CS425: Computer Networks

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Lecture 02: Fri, 04 Aug 2006

Updates/Announcements

- Course web-page is up
- Lecture times (CS101):
  - Mon 11-12, Fri 5-6:30
- Tutorial times (CS101):
  - Tue 4:30-6, Wed 11-12:30, Thu 5:30-7
  - May be reduced to one hour
- Will have to move to LHC if needed

Recap and Lecture Outline

- Recap:

  – What is a network?

  – What is a protocol?

- Lecture outline:

  – What are the required/desirable functionalities?

  – How to structure them?

  – Concepts of layering, encapsulation

  – Physical layer encoding (Kameswari Chebrolu)

Required/Desired Functionalities

- Modulation, demodulation

- Encoding

- Framing

- Detect, correct errors

- Medium Access Control

- Routing

- Reliability

- In-order delivery

- Multiplexing, demultiplexing

- Quality-of-Service

- Security

- Compression

- Naming, addressing

- Application

OSI Layering

- ## What is layering?

  – *"Structuring technique which permits the network... to be viewed as logically composed of a succession of layers, each wrapping the lower layers and isolating them from higher layers"* *[Zim80]*

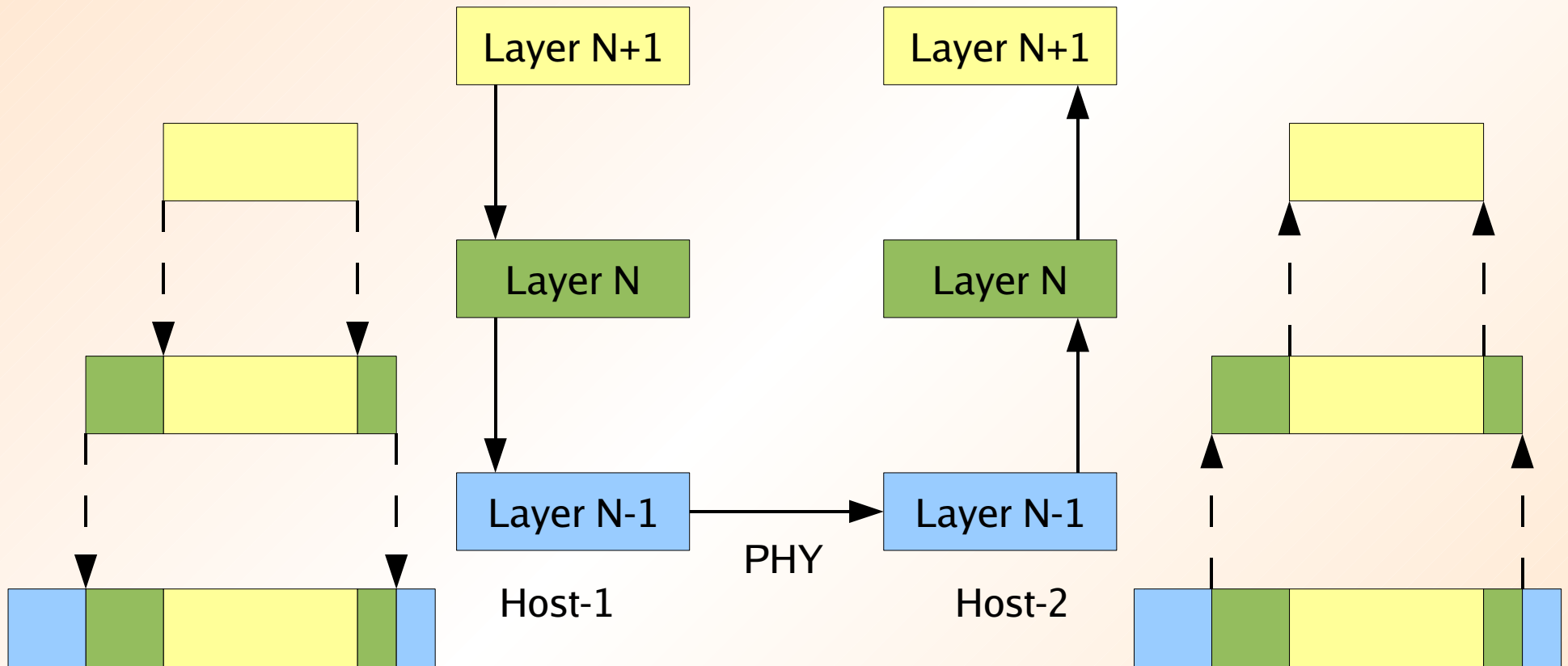| Application |
| Presentation |
| Session |
| Transport |
| Network |
| Link-Layer-Ctrl Medium-Access |
| Physical |

Advantages of Layering

- Handle heterogeneity

- Software reuse, modularity

- Allows extensibility, new technologies
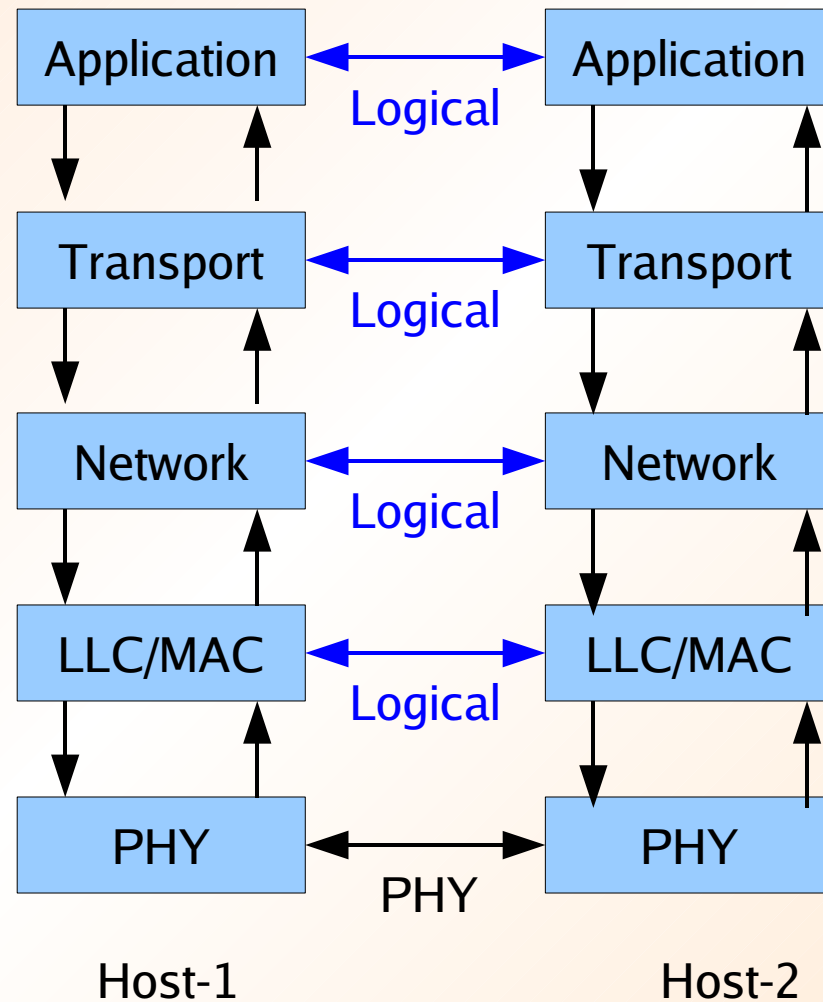
Inter-Layer Communication
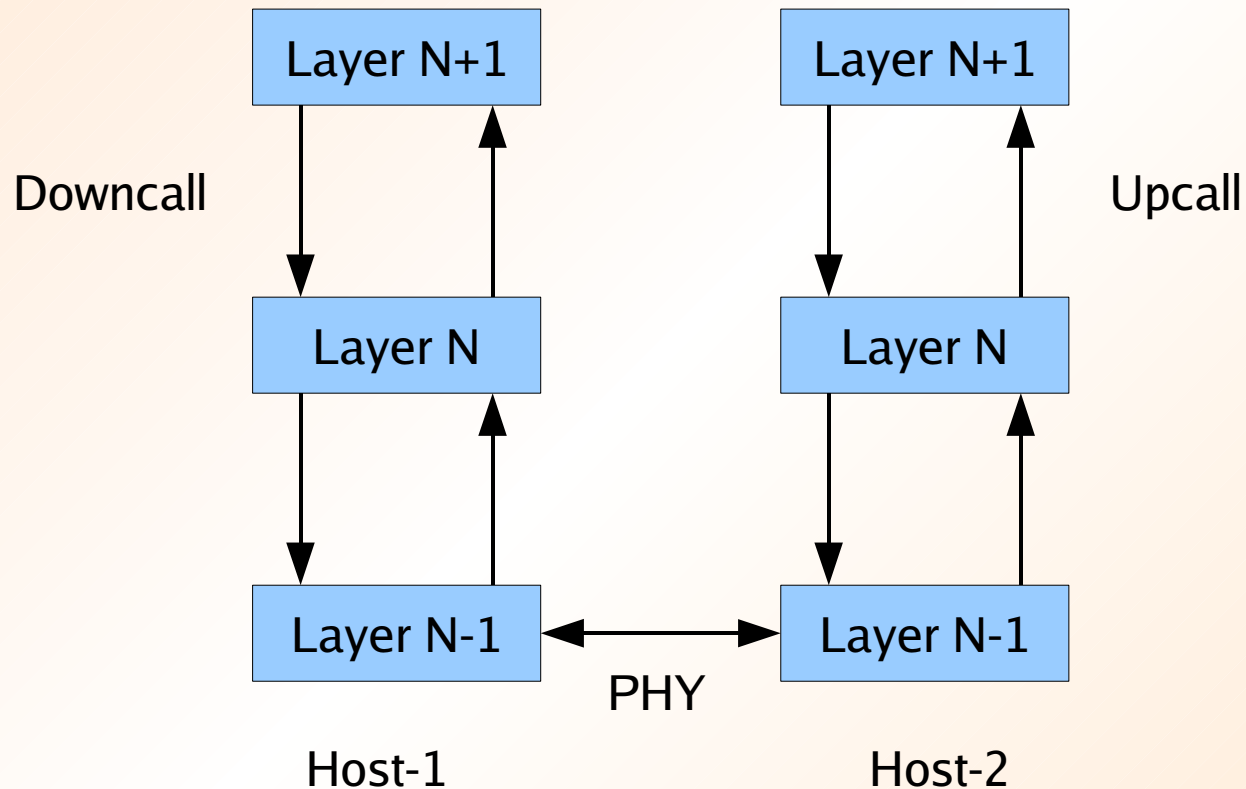
Interface definition between layers is crucial
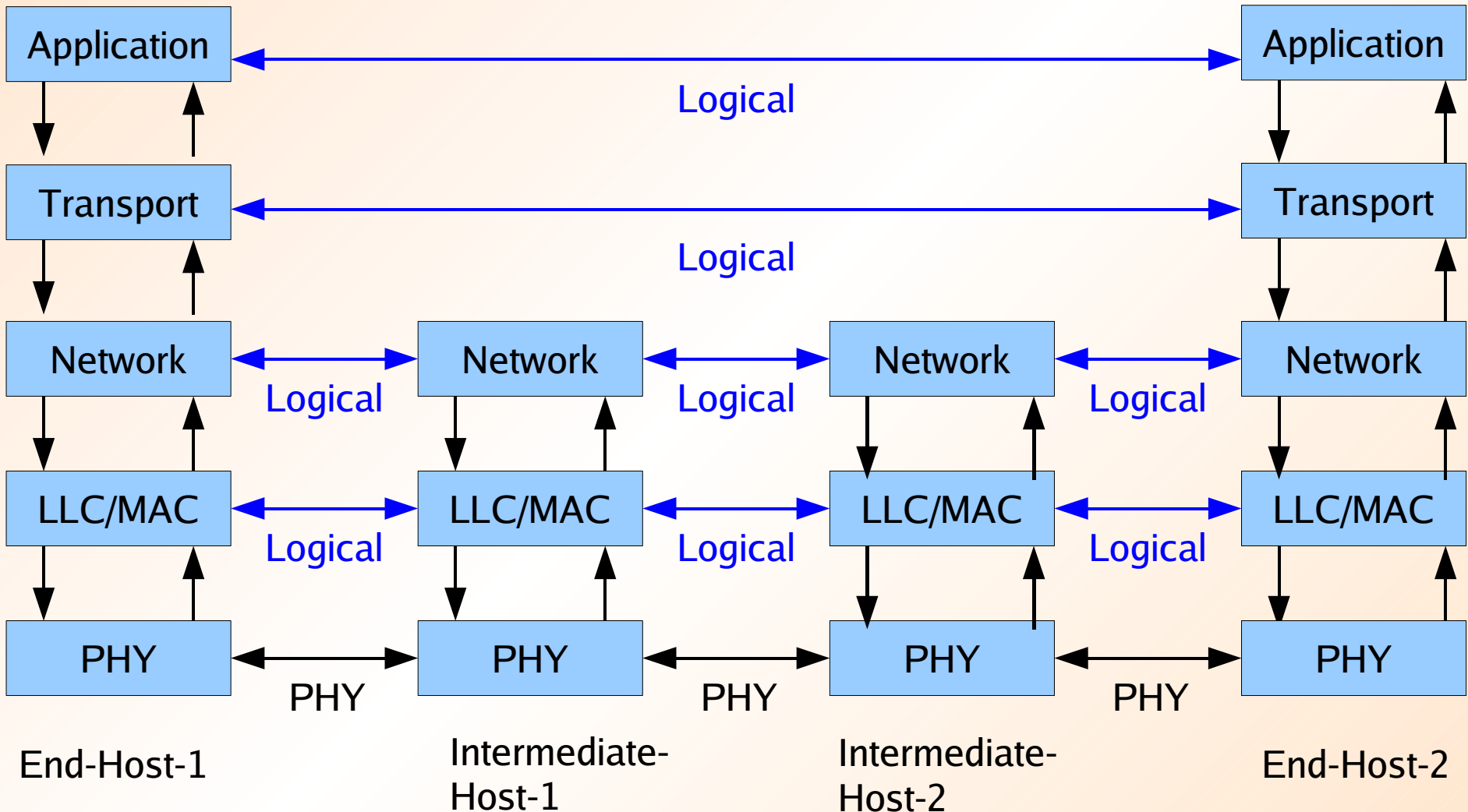
Encapsulation & Decapsulation

Each layer adds/removes its header

Logical Communication between Layers at the Same Level

End-to-end versus Hop-by-hop

Summary of Concepts

- Layering

- Inter-layer communication

- Encapsulation

- End-to-end versus hop-by-hop communication

- Concepts *not covered* from Chapter-1 of Peterson book:
    - Packet switching
    - Sockets
    - Protocol graph
    - Bandwidth-Delay Product (BDP)