The Cable Modem Revolution Essay, Research Paper

The Cable Modem Revolution

Cable modems are the latest tools used for high-speed Internet access. These modems connect to the Internet via coaxial cable lines rather than telephone lines like conventional modems. By making use of the larger coaxial cables, cable modems are able to transfer much more data than anything in the past. These new modems can connect up to 180 times faster than the fastest analog telephone modems available today. In other words, a file that takes fifteen minutes to download using a 56k modem only takes about five seconds on a cable modem. Currently, cable modems are capable of data transfer rates of up to 40 Megabits per second (Mbps). Although rated as so, most of the cable modems today can realistically transfer around 10Mbps.

Like regular telephone modems, cable modems have to modulate and demodulate the stream of data from different computers at different locations. The similarity with analog modems ends there, however. Cable modems also incorporate a tuner (to separate the data signal from the rest of the broadcast stream); parts from network adapters, bridges, and routers (to connect to multiple computers); network-management software agents (so that the cable company can control and monitor its operations); and encryption devices (so your data isn t intercepted or sent somewhere else by mistake).

In order to use a cable modem, certain hardware is needed. First of all, you need a fast computer. A Power PC or Pentium processor with sixteen Megabytes of RAM would be recommended as a minimum. Next, you need to have a network interface card (NIC) installed in the computer. The most popular NIC used today is an Ethernet card (10baseT). Finally you need the cable modem itself and wires to hook everything up. The physical connection is pretty straightforward but then you have to configure you computer with standard TCP/IP software. Once connected, the computer is hooked up directly to the Internet. There are no phone numbers to dial and no limitations to serial-port throughput as is the case with ISDN modems.

Although cable modems use the same wires as your cable television, they operate at a separate frequency from that of cable television channels. By doing so, cable modems should operate without interfering with television reception. But pulling this off requires careful integration because of the way cable systems are currently set up. Most cable systems are used to sending signals in only one direction. Internet access, obviously, is two-way: every mouse click, every command and keystroke must travel back upstream. In order to become interactive, cable operators must allocate a spectrum on the cable for upstream signals so you can send data from the PC back to the Internet. Typically, the upstream signal is transmitted via a low frequency band that hasn t previously carried a TV channel. This low frequency band, however, is noisy due to the interference caused by such devices as CB radios, household appliances, and lights, which must be filtered out somewhere between the nearest distribution junction and the cable recipient. Another drawback is that all homes or offices connected to the same junction share this one transmission channel. And as is the case with an Ethernet network, too many nodes competing for bandwidth can slow network performance. If your neighbors do lots of downloads, your throughput will suffer unless the cable operator provides additional capacity or extra routers and channels. Cable companies will also have to modify their cable amplifiers to separate the upstream and downstream signals. In some regions, they ll end up replacing most amplifiers and putting lines closer to each home. Finally, cable operators will have to set up a community-wide Internet point of presence (POP) to serve all the networks associated with a particular distribution junction. This will require the cable companies to plan very carefully and to gain an enormous understanding of TCP/IP networking. They ll have to set up routers and servers at the distribution points and at strategic places around the cable system to manage Internet traffic.

Many user concerns must also be considered. For instance, if your home or office isn t yet wired for cable TV, or if your cable operator isn t planning to offer Internet access, you can t do much to change that except move. Another location issue concerns your home appliances. What if your PC isn t near your TV of existing cable drops? The cable company will need to rewire your house and snake the cable to your computer room. Yet another concern is standardization. For one thing, cable modems are still fairly new; many have only recently begun shipping. Each modem manufacturer uses a different data-transmission specification, so cable modems from different vendors are incompatible. Therefore, if you move to another city, you ll need a cable modem from the local cable operator.

Telephone companies aren t just sitting around as the cable Internet access technology prepares to past them up. Many Telephone companies are actively investigating their own weapon. This weapon is ADSL (asymmetrical digital subscriber line) technology that allows the transport of data over plain old copper telephone lines at speeds up to 9Mbps. If they provide this service at a similar price with faster connections to the Internet backbone and better customer service, cable modems will face significant competition. But, until ADSL is deployed and as long as usage patterns stay the same, 10Mbps access through cable modems will be very attractive.

For the most part, using cable lines to access the Internet is still in the pilot stage. Only a dozen or so cities currently offer cable modem service for testing purposes. As mentioned earlier, many technical hurdles have to be overcome before cable modem service is widely available. Furthermore, hardware and transmission protocols must become standardized so that everything can work together and interchangeably. It is projected that cable Internet access won t be widespread until three to five years. And once that happens, you can probably buy a cable modem for about twenty percent higher than telephone modems and get service for about thirty dollars a month. That s quite a deal considering ISDN service of today cost twice that, but connection speeds are only around 128kbps.