



Hands-on with Progress Tracking Cards: A Lightweight Method for Improving Your Software Practices



Elsa Gonsiorowski

Lawrence Livermore National Laboratory

Reed Milewicz

Sandia National Laboratories

Elaine M. Raybourn

Sandia National Laboratories

Greg Watson

Oak Ridge National Laboratory

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Tutorial outline and objectives

Presentation	10	Overview of PSIP
Activity	30	Summarize Team Practices
Debrief	10	Identify a Goal for Process Improvement
Slides	15	Overview of Progress Tracking Cards
Activity	30	Create a PTC
Debrief	10	Share your card
Conclusion	10	Where to go from here
115 Minutes Total		
Demo	<i>afterwards</i>	How to move card into GitHub/GitLab/Jira

Focus of this tutorial

Realize process improvements without a disruption to any current development.

- *Introducing...*
- A practice that can help your team mitigate technical risk and develop software with confidence. (PSIP)
- How to identify topics for improvement by rating your project
- Progress tracking cards (PTC)
- Progress tracking card (PTC) catalog
- Integrating PTCs into your projects

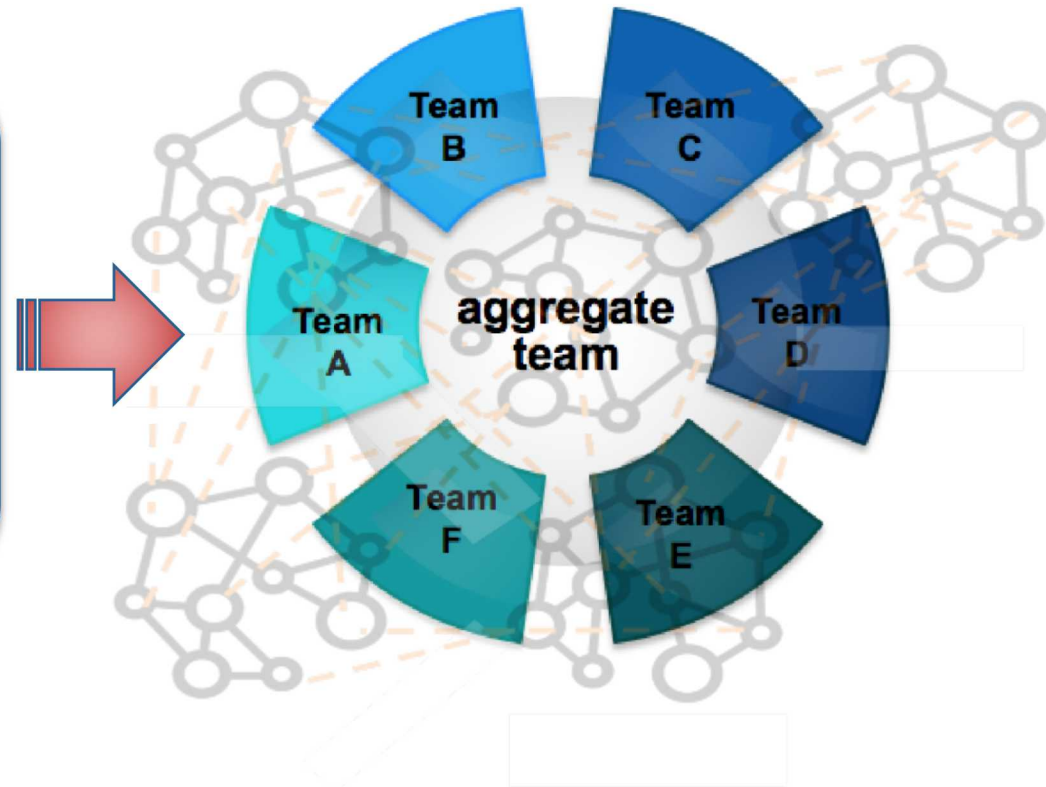


Enabling Software Quality

PSIP: Productivity and Sustainability Improvement Planning

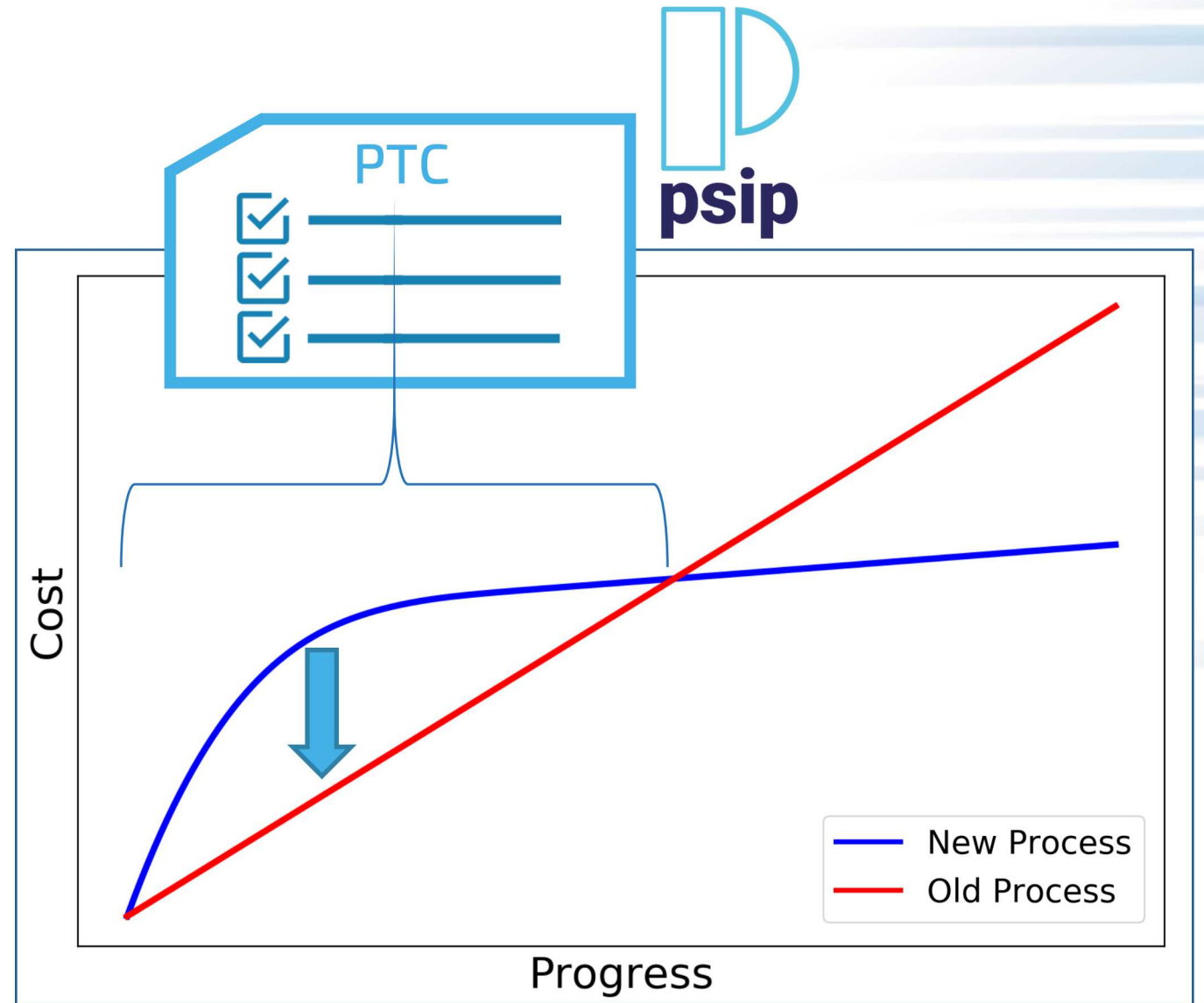
- PSIP is a lightweight workflow that can be used on its own or alongside frameworks you may currently use such as Kanban, Agile, etc.
- You *implement PSIP* by creating and using Progress Tracking Cards (PTCs) to achieve quality goals.

PSIP helps software teams to **IDENTIFY** opportunities to iteratively and incrementally **IMPROVE** software team practices and processes.



PSIP: At A High Level

- Why **not** improve?
 - Software process improvement often carries upfront costs.
 - It can introduce uncertainty and risk into a project. You can't control what you can't measure.
- PSIP provides tools and resources to set, measure, and realize improvement goals.





Reflect

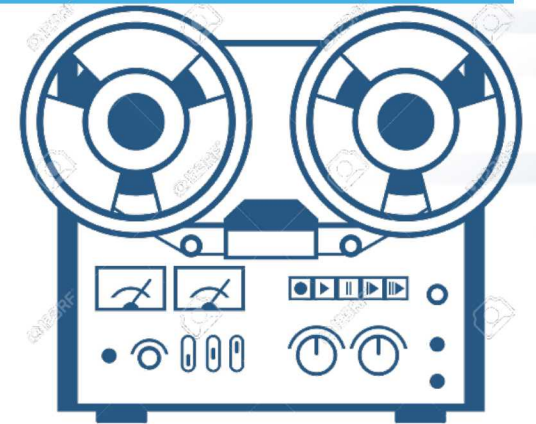
Reflect: How does your software deliver value to your users?

01 Summarize Current Project Practices

- Write brief practices summary document
- High level description, a few pages.

Q: If the new software requires teaching other how to use it, how does that happen?

A: Our project tasks students and postdocs with formulating their own tutorial for how to build and run the code [...]



Scope: What are the barriers to quality and efficiency?

Scope

02 Set Goals

- Identify practices ready for improvement.
- Select those with near-term payoff.

www.github.com/bssw-psip/ptc-catalog

Progress Tracking Card

Step 1

Step 2

...

03 Construct Progress Tracking Card (PTC)

- Construct from PTC catalog.
- Select only a few items.

Plan: What actions can you take in a predictable span of time?

Plan

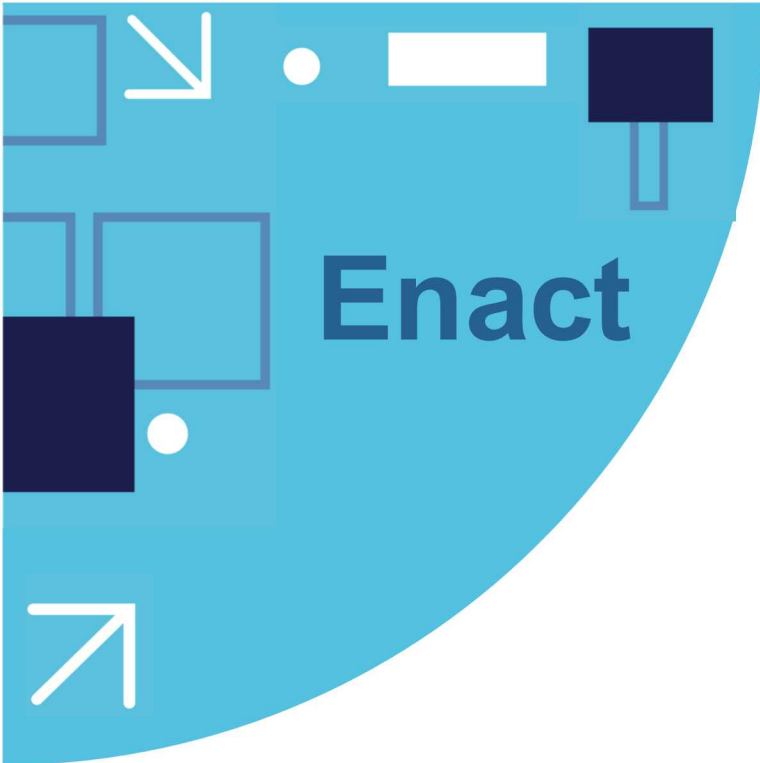


04 Record Current PTC Values

- Set baseline values for future reference.

05 Create Plan For Increasing PTC Values

- Define practice improvement steps.
- Be specific, track issues.



Enact: Can you execute on the plan? Are these changes impactful?

06 Execute Plan

- Increase PTC values by improving selected practices.
- Track issues progress.



07 Assess Progress

- Track PTC values.
- Adjust strategy if needed.

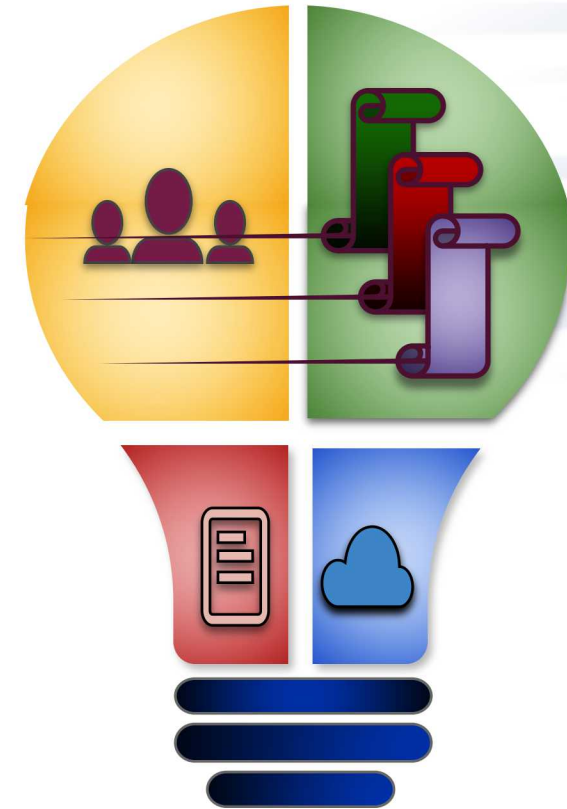
Activity: Summarize team practices by rating the current state of your project

- Software engineering is a systematic approach to the design, development, and maintenance of a software system
- By adopting a systematic approach to software development, it is possible to mitigate technical risk and develop software more effectively
- Quality in software is no accident; it is the result of deliberate practices
 - We often track the external qualities of software such as correctness or performance
 - But we can give the same care and attention to internal qualities such as maintainability, reusability, or testability
- Rate your projects' software practices:
<https://bssw-psip.github.io/ptc-catalog/survey.html>



Debriefing: PSIP Goal Setting

- Rate your project – how did you do?
 - What would you like to improve based on your evaluation?
- When setting improvement goals, look for improvements that *can be realized in a few weeks or months*, at least in early PSIP iterations. Larger goals are fine, if they can factored into smaller increments with delivered value.
 - For example, if your team wants to have a goal of comprehensive testing, you will want to specify incremental goals in making your plan toward the comprehensive goal.



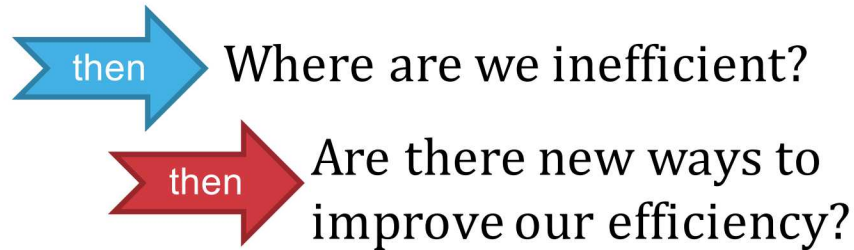
Work through improvement goal setting on your own, or with a PSIP facilitator.

bssw.io/psip

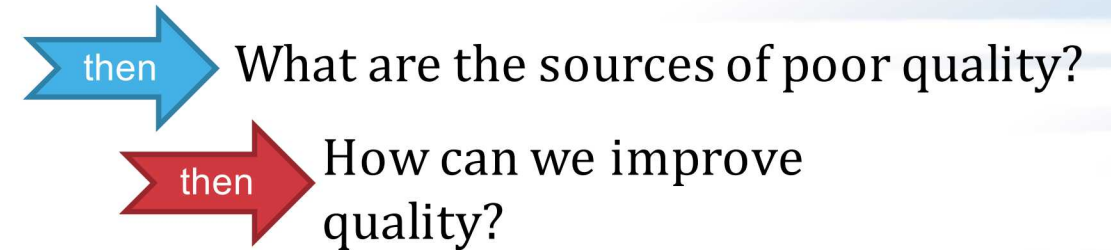
Debriefing: PSIP Goal Setting, continued

- As you set your goals, consider these questions, engaging external expertise as needed:

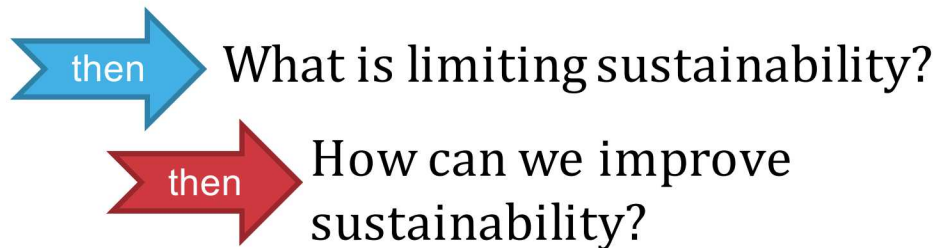
What consumes most of our time?



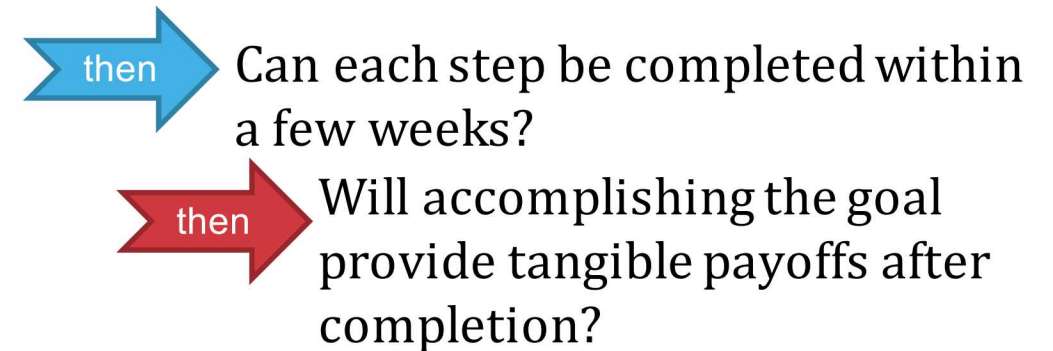
Where do we have quality problems?



Is our product sustainable for its expected lifespan?



Can I construct a goal with deliverable value in manageable increments?



Overview: Progress Tracking Cards (PTC)

What is a Progress Tracking Card (PTC)?

- A step-by-step list of activities or outcomes that incrementally lead to improvements in team effectiveness and efficiency
- Created by the team during the PSIP process
- Contains the target, or goal of the planning activity
- Each goal should map to one PTC. Larger goals can be split over several consecutive PTCs
- Teams may select PTCs from the PTC catalog, modify PTCs found in the catalog, or define their own PTC

EXAALT PSIP: Continuous integration (CI) testing

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

PSIP Process: Continuous Integration (CI)

Target: Implement and document a basic CI pipeline to act as the foundation for automated build and functionality testing.

0. **Initial Status.** No comprehensive CI framework in place

1. Develop a minimal docker image, with EXAALT dependencies ☒
2. Implement a minimal 'yaml' script for the CI pipeline ☒
3. Update EXAALT docker image to leverage CMake, and create a ParSplice-specific image for build testing ☒
4. Generate step-by-step "how-to" Docker-image documentation ☒
5. Extend CI to automate build and functionality testing with both CMake and Boost. ☒

Score (0-5): **4**

PSIP Process: Testing

Target: Implement and document practical testing examples for ongoing EXAALT development.

0. **Initial Status.** No comprehensive testing framework in place

1. Add 1-3 example tests using the existing CMake infrastructure (CTest) ☒
2. Add 1-3 example tests using the 'Boost Test' library ☒
3. Integrate the CTest infrastructure with the new Boost tests ☒
4. Integrate the Boost-enabled CTest framework into the CI pipeline ☒
5. **Bonus:** Work with EXAALT team to add more advanced tests to improve code coverage ☐

Score (0-5): **3**

Activity: Create a PTC

- Hands-on example of how to go through the PSIP process to select existing or create new PTCs
- PSIP and PTC GitHub repos <https://github.com/bssw-psip>
- PTC catalog <https://github.com/bssw-psip/ptc-catalog>

Debriefing: Share your PTC

PSIP Process: Onboarding Process

Target: Implement a technical onboarding process to facilitate integration of new team members

- | | | |
|---|--|-------------------------------------|
| 0 | Initial Status: No training process in place. | |
| 1 | Understand MPICH current onboarding training practices and define training categories | ☒ |
| 2 | Review and gather resources for training in <u>atleast two</u> categories | ☒ |
| 3 | Design website and integrate content for two categories | ☒ |
| 4 | Solicit feedback, improve content, design processes for external contributions and updating of website | ☒ |

Score (0-4) = **3**

EXAALT PSIP: Continuous integration (CI) testing

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| 3. | Update EXAALT docker image to leverage CMake, and create a ParSplice-specific image for build testing | ☒ |
| 4. | Generate step-by-step "how-to" Docker-image documentation | ☒ |
| 5. | Extend CI to automate build and functionality testing with both CMake and Boost. | ☒ |

Score (0-5): **4**

PSIP Process: Testing

Target: Implement and document practical testing examples for ongoing EXAALT development.

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| 3. | Integrate the CTest infrastructure with the new Boost tests | ☒ |
| 4. | Integrate the Boost-enabled CTest framework into the CI pipeline | ☒ |
| 5. | Bonus: Work with EXAALT team to add more advanced tests to improve code coverage | ☐ |

Score (0-5): **3**

Conclusion: In summary, what is PSIP?

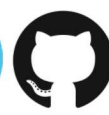
- PSIP: Incremental, integrated into the primary feature development process, lightweight, iterative and informal.
- PSIP embodies the spirit of the **Plan-Do-Check-Act** (PDCA) management cycle.
- Aims to captures the tacit, more subjective aspects of team collaboration, workflow planning, and progress tracking.
- Bootstrap aggregate team capabilities into best practices.
- Encourage teams to adopt a culture of process improvement.
- **PSIP is easy to learn, especially for scientists who cannot dedicate time and resources to more formal or heavyweight approaches.**

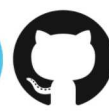
Conclusion: Where do we go from here? PSIP and PTC resources

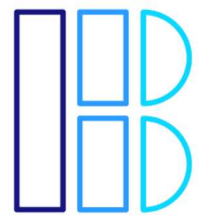
- PSIP landing page on bssw.io <https://bssw.io/psip>
- PSIP and PTC GitHub repos <https://github.com/bssw-psip>
- PTC catalog <https://github.com/bssw-psip/ptc-catalog>
- PSIP research paper <https://www.osti.gov/biblio/1574620>
- PSIP and PTC help <https://gitter.im/bssw-psip/community>
- Rate your project's practices here: <https://bssw-psip.github.io/ptc-catalog/survey.html>
- Examples of PTC integration in GitHub
 - <https://github.com/bssw-psip/example-ptc-projects>
 - <https://github.com/bssw-psip/example-ptc-issues>
 - <https://github.com/bssw-psip/example-ptc-milestones>

Thank you for your participation!

 @gonsie

  @rmmilewi

  @elaineraybourn

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