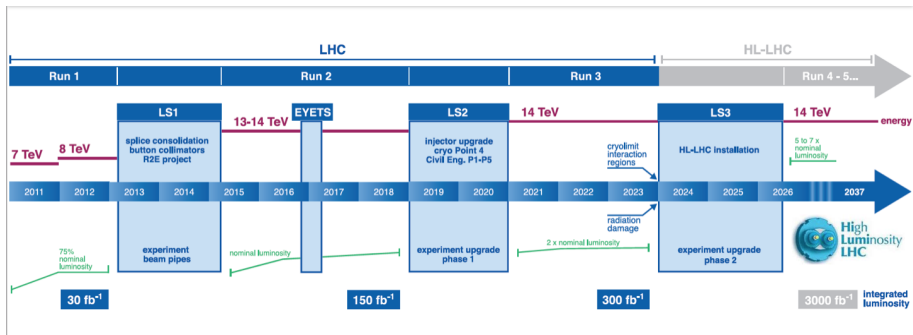


S2I2-HEP Workshop Introduction and Goals

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Plans for upgrading the LHC and Experiment Detectors



The primary goal of the S2I2-HEP conceptualization project is to prepare a strategic plan for a potential NSF Scientific Software Innovation Institute (S2I2) to develop software for experiments taking data in the “High-Luminosity Large Hadron Collider” (HL-LHC) era in the 2020s.

S2I2-HEP Strategic Plan - Timeline

- The CWP (workshop) process culminated with the Annecy workshop at the end of June
- The goal was to have a draft version of the WG white papers by end of July and a draft CWP by the end of August. This has shifted by at least one month. (August remains August!)
- Goal is to produce >80% version of the S2I2-HEP Strategic Plan by the end of October, sufficiently complete in the big picture that we can share it with NSF
- What happens after that in terms of (a) solicitation(s) is up to NSF

S2I2 Strategic Plan

The product of a conceptualization award will be a strategic plan for enabling science and education through a sustained software infrastructure that will be freely available to the community, and will address the following elements:

- the science community and the specific grand challenge research questions that the S^2I^2 will support;
- specific software elements and frameworks that are relevant to the community, the sustainability challenges that need to be addressed, and why addressing these challenges will be transformative;
- the required organizational, personnel and management structures and operational processes;
- appropriate software architectures and lifecycle processes, development, testing and deployment methodologies, validation and verification processes, end usability and interface considerations, and required infrastructure and technologies;
- the requirements and necessary mechanisms for human resource development, including integration of education and training, mentoring of students, postdoctoral fellows as well as software professionals, and proactively addressing diversity and broadening participation;
- potential approaches for long-term sustainability of the software institute as well as the software; and
- potential risks including risks associated with establishment and execution, necessary infrastructure and associated technologies, community engagement, and long-term sustainability.

Sessions at this workshop

- Wednesday afternoon - S2I2-HEP Strategic Areas of Focus and Priorities
- Thursday afternoon - S2I2-HEP Organisation and Processes
- Friday afternoon - S2I2-HEP Writing and CWP Review Sessions, Area Discussions
- Saturday morning - S2I2-HEP Writing and CWP Review Sessions, Area Discussions

Goals for this workshop

- Reach consensus on a prioritization high, medium, low for possible S2I2-HEP focus areas, guided by the criteria
- Reach consensus on a basic strawman S2I2-HEP organization and processes
- Provide reference slides (or short-document) describing this consensus
- Review/edit/update/finalize CWP WG documents

The primary goal of the S2I2-HEP conceptualization project is to prepare a strategic plan for a potential NSF Scientific Software Innovation Institute (S2I2) to develop software for experiments taking data in the "High-Luminosity Large Hadron Collider" (HL-LHC) era in the 2020s.

Questions - Institute Focus Areas and Priorities

- 1 **Impact - Physics:** Will efforts in this area enable new approaches to computing and software that maximize, and could potentially radically extend, the physics reach of the detectors?
- 2 **Impact - Resources:** Will efforts in this area achieve required improvements in software efficiency, scalability and performance and make use of the advances in CPU, storage and network technologies?
- 3 **Impact - Sustainability:** Will efforts in this area guarantee the long term sustainability of the software through the lifetime of the HL-LHC?
- 4 **Interest/Expertise:** Does the U.S. university community have a strong interest and expertise in the area?
- 5 **Leadership:** Are the proposed focus areas complementary to efforts funded by the US-LHC Ops programs, DOE or international entities?
- 6 **Value:** Is there potential to provide value to more than one LHC experiment and to the wider HEP community?
- 7 **Research/Innovation:** Are there opportunities for combining research and innovation as part of partnerships between the HEP and Computer Science communities?

What is software sustainability?

- **Dependent Infrastructure:** Will the infrastructure element continue to provide the same functionality in the future, even when the other parts of the infrastructure on which the element relies change?
- **Collaborative Infrastructure** Can the element be combined with other elements to meet user needs, as both the collaborative elements and the individual elements change?
- **New Users:** Is the functionality and usability of the infrastructure element clearly explained to new users? Do users have a mechanism to ask questions and to learn about the element?
- **Existing Users:** Does the infrastructure element provide the functionality that current users want? Is it modular and adaptable so that it can meet the future needs of the users?
- **Science:** Does it incorporate and implement new science and theory as they develop?

Questions - Institute Organization and Processes

- 1 **Goals:** What are the goals of the Institute?
- 2 **Interactions:** Who are the primary clients/beneficiaries of the Institute? How are their interests represented? How can the Institute align its priorities with those of the LHC experiments?
- 3 **Operations:** How does the Institute execute its plan with the resources it directly controls? How does the Institute leverage and collaborate with other organizations? How does the Institute maintain transparency?
- 4 **Metrics:** How is the impact of the Institute evaluated? And by whom?
- 5 **Evolution:** What are the processes by which the Institutes areas of focus and activities evolve?