Step-by-Step Guide to Setting Up Jenkins and SonarQube Integration with Slack Notifications

Overview

This document describes the process to set up a Jenkins CI/CD pipeline integrated with SonarQube for code analysis and Slack for notifications. It also includes hosting a Java application in a Docker container.

Prerequisites

1. **Two EC2 instances:**
   - Instance 1: For Jenkins and hosting the Java application.
   - Instance 2: For SonarQube.

Steps

Step 1: Set Up Jenkins Instance

1. **Launch an EC2 instance (Instance 1) and install the following tools:**
   - Jenkins
   - Git
   - Maven
   - Docker

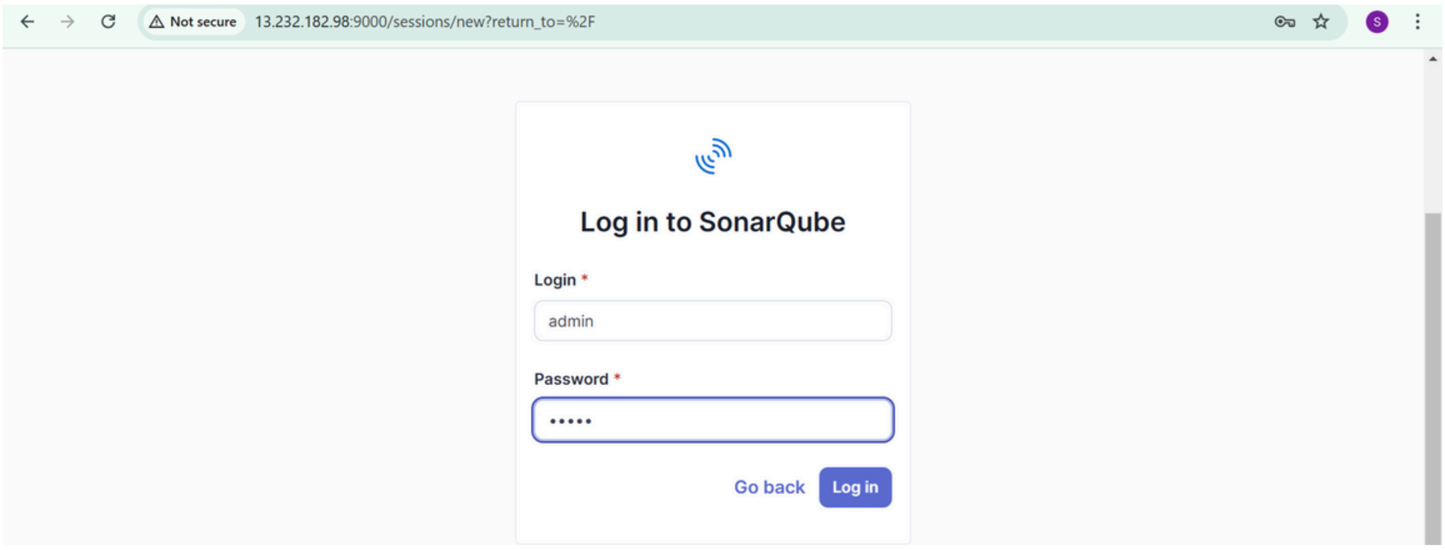
Access SonarQube via the browser at http://<Instance-2-Public-IP>:8080 and log in.

Step 2: Set Up SonarQube Instance

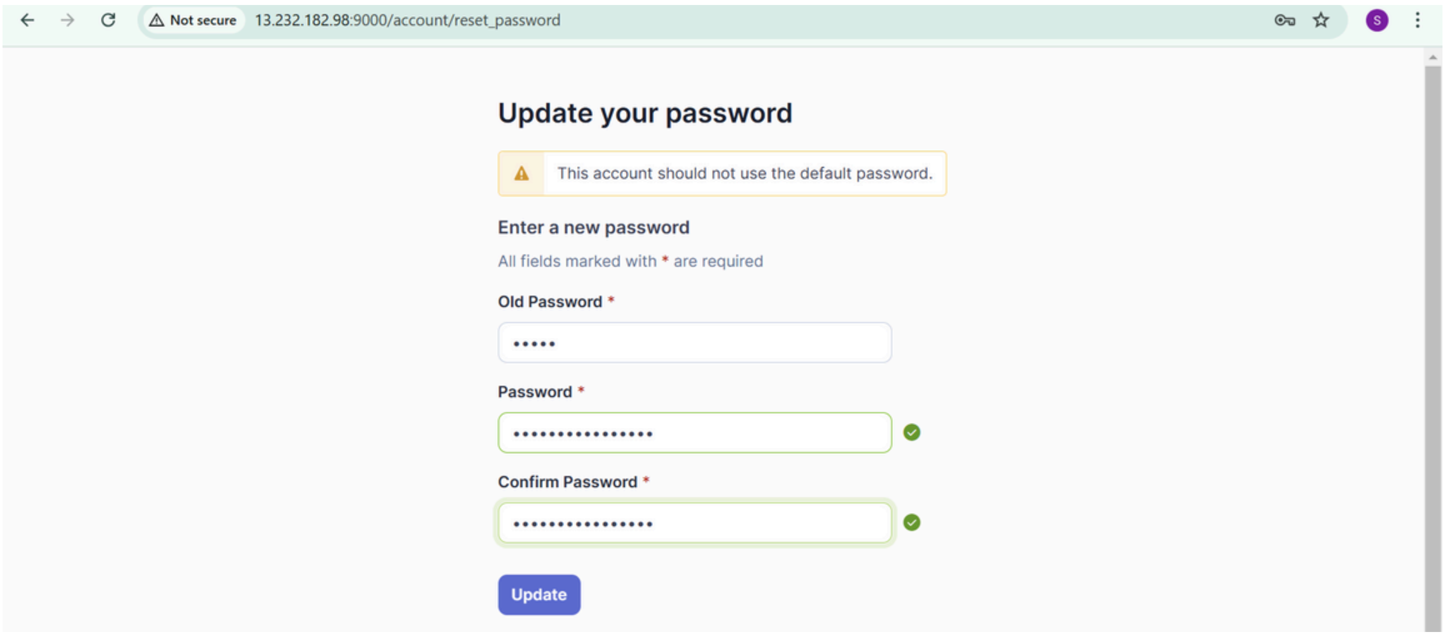
1. Launch a second EC2 instance (Instance 2) and install Docker.
2. Pull the SonarQube Docker image and run a container:

```
docker pull sonarqube
docker run -d --name sonarqube -p 9000:9000 sonarqube
```

Access SonarQube via the browser at http://<Instance-2-Public-IP>:9000 and log in.



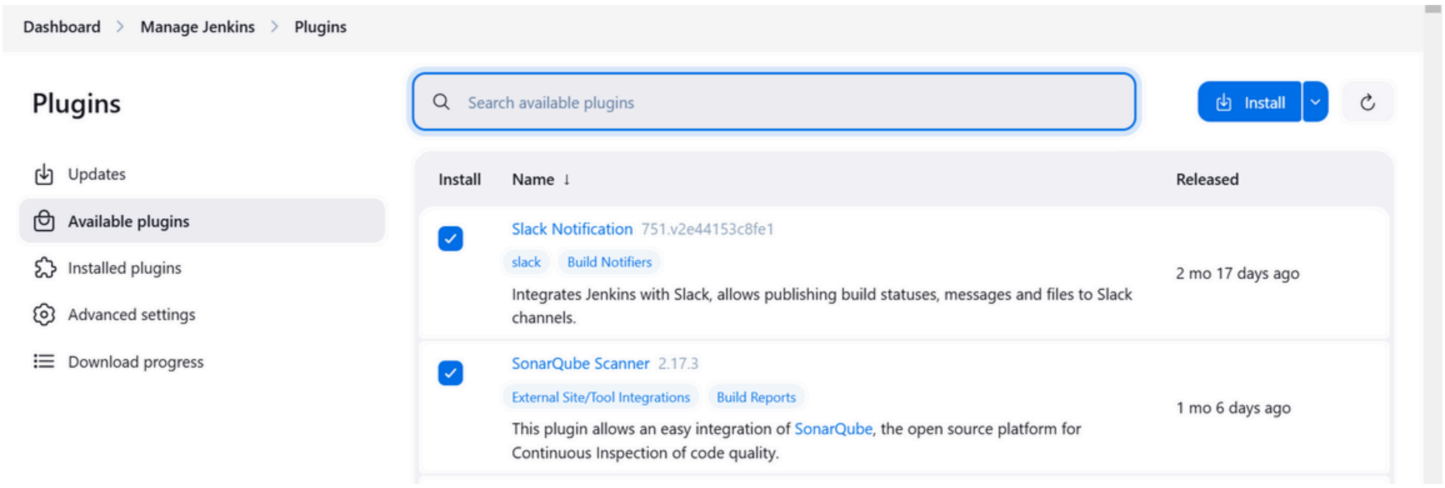
first login is admin and password is admin



Step 3: Configure SonarQube in Jenkins

Install the following plugins in Jenkins:

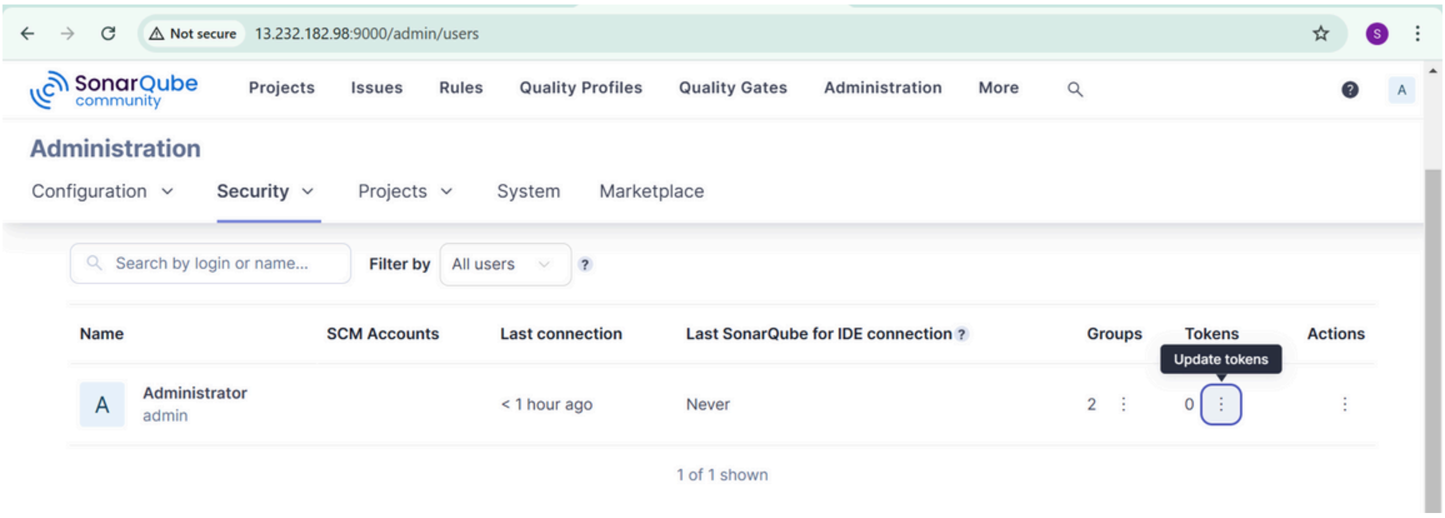
- Slack Notification
- SonarQube Scanner



Install	Name ↓	Released
✓	Slack Notification 751.v2e44153c8fe1 slack · Build Notifiers Integrates Jenkins with Slack, allows publishing build statuses, messages and files to Slack channels.	2 mo 17 days ago
✓	SonarQube Scanner 2.17.3 External Site/Tool Integrations · Build Reports This plugin allows an easy integration of SonarQube, the open source platform for Continuous Inspection of code quality.	1 mo 6 days ago

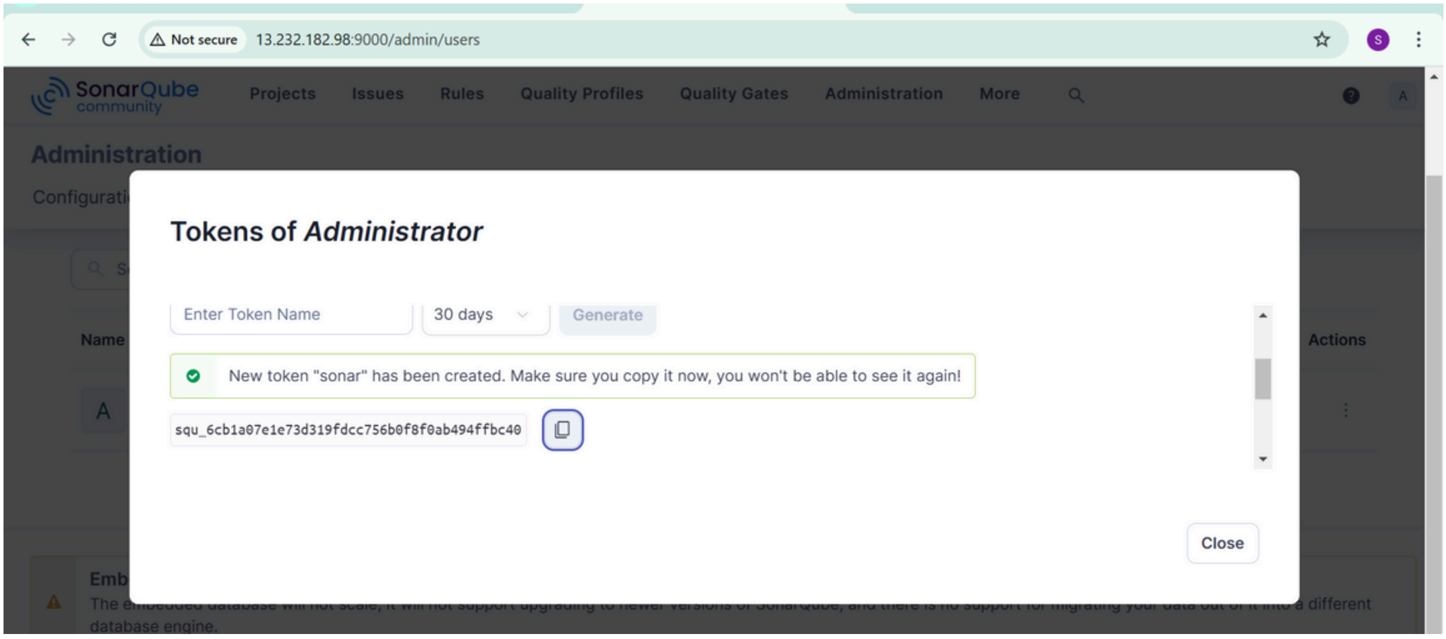
In SonarQube:

- Go to **Administration > Security > Tokens**.
- Generate a token and copy it.



Name	SCM Accounts	Last connection	Last SonarQube for IDE connection	Groups	Tokens	Actions
Administrator admin		< 1 hour ago	Never	2	0	

1 of 1 shown



Tokens of *Administrator*

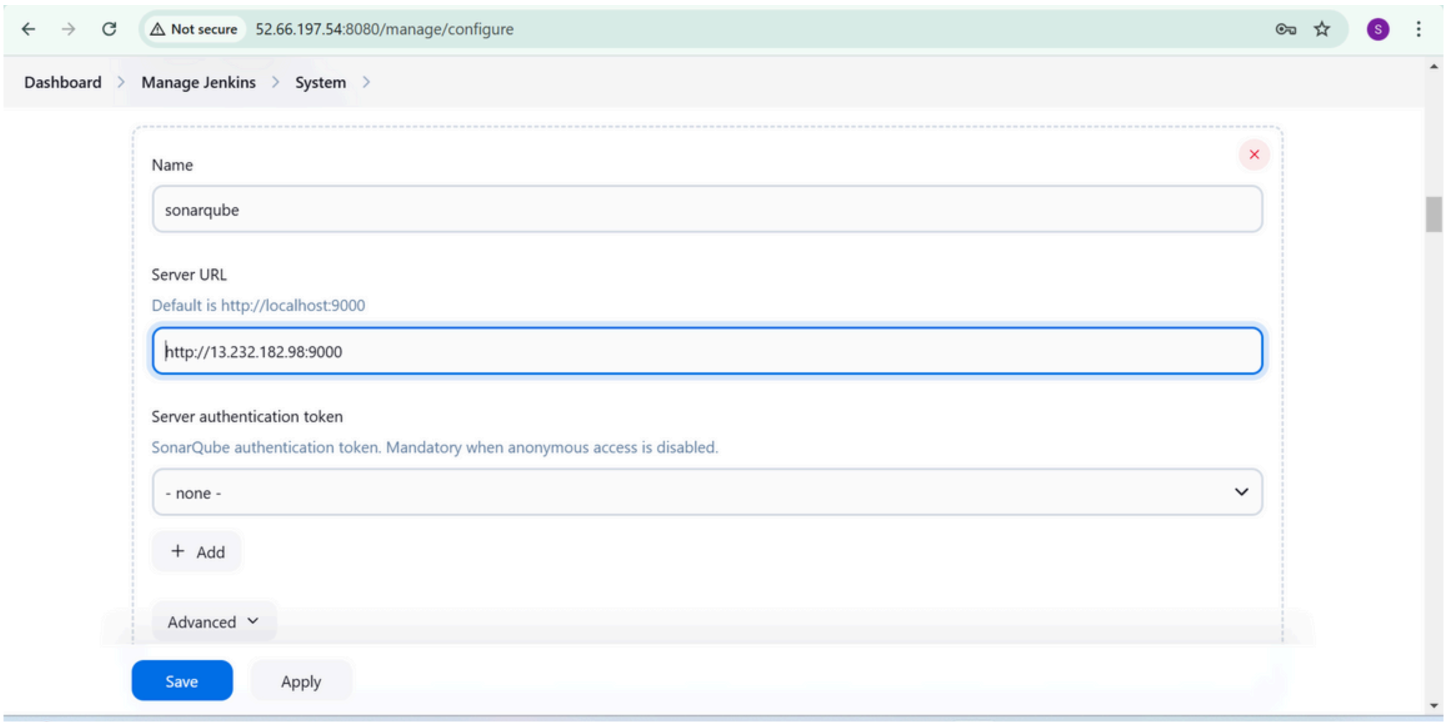
New token "sonar" has been created. Make sure you copy it now, you won't be able to see it again!

```
squ_6cb1a07e1e73d319fdcc756b0f8f0ab494ffbc40
```

In Jenkins:

- Navigate to Manage **Jenkins > System Configuration > SonarQube Servers**.

- Add a new SonarQube server with the following details:
  - Name: SonarQube
  - url : http://<public-ip>9000
  - Credentials: Add a secret text credential and paste the token.
- Save the configuration.



Name

sonarqube

Server URL

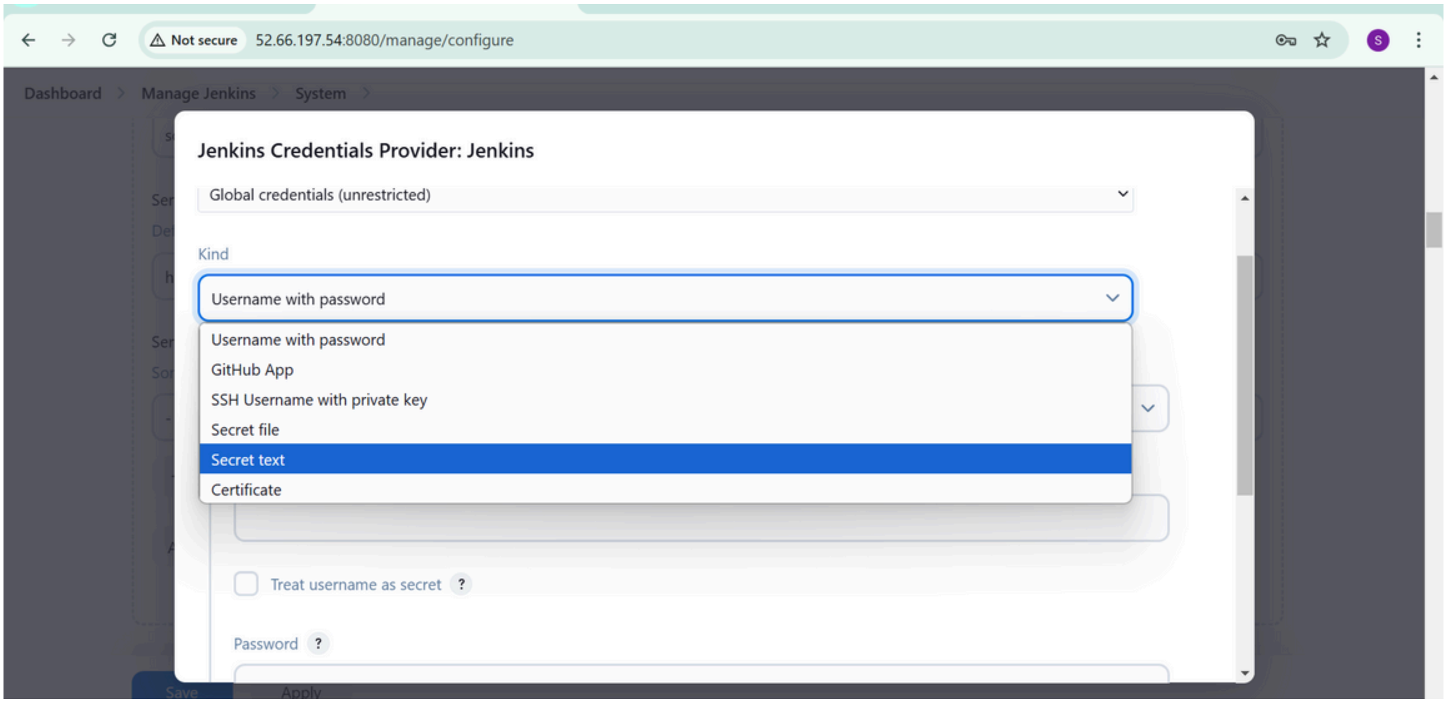
Default is http://localhost:9000

http://13.232.182.98:9000

Server authentication token

SonarQube authentication token. Mandatory when anonymous access is disabled.

- none -

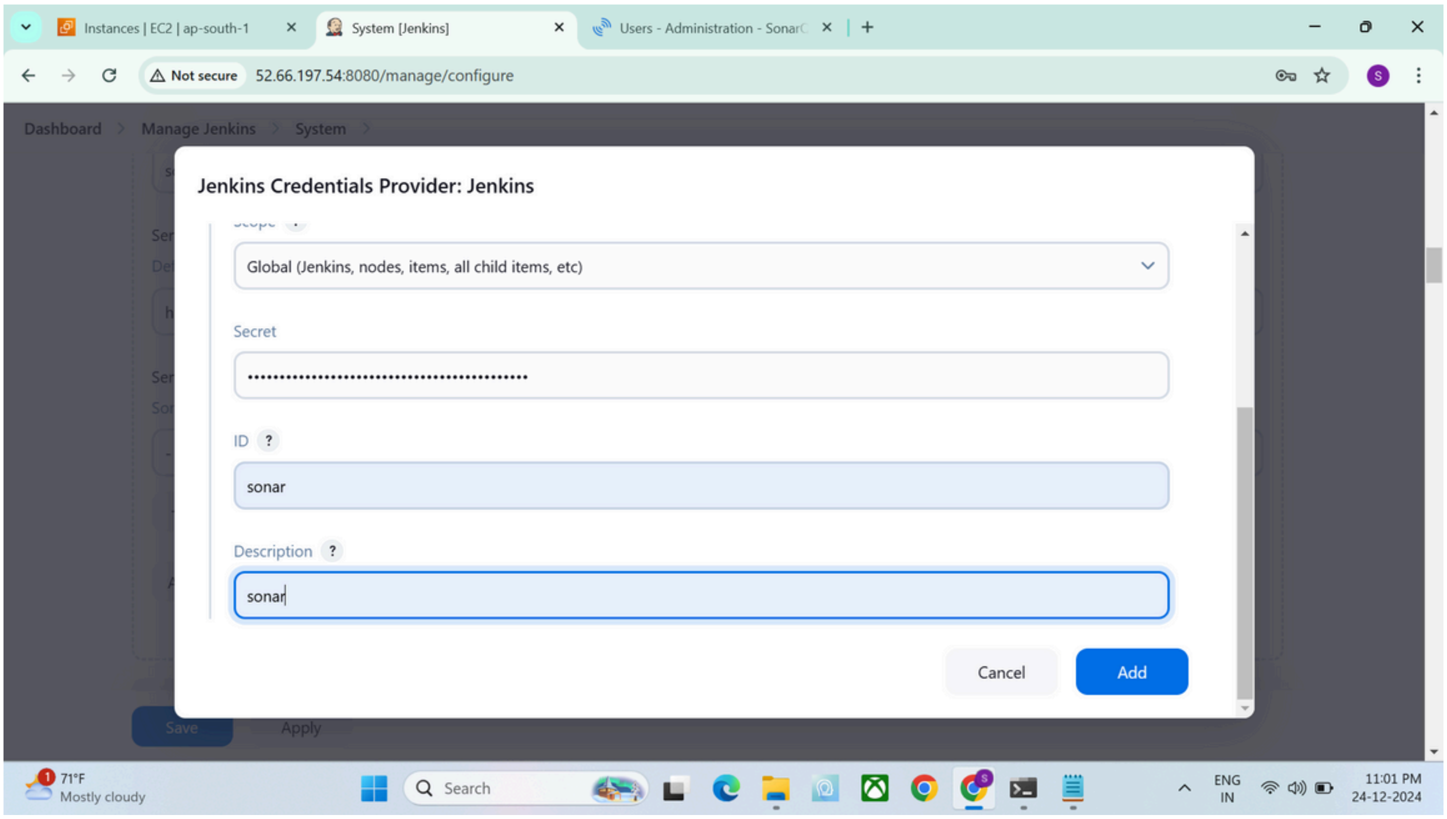


Jenkins Credentials Provider: Jenkins

Global credentials (unrestricted)

Kind

Username with password



Jenkins Credentials Provider: Jenkins

Global (Jenkins, nodes, items, all child items, etc)

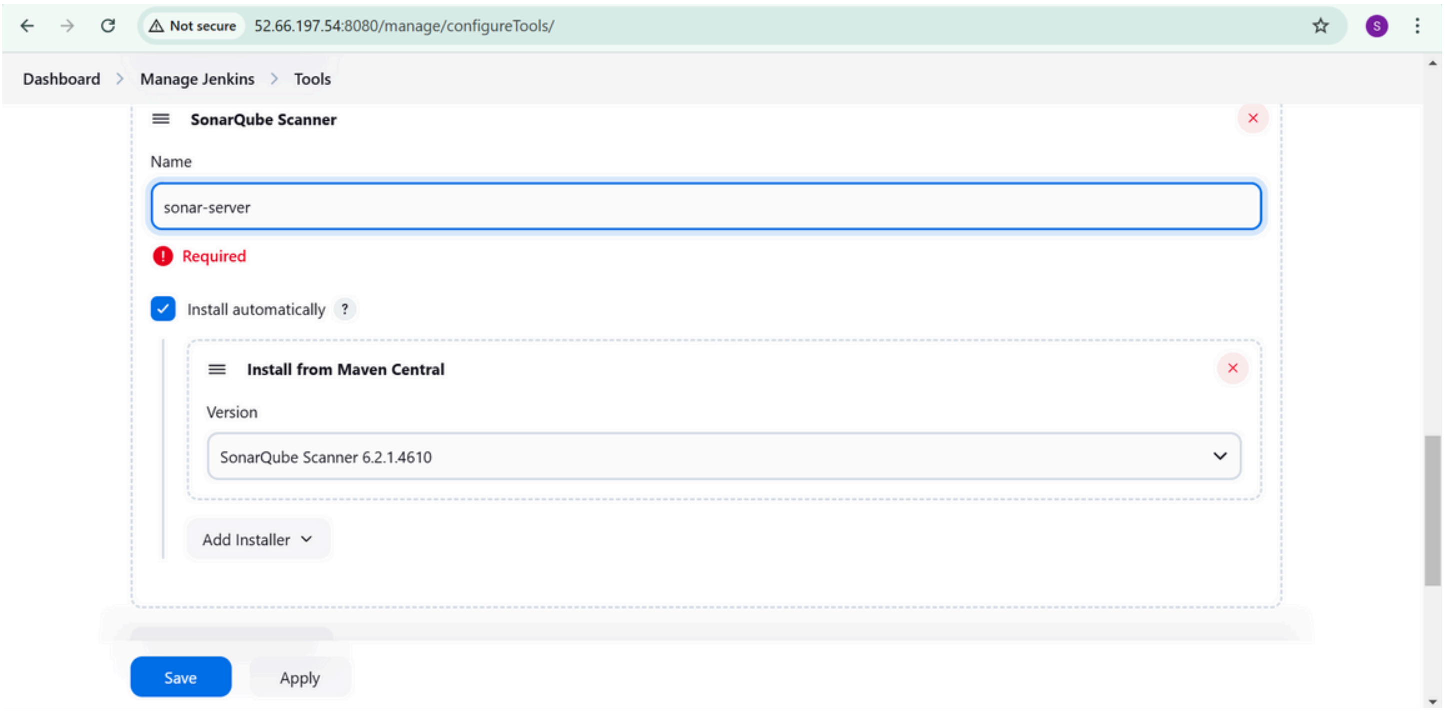
Secret: ••

ID: sonar

Description: sonar

Navigate to Manage Jenkins > Global Tool Configuration.

- Under SonarQube Scanner, add a new scanner:
  - Name: sonar-server
  - Install automatically.



SonarQube Scanner

Name: sonar-server

Install automatically: ✓

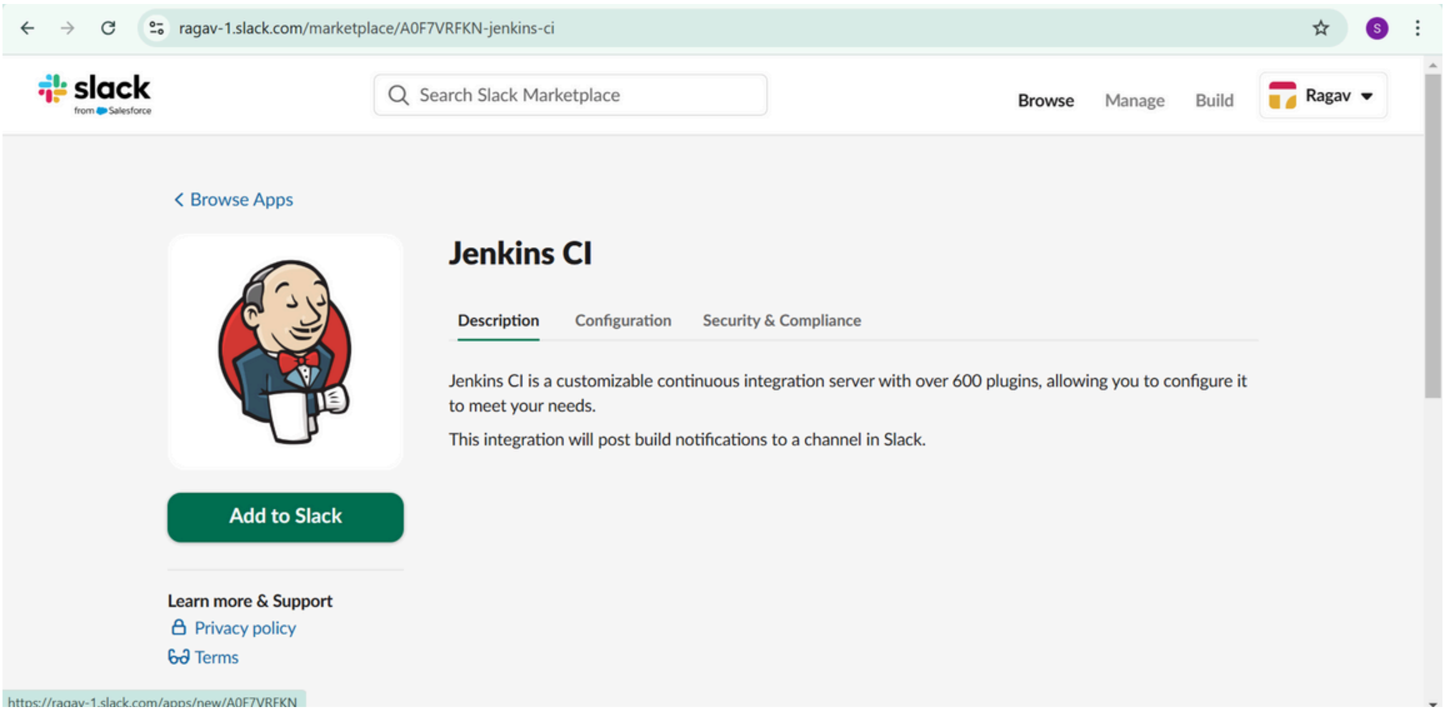
Install from Maven Central

Version: SonarQube Scanner 6.2.1.4610

Step 4: Configure Slack Notifications

1. **In Slack:**
   - Go to Slack Apps and select Jenkins CI.
   - Configure it for your desired channel and generate a token.

2. **In Jenkins:**
    - Navigate to **Manage Jenkins > System Configuration > Slack**.
    - Add Slack workspace and channel credentials:
        - Credential Type: Secret text.
        - Secret: Paste the Slack token.
    - Save the configuration.

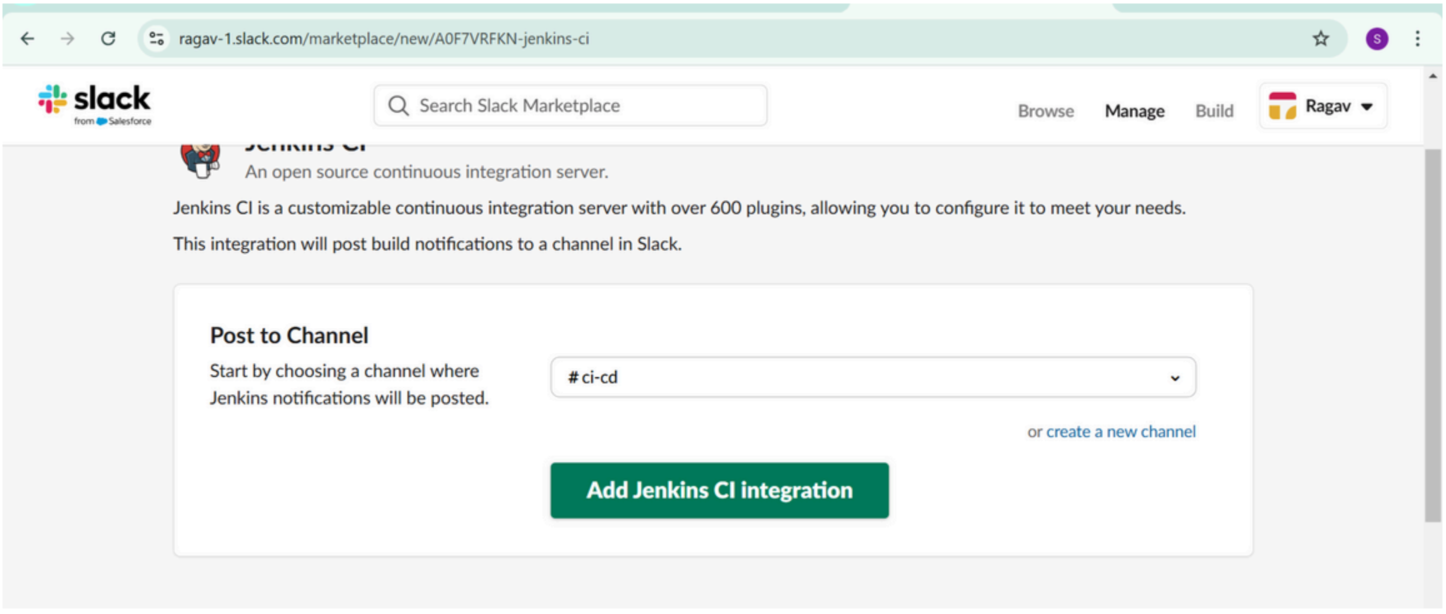


Jenkins CI

Description | Configuration | Security & Compliance

Jenkins CI is a customizable continuous integration server with over 600 plugins, allowing you to configure it to meet your needs.

This integration will post build notifications to a channel in Slack.



An open source continuous integration server.

Jenkins CI is a customizable continuous integration server with over 600 plugins, allowing you to configure it to meet your needs.

This integration will post build notifications to a channel in Slack.

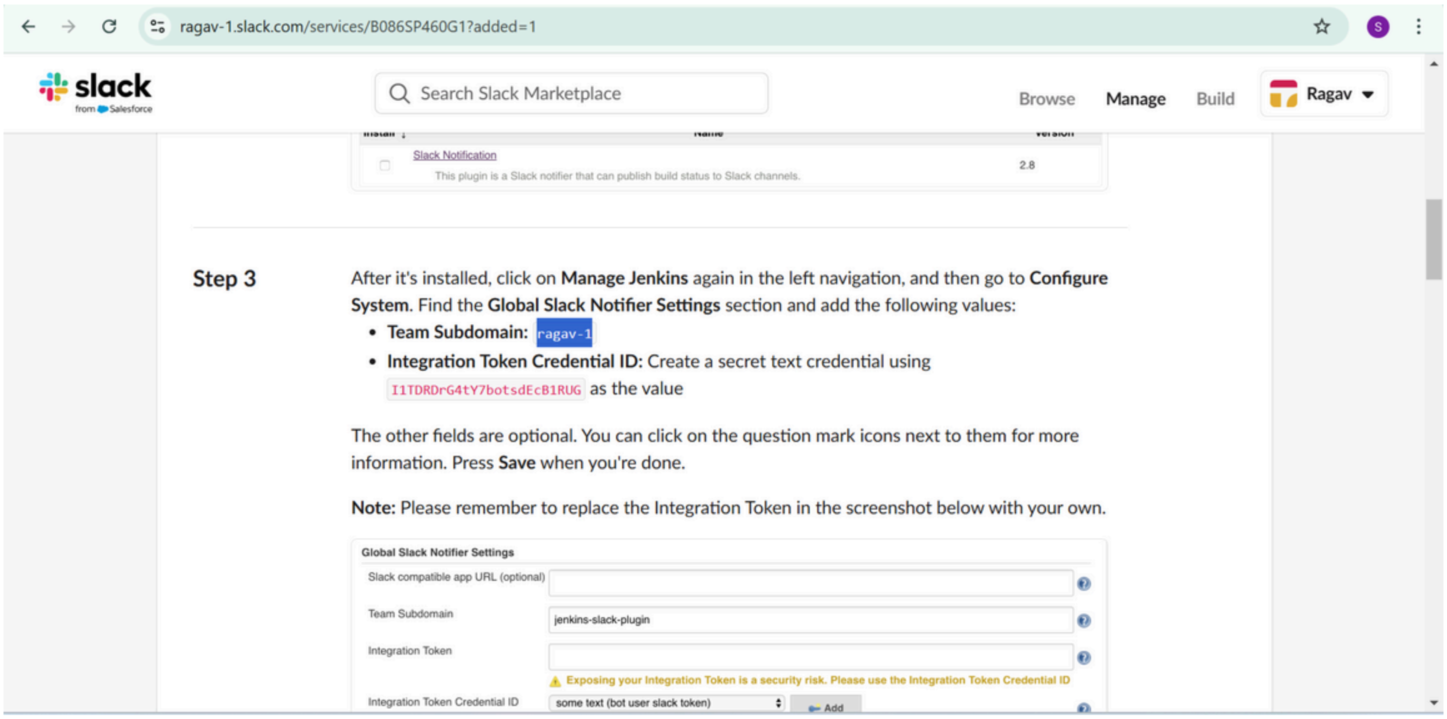
Post to Channel

Start by choosing a channel where Jenkins notifications will be posted.

ci-cd

or create a new channel

Add Jenkins CI integration


ragav-1.slack.com/services/B086SP460G1?added=1

Install	Name	Version
☐	Slack Notification This plugin is a Slack notifier that can publish build status to Slack channels.	2.8

Step 3

After it's installed, click on **Manage Jenkins** again in the left navigation, and then go to **Configure System**. Find the **Global Slack Notifier Settings** section and add the following values:

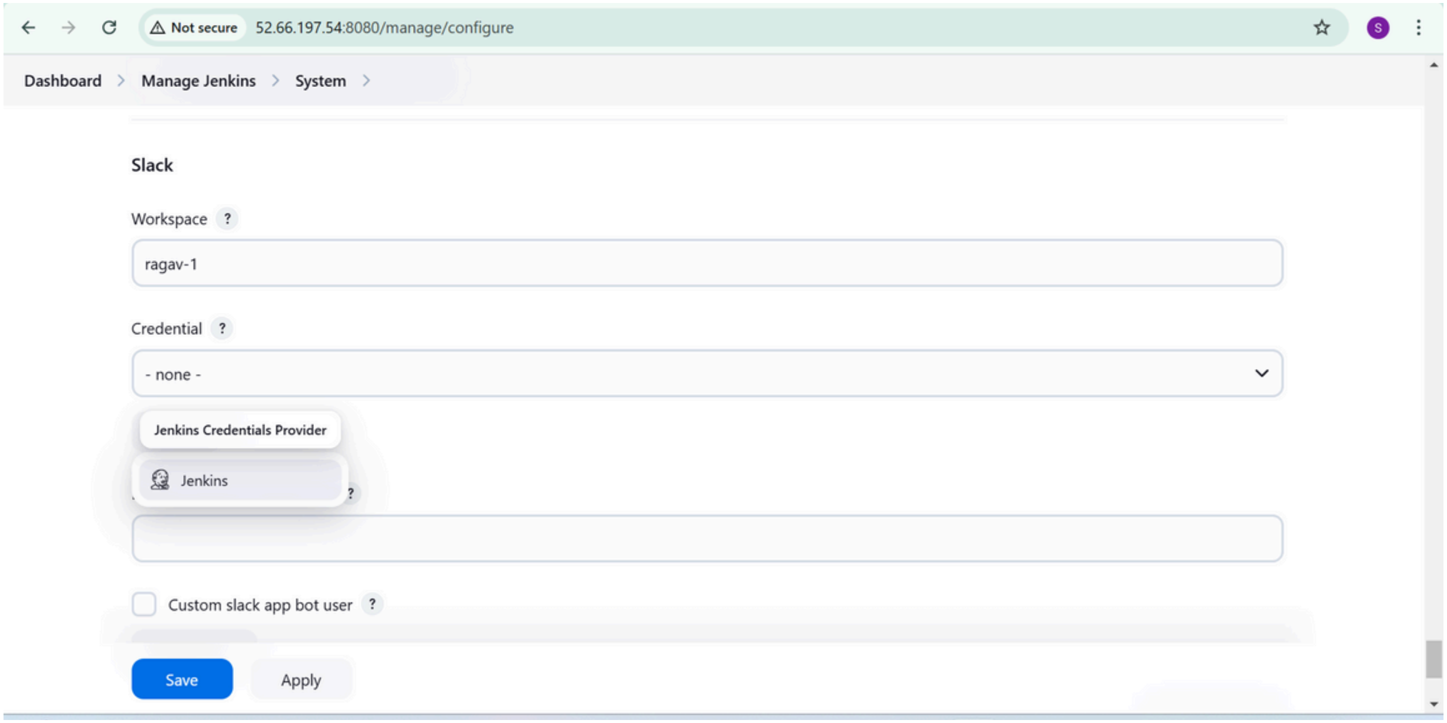
- **Team Subdomain:** `ragav-1`
- **Integration Token Credential ID:** Create a secret text credential using `I1TDRDrG4tY7botsdEcB1RUG` as the value

The other fields are optional. You can click on the question mark icons next to them for more information. Press **Save** when you're done.

Note: Please remember to replace the Integration Token in the screenshot below with your own.

Global Slack Notifier Settings

Slack compatible app URL (optional)	
Team Subdomain	jenkins-slack-plugin
Integration Token	
	⚠ Exposing your Integration Token is a security risk. Please use the Integration Token Credential ID
Integration Token Credential ID	some text (bot user slack token)

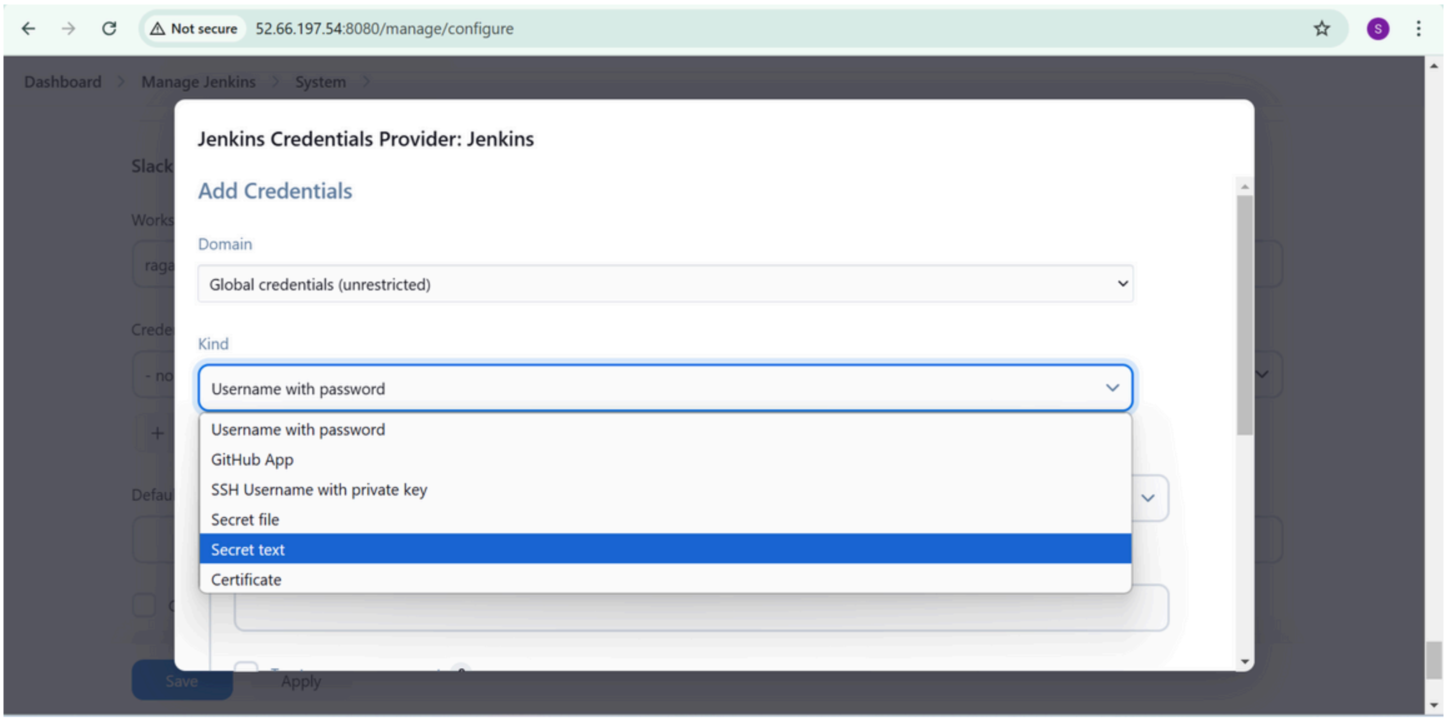

⚠ Not secure 52.66.197.54:8080/manage/configure

Dashboard > Manage Jenkins > System >

Slack

Workspace ?	ragav-1
Credential ?	- none -

Jenkins Credentials Provider
Jenkins
?
Custom slack app bot user ?
Save
Apply


52.66.197.54:8080/manage/configure

Dashboard > Manage Jenkins > System >

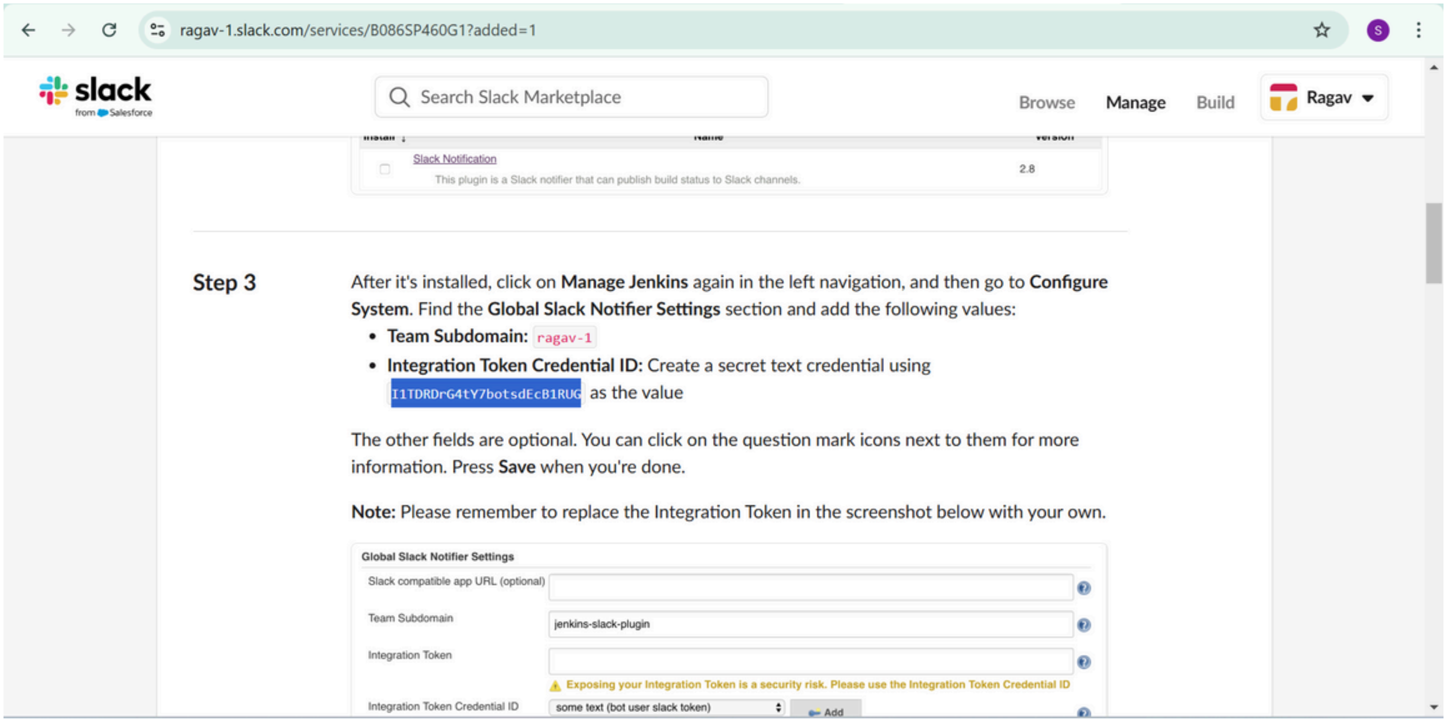
Jenkins Credentials Provider: Jenkins

Add Credentials

Domain: Global credentials (unrestricted)

Kind: Username with password

- Username with password
- GitHub App
- SSH Username with private key
- Secret file
- Secret text
- Certificate


ragav-1.slack.com/services/B086SP460G1?added=1

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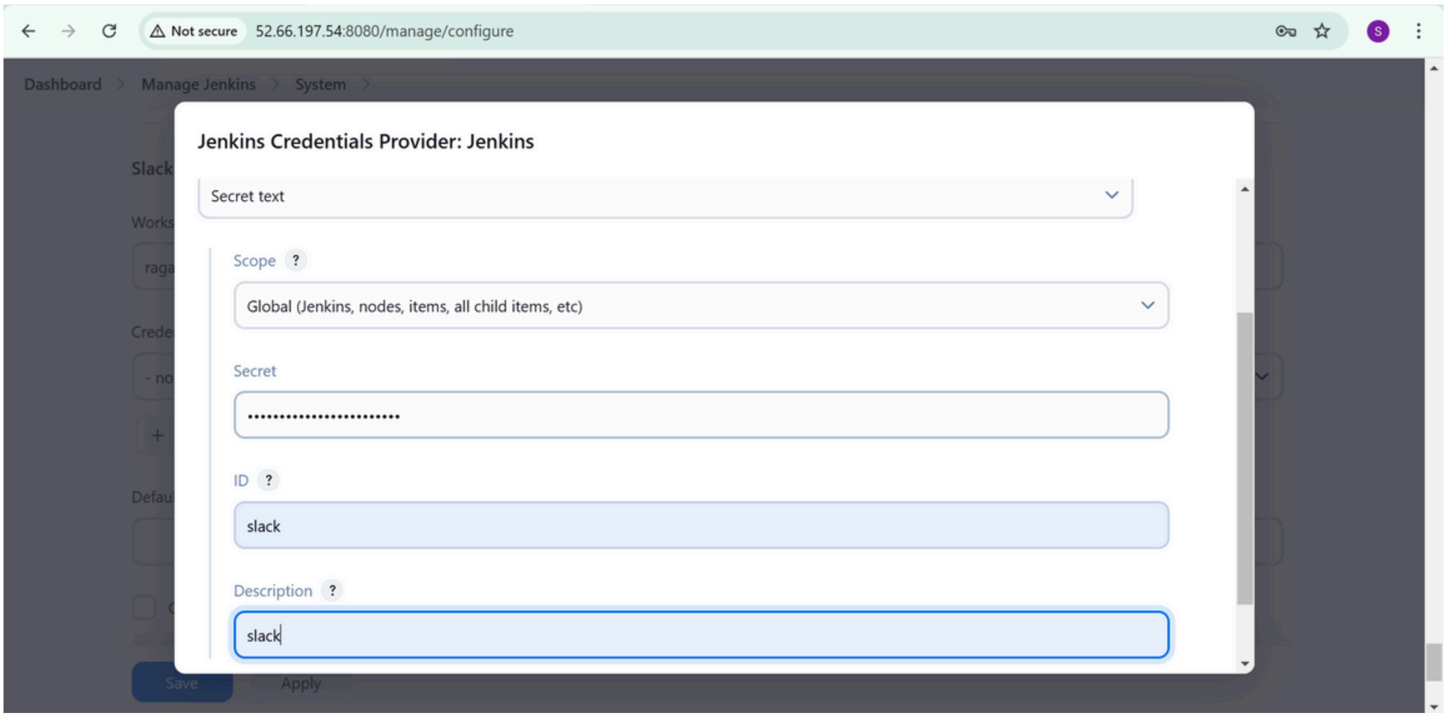

Jenkins Credentials Provider: Jenkins

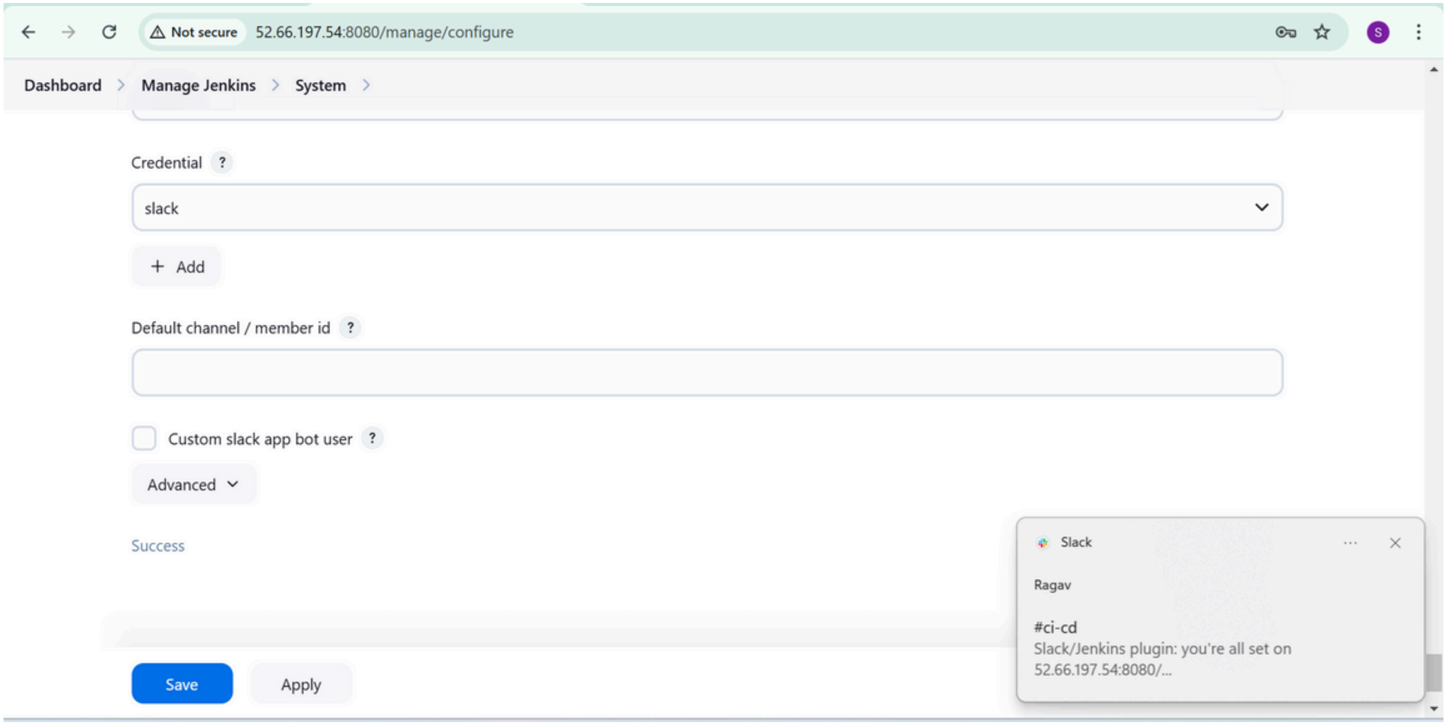
Secret text

Scope: Global (Jenkins, nodes, items, all child items, etc)

Secret: ························

ID: slack

Description: slack


Dashboard > Manage Jenkins > System >

Credential: slack

Default channel / member id:

Custom slack app bot user

Success

Slack
Ragav
#ci-cd
Slack/Jenkins plugin: you're all set on 52.66.197.54:8080/...

Step 5: Create and Run Jenkins Pipeline Job

1. In Jenkins, create a new Pipeline job.
2. Select Pipeline script from SCM and provide the repository URL:
   - https://github.com/RagavMuthukumar/java-spring-boot.git
3. Use the following Jenkinsfile for the pipeline:

```
def COLOR_MAP = [

  'SUCCESS': 'good',

  'FAILURE': 'danger'

]
```

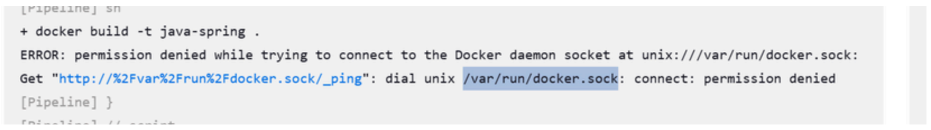
```
pipeline {
  agent { label 'slave-1'}
  environment {
    SCANNER_HOME = tool 'sonarqube'
  }
  stages {
    stage('git checkout') {
      steps {
        git 'https://github.com/RagavMuthukumar/java-spring-boot.git'
      }
    }
    stage('compile') {
      steps {
        sh 'mvn clean compile'
      }
    }
    stage('code analysis') {
      steps {
        withSonarQubeEnv('sonar-server') {
          sh '''$SCANNER_HOME/bin/sonar-scanner -Dsonar.projectName=java-spring-boot \
          -Dsonar.java.binaries=. \
          -Dsonar.projectKey=java-spring-boot'''
        }
      }
    }
     stage('docker clean') {
```

```
    steps {
        script {
        sh '''
        docker stop $(docker ps -q) || true
        docker rm $(docker ps -a -q) || true
        docker rmi $(docker images -q) || true
        '''
        }
    }
}
stage('docker build') {
    steps {
        script {
            sh 'docker build -t  ragavmuthukumar/java-spring .'
        }
    }
}
stage('docker push') {
    steps {
        script {
            withDockerRegistry(credentialsId: 'docker-hub-credential', toolName: 'docker'){
            sh 'docker push ragavmuthukumar/java-spring'
            }
        }
    }
}
stage('docker container') {
        steps {
          script {
            sh 'docker run -itd -p 8081:8080 java-spring'
          }
        }
      }
    }
    post {
      always {
        echo 'slack Notification.'
        slackSend(
          channel: '#ci-cd',
          color: COLOR_MAP[currentBuild.currentResult],
          message: "*${currentBuild.currentResult}:* Job ${env.JOB_NAME} build ${env.BUILD_NUMBER} \nMore info at: ${env.BUILD_URL}"
        )
      }
    }
}
```

Save and run the job.

Step 6: Resolve Docker Permission Issue

If the error Permission denied: /var/run/docker.sock occurs:



```
[Pipeline] sh
+ docker build -t java-spring .
ERROR: permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock:
Get "http://%2Fvar%2Frun%2Fdocker.sock/_ping": dial unix /var/run/docker.sock: connect: permission denied
[Pipeline] }
```

1. Grant Docker permissions to Jenkins:

sudo usermod -aG docker jenkins

sudo chmod 777 /var/run/docker.sock

Step 7: Dockerfile for Java Application

Use the following Multi stage build Dockerfile for the Java application:

```
FROM amazonlinux AS file

RUN yum install git -y

WORKDIR /app

RUN git clone https://github.com/RagavMuthukumar/java-spring-boot.git /app


FROM maven AS build

WORKDIR /source

COPY --from=file /app /source

RUN mvn clean install


FROM openjdk:17-alpine

WORKDIR /test

COPY --from=build /source/target/app-0.0.1-SNAPSHOT.war /test

CMD ["java", "-jar", "app-0.0.1-SNAPSHOT.war"]

EXPOSE 8080
```