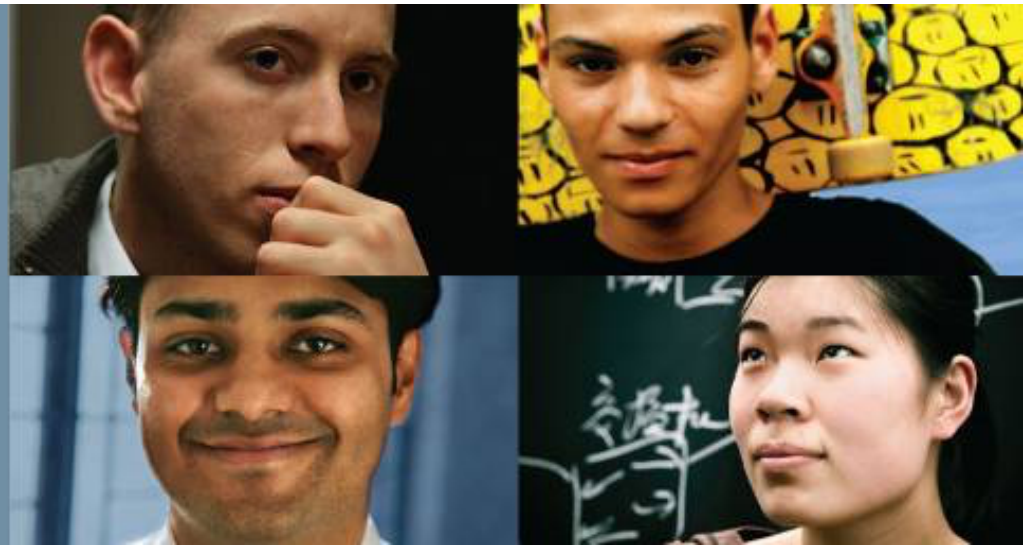
TNE10006/TNE60006: Networks and Switching



Network Layer

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Outline

- The Network Layer in the OSI Model
- Responsibilities
- Addressing
- Handling Problems
- Common Network Layer Protocols

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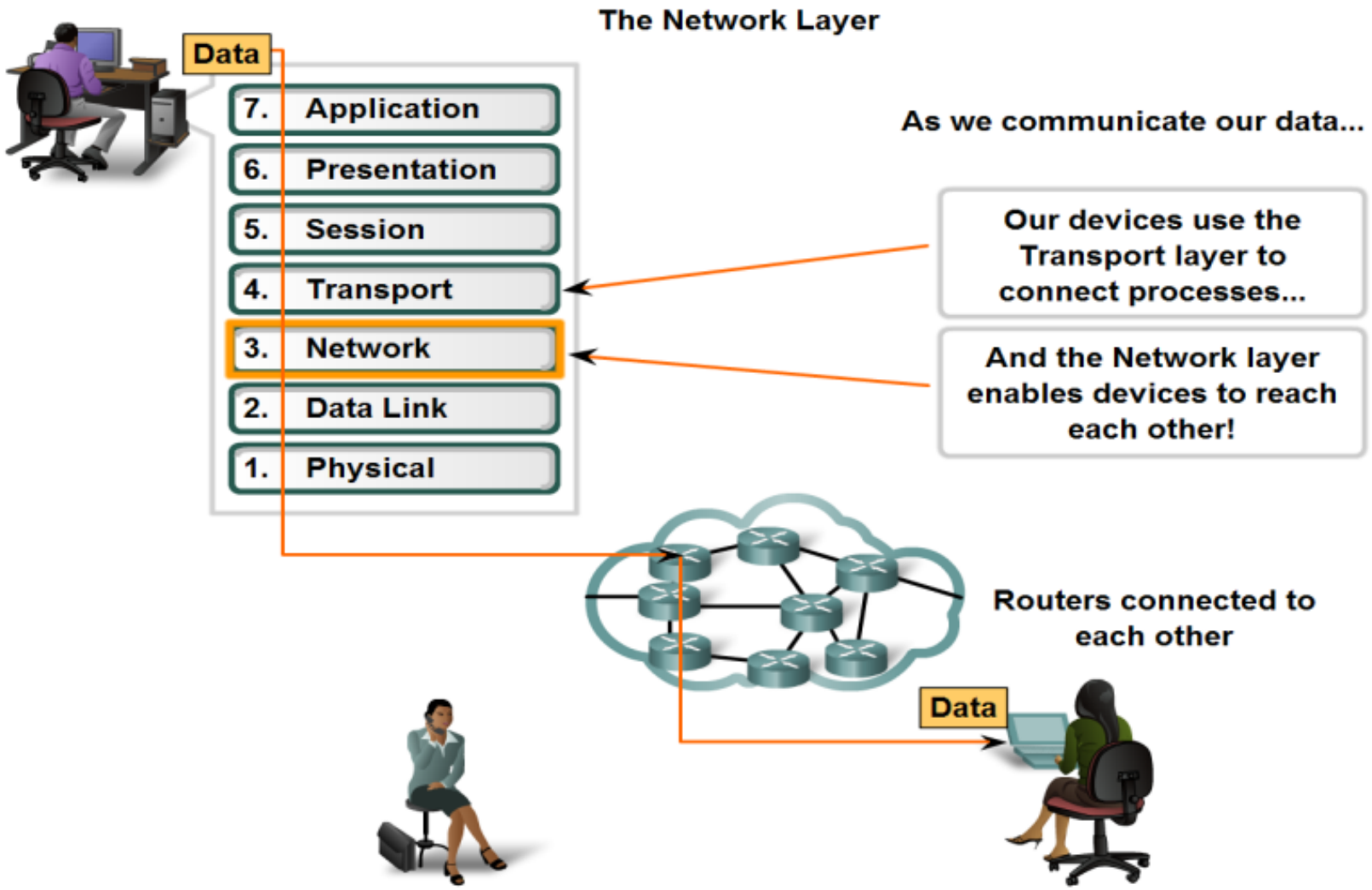
Role of the Network Layer



Network Layer Responsibilities

- Provide end-to-end connectivity across multiple Link Layer networks
  - Responsible to route connections through the network
  - Only provides device connectivity – **not** application
- Defines generic network behaviours
  - Packet or Connection based
  - Best Effort or Guaranteed throughput
  - Secure or Open
- Should aim to be Link Layer agnostic

Network Layer Addressing

- Should provide unique, network-wide addresses
- Addresses should have structure – helps routing traffic
- Addresses need to consider potential network size
  - Primary reason we now need IPv6

Handling Problems

- Network connectivity issues
  - Dealing with loss
  - Dealing with duplication
- Network routing issues
  - Dealing with problems routing traffic
- Network throughput issues
  - How to guarantee performance
  - How to deal with bottlenecks

Network Layer Protocols

Common network layer protocols include:

- IP version 4 (IPv4)
- IP version 6 (IPv6)

Legacy network layer protocols include:

- Novell Internetwork Packet Exchange (IPX)
- AppleTalk
- Connectionless Network Service (CLNS/DECNet)

Summary

In this lecture, we covered:

- The Network Layer in the OSI Model
- Responsibilities
- Addressing
- Handling Problems
- Common Network Layer Protocols