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Integration of Russian Tier-1 Grid Center with High Performance Computers at NRC-KI for LHC experiments and beyond HENP

During LHC Run1 ATLAS and ALICE produced more than 30 Petabytes of data, That rate outstripped any other scientific effort going on, even in data-rich fields such as genomics and climate science. To address an unprecedented multi-petabyte data processing challenge, the experiments are relying on the computational grid infrastructure deployed by the Worldwide LHC Computing Grid (WLCG).

LHC experiments preparing for the precision measurements and further discoveries that will be made possible by much higher LHC collision rates from early 2015 (Run2). The need for simulation, data processing and analysis and would overwhelm the expected capacity of WLCG computing facilities unless the range and precision of physics studies were to be curtailed. To meet this challenge the integration of the opportunistic resources into LHC computing model is highly important.

Tier-1 facility at Kurchatov Institute (NRC-KI) in Moscow is a part of WLCG and it will process and store up to 10% of total data obtained from ALICE, ATLAS and LHCb experiments. In addition Kurchatov Institute has supercomputers with peak performance 0.12 PFLOPS. Delegation of even a fraction of super-computing resources to the LHC Computing will notably increase total capacity.

In 2014, we have started a pioneer work to develop a portal combining a Tier-1 and a supercomputer in Kurchatov Institute. This portal is aimed to provide interfaces to run Monte-Carlo simulation at the Tier-1 Grid and supercomputer, using common portal and storage. PanDA (Production and Distributed Analysis) workload management system having great results at the ATLAS was chosen as underlying technology. In the nearest future we are planning to evolve the portal to fullscale data- and task- management system for federative heterogeneous resources.

The portal will be used not only for HEP, but also for other data-intensive sciences like biology with genome sequencing analysis; astrophysics with cosmic rays analysis, antimatter and dark matter search, etc. At this moment we have developed portal architecture, deployed prototype and run the first HENP and biology applications. Also we have deployed the local independent PanDA WMS instance in Kurchatov Institute adapted for the local supercomputer.

We want to present our current accomplishments with running PanDA WMS at NRC-KI super-computers and use PanDA as a portal independent to the computing facilities infrastructure for High-Energy and Nuclear Physics as well as other data-intensive science applications.

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