CSE 461: Introduction to Computer Communications Networks
Spring 2012

Module 1
Course Introduction

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A Network in 461

- A network is what you get anytime you connect two or more computers together by some kind of a link.
Focus of this Course

- You will understand how to design and build large, distributed computer networks.
  - Fundamental problems
  - Design principles
  - Implementation technologies

- This is a systems course, not queuing theory, signals, or hardware design.
- We focus on networks, and a bit on applications or services that run on top of them.

Today’s agenda

- Course Administration
  - Everything you need to know will be on the course web page:

    http://www.cs.washington.edu/461/

  - Most everything (lecture schedule, reading, assignments, section materials, ...) is linked off the schedule

- Introduction to Course Content
  - Part 1: Generally useful principles and abstractions
  - Part 2: An overview of the Internet
Course goals

• Our primary goal is to understand how today’s networks are built

• This involves a mixture of:
  – Science
    • Is there an algorithm that meets some goal?
  – Engineering
    • How cost effective are various alternatives likely to be?
  – Experience
    • What has worked, what hasn’t, and why?
  – Measurement
    • Are current networks working as intended?
    • How are people using them?

Course goals (cont.)

• What is likely to be of lasting value to you?
  – Specific information
    • Many (most? all?) real applications involve networks.
  – Experience
    • Distributed computing “applications”
  – General lessons
    • Engineering a large, dynamic system

• The hope, as always, is to make all minutes you spend on the course worth your while

• Activities:
  – Reading text, answering questions from text, taking exams
  – Reading additional important papers, writing short analyses of them
  – Project implementations...
Project Plan

Client-Server

Peer-to-Peer

Internet

Internet

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8
Client Platform: Android Phones

The Emulator  The Phones

Projects On Phones: Pros

- Pros
  - Fun...
  - The core ideas and experiences of the course apply
  - Mobile devices will be/are the “standard platform”
Smartphone Adoption Rate

Mobile Internet Ramping Faster than Desktop Internet Did – Apple Leading Charge

Ship Rate vs. PCs
2011 Data

Worldwide smart phone and client PC shipments

<table>
<thead>
<tr>
<th>Category</th>
<th>Q4 2011 (millions)</th>
<th>Growth Q4'11/Q4'10</th>
<th>Full year 2011 (millions)</th>
<th>Growth 2011/2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart phones</td>
<td>158.5</td>
<td>56.6%</td>
<td>487.7</td>
<td>62.7%</td>
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<tr>
<td>Total client P</td>
<td>120.2</td>
<td>16.3%</td>
<td>414.6</td>
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<td>- Pads</td>
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<td>- Netbooks</td>
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<td>29.4</td>
<td>-25.3%</td>
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<td>7.3%</td>
<td>209.6</td>
<td>7.3%</td>
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<tr>
<td>- Desktops</td>
<td>29.1</td>
<td>-3.6%</td>
<td>132.4</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Source: Canalys estimates © Canalys 2012

Worldwide smart phone market

Number of Users

Mobile Users > Desktop Internet Users Within 5 Years


Source: Morgan Stanley Research
Mobil Traffic: Types

Total Mobile Traffic

1 exabyte = 1 billion gigabytes
Total Internet Traffic By Type

Cisco's projection for 2014: 91% of all traffic is video

Phone Projects: Cons

- **Cons**
  - Eclipse
  - Java
  - Phone UI
  - Some somewhat different programming constructs
  - Hard to grade...

- **Time is built into the schedule to ease into the new parts**
  - Project 1’s ”programming” is mainly Eclipse + Android setup
  - Project 2’s programming includes Android + UI
Project 1 Is Online

• Go through the setup instructions ASAP
  – If things go smoothly, they won't take long

• Form teams (of 2) by Wednesday
  – We'll hand out phones on Wednesday
  – We have almost enough for 1 per team
    • If you own an Android phone, you can most likely use that

• I'll talk more about Project 1 at the end of today's lecture