IPv6 Addressing
Bechtel's Experience

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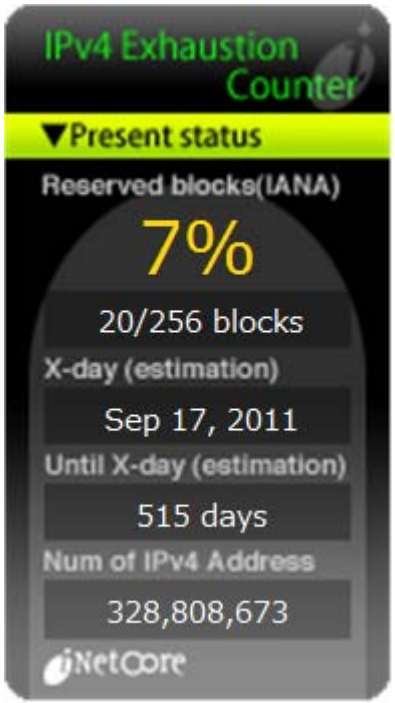
Presented to IPv6 Business Info Exchange

Change never ends…

- Natural evolution of Internet
- Dual stack model
- IPv6 – just another tech change
- Most Bechtel computers run IPv6 today
- Bechtel's /32 allocation [21-Jul-2005]

What WILL you do? →



Source: http://www.potaroo.net/tools/ipv4/

Start here…

Your Biggest IPv6 Decision?

- IPv4 model?
- Extreme address conservation?
- NAT & private addressing?
- Learn implications & best practices
- Understand the standards
- Keeping score

Get Help!

Geographical considerations

- Land masses change VERY slowly.
- Aligned with RIRs
- Route summarization

Business considerations

- Internal use
- External use (customers)
- Experimental

Bechtel High-Level Allocation

- 2001:4920::/32
  - Internal (ALL of Bechtel's Business Units)
    - Geo 1
    - Geo 2
    - Geo 3-5
  - External (Direct allocations to Bechtel projects)
    - Geo 1-5
  - Experimental
    - Geo 1-5
  - Unallocated

Geo Route Summarization

Natural Order of Addresses -3

Mapping ISO 3166 countries to IANA Regions

Country	Country Code	IANA Region	Sub Region
Afghanistan	AF	APNIC	South-central Asia
Albania	AL	RIPE	Southern Europe
Algeria	DZ	AFNIC	Northern Africa
American Samoa	AS	APNIC	Polynesia
Andorra	AD	RIPE	Southern Europe

IPv6 Address Segment

Binary	Hex	IANA Region
0000	0	ARIN
1000	8	RIPE
0100	4	APNIC
1100	C	LACNIC
0010	2	AFNIC

Sparse Allocations

Left bit –
Right bit

Today's allocation for future contiguous address space

Sparse

Left-most bit order

Binary	Hex	Assignment
0000	0	Group 1
1000	8	Group 3
0100	4	Group 2
1100	C	Reserved

Right-most bit order

Binary	Hex	Assignment
0000	0	Group 1
0001	1	Reserved
0010	2	Reserved
0011	3	Reserved
0100	4	Group 2
0101	5	Reserved

Allocations to sites

- …SubRegion (+country?) → Site
- /48 for each site
- Site = Office / project delivery address
- Accommodates changes up and down

Bits 65-128

Allocations within sites

- Common ranges for all sites
  - Data
  - DMZ
  - Cloud computing
  - Wireless
  - Real-time traffic (voice, video, etc)
  - Loopback addresses
  - Link Addresses

Who assigns addresses?

SLAAC vs. Static Assignments

- Bechtel uses SLAAC where possible
  - Desktops, laptops, most servers…
- Static exceptions
  - Routers, switches and network devices
  - Security controllers and other select servers
  - Websites configured to use a manually bound address
  - Static address starting ranges.

STOP
Entering IP
Addresses!

DNS Reality Check

- You MUST HAVE solid DNS supporting IPv6 (AAAA) resolution.
  - Windows 2003 SP2 & later
  - Bind
- Support for SLAAC is ahead of DHCPv6.
- Internal and External issue
- Follow the route…

Related News Bit…

OECD resources on Internet addressing: IPv4 and IPv6

Link: www.oecd.org/STI/ICT/IPv6

Global perspective of IPv6 from OECD (Organisation for Economic Cooperation and Development) - US is a member country.

April 2010 updates at bottom of page

OECD resources on Internet addressing: IPv4 and IPv6

Send Print

In May 2008, the OECD warned that Governments and business must tackle Internet address shortage together. In particular, governments and business needed to work together more effectively and urgently to meet the growing demand for Internet addresses and secure the future of the Internet economy by implementing IPv6. Not implementing IPv6, it warned, would impact the economic opportunities offered by the Internet with severe consequences in terms of stifled creativity and deployment of new services.

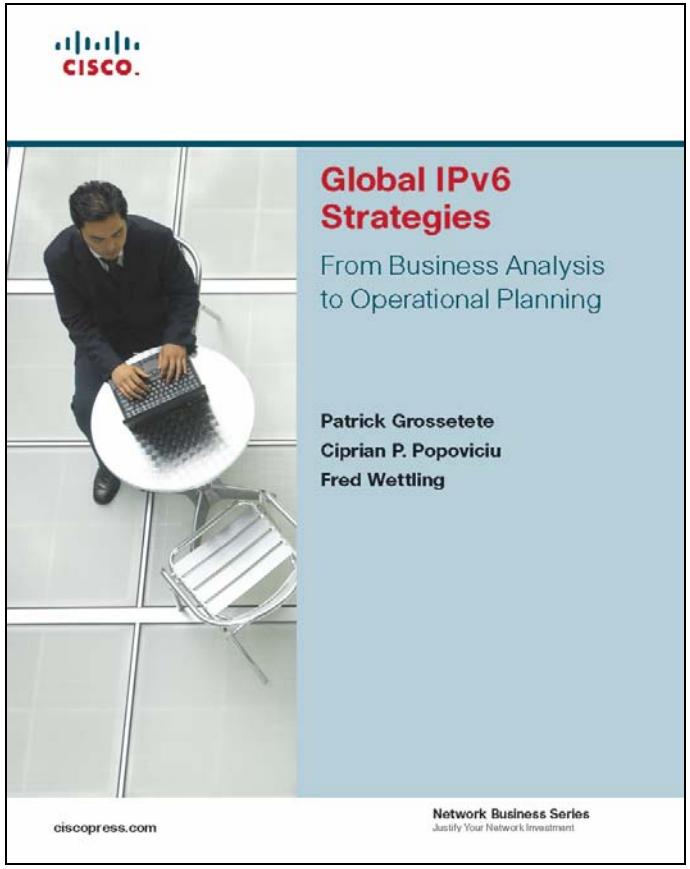
- See OECD report: "Economic Considerations in the Management of IPv4 and in the Deployment of IPv6", June 2008
- Presentation: IPv6 and the Future of the Internet Economy from a public policy perspective

Nearly two years later, the OECD followed up on previous work by trying to assess the level of IPv6 deployment by presenting several indicators, each of which offers information on a specific aspect of IPv6 deployment and from a particular vantage point. It warns, importantly, that the Internet's distributed nature makes measuring IPv6 deployment very challenging and necessarily limited.

- **See OECD report: "Measuring Deployment of IPv6", April 2010**
- Presentation: Measuring Deployment of IPv6

Permanent URL: www.oecd.org/sti/ict/ipv6

Global IPv6 Strategies



Don't miss it!

- The Business and Economic Importance of IP Communications
- IPv4 or IPv6 – Myths and Realities
- The Economy of an IP Evolution
- IPv6 Adoption Strategies
- Analysis of Business Cases for IPv6
- Planning Your IPv6 Migration

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