SHRAVANI RASAM D15A 46

ADVANCED DEVOPS EXP 7

Static Application Security Testing (SAST)

SAST is a method of security testing that analyzes source code to identify vulnerabilities **without executing the program**. It is also known as **white-box testing**.

SAST Process Breakdown

1. **Code Parsing**
   - The source code is parsed to create an **Abstract Syntax Tree (AST)**, which represents the code structure.
2. **Pattern Matching**
   - The AST is analyzed using predefined rules to detect patterns that may indicate security vulnerabilities.
3. **Data Flow Analysis**
   - This step examines how data moves through the code to identify potential security issues like **SQL Injection** or **Cross-Site Scripting (XSS)**.
4. **Control Flow Analysis**
   - Involves analyzing the paths that the code execution might take to find logical errors or vulnerabilities.
5. **Reporting**
   - The tool generates a report highlighting the vulnerabilities found, their severity, and recommendations for fixing them.

Benefits of SAST

- **Early Detection**
  - Identifies vulnerabilities early in the development lifecycle, reducing the cost and effort required to fix them.
- **Comprehensive Coverage**
  - Can analyze **100% of the codebase**, including all possible execution paths.
- **Automated and Scalable**
  - Suitable for large codebases and can be integrated into **CI/CD pipelines** for continuous monitoring.

SHRAVANI RASAM D15A 46

SonarQube and SAST

SonarQube is a popular tool that provides static code analysis to detect bugs, code smells, and security vulnerabilities. Here's how SonarQube fits into the SAST process:

1. **Integration**
   - SonarQube can be integrated into your **CI/CD pipeline** to automatically analyze code every time it is committed.
2. **Rule Sets**
   - It uses a comprehensive set of rules to detect **security vulnerabilities**, **coding standards violations**, and **code quality issues**.
3. **Detailed Reporting**
   - SonarQube generates detailed reports that help developers understand and fix the identified issues efficiently.
4. **Continuous Feedback**
   - Provides continuous feedback to developers, enabling them to maintain high code quality and security standards throughout the development process.
5. **Customization**
   - Allows customization of rule sets to match the specific needs and standards of your project or organization.

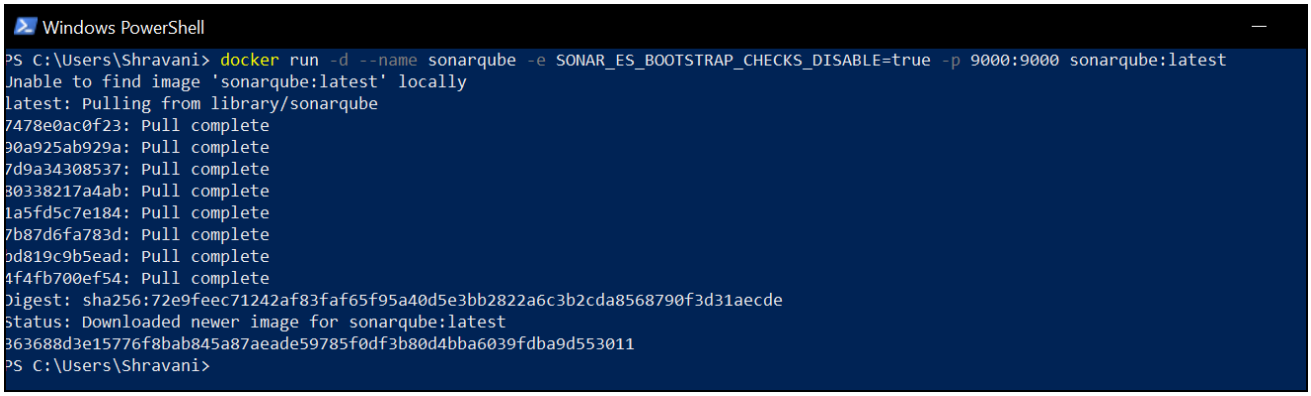
Implementation:

1. Open Jenkins Dashboard

- Access your Jenkins Dashboard by navigating to http://localhost:8080 (or the port you have configured Jenkins to run on).

2. Run SonarQube in a Docker Container

- Open a terminal and run the following command to start SonarQube in a Docker container Command - docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest

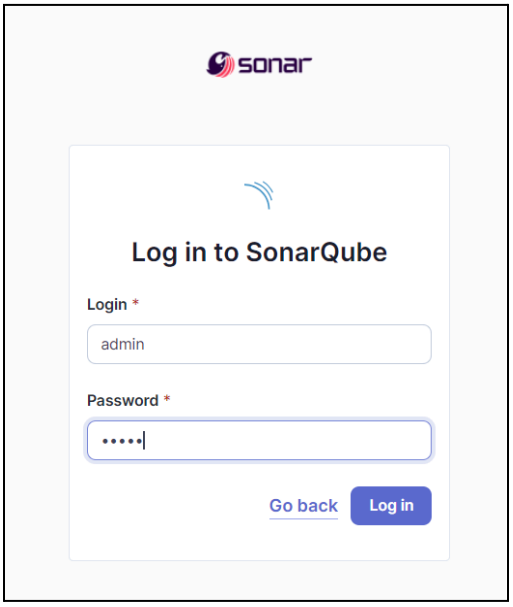


3. Check SonarQube Status

● Once the container is up and running, check the status of SonarQube by navigating to http://localhost:9000

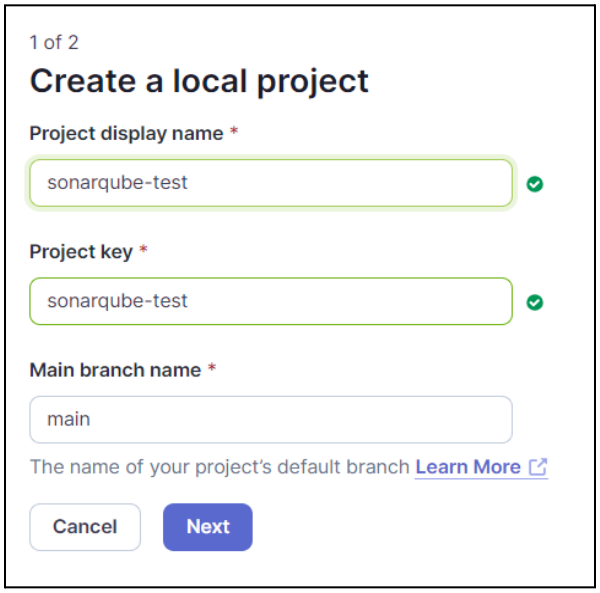
4. Login to SonarQube

- Use the default credentials to log in:
  - Username: admin
  - Password: admin

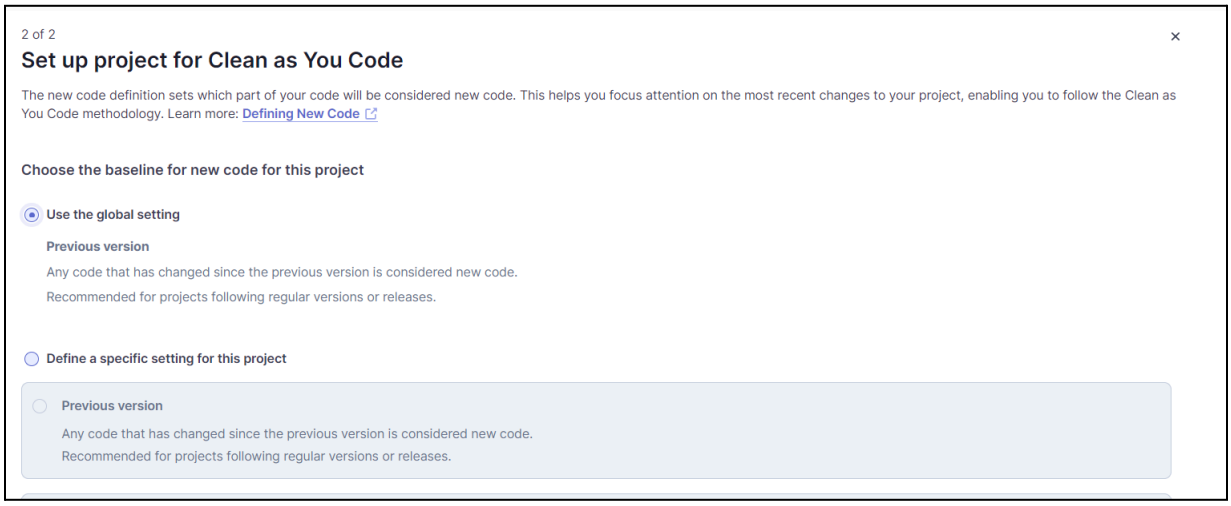


5. Create a Project in SonarQube

- Create a new project manually in SonarQube and name it sonarqube

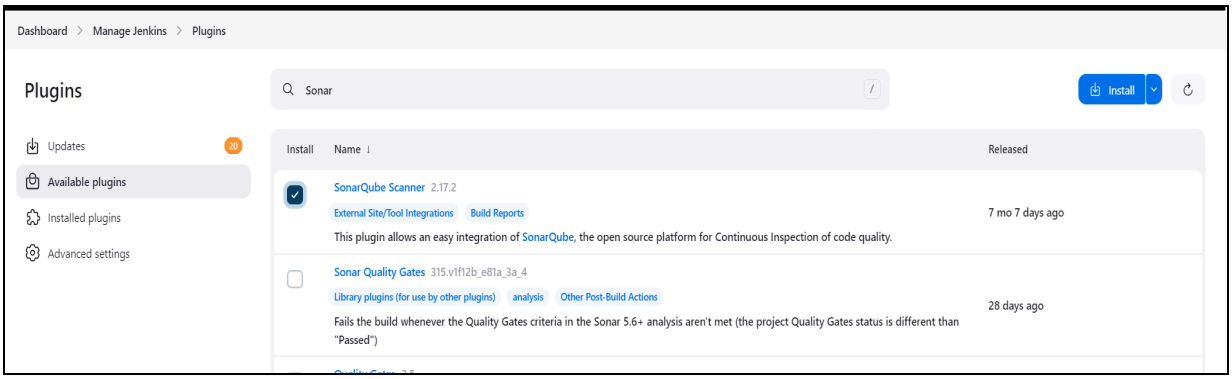


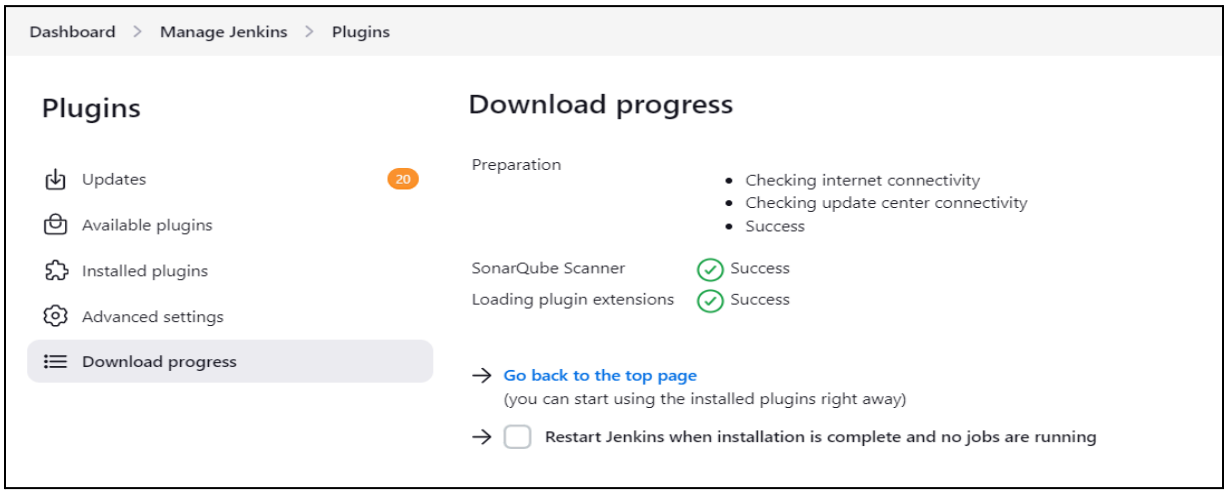
SHRAVANI RASAM D15A 46



6. Install SonarQube Scanner for Jenkins

- Go back to the Jenkins Dashboard.
- Navigate to Manage Jenkins > Manage Plugins.
- Search for SonarQube Scanner for Jenkins and install it.

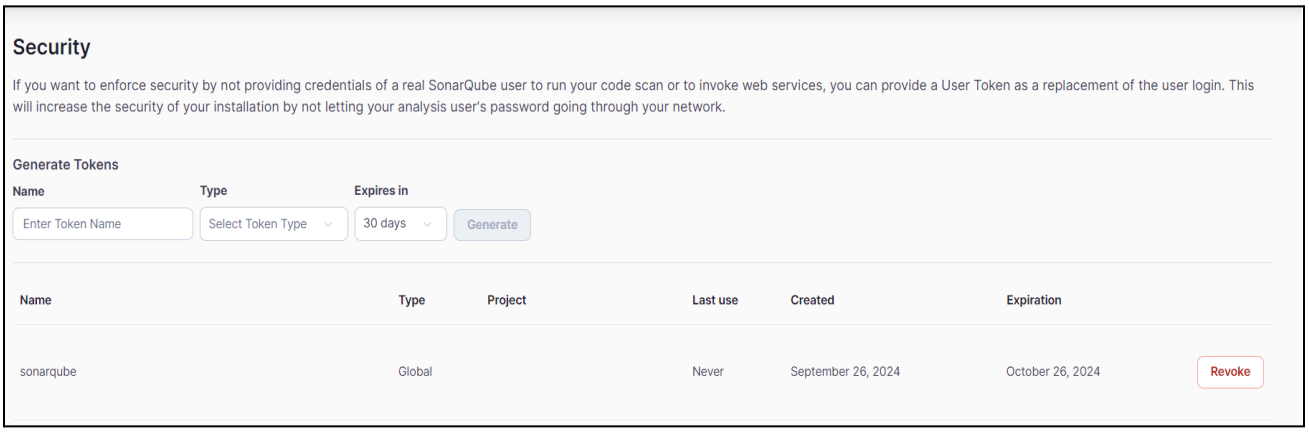




SHRAVANI RASAM D15A 46

7. Configure SonarQube in Jenkins

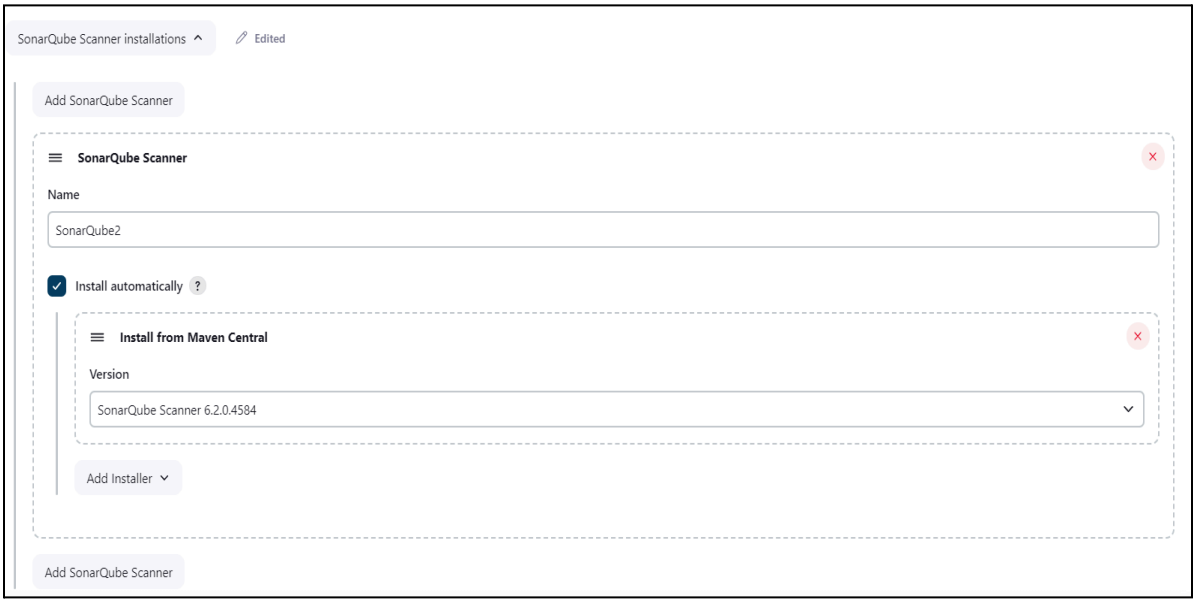
- Go to Manage Jenkins > Configure System
- Scroll down to the SonarQube Servers section and enter the required details:
  - **Name**: Any name you prefer.
  - **Server URL**: http://localhost:9000
  - **Server Authentication Token**: (Generate this token in SonarQube under My Account > Security > Generate Tokens).
  - **Add Jenkins**: Select Kind - Secret Text > Secret (Paste Generated Token)



SHRAVANI RASAM D15A 46

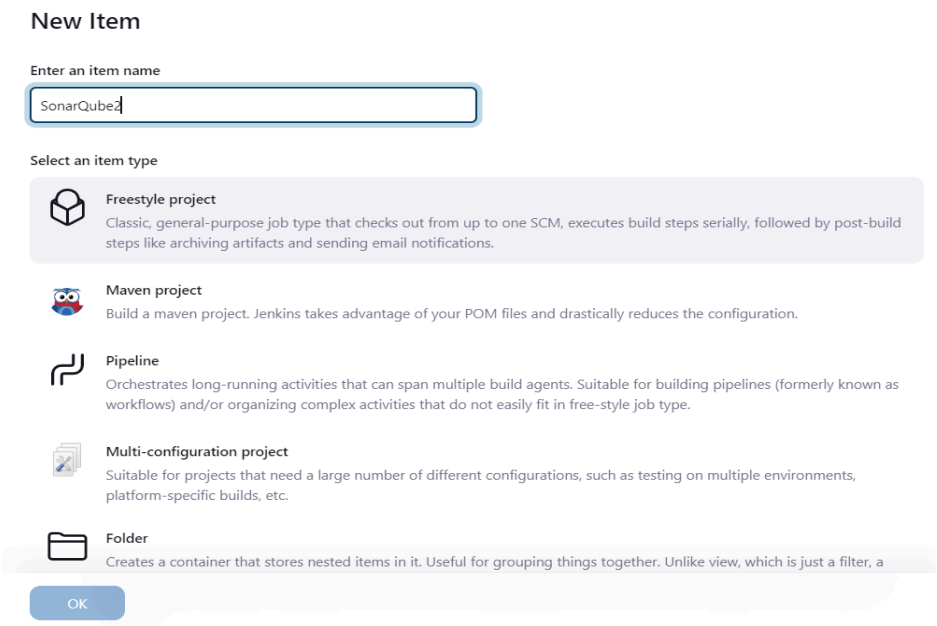
8. Configure SonarQube Scanner in Jenkins

- Go to Manage Jenkins > Global Tool Configuration.
- Scroll down to SonarQube Scanner.
- Choose the latest version and select Install automatically



9. Create a New Jenkins Job

- In Jenkins, create a new item and select Freestyle project.
- Under Source Code Management, choose Git and enter the repository URL: https://github.com/shazforiot/MSBuild_firstproject.git



10. Configure Build Steps

- Under the Build section, add a build step to Execute SonarQube Scanner

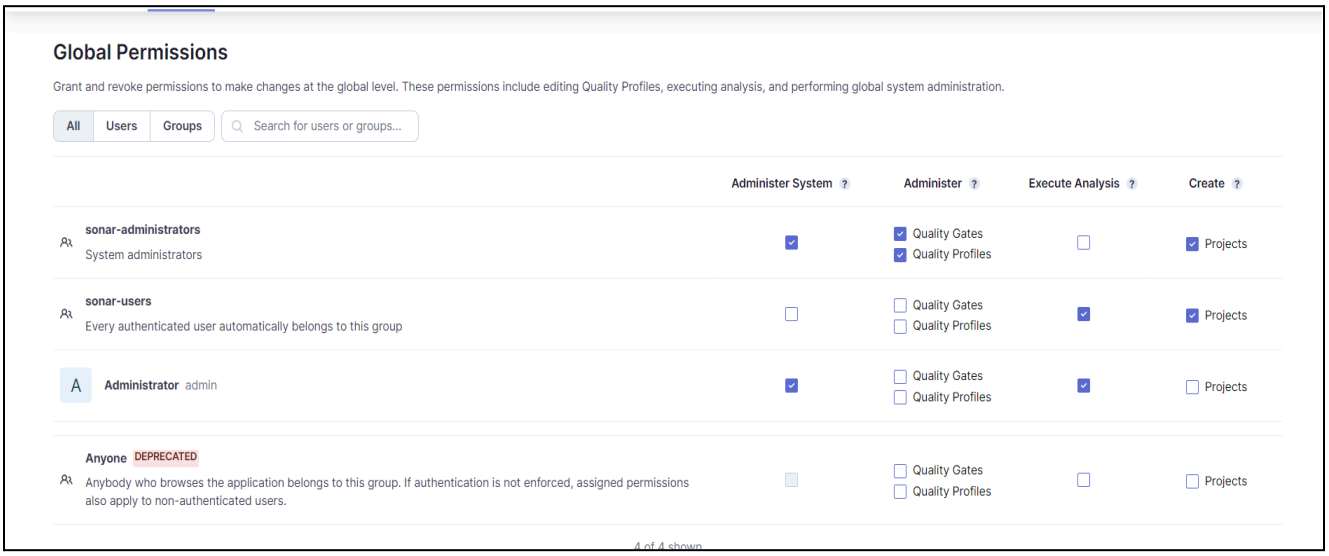
. ● Enter the following analysis properties:

  - sonar.projectKey=my_project_name
  - sonar.login=your_generated_token
  - sonar.sources=HelloWorldCore
  - sonar.host.url=http://localhost:9000

SHRAVANI RASAM D15A 46

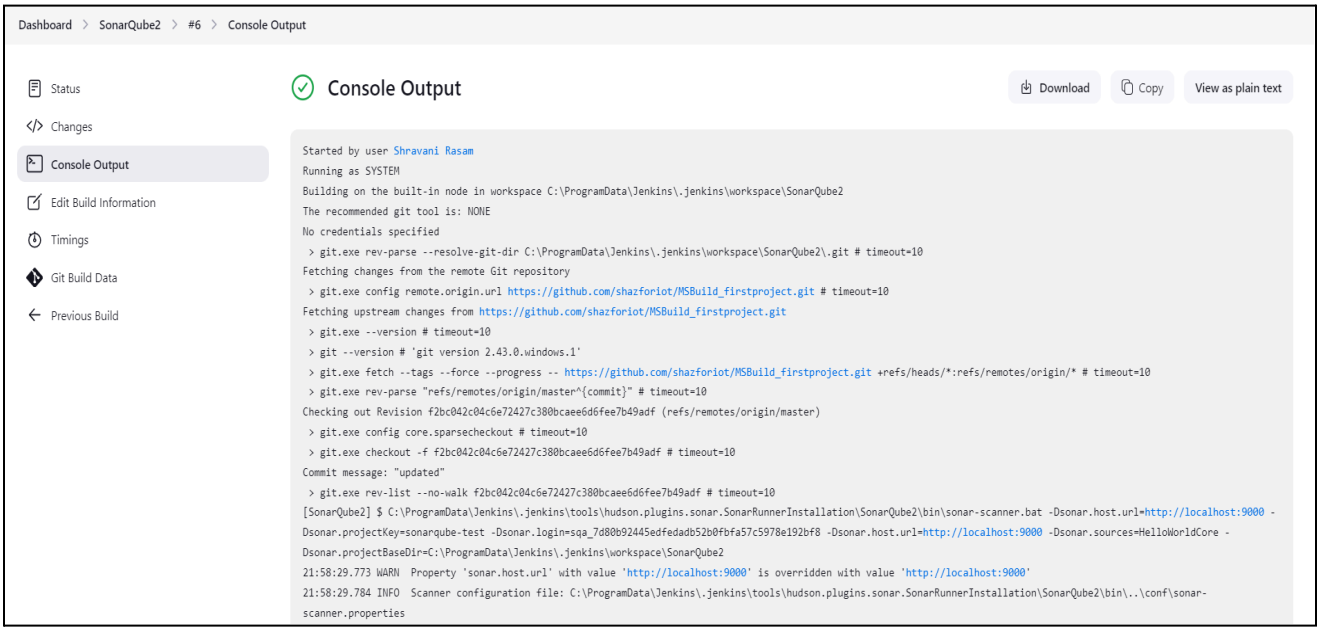
11. Set Permissions in SonarQube

- Navigate to http://localhost:9000/<user-name>/permissions.
- Allow Execute Permissions to the Admin user.



12. Run the Build

- Go back to Jenkins and run the build.
- Check the console output for any errors or issues.



SHRAVANI RASAM D15A 46

13. Verify in SonarQube

- Once the build is complete, check the project in SonarQube to see the analysis results.