



## ISP Checklist

Considerations for communities engaging Internet Services from an Internet Service Provider.

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## Terminology

Appendix B includes a glossary of commonly used technical terms.

Throughout this document we discuss quantities of information being transferred over a network in terms of “bits” and “bytes”.

By convention a “byte” is a single letter (eg: The letter “A” consumes one byte), however network operators often refer to the amount of data transferred over a network in terms of “bits”. There are 8 bits in a single byte.

Here are common abbreviations used to describe bits and bytes:

- bps – bits per second. The number of bits transferred in a single second.
- Bps – bytes per second. The number of bytes transferred in a single second.

Note the use of capitalization. An upper case character always refers to a larger quantity.

When describing thousands, millions and billions of bits and bytes we use the scientific symbols “K”, “M” and “G”.

- Kbps – Kilo bits per second or roughly one thousand (1000) bits of information.
- Mbps – Mega Bits per second or roughly one million (1,000,000) bits of information.
- Gbps – Giga bits per second, or roughly one billion (1,000,000,000) bits of information.

These prefixes also apply to Bytes per second (or Bps).

# **1. What you need to know about working with an ISP**

An Internet Service Provider (“ISP”) typically provides an Internet connection and additional services such as Email and Web content. Your ISP serves as your gateway to the world wide Internet. This guide has been produced to help explain some of the considerations in choosing an Internet Service Provider for your organization's use.

## ***1.1 General***

If your users are new to the Internet, your ISP may be the only source of help and information. In addition to providing reliable Internet access, consider whether the ISP can provide adequate support and/or training for your users.

Some Internet Providers may not provide support beyond their core service offerings. If your user base is new to the Internet make sure your ISP can handle general Internet usage inquires and not just technical trouble shooting.

If in doubt, ask your ISP for references. Also talk with other communities about the ISP, ask questions about reliability but more importantly, try to find out how well the ISP handles problems when they occur.

## **1.2 Determining your capacity needs**

Your Internet service will be delivered over a network connection based on the available technology options in your community. In many communities where broadband is not available this may be limited to dial-up Internet access. Your ISP may also build a broadband network to provide you with service depending on your needs but may require additional funding to offset the build costs.

When approaching an ISP for Internet Access you must clearly state your present and long term (5+) year needs. Technologies such as dial-up are not suitable for bandwidth intensive applications (eg: Health care, education, teleconferencing, etc.).

For example:

- Will the Internet connection be used primarily for basic office/home use (web surfing, Email access, etc.)?
- Will the Internet connection be used for teleconferencing, Internet telephone service, TeleMedicine. etc.?

### **1.2.1 Flat vs. tiered service**

Some connections may be *flat rate* connections, allowing for as much data to be transferred per billing (ie: monthly) period based on the speed of the connection.

Some connections may also be *tiered*, meaning you can purchase a lower speed connection and upgrade later. Some providers may also provide *burstable* service allowing you to transfer larger amounts of information at a higher speed for short periods of time.

Example:

- You may purchase a 2 Mbps connection that can later be upgraded to 5 Mbps through a technology upgrade.
- You may purchase a 2 Mbps connection but be allowed to *burst* up to 5 Mbps on an as-needed basis, paying an additional cost when the extra bandwidth is used.

You will need to determine the costs for upgrades, over-usage charges, etc.

### **1.2.2 Do you need full or half duplex?**

Duplex refers to the ability of the connection to send and receive information at the same time. A full duplex connection is able to transmit information while simultaneously receiving information and is necessary for bandwidth sensitive applications such as Internet servers or TeleMedicine applications.

For regular use (checking Email, accessing web sites, etc) a half duplex connection is suitable.

Your ISP may refer to half and full duplex using technical terminology:

- Half Duplex – Asymmetric
- Full Duplex – Symmetric

Full Duplex connections are usually more expensive than a half duplex connection. If you are unsure of your need for symmetry specify a half-duplex connection.

### **1.2.3 Determining your bandwidth usage**

In determining the amount of bandwidth (rated in bits per second or bps) factor in the bandwidth needs of your applications multiplied by the number of users using the application simultaneously.

Teleconferencing and transferring large data files will consume bandwidth over a longer period of time vs. downloading small amounts of data such as Email messages or surfing the web. Care must be taken to allocate enough bandwidth for resource hungry uses while providing enough bandwidth for other users on the network.

For example:

- A teleconference call may use 128 Kbps of bandwidth.
  - If 3 people use a teleconference over the course of one hour the bandwidth needed to sustain 3 calls is  $128 * 3$  or 384 Kbps.

**Determining your bandwidth usage continued..**

- Email messages with no attachments typically require very little bandwidth. An average Email message will take less than a few seconds to download if 64 Kbps is allocated.
  - Email messages with attachments can be up to 40% larger than the file attachment itself. For example: a 5 MB file sent through Email may actually be 7 MB during transmission over the network.
  - If you rely on Email to transfer large files such as health care data consider over-allocating bandwidth to those users.
- Most web pages are quite small (between 20 - 40 KB), the bandwidth needed will not be as intense as a teleconference call.

Here are some common bandwidth needs. For specialized applications such as TeleMedicine you should consult with the manufacturer for recommended minimum bandwidth needs.

- Web Surfing = 64 Kbps
- Email = 64 Kbps
- Voice Calling = 64 Kbps
- Teleconferencing = 128 Kbps

On average your total bandwidth consumption should not exceed 60% of your available capacity.

## 1.2.4 Warranty of service

Your Internet connection should be covered by a *Service Level Agreement (SLA)*. The SLA should specify:

- Maximum out of service minutes. The maximum amount of time the connection may be unreliable.
- A guaranteed time to repair. If the connection fails your ISP guarantees to resolve the problem within a certain time frame.
- Refund policy. If your connection stays down for longer than the time to repair, will the ISP provide a refund for those unavailable minutes?
- Technical support. Does the ISP provide 24 hour/7 day technical support? Will they dispatch a repair team on a Sunday at 2 in the morning?
- Average throughput. You may have a 2 Mbps ADSL or even 10 Mbps E connection but can the ISP guarantee you will achieve those speeds from the Internet? Ask for a way to test your speeds on a regular basis.

## 1.2.5 Billing Considerations

- Setup charges. You may have to pay an initial installation fee. If your ISP needs to build out a fiber network, you may need to pay a build fee as well.
- Contract term. Is your service based on a month to month term? Some broadband services such as T1 and E10 connections may be based on 1, 3 or even 5 year contracts.
- Cancellation charges. Is there a cancellation penalty if you terminate your contract early?
  - Does a cancellation fee apply if you decide to replace your connection with a higher capacity connection? eg:
    - You purchase a 1.5 Mbps T1 on a three year contract.
    - Two years later you look at installing an E-10 to replace the T1. Will the ISP charge you for canceling the T1?

## **1.3 Value added services**

Your ISP will likely offer Email and Web services in addition to an Internet connection.

### **1.3.1 Email accounts**

Your ISP will provide a number of Email addresses to you under their own domain.

Example:

- [bob.smith@isp.com](mailto:bob.smith@isp.com)

You may also be able to purchase an Internet Domain to reflect your own community. Find out if your ISP can support this.

Example:

- [bob.smith@yourcommunity.bc.ca](mailto:bob.smith@yourcommunity.bc.ca)

Many providers will place limits on how many Email messages can be stored, or the size of individual messages being sent or received through their server. If you regularly transfer large files via Email make sure your ISP can accommodate your needs.

#### **Questions:**

- What limits are in place to how Email can be used?
  - How many Email addresses are permitted?
  - Is there a limit to the number of Email messages you can send/receive?
  - Is there a limit to the size of Email messages sent/received?

**Questions Continued..**

- Is Email scanning (anti-virus, anti-spam) included or an additional cost?
- Is “Web Mail” (a web based mail client) available for your staff to access Email while traveling?
- Can the ISP host your own Email domain (eg: @yourcommunity.bc.ca)?
- How reliable is the Email service?
  - Most ISPs will have a “maintenance” window where they will take an Email service offline for work. Find out if this maintenance window overlaps with your day to day needs.

In general most ISPs provide between one and five Email addresses under their own domain.

Hosting of your own domain (eg: @yourcommunity.bc.ca) is almost always available at an additional cost.

### **1.3.2 Web Hosting**

Your organization may wish to setup a website to publish information about itself or provide a repository for information. Most ISPs will include support for a very basic, small website.

Third party Web hosting providers can also provide advanced web and Email hosting to support eCommerce and interactive websites.

Consider how you wish to leverage your web presence to facilitate community building.

Examples:

- A simple site may only include contact information for your organization.
- You may wish to publish news and community events.
- Interactive discussion forums will enable your users to interact and discuss common issues.
- eCommerce software can help you sell products and services online.

#### **Questions:**

- How much disk space is available? Pictures and multimedia can easily consume 50 MB or more.
- Does the ISP support database driven web sites such as eCommerce or library based websites?
- Does your ISP provide consulting/web design services or support “site builder” programs to help you easily setup a website?
- Are there any limits to the number of visitors your website can receive?

## **2. Considerations if you are an ISP**

If you are planning to run your own Internet Service (providing connectivity, Email, Web and related services) these additional considerations should be factored in your evaluation of an Internet Service Provider.

### **2.1 - IP Addressing**

Your upstream Internet provider will assign blocks of IP addresses for your servers and clients. As part of this process you will be required to justify the IP addresses used on your network and demonstrate efficient use of your IP addressing scheme.

Some Internet Providers will assign blocks of IP space as part of your standard contract. Other providers may charge per block, either on a one-time or reoccurring basis.

In general you will need one IP address per physical server, router and customer. In some cases you may be able to use *private* IP address space (IP addresses that are not directly connected to the Internet) through a process known as *Network Address Translation* (“NAT”). This scheme may be used by small providers for client systems but is not common.

### **2.2 - Network Abuse Policies**

As an Internet Provider you are responsible for illicit and criminal activities originating from your network. Issues such as spam, virus infections, criminal acts and copyright infringement are all issues you as an ISP will need to deal with from time to time.

Find out how your Internet Provider handles abuse reports. Generally speaking your provider should forward complaints to a contact within your organization for resolution.

Inquire as to how network abuse issues affect your service contract. Many providers require timely response to issues otherwise you may be considered in breach of your service contract.

## **Appendix A - Checklist**

- **1.2 - What is the capacity of your Internet connection?**
  - Maximum speed (megabits per second)
  - Multiple tiers of service? Burstable?
  - Maximum amount of data transferred in a month?
- **1.2.1 - Flat vs. tiered service**
  - Are there any tiers to service, what does upgrading the bandwidth entail?
    - Upgrade increments?
    - Is the technology already in place?
    - Cost to upgrade later?
      - Fee for changing service/contract?
      - New build costs?
- **1.2.2 - Is the connection full or half duplex?**
  - Symmetric or asymmetric?
  - Maximum bandwidth used per month, upload and download combined or separate?
- **1.2.3 - Determining your bandwidth needs**
  - What applications are you using and what bandwidth do they need?
  - How many users will use the network at the same time?
  - Will you have at least 40% or greater spare capacity during peak hours?
- **1.2.4 – Warranty of service : What type of SLA is available?**
  - Minimum uptime guarantee and refund policy?
  - Technical support, 24x7, front line?
  - Does the ISP have records showing historical uptimes/service outages?

- **1.2.5 – Billing considerations**
  - Setup charges?
  - Contract term?
  - Cancellation charges?
    - Does a cancellation fee apply if you replace your connection with a different technology in the future?
- **1.3 – Value added services**
  - **1.3.1 - What limits are in place to how Email can be used?**
    - How many Email addresses are permitted?
    - Is there a limit to the number of Email messages you can send/receive?
    - Is there a limit to the size of Email messages sent/received?
    - Is Email scanning (anti-virus, anti-spam) included or an additional cost?
    - Is “Web Mail” (a web based mail client) available for your staff to access Email while traveling?
    - Can the ISP host your own Email domain (eg: @yourcommunity.bc.ca)?
    - How reliable is the Email service?
      - Most ISPs will have a “maintenance” window where they take an Email service offline for work. Find out of this maintenance window will impact you.
  - **1.3.2 – Web Hosting**
    - Does the ISP provide web hosting service?
    - How much space is available?
    - Are you able to run eCommerce software or other interactive systems to support community building?
    - Does your ISP provide consulting or “site builder” software to help you setup a website quickly and effectively?
    - Are there any limits to the number of visitors your website can receive?

- **2.0 – Considerations if you are the ISP**
  - **2.1 – IP Addressing**
    - Charge for IP assignments
      - One time charge, yearly charge?
      - Cost for additional blocks?
    - Utilization policy
      - what percentage of addresses must be used in a year?
  - **2.2 – Network Abuse Policy**
    - Method of contact and conduct if a security or abuse situation arises?
    - Mandatory response/resolution time?

## Appendix B - Glossary

<i>Term</i>	<i>Definition</i>
ADSL	Asymmetric Digital Subscriber Line. A moderate speed (1-8 Mbps) half duplex connection often used by telephone companies.
Bandwidth	Used in two contexts: <ul style="list-style-type: none"> <li>• Refers to rate of information flow (see Bps)</li> <li>• Refers to amount of information transferred during a billing period.</li> </ul>
“bps” / “Mbps”	Bits per second, the number of information bits that can be delivered in a single second. <ul style="list-style-type: none"> <li>• Kbps = Kilo bits per second</li> <li>• Mbps = Mega bits per second</li> <li>• Gbps = Giga bits per second</li> </ul>
E10 / E100	10 or 100 Mbps “Ethernet” connection, delivered by a variety of technologies.
FDX	Full Duplex
HDX	Half duplex
HDSL	Hybrid Digital Subscriber Line. Often used to deliver 1-3 Mbps T1 service.
IOS	Internetwork Operating System. The software used on Cisco brand routers.
ISDN	Integrated Services Digital Network. A digital telephone line consisting of one or two 64 Kbps channels.
ISP	Internet Service Provider

<i>Term</i>	<i>Definition</i>
MUX	Multiplex. A method of combining multiple telecommunication lines into a single cable.
SDSL	Symmetric Digital Subscriber Line. A full duplex moderate speed (1-8 Mbps) connection often used by telephone companies.
SLA	Service Level Agreement
T1	1.5 Mbps connection usually carried over a copper wire.
WISP	Wireless Internet Service Provider