

Introduction to PSIP

Process to Progress. The Exascale Computing Project (ECP) Interoperable Design of Extreme-scale Application Software (IDEAS) team is developing the PSIP (Productivity and Sustainability Improvement Planning) method—a lightweight, iterative workflow where teams identify their most urgent software bottlenecks, and track progress on work to overcome them. We believe PSIP can encourage teams to adopt a culture of process improvement but belief alone is not enough. We would like **your** feedback on the framework and the use of progress tracking cards (PTC). Seriously.

The PSIP Framework

Step by Step. PSIP is intended to facilitate team collaboration, workflow planning, and progress tracking. We have introduced the methodology [1] and conducted successful PSIP activities with two ECP teams: EXAALT and MPICH [1]. We are also populating a catalog of PTCs [2] so motivated teams can grab ideas off the shelf to get started on their own.



What's missing from the framework above?

PSIP Progress Tracking Cards

Actual Cards created by EXAALT

Card: Testing	Initial Status	Score
0	Initial Status : No comprehensive testing framework in place.	0
1	Add 1-3 example tests using the existing CMake infrastructure (CTest).	1
2	Add 1-3 example tests using the 'Boost Test' library.	2
3	Integrate the CTest infrastructure with the new Boost tests.	3
4	Integrate the Boost-enabled CTest framework into the CI pipeline.	4
5	Bonus: Work with EXAALT team to add more advanced tests to improve code coverage.	5

Card: Continuous Integration	Initial Status	Score
0	Initial Status : No comprehensive CI framework in place.	0
1	Develop a minimal Docker image with EXAALT dependencies.	1
2	Implement a minimal 'yaml' script for the CI pipeline.	2
3	Update EXAALT Docker image to leverage CMake, and create a ParSplice-specific image for build testing.	3
4	Generate step-by-step "how-to" Docker image documentation.	4
5	Extend CI to automate build and functionality testing with both CMake and Boost.	5

Practice: Test Coverage	Score (0 – 5):
Score Descriptions	
0	Little or no independent testing. Functional testing via users.
1	Independent functional testing of primary capabilities.
2	Primary functional testing, some unit test coverage.
3	Comprehensive unit testing, primary functional testing.
4	Comprehensive unit testing, functional testing for documented use cases.
5	Comprehensive unit, use case functional testing; test coverage commitment.

- Comments:
- Functional testing:** Testing capabilities from user's perspective. Many functions can be called. Good for usability assurance. Insufficient to protect against some regressions. Difficult to isolate regressions. Can require extensive test execution times.
 - Unit testing:** Isolated, independent testing of functions and methods. Enable test-driven development, rapid test execution, fault isolation. Insufficient to ensure functional correctness.
 - Comprehensive:** Does not mean 100% line coverage, but sufficient coverage to detect most errors. Experts suggest various metrics such as 80% or more line coverage, or some similar high percentage of function point coverage.
 - Commitment:** Team is committed to writing comprehensive tests concurrent with functionality.

Examples of progress tracking cards (PTCs). What are the differences among these cards?

What process would an ideal PTC articulate?
A meta-planning process? A task checklist?

Questions You Can Help Us With

This is where you come in.

1. Where does PSIP fit along the spectrum of process improvement methods?
2. What is PSIP most similar to, most different from?
3. Does PSIP overlap or conflict with other process improvement methods – or can it be used to augment some? If so, which?
4. How do you currently track progress towards specific improvement activities?
5. Would you use PSIP? Why, or why not?
6. What if you had to involve another team in your workflow, then would you use PSIP? How, or why not?
7. What project characteristics may PSIP be the right or wrong choice?
8. To what extent is self-assessment an effective strategy for accomplishing improvement activities? Does PSIP require an external assessor to be successful?

We Made Some Room For You.

