Syllabus

CS 550

Advanced Operating Systems

http://www.cs.iit.edu/~iraicu/teaching/CS550-S11/index.html

Semester: Spring 2011

Lecture Time: Tuesday/Thursday, 11:25AM - 12:40PM

Location: Stuart Building 106

Professor: Dr. Ioan Raicu (iraicu@cs.iit.edu, 1-312-567-5704)

Office Hours Time: Monday 2PM – 3PM, Thursday 12:40PM – 1:40PM

Office Hours Location: Stuart Building 237D

Teaching Assistant: Wei Tang (wtang6@iit.edu, 312-567-5149)

Office Hours Time: Tuesday 1:00PM – 2:00PM, Friday 1:00PM – 3:00PM

Office Hours Location: Stuart Building 004

Course Description

This course covers general issues of design and implementation of advanced modern operating systems. The focus is on issues that are critical to the applications of distributed systems and computer networks, which include interprocess communication, distributed processing, sharing and replication of data and files. Approximately two third of the course will be devoted to basic concepts and techniques, and the remaining third will be on assorted current topics in modern operating systems and distributed systems.

Required Texts

Andrew S. Tanenbaum and Maarten van Steen. "Distributed Systems: Principles and Paradigms", Prentice Hall, 2nd Edition, 2007. (Required)

Randy Chow and Theodore Johnson. "Distributed Operating Systems & Algorithms", Addison-Wesley, 1997.

Prerequisites

CS450 Operating Systems

Mailing lists

There is a course mailing list; you can send mail to the list by sending email to cs550-s11@datasys.cs.iit.edu. The email you have on BlackBoard has already been added to the mailing list. You can remove this email and/or add other emails by visiting http://datasys.cs.iit.edu/mailman/listinfo/cs550-s11.

Detailed Course Topics

Lecture topics:

- Distributed systems
- Issues in communication
- Remote Procedure Call
- Remote Method Invocation
- Message- and Stream-Oriented communication
- Processes and threads
- Code migration and distributed scheduling
- Naming
- Clock Synchronization
- Distributed mutual exclusion and distributed deadlocks
- Distributed transaction
- Consistency models
- Replication
- Fault tolerance
- Distributed commit and failure recovery
- Distributed file systems (NFS, AFS & coda)
- Security in distributed systems
- Security: authentication
- Distributed middleware: CORBA
- Case studies: DCOM and JINI

Laboratory Projects

There will be a major quarter long project (on the topic of choice of the student) that will require possibly the implementation of a real/simulated system, a written report, and an oral presentation. Students are encouraged to work in teams of 2. Projects can fall in a number of different areas of distributed systems. These areas will be expanded on during the course, with specific projects for each area.

- Distributed file systems
- Scheduling algorithms
- Distributed operating systems
- Distributed job management systems
- Parallel programming languages
- Workflow systems
- Distributed monitoring systems
- GPU Computing
- MapReduce
- Distributed caching strategies
- Distributed hash tables
- Virtualization

Grades

Grading Policies:

- Written Homeworks (~4): 20%
- Programming Assignments (~3): 30%
- Exam (1): 25%
- Project (1): 25%