

Pod B

Afternoon session

Names:

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HEP/CS Collaboration

1) ***How could we proceed to put together a document in the next 6 months summarizing HEP computing challenges in a language that CS people understand and map it to established discipline areas in CS?*** (useful for developing future synergistic and collaborative projects/relationships with CS faculty?)

It is difficult to document the full set of HEP challenges. Striving for completeness in the next 6 months is too ambitious. Thus, we should focus on a subset of high impact challenges that have the following characteristics:

- (i) there is interest in the US community to work on them
- (ii) there is expertise and strength in the US community
- (iii) there is potential for huge impact to the HL-LHC scientific goals, if solutions can be found that serve more than one experiment
- (iv) we probably do not have to worry about matching HEP challenges to CS discipline areas in general. The CS community funded by ACI is probably already diverse enough for this.

Steps: 1) identify HEP challenges, 2) engage CS with “menu” to identify areas of common interest/strength, 3) workshop to create the document.

2) ***What are the incentives for such collaboration for HEP people? For CS people? For non-CS people?*** E.g. recognition, funding, publications, students, new problems to solve, new places to apply technologies, new solutions to current problems, pride in working on a global-scale problem. ***How could an S2I2-HEP institute create the relevant incentives and promote HEP/CS research collaborations?***

The list in e.g. ... is an excellent set of incentives. Hard to do better than what is already listed here. An example missing in the e.g. ... above is “credit for software and/or data products”.

The fellowship model as implemented in MoISSI makes sense for an S2I2-HEP as long as high standards of quality and relevance to the scope of the institute are maintained. The supervision that the students and/or postdocs receive is an important factor for success. It's a big responsibility for the “selection committee” that selects the fellows. In the MoISSI this is planned by attaching 10% of a staff software engineer to each and every fellow.

In addition, the ultimate success (and eventual impact) of a fellowship program will depend on the fellows visibly advancing in their careers (both in HEP and outside of HEP) through the work/research they did as a fellow. Evaluation of this success will only be possible after a latency of a few years, of course.

3) *What can an S2I2-HEP institute do to create an environment of increased communication and awareness by individual HEP and CS researchers of each other's problems, expertise and research interests?*

The very existence of such an institute will provide a focal point for joint work across experiments in HEP and individuals in CS for the small set of topics chosen to be within the scope of the institute.

4) *Will HEP have anything interesting to offer in 5-10 years for CS researchers? What?*

Yes. Throughout the HL-LHC period there will be a continued string of challenges in part due to changes in technology and in part due to increases in scale and in part due to operational challenges posed by the reality of the running program.

S2I2-HEP Scope

5) The S2I2-HEP will not be trying to solve all problems for HL-LHC or HEP for that matter. Rather, it will be laying out a set of software activities for US Institutions for which the US can play a leading role. ***What are the areas that the S2I2-HEP should play a leading role in, informed by activities and interests within the US HEP and US CS communities?***

If we go by "interest, strength, and impact" then we can arrive at some guidance to the scope:

US HEP strengths & interest:

ATLAS: workload management & distributed computing, remote data access, new algorithms (incl. but not limited to machine learning) on new archs, VR

CMS: data management, remote data access, new algorithms (incl. but not limited to machine learning) on new archs,

CS strengths and interests:

High-performance and/or high throughput distributed computing, data science, data transfer and management software, workflow management software