Examining The Opportunities For Frame Relay and IP Interworking

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Presented by

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Agenda

- If IP is the future, then why is Frame Relay so popular?
- Trends in traffic, Frame Relay as IP in disguise
- Interworking and transport – opportunities for synergy
- Challenges and opportunities of Frame Relay transition into the Layer 3 world

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Why are we talking about Frame Relay anyway?

I heard IP was the future and Layer 2 was dead. At least that's what all the trade magazines say.

Why do I care about frame relay products and services?

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Frame Relay Market Statistics

WW Frame Relay Market
Services & Equipment

$20B

- Services
- Equipment

$3.5 $6.0 $8.9 $11.9 $14.8 $17.6

1996   1997   1998   1999   2000   2001

Source: Vertical Systems Group

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- Frame relay services and equipment revenue will grow to $17.6 billion worldwide by 2001 increasing at a CAGR of 31% from 1997.

- Services will comprise 75% of total cumulative market revenue between 1997 and 2001 and grow at a CAGR of 38%.

- Equipment revenue will grow at a CAGR of 13% to $3.6 billion in this time frame.
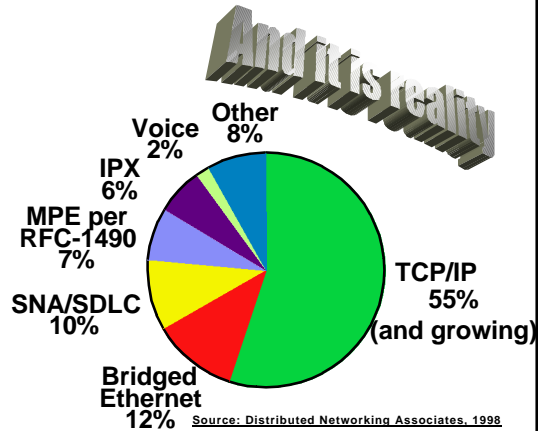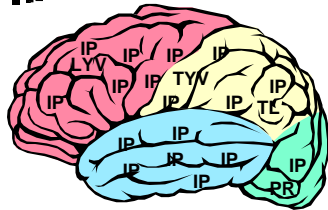
So why is there still so much money in Frame Relay?

- **GUARANTEED QUALITY OF SERVICE**

- **Excellent value (price/performance)**

- **Security**

- **Provides investment protection**

- **Supports multiple protocols**

- **Meets the speed requirements of most users**

- **Available where users do business**

- **Easy to implement, use & manage**

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"What about IP?" you say. Well, when you get down to reality, most frame relay traffic is IP anyway!

This is the customer's brain

And it is reality

Voice 2%

Other 8%

IPX 6%

MPE per RFC-1490 7%

SNA/SDLC 10%

Bridged Ethernet 12%

TCP/IP 55% (and growing)

Source: Distributed Networking Associates, 1998

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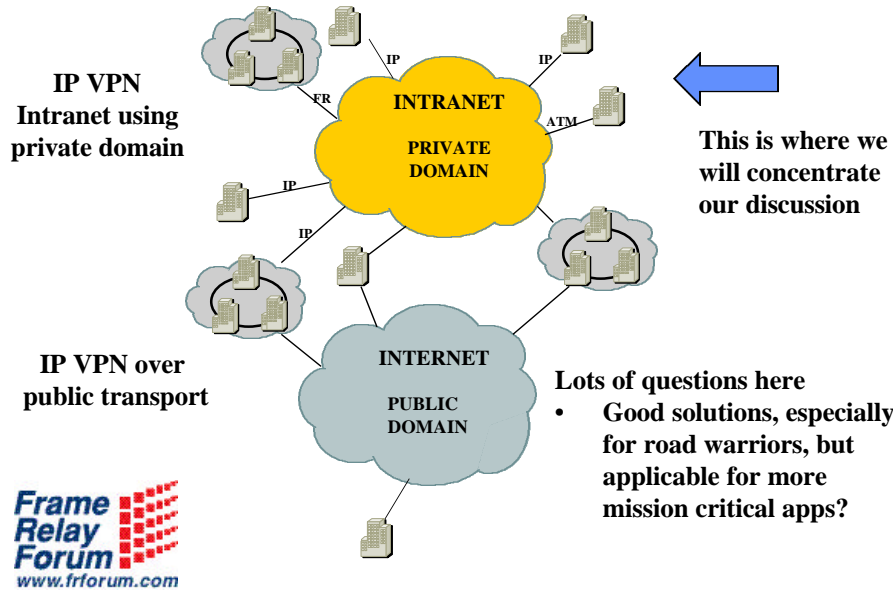www.frforum.com

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So, why the big debate then?

Frame Relay is a proven technology

FR is Globally deployed

Frame prices continue to drop
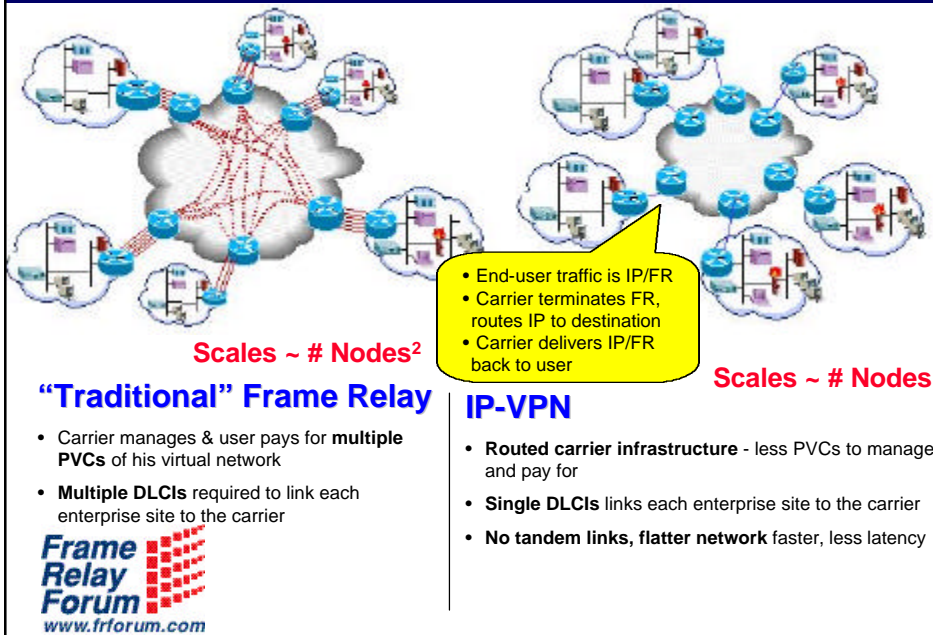
Frame Relay latency continue to get lower

But the market believes:

- IP networks will be more cost effective
- IP networks are easier to manage
- IP networks are faster

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Two Types of IP VPNs

IP VPN Intranet using private domain

IP

FR

IP

INTRANET

PRIVATE DOMAIN

ATM

IP

IP

This is where we will concentrate our discussion

IP VPN over public transport

INTERNET

PUBLIC DOMAIN

Lots of questions here
- **Good solutions, especially for road warriors, but applicable for more mission critical apps?**

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FR VPN vs. IP VPN

Scales ~ # Nodes^2

- End-user traffic is IP/FR
- Carrier terminates FR, routes IP to destination
- Carrier delivers IP/FR back to user

Scales ~ # Nodes

"Traditional" Frame Relay

- Carrier manages & user pays for **multiple PVCs** of his virtual network
- **Multiple DLCIs** required to link each enterprise site to the carrier

IP-VPN

- **Routed carrier infrastructure** - less PVCs to manage and pay for
- **Single DLCIs** links each enterprise site to the carrier
- **No tandem links, flatter network** faster, less latency

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What do we need to think about?

The end customers are faced with two solutions for their VPN

FR VPN
- Connection oriented
- Multi-protocol support
- Mature, stable, trusted, secure (implicit)
- Widely available services
- Traffic management and GUARENTEED QoS
- Powerful reporting and service management tools

IP VPN
- Connection less
- Any to any connectivity
- New applications
- Possibility of lower cost
- Traffic management and QoS – is it there yet?
- Different reporting and service management tools – are they good enough?
- Need for security measures

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Frame relay can remain the access method for IP-VPN – this means investment protection

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How will customers choose: IP-VPN or FR-VPN?

There are at least five fundamental drivers that will provide the answer for the customers:

- **Price**
- **Quality of Service..SLAs.**
- **Are you an early adopter?**
- **Customer technology goals …timing**
- **Geographic scope…implementation "Extended Reach"**
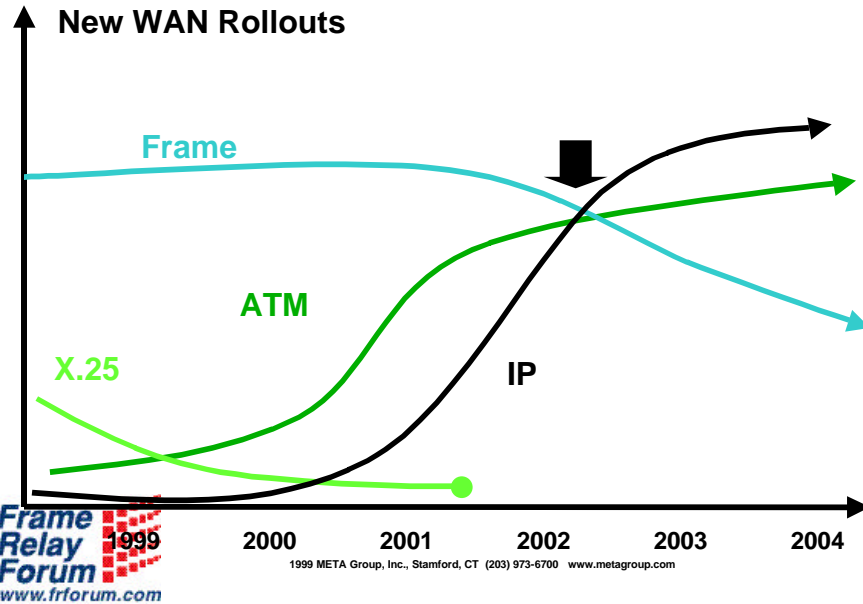- **Applications**

And there at least six fundamental drivers that will provide the answer for Carriers:

- **Is the customer New or Existing ?**
- **Is the Customer an "Early Adapter"**
- **The geographic needs of the customer - can they be met SLA targets**
- **Type of network Hub and spoke, or Any to Any**
- **Supply chain integration Cost**

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IP-VPN is a great solution for many people – but it's not for everyone!

WAN Services Trends

New WAN Rollouts

Frame

ATM

X.25

IP

1999   2000   2001   2002   2003   2004

1999 META Group, Inc., Stamford, CT (203) 973-6700 www.metagroup.com

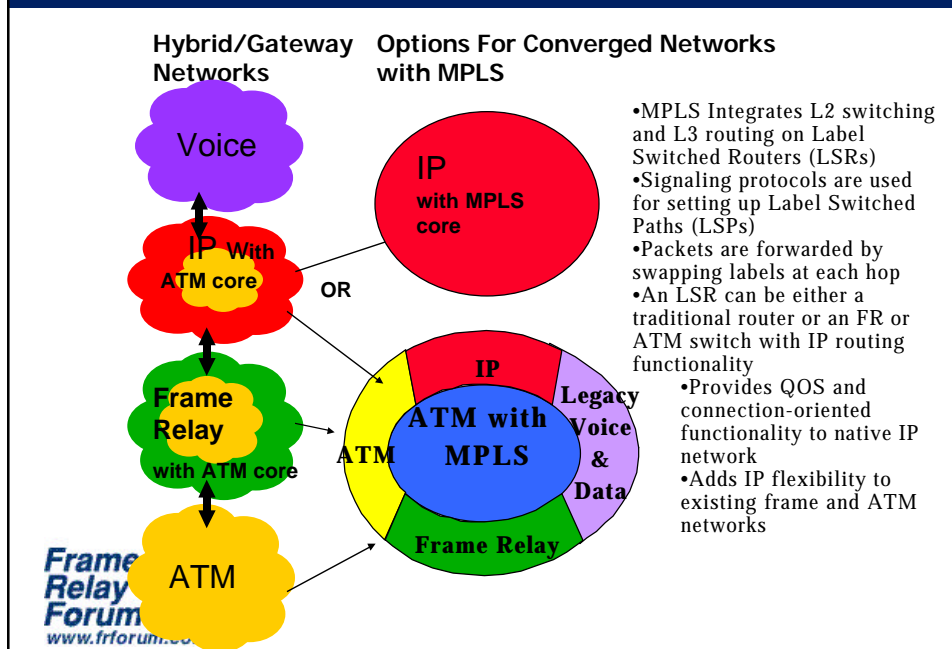*Frame Relay Forum*
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Yankee Group:
A Special Year 2000 Predictions Edition

IP VPN Overturning the Base of Frame Relay?: It'll Never Happen in the United States

The much-ballyhooed mass exodus to IP virtual private network services from frame relay services never occurs. Working in frame relay's favor is sooner-than-expected implementation of the Multi-Protocol Label Switching <u>(MPLS) protocol, which provides functionality that allows frame relay to hold on to customers with large mesh networks</u>, and new Internet gateways that allow frame relay to compete effectively for dial-up business. In addition, Web and back-office hosting services turn out to be as big a boon for frame relay services as they are for IP services, as the first wave of hosted applications are more intranet- than extranet-centric.

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MPLS and Provider Network Trends

Hybrid/Gateway Networks

Options For Converged Networks with MPLS

Voice

IP With ATM core

OR

Frame Relay with ATM core

ATM

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IP with MPLS core

IP

ATM with MPLS

ATM

Frame Relay

Legacy Voice & Data

•MPLS Integrates L2 switching and L3 routing on Label Switched Routers (LSRs)
•Signaling protocols are used for setting up Label Switched Paths (LSPs)
•Packets are forwarded by swapping labels at each hop
•An LSR can be either a traditional router or an FR or ATM switch with IP routing functionality
•Provides QOS and connection-oriented functionality to native IP network
•Adds IP flexibility to existing frame and ATM networks

Looking Forward to Tomorrow

Both ATM and Frame Relay support MPLS (Multi-Protocol Label Switching)

MPLS unifies IP routing with Frame Relay and ATM switching

Provides IP with the benefits of a connection-oriented infrastructure

- Traffic engineering
- QoS

MPLS holds the promise of greatly simplifying multiservice network architectures!

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Conclusion

IP will be dominant protocol, IP applications will grow, but….

- There is no "Holy Grail" with IP…not at the transport layer (yet)
- IP is an enabling protocol that will delivery many benefits but not at the expense of frame today. Frame relay <u>will continue to dominate as an access service</u>
- IP-VPNs can offer good value to some customers in the right situations – but they aren't for everyone
- MPLS holds great promise for the future
- IP may get the press, but frame will continue to be deployed (especially as a way to provide QOS for IP)

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Thank You

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