INTERNET SERVICE OVERVIEW

This article contains information about:

- Internet Service Provider Networks
- Digital Subscriber Line (DSL)
- Cable Internet
- Fiber Internet
- Wireless/WIMAX
- Cellular/Wireless
- Satellite
- Which Internet Service is Best?

Internet Service Provider Networks

Internet services can be delivered over wired (land-based) networks or without wires using wireless or satellite technologies.

Wired or land-based networks use three types of network lines (cables) to provide service:

Copper – Originally used to provide phone service, DSL technology was developed to provide Internet service over copper telephone wires.

Coaxial – Originally used to provide cable TV service, technology was developed to provide Cable Internet service over coaxial cables.

Fiber Optic – Fiber optic cables that contain one or more fi bers (typically made from a type of glass) are used to provide Fiber Internet Service.

Most wired networks (including DSL and Cable Internet networks) have fiber optic cables in some areas even though customers are not receiving an actual Fiber Internet connection at their home or business. Replacing the main copper or coaxial cable routes with fiber optic cables improves the overall performance of DSL or Cable Internet services. The fiber cables terminate at a site (usually at a cabinet) close to the customer location and then copper (for DSL) or coax (for Cable Internet) are still used to connect the home or business.

Wireless networks use tower sites to provide service. The two general types of Wireless networks are:

Wireless/WIMAX: Typically use unlicensed frequencies to provide service.

Wireless/Cellular: Operated using licensed frequencies where the service provider pays for the right to use.

Fiber optic cables or high speed point-to-point wireless connections are used to link tower sites to create a network.

Satellite Internet Providers provide service from satellites located about 22,000 miles above the earth. The frequencies that are used to provide service are also licensed.

Types of Internet Connections

There are a number of technologies that can be used to provide a customer with an Internet connection including:

- Digital Subscriber Line (DSL)
- Cable Internet
- Fiber Internet
- Wireless/WIMAX
- Cellular/Wireless
- Satellite

Digital Subscriber Line (DSL)

DSL is provided over a copper line. These are the same copper lines that are used to provide telephone service.

Internet service inside the home or business is activated to a phone or Ethernet outlet (jack). All DSL services require a device called a modem. The modem is connected to the jack and to the computer (or router).

DSL speed (bandwidth) is directly impacted by the length of the copper line that is used to provide the service. Longer copper lines decrease the maximum speed that can be provided. For example, a home at the beginning of a residential street may be able to receive a relatively fast download speed (say 25 MEG) and a home at the far end of the same street may only be able to get a 5 MEG download speed.

Most of the components of a DSL network are not shared across customers. In most cases, the connection from the service provider to your home or business is dedicated to your service only. This means that the speed of your connection should be very consistent.

Very High Bit Rate DSL (VDSL) is a newer technology that provides higher speeds than traditional DSL. At short distances, download speeds as high as 100 Mbps and upload speeds as high as 25 Mbps can be achieved.

Cable Internet

Cable Internet is provided over coaxial cable (sometimes referred to as “coax”). This is the same type of cable that is used for cable TV service.

Internet service inside the homes or business is activated to a cable outlet (jack). Cable Internet service also requires a modem.

Cable Internet networks are affected by interference (sometimes called noise) and signal loss. Both of these can cause your connection to run slower or not work at all. These problems can originate anywhere in the network where coaxial cable is used. A noise or signal loss issue that is affecting your service could be:

- In the wiring inside your home or business
- Somewhere else in your neighborhood
- Anywhere in the network where coaxial cable is present

However, a well-maintained cable network can provide you with reliable service.

Cable Internet networks are shared across customers. If too many customers are added to an area of the network, the speeds for all customers may be slower, particularly during peak usage hours.

Cable Internet technology has been improved significantly in the past few years and available speeds have been increasing. Higher speed services (greater

than 20 Mbps) usually require a modem that is specifically designed to deliver higher bandwidth.

Fiber Internet

Fiber Internet connects your home or business to the service provider network with a fi ber optic cable connected to a terminal mounted inside or outside of your building.

Fiber Internet service does not require a modem. The service is activated to a phone or Ethernet outlet (jack) and a computer or router can be connected directly to the active jack for service.

Fiber connections provide consistent speeds and high reliability. They are not affected by distance, signal loss or interference.

Wireless/WIMAX

Wireless Internet (sometimes called WIMAX) is provided using wireless technology. Service providers use a network of towers to deliver service. An antenna is mounted on the home or business and then connected to the inside wiring.

Wireless Internet service does not require a modem. It does, however, require a device that provides electrical power to the antenna and a connection point for a computer or router. This device is usually called a Power Over Ethernet (POE) and it looks similar to a power supply for a computer.

This type of service requires clear line of sight to work effectively. Any obstructions (trees, buildings, hills, etc.) in the path from the antenna at the customer site to the tower location can cause the connection to be slower, less reliable or to not work at all.

The bandwidth of Wireless/WIMAX networks is shared by customers who are on the same tower antenna (sometimes called a sector). If too many customers are added to a sector, the speed of the service for all customers may be slower, particularly during peak hours.

Most of these networks use wireless frequencies that are unlicensed. This means that there are no limits on the number of service providers or devices that can use a frequency. Service can be negatively impacted by:

- Interference from another wireless Internet service provider
- Other wireless services
- Something as simple as a cordless telephone

Cellular/Wireless

Cellular/Wireless Internet service describes the type of Internet service that is typically available from cell phone companies. These service providers use the same towers used for cellular phone service to deliver Internet service.

Devices that are designed to work with this type of service such as cell phones, tablet computers, etc. can access the Internet with a valid subscription. No modem or additional device is required. You can also use a routing device called a “hotspot” to connect to the Internet with a standard computer.

This type of service does not necessarily require a clear line of sight to the tower in order to work. How ever, significant obstructions (buildings, hills, walls in a home or business, etc.) in the path from the device in use to the tower location can cause the service to be slower or less reliable.

The bandwidth of Wireless/cellular networks is also shared by customers who are on the same sector at the tower site. Also, the majority of customers on these networks use mobile devices. This can cause high levels of use on some towers at certain times of the day. For example, a tower may be overloaded during evenings and weekends due to high Internet usage by customers while they are at home. This same tower may have low levels of use during the day on weekdays when most of those customers are at work.

These networks use wireless frequencies that are licensed, which means that there are no service

providers or devices using a given frequency that are not authorized by the owner of the license. A customer's Internet service should not be negatively impacted by interference from other service providers or devices.

Satellite

Satellite Internet service is provided by satellites stationed above the earth. In order to receive service a satellite dish is mounted on the roof or wall of a residence or business. The dish must be pointed at the location of the satellite and there cannot be any obstructions in the path (trees, buildings, etc.).

Satellite Internet service requires a modem.

The bandwidth is shared by customers at the satellite. If too many customers are added to a given satellite, the speed of the service for all customers may be slower.

Satellite Internet connections can be affected by weather in extreme circumstances such as heavy storms or unusually dense clouds.

Which Internet Service Is Best For Me?

If you have a choice of more than one type of service you need to evaluate your needs in order to make your decision.

Reliability

We all would like to have service with 100% reliability but every network experiences at least some downtime. What is your requirement for reliability?

In general, wired services like DSL, fiber and cable Internet will be more reliable than wireless or satellite. If you work from home or you are running a business using your Internet connection, reliability may be the most important consideration. It may make sense for you to choose a slower DSL connection over a wireless/WIMAX service that has a higher speed in order to get the reliability that you need.

Another option to help ensure reliability is to subscribe to 2 different services. A Cable Internet connection from one provider and a wireless connection from another company can give you a backup in the event that one of the services is down.

Speed

Is high speed your most important requirement? For example, activities such as video streaming require higher speeds than typical web surfing.

How many devices (computers, phones, tablets, etc.) are you planning on using at the same time? If you are installing a network with multiple computers or you plan to use a number of devices with the same connection you will need to understand your bandwidth requirements. You need to be 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. This means that you may not be able to support your needs with some of the connections that are available to you. For example, if 5 Mbps is the highest download speed you can get and you want to watch high definition movies on 2 computers at the same time, your service will probably not be fast enough.

If you have a choice of a 1 Meg DSL connection or wireless/WIMAX service that provides 5 Meg, you may choose the wireless/WIMAX option to meet your needs even though reliability may be less than DSL.

Bandwidth Caps

Do you plan to use the service often for large downloads or video streaming? If so, you need to check with a provider before you sign up to see if they limit the amount of data that you can download in a given month. This limit is sometimes called a "bandwidth cap" or "data cap". Providers have different penalties for going over your cap. Some will charge you more on your next bill based on the amount of data that you

download above the specified cap. Others will "throttle" your service down to a slower speed for the remainder of the billing month once you exceed the cap.

Location

Where is the connection being installed? It may be easier to get a wireless/WIMAX connection in the location where you need it if internal wiring in your home or business is limited. Wireless/WIMAX may also make sense for a shop or garage on your property where it is not practical to install a wired service.

Gaming

Are you a gamer? The most important requirement for a good online gaming experience is a relatively low latency. Latency is the amount of time that it takes for data to travel from the source to the destination. Data travels from your computer to the gaming server and from the gaming server to your computer while you are playing an online game. If latency is high, you may see:

- Hesitation in movement
- Objects or characters that jump from one location to another instead of moving normally
- Interruptions in the game that require you to log back in to resume playing

Latency varies across different networks and may be higher in some areas of a service provider's network than others. Most providers attempt to minimize latency and work to correct these problems if they occur.

Satellite networks cannot reduce latency to an acceptable level for a good gaming experience. You can find out more information about satellite latency by contacting a provider or looking for information on their web site.