TraCo is supported and promoted by the "Austrian Research Promotion Agency (FFG)" by the funding program BRIDGE. Launch of the 18-month project is October 2012.
Sparx Systems Central Europe

* Sister Company of Sparx Systems Australia (Headquarter)
* Provide Licences, Trainings and Consultants
What is linked with what?
Are all requirements considered?
Progress of the implementation?
Why is the architecture like it is?
Do we have the same idea of the solution?
What impact has a change of a requirement?

Legend
- Customer Requirements
- System Requirements
- Other Design Artefacts
- Implementation

*Requirements Traces*
What is linked with what?
Are all requirements considered?
Progress of the implementation?
Why is the architecture like it is?
Do we have the same idea of the solution?
What impact has a change of a requirement?
Agile Approaches

Legend
- Customer Requirements
- System Requirements
- Other Design Artefacts
- Implementation

Customer

Requirement1

Requirement5

Ranking

TraCo

Class1

Class2

Application
**TraCo Approach**

- List Stock Levels
- Chose Context (Quality Criteria)
- All available votes for this trace

**Relationship Matrix**
**TraCo Approach**

**Relationship Matrix**

ListStockLevel <-> Requ021

| high | Functionality relevant |
|      | Maintainability relevant |
| weak | Security relevance |

**Weighted Design Decision Matrix**

<table>
<thead>
<tr>
<th>Context</th>
<th>Requ021 x ListStockLevels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>7</td>
</tr>
<tr>
<td>Performance</td>
<td>4</td>
</tr>
<tr>
<td>Usability</td>
<td>9</td>
</tr>
<tr>
<td>Reliability</td>
<td>7</td>
</tr>
<tr>
<td>Maintainability</td>
<td>5</td>
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<td>Security</td>
<td>7</td>
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<td>Portability</td>
<td>5</td>
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<tr>
<td>Compatibility</td>
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Degree of fulfilment of the quality aspect

Rating Objects: Team Member

ListStockLevel <-> Requ021

| high | Usability relevance |
|      | Security relevance |
| weak | Performance relevance |

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### Weighted Design Decision Matrix

<table>
<thead>
<tr>
<th>Context Template</th>
<th>Effective Size (Sef):</th>
<th>28%</th>
<th>21%</th>
<th>26%</th>
<th>5%</th>
<th>15%</th>
<th>9%</th>
<th>0%</th>
<th>0%</th>
<th>0%</th>
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</thead>
<tbody>
<tr>
<td>Requ021 x ListStockLevels</td>
<td>4,57</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>1</td>
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<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Requ010 x ListStockLevels</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>Requ19 x ManageTitles</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Requ20 x ManageTitles</td>
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<td>2</td>
<td>5</td>
<td>2</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Requ32 x ManageTitles</td>
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<tr>
<td>Requ20 x ReceiveOrders</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Requ32 x ReceiveOrders</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>3</td>
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<td>4</td>
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<td>Requ22 x CreateOrders</td>
<td>1,43</td>
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<td>7</td>
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<td>Requ27 x AddNewTitles</td>
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</table>

**Aggregated relevance**

Sum: 32 / 85 = 0.38

### Design Decision Traceability Grid

<table>
<thead>
<tr>
<th>DDTC-Grid</th>
<th>Priorization</th>
<th>Add New Title</th>
<th>Create Orders</th>
<th>Edit Titles</th>
<th>List Stock Levels</th>
<th>Manage Publishers</th>
<th>Manage Titles</th>
<th>Receive Orders</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Requirements</td>
<td>Stakeholder Value</td>
<td>11%</td>
<td>10%</td>
<td>0%</td>
<td>41%</td>
<td>0%</td>
<td>32%</td>
<td>22%</td>
<td>0%</td>
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<td>6</td>
<td>18</td>
<td>4</td>
<td>0</td>
<td>5</td>
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<tr>
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<td>2</td>
<td>14</td>
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<td>10</td>
<td>2</td>
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<td>19</td>
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</tbody>
</table>

Sum: 32 / 85 = 0.38

### Simple Relationship Matrix

<table>
<thead>
<tr>
<th>Classes</th>
<th>Utility Scoring</th>
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</thead>
<tbody>
<tr>
<td>&gt; 0.75</td>
<td>highest</td>
</tr>
<tr>
<td>[0.51, 0.75]</td>
<td>high</td>
</tr>
<tr>
<td>[0.26, 0.50]</td>
<td>middle</td>
</tr>
<tr>
<td>[0.16, 0.25]</td>
<td>low</td>
</tr>
<tr>
<td>[0, 0.15]</td>
<td>lowest</td>
</tr>
</tbody>
</table>

### Level of Utility

- **6 * 18 + 3 * 19 = 165**
- **165 / (6+4+3+8+7+6+6) = 4,125**
- **4,125 / 10 = 0,412 == 41%**
TEMoR Process

Create New Link

*Agile Approaches

Transact

Regulate

Evaluate

Monitor

List Stock Levels

Ranking

Weighted Design Decision Matrix

Design Decision Traceability Grid

Create New Link
**Conclusion and Outlook**

What is linked with what?
Are all requirements considered?
Progress of the implementation?
Why is the architecture like it is?
Do we have the same idea of the solution?
What impact has a change of a requirement?

Future Work
Have a look in the DDTG and WDDM
Compare all WDDM / DDTG
See the change in the DDTG

*Evaluation in a praxis study*

*Use this approach on different levels*

* Customer Requirements 2 System Requirements
* **System Requirements 2 Design Artefacts**
* Design Artefacts 2 Implementation Elements
Cognitive Engineering meets Requirements Engineering
Bridging the Traceability Gap

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Context-sensitive Traceability Controlling

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ICSEA 2012 Lisbon, Portugal
The Seventh International Conference on Software Engineering Advances

CBI 2013 Vienna, Austria
15th International IEEE Conference on Business Informatics