SIGCSE 2007 Technical Symposium on Computer Science Education, March 7 -10, 2007

NSF SHOWCASE

State-Wide Undergraduate Grid Computing Course

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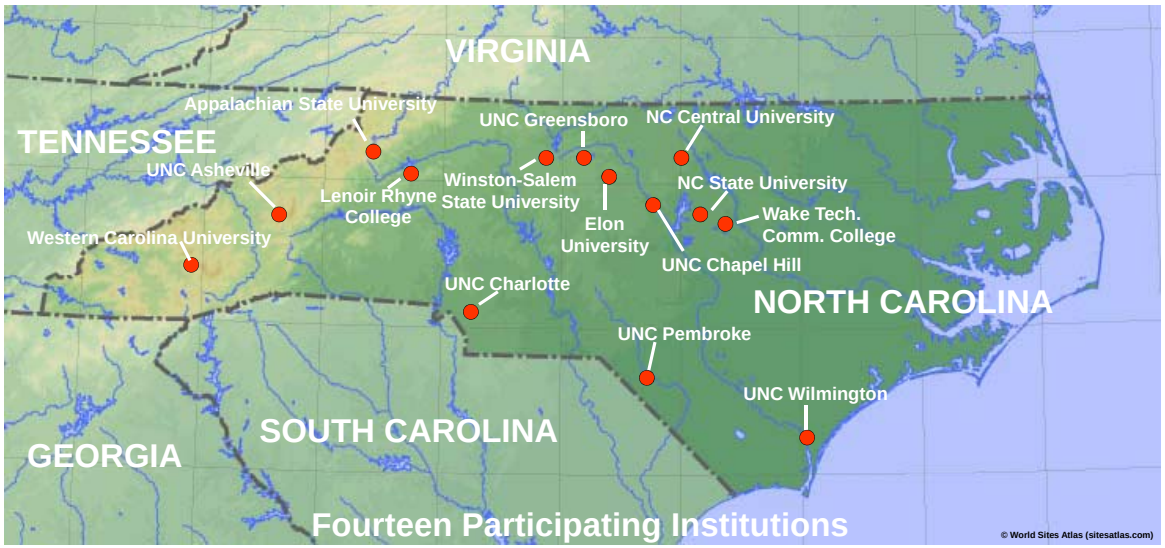
Executive summary

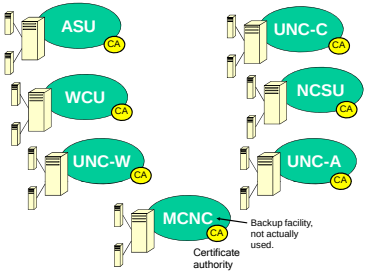
Grid computing has become an important concept for high performance computing. By taking advantage of the Internet, geographically distributed computers can be used collectively for collaborative problem solving. In Grid computing, different organizations can supply resources and personnel, and the Grid infrastructure can cross organizational boundaries. This concept has many benefits including solving problems that could not be solved previously because of limited computing resources (e.g. searching for new drugs). We have developed an undergraduate grid computing course that crosses organizational boundaries using resources at several North Carolina universities. The course is broadcast across North Carolina using the televideo facilities of the North Carolina Research and Education Network. Fourteen universities and colleges participated included minority-serving universities, state universities, and private colleges.

Most grid computing courses are graduate-level courses within a single department. Our course is unique both because it targets undergraduates and because many universities participated. The course was first taught in Fall 2004 and again in Fall 2005. A newly revised version of the course is currently being taught in Spring 2007 using a top-down approach starting with the use of a grid computing portal, leading through details of grid computing infrastructure with seven hands-on assignments, finally cumulating in a team mini-project.



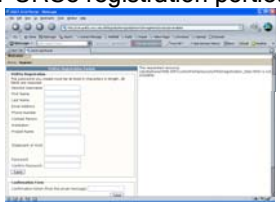
NCREN Televideo facility
Used to broadcast course across state

Fall 2005 Course Grid Infrastructure

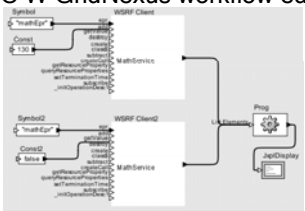


Course home page: http://www.cs.uncc.edu/~abw/ITCS4146S07/

PURSe registration portlet

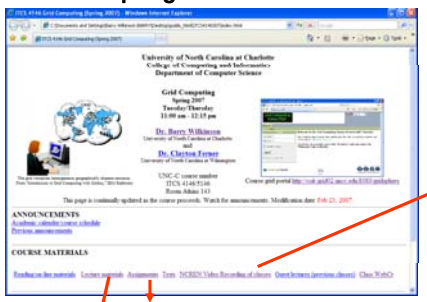


UNC W GridNexus workflow editor



Application driven portlet design

Spring 2007 course



Hands-on
Seven assignments. Mini-project

Top-down approach

Topics:
Grid portal
Job submission
Grid infrastructure
Grid services
Grid service workflow editor
MPI on a grid
Portlet design
Guest speakers

Class Recording

Course portal

Job Submission

National Publicity

- "Distributed Classes For Distributed Computing" by Katie Yurkewicz, editor, *Science Grid This Week*, Dec. 14, 2005
- Repeated in *GridToday*, Dec. 19, 2005.

Publications

- M. A. Holliday, B. Wilkinson, J. House, S. Daoud, and C. Ferner, "A Geographically-Distributed, Assignment-Structured Undergraduate Grid Computing Course," *SIGCSE 2005 Technical Symposium on Computer Science Education*, St. Louis, Missouri, February 23 - 27, 2005.
- B. Wilkinson, M. Holliday, and C. Ferner, "Experiences in Teaching a Geographically Distributed Undergraduate Grid Computing Course," Workshop on Collaborative and Learning Applications of Grid Technology and Grid Education, *IEEE International Symposium on Cluster Computing and the Grid* (CCGrid2005), Cardiff, UK, May 9 - 12, 2005.
- B. Wilkinson and M. Holliday, "State-Wide Collaborative Grid Computing Course," 2005 *Teaching and Learning with Technology Conference*, March 30, 2005, Raleigh, NC.
- B. Wilkinson and C. Ferner, "Chapter 151 Grid Computing Implementation," The Handbook of Computer Networks, H. Bidgolo, Editor-in Chief, John Wiley & Sons, 2006.
- M. A. Holliday, B. Wilkinson, and J. Ruff, "Using an End-to-End Demonstration in an Undergraduate Grid Computing Course," *ACMSE 2006: 44th ACM Southeast Conference*, March 10-12, 2006, Melbourne, Florida.
- B. Wilkinson and C. Ferner, "Teaching Grid Computing across North Carolina Part I," *IEEE Distributed Systems Online* , vol 7, no 6, 2006.
- B. Wilkinson and C. Ferner, "Teaching Grid Computing across North Carolina Part II," *IEEE Distributed Systems Online* , vol 7, no 7, 2006.

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