

# Asynchronous Chat: Comparing REST-ful and Protocol Buffer Implementations

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## 1 Introduction

REST-ful communication protocols have taken the web by storm. In this design specification, we compare this exceedingly popular communication protocol with alternate protocol buffers, having created a web application to facilitate online chat between users and groups using each of these communication protocols.

## 2 REST-ful Design

### 2.1 Long Polling

In implementing our web chat application using the REST-ful communication protocol, we opted for a long polling approach, wherein the client opens a webpage which initiates frequent, constant communication with the server by means of a series of GET requests.

We extend the long-polling approach to include a success handshake so as to confirm message receipt. In this way, if a message send operation is unsuccessful, we retry sending the message.

This long polling approach operates as follows:

- The client opens a webpage which initiates a GET request using AJAX. This GET request is open until one of the following occur: (a) a success response is received or (b) an error response is received.
- In either (a) or (b), a completion script runs in which the AJAX request is dispatched again after a set amount of time. In the case of (a), there is no delay; in the case of (b), there is a 1000 millisecond delay.
- The server receives the GET request. It looks up messages for the particular client, based on a cookie passed in the request header, and sends an unread message back to the client, along with a success response. Further, the server sends the ids of

the message returned in the response header. Lastly, the server updates the MySQL database of messages to indicate that this message is currently being sent.

- On (a), the success response, the client receives a message to display and an id corresponding to that message from the MySQL database. The client then dispatches an additional GET request containing the id of the message.
- On receiving the second get request corresponding to a received message, the server updates the MySQL database to indicate that the message corresponding to a particular id has been received.
- If the server does not receive a success response a minute after sending a message, on the next client-initiated GET message corresponding to a request for new messages, the server updates the MySQL database to indicate that the formerly sent message was not received.

### 3 Protocol Buffer Design

### 4 Approach Comparison

### 5 Conclusion