Agile Methodologies Redux

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- The requested citation the overall tutorial is: David E. Bernholdt, Anshu Dubey, Rinku K. Gupta, and David M. Rogers, Software Productivity and Sustainability track, in Argonne Training Program on Extreme-Scale Computing (ATPESC), online, 2021. DOI: 10.6084/m9.figshare.15130590
- Individual modules may be cited as Speaker, Module Title, in Better Scientific Software tutorial...

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Outline

• Refining our Epic
• PSIP: Productivity and Sustainability Improvement Planning
More on Epic, Story, Task

• Definition of Done
• Refining Issues
• Agile Estimation
Epic, Story, Task Review

• Break down and refine *when and as needed*
  – Close to when the work will be done
  – Only for work that will take place
  – Can be valuable for estimating
  – There is no “correct” level of granularity

• Epics are very high level objectives

• Stories should represent an increment of value to the customer
  – “Definition of Done” – understandable to user

• Tasks are the steps necessary to complete a story
  – May not individually provide value to the customer
Definition of Done

• Simplified definition: When all acceptance criteria are met

• Acceptance criteria
  – “Conditions that a software product must satisfy to be accepted by a user, customer or stakeholder.” – Microsoft Press
  – “Pre-established standards or requirements a product or project must meet.” – Google
  – Can include functional, non-functional, and performance requirements.
Definition of Done

• Important to establish for a story before estimating or beginning a task
• Defined by the team, acceptable to customer
  – Customer language
• Should not specify an implementation unnecessarily
Refining Our Epic

• Epic: Refactor code for enhanced modularity
  – Description: The heat equation code needs refactoring to improve modularity. Specifically, there are utilities that could be generalized and used with for other applications. Also, the integration function is currently hard-coded. In the future, we want to use alternative integration functions, so we should generalize the interface for this function.
  – Story 1: Separate out utilities
    • Definition of Done
    • Task list

  – Story 2: Separate out integration function
    • Definition of Done
    • Task list
Refining Our Epic

– Story 1: Separate out utilities
  • Definition of Done
    – Unit tests pass
    – Code review completed
    – Integration/system tests pass
    – Utility performance is at least 95% of pre-separation performance
    – Utility usability demonstrated outside of heat equation application

– Story 2: Separate out integration function
  • Task 1: Add testing for integration function to protect functionality during refactor
    – Needed testing should be specified
  • Task 2: Generalize interface to allow alternative implementations
  • Task 3: Expose current integration function through the new interface & run tests
Agile Estimation

• Estimating is hard
  – Requires practice
  – With practice, it is still hard

• Stories are estimated using “story points”
  – Relative estimate
  – Many estimating techniques
  – Should NOT map to hours, days, etc
  – Definition of done needed, tasking not required

• Tasks are estimated in hours
  – Absolute estimate

• Useful for planning schedules

**Key concept:**
It is easier to accurately estimate many small tasks than to estimate a large epic.

**Epic:** Huge refactor effort

**Tasks:**
- Add tests
- Generalize interface
- Expose existing interface
How To Get Better

“Use iteration and incrementation only for projects you want to succeed.”

- Adaptation of Martin Fowler quote
Strategy for Incremental Productivity Improvements

- Identify, analyze, prototype, test, revise, deploy. Repeat.
- Realistic: There is a cost.
  - Startup: Overhead
  - Payoff: Best if soon, clear
- Working model:
  - Reserve acceptable time/effort for improvement.
  - Improve how you do your work on the way to getting it done.
  - Repeat.
Productivity and Sustainability Improvement Planning (PSIP) Examples: EXAALT & MPICH

PSIP workflow helps a team create user stories, identify areas for improvement, select a specific area and topic for a single improvement cycle, and then develop those improvements with specific metrics for success.

**EXAALT PSIP: Continuous integration (CI) testing**

BSSw blog article: *Adopting Continuous Integration for Long Timescale Materials Simulation*, Rick Zamora (Sept 2018)

**EXAALT PSIP: Onboarding new team members**

https://bssw.io/psip