

broadbandvantage 

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the broadband imperative



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## about the author



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Broadband is one of the most exciting markets imaginable. Service and content providers can touch people's lives in new ways, by bringing new forms of entertainment to the consumer and enabling huge new opportunities for small and medium-sized businesses who have yet to fully exploit Broadband technologies. Most importantly it can also offer market players a highly profitable business opportunity.

Statistics show that, globally, over 25 million Broadband connections exist (see chart on page 5), so this is clearly an opportunity worth tracking. Yet because of the recent downturn in the world economy and the stigma attached to enterprises involving the Internet or

Internet technologies, raising capital to exploit some of these opportunities has been tough. Even established companies have found it difficult, if not impossible, to raise money for new ventures.

However, Broadband's greatest advantage is that it enables many of the promises that the Internet appeared to deliver but singularly failed to do. It does so simply by making that technology work at acceptable speeds. And speed is critical. Internet addicts and early adopters have already got Broadband where they can, and are complaining loudly where they cannot – it's a clear indication of demand when people set up consumer web sites and pressure groups.

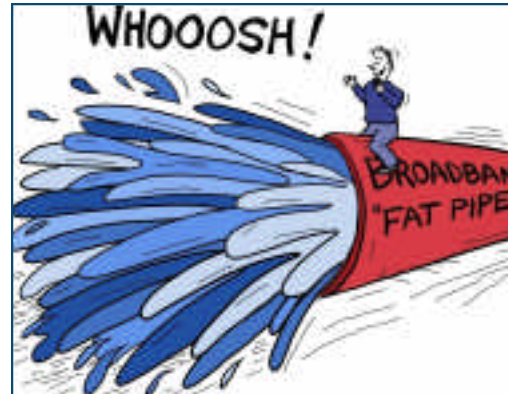
However, although speed is important it is simply the beginning of the story, the starting point. The rest of the market needs more stimulation than fast, always-on Internet access to convert them into customers, and they are not getting that from the current providers. Without content for consumers, or services and applications for businesses, Broadband is just a fast, always-on connection to the Internet and, for most users, that is not enough.

The growth in Broadband markets will be driven not by downloaders of MP3 files and the 'adult' market but by real Internet-based applications and by content. When those offerings become compelling, so will the Broadband proposition.

If the telecommunications and IT industries do not exploit Broadband's ability to transform the way we use communications and deliver new compelling applications and services at revolutionary prices to previously poorly served markets, it will be seen as another technology which failed to deliver.

What this paper seeks to do is explain the Broadband market, not merely in end user terms, but in a way that helps companies who want to participate in this new market understand the potential for them to build new profitable businesses at speed. It will examine some of the underlying technologies and provide a fast scan of the market. It will also highlight where the opportunities really are, start asking the questions as to how you and your organisation might find the best opportunities, and discuss some of the tools you can use to plan your offering.

In Appendix A you will find definitions of and a discussion around the various types of Broadband access technologies. Appendix B defines the ISO network layer model.



# broadband overview

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One issue is clear: Broadband is not a technology. It is a market, and a fast-moving one. Three or four years ago, few people other than those on the lower slopes of the bell curve had it or had even heard of it. Today, it is an issue for governments. The changes that have been made to prices and the structures of national telcos, together with the growth of alternative operators, are widespread indeed.

The corollary is that new entrants to this market will have to move quickly or they will be too late. A good estimate to how long you might have is two years. The market and its key players will be established by then and the opportunities for getting in to the market will be more limited.

However, we are not talking about two years thinking time, rather two years total: to think, identify a direction and develop a strategy, assemble the products or services with all the necessary partnerships and routes to markets, launch and execute.

The first thing to understand is that Broadband is not merely an access or transmission technology. Broadband also consists of the services that run over the

technology and the applications that run over that. Consumers neither know nor care which satellite their Pay TV service is connected to, but they do know who their service provider is and what the package of channels that they subscribe to includes. They also know how much it costs.

If Broadband is going to become a mass market, either for consumers or for small businesses, then it has to be provided in the same way. If the technology is complex then customers will need that complexity to be masked from them, by having it installed and configured for them, via automation or, as a minimum, with great customer service. Because the big opportunity is in the consumer and SME markets this creates a challenge for companies used to providing sophisticated services to larger companies; the service model is radically different.

And this is key: Broadband services are inherently complex; there are many links in the chain. Unlike the process of selling enterprise software directly to the IT directors of Fortune 500 companies, would-be service providers need to realise they must act in a completely

different way to succeed in the Broadband market. To have a distinctive offering in the consumer market you need access and content, usually entertainment.

Access, so far, has been mostly Internet oriented but there will be money to be made in telephony. For a lot of consumers the Internet piece will be secondary and this raises issues, because many users will not get their access via a PC. Their key applications may be game playing or video based. Content almost always has a televisual element to it and this leads us back to where the real power is.

Consumers want content – the sports channel or the premium movie – and are prepared to pay for it. They are uninterested in how they get it as long as it is reasonably easy to use, but they do care about the price. So the key to success in the consumer Broadband market centres on whether the provider can deliver a service with reasonable quality that people will pay for, and still make money.

What is going to get the SME market taking up Broadband in large numbers? Curiously it might just be good old-

fashioned telephone service. So why does a service as established as fixed line telephony make such a difference? The answer is simple economics. For new market entrants, the telephone market is massive. Look at any national telecommunications provider's annual report and you will see most of the revenue and virtually all of the profit – if there is any – comes from POTS (Plain Old-Fashioned Telephone Service). So phone calls offer high ARPU (Average Revenue Per User) and pretty good margins, especially relative to Internet access. Because it gives access to revenues that have been traditionally hard to win away from the older telephone companies, Broadband offers a unique opportunity to disintermediate the incumbent. Whenever this type of discontinuity happens in a market, the old order can be unseated. New leaders can emerge.

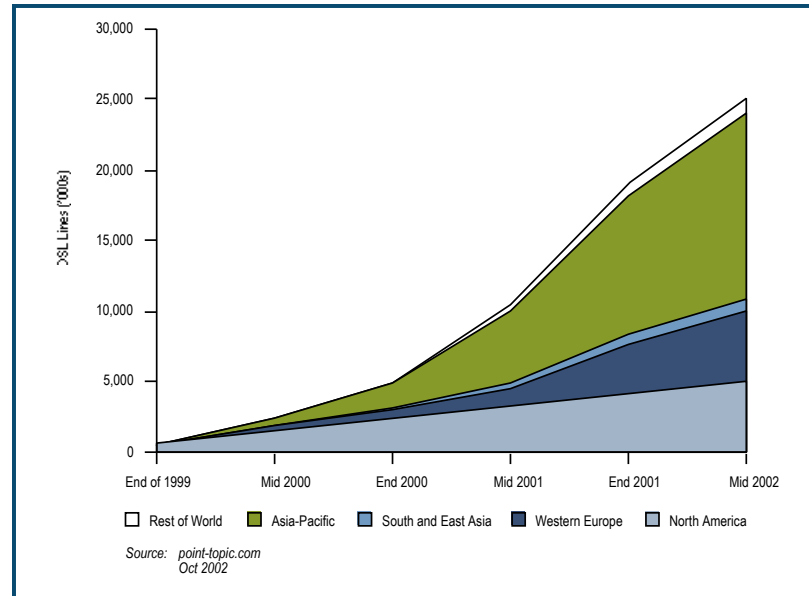
It is possible this may not be the market for you. If you think it is, then you are going to have to do some radical thinking about everything that you do that touches the customer, and quite a bit else besides.

## worldwide growth

In the industry today, the big success story is the speed at which Broadband has taken off in Korea as a result of the government's intervention to fast start the market, assisted by a densely concentrated population. Penetration levels are huge, with a claimed 10 million subscribers in November 2002 in a population of approximately 45 million.

The North American market is still growing fairly fast, Europe is catching up but Asia seems capable of leapfrogging the rest of the world. Even the UK, which was running last in terms of deployment amongst G7 countries, is forging ahead and the first million users are now connected, with DSL and cable sharing the connections equally (Source: OfTel <http://www.oftel.gov.uk>).

How far can it go? The latest estimates indicate that the market may tail off in terms of new connections from about 2006 at about 60% penetration. Of course, bandwidth may well increase further from there and there is no common view of how revenues might grow beyond that, but these are staggering figures in their own right. Issues of geographic coverage become paramount and this level of



penetration will increase the influence of government.

Much has been made of the role of government in the deployment of Broadband. Powerful regulators have intervened in most markets, with Broadband now a “testosterone” issue for many progressive politicians. Positioning in international league tables has become a matter of national pride. One of the benefits of this is in raising awareness, at

both the consumer and business level. This is critical in both markets as they are difficult to communicate with directly, typically with high marketing costs. The political agenda can reduce resistance and accelerate adoption.

## market environment

The two most widely deployed technologies are DSL, by incumbent telcos and alternative operators, and cable, by

cable operators. They are quite different, not just as technologies but also in terms of the markets they address and the sorts of services that are run over them.

Cable companies tend to be TV-oriented, their networks are designed to broadcast televisual content and, historically, most of their customers were consumers. They mostly build their own networks from scratch, carry lots of debt and are currently going through painful debt-for-equity swaps. As a result their new build-out programs are stalled and they are looking for new sources of revenue. One way to get this is to use spare capacity on their backbone networks to create wholesale services, but also to sell bandwidth directly to large companies. Many are also looking to provide services to small businesses passed by their cable plant. They tend to have limited expertise in these add-on markets and behave opportunistically. However they are classically very successful with consumers and should not be under-estimated as competition, mostly because they have assets in the ground and, eventually, this will give them a profit advantage over others who enter the market on a “virtual” basis.

On the DSL side of the house, the market was disrupted in 2001 by the collapse of

# broadband today

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the financial markets and the lack of funds available for new investment. This has meant that unbundling options in many markets are on hold and most providers are reselling capacity from the incumbent operators.

Unbundling meant that the provider effectively bought control over the existing provider's lines. This had the advantage that the new company could control the traffic from end to end, making quality improvements easier, as well as reducing the amount they had to pay the existing provider to connect their customers to the new network. In the long term this makes the business model more profitable. The downside is that it means the new provider has to make a significant investment in their own network, often running into hundreds of millions of dollars.

As a result, national markets are often dominated by the incumbent operator, especially in the consumer space. As most people are basing their services on the incumbent's wholesale offering, services are undifferentiated. This has led to early commoditisation of the access market and narrow margins. Those few who got to market early and have been conservative with their cash have been able to run with

the original model. Many ran out of cash with only part of their networks built and no access to new investment. Others had huge debt burdens, which are being exchanged for equity and will lead to depressed share prices for some time to come. For most others, they will start with wholesale services provided by the incumbent until they can develop their revenues and user bases to the point where building their own network makes sense again.

This lack of differentiation creates opportunities for new entrants. Barriers to entry are lowered. You do not need so much infrastructure or investment. And the cost of making mistakes is reduced.

## financial markets

The final issue to consider is the state of the financial markets. The state of the stock indices has always had a direct effect in the IT and telecommunications industries. Stock options and wide share ownership has made these industries extremely sensitive to the health of the markets. And the bankers lost a lot of money in the bursting of the dotcom bubble.

We tend to forget though how many good years these markets had before the current setbacks. The general view is that the markets will take a large part of 2003 to recover, if then. There are still a lot of consolidations, failures and revaluations to go before growth is consistent. Having said that the end of 2002 has maybe seen the beginning of the end to the downward spiral. When the markets are falling, companies try to cut costs; the accountant reigns supreme. Trying to grow revenues may be the last story that the financial community wants to hear. But at some point the only way to survive becomes to grow the top line. To get support for that sort of strategy, business plans will need to be well constructed and researched, and propositions compelling and profitable. If there is a need to raise money then these pressures will be even more acute.

Broadband may be that survival opportunity.

## overview

Broadband Internet is stabilising around an entry-level price of about \$40 per month. Margins are tight at that level and service costs are fairly high. Prices are not dropping particularly fast confirming there is little supply-side elasticity. People will pay more for higher speeds but the price does not go up in proportion to the increase in bandwidth. With high fixed costs, any new revenues an operator can deliver which add little to the service cost and provide good margins can lift the return on an operator's investment dramatically.

Critical is the need for market players to drive up the value chain to higher added-value services and applications. The alternative is to stay with undifferentiated, basic access level products, which leads to increased competition – because the barriers to entry are relatively low, and price-based buying decisions. This may have the short-term effect of driving volumes up but will cause margins to drop. At this point, the market favours those with deep pockets who need to defend existing revenues, allowing traditional suppliers a second chance.

So Broadband is the pipe down which all sorts of value can be pumped,

transforming the customer experience and creating completely new business models.

## the broadband value chain

The difference between the Broadband value chain and more traditional value chains such as those found in manufacturing is its non-linear nature. It is not a function of processing raw materials into components, assembly of components into parts, screwing the parts into products and so on. Instead, there are lots of choices at every level, depending on where you want to enter the market. Using the layered ISO network model (see Appendix B for more) as an analogue, there are a plethora of competing technologies at the physical access layer. All have attributes that make them more or less suitable for certain applications.

For Internet access, the physical layer matters little. For other services, the support the network can offer the service is critical. For example, video and audio quality quickly break down and become unacceptable if the network cannot deliver data consistently. The issue is perceived quality of service as users are, rightly, not interested in the delivery mechanism but they do care about the

fact that Broadband is cheaper. And key to Broadband's price advantage is that, unlike traditional leased lines, which operate on a point-to-point basis, Broadband IP compresses and consolidates traffic streams across shared backbones, which reduces the operator's costs.

The next layer up consists of basic services such as voice and data, and Internet access.

The third layer comprises live network-centric applications manifested as services, for example conferencing (voice and video), voice mail, email, VPNs, intra and extranets. Delivery can be via portals that allow users to make use of such services on a pay-as-you-go basis.

Further up still are generic business applications – this layer has perhaps been the most problematic for the IT industry since it includes the currently stalled Application Service Provision model. I would argue that one key problem has been the lack of infrastructure to support the ASP concept, an issue now on its way to becoming solved via the onward march of Broadband. Modern Broadband underpinnings now enable, for example, simple services such as online backup to

be practical and economical both to deliver and to buy.

## model applications

Telephony has well understood service costs and is, essentially, a simple service. Even the smallest business spends upwards of \$100 per month. An operator owning at least some of his own network (which reduces his payments to network providers) should be able to make over 20% gross margins.

From a telco's point of view, telephony means delivering a 100% uninterrupted service with perfect voice quality. However, you could offer a voice service over the Internet that, together with a gateway to the PSTN (Public Switched Telephone Network), delivers a service with 'VHS quality' audio and with only 99% uptime guaranteed. In the same way that customers understand the differing propositions associated with the relatively low-fi VHS tape and the higher quality offered by DVD, by differentiating from the gold label service offering by telcos, you could effectively offer a product that does not currently exist.

As long as the customer understands what they are getting, what they are paying for

# market entry

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and the consequent trade-off they are being asked to make, there exists an opportunity unexploited by most of the established players.

This model is applicable across all kinds of services that can be offered over a Broadband connection to both consumers and businesses alike. What is crucial is retaining some degree of control over other elements in the value chain so, in the telco example, you will need to partner with a provider whose network exhibits the characteristics that support your proposition.

The future offers huge potential. When Broadband becomes pervasive and the

market is wide enough, some much-trumpeted but rarely delivered services become possible. One example is remote control over domestic systems such as central heating, security, and audio-visual equipment. All can be managed over the network.

Such offerings have long been perceived as futuristic largely because the network wasn't strong enough but also because they are hard for consumers to understand, have not worked well, and are expensive. A market awaits the service provider who pulls together all the pieces and delivers this complex set of services in a way that is affordable, and both easy to understand and use via a browser interface.

You should remember that Telephony and Internet are basic access services. Once the cost of acquiring the customer has been absorbed, any new revenues will have a potentially dramatic effect on profitability. If they offer good margins then the effect can flow quickly to the bottom line.

At a more sophisticated level, for small businesses, the growth of SDSL – symmetrical DSL – allows clients who want to host their own email servers or websites to do so, not least because it can be cheaper than using a service provider. However, SDSL also makes it viable for service providers to offer more complex business applications to SMEs

on a pay-as-you-go basis, as service, reliability, consistent performance, and quality of service are critical at this level. The supply side community has to get this right if it is to retain the confidence of its potential customers.

That is why Broadband as a complex bundle of services makes sense. It gives the operator or content provider a single service over which he can start to offer almost any service or application you can manage. Broadband is a chance for small businesses to get the facilities (or offer the services) that previously only big companies could afford – on both sides of the value chain.

# broadband opportunities

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## overview

Because the Broadband market is complex, understanding where you might fit in and can leverage advantage to create profit is key.

Broadband is what has come to be known as a disruptive technology. This means it not only improves performance in a linear sense, but it also transforms

the way we do things. Some of the outcomes of disruptive technologies cannot be predicted. People will find uses for them that were never envisaged by their innovators.

Content and services will be the most important value-add for the Broadband connected. Right now, most service and network providers neither understand nor have the right attitude to deliver to

consumers and small businesses. The key issue is to understand where in the value chain your proposition fits.

## execution

A rigorous assessment of your organisational capabilities is crucial. Strengths that you can turn into competitive advantage come in many guises. Strength is found not just in your

products and services but may also show up in other areas, such as sales and marketing.

The key organisational capabilities are speed, flexibility and good people. No person or small group of people is likely to have all the answers in such a situation.

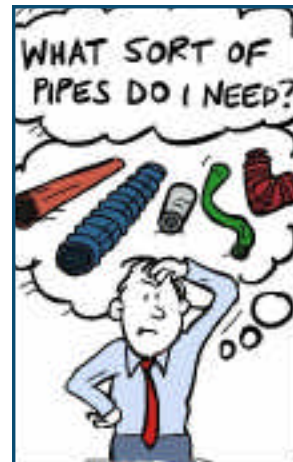
The ability to harness the collective intelligence of the organisation is critical.

Markets change as they go through their different phases, and so a form of organisational “honesty” is critical. This means remaining flexible and facing the fact that perfect execution is very hard if not impossible to achieve.

Be prepared to change your plans if circumstances change or new information becomes available. Standard sources of information or research may be inadequate so be prepared to conduct your own. The simplest, and often the most effective, is to poll as wide a group of your customers as you can and listen to what they tell you even if it does not fit with your preconceptions.

The complexity of the market applies not just to the products that you supply, or even those pieces with which they integrate. Factors outside your control, such as network congestion, can have a direct influence on your products.

Once you have assessed where your fit might be, the other pieces that you need in order to create a compelling offering will be more obvious. There are a number of routes to consider beyond developing the necessary capabilities in-



house. These could include partnerships, in a range from loose marketing and co-selling arrangements through white label and joint ventures to outright purchase of a technology or even M&A. Each of these approaches has pluses and minuses, which need to be considered in the light of opportunity and timescales.

Having developed an understanding of the market and your current capabilities, the next goal is to create differentiation. Differentiation is important to enable you to reduce churn and resist the tendency towards price-based competition and the

inevitable contraction in margins that follows. You might consider achieving differentiation through adding value. How customers see value depends on many factors and service, availability and delivery can be as important as functionality and price. The objective has to be to increase customer spend. The greater a proportion of a customer's spend that you have in any segment, the greater the likelihood of you retaining that customer profitably, and the lower the churn.

Having decided on your strategy, and possibly some tactical responses to different scenarios, the next key action is to create buy-in around this strategy. If you have communicated with your people, and with those who sit between you and the customer from the beginning, you will be rewarded in having an organisation that can react at speed. Maintaining this communication as you move forward is critical. You are not dealing with static models.

# useful tools and summary

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## useful tools

Strategic planning has changed a lot over the last 40 years, especially in terms of a shift from static models to an understanding of market dynamics. Apart from the usual research and competitive analysis tools, the critical element in the Broadband market is an understanding of how things change over time. The best conceived plans are worth nothing if they come to market at the wrong time. And you can be both too early and too late. Despite the recent sudden growth in connections, the interesting thing is that the Broadband market is still immature.

Adoption curves are key to understanding what happens to a technology or product over time. They can also help create understanding of the factors that drive adoption and how technology markets have compressed product life cycles. Understanding how the market is evolving demands acceptance of the fact that static models are increasingly inappropriate when the product life cycle in some technology markets is now less than six months.

Value chains started out in the 1980s as a tool for understanding complex interdependencies between suppliers,

processes and customers (M.E. Porter, *Competitive Advantage*, Free Press, 1985). Taking these relationships on to the next level extends the model into value systems and value networks, which better reflect the diverse and complex models at work in the Broadband market. One of the issues with the original application of the model was that it worked best in a static or slowly changing context. To get a full understanding of business planning we have to use other, more time-bound techniques.

The creation of timelines improves the relevance of market adoption and value chain theories to the Broadband market. They also enable you to identify milestones that will aid the management of the multitude of sub-projects that such a complex marketplace inevitably creates.

The associated moral is: do it quickly, otherwise it might not be worth doing at all. In turbulent markets, first to market often wins, despite product and service imperfections. In fact, early adopters in technology markets expect incomplete and imperfect products. Later phases of the market require better packaging and a fully rounded product.

However, until the basic product market (in this case, the access market) has settled down to some degree, high added-value services are unlikely to gain much traction, partly because people cannot understand how the business benefits connect to the technology. This is the classic case of getting to market too early, a good example of which is the stalled ASP (Application Service Provider) market, mentioned earlier. The conclusion is that now is the time to get the basics right, and build the foundations for the higher added value applications to come later. If you are in the high-end applications market now is a good time to make your alliances with the access providers (if this is the right strategy for you).

Understanding this complex interaction and the effects of time are critical. Market entry and development strategies for turbulent markets are always a trade-off between time, price, margin and functionality. And yet, dominant positions have not been established in most sectors of the Broadband market. Even the more established sectors have opportunities for people coming in further up the value chain.

## summary

Windows of opportunity exist in the Broadband market that are likely to close within the next two years as the market matures and dominant suppliers raise the barriers to entry. Customers are not yet being offered the range of services that would make the Broadband proposition compelling, rather, they are being sold fast, always-on Internet access, which for most has little or no resonance.

What potential market entrants need to understand is:

1. Broadband service delivery is inherently complex
2. Where in the value chain their service offering is located
3. They need to build partnerships with other players in that chain if the services they offer are to be fully supported.

Broadband is a unique opportunity, and its time is now. This is what creates the Broadband Imperative. These opportunities do not come along often, and when they do they rarely develop to this stage and still leave the door open for new participants. The expertise and tools to execute await those with sufficient imagination right here.

# appendix a: broadband technologies

Plenty of definitions exist of the point at which narrowband (think dial-up 56kbit/sec modems) becomes Broadband. Technical bodies such as the ITU (International Telecommunications Union) and the FCC (Federal Communications Commission) in the US define a variety of standards from more than 128kbit/sec to over 200kbit/sec. This measures the maximum bandwidth or speed measured downstream in the network, that is, from the network to the user.

I shall define Broadband as always on, that is, charged at a flat rate rather than by usage, and which operates in at least one direction at more than 128kbit/sec. The main technologies are xDSL, cable, satellite, fixed Broadband wireless, and Metro Ethernet.

Many Broadband technologies, especially those targeted at consumers such as ADSL (Asymmetrical Digital Subscriber Line) and cable, are asymmetrical. That is they have faster speeds down than up, which is acceptable for Internet browsing, downloads and email. It is not acceptable for real-time applications, especially voice.

xDSL in all its variants works well for both consumers and for businesses, especially if a combination of these versions is deployed. Classically, ADSL is great for

Internet access and consumers. SDSL (Symmetrical DSL) is the technology of choice for business. VDSL (Very high data rate DSL) may well be the bridge from copper-based technologies to getting more fibre closer to the customer.

Satellite is limited not so much in bandwidth but more by its high price and the fact that it has extremely limited upstream capacity (in fact, in some implementations, a normal dial up modem is used for the upstream connection) – the result is a very asymmetrical connection, which would be unsatisfactory to most. Its main applications are where there exists no other means of making a Broadband connection.

Fixed wireless Broadband consists of a transceiver base station, together with an aerial or dish at the user's premises. It is being trialled in many areas and offers the advantage of being two-way, but also needs a concentration of population to make it viable. It can usefully act as an extension to other Broadband access technologies.

Most Broadband technologies are transient. They are a route to creating demand for more bandwidth, and get fibre closer to customers. When customers are connected via fibre, bandwidth is, to all intents and purposes,

infinite. None of the service quality issues apply for fibre, assuming the core networks can be scaled to cope with the aggregation of all this bandwidth in the access network. Does this spell the end for wireless and mobile Broadband? Not at all. Experience suggests the mobile Broadband market will follow the fixed Broadband market as, once users become accustomed to new Broadband applications, they will want to use them whenever and wherever they want.

The key is to be technology agnostic. It would be a mistake to back one technology to the exclusion of others. No one can predict which will win, or for how long. In fact there are some other technologies waiting in the wings to replace the ones currently bedding down in the market. Ethernet in the last mile, also called metro Ethernet, is gaining popularity in the US, and there even are scattered examples in Europe. Ethernet is ubiquitous, cheap, scales to very high speeds and is easy to deploy and manage. And metropolitan providers with enterprise customers will need to take account of it sooner rather than later.

However there are other attributes that have a more pronounced effect than raw speed upon the perceived quality of service as experienced by the user, and these can

rule out certain technologies for certain types of usage.

Although Quality of Service (QoS) is a technical term, which defines how some of these attributes can be managed, it is the customer perceptions that count. People's perception of service quality is what will define success for many applications and services in the Broadband market. The most easily understood of these characteristics or attributes is throughput. The problem with measuring speed is that it indicates the maximum rate at which that connection can work. Providers classically share links between users to bring down costs and so, although they may all be connected at high speed, how much traffic gets through is often a different matter.

Poor throughput can rule out interactive applications such as video conferencing or give such poor quality as to make them almost unusable. Satellite Broadband is a good example. It is fine for asymmetrical Internet access but is entirely unsuited to voice traffic. Similarly, interactive business applications such as web and email server hosting are impractical via ADSL, while audio and video-conferencing require quality of service underpinning at the network layer.

# appendix b: ISO network model

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The standard model for networking protocols and distributed applications is the International Standard Organisation's Open System Interconnect (ISO/OSI) model. It defines seven network layers and can help clarify some of the concepts discussed in this paper.

## *Layer 1 – Physical*

Physical layer defines the cable or physical medium, such as Category 5 cable or a radio/wireless link.

## *Layer 2 – Data Link*

Data Link layer defines the format of data on the network and handles the physical and logical connections to the packet's destination. Ethernet is the best-known example and is often described as the MAC (Media Access Control) layer.

## *Layer 3 – Network*

IP (Internet Protocol), the best-known example, is responsible for routing, directing packets from one network to another. IP identifies each host with a 32-bit IP address, e.g., 129.79.16.40.

## *Layer 4 – Transport*

Two transport protocols, Transmission Control Protocol (TCP) and User Datagram Protocol (UDP), sit at the transport layer. Transport layer enforces transmission control to allow for differing connection speeds.

## *Layer 5 – Session*

The session protocol defines the format of the data sent over the connections.

## *Layer 6 – Presentation*

It converts data to a form acceptable to the receiving machine – one example is https (secure hypertext for browsers).

## *Layer 7 – Application*

Provides network services such as email, ftp, telnet, DNS.

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