
HURRICANE ELECTRIC
INTERNET SERVICES

# World IPv6 Day at Hurricane Electric

*(Hint: It was a good day!)*


Hurricane Electric
*IPv6 Native Backbone – Massive Peering!*

RIPE63 MAT Working Group

Vienna Austria – 3rd November 2011

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Hurricane Electric

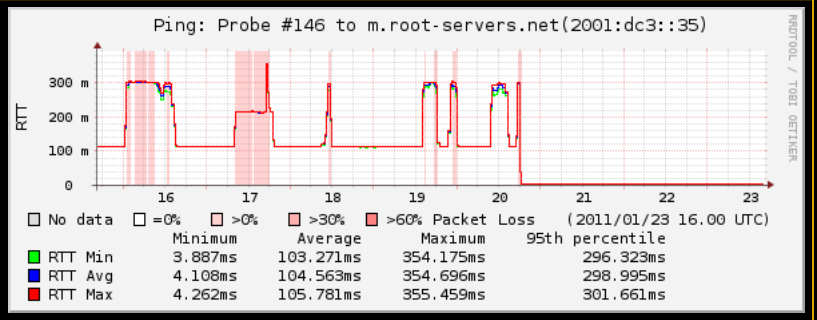

But first … another subject … RIPE Atlas probes

# RIPE Atlas probes at Hurricane Electric

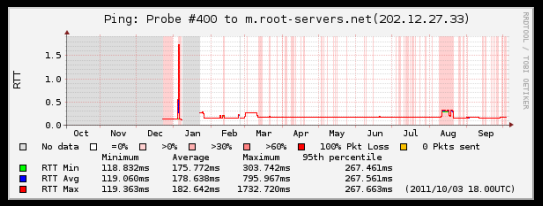
NATIVE IPv6 EVERYWHERE

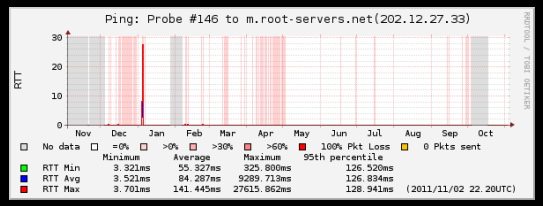
The fix in January:

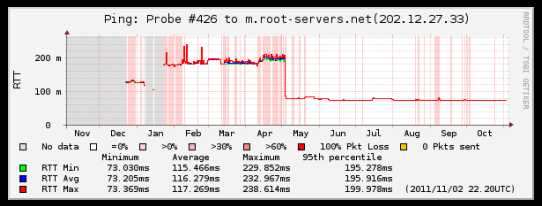
Routing for “M” was wrong and needed a fix



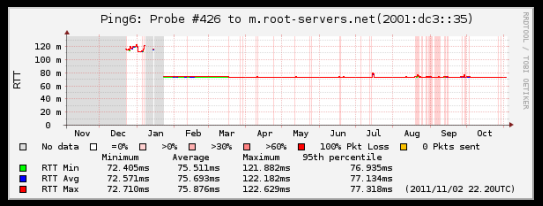

Fixing M root access at our Hong Kong POP

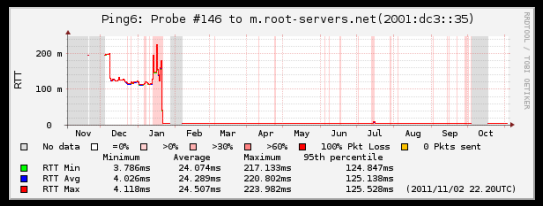


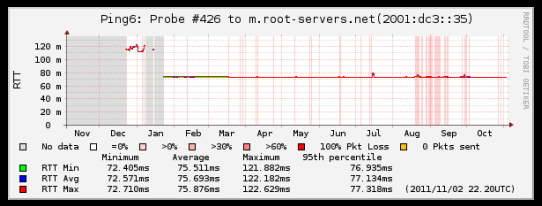




Ping (IPv4) to m.root-servers.net (202.12.27.33)




Ping (IPv6) to m.root-servers.net (2001:dc3::35)

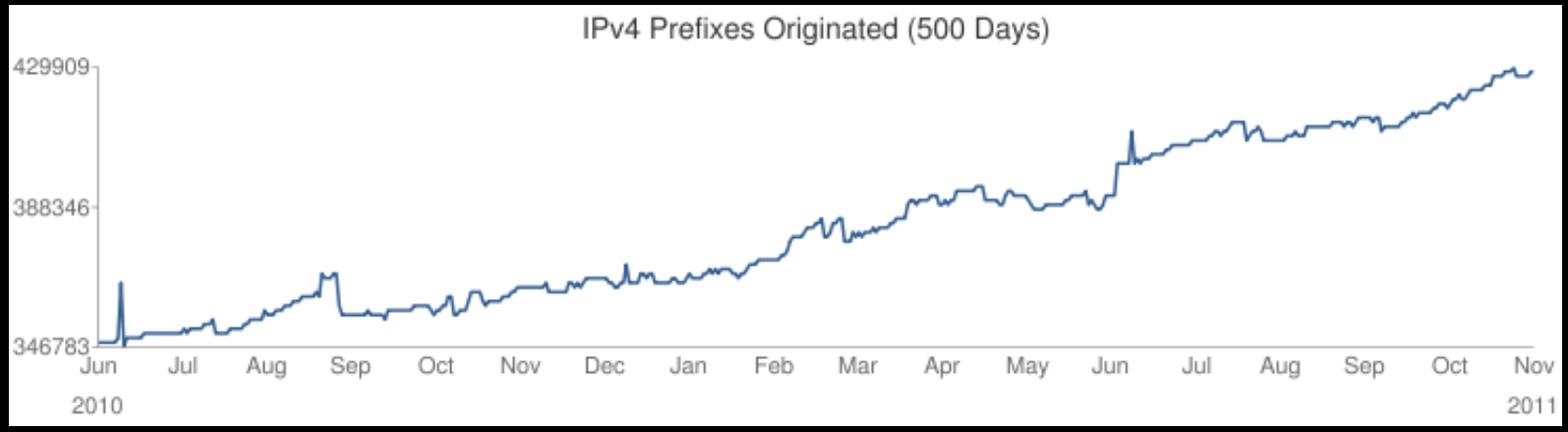

Now World IPv6 Day …

# Is IPv6 routing/interconnect/peering prevalent?

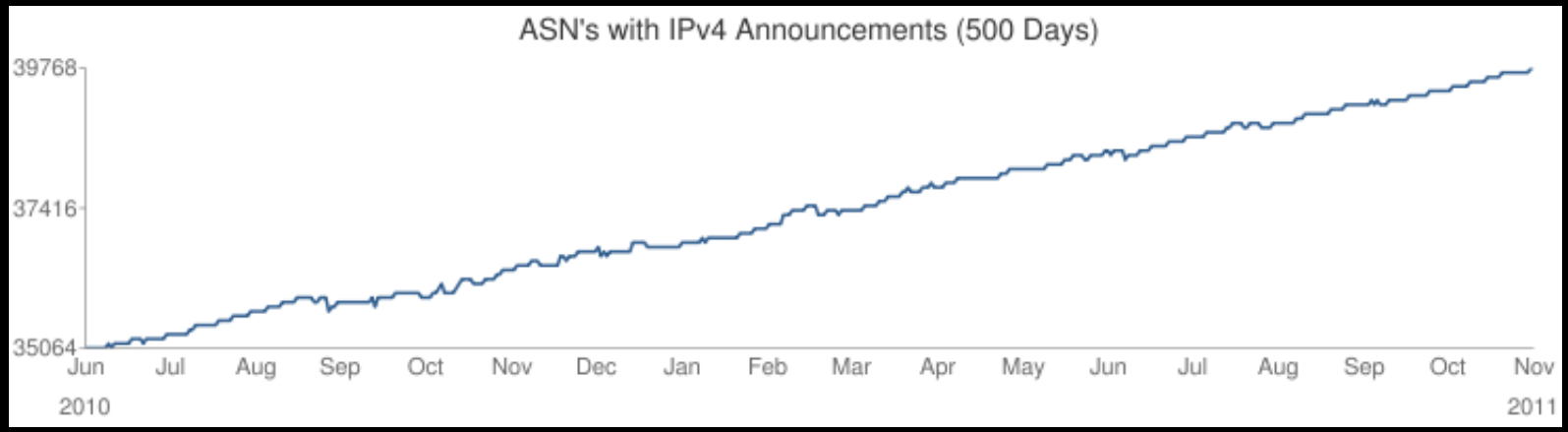

http://bgp.he.net/report/prefixes#_prefixes


http://bgp.he.net/report/prefixes#_networks

# What does IPv4 look like?




http://bgp.he.net/report/prefixes#_prefixes



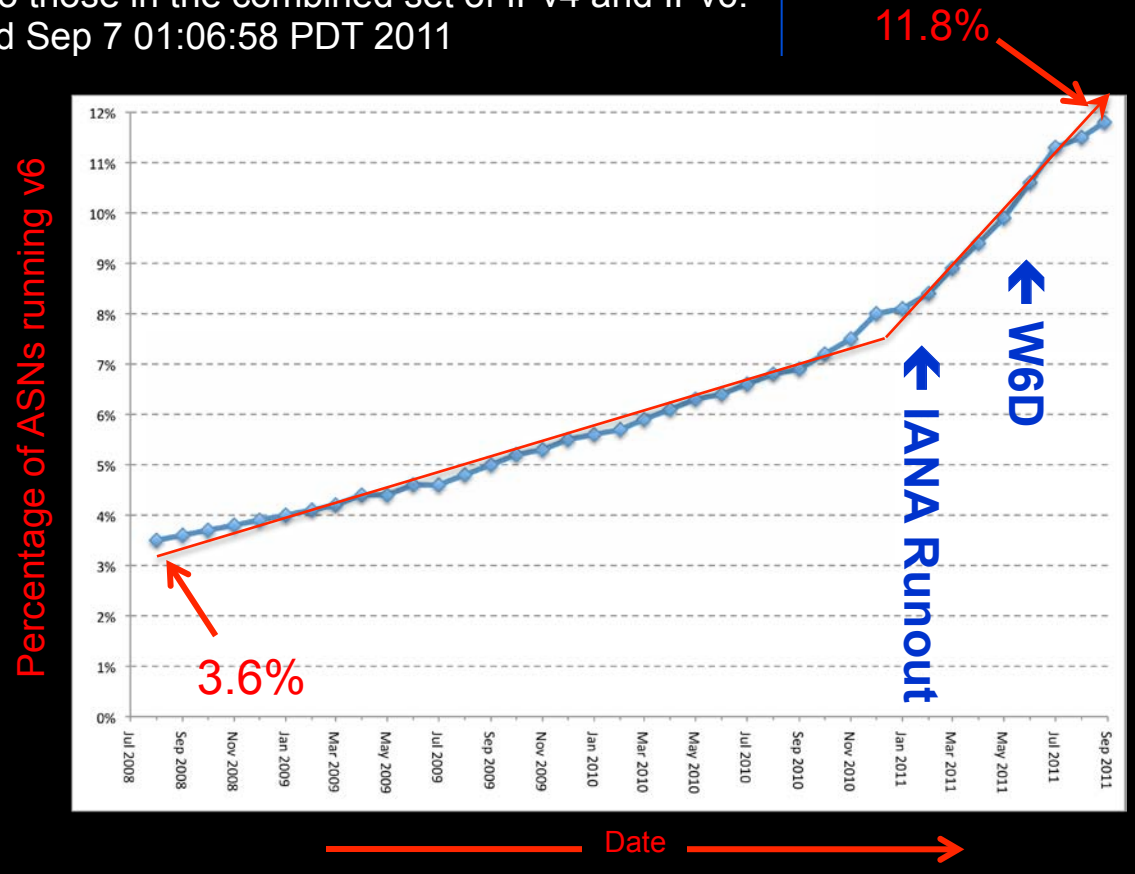

http://bgp.he.net/report/prefixes#_networks

# IPv6 measured at via BGP ASNs with IPv6

http://bgp.he.net/ipv6-progress-report.cgi

**Networks Running IPv6**
We can measure the percentage of networks running IPv6 by comparing the set of ASes in the IPv6 routing table to those in the combined set of IPv4 and IPv6.
IPv4 and IPv6 RIBs Last Parsed: Wed Sep 7 01:06:58 PDT 2011

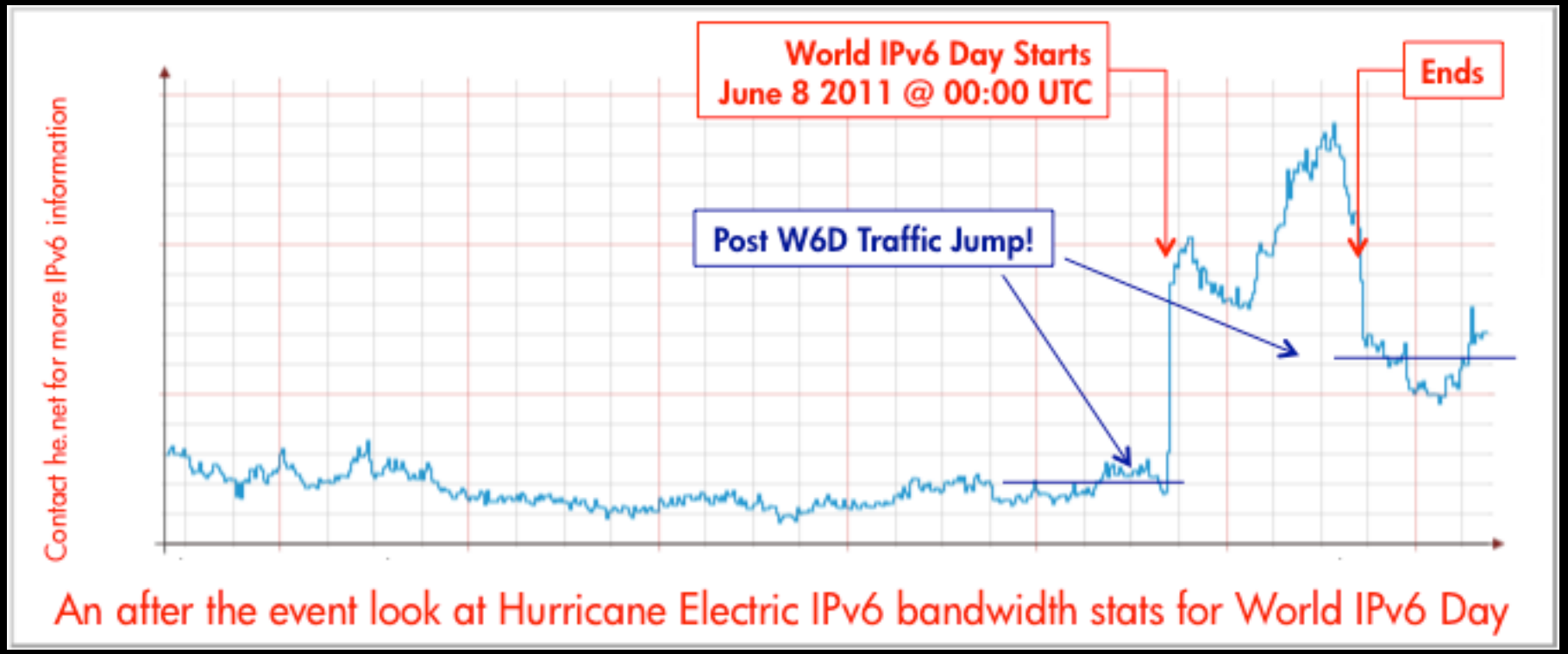
IPv4 Ases: 38,889
IPv6 ASes: 4,592
ASes using only IPv4: 34,394
ASes using only IPv6: 97
ASes using IPv4 and IPv6: 4,495
ASes using IPv4 or IPv6: 38,986
Percentage of ASes (IPv4 or IPv6) running IPv6: 11.8%



# World IPv6 Day and real IPv6 traffic

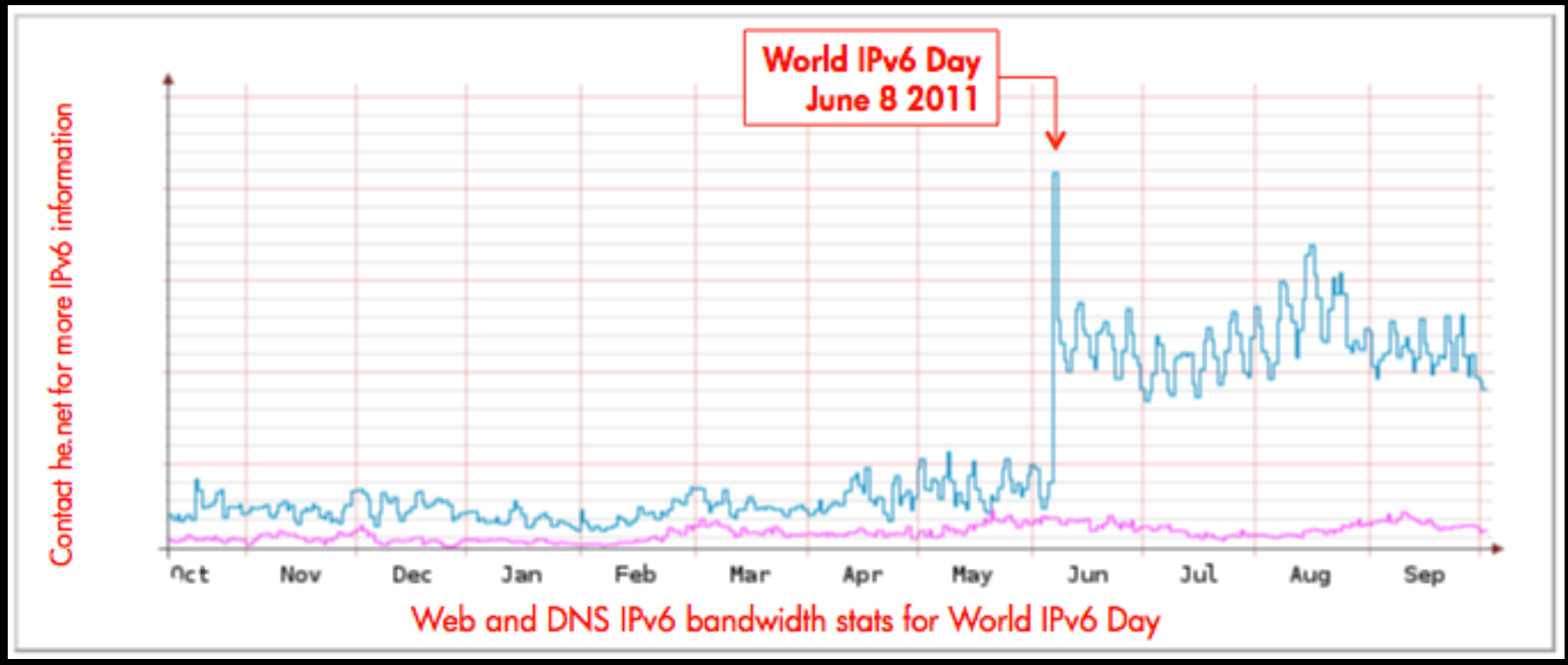


- World IPv6 Day was about enabling web-based traffic for IPv6
  - Focus on content providers
  - Web (port 80 & 443 TCP traffic) plotted below



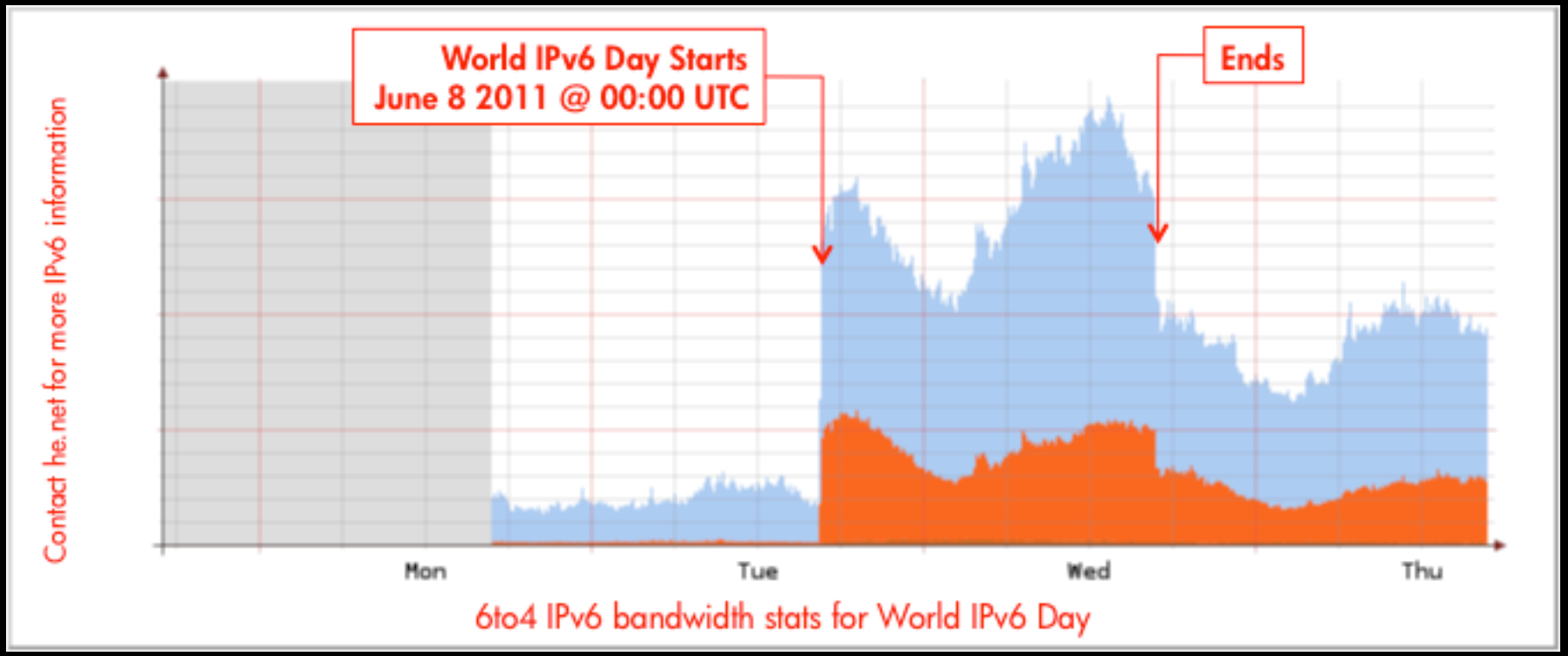
# World IPv6 Day and real IPv6 traffic

- Long term win since W6D in IPv6 traffic levels
  - That means there are both content and eyeballs in play
  - That means IPv6 peering has traffic (if you have customers with IPv6 enabled)



# Hurricane Electric W6D and translation traffic

- Yes – there is 6to4 traffic
  - Lots of traffic on Hurricane Electric's backbone!
- Measured on the largest 6to4 global deployment (with Teredo included)
  - AMS ASH CHI FMT FRA HKG LAX LON MIA NYC PAO PAR SEA SIN SJC STO TYO

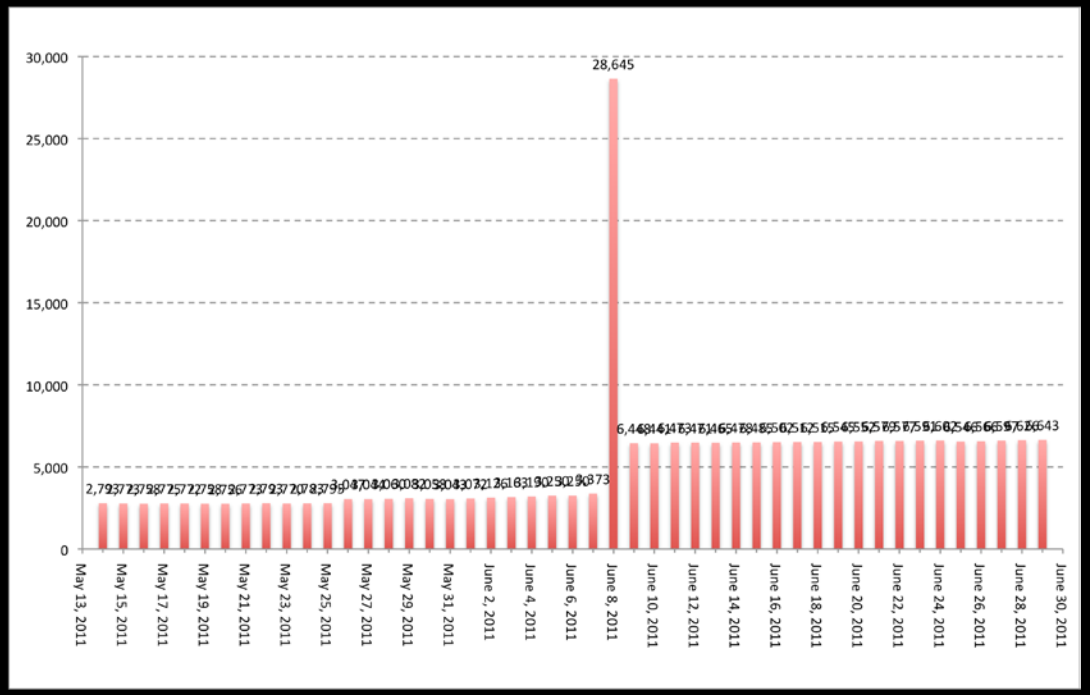


# IPv6 measured on the Alexa 1m list

http://bgp.he.net/ipv6-progress-report.cgi

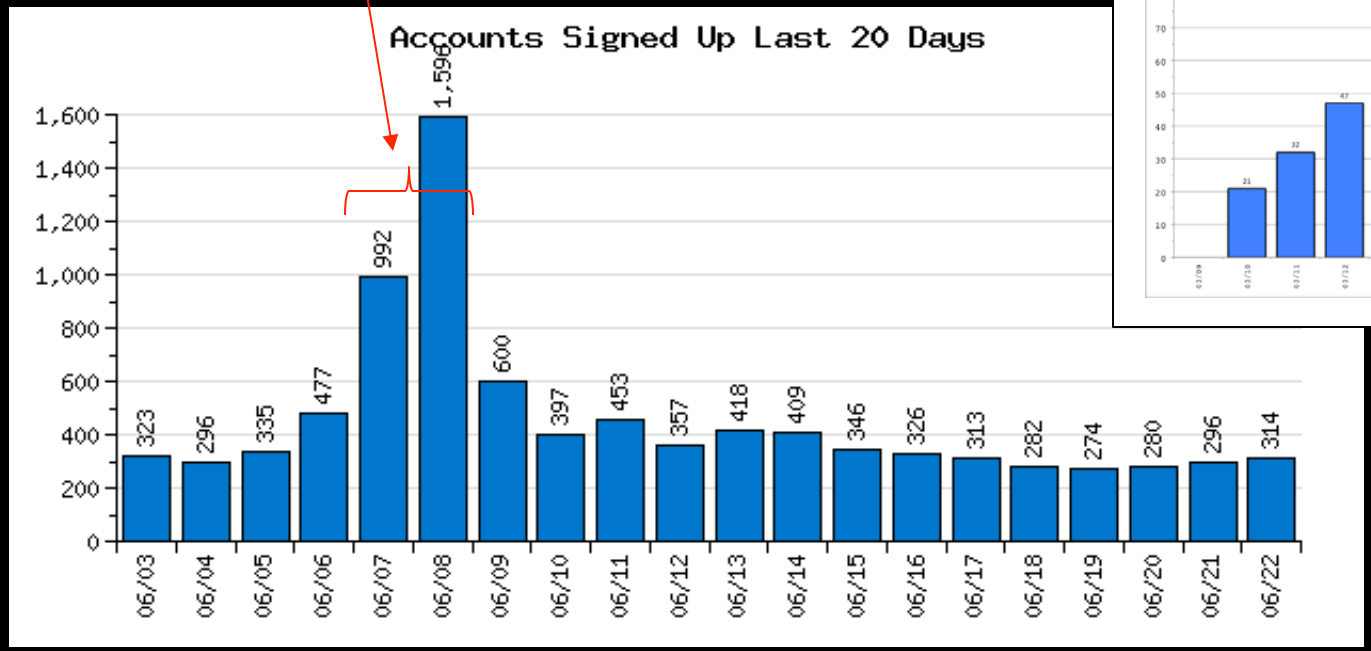
**Top Websites Running IPv6**
A very quick way to measure IPv6 deployment for websites is just to check for a AAAA record in DNS.
Alexa Top 1 Million Domains Downloaded:
Sun Aug 28 00:00:05 2011
Alexa Top 1 Million Domains Processe(
Sun Aug 28 00:37:44 2011

Alexa 1M raw domains:
1000000
Alexa 1M raw with a direct IPv4 address: 942156
Alexa 1M raw with a direct IPv6 address: 9595

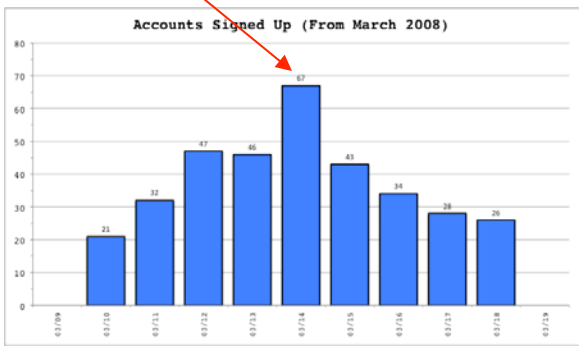


# World IPv6 Day – tunnelbroker.net users

June 7th 2011 / June 8th 2011
A large jump in new accounts
(shows a great interest in IPv6 on W6D)



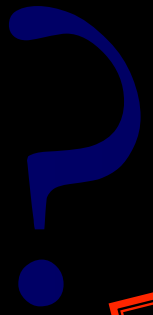

Smaller effect
March 2008



# Hurricane Electric W6D – Observed issues


- PMTU & ICMP6 blocking
  - Heard again and again all over the net
  - Enabling IPv6 (for the first time) with too-aggressive filtering
- Two failure modes
  - Pre W6D testing – normally on “ipv6.example.com”
  - During W6D – affected “www.example.com”
- Trigger points?
  - Testing from Teredo or 6to4 enabled end-nodes
  - Real-world tunnels
- ICMP6 re-explained
  - Teredo requires end-node to respond to a ping to initiate protocol
  - This breaks classic enterprise firewall/filter setups
  - Consensus is that elements ahead of server perform this function

# Q&A



Native IPv6 Everywhere

Every Day is v6 Day at Hurricane Electric

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