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Intercontinental Multi-Domain Monitoring for the LHC Optical Private Network

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The Large Hadron Collider (LHC) is currently running at CERN in Geneva, Switzerland. Physicists are using LHC to recreate the conditions just after the Big Bang, by colliding two beams of particles and heavy ions head-on at very high energy. The project is expected to generate 27 TB of raw data per day, plus 10 TB of “event summary data”. This data is sent out from CERN to eleven Tier 1 academic institutions in Europe, Asia, and North America using a multi-gigabits Optical Private Network (OPN), the LHCOPN.

Network monitoring on such complex network architecture to ensure robust and reliable operation is of crucial importance. The chosen approach for monitoring the OPN is based on the perfSONAR MDM framework (<http://perfsonar.geant.net>), which is designed for multi-domain monitoring environments.

perfSONAR (www.perfsonar.net) is an infrastructure for performance monitoring data exchange between networks, making it easier to solve performance problems occurring between network measurement points interconnected through several network domains. It contains a set of services delivering performance measurements in a multi-domain environment. These services act as an intermediate layer, between the performance measurement tools and the visualization applications. This layer is aimed at exchanging performance measurements between networks, using well defined protocols. perfSONAR is web-service based, modular, and it uses NM-WG OGF standards.

perfSONAR MDM is the perfSONAR version built by GÉANT (www.geant.net), the consortium operating the European Backbone for research and education.

Given the quite particular structure of the LHCOPN, a specially customised version of the perfSONAR MDM was prepared by an international consortium for the specific monitoring of IP and circuits of the LHC Optical Private Network.

The proposed presentation will introduce the main points of the LHCOPN structure, provide an introduction about perfSONAR framework (software, architecture, service structure) and finally describe the way the whole monitoring infrastructure is monitored and how the support is organised.

Summary

The presentation submitted will be organised as follows:

- Introduction to the LHCOPN: structure, motivation, challenges
- The perfSONAR Multi-Domain Monitoring framework: software, architecture, service structure
- Monitoring the monitoring infrastructure (including support)

Author: Dr VICINANZA, Domenico (DANTE)

Presenter: Dr VICINANZA, Domenico (DANTE)

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