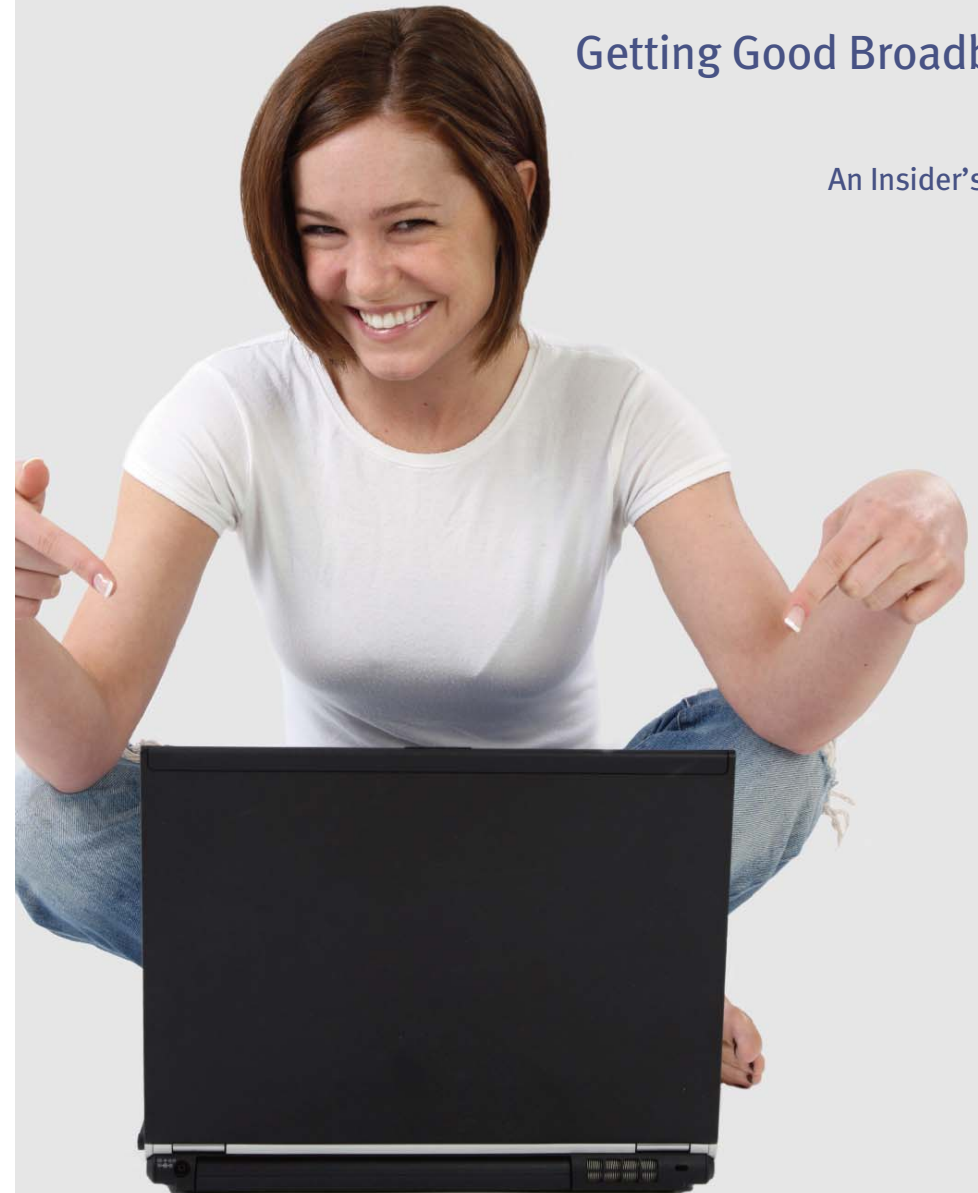


Getting Good Broadband

An Insider's Guide



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Foreword

Broadband is meant to give us fast, reliable and hassle-free access to the internet and the world wide web. While computers are fraught with little niggles that can slow things down, the service capabilities and policies of your internet service provider will ultimately determine the quality of your time on the 'net.

As the world's leading independent analyst of broadband services, Epiteiro is pleased to offer this Insider's Guide which we hope will bring clarity to the jargon associated with broadband and explain the key issues that will affect broadband service.



Types of broadband

The two most established types of broadband are DSL Broadband that works over a telephone line, and Cable Broadband that operates over a cable TV connection.

Both services are comparable in terms of performance and both require a special modem be present in the home for connection to the internet.

The actual speed of the connections may be reduced for different reasons. Cable broadband service is shared by others on the street so slowdowns may occur when many users are online. While DSL broadband is not shared, the speed of this type of broadband service decreases the further an installation is away from the exchange.



New but growing in popularity is mobile internet service – that is, broadband offered by cell phone operators keen to establish themselves in the residential and home internet markets. Mobile broadband is accessed using a special ‘dongle’ that inserts into a PC or laptop, or it may work directly with new smartphones that are combined with new computers and mobile phones. Not to be confused with wireless broadband that may work in your home or a cafe, mobile broadband connects to the cell phone network directly and offers speeds that meet or exceeds DSL and cable. The strength of the radio signal and the number of users attempting to connect through any one cell will determine the actual speed of the connection.

While each of these internet services can perform internet tasks, selecting the type of broadband is still very much dependent on what is available in your area – and your need for speed.

The Need for Speed



Speed has been pushed to consumers as the main measuring stick for broadband service quality. Speed is also the most mis-represented term.

ISPs have typically advertised their broadband packages in terms of maximum speed with “speeds up to” proviso somewhere in the fine print. After much public outcry ISPs are now openly qualifying their “speeds up to” claims, knowing few consumers actually achieve speeds advertised. In fact, Epiro has discovered that customers who purchased higher-speed broadband service typically only achieve speeds at half that amount.

Further, the internet is a two-way communication medium so speed in both directions is of concern. Upload speeds offered by ISPs are usually a fraction of the download speed due to the nature of how the internet works. During a typical browsing session,

we generally upload small instructions – like typing in a website address – hence ISPs allocate the majority of available speed or *bandwidth* to downloading. However, having adequate upload speed is important when sending photographs and other file attachments in email, or when speaking during a VoIP internet phone call.

Confusingly, speed is measured in *bits* per second, while anything we download to our computers – a web page, email etc. – is measured in *Bytes*. Calculating the time to download a file is not straight forward. It’s like trying to estimate the time to get to a destination by measuring the speed of a car in “miles per hour” and the distance in “kilometers”.

The World Wide Wait

While speed is often at the forefront of broadband adverts, our real concern with any task we do on the internet is the ‘world wide wait’.

How long will it take to see a web page or an email attachment?

What speed should I have to download a movie?



Surfing and Email

Surfing the web is probably the most popular yet least demanding internet function. The table [opposite] shows that it should only take about 1 second to download a fairly large web page - typical of a retail or news site containing quite a few pictures - using a basic 1Mbps broadband service. Most web pages are smaller than the example used [above] meaning even a basic broadband connection would suit most of us for casual web surfing.

Email Attachments - Holiday Photos

Downloading an email with 5 photos compressed for emailing should only take a couple of seconds with a 1 Mbps connection. Again this basic level of broadband service would be fine for most users. Sending or uploading an email with 5 photos via the typical upload speed of 256Kbps would take about 8 seconds.

MP3 Songs

Downloading MP3 songs demands more bandwidth from your broadband connection. An MP3 song may be 4 Megabytes – some 40 times larger than the retail web page example. Downloading these files would take about 16 seconds at the 1 Mbps speed above. If you only download a song every now and then a basic internet package may suffice.

Connection speed	Busy Retail or News Web Page (100KB)	5 Holiday Photos (250KB)	MP3 Song (4MB)	Movie (700MB)
Dial up 56Kbps	15 Seconds	35 Seconds	10 Minutes	28 hours!
256Kbps	3.2	8 seconds	2 minutes	6 hours
512Kbps	1.6 Seconds	4 Seconds	1 minute	3 hours
1Mbps	.8 Seconds	2 seconds	30 seconds	1 hour 30 minutes
2Mbps	.4 Seconds	1 second	15 seconds	45 minutes
10Mbps	Quick as a Wink	Zip! It's there!	3 seconds	9 minutes

TV Programs and Movies

Downloading TV shows and movies, known as P2P files, is becoming more popular as access to these types of files becomes easier and broadband service becomes faster. At a speed of 1Mbps it takes almost as much time to download as it does to watch the program. However, external factors may cause the download speed to decrease. The increasing appetite for consumers to download large files of movies, TV shows and music tracks is a burden to ISPs that haven't the infrastructure to cope. ISPs compensate by using Traffic Management techniques to ensure all users get an acceptable level of service.

Traffic Management and Other Limits

Even though you may be subscribed to a very fast connection P2P files could take much longer to download than the estimates in the chart should your ISP invoke traffic management policies also known as throttling back. Further, common 'speed tests' available may not reveal the true traffic management policies of an ISP as these tests typically check for web page traffic and not the cumbersome P2P movie and music traffic.

Peak Times

Ultimately ISPs route their traffic over a common national network which is subject to its own traffic limitations. Think of ISPs as being the entrance roads to a single super-highway where all traffic meets. No matter what type of speed your ISP promises, your surfing experience will also be dependent on the national operator's ability to cope with the summed traffic of all online users during peak times.

The peak times of the web tend to be in the early evening when home users go online, read their email, surf and download photos, music and movies. During these times achievable speeds can drop significantly and, when combined with Traffic Management, service may slow to a crawl.

Limiting Use

Because cable broadband is a shared resource, cable broadband ISPs may limit the amount of data a customer may download during peak hours to ensure good levels of service for the majority. DSL ISPs tend to be concerned with the summed traffic going through a local exchange so often their download policies limit the amount of data a subscriber can download in a month in order to ensure services are reasonably available. Sharing of resources is known as *contention*.

Average consumers are unlikely to exceed their limits during the course of surfing and most ISPs will either send a polite warning or suggest an upgrade in your service package should you exceed the limit. Still, consumers should be aware of downloading 'caps' in their contract.



Communicating over the 'Net



In communication applications any delays in transmission or data received out of sequence can ruin the listening or viewing experience. While we may tolerate a web page that doesn't load immediately due to traffic congestion, we won't accept videos that stop and start, or VoIP phone conversations that are delayed in mid sentence. A good ISP needs to be able to spot communication type traffic and treat it such that the data flows steadily and in the right sequence. VoIP only requires a mere 50Kbps to operate - less than dial-up - yet even some broadband providers struggle to cope with lost or out of sequence data resulting in an undesirable service.



Ping!

On-line gamers need the internet to be responsive in order to compete against others in cyberspace. While speed is important, so too is the ability for an ISP to push data through the backhaul network to the servers that are running the gaming programs. An "up to" 8Mbps connection will not automatically give a better gaming performance than a 1Mbps connection. A ping test checks the time it takes to send and return a signal to the gaming server. Anything slower (higher) than 50 milliseconds - that's 50 thousandths of a second - is deemed to be too slow for multiplayer games.

Beyond downloading movies and MP3 songs, many internet users now take full advantage of the communication features available. The use of streaming media and interactive games is certainly popular and internet telephony (VOIP) such as Skype™ is widespread.

However, the internet was originally constructed to move the content of data files in one direction, and like house removal firm, it matters not what is taken off the truck first - as long as all the contents get there in tact. When a web page loads it doesn't really matter if you see the picture or the text first, as long as it all appears relatively quickly.

What Should I Look for in an ISP?

Understanding how you are likely to use your broadband connection is great place to start before going shopping for an ISP. Here are some questions you can ask potential ISPs;

Q : What is the best speed I can realistically expect at my house during off peak hours?

A : While the contention issue may prevent a cable or mobile broadband supplier from providing an accurate answer, DSL suppliers should be able to provide a close estimate of the speed you'll get prior to installation. Don't forget to ask about upload speed if you'll be sending out large files or using VoIP.

Q : What is the minimum speed I will get?

A : Well you can ask however the real answer is that in very rare moments service level will reach next to zero. With regards to meeting a commitment on speed the best guarantee you could hope for is an average speed during the course of a month.

Q : What is your Traffic Management policy?

A : Will you be downloading lots of MP3s and movies? Are you happy to do this activity overnight or would you like immediate downloads? Understanding your ISP's traffic management policy is key to getting the service you require.

Q : How much can I download per day? Per Month?

A : Again, if you think you'll be downloading entertainment (and you probably will in time) understand the implications of any caps on data downloads. Allow 1MB per minute of music, 10MB per minute of Movie/TV Show.

Q : Can I make VoIP calls?

A : ISPs may treat VoIP traffic positively, negatively or not at all. If you plan to use VoIP try and use an ISP that will prioritise VoIP traffic – or at least not limit it.

Q : What is Your Ping Rate?

A : For gamers, select an ISP with low ping rates. Anything below 50ms is considered good.

Home Improvements

No matter what the internet task, the time to complete it will be dependent on the speed of the ISP connection and your computer's ability to process the data. A well-tuned computer and proper installation can improve your internet performance considerably.



Tidy Up

As you surf the 'net and download emails, much stealth activity occurs that ultimately clogs up the processing of your computer. Cookies, hidden programmes and viruses all find their way into the processes a computer uses and these impediments can be running in the background and slowing down the perceived speed of the connection.

Computers also tend to become garden sheds filled with this-may-come-in-handy-someday programs and files that fill up the memory and tax the performance.

Having an expert tidy up your computer on a regular basis is an excellent way to ensure you are able to make the most of the bandwidth your ISP allocates. Also, ensure you have anti-virus software from a recommended source. Even harmless viruses – like pop-up advertisements – can slow down internet applications.

Good Gear

There is a difference between cheap computer gear and the seemingly more expensive alternatives. Cheap cables can form a resistive path for electrical signals while economy wireless routers and modems can lead to lower performance.

Broadband of the Future



Our appetites for faster broadband services and the increasing availability of entertainment media will continue to put pressure on ISPs to provide greater bandwidth service. While we may be happy now with waiting an hour or so for a movie to download, soon we'll expect this type of media virtually on demand.

DSL and Cable broadband suppliers are currently achieving 20 Mbps in upgraded networks while speeds of 100 Mbps are being anticipated in new Fiber-to-the-Home (FTTH) installations where fiber optic cables are replacing speed-limiting copper wire.

Meanwhile mobile providers are testing a 300 Mbps wireless protocol called Long Term Evolution (LTE) which could download an episode of 'Lost' in 15 seconds – and you could do that anywhere a signal was available.

With these types of speeds soon to be available, major media companies are seeing broadband as the next entertainment era. Yet broadband is being seen as much more than a replace for the TV and a means to make cheap phone calls. Governments around the world see access to faster broadband as essential to economic growth and social development.

Jargon Buster

Bandwidth – Same as speed.

Broadband – any internet connection service speed greater than 56kbps

Cable Broadband – A means of providing broadband over cable TV lines

Contention Ratio – A ratio of the total number of users sharing a facility to a single user

Delay – The more extreme end of Latency

Dongle – a mobile broadband modem that inserts into a laptop or PC to enable mobile broadband service.

Download – Data that is received by an end user such as web pages, emails, attachments, MP3 files, video streams, movies and reception of VoIP speech

Download Cap – The maximum amount of data an ISP allows a consumer to download usually within a one month period.

DSL Broadband (ADSL) – A means of providing broadband service over telephone lines

HTTP (Hypertext Transfer Protocol) – A standard means of creating web pages such that they work predictably in browsers.

Jitter – The time to sequence data packets in order

Latency – small delays in data transmission

Mobile Broadband – A means of using 3G cell phone service to provide broadband

P2P File – A large movie or MP3 file sthat may be subject to traffic management.

Packet – A unit of data that is routed between an origin and a destination on the Internet

Packet Loss – the amount of packets, in per cent, that are discarded when traffic is too congested

Ping – The time it takes to send signal to a server and receive a reply.

Speed – the rate at which data is transmitted or received. Usually given in Kilo bits per second for dialup or upload speeds and Mega bits per second for download speeds

Upload – Data that is transmitted by an end user such as URL commands, emails, attachments and transmission of VoIP speech

VoIP – A technique for using the internet for making phone calls

Wireless (WiFi) – a connection from laptops and PCs to local routers.

Epitiro is the global leader in comparative broadband benchmarking providing customer experience insight to ISPs, media providers, multi-national corporations and government regulators.

VoIP, video and internet performance levels are benchmarked via Epitiro's extensive deployment of edge-based agents with independent analysis and results available through an on-line database access service or the regularly published Internet Performance Index™ report. Epitiro is based in Cardiff, Wales with regional locations in New Zealand, France and Ireland.