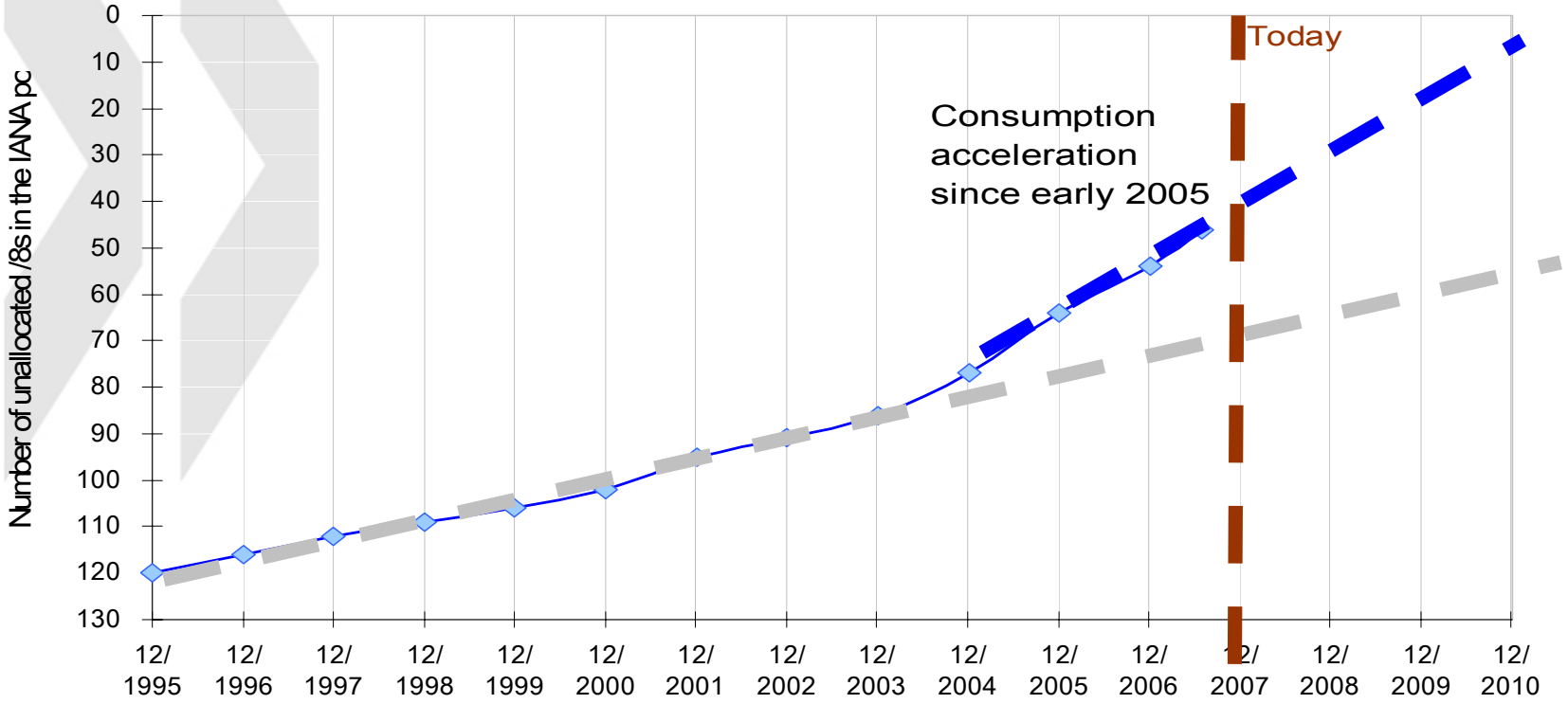
IPv6 and the Future of the Internet Economy

OECD report: Economic Considerations in the Management of IPv4 and in the Deployment of IPv6

Available at http://www.oecd.org/dataoecd/7/1/40605942.pdf

Brussels, European IPv6 Day, 30 May 2008

1. Facing IPv4 *address space* issue has become more urgent



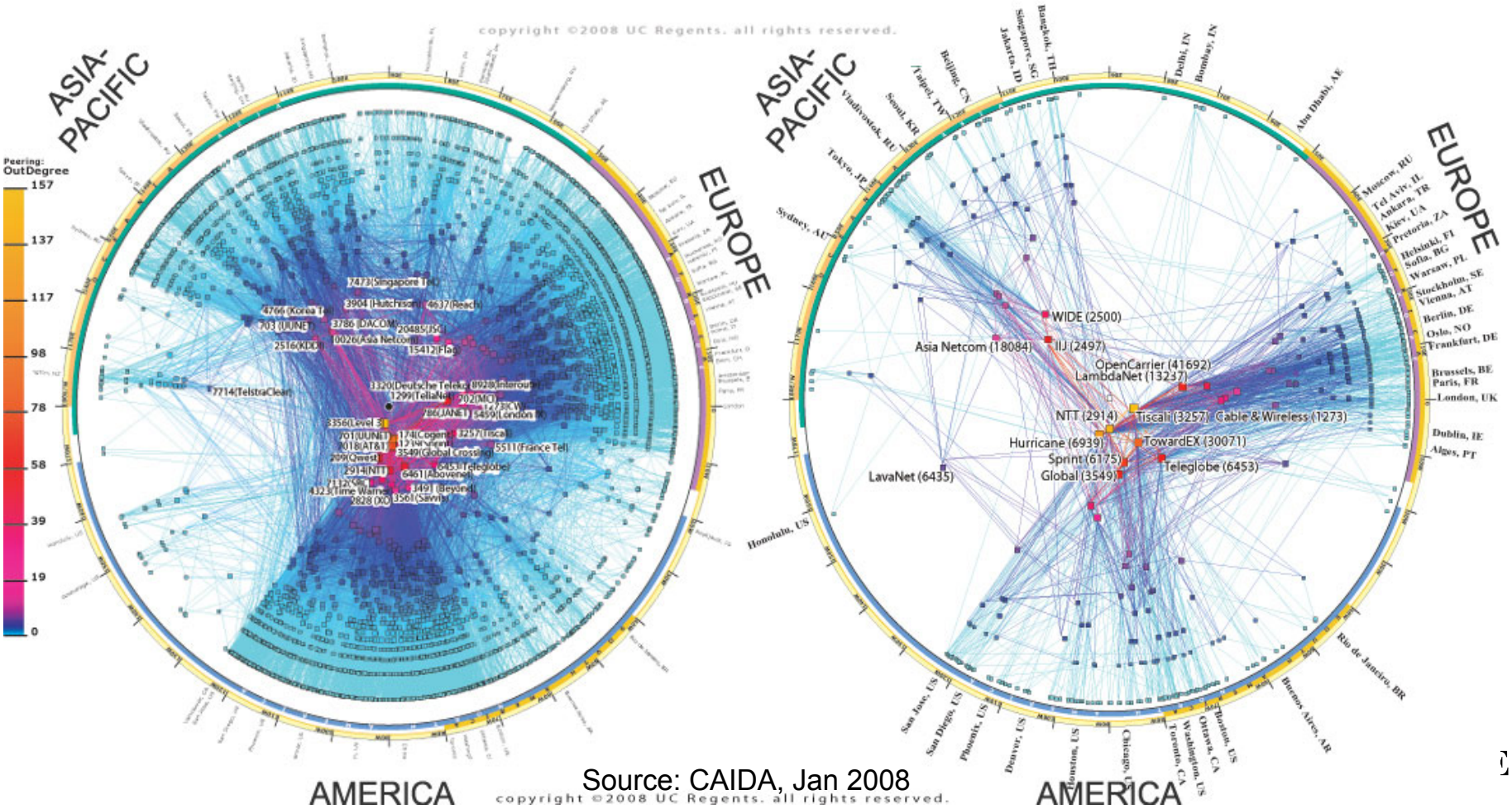
Source: MIC, Japan, 2007

- The current Internet is based on the Internet Protocol version 4 (IPv4), which is finite.
- Available IPv4 number pool will be entirely allocated within **a few years** (2 or 3 years, *i.e.* 2010-2011)

2. 10 years on, much more use of IPv4 than of IPv6. Europe & Japan lead in IPv6 connectivity.

IPv4/IPv6 Internet topology maps – AS-level Internet graph

IPv4 **IPv6**



Source: CAIDA, Jan 2008

3. IPv6 widely viewed as the way forward, but transition poses important challenges and the market has been slow in adopting IPv6.

- Available data show limited deployment
  - 21% of Internet exchange points support IPv6 (Source: Packet Clearing House)
  - 3.3% of Internet networks (ASs) have some IPv6 activity (Source: Geoff Huston)

For the transition to IPv6:

- Many networks, services and users will need IPv4 and IPv6.
- Immediate costs // many benefits are long-term and depend on adoption by critical mass.
- Requires time, awareness and finding skilled resources.

Back in the 1980's, T-shirts saying "I survived the TCP/IP transition »

4. Cannot ignore future of IPv4, *i.e.* more IPv4 « à la NAT » and a possible market for previously allocated IPv4 addresses

- Likely that all three options will be pursued by various actors in parallel, according to business requirements:

1. Many networks likely to increase NAT usage
2. Some may acquire previously allocated IPv4 addresses
3. Some actors will deploy IPv6

⇒ Likely ongoing demand for IPv4 address space but demand likely to exceed supply.

- Overall, more IPv4 « à la NAT » **not** a LT solution: problems accrue over time (performance, reliability, scalability, operational costs, new application support…)

5. Why is the IPv4/IPv6 issue relevant to policy makers?

Platform for innovation & growth:

- IPv6 necessary for the Internet to continue to provide a platform for innovation, for the LT growth of the Internet economy (worldwide, mobile, wireless, ubiquitous etc.).
- Maintaining as much interoperability as possible is key.

Competition:

- If new entrants cannot access IPv4 resources but need them to interoperate, this could be a barrier to competition => after depletion of IPv4 there will need to be a way for IPv4 addresses to be transferred from one party to another.
- IPv6 expertise key for economies to remain competitive in technology products and services.

6. Why all stakeholders, including governments, have a role to play…

- Governments should focus on building awareness of IPv6 and being early adopters (**not** about regulation).
- Issue for public institutions as much as for private sector.
- Market may not be enough… too much risk and uncertainty => need for all to participate.
  - Wait and rush non desirable => Pressure for hurried (= unstable) deployment of IPv6.
  - Very dense roll-out of Network Address Translation (NAT) without IPv6 non desirable => Limitations on scalable networks.

Need for muti-stakeholder co-operation between industry, policy makers, and the Internet technical community.

What should be done in partnership

7. Education and awareness
Multistakeholder efforts

- IP addressing should not be considered only as a specialist's topic…
- During IPv4/IPv6 co-existence period: need to find ways to maintain operations & interoperability.
- Awareness efforts must target decision-makers.
- Policy makers should also participate as a stakeholder in registry & industry groups' efforts to find solutions for resource management, especially IPv4, bearing in mind no solution will meet all expectations.

What should be done in partnership

8. Easing bottlenecks
Multistakeholder efforts

Encourage…

- Operators to consider IPv6 connectivity in traffic exchange agreements.
- Greefield deployments to use IPv6 from the outset.
- CPE vendors & other CPE providers to plan for IPv6.
- Telecommunications operators to facilitate IPv6 deployment.
- Software development companies to incorporate IPv6 capabilities, and develop new applications leveraging IPv6 functionality.

9. Government adoption of IPv6

- Plan adoption of IPv6 for governments' internal use and for public services.
- Ensure new programmes consider the relevancy of IPv6 and assess public programmes and priorities to determine how they can benefit from IPv6.
- Ensure relevant government security entities integrate IPv6 security dimension.
- Education initiatives.

What should be done by policy makers?

10. International cooperation and measurement & statistics

- As one example, EC & OECD initiatives consistent, complimentary & reinforce one another:
  - **EC Action Plan** with concrete 25% target extremely positive.
  - **OECD Ministerial Declaration** contains section on IPv6 based on analytical report. Forthcoming Ministerial on the Future of the Internet Economy in Seoul on 18 June 2008. EC, represented by Commisioner Reding, as an important partner.
- Measurement and statistics
  - Monitoring essential for informed policy.
  - To meet target of 25% IPv6 penetration (EC Communication), will need to measure this penetration.

Moving forward… Possibility for co-operation to help put in place statistical methodology to measure progress of IPv6 deployment?

Give your opininion…

11. How is IPv6 needed for the Internet to make the world a better place?…

IPv6 The way forward!

Do it now!

www.YouTube.com/FutureInternet

Merci !

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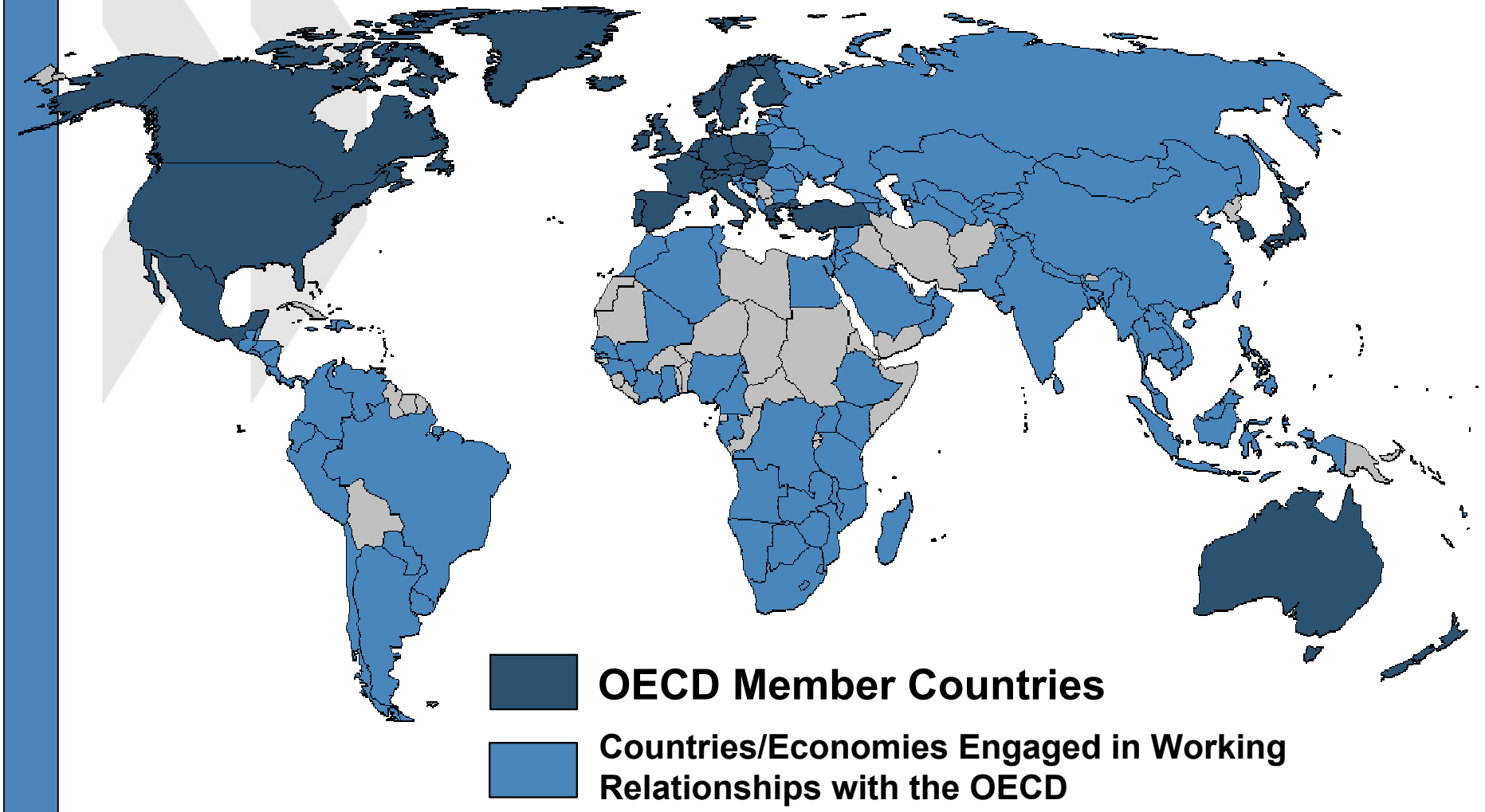
(Background) What is the OECD?

- **Forum** for governments to together address economic and social challenges of globalisation
  - **30 Member countries/governments**: some **40 000 senior officials from national administrations** come to OECD meetings each year
  - Over **70 developing and transition economies** engaged in working relationships with the OECD, e.g. through APEC
  - Private sector represented via BIAC
  - Trade Union Advisory Committee TUAC
  - **Committees and Working Parties: about 200**
- Provider of comparative data, analysis and forecasts to underpin multilateral co-operation
- Rules of the game and best practices

(Background) OECD has a global outreach



(Background) Goals of the OECD Ministerial on the Future of the Internet Economy

1. Call attention to the fundamental role the Internet plays in our economies and societies and the need for policies to reflect this reality;
2. Identify ways the Internet Economy can help address global challenges such as climate change;
3. Establish a global dialogue on **how best to safeguard the Internet's future and expand access to the next several billion of users and devices**;
4. Discuss practical mathods for improving cross-border coordination for protecting consumers, enhancing privacy and security.