

# SOFTWARE VERIFICATION

정적 분석 도구  
Testlink 및 시스템테스트 도구

**Team 7**

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201211356 송원중

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- 3 테스트 진행

## 3 Q&A

## 소 개

### 소개

-JAVA, C/C++, C#등 여러 가지 언어의 정적 분석 도구

### 기능

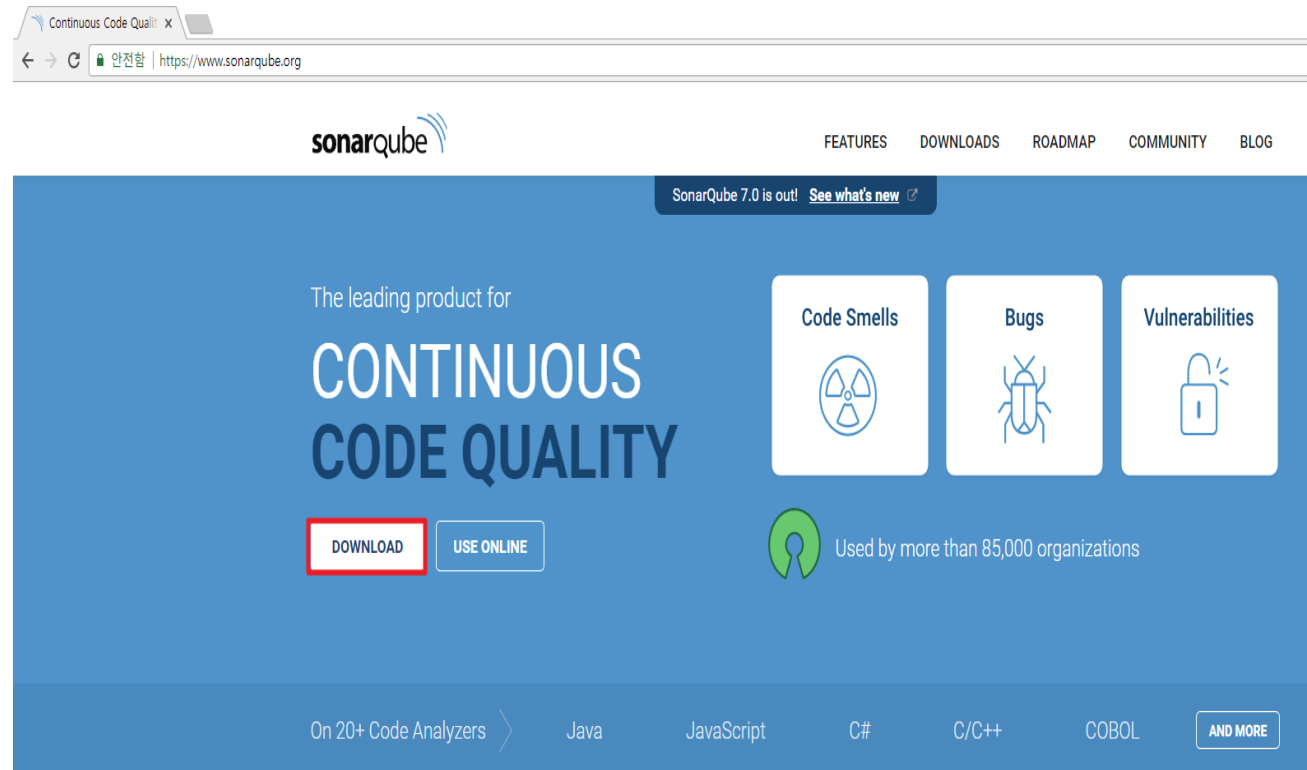
Static Test Coverage분석, 코드 품질 관리  
자원 누수, null포인터 분석 등 까다로운 이슈 관리  
Code complexity, 버그 추적 등의 CI 도구

### 특징

오픈 소스 코드 품질검사 플랫폼  
plug-in을 이용한 다양한 기능 제공  
한눈에 보기 편한 대쉬보드

## 다운로드

<https://www.sonarqube.org>

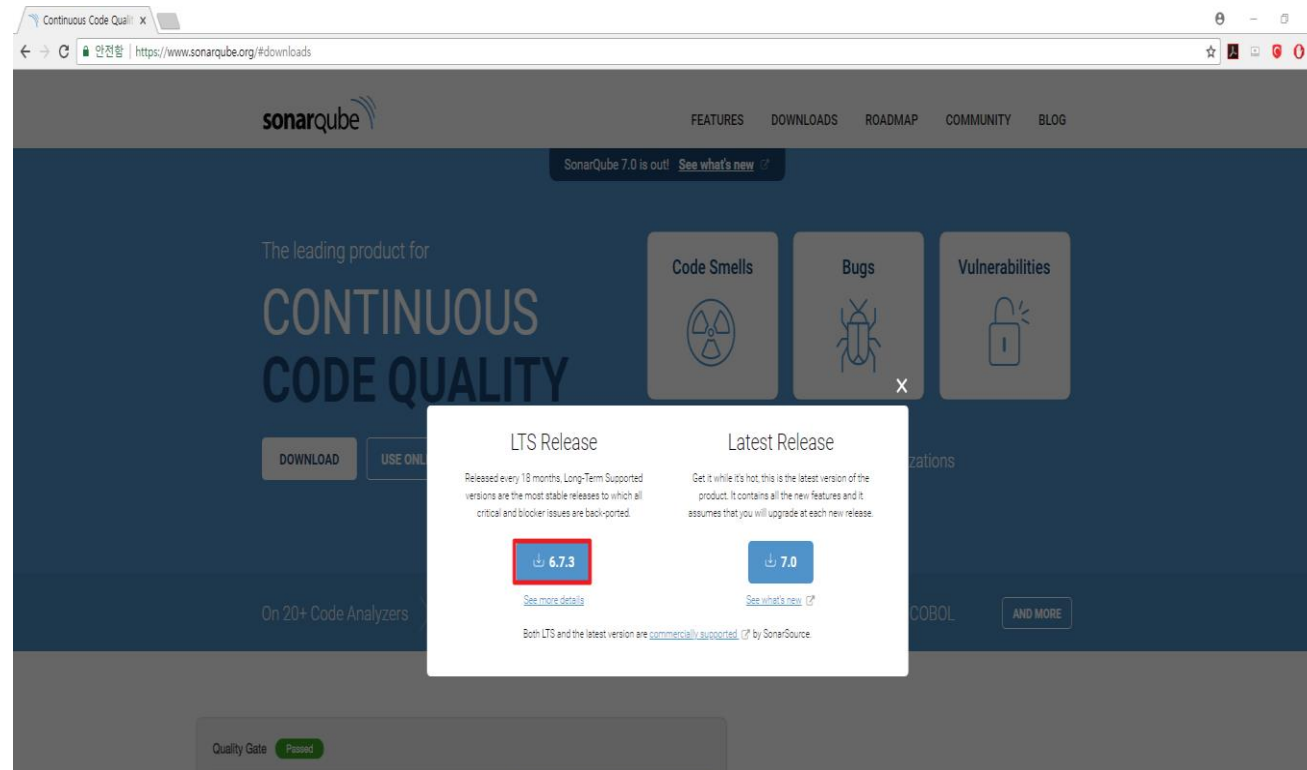


The screenshot shows the SonarQube website homepage. The browser's address bar displays the URL <https://www.sonarqube.org>. The website features a blue header with the SonarQube logo and navigation links for FEATURES, DOWNLOADS, ROADMAP, COMMUNITY, and BLOG. A dark blue banner at the top right announces "SonarQube 7.0 is out! See what's new". The main content area is blue and includes the text "The leading product for CONTINUOUS CODE QUALITY". Below this text are two buttons: "DOWNLOAD" (highlighted with a red border) and "USE ONLINE". To the right, there are three white boxes with icons and labels: "Code Smells" (radioactive symbol), "Bugs" (beetle icon), and "Vulnerabilities" (lock icon). Below these boxes, a green icon and text state "Used by more than 85,000 organizations". At the bottom, a dark blue footer contains the text "On 20+ Code Analyzers" followed by a list of supported languages: Java, JavaScript, C#, C/C++, and COBOL, with an "AND MORE" button.

# 1 SonarQube

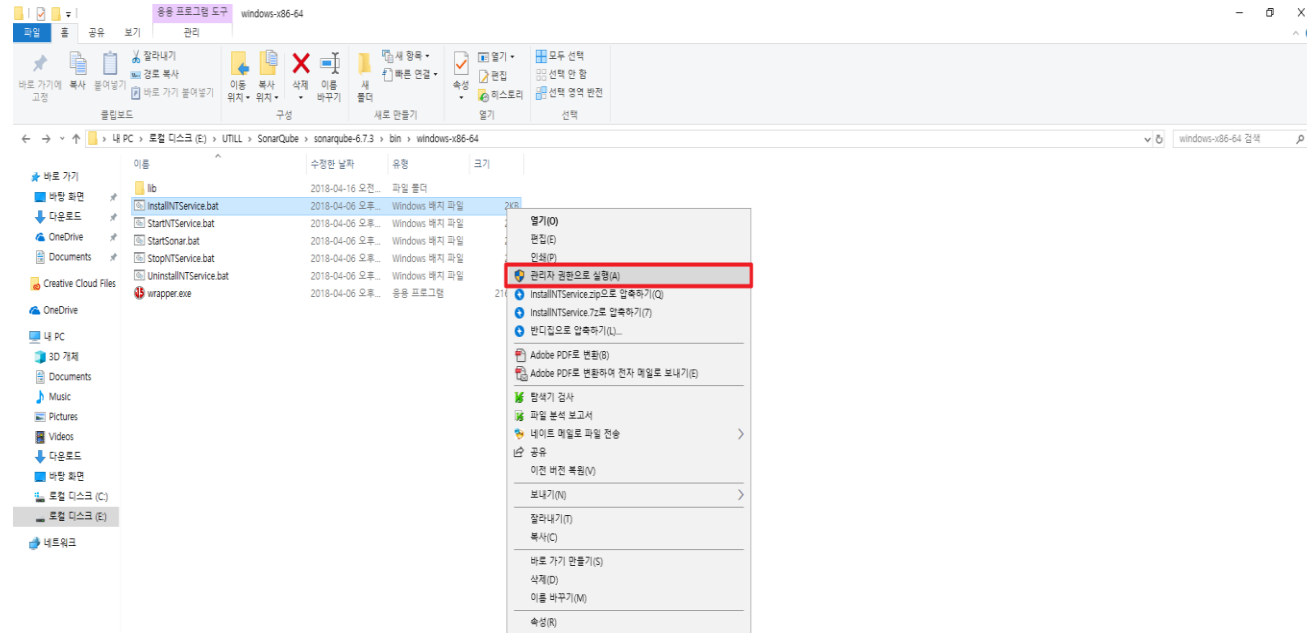
## 다운로드

<https://www.sonarqube.org>



## 설치 및 설정

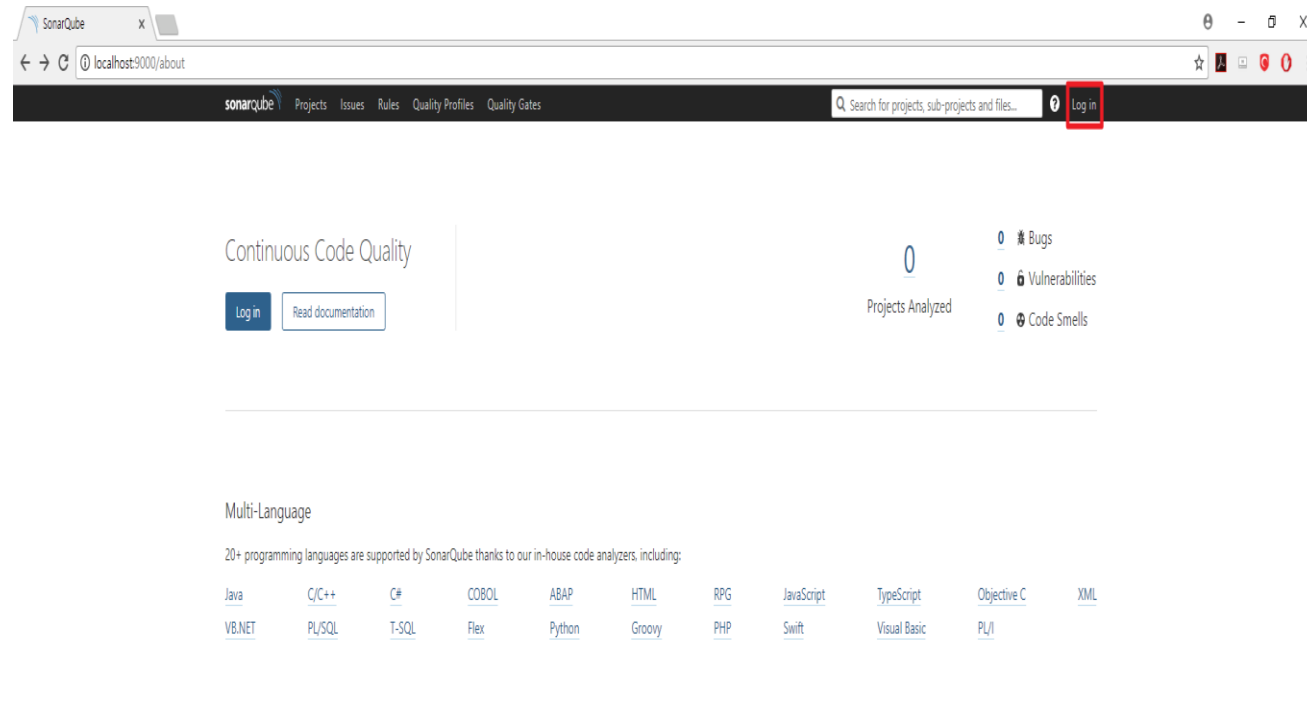
환경변수 설정 후 관리자권한으로 .bat파일 실행



# 1 SonarQube

## 설치 및 설정

localhost:9000



## 설치 및 설정

ID : admin / PW : admin

The screenshot shows the SonarQube web interface for the 'Security - My Account' page. The user is logged in as 'Administrator'. The page title is 'Tokens'. Below the title, there is a paragraph explaining the purpose of 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.'

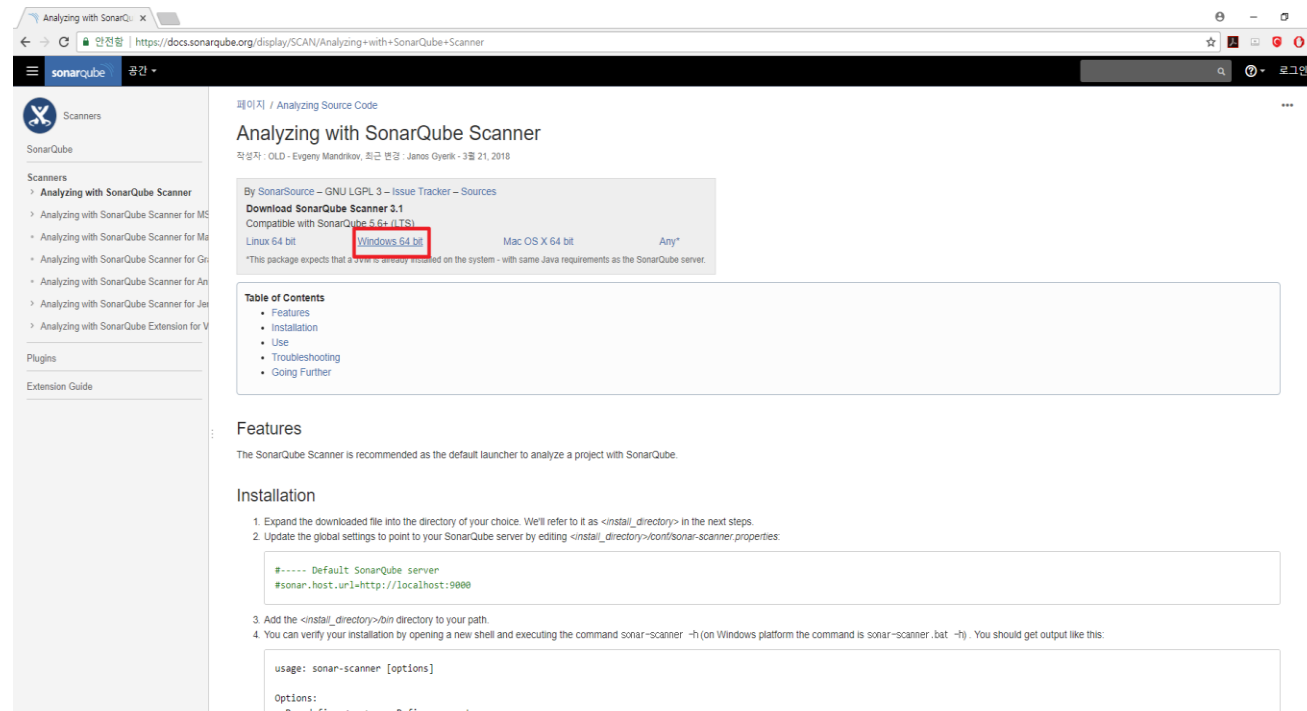
Step 1: A red dashed box highlights the 'Generate New Tokens' section. It shows a table with one token named 'nimz0630' created on 'April 16, 2018'. Below the table is a 'Generate New Tokens' form with a 'Generate' button. A message below the form states: 'New token "nimz0630" has been created. Make sure you copy it now, you won't be able to see it again.' A 'Copy' button is next to the token value: 'a83f6159644a67beF242e086c5d4a8d772c405'.

Step 2: A red dashed box highlights the 'Change password' section. It shows a message: 'The password has been changed:'. Below this are three password input fields: 'Old Password\*', 'New Password\*', and 'Confirm Password\*'. A 'Change password' button is at the bottom.



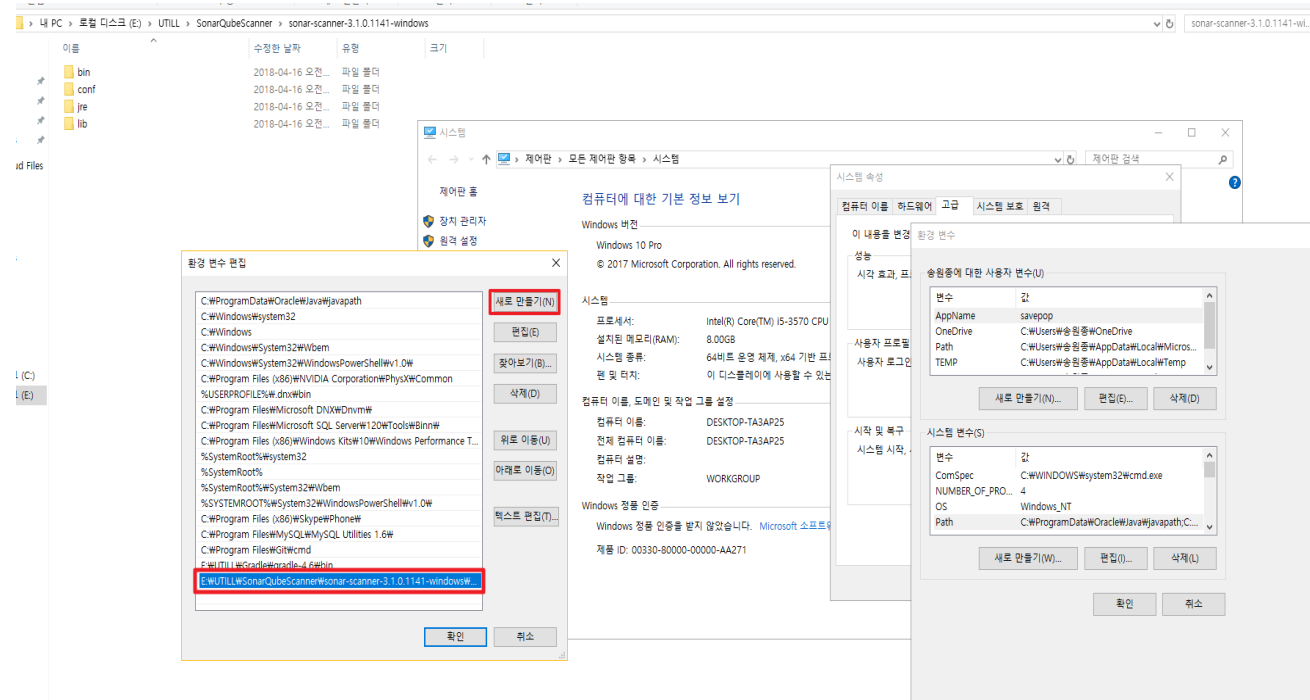
## 설치 및 설정

### SonarQubeScanner 설치



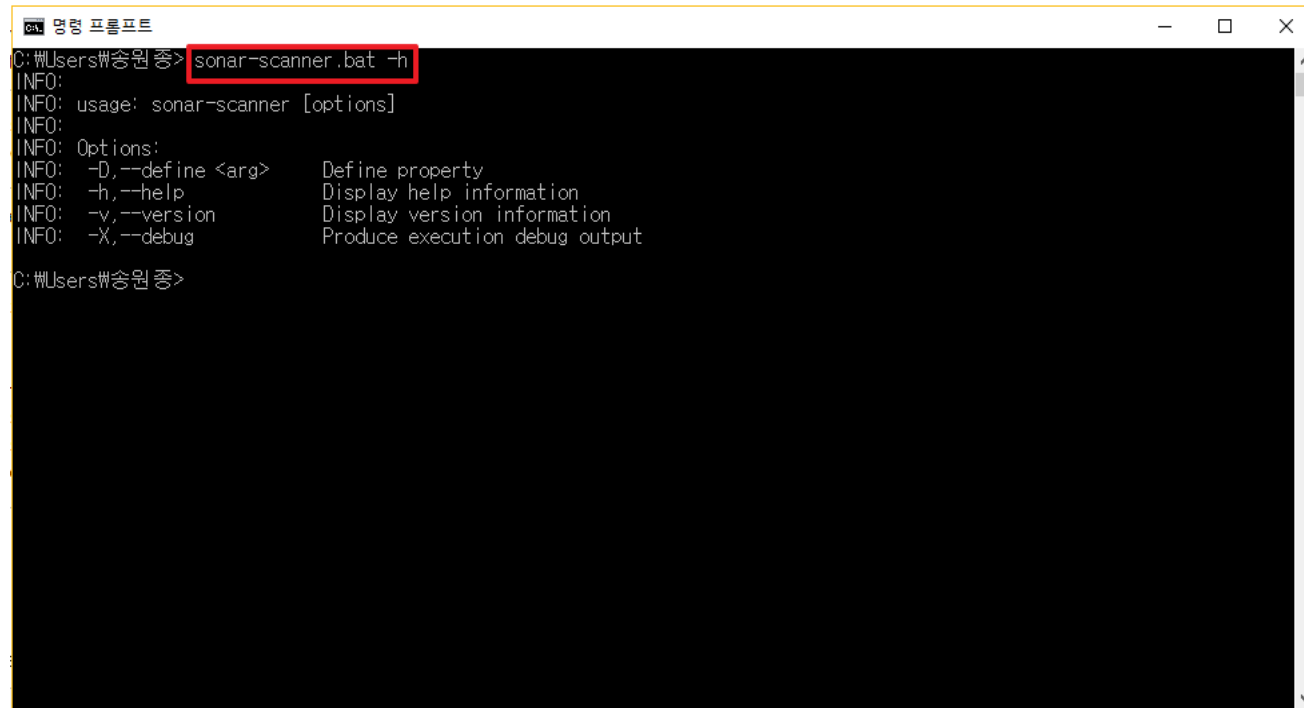
## 설치 및 설정

### 환경변수 설정



## 설치 및 설정

### 환경변수 설정확인

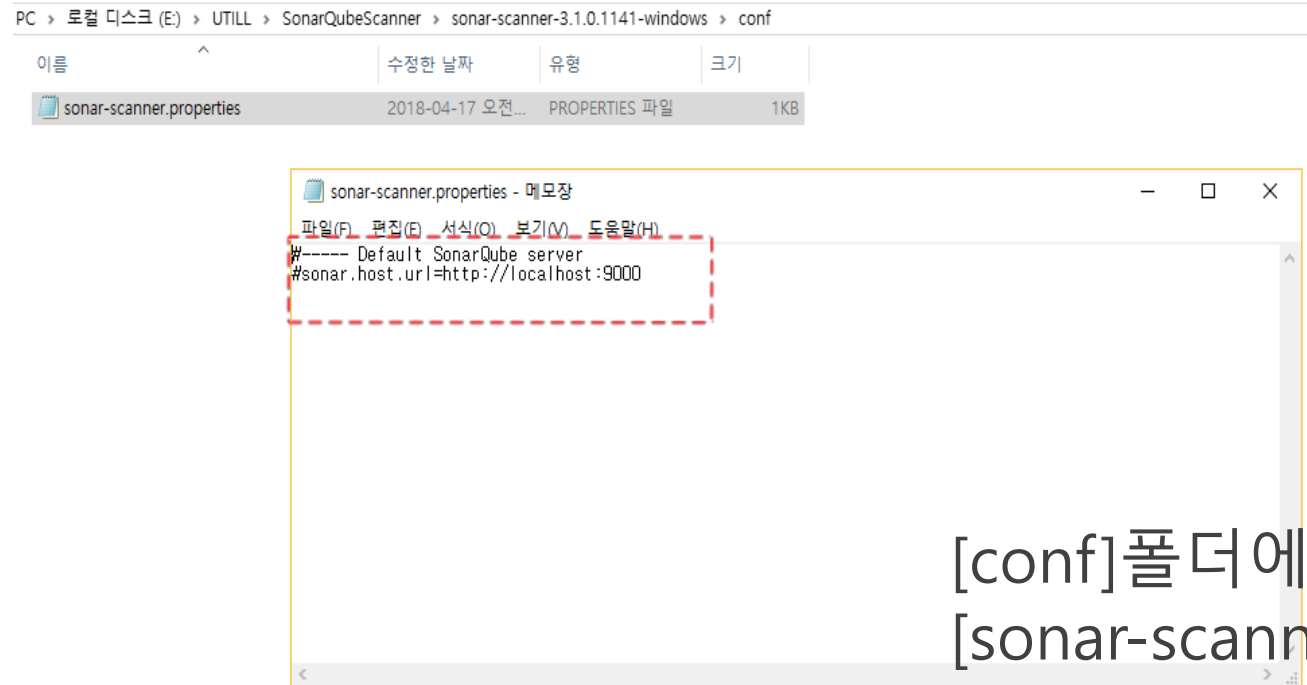


```
명령 프롬프트
C:\Users\#승원> sonar-scanner.bat -h
INFO:
INFO: usage: sonar-scanner [options]
INFO:
INFO: Options:
INFO: -D,--define <arg>   Define property
INFO: -h,--help           Display help information
INFO: -v,--version        Display version information
INFO: -X,--debug          Produce execution debug output
C:\Users\#승원>
```

# 1 SonarQube

## 설치 및 설정

### SonarQube 서버 & Scanner 연결



[conf]폴더에  
[sonar-scanner.properties] 생성

## 설치 및 설정

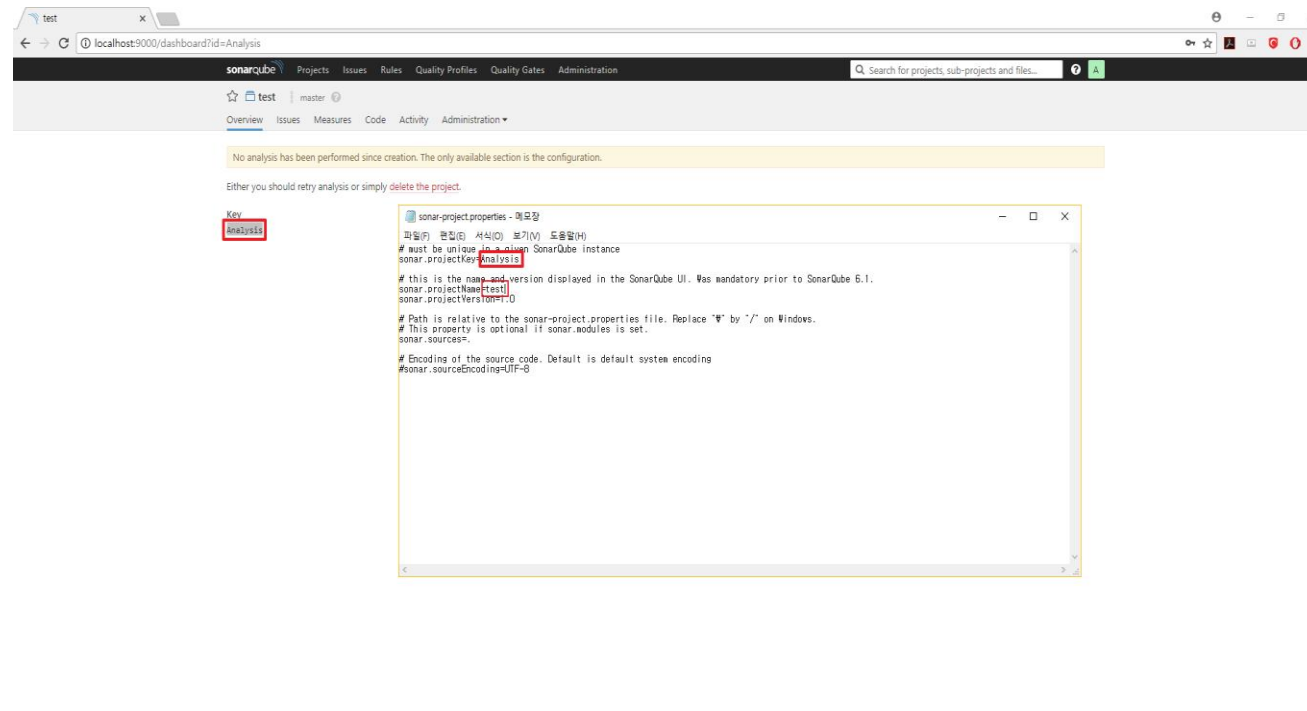
소스코드 루트폴더 – [sonar-project.properties] 생성



# 1 SonarQube

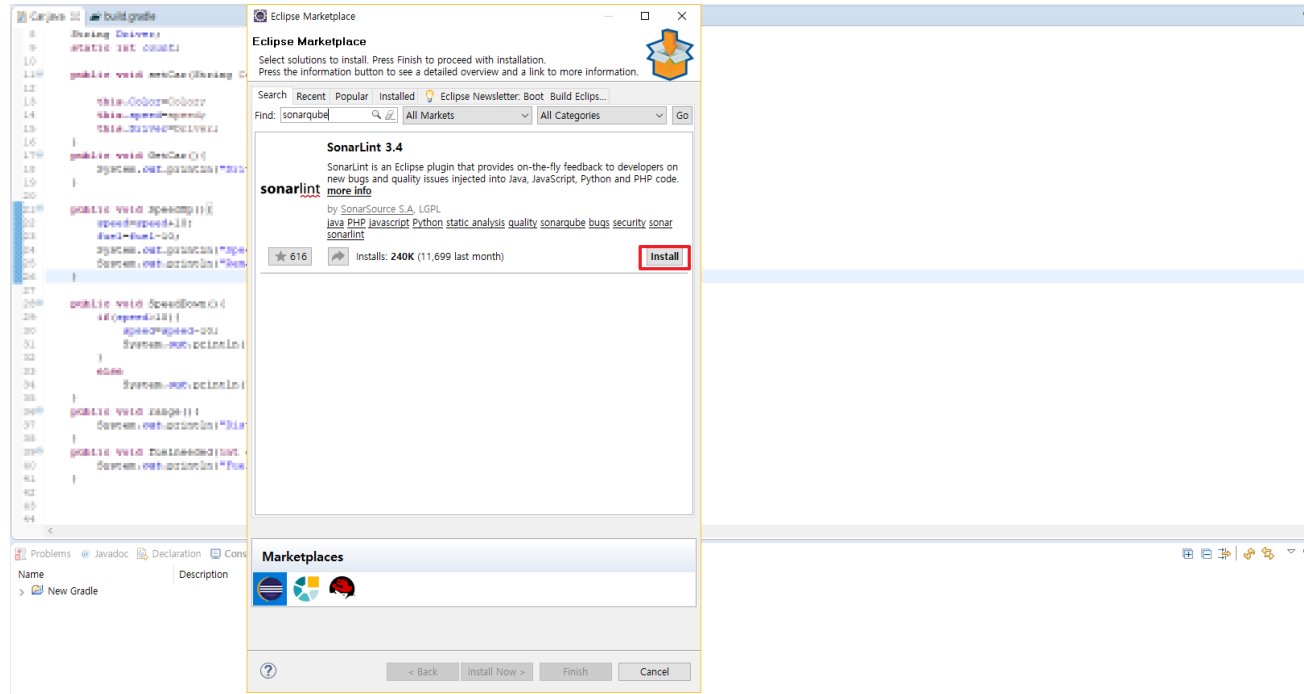
## 설치 및 설정

소스코드 루트폴더 – [sonar-project.properties] 생성 – project name/key 입력



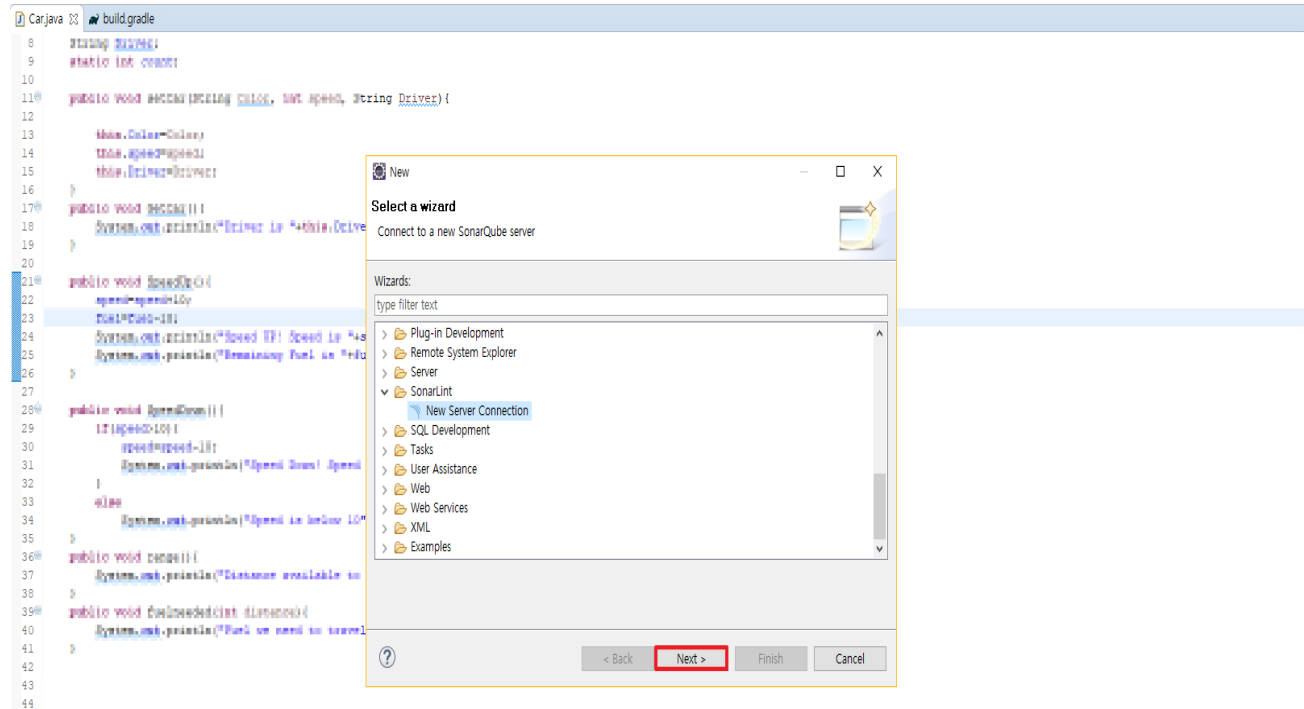
# Eclipse SonarQube plugin 설치

Market place - SonarLint



# Eclipse SonarQube plugin 설치

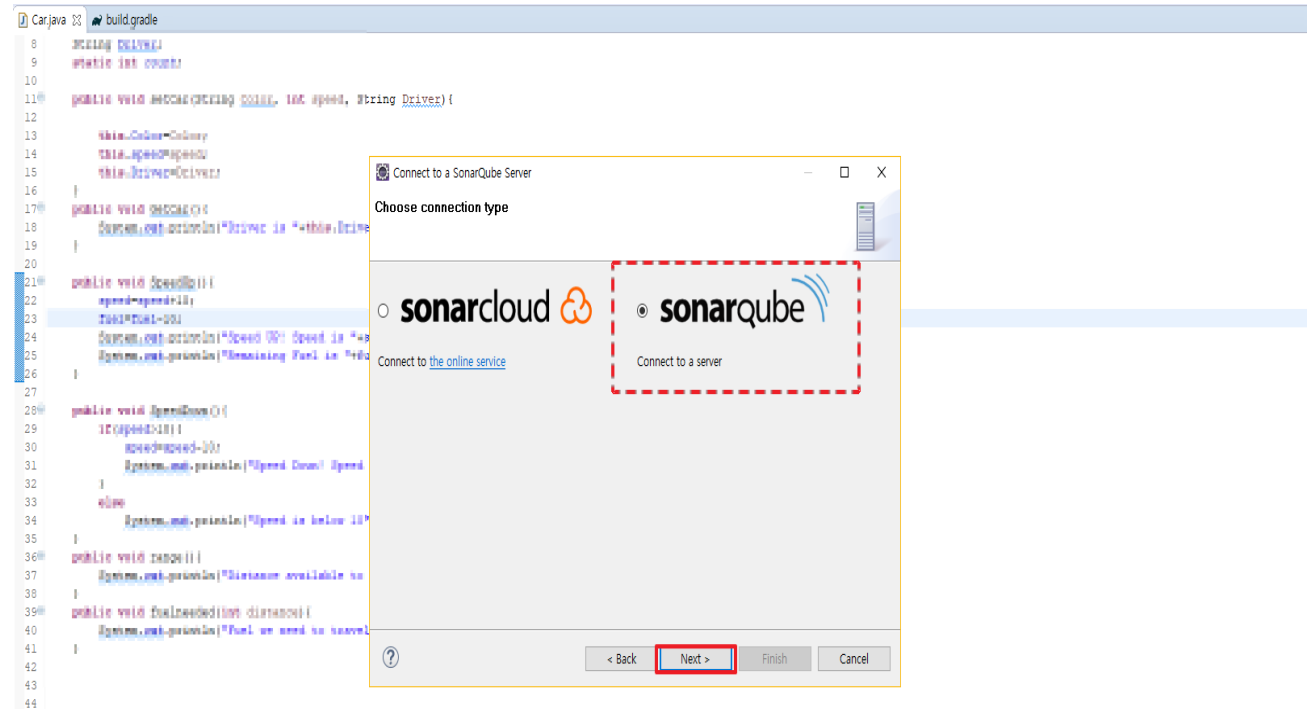
## SonarQube 서버와 연결





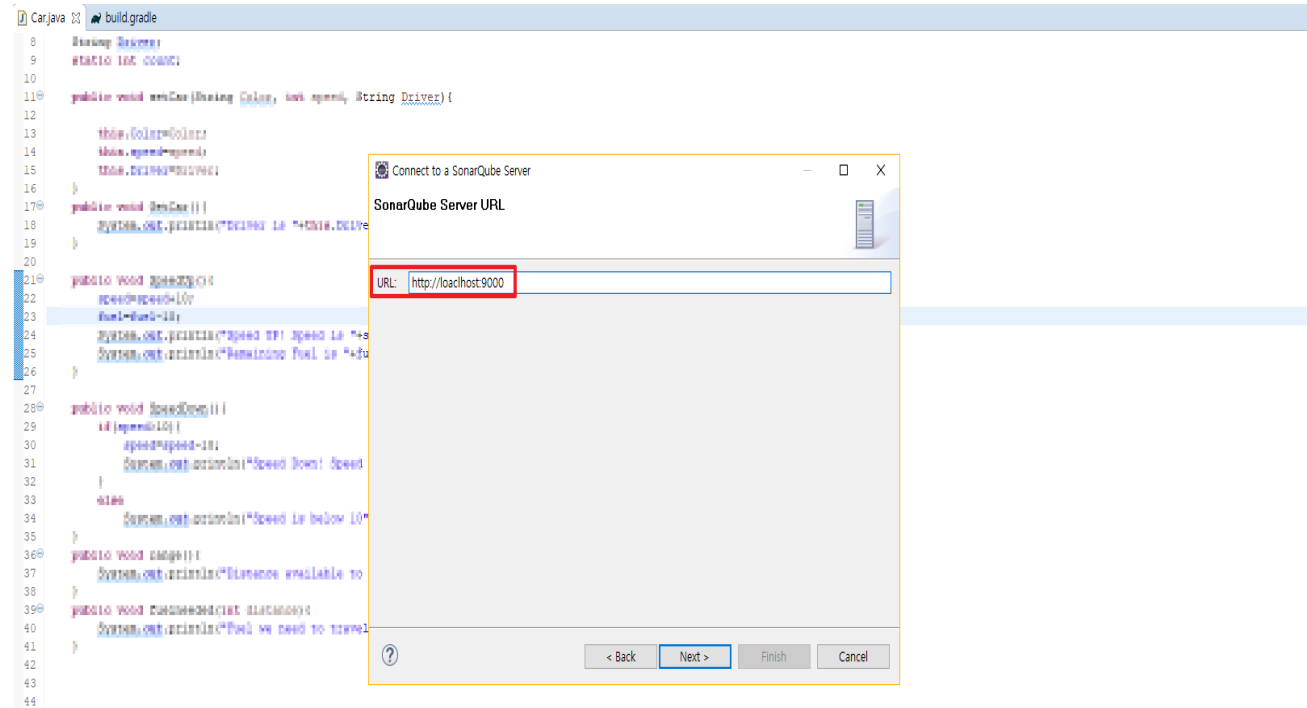
# Eclipse SonarQube plugin 설치

## SonarQube 서버와 연결



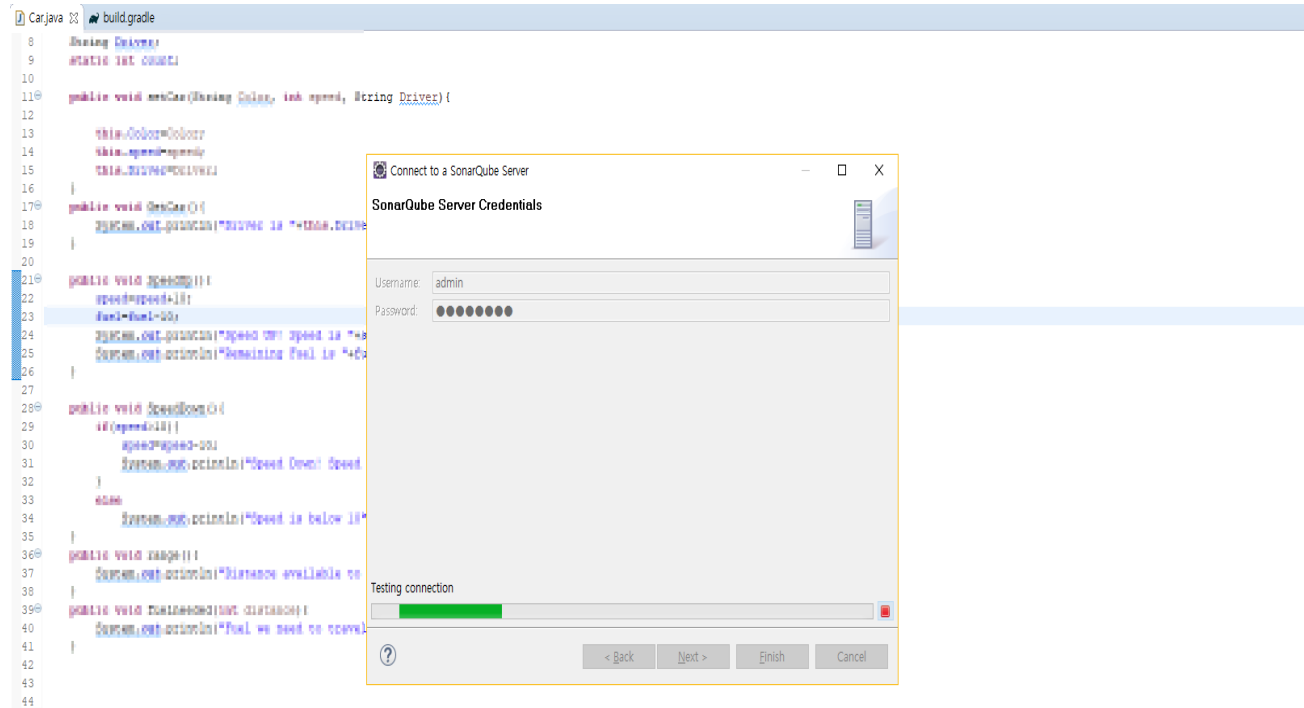
## Eclipse SonarQube plugin 설치

### SonarQube 서버와 연결



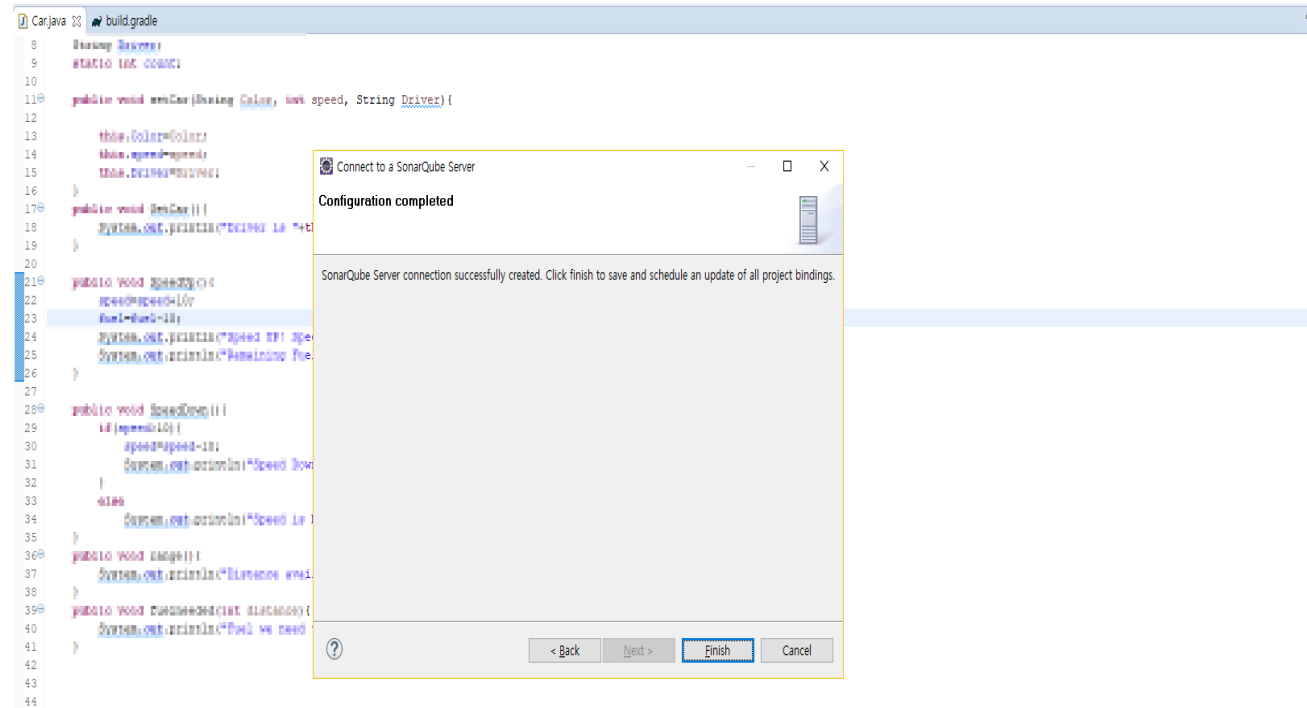
# Eclipse SonarQube plugin 설치

## SonarQube 서버와 연결



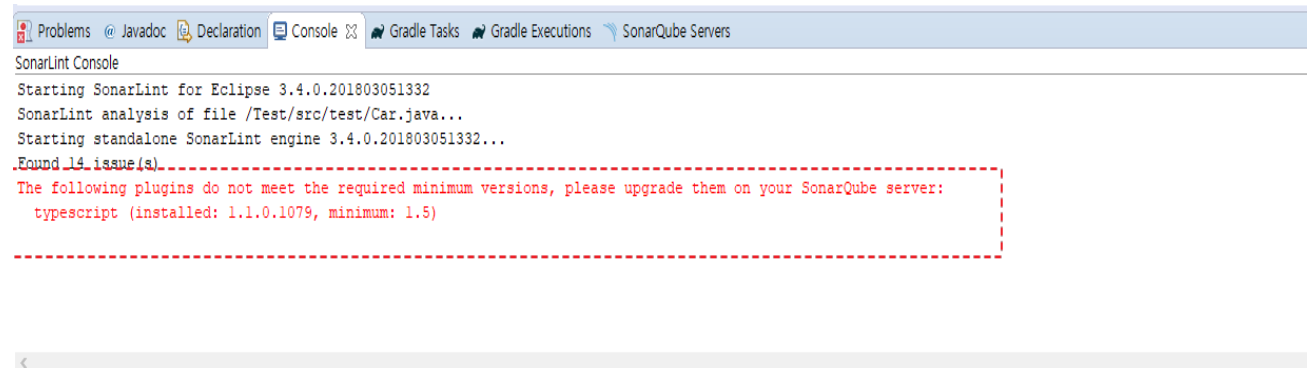
# Eclipse SonarQube plugin 설치

## SonarQube 서버와 연결



## Eclipse SonarQube plugin 설치

### Script Error 발생



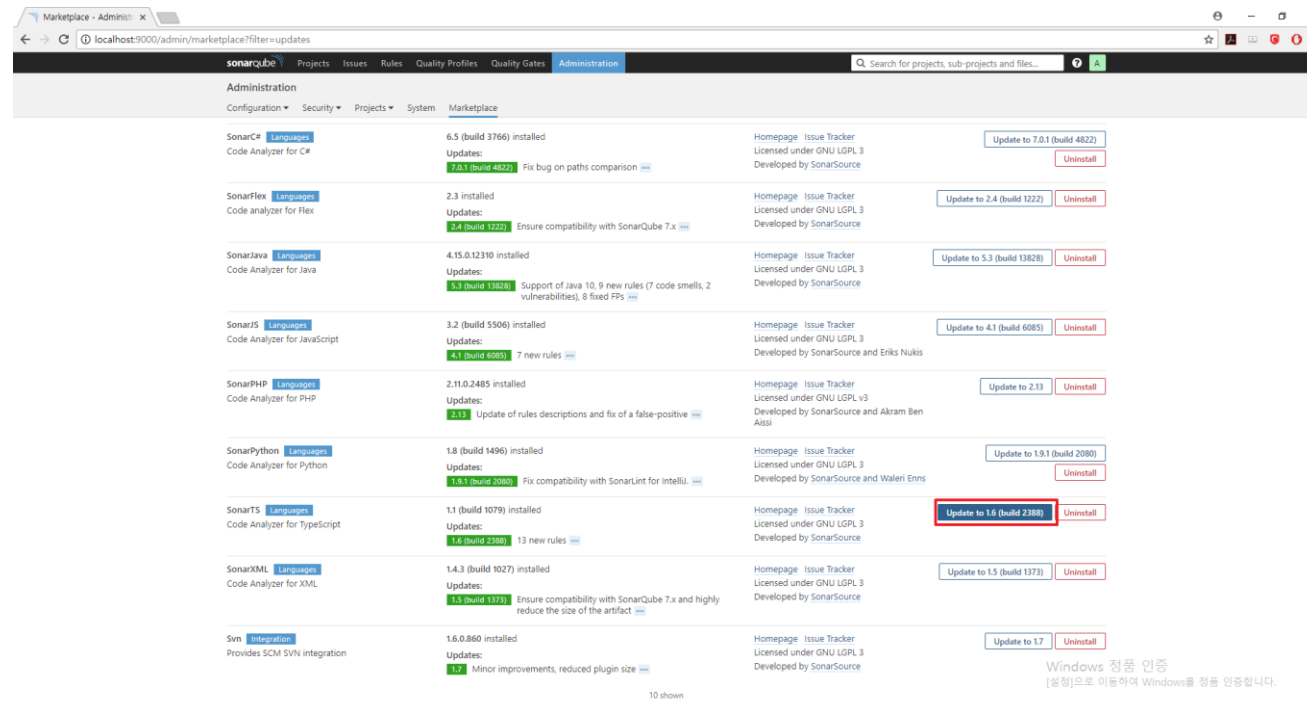
The screenshot shows the Eclipse IDE's console window. The console output includes the following text:

```
SonarLint Console
Starting SonarLint for Eclipse 3.4.0.201803051332
SonarLint analysis of file /Test/src/test/Car.java...
Starting standalone SonarLint engine 3.4.0.201803051332...
Found 14 issue(s)
The following plugins do not meet the required minimum versions, please upgrade them on your SonarQube server:
  typescript (installed: 1.1.0.1079, minimum: 1.5)
```

The error message is highlighted with a red dashed border in the original image.

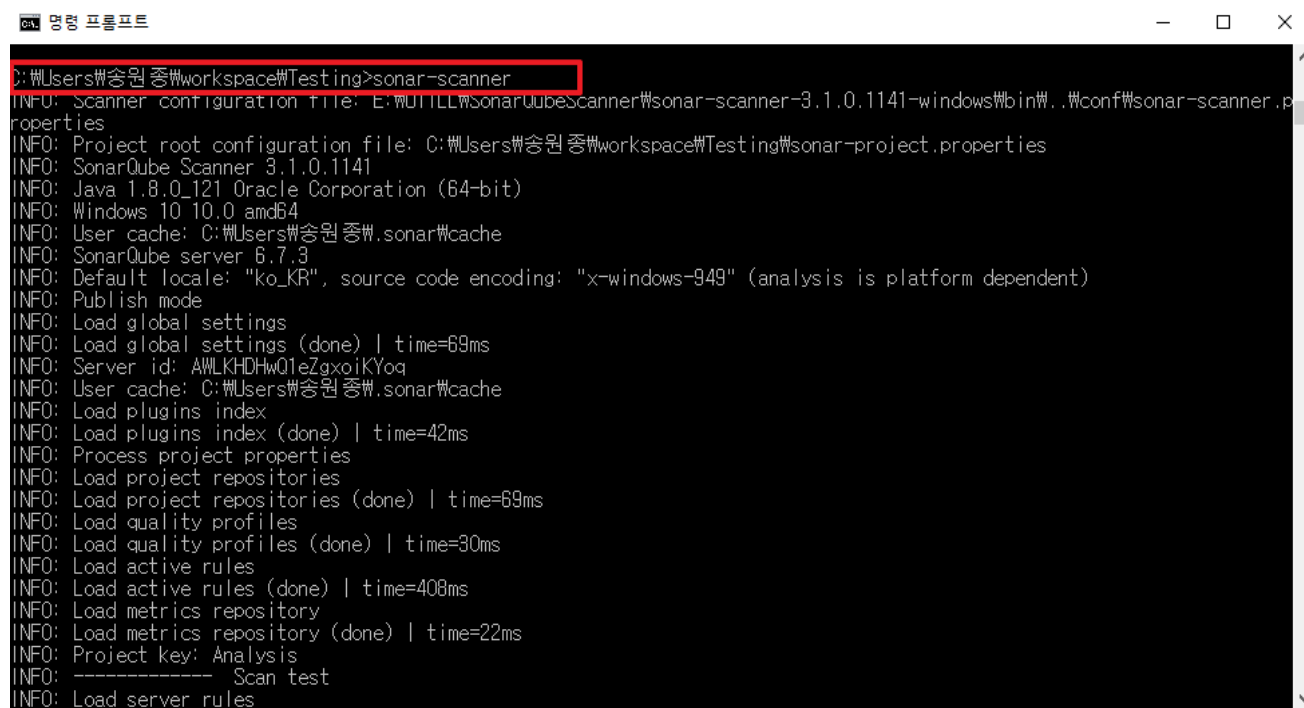
# Eclipse SonarQube plugin 설치

Localhost:9000 – administration – SonarTs update - Restart



## Eclipse SonarQube plugin 설치

프로젝트 폴더로 이동 - [sonar-scanner] 입력



```
명령 프롬프트
C:\Users\송원종\workspace\Testing>sonar-scanner
INFO: Scanner configuration file: E:\UTIL\sonarQubeScanner\sonar-scanner-3.1.0.1141-windows\bin\..\conf\sonar-scanner.properties
INFO: Project root configuration file: C:\Users\송원종\workspace\Testing\sonar-project.properties
INFO: SonarQube Scanner 3.1.0.1141
INFO: Java 1.8.0_121 Oracle Corporation (64-bit)
INFO: Windows 10 10.0 amd64
INFO: User cache: C:\Users\송원종\.sonar\cache
INFO: SonarQube server 6.7.3
INFO: Default locale: "ko_KR", source code encoding: "x-windows-949" (analysis is platform dependent)
INFO: Publish mode
INFO: Load global settings
INFO: Load global settings (done) | time=69ms
INFO: Server id: AWLKHdHwQ1eZgxoikYoa
INFO: User cache: C:\Users\송원종\.sonar\cache
INFO: Load plugins index
INFO: Load plugins index (done) | time=42ms
INFO: Process project properties
INFO: Load project repositories
INFO: Load project repositories (done) | time=69ms
INFO: Load quality profiles
INFO: Load quality profiles (done) | time=30ms
INFO: Load active rules
INFO: Load active rules (done) | time=408ms
INFO: Load metrics repository
INFO: Load metrics repository (done) | time=22ms
INFO: Project key: Analysis
INFO: ----- Scan test
INFO: Load server rules
```

## Eclipse SonarQube plugin 설치

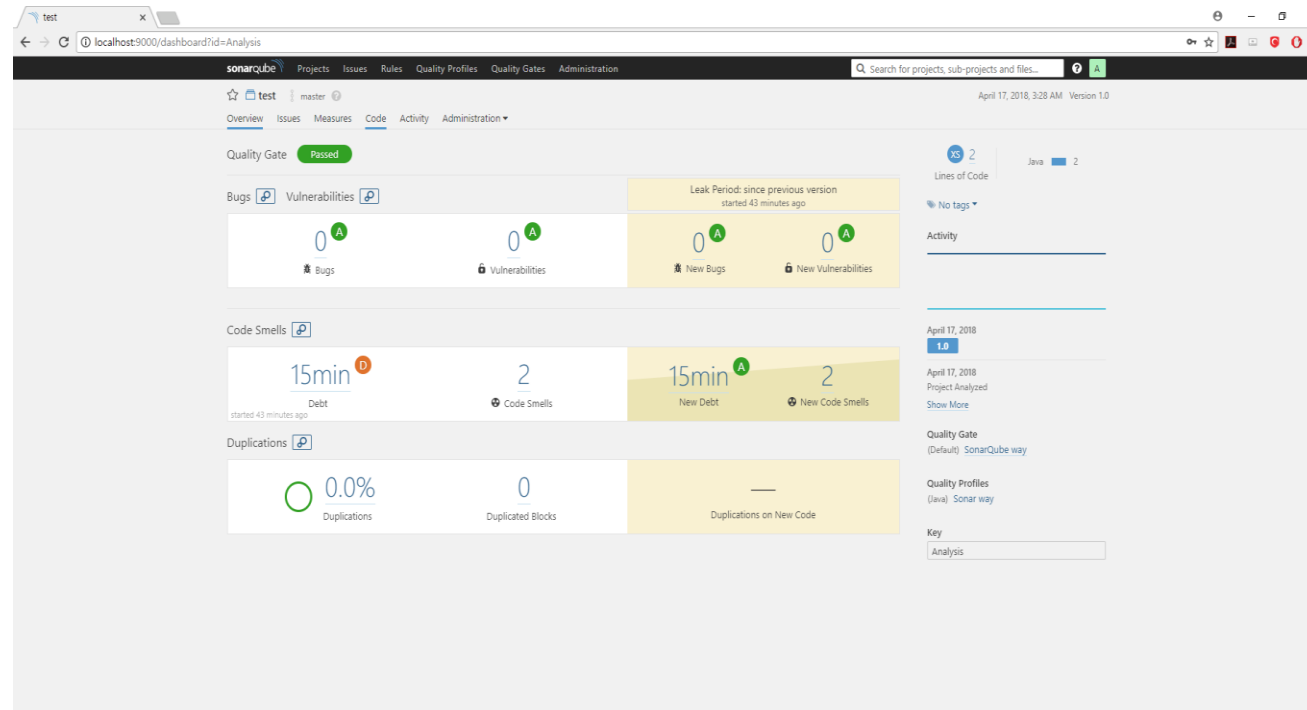
EXECUTION SUCCESS 메시지 확인

```
port
INFO: More about the report processing at http://localhost:9000/api/ce/task?id=AWLPtyyfgkXl0xci3KaU
INFO: Task total time: 4.228 s
INFO: -----
INFO: EXECUTION SUCCESS
INFO: -----
INFO: Total time: 5.940s
INFO: Final Memory: 20M/263M
INFO: -----
C:\Users\#송원종\workspace\Testing>
```



# Eclipse SonarQube plugin 설치

결과 확인



# 소 개

### 소개

-JAVA, C/C++, C#등 여러 가지 언어의 정적 분석 도구

### 기능

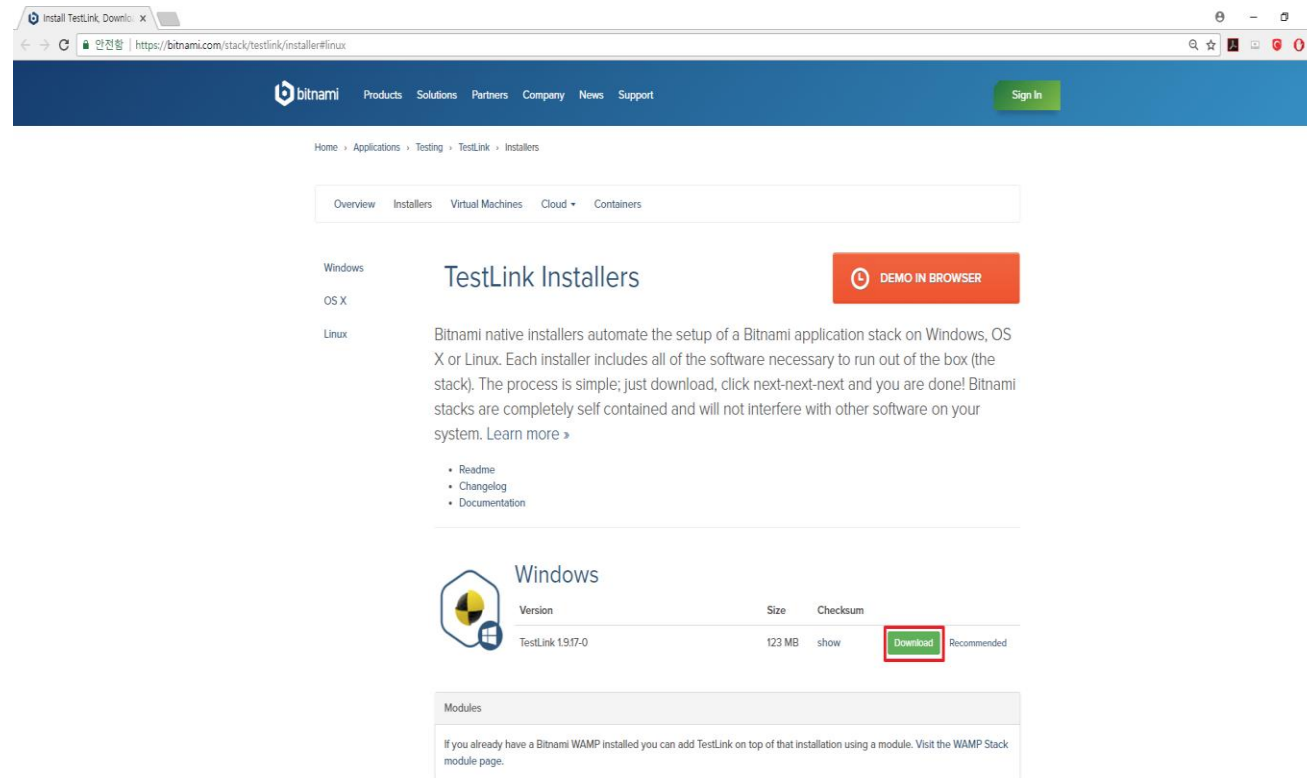
테스트케이스 - 요구사항 매핑  
테스트 계획과 결과를 관리

### 특징

Web기반 인터페이스(사용자 Install 불필요)  
다양한 종류의 DB지원, 다양한 언어 지원  
배우기 쉬운 편

## 다운로드

<https://bitnami.com/stack/testlink>

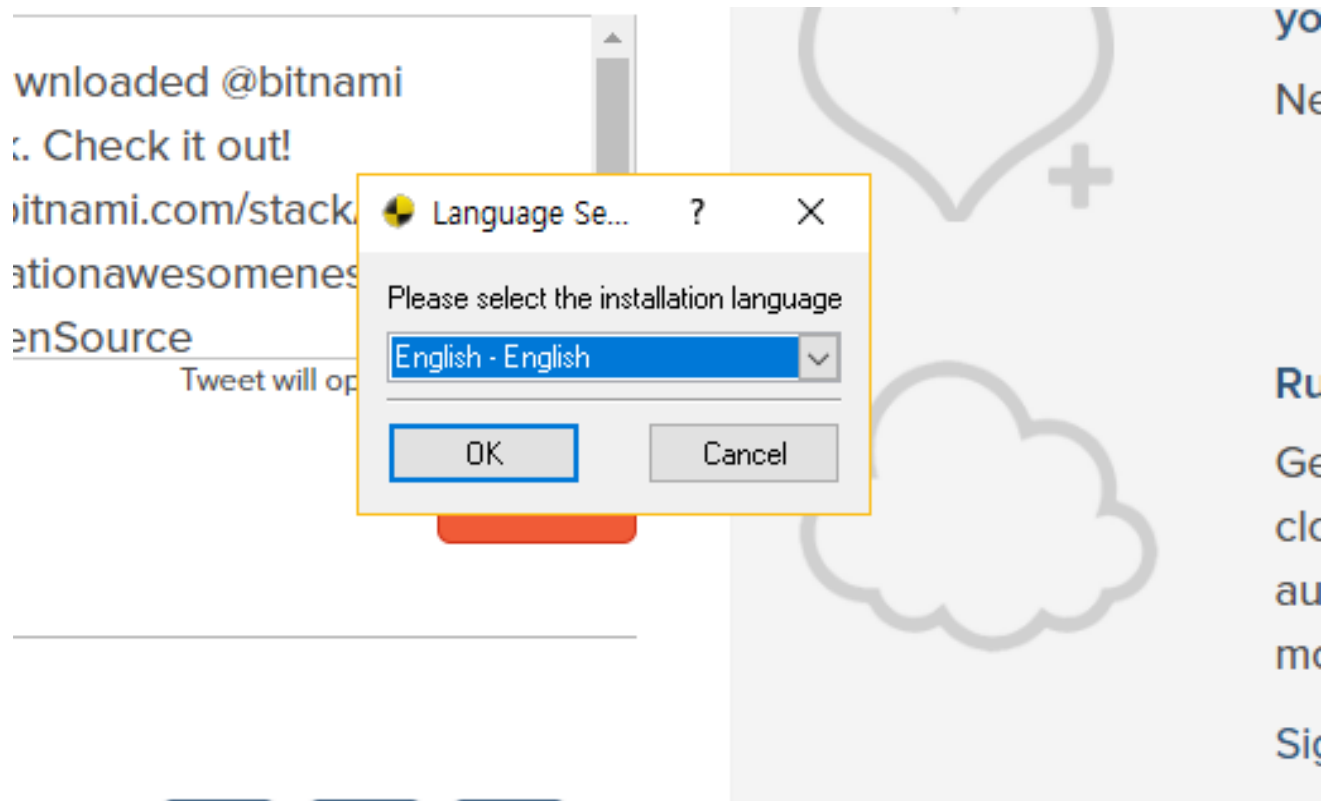


The screenshot shows the Bitnami website's 'TestLink Installers' page. The page features a navigation menu with 'Overview', 'Installers', 'Virtual Machines', 'Cloud', and 'Containers'. A sidebar on the left lists operating systems: 'Windows', 'OS X', and 'Linux'. The main content area is titled 'TestLink Installers' and includes a 'DEMO IN BROWSER' button. Below this, there is a paragraph describing the installers and a list of links: 'Readme', 'Changelog', and 'Documentation'. A table lists the available installers for Windows, with the 'TestLink 1.9.17-0' entry highlighted by a red box around its 'Download' button. The table also shows the size (123 MB) and a 'show' link for the checksum. At the bottom, there is a 'Modules' section with a note about installing TestLink on top of an existing WAMP installation.

Version	Size	Checksum	Download	Recommended
TestLink 1.9.17-0	123 MB	show	Download	Recommended

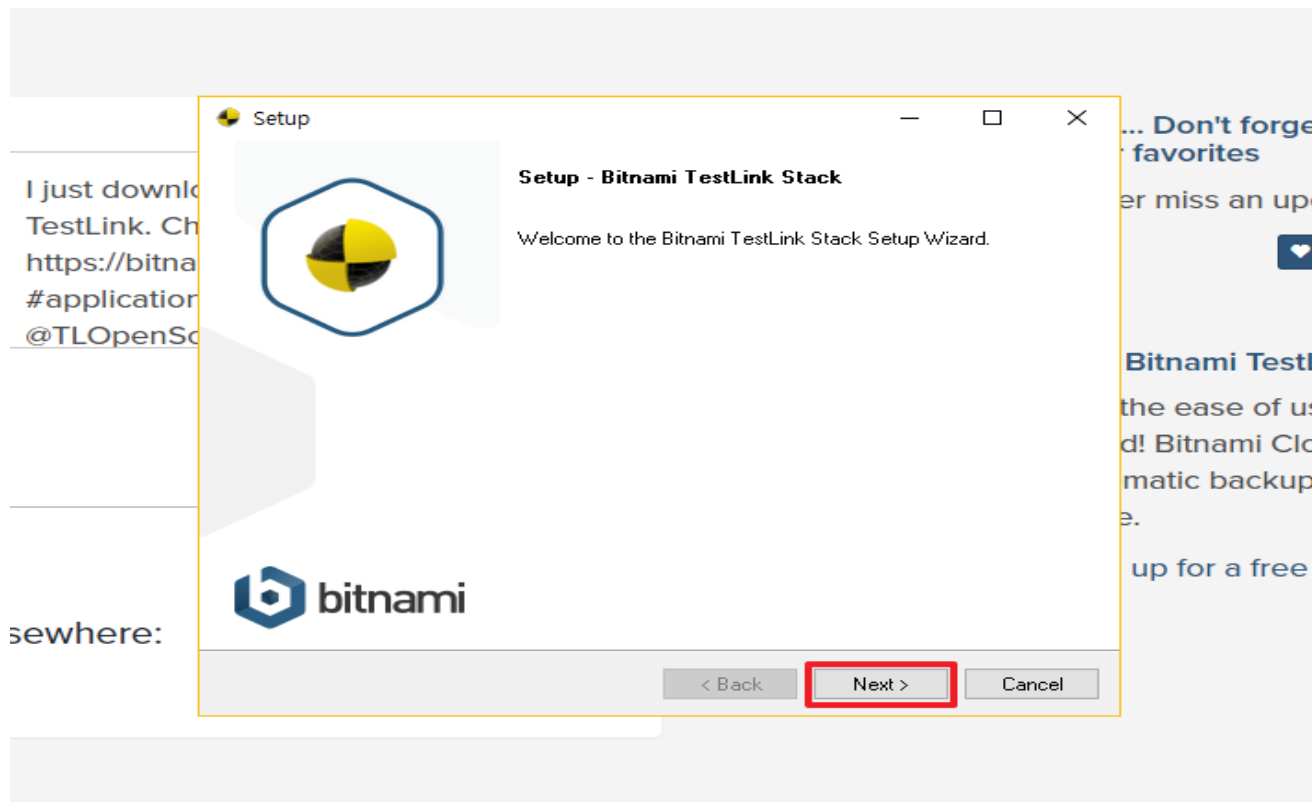
# 설치 및 설정

## 사용언어 설정



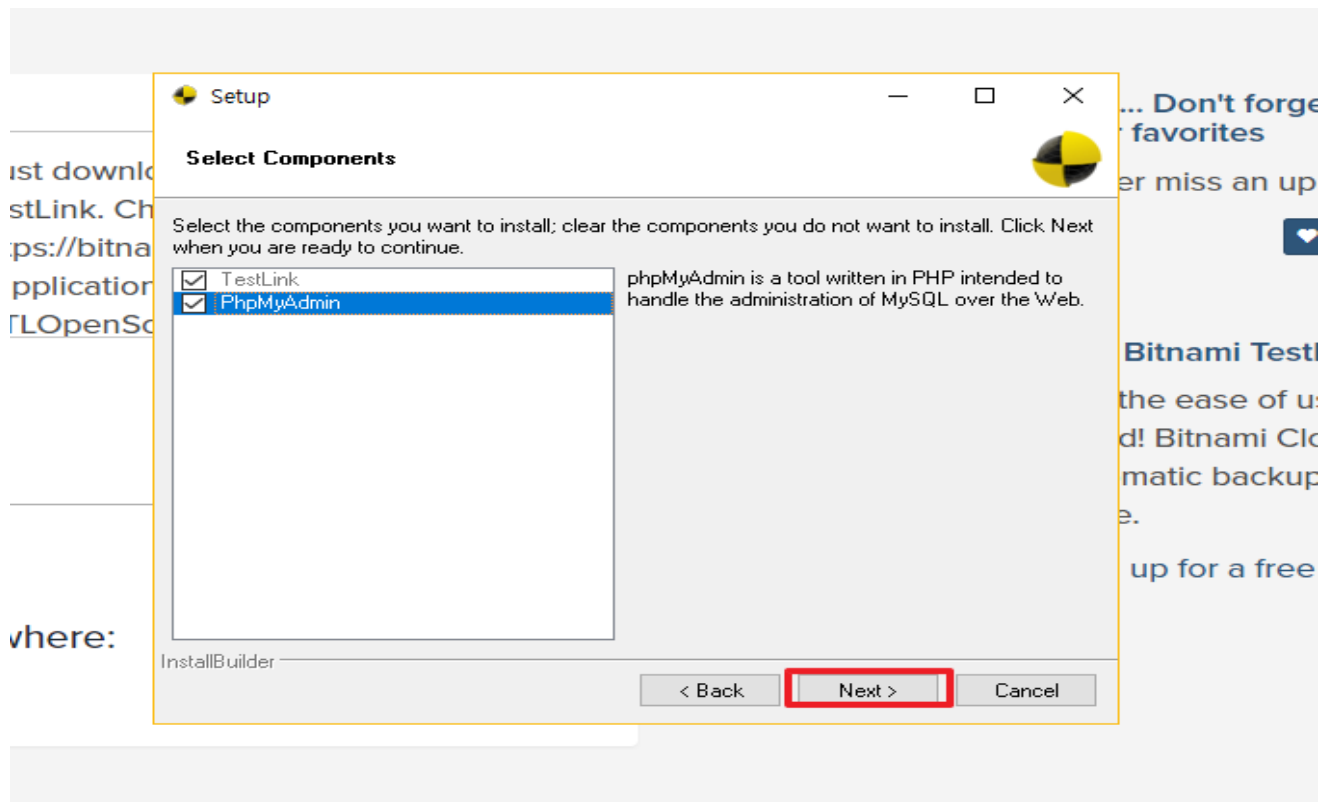
# 설치 및 설정

Install



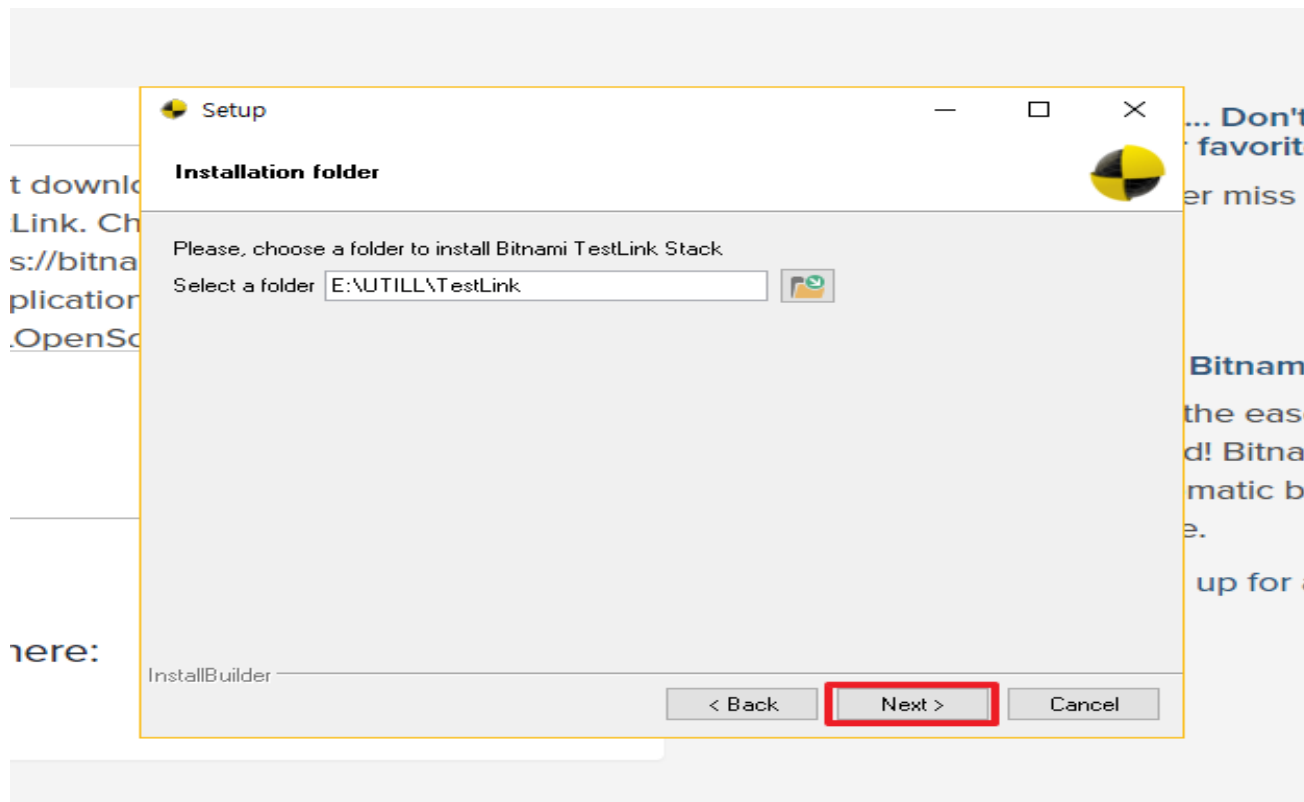
# 설치 및 설정

## Install



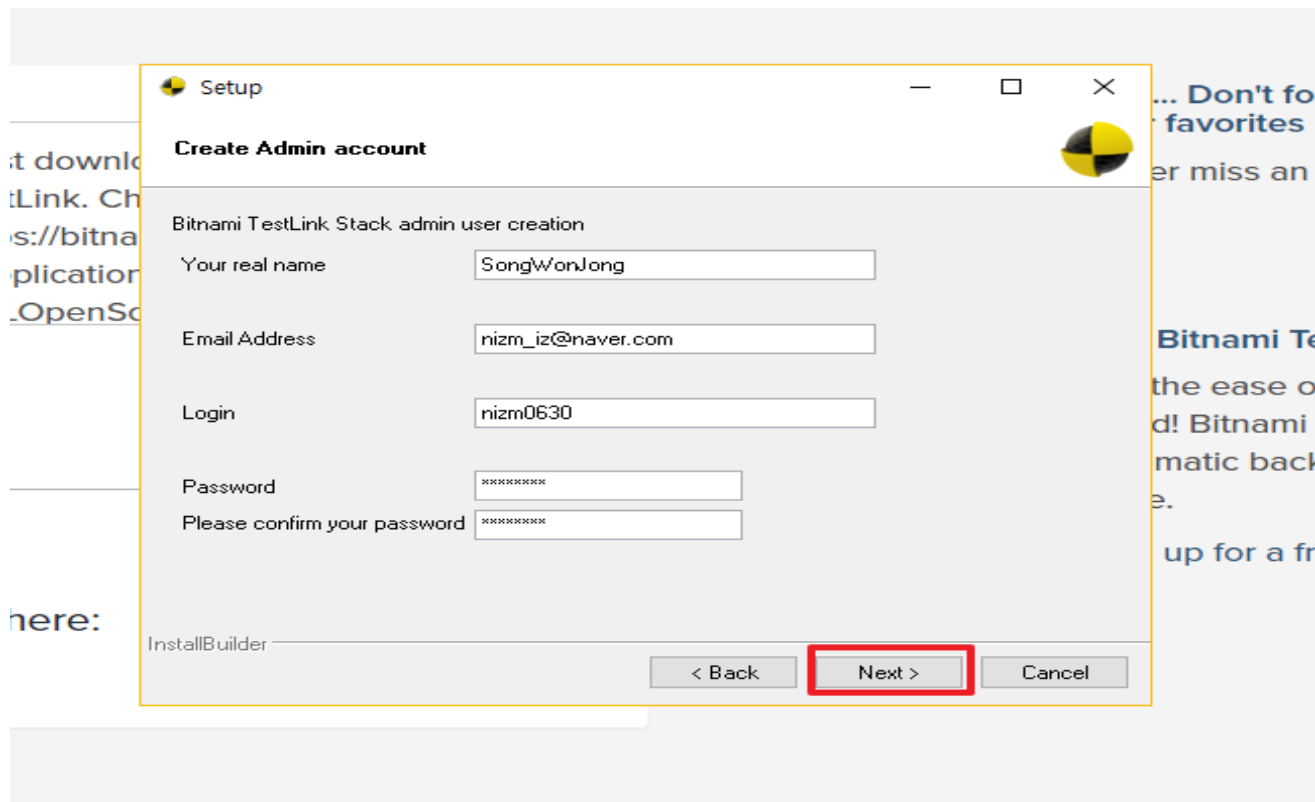
# 설치 및 설정

## Install - 경로설정



# 설치 및 설정

Install – admin계정생성



The image shows a Windows-style 'Setup' window titled 'Create Admin account'. The window contains the following fields and text:

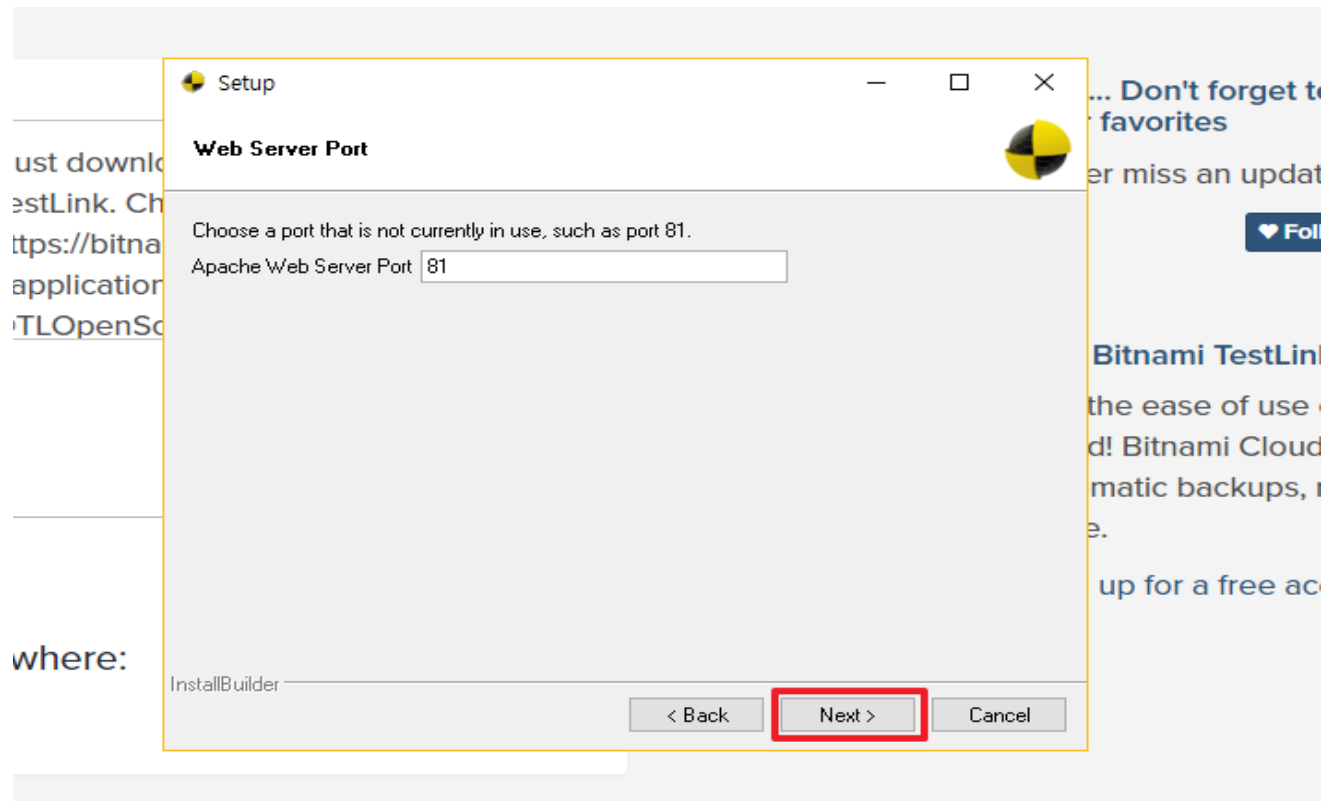
- Bitnami TestLink Stack admin user creation
- Your real name:
- Email Address:
- Login:
- Password:
- Please confirm your password:

At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red border.



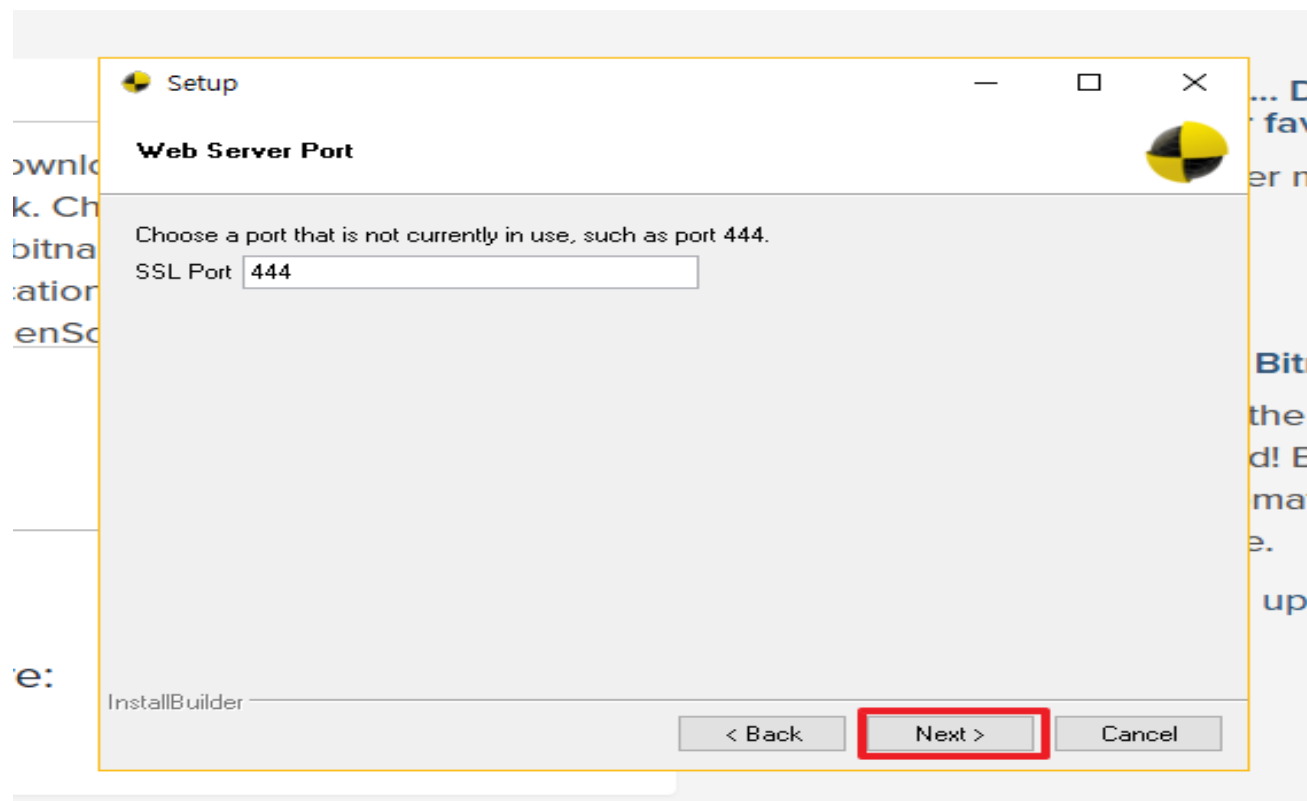
# 설치 및 설정

## Install – Apache Web Server Port 설정



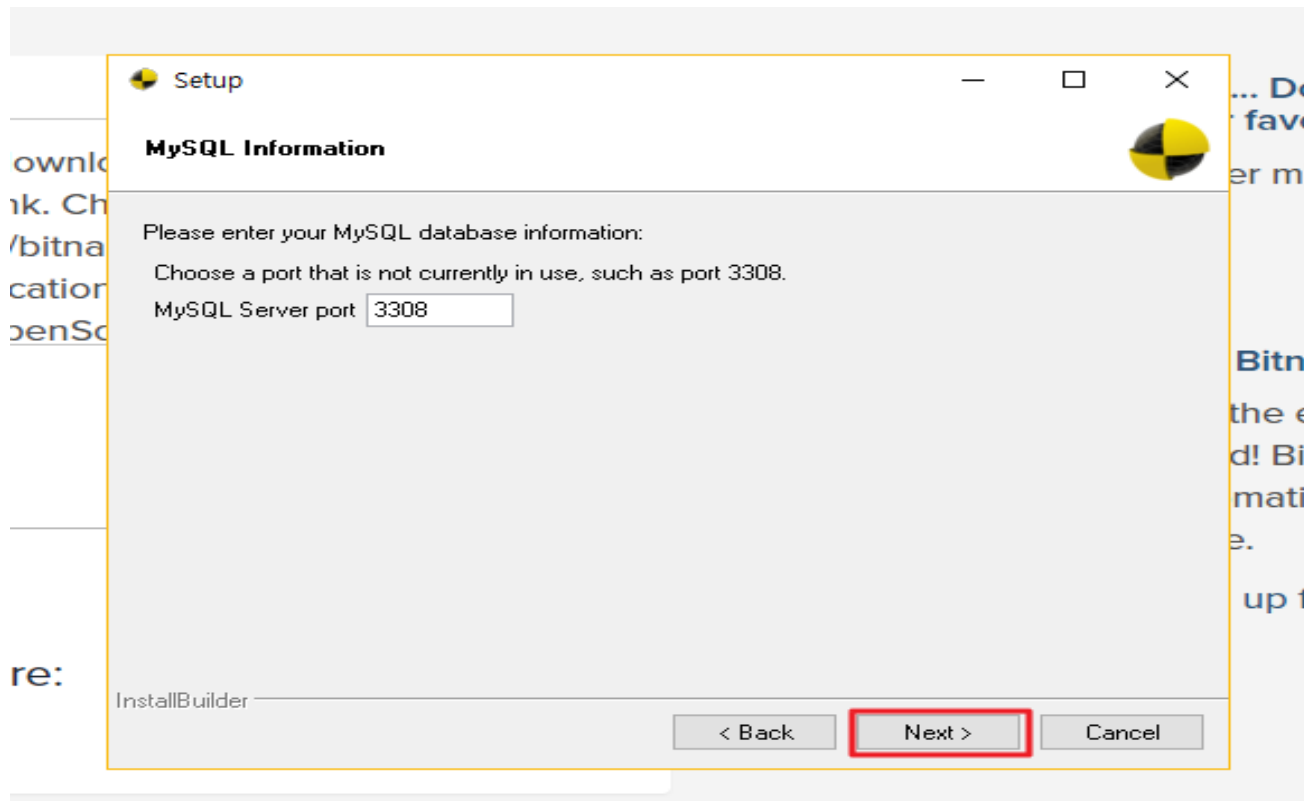
# 설치 및 설정

## Install – SSL Port 설정



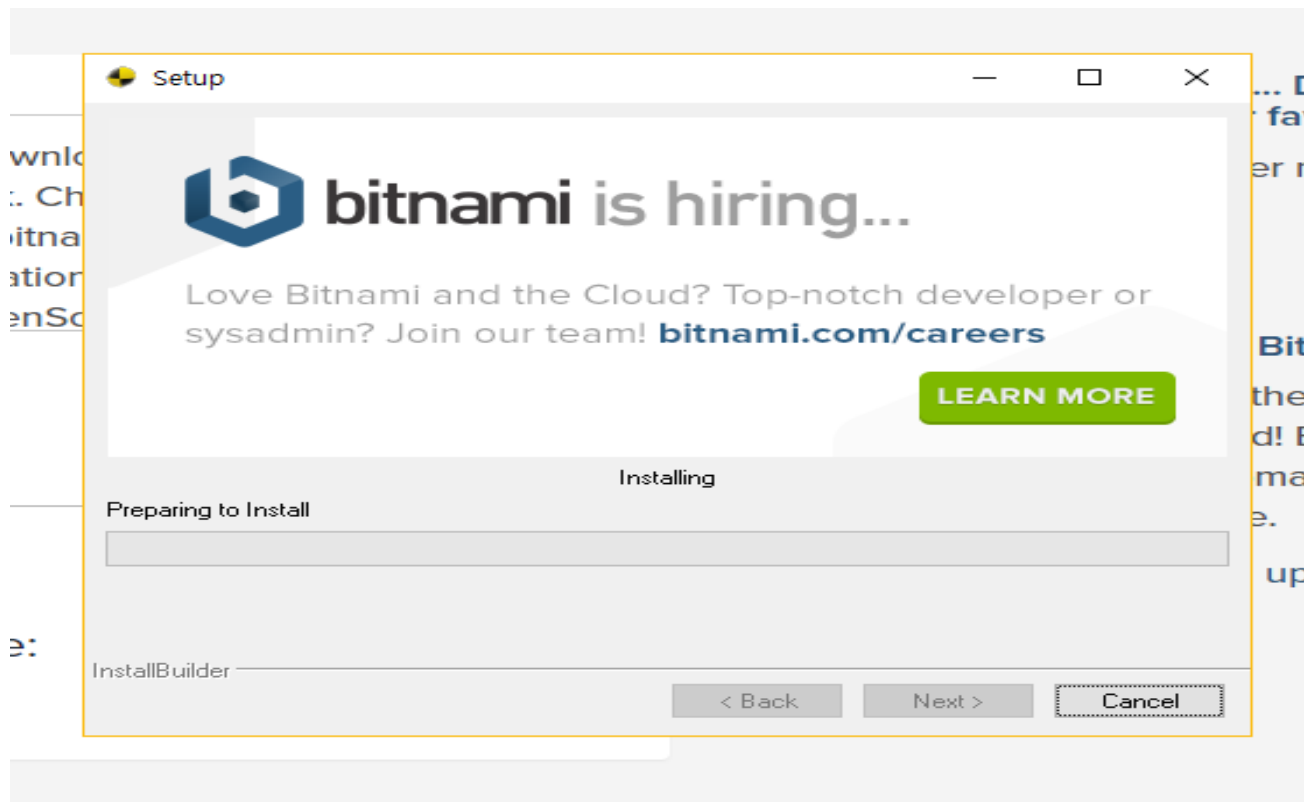
# 설치 및 설정

## Install – MySQL Port설정



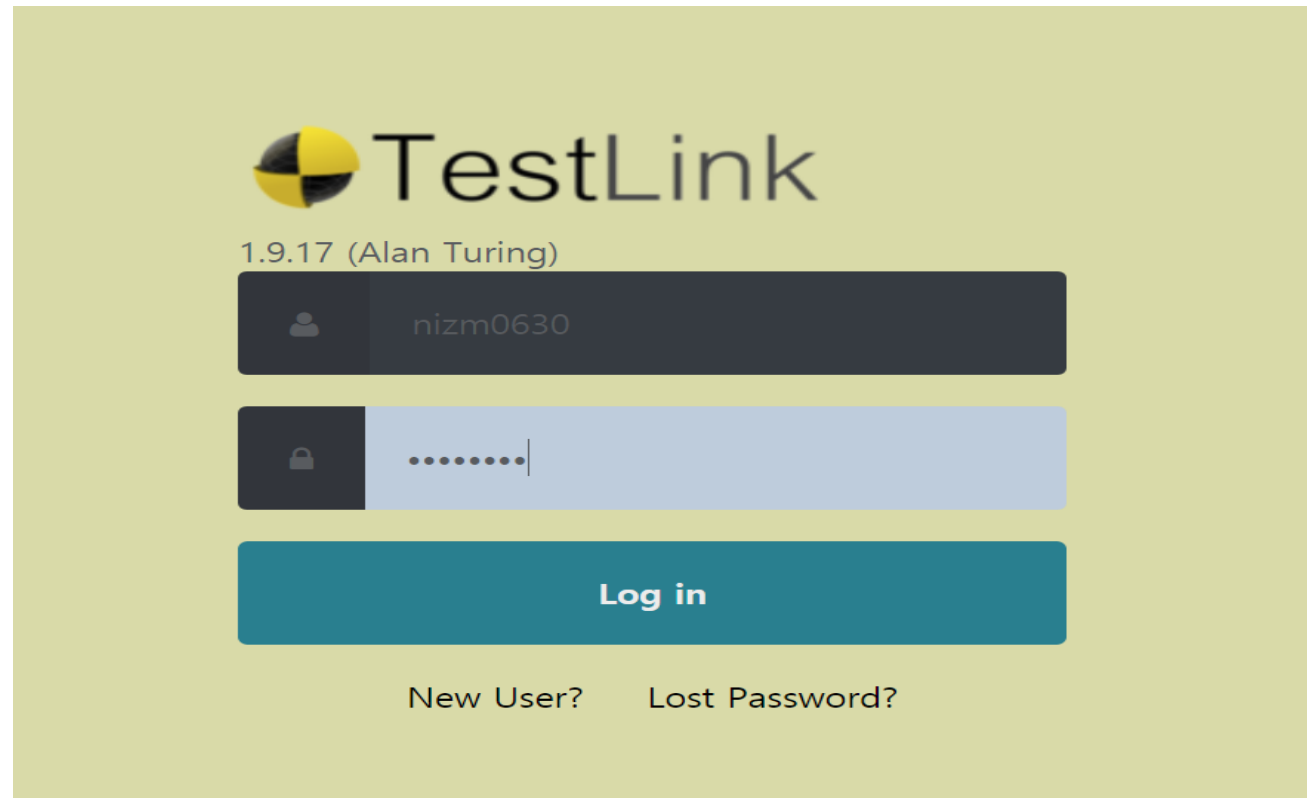
# 설치 및 설정

Installing



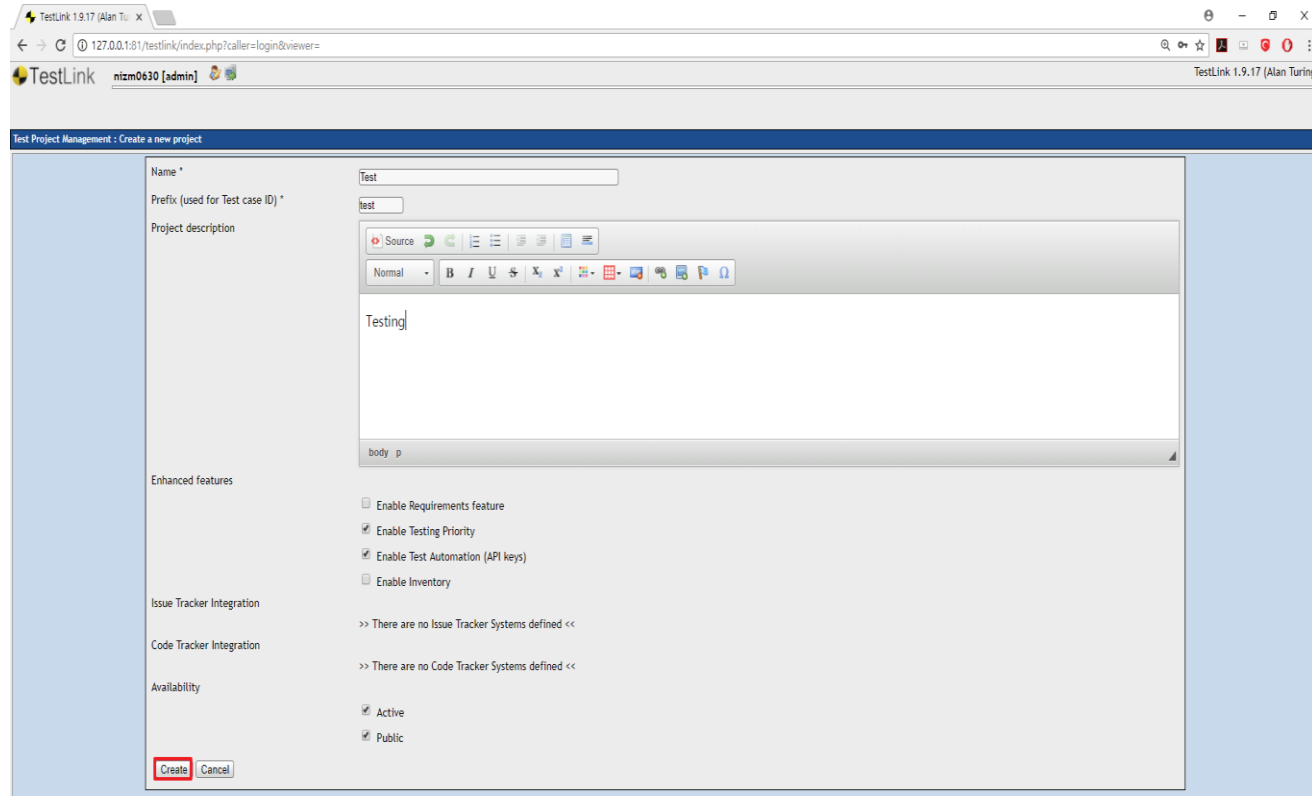
# 설치 및 설정

Admin계정으로 접속



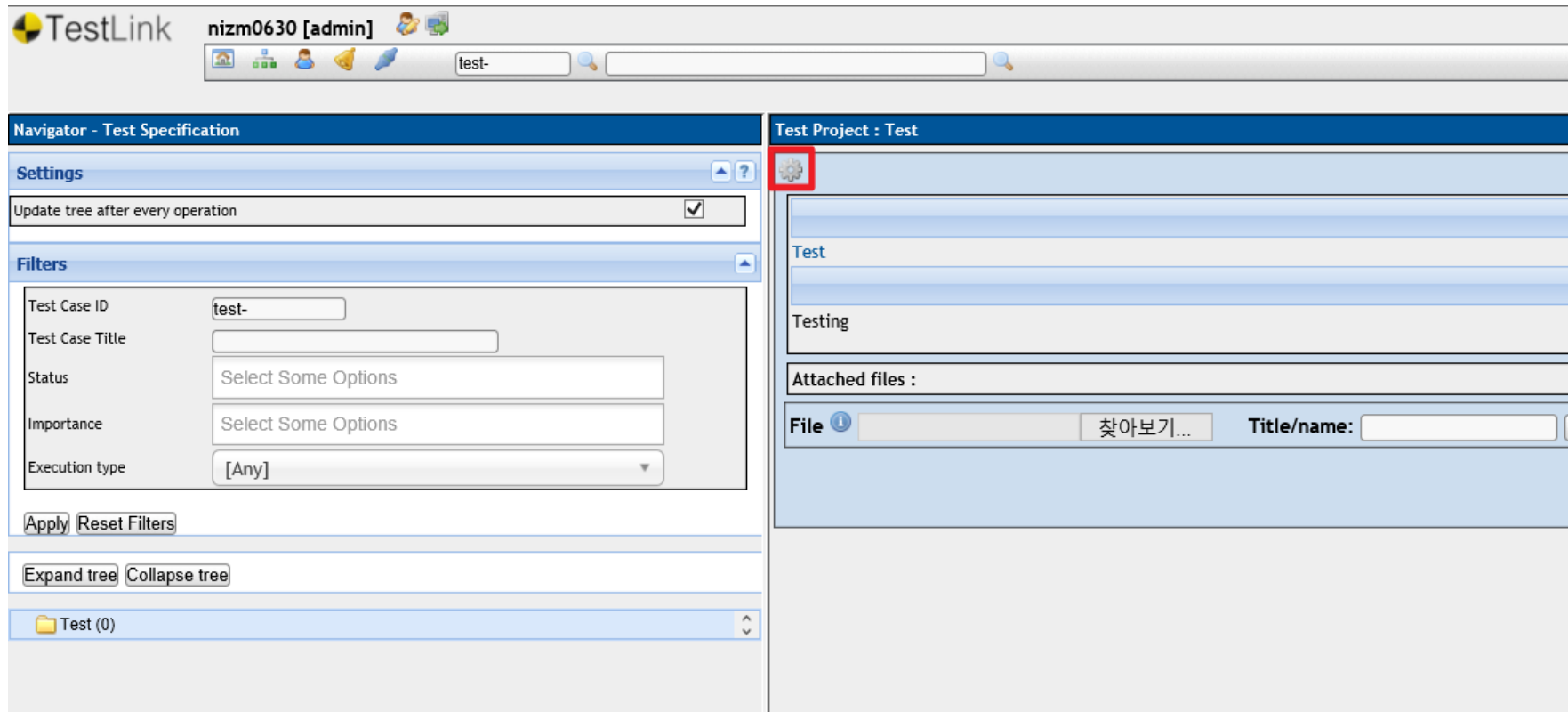
## 테스트 진행

### Creating Project



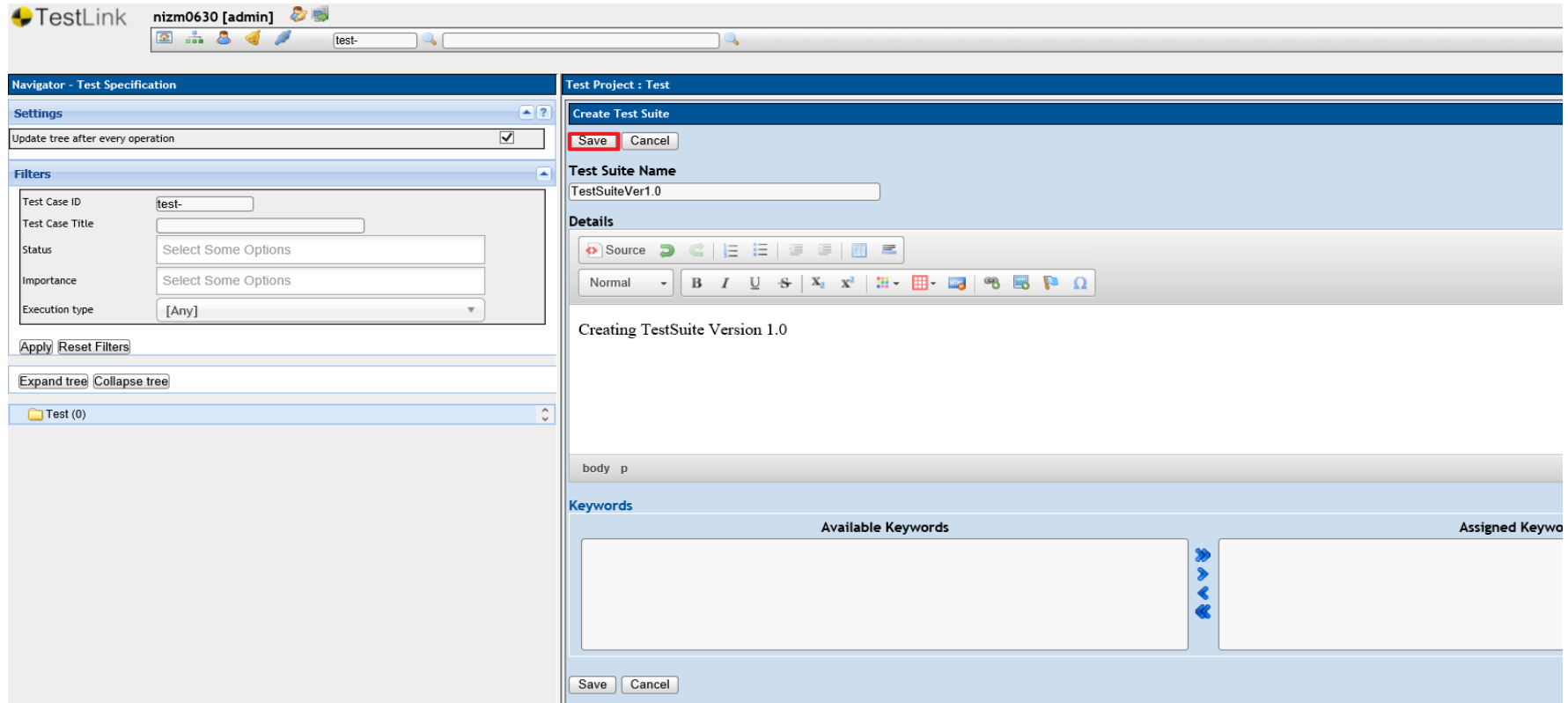
## 테스트 진행

### Creating TestSuite



## 테스트 진행

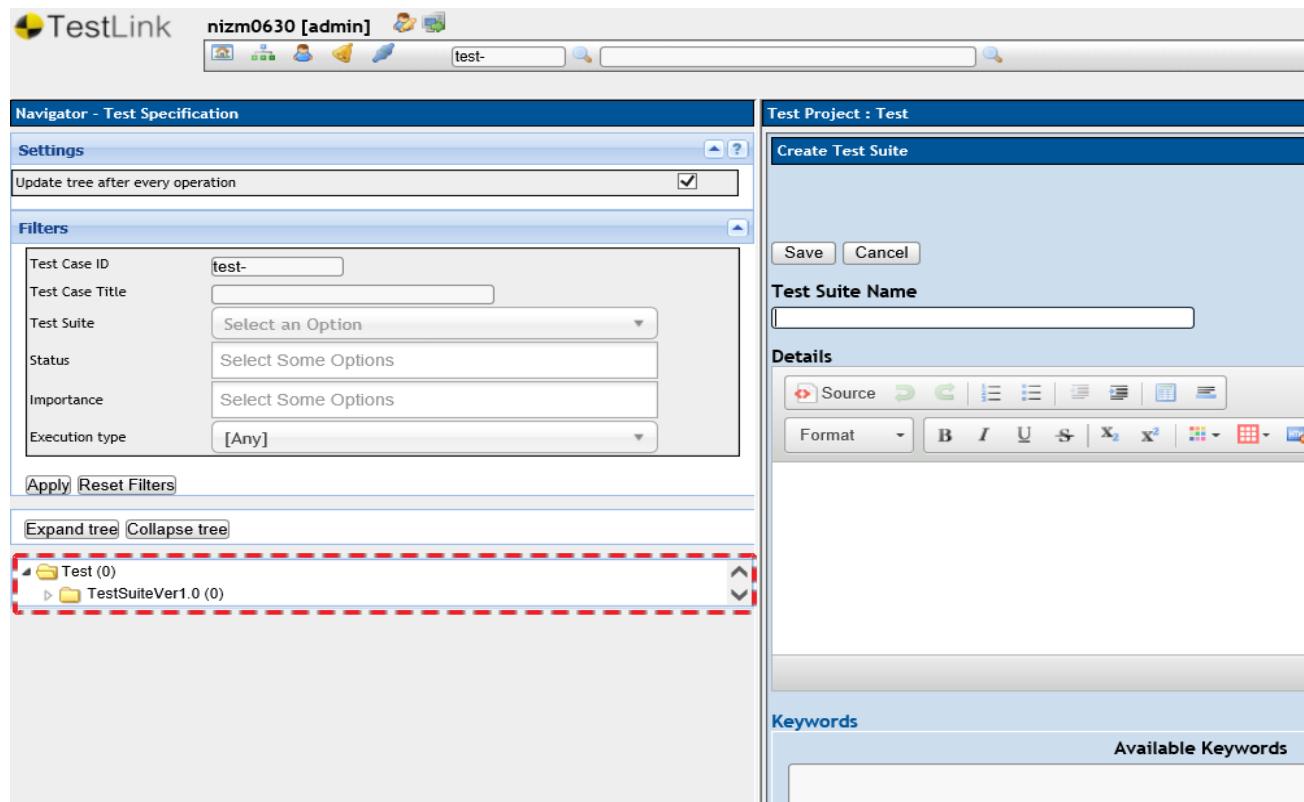
### Creating TestSuite





## 테스트 진행

### Creating Project



## 테스트 진행

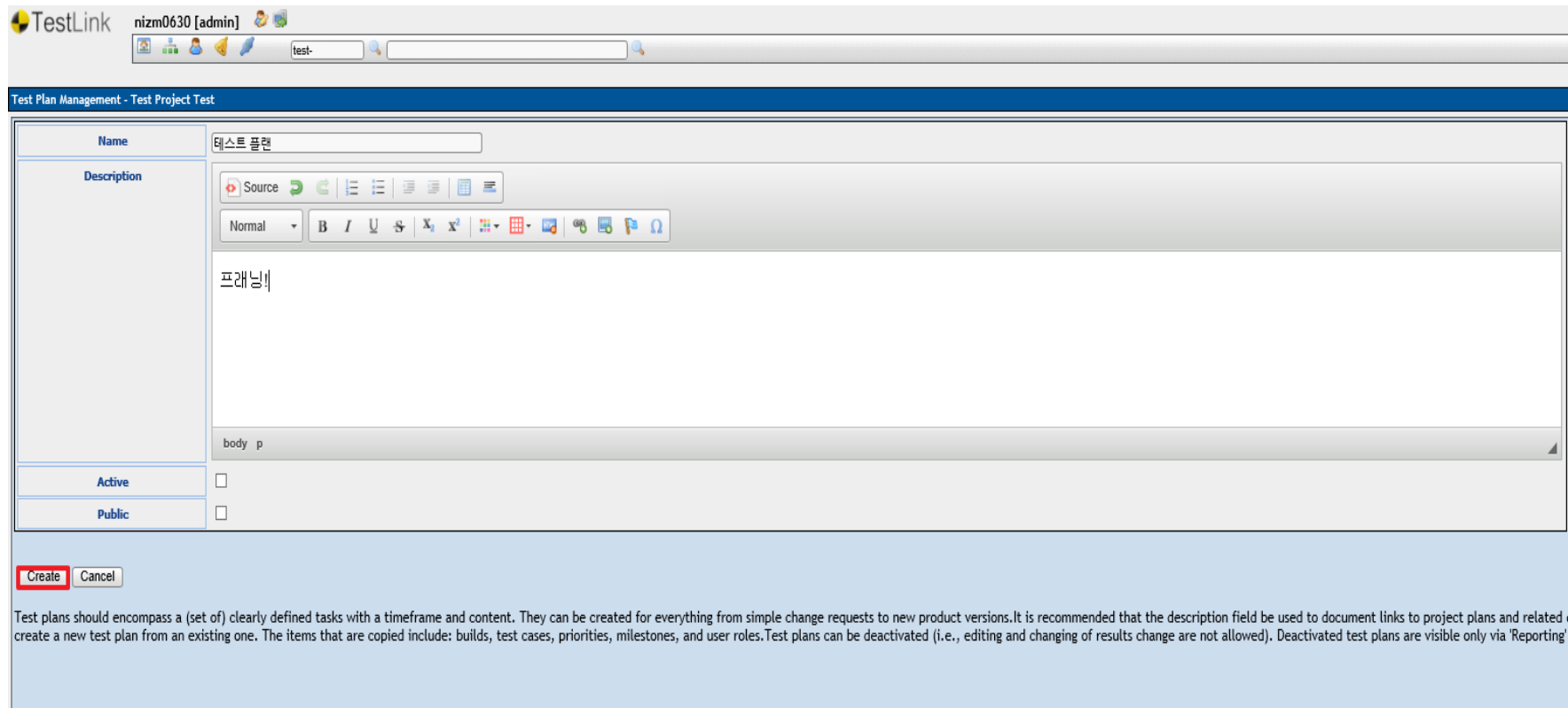
### Creating TestSuite

The screenshot shows the 'Create Step' interface in TestLink. The window title is 'Create Step - Test Case: test-2:테스트 케이스 이름 - Version: 1'. The interface is divided into several sections:

- Summary:** Contains the text '테스트 케이스 내용'.
- Preconditions:** Contains the text '미리 되어야 하는 부분'.
- Buttons:** 'Save', 'Save & exit', and 'Cancel' buttons are located below the preconditions section.
- Table:** A table with three columns: '#', 'Step actions', and 'Expected Results'. The 'Execution' column is partially visible on the right.
  - Row 1: '# 1'. The 'Step actions' column contains a list of instructions: '1. 테스트 suite을 작성', '2. 테스트 case 작성', and '3. step 작성'. Below the list is a text area with 'body p'. The 'Expected Results' column contains a text area with '보여' and a 'body p' text area below it.
- Buttons:** A second set of 'Save', 'Save & exit', and 'Cancel' buttons is located at the bottom of the interface.

# 테스트 진행

## Creating TestPlan



The screenshot shows the TestLink web interface. At the top, the user is logged in as 'nizm0630 [admin]'. The page title is 'Test Plan Management - Test Project Test'. The main form has the following fields:

- Name:** 테스트 플랜
- Description:** 프레닝
- Active:**
- Public:**

At the bottom of the form, there are two buttons: 'Create' (highlighted with a red border) and 'Cancel'.

Test plans should encompass a (set of) clearly defined tasks with a timeframe and content. They can be created for everything from simple change requests to new product versions. It is recommended that the description field be used to document links to project plans and related documents. To create a new test plan from an existing one, the items that are copied include: builds, test cases, priorities, milestones, and user roles. Test plans can be deactivated (i.e., editing and changing of results change are not allowed). Deactivated test plans are visible only via 'Reporting'.

# 테스트 진행

## Adding TestCase to a Plan

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

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

TestSuiteVer1.0

<input checked="" type="checkbox"/> Test Case	Version	Status	Importance	
<input checked="" type="checkbox"/> test-1 : 할 일	1	Draft	Medium	10000
<input type="checkbox"/> test-2 : 테스트 케이스 이름	1	Draft	Medium	10010

## 테스트 진행

### Adding TestCase to a Plan

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

Check/uncheck all Test cases for

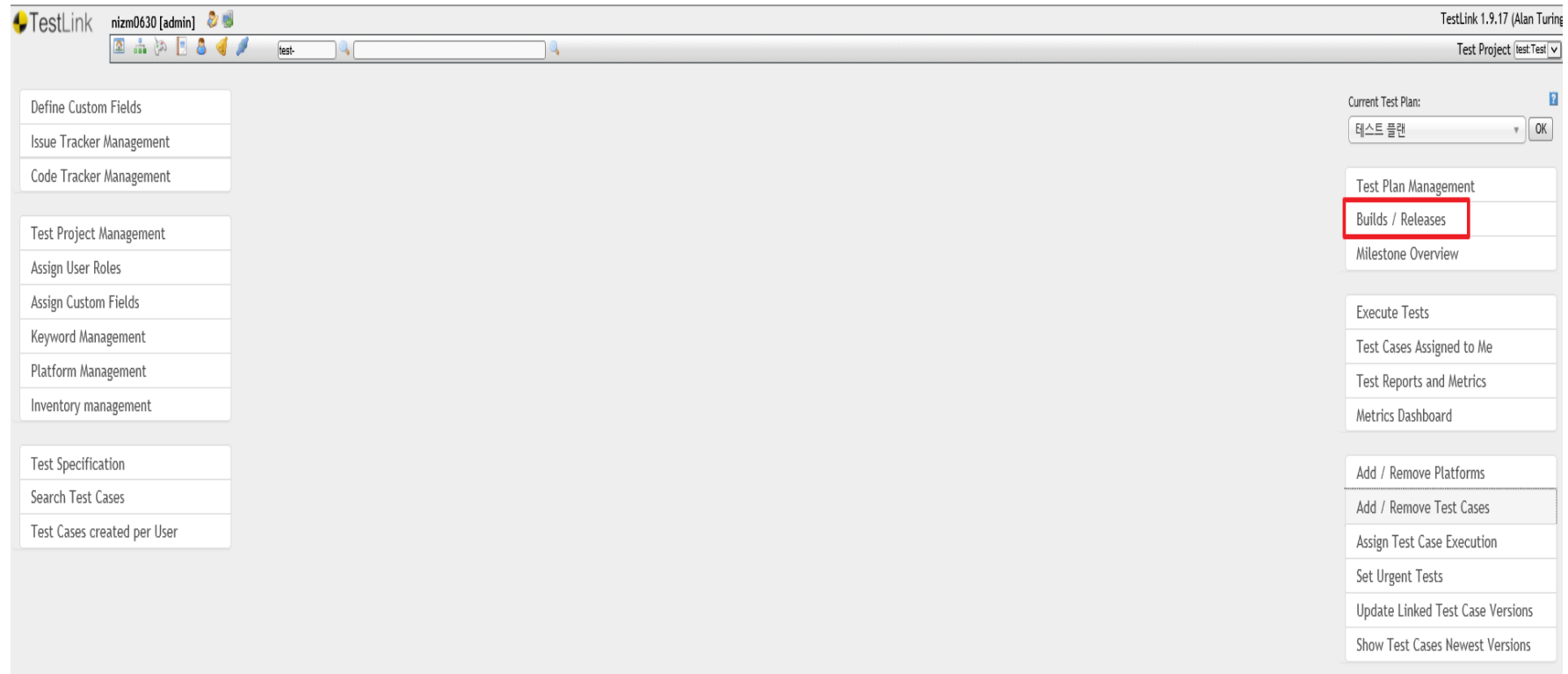
Test cases with Latest Version with status with one of these values (Obsolete,Future) will not be displayed in this screen

TestSuiteVer1.0

<input checked="" type="checkbox"/> Test Case	Version	Status	Importance			
<input checked="" type="checkbox"/> test-1 : 할 일	1	Draft	Medium	10000	<input type="checkbox"/>	04/16/2018
<input type="checkbox"/> test-2 : 테스트 케이스 이름	1	Draft	Medium	10010		

## 테스트 진행

### Create Build File



## 테스트 진행

### Create Build File

TestLink nizm0630 [admin]

Build management - Test Plan : 테스트 플랜

Create a new Build

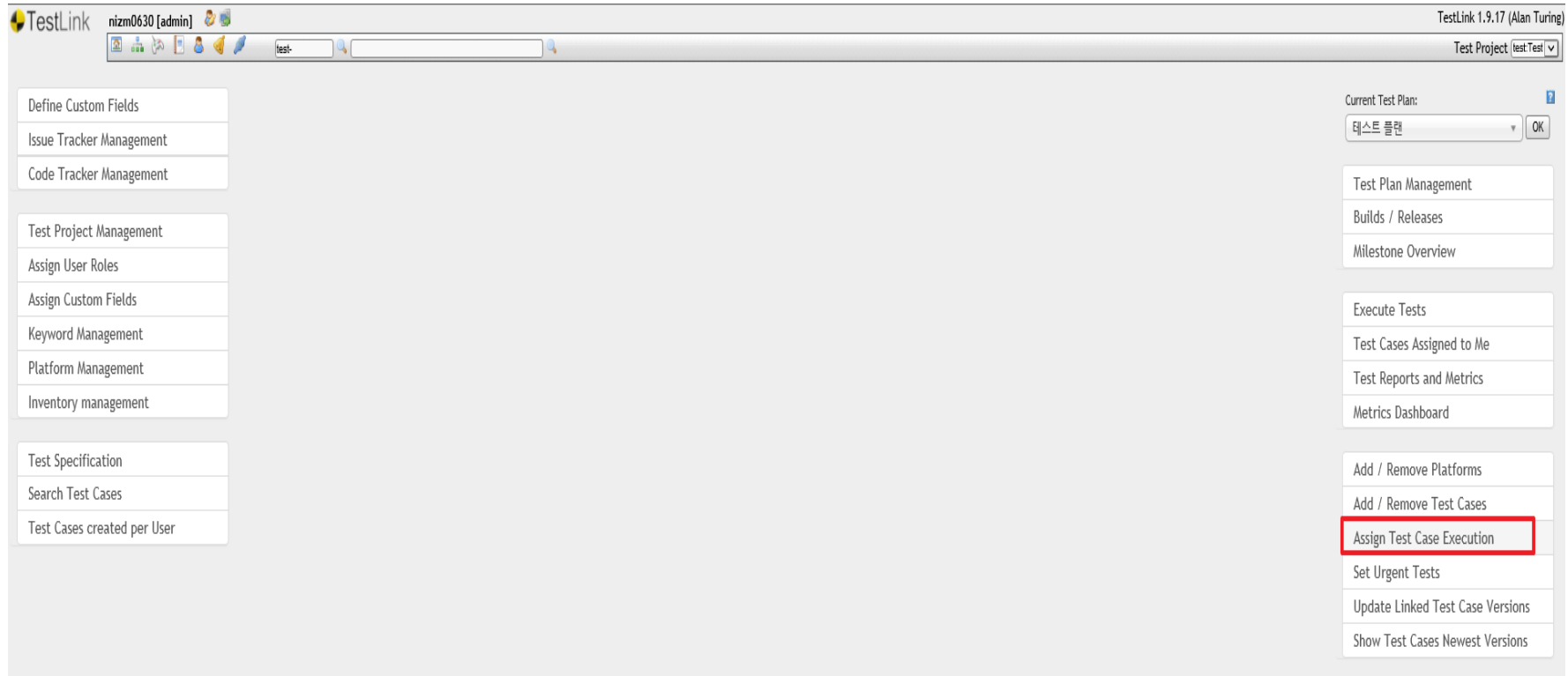
Title	테스트빌드
Description	<p>테스트빌드</p>
Active	<input checked="" type="checkbox"/>
Open	<input checked="" type="checkbox"/>
Release date	04/17/2018

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.

Create Cancel

# 테스트 진행

## Assigning TestCase to Users



The screenshot displays the TestLink 1.9.17 (Alan Turing) web interface. The user is logged in as 'nizm0630 [admin]'. The current test project is 'Test Project (test-Test)'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation links for 'Define Custom Fields', 'Issue Tracker Management', 'Code Tracker Management', 'Test Project Management', 'Assign User Roles', 'Assign Custom Fields', 'Keyword Management', 'Platform Management', 'Inventory management', 'Test Specification', 'Search Test Cases', and 'Test Cases created per User'.
- Right Sidebar:** Contains navigation links for 'Current Test Plan:' (set to '테스트 플랜'), 'Test Plan Management', 'Builds / Releases', 'Milestone Overview', 'Execute Tests', 'Test Cases Assigned to Me', 'Test Reports and Metrics', 'Metrics Dashboard', 'Add / Remove Platforms', 'Add / Remove Test Cases', 'Assign Test Case Execution' (highlighted with a red box), 'Set Urgent Tests', 'Update Linked Test Case Versions', and 'Show Test Cases Newest Versions'.



## 테스트 진행

### Assigning TestCase to Users

The screenshot displays the TestLink interface for assigning test cases. The top navigation bar shows the user 'nizm0630 [admin]' and the version 'TestLink 1.9.17 (Alan Turing)'. The main content area is titled 'Assigning Test Case execution tasks for build 테스트빌드 in test plan 테스트 플랜'. It includes a 'Check/uncheck all Test cases' button and a section for 'Users for Bulk Actions' with buttons for 'Apply Assign', 'Save Assignments', and 'Remove Assignments'. Below this is a table for 'TestSuiteVer1.0' with columns for 'Test Case [ Version]', 'Priority', 'Assigned to', and 'Assign to'. The table contains one row for 'test-1 : 할 일 [ 1 ]' with a 'Medium' priority. The 'Assign to' field for this row is highlighted with a red box, showing the user 'nizm0630'. The left sidebar contains 'Settings' and 'Filters' sections, with the 'Filters' section showing various search criteria like 'Test Case ID', 'Test Case Title', 'Test Suite', etc.

## 테스트 진행

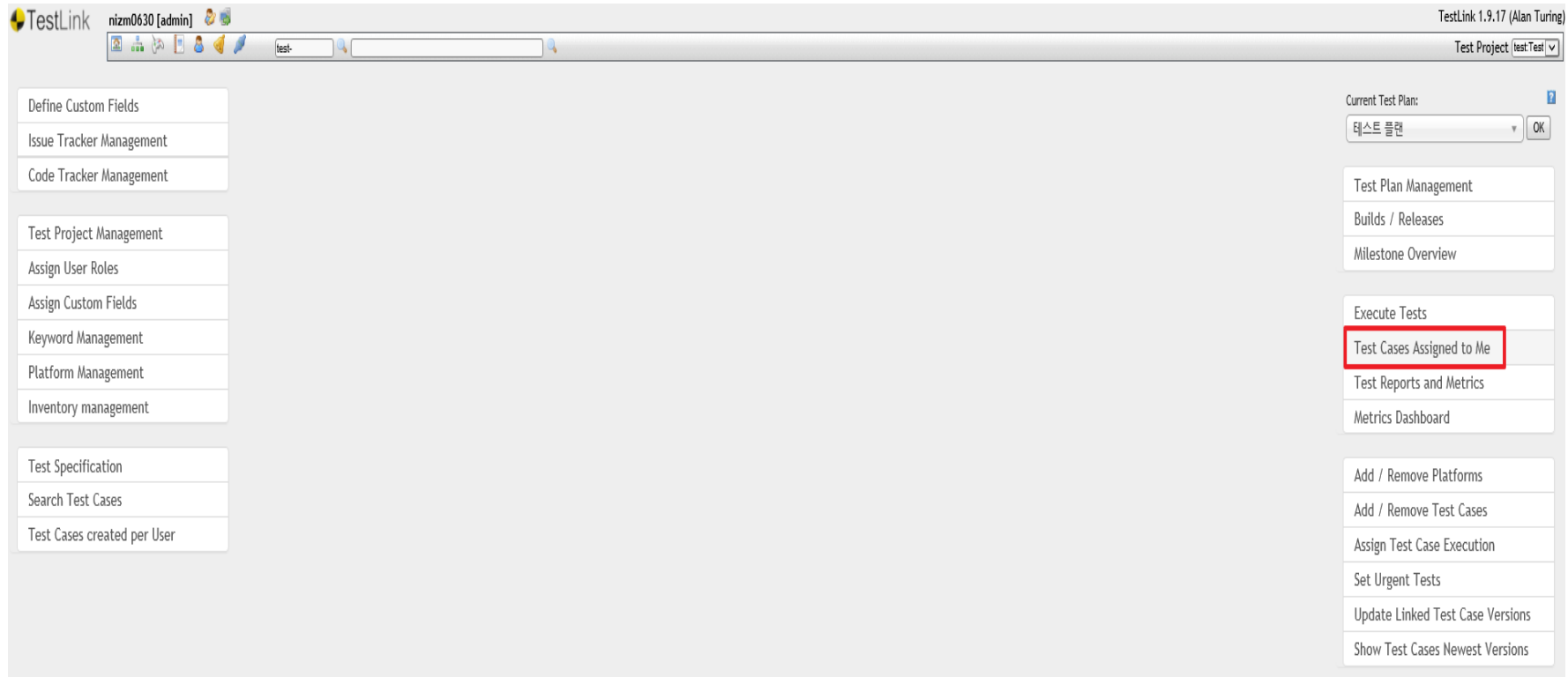
### Assigning TestCase to Users

The screenshot shows the TestLink interface for assigning test cases to users. The top navigation bar includes the TestLink logo, user information 'nizm0630 [admin]', and the version 'TestLink 1.9.17 (Alan Turing)'. The main content area is titled 'Assigning Test Case execution tasks for build 테스트빌드 in test plan 테스트플랜'. It features a 'Check/uncheck all Test cases' button and a 'Users for Bulk Actions' section with an input field and buttons for 'Apply Assign', 'Save Assignments' (highlighted in red), and 'Remove Assignments'. Below this is a table for 'TestSuiteVer1.0' with columns for 'Test Case [ Version]', 'Priority', 'Assigned to', and 'Assign to'. The table contains one row for 'test-1 : 할 일 [ 1]' with a priority of 'Medium' and is assigned to 'nizm0630' (highlighted in a red dashed box). The left sidebar contains 'Settings' and 'Filters' sections with various dropdown menus and checkboxes.

Test Case [ Version]	Priority	Assigned to	Assign to
test-1 : 할 일 [ 1]	Medium	nizm0630	

## 테스트 진행

### Check Assigned Tasks



## 테스트 진행

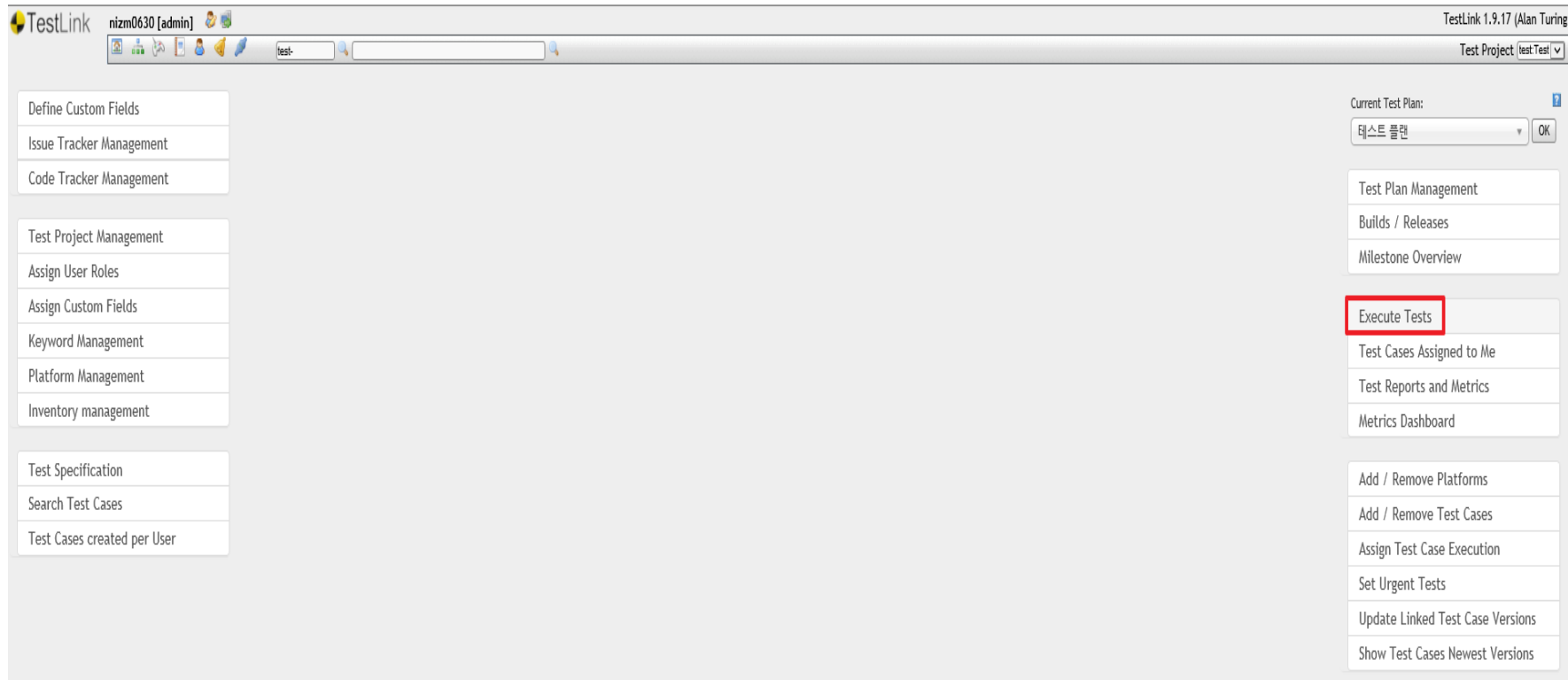
### Check Assigned

The screenshot displays the TestLink web interface. At the top, the user is logged in as 'nizm0630 [admin]'. The page title is 'Test Project: Test - Test Cases Assigned to User: nizm0630'. Below the title bar, there is a search field containing 'test-'. The main content area shows a table of assigned test cases. The table has columns for 'Test Suite', 'Test Case', 'Priority', 'Status', and 'Assigned Since (days)'. A single row is visible under the 'Build: 테스트빌드 (1 Item)' group, showing 'TestSuiteVer1.0' with a 'Medium' priority and 'Not Run' status, assigned on '2018-04-16 12:51:48 (0)'. The footer of the page indicates it was 'Generated by TestLink on 04/16/2018 12:53:14'.

Test Suite	Test Case	Priority	Status	Assigned Since (days)
Build: 테스트빌드 (1 Item)				
TestSuiteVer1.0	test-1 : 할 일 [v1]	Medium	Not Run	2018-04-16 12:51:48 (0)

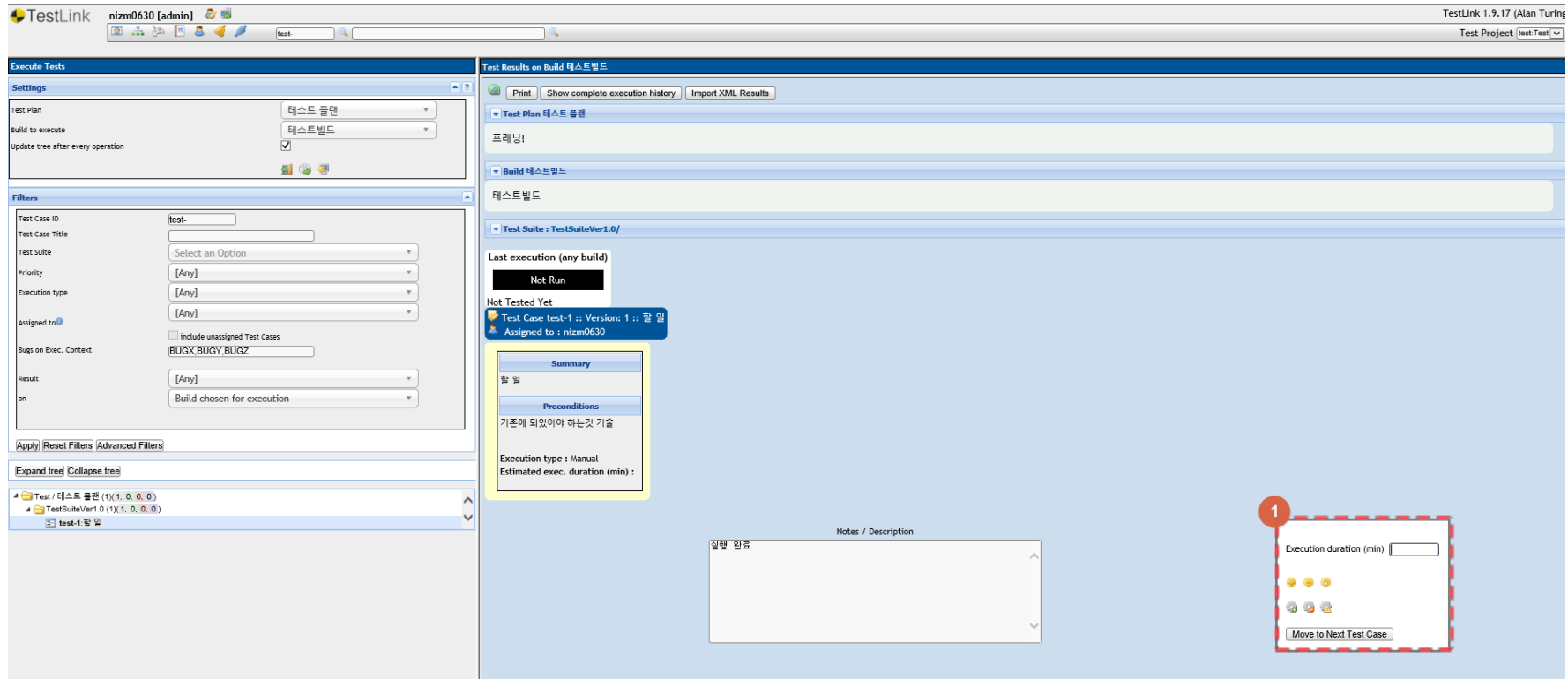
## 테스트 진행

### 테스트 실행



## 테스트 진행

### 테스트 실행



## 테스트 진행

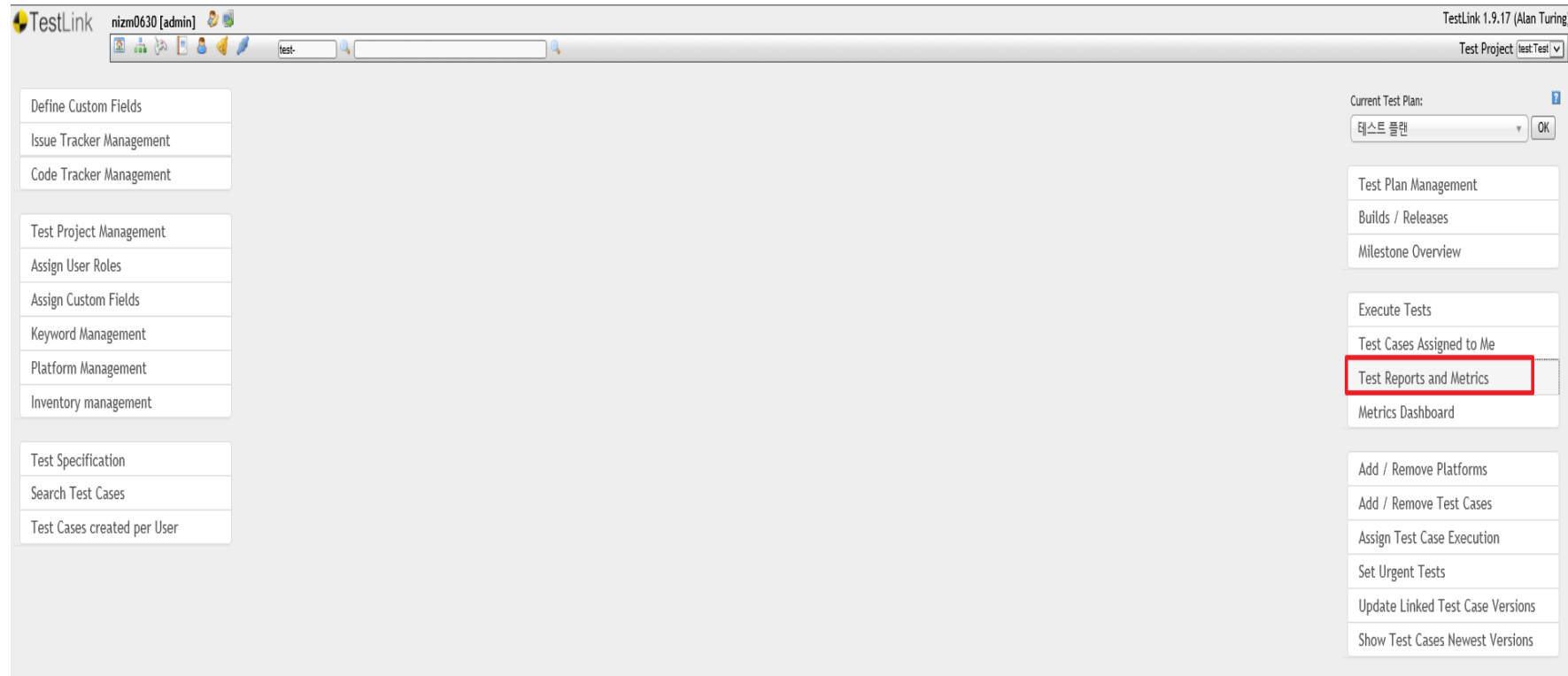
### 테스트 실행 – Passed/Failed

The screenshot displays the TestLink web interface. On the left, the 'Execute Tests' sidebar contains settings for the test plan and filters. The main area shows the test results for a specific build. A table titled 'Execution history - Build : 테스트빌드' is highlighted with a red dashed box, showing a single entry with a 'Passed' status. Below this, a 'Summary' box is highlighted with a yellow box, containing details about the test case and its execution type. The bottom right corner features a 'Move to Next Test Case' button and an execution duration input field.

Date	Tested by	Status	Exec (min)	Version	Run mode
04/16/2018 12:58:35	nizm0630	Passed	1		

# 테스트 진행

## 테스트 결과 확인

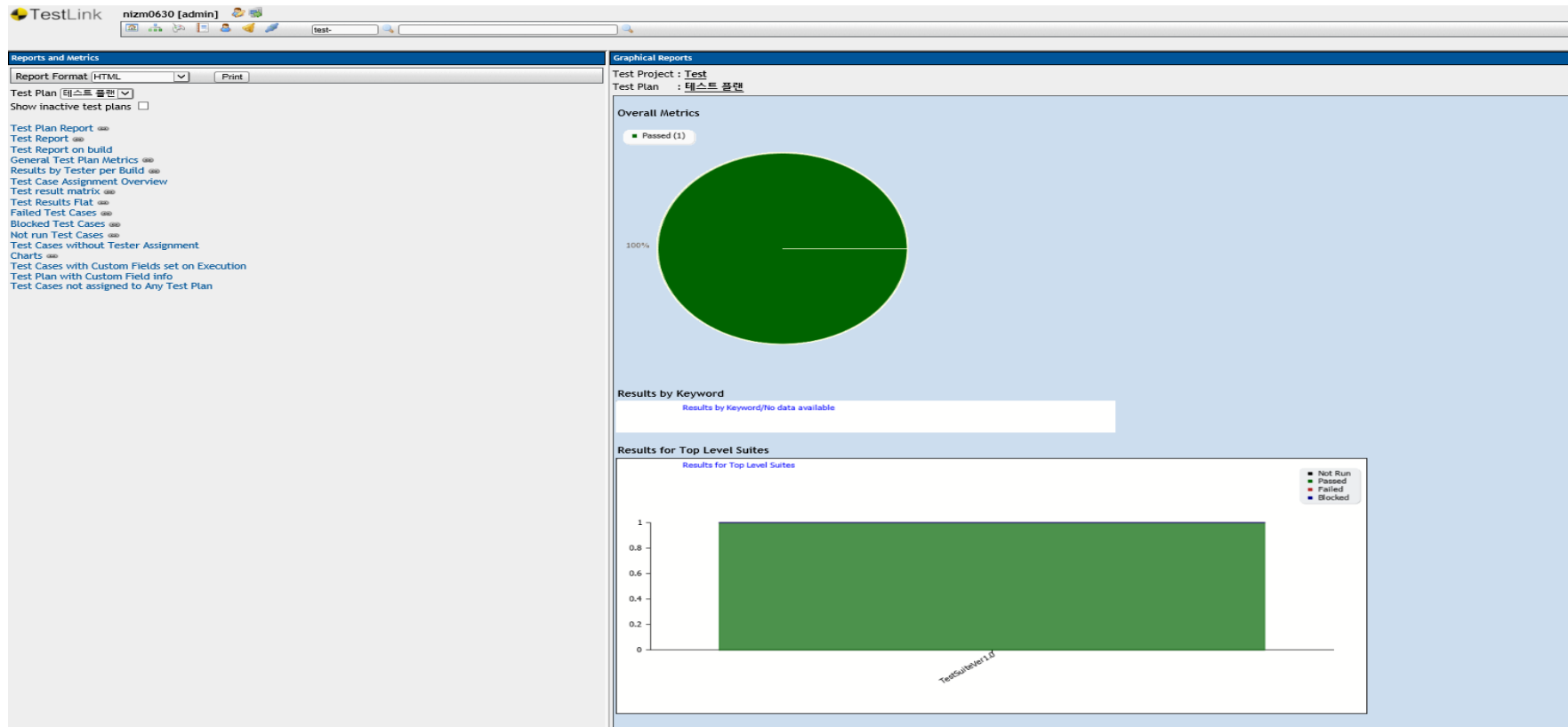






## 테스트 진행

테스트 결과 확인 - Chart.ver



## 테스트 진행

### 테스트 결과 확인 – SortByUser.ver

The screenshot shows the TestLink web interface. The top navigation bar includes the TestLink logo, the user 'nizm0630 [admin]', and the version 'TestLink 1.9.17 (Alan Turing)'. The main content area is divided into two panels. The left panel, titled 'Reports and Metrics', contains a sidebar with various report options such as 'Test Plan Report', 'Test Report', 'Test Report on build', 'General Test Plan Metrics', 'Results by Tester per Build', 'Test Case Assignment Overview', 'Test result matrix', 'Test Results Flat', 'Failed Test Cases', 'Blocked Test Cases', 'Not run Test Cases', 'Test Cases without Tester Assignment', 'Charts', 'Test Cases with Custom Fields set on Execution', 'Test Plan with Custom Field info', and 'Test Cases not assigned to Any Test Plan'. The right panel, titled 'Results by Tester per Build', displays the test results for the user 'nizm0630'. It shows a table with columns for 'User', 'Assigned', 'Not Run', 'Not Run (%)', 'Passed', 'Passed (%)', 'Failed', 'Failed (%)', 'Blocked', 'Blocked (%)', 'Progress (%)', and 'Total time (h:mm:ss)'. The table contains one row for user 'nizm0630' with the following values: Assigned: 1, Not Run: 0, Not Run (%): 0.0, Passed: 1, Passed (%): 100.0, Failed: 0, Failed (%): 0.0, Blocked: 0, Blocked (%): 0.0, Progress (%): 100.0, and Total time: 00:00:00. Below the table, there is a note: 'More information about testers: If you click on a tester name in this table, you will get a more detailed overview about all Test Cases assigned to that user and his testing progress.' and a footer: 'Generated by TestLink on 04/16/2018 13:02:26'.

User	Assigned	Not Run	Not Run (%)	Passed	Passed (%)	Failed	Failed (%)	Blocked	Blocked (%)	Progress (%)	Total time (h:mm:ss)
nizm0630	1	0	0.0	1	100.0	0	0.0	0	0.0	100.0	00:00:00

Q&A

Thanks for  
your attention