
# COMPUTER NETWORKS

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## Computer Networks and the Internet

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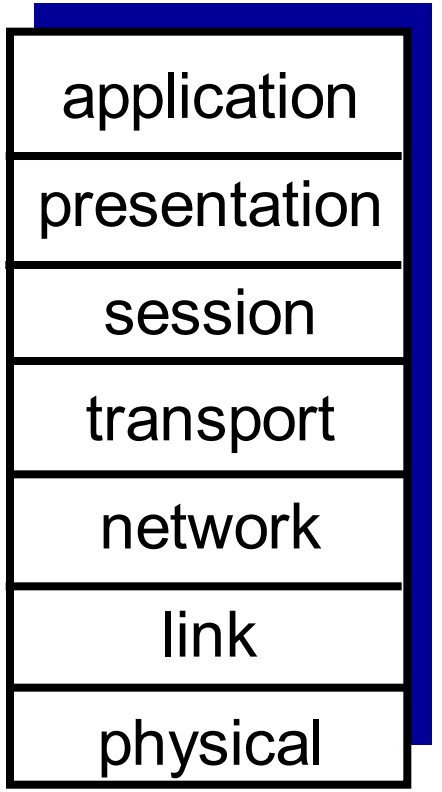
## OSI reference model

- *presentation:* allow applications to interpret meaning of data, (e.g., encryption, compression, machine-specific conventions)
- *session:* synchronization, checkpointing, recovery of data exchange
- Internet stack "missing" these layers!
  - these services, *if needed,* must be implemented in application
  - needed?




**O**pen **S**ystems **I**nterconnection (OSI) model – introduced in late 1970s by ISO.

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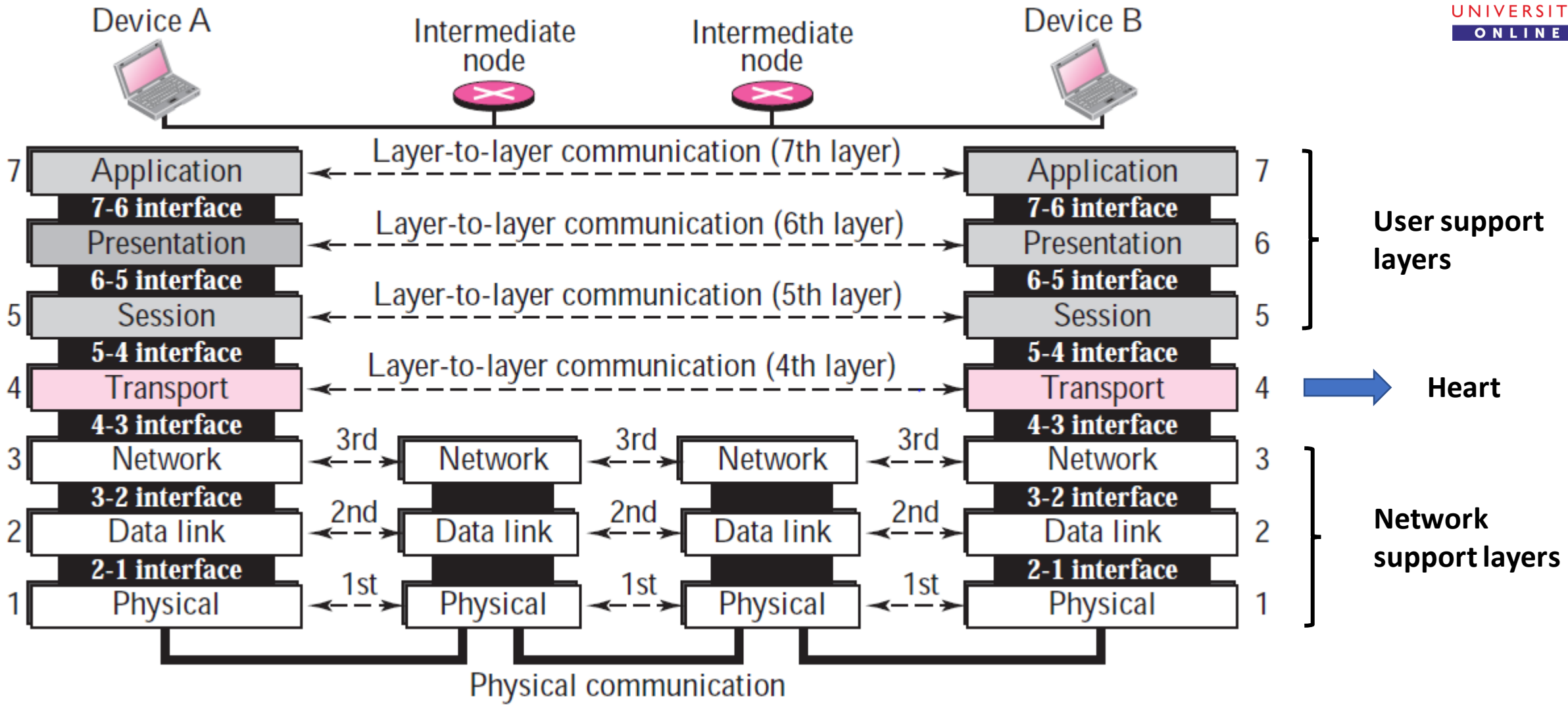
## OSI reference model (more)



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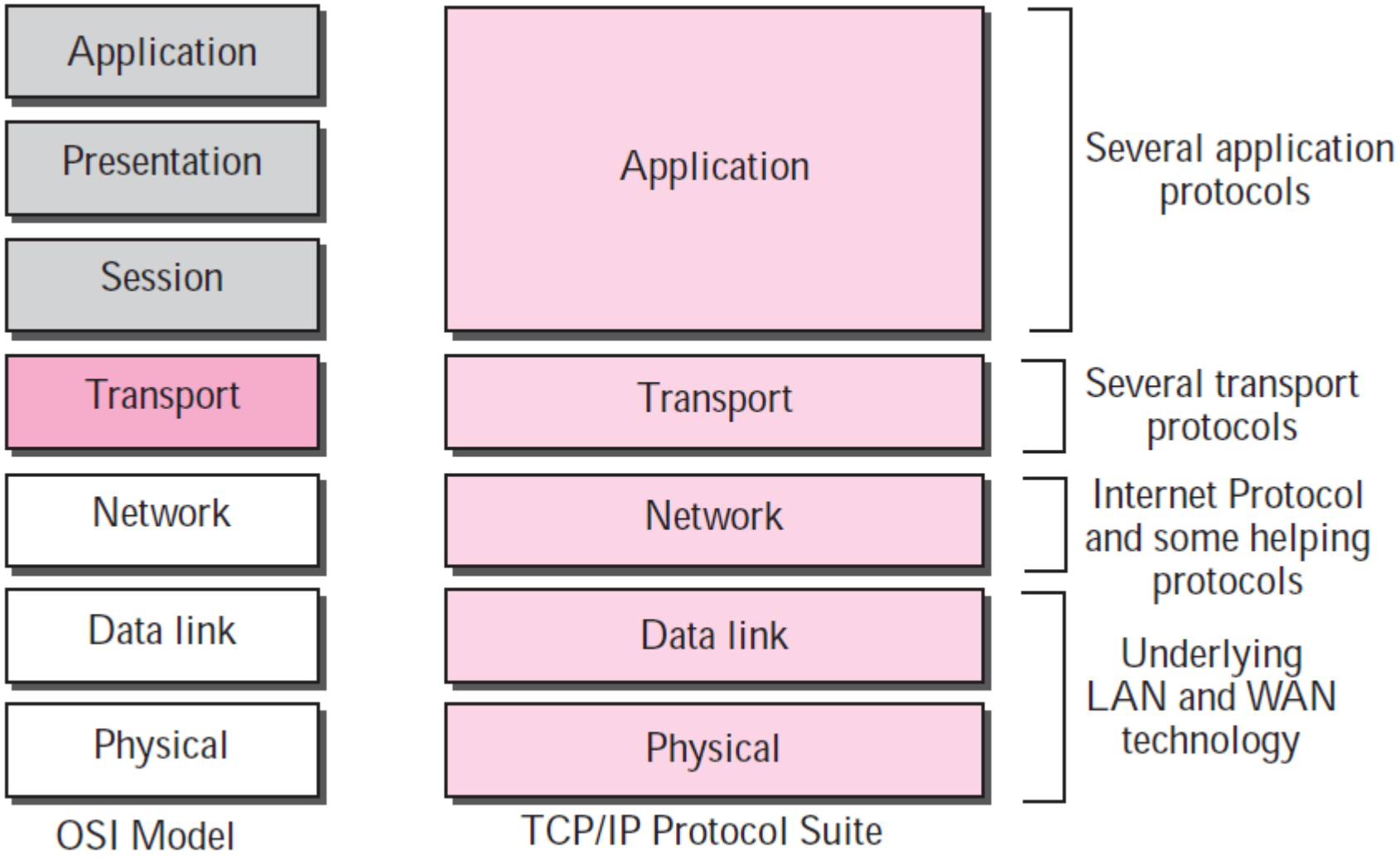
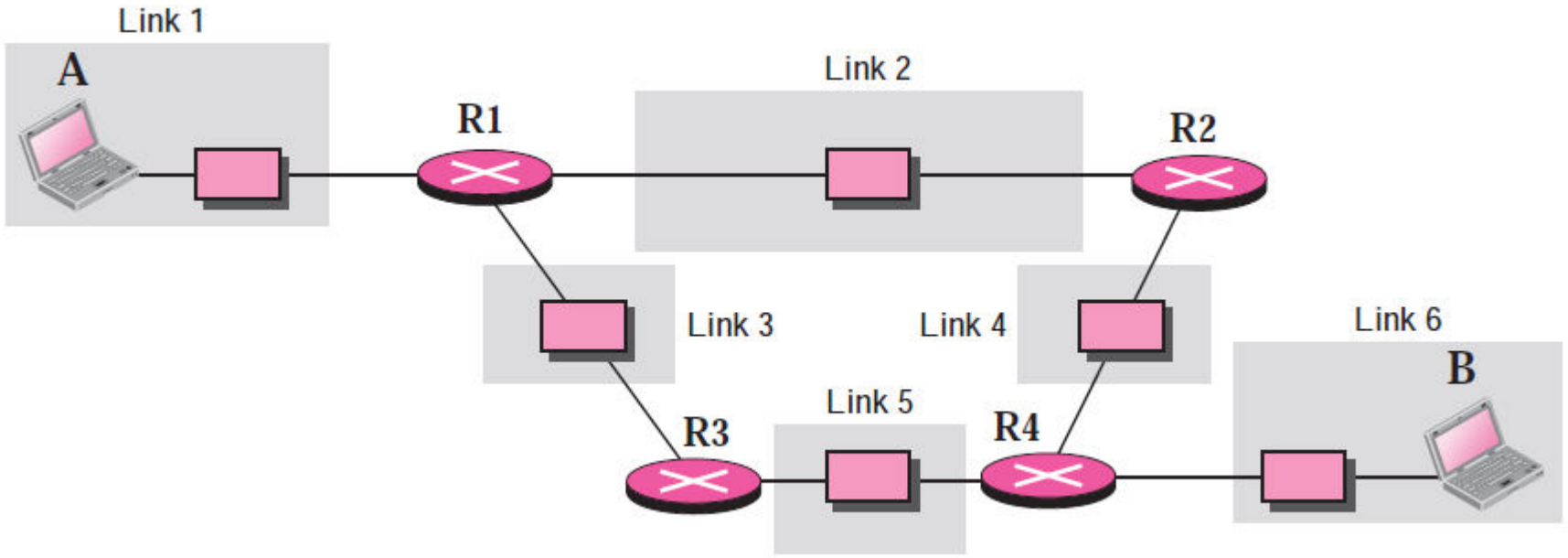
## TCP/IP vs OSI reference model

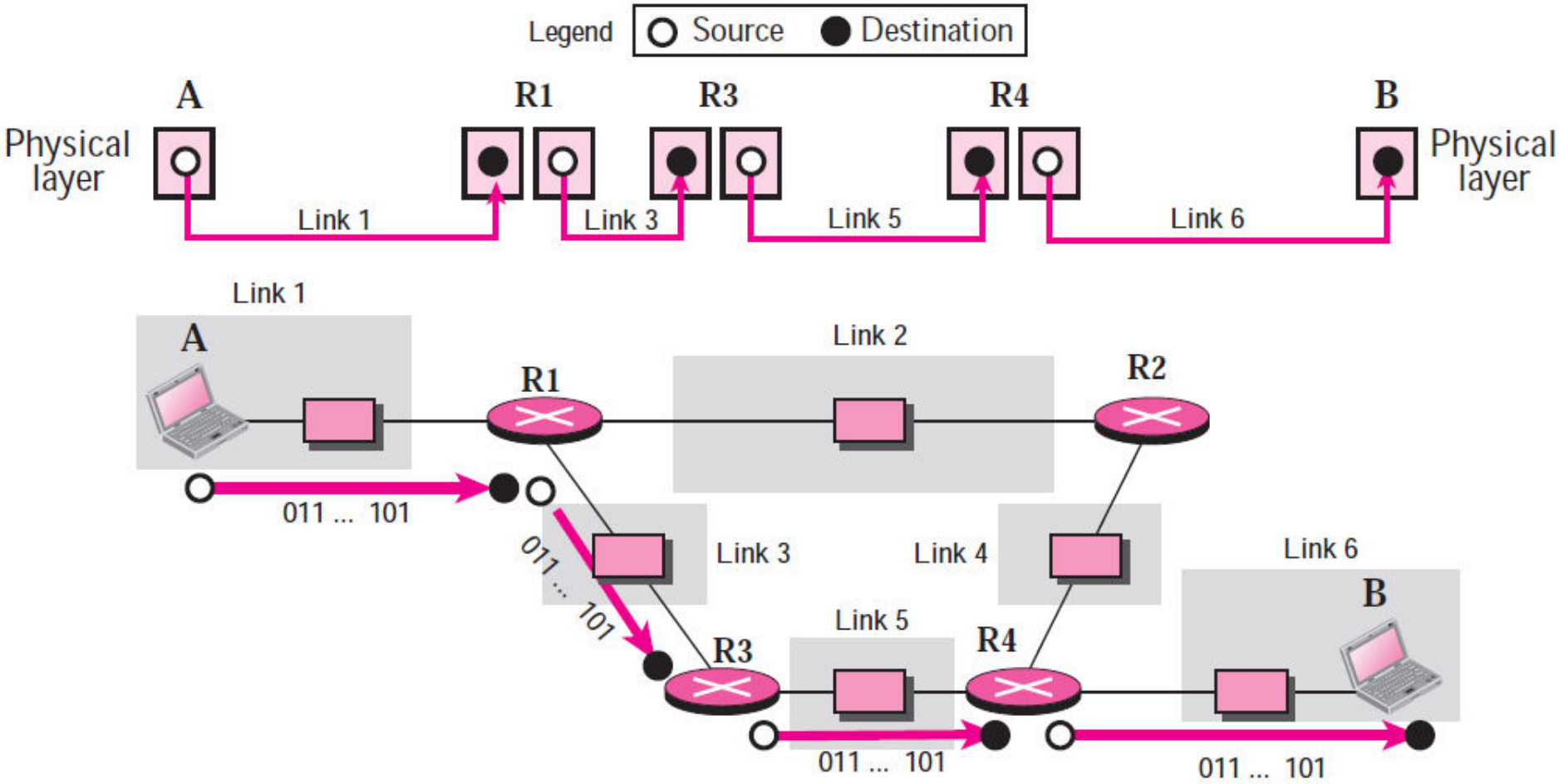


# Layers in the TCP/IP Protocol Suite (more)




**A private internet**

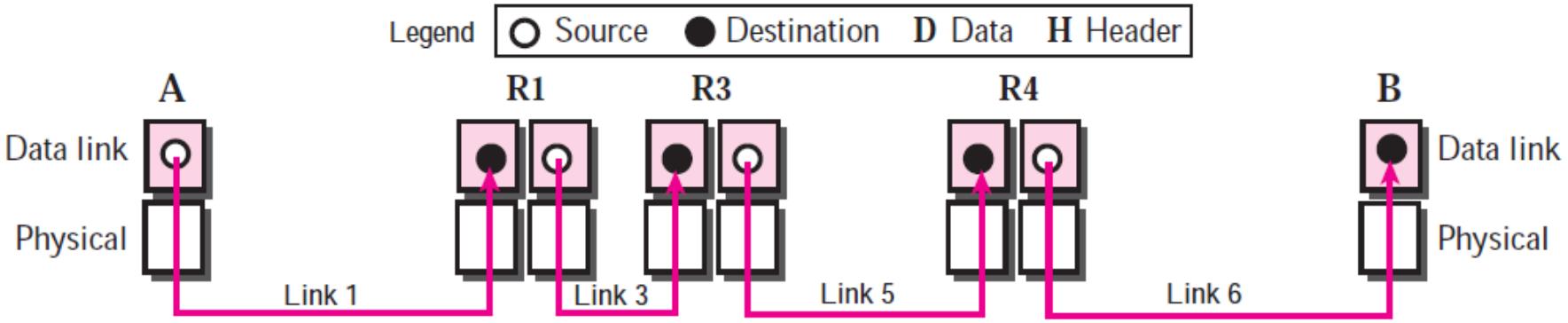
# Layers in the TCP/IP Protocol Suite (more)

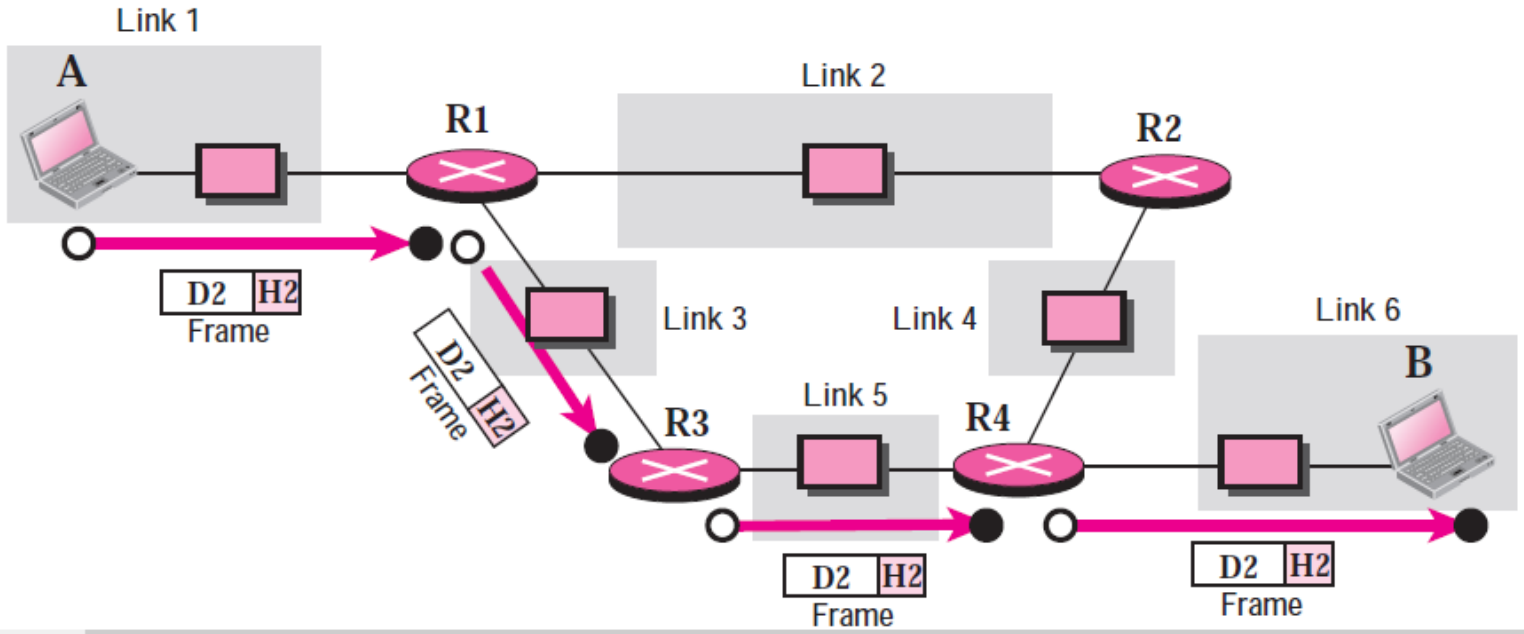



**Communication at the physical layer**

**Unit of Communication – bit**

# Layers in the TCP/IP Protocol Suite (more)

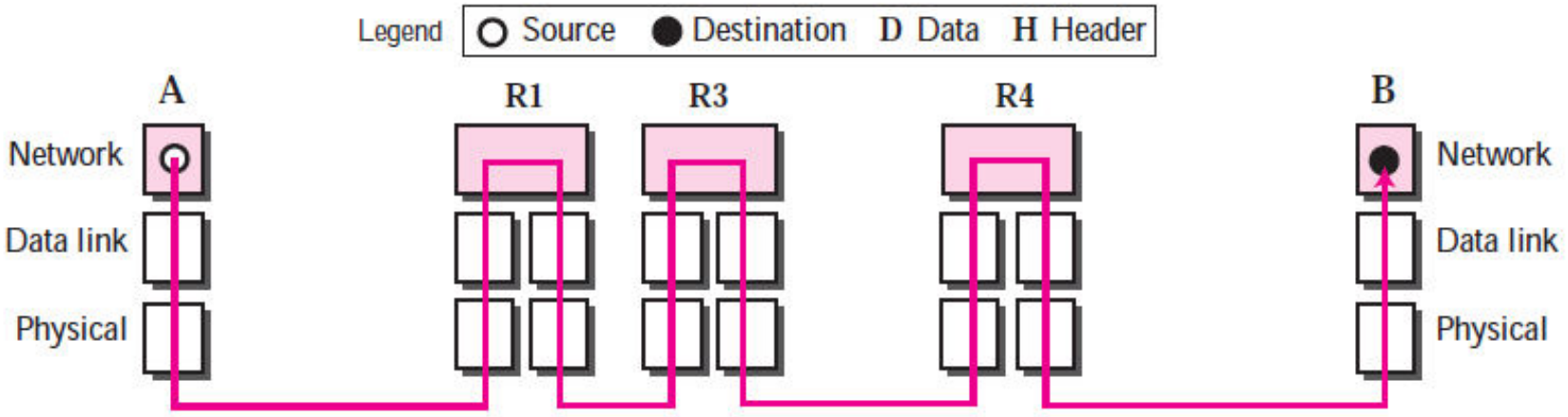


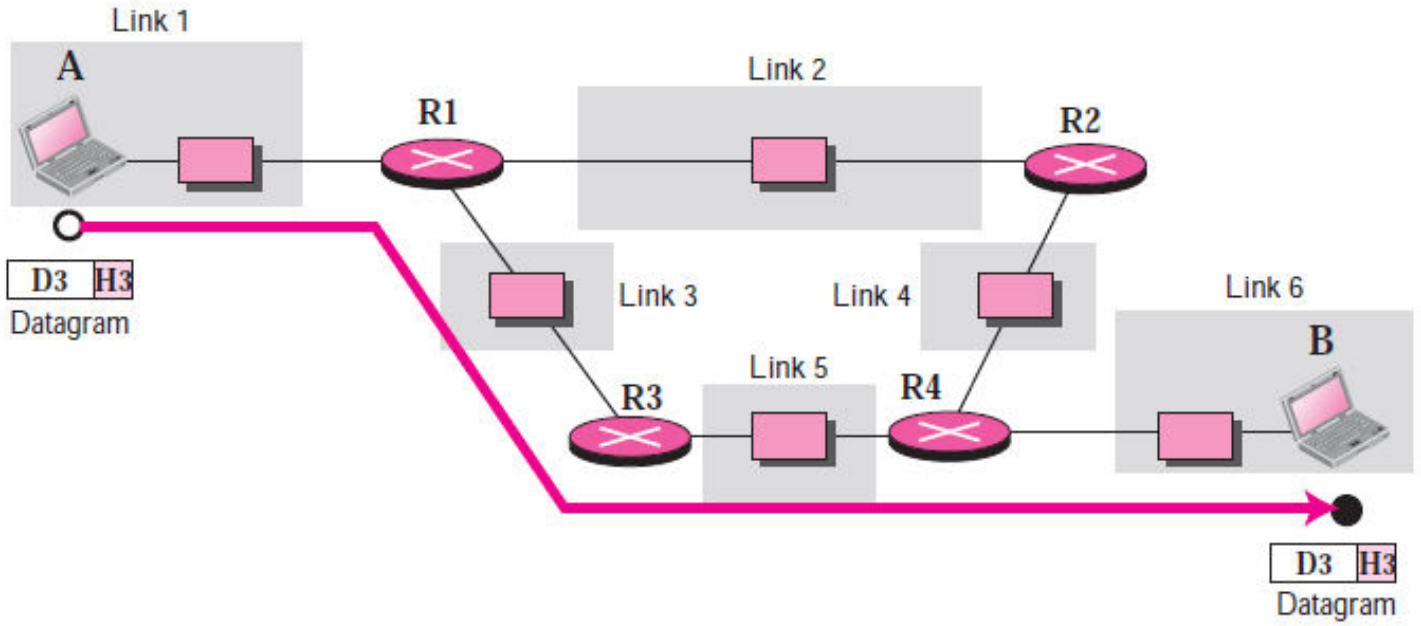




**Communication at the data link layer**

**Unit of Communication – frame**

# Layers in the TCP/IP Protocol Suite (more)




**Communication at the network layer**

**Unit of Communication – datagram**

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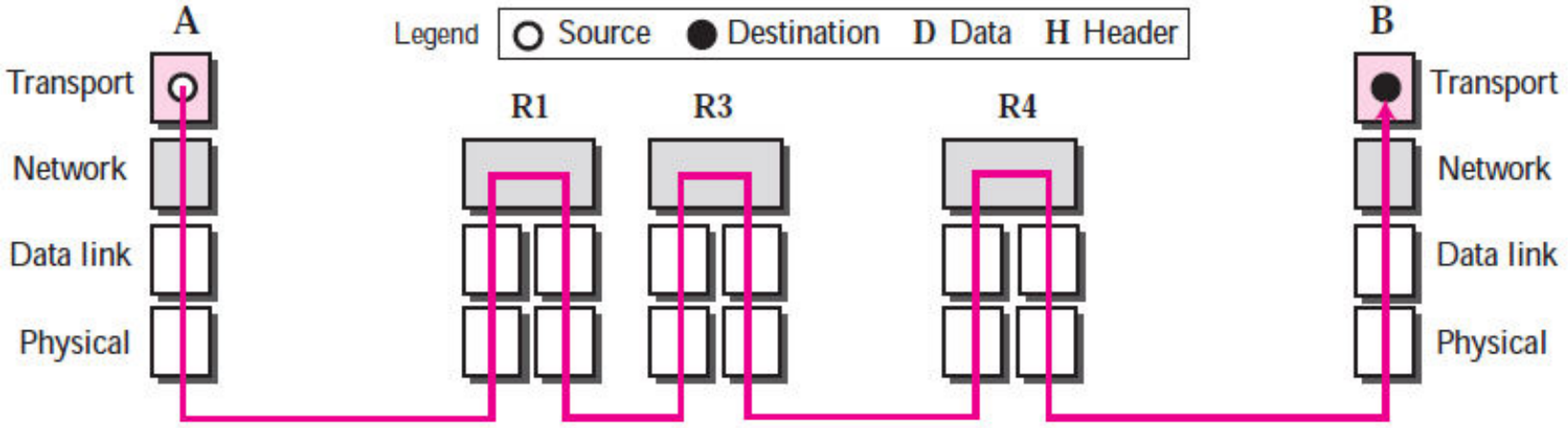
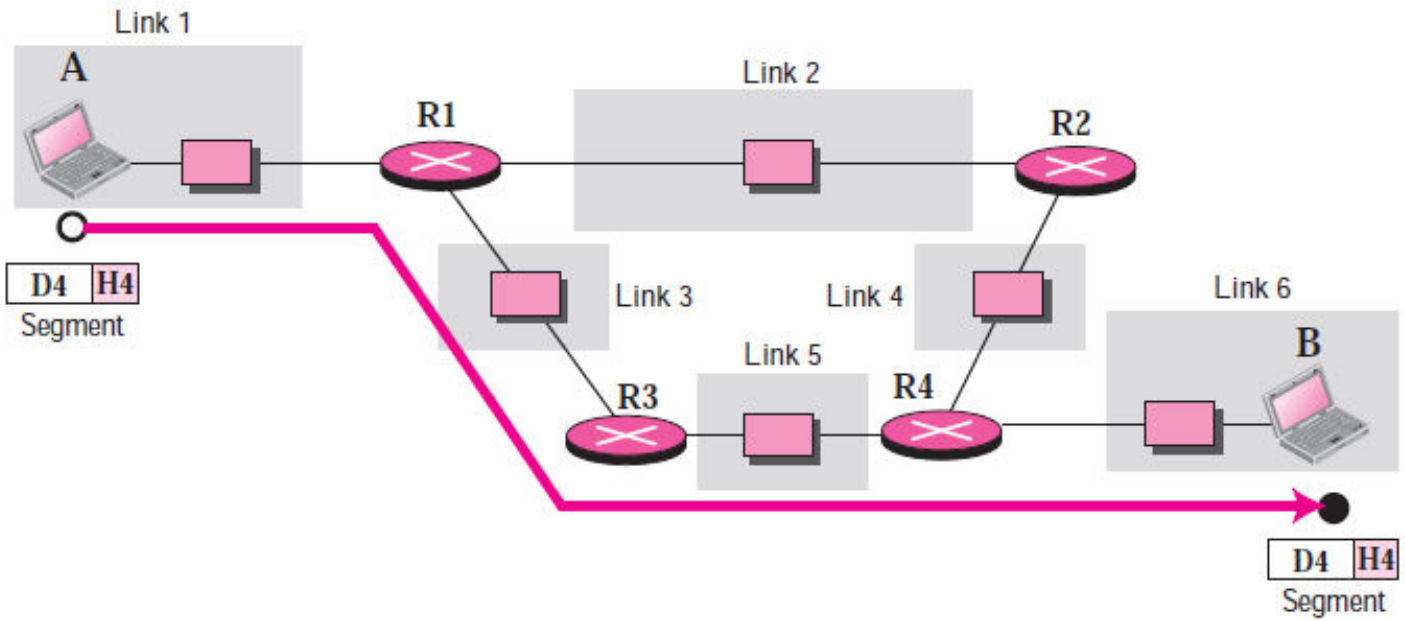
## Layers in the TCP/IP Protocol Suite (more)




**Communication at the transport layer**

**Unit of Communication – segment/packet**

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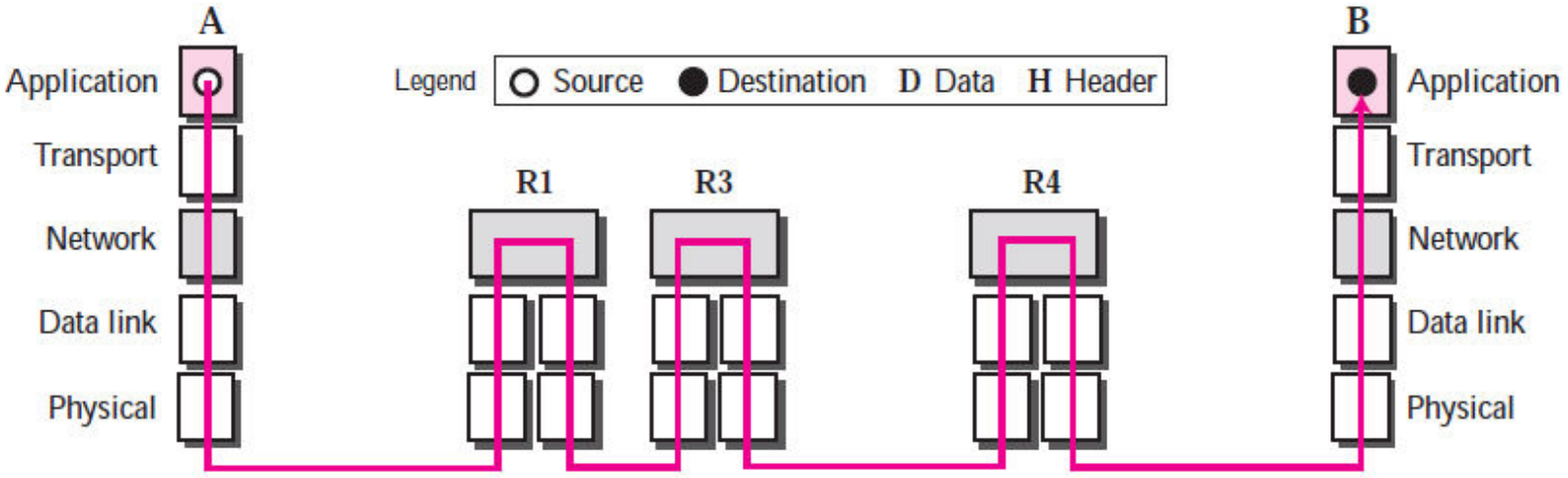
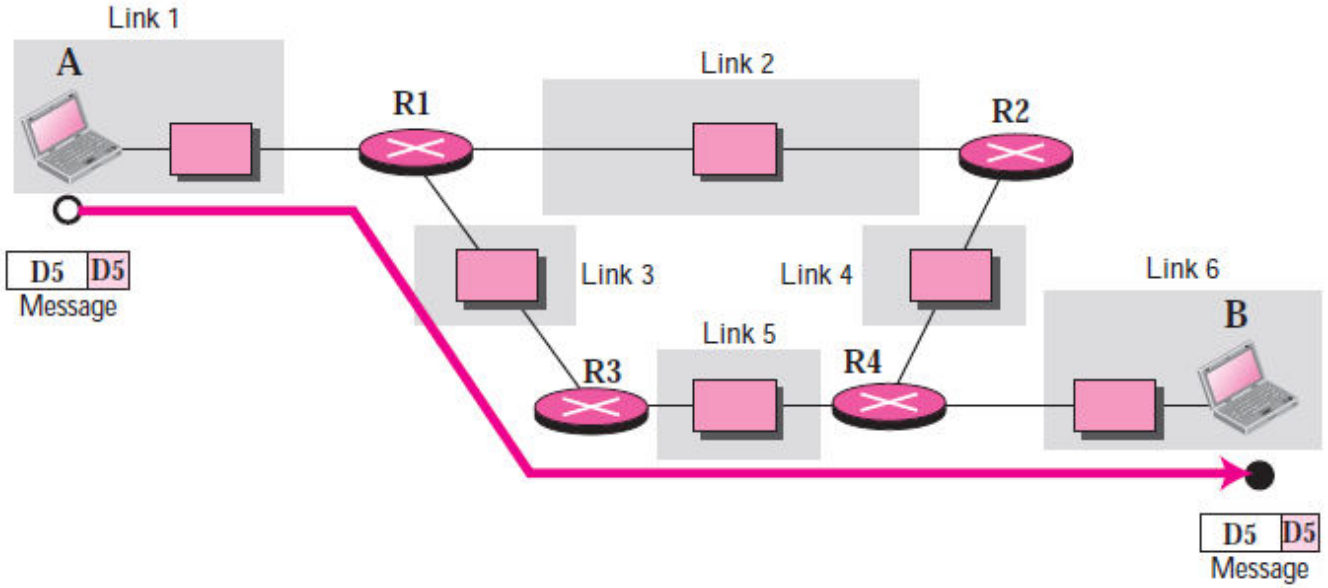
## Layers in the TCP/IP Protocol Suite (more)

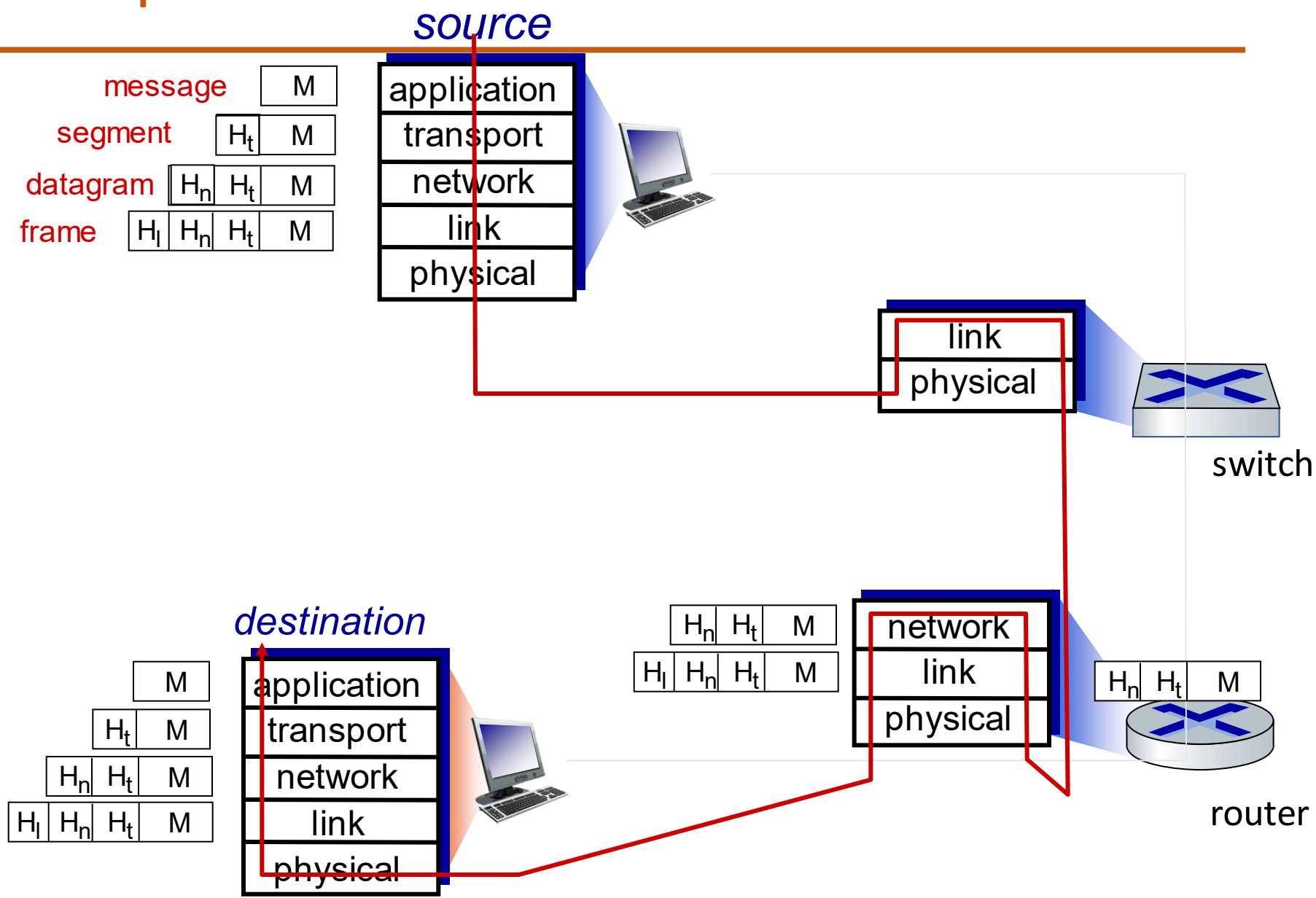



**Communication at the application layer**

**Unit of Communication – message**

# Encapsulation – Data Communication in Protocol Stack



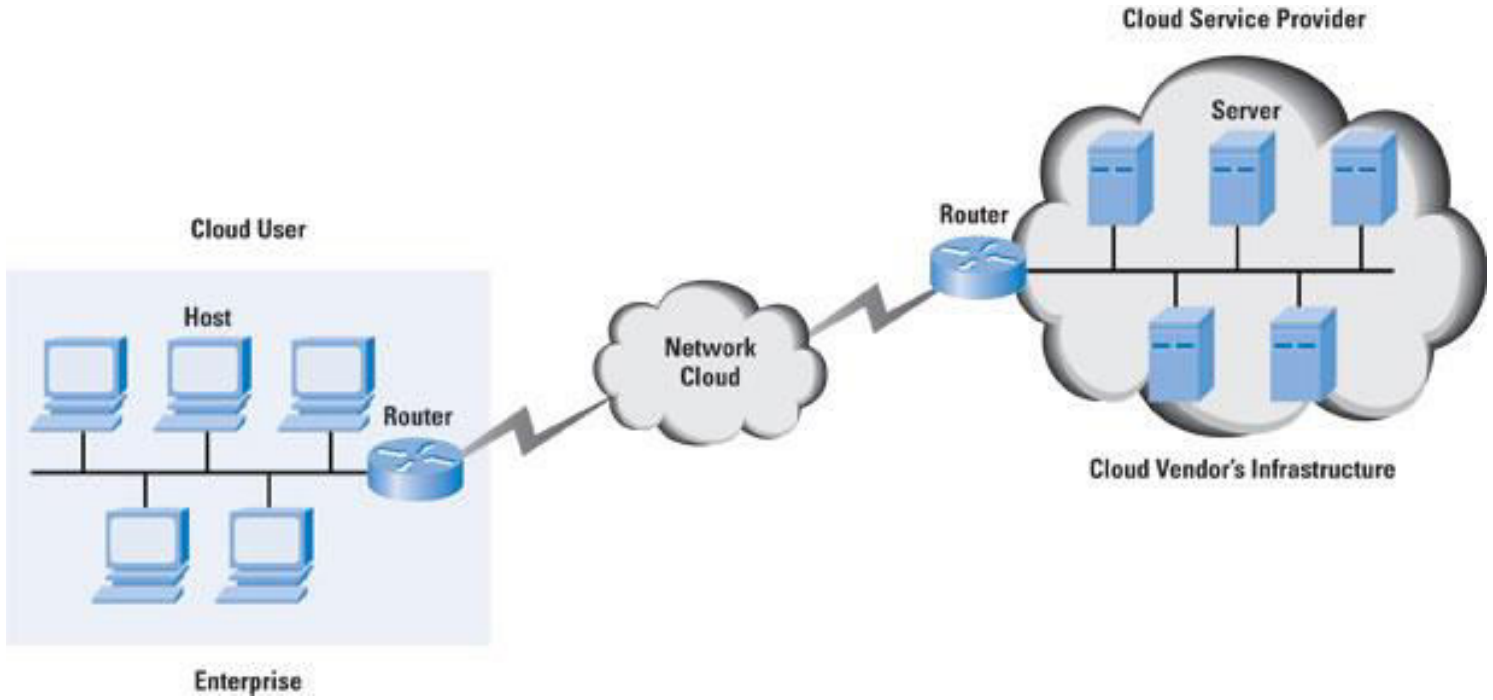
# Cloud Computing

## Definition

- Cloud computing is a model
  - for enabling ubiquitous, convenient, on-demand network access
  - a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services)
  - can be rapidly provisioned and released with minimal management effort or service provider interaction.
- This cloud model is composed of:
  - five essential characteristics
  - three service models
  - four deployment models

## Cloud Networking (SD-CN)

- Hosting some or all of an organization's networking resources/services from the cloud.
- Network -> cloud-enabled or entirely cloud-based.



## Cloud enabled networking

- Network is on premises, but some or all resources used to manage it are in the cloud.
- Core network infrastructure – packet forwarding, routing, and data— remains in-house.
- Others like network management, monitoring, maintenance, and security services are done through the cloud.

## Cloud based networking

- Entire network is in the cloud.
- Includes network management resources and physical hardware

## Summary

*We've covered a "ton" of material!*

- Computer Networks overview
- Internet overview
- what's a protocol?
- network edge, access network, core
  - packet-switching versus circuit-switching
  - Internet structure
- performance: loss, delay, throughput
- layering, service models
- Introduction to cloud computing

*You now have:*

- context, overview, vocabulary, "feel" of networking
- more depth, detail, *and fun* to follow*!*

## Queries

PES UNIVERSITY ONLINE

Thank You
For Your Attention


# THANK YOU

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