Risk-based Testing with Jira and Jubula

Daniele Gagliardi
@dangagliar
Agenda

✔ The Theory
  ✔ What is it?
  ✔ Why should I care?

✔ The Practice
  ✔ The ingredients and the recipe

✔ The Use Case
  ✔ How can you use it (with a special guest...?)
The Theory
What to test?

How many tests for each requirement?

Mmmmmhh... we can prove that it works well with good data (how many good data?)... What about bad data?

One! Of course! We need to see if it works!

Uh oh... combination for good data are a lot! And bad data... Uncountable!
What to test?

We have 1342 new requirements. What should we test?

Everything! Of course! We need to be confident that it works!

Mmmmmhh… OK, I need $42^{10}$ good testers and $10^{42}$ years to test all.

Mmmmmhhh… I’m wondering if our budget… we need to make a choice about what to test.

Once upon a time someone told me something about risk based testing…
Traditional Testing vs RBT

Effectiveness
Guarini: chapel of the Holy Shroud

- Baroque-style Roman Catholic chapel
- Designed by architect Guarino Guarini and built in Turin at the end of 17th century, during the reign of Charles Emmanuel II, Duke of Savoy
- Constructed to house the Shroud of Turin, a religious relic believed by many to be the burial shroud of Jesus Christ
- 1997: a fire, due to a short circuit, seriously damages the chapel
- Restoration in progress, supported by a software project
The chapel and the software

- Applications to manage all the phases of the restoration project
- Every single piece subject to restoration is geo-referenced within a 3D model
- Database with all the relevant information and documents collected during the investigation phase (world-wide relevance)
- Web site to publish news on the restoration progress, and to offer search functions on the single elements subject to restoration
- Cam video system management
- Technologies: open source!
The chapel, the software and the risks

(A non exhaustive list...)

- World-wide relevance of the data → Usability, Accessibility and performance tests
  
  And also backup/recovery test !!!

- High level of innovation and required technologies not so well known to the project team (project risk)

- Heterogeneous technologies and components → integration tests

- Search functions on web site → functional tests

  (Mitigate risks with proper testing...)

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Five Phases in a Tester's Mental Life

- **Phase 0**: There's no difference between testing and debugging. Other than in support of debugging, testing has no purpose.

- **Phase 1**: The purpose of testing is to show that the software works.

- **Phase 2**: The purpose of testing is to show that the software doesn't work.

- **Phase 3**: The purpose of testing is not to prove anything, but to reduce the perceived risk of not working to an acceptable value.

- **Phase 4**: Testing is not an act. It is a mental discipline that results in low-risk software without much testing effort.
Phase 4 and new ISO 9001:2015

- **ISO 9001:2015** – systematic approach to risk
- **Risk based thinking**
- **Become proactive rather than purely reactive**

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**Risk Based Emphasis**

ISO 9001 has always advocated mitigating and avoiding risk; it has implicitly addressed the issue. The new ISO 9001:2015 standard explicitly expects organizations to identify and address risks affecting product and service compliance, resulting in improved customer satisfaction.

OK, where are the really interesting things here? ISO stuff is boring me...
What is Risk?

- Risk: the **possibility** of a negative or undesirable event or outcome
- Quality risk: the possibility that the product or system might fail to deliver one or more of the key quality attributes
- Project Risks
- Software Risks (Risky features)

**Risk Management**

Managing risks is something we all do every day, mostly without even thinking about it. When the complexity increases beyond our everyday experiences, such as risks faced by a business or a big project, a more formal approach is needed. However, it really isn’t difficult.

A generic risk management process has been set out in ISO standard 31000 and can be applied to any kind of risk by any kind of organisation. PMBOK and PMI both describe a similar process for managing project risk.

Different kinds of risks need different assessments in terms of the questions to ask or the exact technique you use, but the overall risk management process is the same. Essentially, the steps are as follows:

- **Establish the context** – what activities are we talking about? What are you trying to do?
  - e.g., using a piece of machinery, making/building something, collecting measurements, importing or exporting goods, staff, data analysis and reporting.
- **Identify risks** – what **might** affect the outcome?
  - e.g., a weather event, change to regulations, injury, staffing shortages, lack of suppliers, chemical exposure, theft, fraud, computer failure, human error.
- **Analyze the risks** – to prioritise them.
What is Risk?

- Probability: trivial
- Note:
  - 0% event: not a risk!
  - 100%: not a risk! Rather issue!
- Impact: an evaluation of the hypothetical damage (on costs, times, ...)
- Exposure: $f(P,I)$
  - $E = f(P) \cdot f(I)$

Risk Management

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- Identify risks – what might affect the outcome?
  - e.g., a weather event, change to regulations, injury, staffing shortages, lack of supplier, chemical exposure, theft, fraud, computer failure, human...
Risk-based Testing

1. Make a prioritized list of risks
2. Perform testing that explores each risk
3. As risks evaporate and new ones emerge, adjust your test effort to stay focused on the current crop

*(James Bach, Heuristic Risk-Based Testing)*
Risk-based Testing

1. Rigorous risk analysis, applying statistical models or...

2. Heuristic Risk Analysis:
   
   1. Inside-Out: study (you tester with a developer) your product and ask yourself repeatedly: « What can go wrong here? »

   2. Outside-In: start with a potential set of risks and match them to the current product – Need for a risk catalogue/lists

Prioritize? How can I do it?
1. Three possible kind of risks:
   1. Quality risks (performance, usability, …)
   2. Generic risk list (complex, new, critical, third party, strategic, …)
   3. Risk catalogue (risk lists, related to specific domains)

2. Use them
   1. Choose a component/function
   2. Determine scale of concern
   3. Match risks
Traditional Testing vs RBT

Traditional Testing
- Smaug attack
- T-Rex attack
- Shark attack
- Rhino attack
- Wolf attack

Risk Based Testing
- Realistic Wolf attack
Catalogue and prioritize

Smaug attack: 0.00002%

T-Rex attack: 0.00001%

Shark attack: 0.002%

Wolf attack: 87%

Rhino attack: 0.1%
Refine your risk analysis

Wolf attack

1%

Realistic Wolf attack

87%
Risk-based Testing – Considerations

- Your risk analysis incomplete and inaccurate to some degree;
- At the beginning of a project rumors of risks;
- As the project progresses, and you gain information about the product, you should adjust your test effort to match your best estimation of risk;
- To deal with the risk of poor risk analysis, use other weapons: exploratory testing (remember the talk of Alex last year?), static testing, code coverage testing, or functional coverage testing (principle of diverse half-measures: use a diversity of methods, because no single heuristic always works);
- Two vital factors needed to make risk-based testing work: experience and teamwork;
  - Over a period of time, any product line or technology will reveal its pattern of characteristic problems: learn from that;
  - Do whatever you can to invite different people with different points of view into the risk analysis process.
The Practice
The Ingredients and the Recipe

- Use **Jira** to catalogue and prioritize risks
- Use **Jubula** to mitigate them
- Use **Myllyn** to mix everything (Risk Based Interface)
Would you really pay $36000 for a bug tracking system?

- Very flexible tool to manage almost everything
- Define objects, attributes, lifecycle, actions, validators, conditions,...
- If you're missing something, develop it with Atlassian SDK! (but it isn't necessary to manage risks...)

Jira to manage risks
Jira to manage risks - types

ESL Agile Scrum Issue Type Scheme

Keep track of different types of issues, such as bugs or tasks. Each issue type can have different workflows. The issue type scheme defines which issue types apply to this project. To change it, go to the issue type management page.

<table>
<thead>
<tr>
<th>Issue Type</th>
<th>Description</th>
<th>Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bug</td>
<td>A problem which impairs or prevents the functions of the product.</td>
<td>Agile Simplified Workflow for Project PPSAGILE</td>
</tr>
<tr>
<td>Epic</td>
<td>Created by JIRA Agile - do not edit or delete. Issue type for a big user story that needs to be broken down.</td>
<td>Agile Simplified Workflow for Project PPSAGILE</td>
</tr>
<tr>
<td>Issue</td>
<td>Un problema, una questione, un punto aperto, una situazione critica, ecc.</td>
<td>ESL Issue Workflow</td>
</tr>
<tr>
<td>Opportunity</td>
<td>A project opportunity</td>
<td>ESL Opportunity Workflow</td>
</tr>
<tr>
<td>Risk</td>
<td>A project risk</td>
<td>ESL Risk Workflow</td>
</tr>
<tr>
<td>Story</td>
<td>Created by JIRA Agile - do not edit or delete. Issue type for a user story.</td>
<td>Agile Simplified Workflow for Project PPSAGILE</td>
</tr>
<tr>
<td>Task</td>
<td>A task that needs to be done.</td>
<td>ESL Task Workflow</td>
</tr>
<tr>
<td>Test Case</td>
<td>Work item di descrizione del test</td>
<td>ESL Test Case Workflow</td>
</tr>
<tr>
<td>Sub-task (Sub-Task)</td>
<td>The sub-task of the issue</td>
<td>ESL Task Workflow</td>
</tr>
<tr>
<td>Technical task (Sub-Task)</td>
<td>Created by JIRA Agile - do not edit or delete. Issue type for a technical task.</td>
<td>Agile Simplified Workflow for Project PPSAGILE</td>
</tr>
</tbody>
</table>
Jira to manage risks - workflow

ESL Risk Workflow

New

In Assessment

Surveillance

Closed

Managing

Happened

Raise Issue!

Other Jira types...
Jira to manage risks – screens...

### ESL Opportunity Default Screen Scheme
- **Opportunity**

### ESL Risk Default Screen Scheme
- **Risk**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Issue</td>
<td>ESL Risk Create Screen</td>
</tr>
<tr>
<td>Edit Issue</td>
<td>ESL Risk Edit Screen</td>
</tr>
<tr>
<td>View Issue</td>
<td>ESL Risk View Screen</td>
</tr>
</tbody>
</table>

### Issue Default Screen Scheme
- **Issue**
Jira to manage risks – ...custom fields (1)

The checkout process fails to calculate VAT

<table>
<thead>
<tr>
<th>Details</th>
<th>Source: Gestione corrente</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority: Normal</td>
<td></td>
</tr>
<tr>
<td>Cause: New European regulation since 1st, January 2015</td>
<td></td>
</tr>
<tr>
<td>Effect: Wrong price calculation, and need to refund or sell to a lower price</td>
<td></td>
</tr>
<tr>
<td>Probability: 60</td>
<td></td>
</tr>
<tr>
<td>Impatto costi: Molto Alto</td>
<td></td>
</tr>
<tr>
<td>Impatto tempi: Molto Basso</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Probability</th>
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</thead>
<tbody>
<tr>
<td>Very High (5)</td>
</tr>
<tr>
<td>High (4)</td>
</tr>
<tr>
<td>Medium (3)</td>
</tr>
<tr>
<td>Low (2)</td>
</tr>
<tr>
<td>Very Low (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impatto costi: Molto Alto</td>
</tr>
<tr>
<td>Impatto tempi: Molto Basso</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Time impact</th>
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<tbody>
<tr>
<td>Impatto tempi: Molto Basso</td>
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</tbody>
</table>

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**Jira to manage risks – ...custom fields (2)**

### The checkout process fails to calculate VAT

<table>
<thead>
<tr>
<th>Type</th>
<th>Status</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>Status:</td>
<td>Unresolved</td>
</tr>
<tr>
<td>Priority: Normal</td>
<td>(View Workflow)</td>
<td></td>
</tr>
<tr>
<td>Labels: None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Strategy and Actions

- Mitigate
- Transfer
- Accept
- Composite

#### Contingency Plan

- Alert the administrative office to manage billing exceptions

#### Actions To mitigate risk

- Mitigare
The checkout process fails to calculate VAT

Details
- Type: Risk
- Priority: Normal
- Labels: None

Phases
- Project phase
- (15 Engineering Group Project phases)

Activity

Congratulations! You've just finished to build your Risk Management Tool! Risk catalogue, prioritization, and whatever you need to manage them (incidentally you've just ended to be compliant with RSKM Process Area for CMMI)
Jubula to test – a recipe for RBT

- Configure PostgreSQL
  - Centralized DB to feed a DWH, for instance...
- Configure Mylyn to build your Risk Focused Interface in your Integrated Test Environment
- Define and execute your Test cases (of course…) - bind them to each risk!
- Analyse results with reports and dashboards
Jubula – Configure PostgreSQL

1. Create a user and a database

```
daniele@agliardi -> $ psql postgres
psql (9.4.5)
Digit "help" per avere un aiuto.

postgres=# create user jubula password 'jubula';
```

```
daniele@agliardi -> $ psql postgres
psql (9.4.5)
Digit "help" per avere un aiuto.

postgres=# create database jubula with owner jubula;
```
Jubula – Configure database

2. Configure Jubule to use it

Don’t worry, they say « Unsupported » but it works very well! ;-

3. Select the type of database that this configuration is for.

The ITE is thoroughly tested with Oracle. PostGreSQL and MySQL have been successfully tried out, but we cannot guarantee their usage in productive environments.

From the online help of Jubula
3. Use it (select, insert credential, Connect, create your projects and versions)
Jubula – Configure risks repository

Mylyn
From the Task Focused Interface
To the Risk Focused Interface
Jubula – Configure risks query

Pay attention !!!
We have risks here!
Congratulations!
You’ve just finished to setup your Risk Mitigation Tool!
Jira connector: bad news...

https://developer.atlassian.com/blog/2015/06/discontinuing-ide-connectors-support/

We are discontinuing the support for Atlassian IDE Connectors

June 1st 2015  Bartek Gatz in IDE Connectors

Four years ago Jens Schumacher, the Group Product Manager of Development Tools at Atlassian, wrote a blog post where he explained our motivation behind starting the open source Atlassian IDE Connectors project. We had a goal of delivering a faster and more convenient way to interact with Atlassian applications.

Since we started that effort, a lot has changed. The web and our products have evolved, and as a consequence, IDE Connectors are duplicating functionality that is already available today in Atlassian products.

Over the last several years, we have performed a full redesign of all Atlassian products' UI to match the
Jira connector: bad news...

What exactly is changing?

Atlassian will not release any new versions of IDE connectors, the current release is the last. We have also discontinued the customer support and Atlassian Answers effort related to IDE Connectors.

Specifically:

- **IDE Connector for Eclipse**, the last version released from Atlassian on 27 April 2015 is 3.2.5. Its support project on SAC and the development backlog project on EAN are now closed.
- **IDE Connector for IntelliJ**, the last version released from Atlassian on 20 April 2015 is 3.0.16. Its support project on SAC and the development backlog project on EAN are now closed.
- **IDE Connector for Visual Studio**, the last version released from Atlassian on 10 April 2015 is 1.3.12. Its support project on SAC and the development backlog project on EAN are now closed.
- We have updated product listings on [www.atlassian.com](http://www.atlassian.com) and [marketplace.atlassian.com](http://marketplace.atlassian.com).

These changes are effective immediately.
Jira connector: a new hope?

https://bitbucket.org/roland_ewald/connector-eclipse/
The Risk Based Testing architecture

Risk Mitigation Tool

Jubula ITE
- requirements/user stories
- risks
- bugs

Jubula Database
- test projects
- test cases
- test data
- Jira Database

Jubula Dashboard

Centralized database

Risk Catalogue

Requirements

Take Control

Bugs
The Use Case
Spagoshop – The Use Case

- [https://spagoshop.spagoworld.org/spagoshop](https://spagoshop.spagoworld.org/spagoshop)
- E-commerce site to sell professional services on SpagoWorld open source products (SpagoBI, Spago4Q, Spagic, Spago framework)
Spagoshop – Internals

- JEE, Tomcat 6/7, JDK 7
- Set-up with Spring Roo (best practices – i.e. web page elements have unique identifiers)
- MySQL rDBMS
- Built with Eclipse (of course)
- It doesn't manage credit cards, it leverages an italian bank payment gateway

An example of Risk Transfer!
As a customer
I want to register myself as a private user

As a customer
I want to buy Using my credit card

As a customer
I want to buy Using my PayPal Account

As an end-user
I want to Access to the Shop Using a userid And a password chosen by me

As a customer
I want to register myself as a company/professional user In order to Deduct VAT

As a SpagoBI Consultant
I want to sell My professional Services on the web

As a customer
I want to buy

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Spagoshop – Where are the risks here?

As a customer
I want to
register myself as a private user

As a SpagoBI Consultant
I want to sell My professional Services on the web

As a customer
I want to buy Using my credit card

As a customer
I want to register myself as a company/professional user In order to Deduct VAT

VAT calculation rules
(since 1st January 2015 you Have to apply the customer’s EU country VAT)

Engineering Group needs Customer info for billing purposes: NIN or VAT (different patterns from country to country)

As a customer
I want to access the Shop Using a userid And a password chosen by me
Let's start!

Connect To your test cases

For the sake brevity: we assume we've Developed test cases yet
Choose project and project version

Project

The version (bound to SVN TAG)

Good practice: bind your test cases to your project versions (TestLink lesson)
Synch with Risk Repository

Your risks
In your ITE
Activate task (focus on one risk at a time)
Define datasets (VAT & NIN Risk!!!)

Populate dataset

Define dataset
Traceability

**What is it?** Why should I care?

Traceability is a keyword to take things under control: from the requirements to the risk to the test cases to mitigate them.
Traceability - example

A Jira search result view

A plugin we developed at Engineering Group using Atlassian SDK
Select test case to execute
Execute
Write comments/results

Results written
As comments
In Jira
Jubula execute them
Iterating through your dataset
Analyse results
A special guest (to gain control)

Do you remember the beginning?
Slide number 12

What is Risk?
- Probability: trivial
- Note:
  0 % event: not a risk!
  100 %: not a risk! Rather issue!
- Impact: an evaluation of the hypothetical damage (on costs, times, ...)
- Exposure: $f(y)$
- $E = f(y) f(I)$

RISCHI

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<th>ESP. TEMPI</th>
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<tr>
<td>The checkout process fails to calculate VAT</td>
<td>Nuovo</td>
<td>300</td>
<td>60</td>
</tr>
<tr>
<td>The registration of a professional/company user may fail while checking the VAT against the EU web service</td>
<td>Nuovo</td>
<td>280</td>
<td>70</td>
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<td>Nuovo</td>
<td>120</td>
<td>40</td>
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<tr>
<td>The registration of a private user may fail while checking the NIN</td>
<td>Nuovo</td>
<td>200</td>
<td>80</td>
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</table>

PROBABILITA'

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</tr>
</tbody>
</table>

https://production.eng.it/jira/browse/PPSAGILE-7
- Risk dashboard
- Top ten & red zone
- Test report from Jubula (thanks to centralized db)

One Dashboard to rule them all, One Dashboard to find them, One Dashboard to bring them all and in the risk based testing bind them (trans. from the ancient Elvish)
Another example – A Unified Dashboard

- **Risks**
- **Tasks & Issues**
- **Reqs & Bugs**
- **Docs**
- **Metrics**

Stato corrente e trend

- **5 Rischi**
  - 20% Esposizione bassa
  - 40% Esposizione media
  - 40% Esposizione alta

- **44 Requisiti**
  - 22.73% chiusi
  - 13.64% coperti da test

- **29 Documenti**
  - 21.71 MB totali
  - 0 caricati nel mese corrente
  - 44.83% di tipo doc

- **23 Anomalie**
  - 56.52% risolte
  - 47.83% risolte in tempo
  - 2.74% risolte fuori SLA
  - 0.00% severità bloccante

- **10 Criticità**
  - 40.00% risolte
  - 20.00% risolte in tempo
  - 30.00% risolte fuori
  - 6.00% severità bloccante

- **1 Opportunità**
  - 100% Esposizione bassa
  - 0% Esposizione media
  - 0% Esposizione alta

- **20 Attività**
  - 50.00% chiuse
  - 45.00% chiuse in ritardo

- **4 Stime prodotte**
  - 20 FP stimati
  - 11 scarto quadratico medio FP
  - 45 GGU stimati
  - 58.33 scarto quadratico medio GGU

- **2 Consuntivi prodotti**
  - 20 FP consuntivi
  - 2.5 scostamento dalla media FP
  - 47 GGU consuntivi
  - 6 scostamento dalla media GGU
Spago4Q Internals
Full architecture

Risk Mitigation Tool

Jubula Dashboard

Take Control

Centralized database

Gain (more) Control

Jubula Database
- test projects
- test cases
- test data
- Jira Database
- Spago4Q Database & DWH
  - meta-model
  - DWH
  - ETL 'talend'

- project dashboards
- risks dashboards
- test reports
- project progress

Requirements

Risk Catalogue

Bugs

Jubula ITE

- requirements/user stories
- risks
- bugs

JIRA Software

Take Control

Gain (more) Control
Last thoughts

- On the theoretical side: Risk based analysis can boost the effectiveness of your test effort (concentrate on what really matters) Your test cases are your treasure...

- On the practical side: Effective risk based testing without coding

  Take care of your test cases

  They live within your application... and your risks

- Jira the only solution for the risk catalogue? Maybe Bugzilla and oth. work equally well (this presentation showed you how to configure your favourite issue tracker) and Mylyn connector is supported yet...

- Jubula can greatly lower the burden of testing (remember VAT/NiN issues and Jubula datasets?)

  OSS helped you to build quality. Once again.
References

- Eclipse Jubula Project (http://www.eclipse.org/jubula)
- Atlassian Jira (https://www.atlassian.com/software/jira)
- Spago4Q (http://www.spago4q.org)
That's all folk!

Evaluate the sessions at www.eclipsecon.org

+1  0  -1

Merci de votre attention!

Vielen Dank für Ihre Aufmerksamkeit!

Thanks for Your attention!

Dankon pro via atento!

Grazie per la vostra attenzione!

Any question?