

Making the Business Case for Fiber

Summit speakers and attendees showed that fiber to the premises, along with marketing that gets the broadband story across to buyers, help overcome the real estate slowdown.

By Steven S. Ross and Masha Zager ■ *Broadband Properties*

The mood was guarded but upbeat at this year's Broadband Summit. Attendees talked of ways to adjust to the new real estate realities – a slowdown in buying, a drop in mortgage availability, and dearth of really big new developments that make adding fiber to the home an easy choice. But adjust they have. A key lesson:

Adding fiber access to a home sells or rents it faster, and for a higher price. It is one of the best ways to lure active young professionals, as well as empty-nesters with money to spend and with special



Almost every seat was taken at main events at this year's Broadband Summit, despite the move to a larger venue.

THE CORNERSTONE AWARDS

Each year, a committee of industry leaders, analysts and writers selected by Broadband Properties votes to bestow a half-dozen or so Cornerstone Awards to private developments, municipalities, communities, companies, and individuals with outstanding accomplishments in the area of delivering telecommunications for the benefit of the end user.

Since 2004, Cornerstone Awards have included recognition for the most notable deployments of fiber to the home in the US and abroad.

Cornerstone Awards were originally established in 1989 and presented in recognition of achievement to companies providing cable services to the MDU industry. The Cornerstone Awards have been expanded to recognize achievements in broadband and telecommunications for all communities and municipalities, including residential multifamily (apartments, campus housing, active adult communities) and planned communities (multihome developments, renewed urban areas).

This year's awards, presented at the Broadband Summit, went to:

Bristol Virginia Utilities

For outstanding customer service. BVU has been doing triple play longer than any other muni network in the country – and doing it very well. New customers can be on line in hours.

EATEL

For far-sighted planning plus bold action in delivering FTTH. EATEL started laying fiber in conduits a dozen years ago, and was able to move quickly to accommodate the influx of new residents after Hurricane Katrina.

Waterfront Toronto

Developing a world-class concept for an ultra-broadband community. The massive Toronto waterfront development will be a city within a city, planned from the ground up not only to use broadband services. The broadband availability shapes the development, just as transportation networks shape all cities.

PAXIO

Helping top developers deliver the future, today. So you want to add broadband to your MDU or subdivision. Where do you plug in? Paxio's unusual business plan has brought ultrabroadband to the Oakland area, across the Bay from San Francisco.

PAXIO has gigabit customers... and eyes for the rest of California.

Corning

Innovation of the year for the MDU market. An improved twist on bend-tolerant fiber expands the segment and brings the day of everyday routine installation closer.

Affärsverken Karlskrona AB

For fostering new broadband services. The potential of open-access networks is highlighted in this old Swedish naval town – nonprofit medical establishments make the concept of triple play seem quaint.

Hafslund Telekom

Most advanced strategy for an open-access network (City of Oslo, Norway).

Mosaic of Houston

Most exciting fiber optic condo project of the year. Mosaic shows how broadband technology sells condos.

Kellswater Bridge Development

Best marketing of FTTH in a connected community. Kellswater is not only a great project, it also shows a great marketing plan. There, fiber really does compete with granite countertops in customer eyes.

Enthusiastic real estate developers and property managers described the event as the only bright spot of the year in their industry. Exhibitors – mainly equipment and service providers, network designers and builders – shared their enthusiasm.

needs that only fiber broadband can reliably deliver.

Driving the point home: This year's Summit was the biggest yet; more than 800 registrants, up about 15 percent from last year. Enthusiastic real estate developers and property managers described the event as the only bright spot of the year in their industry. Exhibitors – mainly equipment and service providers, network designers and builders – shared their enthusiasm.

Keynoter Matt Wenger, who heads PacketFront's North American operations, said that four principles underlie successful delivery of fiber to the home:

1. Commoditization of the "triple play" of voice, video and data threatens traditional FTTH business models. Wenger reminded the audience that successful products and services go through three phases. The first is optimization. When a new service is introduced into a marketplace, the seller usually does not have volume efficiencies or experience and, as a result, margins are low. Over time, volume increases and the seller becomes more efficient. In this second phase, margins are maximized. But this is followed by commoditization and competition, and margins fall again.

Telecommunications services have followed this familiar pattern, Wenger said. Video has been the gold mine of revenue in broadband, for instance, but competition has cut prices and Steve Jobs at Apple has other ideas, too. Providers can no longer count on any of the three major services generating high margins.

2. In the open access model, where the network ownership is separated from the content providers and broadband services, competition squeezes profits still further. In the Swedish city of Västerås, five telcos, 15 ISPs, and three video companies share the municipal network. This proliferation of services "dramatically lowers prices to consumers," Wenger said.

3. Up-front connection fees alter the economics of FTTH, providing a mechanism to compensate for declining margins on sales of services. In Sweden, it is fairly common for the homeowner (or an MDU owner, who passes on the fee to residents) to pay for the fiber connection to the home. In Västerås, homeowners pay a \$3,500 connection fee. The money can be added to their mortgage, and adds between \$7.50 and \$12.00 to monthly payments. In exchange, homeowners there save 35 to 45 percent of overall cost on triple play. "This approach is now being used in the Netherlands as well and is spreading across Europe," Wenger said, "not just for municipal systems but also for real estate operators and others."

Nuenen, in the Netherlands, is an open access network with 8,000 homes. Residents got a free 10 Mbps connection for a year if they bought into the community cooperative, Wenger said. The result was a 98 percent take rate. Open networks with up-front connection fees are a win-win solution: Homeowners get multiple services at discounted rates; service providers get very high take rates; and

network builders get up-front user financing for their networks.

4. Marketing is everything. In Västerås, residents get a free 100 Mbps connection to file-share with everyone else in the community. Some 95 percent of the network traffic once left Västerås, now over 80 percent of the traffic stays local.

"What enhances the value of a community?" asked Diane Kruse, founder and CEO of greenfield fiber network builder Zoomy Communications. "A swimming pool, golf course, and in the last few years, technology. It's on the top-five list of what people want and are willing to pay for" when they buy into a new community. She cited a new Pulte Del Webb survey that says homeowners are willing to pay for technology in general, high-speed Internet access in particular, and especially FTTH. The study found 87 percent wanted their new home wired for technology and ultrahigh bandwidth and would be willing to pay for that. "So technology as an amenity will expedite your sales rates," she said.

Kruse called FTTH "inevitable," saying "Only FTTH can meet the demand. Internet use has been almost doubling every year for the last five years. HDTV is new. FTTH is the only technology that allows everything to work together." Residential usage of the Internet (including telecommuting) surpassed business use for the first time this year.

But she says there are many institutional and financial barriers. "We can shape regulation that will help. We're doing a terrible job. Japan and Korea are doing much better. We need to come together to foster investment in FTTH," she insisted.

Zoomy is also strong proponent of open access networks, Kruse said – that is, separation of the network ownership from service providers, at least for larger communities. A year ago, most companies in greenfield markets defined "larger" as having at least 1,000 households and perhaps a two- or three-year buildout time. But the slowing real estate market and problems builders have getting financing, along with more ef-

iciencies for FTTH, have reduced the necessary project size. “Most of our developments are large enough to support multiple service providers,” Kruse said. “We need 300 homes for this to make sense.” Most Zoomy projects are being built with the expectation they will build out to 3,000 units or more.

One justification for open access, Kruse said, is that it checks providers’ power to control content: “AT&T has been accused of censoring information from a Web site for political reasons. If true, that is just wrong. A network provider should not have that control. But the economic model doesn’t support multiple side-by-side networks. Long-distance and metro fiber networks were overbuilt and the industry tanked, so let’s not make that mistake. Multiple networks did work in the cell phone industry, but only because the cell tower companies were separate and leased their facilities to the cell phone providers.”

Kruse wryly noted that there are “three sources of conflict in the world: response to threat, struggle over resources, and desire to be in charge. Threat and resources don’t really apply here. The issue is control. But we can set it up so everyone has the control they need – service providers have control over their customers, network builders can have service level agreements and reporting. In the cell phone industry, regulations say that the cell phone provider must use a tower if it exists. We could say that providers have to use the FTTH infrastructure if it’s in place. But a market solution is probably better. Municipalities should be permitted to build if there is no market-based builder.”

“Developers need a program to get people to use the technology amenity, just as they might have a golf league to encourage use of the golf course,” she said. “For example, we put wireless hot spots in all the common areas. Offer a computer concierge service with x hours of free consulting. Call someone onsite to fix, configure, and update technology. Turn up the service ahead of time so it’s ready to go when the homeowner moves in. Pay attention to the structured wiring plant – put in place a builder program

to train installers, certify the home, and develop a maintenance program.”

Kruse said the most used amenity in Zoomy communities is the community intranet, for “discussion groups, organizations, new moms’ groups where they

Consumers Approve

Kurt Scherf, chief analyst at Parks Associates, also said there is strong consumer interest in home networking, but it could be TV- or game station–centric.

Video has been the gold mine of revenue in broadband...but competition has cut prices and Steve Jobs at Apple has other ideas, too. Providers can no longer count on any of the three triple-play services – voice, video and data – generating high margins.

can do bulk purchases of baby stuff. Schools can use it to post schedules, grades, assignments. Energy management allows residents to change their home settings remotely. Purdue University is doing studies about this.”

She noted that developers’ internal systems can use the fiber as well. “Tamarack uses the network to manage ski lifts, snow making, and the discount ‘ski card’ program. In Mississippi, police cooperate with the developer to do video surveillance of common areas.”



Matt Wenger, head of PacketFront's North American operations, extolled open networks.

In early September, Sony announced availability of a video drive for the PlayStation3, and Microsoft is doing the same for the Xbox. HP has a home video server product, and TVs with sophisticated computer-like controls.

Despite the interest, however, the market has a long way to go to maturity. Fewer than 1 percent of US households have whole-house comprehensive network control.

Scherf predicted that consumers will place a premium on having access to their content anytime, anywhere. Energy management and remote-access and security monitoring needs, health and lifestyle issues, and the infirmities of aging baby boomers will drive the market, he said.

Aside from that, there are new consumer products and services. In particular, Scherf noted, is a growth in “gamer” households. “Not just 14-year-old boys” are attracted to gaming, he said, “but also adults, especially role-playing games like Second Life and Halo.”

Preparing for the Exaflood

A blue-ribbon panel called for a new, more enlightened look at network-building, to assure that needed investments will be made. Robert Whitman of Corning Cable Systems said we must “plan for the long term. Look at young people’s intolerance for [network] downtime.

And there is an inverse relationship between age and Internet penetration. Internet use has gone from text to photos to music to video to software. You can now download MS Office from the Internet. The average Web page size has grown to 1.5 Mb. Today, power users need 30 Mbps of bandwidth; by 2010 they will need 70 Mbps.”

David McClure, President and CEO of the U.S. Internet Industry Association, said fast networks are “the engine of commerce for the 21st century. Huge amounts of data are being produced. Government doesn’t get it. We’re talking about taxes, net neutrality, favoring companies or sectors. IPv6 is coming in. We’ll need it because there aren’t enough Internet addresses otherwise. There are more addressable devices. The network buildout will cost \$1 trillion, and we need it NOW.”

Larry Irving, Co-Chairman of the Internet Innovation Alliance, agreed: “Students coming out of colleges will want the broadband they had in college, and iPhone users are doubling their use of data transmission beyond what was expected.”

Whitman said telcos should tell their investors that “opex for FTTH is half of what it is for copper. Capex has fallen from \$4,000 to \$1500 per home. In Japan and Korea, people are switching from DSL to much faster FTTH.”

Whitman was open to who exactly should be building the networks. He said private investors “should do research about the communities they’re planning to build in,” but that “there may have to be public builds in some places.”

Irving noted all the new video services on the Web and said telcos should “understand kids and what they’re doing.

McClure responded, “Cut away unnecessary regulation, get rid of 19th-century phone regulations.”

Irving said his organization “doesn’t want regulation or legislation – it’s always going to be obsolete. Set a good investment climate through tax policy. Bring in additional assistance for the digital divide.”

A new Pulte Del Webb survey...says homeowners are willing to pay for technology in general, high-speed Internet access in particular, and especially FTTH. The study found 87 percent wanted their new home wired for technology and ultrahigh bandwidth and would be willing to pay for that.

Investment will require a mixture of public policy and not underestimating the market. Latinos and African Americans are discounted as a broadband market, but they spend more on entertainment than whites, even if they’re not as likely to be computer users. The iPhone is appealing to minority kids.”

From the floor, Diane Kruse noted that “it’s easy to call policymakers stupid.” She asked what policy positions, other than education, panelists would favor.

One rural telco manager said, “We applied for an RUS loan, but we can’t get funding because they consider the market well served. That’s because they define broadband as anything over 256K. Lobbying money is protecting the status quo. How can we convince government to support competitive networks that are superior?”

Irving answered that “we need to have a dynamic definition of broadband. Most Congresspeople aren’t aware of this.”

Several audience members worried about quality of service. “How do you prod network providers to increase not just speed but quality of service?” asked one. “Could the USIIA organize such a thing, so it could be measured nationwide?”

McClure said that it wasn’t a feasible project for his group to undertake, because there were too many ISPs and consumers were not well enough informed about QoS issues. Irving said his organization would take the idea under consideration, but that measuring QoS might be a good opportunity for a private entrepreneur.

The March of Technology

Herb Hauser, president of New York City-based Midtown Technologies, also noted that “there’s a limit to how many ways we can do the triple play.” Instead,



Kurt Scherf, principal analyst at Parks Associates, said consumer uses for broadband are more advanced than many company business plans account for.

he described “genius buildings” and “genius communities,” using three terms he’s trademarked: “e-ppliances,” “B-Tech,” and “Forward Living.” The firm is responsible for Steel Point, 3,500 residential units on 84 acres in Bridgeport, Connecticut.

First, he said, is the invasion of the e-ppliances, devices that provide intelligent, real-time information to users (and others), wherever they might be. “New furnaces are Web devices and report back to users for maintenance,” he said. “This is the beginning of the e-ppliance.” He also sees items such as “reporting refrigerators” that keep track of food and medicines for the elderly.

B-Tech refers to resource metering, “behavioral technology,” in Hauser’s words. B-Tech is enabled by e-ppliances that will modify your behavior, in such areas as energy consumption. Hauser says he has a modified WiFi device for energy monitoring that is easy to use, costs less than \$50, and pays back its cost in a few months.

Forward Living refers to his idea that “real estate should be dynamic, buildings should modify themselves over their life cycle...your real estate is aging with you.” As an example, the spectrum of light that humans need changes over their lifetime. His firm’s forward living design uses LED lights that can change intensity and color.



Diane Kruse, founder of Zoomy Communications, said open-access networks are becoming more practical, even in smaller greenfield builds.

But Hauser had many caveats. “Owners will pay for something only if there is a way to make a return on investment,” he said. “So there must be expectation of user demand, as we are beginning to see for broadband. Green energy is fashionable, but it must stand up in the business plan, or don’t build it. Use the money elsewhere.”

Also, Hauser warned that today’s “e-ppliances are a tremendous pains in the neck because they require huge operating manuals; they are not intuitive. Users don’t need a lecture on how to turn on a refrigerator or a stove.” He compared the thick manual that comes with today’s

appliances with the thin, well-illustrated one that came with a Cadillac 40 years ago.

He called for “converged infrastructure – not 15 different wiring infrastructures – and use of a universal communications protocol, IP...A genius community is only as good as the infrastructure supporting it. Fiber is the way to go.”

The payoff, he said, is that “a genius community can retain generations [of residents] who can live, work, and play in multipurpose spaces, enjoy indoor/outdoor digital events and share experiences with the entire community.” He added, “The old Lower East Side was the original genius community. All it was missing was the telephone.”

Hauser also noted that broadband helps save money during construction. “A tablet PC used by the risk manager, who takes a picture of the violation and e-mails it with a description to contractor” is one example of processes and equipment that modern contractors have been using.

Broadband-based technology “reduces operating expenses by 4 to 18 percent and also increases speed of sale or rental,” he said. “No one buys because of technology – ‘Oh my god, look at that RJ-11 jack, darling!’ – but attention to detail creates the right impression.”



One keynote panel warned everyone to make it easier for network builders to prepare for the “exaflood” of data that’s already upon us. Left to right: Robert Whitman of Corning Cable Systems, David McClure of U.S. Internet Industry Association, and Larry Irving of the Internet Innovation Alliance.

The average Web page size has grown to 1.5 Mb. Today, power users need 30 Mbps of bandwidth; by 2010 they will need 70 Mbps.

Death of Bulk?

What do owners want? And how can providers help? A panel of MDU owners and operators made clear that old ways of doing business have to be carefully examined. Panel moderator Josh Katz,



Jam-packed DIRECTV reception.

Students coming out of colleges will want the broadband they had in college, and iPhone users are doubling their use of data transmission beyond what was expected.

vice president at Roseland Property Management, said that his company (which like most of the companies represented on this panel specializes in high-end MDU rentals) “has for years pursued bulk service for all our communities. Now we are moving away from it. This shifts branding to providers.”

Part of the problem, Katz said, is that “Roseland tries to explain to residents they should call service providers first, but because we get the check [for bulk services as part of the rent] of course

many residents see us as the provider.” It’s a common issue among property owners and managers.

Another issue is ethnic content. Panelists complained about lack of choices, or poorly calibrated choices. Said Chris Acker, Director for Building Technology at Forest City Residential, “we did a PCO [private cable operator] deal in southern Florida, where we looked for more Hispanic programming but there was maybe too much in Spanish.”

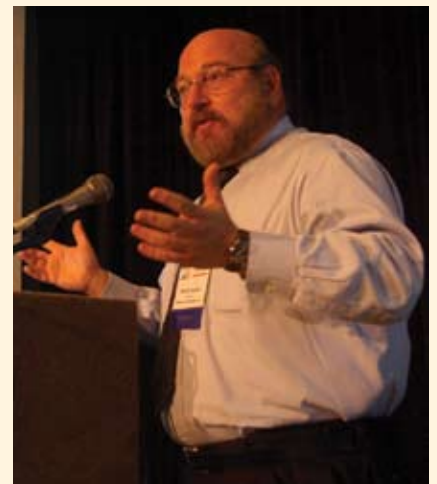
Steve Sadler, Director of Ancillary Services at Post Properties, noted that “more than Latino, Indian programming has become a big deal and some MSOs have only one channel in the wrong dialect.” Most Indians speak Hindi, but there are 18 major official languages there, including Bengali and Tamil.”

Katz said he worries about steering people to specific buildings with specific ethnic programming – some government officials could consider that a move toward segregation.

In a sellers’ market, property owners and developers can push providers to pay hefty fees for entry. But current economic realities, and the growing complexity of service choices, have pushed owners to look beyond up-front rewards. They have

to make sure the provider has enough heft to give residents reliable service. They worried about obtaining services that differentiate their property from competitors, and they worried about future-proofing, to reduce the chance their building would soon be obsolete.

Future-proofing is probably the most important by today’s standards, said Bob Faitz, Vice President for Ancillary Ser-



Herb Hauser of Midtown Technologies asked why new electronic gadgets are so complicated. He described ways to fix that problem.

vices at AMLI Residential. “Demand is almost certain to grow. Residents need choice, demand choice. Are we willing to give up things for that choice? By giving our residents choice we keep the units leased, so choice is more important than door fees and other revenue.”

Faitz says broadband providers often do not deliver anywhere near the service promised, at least not consistently. “I use Speedtest.net, which tests your speed on the Internet. The speed on Comcast [at one property] was only 220 Kbps. At work residents will have 300 kbps or more and now they want more at home. Residents also want HD television.”

Sadler agreed, adding that “there is a responsibility that falls on the owner. Many owners have not grasped the context that they have to build the [broadband] infrastructure.”

Details matter, too, for providers wishing to do business with MDU operators. Said Acker, “Providers have to understand how owners run their business. Leasing agents can’t sell broadband. We use video to preview what’s going on.”

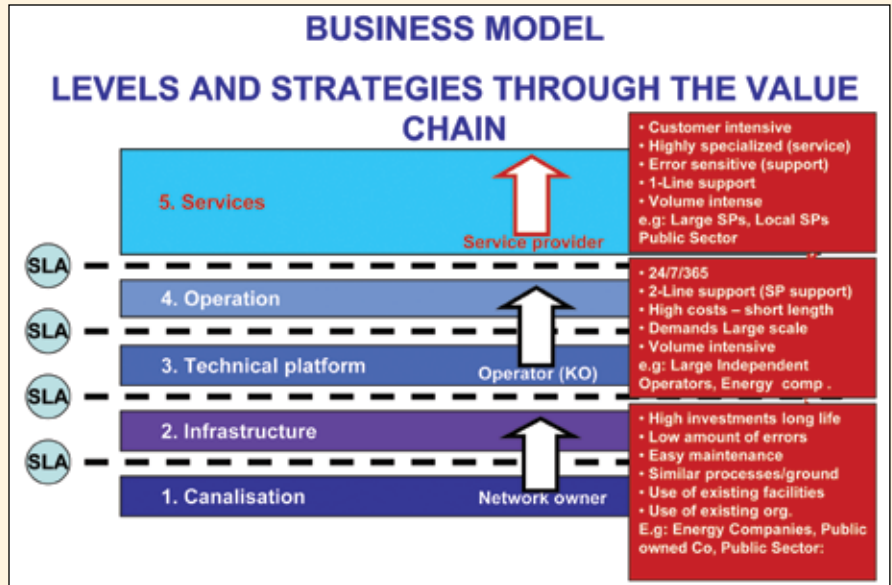
Faitz warned that providers must “keep the subcontractors under control and inform about what they are doing.” He said the best experience he’d had was with giant private cable operator Direc-Path. “They worked quickly and without an agreement to get us up quickly. I had happy residents.” But he said the large MSOs were also capable of great service and that PCOs can no longer compete in the hope that the franchise operators will fail. “Comcast, AT&T, Time Warner – we all have up-and-down experiences, depending on the region and the people involved.”

Sadler agreed, saying “I’ve had great experiences with just about all MSOs and absolutely atrocious experiences as well.”

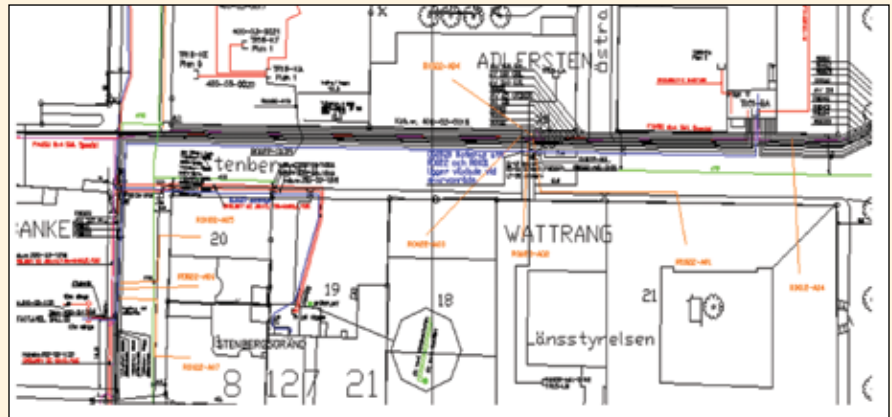
Katz said he “has had some absolutely outstanding experiences with Verizon this year but then I go to a different region and they are awful.”

About the Authors

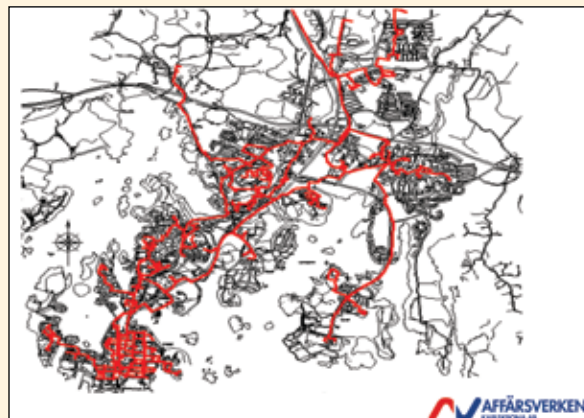
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The open-access model for Karlskrona, according to network builder Affärsverken. Note that a service-level agreement is needed at every level, and that the network builder has an easier task, once the initial investment is made in trouble-free fiber.



Network builders must document everything, in obsessive detail, for open access, because multiple service providers will be sharing the fiber. The example is from Affärsverken.

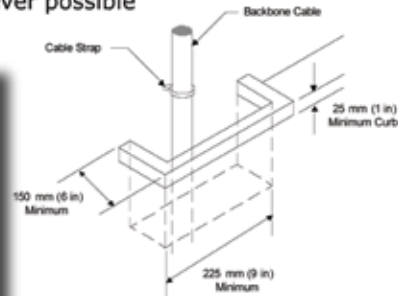


Fiber backbone in Karlskrona follows road rights-of-way. Note long extensions from metro ring in some places.

MDUs have tighter building codes than do single-family dwelling units. But Patrick Sims of ADC pointed out that cable and fiber installers don't always realize the detail they have to follow. Here are four examples from BICSI manuals.

MDU Applications – Slot Quantity and Configuration

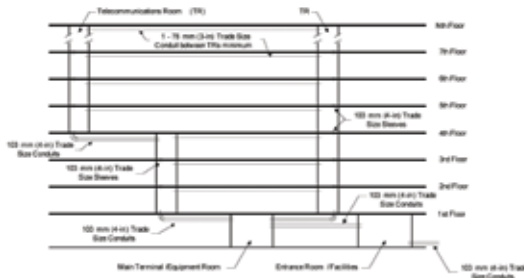
- According to ANSI/TIA/EIA-569-B, "Slots are typically located flush against the wall within a space, and should be designed at a depth (the dimension perpendicular to the wall) of 150–600 mm (6–24 in), giving preference to narrower depths wherever possible



Typical Slot Through Floor

MDU Applications – Vertically Aligned Telecommunications Rooms (TR)

- With telecommunications rooms aligned in a vertical pathway, some means for cable pulling should be provided above and in line with the sleeves or slots at the uppermost room of each vertical stack. A steel anchor pulling iron or eye embedded in the concrete is an example. Where pulling irons are not available, the building steel may act as a sufficient pulling mechanism location.



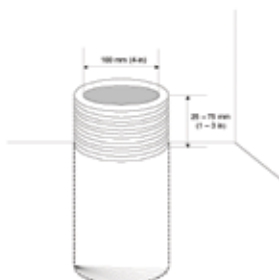
MDU Applications – Riser Cable Placement Techniques

- Backboard Placement for Riser Installation from the top down.



MDU Applications – Sleeve Quantity and Configuration

- According to ANSI/TIA/EIA-569-B, "The quantity of pathways using 103 mm (4 trade size 4-inch) conduits or sleeves should be four sleeves or conduits plus one additional sleeve or conduit per 4000 m² (40,000 ft²) of usable floor space.



Typical Conduit/Sleeve Through Floor

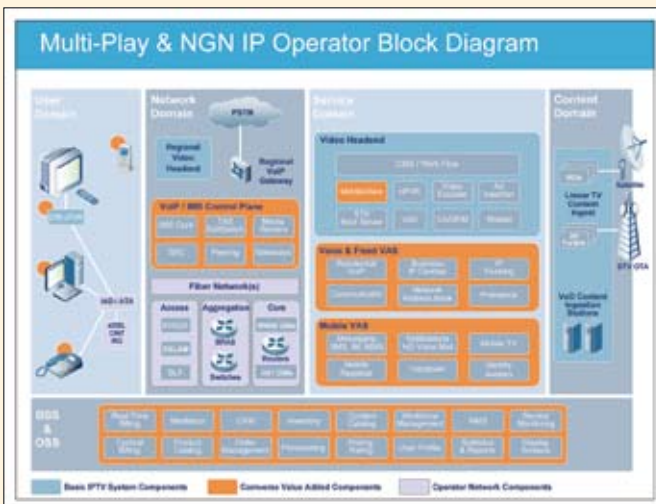
"NGN IP Operator" Potential Service Offerings

Phone	TV	PC	Mobile
<ul style="list-style-type: none"> VoIP Soft Switching Residential Primary Line IP Trunking Long Distance Video Communications Network Address Book Presence Converged Billing 	<ul style="list-style-type: none"> IPTV & VoD VoIP on TV Click to Dial on TV Visual Voice Mail on TV Messaging on TV Network Calendar Video Communications Control Phone Services on TV Network Address Book Presence Converged Billing 	<ul style="list-style-type: none"> TV on PC Mobile Phone on PC VoIP on PC Visual Voice Mail on PC Messaging on PC Network Calendar Video Communications Control TV cPVR on PC Network Address Book Presence Converged Billing 	<ul style="list-style-type: none"> TV on Mobile VoIP on Mobile Visual Voice Mail on Mobile Messaging on Mobile Network Calendar Video Communications Control TV cPVR on Mobile Network Address Book Presence Converged Billing

What You Want, Where You Want It, & When You Want It
 3 Screens For: Video Entertainment, Phone Calling, Video Calling & Messaging
 Single: Identity, Inbox, Address Book & Bill; Cross Devices With Presence

3 Screen Clients: PC, TV & Mobile Voice, Messaging & Video Communications

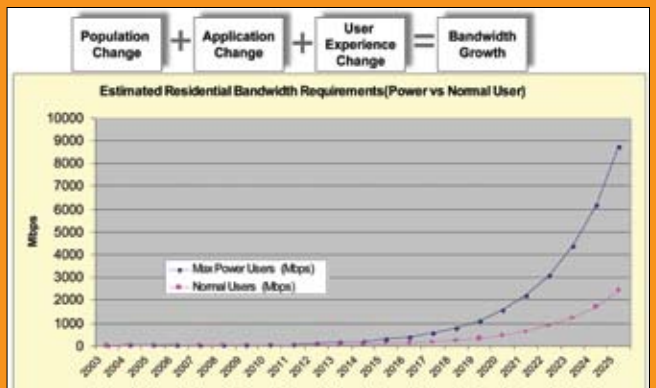
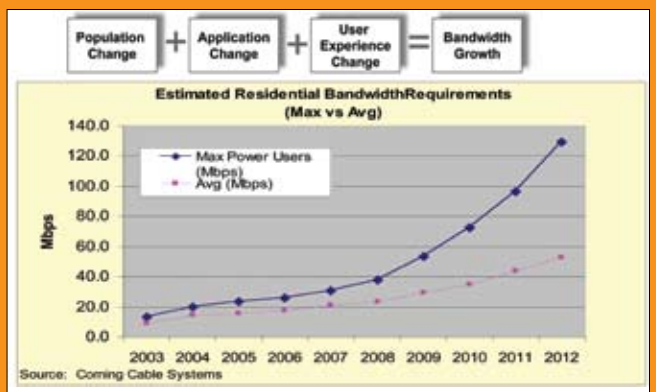
PC Client TV Client Mobile Client



Internet Users in the US, by Age, 2004 (in millions and as a % of each age group)

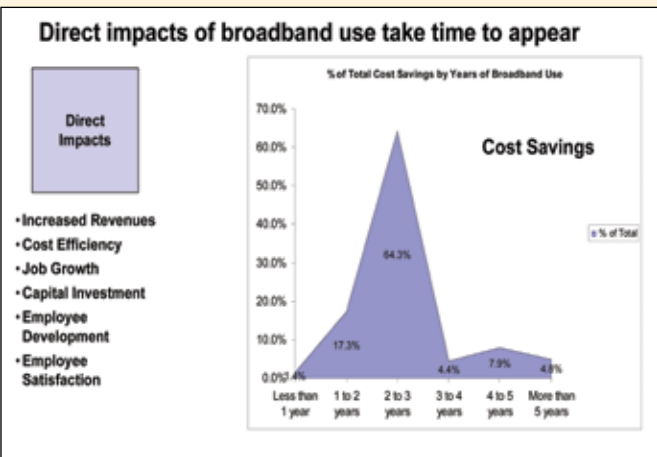
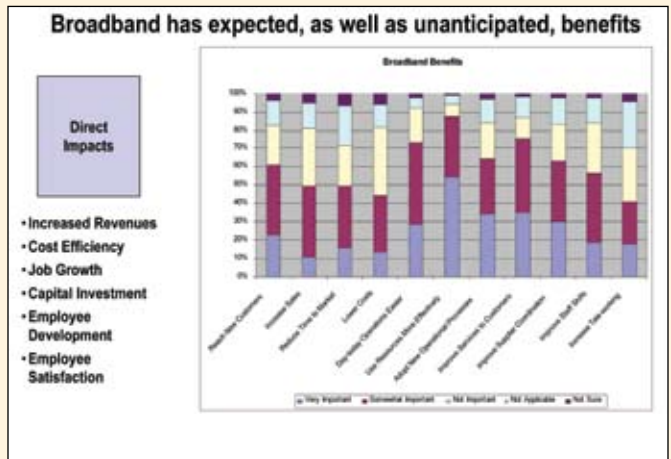
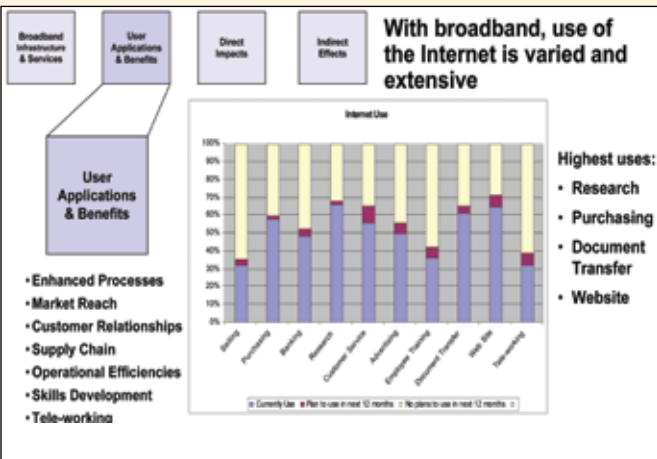
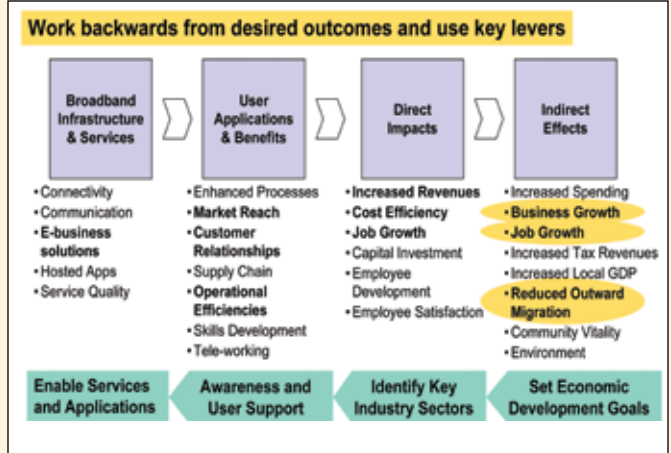
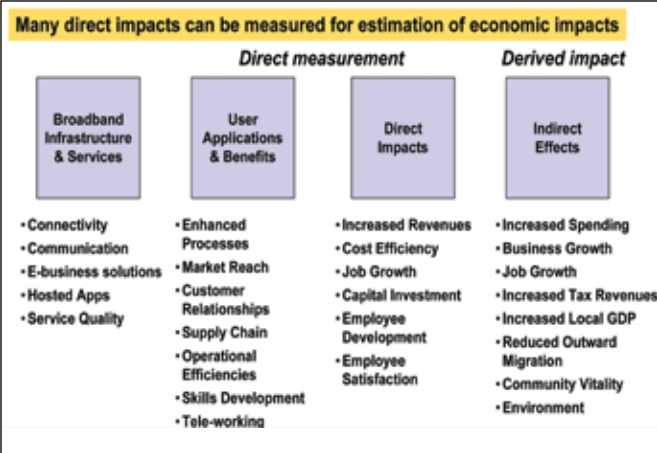
Age Group	Internet users	Estimated US population*	Penetration	Percent Using Broadband
3-17	34.26	73.37	46.69%	60%
18-24	21.25	28.76	73.89%	60%
25-34	27.90	39.66	70.35%	55%
35-44	30.55	43.91	69.57%	50%
45-54	27.90	41.48	67.26%	49%
55-64	14.61	29.16	50.10%	45%
65+	10.63	36.36	29.24%	34%
Total	167.1	292.7	57.09%	

Note: *eMarketer estimates extrapolated from US Census data
 Source: eMarketer, April 2004
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Corning Cable Systems marketing data presented by Bob Whitman (FTTx Program Manager, for North America) makes a strong case that population patterns as well as growth of bandwidth-devouring devices create bandwidth demand; 2 Gbps to each home by 2020 is in sight. Younger customers are the heaviest bandwidth users.

FTTH bandwidth and reliability position providers to offer full HD now, and the super-high definition HD-4K and 3D HD services of the future. But Tim Phillips, Comverse's General Manager for IPTV in the Americas, said telcos cannot compete in the long run if they merely imitate cable's TV-centric business. He called for a "total communications-centric" business with video and many other services on mobile and well as fixed platforms. "Service-rich [Cisco] Next-Generation Network IP over FTTH allows you to leverage what the competition cannot easily adopt," he said.



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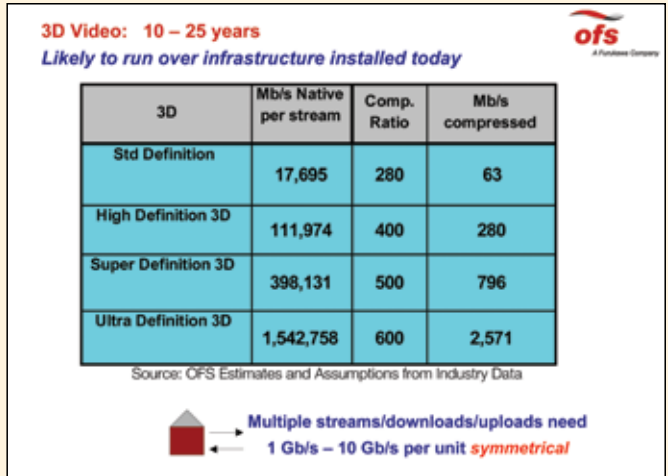
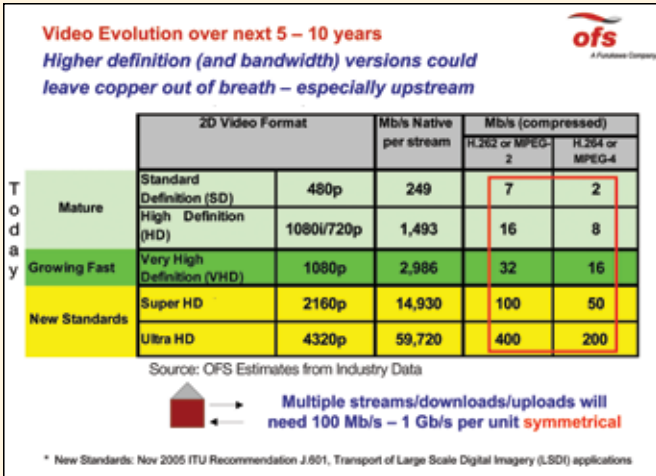
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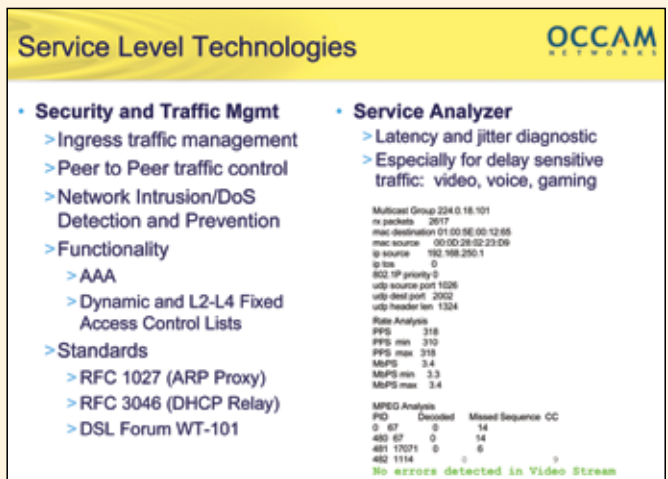
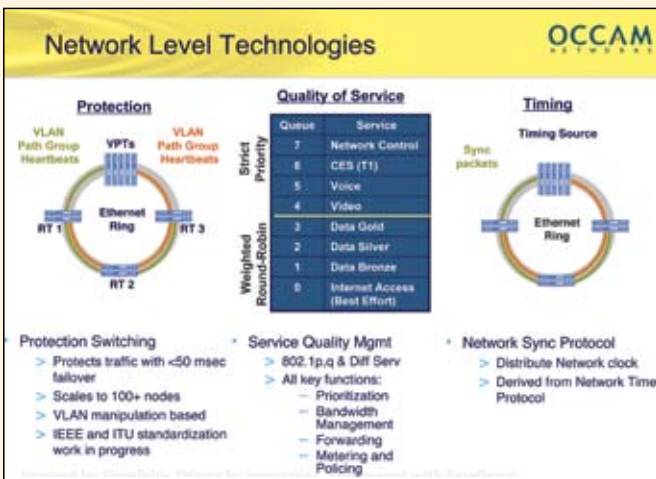
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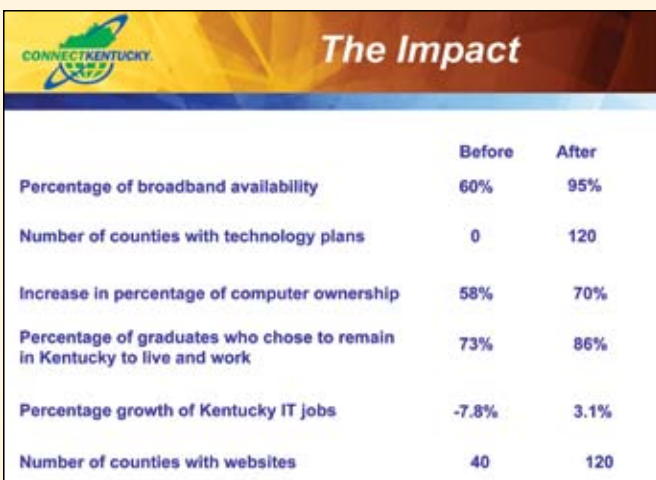
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Video alone can soak up all the bandwidth we're providing for today, said John George of OFS. Forms of HDTV already in advanced prototype for introduction in the decade ahead will require 50 to 100 Mbps with severe compression. The 3D sets in the lab demand 2.5 Gbps



Property owners should not confuse service-level and network-level quality control, said Russ Sharer, Vice President, Marketing, at Occam Networks. Here's how QC can be done today on Ethernet networks.



ConnectKentucky, a public-private partnership with over 100 participating providers, had brought broadband to 95 percent of all Kentucky counties by September; satellite hookups will service the last few percent by year-end, said Joe Mefford. All 120 counties have a broadband implementation plan and Website. In Kentucky, the economic and social effects are obvious, Mefford said. In IT-related jobs alone, the growth rate is now over 3 percent; the state had been losing nearly 8 percent per year. The swing accounts for 14,000 IT-related jobs. Other states are considering the Connect-Kentucky approach, where the state catalogs customers and resources, and spurs local interest.