On Usability in Requirements Trace Visualizations

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9/8/2008
Traceability

Definition (Traceability)
Ability to follow the life (of a requirement) backwards to its sources and forwards to its products.
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Example

**SysReq5**
If the system memory is short, the system shall inform the user.

**SoftReq15**
The system observer module shall implement a function to check that available RAM is >50MB.

Revision: 1.13
Modified: 2008-3-25
Modified by: homer
Version history: ...

Revision: 1.25
Modified: 2008-5-29
Modified by: marge
Version history: …
Traceability

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Visualization

Charts and Tables

<table>
<thead>
<tr>
<th>Module</th>
<th>#Req</th>
<th>LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>56</td>
<td>15823</td>
</tr>
<tr>
<td>Module 1.1</td>
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<td>10536</td>
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<tr>
<td>Module 1.2</td>
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<td>5287</td>
</tr>
<tr>
<td>Module 2</td>
<td>24</td>
<td>3578</td>
</tr>
</tbody>
</table>

Properties

- management summary
- special purpose
- static
- high-level view
Visualization

Traceability Matrix

<table>
<thead>
<tr>
<th>Class1</th>
<th>Req1</th>
<th>Req2</th>
<th>Req3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Class2</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Class3</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Class4</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Properties

- shows links between two sets of artifacts
- static overview, no content
- can become quite large
**Visualization**

### Cross-References

<table>
<thead>
<tr>
<th>id</th>
<th>content</th>
<th>traceability links</th>
</tr>
</thead>
</table>
| Req 1 | The system shall...                          | ▶ Req2  
      |                                               | ▶ Req3  
      |                                               | ▶ Class1 |
| Req 2 | The system shall...                          | ▶ Req3  
      |                                               | ▶ Req1  
      |                                               | ▶ Req3  |
| Req 3 | The system shall...                          | ▶ Req2  
      |                                               | ▶ Req1  
      |                                               | ▶ Req2  |

### Properties

- shows links from/to one artifact
- along with content
- does not show peer content
Visualization

Traceability Network/Graph

SysReq1
The system shall...

SoftReq5
The system shall...

SysReq8
The system shall...

Class 1

Properties

- flexible – can show both content and links
- good for navigating and browsing
- problematic: complexity and layout
Usability

User roles
- reviewer
- maintainer
- ...

Tasks
- find inconsistencies
- understand system
- ...

Data access: driven by user role and task
- report
- search
- browse

Problem: visualizations try to be universal
- They are not targeted at users and tasks.
- They do not provide guidance.
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**Conclusion**

**Statement:**
More usable visualizations → More benefit of traceability.

**In the paper you’ll find:**
Conclusion

Statement:
More usable visualizations $\Rightarrow$ More benefit of traceability.

In the paper you’ll find:

- what (tasks)
- how (access)
- who (users)
Conclusion

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preliminary relations
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what (tasks)

who (users)

how (access)

to do

[http://www.visualcomplexity.com]