

Final report on Helen research training at UERJ – Rio de Janeiro, Brazil

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Overview

The main goal during my one month visit at UERJ in Rio de Janeiro was to assist in the installation of CMS[1] software and the integration of the local Tier 2 centre (T2) in the CMS distribution network. This was achieved by installing the CMS data management and data placement tool PhEDEx[2] at the T2 in Rio de Janeiro.

At the same time the LisHEP 2006 conference on High Energy Physics took place in Rio de Janeiro, in which I participated and also gave an overview presentation on PhEDEx.

An analysis of the system performance of the individual components of the T2 centre in Rio revealed a severe bottle neck in the response and accessibility of the attached storage system. To overcome this performance issue, I suggested and performed a dCache[3] installation, which considerably improved the overall performance and accessibility of the attached storage system.

Detailed report

After my arrival in Rio de Janeiro on March 19th, I dedicated the first week of my visit to the installation of the CMS data management and data placement tool PhEDEx. After having analysed the available hardware and network infrastructure, the system was installed and tested on Wednesday March 22nd. However, it became quickly apparent, that the overall transfer speed was unsatisfactory low.

A more detailed analysis, performed on the following two days, revealed a significant bottleneck caused by the access method to the local storage system. The available NFS solution turned out to be non-scalable and after a brief discussion with representatives of other T2 sites, I decided to suggest the installation of dCache to improve the response and performance of the storage system. The local CMS representatives and the system administrators agreed to my suggested solution.

In the following second week (March 27th – March 31st), a high energy physics school was held at UERJ as part of the LisHEP 2006 conference. I participated in that school and used the time to gather further useful informations about the T2 architecture in Rio for the scheduled dCache deployment.

In the third week of my one month stay, the second part of the LisHEP 2006 conference took place (April 2nd – April 7th), in which I actively participated by giving an overview presentation on PhEDEx. My main focus during this presentation was on:

- PhEDEx design
- Data transfer operations in practice using PhEDEx
- Monitoring, problem discovery and analysis
- How to deploy PhEDEx and join the distribution network

The resulting discussions were very fruitful and I had the chance to talk to representatives of other Latin-American universities, which also recently joined CMS and intend to participate in the CMS data distribution network.

Finally during the last week of my visit to Rio de Janeiro (April 9th – April 13th), I managed to deploy the dCache system at the T2, which led to a significant improvement with respect to accessibility and transfer performance. The system is easily extendable and gives a high level of flexibility to administrate the data storage at T2-Rio.

Summary

The CMS data management and data placement tool PhEDEx was successfully installed at the T2 centre in Rio de Janeiro. The system was tested and the centre should be well prepared to participate in the CMS data simulation and shipment.

Access to the site's storage system was improved significantly by the deployment of dCache, which is known to be a flexible and scalable system. This approach allows an easy integration of new storage capacity in a step by step manner over the next years.

During the LisHEP 2006 conference useful contacts and fruitful discussions were conducted. A good relationship to the Brazilian groups and colleagues from other Latin-American countries was established.

References

- [1] CMS Collaboration, “The Compact Muon Solenoid Computing Technical Proposal”, CERN/LHCC 1996-045, 1996.
- [2] PhEDEx, <http://cms-project-phedex.web.cern.ch>.
- [3] dCache, <http://www.dcache.org>.