

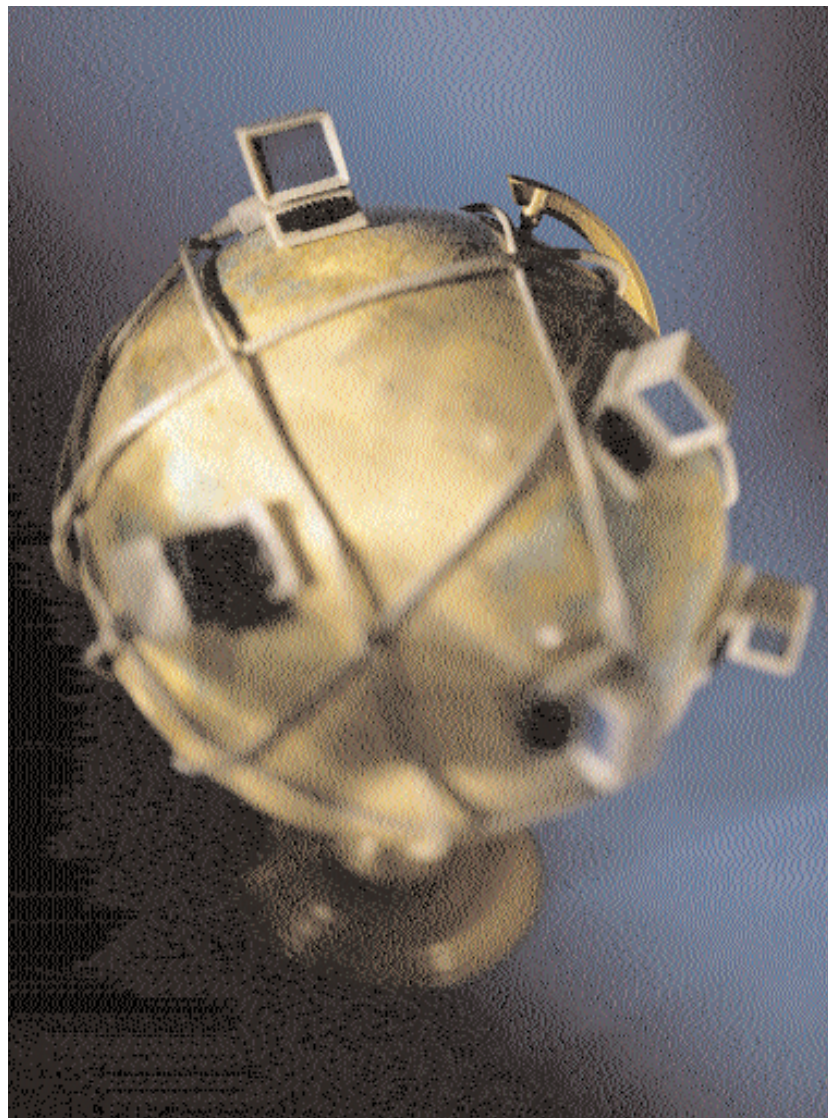
DSL global growth explosion

Around the globe, broadband DSL is gaining momentum as a key high-speed access solution to eliminate the dial-up doldrums. High-speed internet access is more than a possibility; with broadband DSL it is a reality

Overall data spending has grown every quarter for the past several years, and the DSL global installed base exploded to 18.7m consumers at the end of 2001, according to industry analyst firm Point Topic. This represented 188 per cent broadband DSL growth during 2001, which has shocked most industry observers.

While there has been growth in every sector, the deployment of broadband DSL has not been evenly distributed around the world. Certain countries with providers such as Korea Telecom in the Asia-Pacific region and Deutsche Telekom in Germany have leapt far ahead of friends and neighbours, which leaves providers and businesses alike to ponder what it takes to become successful on the broadband bandwagon. Not only that, but providers are blazing new trails with heavy marketing efforts focused on what motivates customers to get onboard.

Access is a commodity. Internet access is a homogeneous good, and



internet service providers (ISPs) could be low-growth, low-margin utility companies unless they provide value-added services. The trend is towards higher data transfer rates in order to gain the

benefits of multimedia communication as broadband DSL technology matures – though not without growing pains, as most service providers have experienced in deploying DSL.

Broadband DSL installation advancements

Most of the 18.7m or so DSL broadband lines in use around the world have been installed without problems but have depended on a site visit by a specially trained engineer. The engineer has brought the equipment needed to enable DSL broadband on a single home computer or on a network. The DSL service provider will have specially selected that equipment because it "speaks to" – is interoperable with – the DSL service equipment at the telephone exchange.

The broadband DSL industry is improving the process of installing DSL at home – or at work – with a goal of making the procedure as straightforward as plugging in a new telephone, printer, CD or DVD player, if not even easier. Technology consumers are used to being able to add almost any new equipment to information and entertainment resources quickly and effectively.

Automation has been added throughout the provisioning process, which reduces both costs and time to provision. Aggressive providers have instituted solutions that allow a customer to order service on-line and track the entire automated provisioning process right through the self-installation and service turn-up phase. An installation process that once took a couple of weeks is now on average completed within three days.

The expectation is to be able to plug-n-play, meaning buy that equipment when and where desired, plug it in, get it working in minutes, and to pack-n-go, which means to take it along in a move or even travelling on the road – and for it to still work. The DSL Forum is focused on achieving that level of interoperability for DSL broadband equipment.

On the equipment side over the past year, the DSL broadband

DSL growth by region			
	Subscribers (000s)		% growth
	2001	2000	188
North America	5,510	3,397	62
South & East Asia	499	240	107
Asia-Pacific	7,949	2,986	166
Western Europe	4,232	1,062	298
Latin America	380	70.1	442
Eastern Europe	53	7.8	579
Middle East & Africa	48	6	700

Source: Point Topic March 2002

equipment market has been under siege. The spectacular collapse of certain competitive DSL providers, combined with an enormous build out by the ILECs has created a market awash with excess equipment. However, despite these twin challenges, Yankee Group points out there is evidence that the broadband DSL equipment market still has a number of rich untapped markets. This is primarily in the international marketplace, but also in the US as carriers upgrade remote terminals and replace older platforms. Rapid market expansion driven by a quest for broadband DSL applications is beginning to change all that.

What content providers need to know

Content providers are faced with a number of challenges today, such as determining what types of content are best suited to drive revenue and subscriptions and how to cost-effectively create content that is unique and has demand in the market to ensure positive returns.

More companies have dispersed workers to telecommute or work out of smaller regional offices, and DSL is uniquely suited to support their business needs of file sharing, video conferencing, email, corporate LAN and

internet access. End users around the world are simplifying their lives through on-line shopping, education, travel planning, as well as enjoying gaming, on-line chats, and video-on-demand. As more bandwidth intensive applications and more demanding end users covet better real-time experiences on the net, DSL broadband is rapidly progressing from luxury to necessity.

In response to these trends, the industry as a whole is struggling competitively as providers attempt to brand and own the best proprietary content. Yet seeking the largest audience possible, most content producers are refusing to give any specific ISP exclusive rights to their best content. This ISP selection has resulted in minor content distinctions for subscribers.

Both content and service providers are making strides in the search for the right revenue model and partnership arrangements that will solve these problems, according to analyst firm Pyramid Research. Both can find what they are looking for in Korea's online gaming industry. By lowering initial costs of playing, gaming has entered the mainstream, boosting broadband subscriptions. ISPs benefit by helping content producers distribute their wares and making payment easy by bundling

invoices with internet or mobile services through partnership arrangements and offering auto-payment solutions. ISPs in Korea are taking on a profitable role as they evolve into internet aggregators, becoming a nucleus of money, information and content.

Hong Kong's broadband market presents great opportunities in Asia. Online gaming companies such as NC Soft are only starting to tap into the market. For all players in the broadband service market, there is still ample room to define ones' space in the market. Pyramid Research also says that despite the small size of Hong Kong's market, succeeding is essential for local operators as it provides them with the opportunity to expand into other larger markets not far down the road, particularly China.

Providers are looking more closely at their opportunities in Latin America, and over the longer term the picture is bright, as a recent McKinsey study shows. Despite low broadband penetration, the percentage of higher-income households and businesses reached by that infrastructure is relatively high. The DSL broadband adoption growth rate in the Latin American region for 2001 was 442 per cent for overall usage, including nearly 30 per cent business adoption, according to Point Topic. Since business products typically bring in more revenue, this means positive cash flow much earlier than in regions that have primarily targeted residential customers. Offers targeted at these households and businesses might therefore prove to be good business for providers even now.

Pyramid Research says that Central America's long-ignored telecomms sector is drawing the attention of the region's leading telecommunications operating companies. When measured collectively, this area represents a

significant growth opportunity.

Another positive factor is the pace at which these and other potential markets are growing. This growth rate will vary by country, depending not only on the size of the market, the affordability of broadband and the number of installed broadband wire lines but also on the regulatory environment and on consumers' willingness to adopt new technologies quickly.

Whether at home, at work, at school or on the move, everybody wants more speed and easier access from every service whenever and wherever it is needed. The reality is that if you can get what you need done on the net faster, whether it be grocery shopping, information communication or entertainment – then more leisure time can be created.

Global standards: the key to deployment advancements

In order to create a mass market for broadband services, the end user must be offered products and service that meet their personal requirements. This requires "mass customisation" whereby a user can select the equipment that best matches their needs and know that this will work with a wide range of services and network providers.

The consumer's choice of equipment may be dictated by many factors including:

- Functionality (modem, router, VPN/firewall/voice capability);
- Interface (USB, Ethernet, HPNA, wireless LAN, etc);
- Ease of use (configuration changes, diagnostics);
- Form factor;
- Vendor;
- Price; and even
- Colour!

The secret for service and network providers is to be able to meet these requirements without overly

complicating the network delivery (and hence resulting cost base of the service). This is done by taking a layered approach to interoperable standards in order to offer a limited number of options at each layer (thus keeping the provisioning and network issues tractable). Meanwhile, the total number of combinations should always offer at least one permutation that will meet the end user's personal requirements.

Therefore global interoperable standards are vital to create the environment from which a healthy broadband DSL mass market will emerge. Working up the protocol stacks, some of the layers and options for product differentiation are:

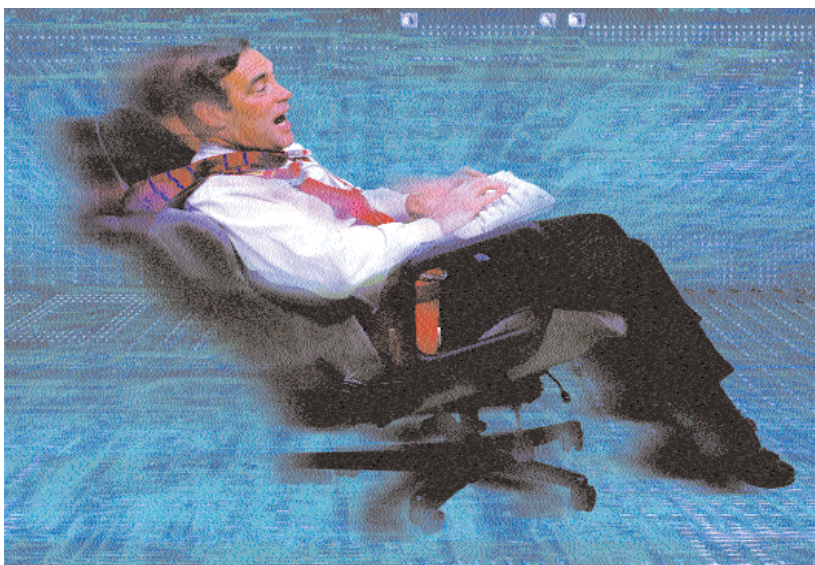
- PHY Layer: ADSL versus SHDSL (choice depends on upstream bandwidth needs and need for base band POTS);
- ATM Layer: choice of traffic class (CBR versus UBR or rtVBR etc.) and overbooking ratio;
- IP Layer: choice of static or dynamically allocated IP address, NAT or no NAT; or
- PPP Layer: choice of PAP or CHAP for authentication..

These are just some examples at the network/connectivity layers. More service-focused examples can include:

Voice: Approach to voice integration with data (VoATM, VoIP or channelled voice), voice codec rate, contention on the voice service (eg residential ratio versus business ratio options);

IP VPN: Options within IP Sec encryption (Authenticating Header and Encapsulation Security Payload), etc.

Internationally agreed upon standards and technical recommendations are in place for all of the above. Many bodies including the ITU, The ATM Forum, IETF, DSL Forum and others develop the standards. As illustrated, within this structured



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framework a huge range of combinations exists which enables product and service differentiation within a bounded space, in order to avoid an infinite number of testing options but to strive for an optimal balance between customer choice and manageable network engineering. Many current initiatives including those within DSL Forum are focused on progressing interoperability of CPE with network architectures and service models across these layers.

To ensure success, the DSL industry must complete the work that has been facilitated by the DSL Forum. This will allow broadband DSL to be available to all who want it. DSL Forum's efforts to fast track the essential work go beyond testing the equipment interoperability to encompass the wider aspects of such services. For example, guidelines on flow-through provisioning assist all the players in the value chain to act consistently so that a service can be

provided across all the network layers when multiple business entities are involved in the delivery. This work also includes recommendations for CPE dynamic configuration advancements.

Service provider implementation of these recommendations is the final step in making universal availability a reality. It is not enough to have solutions and standards available, service providers must commit to these improvement implementations in order to extend the reach. The tools are at hand and with regulatory support, broadband DSL will become the flagship product and a strategic imperative for service providers worldwide.

Building the broadband future

The broadband DSL industry is at the point of fine-tuning performance, which requires a higher level of interoperability, including capacity to accommodate future DSL technology developments. Today, both the end user and the service provider are benefiting. At the

same time, the technology itself is sufficiently mature to allow specification of equipment with built-in capability to upgrade services from, for example, ADSL to SHDSL, without having to change core equipment at the customer's premises.

Content and service providers are making strides. Leading edge companies are on the table that have determined and established some best practice methodology to show a hungry global market is waiting for others to follow suit.

With Point Topic's year-end 2001 broadband DSL deployment figures at 18.7m consumers, DSL now addresses nearly 2 per cent of the world's existing copper loops. Clearly we are just at the beginning of broadband DSL deployment. In fact, the DSL industry has set its sights on a target penetration of 20 per cent of the world's loops by 2005. Effective, scalable deployments of essential broadband DSL capacity is a growing reality, as evidenced by the 188 per cent growth in DSL end users around the world during last year alone. In order to reach 200m consumers, the DSL industry will need to continue fast tracking the technological advancement and facilitating the industry-wide co-operation that is making DSL the leading global broadband option today. ■

About the author

Bill Rodey is Chairman & President of the DSL Forum, a consortium of more than 225 leading industry telecommunications, equipment, computing, networking and service provider companies. Established in 1994, the Forum continues its drive for a global mass market for DSL broadband, to deliver the benefits of this technology to end users around the world over existing copper telephone wire infrastructures. Technical Reports and more information are available publicly at www.dslforum.org