CS244a: An Introduction to Computer Networks

Handout #2: Introduction

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Some Ground Rules

❖ Let's make this educational and enjoyable.
❖ It's a big class, and it's easy for things to get out of hand, so please...
  ❖ Let me orchestrate the questions.
  ❖ Listen to other people's questions.
  ❖ Be here.
  ❖ Be here on time.

Let's begin

❖ An Introduction to the mail system
❖ An Introduction to the Internet

An Introduction to the mail system

Stanford   MIT

Nick .... Dave

Admin .... Admin

Characteristics of the mail system
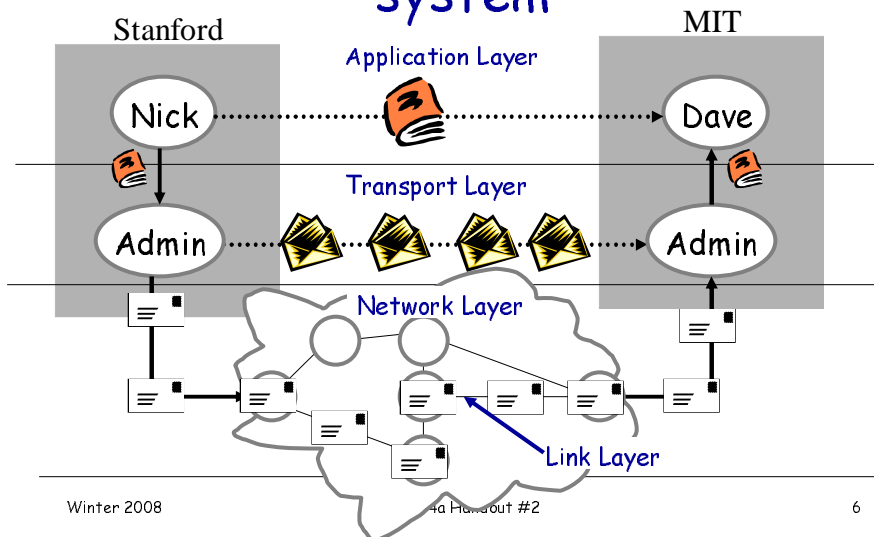
❖ Each envelope is individually routed.
❖ No time guarantee for delivery.
❖ No guarantee of delivery in sequence.
❖ No guarantee of delivery at all!
  ❖ Things get lost
  ❖ How can we acknowledge delivery?
  ❖ Retransmission
    ❖ How to determine when to retransmit? Timeout?
    ❖ Need local copies of contents of each envelope.
    ❖ How long to keep each copy.
    ❖ What if an acknowledgement is lost?

An Introduction to the mail system

An Introduction to the Internet
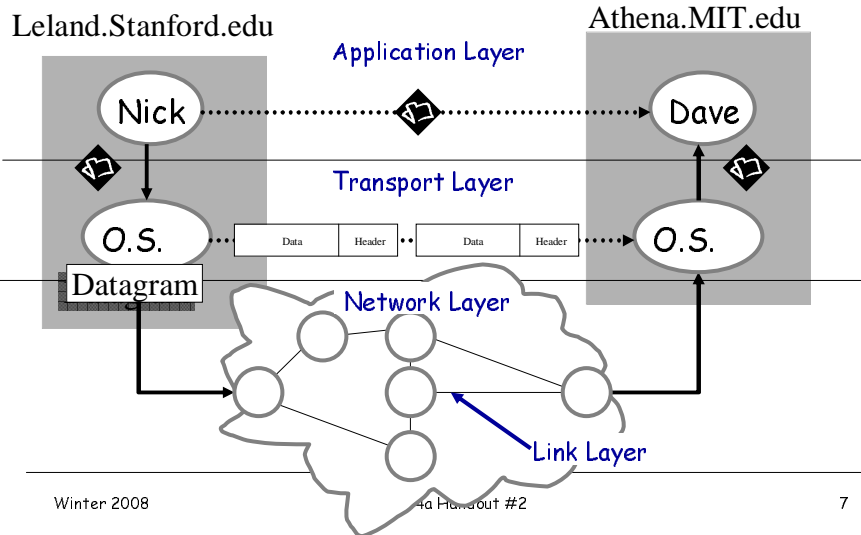
Leland.Stanford.edu

Athena.MIT.edu

Application Layer

Nick .... Dave

Transport Layer

O.S. | Data | Header | | Data | Header | O.S.

Datagram

Network Layer

Link Layer

Characteristics of the Internet

❖ Each packet is individually routed.
❖ No time guarantee for delivery.
❖ No guarantee of delivery in sequence.
❖ No guarantee of delivery at all!
  ❖ Things get lost
  ❖ Acknowledgements
  ❖ Retransmission
    ❖ How to determine when to retransmit? Timeout?
    ❖ Need local copies of contents of each packet.
   ❖ How long to keep each copy?
    ❖ What if an acknowledgement is lost?

Characteristics of the Internet (2)

❖ No guarantee of integrity of data.
❖ Packets can be fragmented.
❖ Packets may be duplicated.

Layering in the Internet

❖ **Transport Layer**
  ❖ Provides reliable, in-sequence delivery of data from end-to-end on behalf of application.
❖ **Network Layer**
  ❖ Provides "best-effort", but unreliable, delivery of datagrams.
❖ **Link Layer**
  ❖ Carries data over (usually) point-to-point links between hosts and routers; or between routers and routers.

An Introduction to the mail system

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Application Layer

Nick ....→ Dave

Transport Layer

Admin .... Admin

Network Layer

Link Layer
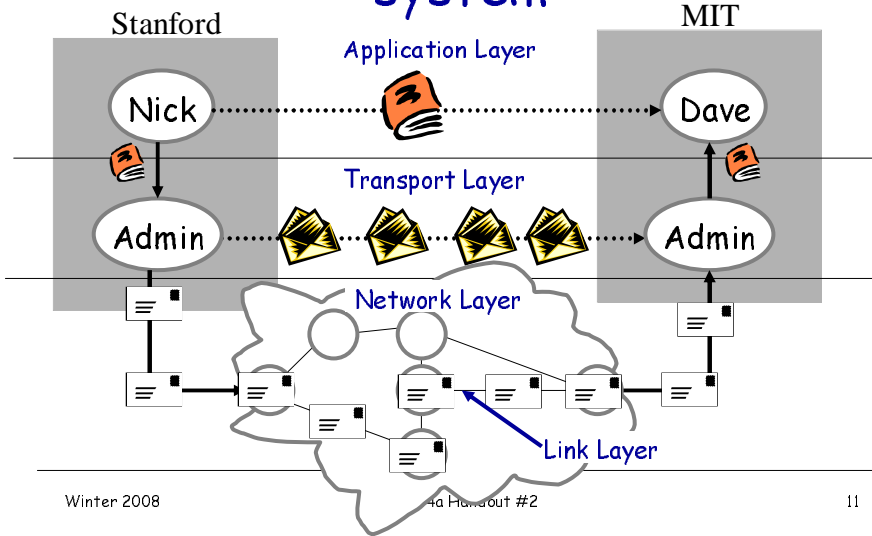
Some questions about the mail system

❖ How many sorting offices are needed and where should they be located?

❖ How much sorting capacity is needed?
  ❖ Should we allocate for Mother's Day?

❖ How can we guarantee timely delivery?
  ❖ What prevents delay guarantees?
  ❖ Or delay *variation* guarantees?

❖ How do we protect against fraudulent mail deliverers, or fraudulent senders?