IAB Workshop on

Stack Evolution in a Middlebox Internet (SEMI)

26-27 January 2015, Zurich

IETF 92 Technical Plenary Report, 23 March 2015, Dallas

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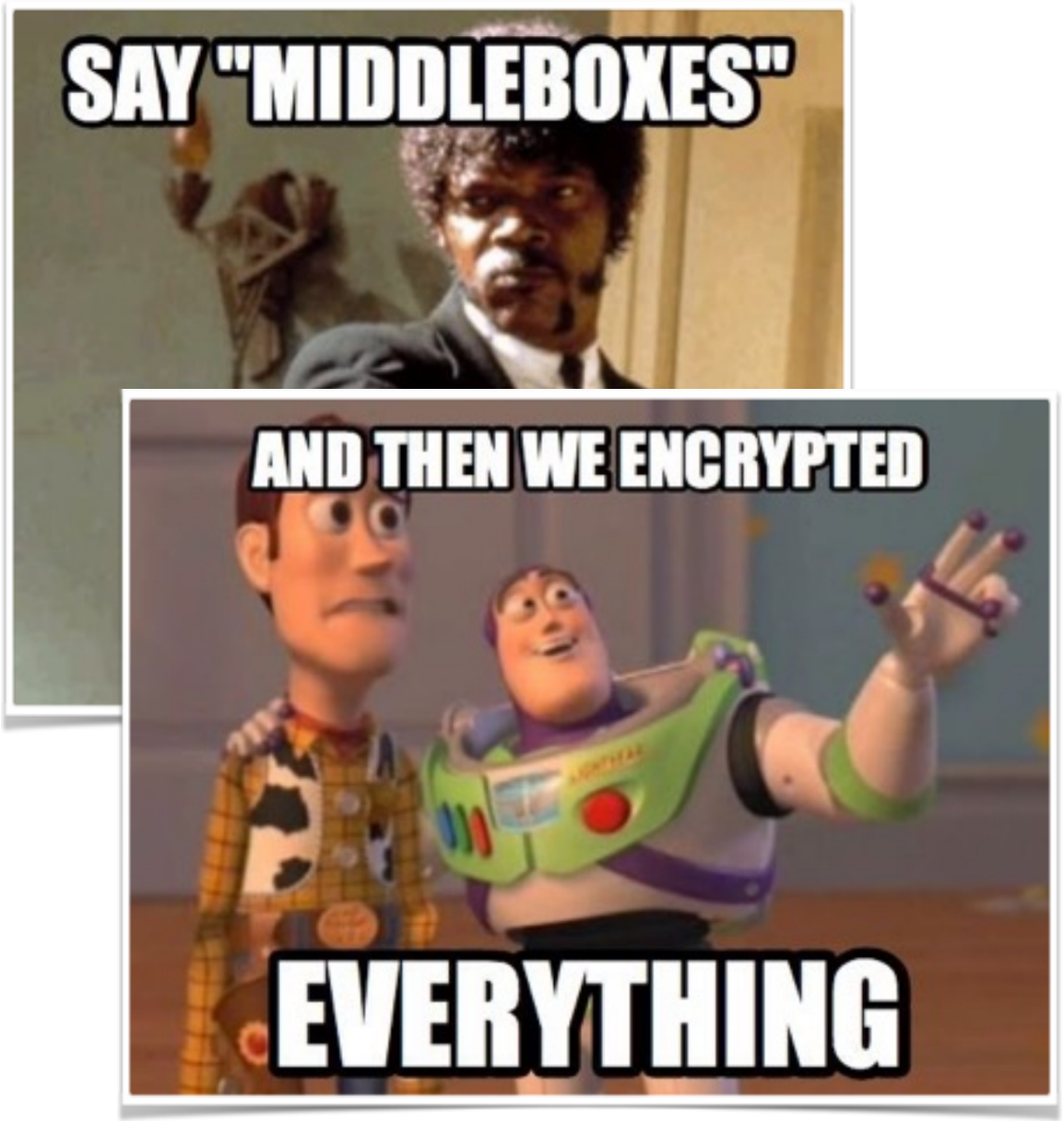
Background

- 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**

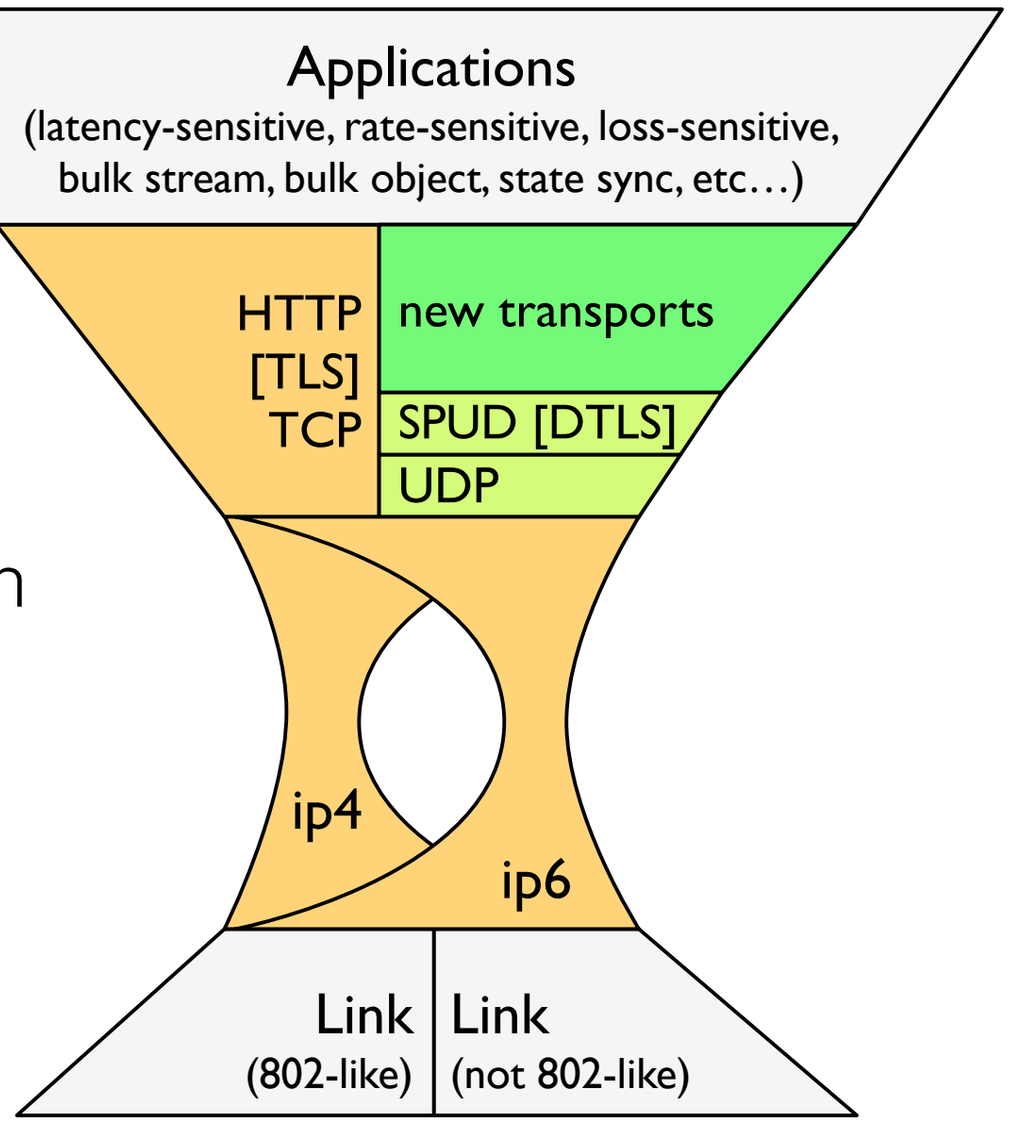
Middlebox cooperation: less separable than it seems

Transport (de)ossification

\+ increasing encryption

= requirement for selective, minimal metadata exposure to the path.

- Back to the NCP → TCP/IP split:
  - Expose what you must to the path
  - Everything else is end-to-end
  - (use crypto to keep everyone honest where we must)
- **SPUD BoF: 9:00 Wednesday**, International room



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