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CTACG - Cherenkov Telescope Array Computing Grid

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Gamma-ray astronomy is one of the most active topics in astroparticle physics involving both particle physicists and astrophysicists leading to the design of new types of research infrastructures. The Cherenkov Telescope Array - CTA - is a proposed new project for ground based gamma-ray astronomy. This communication aims at providing a report of the most relevant activity carried out and in progress within the CTA consortium in EGEE and a view of perspectives and implications of ICT-based infrastructures such as the future EGI for the needs of a project like CTA.

Conclusions and Future Work

CTA is proposed as a next-generation open observatory for very high energy gamma rays. The high data rate together with the large computing power requirements for data analysis demand dedicated resources, thus EGEE-Grid infrastructures for distributed data storage, data analysis and data access are considered the most efficient solution for the CTA e-infrastructure. The CTACG project aims to deploy end-to-end services in support of a wide scientific community for open data access for CTA.

Detailed analysis

The CTA Computing Grid (CTACG) project aims at optimizing the application of Grid technology for the CTA simulation, data processing and storage, offline analysis and the Virtual Observatory interface through a dedicated global CTA EGEE Virtual Organization. Positive experiences have already been achieved through applications of Grid technologies in the context of services for distributed computing resources exploitation for Monte Carlo studies. The main issues inherent to the observatory work flow, which could benefit of Grid applications and which concern the CTACG project are: Monte Carlo simulations; Data flow, data transfer and storage; Data reduction, data analysis and open access.
This communication will report mainly about recent experiences in scheduling, executing and managing Grid jobs for massive Monte Carlo simulations as well as improving the distributed analysis of the simulated data. The development of a web-browser application to provide a CTA-Monte Carlo-Dashboard running a CTA dedicated MySQL database and the implementation of applications oriented to all different levels of user requirements are the main first achievements of the CTACG project.

Impact

Intensive Monte Carlo simulations are an essential tool in order to optimize the best configuration and performance of the CTA installation. Even exploring only a few possible configurations, simulated CPU time consumption for that purpose is on the order of 10 CPU years per configuration. Despite many tricks that improve the efficiency of these simulations the needed memory storage cannot be reduced to less than 200-300 TB. A large number of degrees of freedom to explore as well as different levels of specific needs in the analysis process demand an efficient worldwide access to simulated output files and computing resources for MC data analysis to all members of the CTA consortium. The need to fulfill such requirements has motivated the

Grid-approach. Furthermore a dedicated database and a Monte Carlo dashboard are two important services implemented to strength the adoption of Grid solutions for a part of the scientific community never involved before in an EGEE virtual organization. This communication would like to tell about the successful impact of the Grid application in CTA, one future research infrastructure in the ESFRI roadmap.

Keywords

Gamma-rays; CTA; Monte Carlo; Dashboarc

URL for further information

http://lappwiki01.in2p3.fr/CTA-FR/doku.php?id=cta-computing-grid-public

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