

Software Verification

# Team Presentation#3

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Advertising Management

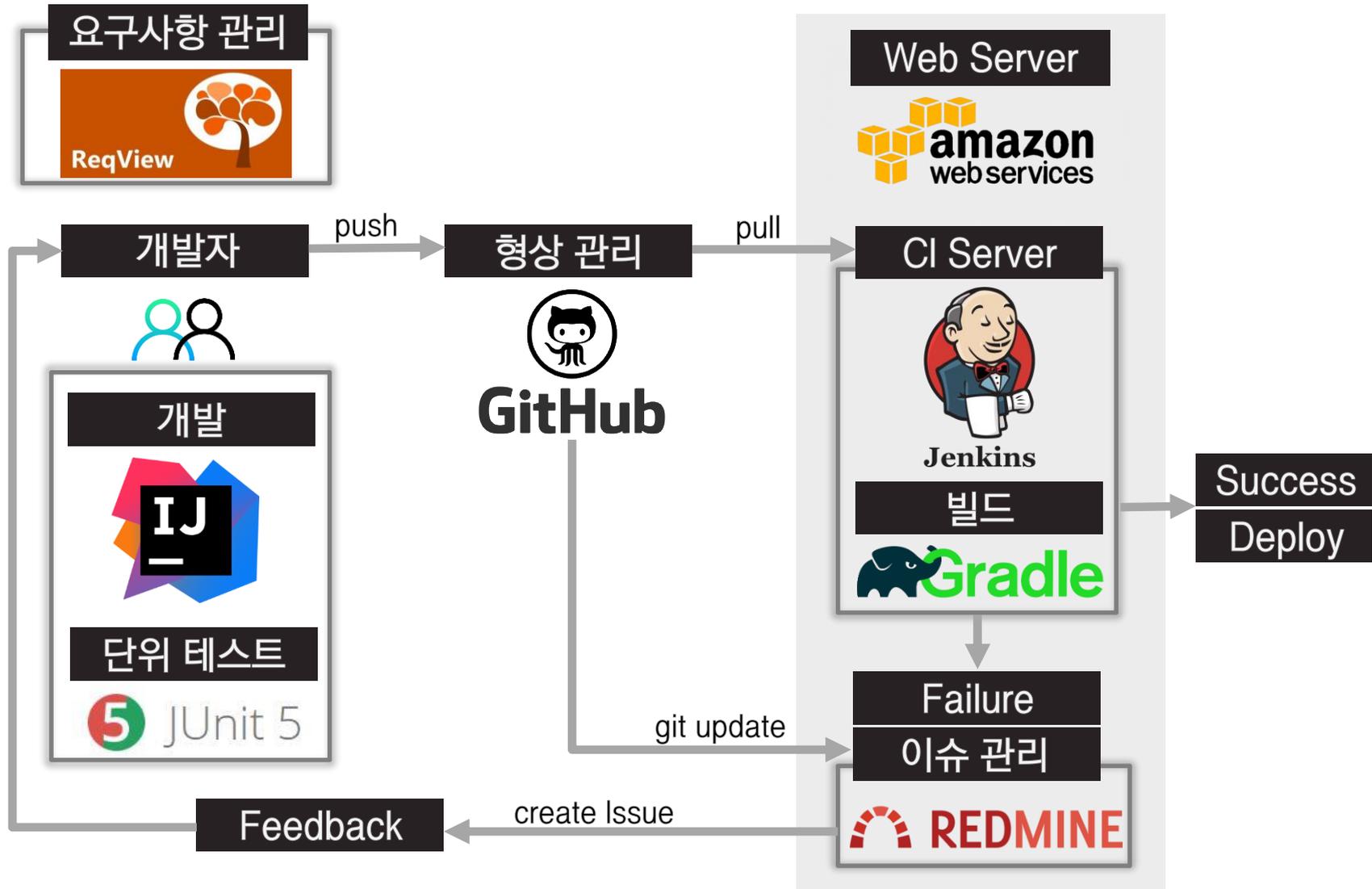
# INDEX

- CTIP / 2차 구축 현황
- Sonarqube
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- Summary / 3차 구축 현황

# CTIP / 2차 구축 현황

Continuous Test & Integration Platform

Intro

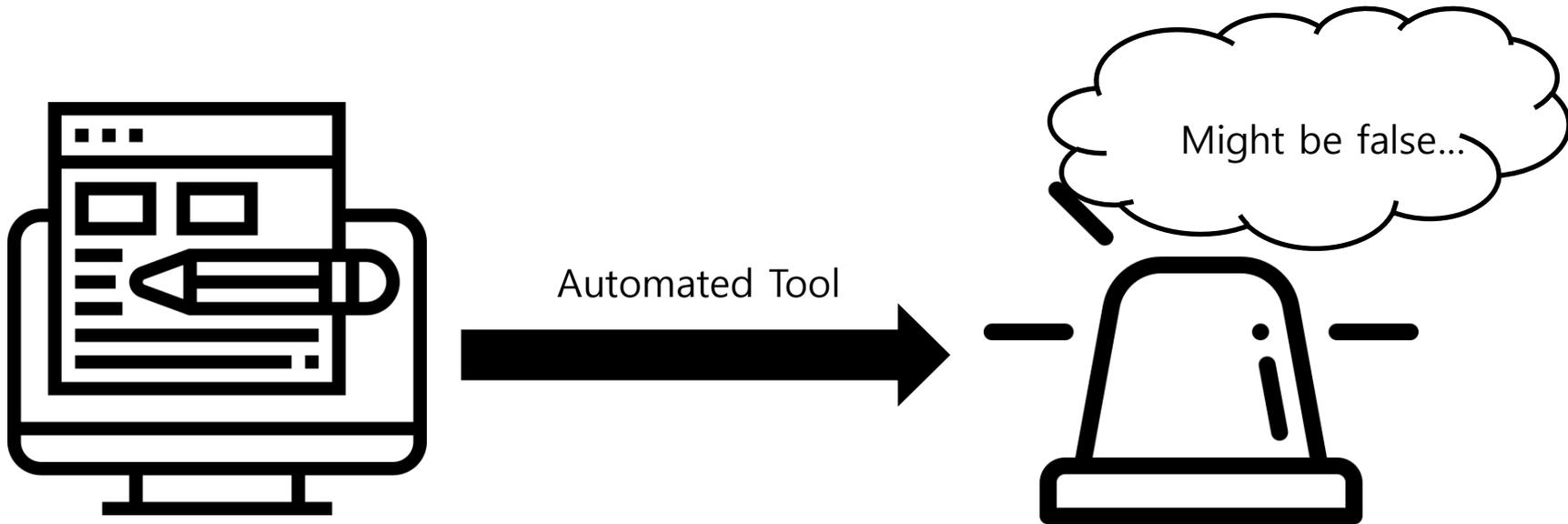


- 
- + 정적 분석 도구
  - + 테스트 관리

# Sonarqube

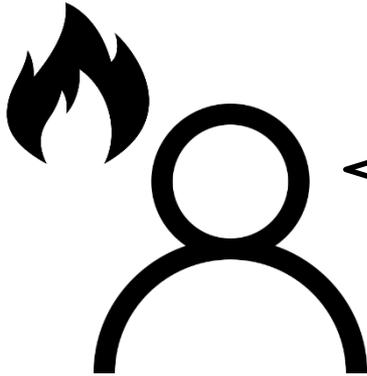
정적 분석 도구

- 01 >> 정의  
실제 실행 없이 컴퓨터 소프트웨어를 분석하는 것
- 02
- 03
- 04



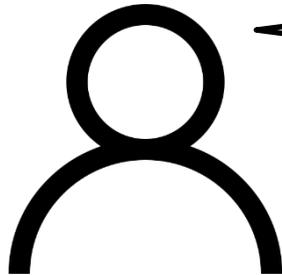
01

정의를  
실제 실행 없이 컴퓨터 소프트웨어를 분석하는 것



동적 분석

A를 입력했을 때 a가 나오나 확인하고....  
B를 입력했을 때 b가 나오나 확인하고....  
.  
.  
.  
Z를 입력했을 때 z가 나오나 확인하고....



정적 분석

코드 단에서 임의의 대문자 알파벳을 입력하면 소문자가 출력되는지 자동화된 툴을 통해 분석

01

## »» What is SonarQube?

- 프로젝트 품질 관리를 위한 여러가지 모니터링 툴 제공 플랫폼
- continuous inspection을 통한 새로운 이슈 추적 기능 제공
- Powerful path sensitive dataflow 엔진을 통한 tricky 이슈 추적
- 25 가지 이상의 언어 제공
- Jenkins 등 CI 툴들 간의 연동

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## »» 장점

- 오픈소스 프로젝트이므로 라이선스 비용없이 사용 가능
- 파워풀하고 심플한 Web Monitoring UI
- 테이블과 차트를 통해 직관적으로 개선 척도 확인 가능
- 품질 개선을 위한 정보를 프로젝트 단위부터 파일 단위까지 제공

The logo for SonarQube, featuring the word "sonarqube" in a bold, lowercase sans-serif font. To the right of the text is a stylized icon consisting of three curved lines that resemble a sonar wave or a signal.

Benefits of Using SonarQube For Code Reviews

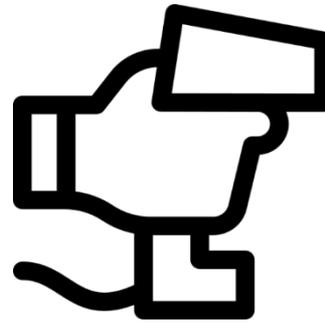
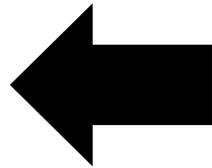
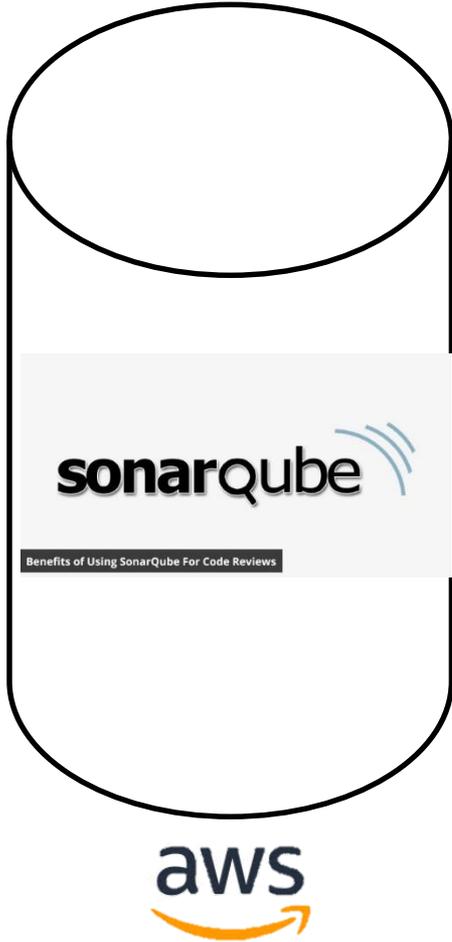
01

>> Overview

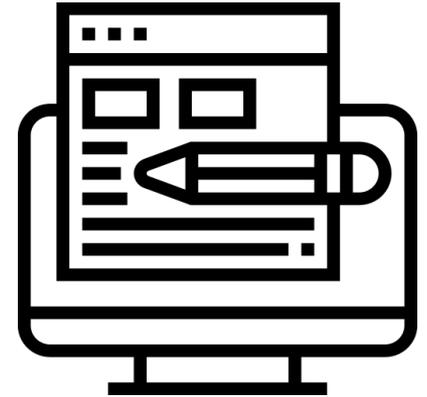
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Sonar Scanner



>> 실행 예제

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The screenshot shows the SonarQube website interface. At the top, there is a navigation bar with the SonarQube logo and a search bar. The main content area is titled 'Analyzing with SonarQube Scanner' and includes a 'Table of Contents' with links to 'Features', 'Installation', 'Use', 'Troubleshooting', and 'Going Further'. Below the 'Features' section, there is a paragraph describing the scanner as the recommended launcher. The 'Installation' section contains a numbered list of steps and a code block for configuration. The code block shows the default SonarQube server URL: `#sonar.host.url=http://localhost:9000`. At the bottom, there is a usage command: `usage: sonar-scanner [options]`.

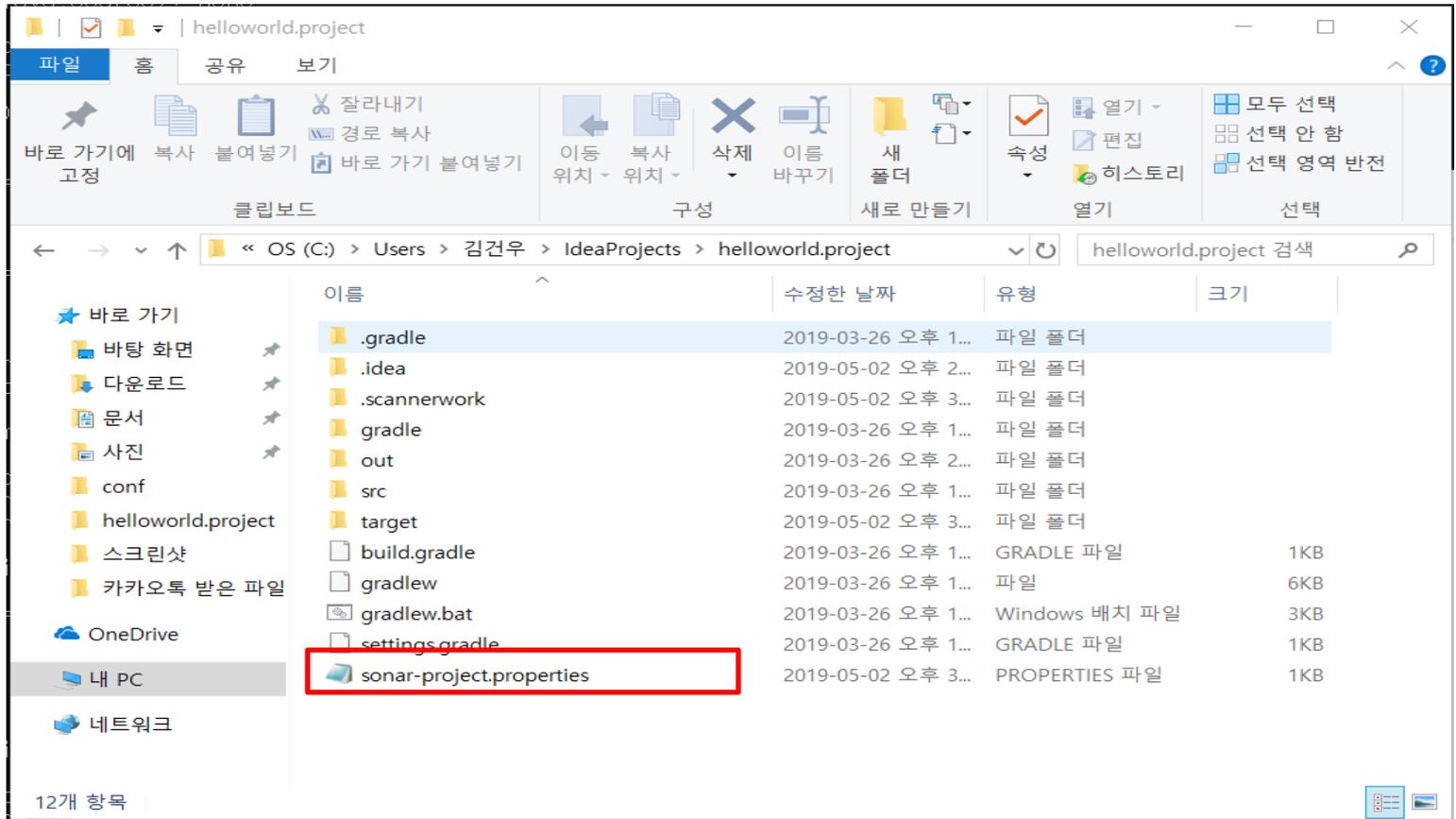
01

» 실행 예제

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## >> 실행 예제

```
sonar-project.properties - 메모장
파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
# must be unique in a given SonarQube instance
sonar.projectKey=my:project
# this is the name displayed in the SonarQube UI
sonar.projectName=My project
sonar.projectVersion=1.0

sonar.host.url=http://ec2-13-125-142-52.ap-northeast-2.compute.amazonaws.com:9000

sonar.login=861496b:534
# Path is relative to the sonar-project.properties file. Replace "\" by "/" on Windows.
# Since SonarQube 4.2, this property is optional if sonar.modules is set.
# If not set, SonarQube starts looking for source code from the directory containing
# the sonar-project.properties file.
sonar.sources=./src
sonar.java.binaries=target/classes
# Encoding of the source code. Default is default system encoding
#sonar.sourceEncoding=UTF-8
```

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» 실행 예제

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sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration

Search for projects, sub-projects and files...

A Administrator Profile Security Notifications Projects

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.

Name	Created	
MyProject	May 2, 2019	<a href="#">Revoke</a>

Generate New Token:  [Generate](#)

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

[Copy](#) **c0e519a:**

Change password

Old Password\*

New Password\*

Confirm Password\*

[Change password](#)

Embedded database should be used for evaluation purpose 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 database engine.

SonarQube™ technology is powered by SonarSource SA

01

## » 실행 예제

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```
INFO: Working dir: C:\Users\김건우\IdeaProjects\helloworld.project\scannerwork
INFO: Source paths: src
INFO: Source encoding: x-windows-949, default locale: ko_KR
INFO: Index files
INFO: 2 files indexed
INFO: Quality profile for java: Sonar way
INFO: Sensor JavaSquidSensor [java]
INFO: Configured Java source version (sonar.java.source): none
INFO: JavaClasspath initialization
WARN: Bytecode of dependencies was not provided for analysis of source files, you might end up with less precise results. Bytecode can be provided using sonar.java.libraries property
INFO: JavaClasspath initialization (done) | time=9ms
INFO: JavaIstClasspath initialization
INFO: JavaIstClasspath initialization (done) | time=1ms
INFO: Java Main Files AST scan
INFO: 2 source files to be analyzed
INFO: Java Main Files AST scan (done) | time=389ms
INFO: 2/2 source files have been analyzed
INFO: Java Test Files AST scan
INFO: 0 source files to be analyzed
INFO: Java Test Files AST scan (done) | time=3ms
INFO: 0/0 source files have been analyzed
INFO: Sensor JavaSquidSensor [java] (done) | time=867ms
INFO: Sensor SurefireSensor [java]
INFO: parsing [C:\Users\김건우\IdeaProjects\helloworld.project\target\surefire-reports]
INFO: Sensor SurefireSensor [java] (done) | time=13ms
INFO: Sensor JaCoCoSensor [java]
INFO: Sensor JaCoCoSensor [java] (done) | time=4ms
INFO: Sensor SonarJavaXmlFileSensor [java]
INFO: Sensor SonarJavaXmlFileSensor [java] (done) | time=14ms
INFO: Sensor Analyzer for "php.ini" files [php]
INFO: Sensor Analyzer for "php.ini" files [php] (done) | time=18ms
INFO: Sensor Zero Coverage Sensor
INFO: Sensor Zero Coverage Sensor (done) | time=33ms
INFO: Sensor CPD Block Indexer
INFO: Sensor CPD Block Indexer (done) | time=18ms
INFO: SCM Publisher is disabled
INFO: 2 files had no CPD blocks
INFO: Calculating CPD for 0 files
INFO: CPD calculation finished
INFO: Analysis report generated in 92ms, dir size=25 KB
INFO: Analysis reports compressed in 38ms, zip size=9 KB
INFO: Analysis report uploaded in 1278ms
INFO: ANALYSIS SUCCESSFUL, you can browse http://ec2-13-125-142-52.ap-northeast-2.compute.amazonaws.com:9000/dashboard/index/my:project
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://ec2-13-125-142-52.ap-northeast-2.compute.amazonaws.com:9000/api/ce/task?id=AWp30_kXXDZ_JoJ-JhZa
INFO: Task total time: 4.850 s
INFO:
INFO: EXECUTION SUCCESS
INFO:
INFO: Total time: 6.987s
INFO: Final Memory: 10M/154M
INFO:
C:\Users\김건우\IdeaProjects\helloworld.project>
```

## 실행 예제

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The screenshot displays the SonarQube web interface. The top navigation bar includes 'sonarqube', 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', and 'Administration'. A search bar is present on the right. The main content area shows a list of projects, with 'My project' highlighted and enclosed in a red box. The project status is 'Passed'. Below the status, there are several metrics: 0 Bugs (A), 0 Vulnerabilities (A), 4 Code Smells (B), 0.0% Coverage, and 0.0% Duplications. The last analysis was performed on May 2, 2019, at 3:38 PM. The project is associated with 24 issues (KS) in Java. Below the project card, there is a section for 'Software\_Verification' which states 'Project is not analyzed yet.' The bottom of the page features a warning message: 'Embedded database should be used for evaluation purpose 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 database engine.' The footer includes the version information: 'Version 6.7.7 (build 38951) - LGPL v3 - Community - Documentation - Get Support - Plugins - Web API - About'.

## >> 실행 예제

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The screenshot displays the SonarQube interface for a project named 'My project' (master branch). The Quality Gate is 'Passed'. The main dashboard shows the following metrics:

- Bugs:** 0 (Grade A)
- Vulnerabilities:** 0 (Grade A)
- Code Smells:** 4 (Grade B), Debt: 45min (started 1 hour ago)
- Coverage:** 0.0%
- Duplications:** 0.0%
- Duplicated Blocks:** 0

Additional information on the right sidebar includes 24 Lines of Code (Java: 24), No tags, Activity for May 2, 2019 (version 1.0), and Quality Gate (Default) SonarQube way. A footer message states: 'Embedded database should be used for evaluation purpose 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 database engine.'

01

**>>> PMD**

- 코딩에서 흔히 하는 실수들을 잡아주는 plugin (미사용 변수, 불필요한 객체 선언, 빈 블록, duplicated code 등)
- 위반 사항에 대한 report파일 수정이 용이함.
- 한 번의 클릭으로 여러 규칙에 대한 수정이 용이함.

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**>>> CheckStyle**

- 여러 개발자 간 다를 수 있는 coding convention을 통일
- 규칙 변경이 용이.
- 기업에서 사용하는 공개된 convention 적용도 가능.

**>>> Findbugs → Spotbugs**

- Bytecode에서 버그 패턴을 찾아줌.
- 에러타입에 따라 100여개로 분류되며 위험도에 따라 rank 가능
- Jenkins plugin은 제공되지 않음

01

## »» 실행 예제

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The screenshot shows the SonarQube Administration interface. The top navigation bar includes 'sonarqube', 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', and 'Administration'. A search bar is present with the text 'Search for projects, sub-projects and files...'. Below the navigation, the 'Administration' section is active, with sub-menus for 'Configuration', 'Security', 'Projects', 'System', and 'Marketplace'. The 'Marketplace' page displays four editions: 'Community Edition' (marked as 'Installed'), 'Developer Edition', 'Enterprise Edition', and 'Data Center Edition'. Each edition has a description and an 'Upgrade' button. Below the editions, there is a search bar with 'pmd' entered. The search results show a 'PMD External Analyser' plugin with version '3.2.0'. The plugin description includes 'Support SonarQube 7.6+ and PMD 6.10.0' and 'Installing this plugin will also install: SonarJava'. There are links for 'Homepage' and 'Issue Tracker', and an 'Install' button. At the bottom, a red banner contains a warning: 'Embedded database should be used for evaluation purpose 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 database engine.' Below the banner, there is a footer with the text: 'SonarQube™ technology is powered by SonarSource SA. Version 6.7.7 (build 38951) - LGPL v3 - Community - Documentation - Get Support - Plugins - Web API - About'.

01

## >> 실행 예제

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sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration Search for projects, sub-projects and files... ? A

Administration  
Configuration Security Projects System Marketplace

SonarQube needs to be restarted in order to

- install 1 plugins
- update 1 plugins

Restart Revert

Marketplace  
Discover and install new features

Community Edition Installed  
Comes with support for 9 programming languages, numerous plugins, integration with DevOps tool chains, and ability to connect to SonarLint in the IDE.  
Learn more

Developer Edition  
Community Edition + branch analysis, SonarLint push notifications, and 16 languages.  
Learn more Upgrade

Enterprise Edition  
Developer Edition + portfolio management, executive reporting, parallel processing of analysis reports and 20 languages.  
Learn more Upgrade

Data Center Edition  
Enterprise Edition + component redundancy and data integrity.  
Learn more Upgrade

All Updates Only search checkstyle

Checkstyle External Analysers 4.19 Upgrade to Checkstyle 8.19  
Provide Checkstyle rules for Java projects  
Homepage Issue Tracker  
Licensed under LGPL-3.0  
Developed by Checkstyle  
Install

1 shown

Embedded database should be used for evaluation purpose only  
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01

## >> 실행 예제

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The screenshot displays the SonarQube Administration interface. At the top, the navigation bar includes 'sonarqube', 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', and 'Administration'. A search bar is present on the right. Below the navigation bar, the 'Administration' section is active, with sub-menus for 'Configuration', 'Security', 'Projects', 'System', and 'Marketplace'. A yellow notification banner states: 'SonarQube needs to be restarted in order to' followed by a list: 'install 2 plugins' and 'update 1 plugins'. Below this, the 'Marketplace' section is titled 'Discover and install new features'. It features four cards: 'Community Edition' (marked as 'Installed'), 'Developer Edition', 'Enterprise Edition', and 'Data Center Edition'. Each card provides a brief description and an 'Upgrade' button. Below the marketplace cards, there is a search bar with 'All' and 'Updates Only' filters. A search result for 'Findbugs' is shown, with a version of '3.9.3' and a note: 'Use SpotBugs 3.1.11'. The result includes a description, a link to the homepage, and an 'Install' button. At the bottom of the interface, a red banner contains a warning: 'Embedded database should be used for evaluation purpose 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 database engine.' Below the banner, the footer text reads: 'SonarQube™ technology is powered by SonarSource SA. Version 6.7.7 (build 38951) - LGPL v3 - Community - Documentation - Get Support - Plugins - Web API - About'.

» 실행 예제

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The screenshot shows the SonarQube Administration interface. At the top, there is a navigation bar with 'Administration' selected. Below it, the 'System' tab is active. A notification banner at the top indicates a new version is available. The main content area displays 'System Info' with a table of system parameters. A 'Restart Server' dialog box is overlaid on the page, indicating that the server is restarting and the page will be refreshed.

System	
Server ID	BF41A1F2-AlpuncvpxkId1sD816RX
Version	6.7.7.38951
High Availability	✘
Official Distribution	✔
Force authentication	✘
Home Dir	C:\Program Files\sonarqube-6.7.7
Data Dir	C:\Program Files\sonarqube-6.7.7\data
Temp Dir	C:\Program Files\sonarqube-6.7.7\temp
Processors	1
Lines of Code	24
Database	
Database	H2
Database Version	1.3.176 (2014-04-05)
Username	
URL	jdbc:h2:tcp://127.0.0.1:9092/sonar
Driver	H2 JDBC Driver
Driver Version	1.3.176 (2014-04-05)
<a href="#">Web</a>	
<a href="#">Compute Engine</a>	

01

## 실행 예제

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The screenshot displays the SonarQube Administration interface. At the top, the navigation bar includes 'sonarqube', 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', and 'Administration'. A search bar is present with the text 'Search for projects, sub-projects and files...'. Below the navigation bar, the 'Administration' section is active, with a sub-menu for 'Marketplace'. The Marketplace page is titled 'Discover and install new features' and lists four editions: 'Community Edition' (marked as 'Installed'), 'Developer Edition', 'Enterprise Edition', and 'Data Center Edition'. Each edition has a 'Learn more' link and an 'Upgrade' button. Below the editions, a search bar contains the text 'pmd'. The search results show one item: 'PMD' (External Analysers), version '3.2.0 installed'. The item description is 'Analyze Java code with PMD.' and it is licensed under 'GNU LGPL 3'. There is an 'Uninstall' button for this item. At the bottom of the page, a red warning banner states: 'Embedded database should be used for evaluation purpose 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 database engine.' Below the banner, the footer text reads: 'SonarQube™ technology is powered by SonarSource SA. Version 6.7.7 (build 38951) - LGPL v3 - Community - Documentation - Get Support - Plugins - Web API - About'.

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## »» 실행 예제

The screenshot shows the SonarQube interface for Quality Profiles. A 'New Profile' dialog box is open in the center, allowing the user to create a new profile. The dialog has the following fields:

- Name\***: A text input field.
- Language\***: A dropdown menu currently set to 'Java'.
- PMD**: A text input field with a '찾아보기...' (Find) button and the label 'Optional configuration file' below it.
- FindBugs**: A text input field with a '찾아보기...' (Find) button and the label 'Optional configuration file' below it.
- Checkstyle**: A text input field with a '찾아보기...' (Find) button and the label 'Optional configuration file' below it.

At the bottom of the dialog are 'Create' and 'Cancel' buttons. The background shows the 'Quality Profiles' page with a table of profiles and a 'Recently Added Rules' sidebar.

Profile Name	Projects	Rules	Updated	Used
<b>C#, 1 profile(s)</b>				
Sonar way		Built-in		
<b>Flex, 1 profile(s)</b>				
Sonar way		Built-in		
<b>Java, 6 profile(s)</b>				
FindBugs		Built-in		
FindBugs + FB-Contrib	0	745	Never	Never
FindBugs Security Audit	0	121	Never	Never
FindBugs Security Minimal	0	91	Never	Never
Sonar way	0	349	Never	2 hours ago
what	0	0	Never	Never
<b>JavaScript, 2 profile(s)</b>				
Sonar way		Default	66	Never
Sonar way Recommended	0	114	Never	Never
<b>JSP, 1 profile(s)</b>				
	Projects	Rules	Updated	Used

# TestLink

시스템 테스트

01

➤➤ 다음과 같은 테스트 프로세스가 존재함

02

- 테스트 케이스가 어떻게 요구 사항에 mapping 되는지
- 테스트 케이스의 시나리오가 어떻게 되는지
- 테스트 케이스의 expected output은 무엇인지
- 테스트 결과가 어떻게 나오는지
- 테스트 계획은 어떻게 되는지
- ...

03

04

테스트 프로세스나 테스트 케이스 전체를 관리할 수 있는 도구가 필요

01

» 한 번에 총체적으로 조직/관리하기 위한 테스트 활동의 묶음

02

03

04



각 테스트 레벨은 SW개발 단계에 대응

각 테스트 레벨은 서로 독립적  
테스트 주체,  
테스트 대상,  
테스트 목표,  
테스트 산출물이 다름  
→ 서로 다른 테스트 계획/전략 필요

01

02

03

04

어떤 구성요소들이 **시스템 전체로서 상호작용**하는지 확인하기 위해  
주변 장치들을 포함하여 전체적으로 **통합된 애플리케이션을 테스트**하는 것



Who ? 독립적인 테스트 팀이

When ? 단위 테스트와 통합 테스트가 완료되어 기능상 문제가 없는 상태에

How ? 실 사용 환경과 동일한 모의 시스템을 구성하여 Blackbox 기법으로 수행

01

»» 시스템 테스트 도구

02

03

04



# TestLink

- 오픈소스
- Web 기반의 테스트 관리
- **jenkins와 연동 가능**
- 다양한 버그 트래킹 시스템과 연동 가능 → **redmine과 연동 가능**
- 테스트의 우선순위 부여 기능 및 사용자의 활동영역 정의
- 트리 구조를 이용한 테스트 케이스 작성 기능
- 다양한 형식의 보고서 제공 및 E-mail 보고서 전송 기능

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**Test Project**

테스트를 수행하는 프로젝트 자체  
테스트 팀 단위로 분할하는 것이 관리에 용이

**Test Specification**

테스트를 진행하고자 하는 Test Case들의 집합  
Test Suite과 Test Case로 분류

**Test Suite**

테스트의 대상이 되는 컴포넌트나 시스템에  
사용되는 여러 Test Case들의 집합

**Test Case**

Test Specification의 소분류  
버전 관리 가능

**Test Plan**

실제로 진행하는 테스트  
Test Suite/Test Case를 모아놓은 것

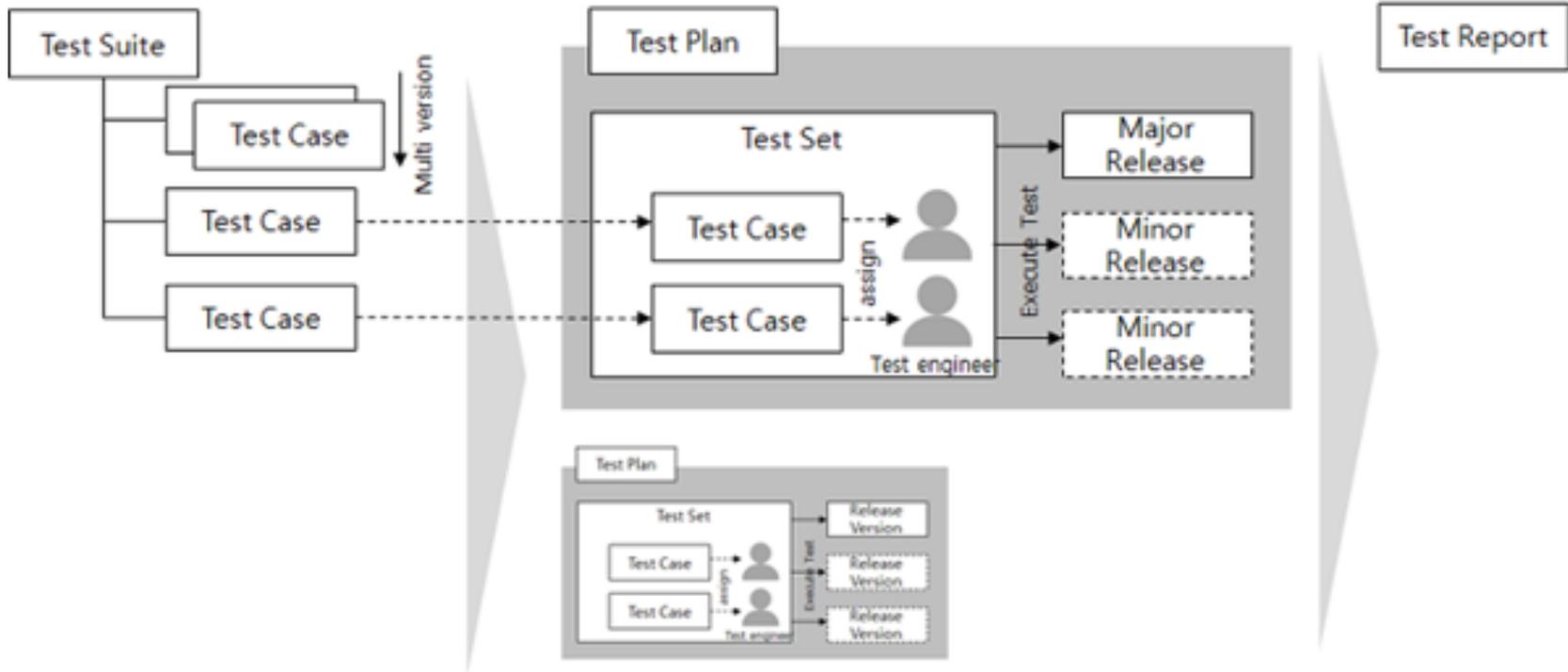
**Test Execution**

Test Plan에 따라서 할당된 테스트를 수행  
테스트 결과(Pass/Fail) 여부 체크

**Test Report**

테스트 결과 리포팅  
테스트 성공, 실패 여부 리포팅

TestLink의 테스트 프로세스



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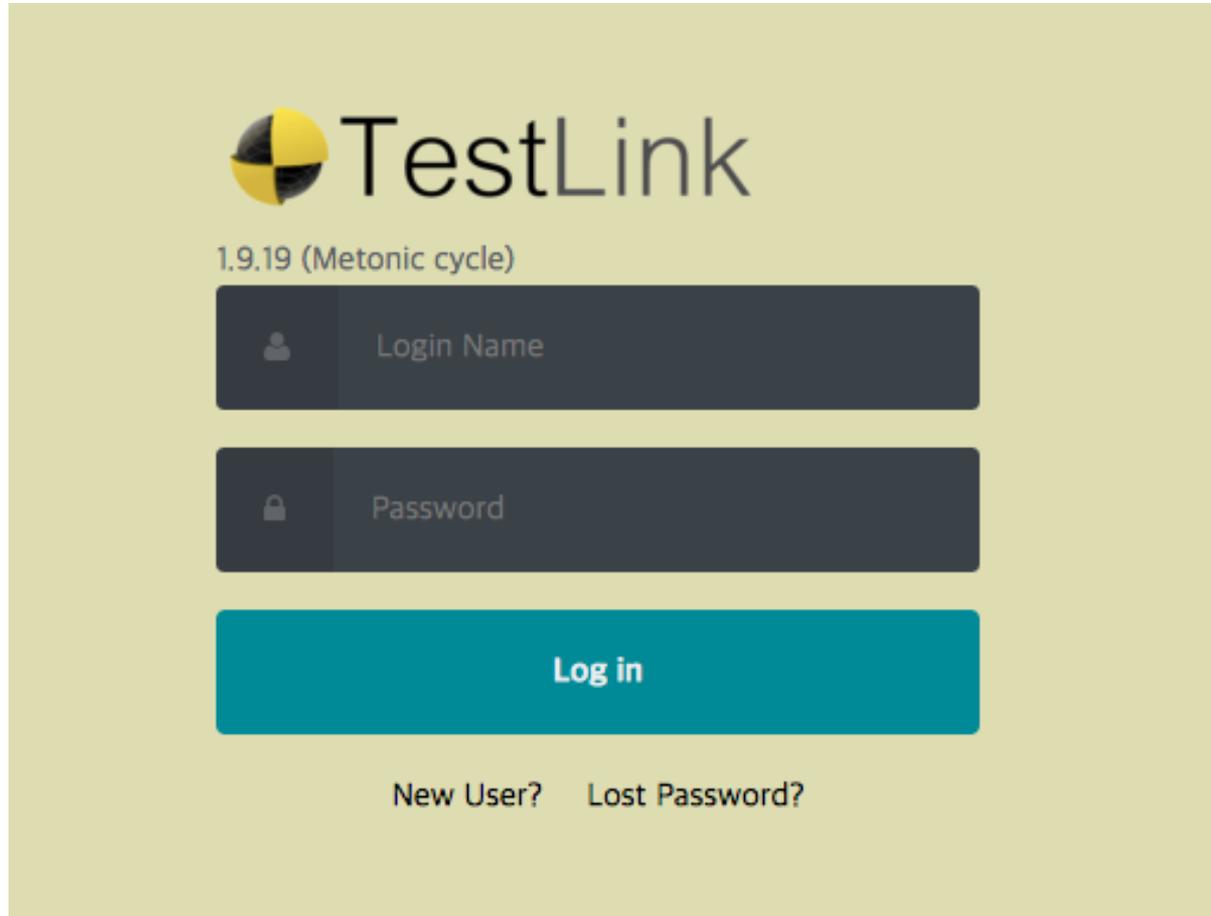
01

»» 시작 화면

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01 >> 프로젝트 생성

TestLink mbkim95 [admin]

Test Project Management : Create a new project

Name \*  
Prefix (used for Test case ID) \*

Project description

Software\_Verification  
SV

Source

Normal B I U X<sub>2</sub> X<sup>2</sup>

Software\_Verification

body p

Enhanced features

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

>> There are no Issue Tracker Systems defined <<

>> There are no Code Tracker Systems defined <<

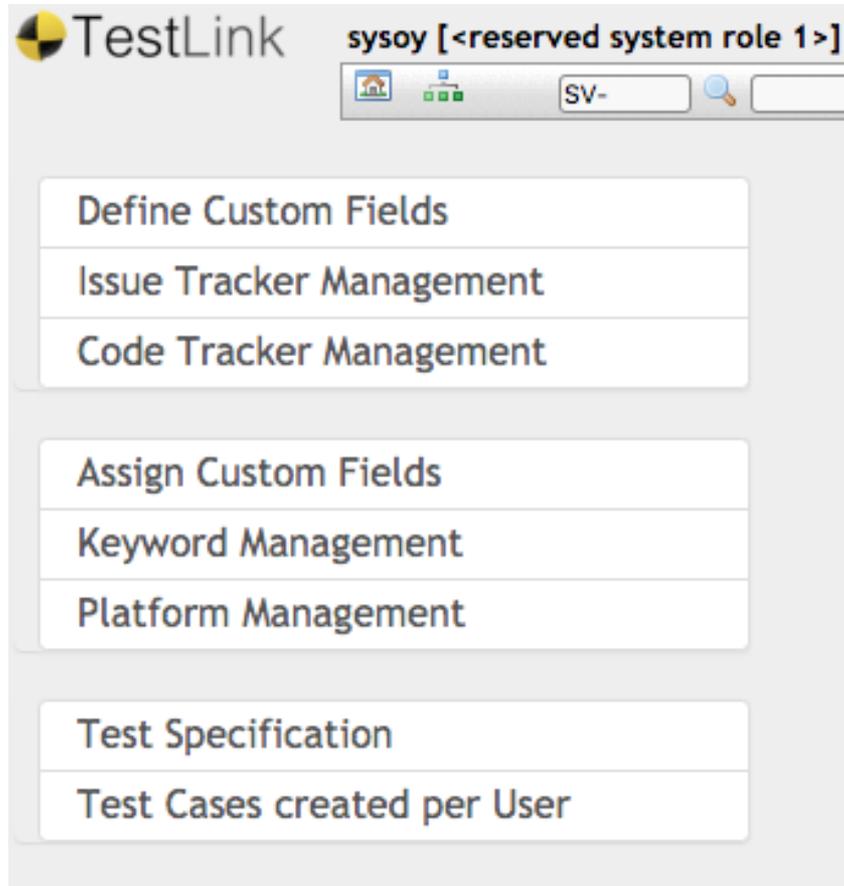
Code Tracker Integration

Availability

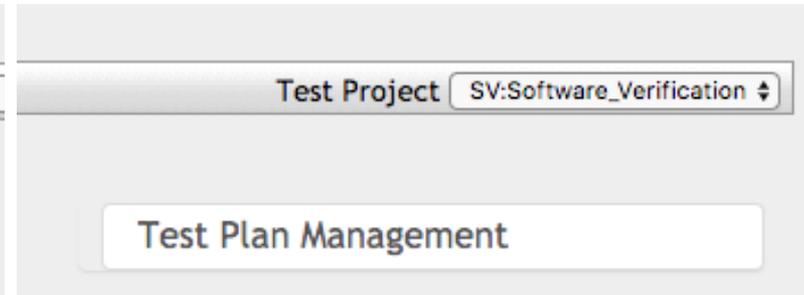
- Active
- Public

Create Cancel

»» 생성된 프로젝트에서 사용할 수 있는 기능



The screenshot shows the TestLink main menu. At the top left is the TestLink logo. To its right is the user name 'sysoy' and a role indicator '<reserved system role 1>'. Below this is a navigation bar with a home icon, a project tree icon, a search box containing 'SV-', and a search icon. The main menu consists of several groups of buttons: a group with 'Define Custom Fields', 'Issue Tracker Management', and 'Code Tracker Management'; a group with 'Assign Custom Fields', 'Keyword Management', and 'Platform Management'; and a group with 'Test Specification' and 'Test Cases created per User'.



The screenshot shows a dropdown menu for 'Test Project'. The selected project is 'SV:Software\_Verification'. Below the dropdown is a button labeled 'Test Plan Management'.

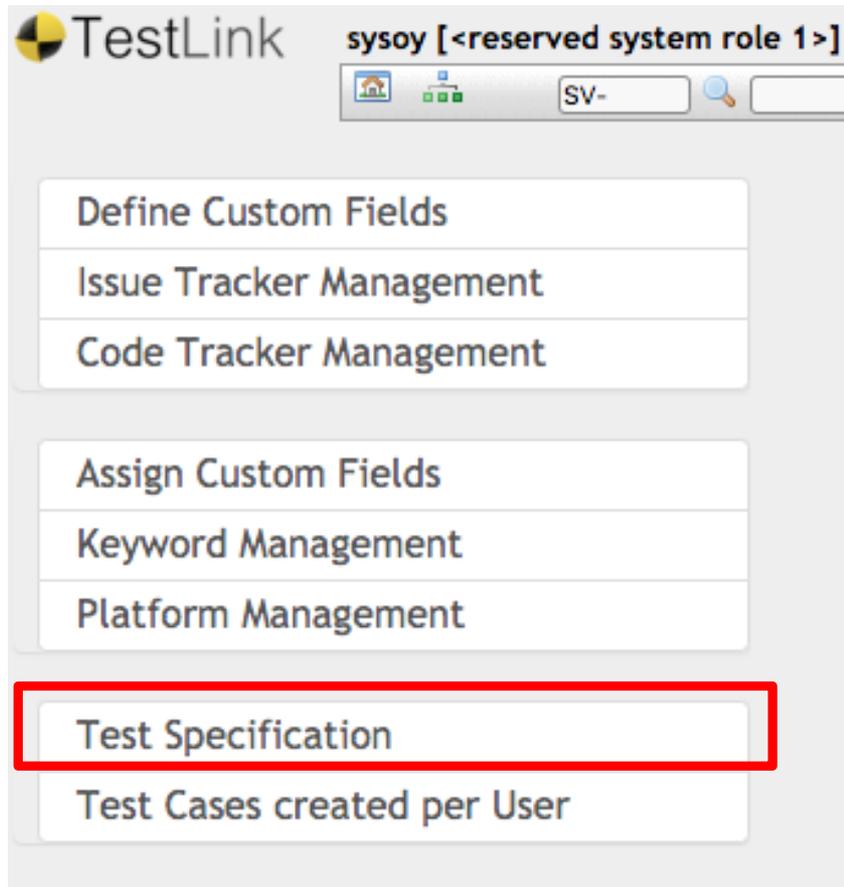
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01 >> Test Specification에서 Test Suite/Test Case 생성



01 >> Test Specification에서 Test Suite 생성

01

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The screenshot displays the TestLink web interface. On the left, the 'Navigator - Test Specification' panel is active, showing a 'Settings' section with a checked 'Update tree after every operation' option, and a 'Filters' section with input fields for 'Test Case ID' (SV-), 'Test Case Title', 'Status', 'Importance', and 'Execution type' ([Any]). Below the filters are 'Apply' and 'Reset Filters' buttons, and 'Expand tree' and 'Collapse tree' buttons. At the bottom of the navigator, a folder icon is labeled 'Software\_Verification (0)'. On the right, the 'Test Project : Software\_Verification' panel is visible. It features a 'Test Suite Operations' section with a red square highlighting a green plus sign icon. Below this are fields for 'Test Project Name' (Software\_Verification) and 'Description' (Software\_Verification). An 'Attached files' section shows a 'File' button with an information icon, and text indicating '파일 선택' (File selection) and '선택된 파일 없음' (No files selected).

01 >> Test Specification에서 Test Suite 생성

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The screenshot displays the TestLink interface. On the left, the 'Navigator - Test Specification' panel is visible, showing filter settings for Test Case ID (SV-), Test Case Title, Status (Select Some Options), Importance (Select Some Options), and Execution type ([Any]). Below these filters are 'Apply' and 'Reset Filters' buttons. The main area on the right shows the 'Test Project : Software\_Verification' dialog. A red box highlights the 'Create Test Suite' button, with 'Save' and 'Cancel' buttons below it. The 'Test Suite Name' field contains the text 'TestSuite 생성 테스트'. Below this is a 'Details' section with a toolbar containing icons for Source, refresh, back, and list views, along with a 'Normal' dropdown and text formatting buttons (B, I, U, S, X). The text 'TestSuite 생성 테스트' is displayed below the toolbar.

## 02 &gt;&gt; Test Specification에서 Test Suite 생성 확인

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**Navigator - Test Specification**

**Settings** [↑] [?]

Update tree after every operation

**Filters** [↑]

Test Case ID:

Test Case Title:

Test Suite:

Status:

Importance:

Execution type:

▲

Test Suite에서 Test Case 생성

The screenshot displays the TestLink interface with two main panels. The left panel, titled 'Navigator - Test Specification', contains a 'Settings' section with a checked 'Update tree after every operation' option, a 'Filters' section with input fields for 'Test Case ID' (SV-), 'Test Case Title', 'Test Suite' (Select an Option), 'Status' (Select Some Options), 'Importance' (Select Some Options), and 'Execution type' ([Any]), and a tree view showing 'Software\_Verification (0)' and 'TestSuite 생성 테스트 (0)'. The right panel, titled 'Test Suite : TestSuite 생성 테스트', shows 'Test Suite Operations' and 'Test Case Operations' toolbars with a red box highlighting the '+' icon in the 'Test Case Operations' toolbar. Below the toolbars, the 'Test Suite : TestSuite 생성 테스트' details are shown, including 'Keywords: None' and an 'Attached files' section with a 'File' table containing '파일 선택' and '선택된 파일 없음'.

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01 >> Test Suite에서 Test Case 생성

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Test Suite : TestSuite 생성 테스트 - Create Test Case

Create Cancel  check to create another test case after saving

**Test Case Title**

TestCase 생성 테스트

**Summary**

Source ↻ ↶ ↷ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮

Normal ▾ **B** *I* U ~~S~~ <sub>x<sub>2</sub></sub> <sup>x<sup>2</sup></sup> [Color] [Background Color] [Link] [Unlink] [Help]

어떤 내용을 테스트하는지 기술

body p

**Preconditions**

Source ↻ ↶ ↷ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮

Normal ▾ **B** *I* U ~~S~~ <sub>x<sub>2</sub></sub> <sup>x<sup>2</sup></sup> [Color] [Background Color] [Link] [Unlink] [Help]

테스트 전제조건 입력

01 >> Test Specification에서 Test Case 생성 확인

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The screenshot displays the TestLink interface for creating a test case. On the left, the 'Navigator - Test Specification' panel shows filter settings for 'Test Case ID' (SV-), 'Test Case Title', 'Test Suite', 'Status', 'Importance', and 'Execution type'. Below these are 'Apply' and 'Reset Filters' buttons. At the bottom of this panel, a tree view shows a folder structure: 'Software\_Verification (1)' containing 'TestSuite 생성 테스트 (1)', which in turn contains 'SV-1:TestCase 생성 테스트'. This tree view is highlighted with a red box. On the right, the main test case details panel shows 'SV-1 : TestCase 생성 테스트 - Version 1' with a summary of '어떤 내용을 테스트하는지 기술' and preconditions of '테스트 전제조건 입력'. A 'Create step' button is highlighted with a red box. Below this, there are fields for 'Status' (Draft), 'Importance', and 'Estimated exec. (min)', along with a 'Save' button. The 'Keywords' field is currently empty.

01 >> Test Case 에서 실제 Test Step 생성

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Create Step - Test Case: SV-1:TestCase 생성 테스트 - Version: 1

SV-1 : TestCase 생성 테스트 - Version 1

**Summary**  
어떤 내용을 테스트하는지 기술

**Preconditions**  
테스트 전제조건 입력

Save Save & exit Cancel

#	Step actions	Expected Results	Execution
1	<p>body p</p>		Manual

Save Save & exit Cancel

01

## Test Case 생성 확인

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Test Case

SV-1 : TestCase 생성 테스트 - Version 1

**Summary**  
어떤 내용을 테스트하는지 기술

**Preconditions**  
테스트 전제조건 입력

#	Step actions	Expected Results	Execution
1	Create Step 버튼을 누른다.	Step 생성 화면이 나온다.	Manual
2	Step actions 에 내용을 입력한 뒤 저장한다.	Step 에 내용이 반영된다.	Manual

01

Test Plan 생성

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Test Project SV:Software\_Verification

Test Plan Management

Test Plan Management - Test Project Software\_Verification

Name Test Plan 테스트 생성

Description

Source ↻ ↺ ↻

Normal B I U

Test Plan 테스트 생성

body p

Active

Public

Create Cancel

01

## »» Test Plan Builds/Releases

02

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04

Current Test Plan: ?  
Test Plan 테스트 생성

Test Plan Management  
**Builds / Releases**  
Milestones

Access Execute Tests RO  
Test Cases Assigned to Me  
Test Reports and Metrics  
Metrics Dashboard

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

### Build management - Test Plan : Test Plan 테스트 생성

#### Create a new Build

**Title** version 1.0

**Description**

Source

Normal

첫번째 builds/release

body p

**Active**

**Open**

**Release date** 02/05/2019 45 / 52

01

## »» Test Plan에 Test Case mapping

02

The screenshot shows the TestLink interface for a specific test plan. At the top, there is a 'Current Test Plan:' label with a help icon. Below it is a dropdown menu currently showing 'Test Plan 테스트 생성' and an 'OK' button. The main area contains a list of actions grouped into three sections. The first section includes 'Test Plan Management', 'Builds / Releases', and 'Milestones'. The second section includes 'Access Execute Tests RO', 'Test Cases Assigned to Me', 'Test Reports and Metrics', and 'Metrics Dashboard'. The third section includes 'Add / Remove Platforms', 'Add / Remove Test Cases' (highlighted with a red box), 'Assign Test Case Execution', 'Set Urgent Tests', 'Update Linked Test Case Versions', and 'Show Test Cases Newest Versions'.

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01 >> Test Plan에 Test Case mapping

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**Add/Remove Test Cases**

**Settings**

Test Plan: Test Plan 테스트 ...

Tests Grouped By: Test Suite

Update tree after every operation:

**Filters**

Test Case ID: SV-

Test Case Title:

Test Suite: Select an Option

Status: [Any]

Importance: [Any]

Execution type: [Any]

Apply Reset Filters Advanced Filters

Expand tree Collapse tree Show Full (on right pane)

Software\_Verification

TestSuite 생성 테스트 (1)

**Test Plan : Test Plan 테스트 생성 - Add Test Cases**

Assign to user on add: on build

Check/uncheck all Test cases for: adding

Test cases with Latest Version with status with

**TestSuite 생성 테스트**

**Test Case**

SV-1 : TestCase 생성 테스트

01 >>> Test Engineer한테 Test Case 할당

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Test Plan : Test Plan 테스트 생성 - Add Test Cases to 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

**TestSuite 생성 테스트**

<input checked="" type="checkbox"/> Test Case	Version	Status
<input checked="" type="checkbox"/>    SV-1 : TestCase 생성 테스트	<input type="text" value="1"/>	Draft

>>> 그 이후 Test Execution, Report 기능을 사용

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# TestLink

TestLink는 **테스트 팀 관리**와 **테스트 케이스 관리** 기능을 제공해

시스템 테스트를 편리하게 해주는 도구이지만,  
테스트에 필요한 코드 작성을 지원하지 않기 때문에

- ✓ 어떻게 테스트 팀을 구성하고
- ✓ 어떻게 테스트 프로세스를 정의하는지에 따라  
테스트 품질이 결정된다.

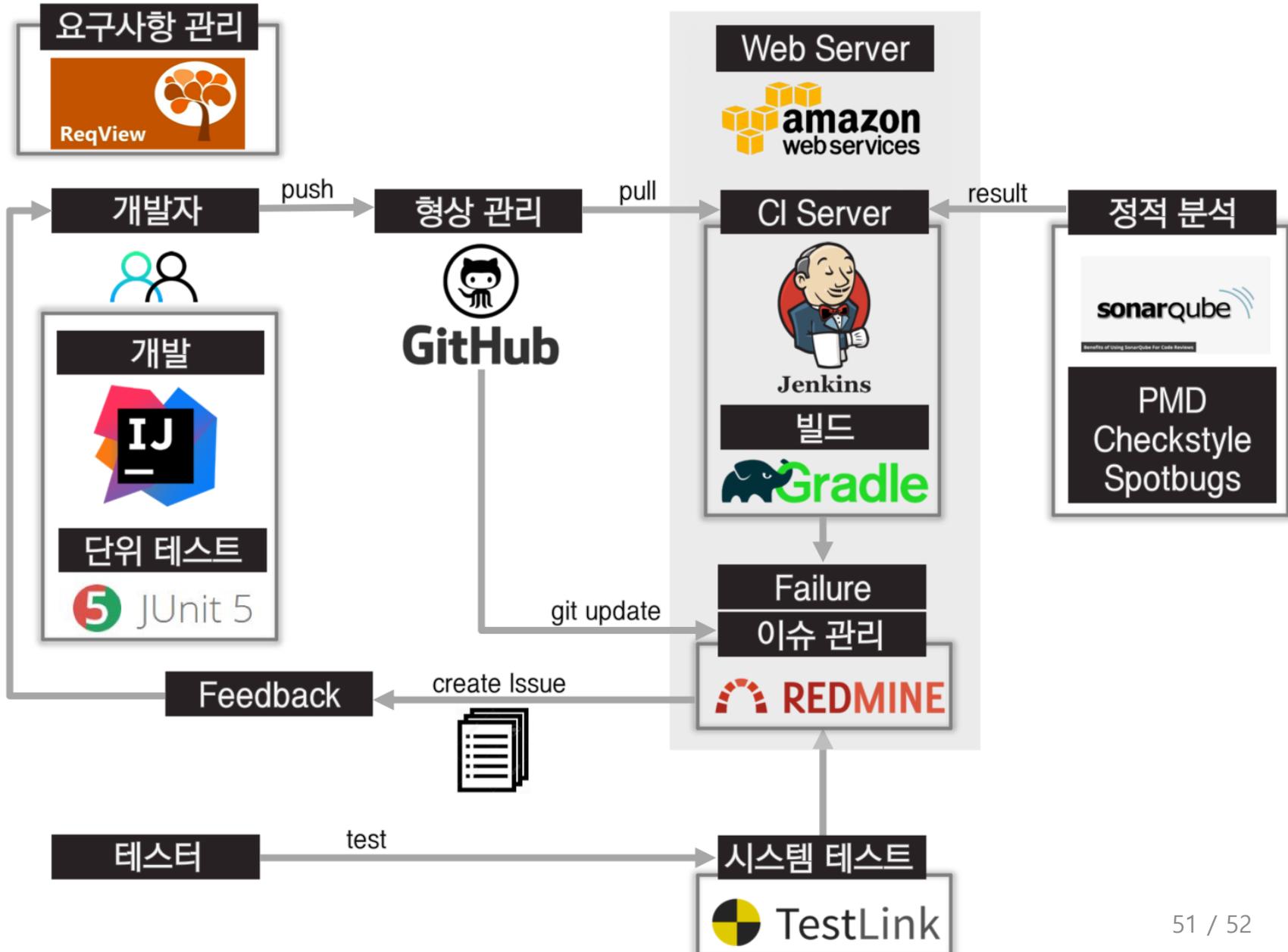
# Summary

01

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THANK YOU