Building a Multiservice RBOC Data Service Infrastructure

Solutions Overview

Introduction

With overall growth in the communication services market likely to remain stagnant over the next several years, carriers must seek revenue growth through increased market share. Market share gains can be derived by introducing new or existing services more efficiently to attract customers away from competitors. The challenge is to do so in a way that requires low initial capital investment and ongoing operations costs, with the flexibility to evolve with changing service requirements.

The Long Distance Data Service Market Opportunity

In the U.S. market, the RBOCs and IXCs are poised to begin a battle over the $15 billion long distance (LD) data services market. As the RBOCs meet the requirements of Section 271 (c) (2) (B) of the 1996 telecommunications act, they are in a position to aggressively compete in the LD data services market. (Section 271 (c) (2) (B) restricts RBOCs from offering long distance data services until they have implemented, and the state-level PUC has approved, compliance with a 14-point competitive checklist providing non-discriminatory access to each checklist item.)

This battle is made more poignant by the declines in IXC and RBOC voice revenue and slower-than-anticipated growth in data service demand. The victors will be those who can efficiently offer the data services demanded by customers today and in the future.

The IXCs will see ever-increasing competition from the RBOCs. Yet, it remains to be seen how the RBOCs will build their networks or how the IXCs will react to the competitive threat. What is certain is that both camps will rely on architectural data service network efficiencies to realize competitive advantages.

RBOC Multi-service Expansion Infrastructure Requirements

The starting point for defining any carrier network architecture is to review what assets are already in place that might be used to deliver competitive services or react to a competitive threat. The RBOCs currently have limited LD data infrastructure, little or no out-of-region local infrastructure and extensive in-region local infrastructure. This gives the RBOCs the freedom to deploy an LD data infrastructure that delivers the greatest competitive advantage, makes best use of the local assets available in-region and offers the longest network lifecycle.

The primary challenge facing all RBOCs expanding into the LD market is which technology choice will support the most diverse data service offerings today, with minimal initial capital and ongoing operations costs, while preparing for future service

evolution. The obvious choice is a multi-service edge device, which gives RBOCs the ability to cost effectively launch a complete portfolio of LD data services by deploying a single device in target locations.

To create a complete portfolio of data services, the multi-service device must support both switched and routed data services in a single platform. This enables RBOCs to offer connection-oriented virtual private line services such as ATM or Frame Relay as well as dynamic routed services like Internet or IP VPNs. The transport of these services should be flexible and optimized for the most common traffic carried on the network.

From a services perspective, a multi-service edge provides a number of benefits, including:

Investment Protection: A multi-service edge is future-proof in that it allows the RBOC to transition services over time. A true multi-service edge provides full QoS (Quality of Service), connection switching, and dynamic routing and is equally adept at carrying either cells or packets. This allows the provider to deliver the same service set offered on ATM networks today (QoS and connections) and enable IP services and service features in the future with no additional investment.

Service Agility: The multi-service solution allows an ever-changing portfolio of services. This is critical. To date, data service offerings have been limited by the underlying vendor technology. A device with true service agility changes this by enabling carriers to offer any type of switched or routed service, and to easily support new data services as they evolve. Service agility also requires support for low- to high-speed connectivity over any type of access network.

RBOCs entering the LD data services market have a choice between two types of multi-service edge devices: WAN switches, based on an ATM control plane, or service edge routers, based on an IP-control plane.

WAN Switches: The ATM-based Approach

Given the significant RBOC investment in ATM-based switching equipment within their operating regions, an ATM-based WAN switch appears to leverage existing investment and provide a more unified architecture for RBOC LD data expansion. In fact, ATM-based technology currently provides the infrastructure for extremely successful ATM and Frame Relay services.

However, the majority of traffic carried across these networks is IP. WAN switches lack an IP control plane and are limited in their ability to allow carriers to "IP-enable" or transition customers as IP applications eventually become nearly 100% of traffic traversed across the network. As a result, while RBOCs deploying WAN switches may be able to meet today's revenue-generating ATM/Frame Relay-based service demands, they will lack the flexibility to evolve to support changing service requirements of the future.

In addition, most WAN switches face capacity and interface speed limitations. ATM-based Frame Relay services are running into capacity constraints due to the decision of most ATM device vendors to shift R&D investment from next-generation ATM devices to optical and other technology devices. As a result, RBOCs that want to offer higher speed data services to customers may find that their WAN switches are incapable of growing with customer demand.

Multi-service Edge Router: The IP-based approach

Since the vast majority of networked enterprise data applications use IP, any compelling feature enhancement to existing data services will almost certainly be based on IP. This trend can already be seen in the new data services that have become available in the last few years, including Private IP from WorldCom and IP-enabled Frame Relay from AT&T. As a result, no carrier investing in data switching can ignore the importance of scalable IP routing.

It is important to note that an existing IP or MPLS infrastructure can easily evolve into a multi-service infrastructure. What's critical is that the devices deployed at the edge of the IP/MPLS network are designed with full multi-service capabilities.

Multi-service Edge Routers: Evolutionary or Revolutionary

Some successful edge and core router vendors have attempted to evolve existing core or edge aggregation routers into multi-service edge routers by adding multi-service capabilities to an existing platform. The results have been largely disappointing due to architectural limitations inherent in modern routers.

Core Routers: With their focus on capacity, core routers are not well suited to supporting the sophisticated QoS, bandwidth management and accounting functions required of a service edge router. With hardware optimized for performance over features, core routers are often forced to implement multi-service functions in software, sacrificing performance for functionality. Unlike core routers, service edge routers must support very high densities of lower speed interfaces to aggregate thousands of customers in a single chassis using logical interfaces. This requires a fundamentally different architecture that enables many features on many interfaces without degrading performance.

Edge Aggregation Routers: Designed to terminate traffic from access lines and route it to core routers, edge aggregation routers are typically single-purpose devices optimized for Internet access and pure IP forwarding. They typically lack the QoS, connection management, carrier class availability and service management required to deliver switched data services.

Multiservice from the Ground Up – The ST™200 Service Edge Router: The ST200 is the only edge router designed from the ground up with the hardware and software features required to deliver investment protection and service agility to RBOCs looking to successfully enter the LD data service market. The ST200 includes the QoS and connection management required to offer switched data services, as well as the scalable routing required to offer IP-based services and IP-enable switched services. The ST200 adds another important feature – built-in service agility – that allows carriers to offer any type of switched or routed service over any interface at any speed while evolving services as customer requirements change. And unlike routers designed for best-effort Internet services, the ST200 was designed with the high availability and reliability required for all mission-critical carrier data services.

ST200 Service Agility: The ST200 incorporates a flexible service adaptation engine as a key element in its forwarding and control systems. The result is the ability to support any type of switched or routed data service, today and in the future.

The ST200 *FLEXForwarding Engine*™ performs service adaptation prior to encapsulating and forwarding packets across an MPLS network. The *FLEXForwarding Engine* adaptation features include:

- QoS translation to map code points and create service-specific queuing algorithms
- Service-specific and customizable policers that precisely align with the existing data services
- Service interworking between ATM, Frame Relay and Ethernet to connect customers over multiple access networks
- Traffic shaping and smoothing to ensure interframe gap for traffic going onto the MPLS network and reshape traffic to ensure low jitter on edge interfaces

The ST200 *FlexControl Engine*™ provides extensive signaling and routing protocol interworking to seamlessly tie together ATM, IP and MPLS at the network control layer. This allows critical network topology, address reachability and service information to be translated and passed transparently across an existing IP/MPLS core network.

Together, these features give RBOCs the power to offer any type of switched or routed data service from a single ST200 with the efficiency required to compete effectively.

Conclusion

Regulatory changes and technology innovations have created an opportunity for RBOCs to aggressively expand their presence and offer LD data services. The challenge is to do so in a way that requires low initial capital investment and ongoing operations costs, with the flexibility to evolve with changing service requirements. The ST200 is the only edge router designed from the ground up with the hardware and software features required to deliver investment protection and service agility to RBOCs looking to successfully enter the LD data service market.

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About ECI Telecom
ECI Telecom offers future-ready telecommunications solutions that leading carriers and service providers rely on for delivering revenue-generating services to their business and residential customers. With its current products, ECI can deliver a full complement of access-to-edge IP transport solutions today. Known for its ability to translate customer needs into scalable, flexible, cost-effective solutions, ECI helps companies increase the value of their network infrastructure and reduce operating expenses. The company's single-shelf networking systems simplify network deployment and enable Build-as-You-Grow™ next generation telecommunication networks.

The Data Networking Division
The Data Networking Division (DND) adds next-generation IP/MPLS edge routing technology to ECI Telecom's product and services portfolio. DND's edge routers offer full-featured, multi-service support and complete Internet routing in a carrier-class, IP-based platform. ECI's ST-series routers provide the automated subscriber management, reliability, and performance that service providers need to implement advanced, revenue-generating broadband applications, like video on demand or voice over IP.