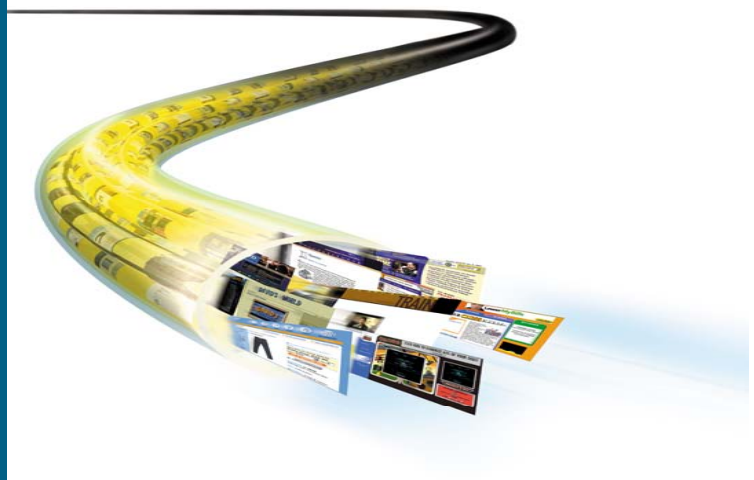
Cisco Visual Networking Index Forecast, 2007-2012



Thomas Barnett thomasb@cisco.com

Arielle Sumits arielle@cisco.com

September 2008

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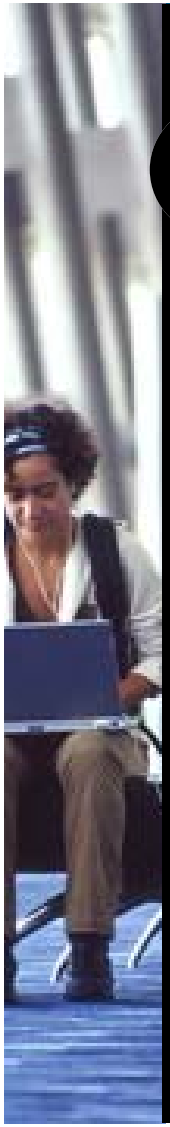
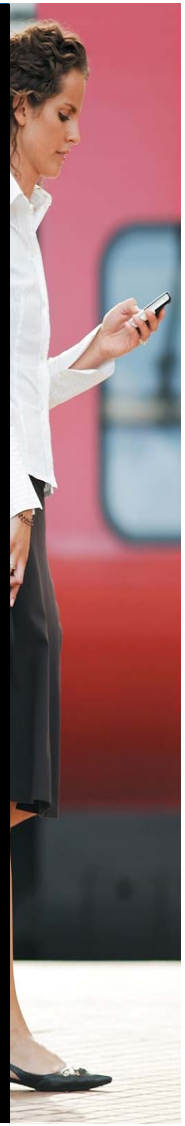




Cisco Visual Networking Index (VNI) – Forecast
Measuring IP Traffic Growth from 2007 to 2012

- In 2007, visual networking ushered in the exabyte era…
- In 2008, visual networking is ringing in the zettabyte era…

What is the Cisco Visual Networking Index (VNI)?

Visual Networking is the combination of video and social networking/collaboration (Web 2.0) technologies.

The Cisco Visual Networking Index is an initiative to track and forecast the suite of visual networking applications.

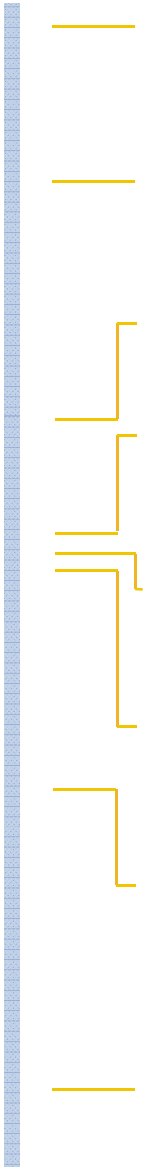
The Zettabyte Scale

1 Petabyte
1,000 Terabytes or
250,000 DVDs

1 Exabyte
1,000 Petabytes or
250 million DVDs

1 Zettabyte
1,000 Exabytes or
250 billion DVDs

1 Yottabyte
1,000 Zettabytes or
250 trillion DVDs



200 Terabytes
A digital library of all books ever written in any language

100 Petabytes
The amount of data produced in a single minute by the new particle collider at CERN

5 Exabytes
A transcript of all words ever spoken

100 Exabytes
A video recording of the all the meetings that took place last year across the world

150 Exabytes
The amount of data that has traversed the Internet since its creation

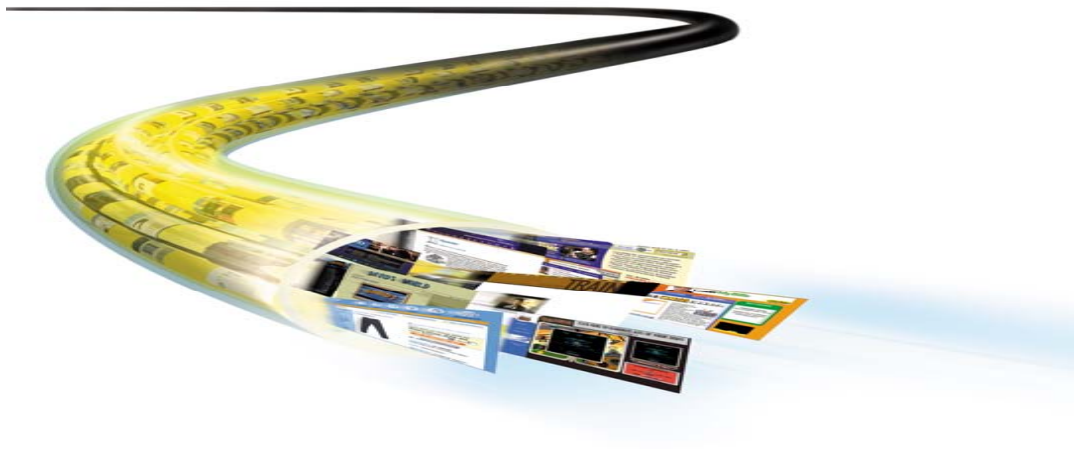
175 Exabytes
The amount of data that will cross the Internet in 2010 alone

66 Zettabytes
The amount of visual information conveyed from the eyes to the brain of the entire human race in a single year

20 Yottabytes
A holographic snapshot of the earth's surface

Source: Cisco Visual Networking Index – Forecast, 2007-2012

Key Cisco VNI Forecast Insights



1. Video is the key driver of IP traffic growth
2. High-definition and on-demand content are driving video traffic today
3. Collaboration and mobility will drive video traffic tomorrow
4. Video traffic will cause shifts/changes in network topologies
5. The sheer volume of video content may cause traffic “surprises”

Source: Cisco Visual Networking Index – Forecast, 2007-2012

Key Cisco VNI Forecast Predictions

Total IP Traffic 44 exabytes per month in 2012, 46% CAGR

- Annual global IP Traffic will reach half a zettabyte in four years

Total Internet 27 exabytes per month in 2012, 41% CAGR

- In 2012, the Internet will be 75 times larger than it was in 2002
- The sum of video will be close to 90% of consumer Internet in 2012

Internet video 10 exabytes per month in 2012, 65% CAGR

- In 2010 Internet video will surpass P2P in volume.
- Online video will account for nearly 50% all consumer Internet by 2012.
- In 2012, Internet video will be nearly 400X the U.S. backbone in 2000.

Mobile 1.2 exabytes per month in 2012, 116% CAGR

- Mobile data traffic will more than double every year through 2012.
- Mobile data traffic in 2012 will be twenty times what it is today.

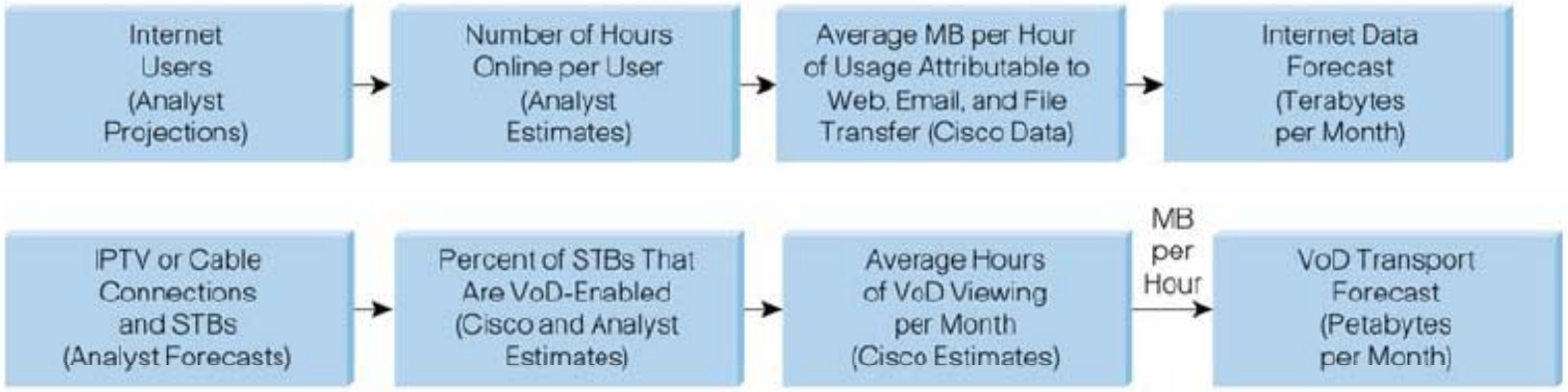
Source: Cisco Visual Networking Index – Forecast, 2007-2012

Cisco VNI Forecast Methodology – 2007-2012

The forecast relies on analyst projections for Internet users, broadband connections, video subscribers, mobile connections, and Internet application adoption.

Cisco also collects traffic data directly from a number of our service provider customers, and this data is used to validate and adjust the usage assumptions underlying the forecast model.

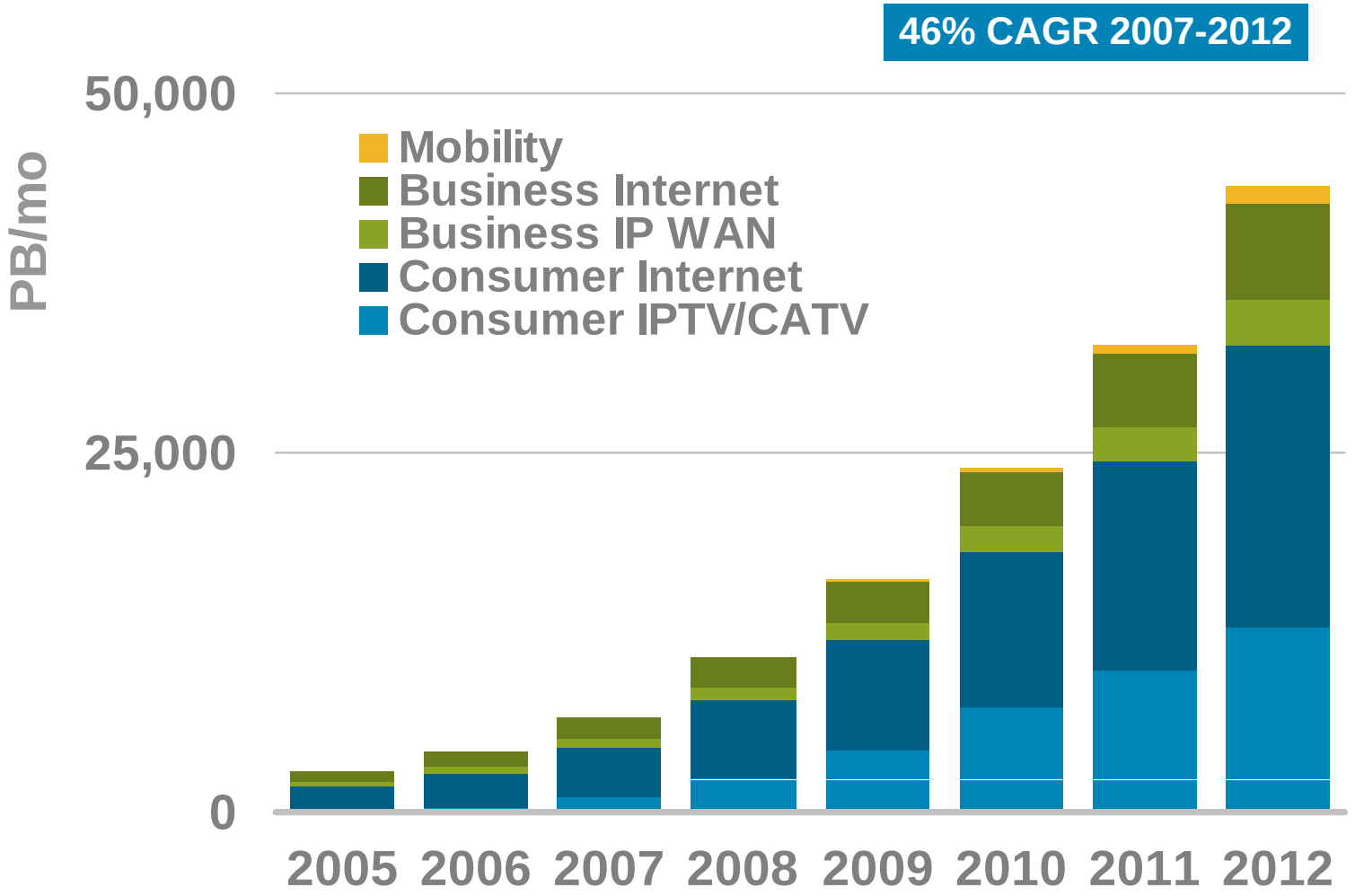
Examples of the VNI Forecast methodology:



Global IP Traffic Growth

IP traffic will increase 6X from 2007 to 2012

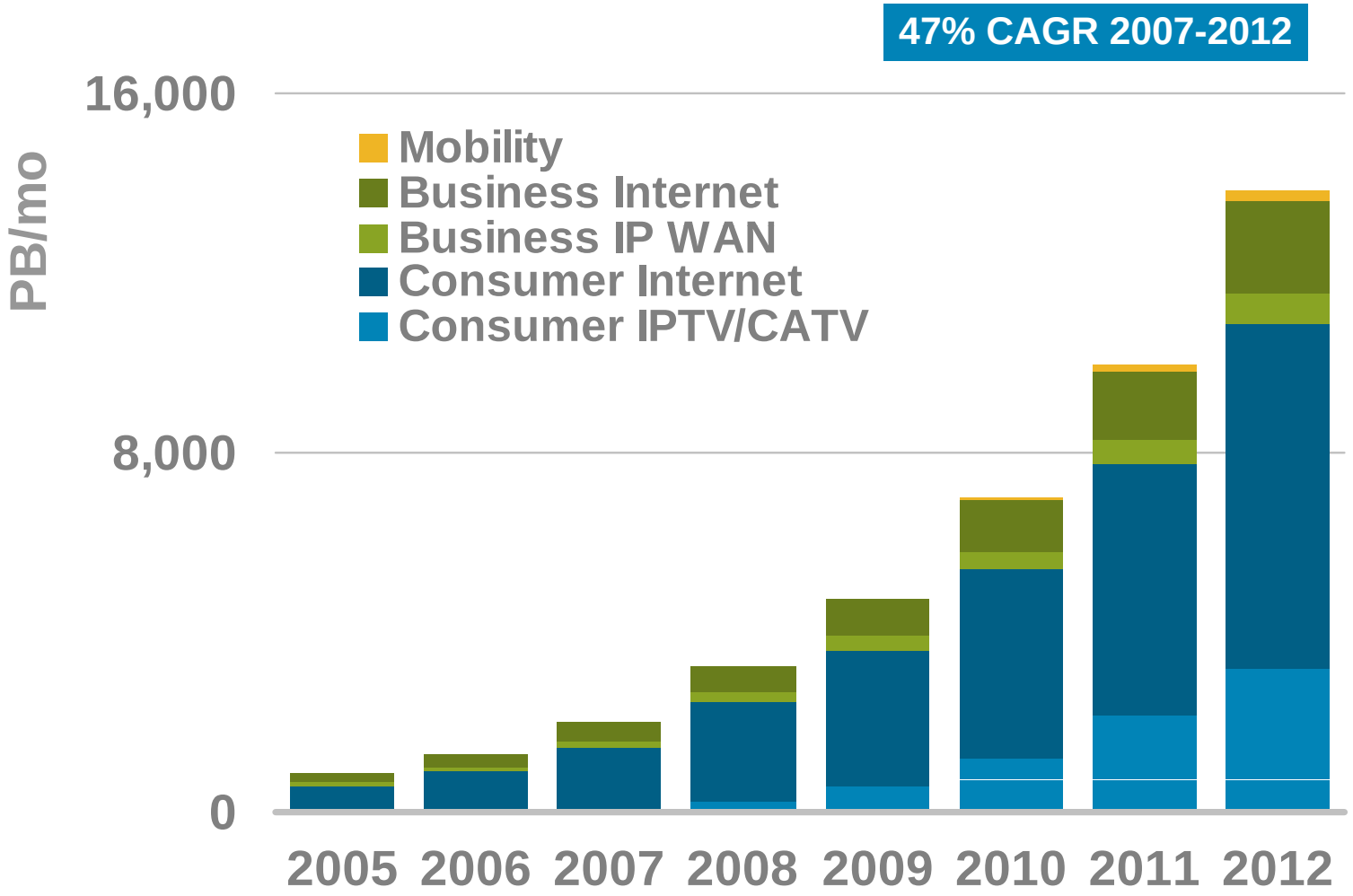
In 2012, half a zettabyte will cross the global network



Source: Cisco Visual Networking Index – Forecast, 2007-2012

APAC IP Traffic Growth

IP traffic will increase 7X from 2007 to 2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

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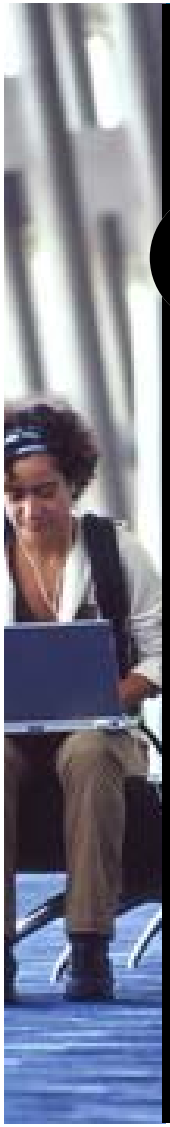
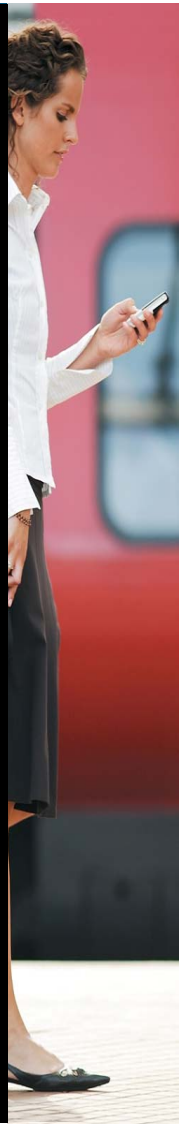
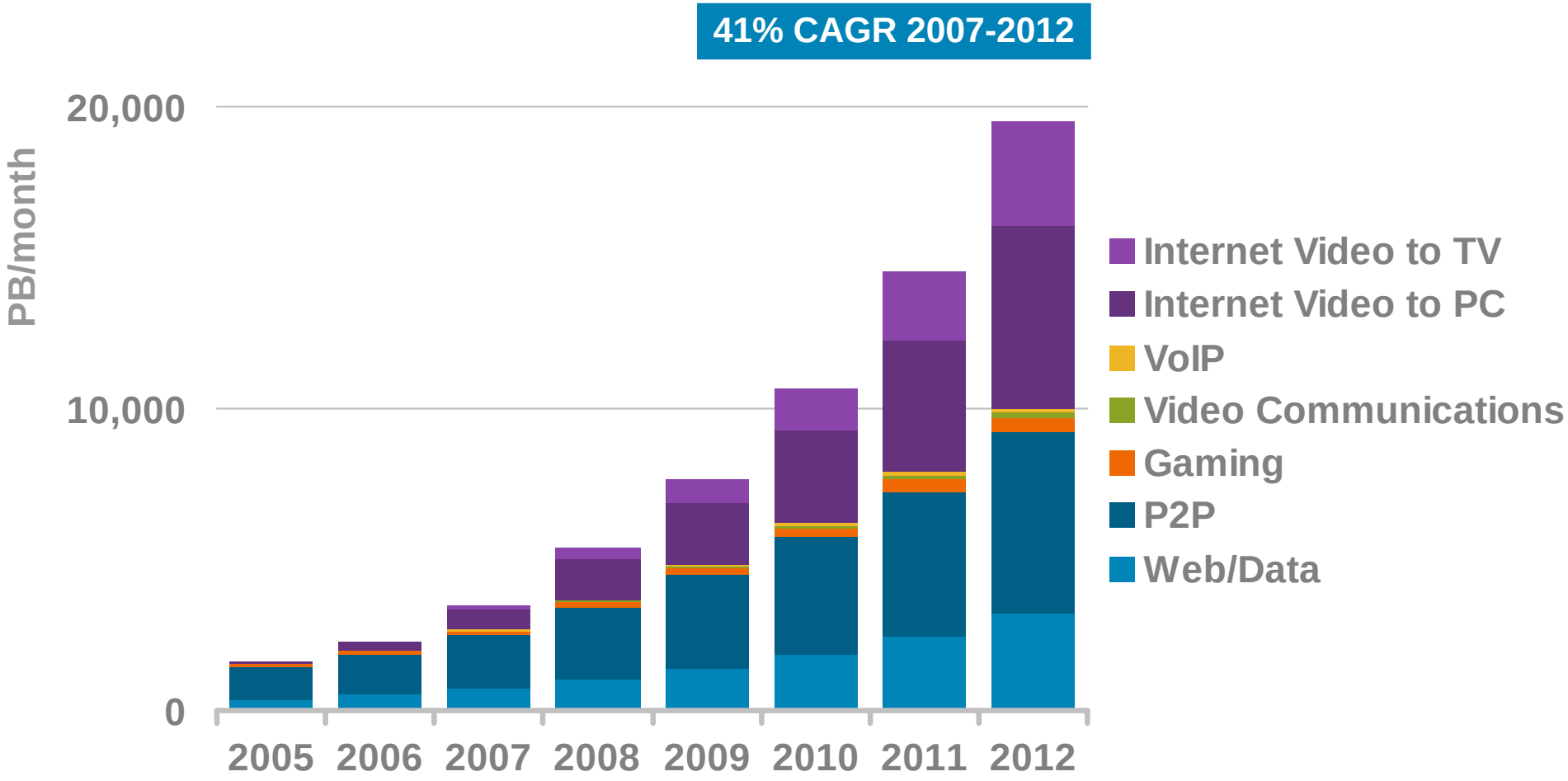




Global Consumer Internet Traffic Mix

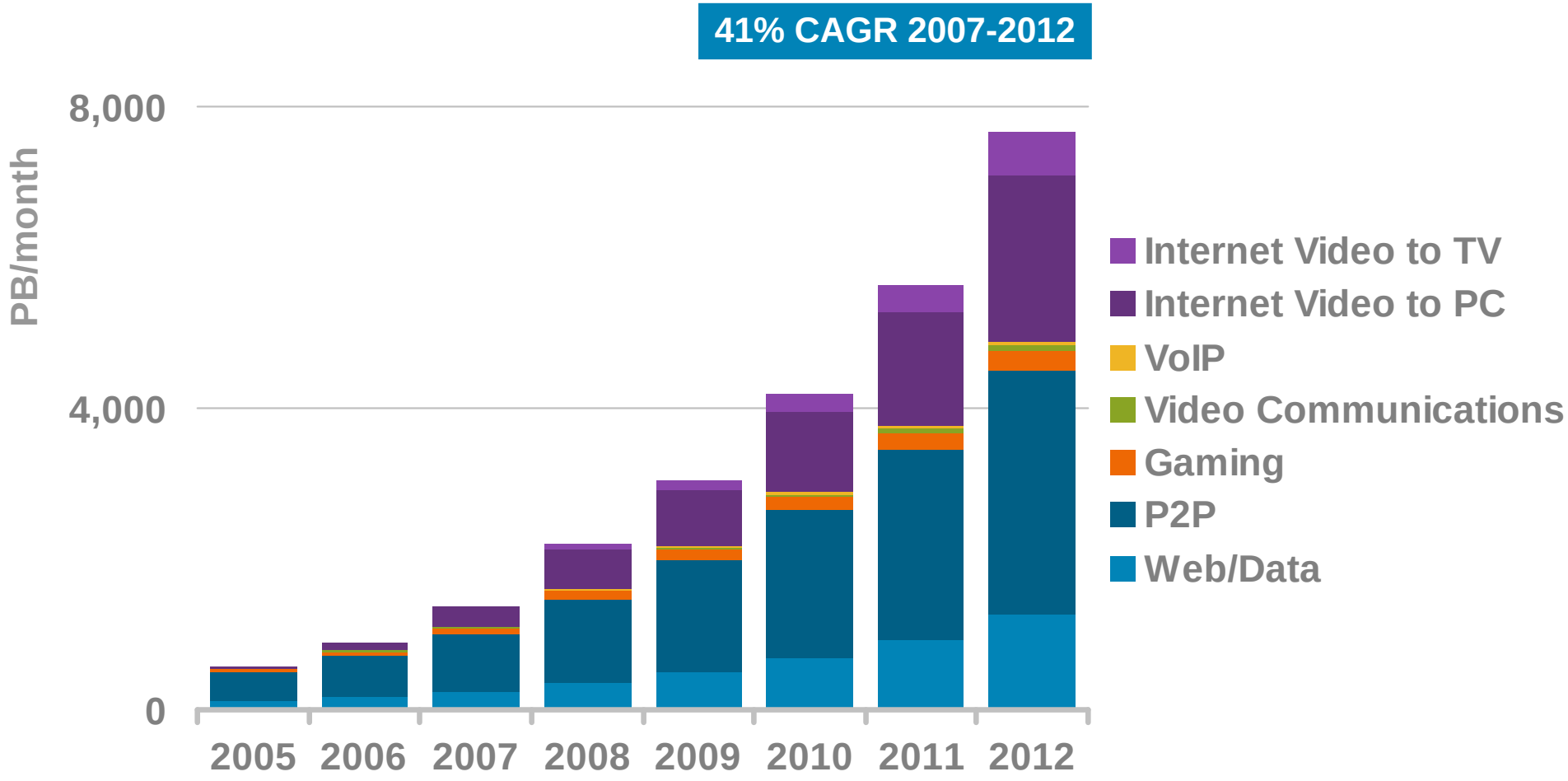
Video will be nearly 50% of traffic by 2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

APAC Consumer Internet

Video will reach 33% of traffic by 2012



Source: Cisco Visual Networking Index – Forecast, 2008

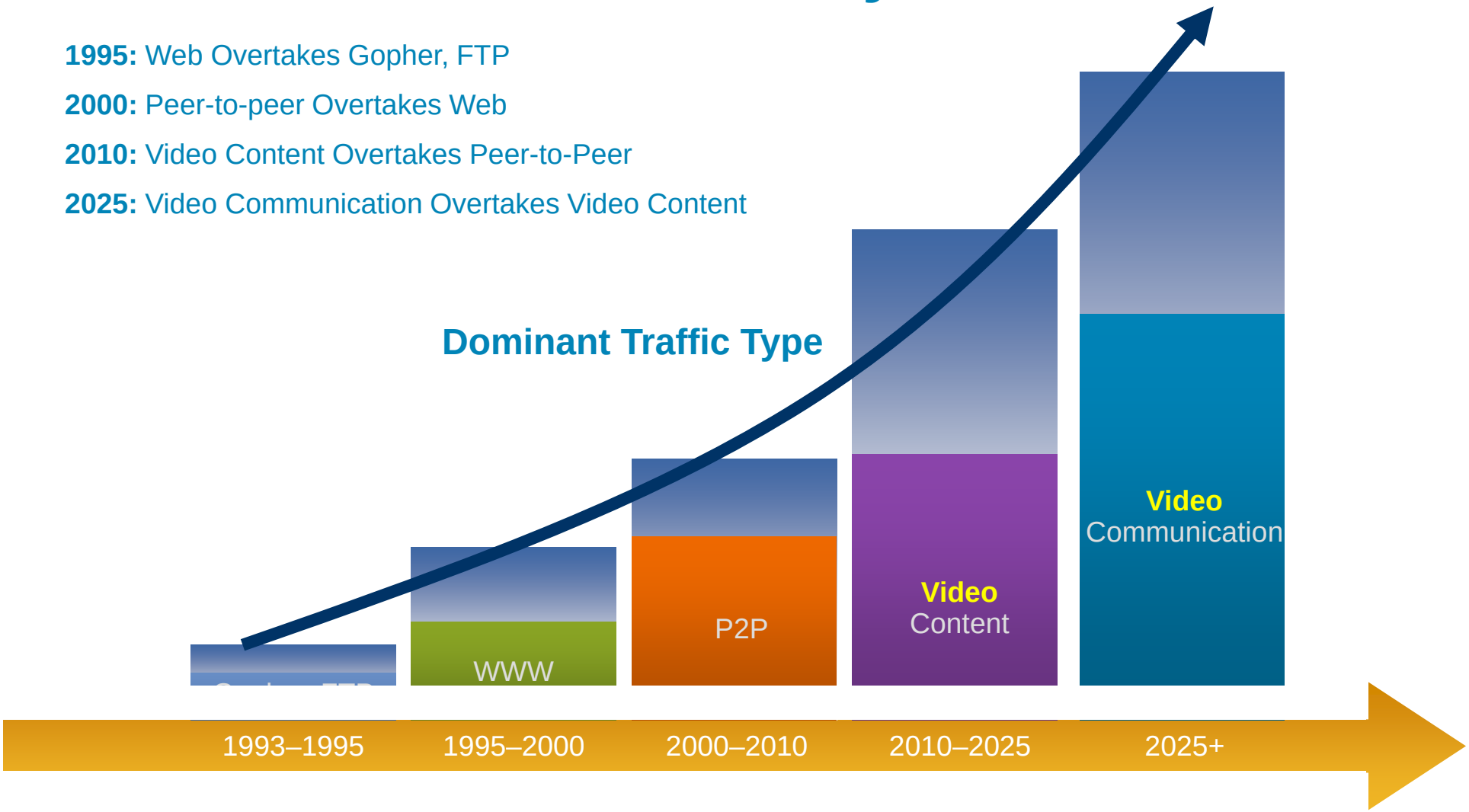
Video to Overtake P2P by 2010

1995: Web Overtakes Gopher, FTP

2000: Peer-to-peer Overtakes Web

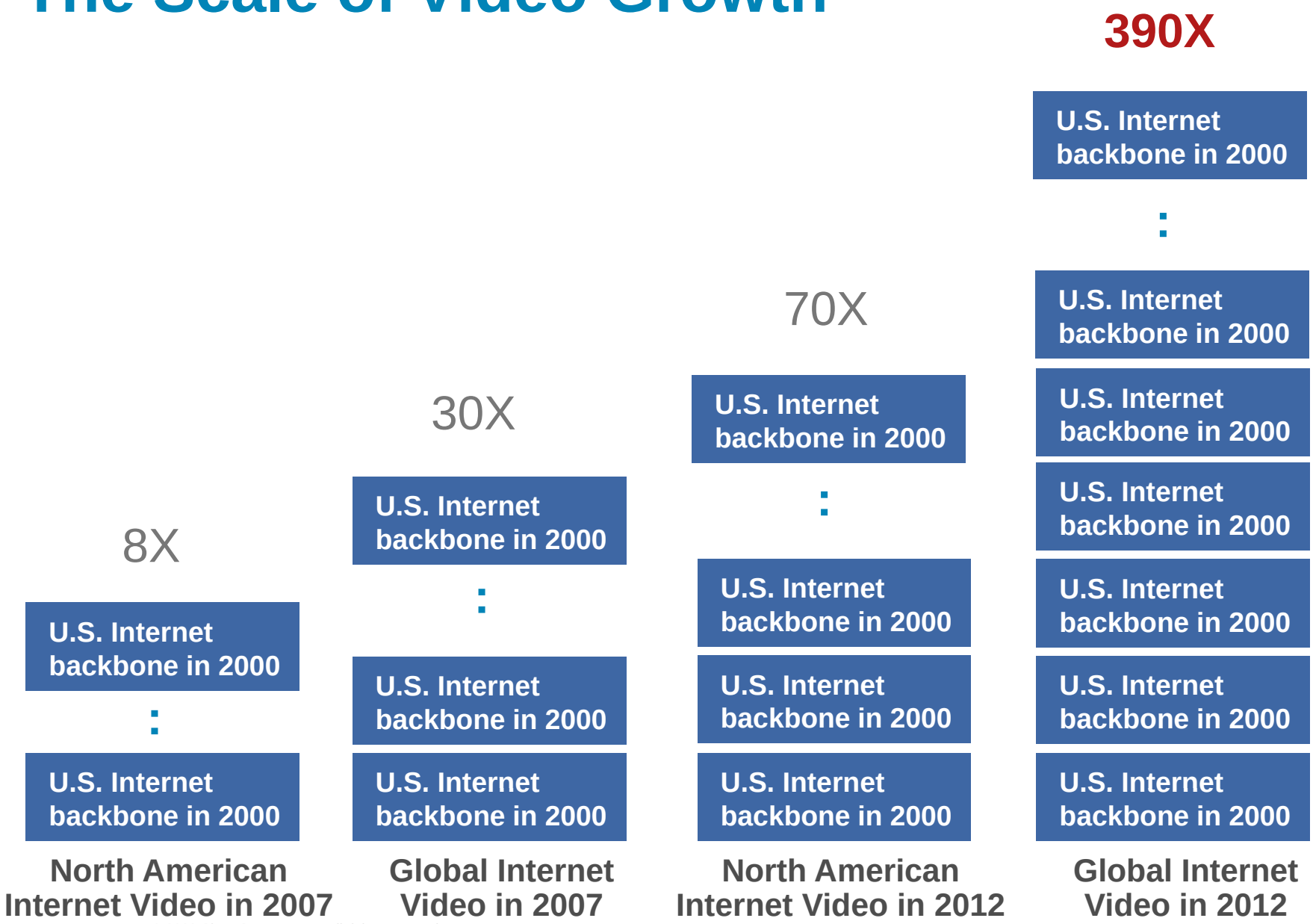
2010: Video Content Overtakes Peer-to-Peer

2025: Video Communication Overtakes Video Content



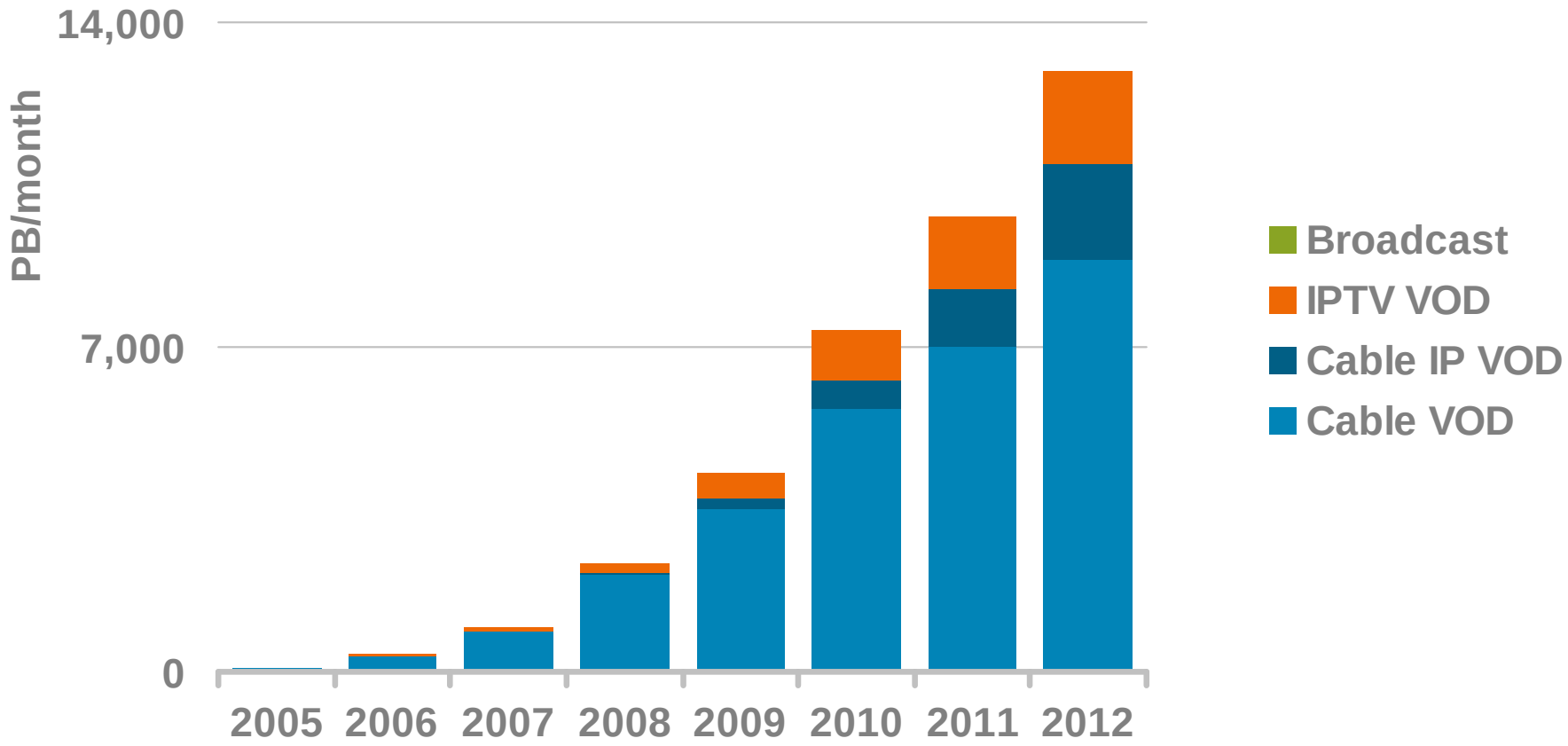
Source: Cisco, 2008

The Scale of Video Growth



Global Consumer VOD Traffic Mix

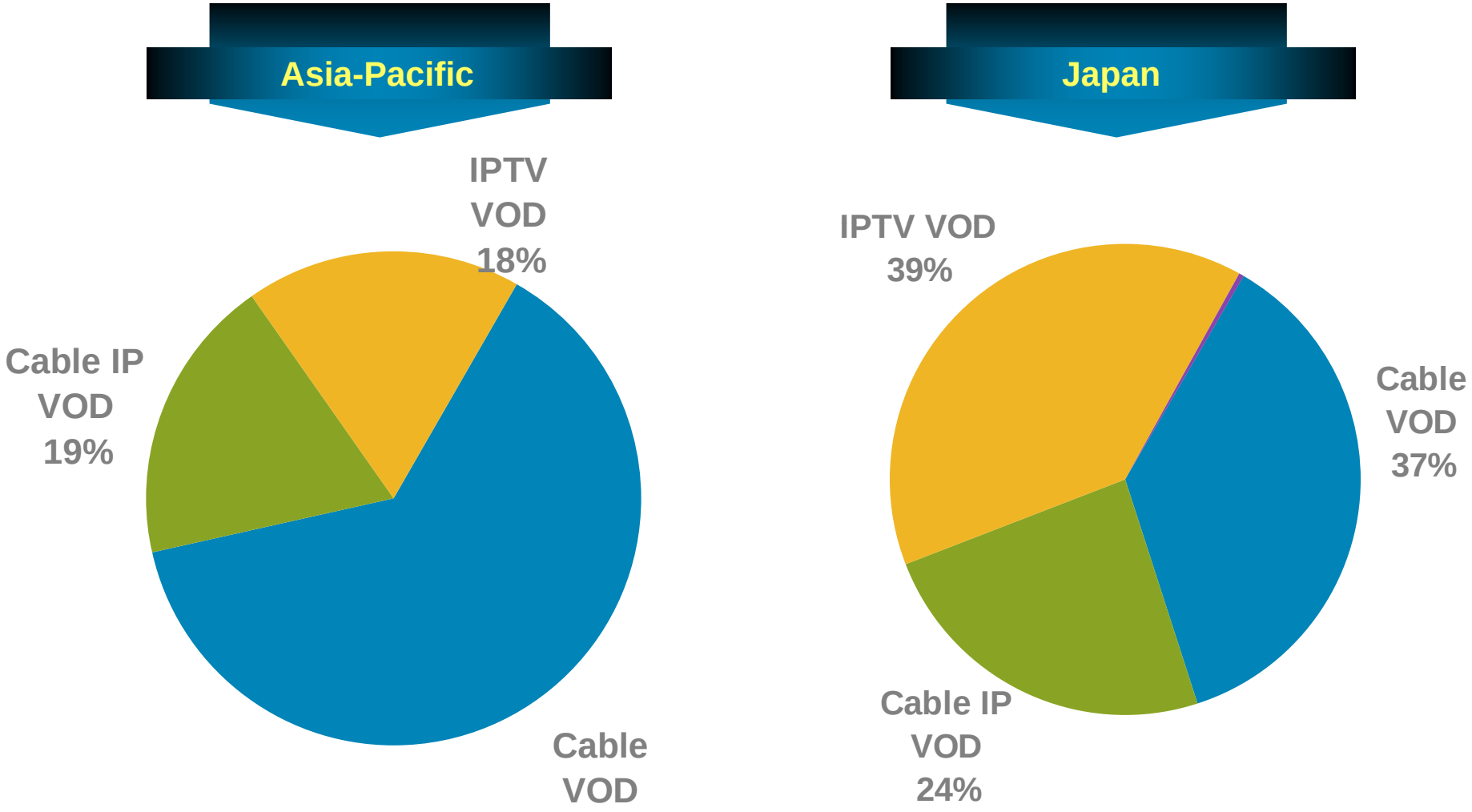
Consumer VOD traffic grows at a 93% CAGR from 2007 to 2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

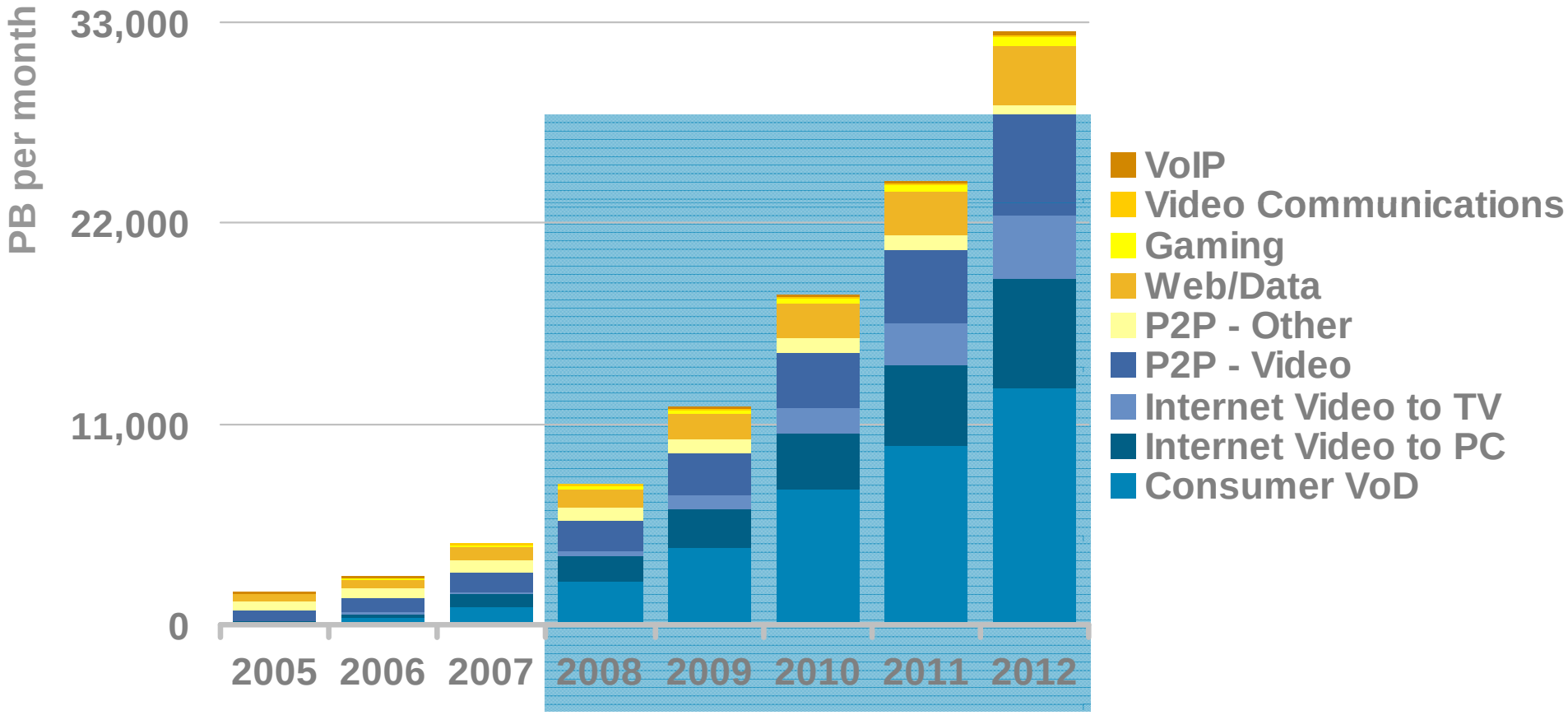
Consumer VOD Traffic by Region in 2012

IPTV VOD to reach 18% of VOD in APAC by 2012



Source: Cisco Visual Networking Index – Forecast, 2008

Without Video, Consumer IP Doubles by 2012
With Video, Consumer IP Quadruples by 2012

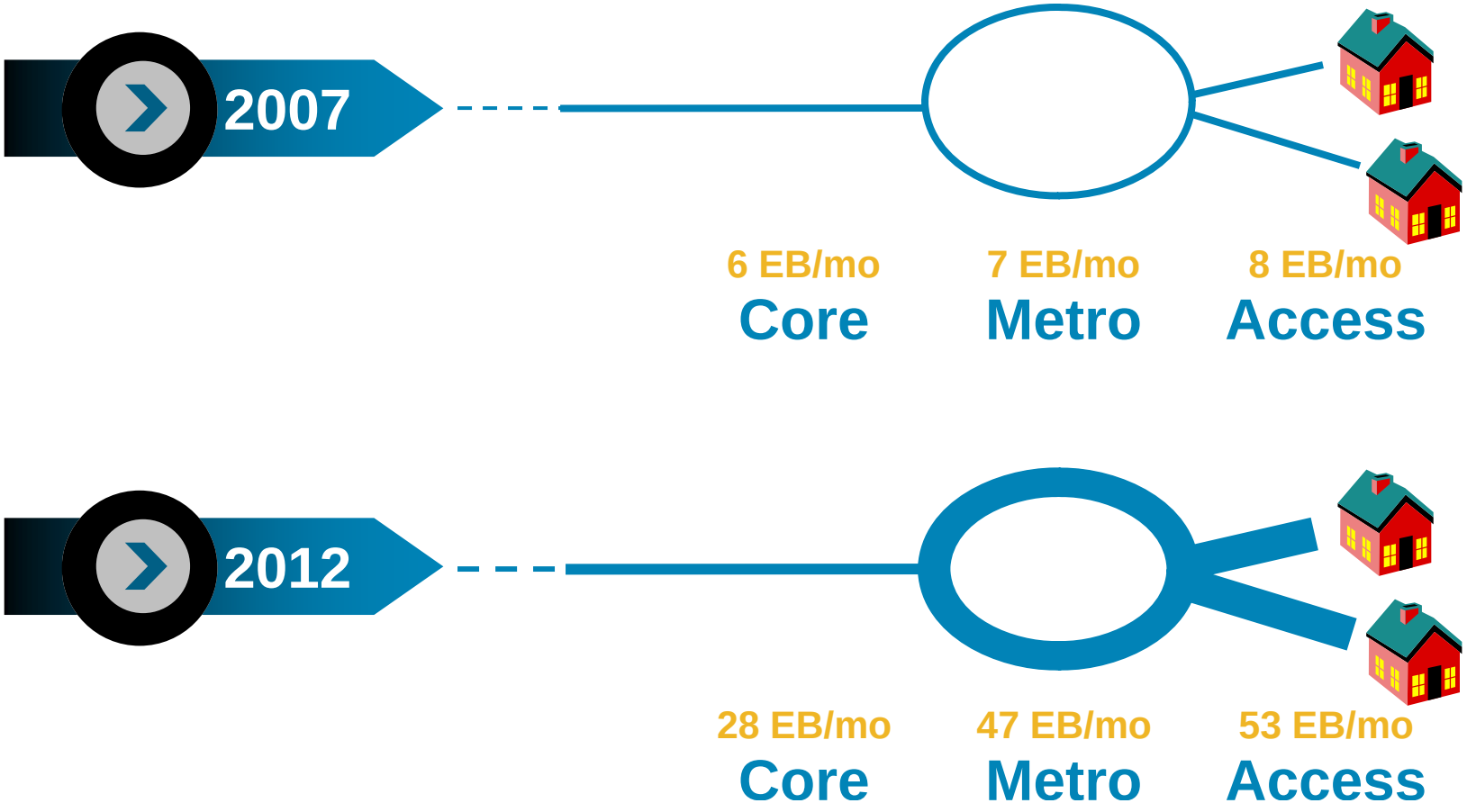


Video to reach 87% of Consumer IP in 2012

Source: Cisco Visual Networking Index – Forecast, 2007-2012

Core Grows Fivefold, Metro Sevenfold

Metro IP traffic grows by a factor of 7, Core by 5



Source: Cisco, 2008

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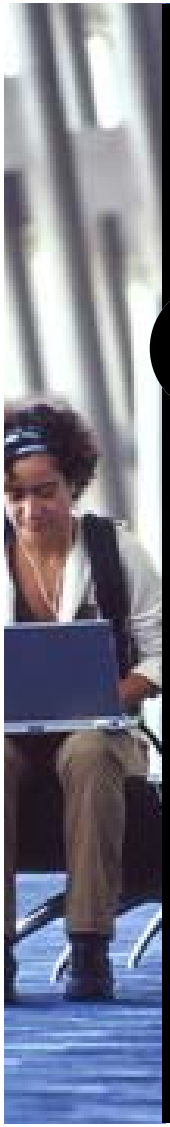
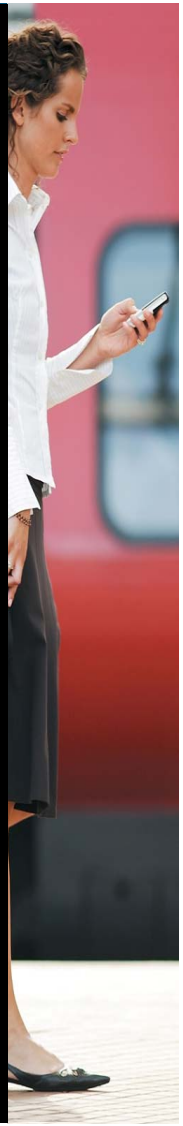
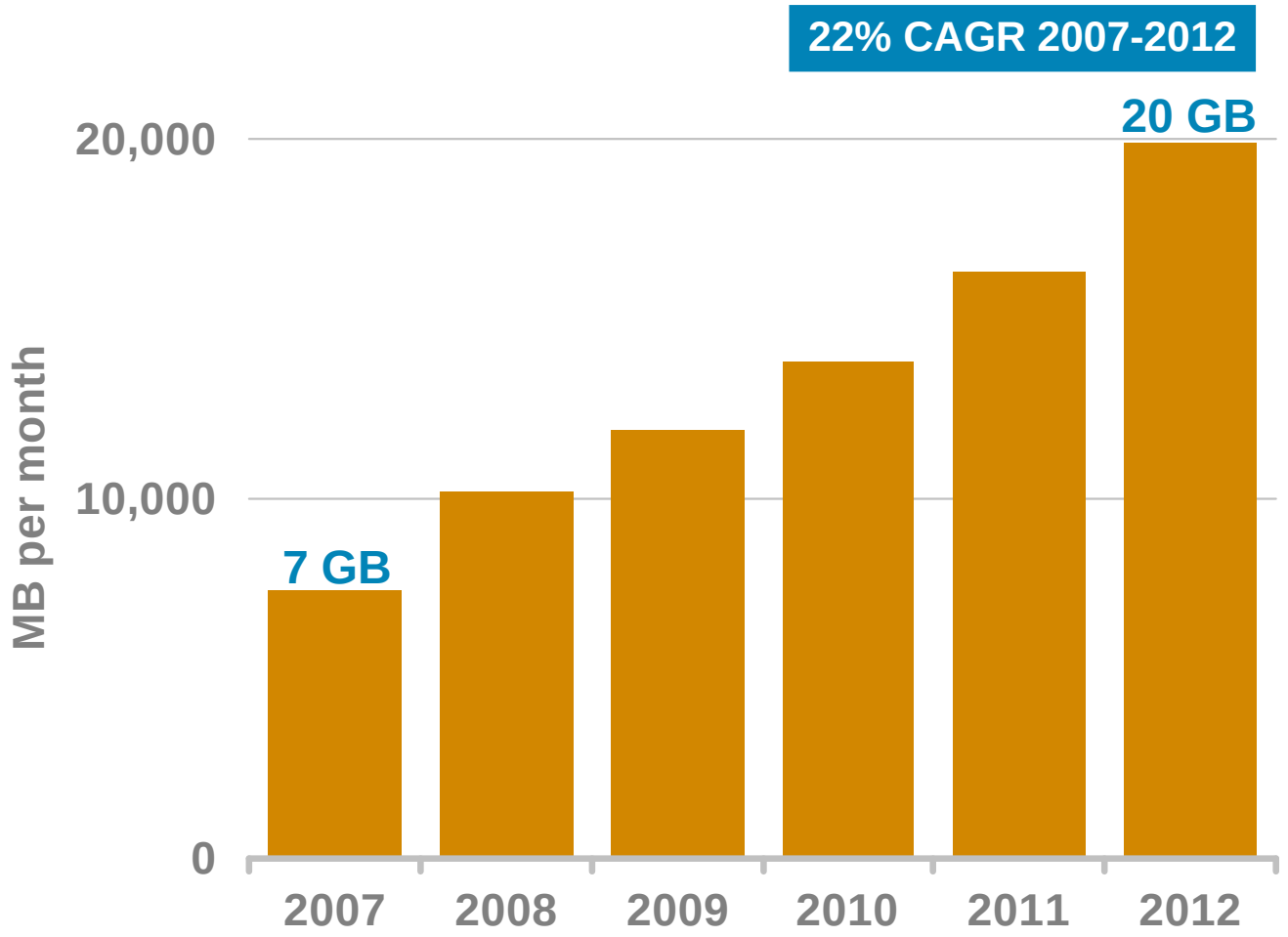




Per Household Internet Traffic Forecast – APAC*

Internet Household Traffic to Grow At 22% CAGR

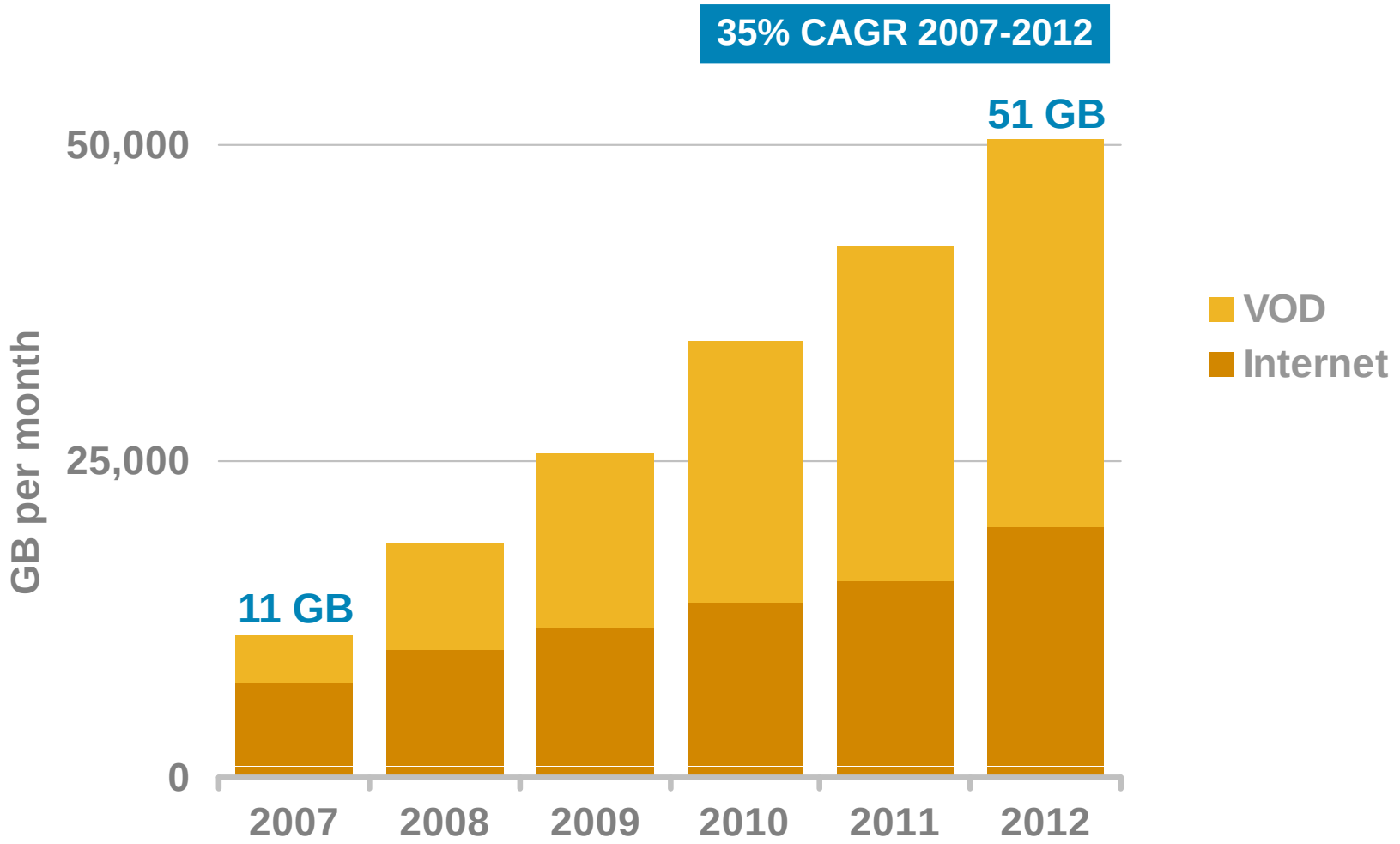


*Excluding Japan

Source: Cisco Visual Networking Index – Forecast, 2007-2012

Per Household IP Traffic Forecast – APAC*

Internet + VoD Traffic to Exceed 50GB per Month by 2012



*Excluding Japan

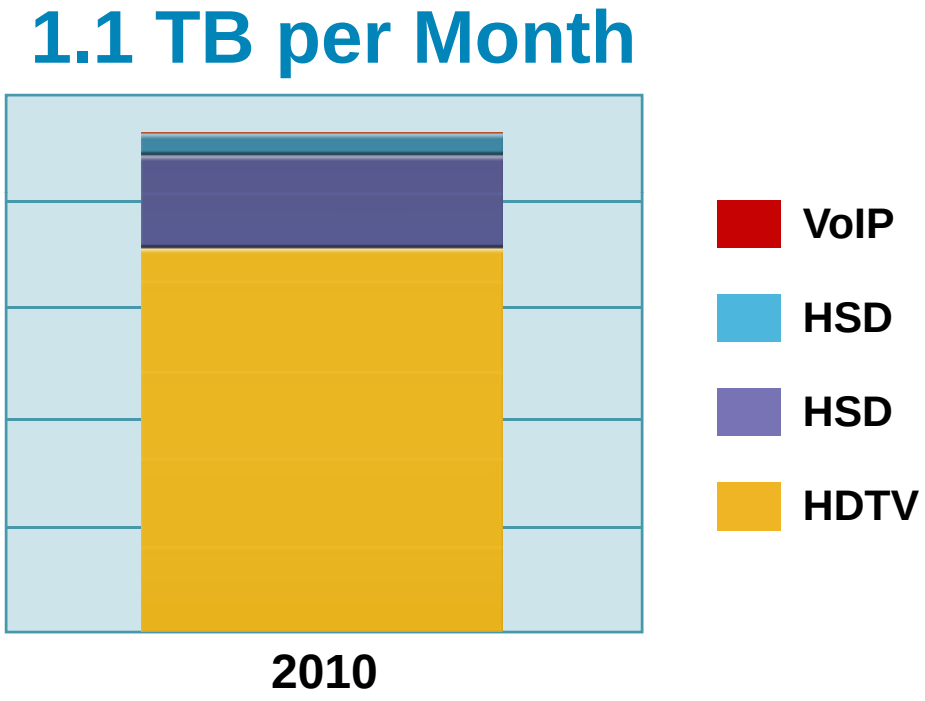
Source: Cisco Visual Networking Index – Forecast, 2007-2012

Household Bandwidth to Reach 1.1 TB/mo

Household Bandwidth Needs in 2010 (U.S.)

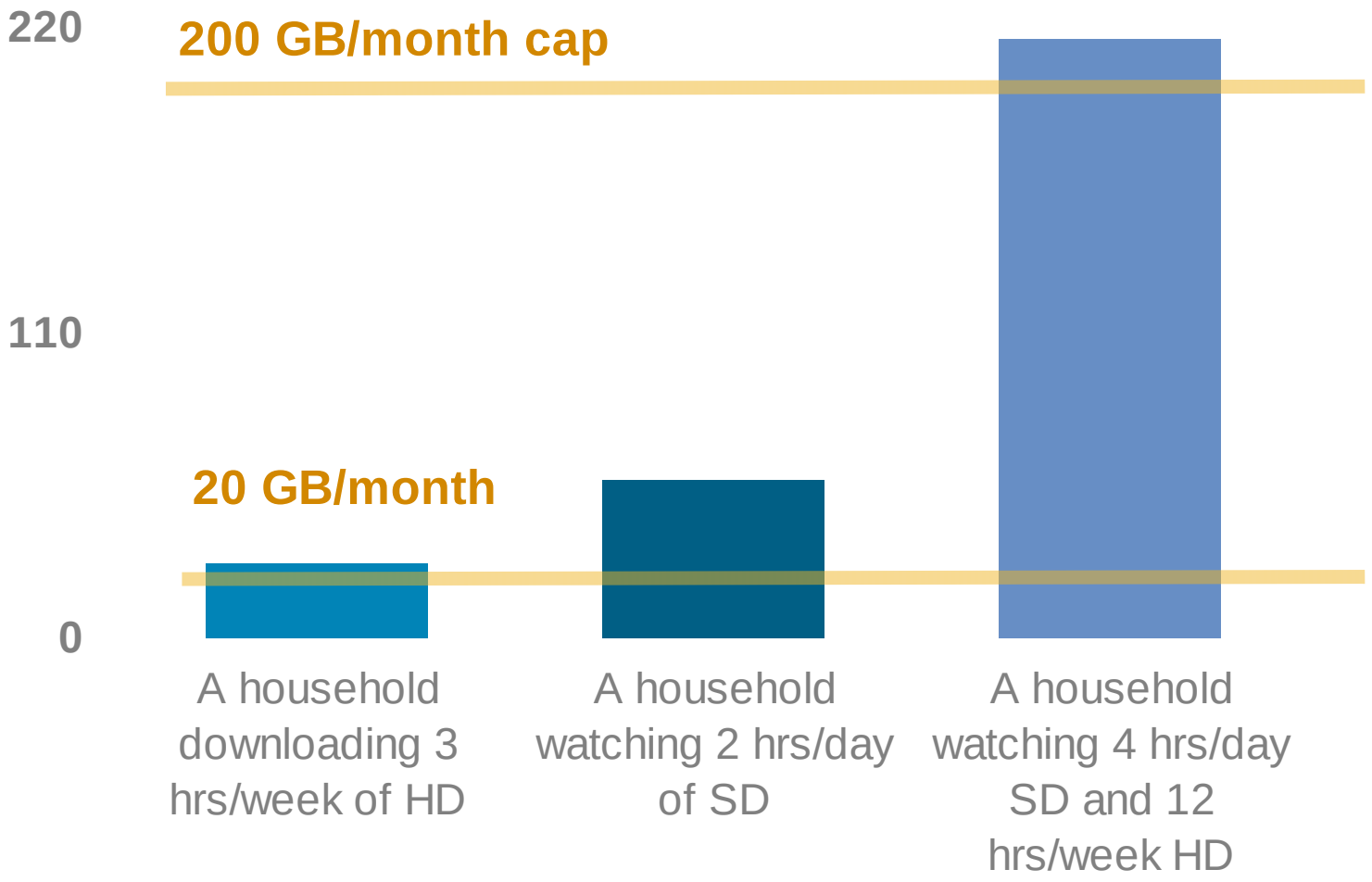
1x HDTV
+
1x SDTV
+
2x PVRs
+
1x VoIP
w/ 2 Dual Mode Handsets
+
1x HSD
w/ 2 PCs

=



Twenty such homes would generate more traffic than traveled the entire Internet backbone in 1994/1995.

Internet Video Scenarios



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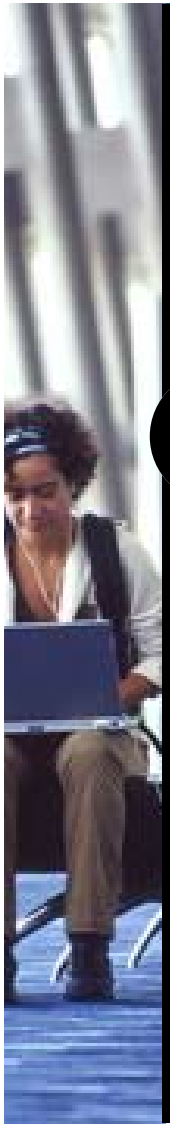
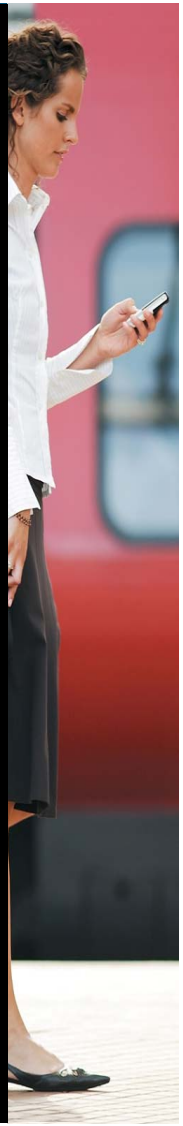
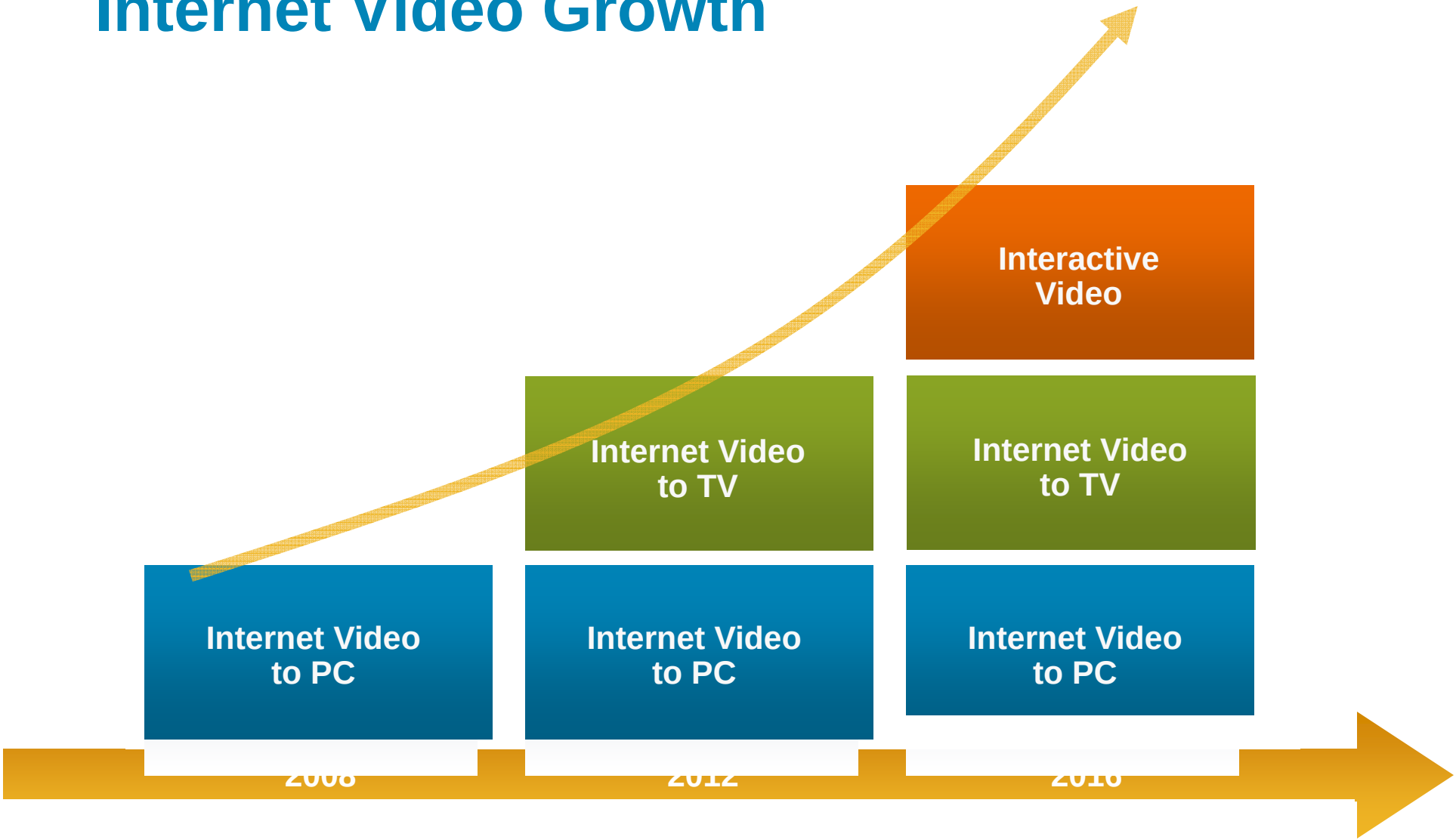




Three Waves of Internet Video Growth



Source: Cisco, 2008

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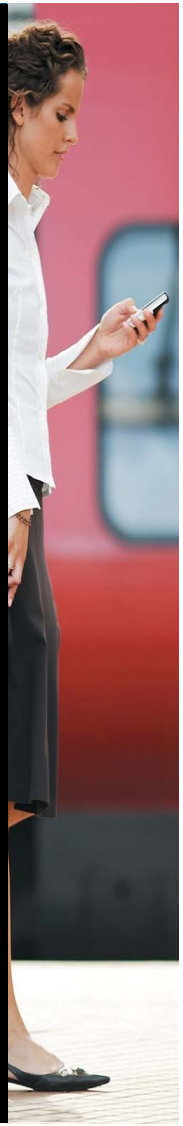
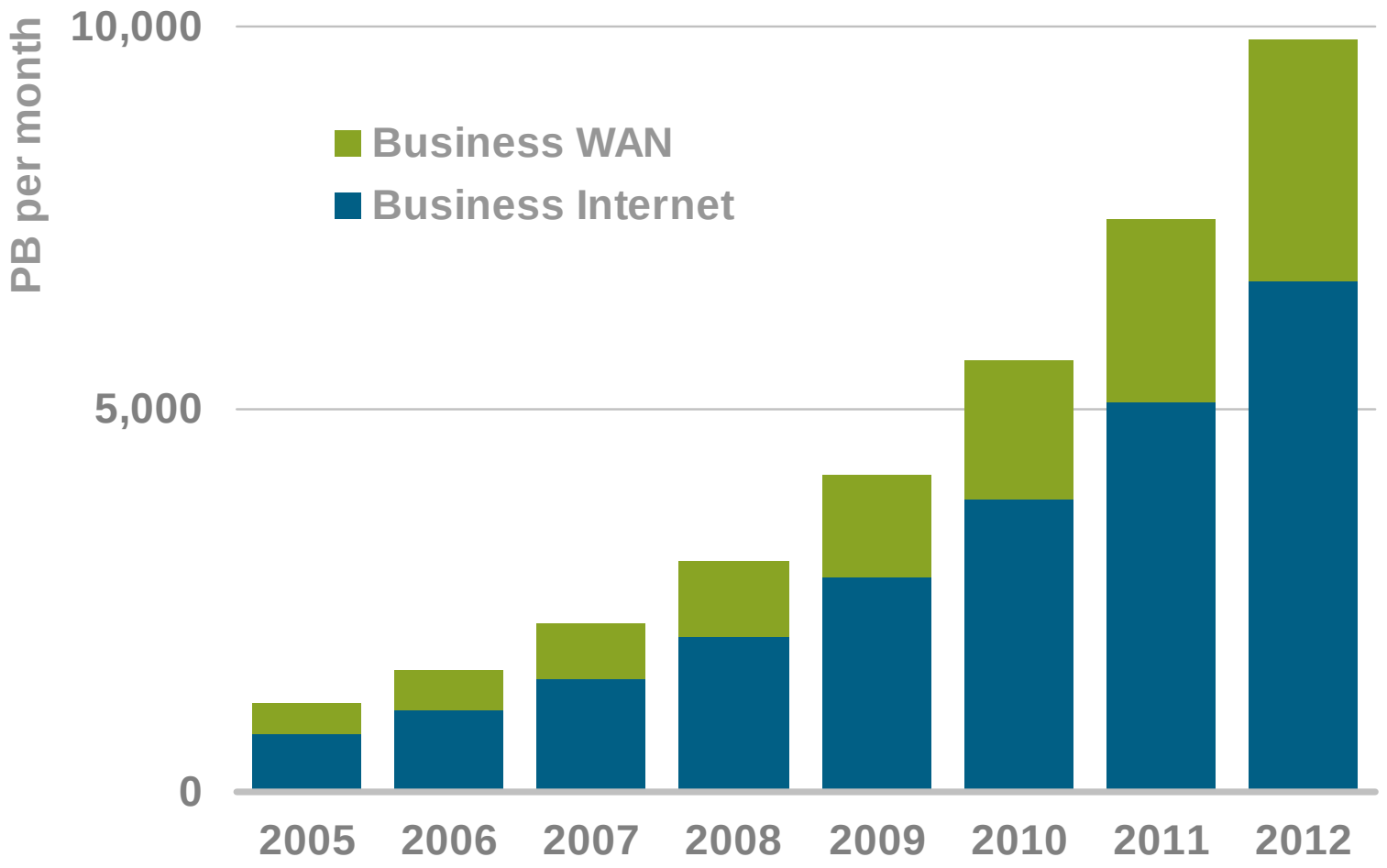


Global Business IP Traffic

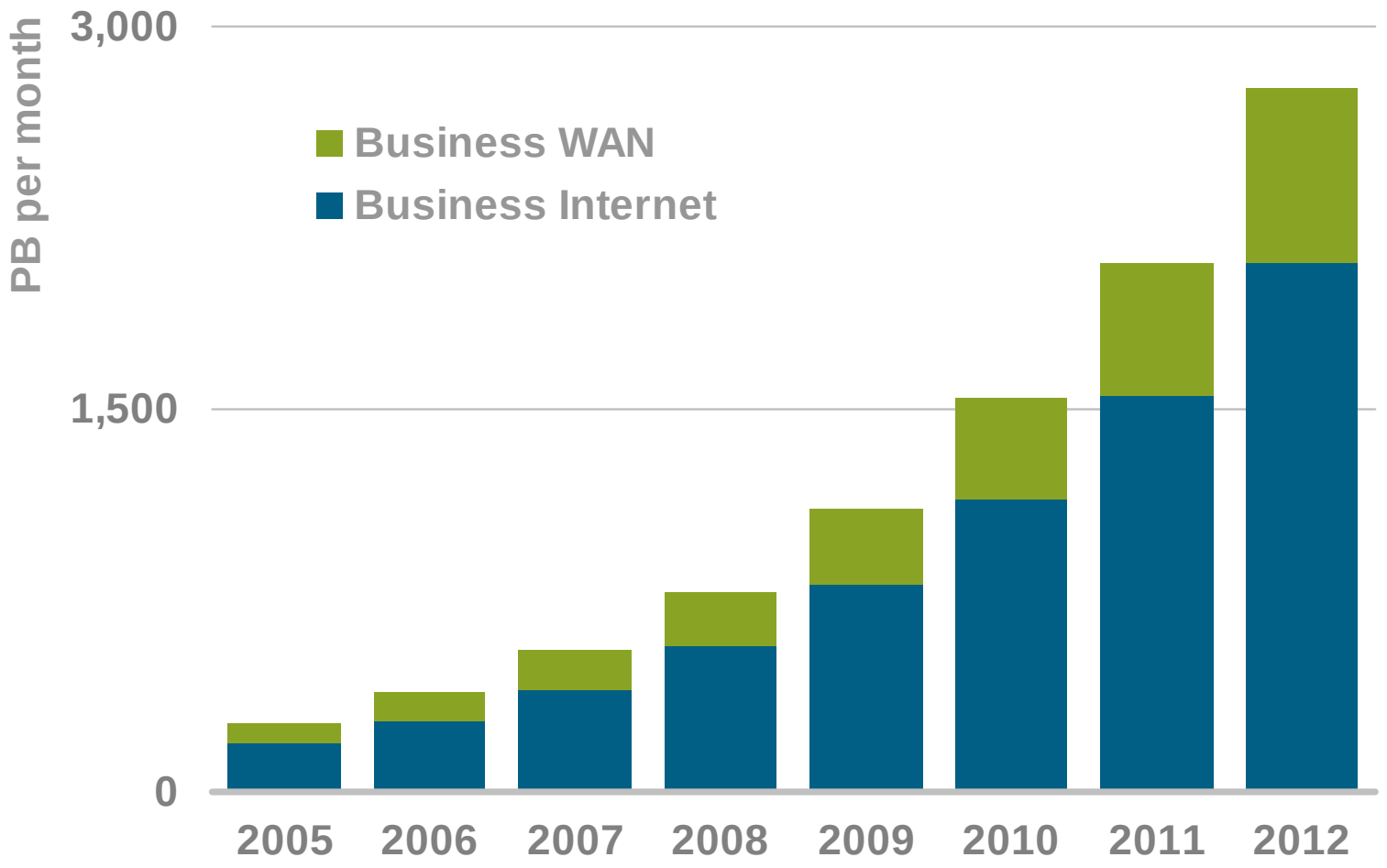
Business IP to Grow at 35% CAGR 2007-2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

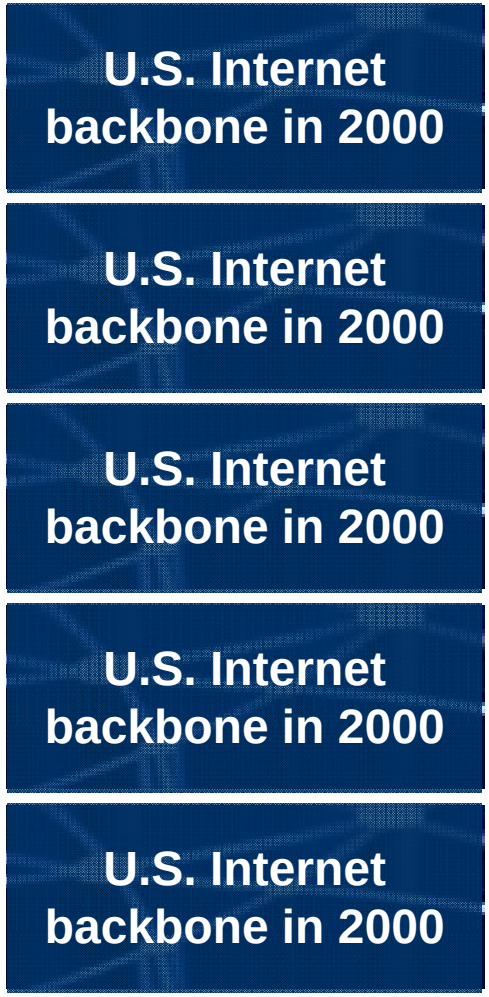
Business IP Traffic in APAC

Business IP to Grow at 38% CAGR 2007-2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

By 2012, corporate telepresence will be 5 times larger than the U.S. Internet backbone in 2000



TelePresence in 2012

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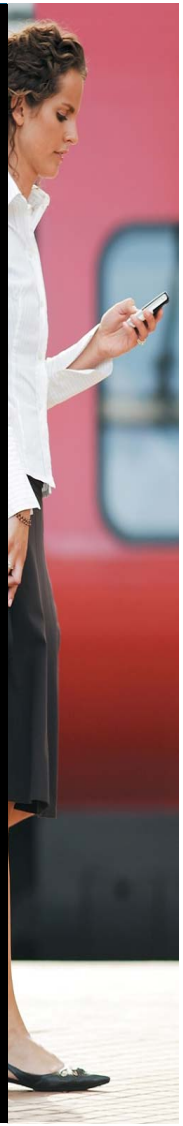
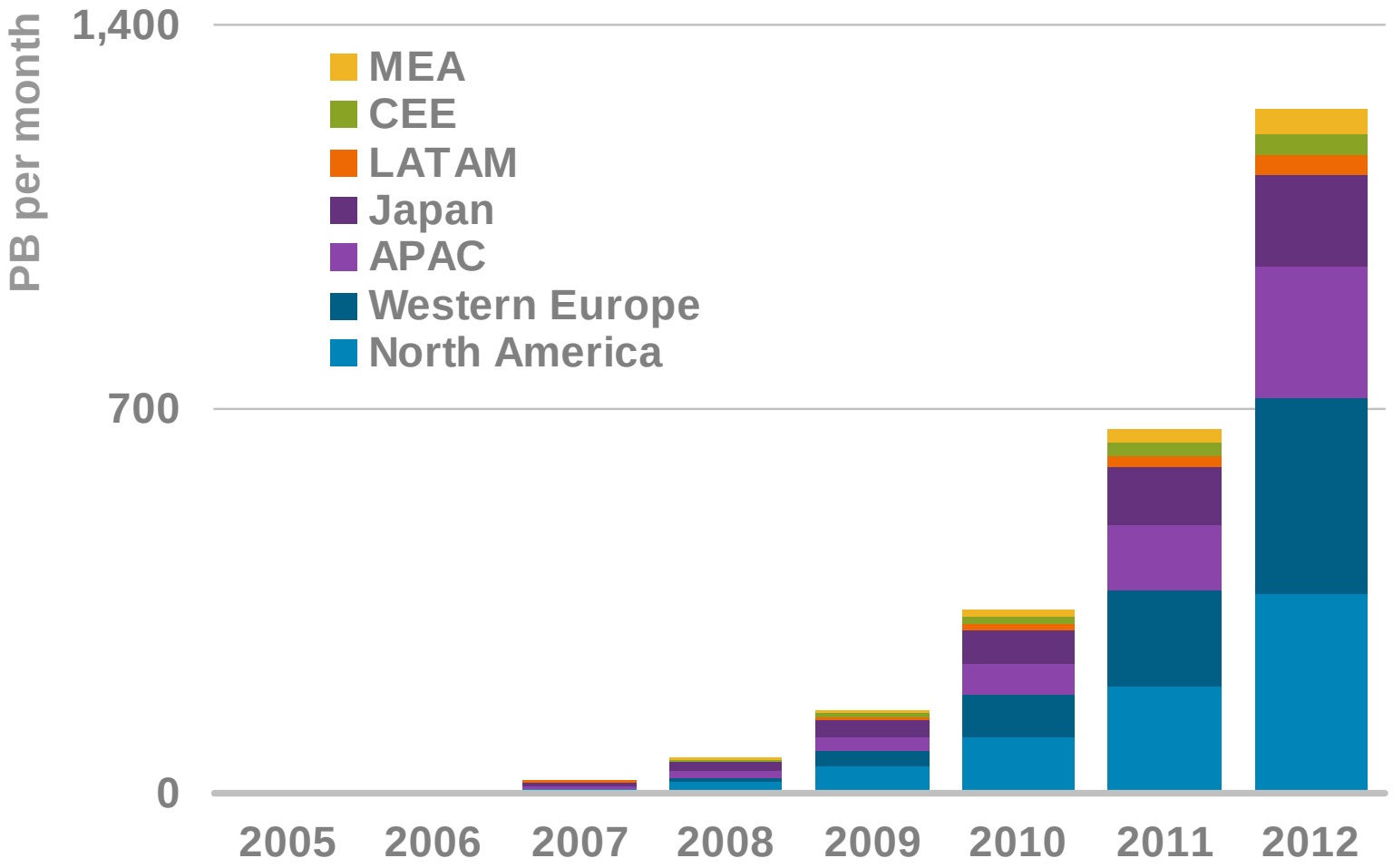


Global Mobile Data Traffic

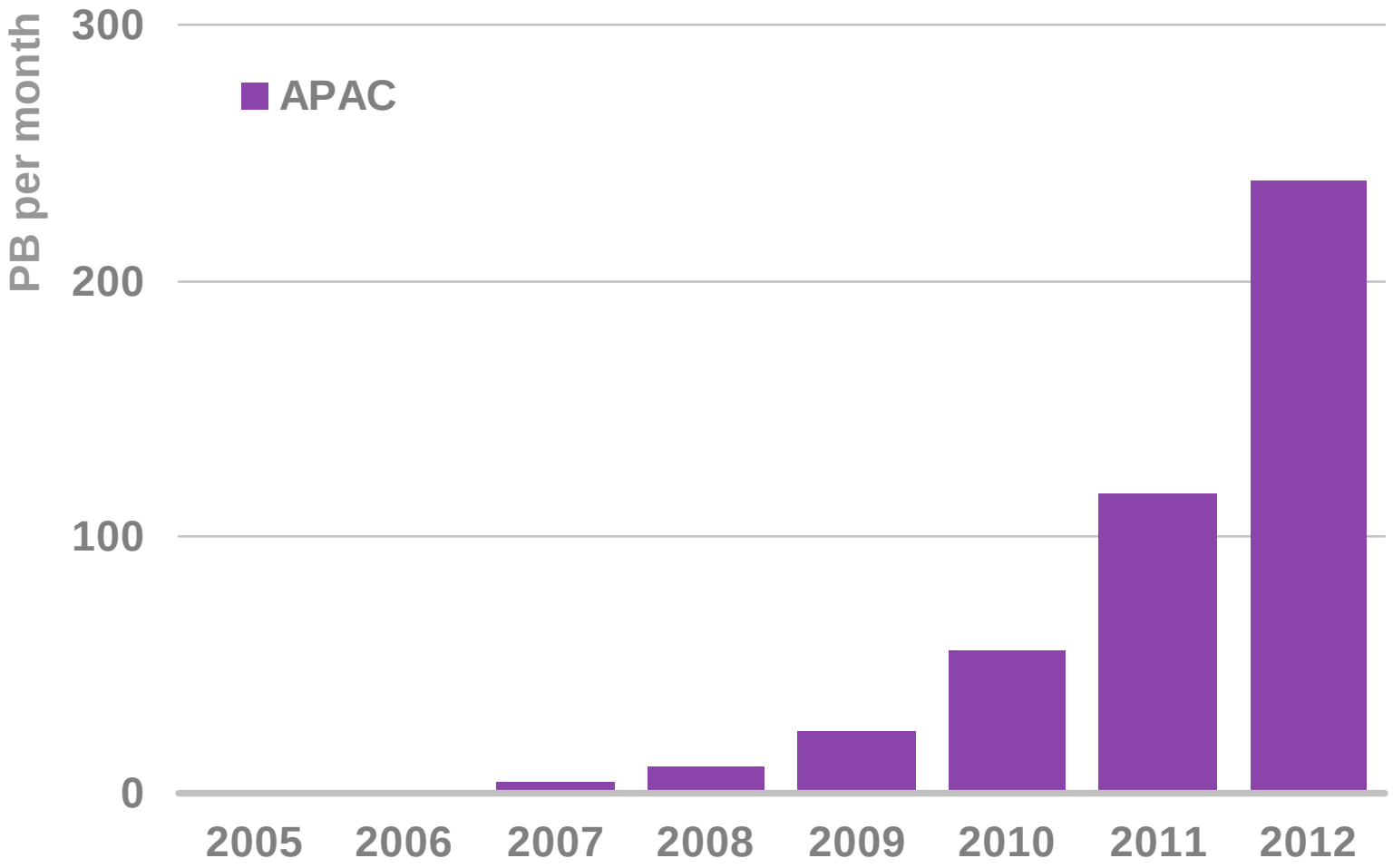
Mobile Data to Grow at 116% CAGR 2007-2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

Mobile Data Traffic in APAC

Mobile Data to Grow at 125% CAGR 2007-2012



Source: Cisco Visual Networking Index – Forecast, 2007-2012

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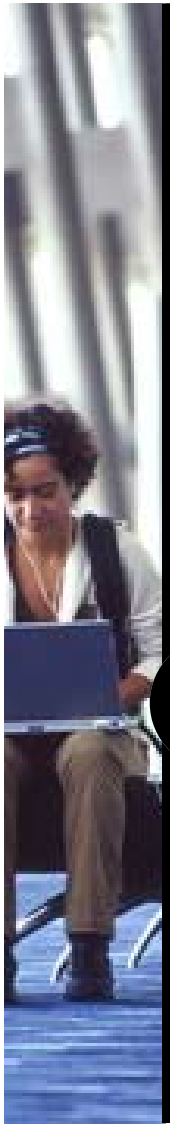
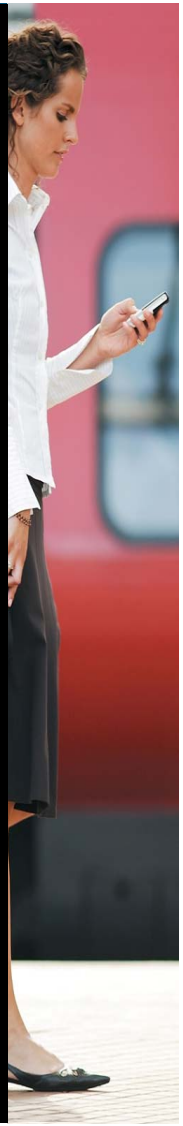
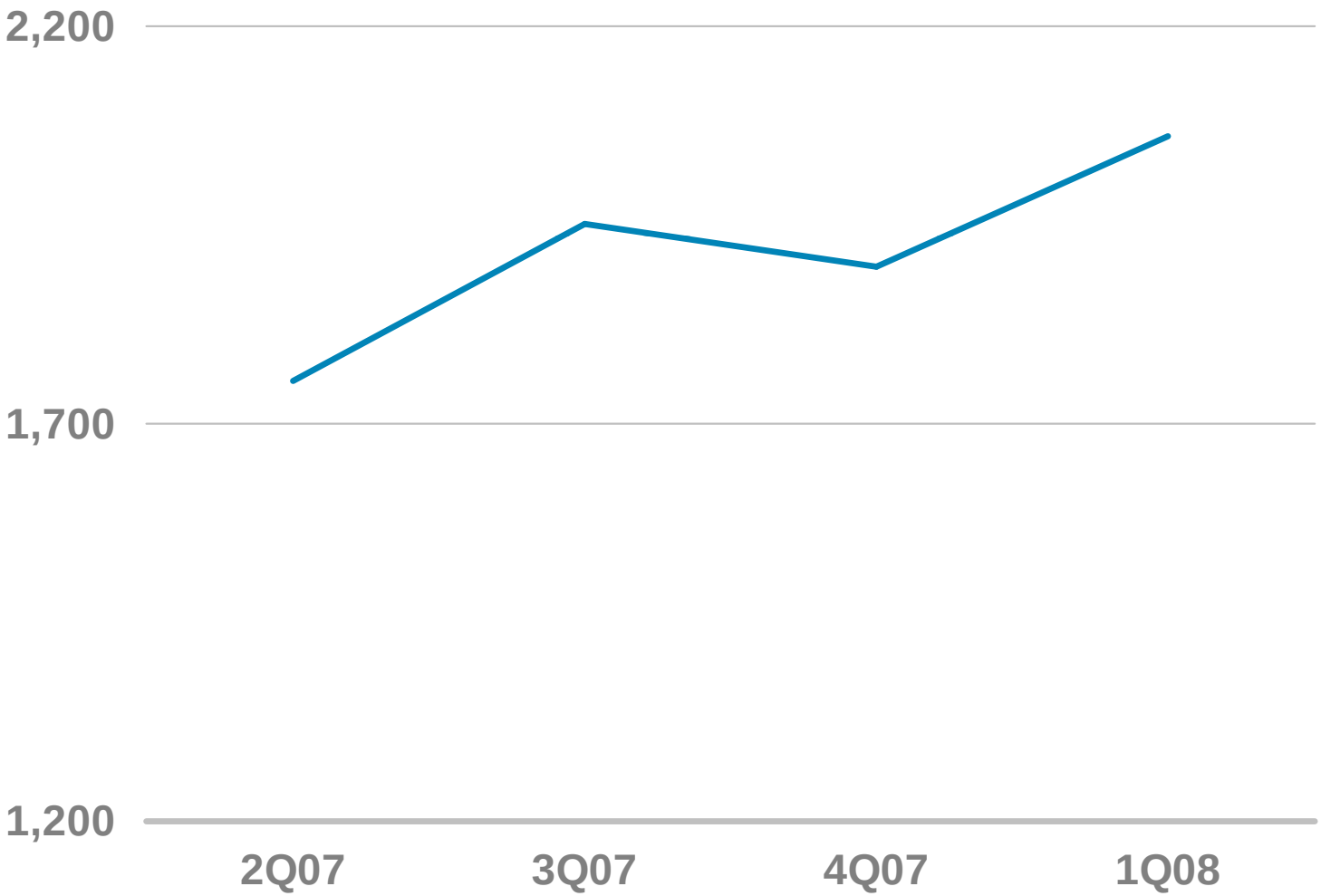




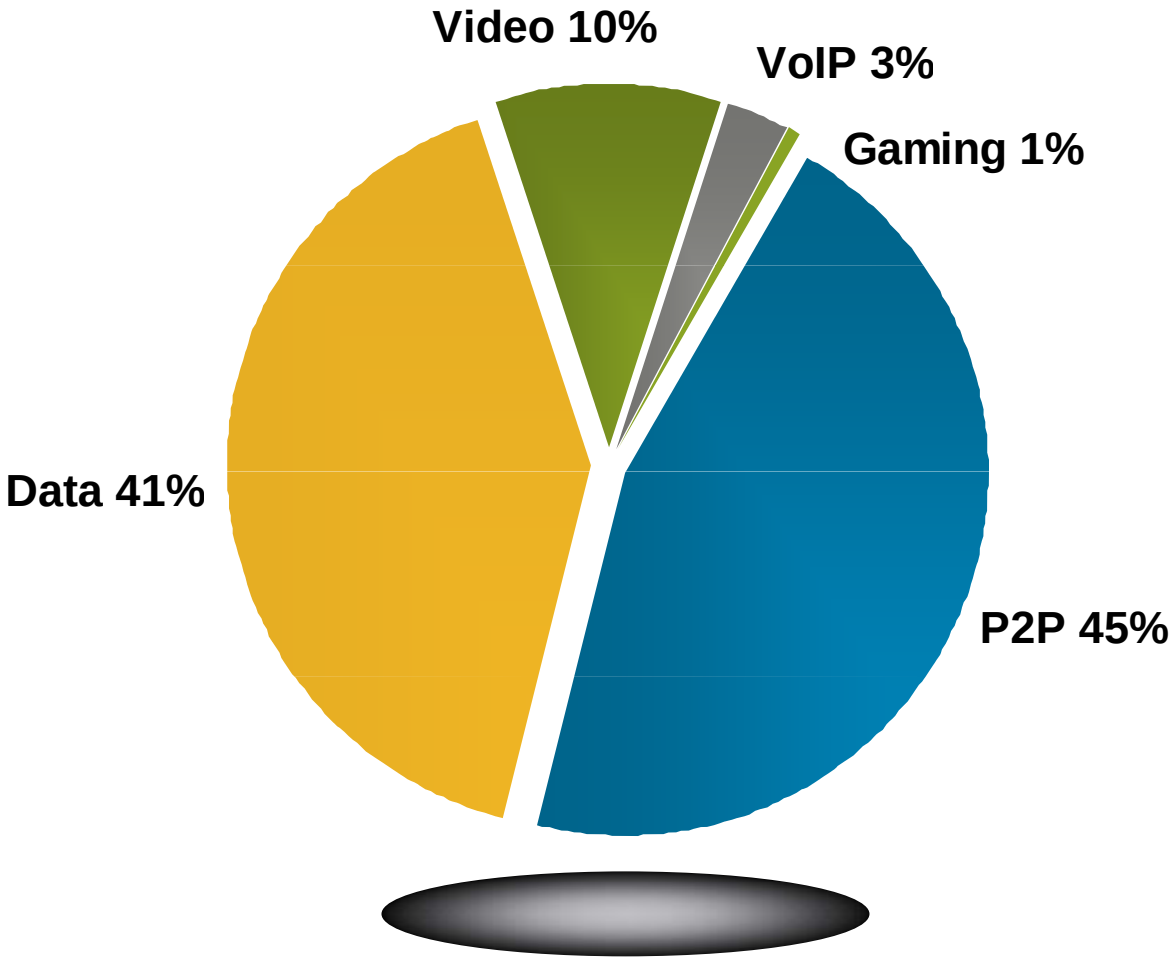
Traffic is Growing 6% per Quarter per Sub

Traffic excluding P2P growing at 12%



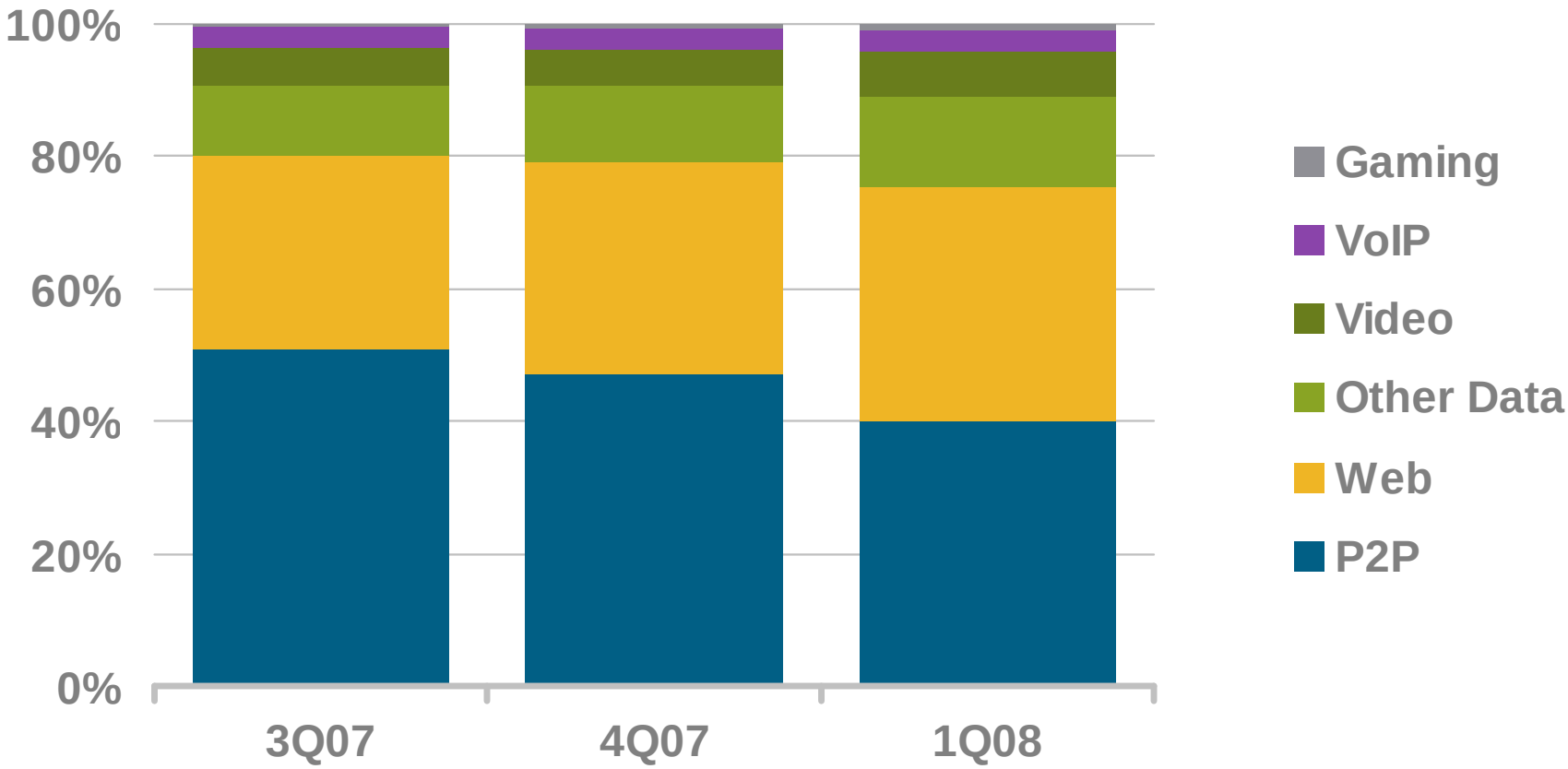
Source: Cisco Service Control Engine, 2008

Residential Broadband Traffic Mix



Source: Cisco Service Control Engine, 2008

Decline of P2P as a Percentage

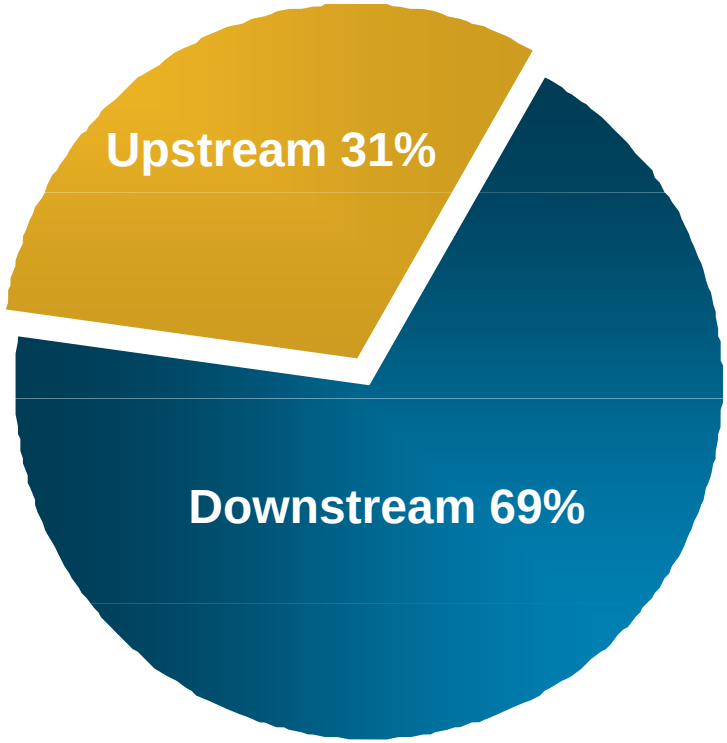


Source: Cisco Service Control Engine, 2008

Upstream Steady at One-Third of BB Traffic

Upstream has remained at 30% for the last year

P2P is 76% of Upstream, and 68% of Downstream



Source: Cisco Service Control Engine, 2008

U.S. TV Minutes – 1CQ08

8 hrs per day of TV time, nearly 1 hr of VOD/PVR/HD

	Mid-2008
Total minutes per day per STB	479
VOD minutes per day per active VOD STB	46
PVR minutes per day per active PVR	63
HD minutes per day per active HD STB	139
VOD minutes per day over all STBs	15
PVR minutes per day over all STBs	10
HD minutes per day over all STBs	32

Source: Cisco Retriever, 2008