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DESIGN AND ARCHITECTURE OF VISUALIZATION SERVICE
IN THE CYBERINFRASTRUCTURE WEB APPLICATION
FRAMEWORK

Abstract:

Scientific visualization is used to graphically represent scientific data in order to provide a better understanding of crucial scientific results. It is widely used in different fields including engineering, medical, chemistry, education, economics geographical systems, and many more. Visualization is often employed in scientific portals that run scientific computations to help analyze and monitor data produced as a result of jobs run via the portal. This visualization can be used for be real-time dynamic monitoring of computation that are in progress and can provide better insight of scientific jobs or post processing.

In this thesis, we present our approach for visualization in scientific portals that are built using the Cyberinfrastructure Web Application Framework (CyberWeb) and its services. The objective of this thesis is to develop dynamic visualization functionality in Cyberweb that allows clients to monitor jobs both during the job and after it is completed. Cyberweb Visualization service (CWViz) enables users to analyze intermittent results of jobs running on various remote hosts. CWViz provides an easy and clear understanding of job progress to the user by creating real-time and post processing visualization plots. CWViz include features like creating variety of plot types like 2D linear, gradient, 3D surface or mesh plots and animation or movies, a dynamic web-based portal client and a command line interface. The system uses the gnuplot library and gnuplot.py package for creating various plots. It enables user to customize these plots by changing different plot parameters via web interface or client API. These plots are created dynamically and all requests sent by user are handled in run-time with proper error handling. This visualization service tool in Cyberweb gives a very clear and easy perception of running jobs and its progression to users and thus helps in controlling them more efficiently.

Thesis Committee:

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