IPv6 a podnikové sítě nejen v Česku

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Where we are today

3 Realities of the transition today

Most customers are unprepared to make the leap; a huge education gap

There is no parity between IPv4 and IPv6

Transition Preparedness is key, starting with education

2 Major concerns, at the moment

Haphazard deployments

Evolving (changing) requirements and development "must haves"

1 Truth

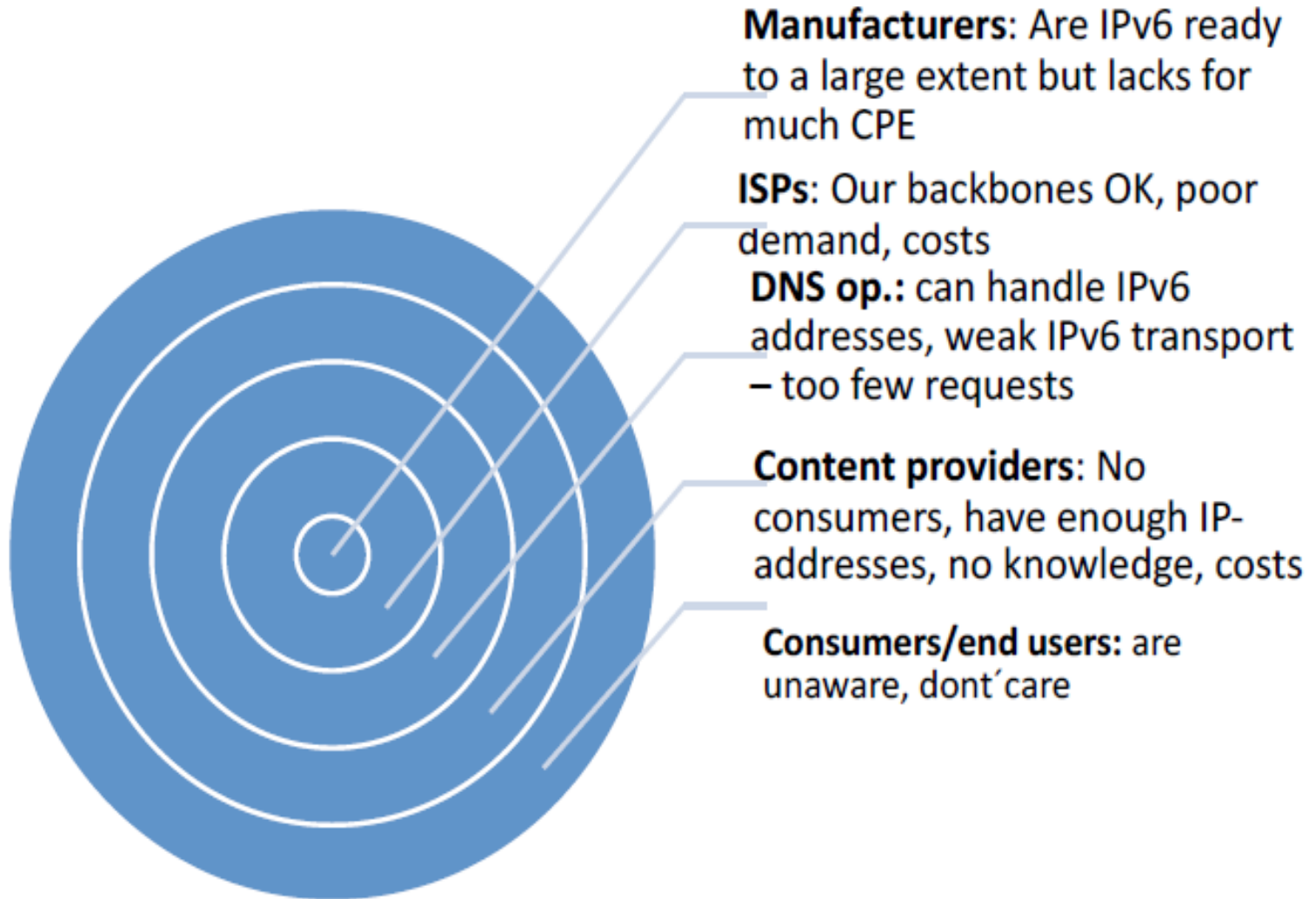## IPv6 is going to happen
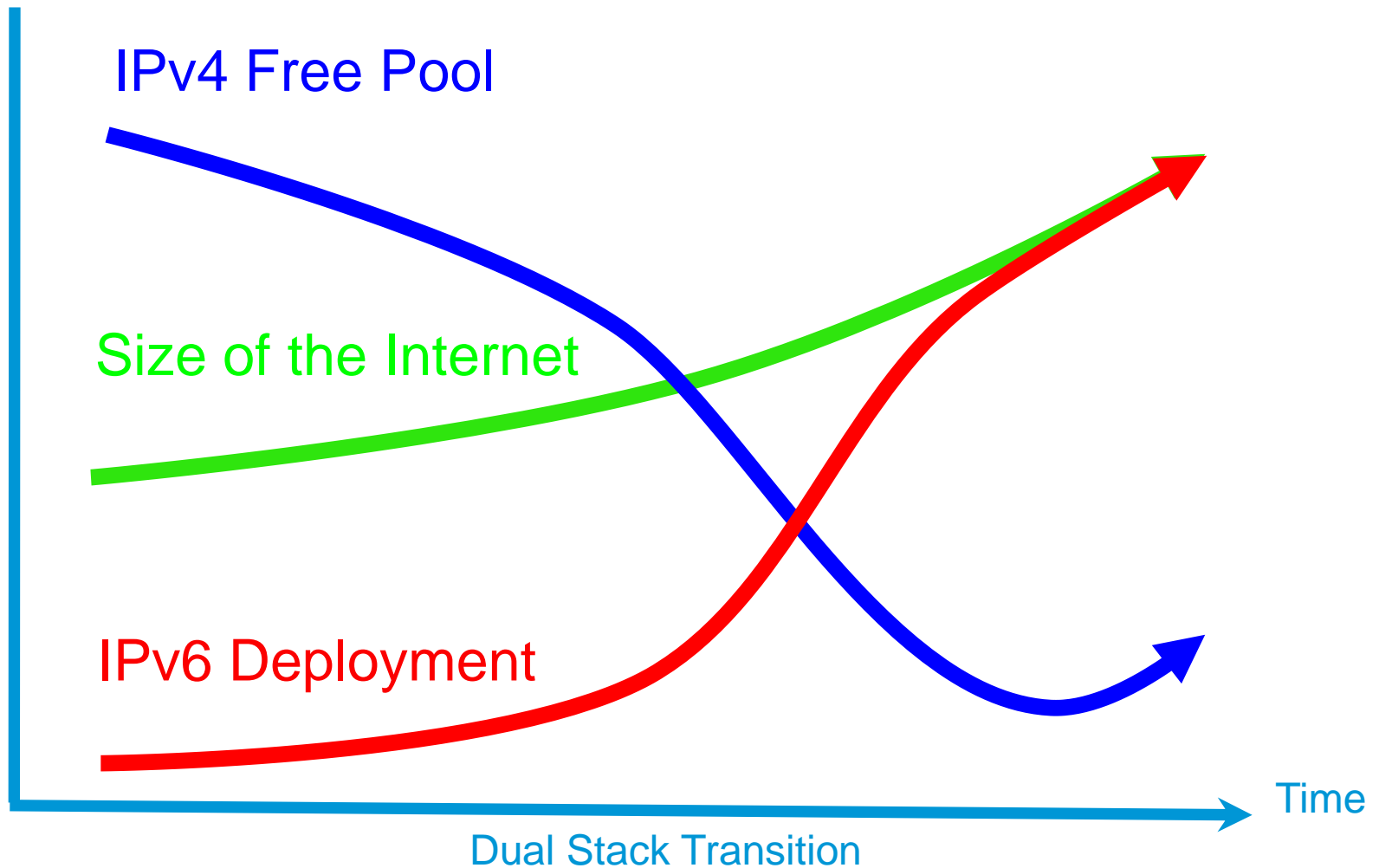
What do we see from our customers?

- SP and Content providers worldwide are moving

  Pilot projects in 2010 or 2011

  Production networks in 2011 or 2012

- Governments and Public Sector

  - Regulations Guide Purchasing
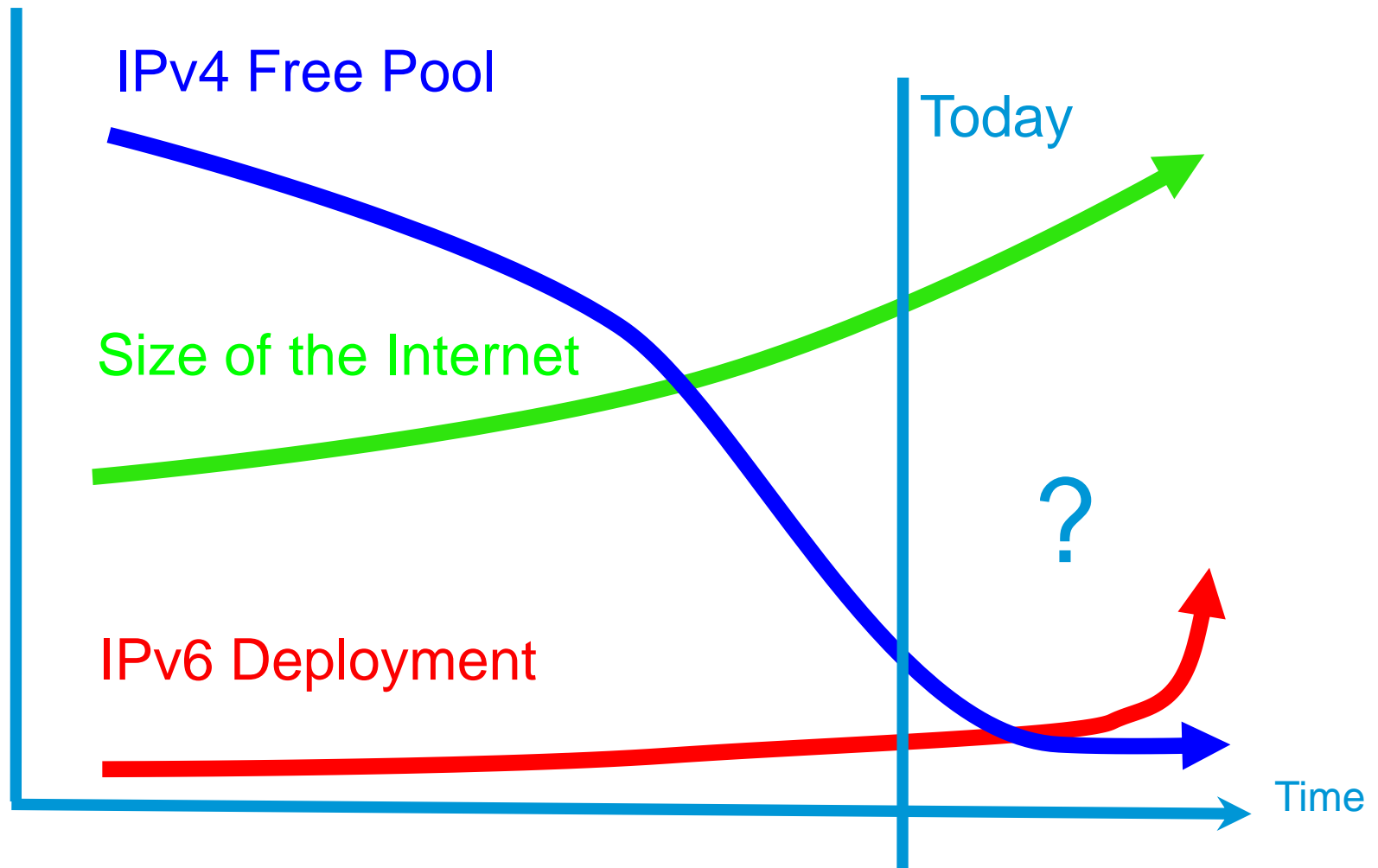 - Pilot projects

- Enterprises … still vastly unaware of IPv6

IPv6 deployment – what involved parties say:

Manufacturers: Are IPv6 ready to a large extent but lacks for much CPE

ISPs: Our backbones OK, poor demand, costs

DNS op.: can handle IPv6 addresses, weak IPv6 transport – too few requests

Content providers: No consumers, have enough IP-addresses, no knowledge, costs

Consumers/end users: are unaware, dont´care

IPv6 Deployment plan

IPv4 Free Pool

Size of the Internet

IPv6 Deployment

Time

Dual Stack Transition

IPv6 Deployment reality

IPv4 Free Pool

Today

Size of the Internet

?

IPv6 Deployment

Time

IPv6 deployment is too slow

WHY?

IPv6 deployment is too slow

- Little business justification for IPv6
  - Almost no IPv6 content
  - No killer app or user demand

- IPv6 still perceived as being "experimental"
  - Limited number of ISPs offer IPv6 connectivity

- There are also some myths

- Drivers for IPv6 won't emerge until lack of IPv4 starts to hurt

Myth: We'll Never Run Out of IP Addresses

Reality: IPv4 is running out...

- The exhaustion of IPv4 addresses was postponed… but not prevented.

- IANA run out of /8s in february 3rd, 2011

  RIRs run out of IPv4 blocks in 2012

- More than 1.6 billion devices worldwide were used to access the Internet in 2009, including PCs, mobile phones, and online videogame consoles.

- By 2013, the total number of devices accessing the Internet will increase to more than 2.7 billion.

- There will be more Internet hosts than IPv4 addresses well before the end of this decade

Myth: IPv6 is a Problem for My Provider
Awareness of IPv4 run-out largely confined to ISPs

Reality: Every Customer Will Need an IPv6 Transition Strategy

- Government mandates
  - Governments have recognised IPv6 as a strategic investment, and catalyst for innovation / economic growth
  - US Federal Government

    Upgrade public/external facing servers and services (e.g. web, email, DNS, ISP services, etc) to use native IPv6 by the end of FY 2012;

    Upgrade internal client applications to use native IPv6 by the end of FY 2014

- Customers having only IPv6 connectivity

- To be ready for IPv6
  - Business Growth
  - New areas of expansion Smart Grid, Smart and Connected communities
  - Competitive Advantage

- Do not get left behind

# Myth: I Can Run My Business on IPv4 and rely on NAT

NAT impact
Multiple connection applications

- Google Maps opens ~ 70 parallel connections

- iTunes store has been shown to open as many as 300 parallel connections

- New apps that have not emerged yet ???

- IPv4/nat multiplexes multiple users through the port range, so 64k divided by 300 parallel connections results in ~200 customers per ISP based nat address (assuming each customer is only allowed to run one simultaneous instance of iTunes or similar apps).

- Services generally don't allow connections from the same host to span multiple public side addresses, so use of more ports on another address will cause the application to fail.

NAT impact
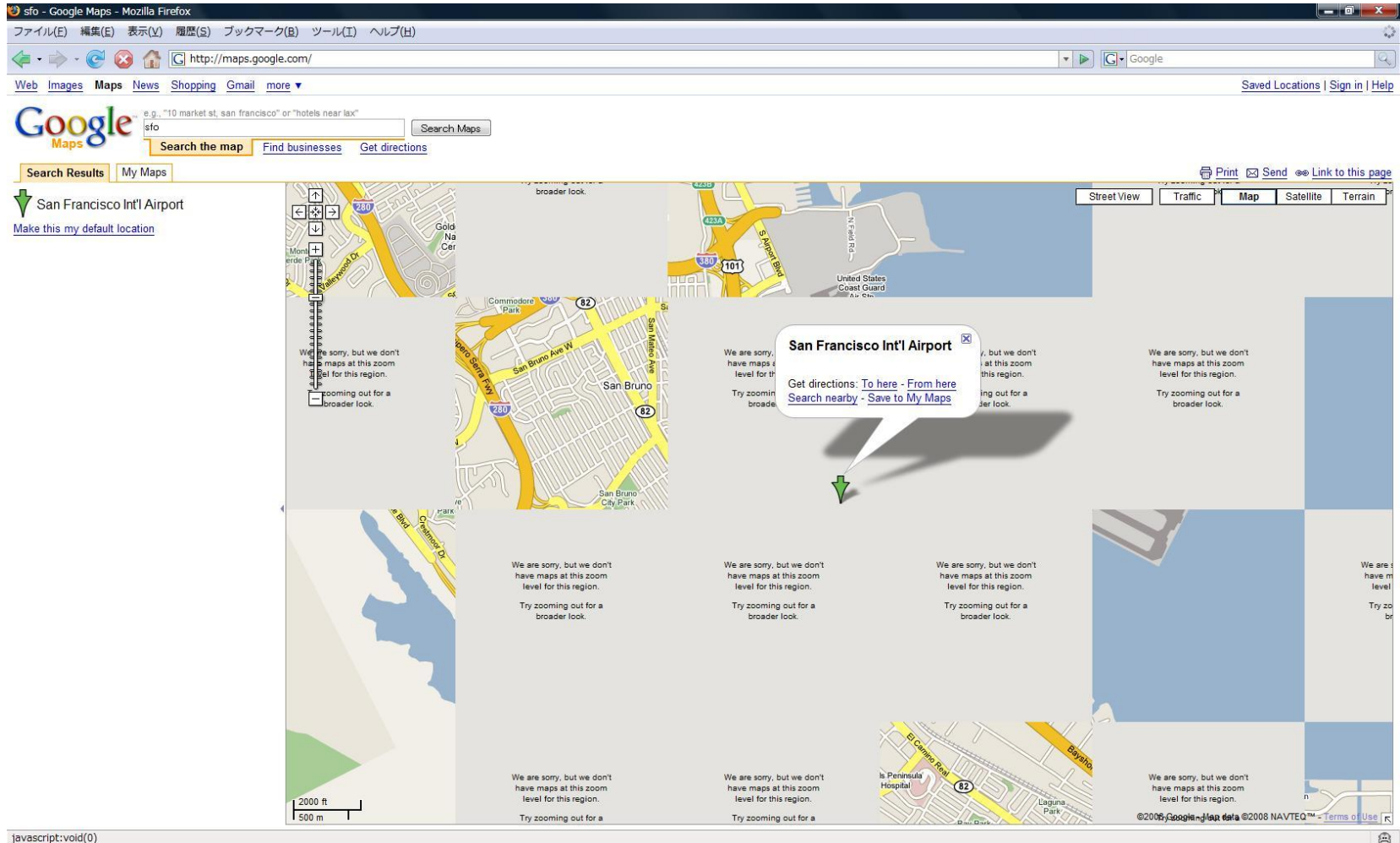# Multiple connection applications

30 NAT Connections
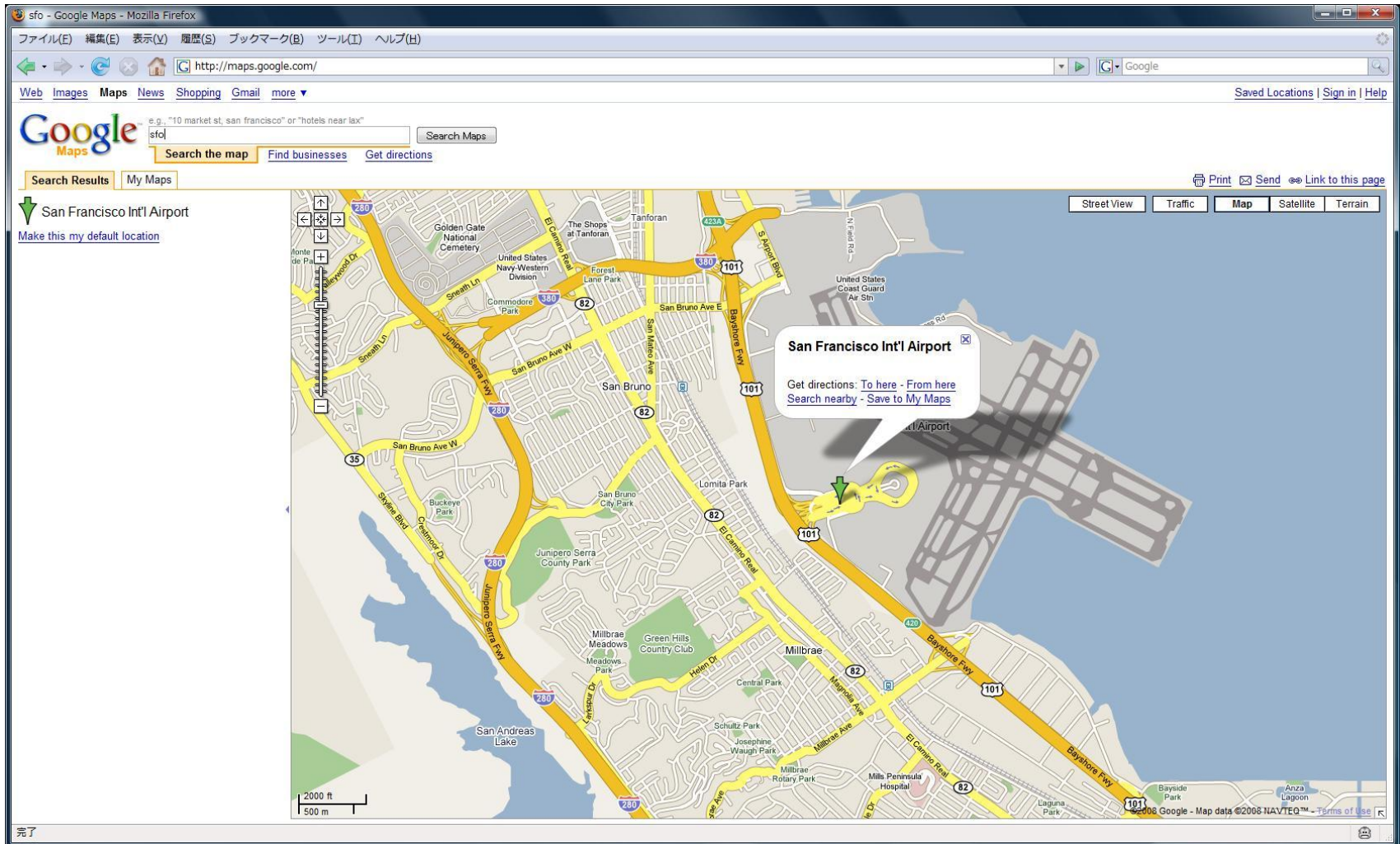
NAT impact
Multiple connection applications

Max 10 NAT Connections

Česká republika a implementace IPv6

IPv6 a státní správa ČR

1. Dle <u>usnesení vlády České republiky číslo 727</u> musí ministři zajistit zpřístupnění služeb/portálů na IPv6 již do konce roku 2010 a všechny obnovované aktivní prvky musí již nyní umět IPv6 !!!

Vláda:

...

II. ukládá ministrům a vedoucím ostatních ústředních orgánů státní správy zajistit

   1. od 30. června 2009 při pravidelné obnově síťových prvků jejich kompatibilitu s internetovým protokolem verze 6 (IPv6),

   1. do 31. prosince 2010 přístup k internetovým stránkám a veřejně dostupným službám eGovernmentu internetovým protokolem verze 4 (IPv4) i internetovým protokolem verze 6 (IPv6);

VLÁDA ČESKÉ REPUBLIKY

USNESENÍ

VLÁDY ČESKÉ REPUBLIKY
ze dne 8. června 2009 č. 727

ke Zprávě o přechodu na internetový protokol verze 6 (IPv6)

Plnění vládního usnesení

- Průzkum plnění usnesení sleduje Ministerstvo průmyslu a obchodu

- Požadavek na kompatibilitu obnovovaných kom. prvků s IPv6 splnilo 100% ústředních orgánů státní správy

- Požadavek na přístup k internetovým stránkám a veřejně dostupným službám eGovernmentu přes IPv6 splnilo zatím cca 40% ústředních orgánů státní správy:
  - Úřad vlády
  - MF
  - MD
  - MPSV
  - MPO
  - MZV
  - Infrastruktura datových schránek

IPv6 a podniková sféra ČR

- Zatím spíše postoj

  „Počkáme a uvidíme"

- Někdy vyžadována podpora IPv6 při obnově komunikační infrastruktury

Evropská unie a implementace IPv6

IPv6 and Europe Union

- IPv6 Action plan "Advancing the Internet" launched in 2008

- IPv6 to become widely implemented in Europe by 2010, at least 25% of users should be able to connect to the IPv6 Internet and to access their most important content via IPv6

- Actions:
  - work with Member States to enable IPv6 on public sector websites and eGovernment services
  - encourage Member States to prepare for IPv6 within their own networks
  - encourages ISPs to provide full IPv6 connectivity to their customers
  - disseminate best practices and will work with vendors to provide full IPv6 functionality
  - support the inclusion of IPv6 technology knowledge in relevant retraining curricula and in computer and network engineering courses of universities
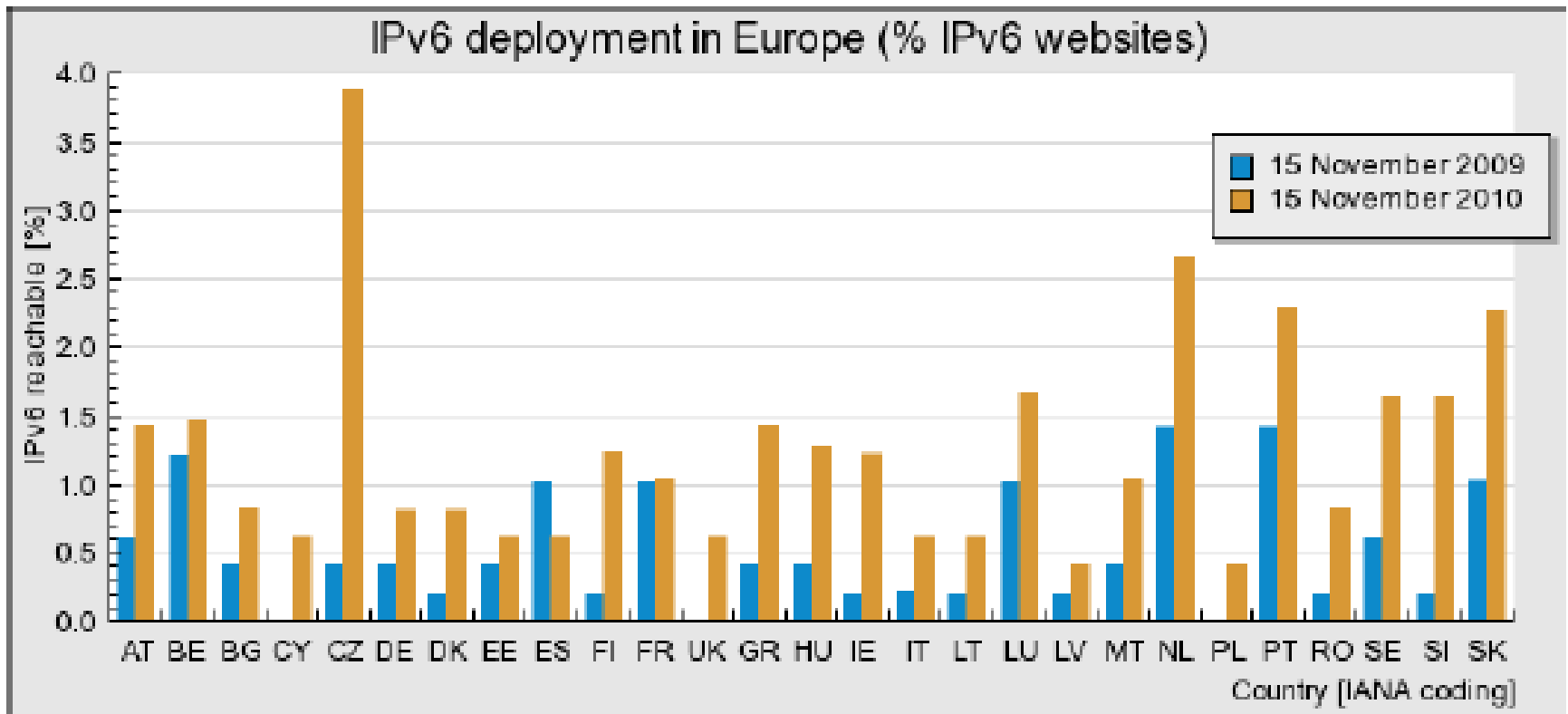
IPv6 and EU
IPv6 deployment per EU member state

IPv6 deployment in the European Union (Fraction U)
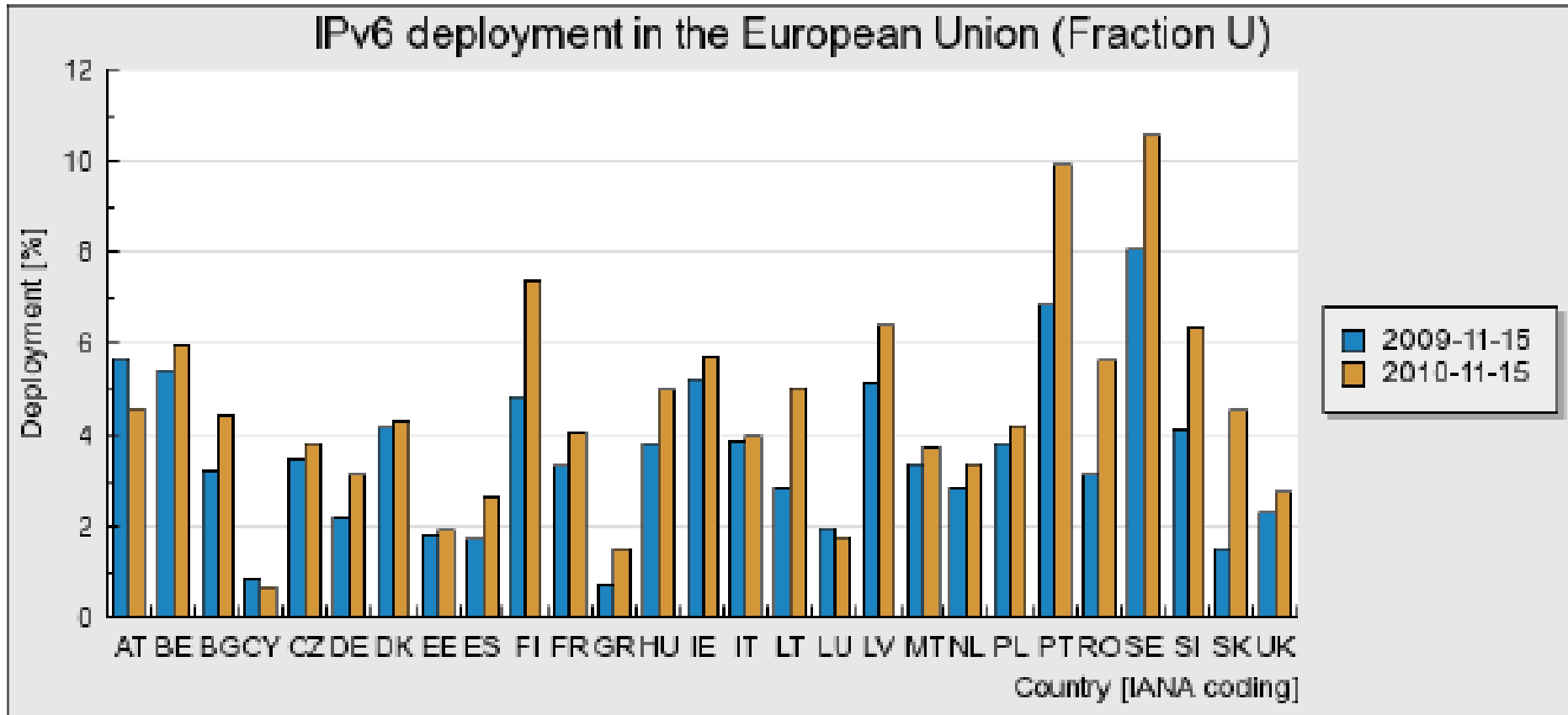
IPv6 and EU
Number of websites of ALEXA top 500 per country reachable on IPv6

total of 13500 websites analyzed

IPv6 deployment in Europe (% IPv6 websites)

ISPs and IPv6 preparedness in EU region

Legend: Deployed, Plans, No plan

Categories (2009 and 2010): cable/dsl, e-mail, hosted, webservices, desktops, DNS, transit, peering, internal, ISP to business, ISP to consumers
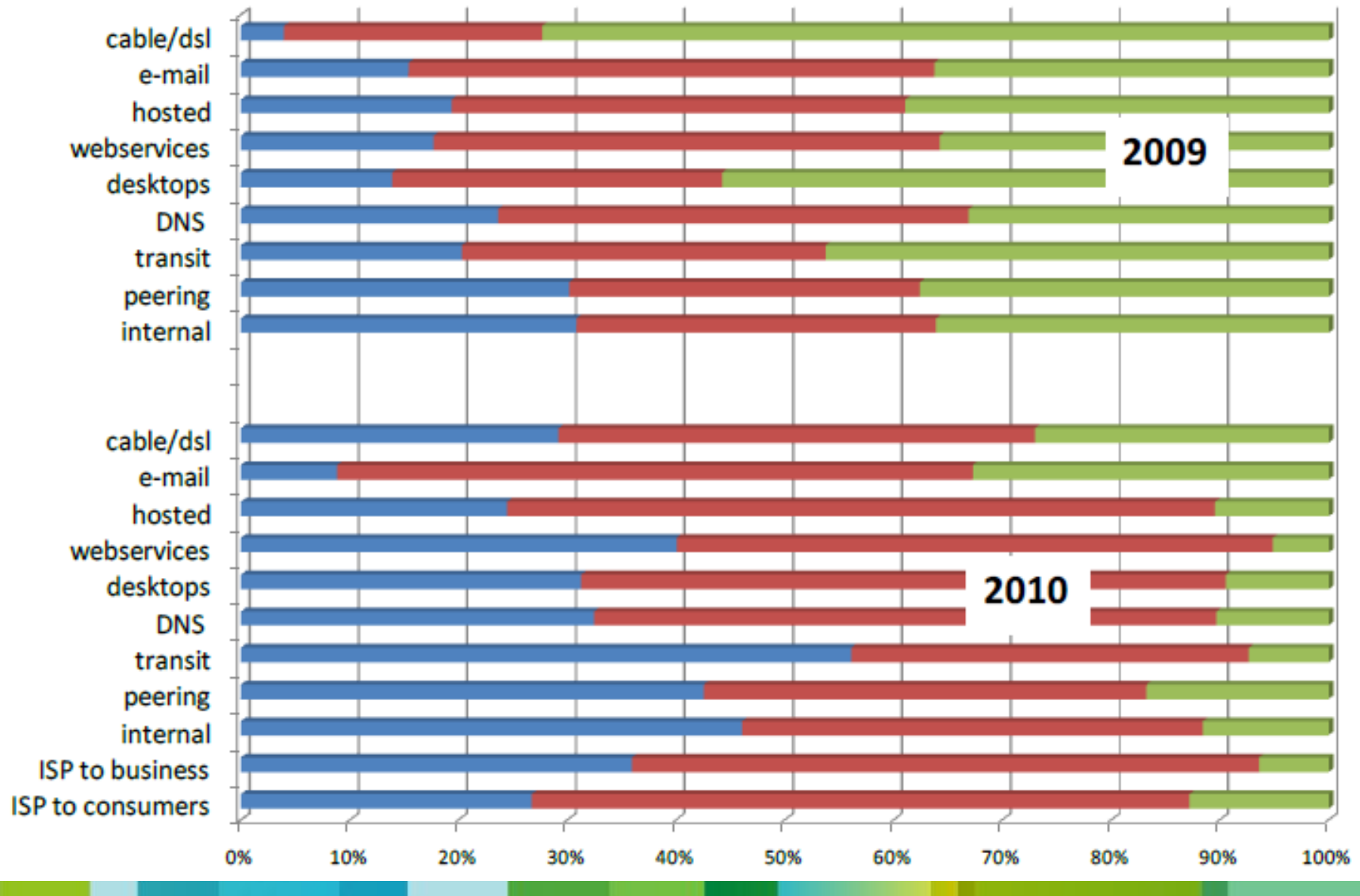
IPv6 a výrobci síťových zařízení

Where are the Vendors?

- Routers and switches have had IPv6 hardware and software for many years

- IPv6 comes license-free with IPv4

- Still some feature discrepancies between IPv4 and IPv6

- New transition mechanisms begin to ship
    - 6rd
    - DS-lite
    - NAT64

- Low-cost CPE are still a 'rare species'

IPv6 and Cisco

IPv6 IOS support since 2001

Many Cisco products are IPv6 capable today or can be upgraded to become IPv6 capable

Completed IPv6 Ready Logo and DoD certification on 19xx, 29xx, 39xx, 72xx, 76xx; campus switching 65xx, 45xx wit the 3560/3750-E in process....

Published transition architectures

Customer IPv6 assessment capabilities and status tool

Strong IPv6 services practice

www.ipv6.cisco.com – 2001:420:80:1::5
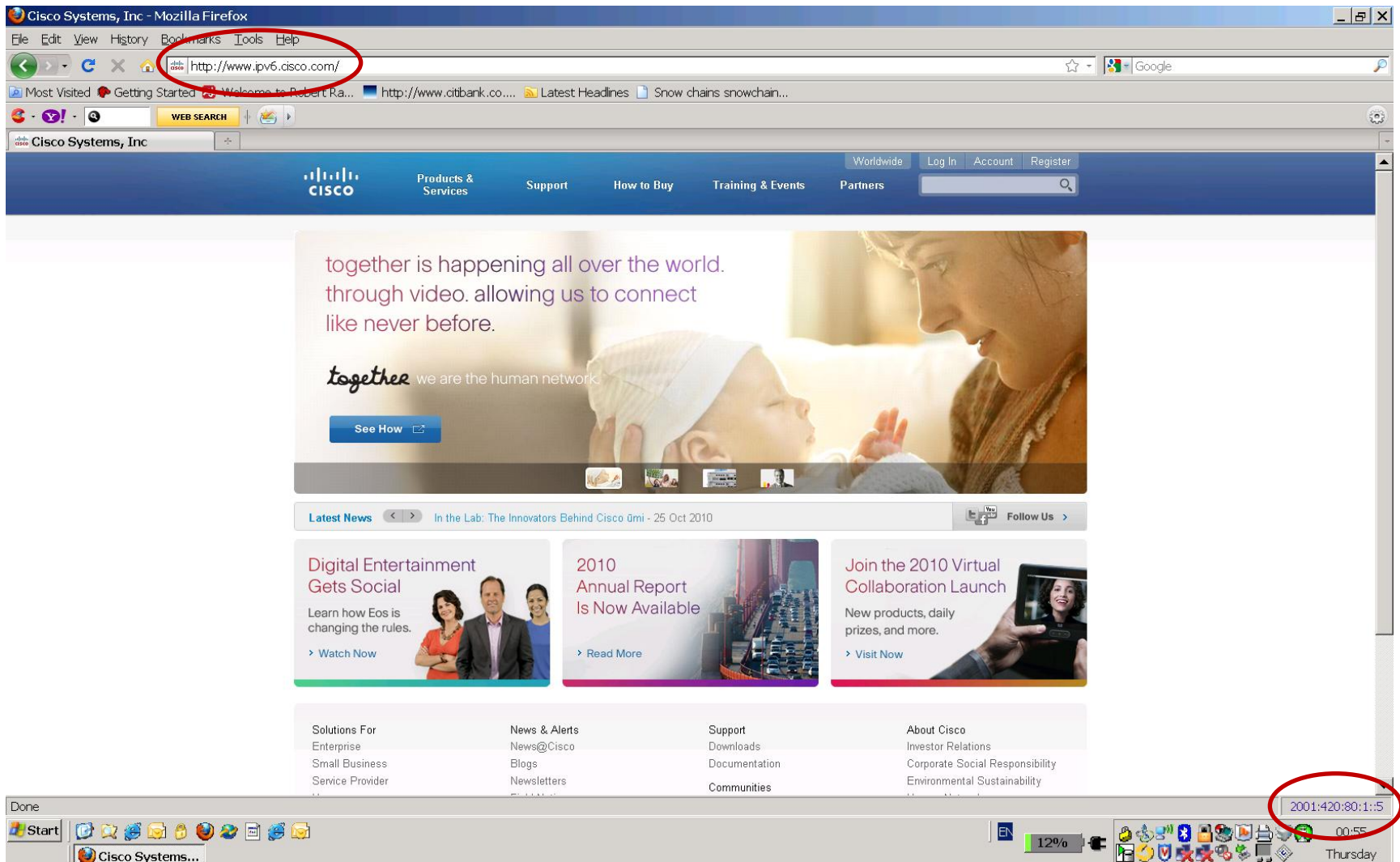
Conclusion

- IPv6 will rule the Internet – whether we like it or not, with or without us

- **IPv6 is NOT a feature**. It is about the fundamental IP network layer model developed for end-to-end services and network transparency

- IPv6 content is a clue

  Governments may help and start to offer their content via IPv6

- IPv4 & IPv6 will coexist for the foreseeable future

  No D-Day / Flag Day

- Need to raise awareness, educate, and encourage IPv6 adoption

- IT Departments of public and enterprise customers must include IPv6 as a core element of their IT strategy

Resources

IPv6 on Cisco.com
http://www.cisco.com/go/ipv6

IPv6 Ready Logo Site
http://www.ipv6ready.org/?page=phase-2

IPv6 in EU
http://www.ipv6monitoring.eu/

together we are the human network. CISCO