Technology-Driven Development: Using Automation and Development Techniques to Grow an Agile Culture

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About me

Hiroyuki Ito (The Hiro)

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Test-Driven Development Group

[Images and logos]

Rakuten
http://global.rakuten.com/corp/about/strength/business_model.html
It’s my 3rd time to be here!

Agile2014 : as a Speaker
This session’s theme

Technology-Driven Development
Additional possibilities of automation
“TDD” stands for three purposes

Efficiency
Learning
Collaboration
By three approaches

CI/CD

TDD

BDD
Three approaches by

CI/CD

TDD

BDD
Agenda

1. Conditions and Challenges
2. CI/CD
3. TDD
4. BDD
5. Results, Problems, Possibility and Future
6. Conclusions
<p>| | |</p>
<table>
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<tbody>
<tr>
<td>1. Conditions and Challenges</td>
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At the end of April 2013

- Business Analyst
- UI/UX Designers
- Developers
At the end of April 2013

HELP!

Business Analyst

UI/UX Designers

Developers

Agile Coach (The Hiro)
Our target application is
Conditions and Challenges
None of the team members had any experience with agile
None of the team members had any experience with agile.

There had been many manual operations.
Conditions and Challenges

None of the team members had any experience with agile.

There had been many manual operations.

Most of the team members were young and immature.
What do you think?
I was so much excited!
I can achieve anything through such a challenging project!
Three approaches

CI/CD

TDD

BDD
1. Conditions and Challenges

2. CI/CD

3. TDD

4. BDD

5. Results, Problems, Possibility and Future

6. Conclusions
Challenges

Low performance
- So many manual tasks

Going in circles
- No clear vision and no requirements
- No timely progress information
Before CI/CD

13.5 hours/week

- Change requests : 3 times/week
- Regression testing : 4 hours/change
  - Need to retry if we find bugs…
- Install applications : 0.5 hour/change
  - 5-minute work for 6 persons
The Implementation of CI/CD in our project
The Implementation of CI/CD in our project
The Implementation of CI/CD in our project

Atlassian Stash

Check-in build (hourly)

My PC
The Implementation of CI/CD in our project

Check-in build (hourly)

My PC

Build applications and run regression tests automatically
The Implementation of CI/CD in our project

Atlassian Stash

Check-in build (hourly)

My PC

Deliver to all team members automatically

TestFlight

Build applications and run regression tests automatically

Rakuten
The Implementation of CI/CD in our project

Check-in build (hourly)  
Deliver to all team members automatically  
Build applications and run regression tests automatically  
We demonstrate latest application to the business analyst and managers in every daily scrum
Shared understanding by the working software

Business Analyst

Know about the progress

UI/UX Designers

Get fast feedback

Developers
15 minutes/week

- Change requests: 3 times/week
- Regression testing: 3 minutes/change
- Install applications: 2 minutes/change
After CI/CD

15 minutes/week

- Install applications: 2 minutes/change
- Regression testing: 3 minutes/change
- Change requests: 3 times/week: 15 minutes/week

↓ 13 hours!
Challenge

Lack of skill and knowledge of Android
• the architecture of Android
• how to develop the Android application
• how to access the database on the device
• how to implement the UI
Before TDD

• Could not test after we implemented all components (Debug Later Programming)
• It took five days to implement one activity set
Too difficult to use Android JUnit 😞
Too difficult to use Android JUnit 😞

java.lang.RuntimeException: Stub! (Д°)
Too difficult to use Android JUnit 😞

java.lang.RuntimeException: Stub! (°Д°)

Why we need an emulator or a device? :-o
Too difficult to use Android JUnit 😞

java.lang.RuntimeException: Stub! (°Д°)

Why we need an emulator or a device? :-o

Please don’t start a heavy lifecycle of Android for each test case :-(

楽R天 Rakuten
Solution to do TDD on Android
Solution to do TDD on Android

• Robolectric: Do all unit testing only on JVM
  • [http://robolectric.org/](http://robolectric.org/)
  • Without any emulator or device!
Solution to do TDD on Android

- Robolectric: Do all unit testing only on JVM
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  - Without any emulator or device!

- Mockito: Can use the “Test Double”
@Before
public void setUp() {
    Create database for Test;
    Insert test data;
}

@Test
public void findXxx() {
    Assertions;
}

@After
public void tearDown() {
    Drop Database for Test;
}
After TDD

- Can test each component **independently and separately**
- It takes **one day** to implement one activity set  
  (**five times faster** than at the start of the project)
1. Conditions and Challenges
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Challenges

Avoid **feature creep**

Detect bugs and regressions on **use-cases**

Learn **domain knowledge** effectively
Example of feature creep

DONE!
Example of feature creep

Business Analyst

Developers

UI/UX Designers

DONE!

More features!
Example of feature creep

Business Analyst

UI/UX Designers

More features!

Developers

DONE!

NUUN 😞
Example of feature creep

Need discipline!

More features!

UI/UX Designers

NUUN 😞

DONE!
Calabash-android: improve the discipline

Cucumber

• The wrapper of Cucumber for Android
• As an executable specification
• As a communication tool
  Specifying collaboratively with business analyst, designers and developers
• By specification with examples
**Example of BDD test scenario with Calabash-Android**

**Feature**: Input  
**Scenario**: Input today’s data

- **Given** I kick drumroll  
- **And** drumroll show today  
- **When** press next  
- **Then** I should see "xxx" screen

- **When** I press keys and calculator should show like this:  
  |   |   |   |
  | 2 | 2 |   |
  | 0 | 20|   |
  | 0 | 200|  |
  | * | 200|   |
  | 3 | 3 |   |
  | = | 600|   |

- **Then** take photo...

- **Feature** : name of all cases  
- **Scenario** : name of each case

These statements are **RUNNABLE**!

We can write data with table style like this
Process of BDD

- Business Analyst
- Developers
- We want to...
- UI/UX Designers
Process of BDD

We want to…

GIVEN … WHEN … THEN …

Is that right?

Business Analyst

UI/UX Designers

Developers
Process of BDD

GIVEN … WHEN … THEN …

Business Analyst

UI/UX Designers

Developers

OK, go ahead!

Is that right?
Process of BDD

GIVEN …
WHEN …
THEN …

Developers

Is it OK?

Business Analyst

UI/UX Designers

Process of BDD
Process of BDD

GIVEN … WHEN … THEN …

Sure!

Is it OK?

Business Analyst

UI/UX Designers

Developers
After BDD

- Bugs : -67%
- Change requests : -70%
- Regressions : -60%
After BDD

- Bugs: -67%
- Change requests: -70%
- Regressions: -60%
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Results
[Example] Changing scope

Business Analyst

UI/UX Designers

Developers

Agile Coach (The Hiro)

Please change scope!
[Example] Changing scope

No!
Do all we planned at first!

Business Analyst

UI/UX Designers

Developers

Please change scope!

Agile Coach (The Hiro)
[Example] Changing scope

It’s impossible to change the scope within our company…

Business Analyst

UI/UX Designers

Developers

Agile Coach (The Hiro)

Belong to another (subsidiary) company
Asked for one executive

Yes, you can!

We changed scope!
Technical excellence and working software are **not the only way** to improve projects.

Anything is OK for improving your situation! (Anything goes/Vale tudo)
Possibility and future
[Example] Growing a collaborative culture

Got some slack time!

Developers
[Example] Growing a collaborative culture

Got some slack time!

Developers

Too slow emulator…
[Example] Growing a collaborative culture

Got some slack time!

Developers

How about Genymotion?

Too slow emulator…
[Example] Growing a collaborative culture

Got some slack time!

How about Genymotion?

Developers

Too slow emulator…

• Over 10 times faster
• Can run via Calabash-Android
Can enhance “TDD” by numerical measurement

[e.g.]

- Change requests : 3 times/week
- Regression testing : 3 minutes/change
- Install applications : 2 minutes/change
Use “TDD” as a measure for total optimization
Don’t lose the whole picture!
Three purposes

Efficiency

Learning

Collaboration

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Three approaches

CI/CD

TDD

BDD
Three approaches by

CI/CD

TDD

BDD
We found this practice
• through the project
• with passionate members
• with a lot of trial and error
Experience from Gemba

現場主義
Find your answer by yourself through your experience
Find your treasure!