

# CSE 461: Introduction to Computer Communications Networks

## Spring 2012

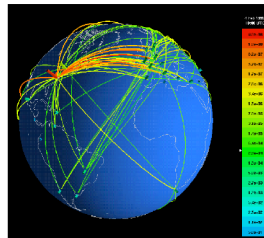
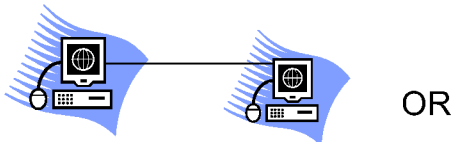
### Module 1

### Course Introduction

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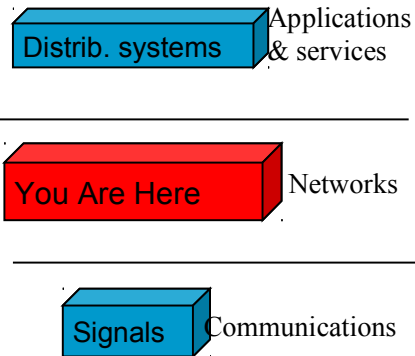
### A Network in 461

- 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

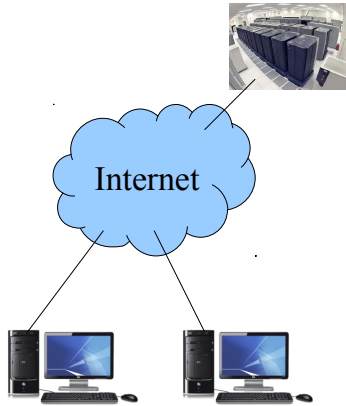
- Our primary goal is to understand how today's networks are built
- This involves a mixture of:
  - Science
    - Is there an algorithm that meets some goal?
  - Engineering
    - How cost effective are various alternatives likely to be?
  - Experience
    - What has worked, what hasn't, and why?
  - Measurement
    - Are current networks working as intended?
    - How are people using them?

## Course goals (cont.)

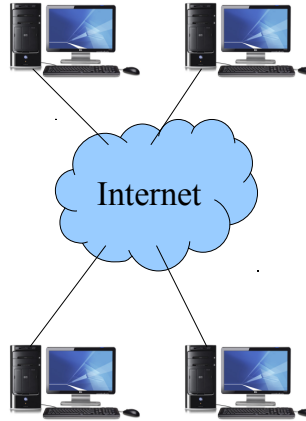
- What is likely to be of lasting value to you?
  - Specific information
    - Many (most? all?) real applications involve networks.
  - Experience
    - Distributed computing "applications"
  - General lessons
    - Engineering a large, dynamic system
- The hope, as always, is to make all minutes you 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



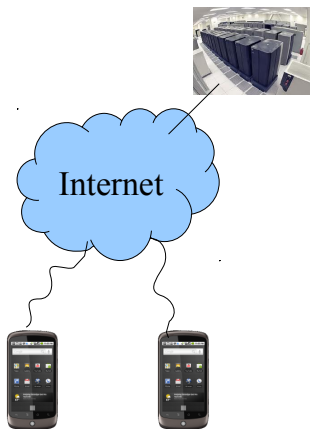
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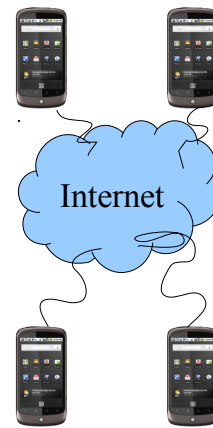
7

# Project Plan

## Client-Server



## Peer-to-Peer



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8

## Client Platform: Android Phones



*The Emulator*



*The Phones*

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9

## Projects On Phones: Pros

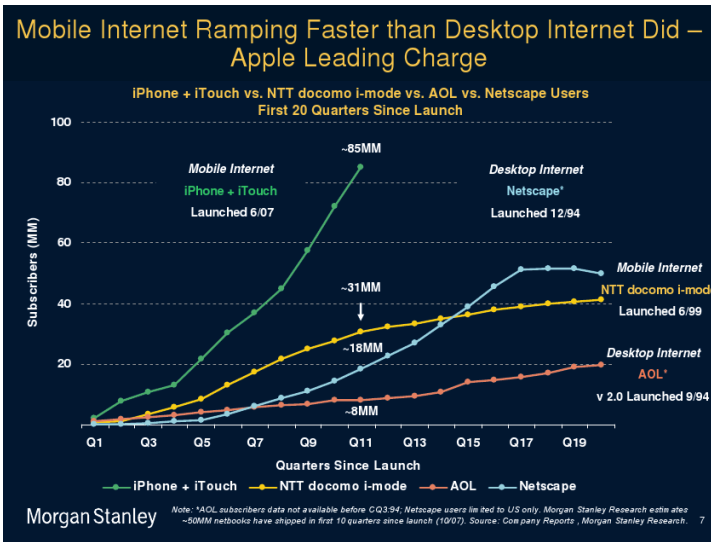
- **Pros**
  - Fun...
  - The core ideas and experiences of the course apply
  - Mobile devices will be/are the "standard platform"

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10

# Smartphone Adoption Rate

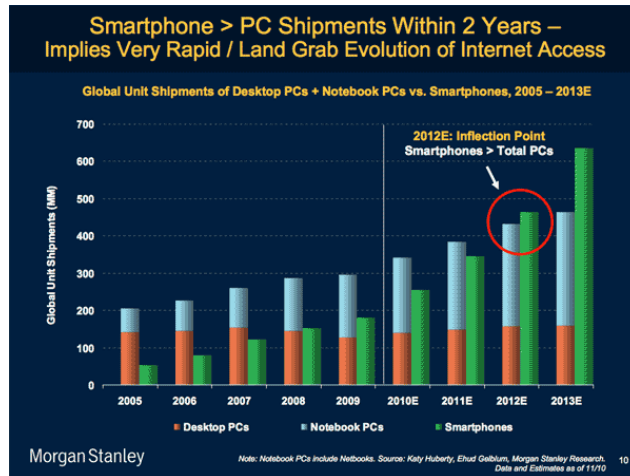


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11

# Ship Rate vs. PCs



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12

# 2011 Data

**Worldwide smart phone and client PC shipments**  
Shipments and growth rates by category, Q4 2011 and full year 2011

Category	Q4 2011 shipments (millions)	Growth Q4'11/Q4'10	Full year 2011 shipments (millions)	Growth 2011/2010
Smart phones	158.5	56.6%	487.7	62.7%
Total client PCs	120.2	16.3%	414.6	14.8%
- Pads	26.5	186.2%	63.2	274.2%
- Netbooks	6.7	-32.4%	29.4	-25.3%
- Notebooks	57.9	7.3%	209.6	7.5%
- Desktops	29.1	-3.6%	112.4	2.3%

Source: Canalis estimates © Canalis 2012

**Worldwide smart phone market**  
Shipments by platform, full year 2011

Platform	Full year 2011 shipments	Share (%)	Growth Q4'11/Q4'10
Total	487.7	100.0%	62.7%
Android	237.8	48.8%	244.1%
iOS	93.1	19.1%	96.0%
Symbian	80.1	16.4%	-29.1%
BlackBerry	51.4	10.5%	5.0%
bada	13.2	2.7%	183.1%
Windows Phone	6.8	1.4%	-43.3%
Others	5.4	1.1%	14.4%

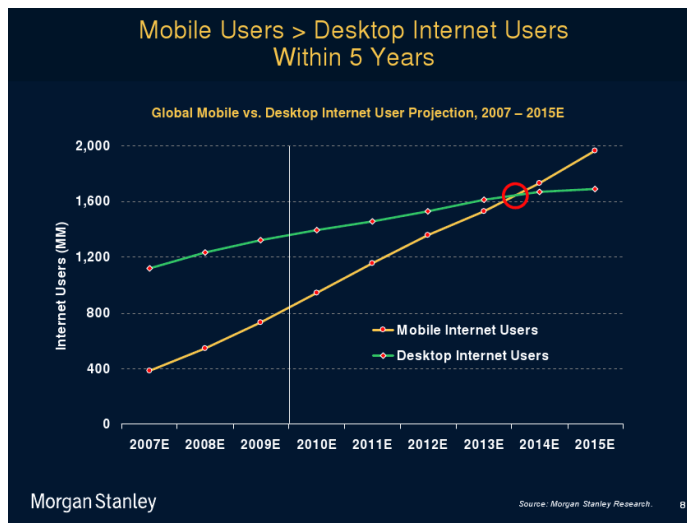
Source: Canalis estimates © Canalis 2012

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13

# Number of Users

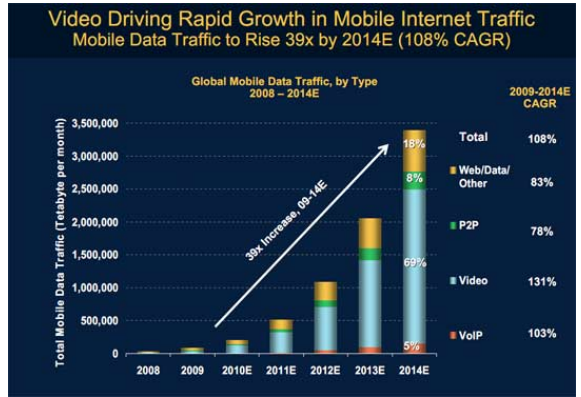


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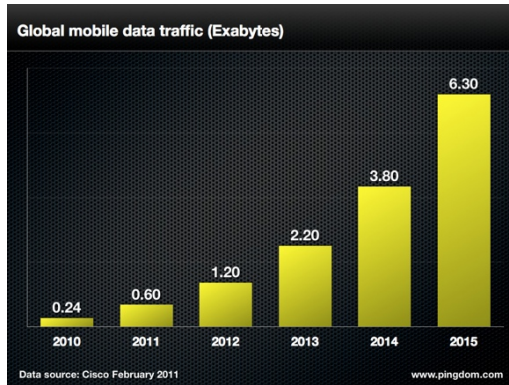
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14

# Mobil Traffic: Types



# Total Mobile Traffic

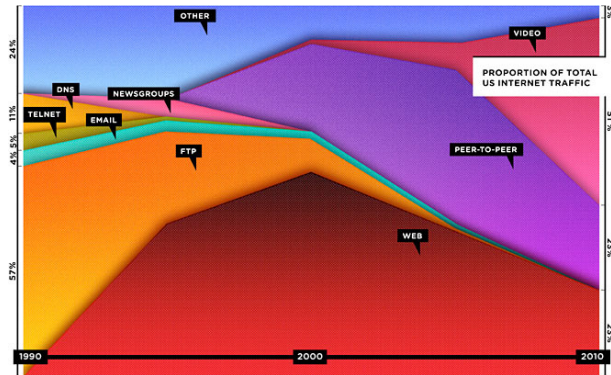


*Cisco's projection for total Internet traffic in 2014 is 766.8 exabytes*

1 exabyte = 1 billion gigabytes



## Total Internet Traffic By Type



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

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17

## 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

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18

## 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