

Software Verification

[정적분석도구 & 시스템테스트 도구]

Team 3

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*** Redmine**

- Mail 알림 -



Recent Presentation

초기화면 내 페이지 프로젝트 관리 도움말

Redmine

설정

일반 표시방식 인증 API 프로젝트 일감 추적 파일 **메일 알림** 수신 메일 저장소

발신 메일 주소

참조자들을 bcc로 숨기기

텍스트만 (HTML 없이)

기본 알림 옵션

알림메일이 필요한 작업을 선택하세요.

- 일감 추가
 - 댓글이 추가되었습니다.
 - 상태가 변경되었습니다.
- 일감 수정

Redmine 메일 알림

설정 및 결과

<input type="checkbox"/>			mrqls1220@naver...	Redmine test	16-04-05 21:57	2,8 KB
<input type="checkbox"/>			aksim2@gmail.com	Redmine test	16-04-05 21:54	2,9 KB
<input type="checkbox"/>			mrqls1220@naver...	Redmine test	16-04-05 21:51	2,8 KB

INDEX

01 시스템테스트 도구

02 정적분석 도구

03 CTIP 연동

04 CTIP 환경

05 Q & A

1. 시스템테스트 도구

- Test link -

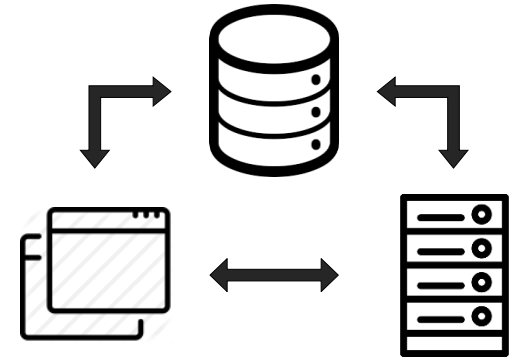
Purpose



사용자가 원하는 기능
테스트



사용자가 원하는 성능
테스트



외부 시스템과의 연계
테스트

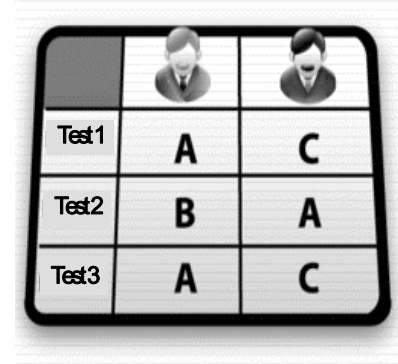
Feature





웹 기반
테스트 관리 프로그램



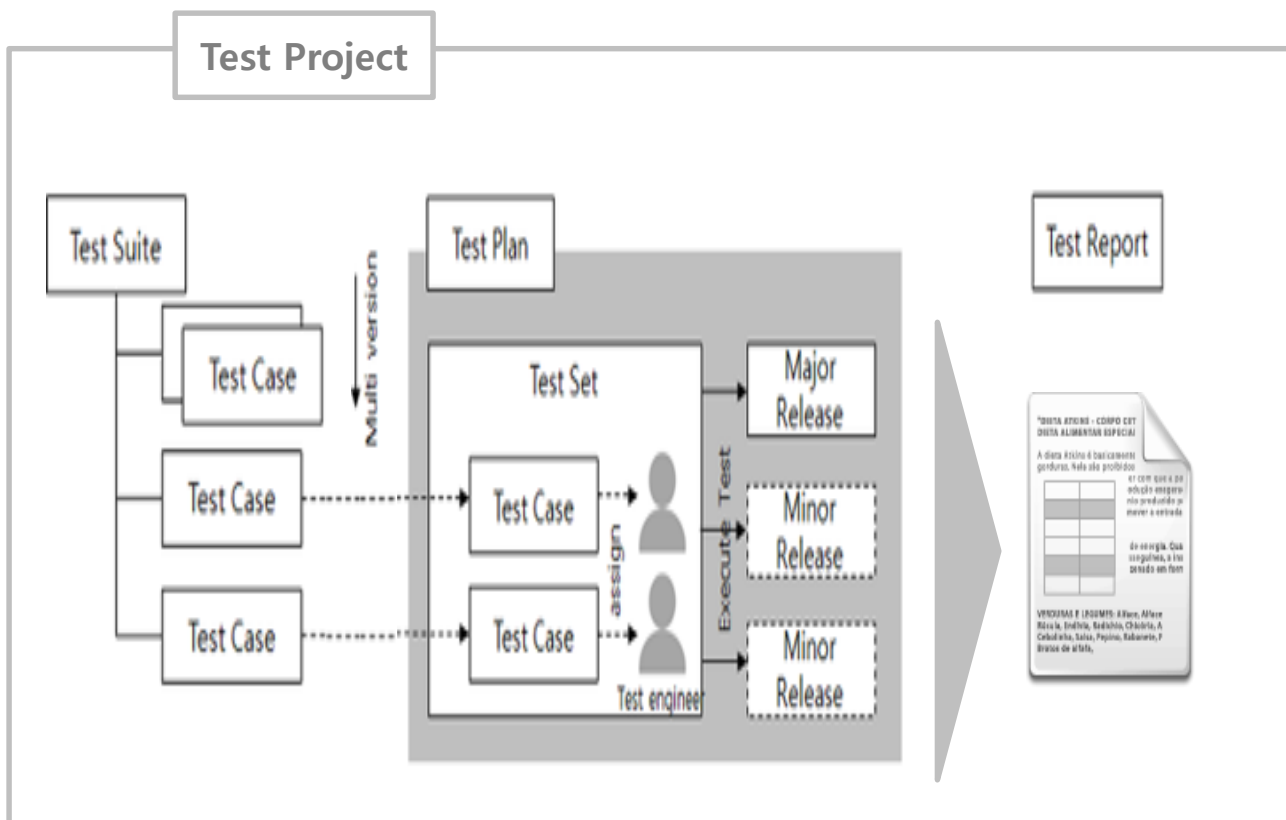
요구사항 별 T.O, T.C,
버전 별 T.C 관리 및 추적



		
Test1	A	C
Test2	B	A
Test3	A	C

테스터에게
작업 지정

Fundamental Concept



[Test Project]

테스트를 수행하는 프로젝트 자체를 이야기 한다.
단일 테스트 프로젝트로도 만들 수 있고, 하나의 서비스에 대해서 여러가지 프로젝트로 분할해서 테스트를 진행할 수 있다.

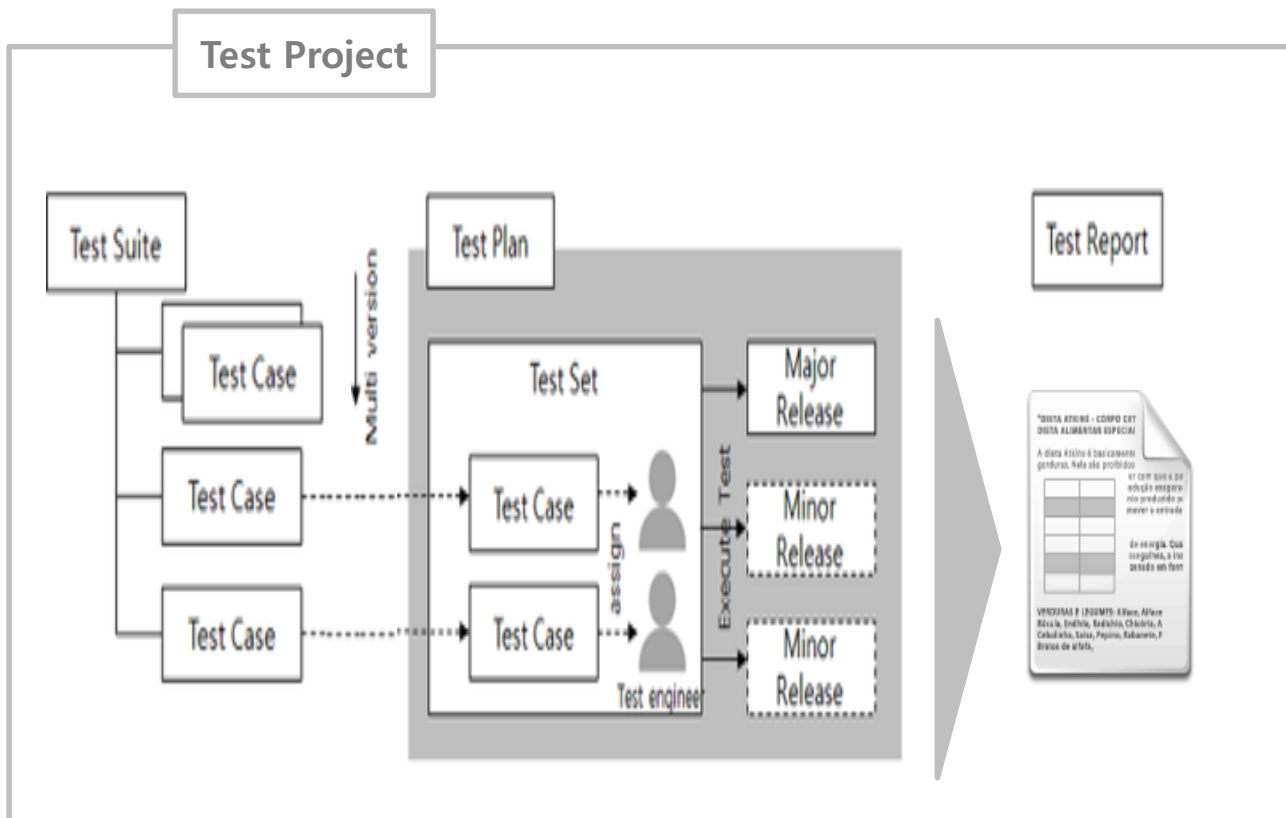
[Test Specification]

테스트를 진행하고자 하는 테스트 케이스들의 집합이다.
Test Suite과 Test case로 나뉘어져 있는데, Test Suite은 대분류, Test Case는 소분류라고 보면 된다.

[Test Plan]

실제 진행하는 테스트를 의미한다. Test Project내에서, 테스트 대상 시스템의 특정 버전을 테스트 하기 위해서 Test Spec 내의 Test Suite/Case를 모아 놓은 것을 의미한다.

Fundamental Concept



[Test Execution]

Test Plan을 세웠으면, 실제로 각 Test Engineer가 자기에게 할당된 테스트를 수행하고, 테스트 결과 Pass/Fail 여부를 체크한다.

[Test Report]

테스트 결과를 리포팅한다.

테스트 실패, 성공 여부, 주요 Test Category(Test Suite)별 성공 실패 여부 등을 리포팅 한다.

Install

<https://bitnami.com/stack/testlink/installer#linux>

Linux



Version	Size	Checksum	
TestLink 1.9.14-2 (64-bit)	89 MB	show	Download Recommended
TestLink 1.9.14-2	86 MB	show	Download

Modules

If you already have a Bitnami LAMP installed you can add TestLink on top of that installation using a module. Visit the [LAMP Stack module page](#).

We are Hiring! Love Bitnami and the Cloud? Top-notch developer or sysadmin? [Join our team »](#)

자신의 OS에 맞는 Download 주소 복사

Install

```
ubuntu@ip-172-31-20-74:~$ sudo wget https://bitnami.com/redirect/to/95446/bitnami-testlink-1.9.14-2-linux-x64-installer.run
--2016-04-11 09:57:12-- https://bitnami.com/redirect/to/95446/bitnami-testlink-1.9.14-2-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/1.9.14-2/bitnami-testlink-1.9.14-2-linux-x64-installer.run [following]
--2016-04-11 09:57:13-- https://downloads.bitnami.com/files/stacks/testlink/1.9.14-2/bitnami-testlink-1.9.14-2-linux-x64-installer.run
Resolving downloads.bitnami.com (downloads.bitnami.com)... 54.230.109.112, 54.230.109.123, 54.230.109.125, ...
Connecting to downloads.bitnami.com (downloads.bitnami.com)|54.230.109.112|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 93700116 (89M) [binary/octet-stream]
Saving to: 'bitnami-testlink-1.9.14-2-linux-x64-installer.run'

100%[=====>] 93,700,116  91.4MB/s  in 1.0s

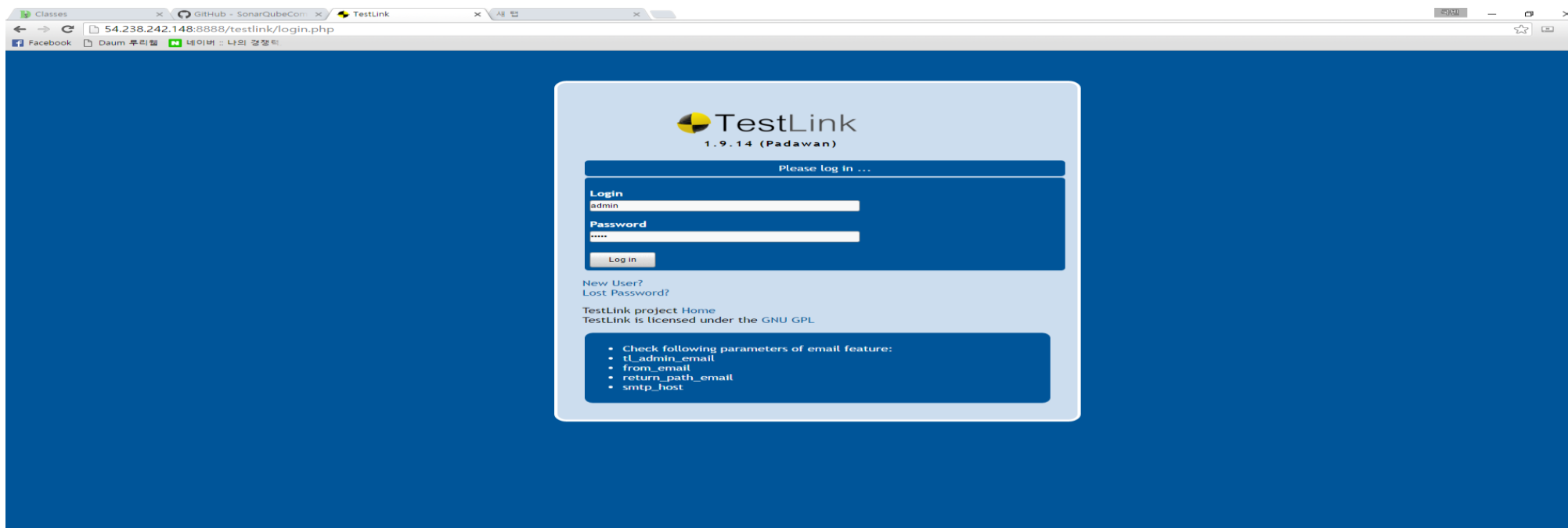
2016-04-11 09:57:14 (91.4 MB/s) - 'bitnami-testlink-1.9.14-2-linux-x64-installer.run' saved [93700116/93700116]
```

```
ubuntu@ip-172-31-20-74:~$ ./bitnami-testlink-1.9.14-2-linux-x64-installer.run
```

설치파일 실행

Use

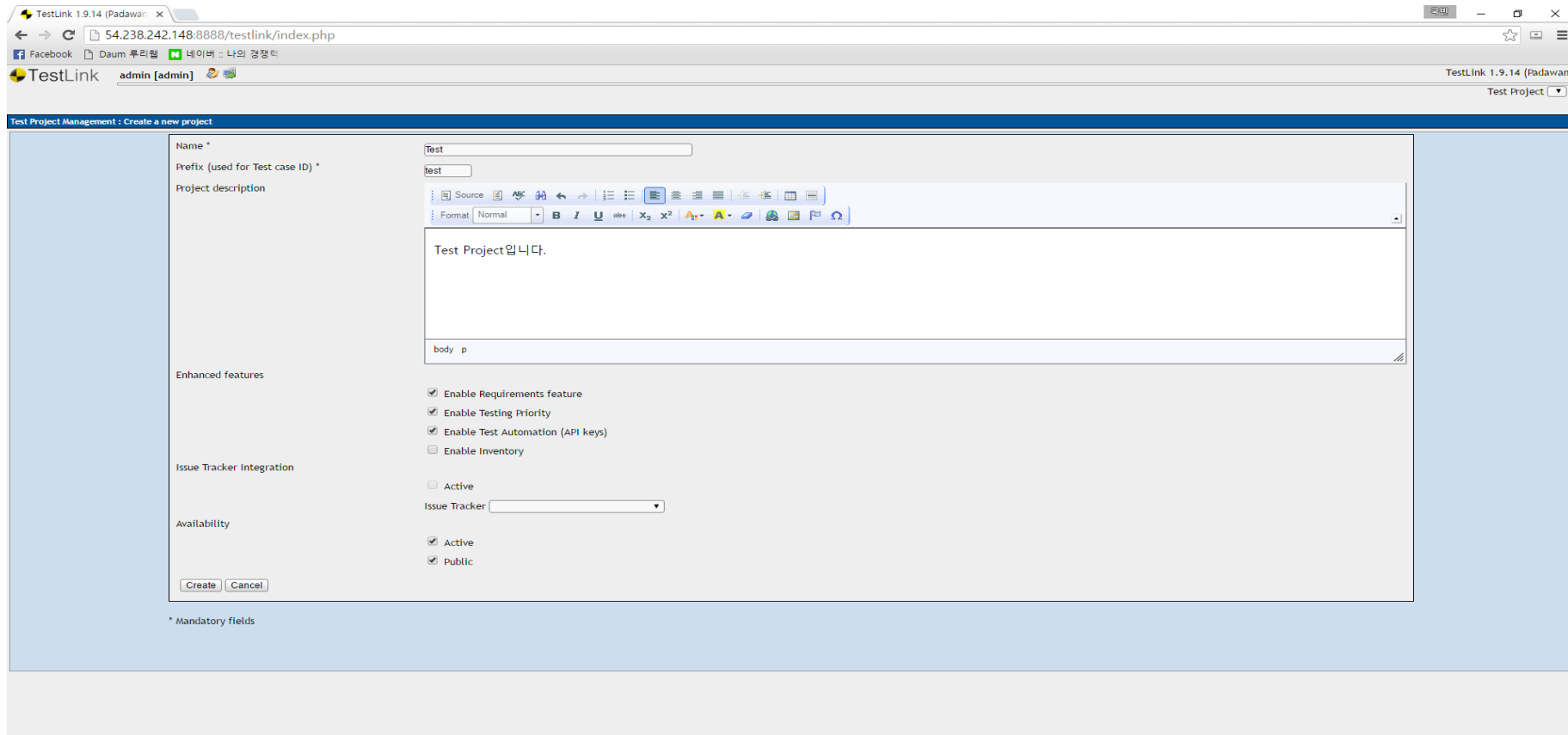
<http://testlinkServer IP : Port/testlink>



설치할 때 지정한 관리자 ID와 PW로 로그인

Use

Test Project 생성



Use

요구사항 관리

The screenshot shows the TestLink main dashboard. At the top, there is a navigation bar with the TestLink logo, the user name 'admin [admin]', and a search bar containing 'test-'. Below the navigation bar, there are four main menu categories:

- System**: Define Custom Fields, Issue Tracker Management
- Test Project**: Test Project Management, Assign User Roles, Assign Custom Fields, Keyword Management, Platform Management
- Requirement Specification**: Requirement Specification (highlighted with a red box), Requirement Overview, Search Requirements, Search Requirement Specifications, Assign Requirements, Generate Requirement Specification Document
- Test Specification**: Test Specification, Test Cases created per User

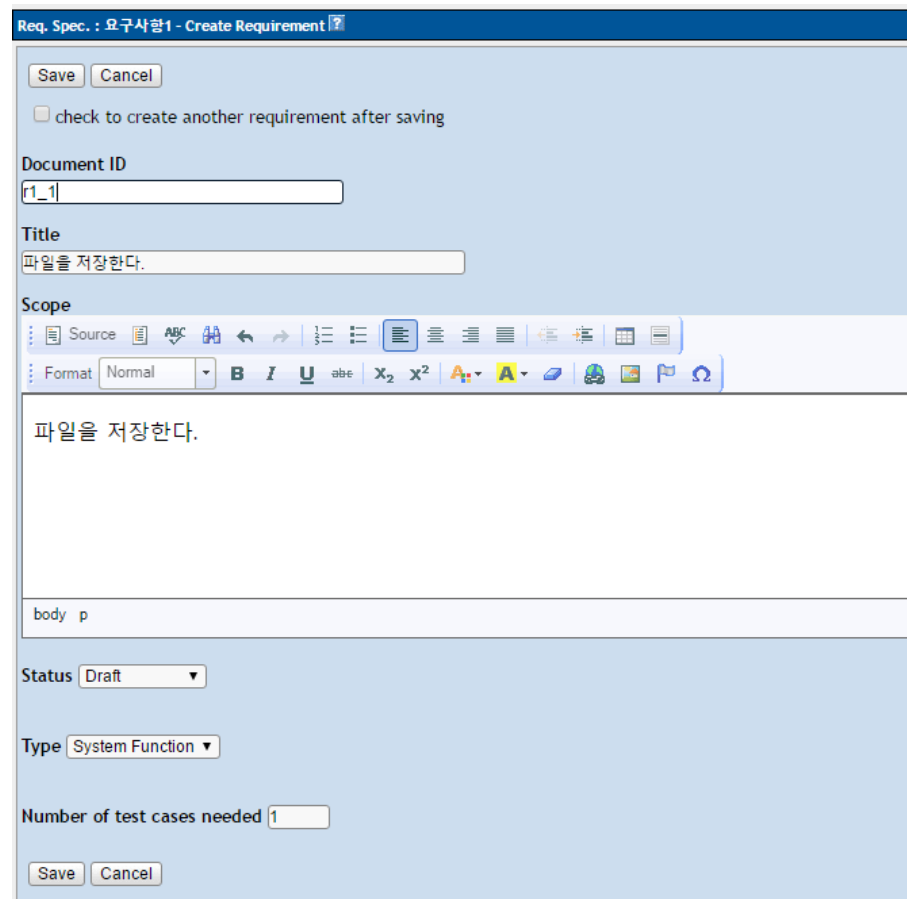
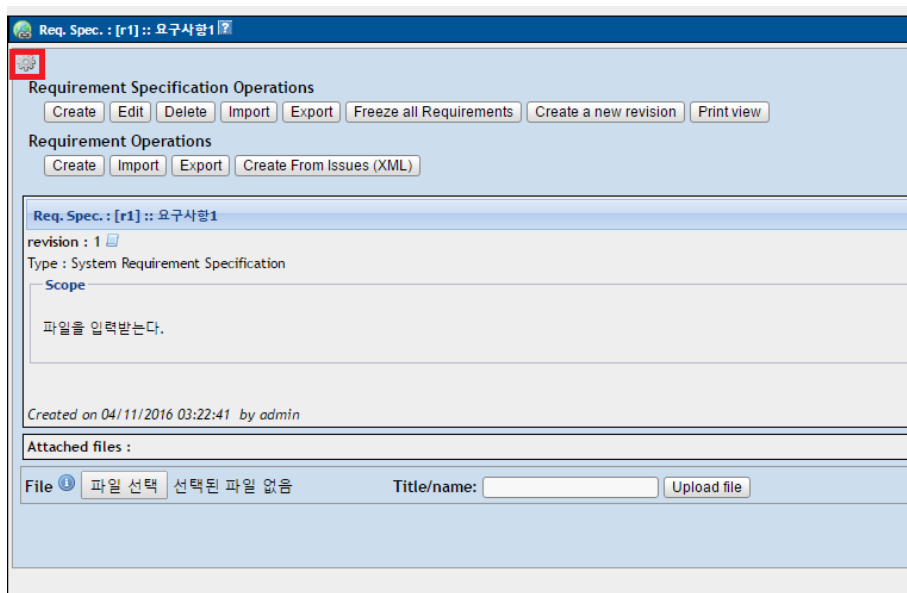
This screenshot shows the 'Test Project : Test : Requirement Specifications' page. At the top, there are three buttons: 'Create' (highlighted with a red box), 'Export All Requirement Specifications', and 'Import'.

This screenshot shows the 'Create Requirements Specification Test Project : Test' form. It includes the following fields and elements:

- Buttons: Save, Cancel
- Document ID: Input field with 'r1'
- Title: Input field with '요구사항1'
- Scope: A rich text editor area containing the text '파일을 입력받는다.' and a toolbar with various formatting options.
- Type: A dropdown menu currently showing 'Section', with a list of options: Section, User Requirement Specification, and System Requirement Specification (highlighted).
- Buttons: Save

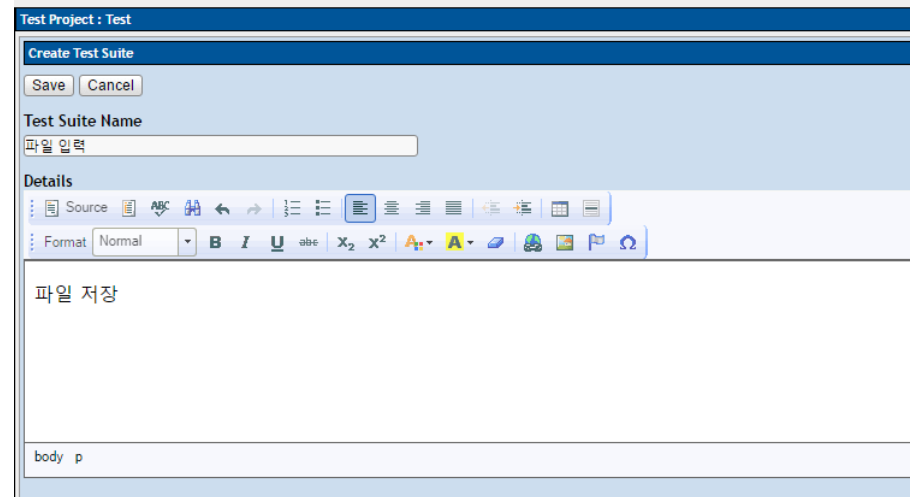
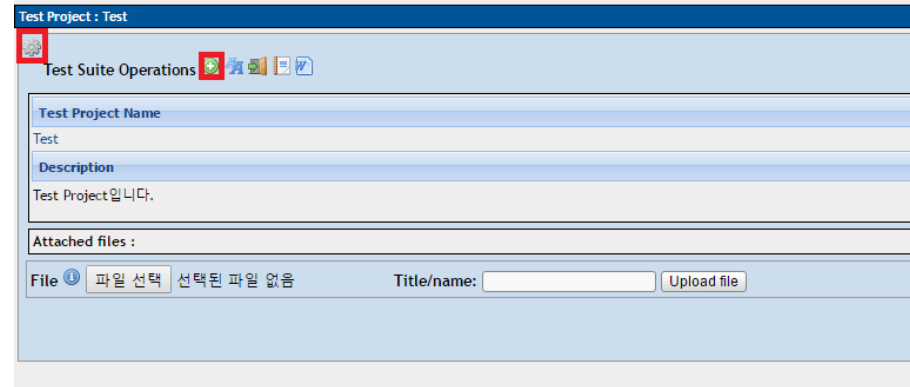
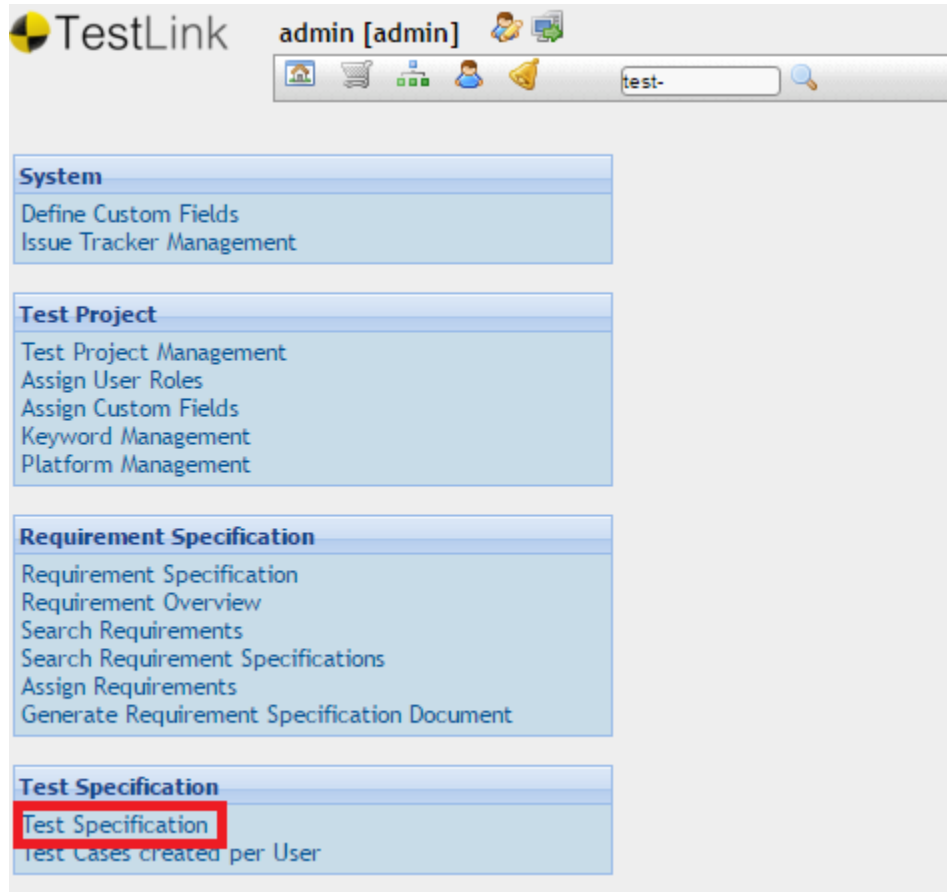
Use

요구사항에 관한 Operation 관리



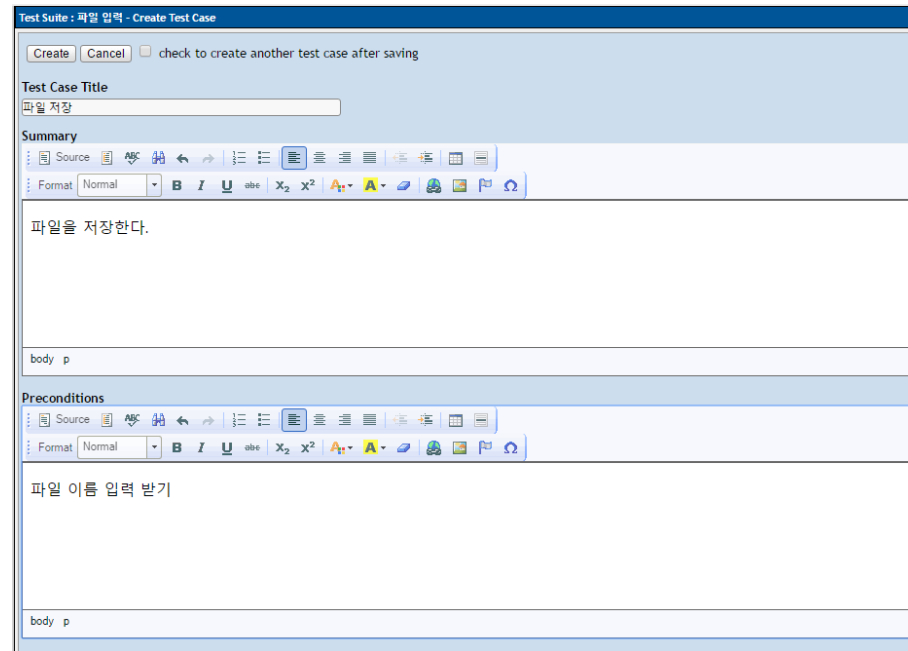
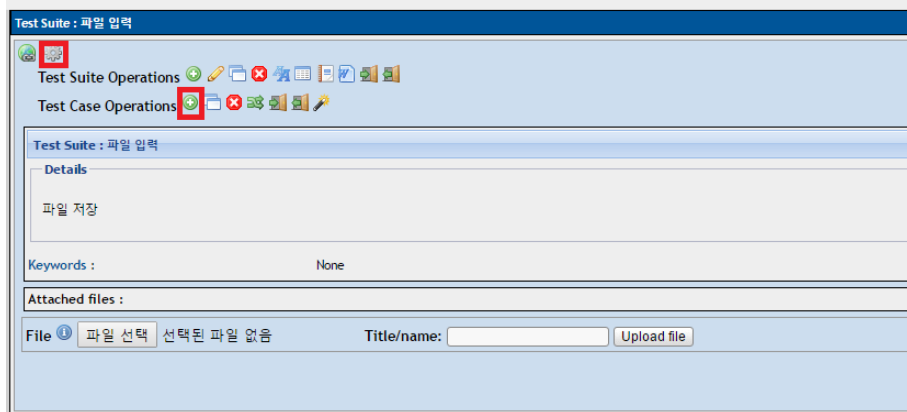
Use

Test Suite 생성



Use

Test Case 생성 (1/2)



Use

Test Case 생성 (2/2)

Test Case

test-1:파일 저장

Version 1

Summary
파일을 저장한다.

Preconditions

Create step

Status : Draft Importance : Medium Execution type : Manual

Keywords: None

Requirements : None

Relations

New relation: This test case is related to PREFIX-ID Add

Attached files :

File 파일 선택 선택된 파일 없음 Title/name: Upload file

Create Step - Test Case: test-1:파일 저장 - Version: 1

Step number: 2 created

test-1 : 파일 저장

Version 1

Summary
파일을 저장한다.

Preconditions

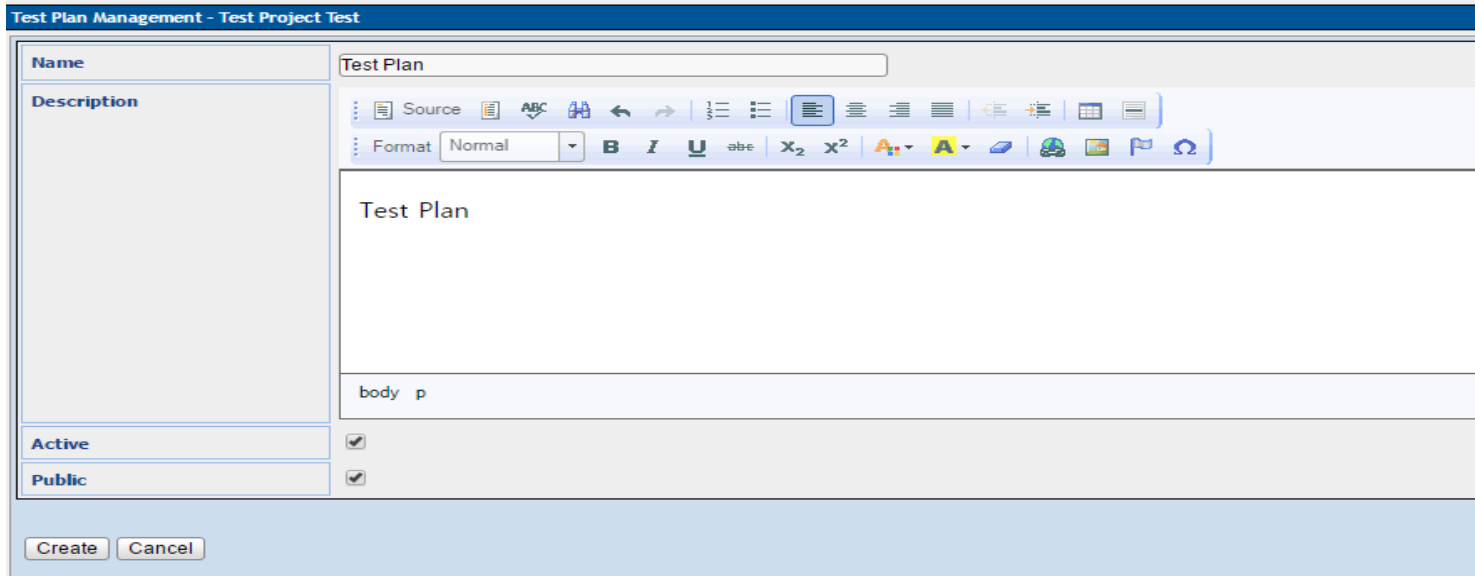
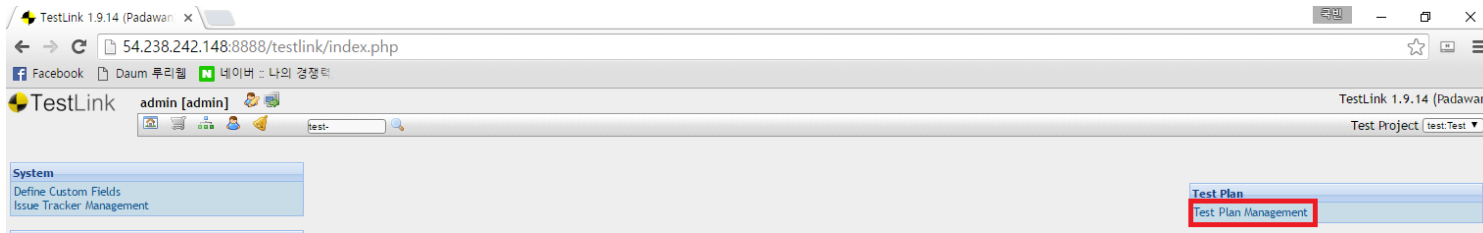
Save Save & exit Cancel

#	Step actions	Expected Results
1	파일 이름 입력	이름을 저장한다.
2	파일 저장	해당하는 파일을 저장한다.
3		

Save Save & exit Cancel

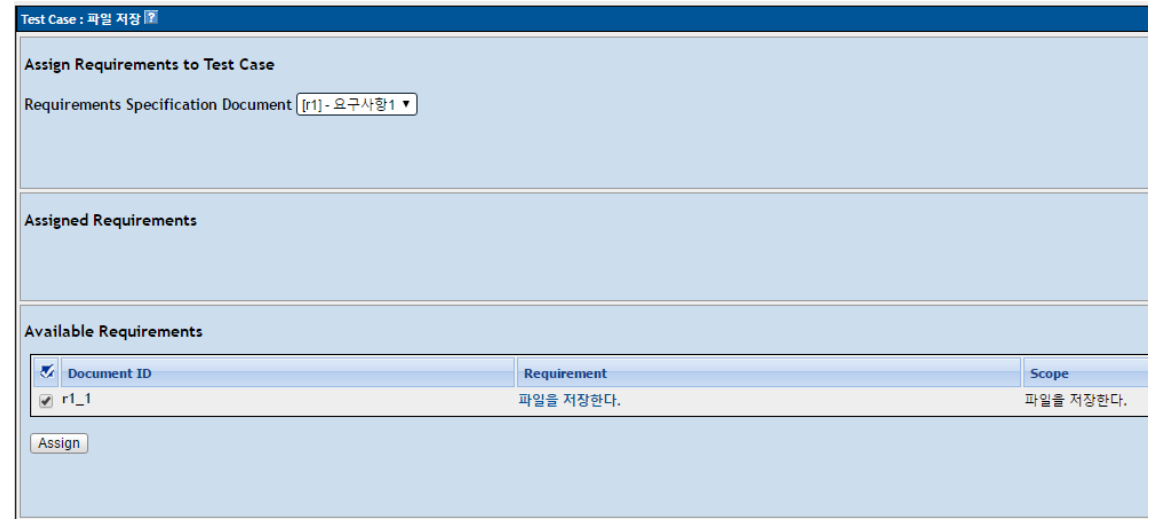
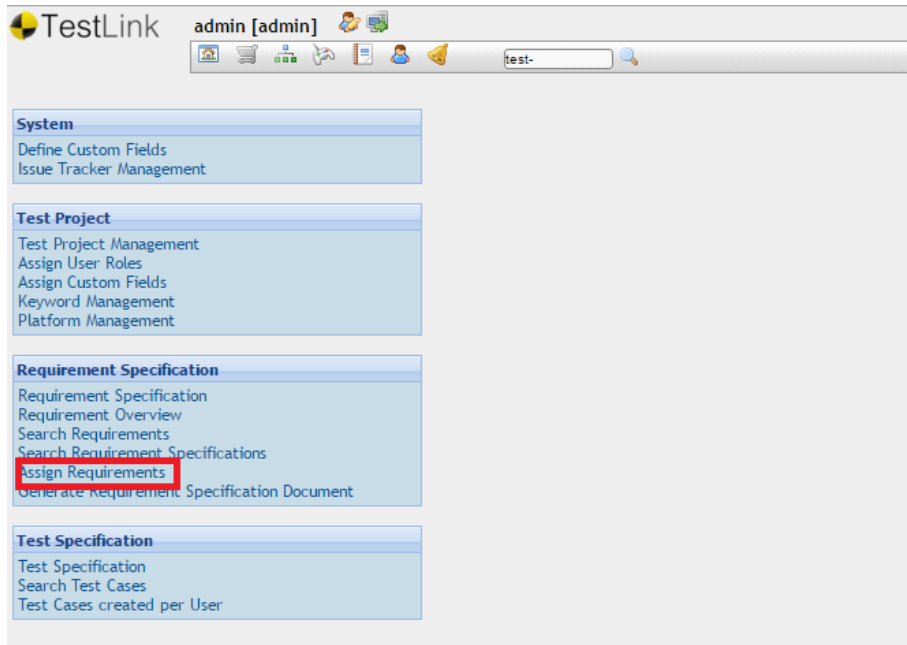
Use

Test Plan 생성



Use

Requirement와 Operation 매칭



Use

Test Plan에 Test Case 추가

Current Test Plan: Test Plan OK

Test Plan
Test Plan Management
Builds / Releases
Milestone Overview

Test Execution
Execute Tests
Test Cases Assigned to Me
Test Reports and Metrics
Metrics Dashboard

Test Plan contents
Add / Remove Test Cases
Assign Test Case Execution
Set Urgent Tests
Update Linked Test Case Versions
Show Test Cases Newest Versions

Test Plan : Test Plan - Add Test Cases to Test Plan

Assign to user on add ▼ on build Build 1 Send mail notification to tester

Check/uncheck all Test cases for adding removal Add selected Save order

파일 입력

<input checked="" type="checkbox"/> Test Case	Version	Importance	
<input checked="" type="checkbox"/> test-1 : 파일 저장	1	Medium	10000

Use

User(테스트 엔지니어)에게 Test Case 할당

Current Test Plan: Test Plan [OK]

Test Plan
Test Plan Management
Builds / Releases
Milestone Overview

Test Execution
Execute Tests
Test Cases Assigned to Me
Test Reports and Metrics
Metrics Dashboard

Test Plan contents
Add / Remove Platforms
Add / Remove Test Cases
Assign Test Case Execution
Add / Remove Tests
Update Linked Test Case Versions
Show Test Cases Newest Versions

Assigning Test Case execution tasks for build Build 1 in test plan Test Plan

Check/uncheck all Test cases

Bulk user assignment
[Input Field] [Do] [Save] [Email Icon] [Refresh Icon]

Do Bulk user remove

파일 입력

<input checked="" type="checkbox"/>	Test Case [Version]	Priority	Assigned to	Assign to
<input checked="" type="checkbox"/>	test-1 : 파일 저장 [1]	Medium		<input type="text" value="admin"/> <input type="text" value="junik"/>

Use

할당된 Test Case 확인

Current Test Plan:

Test Plan
Test Plan Management
Builds / Releases
Milestone Overview

Test Execution
Execute Tests
Test Cases Assigned to Me
Test Reports and Metrics
Metrics Dashboard

Test Plan contents
Add / Remove Platforms
Add / Remove Test Cases
Assign Test Case Execution
Set Urgent Tests
Update Linked Test Case Versions
Show Test Cases Newest Versions

TestLink junik [admin]

Test Project: Test - Test Cases Assigned to User: junik

Show also closed builds

Test Plan: Test Plan

Expand/Collapse Groups Show all Columns Reset to Default State Refresh Reset Filters MultiSort

Test Suite	Test Case
Build: Build 1 (1 Item)	
파일 입력	test-1 : 파일 저장 [v1]

Generated by TestLink on 04/11/2016 05:14:37

Use

Current Test Plan:
Test Plan

Test Plan

- Test Plan Management
- Builds / Releases**
- Milestone Overview

Test Execution

- Execute Tests
- Test Cases Assigned to Me
- Test Reports and Metrics
- Metrics Dashboard

Test Plan contents

- Add / Remove Platforms
- Add / Remove Test Cases
- Assign Test Case Execution
- Set Urgent Tests
- Update Linked Test Case Versions
- Show Test Cases Newest Versions

Test Plan의 Build 생성

TestLink admin [admin]

Build management - Test Plan : Test Plan

Create a new Build

Title: Build 1

Description: Build 1

Active:

Open:

Release date:

A build is identified by its title. Each build is related to the active Test Plan.
Description should include: list of delivered packages, fixes or features, approvals, status, etc.
A build has two attributes:
Active / Inactive - defines whether the build can be used. Inactive builds are not listed on the execution and reports pages.
Open / Closed - Only for open builds, test results can be modified.

Use

Test 실행

Current Test Plan: Test Plan

Test Plan
 Test Plan Management
 Builds / Releases
 Milestone Overview

Test Execution
Execute Tests
 Test Cases Assigned to Me
 Test Reports and Metrics
 Metrics Dashboard

Test Plan contents
 Add / Remove Platforms
 Add / Remove Test Cases
 Assign Test Case Execution
 Set Urgent Tests
 Update Linked Test Case Versions
 Show Test Cases Newest Versions

Last execution (any build)
Not Run

Not Tested Yet

Test Case test-1 :: Version : 1 :: 파일 저장
 No tester assigned

Summary
 파일을 저장한다.

Preconditions

#	Step actions	Expected Results	Execution	Execution notes	Result
1	파일 이름 입력	이름을 저장한다.	Automated	<input type="text" value="항목"/>	Passed
File <input type="button" value="파일 선택"/> 선택된 파일 없음					
2	파일 저장	해당하는 파일을 저장한다.	Automated	<input type="text" value="항목"/>	Passed
File <input type="button" value="파일 선택"/> 선택된 파일 없음					

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

Requirements
 [요구사항1] r1_1 : 파일을 저장한다.

Notes / Description

Result: Passed
 Execution duration (min):
 Assign task to me:
Save execution Save and move to next

Important Notice: Once a Result is updated from 'Not Run' to another value, you cannot set it back to 'Not Run'.

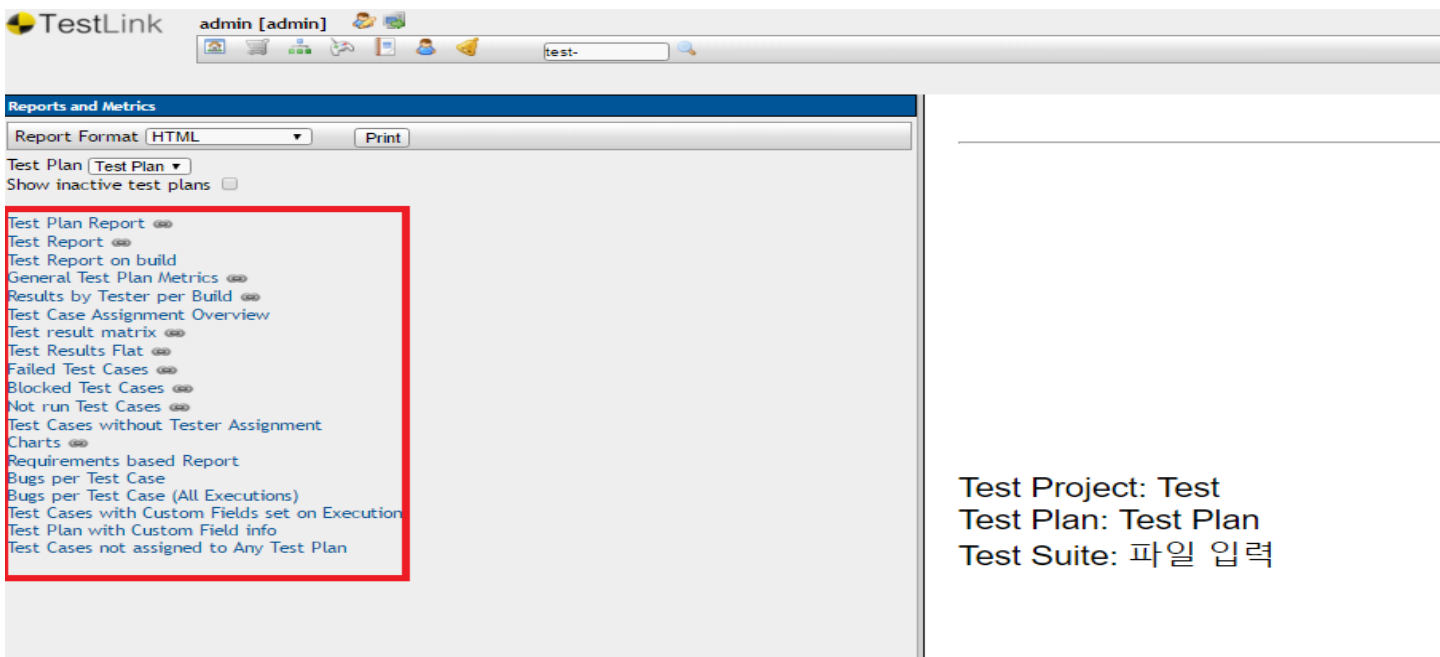
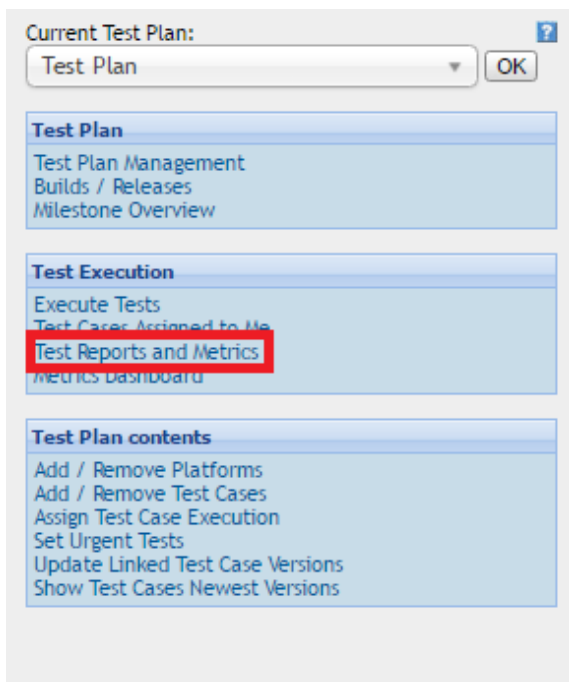
Execution history - Build : Build 1

Date	Tested by	Status	Exec (min)	Version	Run mode
04/11/2016 04:18:30	admin	Passed		1	<input type="button" value="항목"/>

Notes

Use

Test Report



Test Project: Test
Test Plan: Test Plan
Test Suite: 파일 입력

Use

Current Test Plan:
Test Plan

Test Plan
Test Plan Management
Builds / Releases
Milestone Overview

Test Execution
Execute Tests
Test Cases Assigned to Me
Test Reports and Metrics
Metrics Dashboard

Test Plan contents
Add / Remove Platforms
Add / Remove Test Cases
Assign Test Case Execution
Set Urgent Tests
Update Linked Test Case Versions
Show Test Cases Newest Versions

Metric Dashboard

TestLink admin [admin]

Test Project : Test

Show metrics only for active test plans

Test Project Progress

Progress: 100% [1/1]

Not Run: 0% [0/1]

Passed: 100% [1/1]

Failed: 0% [0/1]

Blocked: 0% [0/1]

The project progress is calculated by summing up all executions for a specific execution result for all platforms within all test plans. This sum is then set into relation to the sum of all active test cases for all platforms within all test plans.

Test Plan Progress

Metrics Dashboard

Expand/Collapse Groups Show all Columns MultiSort ↓

Test Plan	Active Test Cases	Not Run [%]	Passed [%]	Failed [%]	Blocked [%]	Progress [%]
Test Plan - Overall Progress: 100%	1	0	100	0	0	100

This Report shows the progress for the whole project and all (or only active) test plans defined within project.
"Overall Progress" for test plans is calculated based upon the progress of each platform (if in use).
"Test Project Progress" is calculated based upon the progress of all (or only active) test plans.

Generated by TestLink on 04/11/2016 04:37:59

2. 정적분석 도구

- SonarQube
- PMD, Checkstyle, Findbug

Code Review



사람이 직접 소스코드를 보면서
코드의 품질 체크

Static Analysis



자동화된 툴에 의해서
코드의 품질 체크

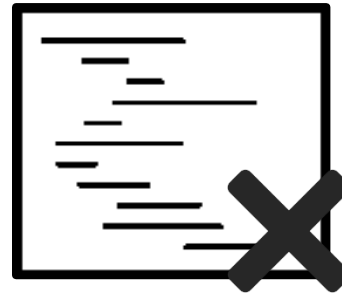
Purpose



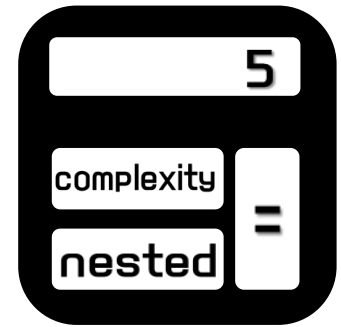
잘 알려진
버그 리포팅



표준에 맞지 않는
코드 검출



실행되지 않는
코드 검출

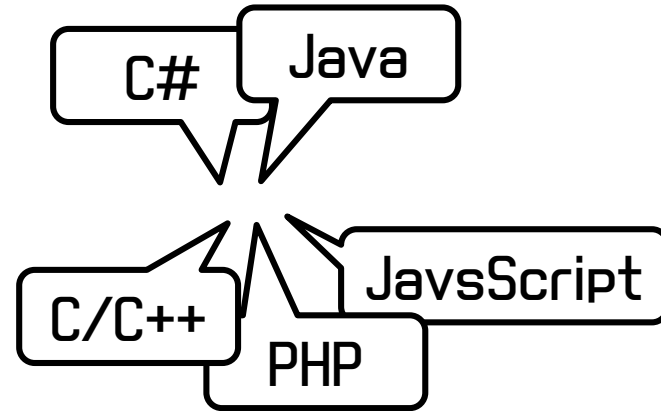


코드의 복잡도를 계산

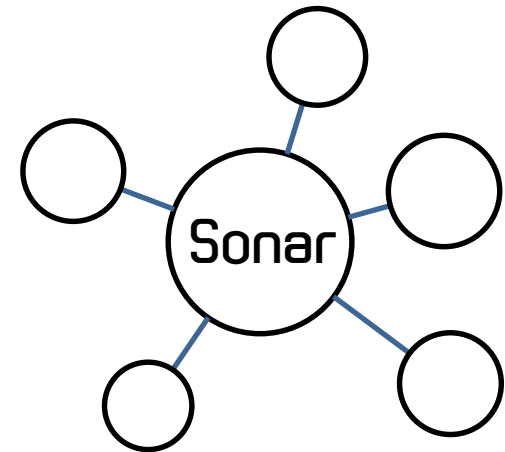
Introduction

- Duplicate code
- Coding standards
- Code coverage
- Complex code
- Potential bugs
- Comment
- Design and Architecture

다양한 품질 항목들에
대해서 분석해
사용자에게 결과 제공



20개 이상 언어 지원

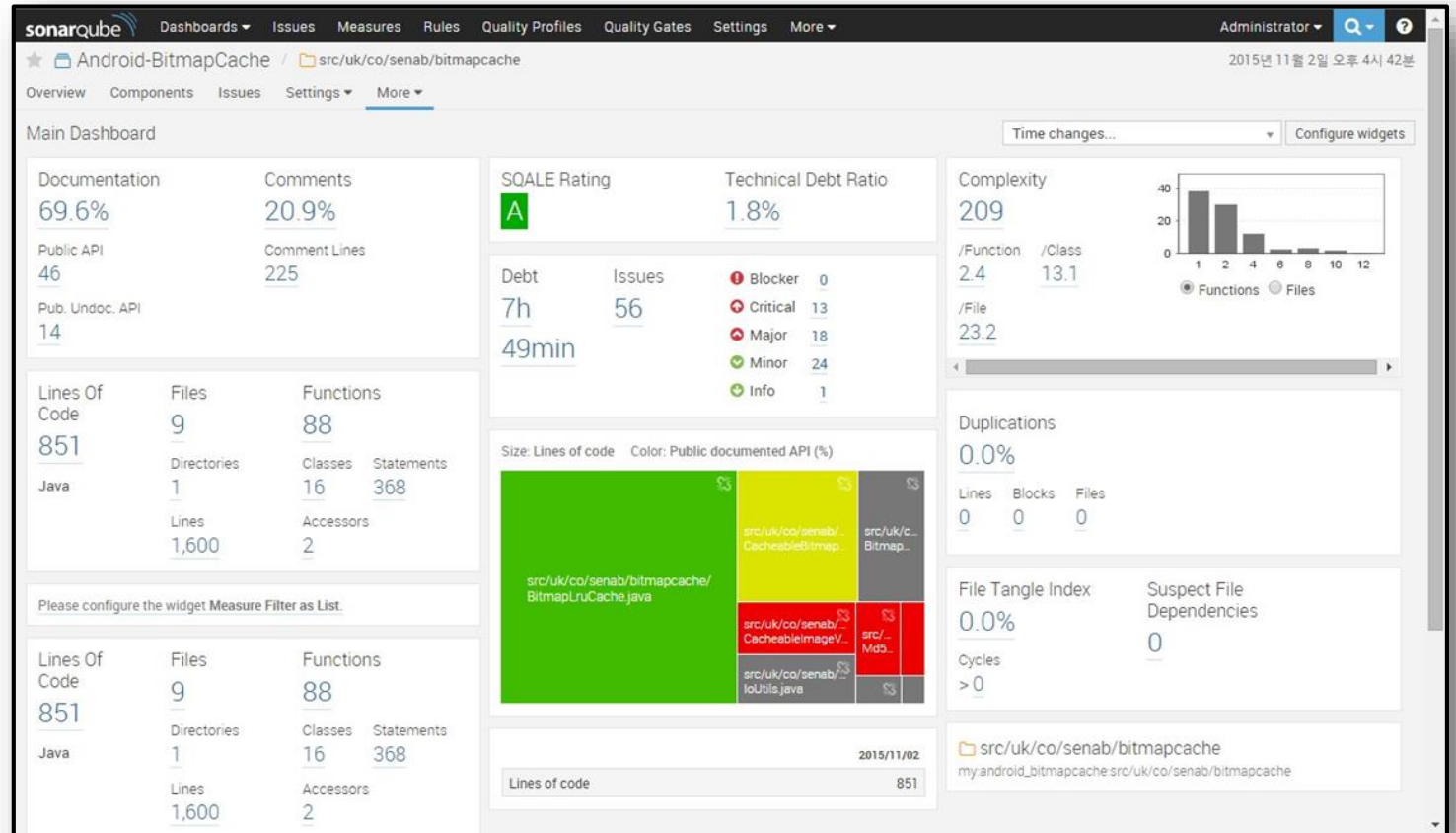


60여가지
플러그인 제공

Feature



직관적인
대시보드 제공



Feature



지속적인 품질관리 가능

The screenshot displays the SonarQube interface for a project named 'test'. At the top, there are navigation tabs for 'Technical Debt', 'Coverage', 'Duplications', 'Structure', '대시보드', 'Code', '이슈', and '환경설정'. Below these, a summary table shows:

False positive issues	0	+0
Open issues	11	
Reopened issues	1	

The 'History' section is highlighted with a red box. It features a dropdown menu currently set to 'Confirmed issues'. The dropdown menu is open, showing the following options:

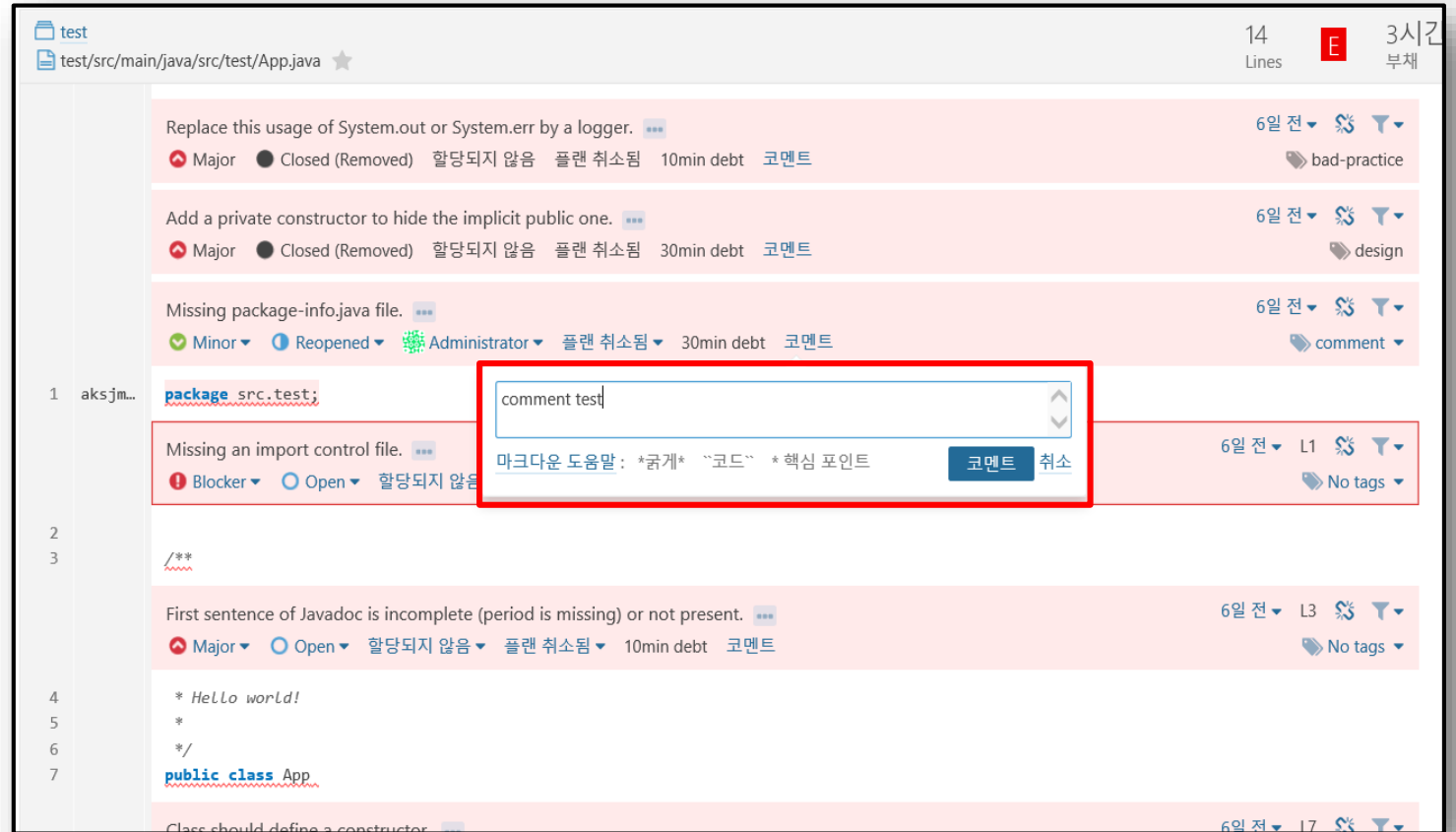
- Critical issues
- Issues
- Blocker issues
- Confirmed issues
- Critical issues
- False positive issues
- Info issues
- Issues
- Major issues
- Minor issues
- Open issues

The background of the screenshot shows a chart area with a yellow bar and a green bar, and a timeline from 'Wed 06' to 'Apr 10'. The footer of the interface reads: 'SonarQube™ technology is powered by SonarSource SA. Version 5.4 - LGPL v3 - Community - Documentation - Get Support - Plugins - Web Service API'.

Feature



온라인 코드 리뷰
협업 가능



The screenshot displays the SonarQube interface for a file named `test/src/main/java/src/test/App.java`. The interface shows several quality issues with their respective severity levels and actions. A red box highlights a comment input field where the text "comment test" is entered. Below the input field, there are buttons for "코멘트" (Comment) and "취소" (Cancel). The code editor shows the following content:

```
1 aksjm... package src.test;
```

```
2
```

```
3 /**
```

```
4 * Hello world!
```

```
5 *
```

```
6 */
```

```
7 public class App
```

Install

```
root@ip-172-31-20-74: /
root@ip-172-31-20-74: /# nano /etc/apt/sources.list

GNU nano 2.2.6 File: /etc/apt/sources.list

## Note, this file is written by cloud-init on first boot of an instance
## modifications made here will not survive a re-bundle.
## if you wish to make changes you can:
## a.) add 'apt_preserve_sources_list: true' to /etc/cloud/cloud.cfg
## or do the same in user-data
## b.) add sources in /etc/apt/sources.list.d
## c.) make changes to template file /etc/cloud/templates/sources.list.tpl
#
deb http://downloads.sourceforge.net/project/sonar-pkg/deb binary/
# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.
deb http://ap-northeast-1.ec2.archive.ubuntu.com/ubuntu/ trusty main restricted
deb-src http://ap-northeast-1.ec2.archive.ubuntu.com/ubuntu/ trusty main restri$

## Major bug fix updates produced after the final release of the
## distribution.
```

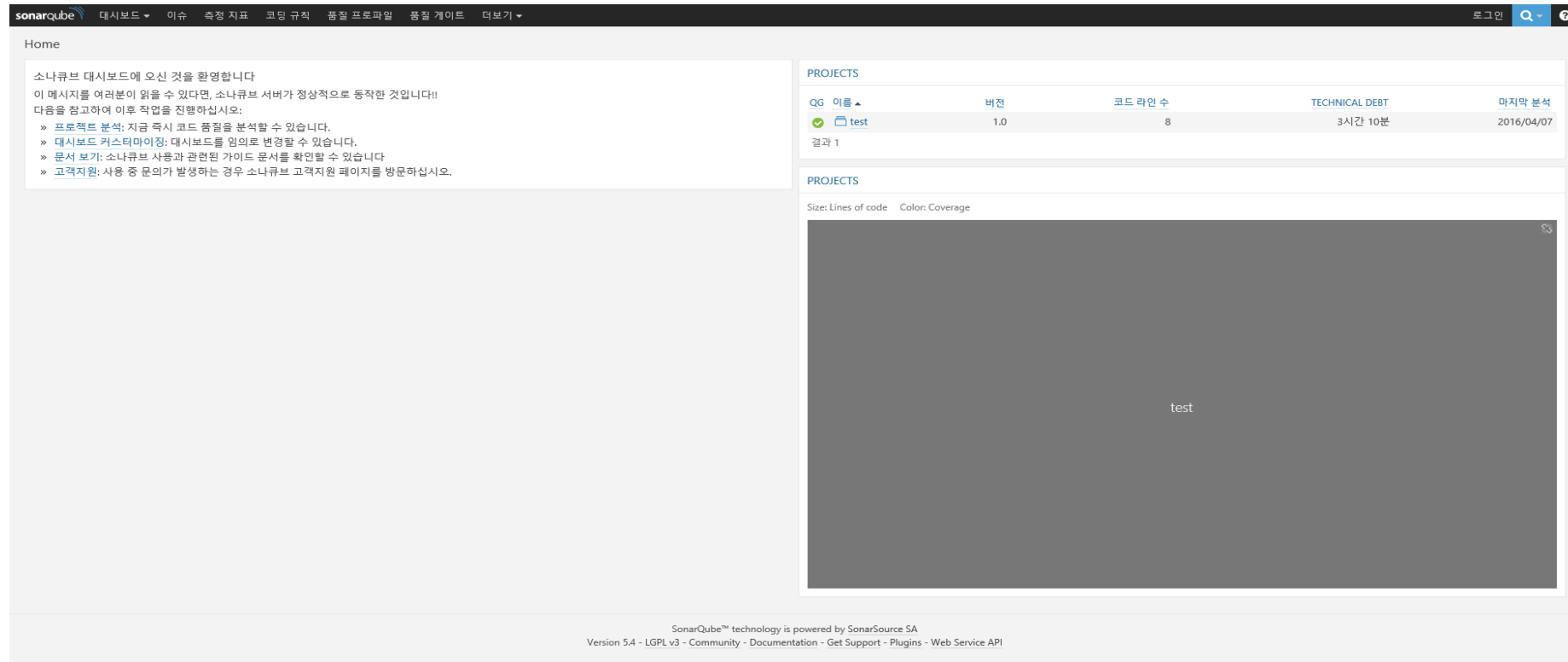
SonarQube 설치를
apt-get으로 하기 위한
Source.list 수정

Install

```
root@ip-172-31-20-74: /  
root@ip-172-31-20-74:/# nano /etc/apt/sources.list  
root@ip-172-31-20-74:/# sudo apt-get install sonar  
root@ip-172-31-20-74: /  
root@ip-172-31-20-74:/# sudo service sonar start  
Starting SonarQube...  
Started SonarQube.  
root@ip-172-31-20-74:/#
```

SonarQube install & Service Start

Install Check



[http://SonarQube Server Ip : Port\(default : 9000\)/](http://SonarQube Server Ip : Port(default : 9000)/) 에서 확인 가능한 페이지

DB setting

```
root@ip-172-31-20-74: /
root@ip-172-31-20-74:/# mysql -u root -p
Enter password: █

root@ip-172-31-20-74: /
root@ip-172-31-20-74:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 5.6.29 MySQL Community Server (GPL)

Copyright (c) 2000, 2015, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE sonar DEFAULT CHARACTER SET utf8 COLLATE utf8 general ci;
mysql> GRANT ALL PRIVILEGES on sonar.* to 'sonar'@'localhost' IDENTIFIED BY 'sonar' WITH GRANT OPTION;
mysql> flush privileges; █
```

SonarQube와 Mysql 연동

Database 생성 및 설정

DB setting

```
root@ip-172-31-20-74: /  
root@ip-172-31-20-74:/# sudo nano /opt/sonar/conf/sonar.properties
```

SonarQube의 속성 설정.

```
root@ip-172-31-20-74: /  
GNU nano 2.2.6 File: /opt/sonar/conf/sonar.properties  
# 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  
  
#----- Embedded Database (default)  
# H2 embedded database server listening port, defaults to 9092  
#sonar.embeddedDatabase.port=9092  
  
#----- MySQL 5.x  
# Only InnoDB storage engine is supported (not myISAM).  
# Only the bundled driver is supported. It can not be changed.  
sonar.jdbc.url=jdbc:mysql://localhost:3306/sonar?useUnicode=true&characterEncoding=utf8&rewriteBatchedStatements=true&useConfigs=maxPerformance  
sonar.jdbc.driverClassName=com.mysql.jdbc.Driver  
sonar.jdbc.validationQuery=select 1
```

Database 접속 아이디/ 비밀번호 및 JDBC 연결을 위한 속성

DB setting

```
root@ip-172-31-20-74: /
root@ip-172-31-20-74:/# sudo service sonar restart
Stopping SonarQube...
Stopped SonarQube.
Starting SonarQube...
Started SonarQube.
```

service sonar restart

```
root@ip-172-31-20-74: /
root@ip-172-31-20-74:/# mysql -u sonar -D sonar -p
Enter password:
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 18
Server version: 5.6.29 MySQL Community Server (GPL)

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Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

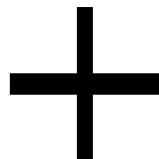
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show tables;
+-----+
| Tables_in_sonar |
+-----+
| action_plans    |
| active_dashboards |
| active_rule_parameters |
+-----+
```

Mysql 접속 및 테이블 확인

Feature

Java
JavaScript
XML



Rule Set

정해진 규칙에 따라 소스코드를 검사해서 잠재적 문제점을 탐색
(Dead Code, 중복 Code, 비효율적 Code)

Feature

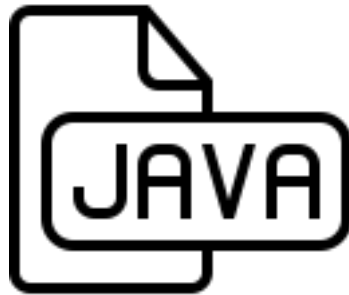


여러 사람과 작업 시
코딩 스타일을 맞출 수 있다.

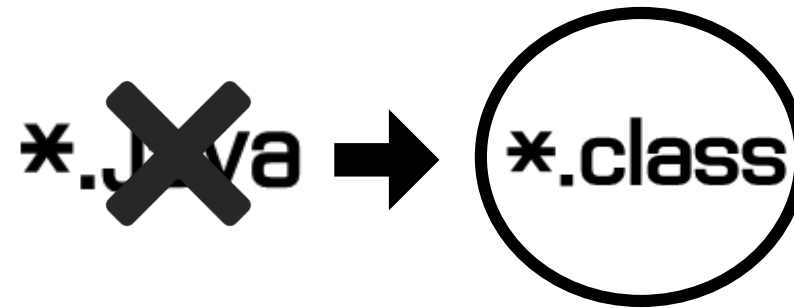


표준 코딩 스타일을 쉽게
프로젝트에 적용 가능

Feature

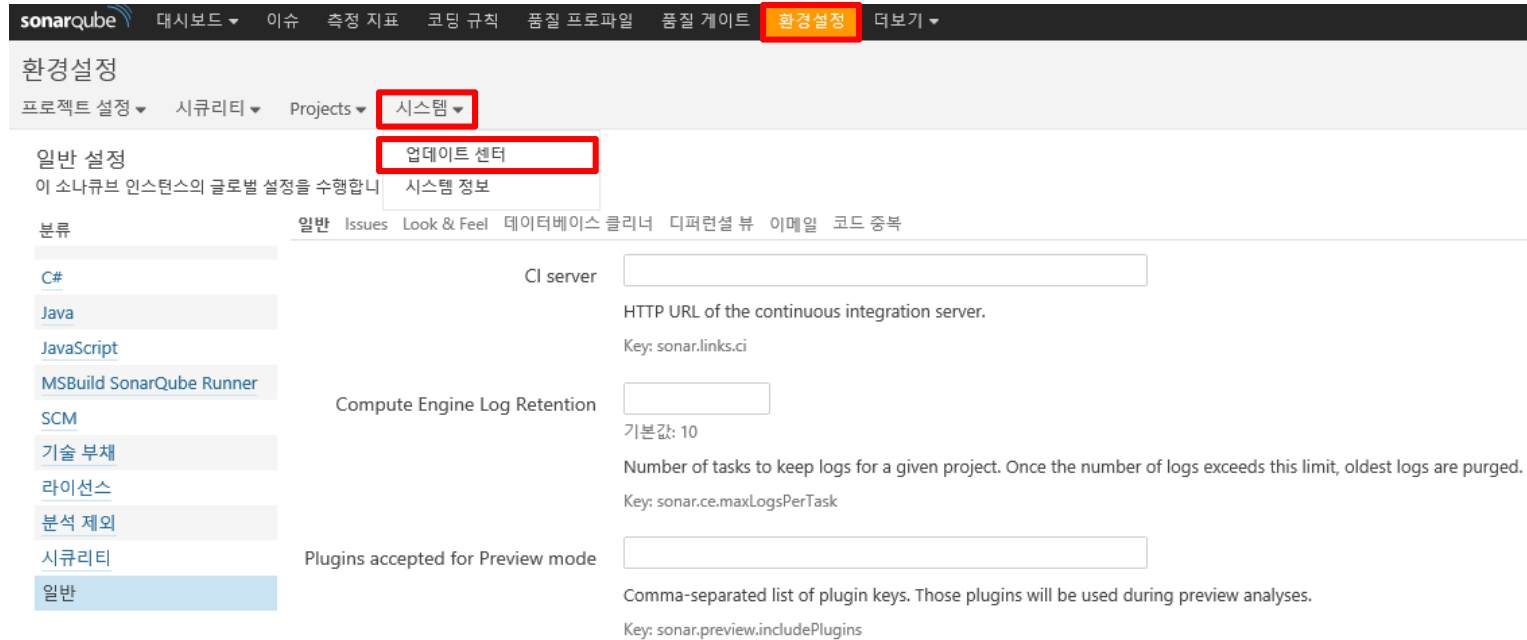


Java 프로그램 분석도구



오브젝트 코드 분석

Install



SonarQube에서 PMD, Checkstyle, Findbug 플러그인 설치

Install

The screenshot shows the SonarQube '환경설정' (Environment Settings) page. At the top, there are navigation tabs: 'Installed', 'Updates Only', 'Available', and 'System Upgrades'. The 'Available' tab is selected and highlighted with a red box. A search bar is also highlighted with a red box. Below the tabs, a list of plugins is shown, with four items highlighted by red boxes:

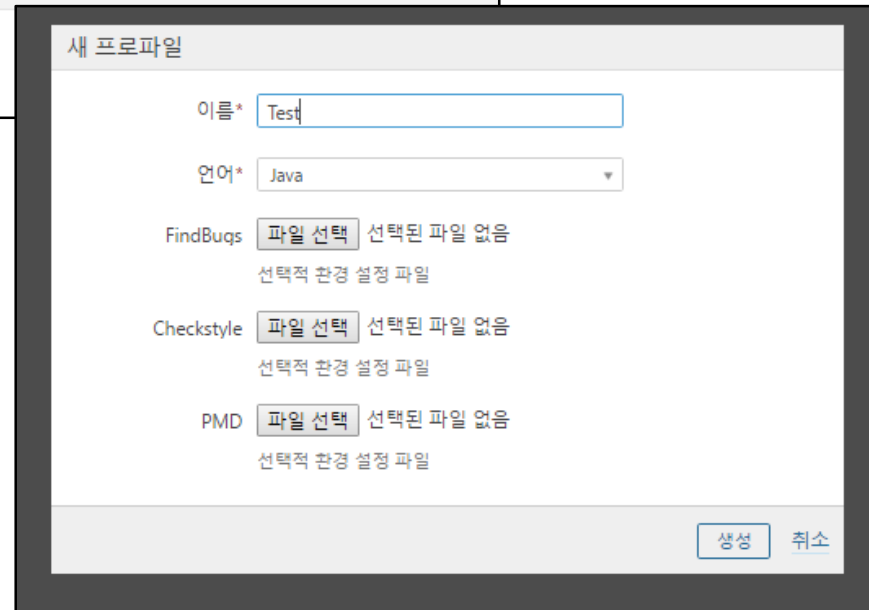
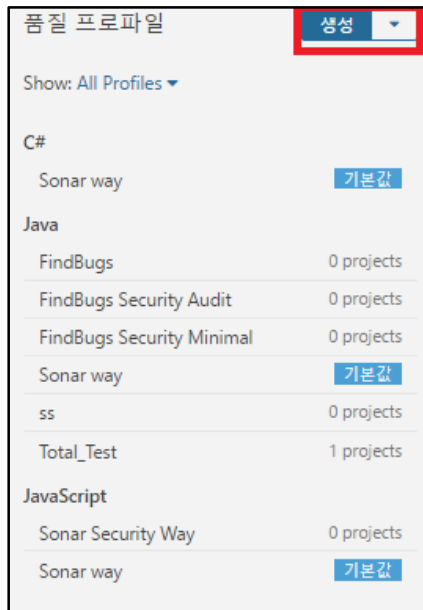
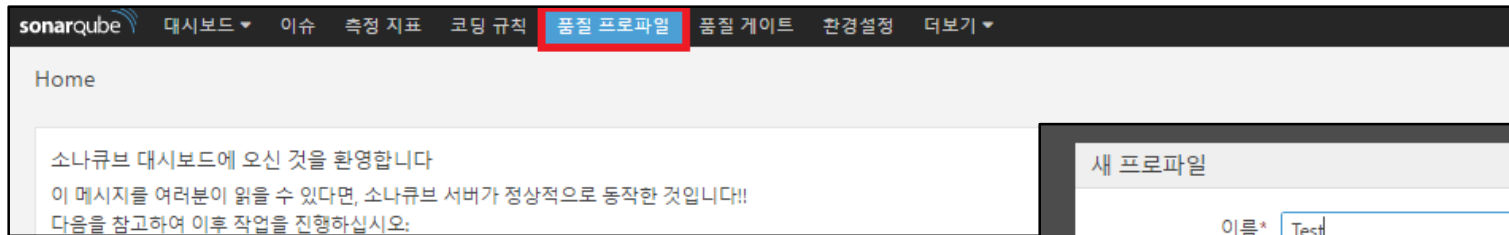
- C# Languages**: 4.4 installed. Updates: 5.1 Support Visual Studio 2015 Update 2, integration test code coverage and xUnit reports import and speed-up the processing of code coverage reports.
- Checkstyle** (External Analysers): 2.4 installed. Analyze Java code with Checkstyle.
- Findbugs** (External Analysers): 3.3 installed. Analyze Java code with Findbugs 3.0.1.
- Korean Pack** (Localization): 1.2.0 installed. Language pack for Korean.
- PMD** (External Analysers): 2.5 installed. Analyze Java code with PMD.

Other visible items include 'SVN Integration' (1.2 installed) and 'Languages' (4.4 installed).

PMD, Checkstyle,
Findbug, Korean Pack
플러그인 설치

Rule Setting

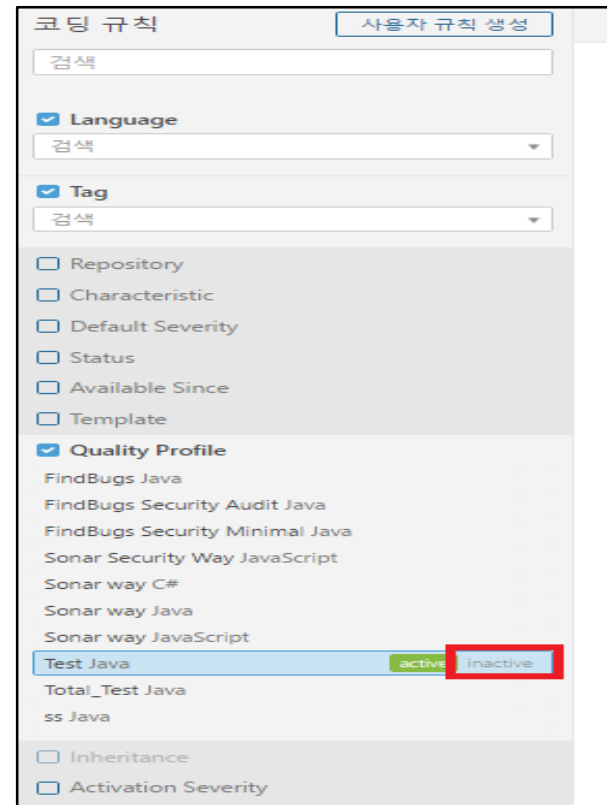
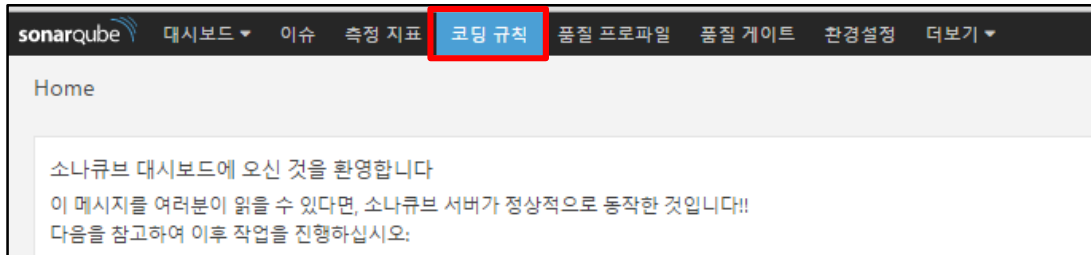
Quality Profile 생성



(기존 설정 파일 사용 가능)

Rull Setting

Quality Profile에 Coding Rule 추가



Rule Setting

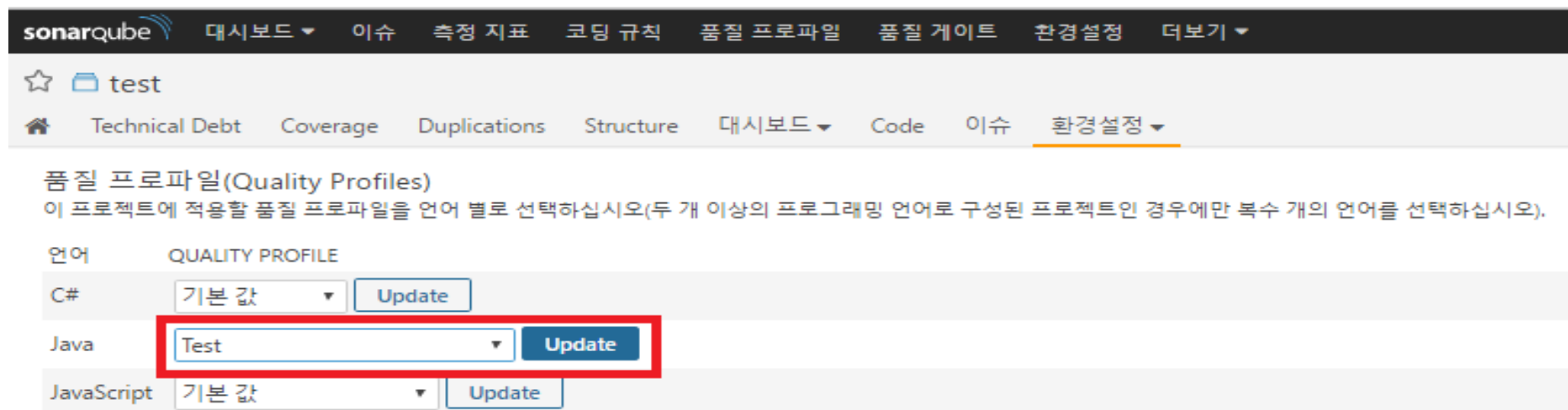
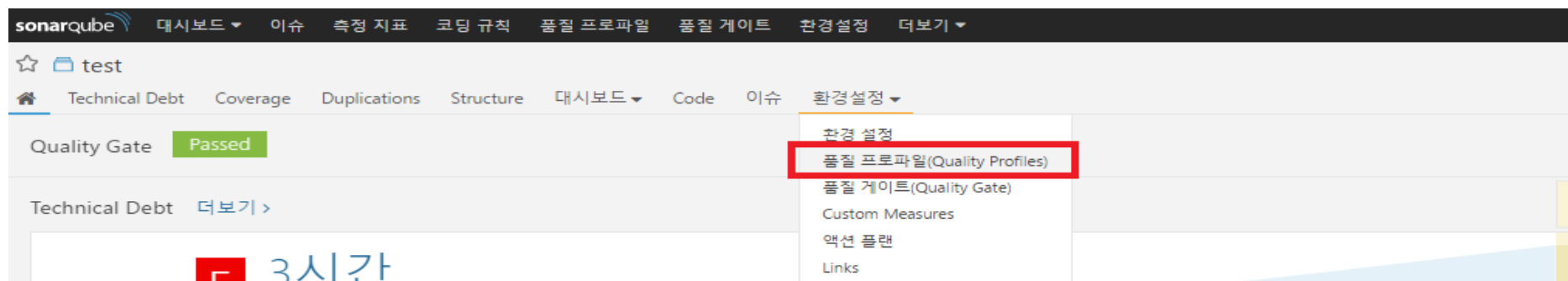
Quality Profile에 Coding Rule 추가

The screenshot shows the SonarQube Quality Profile configuration interface. The left sidebar contains a search bar with 'pmd' entered and a list of tags such as 'Language', 'Tag', 'Repository', 'Characteristic', 'Default Severity', 'Status', 'Available Since', and 'Template'. The main area displays a list of coding rules with columns for rule name, language, status, and action buttons. The 'Check ResultSet' rule is highlighted with a red box, indicating it is the focus of the configuration.

Rule Name	Language	Status	Action
Ternary operator with a boolean literal can be simplified with a boolean expression	Java	Active	활성화
Excessive Method Length	Java	DEPRECATED	활성화
Clone Throws Clone Not Supported Exception	Java	DEPRECATED	활성화
Proper Logger	Java	DEPRECATED	활성화
Replace Enumeration With Iterator	Java	DEPRECATED	활성화
Add Empty String	Java	DEPRECATED	활성화
Non Case Label In Switch Statement	Java	DEPRECATED	활성화
Avoid unnecessary comparisons in boolean expressions	Java	DEPRECATED	활성화
Empty Finalizer	Java	DEPRECATED	활성화
Do Not Extend Java Lang Error	Java	DEPRECATED	활성화
Guard Debug Logging	Java	Active	활성화
Check ResultSet	Java	Active	활성화
Java5 migration - Byte instantiation	Java	Active	활성화
Law Of Demeter	Java	Active	활성화
String Instantiation	Java	Active	활성화
Abstract class without any methods	Java	DEPRECATED	활성화
Use Notify All Instead Of Notify	Java	DEPRECATED	활성화
Useless String Value Of	Java	DEPRECATED	활성화
Ncss Type Count	Java	DEPRECATED	활성화
Missing Static Method In Non Instantiatable Class	Java	Active	활성화
Avoid Using Octal Values	Java	DEPRECATED	활성화
Too Many Static Imports	Java	Active	활성화

Rule Setting

Project의 Quality Profile 설정



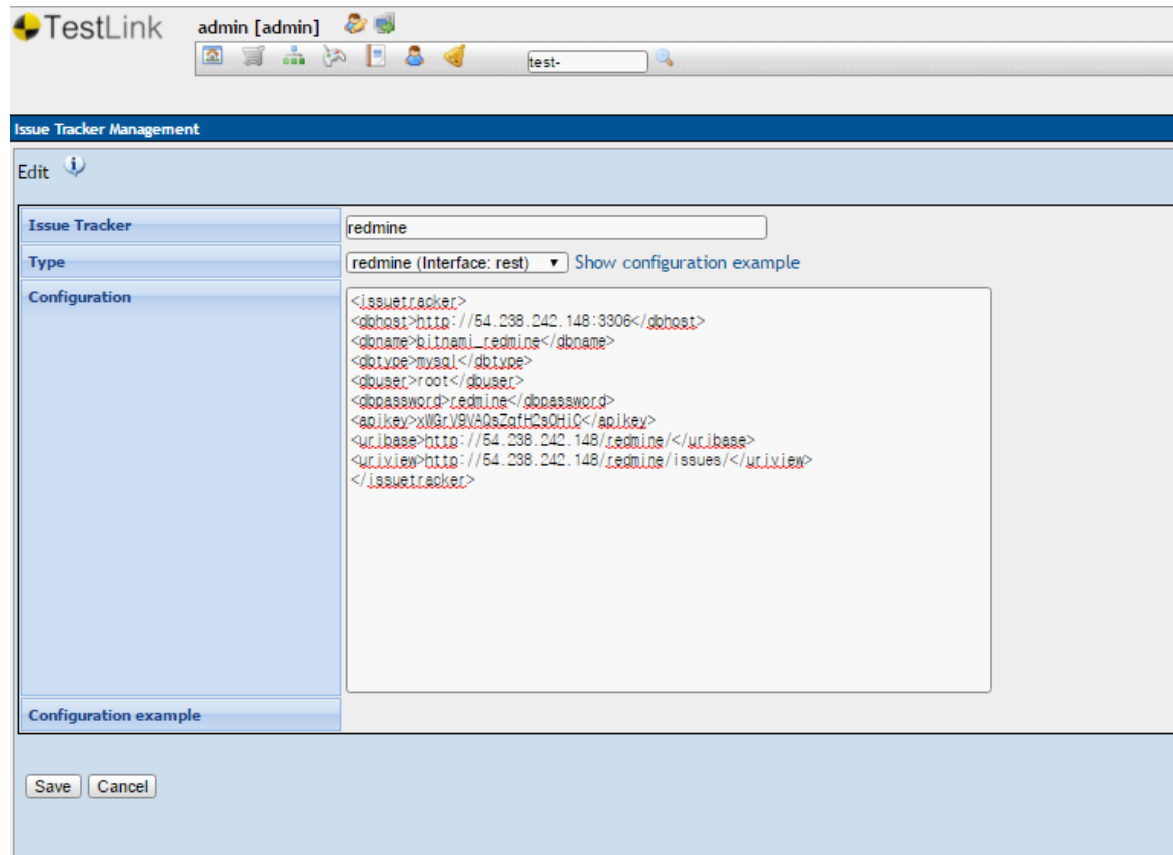
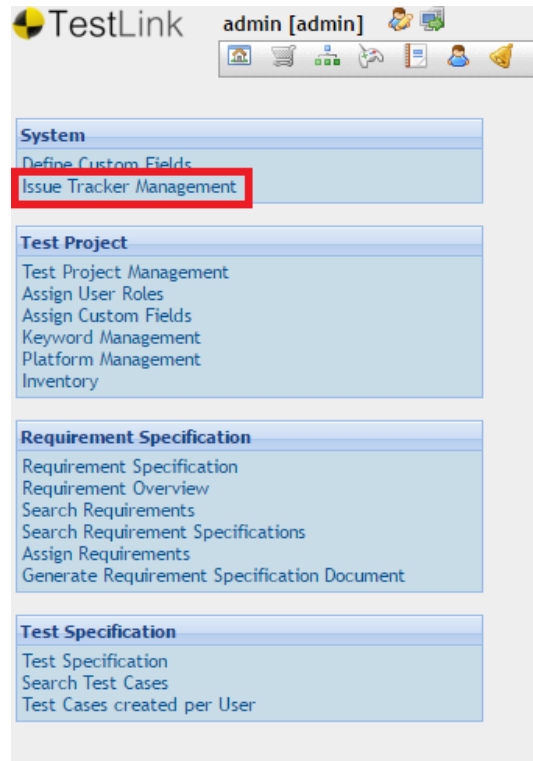
3. CTIP 연동

Redmine <-> Testlink

Jenkins <-> SonarQube

linkage

이슈 트래커 등록



linkage

Test Project와 이슈 트래커 연동

The screenshot shows the configuration page for a Test Project in Redmine. The page is divided into several sections on the left and right. The right side contains a rich text editor with the text "Test Project입니다." and a list of checkboxes for enhanced features. The "Issue Tracker Integration" section is highlighted with a red box, showing the "Active" checkbox checked and the "Issue Tracker" dropdown menu set to "redmine (redmine (Interface: rest))".

Name * Test

Prefix (used for Test case ID) * test

Project description

Test Project입니다.

Enhanced features

- Enable Requirements feature
- Enable Testing Priority
- Enable Test Automation (API keys)
- Enable Inventory

Issue Tracker Integration

- Active
- Issue Tracker: redmine (redmine (Interface: rest))

Availability

- Active
- Public


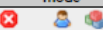
API Key 5e6993c7508ee0520a50d1f6a3f0e1510c39ecd5c6cb4e557f96ac7f37794468

Save Cancel

linkage

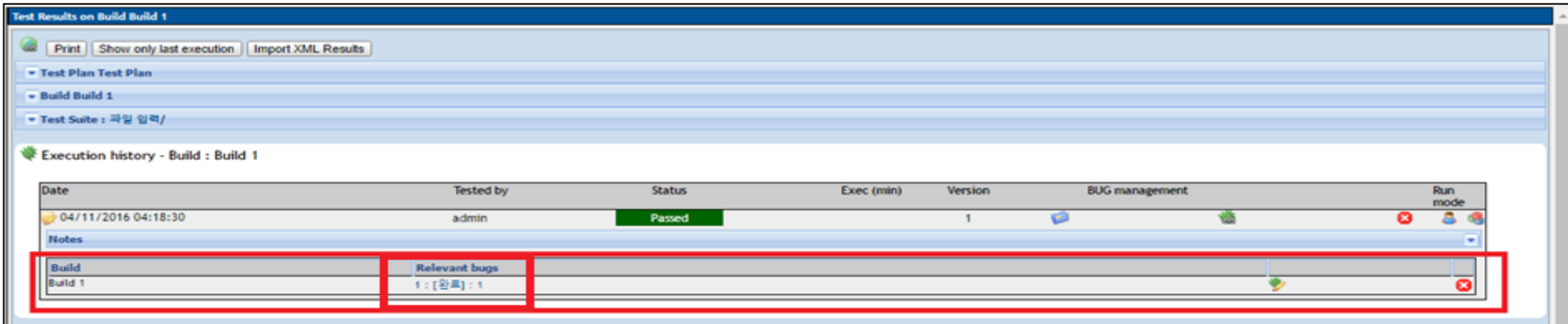
Test 실행 후 이슈 트래커의 이슈와 연결

The screenshot displays the TestLink interface for 'Test Results on Build Build 1'. The main area shows a table of test results with columns for Status, Exec (min), Version, BUG management, and Run mode. A single row is visible with a status of 'Passed' and version '1'. A red box highlights a green bug icon in the 'BUG management' column. An 'Add bug report' modal window is open in the foreground, titled 'Bug added'. It contains the text 'Access to Bug Tracking System (redmine)', a field for 'redmine (Interface: rest) Bug id' with the value '1', and a 'Notes' section with the text 'Test'. The modal has 'Save' and 'Close' buttons at the bottom.

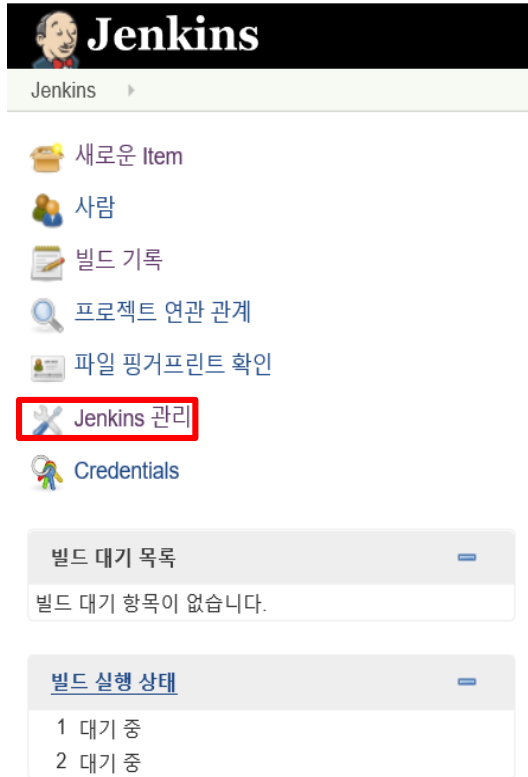
Status	Exec (min)	Version	BUG management	Run mode
Passed		1		

linkage

연결 후 Redmine과 연동 확인



linkage




The screenshot shows the Jenkins dashboard. At the top is the Jenkins logo and name. Below it are several navigation links: '새로운 Item', '사람', '빌드 기록', '프로젝트 연관 관계', '파일 핑거프린트 확인', 'Jenkins 관리' (highlighted with a red box), and 'Credentials'. There are also two panels: '빌드 대기 목록' (Build Queue) which is empty, and '빌드 실행 상태' (Builds in Progress) showing two builds in progress.

Jenkins, SonarQube 연동 - 플러그인 설치

Jenkins 관리

- ⚠ Jenkins 신규버전(1.656)을 [여기서](#) 받을 수 있습니다.([변경사항](#)).
- ⚠ Unsecured Jenkins allows anyone on the network to launch processes on your behalf. Consider at least e

 [시스템 설정](#)
환경변수 및 경로 정보등을 설정합니다.

 [Configure Global Security](#)
Secure Jenkins; define who is allowed to access/use the system.

 [Reload Configuration from Disk](#)
Discard all the loaded data in memory and reload everything from file system. Useful when you modifie

 [플러그인 관리](#)
Jenkins의 기능을 확장하기 위한 플러그인을 추가, 제거, 사용, 미사용으로 설정할 수 있습니다. (업데이

 [시스템 정보](#)
문제 해결을 돕기위한 다양한 환경 정보를 보여줍니다.

 [System Log](#)
System log captures output from java.util.logging output related to Jenkins.

 [브치 통계](#)

linkage

Jenkins, SonarQube 연동 - 플러그인 설치

<input checked="" type="checkbox"/>	Maven Integration plugin Jenkins plugin for building Maven 2/3 jobs via a special project type.	2.7.1	설치 제거
<input checked="" type="checkbox"/>	Maven Release Plug-in Plug-in A plug-in that enables you to perform releases using the maven-release-plugin from Jenkins.	0.14.0	설치 제거
<input checked="" type="checkbox"/>	OWASP Markup Formatter Plugin Uses the OWASP Java HTML Sanitizer to allow safe-seeming HTML markup to be entered in project descriptions and the like.	1.1	설치 제거
<input checked="" type="checkbox"/>	PAM Authentication plugin Adds Unix Pluggable Authentication Module (PAM) support to Jenkins.	1.1	설치 제거
<input checked="" type="checkbox"/>	Plain Credentials Plugin Allows use of plain strings and files as credentials.	1.1	설치 제거
<input checked="" type="checkbox"/>	Redmine plugin This plugin integrates Redmine project management into Jenkins.	0.15	설치 제거
<input checked="" type="checkbox"/>	SCM API Plugin This plugin provides a new enhanced API for interacting with SCM systems.	1.0	설치 제거
<input checked="" type="checkbox"/>	Script Security Plugin Allows Jenkins administrators to control what in-process scripts can be run by less-privileged users.	1.13	설치 제거
<input checked="" type="checkbox"/>	SonarQube Plugin This plugin allows an easy integration of SonarQube , the open source platform for Continuous Inspection of code quality.	2.3	설치 제거
<input checked="" type="checkbox"/>	SSH Credentials Plugin This plugin allows you to store SSH credentials in Jenkins.	1.11	1.10으로 다운그레 이드 고 정 해 제 설치 제거

linkage



- 새로운 Item
- 사람
- 빌드 기록
- 프로젝트 연관 관계
- 파일 핑거프린트 확인
- Jenkins 관리**
- Credentials

빌드 대기 목록
빌드 대기 항목이 없습니다.

빌드 실행 상태
1 대기 중
2 대기 중

Jenkins, SonarQube 연동 - 시스템 설정

Jenkins 관리

- ⚠ Jenkins 신규버전(1.656)을 [여기](#)서 받을 수 있습니다.([변경사항](#)).
- ⚠ Unsecured Jenkins allows anyone on the network to launch processes on your behalf. Consider at least e

시스템 설정
환경변수 및 경로 정보등을 설정합니다.

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플러그인 관리
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시스템 정보
문제 해결을 돕기위한 다양한 환경 정보를 보여줍니다.

System Log
System log captures output from java.util.logging output related to Jenkins.

브라우저 통계

linkage

Sonar Runner Install

SonarQube Runner

SonarQube Runner installations

SonarQube Runner

Name

Install automatically ?

Install from Maven Central

Version

List of SonarQube Runner installations on this system

linkage

Jenkins, SonarQube 연동 - 시스템 설정 * SonarQube server URL 주의!

SonarQube

Environment variables

SonarQube installations

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

Name	<input type="text" value="Sonar"/>
Server URL	<input type="text" value="http://54.238.208.45:9000/"/> <small>Default is http://localhost:9000</small>
SonarQube account login	<input type="text" value="admin"/> <small>SonarQube account used to perform analysis. Mandatory when anonymous access is disabled.</small>
SonarQube account password	<input type="password" value="....."/> <small>SonarQube account used to perform analysis. Mandatory when anonymous access is disabled.</small>
Disable	<input type="checkbox"/> <small>Check to quickly disable SonarQube on all jobs.</small>
Database URL	<input type="text" value="jdbc:mysql://localhost:3306/sonar?useUnicode=true&characte"/> <small>Do not set if default embedded database. This parameter is no longer used since SonarQube 5.2.</small>
Database login	<input type="text" value="sonar"/> <small>Default is sonar. This parameter is no longer used since SonarQube 5.2.</small>
Database password	<input type="password" value="....."/> <small>Default is sonar. This parameter is no longer used since SonarQube 5.2.</small>
Version of sonar-maven-plugin	<input type="text"/>
Additional arguments	<input type="text"/> <small>If not specified, the goal will be sonar:sonar.</small>

linkage

Jenkins, SonarQube 연동 - Post Step 즉 빌드 후 조치 설정

Jenkins mvn_test

- 대시보드로 돌아가기
- 상태
- 변경사항
- 작업공간
- Build Now
- Maven project 삭제
- 구성**
- Modules
- Redmine - test
- GitHub Hook Log
- Perform Maven Release
- SonarQube
- GitHub

Post Steps

Run only if build succeeds Run only if build succeeds or is unstable Run regardless of build result
Should the post-build steps run only for successful builds, etc.

Invoke Standalone SonarQube Analysis

Task to run

JDK
JDK to be used for this sonar analysis

Path to project properties

Analysis properties

Additional arguments

JVM Options

linkage

Jenkins와 연동 - 빌드 후 결과 확인 - Console output



- 대시보드로 돌아가기
- 상태
- 변경사항
- 작업공간
- Build Now**
- Maven project 삭제
- 구성
- Modules
- Redmine - test
- GitHub Hook Log
- Perform Maven Release
- SonarQube
- GitHub

```
Jenkins > mvn_test > #77
to /var/lib/jenkins/.m2/repository/src/test/0.0.2-SNAPSHOT/test-0.0.2-SNAPSHOT.pom
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 6.570s
[INFO] Finished at: Mon Apr 11 10:15:07 UTC 2016
[INFO] Final Memory: 18M/44M
[INFO] -----
Waiting for Jenkins to finish collecting data
[JENKINS] Archiving /var/lib/jenkins/jobs/mvn_test/workspace/test/pom.xml to src/test/0.0.2-SNAPSHOT/test-0.0.2-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/jobs/mvn_test/workspace/test/target/test-0.0.2-SNAPSHOT.jar to
src/test/0.0.2-SNAPSHOT/test-0.0.2-SNAPSHOT.jar
channel stopped
[workspace] $ /var/lib/jenkins/tools/hudson.plugins.sonar.SonarRunnerInstallation/Sonar_Runner/bin/sonar-runner -e
-Dsonar.jdbc.url=jdbc:mysql://localhost:3306/sonar?useUnicode=true&characterEncoding=utf8 *****
-Dsonar.host.url=http://54.238.242.148:9000/ ***** -Dsonar.projectBaseDir=/var/lib/jenkins/jobs/mvn_test/workspace
-Dsonar.projectName=test -Dsonar.projectVersion=1.0 -Dsonar.sourceEncoding=UTF-8 -Dsonar.projectKey=test
-Dsonar.sources=test/src/main/java/src/test/
INFO: Scanner configuration file: /var/lib/jenkins/tools/hudson.plugins.sonar.SonarRunnerInstallation/Sonar_Runner/conf/sonar-runner.properties
INFO: Project configuration file: NONE
INFO: SonarQube Scanner 2.5.1
INFO: Java 1.7.0_95 Oracle Corporation (64-bit)
INFO: Linux 3.13.0-74-generic amd64
INFO: Error stacktraces are turned on.
INFO: User cache: /var/lib/jenkins/.sonar/cache
INFO: Load global repositories
INFO: Execute PMD 5.4.0 done: 3105 ms
INFO: Sensor PmdSensor (done) | time=3112ms
INFO: Sensor SurefireSensor
INFO: parsing /var/lib/jenkins/jobs/mvn_test/workspace/target/surefire-reports
INFO: Sensor SurefireSensor (done) | time=1ms
INFO: Sensor SCM Sensor
INFO: Sensor SCM Sensor (done) | time=0ms
INFO: Sensor Code Colorizer Sensor
INFO: Sensor Code Colorizer Sensor (done) | time=0ms
INFO: Sensor CPD Sensor
INFO: JavaCpdIndexer is used for java
INFO: Sensor CPD Sensor (done) | time=28ms
INFO: Analysis report generated in 76ms, dir size=49 KB
INFO: Analysis reports compressed in 12ms, zip size=17 KB
INFO: Analysis report uploaded in 408ms
INFO: ANALYSIS SUCCESSFUL, you can browse http://54.238.242.148:9000/dashboard/index/test
INFO: Note that you will be able to access the updated dashboard once the server has processed the submitted analysis report
INFO: More about the report processing at http://54.238.242.148:9000/api/ce/task?id=AVQe0c9pKTzwnAlYpQ-7
INFO: -----
INFO: EXECUTION SUCCESS
INFO: -----
INFO: Total time: 31.943s
INFO: Final Memory: 47M/132M
INFO: -----
Finished: SUCCESS
```

linkage

SonarQube에서 확인 결과

sonarqube 데시보드 이슈 측정 지표 코딩 규칙 품질 프로파일 품질 게이트 더보기 로그인

Home

소나큐브 데시보드에 오신 것을 환영합니다
이 메시지를 여러분이 읽을 수 있다면, 소나큐브 서버가 정상적으로 동작한 것입니다!!
다음은 참고하여 이후 작업을 진행하십시오:
 * 프로젝트 분석: 지금 즉시 코드 품질을 분석할 수 있습니다.
 * 데시보드 커스터마이징: 데시보드를 임의로 변경할 수 있습니다.
 * 문서 보기: 소나큐브 사용과 관련된 가이드 문서를 확인할 수 있습니다.
 * 고객지원: 사용 중 문의가 발생하는 경우 소나큐브 고객지원 페이지를 방문하십시오.

QG 이름	버전	코드 라인 수	TECHNICAL DEBT	마지막 분석
test	1.0	8	3시간 10분	10:15

결과 1

sonarqube 데시보드 이슈 측정 지표 코딩 규칙 품질 프로파일 품질 게이트 더보기 로그인

test 2016년 4월 11일 오후 8시 24분 Version 1.0

Technical Debt Coverage Duplications Structure 데시보드 Code 이슈

Quality Gate **Passed**

Technical Debt 더보기

Leak Period: since 2.0 started 6일 전

3시간 Debt started 6일 전 **12** Issues

0 New Debt **0** New Issues

Duplications 더보기

0.0% Duplications **0** Duplicated Blocks **+0.0%** Duplications

Structure 더보기

Java **100.0%** **8** Lines of Code **+0** Lines of Code

Key: test

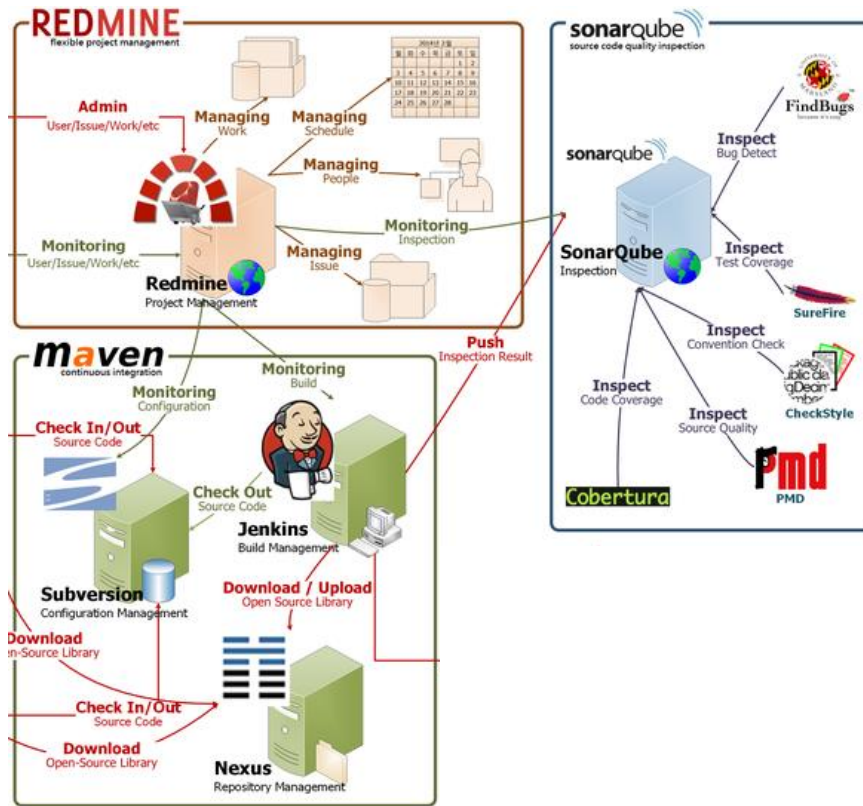
Quality Gate (Default) **SonarQube way**

Quality Profiles (Java) **Total_Test**

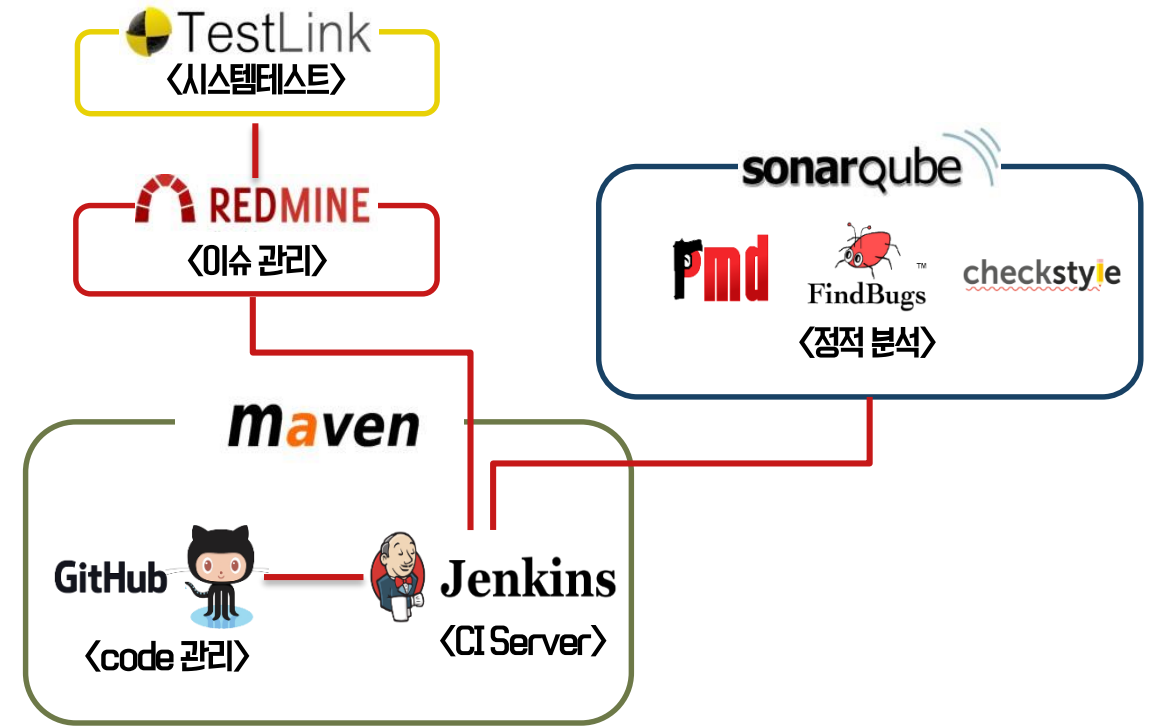
Events | 이벤트: All

버전: 1.0
2016년 4월 11일
품질 게이트: Green (was Red)
2016년 4월 7일
품질 프로파일: Stop using 'FindBugs' (Java)
2016년 4월 5일
품질 프로파일: Use 'Total_Test' (Java)
2016년 4월 5일
품질 게이트: Red (was Green)
2016년 4월 5일
[Show All](#)

4. CTIP 환경















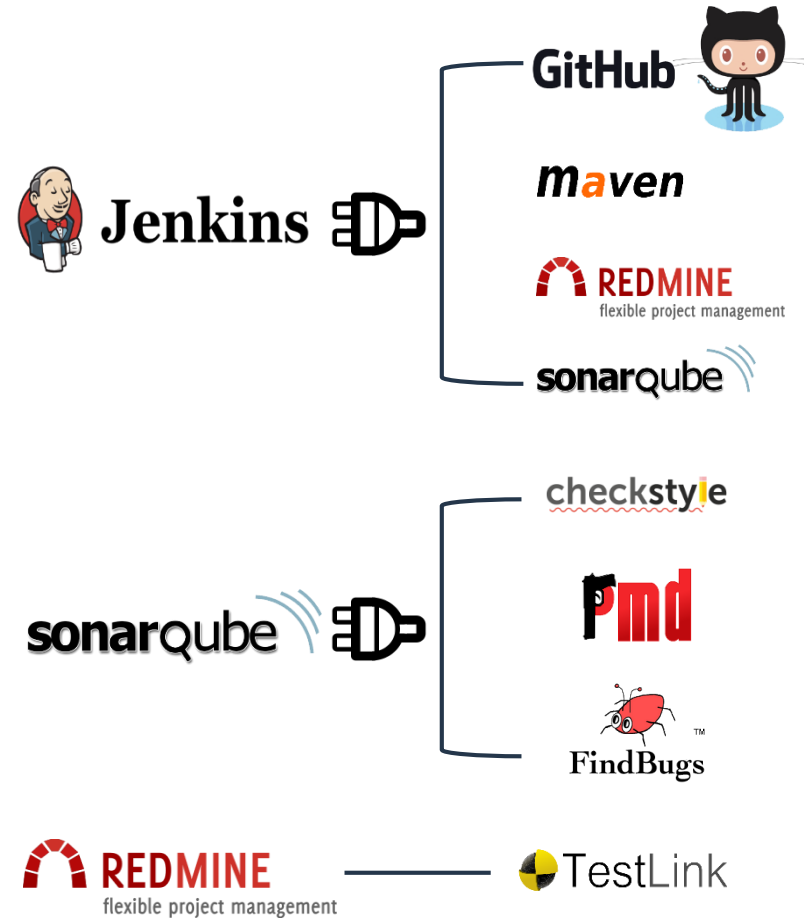
전자정부 프레임워크



Team 3

04 CTIP 환경 Team 3 CTIP 환경

 Port : 80	 Jenkins Port : 8080	<i>maven</i>	 sonarqube Port : 9000	 TestLink Port : 8888
 APACHE	 APACHE	—	 APACHE	 APACHE
 Port : 3306	—	—	Port : 3306	 Port : 3307
 ubuntu				
 amazon web services™ EC2				



5. Q & A

감사합니다.