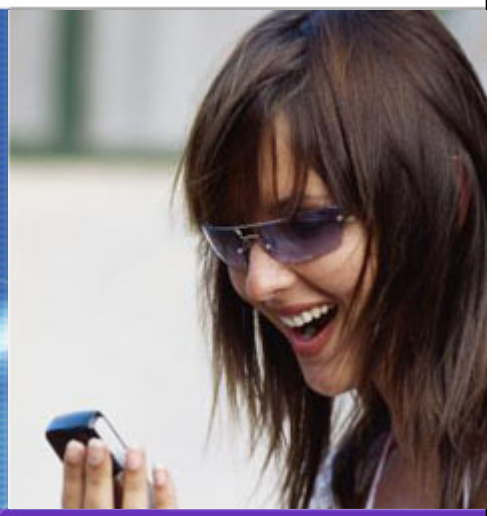
Impact of Video on the LAN and MAN Architectures



Ron Haberman

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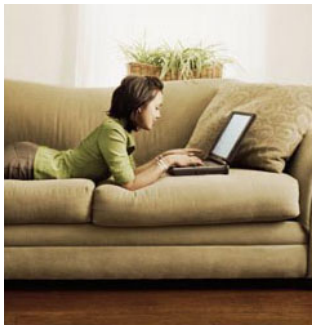
What is Video?



IP Network

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ifilm
See the big picture.

Google Video BETA

IPTV, VoD and Internet TV attract customers … and create lots of traffic

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Impact of Video Entertainment

Video is the change agent driving next gen IP network infrastructure design

- IPTV – Controlled delivery of premium broadcast TV and VoD services

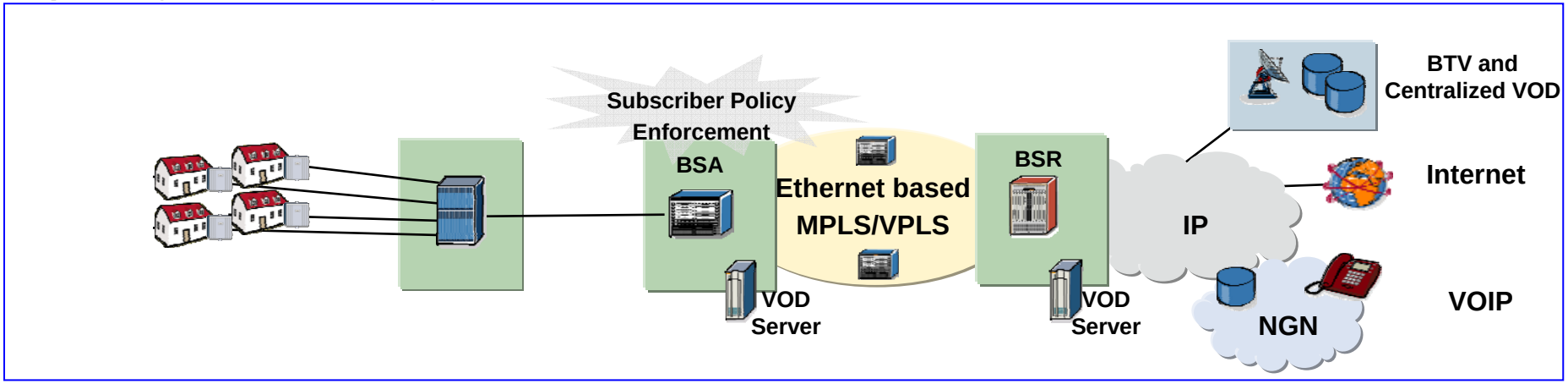
Video and multimedia streaming causes dramatic shifts in traffic patterns

- Scalable bandwidth capacity, QoS/QoE, HA, Multicast, …
- Evolving user expectations, evolving network needs

"IPTV" service – A new level of QoE

Optimizing Broadcast Video Delivery
Key Requirements

Triple Play Service Delivery Architecture



Traffic engineering, QOS, security, carrier OAM

VPLS: combines strengths of Ethernet and MPLS

Service separation: unicast/mcast VPLS instances

HQOS: per-subscriber and per-service flow control

Security: residential split horizon, anti-spoofing, Mac-protection…

Multicast optimization and flexibility

VPLS multicast registration (IGMP proxy)

H-VPLS: optimize rings and/or mesh topologies

Distributed multicast and content insertion

Assuring the user experience

- **IGMP performance, HQOS, ICC**
- **Service admission control**
- **Performance monitoring**
- **End-to-end management**

High-availability, non stop services

- **Rapid restoration (MPLS FRR)**
- **Source redundancy (PIM-BFD)**
- **Node/network resilience (NSR, ISSU)**

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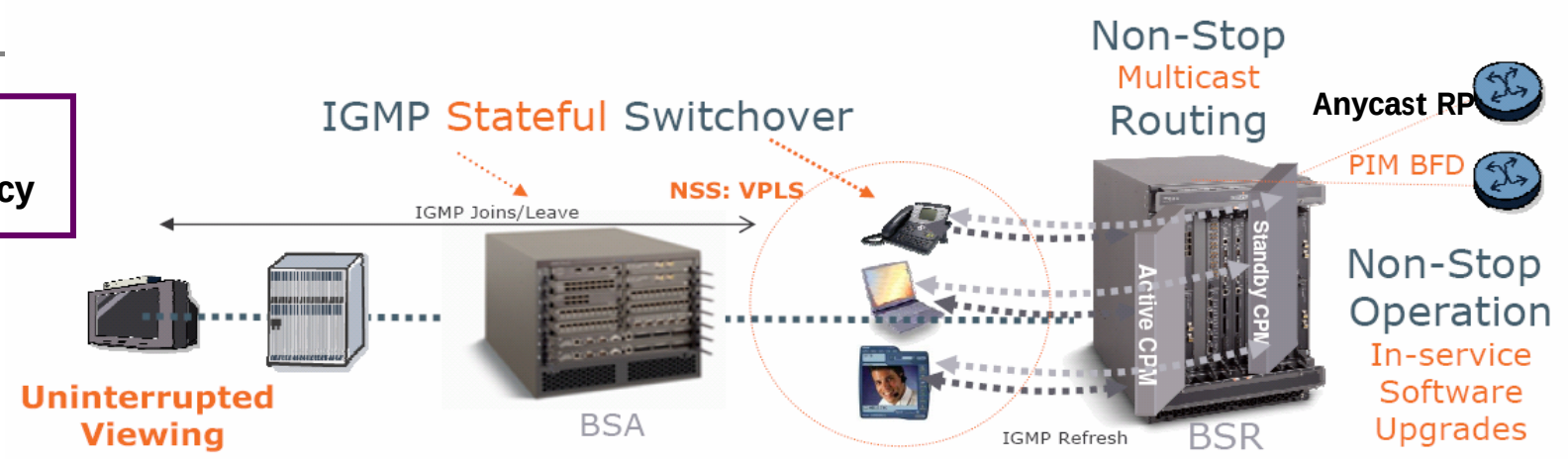
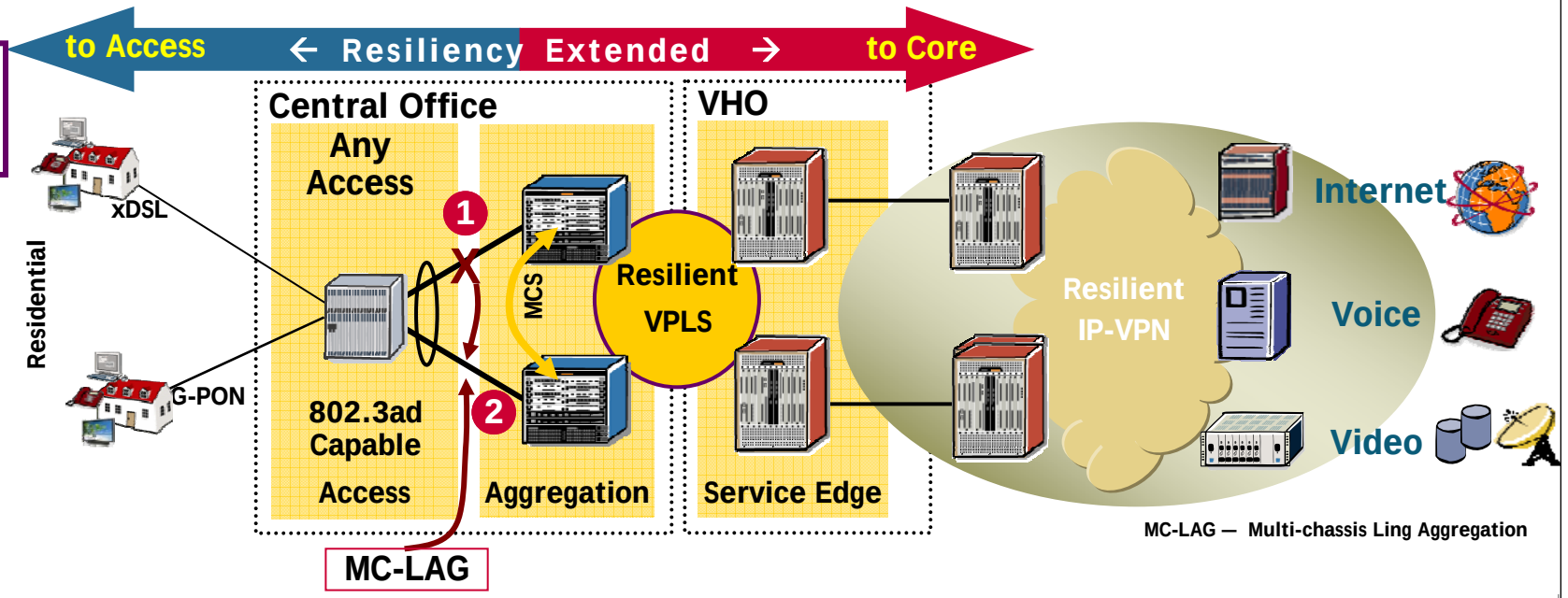
Non-Stop Video Service Availability

System Resiliency



Network Resiliency



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Impact of Video Entertainment

Video is the change agent driving next gen IP network infrastructure design

- IPTV – Controlled delivery of premium broadcast TV and VoD services
- Internet TV – Over-the-top video content, aggregated from many sources

Premeditated Video Entertainment

- download for future viewing

- variable bandwidth determines "wait" to view

- delay tolerant

On-demand Video Entertainment

- real-time video streaming

- sustained bandwidth proportional to screen size

- delay intolerant

Video and multimedia streaming causes dramatic shifts in traffic patterns

- Scalable bandwidth capacity, QoS/QoE, HA, Multicast, …
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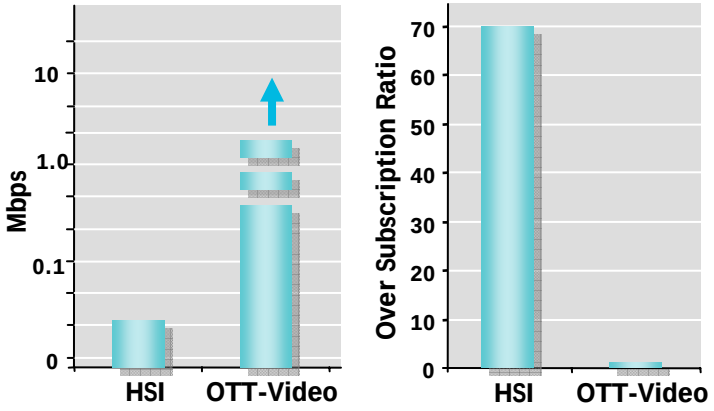
Average b/w per Subscriber Over Subscription



"Best Effort" service is great for many applications – but video isn't one of them

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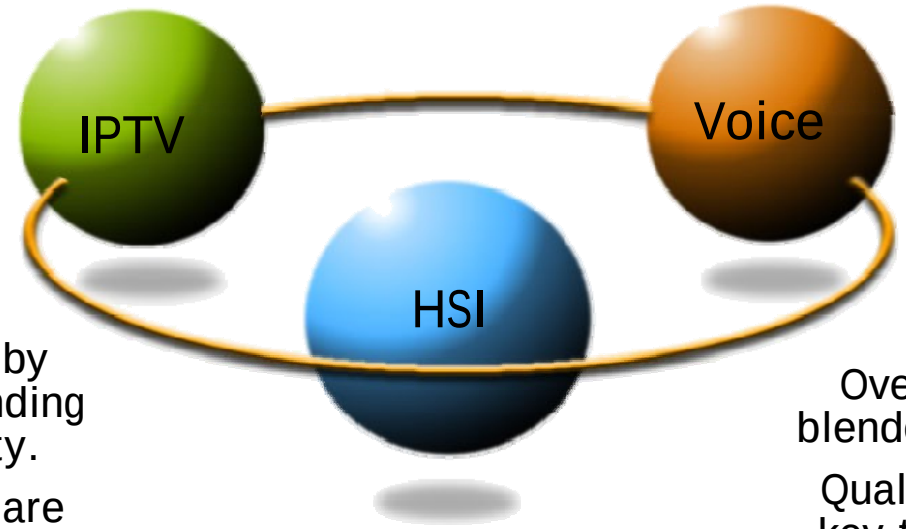
Just “Doing Nothing” Affects a Service Provider’s Competitive Position



IPTV services are by far the most demanding in terms of quality.

User expectations are set very high.

Over time voice evolves to blended IP multimedia services

Quality of user experience is key to long-term success and profit

OTT video demands better QoE than best effort HSI services can provide

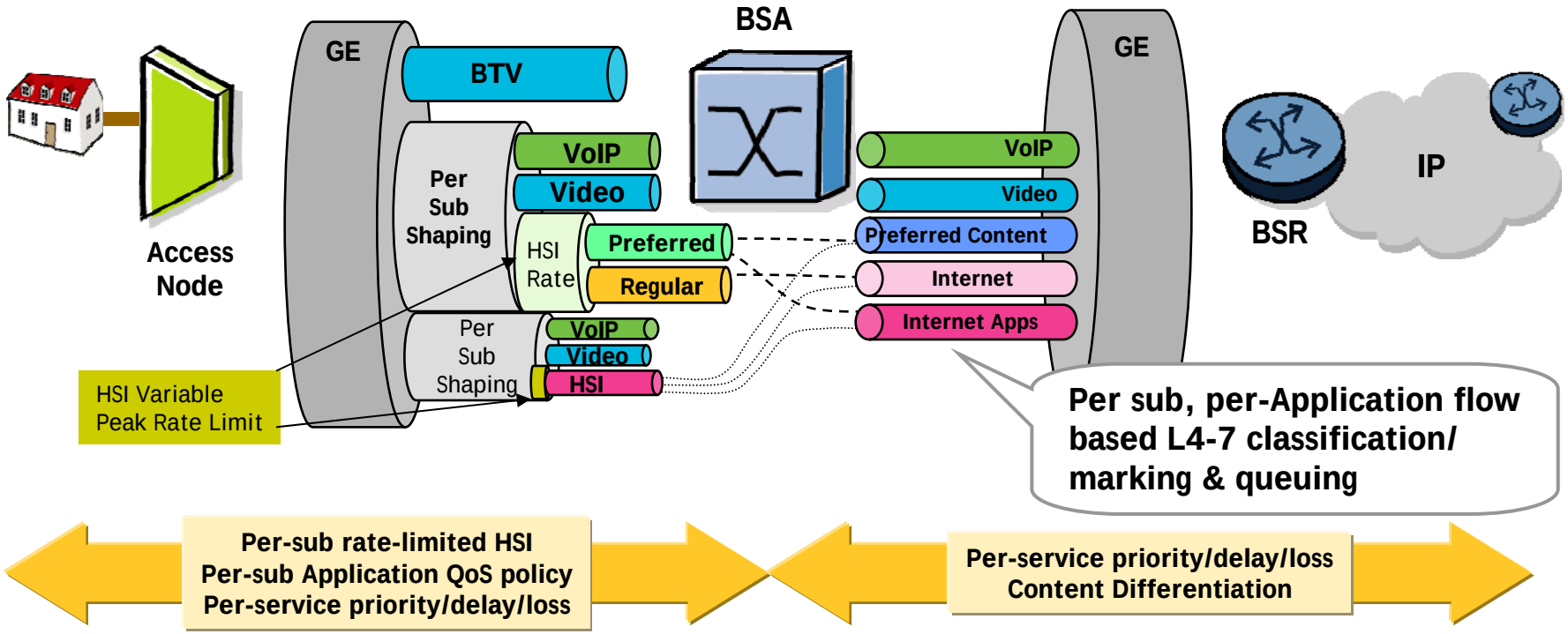
Dissatisfied customers may churn all their services, not just one.

Fairness is essential.

“Flawless Quality of Experience” across all services is a brand-defining attribute

What about IPTV: Opportunity or Threat?

Application based QoS for Over The Top Partners



Differentiated Data content can be treated according to subscriber policy

- Each subscriber has independent policy configuration to allocate dedicated queues and Application QoS
- Can have separate rates for preferred vs. regular content
- Can shape overall HSI rate and individual OTT video

Thank-You

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Backup

The Video Inflection Point

Video is the change agent driving next gen IP network infrastructure design

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- Internet TV – Over-the-top video content, aggregated from many sources

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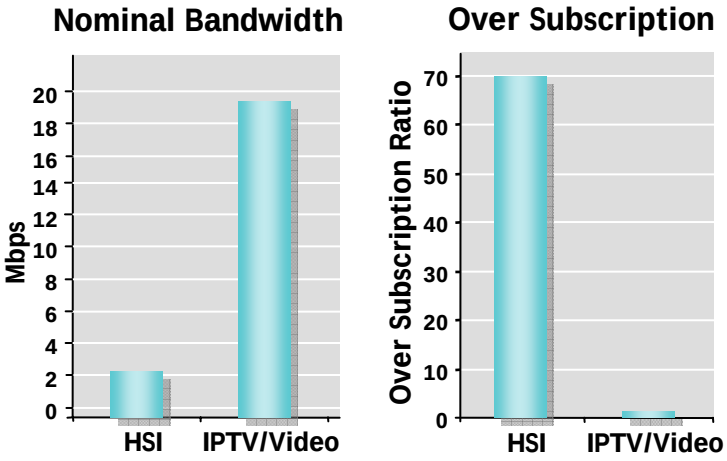
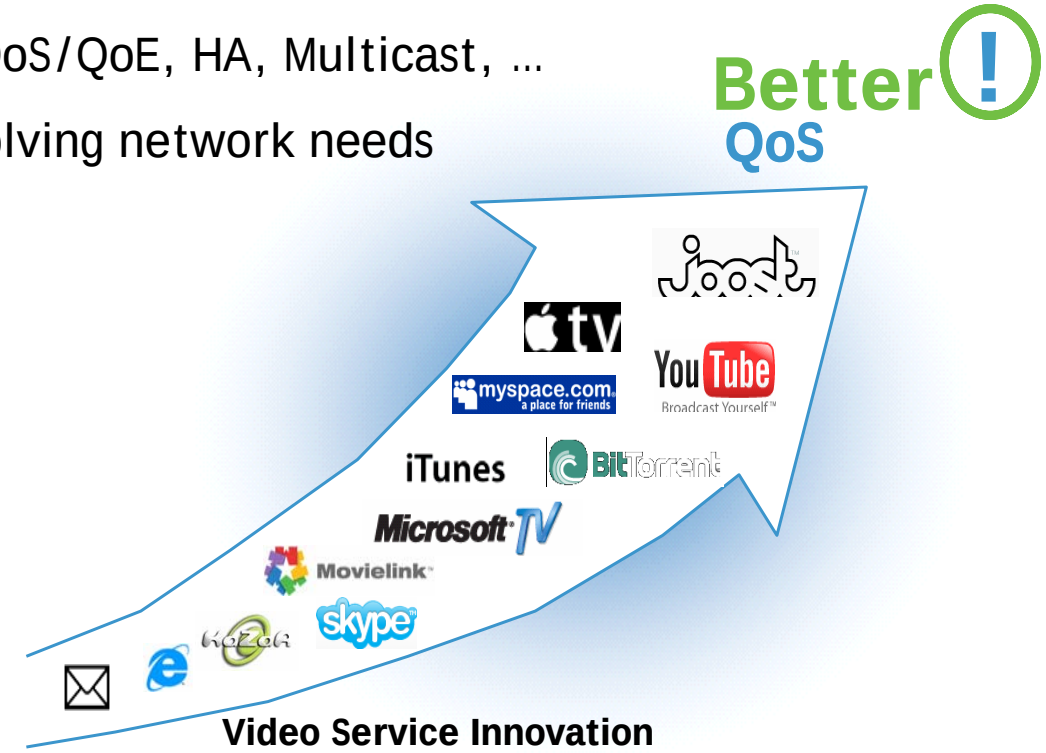


Aggregate bandwidth consumption



Video Service Innovation

Neutrality, Fairness and Service Improvement

Neutrality (FCC August 2005 Principles)

- Access the Internet content of choice
- Run applications and use services of choice
- Connect their choice of devices that do no harm
- Enjoy competition among service, application and content providers

Fairness

- Ensure best-effort network resources are allocated in a just and equitable fashion

Service Improvement

- Enables subscribers and content/application providers to improve their experiences over the public Internet

Service Expansion Delivers a Better Experience
Ensures Fairness and Maintains the Principles of Neutrality

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A Service Provider's Response to evolving Internet applications

For Service Providers, ASPs are a:

a) Threat?
b) Opportunity?
c) Both a & b?

What Service Providers can do about it

Status Quo

(Nothing Fails Like Success)

Current "Best Effort" model self-regulates traffic, providing an increasingly inferior user experience and a decrease in video usage. Subscriber fairness is essential.

Give Away More Bandwidth

Embrace the Internet's separation of applications and transport, further propagating the Service Provider's role as transport utility

Create New Services

Leverage physical network assets to deliver an enhanced user-centric experience and increase shareholder value

IP innovation lets Service Providers become part of the application value chain

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