

# **Big Pipes and Little Pipes – Why do they Matter?**

***Talk to Western Australian ICT Development Forum***

***Wednesday, 5 April 2006***

## ***Introduction:***

My task is to put today's "Big Pipes" report into the larger context of the economic significance of broadband for the Australian and Western Australian economies. The multi-billion dollar issue I have been asked to address is how the speed of broadband affects the generation and distribution of economic wealth. This is a big ask.

The "Big Pipes", of course, refer to the large transmission pipes connecting Australia to the rest of the world. Feeding, and being fed by, these "Big Pipes" are the "Little Pipes" that connect each customer to their local telephone exchange or mobile switch; these are more commonly known as the customer access network. In between the Big and Little Pipes is the inter-exchange network.

The original telephone system connecting Australians to each other and to the rest of the world was dimensioned for a three minute voice call. This is the narrow band network that provided the plain old telephone service. But, the telephone system is now morphing into a new system able to deliver many different services. Voice calls, data, music, pictures, video, television and any other form of exchange, distribution or transaction you care to name can now all be transmitted as one common denominator - bits.

## ***What is broadband?***

The speed at which bits can be transmitted is a key feature of new networks. For some applications, this may not matter. For example, you can download and store a movie overnight rather than over ten minutes. But, sports may be a different matter and the quality of voice calls transmitted as bits over a 56 kbit/s modem is unacceptable.

We know what “narrowband” speed is like. Narrowband is a dial-up connection to the Internet using the public switched telephone network (PSTN) such that its download speed is limited by the modem to a maximum of 56 kbit/s. However, the definition of “broadband” is a moving target.

Currently, the ABS defines broadband as an “always on” Internet connection with an access speed equal to or greater than 256 kbit/s and the ACCC defines the threshold as 200 kbit/s. As you will see from Box 4.1 in today’s “Big Pipes” report, these definitions are only slightly more generous than official international definitions. But, they have all been overtaken by improvements in technology and increased customer expectations.

In terms of technology, the United Kingdom cable operator NTL raised its baseline speed from 128 kbit/s to 10 mbit/s between 2003 and 2005. And, Telstra has just increased its maximum cable download speed from 8 mbit/s to a “super-fast” 17 mbit/s. This compares with a maximum download speed of 1.5 mbit/s on its retail ADSL services. However, BT announced last month that 78 per cent of its ADSL customers will now be able to get 4 mbit/s and above, 42 per cent will get 6 mbit/s and above and those very near their local exchanges will be able to get up to 8 mbit/s. Of course, we also know that iiNet and others are offering up to 24 mbit/s using Telstra’s own copper (ADSL2+).

You might wonder why Telstra restricts its retail ADSL offering to 1.5 mbit/s and well below what the current technology permits and yet will supply cable its service at 17 mbit/s. In my view, the main reason is that Telstra does not want to cannibalise its other data service revenues; a consideration that new entrants like iiNet do have to worry about. Second, cable only passes residential households so there are no business data services to be cannibalised. Third, the cable is exclusive to Telstra so that it does not have to worry about providing equivalent service to other ISPs.

Apart from the difference between advertised and potential speeds, there is also a smaller difference between advertised and delivered speeds. The ACMA has reported some

research to find out what speeds were actually delivered across Australia<sup>1</sup>. In 2004-05, the sample showed an average download speed for cable of just over 3mbit/s and 1.2mbit/s for the advertised 1.5mbit/s ADSL services.

This is not a talk about technology but about its economic significance. So, I shall not say any more about the possibilities of emerging technologies like fibre to the node (FTTN), broadband over power-line (BPL) or new wireless technologies. The point is made that the original definitions of broadband are based on old technology.

### ***From dial-up to always-on***

More important than any official definition of broadband is what customers expect and what the market can or is prepared to deliver. And, most important of all, of course, is whether any of this matters for the economy.

For most residential customers, the “always on” feature of broadband may be even more important currently than the greater speed it offers relative to dial-up. One survey reports that 85 per cent of broadband households accessed the internet daily, compared with 65 per cent of dial-up households<sup>2</sup>. Last year, 31 per cent of Australians over 18 years old purchased goods over the Internet for private use. Travel, accommodation or tickets were the most commonly purchased items<sup>3</sup>.

This always-on functionality has important implications for on-line commerce. Early attempts, for example, to allow customers to order pizza over dial-up connections proved more cumbersome than placing an ordinary phone order. With always-on broadband connections, that has changed. Domino’s Pizza in the UK now receives 25 per cent of its orders on-line and has discovered that 65 per cent of its customers now have broadband access<sup>4</sup>. Dominos found that on-line ordering generates greater spend, is more accurate than taking verbal orders and removes a third of the workload associated with an order.

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<sup>1</sup> ACMA “Understanding you Internet Quality of Service 2004-05”, February 2006

<sup>2</sup> December 2004 Australian Online Survey by AC Nielsen Consult

<sup>3</sup> ABS Cat No 8146.0, 15 December 2005

When you have always-on connectivity you will be more tempted to check-out the company web-site than wait in its call-centre queue. You may remember how the French persuaded customers to give up printed directories in exchange for Minitel access. This approach becomes really attractive with always-on service. Now, I can find out not only a telephone number but also where to find the nearest store, its opening hours, whether what I want is in stock and even put it on lay-by. This is why traditional “bricks and mortar” stores like Wal-Mart and Tesco (a UK supermarket store) are finding that the Internet complements their business. The biggest stores have most to gain from on-line sales<sup>5</sup>,

- They are big enough to have the economies of scale to rate well in price comparisons with other retailers
- They enjoy a “trust” or brand image; Tesco has 30 per cent share of the UK grocery market and 70 per cent of on-line shoppers claim they will place orders on-line with Tesco
- They can, and do, test -market products on-line
- They have ubiquitous physical presence to offer “pick-up-in-store”, which customers value because it saves freight costs and provides confidence that faulty goods can be returned.

The importance of e-commerce in transforming economic processes seems clear.

Exchange is at the heart of the economy and involves not only the migration from local markets to virtual (on-line) global markets but also involves every stage in the value chain from development and production to consumption. It includes public internet (eg Amazon book sales) as well as corporate intranets and (closed user group) extranets (eg EDI, electronic data interchange).

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<sup>4</sup> CEO Domino Pizza, Don Meij reported in the AFR 6 December, 2005

<sup>5</sup> From The Economist, p52, December 3rd, 2005

At this point, it seems that e-commerce is used mainly to improve supply chains in business to business (B2B, “placing orders”) relationships. Note that business use through closed user-groups or extra-nets does not raise the security issues associated with the public internet. In the UK, the Department of Trade and Industry reported that cost reduction is cited as the greatest driver of ICT adoption.<sup>6</sup> However, the report was surprised to find that “boosting revenue” was not among the top driving forces. Another interesting finding was that “*a clear asymmetry now exists: e-commerce transfers value from seller to buyer*.” That is, ordering online benefits buyers more than sellers through increased price transparency and lowered switching costs.

Business to consumer (B2C) on-line commerce has not yet taken-off. For example, in Canada, only 11 per cent of total on-line sales are accounted for by the retail sector and these represent only 0.8 per cent of all retail sales. Statistics Canada<sup>7</sup> attributes the relatively slower growth of B2C to,

- a lower level in the trust relationship between retailers and customers than between firms,
- household concerns about credit card security and
- relatively smaller expected economic benefits compared with firms’ use of on-line transactions.

But, B2C is growing fast with increased access to broadband and will accelerate as security and authentication issues are resolved.

### ***Does size matter?***

If the transition from dial-up to always-on presents a step-change in economic possibilities, what about the transition to higher speeds? What can we expect from the transition from our current broadband speeds to “true broadband”?

In this country true-broadband seems to refer to download speeds in excess of 10 mbit/s. I like another definition I heard attributed to Reed-Hundt, a former FCC Commissioner.

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<sup>6</sup> DTI (2003) *Business in the Information Age*, prepared for the DTI by Booz Allen Hamilton  
<http://www.ecdti.co.uk/cgi-bin/perlcon.pl>

<sup>7</sup> Statistics Canada, 205, Cat.No.11-621-MIE-No.033

His concept of true broadband is 1-10 gbit/s at the office, 10-100 mbit/s at home and high-speed wireless in between.

Just before Christmas I was asked by the ITU to write a chapter on the economic impacts of information and communication technologies (ICTs) for the World Telecoms Development Report published last month<sup>8</sup>. For those of you who may not know, the International Telecommunications Union is the oldest inter-governmental organisation in the world. It was formed to set the standards that deliver the global any-to-any connectivity that we enjoy today.

As part of the United Nations, the ITU is also interested in development issues. It publishes international comparisons on the adoption and use of telecommunications and other information and communication technologies (ICTs). While we can measure the take-up of broadband and other ICTs, how do we measure their economic impact? And, is it a multi-billion dollar impact?

Frankly, as you would read in the ITU report, it is difficult to isolate and measure the impact of, say, broadband on productivity growth from other factors. But, you could also have said the same about electricity at an early stage of its development. I am sure that broadband, like electricity, will prove to be a powerful enabling and general purpose technology. It is not just because ICTs like broadband increase efficiency and productivity but most of all because they enable new ways of doing things, new business models and new services that transform the way we work and play.

I certainly recommend that you read today's Big Pipes report which builds on the earlier excellent reports that have been developing the thinking for moving WA from "Mines to Minds". Our best bet for improved living standards in the long-term is to invest in becoming an internationally well-connected knowledge economy. And, that takes Big Pipes at both the local and international levels.

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<sup>8</sup> My contribution is in the report at [http://www.itu.int/ITU-D/ict/publications/wtdr\\_06/index.html](http://www.itu.int/ITU-D/ict/publications/wtdr_06/index.html)

### ***What have we got?***

In 2003-04, 74 per cent of Australian businesses used the internet and 41 per cent had broadband connections; of which 14 percentage points enjoyed broadband at 1.5 mbit/s or more. Lack of broadband was a problem for 17 and 35 per cent of businesses in capital cities and outside capital cities respectively. The most common reason for not taking broadband where it was available was a lack of perceived benefit (32 per cent of all reasons for not connecting)<sup>9</sup>.

It is interesting to note that 72 per cent Australian households with children under 15 have home internet access. This compares with 49 per cent for other households. Overall, in 2004-05, over 56 percent of Australian (58 percent WA) households had internet access and household broadband penetration was 15.7 per cent in Australia (15.1 per cent in WA)<sup>10</sup>. But, only 9 per cent of all households had broadband at or in excess of 1.5 mbit/s<sup>11</sup>. This is not really good enough for tele-working, which can deliver great benefits<sup>12</sup>. CISCO expects its technology gurus working from home to have at least 12 mbit/s.

Over 80 per cent of households in WA with broadband access obtain this service over DSL lines (118,000 households in 2004-05). Those lucky enough to be near their exchange may enjoy better than 1.5 mbit/s maximum download speeds if their ISP is willing to provide it. According to Telstra, the lucky ones are among the 40 percent of customers who live within 1.5 km of their local exchange.

Broadband penetration in the OECD in 2004 was 10.2 per cent of total population compared with 6.2 per cent in Australia (5.9 per cent in WA).

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<sup>9</sup> ABS Press Release, 17 March 2006 (for Cat No 8129.0)

<sup>10</sup> ABS Cat. No. 8146.0 for 2004-05

<sup>11</sup> ABS Cat No 8153.0, for March Quarter 2005

<sup>12</sup> John de Ridder Teleworking – It's just a matter of trust" in Exchange Newsletter 18-07, 3 March

### ***What has Canada got that we have not ?<sup>13</sup>***

As of December 2004, was Canada ranked number 5 and Australia number 21 by the OECD in terms of the broadband subscription rate per 100 inhabitants. It is clearly relatively more successful than Australia in promoting broadband and public policy and funding is part of the reason for this.

Canada's counter-part to the ACCC, the CRTC, now defines broadband as a *“a service enabling the two-way transmission of voice, data or multimedia communications with speeds in one direction in excess of 1.544 Mbps.”* On this definition, Broadband service was available to approximately 89 per cent of Canadian households in 2004 although only 43 percent of households had a high-speed Internet service (9 per cent in Australia had 1.5 mbit/s or more); and another 16 per cent had dial-up subscriptions (39 and 17 per cent in Australia and WA respectively).

The CRTC says that 98 per cent of urban households can access broadband service versus 68 per cent of rural households. Of course, with satellite all Australians can access a broadband service. In Australia (2004-05), on our meaner definition of broadband, 19.5 and 9.2 per cent of metropolitan and remaining households respectively do access broadband service.

Public funding to help seed private sector investment in broadband deployment is available at both the federal and provincial levels based on a variety of funding models. The CRTC's annual reports to the Governor in Council provide detailed reports on all such projects. These could provide some ideas for our Minister of Communications as she decides how to use Broadband Connect to wire-up or, more likely, wire-less-up regional areas with broadband services.

### ***What should we do?***

So, what can WA do to maximize the benefits of broadband for economic growth?

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<sup>13</sup> Data from the CRTC's Report to the Governor in Council, "Status of Competition in Canadian Telecommunications Markets - Deployment/Accessibility of Advanced Telecommunications Infrastructure and Services", October 2005



First, it should be noted that WA is geographically challenged. Its population density is only 0.8 people per km<sup>2</sup> compared with 2.6 people per km<sup>2</sup> for the whole of Australia. Although 70 percent of WA's population live in major cities, over 7 per cent live in remote and very remote areas compared with less than 3 per cent for Australia<sup>14</sup>. This means that connecting people and businesses to broadband in WA is a challenge for any infrastructure builder.

Second, apart from Telstra, satellite providers and, very possibly wireless networks most service providers concentrate on services rather than the provision of infrastructure. There are 689 ISPs in Australia; and 88 of them operate in WA. There were 550 ISPs offering DSL broadband services and 1.8m broadband subscribers at the end of March 2005<sup>15</sup>. They serve a useful purpose but the role they play in broadbanding WA and Australia is going to be as demand aggregators or as agents of the network builders.

Third, where users can get local access at decent speeds, they need long distance transmission speeds at least as good. They have this domestically but, as argued in today's report, users in WA need better international connectivity.

Finally, broadband is only an enabler. It's what we do with it that counts.

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<sup>14</sup> ABS Cat No. 1379.0.55.001, accessed 23 March, 2006

<sup>15</sup> ABS Cat No 8153.0