Connecting to the Internet

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- To access the Internet by computer, you need a computer, physical connection (a modem or other telecommunications link), and software to connect to an Internet Service Provider (ISP).

Physical Connection to the Internet

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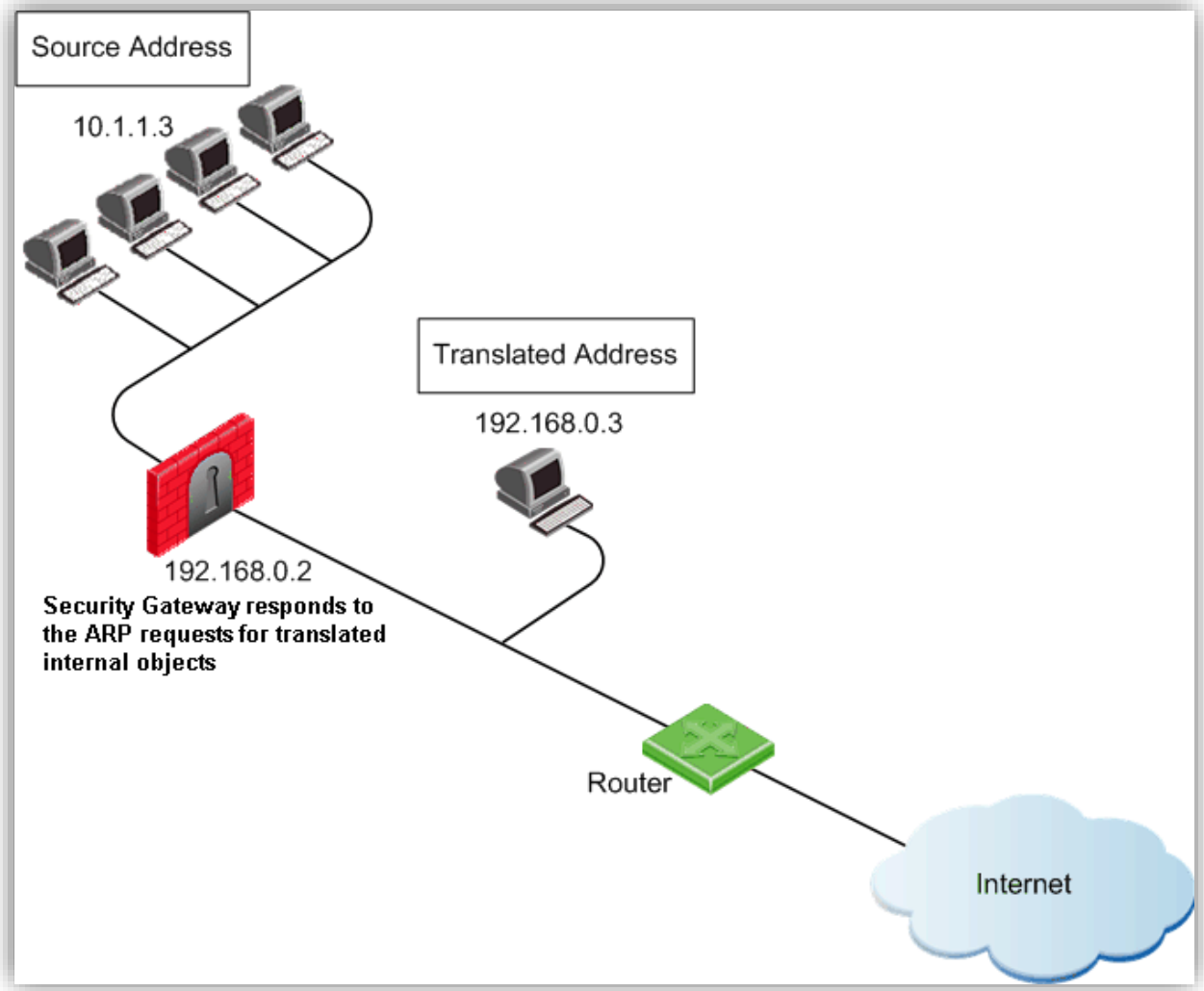
- Most computers are not connected directly to the Internet. They are connected to smaller networks (LAN) that connect through gateways to the Internet backbone. That is why the Internet is called as network of networks.
- Type of your network connection between your computer and ISP define your Internet connection and connection speed.
- A **gateway** is a network point (a computer or router) that acts as an entrance to another network. It allows users to connect from one network to another.

Physical Connection to the Internet



Connection Speed (Transmission Speed)

- Connection speed is how fast your computer is able to talk to other computers or how fast a computer can send and receive information. Depending on how you are connected to the Internet it will take a certain amount of time for information to be transferred to your computer.
- **Bandwidth** is the amount of information or data that can be sent over a network connection in a given period of time.

Connection Speed (Transmission Speed)

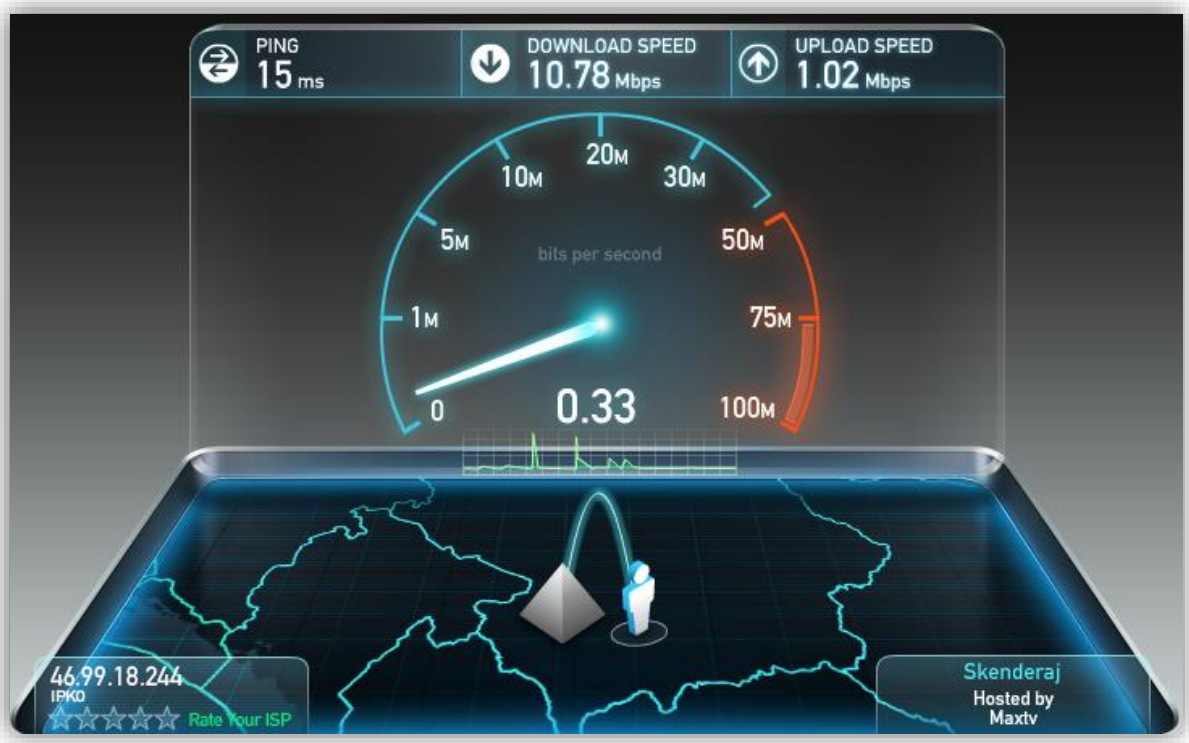
- Connection speed (**bandwidth**, data transfer rate, transmission speed) is typically expressed in terms of bits per second (bps) or, kilobits per second (Kbps). Dial-up modems typically operate at speeds of 56 Kbps. A ten pages letter can be transmitted a 56 Kbps modem in about 5 seconds.
  - **Kbps:** thousand bits per second. (1024 bits)
  - **Mbps:** million bits per second. (1024*1024=1 048 576 bits)
  - **Gbps:** milliard bits per second. (1024*1024*1024=1 073 741 824 bits)
- A **bit** is a single ZERO (off) or ONE (on). So **bps** (bit per second) refers to the number of bits (zeros and ones) that can be sent over the modem in a second.

Connection Speed (Transmission Speed)

- Measure your home Internet connection speed and school Internet connection speed. Use the following link.

  http://www.speedtest.net/

$$\frac{\text{Amount of Data}}{\text{Time to Download}} = \text{Your Internet Connection Speed}$$



Calculation of Internet Speed

- To determine how fast your internet connection can download data per second, you must convert the speed Mb/s (Megabits per second) or Kb/s (Kilobits per second) into Megabytes (MB).
- Let's say your internet connection speed is 5Mb/s (Megabits per second). This means you can download at 625 Kilobytes per second (KB/s), or 0.625 Megabytes per second (MB/s). Remember, 8 bits equal 1 byte, so to work it out you need to divide it by 8. So our equation is: 5 Megabits per second / 8 = 0.625 Megabytes per second.
- All you need to remember is this simple formula:

$$\boldsymbol{Time}(seconds) = \frac{\boldsymbol{File\ size}\ (megabytes)}{\boldsymbol{Download\ Speed}\ (megabits)/\mathbf{8}}$$

- How long it will take to download a 15 Megabyte (MB) file downloading at 10 Mbps?

$$\boldsymbol{Time}(seconds) = \frac{\mathbf{15}(megabytes)}{\frac{\mathbf{10}(megabits)}{\mathbf{8}}} = \frac{\mathbf{15}}{\mathbf{1.25}} = \mathbf{12\ seconds}$$

Communication Channel

- All network connection types use a path or way to send and receive information. A communication channel is the path -the physical medium over which data travels from its source to its destination. Channels are also called links, lines, or media.
- Nowadays, individual communications generally are carried by
  - A telephone wire
  - A wireless method such as shortwave radio.

Internet Service Provider (ISP)

Internet Service Provider (ISP)

- An Internet service provider (ISP) is an organization that provides services for accessing and using the Internet.

Internet Connection Types

Internet Connection Types

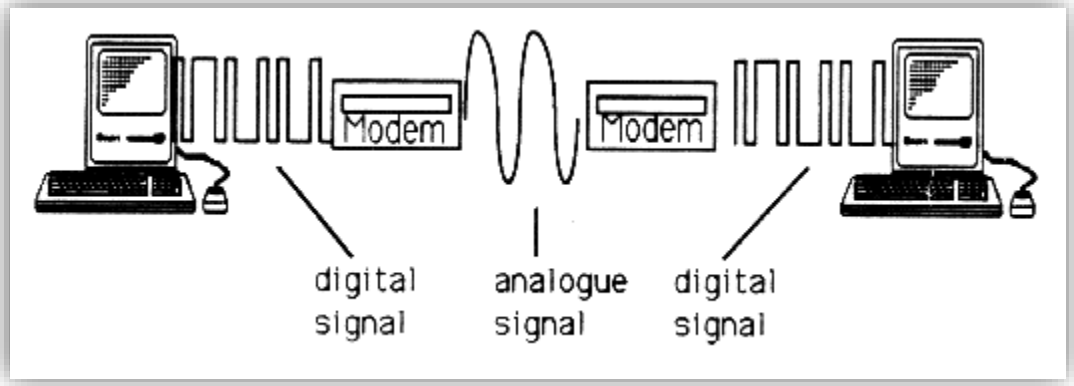
- This section explains the most common used network connection which is used for connecting to the Internet. The one you use --Modem, ADSL, Cable modem, T1 line, or T3 line -- depends on many factors, with cost being one of the greatest determiners.

Dial-Up Modem Connections

- Data can be transmitted by two types of signals, **Analog** and **Digital** signals.
  - An **analog signal** represents a continuous electrical signal in the form of a wave.
  - A **digital signal** is discontinuous, expressed as discrete bursts in on/off electrical signal.

Dial-Up Modem Connections

- A modem is an electronic device that converts computer data into audio signals. This conversion process is called **MO**dulation. These audio signals can then be transmitted over a normal phone line. At the receiving end, another modem converts the audio signals back into computer data. This conversion process is called **DEM**odulation.
- Modulation and Demodulation is where the name **MODEM** comes from.



ISDN

- **ISDN** stands for Integrated Services Digital Network. ISDN lines are connections that use ordinary phone lines to transmit digital instead of analog signals. With digital signals, data can be transmitted at a much faster rate than with a traditional modem.
- **ISDN** converts audio signals--your voice, for example--into digital bits. Because bits can be transmitted very quickly, you can get a much faster speed out of the same telephone line, roughly 128 Kbps.
- **ISDN** connections are made up of two different channels, allowing two simultaneous "conversations"; therefore you can speak on one channel and send a fax or connect to the Internet over the other channel.

ADSL

- A recent hardware and software technology called Asymmetric Digital Subscriber Line (**ADSL**) is considered to be the successor of ISDN.
- As the connection is asynchronous, the download speed is typically higher than the upload speed, with upload speeds typically limited to around 256kb/s, despite download speeds of up to 8Mb/s.

Cable Modems

- A **cable modem** is a new type of modem that connects up your computer to a local cable TV line and provides Internet access.
- Cable modems run over coaxial cable which allows much faster data transfer rates than phone wiring and ADSL. Cable modem connections are digital - not analog.
- The actual bandwidth of a cable modem is up to 27 Mbps on the receiving end and about 2.5 Mbps on uploads or interactive responses. The cable modem takes the signal from the cable company and separates the signal into a regular cable TV signal and also provides a constant connection to the Internet.

T1 Line

- A **T1 line** is a high-speed digital connection capable of transmitting data at a rate of approximately 1.5 Mbps. A T1 line is typically used by small and medium-sized companies with heavy network traffic.
- This line is large enough to send and receive large text files, graphics, sounds, and databases instantaneously, and it works at the fastest speed commonly used to connect networks to the Internet.
- A T1 line is basically too large and too expensive for individual home use.

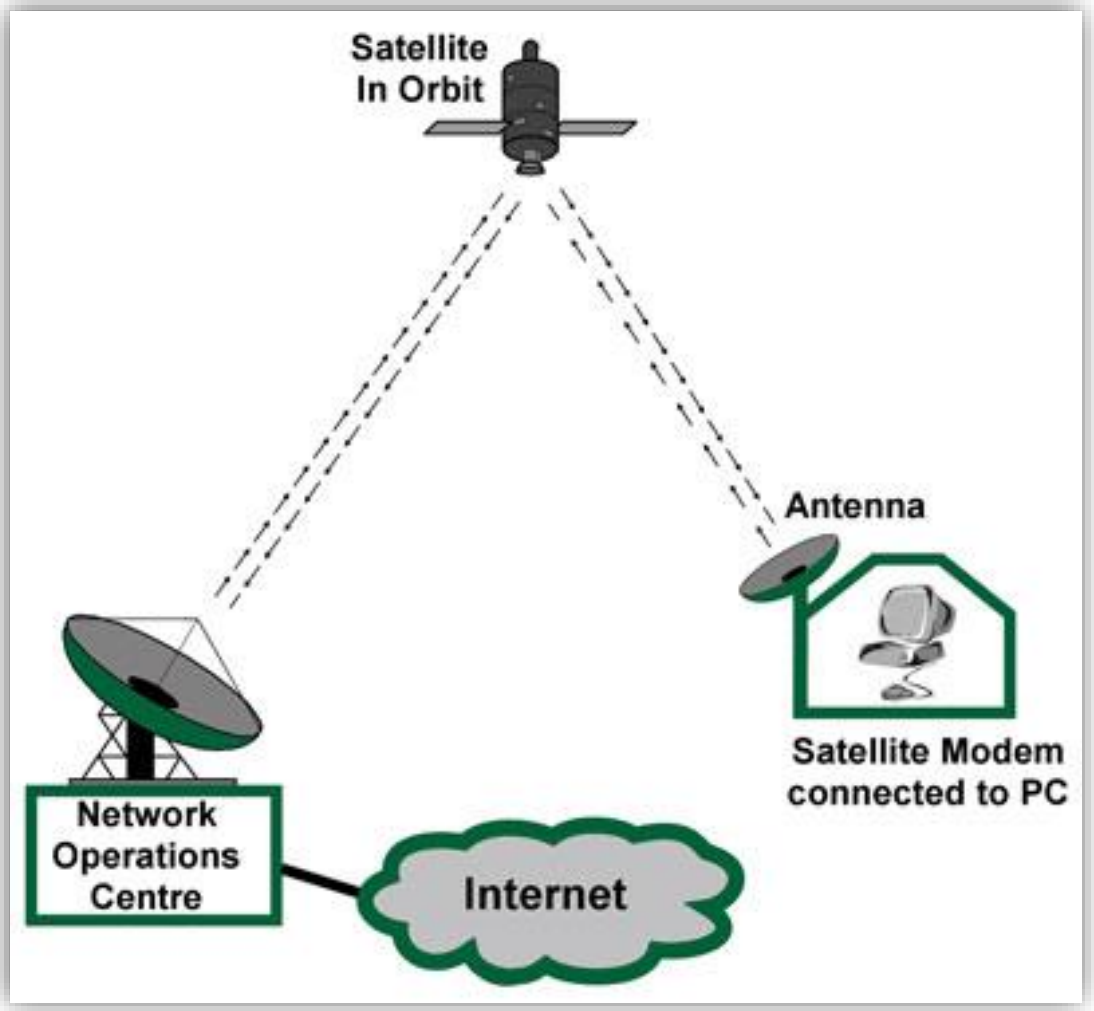
T3 Line

- A **T3 line** is a super high-speed connection capable of transmitting data at a rate of 45 million bits per second (~43Mbps).
- A T3 line is wide enough to transmit full-motion, real-time video and very large databases over a busy network.
- A T3 line is typically installed as a major networking artery for large corporations and universities with high-volume network traffic. The backbones of the major Internet service providers, for example, are made up of T3 lines.

Satellite Connection

- Satellite connection lets to download data from the Internet to your PC at speeds almost eight times faster than a dial-up modem. Data uploads via satellite at speeds faster than or similar to a dial-up modem, all without tying up your phone-line. Download speeds of up to 400 Kbps and upload speeds of up to 60 Kbps. Although, the connection speeds are not guaranteed.

Satellite Connection



Internet Connection Types

CONNECTION TYPE	SPEED (BIT PER SECOND)
Dial-Up Modem	56 000
ISDN	128 000
ADSL	8 000 000
Cable Modem	27 000 000
T1 Line	1 500 000
T3 Line	45 000 000
Satellite Connection	400 000

Accessing the Internet

- After choosing your ISP and deciding to the Internet channel, (for example ISDN, ADSL or dial-up), third step is configuring operating system and establishing connection between your computer and ISP's system.
- Nowadays, a configuration cd comes with modem, so you just need to install it.

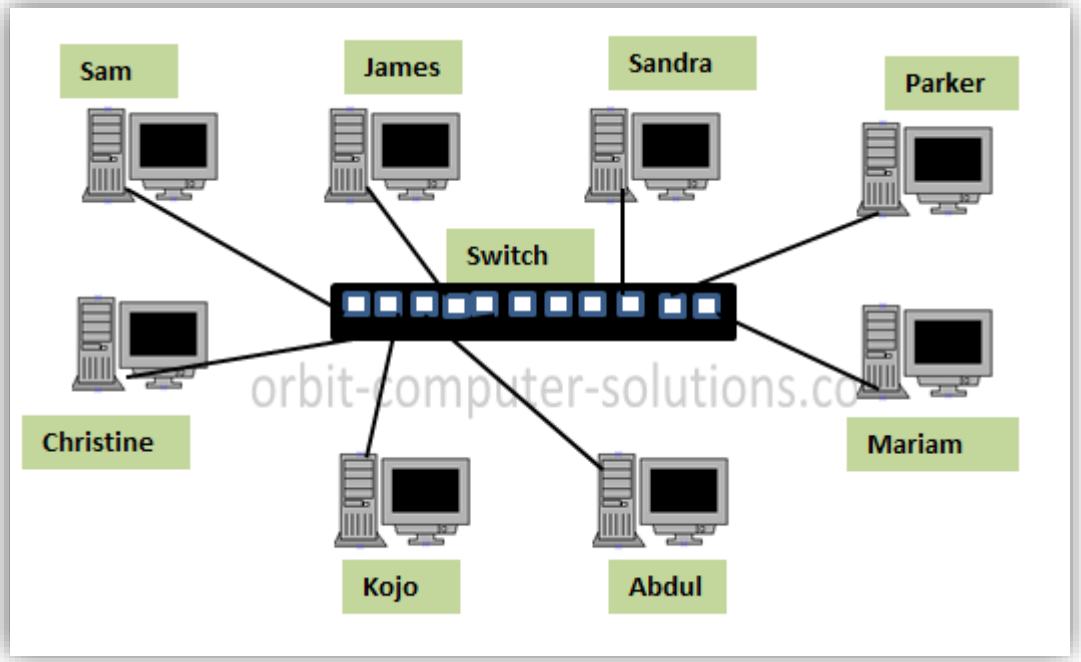
Sharing The Internet In A Workgroup

Sharing The Internet In A Workgroup

- If you have more than one computer, or other hardware devices such as printers, scanners, or cameras, you can use a network to share files, folders, and your Internet connection. For example, if you are working online, someone else can be surfing the Internet from another computer at the same time.
- There are several ways to connect computers or create a network. For a home or small office, the most common model is peer-to-peer networking (Workgroup).

Sharing The Internet In A Workgroup

- In a **peer-to-peer network**, also called a **workgroup**, computers directly communicate with each other and do not require a **server** to manage network resources. A peer-to-peer network is the most appropriate when fewer than ten computers are located in the same general area.



Sharing The Internet In A Workgroup

- Advantages of The Home or Small Office Networking
  - You can use one computer to secure your entire network and protect your Internet connection.
  - You can share one Internet connection with all of the computers on the network.
  - You can work on files stored on any computer on the network.
  - You can Share printers with all of the computers on the network.
  - You can play multiplayer games.

Setting Up a Network

- Connecting to the Internet

- Wireless Network Setup

Protect Your Network

Protect Your Network

- When you create a home network connected to the Internet, you increase the vulnerability of your computers to unauthorized access, including viruses. To protect your network, you need to create a type of barrier called a firewall. Windows comes with a firewall that you create when setting up a home network.

How Does a Firewall Work?

- Like an actual firewall built to prevent fire from spreading between adjoining buildings, computer firewalls prevent the spread of unauthorized communication between an individual computer or group of networked computers and the Internet. One of the most effective ways to protect a home network-and the least expensive-is to create a firewall on the Internet Connection Sharing (ICS) host computer, and to make sure that computer is the only one on the network with a direct connection to the Internet.

Spyware

- Not only the firewall but also some other security programs are necessary to install all networked computers. Such as, Antivirus programs, advertisement removers, spywares.
- **Spyware** is software that aims to gather information about a person or organization without their knowledge.

The End