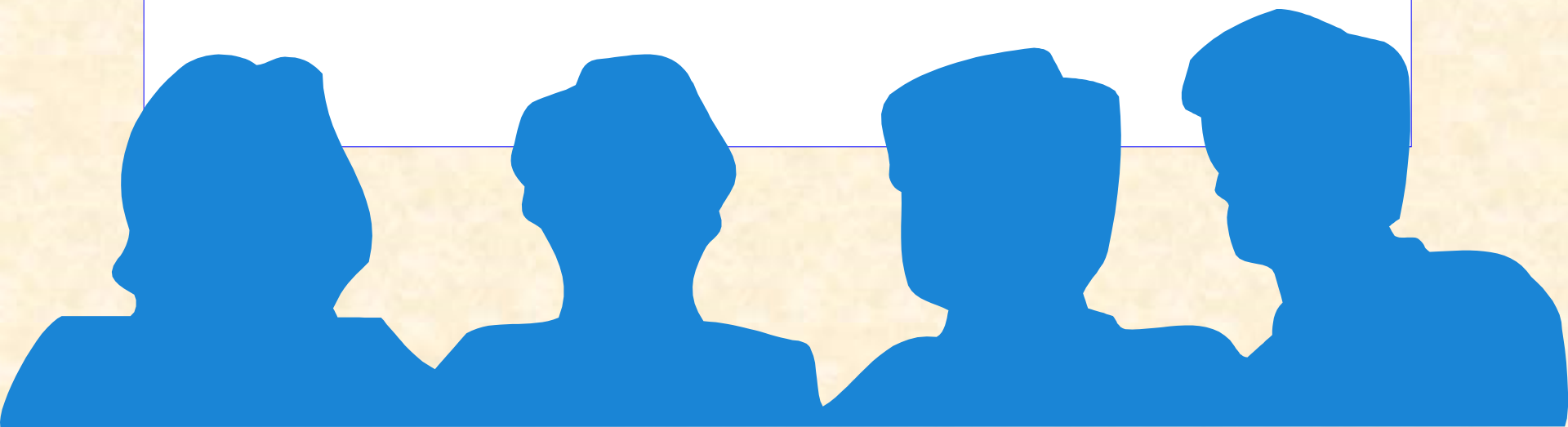
LESSON 18

Networking at Home and Abroad

This lesson includes the following sections:

- Standard Telephone Lines
- Digital Telephone Lines
- Networks in the Home



Data Communications over Standard Telephone Lines

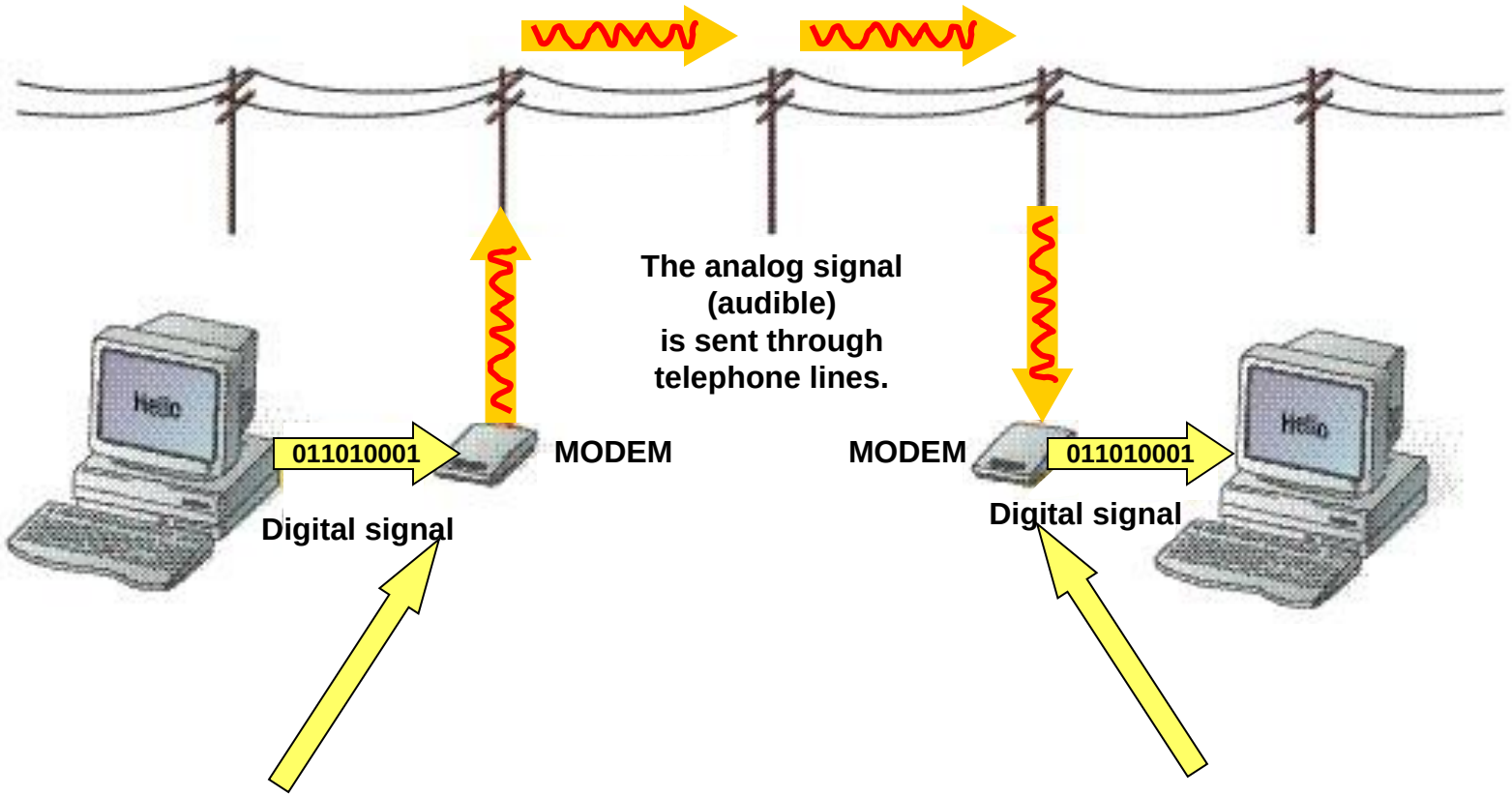
- **Networks commonly use dedicated media to transmit data. However, the public telephone system can also be used for data communications.**

- **Standard phone lines transmit data much more slowly than network media, but devices such as modems make phone lines practical for data transmission over long distances.**

- **Many people and businesses use modems to exchange data, and to establish connections with office networks.**

Data Communications over Standard Telephone Lines - Modems

- Most telephone lines attached to home and businesses are analog, not digital.
- Because PCs transmit and receive data in digital format, a device called a modem is needed to convert digital data to analog format for transmission over phone lines.
- When receiving data from another computer, the modem converts it from analog format to digital format.

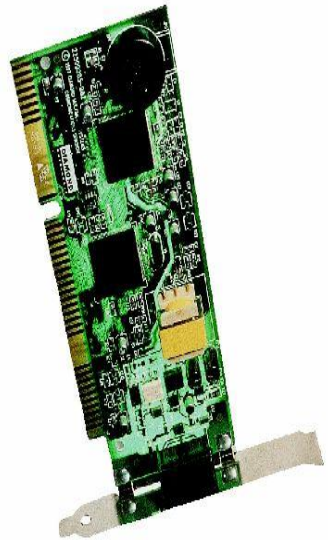

The analog signal
(audible)
is sent through
telephone lines.
011010001
MODEM
MODEM
011010001
Digital signal
Digital signal
This modem converts
digital to analog.
This modem converts
analog to digital.

Data Communications over Standard Telephone Lines - Choosing a Modem

When choosing a modem, consider the following factors:

- **Transmission speed - the speed at which the modem sends data - which is measured in bits per second.**
- **Data compression, the technology the modem uses to shrink data so it can be transmitted faster.**
- **Error correction, the method the modem uses to ensure data is sent and received without errors.**
- **Internal versus external, which describes whether or not the modem fits inside the PC case.**

Internal Modem



External Modem

Data Communications over Standard Telephone Lines - Uses for a Modem

Modems are primarily used for file transfer, or sending files to a remote computer

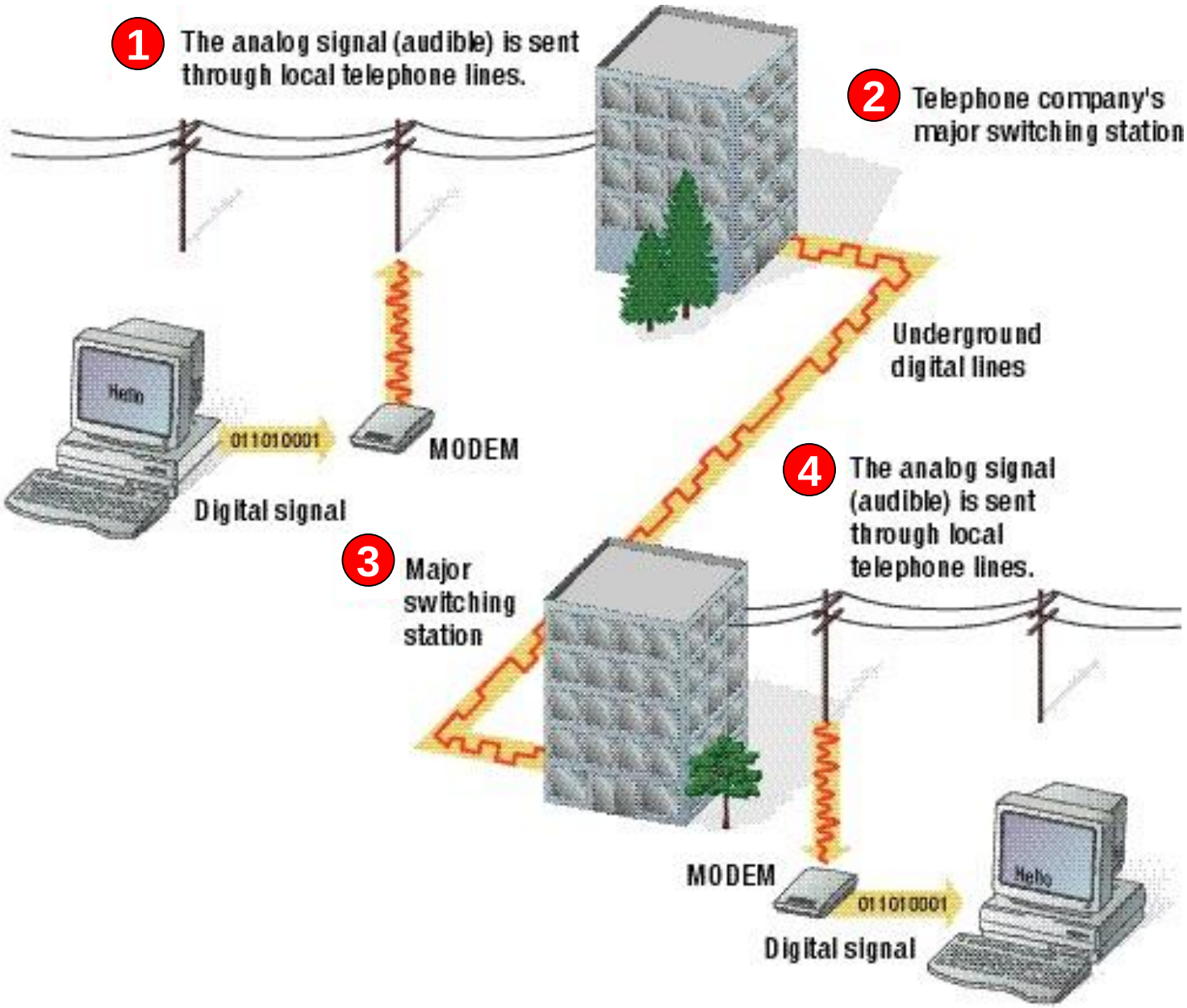
- **Sending a file to another computer is called uploading.**
- **Receiving a file from another computer is called downloading.**

Using Digital Telephone Lines

- Telephone companies are now installing digital telephone lines, which are dedicated to transmitting data in digital format.

- Digital phone lines transmit data at much higher speeds than standard analog phone lines.

- Often, data travels across analog lines and digital lines. In such cases, data may need to be converted from one format to another multiple times before reaching its destination.


1
The analog signal (audible) is sent through local telephone lines.
2
Telephone company's major switching station
Underground digital lines
Hello
011010001
MODEM
Digital signal
3
Major switching station
4
The analog signal (audible) is sent through local telephone lines.
MODEM
011010001
Digital signal
Hello

Using Digital Telephone Lines - Common Digital Services

The most commonly used digital telephone services are:

- **ISDN, T1, and T3**
- **DSL**
- **ATM**
- **Cable Modem**

Using Digital Telephone Lines – ISDN, T1, and T3

- **Integrated Services Digital Network (ISDN) is a system that replaces analog phone services with digital services.**
- **Basic rate ISDN (BRI) offers three channels on one phone line: two for data and one for control. BRI transmits data up to 128 Kbps.**
- **Primary rate ISDN (PRI) offers 24 channels at transmission speeds up to 1.544 Mbps. This is T1 service.**
- **Using even more channels, T3 service offers up to 672 channels and speeds up to 44.736 Mbps.**

Using Digital Telephone Lines - DSL Technologies

- **Digital Subscriber Line (DSL) service is outpacing ISDN services.**
- **Standard DSL offers speeds of 52 Mbps using standard phone lines.**
- **Several types of DSL service are available, reaching transmission speeds up to 51.84 Mbps.**

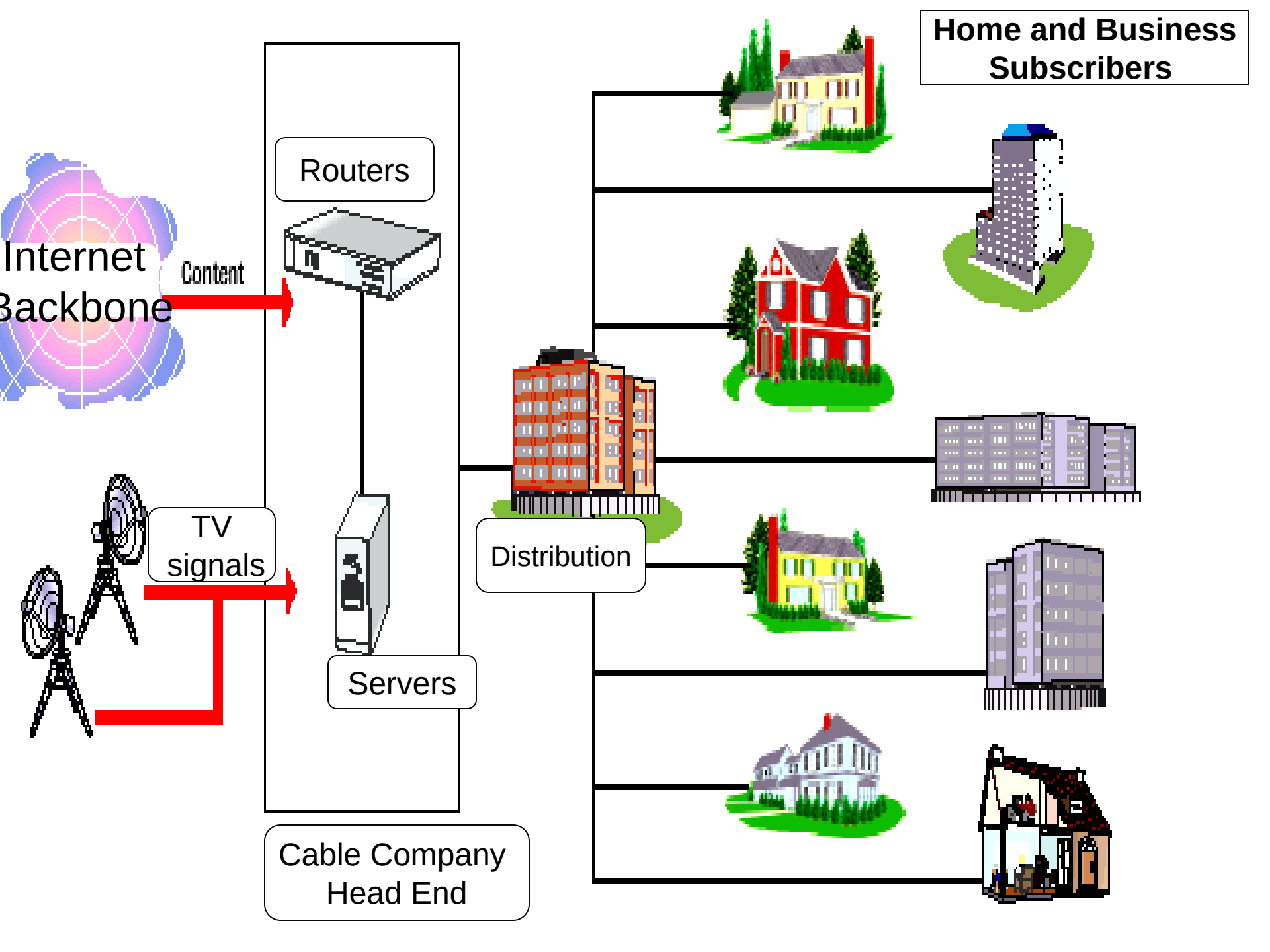
Using Digital Telephone Lines - ATM

- **Asynchronous transfer mode (ATM) digital service is offered as a high-bandwidth, efficient means for transferring multimedia content, data, and voice over phone lines.**

- **Some types of ATM service can reach transmission speeds of 10,000 Mbps.**

Using Digital Telephone Lines - Cable Modem Connections

- Cable modems allow users to connect their PCs to the Internet via the local cable television system.
- Cable companies offer Internet service by combining television and data signals and distributing them over the cable system.
- Cable modem service can achieve speeds of 27 Mbps.


Home and Business Subscribers
Routers
Internet Backbone
Content
TV signals
Servers
Distribution
Cable Company Head End

Networks in the Home

- **Because more homes now have multiple computers, home networks are gaining in popularity. Home networks offer the same advantages to home users as to a business.**

- **Home networks are typically based on existing telephone or wireless technologies.**

- **Popular PC operating systems, such as Windows and the Mac OS, provide simple networking tools that are adequate for running a home network.**