Contribution ID: **296** Type: **poster**

A Multidimensional Approach to the Analysis of Grid Monitoring Data

Wednesday, September 29, 2004 10:00 AM (1 minute)

Analyzing Grid monitoring data requires the capability of dealing with multidimensional concepts intrinsic to Grid systems. The meaningful dimensions identified in recent works are the physical dimension referring to geographical location of resources, the Virtual Organization (VO) dimension, the time dimension and the monitoring metrics dimension. In this paper, we discuss the application of On-Line Analytical Processing (OLAP), an approach to the fast analysis of shared multidimensional information, to the mentioned problem. OLAP relies on structures called 'OLAP cubes', that are created by a reorganization of data contained inside a relational database, thus transforming operational data into dimensional data.
Our OLAP model is a four-dimension cuboid based on time, geographic, Virtual Organization (VO), and monitoring metric. Time and geographic dimensions have total order relation and form two concept hierarchies, respectively hours<days<weeks<months and services<hosts<sites<countries. This model is applied to a set of Grid monitoring data generated by a monitoring tool called GridICE.

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Session Classification: Poster Session 2

Track Classification: Track 4 - Distributed Computing Services