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

Oleg Bilovus

Università degli Studi di Salerno

1st Scalability Research Forum

# Outline

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- ▶ *Historically*, creating web applications that need bidirectional communication between a client and a server has required an abuse of HTTP to poll the server for updates while sending upstream notifications as distinct HTTP calls.

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- ▶ *Historically*, creating **web applications** that need **bidirectional communication** between a **client** and a **server** has required an **abuse of HTTP to poll** the server for updates while sending upstream notifications as **distinct HTTP calls**.

# HTTP polling

Check whether the server is changed in a while, thereby performing incremental updates.

## Background

HTTP polling

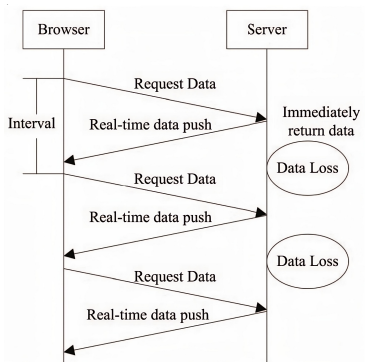
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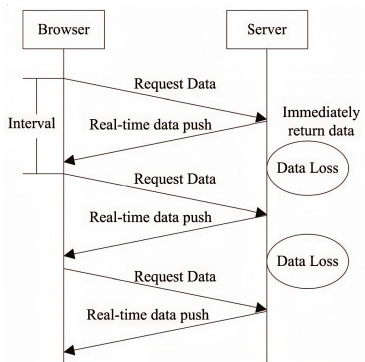
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► How often to query?



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Check whether the server is changed in a while, thereby performing incremental updates.

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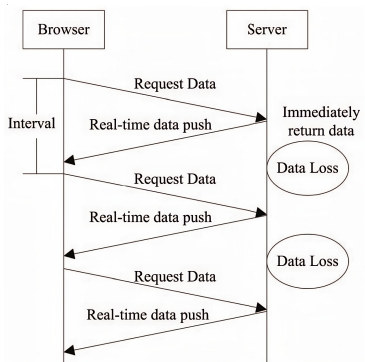
#### HTTP long polling

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- ▶ How often to query?
- ▶ Continuously **short interval** requests will be **washed away** the server.

# HTTP polling

Check whether the server is changed in a while, thereby performing incremental updates.

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### HTTP polling

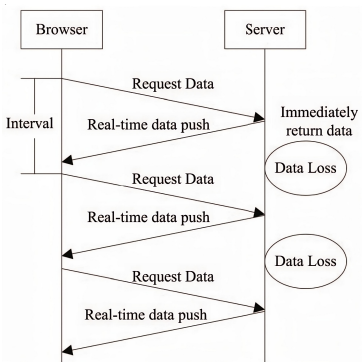
#### HTTP long polling

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- ▶ How often to query?
- ▶ Continuously **short interval** requests will be **washed away** the server.
- ▶ **Long interval** will require more time to reach the client, **no real-time** data.

# HTTP long polling

## Background

HTTP polling

HTTP long polling

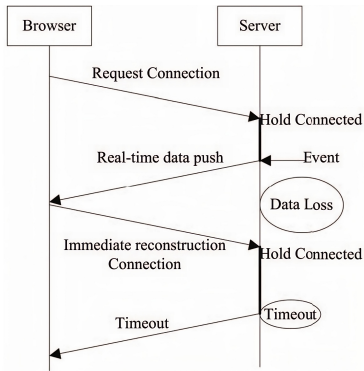
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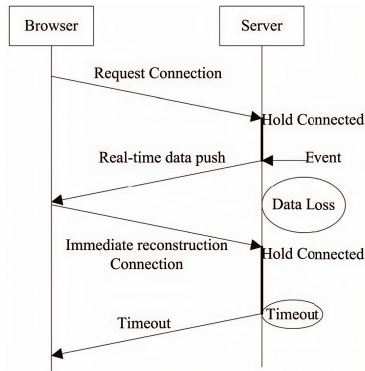
Handshake

When a client sends a data request, the server will block the request until there is data transfer or timeout before returning.



# HTTP long polling

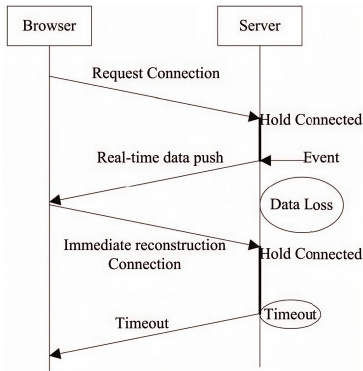
When a client sends a data request, the server will block the request until there is data transfer or timeout before returning.



► Solve the short polling frequency to access the server.

# HTTP long polling

When a client sends a data request, the server will block the request until there is data transfer or timeout before returning.



- Solve the short polling frequency to access the server.
- No bidirectional communication, server push data.



# Streaming

Iframe embed a hidden frame in an HTML page, then set it as a long connection request, thus the server can send data to the clients constantly.

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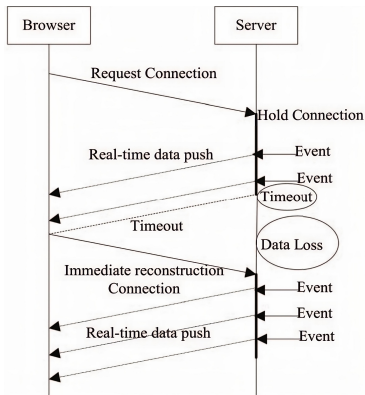
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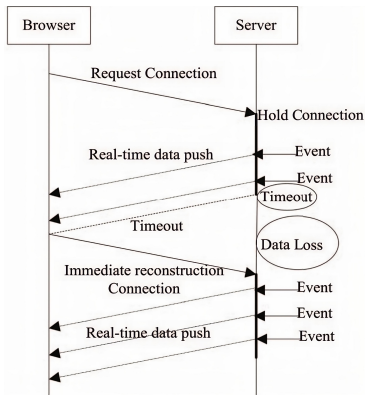
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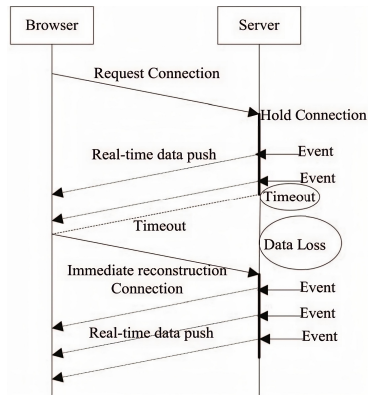
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- It can send multiple events from a single request.



# Streaming

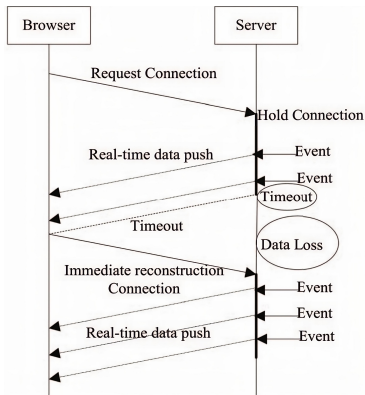
Iframe embed a hidden frame in an HTML page, then set it as a long connection request, thus the server can send data to the clients constantly.



- ▶ It can send **multiple events** from a **single request**.
- ▶ But, it increases the **burden on the server**, causing the server **performance degradation**, or even collapse.

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Iframe embed a hidden frame in an HTML page, then set it as a long connection request, thus the server can send data to the clients constantly.



- ▶ It can send **multiple events** from a **single request**.
- ▶ But, it increases the **burden on the server**, causing the server **performance degradation**, or even collapse.
- ▶ **No bidirectional communication.**

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## Keywords

- ▶ 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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