



NETWORKED EUROPEAN
SOFTWARE & SERVICES
INITIATIVE

Services and Sustaining Openness in the Future Internet

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PARADISO Conference

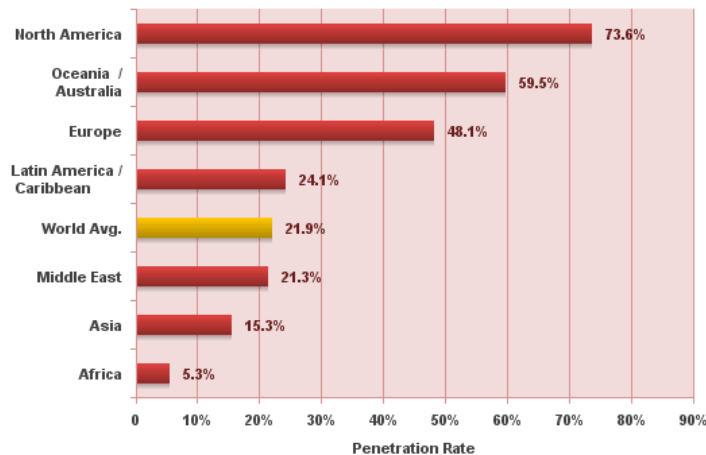
ICT for a Global Sustainable Future

European Commission, Brussels, 23/01/09

The Internet World Population

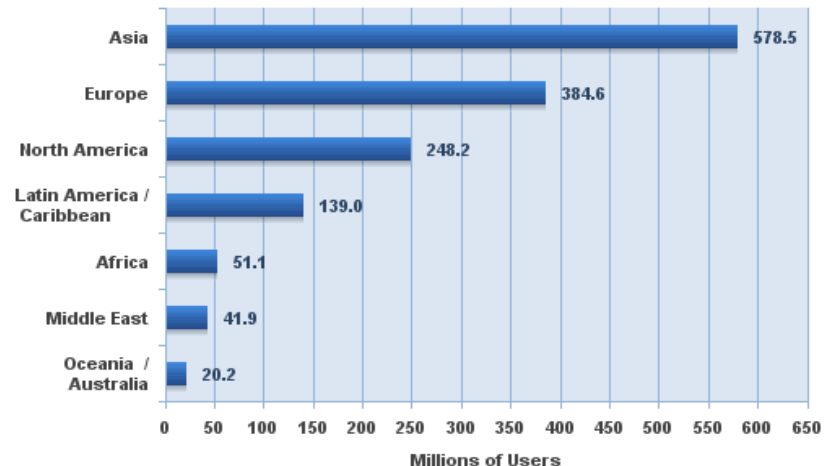
- Internet usage is currently at 21% of the earth's population (world average)
- But the penetration has strong differences according to geographies
- Major growth to be expected in particular from Asia

**World Internet Penetration Rates
by Geographic Regions**



Source: Internet World Stats - www.internetworldstats.com/stats.htm
Penetration Rates are based on a world population of 6,676,120,288 for mid-year 2008 and 1,463,632,361 estimated Internet users.
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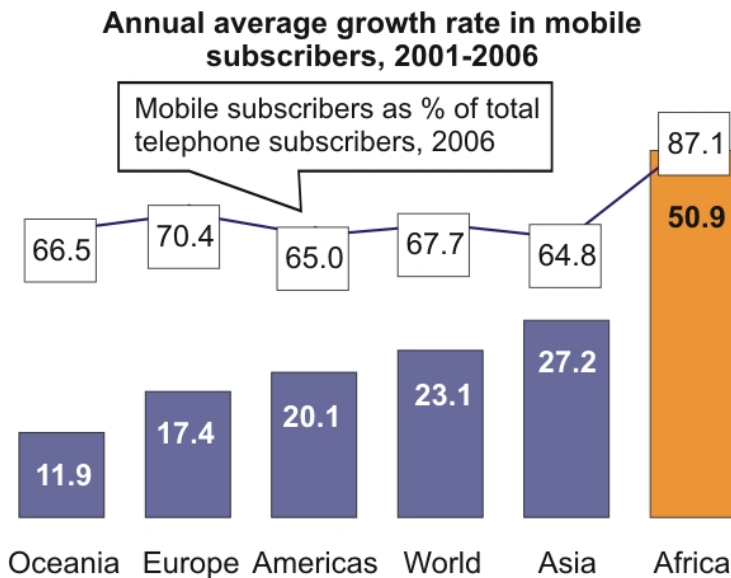
**Internet Users in the World
by Geographic Regions**



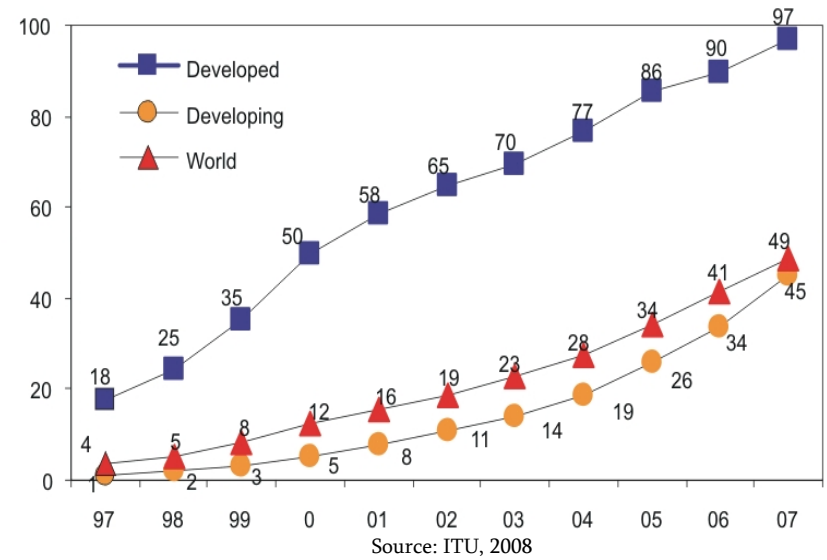
Source: Internet World Stats - www.internetworldstats.com/stats.htm
Estimated Internet users is 1,463,632,361 for Q2 2008
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The Mobile Users World Population

- Mobile phone penetration is more than doubling current Internet penetration – current world average 50%
- Penetration is approaching 100% in developed countries
- Strong growth rates in particular in developing countries – primarily in Africa

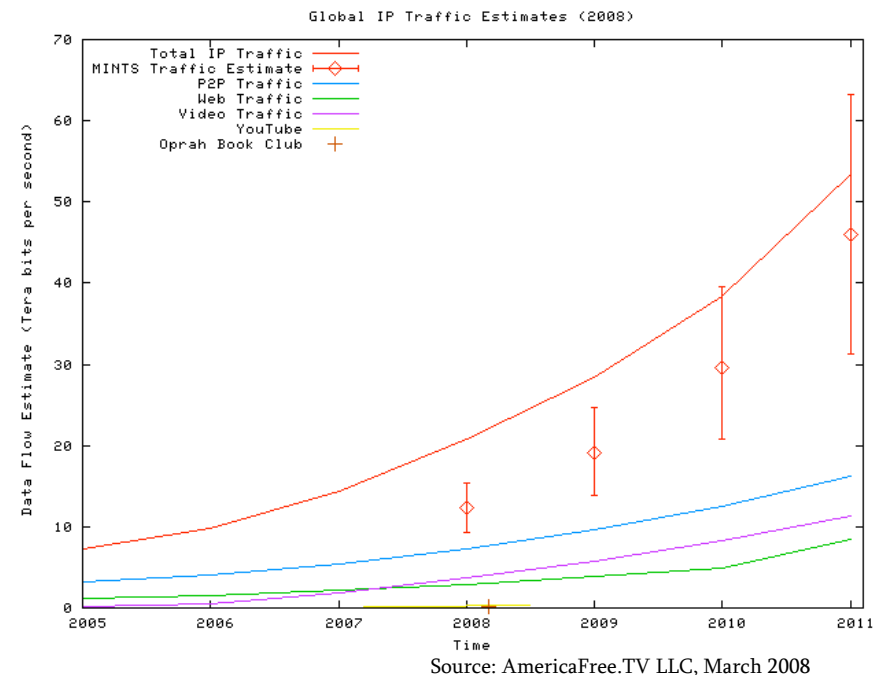


Mobile telephone subscribers per 100 inhabitants, 1997-2007



The Future of the Internet – Growth and Convergence

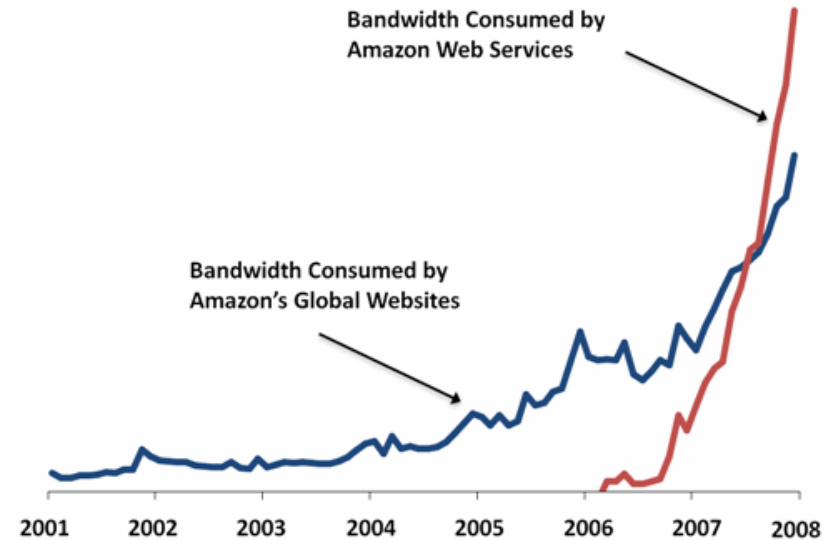
- The Internet data traffic – as measured by IP traffic is growing exponentially
- In particular data intensive services – e.g. for audio and video streaming or P2P telephony and file sharing are boosting Internet bandwidth demand
- In the same way, numbers of connected devices are growing with an evolving Internet of Things
- Technological developments are in permanent interaction with new usage developments



Example 1: Cloud Services

- Core web services – such as providing
 - storage
 - compute power
 - basic appliances (e.g. databases, message queuing)

are in strategic focus of major Internet & ICT companies (e.g. Google, Amazon, Microsoft, IBM) building on massive Internet data center capacities




Source: Amazon

Example 2: Communities / Social Networking Services

- User communities and social networking services are growing in increasing speed
 - It took MySpace 25 months to reach 20 million users
 - It took YouTube 16 months to reach 20 million users
- Internet communities are spreading to social voluntary applications –
 - Kiva.org e.g. connects donors directly with entrepreneurs to allocate micro-loans
 - Currently over 270.000 lenders are connected with about 40.000 borrowers in 40 countries

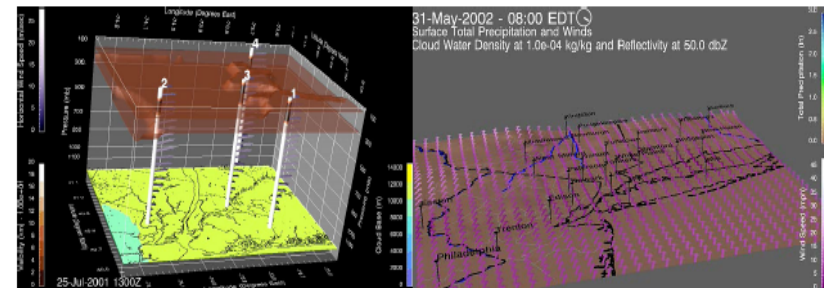
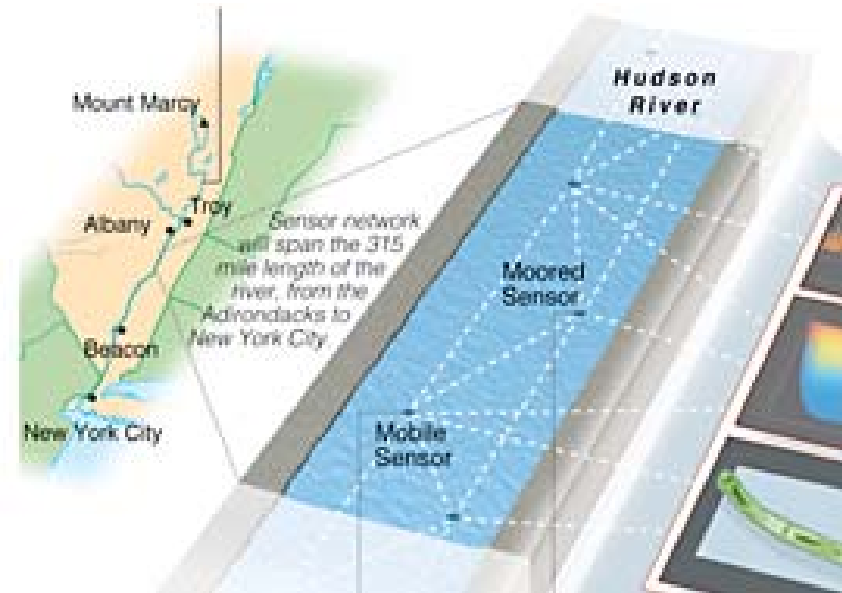
The screenshot shows the Kiva.org website interface. At the top, it says "loans that change lives" and has navigation buttons for "LEND", "ABOUT", "JOURNALS", and "MY PORTFOLIO". Below this, it reports "Impact This Week 3,220 new lenders joined." There is a search bar and filters for "Status: Fundraising", "Gender: All", "Sector: All", "Region: All", and "Sort By: Popularity". It states "Found 490 Fundraising loans sorted by Popularity." Below this is a table of loan listings.

Entrepreneur / Activity	Loan Info	Country / Partner	Description
 Kpatanyo Aglebe Charcoal Sales	\$1,200 81% raised	Togo WAGES	Mrs. Kpatanyo AGLEBE was born November 27th, 1968 in Afagna-Bléta. She is married and the mother of two children. Since 1999, she has been doing business in charcoal, corn, and in 2004 she also... more >>

LEND \$25

Example 3: Sensor Networks / Environmental Services

- Real time environmental information is increasingly provided via large sensor networks at the edge(s) of the Internet
- Massive amounts of data are collected, analyzed and fed into higher level services – such as complex weather forecasting, flood and Tsunami warning



Internet Service Systems

- The Future Internet is growing – not only in data or connected devices but also in the complexity of use
- Many core services will become overlays of the network connectivity layer of the Internet – they will be literally *invisible* to the end user and just regarded as the Internet (Cloud)
- But these service systems will be more closely interlinked with social, cultural economic and regulatory influences than the network infrastructure
- Sustaining the tremendous global social value of the Internet will also demand to deal with the openness of these higher level structures of Internet services

Service Systems Vulnerability

- **Service Systems have inherent dependencies and possible bottlenecks and limitations as e.g.**
- **Dependency on core services**
 - E.g. Search: The Google search service has around 200 Million requests per day – literally providing the primary entrance door to the Internet for millions of users
 - E.g. Background services: services such as Akamai have been used by most of us – but are we really aware
 - E.g. Authentication: who do you trust?
- **Other Threats**
 - Services can be subject to lock-in effects e.g. by proprietary standards
 - Services are not free from political influence – e.g. censorship or exclusion – but governmental control can be necessary (e.g. with regard to criminal content or protection of ownership rights)
 - Privacy and trust are major concerns in services that treat sensitive data – e.g. in health-care

- The Openness of the Internet has greatly benefited from a few core principles such as *end-to-end* and *net neutrality*.
- The evolving complex service systems and the related overlays and platforms will need their own principles and quality standards to further ensure Internet openness
- A discussion is needed between regulators, governmental bodies, NGOs and the ICT and Internet services industry
- Internet service systems need therefore to be more systematically analyzed and better understood – from an interdisciplinary perspective (including their social, legal / regulatory, business and technological aspects)
- Academia is only partially prepared for that – and new public / private partnerships are needed to drive innovation on that front