Agile Methodologies
Pivotal Labs SG

Agile Software Engineering

Test Driven Development • Pair Programming • Continuous Integration
2011 ~ 2013

Neo Innovations

Agile Software Engineering

Test Driven Development • Pair Programming • Continuous Integration
SG Ruby Group

http://www.meetup.com/Singapore-Ruby-Group/
June 26-27, 2014
Singapore

http://www.reddotrubyconf.com
Why do Software Projects Fail?
PLANNING AND ESTIMATING IS DIFFICULT
Why Are Software Development Task Estimations Regularly Off By A Factor of 2-3

Problems with Traditional Planning & Estimation
Premature System Design
### Activity-Based Management

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements Gathering</td>
<td>09/16/13</td>
<td>10/04/13</td>
</tr>
<tr>
<td>High Level Scoping</td>
<td>09/16/13</td>
<td>09/17/13</td>
</tr>
<tr>
<td>Design</td>
<td>09/18/13</td>
<td>09/27/13</td>
</tr>
<tr>
<td>Wireframe</td>
<td>09/30/13</td>
<td>10/04/13</td>
</tr>
<tr>
<td>Build</td>
<td>10/07/13</td>
<td>11/08/13</td>
</tr>
<tr>
<td>Home Page</td>
<td>10/07/13</td>
<td>10/11/13</td>
</tr>
<tr>
<td>Contact Us</td>
<td>10/14/13</td>
<td>10/18/13</td>
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<tr>
<td>Blog</td>
<td>10/21/13</td>
<td>10/25/13</td>
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<tr>
<td>Products Page</td>
<td>10/28/13</td>
<td>11/01/13</td>
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<tr>
<td>SEO</td>
<td>11/04/13</td>
<td>11/08/13</td>
</tr>
<tr>
<td>Testing &amp; Deployment</td>
<td>11/11/13</td>
<td>11/18/13</td>
</tr>
</tbody>
</table>
Wrong Perception of Estimation

Estimation ≠ Commitment
No Customer Collaboration
This project will be completed by Christmas.

- Project Manager, based on Traditional Planning

Unrealistic Timeline
Waterfall

- Requirements
- Design
- Build
- UAT
- Fix

Time to Ship
Waterfall Product/Market Fit

- Requirements
- Design
- Build
- UAT
- Fix

System Goal

Misfit
SOFTWARE SERVES BUSINESS NEEDS
SOFTWARE IS IMPORTANT!
<table>
<thead>
<tr>
<th>Features</th>
<th>Resources</th>
<th>Duration</th>
<th>Cost</th>
</tr>
</thead>
</table>

WHAT'S A BETTER WAY TO PLAN AND ESTIMATE..
Manifesto
agilemanifesto.org
Manifesto

Individuals and Interactions
- Working Software
- Customer Collaboration
- Responding to Change

Processes and Tools
- Comprehensive Documentation
- Contract Negotiation
- Following a Plan
Benefits of Agile
HIGHER VISIBILITY.
HIGHER
ADAPTABILITY.
REDUCED RISK AND UNCERTAINTY.
GREATER BUSINESS VALUE.
[for the engineers]  
EMPOWERED.  
PURPOSE.
Comparison
Waterfall

Requirements → Design → Build → UAT → Fix

Time to Ship
Waterfall Product/Market Fit

System Goal

Misfit

Requirements  Design  Build  UAT  Fix
Agile Product/Market Fit

Scope & Design

Build + UAT

Misfit
Agile Implementations

Kanban
Scrum
Extreme Programming
e tc
Roles in an Agile Project
Customers <-> Product Owner <-> Engineers

Customers

• Use the system/service

• Provides feedback on the system/service
Product Owner

• Represents the stakeholders
• Represents customers and subject matter experts
• Manages product backlog by ranking and prioritizing user stories
• Ensures that the Team delivers value to the business
Project Manager

- Bridge between the Product Owner and Engineers
- Could be the Lead Developer too
Engineers

• Write the code
• Estimate the stories effort
• Provide expertise on simplest solution first
• Pivotal to the success or failure of a project
Customers ↔ Product Owner ↔ Engineers

Icons: http://www.iconarchive.com/show/sleek-xp-basic-icons-by-deleket
Management Practices

Engineering Practices
Management Practices

- Inception
- Iteration Planning
- Release Planning
- Retrospectives
Engineering Practices

• Daily Standups
• Pair Programming
• Test Driven Development
• Continuous Integration/Deployment
Agile Project Life Cycle
Inception → Iteration 1 → Iteration 2 → Iteration 3 ... Iteration n

↑

Retrospective
(every 2-4 iterations)

↓

Release Planning Meeting
(every 12-24 iterations)
Iteration

An Iteration

- Iteration Planning Meeting
- Build
- Release
An Iteration → Iteration Planning Meeting → Build → Release

- Stories Generation
- Stories Clarification
- Stories Estimation
- Stories Prioritization
An Iteration

- Iteration Planning Meeting
  - Build
    - Release

- Daily Standups
- Pair Programming
- Test Driven Development
An Iteration → Iteration Planning Meeting → Build → Release

Continuous Integration
Continuous Deployment
Iteration Planning Meeting

An Iteration

- Stories Generation
- Stories Clarification
- Stories Estimation
- Stories Prioritization

Build

- Daily Standups
- Pair Programming
- Test Driven Development

Release

- Continuous Integration
- Continuous Deployment
What is..
Inception

[Management Practice]

- Alignment and Expectation Setting
- Days to Week depending on size of project
- Agenda:
  - Goals (Business, Product, Non-Goals)
  - Risks
  - High Level Stories Estimation and Prioritization
  - Release Planning
Release Planning Meetings
[Management Practice]

.. is used to create a release plan, which lays out the overall project. The release plan is then used to create iteration plans for each individual iteration.

Release Planning Meetings

Each release is 3 - 6 months

Business to make decision on MVP, and its features

Release is planned by Time or Scope

Project can be quantified by:

- Scope, Time, Resources and Quality
Release Planning Meetings
[Management Practice]

Today

1 Iteration

Estimation by Engineers

Prioritization by Product Owner

MVP
Release Planning Meetings

[Management Practice]

Today

1 Iteration

Estimation by Engineers

Prioritization by Product Owner

MVP
Iteration Planning Meetings

[Management Practice]

.. is called at the beginning of each iteration. User stories are chosen for this iteration by the customer in order of the most valuable to the customer first.

Iteration Planning Meetings

Each iteration is short, 1 - 3 weeks

Features are prioritized, based on:

- Business value (usually in financial sense)
- Effort required
- Amount and significance of new knowledge gained from feature
- Risk added / removed
.. play a very important role in iterative and incremental development. At the end of every iteration a retrospective is held to look for ways to improve the process for the next one.

Retrospective
[Management Practice]

- Reflect and Adapt methods and to help whole team learning
- Benefits of Retrospectives:
  - Productivity
  - Capability
  - Quality
  - Capacity
Daily Standups
Daily Standups

Engineering Practice

- General project updates
- Which story did you work on yesterday?
- Which story are you going to work on today?
- Blockages?
Pair Programming
Pair Programming
[Engineering Practice]

• Benefits of Pair Programming:
  • Focus
  • Knowledge Exchange
  • Collective Code Ownership
  • High Code Quality
  • Engineering Happiness!

http://winstonyw.com/2012/12/02/pair_programming/
Test Driven Development

[Engineering Practice]

“..when you create your tests first, before the code, you will find it much easier and faster to create your code.”

Test Driven Development

[Engineering Practice]

- Red, Green, Refactor
- Benefits of Test Driven Development:
  - Quality
  - Accountability
  - Maintainability
  - Live Documentation
Continuous Integration/Deployment
Continuous Integration/Deployment
[Engineering Practice]

“...often avoids diverging or fragmented development efforts, where developers are not communicating with each other about what can be re-used, or what could be shared.

WHAT SETS AGILE APART FROM WATERFALL
High Level Stories
Estimation and Prioritization
What is a User Story?

"..one or more sentences in the everyday or business language of the end user or user of a system that captures what a user does or needs to do as part of his or her job function."

As a <user role>,
I want <capability>,
so that <business value>.
Acceptance Criteria:
1. <do this>
2. <do that>

... 

n. <expected result>
Example of a User Story (1)

As a Facebook User,
I want to sign up with my FaceBook account,
so that I can start using the service instantaneously.
Example of a User Story (2)

Acceptance Criteria:
1. Go to homepage
2. Click on “Login with Facebook”
3. Wait to be redirected to Facebook Login page
4. Login with your Facebook credentials
5. You will be redirected to homepage
6. You should see “Welcome John” in header
HOW TO
ESTIMATE
STORIES?
Techniques
ANALOGY.
EXPERT ADVICE.
DIVIDE AND CONQUER.
TECHNIQUES

NOT ENOUGH
\[
\frac{\text{Total Story Points}}{\text{Velocity}} = \text{Duration}
\]
Relative Sizing
Relativity
Let's Estimate

Estimate the size of these balls. Pick from S, M, L or XL.

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
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</thead>
<tbody>
<tr>
<td>Golf Ball</td>
<td>S</td>
</tr>
<tr>
<td>Basketball</td>
<td>XL</td>
</tr>
<tr>
<td>Soccer Ball</td>
<td>L</td>
</tr>
<tr>
<td>Ping Pong Ball</td>
<td>S</td>
</tr>
<tr>
<td>Tennis Ball</td>
<td>M</td>
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</table>
Size Chart and Story Points
### Size Chart

<table>
<thead>
<tr>
<th>Size</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>L</td>
<td>4</td>
</tr>
<tr>
<td>XL</td>
<td>8</td>
</tr>
<tr>
<td>XXL</td>
<td>16</td>
</tr>
</tbody>
</table>

Increasing Order of Complexity
TOTAL STORY POINTS

VELOCITY

= DURATION
Velocity
Velocity

- Story Points per Iteration (Throughput)
- Derived based on:
  - Estimation
  - Historical Data
- Depends on:
  - Team Members (skills)
  - Team Size
TOTAL STORY POINTS \over VELOCITY = DURATION
ESTIMATE WITH
PLANNING POKER
AGILE IS CONSTANT FEEDBACK
Thank You