

201611301 조용빈
201611305 채현우
201811219 정서윤
201812627 유지원



Software V&V CTIP 환경 구축 (2)

Contents

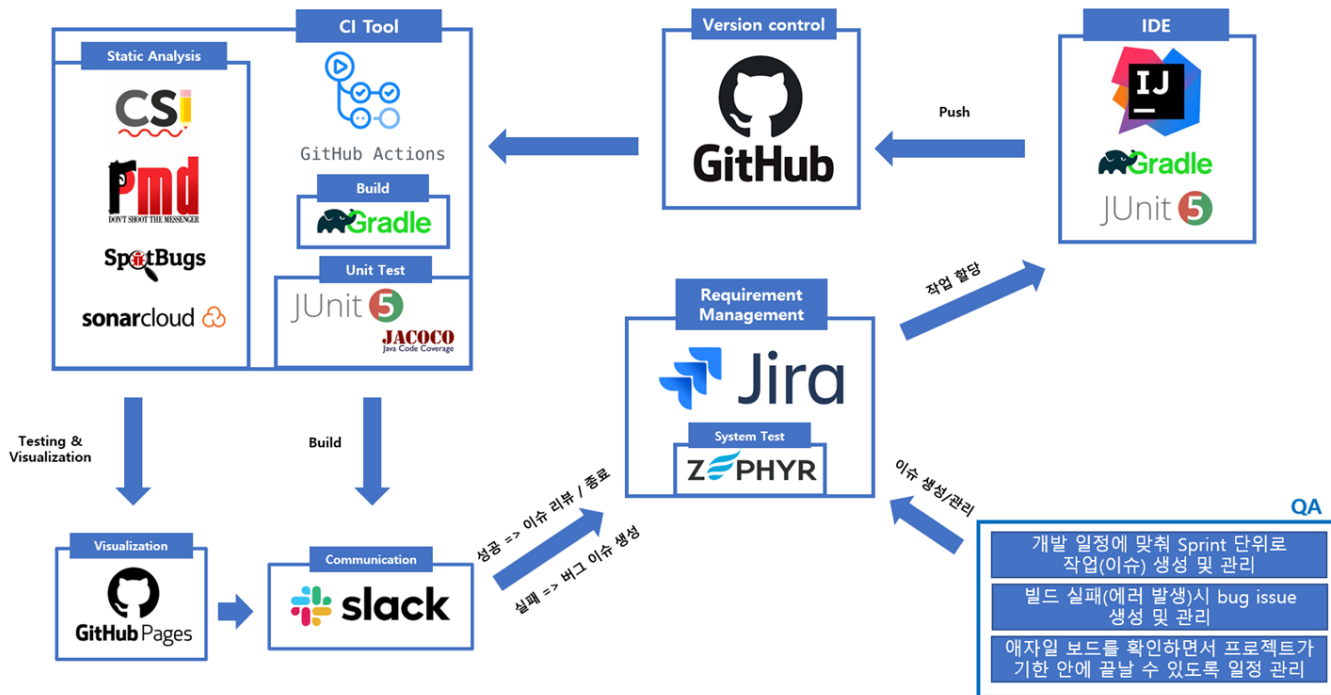
1. Code Coverage Analysis

2. Static Analysis

3. System testing

4. Result

Overview



Jenkins > Github Action


- 젠킨스에서 PMD, Check Style, Find bugs plugin을 붙여보려 했지만 실패
- 젠킨스의 Scripted Pipeline 문법보다 Github Action 의 yml 문법이 더 사용하기 쉬움
- 결정적인 이유는 젠킨스 서버를 구축해 놓았던 AWS Free tier의 종료, 과금 문제 발생

> Github Action으로 변경

AWS Free Tier limit alert 받은편지함 x

no-reply-aws@amazon.com
나에게 ▾

🇺🇸 영어 ▾ > 🇰🇷 한국어 ▾ [메일 번역](#)



AWS Free Tier usage limit alerting via AWS Budgets 04/24/2021

Dear AWS Customer,

Your AWS account 254800465990 has exceeded 85% of the usage limit for one or more AWS Free Tier-eligible services for the month of April.

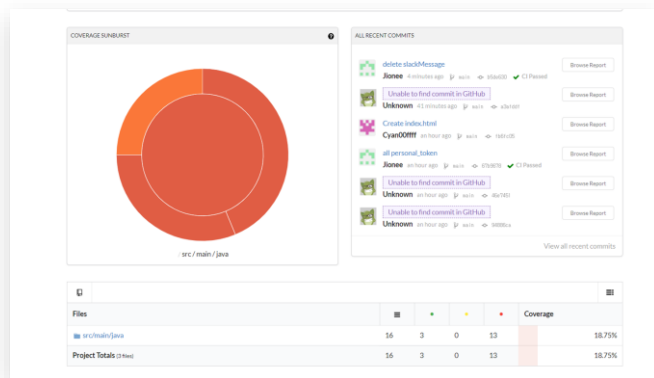
Product	AWS Free Tier Usage as of 04/24/2021	Usage Limit	AWS Free Tier Usage Limit
AmazonEC2	697.565 Hrs	750.0 Hrs	750 hours per month of Amazon EC2 Linux, RHEL, or SLES t2.micro or t3.micro instance dependent on region

1. Code Coverage Analysis - jacoco -



- 코드 커버리지 결과를 파일 형태로 저장 가능 (html, xml, csv)
- 설정한 커버리지 기준을 만족하는지 확인 가능

1. Code Coverage Analysis - jacoco -



codecov.io 사이트를 이용하여 jacoco analysis 결과를 리포팅 해보았으나 static analysis testing 결과가 한 사이트에 모여있는 편이 깔끔하다고 생각하여 해당 사이트는 이용하지 않기로 결정

2. Static Analysis - PMD -



- Java의 잘못된 코드를 검사해주는 정적 소스 코드 분석 도구
- 기본 제공 규칙 세트가 포함되어 있으며 사용자 지정 규칙 작성 가능
- 올바른 형식의 소스 파일만 처리 가능하기 때문에 컴파일 오류를 보고하지 않음

2. Static Analysis - Checkstyle -



- Java의 소스 코드가 기술형식 코딩 규약에 준하고 있는지 체크하는 정적 해석 툴
- 코딩 컨벤션 룰셋 외에도 별도의 룰셋을 정의하여 사용 가능
- 코딩 컨벤션을 정의하는 xml 기반의 룰셋을 사용하여 코드 검사

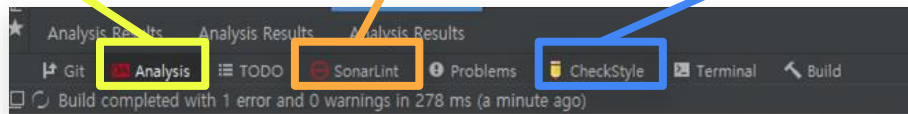
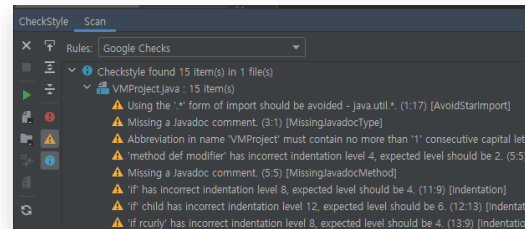
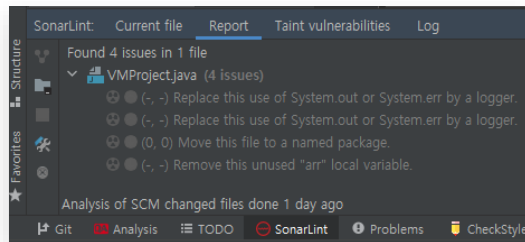
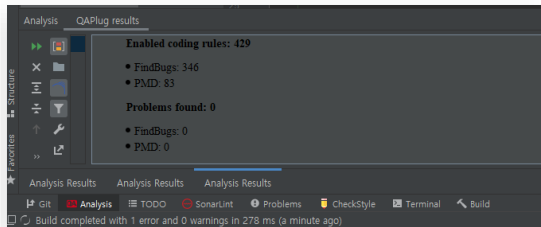
2. Static Analysis - Spotbugs -



- Java 바이트 코드를 분석하여 버그 패턴을 발견하는 정적 분석 공개 소프트웨어
- 찾은 결함이 엉뚱한 결함일 확률이 낮음(정확성이 높음)

2. Static Analysis IntelliJ plugins

IntelliJ에 static analysis 도구들을 plugin으로 추가하여 코드를 작성하며 잠재적인 에러를 파악할 수 있도록 함



2. Static Analysis - Sonarcloud -



- 대표적인 정적 분석 툴인 SonarQube를 개인 서버에서 준비하는 것이 아니라 클라우드 서비스를 사용하여 훨씬 편리하게 정적 분석이 가능
- 코드의 잠재적인 위험 사항까지 안내해주어 코드의 품질향상에 많은 도움을 줌

3. System Testing - TestQuality -



- Jira Plugin 지원
- 깃헙 public repo는 무료로 지원
- 팀원 명수 제한 없음
- 다른 test runner 로부터 결과 import 가능

3. System Testing - Test Collab -

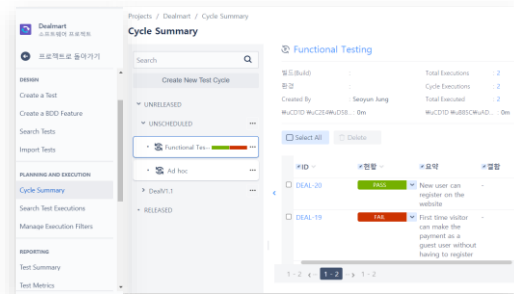


- 모든 테스트 자동화 도구와 통합
- 구축된 시간 추적 및 예측
- 자동 스크린 샷 레코더
(작업중인 테스트에 자동으로 업로드 및 링크)
- 사용법이 어려움

3. System Testing - Zephyr -



- Jira 내부에서 모든 테스트 수행 가능, Jira Issue 형태로 test 관리 가능
- SoapUI Pro, TestComplete, Selenium, Junit, TestNG 등 유명한 도구들과의 통합
- Jira, Confluence 와 원클릭 통합
- 테스트 케이스 및 테스트 사이클 생성을 통한 분석/관리



4. Unit test - Success -

Update test2.yml CI #26

Summary

Jobs

- Prepare(Build,UnitTest)
- Static Analysis
- JUnit Test Report

Triggered via push 7 hours ago

Job	Status	Total duration	Artifacts
Static Analysis	Success	2m 15s	1

test2.yml
on: push

- Prepare(Build,UnitTest) 35s
- Static Analysis 1m 57s

Repo
VnV-Test/Software_VnV

Status
BUILD SUCCESS commit:189b160c

Event
push

VnV-Test/Software_VnV | 오늘 오전 2:15

Workflow
CI
Branch
main

Repo
VnV-Test/Software_VnV

Status
UNIT TEST SUCCESS commit:189b160c

Event
push

VnV-Test/Software_VnV | 오늘 오전 2:15

Workflow
CI
Branch
main

4. Unit test - Failed -

GitHub Actions / JUnit Test Report
failed 8 minutes ago in 0s

3 tests run, 0 skipped, 2 failed.

ANNOTATIONS

```
✖ Check failure on line 23 in src/test/java/VMProjectTest.java
github-actions / JUnit Test Report
VMProjectTest.verify()
org.opentest4j.AssertionFailedError: expected: <7> but was: <3>
Raw output

✖ Check failure on line 11 in src/test/java/VMProjectTest.java
github-actions / JUnit Test Report
VMProjectTest.multiply()
org.opentest4j.AssertionFailedError: expected: <17> but was: <16>
Raw output
```

Repo
VnV-Test/Software_VnV

Status
BUILD SUCCESS commit:85cf5668

Event
push
VnV-Test/Software_VnV | 오늘 오전 2:17

Workflow
CI

Branch
main

Repo
VnV-Test/Software_VnV

Status
UNIT TEST FAILED commit:85cf5668

Event
push
VnV-Test/Software_VnV | 오늘 오전 2:17

Workflow
CI

Branch
main

4. Unit test - Report -

The screenshot shows a GitHub Actions workflow for a pull request titled "Update VMProject.java". The workflow is currently in a failed state, indicated by a red circle with a white exclamation mark. The workflow consists of several steps: "Prepare(Build.UnitTest)", "Static Analysis", "JUnit Test Report", and "Review Dog". The "JUnit Test Report" step is currently selected and highlighted in blue. The workflow summary shows "3 tests run, 0 skipped, 2 failed." The "ANNOTATIONS" section displays two failed test cases: "VMProjectTest.특기2()" and "VMProjectTest.multiply()". Each failure is accompanied by a "Raw output" button and a "View more details on GitHub Actions" link.

Conversation 1 Commits 4 Checks 4 Files changed 2 +9 -9

Update VMProject.java 7eabfce

Cancel workflow

CI on: pull_request 5

Prepare(Build.UnitTest) Static Analysis **JUnit Test Report** Review Dog

GitHub Actions / JUnit Test Report failed 12 seconds ago in 0s

3 tests run, 0 skipped, 2 failed.

ANNOTATIONS

Check failure on line 23 in src/test/java/VMProjectTest.java

github-actions / JUnit Test Report

VMProjectTest.특기2()

org.opentest4j.AssertionFailedError: expected: <7> but was: <5>

Raw output

Check failure on line 11 in src/test/java/VMProjectTest.java

github-actions / JUnit Test Report

VMProjectTest.multiply()

org.opentest4j.AssertionFailedError: expected: <17> but was: <16>

Raw output

View more details on GitHub Actions

4. Build

- build 실패시 > slack 알람

Repo

VnV-Test/Software_VnV

Status

BUILD FAILED commit:f3500dca

Event

pull_request

VnV-Test/Software_VnV | 오늘 오전 10:38

Workflow

CI

Pull Request

branch test

5

Static Analysis

failed 4 minutes ago in 1m 4s

Analyze

```
56 Full recompilation is required because no incremental change information is available. This is usually caused by
57 Compiling with JDK Java compiler API.
58 :compileJava (Thread[Daemon worker,5,main]) completed. Took 0.498 secs.
59
60 Deprecated Gradle features were used in this build, making it incompatible with Gradle 7.0.
61 Use '--warning-mode all' to show the individual deprecation warnings.
62 See https://docs.gradle.org/6.7/userguide/command\_line\_interface.html#sec:command\_line\_warnings
63 1 actionable task: 1 executed
64 /home/runner/work/Software_VnV/Software_VnV/main/java/VNProject.java:22: error: ';' expected
65     System.out.println("a equal 3!")
66                               ^
67 1 error
68
69 FAILURE: Build failed with an exception.
70
71 * What went wrong:
72 Execution failed for task ':compileJava'.
73 > Compilation failed; see the compiler error output for details.
74
```

- ex) ';' 을 빼먹은 compile error

Review Dog

4. CheckStyle - Report -

- pull request 시 checkStyle 결과 리포트 (by review dog)

The screenshot displays a GitHub Actions workflow run for 'Review Dog'. On the left, a sidebar shows the workflow steps: 'CI' (with a sub-step 'orc: pull_request'), 'Prepare(Build,UnitTest)', 'Static Analysis', 'JUnit Test Report', and 'Review Dog' (which is currently selected and highlighted in blue). The main area shows the 'Review Dog' job, which completed 8 minutes ago. Below the job name, it indicates 'reported by reviewdog' and shows 'Findings (2)' and 'Filtered Findings (176)'. The 'ANNOTATIONS' section lists two specific errors:

- Check notice on line 18 in src/main/java/VMProject.java: 'method def' child has incorrect indentation level 8, expected level should be 4.
- Check notice on line 22 in src/main/java/VMProject.java: 'if' child has incorrect indentation level 12, expected level should be 6.

Each annotation includes a 'Raw output' button for further details.

4. SonarCloud - Report -

- pull request 시 sonarcloud 결과 리포트 확인
- sonarcloud 사이트에서도 확인 가능



sonarcloud bot commented 2 minutes ago

SonarCloud Quality Gate failed.

🐛 0 Bugs
🛡️ 0 Vulnerabilities
🔥 0 Security Hotspots
🧹 1 Code Smell
📊 0.0% Coverage
🔄 0.0% Duplication

👤 Jionee merged commit `ceb4053` into `main` now
2 of 5 checks passed

The screenshot displays the SonarCloud web interface. At the top, the navigation bar includes 'My Projects' and 'My Issues'. The main content area shows a list of issues for the project 'Software_VnV'. A specific issue is highlighted, titled 'Swap these 2 arguments so they are in the correct order: expected value, actual value.' This is a 'Code Smell' issue, categorized as 'Major' with a '2min effort' to resolve. The issue is located in the file 'srcTest/java/VMProjectTest.java' at lines 21 and 22. The code snippet shows a test method where the arguments in an assertion are swapped. A tooltip provides the explanation: 'Swap these 2 arguments so they are in the correct order: expected value, actual value. Why is this an issue?'. The interface also shows a search bar, a date 'April 29, 2021, 10:56 AM', and version information 'Version 1.0-SNAPSHOT'.

4. Static Analysis (Visualization)

GitHub Actions for Hugo



- github action의 yml파일에서 각 마켓을 이용하여 pmd, jacoco spot bugs , junit 테스트 진행
- 각 테스트 결과 파일들 (html로 생성) github page 생성 위한 리포지토리로 전송 (external_repository, personal_token 이용해서 전송)
- github_page 생성 위한 레포지토리에서 받은 후, 정적 사이트 호스팅 (index.html 이 메인인 되어서 그 파일 수정)

Distributed Vending Machine Project

Static Analysis Report

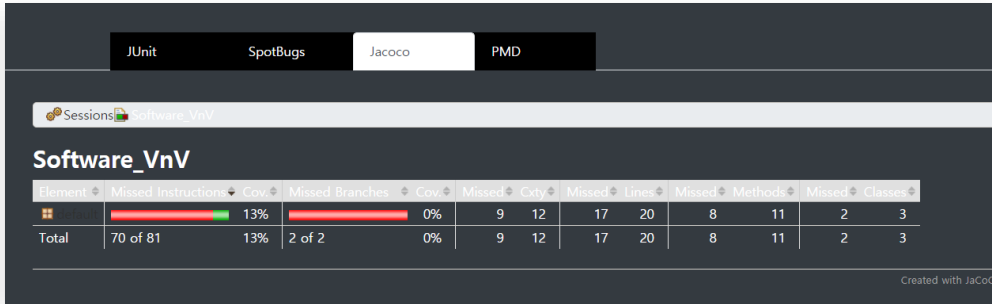
JUnit

SpotBugs

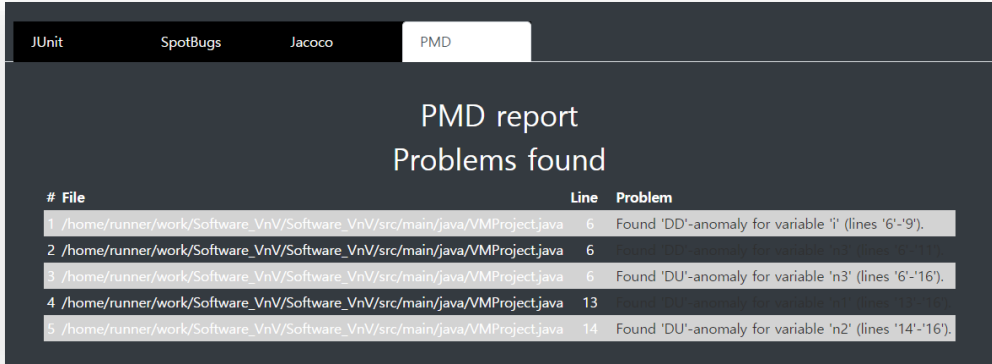
Jacoco

PMD

4. Static Analysis
- PMD, Jacoco Result -



Jacoco Code Coverage 분석 결과 리포트



PMD Problems found report

4. Static Analysis
- Spotbugs, JUnit -

SpotBugs Report

SpotBugs Report

Project Information
Project: Software_VnV (spotbugsMain)
SpotBugs version: 4.2.1
Code analyzed:

- /home/runner/work/Software_VnV/Software_VnV/build/classes/java/main/Addnumber.class
- /home/runner/work/Software_VnV/Software_VnV/build/classes/java/main/Member.class
- /home/runner/work/Software_VnV/Software_VnV/build/classes/java/main/VMPProject.class

Metrics
36 lines of code analyzed, in 3 classes, in 1 packages.

Metric	Total	Density*
High priority warnings	0	0.00

Total Warnings: 0 / 0.00
(* Defects per Thousand lines of non-commenting source statements)

JUnit 결과 확인

Test Summary

1	1	0	0.048s	0% successful
tests	failures	ignored	duration	

Failed tests: 0
Packages: 0
Classes: 0

Failed tests

Packages

Package	Tests	Failures	Ignored	Duration
default-package	1	1	0	0.048s

Classes