by Hugh Long, C.Tech

ADLS: ACHIEVING WARP SPEED INTERNET ACCESS

SURFING THE WEB IS LIKE DRIVING DURING rush hour: you start, you stop, you crawl! The only difference is that the congestion is made up of bits and bytes, not cars and trucks. If you are anything like most Web surfers, you yearn for the days when the Web will be navigated at warp speed, instead of the snail's pace we currently tolerate. For those of you looking for a ride on the Big Kahuna, it just might be here, and it could be ADSL.

Accelerate access

Asymmetric Digital Subscriber Line (ADSL), is one of several Digital Subscriber Line (DSL) technologies that have been developed to accelerate Internet access. The focus is on accelerating data rates over the last mile of copper twisted-pair wire in the plain-old telephone system (POTS) before that wire enters your home.

It's well known that fiber has greater bandwidth than copper as well as immunity to electromagnetic interference (EMI) and lightning. Fiber is certainly the long-term solution, however, given the huge installed base of copper twisted pair and the fact that it could take decades to replace that infrastructure with fiber, it's clear that interim solutions must be developed.

ADSL technology is potentially up to 200 times faster than the typical analog modem used today. One of the ideas underlying ADSL, and hence its name, is that Internet usage is almost always "asymmetric". The majority of Internet activity is spent downloading, not uploading. ADSL groups and service providers usually promote a downstream to upstream ratio of about 10:1; ADSL currently uses data rates of 6.144 Mbps (mega bits per second) downstream and 640 kbps (kilo bits per second) upstream. ADSL realizes these blazing fast data rates by employing coding techniques that use error correction and echo cancellation.

The bottom line is that ADSL is a potentially exciting technology that may mitigate the page loading delays that we Web surfers loathe.

ADSL field trials

Besides being an obvious relief to Web surfers, the Regional Bell Operating Companies (RBOCs) and telephone service providers would like to see this kind of technology implemented yesterday. Consider their plight: a voice call used to tie up a connection on a Central Office (CO) telephone switch for a few minutes. Now that same line may be in use for hours at a time as someone surfs the web. The RBOCs would like to get Internet users off the CO switches and implement faster technologies, such as ADSL. To do that the necessary infrastructure must be put in place which would require the addition of new modems and POTS splitters. To that end, the seven RBOCs and most telephone service providers are involved in ADSL testing and field trials with some limited commercial installations.

Competing standards

As sometimes happens in the development of new technologies, there exist competing standards, and so it is with ADSL. There are currently two major contenders for a modulation scheme: discrete multi-tone (DMT) and carrier amplitude phase (CAP). These two modulation schemes enable the increased data rates on twisted pairs. There are, of course, pros and cons with each modulation scheme: Firstly, DMT has been adopted by the American National Standards Institute (ANSI) as ANSI T1.413, so there is an industry standard in place.

CAP, however, does have a large installed base. DMT's use of Fourier Fast Transform (FFT) calculations causes latency delays that could impact voice and video applications, however it is this same complexity that allows it the ability to be rate adaptive and provide, theoretically, higher bandwidth than CAP.

It is anyone's guess as to when we will start to see large scale implementation of ADSL technology and which modulation technique will win favour in industry. The bottom line is that ADSL is a potentially exciting technology that may mitigate the page loading delays that we Web surfers loathe!

The opinions expressed in this article are not necessarily those of my employer, nor is any endorsement intended of any product or company mentioned.

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