Multiple HLA Federate Processes in Grid Environment

Katarzyna Rycerz[1], Marian Bubak[1,2], Maciej Malawski[1], Peter Sloot[3]

[1] Institute of Computer Science, AGH, Kraków, Poland
[2] Academic Computer Center CYFRONET AGH, Kraków, Poland
[3] Faculty of Sciences, Section Computational Science,
University of Amsterdam, The Netherlands

Abstract

The subject of this talk is a Grid management service called HLA-Speaking Service that interfaces actual High Level Architecture (HLA) [1] application with the Grid HLA Management System (G-HLAM) [2]. The design of the architecture of G-HLAM is based on the OGSA concept that allows for modularity and compatibility with Grid Services already being developed. The group of main G-HLAM services consists of a Broker Service which coordinates management of the simulation, a Performance Decision Service which decides when the performance of any of the federates is not satisfactory and therefore migration is required, and a Registry Service which stores information about the location of local services.

On each Grid site supporting HLA there are local services for performing migration commands on behalf of the Broker Service as well as for monitoring of federates and benchmarking. The HLA-Speaking Service is one of the local services interfacing federates running on its site to the G-HLAM system. HLA Speaking Service is responsible for execution of an application code on the site it resides and manages multiple federate processes. The version for single federate process was described in [3]. We present the functionality of the HLA-Seaking Service with an example of N-body simulation of dense stellar system. Such simulations remain a great challenge in astrophysics and there is a need for a computer infrastructure that will significantly improve their performance. We believe that the Grid is a promising environment for such requirements, since it offers the possibility of accessing computational resources that have heretofore been inaccessible.

References

1. HLA specification, http://www.sisostds.org/stdsdev/hla/
2. K. Rycerz, M. Bubak, M. Malawski, and P. Sloot; A Framework for HLA-Based Interactive Simulations on the Grid SIMULATION, 81(1):67–76, 2005.

3. K. Zajac, M. Bubak, M. Malawski, and P.M.A. Sloot; Towards a Grid Management System for HLA-Based Interactive Simulations. In: S.J. Turner and S.J.E. Taylor, editor, Proceedings Seventh IEEE International Symposium on Distributed Simulation and Real Time Applications (DS-RT 2003), pages 4-11, Delft, The Netherlands, October 2003. IEEE Computer Society.