



# Chapter 1: Exploring the Network



## Introduction to Networks

Cisco | Networking Academy®  
Mind Wide Open™



## Networking Today

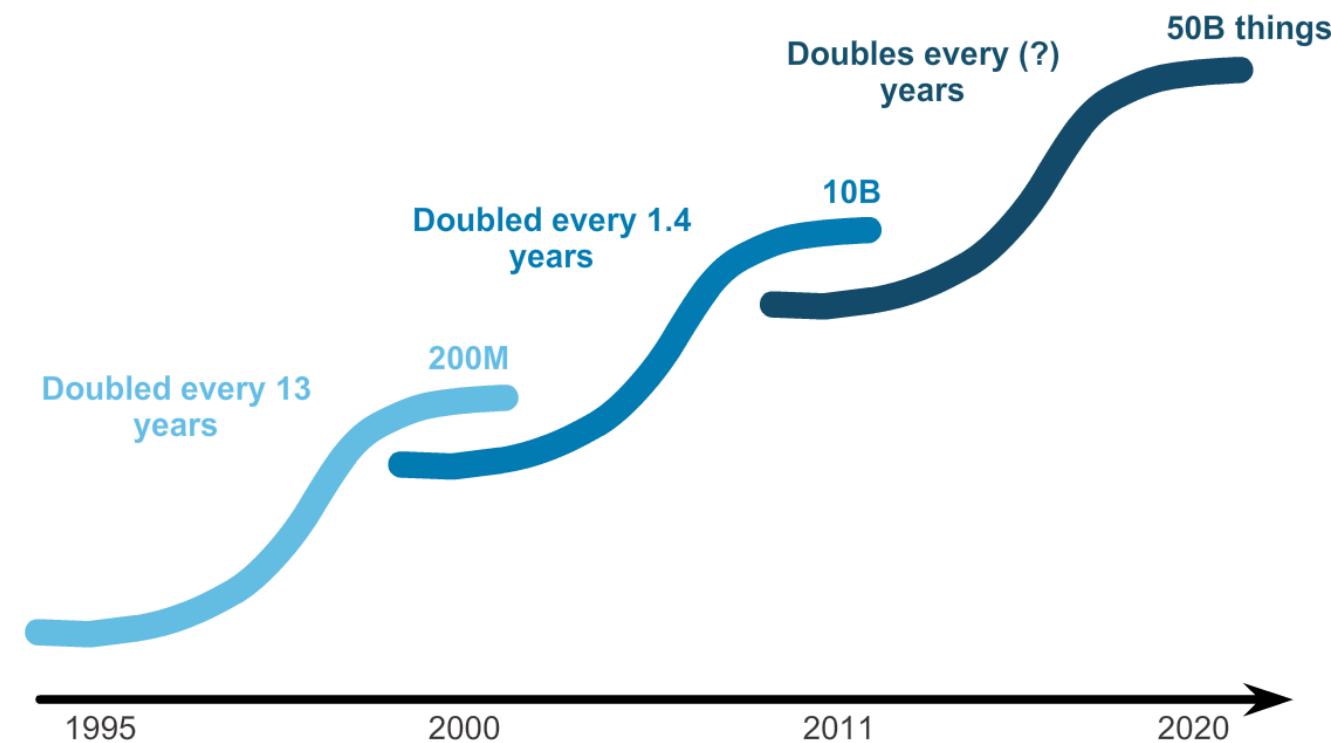
# Networks in Our Past and Daily Lives

**"Fixed"** Computing  
(You go to the device)

**Mobility/BYOD**  
(The device goes with you)

**Internet of Things**  
(Age of Devices)

**Internet of Everything**  
(People, Process, Data, Things)





# Providing Resources in a Network

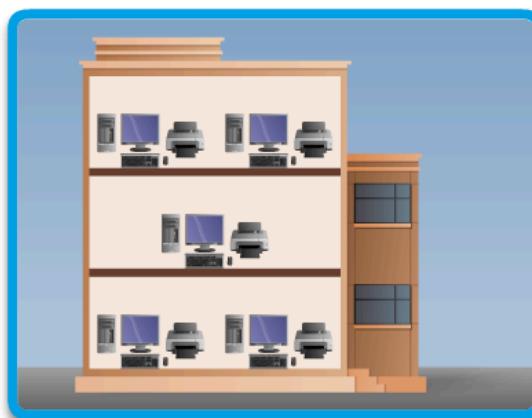
## Networks of Many Sizes



Small Home Networks



Small Office/Home Office Networks



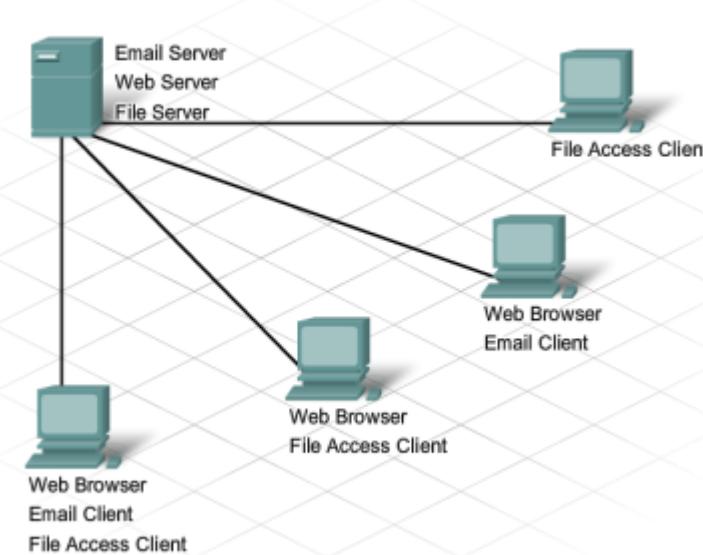
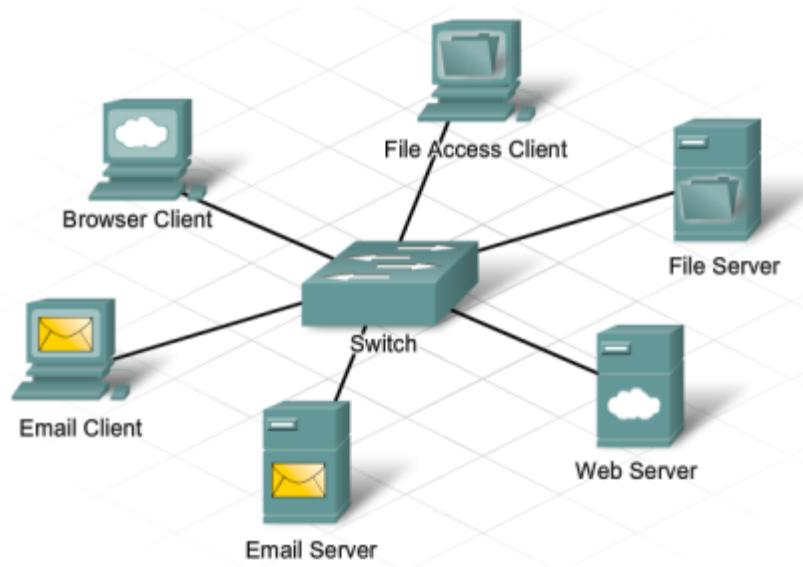
Medium to Large Networks



World Wide Networks



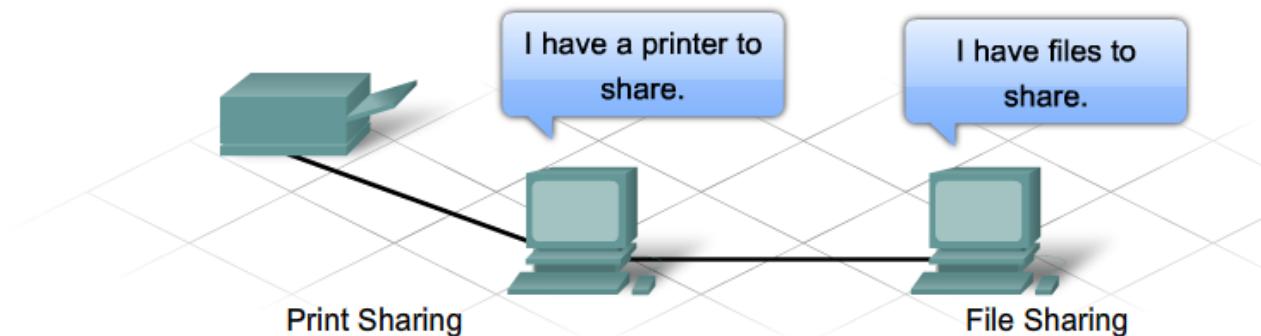
# Providing Resources in a Network Clients and Servers





# Providing Resources in a Network

## 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

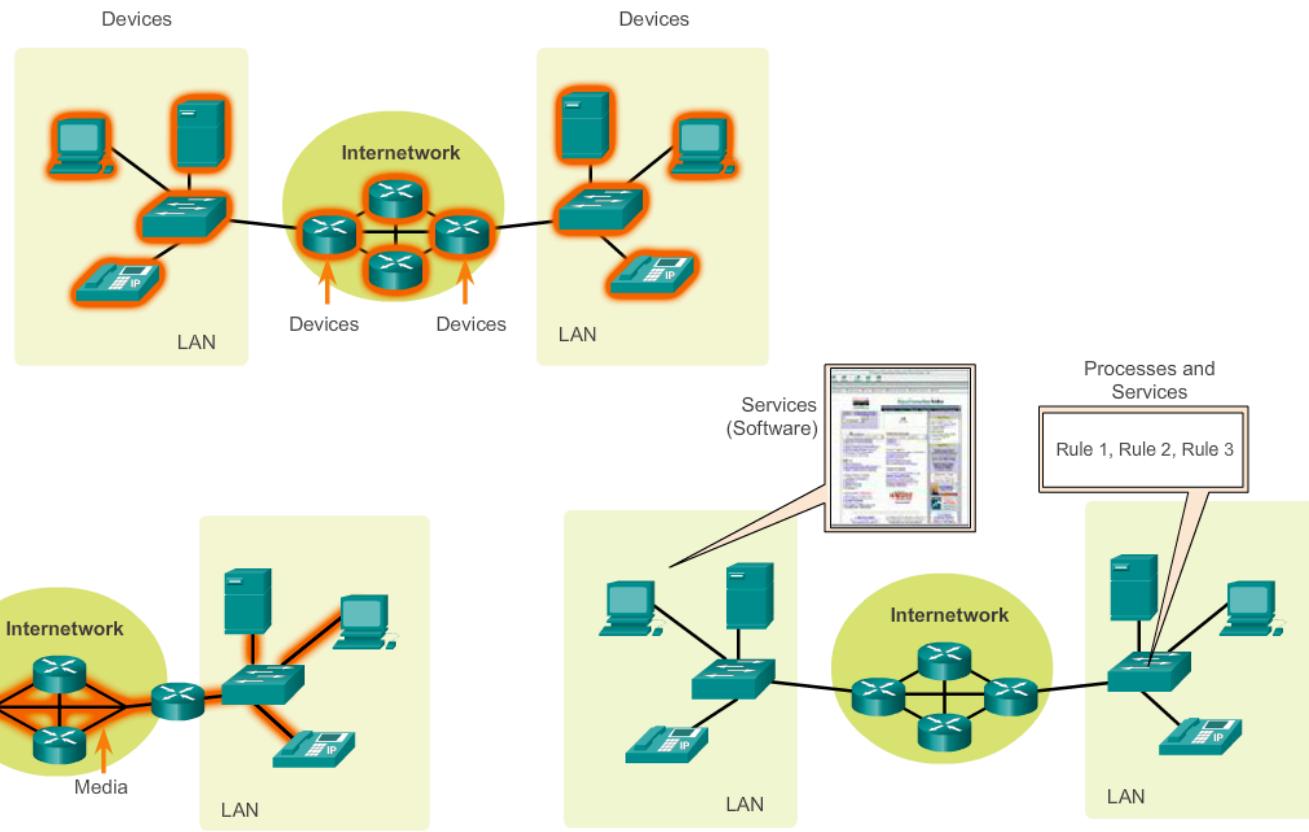


# LANs, WANs, and Internets

# Components of a Network

There are three categories of network components:

- Devices
- Media
- Services

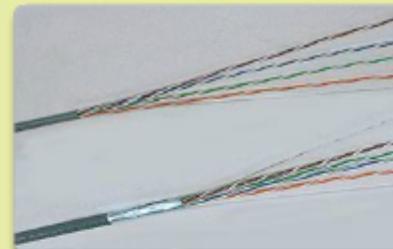




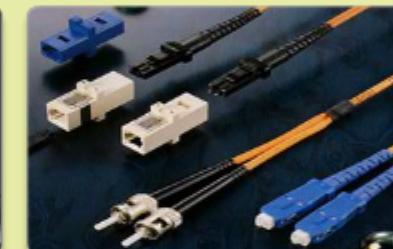
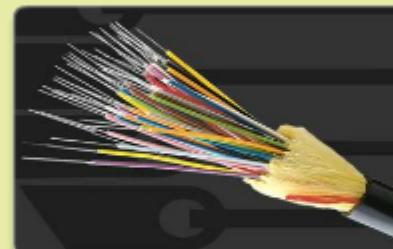
# Components of a Network

## Network Media

Copper



Fiber Optic



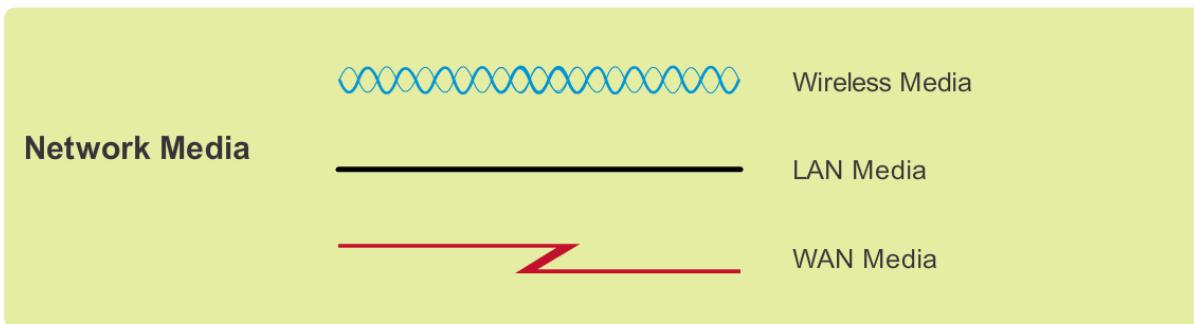
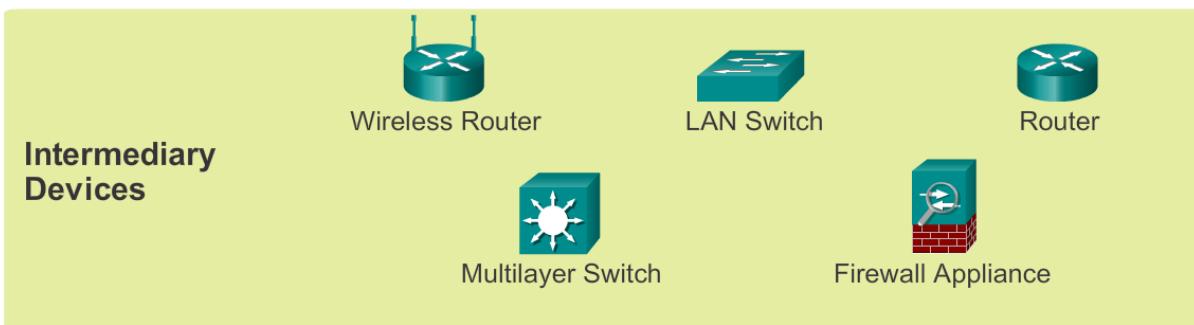
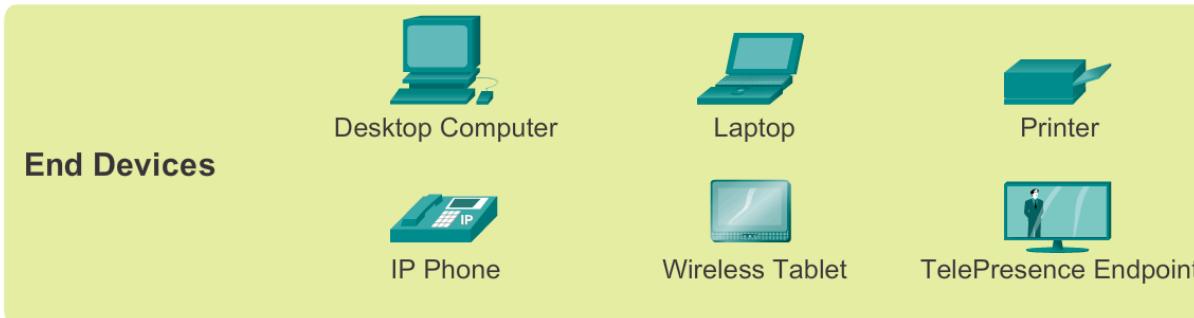
Wireless





# Components of a Network

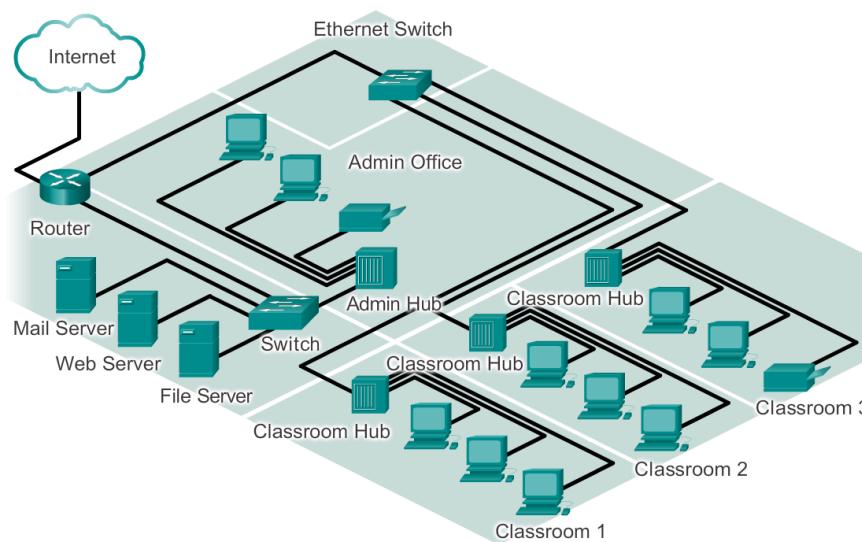
# Network Representations



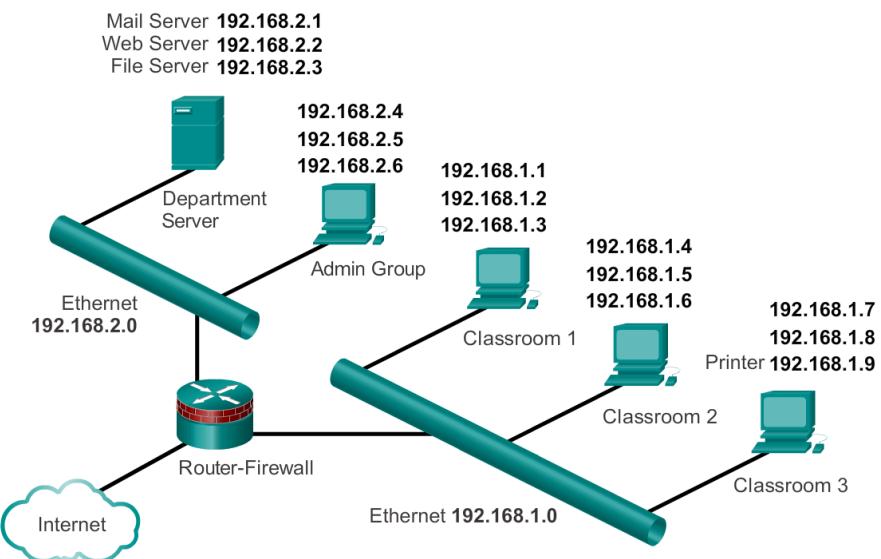


# Components of a Network Topology Diagrams

Physical Topology



Logical Topology





## LANs and WANs

# Types of Networks

The two most common types of network infrastructures are:

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

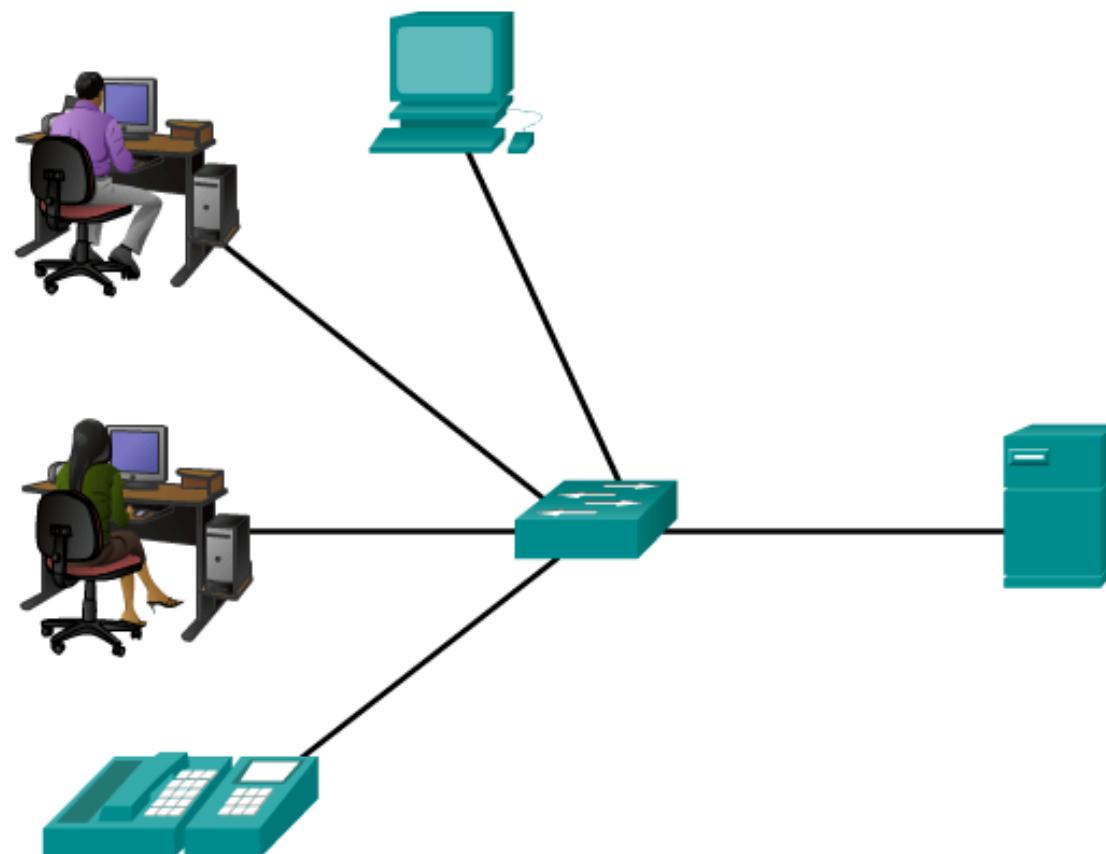
Other types of networks include:

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



## LANs and WANs

# Local Area Networks (LAN)



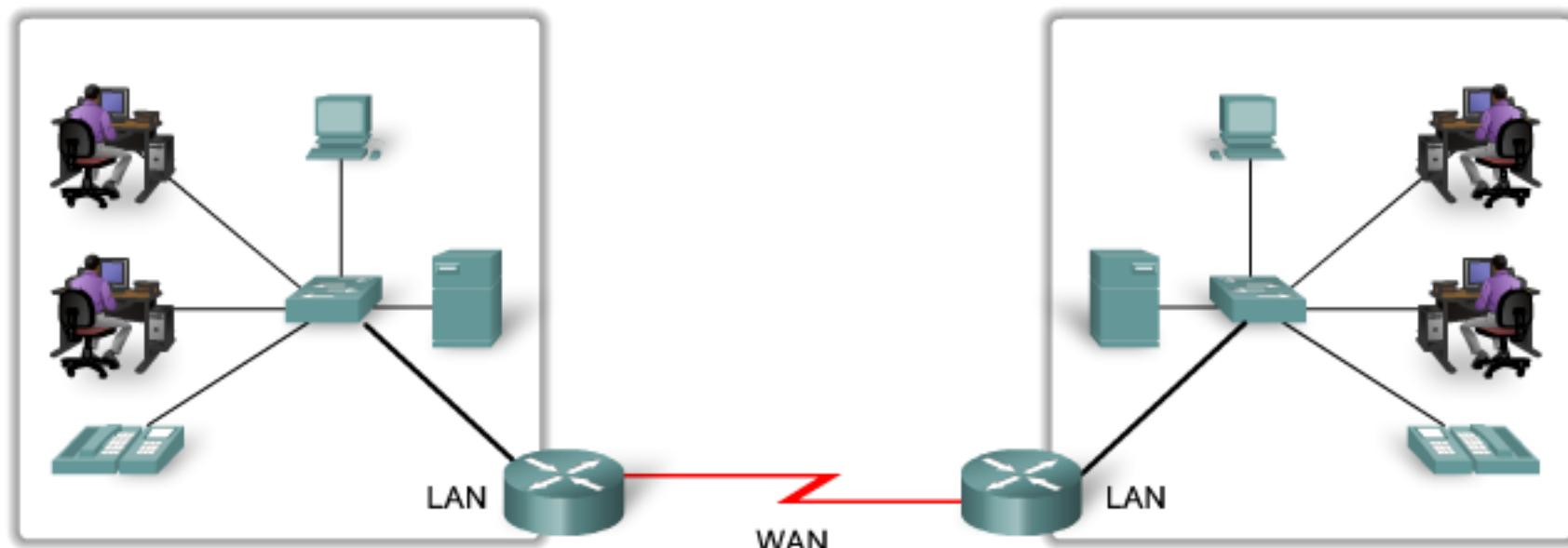
A network serving a home, building, or campus is considered a LAN.



## LANs and WANs

# Wide Area Networks (WAN)

LANs separated by geographic distance are connected by a network known as a Wide Area Network (WAN).

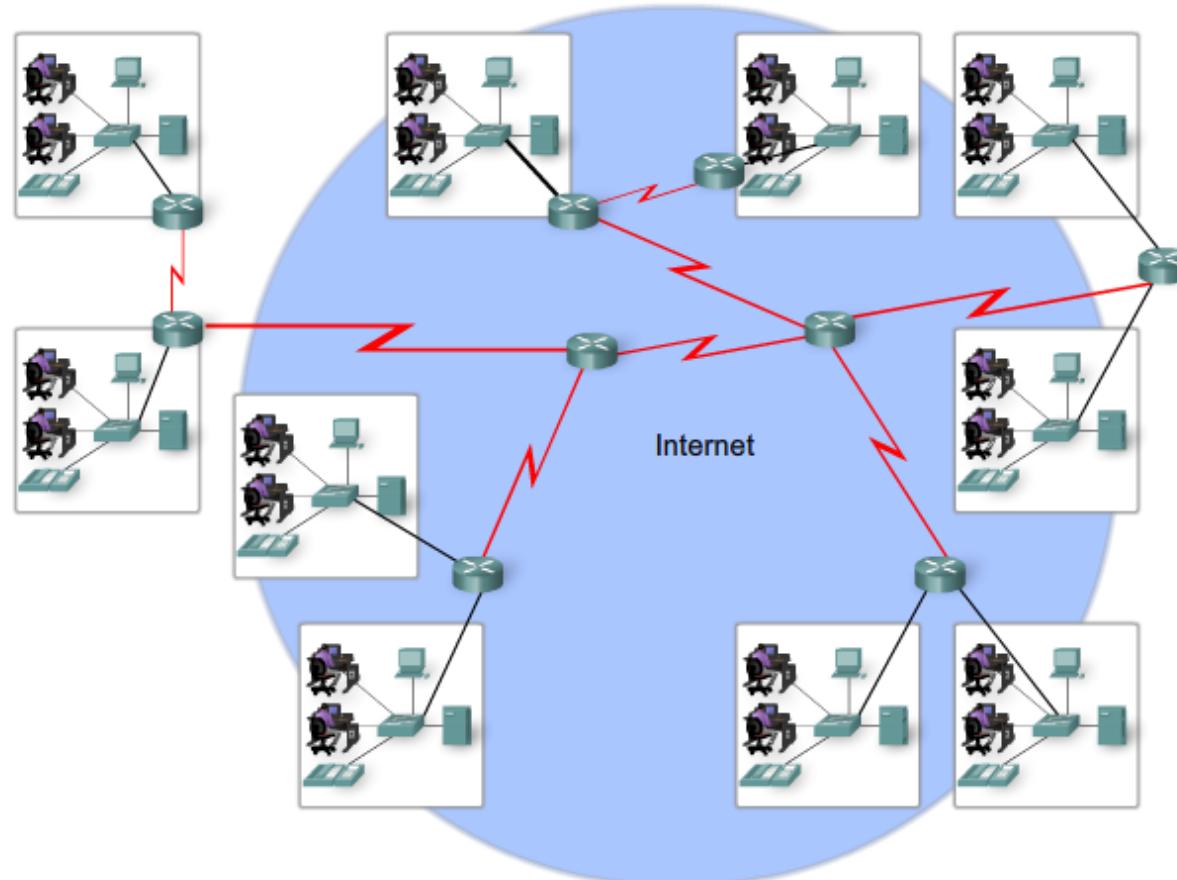




# LANs, WANs, and the Internet

## The Internet

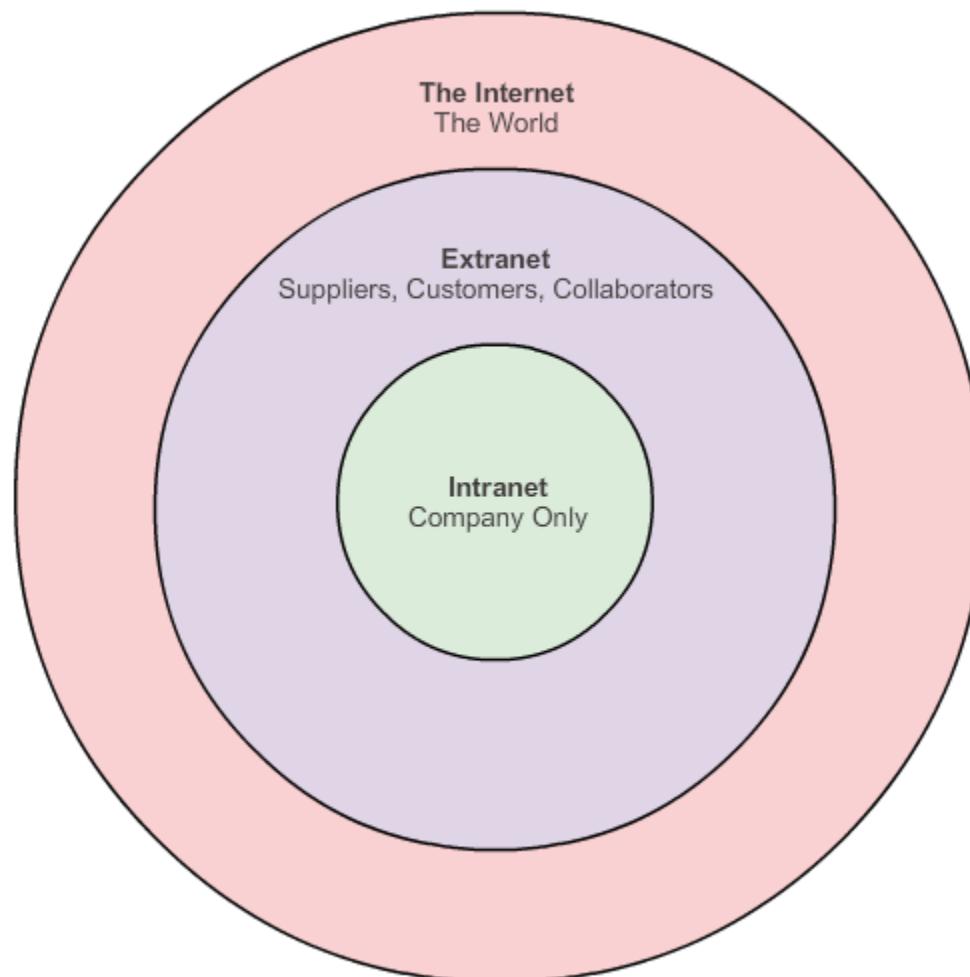
LANs and WANs may be connected into internetworks.





LANs, WANs, and the Internet

# Intranet and Extranet

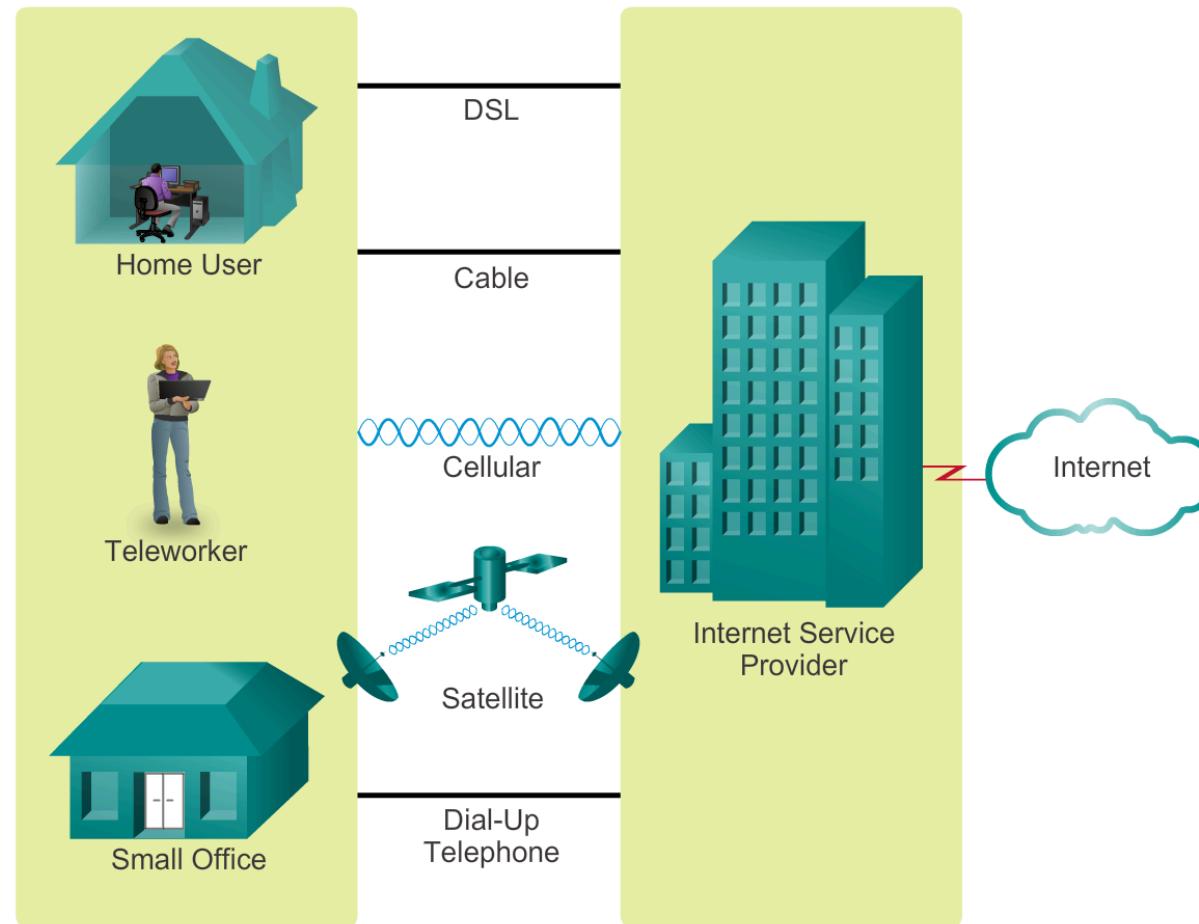




## Connecting to the Internet

# Connecting Remote Users to the Internet

### Connection Options

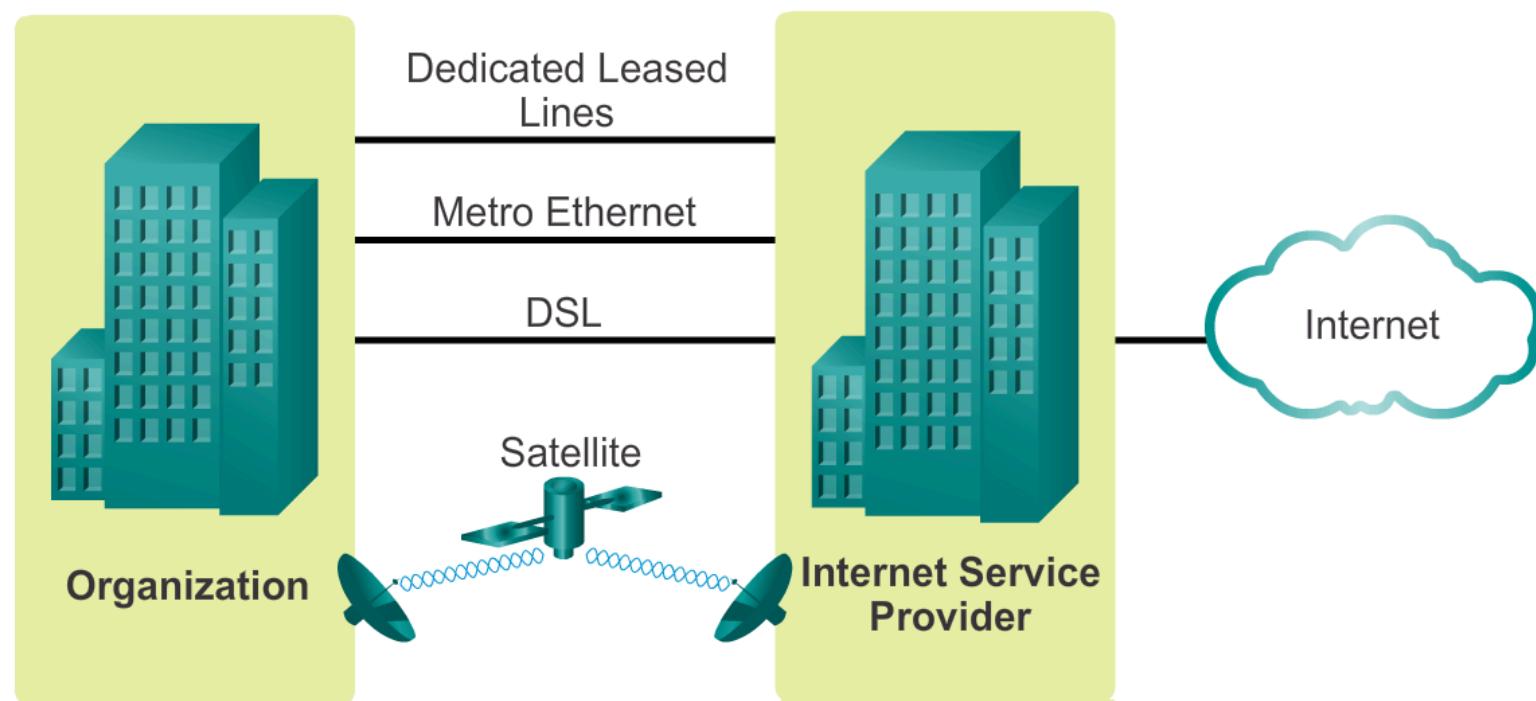




Connecting to the Internet

# Connecting Businesses to the Internet

## Connection Options





## Reliable Network

# Supporting Network Architecture

As networks evolve, we are discovering that there are four basic characteristics that the underlying architectures need to address in order to meet user expectations:

- Fault Tolerance
- Scalability
- Quality of Service (QoS)
- Security



# Network Trends

## New trends

Some of the top trends include:

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



## Network Trends

# Bring Your Own Device (BYOD)



The concept of any device, to any content, in anyway is a major global trend that requires significant changes to the way devices are used. This trend is known as Bring Your Own Device (BYOD).



# Network Trends

# Online Collaboration

## Collaboration



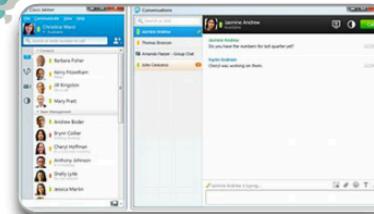
IP Communication



Mobile Applications



Telepresence



Messaging



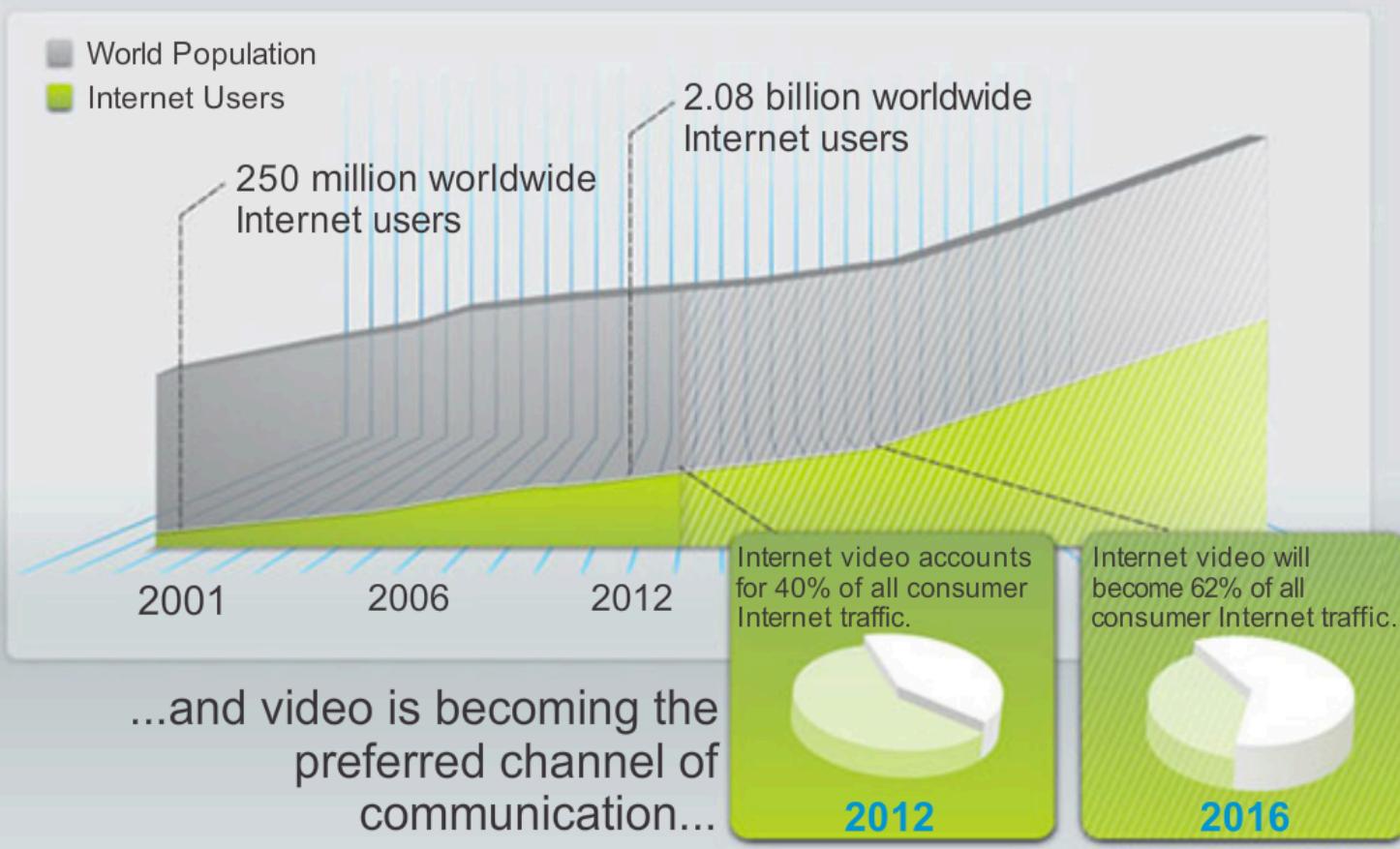
Online Conferencing



## Network Trends

# Video Communication

People are becoming more connected...



...and video is becoming the preferred channel of communication...

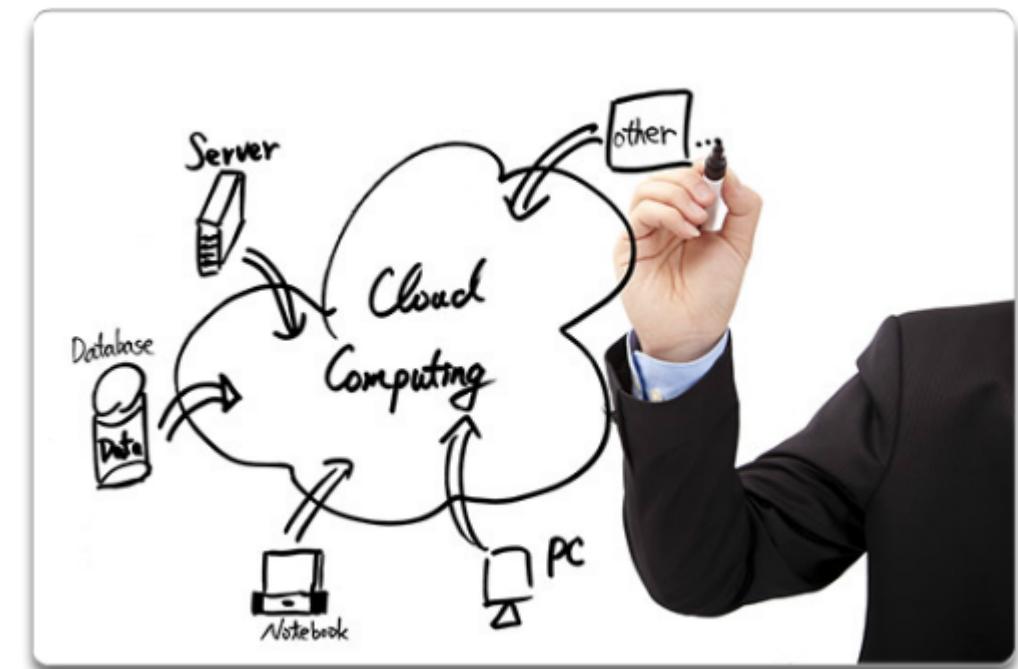


## Network Trends

# Cloud Computing

Cloud computing offers the following potential benefits:

- Organizational flexibility
- Agility and rapid deployment
- Reduced cost of infrastructure
- Refocus of IT resources
- Creation of new business models





## Network Trends

# Data Centers

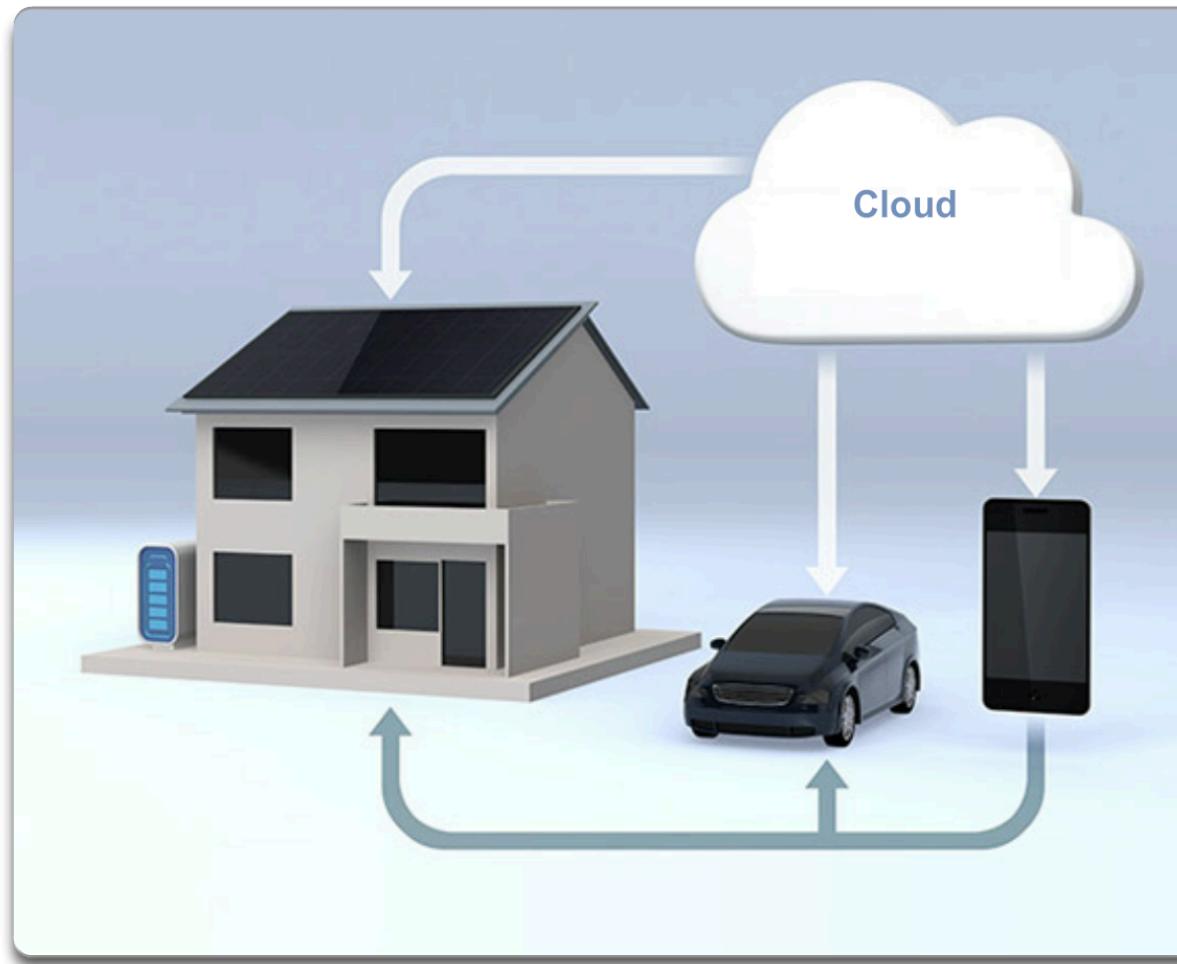
A data center is a facility used to house computer systems and associated components including:

- Redundant data communications connections
- High-speed virtual servers (sometimes referred to as server farms or server clusters)
- Redundant storage systems (typically uses SAN technology)
- Redundant or backup power supplies
- Environmental controls (e.g., air conditioning, fire suppression)
- Security devices

# Networking Technologies for the Home

# Technology Trends in the Home

## Smart Home Technology

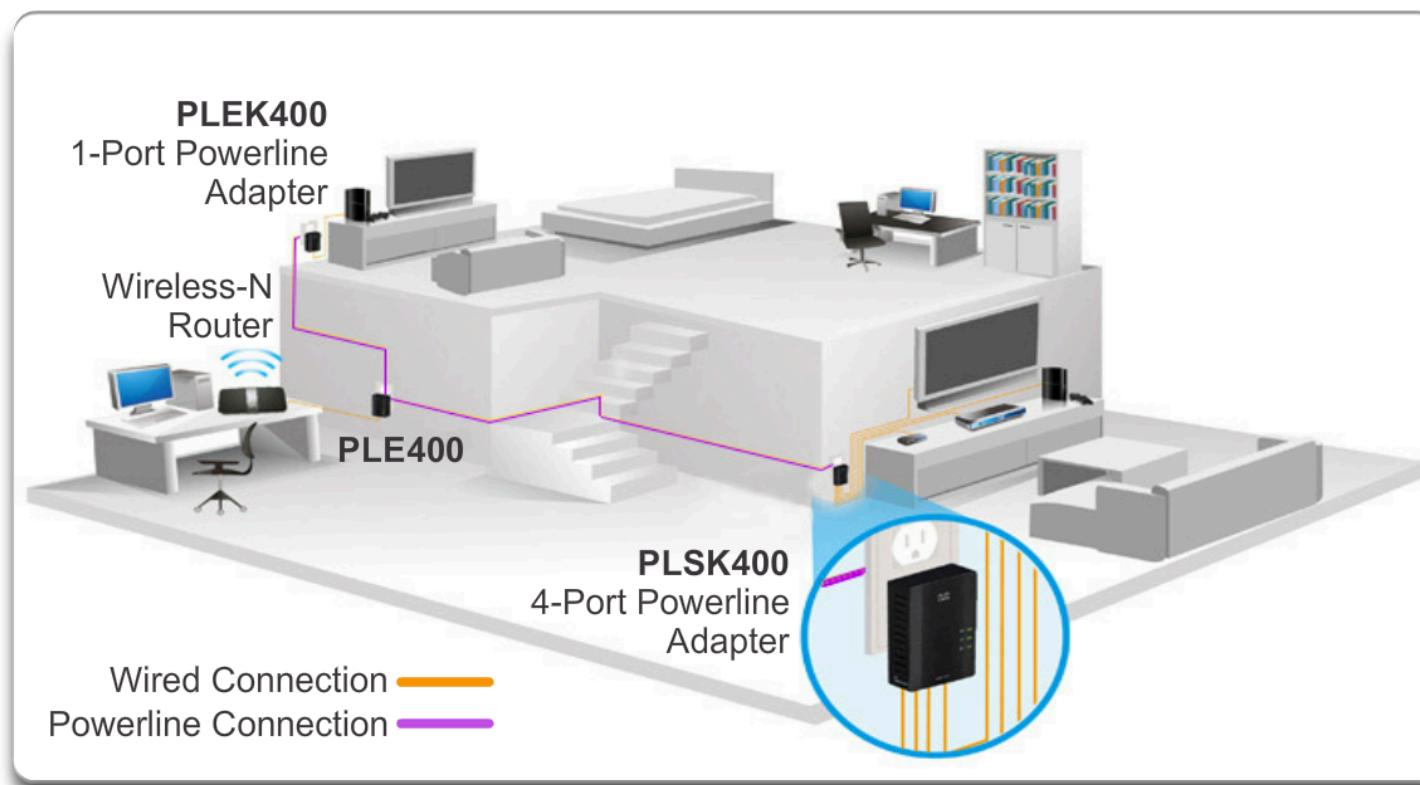




# Networking Technologies for the Home

## Powerline Networking

### Powerline Networking





# Networking Technologies for the Home

# Wireless Broadband

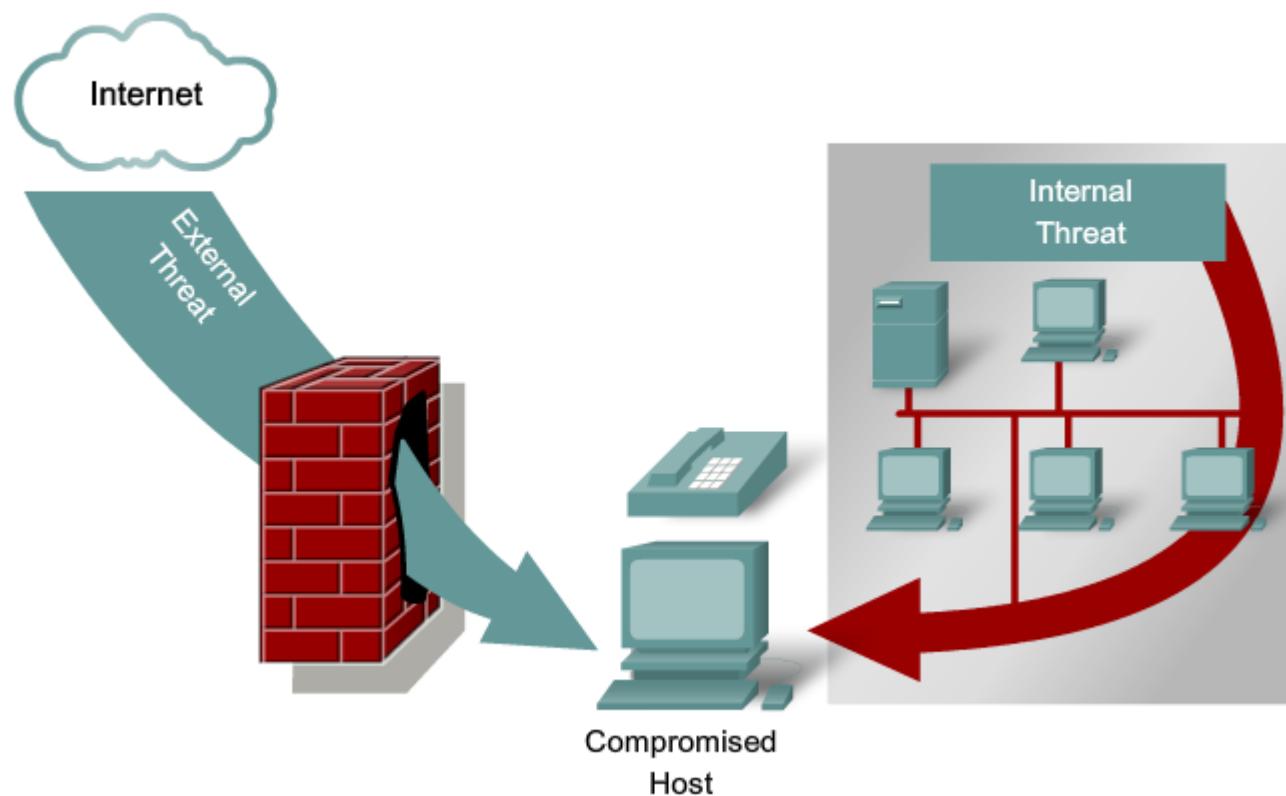
## Wireless Broadband Service





# Future of Networking Network Security

## Threats to Networks





# Network Security

# 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 (DoS) attacks
- Data interception and theft
- Identity theft



# Network Security Security Solutions

Network security components often include:

- Antivirus and antispyware
- Firewall filtering
- Dedicated firewall systems
- Access control lists (ACL)
- Intrusion prevention systems (IPS)
- Virtual Private Networks (VPNs)



Network Architectures

# Cisco Certified Network Associate (CCNA)



