



**Secure
Resilient
Networks**

July 2008

Whitepaper

All DSL is equal, right?

By: Ben Coleman
Sales Manager, CI-Net Ltd

All DSL is equal, right?

By introducing a Voluntary Code of Practice regarding broadband speeds to which ISPs must adhere, OFCOM has shone a light on an issue which has long been a problem within our industry. As we will now explore, there are many essential components required to deliver a DSL service; the majority of which are not mentioned in the product's description. The quality of each component in the chain has a direct impact on the overall quality of the service, therefore any well-informed customer is well advised to explore the quality of these components, especially if they are planning to purchase these circuits in large volumes. How is it possible for one provider to deliver an "Up to 8Mbps" service for upwards of £1,000 per annum, while another can offer the same "Up to 8Mbps" service for free?

This paper is designed to describe the key components required to deliver a quality DSL service* and to show how making economies in any of these areas can have a significant impact on the quality of the overall service. The paper will have a specific focus on the provision of resilience throughout the delivery of individual and multiple DSL circuits.

A typical description of an ADSL service will likely describe the maximum bandwidth which can be delivered, based on key circumstances. This bandwidth is that which can be delivered from the local exchange to the required location. As a general rule, the further along the local loop a location is the lower the bandwidth which can be delivered. This bandwidth will not typically vary from one ISP to another. The products which are available from BT for the provider to resell are then broken up into two main categories: ADSL Max Standard and ADSL Max Premium. The key differences between these two categories are as follows:

- Packets travelling over ADSL Max Premium circuits are prioritised at the local exchange
- ADSL Max Premium Circuits deliver up to 800Kbps uplink, whereas ADSL Max Standard Circuits deliver up to only 400Kbps uplink

From here a provider may describe the bandwidth "cap" on any service, which is generally the maximum amount a customer can download per month, per circuit.

In the absence of this a provider may offer an unlimited package, sometimes covering this with a "Fair Usage Policy". It is important to bear in mind that this is not necessarily good news, as standard users will often end up paying (either financially or through an inferior service) for other customers' use.

Other than this basic information, a customer is not generally given any further information on the rest of the components required to deliver the service.

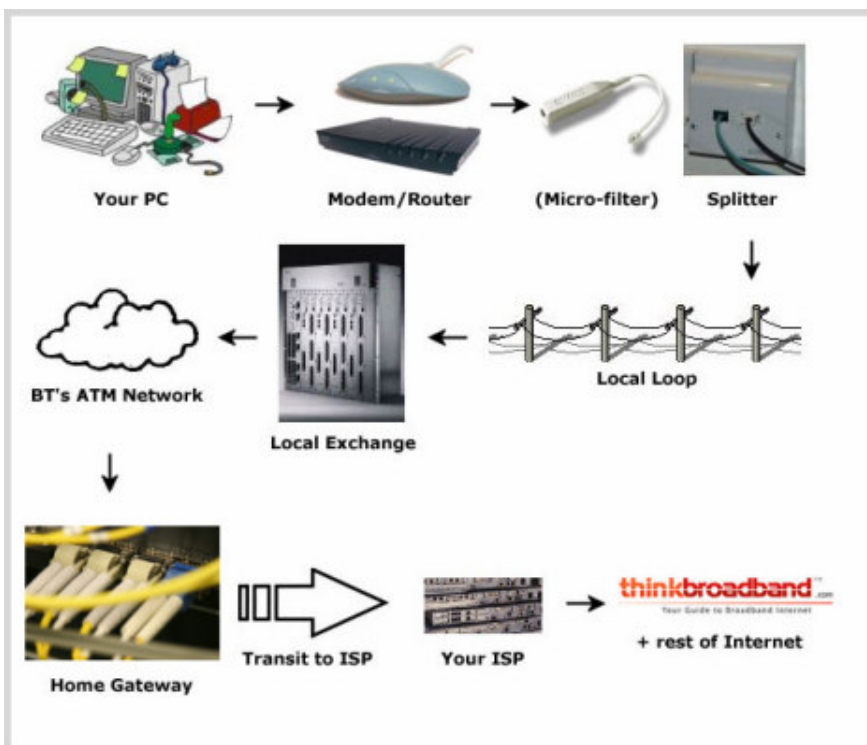
* Where services are sourced from BT wholesale

Required key components

The key components required to deliver DSL are:

- Router / Modem
- PSTN Line / Copper Pair
- Local Loop
- Local Exchange
- BT's ATM Network
- Home Gateway (BT Central)
- Provider's Network
- Transit to the Internet

DSL – How it works



Source: www.thinkbroadband.com

Reproduced with permission of thinkbroadband.com

Router / Modem

A good, reliable router is essential in the delivery of a superior DSL service. A first class provider will look to prescribe a high quality router for two main reasons:

1. Routers of a higher quality suffer fewer faults, meaning fewer calls into the provider's support desk. This in turn will deliver value to the customer as their staff will experience fewer problems and will therefore spend less of their valuable time trying to fix problems, some of which time would be spent speaking to the provider's support desk (if they have one).
2. Normalising onto one key router manufacturer means that support staff can gain greater expertise. The familiarity with the interfaces will enable those support staff to quickly diagnose and fix problems as and when they occur, often also being able to fix them remotely rather than having to instruct the end user on how to make changes.

PSTN Line / Copper Pair

SDSL services are always delivered over a dedicated copper pair whereas ADSL circuits run over PSTN circuits (analogue telephone lines). Issues can occur when there are problems such as excess noise on the PSTN line. Although a provider cannot prevent such issues, experienced support staff can diagnose these problems quickly to ensure that faults are repaired promptly.

Local Loop

The local loop is the single route via which all DSL tails from a specific location will pass to connect to the local exchange. This is therefore a "single point of failure" for DSL links. If true resilience is required for a location, alternative products such as Leased Lines or 3G must be used to provide this. The local loop is the only link in the chain required to provide DSL where resilience cannot currently be built in.

Local Exchange

Each local loop eventually terminates in the local exchange. Across the board, regardless of the provider, all DSL links will be presented in the same way at the local exchange. Diversity can be built into a solution at this level by sourcing a selection of IPStream and DataStream products. By nature, these products will be terminated on different DSLAMs in the Local Exchange. Though this does not provide true resilience, the likelihood of an outage being suffered throughout a whole exchange is far less than an outage being suffered on an individual DSLAM.

BT's ATM Network

This component of the solution takes multiple diverse routes via multiple diverse locations and is unlikely to cause any outage or poor performance. This network is used to deliver services to all providers.

Home Gateway (BT Central)

The home gateway can be the threshold where responsibility for the service passes from BT to the provider. It is often up to the provider to decide how many users share this gateway and therefore if a provider is not concerned about the quality of the service they can cram as many users as they wish onto each individual gateway. This can lead to slower connection speeds and packet loss. A superior provider will always maintain sufficient "headroom" in the capacity of these gateways to ensure that these problems do not occur. In addition to this, multiple gateways can be provided. This means that should a problem arise with an individual gateway, traffic can be diverted to another. It therefore makes good sense for a provider to locate these gateways in different locations to ensure resilience.

ISP's Network

From the home gateway, the traffic will then traverse the ISP's network. In an ideal world this will be made up of multiple, high bandwidth diverse connections between diversely located data-centres. The links and hardware making up this network should all have plenty of spare capacity to ensure that all traffic passing over it reaches its destination or exit point with an absolute minimum delay, and should not be affected at peak times. Where a provider cannot deliver this, they will often opt for some mechanism (such as MPLS) to ensure that essential traffic (such as VoIP) is prioritised. In order to achieve headline prices on DSL services, a provider could heavily contend their network in order to save cost, resulting in poorer performance. This contention is not generally referred to in any standard product description, partly due to the fact that it is difficult to quantify.

Transit to the Internet

In order to allow users to browse the Internet, the ISP needs to provide transit out to the Internet. A first class ISP will have multiple links in place with plenty of spare capacity over and above their customers' peak usage. There should also be an allowance for the possibility of one of these links suffering an outage. However, there is no actual requirement for this to be provided, which means if a provider wished to make efficiencies this bandwidth could be heavily contended with no "Plan B" in the event of an outage. Economies made in this area could have a severe impact on the quality of the overall service. In addition to these links, it is also good practice for a provider to peer with other ISPs which will increase speed and reduce latency when accessing sites hosted on their networks.

Support

Though a good provider of DSL services will always aim to avoid any instance of their customers needing technical support, even the highest quality provider cannot avoid this all of the time. A good provider will nevertheless benefit from the quality of their network, as their support desk will not be deluged by calls. This fact enables a superior provider to man their first-line support with higher calibre staff and as a consequence calls are handled more efficiently. A provider looking to economise would employ fewer less able support staff often resorting to the use of automated systems to relieve pressure, causing their customers to spend more valuable time on the telephone trying to get problems resolved. Other ways of economising in this area are to outsource, or provide no telephone support at all.

Billing

Billing is often the one area in which a provider can come unstuck. The majority of providers are generally geared up for the provision of services to a vast number of individual customers. The billing for these services is generally tailored to this model and therefore when a customer does not fit this, things can go awry. Though the quality of the overall product is where most providers will focus the majority of their efforts, billing is all too often the reason cited for a company looking to change provider. The ability to tailor billing to a specific customer is a key way in which a provider can set themselves apart from their competitors, although it is often not even discussed in solution specification.

Challenging the key assumptions

As a result of its general use by residential customers, there are a number of key assumptions made about "standard DSL" services which are not necessarily true:

"It's not secure"

It is possible to implement a private addressing scheme on a network incorporating standard DSL circuits. In order to achieve this all sites will need to be on the same "network" and the provider will need to have the expertise to implement the scheme. Nonetheless, a quality provider will always maintain that it is essential to encrypt traffic passing over any Wide Area Network.

"There's no 'SLA'"

Every standard DSL service has an 'SLA' attached to it of 20 hour response, 40 hour fix where the clock ticks only during office hours from the time the provider logs the call with BT. It is also possible to upgrade this SLA to 3 hour response, 20 hour fix where the clock ticks 24/7 from the time the provider logs the call with BT (the initial call must be placed during office hours). Both of these SLAs are dependent upon the PSTN circuit being live in the case of ADSL circuits.

"It takes at least 5 working days from the date the PSTN line goes live to deliver ADSL"

There are two ways in which this can be avoided:

1. Simultaneous Provide. It is possible at the time of ordering the PSTN line to request a reference code against which the ADSL circuit can be ordered. This makes it possible to activate the ADSL circuit on the day that the PSTN circuit goes live. This process can be problematic and it is not generally known. However, where a provider has a good understanding of the processes simultaneous provides can be delivered reliably.
2. Expedited Install. For an additional cost, a provider can deliver an expedited install of ADSL once the PSTN line is installed. This can often mean that the ADSL circuit can be enabled the next working day. *"Contracts must last a minimum of 12 months"*

It is possible for providers to deliver ADSL services on monthly contracts if necessary without incurring additional charges. This is not the case for SDSL as it stands.



Conclusion

All DSL is not equal. As can be seen, there are many component elements which are necessary for the successful delivery of a DSL service. In order to ascertain the right provider to use it is important to dig into the detail of how they deliver the service.

CI-Net offers your business an always on, permanent connection to the Internet with the ability to surf, download, and e-mail at high speed.

Service	DSL Max 20GB	DSL Max 50GB	DSL Max Premium 20GB	DSL Max Premium 50GB	Business 500	Business 1000	Business 2000
Download Speed	Up to 8Mb	Up to 8Mb	Up to 8Mb	Up to 8Mb	512K	1Mb	2Mb
Upload Speed	400K	400K	800K	800K	256K	256K	256K
Data Transfer	20GB	50GB	20GB	50GB	Unlimited	Unlimited	Unlimited
Back-up 0845 service	Included	Included	Included	Included	Included	Included	Included
Static IP Addresses	✓	✓	✓	✓	✓	✓	✓
Router/Firewall	✓	✓	✓	✓	✓	✓	✓
Wireless Router	✓	✓	✓	✓	✓	✓	✓
Engineer install option	✓	✓	✓	✓	✓	✓	✓
Installation	From 5 Days	From 5 Days	From 5 Days	From 5 Days	From 5 Days	From 5 Days	From 5 Days

Security

CI-Net offer both wired and wireless router options which can be pre-configured for you so you can simply plug in and go, or left so you that you can configure it just as you want. Businesses are becoming increasingly concerned about the risk of damage to their systems from external attack. Since all CI-Net routers come with firewall capability as standard you can be sure your valuable resources will be safe.



July 2008

Resiliency

All of our broadband packages come with a back-up dial service which can be used to gain access to the Internet in the event of a temporary failure. If you choose to have ISDN back-up you have the option of automatic switch-over to ensure you have an uninterrupted Internet connection.

Flexibility

CI-Net offer a wide range of broadband services tailored to suit individual company needs. Whether you want 'plug in and go' hardware, the option of configuring the kit to suit your requirements or assistance with installations through our national network of qualified engineers: You decide. Each package gives your business a permanent connection to the Internet with the ability to surf, download and email at high speed. Combined with our commitment to providing the very best personal customer support, broadband from CI-Net will increase productivity and improve communications within your business.

Managed Services

Take the headache out of providing broadband for your home workers and let us manage the entire project for you. We look after everything from checking availability, recommending products, pre-configuring hardware and delivering kit direct to your staff.

To find out more about DSL Broadband, contact the CI-Net team on 01865 856030 to discuss your requirements.

To read more about the OFCOM Voluntary code of practice for broadband speeds visit their website <http://www.ofcom.org.uk/telecoms/ioi/copbb/copbb/>.