

Syllabus

CS 553

Cloud Computing

<http://www.cs.iit.edu/~iraicu/teaching/CS553-S12/index.html>

Semester: Spring 2012

Lecture Time: Monday/Wednesday, 11:25AM - 12:40PM

Location: Life Sciences Building 121

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

Office Hours Time: Wednesday 12:40PM-1:40PM

Office Hours Location: Stuart Building 237D



Teaching Assistant: Siyuan Ma (sma9@iit.edu)

Office Hours Time: Tuesday/Thursday, 2PM-3PM

Office Hours Location: Stuart Building 003



Course Description

Cloud Computing is “A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.” It has become a driving force for information technology over the past several years, and it is hinting at a future in which we won’t compute on local computers, but on centralized facilities operated by third-party compute and storage utilities. Governments, research institutes, and industry leaders are rushing to adopt Cloud Computing to solve their ever-increasing computing and storage problems arising in the Internet Age. There are three main factors contributing to the surge and interests in Cloud Computing: 1) rapid decrease in hardware cost and increase in computing power and storage capacity, and the advent of multi-core architecture and modern supercomputers consisting of hundreds of thousands of cores; 2) the exponentially growing data size in scientific instrumentation/simulation and Internet publishing and archiving; and 3) the widespread adoption of Services Computing and Web 2.0 applications. This course is a tour through various topics and technologies related to Cloud Computing. We will explore solutions and learn design principles for building large network-based systems to support both compute and data intensive computing across geographically distributed infrastructure. Topics include resource management, programming models, application models, system characterizations, and implementations. Our discussions will often be grounded in the context of deployed Cloud Computing systems, such as Amazon EC2 and S3, Microsoft Azure, Google AppEngine, Eucalyptus, Nimbus, OpenStack, Google's MapReduce, Yahoo’s Hadoop, Microsoft’s Dryad, Sphere/Sector, and many other systems. The course involves lectures, outside invited speakers, discussions of research papers, programming assignments, and a major project (including both a written report and an oral presentation).

Required Texts

We will be using the textbook [Distributed and Cloud Computing: Clusters, Grids, Clouds, and the Future Internet](#) by [Kai Hwang](#), [Jack Dongarra](#) & [Geoffrey C. Fox](#). (Required)

Prerequisites

None required. CS450 (Operating Systems) highly recommended, and CS550 (Advanced Operating Systems) recommended. Other courses that might contribute to having a better in depth understanding of this course are CS542, CS546, CS551, CS570, and CS595 (Data-Intensive Computing).

Mailing lists

There is a course mailing list; you can send mail to the list by sending email to cs553-s12@datasys.cs.iit.edu. The email you have on BlackBoard has already been added to the mailing list (on January 7th, 2012). You can remove this email and/or add other emails by visiting <http://datasys.cs.iit.edu/mailman/listinfo/cs553-s12>.

Detailed Course Topics

Lecture topics:

- Distributed System Models
- Parallel Computing
- Virtualization
- Cloud Platform Architectures
 - Amazon AWS
 - Microsoft Azure
 - Google App Engine
 - Google MapReduce / Yahoo Hadoop
 - Eucalyptus, Nimbus, OpenStack
- Service-Oriented Architectures
- Cloud Programming
- Grid Computing
- Peer-to-Peer Computing

Late Policy

Assignments will be due at the beginning (11:25AM) of the lecture on the due date, to be submitted via BlackBoard; there will be a 5 minute grace period. Please do not submit your assignments via email to the professor.

- Written homeworks
 - 5 min ~ 24 hours late: 25% penalty
 - 1 day ~ 2 days late: 50% penalty
 - 2+ days late: 100% penalty
- Programming Assignments
 - 15% penalty per every day that it is late
 - 6+ days late: 100% penalty
- Quiz
 - There will not be any makeup quizzes; do not miss the quizzes
- Exams
 - There will not be any makeup exam; do not miss the final exam

Grading Policies:

- Written Homeworks (~10): 20%
- Programming Assignments (~4): 40%
- Quiz (4): 20%
- Exam (1): 20%

Grades

Grading Policies:

- Written Homeworks (~10): 20%
- Programming Assignments (~4): 40%
- Quiz (4): 20%
- Exam (1): 20%