THE FUTURE IS FOREVER
6 JUNE 2012

www.WorldIPv6Launch.org
THIS TIME IT’S FOR REAL

- 6 June 2012 is the kick-off date
- Regular business operation with IPv6
- IPv6 “on by default” is the new normal
- Commercial IPv6 at scale by year-end
World IPv6 Launch

When?
- 6 June 2012

What?
- IPv6 is part of Regular Business, on by default, no special configuration necessary for anyone anywhere

Who?
- Access networks, home router vendors, websites from around the world participating, please join – www.worldipv6launch.org

Why?
- Acceleration: those already planning to roll-out IPv6 should accelerate their plans
- Adoption: those who don’t have plans yet, it’s safe now, please start
- Definition: industry leaders are establishing IPv6 as the new normal

www.worldipv6launch.org
World IPv6 Launch: Access Networks

Who?

- ATT, Comcast, Free, Internode, KDDI, Time Warner Cable, and XS4ALL initially
- Additional networks are welcome to join, see: www.worldipv6launch.org

IPv6 becomes part of Regular Business now

- New subscribers get IPv6 on by default after 6 June 2012
- No user config required
- IPv6 usage will depend on home networks, home equipment, etc.
- But 1% of visits to big websites from participating networks needs to be done using IPv6 by 6 June
- This will be measured by the big participating websites and displayed on the World IPv6 Launch website
World IPv6 Launch: Home Router Vendors

Who?

- Cisco and D-Link initially
- Additional home router vendors are welcome to join, see: www.worldipv6launch.org

IPv6 becomes part of Regular Business now

- Majority of products shipping with IPv6 on by default
- No user configuration is required to use IPv6
- V6 interoperability verification by UNH-IOL (and others?)
World IPv6 Launch: Websites

Who?

- Facebook, Google, Microsoft Bing, and Yahoo! initially
- Others are welcomed to join, see: www.worldipv6launch.org

IPv6 becomes part of Regular Business now

- IPv6 is enabled on the main website
- No IPv6 specific URLs (www.ipv6.example.com) or mirror sites
- IPv6 enabled users will use IPv6 without doing anything
- The World IPv6 Launch website will have a reachability dashboard similar to what was used in 2011 for World IPv6 Day
Internet Society Deploy360 Programme

http://www.internetsociety.org/deploy360/

- IPv6 and DNSSEC knowledge base including tutorials, case studies, training resources, etc.
- Content specific to:
  - Network Operators
  - Developers
  - Content Providers
  - Consumer Electronics Manufacturers
  - Enterprise Customers
- Blog posts
- Social media integration
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How do we get to 1% actively using IPv6?

Each block represents 100,000 users.

1% = 100,000
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Home Router Participation in World IPv6 Launch

Timothy Winters
April, 2012
IPv6 World Launch

Home Routers Manufactures

- Completing the Interoperability portion of the CPE Logo will get you on IPv6 World Launch list.

- [http://www.worldipv6launch.org/participants](http://www.worldipv6launch.org/participants)

- Must pass every mandatory test case to be included as a participant in World IPv6 Launch.
IPv6 CE Router Event

The UNH-IOL is hosting a CE Router Event April 16, 2012. IPv6 Ready CPE Interoperability Test Plan is executed. **Whitepapers** discussing technical discoveries

- DHCP Issues
- ISP Prefix length issues
- M/O Flag
- Forwarding Loops
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IPv6 @ Yahoo

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Agenda:
Motivation for IPv6
World IPv6 Day Recap, 2011
World IPv6 Launch, 2012
Motivation for IPv6

Why not just rely on Carrier Grade NAT (CGN)?
“The internet is a series of tubes.”
- Senator Ted Stevens
“The internet is a series of tubes.”
- Senator Ted Stevens

Photo by USG via Wikimedia Commons
http://tinyurl.com/3whv8jl
Public Domain

Photo by Horia Varlan - http://flic.kr/p/7vEzW1
• **Capacity:** CPU, NET

NAT is expensive. Why buy more than you have to?
• Capacity: CPU, NET
• Port Exhaustion

TCP source/destination
IP+port reuse limited over time

Photo by Jason Fesler - http://flic.kr/p/bhDoxg
• Capacity: CPU, NET
• Port Exhaustion
• Geo Location

Local news, weather, movies
• Capacity: CPU, NET
• Port Exhaustion
• Geo Location
• Abuse – Bad Guys
This is how NAT abuse will be handled by content providers.
NAT is a reality, and we must learn to cope...

Adopting IPv6 will limit the NAT shared IP pain long term.
World IPv6 Day 2011 Recap
World IPv6 Day – June 8th 2011

- Global event coordinated by the Internet Society
- Major content providers enabled IPv6 access on their “front door” for 24 hours
  - Sites accessible via IPv4 + IPv6
- “Test flight” for IPv6 on a broad basis
  - Motivate industry to move forward – Break the chicken/egg cycle
  - Real world smoke test – what you can’t do in a lab
  - Test included real end users
Participating Yahoo! Front Page Markets
IPv6 Proxy Locations

Traffic Server (Proxy)
translated HTML for IPv6 users
Some risk involved.
The Broken Users Problem

At the time: 50+ out of these 100,000 users had IPv6 enabled and misconfigured. They could not reach dual-stack web sites due to local misconfiguration.
Customer Outreach

• Real time detection of “Broken” Users, with a “Window Shade”

• Search results advertising based on keywords
• Traditional PR
• Social channels, blogs
Trial Runs
What Happened on World IPv6 Day?
What we feared.
Reality.
Few support calls

• About 10 calls to Yahoo! Support

• Some ISPs reported few or no calls
Practice makes perfect.
For a major change, schedule one or more test runs.
Results for Y! at a peek

Over 2.2 Million users served via IPv6

Over 1 Million visits to Y! IPv6 help pages

Ratio of users served via IPv6:
  • Peak = 0.229%
  • Average = 0.168%

France led the pack with over 3% IPv6-enabled users! Thank you Free.fr!

US was at 0.35%

Breakage stats now at 0.022%
Industry changes

Mac OS X

Firefox

Chrome

Safari
A large number of IPv6-day sites remained dual-stack after the event.

http://gigondas.dh.bytemark.co.uk/3days.html
Even the politicians are paying attention.
We need more than just a World IPv6 Day.
6/6/12: Turn it on, Leave it on.

http://www.worldipv6launch.org
Static images, JavaScript, and CSS on most Y! pages will automatically become IPv6 accessible as part of the World IPv6 Launch.
Committed IPv6 Proxy Locations – 6/6/12

Traffic Server (Proxy)
HTML (launch properties) + Images, CSS, JS
Extended Customer Outreach

- Windowshade deployed to more sites
- Same outreach channels as Flag day
More sites to come!
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Appendix
Example Causes for Broken Users

- Incorrect Addresses
- Bad Routes
- Good Routes, Bad Performance
- Good Routes, Dumb Firewalls
Timeouts until IPv4 fallback

- Windows: 21 seconds per AAAA
- Linux: 21 seconds per AAAA
- OS X: 75 seconds per AAAA
- iPhone, iPad: No fallback
Test Run #1: 5/31/11, 10:00 PM

Lesson 1:
Monitoring is not the same in a dual stack environment. You must check IPv6 in addition to IPv4.

Root cause: One geo load balancer was not set up with IPv6, failed health checks.
Test Run #2: 6/2/11, 2:00 PM PDT

Lesson 2:
Don’t start something big and risky at a traffic inflection point.

Root cause: People leaving the office, 5pm Eastern USA time.
Lesson 3:
Have more than one way to look at your metrics.
Ping (RTT) measurements in the last 48 hours, from 'tt120' to Yahoo as of 2011-06-08 06:20:43 UTC, target: primary site

http://gigondas.dh.bytemark.co.uk/3days.html
Root cause:
Geo load balancer was reimaged a week prior to World IPv6 Day.
IPv6 was not re-provisioned as part of the process.

See again: Lesson 1.
UK: What RIPE saw on June 8

Yahoo! Presentation

Lesson 3:
Have more than one way to look at your metrics.

Root cause:
Geo load balancer was reimaged a week prior to World IPv6 Day. IPv6 was not re-provisioned as part of the process.

See again: Lesson 1.
Per-hour Breakdown (IPv6 pageviews)

Note: Excludes Y!JP, Y!CN
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