

3 Weeks of IPv6 Glue for the Root Servers

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- The World Changed (Slightly)
 - `ftp://ftp.internic.net/domain/named.root` contains AAAA resource records!
 - IPv6-only service now (slightly) easier!
- The World Didn't End
 - In fact, not a lot changed

It Made The News!

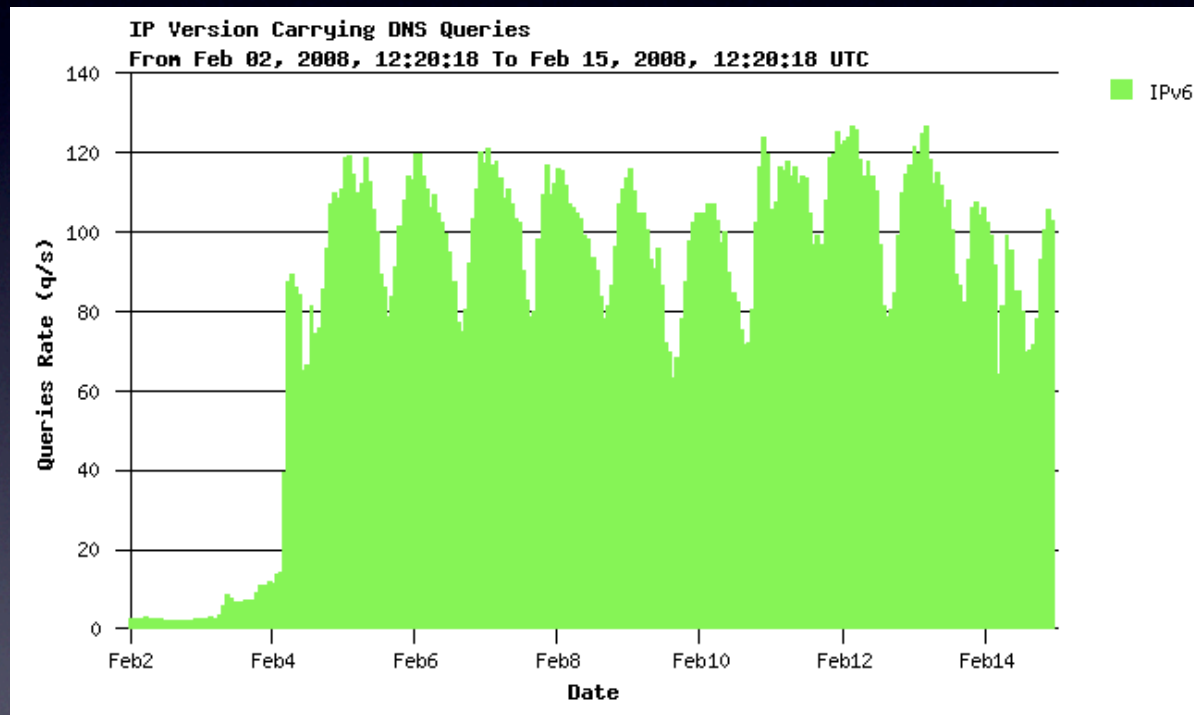
The screenshot shows a news website with the following elements:

- Navigation:** Home, News, Sport, Radio, TV, Weather, Languages.
- Header:** www.technewsreview.com.au, TECH NEWS REVIEW, The best of techn...
- DomainNews.com:** Logo and text: DomainNews.com, Domain Name Industry News.
- Start your DOMAIN:** A red box with white text.
- InformationWeek:** Logo and text: InformationWeek, DEFINING THE BUSINESS VALUE OF TECHNOLOGY.
- What Readers Are Talking About:** Outsourcing Honch Trouble, How To Blow Up Satellite.
- Navigation:** NEWS, BLOGS, WINDOWS, SECURITY, MOBILITY, INTERNET, SOFTWARE, HA.
- CAREERS:** News Center • Blog • Columns • Product Reviews • Current Print Issue • Read All Stories • All.
- Article Title:** Switch To IPv6 On Internet's Root Servers Begins.
- Article Summary:** The current version -- IPv4, which can accommodate 4.3 billion addresses -- would have run out of addresses by 2012, experts predict.
- Author:** By Antone Gonsalves, InformationWeek.
- Date:** February 4, 2008 06:17 PM.
- Article Content:** The switch to a new Internet address format has begun, as Web overseers look to provide a pool of virtually unlimited addresses to support the growing number of Internet-connected devices.
- Interactions:** E-Mail, Print, Discuss, Write To Editor, Digg, Slashdot, News Stories.

Sequence of Events

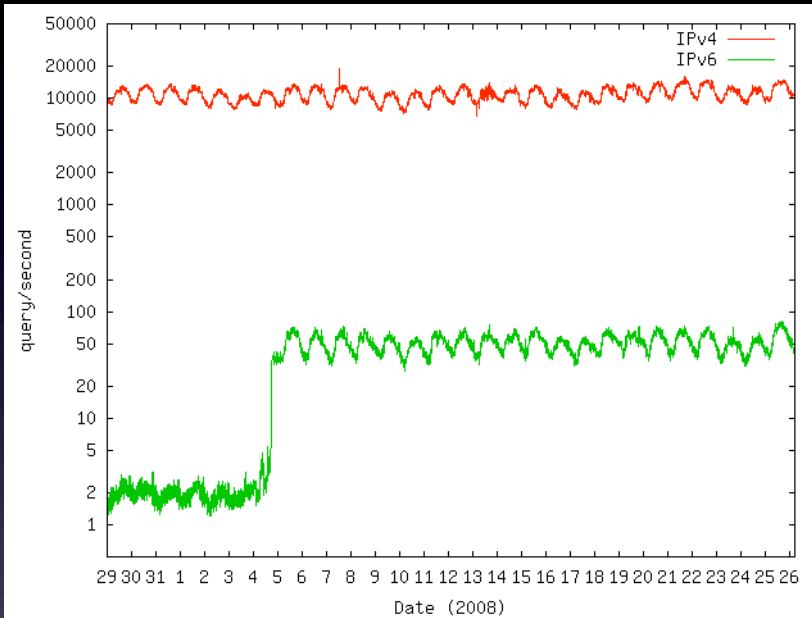
Date	Event
Dec 2000	First discussions in RSSAC on adding IPv6 to root servers.
Jul 2003	First requests from root server operators (“B” and “F”) to add AAAA RRs.
Aug 2003	First IANA request for input from RSSAC on actions to take to add AAAAs for the root servers.
Mar 2005	IANA closes existing requests, requesting root operators resubmit when actions IANA should take are clarified.
Mar 2007	RSSAC/SSAC publish SAC-018, “Accommodating IP Version 6 Resource Records for the Root of the DNS”.
Apr 2007	Requests for IPv6 glue from B, F, H, K, and M (B subsequently rescinded).
Dec 2007	Board instructs ICANN staff to implement IPv6 glue for the roots.
Jan 2008	Requests for IPv6 glue from A and J.
Feb 2008	IPv6 AAAAs added for A, F, H, J, K, M.

So What Happened? (at k.root-servers.net)

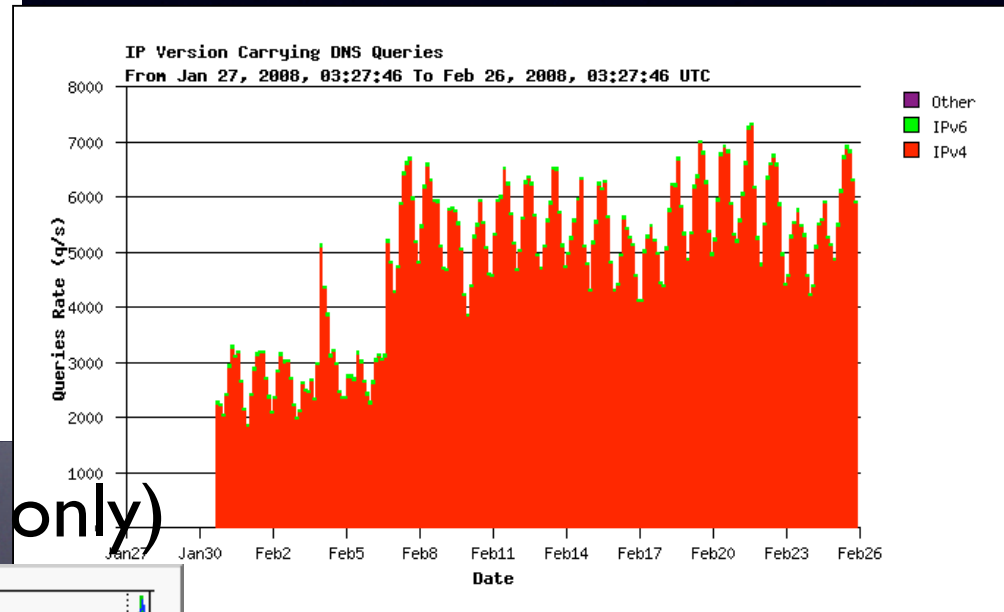


Other Root Servers

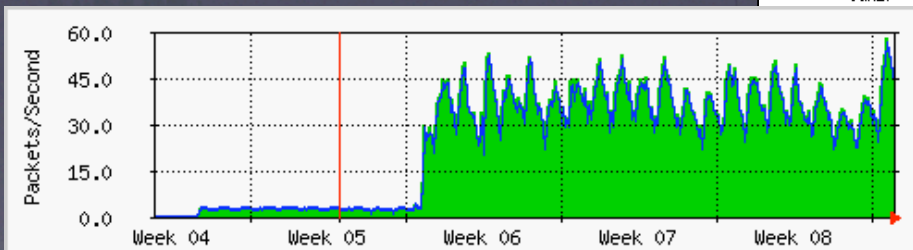
m.root-servers.net



f.root-servers.net

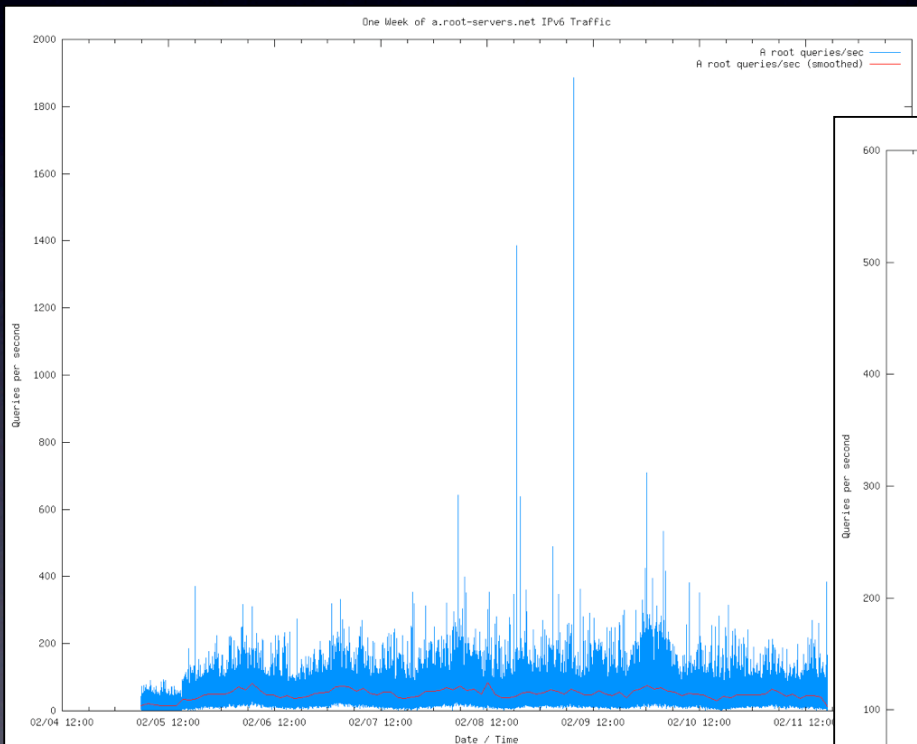


h.root-servers.net (v6 only)

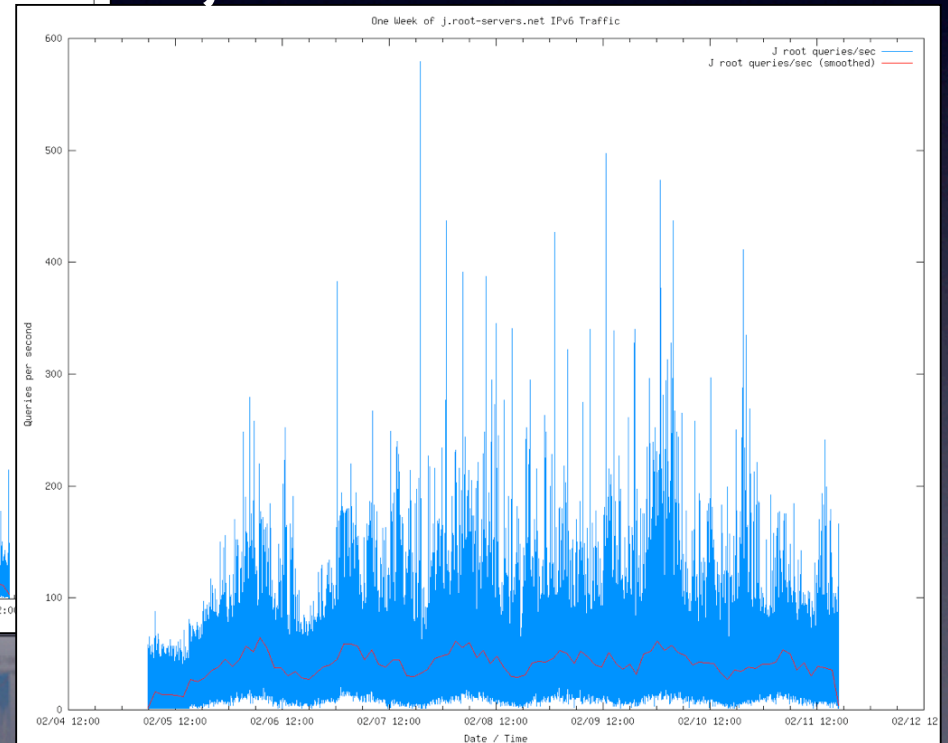


Yet More Root Servers

a.root-servers.net



j.root-servers.net

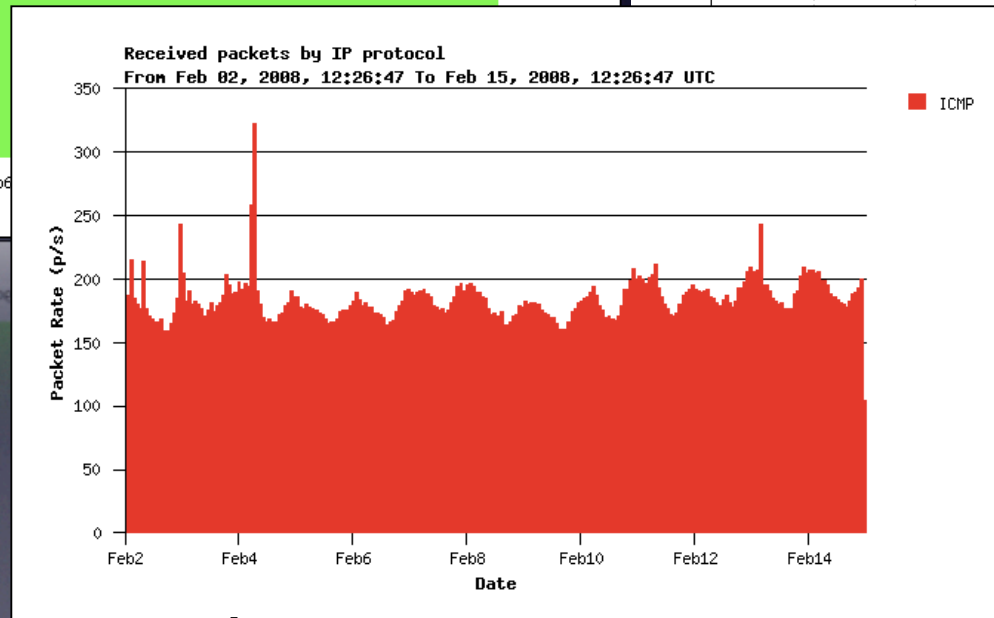
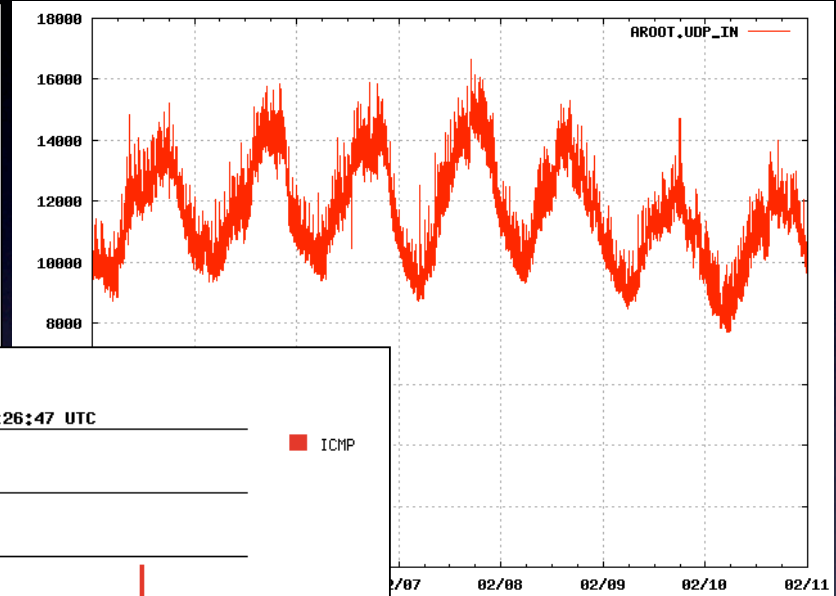
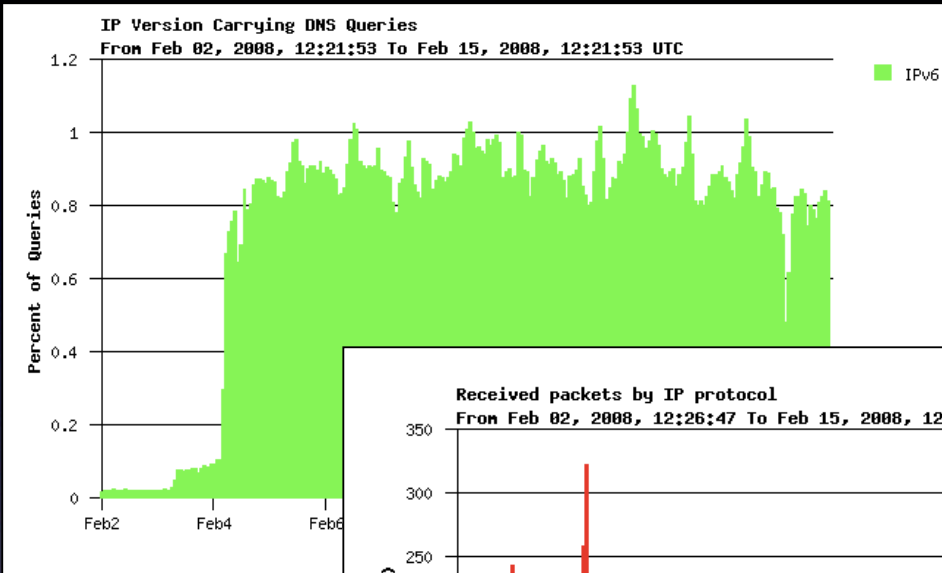


APRICOT 2008 - Taipei, Taiwan - 27 Feb 2008

Some Context

k.root-servers.net

a.root-servers.net



k.root-servers.net

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Concerns vs. Reality

Concern	Reality
Increase in load	No significant change
Queries for missing glue	No significant change
Queries using TCP	No significant change
Doom, disaster, despair	Not because of IPv6

Future

- It is likely more root server operators will request IPv6 addresses for their roots
 - Depends on their IPv6 deployment schedules
 - Root server operators are independent
- Will be treated as a “normal” root server change.

Thanks

- Root server operators
 - VeriSign for (A & J)
 - Internet Systems Consortium (F)
 - US Army Research Labs (H)
 - RIPE-NCC (K)
 - WIDE (M)

More Info

- Daniel Karrenberg's writeup for K
 - <http://www.ripe.net/news/k-root-service-IPv6-glue.html>
- <http://www.root-servers.org/>
- <https://oarc.isc.org/>
- Various statistical graphs
 - H: http://h.root-servers.org/h2_6.html
 - M: <http://m.root-servers.org/>

Questions

