Cisco Networking Academy
Mind Wide Open

Chapter 1: Explore the Network

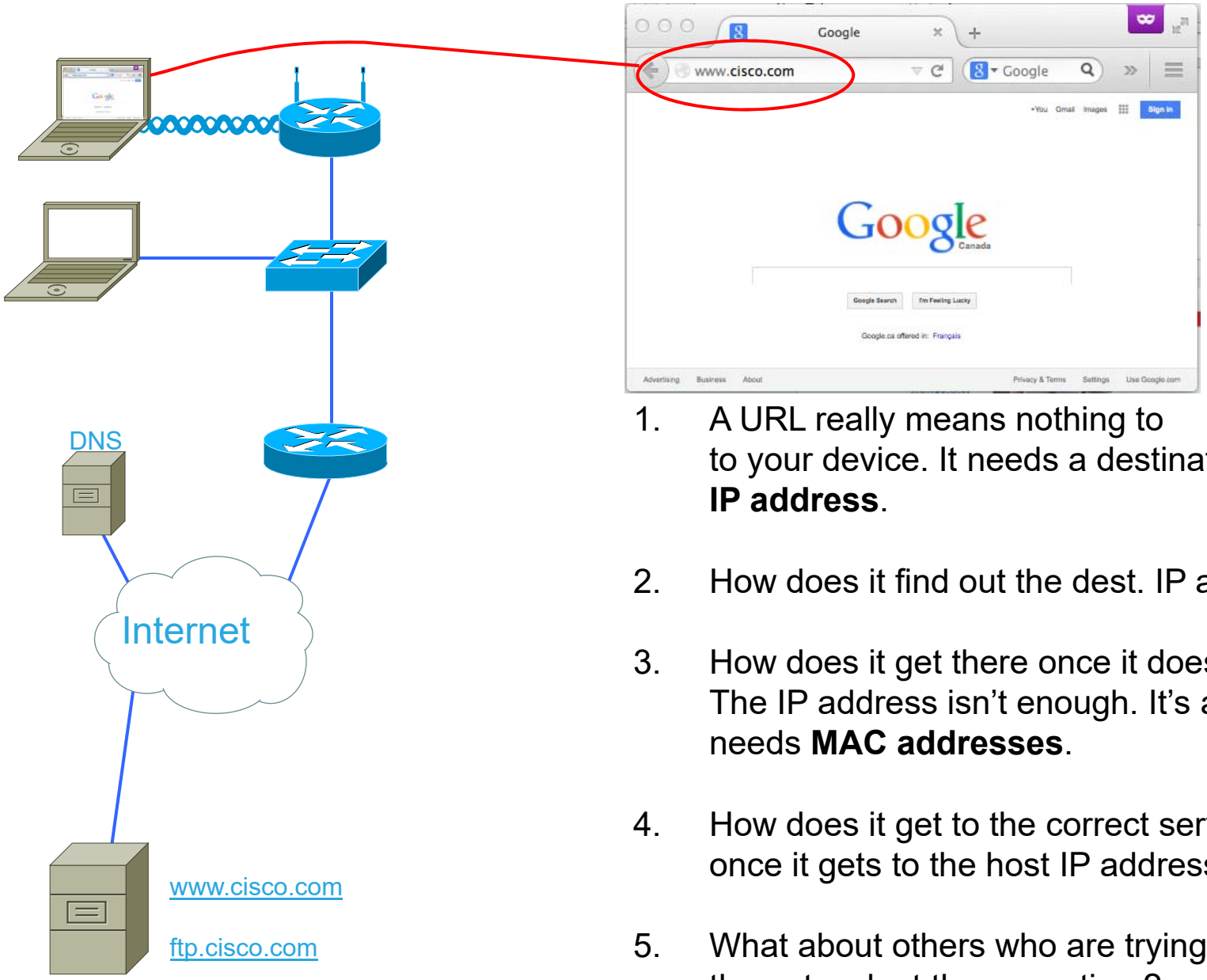
Introduction to Networks v5.1

Peer Tutoring

- Peer tutoring service
  - $6/hour (could save you thousands!)
  - How much does failing a course REALLY cost?
  - Financial assistance may be available
  - 2nd floor of the Student Commons – (Inside the Mobile Learning Centre)
- http://www.algonquincollege.com/peer-tutoring/

The big picture

- What happens when you try to get to a website, like Cisco.com?
- There is somewhere between seven hundred million to one BILLION different websites in the world. How does your computer/table/phone know how to get to the one you want?
- A lot of things have to happen to allow your device to finally reach that website… Most of which is hidden in the background….



1. A URL really means nothing to to your device. It needs a destination **IP address**.

2. How does it find out the dest. IP address?

3. How does it get there once it does? The IP address isn't enough. It's also needs **MAC addresses**.

4. How does it get to the correct service once it gets to the host IP address?

5. What about others who are trying to use the network at the same time?

Networks of Many Sizes

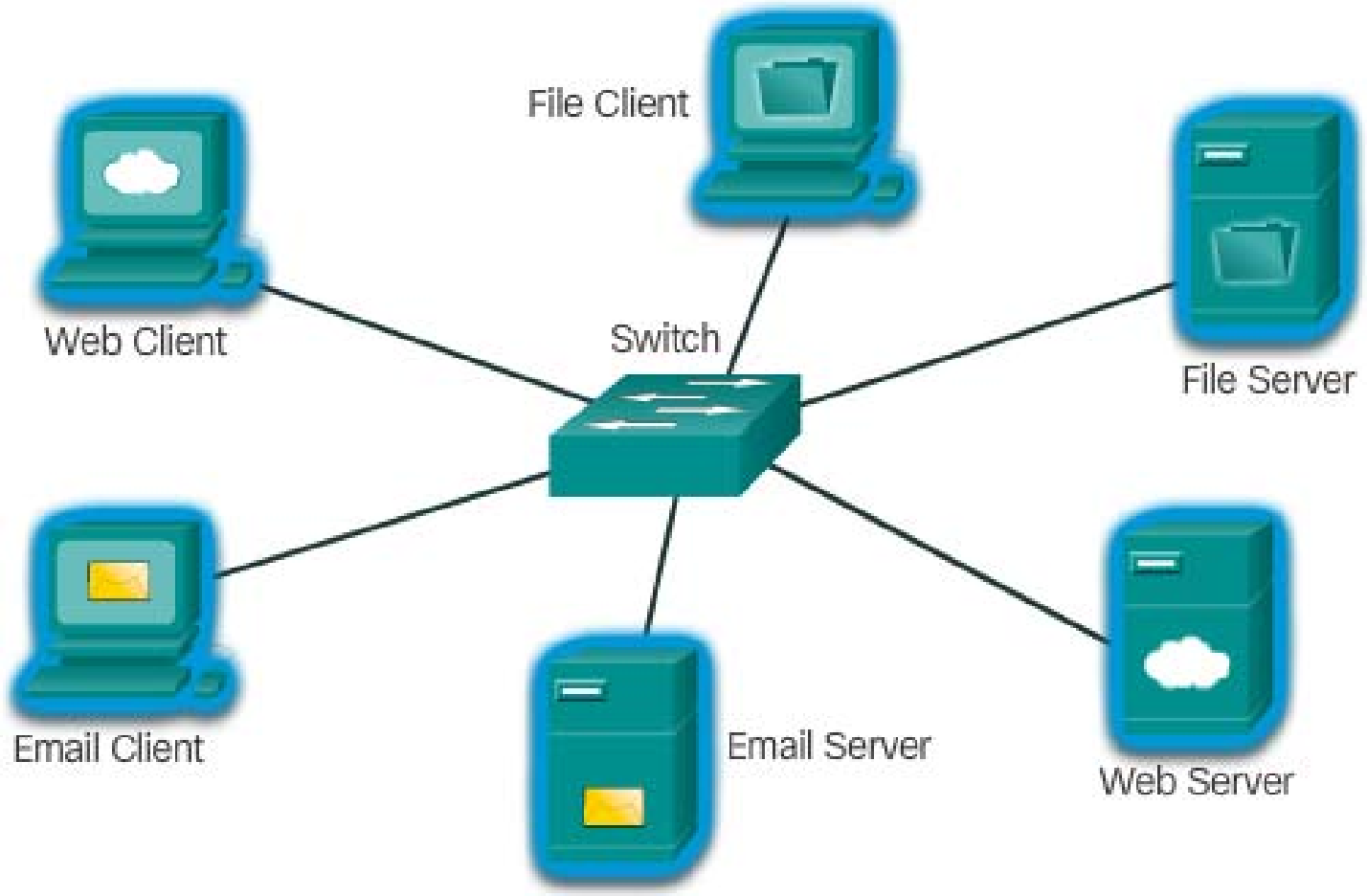
Small Home Networks

Small Office/Home Office Networks

Medium to Large Networks

World Wide Networks

Clients and Servers



Peer-to-Peer

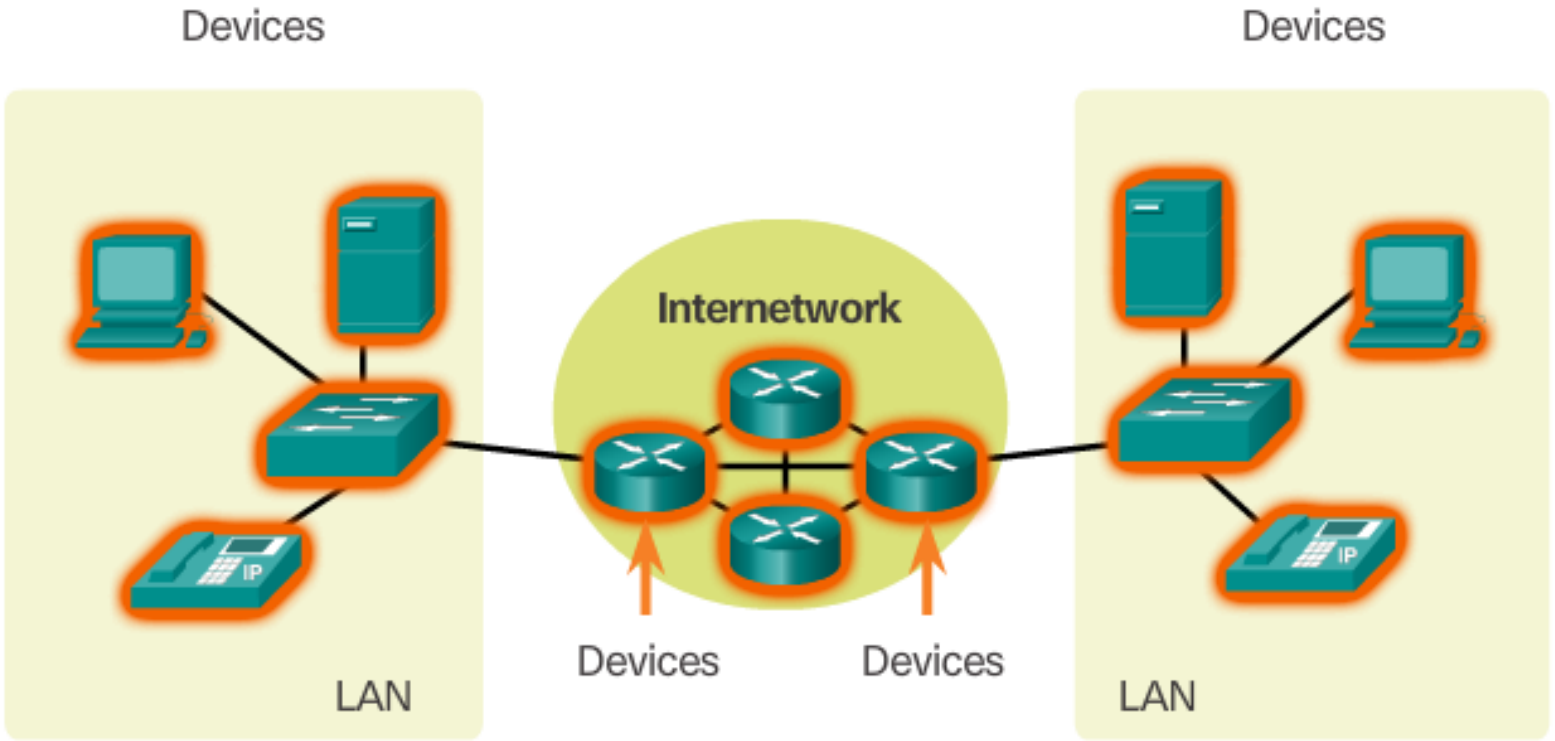
The advantages of peer-to-peer networking:

- 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:

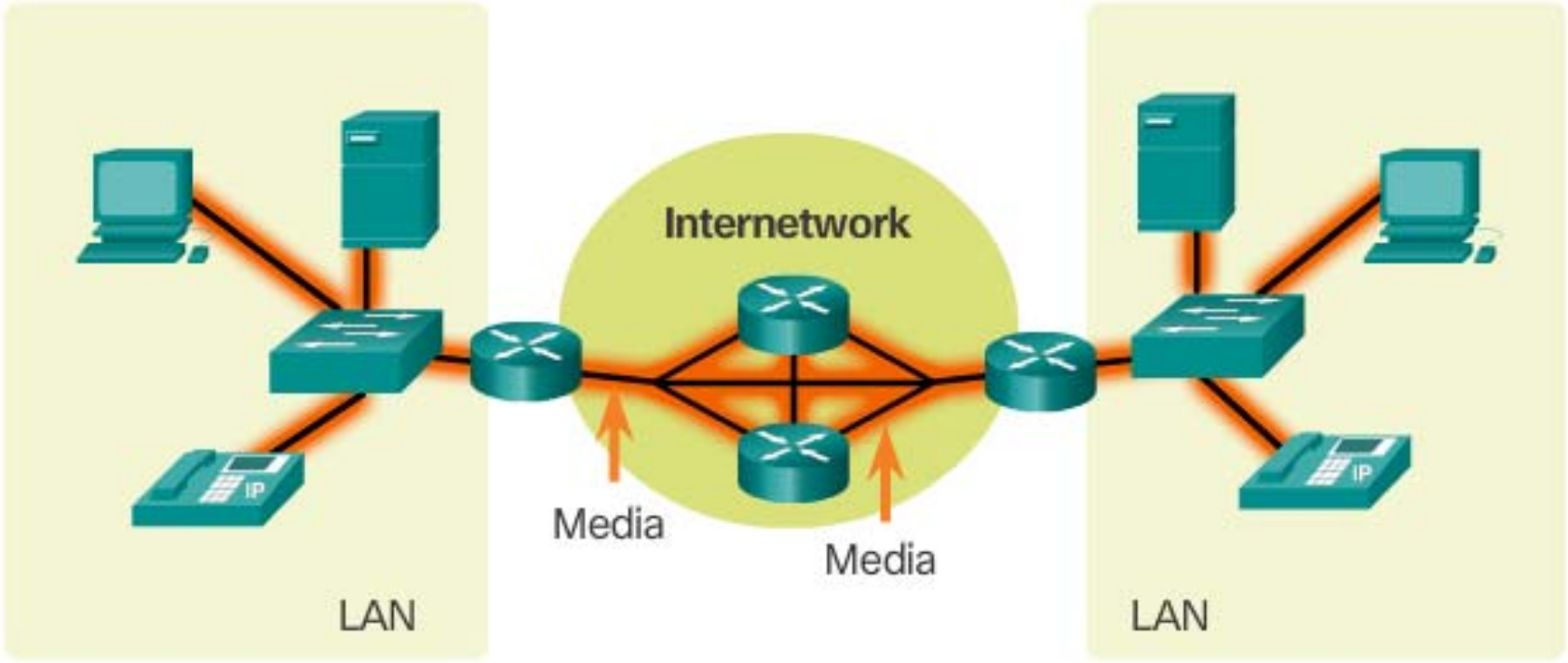
- No centralized administration
- Not as secure
- Not scalable
- All devices may act as both clients and servers which can slow their performance

Overview of Network Components



Devices | Media | Services

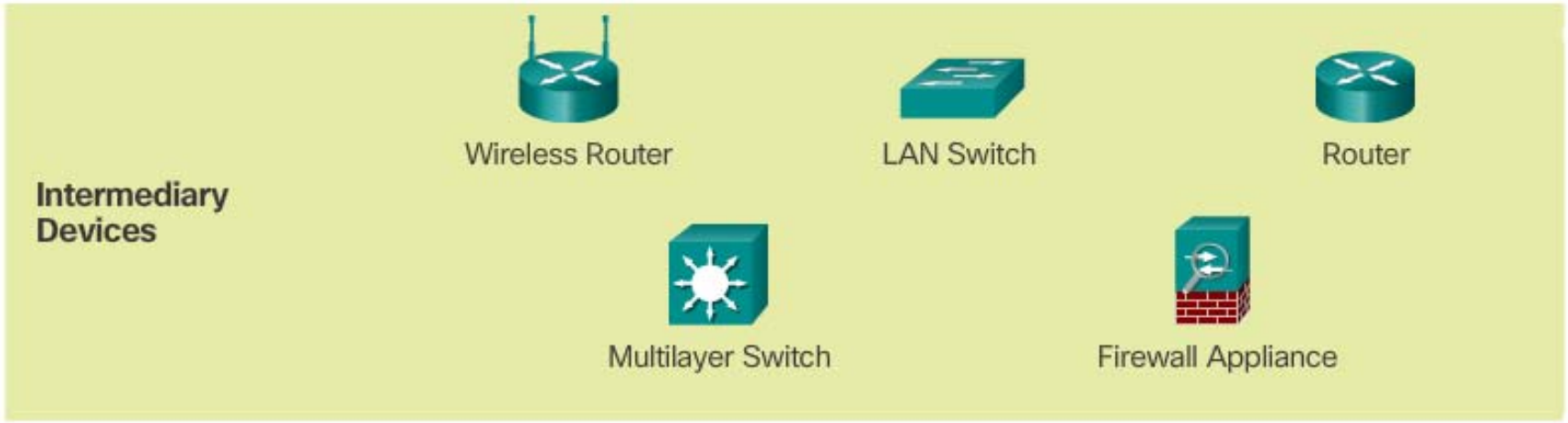
Overview of Network Components (cont.)



Devices | Media | Services

End Devices

Intermediary Network Devices

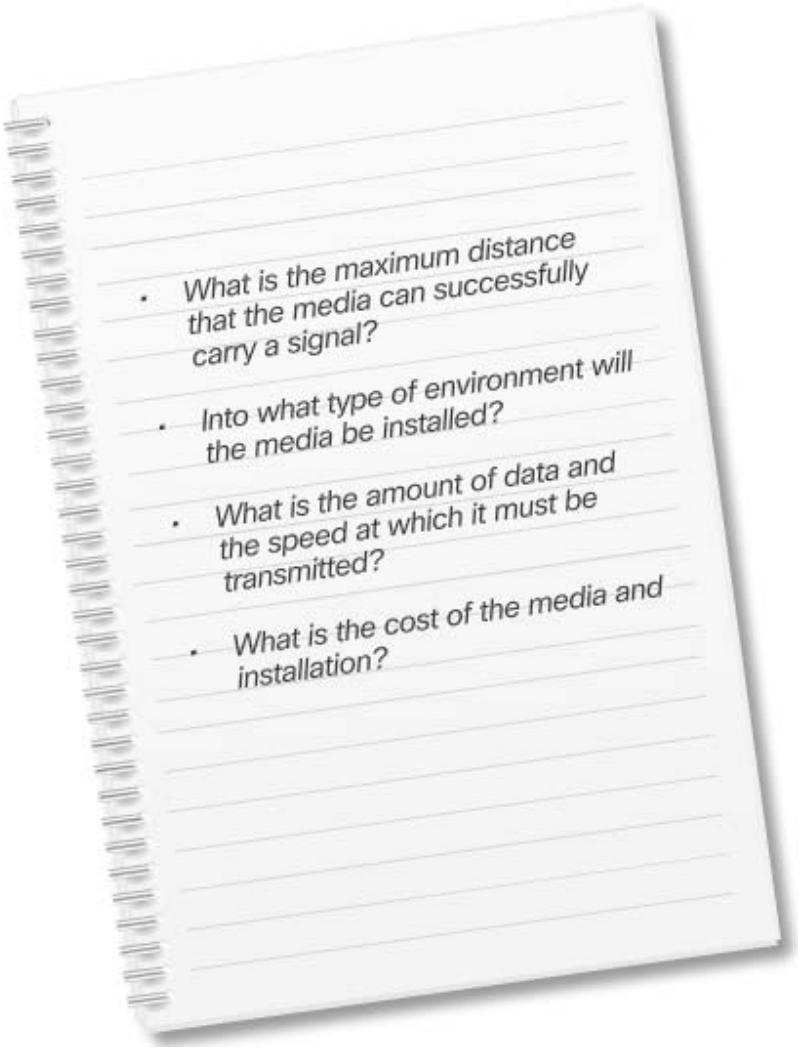


Intermediary network devices perform some or all of these functions:

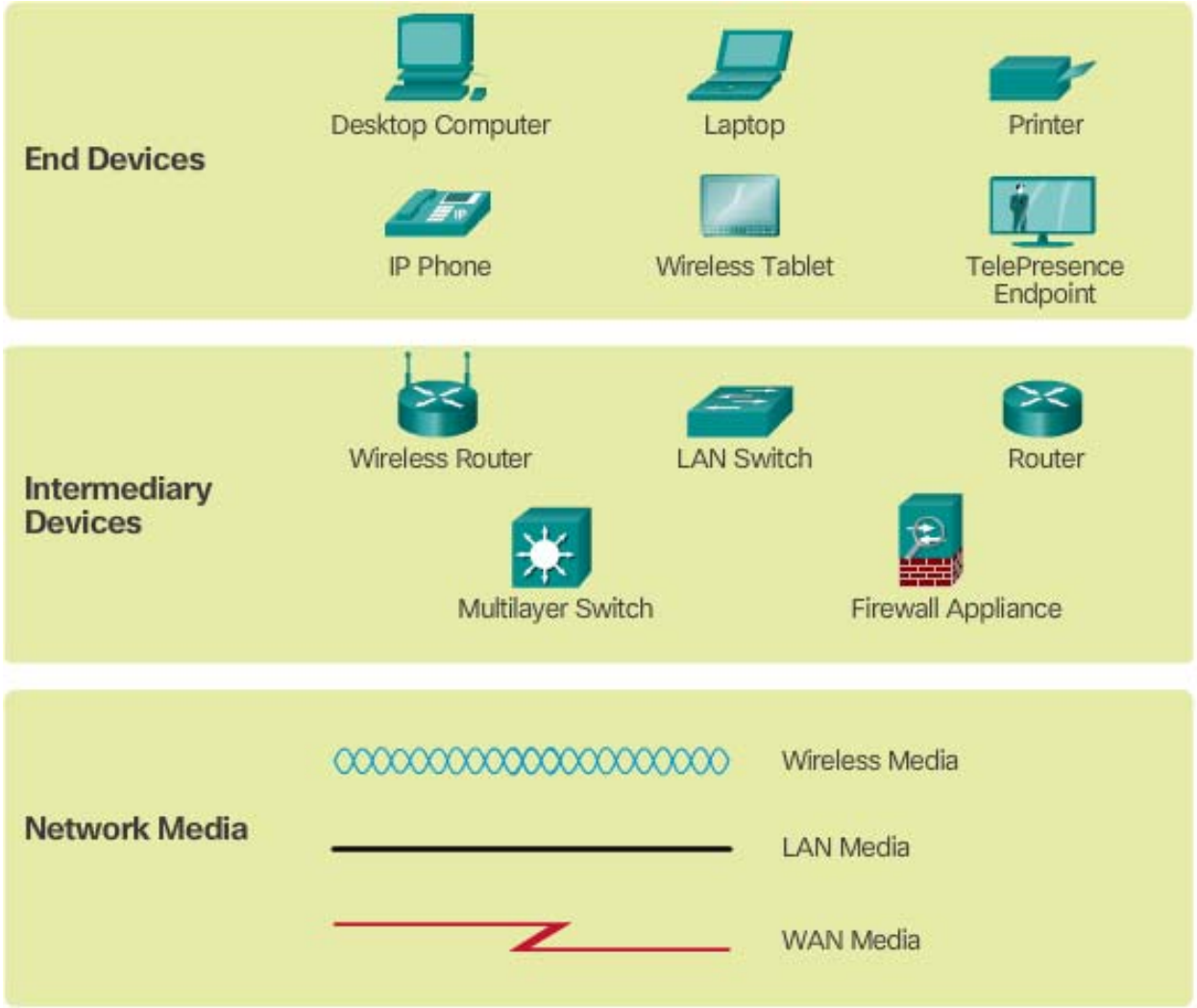
- Regenerate and retransmit data signals
- Maintain information about what pathways exist through the network and internetwork
- Notify other devices of errors and communication failures
- Direct data along alternate pathways when there is a link failure
- Classify and direct messages according to priorities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

Network Media

Network Media (cont.)



Network Representations

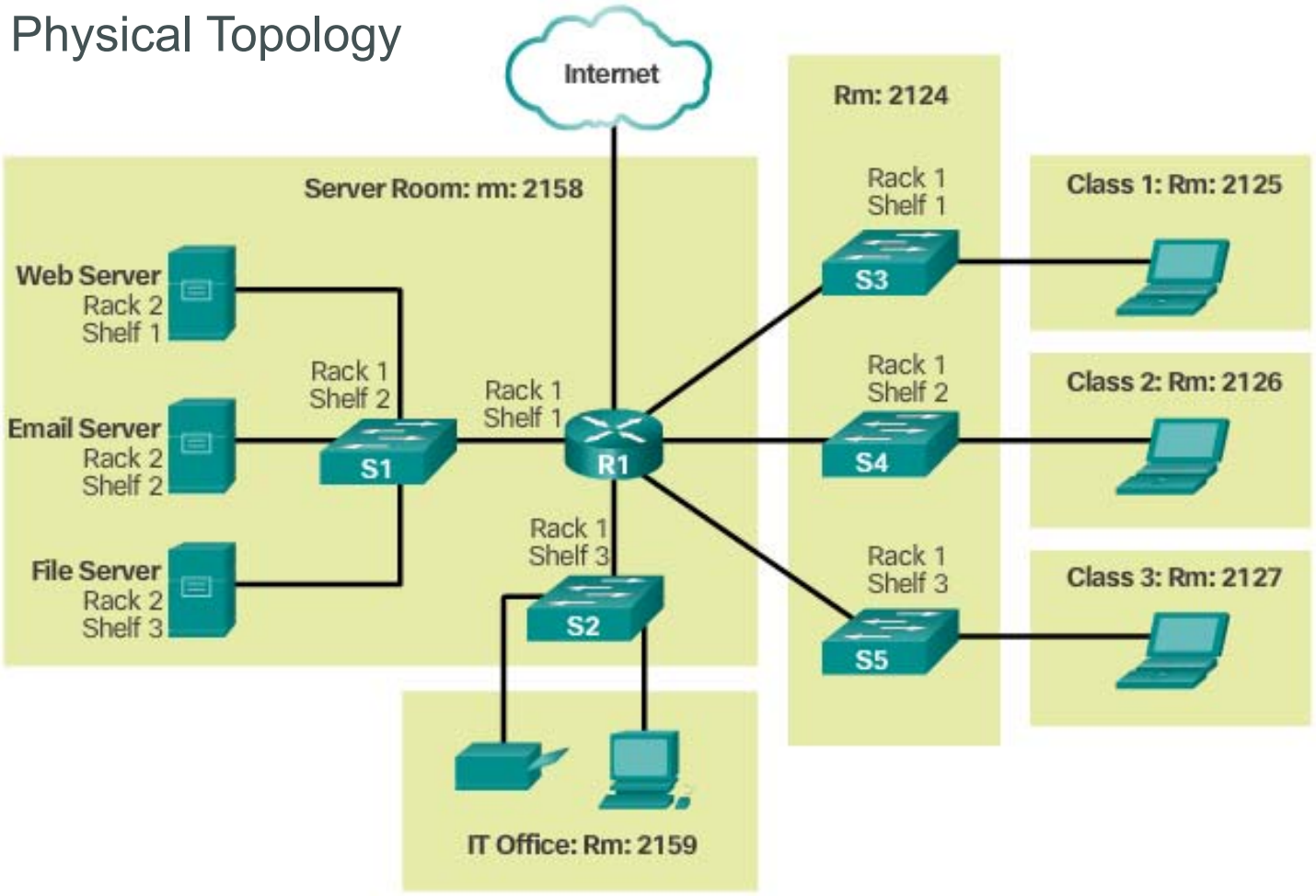


Network Representations (Cont.)

Network Interface Card

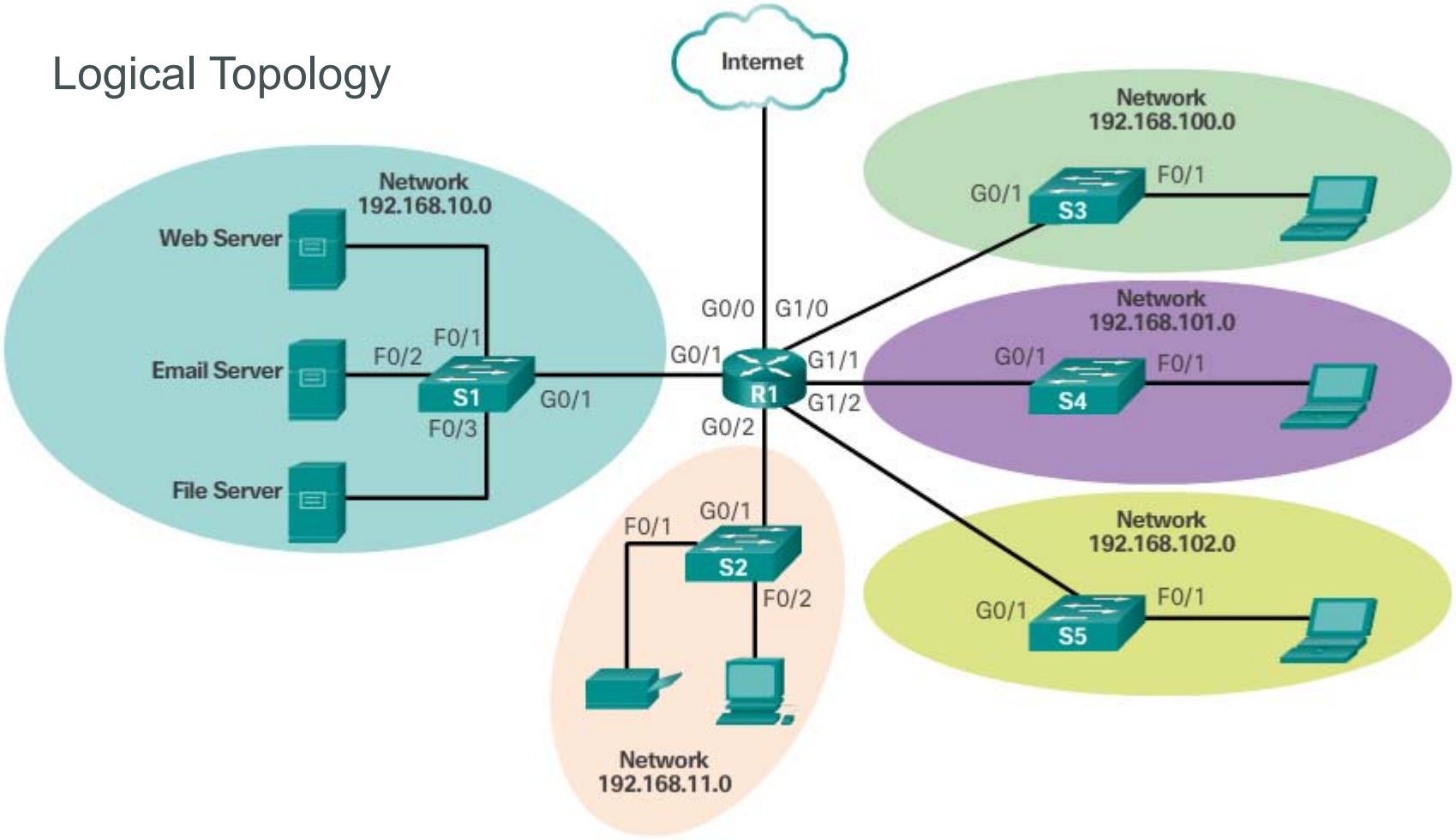
Topology Diagrams

Physical Topology



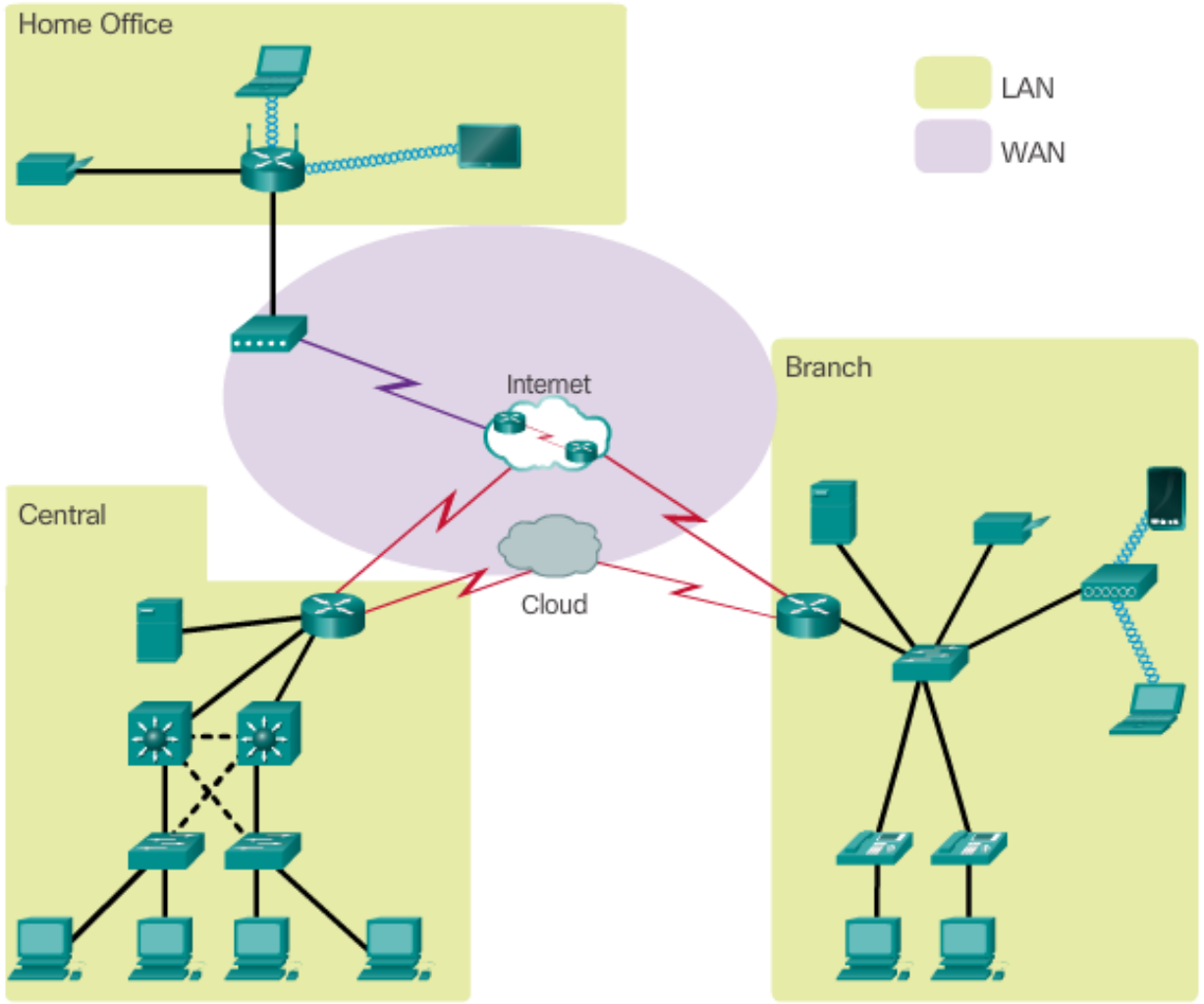
Topology Diagrams (Cont.)

Logical Topology



Topic 1.2.2:
LANs and WANs

Types of Networks

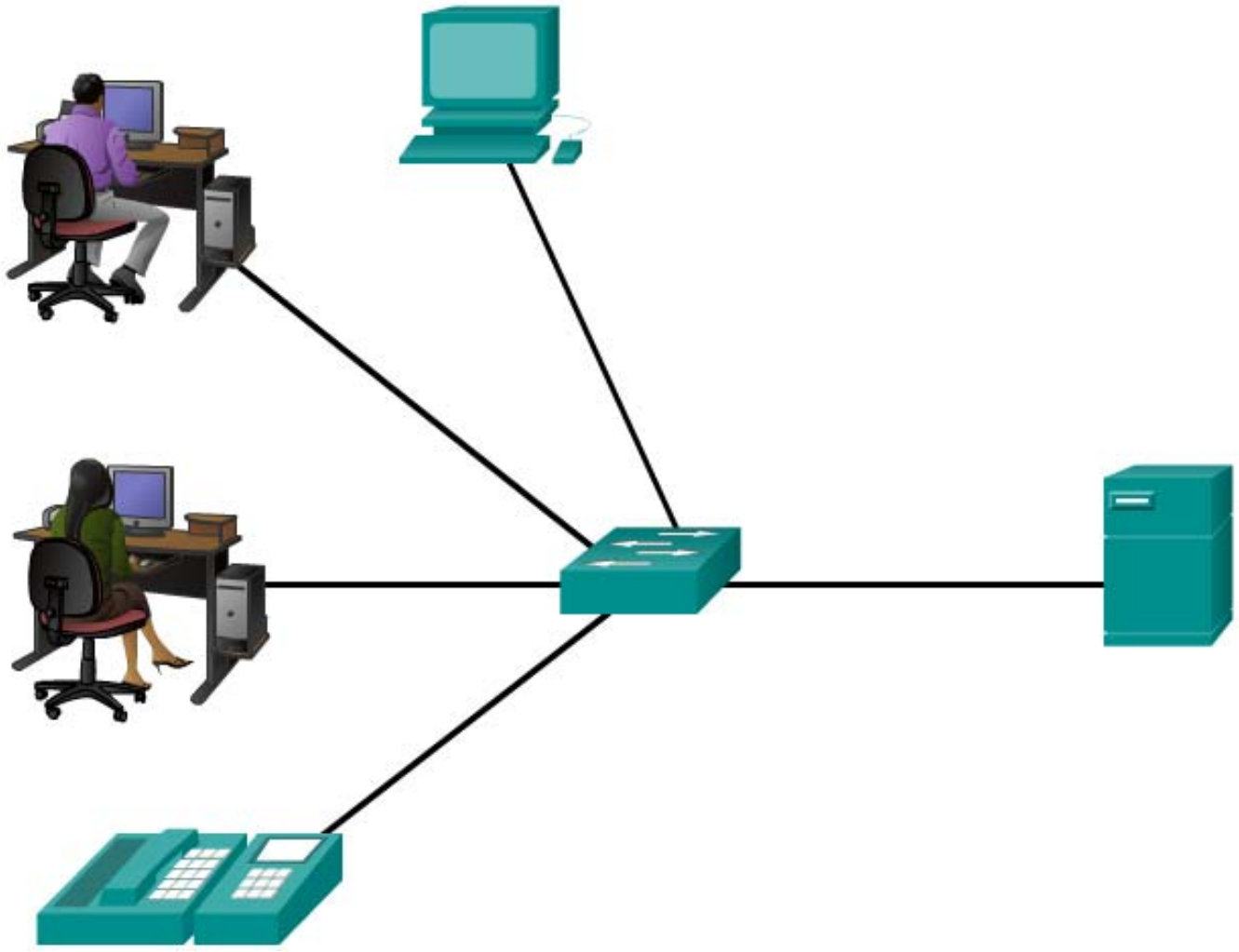


Types of Networks

The two most common types of network infrastructures are:

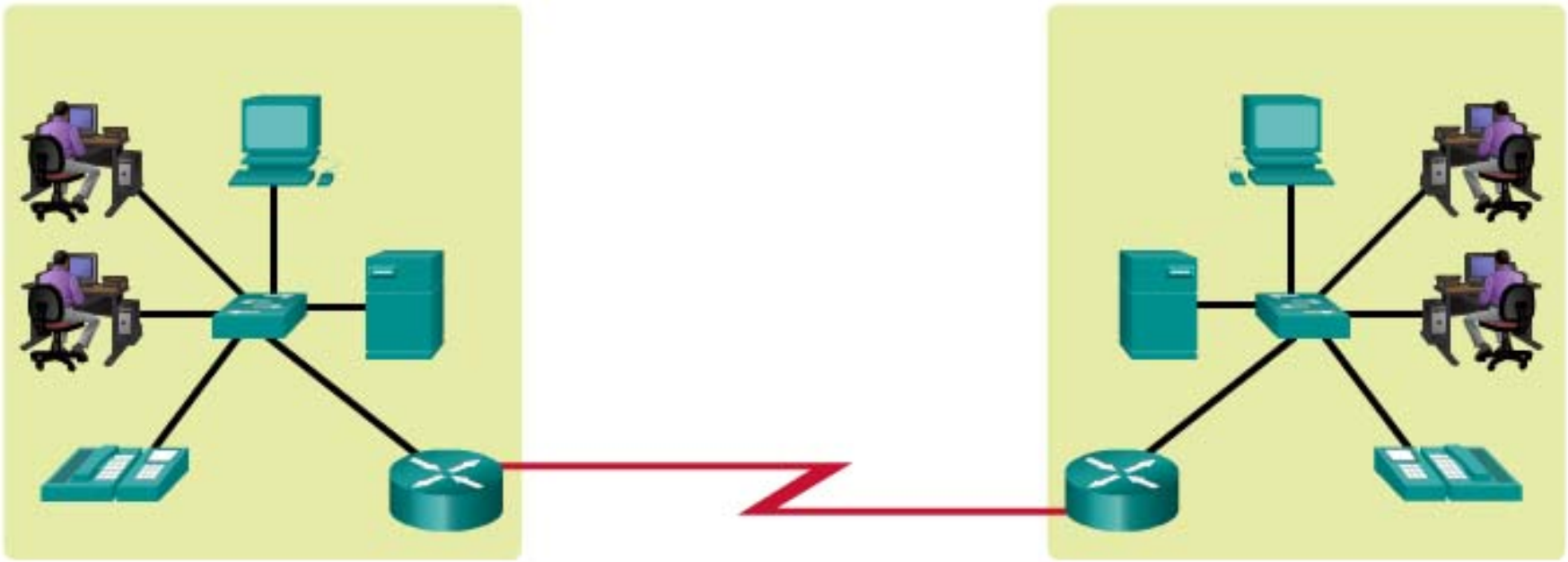
- Local Area Network (LAN) (Wired & Wireless)
- Wide Area Network (WAN)

Local Area Networks



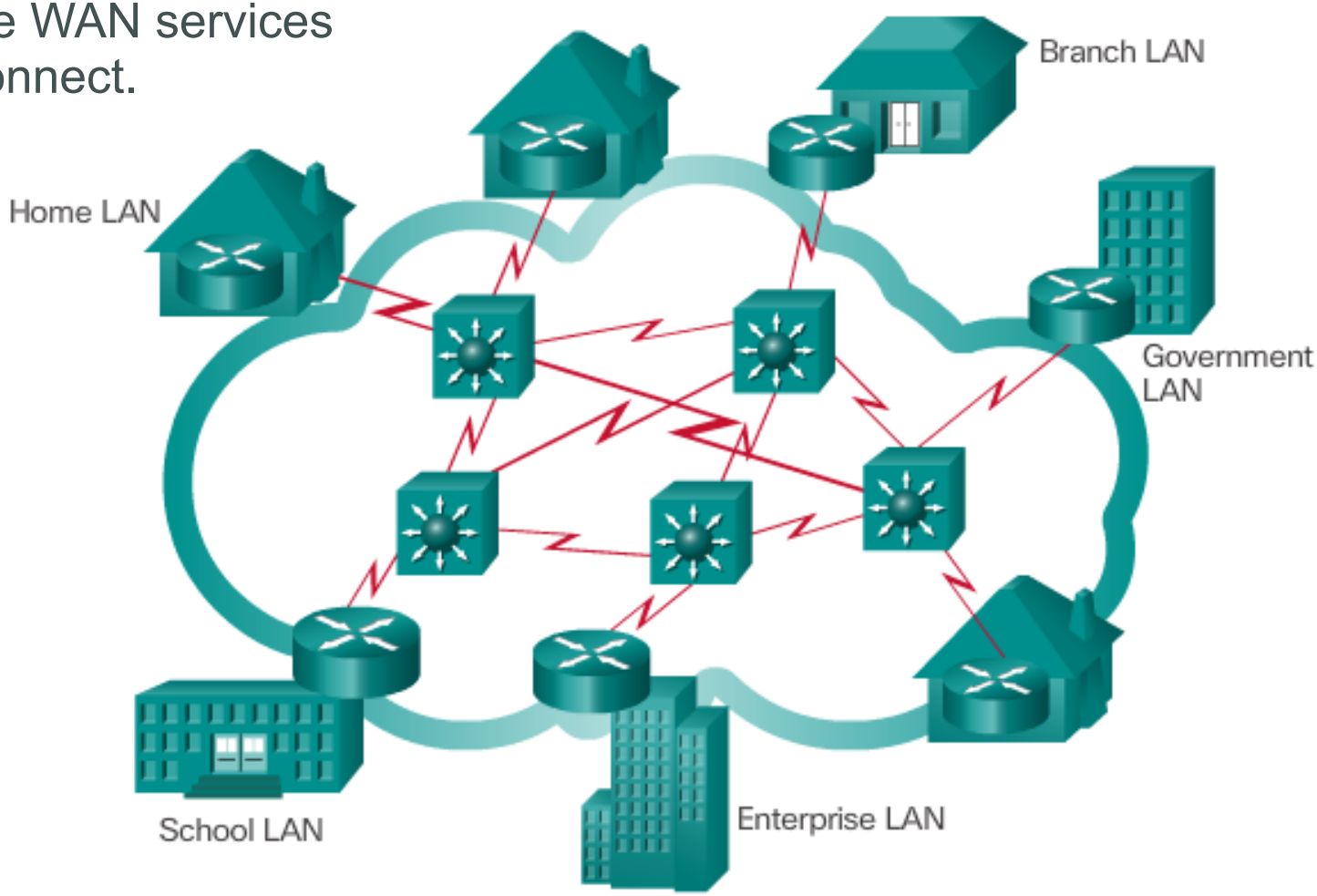
Wide Area Networks

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

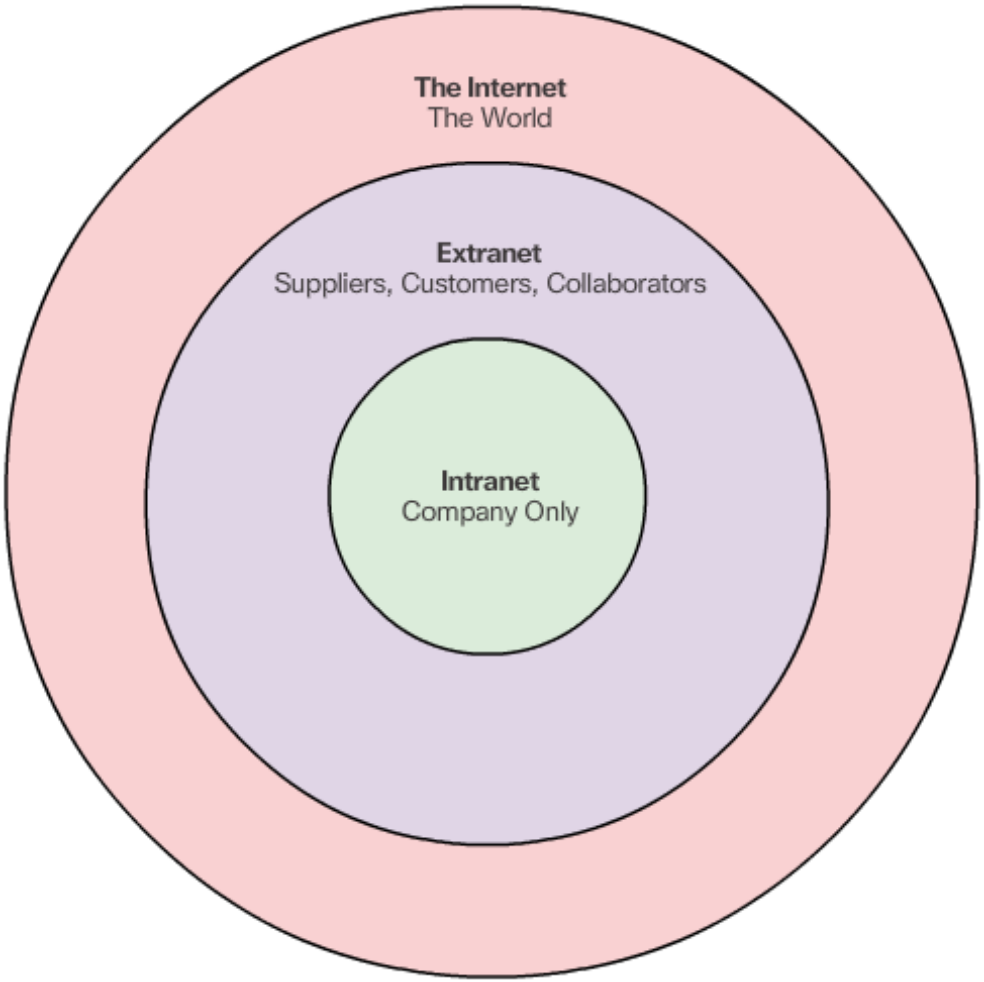


The Internet

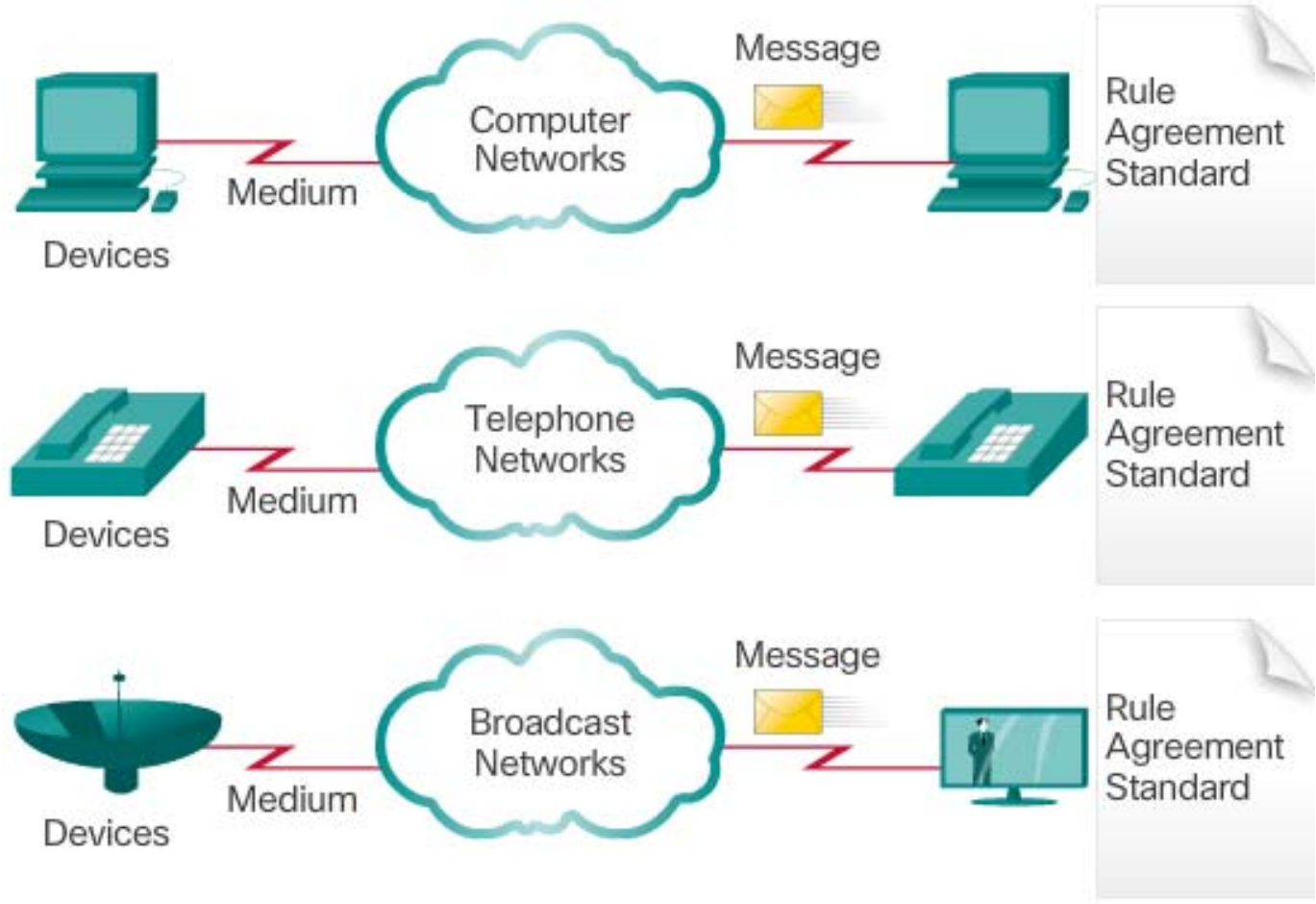
LANs use WAN services to interconnect.



Intranets and Extranets

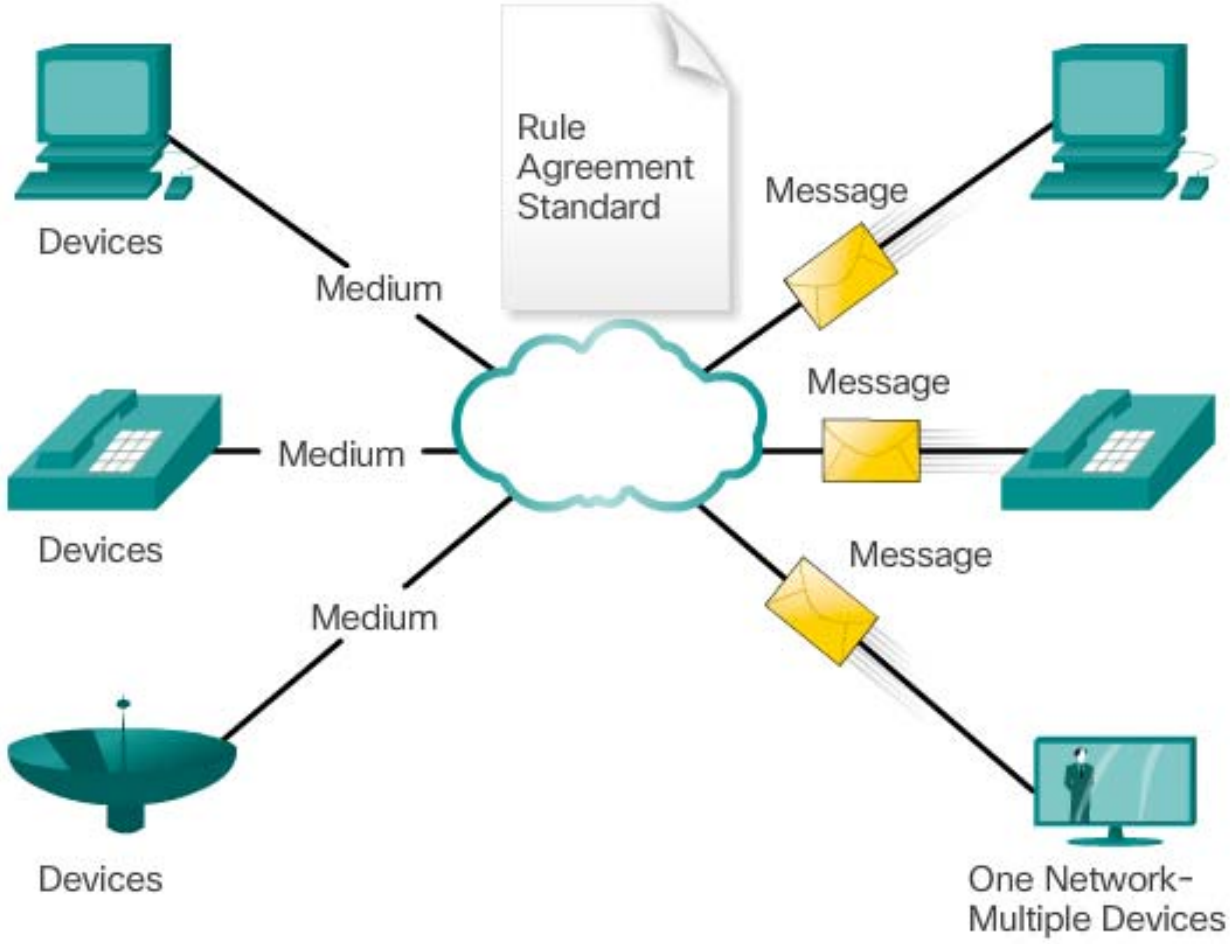


Traditional Separate Networks



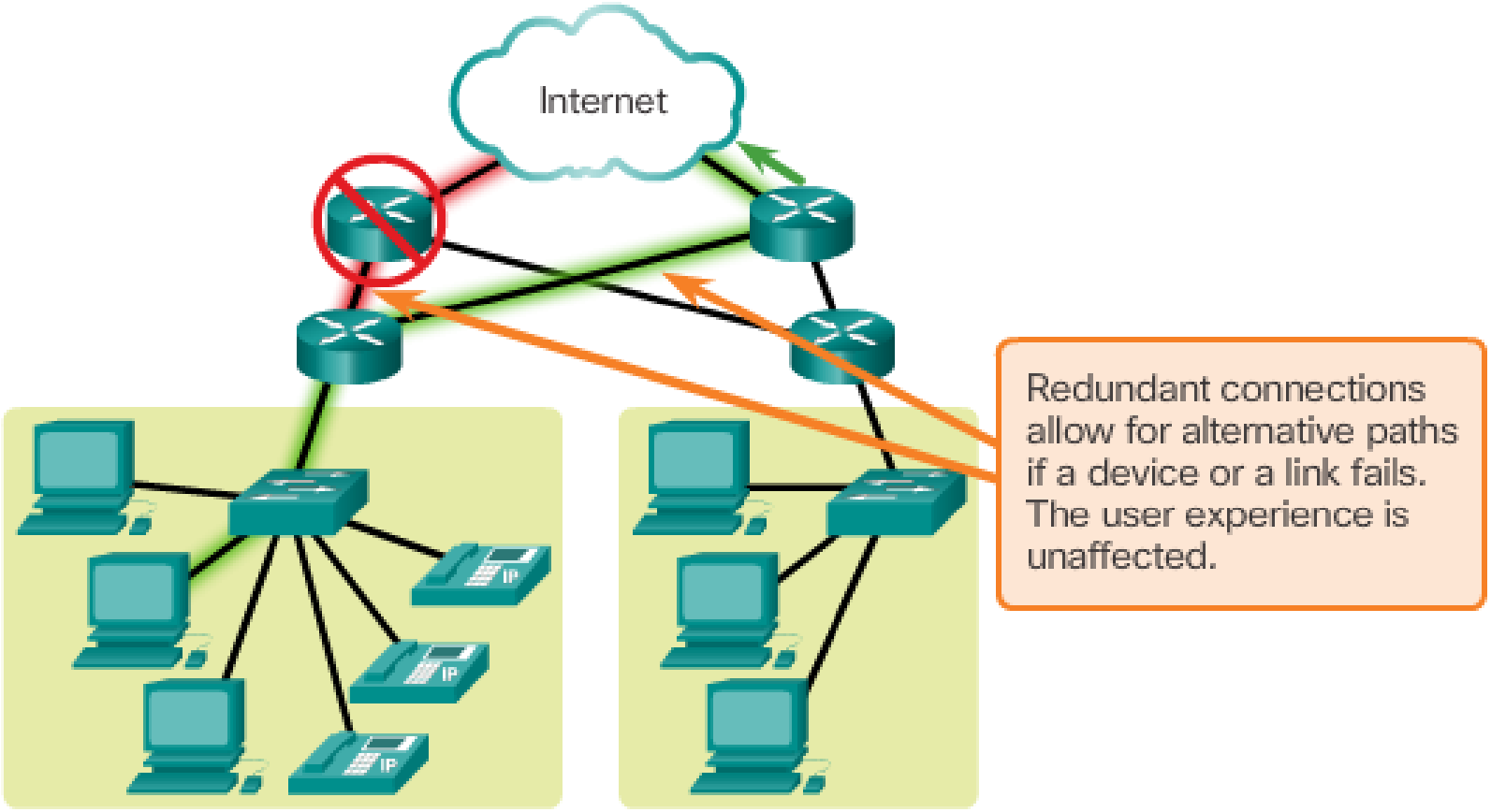
Multiple services are running on multiple networks.

The Converging Networks

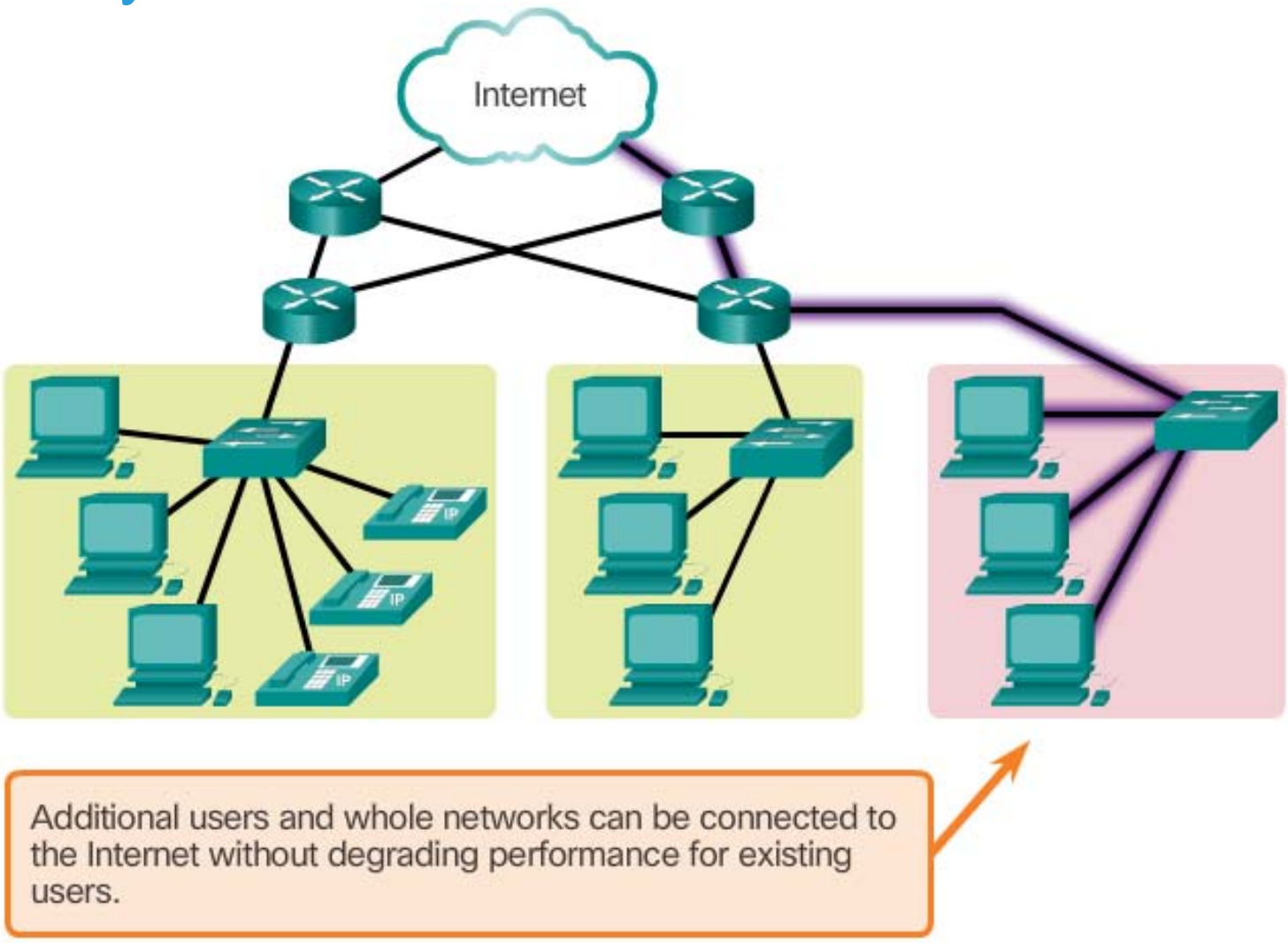


Converged data networks carry multiple services on one network.

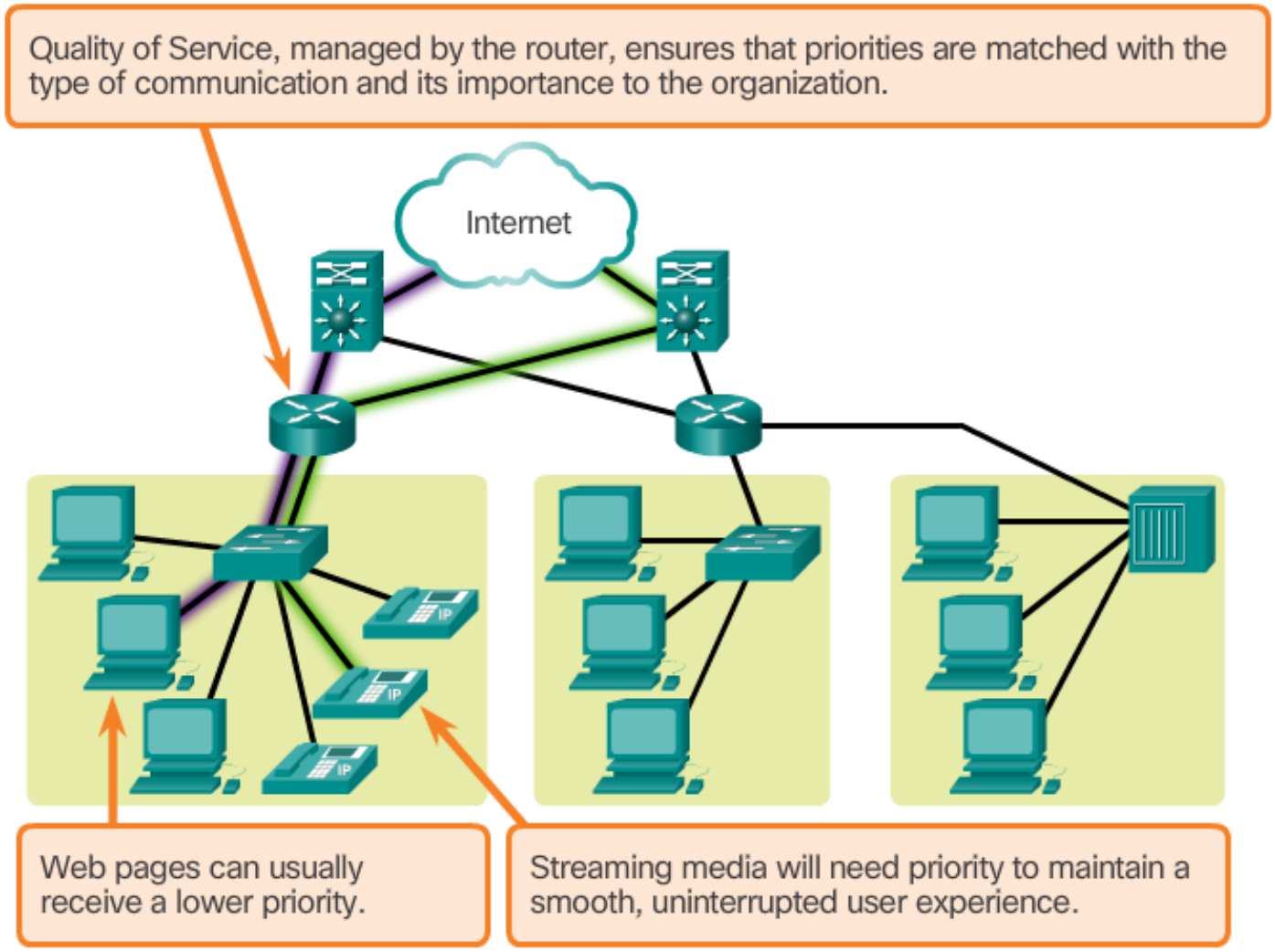
Fault Tolerance



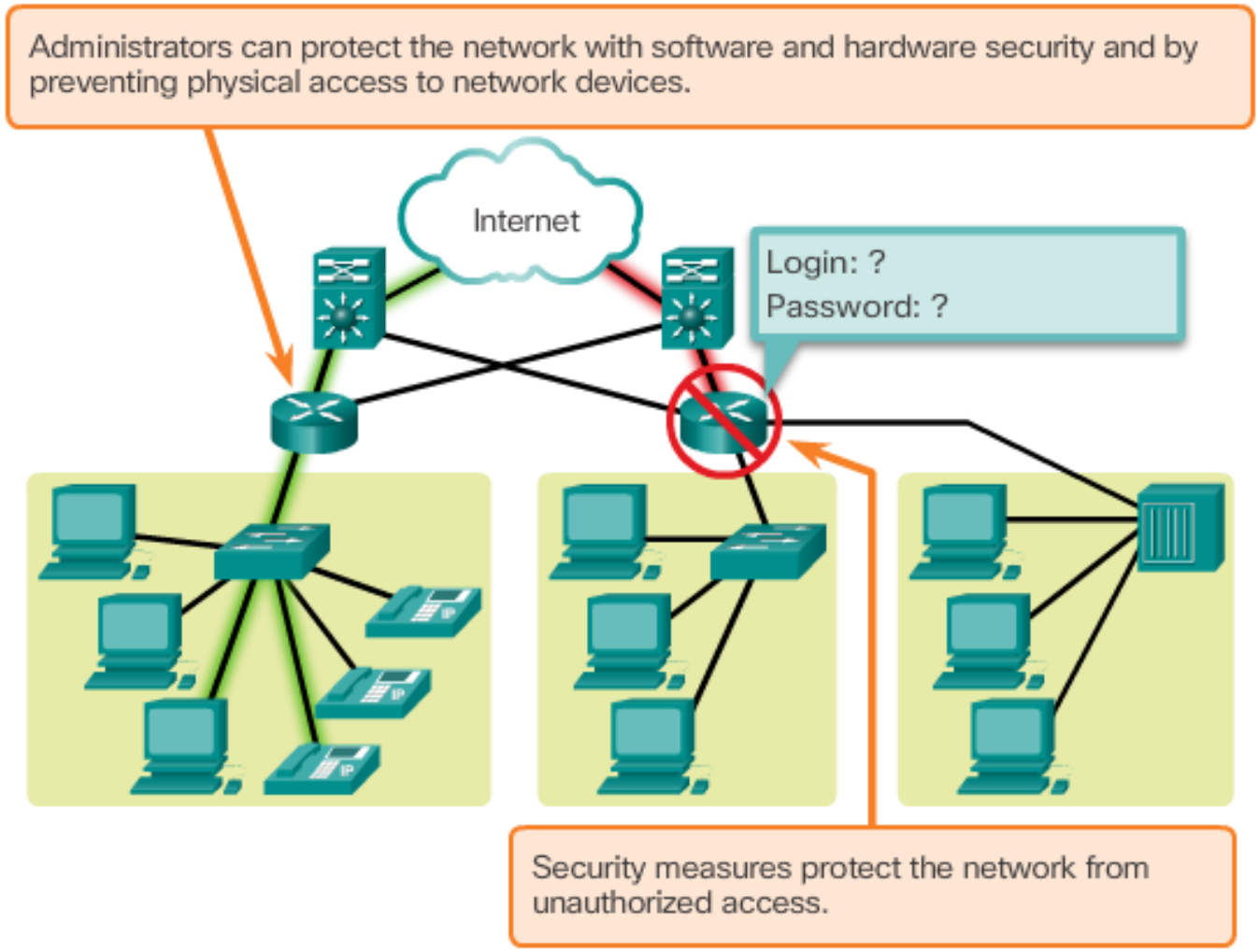
Scalability



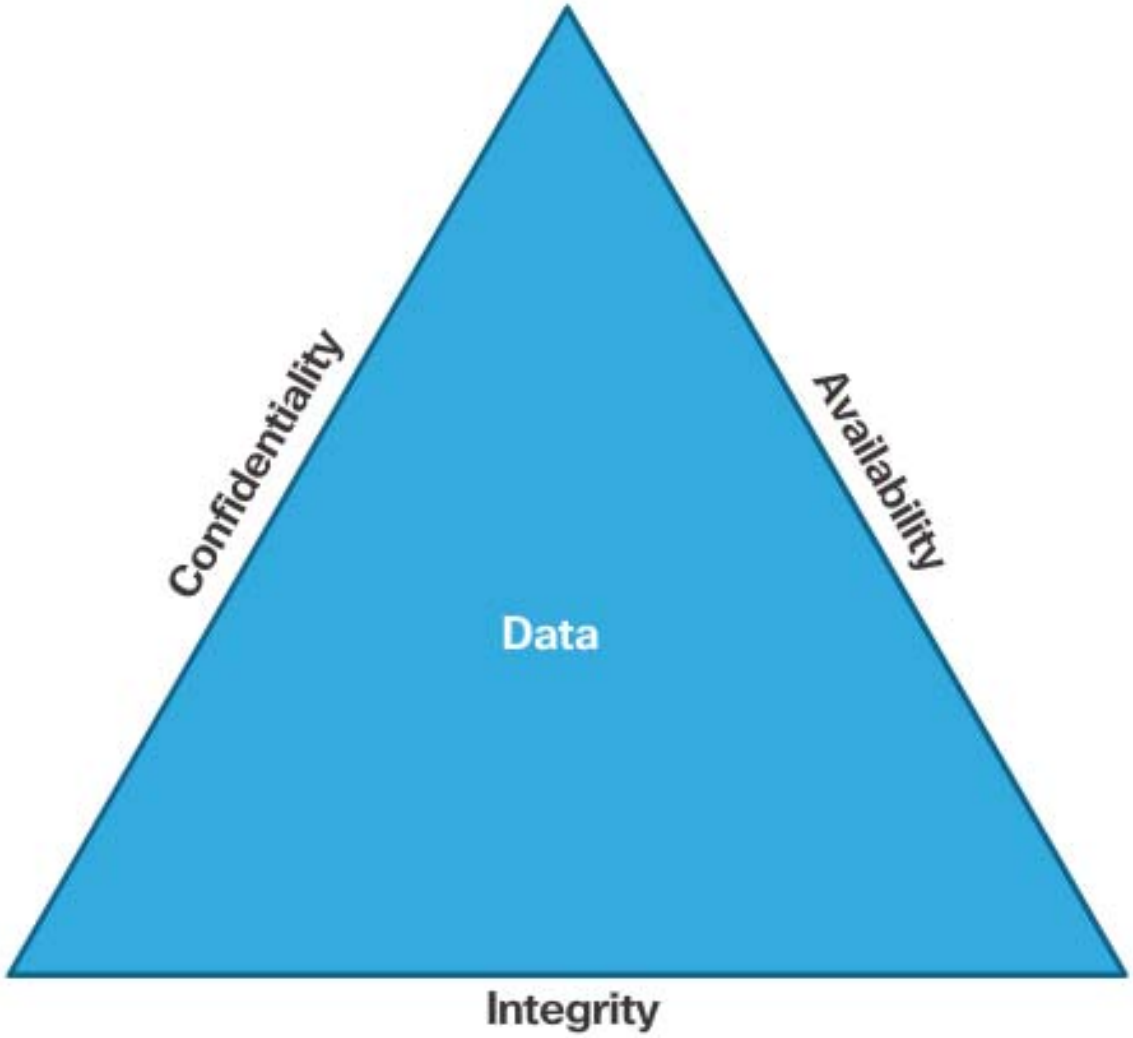
Quality of Service



Security



Security (cont.)



CIA

- Confidentiality
  - Data is only accessible to authorized people (and devices)
  - **Authentication** – Proof of who you are (passwords, biometrics, tokens)
  - **Encryption** – Only the intended recipient can access the data
- Integrity
  - The data has not been changed in storage or in transit (Willfully or accidentally)
  - How do you know? (HASH)
- Availability
  - reliable access to data
  - Firewall, AV, redundancy
  - (DOS attacks)

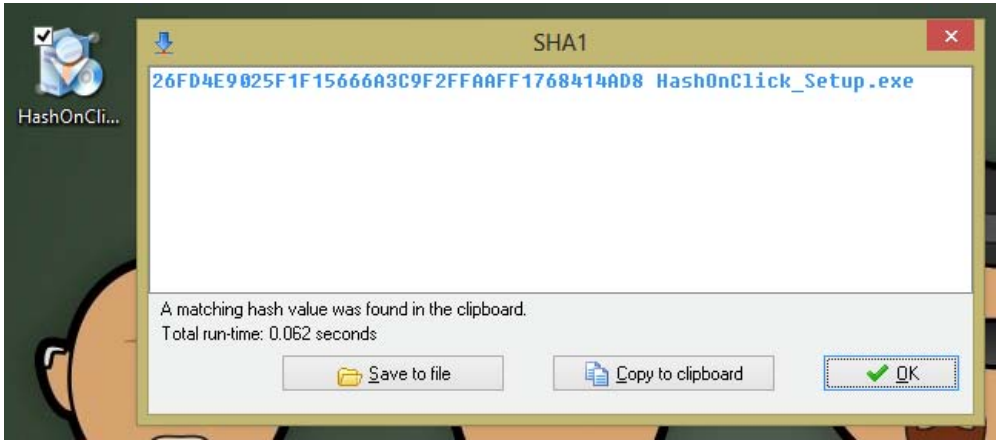
HASH

- Uniquely generated – ONE WAY
  - You can't use the HASH to generate the original data
  - A single bit changes – the HASH changes

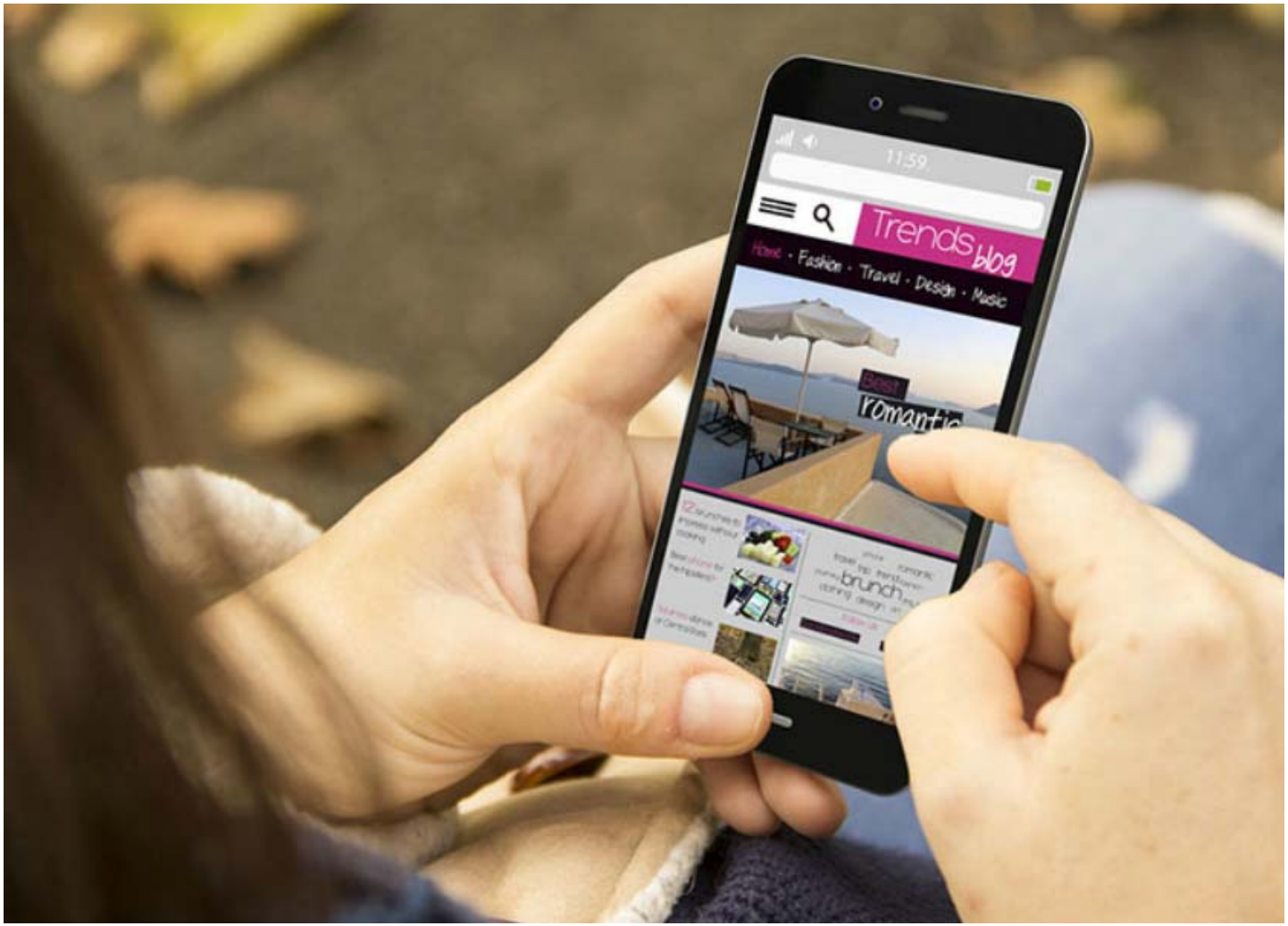
HashOnClick

File name: HashOnClick_Setup.exe

SHA-1 = 26FD4E9025F1F15666A3C9F2FFAAFF1768414AD8

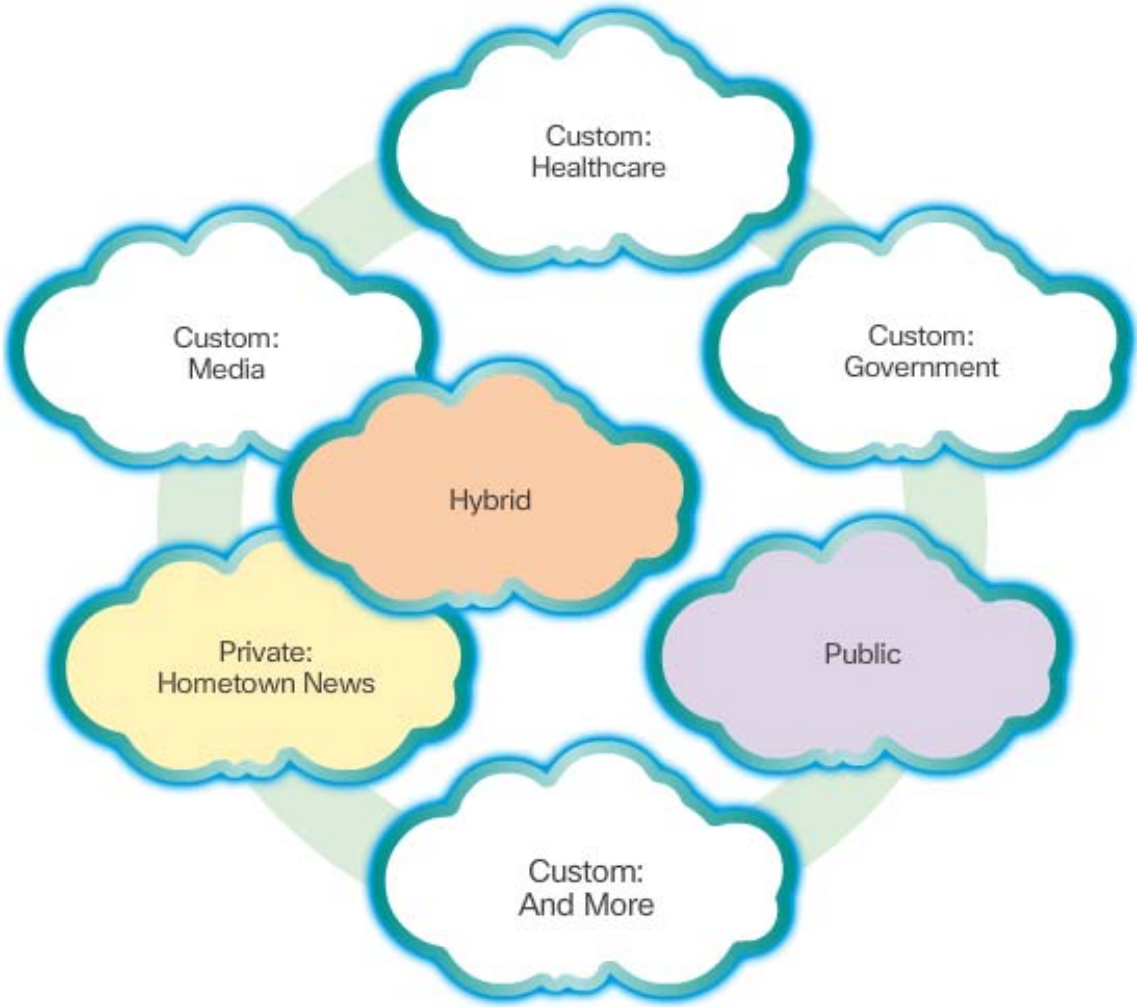


Bring Your Own Device

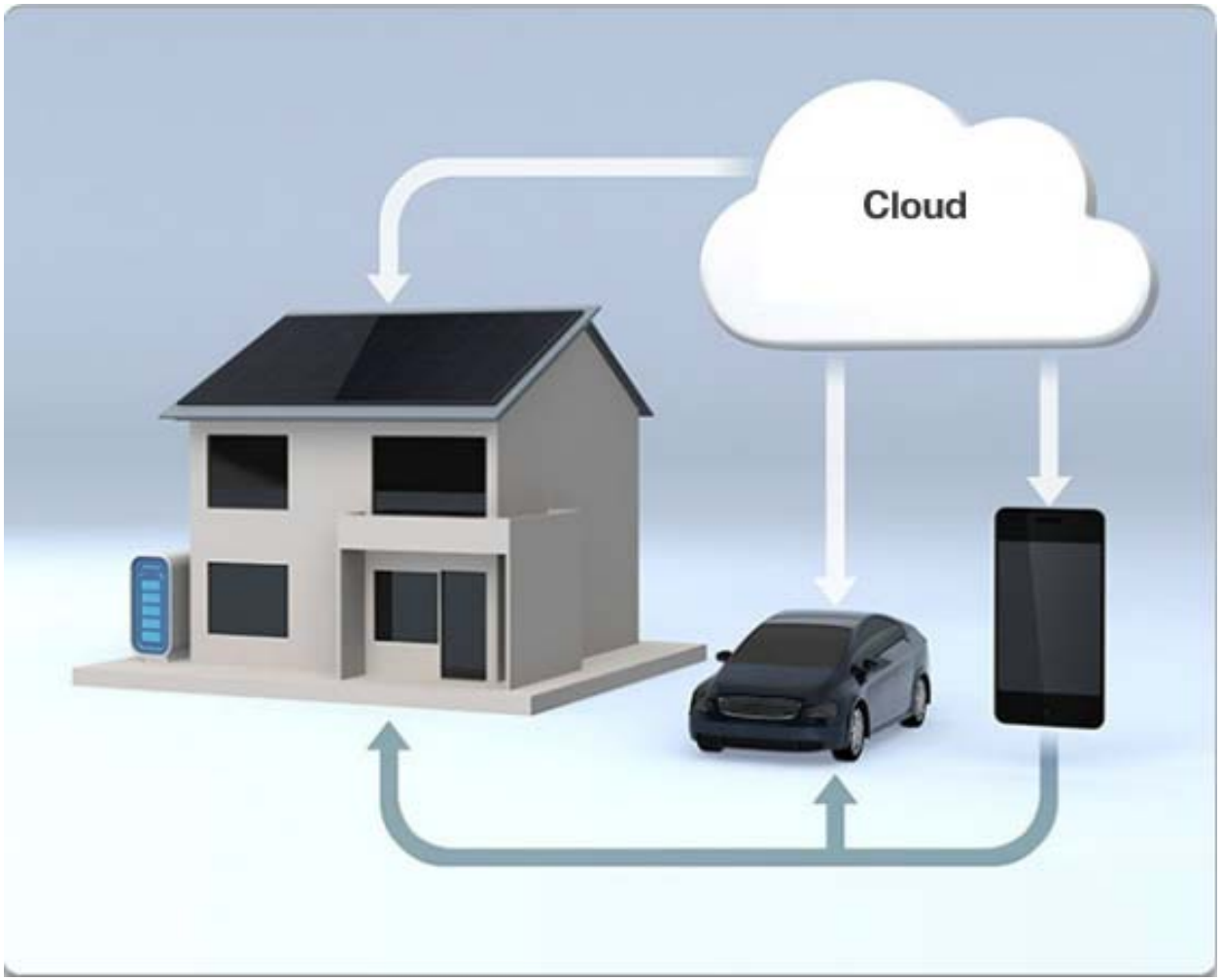


Online Collaboration

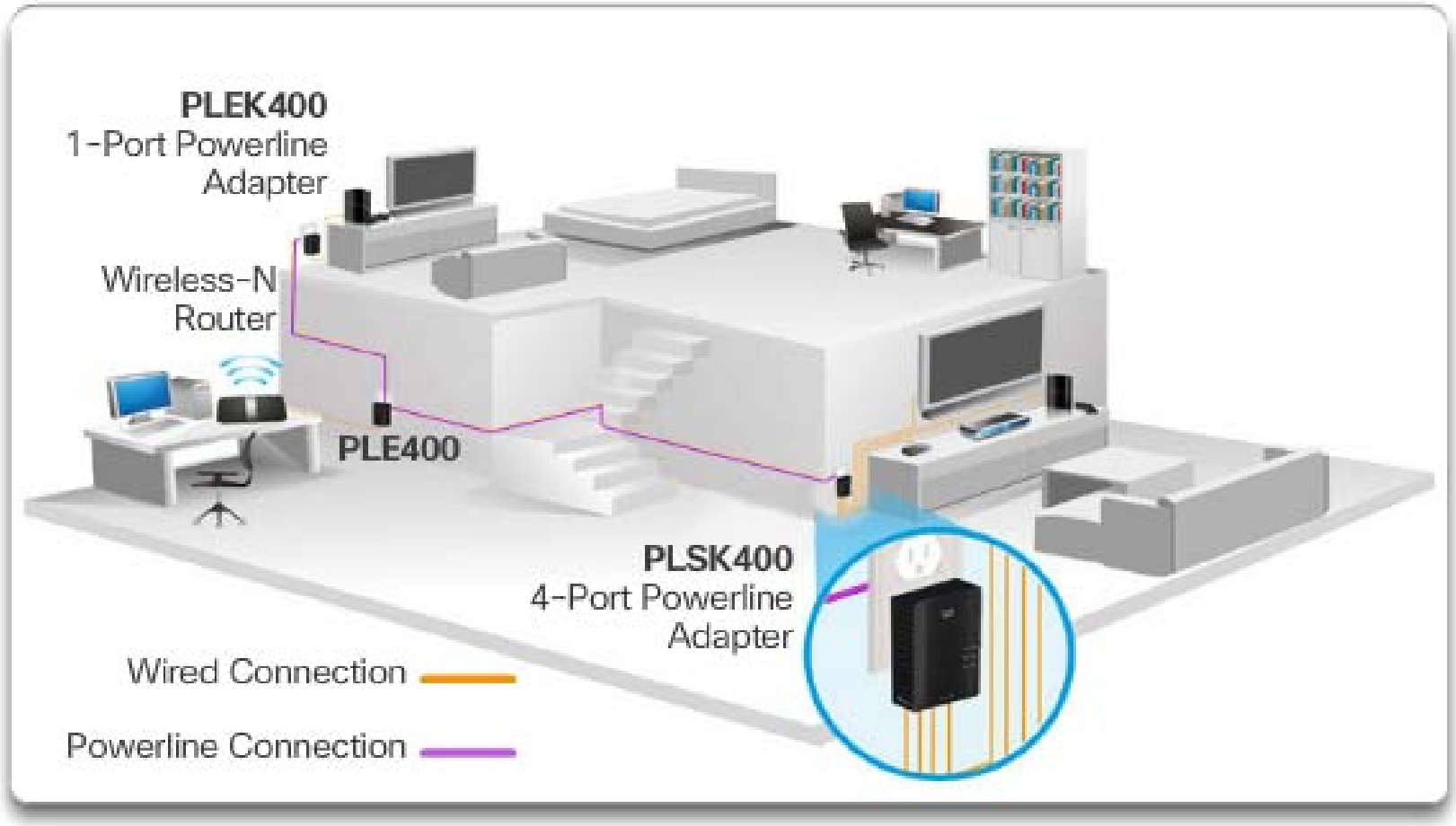
Cloud Computing



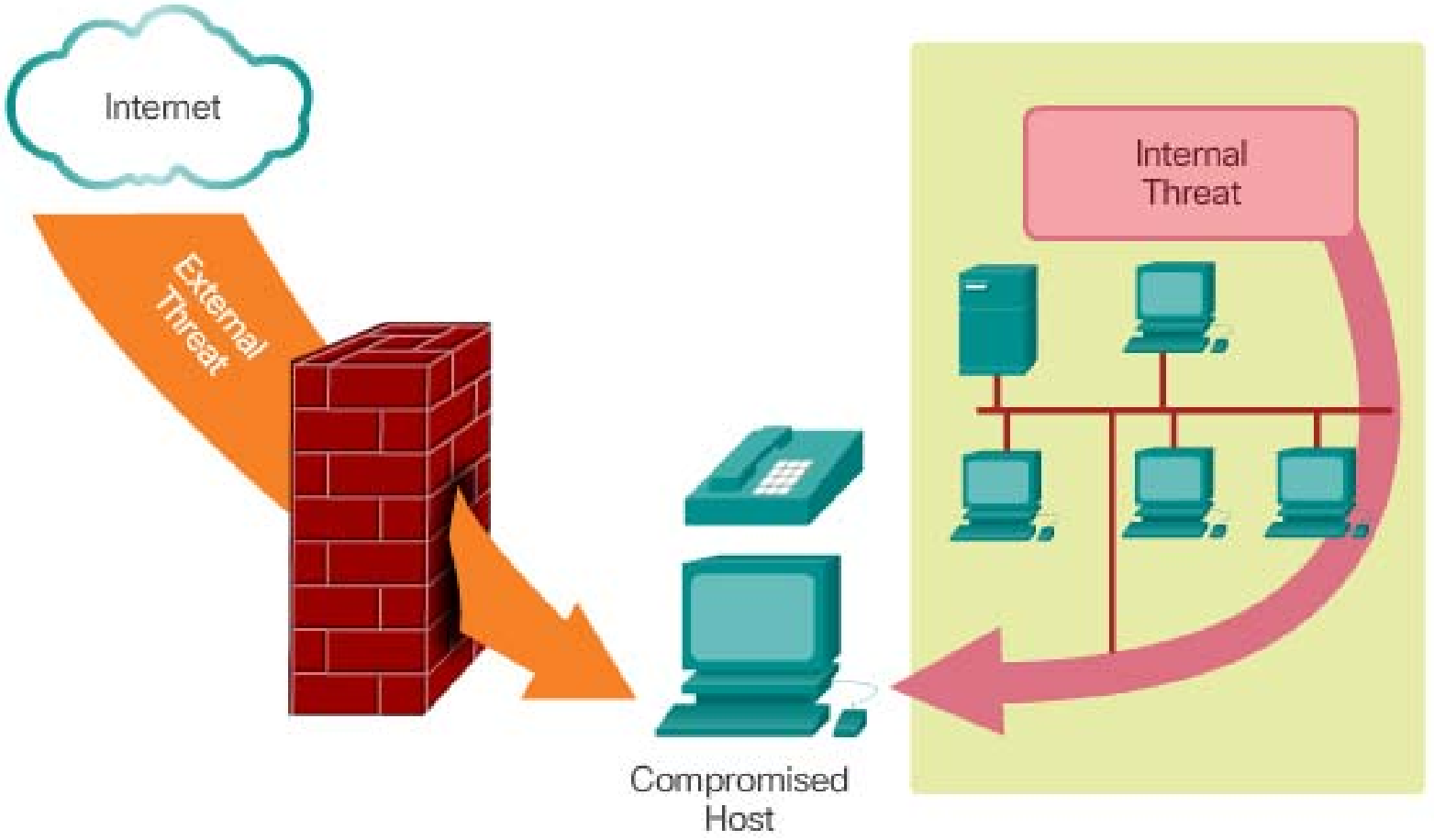
Technology Trends in the Home



Powerline Networking



Security Threats



Security Threats

The most common external threats to networks include:

- Viruses, worms, and Trojan horses
- Spyware and adware
- Zero-day attacks, also called zero-hour attacks
- Hacker attacks
- Denial of service attacks
- Data interception and theft
- Identity theft
- Definitions: https://www.sophos.com/en-us/threat-center/threat-analyses/threatsaurus/a-to-z-of-threats.aspx

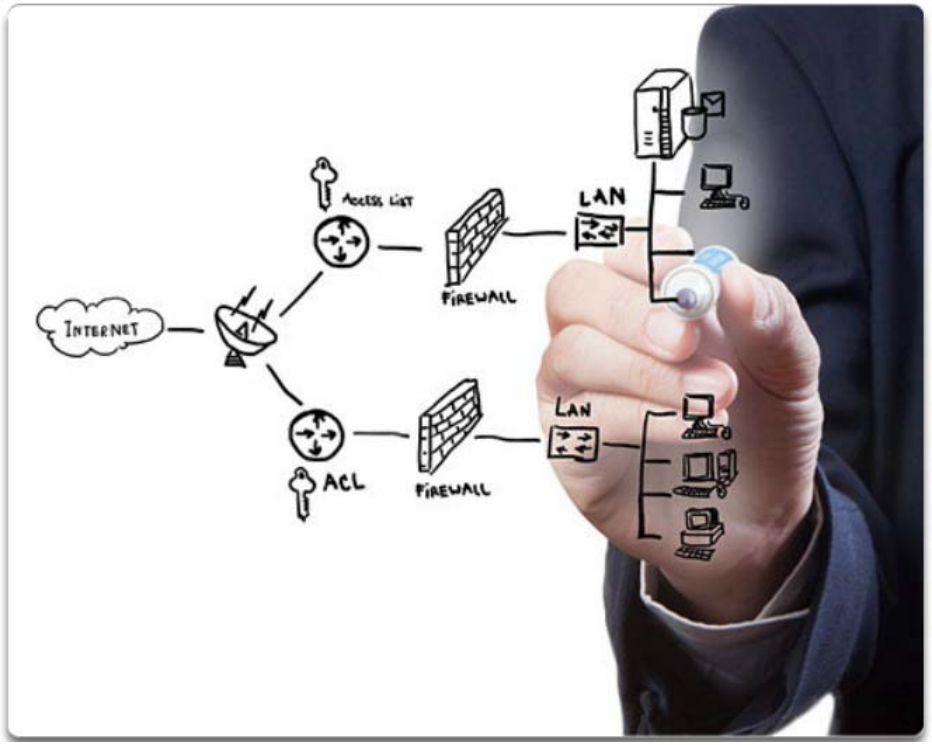
Security Solutions

Minimum solutions:

- Antivirus and antispyware
- Firewall filtering

Additional solutions:

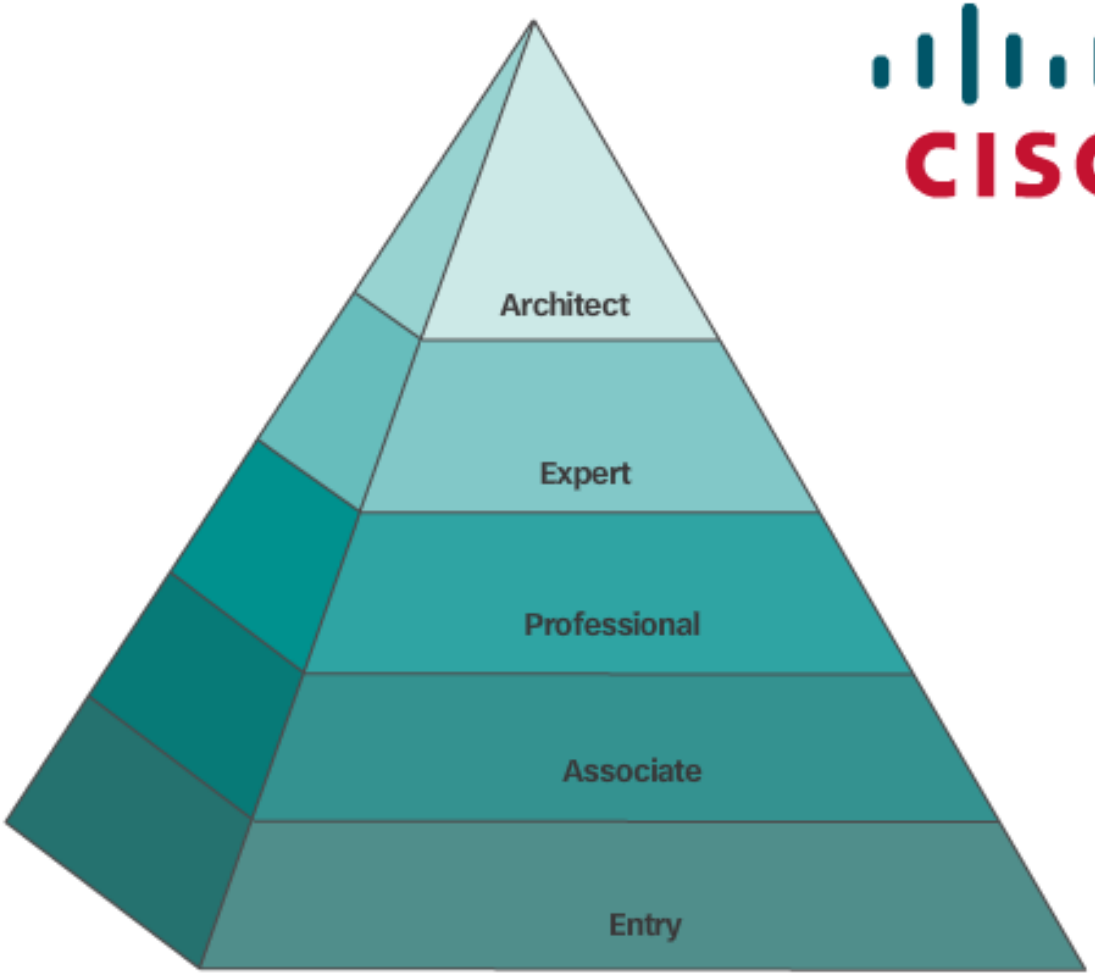
- Dedicated firewall systems
- Access control lists (ACL)
- Intrusion prevention systems (IPS)
- Virtual Private Networks (VPNs)



Network Security

Defense in depth

CCNA



To view the video, Warriors of the Net, go to:
http://www.warriorsofthe.net

- Saturday morning lab tutor

  How much? FREE!

  Where? T113 (the lab)

  9AM to 12PM (Tentative)

  Should start on the 17th
  (Watch for BB announcement)