

Adaptive Load Balancing Control of Data-Parallel Applications Running in Grid-Environments

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Today, the simulation of complex issues is a wide spreaded approach. The Grid environment having lots of resources provides an appropriate platform for such memory and processing intensive applications. In order to achieve an efficient calculation it is necessary to provide adequate load balancing that considers the dynamic behaviour and the heterogeneity of the Grid.

This thesis presents a load balancing control approach that supports application programs and their load balancing tools exploiting the dynamic and heterogeneity of the Grid.

Methods are described that uses monitoring to analyse the environment. Based on the gained information the communication structure of the environment and the capacity of the compute units are captured during runtime and utilized for load balancing.

Load balancing decisions are based on a hierarchical structure determined during runtime. As this structure is premised on current monitoring value, it represents the current network status from the application's view. During the load balancing procedure, load is targeted to be migrated between compute units with the fastest possible connections. At the same time load is adapted to the available capacity of the compute units.

These concepts are implemented in the tool mLB. mLB is a distributed, scalable and adaptive tool that supports the application to increase its efficiency in the Grid environment.