Enterprise End Users Moving To Next-Generation Networks

David Hold and David Baltaxe

ATM and frame relay customers say they're poised to migrate.

Back around 1999–2000, pundits were already predicting the demise of frame relay and ATM network services. With IP-VPN services coming on line, the next generation of connectionless services would usher in a new era of meshed networks by eliminating the need for expensive and rigid permanent virtual circuit (PVC) connections.

Not long after, Ethernet services held out the promise of cheap and plentiful bandwidth by simply extending local area networks across a metropolitan area. Then it was said that a combination of IP-VPNs provisioned over MPLS would provide the one-two punch that would all but eliminate the need for legacy frame relay and ATM services.

As it turned out, the pundits were half right; many of those enterprise network managers who had balked at using the public Internet for the corporate backbone were more willing to trust "private" MPLS-based IP-VPNs. And with the demand for bandwidth once again on the rise, Ethernet today ranks among the fastest growing data services.

Still, as recently as 2006, legacy data services were still generating as much or more revenue at some major carriers than were the next-generation services, and while the number of enterprises operating frame and ATM networks is declining, the holdouts represent the cream of the largest corporate and government customers.

Current trends suggest that the growth of IP and Ethernet, and the decline of frame relay and ATM, will inevitably reverse that revenue mix, but the question is, when? Has the time finally come when even the most conservative networkers are finally ready to replace those big ATM backbones?

Asking The Customers

Current Analysis' Enterprise Demand Research, conducted in conjunction with *BCR*, sought to answer a number of questions regarding enterprise migration plans with respect to Ethernet and IP-VPNs, with an additional point of focus on emerging virtual private LAN services (VPLS). We wanted to talk to *BCR* readers because they rank among the best informed with respect to the trends and technologies driving next gen services, and thus could act as a leading indicator of networking trends in general (see "Demographics Of The Respondents," p. 30, and "*BCR* Readers Use Different Types of IP-VPN Services," p. 32).

The first question we sought to answer was, for those companies that still operate legacy networks, what percentage are planning to migrate to next-generation IP and/or Ethernet network services? The second question was "When?" Specifically, we wanted to know whether they were planning to migrate part or all of their enterprise networks within the next 1–2 years. And the third question was "Why?" What were the main reasons driving these enterprises' movement to next generation services?

The answer to the first question was clear: Three out of four are ready to switch.

Large percentages of frame relay and ATM users say they plan to migrate to IP or Ethernet services over the next 24 months (Figure 1). As the figure indicates, only 24 percent of current frame relay users say they have *no* plans to migrate to IP-VPNs within the next 24 months, and three-quarters of respondents plan to migrate at least part, if not all, of their enterprise networks to IP-VPNs during the forecast period. The percentage of respondents planning to migrate sooner, within the next 12 months, is actually higher than those selecting 12–24 months.

BCR's frame relay users also show a clear preference for migration to IP-VPNs rather than Ethernet services. Fifty-four percent say they have no plans to migrate to Ethernet within the next two years, which is not surprising, since Ethernet has been deployed and marketed primarily as a high-bandwidth metro area solution requiring optical connectivity, making it less suitable for typical frame relay networks. Although frame relay is available at speeds up to DS3, the vast majority of connections are at T1 or below and do not require dedicated fiber.

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The availability of long-haul switched Ethernet, as well as low speed (sub-10 Mbps) copper-based access for Ethernet is still quite limited, and apparently has not achieved sufficient market penetration to be viewed as a potential replacement for frame relay by the majority of *BCR* readers.

The pattern for ATM services is quite similar (Figure 2). Only 20 percent of ATM users say they have no plans to migrate to next generation services, and 80 percent are planning to migrate part or all of their enterprise networks to IP-VPNs within the next two years.

The one striking difference is that ATM users are much more willing to consider Ethernet as a replacement than was the case with frame relay users; 61 percent say that they plan to migrate part or all of their networks to Ethernet services. This is probably because ATM scales to higher bandwidth than does frame relay, with port speeds ranging from T1 to OC-12 (622 Mbps). Since our survey indicated that the most commonly deployed Ethernet interface rates are 10, 100 and 1,000 Mbps, that service is more closely aligned with ATM than frame relay.

Users Leaving Legacy Services—Promise Or Threat?

With high percentages of enterprise end users gearing up to leave their legacy services, this might sound like a threat to incumbent service providers such as AT&T, Verizon Business, Qwest and others that collectively receive billions in revenues from legacy frame relay and ATM services. As Rosemary Cochran pointed out in these pages, as recently as October 2006 (see pp. 20–25), frame relay was a $9 billion market with around 1 million deployed ports in service.

This transition could also be seen as a boon to the handful of insurgent service providers such as Time Warner Telecom, Masergy and Yipes, operating purpose-built Ethernet and MPLS networks. With no legacy TDM or fast packet networks to support, this class of carrier stands to gain as more enterprises transition to next-generation network services.

However, the transition has been under way for some years, and it is certainly not unexpected by the largest carriers, who would, in fact, welcome such a movement. For example, Verizon Business has said that while legacy service revenues still outweigh those of its flagship "Private IP" service, current trends suggest that Private IP revenues will achieve parity during 2007, and surpass the legacy services thereafter. Company officials also say that because more investment is going into expanding and upgrading its MPLS-based infrastructure, while less is being spent on legacy networks, this customer transition is welcome.

Sprint has gone one step further, by announcing the end of life for its traditional frame relay (2005) and ATM (2006) services as a means of encouraging customers to make the switch to later-generation services that use an IP infrastructure.

FIGURE 1 Migration Plans—Frame Relay

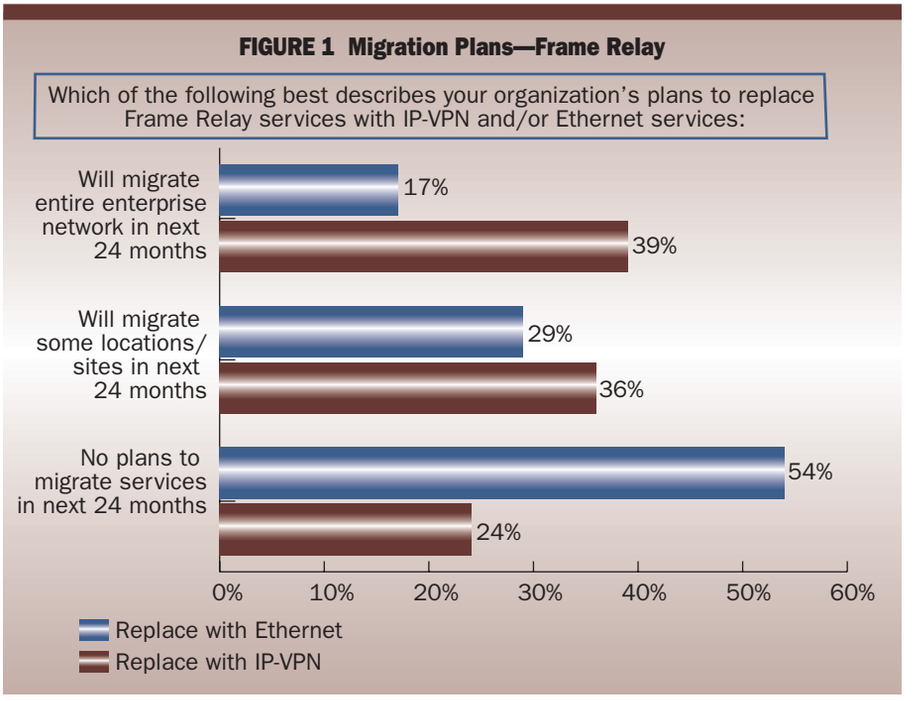
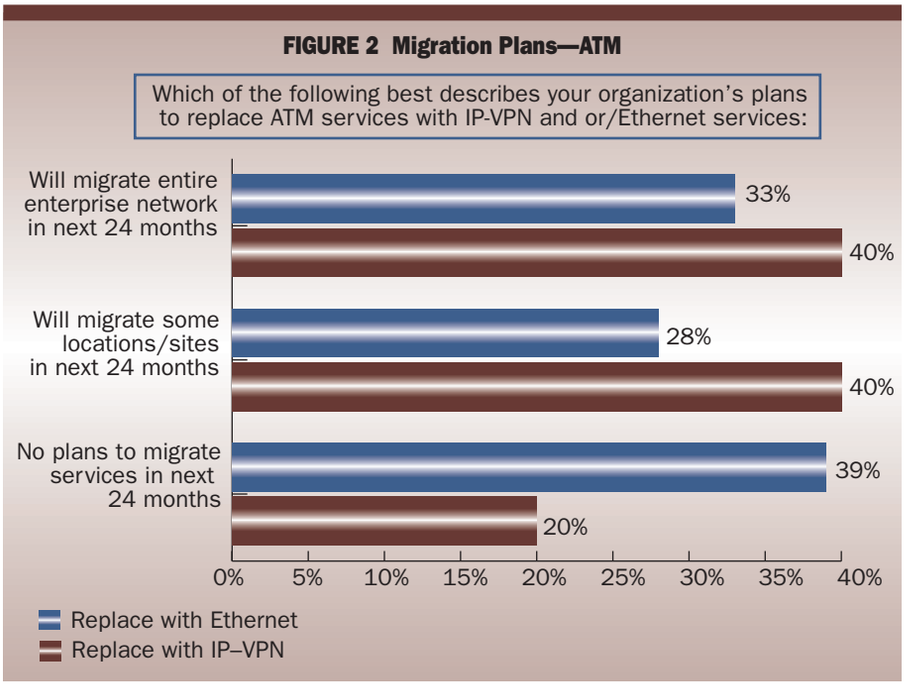


FIGURE 2 Migration Plans—ATM



Money and bandwidth rank ahead of convergence as a driver

The problem for the large incumbent carriers with huge installed bases of legacy services is that while many customers have made the jump to next generation services, the holdout enterprises tend to be over-represented among the largest blue-chip corporate and government customers, some of whom are quite content with existing networks that work reliably day after day, cost relatively little to operate, and are adequate for most application requirements. Some of these large, 1000+ site networks still need to support non-routable protocols that require a reliable Layer-2 transport mechanism.

In addition, the managers of some large networks are not keen on the idea of turning over their IP address tables to the service provider in a Layer 3 MPLS-based IP-VPN service, as per RFC 4364 (formerly RFC 2547bis).

Finally, while ATM is less widely deployed than frame relay, it is often used as the backbone of large enterprise networks that employ Frame-to-ATM Service Interworking (FRASI) to link low speed branch offices on frame relay to regional hubs and datacenters over higher-speed ATM. This reluctance to migrate is reflected in the generally high satisfaction scores that most *BCR* readers gave to their legacy services, with the biggest spenders expressing the greatest satisfaction for ATM services, as shown in Figure 3.

Less Money, More Bandwidth, And Convergence

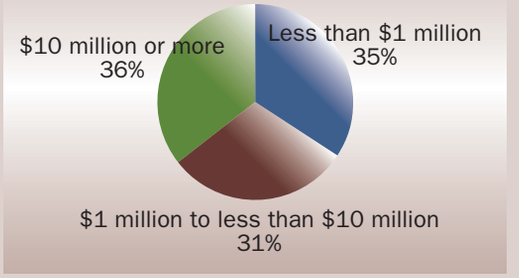
So why are so many of our survey respondents apparently willing to finally replace their old faithful networks with shiny new late-model services? As with most trends of this kind, there are a num-

Demographics Of The Respondents

BCR invited its subscribers to participate in a Web-based survey hosted by Current Analysis. Nearly 120 readers took the time to take the survey, and about two-thirds of those were qualified after various filters were applied. Restrictions included minimum company size and the degree of involvement by the end-user in the management and procurement of telecommunications networks and services.

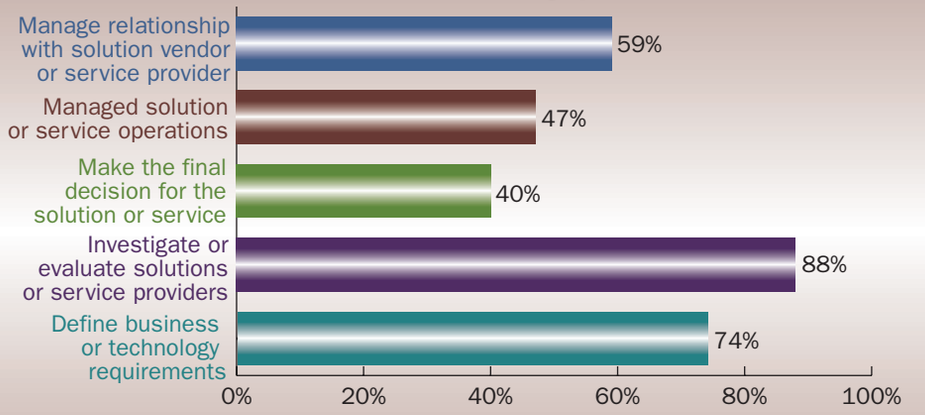
The qualifying sample was characterized by a very good distribution across small, medium and large enterprises, in terms of revenues, employees, numbers of sites, and that all-important statistic, annual telecom spend (Figure A). In addition, 56 percent of respondents worked for companies that had $1 billion or more in annual revenue, 31 percent of respondent networks have 1,000 sites or more, and 35 percent work for companies with 10,000 or more employees.

FIGURE A Annual Telecom Spend—Size of Company



Qualifying criteria were not dependent upon titles but on the functional role of the individual within the network organization. The sample was restricted to those respondents directly involved in the evaluation, selection and management of network services. About 40 percent of respondents were the final decision maker with

FIGURE B Role—Demographics



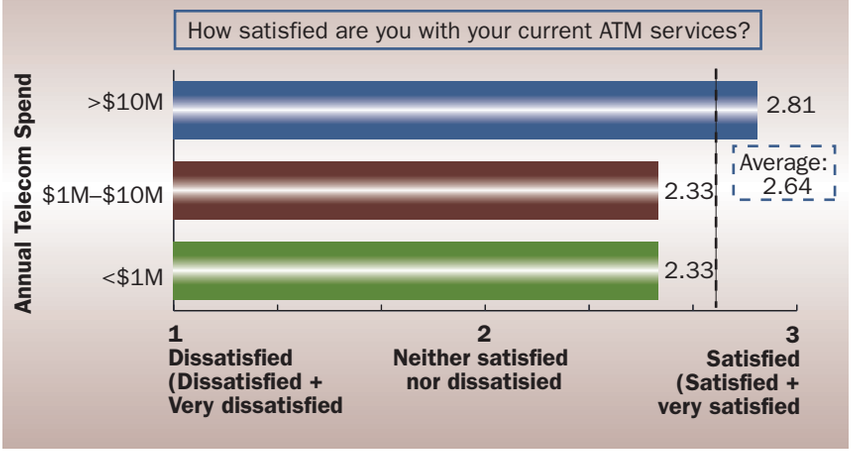
Note: Sample was restricted to those respondents directly involved in the selection or management of network services.

ber of factors at work, but by and large, the primary motivators, as with so many other things, are money and bandwidth. Convergence, which helps customers to save money, also ranked high among reasons to switch.

Survey respondents were asked to select and prioritize their top three reasons for migrating to IP or Ethernet services. Consistently, the reasons rated as number one involved either lower cost, more bandwidth or convergence.

For frame relay users, the primary reason to migrate to IP-VPNs was convergence and lower cost—the two were selected by nearly equal numbers of respondents, followed by lower cost per bit, which is a cost-efficiency measure. A

FIGURE 3 ATM Satisfaction

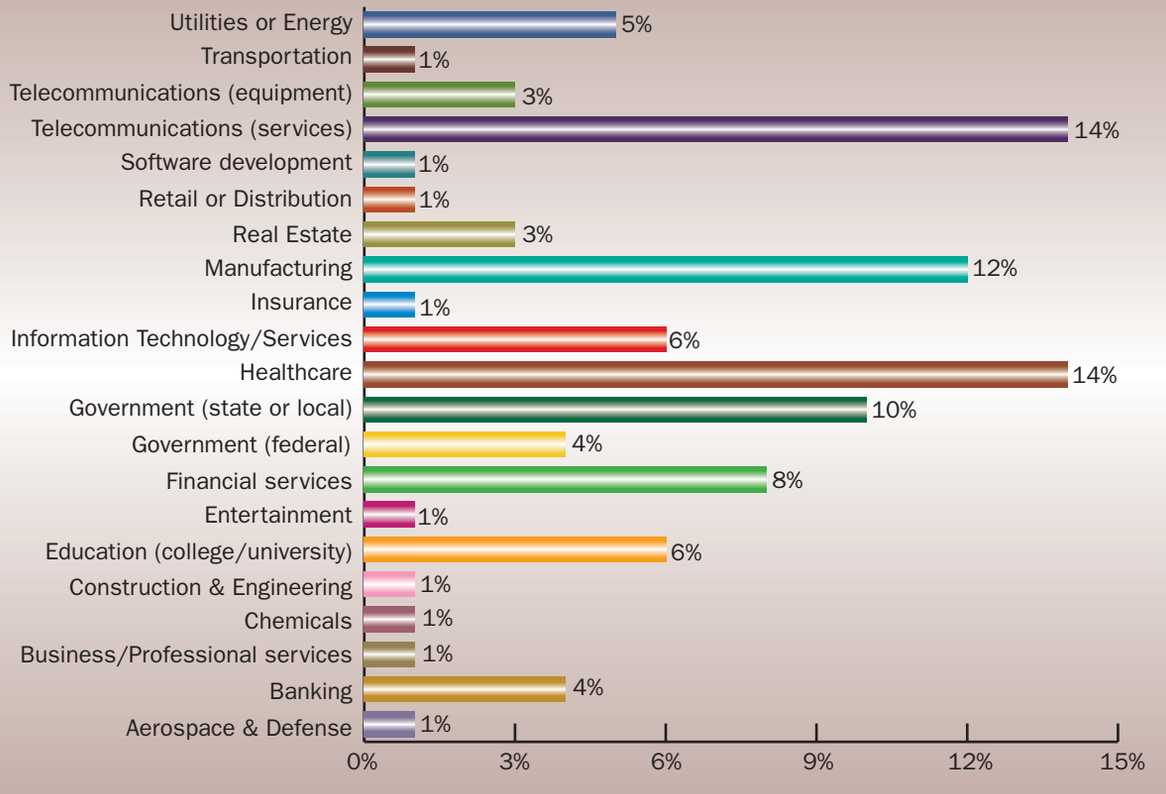


respect to purchasing telecommunications services, while nearly 60 percent were involved with managing the relationship with service providers or solution vendors (Figure B).

BCR's enterprise readers also come from a broad cross-section of industry types, numbering 23 specific categories, with no category accounting for more than 16 percent of the total. The top four were telecommunications services (their internal networkers), manufacturing, health care and state/local government, followed by financial services, information technology, higher education and utilities/energy (Figure C).

Finally, in terms of geographic distribution, the vast majority (92 percent) of respondents networks were in North America, but almost half had networks in other parts of the world. For example, significant numbers had networks in Europe (45 percent), Pacific Rim (36 percent), Latin America (23 percent) and elsewhere□

FIGURE C Industry—Demographics



For ATM users, cost is the primary reason to migrate

company selecting cost per bit may be interested in reducing its payments for the same amount of bandwidth or, more commonly, a company may try to increase its bandwidth by two or three times for the same or slightly higher monthly payment. Most service providers, not wishing to go bankrupt, generally prefer to steer customers toward the latter scenario.

The survey found that the primary reason for frame relay users to migrate to Ethernet was higher bandwidth, followed by lower cost and convergence. Interestingly, business application requirements were not selected as a number one reason by anyone, but it was the strongest number two and three.

With ATM, the number one reason for migrating to IP-VPN was not bandwidth but lower cost, followed by lower-cost-per-bandwidth ratio. Convergence was not a primary driver, but it was a strong second and third reason.

Bandwidth was ranked very low as a reason for ATM users migrating to IP-VPNs. This is not surprising, since ATM customer interfaces typically scale to OC-12 (622 Mbps), and it has even been deployed at rates up to OC-192 (10 Gbps) by branches of the federal government. Large end-users could gain from OC-48 (2.4 Gbps) interfaces available on some IP networks, but only a minority of locations would need that great a speed increase.

Ethernet, however, is another story. For those ATM users migrating to Ethernet, the largest number selected higher bandwidth as the primary reason, followed by lower cost and cost-per-bandwidth ratio.

As noted above, ATM interfaces typically peak at OC-12, while at Gigabit level speeds, especially in the OC-48 to OC-192 neighborhood, Ethernet is a much more cost-effective interface than IP. Business application requirements had no first-place votes, but it was the strongest secondary reason, and convergence was often number three. It makes sense that convergence would not play as strong a role in driving migration from ATM, since ATM was, after all, the original convergence protocol, and some companies have been running converged voice and data networks over ATM since the early 1990s.

What About VPLS?

That brings us to the final question—what about VPLS? Virtual private LAN services that use

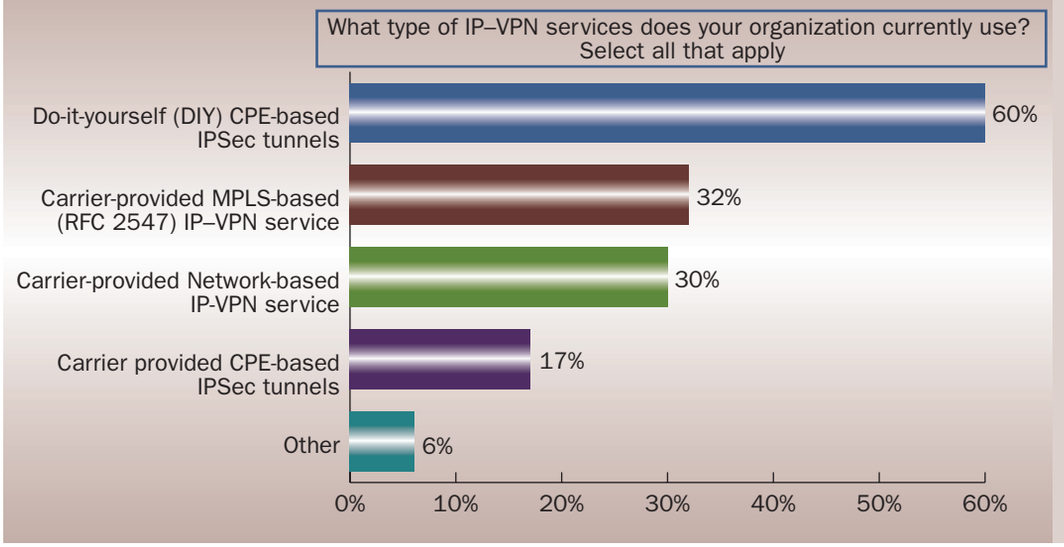
BCR Readers Use Different Types Of IP-VPN Services

As Figure A shows, BCR subscribers use multiple types of IP-VPNs, most often deploying their own CPE-based IP-VPN networks using IPSec clients to establish secure tunnels between sites. By a margin of almost two to one, respondents selected do-it-yourself IP-VPNs over carrier-provided IP-VPN network services, including MPLS-based IP-VPN services based on RFC 2547.

In addition, the Ethernet services market is highly diverse, with services offered over various topologies and physical transport types, as Figure B indicates. By far the most common among *BCR* readers is Ethernet delivered over fiber optic lines in the metro area, usually in point-to-point configurations connecting two sites.

While Ethernet over SONET is the second most popular transport type, direct fiber ranked number one, most likely due to the lower cost and greater availability of unprotected physical transport. The second leading configurations

FIGURE A Type Of IP-VPN Service—IP-VPN



MAC address routing to create fully meshed LAN-like WANs have been talked about in the standards bodies for years; vendors have done their part implementing the various competing draft specifications, and a few second-tier U.S. carriers, including Broadwing (acquired by Level 3), Masergy, Time Warner Telecom and Yipes, have offered VPLS over their IP/MPLS backbone networks. Yet the major carriers, until recently, have been slow to embrace VPLS, preferring to steer most customers to IP-VPNs.

However, a significant minority of influential large enterprise managers, not wanting to turn control of IP routing over to the carrier, have steadfastly refused to use Layer 3 VPN services. For security or other reasons, these end users have expressed a strong preference for buying network services at Layer 1 or Layer 2 and operating their own routed networks at Layer 3.

In 2007, the larger carriers are beginning to respond. Spurred on by the federal government's Networx Universal RFP, Verizon Business launched its Ethernet-VPLS service in March, and both Qwest and AT&T have said they would deploy national VPLS offers in 2007.

BCR readers did not show much inclination to jump on the VPLS bandwagon (Figure 4, p. 34). Only about 13 percent are currently using the service, compared with 44 percent for frame relay and 77 percent for IP-VPNs.

Of the few VPLS users, most were large enterprises. Of those not currently using VPLS, only 10 percent described themselves as very familiar with the service, while 15 percent had no knowledge of the term, and 40 percent of respondents did not know if their carrier even offered VPLS.

Clearly, VPLS service providers have a big marketing "opportunity" in front of them. The one bright spot is that when companies investigate and evaluate the service, they like what they see. Of those enterprises that compared VPLS with their legacy frame relay and ATM services, nearly half said they preferred VPLS, while 19 percent would choose both VPLS and their legacy service.

Readers showed little inclination to jump on the VPLS bandwagon

Summary

One conclusion from this survey is clear. Enterprise end users have been migrating to next-generation services for years, but significant percentages, especially among the top-tier corporations spending more than $10 million a year, have not left their legacy services entirely.

include dedicated access to a cloud-type service, typically the Internet or carrier-provided VPN, and Ethernet LAN extension or Transparent LAN service. The use of long haul inter-metro Ethernet services and Ethernet over copper are far less prevalent among *BCR* readers□

FIGURE B Types Of Ethernet Service—Ethernet

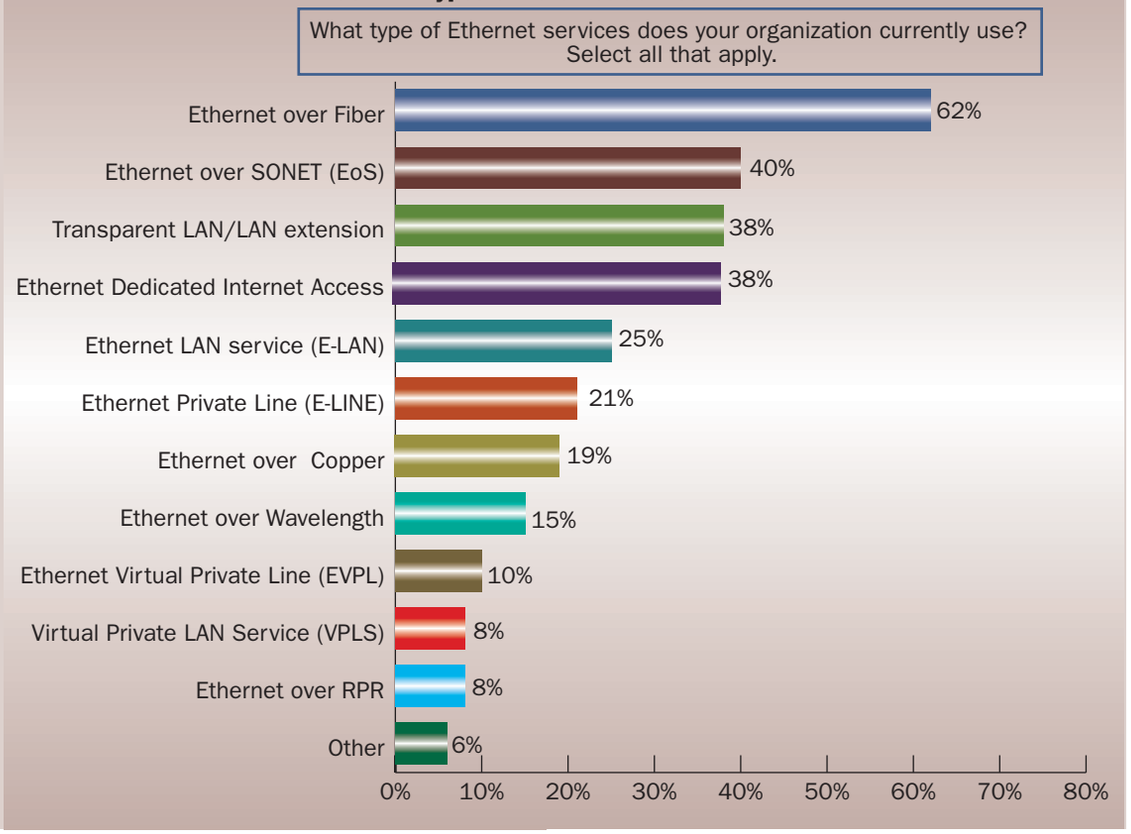
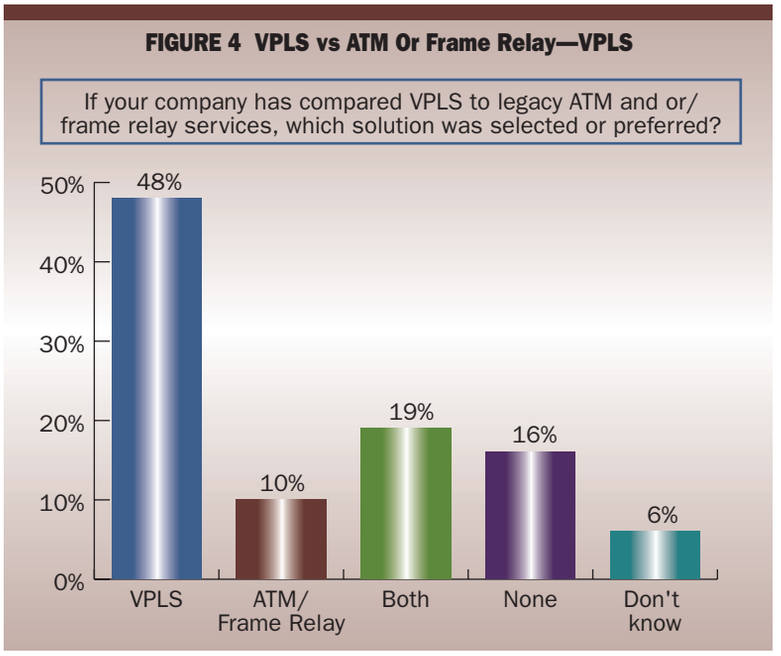


FIGURE 4 VPLS vs ATM Or Frame Relay—VPLS



But that appears to be changing, as the majority of respondents that are still using ATM and/or frame relay have indicated their intention to migrate part or all of their enterprise networks to next generation services soon within the next year or two. MPLS-based IP-VPNs will meet the needs of many of those enterprises, but not all.

Fortunately, service providers are beginning to roll out new and improved Layer 2 networking services, such as Ethernet-over-MPLS and VPLS, which should meet the needs of those networkers that prefer to maintain control over their routed networks. However, the carriers clearly need to do a much better job of marketing and explaining the benefits of VPLS services to their customers.

But no matter which of the next-generation services are preferred by enterprise end users, over time, the legacy infrastructure will become hollowed out, as more and more users leave and fewer remain. At some point in the future, most carriers will have no choice but to pull the plug on those ATM networks that have served so well for the past 15 years□

Companies Mentioned In This Article

AT&T (www.att.com)
Level 3 (www.level3.com)
Masergy (www.masergy.com)
Qwest (www.qwest.com)
Time Warner Telecom (www.twtelecom.com)
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