

IPv6 Mini-Conference '04

Implications for IPv6 in Oz.

Michael Biber
Chair
IPv6 Forum Australia/New Zealand

Chair
AARnet IPv6 Working Committee

Ph: 02 9706 4335

Email:
info@ipv6forum.org.au
mbiber@apnetworx.com.au



Time	Title	Presenter
10:00	Welcome	Mike Biber <small>Chair, IPv6 Forum Australia</small> Trent Lloyd <small>Sixlabs</small>
10:05	Introduction to IPv6 <small>A broad coverage of the principles of IPv6 from the ground up which will allow anyone who has never touched IPv6 before to understand the basics, how to use it, what you can do with it and how it works.</small>	Trent Lloyd <small>Sixlabs</small>
11:00	Mobile IPv6: Mobility in a Wireless Internet	Hesham Solimon <small>Flavion</small>
11:40	Modelling and Simulation of IPv6 Networks	Ahmet Sekercioglu <small>Monash Uni, Melbourne</small>
12:20	Lunch <small>One hour lunch time, no catering is provided you will need to find your own source of lunch, there are plenty of places around</small>	
14:00	IPv6 for Applications, OS Implementations	John Barlow Trent Lloyd
15:00	Afternoon Tea <small>Provided for you, move to the Robing Room for the afternoon sessions following afternoon tea</small>	
15:30	IPv6 Status, Activity and Prospects in Australia	Mike Biber <small>Asia Pacific Networx</small>
16:30	Official ' <i>Soft</i> ' launch of IPv6 Forum	Mike Biber <small>Chair, IPv6 Forum Australia</small>
17:00	Panel session <small>All available speakers with attendees - general question and answer/discussion session over drinks</small>	All



Day 2 Workshop

Time	Title	Presenter
10:00	<h2 data-bbox="269 408 766 450">IPv6 101 and Hands-on</h2> <p data-bbox="336 458 1368 495">Designed for people who are new to IPv6, probably aren't a computer whiz or interested in the technical side and simply want to get involved and enjoy its benefits as easily as possible</p> <p data-bbox="336 515 1339 536">Bring along your internet-connectable PDA, Laptop or Internet Toaster and we'll get it configured to use IPv6 and show you what you can do</p>	<p data-bbox="1430 408 1688 450">John Barlow</p> <p data-bbox="1430 458 1567 478">AARNet/GrangeNet</p> <p data-bbox="1430 485 1670 526">Trent Lloyd</p> <p data-bbox="1430 535 1476 555">Sixlabs</p>
13:00	<h2 data-bbox="269 587 378 628">IPsec</h2> <p data-bbox="336 632 1106 653">An overview of IPsec, what it does, how it works, why you should use it as well as demonstrations of its use</p>	
13:30	<h2 data-bbox="269 742 684 783">IPv6 Global Routing</h2> <p data-bbox="336 790 1330 810">An overview of routing protocols available for IPv6, a view on the global status of IPv6 routing as well as what you can use for local routing.</p>	
14:00	<h2 data-bbox="269 897 611 938">Issues with IPv6</h2> <p data-bbox="336 945 1361 996">We've just spent the last 2 days telling you how good IPv6 is, now lets unwind and look at some of the issues with IPv6 and what you can do to help solve them</p>	
18:30	<h2 data-bbox="269 1052 584 1093">End of day two</h2>	



What's so special about IPv6?

- Assessing the Implications for Tomorrow's Broadband Internet Architecture(s)
 - IPv6 for QoS Broadband and Mobility Networks
 - Comparing IPv6 Advantages over IPv4 and assessing the unique value propositions for IPv6
 - Assessing the impact of migration from IPv4 to IPv6 on existing applications and customers
 - Identifying the impact of IPv6 on Business Strategies for Voice Data Video Convergence



Tomorrow's Broadband Internet

- Fast
 - Things generally happen in (near) real time
- Always On
 - Available whenever and wherever it's needed
- Secure
 - 'Always On' means 'Always Exposed'
- Pervasive
 - Smoothly integrates with lifestyle choices
 - Work, Home, Family, Play, Environment, Privacy ...
- Intangibility
 - Ethereal presence without contour

See www.internet2.edu for in-depth discussions on this.



IPv6 is about Freedom

- Ability at some point to renumber a network easily.
 - avoids ISP lock-in.
- NAT is about control
 - No NAT with IPv6 is about peer-2-peer computing and the Freedom to also not live with the client/server control model as a matter of market and customer/user choice.
- Freedom to have privacy
 - By using IPsec peer-2-peer all that is exposed is the IPv6 Header and Options. That means no one gets to see the IP Layer Suite layers 4 and 5 data at all. Not ISPs, Not Routers, Not Switches, Not Network Manager Stations, Not snooping Clients, Not Anyone, EXCEPT the peer at the end of the connection.

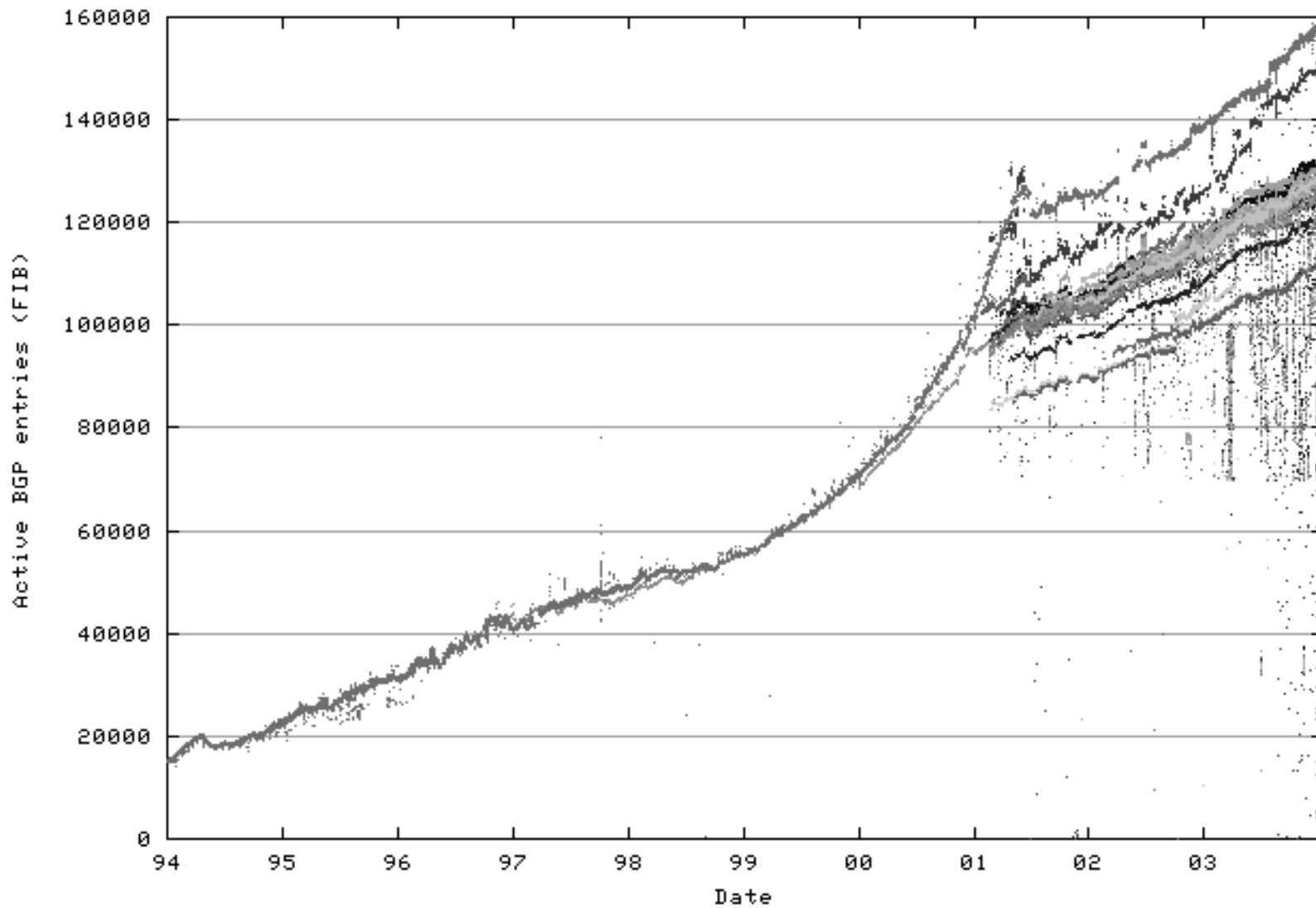
The trust model from IPsec is all about Freedom as I equate part of Freedom with PRIVACY. As IPv6 can be deployed as business and technical model without NAT it supports that Freedom with IPsec, which IPv4 with NAT simply cannot.
 - Comment from Jim Bound , Chair, Nav6TF (www.nav6tf.org)



BGP Table Data -Active BGP entries



Report last updated at Mon, 12 Jan 2004 14:1:12 UTC+1100.

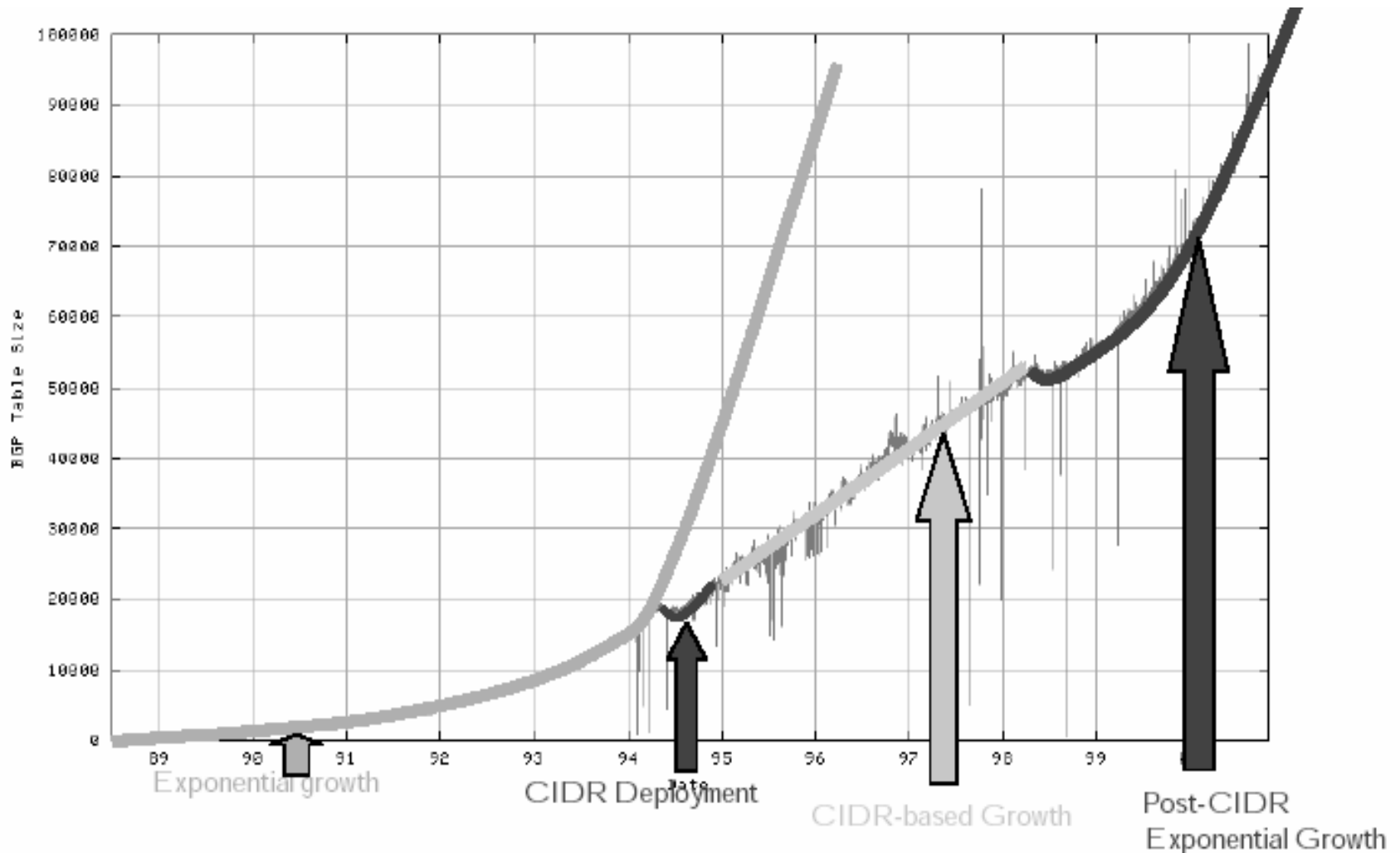


source: <http://bgp.potaroo.net/>



Route Table Consolidation

- Short term solution



Current Initiatives

- **Korea to invest \$160 million in IPv6 by 2007**
 - The Korean government aims to put the nation in a leadership role in the world-wide Internet equipment market and make it an internet super power by commercialising IPv6 technology early on

(Source: Korea Herald, 19 Sep 2003).



US DoD

- DoDD 8100.1 IPv6 Procurement Policy – June 9, 2003
 - IPv6 is vital for the US version of network-centric warfare, the Global Information Grid (GIG) project.
 - The GIG involves networked sensors, platforms and other IT and existing national security systems. It is designed to share resources and expand US security data and analysis.
 - The US Defense Department intends to migrate parts of the GIG to IPv6 between 2005 and 2007, and fully adopt the standard by 2008. The first applications to be ported to the network will include basic language translation, military gaming and simulations.
 - As from October 1 2003, ALL US DoD GIG Network Hardware and Software purchases must be IPv6 compliant.
 - “The Australian ADF intends to follow this US lead.”
 - Marc Ablong, Director Information Management Futures, ADoD
 - The Australian, July 22, 2003



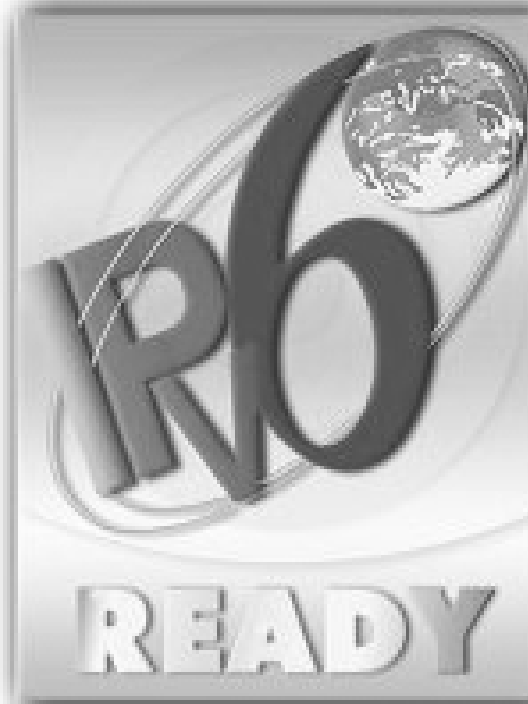
SOC Committed to Promotion of IPv6



- The mission of the Internet Society (ISOC) consists in ensuring the open development, evolution, and use of the Internet for the benefit of all people throughout the world, and advises governments and others against actions that would restrict how technology can evolve in the future.
- Since 1992 ISOC has been the organisational home for the Internet Engineering Task Force (IETF), which develops the standards that ensure the stability, reliability, security, and scalability of the Internet.
- The Society in particular sees IPv6 as one of the technologies that will help support social and economic development and has a specific policy position for the promotion of IPv6.



IPv6 Ready Logo Program



<http://www.ipv6ready.org/>

<http://43.254.18.162/>

HTTPv4 and HTTPv6



IPv6 Ready Logo Program

- Launched September 1, 2003
- To avoid confusion in the mind of customers, a globally unique IPv6 Ready logo programme has been defined.
- The IPv6 Ready logo will give confidence to users that IPv6 is both currently operational and provide a clear indication that the technology is future-proof.
- The IPv6 Ready logo programme will contribute to the feeling that IPv6 is available and ready to be used TODAY.



IPv6 Logo Programme Phases



- Phase I (Short term period) :
 - In a first stage, the Logo will indicate that the product includes IPv6 mandatory core protocols and can interoperate with other IPv6 Ready IPv6 equipment.
- Phase II (Long term period) :
 - The "IPv6 Ready" step implies proper care, a technical consensus and clear technical references. The IPv6 Ready logo will indicate that a product has successfully satisfied strong requirements stated by the test contract.
To avoid confusion, the logo "IPv6 Ready" will be generic. The programme defines the test profiles with associated requirements for specific functionalities.



IPv6 Ready Programme Self Test

Further Information



- **Phase-1 Test Specification Policy**
 - For ROUTERS and HOST (Ver. 1.0) update Jul. 30, 2003
 - IPv6 Specification
 - ICMPv6 for IPv6 Specification
 - Neighbor Discovery
 - IPv6 Stateless Address Autoconfiguration
- **Interoperability test scenario**
 - The Interoperability Test Scenarios correspondent to above specification is available.
 - For HOST and ROUTER (Ver. 1.1) update Sep. 23, 2003
 - Interoperability Test Scenario Ver. 1.1
- **Test Suite**
 - Platform
 - download latest version of v6eval. [6eval reference manual]
 - Scripts
 - For HOSTS and ROUTERS
 - Samples of test results

Source: <http://www.tahi.org/ume/>



The IP-over-Everything Internet

- Always-on devices
 - ADSL, cable modems... games consoles...
- Voice and data convergence
 - mobile IP telephony – VoIP, UMTS and beyond
 - compare cellular ownership to Internet hosts
- Mobile ad-hoc computing
 - wireless devices/PDAs (e.g. 802.11),
 - Bluetooth...
- Need UNIQUE address space as a tech enabler
 - 100's IP addresses per person or household?



The Pervasive Internet

- Pervasive IP-based computing
 - palmtop, wearable, household, in-car,...
- Smart Buildings
 - pervasive information fabric
 - embedded IP devices
 - shared mobile, wireless work
- Smart Homes
- Smart Cars

....Millions of IP Addresses!



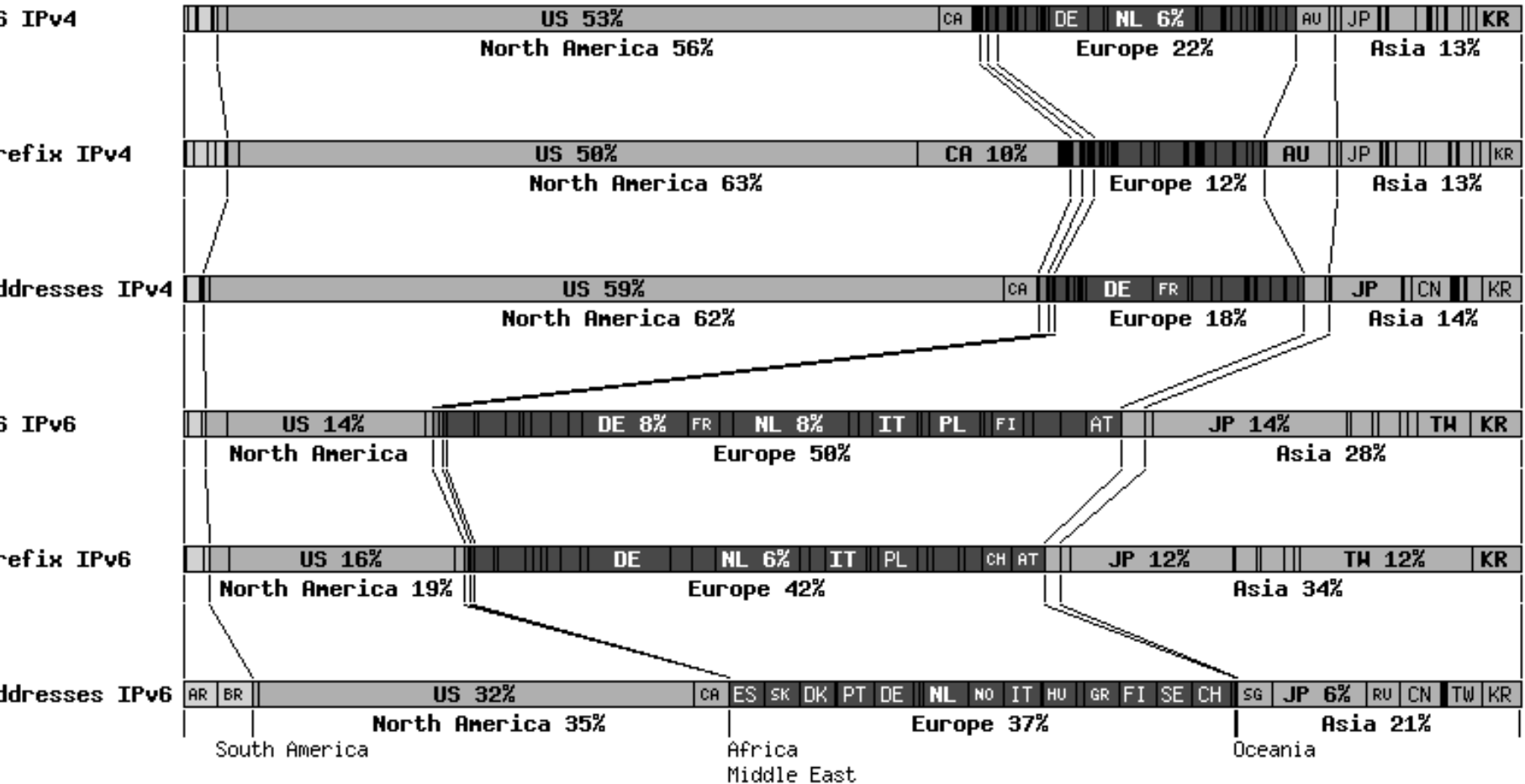
IPv4 ADDRESS SHORTAGE?

- China Currently Allocated
 - ~ 9 Million Global Addresses
(137 /16's + 27 /24's)
- Indian ISPs have more than 5 levels of NAT to provide sufficient end user IPv4 addresses
- Other Allocations (minimum)
 - MIT ~17 Million
 - IBM ~33 Million
 - US Government ~168 Million
 - UK Government ~33 Million
 - Europe ~80 Million



Distribution of announced IPv4 and IPv6 Prefixes/ASs

percentage of metric controlled by a country/continent



IPv4 : 129,673 prefixes, 15,361 ASs

IPv6 : 612 prefixes, 324 ASs

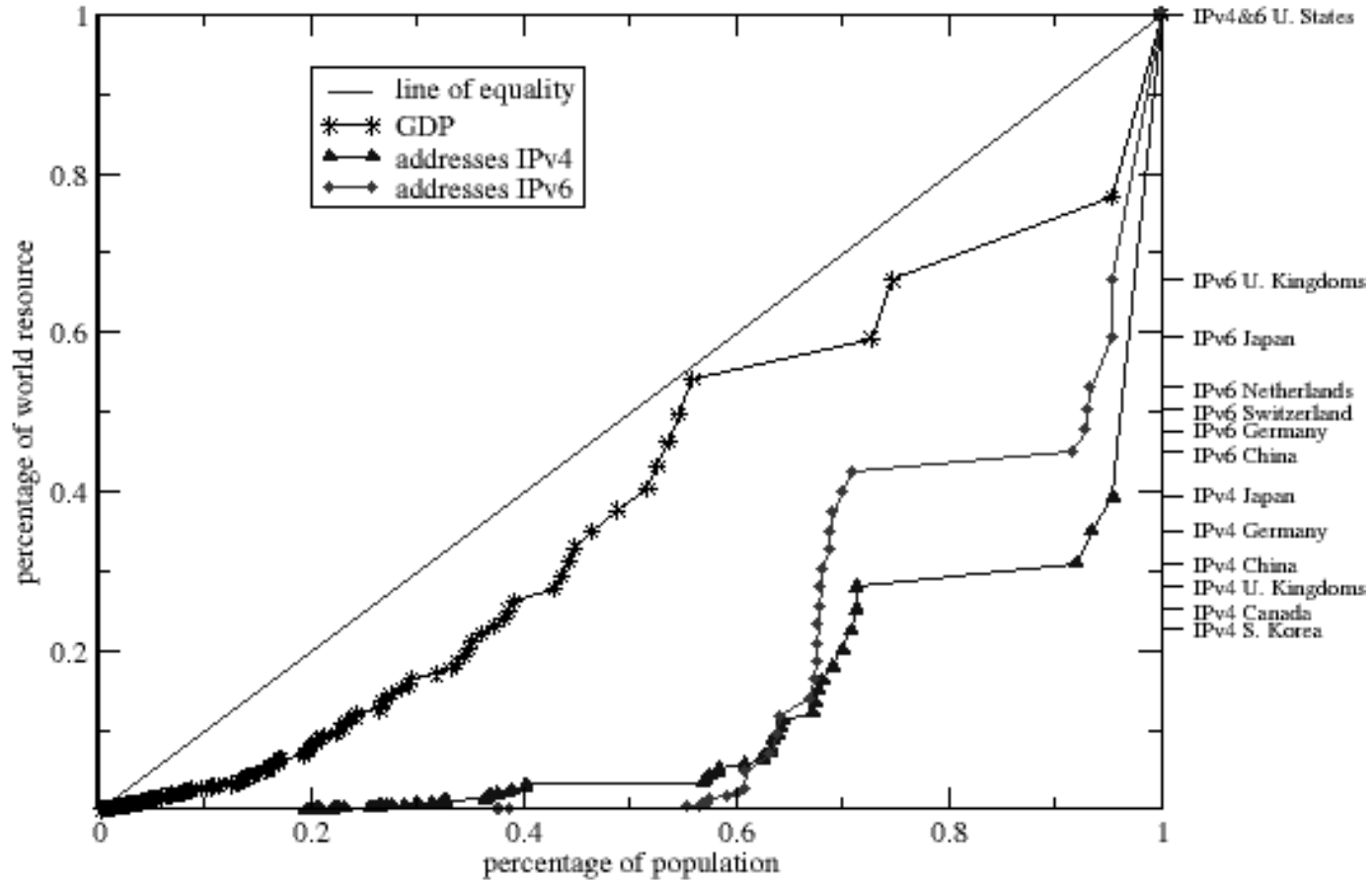
CAIDA Research



Cooperative Association for Internet Data Analysis

distribution of GDP and IP addresses across the world population

Lorenz curve of address inequality



Source:

<http://www.caida.org/analysis/geopolitical/bgp2country/ipv6.xml>



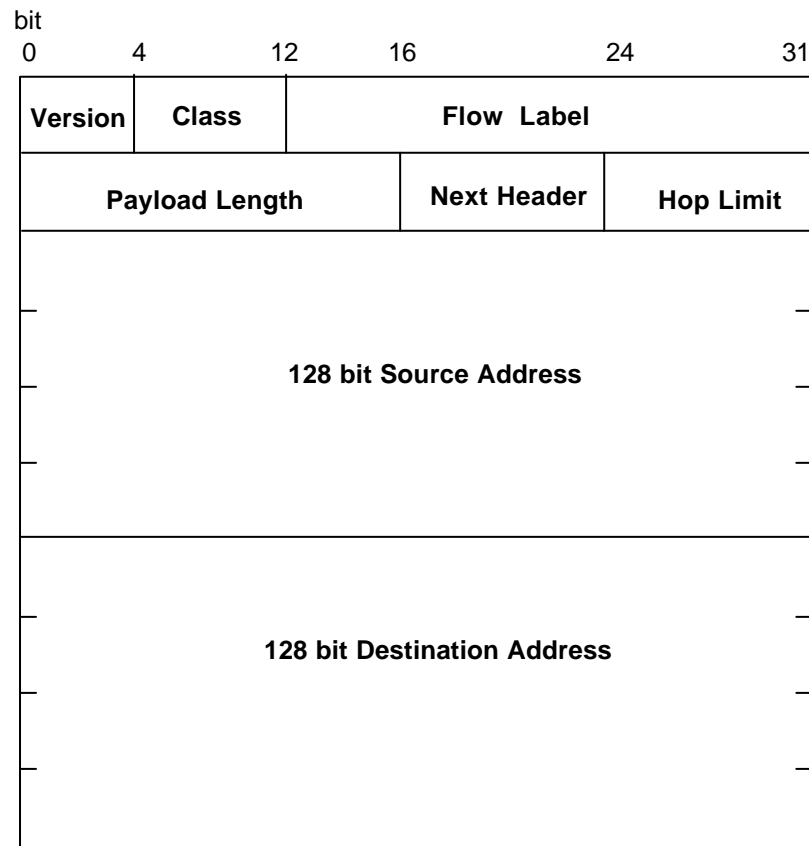
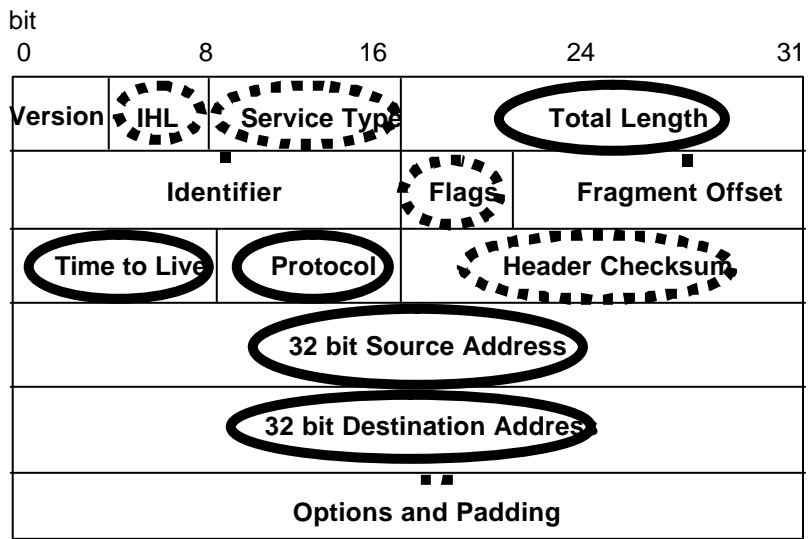
IPv6 Design Philosophy



- Recognizable yet simplified header format
- Reduce common-case processing cost of packet handling
- Keep bandwidth overhead low in spite of increased size of the address
- Flexible and extensible support for option headers
- Design optimised for 64-bit architecture
 - Headers are 64-bit aligned



Pv6 Header–Comparison with IPv4



IPv4 Header

20 octets, 12 fields, including 3 flag bits
+ fixed max number of options

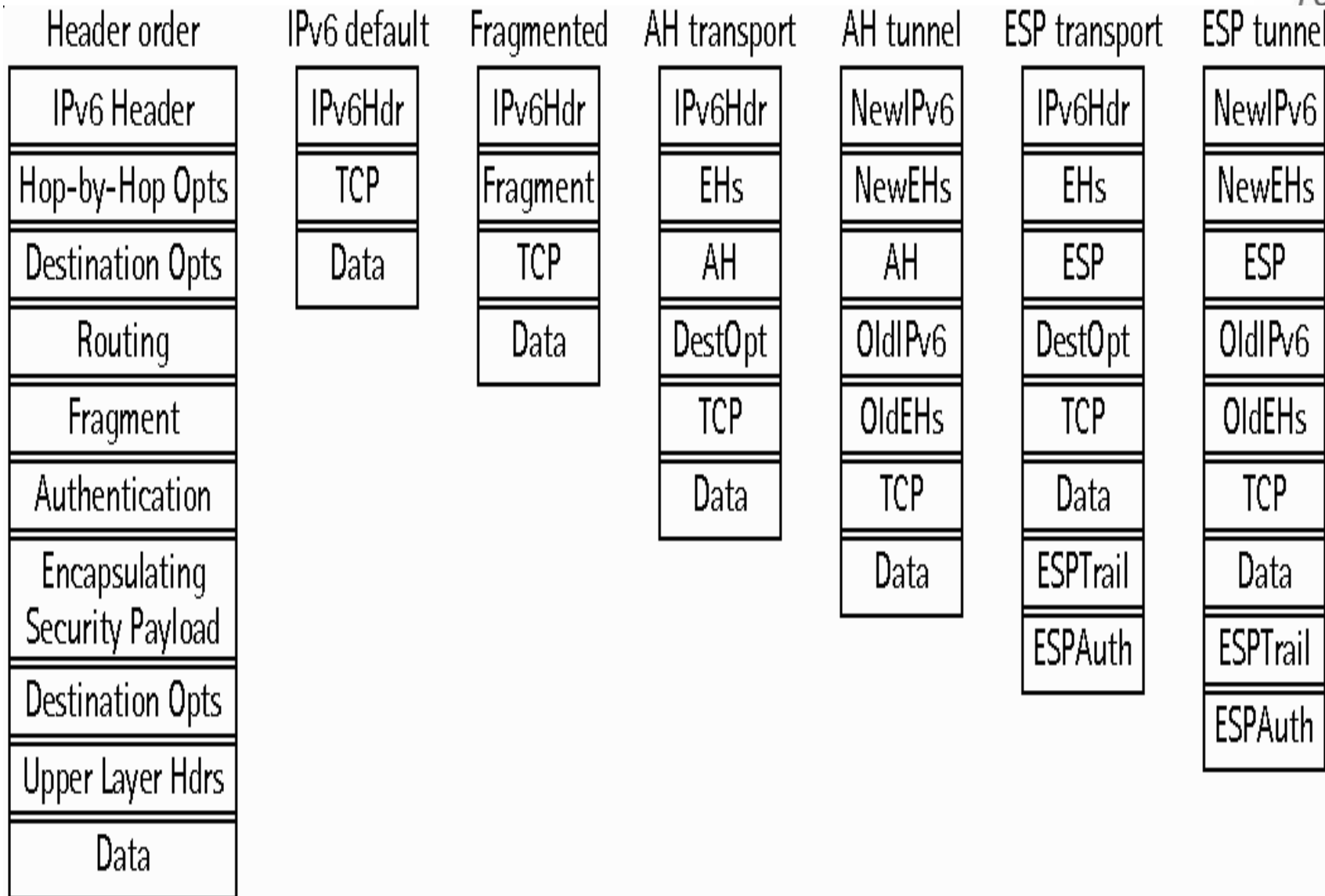


IPv6 Header

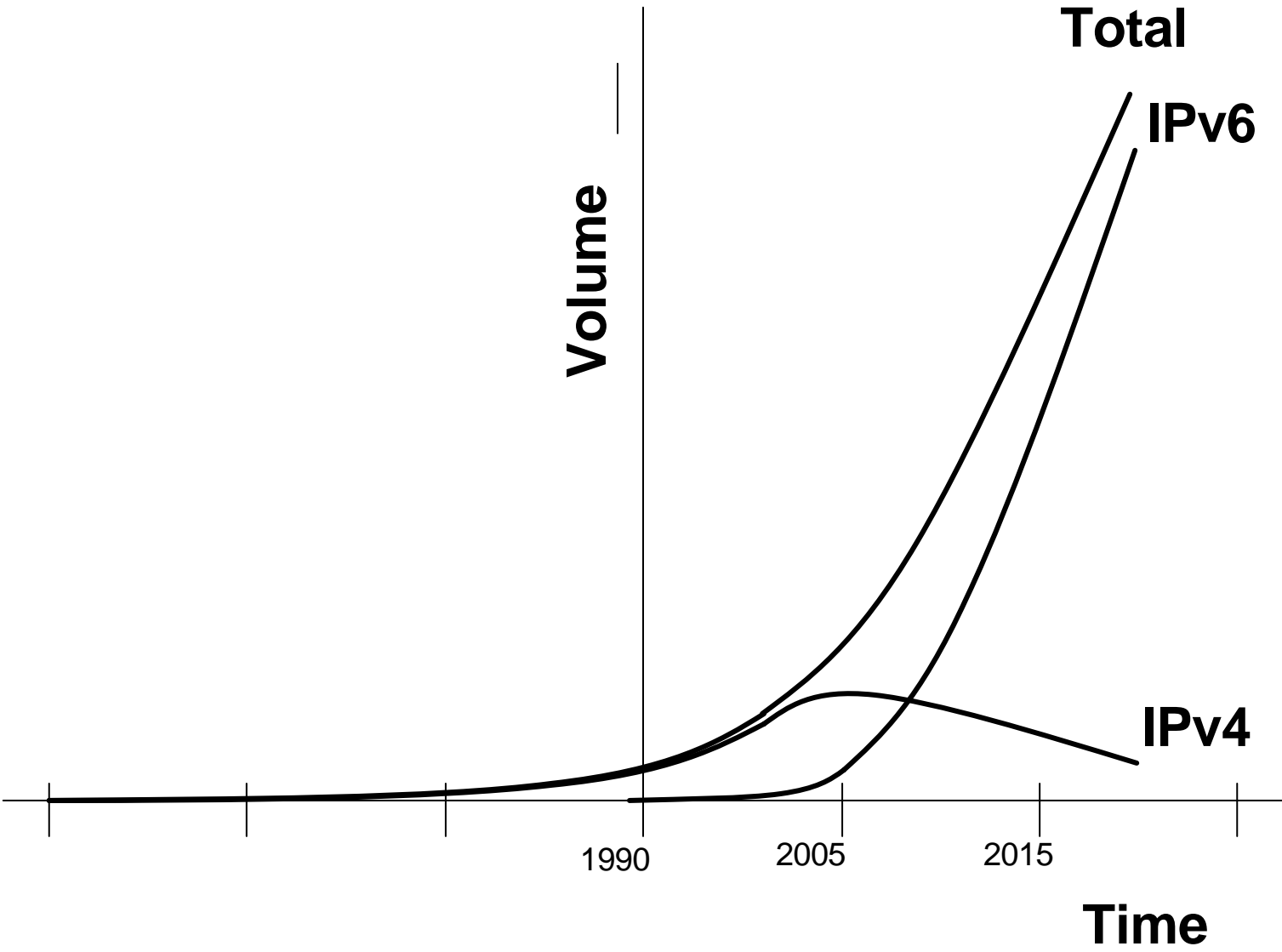
40 octets, 8 fields
+ Unlimited Chained Extension (options) Header



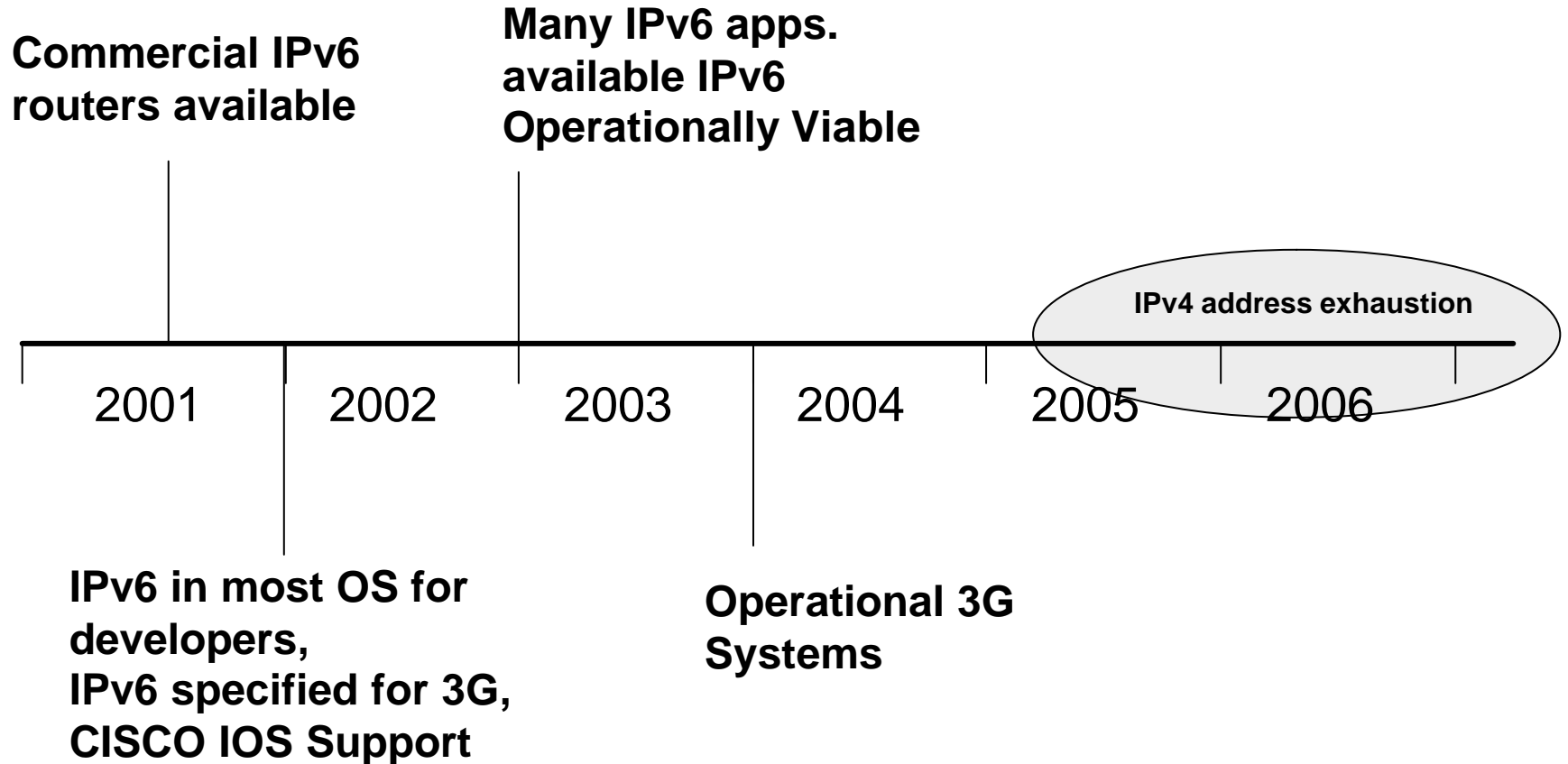
IPv6 Extension Headers



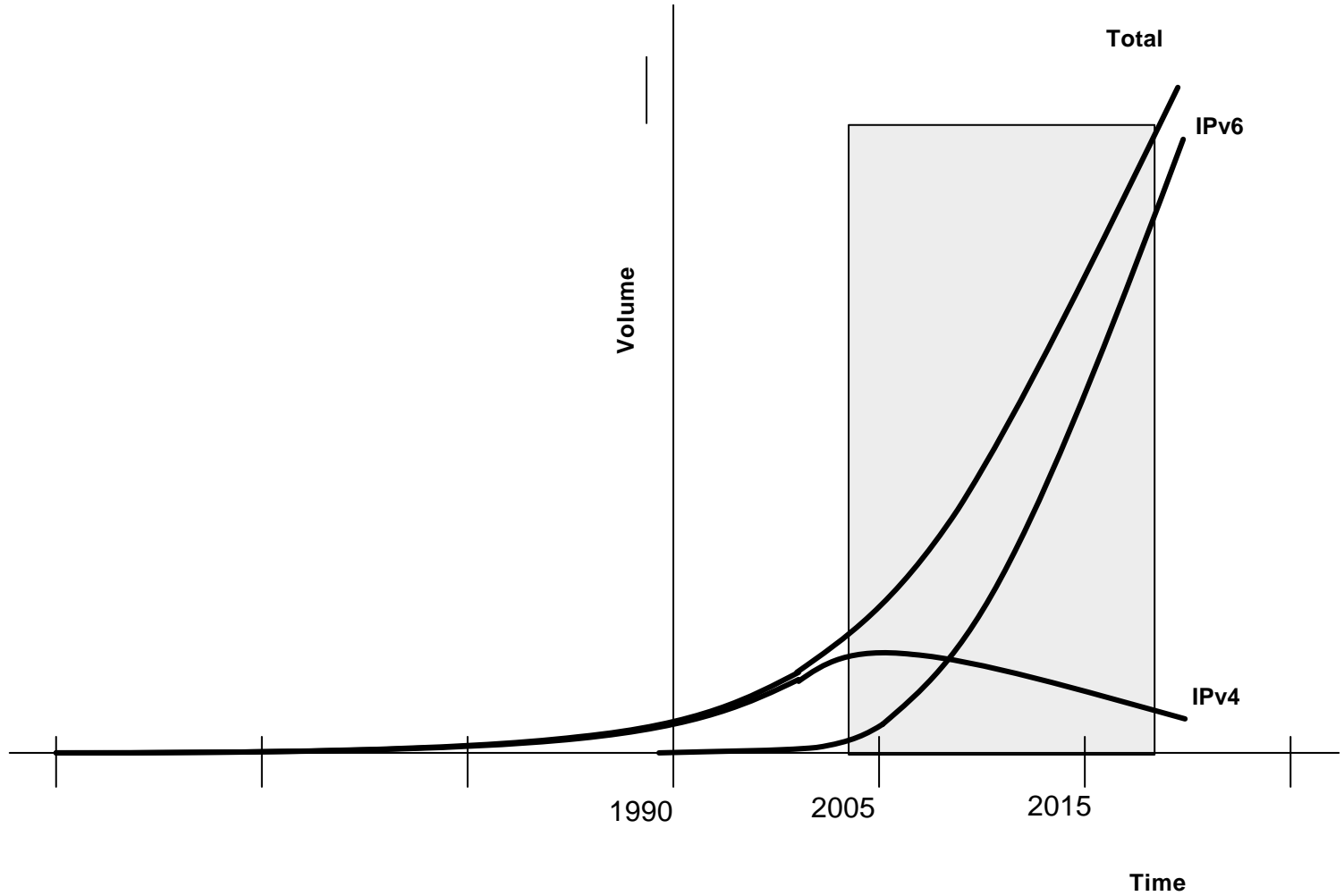
IPv6 Position



IPv6 Timeline



Interworking Required



Australia Status

- 6Bone operations through Trumpet etc. 1996
- UeCOMM deployed IPv6 with Ericsson core in 2000
- Connect.com registered as TLA, begins to allocate IPv6 Addresses - 2001
- NTT announces trial launch 18/9/2002
 - Trial to operate from 1/10/2002 to 30/6/2003



Australia Status

- Hitachi 1st vendor to offer IPv6 Router in Oz

- IPv6 Web Sites -[http_{v6}](http://v6)

(not Web sites about IPv6):

- <http://shag.ipv6.bl.echidna.id.au/>
 - Experimental private IPv6 Router
- <http://www.sharks.org.au/>
 - Ice Hockey Club web page
- <http://vortex.ipv6.intercode.com.au/>
 - This site has some links to other sites and a traceroute server
- IPv6 in most OS now
 - CISCO IOS, WindowsXP, FreeBSD, Linux, MACOS, PS2 etc.
- Telstra is offering an IPv6 Experimental exchange [TID]:
 - <http://vee-six.telstra.net>
- AARnet offering IPv6 Interexchange service at:
 - <http://>



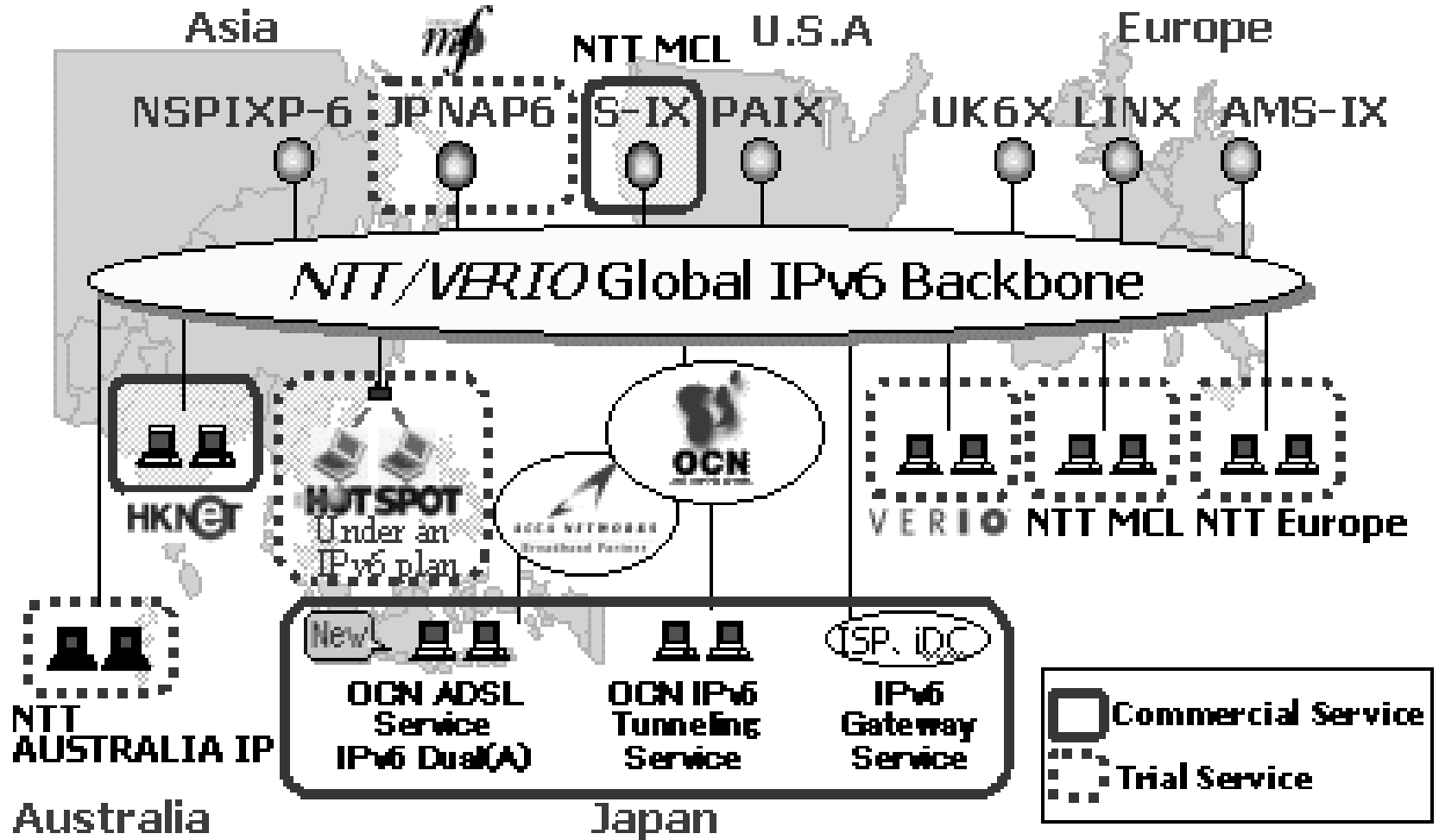
IPv6 through AARnet



- Initially tunneling IPv6 into an AARnet router and tunneling on to IPv6 researchers networks. In time this will move to native IPv6 routing.
- Overseas feed - peering with Abilene (noc@abilene.iu.edu, AS11537 and the Internet2 IPv6 working groups pages) and APAN-JP (AS7660) and Euro6IX (Jordi Palet info@euro6ix.net).
- Australian backbone - tunneled through the AARnet "lattice" boxes (Dell PCs running RedHat linux).



NTT in Australia




Source: http://www.v6.ntt.net/globe/index_e.html

IPv6 Going Mainstream?





NAMESERVER DETAILS

Delegation is not required, but is available as an extra option for some registrants. If you just want to register your domain and aren't too concerned where it's hosted at the moment, you may safely ignore this for now. You can delegate your domain at a later date.

Do you require delegation?

If so, enter your name servers below

	Hostname	IP Address	IP Version
Primary	<input type="text"/>	<input type="text"/>	IPv4 
Secondary	<input type="text"/>	<input type="text"/>	IPv4 
Tertiary	<input type="text"/>	<input type="text"/>	IPv4   <ul style="list-style-type: none">IPv4IPv6

- Melbourne IT domain registration page now includes nameserver delegation over IPv6



IPv6 Forum Australia

- Part of the *OneWorld IPv6 Forum* that includes, the US, Europe, China, Taiwan, Japan, Malaysia, India and Korea
- Launched at the IPv6 miniconf on January 12, 2004 at the Linux2004 Conference, Uni of Adelaide.

Email info@ipv6forum.org.au for information

- Education
- Case Studies and Implementation Self Help
- Promote IPv6 Ready to Australian hardware and software developers
- Facilitation; acting as a clearing house for vendors, carriers, developers and end users
- Removing the barriers to IPv6 adoption, including the identification of any regulatory or government policy impediments



IPv6 Forum Australia/New Zealand



- Call for Participation as Steering Committee/Board of Directors
- Call for General Membership
- Planning for National Roadshow
 - July 12-16, 2004
 - Perth, Brisbane, Sydney, Melbourne
 - July 19-20, 2004
 - Auckland and/or Wellington, TBC



Forum Models - Discussion

- Hierarchical membership, a la SNIA, ACIF, FRF etc:
 - Vendors A\$10,000 p.a. Full Voting Rights
 - Associates A\$1,500 p.a. No Voting Rights
 - End Users A\$150 p.a. No Voting Rights
- Flat Structure:
 - Equal and Individual membership, A\$200 p.a.
- Associated Structure, a la ISOC-AU:
 - Similar administrative arrangement as for the IETF, IANA, IAB etc.
 - All members of ISOC-AU are members of the IPv6 Forum Australia/New Zealand by default. Proposed trial for 12 months while Forum is established.

PROS and CONS ???



Budget Requirements

- Depends on scale of activities
 - Full on Secretariat and funded operations, perhaps A\$100,000 to A\$200,000 p.a.
 - Minimal Operations, voluntary secretariat, perhaps A\$50,000 p.a.
 - Minimal activity, all voluntary, perhaps A\$0 p.a.
- A\$200,000 is achieved by 1000 x \$200 p.a.
Or
- Sponsorship of a similar magnitude.





Contact Information



Chair: Michael Biber

IPv6 Forum Australia/New Zealand

PO Box 542

Burwood NSW 1805 Australia

Ph: +61 2 9706 4335 Fx: +61 2 9475 0673

Mb: 0412 058 808

Em: info@ipv6forum.org.au

W3: <http://www.ipv6forum.au>



Thanks for your attention
Any questions?

Want to join the IPv6 Forum
In Australia/New Zealand?

Register your interest!

Michael Biber

<http://www.asiapacificnetworx.com>

mbiber@apnetworx.com.au

