

Computer Networking

This article contains:

- Why should you install a computer network?
- Basic Information about Routers
- What type of Router Should You Buy?
- Installation
- Security
- Troubleshooting
- Extending the Range of a Wireless Router

Why Should You Install a Computer Network?

Installing a computer network will enable you to use multiple devices in your home or business with a single Internet connection. Devices that can be connected to your network include:

- Computers
- Wireless Phones
- Cameras
- Televisions
- Tablets
- Gaming Consoles
- Over The Top (OTT) Video

You can install a computer network by adding an additional device called a router. Once you have installed and configured your router, you can connect devices to it using cables (“wired” connections) or by using the router’s wireless capability.

Basic Information About Routers

Routers for home or small business use range in price from about \$30 up to around \$250. Price is determined by the technology and capabilities of the router. Most home and small business routers support both wired and wireless connections.

Wired (or “Ethernet”) Connections are used by plugging a cable into the Ethernet port on the computer and into one of the available ports on the router. Connecting a computer with an Ethernet cable provides the fastest, most secure connection. If your computer is located close to your router, using a wired connection is recommended.

Wireless connections are sometimes referred to as “Wi-Fi”. They give you the convenience of using a device anywhere in the home or business where you can connect (where the wireless “signal strength” is adequate). Wireless connections are useful for laptops, smart phones and other devices that are frequently moved. It can also be practical for connecting a desktop computer that is in a location where there is no internal wiring.

A wireless router will transmit and receive data in the immediate area around where it is installed. If you are within the range of the router, you can use a wireless capable device to access the Internet. Routers have a range of about 150 to 300 feet; however, the range of your router will depend on a number of factors including:

Technology: Newer routers that use the latest technology have a greater range.

Obstructions: For example, the more walls in your home that the signal has to go through, the shorter the range.

Interference: Other devices in use can interfere with the signal and decrease the range.

The device that you are using to connect must have a wireless antenna capable of processing signals from a wireless router. Most new devices (laptops, tablets, cellphones, etc.) already have an antenna installed. For some computers, you may need to install a wireless antenna in order to connect.

Wireless routers use unlicensed frequencies to transmit and receive data. There are other devices that can use these same frequencies. Any device that operates in the same frequency as your wireless router can lower your speed/bandwidth or interrupt your connection. Examples include:

- Other wireless routers
- Cordless phones
- Baby monitors

Devices causing interference may even be located in another residence or business. For example, a router in use at the house next door to you may impact the performance of your wireless network.

The newest technology routers support a very high level of bandwidth from the device to the router. You should be able to use more than one device at the same time and see good performance.

Regardless of the bandwidth that your router supports, you need to remain aware that all of the connected devices are using the bandwidth of your Internet service. If you have a 5 Mbps service and two devices are connected through your router, those devices will share the 5 Mbps of bandwidth. Therefore, your router may support more devices than you can effectively use at the same time.

What Type of Router Should I Buy?

Wireless router technology levels had been previously identified with a single alpha character (G, N, etc.) which is usually shown on the box. For example, a box for an N router may show:

- A large N
- The words “Wireless N Router”
- A product code that has N in the first position

Most of the routers that have been sold over the last few years are “B”, “G” or “N”. The reason for these labels and how they work is not significant to most users. The main thing to be aware of is that the G router technology was an improvement over the B versions. N was the next step in technology and performed better than G.

The latest router technology is identified by the two characters “AC”. The AC router will:

- Provide the greatest range
- Penetrate walls and other obstructions most effectively
- Be more effective at handling interference from other devices and wireless networks in the area

The recommendation is to buy the most advanced router designed for home or small business use that you can afford. You may be able to save money by buying an inexpensive model but you really need to try to get the best solution. With all of the factors that can affect performance, you want a router that can limit these effects.

Installation

Routers come with installation directions and/or a CD that will walk you through the installation steps. The basic steps to get started are:

- Plug the router in
- Turn the power switch on
- Plug the cable from your Internet service (either your modem or wall jack) into the correct port on the router. This port is usually labeled “WAN” which stands for Wide Area Network.

To use a wired connection, plug an Ethernet cable into one of the available ports on the router. These ports are usually labeled “LAN” which stands for Local Area Network.

Devices that can connect wirelessly (phones, computers, etc.) have a selection somewhere in the menu or configuration that prompts the device to search for a wireless network. Your network has a name that will appear on the screen of your device. After you select the network, you will be prompted to enter a security code.

Security

Wired connections to your router provide a higher level of security than wireless. Someone who is attempting to access your network cannot “see” the network from the outside.

Wireless routers use a code (sometimes called a “key”) to manage access. The standard that was used for some time was called a WEP key. The latest security uses a WPA2 key that provides better security.

When properly enabled, devices will search for a wireless network and ask you to select one to join. The key for both WEP and WPA2 is an alphanumeric string (sequence) that is entered into a prompt on the device requesting access. Once you attempt to join a network, you will need to enter the key.

Troubleshooting

Adding a network to your home or business using a router means that you will have to learn how to use and maintain another device. Routers can be a big improvement to your service but it is important that you understand how they work and how to resolve some of the issues that often occur. The most common error in troubleshooting occurs when there is a problem with the router and the user immediately assumes that their Internet connection is not working.

No Internet Access? Some basic things to check:

- The router is plugged in and has power.
- Check that the on/off switch is in the on position.
- Make sure all cables are plugged in correctly.
- Connect your computer directly to the Internet (bypass the router) to see if you can access the Internet.

Slow Speed? You can check the speed of your Internet connection by using a speed test web site. Search for “Internet Speed Test” to find sites that are available. Use a site that allows you to select a speed test server site and choose one that is closest to your location. Try more than one site to get a good average speed result.

Speed test results will typically be slower when using a router. If you are testing over a wireless connection, your result will be slower than if you are connected directly to your modem. You should always run tests without your router in place before you assume that your Internet service is the reason for slow speeds.

Extending the Range of a Wireless Router

You may find that your wireless signal strength is better in some places in your home or business than it is in others. If you need to increase the range of your wireless router, there are products available that can boost the signal. Look for a product called a Wireless Range Extender.

These devices plug into a standard electrical outlet. The range extender must also be located within signal range of your wireless router. You may need to experiment with different locations. The stronger the signal, the more it has to boost, so the placement is important.

Summary

Adding a router will allow you to use multiple devices to access the Internet, and greatly enhance the use of your Internet service. It is important to become familiar with the capabilities, security and troubleshooting for your router to ensure that you have a positive experience.