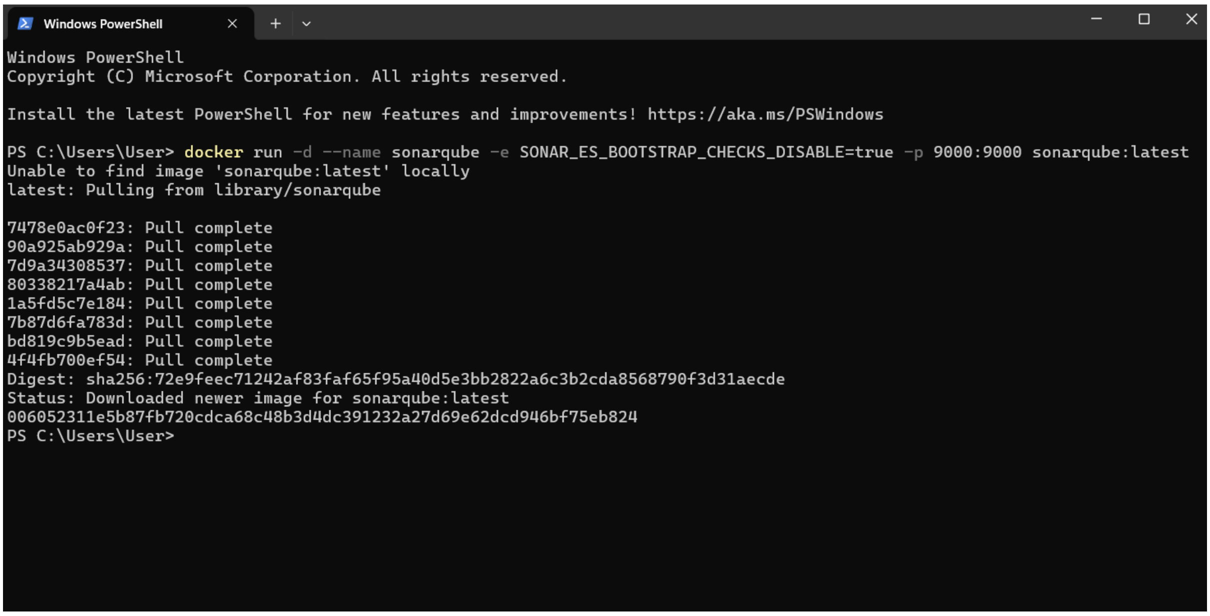
EXPERIMENT 7

Aim: To understand Static Analysis SAST process and learn to integrate Jenkins SAST to SonarQube/GitLab.

Step 1: Open Windows PowerShell and run the following command –
docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest
WARNING: Run the following command only once



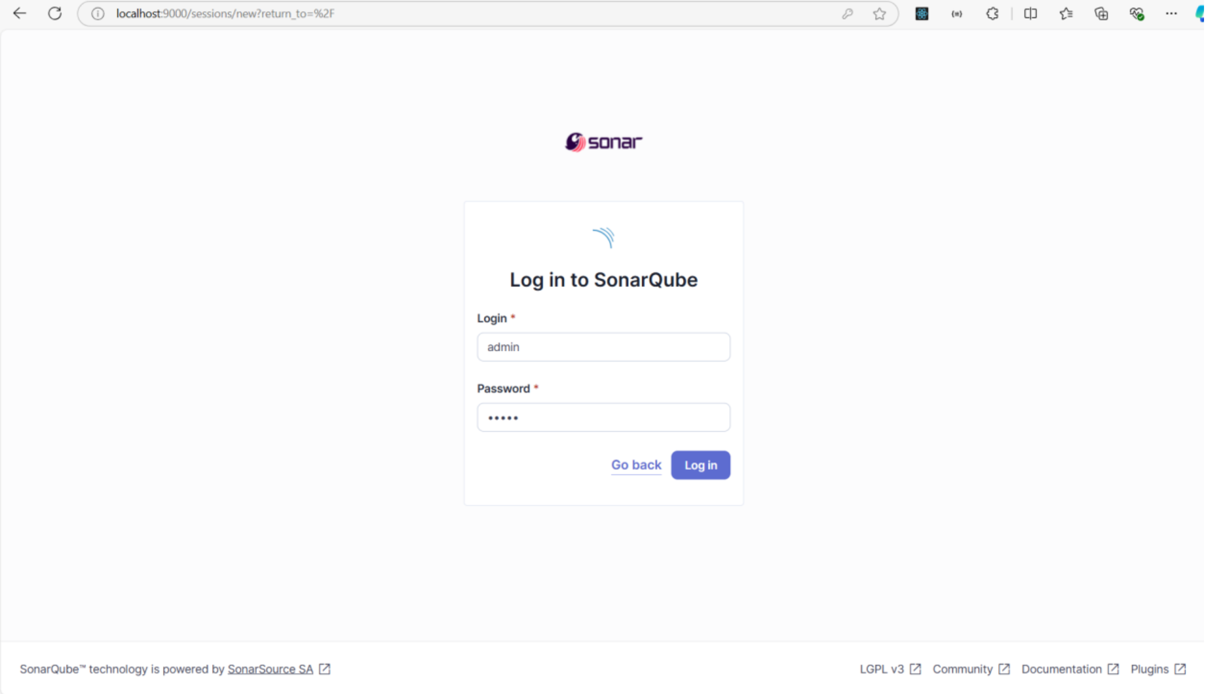
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\User> docker run -d --name sonarqube -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true -p 9000:9000 sonarqube:latest
Unable to find image 'sonarqube:latest' locally
latest: Pulling from library/sonarqube

7478e0ac0f23: Pull complete
90a925ab929a: Pull complete
7d9a34308537: Pull complete
80338217a4ab: Pull complete
1a5fd5c7e184: Pull complete
7b87d6fa783d: Pull complete
bd819c9b5ead: Pull complete
4f4fb700ef54: Pull complete
Digest: sha256:72e9feec71242af83faf65f95a40d5e3bb2822a6c3b2cda8568790f3d31aecde
Status: Downloaded newer image for sonarqube:latest
006052311e5b87fb720cdca68c48b3d4dc391232a27d69e62dcd946bf75eb824
PS C:\Users\User>
```

Step 2: Visit http://localhost:9000/ to open SonarQube. Login with username: admin and password: admin.



Log in to SonarQube

Login * admin

Password * •••••

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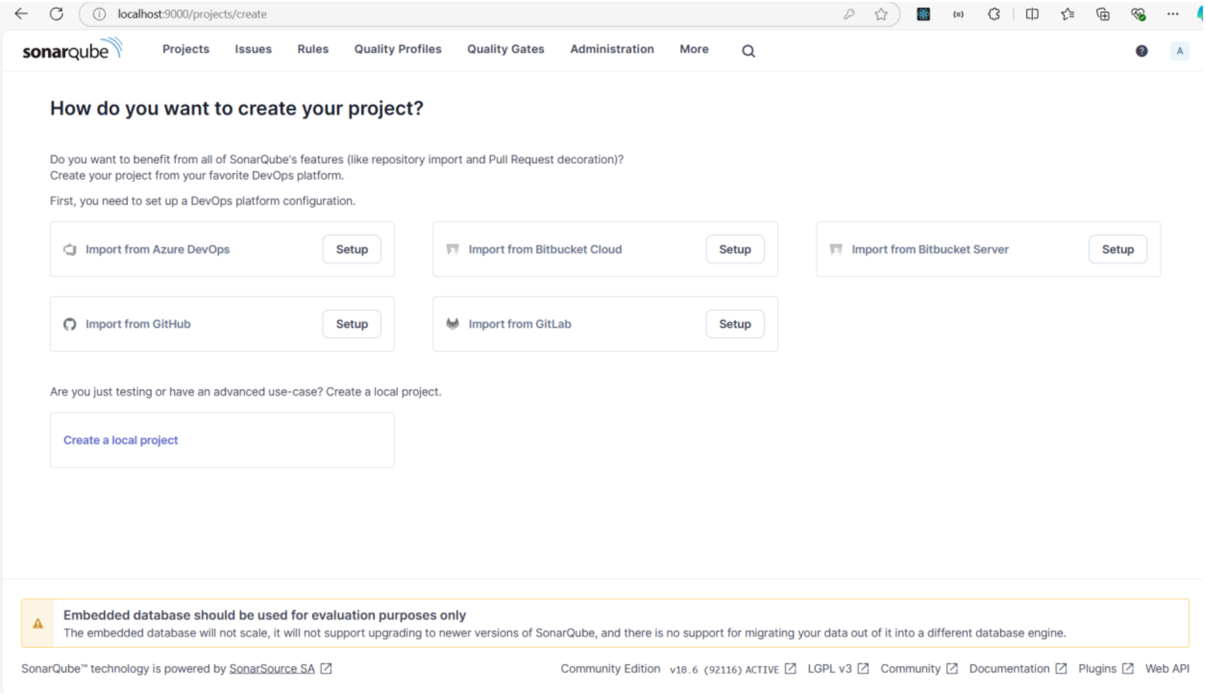
Step 3: Click on create a local project and name the project as sonarqube-test and key as sonarqube-test and click on the next button. In the next step select the “Use the global setting” option and click on create project.



How do you want to create your project?

Do you want to benefit from all of SonarQube's features (like repository import and Pull Request decoration)?
Create your project from your favorite DevOps platform.

First, you need to set up a DevOps platform configuration.

Are you just testing or have an advanced use-case? Create a local project.

Embedded database should be used for evaluation purposes only
The embedded database will not scale, it will not support upgrading to newer versions of SonarQube, and there is no support for migrating your data out of it into a different database engine.

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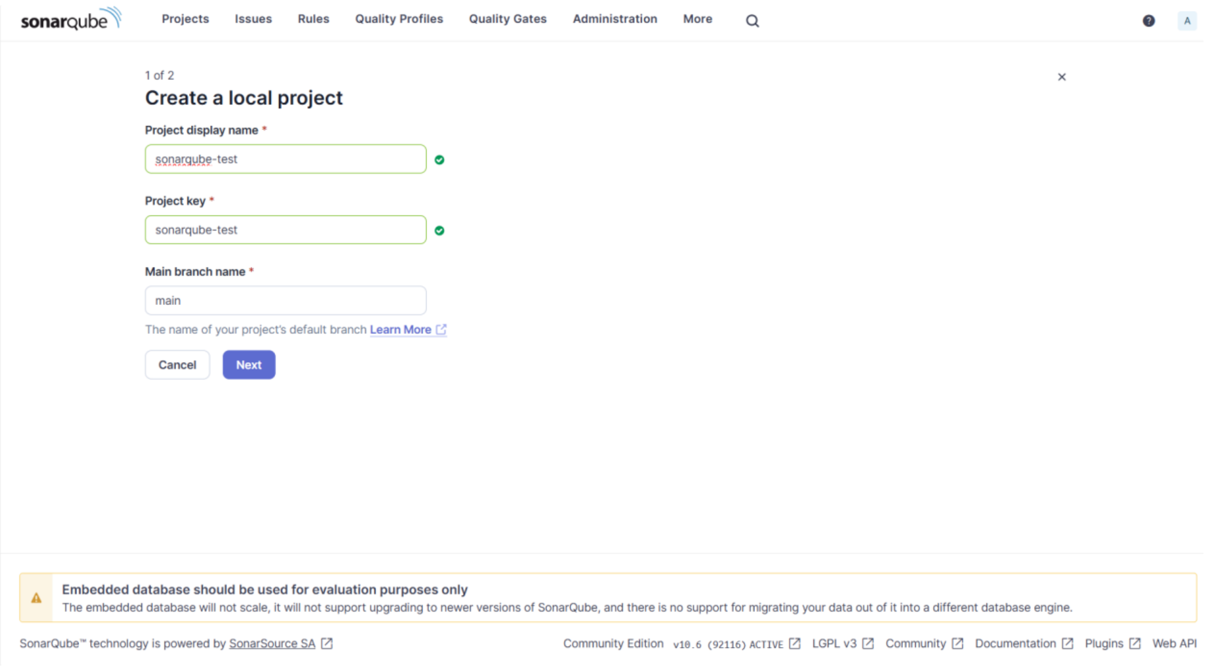
Community Edition v10.6 (92116) ACTIVE LGPL v3 Community Documentation Plugins Web API



1 of 2

Create a local project

Project display name *: sonarqube-test

Project key *: sonarqube-test

Main branch name *: main

The name of your project's default branch Learn More

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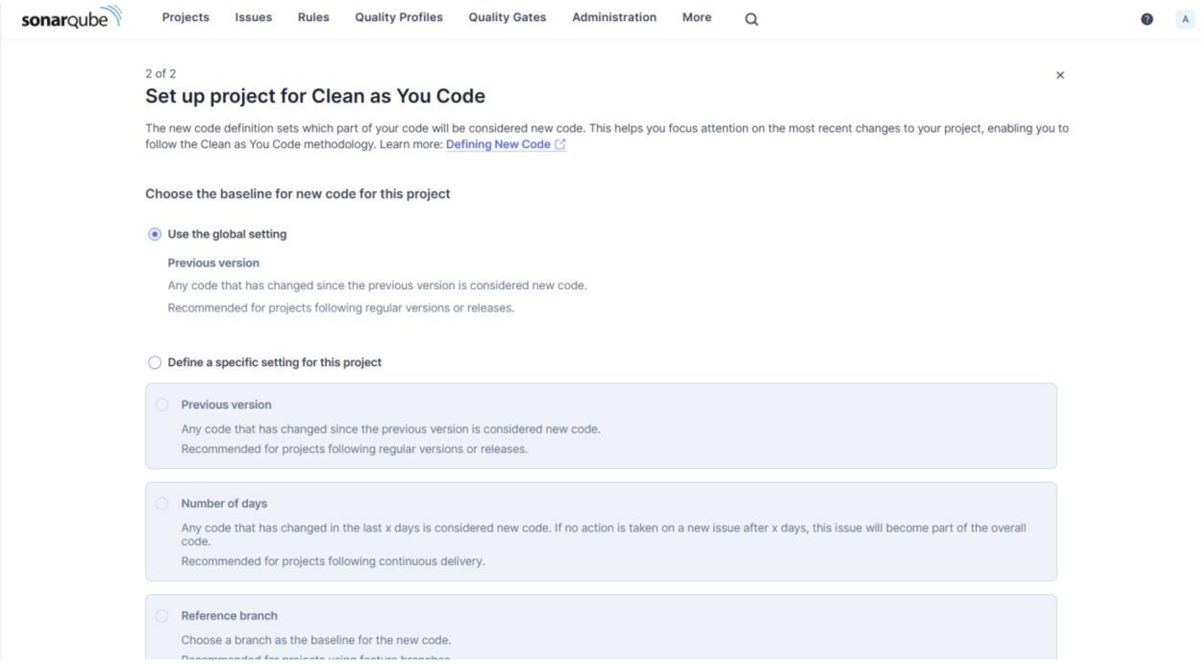


2 of 2

Set up project for Clean as You Code

The new code definition sets which part of your code will be considered new code. This helps you focus attention on the most recent changes to your project, enabling you to follow the Clean as You Code methodology. Learn more: Defining New Code

Choose the baseline for new code for this project

● Use the global setting

Previous version

Any code that has changed since the previous version is considered new code.

Recommended for projects following regular versions or releases.

○ Define a specific setting for this project

○ Previous version

Any code that has changed since the previous version is considered new code.

Recommended for projects following regular versions or releases.

○ Number of days

Any code that has changed in the last x days is considered new code. If no action is taken on a new issue after x days, this issue will become part of the overall code.

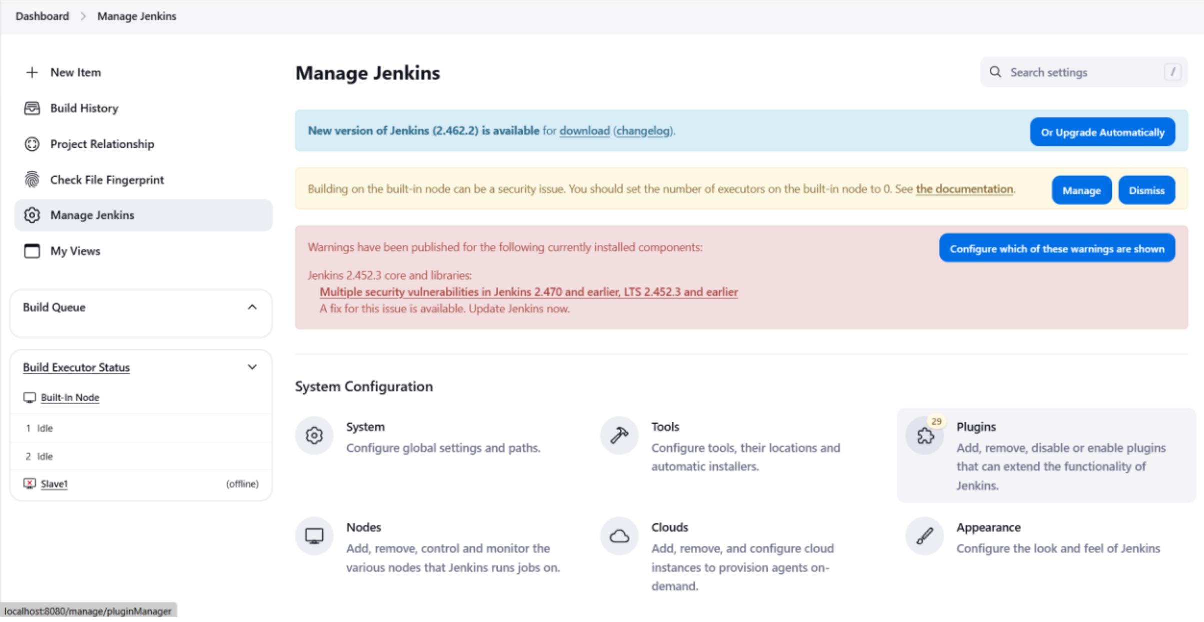
Recommended for projects following continuous delivery.

○ Reference branch

Choose a branch as the baseline for the new code.

Recommended for projects using feature branches.

Step 4: Open Jenkins using http://localhost:8080/ and select Manage Jenkins, then select the Plugins and select available plugins from sidebar and search for SonarQube Scanner and install it. Once installed you can view the installed plugin in installed plugins section in sidebar.



Manage Jenkins

New version of Jenkins (2.462.2) is available for download (changelog).

Building on the built-in node can be a security issue. You should set the number of executors on the built-in node to 0. See the documentation.

Warnings have been published for the following currently installed components:

Jenkins 2.452.3 core and libraries:
Multiple security vulnerabilities in Jenkins 2.470 and earlier, LTS 2.452.3 and earlier
A fix for this issue is available. Update Jenkins now.

System Configuration

System
Configure global settings and paths.

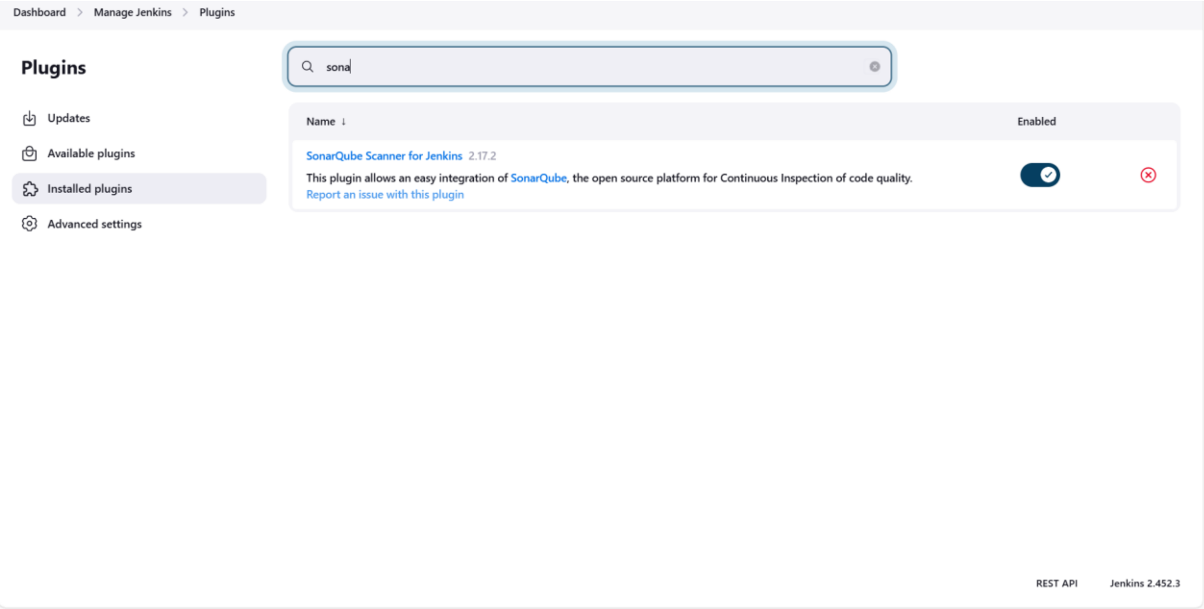
Tools
Configure tools, their locations and automatic installers.

Plugins (29)
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.

Nodes
Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

Clouds
Add, remove, and configure cloud instances to provision agents on-demand.

Appearance
Configure the look and feel of Jenkins



Dashboard > Manage Jenkins > Plugins

Plugins

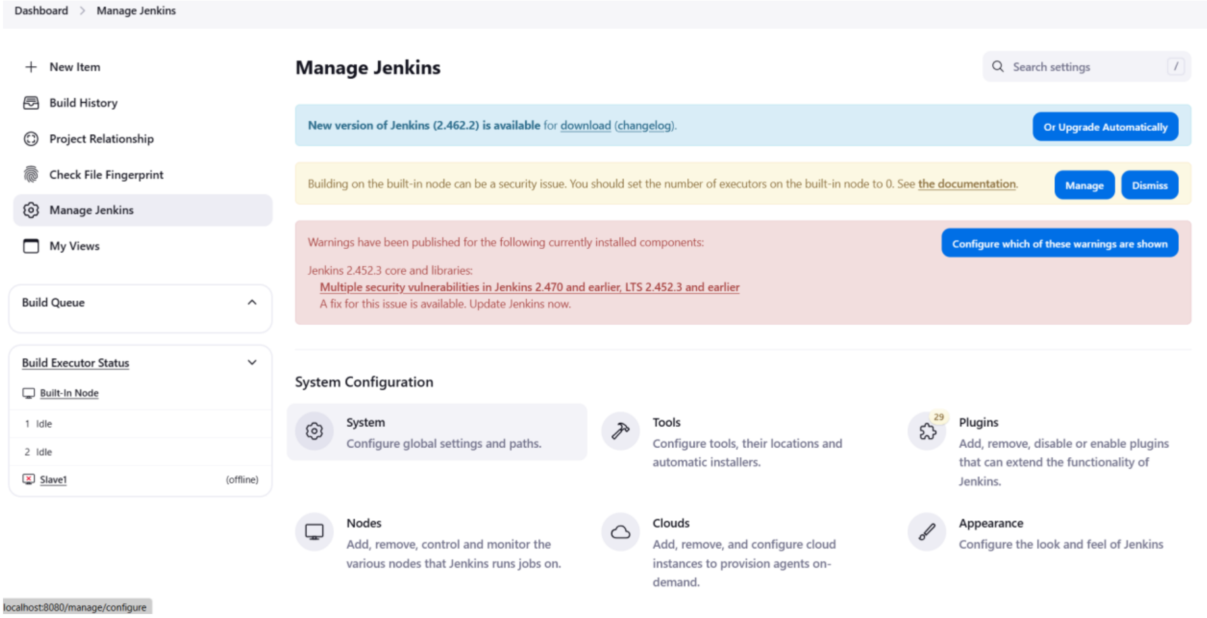
sona

- Updates
- Available plugins
- Installed plugins
- Advanced settings

Name ↓	Enabled	
SonarQube Scanner for Jenkins 2.17.2 This plugin allows an easy integration of SonarQube, the open source platform for Continuous Inspection of code quality. Report an issue with this plugin	✓	⊗

REST API Jenkins 2.452.3

Step 5: Select Manage Jenkins, then select the System and then scroll down to SonarQube Server. Name the server as sonarqube and set the server url as http://localhost:9000/ then click on save.



Dashboard > Manage Jenkins

- New Item
- Build History
- Project Relationship
- Check File Fingerprint
- Manage Jenkins
- My Views

Build Queue

Build Executor Status

Built-In Node

1 Idle

2 Idle

Slave1 (offline)

Manage Jenkins

Search settings /

New version of Jenkins (2.462.2) is available for download (changelog). Or Upgrade Automatically

Building on the built-in node can be a security issue. You should set the number of executors on the built-in node to 0. See the documentation. Manage Dismiss

Warnings have been published for the following currently installed components: Configure which of these warnings are shown

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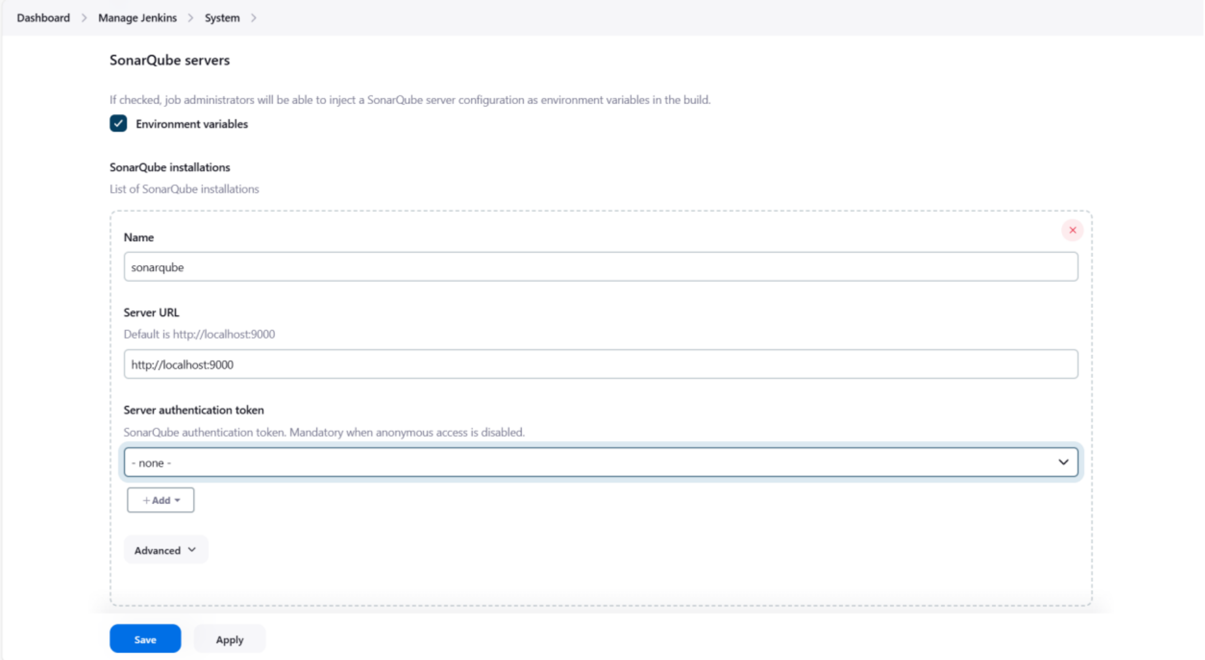
Appearance
Configure the look and feel of Jenkins

localhost:8080/manage/configure



SonarQube servers

If checked, job administrators will be able to inject a SonarQube server configuration as environment variables in the build.

☑ Environment variables

SonarQube installations

List of SonarQube installations

Name

sonarqube

Server URL

Default is http://localhost:9000

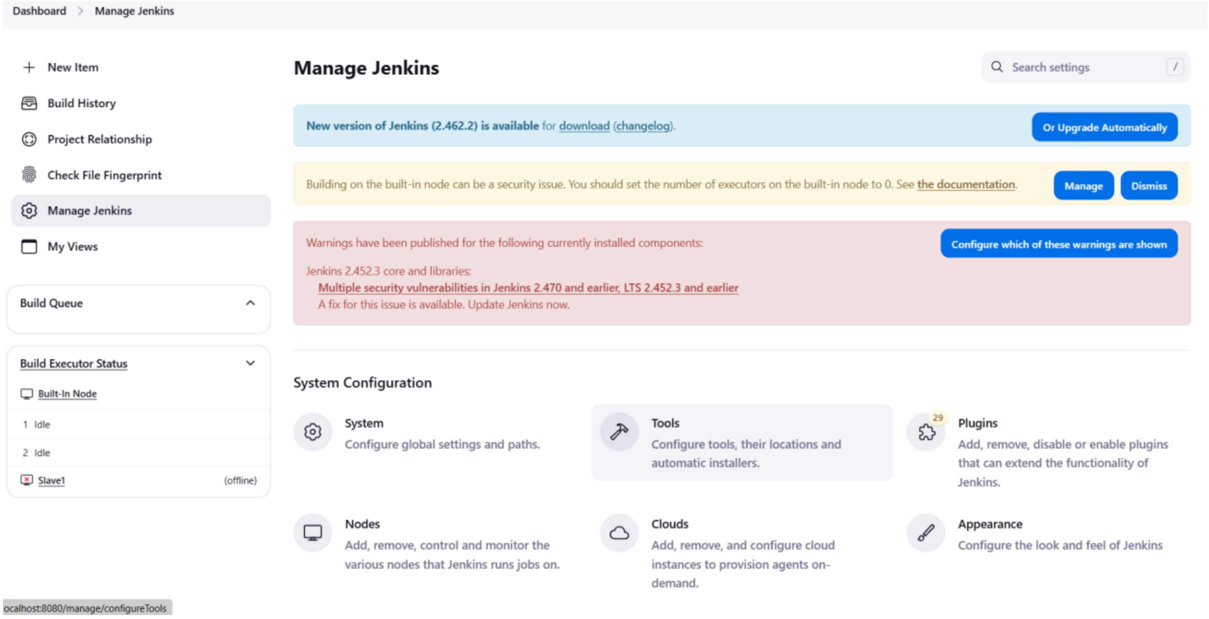
http://localhost:9000

Server authentication token

SonarQube authentication token. Mandatory when anonymous access is disabled.

- none -

Step 6: Go to Jenkins Dashboard and select Manage Jenkins, then select the Tools and then scroll down to SonarQube Scanner installations. Name the sonarqube scanner as sonarqubescanner and select install automatically then click on save.



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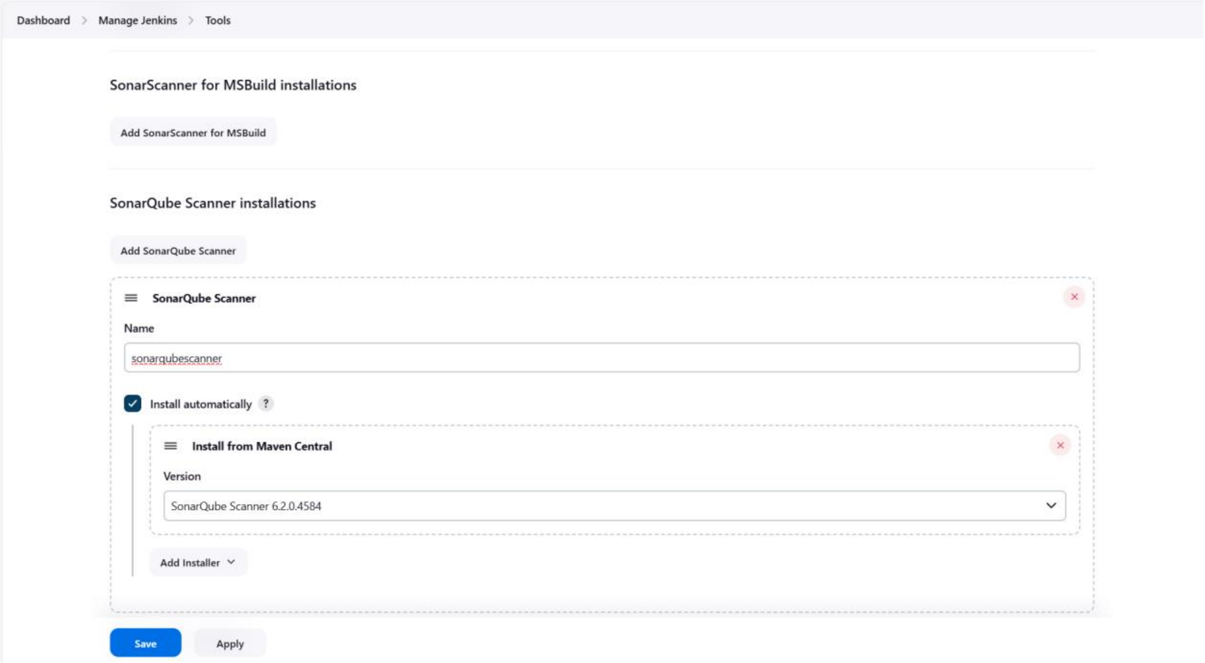
Appearance

Configure the look and feel of Jenkins

ocalhost:8080/manage/configureTools



Dashboard > Manage Jenkins > Tools

SonarScanner for MSBuild installations

Add SonarScanner for MSBuild

SonarQube Scanner installations

Add SonarQube Scanner

SonarQube Scanner

Name: sonarqubescanner

☑ Install automatically ?

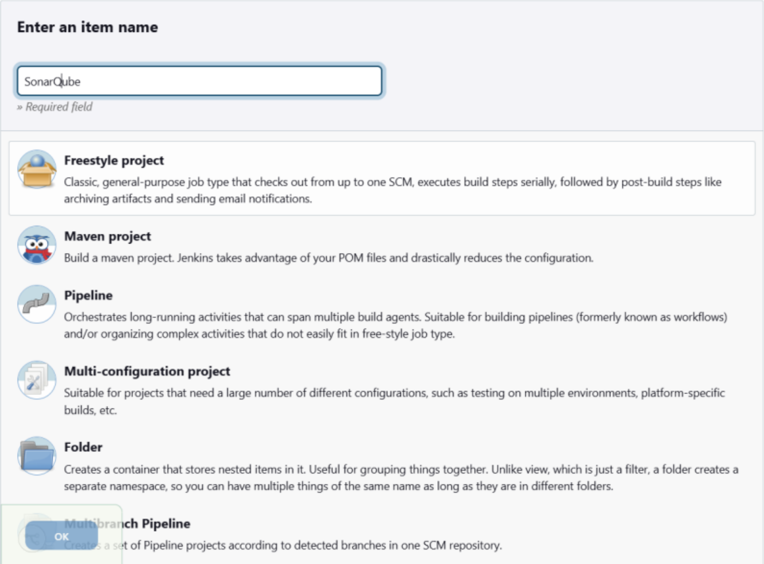
Install from Maven Central

Version: SonarQube Scanner 6.2.0.4584

Add Installer

Save Apply

Step 7: Go to Jenkins dashboard and click on New Item and select Freestyle project and name it as SonarQube and then click on ok.



Enter an item name

SonarQube

» Required field

Freestyle project
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

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.

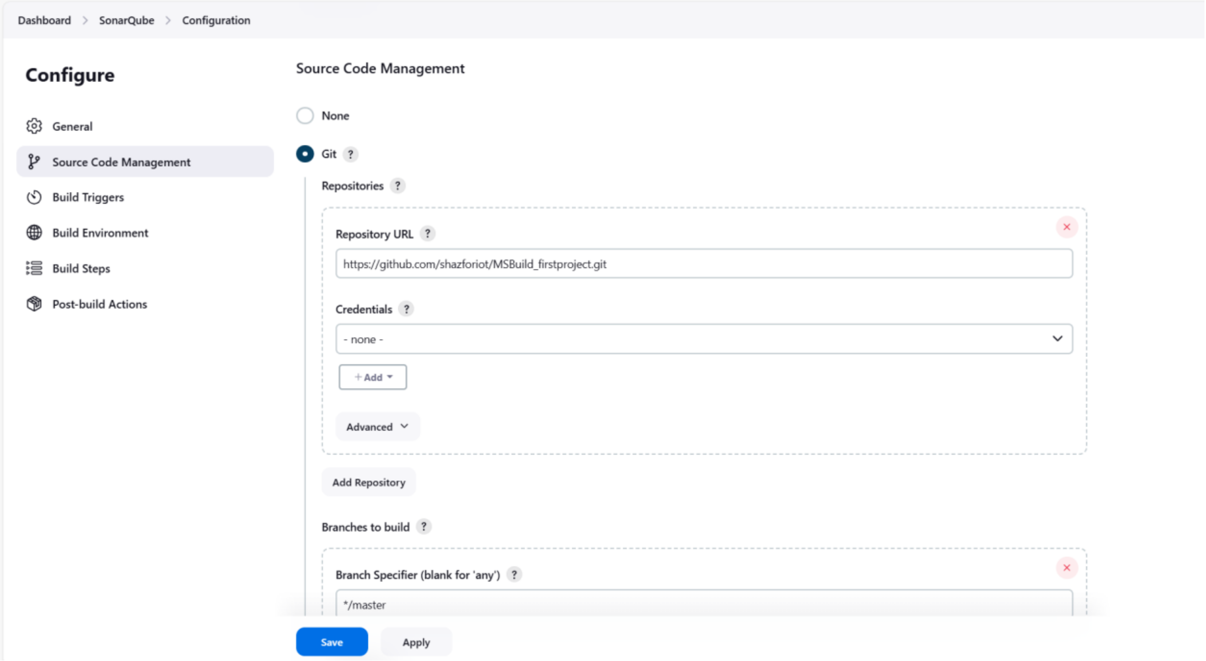
Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

OK

Step 8: For configuration, Select git and paste the following git repository in the repository url.
https://github.com/shazforiot/MSBuild_firstproject
This is a simple Hello world project



Source Code Management

○ None

● Git

Repositories

Repository URL: https://github.com/shazforiot/MSBuild_firstproject.git

Credentials: - none -

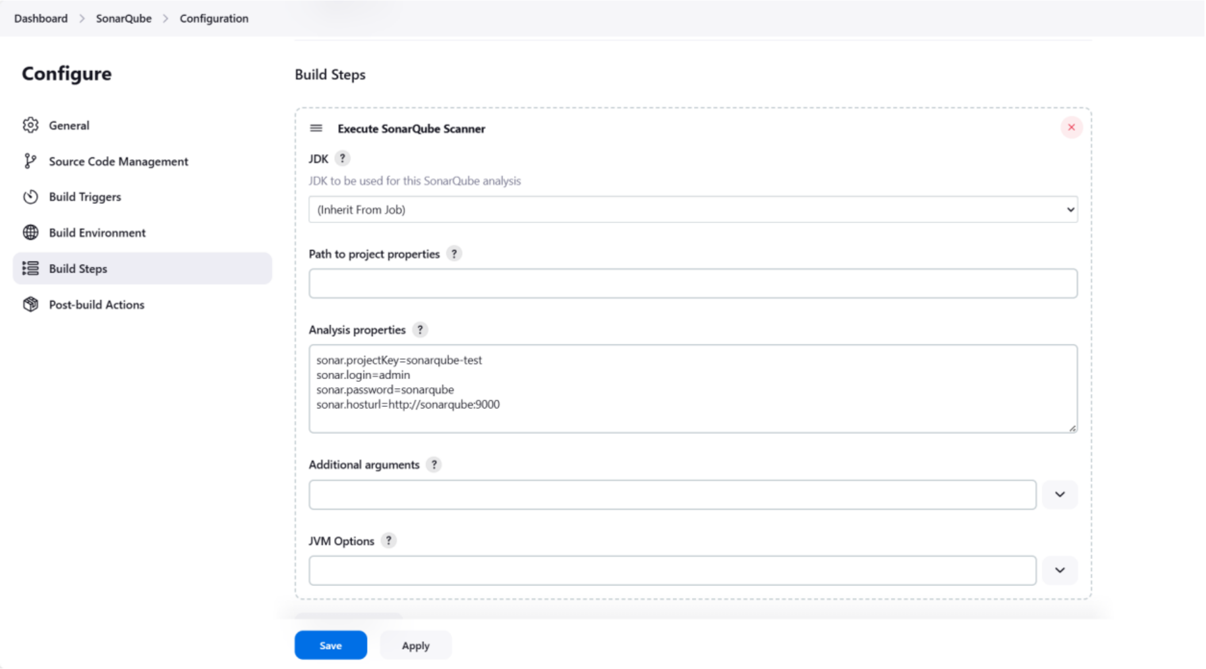
Branches to build

Branch Specifier (blank for 'any'): */master

Step 9: Under the Build steps select "Execute SonarQube Scanner" option and under Analysis Properties write the following -

sonar.projectKey=sonarqube-test
sonar.login=admin
sonar.password=sonarqube
sonar.hosturl=http://sonarqube:9000

Then click on the save button.



Build Steps

Execute SonarQube Scanner

JDK
JDK to be used for this SonarQube analysis
(Inherit From Job)

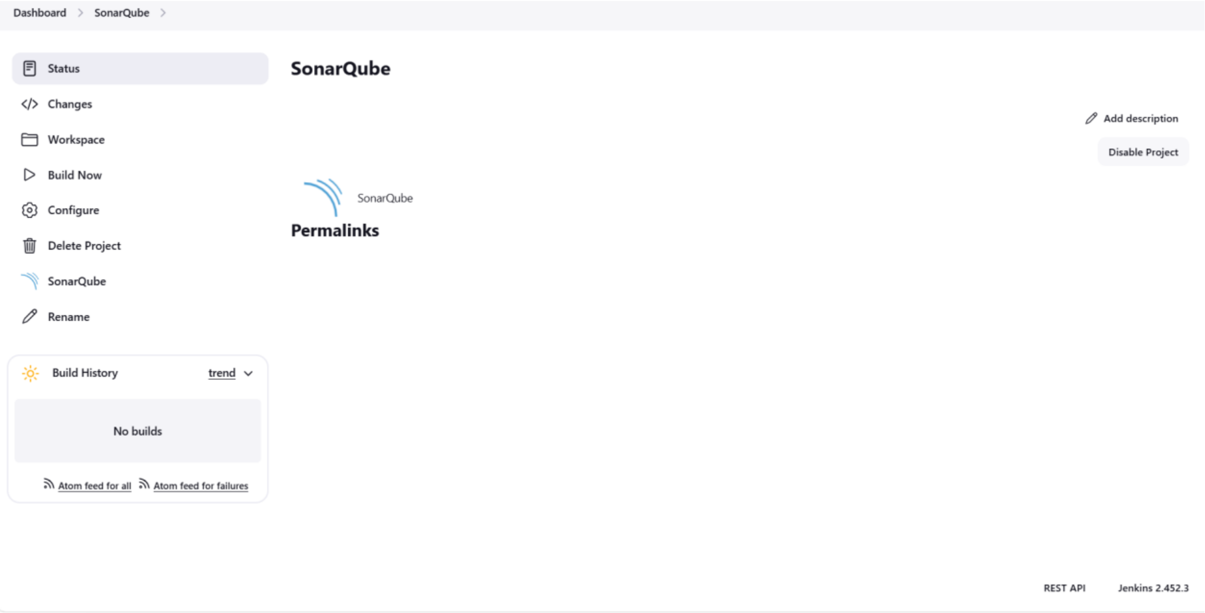
Path to project properties

Analysis properties

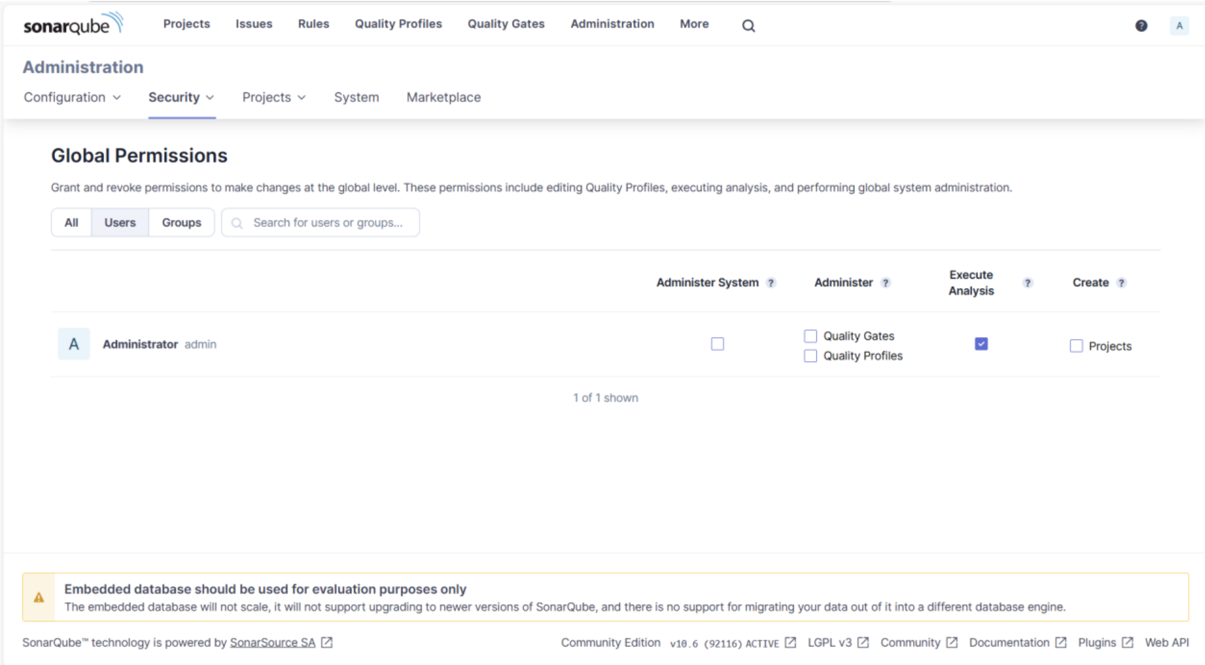
```
sonar.projectKey=sonarqube-test
sonar.login=admin
sonar.password=sonarqube
sonar.hosturl=http://sonarqube:9000
```

Additional arguments

JVM Options



Step 10: Visit http://localhost:9000/admin/permissions and select the Users tab and for Administrator select the checkbox Execute Analysis.



Global Permissions

Grant and revoke permissions to make changes at the global level. These permissions include editing Quality Profiles, executing analysis, and performing global system administration.

	Administer System	Administer	Execute Analysis	Create
A Administrator admin	□	□ Quality Gates □ Quality Profiles	☑	□ Projects

1 of 1 shown

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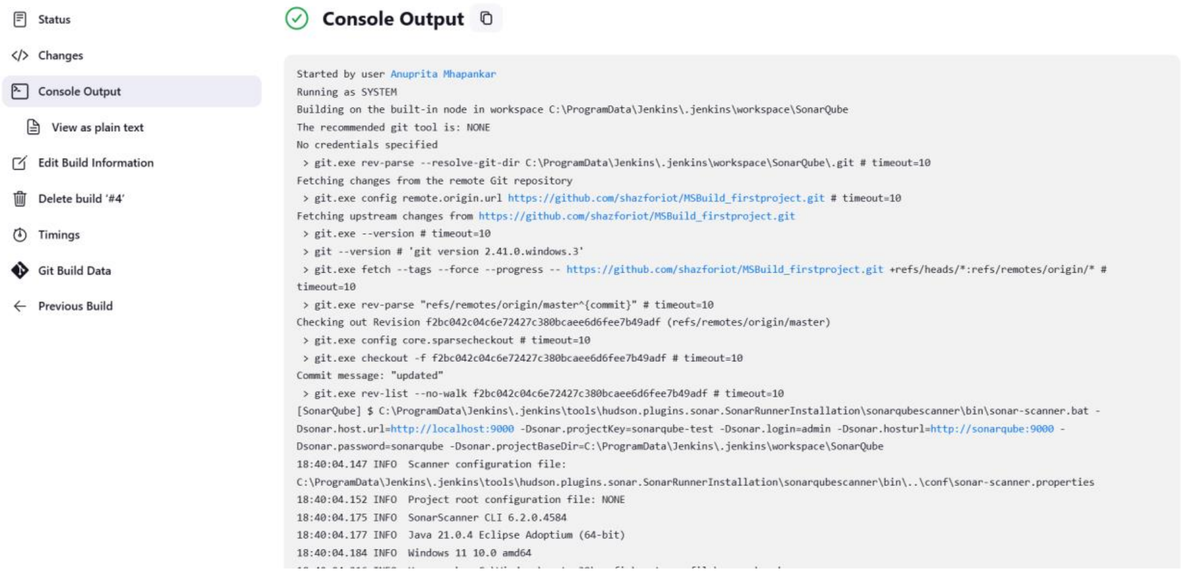
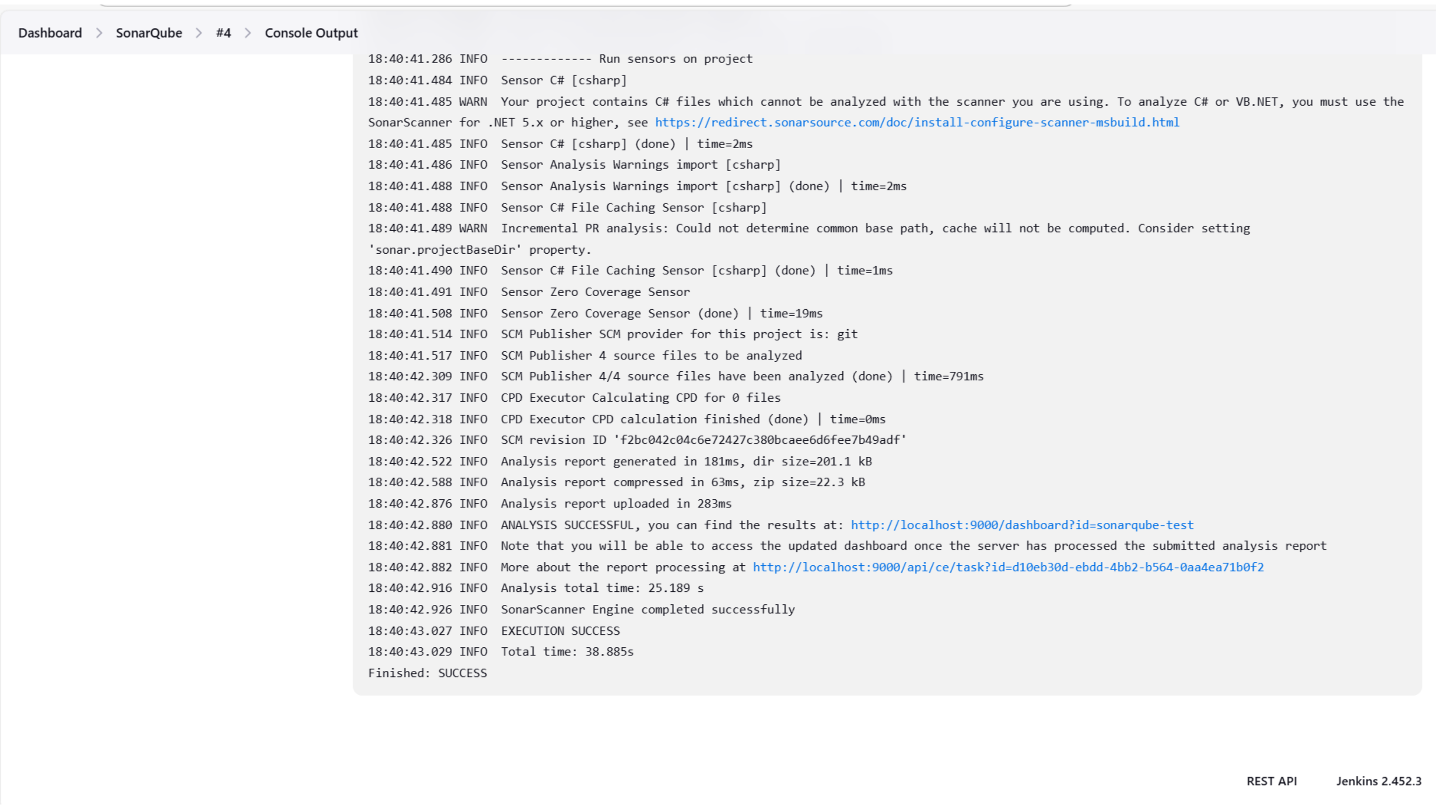
Step 11: Now, come back to Jenkins and click on Build Now. The build is success.

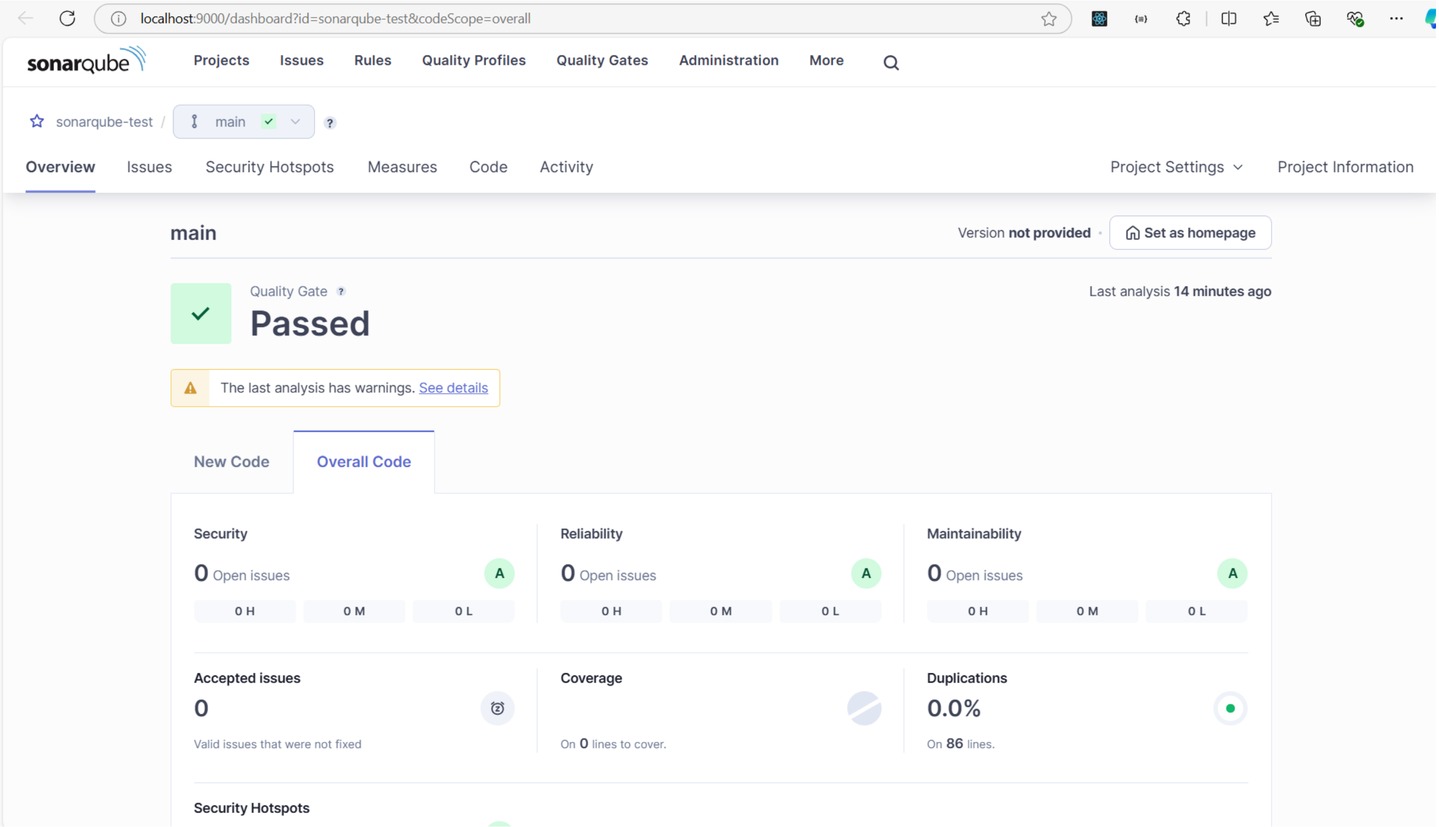


```
Started by user Anuprita Mhapankar
Running as SYSTEM
Building on the built-in node in workspace C:\ProgramData\Jenkins\.jenkins\workspace\SonarQube
The recommended git tool is: NONE
No credentials specified
 > git.exe rev-parse --resolve-git-dir C:\ProgramData\Jenkins\.jenkins\workspace\SonarQube\.git # timeout=10
Fetching changes from the remote Git repository
 > git.exe config remote.origin.url https://github.com/shazforiot/MSBuild_firstproject.git # timeout=10
Fetching upstream changes from https://github.com/shazforiot/MSBuild_firstproject.git
 > git.exe --version # timeout=10
 > git --version # 'git version 2.41.0.windows.3'
 > git.exe fetch --tags --force --progress -- https://github.com/shazforiot/MSBuild_firstproject.git +refs/heads/*:refs/remotes/origin/* #
timeout=10
 > git.exe rev-parse "refs/remotes/origin/master^{commit}" # timeout=10
Checking out Revision f2bc042c04c6e72427c380bcaee6d6fee7b49adf (refs/remotes/origin/master)
 > git.exe config core.sparsecheckout # timeout=10
 > git.exe checkout -f f2bc042c04c6e72427c380bcaee6d6fee7b49adf # timeout=10
Commit message: "updated"
 > git.exe rev-list --no-walk f2bc042c04c6e72427c380bcaee6d6fee7b49adf # timeout=10
[SonarQube] $ C:\ProgramData\Jenkins\.jenkins\tools\hudson.plugins.sonar.SonarRunnerInstallation\sonarqubescanner\bin\sonar-scanner.bat -
Dsonar.host.url=http://localhost:9000 -Dsonar.projectKey=sonarqube-test -Dsonar.login=admin -Dsonar.hosturl=http://sonarqube:9000 -
Dsonar.password=sonarqube -Dsonar.projectBaseDir=C:\ProgramData\Jenkins\.jenkins\workspace\SonarQube
18:40:04.147 INFO  Scanner configuration file:
C:\ProgramData\Jenkins\.jenkins\tools\hudson.plugins.sonar.SonarRunnerInstallation\sonarqubescanner\bin\..\conf\sonar-scanner.properties
18:40:04.152 INFO  Project root configuration file: NONE
18:40:04.175 INFO  SonarScanner CLI 6.2.0.4584
18:40:04.177 INFO  Java 21.0.4 Eclipse Adoptium (64-bit)
18:40:04.184 INFO  Windows 11 10.0 amd64
```



```
18:40:41.286 INFO  ------------- Run sensors on project
18:40:41.484 INFO  Sensor C# [csharp]
18:40:41.485 WARN  Your project contains C# files which cannot be analyzed with the scanner you are using. To analyze C# or VB.NET, you must use the
SonarScanner for .NET 5.x or higher, see https://redirect.sonarsource.com/doc/install-configure-scanner-msbuild.html
18:40:41.485 INFO  Sensor C# [csharp] (done) | time=2ms
18:40:41.486 INFO  Sensor Analysis Warnings import [csharp]
18:40:41.488 INFO  Sensor Analysis Warnings import [csharp] (done) | time=2ms
18:40:41.488 INFO  Sensor C# File Caching Sensor [csharp]
18:40:41.489 WARN  Incremental PR analysis: Could not determine common base path, cache will not be computed. Consider setting
'sonar.projectBaseDir' property.
18:40:41.490 INFO  Sensor C# File Caching Sensor [csharp] (done) | time=1ms
18:40:41.491 INFO  Sensor Zero Coverage Sensor
18:40:41.508 INFO  Sensor Zero Coverage Sensor (done) | time=19ms
18:40:41.514 INFO  SCM Publisher SCM provider for this project is: git
18:40:41.517 INFO  SCM Publisher 4 source files to be analyzed
18:40:42.309 INFO  SCM Publisher 4/4 source files have been analyzed (done) | time=791ms
18:40:42.317 INFO  CPD Executor Calculating CPD for 0 files
18:40:42.318 INFO  CPD Executor CPD calculation finished (done) | time=0ms
18:40:42.326 INFO  SCM revision ID 'f2bc042c04c6e72427c380bcaee6d6fee7b49adf'
18:40:42.522 INFO  Analysis report generated in 181ms, dir size=201.1 kB
18:40:42.588 INFO  Analysis report compressed in 63ms, zip size=22.3 kB
18:40:42.876 INFO  Analysis report uploaded in 283ms
18:40:42.880 INFO  ANALYSIS SUCCESSFUL, you can find the results at: http://localhost:9000/dashboard?id=sonarqube-test
18:40:42.881 INFO  Note that you will be able to access the updated dashboard once the server has processed the submitted analysis report
18:40:42.882 INFO  More about the report processing at http://localhost:9000/api/ce/task?id=d10eb30d-ebdd-4bb2-b564-0aa4ea71b0f2
18:40:42.916 INFO  Analysis total time: 25.189 s
18:40:42.926 INFO  SonarScanner Engine completed successfully
18:40:43.027 INFO  EXECUTION SUCCESS
18:40:43.029 INFO  Total time: 38.885s
Finished: SUCCESS
```

Step 12: Visit the following URL to see the result - http://localhost:9000/dashboard?id=sonarqube-test&codeScope=overall



main

Version **not provided** · Set as homepage

Quality Gate

Passed

Last analysis **14 minutes ago**

The last analysis has warnings. See details

New Code | Overall Code

Security
0 Open issues A
0 H | 0 M | 0 L

Reliability
0 Open issues A
0 H | 0 M | 0 L

Maintainability
0 Open issues A
0 H | 0 M | 0 L

Accepted issues
0
Valid issues that were not fixed

Coverage
On **0** lines to cover.

Duplications
0.0%
On **86** lines.

Security Hotspots