## SonarQube Server

SonarQube Material

CODE QUALITY CHECK

⊙ **Why code Quality Check?**
- Makes code readable
- Easy to maintain code in future.
- Detects bug at earlier stage
- . . . . Many more

⊙ **Various tools for Quality check:**
- SonarQube
- ReSharper
- Codacy
- Checkmarx
- Codebeat

SONARQUBE FEATURES

⊙ It doesn't show only what's wrong. It also offers quality management tools to help you put it right.
⊙ SonarQube addresses not only bugs but also coding rules, test coverage, code duplications, complexity, and architecture providing all the details in a dashboard.
⊙ It gives you a snapshot of your code quality at the certain moment of time as well as trends of lagging and leading quality indicators.
⊙ It provides you with code quality metrics to help you take the right decision.
⊙ There are code quality metrics that show your progress and whether you're getting better or worse.
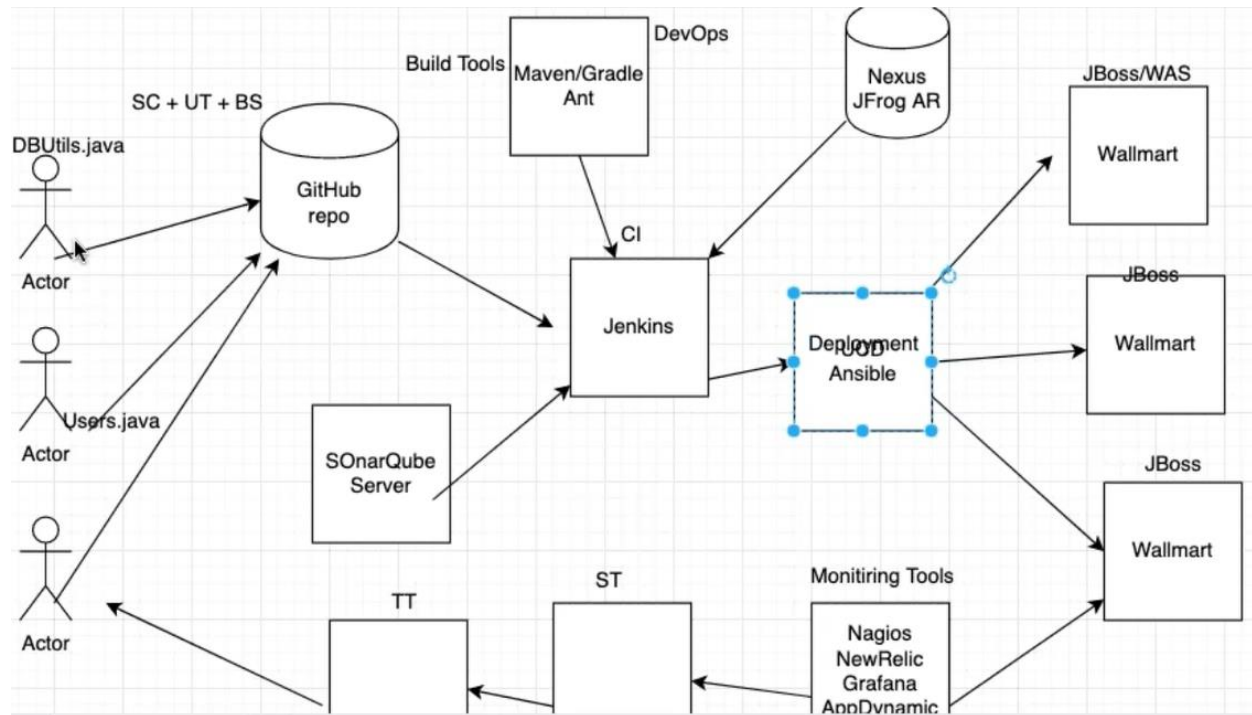
sonarqube)) - Introduction cont…

- ➤ Initially it is developed only for Java projects.
- ➤ Today it is supporting over twenty languages.

Commercial: ABAP, Cfamily(C, C++, and Objective-C), COBOL, PL/SQL, Visual Basic, Natural, VB.Net, RPG, Swift ..

Open source: Java, Java Script, C#, Web(HTML, JSP, JSF, ..) XML, Python, Groovy, PHP, Puppet, Lua, Groovy, FxCop, Flex, Erlang ...

SonarQube Server

Introduction

- ➢ SonarQube (previously called Sonar) is an open source software quality management tool.
- ➢ It continuously analyses and measures quality of the source code.
- ➢ I will generate the report if any issues in html format/PDF format.
- ➢ It is a web-based tool which supports multiple languages (Java, C#, JS …)
- ➢ It will support multi OS platform (Windows. MAC, Linux…).
- ➢ It will support multiple databases (MySQL, Oracle, Microsoft SQL Server, PostgreSQL ...)
- ➢ Supports multiple browsers (IE, Microsoft Edge, FF, Chrome, Safari)
- ➢ It will identify the below category of issues.
    - Duplicated code
    - Coding standards
    - Unit tests
    - Complex code
    - Comments
    - Potential Bugs
    - Architecture & Design

- ➢ Initially it is developed only for Java projects.
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- ➢ Commercial: ABAP, Cfamily(C, C++, and Objective-C), COBOL, PL/SQL, Visual Basic, Natural, VB.Net, RPG, Swift ..
- ➢ Open source: Java, Java Script, C#, Web(HTML, JSP, JSF, ..) XML, Python, Groovy, PHP, Puppet, Lua, Groovy, FxCop, Flex, Erlang …

Pre-requisites

- ➢ The only prerequisite for running SonarQube v6.2 is to have Java (Oracle JRE 8 onwards or OpenJDK 8 onwards) installed on your machine.
- ➢ Java 8 onwards
- ➢ MySQL DB 5.6 onwards - Optional
- ➢ Oracle 11g onwards - Optional

SonarQube Details	
Type	Source Continuous Code Quality
Vendor	SonarQube
Is Open Source?	Yes
Version	7.8
Operating system	Cross Platform
Software Download URL	http://www.sonarqube.org/downloads/

| Is executable software? | No, download as zip, extract and use it. |
| Reference Websites | 1) https://docs.sonarqube.org/ |

Installation of Sonar Scanner

Linux
----
cd /opt
wget https://binaries.sonarsource.com/Distribution/sonar-scanner-cli/sonar-scanner-cli-3.3.0.1492-linux.zip
unzip sonar-scanner-cli-3.3.0.1492-linux.zip
/opt/sonar-scanner-cli-3.3.0.1492-linux/bin
echo "export SONAR_SCANNER_HOME=/opt/sonar-scanner-3.3.0.1492-linux" >> /etc/environment
echo 'export PATH=$PATH:$SONAR_SCANNER_HOME/bin' >> /etc/environment
source /etc/environment

sonar-scanner -v

How to change the default port number from 9000 to custom port in SonarQube server?

Go to the conf directory and open the sonar.properties and search for
Sonar.web.port=9000 and
Replace 9000 with 9001

SonarQube Server Installation

```
# Install pre-requisite
yum -y install unzip wget git
# Install java
wget -c --header "Cookie: oraclelicense=accept-securebackup-cookie"
http://download.oracle.com/otn-pub/java/jdk/8u131-
b11/d54c1d3a095b4ff2b6607d096fa80163/jdk-8u131-linux-x64.rpm
yum install jdk-8u131-linux-x64.rpm -y

 #Download the SonarqQube Server
 software. cd /opt
 yum install wget unzip -y
 wget https://binaries.sonarsource.com/Distribution/sonarqube/sonarqube-
 7.8.zip unzip sonarqube-7.8.zip

 #As a good security practice, SonarQuber Server is not advised to run sonar service as a
 root user, so create a new user called nexus and grant sudo access to manage nexus
 services as follows
 useradd sonar
```

#Give the sudo access to sonar user
visudo

sonar   ALL=(ALL)   NOPASSWD: ALL

#Change the owner and group permissions to /opt/sonarqube-7.8/ directory.

chown -R sonar:sonar /opt/sonarqube-7.8/
chmod -R 775 /opt/sonarqube-7.8/
su - sonar
cd /opt/sonarqube-7.8/bin/linux-x86-64/

./sonar.sh start

- - - - - - - - - -
Troubleshooting

sonar service is not starting?

a)make sure you need to change the ownership and group to /opt/sonarqube-7.6/ directory for sonar user.
b)make sure you are trying to start sonar service with sonar user.
c)check java is installed and version compatibility or not using java -version command.

Unable to access SonarQube server URL in browser?

a)   make sure port 9000 is opened in security group in AWS ec2 instance or firewall.

Starting Sonar as a service
#Create SonarQube server as a sonar service

ln /opt/sonarqube-7.8/bin/linux-x86-64/sonar.sh /etc/init.d/sonar

sudo vi /etc/init.d/sonar

#add below lines in /etc/init.d/sonar

SONAR_HOME=/opt/sonarqube
PLATFORM=linux-x86-64

WRAPPER_CMD="${SONAR_HOME}/bin/${PLATFORM}/wrapper"
WRAPPER_CONF="${SONAR_HOME}/conf/wrapper.conf"
PIDDIR="/opt/sonarqube/"

#Enable the sonar service
systemctl enable sonar

```
#Start the sonar service
systemctl start sonar

#Check the status of the sonar service
systemctl status sonar
```

How to execute the SonarQube report for ant java projects.
Ans) create a file called sonar-project.properties file in the project root directory for which project need to execute the report with below properties.

```
sonar.projectName=MyLandmarkTech
sonar.projectKey=com.mt
sonar.projectversion=1.0
sonar.sources=src
```

How to execute the SonarQube report for maven java projects.
Ans) mvn sonar:sonar
(OR)
mvn clean install sonar:sonar

If you don't mention SonarQube Server details in pom.xml, you can use below commands.
mvn clean sonar:sonar package -Dsonar.host.url=http://localhost:9000
(OR)

mvn clean package sonar:sonar -Dsonar.host.url=http://13.234.113.46:9000/ -Dsonar.login=admin -Dsonar.password=admin
(OR)
mvn clean package sonar:sonar -Dsonar.host.url=http://13.234.113.46:9000/ -Dsonar.login=f452576949599315a73e51ceb5840f8230a8d1c5

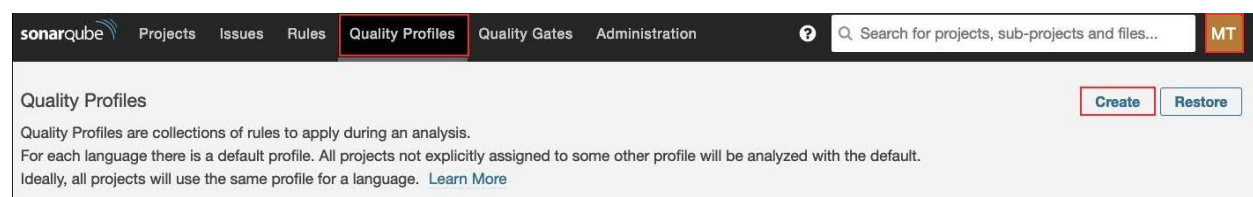Note: As a best practice create token and use the for authentication.

SonarQube Server Administration

Creating the Custom Quality Profiles

Login into SonarQube with admin credentials (default credentials admin/admin).

As soon as login into SonarQube dashboard, click on Quality Profiles,
You will see all the language profiles.

Click on Create and provide the Name of the profile and select the language and, Click on Create button.

New Profile

Name*

LandmarkTechnologyCustomQualityProfile

Language*

Java

Parent:

Sonar way (Built-in)

Create   Cancel

Click on **Active More**

sonarqube   Projects   Issues   Rules   **Quality Profiles**   Quality Gates   Administration   Search for projects and files...   +   A

Quality Profiles / Java

LandmarkTechnologyCustomQualityProfile   Updated: 36 seconds ago   Used: Never   Changelog   ⚙▾

Rules	Active	Inactive
Total	381	156
Bugs	109	12
Vulnerabilities	36	8
Code Smells	206	134
Security Hotspots	30	2

Activate More

Inheritance   Change Parent

| Sonar way   Built-in | 381 active rules | 0 overridden rules |
| LandmarkTechnologyCustomQualityProfile | 381 active rules | 0 overridden rules |

Projects   Change Projects

No projects are explicitly associated to the profile.

Select the rule and click on **Active**, you will get the one popup and again you can click on **Activate** as follows.
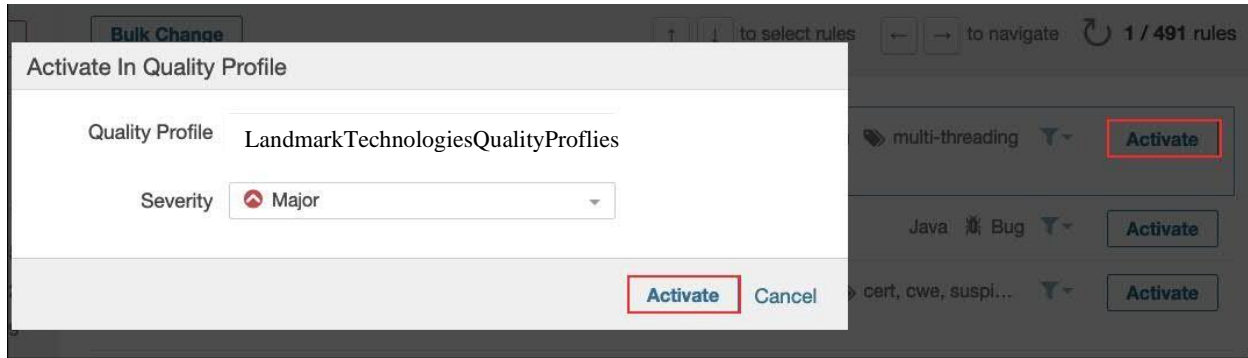
Quality Profiles / Java

LandmarkTechnologyCustomQualityProfile

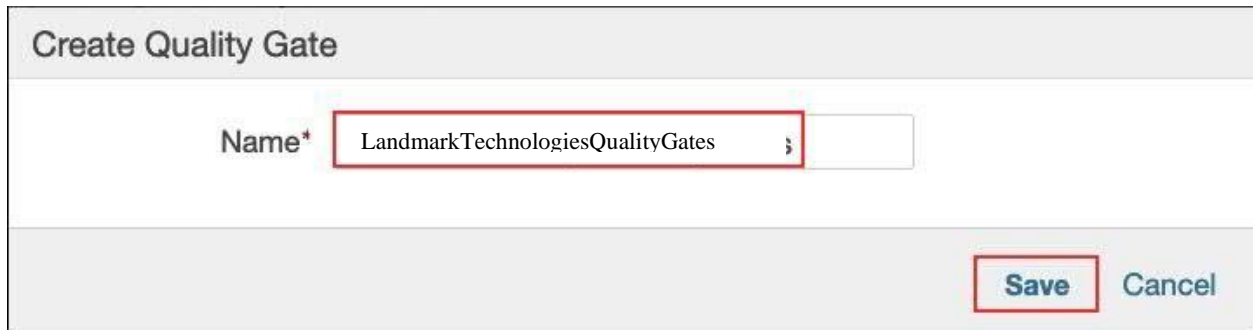| Rules	Active	Inactive
Total	381	156
Bugs	109	12
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Activate More

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Creating the Custom Quality Gates

Login into SonarQube with admin credentials (default credentials admin/admin).

As soon as login into SonarQube dashboard, click on Quality Gates, and click on Quality Gates, and click on Create.

Give the Name and click on Save button.

Click on Add Condition and select the condition as follows.

- -

To Create the Users

Login into SonarQube with admin credentials (default credentials admin/admin).

As soon as login into SonarQube dashboard, click on Administration, and click on Security, and click on Users.

Click on Create User.

Create User

Login* landmark

Minimum 3 characters

Name* landmark

Email mylandmark@mylandmarktech.com

Password* ••••••••

SCM Accounts **Add**

Login and email are automatically considered as SCM accounts

Create Cancel

Create User

Login* **mylandmark**

Minimum 3 characters

Name* **mylandmark**

Email **mylandmark@mylandmarktech.com**

Password* ••••••••

SCM Accounts **Add**

Login and email are automatically considered as SCM accounts

Create Cancel

To Generate a Token

Login as a admin user and select to which user we need to generate the token and click on

barcode symbol (▤) as follows.

		SCM Accounts	Groups	Tokens	
A	**Administrator** admin		sonar-administrators sonar-users ▤	0 ▤	⚙▾
MT	mylandmark@mylandmarktech.com	mylandmark@ mylandmarktech.com	dministrators sers	0 ▤	⚙▾

Give the name of Token and click on **Generate** button as follows.

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Tokens

Generate Tokens

SonarQubeToken [ ] Generate

Name	Created
No tokens	

Done

Once it is generated, copy and save the key in one file for future use as follows.

Tokens

Generate Tokens

Enter Token Name | Generate

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

Copy   8fb9505f221f5eeb7e6e677d8b2a6dd560a3ece9

Name	Created	
SonarQubeToken	March 24, 2019	Revoke

Done

Configure Email settings

Login as admin user

Go to the Administration button ---> Configuration ---> General Settings

- -

Errors and Solution


```
[INFO] ------------------------------------------------------------------------
[INFO] BUILD FAILURE
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 4.159 s
[INFO] Finished at: 2018-06-08T10:21:15+05:30
[INFO] Final Memory: 13M/128M
[INFO] ------------------------------------------------------------------------
[ERROR] Failed to execute goal org.sonarsource.scanner.maven:sonar-maven-plugin:3.4.0.905:sonar (default-cli) on project m
aven-web-project: Not authorized. Analyzing this project requires to be authenticated. Please provide the values of the pr
operties sonar.login and sonar.password. -> [Help 1]
```

If you see above error,

For maven Project: Need to update the settings.xml add below lines in <profiles> element.

```
<profile>
        <id>sonar</id>
        <activation>
           <activeByDefault>true</activeByDefault>
        </activation>
        <properties>
           <sonar.host.url>http://localhost:9000/</sonar.host.url>
           <sonar-maven-plugin.version>3.3.0.603</sonar-maven-plugin.version>
          <sonar.login>admin</sonar.login>
          <sonar.password>admin</sonar.password>
        </properties>
        <build>
         <plugins>
          <plugin>
             <groupId>org.sonarsource.scanner.maven</groupId>
             <artifactId>sonar-maven-plugin</artifactId>
             <version>${sonar-maven-plugin.version}</version>
          </plugin>
         </plugins>
        </build>
</profile>
```

For Ant Project:

add below line in sonar-project.propertiesfiles
sonar.login=admin
sonar.password=admin

- -

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Error

```
[ec2-user@ip-172-31-19-113 logs]$ cat sonar.log
--> Wrapper Started as Daemon
Launching a JVM...
Unable to start JVM: No such file or directory (2)
JVM exited while loading the application.
JVM Restarts disabled.  Shutting down.
<-- Wrapper Stopped
```

Solution

Install the Java.

Error

```
2019.02.28 02:23:27 INFO  app[][o.s.a.p.ProcessLauncherImpl] Launch process[[key='web', ipcIndex=2, logFilenamePrefix=web]] from [/home/ec2-user/sonarqube/son
arqube-7.6]: /usr/java/jdk1.8.0_201-amd64/jre/bin/java -Djava.awt.headless=true -Dfile.encoding=UTF-8 -Djava.io.tmpdir=/home/ec2-user/sonarqube/sonarqube-7.6/
temp -Xmx512m -Xms128m -XX:+HeapDumpOnOutOfMemoryError -cp ./lib/common/*:/home/ec2-user/sonarqube/sonarqube-7.6/lib/jdbc/h2/h2-1.3.176.jar org.sonar.server.a
pp.WebServer /home/ec2-user/sonarqube/sonarqube-7.6/temp/sq-process2425106126874713867properties
Java HotSpot(TM) 64-Bit Server VM warning: INFO: os::commit_memory(0x00000000e0000000, 44695552, 0) failed; error='Cannot allocate memory' (errno=12)
#
# There is insufficient memory for the Java Runtime Environment to continue.
# Native memory allocation (mmap) failed to map 44695552 bytes for committing reserved memory.
# An error report file with more information is saved as:
# /home/ec2-user/sonarqube/sonarqube-7.6/hs_err_pid1943.log
2019.02.28 02:23:27 WARN  app[][o.s.a.p.AbstractProcessMonitor] Process exited with exit value [web]: 1
2019.02.28 02:23:27 INFO  app[][o.s.a.SchedulerImpl] Process [web] is stopped
2019.02.28 02:23:27 INFO  app[][o.s.a.SchedulerImpl] Process [es] is stopped
2019.02.28 02:23:27 INFO  app[][o.s.a.SchedulerImpl] SonarQube is stopped
2019.02.28 02:23:27 WARN  app[][o.s.a.p.AbstractProcessMonitor] Process exited with exit value [es]: 143
<-- Wrapper Stopped
```

Solution:
Increase the RAM size. After increasing RAM size, check the ram size using free -h command in the Linux OS.

SonarQube Cloud

http://sonarcloud.io/

| Landmark Technologies | SonarQube Serrver mylandmarktech@gmail.com | A | S. Legah |
| | | W | www.mylandmarktech.com |

References :

http://www.base36.com/2012/11/what-is-java-sonar/
http://blogs.sourceallies.com/2010/02/sonar-code-quality-analysis-tool/
http://www.sonarsource.com/
http://docs.sonarqube.org/display/SONARQUBE45/Installing+and+Configuring+SonarQube+Runner

https://docs.sonarqube.org/display/SONAR/Analysis+Parameters