

# **GNU WebSocket4J Reference Manual**

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version 1.3

**Marek Aaron Sapota**

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This file is part of GNU WebSocket4J Reference Manual (version 1.3).

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# 1 WebSocket

This chapter describes WebSocket protocol and it's GNU WebSocket4J implementation.

## WebSocket protocol

WebSocket is a protocol that provides bi-directional communication over a TCP socket, designed to be implemented in web browsers for use in HTML5 applications. While main use of this protocol is to allow a stable communication channel between a web server and JavaScript running in a web browser the protocol can be used by any application.

JavaScript WebSocket API is being standardised by W3C (latest draft can be obtained from <http://dev.w3.org/html5/websockets/>). WebSocket protocol is being standardised by the IETF. Latest standard can be downloaded from <http://www.whatwg.org/specs/web-socket-protocol/>.

## GNU WebSocket4J implementation

GNU WebSocket4J is an implementation of WebSocket protocol in Java. GNU WebSocket4J tries to provide a simple API for both client and server sockets that would be as easy to use, as the WebSocket JavaScript API, or TCP sockets in Java standard library.

See [Chapter 2 \[Accepting connections\]](#), [page 2](#), if you want to create a WebSocket server application.

See [Chapter 3 \[Connecting to server\]](#), [page 3](#), if you want to create a WebSocket client application talking to a WebSocket server.

## 2 Accepting connections

This chapter tells how to use GNU WebSocket4J in a server application.

### Naming convention

Throughout this chapter `WebServerSocket` will refer to `websocket4j.server.WebServerSocket` class and `WebSocket` will refer to `websocket4j.server.WebSocket` class.

### General idea

Accepting `WebSocket` connections is similar to using TCP sockets from the standard library. You have to create an instance of `WebServerSocket` (modelled after `java.net.ServerSocket`), and then you can use `accept() : WebSocket` method to get incoming connections. Accepted sockets have successfully completed an opening handshake and are ready to use (see [Chapter 4 \[Using an established socket\]](#), page 4).

### Creating a `WebServerSocket` instance

`websocket4j.server.WebServerSocket` has two constructors, first without any parameters and second taking an `Integer`. Second one creates a new socket listening on port specified as an argument, and the first one chooses a random free port. If you create a socket listening on a random port, you can use `getLocalPort() : Integer` method to get that port number.

### Accepting new connections

`accept() : WebSocket` works similar to method, of `java.net.ServerSocket` class, of the same name. It waits until someone connects and returns an established socket. You can limit the time for which `accept` will block with `setSoTimeout(Integer) : void` method (provided `Integer` is time in milliseconds) — if no client connects in this much time a `java.io.IOException` will be thrown.

After you've accepted a socket, you can use `getRequestUri() : String` method of `WebSocket` to get URI requested by client, so you can decide what to do next with this socket.

### Closing the socket

Both `WebServerSocket` and `WebSocket` have `close() : void` method that closes the socket and ends connection in case of `WebSocket`, or stops listening for new connections in case of `WebServerSocket`. `isClosed() : Boolean` method can be used to determine if socket is already closed.

## 3 Connecting to server

This chapter tells how to use GNU WebSocket4J in a client application.

### Naming convention

Throughout this chapter `WebSocket` will refer to `websocket4j.client.WebSocket` class.

### General idea

`WebSocket` class works similar to `java.net.Socket` — you have to create an instance providing information where it should connect to and you get back a socket that is ready to use (see [Chapter 4 \[Using an established socket\]](#), page 4).

### Creating a WebSocket instance

`WebSocket` has two constructors, first one takes a `String`, `Integer` and `String`, second one takes an additional `Integer`. First `String` is the host name of the server you want to connect to, first `Integer` is port on which the server listens for incoming connections. Second `String` is URI that should be requested when connecting — just as HTTP servers, `WebSocket` servers can handle multiple kinds of connections over one port.

For example `new WebSocket("localhost", 5432, "/echo")` would connect to localhost on port 5432 and request `/echo` URI. In JavaScript API you'd use `ws://localhost:5432/echo` URI to connect to the same server.

Fourth, optional, argument of the constructor is timeout in milliseconds, if the opening handshake takes more time than this, an `IOException` will be thrown.

### Closing the socket

Just like the server socket, client sockets have `close() : void` method that ends the connection. Also you can use `isClosed() : Boolean` method to check if the socket is already closed.

## 4 Using an established socket

Once a connection is established and you have an instance of either `websocket4j.client.WebSocket`, or `websocket4j.server.WebSocket` you can use them in uniform way to send and receive messages.

### Naming convention

Throughout this chapter `WebSocket` will refer to both `websocket4j.client.WebSocket` and `websocket4j.server.WebSocket`.

### Sending messages

To send messages you can use `sendMessage(String) : void` method of `WebSocket`. This method immediately sends given string to the other party.

### Receiving

To receive messages you can use synchronous `getMessage(void) : String` method of `WebSocket`. This method waits until the other party sends a message and then returns it.

## Appendix A Example echo server

This chapter shows how to build a simple threaded echo server. This example is included in the distributed package in 'src/websocket4j/examples/EchoServer.java'.

```
package websocket4j.examples;

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 */

import java.io.IOException;

import websocket4j.server.WebServerSocket;
import websocket4j.server.WebSocket;

/**
 * Example presenting an echo server using WebSocket4j.
 */
public class EchoServer extends Thread {

    private WebSocket ws;
```



```
public EchoServer(WebSocket ws) {
    this.ws = ws;
}

private void handleConnection() {
    try {
        while (true) {
            String message = ws.getMessage();
            ws.sendMessage(message);
            System.out.println("Received: " + message);
            if (message.equals("exit"))
                break;
        }
    } catch (IOException e) {
    } finally {
        try {
            ws.close();
        } catch (IOException e) {
        }
    }
}

public void run() {
    handleConnection();
}

public static void main(String[] args) throws IOException {
    WebServerSocket socket = new WebServerSocket(5555);
    try {
        while (true) {
            WebSocket ws = socket.accept();
            System.out.println("GET " + ws.getRequestUri());
            if (ws.getRequestUri().equals("/echo"))
                (new EchoServer(ws)).start();
            else {
                System.out.println("Unsupported Request-URI");
                try {
                    ws.close();
                } catch (IOException e) {
                }
            }
        }
    }
    } finally {
        socket.close();
    }
}
```

```
    }  
}
```

## Appendix B Example echo client

This chapter shows how to build a simple echo client reading from stdin. This example is included in the distributed package in 'src/websocket4j/examples/EchoClient.java'.

```
package websocket4j.examples;

import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

import websocket4j.client.WebSocket;

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 */

/**
 * Example presenting an echo client using WebSocket4J.
 */
public class EchoClient {
```

```
public static void main(String[] args) throws IOException {
    BufferedReader in = new BufferedReader(new InputStreamReader(System.in));
    WebSocket ws = new WebSocket("localhost", 5555, "/echo");
    while (true) {
        String message = in.readLine();
        ws.sendMessage(message);
        System.out.println("Response: " + ws.getMessage());
        if (message.equals("exit"))
            break;
    }
    ws.close();
}
}
```

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