



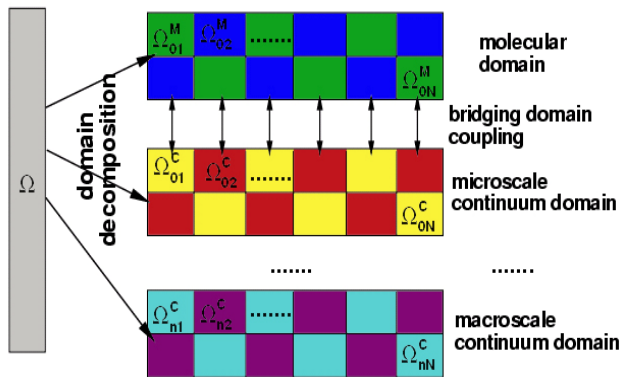
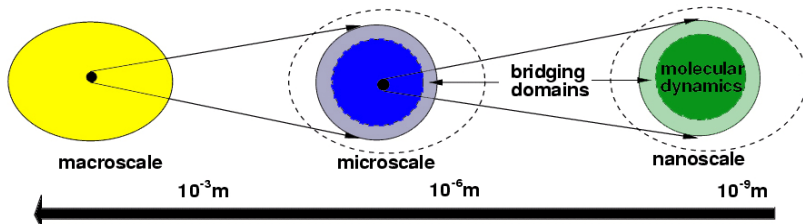
Grid-enhanced Bridging Domain Multiscale Method

Shaoping Xiao, Ph.D.M.E., Jun Ni, Ph.D.M.E., and Shaowen Wang, Ph.D.
Department of Mechanical and Industrial Engineering, The University of Iowa, Iowa City, IA 52242

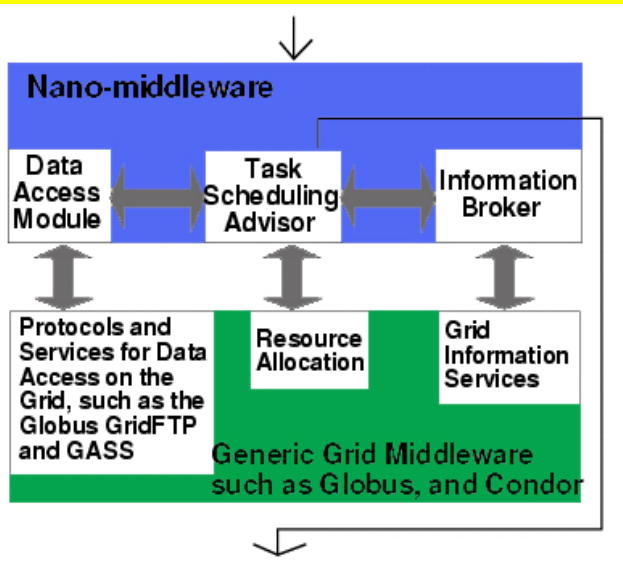
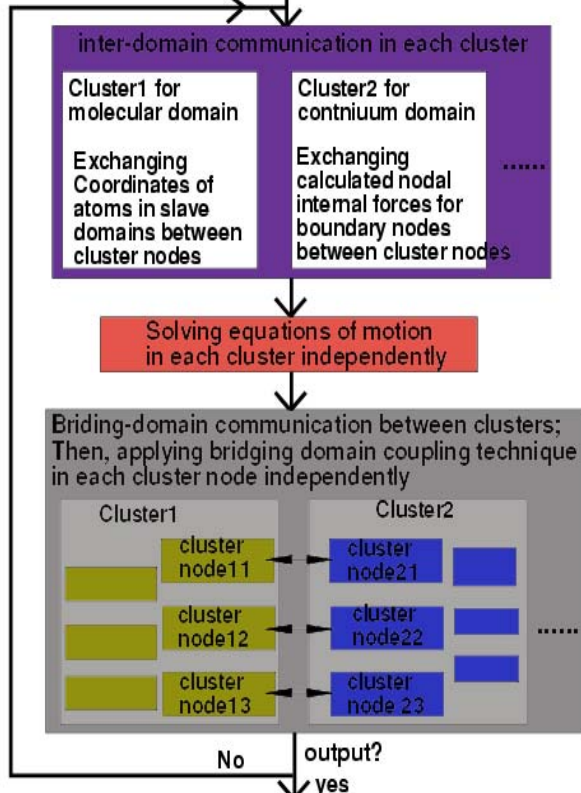
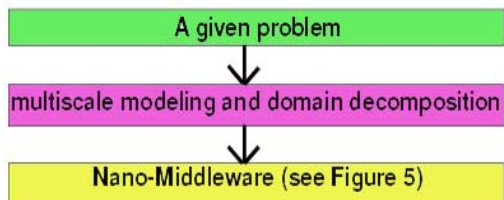
Motivations. Multiscale methods have become a powerful tool for elucidating complex physical phenomena at the nanoscale level. However, they still have limitations on both length and time scales. Grid computing, which is the most exciting revolution in IT-powered high-performance computing (HPC) today, can be enhanced in multiscale modeling and simulation so that nano systems with billions even trillions of atoms can be approached.

- A bridging domain multiscale method with different length scales

- Multiple time steps are employed in different time scales



The hierarchical domain decomposition (left) technique is used to decompose the simulated domain in various clusters and cluster nodes for Grid-based bridging domain multiscale modeling and simulation.



- Nano-middleware (above) is designed for Grid-based bridging domain multiscale methods.
- The flow chart of the Grid-based bridging domain multiscale method is shown on the right.

For further information please contact, Dr. Shaoping Xiao, shaoping-xiao@uiowa.edu, (319) 335-6009 or Dr. Jun Ni, jun-ni@uiowa.edu, (319) 335-5485