

## Pod C

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## HEP/CS Collaboration

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

- Articulate grand challenge science problems (domain science)
- Identify difficult computing problems that need answers from CS (for example)
  - more flops, more computation → distributed → must rethink domain-specific code
  - lower bandwidth: “thin” the data, lossy but determine what parts of the data are more important than others (again, domain-specific)
  - hardware budget and power budget
- Form a group of computer scientists/computational scientists to distill a computing research agenda from the HEP computing problems. [integrate computer scientists into the process explicitly.]
- Make sure it's an iterative process.

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?**

Incentives can be constructed and used to encourage the types of behavior deemed to be useful or productive for HEP efforts.

Who are the CS communities? Faculty, researchers, students, software engineers, operations staff, etc. Each of these groups would be motivated by different incentives. The incentives for software engineering and faculty are likely to be very different.

Who are the HEP people?

The sociological environment and incentives for multidisciplinary efforts need to be well understood and carefully addressed to increase the chances of success.

**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?**

- A. serve as a matchmaker; respected and trusted expertise + source of seed funding, not welfare
- B. Innovative multidisciplinary efforts require depth and sustained commitment from all of the disciplines engaged in the collaborative effort.
- C. The sociological elements of trust, respect, affirmative acknowledgement of mutual and differing disciplinary needs, and frequent communication should be deliberately and specifically addressed and managed as sociological "investments" that help to accelerate productivity and reduce potential misunderstandings and friction.
- D. Generate a glossary of terms. For example, "framework" has had at least three different meanings in today's discussions.

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

- Unique environment in scale for distributed computing; publicly releasing data on how data is accessed, distributed, etc. could be of interest to the CS community.
- FPGAs for "in-flight" analysis
- Provide access to software development process for "anthropological" studies.
- "Industry scale, academic openness™."

**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?***

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