HTTP2.0 with a TSV Eye

Allison Mankin
Verisign Labs
TSV Technical Advisor to httpbis WG
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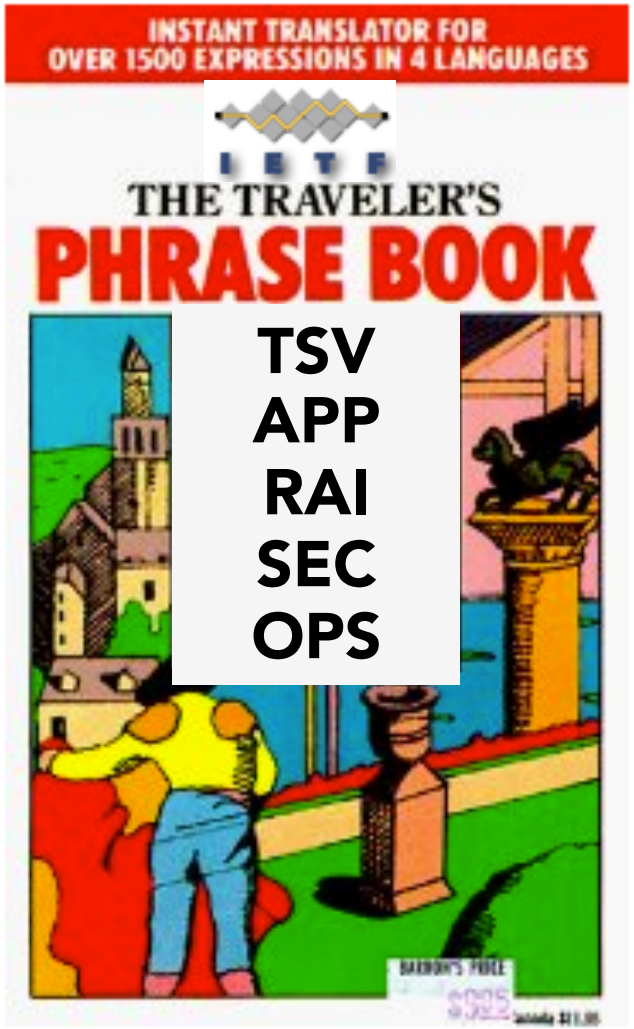
Motivation

- TSV decided it would like someone with TCP/ TSV experience and perspective to closely follow the work on HTTP 2.0
- Caveat: this is an individual TSV person's technical perspective
- I hope this meeting increases constructive relationship between HTTPbis WG and TSV folks

Digression: IETF Phrase Book for Traveling Between Areas



Examples of Differing Usage
"hop-by-hop"
"flow control"
"streams"
"transport"
Required - Close Listening and Close Reading

Five Myths

- **Myth 1** – that HTTP 2.0 might not the address (and mitigate) the use of many concurrent TCP connections
- **Myth 2** – that HTTP 2.0 may try to appropriate/duplicate windowing and data management roles of TCP
- **Myth 3** – that HTTP 2.0 may try to move congestion avoidance and control functions into the application, with an eventual plan of replacing TCP with a transport without native CA/CC. For TSV people, this suggests large amounts of traffic with unknown congestive potential
- **Myth 4** – that prioritization in HTTP 2.0 is related to (and/or clashes with) prioritization implemented in various transport and lower layer protocols

Myth Busting

Myth 1 – that HTTP 2.0 might not address (and mitigate) the use of many concurrent TCP connections in present web.

Ancient creation myth stone from British Museum

No: HTTP 2.0 adds features beyond HTTP 1.1 for sending data on a single TCP connection

A big part of the motivation for HTTP 2.0 over HTTP 1.1 is to provide these features, and reduce connection setup costs to the web (for instance, unnecessary RTs)

Myth 2 – that the HTTP 2.0 Frame and Stream features may duplicate/appropriate TCP's byte stream and segmentation of data. No: Frame and Stream do not match the transport concepts – they serve application processing needs.

Myth Busting

Myth 3 – that HTTP 2.0 may be trying to appropriate or duplicate TCP's congestion avoidance and control functions with its flow control features

No: HTTP 2.0 does have a hop-by-hop window/ credit scheme. This is not the same as CA/CC. Examine the text scientifically, find this serves application service flow, not the flow of the transport.

HTTP 2.0 also allows this to serve well-recognized HTTP intermediaries.

Some introductory language is confusing, citing the evolution of CC but not claiming this is CC. Still not duplicative/appropriative.

Myth Busting

Myth 4 – that prioritization in HTTP 2.0 is related to (and/or clashes with) TSV (and lower) schemes that e.g. are built around DSCP

No/Maybe: HTTP 2.0 Priority Headers are not associated with QoS, not described in a way that matches up with transport types of priority schemes.

"Maybe" because there is one section with language connecting Priority Frames to the bandwidth pipe. TSV folks should conduct close listening/close reading review.

TSV folks can also take the opportunity to learn about operations in large web environments – real issues are supported by this Header.

Myth Busting

Myth 5 (Bonus) – that HTTP 2.0 leads to the replacement of TCP by a new transport, possibly UDP-based, and potential for congestion instability in the Internet

No/Maybe: TSV may have apprehensions of some HTTP 2.0 folks refactoring transport. The HTTP 2.0 work item is unequivocally TCP-mapped. "Maybe" because of several activities and discussions:

- Experimental settings of the TCP initial congestion window setting
  - A setting that provided a knob to control initial cwnd in the underlying TCP was debated vigorously and removed. Experiments about initial cwnd took place; interesting to review these.
- Minion discussion in this IETF's tsv-area meeting / QUIC

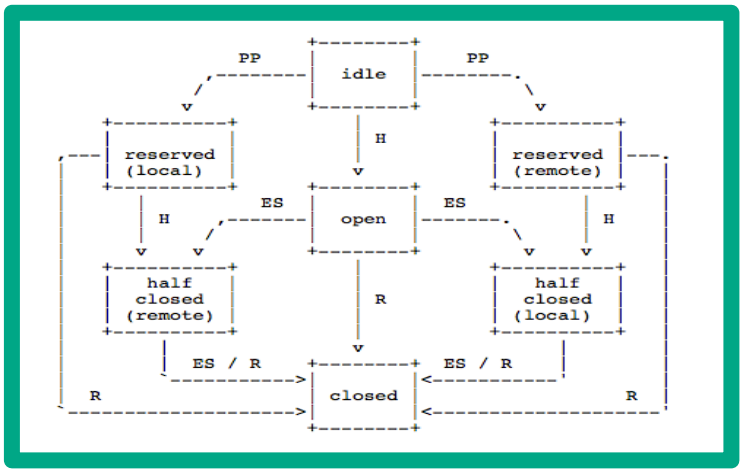
Myth Busting

Myth 5 "No/Maybe" Concluded:

- TSV has long acknowledged applications needing refactored services for instance to avoid HOL-blocking
- TSV has developed new-service transports such as SCTP, PR-SCTP, DCCP...
- An opportunity to become ever more clear on matching transport services to their customers

HTTPbis WG Work Style

- HTTP 2.0 effort is very intensive (not sure TSV has a comparable now)
- Frequent interim meetings, about to start interops
- Strong working method using github for the document
- http2 draft underwent some large but very coherent and TSV-friendly developments in its last iteration (to 04), such as a stream lifecycle state diagram (which will help with TSV-type issues such as risks of brittleness in closing)



There *are* points for TSV review...

- GOAWAY and RST_STREAM - TSV has learned to carefully think through validation for terminations like these. I think this is still in need of review in 04.
- TSV style review of the risks of off-path attack in general –we've become sadder but wiser about these
- TSV style review of data integrity issues -
  - Should better provisions be made because HTTP 2.0 Headers are binary and compressed? If someone looks into this, the check should be in the context of data integrity afforded by TLS
  - Weakness of TCP checksum probably furthers case for "TLS Everywhere" in the HTTP 2.0 world

Going Forward

- TSV community members can constructively offer *close-listening/close-reading* style review

  Contribute to IETF travelers' phrasebook, perhaps

- Given TSV's research affinities, take a look at a spate of studies in the wild of the lead-ups to HTTP 2.0 (SPDY versions).
- What do we learn, what would we like to see in more detail?
- The rapid deployments, pace of innovations, in HTTP 2.0's space, is meaningful, should be resonant to long-term thinkers in TSV

Gratuitous photo of Tiergarten tapir

Thanks for your time (and thanks to Mark and the Transport Chairs for patience with my jetlag)