

HEP Software Foundation: Progress so Far

Pere Mato / CERN on behalf of the HSF Startup Team
GDB Meeting, 12 November 2014

Motivation

- ❖ Much of our HEP software is now old (> 20 years)
 - ❖ it needs to be adapted to more modern standards
- ❖ Paradigm-shift resulting from the evolution of CPU architectures
 - ❖ our code has to be re-engineered to make use of the full capabilities
- ❖ Make use of all resources available to our community
 - ❖ HPC facilities, 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

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)
 - ❖ Formed by WP authors and other interested people
 - ❖ Started meeting from mid July
 - ❖ Favored a bottom-up approach: invite projects to join ('endorsed' and 'hosted'), produce specific proposals on services and eventually agree on a governance strategy
 - ❖ Identified people who can lead the initial phase of building a collaborative software foundation

Software Domains in Scope

- ❖ Make 'scientific software' an early focus
 - ❖ Software to process the data coming from the detectors up to the publication of physics results
 - ❖ Simulation; MC generators; reconstruction, calibration, alignment algorithms; analysis tools; statistical tools; etc.
 - ❖ Many / most new architecture / concurrency challenges are in this domain
- ❖ Include software addressing data-intensive challenges early as well? It's a challenge up there with new architectures / concurrency
- ❖ For other areas, rely on community engagement & initiatives, or leave for later
 - ❖ Distributed software, middleware
 - ❖ DAQ / online
 - ❖ ...

Early Focus: Software Packages

- ❖ Establish the initial list of 'guinea pig' packages to include in the Foundation
- ❖ Handle packages at different stages
 - ❖ Existing, well established packages not requiring significant change (e.g. Pythia6)
 - ❖ Packages in active development as common software by developers strongly interested in being early adopters and active contributors
 - ❖ Established packages in need of re-engineering, adaptation to the new computing landscape such as vectorization, parallelization (e.g. ROOT, Geant4, ..).
 - ❖ New packages and R&D initiatives that are good candidates to make use of the Foundation from the beginning (e.g. USolids/VecGeom)
- ❖ Establish the guidelines for incorporating and managing these initial sets of packages

Initial Organization

- ❖ Should be lightweight, transparent, open
- ❖ Charge a smallish 'startup team' with putting the HSF in place
 - ❖ Pere Mato, Torre Wenaus volunteer / are volunteered to steer and coordinate
 - ❖ Enlist additional members to provide broad representation and expertise
 - ❖ Be flexible as to the membership, let it evolve, e.g. to take advantage of motivated experts becoming interested and available
 - ❖ Keep it practical, technical, results-driven, responsive to input, consultative
 - ❖ Early experience can guide a longer term organization

Initial Organization (2)

- ❖ Startup team works in an open way, complemented and aided by active ongoing community discussion, meetings
- ❖ Startup team is meeting every week
 - ❖ Limited attendance to make it effective, but open & prompt minutes
 - ❖ and every month the meeting is fully open
- ❖ Complemented by animated discussions & info exchange
- ❖ As we accrue active participants, recognize them as such: HSF members
- ❖ HSF will at some point begin to recognize projects and organizations as members but **we start with people**

Startup Team

- ❖ Peter Elmer (Princeton)
- ❖ Daniel Elvira (FNAL)
- ❖ Frank Gaede (DESY)
- ❖ Michel Jouvin (LAL, IN2P3)
- ❖ Pere Mato (CERN)
- ❖ Dario Menasce (INFN)
- ❖ Graeme Stewart (Glasgow)
- ❖ Craig Tull (LBNL)
- ❖ Andrea Valassi (CERN)
- ❖ Brett Viren (BNL)
- ❖ Torre Wenaus (BNL)
- ❖ ...and we welcome more participants who can be actively engaged and represent additional parts of the community

Startup Activities

- ❖ Primary activities:
 - ❖ Synthesizing the White Papers
 - ❖ Making contacts, planning contact meetings
 - ❖ Website and communication
 - ❖ Workshop preparation
- ❖ These will be elaborated in the coming slides

Analysis of the White Papers

- ❖ Did a bulleted summary of main points of each of the white papers and later a **matrix of papers/points**
 - ❖ Using the matrix, we made first, second and third outlines and drafts of a synthesised document
 - ❖ The synthesis is not just a summation of points in the papers, it's a qualitative synthesis with recommendations to build an initial HSF plan from the white paper commonalities, as well as the thoughts and deliberations of the startup team
 - ❖ A “White Paper Analysis and Proposed Startup Plan”
 - ❖ Version 1.0 of the document released yesterday
- View of the German Community on the proposed “HEP Software Foundation” - submitted by Gunter Quast ([pdf](#))
 - HEP Software Foundation - submitted by Oxana Smirnova (Grid) ([pdf](#))
 - HEP Software Foundation - submitted by Jeff Templon (Nikhef) ([pdf](#))
 - Foundation for HEP Software - submitted by Richard Mount ([pdf](#))
 - HEP software collaboration - submitted by Michel Jouvin (IN2P3) ([pdf](#))
 - HEP Software Consortium - submitted by Panagiotis Spentzouris (US) ([pdf](#))
 - HEP Software Foundation - submitted by David Britton (UK GridPP) ([pdf](#))
 - HEP Software Foundation - submitted by Dario Menasce (INFN) ([pdf](#))
 - Experiences of the Geant4 Collaboration - submitted by Makoto Asai ([pdf](#))
 - Openlab thoughts on a HEP Software Foundation - submitted by Andrzej Nowak ([pdf](#))

Proposed Startup Plan

- ❖ Establish an inclusive, representative startup team
- ❖ Establish communication tools facilitating discussions between all stakeholders
- ❖ Define the initial software domain scope that will be the focused target of the core HSF effort
- ❖ Meet with as many software domains and science communities as possible to gather input
 - ❖ Be receptive to early proactive input from the wider community also
 - ❖ Promote and foster broad involvement such that community engagement amplifies the core effort
- ❖ Based on the input, develop objectives and deliverables for the HSF tailored to the declared interests of the involved communities
 - ❖ Maintain the evolving plan and work program as a 'living document'
 - ❖ Decide based on interest and support which of the potential activities and deliverables the HSF should proceed with
- ❖ Organize an early face-to-face workshop to assess progress and plans a few months into the startup, and plan the way forward
 - ❖ Make plans to use CHEP as a second venue for a face-to-face meeting
- ❖ Consider the longer term, post startup team organization and governance once some real experience has been accrued

Making contacts, planning contact

- ❖ Started the first round of contacts of the wide community
 - ❖ Essential to get their input and engagement to define initial services and activities
- ❖ MC generator community identified as priority
 - ❖ No participation to initial WS
 - ❖ Contacted already the first people
 - ❖ Organizing an information meeting with authors of the main generators
- ❖ Major software packages
 - ❖ Geant4
- ❖ Experiments and projects
 - ❖ HEP Forum for Computational Excellence, Photon Science
 - ❖ Belle II, Alice, FCC, LHCb, CMS,..., LCG Architects Forum, GDB (now!)
- ❖ Laboratories and Universities
 - ❖ SLAC, Oxford, INFN, ...

HSF Website

- * Number one on the HSF task list was: *Animate discussions between all stakeholders, including users; provide a system for facilitating information exchange*
- * We've established an autonomous website (hosted in Amazon EC2)
- * Intentions for the website:
 - * A communication and information exchange tool for all, with contributions from all
 - * Facilitate collaboration and common efforts, and avoid redundant efforts, by increasing awareness of the activities and resources within our field
 - * Promote awareness of useful software and tools from outside our community, e.g. open source
 - * Define, describe, encourage "membership in the HSF" on the part of projects
 - * Serve as a nexus for HSF activities

Website Elements

❖ Existing

- ❖ Software projects/packages categorized with software category and science field tags
- ❖ Events: meetings, workshops, conferences, schools, tutorials...
- ❖ Experiments: describe and crosslink what software your experiment uses
- ❖ Organizations: OSG, WLCG, HSF, Concurrency Forum, ... our community

❖ Planned

- ❖ More/better content! Add your favorite software, extend/correct existing entries
- ❖ Facilities, institutes: extend to 'computing', not just 'software'
- ❖ Licensing
- ❖ 'HSF membership/participation/standing/interest...'
- ❖ Assessment/evaluation/scoring/ranking/crowdsourced reviews/HSF peer reviews/endorsement...
- ❖ Job postings
- ❖ .. bring your ideas!

The screenshot displays the homepage of the HEP Software Foundation. The header features the site's name and tagline, along with a navigation menu. A user login section is on the left, followed by a central content area with a note about the site's setup phase. The right sidebar contains sections for Events, Science fields, Community, and HSF monthly archive.

The HEP Software Foundation
Advancing high energy physics community software

Home Documents Events Organization Plan Needs Google

User login
Username *
Password *
• Create new account
• Request new password
Log in

The HEP Software Foundation
View What links here

Note: this site is in its setup phase. You will find pages and material to be incomplete, planned content is missing, etc.

The HEP Software Foundation (HSF) is being organized to facilitate coordination and common efforts in high energy physics (HEP) software and computing internationally.

Current HEP software is the result of 20 years of development, and now must evolve to meet the challenges posed by new experimental programmes. In addition, the computing landscape is evolving rapidly and we need to exploit all the expertise available in our community, and in other scientific disciplines, in order to meet the technical challenges we are facing.

The objectives of the HSF as a community-wide organization are in sharing expertise; raising awareness of existing software and solutions; catalyzing new common projects; promoting commonality and collaboration in new developments to make the most of limited resources; aiding developers and users in creating, discovering, using and sustaining common software; and supporting career development for software and computing specialists.

A recognized community organization can also provide a framework for attracting effort and support, and provide a structure for the community to set priorities and goals for the work. It can also 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.

The HSF is currently starting up. All are welcome and encouraged to participate in establishing and developing the foundation. Contact Pere Mato (pere.mato at cern.ch) and/or Torre Wenaus (wenaus at gmail.com) if you are interested in participating. For starters, create an account at this site so you can use it fully and help build it.

HSF website
• Content summary
• Recently added
• Discuss

HSF what's new
11/11 Startup document 1.0
11/5 HSF meeting
Jan 2015 SLAC workshop

Software catalog
Software list
Software by category

Software categories
• Analysis tools
• Calibration and alignment
• Collaborative tools and projects
• Commercial
• Concurrency
• Concurrent I/O
• CPU and co-processor

Events
Event list
Calendar

Science fields
• Accelerator science
• Astrophysics and astroparticle physics
• b physics
• Health physics
• High intensity, neutrinos
• LHC, collider physics
• Linear collider
• Nuclear physics
• Photon physics, light source
• Space physics
• Theory

Community
Experiments
Institutes
Facilities
Organizations

HSF monthly archive
• October 2014 (105)
• November 2014 (9)

<http://hepsoftwarefoundation.org>

HSF Forum

- ❖ Google groups adopted as the basis for discussion forums
 - ❖ Better to be outside the perimeters of our institutions
 - ❖ But we stick with indico, vidyo for agendas, conferencing
- ❖ Open HSF forum
 - ❖ Supersedes the CERN IFB e-group
 - ❖ HSF Forum - hep-sf-forum@googlegroups.com
 - ❖ Sign up with any email account by sending a mail to hep-sf-forum+subscribe@googlegroups.com with the subject "subscribe"
 - ❖ IFB continues as the self-selected open group defined by membership in the forum
- ❖ Startup team internal discussions proceed on a closed google group
- ❖ More google groups can be set up based on needs and interests, under the HSF umbrella
- ❖ E.g. recently we added
 - ❖ HEP Software and Computing - hep-sw-comp@googlegroups.com
 - ❖ Everyone involved or interested in HEP S&C is encouraged to sign up to this list
- ❖ Posting rights, moderation requirements etc. may need some tweaking

Workshop Preparation

- ❖ Venue and dates are now fixed
 - ❖ SLAC, January Tue 20 and Wed 21, 2015
- ❖ Main goal: refine next steps for building HSF
 - ❖ Structured after main topics from WP Synthesis
 - ❖ Get feedback from package authors, identified missed requirements or wrong priorities
 - ❖ Vision from the the various HEP communities
 - ❖ Initiatives, input arising from community engagement
- ❖ Importance of a wide SW project participation
 - ❖ Does not require a long-term commitment with HSF
- ❖ Possibility to organize ancillary meetings before and after the two days meeting
 - ❖ Reserve at least Thu 22 for ancillary meetings

<http://hepsoftwarefoundation.org/workshop-slac-jan-2015>

WS Program Outline

- ❖ Survey what has been done so far (previous workshop, startup team, White Papers synthesis, startup plan, etc.)
- ❖ Invite a range of large and small projects to briefly express their views on how the HSF could be useful to them, and what they can bring to it
- ❖ Invite a wide range of experiments, small communities, individual users to express their views in lightning talks
- ❖ Discuss new project initiatives which might be launched under the Foundation umbrella
- ❖ Hear the views of institutions and funding agencies
- ❖ Come to consensus and conclusions on the next steps in starting up the HSF

Next Steps

- ❖ Official announcement of the SLAC workshop
- ❖ Use the synthesis document as introduction/background when pursuing our contacts meetings
- ❖ Based on contact meetings and discussions, begin planning/tailoring Foundation activities to the declared interests of groups and projects
 - ❖ Start populating a list of 'possible' activities
- ❖ Encourage early contributors to the website, respond to feedback, continue development
- ❖ Fill out the plans for the SLAC workshop and ancillary meetings
 - ❖ By end Nov, have the plans firm enough to allow people to book their flights

Summary

- ❖ Communication tools
 - ❖ Foundation Web: <http://hepsoftwarefoundation.org>
 - ❖ Forum: <https://groups.google.com/forum/#!forum/hep-sf-forum>
 - ❖ Mailing lists:
 - ❖ hep-sf-forum@googlegroups.com please sign up at to participate in the HSF
 - ❖ hep-sw-comp@googlegroups.com more general list for HEP SW & COMP
- ❖ Began consultations and community engagement
- ❖ White Paper synthesis document available
- ❖ Preparation of the SLAC workshop
 - ❖ Preliminary announcement at <http://hepsoftwarefoundation.org/workshop-slac-jan-2015>