



Crossing the Exabyte Threshold



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What is an exabyte?

An Exabyte is 1,000,000,000,000 bytes

What does it mean to think in exabytes?

Video streaming of the 2008 Olympics could generate an exabyte of traffic. BBC's iPlayer will double consumer fixed broadband took doubling China's Internet traffic in 10 years to reach 1 exabyte month.

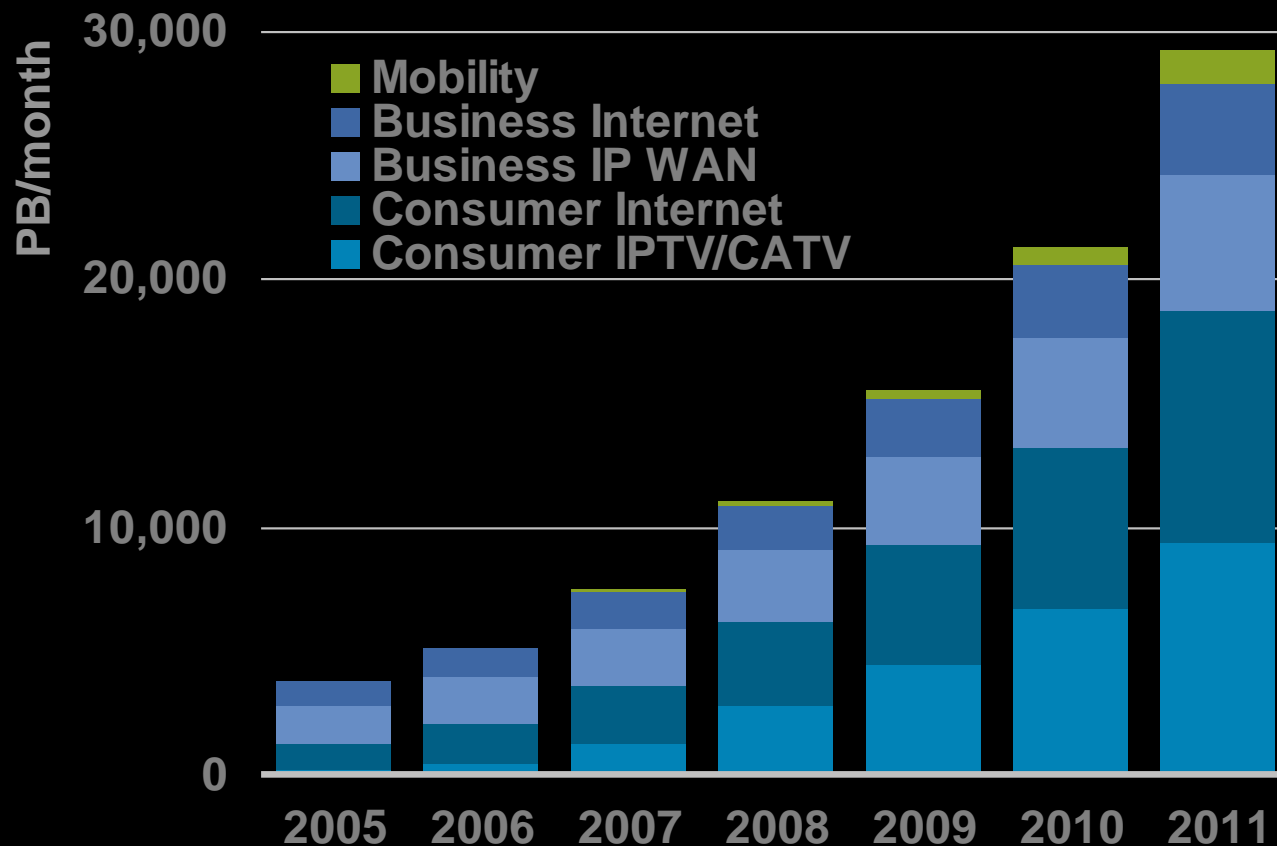
By 2011, global IP traffic will quintuple to 29 exabytes per month and compared to the U.K. (if adoption targets are reached) aims to empower 1 billion Internet video Exabytes per month in 2007, than 5 years.

Exabytes per month (equivalent to 650 million DVDs. (over 2 exabytes per month) generate 1 exabyte of traffic per month.

By 2011, P2P traffic will account for the equivalent of 900 million DVDs across the network each month (almost 4 exabytes)

Global IP Traffic Growth

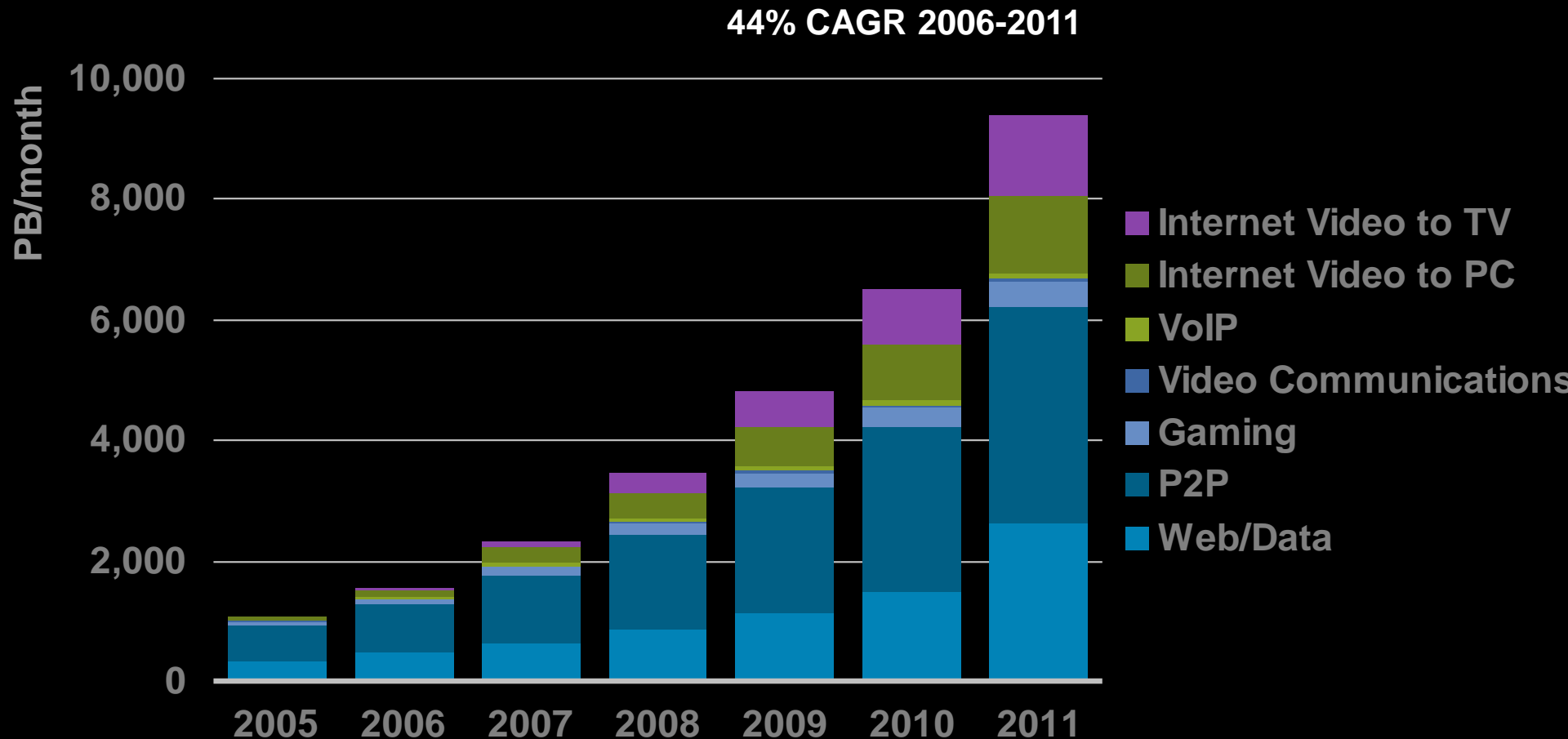
42% CAGR 2006-2011



Global Consumer Internet Traffic Growth

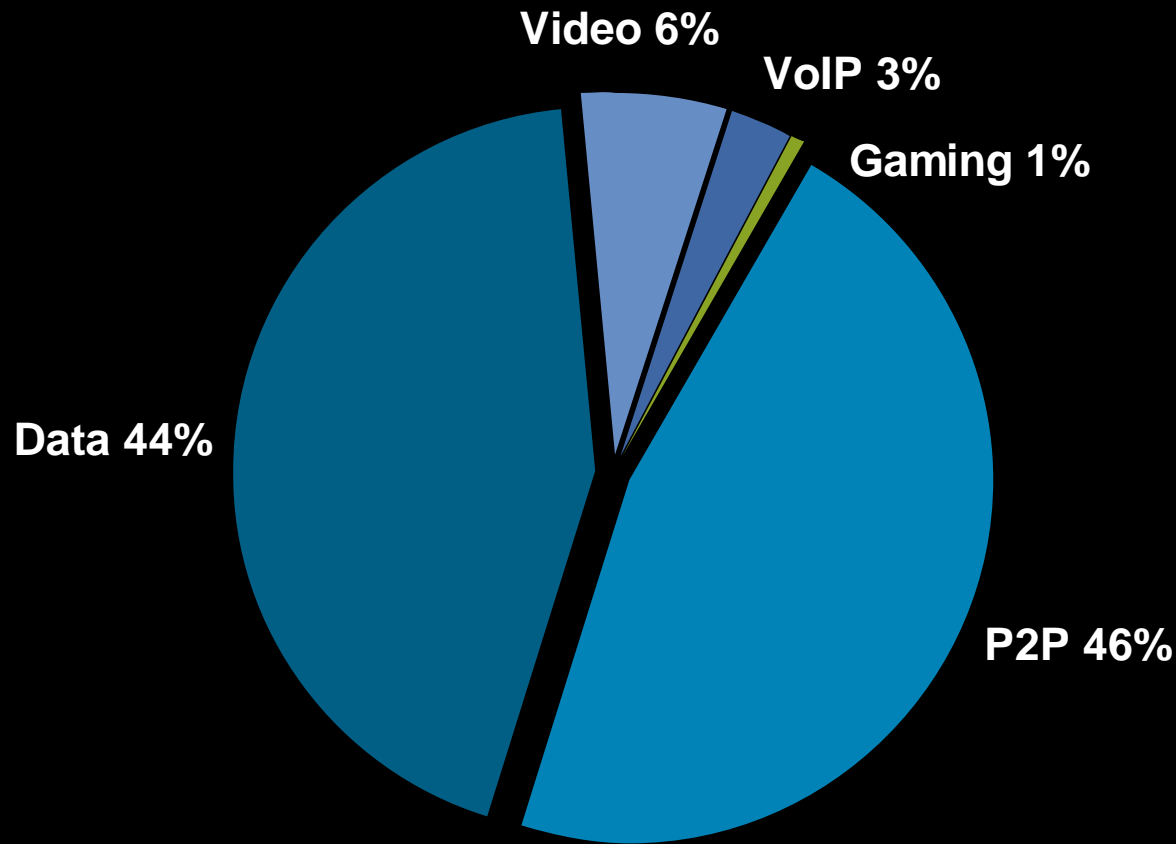
Internet video-to-TV will increase 12X from 2007 to 2011

Internet video-to-PC will increase 5X

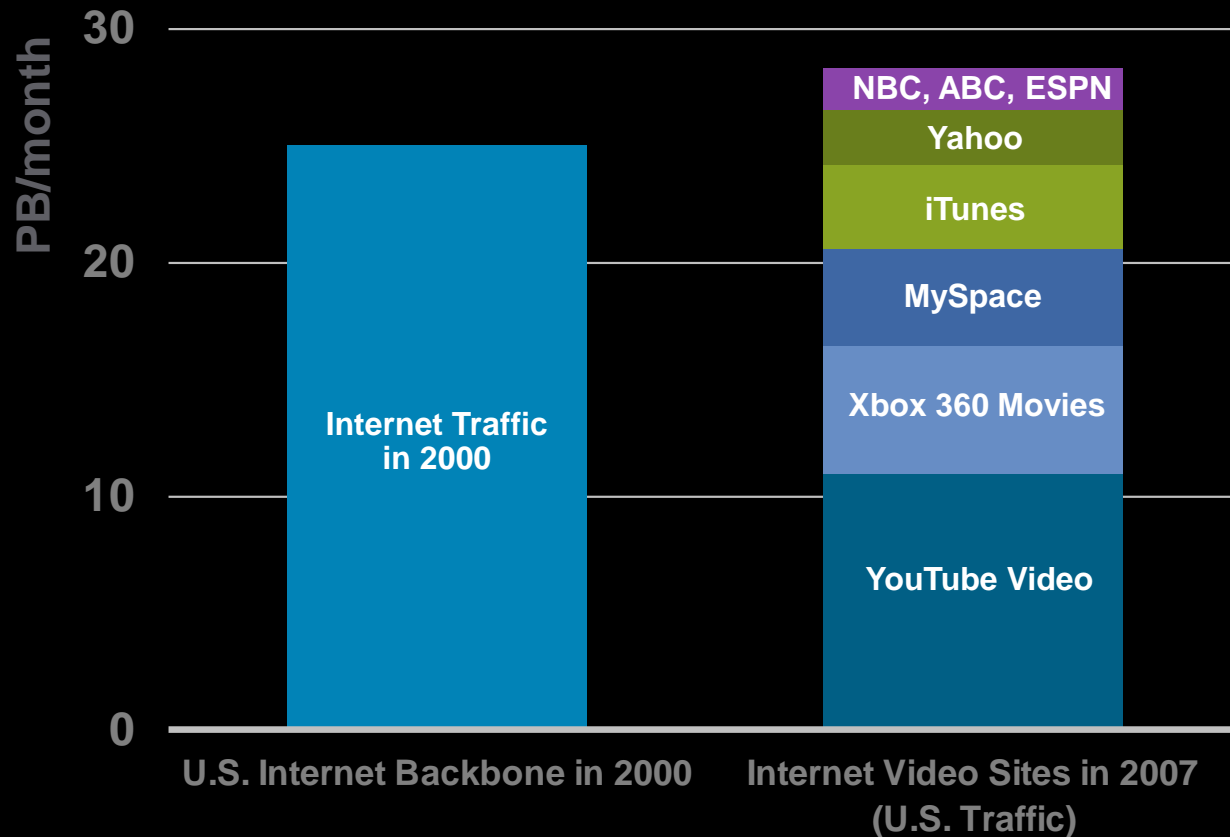


Residential Broadband Traffic Mix

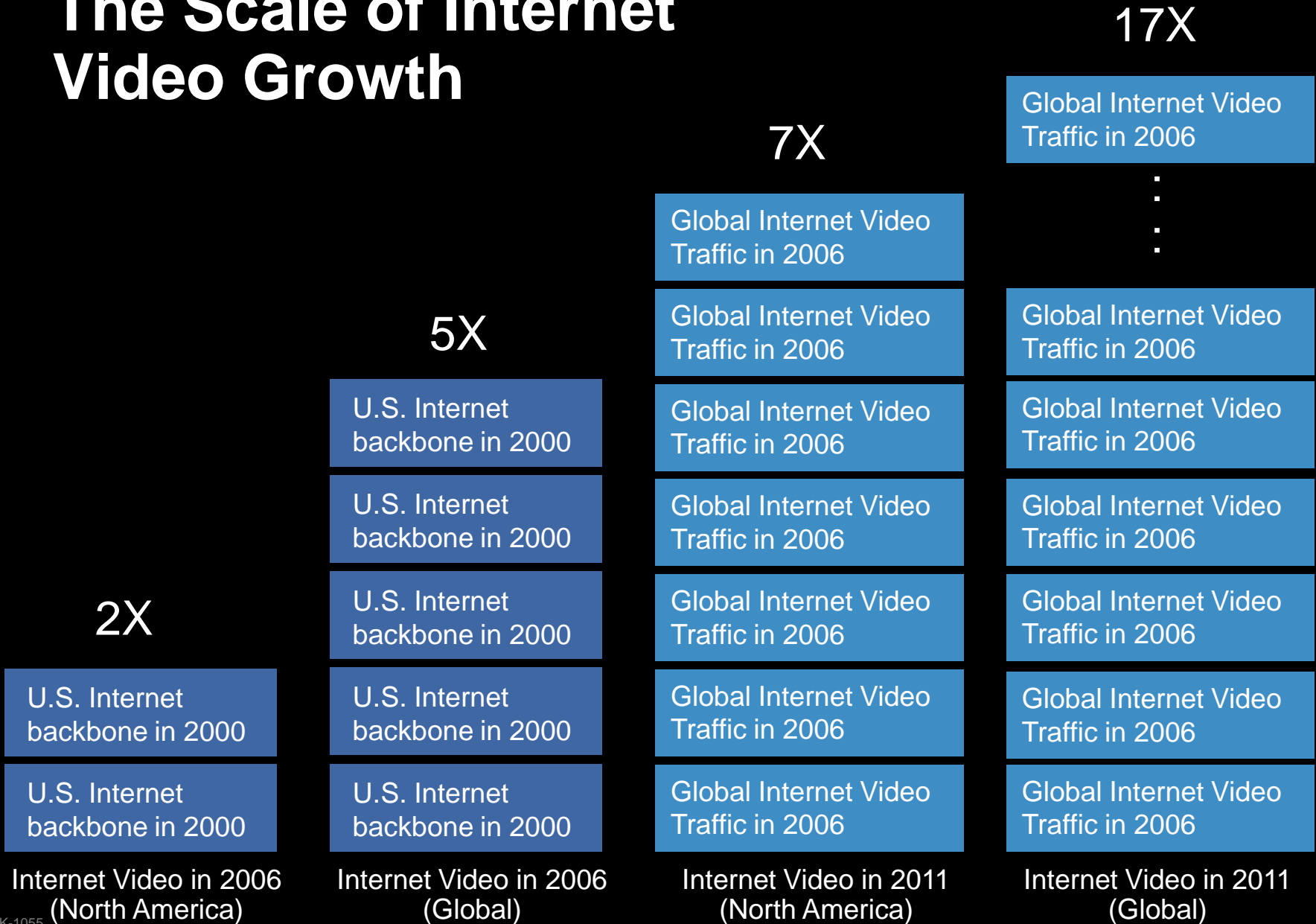
P2P is 46%, Video 6%



Video Already Generates More Traffic than the Entire U.S. Backbone in 2000



The Scale of Internet Video Growth

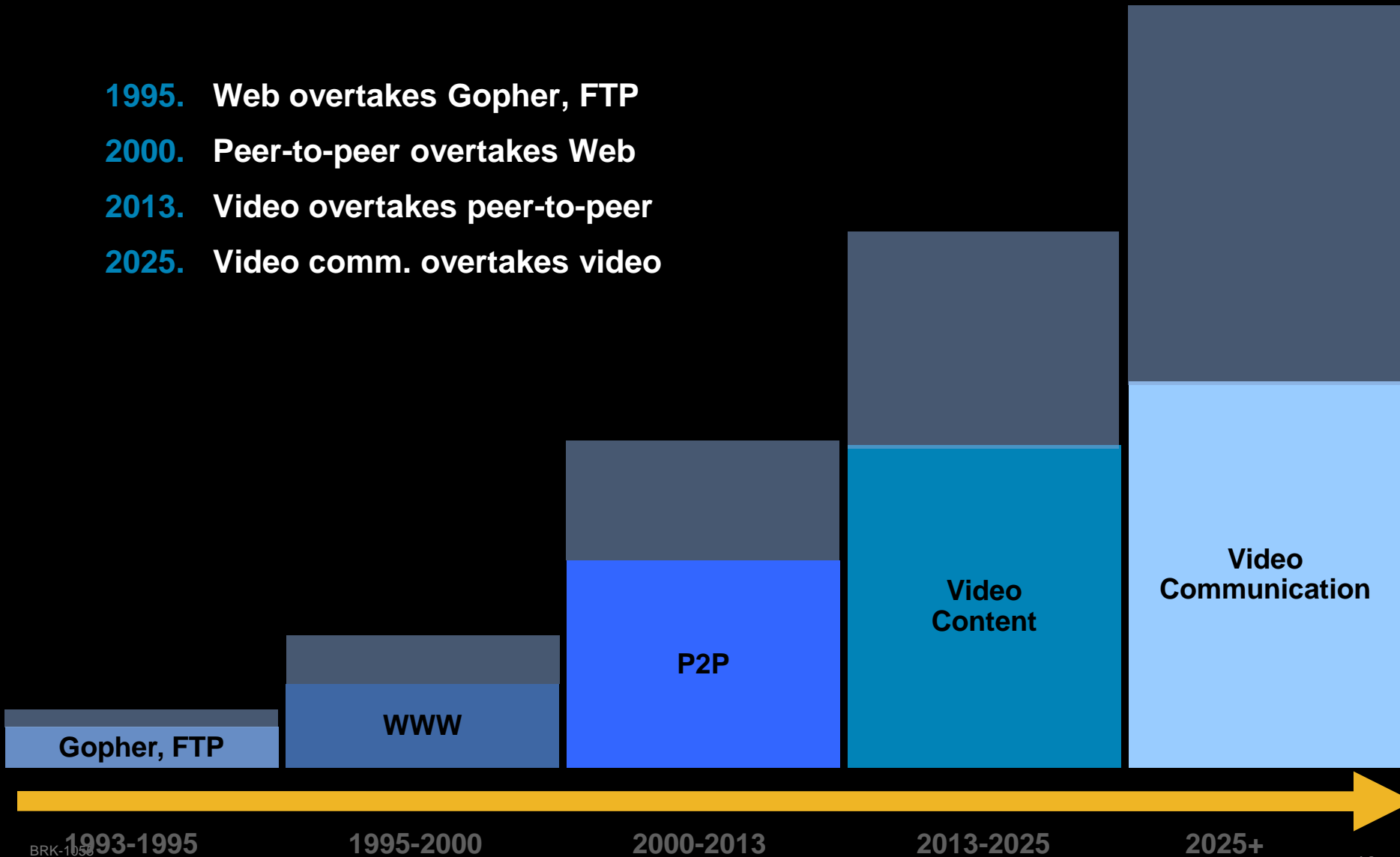


Strategies for Coping with Traffic Growth

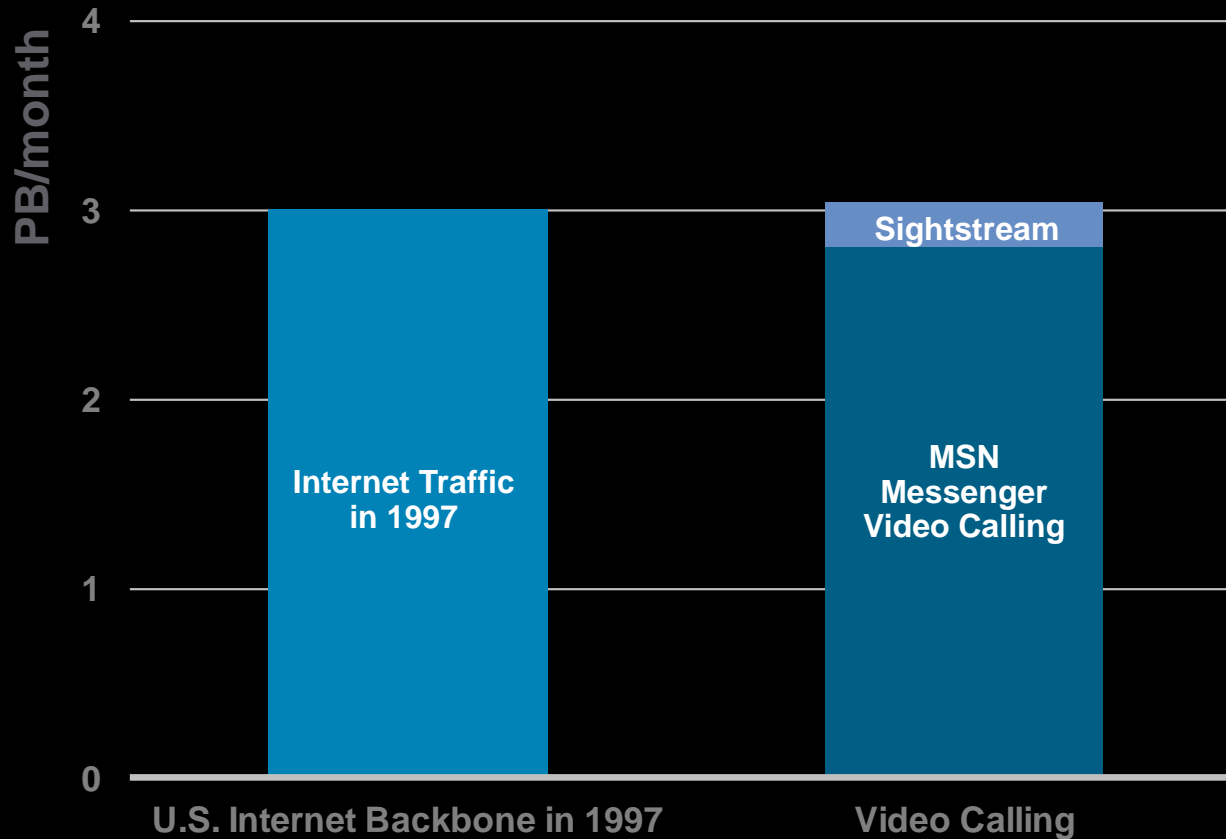
| Trend | Potential Problem | Potential Solution |
|----------------------------|---|---|
| Internet video (on demand) | Metro and core – growth in average volume | Content delivery systems (CDS), capacity upgrades, advanced compression |
| Internet broadcast | First mile and data center – flash crowds | P2P content distribution, multicast |
| | Metro and core – flash crowds | CDS, multicast, P2P content dist. |
| P2P | Access – upstream bottleneck, uniform traffic pattern | Fewer homes per serving area, lower oversubscription ratios |
| | Core – growth in average traffic volume | P2P caching |
| Commercial VoD | Metro – growth in average traffic volume | CDS, capacity upgrades, compression |
| High Definition Content | Access – last mile IPTV bottleneck | Capacity upgrades |
| | Metro – growth in VoD traffic volume | CDS, capacity upgrades, compression |

Evolution of Internet Traffic Mix

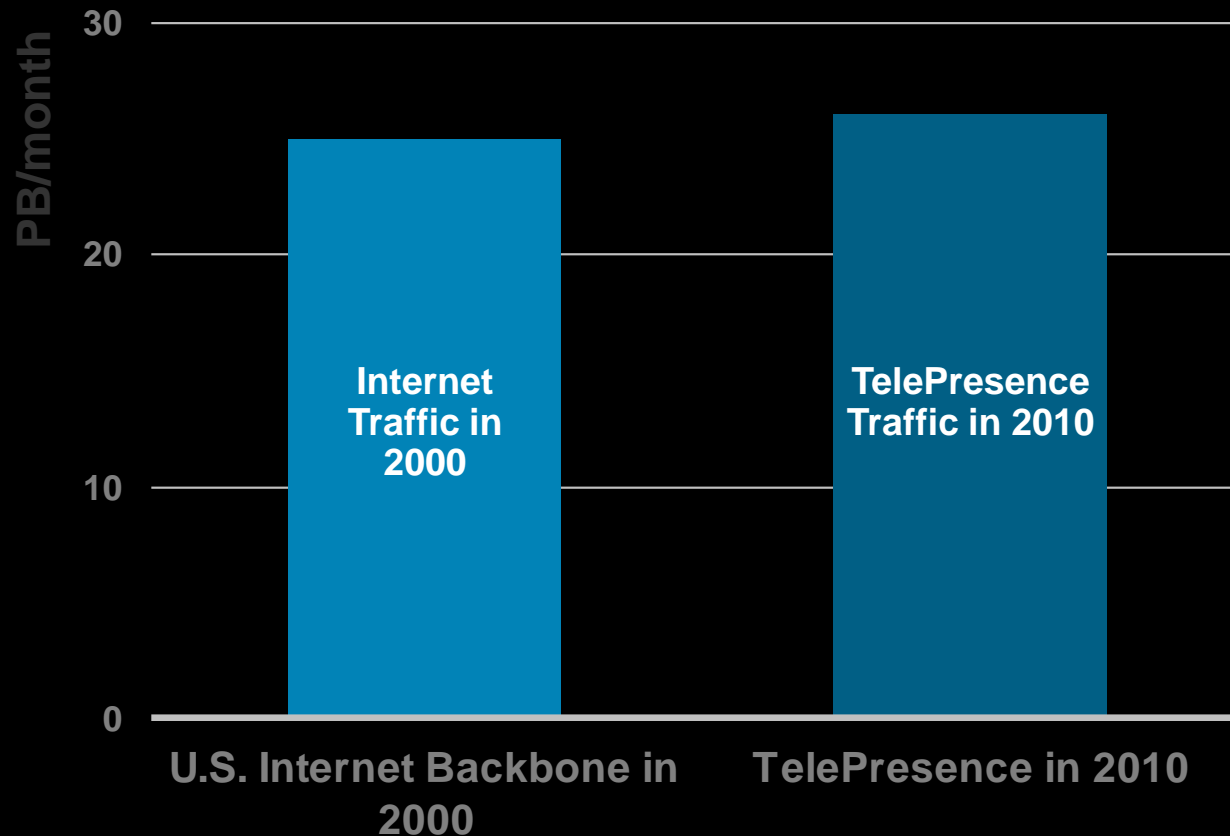
- 1995. Web overtakes Gopher, FTP
- 2000. Peer-to-peer overtakes Web
- 2013. Video overtakes peer-to-peer
- 2025. Video comm. overtakes video



Video Calling Generates More Traffic than Entire U.S. Backbone in 1997



TelePresence Traffic in 2010 Will Be Larger than the Internet Was in 2000



Sources of Traffic Growth

Growth in Internet users

Migration of existing traffic to a new network

- Broadcast

- Mobility

Changes in user behavior

- On-demand

- Placeshifting

- Timeshifting

- Social viewing

- Content creation

- Social gaming

Three Traffic Myths

1. All video viewing will be on-demand
2. Traffic will grow linearly with broadband penetration
3. User-generated content is user-authored content

Aspects of the Video Experience

1995

Video as
Entertainment, Social
Centerpiece, and
Expression

Single Device
Single Network

2005

Video as Entertainment

Video as Social Centerpiece

Video as Expression

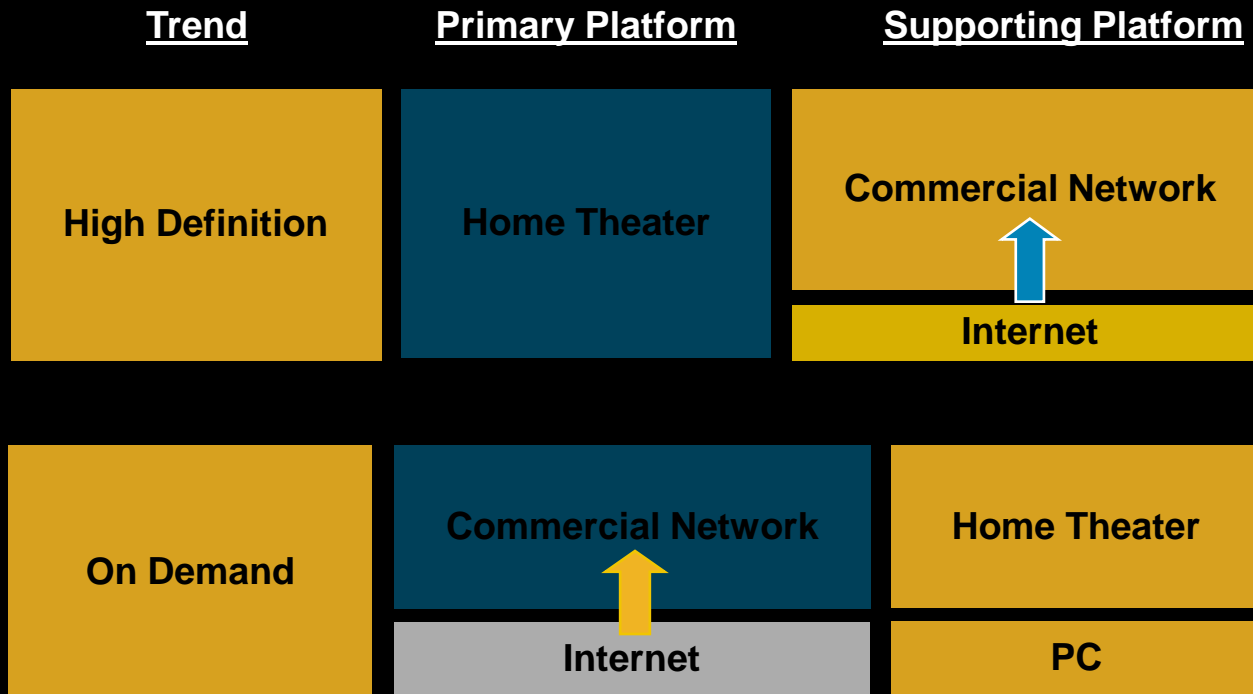
Multiple Devices
Multiple Networks

2015+

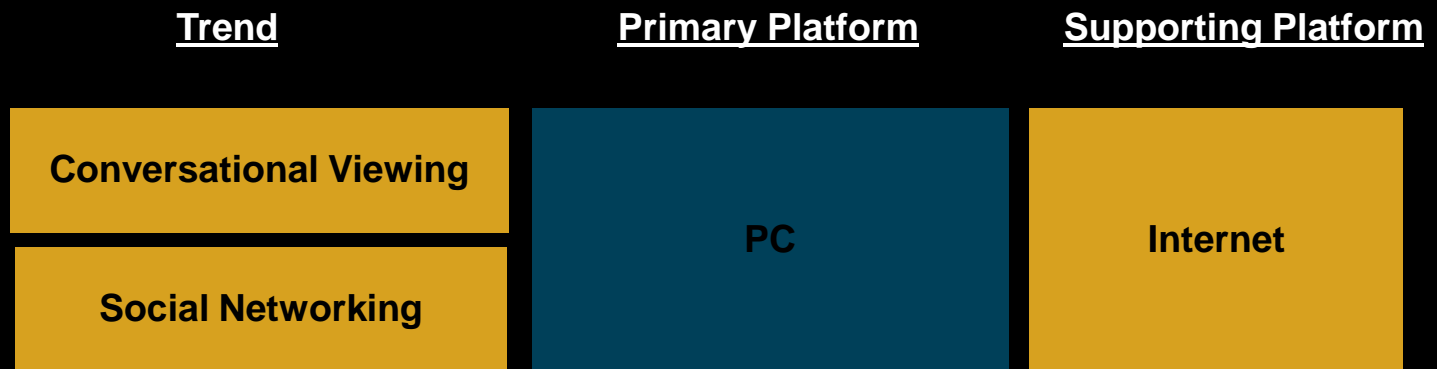
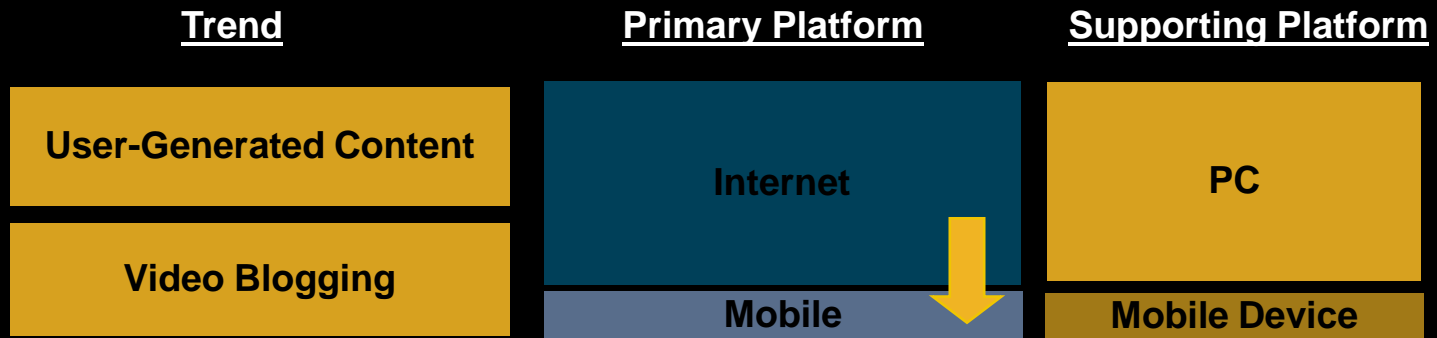
Video as
Entertainment, Social
Centerpiece, and
Expression

Multiple Devices
Converged Network

Trends in video-as-entertainment and accompanying traffic shifts



Trends in the expressive and social aspects of video and accompanying traffic shifts



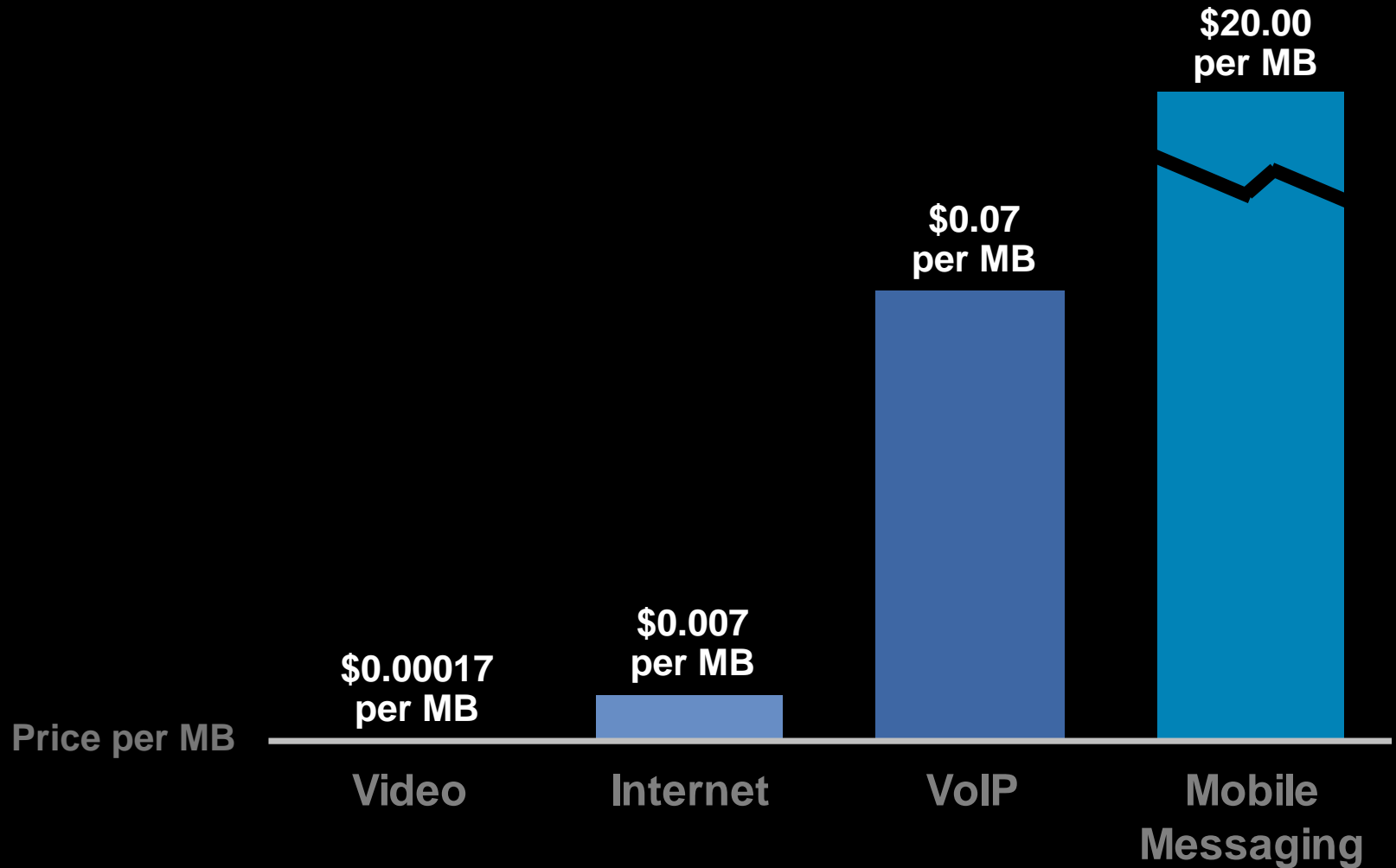
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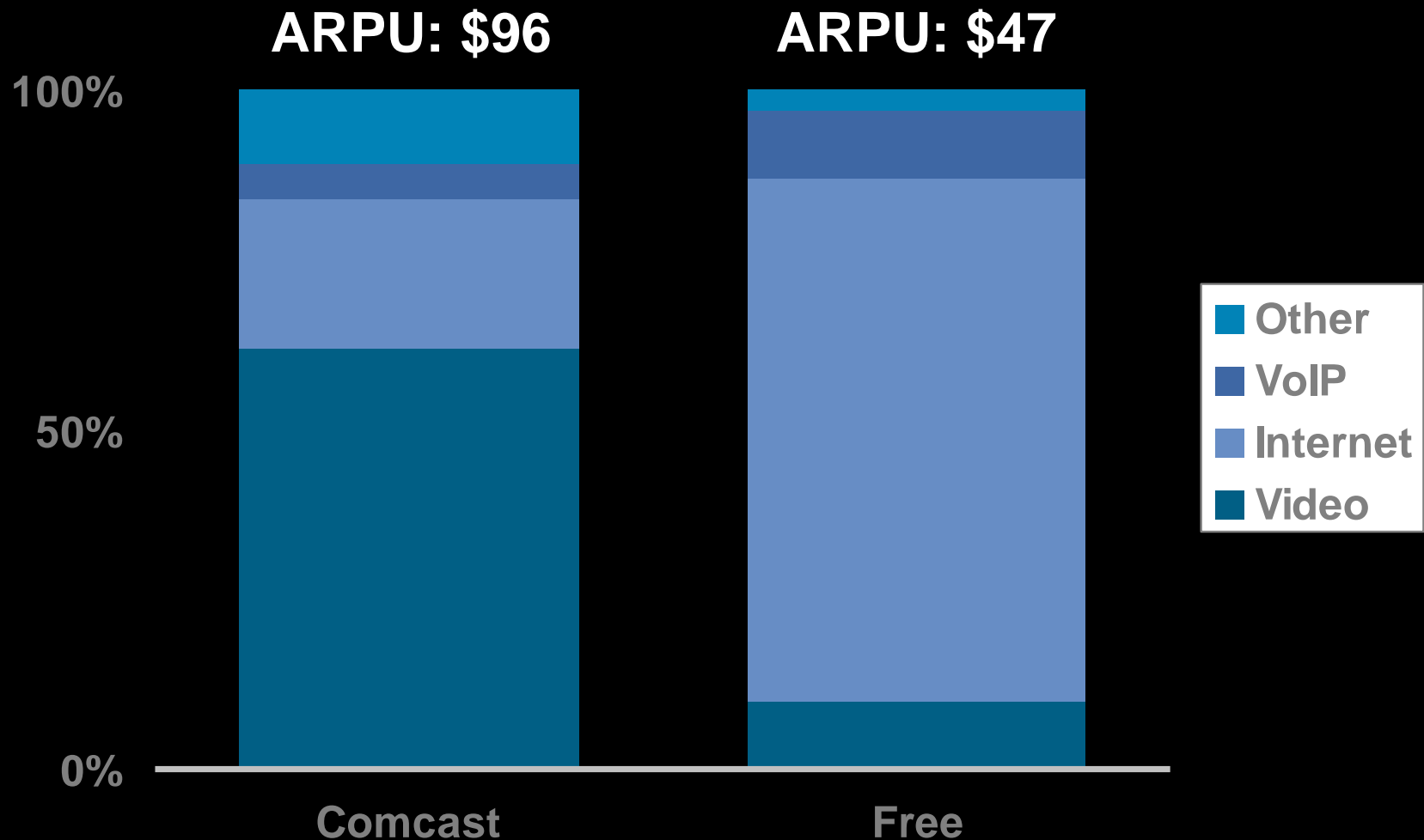
Three Traffic Myths

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Video consumes more than its weight in bandwidth



Disruptive Revenue Models



For more information:
<http://www.cisco.com/go/ipngn>

Thank you

