

Lecture 0

Introductory Lecture

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Structure

1. Information networks introduction
2. Why study computer networks
3. A look through the program
4. *student comments and discussion*
5. practical arrangements

Reading

nothing

Background on networks

Since about the last 20 years, there have been two major technology changes affecting people's lives

- The increase in computer power
- The improvement in the throughput of telecommunication networks

Which of the one is more impressive?

Is the majority of the impact behind us?

Yes: technological change in the area is likely to be slower in the next few years.

No: social factors surrounding the technology still have to catch up.

What does that mean for libraries?

Libraries are information storage and access centers. They can benefit from, or are vulnerable to, changes in IT, and particular in changes coming from networked computing.

What changes do you foresee?

Computer networks are distributed computing applications where the distributed nature of the application is apparent to the user. Counter-example: A multi-user computer, like a Linux machine for example. Information network? To me, an information network is a network application that supplies information. The networked nature of the application may or may not be apparent to the user.

Why study computer networks?

Today, an increasing amount of information is stored on computers that are accessible over telecommunication networks. This trend is set to continue until all current information from all aspects of information that are the domain of libraries will be accessible on networked computers (though not necessarily free). The networked computer will be the tool of choice for the 21st century librarian.

Why tool up?

Can we not leave the computer scientist to give us the tool and we use it?

- we have to wait
 - we can not argue back when we are not given the tool
 - we have to wait until some computer network savvy person invents something.
- gopher
- web

- napster
- gnutella
- e-book

none invented by a librarian. Librarians have been sitting in the back seat.

Money and power

Whoever controls the computer networks will control information in the 21st century.

There is a lot at stake. Discuss.

computer network / information network

This course, as from the course outline, deals a lot with the technical point of view.

But this is all up for discussion. This is your course and so YOU should decide what the contents is.

1. Introduction to Computer Networks

This is to present a basic conceptual framework of computer models, the layered model. We discuss different layers that a network can have. We will also introduce the notion of a protocol.

In fact we can do some of that today if we have time. It is an important preliminary topic.

2. Internet history and standard setting

"War is the inventor of all things", (ancient Greek saying)

Some of the design decisions that have been made for the Internet can be understood through the history of and motivation for it.

"We reject kings, presidents and voting. We believe in rough consensus and running code", (David Clark)

Who makes decisions on and about the Internet?

3. LAN and Ethernet

LANs are components networks of the Internet. Most LANs run the Ethernet, an IEEE standard application. This is a technical lecture about them. (to be replaced?)

4. IP numbers

The IP number identifies a machine on the Internet. In this lecture we will discuss how these numbers are constructed and managed.

5. IP protocol

This will follow on from the previous lecture to talk more about IP.

6. DHCP and TCP

DHCP is a way for machines to find out what their IP address is.

TCP is more difficult to grasp than IP. TCP makes IP reliable. In practical situations, once basic IP works, we can usually get the TCP based application running (except when there is a firewall).

Therefore we will not talk so much about TCP.

7. DNS and bind

the domain name system, DNS is a protocol that associates human-friendly names to IP numbers.

bind is a popular software that implements DNS.

8. telnet and ftp and smtp

Two important application for TCP/IP, at least historically. Sntp is the protocol that defines electronic mail transport.

9. http

is the protocol used on the web. Maybe we should discuss html as well.

10. Gnutella

is a recent protocol done by anarchists who want to transform the Internet into a copying machine for pirated music and porn. This lecture will deal with technical aspects of this protocol. We will also try it out.

11. Network security

Everything on a network can be viewed. How do we keep things secret?

We will discuss elements of cryptography and how they are used on the Internet.

12. Authentication and digital signature

This is a difficult problem on which there are no good solutions yet. Digital signatures must not only be unforgeable, but also be safe against disclaimers by the signing party.

essentially a spare class.

Addition protocols

Z39.50 :- (

OAI metadata harvesting :-), but tough

Network applications

html

dynamic html, constructing interactive web pages.

Assessment.

Mini-exams at the start of each class, except this one and the next one. One or two questions that have a straightforward answer from the material in the previous class.

Alternative:

Minixams 60%

Essay 20%

Student presentation 20%

For the student presentation, a student and instructor choose a topic that is related to the class content, and deliver 20 to 30 minutes on that topic. Hint: the presentation topic could form the basis for the written

Calendar.

next week: Thomas in Russia

24 October: Thomas in Japan

propose to teach on all holidays, including Thanksgiving. 20 December is an option.