- You can connect a single computer on a local area network (LAN) to the Internet over a telephone line, and with proper configuration the entire LAN can use the Internet through this one connection.

What special equipment is needed?

Generally, the same computer, modem, and telephone line used for dialing up to a personal account can be used with SLIP or PPP. In most circumstances the connection will only work well if you are using a fast modem (9600 baud or higher).

You need the special SLIP or PPP software mentioned above, in addition to your regular communications software. The regular communications software allows your computer to *communicate* over the telephone line in the first place; the SLIP or PPP software lets it *use Internet protocols* on the telephone line. SLIP or PPP software is not available for every type of personal computer, but is readily available for Apple Macintosh and IBM PC. Internet service providers that offer individuals relatively low-cost SLIP or PPP access (in the $35/month range) sometimes include in the setup charges a special software package that takes care of your SLIP or PPP software configuration. Commercial SLIP packages are also available from software outlets, or you can borrow or download a copy of free public domain SLIP software such as NCSA Telnet.

You also need a separate e-mail arrangement if you use SLIP or PPP. When you connect with SLIP or PPP, you are attaching your computer to the network as a full-fledged Internet system. But e-mail is sent to specific accounts, not to whole Internet systems. Normally your Internet service provider will have e-mail arrangements available. The service provider's computer collects and holds e-mail for you, then transfers it to your computer when you connect with SLIP or PPP. Using mail-reading software you install on your personal computer, you can then read and answer e-mail much as you would if you were logged on to a personal account on another Internet system. Check with your Internet service provider to make sure e-mail forwarding is part of the service provided, and to find out how to obtain and install mail-reading software for your personal computer. Again, the software may be included in a setup package you receive from your service provider.

provider. Both are protocols -- commonly-agreed ways for your computer to communicate -- that let your computer act as an equal entity, or peer, to any other computer on the Internet. The acronym SLIP stands for Serial Line Internet Protocol. PPP stands for Point-to-Point Protocol. It is a newer, extended protocol that may eventually make SLIP obsolete, but for now, most providers offer SLIP, not PPP.

SLIP and PPP have advantages, as described below, but their software programs are not simple to install. Some service providers that offer SLIP or PPP access also offer installation help, but not all do. If you are considering using SLIP or PPP, weigh the advantages against the fact that you may need a relatively high level of expertise to set them up. Consider also the cost of the SLIP or PPP service available to you; many (but by no means all) Internet service providers offering SLIP or PPP access charge higher fees than providers offering accounts.

Why use SLIP or PPP?

SLIP or PPP makes your computer appear to the Internet to be directly connected (as an Internet host), rather than requiring it to access the Internet through an account on another computer that is directly connected.

The Internet is commonly pictured or described as a sort of cloud, with new machines coming into the cloud from time to time, some as permanent additions and some temporarily. When you log on to an account on an Internet system, your personal computer remains outside the cloud. It is dependent on the Internet system to which it connects, and which is a permanent part of the cloud. A computer connecting with SLIP or PPP actually comes into the cloud temporarily (for the duration of the telephone call that connects it). It is assigned its own Internet host name and address, just like any other Internet computer, and, it is able to perform Internet functions directly.

Using SLIP or PPP means:

- You can transfer files with FTP direct to your own computer's hard disk. Using an account instead, you can transfer files to the account from other Internet computers, but then you must download the file from the account in order to get it onto your own disk.
- You can connect to more than one Internet computer at a time.

- **Multi-user Systems**

  Most large, commercial multi-user systems such as Compuserve and GEnie do not currently have full-service Internet connections, but some allow e-mail to and from the Internet. Pricing may be hourly or monthly, starting about $15 per month for a basic account plus access to Internet e-mail; there may be additional per-message charges for each e-mail item. Accounts on these systems are generally available to anyone.

Select some likely service providers from the list, then contact them for current cost and service information. Many have brochures available with full details of their services. Once you pick a provider, sign up for an account. In some cases, you can sign up online; you often need to give a credit card number for billing purposes. In other cases, you must fill out and return a form, often with the initial fee or deposit. You will receive your account information (such as the phone number to dial, your account ID, and your password). If you sign up online, this information will be displayed when you sign up. Write it down, as you normally will not receive a written confirmation. If you sign up by mail, account information will generally be sent by mail.

Check the manual for your communications software to find out how to enter the appropriate telephone number and any other settings that your service provider may specify. Then, using your computer and modem, dial the telephone number. If you run into difficulties, contact the service provider for help. Once you successfully connect, you are ready to use all the features described in Chapter 4. You are on the Internet!

"Direct" Connection with SLIP or PPP

We have added a section on SLIP .and PPP to the end of this chapter because for most people trying to use the Internet, SLIP and PPP really are afterthoughts -- it's only in rare circumstances that you would *need* to use them.

What are SLIP and PPP?

SLIP and PPP are sets of programs that you can buy from a computer supplier or obtain through your Internet service

- **Free**

  The cheapest way to get an account is to request a free or discounted account from a nearby organization that is connected to the Internet. Some colleges and universities will occasionally make guest accounts available to libraries, schools, or non-profit organizations. Check with these institutions in your area to see if a guest account is available. An account on a university system connected to the Internet normally includes access to all Internet services listed in Chapter 4.

- **Mid-Level Networks**

  Many mid-level networks support dial-up access to accounts on a central system connected to the Internet. Fees vary depending on whether the network specializes in supporting individual accounts (starting about $35 per month) or organizational access (starting about $150 per month). Mid-level networks provide full Internet services. Accounts on some of these systems may be restricted to research and educational use. Libraries generally won't encounter access restrictions, but if yours is a corporate library, pay special attention to eligibility requirements. Appendix B lists mid-level networks as well as other large networks; Chapter 3 includes mid-level networks that currently offer dial-up service.

- **Commercial and Non-Profit Providers**

  Numerous commercial and non-profit Internet service providers have accounts available for a monthly or annual fee such as $20 per month or an hourly fee such as $2 per hour. Accounts on these systems are generally available to anyone.

- **BBSs**

  Bulletin board systems (BBSs) contain messages and files posted by their users. Hundreds of these systems are available in the U.S., ranging in size from single personal computers with a few incoming telephone lines to banks of workstations with dozens of lines for many simultaneous users. Some BBSs have Internet connections. BBSs that offer full access to Internet services charge a fee, such as $250 per year. BBSs that offer access to a subset of Internet services, such as e-mail to and from the Internet, may charge a fee such as $6 per month or more. These BBSs are generally available to anyone.

The telephone line

The telephone line is an ordinary line; no special data line or leased line is needed. You can use the same telephone line that you use for regular calling, unless that line will be needed for telephone calls at the same time that you are dialing from your computer. In that case you will want to have an additional line installed.

The telephone line must end in a modular jack so that it can plug into the modem properly. The jack plugs into your external modem, if you are using one; if you are using an internal modem, the jack plugs in to the telephone connection on the back or side of your computer. If your phone lines do not have modular connections, you will need converters that connect other types of phone lines (such as round wire) to modular jacks. You can have a converter installed by the telephone company, or you can buy one from a local store such as a hardware or electronics store, and install it yourself.

A direct line is preferable to one that is switched (i.e., one that goes through a switchboard of any type). If your library has a telephone system that allows direct calls out, but requires you to dial "9" or some other number for outside calls, this should work without problems for dialing in to an Internet account; simply add "9" (or the appropriate number) to the beginning of each number you have your modem dial. If the line you use has call waiting, any incoming calls may disconnect your Internet session. Check with your local telephone company for instructions on turning off call waiting for the duration of your Internet call.

Arranging for an Account

Once you have the equipment described in "Basic Equipment for Dial-Up Access" above, the next step is to contact an Internet service provider for access.

An account on a system that is part of the Internet gives you access to the applications and services described in Chapter 4. The list in Chapter 3 gives information about networks and companies known to offer Internet access; more are becoming available all the time.

The following are types of account providers from which to choose:

If you already have a computer you are using for an online catalog, should you use it for Internet access? Generally, the answer is no. If the computer is provided by an online catalog vendor specifically for the online catalog, it may not be set up to do an additional job like providing communications service to other computers, and your vendor's support of the system is almost certainly limited to your use of the system for the functions the vendor set it up to do. Consider carefully your security responsibilities, also. Using a publicly-accessible computer for Internet access may invite serious security problems both for your own account and for the Internet at large. See the section "Security on the Internet" in Chapter 1 for more information on your responsibilities in this area. On the other hand, if your library has already bought a computer for staff use in applications such as word processing, and it is not already in constant use for these tasks, then you can probably add a modem and communications software for Internet access.

You can use a terminal instead of a personal computer. The terminal will not require a telecommunications program, but because it has no disk drives, it will not be able to store any of the information that you might like to retrieve from the Internet. As with the personal computer telecommunications software, your terminal will work better with many Internet resources if it is a VT100 or later DEC VT model, or if it can emulate a VT100.

The modem

The modem lets your computer communicate through a telephone line, and determines the speed at which your computer communicates. Most of the Internet service providers listed in Chapter 3 support modem connections at speeds between 1200 and 9600 baud. Some also allow higher-speed connections, while some cannot make connections at lower speeds such as 300 or 1200 baud. Before buying a modem specifically to connect to the Internet, check with the service providers that interest you to see what modem speeds they support.

When buying a modem, you can also choose from internal or external modems. Internal modems are installed inside the computer, while external modems are separate items that need to be connected to your computer through its serial port. For dialing up to the Internet, internal and external modems work equally well.

its most basic form, though, dial-up access only requires you to reach an ordinary personal account on another computer system. That system, in turn, must be on the Internet, and is responsible for using TCP/IP protocols to communicate with other computers on the Internet.

The computer and software

Virtually any personal computer will work; the Internet itself does not require a specific brand or type. A few of the individual Internet service providers listed in Chapter 3 may require, or work better with, a specific computer type. This is mainly because they provide special interface software, such as menu-based systems for e-mail or Internet use, and the software can only run on specific types of personal computers such as Apple Macintosh or IBM PC. However, with most service providers, any personal computer will do.

Your computer must be able to connect properly to a modem. If you are using an internal modem -- one that has been installed inside the computer -- it is already properly connected. If you are using an external modem that is separate from the computer, it has a short cable (sold with the modem) to connect to the computer. There should be a connector on the computer, usually at the back, for plugging in the cable. This is a serial port, also known as a communications port or COM port. If your computer does not have a serial port, you will need to have one installed in order to use an external modem.

Your computer must have a telecommunications program -- that is, software that enables it to communicate with another computer through a modem over a telephone line. ProComm, Kermit, Smartcom, and MicroPhone II are a few of the telecommunications programs available. The telecommunications program causes your computer to act like, or emulate, a terminal. Different settings may be available in the program to allow it to emulate different kinds of terminals. Some of the resources on the Internet, such as Archie and Gopher as well as many of the online library systems available, work best with DEC VT100 or later-model VT terminals or emulations such as VT102 or VT220. You will have good results with a telecommunications program that can emulate a VT100 or VT102. Most currently available programs can do this. Some do not support VT100 but do support an ANSI terminal setting, which can generally be used whenever VT100 emulation is expected.

Chapter 2: How to Get Dial-Up Access to the Internet

This chapter focuses on linking one or two personal computers to the Internet -- that is, on dial-up access. This is a small part of the complete range of Internet access options, but for most people, it is the easiest and least expensive option. Making Internet access simultaneously available to hundreds of users generally requires substantial investments in time, equipment, and expertise; such a project is not covered here. Please refer to the bibliography for other guides more appropriate to that undertaking.

Basic Equipment for Dial-Up Access

The first thing to know about equipment for dial-up access to the Internet is that *no special Internet equipment is required.* The equipment you will use is the same as you would use to dial up to services such as DIALOG, Compuserve, a local bulletin board system, or an online library catalog.

The basic equipment you need is a *personal computer,* connected to a *modem,* connected to a *telephone line.* The computer needs to have a *communications program* in order to communicate properly over the modem. If you have a personal computer with a modem, and you have already used it to dial up to another computer, you do not need any more equipment!

It may seem strange that ordinary equipment and communications software are all you need to use a huge network built on its own special communications protocols. In