IPv6 a privátní podnikové sítě nejen v Česku

Miroslav Brzek

System Engineer, Cisco

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

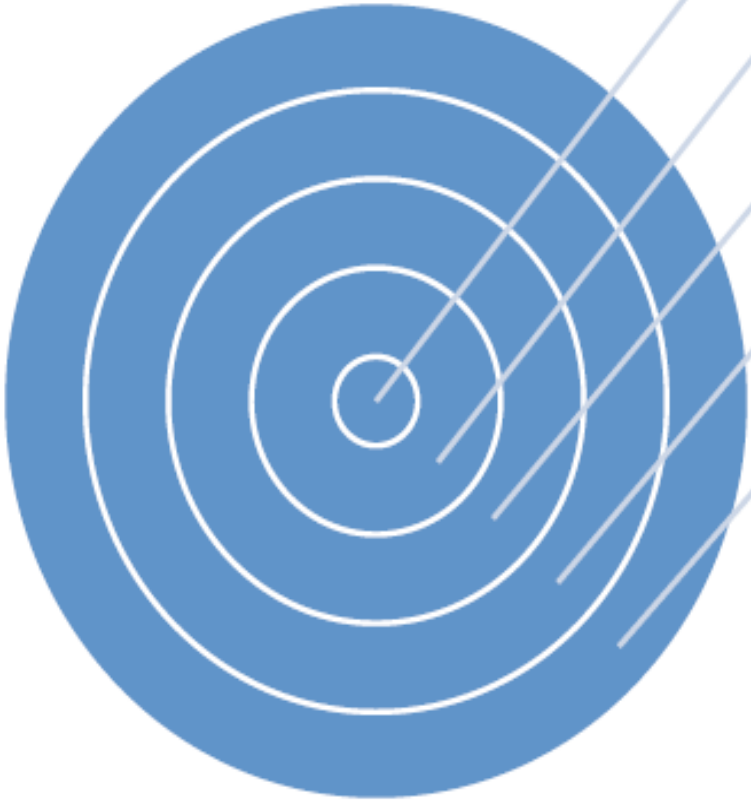
What do we see from our customers?

- 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

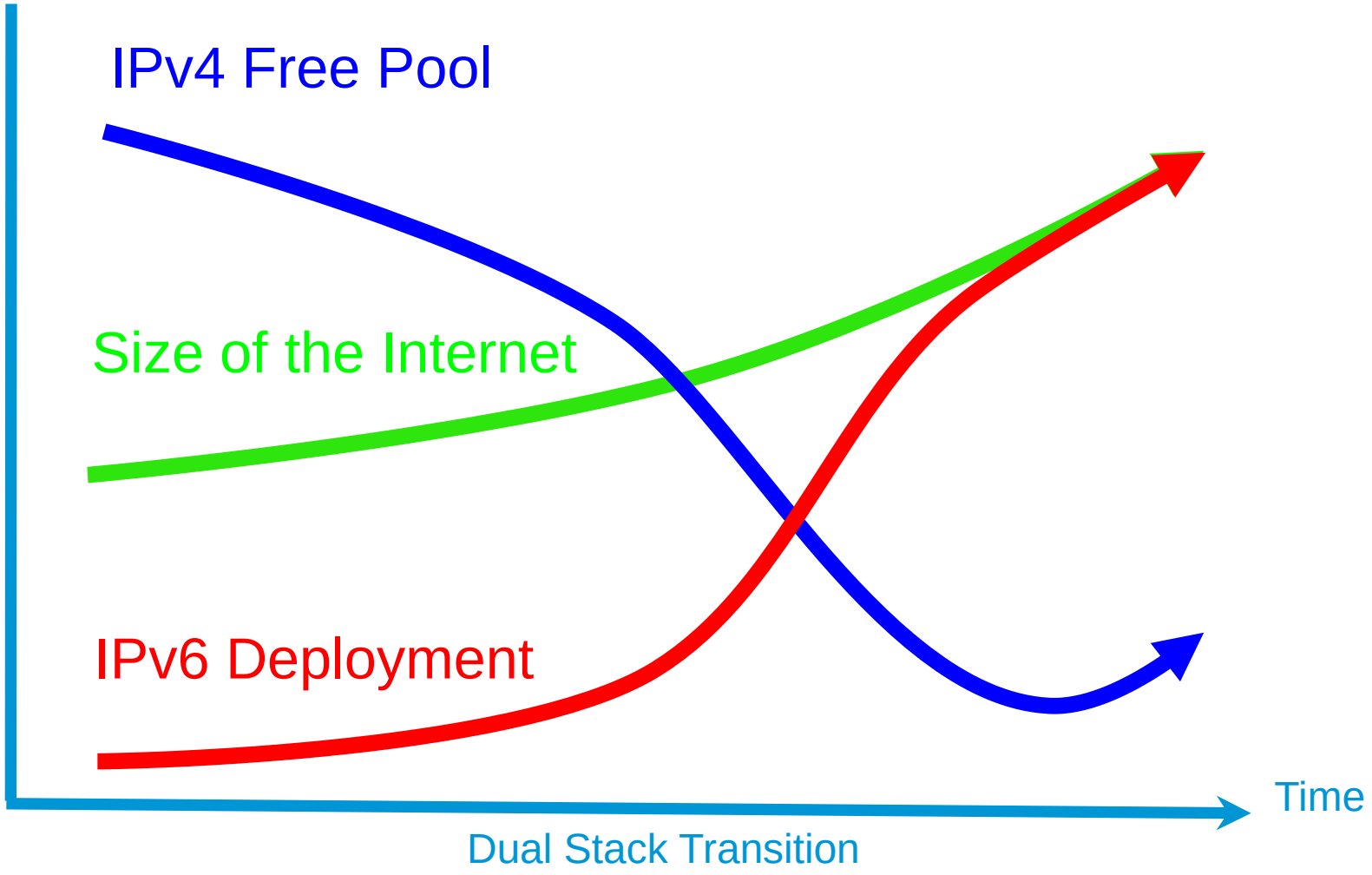
ISPs: Our backbones OK, poor demand, costs

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

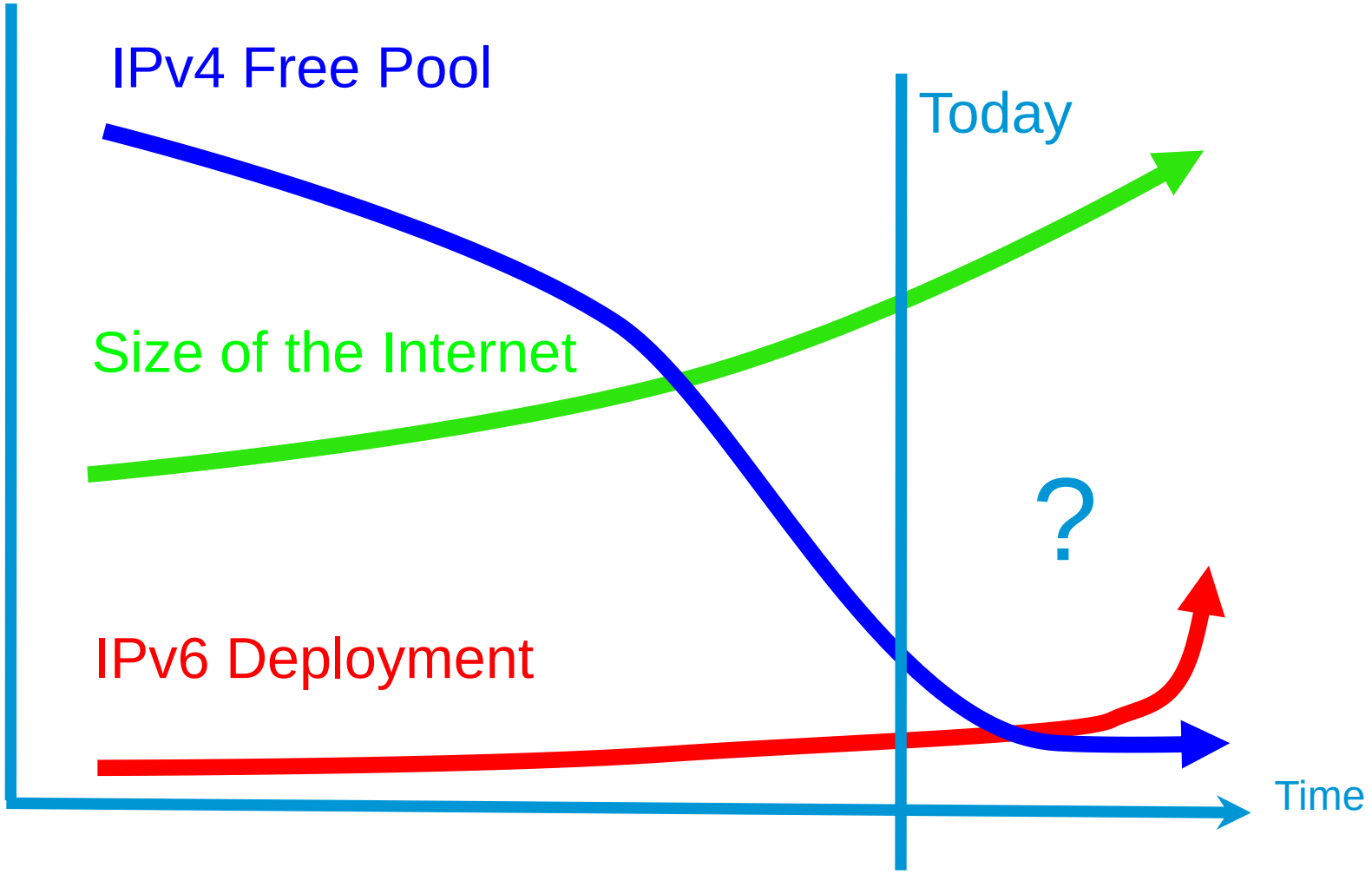
Content providers: No consumers, have enough IP-addresses, no knowledge, costs

Consumers/end users: are unaware, dont´care

IPv6 Deployment plan



IPv6 Deployment reality



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
- General wait and see attitude

“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

Reality: Growth of Connected Devices

In 2013….There Will Be

50 BILLION

Devices Connected to the Network,

up from 35 BILLION in 2010

This includes everything from RFID tags attached to shipping containers to traffic control systems and wireless sensors now being deployed as we build out SmartGrids.

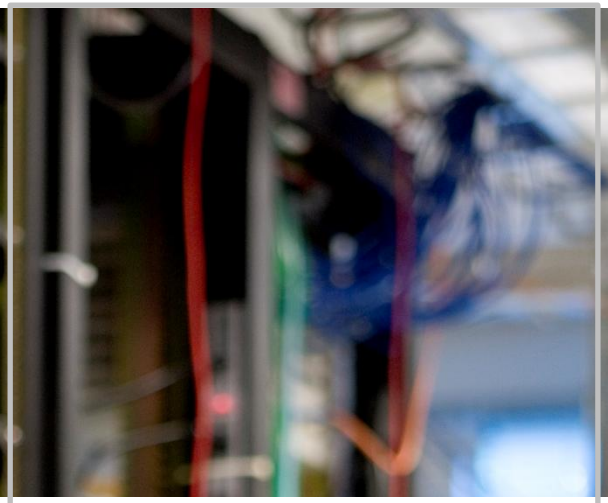
Source: Forrester, Cisco IBSG

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

Service Providers are valuable partners for an orderly IPv6 transition



Translation (NAT) services provide an option to start the transition

Translation services are not a permanent IPv6 alternative

As the Internet Grows, Translation Becomes Expensive

Both in Terms of Lost Visibility / Reach, and Fiscal Impact

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

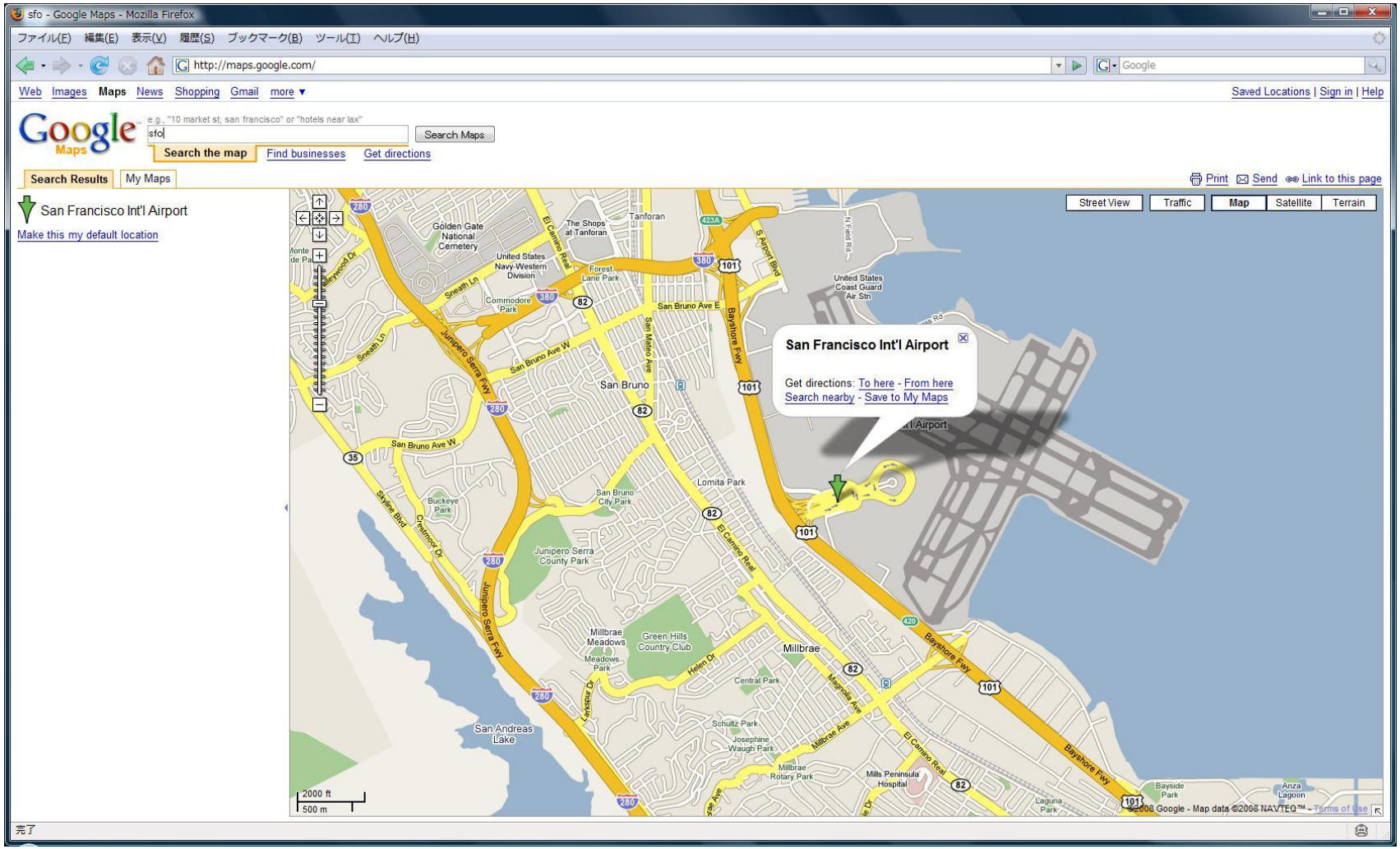
NAT impact
Multiple connection applications

- 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.

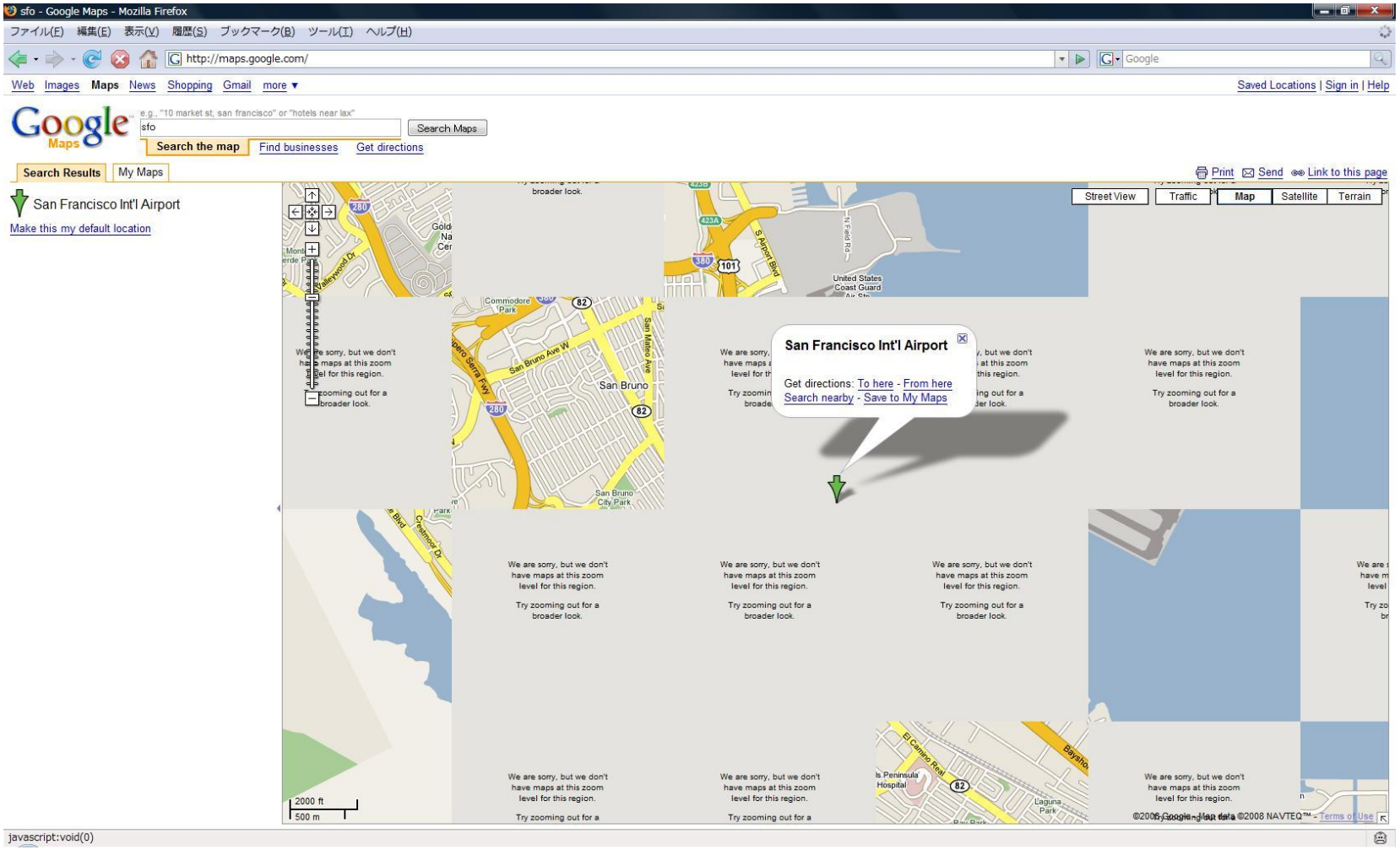
NAT impact
Multiple connection applications

30 NAT Connections

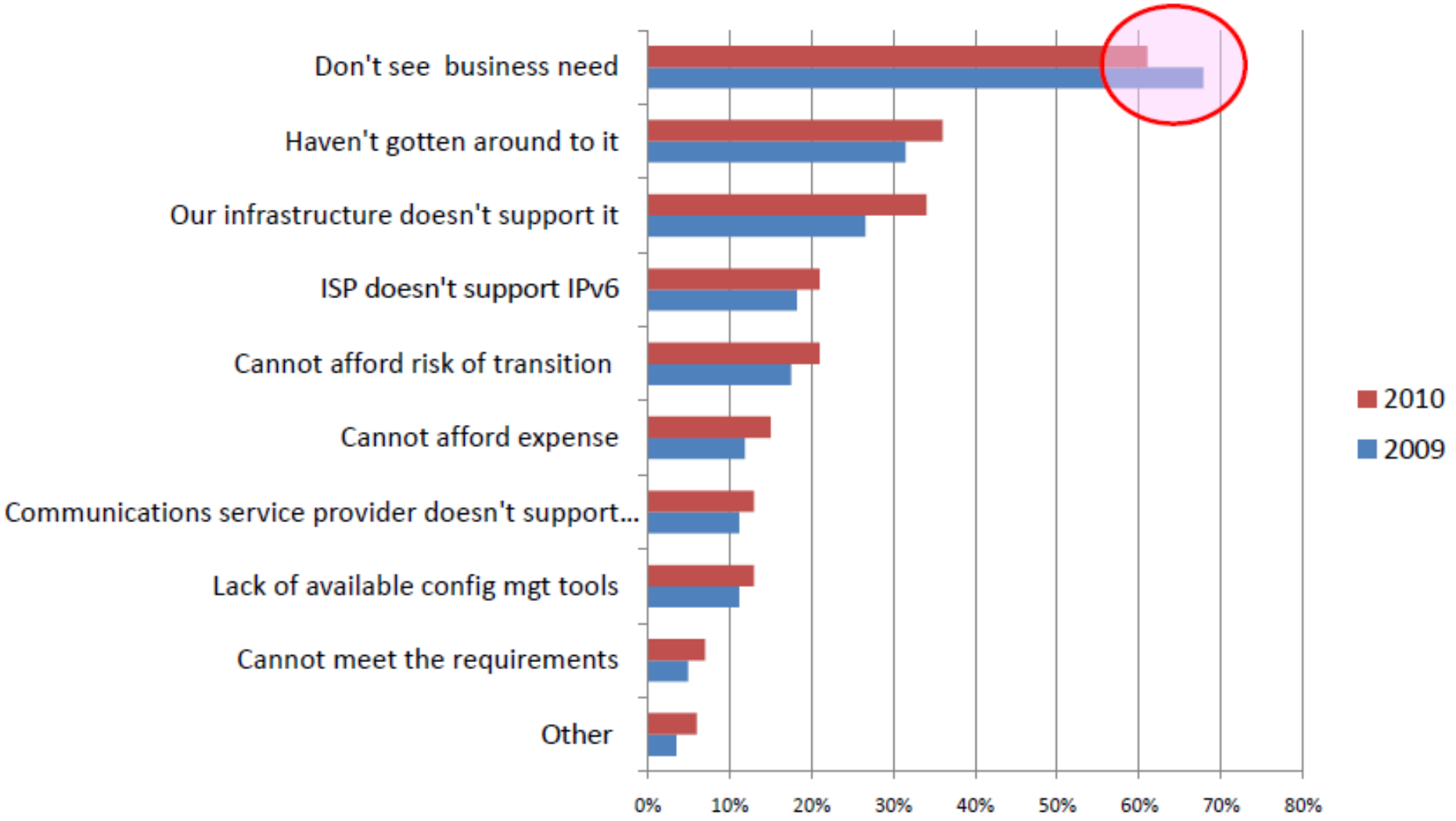


NAT impact
Multiple connection applications

Max 10 NAT Connections



Some other reasons why organizations don’t consider having an IPv6



Česká republika a implementace IPv6

IPv6 a státní správa ČR

1. Dle usnesení vlády České republiky číslo 727 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 cca 40% ústředních orgánů státní správy:
  - Úřad vlády
  - MF
  - MD
  - MPSV
  - MPO
  - MZV
  - Infrastruktura datových schránek

Implementace IPv6 v sítích státní správy

- Presence IPv6 pouze na Internetu
- Využití různých metod implementace
  - Dual-stack infrastruktura
  - NAT-PT
  - IPv6-to-IPv4 Transport Relay Translator

IPv6 a podniková sféra ČR

„Čekání na Godota“

- Podniková sféra v ČR rozhodně není hnacím motorem pro nasazení IPv6
- Někdy vyžadována podpora IPv6 při obnově komunikační infrastruktury
- Zatím vyčkávání zda se to „rozjede“

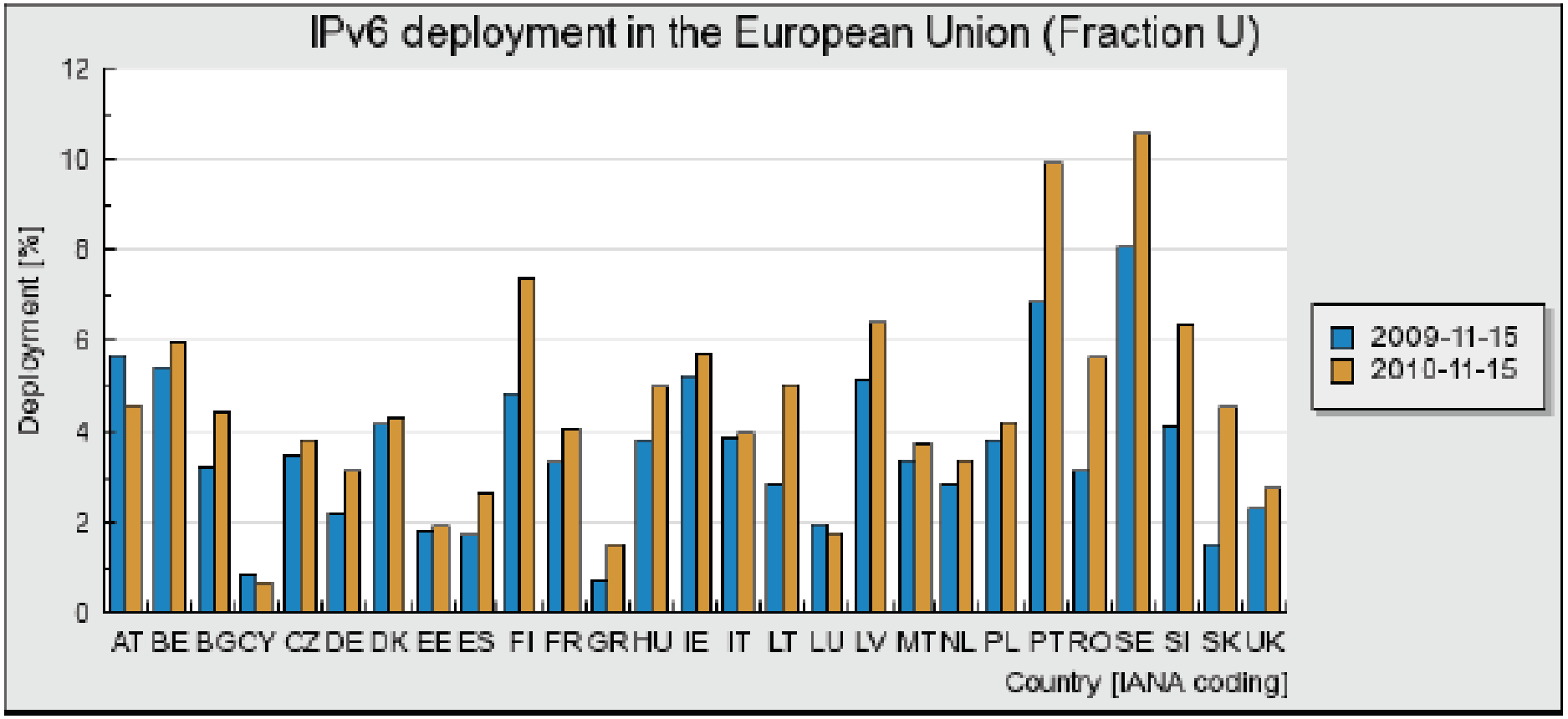
Evropská unie a implementace IPv6

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

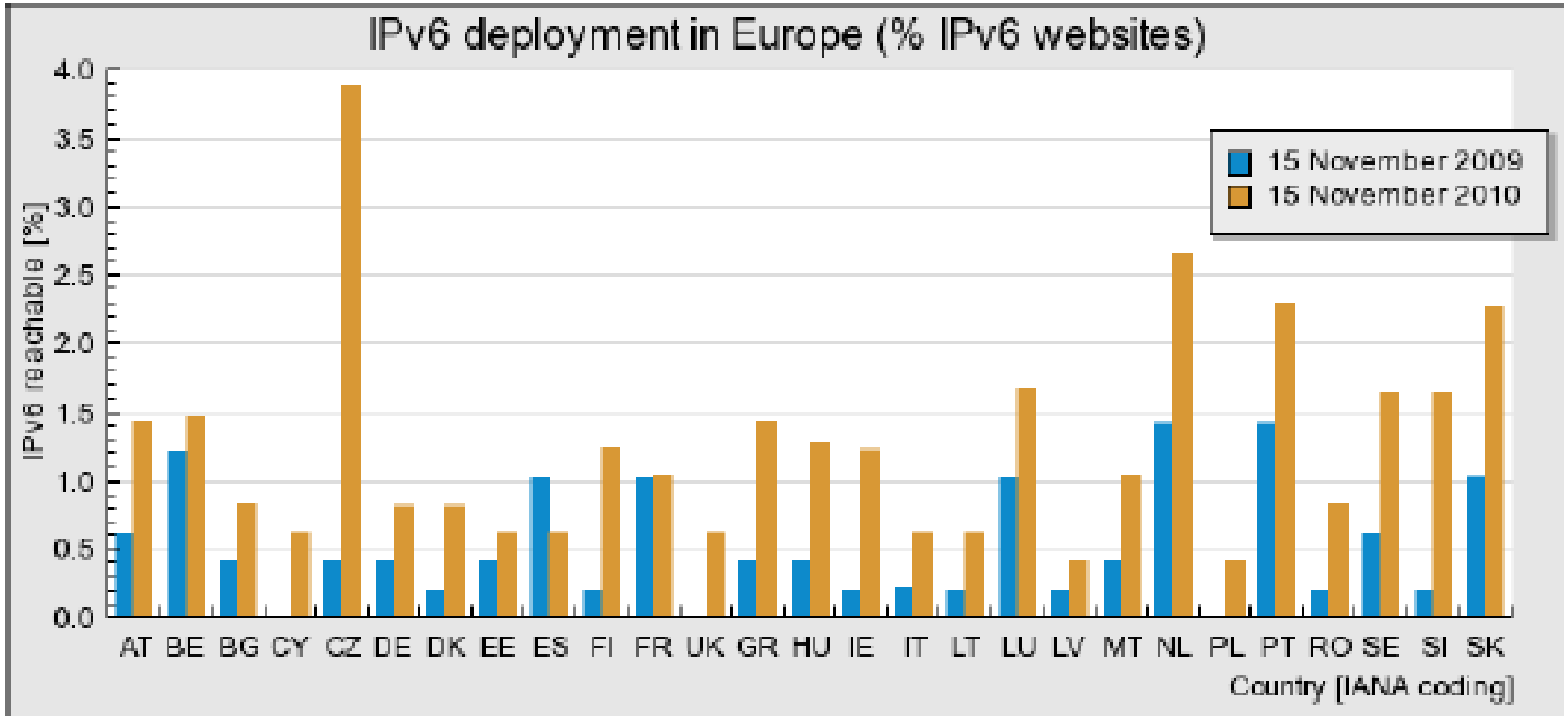
IPv6 deployment per EU member state



IPv6 and EU

Number of websites of ALEXA top 500 per country reachable on IPv6

total of 13500 websites analyzed



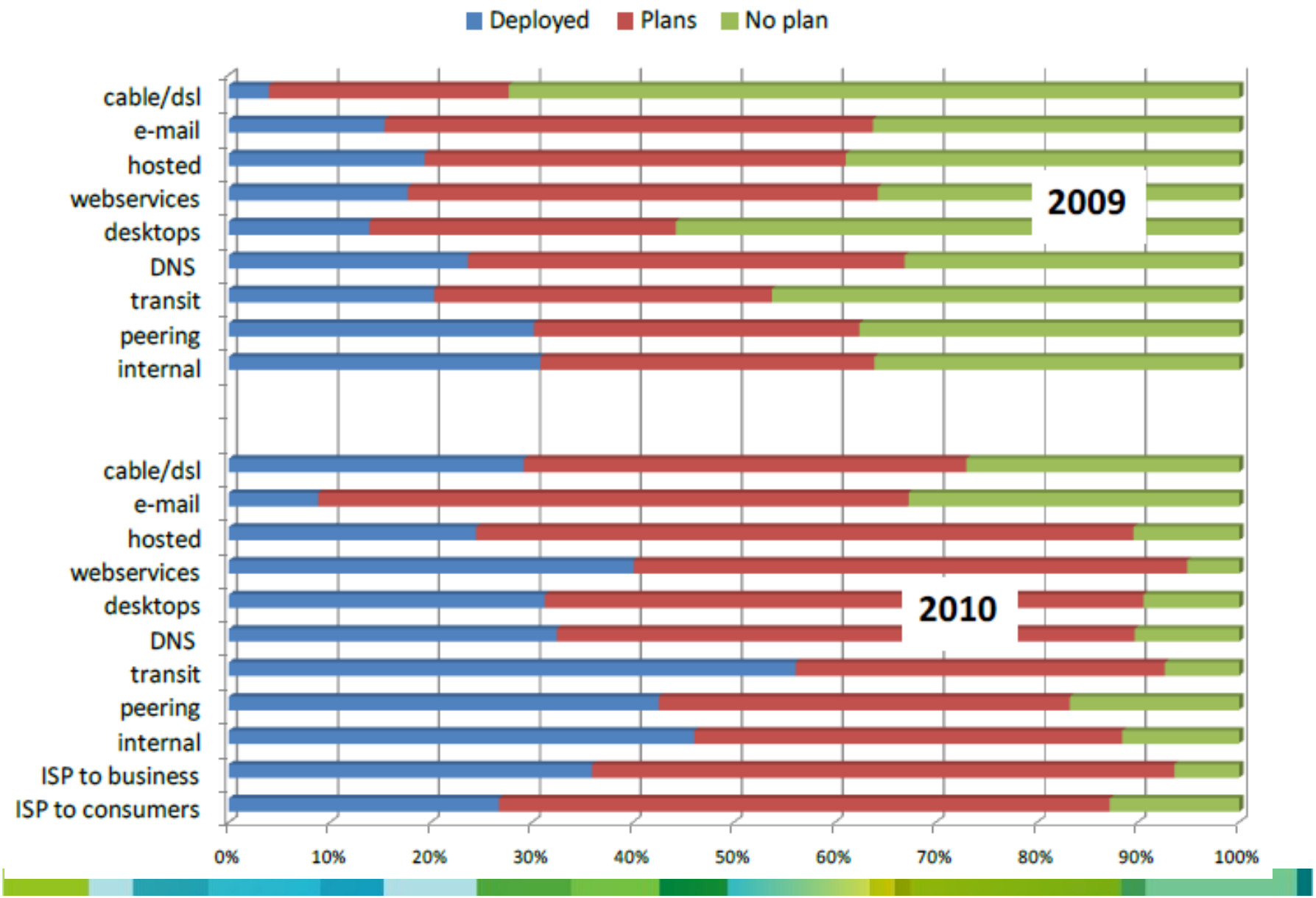
IPv6 and EU - Conclusion

- IPv6 deployment in EU countries has not significantly improved over the last years.
- Some pilot IPv6 projects

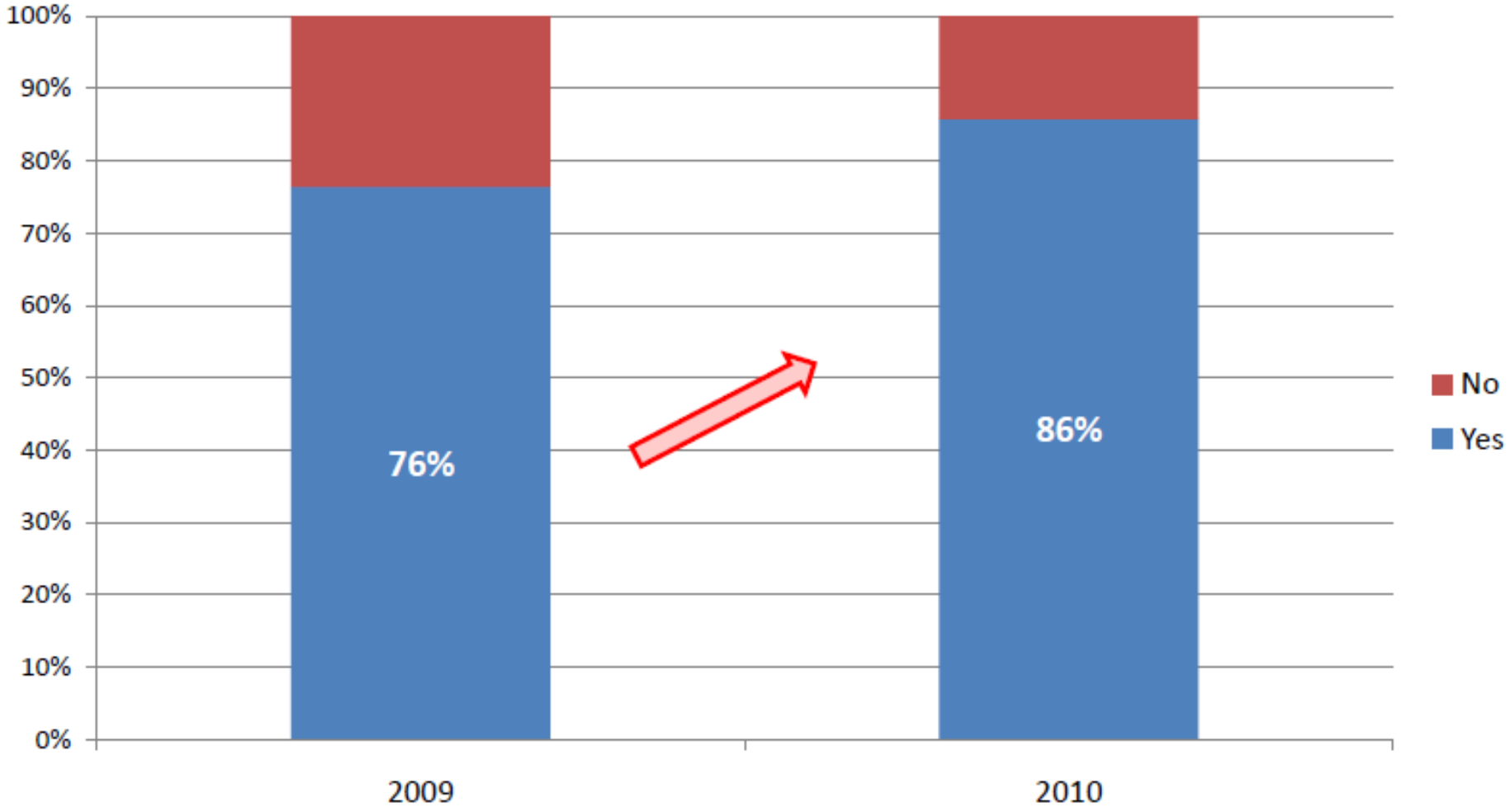
  DoI Nation wide MPLS network in Germany is based on dual-stack
- IPv6 initiatives in some EU countries
- The fraction of users capable of accessing the Internet over IPv6 has grown less than a percent (2009-2010).
- The target set by the European Commission to have 25 percent of the European citizens capable of accessing the IPv6 internet is not met.
- EU regularly monitors IPv6 deployment in EU countries

Co dál?

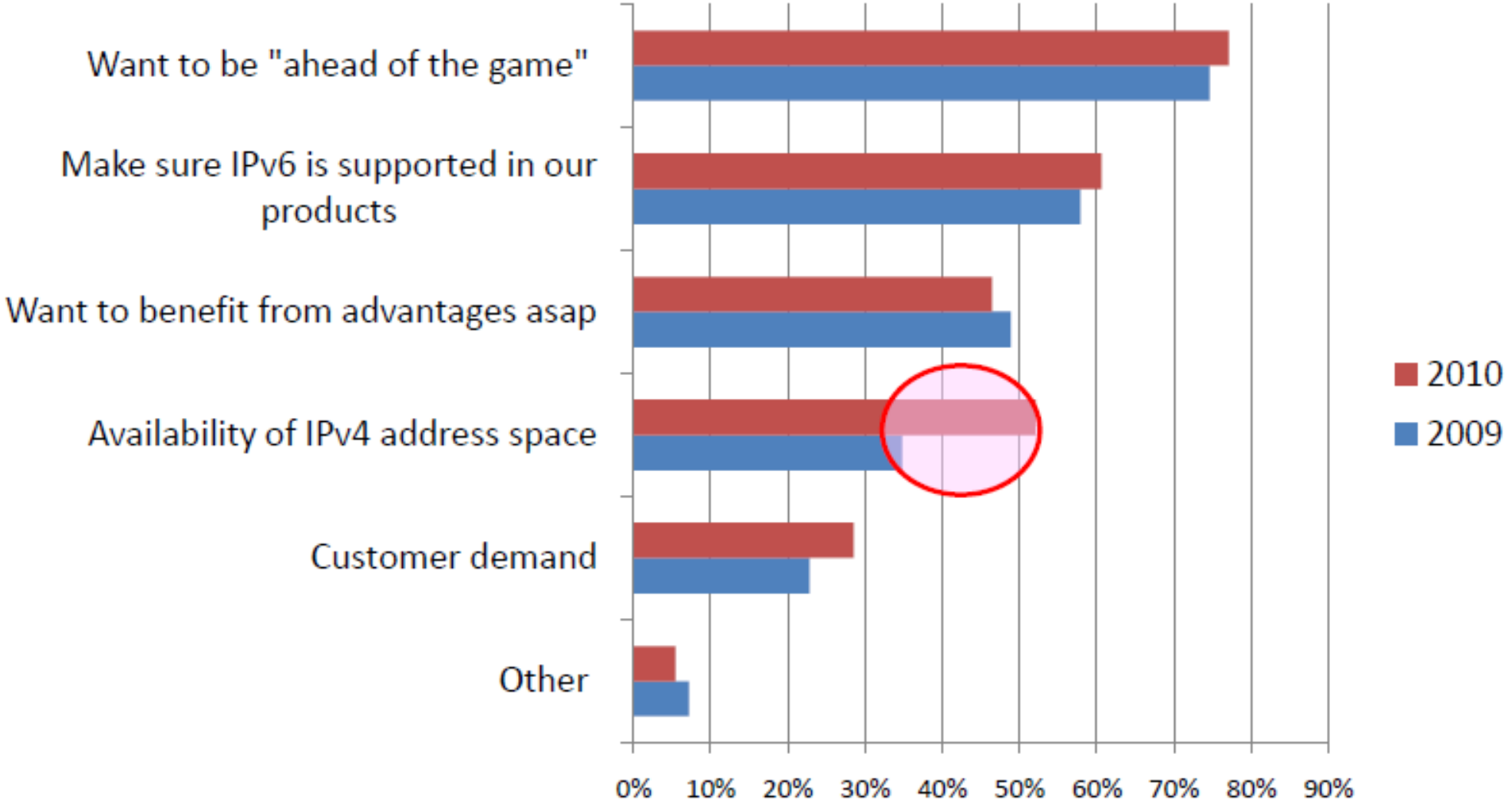
ISPs and IPv6 preparedness in EU region



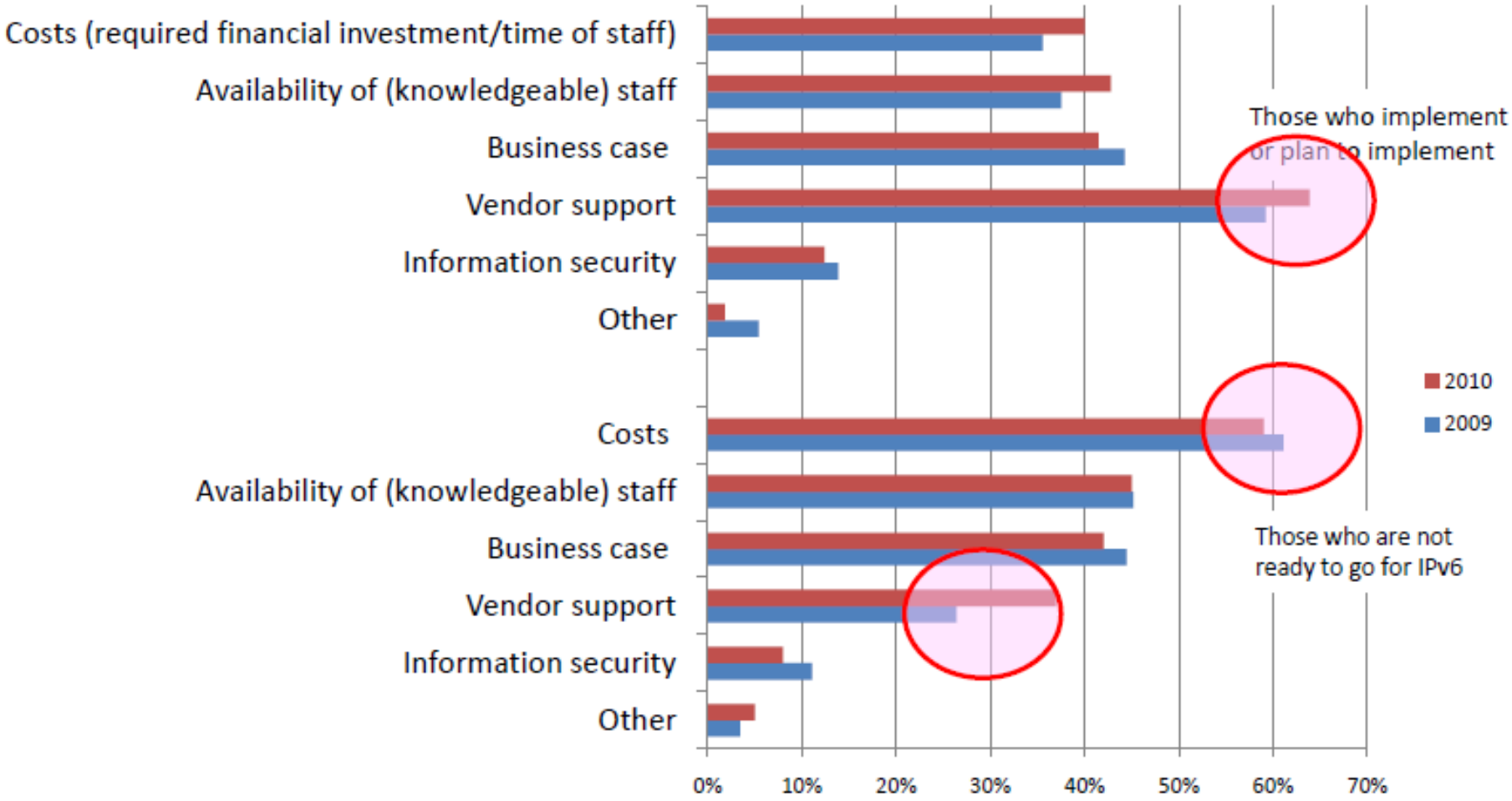
More organization have/considers having an IPv6 allocation and/or assignment



Main motivations to consider having IPv6 allocation/assignment



What are likely to be the biggest hurdle(s) when deploying IPv6



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

John Chambers on Cisco's IPv6 Strategy

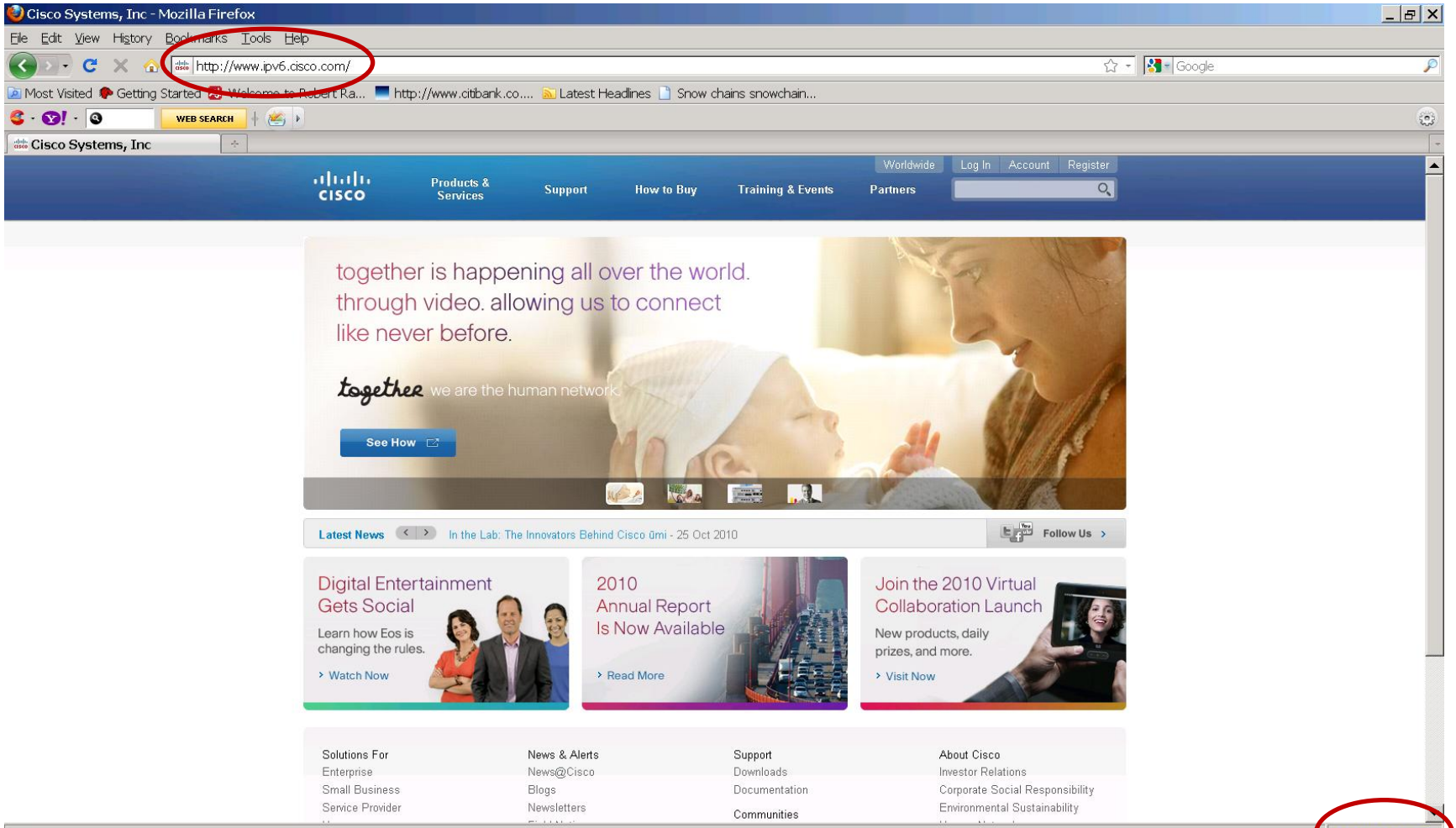
From Google's 2010 IPv6 Developer's Conference

"…if we don't overcome the challenges of IPv4 (...) we will slow down the growth of the Internet and loose momentum as an industry "

"IPv6 is important to all of us (…) to everyone around the world. It is crucial to our ability to tie together everyone and every device."

"At Cisco we are commited architecturally to IPv6 across the board: All of our devices, all of our applications and all of our services" .

www.ipv6.cisco.com – 2001:420:80:1::5



Conclusion

IPv6 will rule the Internet ...

but

we have to brake the chicken and egg problem (no offer because of no request/ no request because of no offer)

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

June 8 2011 – 00h00-23h59 (UTC)
24-hr IPv6 “Test Flight”
IPv6 access on website’s “front door”
(DNS AAAA Record on www.company.com)
Note: This is not about turning off IPv4!

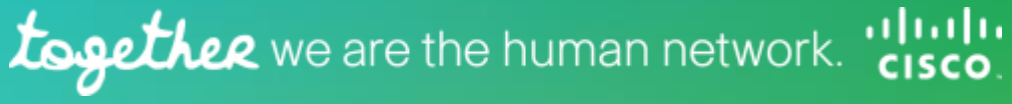
Coordinated by: Internet Society

http://isoc.org/wp/worldipv6day

http://isoc.org/wp/worldipv6day/participants

World IPv6 Day: Jumping In Together

Resources


together we are the human network.
cisco