Helping You Improve Software Sustainability and Development Productivity: An Overview of the IDEAS Productivity Project

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Introduction and Call to Action

- IDEAS = Interoperable Design of Extreme-Scale Application Software
- IDEAS-ECP (2017-present)
  - Funded by Exascale Computing Project (ECP)
  - Work with the ECP community to improve developer productivity and software sustainability as key aspects of increasing overall scientific productivity
  - Funded by DOE ASC/BER Semester Ecosystem Modeling
  - Improving interoperability of key DOE numerical libraries
- Fundamental goals
  - Increase the awareness of, and attention to, software development, productivity, and sustainability throughout the HPC/computational science and engineering (CSE) software community
  - Engage with...
    - Research sponsors and other stakeholders
    - Specific software development teams
    - Broader HPC/CSE community

We’re not a Community without You

- Be part of the community talking about and acting on software development, productivity, and sustainability!
- Join us for software-related events at PASC, ISC and other conferences
  - PASC: Poster CSI69 (Thursday)
  - PASC: Minisymposium MSSS — Towards Sustainable Scientific Software through Better Engineering, Development, Documentation, Publication and Curation (Friday)
  - ISC: Tutorial on Better Scientific Software (Sunday)
  - ISC: Tutorial and BOF on Spack (Sunday and Tuesday)
  - ISC: Poster PSI14 (Tuesday)
  - ISC: BOF on Software Engineering for Computational Science and Engineering (Wednesday)
  - ISC: Focus Session on New Approaches, Algorithms Towards Exascale Computing (Wednesday)
- Organize software-focused events — on your own, or join with us!
- Follow the IDEAS Productivity Project: https://ideas-productivity.org/
  - Join us for events, including HPC Best Practices Webinar Series, tutorials, minisymposia, posters, birds of a feathers, etc.
  - Tell us what topics you’d like hear (or present) in a webinar or a tutorial
  - Co-organize a workshop or minisymposium with us
  - Announcement mailing list: mailto:ideaskinfo@gmail.com
  - Email Us: IDEASproductivity@gmail.com
- Use and contribute to Better Scientific Software: https://bssw.io/
  - Contributing: https://bssw.io/contribute
  - Mailing list: https://bssw.org/pages/subscribe
  - Contact Us: https://bssw.io/contact

Outreach

- Tutorials
  - Full-day and half-day variants
  - Hands-on in full-day
- Recent venues
  - AT PesC (2016-2018)
  - ECP Annual Meeting (2017-2018)
  - ISC (2018-2019)
  - SAM GSE (2018)
  - Supercomputing (2016-2018)
- Current tutorial modules
  - Overview of Best Practices for HPC Software Developers
  - Git workflows
  - Better (Small) Scientific Software Teams
  - Improving Reproducibility through Better Software Practices
  - An Introduction to Software Licensing
  - Verification and Relocalization
  - Code Coverage and Continuous Integration

Best Practices for HPC Software Developers Webinar Series (HPC-BP)

- Monthly series, since May 2016
  - Traditional time slot is 1-2pm ET on a Wednesday
  - Offered live and archived
  - Presented by the community to the community
    - Not just IDEAS
  - 29 webinars to date
  - 77 attendees per webinar on average
  - 1712 attendees total, to date
  - Series info, archives, and mailing list for announcements
    - https://ideas-productivity.org/events/hpc-bp/practices-webinars

Technical Meetings and Birds of a Feather Sessions

- We help create opportunities to talk about software development, productivity, and sustainability in more “academic” environments
  - https://ideas-productivity.org/events/
- Birds of a Feather sessions
  - Software Engineering and Reuse for Computational Sciences and Engineering (2019)
  - Software Curation (2018, 2019)
- Minisymposia
  - PASC (2018, 2019)
- Thematic poster sessions
  - SAM CSE (2017, 2018)

Improving the Development Experience

Productivity and Sustainability Improvement Planning (PSIP)

- A simple methodology to help improve software development practices
- Focus on small, measurable improvements over a short time frame
- Numerous incremental improvements add up over time
- IDEAS Productivity project members assist ECP software teams
  - Interview to document current practices and challenges
  - Assistance selecting target for improvement and tracking progress
- Can be implemented without outside help
- Leverage available resources to learn new techniques

Better Scientific Software

Building an Online Community

- A community-based resource for scientific software improvement
- A central hub for sharing information on practices, techniques, experiences, and tools to improve developer productivity and software sustainability
- Computational science & engineering (CSE)
- Increase
- Resources
- Impact
- Development
- Sustainability
- User experience
- Domain

Goals

- Raise awareness of the importance of good software practices to scientific productivity and to the quality and reliability of computationally-based scientific results
- Raise awareness of the increasing challenges facing CSE software developers as high-end computing heads to extreme scales
- Help CSE researchers increase effectiveness as well as leverage and impact
- Facilitate CSE collaboration via software in order to advance scientific discoveries

Site users can...

- Find information on scientific software topics
- Contribute new resources based on your experiences
- Create content tailored to the unique needs and perspectives of a focused scientific domain

Types of content on BSSw

- Blog articles: success stories, perspectives, opportunities, and more
- Curated content: short pointers to useful material already hosted elsewhere
- Original content: content primarily hosted on BSSw
- Events: increase awareness of events related to better scientific software
- Community Landing Pages: provide an overview of BSSw resources tailored to a particular technical community

Outreach and Better Scientific Software sections below

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