Summary

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Developing a Testing and Continuous Integration Strategy for your Team tutorial @ Exascale Computing Project Annual Meeting

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Acknowledgements

Testing Matters (Maybe even more than you think)
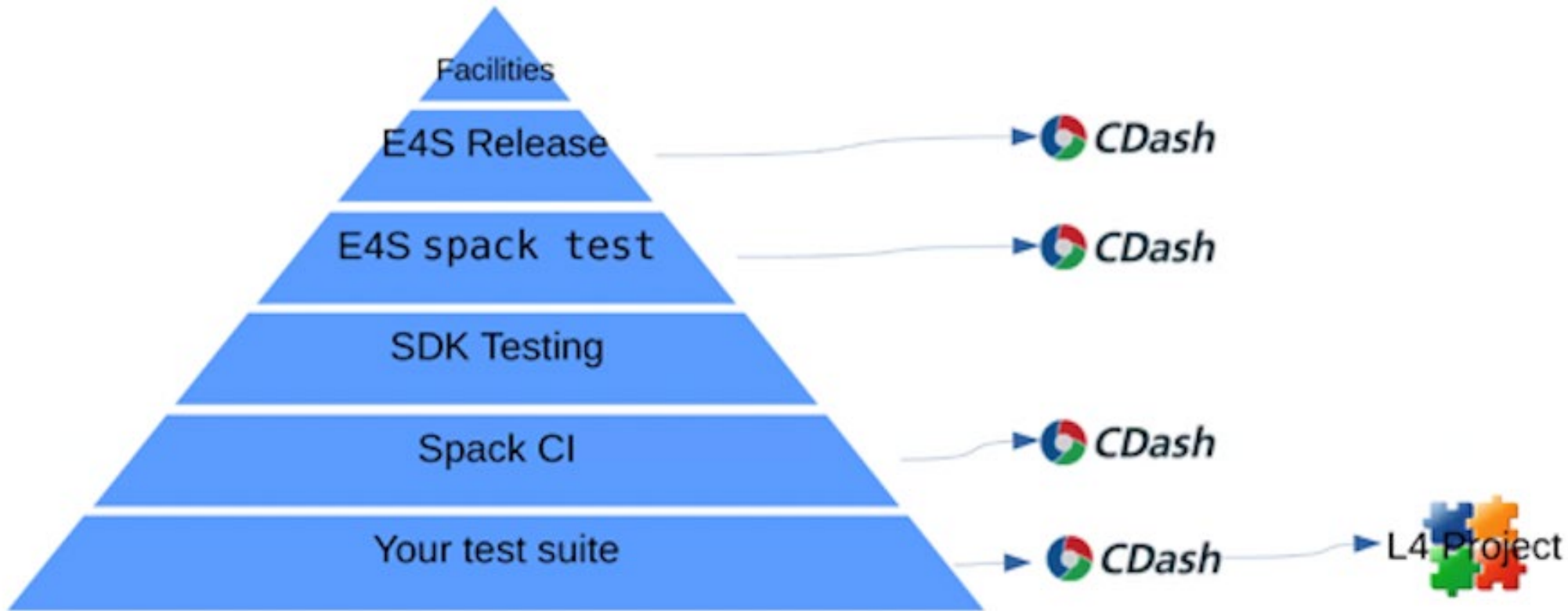
- Individual project test suites are the basis for many layers of testing
  - Well constructed tests add to confidence in and stability of code
  - Fragile or insufficient test suites lead to errors and frustration

IDEAS productivity

ECP EXASCALE COMPUTING PROJECT

We Covered Software Engineering Topics Focused on Testing…

- Testing strategies for complex software systems

- Continuous integration testing

And there are Many More Topics We Didn't Have Time For

- Documentation
- Licensing
- Packaging and distribution
- Issue tracking
- Configuration and build
- Debugging strategies
- Building and sustaining communities around software
- Software publication and citation
- Requirements gathering
- Understanding and debugging floating-point math
- Performance and performance portability
- Project management

- Collaboration around software development
- Designing software for flexibility and extensibility
- Systematic refactoring of large, complex software systems
- Reproducibility

- **Also important topics, but…**
- Less distinction between research software and other software
- More informational resources available
- Next-level concerns for starting researchers
- Very limited time!

But you're a researcher. You can't afford to spend "all" of your time on software engineering.

A Final Recommendation:
Continual, Incremental Software Process Improvement

Target: your project should include "just enough" software engineering so that you can meet your short-term and longer-term scientific goals effectively

1. Identify your team's "pain points" in your software development processes
   – Help: RateYourProject assessment tool: https://rateyourproject.org/

2. Set a goal for something to improve
   – Target processes and behaviors, not just tasks
   – Pick something that you can address in a few months that will give you a noticeable benefit

3. Agree on a plan to address it, identify markers of progress and what is "done"
   – Write them down
   – Help: Progress tracking card examples: https://bssw-psip.github.io/ptc-catalog/catalog

4. Work your plan, track your progress

5. When you are done, celebrate…

…then pick a new pain point to address
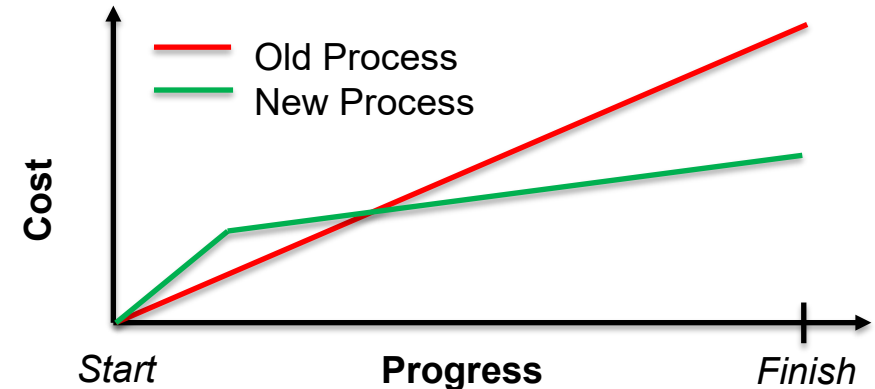
The new process costs something to implement, but it pays off over time

Productivity and Sustainability Improvement Planning
https://bssw.io/psip

A goal of BSSw.io is to provide resources for improving your software processes. If you find useful resources that aren't on BSSw.io, consider contributing. Its easy and quick.

IDEAS productivity

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Thanks, and Keep in Touch!

- Email comments and questions to bssw-tutorial@lists.mcs.anl.gov

- We'll provide feedback on pull requests in the hands-on repository

- See the tutorial web site for an archive of all the materials from this tutorial
  - https://bssw-tutorial.github.io/

- Follow us:
  - IDEAS Productivity project
    - Website: https://ideas-productivity.org/
    - Announcement list: http://eepurl.com/cQCyJ5
  - Better Scientific Software
    - Resources: https://bssw.io/
    - Monthly digest: https://bssw.io/pages/receive-our-email-digest
    - RSS feed: https://bssw.io/items.rss

Related Events at the ECP Annual Meeting (*all times Eastern*)

- IDEAS Desk – informal conversations about developer productivity and software sustainability
  - **Room 125** in the Gather.Town Side Meetings area (Whova -> Logistics)
  - Hours: 12:30pm-1:30pm Monday through Friday

- ECP Broader Engagement Initiative
  - 1:00pm-3:00pm Tuesday

- AD, Hardware and Integration, and Facilities Poster Session
  - 4:00pm-6:00pm Tuesday

- Best Practices #somycodewillseethefuture Breakout
  - 1:00pm-2:00pm Wednesday

- Panel on Sustainability of ECP Software and Applications
  - 1:00pm-3:00pm Wednesday

- What Can be Learned from Applying Team of Teams Principles to the ECP Projects PETSc, Trilinos, xSDK, and E4S?
  - 1:00pm-3:00pm Thursday
- **Bonus**: ECP Community BoF Days: Fostering Software Sustainability, Productivity and Quality through BSSw.io (registration required)
  - 3:00pm-4:30pm Wednesday 11 May