World IPv6 Day

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What's the problem?
The Internet today

ISP

1.1.1.1

1.2.3.4

G

Y

Facebook
No more IPv4... but no IPv6 yet either
The Internet tomorrow?
More specifically...

- We need to move to IPv6
  - ... but to do that IPv6 must provide same quality as IPv4
- Unfortunately, there are problems
  - Brokenness in home networks
  - Incomplete IPv6 backbone interconnections
  - Access network scaling
  - Lack of IPv6 CPE standards
IPv6 Brokenness

- Many OSes and browsers try IPv6 first, then IPv4
- If the host has malfunctioning IPv6, fallback is very slow
  - Windows: 20 seconds
  - OS X: 4 or 75 seconds
  - Linux: instant or 3 minutes
- This is for each connection
  - A full website will take minutes to load
- Unacceptable for websites like Google
  - Would you like to wait 20s for every Google search?
  - Would you like to wait 2 minutes before using maps?
What's the impact?

- Several parties have been measuring impact
  - Google, Yahoo, Facebook, Tore Anderson
  - Measurement via hidden images / javascript
- Approximately 0.03% of users have this problem
  - If you have 1B users, 0.03% is 300k
- ~90% of this is due to Mac OS X
My favourite example

- Home gateway sending out an RA of ::/64
- Host ignoring the unreachables
- 24-second timeout

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Fixing IPv6 brokenness

- Fixing home routers: impractical
  - Need router upgrade
  - Firmware often not upgradable
  - Users don't typically upgrade home gateways
  - Even if they did, hard to know what the problem is

- Fixing hosts: possible
  - Workarounds in individual applications (e.g., Chrome)
  - To fix all apps, need OS upgrade
  - OS upgrade can also work around router problems

- Only possible fix is in OS and applications
Interconnection

- Some backbone operators don't have IPv6 interconnections with each other
  - My home IPv6 connection can't reach some ISPs
- This can break dual-stack websites
  - It's as if the user had broken IPv6
  - 20-75 timeout on every connection
Access network scaling

- The 0.03% brokenness figure is for very low traffic
- What will happen if we turn IPv6 on at scale?
- From a large IPv6 deployment:
  - "Are you throttling IPv6 traffic to us?"
  - No, a router in the path was software forwarding
- When www.biglobe.ne.jp went dual-stack a few years ago
  - Instant 5% drop in page views
  - Walled garden network saturation?
World IPv6 Day
Basic Idea

- There are problems, but we're running out of time
- Need to find out if IPv6 really is the solution and will scale
- One-day test when major websites go dual-stack
  - Fix known problems before the day
  - Help users fix brokenness problem
  - Reveal any unforeseen problems (e.g. scaling issues)
- If all goes well:
  - The sky will not have fallen
  - We'll know IPv6 can work
  - Content can go to IPv6, and access can follow
World IPv6 Day

- ISOC-sponsored event
- June 8, 2011
  - 0000 UTC - 2359 UTC
- Major players publish AAAA records for their main websites
  - Facebook, Google, Yahoo, Cisco, ...
  - Open to anyone who wants to participate
- For Google:
  - Google, YouTube, Blogger, Gmail, ... all over IPv6
  - Effectively, turn on Google over IPv6 for the Internet
Before World IPv6 Day

- Media announcements
- Messaging for broken users
  - "You might experience connection problems next week, click here to test your connection"
- Messaging for all users
  - "Tomorrow is World IPv6 Day. Make sure you're ready"
- Point users at www.test-ipv6.com
Discovering the problem: test-ipv6.com

Test your IPv6 connectivity.

Your IPv4 address on the public internet appears to be 98.210.108.75
Your IPv6 address on the public internet appears to be 2001:470:9f05:906:221.6aff:fe7f:1756
Your IPv6 service appears to be: he.net. or tunnelbroker.net

World IPv6 day is June 8th, 2011. No problems are anticipated for you with this browser, at this location. [more info]

Congratulations! You appear to have both IPv4 and IPv6 internet working. If a publisher publishes to IPv6, your browser will connect using IPv6. Your browser prefers IPv6 over IPv4 when given the choice (this is the expected outcome).
Your DNS server (possibly run by your ISP) appears to have IPv6 internet access.

Your readiness scores
10/10 for your IPv4 stability and readiness, when publishers offer both IPv4 and IPv6
10/10 for your IPv6 stability and readiness, when publishers are forced to go IPv6 only

Click to see test data

(Updated server side IPv6 readiness stats)

Last Updated 31-Jan-2011. Use the contact form if anything appears to be broken.
After World IPv6 Day

- Every past IPv6 Day has resulted in IPv6 being left on
  - Heise in Germany
  - VG and the APDM papers in Norway
- The current plan is to turn AAAA records off at 2359 UTC
  - If everything goes well, one or more participants might want to leave IPv6 on
- If IPv6 stays on, will your network be ready?
  - Don't put in place a temporary solution!
How you can participate

- Websites
  - Dual-stack your website on the day
  - If everything works well, consider leaving it on
- CDN / hosting companies
  - Allow your customers to participate
- Access providers
  - Provide commercial IPv6 services
  - Help your users with broken IPv6 resolve the problem
    - Measurement
    - Support
If you participate, please do it right

- Do not deploy non-production quality IPv6 just for one day
  - Provides the perception that IPv6 is unreliable
    - IPv6 is not unreliable
    - Bad deployments are unreliable
  - This is worse than no IPv6 at all
- Please take the time to do it right
- Ask yourself:
  - Would you be willing to leave it on?
  - If someone else leaves IPv6 on, will it fall over?
  - If not, ask yourself if it's worth the time to do it
IPv6 home router test plan
Home router IPv6 support

- Home router support for IPv6 varies widely
- Not easy for manufacturers to decide what to implement
  - Many deployment models
    - Autoconf vs DHCPv6, PPPoE, Tunneling, ...
  - Many transition technologies
    - 6rd, DS-Lite, 6to4...
  - Too many standards
    - IETF CE router draft, BBF TR-124, etc.
- IPv6 deployment must not make the Internet less reliable!
  - Don't break connectivity if delegated prefix changes
  - Don't allow IPv4 to work but IPv6 to be broken
IPv6 CPE test plan

- Merge IPv6 CE router draft and TR-124
  - Make suggestions to make things more robust
  - Submit errata to BBF and IETF
- Develop a test plan on top of IPv6 Ready Phase II
  - Take to cable, ADSL, and FTTH operators for review
  - Work with RG vendors to help test
  - Work with IPv6 forum on an IPv6-ready router logo?
- Stretch goal: have a logo ready by IPv6 Day
  - "Your connection has problems with IPv6. If you are buying a new router, buy one with this logo on it"
Questions?

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