

# up to it

you sit at the centre of a digital  
part of the globe at any time.

by dan brill

It's almost redundant to say that the quality of Internet connectivity is of vital importance to the graphics community. Most designers, artists, photographers and ad agencies are now producing their artwork and images with digital technologies. More printers and prepress houses are setting up the facility to accept files remotely, either through FTP sites or via straight e-mail attachments. In the last two years, affordable commercial broad band connections have become available in most major urban areas and more content creators than ever are working independently from their homes and small offices.

High speed cable was first out of the gate with commercial services. In late 1998, Rogers Cable began offering high speed Internet in my neighbourhood (downtown Toronto), and I ordered it right away. The difference in my workstyle was immediate and dramatic. No more dialing up to get my e-mail, no more waiting for connections. And I can honestly say that I experienced minimal service disruption (although it's also important to note that at no time did I rely on Rogers for e-mail, which I maintained—and still maintain—with a separate local ISP). Nor did I experience any noticeable slowdowns in my connection speed at peak usage times (and I was not forced to buy the neighbourhood—which, given Toronto real estate prices, was just as well).

In December last year I decided to switch my connection to ADSL, mainly so I could find out how much faster (if at all) this type of service could be. I located a very helpful company in Waterloo called Golden Triangle ([www.golden.net](http://www.golden.net)), whose tech reps also seemed to understand Macintoshes better than most. Golden offered a reasonably priced 2.2 megabit ADSL service, which would be potentially 50% faster than cable (although cable connection in Ontario has a theoretical ceiling of 3 Mbps, in practice it generally maxes out at about half that speed).

Getting my ADSL connection set up was quite a bit slower and more complicated than ordering high speed cable. First, it required Bell to come in to install the basic DSL connection; that meant waiting about two weeks for an appointment—and even then it took two visits by two different Bell installers before it was

set up properly. Then it was another day before the modem was delivered and installed by Golden Triangle. While Golden's installer was here, we tried a test download to compare speeds. A 35MB file on the Golden server transferred over ADSL at over 300KB/second, compared with 190KB/second over cable (although this probably wasn't a fair comparison since my connection to Golden was likely a lot more direct than via cable).

In every day use, I haven't noticed an appreciable difference between cable and ADSL. They're both fast, and they're both reliable. However I should also mention that, whereas my cable connection was temporarily down at least once every couple of

# he cloud

universe, ready to reach out to any  
all it takes is the right connection.



IMAGE COURTESY PHOTODISC FROM THE "GLOBAL COMMUNICATIONS" COLLECTION

months over the two years I used it, so far ADSL has a perfect record—no downtime in the approximately three months I've had it connected.

So much for my personal experiences. Now let's do a quick review of the basics of DSL and cable.

## the choices

Four years ago I wrote about what was available for high speed connections and what was coming in the near future (see *Graphic Exchange* June/1997, "The Digital Courier").

At that time there was no commercial cable Internet or DSL

service available; state-of-the-art was ISDN. Predictions called for commercial ADSL to hit the market in three to five years; high speed cable had just been announced but had not been introduced.

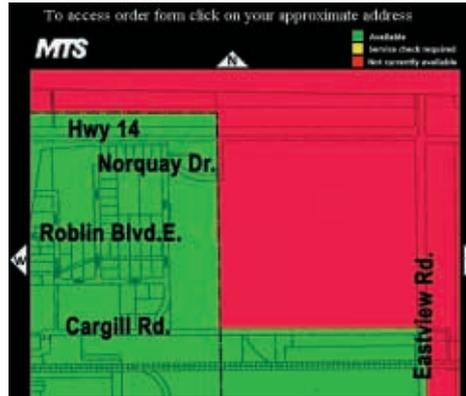
Today, ISDN has all but disappeared from the digital landscape, except as a subcategory of DSL technologies. High speed cable access began to take off in earnest about three years ago; widespread commercial ADSL services started to appear about a year later (although Saskatchewan's SaskTel actually launched the first high speed ADSL service in Canada in November, 1996). Pricing on basic service for both has found its level at about \$40 per month (including modem rental) and that's fairly consistent right across Canada (interestingly, this price point is the same in Canada and the U.S., which means that Canadian subscribers actually get a better deal than their American counterparts). Basic business services (for ADSL) can be had beginning as low as \$59 per month, depending on which province you're in and what extras you choose.

## speed, consistency and security

DSL works through existing copper telephone wires, requiring a modem at the user's end which connects to a DSLAM (Digital Subscriber Line Access Multiplexer) at the telephone company central office (CO). Since telephone lines are ubiquitous, ADSL tends to be more readily available to potential users than high speed cable. This is especially true for businesses, since cable was originally set up mainly for residential service only. But, due to its thinner wires and electrical resistance buildup over longer connections, DSL performance starts to deteriorate once the distance between user and CO reaches about 10,700 feet (just over three kilometers). Once that distance reaches about 14,000 feet (just over four kilometers), speed drops off



In most provinces, finding out whether ADSL is available in your area means typing in your telephone number and getting a simple yes or no. But if you happen to live in Manitoba and you're interested in what's available in your neighbourhood in *ADSL CONNECTIONS* from MTS Sympatico, you can select your home town, pick the area you live in, and view a street map that shows you exactly where the service is currently installed—and where it's planned next. The example here is for the town of Winkler, Manitoba (population 8,500).



is as vulnerable to a breach of security as it would be through other types of connection. It's in the "cloud", where every bandwidth vendor is dependent on every other vendor.

Dedicated telephone lines guarantee more consistent connection speeds than cable, a competitive advantage which cable companies are fighting hard to offset. High speed cable service operates through heavy coaxial cable, which is shared by all

dramatically. That's why people in rural areas or locations too far from the nearest CO are unable to order this service. Bell Canada won't install ADSL if you're more than 4.5 kilometers from a CO.

When high speed Internet providers talk about connection speeds, it is almost always in the context of downloading; but graphics people have a particular need for fast uploads as well. However with both ADSL (Asymmetric Digital Subscriber Lines) and cable, upload speeds are significantly slower than when downloading. That's the bad news. The good news is that, unlike downloading, which can bog down according to traffic volumes and routing patterns, upload speeds are generally consistent since files must only be transferred from the user to the ISP server—the first "hop". Of course from there, the speed with which the packets reach their final destination can vary considerably.

Before we go any further it might be wise to review the definitions of units of connection speed.

Internet connectivity is measured in kilobits per second (Kbps) or megabits per second (Mbps). There are eight kilobits (Kb) in one kilobyte (KB), eight megabits (Mb) in one megabyte (MB), and 1024 kilobits per megabit. A speed of 1 Mbps means that you can transfer 128 KB per second. Or to put it another way, it would take eight seconds to transfer one MB of data, and about four minutes to transfer a 30MB file (although there are always speed fluctuations throughout the download). My DSL connection routinely sizzles along faster than a T-1 (1.5 Mbps); in fact, current ADSL technology can deliver up to seven megabits per second. But basic commercial ADSL offers upload speeds of only 128 to 512 Kbps (depending on where you live); cable is generally faster (up to 768 Kbps)—as long as you don't live next door to a bandwidth hog. Cable companies usually quote maximum downloads in the range of 1250 to 1500 Kbps.

DSL runs through an exclusive chunk of copper wiring from user to the CO, thus the telephone companies' claims that it offers greater security than cable. But once your data reaches the CO, it

the users in a given area; the greater the number of users, the less bandwidth available per user. And whereas telephone companies have many independent central offices servicing its customers, cable companies have always required but a few.

But cable companies contend that accusations of drastic slowdowns at peak periods are grossly exaggerated. In areas where there are many users, they are adding more infrastructure and installing "Shubs" (secondary hubs) to handle the increasing volumes. These secondary hubs connect to the CO's via very fast fibre optic wiring.

As for diminished security on cable systems, Rogers Cable answers this question as follows: "Cable provides dedicated 'packets' or mini time slots to provide a truly dedicated access to their customers—the information may travel inbound on the same broadband superhighway as other packets, but each user has their own secure private 'vehicle' in which their information is delivered intact and untampered. In fact, our competitors often use technology that shares access to an area at the central office, and as a result they face the same challenges as many other Internet providers in maintaining a 'secure network' in a shared environment."

What about advertising that crows about "unlimited" use? If you're planning to buy a basic high speed connection (whether ADSL or cable) in order to set up your own web server that's going to get a lot of traffic, be prepared to get shut down quickly; big service providers are watching for people like you. Similarly, if you need to send or receive big files as e-mail attachments, be aware that basic services carry a 5MB file size restriction, beyond which your e-mail will bounce back to you or your sender.

And the bottom line on all the speed specs being bandied about is that cable and ADSL are about equal speed for equal value, although potential upload speeds through cable could be faster than ADSL—which, for those in the graphics industry, might be a deciding factor if there's a choice to be made. But your choice of connection will depend on where you live or work.



## the service providers

Since CRTC rulings loosened up the telecommunications industry to allow more competition, some Canadian companies have expanded their service territories, and several new faces have entered the Canadian market. This has pushed the big players like Bell Canada and Rogers to ramp up improvements to their services in a hurry with multi-billion dollar investment programs.

High speed cable Internet services are only available in areas where there is a concentration of population, and with less selection than for DSL providers. In fact, Canadian cable providers have been shifting around quite a bit just within the past few months. Rogers Cable ([www.rogers.ca](http://www.rogers.ca)), which dominates in Ontario, recently completed its major swap with Shaw Communications ([www.shaw.ca](http://www.shaw.ca)) to take over New Brunswick as well. In Quebec, Videotron has just been bought by Quebecor. Out west, Videon, a major provider in Manitoba and Alberta, has now been absorbed by Shaw, which is in the process of upgrading its networks in a number of cities in Western Canada.

Within the telephone sector, CRTC deregulation created two classes of providers: CLEC (Competitive Local Exchange Carrier) and ILEC (Incumbent Local Exchange Carrier). ILECs include Bell Canada, Telus ([www.telus.net](http://www.telus.net)) in Western Canada, Manitoba Telecom Services ([www.mb.sympatico.ca](http://www.mb.sympatico.ca)), SaskTel in Saskatchewan, Bell Intrigna, a joint Bell-MTS venture, and Aliant in the Maritimes.

ILECs market their services directly to consumers; however CLECs usually work with smaller partners and individual ISPs and resellers to sell bandwidth which they buy from ILECs, piggybacking their equipment on existing systems.

Last year Bell announced that it would be pouring \$1.5 billion into new equipment and system revamping throughout Ontario and Quebec over a three year period. Currently about 70% of all telephone lines in these provinces have access to high speed services; by 2002, Bell hopes to be able to offer 85% of its customers its state-of-the-art services.

In the meantime, companies like C1 Communications ([www.c1communications.com](http://www.c1communications.com)), Group Telecom ([www.gt.ca](http://www.gt.ca)), and Rhythms Canada ([www.rhythmscanada.com](http://www.rhythmscanada.com)) have been aggressively attacking the Canadian market with alternative plans. Group Telecom claims to be "Canada's largest independent, facilities-based CLEC, with a national fibre-optic network spanning eight provinces and linked by 228,765 strand kilometers of fibre-optics."

Rhythms Canada is a joint venture of Axcent Corporation and U.S.-based Rhythms NetConnections Inc. After introducing DSL services in Canada last

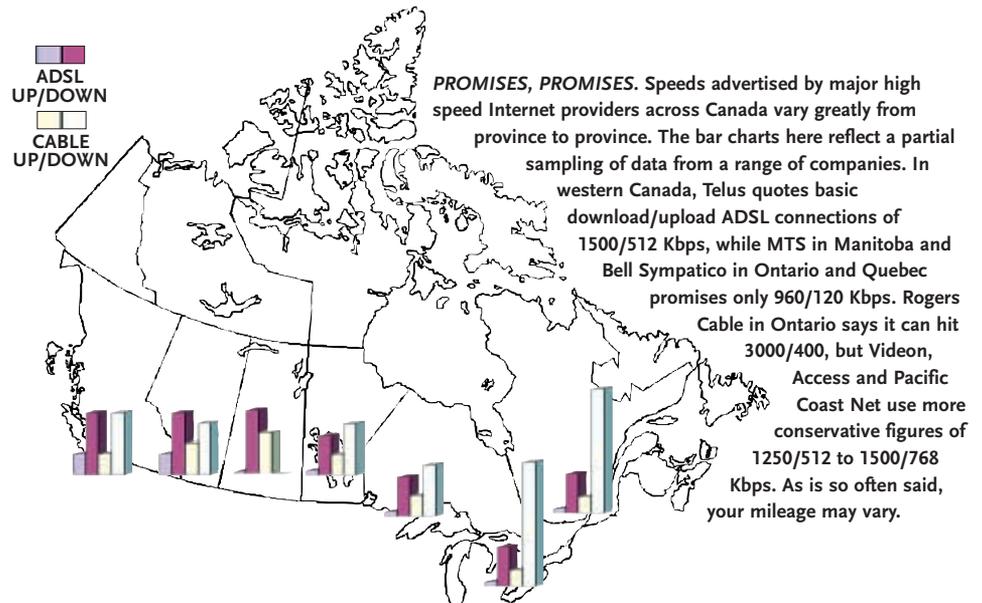
April in Toronto and Montreal, it has expanded in the past twelve months to Ottawa, Quebec City, Hamilton, Vancouver and Calgary. In February, Rhythms Canada announced its first marketing partnership with an ISP to sell its small business ADSL service, called Value Links. Toronto-based Tube-E Communications has specialized in Web services for the graphics industry since 1995.

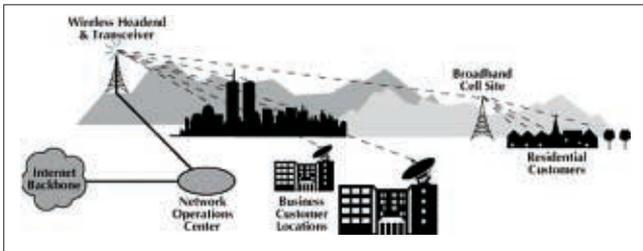
"The addition of flexible DSL plans rounds out our high speed offerings by adding customized access speeds to the hosting services that we're best known for—namely, website hosting at up to 100 Mbps (or higher) and comprehensive mail and secure FTP solutions," says Andrew Bongard, president of the Tube. "Now we can offer affordable high speed access services to our SOHO clients, as well as to those businesses that need to support higher demand applications with symmetrical bandwidth."

What many CLECs and their partners offer that most ILECs do not is a complete selection of DSL services which includes not just ADSL but also SDSL (Symmetric DSL), IDSL (ISDN DSL) and RADSL (Rate Adaptive DSL). SDSL, although more expensive than regular ADSL, is a prime candidate for graphics business users since it provides fixed and guaranteed speeds up to 1.5 Mbps in both directions (hence the name "Symmetric"). But although the cost of the fastest SDSL configuration is about twenty times more than basic cable or ADSL, it's also only roughly one-third that of a T-1 line, yet it offers the same rate of transfer speed.

ILECs also have access to the locations of Bell central offices. What this means is that they are able to tell customers just how far they are from the nearest CO and how much speed degradation their location will suffer—before they order their service. In addition, companies like Rhythms monitor their systems 24 hours a day so that if a disruption occurs, they know about it immediately. (Cable providers do the same, which is why they know that four o'clock in the morning is a peak time for file transfers.)

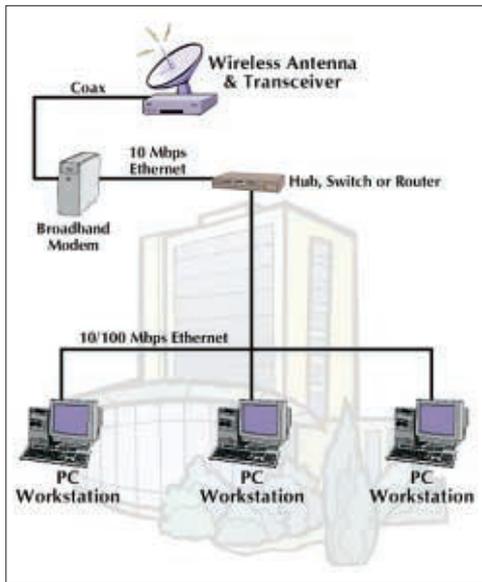
Bell Canada, on the other hand, does not monitor its commercial networks; a repair team is only dispatched when a customer reports a problem.





In areas where cable or DSL connections aren't available, a few companies are beginning to offer commercial broadband wireless Internet connections. Wireless is a "LINE OF SIGHT" TECHNOLOGY, meaning there can't be any obstructions between you and the main headend and transceiver.

**BROADBAND WIRELESS** works just like wired connections once the signal comes into your home or office, allowing you to distribute the bandwidth to a network through a hub or router.



### broadband wireless

DSL and cable providers have extended their services throughout most parts of the country, but there are still rural regions and small towns which do not have access to high speed connections of any kind.

For customers in these areas, a third option is just beginning to become available: commercial broadband wireless. Wireless technologies, which depend on clear lines of sight between the source and the end user, work on microwave signals from antennae.

The first commercial two-way broadband wireless service in Canada is being launched right now in Alberta by Platinum Communications ([www.platinumcommunications.net](http://www.platinumcommunications.net)). Starting at \$39.95 per month (plus \$99 installation), Platinum's 2.3 Mbps Internet service (in both directions) can reach out to a radius of up to ten kilometers from its towers near Okotoks.

Bell Canada is currently performing trial testing of two-way wireless services in Ontario in London, Woodstock and Toronto.

As well, there are other providers which offer wireless systems involving hybrid combinations of towers and ground connections. Satellite systems such as Bell's ExpressVu DirecPC Satellite Edition, introduced last June, use satellite dishes to download in

combination with telephone wires for uploads. For as little as \$39.95 per month (not including ISP) for up to 60 hours per month, Canadian subscribers can take advantage of download speeds of 400 Kbps and for certain connections up to 1 Mbps.

### the future of high speed Internet

Today, \$40 a month buys you Internet access that only three or four years ago would have cost ten times that amount or more. ADSL business services are now available for well under \$100 per month, and for another \$50 to \$200 there are comprehensive packages which would have been priced in the thousands just a few years ago.

But what's in store in the coming months?

"By late summer, we will be introducing a new technology for cable delivery called DOCSIS—Data Over Cable Service Interface Specifications," says Dermot O'Carroll, senior vice president of network engineering and operations for Rogers Cable. "DOCSIS will allow us to offer a premium service that will be capable of [download] speeds as high as 38 Mbps—using existing cable—with improved and more consistent throughput." Upload speeds with DOCSIS can be as high as 10 Mbps.

O'Carroll adds that Rogers has recently implemented new diagnostics and architectures for its (deservedly) much-maligned e-mail system, although the company will continue to rely on @Home's servers in California. However @Home has just upgraded its servers to double the capacity, so downtimes will purportedly be a thing of the past.

O'Carroll also explained that problems with Shaw Cable's Toronto customer service after Rogers' takeover last year were rooted in a Shaw system which was strained to maximum capacity. Rogers, with help from Group Telecom, is now upgrading and expanding the old network to rectify those difficulties. As well, Rogers' recent takeover of New Brunswick's cable system should result in improved service for its Maritime customers. The company is also moving into Newfoundland and British Columbia; details will be announced shortly.

Meanwhile, at Bell Canada, Brad Fisher, director of product development for Bell's Business ISP division, reports that a lower end ADSL service modelled on its current 3 Mbps/640 Kbps business package (which retails for \$450 per month) will be introduced within a few months, and that the company will also be upgrading its multi-user support. However there are no plans to support commercial SDSL in the near future.

Fisher observes, "We expect that it won't be very long before new technologies are developed for DSL that will push speeds up well beyond what they are today."

The choices in high speed Internet connections are only going to get better, cheaper and faster as time goes by. And this can only be good news for all those who need to send and receive high end print or digital video files.

Keep clicking. The cloud is getting much closer. ☺