White Paper Solicitation - Computing Models, Facilities and Distributed Computing

As part of the HEP Community White Paper (CWP) (http://hepsoftwarefoundation.org/cwp.html) process, we are soliciting white papers on the evolution of computing models, facilities and distributed computing for HEP in the 2020s. This initial set of white papers is intended to be begin a top-down discussion at the same time as a number of topical working groups (listed on http://hepsoftwarefoundation.org/cwp.html) prepare the needs, requirements and plans for specific areas.

These initial computing model white papers are intended as input for the planned HSF workshop on Jan 23-26, 2017, at SDSC/UCSD. The papers should be relatively short (<3 pages) and should be sent (in pdf or html link format, e.g. in the arXiv) to hsf-cwp-white-paper-submission@googlegroups.com by 15 January, 2017, in order to be made public for people to read before the workshop. The white papers on this and other topics will be linked to the HSF website (http://hepsoftwarefoundation.org/cwp-whitepapers.html). White papers can be submitted by anyone (individuals, groups, projects, institutions and experiments).

Scope:

The computing models developed 10 years ago, before the LHC turn-on, contained high-level descriptions of:

- which types of computing facilities (compute, storage, networking) would be available and where,
- how data would be handled and processed from data acquisition (or simulation) through end user analysis,
- how the distributed computing facilities (the Tier-N system) would be used to implement the workflows,
- and finally how people within the collaborations would use, and contribute to building, the software tools and computing system.

The original LHC computing models have already evolved during LHC Run 1 and Run 2 due to pressure from limited resources (luminosity/pileup), increased experience with the computing systems, technical evolution and new capabilities, and of course physics needs. On the time scale of 5-10 years, the HL-LHC and other large HEP experiments will likely face significantly different challenges.

This working group focuses on how computing models might evolve and which elements might be key to developing different possibilities over the next years. Contributions originating from many other CWP WGs will of course contribute to the overall computing models.

Challenges over the next 5-10 years:

Challenges include: potential growth in resource needs beyond available resources, evolution in the nature and capabilities of computing hardware (processors, storage, networks), new modalities of use (elastic scale out, commercial, donations, HPC allocations), increased complexity of the data and/or detectors, evolving physics needs, long term sustainability of HEP software and much greater sophistication of analyses required to maximize the physics yield from larger datasets.

Charge/Questions for the WG:

- How will (or should) computing models evolve in the next 5-10 years to meet the challenges for HEP in the 2020s and which elements are key to developing these possibilities?
- Which elements of the current computing models will ***not*** need to change over the next 5-10 years?