

Are you ready with IPv6? Final Count Down to IPv4 Exhaustion in 2011

**APTLD Member Meeting
18 Feb 2011**

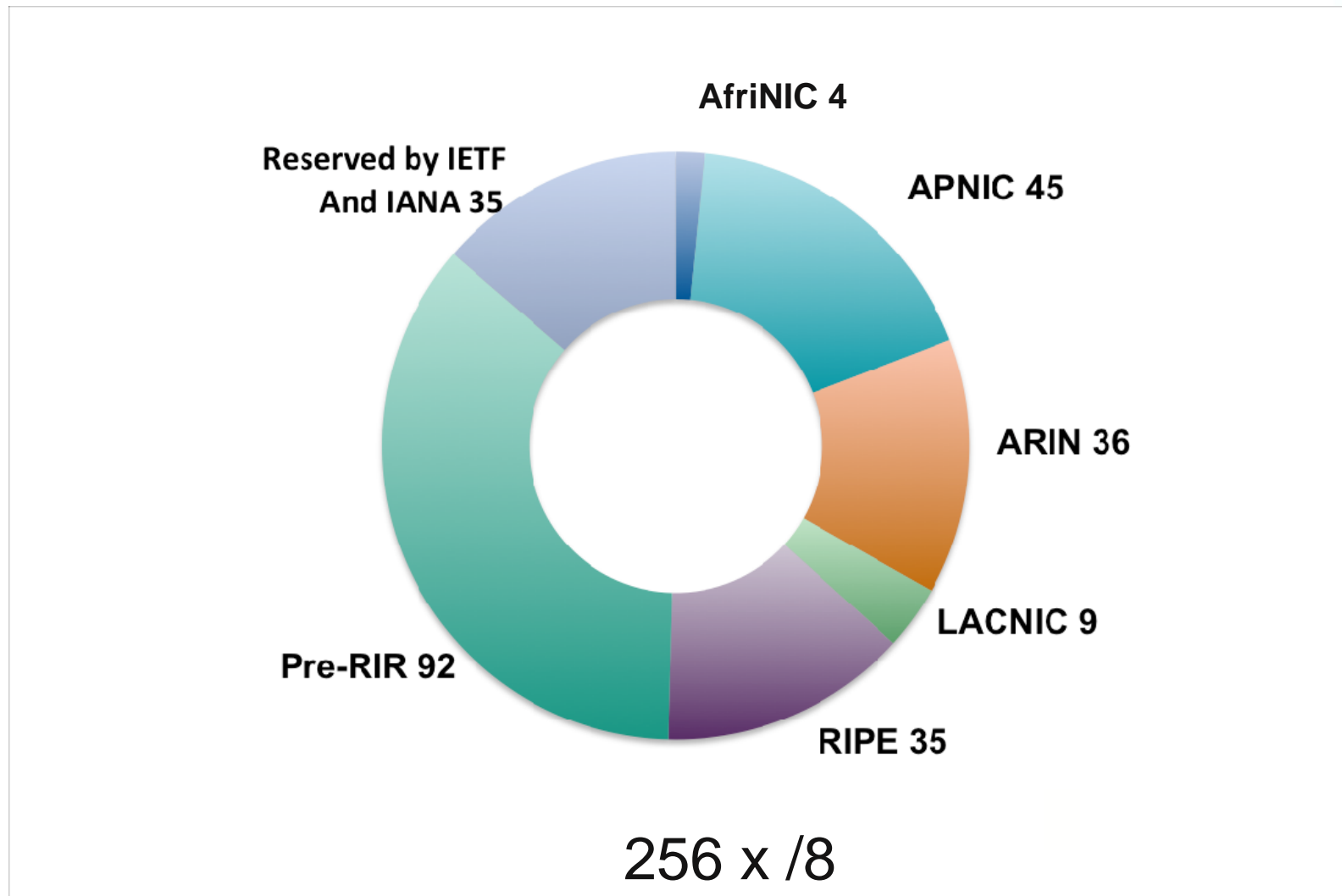
**German Valdez
Communications Director, APNIC**

Overview

- IPv4 address exhaustion
 - Post exhaustion IPv4 address requests
- IPv6
 - Deployment edges
 - General recommendations for IPv6 deployment

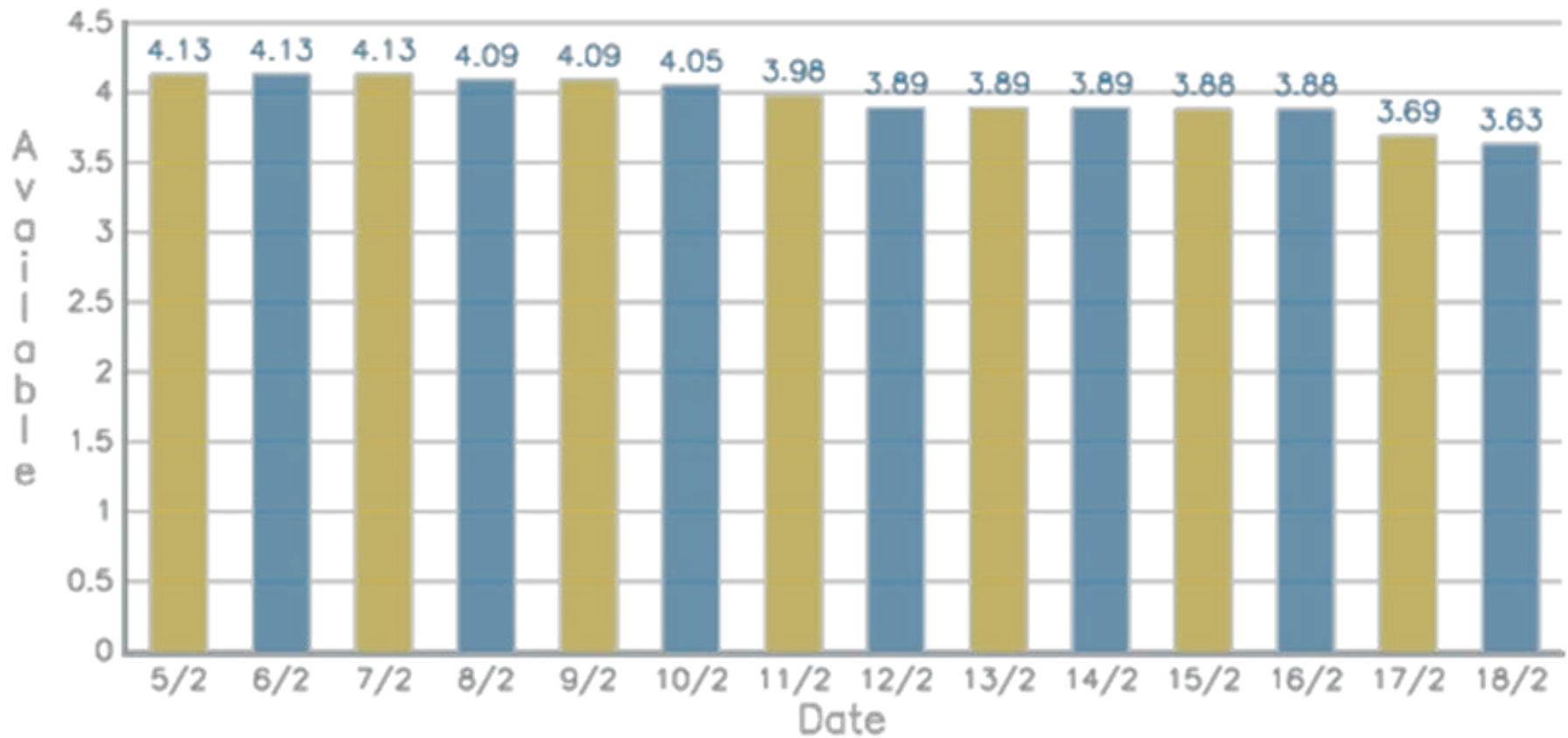
IPv4 address exhaustion: Are we ready?

IPv4 Address Global Distribution



APNIC IPv4 Availability (/8)

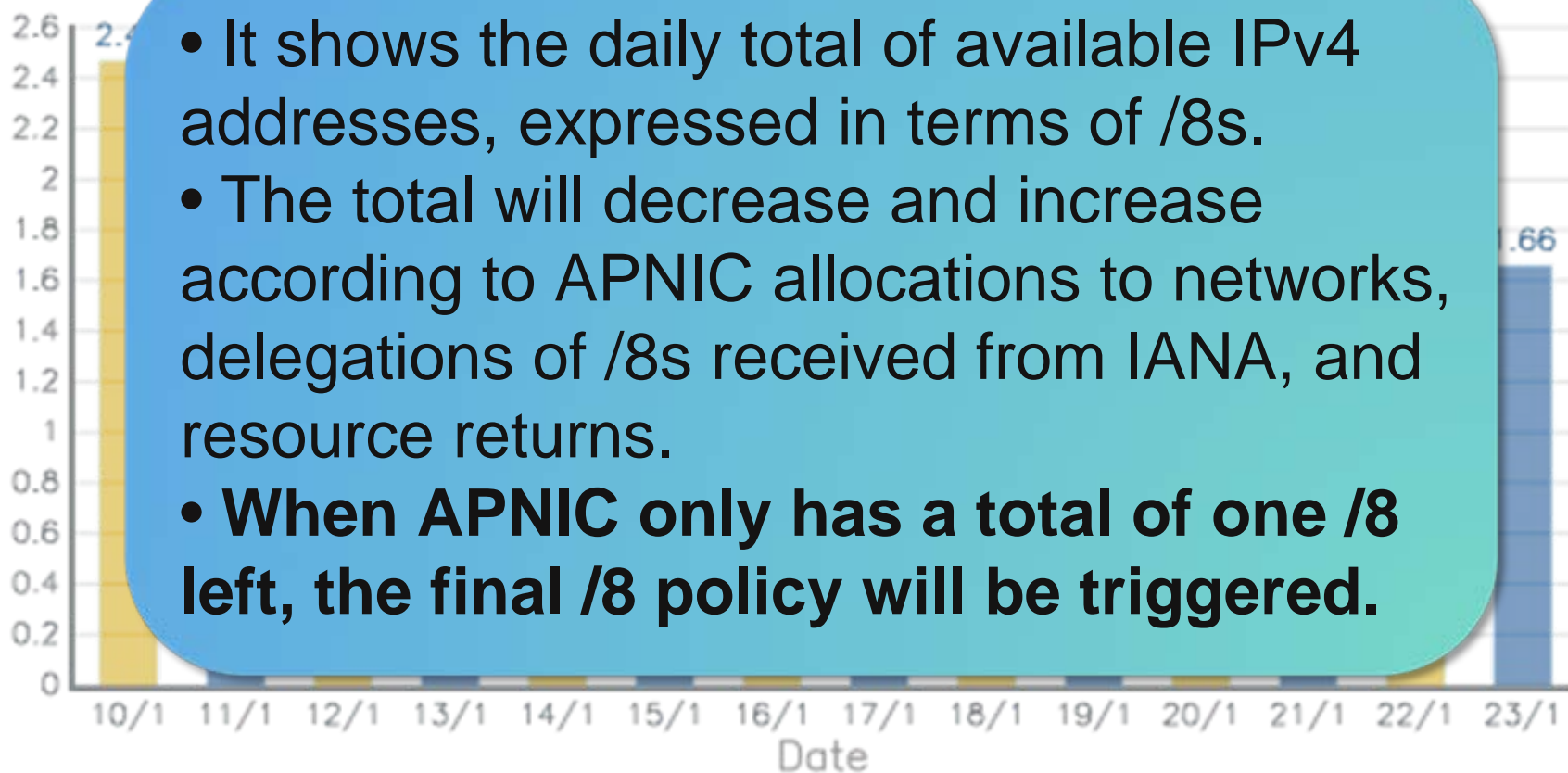
APNIC IPv4 Availability (/8)



<http://www.apnic.net/community/ipv4-exhaustion/graphical-information>

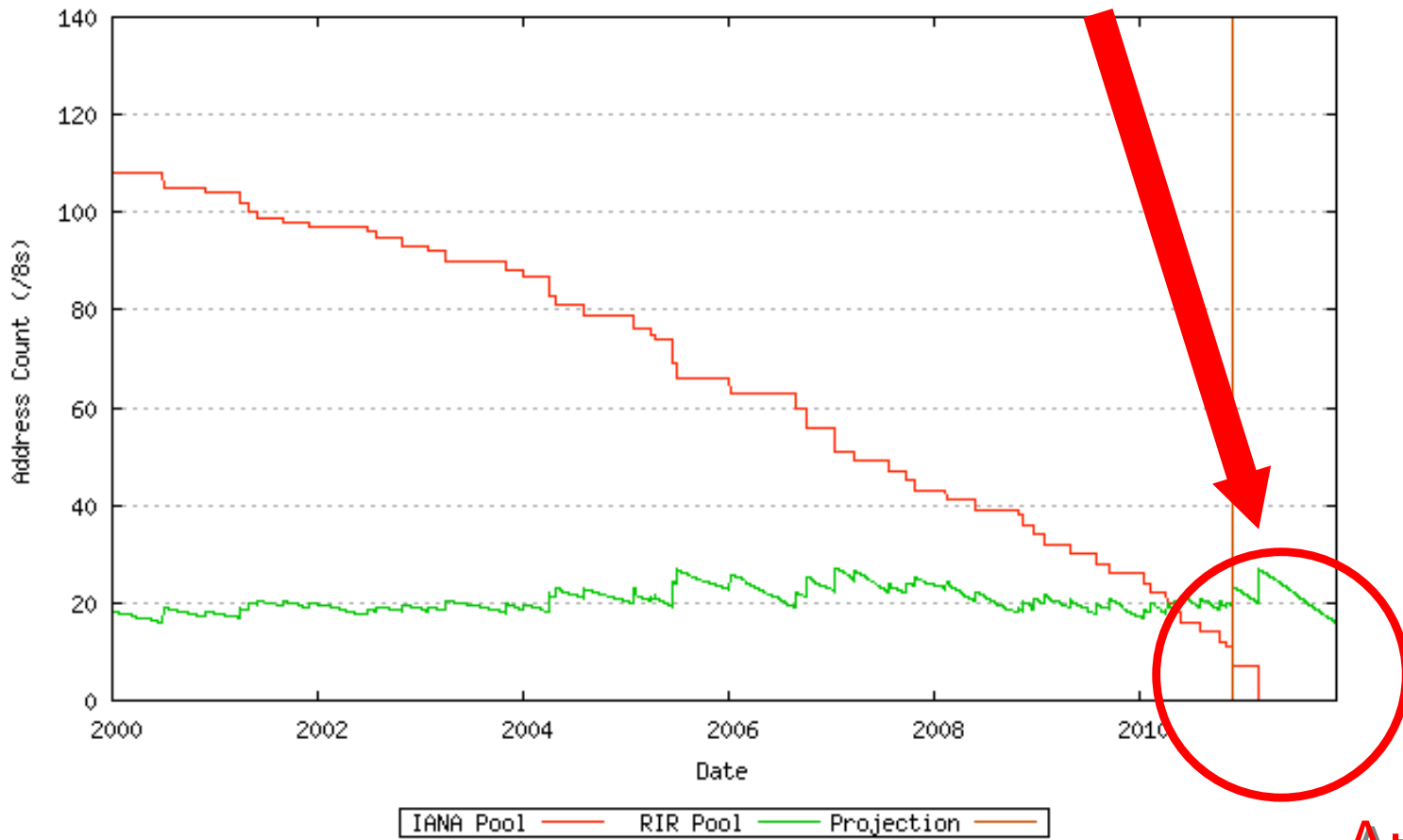
APNIC IPv4 Availability (/8)

APNIC IPv4 Availability (/8)



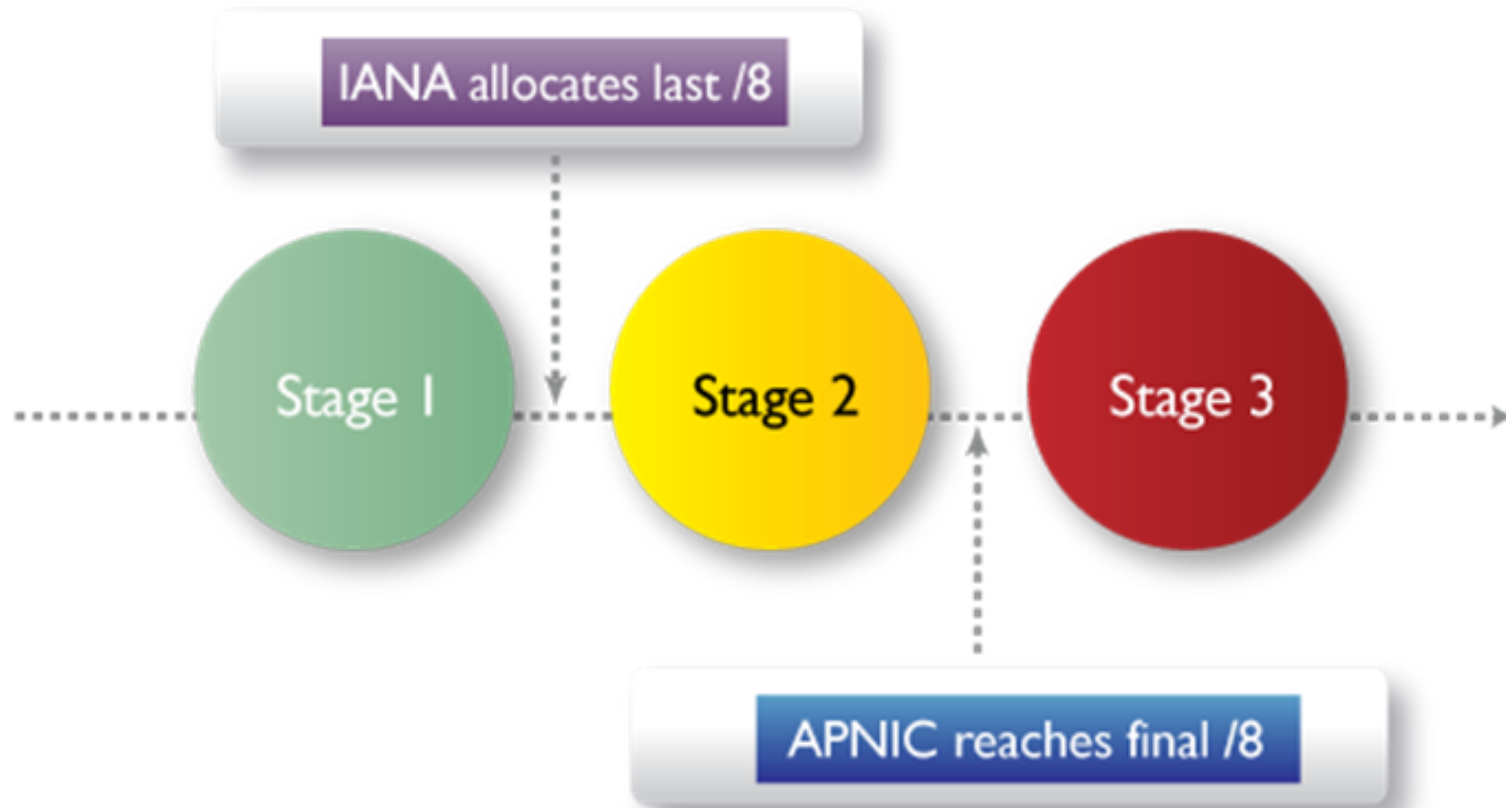
IPv4 Consumption: Projection

- IANA exhaustion: 01/02/2011
- Projected First RIR exhaustion: 11/08/2011



Aug 2011

IPv4 exhaustion planning



Appropriate policies/procedures applied at different stage

Stage 1

- IANA unallocated IPv4 address pool is still available
 - APNIC will continue to follow current policies to distribute IPv4 addresses
 - All allocations will be based on equipment capacity and customer numbers
 - The current minimum practical allocation is a /22 (about 1,000 IP addresses)
 - Current escalation procedure for large requests will continue to apply
 - IANA will reserve last 5 x /8 for RIRs

Stage 2

- Post-IANA exhaustion of IPv4 address pool
 - Effective since 14 Feb 2011
 - **No more IPv4 address allocation is available from IANA to RIRs**
 - One allocation to members may combine multiple prefixes to make up the required allocation size
 - APNIC will keep making allocations/assignments from APNIC's IPv4 address pool until APNIC reaches the "final /8 worth of address".
 - Response to IPv4 requests and correspondence is now set to exactly five (5) business days.
 - Serialization of IPv4 requests.
 - Team evaluation of requests

Stage 3

- APNIC reaches “final /8 worth of address”
 - Projected timing = **Aug 2011**
 - One /8 contains 256 of /16 IPv4 address space
 - One /16 block will be reserved for future uses, as yet unforeseen
 - “Use of final /8” policy
 - Reached consensus in 2008 in the APNIC community
 - Implemented in 2009
 - Each APNIC account holder can request and receive one allocation of the minimum allocation size (current size is /22)

Final /8 worth of address

- It is the time when the total remaining space in the unallocated APNIC IPv4 address pool reaches a **total of one /8**
 - How to interpret “total of one /8”?
 - Community consultation at APNIC30, Aug 2010
 - General support to leave it as an operational decision of APNIC Secretariat
 - “Instead of tweaking the policy in minute details, let’s move on to IPv6”

When will APNIC's IPv4 pool be exhausted?

- APNIC IPv4 address management policy
 - **9.10 Distribution of the final /8 worth of space in the unallocated APNIC IPv4 address pool**
 - <http://www.apnic.net/policy/add-manage-policy#9.10>
 - A total of around 16,000 small slices that can be given out from this final /8.
 - Currently, APNIC has around 3000 account holders.
 - A membership growth rate of 300 new accounts during the past year.
 - Given these variables, it will take a number of years to allocate all addresses from this final /8.
- And of course, IPv6 is available!

IPv6 Deployment Edges

Comcast

<http://www.comcast6.net/>

comcast.net IPv6 Information Center

Your IP address is 2001:dc0:a000:4:21f:f3ff:fed5:8a54

Comcast IPv6 Trials Have Started

This site is intended to provide the latest information about Comcast's IPv6-related work. We are conducting several IPv6 technical trials in our production network, with customers, in order to prepare for the IPv6 transition. This site will be updated as new information about these trials comes out, and as other IPv6-related work occurs.

IPv6 Trial News and Information:

Comcast's 6RD Trial Has Started Wednesday, June 30, 2010

We are pleased to announce that today, Wednesday June 30th, 2010, Comcast activated our first residential 6RD trial customer, who was located in Cambridge, MA.

In the coming weeks we expect to add several hundred trial customers in a wide range of locations in our network, since the 6RD trial is not geographically limited. 6RD trial customers can use their existing computers and cable modems, which may not support IPv6 directly. However, their home gateway devices have been upgraded to one of two different trial devices which support [6RD](#), enabling IPv6 packets to be encapsulated within IPv4 packets. The encapsulated packets are then sent to a 6RD Border Relay in the Comcast network which in turn forwards the traffic to the Internet over native IPv6.

Comcast's First Native Dual-Stack Customer Activated! Thursday, May 13, 2010

IPv6 Presentations & Articles

[ISOC IPv6 Workshop: DNS Whitelisting Concerns](#)

[ISOC IPv6 Workshop: All Presentations](#)

[IETF 77: ISOC IPv6 Momentum Panel](#)

[NANOG 47: IPv6 Emerging Stories of Success](#)

[NANOG 46: IPv6 and Cable](#)

[NANOG 46: DHCPv6 on DOCSIS](#)

[Communications Technology: Hitchhiker's Guide to IPv6 - Prepare, Don't Panic](#)

[Communications Technology: Change of Address: IPv6 - Its Looming Impact on Cable](#)

[IPv6 Implementors Mtg.: IPv6 Broadband and Cable](#)

[IPv6 Business Information Exchange: IPv6 Deployment Experiences](#)

IPv6 Tutorials

[ISOC: IPv6 Educational Materials](#)

[ARIN: IPv6 Wiki](#)

[Wikipedia: IPv6 Wiki](#)

[Understanding DS-Lite](#)

[Understanding CGN/LSN/AFTR](#)

Comcast

<http://www.comcast6.net/>

comcast.net IPv6 Information Center

Your IP address is 2001:dc0:a000:4:21f:f3ff:fed5:8a54

May 2010

- First native dual-stack customer activated
- Comcast Business Class services

June 2010

- Activated their first residential 6RD trial customer located in Cambridge, MA, USA

network, since the 6RD trial is not geographically limited. 6RD trial customers can use their existing computers and cable modems, which may not support IPv6 directly. However, their home gateway devices have been upgraded to one of two different trial devices which support [6RD](#), enabling IPv6 packets to be encapsulated within IPv4 packets. The encapsulated packets are then sent to a 6RD Border Relay in the Comcast network which in turn forwards the traffic to the Internet over native IPv6.

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[Deployment Experiences](#)

IPv6 Tutorials

[ISOC: IPv6 Educational Materials](#)

[ARIN: IPv6 Wiki](#)

[Wikipedia: IPv6 Wiki](#)

[Understanding DS-Lite](#)

[Understanding CGN/LSN/AFTR](#)

sify.com

http://www.sify.com/

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You are on IPv6 address. 2001:dc0:a000:4:21f:3ff:fed5:8a54

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Delhi	Rs. 18750.00	Rs. 29050.00	Euro	58.57			

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Bollywood events
 From Sonam Kapoor at the launch of the *Aisha* soundtrack to Mandira Bedi's play.
In pictures

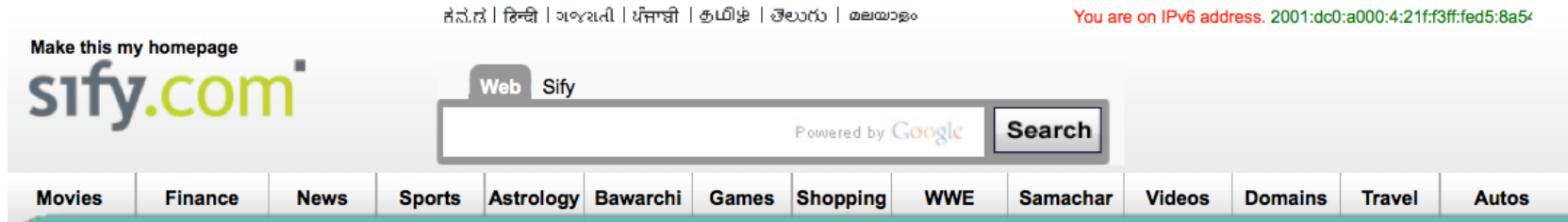
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Holiday Packages

Hotels in Goa	- Rs 510
Hotels in Tirupati	- Rs 577
Hotels in Udaipur	- Rs 664

sify.com

http://www.sify.com/

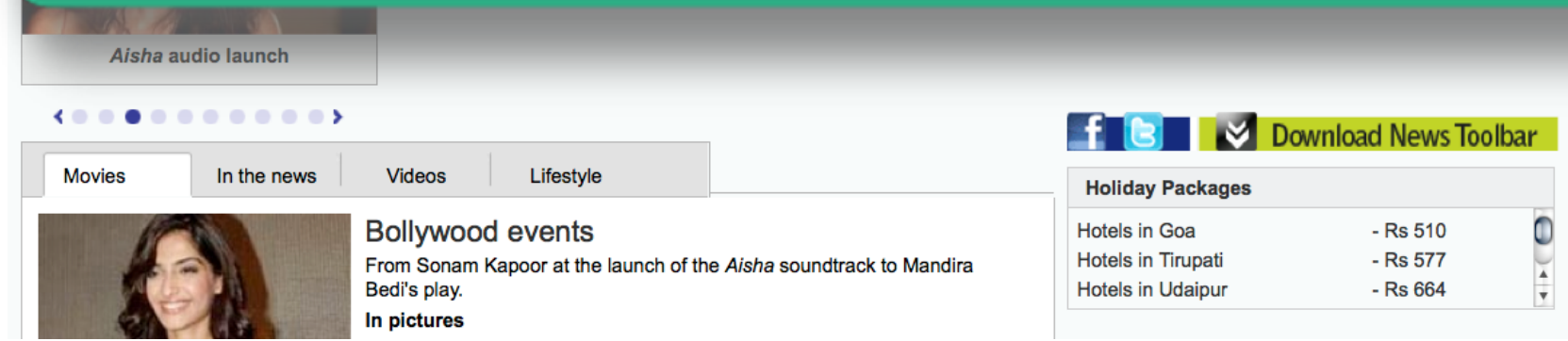


2005

- sify has a dual-stack network that supports commercial services on IPv6 transport for its enterprise customers

http://sify.com

- A dual-stack commercial portal



D-NET

<http://www.dnet.net.id/>

D-NET
Internet Service Provider

IPv6 Ready

Your IP is 2001:dc0:a000:4:21f:f3ff:fed5:8a54
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Block

Excellence

in Information Technology, Solution and Service

D-NET PRODUCTS

- Wireless Broadband
- Fiber Optic
- Data Center
- Ready Port
- IT Solution
- Value Added Services
- Managed Service
- Coverage Area

xirka

D-NET

<http://www.dnet.net.id/>

D-NET
Internet Service Provider



Your IP is 2001:dc0:a000:4:21f:f3ff:fed5:8a54

2006

- Implemented IPv6 based on the business decision made by Board of Director
- Future proof to cope with IPv4 address exhaustion and to maintain sustainable growth

D-NET PRODUCTS



Wireless
Broadband



Fiber Optic



Data Center



Ready Port



IT Solution



Value Added
Services



Managed
Service



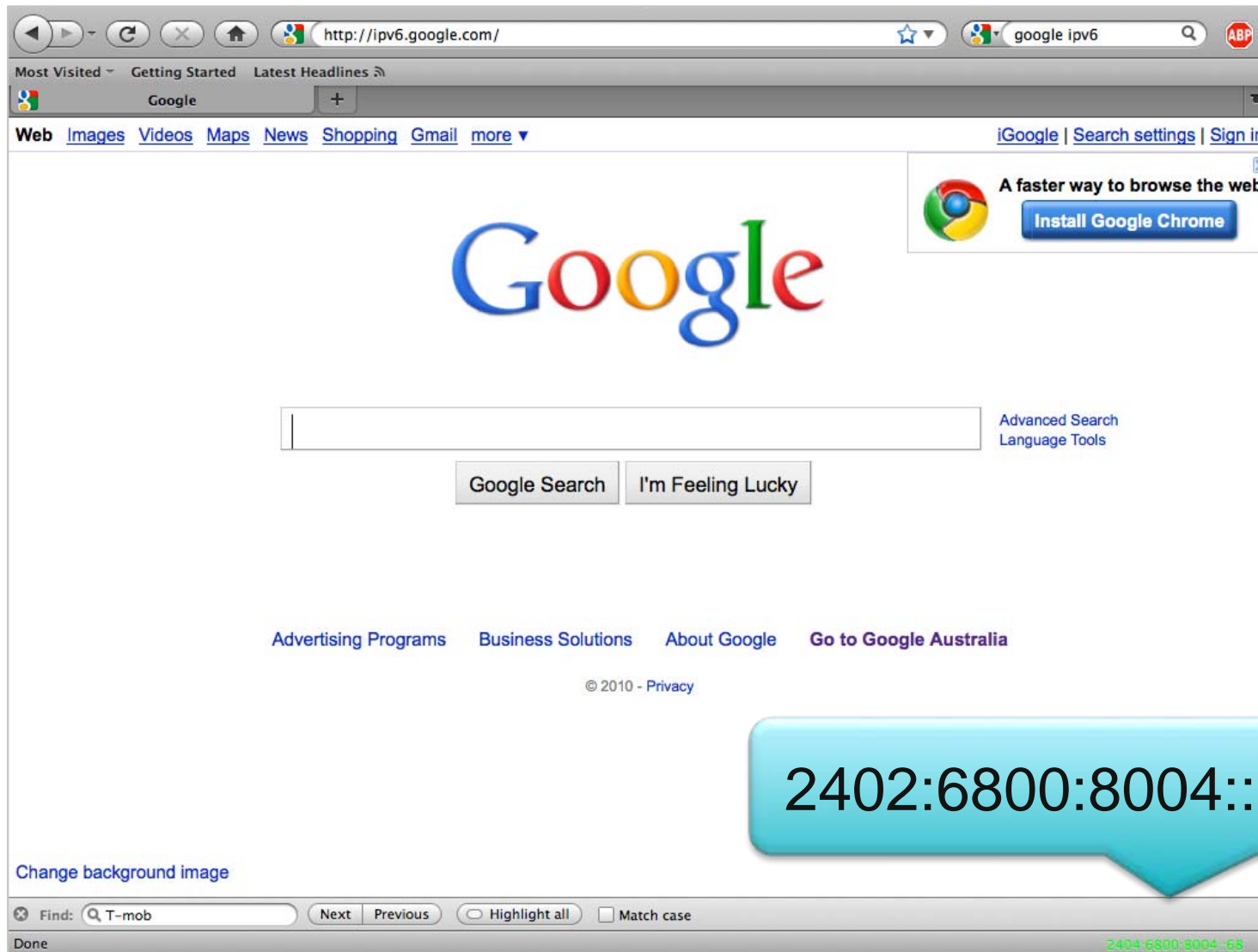
Coverage
Area

xirka



Google

http://ipv6.google.com/

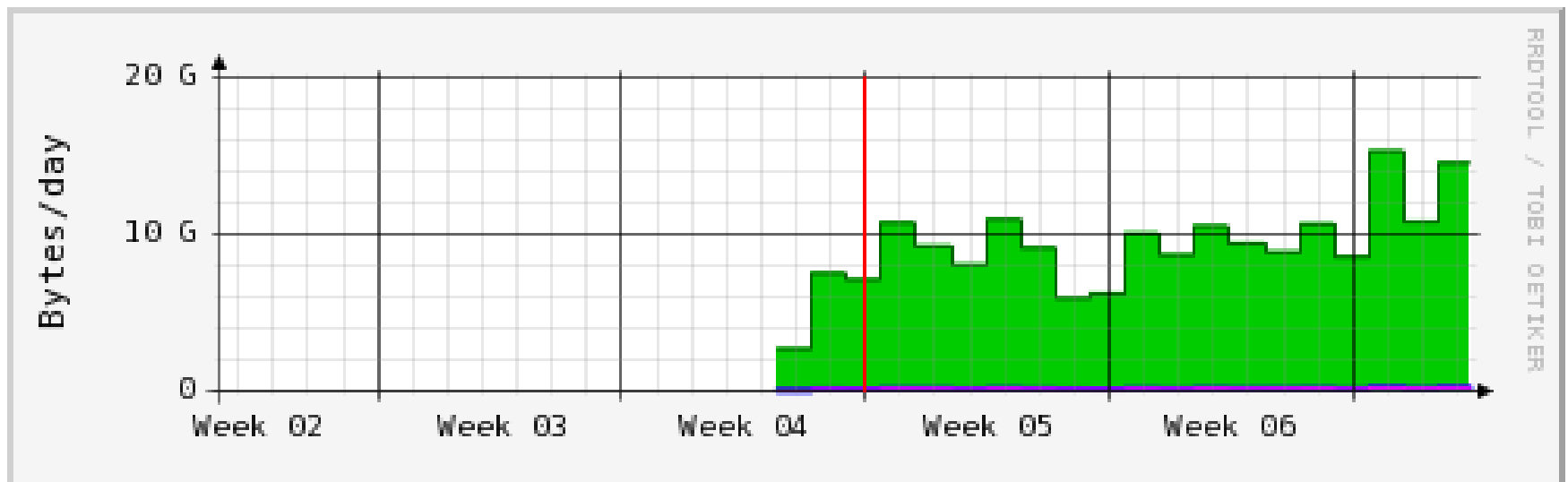


IPv6 Traffic

“Google has quietly turned on IPv6 support for its YouTube video streaming Web site, sending a spike of IPv6 traffic across the Internet...”

– 1 Feb 2010 Networkworld

- Monash University, Melbourne, Australia:



Facebook

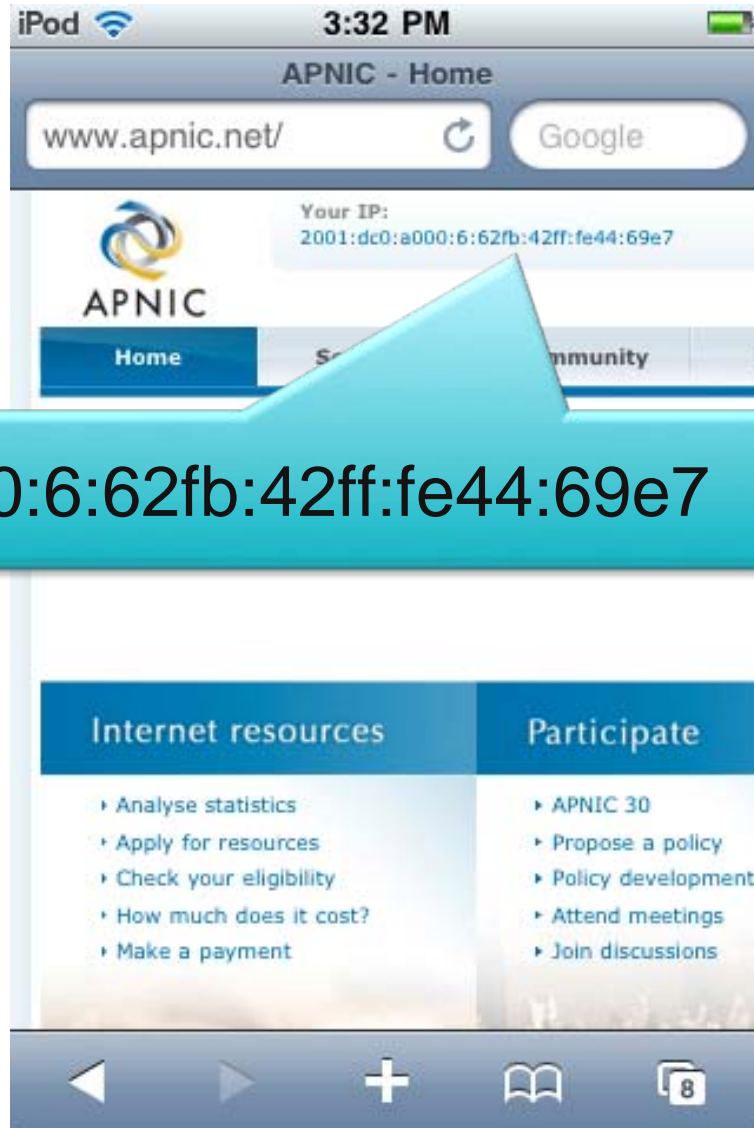
http://www.v6.facebook.com/

Experimental,
non-production

The screenshot shows the Facebook v6 experimental interface. At the top, there is a navigation bar with the Facebook logo and a search bar. Below this, there are login fields for Email and Password, a 'Login' button, and a 'Keep me logged in' checkbox. A green callout box is overlaid on the login fields with the text 'Experimental, non-production'. The main content area features the Facebook logo and the text 'Facebook helps you connect and share with the people in your life.' Below this is a world map with orange person icons connected by dashed lines. To the right of the map is a 'Sign Up' section with the text 'It's free and anyone can join'. The sign-up form includes fields for First Name, Last Name, Your Email, and New Password. It also has dropdown menus for 'I am:' (with a 'Select Sex:' label), 'Birthday:' (with 'Month:', 'Day:', and 'Year:' dropdowns), and a 'Sign Up' button. Below the sign-up form, there is a link to 'Create a Page for a celebrity, band or business.' At the bottom of the page, there is a footer with language options (English (US), Español, Português (Brasil), Français (France), Deutsch, Italiano, العربية, हिन्दी, 中文) and a copyright notice 'Facebook © 2010'. A search bar at the bottom left contains the text 'face' and has buttons for 'Next', 'Previous', 'Highlight all', and 'Match case'. A blue callout box at the bottom right of the screenshot contains the IPv6 address '2620:0:1cfe:face:b00c::3'. The browser's address bar at the top shows 'http://www.v6.facebook.com/' and the search bar contains 'google ipv6'. The browser's status bar at the bottom right shows the IPv6 address '2620:0:1cfe:face:b00c::3'.

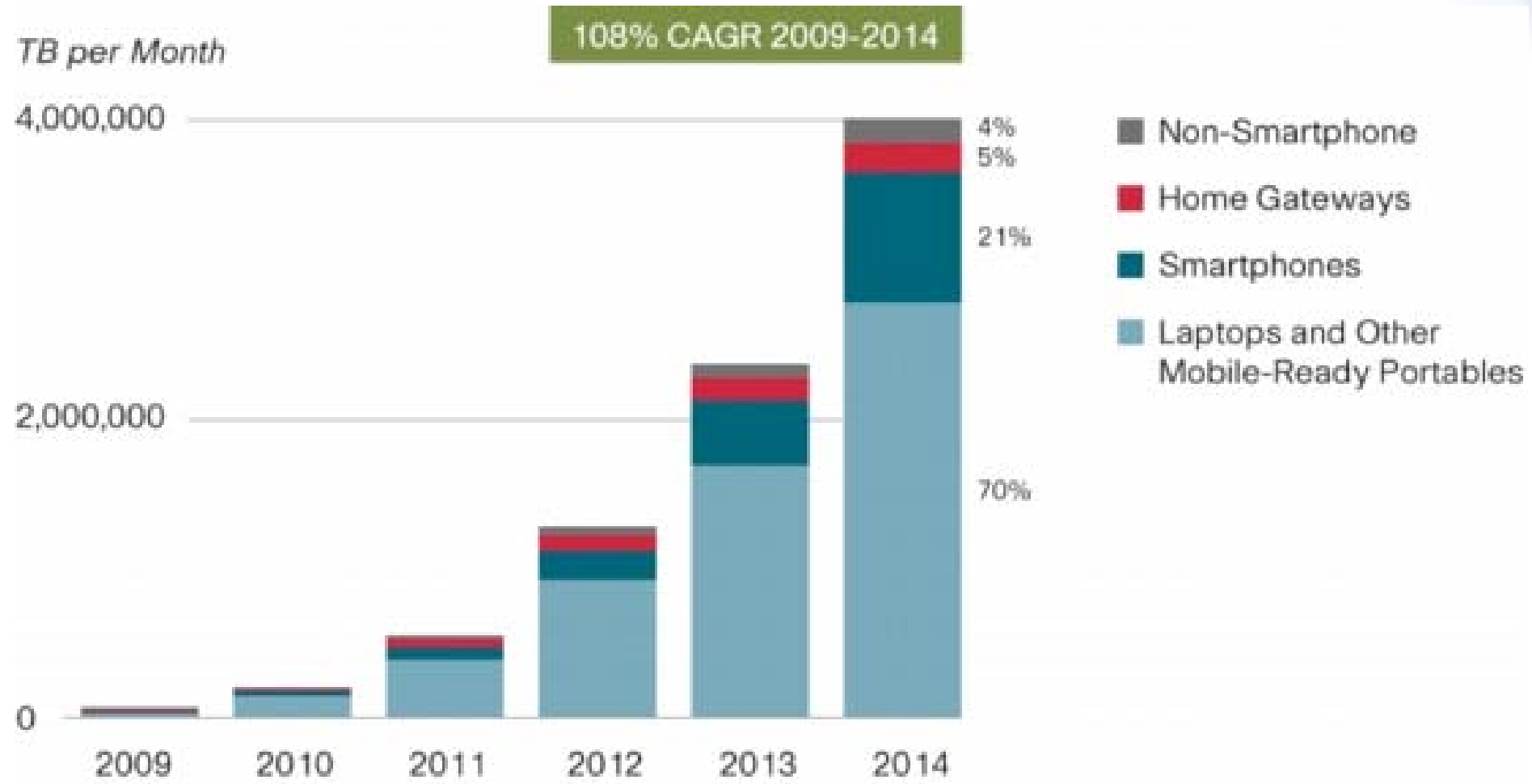
2620:0:1cfe:face:b00c::3

iOS 4



2001:dc0:a000:6:62fb:42ff:fe44:69e7

Laptops and Smartphones Drive Traffic Growth



Source: Cisco VNI Mobile, 2010

General recommendations for IPv6 deployment

Preparing for IPv6 Transition

Overall planning

1. Review the impact of IPv4 address exhaustion
 - Inventory of your IT assets
2. Develop an IPv6 deployment plan
 - Strategy, scope of the deployment, schedule, auditing of execution of the plan
 - How to manage coexistence of IPv4 and IPv6
 - Where to start to deploying IPv6?
 - What transition techniques to be employed?
 - Staff training
3. Budget readiness

Preparing for IPv6 transition

- Technical management
 - Assess the possibility of IPv4 and IPv6 co-existence with desired technology
 - There are quite a few transition technologies available
 - Assess security implication of IPv6
 - Any new technology comes with new security threats and vulnerabilities
- Human capacity development
 - Develop a plan to acquire skills to implement IPv6
 - Implement a test networks with IPv6

IPv6 Transition Conference: Final Count Down to IPv4 Exhaustion in 2011

- 22nd Feb 2011 (Tue)
 - A full day conference in HK
 - As a part of APRICOT/APAN 2011
 - Timely topics with relevant speakers
 - Keynote presentations
 - Panel discussion 1:
 - Sharing IPv6 deployment experiences
 - Panel discussion 2:
 - Supporting IPv6 deployment through a multi-stakeholder approach
 - Panel discussion 3:
 - IPv6 deployment economics

***IPv6:
A prerequisite to the
sustainable long-term
development of a ubiquitous
and open Internet***

Thank you!

`<german@apnic.net>`