everything.
Let me select individual events.
Active
We will deliver event details when this hook is triggered.
Add webhook





8. Post-Experiments Exercise

A. Extended Theory:

Nil

B. Questions:

- Explain the types of agents in a Jenkinsfile?
- What are webhooks?

C. Conclusion:

- Write what was performed in the experiment.
- Write the significance of the topic studied in the experiment.

D. References:

https://jenkins.io/doc/
https://www.jenkins.io/doc/book/pipeline/syntax/
https://www.edureka.co/blog/jenkins-pipeline-tutorial-continuous-delivery
https://www.slideshare.net/abediaz/introduction-to-jenkins
https://www.slideshare.net/jph98/jenkins-ci-presentation