

Software V&V

- CTIP 환경구축 2 -

1팀

컴퓨터공학부	201711381	김소현
컴퓨터공학부	201711394	민하은
컴퓨터공학부	201711401	염혜지
컴퓨터공학부	201711407	이가현
컴퓨터공학부	201711435	홍예주

목차

1 CTIP 환경 구성도

2 TestLink 설치

3 TestLink & Redmine 연동

4 Sonarqube 설치

5 Sonarqube & Jenkins 연동

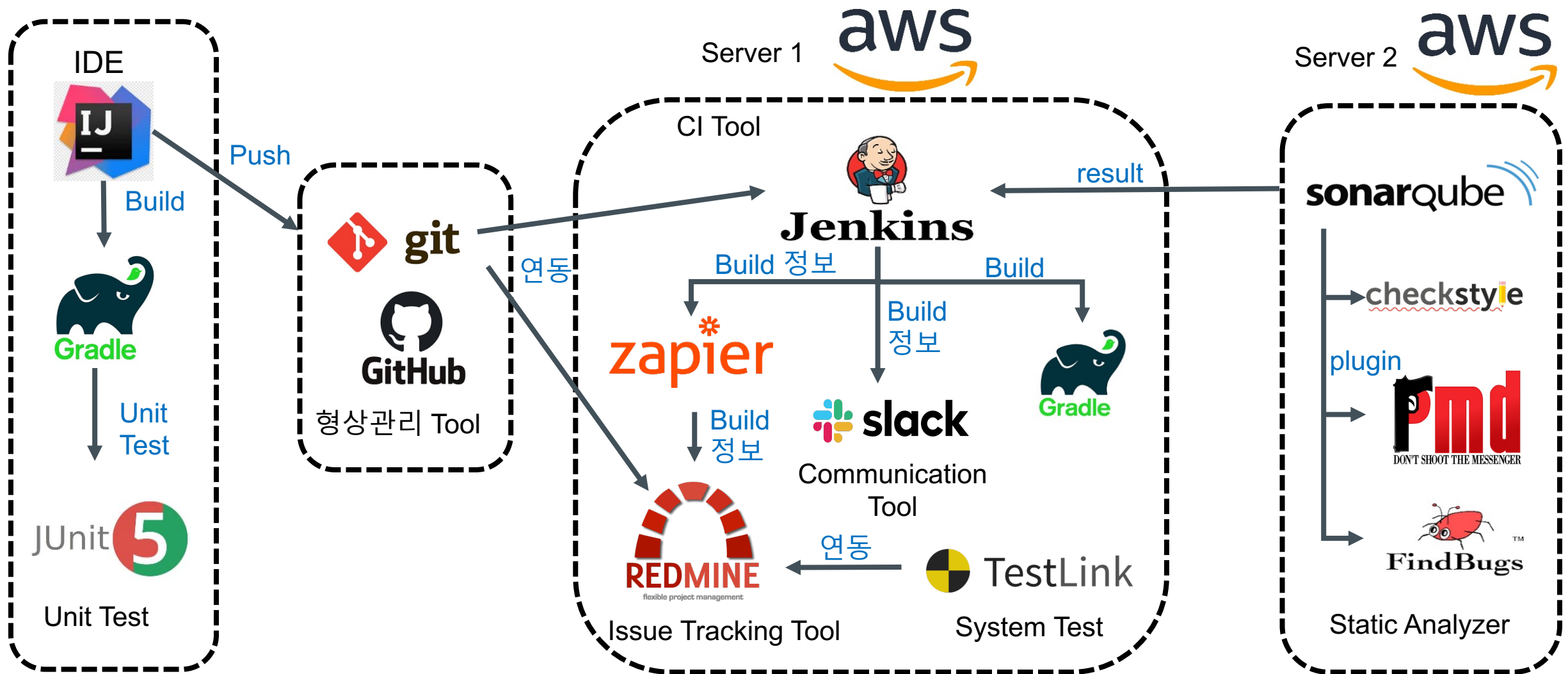
6 PMD, CheckStyle, Findbugs 설치

7 Summary

PART 1

CTIP 환경 구성도

CTIP 환경 구성도



System Test - Why TestLink?



* TestLink를 선택한 이유

- 1) Web 기반의 테스트 관리
- 2) 다양한 버그 트래킹 시스템과 연동 가능
-> Redmine과 연동 가능
- 3) 테스트의 우선순위 부여 가능
- 4) 트리 구조를 이용한 테스트 케이스 작성 가능

Part 1, Static Analyzer - Why Sonarqube?



* Sonarqube를 선택한 이유

- 1) 테이블과 차트를 통해 직관적으로 개선 척도 확인 가능
- 2) 20개가 넘는 프로그래밍언어에 대한 코드 분석 지원
- 3) 지속적으로 관리 가능
- 4) Jenkins 같은 CI 엔진과 통합되어 분석 가능

* Sonarqube 선택 시 감안해야 하는 점

- 1) Sonarqube가 무겁기 때문에 CI Tool, Issue Tracking Tool 과 한 Server에서 실행하기 힘들
-> 서버를 2개로 나누어 해결

Static Analyzer - Why PMD?



* PMD를 선택한 이유

- 1) 소스코드를 분석해 프로그램의 불필요한 부분을 찾아냄
- 2) 프로그램의 성능을 높여주는 오픈소스 도구
- 3) 코드를 자동으로 분석하여 잠재적인 결함을 찾아줌
- 4) 5단계의 우선순위를 부여해 개발자가 판단 가능
- 5) 종종 실제 결함을 찾아줌

Static Analyzer - Why CheckStyle?



* CheckStyle 을 선택한 이유

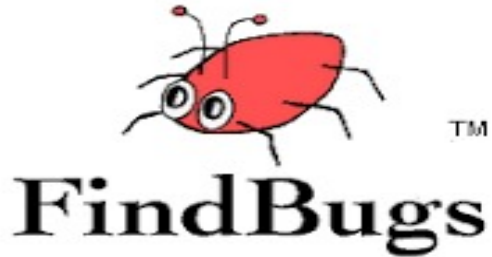
- 1) 소스파일을 읽어서 소스 코드 표준에 위반되는 것들을 검색
- 2) 정해진 코딩 규약에 위반되는 것들을 검사해줌
- 3) 직접 코딩 규약을 만들어 사용 가능

* CheckStyle 선택 시 감안해야 하는 점

- 1) 실제 버그를 찾을 수 없음

Part 1,

Static Analyzer - Why FindBugs?



* FindBugs을 선택한 이유

- 1) 실제 결함을 잘 찾아줌.
- 2) 결함의 정확성이 높음
- 3) 바이트코드를 읽음으로 속도가 빠름

* FindBugs선택 시 감안해야 하는 점

- 1) 바이트코드를 읽어서 사용해야 하므로 빌드 과정 필수

PART 2

TestLink설치

1. TestLink 설치 파일 다운로드 및 실행

* TestLink 설치 command

```
: sudo wget https://bitnami.com/redirect/to/1425422/bitnami-testlink-1.9.20-12-linux-x64-installer.run
```

```
[root@ip-172-31-38-31 ~]# sudo wget https://bitnami.com/redirect/to/1425422/bitnami-testlink-1.9.20-12-linux-x64-installer.run
2021-04-27 07:54:23 --2021-04-27 07:54:23-- https://bitnami.com/redirect/to/1425422/bitnami-testlink-1.9.20-12-linux-x64-installer.run
Resolving bitnami.com (bitnami.com)... 50.17.235.25
Connecting to bitnami.com (bitnami.com)|50.17.235.25|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://downloads.bitnami.com/files/stacks/testlink/1.9.20-12/bitnami-testlink-1.9.20-12-linux-x64-installer.run [following]
--2021-04-27 07:54:24-- https://downloads.bitnami.com/files/stacks/testlink/1.9.20-12/bitnami-testlink-1.9.20-12-linux-x64-installer.run
Resolving downloads.bitnami.com (downloads.bitnami.com)... 54.230.62.69, 54.230.62.74, 54.230.62.98
, ...
Connecting to downloads.bitnami.com (downloads.bitnami.com)|54.230.62.69|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 212815220 (203M) [binary/octet-stream]
Saving to: 'bitnami-testlink-1.9.20-12-linux-x64-installer.run'

100%[=====>] 212,815,220 106MB/s in 1.9s

2021-04-27 07:54:26 (106 MB/s) - 'bitnami-testlink-1.9.20-12-linux-x64-installer.run' saved [212815220/212815220]
```

2. TestLink 설치 파일 다운로드 및 실행

* TestLink 설치 파일 실행 command
: ./bitnami-testlink-1.9.20-12-Linux-x64-installer.run

```
[root@ip-172-31-38-31 ~]# ./bitnami-testlink-1.9.20-12-linux-x64-installer.run
Language Selection

Please select the installation language
[1] English - English
[2] Spanish - Español
[3] Simplified Chinese - 简体中文
Please choose an option [1] :

-----
Welcome to the Bitnami TestLink Stack Setup Wizard.

-----
Select the components you want to install; clear the components you do not want
to install. Click Next when you are ready to continue.

TestLink : Y (Cannot be edited)
[PhpMyAdmin [Y/n] :y
[Is the selection above correct? [Y/n]: y

-----
Installation folder

Please, choose a folder to install Bitnami TestLink Stack
[Select a folder [/opt/testlink-1.9.20-12]:
```

```
-----
Create Admin account

Bitnami TestLink Stack admin user creation
[Your real name [User Name]: admin
[Email Address [user@example.com]: admin@gmail.com
[Login [user]: admin

[Password :
[Please confirm your password :

-----
MySQL Information

Please enter your MySQL database information:

Choose a port that is not currently in use, such as port 3307.
MySQL Server port [3307]:

Do you want to configure mail support? [y/N]: y

-----
Configure SMTP Settings

This is required so your application can send notifications via email.

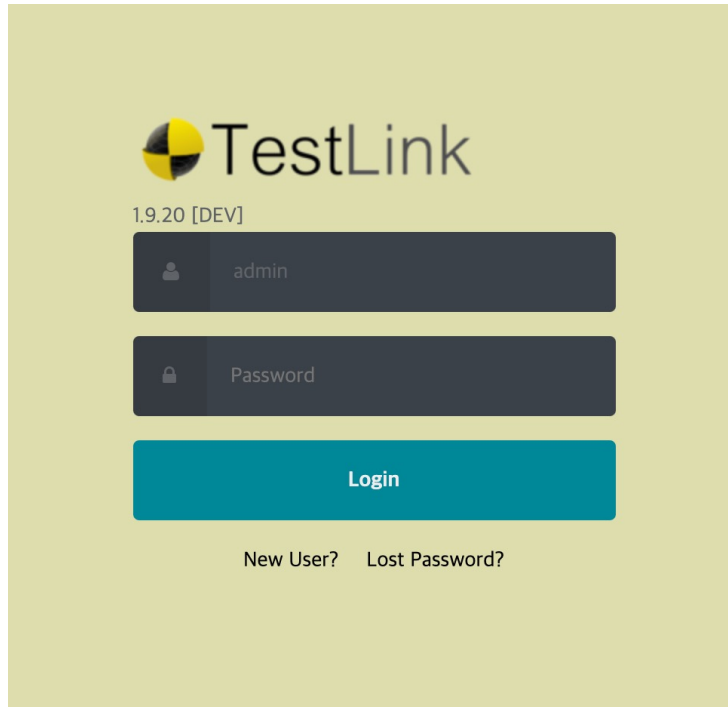
Default email provider:

[1] GMail
[2] Custom
Please choose an option [1] :
```

=> Redmine 과 설치방법이 동일하다.

3. TestLink 실행

```
* TestLink 실행 command  
: sudo /opt/testlink-1.9.20-12/ctlscript.sh restart
```



* TestLink 실행 후 새로 인터넷 창을 켜서
“http://{Personal IP 주소}:81” 입력.
⇒ EC2 인스턴스의 인바운드 규칙에서 81 포트가 해제되어
있는지 확인!!
또는 “http://{Personal IP 주소}/testlink” 입력

1. Test Project 생성

The screenshot shows the 'Create Test Project' form in TestLink. The form is divided into several sections:

- Name ***: A text input field containing 'ctip-yeah'.
- Prefix (used for Test case ID) ***: A text input field containing 'test2'.
- Project description**: A rich text editor containing the text 'ctip-yeah testing'.
- Enhanced features**: A list of checkboxes:
 - Enable Requirements feature
 - Enable Testing Priority
 - Enable Test Automation (API keys)
 - Enable Inventory
- Issue Tracker Integration**: A checkbox for 'Active' is checked, and a dropdown menu for 'Issue Tracker' is set to 'redmine (redmine (Interface: rest))'.
- Code Tracker Integration**: A message '>> There are no Code Tracker Systems defined <<' is displayed.
- Availability**: A checkbox for 'Active' is checked, and a checkbox for 'Public' is also checked.
- API Key**: A text input field containing the long alphanumeric string '3dfd4b199bc330befbb9a15ab0537d5c307f2c0bc88d6c29628130cc5ec7467a'.

At the bottom of the form, there are two buttons: 'Save' and 'Cancel'. The 'Save' button is highlighted with a yellow box.

2. Test Specification에서 Test Suite/Test Case 생성

Test Specification

Search Test Cases








Test Cases created per User









- ctip-yeah (1)

- 덧셈 수행 (1)

- test2-1:덧셈 수행

Test Suite : 덧셈 수행

Test Suite Operations:        

Test Case Operations:        

Test Suite : 덧셈 수행

Details

덧셈수행

Keywords: None



Attached files :

File

파일 선택 선택된 파일 없음

Title/name:

Test Case

test2-1 : 덧셈 수행 - Version1  

Preconditions



덧셈수행

Summary

두개의 수를 인자로 받는다.

3. Test Case에서 실제 Test Step 생성

The screenshot shows the Test Case interface in TestLink. At the top, there is a blue header with the text "Test Case". Below the header, there is a warning message: "Warning! This Test Case version has been executed." The main content area is divided into sections: "Preconditions" with the text "덧셈수행" and "Summary" with the text "두개의 수를 인자로 받는다." Below these sections is a table of test steps. The table has four columns: "#", "Step actions", "Expected Results", and "Execution". The first row contains the number "1", the text "a+b", the text "a+b", and the text "Automated" followed by a red 'x' icon and a green '+' icon. At the bottom of the interface, there are two buttons: "Create step" and "Resequene Steps". The "Create step" button is highlighted with a yellow border.

#	Step actions	Expected Results	Execution
1	a+b	a+b	Automated  

4. Test Plan 생성

Test Plan Management

Builds / Releases

Milestone Overview

Test Plan Management - Test Project ctip-year

Edit Test Plan - 테스트 계획

Name	테스트 계획
Description	<p>Source</p> <p>Format</p> <p>테스트 계획</p>
Active	<input checked="" type="checkbox"/>
Public	<input checked="" type="checkbox"/>
API Key	a09552f08e2ebf073d21faf9132c78c4caf01a105761e98bec43df8a8fbee623

Update Cancel

5. Builds / Releases

Test Plan Management

Builds / Releases

Milestone Overview

The screenshot shows the 'Edit Build' interface in TestLink. The title bar reads 'Build management - Test Plan : 테스트 계획'. The main window is titled 'Edit Build - build-1'. On the left, there is a sidebar with fields: 'Title' (build-1), 'Description' (fisrt build), 'Active' (checked), 'Open' (checked), 'Release date' (04/26/2021), 'commit id', 'tag', 'branch', and 'release candidate'. The main area contains a rich text editor with a toolbar (Source, Format, Bold, Italic, Underline, etc.) and the text 'fisrt build'.

6. Test Plan에 Test Case mapping

Add / Remove Platforms

Add / Remove Test Cases

Assign Test Case Execution

Set Urgent Tests

Update Linked Test Case Versions

Show Test Cases Newest Versions

Add/Remove Test Cases

Test Plan : 테스트 계획 - Add/Remove Test Cases to/from Test Plan

Assign to user on add on build Send mail notification to tester

Check/uncheck all Test cases for

Test cases with Latest Version with status with one of these values (Obsolete,Future) will not be displayed in this screen

덧셈 수행

Test Case	Version	Status	Importance		
test2-1 : 덧셈 수행	1	Draft	Medium	10000	04/26/2021

7. Test Execution

Execute Tests

Settings

Test Plan: 테스트 계획
Build to execute: build-1
Update tree after every operation:
Tree Counters Latest Exec On: Test Plan

Filters

Test Case ID: test2-
Test Case Title:
Test Suite: Select an Option
Priority: [Any]
Execution type: [Any]
Assigned to: [Any]
 include unassigned Test Cases
Bugs on Exec. Context: BUGX,BUGY,BUGZ
Result on: Build chosen for executi...

Apply | Reset Filters | Advanced Filters

Expand tree | Collapse tree

- ctip-yeah / 테스트 계획 (1)(0, 0, 1, 0)
 - 덧셈 수행 (1)(0, 0, 1, 0)
 - test2-1:덧셈 수행

Test Results on Build build-1

Print | Show complete execution history | Import XML Results

- Test Plan 테스트 계획
- Build build-1
- Test Suite : 덧셈 수행/

Last execution (any build)

Date : 04/26/2021 14:09:57 - Tested by : admin - Build : build-1 - Status : Failed

Last execution (current build) - Build : build-1

Date	Build	Tested by	Status	Exec (min)	Version	BUG management	Run mode
04/26/2021 14:09:57	build-1	admin	Failed		1		
	Build	Test Case	Relevant bugs				
	build-1	1 : [신규] : test					

Test Case test2-1 :: Version: 1 :: 덧셈 수행

Estimated exec. duration (min) :
Execution type : Automated

Assigned to : tester,admin

Preconditions
덧셈수행

Summary
두개의 수를 인자로 받는다.

#	Step actions	Expected Results	Execution	Execution notes	Execution Status
1	a+b	a+b	Automated		Passed

Add link to bug report

Access to Bug Tracking System (redmine)

redmine (Interface: rest) Bug id

Notes

Add Link in Issue Tracker to Test Case Execution Feature
 Add Link in Issue Tracker to Test Case Execution Print View

Save Close

PART 3

TestLink & Redmine연동

1. TestLink 로그인 후 Issue Tracker Management 선택

Define Custom Fields

Issue Tracker Management

Code Tracker Management

Issue Tracker Management

Issue Tracker

redmine

Type

redmine (Interface: rest) ▼

Configuration

```
<issuetracker>
<apikey>3769e21d3fc0a2303e2e054451245b6f9b4ab994</apikey>
<uribase>http://[redacted]/redmine</uribase>
<uriview>http://[redacted]redmine/projects/softwarev-v/issues</uriview>
</issuetracker>
```

Test Connection OK

* Check connection을 눌렀을 때
Test Connection OK 창이 나오면 성공!

PART 4

Sonarqube 설치

Sonarqube 설치

1. postgresql 설치 – sonarqube용 데이터베이스 설정

1) PostgreSQL 설치

```
amazon-linux-extras install postgresql10 vim epel -y  
yum install -y postgresql-server postgresql-devel  
/usr/bin/postgresql-setup --initdb  
systemctl enable postgresql  
systemctl start postgresql
```

2) Sonarqube의 database와 사용자 생성

```
su - postgres  
psql  
create user sonar with password 'sonar';  
create database sonar owner sonar;  
\q  
exit
```


Sonarqube 설치

3) Postgresql 설정 파일 수정

```
sudo vi /var/lib/pgsqli/data/pg_hba.conf
```

```
#TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all trust
# IPv4 local connections:
host all all 127.0.0.1/32 md5
# IPv6 local connections:
host all all ::1/128 md5
```

```
# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
#local all all peer
local all all trust
# IPv4 local connections:
#host all all 127.0.0.1/32 ident
host all all 127.0.0.1/32 md5
# IPv6 local connections:
#host all all ::1/128 ident
host all all ::1/128 md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all peer
host replication all 127.0.0.1/32 ident
host replication all ::1/128 ident
```

4) Postgresql 시작

```
sudo systemctl start postgresql
sudo systemctl enable postgresql
```

Sonarqube 설치

1) Sonarqube zip 파일 설치

```
sudo wget https://binaries.sonarsource.com/Distribution/sonarqube/sonarqube-8.3.1.34397.zip
```

2) Unzip 후 opt 폴더로 이동

```
sudo unzip sonarqube-8.3.1.34397.zip  
sudo mv sonarqube-8.3.1.34397 /opt
```

3) 이름을 sonarqube로 바꾸기

```
sudo mv sonarqube-8.3.1.34397 sonarqube
```

Sonarqube 설치

4) sonar.properties에 Database 연결 정보를 입력

```
sudo vi /opt/sonarqube/conf/sonar.properties
```

```
sonar.jdbc.username=sonar  
sonar.jdbc.password=sonar  
sonar.jdbc.url=jdbc:postgresql://localhost/sonar
```

```
# DATABASE  
#  
# IMPORTANT:  
# - The embedded H2 database is used by default. It is recommended for tests but not for  
#   production use. Supported databases are Oracle, PostgreSQL and Microsoft SQLServer.  
# - Changes to database connection URL (sonar.jdbc.url) can affect SonarSource licensed products  
.  
  
# User credentials.  
# Permissions to create tables, indices and triggers must be granted to JDBC user.  
# The schema must be created first.  
sonar.jdbc.username=sonar  
sonar.jdbc.password=sonar
```

```
#----- PostgreSQL 9.3 or greater  
# By default the schema named "public" is used. It can be overridden with the parameter "current  
Schema".  
#sonar.jdbc.url=jdbc:postgresql://localhost/sonarqube?currentSchema=my_schema  
sonar.jdbc.url=jdbc:postgresql://localhost/sonar
```

Sonarqube 설치

5) sonar.properties에 Web Server 수정

```
sudo vi /opt/sonarqube/conf/sonar.properties
```

```
sonar.web.javaOpts=-Xmx512m -Xms128m -XX:+
HeapDumpOnOutOfMemoryError
sonar.web.host=0.0.0.0
sonar.web.port=9000
```

6) Sonarqube를 실행할 수 있는 사용자 생성 후, 권한 부여

```
sudo useradd sonar
sudo chown -R sonar:sonar /opt/sonarqube
```

```
# WEB SERVER
# Web server is executed in a dedicated Java process. By default heap size is 512MB.
# Use the following property to customize JVM options.
#   Recommendations:
#
#   The HotSpot Server VM is recommended. The property -server should be added if server mode
#   is not enabled by default on your environment:
#   http://docs.oracle.com/javase/8/docs/technotes/guides/vm/server-class.html
#
#   Startup can be long if entropy source is short of entropy. Adding
#   -Djava.security.egd=file:/dev/./urandom is an option to resolve the problem.
#   See https://wiki.apache.org/tomcat/HowTo/FasterStartup#Entropy_Source
#
sonar.web.javaOpts=-Xmx512m -Xms128m -XX:+HeapDumpOnOutOfMemoryError

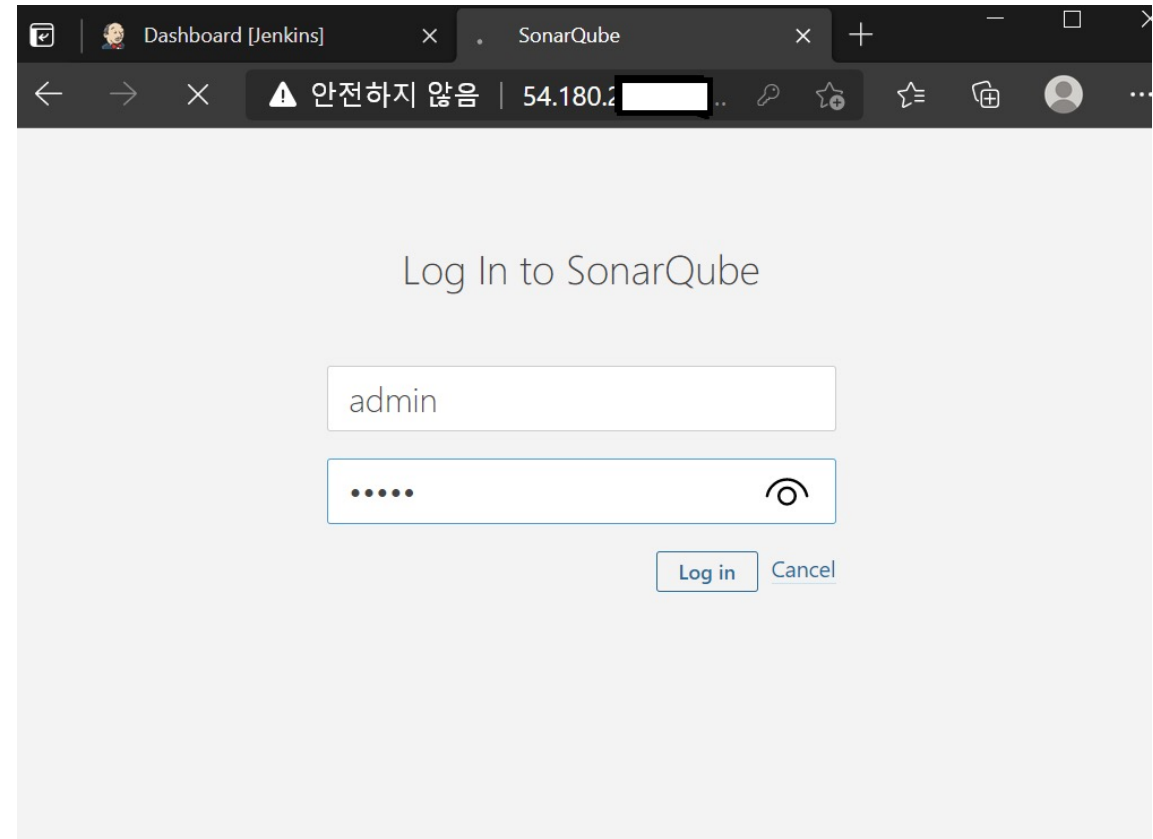
# Same as previous property, but allows to not repeat all other settings like -Xmx
#sonar.web.javaAdditionalOpts=

# Binding IP address. For servers with more than one IP address, this property specifies which
# address will be used for listening on the specified ports.
# By default, ports will be used on all IP addresses associated with the server.
sonar.web.host=0.0.0.0

# Web context. When set, it must start with forward slash (for example /sonarqube).
# The default value is root context (empty value).
#sonar.web.context=
# TCP port for incoming HTTP connections. Default value is 9000.
sonar.web.port=9000
```

7) Sonarqube 실행

```
cd /opt/sonarqube/bin/linux-x86-64  
./sonar.sh start  
./sonar.sh console
```



Sonarqube 설치시 주의할점

1. 호환문제 발생

- Sonarqube v7.2.1 설치 => pmd, checkstyle, findbugs 와 호환이 되지 않음
- sonarqube 7.2.1 -> soarqube 8.3.1

2. MySQL 충돌

- Bitnami - Redmine 와 같이 설치했던 mysql 과의 충돌이 발생
- mysql -> postgresql

3. Jdk 변경

- Sonarqube 8.3.1 버전 사용시 jdk 11 필요
- Jdk 1.8 -> jdk 11

Sonarqube 설치시 주의할점

5. java.lang.IllegalArgumentException: Unable to create shared memory 에러 발생

=> /opt/sonarqube/temp 폴더를 지운다.

6. [1]: max virtual memory areas vm.max_map_count [65530] is too low, increase to at least [262144] 에러 발생

=> Max virtual memory 공간인 vm.max_map_count를 늘린다.

- Sudo 로 접속
- Vi /etc/sysctl.conf
- 하단에 추가

```
# sysctl settings are defined through files in
# /usr/lib/sysctl.d/, /run/sysctl.d/, and /etc/sysctl.d/.
#
# Vendors settings live in /usr/lib/sysctl.d/.
# To override a whole file, create a new file with the same in
# /etc/sysctl.d/ and put new settings there. To override
# only specific settings, add a file with a lexically later
# name in /etc/sysctl.d/ and put new settings there.
#
# For more information, see sysctl.conf(5) and sysctl.d(5).
```

```
vm.max_map_count=262144
```

Sonarqube 실행시 주의할점

7. 생성해 둔 user 로 바꾼 후 실행

- Root 계정에서 sonarqube를 실행할 수 없다.
=> Su sonar(만든 user 명)
- Sonar로 계정 변환 후 실행해야한다.

```
[root@ip-172-31-41-160 linux-x86-64]# su sonar  
[sonar@ip-172-31-41-160 linux-x86-64]$ ./sonar.sh start
```


PART 5

Sonarqube & Jenkins 연동

Sonarqube & Jenkins 연동

1. ec2서버에 소나큐브 스캐너 설치

```
[root@ip-172-31-41-160 ~]# wget https://binaries.sonarsource.com/Distribution/sonar-scanner-cli/sonar-scanner-cli-3.3.0.1492-linux.zip
--2021-04-25 14:23:23-- https://binaries.sonarsource.com/Distribution/sonar-scanner-cli/sonar-scanner-cli-3.3.0.1492-linux.zip
Resolving binaries.sonarsource.com (binaries.sonarsource.com)... 91.134.125.245
Connecting to binaries.sonarsource.com (binaries.sonarsource.com)|91.134.125.245|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 73866903 (70M) [application/zip]
Saving to: 'sonar-scanner-cli-3.3.0.1492-linux.zip'

100%[=====>] 73,866,903 80.8KB/s in
```

2. 설치파일 압축 해제

```
[root@ip-172-31-41-160 ~]# unzip sonar-scanner-cli-3.3.0.1492-linux.zip
Archive:  sonar-scanner-cli-3.3.0.1492-linux.zip
```

3. 폴더 이동

```
[root@ip-172-31-41-160 ~]# mv sonar-scanner-3.3.0.1492-linux /opt/sonar-scanner
[root@ip-172-31-41-160 ~]# cd /opt/sonar-scanner
[root@ip-172-31-41-160 sonar-scanner]# ls
sonar-scanner-3.3.0.1492-linux
```

Sonarqube & Jenkins 연동

4. Jenkins와 sonarqube scanner 연동

```
[root@ip-172-31-41-160 ~]# mv /opt/sonar-scanner /var/lib/jenkins/sonar-scanner-3.3.0.1492-linux
```

=> 결과적으로,

/var/lib/jenkins/sonar-sanner-3.3.0.1492-linux/sonar-sanner-3.3.0.1492-linux 가 sonar runner 경로가 됨

5. Jenkins에 Sonarqube plugin 설치 (plugin : Sonarqube Scanner)

6. Jenkins – 시스템 설정 – sonarqube servers

SonarQube servers

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

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

SonarQube installations

Name

Sonar

Server URL

http://54[]:9000

Default is http://localhost:9000

Server authentication token

SonarQube

▼ Add ▼

SonarQube authentication token. Mandatory when anonymous access is disabled.

⇒ Sonarqube에서 프로젝트를 생성하면서 만든 토큰
(secret text로 만든 후 id는 sonar, pw는 토큰)

7. Jenkins – global tool configuration – sonarqube scanner

SonarQube Scanner

SonarQube Scanner installations

Add SonarQube Scanner

SonarQube Scanner

Name

Sonar scanner

SONAR_RUNNER_HOME

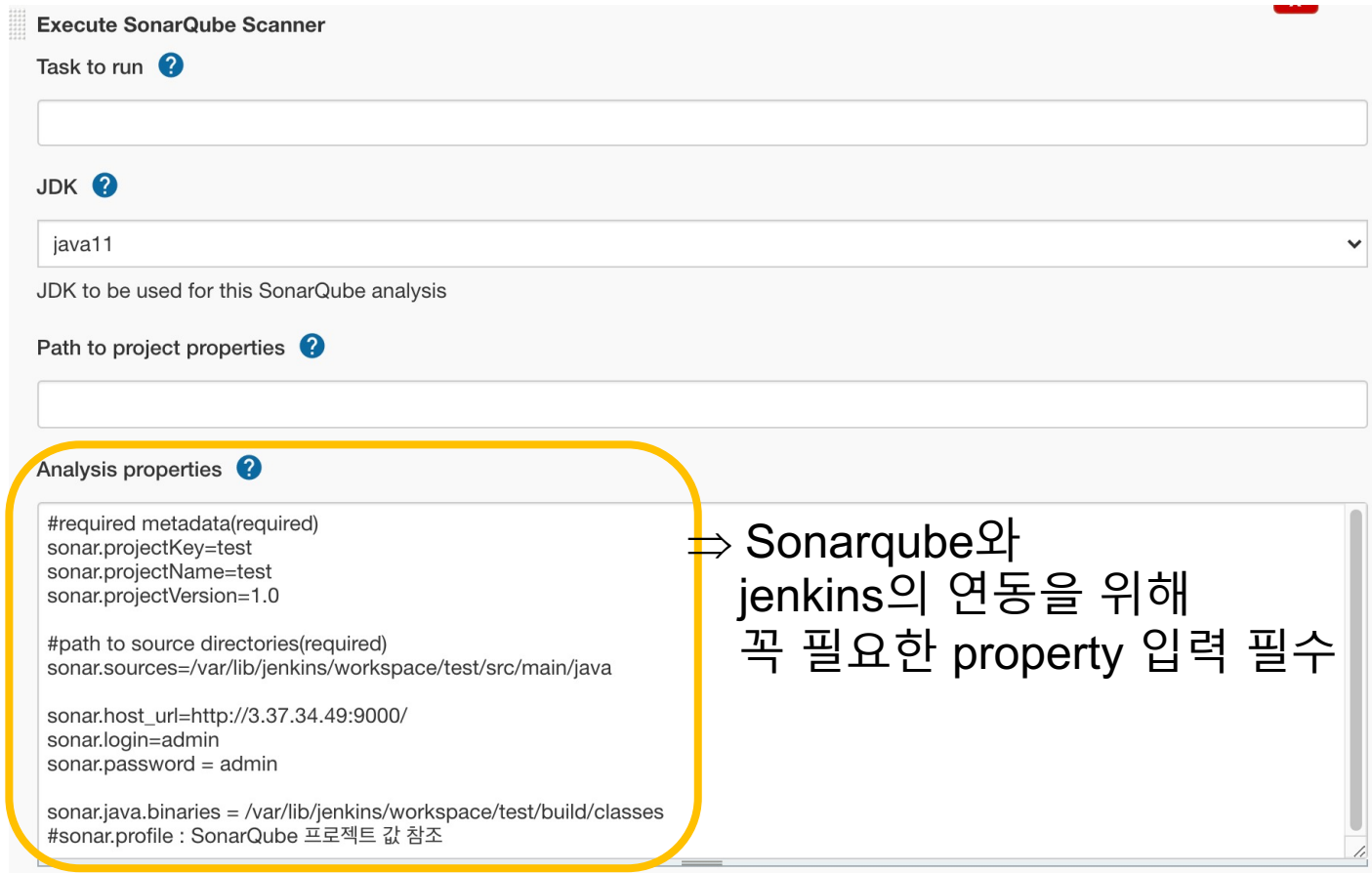
/var/lib/jenkins/sonar-scanner-3.3.0.1492-linux/sonar-scanner-3.3.0.1492-linux

Install automatically

⇒ Ec2서버상에서 설치한 sonarqube scanner를 이동시킨 폴더의 경로



8. 프로젝트 – 구성 – Build



Execute SonarQube Scanner

Task to run [?](#)

JDK [?](#)

java11

JDK to be used for this SonarQube analysis

Path to project properties [?](#)

Analysis properties [?](#)

```
#required metadata(required)
sonar.projectKey=test
sonar.projectName=test
sonar.projectVersion=1.0

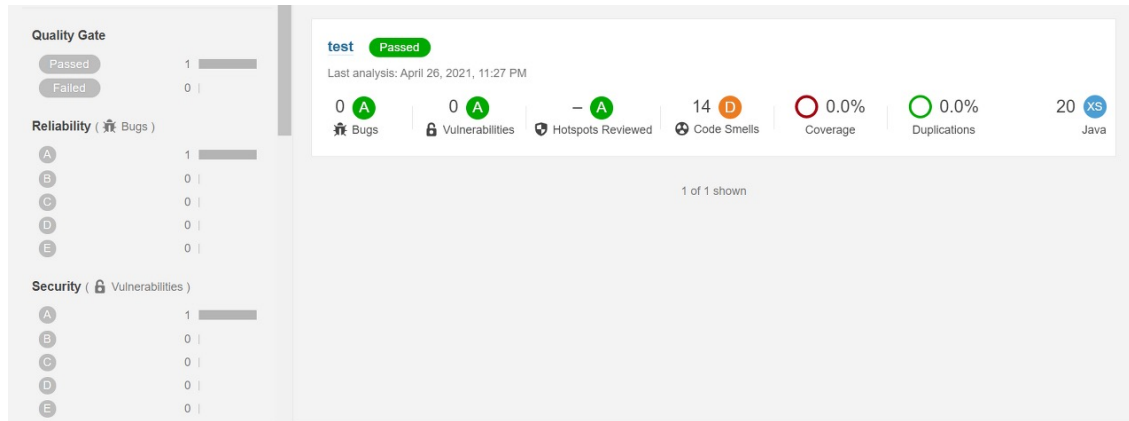
#path to source directories(required)
sonar.sources=/var/lib/jenkins/workspace/test/src/main/java

sonar.host_url=http://3.37.34.49:9000/
sonar.login=admin
sonar.password = admin

sonar.java.binaries = /var/lib/jenkins/workspace/test/build/classes
#sonar.profile : SonarQube 프로젝트 값 참조
```

⇒ Sonarqube와 jenkins의 연동을 위해 꼭 필요한 property 입력 필수

9. Build 후 Sonarqube 확인



The screenshot shows the Jenkins console output for a build. The output includes the following items:

- 대시보드로 돌아가기
- 상태
- 변경사항
- 작업공간
- Build Now
- 구성
- Project 삭제
- Redmine - SoftwareV-V
- GitHub Hook Log
- GitHub
- SonarQube
- Rename
- Build History (추이)

The 'Build History' section shows a search bar with 'find' and a list of builds:

Build ID	Timestamp
#133	2021. 4. 27 오후 1:13

Project test



SonarQube Quality Gate

test **Passed**

server-side processing: **Success**

고정링크

- Last build, (#133), 12 hr 전
- Last stable build, (#133), 12 hr 전
- Last successful build, (#133), 12 hr 전
- Last failed build, (#132), 13 hr 전
- Last unsuccessful build, (#132), 13 hr 전
- Last completed build, (#133), 12 hr 전

PART 6

PMD, CheckStyle, FindBugs 설치

PMD, CheckStyle, FindBugs 설치

- Sonarqube내 Administration – System-Update- Center를 눌러 플러그인 설치

The screenshot shows the SonarQube Administration Update Center. The interface includes a navigation menu with 'Configuration', 'Security', 'Projects', and 'System'. The 'Update Center' section is active, displaying a list of available plugins. Each plugin entry includes its name, description, version, release date, and an 'Install' button. Some entries also have a checkbox for 'I accept the Terms and Conditions'.

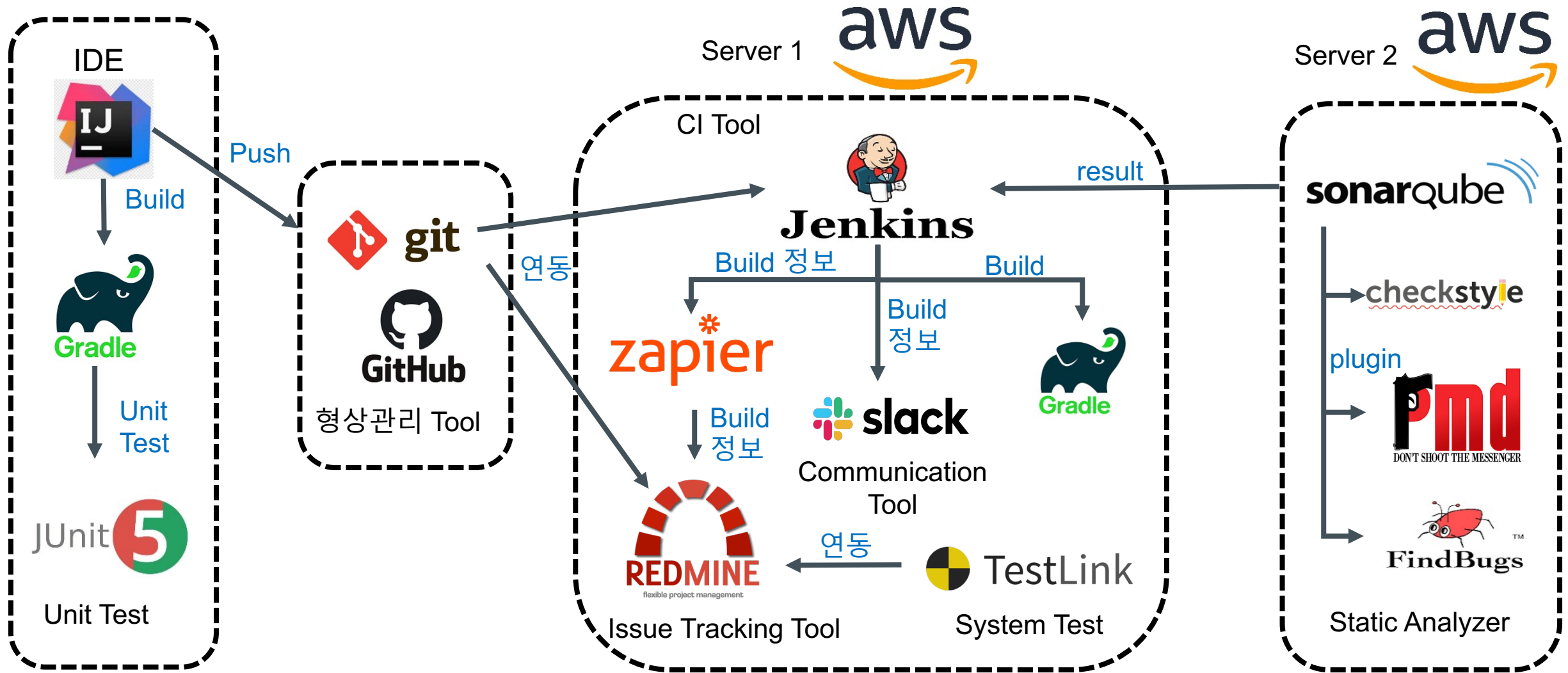
Plugin Name	Description	Version	Release Date	License	Developed by	Install Button
3D Code Metrics	Displays 3D view of your source code as a city	3.1	SonarQube 5.4 support	Commercial	escentia	Install
ABAP	Enables scanning of ABAP-source files	3.0.1	Bug fix release	Commercial	SonarSource	Install
Android	Provide the ability to import Android Lint reports	3.11	This plugin has been renamed "Android Lint" to prevent any misunderstanding about its purpose: an Android project can be analysed with the standard SonarQube Java plugin and this plugin just allows to import Android Lint reports if needed. This new version provides a default sqale mapping for the Android Lint rules and the ability to automatically execute lint has been dropped. Installing this plugin will also install Java	Commercial	SonarSource and Jerome Van Der Linden, Stephane Nicolas, Floren Roncan, Thomas Borez	Install
Azure Active Directory (AAD) Authentication Plug-in for SonarQube	Enables Azure Active Directory (AAD) users to automatically be sign up (a login is created if they don't have one already) and authenticated on a SonarQube server.	3.0	Initial release	Commercial	Visual Studio ALM Rangers	Install
Bitbucket Authentication for SonarQube	Enables OAuth delegation to Bitbucket	3.0	Initial release	Commercial	SonarSource	Install
C / C++ / Objective-C	Enables scanning of C and C++ source files	3.1.0	9 new rules, native support of Visual C++ projects with help of SonarQube Scanner for MSBuild and build-wrapper directly available from SonarQube server	Commercial	SonarSource	Install
CF	Enables scanning of CF source files	3.1	Provides 9 new rules	Commercial	SonarSource	Install



PART 7

Summary

Summary





Q & A