GIPSE: Data-aware Parameter Sweeps on the Grid

Although the grid allows a researcher to tap a vast amount of resources, the complexity involved in utilizing this power can make it unwieldy and time-consuming. The GIPSE (Grid Interface for Parameter-driven Simulation Environments) toolset helps solve this issue by freeing users from scripting, debugging, and other minutia involved in managing simulations on the grid. GIPSE, which interacts seamlessly with existing grid software (Globus, etc.), abstracts interactions with the grid to present a research-centric view of the process rather than the typical task-centric view. GIPSE offers an alternative interface to the grid that removes the need for application specific wrappers around parameter-driven simulations.

While various toolsets such as the Java CoG kits and others have reduced the complexity associated with interfacing with the grid, supporting interfaces must still be developed to bridge the final interface to the application. Although the need for a vertical stovepipe solution has been removed, the interface presented to the user is still task-oriented. For parameter-driven simulation environments with large parameter spaces, the development gap between the existing tools and the actual results can be quite significant. To that end, we propose the concept of a generic framework for parameter-driven simulations that links the entire data production process including task creation, task submission, data parsing, and data storage, in a result-centric fashion. The GIPSE toolset offers an alternative interface to the grid that is specifically tailored to simulation-based research. GIPSE sits on top of existing grid tools (Globus, Java CoG) and employs XML metadata to link the service-centric nature of the grid with the data-oriented nature of the researcher. GIPSE does not change the execution of the grid but rather transforms the view of the grid.

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