Todd Lammle's CompTIA Network+ Chapter 1:Introduction to Networks Instructor: Manour Rousta Zadeh

Chapter 1: Introduction to Networks

The Following CompTIA Network+ Exam Objectives Are Covered in This Chapter:
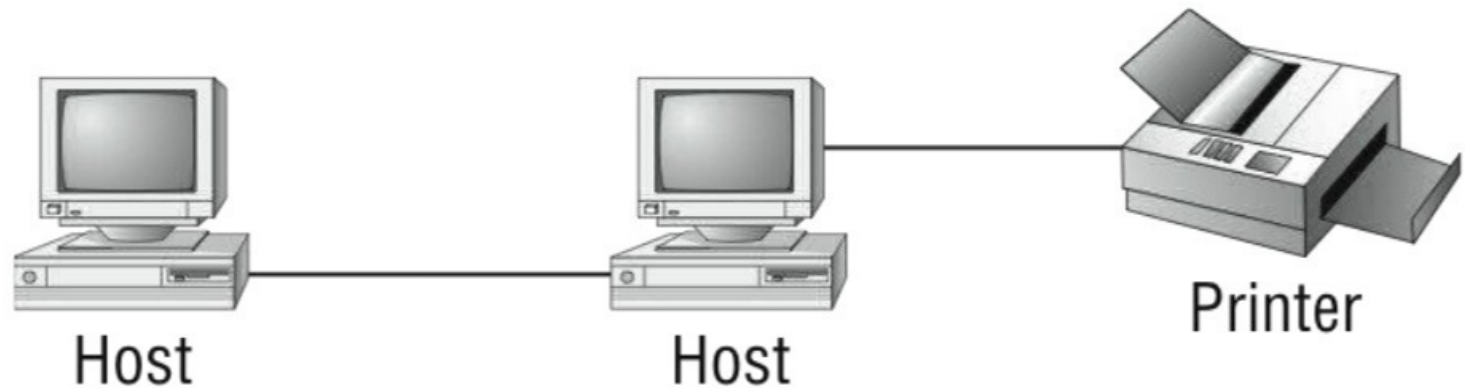
2.3 Identify common physical network topologies

- Star
- Mesh
- Bus
- Ring
- Point to point
- Point to multipoint
- Hybrid

2.7 Explain common logical network topologies and their characteristics

- Peer to peer
- Client/server
- VPN
- VLAN

2

What is a Network?


Host   Host   Printer

In the computer world, the term *network* means two or more connected computers that can share resources like data and applications, office machines, an Internet connection, or some combination of these.
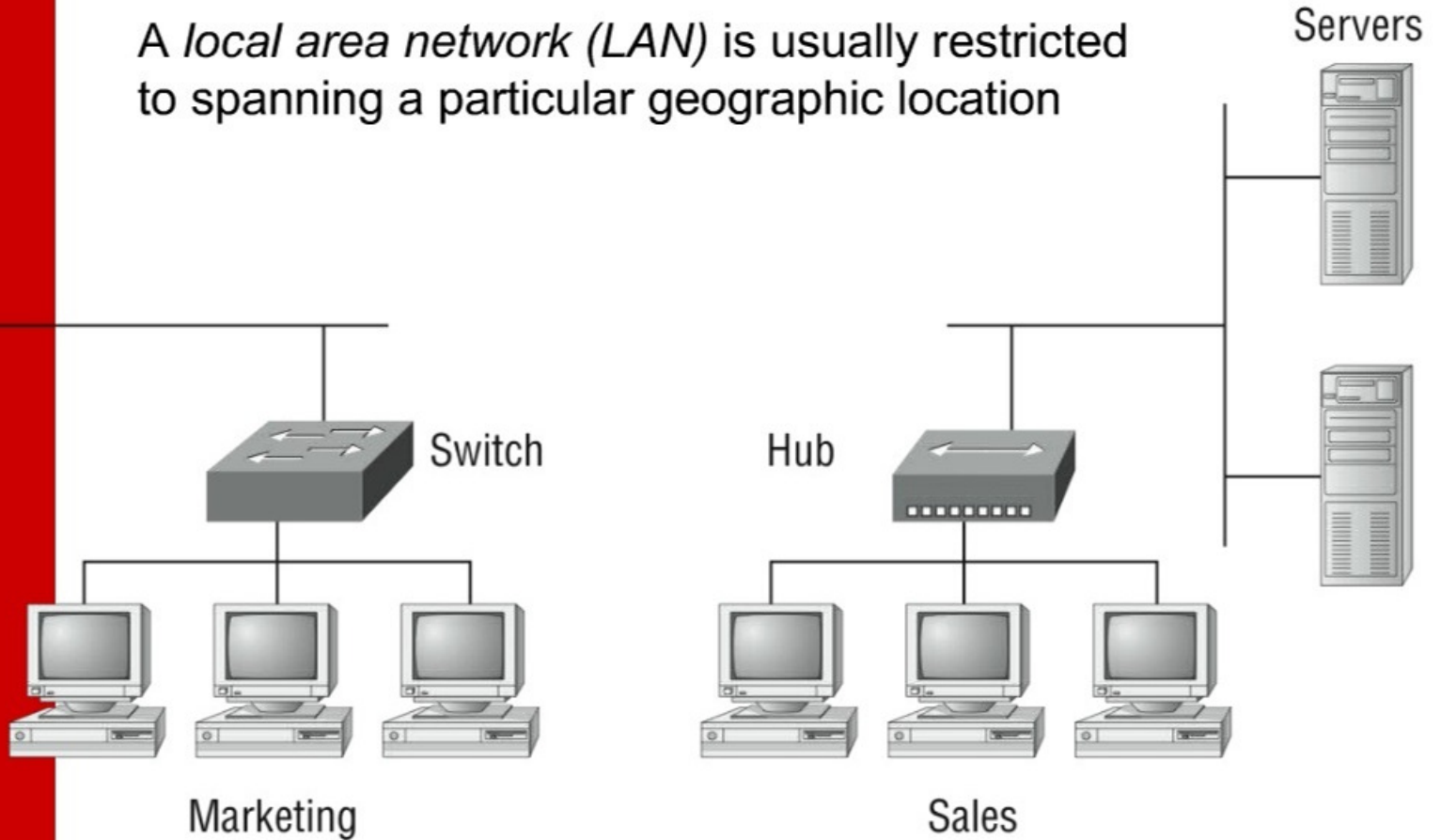
3

What is a LAN?

A *local area network (LAN)* is usually restricted to spanning a particular geographic location

Servers

Printer

Switch

Marketing

Hub
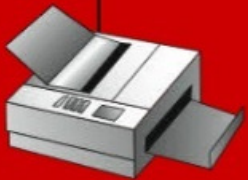
Sales

Servers

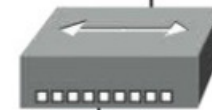# Let's connect these LAN's together...

Servers
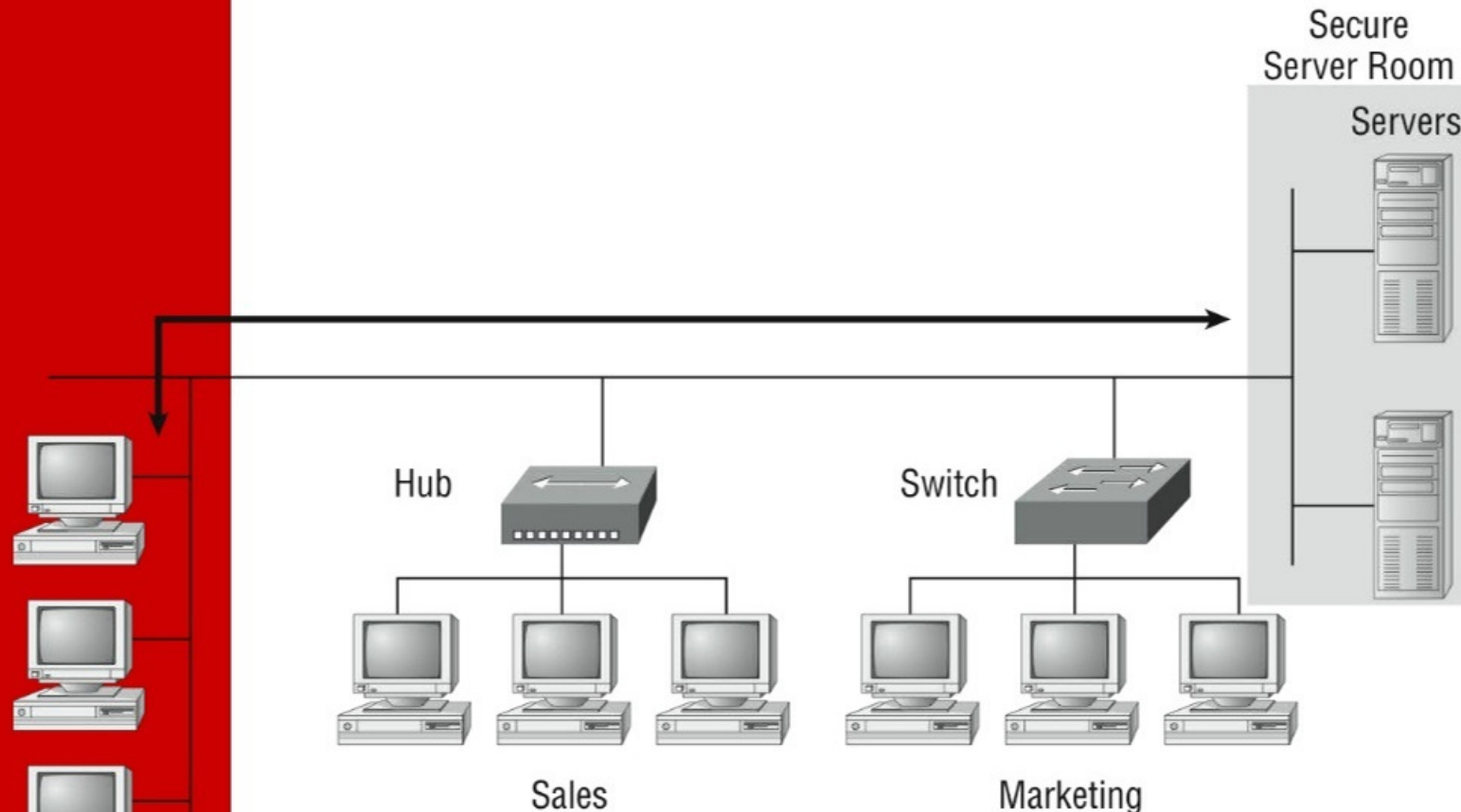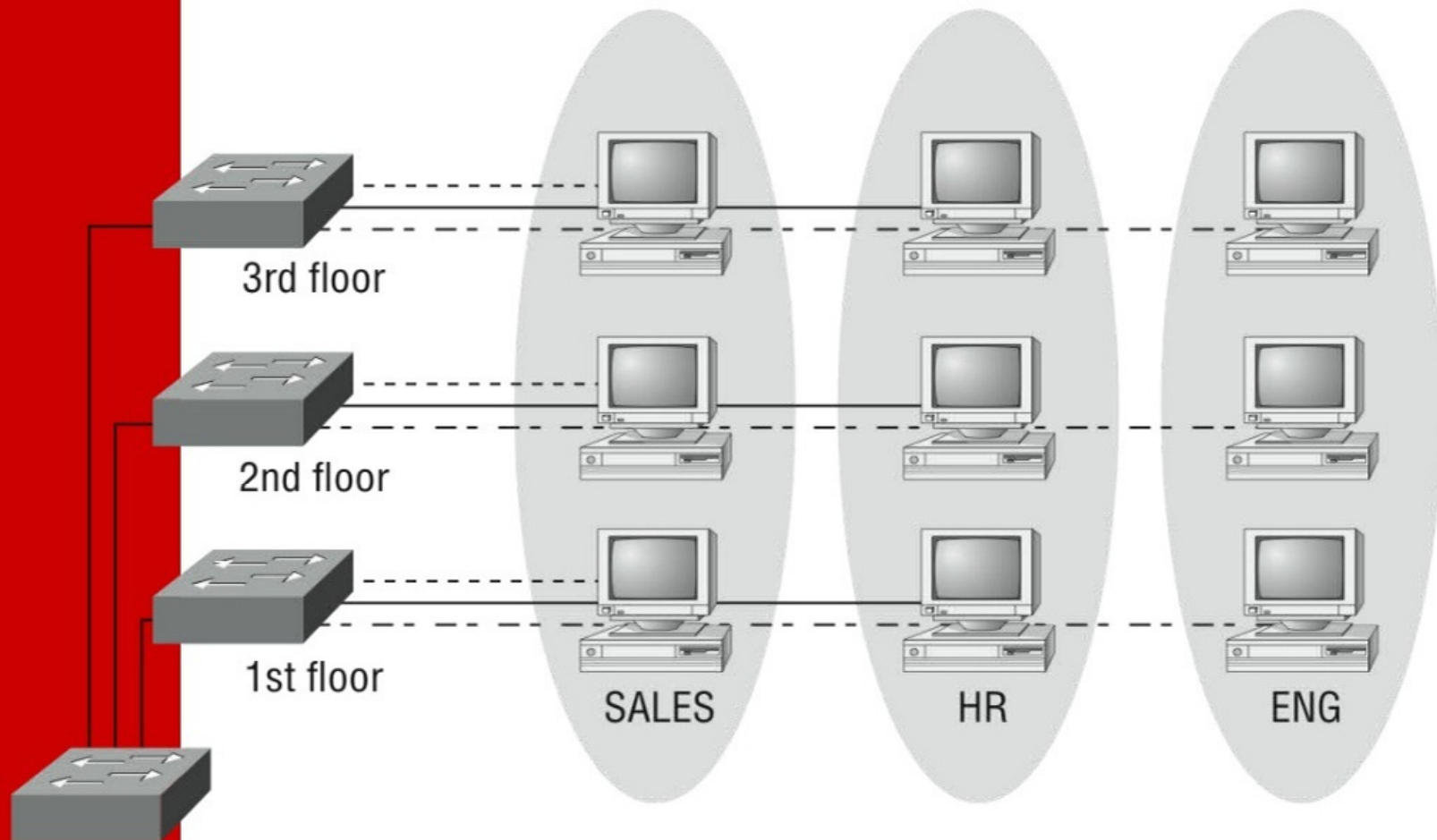
Servers

Router

Switch

Hub

Marketing

Sales

5

Hosts/Workstations communicate to a Server

The term *host* is used to describe pretty much anything that takes an IP address. You also see that the hosts can access the servers across the network—pretty much the general idea of having a network.

6

What is a Virtual LAN (VLAN)?

3rd floor

2nd floor

1st floor

SALES HR ENG

VLANs are the new workgroups, and they define the same thing: a group of users sharing network resources. The difference is that VLANs allow you to be anywhere on the physical network and still be local to the specific network resources you need.

7

Routers create an Internetwork
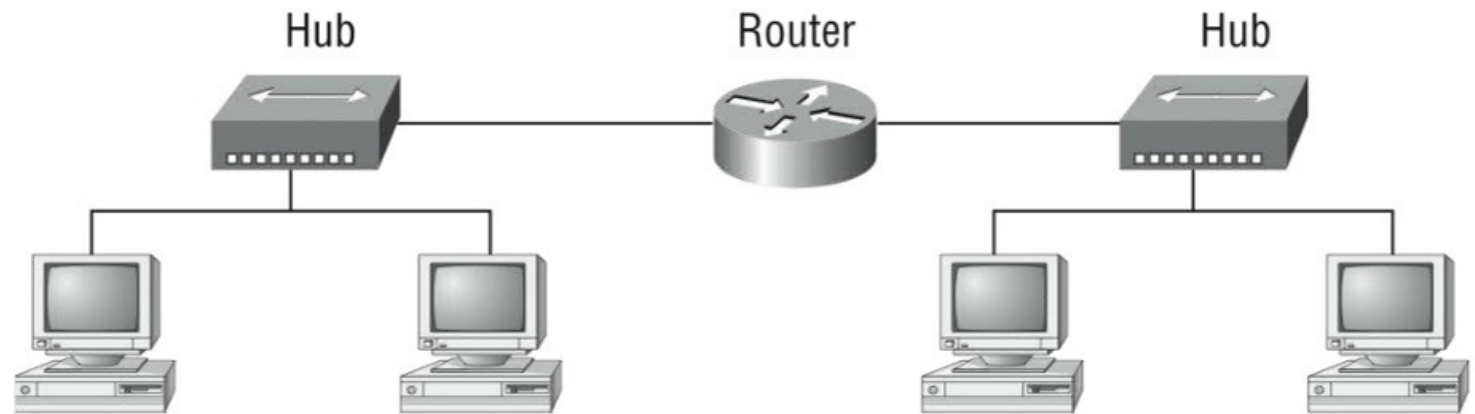
WAN networks are what we use to span large geographic areas and truly go the distance. Like the Internet, WANs usually employ both routers and public links, so that's generally the criteria used to define them.

Routers create an Internetwork

Hub   Router   Hub

9

What is a VPN?

Secure VLAN at Dallas Corporate Office

Servers

Internet

Now my host appears local to the servers

VPN

My host in Colorado

Secure Server Room
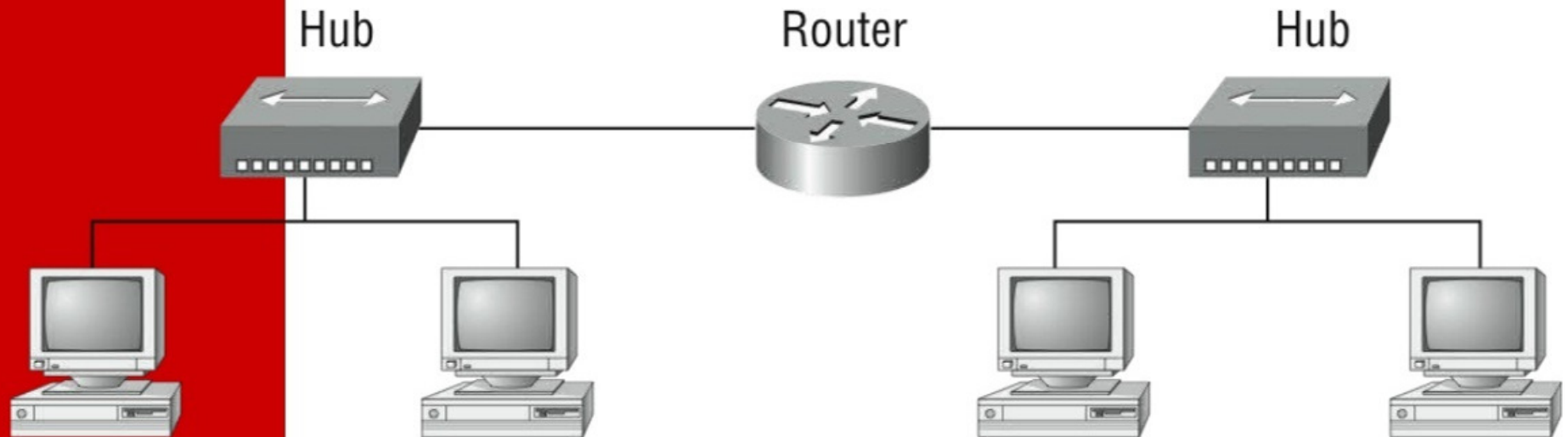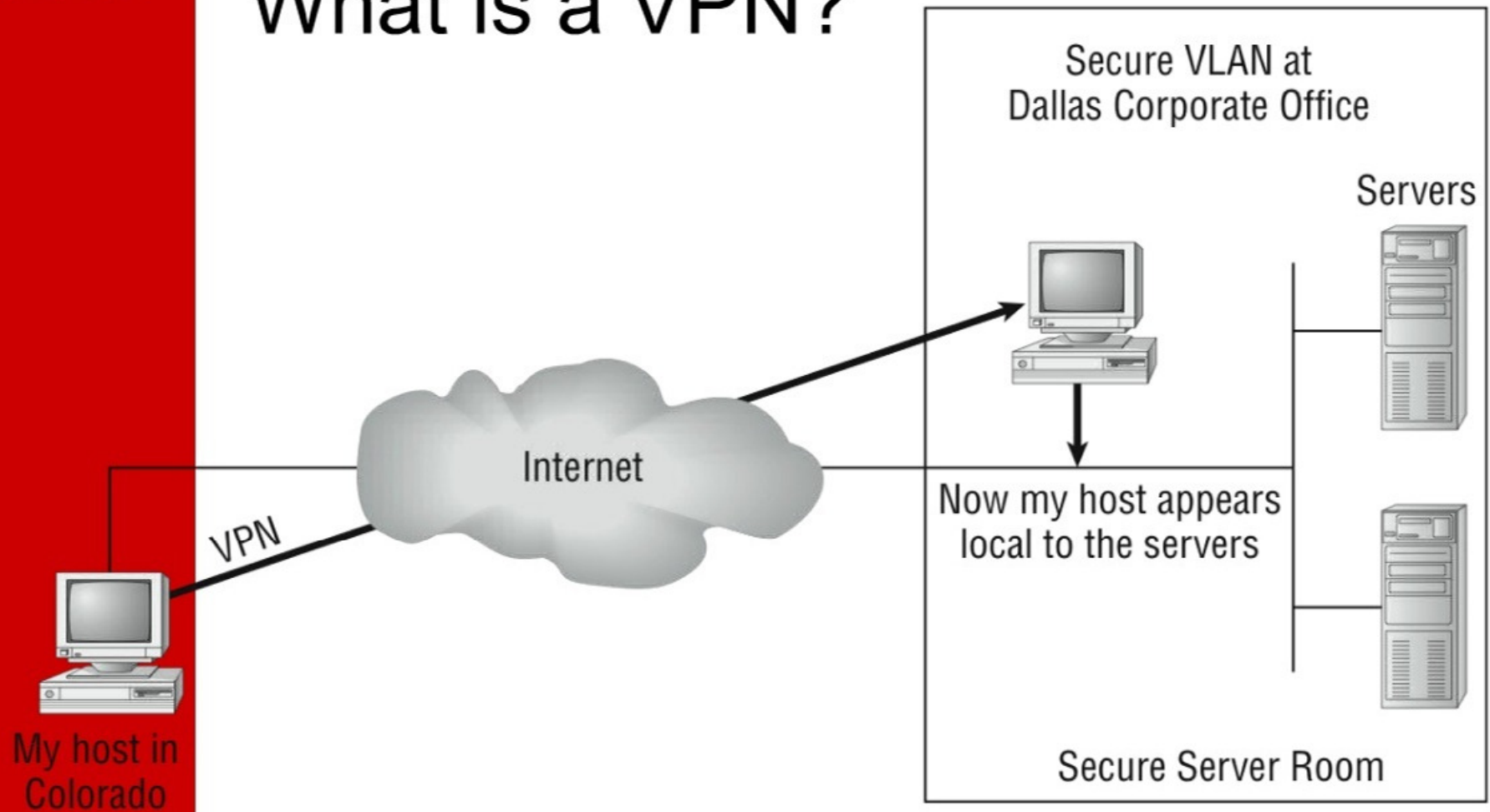
A VPN actually makes your local host part of the remote network by using the WAN link that connects you to the remote LAN. The VPN will make your host appear as though it's actually local on the remote network!

10

Why Use Networks?

- Network
  - Group of computers and devices
    - Connected by transmission media

- Stand-alone computer
  - Not connected to other computers
  - Uses local software and data

- Advantages of networks over standalone computers
  - Device sharing by multiple users
    - Saves money and time
  - Central network management

11

Types of Networks

- Models vary according to:
  - Computer positioning
  - Control levels over shared resources
  - Communication and resource sharing schemes
- Network models
  - Peer-to-Peer
  - Client/server

12

Peer-to-Peer Networks

- Direct computer communication
  - Equal authority
- Individual resource sharing
  - May share resources
  - May prevent access to resources
- Traditional model
  - Two or more general purpose computers
    - Capable of sending and receiving information to and from every other computer
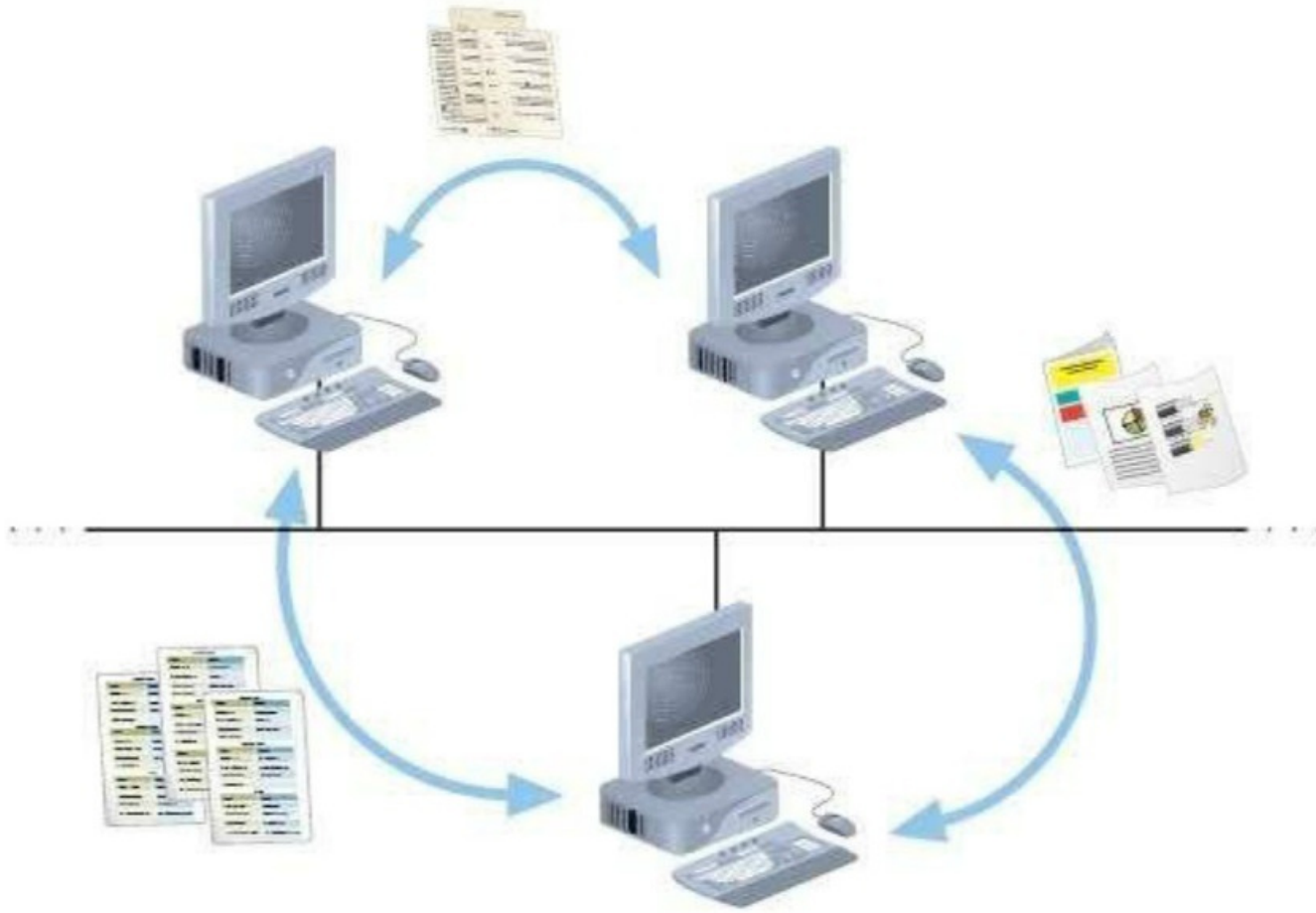
Peer-to-Peer Networks (cont'd.)

Figure 1-1 Resource sharing on a simple peer-to-peer network

14

Peer-to-Peer Networks (cont'd.)

- Advantages
  - Simple configuration
  - Less expensive
    - Compared to other network models
- Disadvantages
  - Not flexible
  - Not necessarily secure
  - Not practical for large installations

Peer-to-Peer Networks (cont'd.)

- Resource sharing method
  - Modify file sharing controls
    - A user responsibility
  - Not centrally controlled
    - Potential variations and security issues

- Environments
  - Small home or office
  - Large networks using the Internet
    - Gnutella, Freenet, original Napster
    - BitTorrent software

16

Peer-to-Peer Networking

Users	Password	Access
Mickey	!Tails?	Full
Pluto	$NoKats	Read
Louie	^Wet#!	Read

Users	Password	Access
Millie	#Shorts?	Read
Mickey	My!Ears?	Read
Louie	^Wet#!	Full

Millie

Pluto

Hub

Mickey

Louie

Users	Password	Access
Millie	#Shorts?	Read
Pluto	&LittleTail!	Full
Louie	^Wet#!	Full

Users	Password	Access
Millie	#Shorts?	Read
Pluto	&LittleTail!	Full
Mickey	&&Boss!@	Full

17
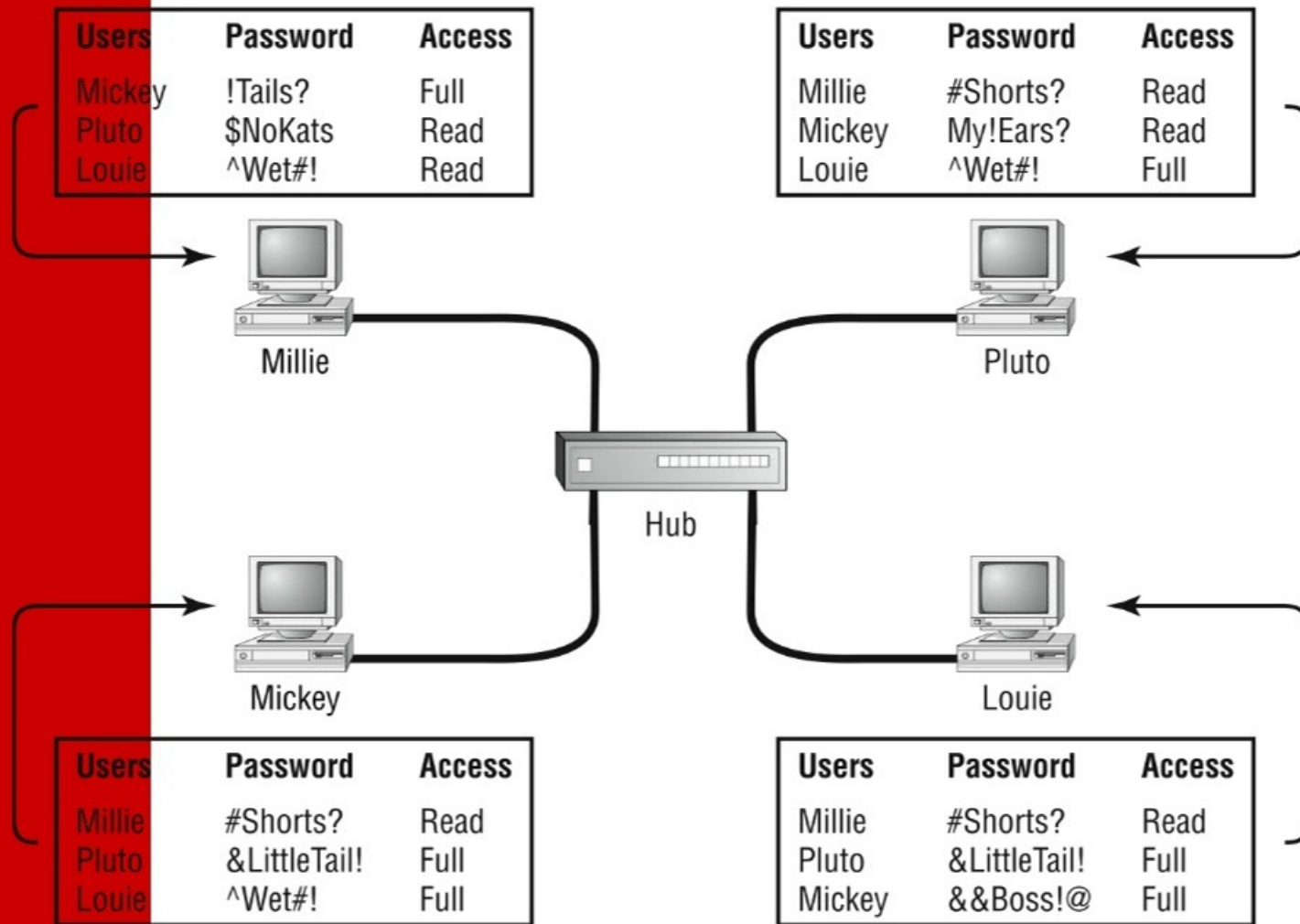
Client/Server Networks

- Central computer (server)
  - Facilitates communication and resource sharing
- Clients (other computers)
  - Personal computers
    - Known as workstations
- Central resource sharing controlled by server
  - Data sharing, data storage space, devices
  - No direct sharing of client resources

Client/Server Networks (cont'd.)

- Computer roles
  - Server
  - Clients
    - Run local applications
    - Store data locally
    - Use server shared applications, data, devices
    - Use server as intermediary
- Communication
  - Switches or routers
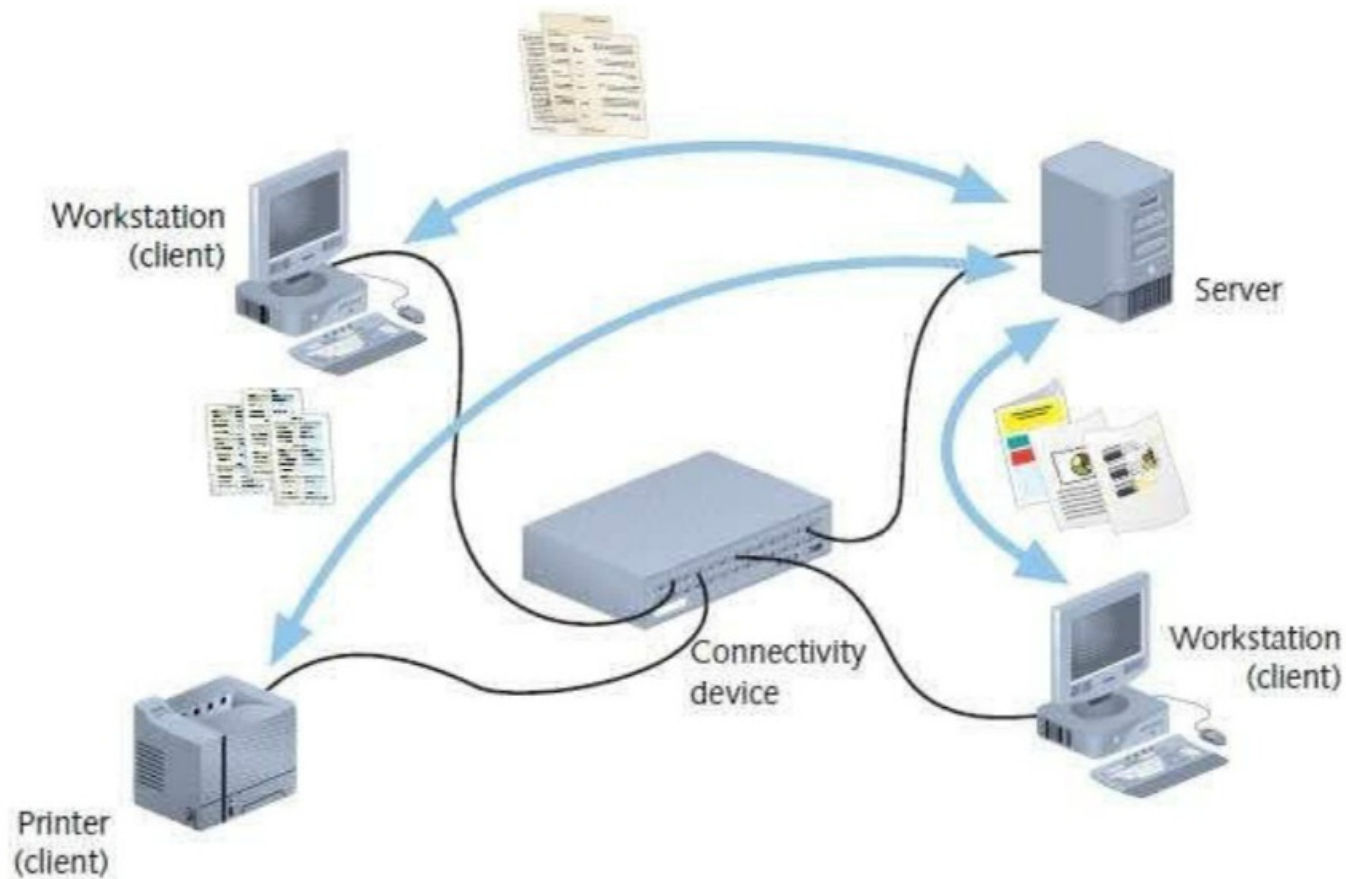
Client/Server Networks (cont'd.)

Figure 1-2 Resource sharing on a client/server network

Client/Server Networks (cont'd.)

- **Server requirement**
  - Network operating system
    - Manages client data, resources
    - Ensures authorized user access
    - Controls user file access
    - Restricts user network access
    - Dictates computer communication rules
    - Supplies application to clients
- **Server examples**
  - UNIX, Linux, Microsoft Server 2003 and 2008, MAC OS X Server

21

Client/Server Networks (cont'd.)

- Server features relative to clients
  - More memory, processing, storage capacity
  - Equipped with special hardware
    - Provides network management functions

- Disadvantages relative to peer-to-peer networks
  - Complex in design and maintenance

Client/Server Networks (cont'd.)

- Advantages relative to peer-to-peer networks
  - User credential assigned from one place
  - Multiple shared resource access centrally controlled
  - Central problem monitoring, diagnostics, correction capabilities
  - User response time optimization capabilities
  - Efficient processing on large networks
  - Scalability
- Popular in medium- and large-scale organizations