



IPv6 at Home

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Overview

- IPv6 and the residential service providers
- IPv6 residential deployment scenarios
 - Hurricane Electric
 - SixXs
 - GoGo6
- Tunnel providers to never use
- Demo with Hurricane Electric and PFSense

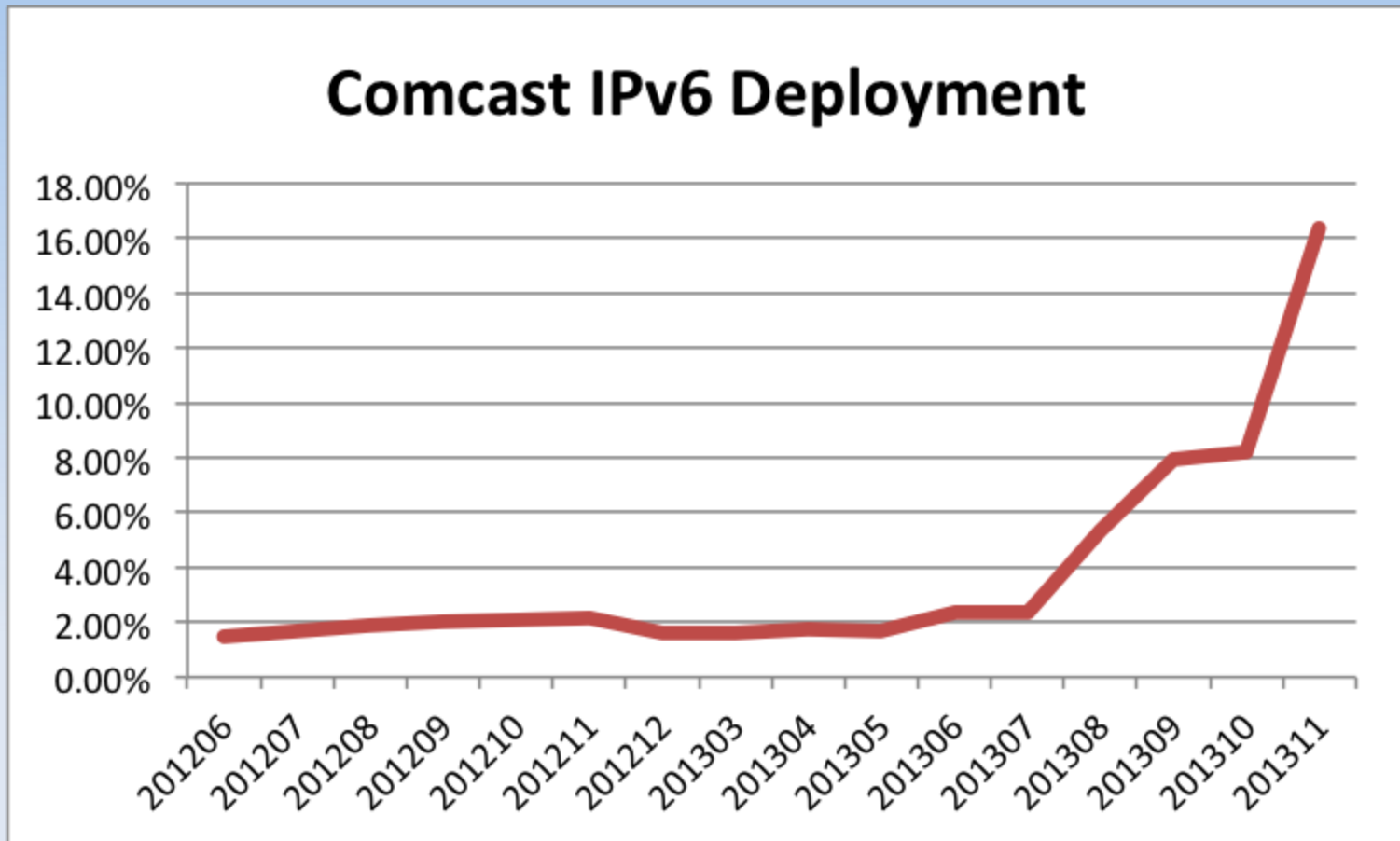
Service Provider Status

- Comcast
- Verizon FiOS
- Cox
- Time Warner
- Mobile
- Anyone else?

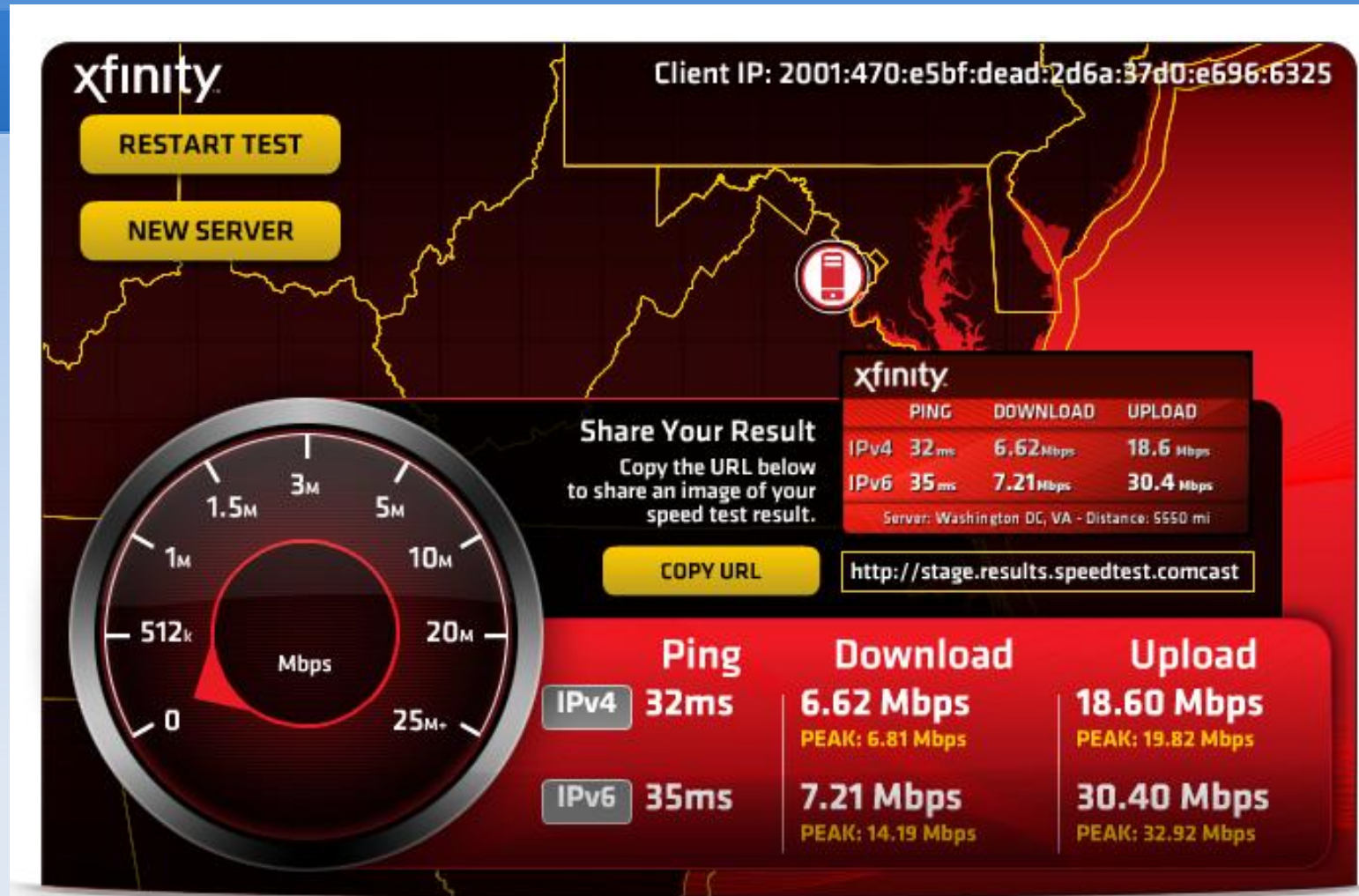
Comcast

- The largest IPv6 residential deployment in the world to date
- Information page: <http://www.comcast6.net/>
 - Provides an extensive set of tools for IPv6
 - Can test IPv6 capability: <http://test-ipv6.comcast.net/>
 - Can test IPv6 speed using custom Ookla on native XFINITY speed test site: <http://speedtest.comcast.net/>

Comcast



Comcast



Verizon FiOS

“Verizon is rolling out IPv6 address space in a “dual stack” mode ... The upgrades will start in 2013 and the first phase will include Verizon FiOS customers who have a dynamic IP address. Unless there is a need to enter an IP address directly, these changes will generally be transparent our customers”

- Some limited commercial deployments, no residential – very far behind
- Virtually no communication – no roadmap

Verizon FiOS

Moving to new Greenwave G110

- 802.11ac (1.3 Gbps WiFi), Zigbee, IPv6



Verizon FiOS

ActionTech - MI424WR-GEN3I

The screenshot displays the ActionTech web interface for a Verizon FiOS MI424WR-GEN3I router. The top navigation bar includes icons for Main, Wireless Settings, My Network, Firewall Settings, Parental Control, Advanced, and System Monitoring. The left sidebar shows a menu with Main, IPv6 (highlighted), IPv6 Firewall, and Logout. The main content area is titled "IPv6 Configuration Control" and is divided into three sections:

- 1. Enable IPv6 Support**
IPv6: Enabled Disabled
- 2. Specify the method to be used to obtain your WAN IPv6 Address**
IPv6 WAN Configuration: DHCPv6
Prefix:
 Obtain IPv6 DNS Server address automatically
 Use the following IPv6 DNS Server addresses
- 3. Specify the method to be used to assign LAN IPv6 addresses**
IPv6 LAN Configuration: Stateless
LAN IPv6 Unique Local Address: fd00::1/64
LAN IPv6 Link Local Address: fe80::27f:28ff:fece:5afc
LAN Subnet Number: 0
Router Advertisement Lifetime: 3 minutes (0-150)

At the bottom of the configuration area are "Apply" and "Cancel" buttons.

Cox Communications

- Have an IPv6 FAQ Page:
<http://www.cox.com/residential/support/internet/article.cox?articleId=0bced860-9666-11df-6baf-000000000000>
- Commercial customer trials – 2015
- Residential customer implementations – 2015

Time Warner

- Have an IPv6 Transition Page:
<http://www.timewarnercable.com/en/support/internet/topics/ipv6.html>
- 90% deployed in residential networks
- Currently deploying commercial customers
- Tested CPE List:
<http://www.timewarnercable.com/en/support/internet/topics/buy-your-modem.html>

IPv6 Rankings – Home

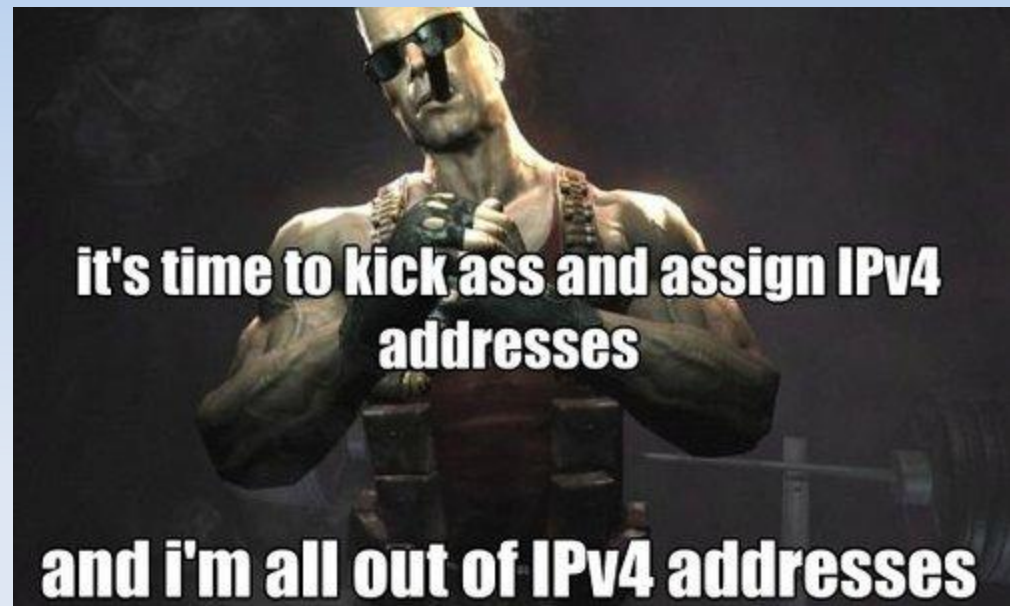
Company	IPv6 Planning	IPv6 Deployments	Complete
Comcast	✓	✓	✓
Verizon FiOS	✗	✗	✗
Cox	✓	✗	✗
Time Warner	✓	✓	✗

IPv6 Rankings – Mobile

Company	IPv6 Planning	IPv6 Deployments	Complete
Verizon Wireless	✓	✓	✓
AT&T	✓	✗	✗
T-Mobile	✓	✓	✓

So you don't have IPv6 at home...

- Do it yourself!
 - Hurricane Electric 6in4 routed static tunnels
 - SixXs
 - GoGo6



Hurricane Electric

- The best IPv6 tunnel provider – oh and it's free
- Provisioning is super easy
- Anything that can do Protocol 41 (6in4) can use Hurricane Electric
- Offers IPv4/IPv6 hosted DNS service
- IPv6 training (Sage)
- IPv6 BGP peering
- Demo!! 😊



Hurricane Electric

- <http://he.net>
- Can configure Hurricane Electric IPv6 tunnels on:
 - Cisco Router/L3 switch/ASA Firewall (Cisco IOS) → Demo!! 😊
 - Juniper router/firewall (JunOS & ScreenOS)
 - PFSense Firewall → Demo!! 😊
 - Linux server/workstation
 - Windows server/workstation
 - OpenWRT
 - Vyatta router
 - Apple Airport
 - Foitigate and Checkpoint firewalls

- <https://www.sixxs.net>
- Another provider, community supported
- Automatic IPv6 Client Utility (AICCU)
 - UDP-based client → server tunnel
 - Uses client application
 - AYIYA protocol (Anything-in-Anything)
 - UDP port 5072
- Also offer 6in4 router/firewall tunnels



- <http://www.gogo6.com/freenet6/tunnelbroker>
- Very similar to SixXs
- Came from the company Hexago
- Tunneling service is Freenet6 (hey, it's free IPv6)
- Client → Server model
- UDP-tunnel, DS-Lite, and Protocol 41
 - UDP port 3653

Please don't do this...

- Don't re-enable Teredo on your Windows domain machine
 - Security nightmare
 - Never know which Teredo relay you are using
- You likely won't be able to use 6to4 because you don't have a public IPv4 address
 - If you do, still don't use it – see above, but protocol 41 based

6 gogoCLIENT Utility


Basic | **Advanced** | Status | Log

Connection Status


Tunnel Information

Virtual Tunneling Adapter:	Local Area Connection 3
Tunnel Mode:	IPv6-in-UDP-IPv4 Tunnel (NAT Traversal)
Local Endpoint Addresses:	173.66.52.203 2001:05c0:1000:000b:0000:0000:0000:1fc1
Remote Endpoint Addresses:	64.86.88.116 2001:05c0:1000:000b:0000:0000:0000:1fc0
Server Address:	montreal.freenet6.net
Delegated Prefix:	(none)
Delegated User Domain:	nacnud.broker.freenet6.net
Tunnel Status:	Connected
Tunnel Duration:	10s
Last Error:	(none)

Activity

Sent —  — Received

Packets: 0 | 3

TDINVVWKS002 —  — Internet

gogoSERVER

[Check for update](#) Apply Close

Demo Time!

- Setup Hurricane Electric 6in4 Tunnel
- With PFSense firewall
- With Cisco IOS



Summary

- If you have Verizon FiOS, they suck and have no plan.
- If you have Comcast, you probably already have IPv6 in your house.
- If you don't there's so many ways to get IPv6 going:
 - Hurricane Electric
 - SixXs
 - GoGo6
- Never ever, ever, ever use Teredo or any kind of 6to4

Questions?



tachyondynamics.com

Contact

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