

Syllabus

Overview

Cloud Computing is an umbrella term for a confluence of trends, which include infrastructure as a service, platforms as a service, and software as a service. An integral component of these trends is their reliance on existing web technology for communication and control. To meet the needs of emerging cloud applications, innovation on both the client side (e.g., new browser architectures) and the server side (e.g., new web application platforms) has drastically accelerated during past years. This class will examine the underlying systems design issues in creating suitable execution environments for in-cloud applications. Class content will involve lectures, research papers, student presentations, and student experimentation as well as a semester-long project.

Staff Information and Meeting Times

Instructor: Dr Godmar Back (gback@cs.vt.edu)

Class website: <http://people.cs.vt.edu/~gback/cs6204/>

The class website will be the primary means of communication. It contains a reading list for this class and a schedule.

Class meets every week Wednesday 4pm-6pm in VTKW-225. In addition, I propose we meet occasionally Monday for tool demonstrations and additional talks, but only when announced.

Prerequisites

Experience with Operating Systems and Networking as provided by CS 3204/5204, CS 5565.

Grading

Grading is based on:

- the in-class presentation you give (1-2)
- your in-class participation and the initiative you show in bringing forth interesting related topics
- your project performance. Projects will be formally presented at the end of the semester.

I will provide feedback at two formal milestones during the semester.

Possible Topics

A preliminary reading list is posted at <http://www.citeulike.org/user/godmar/tag/cs6304>

Most of these papers warrant a single class period; some may be better presented in 0.5 class periods (for 2 per period).

Projects

Projects can be done in groups of 2 students. Projects should involve the exploration of a topic related to the intersection of modern browser technologies on one hand and cloud-based environments on the other hand.

Possible topics include:

- Investigating the suitability of browser-enforced separation in recent browsers (FF4, Google v8); including memory management
- Investigating models for a possible separation of extensions in FF and Chrome
- Dynamic and/or static JavaScript analysis; dynamic race condition checking
- Advanced Application Models for Cloud Environments such as AppEngine
- Analysis of overhead/communication of server-centric frameworks such as ZK; general analysis of Ajax overhead/communication patterns
- Component-based AJAX models (Fiz, IceFaces, ...)
- Exploration of simulation environments such as envjs for mirrored execution environment
- Security-related topics
- Classic “cloud” topics – distributed computing in the cloud