Agile Software Development

Stefan Balbo / Patrick Dolemieux
Content

• Why go Agile?
• Introduction to Scrum
  - Process
  - Roles
• Agile Estimating and Planning
• Scaling Scrum
• Agile Practices beyond Scrum
• Benefits
• Pitfalls and Best Practices
• Resources
Why go Agile?

Development projects have progressed over time

- More complex
- More scope changes
Why go Agile?

Development process has stayed the same

- Inadequate process results in projects that:
  - Fail
  - Have poor quality
  - Are frustrating to work on
  - Take longer than expected

IT Project Survey (Standish 2009)

- 24% Success
- 32% Failing
- 44% Failure
What is Agile Software Development?

The Agile Manifesto (2001):

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan
What is Scrum?

• Framework
  - for agile software development

• Key concepts:
  - Iterative and incremental
  - Small self-organizing teams
  - Short feedback loops
  - Priority by business value
Starting a Scrum Project - Envisioning

- Articulate the project vision
- Determine and prioritize goals and objectives
- Define incremental releases
- Get vision accepted by all stakeholders
Operations Dashboard for ArcGIS Project Vision

- Operations Dashboard for ArcGIS provides a common operational picture for monitoring an event or a system across a group of people within your organization.

- Project started in February 2012
- The first release was delivered in January 2013.
Operations Dashboard for ArcGIS – The Context

Native Applications

- Android SDK
  - Android API
- iOS SDK
  - iOS API
- Java SE SDK
  - Java SE API
- OS X SDK
  - OS X API
- Qt SDK
  - Qt API
- Windows Store SDK
  - Windows Store API
- WPF SDK
  - WPF API

ArcGIS Runtime Core
Starting a Scrum Project - Release Planning

• Create a prioritized list of Epics
• Create a prioritized backlog of items (PBI’s)
  - INVEST in your backlog
    - Independent, Negotiable, Valuable, Estimable, Small, Testable
  - User Story Mapping
• Estimate
• Get commitment to proceed

Example User Story (PBI): Create Map Package
As a Map Author I want to package my map and data, so I can easily share them with other desktop users.
Grooming the Backlog

- As PBI’s move to the top of the backlog
  - Break them up into smaller PBI’s
  - Add detail and get them ready for the Iteration planning
    - UI design
    - Acceptance criteria
- Groom once an iteration with the team
### Operations Dashboard for ArcGIS - Releases

#### AG-Ops Dashboard for Windows: Product Backlog

<table>
<thead>
<tr>
<th>Key</th>
<th>Uncommitted Backlog Items/Tasks</th>
<th>Backlog...</th>
<th>Task H...</th>
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<tbody>
<tr>
<td></td>
<td><strong>Fall Release (APPS GROUP)</strong></td>
<td>Total: 0</td>
<td>Total: 0</td>
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<tr>
<td></td>
<td>Hackathon 10.2</td>
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<td>Total: 0</td>
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<td></td>
<td>10.2 Release (APPS GROUP)</td>
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<tr>
<td></td>
<td>Future Release</td>
<td>Total: 61</td>
<td>Total: 2</td>
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</table>

- ODW-... Support streaming feature services
- ODW-... [Widgets] Line chart*
- ODW-... [Data Sources] Virtual Fields
- ODW-... [Map Widget] View map at different points in time (time slider)*
- ODW-... [Other] Find and use services by browsing servers
- ODW-... Display reverse geocode results on map
- ODW-... [Chat Widget, Sharin...] Share a map with a chat user*
- ODW-... [Map Widget, Map Exp...] Display popups for KML Layers
- ODW-... [Widgets, Map Explor...] Schedule View Widget*
Operations Dashboard for ArcGIS - Backlog description

Title: Sketch on the map

Description:
If the map author has made it available, as a map viewer, I need to be able to do simple markup on my map. I may show this markup to someone, or may choose to email an image of my map with the markup present.

Acceptance criteria:
- sketch tool on the toolbar that displays the sketch palette
- sketch palette tools for thin, medium, thick lines
- color picker
- draw sketches on the map
- clear sketches
- undo sketch
- save map image to device image library
- email map image

Design:
http://devinfo.esri.com/Software%20Releases/ArcGIS/All%20Releases/ProjectGroups/appsGroup/coreApps/MapProject%20Documents/Eko%20Sketching%20iOS.pdf

Release: Fall Release

Status: Not Started
Scrum Framework

Scrum Questions:
- Done?
- Do?
- Impediments?

Iteration 3 weeks

Daily Scrum

Product Backlog

Iteration Planning

Iteration Backlog

Iteration Retrospective

Potentially Shippable Product

Iteration Review
Responsibilities of a Scrum Team

- Cross-Functional (5-9 members)
- Agrees to iteration goal and specifies work results
- Empowered to do anything to reach the iteration goals
  - within the project guideline boundaries
- Organizes itself and its work
- Demos work results to the stakeholders
Product Owner Responsibilities

- Defines product features
- Prioritizes product backlog
- Establishes, communicates and nurtures the vision
- Accepts or rejects work results
- Grooms the product backlog
- Product Owner is the
  - vision keeper
  - daily decision maker
  - single wringable neck
Scrum Master (Agile Coach) Responsibilities

- Ensures team is productive
- Enables close cooperation
- Removes barriers
- Shields team from interferences
- Ensures the process is followed
- Invites to Scrum meetings
- The Scrum Master is the
  - Shepherd
  - Bulldozer
  - servant leader
# Operations Dashboard for ArcGIS - The Team

<table>
<thead>
<tr>
<th>Product Engineers</th>
<th>Developers</th>
</tr>
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<tbody>
<tr>
<td>Andy (Lead) - ME</td>
<td>Jeff (Lead) - ME</td>
</tr>
<tr>
<td>Nick (Test) - UK</td>
<td>Eric, Fred &amp; Scott - CA</td>
</tr>
<tr>
<td>Shelly (API &amp; Doc) - UK</td>
<td>Gunther - UK</td>
</tr>
<tr>
<td>Doug (Product Owner) - CA</td>
<td></td>
</tr>
<tr>
<td>Patrick (Scrum Master) - CA</td>
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</tr>
</tbody>
</table>

The team works in coordination with:
- Mara – Documentation/Resources Center Coordinator
- Lindsay – Release Coordinator
- David – Product Manager
- Patrick – Program Manager
- Scott, Clint, Jeff, Andy – Stakeholders
Sprint planning

• Prerequisite:
  - PBI’s considered in Sprint are fully defined

• Team effort

• Define Goals

• Select PBI’s

• Determine implementation

• Define Tasks for each PBI
  - Dev
  - Test
  - Doc
  - Estimate tasks in hours (2-24)
Operations Dashboard for ArcGIS Sprint Planning – Sprint Goals

**Edit Sprint**

- **From Date:** 10/16/2012
- **To Date:** 10/29/2012
- **Name:** Iteration 16
- **Goals:**
  1. Login to the application or access secured resources using PKI authentication, particularly through the use of a Smart Card.
  2. Enhancing coordinate support for Measure and Find places.
  3. API Help documentation
# Operations Dashboard for ArcGIS Sprint Planning – PBI and Tasks

<table>
<thead>
<tr>
<th>Key</th>
<th>Committed Backlog Items/Tasks</th>
<th>Backlog Effort</th>
<th>Task Hours</th>
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<tr>
<td>Sprint 10/16/2012 - 10/29/2012</td>
<td>Iteration 16</td>
<td>Total: 22</td>
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<tr>
<td>Sprint 10/30/2012 - 11/12/2012</td>
<td>Iteration 17</td>
<td>Total: 77</td>
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<tr>
<td>Sprint 11/13/2012 - 11/26/2012</td>
<td>Iteration 18</td>
<td>Total: 51</td>
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<td>Sprint 11/27/2012 - 12/10/2012</td>
<td>Iteration 19</td>
<td>Total: 40</td>
<td>Total: 85</td>
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</table>

- **ODW-486** [Portal]  Research & Design - Include portal branding in application
- **ODW-484** Design - Find Nearby analysis
- **ODW-528** [Map Exploration] Improve handling of photo attachments in popup
  - Implement expanded list
  - Unit test attachment count and file extensions
  - Ad-hoc test: use of attachments in popups
  - Research orientation issue in popup images
  - XAML change to accommodate new design
  - Rotate image based on EXIF reading
  - Scale image if rotated to fit in popup window
  - Help Documentation for Drive Time
- **ODW-529** [Map Exploration] Improve handling of photo attachments in popup
  - Modify View to support image control
  - Implement photo displaying in popup
  - Analyze effort
  - Design User Experience for improved media handling
  - Rebind Image to BmpImage
  - XAML change to accommodate new design
Operations Dashboard for ArcGIS Sprint Planning – Task description

Title: Dev - query definition dialog
Description:
- hide prompt/parameter option
- add Name property
Point Person: Scott
Estimated Hours: 0 Original Estimate: 6 Status: Done
Backlog Item: Define an attribute query for a data source

Comments
How long will it take?
- Is a legitimate question
- Based on past performance rather than guessing
- Agile estimating works
Operations Dashboard for ArcGIS - Estimating

• **Product Backlog Items**
  - Story points
  - It is not time
  - Based on 3 criterias
  - Compare to baseline story(ies)
  - Using Fibonacci suite (1,2,3,5,8,13)
  - 13 story points is the maximum

• **Tasks**
  - Hours
  - Use ideal time for estimates
  - Only remaining hours are tracked
  - Generally between 1-24 hours
  - 24 hours maximum
Operations Dashboard for ArcGIS - Reports & Charts

Sprint Burndown Chart
Operations Dashboard for ArcGIS - Reports & Charts

Team Member Load Chart
Operations Dashboard for ArcGIS - Reports & Charts

Epic Progress Report

Epic Progress Report - AG-Ops Dashboard for Windows
Release: Fall Release - 7/3/2012 - 12/19/2012  Date: 11/16/2012

Epic Progress Report
Operations Dashboard for ArcGIS - Reports & Charts

<table>
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<th>Scope Change</th>
<th>10</th>
<th>4</th>
<th>19</th>
<th>-8</th>
<th>1</th>
<th>29</th>
<th>71</th>
<th>-12</th>
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<tr>
<td>Baseline</td>
<td>0</td>
<td>-10</td>
<td>-14</td>
<td>-33</td>
<td>-33</td>
<td>-25</td>
<td>-26</td>
<td>-55</td>
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<tr>
<td>Effort</td>
<td>238</td>
<td>193</td>
<td>154</td>
<td>124</td>
<td>89</td>
<td>62</td>
<td>40</td>
<td>-37</td>
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<td>Velocity</td>
<td>45</td>
<td>39</td>
<td>30</td>
<td>35</td>
<td>27</td>
<td>22</td>
<td>77</td>
<td>53</td>
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<td>Iteration</td>
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<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
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<td>17</td>
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<td>Date</td>
<td>20-Aug</td>
<td>3-Sep</td>
<td>17-Sep</td>
<td>1-Oct</td>
<td>15-Oct</td>
<td>29-Oct</td>
<td>12-Nov</td>
<td>26-Nov</td>
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<tr>
<td>Remaining Effort</td>
<td>238</td>
<td>203</td>
<td>168</td>
<td>157</td>
<td>122</td>
<td>87</td>
<td>66</td>
<td>18</td>
</tr>
</tbody>
</table>

Operations Dashboard - Burndown Chart
Fall Release

- Velocity Trend
- Scope change Trend

Complete by Dec 4
Operations Dashboard for ArcGIS - Reports & Charts

- Design: 30%
- Development: 44%
- Test: 7%
- Doc: 10%
- Event: 9%
Scaling Scrum

- Define Team Structure
  - Feature vs. Component Teams
  - Lean towards Feature Teams
- Establish Communities of Practice
  - Topics affecting many teams
- Hold Scrum of Scrums meetings
  - Share information between teams
- Look two to three iterations ahead
  - Coordinate between teams each iteration
- Use Epics to track and communicate
  - High level Stories
Scaling Scrum

- Define Team Structure
  - Feature vs. Component Teams
  - Lean towards Feature Teams
- Establish Communities of Practice
  - Topics affecting many teams
- Hold Dependency meetings
  - Share information between teams
- Look two to three iterations ahead
  - Coordinate between teams each iteration
- Use Epics to track and communicate
  - High level Stories
Agile Practices beyond Scrum

• Engineering
  - Design Patterns
  - Paired Programming
  - Test Automation
  - Test Driven Development
  - Continuous Integration
  - Refactoring Tools

• Design
  - User Centered Design
  - Agile Data Modeling
  - Domain Driven Design
Benefits

• *Bring the maximum value to our users*
• *More productive*
• *Successful Projects*
• *Accurate Estimates*
• *Transparency to Stakeholders*
• *All team members participate*
• *Continuous process improvement*
Pitfalls when using Scrum

- **Backlog Items are too big**
- **Backlog Items not fully defined**
- **Team over-commits**
- **Unclear definition of “Done”**
- **Team is too large**
- **Distributed Teams**
- **Product owner proxies**
- **Team members assigned to multiple Scrum teams**
- **Too many hats**
- **Little or no Release Planning**
Operations Dashboard for ArcGIS – Best Practices

- **Estimates**
  - Always have a baseline PBI in mind
  - When a PBI is estimated at 13 story points, consider splitting it
  - When a task is estimated at more than 24 hours, consider splitting it

- **Miscellaneous**
  - Do design at the earliest
  - Avoid having many tasks in progress unless there are impeded
  - Avoid having unassigned tasks
  - During a daily scrum:
    - Speak loud and clear
    - Be specific and concise
  - Days off and working days on other projects and events
    - *Must be known in front of sprint*
    - *Goal is to better balance the workload*
## Operations Dashboard for ArcGIS – Definition of Done (DoD)

<table>
<thead>
<tr>
<th>Task</th>
<th>is done when:</th>
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<tbody>
<tr>
<td>Design</td>
<td>Reviewed Published</td>
</tr>
<tr>
<td>Implementation</td>
<td>Coded Code reviewed Checked in</td>
</tr>
<tr>
<td>Test</td>
<td>Local tested Reported</td>
</tr>
<tr>
<td>Documentation</td>
<td>Reviewed Published</td>
</tr>
</tbody>
</table>

### PBI is done when:

| All tasks done      | Demoed to the Product Owner   |
Operations Dashboard for ArcGIS - How to be done at the end of a sprint?

Product Engineers do bug verifying, regression testing, update documentation, start design until Developers give them things to test.

Developers stop implementing before the end of the sprint to:
- Fix bugs
- Help testing if necessary or review design
- Look at next sprint PBI and review/estimate development tasks
Links, Tools and Literature

- [www.scrumalliance.org](http://www.scrumalliance.org)
- *Scrumworks by CollabNet [easy to use, focused Scrum Tool]*
- *Agile Software Development with Scrum*
  - by Ken Schwaber and Mike Beedle [The first Scrum book]
- *Scrum and XP from the Trenches*
  - by Henrik Kniberg [very practical how-to-guide]
- *Succeeding with Agile | Software Development Using Scrum*
  - by Mike Cohn (2010) [Helpful for larger scrum implementations]
- *Lean Software Development*
  - by Mary Poppendieck and Tom Poppendieck [A good intro to Lean]
- *Agile Product Ownership in a Nutshell*
  - Video by Henrik Kniberg
    [http://www.youtube.com/watch?v=502ILHjX9EE](http://www.youtube.com/watch?v=502ILHjX9EE)
Summary

- Why go Agile?
- Introduction to Scrum
  - Process
  - Roles
- Agile Estimating and Tracking
- Scaling Scrum
- Agile Practices beyond Scrum
- Benefits
- Pitfalls and Best Practices
- Resources
QUESTIONS?

- Don’t forget to fill the survey about this presentation

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