



Delivering broadband the traditional way

DSL delivers the vast majority of broadband across the world. DSL technology is based on using telephone lines which of course have been around for around a hundred years now. Tom Starr, Vice President of the DSL Forum explains.

Question: Many thanks for your time today. Would you kindly introduce yourself and tell us a little about the DSL Forum?

Tom Starr: I have been with the DSL Forum since its inception that was 11 or 12 years back. I am on the Board of Directors and I serve as Vice President and was previously President. I also am employed by AT&T in the Network Architecture department and am a lead member of technical staff but today I am speaking on behalf of the DSL Forum only.

The DSL Forum is an association of almost 200 companies around the world and its purpose is advancing broadband technology and services. It started out focused very squarely on DSL but about a year and a half ago we expanded the scope to be more about broadband (which of course DSL is a big piece of – DSL is the leading broadband access technology in the world). But I think this is an important change in that it's not just DSL anymore. Now we deal with DSL together with fibre access and we are looking at developing specifications that will work with any form of broadband access whether it be fibre or WiMax or even satellite. We're developing the common specifications that are useful for any form of broadband access and that is the main scope of the DSL Forum.

One of the things we are struggling with within the forum is the name of the forum. We are still the DSL Forum so from the name people think we only deal with DSL. The DSL Forum is a global organisation so we have strong membership from North America, from Europe, Asia, the Middle East – many countries around the world. Predominantly it's equipment vendors, silicon vendors, we have a very strong representation of service providers around the world and then there's

some consultants, some university and testing labs that are members of the forum so I would say that there's a fairly broad representation of the industry geographically as well as the functions.

So typically, we hold our meetings four times a year and we have a little over 200 people attending these meetings and the majority of the work is on the technical side but we also have a marketing committee and they deal with issues such as public relations and trade shows and providing representation of the forum at those events.

Question: Can you tell us about DSL and how it works?

TS: DSL technology is based on using telephone lines which of course have been around for around a hundred years now and there are nearly a billion phone lines out there already and of course they were all put out and justified and paid for by voice services. They still carry the voice services and DSL can in fact operate on those lines at the same time as a voice service and so one of the reasons for the success of DSL is that not only is it using the embedded infrastructure but they can continue to carry the voice service and earn revenue from the voice service but can also carry the DSL high speed data at the same time. However, it is not necessary. Some DSLs are used on the old phone lines but without a voice service so it's the choice of the service provider and the customer whether they have voice service or not. When most people think of DSL they are thinking of ADSL – 'A' stands for asymmetric – this is the most popular form of DSL. There are others. There are symmetric data lines that are more suitable for business applications but most of it is ADSL and the applications they use it for such as video require more downstream

About the DSL Forum

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speed. ADSL technology was first pioneered around 1992 so it's been around for a while so we have generations of ADSL which we're updating with ADSL2+ and then we're moving on to VDSL2 which is a much higher speed.

Question: DSL delivers the vast majority of broadband across the world. What are the advantages of using DSL and why is it so popular?

TS: I would say that a large part of DSL's success is making use of infrastructure that has been largely paid for by the voice services and now you can just easily add high speed data onto that infrastructure by connecting a pair of DSL modems on the customer and network's ends of the subscriber line. I would also say that the fact that you can continue to use the infrastructure for its original purpose and it does not preclude the continuation of the original use, so you can carry two services on one line is an advantage.

The other reasons for its popularity is that the industry standards have been established by the DSL Forum and other industry standards by the ITU. The industry standards have made the DSL equipment very low cost to buy and the competition for interoperable equipment based on these standards is made very reliable because the specifications have outlined the functions needed to make the operation very robust. Then it's also made very easy to install and operate because there's specifications that I have described that enable customers to self-install the equipment.

With ADSL, when a customer calls up a service provider and asks for an ADSL service normally what happens is that they simply receive a box in the mail with the modem and some very simple instructions and the customer – your average customer with no technical training – can install their own service.

Question: From your latest press release, I see that the number of broadband subscribers in the Middle East and North Africa region is up by 38 percent and those using DSL access technology is up by a huge 81.9 percent. To what do you attribute such growth in the region?

TS: I first would say that over the past four or five years, we have seen a very steady and sustained growth on ADSL and DSL in general. It has been very steady and keeps growing at more or less the same pace. Certain regions have got hotter and colder. A few years ago there was a huge spurt of growth in Japan and Korea and those two countries have pretty well approached their potential at this point but there are other countries such as China and India and we are watching Russia to see what happens – there is a lot of potential there. So I think



Photo courtesy of Morguefile.com

those countries are the ones to watch in the future. And as far as North America and Europe are concerned, they have been growing, over the years at a steady and sustained rate so I would expect that to continue. I would say that worldwide, we have not even tapped into half the potential yet. So there's still, I think, reason to believe that we'll see that sustained growth for several more years yet. And as I mentioned over the next few years I expect China and India to be leading the charge with Europe and North America just continuing to move ahead as they have.

So what is driving this? I would say that the fundamental low cost through using an existing telephone line, the low cost equipment due to the high volume of equipment – very, very low cost - and of course the reliable service. I think everybody has learned that DSL is built upon the traditionally reliable telephone infrastructure and is a very reliable, dependable kind of a service and has a very good reputation for that. So that's what I think is driving this sustained growth.

Question: As we were saying before, do you see more hybrid systems being used? Russia, for example is a vast continent and so do you envisage different systems being used to reach those areas where ADSL lines do not exist?

TS: The answer is yes and in two different ways. Firstly, what we are seeing in the

United States (where I am most familiar) and I think this more or less illustrates what is happening in other parts of the world – in the United States right now, DSL is available to I would say, on average, about 85 percent of people. That's a lot of homes but it's not all of them.

So what is being done for the other 15 percent? The answer to that is a combination of WiMax that is just getting started now, and some satellite access. So the remaining areas have broadband service available to them through either WiMax or direct satellite. And that 15 percent of the United States are areas that are more extensive, more difficult to serve with DSL and normally it's because they're very rural with low fibre density so when you run the telephone lines out to serve these customers you are getting very few to pay for the cost of doing this so normally it's the rural areas that are not likely to have the DSL. So satellite is definitely being used to serve the people in these areas.

The second way of using satellites with DSL is providing a triple play – voice, video and data – service to the customer by connecting them with an ADSL line and also a satellite dish or to plug into a combined residential gateway which has both the satellite receiver and the ADSL modem all integrated into one residential gateway device that provides to the customer a unified interface with one set of menus that allows one to navigate through video programmes or broadcast video which would come off the satellite. So this combined satellite and ADSL



DSL Forum acclaims Middle East and Africa broadband growing faster than any other region in the World

During the DSL Forum's first visit to the Middle East, Robin Mersh, the DSL Forum's Chief Operating Officer, applauded the strong growth of broadband in the region during his keynote address at Arabcom. Citing analyst Point Topic's published figures that confirm that the number of broadband subscribers in the middle East and Africa grew by 38 percent in 2006 while the number of those subscribers using DSL technology grew by 81.9 percent to 4.3 million.

Qatar, the United Arab Emirates and Lebanon have the highest broadband penetration with almost half the households in Qatar having broadband access. 28.87 percent in the United Arab Emirates and 22.5 percent in Lebanon. Turkey has the most DSL subscribers in the region and almost doubled the number in 2006 to 2.9 million. Tunisia, Egypt and Qatar all increased the number of subscribers in their respective countries by over 100 percent, while in the United Arab Emirates, DSL subscribers grew by 63.45 percent to 207,080.

"The rapidly emerging markets in the middle East are a testimony to how global standards are improving speed to market" said Mersh. "DSL access technology is by far the most popular access technology, accounting for almost 88 percent of broadband subscribers in the Middle East. New applications, such as supporting IPTV offerings to customers and DSL used for mobile cellular providers are only going to fuel this growth further.

"We are pleased to be here at Arabcom to continue educating the market about the latest in DSL Forum architecture and management specifications to ensure that service providers here have the tools they need to build out superior networks, well capable of delivering all the multimedia applications they envision".

access is being sold in the United States today. It provides subscribers with a complete triple play service so if a person clicks onto a movie on demand, that will most likely come through the ADSL line and if they click on a broadcast channel or internet surfing it will come over ADSL and the really cool part of this is that the customer really doesn't need to concern themselves or worry whether what they have chosen is coming over satellite or over ADSL as the equipment uses the appropriate medium for that particular application. The satellite is already there, the ADSL is already there so really the only new thing is this clever residential gateway device and some software and the network and you're in business with triple play.

Question: The rise in broadband connectivity has had an impact on the services that may be delivered such as IP-based services. Which services do you envision as becoming most popular over the next 12 months and in which regions?

TS: Certainly the services that are most popular are high speed Internet access, just browsing the web, email and all that sort of thing – they are definitely top of the list today. VoIP is growing and becoming more popular so it's safe to predict that this will become increasingly popular. Various forms of video such as broadcast and video on demand is growing and one way of doing that is by this combination of satellite and ADSL. The other approach which is growing is to use fibre to a customer's home and Verizon is doing a lot of that at the moment or ADSL2 which uses existing phone lines and is another way of providing a very complete video service including multiple simultaneous high definition TV streams which can be done with ADSL. So the video, of course, is the exciting service that is becoming more available and we will see that in Asia, in Europe and in

North America that it's really coming on strong.

The other application is education and also we are seeing the business applications – the big area there is wide area networks which enables businesses to connect their computers and branch offices so business is another big application.

Question: We hear more and more about ADSL2 and ADSL2+ standards. BT will be using ADSL2+ to rollout its 21st Century Network. Would you please tell us about these standards and what their capabilities are?

TS: Yes, ADSL, the highest speed that ADSL can achieve is about 7mbps downstream. ADSL2 is about the same but it's not so much about speed but some operational benefits. ADSL2+ can get up to (depending on how aggressive the service provider is) 24mbps downstream. And then VDSL2, again depending on how the service provider configures the equipment can go anywhere from about 25mbps up to 100mbps but don't assume that everyone will get 100mbps with VDSL2 because it definitely costs more to deliver 100mbps than it does to deliver 25mbps. So if some service providers tend to feel they can deliver HDTV with 25mbps then that's good enough, right? Just because VDSL2 can reach 100mbps does not at all mean that everyone is using it at that speed. More often it is used at 25, perhaps 30mbps. One of the fundamentals on DSL is that there is a trade-off between the length of the telephone line and the speed that you can operate at. You cannot deliver 100mbps at a distance of 3km. The line is going to be very short. You just can't do it. So there is this trade-off. You can go fast or you can go long. You can't do both at the same time!

Question: Do you believe that next generation broadband services will

eventually be available to all? What problems do you see regarding rollout of these services?

TS: We certainly have been rolling out over the last few years and we certainly will continue over the next several years and we will continue the expansion of the availability of broadband access so going out to more and more customers in more and more towns every year. DSL is available to approximately 85 percent of homes in the United States through different methods such as coaxial cable, WiMax, and Satellite.

Depending on which country you look at, broadband availability today ranges from about 99 percent to maybe less than 10 percent. And looking to the future I do think that at least in the major industrialised countries, whether it's DSL or fibre or satellite or WiMax I think that most of the major industrialised countries will very soon have up to 99 percent availability. So I think we're getting there.

I would have to say that one of the challenges is that when you move from a 2mbps ADSL service to a 25mbps or higher speed service for triple play with high definition video, one of the challenges the industry is dealing with today is that with ADSL, as I said before you can do customer self installation which is very easy, very quick to do, but with the additional functionalities and the higher speed for a full video triple play service, that is more difficult to have a simple customer self-installation. Most homes today which have this full triple play service which usually requires a fully trained technician to come to the person's house and hook up the equipment - it actually takes a while for a highly trained technician to connect everything and get it working. That clearly adds cost and slows down how many customers can be installed per day. That is one of the challenges that the industry is working through today. We are learning how



to do it a little quicker, a little easier, but I think that will be a continuing challenge for some time and will slow things down just a bit. It definitely will be a success, it just takes a lot of work to deliver these higher speed services.

Question: Would you kindly tell our readers about your Broadband Suite and what it may be used to achieve?

TS: Yes. The DSL Forum has developed what we call the Broadband Suite which is part of our technical work that is focused on delivering end to end solutions, complete solutions for network service providers based on IP networking. It encompasses not just DSL but other types of broadband access. So this is a complete set of tools for service providers and networking providers to use provision and to manage IP-based broadband networks.

There's three parts to this, Broadband Control, Broadband Access and Broadband Home. So the Broadband Control portion is a programmable control area that unifies the subscriber with requests for applications and things to do with their access so basically it connects the subscriber's request for applications to the network in real time control. These things then happen when a customer asks for them, so it is a common

service facility that allows their customers to access a variety of service providers so it's something that allows customers to deal with more than one service provider. We are not just working with the DSL Forum but with other industry bodies such as the IATF that of course is really big for the Internet. So that's Broadband Control.

Next is Broadband Access. This defines the best specifications for what we call network aggregation as it takes traffic from DSL and fibre lines and combines it all together into an IP-based multi-service network that supports all that service. It also supports, and this is some real groundbreaking work here in the area of IP multi-cast, this is very important for video programming – to be able to take one video source and to be able to multi-cast out to a large number of subscribers.

And here in particular I would point to our TR101 document that is basically a roadmap for the industry to move from the ETA type of technology to the Internet technology

The third and last part of the broadband suite is Broadband Home and this is focused at the customer premises equipment and provides a composite of capabilities that automate the device activation, the configuration, the customer equipment,

diagnostics and management of the customer equipment. One of the things that this does is allows a service provider remotely, without sending a technician to the customer's home, to be able to configure the equipment, to troubleshoot the equipment, to adjust the settings of the customer's equipment and to do it all by remote control from a network operations centre. And the real fundamental specification there in the DSL Forum TR69 – that document has been widely altered throughout the industry as a way to remotely manage customer equipment.

Question: Where do you see the DSL Forum in 12 months time?

TS: My expectations over the next 12 months will be firstly to see expanding services in the Middle East and work is going to focus ever more on to IPTV and also we are going to be looking into doing part of the work on fixed mobile convergence – so the notion of mobile services and landline services coming together as a unified service. And the final thing would be that I think that we have expanded attention on serving business customers. Our work has mostly focused on services to residential subscribers. I think we'll see some more attention to the business customers as well. ●

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