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(BYOD-1 Lab Practical)

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Part 1: Local SAST Analysis using SonarQube on VM

1. Virtual Machine Setup

```
ubuntu@ip-172-31-4-67: ~$ sudo apt-get update
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jimage to provide /usr/bin/jimage (jimage) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jinfo to provide /usr/bin/jinfo (jinfo) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jlink to provide /usr/bin/jlink (jlink) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jmap to provide /usr/bin/jmap (jmap) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jmod to provide /usr/bin/jmod (jmod) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jps to provide /usr/bin/jps (jps) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jrunscript to provide /usr/bin/jrunscript (jrunscript) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jshell to provide /usr/bin/jshell (jshell) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jstack to provide /usr/bin/jstack (jstack) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jstat to provide /usr/bin/jstat (jstat) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jstatd to provide /usr/bin/jstatd (jstatd) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/serialver to provide /usr/bin/serialver (serialver) in auto mode
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jhsdb to provide /usr/bin/jhsdb (jhsdb) in auto mode
Setting up openjdk-17-jre:amd64 (17.0.18+8-1-24.04.1) ...
Setting up openjdk-17-jdk:amd64 (17.0.18+8-1-24.04.1) ...
update-alternatives: using /usr/lib/jvm/java-17-openjdk-amd64/bin/jconsole to provide /usr/bin/jconsole (jconsole) in auto mode
Processing triggers for libc-bin (2.39-0ubuntu8.7) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...

Service restarts being deferred:
/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttyS0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

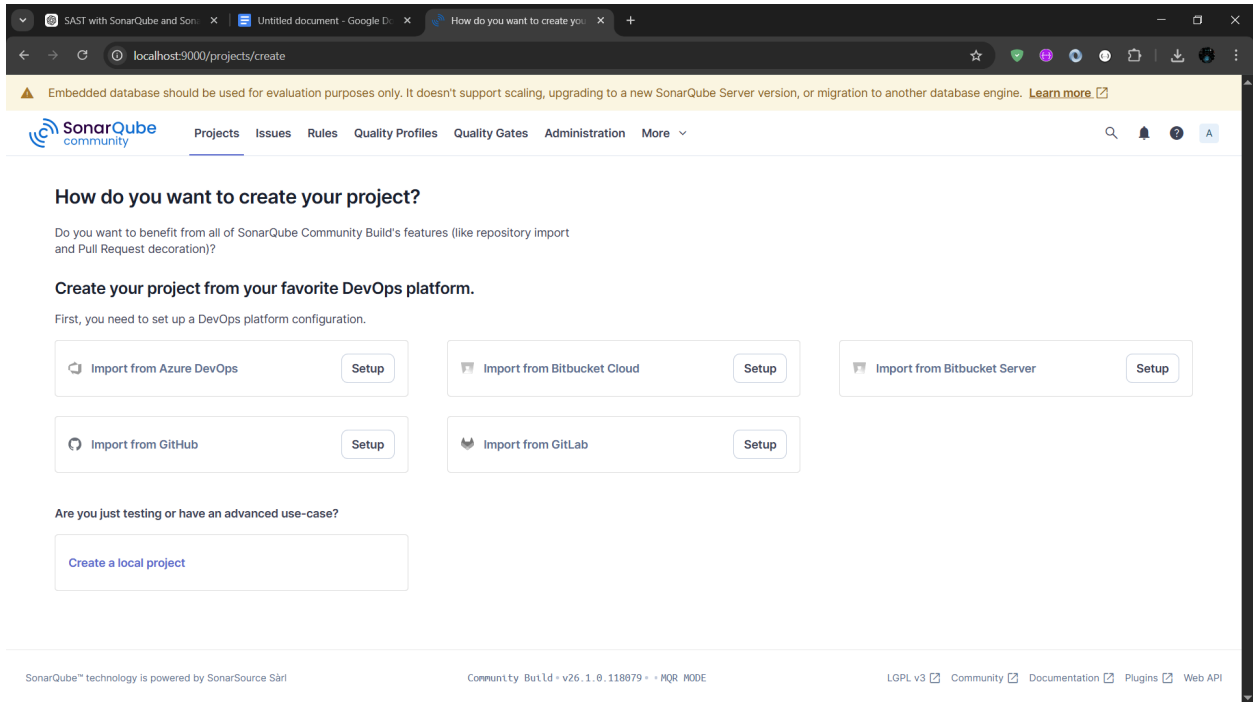
No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #1: sshd[1007,1117]
ubuntu @ user manager service: systemd[1012]

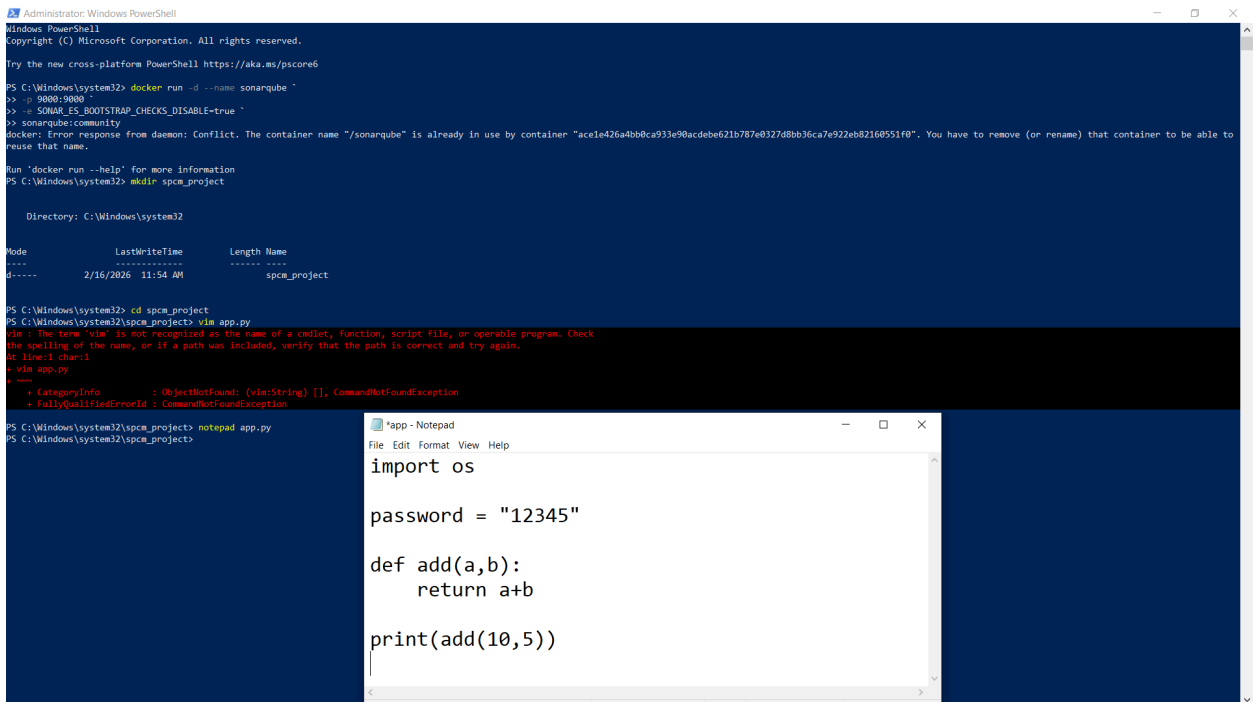
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-4-67:~$ java -version
openjdk version "17.0.18" 2026-01-20
OpenJDK Runtime Environment (build 17.0.18+8-Ubuntu-124.04.1)
```

2. SonarQube Installation

```
ubuntu@ip-172-31-4-67: /opt/ $ cd /opt/sonarqube/bin/linux-x86-64
inflating: sonarqube-9.9.0.65466/web/images/cross.svg
inflating: sonarqube-9.9.0.65466/web/images/loading.gif
inflating: sonarqube-9.9.0.65466/web/images/sq-sl.svg
inflating: sonarqube-9.9.0.65466/web/images/SonarLint-connection-ok.png
creating: sonarqube-9.9.0.65466/web/images/embed-doc/
inflating: sonarqube-9.9.0.65466/web/images/embed-doc/twitter-icon.svg
inflating: sonarqube-9.9.0.65466/web/images/embed-doc/sq-icon.svg
inflating: sonarqube-9.9.0.65466/web/images/hotspot-large.svg
inflating: sonarqube-9.9.0.65466/web/images/filter-large.svg
creating: sonarqube-9.9.0.65466/web/images/alm/
inflating: sonarqube-9.9.0.65466/web/images/alm/azure.svg
inflating: sonarqube-9.9.0.65466/web/images/alm/gitlab.svg
inflating: sonarqube-9.9.0.65466/web/images/alm/github.svg
inflating: sonarqube-9.9.0.65466/web/images/alm/bitbucket-white.svg
inflating: sonarqube-9.9.0.65466/web/images/alm/bitbucket.svg
inflating: sonarqube-9.9.0.65466/web/images/alm/github-white.svg
inflating: sonarqube-9.9.0.65466/web/images/SonarLint-connection-request.png
inflating: sonarqube-9.9.0.65466/web/images/check.svg
inflating: sonarqube-9.9.0.65466/web/images/saml.png
inflating: sonarqube-9.9.0.65466/web/apple-touch-icon-144x144.png
inflating: sonarqube-9.9.0.65466/web/apple-touch-icon-114x114.png
inflating: sonarqube-9.9.0.65466/web/apple-touch-icon-57x57.png
inflating: sonarqube-9.9.0.65466/web/index.html
creating: sonarqube-9.9.0.65466/lib/jdbc/
creating: sonarqube-9.9.0.65466/lib/jdbc/mssql/
inflating: sonarqube-9.9.0.65466/lib/jdbc/mssql/mssql-jdbc-11.2.2.jre17.jar
creating: sonarqube-9.9.0.65466/lib/jdbc/postgresql/
inflating: sonarqube-9.9.0.65466/lib/jdbc/postgresql/postgresql-42.5.1.jar
creating: sonarqube-9.9.0.65466/lib/jdbc/h2/
inflating: sonarqube-9.9.0.65466/lib/jdbc/h2/h2-2.1.214.jar
inflating: sonarqube-9.9.0.65466/lib/sonar-shutdowner-9.9.0.65466.jar
creating: sonarqube-9.9.0.65466/elasticsearch/plugins/
ubuntu@ip-172-31-4-67:~$ cd /opt/sonarqube/bin/linux-x86-64
./sonar.sh start
./usr/bin/java
Starting SonarQube...
Started SonarQube.
ubuntu@ip-172-31-4-67:~$ cd /opt/sonarqube/bin/linux-x86-64$ ./sonar.sh status
./usr/bin/java
SonarQube is running (10887).
ubuntu@ip-172-31-4-67:~$ cd /opt/sonarqube/bin/linux-x86-64$
```



3. Application Setup



4. Local SAST Scan

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

Try the new cross-platform PowerShell https://aka.ms/powershell

PS C:\Windows\system32> docker run -d --name sonarqube `
>> -p 9000:9000
>> -e SONAR_ES_BOOTSTRAP_CHECKS_DISABLE=true `
>> sonarqube:community
docker: Error response from daemon: Conflict. The container name "/sonarqube" is already in use by container "ace1e426a4bb8ca933e90acdebe621b787e0327d8bb36ca7e922eb82160551f0". You have to remove (or rename) that container to be reuse that name.

Run 'docker run --help' for more information
PS C:\Windows\system32> mkdir spcm_project

Directory: C:\Windows\system32

Mode                LastWriteTime         Length Name
----                -
d-----          2/16/2026  11:54 AM             spcm_project

PS C:\Windows\system32> cd spcm_project
PS C:\Windows\system32\spcm_project> vim app.py
vim: The term 'vim' is not recognized as the name of a cmdlet, function, script file, or operable program. Check
the spelling of the name, or if a path was included, verify that the path is correct and try again.
H line1 char1
> vim app.py
+ CategoryInfo          : ObjectNotFound: (vim:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

PS C:\Windows\system32\spcm_project> notepad app.py
PS C:\Windows\system32\spcm_project> notepad sonar-project.properties
PS C:\Windows\system32\spcm_project>
```

sonar-project - Notepad

```
File Edit Format View Help
sonar.projectKey=aman_spcm_local
sonar.projectName=SPCM Local Docker
sonar.projectVersion=1.0
sonar.sources=.
sonar.host.url=http://host.docker.internal:
sonar.login=sqa_80672011657e63ea1d687645c
```

5. Quality Gate Compliance(Faild)

The screenshot displays the SonarQube web interface. The top navigation bar includes links for Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, and More. The main content area shows a list of projects, with 'MyNodeApp' selected. The project status is 'Failed'. The left sidebar contains filters for Quality Gate (Passed, Failed) and Reliability (A, B, C, D, E). The bottom of the interface features a warning message: 'Embedded database should be used for evaluation purposes only'.

Quality Gate Compliance (Failed)

MyNodeApp PUBLIC Failed

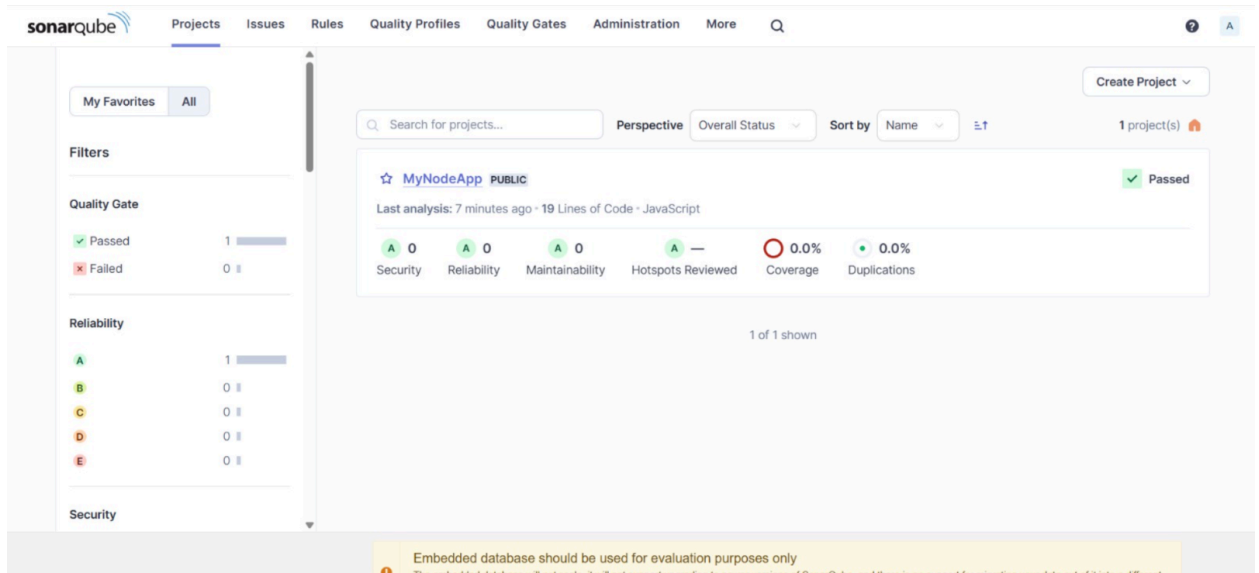
Last analysis: 1 minute ago - 16 Lines of Code - JavaScript

Metric	Value
Security	0
Reliability	0
Maintainability	4
Hotspots Reviewed	—
Coverage	0.0%
Duplications	0.0%

1 of 1 shown

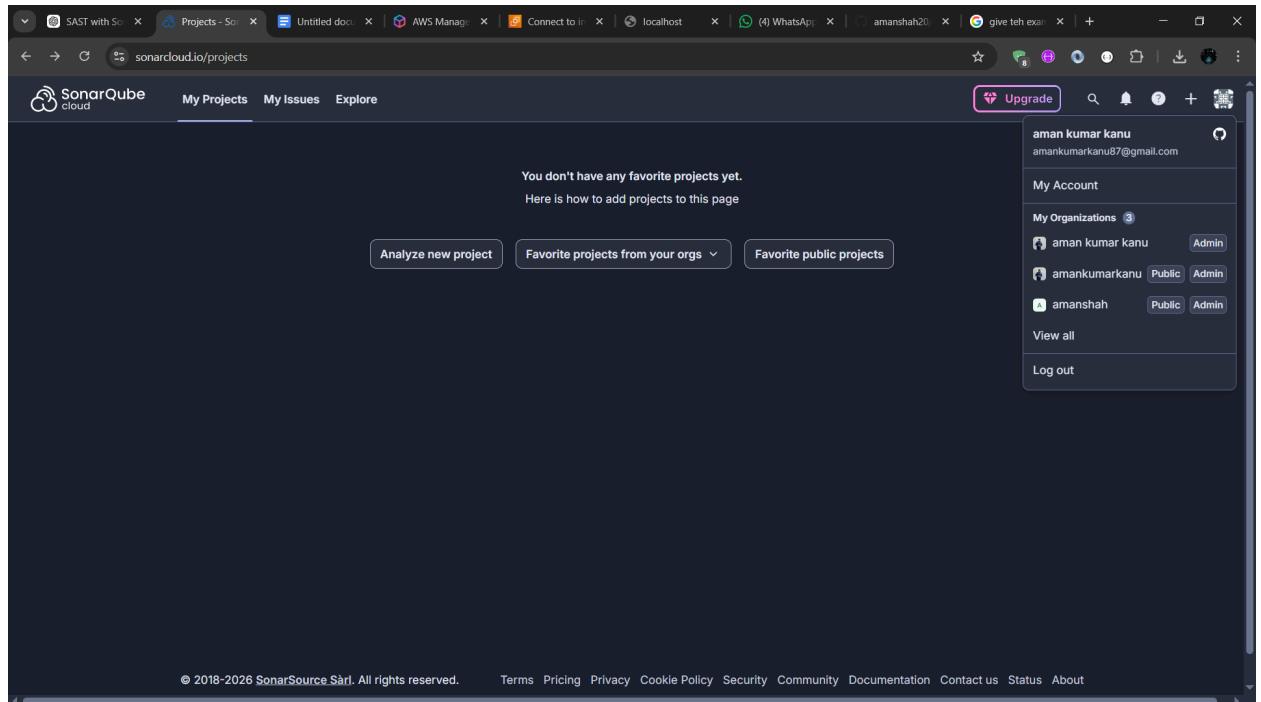
Warning: Embedded database should be used for evaluation purposes only
The embedded database will not scale, it will not support upgrading to newer versions of SonarQube, and there is no support for migrating your data out of it into a different

5. Quality Gate Compliance(Pass)



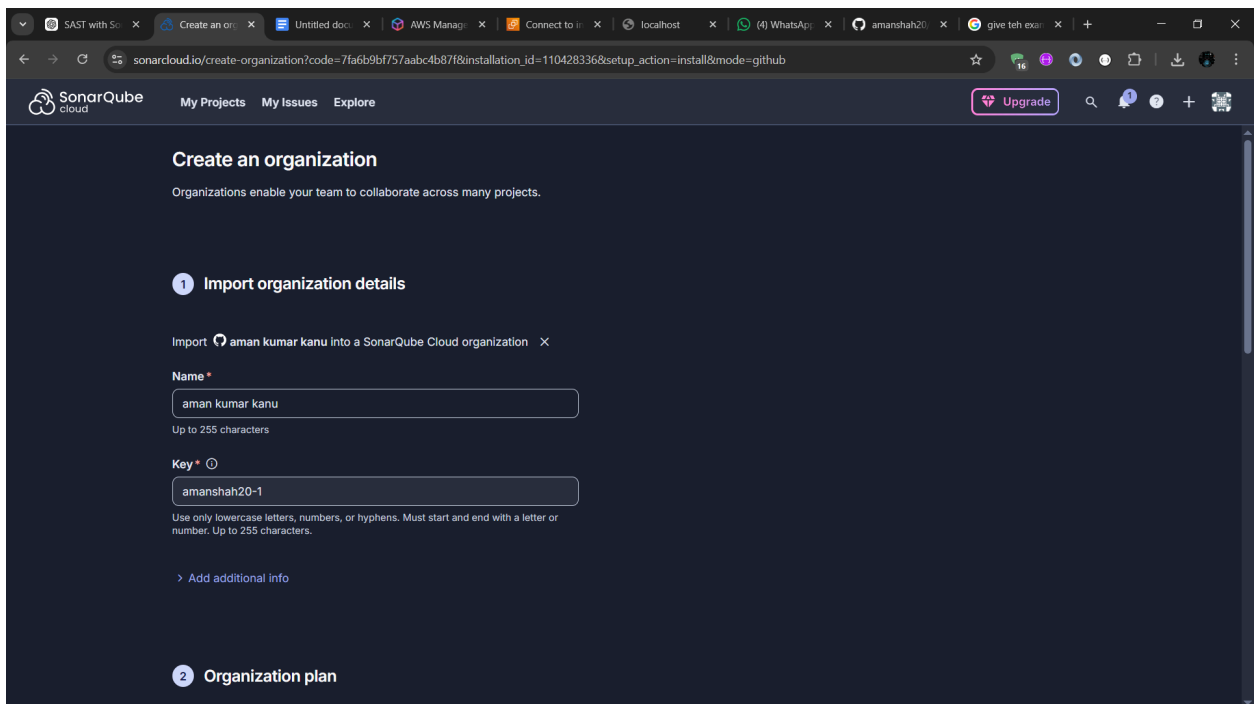
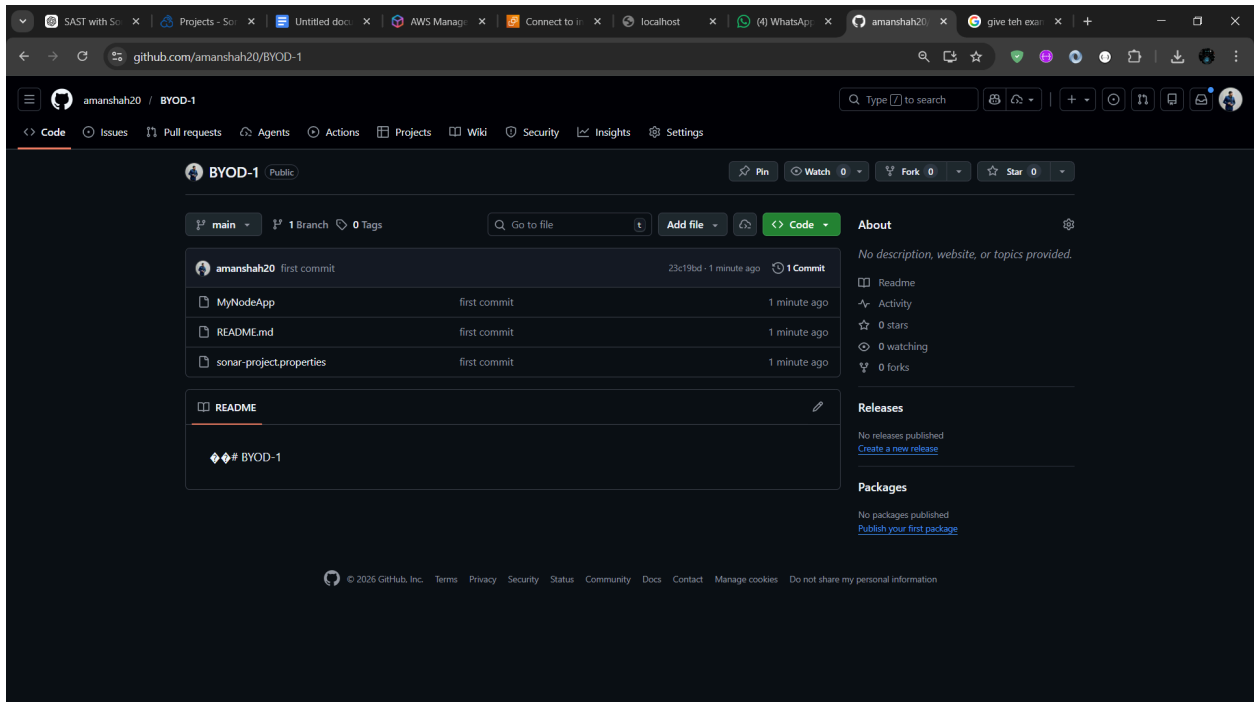
Part 2: Cloud-Based SAST Analysis using SonarCloud

1. SonarCloud Setup



2. Application Integration

- Push the same application code to the repository
- Configure the project for SonarCloud analysis



4. Quality Gate Enforcement

