

Ultra-Broadband: Quality Matters

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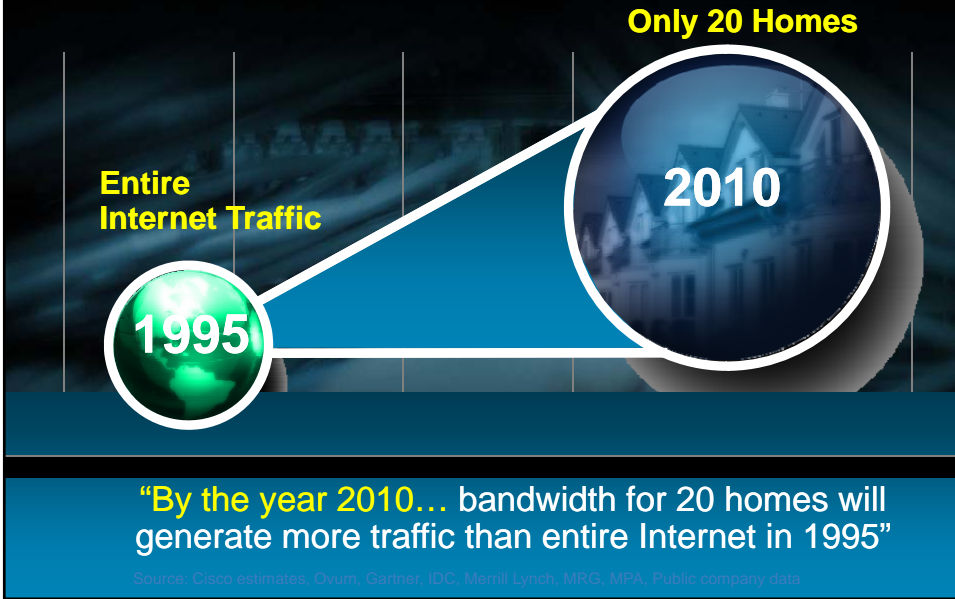
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Growing Demand

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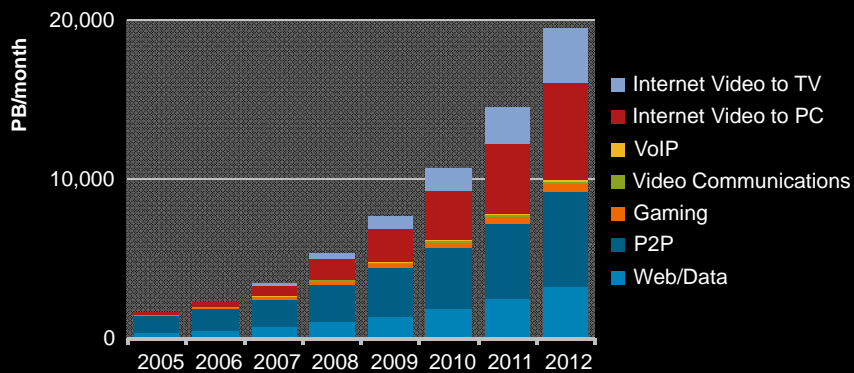
The Consumer in Control and Driving Demand



Impact of Video on Internet Traffic

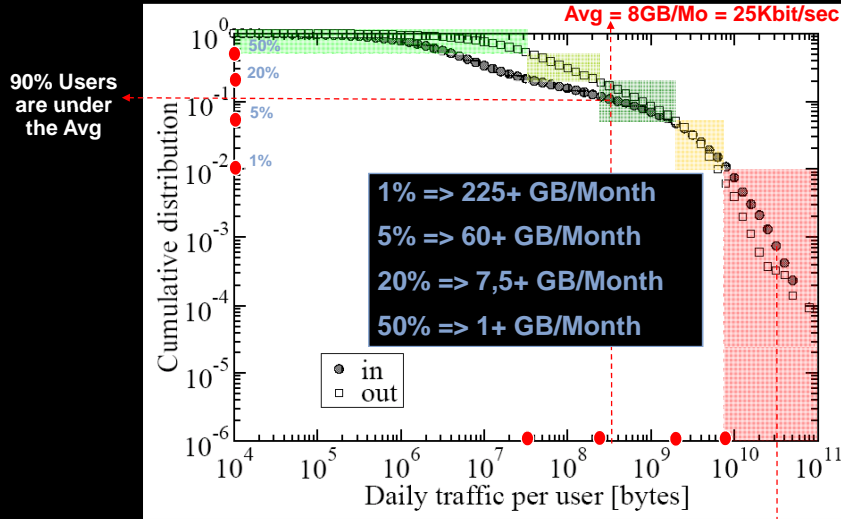
GROWTH OF GLOBAL CONSUMER INTERNET TRAFFIC MIX

41% CAGR 2007-2012



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

Traffic Consumption Among Residential Broadband Users -- 10,000-fold variation



Source : <http://www.iepg.org/march2005/kjc-iepg200503.pdf>

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Quality Matters

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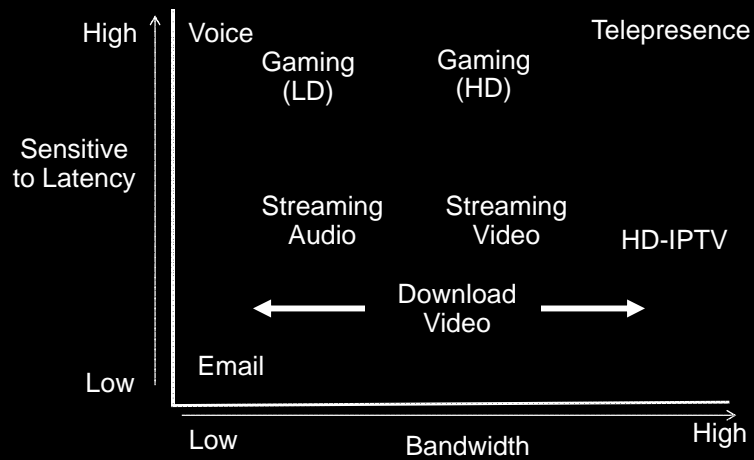
Dimensions of Broadband

- Bandwidth—”speed”
- Latency
- Jitter
- Symmetry
- Bursting
- Other...

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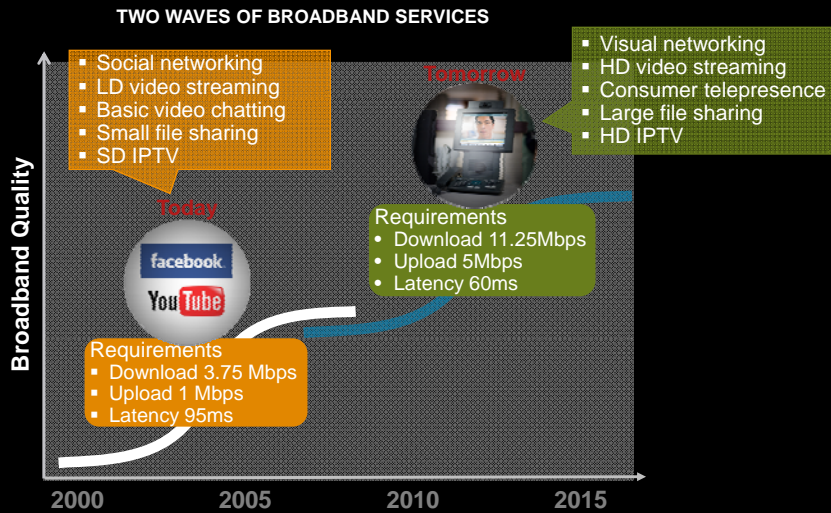
Not All Bits Are Created Equal ”Speed” and Latency



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Changing Requirements for Quality



Source: California Broadband Task Force, Jan 2008; Cisco IBSG; Expert interviews; Oxford Team analysis, Aug 2008

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Broadband Quality Score (BQS)

BQS CALCULATION

- BQS is calculated based on normalized values of:
Download and Upload throughput, and Latency
- About 8million records sourced from actual tests from Speedtest.net (Ookla) during May 2008
- Weights assigned to each factor for *today's* and *tomorrow's* (3 to 5 years) applications.

BQS (today) = 55% Download + 23% Upload + 22%Latency

BQS threshold: 32

- Download 3.75 Mbps
- Upload 1 Mbps
- Latency 95ms

BQS (tmrw) = 45% Download + 32% Upload + 23%Latency

BQS threshold: 75

- Download 11.25Mbps
- Upload 5Mbps
- Latency 60ms

Source: University of Oviedo; Delphi interviews; Oxford University Team Analysis, Aug 2008

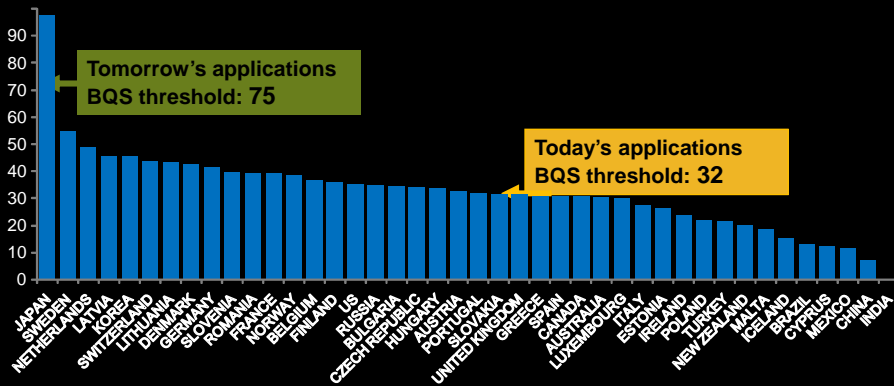
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Country Broadband Quality Scores

BROADBAND QUALITY SCORE BY COUNTRY



Source: Speed Test database, Expert Interviews, BQS Team Analysis, Aug 2008

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