

Multiservice VPNs: What Can Carriers Deliver?

Joanie Wexler

Some implementations are starting to appear, but the major carriers are still promising “future” capabilities.

Technically speaking, enterprises have had the ability to converge voice and data onto a single, multiservice packet network for a long time. For example, installing a voice frame relay access device (VFRAD) at a site, then plugging a PBX into one port and a router into another, basically constitutes a converged frame relay network. Similarly, customers can create a converged ATM network by using its various classes of service to transport multiple traffic types.

Recently, however, IP-based VPNs have also joined the multiservice ranks. After many years of listening to the convergence mantra propagated by equipment vendors—most notably, Cisco—service providers are stepping up to the plate with these managed, integrated-access IP services that assist business customers in layering packet voice and video onto their corporate data networks.

These new services can be called “multiservice VPNs,” because of their closed user-group nature and multimedia application support. While integrated-access services have been available for several years at Layer 2—for example, AT&T’s frame-to-ATM Integrated Network Connection Service (INCS) and Sprint’s recently defunct

ATM-based Integrated On-demand Network (ION) service—they represent a fairly recent phenomenon at Layer 3, the IP layer. IP-based multiservice VPNs are available now from players such as AT&T, Equant and Virtela Communications, and are slated for near-term availability from Global Crossing, Infonet and WorldCom (Table 1).

Why Managed Services?

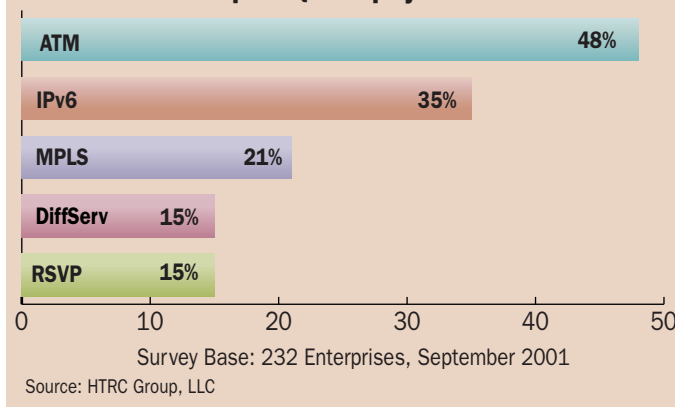
At the IP layer, it is turning out to be no small feat to deploy new Web-based enterprise applications and to tune premises WAN routers with the quality-of-service (QOS) capabilities necessary to deliver high-quality application performance. As Multiprotocol Label Switching (MPLS) technology matures and is rolled out in service provider backbones, at least some enterprise users have more confidence that they can achieve QOS in IP networks (Figure 1). There have been several high-profile MPLS-based IP VPN multiservice network commitments from organizations such as Dow Chemical Co., APL and the City of Dallas. Still, all these enterprises prefer to enter the network convergence waters with a technical partner that can absorb some of the risk.

Another reason to use a managed IP VPN service to carry converged traffic is that enterprises have no other way to enforce end-to-end QOS guarantees through the carrier’s network “cloud.” This is one reason that APL, a multinational logistics and container transportation company headquartered in Oakland, isn’t going the convergence route alone. “Class of service has become a very

important feature to us,” said Cindy Stoddard, chief information officer at APL. Her company is about six months into a 180-site, 18-month project to transition its sites from a worldwide frame relay network to an integrated voice/data IP VPN from Equant.

Stoddard said that because her company is deploying integrated IP-based customer relationship management (CRM), e-learning and VOIP applications, Layer 2 frame relay and ATM technologies were no longer a

FIGURE 1 Enterprise QOS Deployment Plans For 2002



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proper fit. But the company didn't want to take on the IPconvergence project single-handedly, and "Equant was the only carrier that would commit to IP QOS for both voice and data and to a fully managed network service for us," Stoddard said.

Similarly, the world's largest integrated IP voice/data network deployment to date (other than that of Cisco) is under way at Dow Chemical, which also didn't want to tackle the project on its own. It has enlisted the aid of worldwide outsourcer EDS Corp., which is converging the company's global corporate traffic onto Equant's MPLS-based multiservice IP VPN to serve 50,000 users across 450 sites.

Dow, the Midland, Michigan-based maker of chemical, plastic and agricultural products and services, is also swapping out its worldwide legacy voice switches in favor of IP-PBXs. The overall goal of the project is a double-digit percentage savings on operations costs per year, said Ray Warmbier, program manager for the Dow converged IP network.

The savings are expected to come from bypassing international toll charges, as well as eliminating expensive management and upgrades of proprietary TDM-based PBX software, said Warmbier. In addition, like APL, Dow is looking to deploy integrated IP applications that require a converged network.

IP Convergence Drivers

IP-PBX deployments are one impetus behind business demand to layer VOIP onto IP VPN services, said Larry Hettick, a consultant in Alameda, CA (www.larryhettick.com). IP-PBXs are making their way into enterprises such as Dow and the City of Dallas, as TDM-PBX leases expire or as enterprises face expensive upgrades. In addition, companies that wish to run integrated applications, such as unified messaging or Web-based customer call centers, are investing in next-generation rather than legacy technology.

Such was the case at the City of Dallas. "Our old phone systems were way too expensive and

TABLE 1 Multiservice VPN Offerings*

Carrier/Offering	Service Features	Technology	COS, SLA(s)	Internet Gateway? **
AT&T/INCS	Voice tunneled to PSTN; Frame Relay or IP-enabled Frame Relay data	Frame relay customer interface; ATM backbone (Layer 2) or IP VPN backbone (Layer 3)	99.999% uptime	Yes
AT&T/Managed Internet Service Voice over IP	On-net and off-net voice delivery; Weighted Fair Queuing in access router to prioritize voice over data	IP (Layer 3)	Jitter SLA for VOIP to be available in January 2002 (after press time)	Yes
Equant/Equant IP VPN	Integrated voice and data on worldwide IP VPN	IP/MPLS (Layer 3)	Per-customer, by contract for availability, delay, packet loss, jitter, delivery time, & time to respond	Yes
Infonet/Global Multimedia Services	Voice over frame relay	Frame Relay (Layer 2)	Three data COS plus a voice-over-frame COS	Yes
Virtela/Virtela VPN, VirtelaVoice, VirtelaVideo	IP voice and data; includes policy management and managed firewall; Virtela Video has room-based video equipment, point-to-point video conferencing and bridging up to four other parties.	IP (Layer 3)	100% availability, less than 70 msec latency, less than 0.5% packet loss, less than 1 msec jitter domestically.	Yes
WorldCom/SmartATM	Dynamic PVCs and SVCs can be set by user in real time with appropriate class of service for traffic at hand	ATM (Layer 2)	Three COS: Constant Bit Rate, Variable Bit Rate Non-real-time, & Variable Bit Rate Real time	Yes

* Managed network services that include CPE and QOS capabilities specifically geared toward supporting converged corporate voice, data, and/or video traffic.

** Usually involves an extra fee

complicated to fix,” said Dan McFarland, chief information officer. Using SBC as its systems integrator, the city collapsed six data networks and one phone network into a converged IP metro network. They also swapped out the old phone equipment for Cisco CallManager IP-PBXs.

“If we had chosen to upgrade the old phone network, five years down the line we would have found ourselves in the same position we are in today. I wanted to replace our network with VOIP, where voice is truly nothing more than one application that runs on the data network,” said McFarland.

The maturation of MPLS is also driving the carriers’ multiservice VPN service rollouts, by bringing privacy and QOS to IP network services. MPLS-enhanced switches that sit at the edge of the service provider’s network initiate private tunnels across the IP backbone. Using the traffic-engineering feature of MPLS, service providers can override traditional routing protocols, taking into consideration factors other than the number of hops between source and destination, such as real-time network conditions.

It’s not surprising that multinational companies are among the pioneers using multiservice VPNs, said consultant Hettick. “The cost savings associated with toll bypass are the first draw to VOIP, and these are significant outside the U.S.,” he said. “But, ultimately, production deployments of VOIP are driven by the need to run integrated IP applications for competitive reasons.”

Extension To Existing Services

Generally speaking, a multiservice VPN can be thought of as an enhanced managed data VPN service. Both data VPNs and multiservice VPNs can run at either Layer 2 or Layer 3. For either type of service, customer premises equipment (CPE)—generally, a router, FRAD or ATM switch—is installed and managed by the service provider. The customer buys the CPE from the service provider or, more typically, “rents” the equipment as part of the monthly network service charge for each site.

In the case of a multiservice network, the CPE includes voice gateway functions to convert TDM voice to frame relay, ATM or IP. In addition, IP-PBX connections are often supported, as is the ability to translate PSTN calls and signaling into VOIP calls based on H.323 or Session Initiation Protocol (SIP) signaling.

Multiservice VPNs also usually include managed QOS capabilities that carry associated service-level agreements (SLAs), for which customers can often contract on a per-application basis. Service providers then assume responsibility for tuning the CPE and their own network equipment to ensure that packet voice, data and video—each with its own network requirements and characteristics—continue to perform well on the converged service. Configuring QOS settings often involves setting Differentiated Services (DiffServ) bits in the CPE that must be mapped to IP/MPLS QOS tags at the edge of the service provider network for propagation across the backbone—a task some enterprises seem to feel is, at this juncture, better left to the service provider.

What’s New?

At the IP layer, a comprehensive new suite of service offerings comes from start-up Virtela Communications (Greenwood Village, CO). The company offers an IP VPN data service, dubbed VirtelaVPN, over which users can layer VOIP and IP video services, a.k.a. VirtelaVoice and VirtelaVideo. The flat-rate IP VPN data service costs \$300 to \$1,500 per month per site in the U.S. (\$500 to \$4,000 internationally), depending on access type and speed. Virtela determines the appropriate access type, speed and CPE, then installs and manages the service and equipment, according to Virtela Chairman and CEO Vab Goel, a former executive at Qwest and Sprint.

Adding VOIP costs \$200 per site in the U.S. (\$300 in international sites), said Goel. To add

Pricing Model

Monthly per-site fee, plus per-minute billing for PSTN voice delivery

Flat-rate pricing for combined on-net/off-net voice in the U.S., but customer receives credit that increases with their volume of on-net calling

Per-minute pricing for international calling

Monthly per-site fee based on size of access link, CPE model and CPE voice card

Monthly per-site fee based on access link and COS

VirtelaVPN: Flat monthly per-site fee for data IP VPN, based on speed of access connection.

VirtelaVoice: Additional \$200 per site.

VirtelaVideo: In U.S., additional \$500 per month per site for unlimited usage.

Usage-based (per megabyte or hour) or fixed monthly fee for all bandwidth requested

room-based videoconferencing traffic to their VPN service (at speeds from 768 Kbps to 1 Mbps), customers pay about a \$500-per-month premium U.S. (\$1,000 in international sites). The video premium includes the videoconferencing codec, TV, policy management and firewall capabilities, said Goel. The VirtelaVideo offering compares favorably with 128-kbps ISDN-based videoconferencing services, which cost about \$60 per hour in the United States and up to \$700 per hour internationally.

Virtela offers strict service legal agreements for jitter, latency, packet loss, service uptime and mean time to report/repair. If not met in a given day, Goel said, a day's worth of service charges is refunded.

International carrier Equant does not offer a managed service package for video, but is "thinking about it," according to Gopi Gopinath, head of Equant's data and IP product line. The company's voice and data IP VPN service is selling well, and he said that during the last six to 12 months, talks of convergence among Equant customers seem to have gone from a future consideration to a near-future plan. "As long as it's not more expensive, customers are willing to take some risk to position themselves for the future," he added.

Other carriers that are planning to offer multiservice IP VPNs and related services include the following:

■ **AT&T:** According to Joe Abinder, AT&T VOIP product manager, the company is "heavily considering" offering IP-PBXs as part of a multiservice IP VPN offering in 2002, based on its work with IP-PBX vendors Avaya and Cisco.

■ **Global Crossing:** Announced IP VPN services in October that support multiple classes of service, although VOIP and IP video application services are not yet available. The company uses frame relay and ATM as access technologies to the IP VPN network. IP business video conferencing could happen "as early as 2002," said Brady Levy, Global Crossing's vice president of conferencing.

■ **Infonet:** Video and voice classes of service for the company's IP VPN service are slated for availability sometime in 2002.

■ **WorldCom:** VOIP services are available via its IP Communications offering. The service is slated for integration with the company's Private IP data VPN service in the third quarter of 2002.

In contrast, Qwest has no plans at this time for a multiservice bundle based on its IP VPN data service, according to Scott Cassell, senior product manager for Qwest VPNs. The company will sell and manage a Cisco 2620 multiservice CPE router, but customers procure equipment and man-

agement separately from a different group within the company.

Layer 2 Update

In addition to the multiservice VPN activity at Layer 3, new Layer 2-based services, such as WorldCom's SmartATM offering, continue to emerge. SmartATM offers multiple classes of service, and users pay for a single "virtual path" into the network. From there, users can dynamically set up and tear down virtual circuits using a Web-based "cockpit," said Randy Rector, WorldCom manager of frame relay and ATM marketing. These on-demand virtual circuits are particularly useful for applications such as conferencing, which do not require full-time dedicated capacity.

Meanwhile, AT&T upgraded its INCS offering this year to include frame relay access to an IP VPN, said Richard Klapman, AT&T INCS product director. Although voice

traffic is carried over the same access link, he said that at this time, it could be delivered only to the PSTN. Nonetheless, INCS has proven appealing to retailers and other companies with distributed sites that do not want to run separate voice and data

access circuits to all their locations.

For example, Home Depot installed INCS this year to gain more flexible use of aggregate bandwidth, depending on application requirements, said Dan Haumann, director of IS at the Atlanta-based retailer. "We had business applications in queue that were demanding more network capacity," he said.

The company has very high bandwidth data needs at night and high voice needs during the day, a good fit with INCS inverse multiplexing over ATM (IMA). The capability enables customers to add bandwidth in T1 increments as needed, and also to spread their traffic across the aggregate bandwidth as required by applications at a given point in time. With INCS, Haumann said, "We have a conduit [access link] that adjusts to traffic needs as required. Capacity is secured for voice when active but released for data when needed."

Dave Kaercher, IS leader at Best Buy (Eden Prairie, MN), said his company chose the INCS service for the same reason, and is now saving 20 to 40 percent on circuit charges per site. The company is also working to add streaming media to the service. Best Buy would like to eventually run an inbound IP-based Web call center for customer relationship management and disaster recovery, so Kaercher also looks forward to taking the IP multiservice VPN plunge.

For two years, Infonet has been offering a voice-over-frame relay multiservice VPN, called

Multiservice VPNs based on IP are in the works, but carriers are also rolling out more Layer 2 services, using frame relay and ATM

“Global Multimedia Services.” Currently, its SLAs cover only the Infonet backbone (provider edge to provider edge), but Jean-Noel Moneton, Infonet’s vice president of Internet services, said end-to-end guarantees are slated to be available by the end of the first quarter.

Finally, as mentioned, Sprint ION—the original ATM integrated access service that launched three and a half years ago—was discontinued last fall. According to Peter Parish, Sprint director of enterprise solutions marketing, the company found its ATM and ION transport networks overlapped. ION customers will be transitioned to Sprint’s managed ATM integrated access service, he added, and will see no difference in their service capabilities.

Conclusion

International and operational cost savings, coupled with converged applications, are driving early adopters of carrier-managed multiservice IP VPNs, yet the new services themselves could help foster more widespread enterprise acceptance of IP-based convergence. But because the IP convergence waters are relatively uncharted, customers will likely continue to seek the reassurance of a technical partner, such as a service provider, to deliver a fully managed service and to act as a sys-

tems integrator. Carriers who offer multiservice IP VPNs must expect to take responsibility for delivering user-specified service levels on a per-application basis □

Companies Mentioned In This Article

APL (www.apl.com)
AT&T (www.ipservices.att.com)
Avaya (www.avaya.com)
Best Buy (www.bestbuy.com)
Cisco (www.cisco.com)
Dallas (City Government—www.ci.dallas.tx.us)
Dow Chemical (www.dow.com)
Equant (www.equant.com)
Global Crossing (www.globalcrossing.com)
Home Depot (www.homedepot.com)
HTRC Group (www.htrcgroup.com)
Infonet (www.infonet.com)
Qwest (www.qwest.com)
SBC (www.sbc.com)
Sprint (www.sprint.com)
Virtela Communications (www.virtela.com)
WorldCom (www.worldcom.com)



Will new IP VPN services foster widespread acceptance of IP-based convergence?