

IAB Workshop on
Stack Evolution in a
Middlebox Internet (SEMI)
26-27 January 2015, Zurich

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Background

- IAB IP Stack Evolution Program currently focuses on two broad areas:
 - evolution of interfaces to transport and network-layer services beyond SOCK_STREAM and SOCK_DGRAM
 - Improving path transparency in the presence of firewalls and middleboxes.
- Follows the IAB's interest in general issues of protocol evolution (RFC 5218, ITAT workshop)
- Within the program, the IAB convened a workshop in January to discuss ossification of the transport layer...
 - ...and how to fix it for emerging applications (e.g. rtcweb)

Why now?

1. new energy in the IETF:
 - work which requires flexibility we don't appear to have (RTCWEB, TCPINC)
 - work to provide that flexibility at the interface (TAPS)
2. pressure created by increasing deployment of encryption:
 - "Everything over TLS" will brick lots of deployed middleboxes
 - Opportunity to strike a balance between endpoint and midpoint requirements.



Workshop Positions

- 20 position papers accepted, 38 invitations sent.
- Stated goals of participants included:
 - deeper understanding of architecture and incentives,
 - broadening of transport interfaces
 - further research and community education on the issue
 - definition of middlebox cooperation approaches.
- On transport evolution, there were two camps:
 - “TCP is broken, burn it to the ground and start over”
 - “Long live TCP!”

Identified Goals

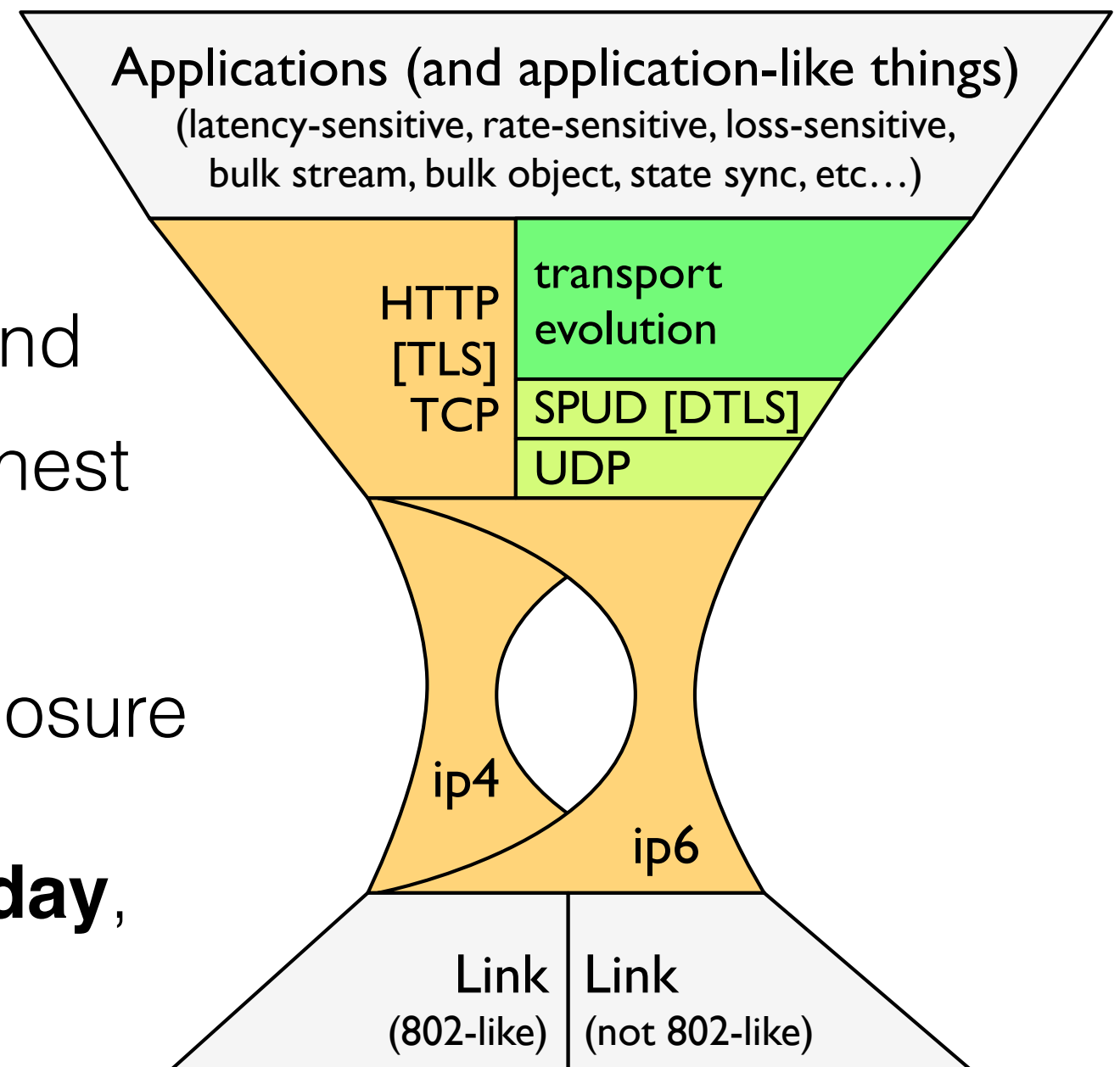
- Future work (WG/RG) on middlebox cooperation (protocol/functionality/etc.), including:
 - mechanisms for detection of path characteristics
 - measurement for path impairment detection and troubleshooting
- Better understanding of how transport should/must evolve, including applicability of present transports to specific use cases.
- Interface improvement: expose more to applications about transport (in the right way)
- Identify trust issues and deployment incentives in cooperation and evolution approaches (this is hard)

Outcome: Measurement

- We need to make data-driven engineering decisions about transport protocol extension
 - If a protocol works in 99.5% of the Internet, why not use when you can?
 - If a feature breaks in 0.5% of the Internet, how much complexity to work around that is too much?
- Service providers and platform developers have access to a great deal of data which, in aggregate, could better inform these decisions.
- **HOPS BarBoF, 21:30 Sunday**

Cooperation: A new view of the two-stemmed Internet martini glass

- Expose what you must to the path
- Everything else is end-to-end
- Crypto keeps everyone honest
- Encapsulation for path exposure in user-space transports:
SPUD BoF: 9:00 Wednesday,
International room



Cooperation Vocabulary

- Once you have this mechanism, what do you say with it?
 - There need to be incentives to expose information.
 - There need to be incentives not to lie.
- A2P (app to path): problem appears tractable, there is a minimal set of useful information (e.g. session lifetime) which can be exposed, and is anyway useful to the far endpoint.
- P2A (path to app): the way forward is less clear
 - If treated as advisory: problem might be tractable; similar to ICMP, but inband.
 - If treated as authoritative: previously unsolved problem, many trust issues.

TODO

- Initial workshop report: Real Soon Now (mid-April)
 - Until then: transcripts, slides, position papers at <https://www.iab.org/activities/workshops/semi/>
- Cooperation with ETSI NFV Forum on middlebox issues (in progress)
- Discussions on transport extensibility in area meetings
- UDP encapsulation guidelines
- Statement on architectural assumptions in transport evolution (referred to program)

Further Discussion

- Middlebox measurement issues
("How Ossified is the Protocol Stack"):
hops@ietf.org
- Substrate Protocol for User Datagrams
spud@ietf.org
- Transport Services WG
taps@ietf.org
- Other future work
stackevo@iab.org