



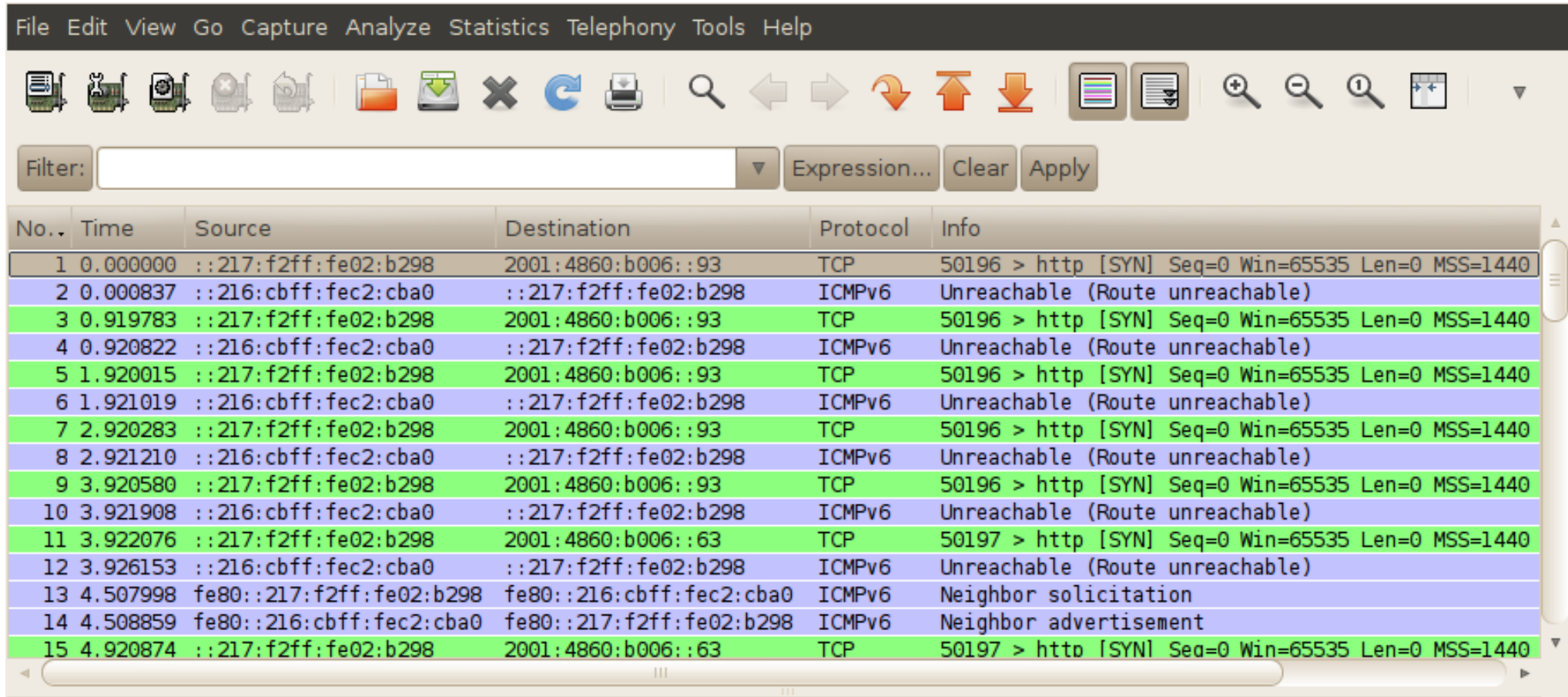
World IPv6 day

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What's the problem?

- Many OS stacks try IPv6 first, then fall back to IPv4
- Fast local failures are normal and transparent
- The problem is slow failures and timeouts
 - Windows: 20 seconds
 - Mac: 4 seconds
 - Linux: either instant or 3 minutes
- One timeout per AAAA record
 - `www.google.com` used to have 6 AAAAs
 - You do the numbers

An example



The screenshot shows a Wireshark interface with a list of 15 network packets. The packets are organized into a table with columns for No., Time, Source, Destination, Protocol, and Info. The traffic shows a sequence of TCP SYN attempts from source ::217:f2ff:fe02:b298 to various destinations, which are consistently blocked by ICMPv6 'Unreachable (Route unreachable)' messages. The destinations include 2001:4860:b006::93 and 2001:4860:b006::63. There are also two ICMPv6 Neighbor Solicitation and Neighbor Advertisement messages between source fe80::216:cbff:fec2:cba0 and destination fe80::217:f2ff:fe02:b298.

No.	Time	Source	Destination	Protocol	Info
1	0.000000	::217:f2ff:fe02:b298	2001:4860:b006::93	TCP	50196 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
2	0.000837	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
3	0.919783	::217:f2ff:fe02:b298	2001:4860:b006::93	TCP	50196 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
4	0.920822	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
5	1.920015	::217:f2ff:fe02:b298	2001:4860:b006::93	TCP	50196 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
6	1.921019	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
7	2.920283	::217:f2ff:fe02:b298	2001:4860:b006::93	TCP	50196 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
8	2.921210	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
9	3.920580	::217:f2ff:fe02:b298	2001:4860:b006::93	TCP	50196 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
10	3.921908	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
11	3.922076	::217:f2ff:fe02:b298	2001:4860:b006::63	TCP	50197 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440
12	3.926153	::216:cbff:fec2:cba0	::217:f2ff:fe02:b298	ICMPv6	Unreachable (Route unreachable)
13	4.507998	fe80::216:cbff:fec2:cba0	fe80::216:cbff:fec2:cba0	ICMPv6	Neighbor solicitation
14	4.508859	fe80::216:cbff:fec2:cba0	fe80::217:f2ff:fe02:b298	ICMPv6	Neighbor advertisement
15	4.920874	::217:f2ff:fe02:b298	2001:4860:b006::63	TCP	50197 > http [SYN] Seq=0 Win=65535 Len=0 MSS=1440

User with broken IPv6 in the Google over IPv6 program

What's wrong with this picture?

- Implementation bugs
 1. Home gateway sending out RA in reserved range (::/64)
 2. Host autoconfiguring an address in a reserved range
 3. Home gateway sending RAs even without connectivity
 4. Host attempting connections with no global address
 5. Host ignoring ICMPv6 unreachables
- Misconfiguration
 - Put home gateway in 6to4 mode behind a NAT
- Impact
 - All Google sites take **24 seconds** to load

What does this mean?

- Problem: home network is broken
- Perception: "Google is broken"
 - All other dual-stack sites are broken as well
 - But user didn't notice
 - User doesn't realize there is a problem
 - Never calls ISP
 - Suffers in silence, goes to another website, ...
- Our data shows that ~0.05% of users has this problem
 - *All the time, every time they connect*
- This is the #1 reason content providers cannot enable IPv6

"World IPv6 day"

Basic idea

- Major websites **enable IPv6** together for one day
- User perceives a problem with Internet connection
 - Calls ISP
 - Disables IPv6
- Benefits of coordination
 - Content providers share the impact
 - OS vendors have time to work around problems
 - Network operators can be prepared
 - Users can be warned in advance
 - Marketing and media can be involved

Current thinking

- Note: work in progress!
 - Nothing decided yet
 - Nobody has committed to anything
- ISOC-organized
- Possible date: 6/6/2011
 - Should be well past IANA runout
- Major content providers involved in discussion
 - Google, Facebook, Yahoo!
 - Akamai, Limelight
 - Netflix, AOL
 - ... the more the merrier

How can you help?

- Content providers
 - Deploy IPv6 and participate
 - Ask your CDN vendor to let you participate
- ISPs
 - Provide separate DNS servers for IPv6 users
 - Train user support
 - Replace broken user CPEs?
 - Deploy IPv6, including IPv6-capable CPEs

How can you help?

- OS vendors
 - Fix bugs
 - Depref 6to4
 - Probe for working IPv6, disable if it's not working
 - Need to patch old systems as well!
- Home router vendors
 - Provide robust IPv6 support
 - Turn off 6to4!



Questions?

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