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Ascend

Service Strategies – Guide to New Service Offerings
Priority Frame

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ASCEND

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1. The Industry Today and New Services – Overview

Since the introduction of commercial Frame Relay services less than eight years ago, the number of users embracing the technology has grown far beyond industry expectations. Frame Relay's ability to transport data traffic in a simple, economical and efficient manner has led to this widespread acceptance. Industry analysts predict continued growth, with newly increasing port and revenue forecasts based on current user demand. The next wave of expansion will also include an increase in the number of service providers. The pressure of these combined factors will increase competition and put pressure on service providers to offer innovative services and to present those services aggressively at prices attractive to their end users. New delay-sensitive applications, including SNA and voice, will continue to promote Frame Relay growth as users migrate to new Frame Relay services. New services also mean that service providers can expand their addressable market and increase their revenue.

The catalyst for widespread migration of these applications will be the delivery of Frame Relay services with Quality of Service (QoS) in terms of Service Level Agreements (SLAs). SLAs allow service providers to deliver proof of delivery in an easy-to-understand method. SLA reports display information for network delay and network throughput. SLA reports are designed to meet the requirements of the end user as well as the service providers.

2. Service Opportunity

Frame Relay service revenue will grow to $10B by 2000, a compound annual growth rate of 55% over the next three years, as depicted in Figure 1.
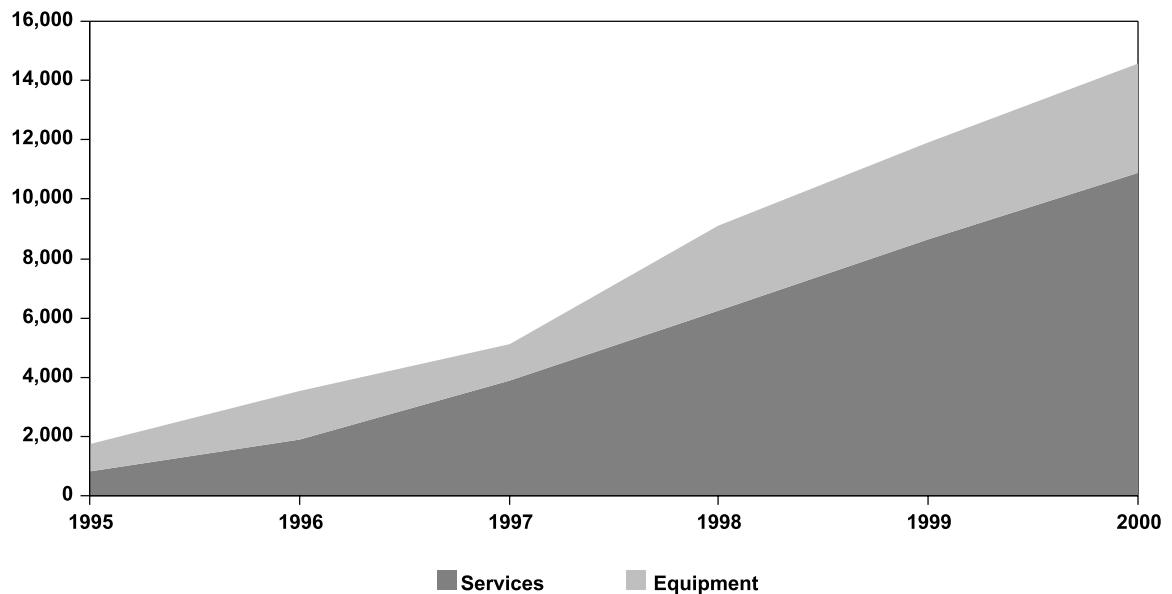

Figure 1 – Worldwide Frame Relay Market – Service Revenue Growth

Source: Vertical Systems 8/97

3.   The Need for Value-added Frame Relay Services

Frame Relay has traditionally been used for LAN applications. But as traffic demands continue to grow and price per port continues to drop, Frame Relay is being used to support many diverse applications. For example, the potential exists to support mission-critical applications like SNA. Today, approximately 20% of SNA users have migrated to Frame Relay, leaving a large market opportunity for converting SNA users to public Frame Relay. SNA networks require reliability, availability, scalability, low latency, guaranteed delay and SLAs. Until recently, Frame Relay networks guaranteed only bandwidth, not delay. Frame Relay QoS will help service providers meet these requirements and guarantee delivery of SNA traffic. (See Figure 2.)

Frame Relay offers a simple, cost-effective service delivery option. However, its uniform treatment of all applications, including bursty data traffic, does not allow it to deliver the adequate service level guarantees that are required to satisfy typical voice or SNA applications. SNA users are primarily banking and financial institutions and, by their nature, are mission-critical environments. Combine their mission-critical service requirement with SNAs delay-sensitive nature, and you have users who require network services with absolute quality guarantees. Also, with existing Frame Relay technology, corporate IP users have no way to guarantee delivery of their traffic. Today, corporate users accessing business information and teenagers downloading video clips receive the same level of access. As companies rely more heavily on the Internet as a business tool, new priority based services are required.
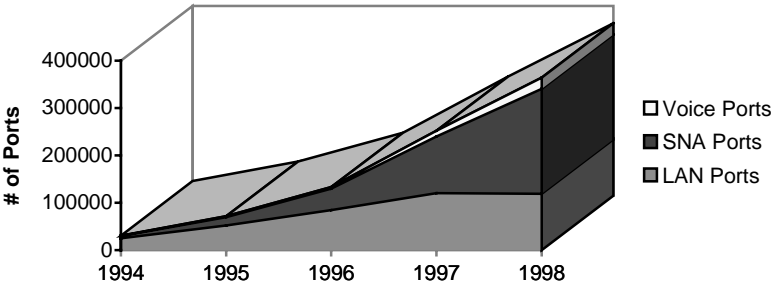

Figure 2 – Growth of Frame Relay Ports by Traffic Type

Source: Vertical Systems 8/96

4.   Existing Technology Limitations

Current technologies are limited in their ability to cost-effectively and efficiently support delay-sensitive applications like SNA and voice. Existing Frame Relay services cannot offer the kind of network guarantees that are required to support SNA and voice. ATM offers the right guarantees through its QoS capabilities, however it does not offer ubiquitous low speed access and is more sophisticated than many users require. A solution is required that will offer network guarantees for throughput *and* network delay. It must be simple, cost-effective *and* scalable.

Frame Relay technology must be expanded to support SLAs whose characteristics include throughput, delay and frame loss. Different levels of service must be available to meet the needs of different applications. This requires that Frame Relay guarantee throughput and delay. Only these multidimensional network guarantees will provide the kind of network delivery required for new Frame Relay SNA and voice services.

5.   Priority Frame Overview

The solution is to guarantee Frame Relay QoS for the new delay-sensitive applications. The Priority Frame™ offering from Ascend Communications, Inc. allows providers to specify multiple elements of quality in a Frame Relay service, including throughput/speed, delay and frame loss. This new technology extends ATM-like QoS to Frame Relay, supporting end-to-end WAN service guarantees. (See Figure 3.)
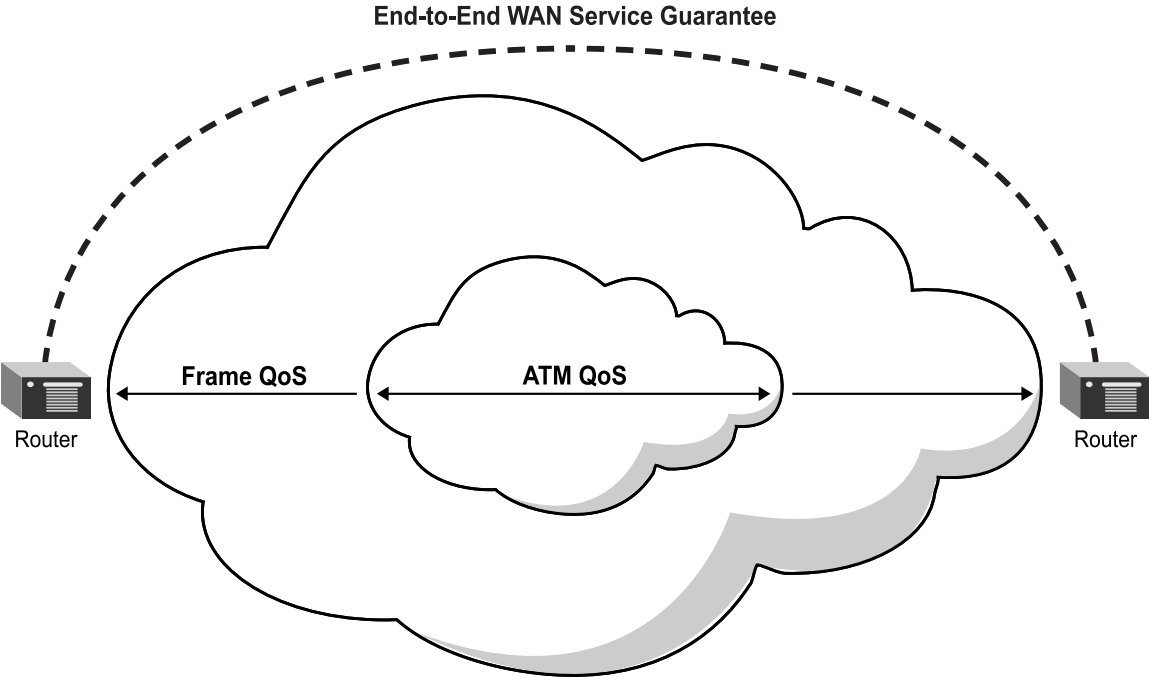

Figure 3 – Priority Frame: Extending ATM-like QoS

The Priority Frame service class system enables a new portfolio of service offerings. The following three new service classes (detailed in Figure 4) comprise the service class system:

- Real Time Variable Frame Rate
- Non-real time Variable Frame Rate
- Unspecified/Available Frame Rate

Real Time Variable Frame Rate (rtVFR) service provides committed bandwidth, low delay and frame loss. This enables service providers to create SLAs with specified delivery characteristics for delay-sensitive traffic like SNA and voice.

Non-Real Time Variable Frame Rate (nrtVFR) service provides committed bandwidth, higher delay and low frame loss. *This enables LAN-to-LAN and business class Internet/Intranet access services.*

Available/Unspecified Frame Rate (AFR/UFR) provides a best-effort service using any remaining bandwidth. *This enables e-mail, file transfer and residential Internet access services.*

Priority Frame prioritizes traffic separately within each class of service and ensures that sufficient network resources are reserved to guarantee bandwidth and delay. Priority Frame allows users to select a path through the network using both administrative and delay metrics. By guaranteeing maximum levels of delay, Priority Frame supports new Frame Relay services for many delay-sensitive applications. The new service offerings (also detailed in Figure 4) that are made possible by the service class system include the following:

- Mission-critical SNA
- Prioritized LAN Interconnect and Internet Access
- Classes of Service (first, business, economy)
- Backup Options (Fault tolerant PVC and priority reroute)
- High-quality voice
- Videoconferencing
- Video on demand
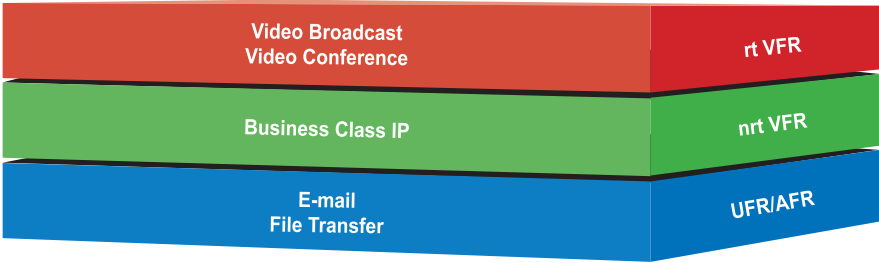- Distance learning
- Intranet

Figure 4 – New Service Classes Enabling New Service Offerings

Expanded Service Offerings

With Priority Frame, end users now have new options for service classes and pricing. Further, subscribers running delay-sensitive applications have reliable options for migrating to Frame Relay services. SNA users can move to Frame Relay with confidence, using a SNA Frame Relay service based on rtVFR class of service. Solutions for improving packetized voice quality will be available through rtVFR. The rtVFR class can also support corporate videoconferencing or video broadcast for distance learning applications. IP traffic will be prioritized at different levels, using nrtVFR for high priority corporate Internet or Intranet access and UFR Frame for lower priority residential Internet access.

Service Provider Solutions

The predicted Frame Relay growth cannot be accomplished on the bandwidth-only Frame Relay service offerings that are supported by today's Frame Relay technology. Today's Frame Relay technology guarantees how much information the network will deliver – with no guarantee when the information will be delivered. These offerings compete on one dimension – price, providing little differentiation and leaving providers vulnerable to price wars. Eroding prices will make new Frame Relay rollouts less profitable, reducing the ability to leverage the existing Frame Relay infrastructure and operational knowledge. With Priority Frame, service providers can leverage the existing infrastructure to offer and support new applications, thereby generating more revenue.

Frame Relay technology must be expanded from a single service definition to a value-added transport for multiple services. From a single dimensional service to a multidimensional service – this is the function of Priority Frame. Through Priority Frame, service providers have new, *differentiable* service offerings. (See Figure 5.)
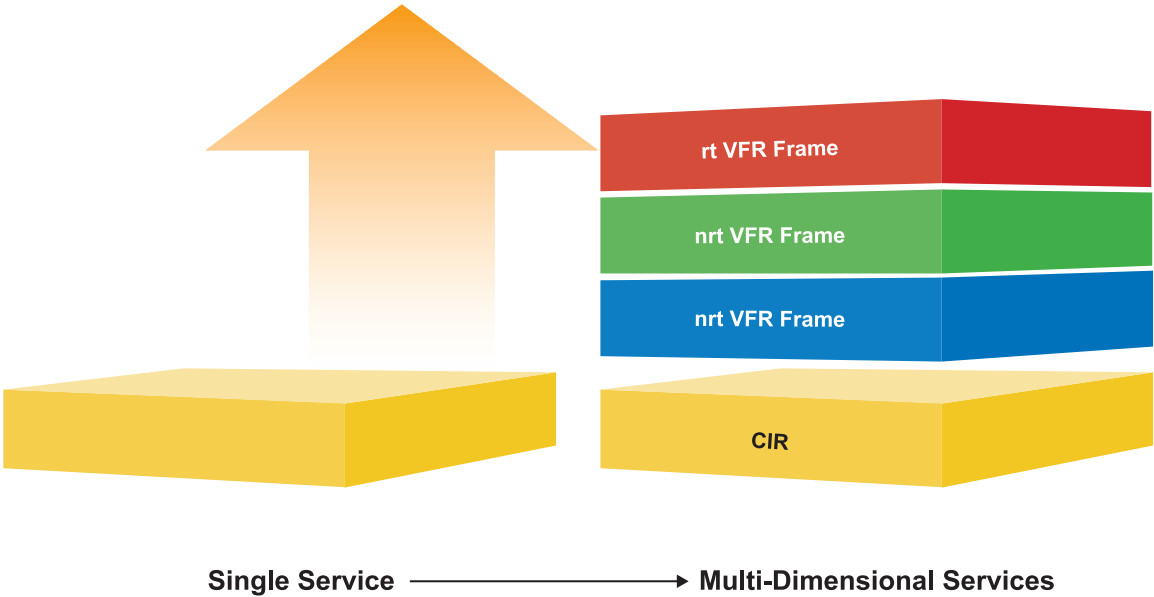

Figure 5 – Differentiable Service Offerings Available Through Priority Frame

Priority Frame allows service providers to reliably carry new services over the existing infrastructure. Priority Frame guarantees bandwidth with a new dimension. It agrees to deliver a specified amount of information, within a specified period of time. Services can now be differentiated based on the maximum amount of delay that the network will deliver. New mission-critical applications with different network delivery requirements can now be supported on Frame Relay. With these new capabilities, Frame Relay moves from a commodity to a value-added service. Priority Frame allows service providers to differentiate their services, providing new ways to compete other than price. And because Priority Frame is a simple software upgrade, service providers can offer new services quickly and cost-effectively, utilizing the existing infrastructure, generating increased revenue with little added cost, and responding quickly to subscriber demand.

Virtual Network Navigator (VNN) and Navis network management offer service providers powerful tools for provisioning new Priority Frame services. VNN provides quality-aware routing, automatically selecting paths through the network that will support the guaranteed SLAs. In addition, the NavisXtend family of network management applications delivers superior service control of the Frame Relay network, by providing applications such as Report Generator, which generates SLA reports.

6. Applications and Priority Frame Services

Only Ascend lets you provide these Frame Relay services:

- Mission-critical SNA services
- Priority LAN interconnect
- High-quality packetized voice
- Video on Demand/Videoconferencing

Mission-critical SNA Services

Target subscribers
Mission-critical SNA users including banks and financial institutions

Services
Branch office SNA access, IP for LAN interconnect, packetized voice

As the trend moves to outsourcing network capabilities, the demand for SNA over Frame Relay becomes enormous. However, given the delay-sensitive nature of most SNA applications, many users are reluctant to utilize public services until network delay and delay variance guarantees are ensured. Priority Frame allows service providers to offer these network guarantees. The rtVFR services offer minimal delay and delay variance, making them well suited to SNA applications. Priority Frame service classes also support the other branch office applications, such as voice with rtVFR Frame service and LAN interconnect with nrtVFR Frame service. With Priority Frame, providers have a full portfolio of offerings to support SNA users. (See Figure 6.)
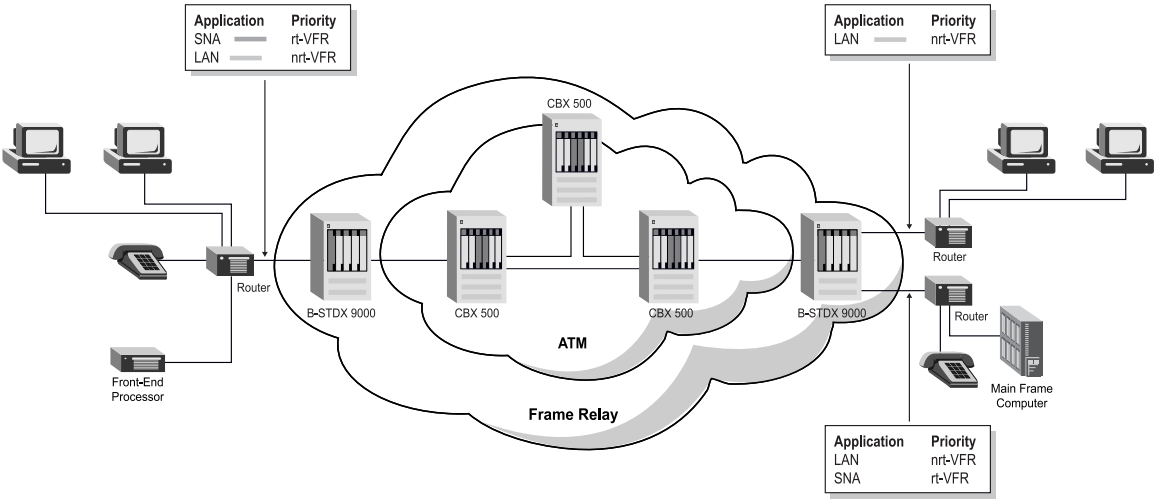

Figure 6 – Mission-Critical SNA Services

Priority Internet Access

Target subscribers
Internet subscribers

Services
Priority-based Web access, Web server hosting

The application in Figure 7 uses Priority Frame to provide unique Internet services. Priority Frame allows service providers to offer guaranteed levels of service based on the user's requirement. Corporate sites can select a higher priority Internet access service with an nrtVFR PVC. Residential users can obtain inexpensive UFR services that will not interfere with the higher priority corporate users.
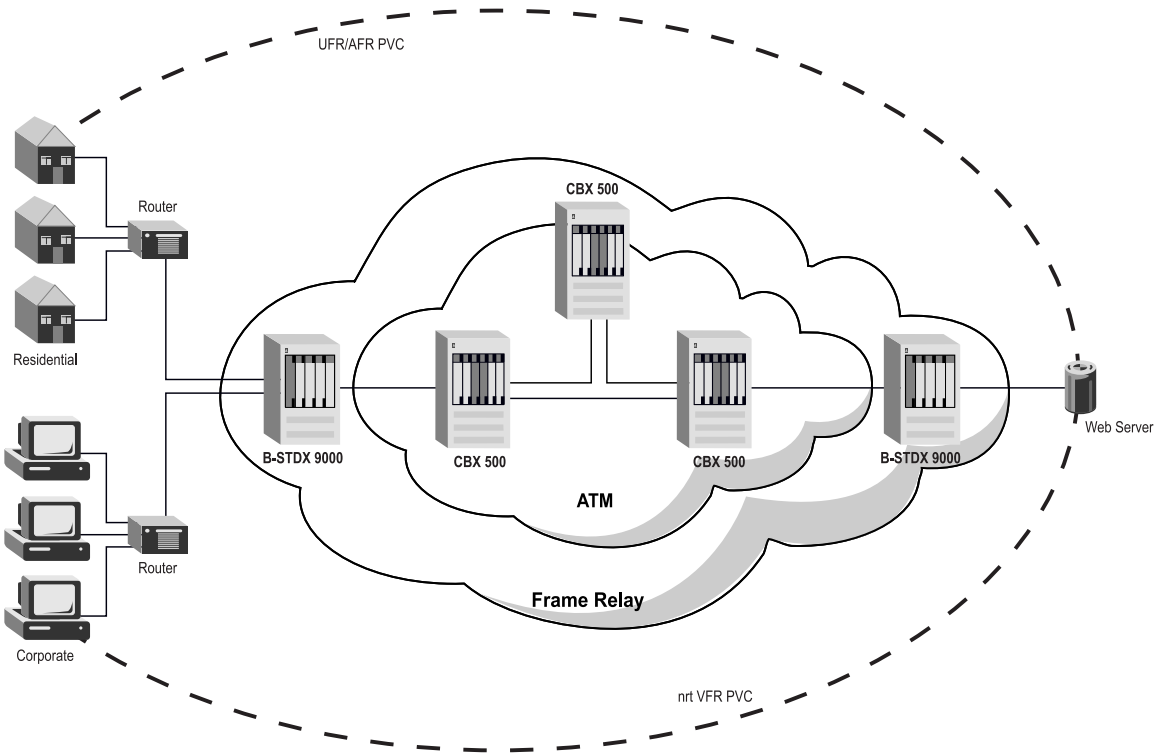
Figure 7 – Differentiated Internet Services

Video Services – Video on Demand, Videoconferencing

Target subscribers

Corporate customers with branch offices, educational facilities

Services

Videoconferencing, video-on-demand, video broadcast

End user demand for video services is growing, requiring service providers to find network delivery tools to handle this delay-sensitive traffic. Three types of applications are in demand. (See Figure 8.) The first is Video on Demand, where users access server-based video clips. The second is video broadcast, where live or taped video is broadcast to multiple locations. This is often used for lectures or distance learning applications. Both of these applications require one-way delivery of the service. The third application is videoconferencing with real time, two-way interaction. This is often a corporate means of cutting travel costs, by allowing remotely located employees to conduct virtual meetings. Priority Frame rtVFR class of service allows service providers to deliver all three types of video applications with guaranteed low delay.
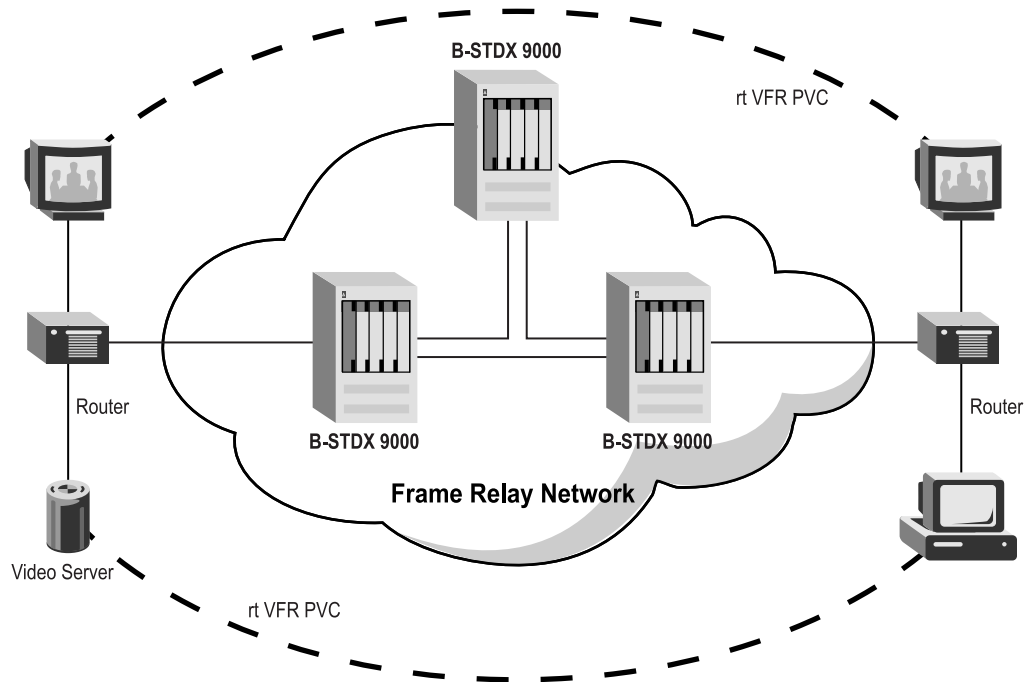

Figure 8 – Video Services

7. Conclusion

Through its Priority Frame technology, Ascend is now the only vendor to offer absolute quality guarantees for Frame Relay. Priority Frame moves Frame Relay from a commodity service to a value-added service that supports new applications with different network delivery requirements. This will enable service providers to meet the increased demand for mission critical services like SNA and voice, thereby increasing their addressable market and revenue. At the same time, Priority Frame preserves the simplicity, economy and familiarity of the existing Frame Relay infrastructure for maximum return on a minimum additional investment, ensuring the continued success of Frame Relay in data networking.