
DSM Desotech FTTH 2009 *Designed for the Future* Executive Roundtable Summary

On Tuesday, September 29, 2009 approximately 30 industry executives gathered to discuss the current state of fiber-optic broadband networks and the challenges and opportunities for the industry as it strives to meet the impending tsunami of bandwidth demand. Entitled *Designed for the Future*, the roundtable discussion addressed pressing industry topics such as government's role in ensuring access and network sustainability, the ability of incumbent networks to support future bandwidth demand, what is and will be that demand, and the risks associated with not embracing industry standards.

Participants included executives from various industry organizations, representing carriers, infrastructure vendors, network service providers, fiber optic cable and optical fiber makers, industry association leaders, academics and media. Participating organizations included ADC, Adtran, AT&T, Broadband Properties, Calient Networks, Cisco, Corning, Draka, FTTH Council, Graybar, Light Brigade, Lightwave, Optical Society of America (OFC/NFOEC), Sigma Technologies, Telcordia, Tellabs and Verizon.

To set the stage for discussion Rob Crowell, VP of Fiber Optic Materials for DSM Desotech, cited a report on bandwidth demand from the Cisco's Global Consumer Internet Traffic Forecast, which states that bandwidth demand will exceed 15 exabytes per month by 2011 and pass 30 exabytes per month by 2013. Rob went on to comment that uptake in rich-media consumption – particularly IP-TV and video – will drive up bandwidth consumption. He also introduced the idea that today, there are 36 hours in a "network day" and that there will be approximately 48 hours in a network day by 2013.

Four areas of conversation emerged as the key topics of the evening:

- Political challenges hinder innovation and true progress in providing broadband access for all
- Current fiber-optic infrastructure may not be optimal for future applications
- Four areas are leading the growth in bandwidth demand
- Standards are important to "future proofing" the network

Political Challenges Are Hindering Innovation and Deployment Progress

While there were varied opinions on many discussion topics, the group was nearly unanimous in its belief that government policy aiming to shape the telecommunications industry posed the largest potential obstacle to sustainable network deployment. Topping the policy discussion was the ARRA Broadband Stimulus plan. While some commented that the influx of capital may provide a short-term economic boost, most agreed that the government is missing the opportunity to facilitate long-term innovation and collaboration that would ensure a cohesive and synergistic approach to broadband deployment in the United States. The roundtable holds that the restrictions imposed by Broadband Stimulus hinder the industry's leading innovators (and employers) from participating. Further, there was skepticism over the number of ARRA proposals that would simply be overbuilds into existing markets and not true expansion of broadband into non-served and under-served communities. Deemed the "de-stimulus plan" by some, the concerns about the plan included its short-term view and the limited benefits of the applications and services being proposed by grant applicants.

Another issue discussed was the inconsistencies in regulations from state to state, which have caused telecommunications providers to choose less-than-optimal deployment solutions or avoid states altogether that make it difficult and costly to deploy services. One example cited an

unorthodox approach that cobbled together infrared and fiber solutions to avoid costly access fees and taxes.

A few suggestions arose as to how the U.S. can “divorce the technology from the politics” including:

- Establish regulatory guidance that ensures a consistent approach for deployment from state-to-state. The technology industry has demonstrated “open platforms” can create collaboration and ultimately spur growth and municipalities can learn from these processes. South Korea can serve as an example. The Korea Communications Commission is planning to invest \$25 billion in a ubiquitous network that will increase network speeds to 1 Gbps, 200 times faster than the typical 5 Mbps DSL connection sold in the U.S. Koreans currently have access to 100 Mbps. Singapore is another example of a coherent national broadband policy that prescribes 1 Gbps speeds.
- The stimulus package should not focus solely on creating jobs for today, but should promote developing the technology for tomorrow, which will create a more sustainable job environment for years to come.

Today’s Fiber Infrastructure Isn’t Optimal for Future Applications

Another near-unanimous belief was that optical fiber is the way forward to realizing true broadband potential. It has infinite capacity versus copper. However, the current 652AB is obsolete and can’t ultimately support the bandwidth-hungry applications on the horizon. It was generally agreed that increasing bandwidth demands will necessitate opening up new transmission windows - likely at 1625 nm wavelength, and that current optical fiber will not be adequate to support those transmissions. It was also noted that even with significant improvements in optical fiber performance and network capacity, the electronics in the network will still be a major obstacle to delivering a rich end user experience.

Four Areas Will Lead the Growth in Bandwidth Demand

To get to the heart of whether or not the right infrastructure and vision are in place to support future bandwidth demand, the group outlined the applications that are currently driving demand for broadband and applications in development that will drive demand in the future. To fully understand the degree to which existing networks will be deficient in supporting future demand, one only needs to consider pending and future applications that will drive demand for more and faster access. Four areas in particular were the unanimous favorites among the roundtable participants:

- Entertainment
- Education
- Medicine
- Mobile

In the short term, the industry is focused on boosting downstream speeds, fueled in large part by the incredible hunger for video content. For example, the new 3-D HD video applications being showcased at the conference, which are expected to be commercially available in 2010, require 160Mbps downstream speed. Developmental applications such as Ultra High HDTV, “Quad HD,” and Holographic Video will also require far more bandwidth than even the highest resolution HDTV today. Today’s generation of “millenials” are quite comfortable engaging in multiple simultaneous data streams (video, audio IM, gaming, social media and search) and have been the early adopters of advanced video applications. In the near future, upstream speed and capacity will be equally important as these individuals seek to share and store more content.

Education is becoming increasingly virtual. Universities that are reaching the physical limits to their expansion and are seeking to keep education affordable for students will benefit from distance learning programs that simulate the in-classroom experience. Remote learning and virtual

classrooms, aided by real-time collaboration systems, online content storing and sharing systems, and telepresence platforms will offer many more students access to top universities, and give them the same learning experience as a student sitting in the classroom. With its ability to provide equal access for many at a fraction of current costs, ubiquitous remote learning could have a profound impact on our global society and economy. Making this a reality will require significant broadband infrastructure and robust networks capable of handling an ever growing amount of traffic.

Telemedicine already exists today but many recognize it is in its infancy. Teleradiology is enabling remote diagnosis, shaving precious hours off of the time to treatment. Doctors are also utilizing streaming video to confer on cases. With advances in medical telematics, we will likely see real-time virtual doctor to patient collaboration for cost-effective diagnoses and follow up consultations. All of these applications require massive amounts of data transmission, which will have to be supported by fast, reliable networks.

The emergence of “superphones”, such as the iPhone and G-1, is creating a demand for mobile data and entertainment. Mobile service providers currently provide 6Mbps for consumer sites such as Facebook, but it is predicted that this will grow to 20 Mbps, then 50 Mbps and eventually will require 100 Mbps. Additionally, analysts estimate that there will be more than a billion mobile broadband phone subscribers by the end of 2010. This demand is causing mobile service providers to build up the mobile backhaul network. In fact, it is estimated that carriers will need 90,000 Gbps of capacity in the last mile of the backhaul network by 2014. The industry has seen a steady increase in backhaul equipment spending as well since 2008 and it is believed that the figure will reach \$10 billion by 2011.

Standards Are Important To “Future Proofing” the Network

It is no secret that the network infrastructure in the U.S. is aging while applications are evolving beyond what the basic design network can ultimately support. Given the costs of optical network deployment and the life-cycle expectations of 20 to 30 years in the field, defects and field failures represent a risk too high to ignore.

Reliance on outmoded networks, particularly at a time when bandwidth demand is aggressively increasing, leaves network operators to absorb greater risk, especially if specifications for system components are made without adequate consideration of long-term, sustainable performance. Consideration for the development of standards is warranted not only to protect those making the network investment, but also to ensure that viable network structures are being put in place worldwide that will be able to sustain bandwidth requirements that are as yet unknown, but eventually to be realized.

To learn more about this *Designed for the Future* roundtable discussion or to participate in future discussions, contact Patrick Foarde at Patrick.foarde@ketchum.com or 1-404-879-9254

About DSM Desotech

DSM Desotech is the global leader in the development and supply of UV-curable fiber optic materials. The company works with the world's largest manufacturers of optical fiber cable to help deliver a higher level of fiber performance-and to lower risk for network service providers. DSM is pioneering research and development in coating technology to improve microbending performance in optical fiber. For more information about the company please visit our Website at www.supercoatings.com.