draft-wing-http-new-tech

Happy Eyeballs: Successful Introduction of New Technology to HTTP

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Why ?

- There's a problem to select IPv4/IPv6/TCP/SCTP

- Important to keep the same URL

    - You can retrieve the copy of these slides at http2sctp://
      www.ipv7.dwing.org/

- Existing application behaviour needs to be improved

V4 vs. V6: AAAA not enough ?

- Routing issues for tunneled IPv6 with some sites

- Some sites put ::1 into AAAA record

- IPv4 may be faster than IPv6... or not...

- "accidental IPv6"

IPv6 versus IPv4 performance

http://www.employees.org/~dwing/plot-speed.png
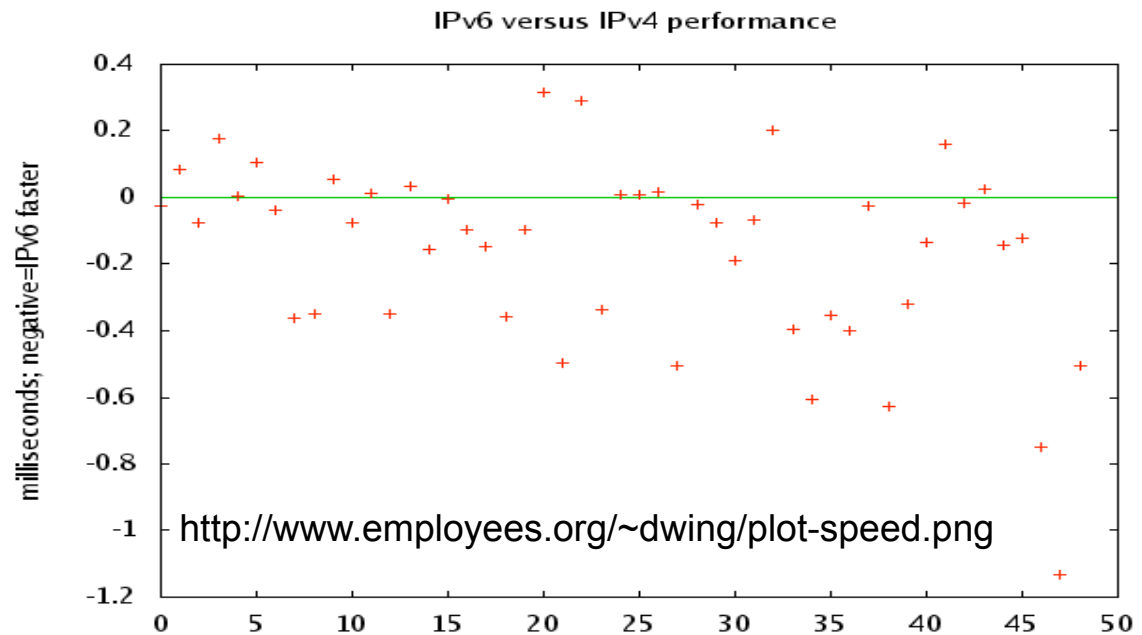
Proposal

- Try everything – IPv4, IPv6, SCTP, TCP
  - A little bit like ICE

- But be careful in doing so
  - Be persistent but not rude
  - Have the "Plan B" ready
    - Fallback to IPv4 TCP

IPv4 vs. IPv6: a tortoise and a hare

- P = IPv4/IPv6 preference
  - P<0 => prefer IPv4
  - P>0 => prefer IPv6
    - delay the other by 10*abs(P) ms
- If the favourite wins
  - Favourite was IPv4: decrement P
  - Favourite was IPv6: increment P
- If the favourite loses – plan B
  - Half P's absolute value
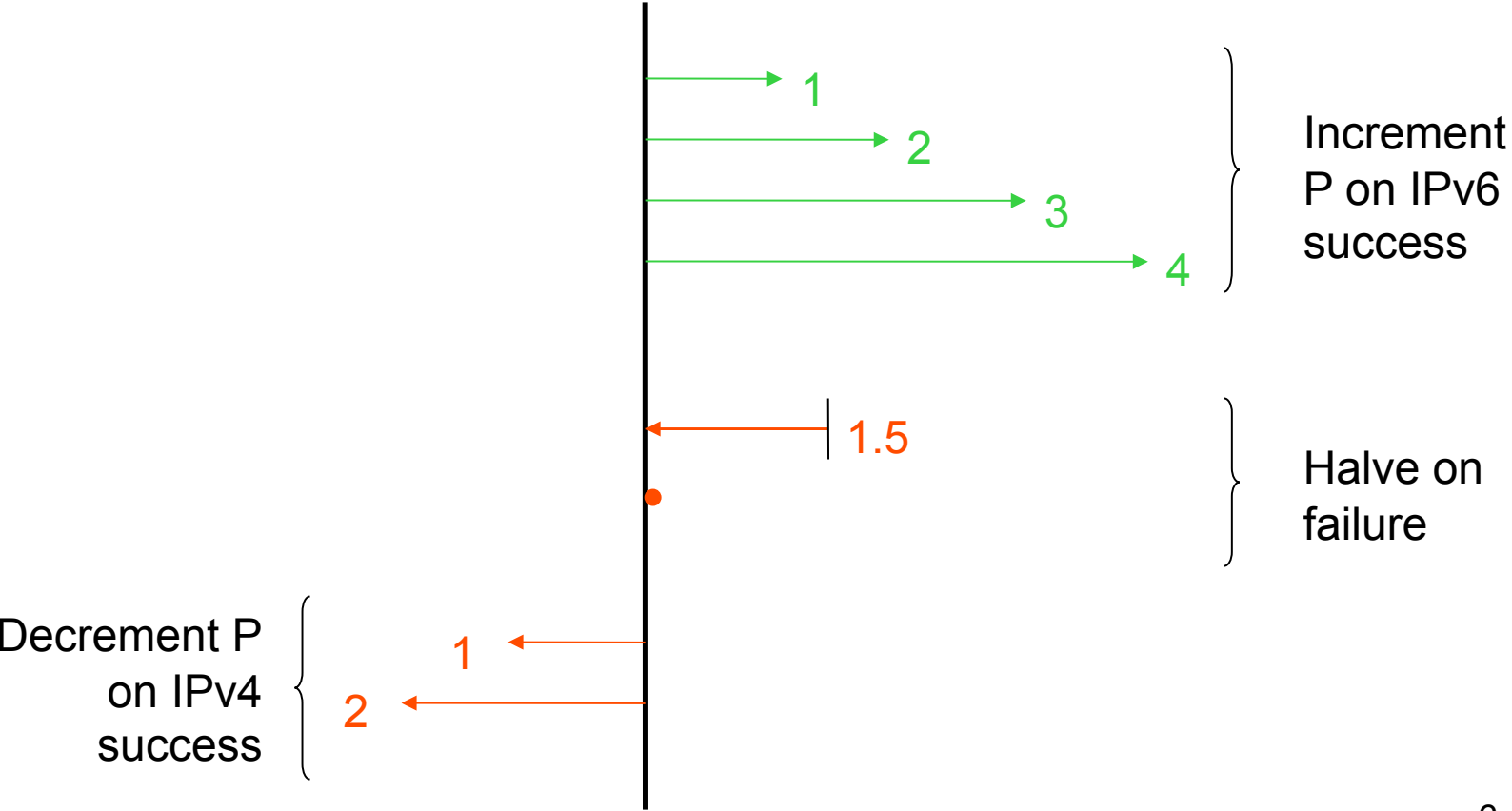- **If the winner is fast enough, the loser might not even need to start**

IPv4 vs. IPv6: graphical view

prefer IPv4 first   simultaneous   prefer IPv6 first

1

2

3

4

Increment
P on IPv6
success

1.5

Halve on
failure

Decrement P
on IPv4
success

1

2

SCTP vs. TCP

- Pref: Per-destination transport preference; Default = "BOTH"

- Pref is SCTP or BOTH: fork SCTP connection attempt

    - If IPv4: try SCTP over UDP in parallel too

    - Allow
      w
      m
      ax(SWAIT, TCP connect time) for SCTP to maybe complete

    - If SCTP succeeded Pref = SCTP; else Pref = TCP ('Plan B')

        - Why: SCTP is better than TCP

- Pref is TCP or BOTH: fork TCP connection attempt

    - If
      TCP
      s
      ucceeded earlier than SCTP, the app may use TCP this time.

Tests

- TCPv4 vs. TCPv6

  - Pthreads-based library that exports function to return an in-progress fd that becom
    e
    s writable as soon as one of the threads completes connection.

  - Links browser
    http://
    lin
    k
    s.sourceforge.net/ - simplest to modify (single-threaded design)

Other new technologies

- Multipath TCP

- Other applications
    - Instant messaging

Discussion

- ... do you agree there is a problem?
  - Half-working IPv6 is bad
  - Middleboxes

- ... do you agree the URI should be the same?
  - Users share URIs on mail, IMs, FB, phone

- ...