# Why We Need More Fiber

## *16% Jump in Six Months: 81 Million People in US Watch Broadband Video at Home or Work*

The latest study of video watching habits, by Nielsen for the Cable & Telecommunications Association for Marketing (CTAM), shows a huge jump in the broadband video audience – up 16 percent in the six months ending last March, from 70 million to 81 million.

But the analysis also showed (as have some earlier studies) that traditional home television ratings are minimally, if at all, affected by broadband video viewing over the Internet, because broadband viewing was found largely to be incremental new viewing rather than a substitute for traditional television viewing. That should be comforting to Wall Streeters who worry about the revenue potential for the "cable TV" base of the triple play – the side of the field that's counted on by Verizon and other video providers to pay for their network upgrades.

The multiphased study, "A Barometer of Broadband Content and Its Users," provides the first comprehensive look at the relationship of broadband video consumption at home and at work to traditional television viewing behavior. It also presents a detailed analysis of television network viewing preferences among broadband video users across all key demographics.

### Key findings:

**Online video usage supplements traditional television viewing overall**. Online video (including broadband video at work and in the home) was shown to add to overall video viewing more frequently than it replaced traditional television viewing in the home, representing a net audience gain to total television viewing. Thirty-three percent of those surveyed indicated that watching video over broadband Internet increased their television viewing time, versus 13 percent who indicated it decreased their traditional television viewing.

**Potential upside for increased television program viewing online is high among current broadband video users:** An additional 32 million lighter broadband video users report being open to watching more TV programs via the Internet. Further, consumers indicate that greater awareness of where to find the videos they're seeking, better navigation interfaces, and the increased availability of high-profile television programs online could significantly drive future broadband video content use over the long term.

**TV set access is the tipping point for widespread broadband video use:** Based on respondent feedback, widespread consumer use of broadband video seems to be contingent on Internet platform video content becoming more easily accessible via home television sets. At that point, consumers say, Internet video fare could assume its place as another source for content on demand.

**Broadband video use is dominated by the top brands:** ABC.com was the leader across all broadband viewer visits to television network Web sites, while Yahoo! Movies was the leader in the movies category.

Because the results are important, and unexpected by many, it is worth looking more closely at the methodology. Internet usage data came from Nielsen//Net-Ratings, which categorizes broadband video users as heavy, moderate or light in their usage levels both at home and at work. These data served as the study's underlying survey sampling framework, a departure from most research in the field, which simply differentiates between users and non-users of broadband.

Next, eight live Internet-linked group sessions were conducted to explore how different video formats and advertising tactics contribute to the long-term growth of television and broadband video platforms while minimizing and controlling TV audience erosion.

Thirty-two consumers participated in these sessions, which were conducted by Nielsen Entertainment Television Group at the CBS TV City facilities in Las Vegas on November 29 and 30, 2006.

This gave Nielsen a better idea of what to look for.

From December 2006 through February 2007, 2,267 online interviews were conducted to gather data on primary online video usage via broadband connections in home and work environments by heavy, moderate and light users as well as non-video users. Broadband behavioral metrics provided by Nielsen//NetRatings were also captured to generate enriched market segment profiles typically not possible in consumer survey research settings.

Respondent-level survey results were then linked to National People Meter (NPM) television viewing data for January and April 2007, using identical household metrics in the segmentation study as those employed to capture NPM data by Nielsen Media Research.

This created a comprehensive benchmark of the programming preferences that characterizes the six broadband video user segments.

The complete study is available for purchase on the CTAM Web site at www.ctam.com/research/form-06-broadband-email.pdf.

# Video Drives Broadband Use Worldwide

*Analysts have long been bullish on video as the major driving force for more bandwidth – bandwidth only FTTH can provide. Some major new studies provide more confidence that actually serving the video can lead to profits.*

## *Asia Leads the World in FTTH Penetration; US Ranks 11th*

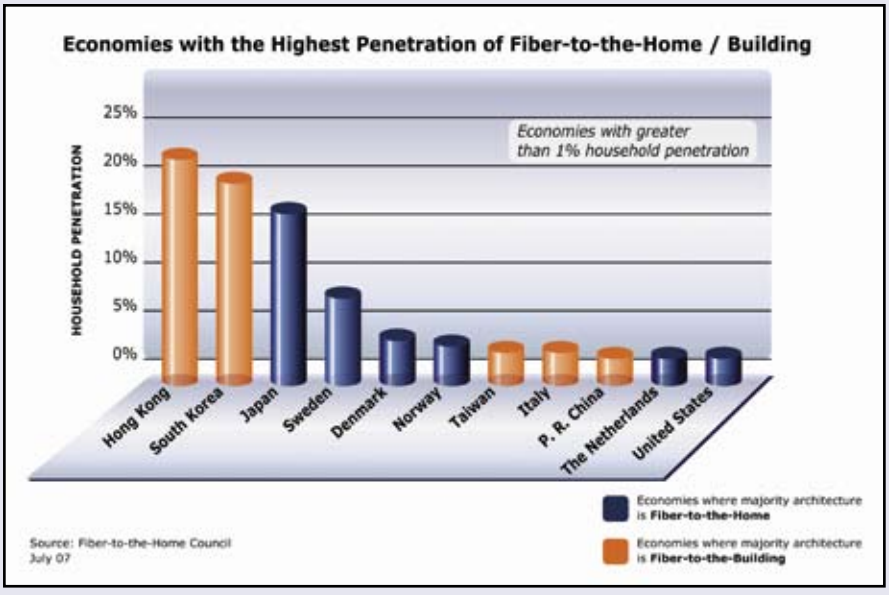
Hong Kong, South Korea and Japan are the world leaders in the percentage of homes that receive broadband communications services over direct fiber optic connections, according to a new global ranking of fiber-to-the-home (FTTH) market penetration issued jointly by the FTTH Councils of Asia-Pacific, Europe and North America.

According to this first-ever official ranking of FTTH deployments in the world's economies, 21.2 percent of homes in Hong Kong are wired with FTTH, followed by South Korea at 19.6 percent and Japan at 16.3 percent. Scandinavian countries occupy the next three positions, with Sweden having 7.2 percent of its households connected to FTTH, Denmark at 2.9 percent and Norway at 2.5 percent.

Taiwan, Italy, People's Republic of China, The Netherlands and the United States round out the top 11 economies, with FTTH penetration rates of between 1.4 and 1 percent of households. Only economies with penetration of 1 percent or more were included in the ranking.

"With this global ranking, it is now evident which countries are FTTH leaders and which are FTTH laggards," said Joe Savage, President of the FTTH Council North America. "What is most interesting is how the leading economies in FTTH penetration are also those with clear public policies aimed at promoting deployment of next-generation broadband networks as a matter of strategic national importance."

The three regional FTTH Councils joined together to create this first official global FTTH ranking in order to provide the telecommunications industry, governments and regulators with a unique snapshot of international fiber access penetration. Going forward, the councils will update and re-issue the rankings on an annual basis, as well as work jointly to further refine the research methods in order to provide more in-depth information.




**Some Asian countries enjoy a 20-to-1 advantage over the US in FTTH households.**

Announcing the release of the global ranking at the FTTH Council Asia-Pacific's Beijing Conference today, Shoichi Hanatani, President of the FTTH Council Asia-Pacific said, "For the first time we have a tool to monitor the transition that is now occurring around the world, from legacy copper loops to powerful new optical fiber access networks."

For completeness and accuracy the ranking includes both FTTH and FTTB (fiber-to-the-building) figures, while copper-based broadband access technologies (DSL, FTT-Curb, FTT-Node) are not included.

"By pooling the data from three regional market studies, the compiled information completes a dedicated resource for global telecommunications professionals to compare industry research from different regions of the world, and open some eyes to the wider FTTH picture," said Joeri Van Bogaert, President of the FTTH Council Europe. "This will be useful in monitoring the success of government and regulatory policy in supporting the historical transition to fiber-based broadband."

## ABI Research Sees Pay and Ad-Supported Internet Video Flourishing as Total Online Viewers Reach One Billion by 2012

Consumption of both ad-supported and pay broadband video will grow strongly over the next few years as direct and third-party distribution channels proliferate, according to a new study from ABI Research (www.abiresearch.com). The growing reach of new distribution models will expand the total consumer base of Internet video consumers from roughly 300 million today to nearly one billion by 2012. This growth will create a demand for new revenue models that will help create a multi-billion dollar industry.

"Who pays for video online will largely be determined by who foots the bill through existing models," says ABI research director Michael Wolf. His predictions:

- For broadcast television, including prime-time TV content, ad support will be the primary engine of monetization as this content moves online.
- Movie content new to the home-video window will be largely consumer pay-supported.
- User-generated content will be ad-supported, as sites such as YouTube and social networking sites make increasing use of content produced by their own online users as a way to drastically increase their inventory of premium advertising opportunities.

The expanding reach of new syndication networks and video "super-portals" such as Joost, alongside established sites like MySpace, will rapidly grow the total user base for ad-supported video, Wolf says, adding, "We believe that pay-video adoption will grow through sites such as iTunes where consumer hardware platforms create end-to-end user experiences that enable easy access to premium video. The growth of Internet-connected hardware platforms will make direct download of Internet video to the TV a viable model in coming years."

ABI Research also sees significant growth for enabling back-end services such as content management, publishing and content delivery network (CDN) services. Emerging broadband video ASPs such as Brightcove are offering not only comprehensive hosted software solutions, but tie-ins to their own ad and syndication networks.

Further, network acceleration overlay players such as BitTorrent and Swarmcast offer additional ways to create economical distribution methods that are already forcing traditional CDNs to adjust their models beyond distributed server-based caching.

## Bandwidth Demand for Advanced Applications Offers Opportunities for Fiber Deployments in Europe

Broadband penetration is increasing rapidly across Europe and, more importantly, bandwidth-hungry applications and services are increasingly being deployed and consumed. This is creating a need for service providers to focus on their access network strategies, and may finally lead to fiber becoming a bigger player in Europe.

A new analysis from Frost & Sullivan (www.communicationsservices.frost.com), "Fibre in the Last Mile in Europe," finds that fiber-to-the-home deployments passed more than 2.5 million homes by 2006 (fewer than 900,000 were paying customers) and are expected to pass more than 14.0 million homes by 2012 – low compared with the US, but higher than projections of only a year ago.

"Video content, high-bandwidth applications and convergence are driving broadband bandwidth requirements in Europe," says Frost & Sullivan Research Analyst Fernando Elizalde. "Several technologies are available to meet the delivery of bandwidth demand, of which fiber in the local loop, and in particular fiber-to-the-home, is future-proof."

Several service providers across Europe have made commitments to deploy fiber-to-the-node or fiber-to-the-home networks in the next three to five years. In addition, the availability of GPON has made such deployments more economically viable.

However, DSL, which uses existing copper access networks to deliver broadband, is well entrenched in Europe – often capable of delivering 30 Mbps or more – and lengthens the useful life of existing copper infrastructures. Furthermore, with DSL technologies, the bandwidth requirements in the near future can be met to a certain extent. Besides, high capital investment and local network characteristics pose restraints to a full fiber-to-the-home deployment across all countries.

"DSL is the preferred technology to deliver broadband and other related services in Europe," remarks Elizalde. "Local network conditions have been favorable to the deployment of this technology to deliver sufficient bandwidth to cope with user and application demands."

However, with the advent of high-definition video and other entertainment applications over broadband, this will not be the case for too much longer. Multiple high-definition video streaming to the home and other converged applications can easily outgrow the bandwidth capacity of DSL-based networks. As a result, service providers will need to start looking at deploying fiber deeper into the network, even to the home or building, in order to be ready to meet future bandwidth requirements.

# First-Ever State-By-State Report on Internet Connection Speed Shows US Far Behind Other Industrialized Nations

The first-ever state-by-state report on Internet connection speeds reveals that the United States is falling far behind other industrialized nations. The report, based on aggregated data from nearly 80,000 users, shows that the median real-time download speed in the US is a mere 1.9 Mbps. The best available estimates show average download speeds in Japan of 61 Mbps, in South Korea of 45 Mbps, in France of 17 Mbps and in Canada of 7 Mbps. Medians are lower, but not as low as in the US.

The national report is based on data collected through the Speed Test at SpeedMatters.org, a project of the Communications Workers of America (CWA). While the Speed Test was made available to all users, more than 95 percent connected to the Internet with DSL or cable broadband. Data, therefore, is largely representative of "high-speed" access in America. SpeedMatters.org was launched in September 2006 to help bridge the digital divide and keep America competitive by encouraging Congress to pass a telecommunications policy fit for the 21st century.

"The United States is the only industrialized nation without a national policy to promote universal, high-speed Internet access," says Larry Cohen, president, Communications Workers of America. "The grim results of the CWA Speed Test illustrate that, without a national policy, we risk losing our competitive edge in today's global economy, and the jobs that go with it."

CWA supports many of the provisions in Senate bill S1492, the Broadband Data Improvement Act recently introduced by Sen. Daniel Inouye (D-HI). The legislation would require collection and evaluation of data on broadband deployment, an upgraded definition of "high speed" that fits with ever-evolving technology, and grant programs for states and local communities to conduct their own broadband mapping.

"The first step to informed policy is good data," added Cohen. "Sound data will help policymakers establish the affordability of Internet services, identify which communities are being left behind and determine where to target policy solutions."

The report also ranks individual states based on median Internet connection speeds. The speediest states? Rhode Island (5.011 Mbps), Kansas (4.167 Mbps), New Jersey (3.68 Mbps), New York (3.436 Mbps) and Massachusetts (3.004 Mbps).

Iowa (1.262 Mbps), Wyoming (1.246), West Virginia (1.117), South Dakota (0.825) and Alaska (0.545) make up the bottom five. The same 10-megabyte file that takes 15 seconds to download in Rhode Island would take nearly two and a half minutes to download in Alaska. A full list of state rankings is available at www.speedmatters.org.

"The benefits of true broadband access for communities across the country are innumerable. From e-government and distance learning to telemedicine and public safety, high-speed Internet access for all Americans – from the rural plains to the inner cities – is essential to improving the quality of our economic, civic and personal lives," says Cohen.

The Speed Test, also available at www.speedmatters.org, is an online tool that measures the first-mile speed of a user's Internet connection. To report the real-time connection speed, the test sends an HTTP request to the nearest server and measures the time that it takes to receive a response. The test does not measure the actual transfer speed of a file over the Internet; uncontrolled variables, such as the content provider's server load and bandwidth, would interfere with accurate data collection. Information included in the report is based on data gathered between September 2006 and May 2007.

# IPTV Content Driving FTTx Market Growth in 14 Asia-Pacific Countries

Although the type and pace of broadband deployments vary by country, IPTV is the major driver for these deployments, according to a new assessment of broadband deployments and service drivers, with a specific focus on FTTx, in 14 countries of the Asia-Pacific region.

Based on interviews with major carriers, the study addresses FTTH/FTTB, DSL, CMTS and wireless initiatives throughout the region. It was conducted jointly by Ovum RHK (www.ovum.com) and the APAC FTTH Council in Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Singapore, South Korea, Taiwan, Thailand and Vietnam.

"Ovum believes there will be over 195 million broadband subscribers in Asia-Pacific by the end of 2010," says Lynn Hutcheson, Vice President, Communication Components at Ovum RHK. "Many operators indicated that content services were going to be a key component of their offerings. However, there are vast differences as to how each country regulates IPTV and content delivery over telecom infrastructures."

The report reveals other factors contributing to FTTx expansion, including national broadband initiatives, intercarrier competition and delivery of basic broadband services.

The report gives an in-depth analysis of the 14 countries, including the number of broadband subscribers by technology, broadband household penetration, key deployment drivers, major government and industry initiatives, regulatory issues and timelines for FTTx deployment.

## Net Neutrality Cuts Efficiency; Undifferentiated Networks Would Require Significant Extra Capacity

A new study by researchers at Rensselaer Polytechnic Institute, AT&T Labs, and the University of Nevada, Reno suggests that an Internet where all traffic is treated identically would require significantly more capacity than one in which differentiated services are offered. The study was funded by AT&T, perhaps the most shrill opponent of net neutrality. But it bears reading, and its modeling technique should be discussed openly, at a time when more traffic is peer-to-peer than from servers through the Internet.

Findings from the study were presented June 22 at the Fifteenth IEEE International Workshop on Quality of Service (IWQoS 2007) in Evanston, Illinois. IWQoS is a premier workshop on quality of service research, featuring rigorously reviewed technical sessions and papers.

As the Internet becomes more crowded with high-bandwidth applications and content, a wide-ranging debate is taking place about the issue of "network neutrality," which involves both economic and technical aspects. One aspect of the debate involves whether application traffic that requires performance assurances (such as video or VoIP) could be serviced differently, or what the impact would be if all traffic were to be treated in an undifferentiated manner.

"We wanted to take one piece of the overall debate and approach it quantitatively," said principal investigator Shivkumar Kalyanaraman, professor of electrical, computer, and systems engineering at Rensselaer. "The study makes clear that there are substantial additional costs for the extra capacity required to operate networks in which all traffic is treated alike, and carrying traffic that needs to still be assured performance as specified in service level agreements (SLAs)."

Using computer models, the researchers compared the current "best-effort" approach with a tiered model that separates information into two simple classes – one for most types of information and another for applications requiring service-level assurance for high-bandwidth content like video games, telemedicine, and VoIP.

The study was meant to answer one basic question, according to Kalyanaraman: "If I want to meet the needs of applications that require service level assurances, how much more capacity do I need?"

The additional capacity needed for an undifferentiated network compared with a differentiated network is referred to as the Required Extra Capacity. The study estimates that the Required Extra Capacity in even modestly loaded networks could approach 60 percent. At times of heavy demand on the network, the Required Extra Capacity in an undifferentiated network could amount to an additional 100 percent or more of the total capacity required when differentiation is permitted.

"Clearly, an undifferentiated network in this context is less efficient and more expensive," said coauthor K.K. Ramakrishnan of AT&T Labs. "We believe understanding the real impacts of the alternative strategies is important as the debate about network architecture unfolds."

The paper, "Value of Supporting Class-of-Service in IP Backbones," is available online at www.ecse.rpi.edu/Homepages/shivkuma/research/projects/cos-support.htm.

Other researchers involved with the study were Murat Yuksel of the University of Nevada, Reno, and Joseph D. Houle and Rita Sadhvani of AT&T Labs.

## Household Income Still a Key Factor in Broadband Adoption

New consumer research from Leichtman Research Group (www.LeichtmanResearch.com) finds that 53 percent of all US households now subscribe to a broadband high-speed Internet service at home. Broadband services now account for about 72 percent of all home Internet subscriptions, compared with 60 percent last year.

While broadband subscriptions continued to increase across the country in the past year, broadband penetration remains strongly correlated with household income; 68 percent of all households with annual incomes over $50,000 now get broadband (compared with 59 percent last year) but only 39 percent of all households with annual incomes under $50,000 get broadband – compared with 27 percent last year.

These findings are based on a telephone survey of 1,600 randomly selected households from throughout the United States and are part of a new LRG study, Broadband Access and Service in the Home 2007. This is LRG's fifth annual study of this topic. Other findings include:

- While 81 percent of all US households have at least one computer, only 56 percent of those with annual household incomes under $30,000 have a computer at home.
- Just 45 percent of households with annual incomes below $30,000 subscribe to an Internet service at home – compared with 92 percent of households with annual incomes above $75,000.
- Overall, 7 percent of all Internet subscribers say that broadband is not available in their area.

"Nearly three quarters of households in the US now subscribe to an Internet service, and broadband has grown to account for over 70 percent of all online subscribers at home," said Bruce Leichtman, president and principal analyst for Leichtman Research Group. "LRG forecasts the total number of broadband subscribers will increase by over 40 million over the next five years."