

Future transports



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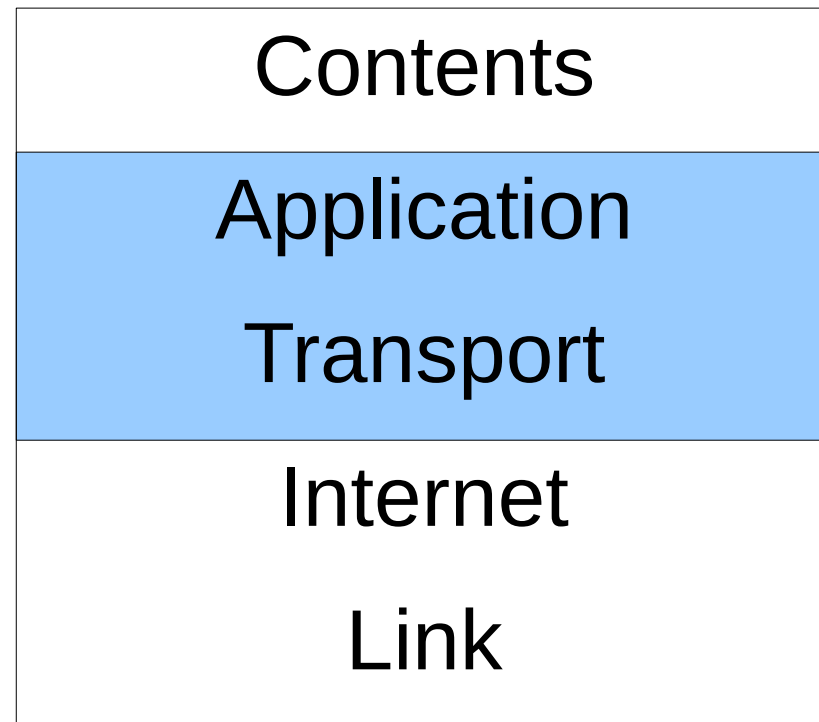
Agenda

- What transport
- Direction
- Problems today
- Deployment fail
- New stuff

(in just 30 mins so let's go!)



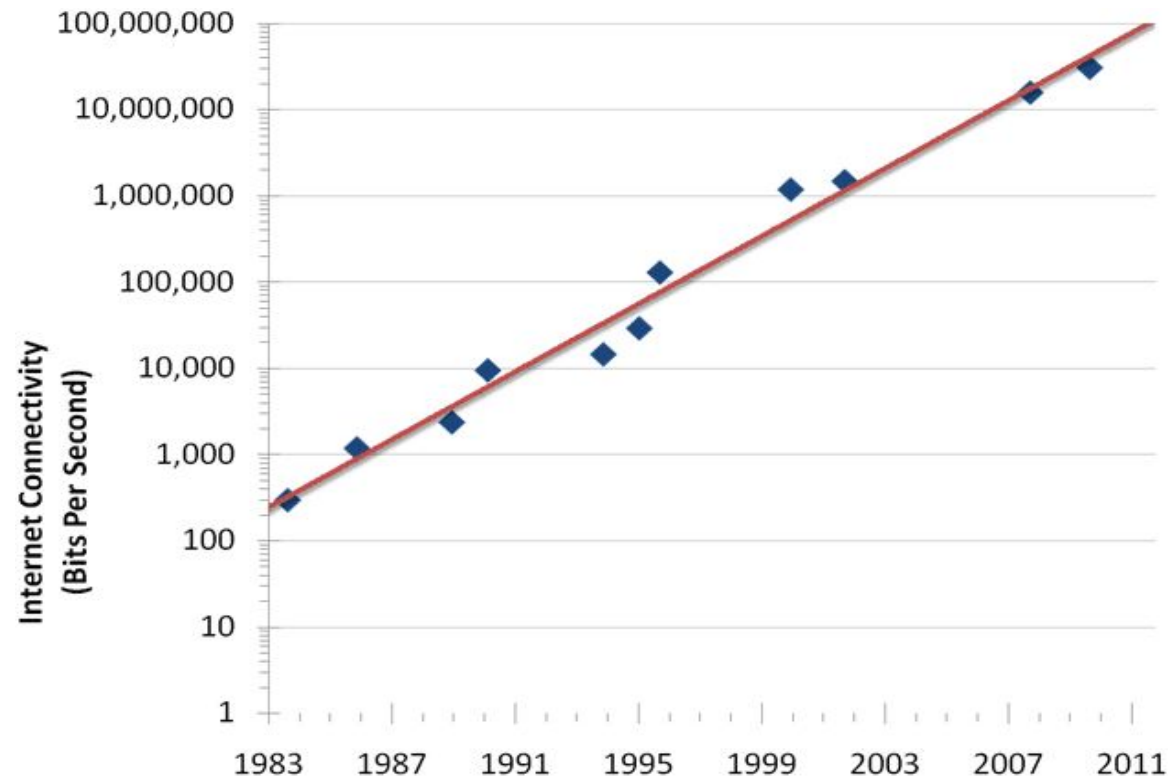
Transport layer



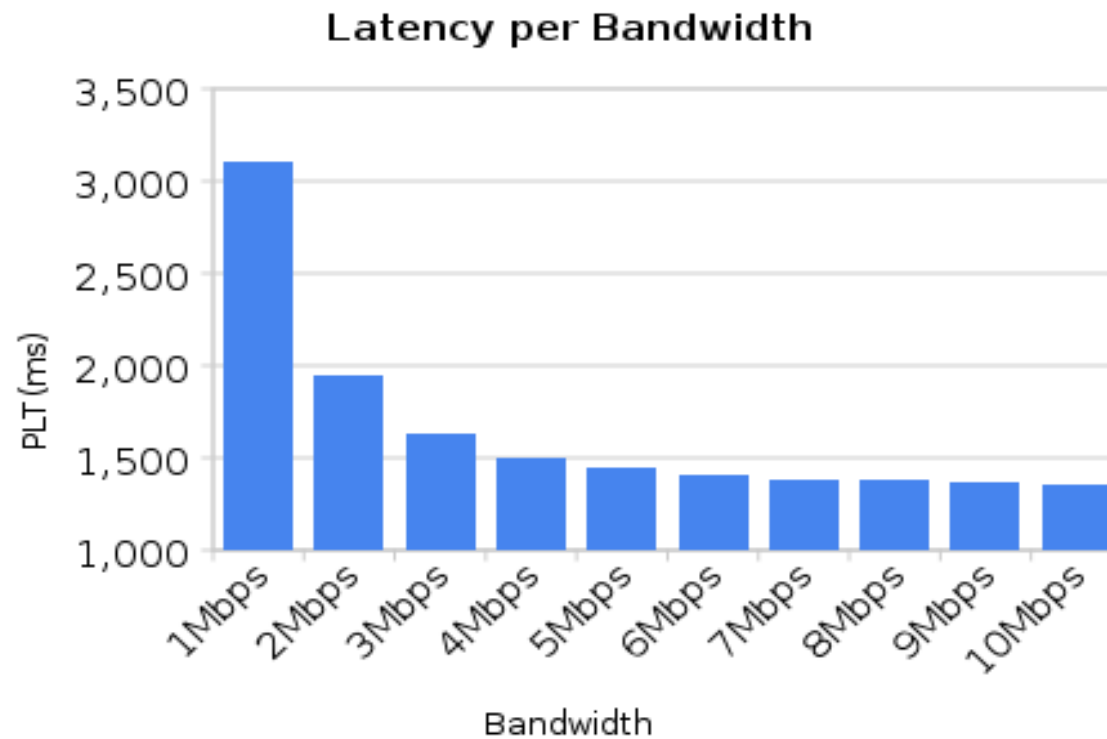
Current state

- Roundtrips to several seconds!
- DNS
- Single route, multiple interfaces
- Deploy failures for new
- Slow start
- Browsers want long connections
- HTTP is “chatty”

Bandwidth growth



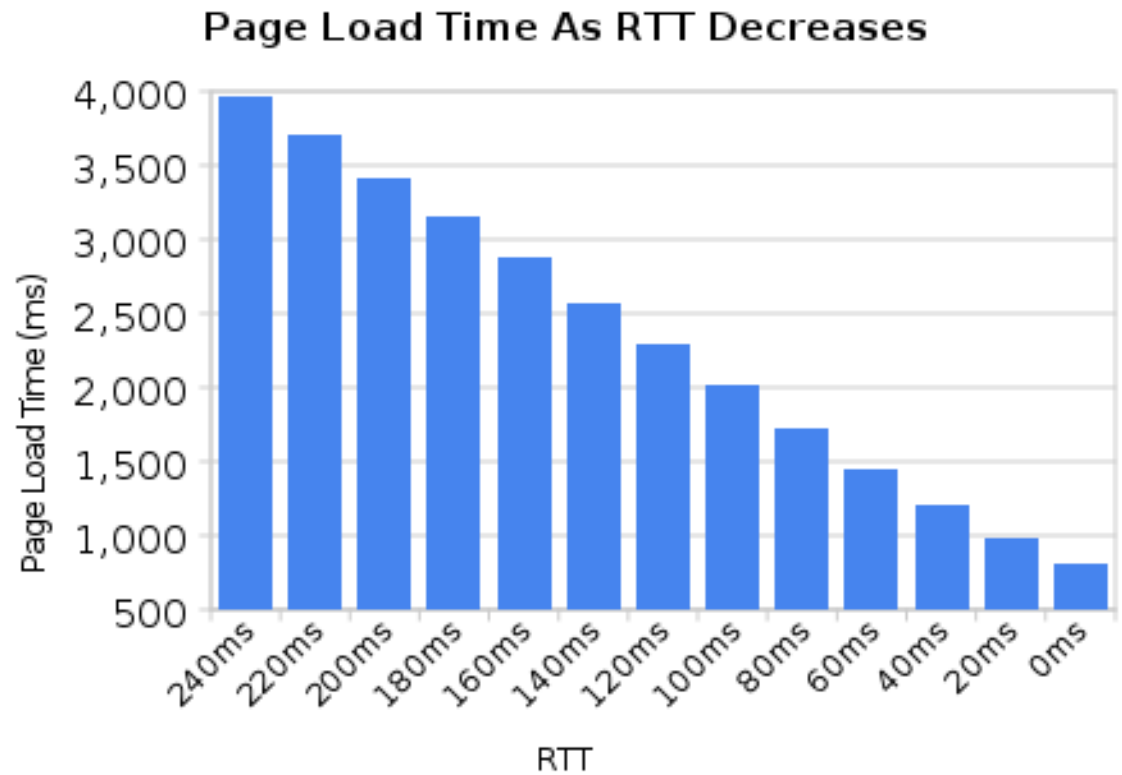
RTT limitations



Graph by Mike Belshe



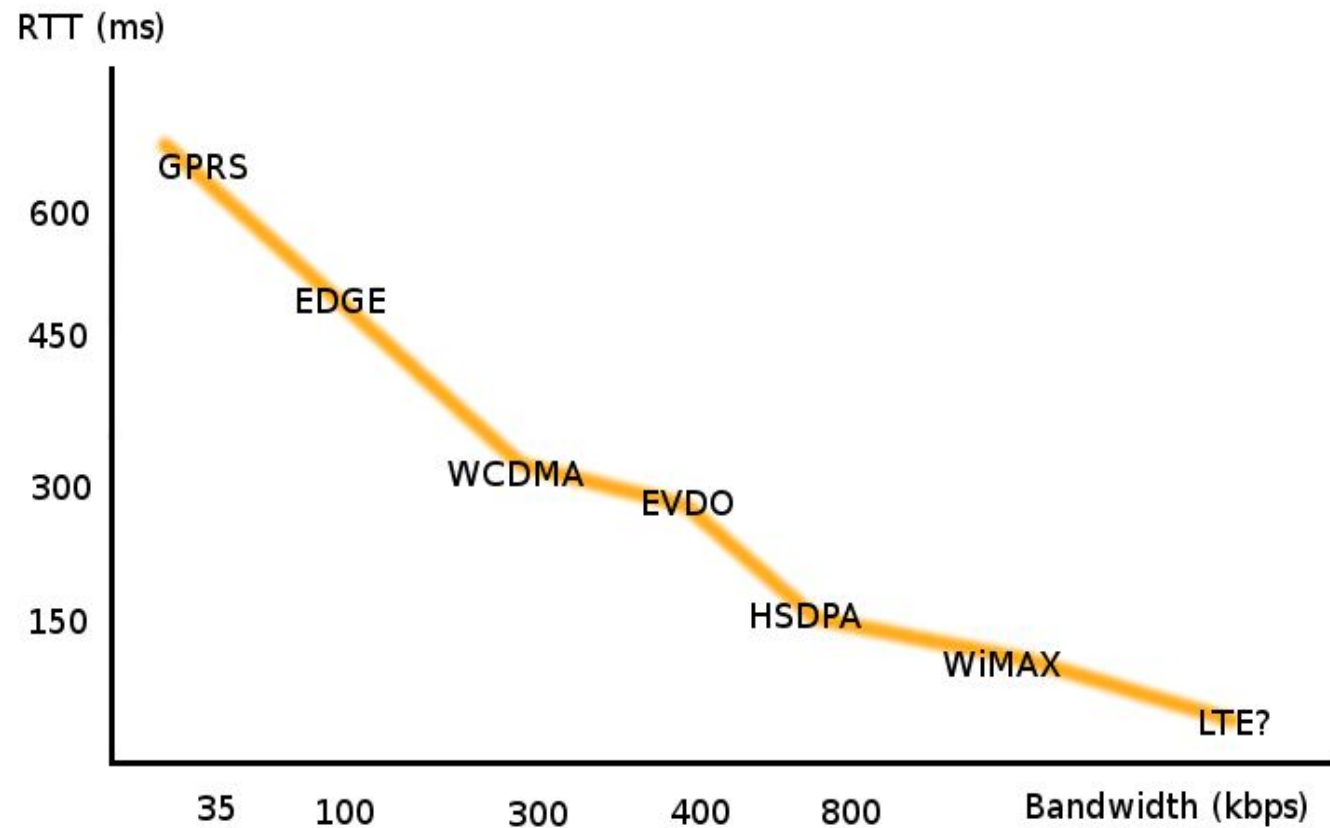
Worse RTT is just downhill



Graph by Mike Belshe



Mobile has not helped



TCP design

- 3-way handshake
- Slow start
- Nagle algorithm
- Delayed ACK

HTTP problems

- Chatty and sizable
- Not to mention cookies
- Pipelining is flawed
- No header compression

HTTP Workarounds

- Many connections
- Pre-lookup host names
- longpolling / AJAX
- pipelining attempts
- Compression

Future

- 4 technologies being developed
- Attempts
- Will they actually happen?

SCTP

- IETF, RFC4960 from 2007
- Replaces TCP
- Messages, not a stream
- Multi-path
- Multi-streaming

SCTP fail

- Intermediaries need upgrade
- HTTP over SCTP
- SCTP over UDP?
- Will it rise?

SPDY

- Google
- HTTP replacement
- Multiplexed streams, prioritized and even server initialized
- Always TLS
- Compressed headers
- Chrome
- Experimental



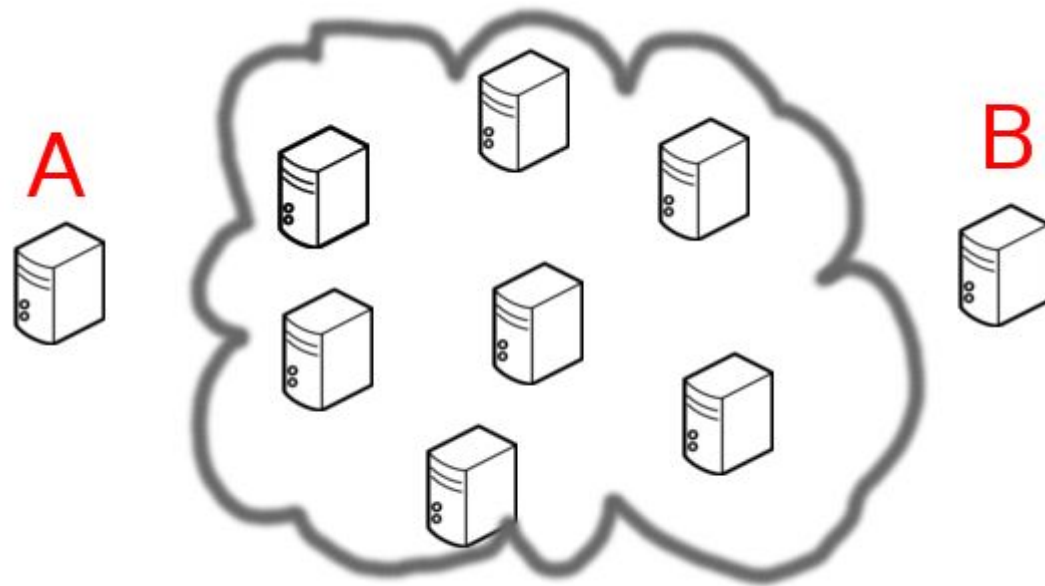
SPDY?

- Simply too early
- Only experiments
- Google tech

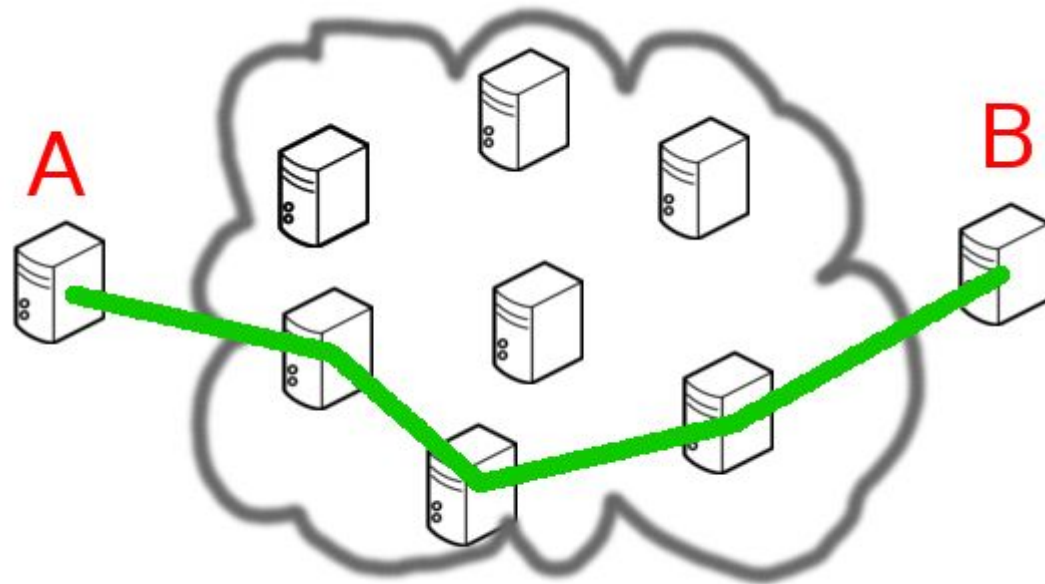
MPTCP

- Multi-path TCP
- IETF
- Compatible socket API
- “kind to the network”
- Made for multi interface hosts

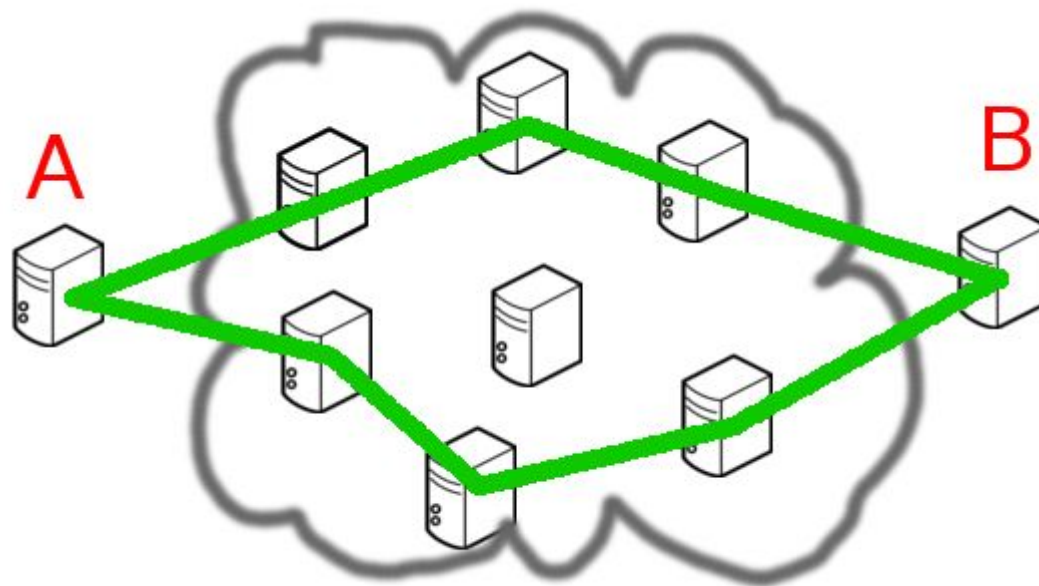
Multi-path explained



One connection



Multi-path!



WebSockets 1

- HTML5 – WHATWG
- IETF – Hybi
- Javascript-focused
- Browser to Server
- Solve the longpolling problem

WebSockets 2

- TCP replacement(!)
- HTTP Upgrade, CONNECT or separate
- “-76/-00” in Chrome, Firefox, Opera
- Already incompatible with latest (-03)
- Lively debated and worked on

WebSockets success?

- I say likely
- Join IETF and help out!

Summary

- Problems with RTT and protocols
- Ways to work around them
- Some might end up used



That's it!

Questions or thoughts?

