Instant Page Load

Analysis

“What if we could reduce cross-Atlantic Round Trip Times from 150ms to 100ms? This would have a larger effect on the speed of the Internet than increasing a user’s bandwidth from 3.9Mbps to 10Mbps or even 1Gbps.”

“Any TCP-based protocol attempting to be maximally efficient on the network will use fewer TCP connections than HTTP.”

- Mike Belshe, Google

Bandwidth is not the universal “measure” of connection quality, for example, it was shown that an increase from 5Mbps to 10Mbps amounts to only 5 percent decrease in Page Load Times (PLT). The real issue is the Round Trip Time (RTT), meaning the time it takes for a packet to get from the source to the destination and back. Current Hypertext Transport Protocol (HTTP) design creates a new TCP session for each requested page resource and also its maximum number of parallel sessions is limited. Clearly HTTP is not best suited for what it is being used, but a protocol that the entire Internet world runs on cannot be easily replaced.

Problems & Solutions

It is either possible to gradually replace HTTP by a more optimized protocol—an approach currently being taken by Google which is using its own in-house protocol SPDY for all its services by default on its Chrome browser (up to 64% decrease in PLT)—or somehow transparently optimize the already deployed protocol.

Both mentioned approaches are based on the same idea: Instead of downloading each resource separately they are downloaded in a single TCP stream thus the effect of RTT is limited when compared to HTTP. IPL is a network-based optimization system. Because of low RTT / large bandwidth Internet connection it can download the web page resources much faster than any client. The web page is then stripped of resources and a JavaScript script is added. This modified page is transparently returned to the client as a reply to its intercepted request. Once loaded, it creates a HTML5 WebSocket connection to the IPL device which is used to download all the resources in a single stream. Lossless resource optimization and/or caching may be also applied.

Conclusions

![Graphs showing improvement in loading time for different websites with HTTP and IPL]