Distributed Systems in Challenging Environments

Today

- Welcome
- Doing systems research
- Class organization

Are you in the right class?

- Goal – to review cool ideas and projects that are pushing distributed systems into new and challenging domains
  - Distributed systems – A collection of independent, interconnected processors that communicate and coordinate their action by exchanging messages
  - Some uncomfortable places …
    - Outer space
    - Underwater
    - African savanna
    - Volcanoes
    - …

Are you in the right class?

- Goal – to learn systems research by doing
  - Read research papers
  - Present research ideas (yours and others)
  - Pick a research project and execute it
  - Write a research paper

A common approach

- Pick a topic/area
- Learn about the area, typically by reading papers
- Come up with a new idea
  - A solution to a problem you notice
  - An open research question
- Execute your idea
  - Model, implement, evaluate, …
- Share what you have learned by writing a paper and presenting it somewhere

Class structure

- Classes
  - Read research papers
  - Present research ideas
  - Learn about ongoing work
- Project
  - Come up with a new idea, but I'll give you something to get started
  - Model, implement, evaluate, …
  - Write a report/paper on your project
  - Present

Grading

- No exams
- Class
  - Participation 10%
  - Summaries 10%
  - Presentation and discussion leading 20%
- Project
  - Proposal 5%
  - Midterm presentation 10%
  - Midterm report 10%
  - Final presentation 10%
  - Final report 25%

Reading papers

- Why reading?
  - You need an overview, are you presenting the paper, …
- Deciding what to read
  - What did they do? Title & abstract should tell you that
- Reading for breadth
  - Develop a framework of the paper and asses the authors credibility by skimming key parts of it; if you want to know how they did it …
- Reading in depth
  - Challenge their argument – examine their assumptions, methods, statistics, conclusions
  - Can you use apply their research to your work?
- Take notes
  - Highlight major points, note definitions, construct an example, …

Reviews

- After reading and writing down your notes
- What have you learned? What where the main points *for you*?
- To submit
  - Paper title and its authors
  - Brief one-line summary, in *your own words*
  - A paragraph of the most important ideas
  - A paragraph of the largest flaws
  - A last paragraph where you state the relevance of the ideas today, potential future research suggested by the article, etc.

Project

- One single project – this is a critical component of the course.
- Your goal – to design, construct and evaluate an interesting distributed system - *the crazier the better*
- Projects must be written up in a term paper and teams will present their results at the end of the course in a systems class mini-conference
- Teams of 2-3 people; based on topics you will be assigned a project leader (could be from outside the class)

Schedule

- Form a group – April 3
- Pick a topic – April 10
- Midterm presentation and report – May 1
  - What is the problem and why it matters? What is the basic idea to solve it? What are the expected results? What are the plausible alternatives? What will be done to test the hypotheses?
- Final presentation – Finals week
- Final report due – Finals week

  "Submissions should contain five or fewer two-column pages, including all figures and references, using 11-point fonts, standard spacing, and 1-inch margins."