Python WebSocket Libraries Comparison

Tornado

Tornado is a Python web framework and asynchronous networking library. It's most popular use is probably for web applications that require scalability, but it can be used for many other applications.

the ability to handle thousands of connections per second

native support for WebSockets

simple API

off-the-shelf components.

It is designed to be scalable, simple, and lightweight. Like all Python frameworks, Tornado is 100% event driven. Its in-memory cache and use of non-blocking sockets makes it ideal for applications that spend most of their time waiting on network requests or generating output.

Autobahn-python

framework for WebSocket and WAMP clients and servers

runs on CPython and *PyPy <https://pypy.org/>*

runs under Twisted and asyncio - implements WebSocket RFC6455

implements WebSocket compression

implements WAMP, the Web Application Messaging Protocol

high-performance, fully asynchronous implementation

best-in-class standards conformance (100% strict passes with Autobahn Testsuite: Client Server)

message-, frame- and streaming-APIs for WebSocket

supports TLS (secure WebSocket) and proxies

Open-source (MIT license)

Comparison

1. Latency:

Tornado:

Tornado's asynchronous design is well-suited for low-latency scenarios.

The single-threaded event loop can efficiently handle incoming WebSocket messages with minimal context-switching overhead.

Autobahn Twisted:

Autobahn Twisted is designed for low-latency communication using Twisted's asynchronous infrastructure.

Twisted provides a robust and efficient event-driven model that can contribute to low-latency performance.

2. Throughput:

Tornado:

Tornado's asynchronous nature allows it to handle a high number of concurrent connections, contributing to good throughput.

Throughput can be influenced by the efficiency of Tornado's event loop and its ability to manage simultaneous WebSocket connections.

Autobahn Twisted:

Autobahn Twisted is optimized for high-throughput scenarios, especially with its focus on WebSocket communication.

Twisted's event-driven model is designed to efficiently manage multiple connections and handle high loads.

3. Scalability:

Tornado:

Tornado can scale well for a moderate number of connections, but its single-threaded event loop may become a bottleneck under extremely high loads.

It can be horizontally scaled by running multiple Tornado instances behind a load balancer.

Autobahn Twisted:

Autobahn Twisted, built on the Twisted framework, is designed to handle a large number of connections efficiently.

Twisted's ability to manage asynchronous I/O operations makes it scalable for applications with a high number of WebSocket connections.

4. Other Metrics:

Ease of Use:

Tornado is known for its simplicity and ease of use. Its straightforward API makes it accessible to developers.

Autobahn Twisted may have a steeper learning curve, especially for those less familiar with the Twisted framework.

Feature Set:

Autobahn Twisted is specifically designed for WebSocket communication and implements advanced features like WAMP (WebSocket Application Messaging Protocol).

Tornado is a more general-purpose framework, and while it supports WebSockets, it may not have the same feature set tailored explicitly for WebSocket applications.

Conclusion:

If your primary focus is on a lightweight, asynchronous, and easy-to-use framework with good performance for WebSocket communication, Tornado could be a suitable choice.

If you need advanced WebSocket features, scalability, and are comfortable with the Twisted framework, Autobahn Twisted may be more appropriate.

Hardware

Processor: Intel i7-8750h

RAM: 16 GB

Operating System: Windows 10 Home 64-bit

Total Cores: 6

Total Threads: 12