



# Summary



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Developing a Testing and Continuous Integration Strategy for your  
Team tutorial @ ECP Annual Meeting, April 2021



See slide 2 for  
license details

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## License and Citation

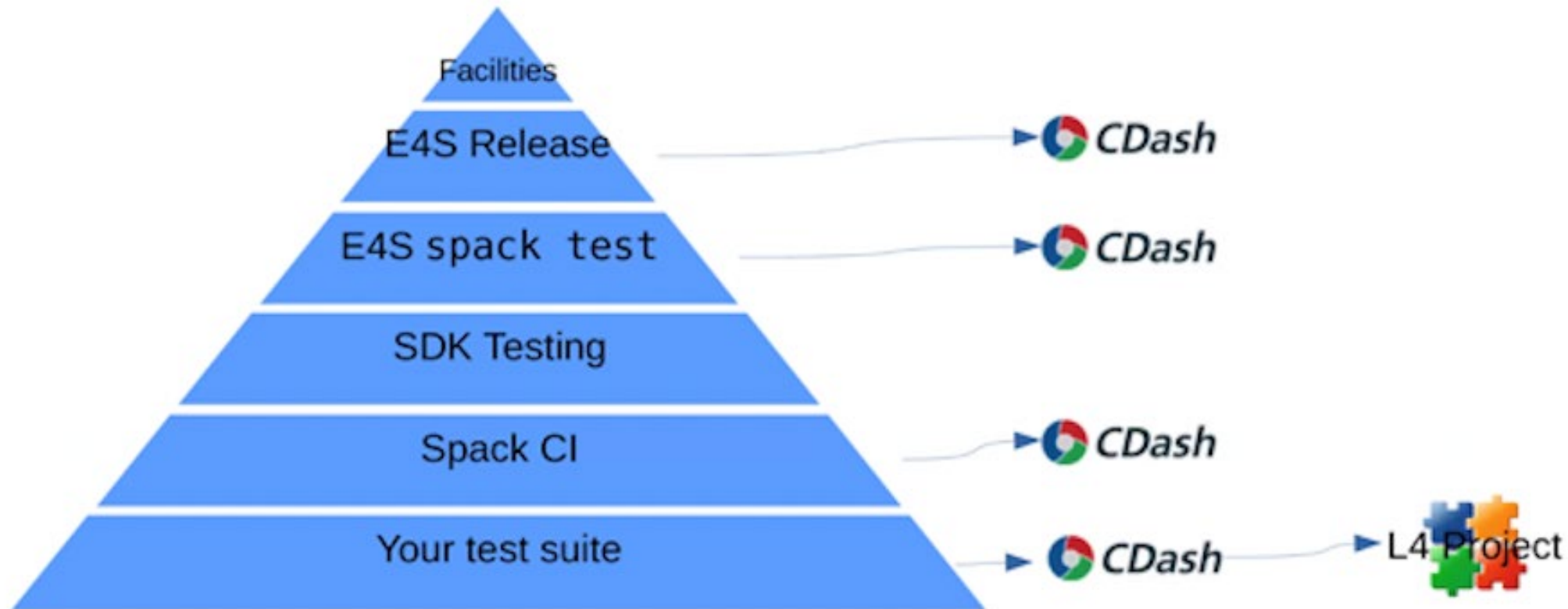


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- **The requested citation the overall tutorial is: David E. Bernholdt, Patricia A. Grubel, and James M. Willenbring, Developing a Testing and Continuous Integration Strategy for your Team tutorial, in Exascale Computing Project Annual Meeting, online, 2021. DOI: [10.6084/m9.figshare.14376956](https://doi.org/10.6084/m9.figshare.14376956)**
- Individual modules may be cited as *Speaker, Module Title*, in Better Scientific Software tutorial...

## Acknowledgements

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# 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

# 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

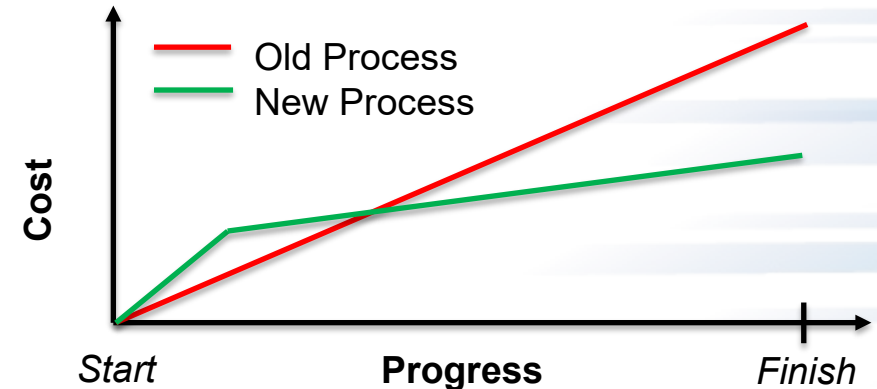
- Documentation
- Licensing
- Packaging and distribution
- Issue tracking
- Configuration and build
- Debugging strategies
- Building and sustaining communities around software
- Software publication and citation
- Requirements gathering
- Understanding and debugging floating-point math
- Performance 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
  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
  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](https://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

ECP  
EXASCALE  
COMPUTING  
PROJECT

# Thanks, and Keep in Touch!

- Email comments and questions to [bssw-tutorial@lists.mcs.anl.gov](mailto:bssw-tutorial@lists.mcs.anl.gov)
- 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
  - 12:30pm-2:00pm Monday through Friday
- Validation, Verification and Performance Suites, Proxy Apps, and Continuous Integration for Exascale Supercomputers
  - 10:00am-11:30am Wednesday
- Advancing Scientific Productivity through Better Scientific Software
  - 11:30am-12:30am Wednesday
- Hands-on with Progress Tracking Cards: A Lightweight Method for Improving Your Software Practices
  - 1:00pm-3:30pm Wednesday
- Benefiting from ECP CI
  - 2:30pm-3:30pm Wednesday
- ECP CI Startup Tutorial
  - 2:30pm-6:00pm Friday