GET TER HOME REALTIME WEB GUIDE ABOUT PHIL LEGGETTER CONTACT ME

PHIL LEGGETTER

HEAD OF DEVELOPER EVANGELISM AT PUSHER
& REALTIME WEB CONSULTANT

REAL-TIME WEB TECHNOLOGIES GUIDE

Note: This page is a work in progress. I plan to update it new technologies as I find them and increase the information on each as I find the time. If you know of a technology that should be included in this guide then please raise a pull request. If you have any questions please drop me an email me

As above, you can contribute to the list by making a pull request to the Realtime Web Technologies Guide github repo.

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Email Address G

My name is **Phil Leggetter**. I'm He
Developer Evangelism at Pusher.

I frequently write articles and give
Realtime Web Technologies and g
technology. Get in touch if you'd l
talk at your event or write an artic
I'm also very interested in develop
experience and productivity, APIs
customer service.

I'm also the co-author of the APre
beginners title "Realtime Web App

Realtime Web Apps: With H WebSocket, PHP, and jQue

SignalR
Mojolicious
Alchemy Websockets
SockJS
socket.io
SocketCluster
Firehose.io
Thunder Push
Cramp
Plezi
phpDaemon
Nugget
SuperWebSocket, a .NET WebSocket server
webbit
Fleck
Persevere
Migratory
Meteor
Beacon Push
LightStreamer
Jetty
Ratchet
BrainSocket
WebSockets and Joomla
Atmosphere
erlycomet
cometD
Pokein
APE Project
StreamHub
Caplin System's Liberator
ICEfaces
Kaazing
FAYE
XSockets
misultin
Cowboy
YAWS (Yet Another Web Server)
juggernaut deprecated
PHP WebSocket
apache-websocket
jwebsocket
Goliath
ws4py
SocketTornad.IO
erlang websocket
Slanger
em-websocket

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HOSTED REALTIME SERVICES

General Messaging & PubSub

Fanout

Docs Pricing

> *Build and scale realtime APIs. Fanout’s push CDN makes it easy. Add live updates to your websites and web services using REST, HTTP streaming, WebSockets, Webhooks, and XMPP*
>
> *For front-end applications, Fanout's JavaScript library receives realtime JSON notifications with just a few lines of code. Integration is quick and simple.*
>
> *For services and APIs, you can add realtime functionality with minimal modification. By acting as a reverse proxy, Fanout's global cloud invisibly bridges realtime clients with the services you've already built.*

WebHooks PubSub XMPP REST WebSockets HTTP Streaming HTTP Long-Polling REST

Hydna

Docs Libraries Pricing

> *A scalable real-time platform*
>
> *Hydna is a hosted backend into which you can send data and have it instantly appear on other devices.*

> *Instantly move data across platforms, technologies, and devices*
>
> *Hydna is ideal for building dashboards, activity streams, notification- and chat systems, real-time collaboration, live statistics, remote controls, multiplayer games, and more.*

Real-Time messaging Binary WebSockets Comet Flash HTTP/REST Behaviors Routing Authentication Room partitioning Presence .NET Erlang Java Node.js Objective-C PHP Python Ruby Multiplexing

PubNub

Docs Libraries Pricing

> *Pubnub is the fastest cloud-hosted realtime messaging system for web and mobile apps.*

HTTP BOSH Fallback-support Real-Time Client Push Real-Time messaging Real-Time data Coldfusion .NET Erlang Google App Engine (GAE) Java JavaScript Lua-Corona node.js Objective-C Perl PHP Python Ruby Silverlight Titaniumf REST API PubSub

Pusher

Docs Libraries Pricing

> *Pusher is a hosted API for quickly, easily and securely adding scalable realtime functionality to web and mobile apps.*

WebSockets HTTP fallback Flash socket fallback Real-Time Client Push Real-Time messaging Real-Time Data in-built security HTML5 JavaScript Objective-C Ruby PHP node.js .NET Silverlight ActionScript Google App Engine (GAE) Erlang Perl Coldfusion Python Groovy Java REST API Presence PubSub

Realtime.co

Docs Libraries Pricing

> *The Realtime Messaging Framework is a cloud-hosted messaging system for websites and mobile apps that require constant content updates in just a few milliseconds, enabling any application to interact with millions of connected users in a fast and secure way.*

Websockets Fallback-support (streaming and polling) Real-Time Client Push

Real-Time messaging Real-Time data

Mobile Push Notifications for iOS and Android (APNS and GCM) .NET Java / Android

JavaScript Lua iOS Titanium Appcelerator Windows Phone node.js Objective-C PHP

Python C/C++ Ruby Silverlight ActionScript REST API Pub/Sub Presence

built-in security (authentication and authorization) multiplexing (through the use of channels)

HTML5 real-time enabled templating engine (xRTML)

Tambur.io

Docs Pricing Libraries

> *Tambur.io provides your business with a simple messaging API to build scalable realtime web and mobile apps.*

Realtime messaging HTTP/REST SSL Websockets Comet Streams Modes Broadcast

Unicast Authcast Presence Direct Messaging PHP Ruby Java .Net Erlang JavaScript

Subscribe

JavaScript (client)

```
var connection = new tambur.Connection("API_KEY", "APP_ID");
var stream = connection.get_stream("my_stream");
stream.onmessage = function(msg){
  // handle message
};
```

Publish

Python (client)

```
tambur = Tambur(api_key='API_KEY', app_id='APP_ID', secret='SECRET')
tambur.publish('my_stream', 'some message')
```

Modes

Streams can operate in one or several modes. As an example a stream can enable the 'Authentication' mode and therefore receive messages that target an authenticated receiver. Besides the 'Authentication' mode Tambur.io supports a 'Direct Messaging' mode that allows the subscribers of a stream to communicate directly among each other, as well as a 'Presence' mode that automatically publishes presence status of all the stream subscribers.

Authentication Mode (JavaScript)

```
stream.enable_auth("AuthToken");
stream.onauth = function(msg) {
  // handle authenticated message
};
```

Direct Messaging Mode (JavaScript)

```
stream.enable_direct("MyUserName", "DirectToken");
stream.ondirect = function(msg) {
  var sender = msg[0];
  var content = msg[1];
  /* reply back */
  stream.direct_msg(sender, "thanks for the message!");
};
```

Presence Mode (JavaScript)

```
stream.enable_presence("MyUserName", "PresenceToken");
stream.onpresence = function(notification) {
  var user = notification[0];
  var status = notification[1];
  if (status === "up") {
    // subscriber has joined the stream
  } else {
    // subscriber has left the stream
  }
};
```

WebSync on-demand (by FrozenMountain)

Comet Real-Time Client Push Real-Time messaging Real-Time data

Data Synchronisation, Persistence, Full Stack

Firebase

> *A scalable real-time backend for your web app. Build apps really fast without the hassle of managing servers*

iOS Java / Android JavaScript WebSockets BaaS (Backend as a Service)

Acquired by Google. Still active.

JavaScript (client)

```
var dataRef = new Firebase( 'https://my-app.firebaseio.com/' );
```

```
dataRef.push( { name: '@leggetter', text: 'Yo from FOWA!' } );

dataRef.on( 'child_added', function(snapshot) {
  // Add the data
} );

dataRef.on( 'child_changed', function(snapshot) {
  // Update the data
} );

dataRef.on( 'child_removed', function(snapshot) {
  // Remove the data
} );
```

Google Drive Realtime API

> *Add Realtime collaboration to your app Give your users the power of Google Docs–style collaboration. All JavaScript. No server. No sweat.*

Meteor

> *Meteor is a set of new technologies for building top-quality web apps in a fraction of the time, whether you're an expert developer or just getting started.*

Node.js fullstack HTTP Streaming HTTP Long-polling WebSockets

Not to be confused with the original Meteor Comet server

Realtime.co Cloud Storage

Docs Libraries Pricing

> *The Realtime.co Cloud Storage is a highly-scalable backend-as-a-service based on Amazon DynamoDB. Built-in real-time notifications keep data synchronized between users (web and mobile).*

BaaS (Backend-as-a-Service) Real-time data sync JavaScript iOS Android (Java) Node.js

NoSQL DynamoDB HTTP Streaming HTTP Long-polling WebSockets

Mobile Push Notifications for iOS and Android (APNS and GCM)

JavaScript (client)

```
var credentials = {
  applicationKey: "[YOUR_APPLICATION_KEY]",
  authenticationToken: "[USER_TOKEN]"
}

var storageRef = Realtime.Storage.create(credentials);
var tableRef = storageRef.table("chat-messages");

var chat-msg = {
  chatid : "My chat room",
  timestamp : +new Date(),
  text : "Hello World",
  nickname : "Beavis"
};

tableRef.push(chat-msg, function() {
  // item successfully committed to database
});

tableRef.on("put", function(item) {
  // item was added to the database table
});

tableRef.on("update", function(item) {
  // item was updated at the database table
});

tableRef.on("delete", function(item) {
  // item was removed from the database table
});
```

simperium

> *Simperium is a service for developers to move data everywhere it's needed, instantly and automatically.*

Messaging: with focus on delivery to servers

Superfeedr

RSS PubSubHubbub

DataSift

Social Media data RSS HTTP Streaming

Other

Echo

SELF HOSTED REALTIME SERVICES

Prosody

> *Prosody is a modern flexible communications server for Jabber/XMPP written in Lua. It aims to be easy to set up and configure, and light on resources. For developers it aims to be easy to extend and give a flexible system on which to rapidly develop added functionality, or prototype new protocols.*

Jabber XMPP Lua BOSH

Centrifuge

> *Simple real-time messaging in web applications. Centrifuge built on top of Python's asynchronous Tornado server/framework. It has admin web interface, Javascript client to communicate from web browser, HTTP API and client to communicate from web application backend code.*

Python JavaScript WebSockets SockJS HTTP-fallback Presence Event/Message history PubSub

Spike-Engine

> *Spike-Engine allows quick and painless creation of real-time web services in .NET. Spike-Engine focuses on latency, bandwith and perfomance and has been designed and proven to be robust and reliable. The technology has been tested in production environment with thousands of simultaneous connections and used to build reliable game and application servers.*

RPC Automatic Client Stub Generation WebSockets Fallback Support Cross-Domain Support Comet Long-Polling PubSub HTTP .NET Flash FlashSockets SPML / SECP HTTP Tunneling Security Cross-Platform Monitoring

SignalR

WebSockets Long-polling ASP.NET IIS PubSub RMI

Mojolicious

> *A modern Perl web framework built from the ground-up as a nonblocking web server, including built-in support for web sockets.*

Full nonblocking web server   WebSockets   Perl

Alchemy Websockets

> *An extremely efficient C# WebSocket server for .NET projects.*

WebSockets   .NET   C#

SockJS

> *SockJS is a browser JavaScript library that provides a WebSocket-like object. SockJS gives you a coherent, cross-browser, Javascript API which creates a low latency, full duplex, cross-domain communication channel between the browser and the web server.*

WebSockets   Fallback-support   HTTP Streaming   HTTP Polling   JSONP Polling

Cross Domain support   EventSource

socket.io

> *Socket.IO aims to make realtime apps possible in every browser and mobile device, blurring the differences between the different transport mechanisms. It's care-free realtime 100% in JavaScript.*

WebSockets   Fallback-support   Flash Socket   HTTP Long-Polling   node.js

Cross Domain Support

SocketCluster

> *A highly scalable realtime environment for Node.js SocketCluster is a new kind of engine which sits between Node.js and your code to provide you with a resilient, scalable, realtime architecture.*
>
> *With SC, you can build systems that make use of all CPU cores on a machine/instance. This*

> *removes the limitations of having to run your Node.js code as a single thread.*
>
> *SC also gives you the flexibility to scale up and scale out easily and at your own pace.*

Node.js

Firehose.io

> *Firehose is a minimally invasive way of building realtime web apps without complex protocols or rewriting your app from scratch. Its a dirt simple pub/sub server that keeps client-side Javascript models in synch with the server code via WebSockets or HTTP long polling.*

WebSockets HTTP Long-Polling Ruby

Thunder Push

> *Thunderpush is a Tornado and SockJS based push service. It provides a Beaconpush (beaconpush.com) inspired HTTP API and client.*

SockJS Python

Cramp

WebSockets Server Sent Events EventSource Ruby

Plezi

> *Plezi is an easy to use Ruby Websocket Framework, with full RESTful routing support and HTTP streaming support. It's name comes from the word "fun" in Haitian, since Plezi is really fun to work with and it keeps our code clean and streamlined.*

WebSockets Long Pulling (supports RESTful HTTP routes) HTTP Streaming Ruby

phpDaemon

> *Asynchronous server-side framework for Web and network applications implemented in PHP using libevent. phpDaemon can handle thousands of simultaneous connections*

PHP

Nugget

> *A web socket server implemented in c#.*
>
> *The goal of the projects is to create an easy way to start using HTML5 web sockets in .NET web applications.*

C# .NET

SuperWebSocket, a .NET WebSocket server

WebSockets, .NET

webbit

> *An event-based WebSocket and HTTP server in Java*

Java

Fleck

> *Fleck is a WebSocket server implementation in C#. Fleck requires no inheritance, container, or additional references.*

WebSockets .NET

Persevere

Comet PubSub

Migratory

Comet WebSockets

Meteor

Comet Perl

Beacon Push

WebSockets Comet Fallback-support Real-Time Client Push Real-time messaging

Real-Time Data Python Ruby PHP node.js REST API

LightStreamer

Comet WebSockets

Jetty

WebSockets HTTP Streaming

Ratchet

> *A PHP 5.3 (PSR-0 compliant) component library for serving/consuming sockets and building socket based applications. Build up your application (like Lego!) through simple interfaces using the decorator and command patterns. Re-use your application without changing any of its code just by wrapping it in a different protocol.*

PHP WebSockets

BrainSocket

> *A Laravel package that allows you to get up and running with real-time event-driven PHP apps using WebSockets.*

Laravel WebSockets PHP

WebSockets and Joomla

PHP WebSockets Joomla

Atmosphere

Comet WebSockets Scala Groovy Java

erlycomet

Comet

cometD

Comet

Pokein

Comet ASP.NET Mono

APE Project

WebSockets Comet

StreamHub

Caplin System's Liberator

Comet WebSockets Fallback-support PubSub

ICEfaces

Kaazing

WebSockets Fallback-support

FAYE

Real-Time messaging Bayeux node.js Ruby

XSockets

WebSockets .NET Fallback-support ### Tornado

> *Tornado is a Python web framework and asynchronous networking library, originally developed at FriendFeed. By using non-blocking network I/O, Tornado can scale to tens of thousands of open connections, making it ideal for long polling, WebSockets, and other applications that require a long-lived connection to each user.*

Represents a core building block of many other realtime web servers.

misultin

WebSockets Erlang

Cowboy

WebSockets Erlang

YAWS (Yet Another Web Server)

WebSockets HTTP Long-Polling HTTP Streaming Erlang

juggernaut *deprecated*

WebSockets Comet Fallback-support node.js

PHP WebSocket

PHP WebSockets

apache-websocket

> *WebSocket module for Apache*

PHP WebSockets Apache

jwebsocket

Java WebSockets

Goliath

Ruby Asynchronous non-blocking HTTP Streaming

ws4py

Python WebSockets Server Client

SocketTornad.IO

> *Implementation of the Socket.IO Websocket emulation protocol in Python on top of the non-blocking Tornado Web Framework.*

Python WebSockets Server Client

erlang_websocket

Erlang WebSockets Server

Slanger

> *Slanger is an open source server implementation of the Pusher protocol written in Ruby.*

Ruby WebSockets Server

em-websocket

> *EventMachine based, async, Ruby WebSocket server.*

Ruby WebSockets Server

Java-WebSocket

> *This repository contains a barebones WebSocket server and client implementation written in 100% Java. The underlying classes are implemented using the Java ServerSocketChannel and SocketChannel classes, which allows for a non-blocking event-driven model (similar to the WebSocket API for web browsers).*

Java WebSockets Server Client

Autobahn WebSocket

> *Autobahn provides Open-Source client and server implementations of WebSocket and WAMP.*

WebSockets Java Android

libwebsockets

> *C Websockets Server Library*

C WebSockets Server

ArduinoWebsocketServer

> *This library implements a Websocket server running on an Arduino*

WebSockets Server Arduino

nowjs

node.js

Doesn't appear to be actively maintained any more and the website is down.

WEBSOCKET CLIENT LIBRARIES

JavaScript - Flash Socket Fallback

web-socket-js

ActionScript

AS3 WebSocket

.NET

Microsoft .NET 4.5 namespace and classes Anaida - WebSocket Client/Adapter

Microsoft Windows Store app MessageWebSocket class WebSocket Sharp

WebSocket4Net - originated from the SuperWebSocket codebase

Silverlight

Silverlight WebSocket client - prototype

Java

Java WebSocket Client UnittWebSocket Java-WebSocket

C++

Arduino C++ WebSocket client

Ruby

web-socket-ruby" em-websocket-client

Python

ws4py websocket-client

Objective-C

ZTWebSocket SocketRocket - Objective-C WebSocket Client (beta)

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23 Comments Phil Leggetter – Real-Time Web Software Consultant 1 Login

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sankalp singha • 2 years ago

Thank you for this awesome list!! This is one of the most comprehensive list in this category!! I am still trying to figure out which would be the best solution. After going through all of them what I fail to understand that why is there such a less support for PHP when half of the net is coded in it. Maybe because of it's memory leaks??

2 • Reply • Share ›

Phil Leggetter Mod sankalp singha • 2 years ago

PHP generally runs on Apache which wasn't built to handle persistent connections. It was built with the request/response paradigm (http://en.wikipedia.org/wiki/R...) in mind and allocates resources to each request accordingly. If you build a realtime solution on Apache and end up maintaining lots of open connections resources are used up very quickly.

That's why you'll see that the PHP solutions, such at Ratchet (http://socketo.me) run as a standalone process.

If I were to build an application using PHP and I wanted realtime functionality then I would probably outsource the realtime functionality to a hosted service. If that wasn't an option then I would run another self-hosted solution in parallel and communicate between the component using message queues.

• Reply • Share ›

sankalp singha Phil Leggetter • 2 years ago

Thank you so much Phil for the really quick reply in the matter. Much obliged!! I did indeed look into Ratchet and also had a look into Slanger. Currently even trying node.js + socket.io + redis for realtime notifications. Just wanted to know if you think that this method is a good idea?

P.S - So if Slanger is using the same Pusher libraries, can I be using more than 100 concurrent connections in the sandbox plan with Slanger? Sorry, just a lame doubt :P

• Reply • Share ›

Phil Leggetter Mod sankalp singha • 2 years ago

node.js + socket.io seems to be the way everybody gets started. Whilst there's value in having a "go to" solution for some things, I think we'd all benefit if there were solid realtime web technologies for all languages. And, it's getting there.

One way of achieving this would be to choose a realtime web technology based on your language preference. So, if you're a PHP developer then take a look at Ratchet, use it, contribute, tell others about it, and hopefully it'll become an even better solution - http fallback support, pubsub abstractions and more.

> So if Slanger is using the same Pusher libraries, can I be using more than 100 concurrent connections in the sandbox plan with Slanger?

If you are using Slanger then it's hosted on your own infrastructure. So, there's no limit on how many connections you can have other than the limits imposed by your realtime web infrastructure.

Hope this helps.

1 • Reply • Share ›

bachwehbi • a year ago

Many thanks for this comprehensive overview over the different technologies/providers

In the hosted realtime services there is
Beebotte (beebotte.com)

It is a cloud platform for Internet of Things and
realtime connected applications. It provides REST, websockets and XMPP
connectivity, an API for data storage and history (statistics), and a number
of Web widgets for data visualization.

Thanks!

1 ^ | v • Reply • Share ›

Vagner Luz Do Carmo • a month ago

http://pushman.dfl.mn

^ | v • Reply • Share ›

Joe Tran • 6 months ago

Hi Phil, thanks for the consolidated list.
I'm currently looking for a solution for my project.
The project is related to online movie ticket booking (with very high frequecy level required as thousands of users can use the booking system as the same time). What is your best suggestion on this? Our system environment is C#, .NET, ASP.
I have tried SignalR but it seems very limited of references. Now I'm thinking of using Node.js and socket.io but not sure about its stability.
Thanks :)

^ | v • Reply • Share ›

Samuel • 6 months ago

Thank you for this wonderful list. I'm looking for a technology that can run behind Amazon ELB, would you please suggest me the best solution?

^ | v • Reply • Share ›

Alex summers • 7 months ago

Hey Phil,its a nice list here...do you know anything about layer.com...it seems they are building new technology for real time chat apps... I don't know much about it...hope you will look into it...

^ | v • Reply • Share ›

Phil Leggetter Mod ➦ Alex summers • 7 months ago

Hey Alex, sorry for the delay in responding. I had a broken website :)

I haven't looked at Layer in any detail yet - although I do have the t-shirt!

see more

^ | v • Reply • Share ›

Danny • 9 months ago

what would you recommend for self-hosted enviornment to create a real tie dashboard with a few graphs and charts?

^ | v • Reply • Share ›

Phil Leggetter Mod ➦ Danny • 9 months ago

I recently wrote an article for Net Magazine September 2014 edition that used Socket.IO (as it just reached 1.0) and Epoch by Fastly fastly.github.io/epoch/ for the charting. You can see the code here: https://github.com/leggetter/s... but I'm not sure if there are any plans to put the tutorial online instead of in print.

The self-hosted solution you choose should really be based on your preferred language and your requirements. See Choosing your Realtime Web App Tech Stack http://www.leggetter.co.uk/201...

1 ^ | v • Reply • Share ›

Danny ➦ Phil Leggetter • 9 months ago

I was actually testing Epoch charts when I got your reply :) For graphs right now I am using Vivagraph

1 ^ | v • Reply • Share ›

iJames • a year ago

Awesome list! Can you get a nice floating TOC on the side though (ala https://phpbestpractices.org/)... Scrolling is so touchpad.... and I have a mouse... :-)

^ | v • Reply • Share ›

tany • a year ago

hi phil..i am making a student portal system using webservices for my university as my fyp..it contains a part of sending notifications..but i am unable to do it..can u help me in it please?its urgent

^ | v • Reply • Share ›

James B • a year ago

Thanks for this list! narrowed my choice down to Pusher or Pubnub. Which service would you say fares better in the following three areas, 1 latency, 2 reliability and 3 scalability

^ | v • Reply • Share ›

Phil Leggetter Mod ➦ James B • a year ago

Hi James B,

Two great services. I should point out that I used to work for Pusher.

1. I'd suggest you take a look at the latency stats page (http://www.leggetter.co.uk/rea...) and make your own judgement on latency. It's also worth doing your own benchmarking to ensure your criteria is measured.

2. Both services are highly reliable and based on personal experience I couldn't differentiate between the two. The best way to determine this would be to look at the respective status pages: Pusher: http://status.pusher.com/ PubNub: http://status.pubnub.com/

3. Scalability is obviously fundamental to hosted services and I know both services have put in a lot of effort into infrastructure support to enable scaling. Pusher can offer dedicated clusters if required and their normal service (the last time I checked) was located in AWS US East. PubNub also appear to be on AWS and have multiple data centres. See: https://help.pubnub.com/entrie... With both appearing to be based on a VM infrastructure it should be easy for both solutions to scale and I've yet to see anybody complain about either service not handling a spike or general growth in traffic.

^ | v • Reply • Share ›

James B ➦ Phil Leggetter • a year ago

Thanks! I notice that PubNub optionally has support for web sockets. http://www.pubnub.com/websocke... Do you know if this implementation is similar to Pusher's, and, what would be a good use case to sue web sockets over the default functionality?

1 ^ | v • Reply • Share ›

Phil Leggetter Mod ➦ James B • 10 months ago

PubNub have a WebSocket emulation layer but don't support WebSocket at the transport layer i.e. they don't *really* use WebSocket.

WebSocket should be lower latency for bi-directional communication since it's a single connection and not multiple HTTP connections. I also believe that since it's a single connection it should result in lower resource usage which should mean it's a better solution for mobile.

The main problem with WebSocket has been that the existing Internet infrastructure gets in the way. some proxies and firewalls block the connections. On mobile this can be a problem since mobile operators will frequently use proxies. Using a secure WebSocket connection (wss://) usually solves this problem, but not always.

^ | v • Reply • Share ›

MetaClass • a year ago

The list has grown during last year:-). But i can't find Iron MQ (hosted service). And maybe queues.io is worth mentioning?

^ | v • Reply • Share ›

David Mertens • 2 years ago

Under Self Hosted Realtime Services you might consider including Mojolicious. Mojolicious is a Perl web framework and server built non-blocking from the ground up, with built-in support for web sockets. Otherwise this is a great list! Thanks!

^ | ˅ • Reply • Share ›

Phil Leggetter Mod ➦ David Mertens • 2 years ago

Hey David,

Please feel free to make a pull request https://github.com/leggetter/r...

Cheers

^ | ˅ • Reply • Share ›

David Mertens ➦ Phil Leggetter • 2 years ago

Awesome! Submitted. :-)

^ | ˅ • Reply • Share ›

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