Northeastern University - Seattle

CS6650 Building Scalable Distributed Systems

Professor Ian Gorton

Building Scalable Distributed Systems

Week 1 – Introduction to Scalable Systems

(Part 4)
Course Outline

Course Overview

- Web site: https://gortonator.github.io/bsds-6650/
- In this course you'll learn both theory and practical knowledge
  - To be able to engineer robust, scalable, efficient internet scale systems
- The theory will be learned by:
  - Reading relevant materials/seminar
  - Lectures
  - Quizzes
- The practical knowledge will be gained by:
  - In class exercises
  - Projects

Course Outline

Course Content

Modules

Week	Topic	Date
1	Introduction to Distributed Systems	9/10
2	Concurrency	9/17
3	Distributed Systems Fundamentals	9/24
4	Data Layer: Replication, Partitioning and Consistency	10/1
5	Data Layer: NoSQL Databases	10/8
6	Scalable Request Processing: APIs and State Management	10/15
7	Caching and Load Balancing	10/22
8	Asynchronous Systems	10/29
9	Microservices	11/5
10	Data Processing Architectures - Lambda/etc	11/12
11	Scalable Data Analytics	11/19
12	Stream Processing	11/26
13	Security	12/3
14	Final Project Presentations	12/10

Grading

- There will be three components to the grades
  - 4 programming assessments (72%)
  - 4 in class Quizzes (28%)

Final Stuff

All course materials will be distributed through web site/canvas

We have a Piazza/Teams site for questions/discussions

It’s easy to fall behind in this class. Try to keep on top of the materials each week

Assignments overview

Project 1 – Using AWS

Client

Multithreading
Measurement
Presentation

Server

Project 2

Client

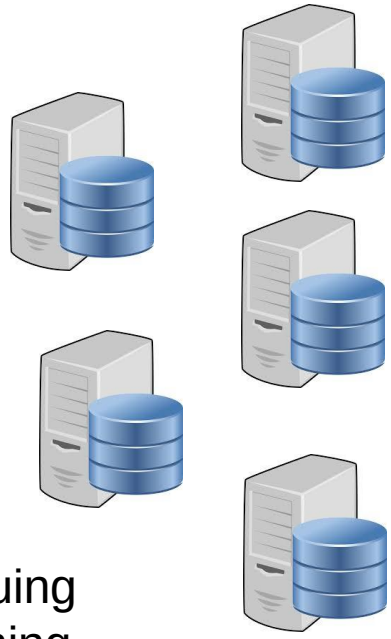
Server

Server thread models
State management
Horizontal scaling
Data storage schemas

Project 3

Client

Server



Queuing
Caching
Monitoring

Project 4

How to succeed in this course

- Do the reading
- Study for the quizzes
- Start the assignments early
  - Really …. #notkidding
- Work consistently
- Experiment
- Be inquisitive and have fun
- Expect to work hard!!!

At the end of the course

- You will acquire a set of skills that is in very high demand right now
  - At Amazon, Google, Facebook, Microsoft and, well, everywhere really!
  - Projects should be useful in interviews
- You will learn a lot about how computer systems really work

A disclaimer…

- This is a “bleeding edge” course!
  - We are somewhat unique in offering such a course
  - The subject of this course is always evolving and is too broad for a single existing textbook
  - (watch this space)
- Some of the material in the course will result in pain, suffering, and a strong desire in some of you for alcohol!!
  - Debugging distributed systems is hard!
- We will be using some really complex technology
  - You will be confused and finding help is not easy
- But it will be fun – honestly!!
  - If you are into that kind of thing ☺