



# Living in a Network Centric World



## Network Fundamentals – Chapter 1

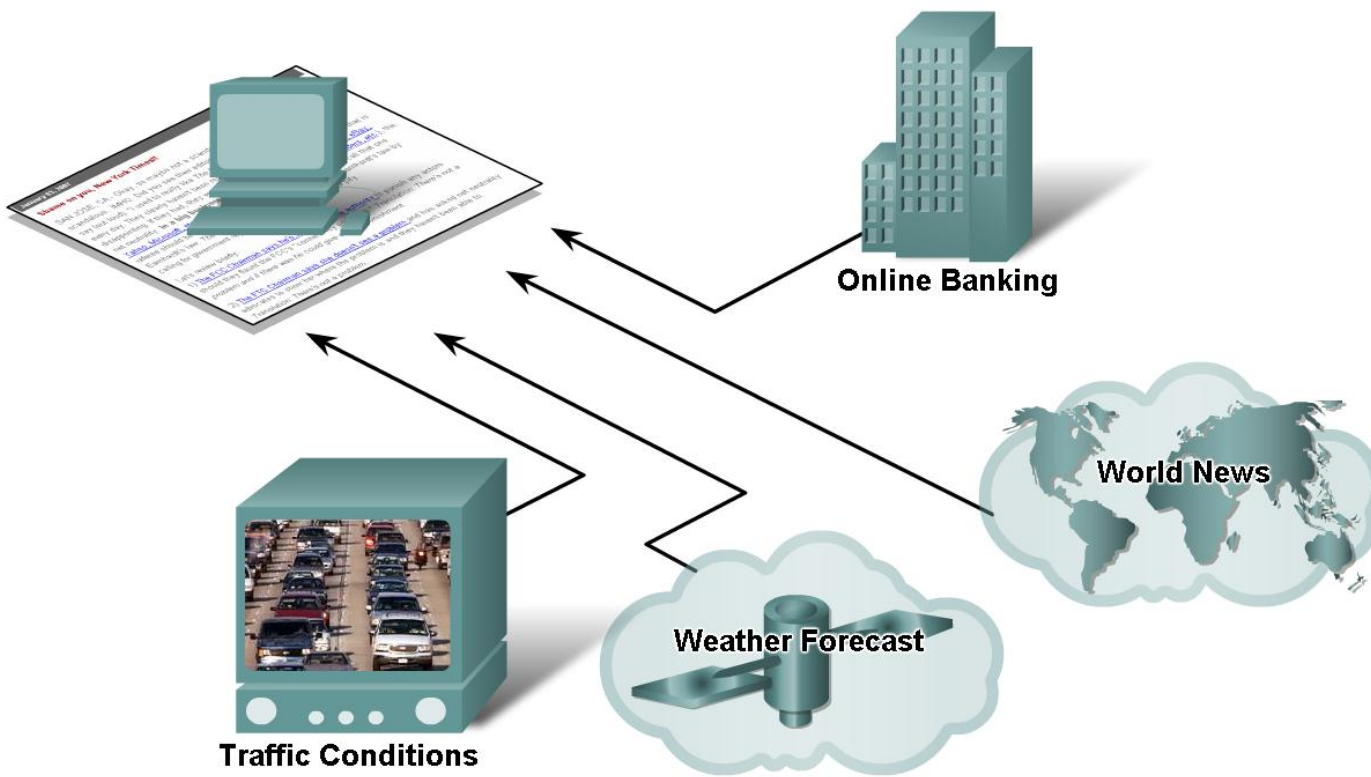
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Mind Wide Open™

# Objectives

- Describe how networks impact our daily lives.
- Describe the role of data networking in the human network.
- Identify the key components of any data network.
- Identify the opportunities and challenges posed by converged networks.
- Describe the characteristics of network architectures: fault tolerance, scalability, quality of service and security.
- Install and use IRC clients and a Wiki server.

# How Networks Impact Daily Life

- Explain the benefits of instantaneous communication and how it supports and improves our lives.



# How Networks Impact Daily Life

- Describe the characteristics and purpose of popular communication media such as, IM, Wikis , Blogs, Podcasting, and Collaboration Tools

## —Instant messaging

- Real time communication between 2 or more people based on typed text

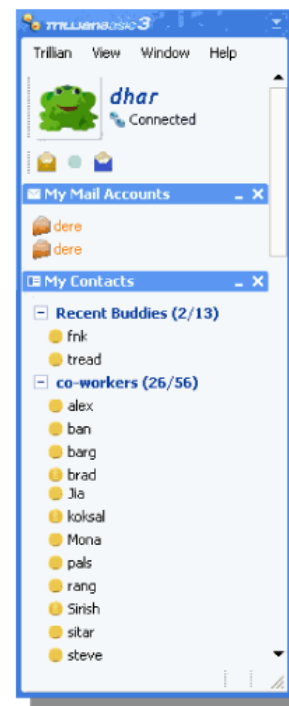
## —Weblogs (Blogs)

- Web pages created by an individual

## —Podcasting

- Website that contains audio files available for downloading

### Instant Messaging



### Weblog

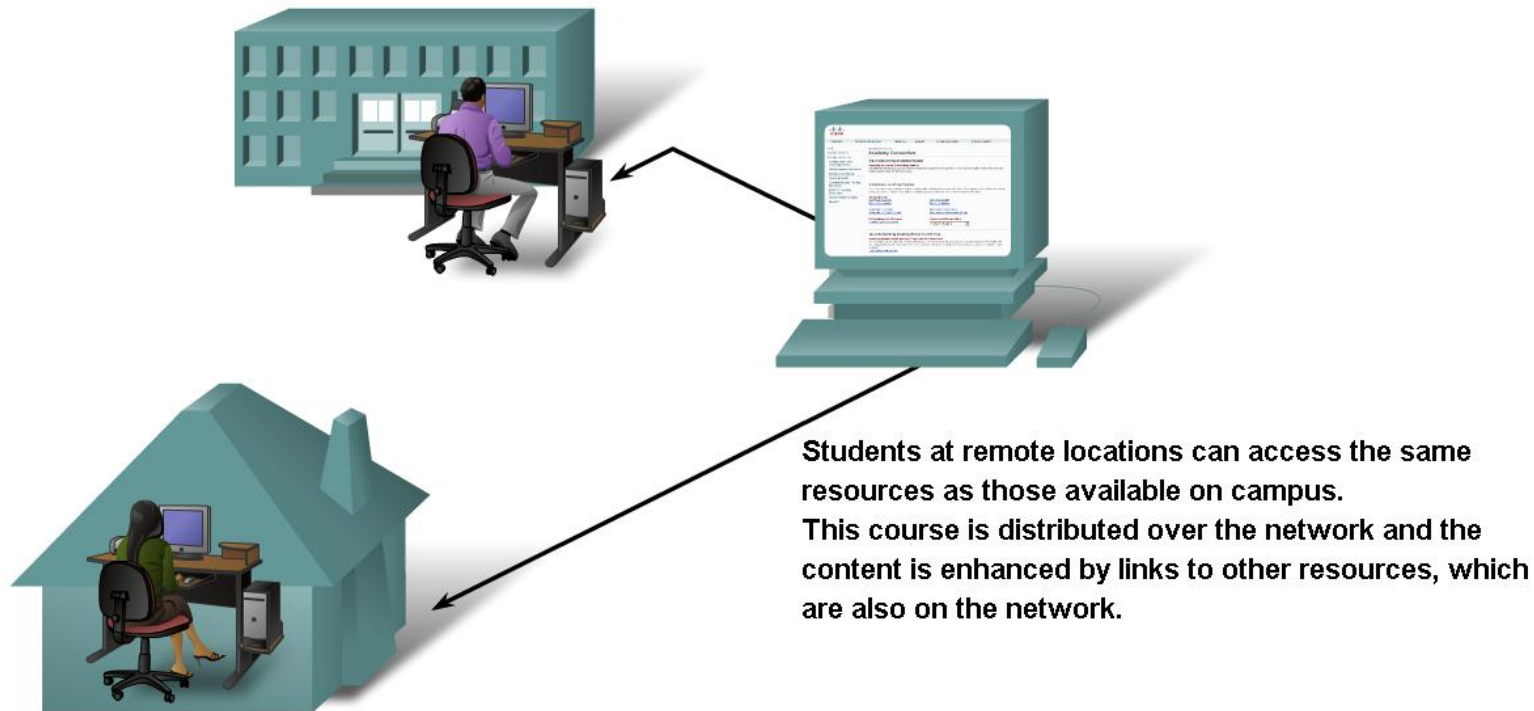


### Podcasting



# How Networks Impact Daily Life

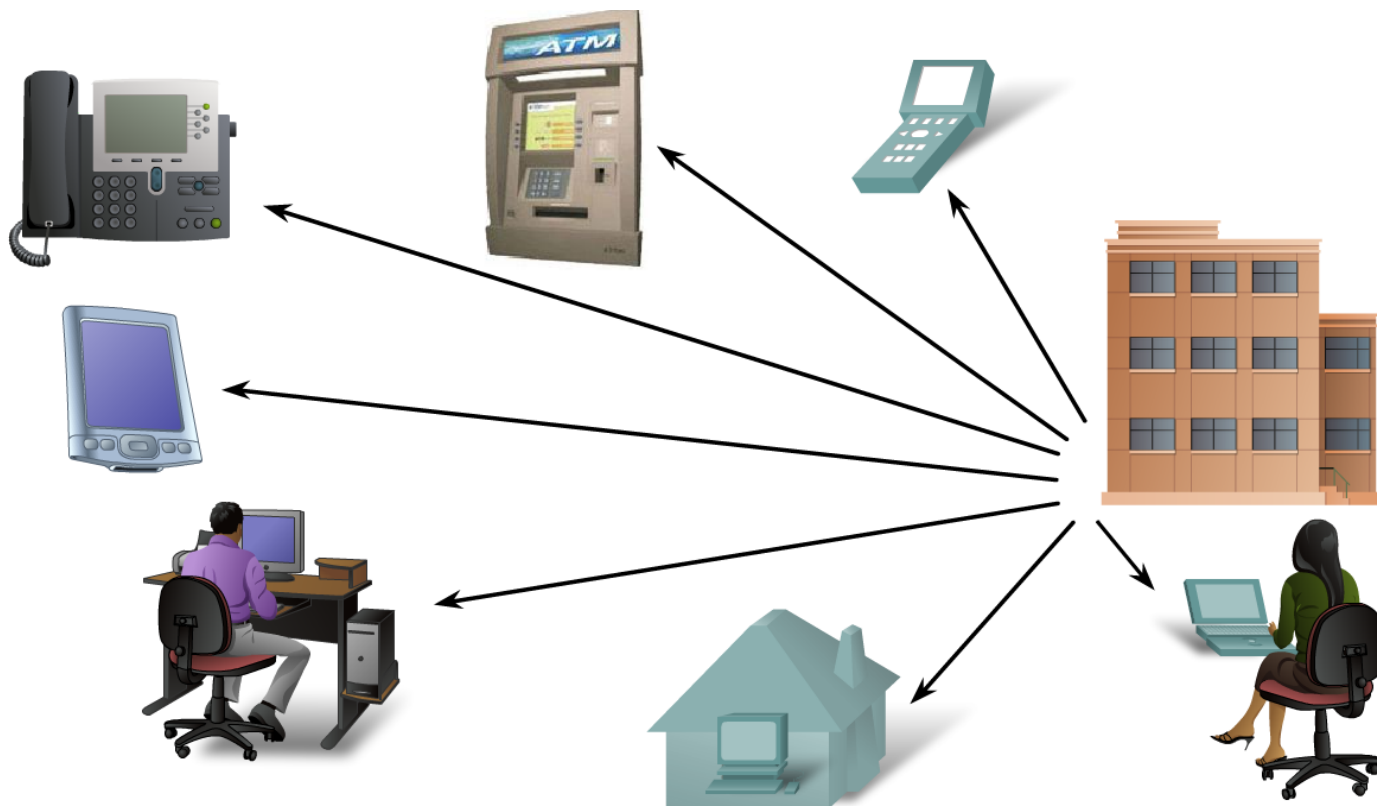
- Explain ways that using information networks to share and collaborate improves teaching and learning





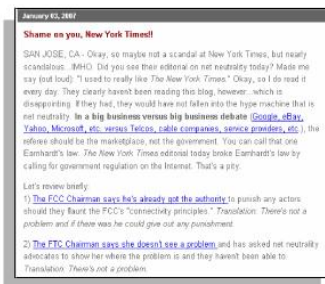
# How Networks Impact Daily Life

- Describe ways communication over a network changes the way we work



# How Networks Impact Daily Life

- Describe ways communication over a network supports the way we play



**Online Interest Groups**



**Online Travel**



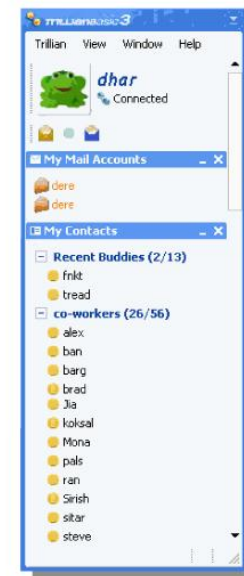
**Online Games**



**Online Entertainment**



The onboard data network provides a range of services to airline personal seatback video systems.



**Instant Messaging**

# Data Networking Role, Components, and Challenges

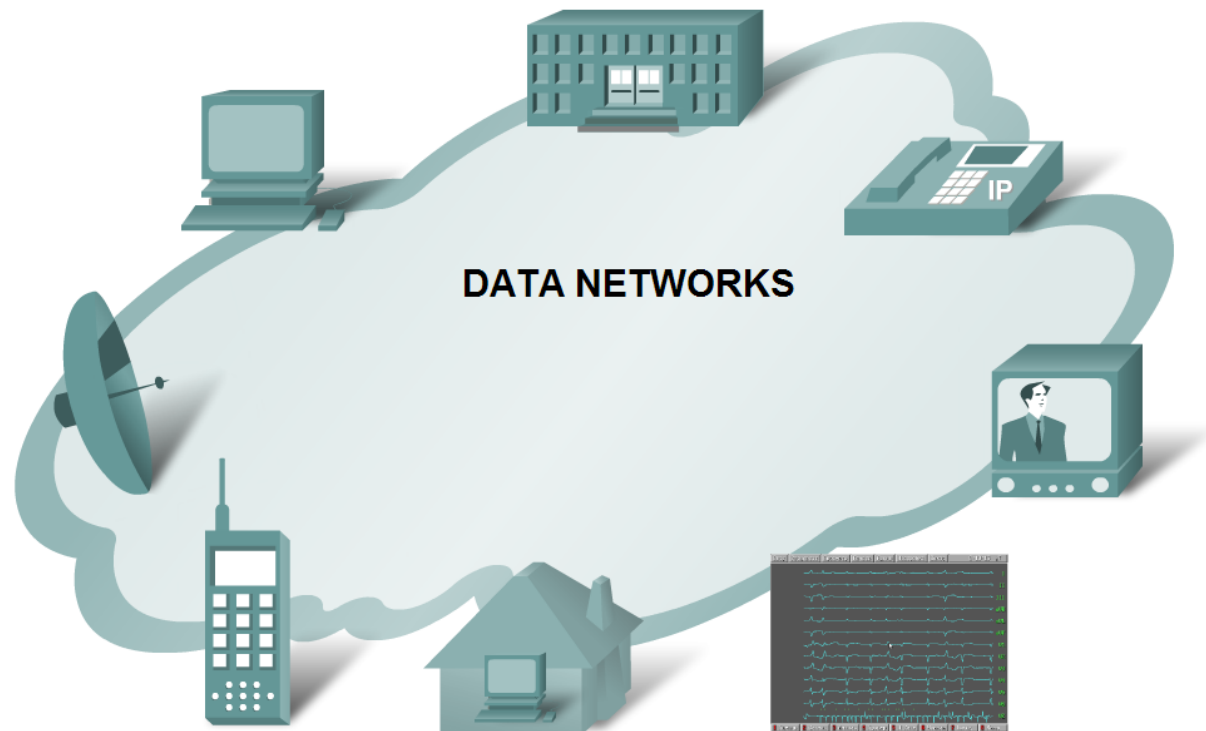
- Basic characteristics of communication
  - Rules or agreements are 1<sup>st</sup> established
  - Important information may need to be repeated
  - Various modes of communication may impact the effectiveness of getting the message across.





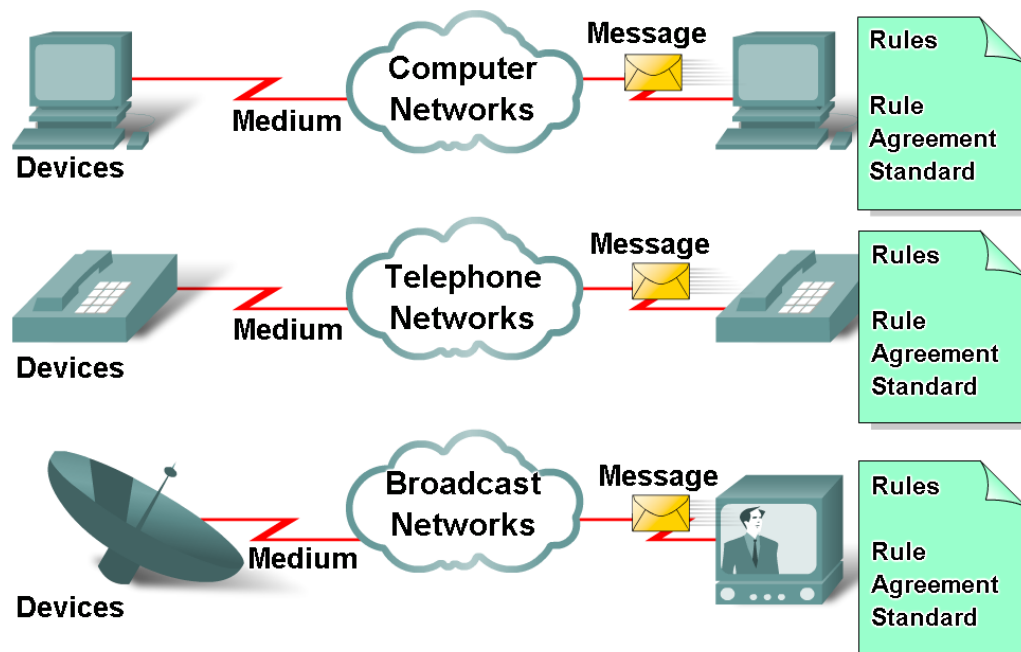
# Data Networking Role, Components, and Challenges

- Describe the role of data networking in communications



# Data Networking Role, Components, and Challenges

- Describe the various elements that make up a network
  - Devices
    - These are used to communicate with one another
  - Medium
    - This is how the devices are connected together
  - Messages
    - Information that travels over the medium
  - Rules
    - Governs how messages flow across network



# Data Networking Role, Components, and Challenges

- Describe the role of converged networks in communications
  - Converged network
    - A type of network that can carry voice, video & data over the same network



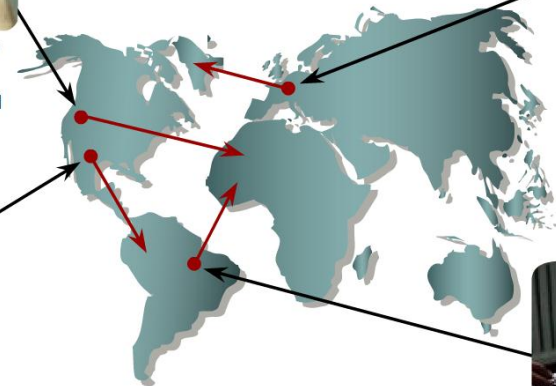
Intelligent Networks allow handheld devices to receive news, Emails, and to send text.



Video conferencing around the globe is in the palm of your hand.



Phones connect globally to share voice, text and images.



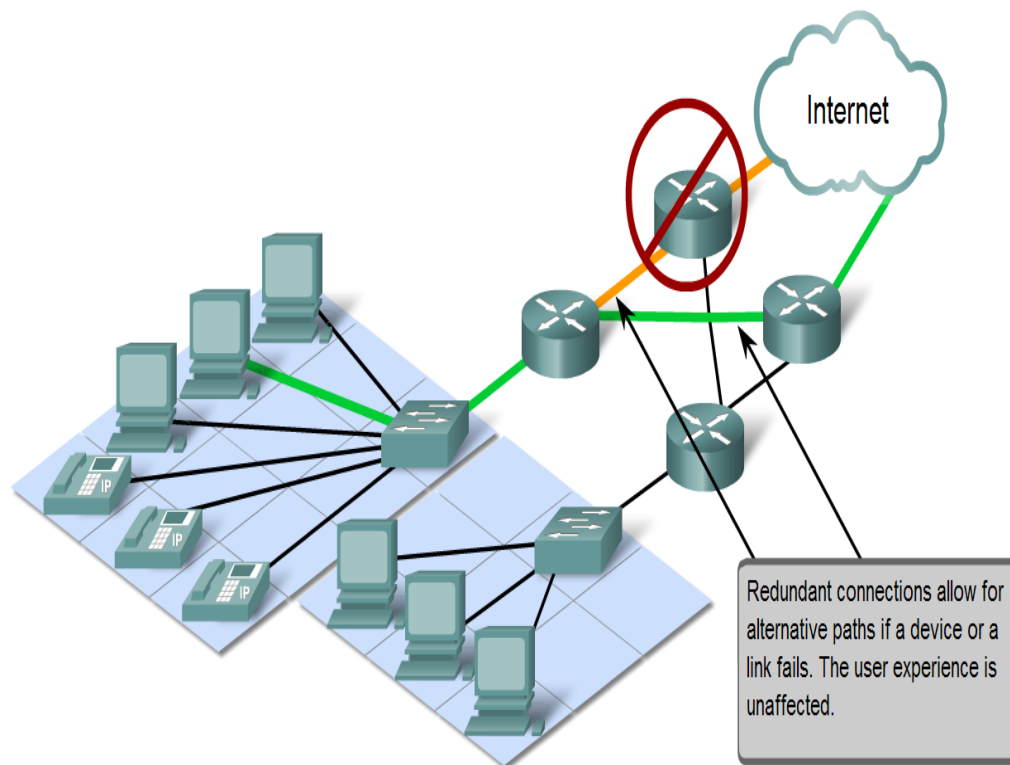
The Human Network is everywhere.



Online gaming connects thousands of people seamlessly.

# Network Architecture Characteristics

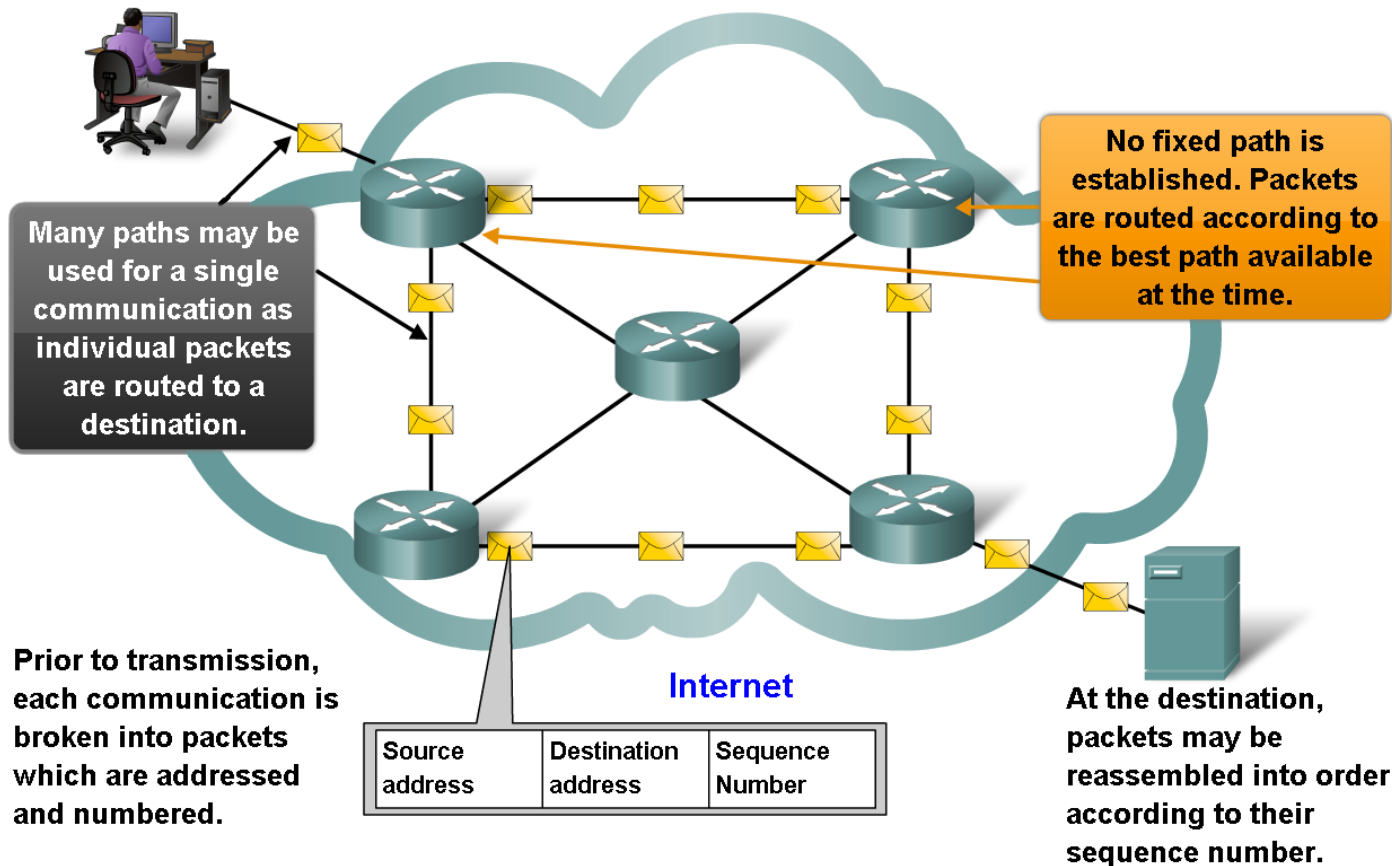
- Explain four characteristics that are addressed by network architecture design
  - Fault tolerance
  - Scalability
  - Quality of service
  - Security



# Network Architecture Characteristics

- Describe how packet switching helps improve the resiliency and fault tolerance of the Internet architecture

Packet Switching in a Data Network

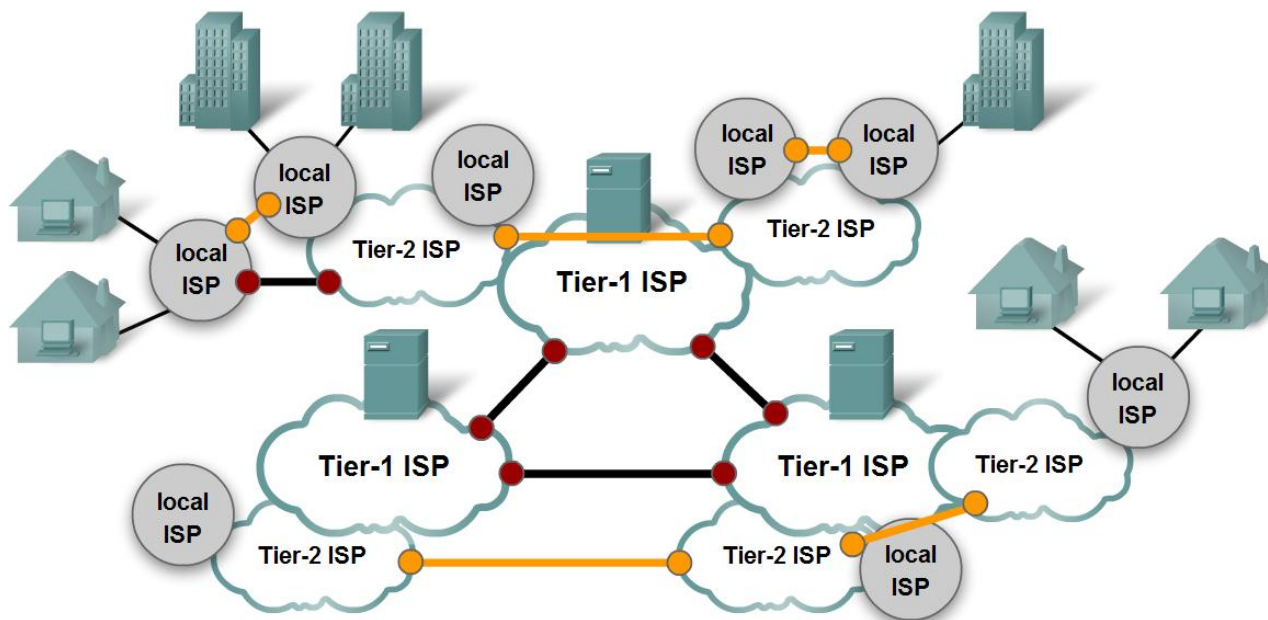




# Network Architecture Characteristics

- Describe characteristics of the Internet that help it scale to meet user demand
  - Hierarchical
  - Common standards
  - Common protocols

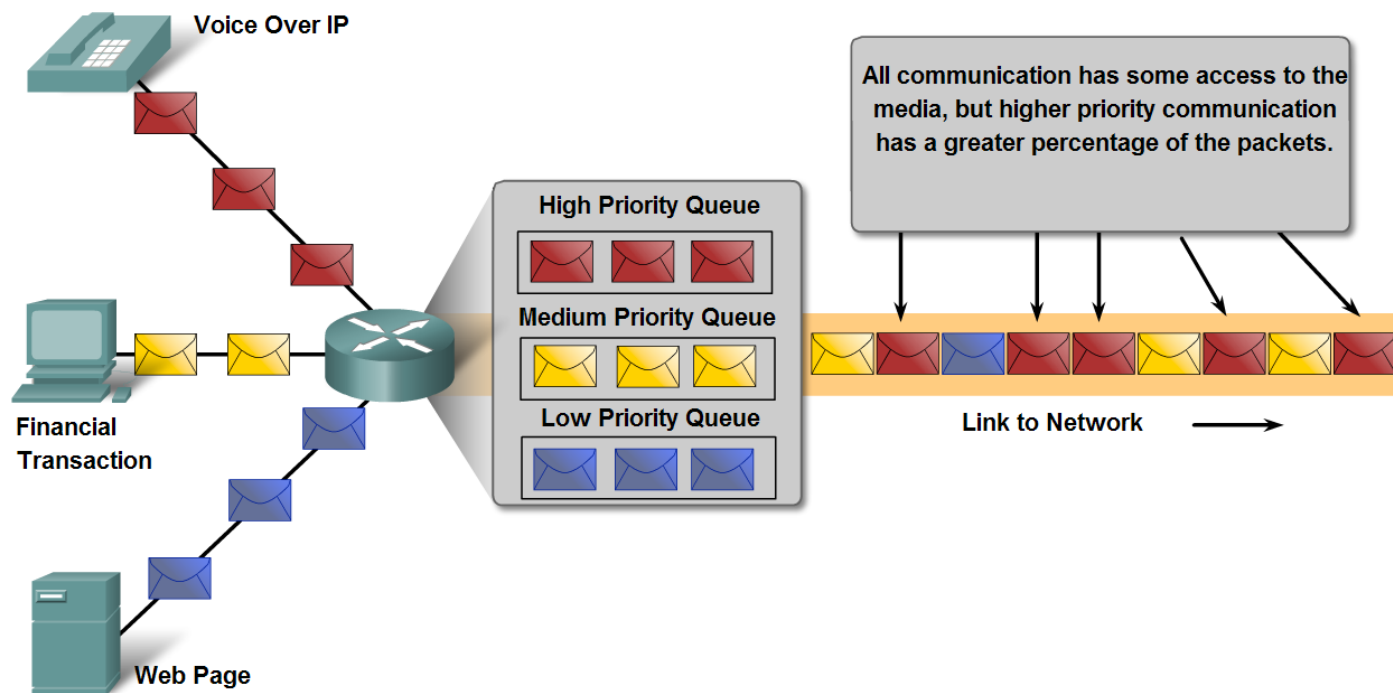
## Internet Structure - A Network of Networks



# Network Architecture Characteristics

- Explain the factors that necessitate Quality of Service and the mechanisms necessary to ensure it

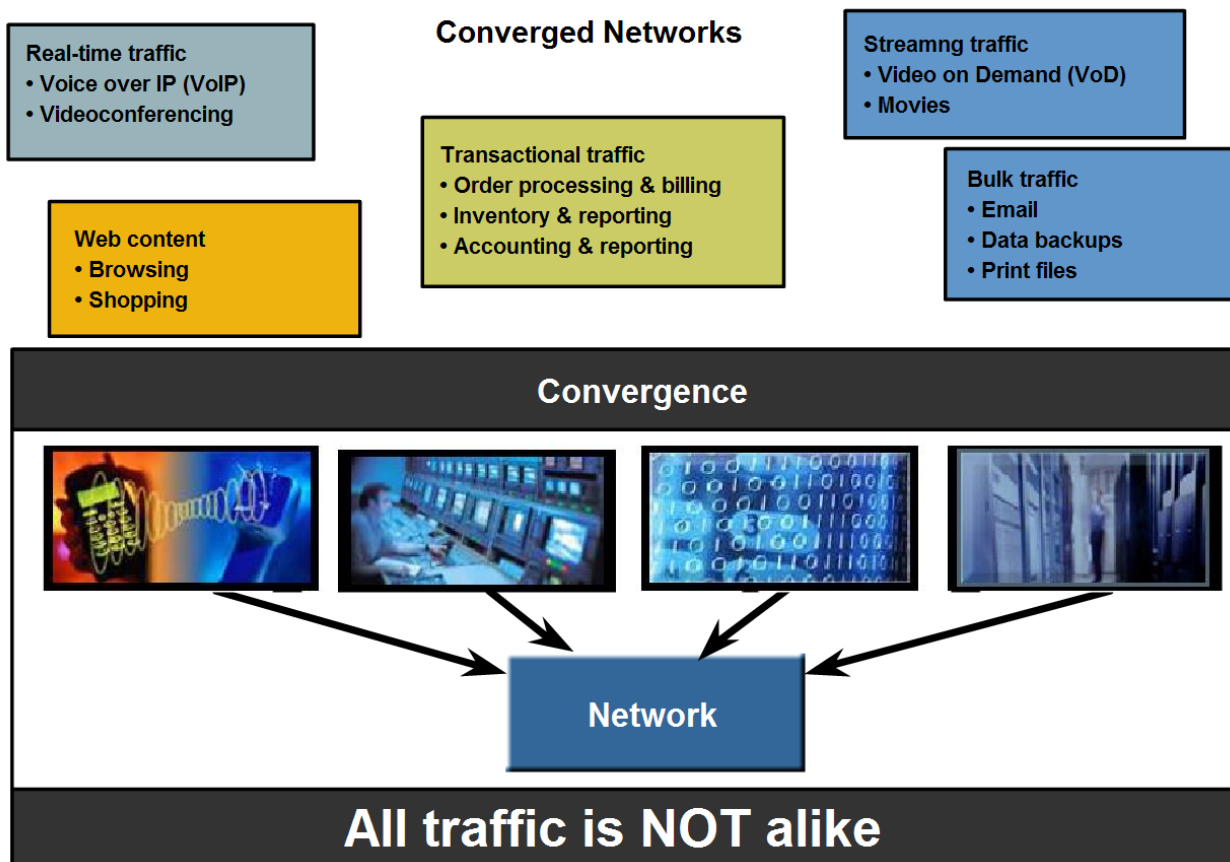
## Using Queues to Prioritize Communication



Queuing according to data type enables voice data to have priority over transaction data, which has priority over web data.

# Network Architecture Characteristics



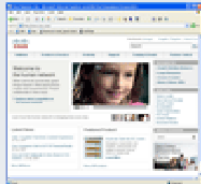
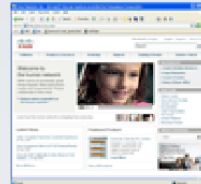
- Describe how QoS mechanisms work to ensure quality of service for applications that require it.



# Network Architecture Characteristics

- Describe how to select the appropriate QoS strategy for a given type of traffic


## Quality of Service Matters

Communication Type	Without QoS	With QoS
Streaming video or audio	 <p>Choppy picture starts and stops.</p>	 <p>Clear, continuous service.</p>
Vital Transactions	<p>Time : Price</p> <p>02:14:05 \$1.54</p> <p>Just one second earlier...</p>	<p>Time : Price</p> <p>02:14:04 \$1.52</p> <p>The price may be better.</p>
Downloading web pages (often lower priority)	 <p>Web pages arrive a bit later...</p>	 <p>But the end result is identical.</p>

# Network Architecture Characteristics

- Describe why networks must be secure

## Unauthorized Transactions



SEND PAYMENT TO  
Box 1234  
Anytown, USA

CREDIT CARD STATEMENT

ACCOUNT NUMBER	NAME	STATEMENT DATE	PAYMENT DUE DATE
4125-239-412	John Doe	2/13/01	3/09/01

CREDIT LINE	CREDIT AVAILABLE	NEW BALANCE	MINIMUM PAYMENT DUE
\$1200.00	\$1074.76	\$125.24	\$20.00

REFERENCE	SOLD	POSTED	ACTIVITY SINCE LAST STATEMENT	AMOUNT
403GB7302		1/25	PAYMENT THANK YOU	-168.80
32F349ER3	1/12	1/15	RECORD RECYCLER ANYTOWN USA	14.83
89102DIS2	1/13	1/15	BEEFORAMA REST ANYTOWN USA	30.55
MX34FUD32	1/18	1/18	GREAT EXPECTORATIONS BIG CITY USA	27.50
84RT3293A	1/20	1/21	DINO-GEL PETROLEUM ANYTOWN USA	12.26
873DWS321	2/09	2/09	SHIRTS 'N SUCH TINYVILLEUSA	40.10

Previous Balance	(+)	168.80	Current Amount Due	125.24
Purchases	(+)	125.24	Amount Past Due	
Cash Advances	(+)		Amount Over Credit Line	
Payments	(-)	168.80	Minimum Payment Due	20.00
Credits	(-)			
FINANCE CHARGES	(+)			
Late Charges	(+)			
NEW BALANCE	(=)	125.24		

FINANCE CHARGE SUMMARY	PURCHASES	ADVANCES	For Customer Service Call:
Periodic Rate	1.55%	0.054%	1-800-XXX-XXXX
Annual Percentage Rate	19.80%	19.80%	For Lost or Stolen Card, Call:
			1-800-XXX-XXXX
			24-Hour Telephone Numbers

Please make check or money order payable to Your First Bank. Include account number on front.

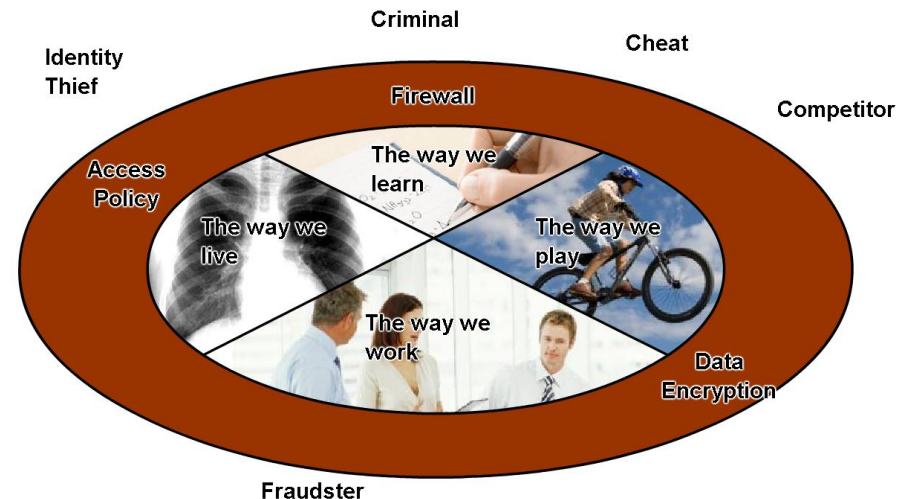


Out of Business



# Network Architecture Characteristics

- Describe basic measures to secure data networks
  - Ensure confidentiality through use of
    - User authentication
    - Data encryption
  - Maintain communication integrity through use of
    - Digital signatures
  - Ensure availability through use of
    - Firewalls
    - Redundant network architecture
    - Hardware without a single point of failure



# IRC Clients and Wiki Server

- Install and use IRC clients and a Wiki server



# Summary

## In this chapter, you learned to:

- Describe how networks impact our daily lives.
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