

Date: 30 January 2003
Time: 9.00am - 12.30pm
Location: Committee Room 3, National Assembly for Wales, Cardiff Bay
Title: Impact and delivery of Broadband services for public and private sectors

MPACT AND DELIVERY OF BROADBAND SERVICES FOR PUBLIC AND PRIVATE SECTOR

Discussion Paper for the Economic Development Committee – The National Assembly for Wales

Date: - 22nd January 2003

Presented by: - Eddie Piper – Total Network Solutions Ltd.
Mike Parker – Groupe-Pathfinder Ltd.

Total Network Solutions Ltd
The TNS Building
Maesbury Road
Oswestry
SY10 8JL
Tel: 01691 663600

CONTENTS

- 1. What is Broadband?**
- 2. The Digital Economy – why is Broadband important?**
- 3. Benefits Ubiquitous Broadband would deliver**
- 4. Current Broadband status in Wales**
- 5. Broadband technologies**
- 6. The Wireless Broadband Opportunity**
- 7. Digital Matrix – A classic Welsh SME business case**
- 8. Suggested Further Reading**

1) What is Broadband?

Broadband is a term used to define the speed of data access from an external network (e.g. the internet) into a home, business, school etc. Broadband is now generally taken to mean a data-speed in excess of 512 kilobits per second – for perspective this is around ten times the speed that current telephone based dial-up modems will provide. Businesses, schools and other facilities generally regard 2 megabits per second as a minimum broadband data capacity (central government legislation defines schools and libraries as requiring this speed for example).

Broadband can conceptually be compared to a road network – the wider and straighter the road, the more traffic it can carry. The wider the communications pipe, the more rapidly information can be accessed and transferred and the more applications that can be provided across it. A normal dial-up modem can be envisaged as a narrow country lane, with broadband as an eight-lane motorway.

2) The Digital Economy – Why is Broadband Important?

Technology within the Western world is moving apace with a multitude of developments and society must be regarded as moving into a new era – The Information Age. Access to broadband services is assumed in the new Global Economy, business investments are based on it, best educational/learning practices are based on it, best e-Government services will be based on it. Broadband should now be regarded as the fourth utility – equally as necessary as the other three.

Broadband is taken for granted in most densely populated urban/city area within the UK, and within Wales the major inner-city areas of Cardiff and Swansea have ready access for most citizens, businesses, schools etc. to affordable services. These ‘urban’ services in Wales provided primarily by BT and Cable TV operators. Technology and financial considerations have determined that the large majority of the land area in Wales is not effectively supplied with these services however.

What is happening now in the rural areas of the UK, and specifically Wales in this context, is that a ‘Digital Divide’ is developing – the broadband haves-and-havenots. Areas without ready and affordable access to broadband are becoming increasingly disadvantaged, with a net outflow of population and commercial investment.

Wales offers probably the very best ‘Quality of Life’ location within the UK for workers, but cannot currently support the requirements of new business to invest in small towns and rural areas – investments that could radically improve the overall wealth of the province. It is an irony that Southern Ireland (with a population of 3.8 million – i.e. not dissimilar to Wales), is now being called ‘The Celtic Tiger’ because of its booming economy – with a particular emphasis on new generation IT-related companies and jobs.

3) Benefits Ubiquitous Broadband would deliver

Several 'drivers' would determine take-up of broadband services in their largest context: -

- Is the service available at the location required (or at all of the locations required in a multi-site operation)?
- Is the cost affordable on a sustainable basis; is it comparable with urban UK locations?
- What local disruption will be created to install the service?
- Will the service be reliable and resilient?
- Will the content and applications necessary for citizens, education, government and business be available (e.g. Intranet services etc.)?

Benefits to broadband users include, but are not limited to the following: -

Businesses

- Improved productivity, more efficient working, less delay in information transfers
- Thin Client Applications, where an ISP/ASP hosts and maintains mainstream office applications for small businesses without in-house ITC skills
- Remote/Centralised Data Storage – businesses can backup or even host the data and network management offsite, a small business need not to carry the full cost of having full time ICT staff
- Emergency Disaster Recovery, offsite secure data storage can provide immediate access to business systems from an alternative site
- E-Learning, easy access to video training, and other web based materials and content
- E-Marketing, website selling and marketing, and access for Welsh companies to the Global Customer Market, tourism based businesses may benefit from live web cameras
- E-Procurement, online ordering for efficiency, cost reduction and just-in-time/ supply chain management
- E-Money Services, e.g. invoicing and banking, more rapid money transfers
- Remote Teleworking, home based full office facilities possibly including video conferencing
- Virtual Call-Centres, based on broadband connection operatives could work from home or be in geographically dispersed locations, also allowing part-time workers to be efficiently be employed
- New Generation Businesses, those requiring specifically high bandwidth connections, such as creative video media, website-design and software writing, would be able to locate and operate within the province

Citizens

- E-Learning, improved facilities for mainstream schools, along with post-school

- vocational and non-vocational adult education services for gaining new job/life skills
- Telemedicine, remote consultation from specialists to local health centres
 - E-Inclusion, use of email/video conferencing for access to E-Government services and contact with remote neighbours/relatives throughout the province, local intranet servers, community notice-boards, job searching etc.
 - E-Banking, easy remote monitoring and management of accounts
 - E-Shopping ordering on-line, with the prospect of new home-delivery businesses to service the remote communities
 - E-Neighbourhood Watch, greater security and contact for the elderly and remote locations
 - Live Community Events, local video multi-casting, agricultural shows, livestock auctions, inter-active multi-village pub quiz etc.

4) Current Broadband status in Wales

In the highly populated main city areas of Cardiff and Swansea, ample provision exists via BT and cable operators, with broadband services delivered as ISDN, ADSL and Cable Modem. The rest of the province does not fare so well, only a small number of rural exchanges are equipped for ADSL, and the technology has an inherent maximum distance limitation of the end-user from the exchange. Users only three miles north of Cardiff report non-availability of broadband currently. (Though it is of note that fibre exists now to every exchange within Wales, and that this would likely form a part of a strategy to deploy ubiquitous broadband.)

The large land area, relatively adverse terrain and low population density have thus far rendered it, understandably, not commercially viable to deploy ubiquitous broadband services.

The National Assembly for Wales is seeking to stimulate both provision and demand for broadband, with an active programme in place. Aggregation of demand (via government intervention), particularly for business usage, is generally seen as key to encourage private sector investment in infrastructure for provision.

A subsidy scheme is currently in place for take-up of satellite based broadband, which although in principal offers an ideal solution, is an expensive (revenue cost) option given the bandwidths and very importantly the high contention ratios (which defines 'true' data rates).

It should be noted that this situation is replicated across the UK within more rurally based locations and similar schemes of intervention to resolve the problem are being enacted.

5) Broadband technologies

A number of technologies are now used to deliver broad band services, briefly as follows: -

ISDN

Typical delivery to the end-user over copper at 128 kilobits per second – a digital version of ‘dial-up’. Common usage to sites with sporadic or low data throughput requirements such as Primary Schools. Regarded now more as an interim technology and is dependant on quality of the phone wire, distance from the exchange and whether the exchange is enabled for the service.

ADSL

Typical delivery to the end user over copper at up to 1 megabit per second (with a lower speed in the reverse direction. A very effective and popular technology where available. Service is dependant on quality of the phone wire, distance from the exchange and whether the exchange is enabled for the service. General availability to end users in rural locations in Wales is poor – few exchanges enabled.

Cable Modem

Requires connection of the end-user to a Cable TV Network. Typical delivery to the end user at up to 1 megabit per second. A very effective and popular technology where available. General availability to end users in rural locations in Wales is non-existent (city areas only).

Fibre Optic Connection

Excellent data throughput with 10 and 100 megabits per second as standard. Heavily used by schools/local government etc. in areas where available. Very high cost of provision where not already in place. General availability to end- users in rural locations in Wales is non-existent. Welsh Networking for example have recently deployed 100MBs services into each of the 22 County Offices around Wales (these though being into town centres) linked back through Cardiff into the JANET network – though this service is for public sector usage only.

Data Satellite

A number of services are available using a satellite downlink, this service is truly ubiquitous and can be deployed almost anywhere, so is ideal in theory for many locations. Factors that are being taken into consideration by potential users of this service are high revenue costs given the bandwidths, often times high contention ratios between users (i.e. many service users competing for the same bandwidth). Also a significant factor is ‘latency’ where interactive services are required (i.e. the time it takes a signal to go up to a satellite and back down to earth – around one second).

Broadband Wireless

This is a new generation solution being used around the world to provide rapid deployment and cost-effective broadband into rural or remote communities. It comprises radio 'cells' (much like mobile phones) into which end-users 'connect' via a small antenna. Distances can be up to 20km from the central cell and data rates of 2 megabits per second and above are feasible. Virtually no Broadband Wireless is yet deployed within Wales – though it seems likely that this mechanism is one of the most probable to establish the broadband services necessary.

6) The Wireless Broadband Opportunity

Although conventional wisdom may suggest that the adverse topology of Wales would not favour wireless delivery, in fact the legacy of the last ice age works to its benefit. Well-located masts on hills provide excellent radio coverage over large areas. Wales benefits from a wealth of existing mast sites, established to provide radio, television and mobile phone access, these could be used to provide the basic 'cell' infrastructure to access individual communities.

Provision of the data bandwidth into these multiple rural access data-cell sites could be cost effectively provided using the already established fibre linking exchanges and on-bound linking up to the hilltop sites from them.

Wireless Broadband can be established in two ways, firstly via unlicensed radio technology (at 2.4GHz and soon 5.7GHz), or via radios operating in licenced bands (such as the 3.5GHz spectrum). Unlicensed bands have an appeal due to their lower cost, though access range is limited – they are more likely to find usage in local 'village-wide' systems. Such unlicensed radio networks are already being trialled in several locations, though it is crucial to understand that they do

not offer guaranteed bandwidth and are open to interference from other users of the band. Licenced bands offer significant coverage areas and are more appropriate for 'professional usage'.

A spectrum auction this year will release licenced bandwidth at 3.5GHz and this should be seen as a major opportunity for Wales to realise it's broadband ambitions with a rapid rollout of services.

7) Digital Matrix – A classic Welsh SME business case

Digital Matrix is an association of Welsh creative media companies. Its members are spread throughout the province and typify the new generation types of business that require broadband services to operate but that are seeking to establish themselves in a quality-of-life

environment.

An example of one of Digital Matrix's members is Dai4 Films, an independent documentary and filmmaker, based in rural Ceredigion and selling its creative product across the world. All of the creative content Dai4 Films produces is digitally based, but lack of any broadband (or indeed any prospect of it) to transmit the content, and remotely or interactively edit it etc. has stopped any expansion in Wales. Dai4 currently has to maintain a base in London with some 50% of staff time being at this location.

Broadband would allow Dai4 Films to work more efficiently, invest money locally, and bring substantial new jobs and wealth into their area and market themselves more effectively on a worldwide stage in conjunction with other companies in the Digital Matrix association.

8) Suggested Further Reading

There is an excellent and hugely detailed report available on the web covering all aspects of the provision of broadband (technologies and otherwise) for the Western Isles of Scotland, whose problem like many other areas in the UK is similar to Wales. It will be seen from the report that overall the technology of choice for rapid deployment and cost effective provision is broadband wireless. The document additionally points to a wealth of sources of information on all aspects of the subject.

The document can be accessed from www.connectedcommunities.co.uk, it is called the Broadband Report, available from the library option in the menu. The file is 1.6 megabytes long, and if downloading via a dial-up modem also provides ample demonstration of the need for a broadband connection.