Some thoughts from a disarrayed mind on the evolution of transport abstractions

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What’s in our purview?

- Resource Pooling, Mobility (MPTCP)
- Better congestion control
- Lower network latency
- Channel encryption (TCP-Crypt)
What’s in our purview?

Are these new services … or bug fixes?

- things we’ve always wanted to do
- Internet plumbing

These are important … and we’re really good at them!
From an app developer’s point of view however, we’re working on improving implementations, not building new abstractions.
Do apps need new abstractions?

● Apps (things that humans interact with) today
  ○ traffick in units of streams, messages
  ○ build to semantics available at design-time
  ○ care about reliability, latency, throughput
  ○ don’t care about the shape of the bits on the wire

● Transport services should map to app needs
  ○ .. but our transport services don’t. There is a gap.
What’s in the gap?

- Common design patterns
  - message dependencies, framing, interleaving …
  - mobility?
- Performance optimizations
  - zero-RTT transactions
  - “slow-start avoidance”?
- New transports lie in this gap.
App developers fill these gaps with new transports using *conventional* transports as low-level building blocks …

- for deployability on existing hosts
- for deployability through middleboxes
- eg: RTMP, RTMFP, QUIC, Minion
Unfortunately, our transports don’t make great building blocks.

- SCTP is not the answer if all an app wants is reliable message semantics.
- Improvements to congestion control seem hidden under TCP’s bytestream API.
Thoughts on the evolution of transport abstractions

- We ought to fill this gap to the application
- We should consider encapsulating our mechanisms as building blocks
  - LEDBAT is an example
- We should consider enabling compositions of mechanisms at design time