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# What WAN technology is right for your business?

## WAN bam, thank you MAN

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**Briefing** For the majority of enterprise corporates Wide Area Network (WAN) infrastructures will form one of their biggest operational expenses in terms of total cost of networking ownership. Given this fact, selecting the most appropriate wide area solution - or indeed combination of solutions - is a choice that firms cannot afford to undertake lightly.

The decision is complicated by what at first sight appears to be a confusing number of options in terms of technologies and permutations of cost versus performance tradeoffs.

A traditionally popular method of interconnecting geographically dispersed corporate sites is by renting dedicated leased lines between each node on the WAN. Leased line connectivity offers excellent quality of service and security resulting in reduced support costs.

However, deploying leased lines is also the most expensive way of creating a WAN infrastructure. According to Alison Adams, product manager for data services at Telewest Business, the ultimate disadvantage of serial leased lines is cost and relatively rigid bandwidths, together with costly upgrade paths, for example from an E1 to E3 or DS-3.

Because of this and the need for increased flxibility, leased lines are increasingly regarded as inefficient use of expensive bandwidth and so many enterprises are now migrating from the communication technology to more cost-effective options such as IP-based Virtual Private Networks (IP-VPNs) or Frame Relay.

For enterprise customers looking for the enterprise-class levels of security and service level agreements, Frame Relay remains a strong contender.

Frame Relay networking services will deliver a permanent virtual circuit (PVC), which means that customers benefit from what looks like a continuous, dedicated connection, without having to pay for a full-time leased line. At a service provider level, the route which each frame travels to its destination is allocated dynamically and can be charged based on actual usage.

It's a proven technology, resilient, is more cost effective than leased line, "and is more scalable than a network of private circuits," said Telewest Business' Adams.

She added that Frame Relay is losing ground to IP-based VPNs, but the market for the technology is still increasing, although at a slower rate.

Steve Kennedy, head of technology futures at Thus, said: "Frame Relay is an aging technology, but is still used by legacy systems because it offers QoS, and switched virtual circuits."

Another enterprise WAN option is Asynchronous Transfer Mode (ATM), a dedicated connection switching technology which is often seen as a compromise offering, because it combines consistency in bandwidth and delay with the flexibility of packet switching.

ATM is suitable for real-time applications and is often found in networks with high bandwidth requirements and stringent QOS specifications. "It is ideal for large or hub sites with the smaller sites supporting Frame Relay where Frame Relay or ATM is supported," said Adams.

ATM sits at the core of most telco networks. It is a packet-based network technology supporting full Quality of Service, allowing true differentiated services to be offered.

As Kennedy says: "ATM to the desktop was going to be the next big thing, but it never happened, as Ethernet and IP technologies increased in functionality and reliability and costs reduced dramatically, however it is still used heavily in backbone networks and won't disappear anytime soon.

"It will eventually be replaced by IP MPLS (Internet Protocol Multi Protocol Label Switching) which really overlays the ATM QoS characteristics on to an IP network. Since the world is moving to everything on IP, it makes sense to move away from ATM and on to IP MPLS."

MPLS is a standards-based technology that improves network data flow while at the same time reducing the infrastructure management overhead. MPLS sets up a specific path for data packets, enabled by a label incorporated into each packet. MPLS offerings can have quality of service (QoS) guarantees. The technology is dubbed multiprotocol as it operates with Internet Protocol (IP), Asynchronous Transport Mode and frame relay network protocols.

In the real world, for an enterprise WAN solution, an Internet Protocol Virtual Private Network (IP VPN) with MPLS transferring data over shared IP backbone belonging to one service provider can deliver substantial cost savings when compared with leased line solutions.

"IP-based VPNs offer enterprise customers an economical and secure data transfer medium between sites," said Craig Thomas, head of marketing for Tiscali Business Services.

It is technically possible to use the public Internet as the backbone for WAN connectivity, but lack of quality of service guarantees and the potential security risks make this option largely unviable for the enterprise. But the cost savings delivered by tunnelling data across the Internet via a virtual private network can be compelling.

"The cost of using the Internet for WAN connections is a no brainer," said Virginia Brooks, an analyst with the Aberdeen Group, "in some cases a VPN can pay for itself in a matter of

months simply from saving on long distance charges."

Corporations in need of inter-office connectivity may also consider Metro Ethernet connections as an alternative wide area networking technology.

Metropolitan Area Network (MAN) services have the potential to offer more bandwidth with provisioning on demand, plus the ability to offer more granular bandwidths (1Mbit/s to 1Gb/s in 1Mbit/s increments in the case of Switched Optical Ethernet). It can also deliver multiple Classes of Service, with up to eight QOS levels defined by the IEEE.

Security forms an inherent element of Metro Ethernet services. Metro offerings typically use VLANs, which are secure links from one point to another, so the carrier technology can form a good solution for a interconnecting large sites. Metro Ethernet provides "a genuine step towards convergence", Adams believes.

Nicholas Maynard, analyst with the Yankee Group said: "The idea of Metro Ethernet services sounds almost too good to be true - more bandwidth for less money, flexibility instead of networking nightmares, and a customer-friendly handoff."

But, there is usually a catch in anything that seems too good to be true, he notes, citing the lack of last-mile fibre as the main limiting factor for Metro Ethernet.

But even as Metro Ethernet emerges from the wings as a cost-effective and flexible, technology the current trend is seeing enterprises begin to move away from traditionally favoured options such as leased lines and make use IP VPNs and MPLS technologies for secure and relatively low cost WAN connectivity. ®

*This datanetworking briefing note was sponsored by Telewest Business.*