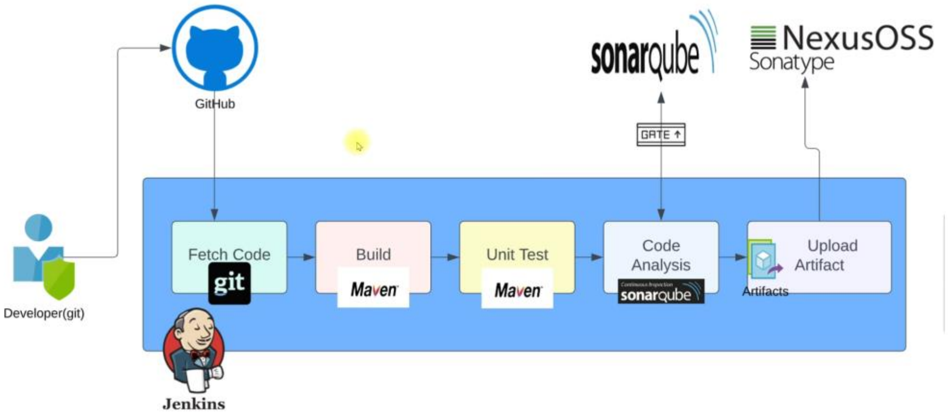
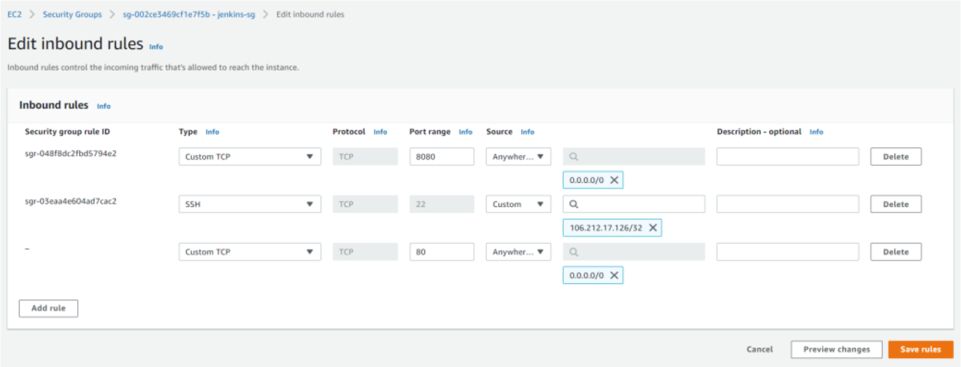
Continuous Integration with Jenkins Pipeline

This CI Pipeline project fetch the code from git repository on commit, generate the build, perform unit test, Code analysis with Sonar qube and finally upload the artifacts in Nexus.

In this project we created three VM's, each one for Jenkins, Sonarqube and Nexus. In sonarqube we have defined the quality gates to check the number of bugs based on it will continue the pipeline. Configured Slack for success or failure notifications.



1. Create a security group and key pair for EC2 – jenkins server,



EC2 > Security Groups > sg-002ce3469cf1e7f5b - jenkins-sg > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

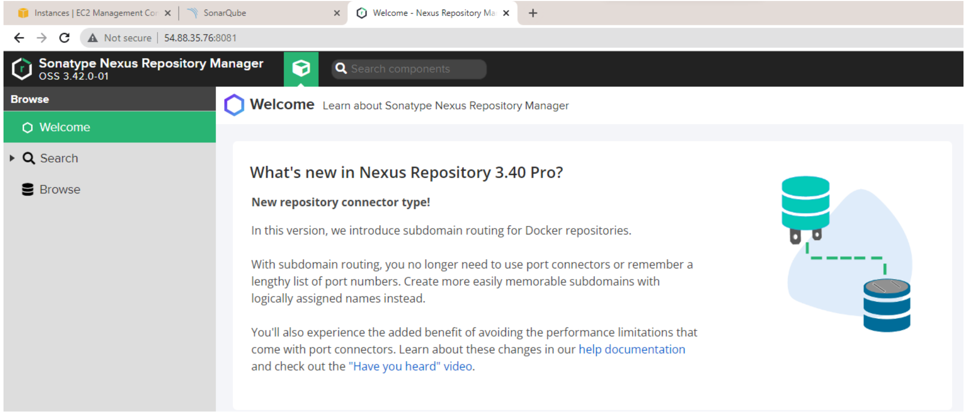
Inbound rules Info

Security group rule ID	Type	Protocol	Port range	Source		Description - optional	
sgr-048f8dc2fbd5794e2	Custom TCP	TCP	8080	Anywher...	0.0.0.0/0		Delete
sgr-03eaa4e604ad7cac2	SSH	TCP	22	Custom	106.212.17.126/32		Delete
–	Custom TCP	TCP	80	Anywher...	0.0.0.0/0		Delete

2. Jenkins server - Create a EC2 machine (ubuntu- t2 micro) with the user data present in the repo.

3. Nexus server setup – Create a EC2 machine (Cent OS)

Choose t2 medium machine, and security group should allow 80 and 8081 traffic. Add user data present in the repo file. Check system status. Check nexus in 8081.



Instances | EC2 Management Co
SonarQube
Welcome - Nexus Repository Ma
Not secure | 54.88.35.76:8081
Sonatype Nexus Repository Manager
OSS 3.42.0-01
Search components
Browse
Welcome
Search
Browse

Welcome Learn about Sonatype Nexus Repository Manager

What's new in Nexus Repository 3.40 Pro?

New repository connector type!

In this version, we introduce subdomain routing for Docker repositories.

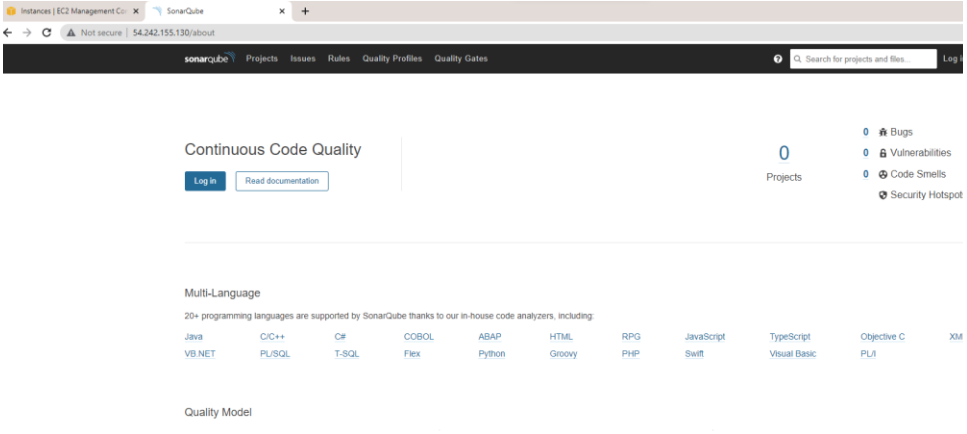
With subdomain routing, you no longer need to use port connectors or remember a lengthy list of port numbers. Create more easily memorable subdomains with logically assigned names instead.

You'll also experience the added benefit of avoiding the performance limitations that come with port connectors. Learn about these changes in our help documentation and check out the "Have you heard" video.

Get nexus password from cat /opt/nexus/sonatype-work/nexus3/admin.password and login into it.

4. Sonarqube server setup – Create a EC2 machine (Ubuntu 18)

Choose t2 medium machine and security group should allow traffic from port 80 and 9000 from anywhere. Add user data present in the repo file. Launch instance. Login ssh and check systemctl status sonarqube. Check in port 80 or 9000. User name and pwd is both admin



Continuous Code Quality

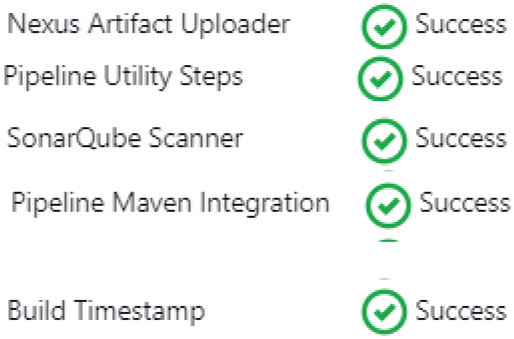
Multi-Language

20+ programming languages are supported by SonarQube thanks to our in-house code analyzers, including:

Java C/C++ C# COBOL ABAP HTML RPG JavaScript TypeScript Objective C XM
VB.NET PL/SQL T-SQL Flex Python Groovy PHP Swift Visual Basic PL/I

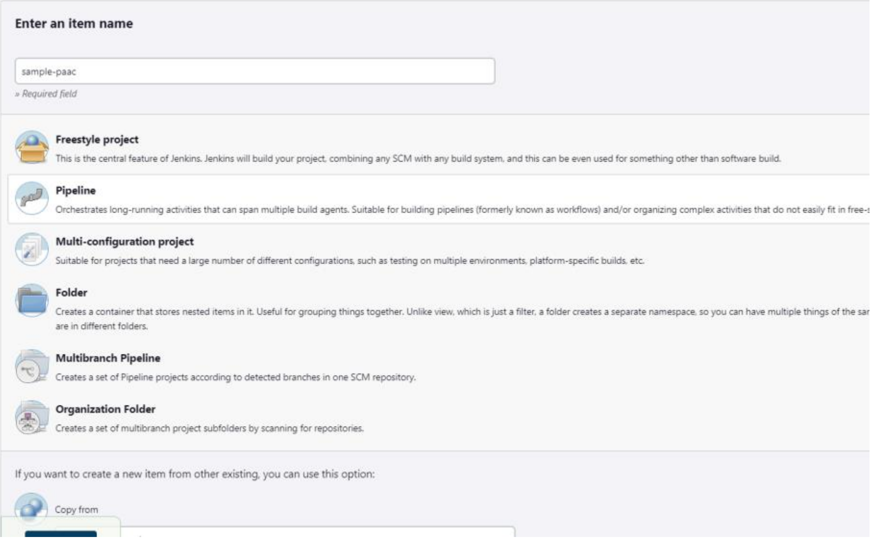
Quality Model

5. Install all these below plugins via manage plugins



Nexus Artifact Uploader	✓ Success
Pipeline Utility Steps	✓ Success
SonarQube Scanner	✓ Success
Pipeline Maven Integration	✓ Success
Build Timestamp	✓ Success

6. Create a pipeline project, and select pipeline code option, paste the code in the repo, ‘MyFirstpipeline’



Enter an item name

sample-paac

» *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.

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-s

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 sar are in different folders.

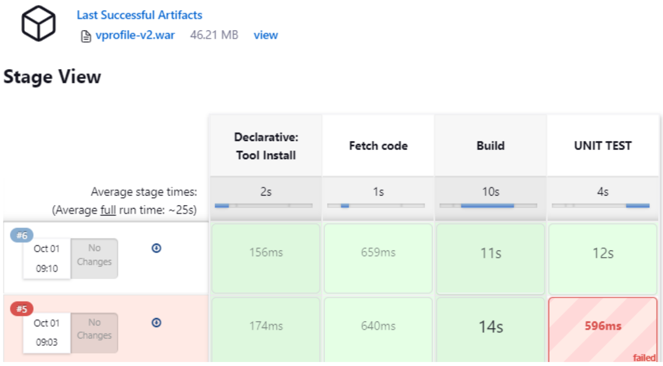
Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

Organization Folder
Creates a set of multibranch project subfolders by scanning for repositories.

If you want to create a new item from other existing, you can use this option:

Copy from

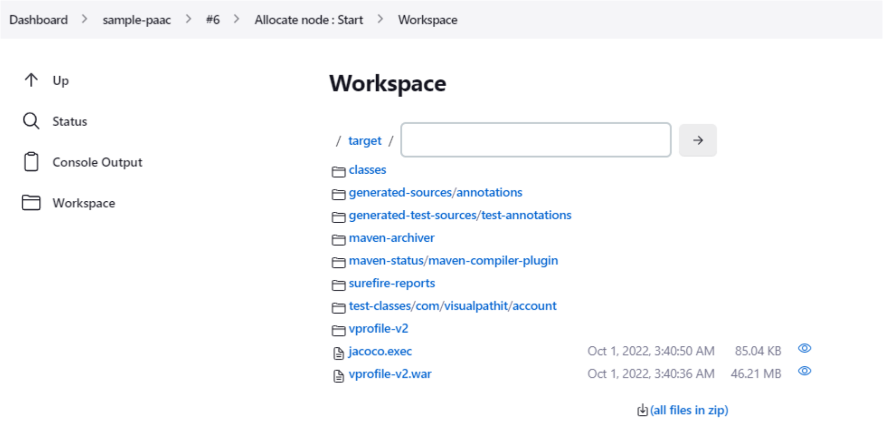
And the build will looks like this,



Last Successful Artifacts
vprofile-v2.war 46.21 MB view

Stage View

	Declarative: Tool Install	Fetch code	Build	UNIT TEST
Average stage times: (Average full run time: ~25s)	2s	1s	10s	4s
#6 Oct 01 09:10 No Changes	156ms	659ms	11s	12s
#5 Oct 01 09:03 No Changes	174ms	640ms	14s	596ms failed



Dashboard > sample-paac > #6 > Allocate node : Start > Workspace

Workspace

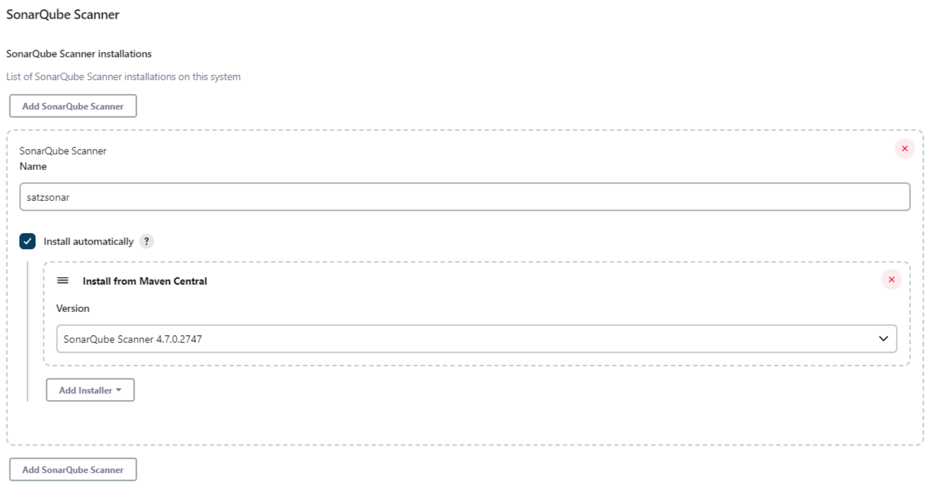
/ target /

classes
generated-sources/annotations
generated-test-sources/test-annotations
maven-archiver
maven-status/maven-compiler-plugin
surefire-reports
test-classes/com/visualpathit/account
vprofile-v2
jacoco.exec Oct 1, 2022, 3:40:50 AM 85.04 KB
vprofile-v2.war Oct 1, 2022, 3:40:36 AM 46.21 MB

(all files in zip)

7. Configure Sonar on jenkins

a. In the global tool configuration selects sonar qube server,



SonarQube Scanner

SonarQube Scanner installations

List of SonarQube Scanner installations on this system

SonarQube Scanner

Name: satzsonar

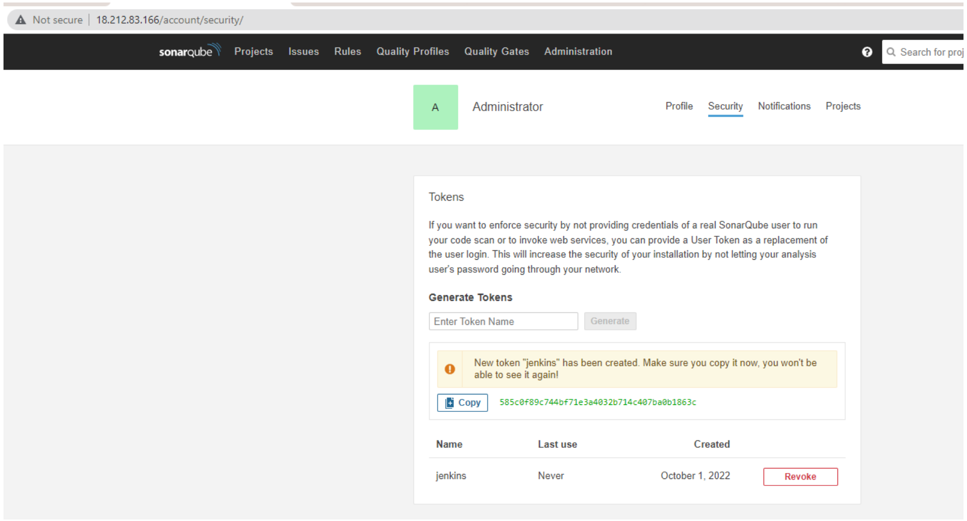
☑ Install automatically

Install from Maven Central

Version: SonarQube Scanner 4.7.0.2747

In sonarqube portal generate credentials,

sonar->myaccount->security->Generate token



Not secure | 18.212.83.166/account/security/

Tokens

If you want to enforce security by not providing credentials of a real SonarQube user to run your code scan or to invoke web services, you can provide a User Token as a replacement of the user login. This will increase the security of your installation by not letting your analysis user's password going through your network.

Generate Tokens

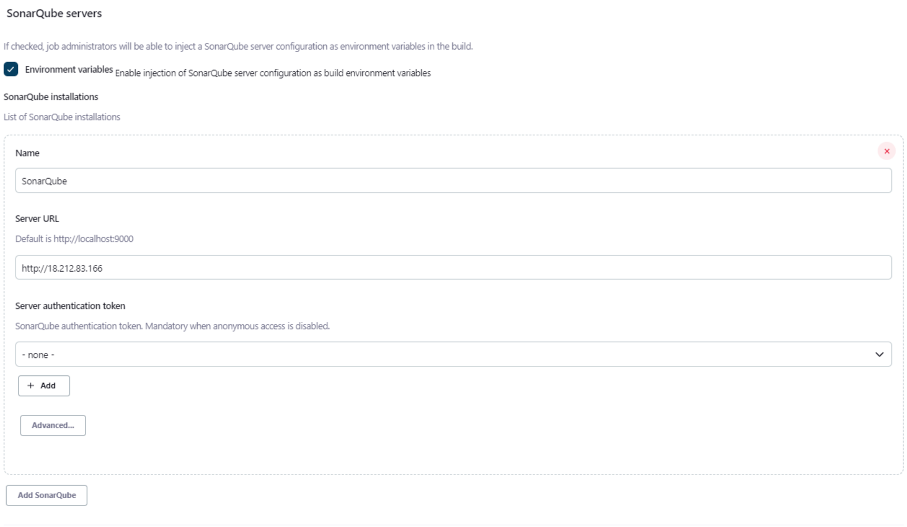
New token "jenkins" has been created. Make sure you copy it now, you won't be able to see it again!

```
585c0f89c744bf71e3a4032b714c407ba0b1863c
```

Name	Last use	Created	
jenkins	Never	October 1, 2022	Revoke

9. In configure system, select sonarQube servers and add (select jenkins) , add secret.

Now select the auth token that created.



SonarQube servers

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

☑ Environment variables Enable injection of SonarQube server configuration as build environment variables

SonarQube installations

List of SonarQube installations

Name

SonarQube

Server URL

Default is http://localhost:9000

http://18.212.83.166

Server authentication token

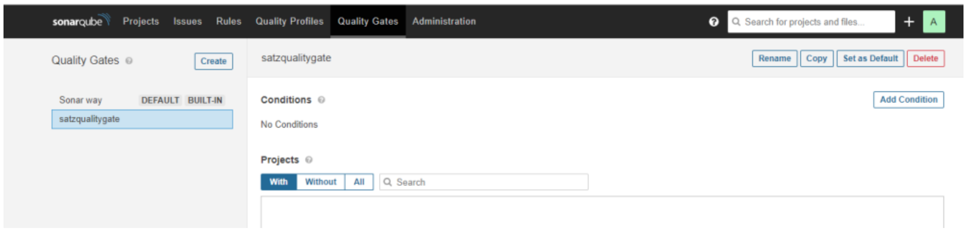
SonarQube authentication token. Mandatory when anonymous access is disabled.

- none -

10. Now create a pipeline project that call sonarQube, and get the sonarqube output.

Refer PAAC_Sonar_QualityGates.

11. Before that create a quality gate in sonarqube server, and add condition. Here system should throw error, if bugs greater than 60.



Quality Gates

Sonar way DEFAULT BUILT-IN

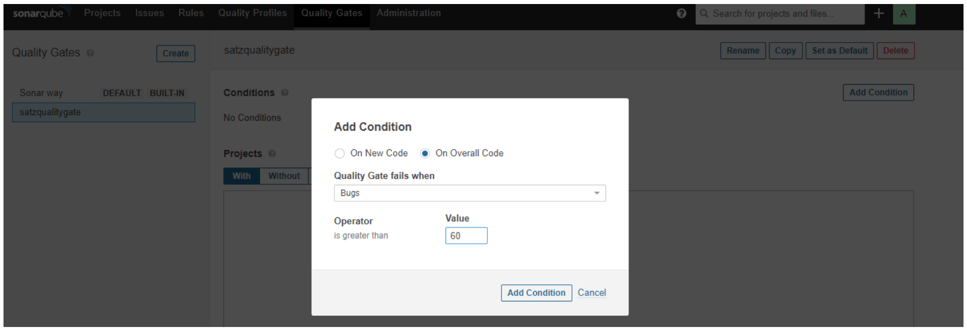
satzqualitygate

satzqualitygate

Conditions

No Conditions

Projects



Add Condition

○ On New Code ● On Overall Code

Quality Gate fails when

Bugs

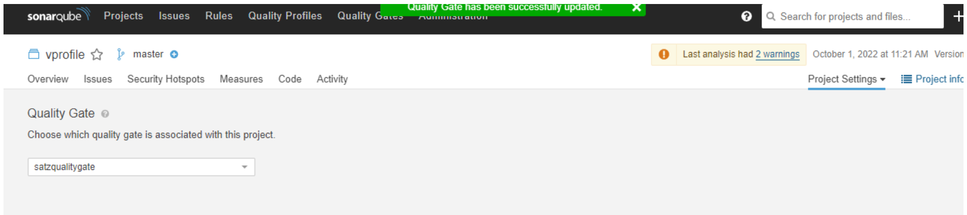
Operator

is greater than

Value

60

12. Now go to project, and in project setting link the new quality gate and add it.



Quality Gate has been successfully updated.

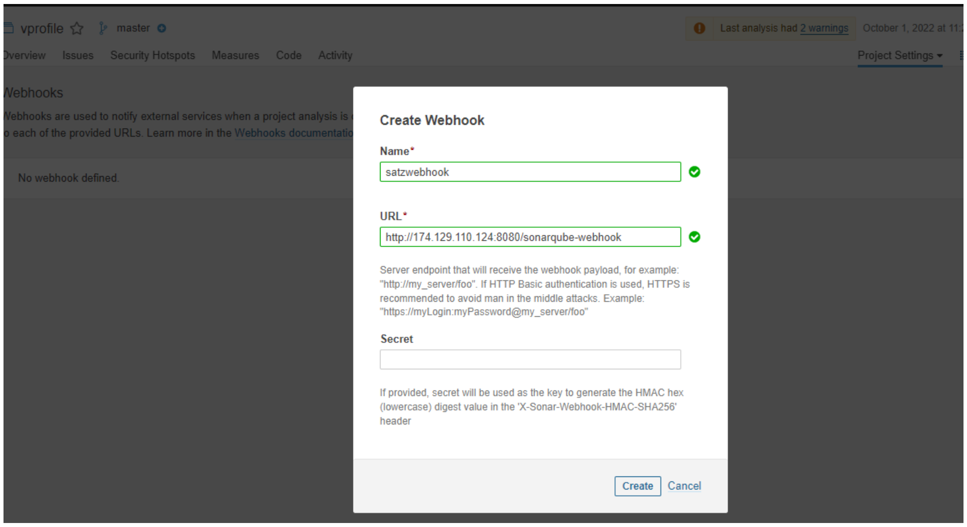
Last analysis had 2 warnings October 1, 2022 at 11:21 AM Version

Quality Gate

Choose which quality gate is associated with this project.

satzqualitygate

13. In project setting add webhook (for jenkins url), so that sonarqube will send info to Jenkins



Last analysis had 2 warnings October 1, 2022 at 11:

Webhooks

Webhooks are used to notify external services when a project analysis is
to each of the provided URLs. Learn more in the Webhooks documentatio

No webhook defined.

Create Webhook

Name* satzwebhook

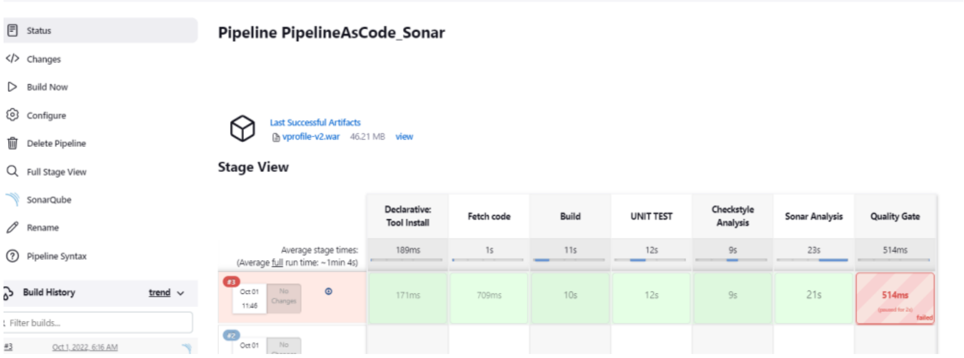
URL* http://174.129.110.124:8080/sonarqube-webhook

Server endpoint that will receive the webhook payload, for example: "http://my_server/foo". If HTTP Basic authentication is used, HTTPS is recommended to avoid man in the middle attacks. Example: "https://myLogin:myPassword@my_server/foo"

Secret

If provided, secret will be used as the key to generate the HMAC hex (lowercase) digest value in the 'X-Sonar-Webhook-HMAC-SHA256' header

14. Build is started and it got error, because quality gate check was failing; the bush we got was more than 60.



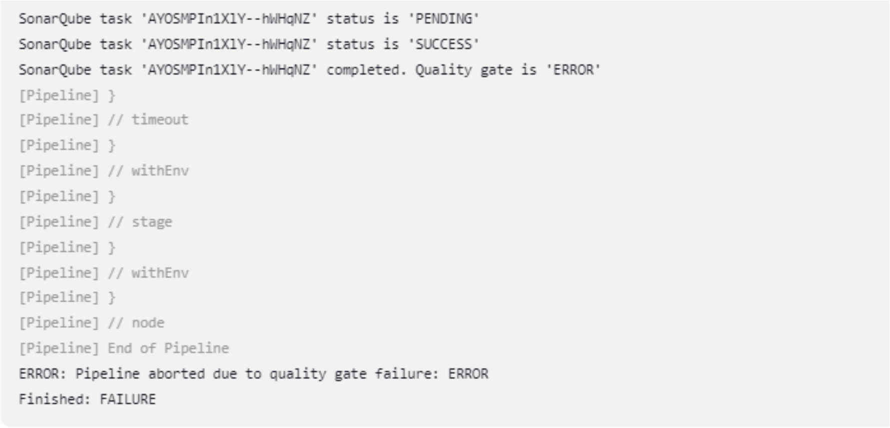
Pipeline PipelineAsCode_Sonar

vprofile-v2.war 46.21 MB

Stage View

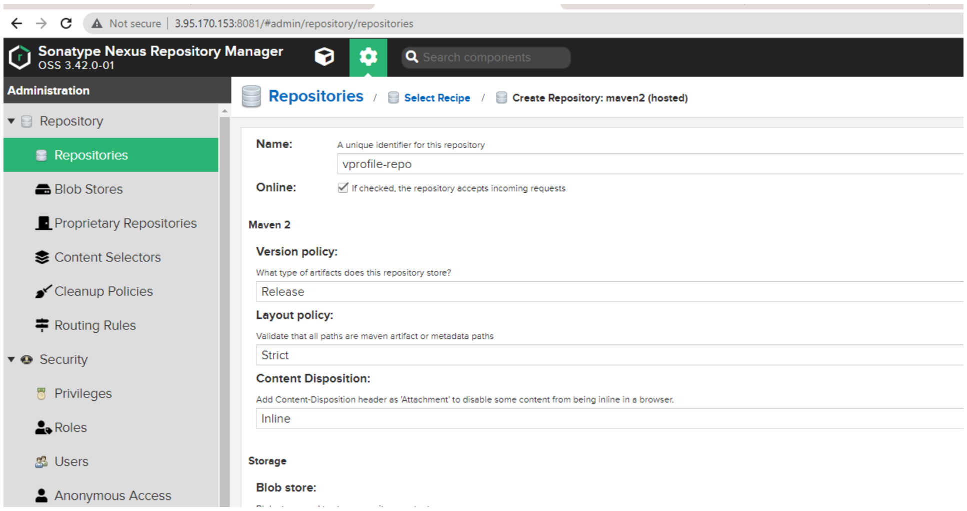
	Declarative: Tool Install	Fetch code	Build	UNIT TEST	Checkstyle Analysis	Sonar Analysis	Quality Gate
Average stage times: (Average full run time: ~1min 4s)	189ms	1s	11s	12s	9s	23s	514ms
#3 Oct 01 11:46 No Changes	171ms	709ms	10s	12s	9s	21s	514ms (paused for 2s) failed
#2 Oct 01 No Changes							

#3 Oct 1, 2022, 6:16 AM



```
SonarQube task 'AYOSMPIn1X1Y--hWHqNZ' status is 'PENDING'
SonarQube task 'AYOSMPIn1X1Y--hWHqNZ' status is 'SUCCESS'
SonarQube task 'AYOSMPIn1X1Y--hWHqNZ' completed. Quality gate is 'ERROR'
[Pipeline] }
[Pipeline] // timeout
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
ERROR: Pipeline aborted due to quality gate failure: ERROR
Finished: FAILURE
```

15. Login into nexus and create a new repository to store artifacts,



Name: A unique identifier for this repository
vprofile-repo

Online: ☑ If checked, the repository accepts incoming requests

Maven 2

Version policy:
What type of artifacts does this repository store?
Release

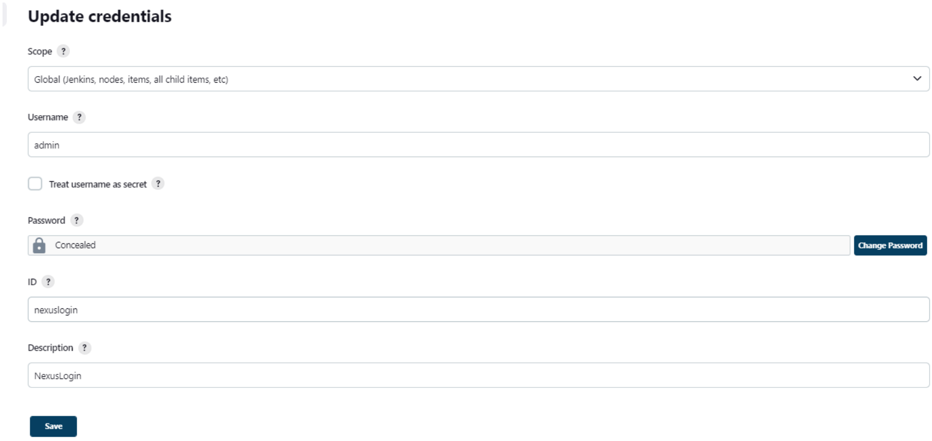
Layout policy:
Validate that all paths are maven artifact or metadata paths
Strict

Content Disposition:
Add Content-Disposition header as 'Attachment' to disable some content from being inline in a browser.
Inline

Storage

Blob store:

16. Create a nexus credentials in jenkins,



Update credentials

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

Username: admin

□ Treat username as secret

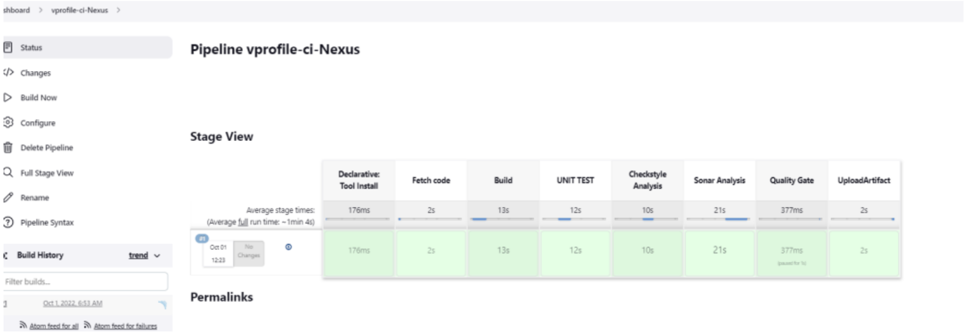
Password: Concealed

ID: nexuslogin

Description: NexusLogin

17. Create a pipeline with nexus stage in it, pipeline code is in repo - PAAC_Sonar_NexusFinal.

Make sure to update the public ip of nexus in the code, run the pipeline



Pipeline vprofile-ci-Nexus

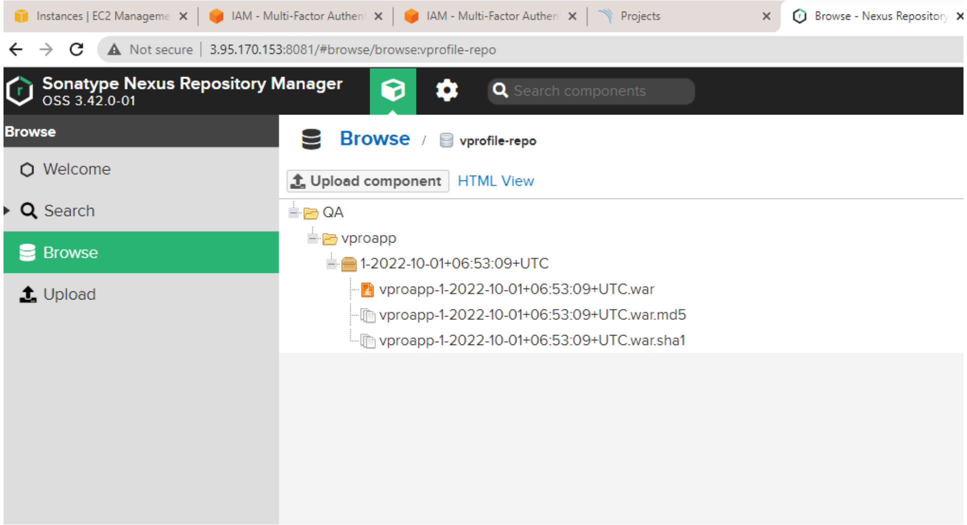
Stage View

	Declarative: Tool Install	Fetch code	Build	UNIT TEST	Checkstyle Analysis	Sonar Analysis	Quality Gate	UploadArtifact
Average stage times: (Average full run time: ~1min 4s)	176ms	2s	13s	12s	10s	21s	377ms	2s
#1 Oct 01 12:23 No Changes	176ms	2s	13s	12s	10s	21s	377ms (paused for 1s)	2s

Oct 1, 2022, 6:53 AM

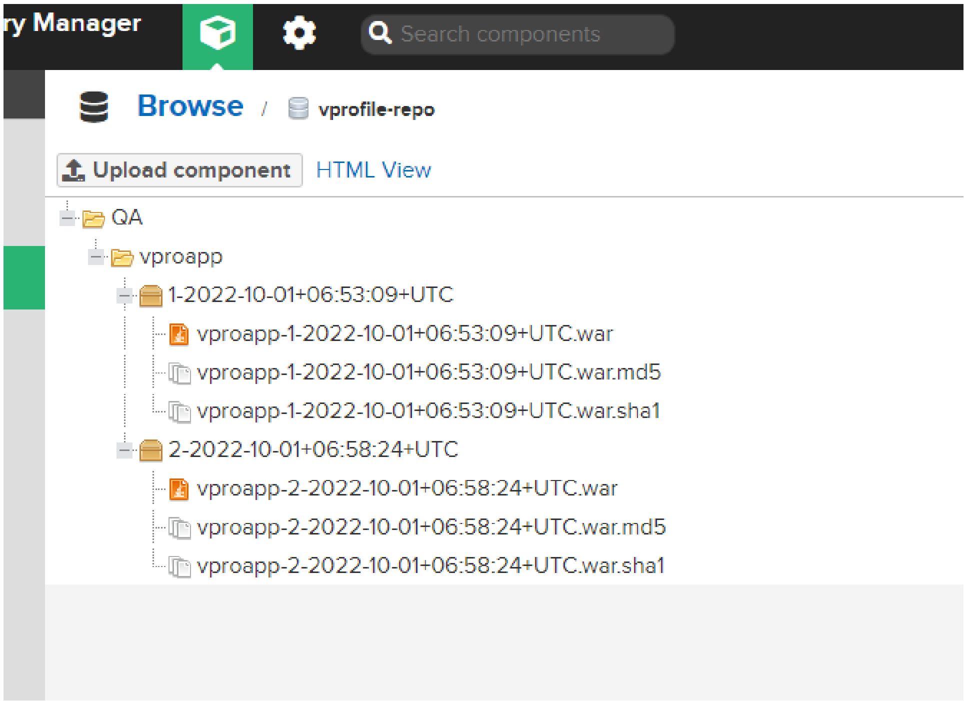
Permalinks

18. Once build is done, new artifacts will be created in nexus.


Instances | EC2 Manageme
IAM - Multi-Factor Authen
IAM - Multi-Factor Authen
Projects
Browse - Nexus Repository
Not secure
3.95.170.153:8081/#browse/browse:vprofile-repo
Sonatype Nexus Repository Manager
OSS 3.42.0-01
Search components
Browse
Welcome
Search
Browse
Upload
Browse / vprofile-repo
Upload component
HTML View

```
QA
  vproapp
    1-2022-10-01+06:53:09+UTC
      vproapp-1-2022-10-01+06:53:09+UTC.war
      vproapp-1-2022-10-01+06:53:09+UTC.war.md5
      vproapp-1-2022-10-01+06:53:09+UTC.war.sha1
```

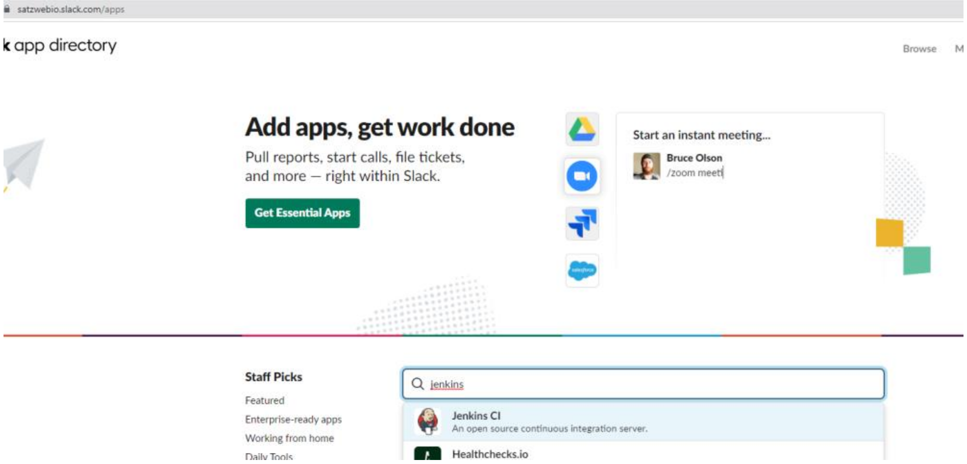
Second Build



```
QA
  vproapp
    1-2022-10-01+06:53:09+UTC
      vproapp-1-2022-10-01+06:53:09+UTC.war
      vproapp-1-2022-10-01+06:53:09+UTC.war.md5
      vproapp-1-2022-10-01+06:53:09+UTC.war.sha1
    2-2022-10-01+06:58:24+UTC
      vproapp-2-2022-10-01+06:58:24+UTC.war
      vproapp-2-2022-10-01+06:58:24+UTC.war.md5
      vproapp-2-2022-10-01+06:58:24+UTC.war.sha1
```

19. Notifications

Login slack and search for jenkins app,



satzwebio.slack.com/apps

k app directory

Add apps, get work done

Pull reports, start calls, file tickets, and more — right within Slack.

Start an instant meeting...

Bruce Olson
/zoom meet

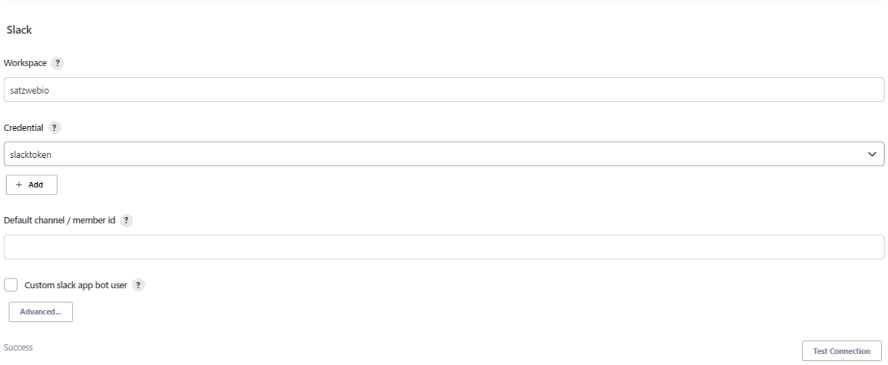
jenkins

Jenkins CI
An open source continuous integration server.

Healthchecks.io

In jenkins app, select the workspace and get the secret key from slack. Sve the setting

20. Now in jenkins, use the slack secret key and add credentials. Make sure to enter workspace and credential details as is., and test connection.



Slack

Workspace: satzwebio

Credential: slacktoken

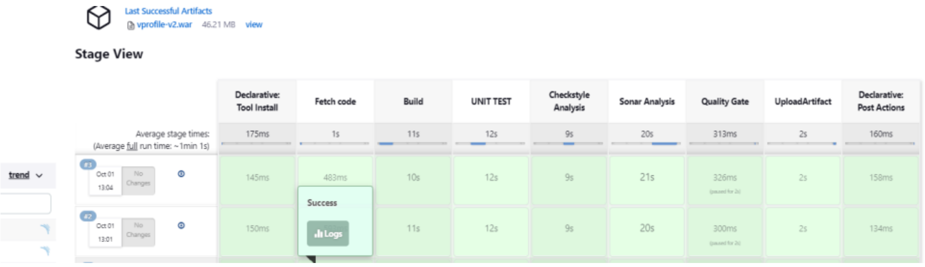
Default channel / member id:

□ Custom slack app bot user

Success

21. Get the latest pipeline code from repo : PAAC_Sonar_SlackFinal, and run the pipeline.

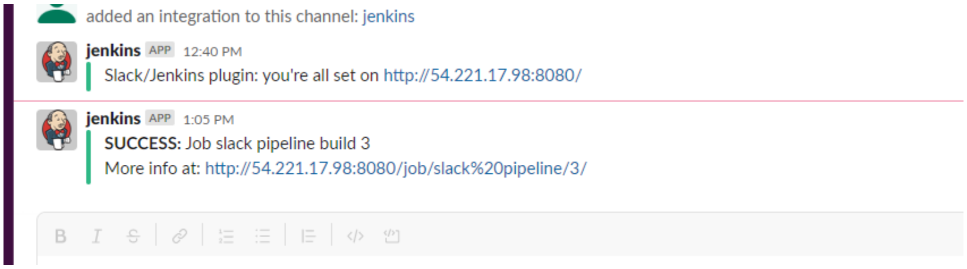
We will get the success notification in slack, If the build is success else failure.



Last Successful Artifacts
vprofile-v2.war 46.21 MB view

Stage View

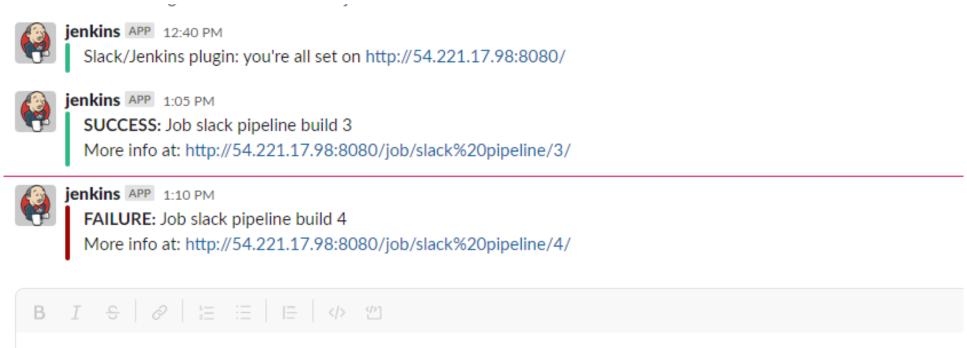
	Declarative: Tool Install	Fetch code	Build	UNIT TEST	Checkstyle Analysis	Sonar Analysis	Quality Gate	UploadArtifact	Declarative: Post Actions
Average stage times: (Average full run time: ~1min 1s)	175ms	1s	11s	12s	9s	20s	313ms	2s	160ms
#3 Oct 01 13:04 No Changes	145ms	483ms	10s	12s	9s	21s	326ms (paused for 2s)	2s	158ms
#2 Oct 01 13:01 No Changes	150ms	Success Logs	11s	12s	9s	20s	300ms (paused for 2s)	2s	134ms



added an integration to this channel: jenkins

jenkins APP 12:40 PM
Slack/Jenkins plugin: you're all set on http://54.221.17.98:8080/

jenkins APP 1:05 PM
SUCCESS: Job slack pipeline build 3
More info at: http://54.221.17.98:8080/job/slack%20pipeline/3/



jenkins APP 12:40 PM
Slack/Jenkins plugin: you're all set on http://54.221.17.98:8080/

jenkins APP 1:05 PM
SUCCESS: Job slack pipeline build 3
More info at: http://54.221.17.98:8080/job/slack%20pipeline/3/

jenkins APP 1:10 PM
FAILURE: Job slack pipeline build 4
More info at: http://54.221.17.98:8080/job/slack%20pipeline/4/