



July 2006

New Zealand's broadband development

An update on the state of the network

From Telecom's Chief Operating Officer Technology and Enterprises

Current Speeds

Broadband is available to 93% of fixed telephone lines in New Zealand, with wireless and satellite broadband supplementing that.

Internationally 256kbps is generally regarded as the minimum broadband speed. In common with many countries, 256kbps was the base rate for general Telecom broadband plans until early this year.

From April 2006 many customers were upgraded to 2Mbps and 3.5Mbps plans at no extra cost.

The speeds quoted are, by international practice, maximum achievable download speeds.

Broadband, and the internet in general, is a shared service and more and more New Zealanders are using this service everyday. It is no different, in many respects, to a road network where the legal speed limit may be 100 km/h but at times of congestion drivers will find themselves unable to travel at top speed. Similarly, driving speed is also affected by the condition of the road. A heavy volume four lane motorway is typically in better condition than a single lane low volume road.

Like the driver, the broadband consumer can find their speed limited by a number of factors. For instance the further the home from the exchange, the slower the speed. This is a rule of physics, dependent on the length of the copper loop. A

short loop is characterised at less than 2km. Ninety percent of DSL-capable cable pairs in New Zealand are less than 3.5km.

The loop is not the only variable that can affect speed. In suburbs with a high level of broadband uptake, signals on adjacent lines can interfere with each other, and therefore be potentially slower. Noise from the environment such as radio frequency can also impact speed. Even the condition of a household's wiring can be an impediment. And the condition and capability of an individual customer's modem is particularly significant.

After the move to 2Mbps and 3.5Mbps plans, Telecom commissioned Alcatel to conduct an audit of the state of the network. In its report (available at www.telecom.co.nz) Alcatel estimates that 23% of customers are not achieving maximum peak download line speeds, because of one of the variables listed above, or a combination of those variables.

After the upgrade, 5% of customers experienced a reduction in performance to below what they received before the upgrade.

Telecom's retail units are identifying those of its customers who they believe are right now experiencing maximum speeds that are not as high as the plans they have opted for. They are being offered a variety of options for the time they have been on the higher-speed plan, including the option to move to a plan with a peak speed that their line is capable of achieving.

Similarly, Telecom Wholesale is providing its wholesale customers with lists of end users who we believe are not able to peak at the maximum downstream speed of their plan. Telecom Wholesale is offering those customers a credit.

Unconstrained speeds

In October this year New Zealand broadband will move to plans featuring unconstrained speeds. Instead of being marketed according to specific maximum line rates, unconstrained broadband plans will deliver whatever the network is capable of delivering at that place, at that time.

Plans will be available which deliver unconstrained speeds for both downloading and uploading.

Often the majority of customers won't notice much difference – although technically savvy customers will find it easier and faster to do things such as video messaging and voice over IP.

It is likely there will be more variability of speeds among households. Telecom estimates that the speed ranges which customers' lines could support would look like this:

Indicative downstream speed ¹	Percentage of customers
Less than 1Mbps	4%
1 - 2 Mbps	5%
2 - 4 Mbps	16%
4 - 6 Mbps	20%
6 - 8 Mbps	51%
8 - 10 Mbps	4%

Customers will need more information about what variables might affect their peak speeds. The distinction between peak speed and throughput is also important to communicate to customers, as throughput is affected by another set of factors in addition to peak line speed, such as the time of day (how busy the network and the internet are), the location and speed of individual web sites and whether a connection is being shared between users.

Telecom intends to establish an enhanced online Line Checker in October this year, giving customers (retail and wholesale) the ability to see what peak speed their lines will generally be capable of delivering. This will help customers make informed decisions about what plan will work best for them.

In addition Telecom will regularly check average line speeds and publish them on its website so the ranges (as in the above table) are available to both retail and wholesale customers.

¹ Many factors govern the maximum speeds that customers experience. These include distance from the exchange, the length and quality of wiring the customers' homes, whether broadband filters are correctly installed, the processing speed of customers' computers and routers and the usage of broadband services in each area.

With the move to unconstrained speeds, there is an increased need for the copper spectrum management plan to mitigate some of the variability in performance caused by increased uptake of the full speed plans, which is now in development in consultation with the rest of the industry.

Responses to speed

In line with international practice, Telecom is soon to roll out the next generation of broadband. It is based on a technology called ADSL2+.

It has the potential to deliver speeds about twice the current rates. But it will also introduce even more variability to the range of speeds that customers experience.

With that technology in New Zealand, Telecom expects that the range of speeds customers' lines could support would look like this:

Indicative downstream speed ²	Percentage of customers
Less than 1 Mbps	4%
1 - 2 Mbps	5%
2 - 4 Mbps	7%
4 - 6 Mbps	9%
6 - 8 Mbps	10%
8 - 10 Mbps	10%
10 - 16 Mbps	12%
16 - 20 Mbps	39%
More than 20Mbps	4%

ADSL2+ has been on Telecom's roadmap for some time. The roll-out was to begin from mid-2006 but now the introduction of unconstrained speeds will occur first, in line with the Commerce Commission's recent determination. ADSL2+ will follow shortly after. Customers in metropolitan areas (Auckland, Hamilton, Wellington,

² Many factors govern the maximum speeds that customers experience. These include distance from the exchange, the length and quality of wiring the customers' homes, whether broadband filters are correctly installed, the processing speed of customers' computers and routers and the usage of broadband services in each area.

Christchurch and Dunedin) will be successively moved to this technology over the course of 2007.

We will also be investing in network upgrades – technically, shorter copper loops through placing equipment in street cabinets rather than telephone exchanges – so that over time, more customers experience the benefits of ADSL2+. In order to reach the largest number of customers most quickly a decision has been made to target Auckland, Hamilton, Wellington, Christchurch and Dunedin first.

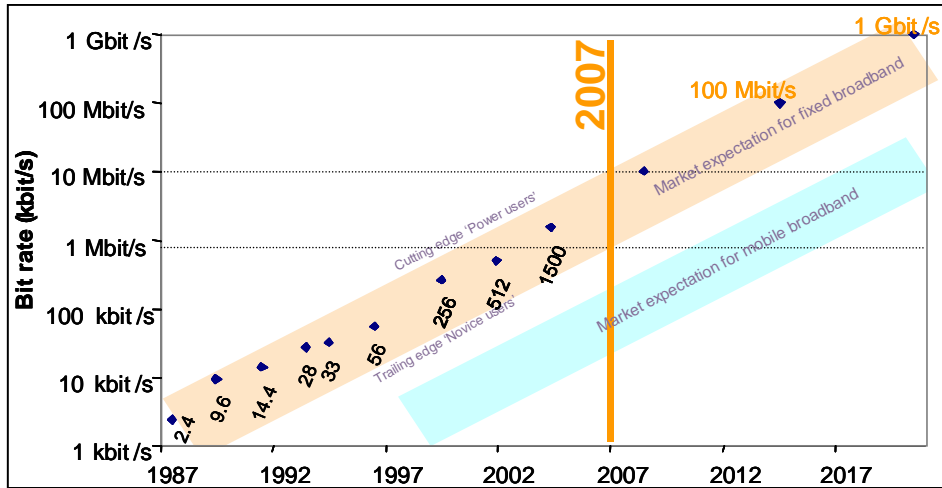
While ADSL2+ is capable of a peak speed of 24 Mbps, very few customers will experience that speed. However Telecom estimates that 75% of customers' lines are capable of speeds of more than 6Mbps and 65% more than 8Mbps.

These estimates are just that. To get a more accurate picture of line capability Telecom will be conducting localised in depth studies (firstly on the impact of unconstrained plans, and later on the impact of ADSL2+) to test line speed and variability including time of day. The results of this study will be published as they become available.

Broadband services

Currently broadband in New Zealand – in common with much of the world – is seeing rapid increases in the speeds available.

Consumer Bandwidth Trends



All rights reserved © 2006, Alcatel



The chart shows how rapidly broadband speeds are growing internationally.

The combination of growing demand and rapid technological development places a heavy weight on the existing infrastructure and even as we improve the infrastructure there is still a huge challenge to keep up.

In this environment it will be more meaningful for customers to look at broadband in terms of the services it will enable, rather than the more simple measure of maximum line speeds. As we have seen, the maximum measure can be a victim of many variables.

At the same time Telecom, with Alcatel, is building an all IP or internet Protocol network.

As yet the benefits of the IP network are hardly visible to residential customers. But within a few years New Zealanders will be seeing user-centric broadband – using any device, on any connection to access a host of broadband services. It will be possible to switch between a mobile and a fixed network, for instance, without the user even being aware of the network change.

For users, that will mean services such as IP video, voice calling and data access can follow them wherever they go, whatever device they are using. It will see a broadband connection becoming the hub of customers' information, entertainment and communications needs.

Future updates

Telecom's Technology Group will continue to provide quarterly updates on its website (www.telecom.co.nz) on the performance of its Network and its future plans.

Mark Ratcliffe

Chief Operating Officer Technology and Enterprises