



Ascend's Virtual Private Network Strategy

*MultiVPN: Public Services,
Private Networks*



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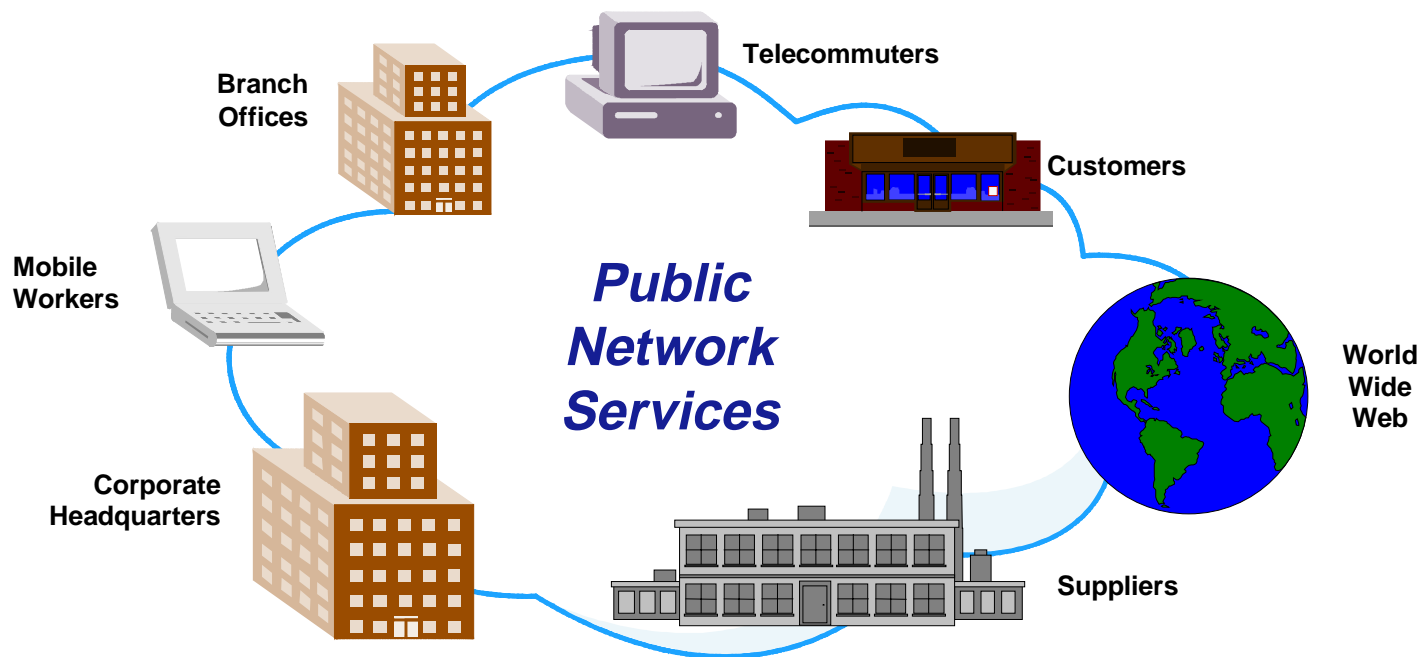
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What are VPNs?

VPNs utilize the *public* network infrastructure for *private* enterprise communications ...





Hurdles to Implementation

Enterprises

Increase Flexibility Add
Capabilities Extend Reach
Save Money/Simplify

Enterprises

Manageability

Availability/SLA

Compatibility/
Security

Service Providers

Huge business
opportunity with new
service and channel
expansion

Service Providers

CNM

Service Mgt

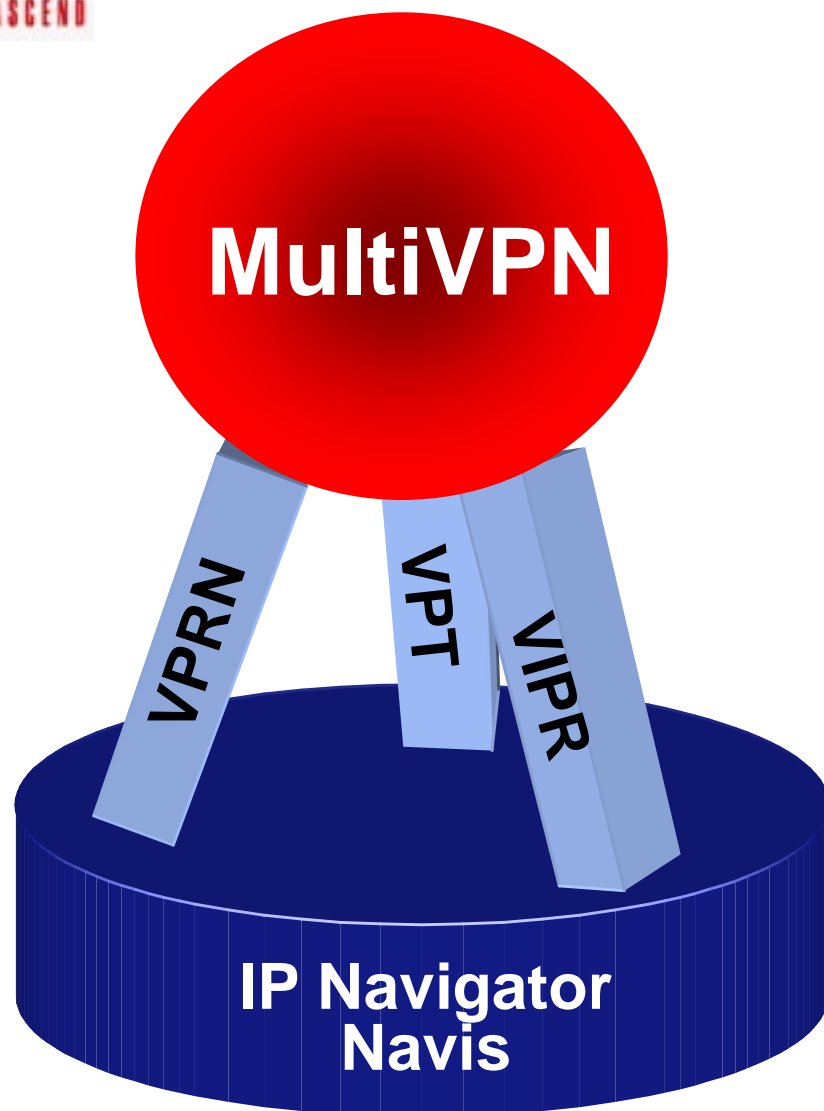
High-Availability
Services/SLA



Ascend's VPN Strategy



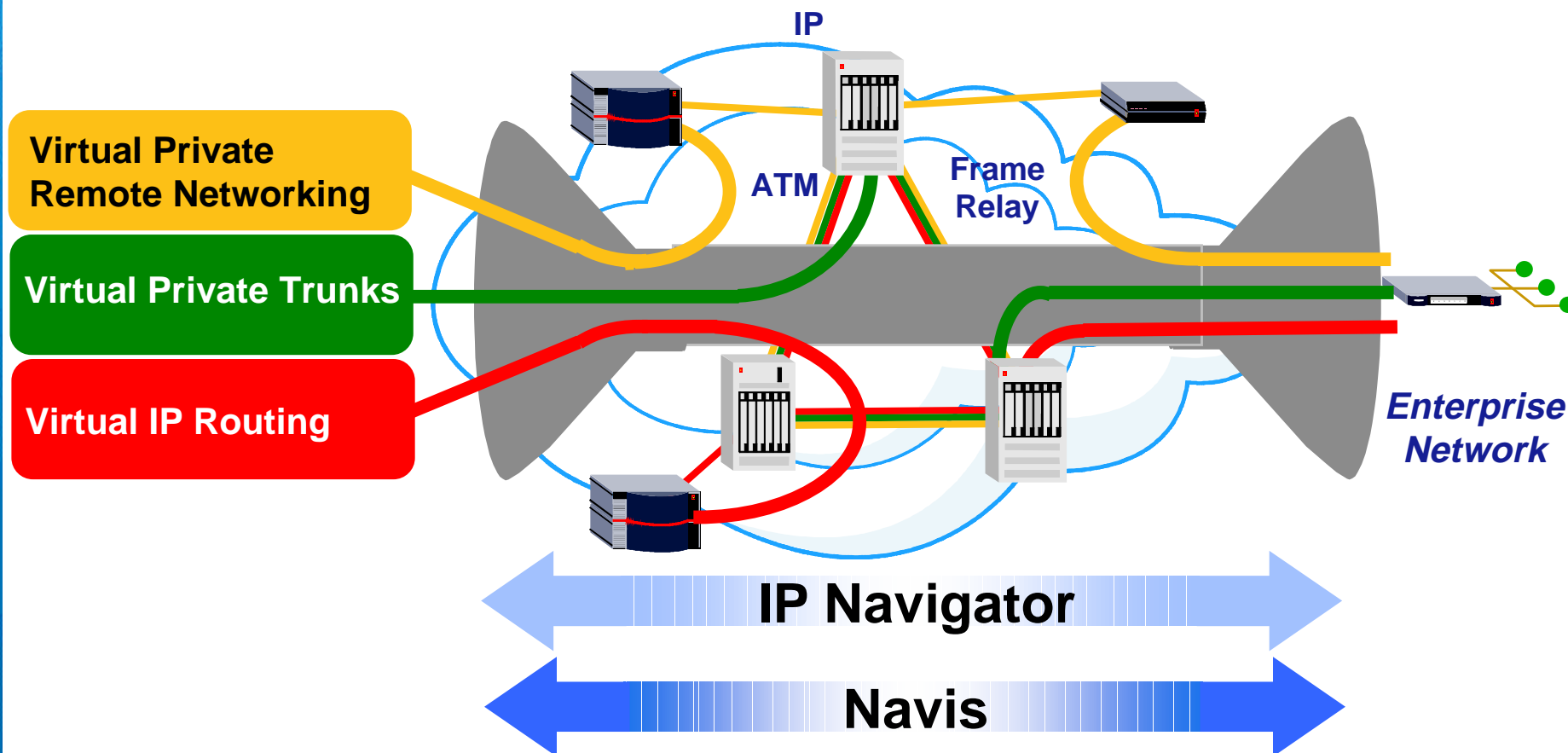
MultiVPN™



- **MultiVPN: Ascend's Provider/Subscriber VPN Architecture**
- **MultiVPN Solutions**
 - ◆ VPRN:
Virtual Private Remote Networking
 - ◆ VPT:
Virtual Private Trunking
 - ◆ VIPR:
Virtual IP Routing
- **IP Navigator™ for BW Management, Virtual Routing, and Absolute QoS**
- **Navis Management Foundation**
 - ◆ Complete Service Management
 - ◆ Comprehensive Enterprise Management



Ascend's MultiVPN™



MultiVPN represent the physical or logical paths that replace the many lines in a private network



MultiVPN™: VPRN

Virtual Private Remote Networking

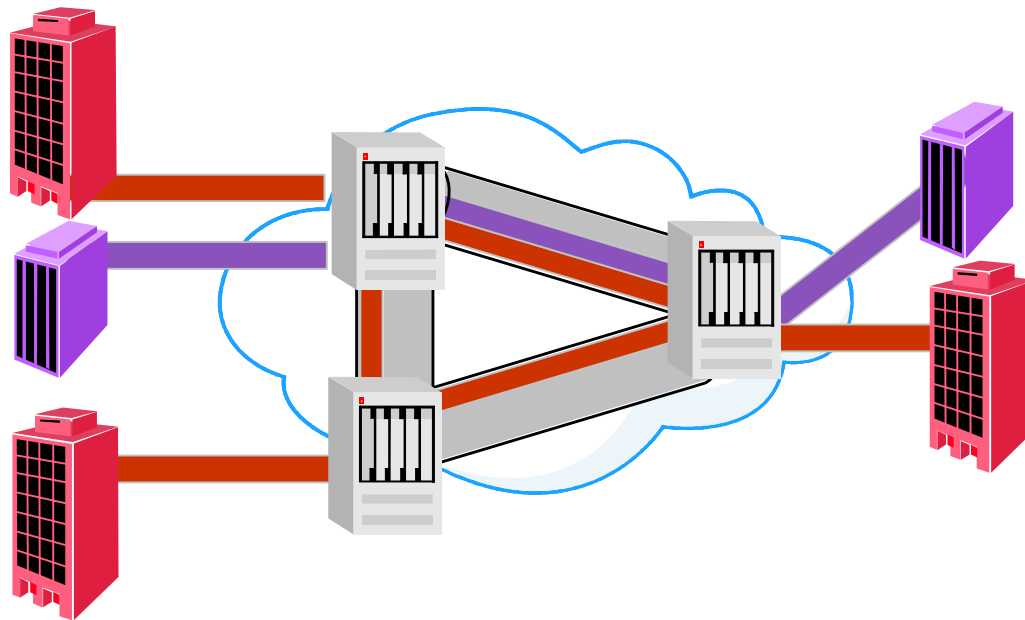


- **Subscriber:** My traffic can go anywhere in the World - w/ QoS
- **Provider:** Leverages existing IP/Internet infrastructure
- **Basic VPN service,** commonly other vendors' entire VPN approach
- **Internet-based VPNs**

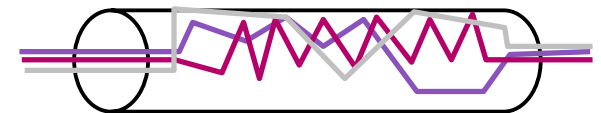


MultiVPN™: VPT

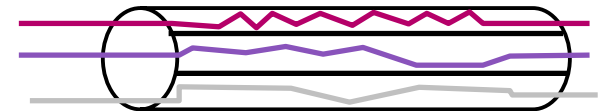
Virtual Private Trunking



Before VPN



After VPN

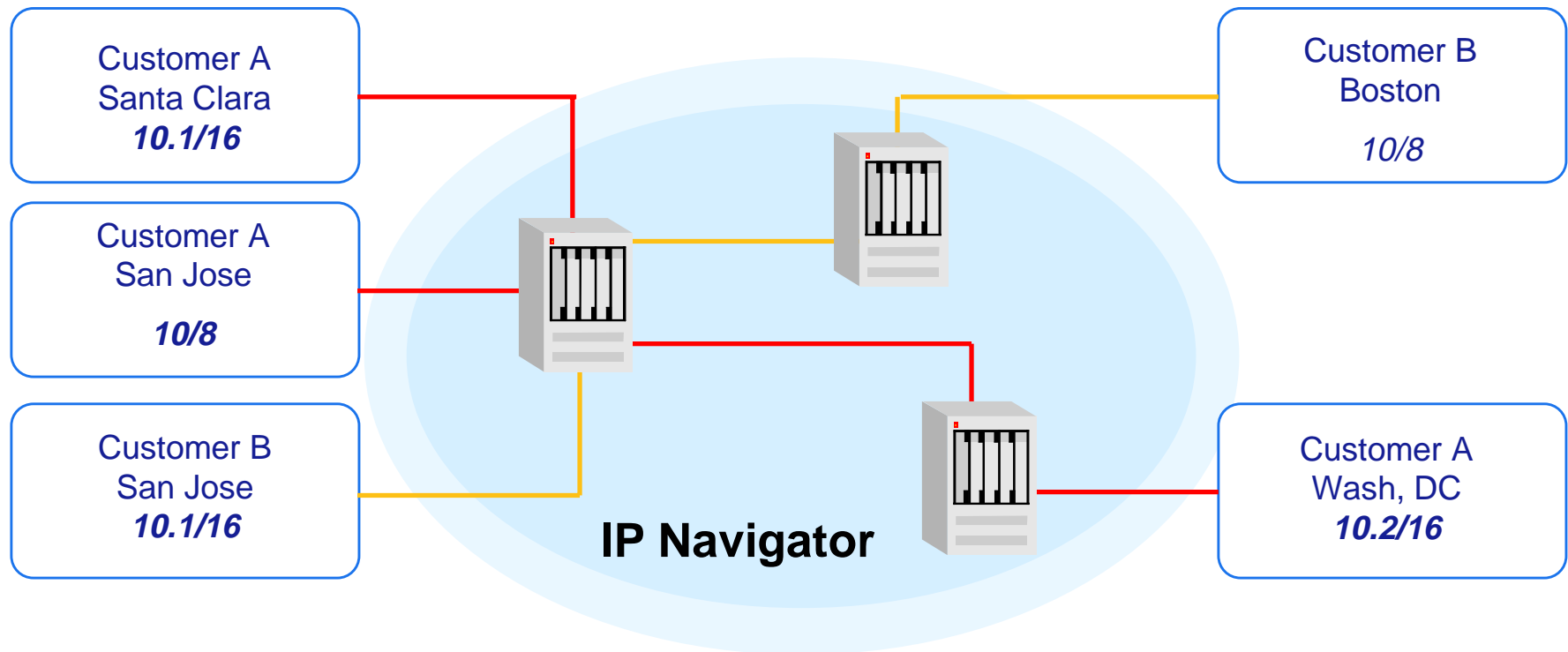


- Portion of FR/ATM trunk dedicated to interconnect sites
- Subscriber: VPN Service Level guarantees
- Provider: Common infrastructure for multiple customers

MultiVPN: VIPR



Virtual IP Routing (Utilizing IP Navigator)



- Extends private routing environment over Public Network
- Subscriber: QoS and bandwidth guarantees per VPN
- Provider: New revenue opportunity with existing network

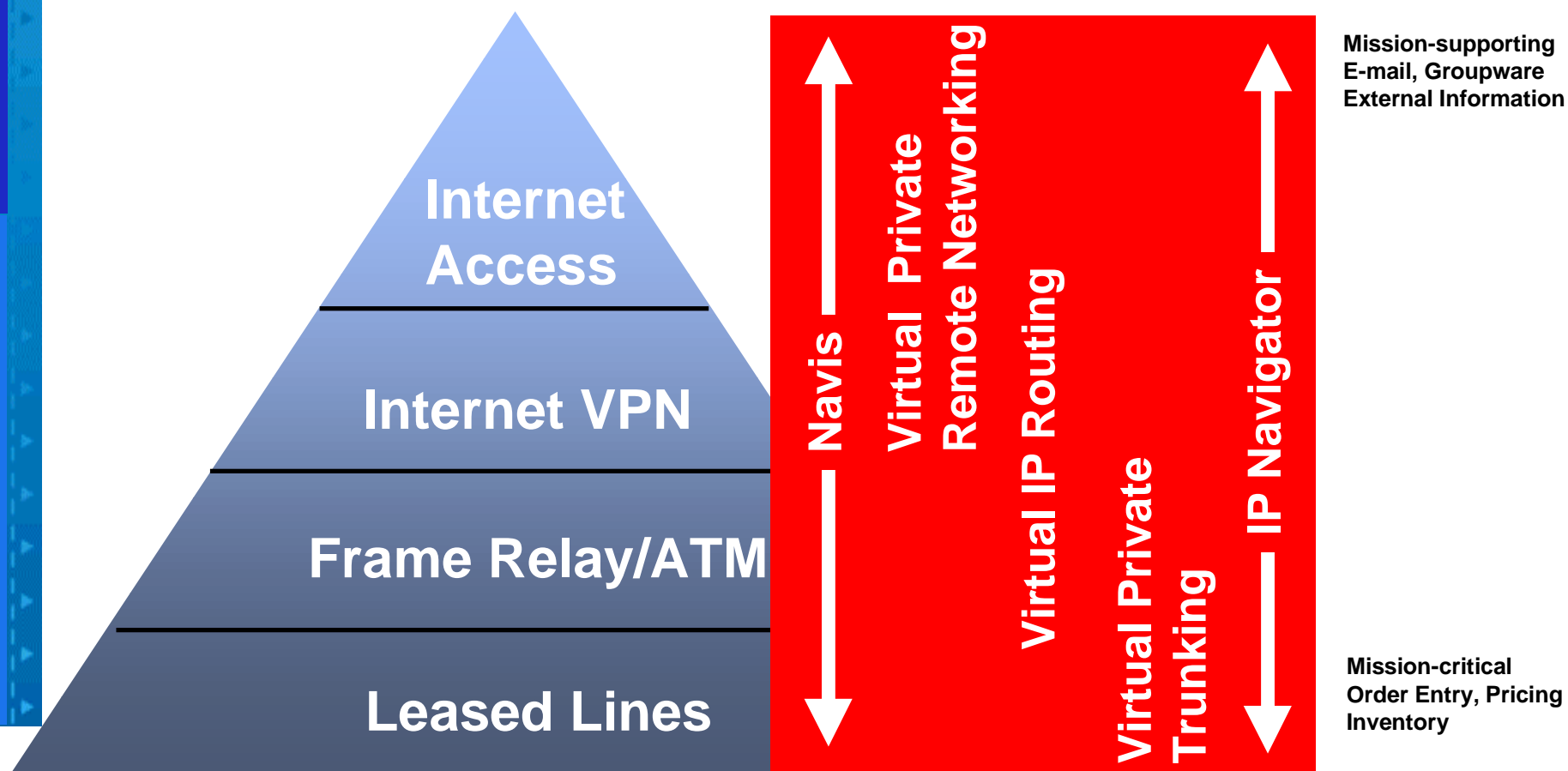


The VPN Continuum

Products/Services

Providers

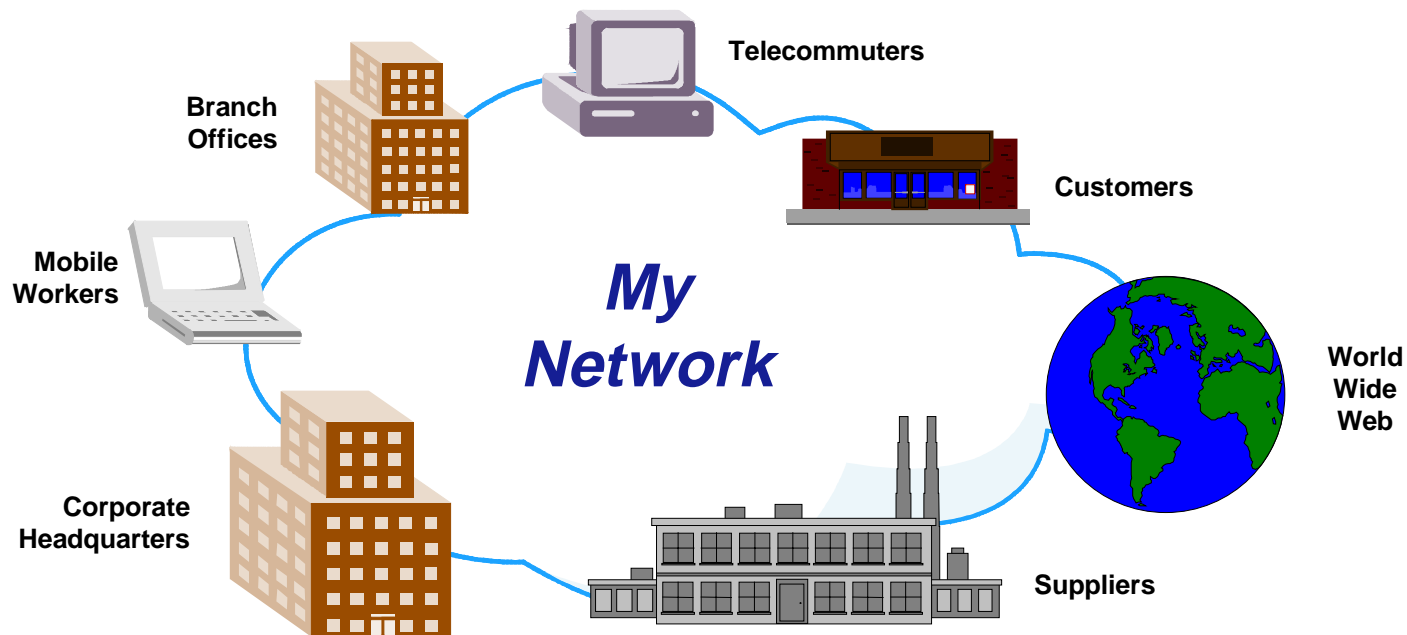
Enterprise
Applications



Source: IDC, 2/98



MultiVPN: The Enterprise View

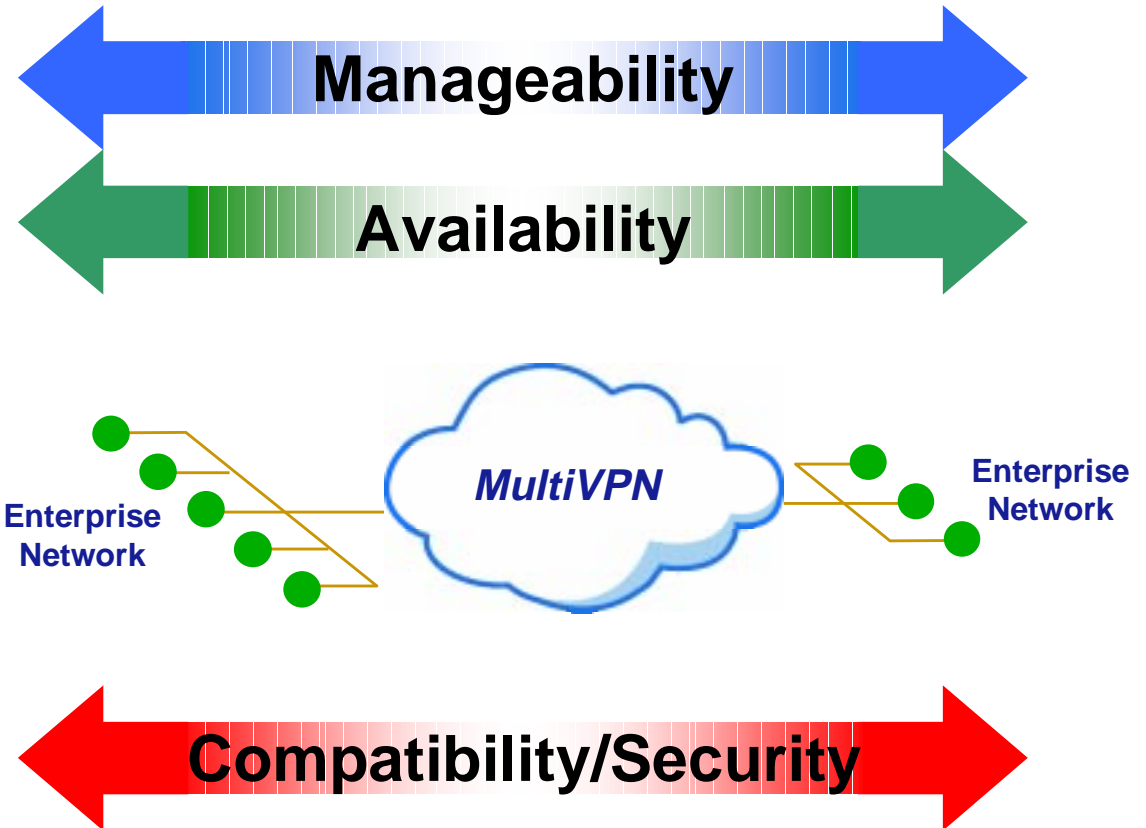


VPNs provide private enterprise and public Internet access—over a single connection for each site/user—with less cost and equal control



MultiVPN Subscriber Strategy

- MultiVPN provides WAN connectivity
- Continuum of products and services
- Facilitate shared provider/subscriber management





Compatibility/Security

Concern: Many existing applications may be incompatible with IP

The Ascend Solution

- **VPRN: Tunnel Private IP and non-IP applications with True Access™ Operating System (TAOS)**
 - ◆ Tunneling Protocols: ATMP, L2TP, PPTP
 - ◆ Security with IPSec, Secure Access Firewall, RADIUS, flexible authentication methods
 - ◆ Directory-Enabled Networks, DHCP, and NAT
- **VPT: Frame Relay and ATM connectivity**
 - ◆ Security consistent with leased line services
- **VIPR: IP Navigator with VPN Routing and Absolute QoS**
 - ◆ Routing environments segregated by customer

MultiVPN makes VPNs compatible with the enterprise

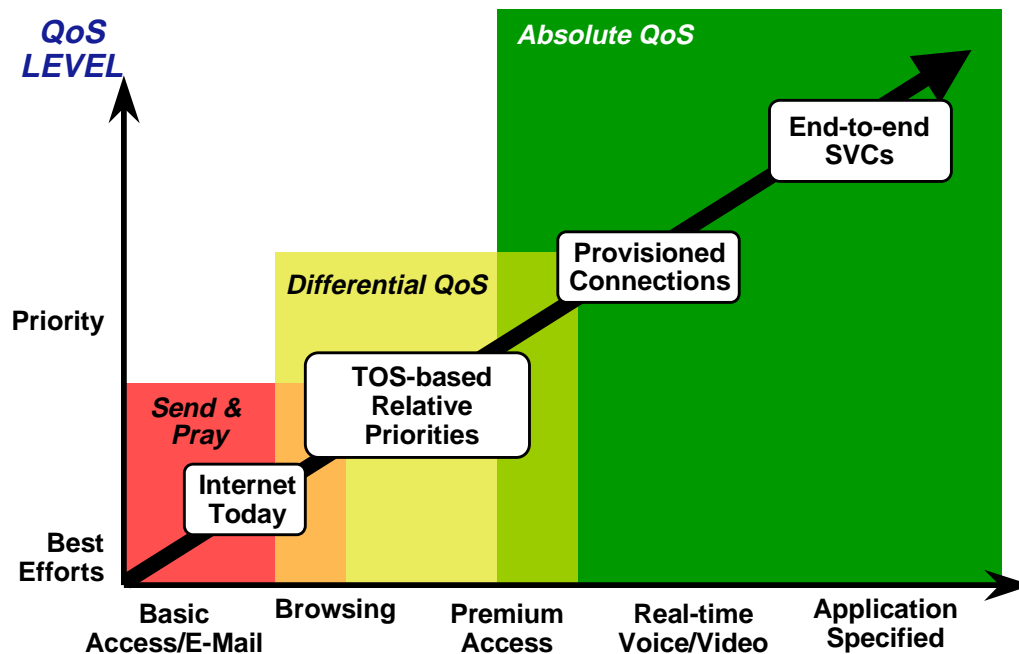


Availability

Concern: VPNs cannot deliver the same uptime and performance as private networks

The Ascend Solution

- Full range of product/Service Fits Any Need
- Absolute QoS for
 - ◆ Guaranteed throughput...
 - ◆ AND never-to-exceed latency
- Service Level Agreements (SLAs) for guaranteed uptime



MultiVPN delivers private network service availability

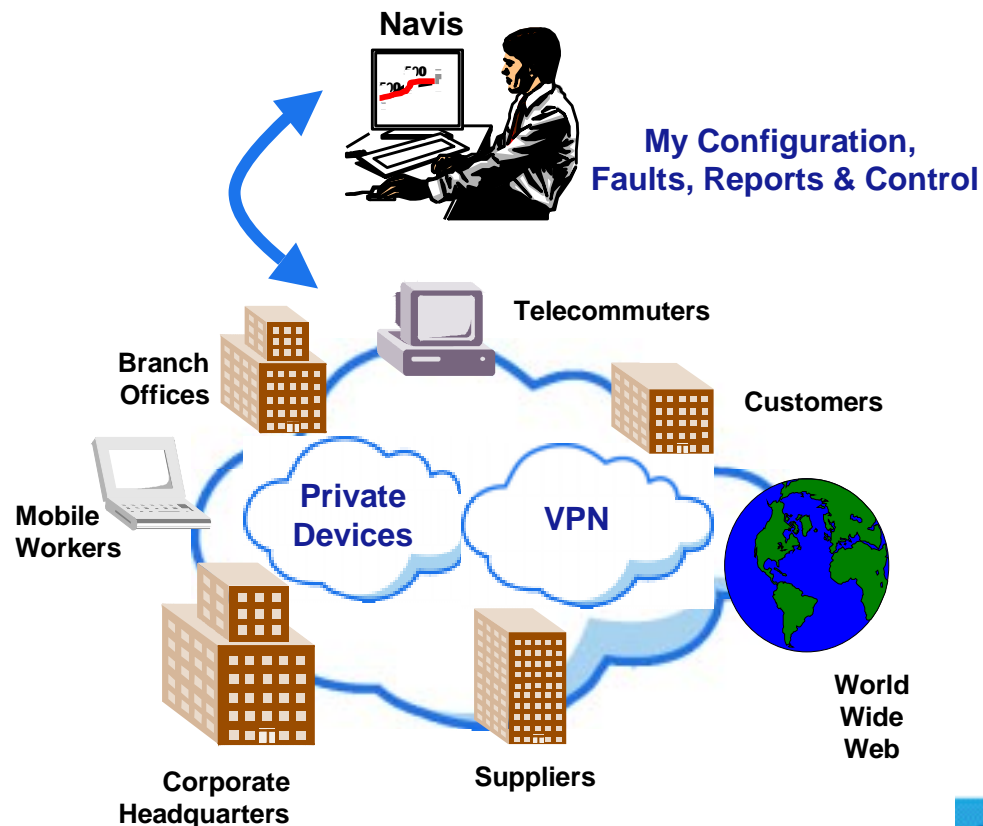


Manageability

Concern: VPNs travel over public transport & the enterprise user loses control

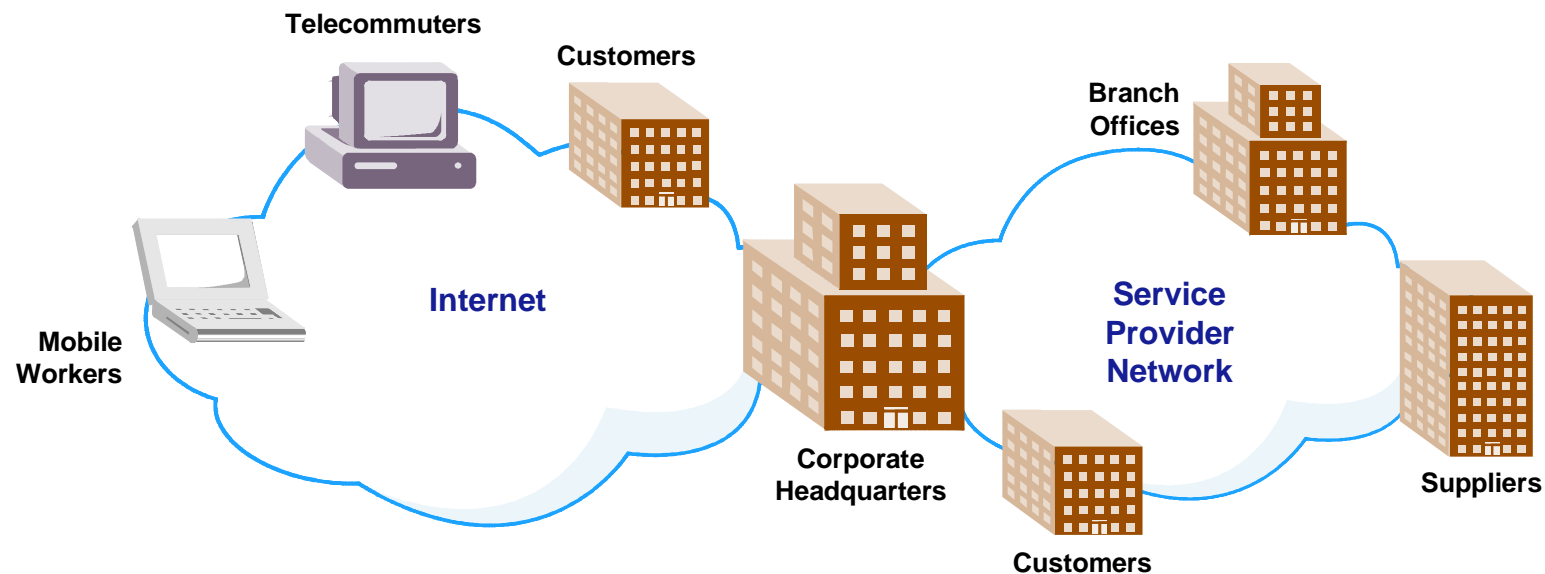
The Ascend Solution

- Navis enables integrated private and VPN management
- Navis provider/subscriber architecture
 - ◆ Navis in Enterprise environment
 - ◆ Navis CNM services enable VPN management integration
- Enterprise Management: visibility of VPN operation and status





MultiVPN: The Service Provider View

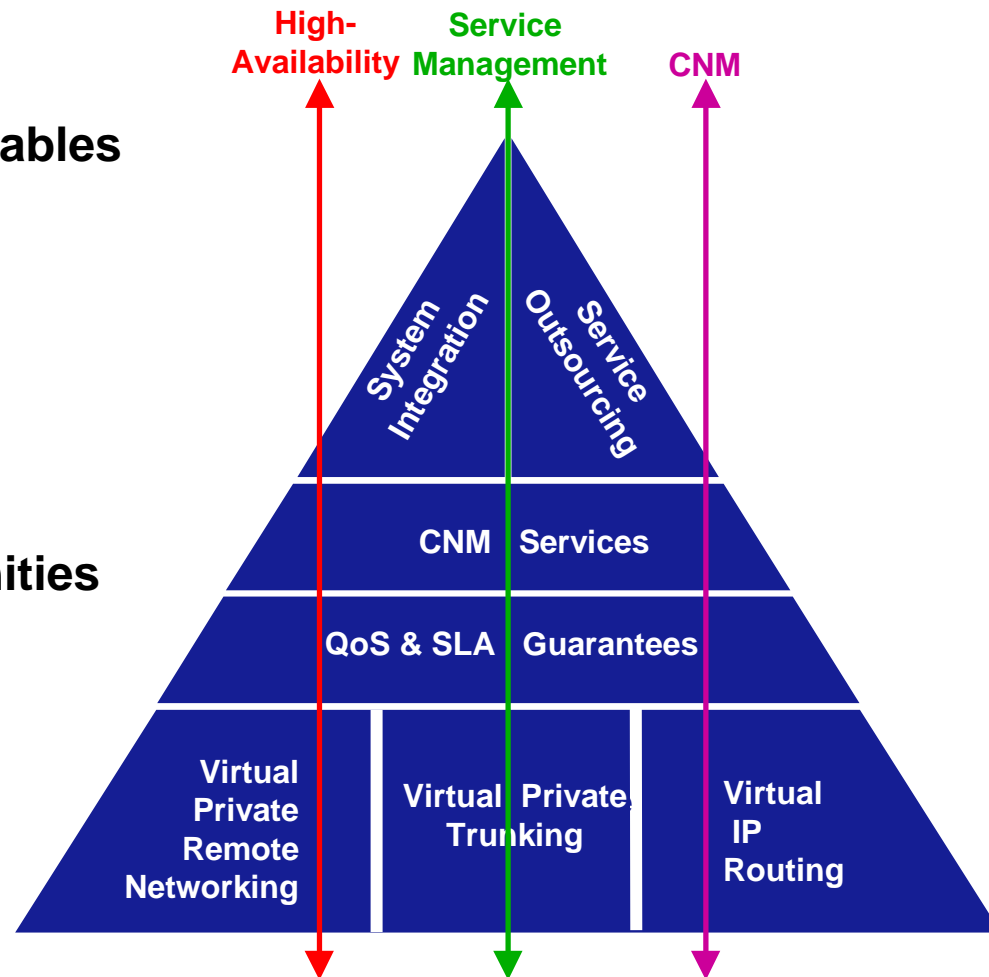


VPNs allow service provider to offer highly differentiated—and profitable—value-added services



MultiVPN Provider Strategy

- MultiVPN infrastructure enables rapid service deployment
- Build VPN service offering over time
- Create value-added service/business opportunities





High Availability

Concern: Network Service Providers must guarantee private network service availability to carry mission-critical traffic

The Ascend Solution

- **Broad range of carrier-class systems**
- **Flexible, rapid deployment of multiple services on common infrastructure**
- **Guaranteed services delivery that matches SLA contract**



Service Management

Concern: Creating and managing profitable services over a single infrastructure and opening access to information

The Ascend Solution

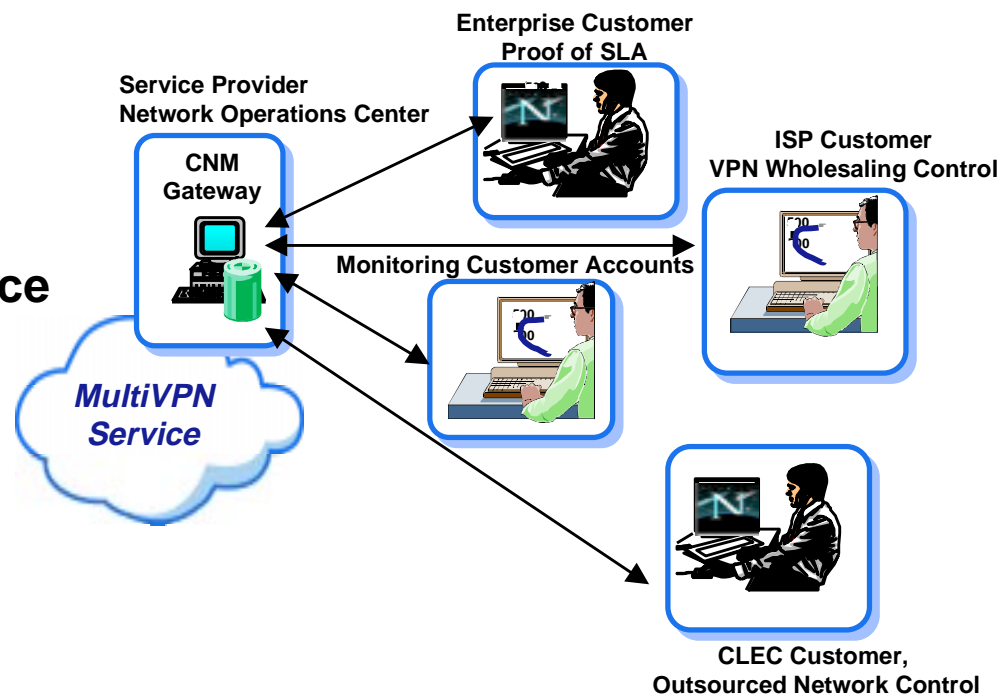
- **Service-Level control from Frame Relay to ATM to Dial**
- **Applications enabling rapid deployment of new services**
- **Comprehensive control over network elements and service metrics**
- **Dramatic reduction in cost of network operations**



Concern: Effective delivery of network management information to subscribers

The Ascend Solution

- Customized access for service subscribers
- Single infrastructure serves many customers
- Secure content and delivery
- SLA reporting





MultiVPN™

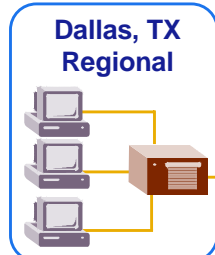
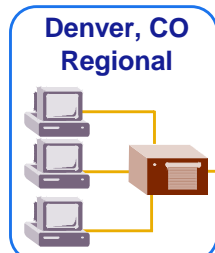
Customer Showcase

Real-World VPNs



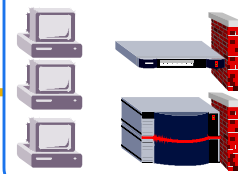
Enterprise VPRN Application

Regional Offices



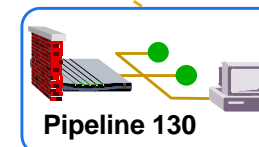
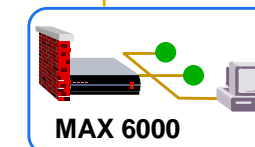
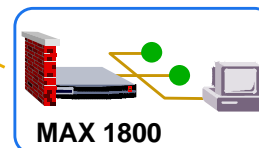
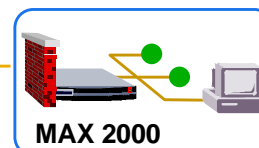
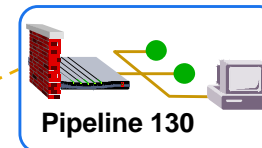
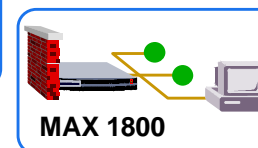
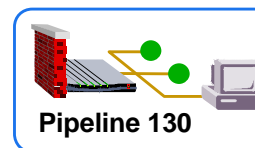
Frame
Relay

Headquarters
Ventura, CA



Pipeline 220's
& MAX TNT

Branch Offices

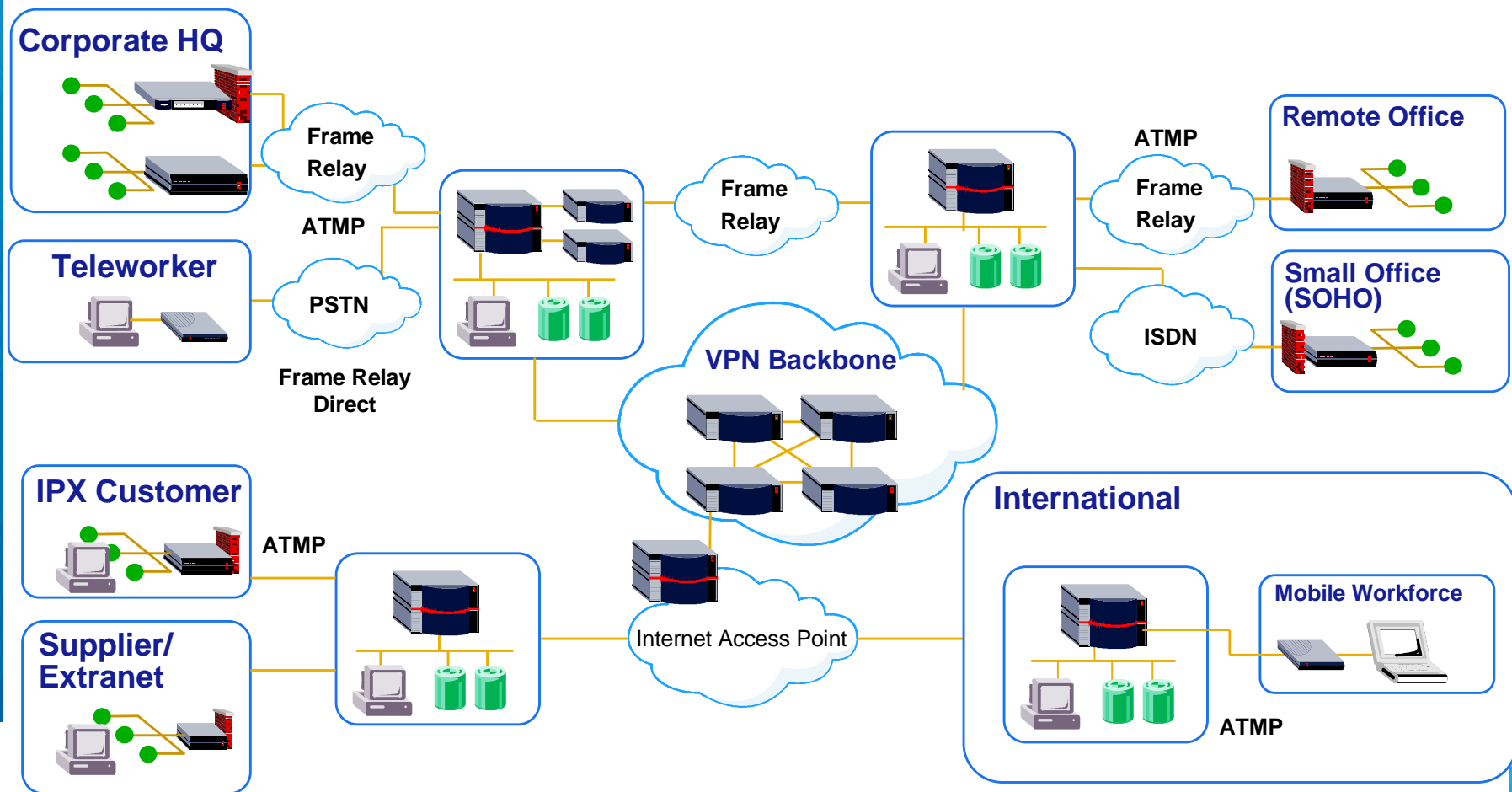


VPN Over
Public Internet



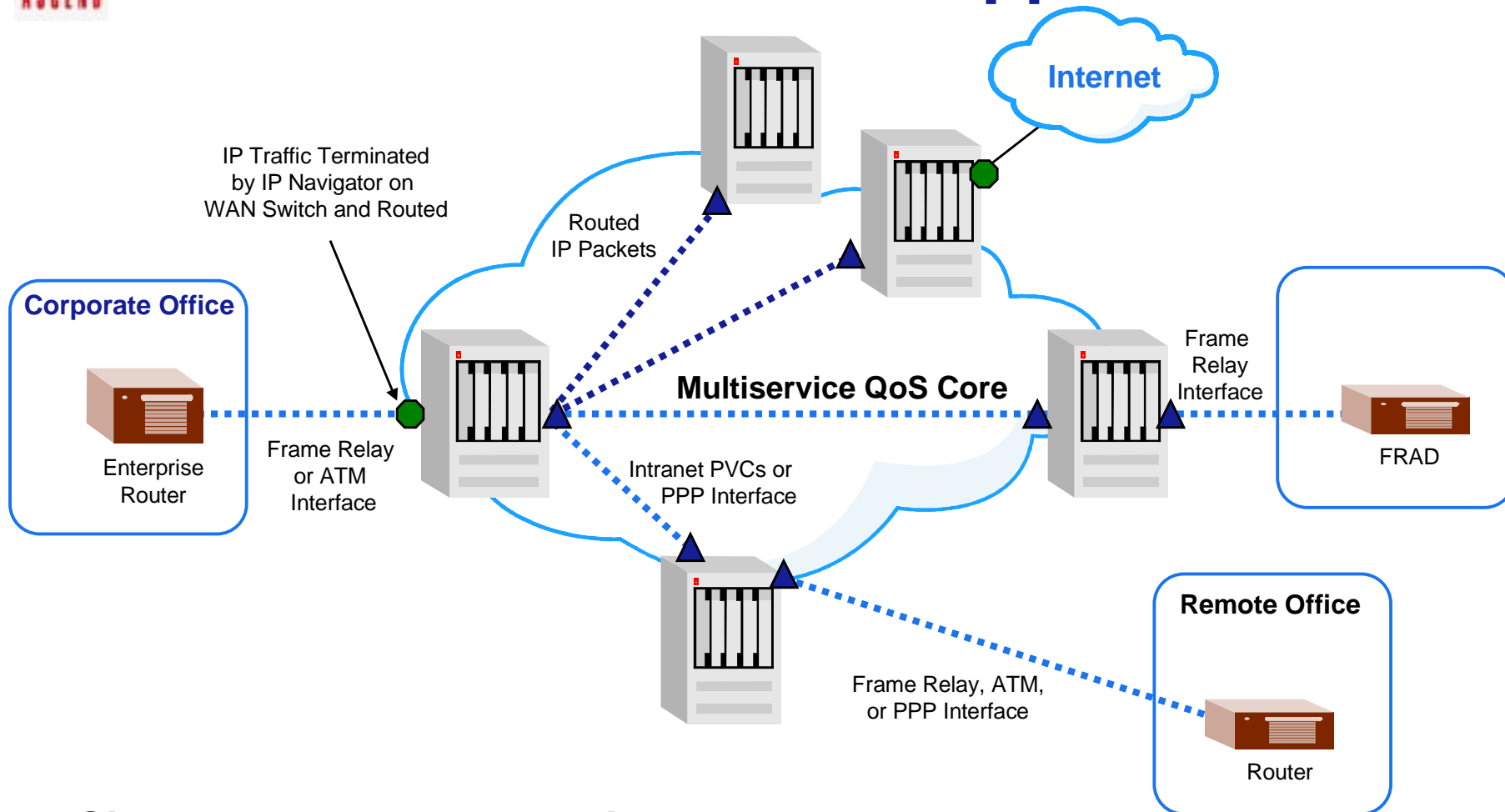
VPN Service Application

ATMP & Frame Relay Direct





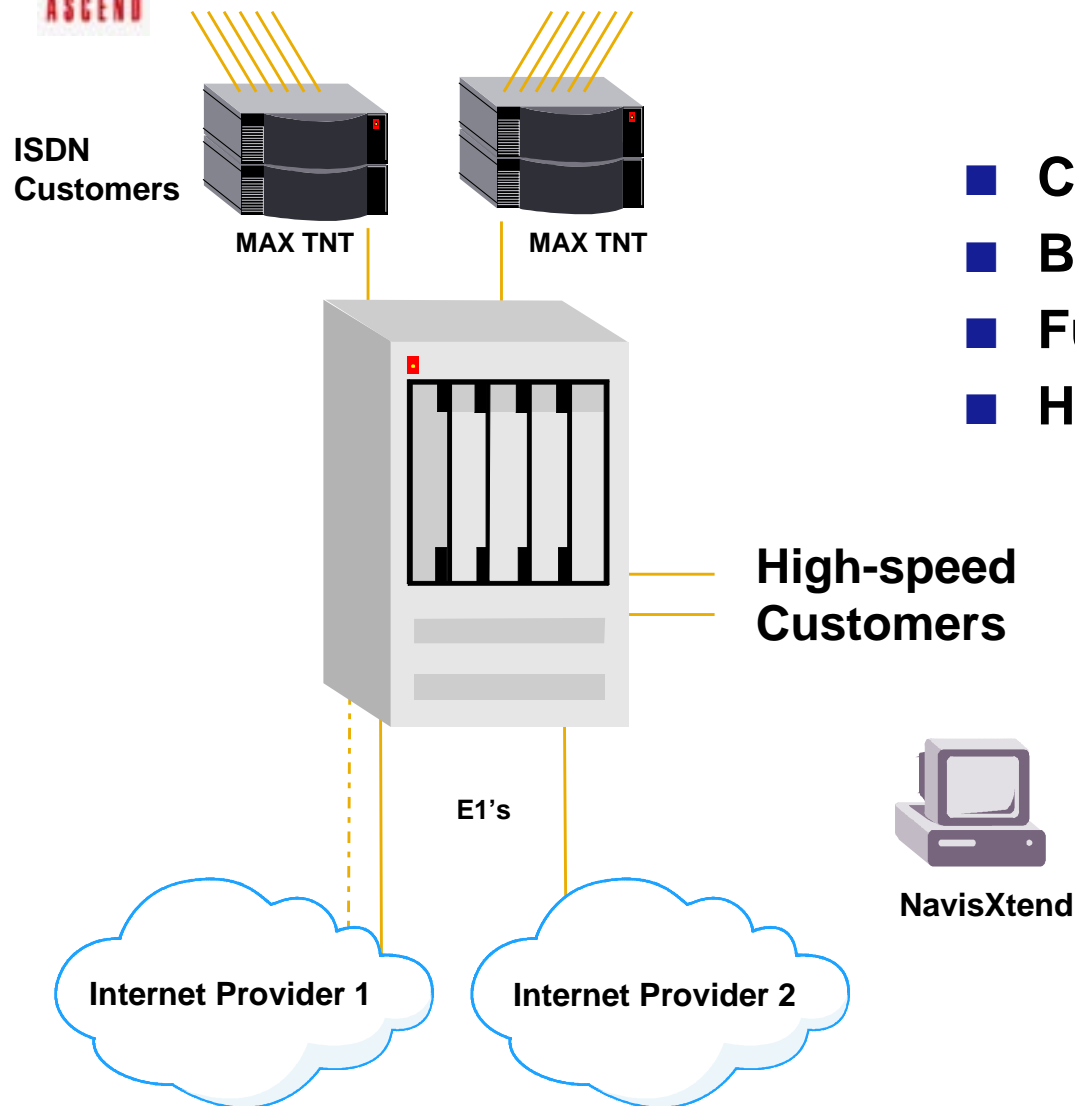
VPT and VIPR Service Application



- **Single customer connection supports FR, VIPR, and Internet Access**



VIPR Service Application



- Complete Ascend Solution
- BGP dual homed
- Full Internet route table, 2x
- High-Performance Routing

B-STDx 8/9000





MultiVPN Unique in Industry

World's largest provider of VPN networks

*Broadest range of VPN-ready products
with industry-leading capabilities*

*Provider/Subscriber approach empowers
Enterprise and NSPs*