Quality on Submit
Continuous integration in practice

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SAP Patent pending application title "Quality on Submit Process". Ref: 2010P00489US

Quality On Submit
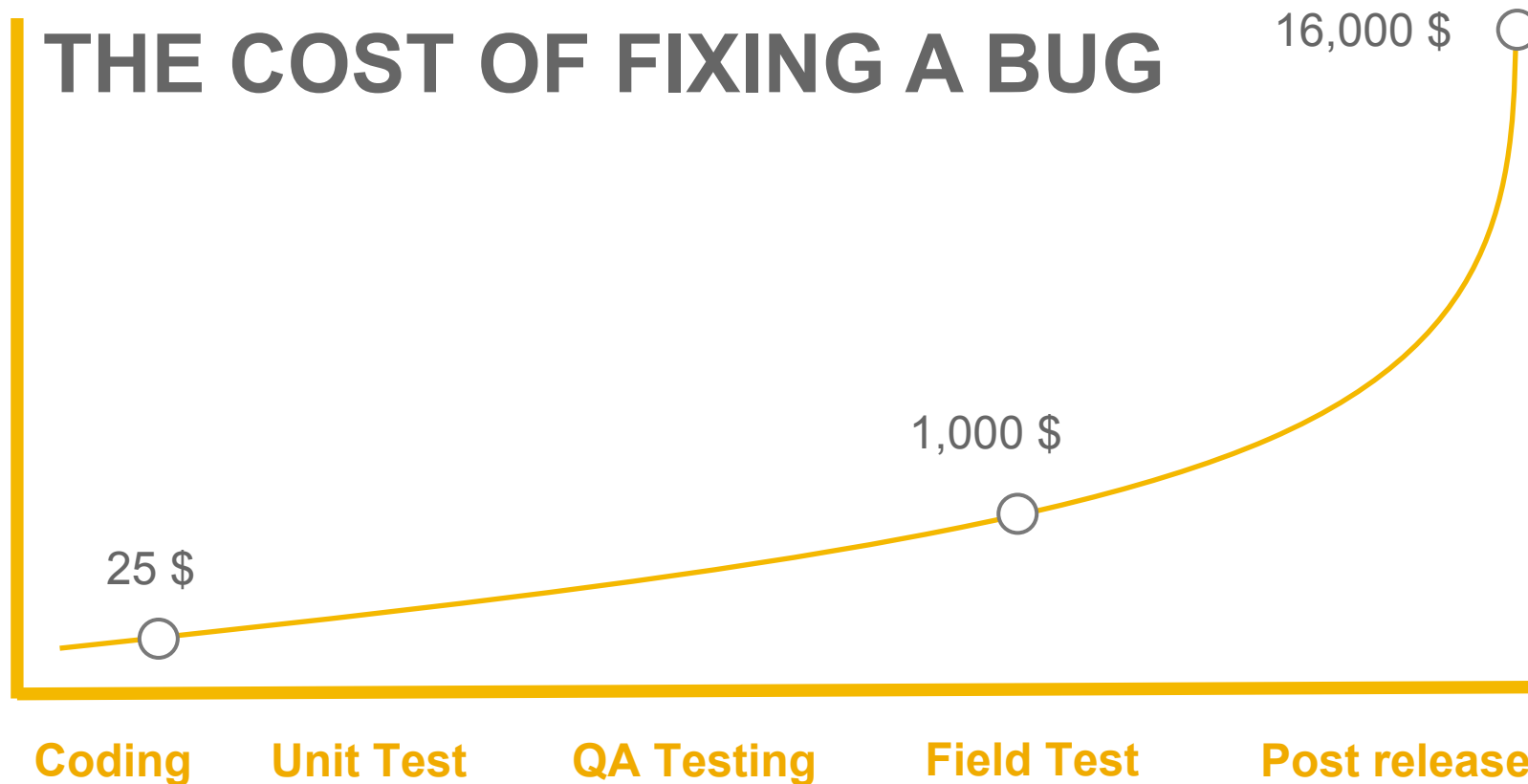
End to end SW development **quality process** that provides instant **feedback** and **transparency** to the SCRUM teams.

Motivation

THE COST OF FIXING A BUG

16,000 $

1,000 $

25 $

Coding   Unit Test   QA Testing   Field Test   Post release

Applied Software Measurement, Capers Jones 1996

Motivation – Cont'

The nightly build was broken ➜ **no systems today**

Who broke the build?

Who broke the runtime?

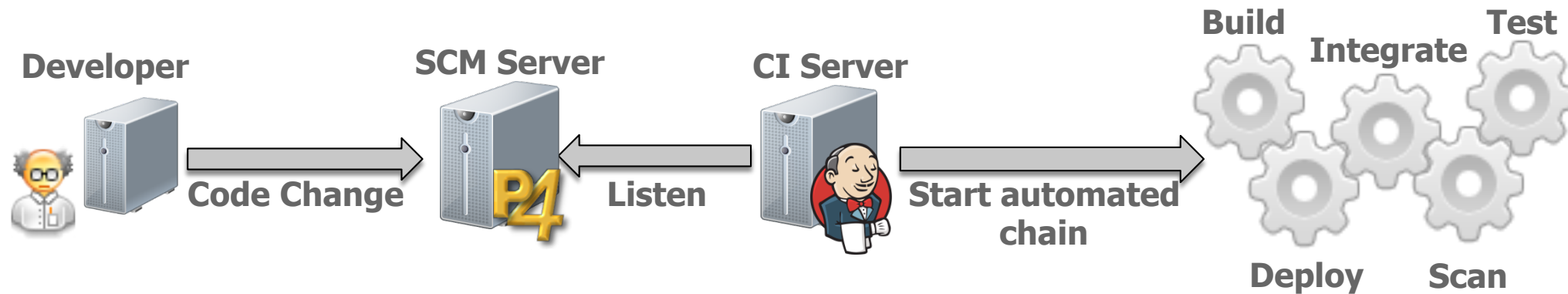**How many** changes do we have today?

Did Jack already check-in his stuff?

What is the **status** of our product **today? Now?**

Why do we fix PMD issues **right before the release**

Code checked-out into SCM

Developer **SCM Server** **CI Server** **Build** **Integrate** **Test**

Code Change **Listen** **Start automated chain**

Deploy **Scan**

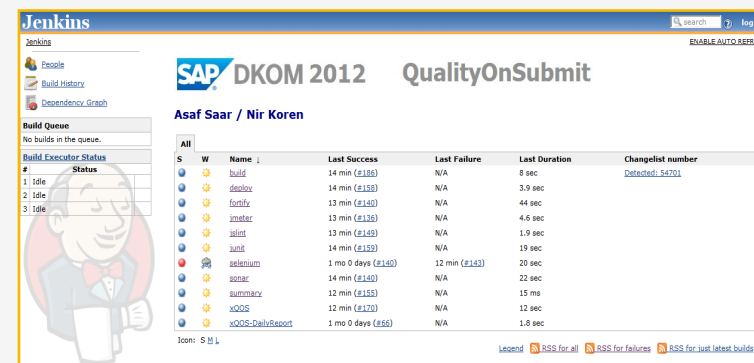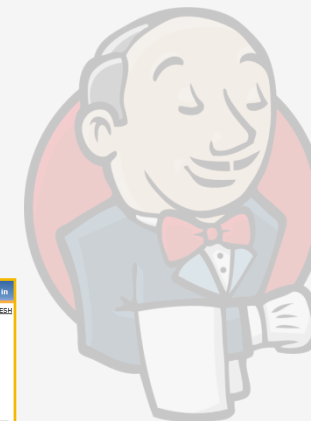Build > Deploy > Unit Test > API Tests > JS Tests > Sonar > Fortify > UI > DB Save > Notify > Gamify

Build

Jenkins SCM Plugin (P4, GIT, etc')
Listen to the SCM and **trigger the QOS**
process.

Compilation starts (Maven / Ant / etc')

SCM Server

Build   Deploy   Unit Test   API Tests   JS Tests   Sonar   Fortify   UI   DB Save   Notify   Gamify

Deploy

A **dedicated** reference system is deployed with the **new build results**.

This system is **always updated** to the **latest code state.**

Continuously Deployed

REF System

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Unit Tests

All Unit tests are **detached from the build** process.

Supports **any kind of unit tests** like NUnit, JUnit, etc.

Reports **provided via Jenkins plugins** like surefire

Test Result : SiteBusinessLayerImplTest

0 failures (±0)

17 tests (±0)
Took 0.53 sec.
add description

All Tests

Test name	Duration	Status
addPageToSite	0.46 sec	Passed
addSite	31 ms	Passed
addWidget	16 ms	Passed
deletePage	0 ms	Passed
deleteSite	0 ms	Passed
deleteWidget	0 ms	Passed
getAllSitePages	0 ms	Passed
getAllSitePages	0 ms	Passed
getAllSitePages	0 ms	Passed
getPageById	0 ms	Passed
getSiteById	0 ms	Passed
getWidgetById	0 ms	Passed
getWidgets	0 ms	Passed
updatePage	16 ms	Passed
updateSite	0 ms	Passed
updateSiteTheme	0 ms	Passed
updateWidget	0 ms	Passed

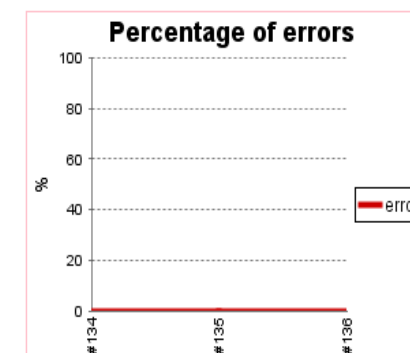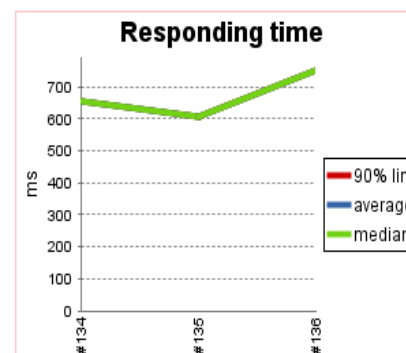| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

API Tests

Run on the deployed system.

Supports various methods like JMeter, soapUI, etc.

provided via Jenkins plugins

Test file: JMeterResults.jtl

Responding time

Percentage of errors

Trend report

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Java Script Tests

Support JSLint for JS Static Code Analysis and JsUnit tests like Jasmine.

Reports provided via Jenkins plugins

PMD Result

Warnings Trend

All Warnings	New Warnings
2	0

Summary

Total	High Priority	Normal Priority
2	0	2

Details

Warnings | **Details**

index.jsp:2, , Priority: Normal
[Unrecognized tag '], at [l.2,ch.2].

index.jsp:2, , Priority: Normal
[Stopping. (2% scanned).]=>[], at [l.2,ch.2].

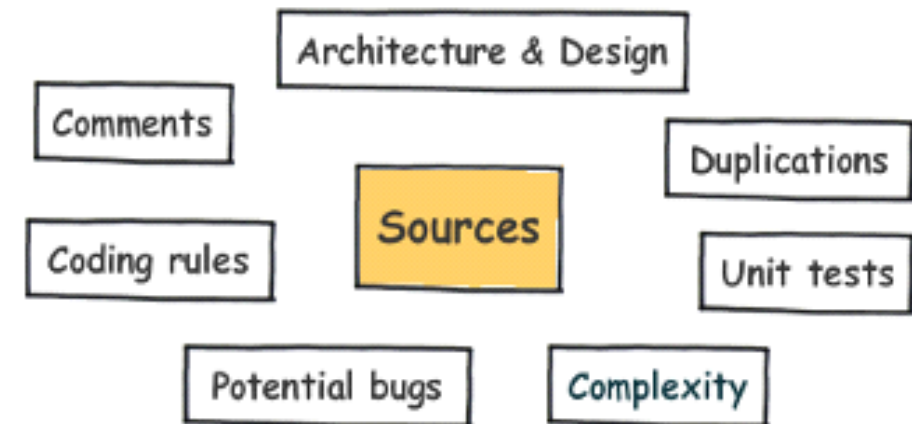| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Sonar

Open source **static code analysis** platform

Rich HTML dashboards

Numerous plug-ins

Violations, components, hotspots, time machine
and a lot more…

Architecture & Design

Comments

Duplications

Coding rules

Sources

Unit tests

Potential bugs

Complexity

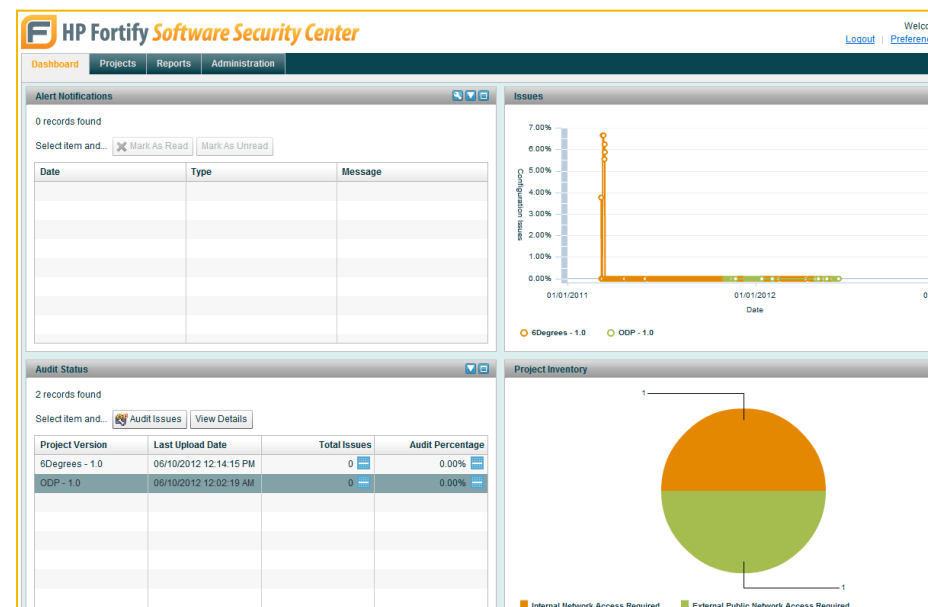Build 〉 Deploy 〉 Unit Test 〉 API Tests 〉 JS Tests 〉 **Sonar** 〉 Fortify 〉 UI 〉 DB Save 〉 Notify 〉 Gamify

Fortify

Licensed security test tool by HP.

Scan the current static code and detects security violations.

Provide rich HTML dashboards

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

UI Automation

Set of **Integration tests executed**

Supports **various technologies** like HP QTP, Selenium, Sikuli and more.

Reports **provided via Jenkins plugins or by any external provider.**

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Data saved into a DB

All data is **saved** into a DB.

QOS Cycles **statistics** can be generated.

Developers' typical behavior can be viewed from this DB.

TIME	PROJECT	USER	CHANGE	BUILD	DEPLOYMENT	JUNIT	SONAR
13-07-2011 13:44	6Degrees	i036832 - Ariel Tammam	3586384	Passed	Passed	Failed	Warning
13-07-2011 10:30	6Degrees	i064039 - Alexey Soshin	3585908	Passed	Passed	Failed	Warning
13-07-2011 09:16	6Degrees	i064039 - Alexey Soshin	3585812	Passed	Passed	Failed	Warning
12-07-2011 16:56	6Degrees	i040335 - Meni Tito	3583861	Passed	Passed	Failed	Warning
12-07-2011 14:42	6Degrees	i064995 - Ravit Huber	3583643	Passed	Passed	Passed	Warning
12-07-2011 10:51	6Degrees	i036832 - Ariel Tammam	3583085	Passed	Passed	Failed	Warning
12-07-2011 10:10	6Degrees	i036832 - Ariel Tammam	3583019	Passed	Passed	Passed	Warning
12-07-2011 10:04	6Degrees	i041381 - Nir Koren	3583000	Passed	Passed	Failed	Warning
11-07-2011 16:51	6Degrees	i068449 - Alon Peled	3581279	Passed	Passed	Passed	Warning
11-07-2011 15:51	6Degrees		Manual	Passed	Passed	Failed	Warning
11-07-2011 14:28	6Degrees	i045597 - Inbal Sabag	3581056	Passed	Passed	Failed	Warning
11-07-2011 11:12	6Degrees	i064039 - Alexey Soshin	3580625	Passed	Passed	Passed	Warning
11-07-2011 10:40	6Degrees	i059143 - Sheli Kahan	3580588	Passed	Passed	Passed	Warning
11-07-2011 09:45	6Degrees	i036832 - Ariel Tammam	3580533	Passed	Passed	Passed	Warning
11-07-2011 08:56	6Degrees	i064832 - Tomer Gabbai	3580477	Passed	Passed	Passed	Warning
11-07-2011 08:51	6Degrees	i064039 - Alexey Soshin	3580475	Passed	Passed	Passed	Warning
10-07-2011 17:06	6Degrees	i036832 - Ariel Tammam	3579514	Passed	Passed	Passed	Warning
10-07-2011 13:23	6Degrees	i045597 - Inbal Sabag	3579344	Passed	Passed	Passed	Warning
10-07-2011 11:41	6Degrees	i040335 - Meni Tito	3579262	Passed	Passed	Failed	Warning

Build > Deploy > Unit Test > API Tests > JS Tests > Sonar > Fortify > UI > **DB Save** > Notify > Gamify

Email Notification

SAP DKOM

Notification sent to the implementation team
➜ **Transparency to the implementation team.**

Elaborated status and links for all phases.

Total running time (in minutes): 15

Passed	Compilation (Duration: 0 min, 8 sec)
Last Change	54701
Developer	i041381 - Nir Koren ★★★★★
Description	Dummy submit for QOS demo
Build Log	Log
Cycle Start Time	10:42

Q-GAME   👍Like

Passed	Deployment (Duration: 0 min, 3 sec)
Deploy Log	Log
System	ILTLVLINJAM1 - DKOM
Archives	Archives

Passed	Junit (Java) (Duration: 0 min, 19 sec)
Test Log	Log

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Gamification

Optional connection to a Gamification system
which calculate phases results and provide
ranks and badges.

Increase the **fun in development.**

Increase the **drive for quality.**

Passed	**Compilation** (Duration: 0 min, 8 sec)
Last Change	54701
Developer	i041381 - Nir Koren ⭐⭐⭐⭐⭐
Description	Dummy submit for QOS demo
Build Log	Log
Cycle Start Time	10:42

🎮 **Q-GAME** 👍Like

| Build | Deploy | Unit Test | API Tests | JS Tests | Sonar | Fortify | UI | DB Save | Notify | Gamify |

Product Team Transparency

Daily report sent to the product team ➔ Transparency

SAP DKOM

Total 3 submitted CL's for 07-02-2012

Date	Developer	Change	Description	Build	Deployment	Junit	JsLint	Jmeter	Selenium	Sonar	Fortify
2012-02-07 17:17	i041381 - Nir Koren	35124	QOS test 1	Passed	Passed	Passed	Passed	Passed	Passed	Warning - Blocker: 1, Critical: 0	Passed: No violations
2012-02-07 17:17	i041381 - Nir Koren	35124	QOS test 3	Passed	Passed	Passed	Passed	Passed	Passed	Warning - Blocker: 1, Critical: 0	Passed: No violations
2012-02-07 17:17	i041381 - Nir Koren	35124	QOS test 2	Passed	Passed	Passed	Passed	Passed	Passed	Warning - Blocker: 1, Critical: 0	Passed: No violations

QOS ➔ End To End Quality

- ➢ **Instant feedback in ~15 minutes.**

- ➢ **Increased team responsibility and quality awareness**

- ➢ **Rewards development for quality**

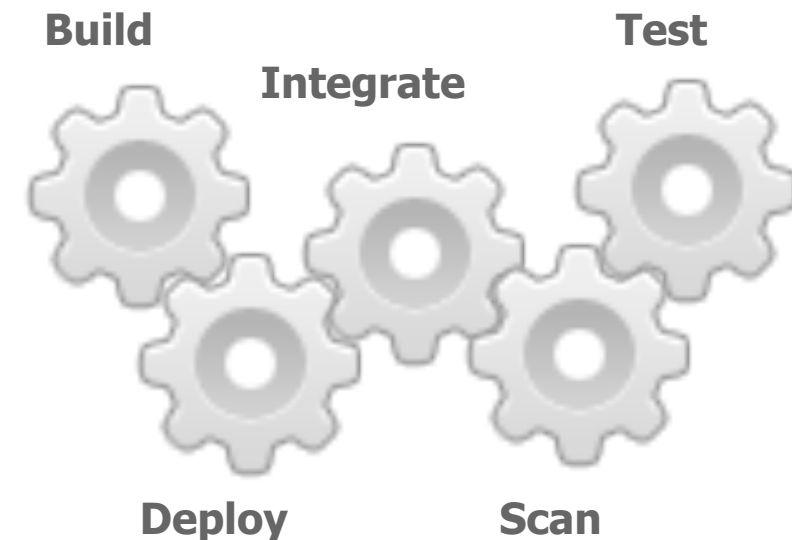- ➢ **Makes TDD realistic and drives towards it**

Prerequisites

Split your unit tests from your build.

Split your build and make it short.

Make your tests in **short cycles.**

Make you tests **reliable**

Avoid false alarms

Build   Test
          Integrate

Deploy   Scan

Quality On Submit in SAP

- **SAP Patent pending application title** "Quality on Submit Process". Ref: 2010P00489US

- Run in **productive** on-demand and on-premise products

- Proved as a **best method** for **quality in short cycles**

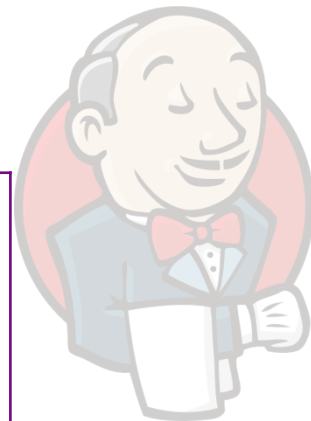- Awarded SAP Labs Israel **as one of the lab's strengths**

Thank you!

SAP

Nir Koren

Development Integration Lead

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