Quality Audit in SCRUM-project
or
Continuous Improvement of Continuous Integration

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- The world leader in the development of solutions for digital TV.
- Produces set-top boxes for digital TV, equipment for cable system operators and IP TV, and broadband access devices.

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Project context

- Distributed development teams following Agile.
- Everybody commits changes to one Trunk.
- Multiple commits daily.
- Control of build states of Jenkins on a board (red, yellow, green).
Keep Jenkins Green!
Keep Jenkins Green!

- If Jenkins is yellow or red, do not commit your code.
Keep Jenkins Green!

- If Jenkins is yellow or red do not commit your code.

- Commit a fixed solution or revert failed builds within 15 minutes.
Keep Jenkins Green!

- If Jenkins is yellow or red do not commit your code.
- Commit a fixed solution or revert failed builds within 15 minutes.
- Contact CI support if you suspect something is wrong.
What’s the problem?
What’s the problem?

New team
New process
New product

Red Jenkins blocking the work of other teams

Escalation to management

Improve it now!
What’s the problem?

- New team
- New process
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- New product
- Red Jenkins blocking the work of other teams
- Escalation to management
- Improve it now!

How to avoid the problems blocking the work of other teams?
What’s the problem?

- How to avoid the problems blocking the work of other teams?
- How to sustain the green monitor?
What’s the problem?

- How to avoid the problems blocking the work of other teams?
- How to sustain the green monitor?
- ... and finally how to «calm down» the senior management?
Improvements of the process

Development

Source control

Commit

Initiate CI process

Build

Test

Testing

Report
Improvements of the process

Development

Report

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Source control

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Development

Pre-commit Checklist

Commit

Source control

Initiate CI process

Build

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Improvements of the process

- Development
- Pre-commit Checklist
- Source control
- Initiate CI process
- Build
- Commit
- Test
- Audit
- Report

Development

Source control

Initiate CI process

Build

Commit

Test

Audit

Report

Improvements of the process
Pre-Commit Checklist

- List of items to be checked before commit is done.
- Pre-commit checklist was partly automated.
- Printed checklists were hanged at each work place.
Example of Pre-commit Checklist

Pre-commit checklist

1) Code should have unit tests?

2) All texts should be translatable and available in English and Swedish?

3) Long/high texts?

...
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Pre-commit checklist

1) Code should have unit tests?

2) All texts should be translatable and available in English and Swedish?

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Improvements of the process

Development

Pre-commit Checklist

Commit

Source control

Initiate CI process

Build

Commit Audit

Testing

Test

Report
Commits Audit
Commits Audit

Select failed commit(s) → Preliminary analysis → Define «our fault» commits → Root Cause Analysis (RCA) of «red builds»

- SCRUM master
- Test Leader
- Quality Engineer

Metrics → Improvements
Reasons of “Red” builds appearance
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The specific implementation of target DBMSs and platforms
Reasons of “Red” builds appearance

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The specific implementation of target DBMSs and platforms

The differences between environment settings
Reasons of “Red” builds appearance

The specific implementation of target DBMSs and platforms

The differences between environment settings
Reasons of “Red” builds appearance

- The specific implementation of target DBMSs and platforms
- The differences between environment settings
- Incorrect use of Jenkins

\[\text{Jenkins} \neq \text{debugger}\]
Reasons of “Red” builds appearance

- The specific implementation of target DBMSs and platforms
- The differences between environment settings
- Incorrect use of Jenkins
- Jenkins ≠ debugger

ARRIS
Reasons of “Red” builds appearance

- The specific implementation of target DBMSs and platforms
- The differences between environment settings
- Incorrect use of Jenkins
- The human factor
Continuous Improvements:
Corrective & Preventive actions
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Corrective & Preventive actions

Additional training for team members
Continuous Improvements: Corrective & Preventive actions

Additional training for team members
Continuous Improvements: Corrective & Preventive actions

- Additional training for team members
- Addition of new items to Pre-Commit Checklist
Continuous Improvements:
Corrective & Preventive actions

Additional training for team members

Addition of new items to Pre-Commit Checklist
Continuous Improvements: Corrective & Preventive actions

- Additional training for team members
- Involvement of the architect in Code Review at the stage of Pre-Commit
- Addition of new items to Pre-Commit Checklist
Continuous Improvements: Corrective & Preventive actions

Additional training for team members

Addition of new items to Pre-Commit Checklist

Involvement of the architect in Code Review at the stage of Pre-Commit
Continuous Improvements:
Corrective & Preventive actions

Additional training for team members

Involvement of the architect in Code Review at the stage of Pre-Commit

Addition of new items to Pre-Commit Checklist

«Violator» coaching
Exampmle of Commits Metrics
Example of Commits Metrics

- Total commits
- Our fault red builds
- Our Failed Rate

<table>
<thead>
<tr>
<th>Month</th>
<th># of commits</th>
<th>Failed rate, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>180</td>
<td>0%</td>
</tr>
<tr>
<td>Feb</td>
<td>160</td>
<td>2%</td>
</tr>
<tr>
<td>Mar</td>
<td>140</td>
<td>4%</td>
</tr>
<tr>
<td>Apr</td>
<td>120</td>
<td>6%</td>
</tr>
<tr>
<td>May</td>
<td>100</td>
<td>8%</td>
</tr>
<tr>
<td>Jun</td>
<td>180</td>
<td>10%</td>
</tr>
<tr>
<td>Jul</td>
<td>160</td>
<td>12%</td>
</tr>
<tr>
<td>Aug</td>
<td>140</td>
<td>14%</td>
</tr>
<tr>
<td>Sep</td>
<td>120</td>
<td>12%</td>
</tr>
<tr>
<td>Oct</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td>Nov</td>
<td>180</td>
<td>8%</td>
</tr>
<tr>
<td>Dec</td>
<td>160</td>
<td>6%</td>
</tr>
</tbody>
</table>

ARRIS
Example of Commits Metrics

<table>
<thead>
<tr>
<th></th>
<th>Limits, min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>&lt; 15</td>
</tr>
<tr>
<td>Yellow</td>
<td>&gt; 15 to 30</td>
</tr>
<tr>
<td>Red</td>
<td>&gt; 30</td>
</tr>
</tbody>
</table>
Automated Tool

- Team name
- Start date
- End date

Commit Audit Report (CAR)

- Number of commit
- Author
- Date
- List of builds with statuses

Jenkins

Build

Some script

Commit

SVN
Git
CVS

1-2 days
## Example of Commit Audit Report

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Author</th>
<th>Date</th>
<th>Builds</th>
<th>Job ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>176939</td>
<td>Ivan Ivanov</td>
<td>9/9/2013</td>
<td>job name xxxxxx01</td>
<td>2719</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>job name xxxxxx07</td>
<td>3323</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>job name xxxxxx358</td>
<td>2194</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>job name xxxxxx3</td>
<td>740</td>
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<td>job name xxxxxx8</td>
<td>150</td>
</tr>
<tr>
<td>181120</td>
<td>Petr Petrov</td>
<td>9/12/2013</td>
<td>job name xxxxxx155</td>
<td>76</td>
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<td>job name xxxxxx39</td>
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<td>job name xxxxxx4</td>
<td>64</td>
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<td></td>
<td>job name xxxxxx120</td>
<td>41</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>job name xxxxxx9</td>
<td>2811</td>
</tr>
</tbody>
</table>
Summary

Commits metric

- Total commits
- Our fault red builds
- Our Failed Rate

# of commits vs failed rate

Before: 5.5%
After: 3.3%
Summary

- ~3-x reduction of “blocked time” over 3 month.
- Now only single cases of “red commits”.
Summary
Summary
Summary
Thank you!
Questions?