The goal of this course is to provide students with theoretical basis of distributed system design and hands-on experience with distributed systems. The course is largely motivated by Google 101 (UW CS 490h) and lack of an undergraduate course on a similar topic in our department in recent years. The lecture material will be mostly from the two textbooks. Students will have additional reading material for projects.
Instructor & TAs

- Sue Moon (sbmoon@kaist.edu)
  - Room 4424, Bldg E3-1 (South Wing)
  - Office hours: Tue 4:30-6:30, Thu 5:30-6:30 or by email
  - [http://an.kaist.ac.kr/~sbmoon/schedule.html](http://an.kaist.ac.kr/~sbmoon/schedule.html)

- TAs
  - Keon Jang (gunjang@an.kaist.ac.kr) – Head TA
  - Hyunwoo Chun (hyunwoo@an.kaist.ac.kr)
  - Seoyeon Kang (sykang@an.kaist.ac.kr)
  - Shinae Woo (shinae@an.kaist.ac.kr)
Course Prerequisites

- CS330 Operating Systems
- CS441 Introduction to Computer Networks
Course Plan

- Lectures
  - Distributed Systems
  - Distributed Algorithms

- Hands-on Projects
  - Design and implement distributed algorithms and systems on a cluster of virtual machines
Textbook (I)

- Distributed Systems: Concepts and Design
  - by George Coulouris, Jean Dollimore, Tim Kindberg
Textbook (II)

- Distributed Algorithms
  - by Nancy Lynch
Our Cluster

Virtual Center

Manage virtual system

VMWare ESX server

NAS

virtual machine

OS image

os1, os2, ..., os5, os6,

bern

venice

prague

suva

os1, os5, ..., os2, os6, ...
Resources

- 8 VMs per student
  - Each VM with 256M memory
    => Plan to increase to 512M or 1G
Projects

- Project #1 (Hyunwoo)
  - Warm-up
- Project #2 (Seoyeon)
  - Hadoop
- Project #3 (Shinae)
  - Paxos
- Project #4 (Keon)
  - Design and implementation of a challenging distributed system
Grading Policy

- **Exams**
  - 15%  Mid-term (Tue 10/21 9am – Noon)
  - 20%  Final (Tue 12/16 9am – Noon)

- **Projects (to be adjusted)**
  - 10%  Project #1
  - 15%  Project #2
  - 15%  Project #3
  - 25%  Project #4
Distributed Systems

• Stock Exchange
• Air Traffic Control

• Commuter Trains
• Telephone networks

• Trauma Centers

[Courtesy of Charles Killian]
Flawed Distributed Systems

San Diego Health Care Reform

Computer Network

ChannelWeb Network

smh.com.au
The Sydney Morning Herald

TECH

Skype: Outage caused by massive restart after users had downloaded Windows patches

August 21, 2007 - 5:20AM

WASHINGTON — A computer failure in the nation's air-traffic control system caused severe flight delays along the East Coast Friday, the Federal Aviation Administration said.
In This Course

- Instead of Yes/No
  - Answers will be: it depends

- Questions we raise
  - What do you think is a computer?
  - What do you think is a distributed system?
  - What are the constraints you have to consider in building a distributed system?