

Growth Prospects

AN AN STAFF REPORT

12 opportunities that will show revenue increases of 30% or more this year

Opportunities seemed infinite at the peak of the telecom boom just three years ago. Together, technology breakthroughs and industry deregulation seemed to have created a fertile ground in which any good idea could quickly grow.

Today's telecom landscape, of course, is completely different — and growth areas may seem as rare as a four-leaf clover. Look close, though, and you'll find a number of opportunities that are beginning to take root. Some, like

seedlings, are just beginning to emerge: New opportunities such as inter-carrier messaging and homeland security are just starting to get noticed. Other opportunities — such as broadband wireless and telco video — may have had a disappointing start but, like a bud set to open, are showing signs of new growth. And others — such as IP Centrex and network-based VPNs — remind us that, although we're in a slow season, technology advances are still occurring.

Of course, growth in one area sometimes comes at the expense of another.

Just as a garden must be thinned for new plants to grow properly, service providers may need to attack some of their existing product lines to maximize their overall potential.

That trade-off is just one of the issues that the *America's Network* editors consider in the pages that follow, where we analyze 12 telecom opportunities that are poised for growth this year. Also included is our take on why they're taking off now, how fast they're growing, and who stands to benefit most from each opportunity.

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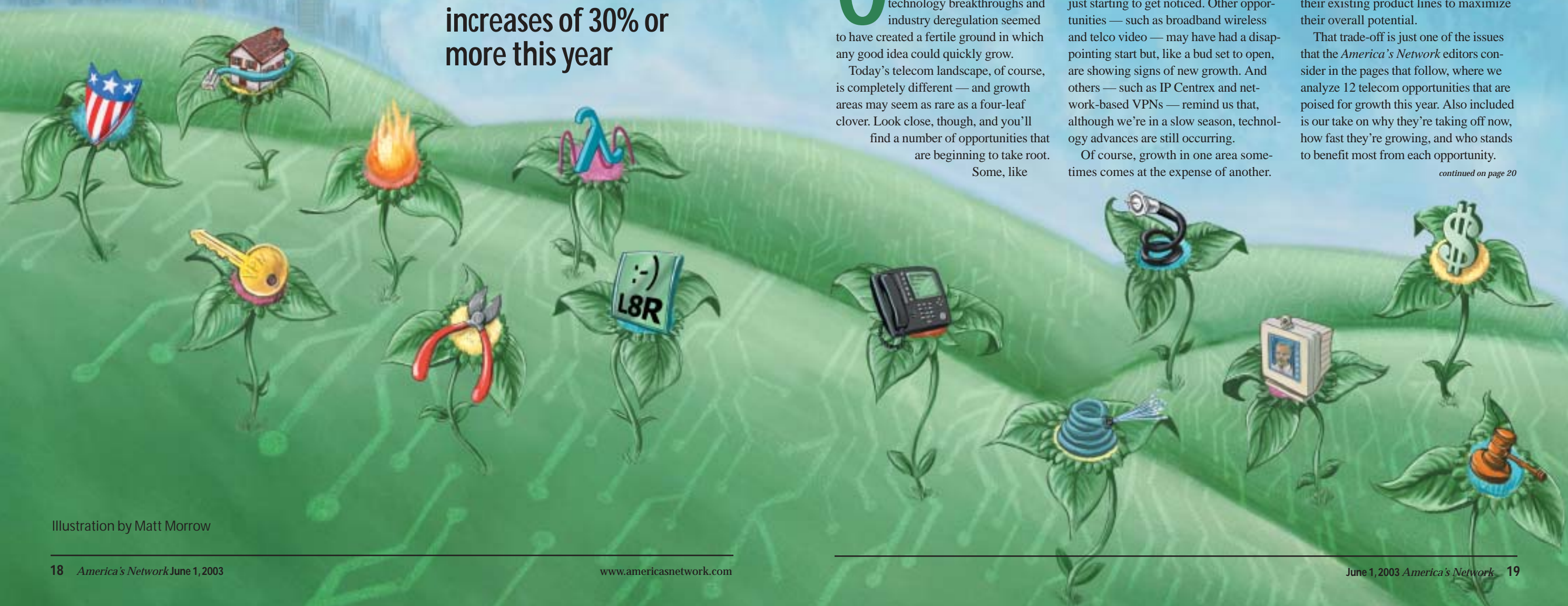


Illustration by Matt Morrow

Taking root

Three technologies that are actually living up to expectations



VPNs find their network niche

THE OPPORTUNITY: Network-based virtual private networks (VPNs) leverage service provider IP infrastructure and can be an easier-to-use alternative to traditional ATM and frame relay offerings

ANNUAL GROWTH RATE: IDC expects the managed VPN market to climb from around \$2.5 billion in 2003 to more than \$3 billion for 2004 — and to reach \$5 billion by 2006.

WHY IT'S TAKING OFF NOW: MPLS has matured to the point where service providers are comfortable offering services based on it. Service providers also may be

motivated by operational efficiencies that MPLS brings to the core network.

POTENTIAL WINNERS: Just about every carrier now offers network-based VPNs. None has a dominant market share. RBOCs likely will have the largest net gain, as long-distance carriers with large installed ATM and frame relay bases will experience some cannibalization.

POTENTIAL LOSERS: VPNs will largely displace ATM and frame relay revenues — and whether traditional ATM and frame vendors can deliver appropriate MPLS- and IP-based replacements is unclear.

Considering all the issues involved, the recent success of network-based virtual private networks (VPNs) should come as no surprise. What could be more appealing than a technology that solves operational problems for the service provider — but can be positioned as a solution to a somewhat different problem for the end user?

For end users, network-based VPNs can be an easier-to-manage alternative to traditional ATM and frame relay offerings, particularly when multiple locations must be interconnected. To support these offerings, many carriers plan to use multi-protocol label switching (MPLS), which sets up customer-dedicated paths through an IP network, (although alternative approaches based on other Internet protocols, such as Layer 2 tunneling protocol or IPSec also are being deployed).

Considering how closely capex spending is watched in today's market, however, the lure of new revenues alone may not be enough to drive carrier deployments, especially when some of those revenues merely displace what would

otherwise be spent on existing services.

What adds to the appeal of network-based VPNs for the service provider is that the infrastructure to support them also paves the way to the multi-service network — a single converged data network carrying IP and legacy ATM and frame relay protocols. Ultimately, even voice traffic may cease to require a separate network.

Certainly carriers today have a strong desire to future-proof their networks. But even that benefit may not always make a powerful enough case for VPN deployment in today's "get results quick" environment. What may seal the deal — for an MPLS-based approach, at least — is the simplified virtual circuit management that MPLS brings to the table, in comparison with ATM. Essentially, MPLS enables carriers to roll many more virtual circuits into a single circuit at the core, enabling the carrier to manage them as though they were a single circuit. That's a powerful capability, especially as carriers get more serious about offering DSL (which requires a virtual circuit for each user) on a broad scale.

At the same time that carriers have an incentive to deploy network-based VPNs, however, they also have strong reasons to eke as much revenue as possible from their installed base of tradition-

Service provider VPN strategies

AT&T	Plans to converge all of its data networks worldwide onto a single MPLS-enabled IP backbone by 2005. Will not buy an off-the-shelf edge device, but wants to work with two established vendors to drive development.
BellSouth	Offers Layer 3 VPNs over a regional MPLS-enabled IP backbone.
MCI	Offers Layer 3 VPNs over MPLS. Has not yet announced plans to migrate all data traffic to an MPLS core.
Qwest	Emphasizes network-based IPsec VPNs based on Nortel Shasta boxes. Has MPLS-enabled its IP network primarily for route protection.
SBC	Plans to offer Layer 3 VPNs over an MPLS-enabled IP network. Frame relay and ATM traffic will go over an ATM backbone, but eventually that traffic may move to the MPLS core.
Sprint	Offers Layer 2 VPNs using L2TP. Does not plan to MPLS-enable its IP network.
Verizon	Will offer Layer 2 and Layer 3 VPNs over an MPLS-enabled IP network. Initially frame relay and ATM traffic will go over an ATM core. But eventually that traffic will migrate to the MPLS core.

ANGraphic

al data infrastructure. Indeed, much of the infrastructure debate in recent months has focused on how to tie in existing frame relay and ATM infrastructure with a multi-service core.

Carriers may be particularly cautious about pushing Layer 2 VPNs, which offer the most direct replacement for ATM and frame relay services. Several carriers have chosen initially to offer only Layer 3 VPNs, which can carry IP traffic, but not legacy data protocols such

as SNA — and which require a router as the customer premises equipment.

How quickly VPNs catch on will depend not only on end user demand but also on how aggressive service providers become about transitioning to a multi-service network, which, in turn will depend on the degree of operational benefits that the service providers derive from that approach. —

Joan Engebretson



Wi-Fi: The great footprint footrace

THE OPPORTUNITY: In a classic "build it and see what happens" strategy, Wi-Fi providers and aggregators are taking advantage of the low cost of 802.11 gear by planting hot spots across the North American landscape.

ANNUAL GROWTH RATE: 130% (In-Stat/MDR)

WHY IT'S TAKING OFF NOW: Wi-Fi is seen as a clever alternative to land-locking broadband Internet users with wired connections. Access ubiquity is essential to realizing the Wi-Fi dream.

POTENTIAL WINNERS: Sellers of Wi-Fi components, Cisco Systems, Symbol, Net-Gear and Proxim

POTENTIAL LOSERS: Wireless carriers with slow-moving Wi-Fi programs — Cingular and Sprint PCS

Although members of the Wi-Fi community may turn out to be this year's poster children for over-hyping a technology, at least one component of Wi-Fi's emergence does genuinely fit in the category of "explosive."

Commercial hot spots sites are proliferating at a rate of more than 10% per month. This is largely due to a concentrated effort by Wi-Fi providers to make the technology as ubiquitous as possible.

One provider, Bell Canada, has tried retrofitting existing pay phones with Wi-Fi components, painlessly creating hot spots in key, high-traffic locations. The pay phone trial is the result of a

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Bell Canada is currently testing a platform that converts existing pay phones into Wi-Fi hot spots.



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partnership with InCode Telecom, a San Diego-based consultancy.

"A lot of pay phones are naturally in places where people are," says Eric Carr, an InCode product manager. New hot spots have been established in all kinds of settings, including airports, municipalities, train stations and even parks.

Bell Canada isn't saying much about the trial at this point, only noting that one of the trial's key features — that access is free — will not be part of a commercial deployment.

Fierce debate continues about the economics of drawing revenue from Wi-Fi users. Yet, there is little doubt that the number of actual hot spots will mushroom during the next several years.

"While the number of hot spot venues has increased from several hundred to tens of thousands worldwide, usage has not grown at similar rates," says In-Stat/MDR analyst Amy Cravens. "Connects per location, per day remain very low, especially in the café and retail venues."

A key sponsor of the U.S. buildout

will likely be Cometa, the powerhouse Wi-Fi alliance of AT&T, IBM and Intel. Cometa is working with restaurants chains such as McDonald's, hoping to potentially turn more than 30,000 locations into McSurfing shops.

Others crusading for Wi-Fi are Wayport (about 550 current locations), Boingo (1200 sites in 300 cities) and T-Mobile (more than 2400 sites). In-Stat/MDR estimates that by 2007, there will be about 30,000 hot spots in North America. — *Kirk Laughlin*



IP Centrex: a defensive play

THE OPPORTUNITY: A carrier-delivered service that replicates the productivity enhancements of an IP-based PBX system

ANNUAL GROWTH RATE: U.S. IP Centrex service revenues (not including Centrex IP) will double from a small base of \$37.2 million per year for 2002 to \$74.4 million for 2003, according to In-Stat/MDR, climbing to \$442 million by 2005.

WHY IT'S TAKING OFF NOW: VOIP has caught on in enterprise PBX systems in a big way. IP Centrex is a logical extension of that trend.

POTENTIAL WINNERS: Vendors such as Broadsoft, Sylanro and VocalData. Niche providers such as GoBeam and Telveise. Traditional carriers may simply shift revenues from other services such as conventional Centrex — but may have the added benefit of improved margins.

POTENTIAL LOSERS: This may be the death knell for conventional Centrex services, which were disappointing from the start.

Centrex — a carrier-delivered service that replicates the functionality of an IP-based PBX system that interfaces with an enterprise's local area network. Enterprise use of IP PBXs has skyrocketed in recent years, endangering carriers' traditional Centrex and business line base.

In response, service providers essentially have three routes open to them.

One route is to deliver existing Class 5 Centrex offerings over IP, enabling customers to use user-friendly IP phones — an offering sometimes dubbed "Centrex IP," rather than "IP Centrex." Although Centrex IP may be a quick fix, its limitation is that end users can only receive traditional Centrex functionality.

Alternatively, a full-blown IP Centrex offering uses either a softswitch or an IP gateway to connect to an application server that can deliver a wide range of value added features.

"The main advantage over regular Centrex is the productivity aspect," says Derrick Richburg, global solutions manager for Surpass Business Connection for Siemens. "It also gives enterprise users more control over their personal telecommunications management."

For example, tight coupling of the

phone and computer networks enables end users to use listings from programs such as Microsoft Outlook in combination with "click to dial" functionality.

A third option is for service providers to offer IP Centrex through a partnership with another company that owns the service delivery infrastructure — an option that Verizon is trialing in Chicago with GoBeam.

To date, most IP Centrex deployments have been by niche players such as GoBeam and Telveise. But competitive carrier ICG recently completed a nationwide rollout using VocalData equipment. And many industry players are expecting the biggest growth to occur when the Bell companies begin serious IP Centrex deployment in the second half of 2004. — *Joan Engebretson*

Telecom attorneys fast facts:

70.5% of members of the Federal Communications Bar Association are based in the national capital region (DC, Maryland & Virginia)

75.3% are in a private practice setting, **13.8%** in government and academic settings, 4.6% in trade associations, and the remainder in some other type of practice



The growth area we're not so proud of: telecom attorneys

The Federal Communications Commission's triennial review decision, issued earlier this year, had the dubious distinction of pleasing absolutely no one — except possibly the legal community. The Commissioners themselves acknowledge that the order will be challenged in court, and at one point, Chairman Michael Powell called it a "full employment act for telecommunications lawyers." The final order, which had not yet been released at press time, is said to be over 800 pages of dense legalese.

Not that the legal profession hasn't benefited from the telecom regulatory roller coaster of the last few years. According to Greg Sidak, resident scholar at the American Enterprise Institute and former FCC deputy general counsel, the number of telecom lawyers has increased by 70% since 1996. "What I take away from that is that deregulation has actually increased regulation, and increased how much public and private clients that come before the FCC have to pay in legal fees," Sidak said at a press event last year.

Sidak's number doesn't include the countless attorneys from other areas of law — such as litigation, bankruptcy, antitrust and M&A — who have worked on telecom cases over the last few years, but aren't truly telecom attorneys. As Reed Smith attorney Rob Jackson puts it, "there are telecom lawyers and there are telecom lawyers. I've always felt that in order to be a true telecom lawyer, one must have had his or her nose bloodied a time or two before the FCC or a state PUC." — *Shira Levine*

In a recent FCBA survey, respondents said they spend **21%** of their time on wireless matters, including satellite; **18.3%** on federal common carrier issues; **17.7%** on non-cable mass media and **12.0%** on state and local common carrier work.

source: Federal Communications Bar Association



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From left field

Three underappreciated opportunities that are beginning to turn heads



Homeland security: new threats, new network demands

THE OPPORTUNITY: Sept. 11 has driven the federal government to ensure that it has the communications systems in place to respond quickly and appropriately to another terrorist attack. In addition, federal, state and local agencies, as well as private enterprises, are looking for better ways to secure their communications networks against intrusion.

ANNUAL GROWTH RATE: Specific projections aren't yet available for this nascent opportunity, but Aberdeen Group says there is \$3.5 billion in funding available for technology and equipment for first respon-

ders and \$700 million for intelligence-gathering and information-sharing systems.

WHY IT'S TAKING OFF NOW: The Homeland Security Act of 2002, passed late last year, has made a significant chunk of money available for security-related telecom products and services.

POTENTIAL WINNERS: Carriers with existing relationships with local and federal governments stand to benefit the most. Hot technologies within this space include radio systems for first responders, wireless priority systems and telematics.

When the telecom industry was booming just a few years ago and the possibilities for expansion seemed infinite, no one would have expected that one of the hottest opportunities for service providers would be helping protect our nation against attack — yet here we are.

That's not to say that security is a new market for carriers. Service providers have "a wealth of experience" in dealing with security and business continuity that is often underestimated, says Elroy Jopling, principal analyst at Gartner Group. "Before homeland security and before 9/11, carriers had security and business continuity services, but quite frankly, they never marketed them," says Jopling. "They've been dealing with natural disasters for decades upon decades."

Those positioned to benefit most immediately from the homeland security push are carriers that have existing relationships with the government. Sprint, for example, has leveraged its existing FTS2001 contract with the federal government, which was awarded back in 1998. The carrier has since added new products and services, including enhanced video service, DTS OC-n private line service and co-location services, and began offering managed secu-

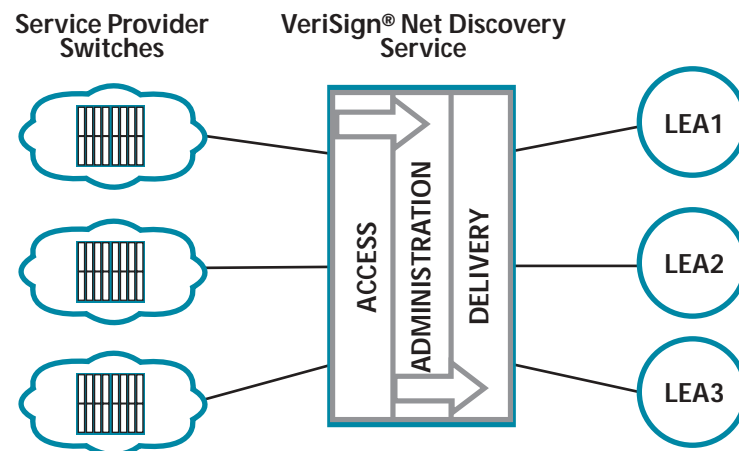
rity services last month. In addition, Sprint began marketing its services to state and local governments last year and now has more than 30 state contracts.

Interconnection and interoperability are other areas where service providers can stand to benefit. Last summer, for example, VeriSign launched its NetDiscovery service, a turnkey solution for carriers trying to comply with the Communications Assistance for Law Enforcement Act (CALEA), which requires carriers to sup-

port the ability of law enforcement agencies to conduct surveillance of all call content and call data. CALEA was passed in 1994, but the USA Patriot Act, passed last year, expanded the scope of CALEA by enabling interceptions to be made on a single person across multiple carriers and services. NetDiscovery manages the intercept process, administers the intercept data event, converts call data into a required legal intercept format, then delivers the data directly to the law enforcement agency. While NetDiscovery was originally developed for voice service alone, VeriSign expanded its capabilities to include support for wireless data networks.

The beauty of NetDiscovery, says Raj Puri, vice president for the service, is that carriers do not need to upgrade their systems or maintain dedicated staff, and law enforcement agencies do not need to establish connections to multiple service providers. "We become the demarcation and delivery point among all different law

One-Stop CALEA Compliance



VeriSign has expanded NetDiscovery to support wireless data networks as well as voice.

enforcement agencies and carriers," Puri says. "Traditionally, a single law enforcement agency might have to deal with hundreds of service providers individually. We streamline the process by acting as a hubbing service for them."

Vendors can also benefit from the recent focus on interoperability, says Dan Bart, senior vice president of standards and special projects at the Telecommunications Industry Associa-

tion. TIA has worked with the public safety community since 1993 on Project 25, a long-term standards development initiative for digital public safety wireless communications. Bart says that since Sept. 11, he has seen interest both from new sectors and in new technologies, particularly broadband.

"We're dealing with the first responder community to come up with the equipment that they need," Bart says.

Puri believes that service providers should start taking a similarly proactive role in their relationships with government agencies. Service providers could offer to work with the department of homeland security to determine their response to different levels of emergency threat, so that certain services could be given higher priority — *Shira Levine*



Inter-carrier messaging: Precursor to bigger things

THE OPPORTUNITY: SMS traffic is growing at a rate of more than 20% per month. Between 25% and 40% of those message are of the inter-carrier variety, enabling revenue to flow more evenly from carrier to carrier.

ANNUAL GROWTH RATE: 30% a month (Yankee Group).

WHY IT'S TAKING OFF NOW: Awareness of SMS is just beginning to take hold. Marketing campaigns and alliances with entertainment and media outlets are adding to the buzz.

POTENTIAL WINNERS: Carriers engaged in interconnection agreements, including all six of the major U.S. operators.

POTENTIAL LOSERS: Smaller carriers yet to participate in interconnections.

to anticipate that great things lie ahead.

U.S. operators need only peer across the Atlantic to imagine the possibilities. More than 56% of European wireless subscribers are SMS users, texting their way into the coffers of Continental carriers to the tune of \$12 billion annually.

The two markets may be very different, but intercarrier platforms are important drivers in both regions. "The inter-carrier piece gave a real shot in the arm for SMS in the U.S.," says Yankee analyst Linda Barabee, who estimates average monthly inter-carrier SMS traffic volumes are increasing at a rate of 30%.

Intercarriage pacts have been in place for about a year in the U.S. Getting carriers with different air-interface standards and competing agendas to agree was a difficult process. On top of that, the U.S. market is locked in fierce combat. Price erosion and steady churn are symptoms of the intense competition.

But the arrival of interconnection seemed to symbolize a major step toward greater cooperation. Few would argue that more revenue could be generated from users if the industry found more ways to collaborate. The current shortcodes initiative, which would permit content creators to distribute media and entertainment-related material to a single wireless "channel," is beginning to take shape.

Waiting in the wings is another service that also needs to be addressed collaboratively — MMS, or multimedia messaging.

Many in the industry expect the "viral" nature of SMS to eventually take root. "There are still a lot of people who don't know you can do this," says Robert Florack, vice president of network services at VeriSign, which along with InphoMatch, supplies carriers with the gateways to transmit messages to other providers. — *Kirk Laughlin*



Revenue assurance plugs carrier cash drains

THE OPPORTUNITY: Eager to reduce opex, carriers are looking for solutions to stop revenue leakage.

ANNUAL GROWTH RATE: 36% growth over the next two years (Technology Research Institute).

WHY IT'S TAKING OFF NOW: Despite the industry downturn, competition remains fierce in many markets, forcing carriers to streamline their

operations and cut costs wherever they can.

POTENTIAL WINNERS: (carriers, vendors, etc.) Revenue assurance vendors such as Connexn and Vibrant Solutions, as well as other OSS vendors able to add revenue assurance capabilities to their existing products.

POTENTIAL LOSERS: Systems integrators and consultants, who risk losing business to commercial off-the-shelf products.

This opportunity is a bit unusual because, unlike the others that we've covered here, it isn't a new service. It does meet our criteria of increasing service provider revenues — but it does so indirectly.

Industry analysts estimates that carriers lose between 3% and 11% of gross revenues each year from disaggregated

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systems and manual processes, which can represent an industry-wide annual loss of up to \$143 billion. Forced to tighten their belts in these lean times, carriers have begun to look closely at revenue assurance solutions, particularly those that can promise a quick return on investment. Vendors in the revenue assurance space say that they're now meeting with CEOs, CTOs and executive vice presidents within the carriers, as opposed to

the lower-level revenue assurance managers they met with a few years back.

Most commonly, revenue assurance solutions identify holes in revenue, where revenue is being improperly accounted for, or the service isn't been billed for at all. But vendors operating in other spaces, such as mediation, billing and provisioning, have begun marketing their products as revenue assurance solutions, drawn by a market opportunity that Technology Research Institute estimates could be

worth nearly \$1.4 billion in 2005.

"The '90s were all about ARPU, fast growth, expansion," says Jason Briggs, senior analyst at the Yankee Group. "Revenue assurance was seen as something that would inhibit growth. But carriers realize now that if they're looking to grow revenue, they need to do it by either pushing services to existing customers or by decreasing their costs. [Revenue assurance] is a hot marketplace right now." — *Shira Levine*

Late bloomers

Overhyped during the boom years, these tenacious technologies still have potential



Broadband wireless: Breaking into the big leagues

THE OPPORTUNITY: Broadband wireless is poised to provide another high-speed passageway to homes. Demand for broadband is estimated to nearly double in the next three years, rising from 30% of online households this year to 52% in 2006.

ANNUAL GROWTH RATE: 42% (The Insight Research Corp.)

WHY IT'S TAKING OFF NOW: Second generation wireless broadband equipment is non-line-of-sight, performs better in adverse environments and is more economical than earlier classes of equipment. Rivals of cable MSOs are also anxious to compete for market share.

POTENTIAL WINNERS: Verizon, BellSouth, Sprint, ISPs, BeamReach, Navini, Aperto and IPWireless.

POTENTIAL LOSERS: Major broadband cable providers who could lose market share, Comcast, Cox and Cablevision.

Only two years ago broadband wireless looked like it was headed toward an early grave.

Sprint, which had earlier championed the technology, pulled the plug on future trials. Incumbent interest was nowhere to be found and vendors began to intensify their focus on markets outside the U.S.

Great hopes for broadband wireless

came crashing to the ground, primarily because carriers were unwilling to invest in systems that required line-of-sight between transmission towers and end-user receivers.

By mid-2002, a new generation of non-line-of-sight equipment was beginning to attract attention from a pair of highly influential suitors — Verizon and BellSouth. Interest from both companies recharged broadband wireless. Suddenly the sector had newfound legitimacy, which has translated into a significantly more promising growth outlook.

"We are getting to the point where the technology is starting to make sense," says Bernard Aboussouan, vice president of marketing at BeamReach, whose equipment Verizon has been trialing since last August in Northern Virginia. "The economics are more favorable."

BeamReach is preparing for "volume production" of its BeamPlex system in apparent anticipation of a long-term contract with Verizon, which recently submitted an RFP to prospective suppliers. BeamPlex uses OFDM technology to source spectrum efficiently and in a manner which yields a high degree of capacity within each cell. Carriers need about 10 MHz of licensed spectrum to

deploy the solution, which relies on 2.3 GHz (WCS) and 2.5 to 2.7 GHz (MMDS) spectrum. The system supports data speeds of 1.5 Mbps downstream and 1.2 Mbps upstream.

Verizon sees broadband wireless as providing a means to increase coverage of DSL-like services, says Brian Whitton, Verizon's executive director of access technologies.

Speaking at the recent Broadband Wireless World conference, Whitton identified several data-rich applications that he believes will drive interest in broadband, and as a result create more incentive for adoption of alternative access technologies. Services with strong potential include: interactive games, Web casts, packet telephony, streaming video and video conferencing, says Whitton.

Broadband wireless is beginning to emerge chiefly as a complement to DSL. With an estimated 20% to 40% of the nation's local loops requiring some form of conditioning or upgrading to enable reliable DSL or ADSL, the major incumbents are becoming aware of a gap between perceived service availability and actual availability.

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Bill Smith, BellSouth's CTO, has been a public advocate of fixed wireless for this very reason. He believes in the technology, stressing that it is among the tools BellSouth wants to possess to overcome provisioning hurdles.

It's no surprise that the RBOCs are putting partner suppliers through the paces. The BeamReach trial has taken place during a horrendous winter on the East Coast. BellSouth's ongoing trial with Navini in Daytona Beach, Fla., is in an area rife with satellite interference.

The BeamReach equipment performed well throughout the winter, Aboussouan says. He notes, however,

that signal attenuation issues seem to surface when rain remains on vegetation in cell coverage areas.

Sprint, which jumped back in the broadband wireless ring last year, is currently trialing equipment from Navini and IPWireless.

Other suppliers scouting for North American business are Alvarion, Clearwire and Arraycomm, which recently told America's Network that it anticipates a U.S. deployment of its i-Burst technology sometime next year.

The Insight Research Corp., an industry analyst firm, estimates that broadband wireless in North America will grow at a 42% annual rate for the next

four years to a \$2.2 billion market.

Part of that growth is also expected to come from wireless Internet service providers (WISPs) who number more than 2,000 and continue to quietly roam rural America seeking broadband-thirsty households. The WISP community is comprised mostly of small operators who cover individual towns or suburban areas.

Tony Kobrinetz, vice president of Motorola's Canopy wireless broadband products, sees the WISP market growing incrementally as more providers become aware of the advantages of rapid provisioning.

— Kirk Laughlin



Telco video services: Still seeking the triple play

THE OPPORTUNITY: End users and service providers are recognizing the appeal of the triple play of voice, video and data over a single connection.

ANNUAL GROWTH RATE: 45% (Wainhouse Research)

WHY IT'S TAKING OFF NOW: As IP technology and DSL technology continue to improve and as consumers continue to want more broadband services, video services are the next logical commodity on wish lists. Telcos also want to defend themselves against cable companies armed with a triple threat offering.

POTENTIAL WINNERS: Rural carriers have learned that video revenues can mean the difference between a viable and non-viable broadband deployment project. RBOCs, are you listening?

On the vendor side, MidStream Technologies, Net Insight, Next Level, Myrio, Minerva Networks, Big Band Networks and Net to Net Technologies all stand to gain.

POTENTIAL LOSERS: Cable companies may lose significant share when telcos begin offering video services — but are seeking to pre-empt them with video-on-demand offerings.

in rural areas has contributed to VDSL's popularity there.

The impending telco threat hasn't gone unnoticed by cable companies, which are seeking to pre-empt the telcos by offering video on demand. VOD is the top new service that MSOs are offering, says Ed Huguez, president and CEO of VOD vendor MidStream Technologies. "This is a critical service that differentiates cable operators from say, satellite providers because they can't do video-on-demand just yet."

Although MidStream mainly serves cable MSOs, it is also seeing interest from telcos, Huguez says.

IP television also is seeing growth. Minerva Networks has 15 telco customers in the United States, and not surprisingly, IP TV initiatives are under way in Asia. — Suzanne Sanders

Independent rural telcos are blazing a path with video over copper offerings, which, in essence, let them offer the triple threat of voice, data and video (America's Network, Feb. 15, page 24). The RBOCs have been a little behind the curve, but continue to investigate alternative deployment options — and as with many services, the biggest jumps in growth are likely to occur when the RBOCs join in.

The challenge is that the ADSL lines that dominate telco broadband deployments cannot support video. That's because most ADSL services run at 1.5 Mbps, and broadcast-quality video needs at least 2 Mbps per stream. Rural

carriers have turned to VDSL, which offers speeds between 13 and 50 Mbps both upstream and downstream. But VDSL, which requires fiber in the loop, is a more costly deployment option — particularly in metropolitan areas. Ironically, the relative ease of laying fiber

VDSL Applications

VDSL applications	True multimedia	High-speed Internet access
video on demand	broadcast digital TV	distance learning
telemedicine	interactive video	video conferencing
HDTV	electronic commerce	electronic publishing
intranet and telecommuting	video games	karaoke on demand

Source: International Engineering Consortium



Voice over cable: The best defense is a good offense for MSOs

THE OPPORTUNITY: By offering voice services, cable companies can more effectively compete with telcos, who in turn, are attacking the CATV market.

ANNUAL GROWTH RATE: 50% (In-Stat)

WHY IT'S TAKING OFF NOW: Voice over cable options based on softswitches have matured to the point where cable companies are comfortable deploying them

POTENTIAL WINNERS: Comcast and Cox have an early lead

POTENTIAL LOSERS: RBOCs, who stand to lose more ground in the broadband battle to cable companies when cable becomes a one-stop shop

In much the same way that telcos view video as a defense against cable companies, the cable companies view voice services as a defense against the telcos.

Voice over cable has been available on a limited scale for years. But many industry observers are predicting that it

will finally begin to take off soon, driven in part by more economical softswitch-based solutions.

In-Stat Research predicts that worldwide cable telephony revenues will rise from \$1 billion in 2000 to more than \$6.5 billion in 2005 (see figure).

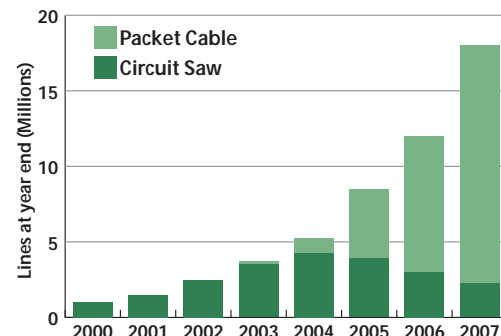
"When looking at cable and voice, Comcast and Cox have switch-based voice services and have been quite successful," says Jonathan Hurd, vice president at ADVENTIS.

Comcast has one advantage, he says, in that it inherited a voice infrastructure from AT&T Broadband.

"Ultimately, no one will be left behind," Hurd says. "Of course some operators have more precarious financial situations than others," he says. Adelphia's new

U.S. voice over cable forecasts

(in service at year end, millions of lines)



Sources: DeutscheBank Alex Brown, SalomonSmithBarney, Siemens estimates

management has some work to do, as does Charter, he adds.

But perhaps the smartest thing the cable companies have done is to work closely together through CableLabs to ensure interoperability and, even more importantly, economies of scale. —
Suzanne Sanders

Ahead of the curve



Thought these opportunities were still some years down the road? Think again

Wavelength services: Right time, right niche

THE OPPORTUNITY: Carriers want a lower-cost means to provide high-capacity transport on long haul and metro routes. Enterprises are more frequently choosing to purchase lambdas instead of dark fiber, creating a gap in service demand that carriers are beginning to fill.

ANNUAL GROWTH RATE: 37%, climbing from \$308 million in 2001 to nearly \$1.6 billion in 2007 (Pioneer Consulting)

WHY IT'S TAKING OFF NOW: Wavelength services are positioned to revolutionize wholesale network services as enterprises and carriers begin to see inherent economic advantages.

POTENTIAL WINNERS: Wavelength service providers, BellSouth, SBC, AT&T, Level3, MetroMedia Fiber Networks, and WilTel

POTENTIAL LOSERS: Owners of dark fiber capacity, Level3, MetroMedia Fiber Networks and WilTel.

Wavelength services seemed to arrive at just the right time for carriers and enterprise customers seeking alternatives to purchasing dark fiber links.

They are providing a new path for carriers to transparently extend their

reach into specific metro markets without the sort of capex hangovers associated with facilities-based buildouts. Enterprises are drawn to wavelength services because of rapid provisioning and the ability to scale up or down depending on

bandwidth needs.

The depressed economic condition of the telecom market has probably also aided wavelength services to some degree, argues Pioneer Consulting in a report released earlier this year. "There is reason to believe that the current downturn has provided incentive for customers to adopt wavelength services," the report states. "Because customers of network capacity are seeking less expensive alternatives to current lease arrangements, the lower price points associated with wavelength services have allowed them to gain a certain measure of acceptance."

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Acceptance is clearly fueling growth of such services, despite what some describe as a half-hearted effort by RBOCs to sell lambdas. Most of the early growth in wavelength services has been in the long-haul area, where providers like Level3, Wiltel (formerly Williams Communications) and Global Crossing have pounced on opportunity.

Wavelength services are percolating, albeit more slowly, in the metro. The four major RBOCs are pitching services in slightly different ways.

The BellSouth offering, for example, splits transmission paths on single strands of fiber. Each digital optical signal can be set for any of the popular data speeds, all the way up to 2.5Gpbs.

To maximize their growth potential,

wavelength services may rely on the industry at large to be more persuasive about adoption. "Carriers will find it difficult to sell wavelengths until customers clearly understand the advantages and ROI they will receive from choosing the service," says Nicholas Maynard, an senior analyst at the Yankee Group. —

Kirk Laughlin



Home phone line networking: Now within reach

THE OPPORTUNITY: By networking multiple computers in a home together using existing phone wiring, family members can share a single broadband connection, fueling service provider loyalty and driving demand for higher speed connections.

ANNUAL GROWTH RATE: 95% (The Yankee Group)

WHY IT'S TAKING OFF NOW: Standards are emerging, and growth is coupled with the continued growth of broadband access.

POTENTIAL WINNERS: Service providers, especially BellSouth, Earthlink, SBC and Verizon, that have taken the lead here. Cable companies also are recognizing this opportunity.

Home networking seems to have overcome its status as a Jetsons-like luxury affordable by only a select few and is projected to be in 10 million homes by the end of this year, according to The Yankee Group. At long last, this technology has come within reach of home office workers and consumers who want to be able to share printers — and broadband connections. The Home Phonline Networking Alliance is one group working to promote growth in this area.

Rich Nesin, president of Home

Phonline Networking Alliance, credits standards for this change. "We developed the Home PNA international standard more than a year ago," said Nesin, adding that standards can help ensure quality of service and interoperability.

Nesin is undaunted by the threat of wireless home networking alternatives based on the 802.11 WiFi standard. Wireline alternatives are more reliable, he says, and can support higher data rates.

— *Suzanne Sanders*



Fiber-to-the-home: Greenfield growth

THE OPPORTUNITY: By deploying fiber to the home, service providers can offer unprecedented bandwidth that can support high-speed data and multiple video channels.

ANNUAL GROWTH RATE: 63% (KMI Research)

WHY IT'S TAKING OFF NOW: Deployment costs (for newly constructed communities, at least) have decreased.

POTENTIAL WINNERS: Municipalities and real-estate developers are the strongest players in this market today. But incumbent local telcos are likely to take more interest now that the FCC's triennial UNE review exempts them from unbundling local fiber.

POTENTIAL LOSERS: The growth of fiber-to-the-home is coming primarily at the expense of alternative offerings based on hybrid fiber coax.

"Fiber to the home opportunities lie in green field construction in the United States," says Mike Moone president and CEO of Alloptic, a manufacturer of optical IP Ethernet solutions. "Typically, these developments are communities of 1000 or more houses that cost \$250,000 and higher." These are usually in the Sun Belt: the Southeast, the Southwest and Southern California, he adds.

"No question, fiber-to-the-home is the long-term answer to communications and

entertainment needs," says Jim Andrew, vice president at Adventis.

The issue, though, is the equipment to deliver it to the end user. "CPE is certainly more expensive and less available for fiber than for hooking up copper or coax," Andrew says.

And older neighborhoods are not seeing much FTTH, mainly because of installation costs, Moone says. "I think what's going to happen is that the more true rural areas will start to see municipalities getting

fed up with the incumbents not deploying broadband," he says. Then, the municipalities will take matters into their own hands and move to install and deploy fiber. "I believe information is quickly becoming a utility, and many municipalities provide water or gas, why not broadband access?"

Still, he says, fiber-to-the-home is going to be an inevitable offering. "What's forcing LECs to start providing fiber is competition from the cable companies. And the cable companies are running into competition from the satellite providers."

Moone expresses concerns, however, that the United States is lagging behind other countries. In fact, most of Alloptic big customers are foreign carriers including Korea Telecom and Telecom Italia.

"This country, in general, needs a wake-up call," Moone says. — *Suzanne Sanders*

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