APPENDIX B

Choosing an ISP

The following is a whitepaper written on how to choose an ISP produced by Intermedia Communications, **www.intermedia.com**.

Available on the Web at: www.intermedia.com/products/businessinternet/whitepapers/bis-choosingisp.html.

This white paper is written for corporations or organizations interested in high-speed access (56 Kbps or higher) to the Internet. Different selection criteria are necessary for dial-up capabilities or for reselling bandwidth from an Internet service provider (ISP).

I. Finding an Internet Service Provider in Your Area

Begin your search by finding a provider who has a point of presence (POP) local to the corporate site where the circuit will be installed. This does not mean that the ISP needs to be headquartered in your city, but that the ISP has an access point to their network within your service area. For many of the access services ISPs sell, the closer the ISP's point of presence is to your site, the less expensive your monthly recurring telecommunications charges will be. Try to avoid the additional charges of ordering and paying for a long distance circuit into the point of presence. Unfortunately, this may not be an option for those in smaller cities.

Prices for point-to-point dedicated circuits are based on the exact mileage from your site to the ISP's point of presence. Other services such as Frame Relay are not distance sensitive, but may not be offered in all areas and do not offer full dedicated bandwidth.

Good resources to find ISPs that service your area are:

- Chamber of Commerce
- Boardwatch Directory of Internet Service Providers
- World Wide Web, **www.thelist.com**
- Word of mouth

Unfortunately, ISPs do not tend to be consistently listed in the Yellow Pages or directory assistance.

II. Examine the ISP's Network

The Internet is a vast network of hundreds of thousands of smaller networks. Find an Internet provider who is:

- Well-connected to those other networks
- Moves your traffic where it needs to go quickly
- Has little to no downtime or packet loss

A few questions to ask ISPs at this point include:

A. Is the ISP a first-tier ISP or a second-tier ISP? A first-tier ISP is connected directly to the Internet, with its own national backbone. First-tier ISPs peer with other backbone providers at the major network access points (NAPs). Their backbone consists of lines owned by that company, not rented by another provider.

A second-tier ISP has only one, maybe two physical links at lower speeds, usually T1 (1.54 Mbps capacity), linking it to the backbones of other larger first-tier provider networks. Second-tier ISPs are resellers since they are reselling the bandwidth they have received from a first-tier Internet service provider.

Corporations and organizations who need high-speed access to the Internet should strongly consider first-tier ISPs, since a second-tier ISP may not be able to support initial bandwidth requirements or future growth.

Receiving full T1 bandwidth from an ISP that usesT1 circuits as its network backbone is impossible.

B. Ask To See a Copy of the ISP's Network Map. This diagram shows you which peering points/NAPs the provider is connected to, number of points of presence, and at what speeds. If a provider does not have a network map in place or doesn't provide you with one, it may indicate they are reselling another provider's bandwidth.

Once you have received the map, look for a few key items including:

- **Number of Points of Presence.** If you have multiple corporate locations, selecting an ISP with a national presence is invaluable. This national presence results is less routing hops for your Internet traffic, reduced costs on telecommunications circuits, the ease of dealing with a single vendor, and often a multisite discount on service. Some ISPs also have virtual wide area network (WAN) options, allowing secure, reliable access to multiple corporate locations, using the Internet to move traffic rather than installing private lines.
- **Speed of Each Network Circuit.** Ensure the ISP has much more bandwidth than you need. The larger first-tier ISPs most likely have DS-3 (45 Mbps) core network circuits, as opposed to T1 (1.54 Mbps) circuits found in the networks of second-tier Internet service providers. Far fewer customers can absorb the bandwidth of a T1 circuit and slow it down than a DS-3 circuit.
- **Peering Locations/National Access Points.** Large ISPs and telecommunications vendors have agreed to swap routes of IP packets at various large telecommunications locations around the nation called peering or access points. These interconnections allow customers of one ISP to interact with customers of other peering ISPs within the Internet.

There are three major interconnection points a provider should be connected to:

1. MAE-East in Washington, D.C.

2. MAE-West in San Jose, Calif.

3. NY NAP in Pennsauken, N.J.

Other peering locations include: PacBell NAP, Ameritech NAP, CIX, FIX-EAST, FIX-WEST, and MAE-LA, MAE-Dallas, DEC NAP, and MAE-Chicago.

Ensure the ISPs you are evaluating are connected to a minimum of three peering points or NAPs. This increases your chances of always being able to connect to most of the networks within the Internet.

- **Network Redundancy.** ISPs should have multiple high-speed routes to and from your service area. In case of an outage, these backup circuits provide alternative paths for your traffic.

C. Hardware Used in POPs. Ask what hardware the ISP uses in its POPs. A reliable ISP uses reliable hardware such as top-of-the-line Cisco routers. Does the ISP stock replacement components at their hub locations or have spare port capacity available in case of problems?

III. Support: What Are You Really Buying?

A. 24x7 Network Operations Center. You are paying an Internet Service Provider to not only assist you in running your Internet connection but to keep it operational. The network operations center (NOC) should be staffed by senior networking personnel who monitor your connection 24 hours a day, seven days a week. The NOC should work directly with the telecommunications vendor in case of an outage, and attempt to trouble-shoot any problems immediately.

Tip: One great way to test a potential Internet Service Provider's NOC is to give them a call. Call at 2 a.m., on a holiday, or during the weekend. You want to make sure your connection stays up all the time and not just during business hours. When you call, find out:

1. If a real person answers the phone

2. How long someone takes to answer the phone

3. How many engineers are on-site when you call

4. How many senior managers are available, should there be a problem that needs escalation

5. If they can be reached by e-mail

In addition, there are a few questions you should have answered by the sales representative you are working with regarding the Network Operations Center.

1. What are the NOC's outage procedures?

2. Does it have written escalation procedures should a problem need extensive technical expertise or managerial escalation?

3. Can you request that the NOC contact you at any time during the day or night should an outage occur rather than waiting until business hours?

4. How often is it monitoring the connection?

5. How are each of the remote hubs monitored? For example, if the ISP is located in Washington, D.C., does it have relationships with telecommunications vendors to provide hands-on maintenance at a point of presence in Dallas, Texas? What is that third party's response time?

6. Does the NOC staff simply monitor the network or are they trained to proactively resolve network problems as they arise?

B. Technical Support/Customer Service Staff. This is a staff of engineers or TCP/IP experts who are trained in mail, news, router configurations, ordering your connection, and so on.

A few key questions to have answered are:

1. What are the hours supported by the technical support staff?

2. Are they accessible by e-mail and phone? Do they have a support Web site?

3. Is the ISP focused on dedicated access? If the ISP also provides dial-up access, consider a few things. Providing dial-up Internet access is a support-intensive business and it tends to draw support time and money away from dedicated access support. Ask if it has a separate support phone number with a priority queue for dedicated access customers.

4. How many personnel are there and what are the hours of coverage?

5. Do they have a trouble ticket system?

6. What is the response time?

7. Specifically, what will the technical support staff answer? Some ISPs provide support only problems within their routers, but others provide support up to and including the customer's equipment. Some actually come on-site to assist with internal networking problems (usually for a fee).

IV. Getting Connected. How Much Will They Help You?

These services should all be included in the installation charges for service. However, you may want to double-check with each ISP you are evaluating.

A. Ordering the Circuit. Select an ISP that will order the circuit for you and have it installed. If you have never ordered a telecommunications circuit before, this can be a frustrating and arduous task. Not having to deal directly with a large telecommunications carrier in itself is worth every penny you pay in installation charges to the ISP. Leaving this responsibility to the ISP benefits you because:

1. The ISP already has an established working relationship with your local telecommunications vendor that should make your installation go more smoothly.

2. The ISP is generally offered reduced costs on circuits because they order in such great quantity.

3. The ISP is experienced in telephony and ordering the circuits correctly.

4. The ISP is knowledgeable on bringing the circuits into the hubs correctly.

5. You have the guarantee that if an outage does occur at 3 a.m., the ISP can work directly with the telecommunications carrier in bringing the circuit back up. If you order the circuit, the ISP isn't authorized to work with the telecommunications vendor to bring the circuit down for standard maintenance or bring it back up should an outage occur.

Ask each ISP you are considering how long installing the circuit takes and to have it operational. Installation can take anywhere from three to eight weeks depending on the telecommunications carrier and the availability of the ISP's installation engineers.

B. How Will Your Mail Be Delivered? Most ISPs expect their customers leasing any sort of line of 56 Kbps or above to run their own mail server or mail gateway. Others offer full mail forwarding services, and some offer SMTP hosts to allow you to run a mail gateway rather than a full mail server. If you are switching ISPs, make sure your new provider works with your old provider in keeping DNS records updated so you have uninterrupted service.

For more information on steps to consider when switching ISPs, please ask your Intermedia Business Internet sales representative for Intermedia Business Internet's Switching Internet Service Providers whitepaper.

C. Registering Your Domain Name. The ISP should work directly with the InterNIC to register a domain name for your company. This process takes three to four weeks; however, registering it yourself could take months.

D. Allocating IP Addresses. Since 1995, the process of obtaining Class C IP addresses directly from the InterNIC has changed. Due to the explosion of networks connecting to the Internet, the number of available IP addresses has diminished and the routing tables needed to hold those addresses became more difficult to manage. To answer this challenge, the Internet community developed a new way of administering IP addresses known as Classless Inter Domain Routing (CIDR), a truncated version of identifying ISPs' networks and routes that now replaces thousands of IP addresses.

Therefore, rather than obtaining your Class C IP addresses from the InterNIC and owning them for life, you will now need to obtain an IP address from the ISP and you will be considered part of their CIDR block. Confirm with the ISPs you are evaluating that this is a free service.

E. Domain Name Service (DNS). Domain name service maps your domain name to a series of IP addresses. A good ISP will take care of this function for you free of charge. If you anticipate frequent additions or changes to your IP addresses, it may be best to run primary DNS yourself and ask that the ISP run a back up secondary DNS for you.

F. Newsfeed. Most large first-tier ISPs include a full USENET newsfeed at no additional charge. If not, ask the sales representative to clearly break this charge out on the quotation.

G. Utilization Reports. Another nice perk to ask a potential ISP is if they provide you monthly or weekly statistical usage reports on your circuit. These reports can show your peak performance, errors, and downtime.

H. Hardware...who owns it? Find out if the hardware you are purchasing from the ISP is owned by you or the ISP, and then determine if they assist in preconfiguring the hardware for you or if you must do it yourself. The most beneficial option is to purchase the hardware from the ISP and have them configure it for you. You ultimately have the most control over routing tables, security, upkeep, port utilization for other needs, and can take it with you should you switch providers.

Ask about warranties and support and maintenance agreements associated with the hardware. There may be additional charges for maintenance, but these agreements assure that if your hardware is faulty, you'll have another replacement within a set period of time.

V. Price

Ask the sales representative to break out all the following charges. You do not want any surprises after installation.

A. One-Time Charges

1. ISP's Installation Charge. This is the initial one-time setup charge to get connected to an ISP's network. This price often includes not only the ISP's hardware, but ordering the circuit and having it installed, domain name registration, and allocating IP addresses.

2. Telecommunications Circuit. There is a one-time setup charge associated with the circuit you are leasing. If the ISP is ordering the circuit for you, they often combine this charge with their installation charge. Ask the sales representative to separate these charges so you can fairly compare all the ISPs' prices.

3. Hardware. There are two essential pieces of equipment you need to purchase or lease from the ISP or an outside vendor that you must pay up front:

Channel Service Unit/Digital Service Unit (CSU/DSU)—The CSU/DSU connects directly to the circuit and acts as a modem receiving digitized pulses from the circuit and translating them into digital signals for the router. Most CSU/DSUs work for either a 56 Kbps circuit or a T1—but not both—so ensure you are receiving the right equipment from your vendor.

Router—The router connects to the CSU/DSU via a v.35 cable on one end and via Ethernet to your LAN on the other. *Note:* If you are purchasing the router from an ISP or vendor, ask if the cable is included for free or if it's an additional cost. Ask what router the ISP uses within its hubs, and then select a compatible router.

An ISP may offer these two pieces of hardware in a package deal, so ask that they be priced out separately.

4. Additional Wiring. The telecommunications carrier ask if you need additional wiring from your demarcation point (the telephone closet) into a specific suite or computer room. If you do not know how to perform the wiring yourself, or do not have trained personnel internally to handle it, this could be an additional $50 to $500, depending on your needs. The sales representative may not know to mention this cost, so make note of it for budgeting purposes.

B. Monthly Recurring Charges

1. Telecommunications Charges. Whether you order the circuit yourself or have the ISP order it for you, two monthly recurring costs associated with leasing a circuit are possible:

Local Loop Charge—This is the charge to lease a circuit from your location to the ISP's point of presence. This charge varies on the distance from those two sites and the size of bandwidth needed.

IXC or Long Distance Charge—If you are outside the local area of your local exchange carrier (LEC), the LEC needs to work with a long-distance carrier to connect you into its local telecommunications network. This fee can be substantial, so find a provider who has the bandwidth capacity closest to your site. This charge is combined with the local loop charge on your bill.

2. ISP's Service Charges. This is often referred to as a port charge, or the recurring charges associated with being connected to the ISP's router, and therefore, to the Internet. This price varies depending on the bandwidth you desire and from provider to provider.

An ISP may also combine their port charge with the leased telecommunications charges or local loop charges. Ask that the sales representative break these charges apart. It will allow you to most effectively compare pricing with other ISPs.

VI. Conclusion

The Internet has become a valuable medium for running your business. You can sell your product, communicate with your vendors and customers, market your corporate name, research your competition, and communicate with your remote offices. Choosing the right Internet service provider to get your business onto the Internet and keep it operational is a crucial endeavor.

Since your Internet needs and goals differ vastly from the needs of another, this whitepaper is intended to act as a selection tool to guide you on your search in locating a reliable ISP, rather than a comprehensive list of all services to consider. Determine from the outset what is most important to you, such as a reliable network backbone or the lowest price, and then use this whitepaper to determine which ISP best meets those needs.