At the end of this chapter you will be able to:

1] Recognize the different types of existing networks.
3] Use the networks to share resources, such as printers, scanners, and even an Internet connection.
4] Recognize the vocabulary needed to provide technical support to your school’s networks.
INTRODUCTION TO THE CHAPTER

Networks constitute one of the many ways to optimize the use of computing systems. Since through a network it is possible to share several resources, such as printers, file libraries, multimedia content, and also Internet connection.

But, how is this possible? In this chapter, you will learn how to recognize the different networks by their use and connection type, knowing the specific vocabulary used in relation to networks.

You will also know the advantages of Windows 7 that make setting up a home network easier. You will be surprised to see how with some simple steps, you can use this knowledge in your school, improving the computing lab.
CONCEPTUAL MAP OF THE CHAPTER

Networks
- Network Basics
- Importance of the Firewall
- Depending on the use
  - Corporate Networks
  - Home Networks

Types of Networks
- Depending on the connectivity
  - Wired Networks
  - Wireless Networks

Windows 7 Advantages HomeGroup Configuration
WHAT IS A NETWORK?

A network is a set of PCs connected with each other that share information, devices, and even an Internet connection. Historically, networks were only used in a corporate environment, but in the last years, due to the spread of PCs, networks have become something usual in lots of homes. For example, a network could include only three PCs connected in the classroom or even one PC connected to the Internet. Because when you connect your PC to the Internet, you are logging on a network, which is the World Wide Web. In this case, the connection is between your PC and the Internet provider.

Did you know…?

...that the biggest wireless Internet provider in the world is in Japan and provides service to 45,687,117 users?

Protocol

A set of standards that regulate communication between the different network components.

Internet is a worldwide computing network, decentralized, formed by the direct connection among PCs by a special communication protocol. It was created in 1969 when the US established the first connection between PCs. Today, the World Wide Web service is massively spread. Also known as "the Web", it is a set of protocols that allow, in a simple way, to remotely consult hypertext files. However, Internet also includes other services and protocols, such as sending emails, transmitting files, instant messaging, online games, and more.
WHAT IS THE POTENTIAL OF A NETWORK AT SCHOOLS?

In the training centers, the use of a network constitutes an advantage as regards distribution and access to information, becoming an interesting support tool both for students and teachers. The following are some of the possibilities offered by a network:

- Shared use of school resources, such as printers, scanners, specific software, etc.
- Availability of multimedia material on the network.
- The use of email between students and teachers.
- Access to information through the Internet.
- Creation and use of file libraries by the members of a class.
- The educational use of an electronic board.
- Conducting video-conferences.
- Communication via chat with foreign students to foster cultural exchange.

That is why it is important to know about networks to provide them technical support and take advantage of their teaching opportunities.
You need to know the types of networks and their characteristics. As regards the network type of connection, there are two categories: wired and wireless networks.

Wired Networks

The characteristic of **wired** networks is that they need a physical element to connect the devices. To configure one of these networks, you must verify that the PCs have a **Network Card**. If you only need to connect two PCs, one cable will be enough to share information and devices. **But if you need to connect more than two PCs, you have to use a device known as active element**, such as a **Hub**.

**Hub**

A hub is an active element used to join all PCs in one network. Its function is to translate the requests of each device and route them accordingly.

Go back to chapter 5 to reinforce your knowledge about hardware and learn more about the characteristics of the network card.
How to create a wired network?

To create this type of network you have to follow some simple steps:

01 Connect each PC to the Hub with a UTP cable.

02 Once you have all the PCs connected to the hub, you must perform the configuration in the Operating System. By the end of this chapter you will find the way to configure a home network in Windows 7.

Wireless Networks

On the other hand, wireless networks do not need cables to connect themselves. This offers greater flexibility than in the wired networks, but at the same time, they depend directly on the scope of the antenna and the connectivity speed. There are different standards that identify connectivity speed and the channel they use. At the beginning, standards were

**UTP Cable**

It is a type of cable to send bits (data) from one point to another. It is made up of copper conductors insulated by paper or plastic and twisted in pairs, which help to reduce noise and interference.

**Pay attention**

Wired network speeds are different from the wireless network ones. They vary between 10, 100 and 1000Mbps, and this last one is the most recent one. The wired network speed is determined based on every element that forms it, that is to say, the network card, the active elements and the cable. This means that if, for instance, you have a 10/100Mbps network card and a hub that supports Gigabit connections (this means, 1000 Gbps connections), the network will work at 10/100, as the network card does not support the desired speed.
How to create a wireless network?

To create a wireless network you will need some network active elements (such as the ones mentioned for the wired networks). In this case, you must have a **Router**, that will receive the Internet signal and transmit it so it is available to all the network users. Follow these steps... they are easy and simple!

01 **Connect the Broadband modem to the Wireless Router**

02 Choose the name of the network -called *SSID*- the type of network, and set the security.

03 Once you have completed these steps, go to each of the devices in your network and connect them to the new network created.

A, B and G. Networks based in standards A and B have a **11Mbps** speed, whereas standard G has a speed of up to **54Mbps**. Nowadays, the use of standard N is more common, it allows speeds of up to **300Mbps** and longer distances between devices. Wireless networks have multiple advantages. However, it is important to pay attention to the **Security milestone**.

In most cases, when using any device with a wireless card, you will be able to see the existence of other networks and the same way around: ie, the existing networks will be able to detect you. If you do not set any type of security mechanism, unauthorized people may access your network without any problem. Therefore, it is important and highly recommendable to protect the network in different ways.
How to connect to a wireless network?

To join a wireless network, follow these steps:

1. Click on the network icon, in the notification area.
2. Click on the network you want to log on, from the available networks.
3. Once you click on the Connect button, your PC will be connected to the selected network.
4. If the security of the network is set, Windows 7 will notify you and you must enter the corresponding credentials.

How to protect your network?

Networks can be protected with simple or complex passwords, certified or security algorithms, and even by the Mac Address, which is a kind of unique “ID number” of each device.

In the following chapter you will learn to change your network’s passwords.
Network Profiles

Each time you log on a network, the operating system registers it and notifies us. For example, if you have logged on a corporate network, the network profile will automatically set as Domain.

Whereas, when you log on a home network, a screen will appear prompting you to choose one of the three profiles shown as network location: Home, Work, or Public.

What do you have to take into account to select the network profile?

When you are in a library or in a coffee shop that offers its customers Internet connectivity, it is usually a non-secure network, so you must select the Public Network profile.

If you connect at your home or in a friend’s house, you can select the Home Network profile, that will allow you to share printers, music, and files.

Finally, if you are at an office that does not have a domain, you must select Work Network when setting it.
TYPES OF NETWORKS ACCORDING TO THEIR USE

Besides the type of connection, wired or wireless, networks can be classified according to their use. In this way, there are corporate networks which are used by companies and large organizations, and home networks, related to family and school use, and in small or medium organizations.

Server. This Server is in charge of providing services to the rest of the PCs. To do so, it has a Server Operating System installed, such as Microsoft® Windows® Server 2008 R2. Usually, administrators of this type of network set a Domain in order to protect the privacy and security of the information that flows within the corporation.

On the other hand, home networks are those that can be found most frequently in our homes, schools, or in public access places, where several PCs are connected with each other, sharing printers, network units, and many times, Internet connection.

Corporate networks have a PC called
Chapter 7: Networks

WINDOWS 7 ADVANTAGES RELATED TO NETWORKS

Windows 7 adds a new concept regarding the network configuration called **HomeGroup**. This feature is based on a mechanism that allows to share resources, printers, and devices in a simpler way than in previous versions. In addition, it allows to perform advanced operations, such as remotely manage the Windows Media Player of another PC in your HomeGroup. In this way, you will be able to share multimedia content across the network without the need to set advanced configurations.

**How to create a HomeGroup?**

In order to **create the HomeGroup**, the network profile set must be **Home** and the PC must not be part of a Domain.

First you have to access the **Network and Shared Resources Center**. To do so, type “Network Center” in the **Start menu** and the option to access the mentioned location will appear. Once in the Network and Shared Resources Center, you will be able to see in the top left margin the **HomeGroup** option. Click **Ready to create**.

A screen will notify that a HomeGroup has not yet been created in your network. In order to create it, click on the **Create a HomeGroup** button. A screen will appear, and you can select the components you want to share in the Network, such as images, documents, music, printers, and videos, among others.
Once you complete the selection, press the Next button. Windows 7 will create the HomeGroup and generate a random password that you must use to access the HomeGroup from other devices.

When you press Finish, the HomeGroup will be created and you will be able to use it. In order to change the configuration of the created HomeGroup, you must access the Network and Shared Resources Center, and find the HomeGroup option. Then, you must click on United and the Setup screen will appear, there you can change the settings.

This feature is very simple to set up, it has a really complex operation but Windows 7 makes it simple and user-friendly.

Once the HomeGroup has been created you will be able to see in Windows Explorer a new branch called HomeGroup. Below it, the names of each one of the PCs in the network will appear and you will be able to navigate the shared resources.

Tip!

If you have only one PC of a HomeGroup connected to the TV and a video file is saved in it, you can access it from any other networked PC. Thus, if you want to use this AV file in a class, it will be easier to play it with this Windows 7 functionality...
Have fun and keep on learning

Arrange the boxes in order to create a diagram with the contents of this chapter.
IMPORTANCE OF THE FIREWALL

The Firewall is a security device that controls the input and output traffic in a network. It is a tool that works as a filter, allowing or rejecting the flow between networks. Windows 7 has a powerful Firewall that allows connectivity without risking the home, corporate and public networks, that many times are insecure. To ensure the Firewall is enabled, you must type “Firewall” in the Windows 7 Start menu and the Windows Firewall will automatically appear.

Once there, you will see if it is enabled or disabled.

On the left side, where the common tasks appear, you will find the option “Enable or Disable Firewall”. There you can control its behavior.
Green tip

Internet, the World Wide Web, can be an essential tool to protect the Environment... can you imagine how?

- Several mass campaigns that encourage to reduce energy consumption during one day, at a specific time, have been organized through the Web.

- Every time, more and more people adopt telecommuting as a way of working, reducing pollution due to the use of vehicles.

- Several environmental laws have obtained adherents through the World Wide Web.

- The use of emails has significantly reduced the use of paper for mail correspondence, saving lots of trees.

What are you waiting for to use the Internet in order to protect the environment? Think strategies and carry them out!
In this way, another corner of Latin America becomes a witness and the main character in the potential that the new technologies can reach in the education field. This Dominican school, located in a beautiful environment surrounded by green spaces and a yard full of flowers where the students can sit and chat, and read, is teaching on a daily basis students that will become the teachers of the future generations.

Yannett, a teacher that “teaches to teach”, comments the way technology enhances her role as a teacher and the education in general. She says: “It is important to highlight two aspects: first, the impact on me as a teacher. It allows me to go through topics in depth, communicate with students and interact with foreign teachers, in short time. On the other hand, regarding the teachers I teach, the experience is wonderful. Because we can create virtual learning communities, that allow not only to exchange experiences but also to work in collaboration.

In addition, my groups of students can study topics in depth, which is not possible with books. Science evolves rapidly, and through new information and communication technologies students can learn the most recent scientific innovations.”

Teaching the teachers is one of the most valuable tasks in the education field. The solid training of the people that will later teach is the first step for any learning process. In a Teacher Training institute in Santo Domingo, Dominican Republic, this challenge is faced on a daily basis, and it is renewed with the impact of new information and communication technologies.

SHARING EXPERIENCES
“A world to discover”

Do you want to know from which countries is your blog visited?
Take your time to review the contents of this chapter through the following exercises:

**A.** Make a comparative table between wired and wireless networks.

<table>
<thead>
<tr>
<th>HOME OR CORPORATE NETWORKS</th>
<th>WIRED</th>
<th>WIRELESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL RESOURCES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPEED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**B.** Research in the Web the characteristics of the Standard N for wireless networks and evaluate if it is convenient to use it at school.

____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________

**C.** Define, in your own words, what a firewall is and what its use is.

____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________

**D.** Try to create a HomeGroup with the PCs in your school and write about your experience. Was the task easy? Did you find difficulties? How many PCs are there in the network? What are the shared resources?

____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________________
Self-assessment
Answer these questions and check your knowledge about networks.

1. How is the wired network speed determined?
   a. By the network card
   b. By the network card and the active elements
   c. By the network card, the active elements and the cable

2. What is a hub?
   a. A type of cable for networks
   b. An active element used to join all PCs in one network
   c. A set of standards that regulate communication between the different network components

3. Which of the following standards are used by wireless networks?
   a. A, B, C and N
   b. A, B, G and N
   c. A, G, D and N

4. What is the Windows 7 new concept related to the configuration of home networks called?
   a. Home Network
   b. HomeGroup
   c. Home Premium

5. If I have a file in a desktop I can access it from a laptop provided that both devices belong to the same HomeGroup.
   a. True
   b. False

6. What is a firewall?
   a. It is the name given to the network protocol
   b. A security device that controls the input and output traffic in a network
   c. An active element that translates the devices’ requests in a network

7. Networks can be classified in corporate and home, depending on their type of connection.
   a. True
   b. False

8. What are the advantages of the configuration of a network in a training center?
   a. Availability of multimedia material on the network.
   b. Internet access
   c. Both answers are correct

9. What is the Mac Address?
   a. A unique ID number for each device
   b. A standard that identifies the speed in a network
   c. None is correct

10. Which of the following is not a network profile?
    a. Home
    b. School
    c. Public