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, technology 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 M-W 4pm-5:15pm in RAND-222.

Prerequisites

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

Grading

Grading is based on:

- the in-class presentations you give. I would expect each student to give 2 presentations:
  - one presentation on a research paper
  - one presentation on an emerging technology
- your in-class participation and the initiative you show in bringing forth interesting related topics
- 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/cs6204spring2014

Some papers are small, and may be best presented in combinations of 2.

**Projects**

Projects can be done in groups of 2 students. I will strongly encourage group projects and require that you make a strong case if you wish to work by yourself. 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:

- **Port an existing application you care about to the emerging technologies that exist for cloud applications.** Evaluate how the use of this new technology streamlined your application’s user interface logic.

- **Benchmarking cloud-based applications.** Unlike traditional web servers, which are often benchmarked using simple throughput/latency tests, complex cloud applications present a challenge for benchmarking.

- **CloudBrowser-related projects.** CloudBrowser is a cloud execution environment developed by us. We are currently preparing a public release & demo site. We need a) a complete multiprocess version of CloudBrowser and b) a cluster version of CloudBrowser with a message frontend such as Reddis.

- **Dynamic and/or static JavaScript analysis; dynamic race condition checking.** Examples:
  - porting EventRacer’s algorithm to node.js and subjecting existing node.js package to race detection would be an interesting project.
  - Using jsdom to implement EventRacer

- **Client-side environments**
  - Investigate the suitability of browser-enforced separation in recent browsers (Firefox, Chrome); including memory management
  - Investigating models for a possible separation of extensions in FF and Chrome

- **Your project here.**