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: <u>3-4 April 2014 at CERN</u>

* <u>10 White Papers</u> 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**

- 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)

✤ 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

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!

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