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SPDY vs HTTP/1.1: An Empirical Evaluation of Network Protocol Performance

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SPDY vs HTTP/1.1: An Empirical Evaluation of Network Protocol Performance
**Background**

- As the Internet evolves, the reduction of page load time has an increased importance.
- The application layer should be changed to avoid altering existing implementations.
- SPDY is a Google proprietary protocol that is deployed in the production environment already on websites such as Google, Facebook, and Twitter.
- SPDY is the working base for HTTP/2.0.

**Why change?**

<table>
<thead>
<tr>
<th>HTTP</th>
<th>SPDY</th>
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<tbody>
<tr>
<td>HTTP uses multiple connections because it can only process requests in a FIFO queue.</td>
<td>Multiplexing over a single connection.</td>
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<td>Only the client can initiate a request.</td>
<td>Server push/Server hint: Server can either suggest a resource to request or push the request to the client unsolicited.</td>
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<td>Sends static header data throughout connection.</td>
<td>Removes static information, such as the User-Agent and Host headers.</td>
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<td>Optional compression encodings for data.</td>
<td>Forces header compression.</td>
</tr>
</tbody>
</table>

**Experimental Setup**

Client
Google Chrome v. 34.0.1847.116

Anue Network Emulator

Emulated Network
- Latency
- Periodic Packet Loss

Server
Apache v. 2.2.22
mod_spdy v. 3.0

- Client requested a web page with 100 small image files totaling ~ 3.4MB.
- PHP script used to generate distinct pages in order to avoid content caching.
- Presented results are averages of 5 runs.

**Throughput and Page Load Time**

**Analysis**

- In a high latency network with zero packet loss, SPDY outperforms HTTP in terms of throughput as it takes advantage of SPDY’s multiplexing.
- In a high packet loss network with near zero latency, SPDY outperforms HTTP. Very small latency masks packet loss problems, so SPDY can recover very quickly.
- In a bad network with high packet loss and high latency, HTTP outperforms SPDY. HTTP can perform load balancing with its multiple connections.

**Next Steps**

Experiments are far from exhaustive. Different application types should be tested against; video files and dynamic content would take advantage of SPDY’s Server Push and Server Hint features.