

# IPv6 in the Real World: Multi-Vendor Adventures

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# Disclaimer

- ▶ The information presented here is based on my research from my own work and articles, presentations and personal communications I have had with various people directly involved. Anything here is as accurate as I can make it, but please check it out for yourself before you make any strategic decision.
- ▶ I welcome any additional material that can make this presentation more accurate.

# Agenda

- ▶ Noteworthy Items
- ▶ Summary of Support
  - Desktops, Printers, Servers
  - Switches, Routers
  - Transit & Access Providers
  - Search Engines, Content Providers and Distribution Networks
  - Cellular, Wireless
  - Applications, Software Development, Databases
  - Security Infrastructure
  - Virtualization
- ▶ Other Items

# Noteworthy Items

- ▶ Buy Items that have been tested.
  - IPv6 Forum's IPv6-Ready Program
    - See <http://ipv6ready.org>
  - US Government
- ▶ Test Items in your environment
  - Create a small lab and test things that are most important before deploying them.



# World IPv6 Day

- ▶ On June 8, 2011, everyone with a public facing server/service of some kind is encouraged to activate IPv6 connectivity to that device for 24 hours (leaving IPv4 service on as it would normally be) and collecting information on the user experience.
- ▶ This will be used to help debug those problems that may still exist.
- ▶ Learn more at <http://isoc.org/wp/worldipv6day>

# Desktops

- ▶ Microsoft OS (Windows XP, Vista and 7) – Yes, but XP support is pretty limited.
  - Watch for systems with Internet Connection Service turned on as this can create bogus RAs.
    - Easy fix is to insure “real” routers announce with high priority all the time.
- ▶ Mac OS X – Yes with limits (no DHCPv6 support)
- ▶ Linux – Yes, with 2.6 kernels

# Printers

- ▶ HP
  - Great Support for JetDirect-based printers.
  - EWS printers don't support IPv6 or supported it poorly.
- ▶ Xerox
  - Good IPv6 support in Phaser line of printers.
- ▶ Lexmark
  - IPv6 support in network-based printers, but check for details.
- ▶ Canon
  - Good IPv6 support in many imageRUNNER models.

# More Printers

- ▶ Epson
  - Software to support IPv6 in Epson printers was recently certified by IPv6-Ready. Unknown if in any printers yet.
  - Third-party printer server available from Germany.
- ▶ Brother/Citizen/Samsung/Panasonic/Oki Data
  - Many specific printers support IPv6, but check individually.
  - The IPv6-Ready logo is a great way to know it “just works.”

# Servers

- ▶ Microsoft OS (Windows Server 2008R2) – Yes
  - Recall ICS note on Desktop slide.
- ▶ Linux – Yes
- ▶ Solaris – Yes ( Solaris 8 and later)
- ▶ HP-UX – Yes (Release 11.iV2 and later)
- ▶ OpenVMS – Yes (TCP/IP Services 5.8)
- ▶ AIX – Yes (since 3.3, but get something more recent)

# Switches

- ▶ As Layer 2 devices, they are generally transport layer (Layer 3) agnostic.
  - Cisco – Yes
  - Juniper – Yes
  - Extreme Networks – Yes
  - HP Procurve – Yes (check specific model)

# Enterprise/Core Routers

- ▶ Cisco – Yes
- ▶ Juniper – Yes
- ▶ Brocade (formerly Foundry Networks) – Yes
- ▶ Alcatel-Lucent – Yes

# Consumer Routers

- ▶ D-Link – Yes
- ▶ Cisco-Linksys – Only via WRT
- ▶ NETGEAR – Yes

# Internet Transit Providers

- ▶ AT&T – Yes (at least partially)
- ▶ Verizon – Yes (38 pops dual stack, the rest via tunnels)
- ▶ Sprint – Yes (at least partially)
- ▶ Qwest – Yes (2010)
- ▶ NTT America – Yes (2004)
- ▶ Level(3) – Yes (2010)
- ▶ Global Crossing – Yes (2005)
- ▶ TeliaSonera – Yes (2001)
- ▶ Cogent – Yes (but peering issues)
- ▶ Hurricane Electric – Yes (2001)

# Internet Access Providers

- ▶ Comcast – Yes, in limited locations
- ▶ Time Warner Cable– Business Customers today, consumer customer trials in Spring 2011
- ▶ Cox – Started trials with customers in 2010
- ▶ Cablevision – Has deployed IPv6 in Monterrey, Mexico (2010), but no clear announcements about US deployments

# Search Engines

- ▶ Google

- [ipv6.google.com](http://ipv6.google.com)

- ▶ Bing

- Plans to Participate in World IPv6 Day

- ▶ Yahoo!

- Plans to Participate in World IPv6 Day

# Major Content Providers

- ▶ Netflix

- [ipv6.netflix.com](http://ipv6.netflix.com)

- ▶ Facebook

- [www.v6.facebook.com](http://www.v6.facebook.com), [www.lisp6.facebook.com](http://www.lisp6.facebook.com)

- ▶ MySpace – no announced plans

- ▶ AOL – no announced plans

# Content Distribution Networks

- ▶ Akami – No, but plans to participate in World IPv6 Day
- ▶ Limelight – Yes (2009)

# Cellular

## ▶ ATT Wireless

- In 2009, ATT said they were studying IPv6 deployment as part of the LTE roll-out. LTE starts to be available in mid-2011.

## ▶ Verizon Wireless

- Upgrades to IPv6 in existing network underway.
- Linked to LTE support.

## ▶ Sprint

- Deployment underway, some mobile broadband users have reported they can use IPv6 now.

## ▶ T-Mobile

- Deploying new IPv6 network to parallel current network.
- Linked to LTE support.
- See <http://forums.t-mobile.com/t5/Nokia/T-Mobile-IPv6-Friendly-User-Trial/m-p/465928> for more.

# Wireless

- ▶ Clearwire (aka Clear)
  - No clear (no put intended) announcements.
  - There are unconfirmed reports the infrastructure can't support it.(Doh!)

# Phones / Tablets

- ▶ Apple/iOS – Yes, for Wifi 4.2.1
- ▶ Google/Android – Yes, for Wifi, but most providers don't enable it
- ▶ HP/webOS – Not in current devices, maybe this summer?
- ▶ Microsoft/Windows Phone 7 (also Nokia!) – Yes, but it's not clear if available in both modes
- ▶ Blackberry
  - BES doesn't work with IPv6, yet.

# Applications

- ▶ DNS – Widely supported in both software and appliances
- ▶ Email /SMTP /POP /IMAP /Mail Clients – Widely supported
  - If using Outlook, be sure to use Outlook 2007 or later.
- ▶ HTTP Servers /Web Browsers – Widely supported

# Application Development

- ▶ IPv6 Bindings are available for many common development languages.
  - C/C++
    - Must convert to use the new bindings and recompile
  - Perl
    - Must convert to use the new IPv6 or network agnostic modules
  - Python
    - Must convert to use the new bindings
  - PHP
    - Must convert to use new bindings (working correctly since 5.3)
  - Erlang
    - Very little conversion required. Most cases just work.
  - Java
    - Will work, but needs “-Djava.net.preferIPv6Addresses=true” added to options

# Databases

- ▶ Oracle – Yes (since release 11g) with some limits
- ▶ Sybase – Yes (releases 12.5.3a and 15)
- ▶ MS-SQL – Yes (2005 and later)
- ▶ Postgres – Yes (8.2 and later)
- ▶ MySQL – No

# Security Infrastructure

- ▶ Cisco Firewalls – Yes (ASA Software 8.2 & later)
- ▶ Juniper Firewalls – Yes (ScreenOS 6.2 and later)
- ▶ Checkpoint Firewalls – Yes
- ▶ Symantec Endpoint Security – Not yet
- ▶ McAfee Endpoint Security – Yes
- ▶ IDS/IPS – Generally no, but getting better

# Virtualization

- ▶ vmware ESX 3.X – No, 4.0 – Yes, but off by default, vSphere 4.1 – USGv6 certified
- ▶ Hyper-V – Yes
- ▶ Xen – Yes (see 4.X release)

# Other Opportunities

## ▶ Attend an IPv6 Event

- <http://www.rmv6tf.org> – Rocky Mountain IPv6 Task Force
  - RMv6TF 2011 IPv6 Summit has been announced for late April in Denver.
- <http://www.txv6tf.org> – Texas IPv6 Task Force
  - Multiple events are in the works in Texas in 2011.

## ▶ Join an IPv6-centric group

- <http://gogonet.gogo6.com> – GoGo6 Social Network

# Thank You

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# Questions?

- ▶ This slide deck will be available for download from <http://www.stanbarber.com/wp-content/uploads/2011/02/ipv6-multivendor.pdf> tomorrow.