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**Broadband Data Services**

### **Background :**

With the rapid growth of the various flavours of DSL (Digital Subscriber Line) technology, it is easy to become confused about what DSL really means.

There are two principal versions of DSL Technologies -ADSL and SHDSL. There are important differences between the two, which means that each will fit a different set of requirements as we shall see below.

### **A quick overview of DSL :**

As demand for faster, cheaper Internet connections has exploded in the UK, various technologies such as ISDN, Cable Modems and DSL have evolved to meet this need. Digital Subscriber Lines are simply high-speed, 'always-on' digital communication lines.

DSL has several advantages over other high-speed communications technologies, but by far the most significant is price. Large savings are possible in comparison with other technologies because DSL runs over existing copper telephone wires and therefore there are no installation costs for new cables in the carrier's network.

### **ADSL (Asymmetric Digital Subscriber Line) :**

ADSL uses the existing copper telephone network to provide business and residential users with a broadband connection This derives its name from the fact that data transfer rates are Asymmetric (not matched); downstream rates (from the Internet to your site) are much faster than upstream rates (from your site to the Internet) -you can therefore download data from the Internet faster than you can send data to the Internet.

This makes ADSL very good for applications like web surfing, retrieving e-mail etc., but not as fast for upstream applications like large mailshots to your customer database, sending graphics files etc.

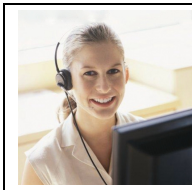
The second issue governing speed is the contention ratio. Within the carrier network, ADSL bandwidth is shared between other users. For domestic services, up to 50users can share a connection (50:1); for commercial services, 20:1contention is common. The performance of an ADSL connection will therefore vary according to time of day and time of week, depending on how many other users happen to be online at that moment.

The third issue governing connection speed is the distance between your site the local BT exchange. At a distance of 9000ft., 8Mbps (Megabits per second) is achievable. At twice this distance, only 1.54Mbps can be achieved. The maximum achievable upstream speed is 640kbps (Kilobits per second) regardless of distance, but the standard carrier offerings are 256Kbps.Upstream speeds scale down in a similar manner to downstream speeds.

### **Advantages and Disadvantages of ADSL :**

ADSL is a good choice for residential and small business applications. Set-up costs are typically cheap as it can utilise existing phone lines. Likewise, running costs are relatively inexpensive and more importantly fixed. ADSL is an 'always on' connection, so there is no additional usage charge (although some carriers offer cheaper versions with data transfer limits) and no delay in waiting for your modem to connect to your ISP. This 'always on' feature does however have security implications that must be addressed.

The primary disadvantage of ADSL is its limited upstream speeds. For large businesses upstream speeds can be as important as downstream speeds, which would make ADSL a bad choice if you plan to send a lot of data to the Internet.



**SHDSL (Single-pair High-speed Digital Subscriber Line) :**

SHDSL has much to offer the larger business, and is more useful in situations where a fast upstream speed is required because the upstream and downstream data transfer rates are the same.

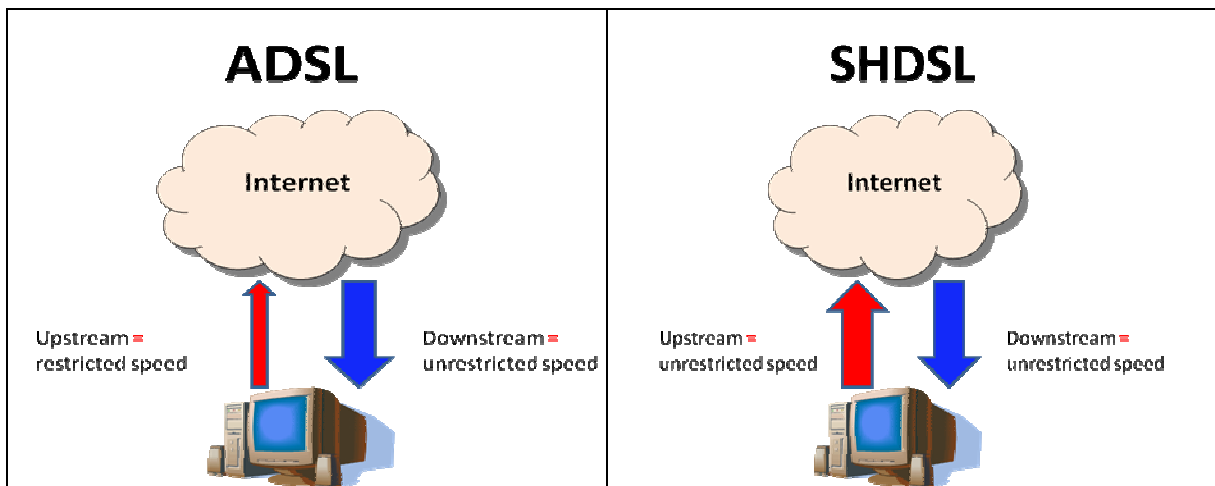
**Advantages of SHDSL :**

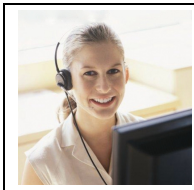
Like ADSL, SHDSL requires only one twisted pair of wires to transfer data. However, SHDSL uses a more efficient encoding scheme for the data than ADSL. Called OPTIS (Overlapped Pulse Amplitude Modulated Transmission with Interlocking Spectra), this method of encoding uses the available bandwidth much more efficiently, and does not suffer from crosstalk as severely as ADSL.

SHDSL has excellent reach. 2.304Mbps can be achieved up to 13,000feet from the exchange, and 384kbps can be maintained at up to a 4-mile radius of the exchange.

The principal disadvantage is cost; SHDSL is significantly more expensive to operate than ADSL (typically 3-5 times more expensive for a given amount of bandwidth) but rates will decline as SHDSL is increasingly widely adopted.

Graphically, the difference between ADSL and SHDSL can be illustrated as follows :





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### **Supplementary Information :**

#### **How does ADSL actually work?**

ADSL makes use of your existing telephone line, and splits the two signals for voice and data. Voice travels at 0-20KHz whereas data travels at around 25.875-1.104MHZ. The frequency that is used for the data is very high to avoid any confusion between the voice and the data.

When your ADSL line enters your office/home the splitter then comes into play, it will split and filter off the voice to your phone line and then send the remaining data to the ADSL modem.

#### **What are the tests they carryout to install Broadband ?**

##### **\*Line Length:**

(They need to know how far you are from the exchange), you must be within 3.5km to pass for 1Mbps and 2Mbps products, and within 5.5km for the 512kbps products. NB: This is related to the actual length of the line underground rather than the physical distance of your building from the exchange.

##### **\*Line Loss:**

(They need to ensure your line has suitable quality for ADSL), you need a line loss of no more than 45db for 1Mbps & 2Mbps products, 59dB for 512kbps products. This test is normally a paper exercise based around the records for your line and area, if a borderline figure appears they may test it out in the street.

##### **\*Capacitance:**

(Again, this is to establish line quality), to pass, this should be below 160nF - for ADSL the figure is believed to be 200nF (nF is nano-farads).

##### **\*Whoosh Test:**

(The final test for users having an engineer install.) The tests looks at the quality of the line across the DSL frequency range and measures how much of the signal reaches your premises, the loss should be less than 45db for 1Mbps and 2Mbps products and 59dB for 512kbps products.

For users with a wires-only installation, this test isn't done, but it can be carried out remotely at a later date if the line is unstable.

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