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QUANTIFYING THE FUTURE

Agile and Function Points: A Winning Combination

Dan French, PMP, CFPS, CSM
Principal Consultant
dfrench@cobec.com
202-827-1316
www.cobec.com

Agenda

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-Agile Manifesto
-Key Principals of Agile
-Critical Components of Agile Development
-Typical Agile Lifecycle
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-Estimation of Agile Projects
-What are Function Points
-Why Function Points are Better for Agile Software Estimation
-Challenges of Using Software Lines of Code (SLOC)
-Background of Function Points
-Why Function Points are preferable to SLOC
-Conclusion
-Sources of Information

A Little About Me

- B.S. in Economics from Virginia Tech
- Graduate of the Chubb Institute Top Gun Program
- Over 15 years experience in software cost estimation
- Counting function points for 17 years and been a Certified Function Point Specialist (CFPS) for 15 years
- Experience in a number of estimation techniques and tools including SEER-SEM, COCOMO, SLiM, Delphi, and Estimating by Analogy
- Chairman of the International Function Point Users Group (IFPUG) Functional Software Sizing Committee (FSSC)
- Former member of the IFPUG Conference Committee for 5 years
- GAO Cost Guide expert team member
- Project Management Institute (PMI) Project Management Professional (PMP)
- Agile Alliance Certified SCRUM Master (CSM)

"Of course, that's only an estimate; the actual cost will be more"

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©Syd Hoff, Ney Yorker Magazine, 1951

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:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

That is, while there is value in the items on
the right, we value the items on the left more[1].

[1] http://www.agilemanifesto.org/

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Key Principles of Agile[2]

- Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- Business people and developers must work together daily throughout the project.
- Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

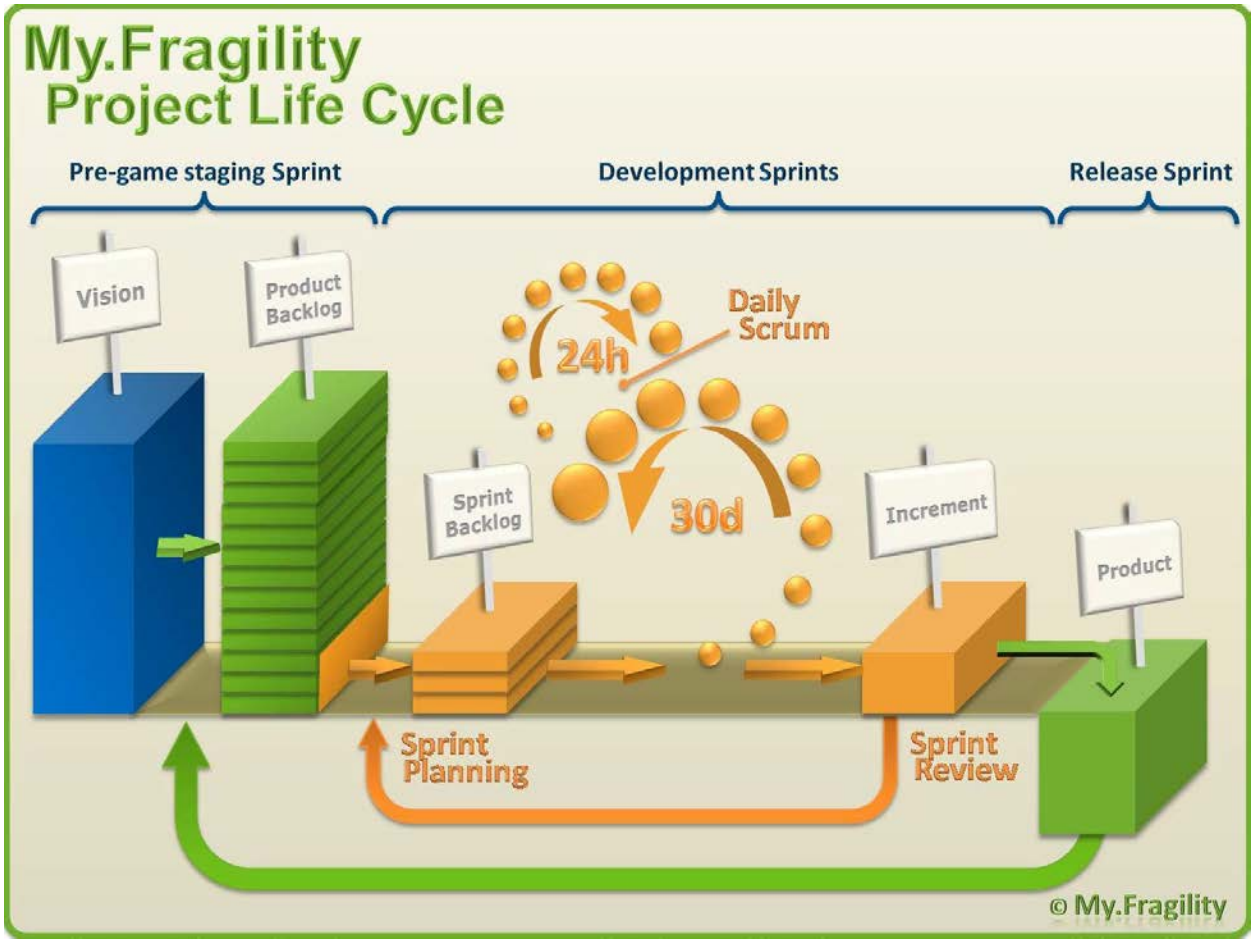
Key Principles of Agile

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

Critical Components of Agile Development

- Sprints of 2 – 4 weeks duration
- Small team size (<20)
- Product owner actively participates in team
- Daily Stand up meetings and burndown charts
- Co-location of team
- Active management of product backlog
- No overtime
- Working software delivered at end of sprint

Typical Agile Project Lifecycle



[3]http://guntherverheyen.com/tag/my-fragility/

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Product Backlog[4]

- A to-do list of all things that needs to be done within the project.
- Replaces the traditional requirements specification artifacts.
- Can have a technical nature or can be user-centric in the form of user stories.
- The owner is the Scrum Product Owner
- The Scrum Master, the Scrum Team and other Stakeholders contribute to it to have a broad and complete To-Do list
- Dynamic and exists as long as the product does
- Team is free to use other artifacts as well

[4]http://www.scrum-institute.org/The_Scrum_Product_Backlog.php

How are Agile Projects Typically Estimated?

- T-Shirt Sizing (Sm, M, L, XL)
- Story Points/Planning Poker (Fibonacci sequence)
- Use Case Points
- Projects are broken into discrete sprints of 2-4 weeks
- Based on velocity, the sprint is assigned a set of capabilities to be delivered that correspond to the velocity of the team/organization

The Challenges with These Methods

- All are subjective and cannot be replicated
- Variation amongst and between teams
- No rules on how to size
- Inconsistent and unpredictable
- Cannot be used to develop productivity metrics
- Optimistic bias
- Difficult to determine Velocity

What are Function Points (FP)?

- Function Points are a unit of software size measure
- Measure the work product of software development
- Work product is measured in terms of functionality from user perspective
- Functions points do not measure internal architecture, effort, or technological complexity of an application
- Function Points are language, platform and technology independent

Which is Easier to Estimate?

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Which is Easier to Estimate?

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Why function points can be used to better estimate Agile projects

- Uniform sizing
- Objective not subjective sizing
- Consistent sizing regardless of team composition & experience
- Can better measure and predict Velocity
- Language, platform and technology independent
- Can more easily size, manage, and prioritize product backlog

How FP Are More Effective When Used for Agile Estimates?

- Size, based on requirements, is the most important factor for cost in software projects- Correlation (r^2) ranges between .7 and .8
- Story Points, Use Case points, T-shirt sizing do not allow for good comparisons between projects due to:
  1. lack of consistent counting rules and standards
  2. dependence upon team skills and experience
  3. Language, technology and platform variances

  These factors all add significant uncertainty to any estimating effort. Function points minimize these risks

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Challenges of using Software Lines of Code (SLOC)

- No defined counting rules or standards organization
- Language and platform dependent
- Inconsistent rules mean there is no reliable and verifiable industry data
- Penalizes efficient software writing, incentivizes poor coding
- Heavily dependent upon developer skill and style
- Difficult to estimate early in lifecycle, particularly from user stories

Function Points address and overcome these challenges

Conclusions

- Determining team and organizational velocity is critical to successful use of Agile
- Typical Agile estimation methods such as t-shirt sizing, planning poker and story points are subjective, non-reproducible, inconsistent, and do not provide a reliable, objective and defensible sizing method
- Using function points as the size metric provides more consistent, accurate, reproducible size metrics that reduce risk and uncertainty and allow for better sprint estimation and velocity calculation

Sources of Information

- These organizations can assist in establishing a metrics program or providing industry data for use until a metrics program is established:
  - International Function Point Users Group (IFPUG) (www.ifpug.org)
  - Agile Alliance (https://www.agilealliance.org/)
  - International Software Benchmark Standards Group (www.isbsg.org)
  - International Cost Estimating and Analysis Association (http://www.iceaaonline.com/)
  - Systems and Software Consortium, Inc. (www.software.org)
  - Software Engineering Institute (SEI) (www.sei.cmu.edu)
  - Vendors : Q/P Management, David Consulting Group, QSM, Longstreet Consulting

Additional Information

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Function Point History

- Developed by Allan Albrecht of IBM in 1979
- Created as an alternative to Source Lines of Code (SLOC) for measuring software size
- Counting Rules are established by the International Function Point Users Group (IFPUG)
- Current version is 4.3.1, Released in January 2010
- International Standards Organization (ISO) Standard for software functional sizing (ISO/IEC 20926 SOFTWARE ENGINEERING - FUNCTION POINT COUNTING PRACTICES MANUAL)

Types of Function Point Counts

- Function points are used to count both projects and applications
- There are 3 types of function point counts:
  - Development Project
  - Count of new software (including conversion functionality)
- Enhancement Project
  - Count of enhancements to existing software functionality (added, changed, or deleted)
- Application
  - Count of an application installed in production

Function Points Transaction Definitions

- Five Functional Components, 3 Transactional and 2 Data
  - Transaction Functions
    - External Inputs (EI) – Batch transaction file, input screen, control information
    - External Outputs (EO) – Reports with calculations, output files with derived data
    - External Inquiries (EQ) – On-line query screen, interface file with no calculations or derived data
  - Data Functions
    - Internal Logical Files (ILF) – Application file, internal database
    - External Interface File (EIF) – Reference

Why Function Points are Preferable to SLOC When Performing Agile Estimating

- Oldest and most utilized functional size metric
- Codified set of rules
- Platform and language independent
- Functional vs. technical viewpoint
- Can be applied to all software applications
- More accurate estimation
- Not dependent upon software developer skill level
- More consistent and accurate metrics

Example Agile Product Backlog[4]

ToDo List

ID	Story	Estimation	Priority
7	As an unauthorized User I want to create a new account	3	1
1	As an unauthorized User I want to login	1	2
10	As an authorized User I want to logout	1	3
9	Create script to purge database	1	4
2	As an authorized User I want to see the list of items so that I can select one	2	5
4	As an authorized User I want to add a new item so that it appears in the list	5	6
3	As an authorized User I want to delete the selected item	2	7
5	As an authorized User I want to edit the selected item	5	8
6	As an authorized User I want to set a reminder for a selected item so that I am reminded when item is due	8	9
8	As an administrator I want to see the list of accounts on login	2	10
Total		**30**	

Example Scrum Product Backlog

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