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JANUARY 2005

MAN of the YEAR

Adelphia's Marwan Fawaz

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2005's tech winners

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Seeing the future

It's "that" time of year again, when the new calendar has been put up, the new budget is in play, and the bills from Christmas begin streaming in. It's also the time of year when everyone looks forward to what the impending 12 months will bring. In that spirit, we present this year's January issue.

Besides the cover story on Marwan Fawaz of Adelphia, you'll find our prognostications on what the coming year will bring in several major service categories. I hope you'll give them a read, then let us know if you agree or if you think we're all wet.

In addition to those predictions, however, I have a few observations and questions of

my own. This coming year will be the most competitive ever for video and telecom service providers. It won't be easy to simultaneously please both investors and consumers, and those who manage to walk the fine line will emerge a year from now as true powerhouses. So, here goes:

- Unfortunately for

many, stocks in cable companies will continue to languish, as investors continue to worry about the impact Rupert Murdoch will have on the MSOs. Rupert is such an icon that even if reality says he's not doing all that much, the fact that he's doing anything at all won't come as good news to competitors. And expect Rupert to do a lot to incent new subscribers to sign on.

- Cox Communications went private late last year, and I'm sure the other MSOs are envious. The good folks in Atlanta say they'll continue to report "some" info to the world, but they won't have to open their kimono too far. In these competitive times, that's a huge advantage. I'm not sure if there was some ulterior motive for going private (Did it need to add bandwidth to its networks? Is it just making sure it survives the next round of consolidation?), but I sure am going to miss those regularly scheduled updates on new-sub growth, digital subs, etc. From their perspective, however, having the freedom to follow their own instincts will be truly liberating.

- It's going to be enlightening to watch the big Bell companies move forward with their fiber build-out plans. A year ago, it looked like the Big Three were going to present a unified strategic voice to the market (something The Street needs to hear to keep stock prices decent), but it's pretty clear now that each has its own agenda and method for building the "network of tomorrow." Some of that is related to geographic, demographic and other differences between each company, but how will each progress? Some analysts are already throwing red flags at Verizon's aggressive FTTP approach—calling it too expensive. Will that heat die down once it's proven successful, or will it come to a distracting boil?



2005 will be the most competitive year ever for video and telecom service providers

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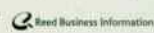
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JIM CASELLA • CEO

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THE INDUSTRY

A passion for the past, a vision for the future

In recognition of his skills as a top engineer, as well as a creative visionary, CED names Adelphia's Marwan Fawaz as "Man of the Year."

By Jeff Baumgartner, Editor

COVER PHOTO BY ROB STUEHRK



INDEPTH

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CED's 2004 Timeline* [p. 6]

the triple play from Ciena

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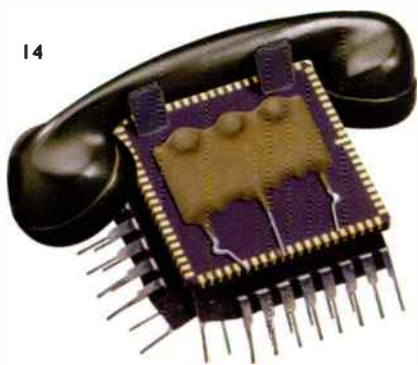
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Local video-on-demand content may prove to be the real killer app in the battle for broadband supremacy.

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Yes, the Western Show is no more, but don't despair. CED recently hosted the industry's first-ever "virtual" trade show, complete with educational sessions and even a virtual exhibit floor.

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LATEST NEWS AND INSIGHT

High Court to review 'Brand X'

The U.S. Supreme Court agreed in December to weigh in on the decision on whether cable modem service providers must provide access to competing, third-party ISPs.

The court said it would review the 9th U.S. Circuit Court of Appeals "Brand X Internet Services vs. FCC" case, which ruled that cable modem services shared elements of telecommunications

services. That decision negated a 2002 ruling by the FCC holding that cable modems provided information services and, therefore, were not subject to mandated open access.

The review decision sparked responses on all sides. National Cable & Telecommunications Association President & CEO Robert Sachs said he was "pleased" with the Supreme Court's decision, and was optimistic that the court would agree with the FCC's original ruling.

"Establishing a deregulatory environment for cable modem service is critical to the universal deployment in the U.S. of broadband services, including emerging services such as Voice-over Internet Protocol service," he said.

FCC Chairman Michael Powell also was glad to hear of the High Court review.

"High-speed Internet connections are not telephones, and I'm glad the Supreme Court has agreed to review the 9th Circuit ruling that they are. The 9th Circuit's decision would have grave consequences for the future and availability of high-speed Internet connections in this country,"

Powell said, in a statement.

The Consumers Union, meanwhile, said it was just as confident that the Supreme Court would uphold the 9th Circuit ruling.

"Consumers should be allowed to enjoy the increased choice and lower prices that come with a more competitive broadband market, as they do in the traditional 'dial-up' Internet market," the Union said, arguing that U.S. consumers pay 30 times as much for high-speed Internet services as the Japanese, and 10 times as much as the Koreans.

Powell had previously countered that a heavy regulatory hand could cause cable modem fees to rise as much as 10 percent.

emuse technologies has launched an interactive television tool designed to create applications that comply with the CableLabs-specified OpenCable Application Platform (OCAP) middleware.

The tool, dubbed Modelstream, is aimed at content developers and advertisers interested in creating iTV applications and services. In addition to OCAP, Modelstream is designed to create iTV applications for multiple middleware types simultaneously. emuse created the OCAP extension in partnership with Osmosys, an OCAP developer based in Geneva.

**emuse
an OCAP
author**

CableLabs stamps 'copy once' technology

CableLabs has approved a digital recording technology developed by Philips and Hewlett-Packard for use in "Digital Cable Ready" products.

Based on FCC guidelines for the so-called "broadcast flag," The Video Content Protection System (VCPS) enables content delivered over cable to be marked as "copy once," meaning it can be burned onto VCPS-enabled DVD+R and DVD-RW optical media. It's expected that "copy once" will be applied to high-value content such as first-run shows and movies. Shows with a "copy freely" designation will not have such restrictions.

CableLabs said the approval extends to all unidirectional DCR products, as well as to one-way and two-way products built to OpenCable specs. The FCC has given its blessing to a unidirectional Plug & Play agreement for set-top-free digital televisions. A two-way version of that agreement is still under discussion.

DCR manufacturers must obtain a license from CableLabs in order to build products that comply with the cable industry's CableCARD removable security platform, and a separate license from Philips to implement VCPS.

The new system is designed to ensure that consumers can continue to copy high-end programming at home in a limited fashion, but also protect studios and networks from digital piracy.





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LATEST NEWS AND INSIGHT

MPEG-4 part of VOOM's HD expansion plan

VOOM, Cablevision Systems Corp.'s HDTV-heavy DBS service, is about to gain a few pounds.

VOOM plans to expand its current lineup of 39 hi-def channels to more than 70 by March 2004 after taking up 16 transponders on the SES Americom AMC-6 satellite, also known as "Rainbow 2." VOOM also plans to simultaneously beef up its lineup with 200 standard-definition channels.

VOOM will use the new capacity to lure consumers hungry for more HDTV fare. That strategy has only generated about 26,000 subscribers during VOOM's first year in operation.

VOOM said it will be able to squeeze out more HD programming through the use of a new encoding system from Harmonic Inc. that takes advantage of advanced codecs. Harmonic's MV 100, initially configured to encode video in MPEG-2, is software-upgradeable to the more bandwidth efficient MPEG-4 codec.



VOOM noted that its set-tops are already outfitted to handle MPEG-4 signals.

Rainbow Media, VOOM's parent, has contracted Lockheed Martin to build five Ka-band satellites that will enable the DBS service to boost its channel capacity to more than 5,000 HDTV channels when operating in "spot beam mode." Rainbow expects the first of those birds to launch in about 34 months.

VOOM's declaration only adds more pressure on cable operators to expand their own HDTV lineups.

In September, DirecTV said it would launch four satellites with enough capacity to deliver "hundreds" of HDTV channels.

The first two birds—Spaceway 1 and Spaceway 2—will go up in 2005. The final two, DirecTV 10 and DirecTV 11, are set to launch in early 2007.

Comcast puts some HD in its VOD

Comcast Cable has launched a limited range of video-on-demand titles in high-definition format in a variety of markets, including the MSO's Washington Metro/Virginia region.

There, Comcast initially offered on-demand access to HD versions of "The Passion of the Christ" and "The Living Sea," an IMAX title. The MSO said HD-VOD fare will carry a premium price of \$3.99 to \$5.99 per title. In the Washington/Virginia area, in particular, Comcast uses VOD servers and back-office systems from SeaChange International.

Comcast initially tested HD-VOD in its hometown of Philadelphia. Cablevision Systems Corp. was the first cable operator to offer an HD-VOD service, launching it in September 2003.



Coaxsys pictures IP video networking

After months of development, Coaxsys Inc. is unveiling an Ethernet-over-coax home networking system it says is the first of its kind for the market.

The IPTV 7000 TVnet can create a video network using coax cabling in a home, regardless of the topology. The customer need only plug in adaptors at the video access point—say, a set-top box or an ADSL modem. From there, adaptors can be plugged in next to each television or set-top box the customer wants to include in the network.

The adaptor can work with a standard MPEG-2 or IPTV set-top box. For the former, Coaxsys is counting on finding a technology partner to supply the MPEG-2 to IP

video format conversion, says Coaxsys CEO Michael D'Addio.

"There's no software and there's no setting," he says. "We deliver up to 104 Megabits per second and that is adequate for multiple SD streams or HD streams."

Cost to the consumer will be dictated by the home networking package the partner telco rolls out. But the initial cost for each adaptor will be somewhere in the \$50 to \$65 range, D'Addio says.

While Coaxsys' technology does use Ethernet over coax, it is not part of the Multimedia over Cable Alliance (MoCA), which aims to pipe data at a blistering 270 Mbps.

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LATEST NEWS AND INSIGHT

FTTP nearing 1M homes passed

More than 970,000 U.S. homes were passed with fiber-to-the-premise (FTTP) technologies as of October, reports Render Vanderslice & Associates LLC (RVA).

RVA added that the number of FTTP homes marketed stands at about 413,000, and homes connected at 146,500. The research firm expects the number of homes connected to FTTP to surge by more than 400 percent in 2005.

On the technology front, RVA said it expects Ethernet- and ATM-based FTTP technologies to lead the market of homes passed going forward.

While BPON, a technology Verizon is using for its FTTP deployments, "will clearly grow a great deal in 2005 because of RBOC involvement, there is also an underlying trend toward higher-end technologies such as EPON, GPON and point-to-point Ethernet," says RVA Principal Michael Render, referring to a surge in FTTP deployments by municipalities, housing developers and independent telcos.

RVA's study also showed that 80 percent of FTTP deployments offer the triple play of voice, video and data. Analog/RF remains the most common platform for video, though trends indicate a shift toward more IP-based delivery, according to the RVA study.



'Soft' security gains momentum

As cable plunges ahead on a digital transition plan that could involve millions of inexpensive set-tops, operators are quickly warming to the concept of downloadable conditional access (CA) systems.

The latest company to stake its claim on downloadable security for cable and IP-based video service providers is Latens Systems, a start-up based in Belfast, Ireland.

The notion of a software-based CA might sound very familiar. Widevine Technologies, Latens's prime competitor, markets a "Virtual Smart Card," an alternative for more expensive hardware-centric approaches such as a traditional smart card and, more recently, the CableCARD, which serves as the security component of the FCC-approved Plug & Play agreement for set-top-free digital

televisions. The Next Generation Network Architecture (NGNA) project, recently handed over to CableLabs, references a software-based CA in a request for information issued earlier this year.

Latens has recently expanded into the U.S., making its first public exhibition at the November 2004 Telco TV show in Orlando. Although Latens replied to the NGNA RFI and is interested in domestic



Movielink beefs up its video 'EQ'

Movielink, the studio-backed, Internet-based movie rental company, has expanded the availability of "enhanced quality" (EQ) titles that are encoded at higher bit rates than those offered at standard settings.

The decision followed a two-month test in which Movielink offered titles in both formats. Movielink traditionally encodes titles at 500 kbps to 800 kbps, but the EQ designation boosts that to 1 Gbps to 1.5 Gbps, a company spokeswoman said.

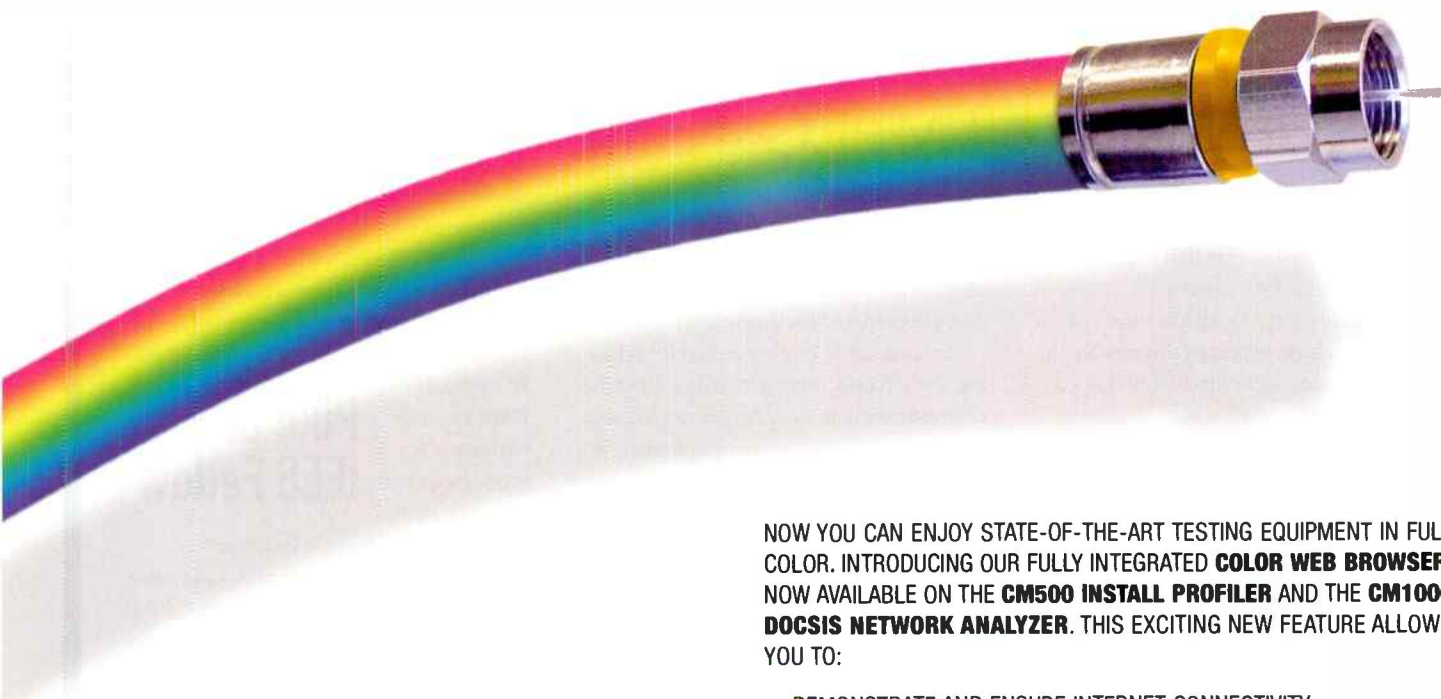
Movielink today offers nearly 50 titles in EQ format, including classics such as "Close Encounters of the Third Kind" and newer flicks such as "Traffic." The company expects to add new EQ titles in the following months.

cable, its initial focus will be the U.S. telco IPTV market, according to company Director Andy Mathieson.

While smart cards answer the need for changeable security without having to change out the whole set-top, they can fall prey to hacking. If a smart card is defeated, swapping just one can run \$20 when all organization costs are factored in, says Mathieson, an executive late of NDS Group.

"It's not practical to run at those costs," he adds. By comparison, if a software-based system is somehow hacked, the idea is that the operator can quickly swap it out via a download without incurring big costs. "Time to fix is important. That's where the money is."

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LATEST NEWS AND INSIGHT

Broadcom fires off MPEG-4 chip

Broadcom Corp. added more fuel to the advanced codec fire in December, announcing its first silicon that supports the H.264/MPEG-4 standard.

Available in samples now with widescale release expected this month, the BCM 7411 decoder chip is aimed at consumer markets.



"It enables manufacturers to cost-effectively roll out set-top boxes, DVD players, consumer entertainment equipment with advanced compression technology, and it offers operators cost savings through lower bandwidth," says Brian Sprague, senior director of marketing in Broadcom's broadband business unit.

The H.264/MPEG-4 technology is an outgrowth of Broadcom's acquisition of Sand Video, and the product now being released is actually the third iteration of the chip.

Pricing has not been released as yet, but Sprague notes the cost will depend on the device and on volume. In time it also will be integrated with other decoder codecs into single-chip designs as well, Sprague says.

Broadcom chose to field the decoder first because that is the most crucial element for consumer devices. H.264 encoder chipware needed to convert content into the MPEG-4 format is in development.

"We already have some real-time encoders in our labs, and clearly, the DVD people are in the process of developing the non-real-time encoders they would need for studios," Sprague says. "There are proto-

types available now in the marketplace from all of the typical people you would expect to be in that marketplace. So I would say definitely in the year 2005 and maybe mid-2005 they are prepared for production."

Sprague adds another reason for releasing the decoder first is that it cannot be changed over time—any changes would make existing consumer equipment incompatible.

The H.264 decoder chip can be added to existing Broadcom system-on-a-chip solutions with older MPEG-2 decoder technology, opening the door for use in cable set-tops.

"This chip has standard interfaces on it, and those interfaces would allow you to bypass the MPEG-2 on the system on a chip and create a set-top box that would be compatible with both MPEG-2 and MPEG-4," Sprague says.

Broadcom expects to announce BCM 7411 product deals around this month's Consumer Electronics Show.

Dan Pike, the CTO of Alaska-based GCI Inc., has been made a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

IEEE grants Fellow status to people the organization's board determines to have "an extraordinary record of accomplishments in any of the IEEE fields of interest."

Pike was recognized "for leadership in the evolution

of the cable television industry."

Pike, a cable engineering vet who has also served three years as CTO of Classic Communications and 18 years with Prime Cable, joins an elite group of cable engineers who have reached IEEE Fellow status. Others with cable engineering backgrounds to obtain it include (but may not be limited to): James Farmer (2004); Stephen Dukes (2002); Henry Samuelli (2000); Paul Baran (1993); CED contributor Walter Ciciora Ph.D. (1988); and Archer Taylor (1978).

Pike an IEEE Fellow

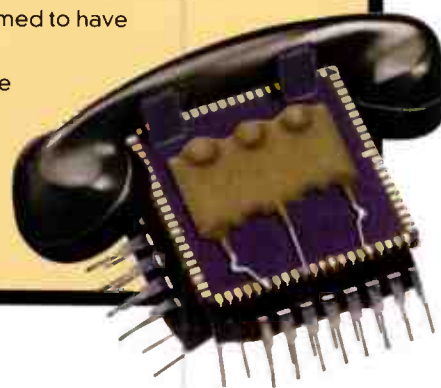
Chip vendors line up MTA deals

Armed with new silicon, Texas Instruments and Broadcom Corp. are making some big, initial land-grabs among multimedia terminal adapter (MTA) suppliers.

For starters, ARRIS selected TI as its "primary" supplier of silicon and software for DOCSIS- and EuroDOCSIS-based MTAs and cable modems.

The deal comes on the heels of TI's introduction of its Puma IV silicon architecture, which combines the company's VoIP hardware and software onto one piece of silicon. Hitron, Bona, Motorola Broadband and Samsung also use TI silicon in cable modem and MTA models, but, at press time, had yet to announce support for Puma IV. In November, TI claimed to have shipped two million cable telephony lines.

That, of course, pushes the competition needle with Broadcom Corp., which also scored a nice deal to power Scientific-Atlanta's line of IP telephony adapters. S-A also uses Broadcom chips in its range of set-tops, cable modems and residential gateways.





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LATEST NEWS AND INSIGHT

National Show gets Game (NET)

A broader than usual 2005 National Cable & Telecommunications Association (NCTA) National Show will also be home to next year's GameNET Conference and Exhibition.

The show will host GameNET, a conference with a specific focus on subscription-based video games and broadband-enabled, multiplayer games. Under the arrangement, GameNET will join the CableLabs CableNET pavilion.

The National Show is set to run April 3-5 at

the Moscone Center in San Francisco.

GameNET will also incorporate a gaming program into the National Show agenda.

The first annual GameNet conference, held last year in Long Beach, Calif., featured speakers from companies such as Sony Online Entertainment, ICTV, Comcast On-line, Cox Communications, and K2 Network, among others. Topics ranged from high-end multiplayer games to casual titles.



Cable technology reached a key milestone last month after a handful of vendors successfully made it through CableLabs with equipment that complies with the new DOCSIS Set-top Gateway (DSG) platform.

As a standard replacement for proprietary out-of-band signaling methods, DSG uses DOCSIS to deliver messages, program guide data and, further down the road, even more advanced streaming applications to digital set-tops. The new OpenCable Host 2.0 spec supports the DSG platform.

Following wave 32, CableLabs awarded "verified for interoperability" status to a DSG-capable set-top from Scientific-Atlanta, and qualification status to DSG-enabled cable modem termination systems from BigBand Networks, ARRIS and Motorola Broadband.

HomeNet Communications has launched voice, video and data services over the fiber-rich "iProvo" municipal network in Utah.

HomeNet's service package includes a 10 Mbps data service (or as low as 512 kbps), video-on-demand and digital broadcast programming

iProvo goes live

and IP telephony. HomeNet is bundling services in the range of \$89.99

to \$124.99 per month. The service will apply competitive pressure on the area's two incumbent service providers: Comcast Cable and Qwest Communications International.

HomeNet initially is offering service to about 3,000 homes in the Grandview area. The full iProvo fiber-to-the-home rollout is scheduled for completion by July 2006.

Entone opens video gateway

Entone Technologies launched an IP gateway that delivers multiple video service streams via traditional home coaxial cables.

Competing with stand-alone IP-based set-tops, which have to be deployed to each TV in the home, the Entone Hydra gateway can convert video for up to six televisions, but decode only three streams simultaneously, notes Entone CEO Steve McKay. The box also supports software- and hardware-based conditional access systems, and ADSL2+ and Ethernet network interfaces.

The company did not disclose specific pricing, but said the Hydra sells for north of \$250, but under \$400, for a three-TV set-up. Entone is also making plans to add high-definition capabilities, but is still waiting for silicon, McKay explains.

Entone is currently shipping the product to a number of unnamed "early adopter" telco customers.



Entone's Hydra gateway

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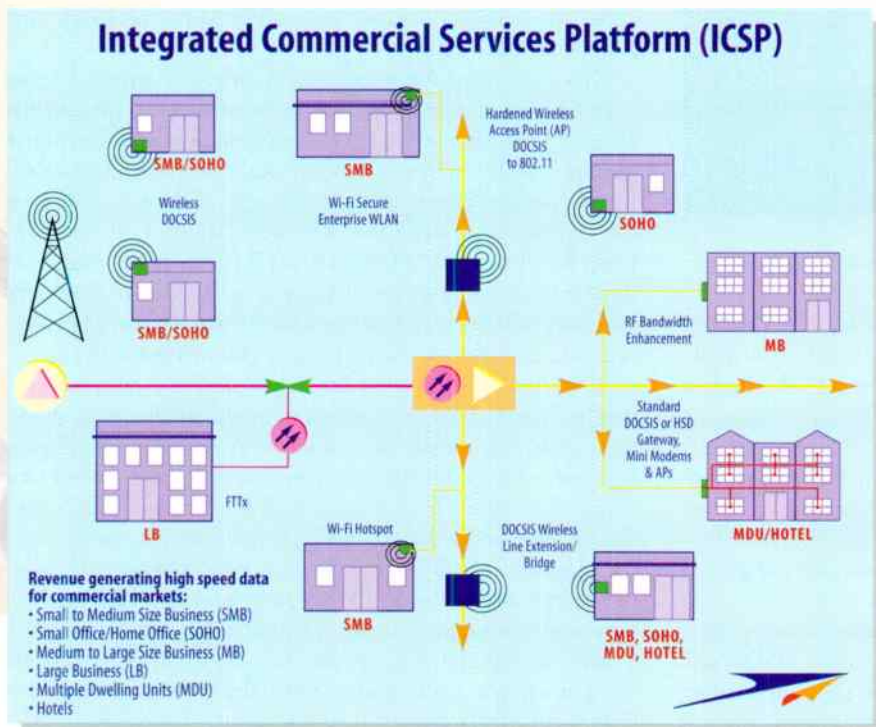
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Year of the dish

In 1994, an upstart rival was dismissed as a pretender to cable's throne

Eleven years ago doesn't seem like much in pure numbers, until you're reminded of some seemingly ancient memories that marked a rather lamentable 1994: a white Ford Bronco, Tonya Harding, a compromised appendage from the husband of Lorena Bobbitt.

For cable, 1994 was the year a newcomer arrived on the scene that would change everything. After years of false starts, a powerful combination of digital video technology and a set of frequencies known as the Ku-band gave real possibility to the category of DBS, or direct broadcast satellite television. Or at least it did for true believers. The attitude of a near-monopolistic cable industry, though, was largely dismissive. In October 1994, even as *Time* magazine pronounced that DBS satellites posed "a fresh challenge to cable TV," cable industry partici-

sion was flirting with the 10 million-subscriber mark. Ever since, cable seems to have been reduced to a game of catch-up it can't quite seem to win.

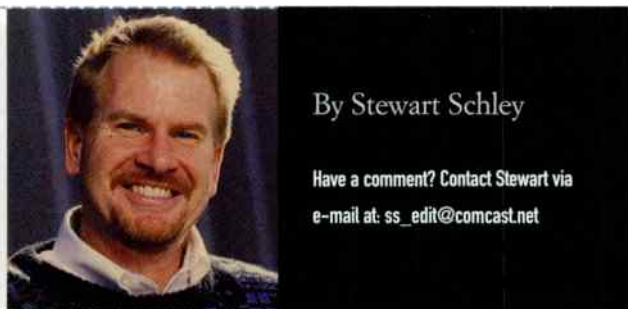
Through the first three quarters of 2004, satellite TV providers added 2.5 million net new subscribers to bring the industry's total to 24 million. More startling, though, is the number of "gross additions" racked up by EchoStar's Dish Network and its rival, DirecTV. In the third quarter alone, new satellite receiving dishes were bolted to the sides of 1.8 million U.S. homes (the third quarter net gain of 835,000 is what's left over after accounting for churn). The idea that more than 150,000 customers a week would make a conscious choice to elect a satellite alternative to cable television would likely have been unthinkable in 1994. But here we are.

Nobody in the cable business today needs to be reminded of the hand-to-hand combat that now characterizes the market. Regional marketing directors for many cable companies look forward to reviewing the latest month's subscriber numbers with about the same enthusiasm level exhibited by the Kerry campaign once Ohio came in.

The retelling of the story of DBS' origins is worth the pain only because it may help fuel a more effective competitive approach this time around. Yet even now, as telephone companies very publicly and methodically begin their assault on cable's wireline video domain, there are vestiges of the past lurking in the comments of some industry seers. When Comcast CEO Brian Roberts points to failed telco-TV efforts of the past, as he did during an earnings conference call in October, or when analysts assure cable executives that telcos will stall out at 15 percent of a saturated market, there's an eerie hint of 1994 in the air.

1994 was the year everything changed for a cable industry that had become too comfortable in its old familiar garb of analog signals and annual rate increases. A newcomer employing new technologies achieved more market share in a shorter time period than anybody imagined. Back then it was digital signal compression and a flood of multiplexed channels that changed the playing field. Today, the newcomer technology is IP video over a switched network. Eleven years after DirecTV made its stunning national debut, the question cable has to answer is whether it's learned to be quicker to innovate this time around. To that end, a quote from 1994's finest U.S. movie, "The Shawshank Redemption," may offer instructive wisdom. "Get busy living," says the wrongly imprisoned Andy Dufresne (Tim Robbins), "or get busy dying." ■

Stewart Schley writes about media and technology from Englewood, Colo.



pants could still be heard delighting over a mocking acronym, "Don't Be Silly."

Silly seems like the right word 11 years later to describe cable's meandering march toward competitive enlightenment. In 1994, a consortium of companies, including GM Hughes Electronics, RCA/Thomson and Hubbard Broadcasting, were completing a national launch of their direct satellite service, which promised 150 channels to those willing to plop down \$700 or more for a small receiving dish and a set-top receiver. Word was out that by the following year another entrant, EchoStar Communications, would launch a similar system featuring even more channels.

Cable's flanks were supposed to be protected by an incumbent house DBS brand, PrimeStar, owned by six MSOs and General Electric. That, and a general sense that steep installation costs would limit satellite TV's appeal, kept industry bigwigs sanguine.

"I'm not having sleepless nights," the chief executive of Falcon Communications, Marc Nathanson, told *Business Week* in April 1994. Easy for him to say. The affable Nathanson would sell his company in 1999 for \$3.6 billion. By then, satellite televi-

Cox Communications

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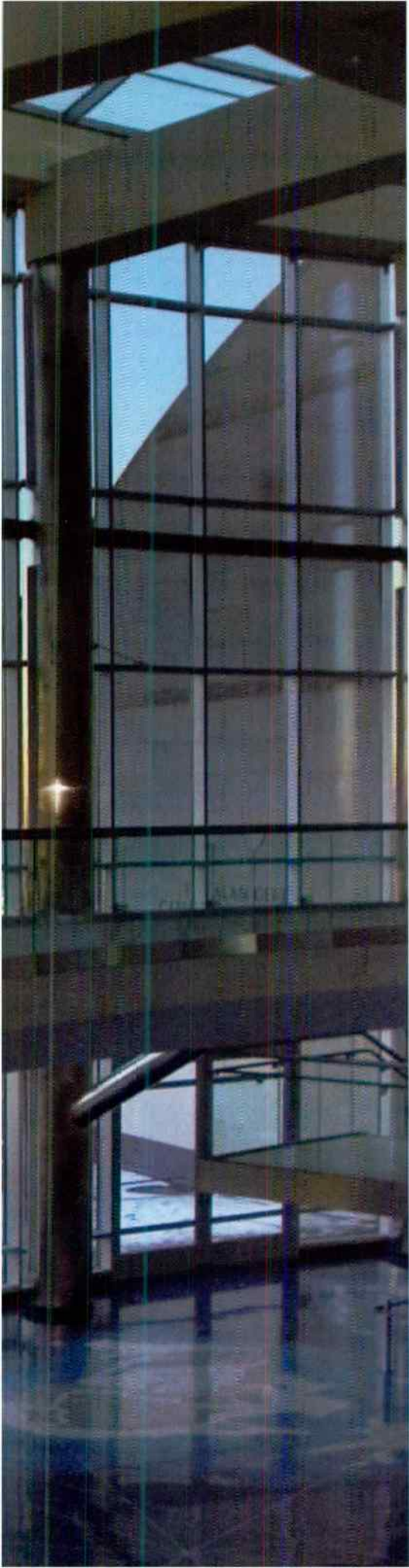


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The final fate of Adelphia Communications remains far from certain, but the engineering feats it has achieved in such a short span of time are nothing short of remarkable.

Before filing for bankruptcy in mid-2002, Adelphia's rebuild and upgrade activities literally were dormant. The engine was not idling. It was out cold.

After coming under new leadership in early 2003, speculation soon followed about Adelphia's future: would it be a sales target or manage a way to go it alone, operating under its own flag?

But even if a sale was part of the discussion, the company at the time was not attractive from a competitive standpoint because it had fallen behind the technology curve, leaving its subscribers ripe for the picking by EchoStar and DirecTV.

With new management and a new CTO in Marwan Fawaz, Adelphia moved ahead on a daunting turnaround project. Led by Fawaz, Adelphia's engineering efforts have become more than a story about a technical facelift. Those efforts have also helped to restore the image for an MSO in desperate need of a makeover, and the successes so far have only underscored the foresight Adelphia had in hiring Fawaz to help get that job done.

Armed with a technical and operations background spanning more than two decades, Fawaz is now acknowledged as a top industry engineer and as a visionary—a tough combination to find.

"There are people who are visionary, but you might not want them running the system," notes Comcast Corp. Executive Vice President and CTO David Fellows, who has worked

By Jeff Baumgartner, Editor

Vision

for the future, a passion for the past

Marwan Fawaz's ability to combine operational skill with the depth of a technological futurist underscore his selection as CED's 'Man of the Year.'

closely with Fawaz at various times over their careers. "There are others who can do upgrades, but you wouldn't want to put them in charge of launching a new service. Marwan understands cable systems and had a curiosity of what was possible about cable systems [on] the visionary side, which was a hard thing for someone to do."

Fawaz, like many others, knows the nuts and bolts side of things, but his ability to fuse the engineering and operations sides of the business has helped set him apart.

"You have to tie technology to a business opportunity," Fawaz explains. "Technology not tied to a market or a business opportunity is most likely doomed to fail. You have to balance [technology] with a business sense."

These traits and his accomplishments at Adelphia (and pre-Adelphia) are just a few reasons why CED has selected Marwan Fawaz as its Man of the Year.

From Lebanon to broadband

How Fawaz made his way to the U.S. cable industry and up the engineering ladder is amazing, considering where it all started: in Zahle, a little town nestled in the central valley of Lebanon.

◀ Fawaz at the Denver-based Cable Center. Photo by Rob Stuehrk.



Vision: Man of the Year

Fawaz, one of 10 children, grew up in Lebanon, but political strife did not permit him to stay there through his high school years. At the behest of his parents, Fawaz and most of his siblings left Lebanon in 1978 as the country plunged into a bloody civil war. Fawaz was just 16 when he joined his oldest brother in the West African country of Liberia.

"My parents...started to send us outside the country so we could find better

against, rather than for, the cable industry.

"My heart was in satellite communications and I wanted in [that industry] so badly," he recalls, noting that most of the satellite firms in the Long Beach area back then were defense-oriented. "Most of them, if not all of them, wanted security clearance and citizenship, which I had none of at the time."

The budding cable industry, he soon discovered, was much more accommodating to Fawaz's predicament.



▲ **All in the family:** One of 10 children, Marwan (front row, second from the left, in this circa 1968 photo), was raised in Zahle, Lebanon. In 1978, civil war would prompt his parents to send Marwan to Liberia, where he would complete his high school education before a big move to the U.S.

futures for ourselves," he recalls.

The Fawaz family is about as global as they come. These days, his sisters and brothers are either citizens of—or are living in—the United States, Canada, France, Germany, Romania and the United Arab Emirates. His parents and oldest sister still live in Lebanon. Since the separation in the late 1970s, the Fawaz family has held several reunions, but not one in which all could attend.

In Liberia, Fawaz, though he could not speak a lick of English when he got there, completed his high school education at an American expatriate school.

Fawaz arrived in the United States in 1979 and enrolled at California State at Long Beach. He later graduated with an electrical engineering degree with an emphasis in satellite communications.

If not for the status of his citizenship at the time, Fawaz today might be working

After answering an ad in 1985, Fawaz found himself interviewing for an engineering job with Times Mirror Cable Television, which was looking for someone to write a program on design automation.

"I looked at that opportunity as temporary so I could get my clearance and work with an aerospace company like TRW or Hughes," he remembers.

Despite those "temporary" intentions, that decision has evolved into a career in cable approaching 20 years. "I liked the industry, and I stayed," Fawaz says. But it wasn't the technical side of the cable industry that first appealed to him.

"In 1985, there wasn't much going on with [cable] technology," he remembers. "It was mostly about people." He also saw it as "an opportunity to develop within a young industry and grow up in an industry that continues to evolve."

Added responsibility kept Fawaz in

the cable industry for his first five years, but the excitement surrounding emerging technological advancements—fiber, system upgrades and two-way communications—have kept him tethered to cable ever since. "Then it became interesting," Fawaz says.

In addition to polishing off his master's degree, Fawaz excelled at Times Mirror during his 10 years there. He started off in staff engineering and corporate engineering positions before moving up into the management ranks. His last position at Times Mirror was director of corporate engineering.

Cox Communications acquired Times Mirror in late 1994, but even the urging of Cox CTO Alex Best (*CED's* Man of the Year in 1998) wasn't enough to convince Fawaz and his family to move to Atlanta and join the company.

But Marwan's time out of cable wouldn't last long. Dave Fellows and Ron Cooper (now Adelphia's COO) came calling, and asked Fawaz to join them at what was then Continental Cablevision. Fawaz agreed to run the MSO's western engineering team.

"What did impress me when we hired him was how articulate he is. He can command an audience and express an idea in understandable terms," Fellows says.

US West acquired Continental in 1996, creating a new MSO called MediaOne. Where Cox failed previously, MediaOne succeeded, convincing Fawaz to move to Atlanta and take control and fix what was considered MediaOne's problem child.

"We gave Marwan the test of his young life," Fellows recalls, noting that the Atlanta system was rife with upgrade problems, contractor issues, shoddy workmanship, and general customer dissatisfaction.

"It was *the* problem system of MediaOne," Fellows recalls. "I think he may have learned a few lessons there. It was a lot like Adelphia."

When AT&T acquired MediaOne in 1999, Fawaz left Atlanta to join Fellows and Bill Schleyer (now Adelphia's chairman & CEO) in Boston at Pilot House Ventures, where he handled technology investments and learned valuable lessons about the business end of the cable industry.

In 2001, Fawaz joined Charter

Congratulations to **Marwan Fawaz**

The CED
Man of the Year

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Vision: Man of the Year

Communications as vice president of operations for its Northwest region. He then got a chance to work directly with Paul Allen at Vulcan Ventures, which had a set of invest-

ments in cable-related companies, including Charter, Digeo Inc. and RCN Corp.

He then received another call from Schleyer and Cooper, who had just joined

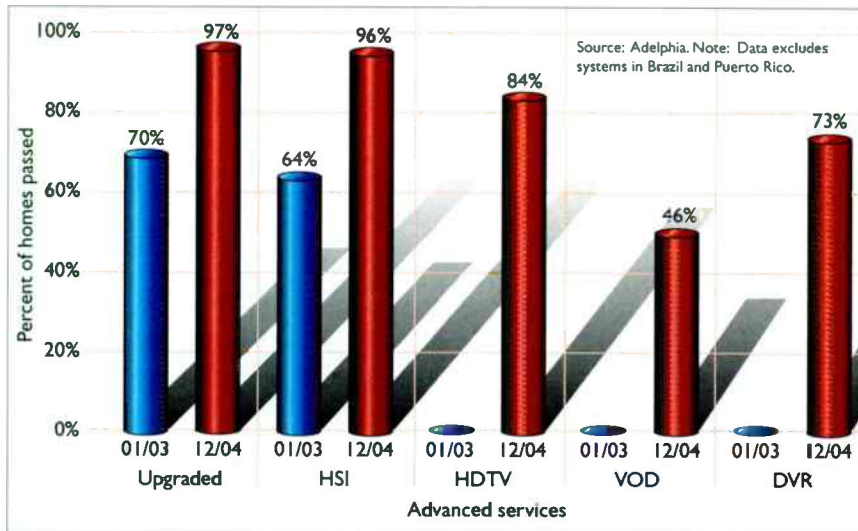
Adelphia. They had an offer he could not refuse.

Adelphia: The fixer-upper of all fixer-uppers

Fawaz came aboard Adelphia as chief technology officer in March 2003. He joined an operator that shared many of the undesirable traits Fawaz encountered in Atlanta at MediaOne. Only this time, the scale of the task ahead was incredibly larger.

When Fawaz arrived, Adelphia was a mess, in more ways than one. The company had recently entered bankruptcy. Its good name was being tarnished as members of the MSO's founding family, the Rigases, were brought up on fraud and conspiracy charges. It was under new management, and questions flew (and still do) about whether the company would emerge as a stand-alone entity or be parted out and sold to other cable operators.

On the technology front, Adelphia was woefully behind on upgrades and the launch of new services such as video-on-



▲ **Turning it around:** Under the guidance of Fawaz and his engineering team, Adelphia deployments of advanced services and network upgrades have quickly accelerated from a virtual standing start.



Congratulations
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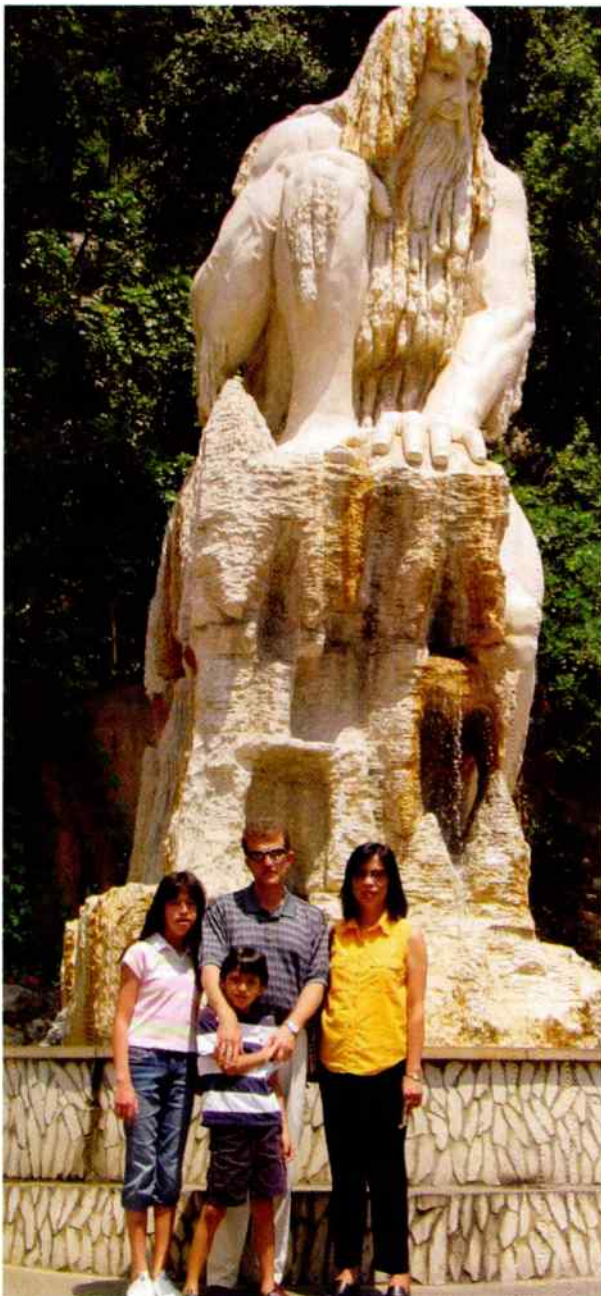
World Radio History



Vision: Man of the Year

demand. At the start of 2003, just 70 percent of Adelphia's plant had been upgraded, high-speed Internet was available to a mere 64 percent, and the company had nothing going with HDTV, VOD and digital video recorders.

"We were one to one-and-a-half years behind our peers," Fawaz recalls. "In 2003, we couldn't compete. We had to quickly get up to speed and launch these new products."



▲ **Back to his roots:** Fawaz took his family to Lebanon last summer so his children "could see where their dad grew up."

But one can't do that before solving the operational logistics and synching up the field support. Systems and regions need to be on the same page. The CSRs must learn how to support the new products, and technicians must understand how to install and maintain them properly.

To accomplish the task, Fawaz first surrounded himself with top-notch talent. On the corporate engineering level he added people such as Tom Buttermore, Doug Ike,

Keith Hayes and Dan Liberatore (who has since left the company).

With financing in place, Adelphia hit the gas with upgrades and new service rollouts. At the end of 2004, Adelphia's plant was 97 percent upgraded, HSI was available nearly everywhere, and the company ramped up deployments of advanced services (see chart on p. 24 for a comparison).

Fawaz is quick to share the credit. "Certainly, what we accomplished wasn't one person's doing. It was the whole team. We worked together very well and understood what we had to do and had specific goals. I think it's safe to say that this company was broken when we first arrived. We're at the level now where we've fixed most of it."

He says Adelphia should have its upgrades finished up in the next six months. So, what's next?

"We're shifting our focus to improve operational efficiencies and improve service quality," Fawaz says. That means an emphasis on network visibility, flow-through provisioning, preventive

maintenance programs and quality control.

Adelphia is catching up to its cable peers on upgrades and services, but it's not about to go out on too many technical limbs, either. Instead, Adelphia has established a "fast-follower" model for everything from telephony to video-on-demand.

But being late to the game can have its advantages. One big benefit: Adelphia has been able to use proven technology and take advantage of lower price curves. Being late means Adelphia is one of a small number of operators to deploy DOCSIS 2.0, and one to jumpstart its VOD efforts with an "open" architecture that gives Adelphia the liberty of using a wide range of server flavors.

Fulfilling a goal

In becoming the CTO of a large MSO, Fawaz met a goal he had set for himself during his early, impressionable days in the industry—to follow in the footsteps of one of the individuals in the industry he most admires: Jim Chiddix, the current chairman and CTO of OpenTV, and former CTO of Time Warner Cable.

"I recall when Jim Chiddix was the *CED* Man of the Year (in 1989)...and I remember looking at that article, and thinking, 'One day I want to be like Jim.' I've followed Jim's career and he's someone I look up to a lot. He's done so much for the industry, and he's a very classy person."

Fawaz has also obtained the respect of his peers on the MSO and vendor side, and there's no doubt that many now look up to him in much the same way Fawaz first did to Chiddix many years ago.

The respect Fawaz has earned in the industry was apparent when he was tapped to head up the 2004 Vendor Forum, which took place at The Cable Center in Denver last October. There, vendors queried MSOs on their key needs and where they think the vendors should be spending their R&D dollars.

"You need someone of sufficient stature to convince people like me and 60 different vendors to attend," Fellows says.

Today's CTO has to be well rounded, and able to nail the technology, but must know the business side, as well. For engineers with management and perhaps even

CONGRATULATIONS, *Marwan!*

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CTO, Adelphia Communications
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Vision: Man of the Year

Marwan on...

PacketCable VoIP: "We're in trials now. Once we go through the trials, testing and evaluations, we'll go into launches in 2005. We haven't said how fast or where. But it's safe to say that we believe in VoIP. It will help us fend off competition as well as enter new sources of revenue."

DOCSIS 2.0: "The capabilities are there. We haven't completely turned it on. As we launch VoIP, we will take advantage of 2.0 capabilities. We've said we would be about three-quarters DOCSIS 2.0 the end of [2004]. I think we'll come close to that."

DOCSIS 3.0: "Strategically, we cannot sit and wait and not continue advancing our platform. 3.0 will be important for us in the next year or two as we push higher speeds and compete and maintain cable's position as a broadband leader. Whether it's 3.0 or NGNA (Next Generation Network

Architecture), it behooves the industry to keep improving and pushing that platform."

Digital simulcast: "I remember discussing the simulcast idea when I was at Vulcan with Paul Allen and Wayne Davis (Charter's CTO) and talking about why it's important. And the reasons are still valid and right on target. It helps us facilitate the start of the analog-to-digital migration. Second, it's a bandwidth management tool for us. We will manage bandwidth better for the long-term; short-term it will cost us additional bandwidth."

The migration will also address consumer perception about digital pictures and take away a marketing advantage currently enjoyed by DBS, he adds. At Adelphia, digital simulcast "is on the drawing board, and we'll be there very quickly." ❧



▲ Marwan visits the homeland.

Congratulations!



CommScope proudly honors
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We salute you and say a special thanks for your vision, dedication and leadership in the continued progress of our industry.

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Congratulations Marwan



From the BigBand Networks team.



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Vision: Man of the Year

CTO aspirations, Fawaz advises a focus on the basics.

"By that I mean you don't need to know every little thing about our business, but at least have the fundamentals. Once you're comfortable with that, you have to understand the operations."

Beyond cable

When Fawaz is not mulling the technology future of Adelphia, he's spending time with his wife, Patsy, keeping up with his three children (Sean, Stephanie and Ian), or hitting the links.

"They have a lot of activities. My kids learned how to ski last year and I'm trying to catch up this year," he says.

As one might surmise from his background, Fawaz is also keen on travel. He took his children to Lebanon in 2004 "to see where their dad grew up." Their reaction? "They loved it," he says.

Because of its location and history, Lebanon isn't exactly a hot tourist spot

among Americans. But Fawaz insists it's a beautiful vacation destination. "It's a cheap tourist paradise. You can enjoy the beaches and the mountains," he says.

"I love to introduce our kids to different cultures and countries," he explains,



▲ **Never in a "fowl" mood (terrible pun intended):** Fawaz and Jim Hannan (now the VP of engineering at CableOne) share a lighthearted moment in 1988, when Pac Bell was threatening Times Mirror with a fiber rollout in the Newport Beach area.

noting that he's planning a family trip to China sometime this year.

Staying focused

Although Adelphia's fate remains up in the air (the company is expected to make a final decision on whether to sell or not in the first quarter of 2005), Fawaz plans to see things through no matter the outcome.

"I'm committed to the team we have in place," he says. "If the company comes out of bankruptcy, then that's great. If it's sold, I'm committed to my peers in the industry so that there's a proper transition."

"I haven't thought about what will happen after Adelphia. There's a lot of work to do here. I love this industry. I love the people around it. It was my first job out of college. It would be hard to convince me to be anywhere else."

Considering his abilities and accomplishments, there's little chance the industry will let him get very far away without a fight. ■



Person of the Year Marwan Fawaz

Adelphia Communications Corporation
Senior Vice President
and Chief Technology Officer

Congratulations to our friend and colleague for this well-deserved honor. Your grasp of technology and innovative ways to harness it inspire everyone in the cable industry.



**Scientific
Atlanta**



Marwan Fawaz

Senior Vice President / Chief Technology Officer
Adelphia Communications

CED's Man of the Year

"In the middle of difficulty lies opportunity."

- Albert Einstein

Adelphia congratulates Marwan Fawaz for being named CED's Man of the Year. In the most difficult of times, he had the clarity of vision to see great opportunity. We applaud his extraordinary leadership and success in delivering superior technology to our customers.

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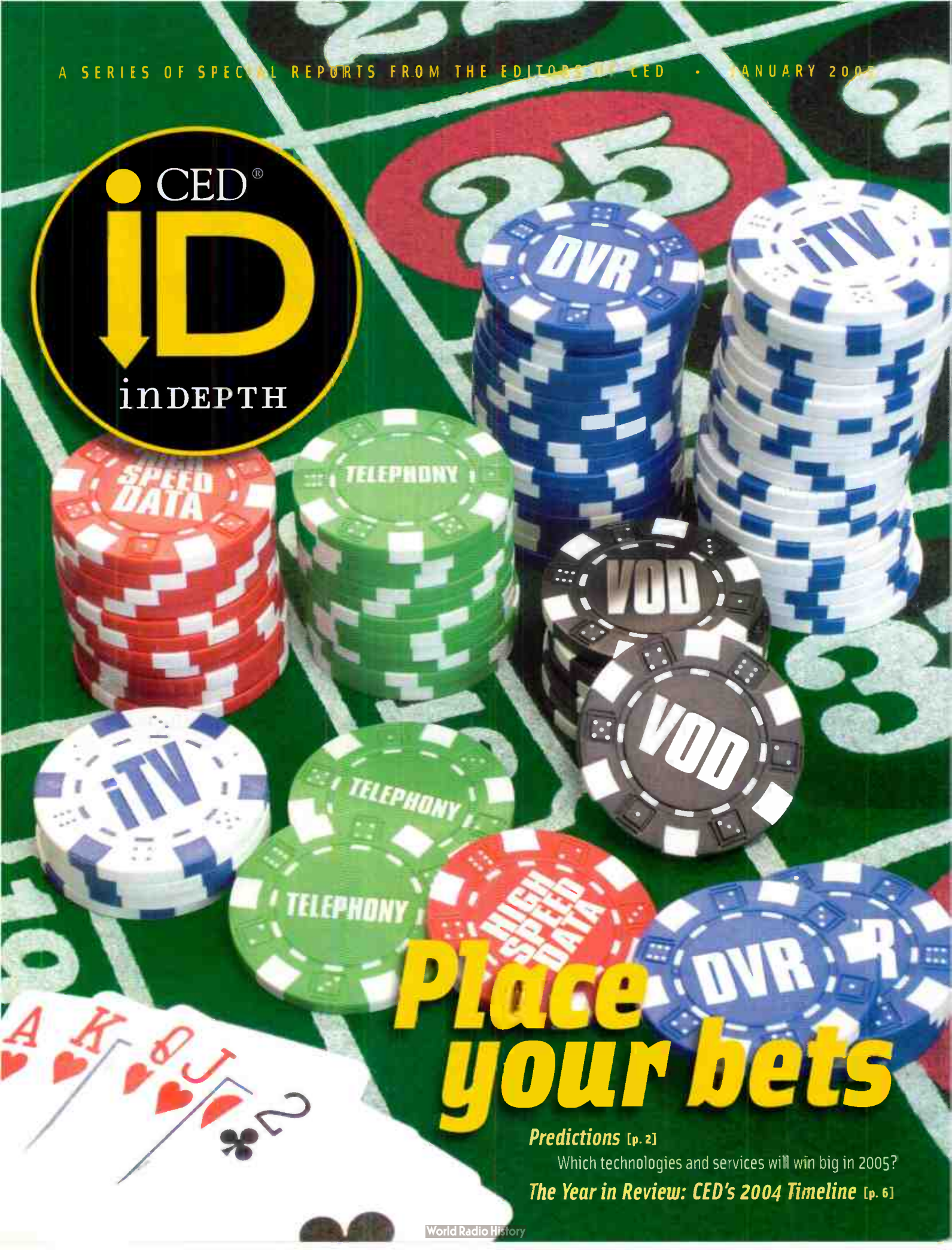
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A SERIES OF SPECIAL REPORTS FROM THE EDITORS OF CED • JANUARY 2005



Place your bets

Predictions [p. 2]

Which technologies and services will win big in 2005?

The Year in Review: CED's 2004 Timeline [p. 6]

are looking to do an end run around standard cable TV distribution, instead offering TV channels over a broadband data connection into the home. That's no new threat to cable ops, but with bigger throughputs, better home networking ties between the cable modem and digital box and a rising interest in IP video fueled by the telcos, this time around it might actually work—if the content aggregators can go beyond D-minus movie fare and video clips of hopelessly obscure rock bands. —KB

10 Mbps...and beyond!

In 2005, cable data tiering will take on a life of its own as operators continue to noodle how to attract and retain subs with the appropriate price and performance levels. RCN Corp. raised the bar last year with a 7 Mbps service, but it won't be too much longer before top cable modem tiers for U.S. consumers breach the 10 Mbps mark.

But, to drive customers toward those tiers, operators will have to demonstrate what customers can do with that speed.

Adding video to the mix is an obvious first step, whether it's offering a library of clips (i.e. Comcast's "The Fan") or partnerships with third parties such as Movielink. But taking that all-important next step is what others might have trouble duplicating.

And what might that be? This year, I won't be surprised to see an operator test or deploy a value-added service that enables cable high-speed customers to stream part or all of their TV lineups to the PC. At 5 Mbps and higher and maybe an advanced codec here or there, there's plenty of bandwidth to ship around high-quality video, as long as the app doesn't become too popular. Maybe the Clearbands and Aerocasts of the world had the right idea back in 2000, but they were just too early with that inspiration.

But this is not to say that slower (and cheaper) is sometimes better as cable modem services extend into the masses. That means there will be more focus on

"lite" tiers designed to convert dial-up Internet users or save price-sensitive customers. The real trick will be to find a price and speed that's appealing to this group, but doesn't cannibalize customers in the higher tiers. —JB

COMMERCIAL SERVICES

Seizing the middle ground

Straight DOCSIS and wireless DOCSIS extension technologies have given operators the opportunity to pick off the low-hanging fruit—the small business customer. But fewer have attacked the mid-range, and even fewer still have spent on the weaponry (mostly fiber, in this case) they'll need to track down and bag the big enterprise customers.

Commercial services have been on cable's agenda since...like forever...but only now does it appear that the industry has all of the weapons it will need to hunt down commercial customers of all sizes. DOCSIS isn't going anywhere. Fiber is also available and being run to big businesses at a faster clip than ever before. The top and bottom are covered.

But that still leaves that fat, juicy middle area exposed and ripe for the seizing. And it appears that operators now have the technology to serve that group without breaking the bank. This is where I see a lot of focus in 2005: using new technology that can grab these mid-range commercial customers away from the telcos. Here I'm talking about S-A's BroadLAN, as well as out-of-band platforms from the likes of Xtend Networks and Narad Networks. With that in mind, we think 2005 will serve as the best year ever for the mid-range commercial services category. —JB

Cable TV still plays

Cable operators are still dabbling in commercial services, and some may make stronger moves in this direction during the coming year. VoIP services may be stimulating some of this activity, along with the potential for PacketCable

services that can give businesses something that has long been viewed as a cable Achilles Heel—quality of service-based services.

Strangely enough, our now more security-conscious society may also strengthen the argument for the addition of good-old-fashioned cable TV services for enterprise, with more companies looking to keep their employees up to date with the latest news events around the world. —KB

INTERACTIVE TELEVISION

Off life support

It's not dead after all. With OCAP still simmering up an interactive TV development stew and iTV-happy News Corp. gaining control of DirectTV, there may be more momentum in 2005 behind developing simple interactivity applications for digital TV.

That could start with interactive long-format ads now starting to debut on VOD platforms. Given the increasing use of DOCSIS signaling for set-tops, the issue of return path communications may get easier as well, and that may also boost the ability to create products that tap viewers' responses. Possible applications include SMS messaging via the set-top, ad click-throughs and promotional contests and viewer polls. —KB

Interactive activation

Speaking primarily of cable, 2005 will finally be iTV's first *big year*, meaning it will begin to live up to the foundation of hype laid five years ago. I wrote as much in my commentary last month.

But what else?

For starters, "enhanced" TV will grow in stature, buoyed by the programmers and the introduction of same-screen eTV, meaning the primary video and the interactive elements will both be delivered by the set-top. Let's say that at least three of the top 10 MSOs will dabble and attempt to dazzle in this particular area, either through trials or outright deployments, sometime in 2005. —JB



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Here's a look back at some of the news and events that shaped broadband in 2004.

Motorola secures FTTP technology foothold via purchase of Quantum Bridge.



Jan. 6 Multimedia over Cable Alliance (MoCA) enters the fray, promising speeds up to 270 Mbps.

Jan. 7

Adelphia announces plans to offer the Digeo-Motorola Moxi Media Center Service in Los Angeles.

Jan. 14

Comcast joins the HomePlug Powerline Alliance.

Jan. 21

Time Warner Cable promotes Mike LaJole to chief technology officer, a position that had remained unfilled for more than two years.



Jan. 13

Cox enters software licensing deal with Liberate Technologies.

Jan. 16

Charter Communications launches digital simulcast platform in Long Beach, Calif.



Mar. 30

Apr. 13 Sony, Hitachi and LG Electronics become the first manufacturers to win CableLabs verification for digital TVs based on the one-way Plug & Play agreement.

Apr. 23 Scientific-Atlanta execs reveal some details about "overlay," a technique that enables Explorer set-tops to run on cable systems originally based on conditional access systems other than S-A's PowerKEY.

Apr. 6

Cox hires VeriSign to handle CALEA compliance for VoIP rollouts.

Apr. 15

C-COR inks deal to buy RPR specialist Lantern Networks.

Apr. 16 Linksys, Netgear and SMC Networks are first to obtain CableHome 1.1 certification.

Apr. 26

Comcast, Time Warner named among financial backers of Arroyo Video Solutions, a video server startup.

Apr. 28

Comcast douses Disney bid.



May 24

Charter signs on to offer cable modem subs a customized version of the Internet-based Movielink service.

May 25

BigBand Networks deals to acquire the IP cable business unit of ADC, which includes the Cuda CMTS product line.

May 27

RCN Corp. files for Chapter 11.

May 28

Zaki Rakib announces he will resign as CEO of Terayon by Aug. 31.



Jun. 4

Rogers Cable targets dial-up Internet users with "Ultra-Lite," a \$19.95 per month, 64 kbps cable modem service.

Jun. 14

Broadcom on the hook for one-time, \$22.5 million payment to Microtune as part of settlement of all outstanding patent and antitrust litigation between the two companies.

Jun. 15

C-COR puts up \$17 million to buy bandwidth management firm Stargus Inc.



Charter promotes Wayne Davis to CTO.



July 17

Anik F2 satellite launches from French Guiana. Payload: the hopes and dreams of WildBlue Communications.

July 19

Former Insight exec Kim Kelly named president & CEO of Arroyo Video Solutions.



July 21

SupportSoft bids to buy OSS specialist Core Networks for \$17 M.

July 22

Verizon enters consumer VoIP race with SIP-based service, dubbed "VoiceWing."

July 27

Time Warner Cable takes wraps off 5 Mbps "Premium" cable modem tier. RCN Corp. follows with 7 Mbps "Mach 7" service.

Terayon hires Jerry Chase as CEO.

Aug. 2

Cox Enterprises offers to take Cox Communications private for \$32 per share.



Aug. 25

Mediacom taps Sprint Corp. as VoIP dance partner.

Aug. 31

Charter signs on Sprint, Level 3 and Accenture as VoIP technology partners.

Sept. 2

Time Warner Cable deploys S-A's "overlay" technology in Houston.



Sept. 24

Panasonic, Comcast announce OCAP licensing deal.

Sept. 22

USDTV chalks up sub No. 10,000.

Sony, Comcast and a trio of other investors sew up agreement to buy MGM for \$4.8 B.

Nov. 1

Bresnan, Net2Phone enter VoIP partnership

Comcast launches Microsoft Foundation platform customers in Washington State



Oct. 22

Verizon accelerates fiber initiative—plans to pass "FiOS" platform to 1 million homes in 2004, and 2 million more in 2005.



Oct. 26

Motorola lands big contract to supply Verizon with set-tops and headend gear.

Broadcom Corp. hires Scott McGregor as president and CEO.

Oct. 28

Citing sluggish support for DOCSIS 2.0, Terayon says it will cease investments in CMTS product line. Company will instead focus on digital video and subscriber-side gear.

10,000 Subscribers



Nov. 1

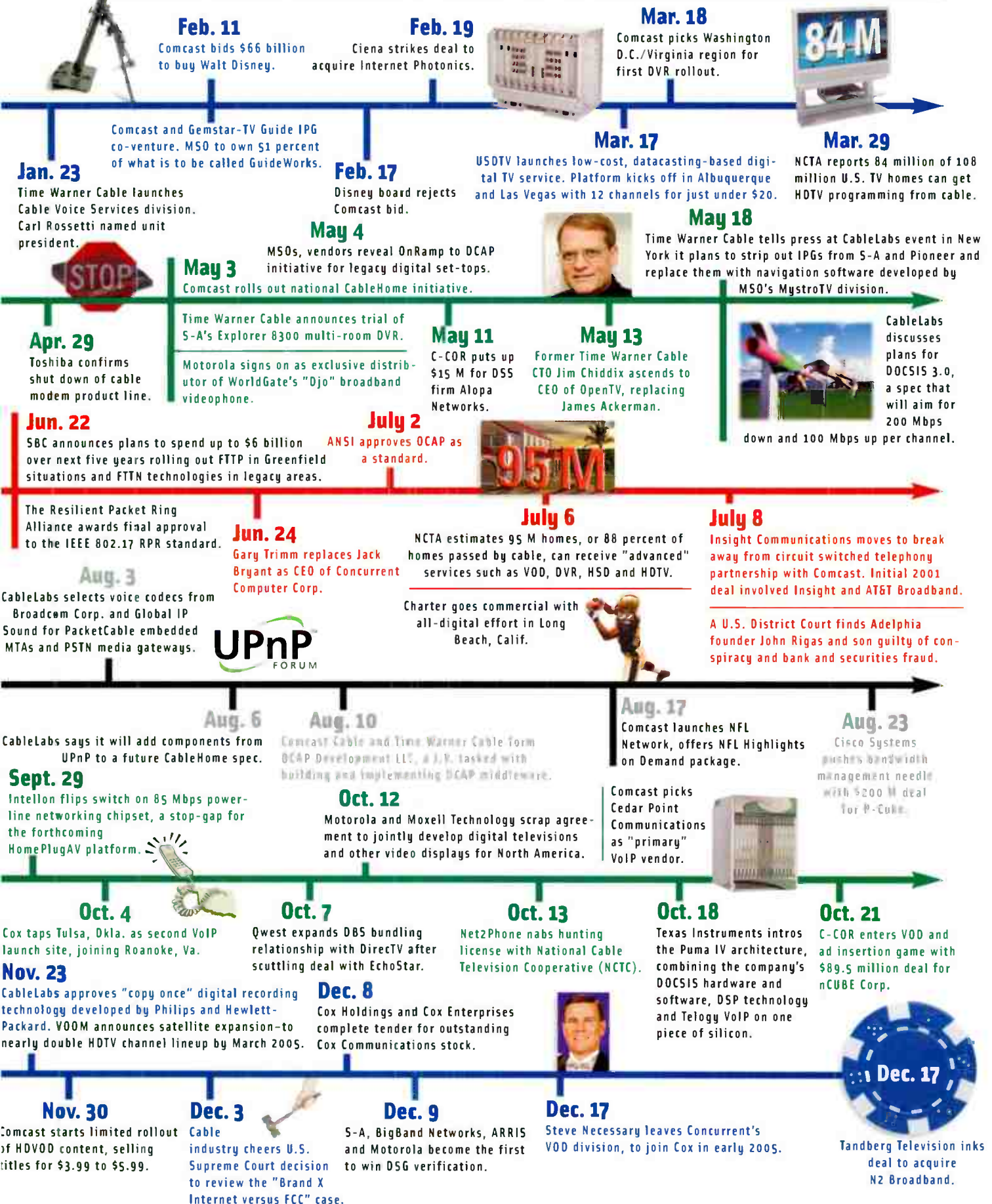
Starz Encore Group HQ is home to first public demo of a satellite TV feed paired with an OCAP-based application: a "mini-guide."

Nov. 8

S-A to roll out set-top with DVR and DVD-burning capabilities.

Nov. 11

SBC speeds up fiber plans; by 2007 expects to spend \$4 billion upgrading networks that pass 18 million homes



Providing QoS for cable VoIP

How to meet ILEC competition head-on

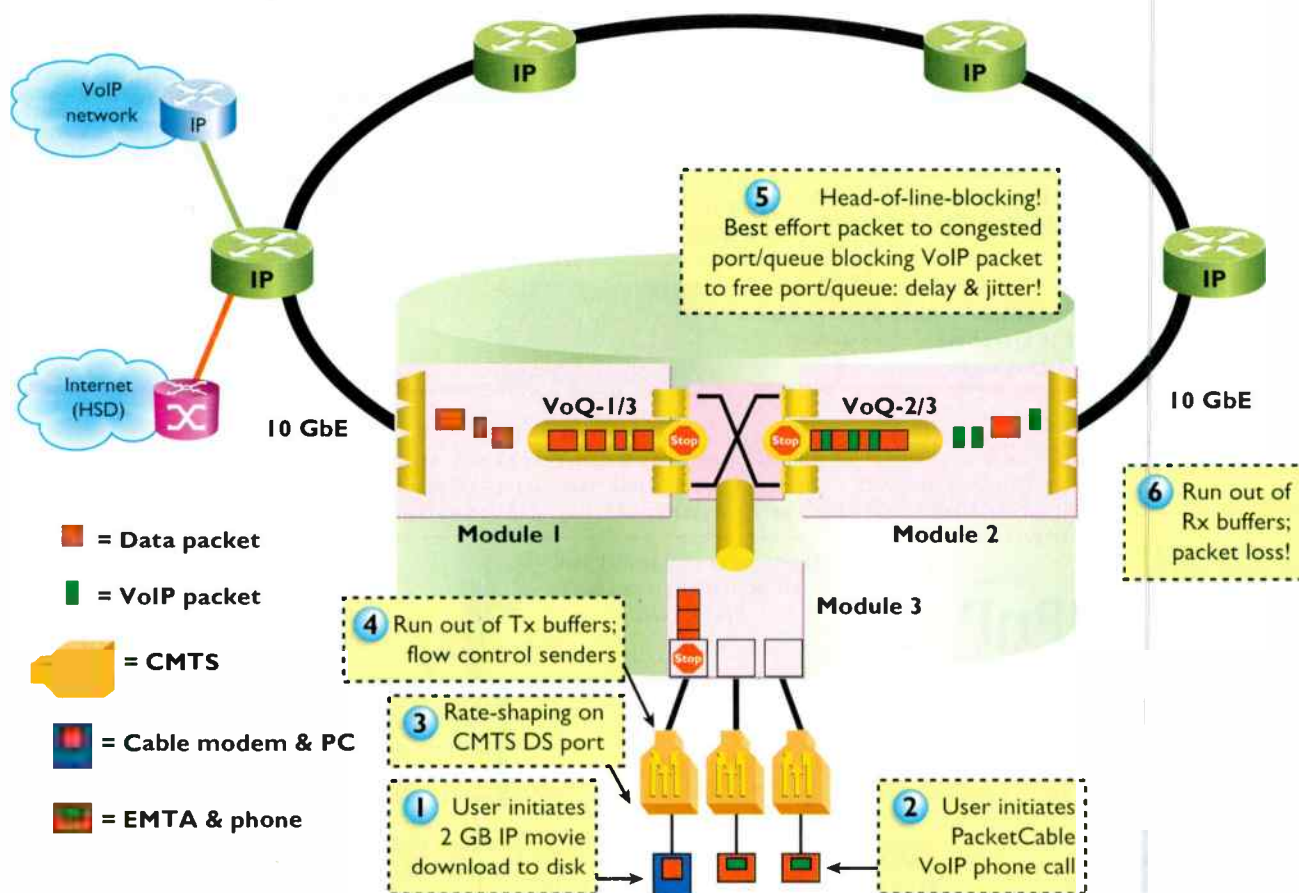


Figure 1. CoS router experiencing head-of-line-blocking.

By Mitch Auster,
Director, Technical Marketing &
Business Development, Ciena

It's unclear who fired the first shot, but now that the telcos finally appear serious about providing video service to complete their residential triple-play offering, the time has come for cable operators to introduce or solidify their telephony product to bundle with video and high-speed data. In doing so, there are myriad technical and commercial approaches to

delivering telephony service, but they all share one common requirement—that the resulting service be reliable and of high quality.

There are two myths about VoIP quality. One suggests that "VoIP quality" is an oxymoron, like "jumbo shrimp"—two concepts that are incongruous. The fact is that with a properly designed architecture using high-quality network elements, VoIP can provide quality and reliability equal to or better than the circuit-switched network. The second myth is that VoIP quality is not

necessary. The argument goes that cellular service, with its dropped calls and sometimes static-laden reception, has conditioned users to accept low quality. The fact is that people consider the trade-off of lower quality for the added convenience of mobility to be beneficial—IP cable telephony (cable VoIP) as an alternative to the telco POTS line doesn't offer such a

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glaring benefit. More importantly, cellular service has continually improved, and the operators offering the best service quality are now the most successful.

Cable VoIP has the ability to increase the average revenue per user by more than \$30 per month, attract new subscribers for a service bundle, and lower the churn rate of existing subscribers. But these rewards will be fleeting if the service is unreliable or the quality is intermittently poor.

With so many provider choices for customers, cable operators may only get one chance to win and keep telephony subscribers. This article discusses the key role that the metro/regional transport and switching network plays in providing a robust architecture for VoIP.

Measures of VoIP quality

There are several factors contributing to the quality of VoIP. The key measures include:

- Dropped calls
- Blocked calls
- Mean Opinion Score (MOS).

Dropped calls can occur as a result of the mid-call failure of either operator-owned client endpoint (e.g. eMTA) or any of the network elements along the bearer path. It can also be the result of a fiber cut along that path.

Blocked calls are generally the result of insufficient resources somewhere along ei-

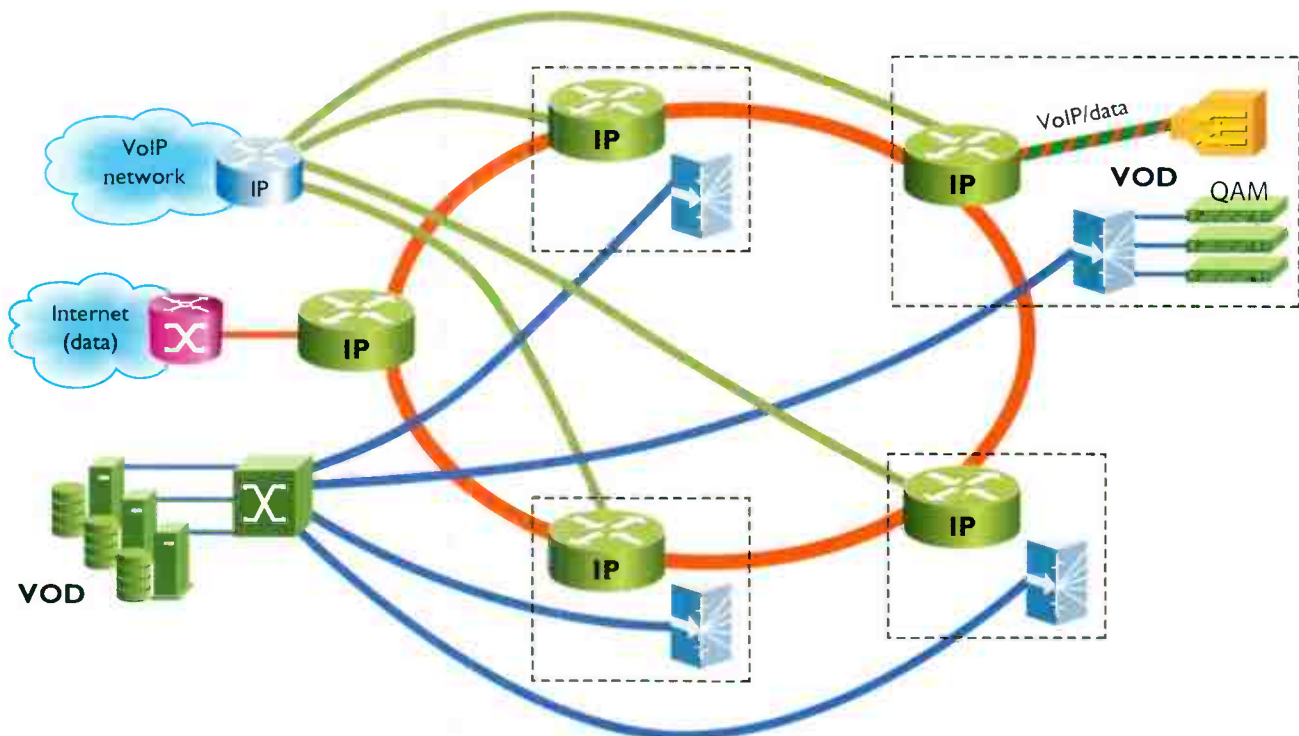


Figure 2. Overlay networks due to relative CoS-only routers.

ther the signaling path or the bearer path. Because it is not economical or practical to dedicate resources for 100 percent utilization and every caller/called combination, a blocking probability (typically <1 percent) is engineered. The amount of resources

provisioned (e.g. media gateway ports to the PSTN, packet trunk bandwidth) is based on the number of subscriber lines, the average calling parameters (e.g. call attempts per hour, duration) and the desired grade of service (i.e. blocking probability)

and are referenced in Erlang tables.

MOS is a subjective measure of voice quality and is directly affected by the codec used as well as the packet latency, packet jitter and dropped packets.

The main goals of the VoIP network architecture and transport design therefore are to avoid dropped and blocked calls, minimize packet latency and jitter, and minimize dropped packets while simplifying the network for easier troubleshooting.

Avoiding blocked calls is a matter of provisioning adequate resources, and ensuring these resources are available during single failure conditions. It is also important to avoid degradation of already connected

Avoiding blocked calls is a matter of provisioning adequate resources, and ensuring these resources are available during single failure conditions.

calls due to over-subscription of a resource. For this, strict connection/session admission control (CAC) is required.

CAC authority over a particular resource can be the jurisdiction of the call management server (CMS) or a proxy. For example, the CMTS acts as proxy for control of bandwidth on the DOCSIS channel, while a media gateway controller, optionally integrated in the CMS, controls the PSTN gateway channels. The originating CMS or its proxies (which may include another CMS) determine whether end-to-end resources exist for a "call" to be completed. In a SIP model, the PacketCable MultiMedia application managers and policy servers would fulfill these roles.

Resource management is well-defined for the DOCSIS channel on the HFC portion of the network using Dynamic QoS (DQoS) signaling, yet the remainder of the packet network has generally been left uncontrolled. This exposes the risk that suffi-

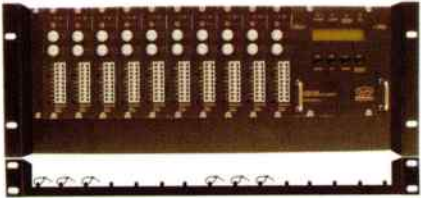


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cient resources for a call may not be available beyond the DOCSIS channel or that they may be squeezed by new calls while the existing call is in progress. The lone remedy offered by the vast majority of routers currently installed in cable networks is DiffServ prioritization, but simply applying that mechanism over the transit metro and regional network doesn't solve the problem. This only provides a *relative Class of Service (CoS)* for the VoIP packets versus other traffic types on a hop-by-hop basis. The architecture of many hub-to-headend networks and the forwarding architecture

of the routers themselves do not enable *guaranteed Quality of Service (QoS)*.

The matter of service quality

For example (see Figure 1), a high-speed data serving area may be experiencing heavy data usage (e.g. several cable modem subscribers downloading 2 gigabyte movies to their PC hard drives to later burn onto DVD). At some point, another subscriber initiates a PacketCable VoIP phone call, and the appropriate DOCSIS resources are allocated. All subscribers' downstream traffic will be rate-

shaped by the CMTS to no more than their subscribed service level (e.g. 4 Mbps), while the VoIP session is provided a guaranteed constant bit rate between the CMTS and eMTA. Eventually the transmit buffers for best effort data packets on the DOCSIS blade will fill up, even though the buffers for VoIP packets should be drained. This in turn will cause the receive buffers on the CMTS uplink to fill up, which causes congestion on the transmit port from the router which itself runs out of best effort transmit buffers. Now here is where the problem occurs—the vast majority of installed routers

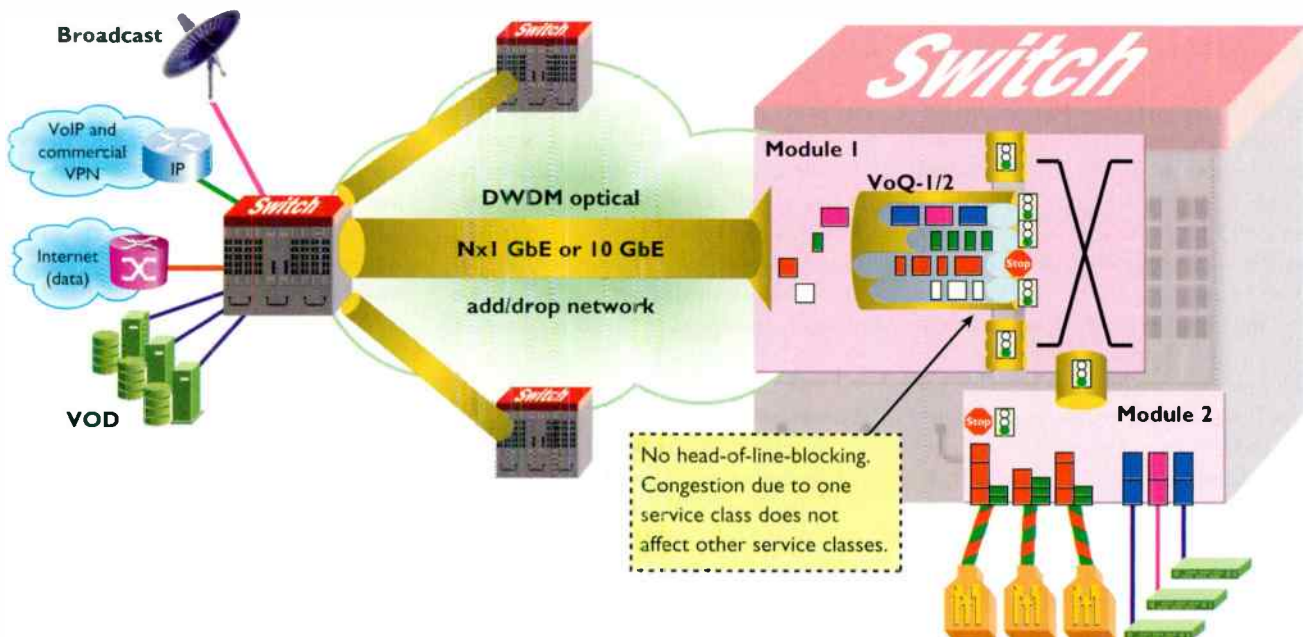


Figure 3. Switch enabling guaranteed QoS.

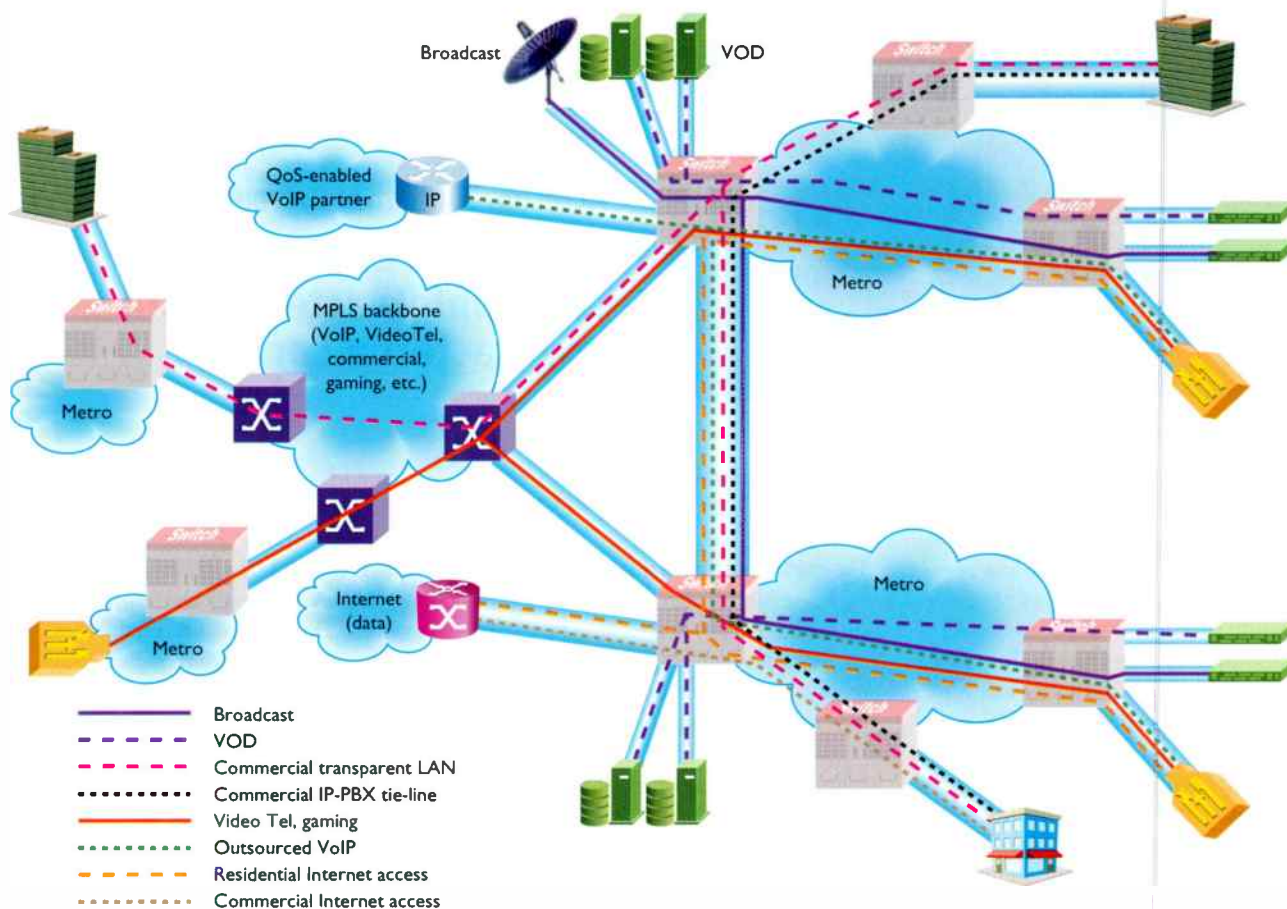


Figure 4. Converged packet network enabling VoIP and other QoS-enabled services.

in cable networks support only a *single* virtual output queue (VOQ) into the fabric from each module per destination module. If a port on a particular destination module is congested—let's say due to best effort CoS 3 traffic—this causes the sending module to hold onto all CoS 3 packets. If a CoS 3 packet is at the front of the VOQ, then the queue is blocked and other potentially higher priority traffic (e.g. VoIP CoS 7 packets) must sit and wait. This is referred to as *head-of-line-blocking*. The effect is added latency and jitter, which is particularly damaging for VoIP service. If this persists long enough, the trunk module experiencing blocking will run out of receive buffers for VoIP packets on the ingress port and packets will be dropped.

This problem is exacerbated by the multiple router hops around the headend-hub ring. These issues have forced at least

one of the leading MSOs to separate out the VoIP traffic directly at the hub and carry it over a logically distinct network. Furthermore, the video-on-demand traffic is forced to be carried on yet another logically distinct network (see Figure 2).

Obviously, while the traffic may be converged onto a single fiber pair using wave division multiplexing, this is not an economical solution.

Guaranteeing QoS

To provide guaranteed QoS for VoIP while converging video, Internet access, commercial VPN, T-1 circuit emulation, interactive gaming and more over a common packet network requires a better traffic management approach to bound latency and jitter and to avoid packet loss. This must be addressed at both the node level and the network level.

The first issue is to distinguish the packets of explicitly admitted connections/flows, either signaled or pre-provisioned, from other packets. These are the ones that will be provided guaranteed QoS; all others will receive best effort service or no service at all. This requires a network resource management (NRM) function which could be implemented by the network elements themselves or by an external software system. In general, the interconnected nodes of the network would be provisioned with a set of virtual trunks among them of determinate size for each service class. These virtual trunks can be implemented using VLANs, MPLS tunnels or whole facilities. The CAC function engages the NRM function to ensure there is adequate capacity in the virtual trunk before admitting the flow.

The switching node must ensure that

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packets received within the traffic contract for admitted service flows are provided the specified performance from ingress port to egress port regardless of the activity of other flows. Some of the key ingredients for this are: 1) buffer allocation, 2) packet policing and marking and congestion control, 3) priority queuing, scheduling and shaping, and 4) intra-node packet switching. A node must separately allocate large amounts of receive buffers and transmit buffers for each port so that an ingress port does not run out of receive buffers if there is transmit congestion on the corresponding or another egress port. This minimizes dropped packets. Traffic flows should be policed on ingress and packets should be marked based on the traffic contract. For cable modem access, this should be done by the CMTS. For commercial fiber access, this is done by the edge switch incorporating mechanisms for providing committed and excess information rates and burst sizes.

To avoid head of line blocking and to bound latency and jitter to several microseconds, the switch must support multiple VOQs from each module into a cell-based fabric—one set of strict priority and weighted round robin VOQs for each destination module (see Figure 3). This ensures that a congested service class queue does not block traffic from other queues. By segmenting packets into small cells, the switch ensures that higher priority packets (e.g. VoIP) arriving after a lower priority packet (e.g. jumbo data packet) begins to be switched don't have to wait for that entire packet to be switched before being

served—they just wait one cell time. At the egress module, there needs to be a set of class-based transmit queues including at least two strict priority queues (e.g. one for video and another for VoIP). Finally, architecting the network as a logical “hub and spoke” between the headend and the distribution hubs further reduces latency and jitter, simplifies traffic engineering and network troubleshooting and enables fast

To deny the ILECs a weak underbelly to exploit in the marketing counter-attack sure to come, the switching and transport elements must feature carrier-grade qualities.

restoration in case of fiber cuts. To deny the ILECs a weak underbelly to exploit in the marketing counter-attack sure to come, the switching and transport elements must feature carrier-grade qualities. This includes full common equipment redundancy with hitless switchover, separation of forwarding and control planes, in-service software upgrades, NEBS Level 3 certification and the ability to rapidly detect and

react to fiber cuts and signal degradation to provide sub-50 millisecond restoration.

The combination of guaranteed QoS through a carrier-grade switch, virtual trunks and connection admission control enables the cable operator to provide service level agreements covering availability, throughput, latency, jitter and loss for any service without over-engineering the network (see Figure 4). Dedicated commercial virtual connections for Internet access, VoIP, transparent LAN service, or point-to-point private lines can be provisioned from one commercial site to another or to an Internet router. Likewise, capacity for a certain amount of cable modem traffic within each service class can be provisioned between each switching point as well as to the application servers. This may include the border to a QoS-enabled VoIP outsourcing partner. Both sets of virtual trunks—monitored by the NRM function—can share common facilities between the switches.

Conclusion

VoIP has been launched by several MSOs to date. Some have taken the steps to ensure service quality, in some cases by deploying an overlay network, while others are still susceptible to reliability, latency, jitter and packet loss problems. For long-term success, it is imperative that any telephony service branded by the cable operator or a reputable, revenue-sharing partner (e.g. Sprint, MCI, Net2Phone) be guaranteed the reliability and QoS necessary to meet or exceed the performance of the ILEC service it is replacing. ■

Hitting close to home

Cable divisions turn to local VOD as weapon in war with satellite

By Karen Brown, Senior Editor

There is nothing like home cooking, and now cable operators are finding out that is true for their video-on-demand service offerings.

A new strategy in cable's battle with satellite competitors is to go local with VOD content. While supplying this home-grown, community-generated content on VOD servers does mean retooling local origination operations and some equipment purchases, the systems that have tried this new on-demand variant say they are getting strong response from their communities—strong enough in some cases to consider expanding the operation to include more content and perhaps advertising support.

One of the first systems to venture into local on-demand content is Time Warner Cable's Southeastern Wisconsin system. The brainchild of then-division President Carol Hevey, the free Wisconsin On Demand service launched to digital subs in fall 2003.

The Wisconsin On Demand channel was placed within its 26 other free on-demand channels from cable programmers such as Oxygen, Court TV and the Cartoon Network. It started with about 90 hours of content, and has grown to about 105 hours.

If there were such a thing as ratings for the free on-demand content, the local channel would be a big winner. As of late November, the local on-demand channel had attracted about 400,000 hits in 2004.

"We have been number one or number two for most of the year—which is remarkable," says Bev Greenberg, vice president of public affairs for Time Warner Cable of Southeastern Wisconsin.

The local programming content ranges from a lineup of high-school sports to a rock talent contest Time Warner South-eastern Wisconsin developed. A second



Time Warner Cable San Antonio's local origination unit provided video of the annual Fiesta Battle of Flowers Marching Band Festival for its San Antonio On Demand channel.

channel offers local education on-demand content, including video classes offered by Milwaukee Technical College.

Similarly, Time Warner's San Antonio system started delving into local on-demand content under its movies-on-demand banner about a year and a half ago, according to Jon Gary Herrera, the division's director of government and public affairs. At first, it consisted of video of local events such as high-school football games and local parades, but it has now grown to encompass local talent shows, and next spring, a series of city council election debates.

"We clearly started identifying initiatives that were not typically covered by big broadcasters or big production companies, but it was absolutely a need, and the demand was there from the public," Herrera

says. "So it kind of grew up from there."

In September, the local content had grown enough that it was put on its own channel in the on-demand lineup. Although there was some concern the local content would suffer if moved away from the popular movie content, the San Antonio On Demand channel has steadily built viewership, which is approaching 20,000 viewers monthly.

A strong argument for local VOD programming is the fact that satellite competitors can't easily duplicate it because of limited spot-beam satellite capacity, but in addition, "it's a great fit for public affairs," Herrera adds. "Those are the kinds of things that this type of initiative and this type of technology then brings and expands your public affairs repertoire."

Time Warner is far from the only cable

operator to see good response from launching local VOD content. After buying and testing the N2Broadband Xport VOD production system this summer, Cox Omaha debuted its local entertainment-on-demand content in September to coincide with the fall high-school football season.

With a lineup of about 10 hours of local content weekly, the channel is part of an umbrella VOD channel along with paid offerings, including movies-on-demand, HBO, Cinemax and Starz.

Viewership numbers have been encouraging. Since the local content channel launched, Cox Omaha has seen a 4 percent increase in digital TV subscriptions and a 9 percent increase overall in Entertainment On Demand order activity, according to Mike Kohler, Cox Omaha's vice president of public and governmental affairs. The local content averages 5,300 orders per month, representing about 2 percent of Cox Omaha's total VOD orders "which is kind of what we were shooting for," he says.

"We are encouraged if people just do the activity because, frankly, we just like them in the neighborhood," Kohler says. "We're not trying to win any ratings race or anything like that. The idea of having our free content located in close proximity to the pay options is we want people to feel like they can just go to this area, explore, and there are some free options available. We just want people comfortable with doing the ordering activity."

Buckeye CableSystem has also pushed the local needle by producing high school football games and other events and then making them available on-demand. Joe Jensen, Buckeye's CTO, discussed that effort on a panel during last month's Cable Television & Broadband Expo 2004 online tradeshow (for coverage, please see our roundup of the confab on p. 50).

Local origination steps in

With local VOD content largely offered for free, cable operators are looking to keep costs down, largely by tapping their existing local origination units. For



Time Warner Cable San Antonio Local Origination Supervisor David Przybylski directs video feeds from the unit's mobile production facility.

Cox Omaha that made sense, since its local origination unit already had a mobile truck and video equipment. But it did require the division to rethink its local origination strategy.

"It doesn't change the equipment we have or the franchise obligation. What it changes is our programming philosophy, because now, to be really honest, we're only going to do programming that serves our competitive needs," Kohler notes. "If

programming overall.

"It really hasn't been a cost increase for us," Herrera says. "It's just a matter of us putting priorities on certain productions versus others that we have done in the past, really to help drive viewership and be more diverse in our coverage."

Still, local VOD does require some outside help. For multiple camera shoots such as football games, Time Warner San Antonio hires local contract camera crews.

"But if it's something like the mayor's address to the chamber of commerce on the state of the city—that's a two-camera (production), so we can do that all in-house," Herrera says. "So there is that balance of what we continue to explore, trying to keep it as efficient as possible."

Time Warner's Southeastern Wisconsin division, meanwhile, also is keeping production costs low by banking heavily on contributions from the community. In fact, 80 percent of the video content is contributed free from outside sources, with 20 percent produced by the MSO.

"The only thing we needed to buy was the N2 Broadband equipment," Greenberg says. She won't release the actual cost paid for its N2 Xport Digital Media Producer encoder, but "it was an initial cost and that was it. That was all that we really invested," she notes.



Cox's Omaha system now offers customers local content as part of its Entertainment On Demand service.

there's not something that distinguishes us from our wire-based or satellite competitors. then we are not going to bother doing it."

Similarly, Time Warner San Antonio also has added local VOD to its local origination unit, and that has benefited the system by increasing the amount of local

In the loop

Have a comment? Contact Tom by e-mail at: robinson@cbgcommunications.com



Building out broadband

BY THOMAS G. ROBINSON, EXECUTIVE VICE PRESIDENT,
CBG COMMUNICATIONS INC.

I have a colleague who feels "broadbandoned" (apparently a cross between "broadband" and "abandoned"). He laments that he is too far from the central office for DSL, the nearest cable television (and thus cable modem) line is about a mile up the road, there is no local WiFi hot spot, and cell service is hit or miss. I told him that perhaps his telephone company would leapfrog current technology and get fiber right to his premises, and all I heard was a giant scoffing sound on the other end of the line.

His situation, while admittedly extreme, is nonetheless similar to the problems still faced by millions of Americans. There are moves afoot to continue to expand the reach and capability of broadband services, but some of them seem to promote certain technologies and providers at the expense of others, when it will likely be a combination of existing and emerging technologies and services that will ultimately provide broadband to the furthest reaches of the country.

A case-in-point is recent legislation signed by the governor in the State of Pennsylvania. The legislation has been hailed by the administration as a way to bring broadband to even the most rural sections of the state by 2015. Yet, the bill appears to now severely inhibit—except for the state's largest jurisdiction, Philadelphia—the development of one of the fastest growing broadband resources around the country, municipal wireless systems. It is the view of many in the state, despite the insistence of commer-

cial providers that they are poised to bring services to even the most remote areas, that unless local governments join the fray, 2015 will come and go and there will still be many in the state without access to broadband.

In a number of locales, local governments have already demonstrated their ability to provide such services affordably where commercial providers are not now meeting the need. Further, what seems to be less understood and certainly not acknowledged by the provider community, is that in a number of cases, local governments are partnering with commercial entities to bring broadband services to the community.

One of the things governments and governmental authorities have always been adept at is providing infrastructure. Whether it's roads, sidewalks, bridges, water and sewer lines or community buildings, nationwide citizens rely on their local governments to provide the basic community infrastructure where they live and work. This can also be true in the provision of wireless broadband services. Local governments provide numerous opportunities for the proper engineering placement of antennas, for example, including municipal towers, public school district buildings, parking garages, water towers, etc. Jurisdictions with even modest public safety agencies or that have a public works department have significant experience in the maintenance of wireless communications. To a certain extent, municipalities are also content providers,

continued on page 49

The trend toward local VOD content has in fact been a boon for N2 Broadband and its Xport VOD production suite of products. N2 so far has sold elements of that product line—which includes a built-in encoder or interfaces to link to an existing encoder, an editing suite and VOD metadata coding tools—to 25 local cable systems.

"Local content for on-demand is just a really natural fit, and I think operators have gotten more and more comfortable with the basic operation of VOD which began with just getting the movies and getting the movies deployed and getting the premium SVOD services," says Raj Amin, N2 Broadband's vice president of content and advertising markets. "It's something satellite can't do, and [cable operators] find a lot of value in providing this local content."

The fact that local cable divisions are buying into Xport has in turn influenced the product line. Based on customer feedback, N2 added the Xport editing suite features to provide simple cutting, splicing and content creation tools.

"What we saw from the local systems was they needed a really easy way to do that, that they could teach to pretty much anyone with basic technical background," Amin says.

Going forward, N2 Broadband anticipates local on-demand content will evolve to include ad spots. So it is providing its AdPoint on-demand advertising system, which can process, insert and swap ad spots, as a module to the Xport platform, Amin says.

Adding the ads

Indeed, the local systems are already mulling the possibility of mixing advertising into their local VOD content offerings.

"We've had a dialogue with our local ad sales group, and that is something that we would consider depending on the content, obviously," Herrera says. "Would more high-school football games get covered if



Amin

there was an underwriter helping with the hard costs? Absolutely.”

Likewise, it's in the future if Cox Omaha finds major advertising accounts willing to cut a deal to support the local on-demand programming “and that a differentiating factor for us can be the promise to do infomercial programming and put it on our EOD menu, we'll do that deal,” Kohler adds. “So that's where the demand will come from.”

It also is mulling the possibility of adding advertising spots to the free local content channel.

“We are working right now with our commercial side and with Cox Media on either augmenting sales proposals that they are making to major clients, or in the case of Cox Media, straight-out sales of advertorial-type content locally,” Kohler says.

Nor is the channel going to be limited to just local content. Starting this month, the channel also will offer customer care, cable service information and troubleshooting tips, as well as employee communications available via a password.

“We want it to be a support mechanism for our customer care people,” Kohler says.

A good picture

Time Warner's Southeastern Wisconsin division also is looking to expand its local VOD efforts, possibly growing it to include multiple channels, Greenberg says. The growing content will probably mean adding more VOD servers “and so we're going to look for greater capacity so we can offer more programming,” she says.

For Time Warner San Antonio, future expansion may include updated encoders. At present, its local on-demand programs have a maximum length of about 90 minutes because of limitations to its existing encoder—so in the case of football games that means splitting the video into two segments. Encoding equipment that can support longer video files is on Herrera's wish list, and “it's actually something we are already discussing with our engineering department, saying ‘hey, for next year's capital, keep us in mind’.”

Also on that wish list is the ability to encode local content in HD. That would

mean increased costs in production and higher bandwidth, but so far, the response and strategic advantage would argue well for such an expense, Herrera says.

“When we first launched it we were at about 12,000 viewers, and now we are approaching 20,000 viewers per month,” he

notes. “As that continues to grow, in every instance we are absolutely putting an exclamation point on the competitive advantage. And that's where we reasonably think we can look at the future of this type of product and continue to grow it as an investment.” ■

In the loop

Have a comment? Contact Tom by e-mail at: robinson@cbgcommunications.com

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since many municipal services can now be provided on-line. Although local governments need revenue to operate, they do not “make money” per se, since municipal corporations are not-for-profit entities. Accordingly, the primary thrust in municipal broadband development is the same public policy imperative espoused by the state of Pennsylvania: to bring broadband to all of its citizens.

There are a multitude of possible ways that local governments and commercial entities could partner in this critical broadband buildout effort, some of which are already being implemented. For example, some local governments are working with vendors where the vendors will provide the network engineering expertise, the equipment and the ongoing system maintenance, while the local government provides the physical support infrastructure, the back office support and promotion of the service's availability.

In other cases, the local government will fund and provide the entire physical plant, including the network engineering and maintenance. Then it will partner with an ISP or content development firm to develop basic and ancillary wireless services. In a couple of recent cases, this includes commercial partners that sell targeted advertising. For example, let's say that you link to the wireless network in the northwest section of the city. The first page that appears once the link is established will be an advertisement or promotion for a business that is located nearby to where you are accessing the network, thus promoting convenient services. The technology can even enable

time-sensitive promotions (such as a restaurant promoting breakfast selections to those accessing the service in the morning and dinner selections to those accessing the service later in the day). Local governments are also working with such content providers to be able to override these initial commercial promotions either system-wide or on a targeted basis, with time-sensitive emergency information, as part of overall reverse 911 efforts.

Still another model has local governments looking for backbone service partners, where high-capacity backbone services may only be available through commercial infrastructure. This would seem to be an ideal scenario for wireline providers such as cable companies to extend the range and remote accessibility of their own Internet services, where access would otherwise be limited to wireline cable modem connections.

There are some who say that local governments should not be in the broadband business or present unfair competition. The simple fact, though, is that there is still a great broadband gap, some of which is not due to a lack of commercial services, but due to a lack of affordability at current pricing structures.

Regardless of which opinion you hold, it is evident that communities as a whole do benefit by a multiplicity of competing, high-speed broadband access options. A case-in-point is another colleague who complains that he is so connected that he can't get away from continuous electronic-based interruptions. To him I said, “Go stay awhile with my broadbanded friend.”

No Western Show? No problem.

Industry's first 'virtual' tradeshow covered everything from iTV to VoIP

By CED staff

2004 was the first year in a string of 37 in which the industry did not gather for The Western Show, which hung up its spurs for good in December 2003.

Still, the industry had an opportunity to gather and talk about some serious tech. Instead of Anaheim, the location for this event was only as far away as your Internet connection. On Dec. 8 and 9, CED hosted the industry's first virtual tradeshow. The event, offered on the Web, drew more than 1,600 registrants. The live event welcomed about 1,000 unique visitors who spent an average of five hours visiting the pavilions and interactive vendor booths.

The show featured eight panels: High-Speed Data, Voice Services, On Demand/Interactive TV, and The Broadband Home. (Editor's note: A complete archive of the show is available at <http://bb.unisfair.com>.)

Have no fear...data tiers are here

Cable, DSL and other broadband providers are clearly embracing data tiering strategies. But why has this practice grown in importance over the last 12 months?

As high-speed data customer penetration grows beyond the early adopter stage, it is heading toward a larger group that is more price-sensitive. The trick, of course, is to figure out what will motivate them to take the broadband plunge, panelists explained during a session titled "High-Speed Data: Are you ready for tiers, or tears?"

That's important to realize, because high-speed data penetration is clearly driven by demographics and household income, explained Bruce Leichtman, president and principal analyst Leichtman Research Group.

But how much are consumers willing to pay to make the broadband plunge? According to LRG survey data, just 17 percent of narrowband subs interested in broadband would pay \$45 per month. That



The CableTV and Broadband Expo 2004 is still live on the Web.

figure more than doubles to 38 percent with a \$30 price point.

DSL has clearly caught on to that trend and has emphasized lower pricing. But cable is responding with tiers of its own.

RCN Corp., among the most aggressive with tiering, launched a 3 Mbps tier in 2002, a 5 Mbps product last year, and, more recently, a 7 Mbps tier. Cox Communications, meanwhile, markets three cable modem products: an Entry Level tier (256 kbps symmetrical), a Preferred tier (4 Mbps down/512 kbps up), and a Premier tier (5 Mbps up/768 kbps down).

How those tiers are sold is just as important as the tiers themselves, said Winston Warrior, Cox's director of high-speed Internet marketing. Cox, for example, trains its CSRs to determine which product package fits the customer's needs by exploring their online behaviors. —Jeff Baumgartner

The broadband pipe: fill 'er up

With consumer cable modem download speeds hitting 5 Mbps and beyond, operators are next figuring out how to fill those wider pipes with compelling content, panelists said during the "Taking High-Speed

Data to the Next Level: Content" panel.

Broadband "opens up a whole new world for us," said William Allman, SVP and GM of interactive new media at Discovery Communications. Discovery's strategy is to use the Internet to offer extras derived from its lineup of linear programming. TLC, for example, offers "designer's cuts" of its "Trading Spaces" series.

ESPN has used broadband, mobile phones, TVs and videogames to bring the network's content "to the fans wherever they want to view it," said Tanya Van Court, the VP and GM of ESPN Broadband & Interactive Television.

This year, ESPN will roll out a new broadband product that shares the look and feel of a video control room. It will also contain personalization. If the service knows a user is a big Red Sox fan, it will have video or other content ready to go at sign-on.

Road Runner has tried to tap into this treasure trove of content with the launch of a new interface that provides users with easy access to a range of videos, images and even simple text. The trick is to make that interface simple enough for a newbie, but with enough bells and whistles for a

techie, said Steven Cook, Road Runner's VP, broadband programming and ad sales.

But where's the money in this?

Advertising is the obvious, first answer. Discovery, for example, sells 30-second and 15-second spots on-air, but they are also applicable—and "clickable"—in a broadband setting. It is also mulling a "download-to-own" service. "We have 70,000 hours of video that we own, and [broadband] is a great opportunity for us to find out how the market might pay for that," Allman said.

One company that has solved the financial puzzle is RealNetworks Inc., which offers Internet-based services such as RadioPass, Music Store, Rhapsody and RealArcade. —JB

I want my iTV

Interactive television doesn't necessarily mean VOD, but early indications show that it's very much in demand, panelists said during the session "Getting Active with Interactive TV."

Thanks to relative iTV vets like GSN, the cable industry is starting to get a clearer picture on iTV usage and business models. Roughly 85 percent of GSN's interactive viewers also interface with advertisers, according to company VP John Roberts.

Advertisers, of course, want eyeballs. Early studies of usage patterns are looking solid. In Hawaii, as much as 12 percent of Time Warner Cable's digital customers interact with GSN, and 75 percent play along at least twice per week, Roberts said.

ICTV Inc., which has gotten off the mark with deployments with Time Warner Cable and Grande Communications, has found that 78 percent of digital subscribers exposed to iTV use it at least once, and 88 percent come back to use it again. About 75 percent use it five times or more, said Jonathan Symonds, ICTV's VP of marketing and business development.

Another trend: usage patterns remain steady from 10 a.m. to 10 p.m., rather than spike up and down throughout the day like it does with traditional program ratings, Symonds said.

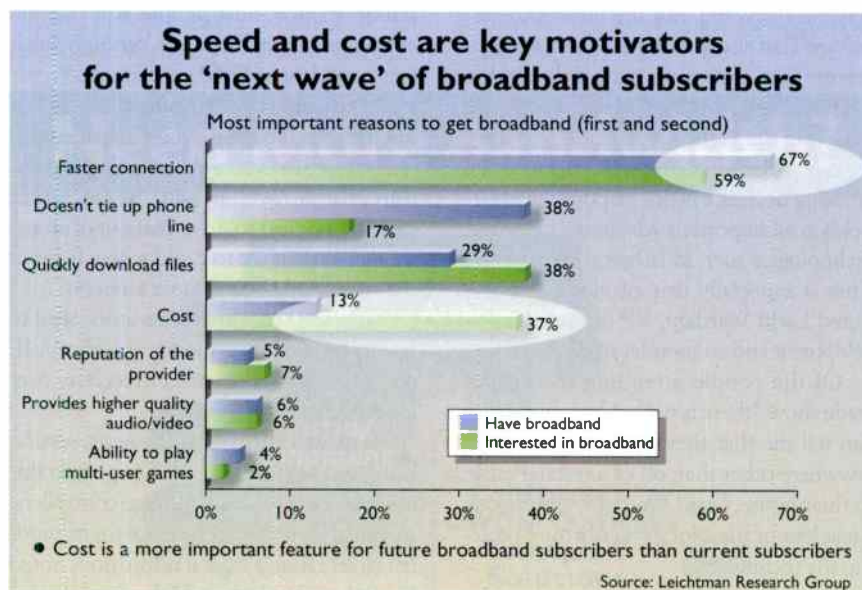
Insight Communications, which has been offering iTV for more than five years, has found that two-thirds of its digital subs use interactive service each month, said

Charlie Barnes, the MSO's VP of interactive services.

Buzztime Entertainment, a trivia service, said recent tests with Time Warner Cable and Comcast Cable indicate that operators now feel that the technology is ready for more advanced trials, said Ty

(those that offer a viewer to "click" to see more information and then provide access back to the original program) will become a staple of the near future, predicted John Connelly, executive VP of marketing and business development at BigBand Networks.

Ads are already evolving from the tra-



Lam, Buzztime's president and COO. —JB

The expanding VOD universe

Progressive cable operators are quickly discovering that a solid VOD lineup goes well beyond a slate of movies to include a suite of local content and advertising.

Buckeye Cablevision of Toledo, Ohio is a case in point. The 150,000-subscriber system features traditional VOD, but also includes subscription VOD and free VOD, and recently added a wide range of locally produced content as well. The operator invested in three mobile production trailers and launched the Buckeye Cable Sports Network. It produces between 15 and 20 events, on average, per week, said CTO Joe Jensen, who spoke during the "Tomorrow's VOD Today" session.

"We've shown everything from Ohio State basketball to the local Cub Scout Pinewood Derby finals on that channel," Jensen said. It's that type of localism that has created a buzz in the community and helped Buckeye differentiate itself from competitors like DBS.

Indeed, targeted and telescoping ads

ditional 30-second broadcast into long-form ads, and narrowcast ads designed to reach only those who are most interested in particular products. As such, Connelly argues that the best approach to accommodate an ever-growing slate of programming is to adopt the switched broadcast network architecture, which better uses available bandwidth.

Forty percent of all TV viewing will be non-real-time, agreed Stephen Becker, executive VP of marketing and business development at N2 Broadband. He argued that open interfaces will be key to making the technology more affordable. Why? Open interfaces allow operators to mix-and-match hardware, and leverage better pricing and higher levels of innovation, he said. —Roger Brown

Hooking up the home

During the panel session "Making Sense of the Home Networking Explosion," the consensus leaned toward a continued diverse—and potentially confusing—market, with no one-size-fits-all home networking technology. "We believe that there are go-

newproducts

PRODUCT REVIEWS

MPEG-2 encoder/decoder

SOUTH PLAINFIELD, N.J.—Radiant Communications has introduced its V4400 Series MPEG-2 encoder and decoder units. This series enables television-over-IP applications including enhanced distance learning, corporate training, security and remote broadcasting with closed captioning signals passed through the MPEG-2 stream.

One of the most significant features of the V4400 Series is the ability to deliver video and audio over T-1 lines, even when a LAN/WAN does not exist and fiber is not present.

This network solution for rural markets is accomplished when the new MPEG-2 products are used in conjunction with Radiant's DL233, which combines T-1 lines to provide an Ethernet connection.

Radiant's MPEG-2 products are designed for either unicast point-to-point

signal distribution or multicast applications to multiple locations on an Ethernet network. In addition, the signal from Radiant's V4400 products can be viewed with a hardware decoder or computer software, enabling the convenience of monitoring from any remote location with an Internet connection.

Visit www.cedmagazine.com/products

720p HD VOD platform

SAN MATEO, Calif.—MatrixStream Technologies Inc. has announced its InstantVOD Platform, a secure, end-to-end IP video-on-demand system that supports HD- and DVD-quality videos. The platform does not require broadband providers to upgrade their existing network infrastructure or provide QoS from the backbone to the customer site. MatrixStream's IP Datacast solution allows broadband providers to deliver IP videos to subscribers' homes without any video degradation, according to the company.

The InstantVOD ASP system allows VOD systems to be deployed quickly over

any best-effort IP broadband network. The InstantVOD package includes VOD server software, VOD subscriber and content management software, a billing API management system, PC viewing clients, media PC viewing clients and IP set-top box TV video clients.

Visit www.cedmagazine.com/products

Fiber cable assemblies

CRANSTON, RI—Electro Standards Laboratories (ESL) has expanded its data communications cable line to include the new multi-fiber MTP/MPO Fan-Out cables. Designed to save front-panel space and streamline fiber management, the cables are supplied in both singlemode and multimode fiber. The MTP Fan-Out utilizes a 12-fiber MTP connector on one end and discrete connectors (LC, SC, FC, ST) on the breakout end.

The advantages of MTP/MPO cables include 12 times the density of SC connectors, compact size and low insertion loss, according to the company.

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Radiant's encoder/decoder

TRANSPORT

10 Gigabit LAN/PHY capability

STATE COLLEGE, Pa.—C-COR Inc. is expanding its PLEXis family of transport gear with several 10 Gbps products based on the new LAN/PHY (Local Area Network/Physical Layer) architecture. Enabling increased transport efficiencies and capacity in existing or new 10 Gbps video-on-demand networks, the PLEXis GXX Series of 10 Gigabit products now includes the GXTX-9180 transmitter, the GXRX-9182 receiver and the GXTR-9184 transceiver.

The new products utilize 10 Gbps short-reach XFP pluggable optics for LAN side connection. The WAN (Wide Area Network) side link is provided by ITU-Grid DWDM (dense wavelength division multiplexing) optics, which offer link distances exceeding 600 km. Extensive monitoring capability for Ethernet statistics is available for each product.

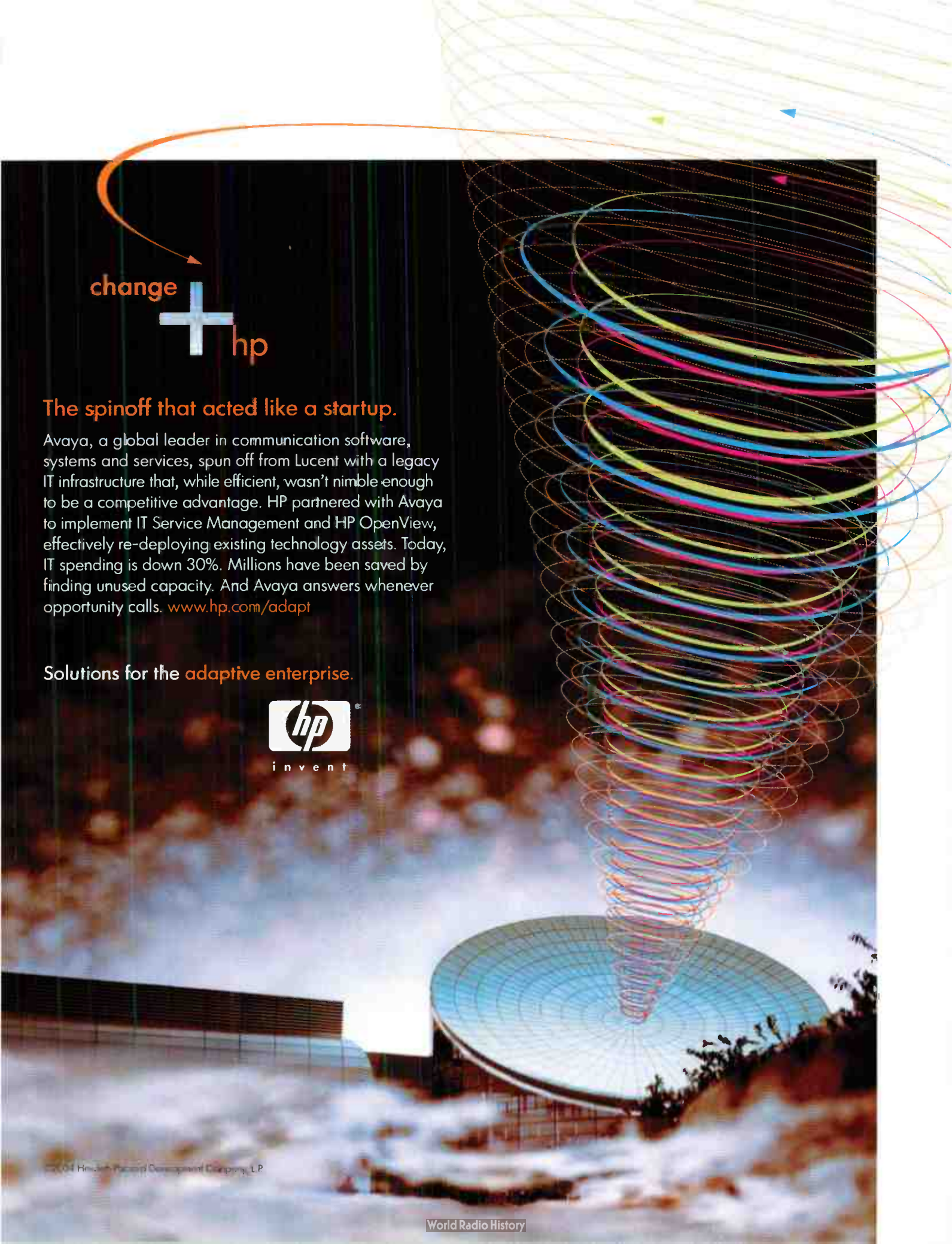
The new LAN/PHY products follow C-COR's strategy of providing scalable digital transport solutions with granularity and reliability. In conjunction with existing products, C-COR's PLEXis line can now offer up to 40 wavelengths per fiber, supporting various line rates including 1, 2, 8 and 10 Gbps of Ethernet traffic per fiber, as well as Sonet, QAM and other protocols.

The new products are supported by the company's Crystal Network Management System, which provides performance information, including link status and capacity utilization.

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C-COR's PLEXis



change + hp

The spinoff that acted like a startup.

Avaya, a global leader in communication software, systems and services, spun off from Lucent with a legacy IT infrastructure that, while efficient, wasn't nimble enough to be a competitive advantage. HP partnered with Avaya to implement IT Service Management and HP OpenView, effectively re-deploying existing technology assets. Today, IT spending is down 30%. Millions have been saved by finding unused capacity. And Avaya answers whenever opportunity calls. www.hp.com/adapt

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nextmonth

ARTICLES

CED's February issue brings you everything from old-school telephony to the New Year's upcoming consumer products to the technologies on the near horizon.

Circuit-switched telephony—Is there a place for it?

Sure, VoIP is currently enjoying most of the water-cooler buzz at cable plants, as well as inclusion in the strategic plans and rollout strategies of the big MSOs. But what about good old circuit-switched? Is this technology truly on its last legs, or might there be a niche for it, especially among smaller cable operators seeking to get into the voice game?

SCTE's Conference on Emerging Technologies

What innovations are waiting in the wings to take the cable spotlight in the next five years? Will Paul Allen's keynote provide a clear picture, or will other sessions start to bring things into focus? CED's editorial team will be on hand to report the results when the discussions turn to the implications of IPTV, fiber-to-the-home, wireless broadband, mobile video, bandwidth management and DOCSIS channel bonding.

2005 International CES—A report from the floor

The CED editorial team will be all over the halls and in the many sessions of the huge annual Consumer Electronics Show. What cable-related products and services will enjoy an increased profile in the retail sector for 2005? Will OCAP and Plug & Play make further strides among the mass marketers? CED's coverage will break through the noise at this incredibly diverse show to zero in on exactly what matters to you.

Plus: A PacketCable Multimedia Pull-out Wallchart

CED

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Mobile multimedia—the next big thing?

Suppose you could buy a nationwide TV channel—say, for example, channel 55 (716-722 MHz)—what would you do with it? Use it for video? Use it for mobile communications? How about mobile multimedia? That's what Qualcomm decided to do with it.

This story starts in 1991, when the FCC established a "Pioneer's Preference" program as an incentive for development of new wireless technology. The idea was that companies that developed new technology could be granted wireless licenses as a reward, without having to compete for the licenses in an auction. In 1993, the FCC awarded four preferences, but denied a Qualcomm request. Qualcomm, the inventor and developer of CDMA cellphone technology, went to court. Finally, in 1999, the U.S. Court of Appeals ordered the FCC to award a preference to Qualcomm (in the form of a voucher worth \$125 million in any FCC spectrum auction), and Qualcomm used it in FCC Auction

and integrate this technology into the CDMA cellular chipsets it already supplies. (So maybe it's an opportunity for Verizon and Sprint, but I wonder where this leaves Cingular and T-Mobile.)

But Qualcomm faces some challenges because of incumbent TV stations on channel 55. There are about 25 to 30 TV stations on channel 55, either existing analog or new digital stations. Most are east of the Mississippi River. A coverage map that the FCC published in 2001 shows TV "protection zones" that blanket the whole eastern part of the U.S., plus Texas, Los Angeles and San Francisco. Analog broadcasters will eventually have to vacate this spectrum, but the date is uncertain. Broadcasters with digital allotments in this range will eventually have to move to a channel in the 2 to 51 range. But the duration of this transition period is uncertain, and meanwhile, Qualcomm's plans for channel 55 are encumbered. So don't expect to see MediaFLO in operation before 2006, at the earliest.

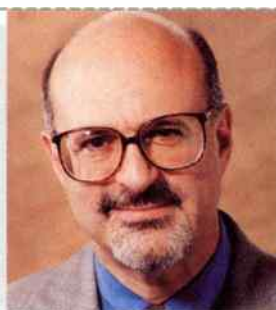
Does this put the U.S. ahead of the rest of the world? Probably not. There are already mobile multimedia activities underway in Europe, Japan and Korea. In Europe, they call it DVB-H. In Japan, it's ISDB-T. In Korea, T-DMB. They all have some similarities, and some differences. They all use MPEG-4 advanced video coding, not MPEG-2, and tiny screens. They will all use some form of COFDM modulation. But the channel frequencies and channel bandwidths differ.

The Radio Sector of the International Telecommunications Union has established working party 6M within Study Group 6 to work toward international standards for mobile multimedia. But Study Group 6's approach to international standards for digital TV broadcasting was to endorse them all: DVB for Europe, ISDB for Japan and ATSC for the U.S., Canada, Mexico and Korea. So don't expect to see one single mobile multimedia technology for worldwide use.

Technically, mobile multimedia should work, although battery capacity is still a challenge. But the big question is whether there is a marketplace demand. An Internet search reveals plenty of conferences and workshops. There's a buzz, no question about it.

But I wonder. Over-the-air TV service is free, and cable TV is a flat monthly price regardless of usage, but cellphone service is priced by minutes of use. A multimedia service that's sold as an add-on to cellphone service may also be priced based on minutes of use. That will depress demand. Or they may price it at a flat rate per channel. And think about that tiny display. And speakers smaller than any laptop's.

Mobile multimedia won't compete with off-air broadcasting or cable TV or DVDs. It won't compete with laptop access to the Internet. It's an entirely new market, and proponents will have to create entirely new demand. The folks who developed the BlackBerry figured out how to do that. The folks who developed Iridium didn't. ■



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No. 49 to buy TV channel 55.

Earlier this year, Qualcomm announced that it would use this spectrum to deliver mobile multimedia service, calling the service MediaFLO. (FLO stands for Forward Link Only.) You can envision a video distribution service, displayed on a portable receiver with a small screen, with a program guide, allowing access to a combination of previously-downloaded and live streaming video. Having the programming downloaded and stored in the receiver is important, because real-time streaming to a mobile device is subject to the vagaries of signal propagation. ("Can you hear me now?") It will be interactive, in two senses. First, users can interact with the program guide to select a program, just like a cable TV subscriber can. But in addition, the receiver will be a cellphone, with two-way access to the Internet.

The Qualcomm service is designed to transmit 50 to 100 separate national and local channels for caching in the receiver (although storage capacity in the receiver may be a constraint), plus up to 15 live streaming channels. Video will be transmitted using advanced MPEG-4 coding at one-quarter VGA resolution (160 or 176 x 120), requiring about 1 Mbyte per minute of storage. Qualcomm plans to partner with CDMA cellphone operators

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