The Changing Face of VPNs

There's been an enormous proliferation of Internet Protocol (IP) traffic in enterprise networks lately. Internet-based services are growing in leaps and bounds, intranets and extranets are becoming increasingly important, and new applications are being developed that use IP to deliver voice, video, and mission critical data.

The challenge for enterprises is to develop ways to support these changing network requirements, while remaining cost efficient. This is no small task. In their efforts to meet this challenge, enterprises are trying to use the shared public infrastructure for the delivery of private business networking services, a concept known as Virtual Private Networks (VPNs).

Up to now, most IP VPN solutions have relied on the Internet for "best effort" transport. However, more and more carriers are recognizing that they can improve on the delivery of IP traffic by using their own backbone infrastructures to deliver reliable, predictable, value-added VPN services.

Service providers must make sure they're ready to meet this burgeoning demand — they must carefully examine their existing IP infrastructures, and determine if they're capable of supporting emerging VPN requirements.

By implementing IP VPN solutions over a carrier's infrastructure, enterprise customers transfer the day-to-day burdens associated with network maintenance onto the service provider. In doing so, enterprise users have access to a reliable network infrastructure, they receive scalable geographic coverage, and they can achieve significant cost savings by outsourcing router maintenance, minimizing hardware investment costs, and eliminating training expenses. Not surprisingly, service providers are willing to incur the maintenance burden associated with VPNs, because they see it as a substantial opportunity for revenue generation. In fact, it's estimated that the worldwide revenues for this market could exceed $100 billion by the year 2010.

Service providers must make sure they're ready to meet this burgeoning demand — they must carefully examine their existing IP infrastructures, and determine if they're capable of supporting emerging VPN requirements. For example, if providers are going to support voice, video and mission critical data in addition to the conventional e-mail, file transfer, and Web traffic, their VPN infrastructures must be highly scalable with predictable traffic delivery, maximized routing throughput, and reduced latency. These infrastructures must also offer Quality of Service (QoS) guarantees that are tied directly to service level agreements (SLAs) and end-to-end network management capabilities that facilitate the deployment of VPN services. In addition, as enterprise applications are extended across floors, buildings, and even between cities, VPN infrastructures must offer a tighter integration between LAN and WAN environments.

Carrier Scale Internetworking (CSI) is an open, standards-based solutions framework that makes this possible. Developed by Newbridge Networks and other industry leading vendors, CSI enables service providers to deliver scalable, reliable, and easy to manage VPNs to enterprise customers. By marrying IP technology with existing carrier ATM infrastructures, CSI offers a foundation for a unique service offering that is both rich in functionality and flexible in design.

The CSI Architecture

The CSI architecture blends the best elements of the Public Switched Telephone Network (PSTN) and the Internet into a homogeneous solutions framework for delivering value-added business services.

The CSI architecture is similar to that of the PSTN in that both use a center-weighted approach for determining how best to deliver network services, and a connection-oriented fabric for the actual delivery of these services. In other words, both CSI and the PSTN separate traffic routing intelligence from traffic forwarding, and employ a connection-oriented fabric (in CSI's case, ATM) for transport. This approach maximizes network scalability, improves reliability, and increases overall throughput. In addition, by centralizing network intelligence within a select number of optimized devices, both architectures enable faster deployment of new services, better end-to-end network management, and improved reliability.

In other respects, the CSI architecture is similar to the Internet. Both provide easy access for IP-enabled hosts, a common foundation for IP-based applications, and a scalable mechanism by which IP traffic can be transported. In addition, both offer a variety of access options for enterprise customers, such as ATM, frame relay, ADSL, TDM and PPP. As a result, both can leverage investments in existing WAN and access equipment, as well as provide a variety of services to different classes of users.

CSI combines the flexibility of the Internet with the scalability, reliability, and management of the PSTN by seamlessly mapping IP information onto a carrier's ATM infrastructure. In doing this, CSI enables service providers to deliver differentiated business services in a cost efficient manner.

CSI
CARRIER SCALE
INTERNETWORKING

CSI is an intelligent internetworking architecture that will revolutionize the way service providers provision advanced IP services to customers.

Rather than the "best-effort", low margin service offerings typical of most IP networks today, CSI enables service providers to sell higher margin, tiered services based on combinations of reliability, quality and features.

Launched as a joint initiative with Siemens and 3Com, Newbridge is actively working with other industry partners to help promote CSI as a premier VPN solution.
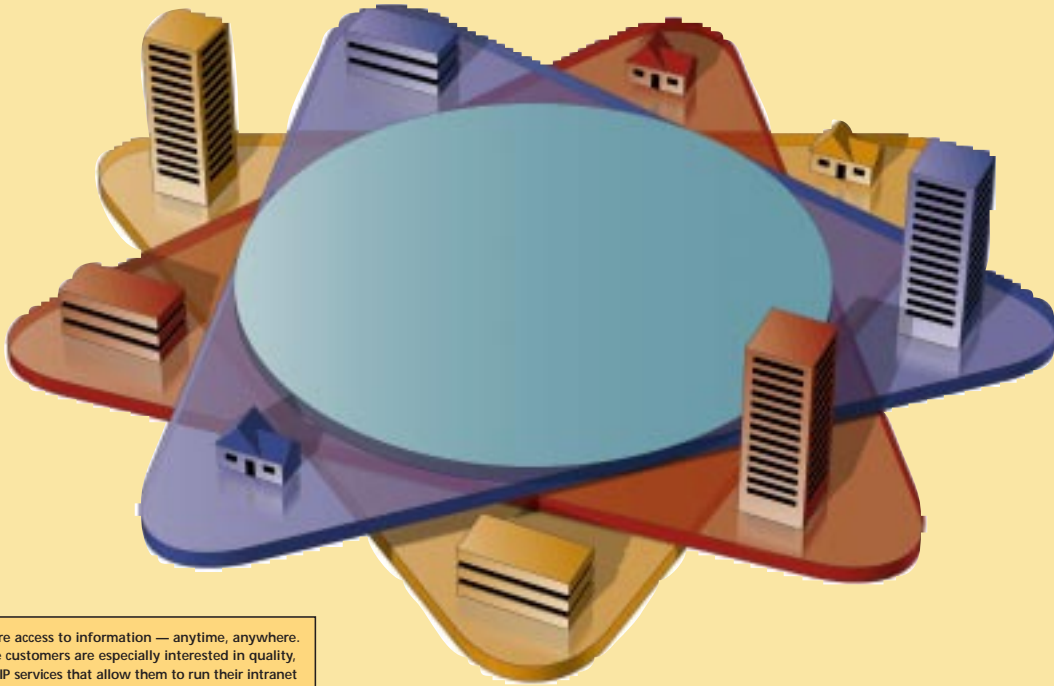
Fast, secure access to information — anytime, anywhere. Enterprise customers are especially interested in quality, managed IP services that allow them to run their intranet and extranet traffic with full firewalled security and guaranteed bandwidth, where and when required.

CSI Applications

With CSI as a foundation, service providers can offer a variety of valuable IP-based services.

Virtual Private Routing Services (VPRS)
In most traditional VPN solutions, service providers offer a transport mechanism by which enterprise customers can connect multiple sites together. Other than providing the bandwidth over which end users tunnel their applications and services, providers of these conventional VPN solutions offer little added value to the enterprise customer.

With CSI, this is no longer the case. That's because CSI offers a way to actually extend services to the enterprise customer. Referred to as Virtual Private Routing Services (VPRS), these services include bridging and routing capabilities, VLANs, directory services, security, and other policies that an enterprise customer might want to include in its VPN network. With CSI, anything that can be implemented in a LAN environment, can now be extended transparently across LAN and WAN boundaries. This offers enormous flexibility in the types of services that enterprise customers can deploy to meet their ever growing, ever changing, network environments. In addition, with advanced service level agreements and sophisticated Quality of Service capabilities, enterprise customers can leverage virtual private routing services with the confidence that their mission critical business demands are being efficiently met by their provider.

Telephony Services
CSI provides an excellent framework for the support of IP telephony applications. In a CSI environment, voice traffic can be transported to enterprise customers over the same link that is used for virtual private routing services. This not only maximizes the usefulness of each connection into a CSI cloud, but it reduces overall telephony costs by bypassing the PSTN.

In a CSI environment, IP telephony traffic is mapped onto an ATM fabric. This enables the appropriate Quality of Service to be applied to each and every telephone call. Not only does this help to guarantee that voice traffic is delivered efficiently, but it ensures that other applications being transmitted over the CSI network are unaffected by these applications.

Video
With IP at the edge, CSI offers plug-and-play support for a variety of different types of standards-compliant video solutions, such as H.323 video teleconferencing and MPEG over IP. With ATM in the core, CSI is able to allocate the appropriate bandwidth and QoS parameters to individual applications that are leveraging these standards. These features make CSI a perfect enabler for any video service, be it unicast, broadcast, or multicast in nature.

With a variety of interface options, including PPP, ISDN, ADSL, and ATM, CSI is a flexible mechanism for the delivery of live video feeds, video on demand, and interactive videoconferencing. Consequently,

By enabling the delivery of virtual private routing services and facilitating access to the public Internet, CSI provides enterprise customers with the tools that are necessary to cost effectively deliver voice, video, and data applications to individual users.
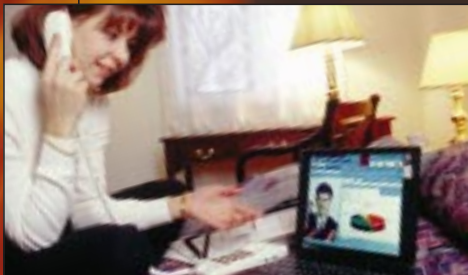
it is ideally suited for telemedicine applications, distance learning, and other multimedia solutions that require cost efficient connectivity between different types of users over a wide geographic boundary.

Access to the Internet

By providing advanced routing services to end users, CSI enables enterprise customers to access any IP application. This includes access to private resources, such as intranet servers and enterprise applications, as well as external services, such as the Internet and secure extranets. With CSI's advanced QoS capabilities and traffic management features, network administrators can prioritize how these different types of traffic are delivered, separating best effort traffic from the delivery of mission critical data. This ensures that network performance is always optimized and predictable in a CSI environment.

With CSI, a single access device, single management platform, and single service contract can be used to deliver both virtual private routing services and access to the public Internet. This reduces administrative hassles, and increases the overall effectiveness of IP service delivery.

Multiservices Remote Access

With the multiservices capabilities of the CSI service points, a variety of access technologies can be used for IP connectivity, such as ISDN, ADSL, and PPP. As a result, CSI is an effective way of extending IP voice, video, and data services to remote users and mobile workers.

In addition, since CSI can be used to access the public Internet, it is an effective means for ISPs to outsource their access business to those providers that can make a profit off of this type of service. This enables ISPs to concentrate on core competencies, such as content creation and Web hosting, while simultaneously improving service by freeing up access congestion on the PSTN.

Making the Right Choice

With the enormous potential associated with IP VPNs, it is estimated that hundreds of billions of dollars will be spent over the next decade on upgrading public IP infrastructures. The goal of this investment is to improve upon the types of services offered to enterprise customers, while making it easier for providers to deliver these services.

Carrier Scale Internetworking, with its unique architecture, makes this possible. By enabling the delivery of virtual private routing services and facilitating access to the public Internet, CSI provides enterprise customers with the tools that are necessary to cost effectively deliver voice, video, and data applications to individual users. With its centralized management scheme, advanced billing capabilities, and scalable infrastructure, CSI makes it more cost efficient for providers to deliver these revenue generating services. Enterprises save money. Service providers make money. CSI creates a win-win environment.

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