GNU WebSocket4J Reference Manual

version 1.3

Marek Aaron Sapota

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 connnections

`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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