Story … and the measure of effort

As a wife I want the husband to lay down the newspaper so that he can talk to me

1,000 Story Points
Chapter 17: **Buffering Plans for Uncertainty**

“To be uncertain is to be uncomfortable, but to be certain is to be ridiculous.”

– Chinese Proverb

Agile does not work in some environments when:

- Project is planned far in advance
- Project must meet a firm deadline & include a reasonably firm set of functionality
- Project is contracted from one organization to another
- Requirements are understood only at a very superficial level
- Organization is uncomfortable allowing too much flexibility in schedules, even on projects that don’t need firm deadlines & deliverables

and

Projects that have greater uncertainty *or* greater consequences for being wrong!
Feature Buffers

Creating feature buffers:
• Customer selects the necessary work (functionality)
• Estimates for the work are summed
• Sum represents the minimum that can be released
• Customer selects 25% to 40% more work
• Add estimates for this work to the total
• Project plan includes the entire set of work
• Some of the work is optional… included only if time permits

Example: Product owner identifies mandatory work: 100 story points
Product owner adds 30% more optional work: 30 story points: total is 130 points
Estimated velocity: 10 points per 1-week iteration; 13 iterations
Mandatory work would be done in the first 10 iterations
If the work takes longer… some or all of the optional features are not completed
DSDM (Dynamic Systems Development Method)

Requirements (i.e. features) sorted into 4 categories

1. Must have
2. Should have
3. Could have
4. Won’t have

**Rule:** No more than 70% are Must Have features. Allows for a buffer of 30%

http://dsdmofagilemethodology.wikidot.com/
Schedule Buffers

*Trip to the airport* analogy… the steps involved

- Drive to airport
- Park car (garage and walk to check-in line)
- Check-in (luggage, boarding pass)
- Going through security check-point

What is the plan to account for possible delays and ensure that you do not miss the flight?

- Something could go wrong in each of the steps
- Concern is that the time “getting there” could too long
- Add buffer to overall schedule of steps (not to each step)

Same approach applies in adding a buffer to projects
Estimates and Uncertainty

• Single point estimate of the “time to implement a feature” is unrealistic.

• Work will be completed within a “range” of times

• Graphing the possible completion times – within a range
  – Limited in what can be done to accelerate work
  – Unlimited in what can go wrong to delay completion of work

Figures 17.1 and 17.2 (next slide)
Probability of completion at or before the time indicated by 2 is 0.50

Probability of completion at or before 3 is 0.95

Probability of completion at any specific time is 0.00
“Mind” Experiment

Given 100 skilled and experienced developers
Each works independently to implement the same feature
How long would each developer take to finish the implementation?

Table 17.1 Number of Developers
Finishing the Implementation on a Given Day

<table>
<thead>
<tr>
<th>Day</th>
<th>Number Finished That Day</th>
<th>Total Finished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Day2</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Day3</td>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>Day4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>Day5</td>
<td>10</td>
<td>95</td>
</tr>
<tr>
<td>Day6</td>
<td>5</td>
<td>100</td>
</tr>
</tbody>
</table>
Again, your estimate should be a Range
Planning the trip to the airport

FIGURE 17.3 The 50% and 90% estimates for making a flight at the airport

Find Keys  
1 5

Drive  
45 30

Park  
10 5

Check-in  
7 30

Security  
7 30

50% estimate  Total time = (70 ÷ 60 = 1:10)
Buffered to 90% Total time = (170 ÷ 60 = 2:50)

(adding the planned 50% estimate and the 90% - **local safety** - as the buffer)
Moving the “local safety” into an overall project buffer

- Avoids the impact of Parkinson’s Law (“student syndrome”)

FIGURE 17.4 A buffered trip to the airport

Find Keys 1
Drive 45
Park 10
Check-in 7
Security 7
Project Buffer

Total Time = 1:58

Duration estimates for the 5 stories with a Project Buffer estimate of 53
Sizing the Buffer

- Buffer size reflects the degree of risk
- The greater the “distance” between the 50% and 90% estimates, the greater the risk
- The difference between the each 50% and 90% estimate is approximately 2 standard deviations

\[ w_i \] the worst case (90% estimate)
\[ a_i \] the average case (50% estimate)

Standard Deviation for each item is \( (w_i - a_i) / 2 \)

Formula for 2 standard deviations

\[
2\sigma = 2 \times \sqrt{\left(\frac{w_1 - a_1}{2}\right)^2 + \left(\frac{w_2 - a_2}{2}\right)^2 + \ldots + \left(\frac{w_n - a_n}{2}\right)^2}
\]

\[
2\sigma = \sqrt{(w_1 - a_1)^2 + (w_2 - a_2)^2 + \ldots + (w_n - a_n)^2}
\]

Table 17.2 Uses this formula to calculate the Variance

(note: the equivalent of 2 Standard Deviations is the square root of the Variance)
## Table 17.2 Calculating the 6-Story Project Buffer

<table>
<thead>
<tr>
<th>User Story</th>
<th>(1)</th>
<th>(2)</th>
<th>[ (2) - (1) ]^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>As any site visitor, I would like to see the personal records of any swimmer</td>
<td>5</td>
<td>13</td>
<td>64</td>
</tr>
<tr>
<td>As any site visitor, I need to be authenticated before given access to sensitive parts of the site</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>As a swimmer, I want to see when practices are scheduled</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>As a swimmer or parent, I want to know where league pools are located</td>
<td>5</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>As any site visitor, I want to see the national records by age group and event</td>
<td>2</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>As any site visitor, I would like to see the results of any meet</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total**

|       | 17 | 35 | 90 |

Project Buffer = Standard Deviation

\[
\sqrt{90} = 9.5 \quad \text{(rounded)}
\]

Assume iteration velocity = 9 pts

- Sum of 50% estimates = 17 pts
- 2 iterations
- Add Buffer = 17 + 9.5 = 26.5 pts
- 3 iterations
Suggested “Quick and Dirty” approach

- Do the 50% estimate for each story
- Set the Buffer at half the sum of the 50% estimates
- Clearly… the understood uncertainty associated with specific stories is not factored into the estimates

Buffer Guidelines

- Using the standard deviation approach with 10 or more stories (or features)
- Fewer than 10, probably do not use a buffer
- Project Buffer should represent at least 20% pf the project duration
Combining feature and schedule buffers protects against uncertainty.

(a) Commit to set of features but allow for a time buffer

(b) Commit to a delivery data but allow for feature buffer

(c) Commit to both a delivery date and a set of features
Other types of buffers…

For medium and large projects…

Budget Buffer to account for personnel needs

1. Adding persons to a small project (team of 4 to 5) would increase productivity… but to a large project (team of 30 to 33) not so much.

2. Allowing for a 10% personnel buffer… a 30-person project with a 3 person buffer

Easier to add persons

With a 10% personnel buffer for a 3-person project has a 0.3 of a person buffer
Some caveats…

When adding a schedule buffer

Use the 50% and 90% approach or a single point estimate representing the 50% probability

Adding a schedule buffer to a 90% estimate results in a longer schedule… sort of like double counting for the uncertainty

For projects with no precise deadline or feature set

Priority is on delivering high quality software ASAP

No need to add buffers

Communicating about adding buffers

May appear to be “padding” … especially for schedule buffering

Communicate how the estimates and buffers were derived

Ensure that schedule provides confidence