

Continuous Integration Tooling Case Study



1 Executive summary

Collaboration and Software Quality are important aspects of software development. The aspects are emphasized when collaboration is done with different partners over international boundaries, which is an ambition of the Hanze University of Applied Science. A multitude of software tools, both commercial and open source, exist to support collaboration and Software Quality Control.

In this project the toolsuite of the firm Atlassian¹ has been installed and explored. The main focus has been on the Continuous Integration² although complete suite has been installed and tested. After installation the tools have been used by 5 development teams of students.

The open source world offers plenty of alternatives to the Atlassian suite. In this project we did not explore those further. Atlassian offers ease of installation, good integration and good support, but these come with a pricetag if the project size grows³.

The general conclusion was that the Continuous Integration tools are useful if restricted to Java development. It was more difficult to support platforms like Android and PHP. Documents have been written for future administrators. In general a team has to expect to spend a certain amount of time to administer these tools (whichever variant is used).

These learnings will be taken along in the next international projects.

¹ www.atlassian.com

² Duvall, Paul, Steve Matyas, and Andrew Glover. Continuous Integration: Improving Software Quality and Reducing Risk, Addison Wesley, Boston, 2007

³ <http://www.atlassian.com/licensing/purchase-licensing#pricinganddiscountsHowmuchdoatlassianproductscost>

2 Problem Statement

With our increasing participation in large software development projects, with an increasing number of partners in different countries, we are faced with the challenge of software quality. How can we ensure a certain uniformity and level of software quality in products developed by our students over time? This is an age-old question in software development and many best practices have been developed. One of these practices is Continuous Integration, whereby software is frequently compiled, tested, and quality controlled through automated scripts.

We had too little knowledge about and experience with hands-on working of these tools so we set out to gain it.

3 Alternatives

There are many commercial and open source alternatives for these kind of tools. We have not made an study of these. We decided to experiment with the Atlassian toolsuite since this is one of the best known suites and starter licences were easily available. The tools were also recommended to us by Quintor⁴, one of our Partners in Education, which provided us with informal support.

⁴ www.quintor.nl

4 Implementation & Conclusion

The tools are currently be used by 5 development teams of students.

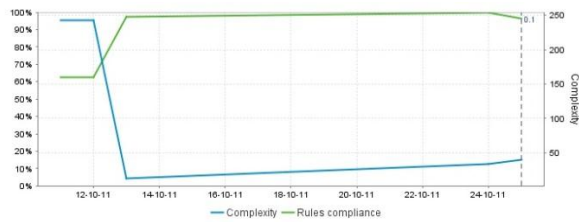
The main Continuous Integration tool **Bamboo** is easy to use and gives teams good feedback on the state of their code. The combination of Bamboo with the tool **Sonar** for the Java programming language is especially powerful. Applying Sonar to Android or PHP projects failed.

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20-08-2011 13:29:54 Buildfile: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\testbuild.xml
20-08-2011 13:29:55 clean-bin:
20-08-2011 13:29:55 [delete] Deleting directory C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\bin
20-08-2011 13:29:55 clean-reports and distribute*:
20-08-2011 13:29:55 [delete] Deleting directory C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\dist
20-08-2011 13:29:55 [delete] Deleting directory C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\reports
20-08-2011 13:29:55 init:
20-08-2011 13:29:55 [mkdir] Created dir: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\bin
20-08-2011 13:29:55 [mkdir] Created dir: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\dist
20-08-2011 13:29:55 [mkdir] Created dir: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\reports
20-08-2011 13:29:55 [mkdir] Created dir: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\reports\raw
20-08-2011 13:29:55 [mkdir] Created dir: C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\reports\html
20-08-2011 13:29:55 compile:
20-08-2011 13:29:55 [javac] C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\testbuild.xml:13: warning: 'includeantruntime' was not set,
defaulting to build.sysclasspath=last; set to false for repeatable builds
20-08-2011 13:29:55 [javac] Compiling 14 source files to C:\data\bamboo-home\xml-data\build-dir\IG07-IG07-JOB1\bin
20-08-2011 13:29:55 run-tests:
20-08-2011 13:29:55 [junit] Running dev.groep7.itract.unittest.AllTests
20-08-2011 13:29:55 [junit] Tests run: 2, Failures: 0, Errors: 0, Time elapsed: 0,141 sec
20-08-2011 13:29:55 [junit] Running dev.groep7.itract.unittest.DataTest
20-08-2011 13:29:55 [junit] route
20-08-2011 13:29:55 [junit] information
20-08-2011 13:29:55 [junit] traveltime
20-08-2011 13:29:55 [junit] distance
20-08-2011 13:29:55 [junit] price
20-08-2011 13:29:55 [junit] type
20-08-2011 13:29:55 [junit] departure
20-08-2011 13:29:55 [junit] time
20-08-2011 13:29:55 [junit] place
20-08-2011 13:29:55 [junit] destination
20-08-2011 13:29:55 [junit] time
20-08-2011 13:29:55 [junit] place
20-08-2011 13:29:55 [junit] description
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step
20-08-2011 13:29:55 [junit] step

```

Figure 1: Bamboo automated build



Show date	11/10/2011 hide	25/10/2011 Version 0.1 hide
Complexity		
<input checked="" type="checkbox"/> Complexity	243	40
<input type="checkbox"/> Complexity /class	9,0	2,7
<input type="checkbox"/> Complexity /file	9,7	2,9
<input type="checkbox"/> Complexity /method	2,3	1,8
Documentation		
<input type="checkbox"/> Comment lines	545	46
<input type="checkbox"/> Commented-out LOC	0	1
<input type="checkbox"/> Comments (%)	28,7%	11,8%
<input type="checkbox"/> Public documented API (%)	67,9%	23,5%
<input type="checkbox"/> Public undocumented API	44	26

Figure 2: Sonar report

Fisheye and **Crucible** are tools for inspecting code repositories. We didn't find it particularly useful for our purposes.

Jira is an issue tracker. It is closely linked to **Confluence**, an enterprise wiki. These tools work as expected although the user interface of Jira takes some getting used to.

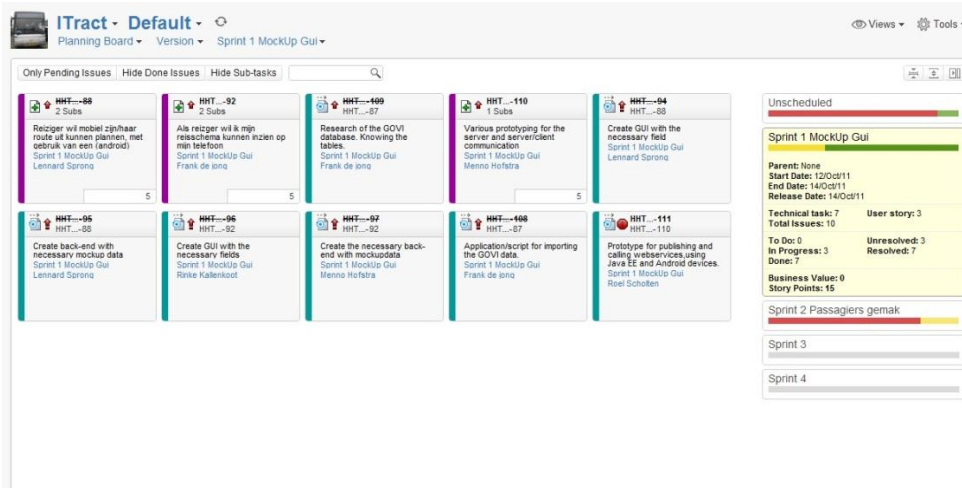


Figure 3: Jira planning board

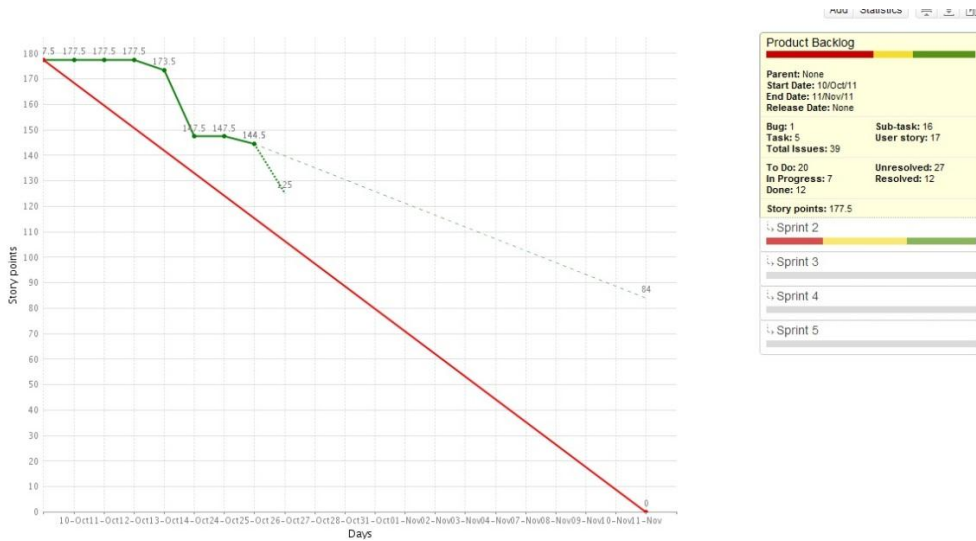


Figure 4: Jira burndown chart

5 Participants

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