Status of the Community White Paper

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23 March, 2017
CWP Discussion at FNAL

Overview

- Today Mark and I will review the current status and plans for the "Community White Paper" roadmap project.
- Additional information can be found on the webpages:
- `http://hepsoftwarefoundation.org/cwp.html`
- `http://hepsoftwarefoundation.org/cwp/cwp-working-groups.html`
- `http://s2i2-hep.org`

HEP Software Foundation - Timeline of Past Workshops

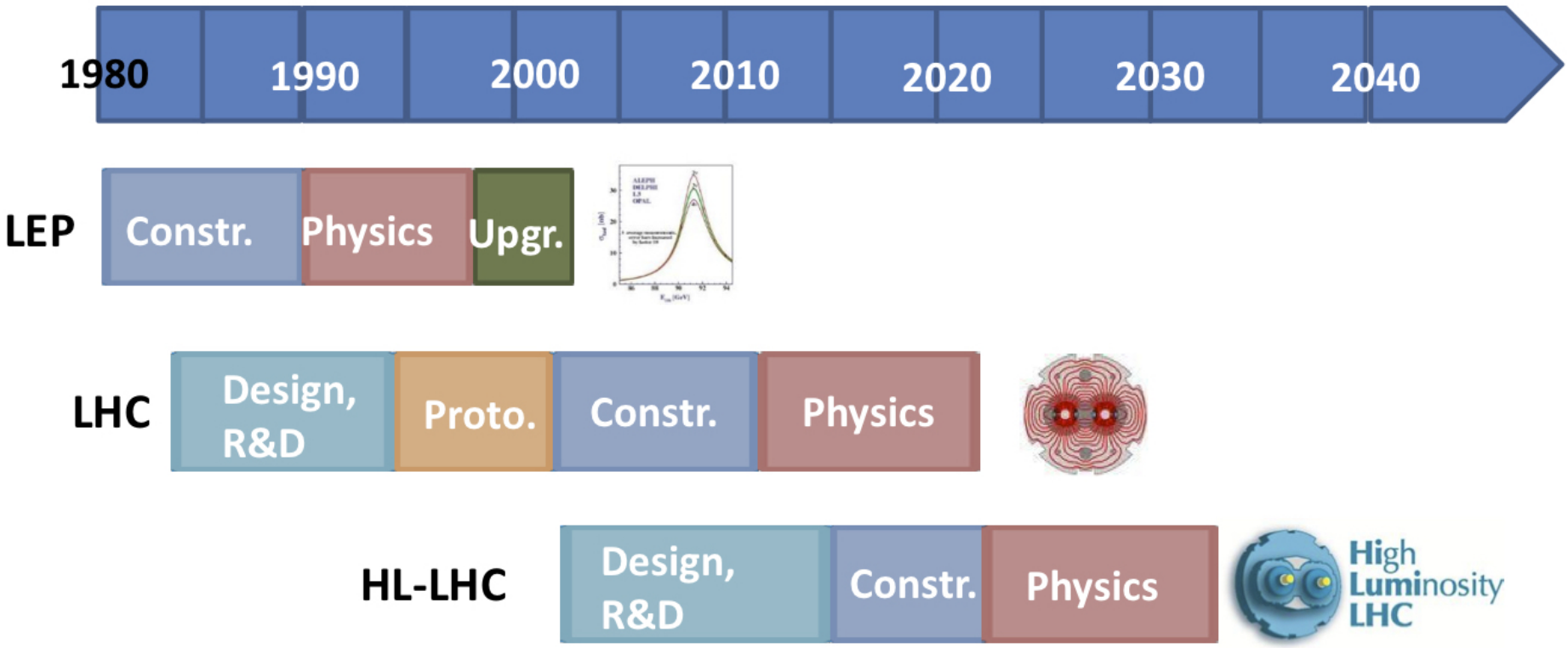
- Apr 2014 - HEP Software Collaboration meeting
- Jan 2015 - HEP Software Foundation workshop (2 days, SLAC)
- Apr 2015 - HEP Software Foundation session (0.5 day, Okinawa, CHEP2015)
- May 2016 - HEP Software Foundation workshop (3 days, LAL-Orsay)
- Jan 2017 - HEP Software Foundation workshop (3.5 days, SDSC/UCSD)

HEP Software Foundation (HSF)

The HSF (http://hepsoftwarefoundation.org) was created in early 2015 as a means for organizing our community to address the software challenges of future projects such as the HL-HLC. The HSF has the following objectives:

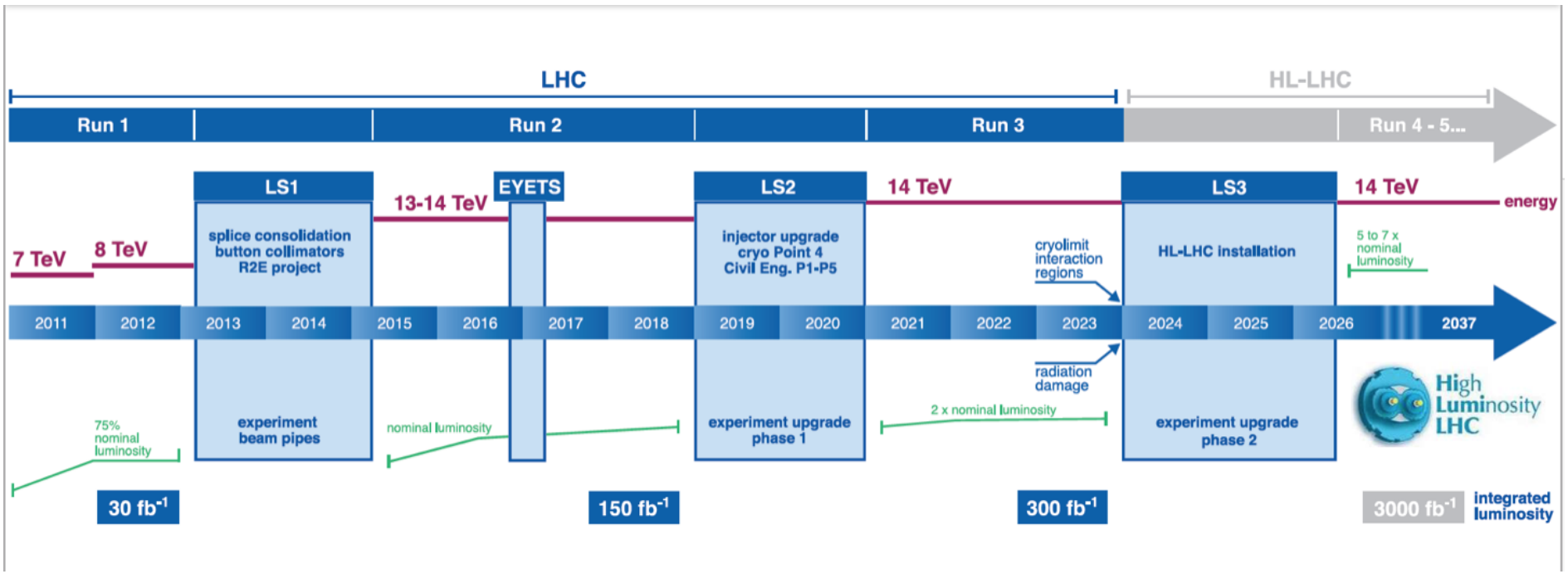
- Catalyze new common projects
- Promote commonality and collaboration in new developments to make the most of limited resources
- Provide a framework for attracting effort and support to S&C common projects (new resources!)
- Provide a structure to set priorities and goals for the work

CERN Accelerator Timeline



Various concepts also exist for subsequent machines.

Plans for upgrading the LHC and Experiment Detectors



A Software "Upgrade" for HL-LHC and 2020s HEP?

Looking forward to the next 10 years, we see a number of challenges for HEP software and computing:

- **Scale:** The HL-LHC will integrate 100 times the current data, with significantly increased data (pileup) and detector complexity.
- **Performance/cost:** Estimates of computing needs run faster than Moore's Law by factors of 3-30
- **Technology/Market evolution:** the return of heterogeneity; technology change will also make it challenging to exploit Moore's Law without software evolution.
- **Sustainability:** Most of the current software, which defines our capabilities, was designed 15-20 years ago: there are many software sustainability challenges.

Why Software? Software is *the* Cyberinfrastructure

Computer hardware is a consumable.
Software is what we keep, and invest in, over time.

Community White Paper (CWP)

- The CWP will identify and prioritise the software research and development investments required:
  - to achieve improvements in software efficiency, scalability and performance and to make use of the advances in CPU, storage and network technologies
  - to enable new approaches to computing and software that could radically extend the physics reach of the detectors
  - to ensure the long term sustainability of the software through the lifetime of the HL-LHC

- The HSF is engaging the HEP community to produce the CWP via a "community process"
  - Initiated as an HL-LHC planning process
  - Aiming for a broader participation (FNAL muon and neutrino program, Belle II, linear collider so far)

CWP process - contributed whitepapers

- The CWP process envisions contributions in the form of short white papers
- Contributions on all related topics are welcome.
- We made a specific call for white paper contributions regarding "Computing Models, Facilities, and Distributed Computing"
- A number of white papers have been received:
- `http://hepsoftwarefoundation.org/cwp-whitepapers.html`
- We will review what is there later today, so if you still have something to send, please send it this morning!
- We expect further contributions over the next 6 months.

CWP as roadmap

- The goal by the end of summer, 2017, is to produce "Roadmap for HEP Software and Computing R&D for the 2020s" and respond both to the WLCG charge:
- `http://hepsoftwarefoundation.org/assets/CWP-Charge-HSF.pdf`
- as the HSF goal of engaging more widely the HEP community (to everyone's mutual benefit).
- We need to be clear about defining priorities for the projects we need, how we will be organized to accomplish the projects and how these things fit in a timeline (for the mid-2020s/HL-LHC era, but which runs through LHC Run 3 and other things in between)
- This is not a full specification of computing models for all HEP experiments. For HL-LHC (CMS/Atlas), for example, that will happen in 2019-2020 in the computing TDRs.

The rest of the CWP process

- (Switch to websites)

Summary

- We have a significant investment in software, it embodies the core of our intellectual property and the real cyberinfrastructure.
- Significant challenges of scale, performance, technology and long term sustainability exist as we face the HEP projects of the 2020s.
- The Community White Paper should specify a roadmap for meeting these challenges for planned HEP projects