

## NETWORKING (/CATEGORY/NETWORKING-HARDWARE)

# How It Works: Cable Modems

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How It Works: Cable Modems The second in our series of primers explaining today's leading technologies. Michael Gowan

Cable modems: devices that provide high-speed Internet access using cable television networks.

- Pro: fast data-transmission rates; always-on connection; least expensive broadband option.
- Con: no Internet service provider choice; bandwidth is shared with neighbors; not available in all areas.

These days, the cable that brings you MTV and CNN can also bring you the Internet. Some cable companies have expanded their services to include high-speed Internet connections for home users. Like its rival Digital Subscriber Line, cable modem service lets you get on the Net without having to dial in.

Cable access theoretically allows downstream speeds of up to 38 megabits per second, but actual rates are considerably slower. PC World test results, published in March 1999, showed that downstream speeds (from the Internet to you) over cable modems averaged 382 kilobits per second, while upstream rates (from you to the Internet) averaged 315 kbps. But those speeds are still about seven times faster than what you get with standard modems.

One reason you'll rarely see the top speeds: Cable modem users must share bandwidth with everyone else on the network. The more people online at any moment, the slower your access will be. Unlike standard modem access, which creates a one-to-one circuit between your PC and your Internet access provider, cable access uses what's called a branching network. In such a network, a device called a cable modem termination system at your cable company's central office sends out signals along a main line. That main line then splits into "feeder lines." All subscribers along a given feeder line must share its overall bandwidth. Your cable modem converts the incoming signals into data your computer can understand and then sends it to your computer through an Ethernet card.

Two types of cable systems are currently in use: coaxial and fiber optic. The older coaxial cables max out at 350 MHz and can't send signals upstream. To get around the latter problem, the cable company uses the phone line to send data upstream. The newer fiber optic networks support rates up to 750 MHz and allow two-way traffic, in which the upstream data typically uses some portion of the 5- to 40-MHz frequency range. Whichever system is used, cable companies split all available bandwidth into 6-MHz channels and assign those channels to individual networks, such as ABC or NBC. For Internet access, one of these 6-MHz channels is dedicated to moving data downstream; fiber optic systems dedicate another channel to upstream signals.

Cable is ahead of DSL in deployment--more than 1 million people currently surf the Net over cable, and another 32 million living in Net-ready cable markets could if they wanted to. Forrester Research predicts that about 20 million people will use cable to access the Internet by 2003, compared to about 8 million DSL subscribers by the same year.

For now, cable Internet access is restricted primarily to home users; cable companies didn't wire downtowns or business parks, so many businesses are out of luck. In most markets, service costs from \$30 to \$40 a month, although in some areas the cheapest access will cost \$70. Downstream speeds at those price levels range from 256 kbps to 512 kbps. But the faster you want to go, the more it will cost: 2 mbps downstream, 1 mbps upstream runs upward of \$500 a month in some places.

You first need to find out if your local cable service offers Internet access. If it does and you want to get set up, be aware: Unlike DSL and standard modem service, cable service gives you no choice in ISPs. Time Warner cable systems, for example, work only with a provider called Road Runner; AT&T works only with Excite@Home. Cable companies have been reluctant to open their wires to unaffiliated ISPs, claiming they've invested too much in the system to lease the lines to other companies. ISPs have filed lawsuits to gain access to the lines, and they've won some local cases, which the cable companies have appealed. AT&T has recently softened its stance, announcing that it's willing to share its lines with other ISPs, though that won't likely happen until 2002.

On your end, you'll need an Ethernet-equipped computer and a cable modem. The modems are produced by a number of companies, including 3Com, Motorola, and General Instruments. Some cable companies rent modems and include the fee in the monthly service charge; others require you to buy them for about \$200 to \$300.

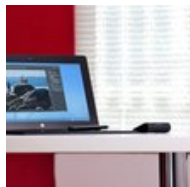
At this time, it's best to get a modem through your cable company. Different cable companies use different modulation schemes, and your modem must use the same scheme used by the cable company. While an industry standard called Data Over Cable Service Interface Specification has been approved, it won't be fully implemented for another year or so. When DOCSIS is universal, you'll supposedly be able to use any modem you want.

A cable service technician may need to install your modem and a splitter. If you already subscribe to cable television, you need a splitter to separate the lines to the television and the computer. You can order cable Net access without having a cable television connection, but some companies will charge more for that arrangement.

For additional information, take a look at the sites for the Cable Modem University and CableLabs.

Michael Gowan is a staff editor for PC World Online.

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