When-to-release Decisions in Iterative Development
A Prototype Tool

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- **Definitions**
  - When-to-release Problem (W2RP)
  - Total Release Value
  - Total Release Quality

- **Approach**
  - Process Workflow
  - Prototype Implementation
  - Demonstration

- **Evaluation - Case Study**

- **Outlooks**

- **References**

- **Q & A**
RQ1: Given a *specific release date*, by varying around a duration, how can we identify an optimized release date?

RQ2: What is the trade-off between *the value* (stakeholders’ satisfaction) and *the assured quality* (reliability) of the release plan?
Modeling

- **Time:**
  - RD: *Targeted time* to be released by stakeholders (calendar dates)
  - RD ± ΔT: The duration in which the release date can be varied to find the *optimized release time*

- **Values:**
  - Measured by Customers’ *weighted satisfaction score*
  - As each feature consumes resources, values is affected by capacity of the resources assigned to that feature set.

- **Quality:**
  - Approximate expected quality of a release through the result of the effort invested in testing. This relates to number of defects found and fixed [14]
  - By varying the test effort, we can estimate the minimum and maximum release quality by aggregating the quality values of features
**Use case 1:** Fixed feature sets (fix TRV), interactively changing the release date, view predicted release quality (vary TRQ)

**Use case 2:** Interactively vary feature sets (vary TRV), view the predicted release date, at the same TRQ

**Use case 3:** Fix release date, playing what-if scenarios between testing and development efforts
## Analyze Plan Set

- Excitement
- Plans

### Optimized Plan Set for undefined (20 features)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
<th>Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highest Value</td>
<td>0% worse</td>
<td>0% worse</td>
<td>1% worse</td>
<td>1% worse</td>
</tr>
<tr>
<td>SMS Call Broadcast</td>
<td>Version 1.1</td>
<td>Version 1.1</td>
<td>Version 1.1</td>
<td>Version 1.1</td>
<td>Version 1.1</td>
</tr>
<tr>
<td>CSVS Robustness Enhancements</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
</tr>
<tr>
<td>EBSC REX Testing</td>
<td>Version 1.0</td>
<td>Version 1.0</td>
<td>Version 1.0</td>
<td>Version 1.0</td>
<td>Version 1.0</td>
</tr>
<tr>
<td>Mobile Recovery Algorithm</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
<td>Postponed</td>
</tr>
</tbody>
</table>
### Analyze Plan Set

- Excitement
- Plans

### Interactive Optimization

Comparing Alternative 1 against a baseline plan (Alternative 3)

Make changes to Alternative 1 below, and then click Evaluate to compare it against the baseline plan.

Evaluate

<table>
<thead>
<tr>
<th>Feature</th>
<th>Alternative 1 (84% optimal)</th>
<th>Alternative 3 (79% optimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 sector, 12 carrier BTS Releases differ</td>
<td>Version 1.1</td>
<td>Postponed</td>
</tr>
<tr>
<td>3 of N Band Class Support Releases differ</td>
<td>Version 2</td>
<td>Postponed</td>
</tr>
<tr>
<td>Access Optimized IMSI Paging Releases differ</td>
<td>Version 1.0</td>
<td>Version 2</td>
</tr>
<tr>
<td>CIU and SRM Management Enhancements</td>
<td>Version 2</td>
<td>Version 2</td>
</tr>
</tbody>
</table>
### Analyze Plan Set

- Excitement
- Plans

**Excitement profile for Alternative 1** and the opinions of each stakeholder about Total

<table>
<thead>
<tr>
<th>Excitement Score</th>
<th>Total</th>
<th>Lonnie Cremer</th>
<th>Kornelia Streb</th>
<th>Marylou Viruet</th>
<th>guenther ruhe</th>
<th>Jeanie Linke</th>
<th>Sofia Mazzotta</th>
<th>Christian Gerling</th>
<th>Mark Przepiora</th>
<th>Tia Dauber</th>
<th>Sofia Bencomo</th>
<th>maleknaiz</th>
<th>PORKODI THIAGARAJAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Excited</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Excited</td>
<td>3%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Neutral</td>
<td>49%</td>
<td>14</td>
<td>17</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>18</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Disappointed</td>
<td>19%</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Very Disappointed</td>
<td>16%</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Surprised</td>
<td>7%</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Very Surprised</td>
<td>4%</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Tool Demonstration (4/4)
We evaluate the approach using a Case study from a real life technical product project

Objectives:
- Evaluate Optimization approach
- Collect data on potential Trade-off solutions

Case set up:

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Bronco Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Honeywell's Bronco Project</td>
</tr>
<tr>
<td>Maximum Number of Planning Items (Features)</td>
<td>66</td>
</tr>
<tr>
<td>Original Release Date RD₀</td>
<td>80</td>
</tr>
<tr>
<td>Features in next release F₀</td>
<td>22</td>
</tr>
<tr>
<td>Number of Resources</td>
<td>7</td>
</tr>
<tr>
<td>Maximum Number of Stakeholders</td>
<td>40</td>
</tr>
</tbody>
</table>
Potential trade-off solutions

- Maximize Total Release Values TRV($F_i$)
- Maximize Total Release Quality TRQ($F_i$)
- Minimize Time to release RD$_i$
“Not all defects are created equal”
- Integration with issues tracking tools (JIRA, Teamtrack, Fogbugz)

How about Technical Debt and Cross-cutting design concerns?
- Design F_0 with these concerns as Features with high business value, yet high efforts estimate

Continuous Release?
- This design is especially effective for release cycle 2-4 weeks
- Continuous sync to issues tracking and version control
Software Decision Support Labs (SEDS) - created in July 2001 at the University of Calgary
  — Research team of 10 researchers
  — Research topics: Decision support (systems)

University start-up company: Expert Decisions Inc. (http://expertdecisions.com/)

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