WebSocket

Performance Evaluation of WebSocket Protocol for Implementation of Full-Duplex Web Streams

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Università degli Studi di Salerno

1st Scalability Research Forum

We will talk about WebSockets and compare its performance with TCP Socket. But, before diving into analyzing the performance we need to understand why we needed WebSockets and what they are.

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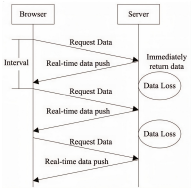

A client can send data and ask for data at the same time. But, if client has no data and server has no data, a request and response will still be generated with all the HTTP headers and thus wasting resources.No real-time data because while the client waits, an event could occur and the client will know about it only when the timeout expires.

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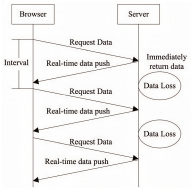

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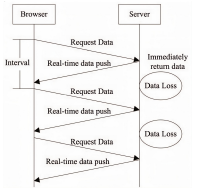

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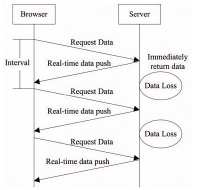

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- Continuously short interval requests will be washed away the server.
- Long interval will require more time to reach the client, no real-time data.

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HTTP long polling

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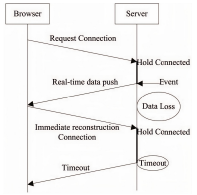

Can hold the connection up to a certain time, after that a timeout is exceeded and need a new connection.No bidirectional because the client may only send data the first time, but then it will only receive until a timeout and another request is made.In the normal polling we could have bidirectional because the interval was shorter.

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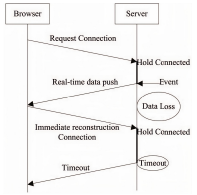

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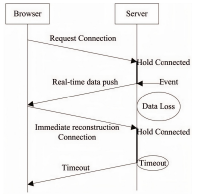

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- No bidirectional communication, server push data.

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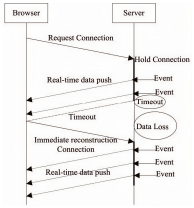

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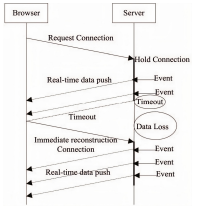

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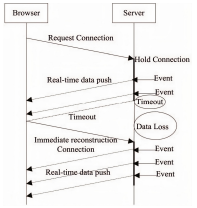

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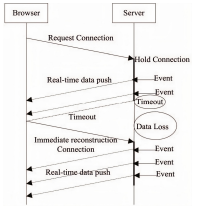

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- The WebSocket Protocol enables two-way communication between a client running untrusted code in a controlled environment to a remote host that has opted-in to communications from that code.

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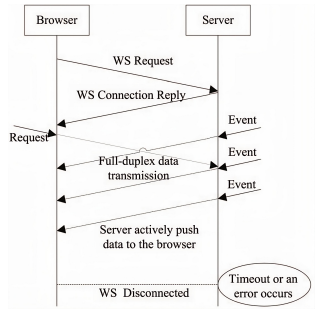

There is the initial handshake, after that, client and server can send and receive data at any moment without further interaction.There is no timeout. If it disconnects, it is because of an error and to establish the connection, the handshake has to be done again.

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- To establish a session, client sends a WebSocket Upgrade Request to the server, upon which server responds with a WebSocket Upgrade Response.
- From this point forward, the client and server can send data back and forth in asynchronous full-duplex mode.

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WebSocket
WebSocket protocol
Handshake
WebSocket Upgrade Request

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- Server proves that it can use WebSocket. Client checks it.
- Server tells which protocol it supports.

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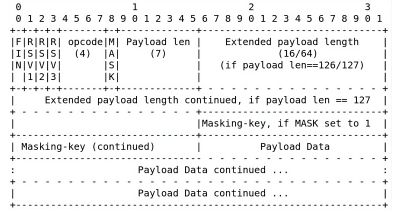
WebSocket Frame Structure



We will not go into the details because it is out of the scope of this presentation and, as mentioned earlier, the added overhead to the payload data is minimal.