



# Summary



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Better Scientific Software tutorial @ ISC23

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## Acknowledgements

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Science through computing is,  
at best,  
as credible as the software that produces it!

# Today, We Covered Many Topics...

- Designing software for flexibility and extensibility
- Refactoring software
- Collaborative software development
- Packaging
- Testing strategies for complex software systems
- Reproducibility

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

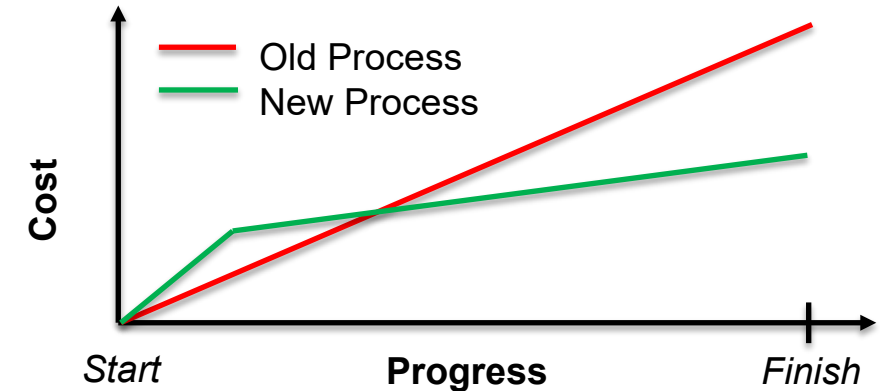
- Documentation
  - Licensing
  - Continuous integration testing
  - Distribution
  - Issue tracking
  - Configuration and building
  - Debugging strategies
  - Building and sustaining communities around software
  - Software publication and citation
  - Requirements gathering
  - Understanding and debugging floating-point math
  - Performance and performance portability
  - ...
- **Also important topics, but...**
  - Less distinction between research software and other software
  - More informational resources available
  - Next-level concerns for starting researchers
  - There's only so much time in the day!

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...
- 7 ...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

ECIP  
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)
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