LAB ACTION PLAN FOR WEEK 11

Jenkins-CI/CD

1. CI-Continous Integration using Webhooks .
2. Sending E-mail Notification on Build Failure or success
3. Draw the **Usecase ,class,sequence and component diagram for your SDC project of III-I**
4. Upload the screenshots for the tasks

Lab

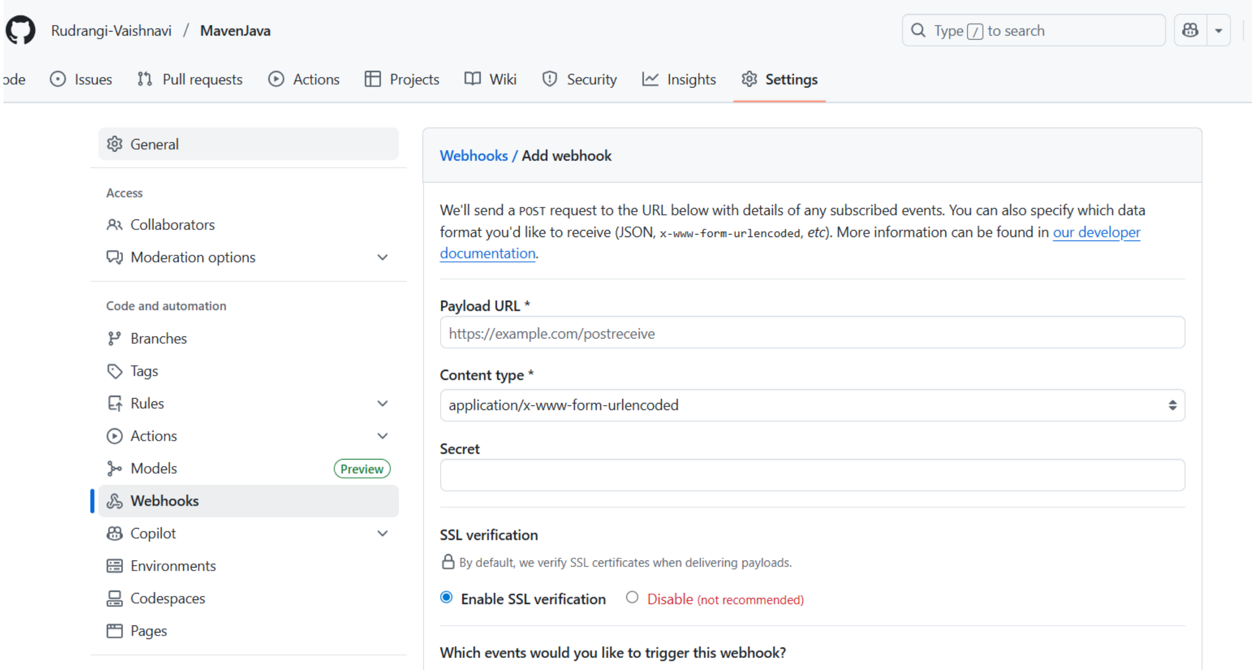
Setting Up Jenkins CI------using GitHub Webhook with Jenkins

Step 1: Configure Webhook in GitHub

1. Go to your GitHub repository.
2. Navigate to Settings → **Webhooks.**
3. Click “**Add webhook**”.
4. In the Payload URL field:
   - Enter the Jenkins webhook URL in the format:
     http://<**jenkins-server-url**>/github-webhook/

Note: If Jenkins is running on localhost, GitHub cannot access it directly.
Use ngrok to expose your local Jenkins to the internet:

   - ngrok.exe http <**Jenkins local host:8080**>
     - Use the generated ngrok URL, e.g.:
     - http://abc123.ngrok.io/**github-webhook**/
5. Set Content type to:
   application/json
6. Under “Which events would you like to trigger this webhook?”, select:
   - Just the push event
7. Click “Add webhook” to save.



Webhooks / Add webhook

We'll send a `POST` request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, `x-www-form-urlencoded`, *etc*). More information can be found in our developer documentation.

Payload URL *

https://example.com/postreceive

Content type *

application/x-www-form-urlencoded

Secret

SSL verification

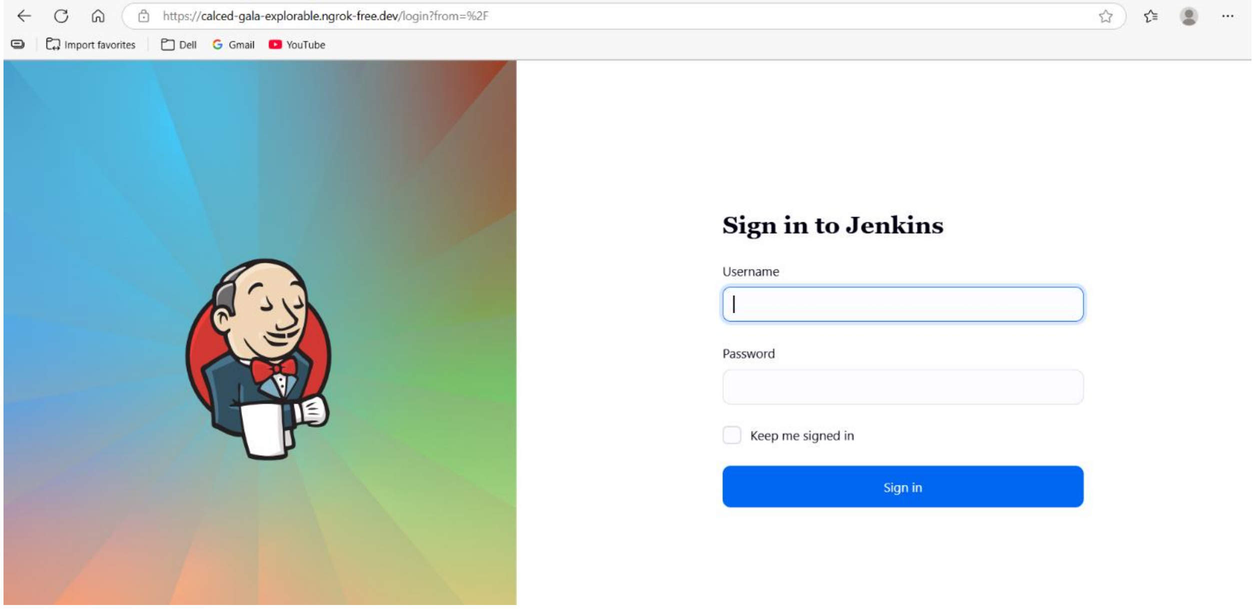
By default, we verify SSL certificates when delivering payloads.

● Enable SSL verification ○ Disable (not recommended)

Which events would you like to trigger this webhook?

Step 2: Configure Jenkins to Accept GitHub Webhooks

1. Open Jenkins Dashboard.
2. Select the job (freestyle or pipeline) you've already created.
3. Click Configure.
4. Scroll down to the Build Triggers section.
5. Check the box: ✅GitHub hook trigger for GITScm polling
6. Click Save.



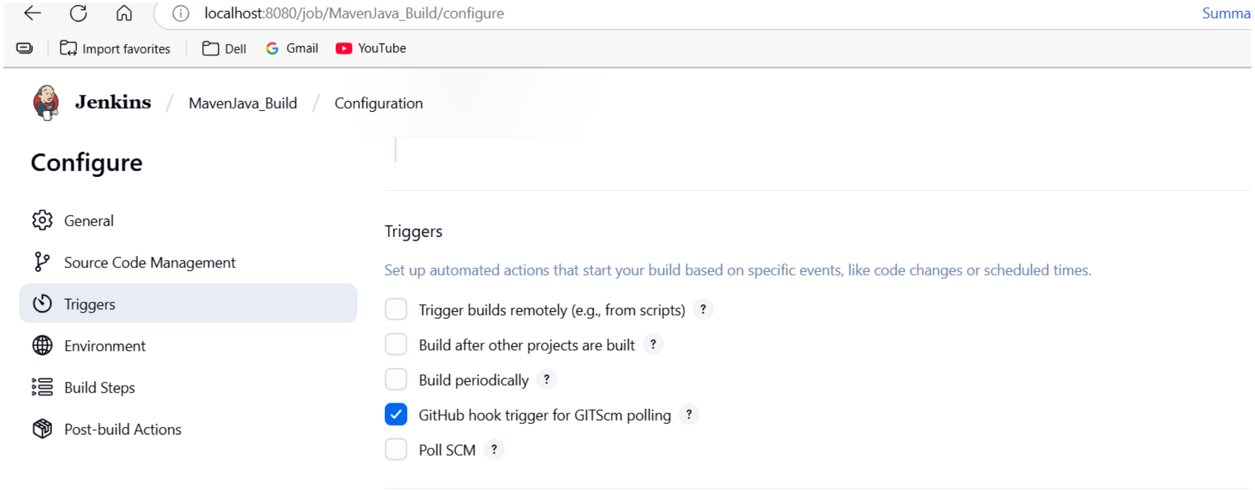
https://calced-gala-explorable.ngrok-free.dev/login?from=%2F
Import favorites
Dell
Gmail
YouTube

Sign in to Jenkins

Username

Password

□ Keep me signed in



Triggers

Set up automated actions that start your build based on specific events, like code changes or scheduled times.

☐ Trigger builds remotely (e.g., from scripts) ?

☐ Build after other projects are built ?

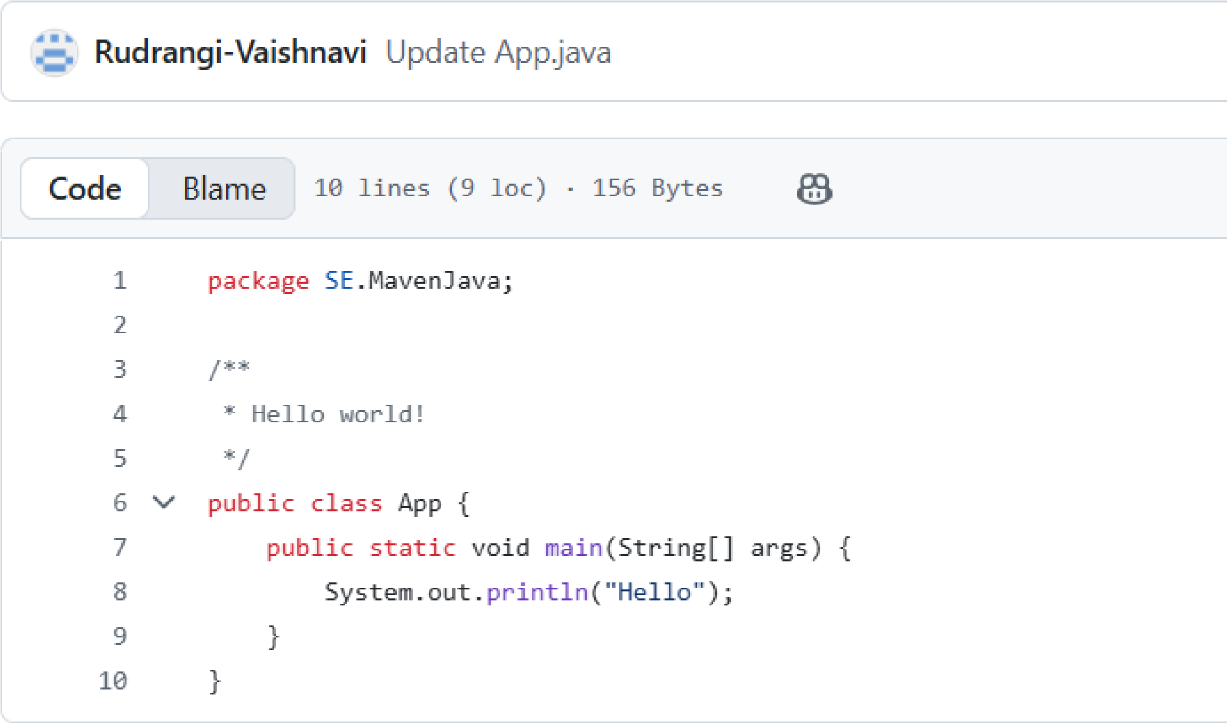
☐ Build periodically ?

☑ GitHub hook trigger for GITScm polling ?

☐ Poll SCM ?

Step 3: Test the Setup

1. Make any code update in your local repo and push it to GitHub.

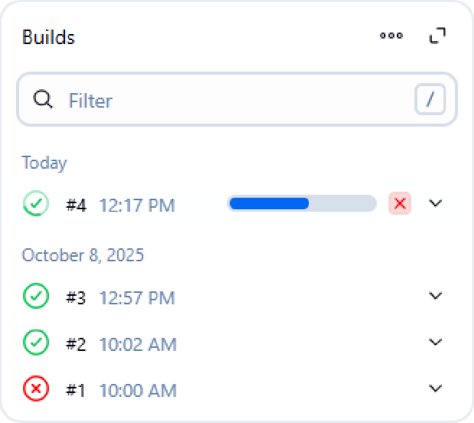


Rudrangi-Vaishnavi Update App.java

```java
package SE.MavenJava;

/**
 * Hello world!
 */
public class App {
    public static void main(String[] args) {
        System.out.println("Hello");
    }
}
```

2. Once pushed, GitHub will trigger the webhook.
3. Jenkins will automatically detect the change and start the build pipeline.



Today

#4 12:17 PM

October 8, 2025

#3 12:57 PM

#2 10:02 AM

#1 10:00 AM

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outcome

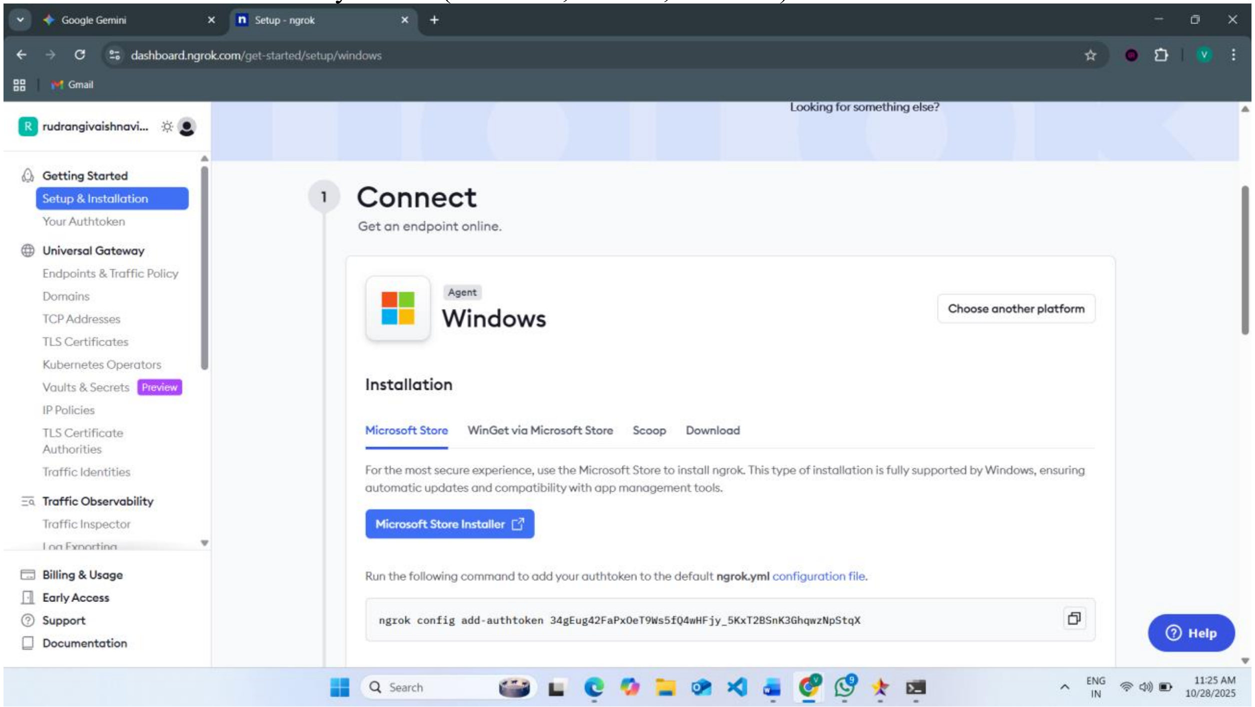
- You’ve successfully connected GitHub and Jenkins using webhooks.
- Every time you push code to GitHub, Jenkins will automatically start building your project without manual intervention.

Set-uping the ngrok

How to Install and Use ngrok

Step 1. Download ngrok

https://ngrok.com/download
Download and extract it for your OS (Windows, macOS, or Linux).



Connect

Get an endpoint online.

Windows

Installation

For the most secure experience, use the Microsoft Store to install ngrok. This type of installation is fully supported by Windows, ensuring automatic updates and compatibility with app management tools.

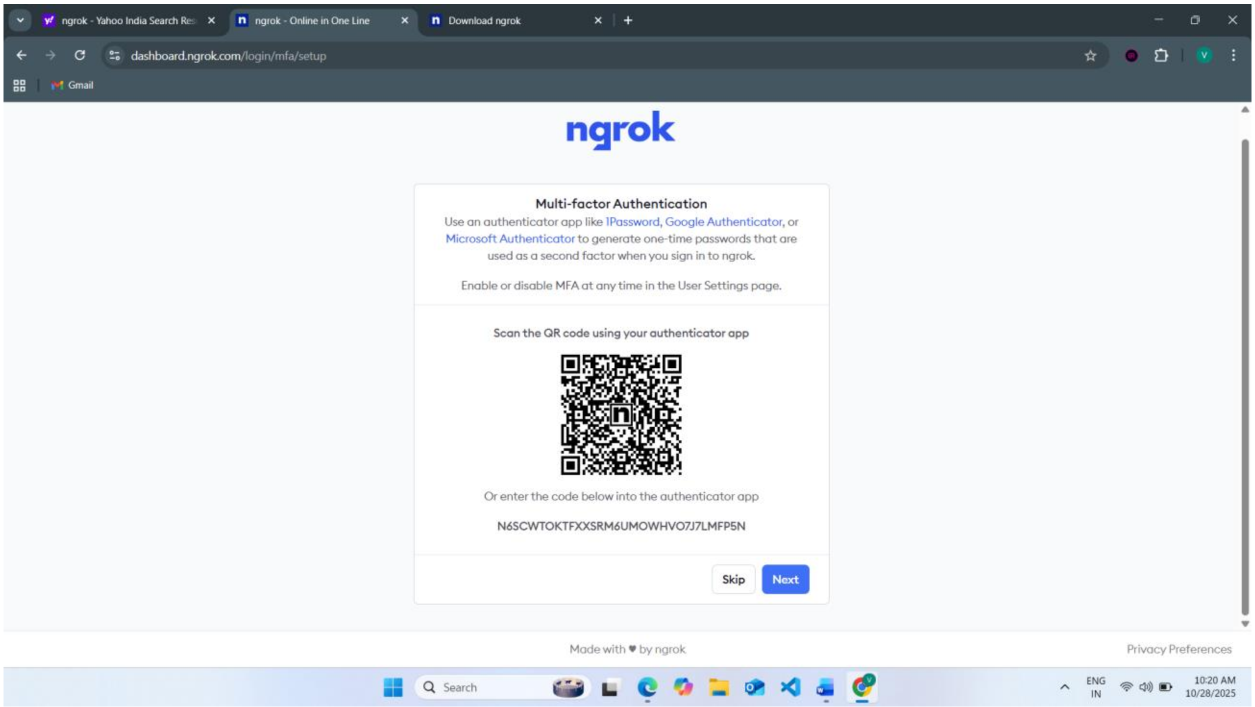
Run the following command to add your authtoken to the default **ngrok.yml** configuration file.

```
ngrok config add-authtoken 34gEug42FaPxOeT9Ws5fQ4wHFjy_5KxT2BSnK3GhqwzNpStqX
```

Step 2. Connect Your ngrok Account (optional but useful)

After you sign up (free), ngrok gives you an auth token.
CREATE AUTHENTICATOR [https://dashboard.ngrok.com/get-started/your-authtoken]
Run this command (replace <your_token> with yours):
ngrok config add-authtoken <your_token>

This ensures stable sessions and more control.



ngrok - Yahoo India Search Res
ngrok - Online in One Line
Download ngrok
dashboard.ngrok.com/login/mfa/setup
Gmail
ngrok

Multi-factor Authentication

Use an authenticator app like 1Password, Google Authenticator, or Microsoft Authenticator to generate one-time passwords that are used as a second factor when you sign in to ngrok.

Enable or disable MFA at any time in the User Settings page.

Scan the QR code using your authenticator app

Or enter the code below into the authenticator app

N6SCWTOKTFXXSRM6UMOWHVO7J7LMFP5N

Step 3. Start a Tunnel for Jenkins

Assuming Jenkins runs locally on port 8085:

```
ngrok http 8085
```

You'll see output like:

```
Session Status                online
Forwarding                    https://1234abcd.ngrok.io -> http://localhost:8080
```

Copy the HTTPS URL (https://1234abcd.ngrok.io) — this is your public Jenkins URL for webhooks.

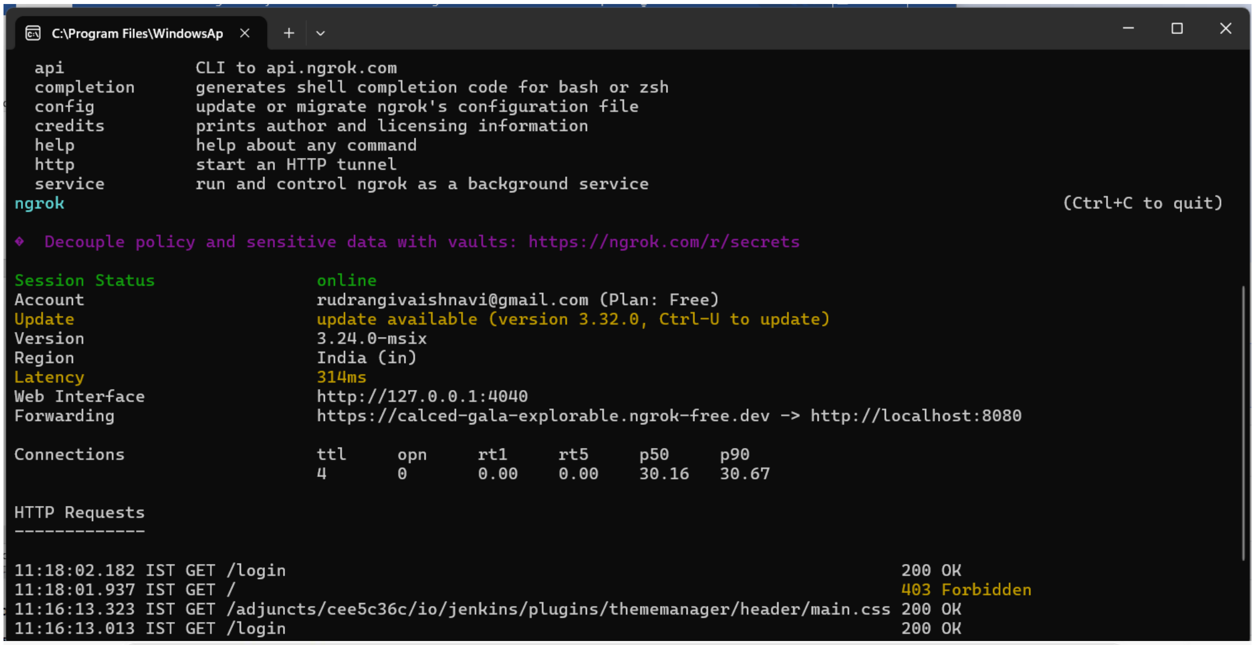
Step 4. Use it in GitHub Webhook

In your GitHub repo → Settings → Webhooks:

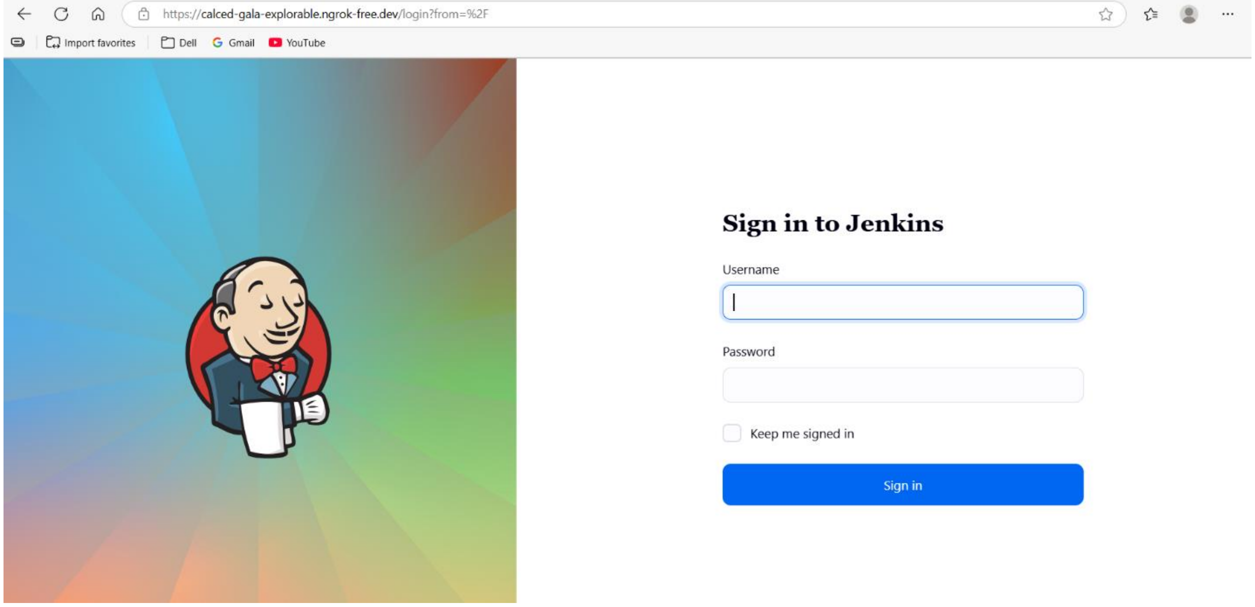
- **Payload URL:** ***[paste the url generated by ngrok]***

https://1234abcd.ngrok.io/github-webhook/ [please include this – remaining all default]

Now, whenever you push code, GitHub sends an event to that URL, which ngrok forwards to your local Jenkins.



```
  api            CLI to api.ngrok.com
  completion     generates shell completion code for bash or zsh
  config         update or migrate ngrok's configuration file
  credits        prints author and licensing information
  help           help about any command
  http           start an HTTP tunnel
  service        run and control ngrok as a background service
ngrok                                                                                      (Ctrl+C to quit)

❖  Decouple policy and sensitive data with vaults: https://ngrok.com/r/secrets

Session Status                online
Account                       rudrangivaishnavi@gmail.com (Plan: Free)
Update                        update available (version 3.32.0, Ctrl-U to update)
Version                       3.24.0-msix
Region                        India (in)
Latency                       314ms
Web Interface                 http://127.0.0.1:4040
Forwarding                    https://calced-gala-explorable.ngrok-free.dev -> http://localhost:8080

Connections                   ttl     opn     rt1     rt5     p50     p90
                              4       0       0.00    0.00    30.16   30.67

HTTP Requests
-------------

11:18:02.182 IST GET /login                                                     200 OK
11:18:01.937 IST GET /                                                          403 Forbidden
11:16:13.323 IST GET /adjuncts/cee5c36c/io/jenkins/plugins/thememanager/header/main.css 200 OK
11:16:13.013 IST GET /login                                                     200 OK
```



https://calced-gala-explorable.ngrok-free.dev/login?from=%2F
Import favorites
Dell
Gmail
YouTube

Sign in to Jenkins

Username

Password

□ Keep me signed in

Setting Up   Jenkins Email Notification Setup (Using Gmail with App Password)

Creation of app password

1. Gmail: Enable App Password (for 2-Step Verification)

i. Go to: https://myaccount.google.com

ii. Enable 2-Step Verification

- Navigate to:
    - Security → 2-Step Verification
    - Turn it **ON**
    - Complete the OTP verification process (via phone/email)

iii. Generate App Password for Jenkins

- Go to:

  - Security → App passwords
- Select:
  - **App**: Other (Custom name)
  - **Name**: Jenkins-Demo
- Click **Generate**
- Copy the **16-digit app password**
  - Save it in a secure location (e.g., Notepad)

2. Jenkins Plugin Installation

i. Open Jenkins Dashboard

ii. Navigate to:

- Manage Jenkins → Manage Plugins

iii. Install Plugin:

- Search for and install:
  - Email Extension Plugin

---

3. Configure Jenkins Global Email Settings

i. Go to:

- Manage Jenkins → Configure System

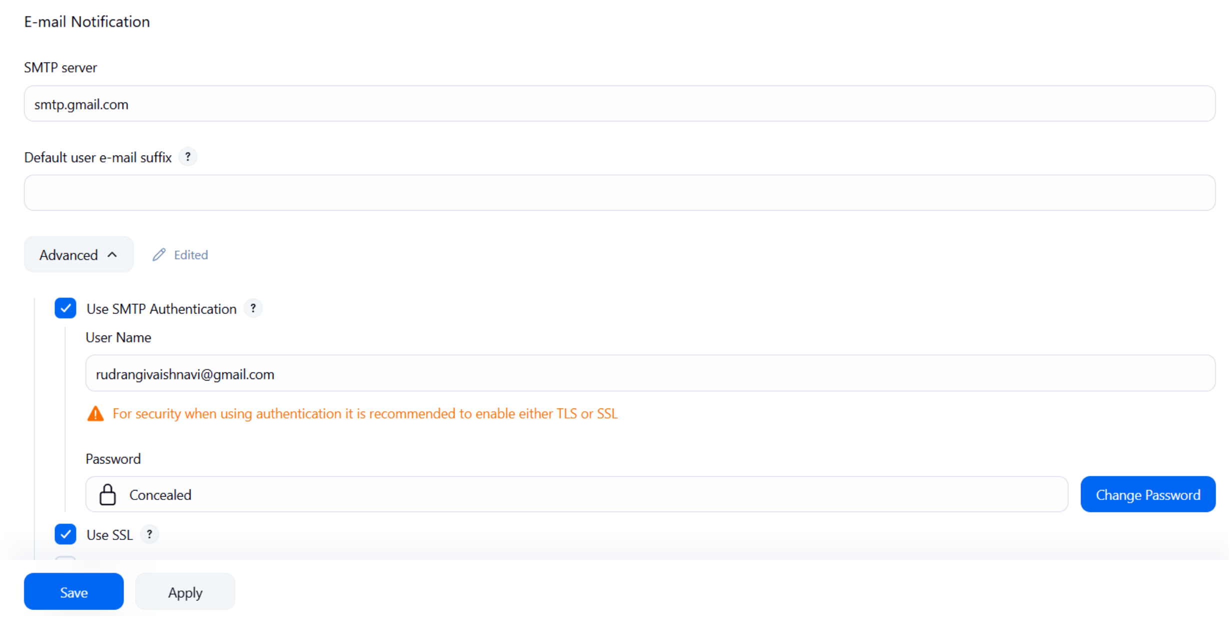
A. E-mail Notification Section

Field	**Value**
SMTP Server	smtp.gmail.com
Use SMTP Auth	✅ Enabled
User Name	Your Gmail ID (e.g.,bhargavikumbham@gmail.com)
Password	Paste the 16-digit App Password
Use SSL	✅ Enabled
SMTP Port	465
Reply-To Address	Your Gmail ID (same as above)

➤ Test Configuration

- Click: Test configuration by sending test e-mail

- Provide a valid email address to receive a test mail



E-mail Notification

SMTP server

smtp.gmail.com

Default user e-mail suffix ?

Advanced ⌃ ✎ Edited

☑ Use SMTP Authentication ?

User Name

rudrangivaishnavi@gmail.com

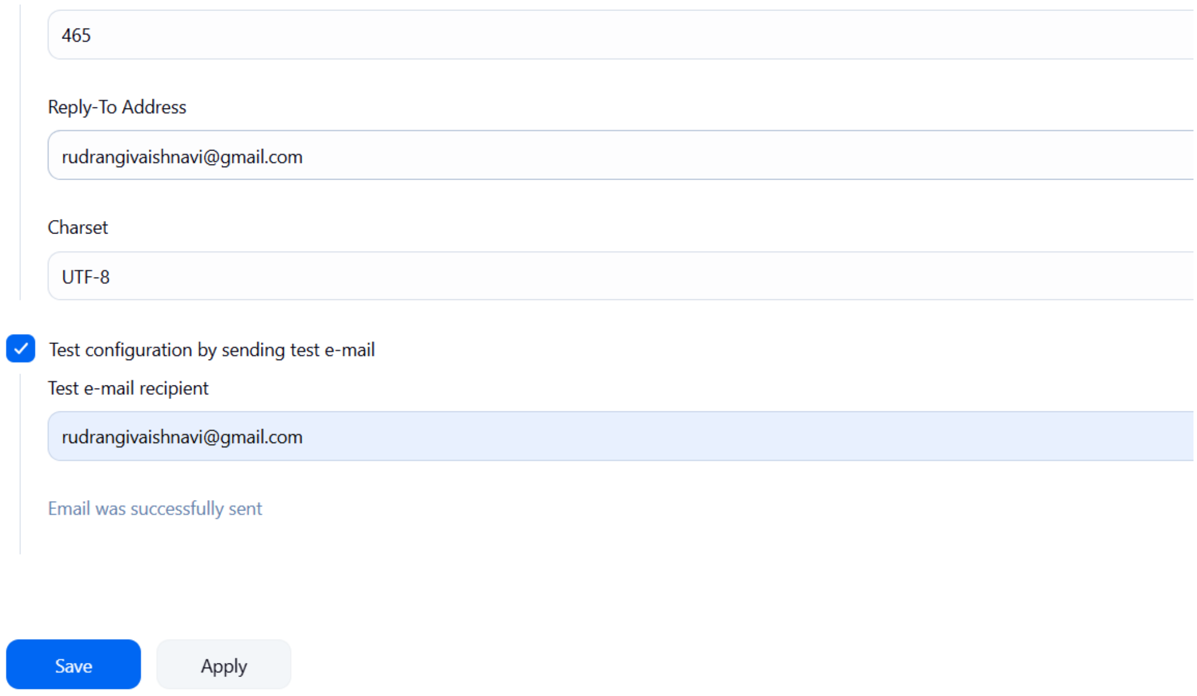
⚠ For security when using authentication it is recommended to enable either TLS or SSL

Password

🔒 Concealed

☑ Use SSL ?

- ✅ Should receive email from Jenkins



465

Reply-To Address

rudrangivaishnavi@gmail.com

Charset

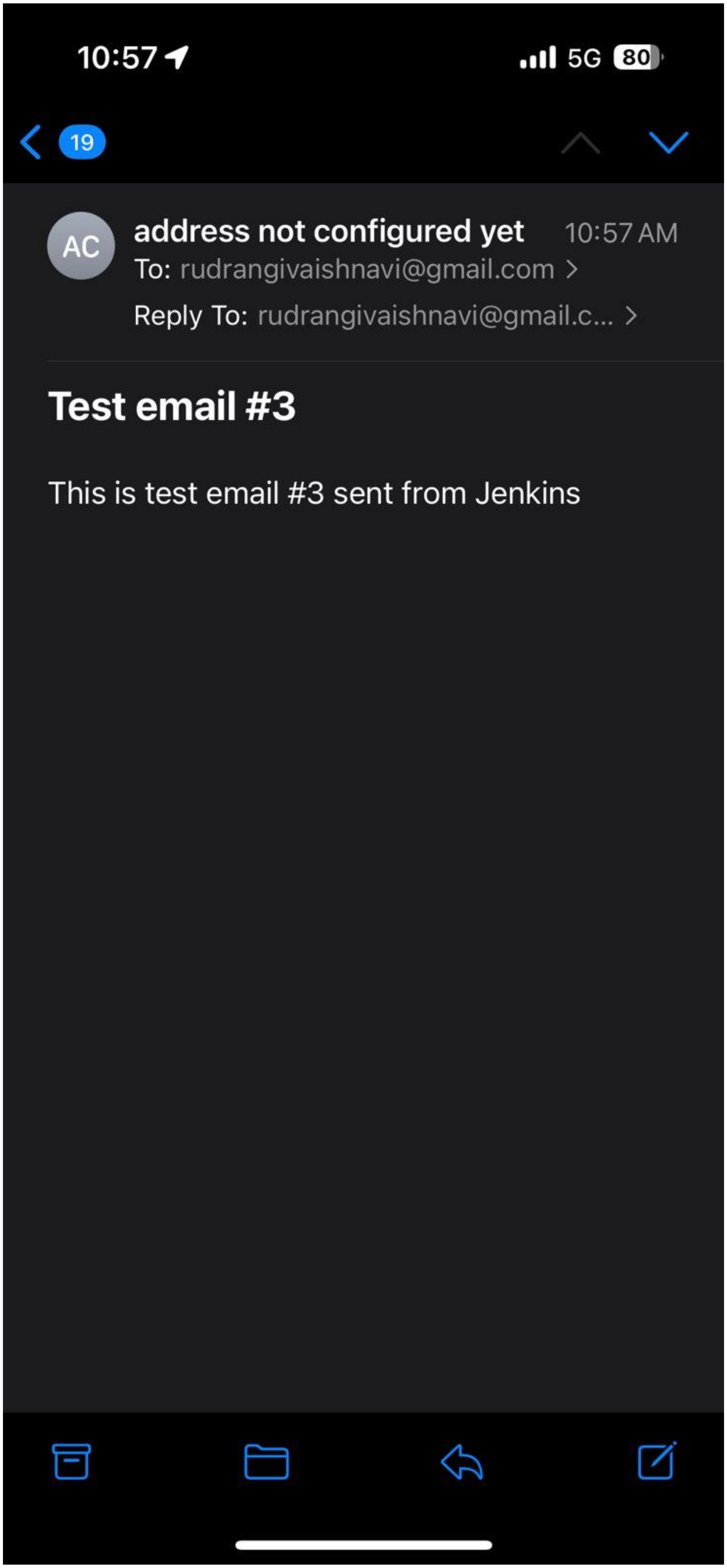
UTF-8

☑ Test configuration by sending test e-mail

Test e-mail recipient

rudrangivaishnavi@gmail.com

Email was successfully sent



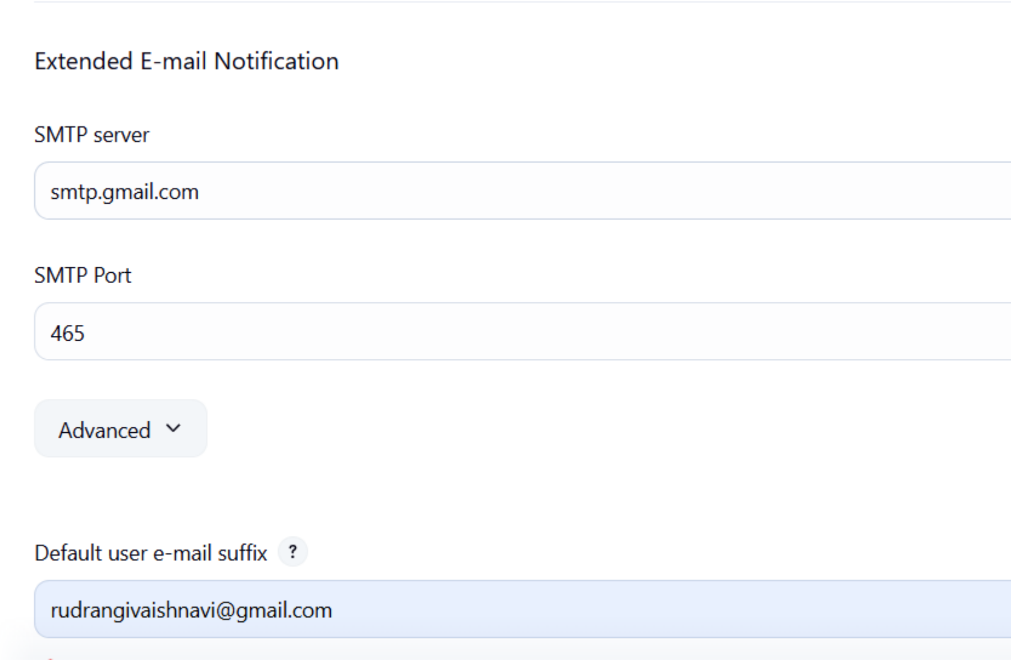
address not configured yet 10:57 AM
To: rudrangivaishnavi@gmail.com
Reply To: rudrangivaishnavi@gmail.c...

Test email #3

This is test email #3 sent from Jenkins

B. Extended E-mail Notification Section

Field	**Value**
SMTP Server	smtp.gmail.com
SMTP Port	465
Use SSL	✅ Enabled
Credentials	Add Gmail ID and App Password as Jenkins credentials
Default Content Type	text/html or leave default
Default Recipients	Leave empty or provide default emails



Extended E-mail Notification

SMTP server

smtp.gmail.com

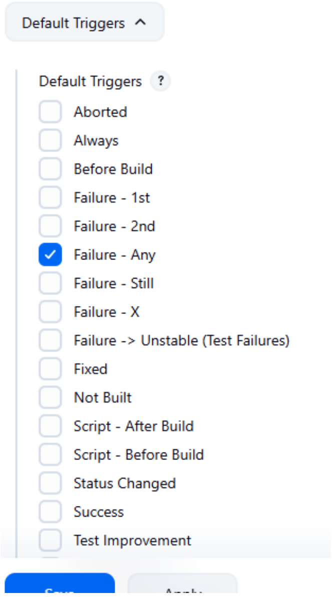
SMTP Port

465

Default user e-mail suffix ?

rudrangivaishnavi@gmail.com

Field	Value
Triggers	Select as per needs (e.g., Failure)



Default Triggers

Default Triggers ?

- □ Aborted
- □ Always
- □ Before Build
- □ Failure - 1st
- □ Failure - 2nd
- ☑ Failure - Any
- □ Failure - Still
- □ Failure - X
- □ Failure -> Unstable (Test Failures)
- □ Fixed
- □ Not Built
- □ Script - After Build
- □ Script - Before Build
- □ Status Changed
- □ Success
- □ Test Improvement

---

4. Configure Email Notifications for a Jenkins Job

i. Go to:

- Jenkins → Select a Job → Configure

---

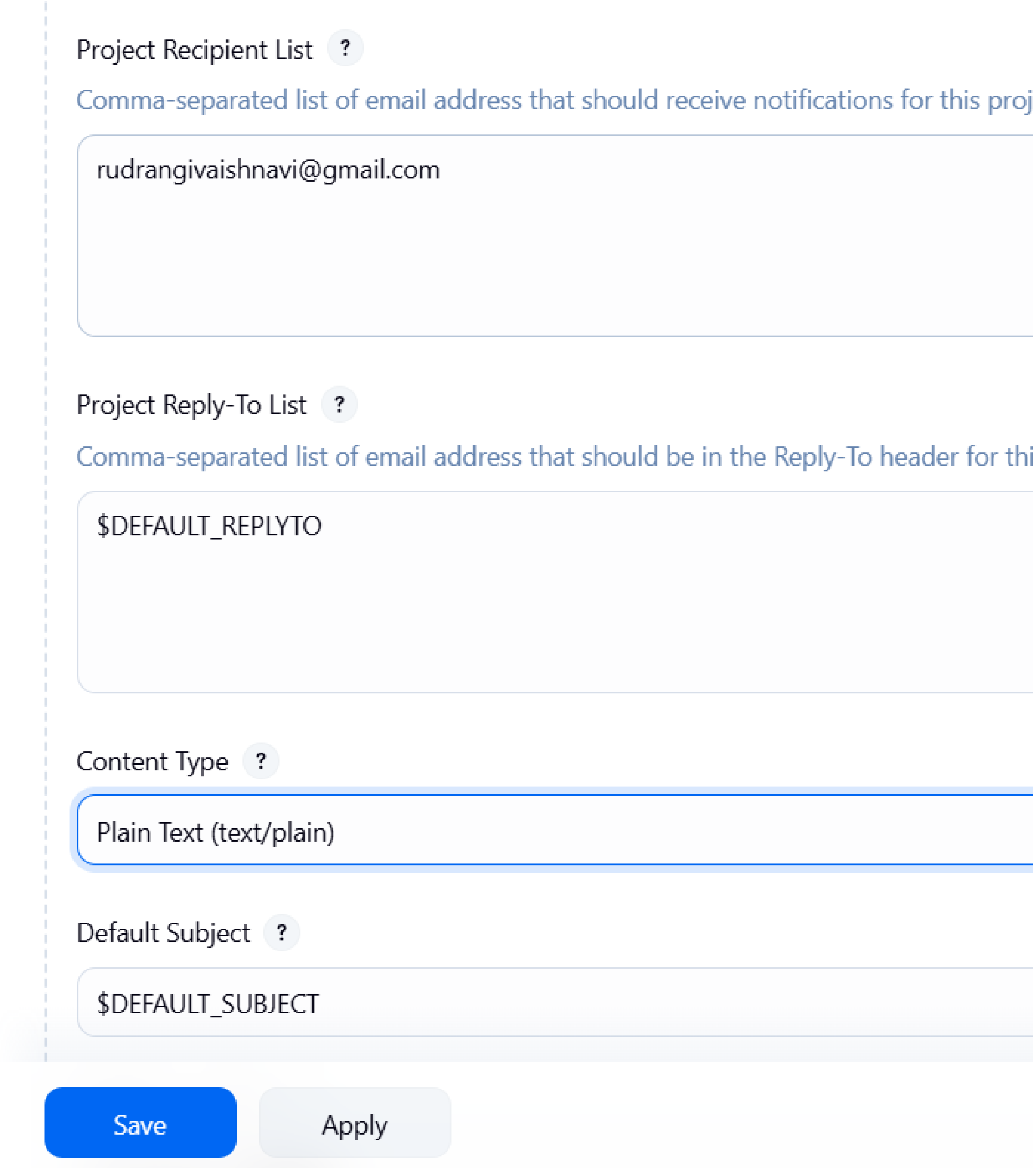
ii. In the Post-build Actions section:

- Click: Add post-build action → **Editable Email Notification**

A. Fill in the fields:

Field	Value
Project Recipient List	Add recipient email addresses

Field	Value
	(comma-separated)



Project Recipient List ?

Comma-separated list of email address that should receive notifications for this proj

rudrangivaishnavi@gmail.com

Project Reply-To List ?

Comma-separated list of email address that should be in the Reply-To header for thi

$DEFAULT_REPLYTO

Content Type ?

Plain Text (text/plain)

Default Subject ?

$DEFAULT_SUBJECT

Content Type	Default (text/plain) or text/html
Triggers	Select events (e.g.,

Field	**Value**
	Failure, Success, etc.)
Attachments	(Optional) Add logs, reports, etc.

---

iii. Click Save

Now your Jenkins job is set up to send email notifications based on the build status!

Takeaway :
Students learned how to integrate Jenkins with GitHub using webhooks to automate build triggers and configure email notifications to monitor build success or failure effectively.

Viva Questions

1. What is Continuous Integration (CI)?

CI means frequently merging code and automatically testing it to find errors early.

2. What is Continuous Deployment or Continuous Delivery (CD)?

CD automates building, testing, and deploying code to production after each change.

3. What is the role of Jenkins in a CI/CD pipeline?

Jenkins automates the build, test, and deployment process.

4. What is a webhook in GitHub?

A webhook sends real-time notifications to external tools when events (like pushes) occur.

5. Why are webhooks used in Jenkins integration?

To automatically trigger Jenkins jobs when code is pushed to GitHub.

6. What are the different types of build triggers available in Jenkins?

Manual, Periodic, Poll SCM, GitHub Webhook, and Trigger by other jobs.

7. What is the difference between polling and webhook triggers?

Polling checks for updates at intervals; webhook triggers instantly on change.

8. What is ngrok and why is it used in Jenkins–GitHub integration?

Ngrok creates a public URL for local Jenkins, allowing GitHub to connect via webhook.

9. How does ngrok help in setting up webhooks for Jenkins running on a local machine?

It tunnels GitHub’s webhook requests to the local Jenkins server.

10. Why do we configure email notifications in Jenkins and how are they useful?

To alert developers about build results—success or failure—for quick issue tracking.