Cisco Networking Academy
Mind Wide Open

Chapter 1:
Explore the Network

Introduction to Networks v5.1

Marvin Krym

Chapter Outline

Red notes inserted by presenter

1.0 Introduction

1.1 Globally Connected

1.2 LANs, WANs, and the Internet

1.3 The Network as a Platform

1.4 The Changing Network Environment

1.5 Summary

Section 1.1: Globally Connected

Upon completion of this section, you should be able to:

- Explain how networks affect the way we interact, learn, work, and play.
- Explain how host devices can be used as clients, servers, or both.

Topic 1.1.1: Networking Today

Networks in Our Daily Lives

Technology Then and Now

Internet of Everything
Hyperconnected World

https://www.youtube.com/watch?v=bAOWpdQeyBQ https://www.youtube.com/watch?v=id035iMAydo

No Boundaries

Networks support the way we:

- Learn
- Communicate
- Work
- Play

Topic 1.1.2:
Providing Resources in a Network

Networks of Many Sizes

Small Home Networks

PAN – Personal Area Networks

Small Office/Home Office

LAN – Local Area Networks – OUR FOCUS

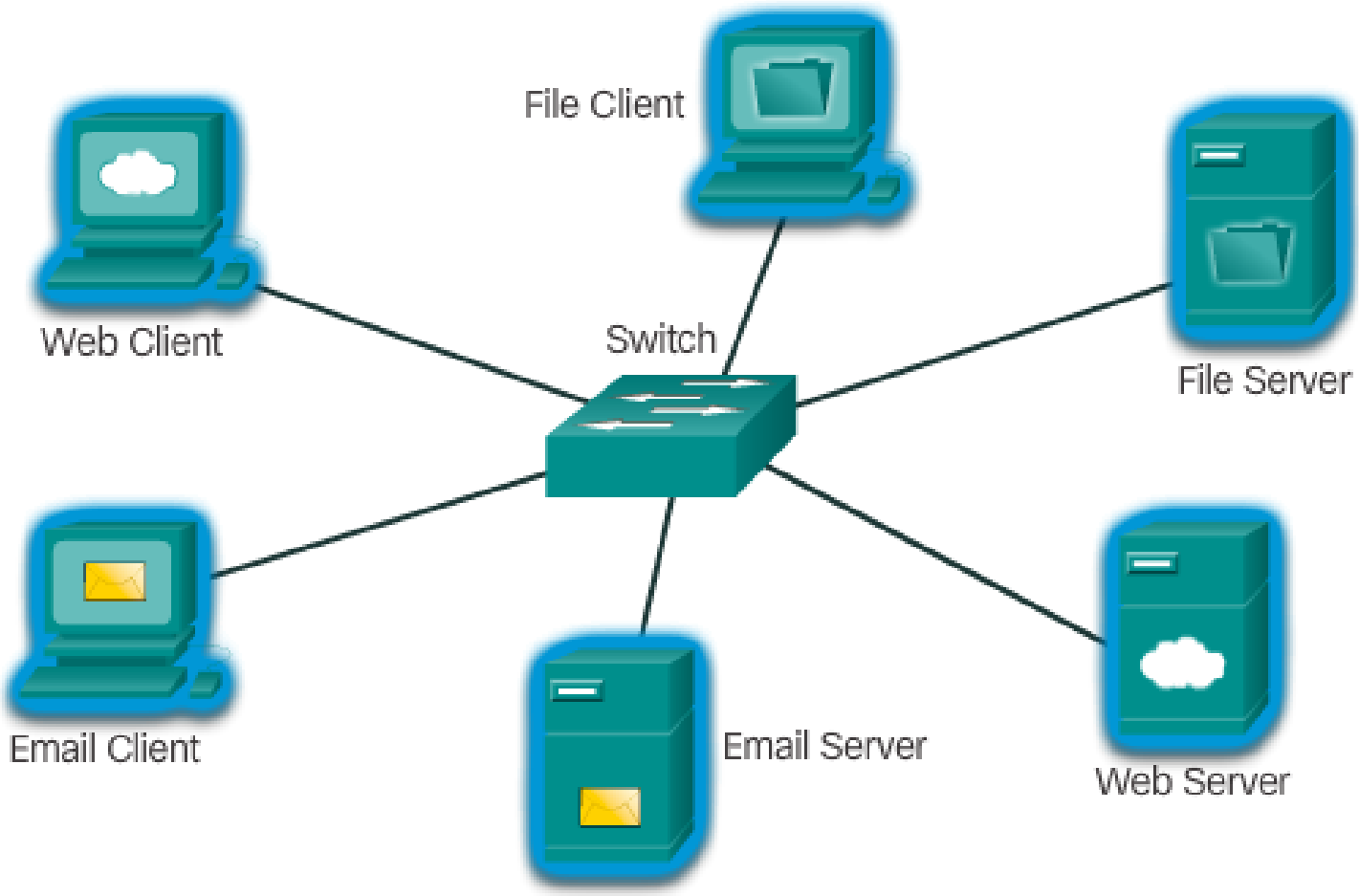
Medium to Large Networks

MAN – Metropolitan Area Networks

World Wide Networks

WAN – Wide Area Networks

Clients and Servers



Peer-to-Peer

Windows Workgroup

The advantages of peer-to-peer networking:

- Easy to set up
- Less complexity
- Lower cost since network devices and dedicated servers may not be required
- Can be used for simple tasks such as transferring files and sharing printers

The disadvantages of peer-to-peer networking:

- No centralized administration
- Not as secure
- Not scalable
- All devices may act as both clients and servers which can slow their performance

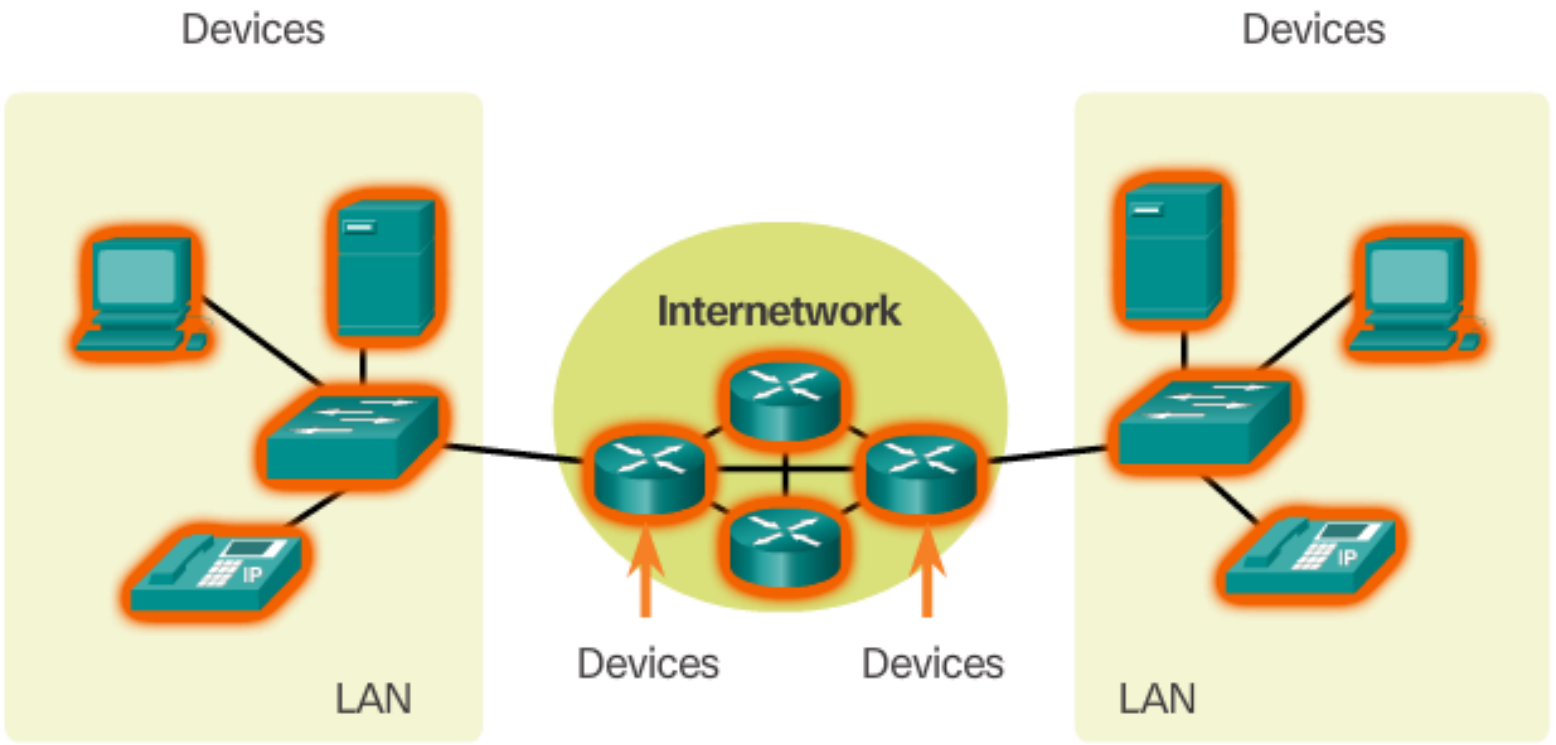
Section 1.2: LANs, WANs, and the Internet

Upon completion of this section, you should be able to:

- Explain the use of network devices.
- Compare the devices and topologies of a LAN to the devices and topologies of a WAN.
- Describe the basic structure of the Internet.
- Explain how LANs and WANs interconnect to the Internet.

Topic 1.2.1:
Network Components

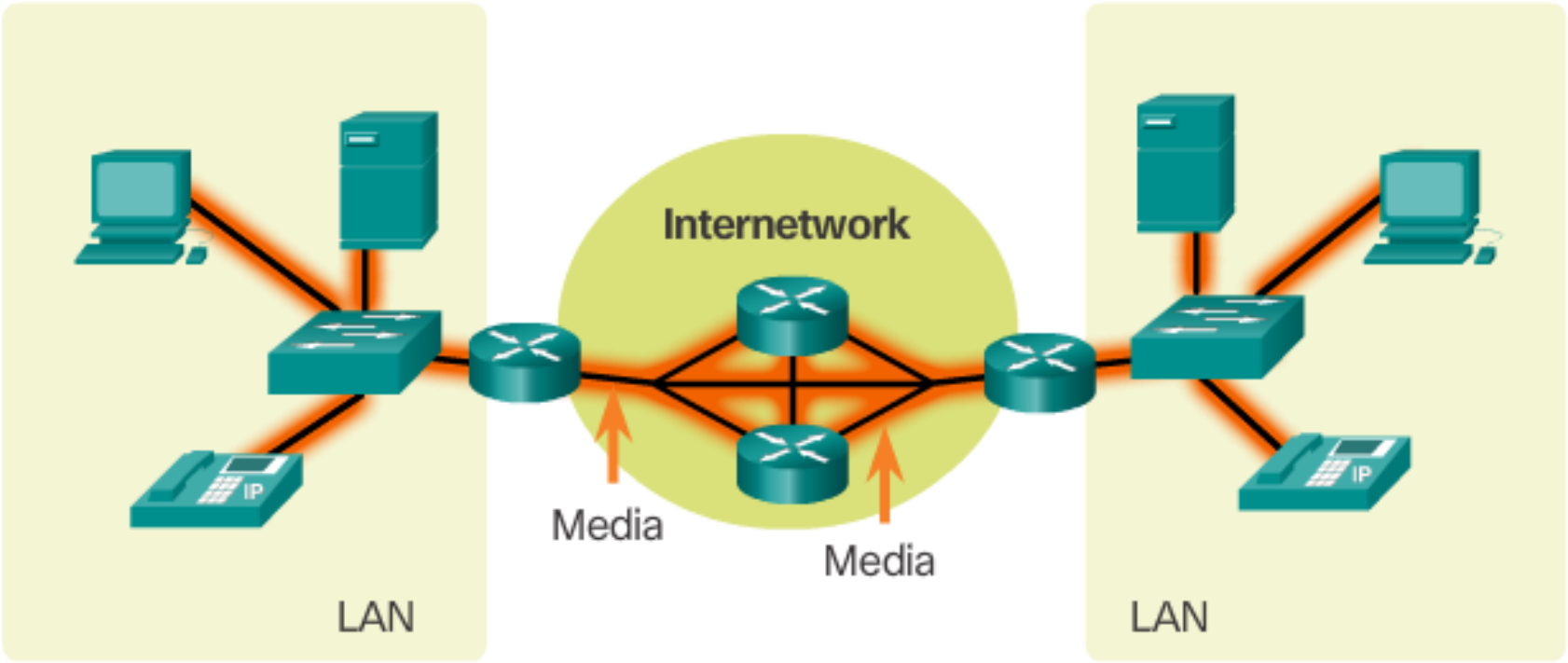
Overview of Network Components



Example of two LANs connected by an Internet

Devices | Media | Services

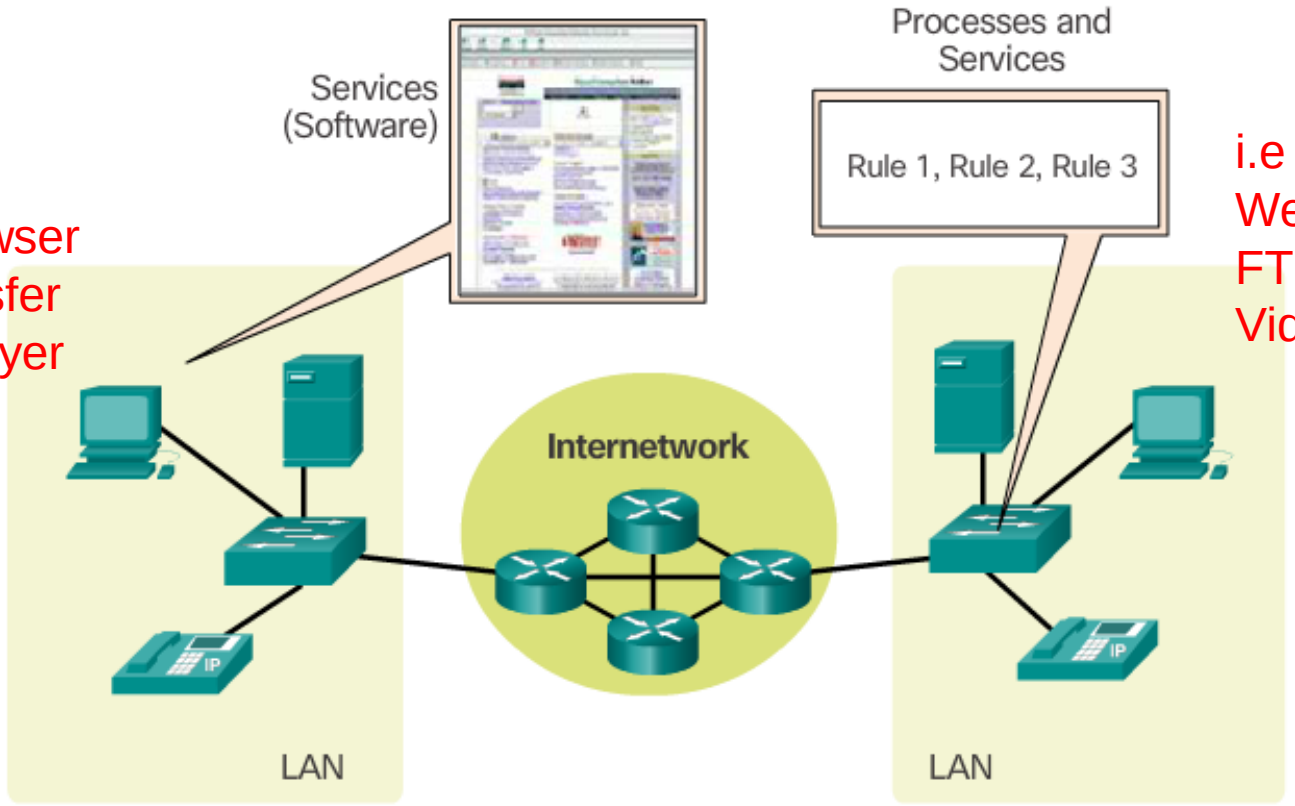
Overview of Network Components (cont.)



Devices | Media | Services

Overview of Network Components (cont.)

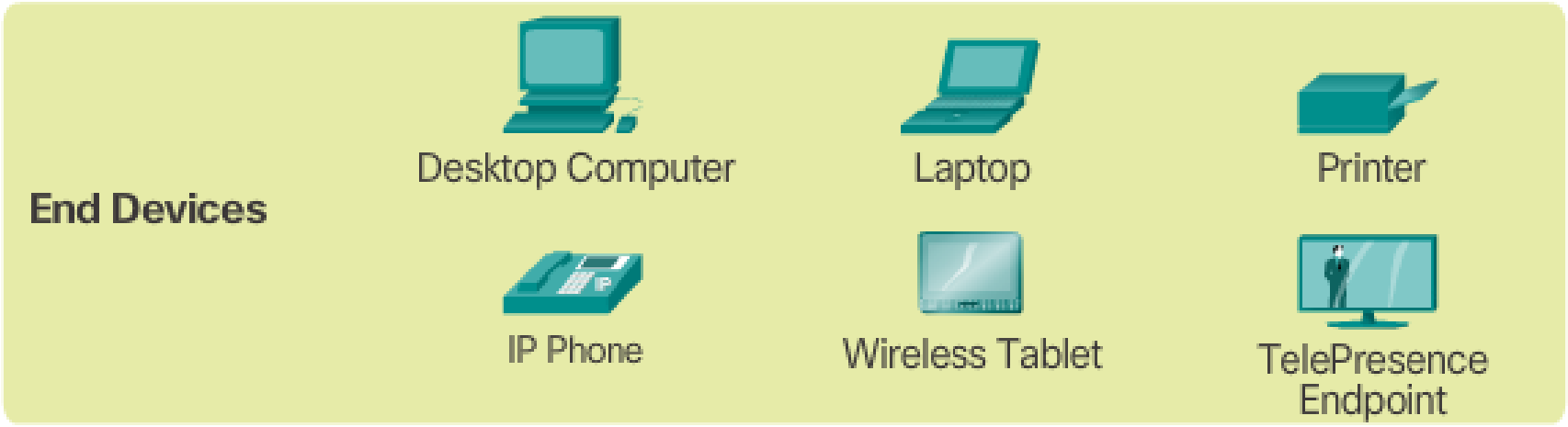
i.e
Web Browser
File Transfer
Video Player



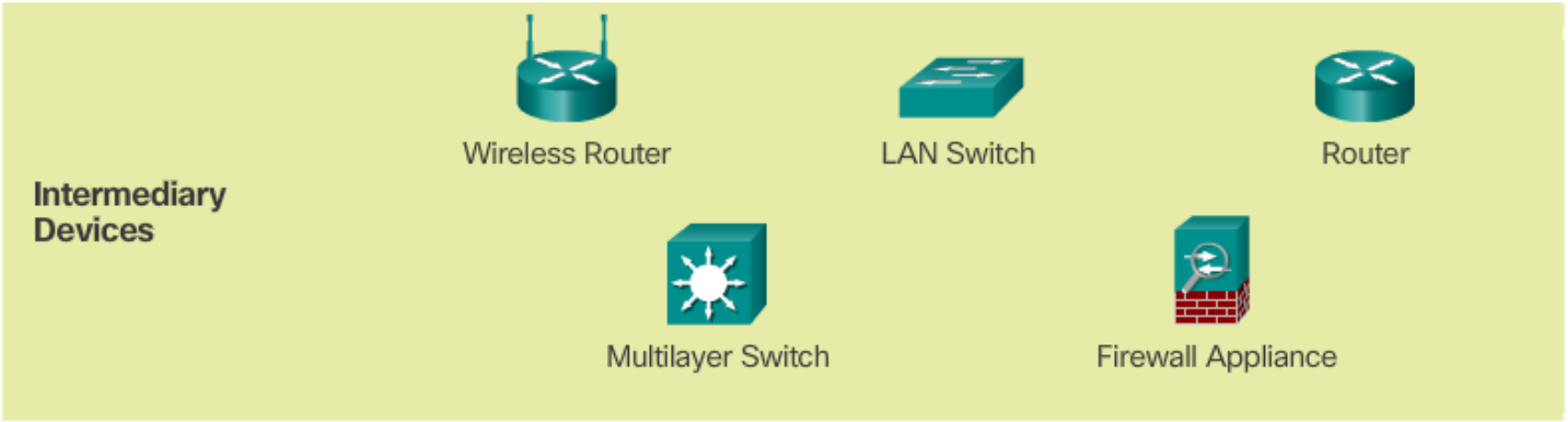
i.e
Web Server
FTP Server
Video Server

Devices | Media | Services

End Devices



Intermediary Network Devices



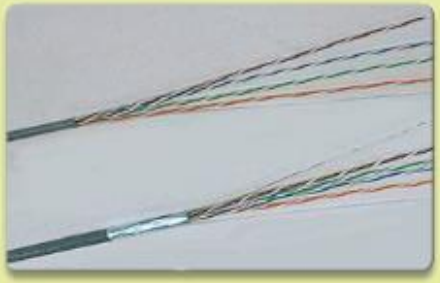
Intermediary network devices perform some or all of these functions:

- Regenerate and retransmit data signals
- Maintain information about what pathways exist through the network and internetwork
- Notify other devices of errors and communication failures
- Direct data along alternate pathways when there is a link failure
- Classify and direct messages according to priorities
- Permit or deny the flow of data, based on security settings

Intelligence to make and manage data connections

Network Media

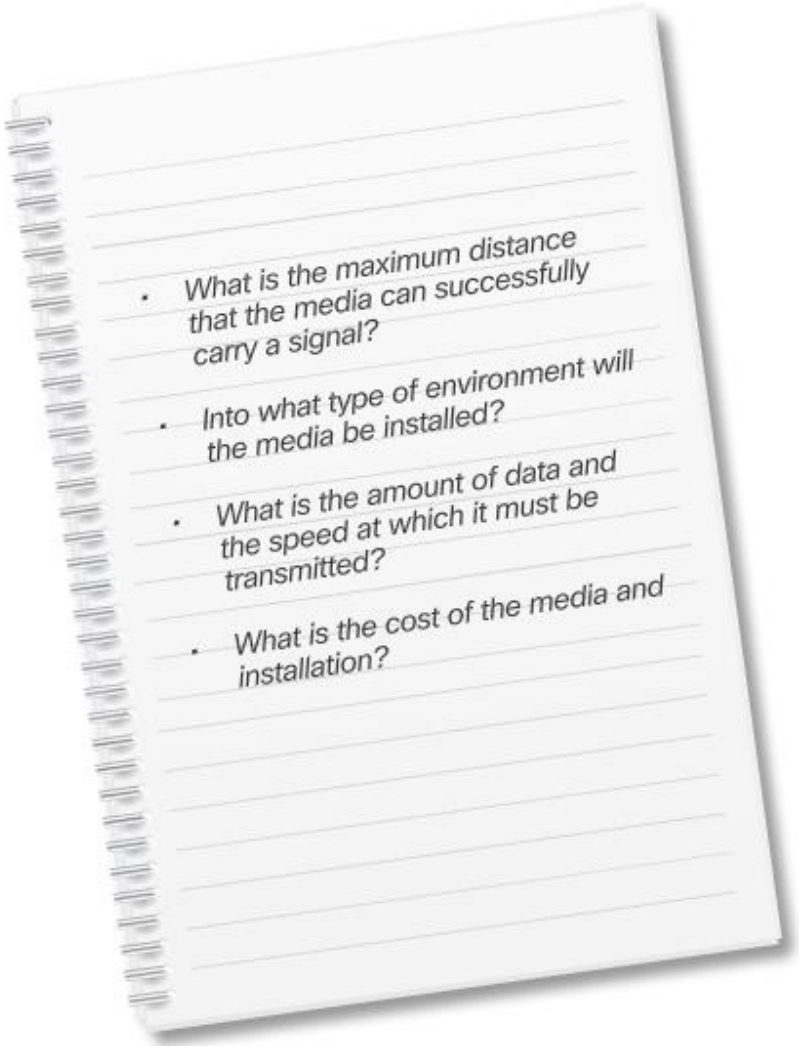
Copper



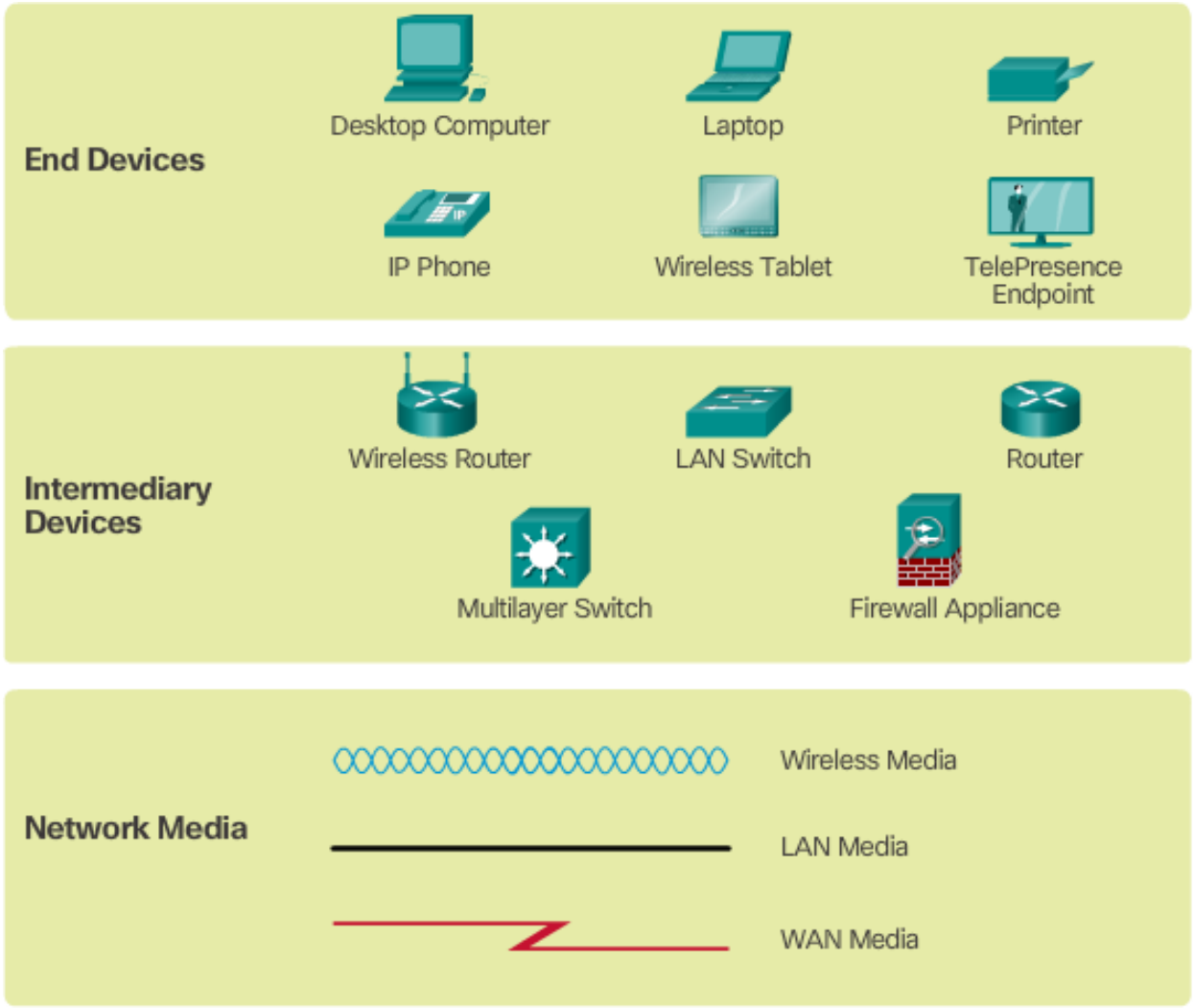
Fiber Optic

Wireless

Network Media (cont.)

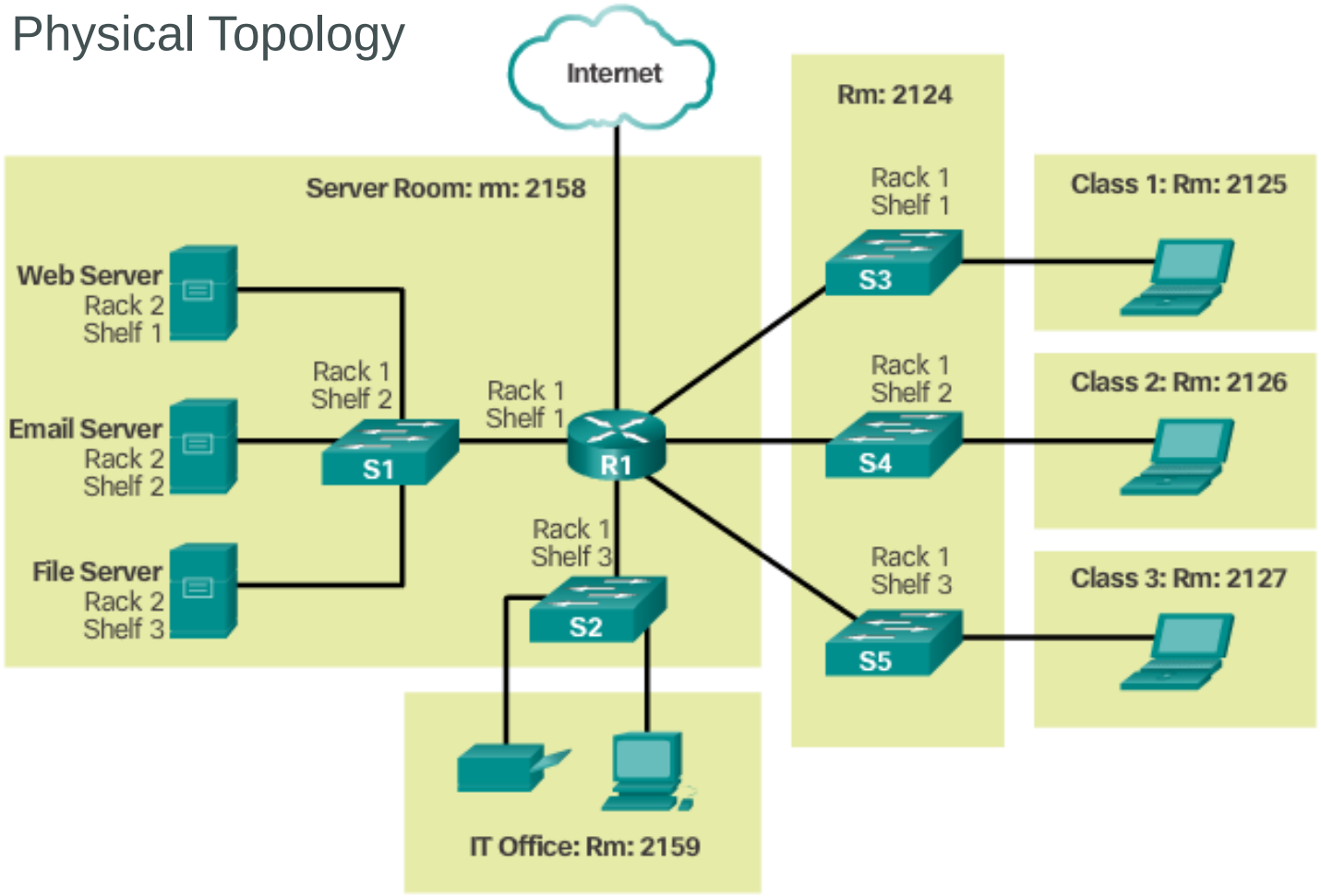


Network Representations



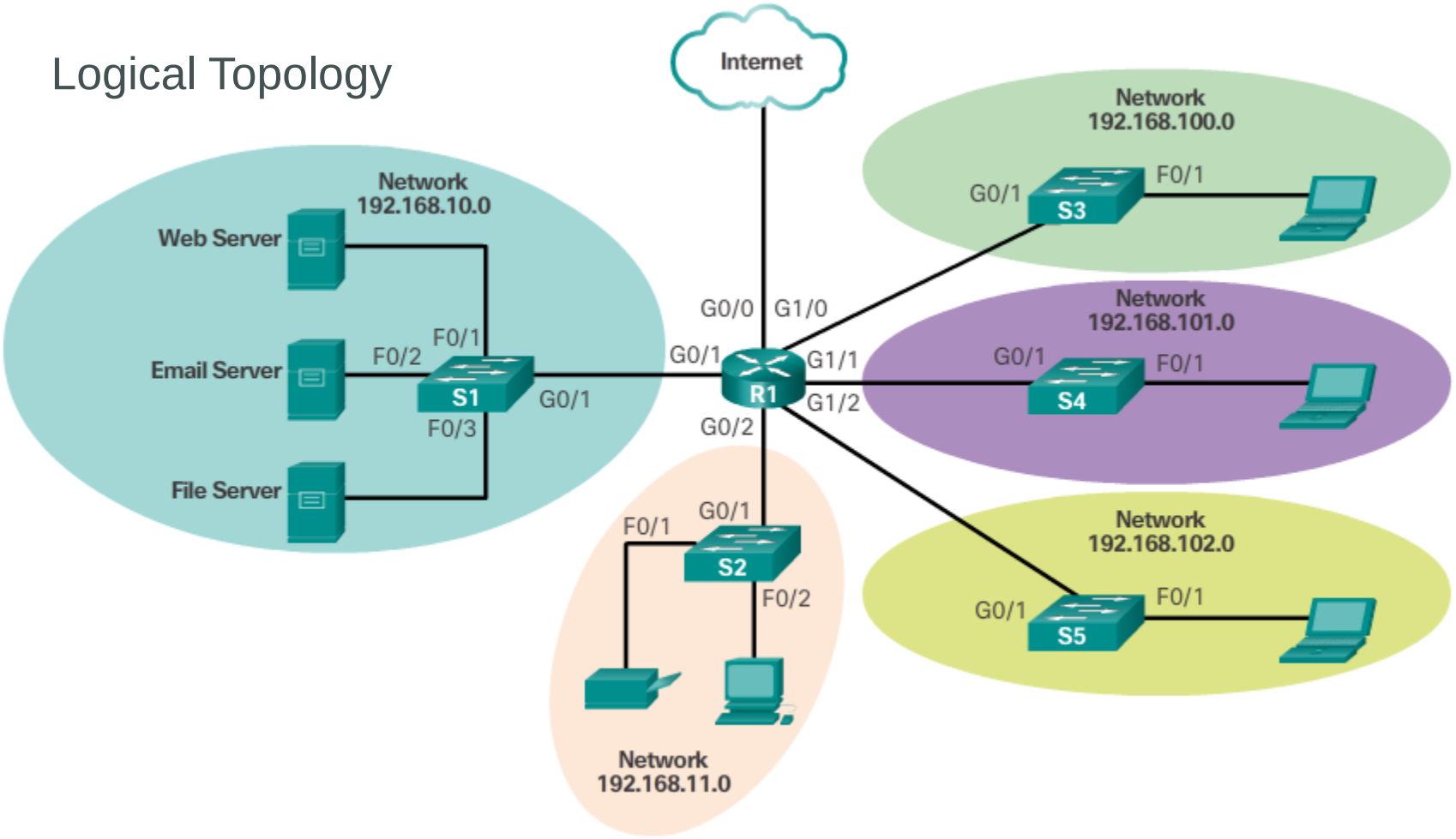
Topology Diagrams

Physical Topology



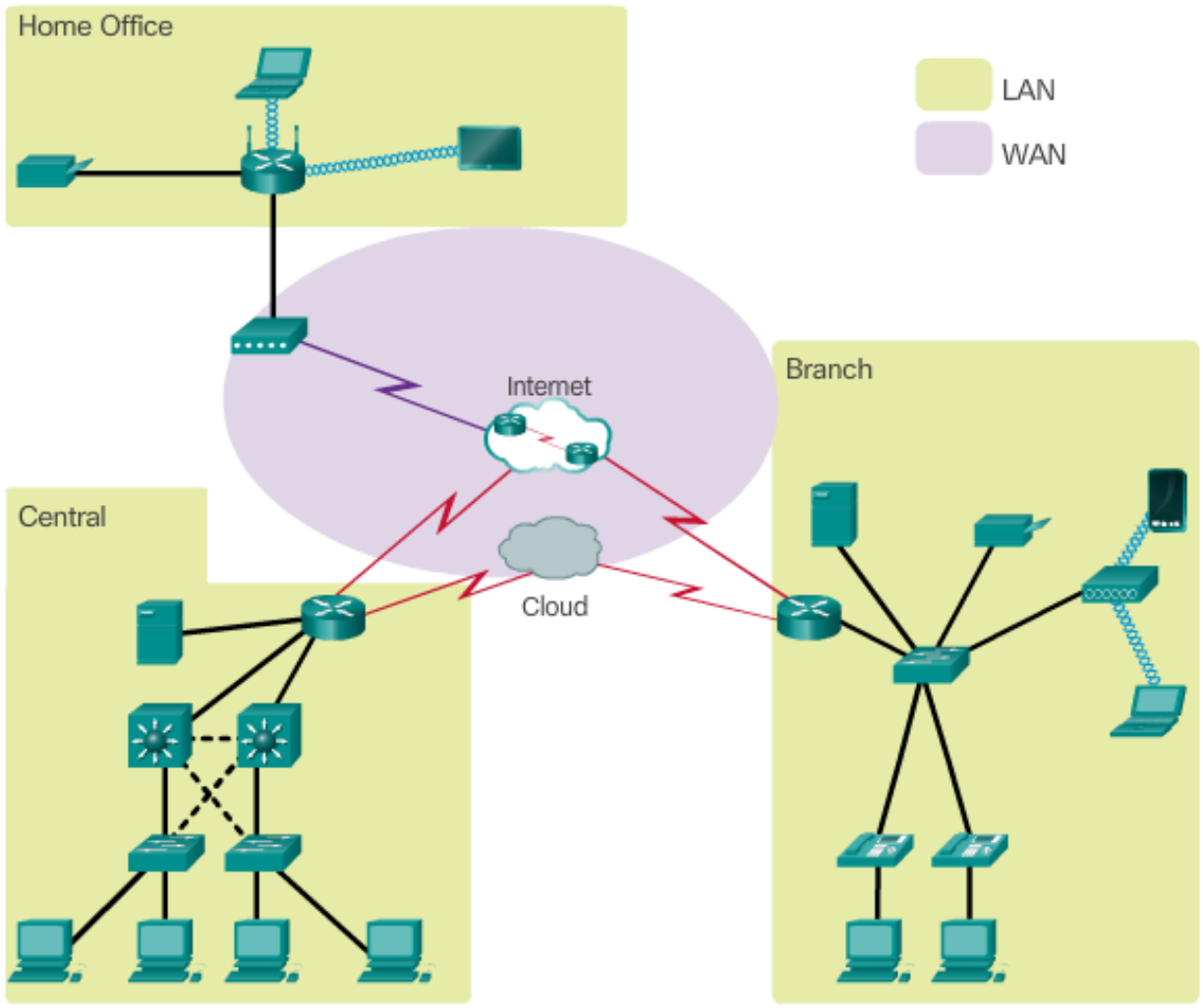
Topology Diagrams (Cont.)

Logical Topology



Topic 1.2.2:
LANs and WANs

Types of Networks



Types of Networks

The two most common types of network infrastructures are:

- Local Area Network (LAN)
- Wide Area Network (WAN)

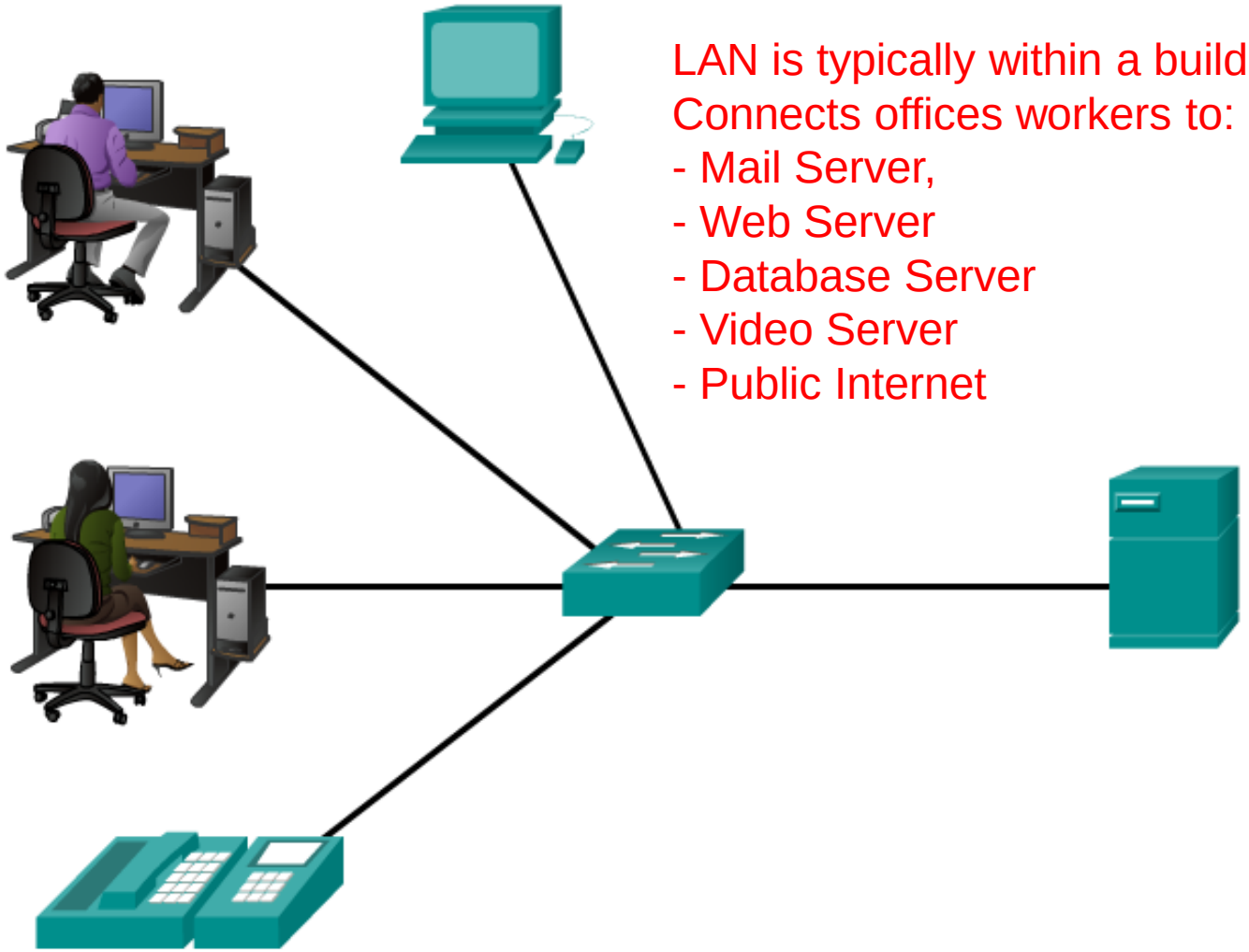
Other types of networks include:

- Metropolitan Area Network (MAN)
- Wireless LAN (WLAN)
- Storage Area Network (SAN)

Personal Area Network (PAN)

Local Area Networks

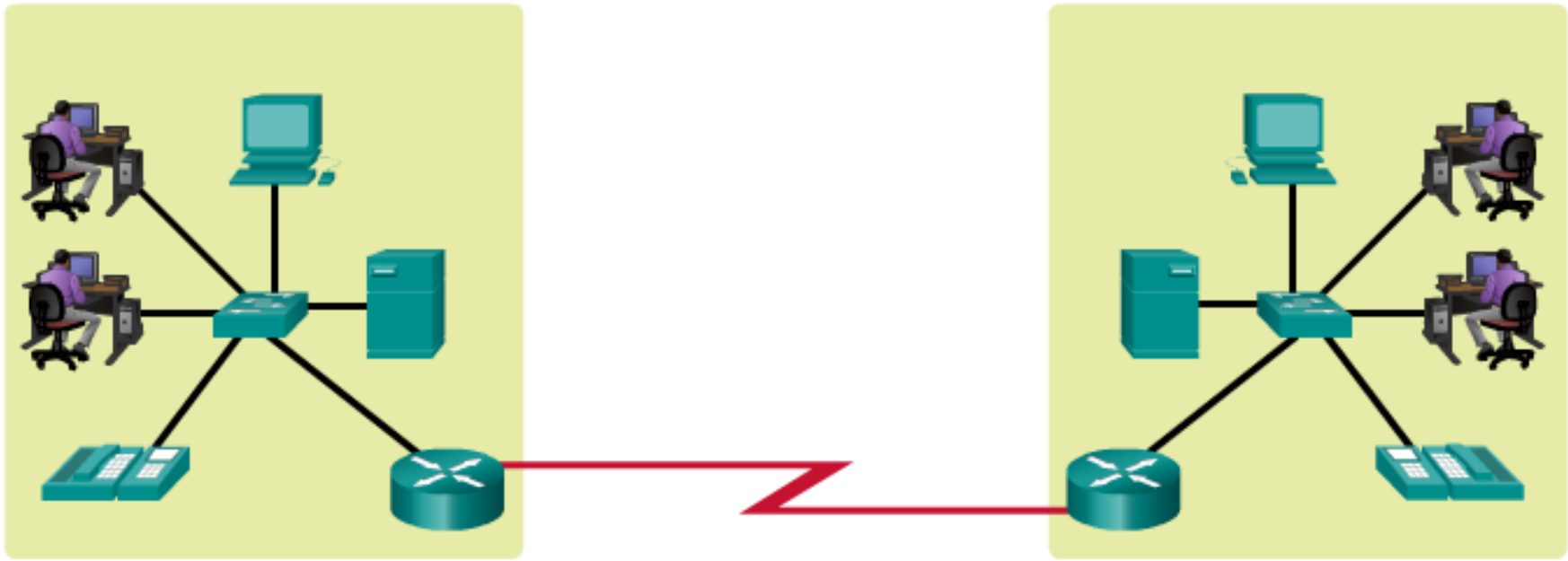
This is the focus of this course.



LAN is typically within a building
Connects offices workers to:
- Mail Server,
- Web Server
- Database Server
- Video Server
- Public Internet

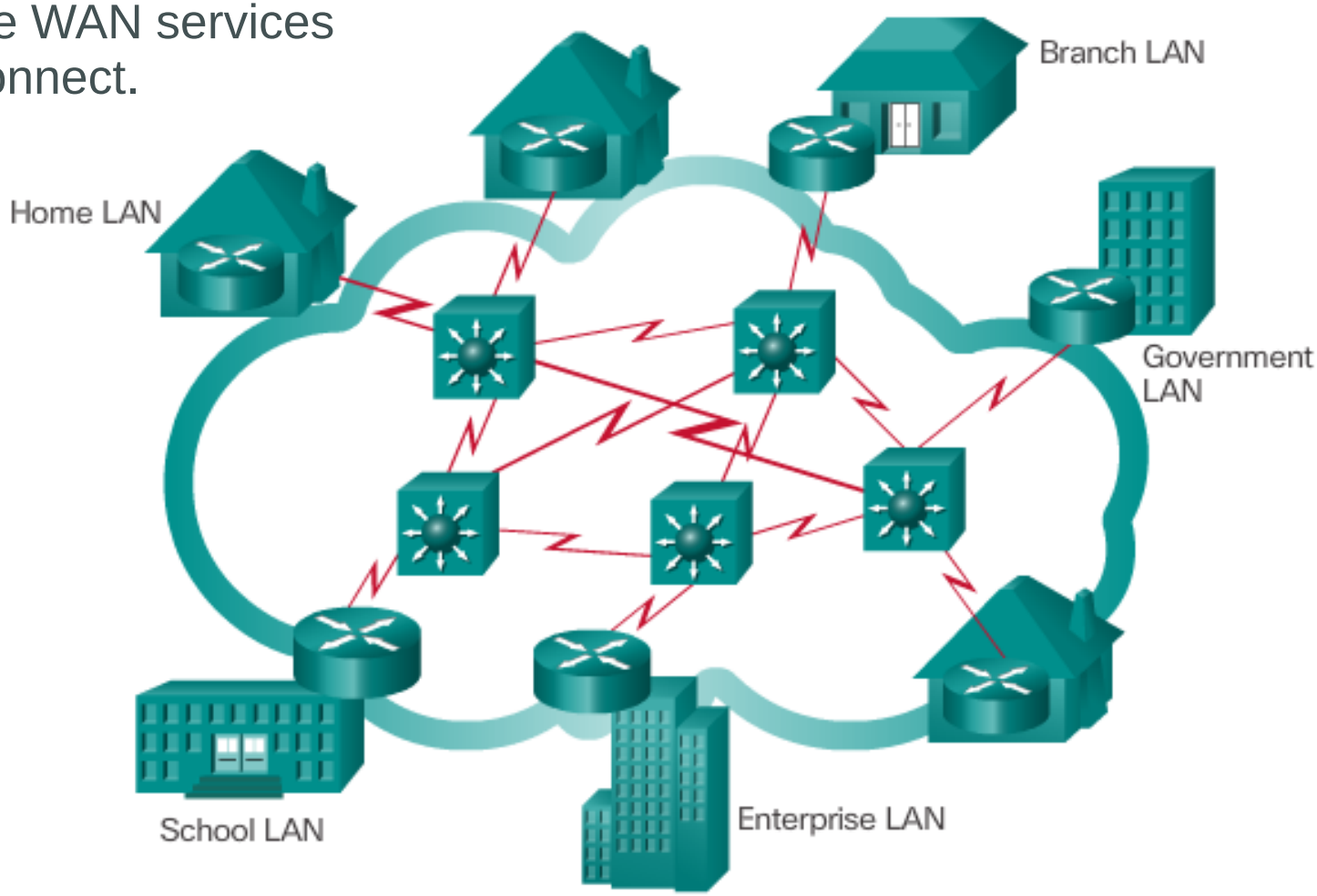
Wide Area Networks

LANs separated by geographic distance are connected by a network known as a WAN.

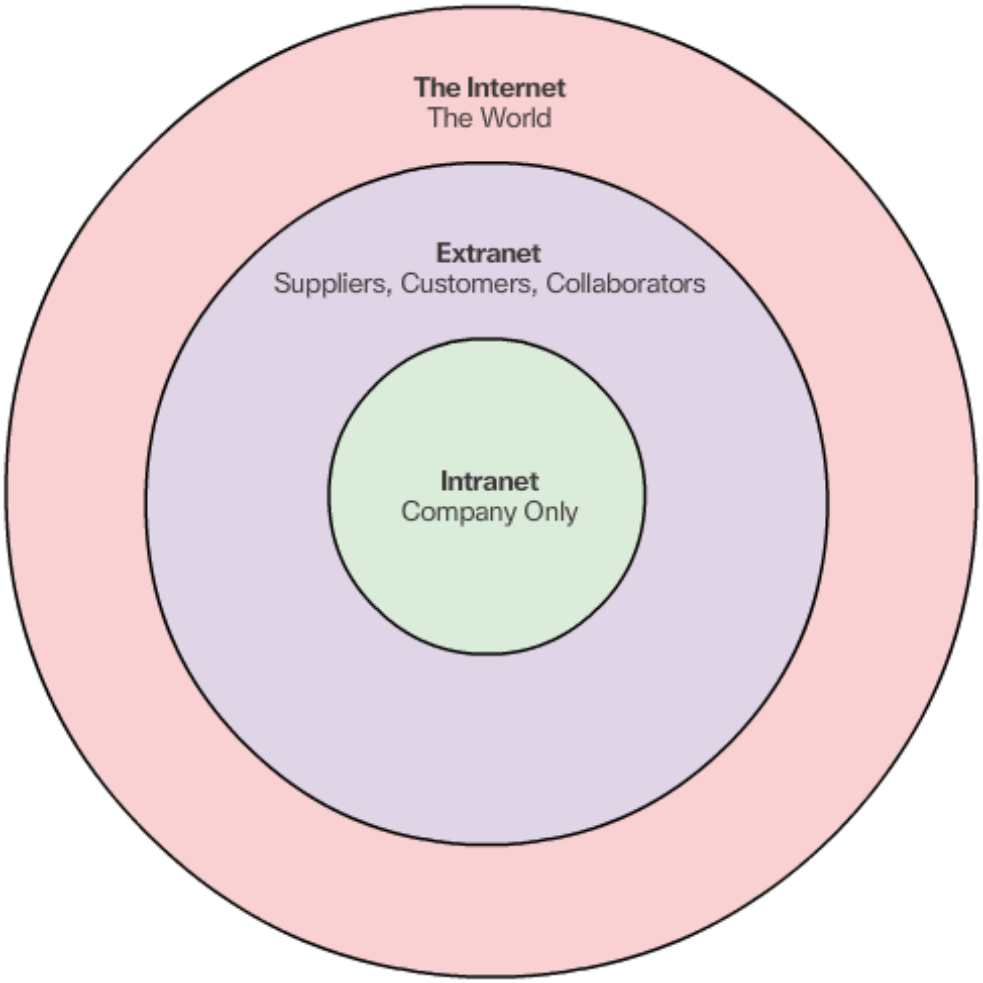


The Internet

LANs use WAN services to interconnect.

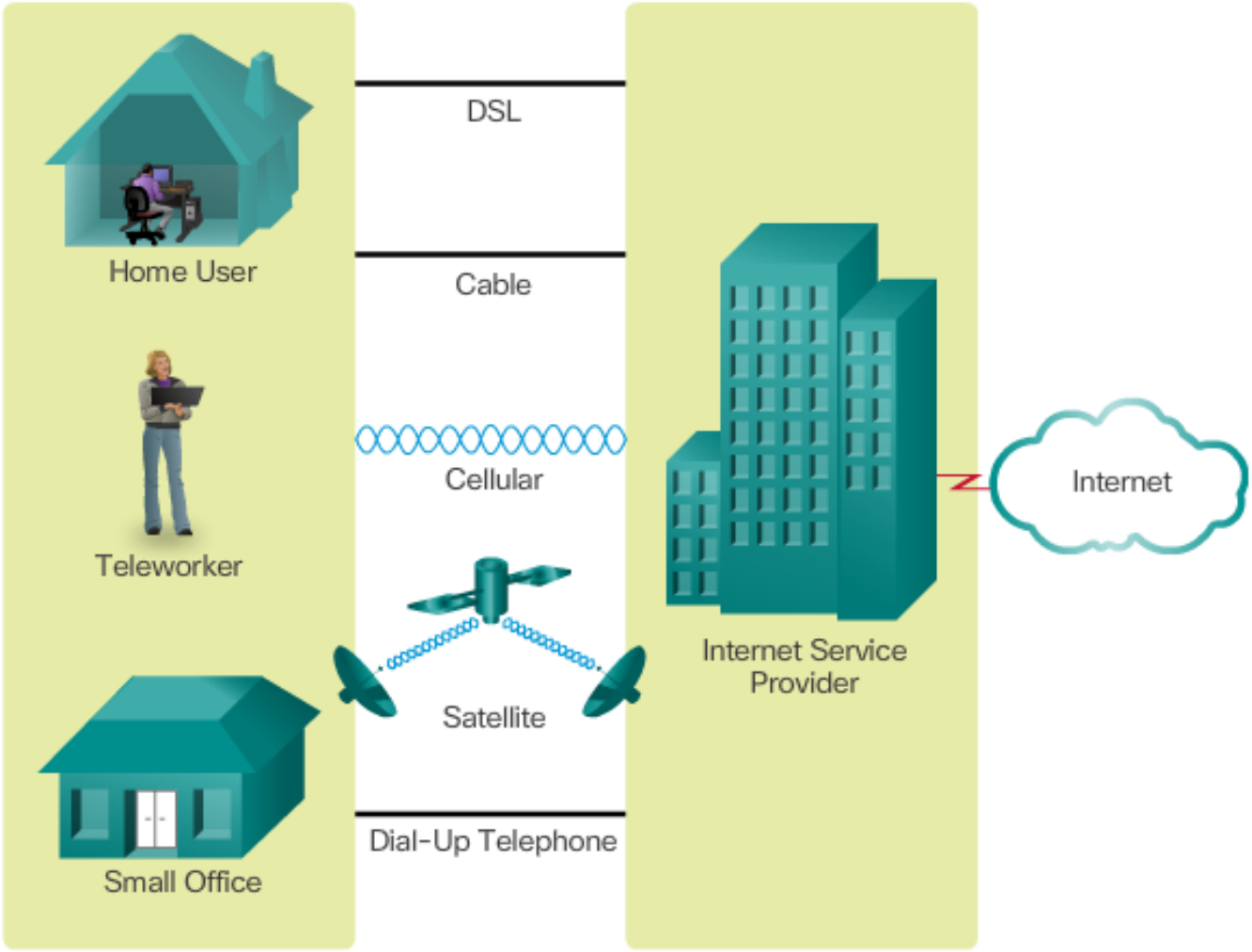


Intranets and Extranets

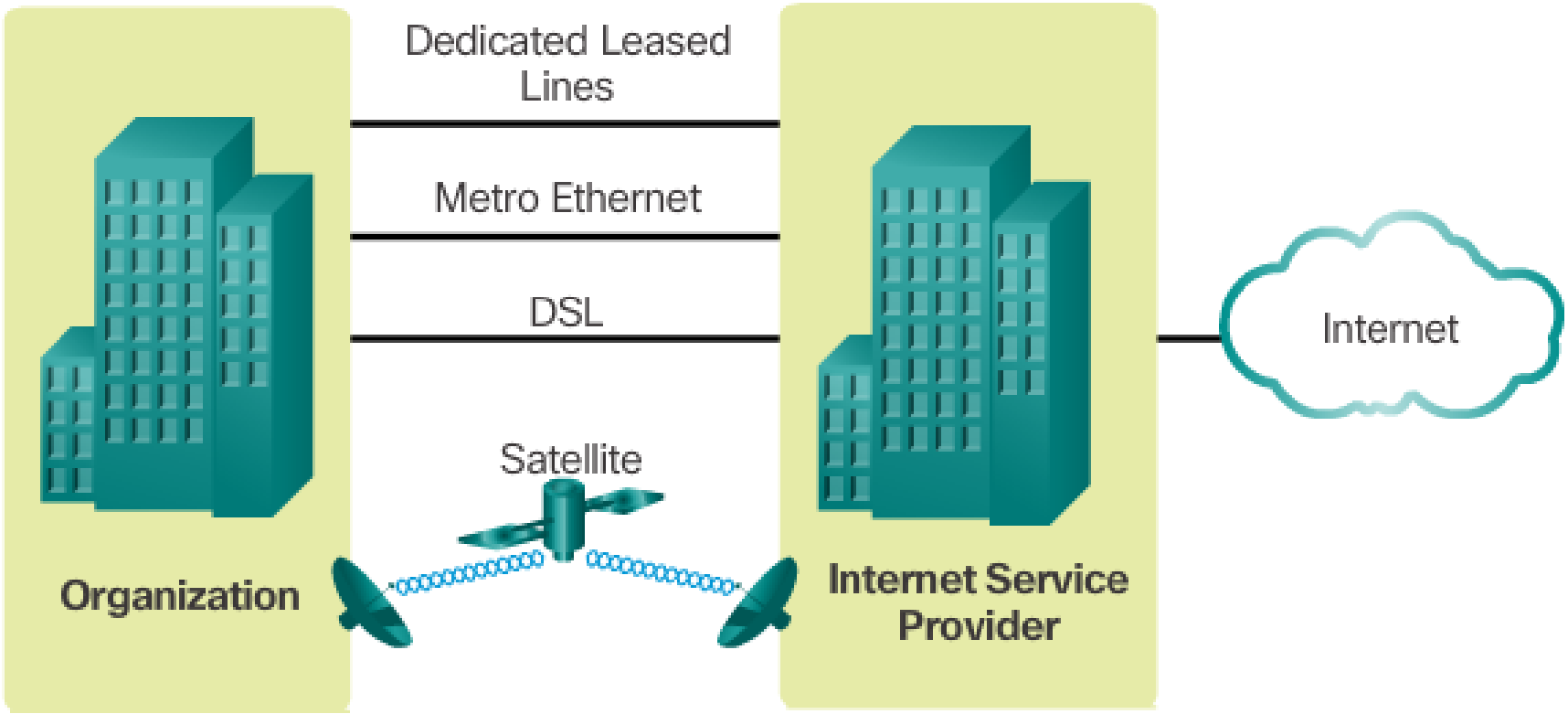


Topic 1.2.4:
Internet Connections

Home and Small Office Internet Connections



Business Internet Connections



Section 1.3: The Network as a Platform

Upon completion of this section, you should be able to:

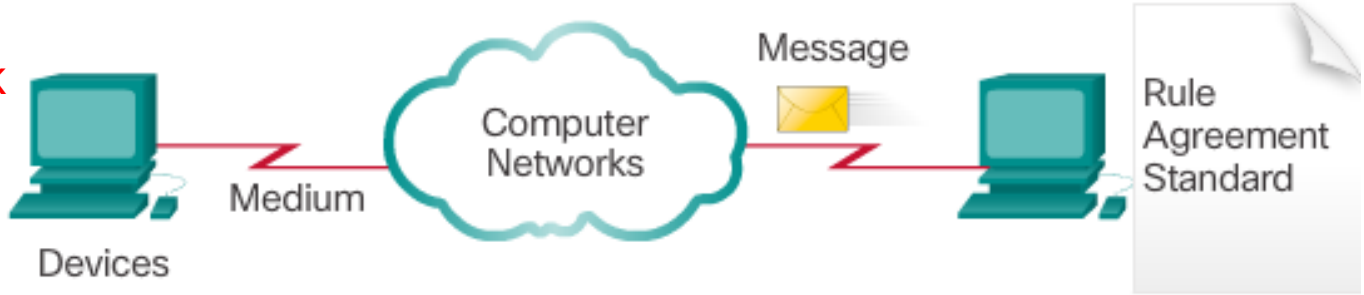
- Explain the concept of a converged network.
- Describe the four basic requirements of a reliable network.

Topic 1.3.1:
Converged Networks

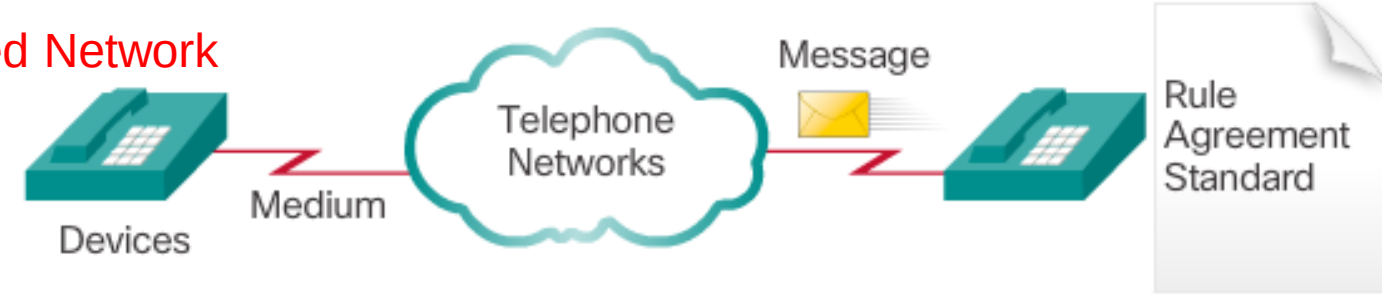
Traditional Separate Networks

Each Service Uses a Different Network Technology

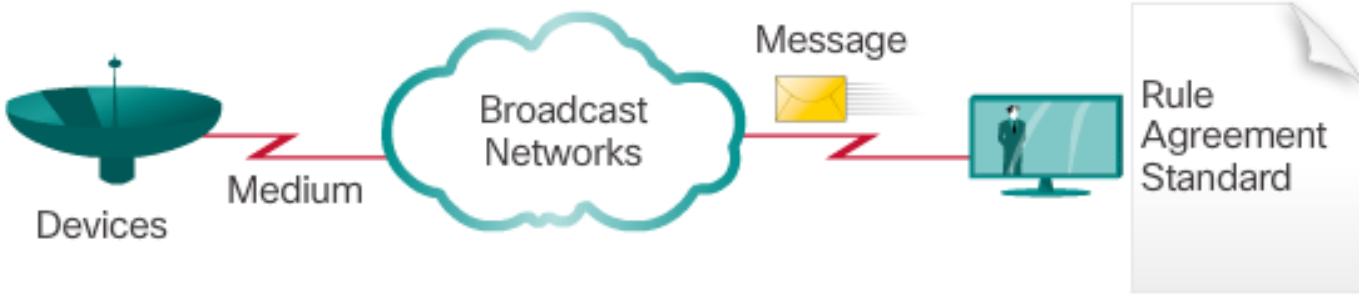
i.e. Packet Network



i.e. Circuit Switched Network



i.e. Cable Network

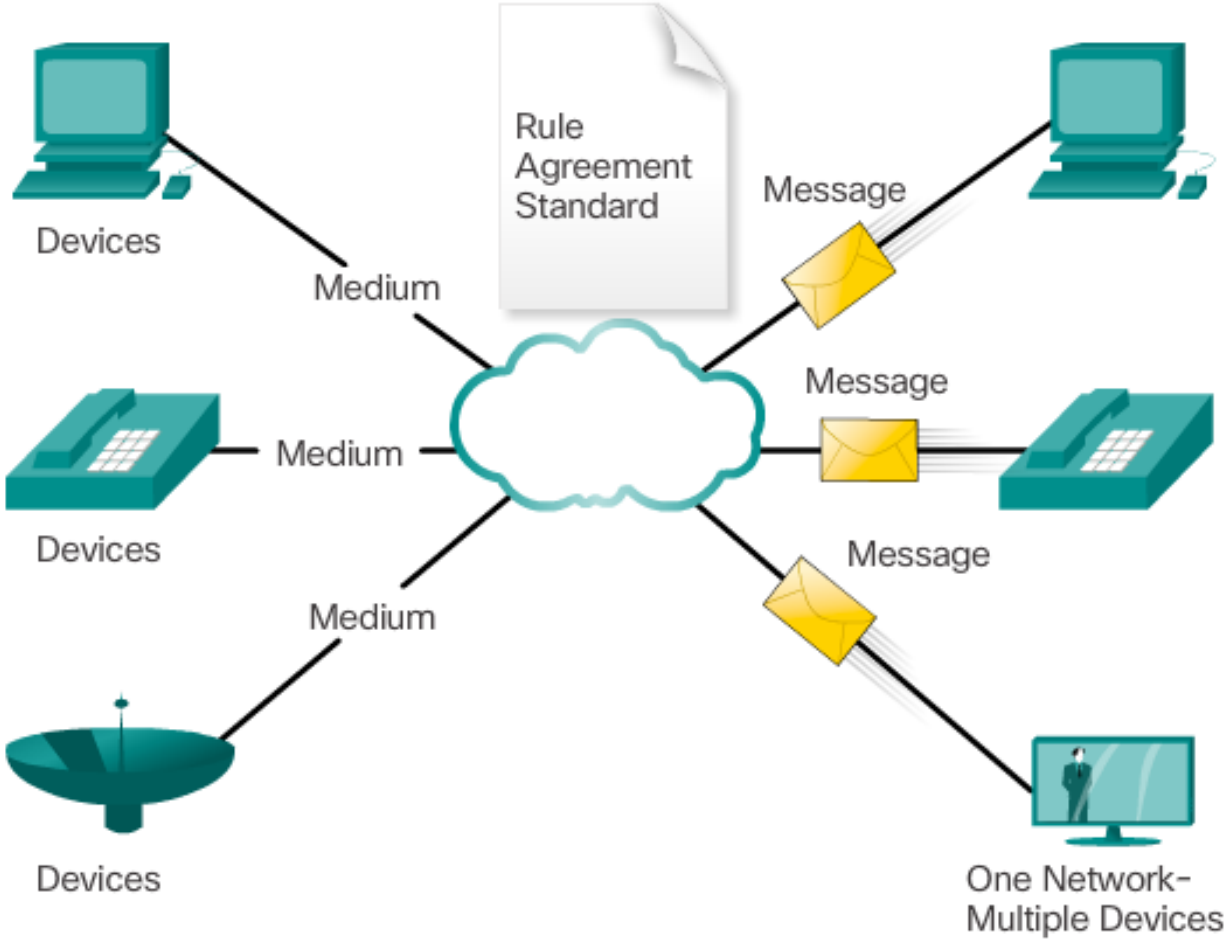


Multiple services are running on multiple networks.

The Converging Networks

One network to carry multiple services:

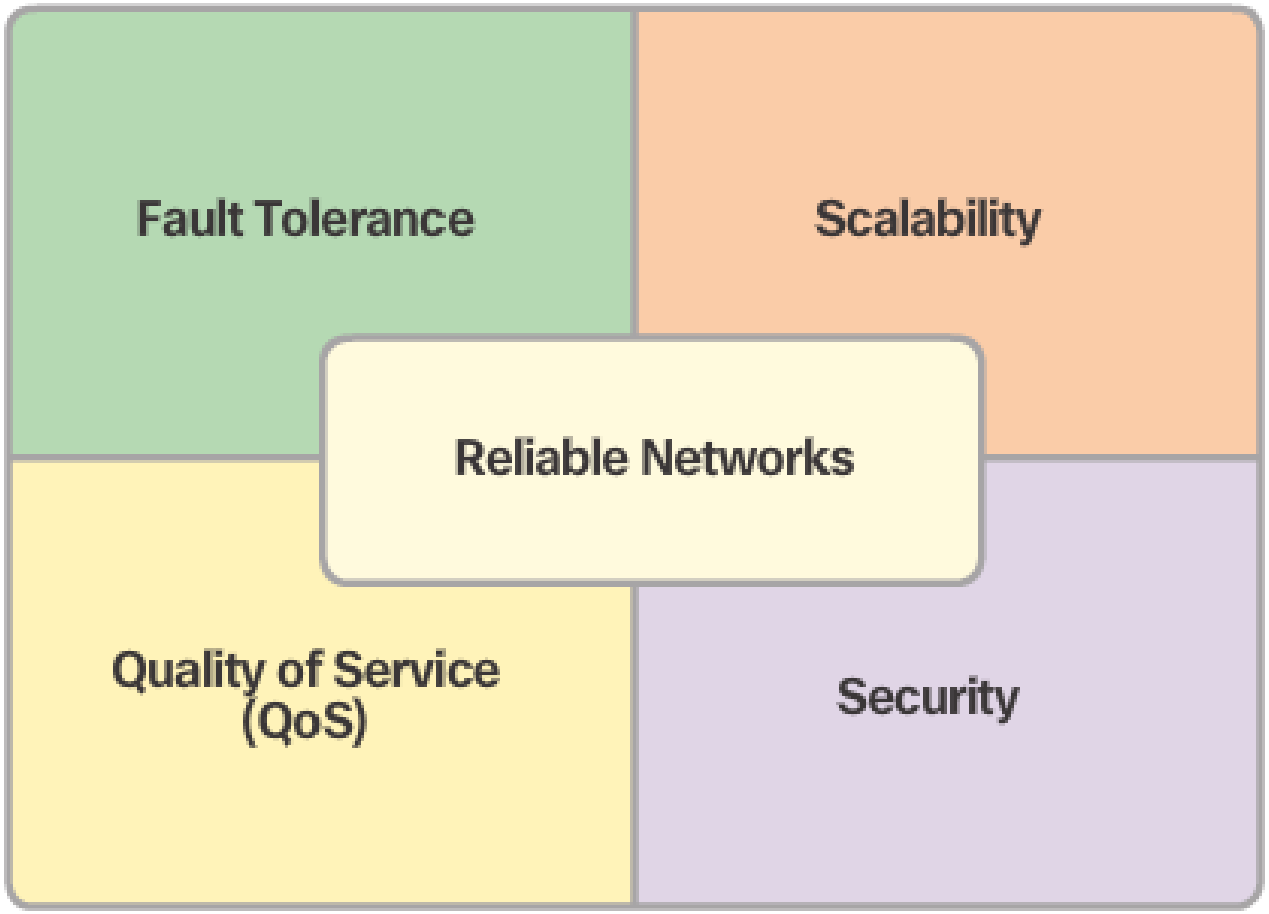
- Data,
- Voice
- Video
- Telemetry



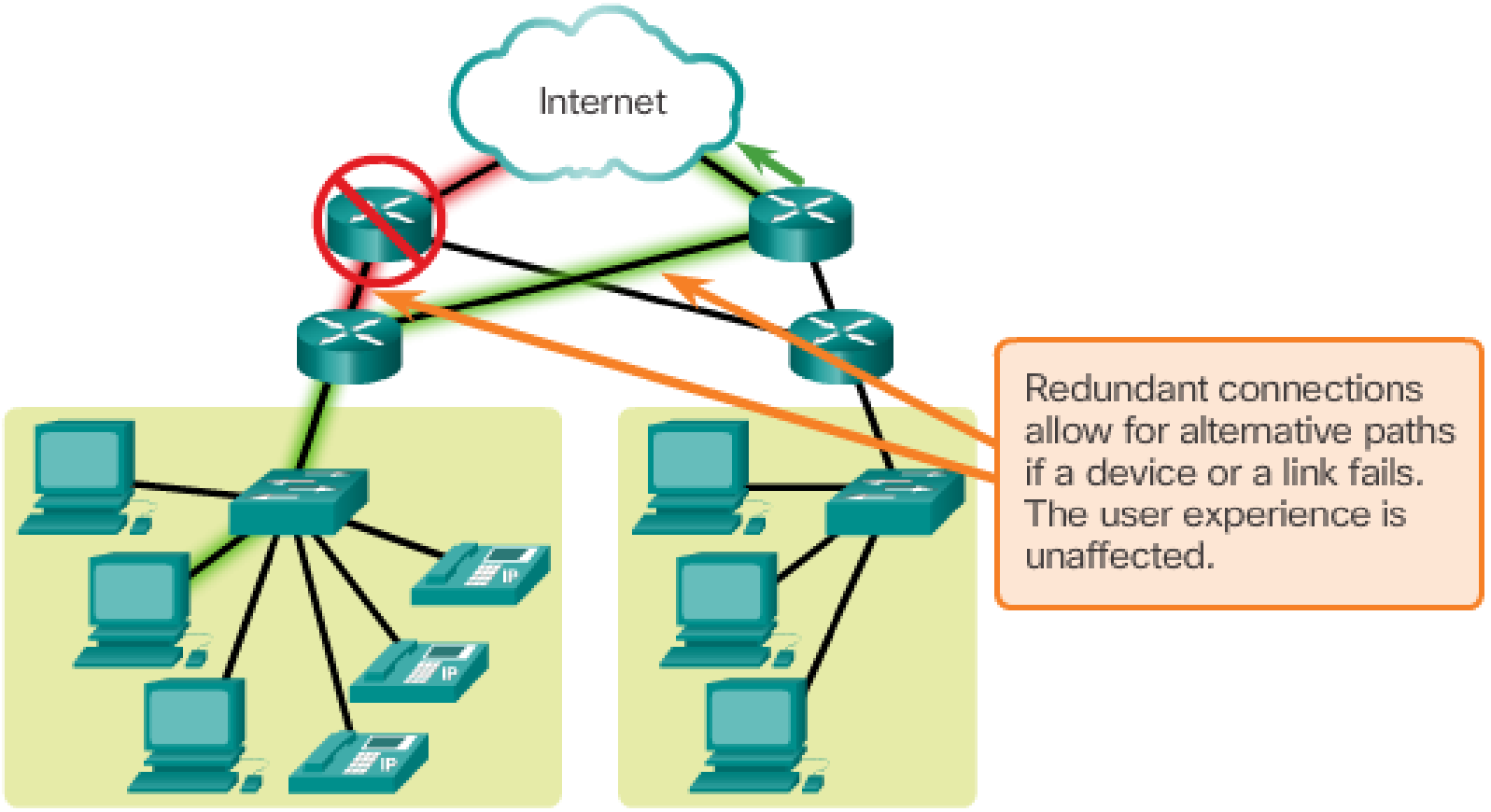
Converged data networks carry multiple services on one network.

Topic 1.3.2:
Reliable Networks

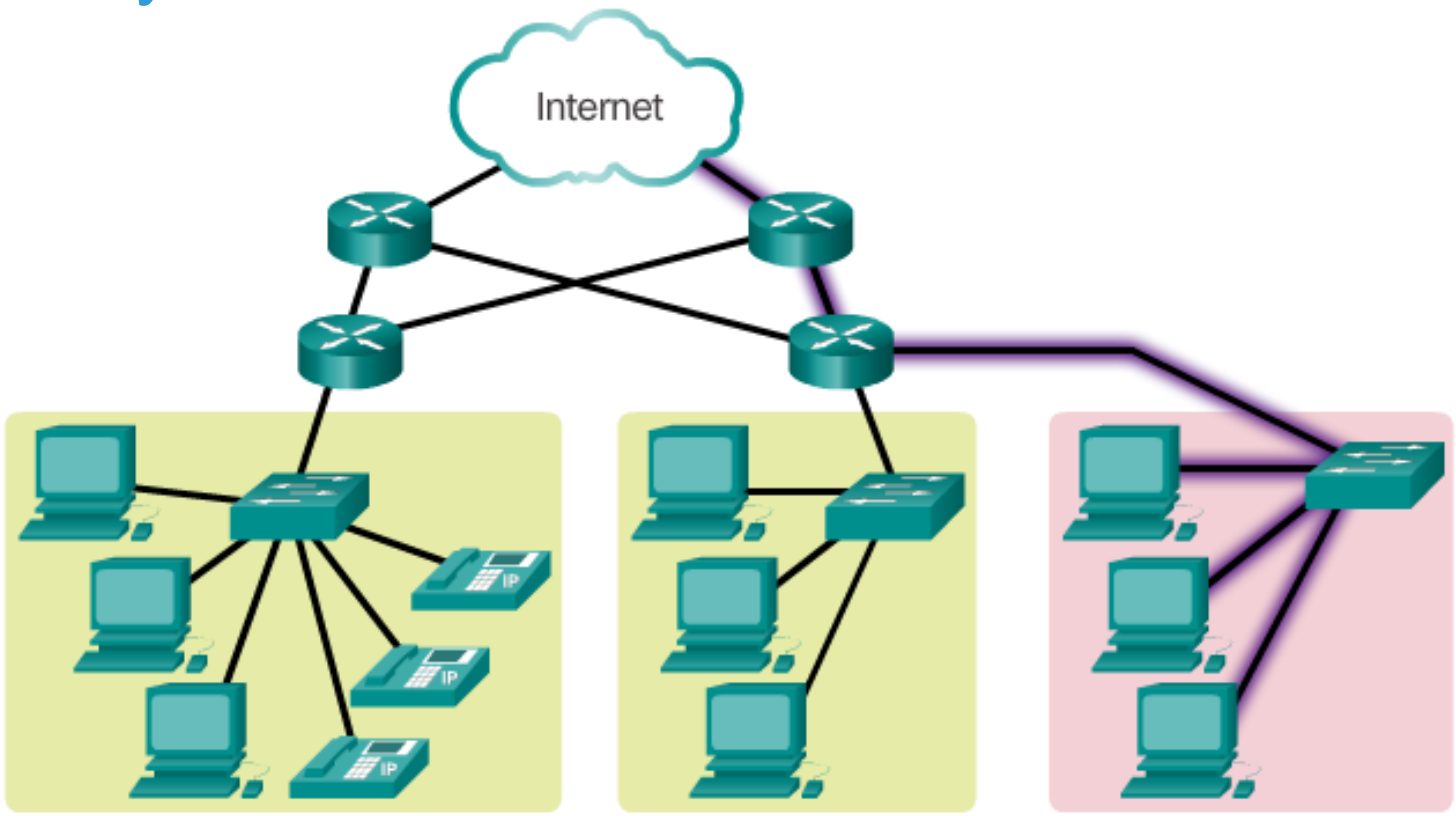
Network Architecture



Fault Tolerance

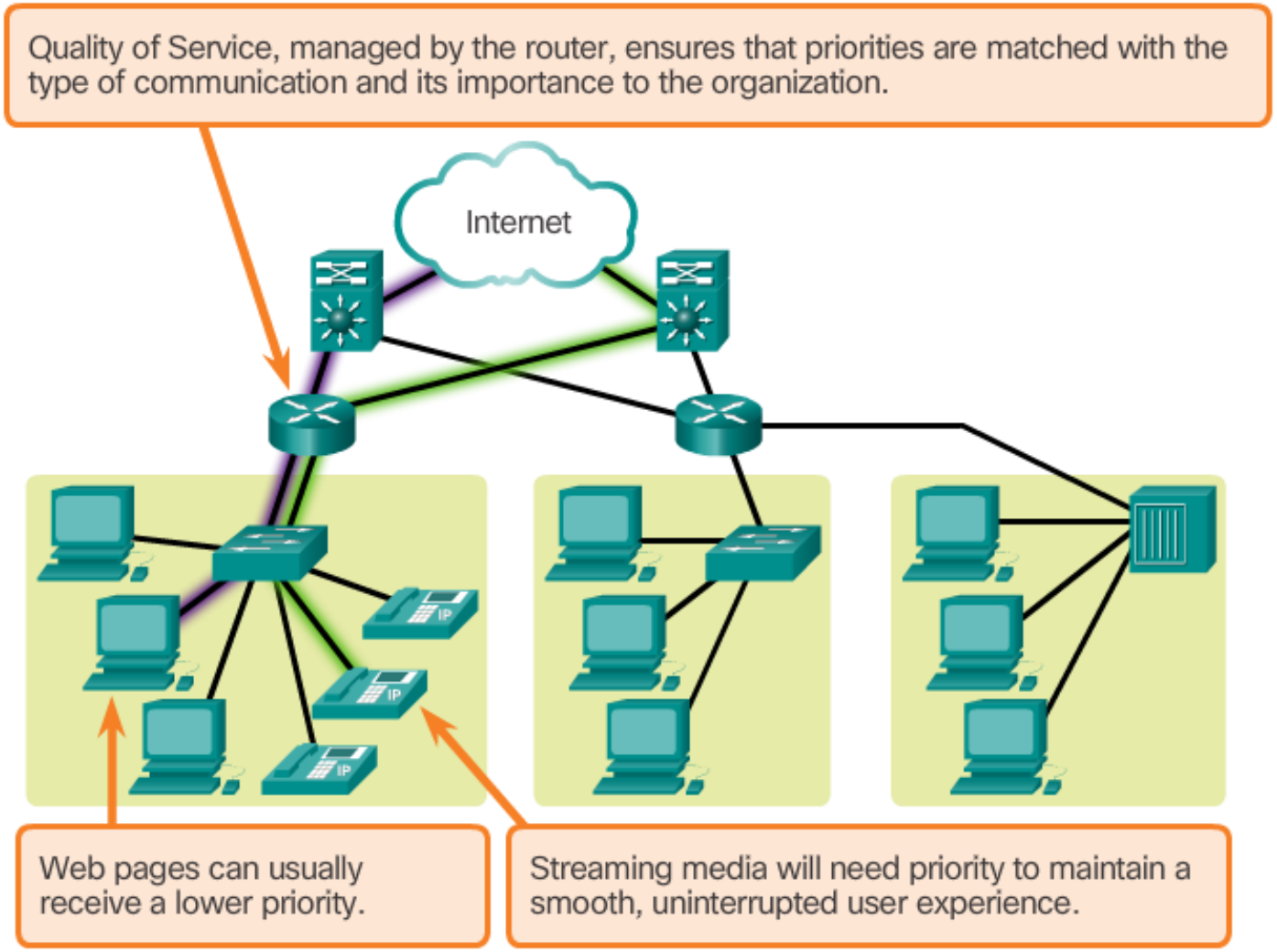


Scalability

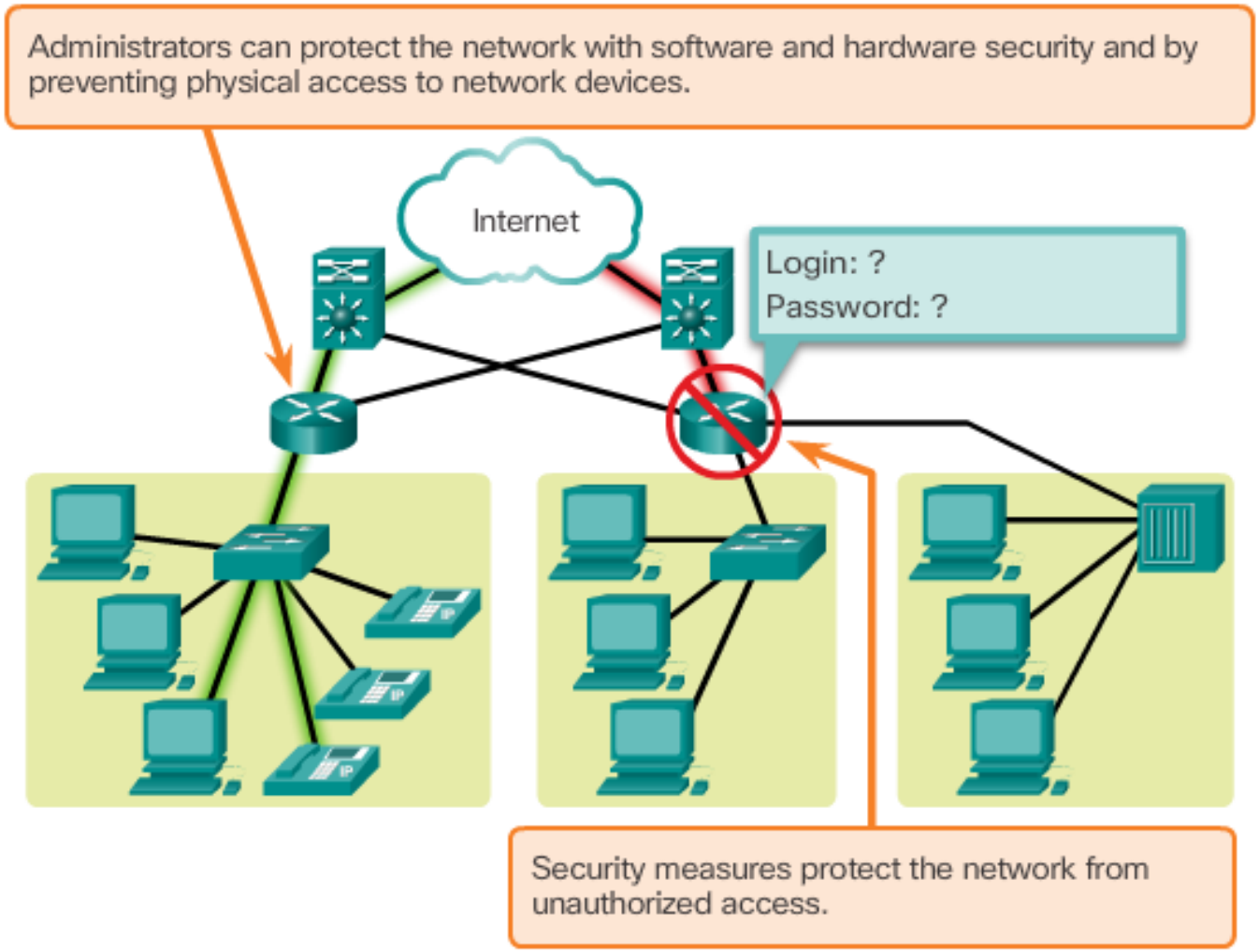


Additional users and whole networks can be connected to the Internet without degrading performance for existing users.

Quality of Service

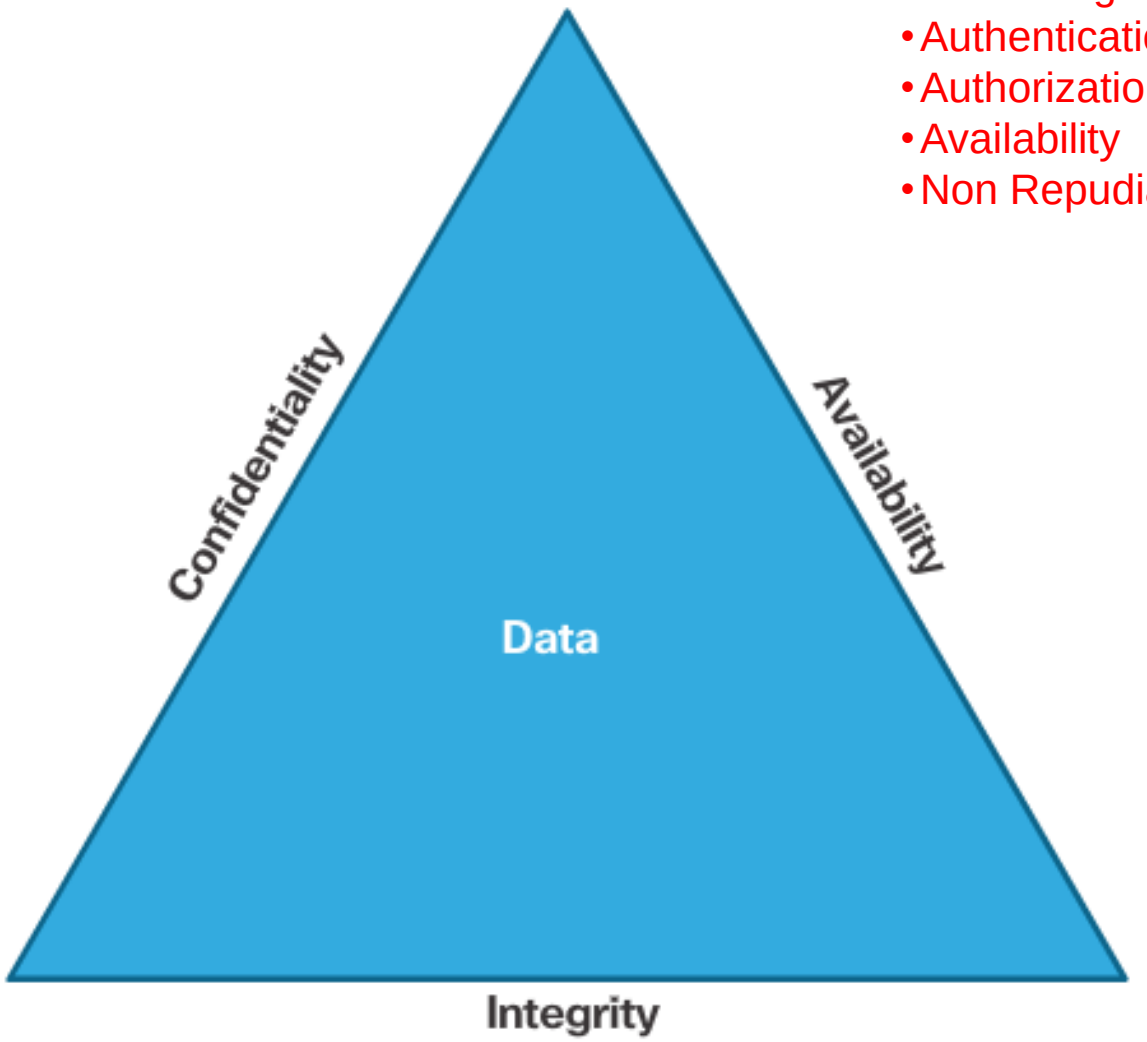


Security



Security (cont.)

Security:
- Privacy
- Data Integrity
- Authentication
- Authorization
- Availability
- Non Repudiation



Section 1.4: The Changing Network Environment

Upon completion of this section, you should be able to:

- Explain how trends such as BYOD, online collaboration, video, and cloud computing are changing the way we interact.
- Explain how networking technologies are changing the home environment.
- Identify basic security threats and solutions for both small and large networks.
- Describe the importance of understanding the underlying switching and routing infrastructure of a network.

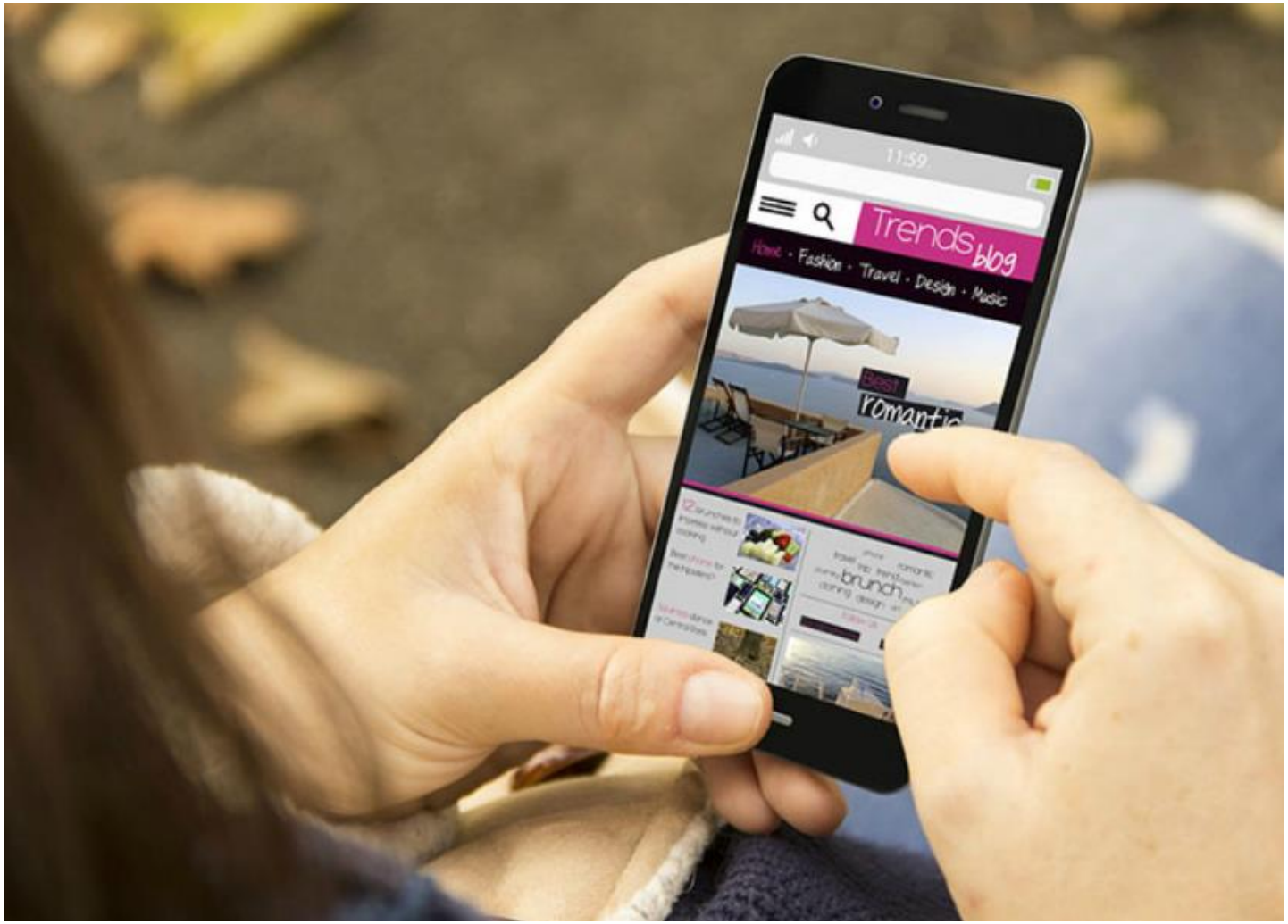
Topic 1.4.1: Network Trends

New Trends

Top trends include:

- Bring Your Own Device (BYOD)
- Online collaboration
- Video communications
- Cloud computing

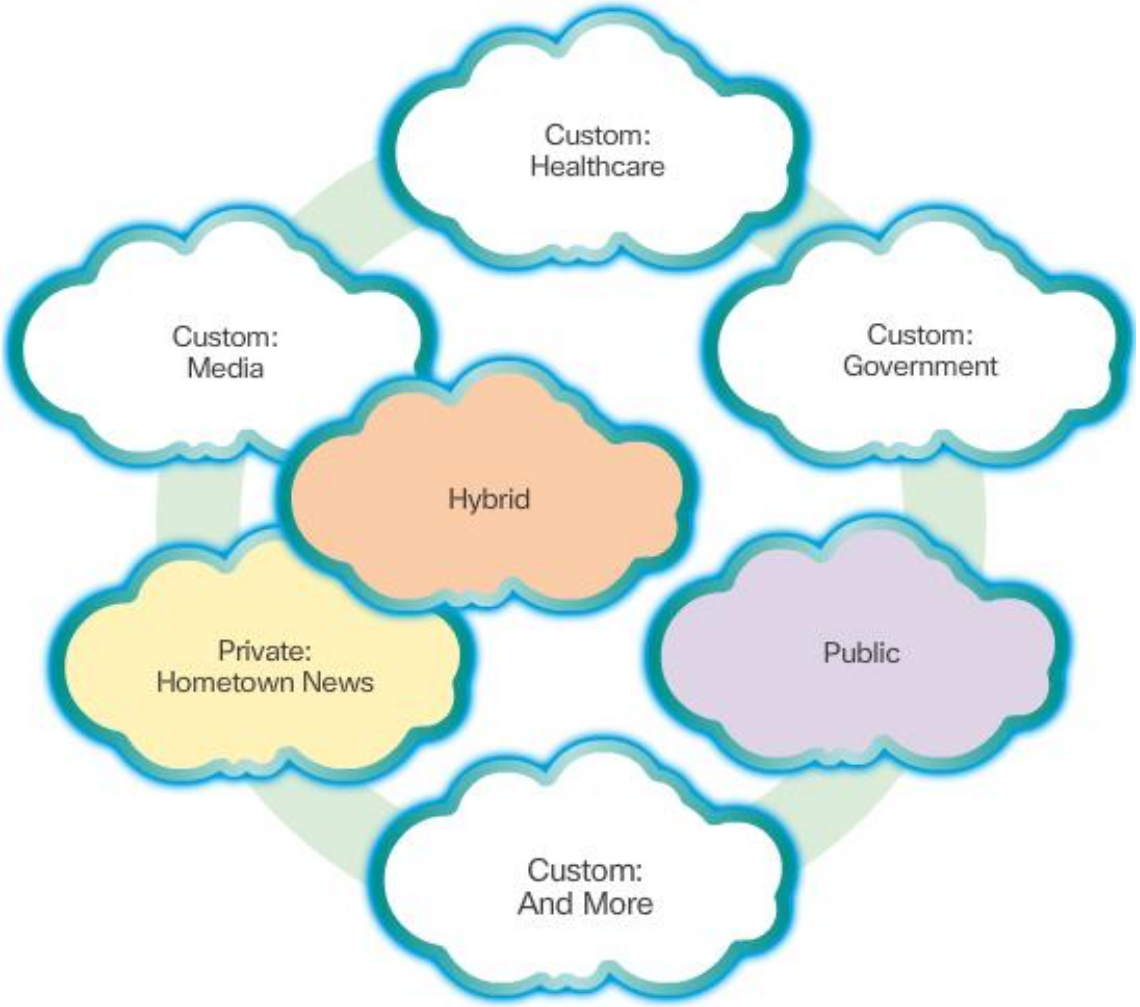
Bring Your Own Device



Online Collaboration

Video Communication

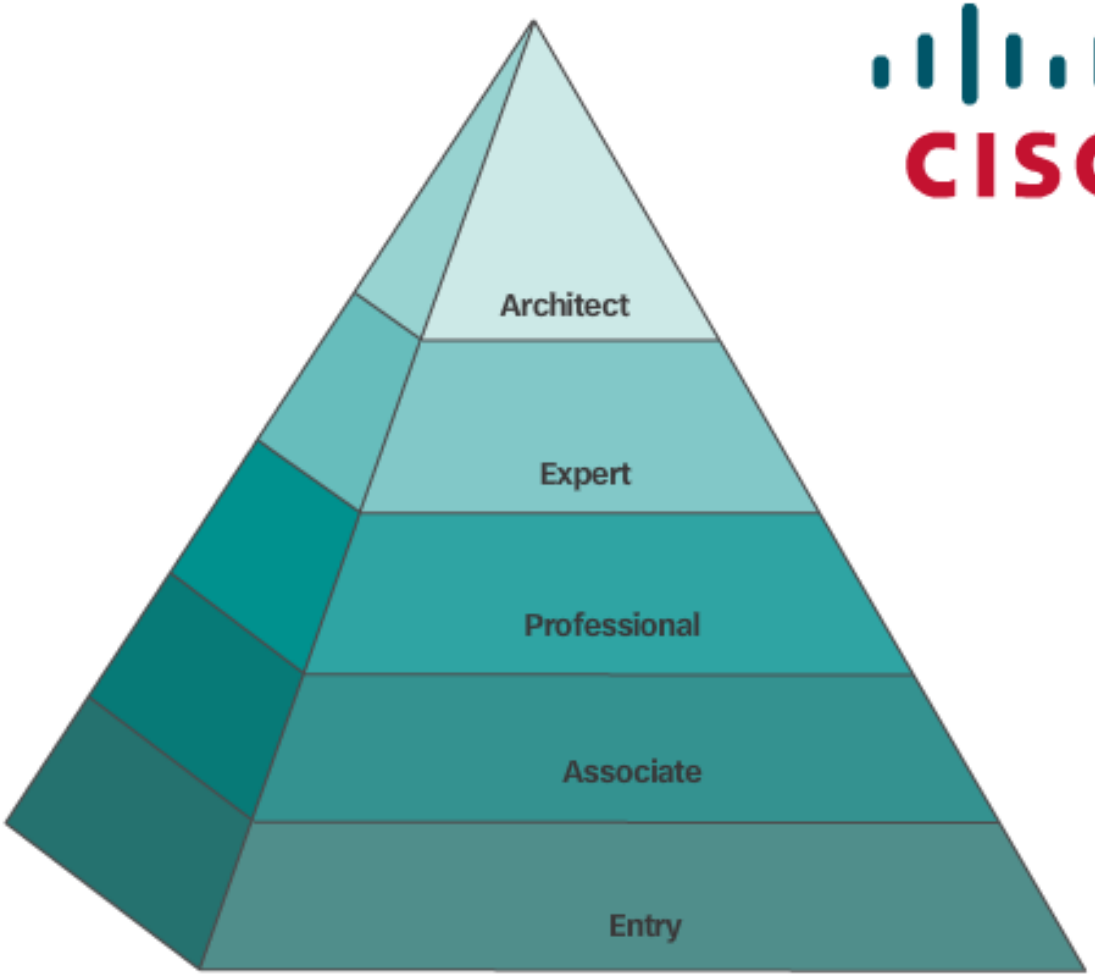
Cloud Computing



Topic 1.4.4:
Network Architecture

Cisco Network Architecture

CCNA



Section 1.5: Summary

Chapter Objectives:

- Explain how multiple networks are used in everyday life.
- Describe the topologies and devices used in a small to medium-sized business network.
- Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
- Explain trends in networking that will affect the use of networks in small to medium-sized businesses.

Thank you.

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Mind Wide Open