# ALT-SVC FOR THE PEOPLE

H.T.T.P

ft. Lucas Pardue

MORNING TEAM
09:00
VABH
+ 12.0
LE TALK – 9:15 UPDATE – 9:17 ALLEN ABOUT – EXPOSE – MORNING TEAM – RESI

# Alt-Svc RFC 7838

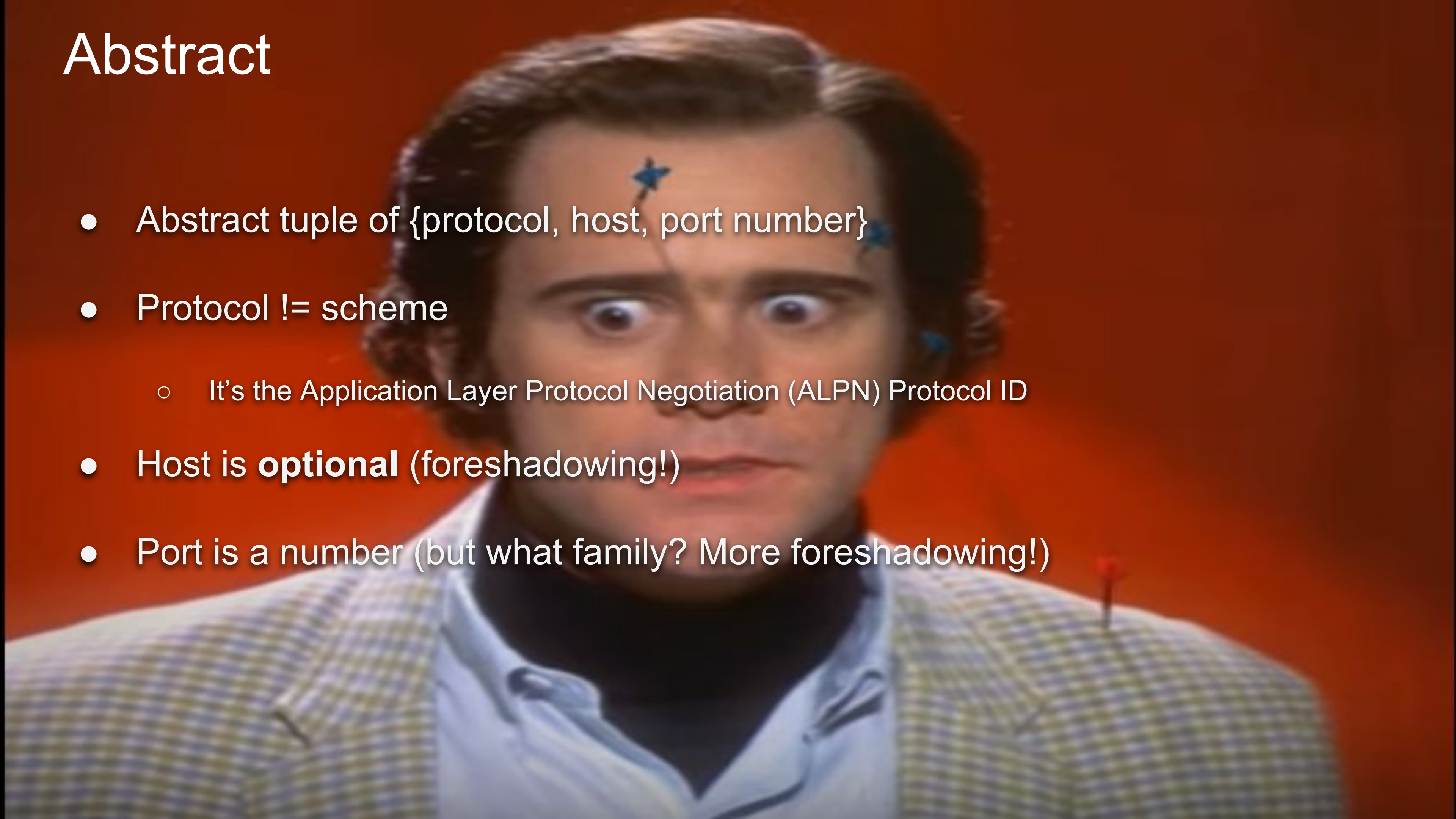
- Motivation? See next slide
- Alternatives == Origins
  - Fully authoritative **iff** reasonable assurance

“When an origin has resources that are accessible through a different protocol/host/port combination, it is said to have an alternative service

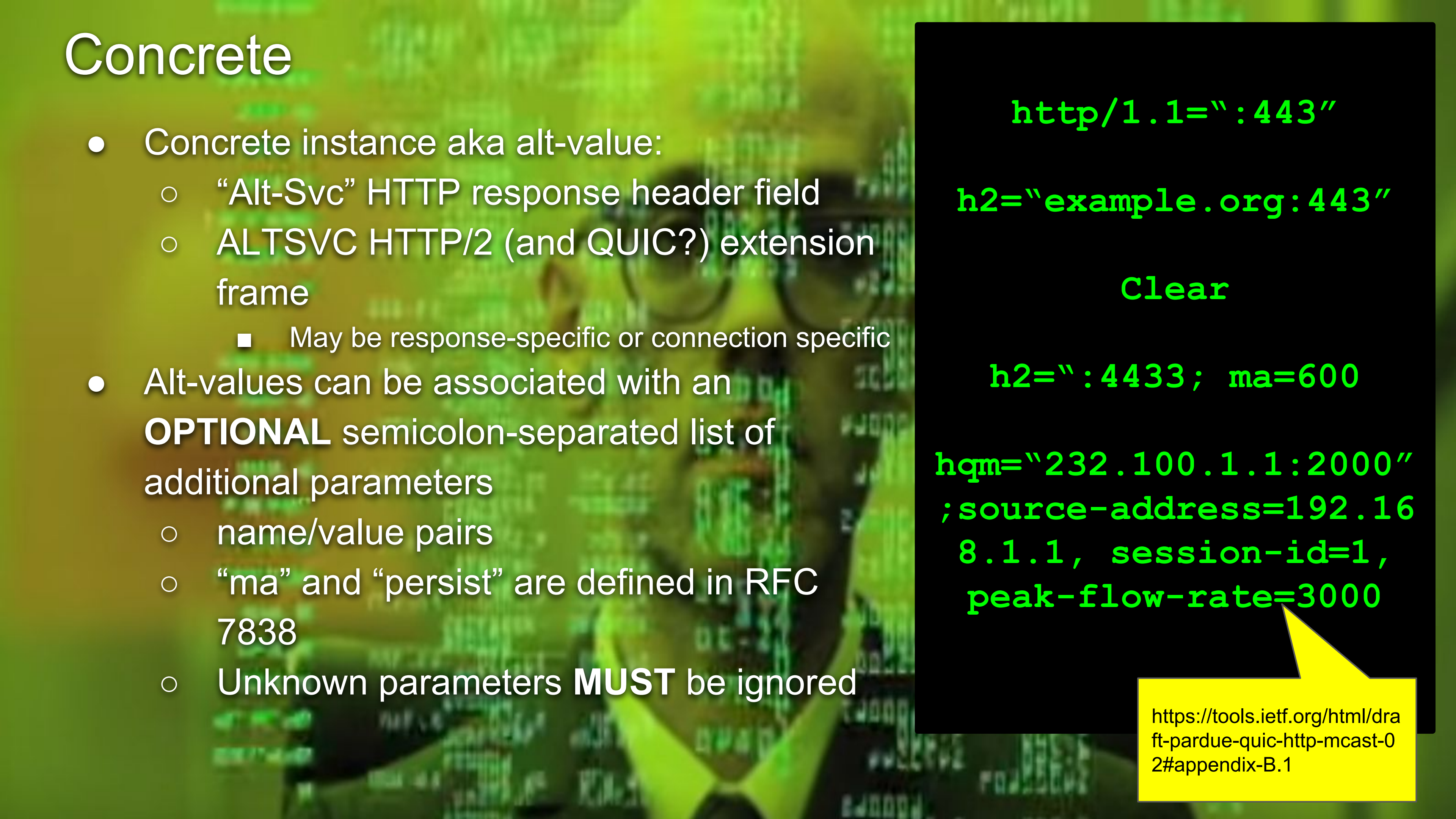
# Shiny HTTP

Shiny HTTP

# Abstract



- Abstract tuple of {protocol, host, port number}
- Protocol != scheme
  - It’s the Application Layer Protocol Negotiation (ALPN) Protocol ID
- Host is **optional** (foreshadowing!)
- Port is a number (but what family? More foreshadowing!)

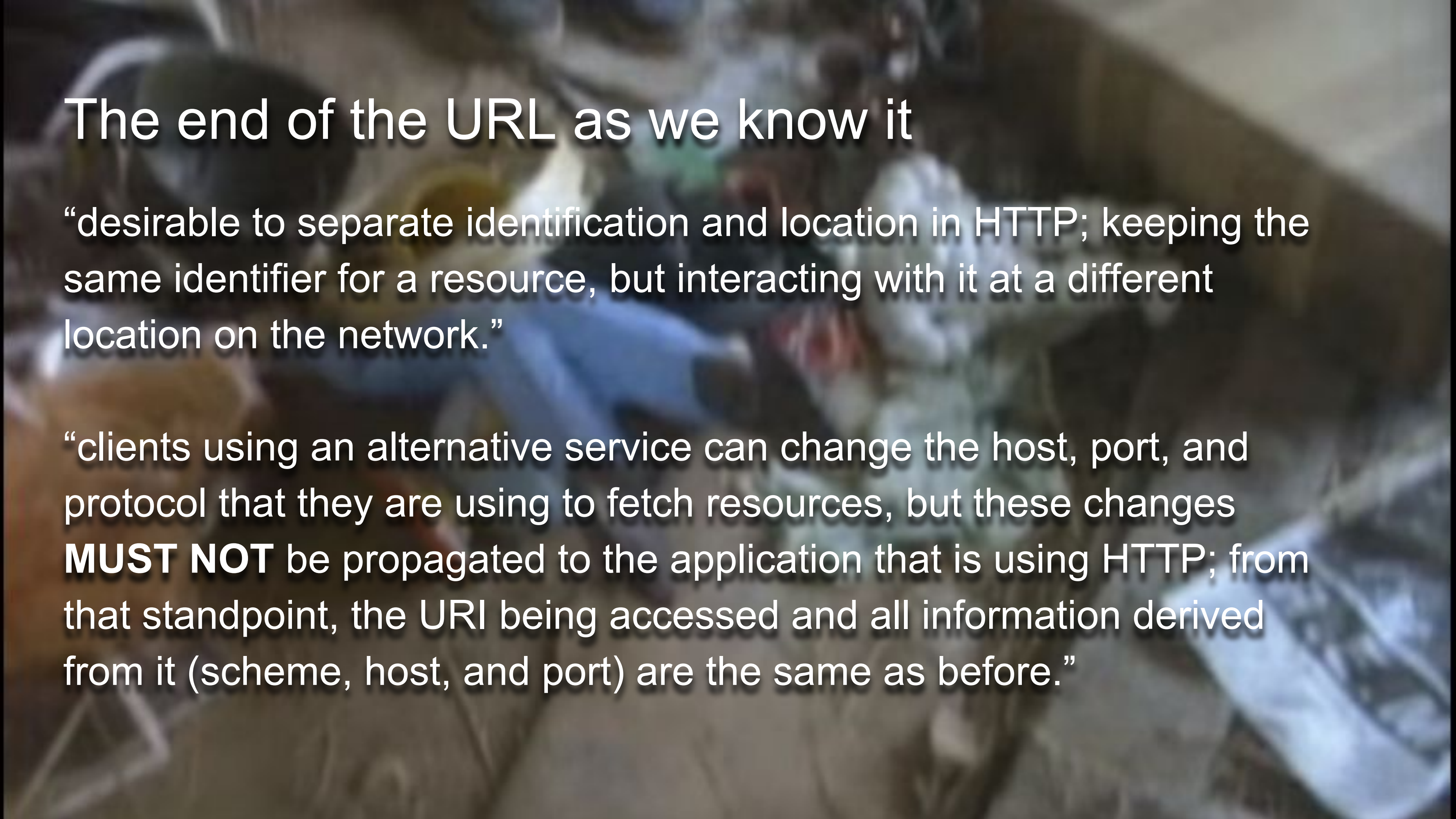


# Concrete

- Concrete instance aka alt-value:
  - “Alt-Svc” HTTP response header field
  - ALTSVC HTTP/2 (and QUIC?) extension frame
    - May be response-specific or connection specific
- Alt-values can be associated with an **OPTIONAL** semicolon-separated list of additional parameters
  - name/value pairs
  - “ma” and “persist” are defined in RFC 7838
  - Unknown parameters **MUST** be ignored

```
http/1.1=“:443”

h2=“example.org:443”

Clear

h2=“:4433; ma=600

hqm=“232.100.1.1:2000”
;source-address=192.16
8.1.1, session-id=1,
peak-flow-rate=3000
```

https://tools.ietf.org/html/draft-pardue-quic-http-mcast-02#appendix-B.1

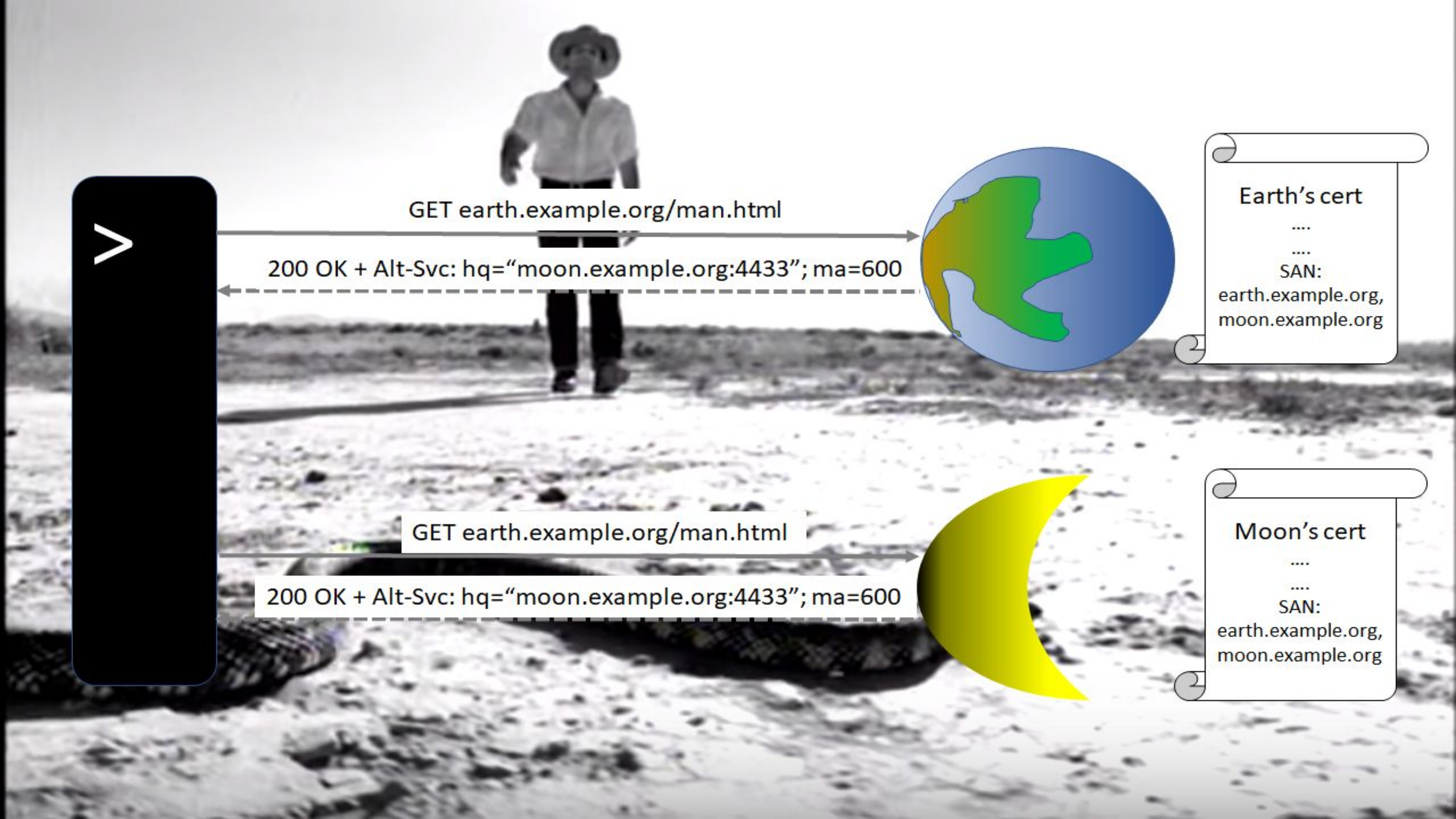


# The end of the URL as we know it

“desirable to separate identification and location in HTTP; keeping the same identifier for a resource, but interacting with it at a different location on the network.”

“clients using an alternative service can change the host, port, and protocol that they are using to fetch resources, but these changes **MUST NOT** be propagated to the application that is using HTTP; from that standpoint, the URI being accessed and all information derived from it (scheme, host, and port) are the same as before.”

Nobody can see me.



>

GET earth.example.org/man.html

200 OK + Alt-Svc: hq=“moon.example.org:4433”; ma=600

Earth’s cert
....
....
SAN:
earth.example.org,
moon.example.org

GET earth.example.org/man.html

200 OK + Alt-Svc: hq=“moon.example.org:4433”; ma=600

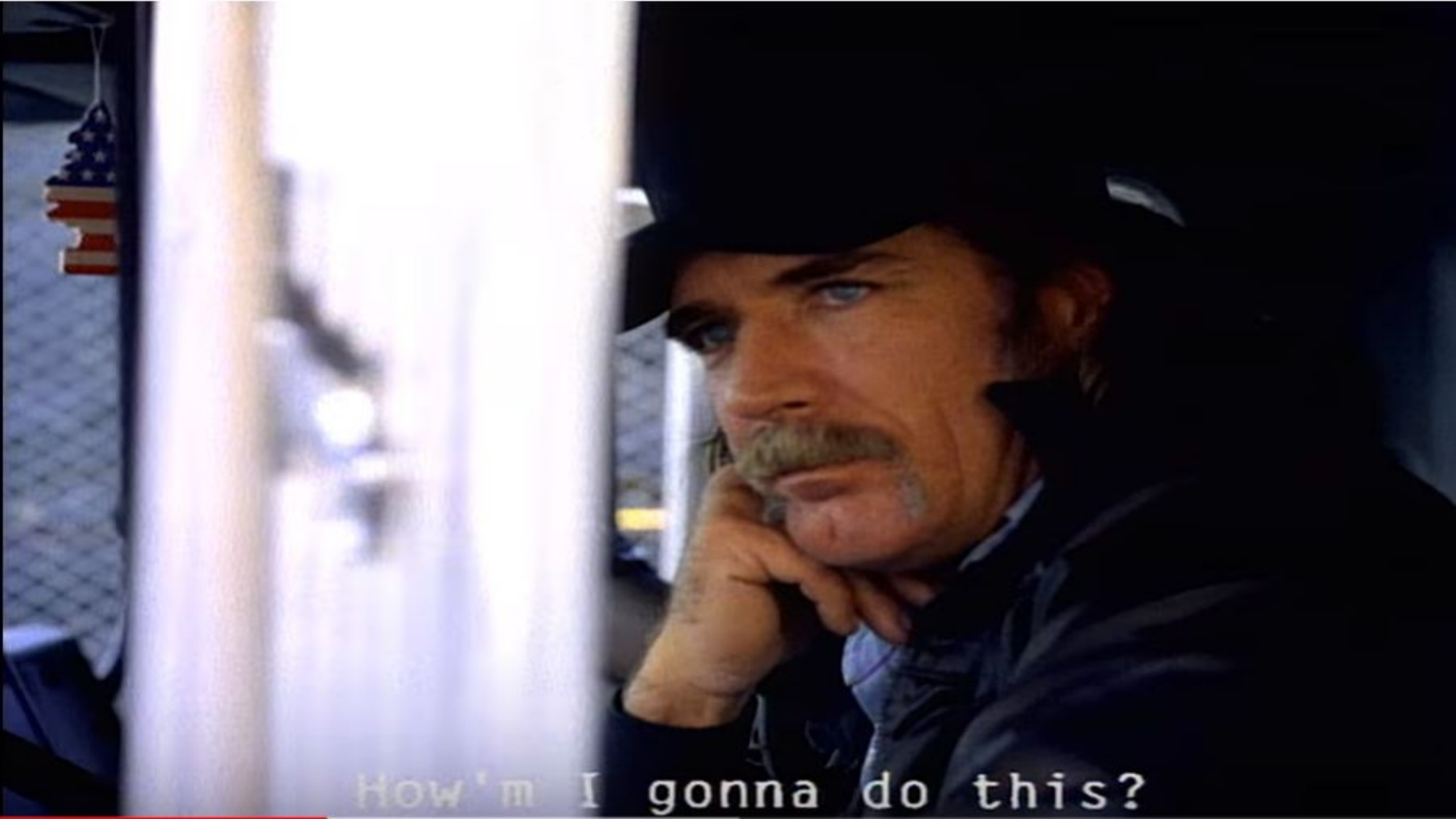
Moon’s cert
....
....
SAN:
earth.example.org,
moon.example.org

Consider this, the hint of the century

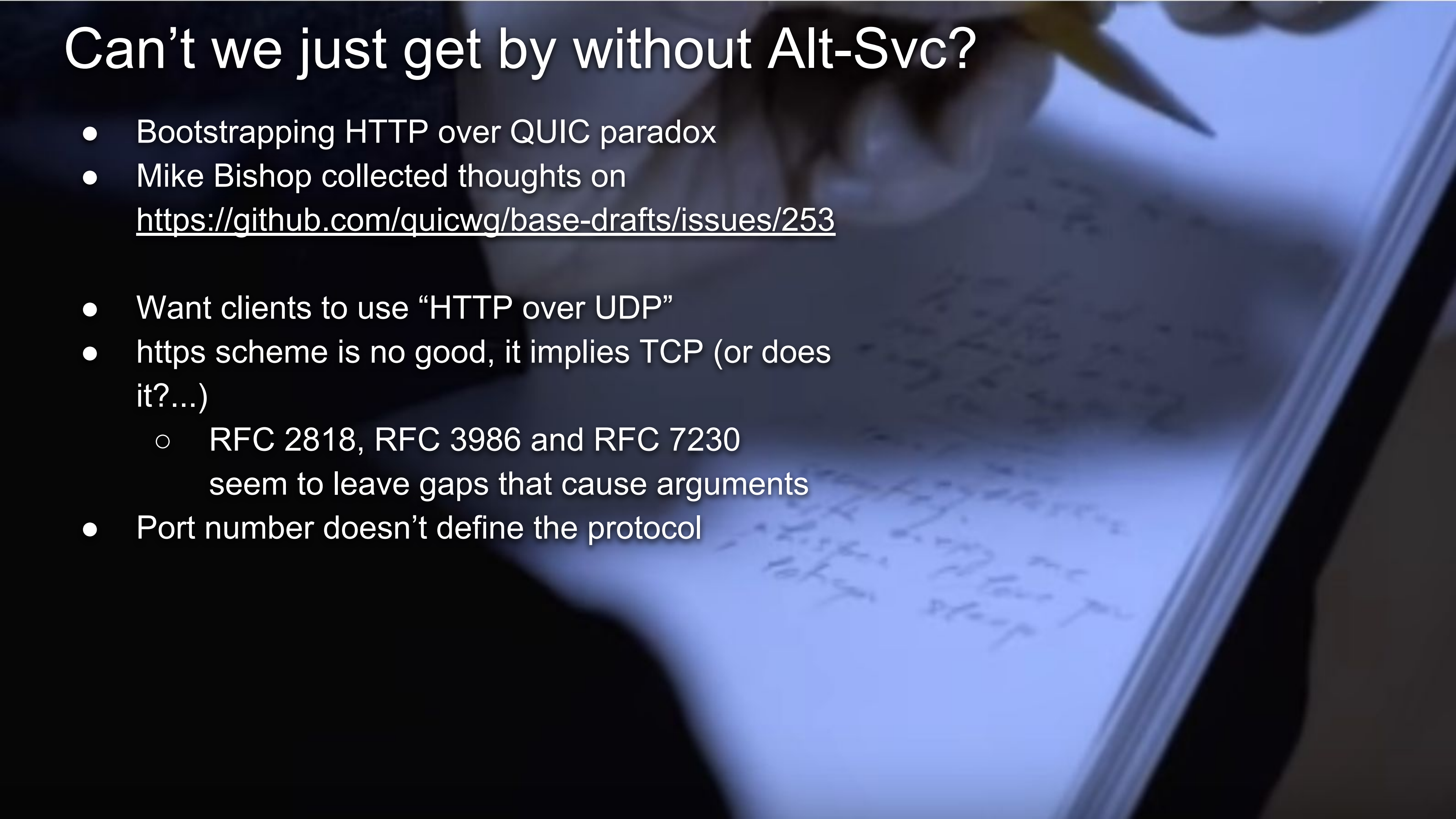
# Happy Alt-Balls

# Caching

- Alternative are default fresh for 24 hours
  - “ma” parameter, measured in seconds
- Alt-Svc adverts update the freshness
  - Alternatives can update their own freshness
- The special alt-value “clear” can clear an entry
- By default, Alt-Svc is cleared on a network change
  - The “persist” parameter can be used to avoid this behaviour
- Connection to the alternative service fails or is unresponsive?
- the client **MAY** fall back to using the origin or another alternative service.
- What happens if connection works but the service (application-layer) has problems?
  - E.g. 500 errors…


How'm I gonna do this?

# Can’t we just get by without Alt-Svc?



- Bootstrapping HTTP over QUIC paradox
- Mike Bishop collected thoughts on https://github.com/quicwg/base-drafts/issues/253

- Want clients to use “HTTP over UDP”
- https scheme is no good, it implies TCP (or does it?...)
  - RFC 2818, RFC 3986 and RFC 7230 seem to leave gaps that cause arguments
- Port number doesn’t define the protocol

# Shiny HTTP

Shiny HTTP

QUIC WG Editor?

QUIC WG Co-chair

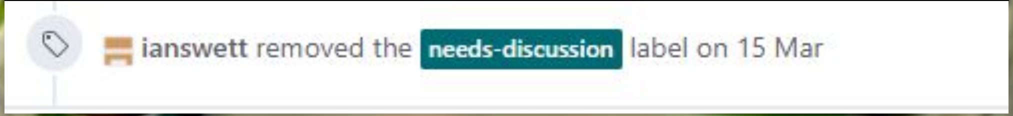
QUIC WG Co-chair

IETF Transport Area Directors

# Try QUIC for all http URLs!

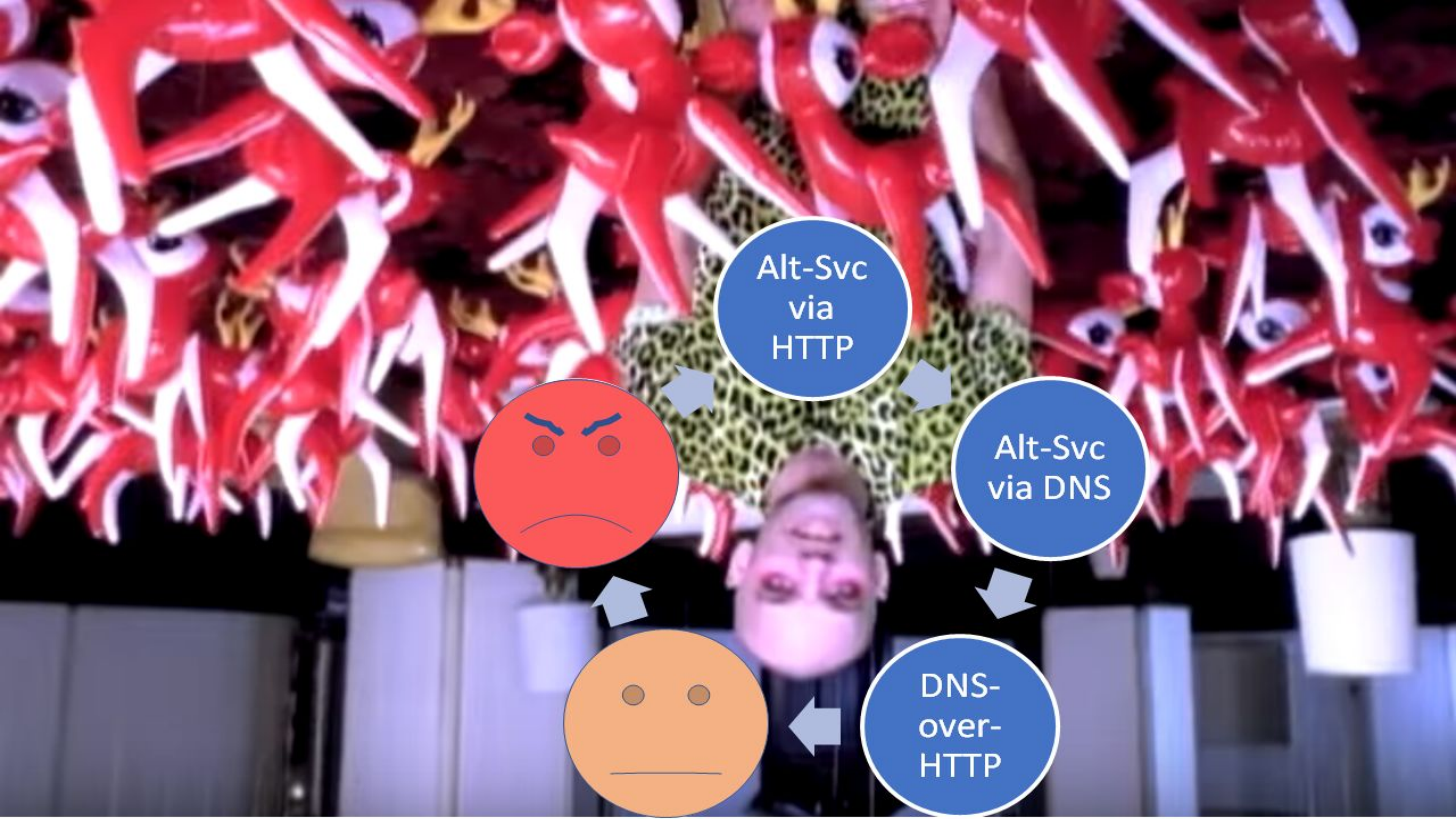
# httpq scheme

https://github.com/quicwg/base-drafts/pull/348
Open for > 1 year



ianswett removed the needs-discussion label on 15 Mar

# Learn about QUIC using Alt-Svc via TCP

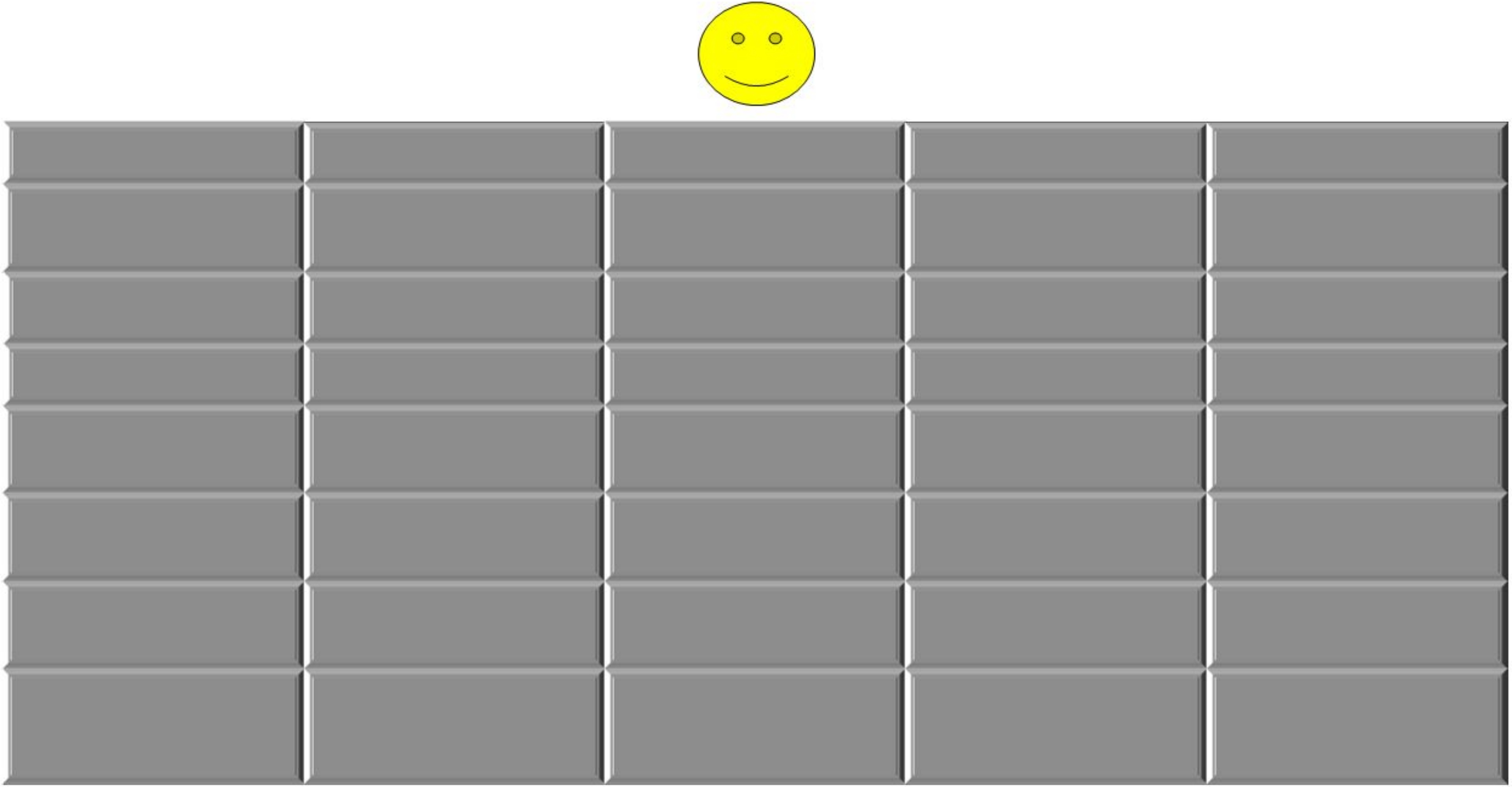


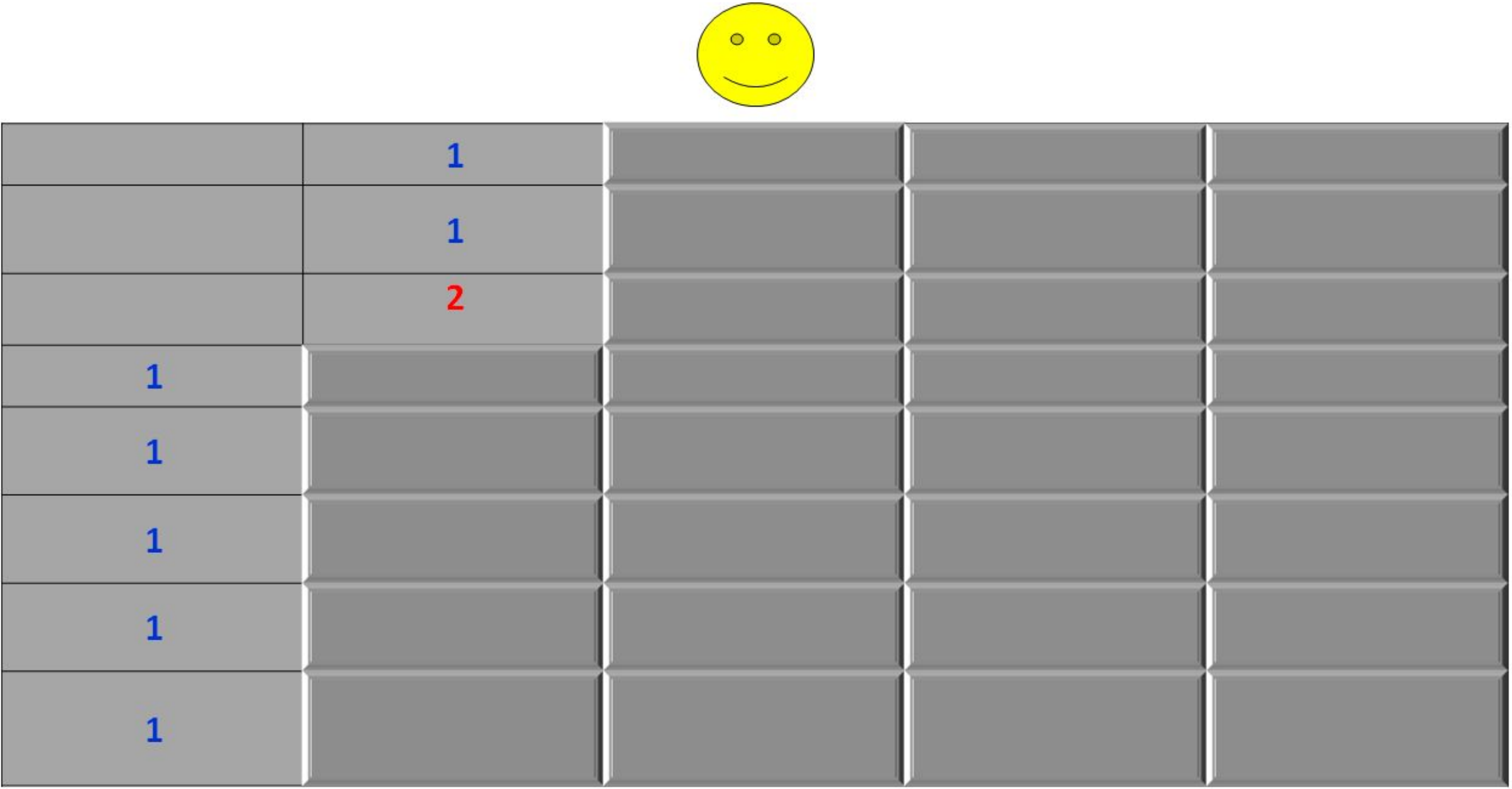
Alt-Svc via HTTP

Alt-Svc via DNS

DNS-over-HTTP

C'MON C'MON

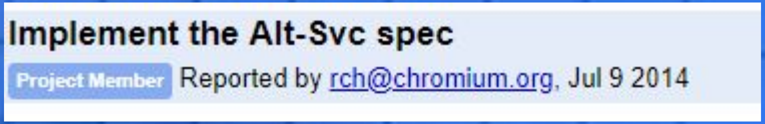




|  |  |  |  |  |
|---|---|---|---|---|
|  | 1 |  |  |  |
|  | 1 |  |  |  |
|  | 2 |  |  |  |
| 1 |  |  |  |  |
| 1 |  |  |  |  |
| 1 |  |  |  |  |
| 1 |  |  |  |  |
| 1 |  |  |  |  |

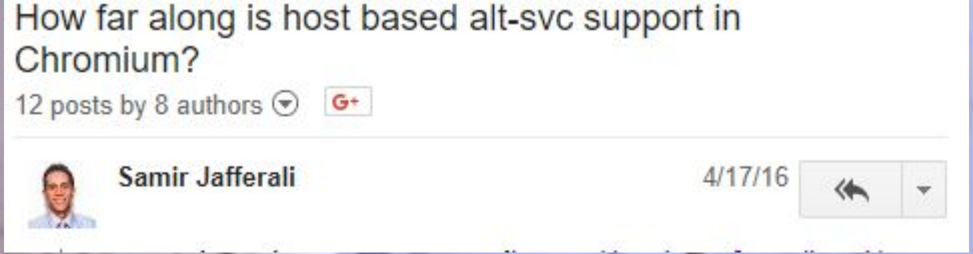
| | | | | |
|---|---|---|---|---|
| | 1 | Ignore *persist* parameter | Take responsibility for selecting Alt-Svc | “Reasonable assurance” |
| | 1 | Ignore cache persistence | Couple Alt-Svc too tightly into application/library | Forget to prevent Alt-Svc security downgrade |
| | 2 | Forget to time out Alt-Svc according to *ma* | Forget ALTSVC frame altogether | Forget parameter extensions |
| 1 | Scrape Alt-Svc header | Forget to refresh Alt-svc according to *ma* | Forget ALTSVC frame on connection | Ignore sever errors |
| 1 | Expose Alt-Svc to client | Forget misdirect request status 421 | Forget to combine Alt-Svc header and ALTSVC frame | Ignore hostname |
| 1 | Take responsibility of managing Alt-Svc validity | Forget ORIGIN frame | Forget Alt-Svc DNS record | Forget client may want experimental schemes |
| 1 | Ignore network conditions | Forget server push | Forget to combine Alt-Svc header, ALTSVC frame and DNS record | Happy Alt-balls |
| 1 | “Connection coalescing” | Forget QUIC out-of-order delivery | Ignore *clear* value | Alt-Svc loops |

https://bugs.chromium.org/p/chromium/issues/detail?id=392575



**Implement the Alt-Svc spec**

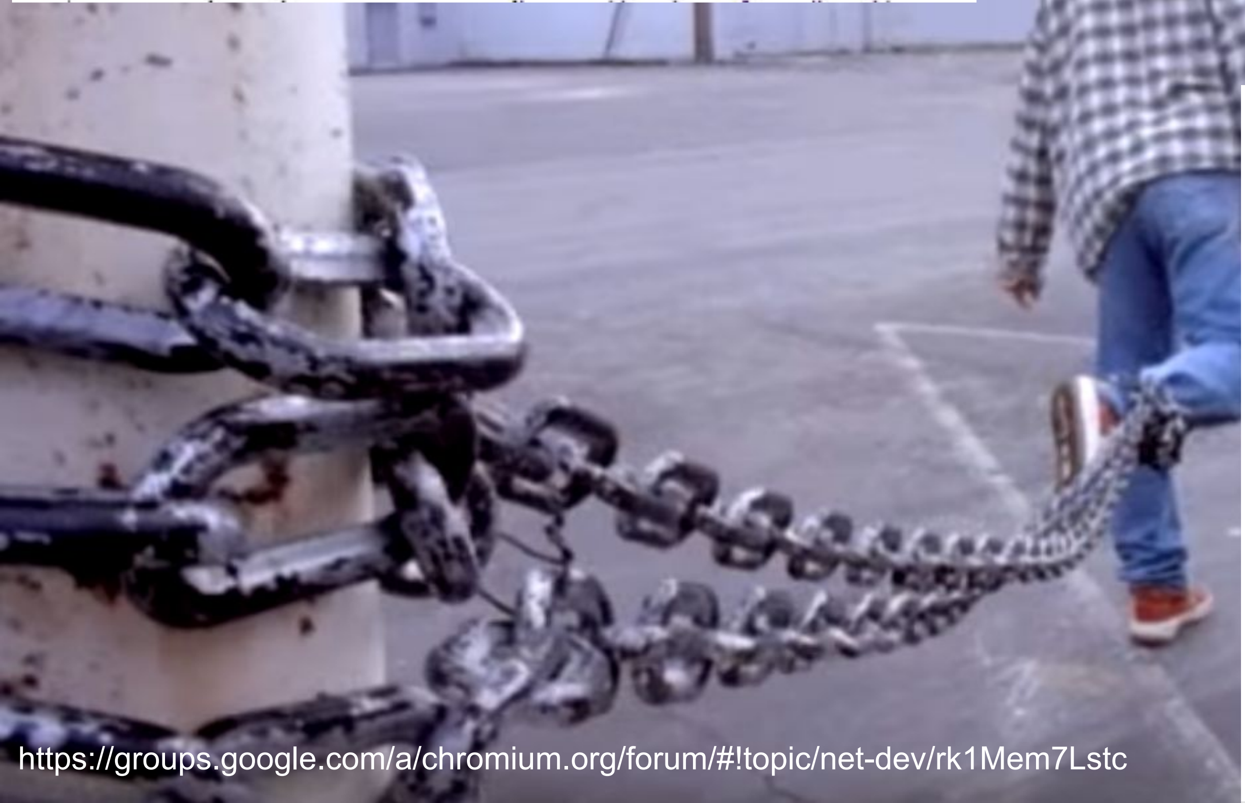
Project Member Reported by rch@chromium.org, Jul 9 2014



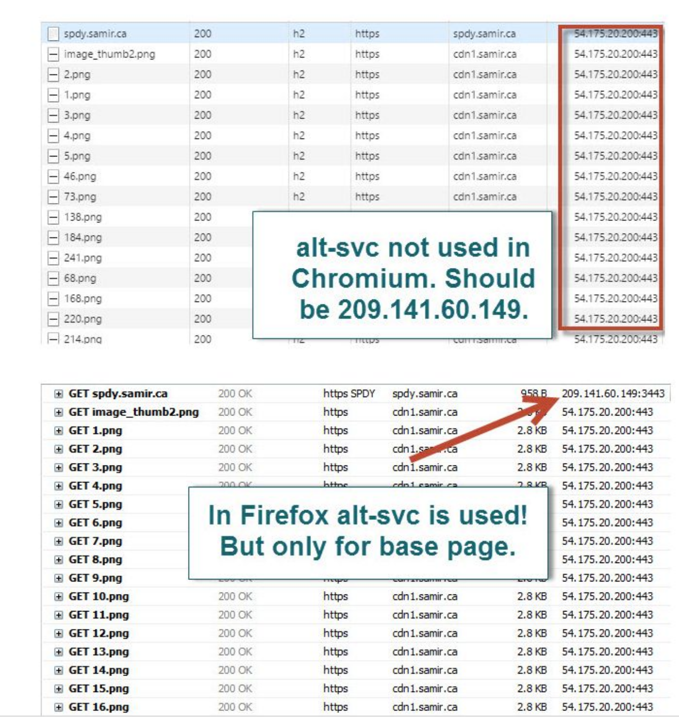
How far along is host based alt-svc support in Chromium?

12 posts by 8 authors

Samir Jafferali 4/17/16



https://groups.google.com/a/chromium.org/forum/#!topic/net-dev/rk1Mem7Lstc

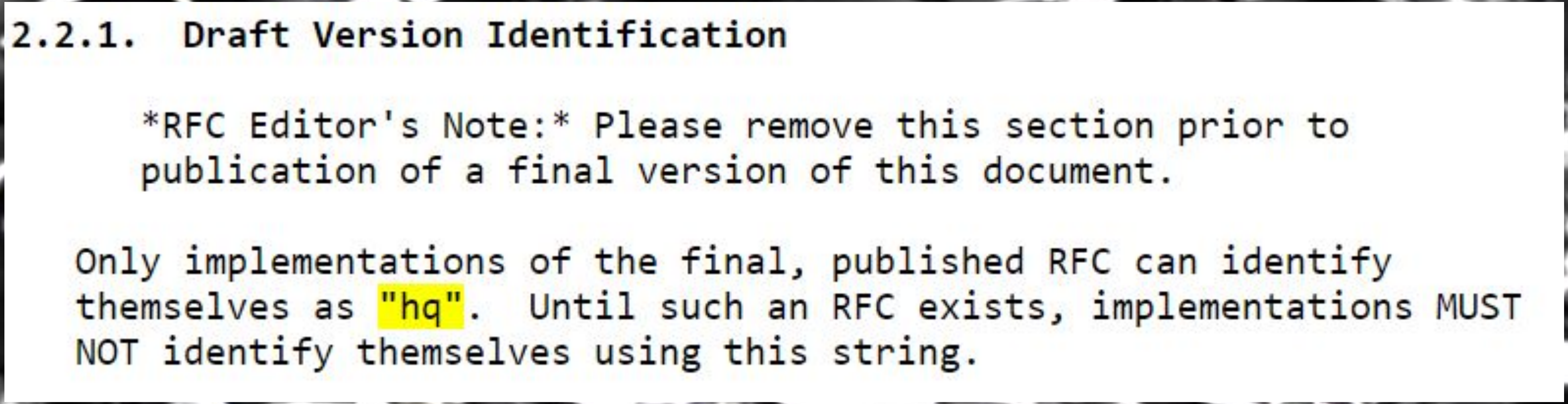


| | | | | | |
|---|---|---|---|---|---|
| spdy.samir.ca | 200 | h2 | https | spdy.samir.ca | 54.175.20.200:443 |
| image_thumb2.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 2.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 1.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 3.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 4.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 5.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 46.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 73.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |
| 138.png | 200 | | | | 54.175.20.200:443 |
| 184.png | 200 | | | | 54.175.20.200:443 |
| 241.png | 200 | | | | 54.175.20.200:443 |
| 68.png | 200 | | | | 54.175.20.200:443 |
| 168.png | 200 | | | | 54.175.20.200:443 |
| 220.png | 200 | | | | 54.175.20.200:443 |
| 214.png | 200 | h2 | https | cdn1.samir.ca | 54.175.20.200:443 |

alt-svc not used in Chromium. Should be 209.141.60.149.

| | | | | | |
|---|---|---|---|---|---|
| GET spdy.samir.ca | 200 OK | https SPDY | spdy.samir.ca | 958 B | 209.141.60.149:3443 |
| GET image_thumb2.png | 200 OK | https | cdn1.samir.ca | [illegible] | 54.175.20.200:443 |
| GET 1.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 2.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 3.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 4.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 5.png | | | | | 54.175.20.200:443 |
| GET 6.png | | | | | 54.175.20.200:443 |
| GET 7.png | | | | | 54.175.20.200:443 |
| GET 8.png | | | | | 54.175.20.200:443 |
| GET 9.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 10.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 11.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 12.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 13.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 14.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 15.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |
| GET 16.png | 200 OK | https | cdn1.samir.ca | 2.8 KB | 54.175.20.200:443 |

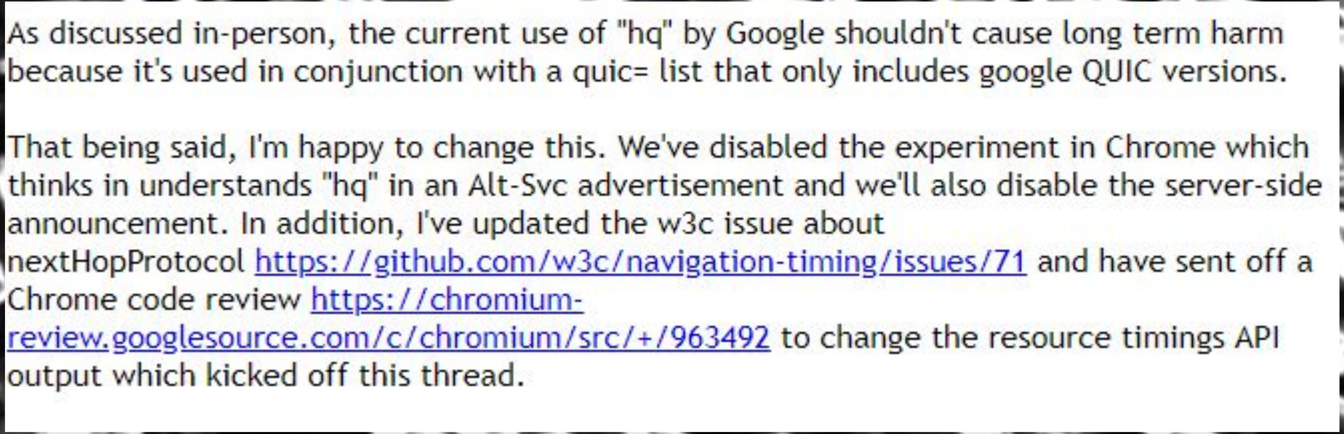
In Firefox alt-svc is used! But only for base page.



2.2.1.  Draft Version Identification

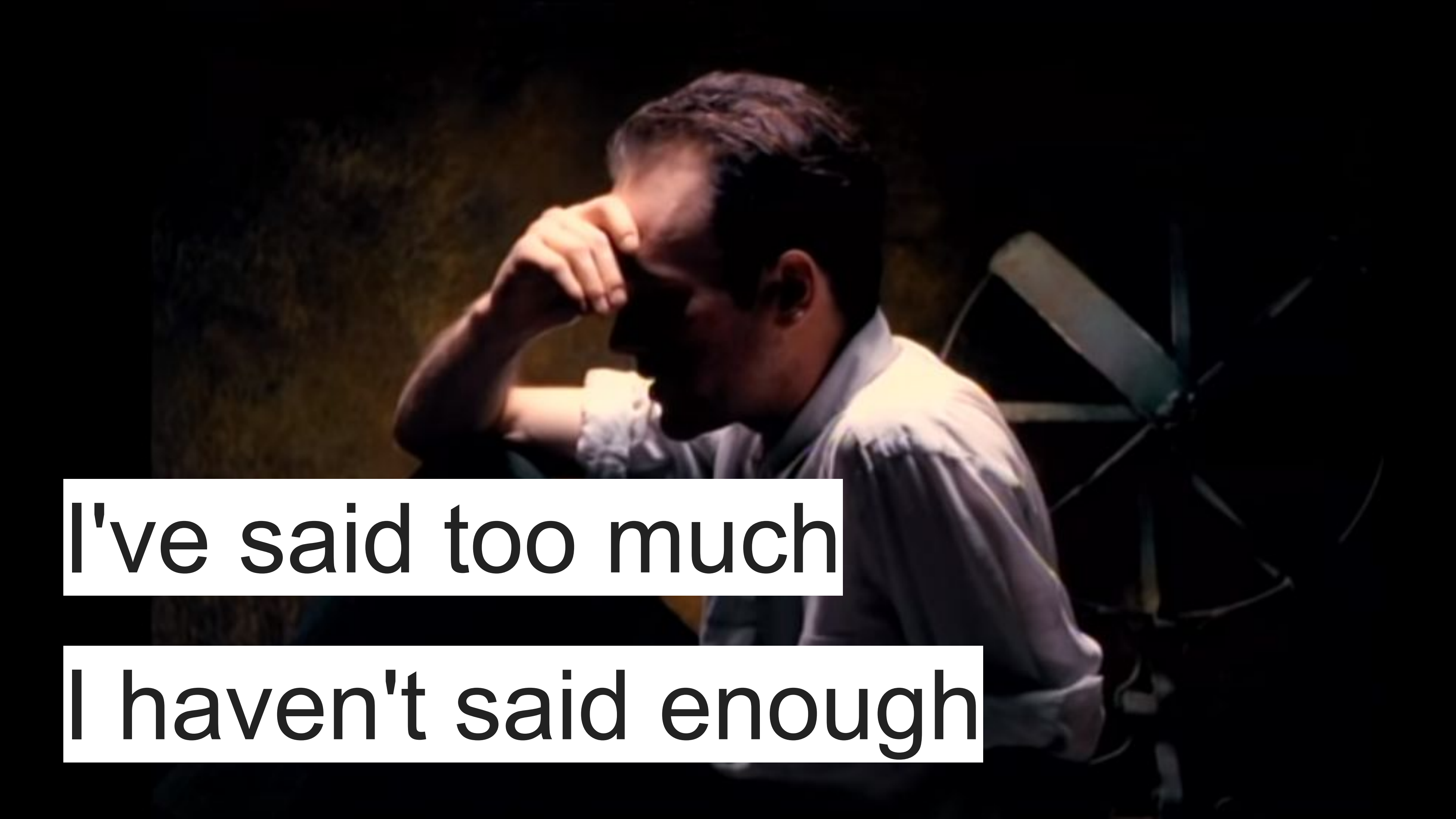
*RFC Editor's Note:* Please remove this section prior to publication of a final version of this document.

Only implementations of the final, published RFC can identify themselves as "hq".  Until such an RFC exists, implementations MUST NOT identify themselves using this string.



As discussed in-person, the current use of "hq" by Google shouldn't cause long term harm because it's used in conjunction with a quic= list that only includes google QUIC versions.

That being said, I'm happy to change this. We've disabled the experiment in Chrome which thinks in understands "hq" in an Alt-Svc advertisement and we'll also disable the server-side announcement. In addition, I've updated the w3c issue about nextHopProtocol https://github.com/w3c/navigation-timing/issues/71 and have sent off a Chrome code review https://chromium-review.googlesource.com/c/chromium/src/+/963492 to change the resource timings API output which kicked off this thread.



I've said too much

I haven't said enough

CUT TO COMMERCIAL