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Scientific Domain

Physics: 1

Computer Science and Applied Mathematics: 2

Title (Maximum 20 words)

Title (Maximum 20 words): Enabling Big Data from Large Instruments on Leadership Class HPC infrastructures

Organizer Information

Organizer 1:

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Is this person on the reviewing committee? No

Organizer 2:

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Description for Review

Description for Review (Maximum 800 words):

The experiments at the Large Hadron Collider use complex and distributed computing infrastructure worldwide with about half a billion job slots and an exabyte of storage interconnected through high speed networks. While a number of the largest HPCs can provide the scale of batch slots needed for the LHC, none of them can provide the storage or IO rates needed for the LHC workflows. Consequently, for the past decade the LHC experiments have used the Worldwide LHC Computing Grid, the WLCG, for their computing needs. The WLCG infrastructure consists of hundreds of individual sites worldwide at universities and national laboratories.

However, with the computing needs of the LHC increasing rapidly in recent years, primarily for simulations that are crucial for physics results, LHC experiments have been exploring the use of HPC system worldwide. Through a number of initiatives, primarily in the United States and Europe,

the LHC experiments are now successfully using or planning to use many hundreds of millions of hours at HPC facilities annually. This usage will grow substantially in coming years. In this minisymposia we plan 4 talks summarizing the current state of the art in the usage of HPC for large scale experimental sciences.

Two talks at the minisymposia will describe the experiences and future plans from High Energy Physics and Particle Astrophysics experiments. Two talks will present perspectives from providers of HPC systems and Virtual Organizations. While the focus of the talks will be primarily on the lessons learned, they will also address the future of HPC usage by large instruments. The challenges and successes in using HPC systems, for example the US DOE leadership class systems will be described and discussed. This minisymposia will provide an important opportunity to discuss the future of HPC systems for instrumental and data sciences.

Abstract for Publishing

Abstract for Publishing (Maximum 200 words):

This symposia will present the latest advances in using HPC systems worldwide for physics results from large experiments in High Energy Physics and Particle Astrophysics. While HPC usage worldwide will be described, the experiences from the use of leadership class computing facilities in the US by the Large Hadron Collider experiments will be highlighted. LHC experiments have traditionally used the infrastructure provided by the Worldwide LHC Computing Grid. This has been supplemented in recent years by incorporating traditional HPC systems into the production and analysis computing systems at the LHC. Primarily CPU intensive simulation workflows are executed at HPCs - though other workflows are also being tested. The experiences gained by the LHC experiments over the past few years have opened HPC usage for other experimental and data intensive sciences. Four talks at this minisymposia will summarize the state of the art and the future wishlist for HPC usage for current and future experiments.

Presenter Information

Presenter 1:

Gender: male

Name: Prof. Kaushik De

Email: kaushik@uta.edu

Affiliation: University of Texas at Arlington

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Presentation Title: Running ATLAS Simulations on HPCs

Presenter 2:

Gender: male

Name: Dr. Dirk Hufnagel

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Affiliation: Fermilab

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Presentation Title: Big Data on HPC via HEPCloud

Presenter 3:

Gender: male

Name: Dr. Jack C. Wells

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Affiliation: Oak Ridge National Laboratory

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Presentation Title: HPC Perspective - Lessons from Titan, Looking to the Future

Presenter 4:

Gender: male

Name: Prof. Frank Wuerthwein

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Presentation Title: Architectural wish list for leadership class HPC systems— An OSG perspective