The Next Generation of Business Networks

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Converging voice and data networks into a single packet-switched network that supports both protocols has its advantages, but the various applications that are converging over the network require different degrees of bandwidth and quality. Multiprotocol label switching has distinct advantages over other traditional WAN methodologies.

The wide area network (WAN) is central to the IT strategy of any multilocation business. Employees expect the WAN to be available when they need it, much like any other utility in the business. WANs have historically been built on "best effort" circuit or packet-switched IP networks such as VPN, Frame Relay, or Private Line connectivity.

This strategy is effective when the WAN is required for email and file-sharing. However, with the growing need to add VoIP (Voice over Internet Protocol) and video, and delay-sensitive and "chatty" applications like SAP (NYSE: SAP) and Citrix (Nasdaq: CTXS), traditional WAN technologies are falling short of meeting customer needs.

Competition in the Converged Network

Network convergence is the combination into a single network of emerging technologies and network architecture designs used to migrate voice and data networks. Specifically, network convergence describes the transition from separate circuit-switched voice networks and packet-switched data networks, to a single packet-switched network supporting both voice and data protocols.

Convergence creates many advantages. IT has only one network to manage its applications. The equipment required to support the WAN is generally reduced, and different applications fill the gaps in one another's usage, so the bandwidth is maximized. IT resources can truly get more done with less.

Unfortunately, the various applications that are converging over the network require different amounts of bandwidth. They also ebb and flow in wildly different patterns and require different standards be maintained for proper operation. For the promise of convergence to become an advantageous reality, the network itself must be able to account for these varying types of traffic and ensure their overall needs are met.

It's Not Just a Bandwidth Issue

Thanks to convergence, speed and uptime as the measurement of a WAN's effectiveness are quickly being augmented by class and quality of service. Class of service (COS) is a network's ability to classify and treat traffic differently based on the type of data, while quality of service (QOS) applies to how the "classified" traffic is handled. This enables network managers to prioritize traffic types.

Internet browsing, for instance, requires very low quality. If there is a slight delay in delivery, it is hardly noticed by the end user. In fact, sometimes it's even expected.

Meanwhile, VoIP requires a significantly higher QOS. When end users pick up the phone, they expect to hear a dial tone. When they speak to the other party, they expect well-timed and smooth audio. Voice is transmitted more evenly over greater periods of time (a data stream). As a result, the quality of data transmission (packet loss, latency or jitter) can greatly affect the quality of a call.

By applying different types of QOS to the different COS, greater efficiency and increased quality can be delivered simultaneously over the WAN.

Disaster Recovery to Avoid Disruption

Besides new applications on the converged network, IT managers are looking for ways to make their WAN infrastructure more resilient. Most traditional WANs are built with a host location serving the data needs of the entire network. In the event that the host experiences some form of outage or disaster, the remaining sites lose connectivity to host-based applications and resources. One way to address this is to replicate the "back office" of the company at a second location or a disaster recovery center.

Traditional WANs do not scale well, and as a result, IT managers are left to completely replicate existing networks around a second host to accomplish disaster recovery. When the secondary WAN is in place, IT Managers must turn to data virtualization or replication tools to keep the secondary site up to date -- adding yet another application for the converged network to contend with.

Enter MLPS

Multiprotocol label switching (MPLS) is the first carrier-class WAN technology to support end-to-end COS and QOS in the network.

MPLS, traditionally delivered through standard "last mile" technologies such as T1 or DS3, simplifies and improves IP-packet exchange. With MPLS, a short label is added to each IP packet.

Subsequent routing decisions are made based on the label, allowing core network routers to operate at higher speeds without having to examine each packet in detail. The label also contains information about how the data should be prioritized (QOS), and allows service providers to deliver private networks for customers over their core network.

The Benefits of MPLS

The ability to use a provider's common network infrastructure, coupled with the advanced abilities of identifying destination, priorities, and handling instructions for every packet, creates distinct advantages for MPLS over other traditional WAN methodologies.

The following are inherent benefits of MPLS:

- **Traffic isolation for privacy.** MPLS separates traffic to ensure privacy between the service provider's customers. MPLS isolates the traffic by containing routes within a separate VRF (virtual route forwarding table).
- **Enables Class and Quality of Service.** MPLS allows service providers to assign class of service based on prioritization of traffic and bandwidth reservation in the network. This allows the customer to implement diverse applications in the network without worrying about performance degradation. Local and edge devices must apply the appropriate tagging for the network to honor it, so organizations should make sure they have the expertise to ensure end-to-end QOS.
- **Reduces network complexity.** Because of its inherently meshed topology, MPLS reduces network complexity and cost. Every site sees every other site by default.
- **Disaster recovery readiness.** Because sites on an MPLS virtual private network are fully meshed intrinsically, the network is natively ready for use in a disaster recovery plan. Any additional site on the WAN can easily operate as a failover site without necessitating the time and expense of replicating the network. Data virtualization and replication can easily be protected to ensure instantaneous recovery across the network without interfering with mission-critical applications such as VoIP.
- **Scalability.** Sites require only a connection to the MPLS network. New sites require a very basic hardware setup and configuration to become part of the meshed network.

Next-Generation Business Networks

Many carriers have begun turning down traditional WAN offerings in favor of MPLS and blending multiple carrier services over a single circuit for better economies of scale.

For businesses with a traditional WAN infrastructure, the time is now to consider moving to MPLS. In many cases, the advantages in quality, disaster recovery and flexibility will keep costs in line while adding value that cannot be achieved through any other means. EOT

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