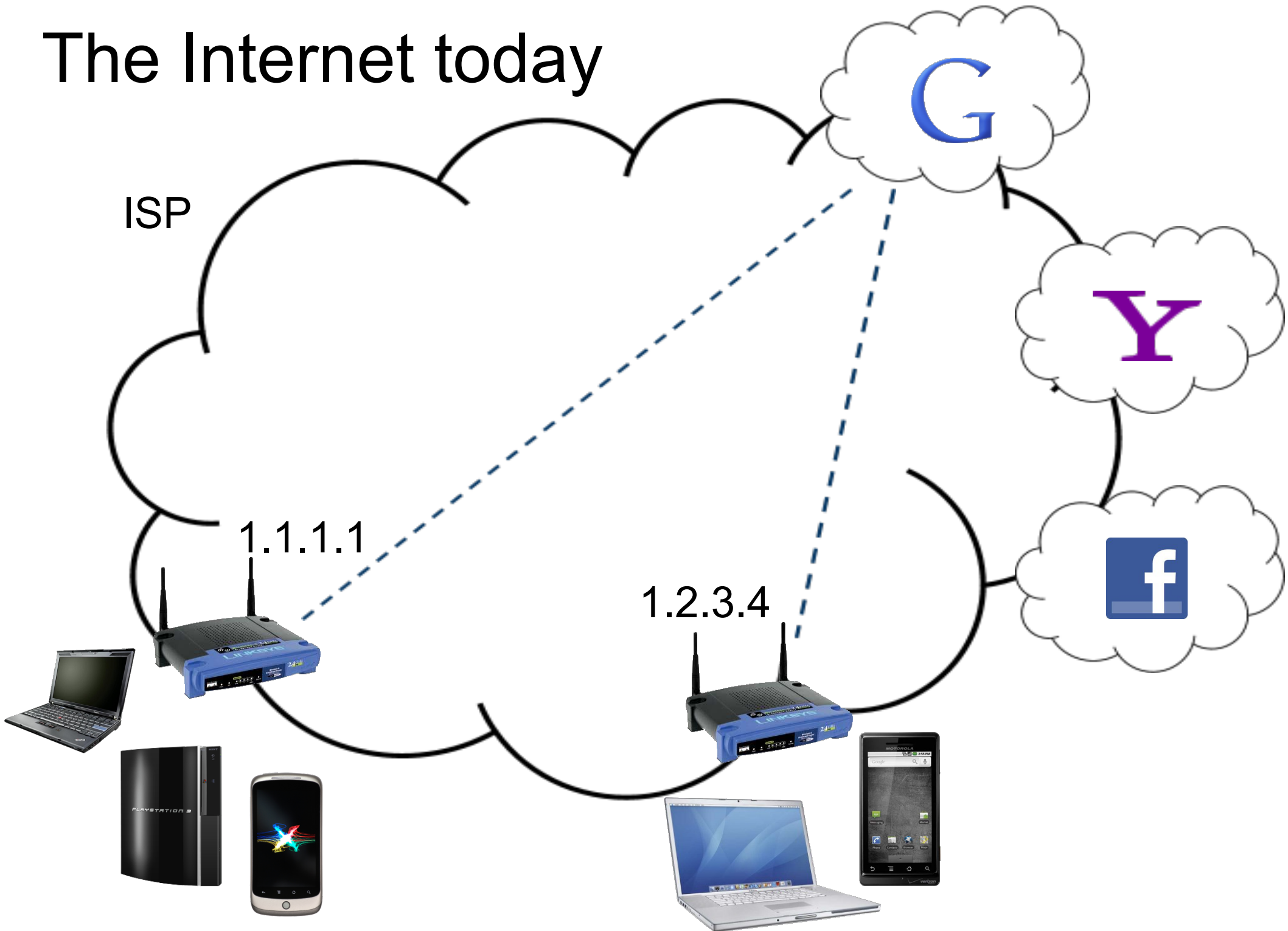# World IPv6 Day
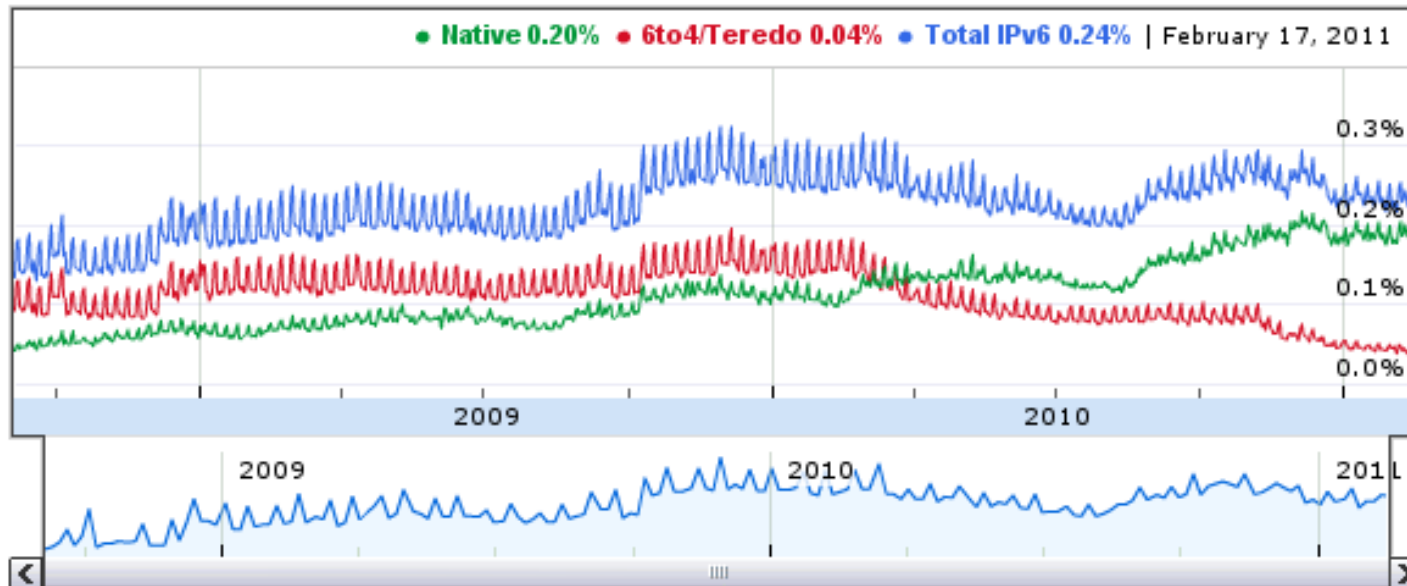
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What's the problem?
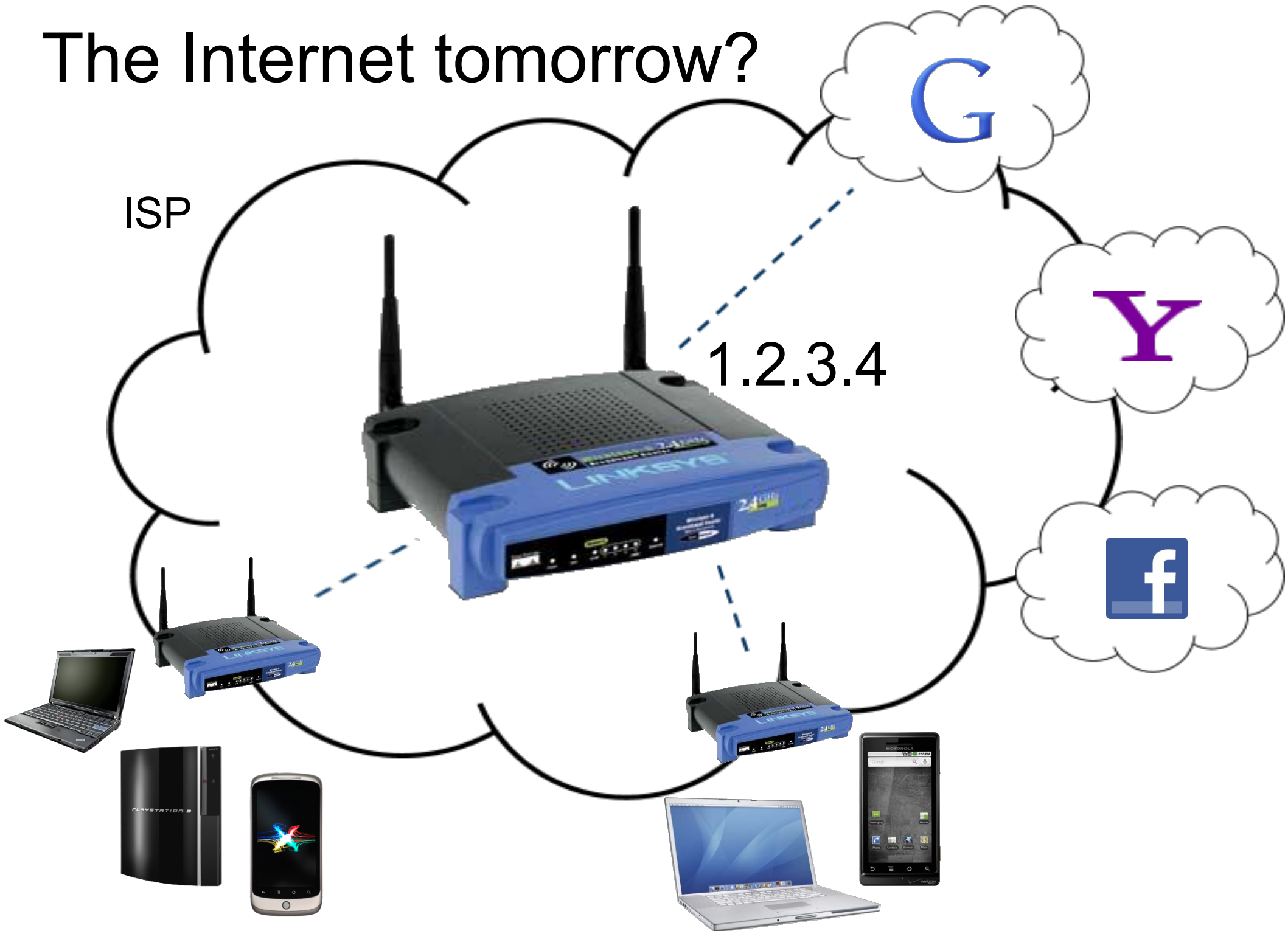
The Internet today

ISP

1.1.1.1

1.2.3.4

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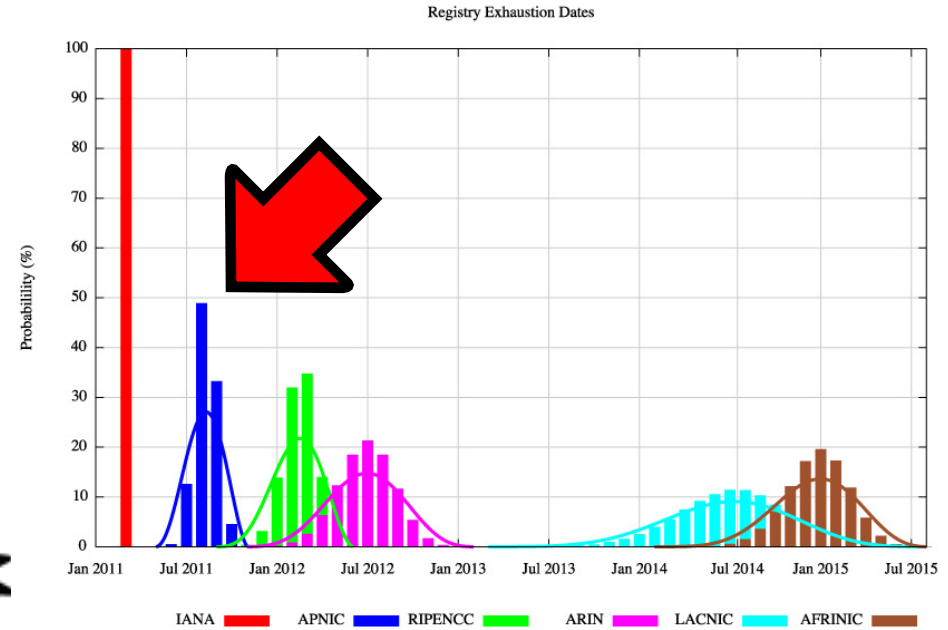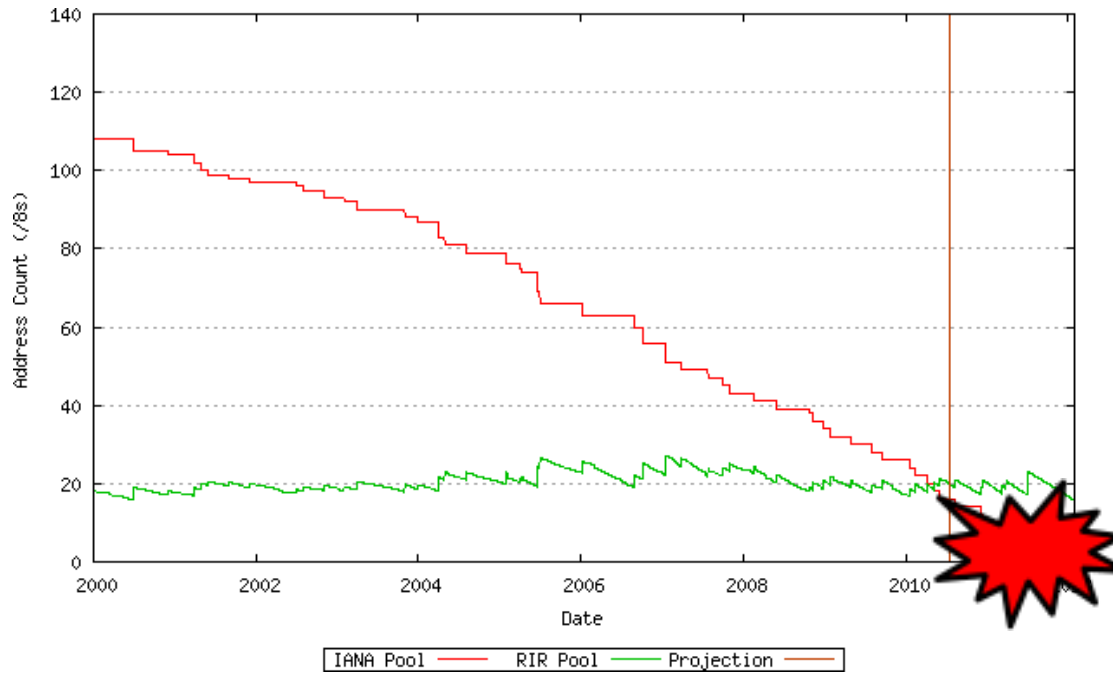
The Internet tomorrow?

ISP

1.2.3.4

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
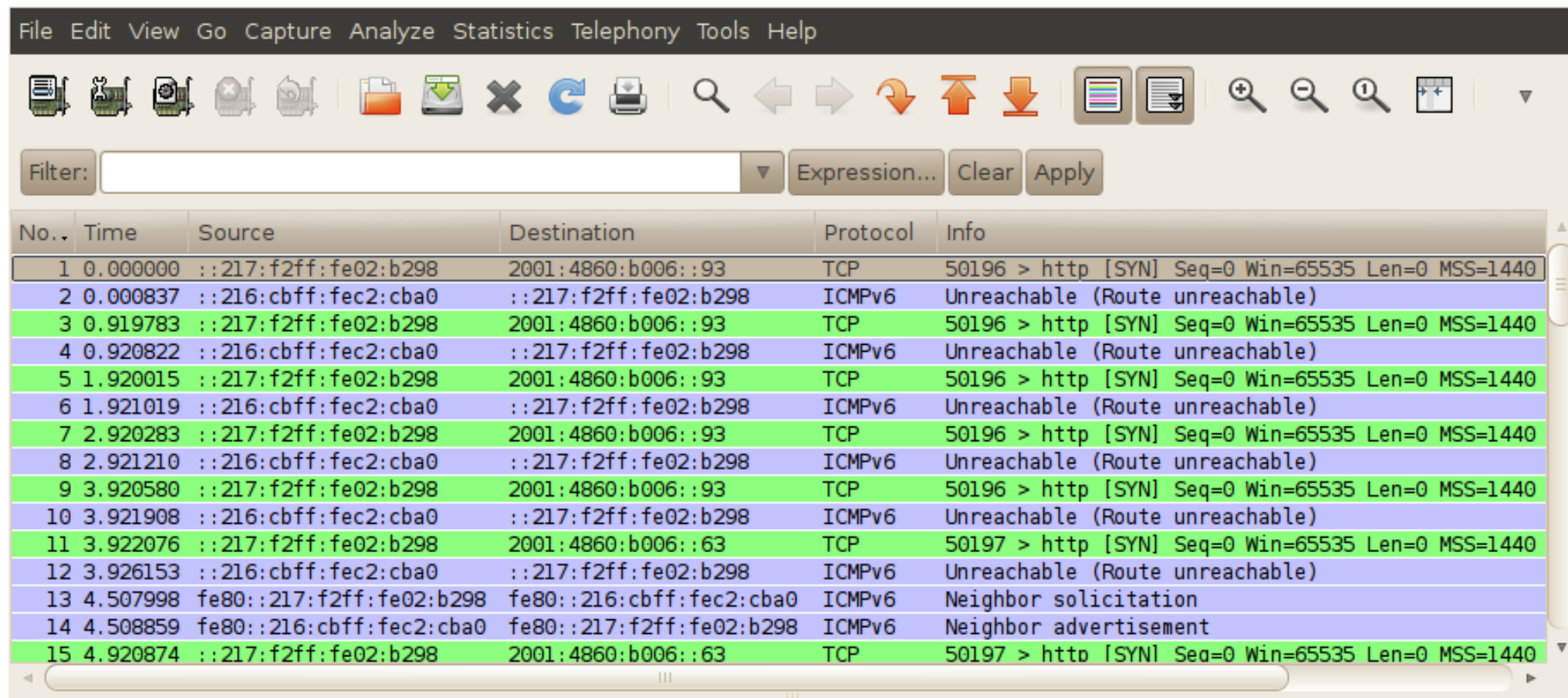 - Lack of IPv6 CPE standards

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

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
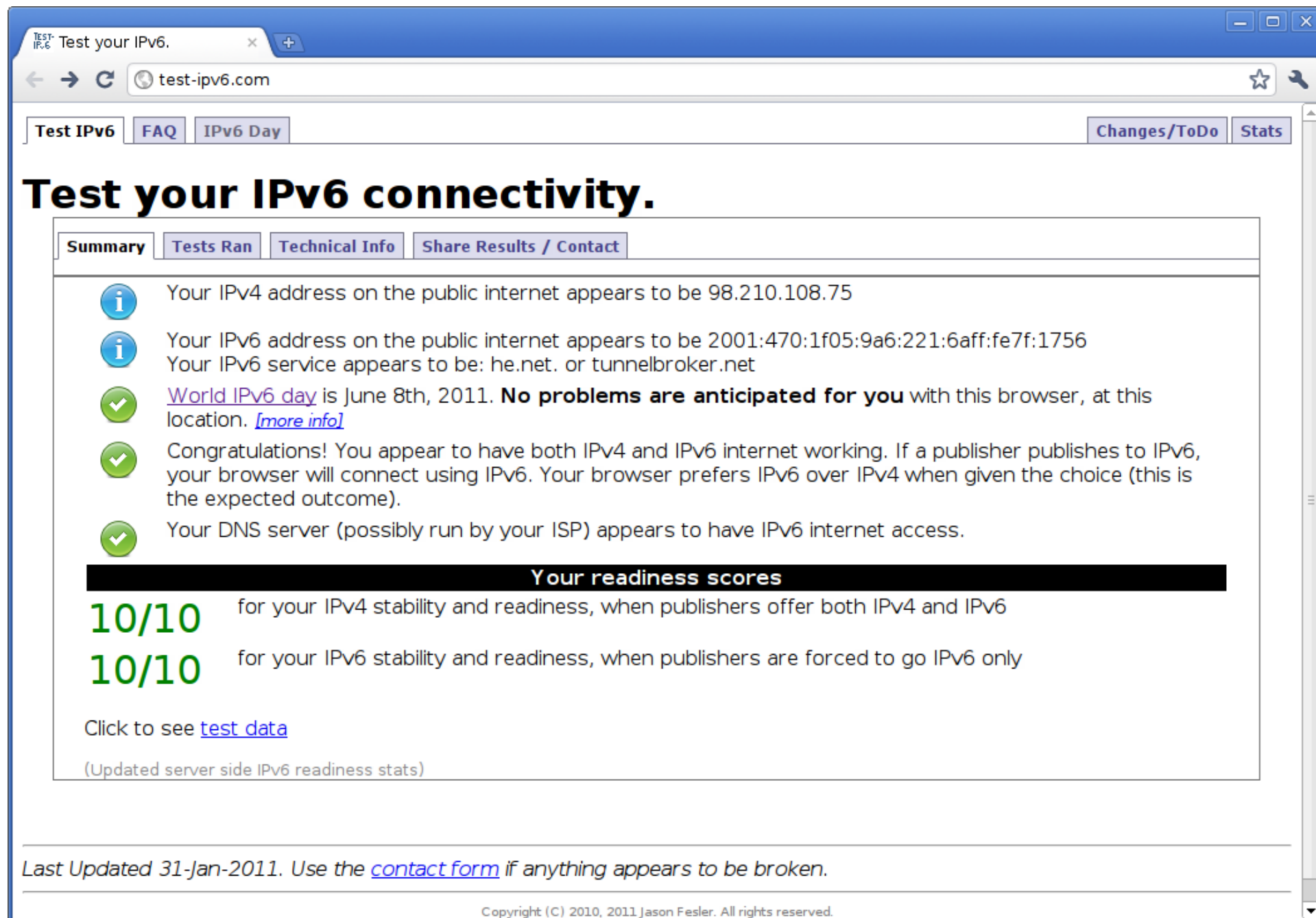 - Content can go to IPv6, and access can follow

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

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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