

# Internet traffic growth and implications for access technologies

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## *Internet traffic:*

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- Wireline traffic growth slowing
- Mobile data growing explosively
- Wireline: probably can “muddle through”
- Wireless: mismatch between supply and demand
- Future traffic levels: result of interaction of complex feedback loops, involving technology, business models, and users

## *Current US and world Internet traffic:*

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- Wireline growth rates mostly in the 50-60% per year range
- Cisco white paper: 40% CAGR prediction
- Mobile data growth 100+%
- Mobile data around 1% of wireline data
- 50% growth rate in traffic only offsets 33% cost decline:
  - traffic: 100  $\Rightarrow$  150
  - unit cost: 100  $\Rightarrow$  67
  - total cost: 10,000  $\Rightarrow$  10,050

## *Huge potential sources of additional Internet traffic:*

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- Storage
  - Year-end 2006 worldwide digital storage capacity: 185,000 PB
  - Year-end 2006 worldwide Internet traffic: about 2,500 PB/month
- Broadcast TV
  - Year-end 2006 U.S. Internet traffic per capita: 2 GB/month
  - Year-end 2006 U.S. TV consumption per capita: 40 GB/month  
(soft figure, assumes 3 hr/day, at 1 Mbps, no HDTV, ...)

## Minnesota Internet Traffic Studies (MINTS)

[Home](#)
[Data](#)
[Methodology](#)
[References](#)
[People](#)

### MINTS News

- Mar 18, 2009 [Possible further slowdown in wireline traffic growth, continued \(and possibly unsustainable\) growth in wireless data traffic](#)
- Feb 8, 2009 [MINTS pages updated to year-end 2008, some new reports](#)
- Nov 23, 2008 [Several traffic reports: As before, the only visible floods are in wireless](#)

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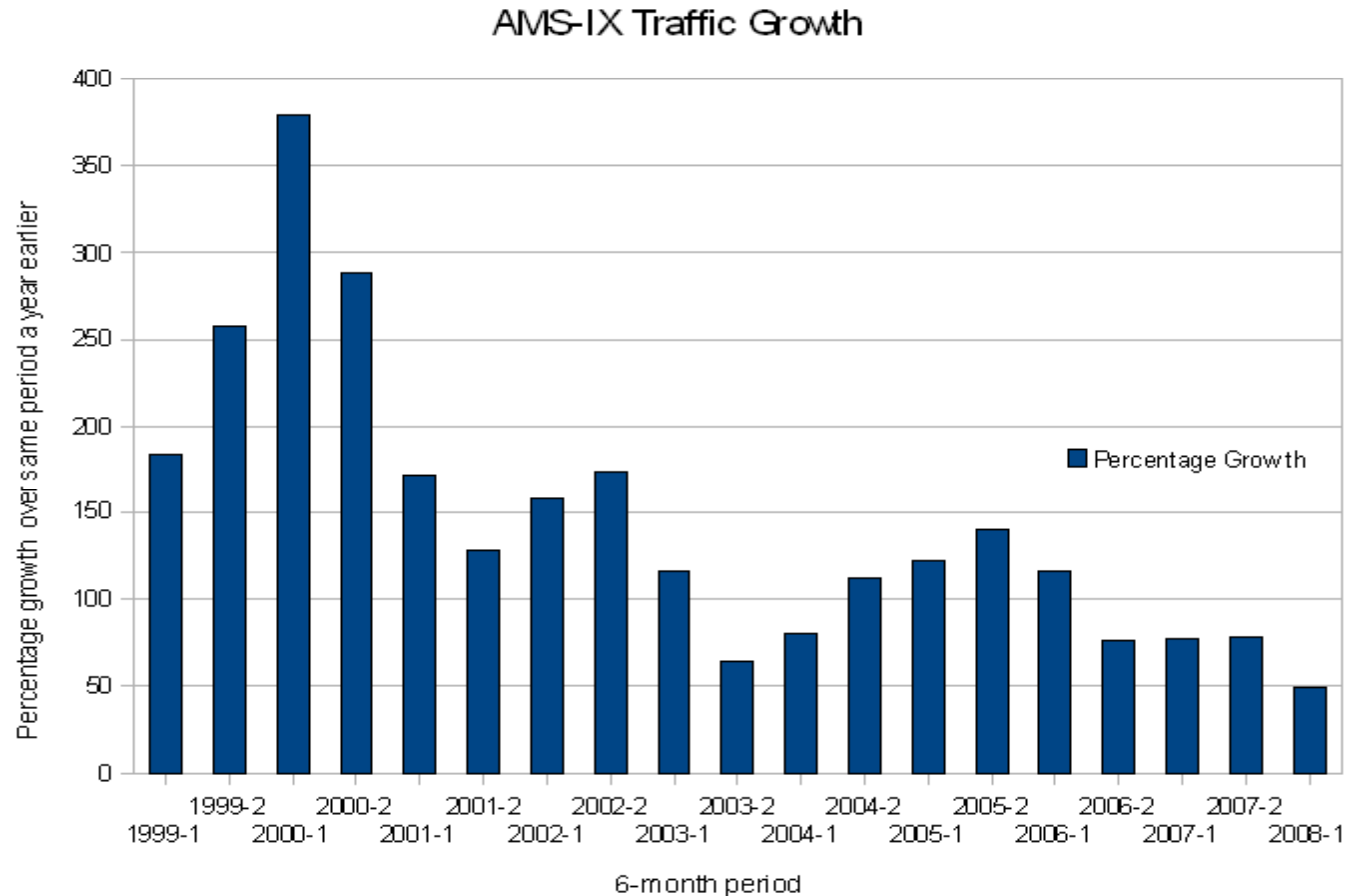
Current (year-end 2008) annual Internet traffic growth rates	
U.S.	50-60%
World	50-60%

Year-end 2008 monthly Internet traffic estimate	
U.S.	1,200-1,800 PB (PetaByte = $10^{15}$ bytes)
World	5000-8000 PB (PetaByte = $10^{15}$ bytes)

Year-end 2008 estimates for monthly Internet traffic (GB per capita)	
Australia	1.0
Western Europe	3.2
Japan	3.5
U.S.	5.0
Hong Kong	20.0
South Korea	24.0

Estimates for Australia and Hong Kong are based on official government

# *General slowdown (world's largest exchange):*



# *Hong Kong: extreme and intriguing slowdown*

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year	growth rate in Internet traffic over the previous year, for February of each year
2002	304%
2003	154
2004	431
2005	122
2006	61
2007	30
2008	11

Per-capita traffic intensity in Hong Kong is about 6x the U.S. level.

## *Implications of current growth rates:*

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- Wireline requires continued innovation and investment
- Wireline does not require big capex increases
- “Muddling through” appears feasible and likely
- Wireless appears very different



## *Revenue per MB:*

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Volume is not value, but is an indicator of ecosystem health and growth!

## *Wireless data:*

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- Many signs of explosive growth (500+% in some cases)
- Start from small base (1% of wireline)
- Already comparable to wireless voice
- Overall growth rate 100+%
- Growth rates of even 100% per year likely not sustainable without big increases in capex

## *Implications of wireless data growth:*

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- Old issues (QoS, net neutrality) to be revisited, with possibly different outcomes
- High value of mobility may bring big new revenues
- Mismatch between wireline and wireless bandwidth to persist
- Innovation seeks profits, so may shift to wireless, and to low-bandwidth access
- Future traffic levels result of interaction of complex feedback loops

Further data, discussions, and  
speculations in papers and  
presentation decks at:

<http://www.dtc.umn.edu/~odlyzko>