An Introduction to Agile/Scrum

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CREDITS



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Goals and Ground Rules

- Introduce the concepts of Agile/Scrum
- Contrast with another methodology, i.e waterfall
- Why we should care?

Get the big picture, concepts, and keywords

I'm not going to be rigorous in history or definitions

I'm likely to make extreme statements to make the point.

We will talk software development, but Agile can be used for anything.

Problem Statement

What we have been doing is not working.

We are faced with...

- Producing more and better output with shrinking budgets
- Maximize the actual and perceived value we deliver
- Keep up with the pace of change in the market

How did we get here?

Adapted from a presentation by Evan Campbell, Slide 32 http://agilecommons.org/files/4e9f355ad9/Agile_Fncl_Impact_Slides.pdf

Project Management -(a VERY brief overview)

- People have ALWAYS organized work
- Management of process and projects became more codified as we developed "Scientific Management" principles in the early 1900's
- Henry Gantt developed the Gantt chart in 1903
- In the 1950's the PERT chart (1958) (program evaluation and review technique) and critical path management were dominant
- In the 60's more formalized "waterfall" techniques were used
- In 1969, the Project Management Institute was incorporated
- in 1985 the DOD issued DOD-STD-2167A that was their standards for working with software development contractors





Waterfall Project Management Methodology

Requirements

- A <u>step-wise</u> approach to product delivery
- It is a or <u>relay race</u> of analysis, requirements definition, design, Implementation (code and test) and then delivery and maintenance.
- Product delivery is a "<u>big</u> <u>bang</u>"/"<u>all or nothing</u>"



Downside of This Approach

Requirements

- <u>Focus</u> is primarily <u>on process</u>, not people
- Long development cycles
- <u>Unresponsive</u> to changing markets (and thus users needs)
- <u>Formal communications</u>, Lots of words on paper
- Each step fosters a <u>them vs. us</u> mentality
- <u>Plan based</u> We measure if we are on track, not what we have done
- You know the least when you start



Cone of Uncertainty



As described by Steve McConnel, Software Estimation: Demystifying the Black Art

We're losing the relay race

"The... 'relay race' approach to product development...may conflict with the goals of maximum speed and flexibility. Instead a holistic or 'rugby' approach—where a team tries to go the distance as a unit, passing the ball back and forth—may better serve today's competitive requirements."

> Hirotaka Takeuchi and Ikujiro Nonaka, "The New New Product Development Game", *Harvard Business Review*, January 1986.

Waterfall vs. Agile



'This project has got so big, I'm not sure I'll be able to deliver it!'

THE AGILE PROCESS



'It's so much better delivering this project in bite-sized sections'



• Why the Neanderthals became extinct •

Agile – some definitions, changing our mindset

The Agile Manifesto

"We are uncovering better ways of developing software by doing it and helping others do it. **Through this work we have come to value**



That is, while there is value on the items on the right, we value the items on the left more."

12 Agile Principles

- 1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- 2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- 3. **Deliver working software frequently**, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- 4. Business people and developers must work together daily throughout the project.
- 5. **Build projects around motivated individuals**. Give them the environment and support they need, and trust them to get the job done.
- 6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

- 7. Working software is the primary measure of progress.
- 8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- 9. Continuous **attention to technical excellence** and good design enhances agility.
- 10. Simplicity--the art of maximizing the amount of work not done--is essential.
- 11. The best architectures, requirements, and designs emerge from **self-organizing teams**.
- 12. At regular intervals, **the team** reflects on how to become more effective, then **tunes and adjusts its behavior** accordingly.

Sequential vs. overlapping development



Source: "The New New Product Development Game" by Takeuchi and Nonaka. *Harvard Business Review*, January 1986.

Scrum – The Big Picture

The Big Picture



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Image available at www.mountaingoatsoftware.com/scrum

Characteristics



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- Requirements are captured as items in a list of "product backlog"
- Product progresses in a series of short "sprints"
- Self-organizing teams
- No specific engineering practices prescribed
- Uses generative rules to create an agile environment for delivering projects

Scrum Details

Scrum Framework



Scrum Framework

Team Roles	5
 Product ow ScrumMast 	ter
•Team	Events
	 Sprint planning Sprint review Sprint retrospective Daily scrum meeting Artifacts
	 Product backlog Sprint backlog Burndown charts

Product Owner



- Define the features of the product
- Decide on release date and content
- Be responsible for the profitability of the product (ROI)
- Prioritize features according to market value
- Adjust features and priority every iteration, as needed
- Accept or reject work results

The Scrum Master



- Represents management to the project
- Responsible for enacting Scrum values and practices
- Removes impediments
- Ensure that the team is fully functional and productive
- Enable close cooperation across all roles and functions
- Shield the team from external interferences
- The ScrumMaster differs from a Project Manager in that he does not exercise command and control

The Team

- Typically 5-9 people
- Cross-functional:



- Programmers, testers, user experience designers, etc.
- Members should be full-time (no multi-tasking!)
 - May be exceptions (e.g., database administrator)
- Teams are self-organizing
 - Ideally, no titles but rarely a possibility
- Membership should change only between sprints

The Myth of Multitasking



Scrum framework

Team Roles		
 Product owner ScrumMaster 	r	
• Team	Events	
	 Sprint planning Sprint review Sprint retrospe Daily scrum me 	ctive eeting
		Artifacts
		 Product backlog Sprint backlog Burndown charts

Sprint Planning



MEETING

BACKLO

24 Hours

2-4 WEEKS

POTENTIALI SHIPPABLI PRODUCT

INCREMEN

The sprint goal

 A short statement of what the work will be focused on during the sprint

	Life Sciences
	Support features necessary
Database Application	for population genetics studies.
Make the application run on SQL Server in addition to	
Oracle.	Financial services
	Support more technical
	indicators than company ABC
	with real-time, streaming
	data.

Sprint Planning

- Team selects User Stories from the product backlog they can commit to completing
- Sprint backlog is created
 - Tasks are identified and each is estimated (1-16 hours)
 - Done Collaboratively, not alone by the Scrum Master/ Product Owner
- High-level design is considered



Code the middle tier (8 hours) Code the user interface (4) Write test fixtures (4) Code the foo class (6) Update performance tests (4)

Sprints



- Scrum projects make progress in a series of "sprints"
- Typical duration is 2–4 weeks or a calendar month at most
- A constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

No changes during a sprint



 Plan sprint durations around how long you can commit to keeping change out of the sprint

The Daily Scrum

- Parameters
 - Daily
 - 15-minutes
 - Stand-up
- Not for problem solving
 - Whole world is invited
 - Only team members, ScrumMaster, product owner, can talk
- Helps avoid other unnecessary meetings





Everyone Answers Three Questions



- These are *not* status for the ScrumMaster
- They are commitments in front of peers

The Sprint Review

- Invite the world
- Whole team participates
- Informal
 - 2-hour prep time rule
 - No slides



- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture



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Sprint Retrospective

- Periodically take a look at what is and is not working
- Typically 15–30 minutes
- Done after every sprint
- Whole team participates
 - ScrumMaster
 - Product owner
 - Team
 - Possibly customers and others

Start / Stop / Continue

• Whole team gathers and discusses what they'd like to:



Scrum Framework

Team Roles	
 Product own ScrumMaste Team 	er r Events
	 Sprint planning Sprint review Sprint retrospective Daily scrum meeting
	Artifacts •Product backlog •Sprint backlog •Burndown charts



- •The requirements
- •A list of all desired work on the project
- Ideally expressed such that each item has value to the users or customers of the product
- Prioritized by the product owner
- •Reprioritized at the start of each sprint

A Sample Product Backlog

Backlog item	Estimate	
Allow a guest to make a reservation	3	
As a guest, I want to cancel a reservation.	5	
As a guest, I want to change the dates of a reservation.	3	
As a hotel employee, I can run RevPAR reports (revenue-per-available-room)	8	
Improve exception handling	8	
•••	30	
•••	50	



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- One or more backlog items make up the backlog.
- The work is decomposed into tasks and hours.
- If work is unclear, define a sprint backlog item with a larger amount of time and break it down later.
- Individuals sign up for work of their own choosing work is never assigned.
- Estimated work remaining is updated daily as more becomes known.
- Any team member can add, delete or change the sprint backlog.

A Sprint Backlog

Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	4	
Test the middle tier	8	16	16	11	8
Write online help	12				
Write the foo class	8	8	8	8	8
Add error logging			8	4	

Burndown Example

Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	7	
Test the middle tier	8	16	16	11	8
Write online help	12				
	44	32	34	18	8



Why do this?

Reasons for Adopting Agile Success Rates

April 1, 2018

PROJECT SUCCESS RATES AGILE VS WATERFALL



https://vitalitychicago.com/blog/agile-projects-are-more-successful-traditional-projects/

Reasons for Adopting Agile Success Rates

PROJECT SUCCESS RATES BY PROJECT SIZE AGILE VS WATERFALL

FOR LARGE PROJECTS, AGILE APPROACHES ARE 2X MORE LIKELY TO SUCCEED



Source: Standish Group, Chaos Studies 2013-2017

WWW.VITALITYCHICAGO.COM

https://vitalitychicago.com/blog/agile-projects-are-more-successful-traditional-projects/

Reasons for Adopting Agile Shifts in Industry Attitudes

Changes from 2018 to 2019

- Less about increasing productivity (51% compared to 55%)
- More about improving team morale (34% compared to 28%)
- Less about reducing project risk (28% compared to 37%)
- More about reducing project costs (41% compared to 24%)

Benefits of Adopting Agile



Source: 13th-annual-state-of-agile-report.pdf - 2019 - https://www.stateofagile.com/#ufh-c-473508-state-of-agile-report

Bottom Line

- Agile projects are 2X more likely to succeed
- Agile projects are1/3 less likely to fail than waterfall projects

The Standish Group has conducted surveys of IT project success and failure rates every 2 years since 1994.

Scrum has been used for:

- Commercial software
- In-house development
- Contract development
- Fixed-price projects
- Financial applications
- ISO 9001-certified applications
- Embedded systems
- 24x7 systems with
 99.999% uptime requirements
- The Joint Strike Fighter

- Video game development
- FDA-approved, life-critical systems
- Satellite-control software
- Websites
- Handheld software
- Mobile phones
- Network switching applications
- ISV applications
- Some of the largest applications in use