HEP Software Foundation (HSF)

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for the HSF Startup Team

AIDA-2020 Kick-off meeting, CERN, June 3-5 2015

Outline

- Goals and Motivations
- Current Status: Working Groups
- AIDA2020 and HSF

Motivations

- Much of our HEP software is now old (> 20 years) and needs to be adapted to more modern standards
- Paradigm-shift resulting from the evolution of CPUs
- Use of all resources available to our community such as HPC, commercial clouds, volunteer resources
- Must attract people with the required advanced skills and experience
- Ensure interoperability with software developed by other scientific communities
- Opportunity for sharing software between different experimental programs

Objectives

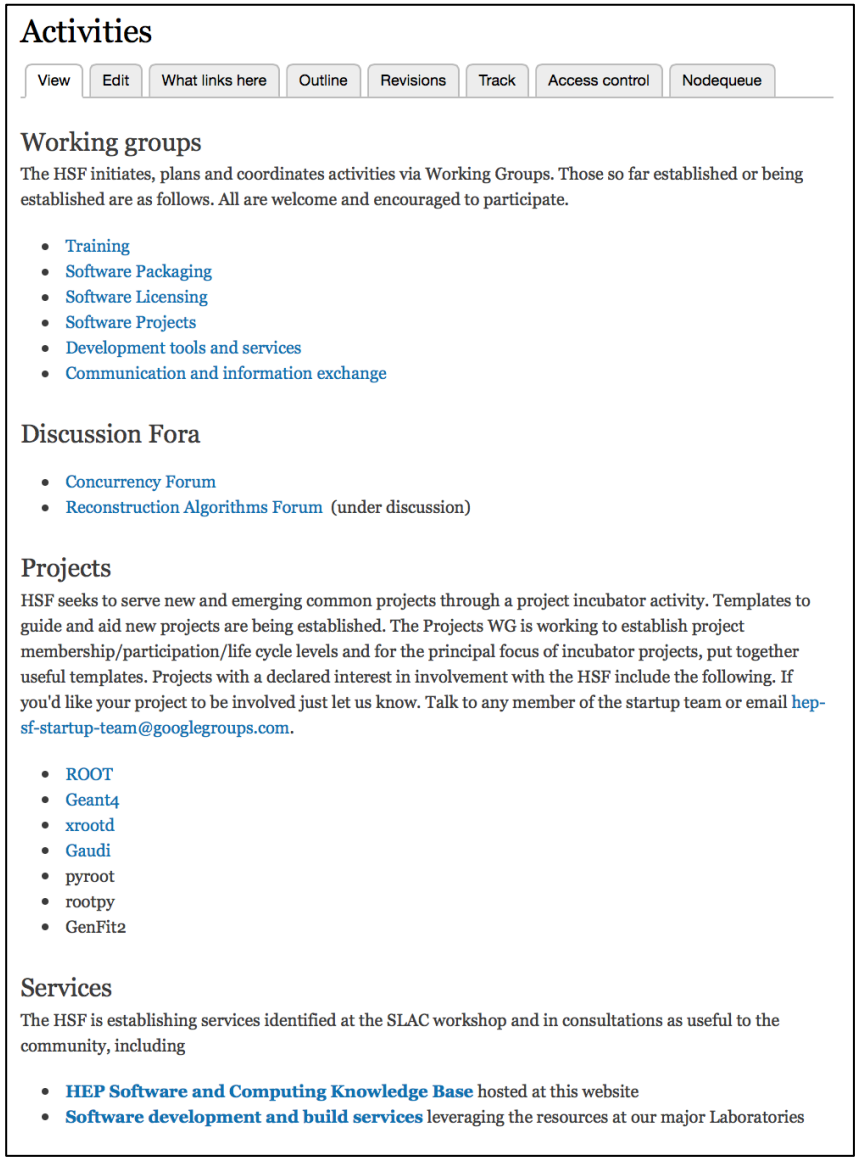
- Share expertise
- Raise awareness of existing software and solutions
- Catalyze new common projects
- Promote commonality and collaboration in new developments to make the most of limited resources
- Aid developers and users in creating, discovering, using and sustaining common software
- Support training career development for software and computing specialists
- Provide a framework for attracting effort and support to S&C common projects
- Provide a structure to set priorities and goals for the work
- Facilitate wider connections; while the HSF is a HEP community effort, it should be open enough to form the basis for collaboration with other sciences

History

- Initial Workshop: 3-4 April 2014 at CERN
- **10 White Papers** with the ideas for scope, goals, formation process, governing models, etc.
- **Interim Foundation Board (iFB)** with WP authors and other interested people, started meeting from mid July and favored a **bottom-up approach**
- Assembled **startup team** of volunteers with a broad representation and expertise interested in getting the HSF started
- Contacts and discussions with the HEP community
- HSF Workshop, 20-22 January in SLAC
- Session at CHEP-2015, 17 April in Okinawa, Japan

HSF Website

- http://hepsoftwarefoundation.org
- Website update reflecting workshop outcomes
- Main pages:
  - **Foundation**
  - **Events**
  - **Activities**
  - **Get involved**
- Left-side website overview box with direct links to activities/WGs (also linked from Activities page and referenced from Get involved page)
  - Communication & info exchange, development tools, knowledge base, software licensing, software packaging & distribution, software projects, training
- More concise front page blurb; more foundation info on the Foundation page



Activities

View | Edit | What links here | Outline | Revisions | Track | Access control | Nodequeue

Working groups

The HSF initiates, plans and coordinates activities via Working Groups. Those so far established or being established are as follows. All are welcome and encouraged to participate.

- Training
- Software Packaging
- Software Licensing
- Software Projects
- Development tools and services
- Communication and information exchange

Discussion Fora

- Concurrency Forum
- Reconstruction Algorithms Forum (under discussion)

Projects

HSF seeks to serve new and emerging common projects through a project incubator activity. Templates to guide and aid new projects are being established. The Projects WG is working to establish project membership/participation/life cycle levels and for the principal focus of incubator projects, put together useful templates. Projects with a declared interest in involvement with the HSF include the following. If you'd like your project to be involved just let us know. Talk to any member of the startup team or email hep-sf-startup-team@googlegroups.com.

- ROOT
- Geant4
- xrootd
- Gaudi
- pyroot
- rootpy
- GenFit2

Services

The HSF is establishing services identified at the SLAC workshop and in consultations as useful to the community, including

- **HEP Software and Computing Knowledge Base** hosted at this website
- **Software development and build services** leveraging the resources at our major Laboratories

Mailing lists

- HSF Forum
  - http://groups.google.com/d/forum/hep-sf-forum
  - 101 members, up from 59 before the workshop
- HEP S&C community website
  - http://groups.google.com/d/forum/hep-sw-comp
  - 189 people have signed up, a small increase from the 163 pre-workshop
  - Please encourage your communities to sign up!
- New lists since the workshop
  - Training
  - Packaging
  - General HSF technical discussion forum
- Reminder: Google-free self-signup to lists
  - Simply send mail with ‘subscribe’ as the *subject* (not content) to <listname>+subscribe@googlegroups.com, e.g. for the list above, hep-sw-comp+subscribe@googlegroups.com
- See the ‘Get involved’ page on the website for details

Working Groups

Working Group	Objectives	Forum - Mailing list
Training	Organization of training and education, learning from similar initiatives	hep-sf-training-wg
Software Packaging	Package building and deployment, runtime and virtual environments	hep-sf-packaging-wg
Software Licensing	Recommendation for HSF licence(s)	hep-sf-tech-forum
Software Projects	Define incubator and other project membership or association levels. Developing templates	hep-sf-tech-forum
Development tools and services	Access to build, test, integration services and development tools	hep-sf-tech-forum
Communication and information exchange	Address communication issues and building the knowledge base Technical notes	hep-sf-tech-forum

Training WG - discussing proposals

- Significant gap between programming expertise acquired at university and what is required by physicists (scientist in general) to perform good quality research
- Students would benefit from lessons aimed at bridging this gap
  - Format must be light-weight: best one is webinars
  - Very cost effective, requires only volunteers, no travel
  - Lessons covering broad spectrum of specializations (from C++ basic to in-depth Python) Several sites offer this kind of tutoring: Software Carpentry (SC) (http://software-carpentry.org/)
  - Collaboration with them is a possibility to explore
- Possible approaches:
  - Establish and maintain our own platform
  - Adopt an existing site, for example WikiFM, specifically developed for university students in Italy
- Goal of building a knowledge base:
  - Collect and distribute information on available courses/tutorials
  - Design a ‘curriculum” with all subjects to support our scientific work
  - Collect existing material and prepare missing modules

Software Packaging WG - first discussions

- Organizing a series of discussions with experts on existing tools and solutions with the idea to reach some consensus
  - identification of all required features
  - pros and cons of each solution
- Touching the topics of
  - Package Building
  - Package Deployment
  - Runtime Environment/ Virtual environments
  - Role of new technologies like Dockers
- Agreement on the usefulness of common tools, which can be used to assemble individual software stacks
  - The tools should be layered as to allow adoption by well established projects and new users
  - e.g. LHC experiments won’t replace their entire system easily

Software Projects WG - First ideas

- The essence of the Foundation are the **Software projects** under its umbrella
- Each development team should keep its autonomy and ownership of their software
  - HSF should not enforce any particular software process, project management or methodology, however packages should conform to some standards to facilitate integration
    - e.g. required documentation, build procedures, dependencies declaration, version naming convention, test definitions, etc.
- Initial Project Guidelines are being developed
  - A template implementing the guidelines will be developed to help new software projects
- A clear message from the SLAC workshop was that the notion of incubator projects -- cf the Apache Software Foundation -- is relevant to the HSF

Development tools and services WG

- Both CERN and Fermilab have expressed willingness to support some development tools and services for the HSF community, once technical issues are worked out
  - For example, access to TechLab resources at CERN
  - In other areas the HSF may provide guidance, recommendations, templates etc. for the use of open source tools
- This working group will plan and coordinate activities and service offerings in this area.

Communication and Information exchange

- Establishment of the website, google groups for email/web discussion forums
- Software catalog and knowledge base integrated with the Drupal website (plans to use other support)
  - software catalog, software categories, science fields, experiments, and events
- Technical Notes
  - provides archived, versioned documents that can be referenced in software documentation and papers
  - HSF Technical Notes policy document being prepared
- Discussion Fora
  - **Concurrency Forum**
    - Technical issues to embrace concurrency in our software
  - **Reconstruction Algorithms Forum**
    - All matters of event reconstruction and pattern recognition

HSF and AIDA-2020

- HSF is just starting at the same time as AIDA 2020 - major synergies expected
  - The HSF aims to promote commonality and collaboration in new developments
  - AIDA WP3 (Advanced software) aims to develop common software packages
- It would be very natural that WP3 software packages be an integral part of the HSF and help defining what the Foundation should be
  - Benefiting from project templates, packaging and distribution, training, development tools, knowledge sharing, information exchange, etc.
  - Acting as ‘guinea-pigs’ projects

Other examples: DIANA

- DIANA (Data Intensive ANAlysis)
- 4-year project funded from May 2015 by US National Science Foundation (NSF)
- Focus on analysis software, including ROOT and its ecosystem
- Three primary goals: performance, interoperability, support for collaborative analysis
- PIs: Elmer (Princeton, CMS), Sokoloff (Cincinnati, LHCb), Cranmer (NYU, Atlas), Bockelman (U.Nebraska-Lincoln, CMS/OSG)
- Test case for wider collaboration around existing software packages

Summary

- HSF will be what participating people will make of it
  - favoring **do-cracy**
  - **transparency is essential**
- Need few guinea-pig software projects
  - Experiment with the inter-project relationships under HSF umbrella
  - Defining what it means being part of HSF and quality criteria
  - Few projects have declared their interest and we expect that AIDA-2020 software projects will be among them
- **Please join and contribute** to any of the working groups, the startup team, discussion fora
  - subscribe to the mailing lists to follow progress and contribute
- Looking forward for a very fruitful collaboration between HSF and WP3 of AIDA-2020