MM802: Multimedia Communications Multimedia and the Internet

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of Computing Science

University of Alberta

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These slides have been originally developed by Prof. Ehab Elmallah.

Instructor Information

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- Office hours: Monday 4:00 PM to 5:00 PM

Agenda

- Course objectives
- Course official information
- Computer Networks and the internet
  - Circuit-switching vs Packet-switching
  - The Internet Layering Architecture
  - A first look at delays in store-and-forward networks
  - Other sources of packet delays

- **Reading:**
  - J.F. Kurose and K.W. Ross, Computer Networking. A Top-Down Approach Featuring the Internet, 7/E, Addison Wesley. Chapter 1.

Course Objectives and topics

- Course objectives:
  - Understanding the enabling technologies, protocols, services, and applications of multimedia networking.
  - Conducting a multimedia project work.
- The topics, that will be discussed (as time permits), include:
  - Multimedia and the Internet: The Internet protocol stack; application layer and transport layer protocols and multimedia; QoS mechanisms.

✞Characteristics, requirements, and compression of multimedia data ✞Web development

Course official information

✈**Grading**

Attendance & participation	5%
Assignments	27%
Literature review note	9%
Midterm presentation	9%
Term project	50%

Course official information

- ✈Assignments
  - ✞3 assignments
  - ✞Mix between programming mini-projects and analytical problems
  - ✞Individual, unless mentioned otherwise.
  - ✞Programming questions can be done in a language of your choice, unless mentioned otherwise.
  - ✞For some programming assignments, you may be asked to present a demo for your work (during the lecture times, my office hours, or through a recorded video presentation and demo).

Course official information

- Literature review note
  - 1 in-depth review is required throughout the term
  - The review **MUST** be no more than 4 pages
  - Each one can choose independently a paper of interest to write the review.
  - The due date, guidelines, and a collection of suggested papers to use are published on eClass.
  - If you choose a paper outside the published list, email me the paper details to check the paper quality and the conference/journal strength before you begin.

Course official information

- ✈ Midterm presentation
  - ✞Each group (3 members) will be allocated 25 minutes (20 minutes for presentation + 5 minutes for questions)
  - ✞Presentations will be held in the following dates:
    - March 6^{th} (1 groups)
    - March 11^{th} (3 groups)
    - March 13^{th} (3 groups)
    - March 18^{th} (3 groups)

Course official information

- ✈ Term project
  - ✞Group project (3 members) ✞The number of groups must be 10 ✞For each project:
    - ✪Project proposal
      - Early submissions will be accepted from 9th of February 2024
      - Due date and cut off date: 1st of March 2024
    - ✪Classroom presentation (20 minutes presentation + 5 minutes for questions): Will be held at the beginning of April. ✪Written report

Course official information

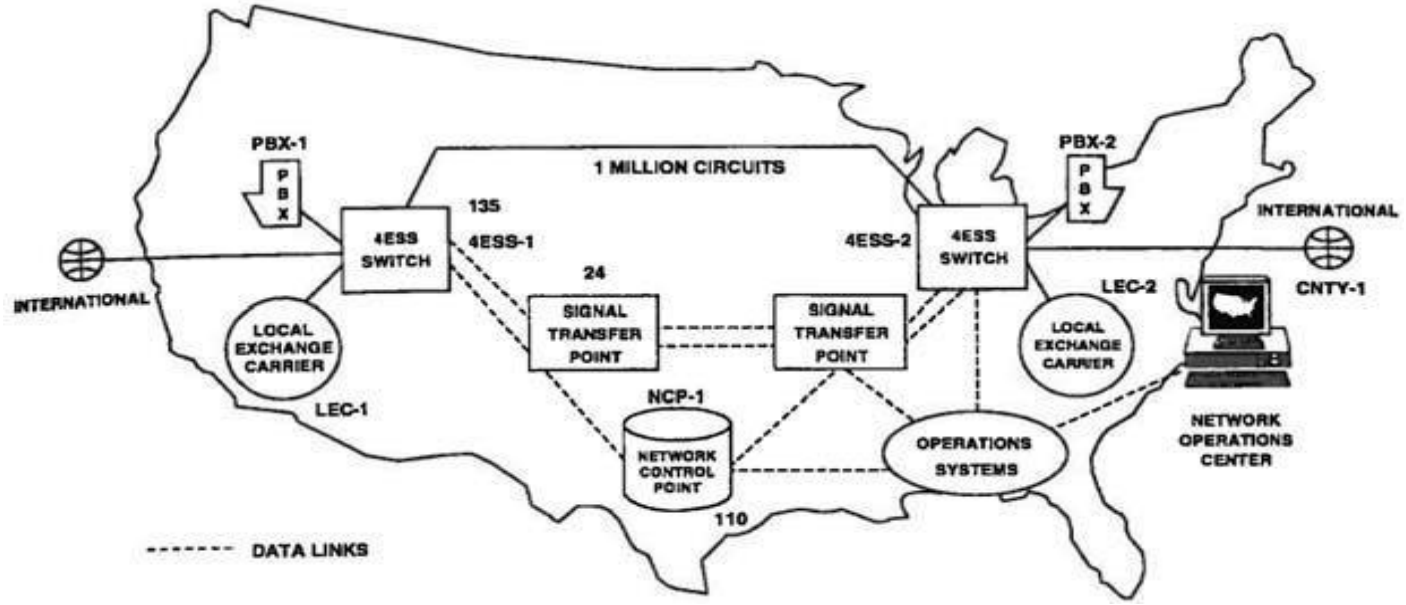
- Lectures
  - All material are to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the instructor.

Computer Networks and the internet

Circuit-switching vs Packet-switching

✈Telephone Networks

✞Hierarchical: edge is simple, core is sophisticated. e.g., the AT&T network has:



[Gerald Ash '97]

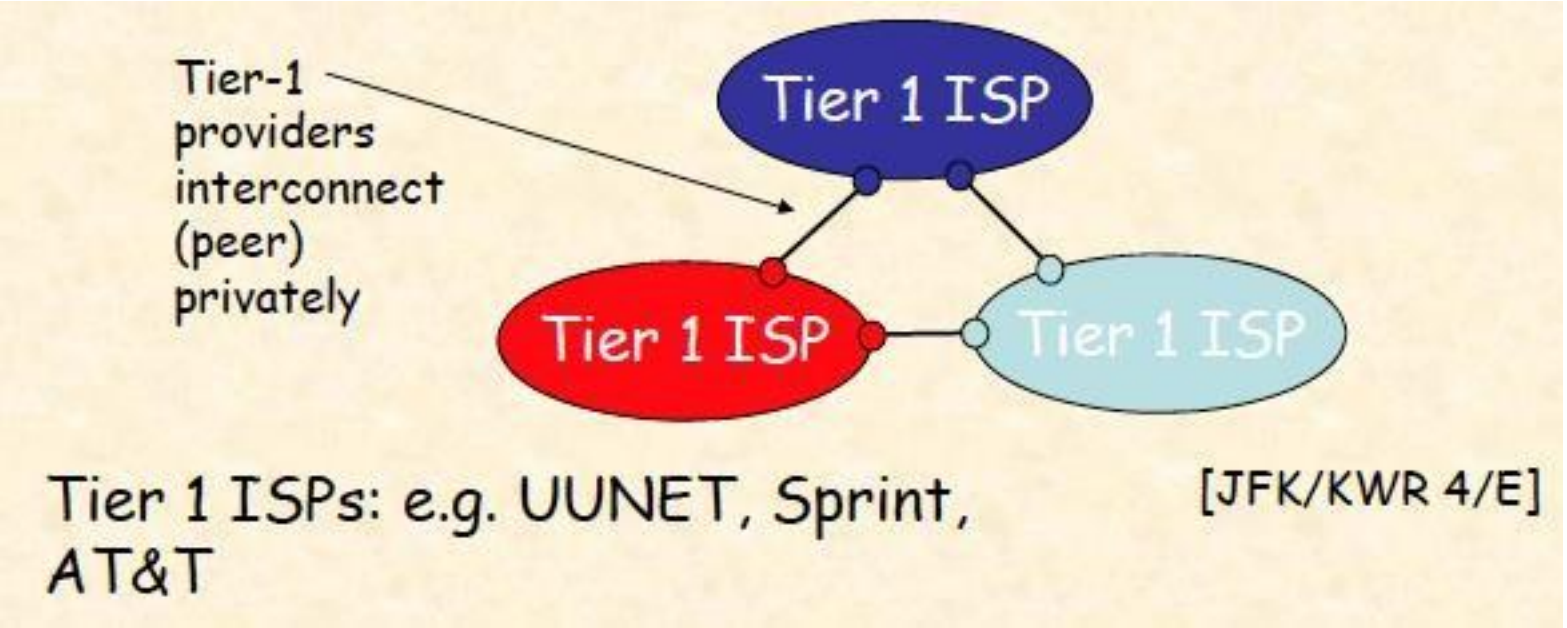
Circuit-switching vs Packet-switching

- A national network of
  - 135 large switching centers (4ESS)
  - 110 Network Control Points (NCPs) providing advanced database for service processing
  - Private Branch Exchanges (PBXs), and Local Branch Exchanges
  - User equipment (connected by about one million trunks)

Other sources of packet delays

- Roughly hierarchical: edge is smart (and should be protected), core is intended to be rather simple, and may be prone to failure.

Other sources of packet delays



Other sources of packet delays