Websockets

Veerle Ongenae

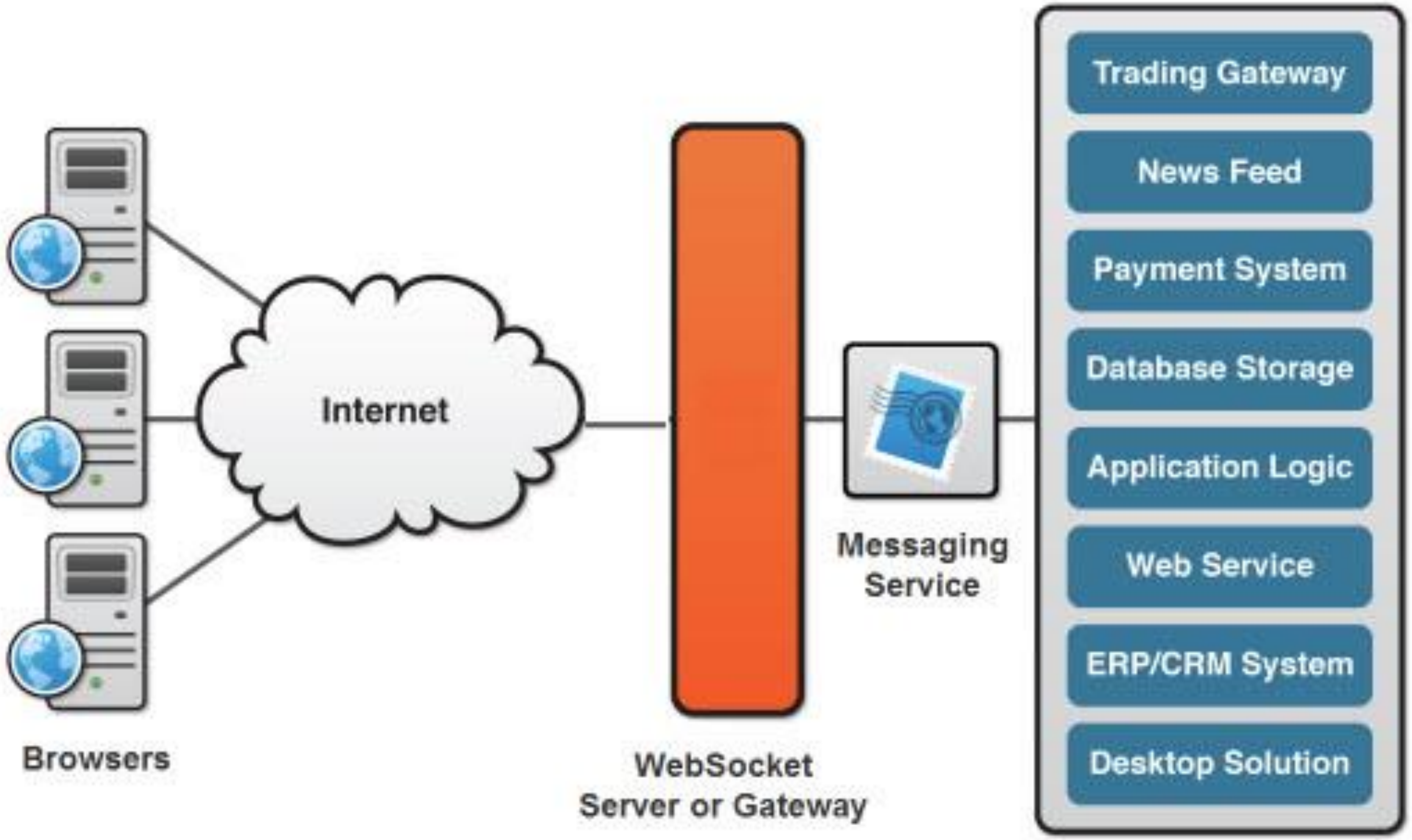
Overzicht

- Inleiding

Wat zijn websockets?

- WebSocket protocol
  - RFC 6455 (IETF, Internet Engineering Task Force)
- WebSocket API
  - Web IDL (Interface Definition Language, W3C)

Architectuur



https://www.websocket.org/aboutwebsocket.html

Protocol

Client → Server

```
GET /chat HTTP/1.1
Host: server.example.com
Upgrade: websocket
Connection: Upgrade
Sec-WebSocket-Key: dGhlIHNhbXBsZSBub25jZQ==
Origin: http://example.com
Sec-WebSocket-Protocol: chat, superchat
Sec-WebSocket-Version: 13
```

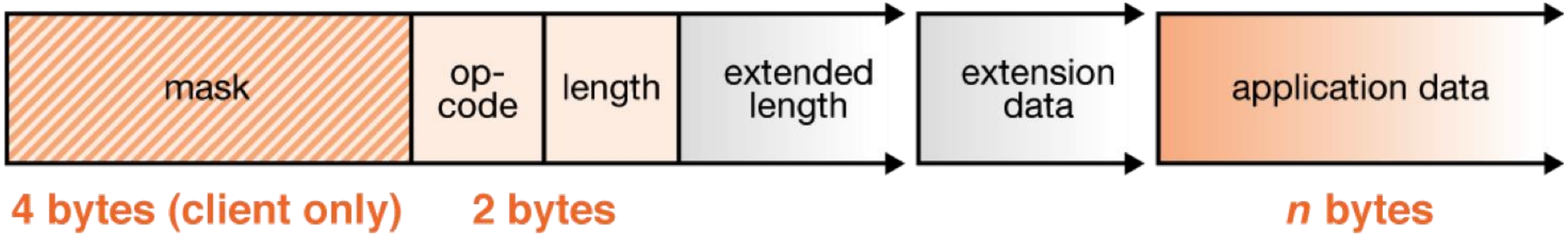
Server → Client

```
HTTP/1.1 101 Switching Protocols
Upgrade: websocket
Connection: Upgrade
Sec-WebSocket-Accept: s3pPLMBiTxaQ9kYGzzhZRbK+xOo=
Sec-WebSocket-Protocol: chat
```

WebSocket Protocol

Zelfde poorten als HTTP en HTTPS

Protocol: ws en wss



https://www.websocket.org/aboutwebsocket.html

Overzicht

- Inleiding
- API

API (deels)

```
[Constructor(in DOMString url, optional in DOMString protocol)]
interface WebSocket {
  readonly attribute DOMString URL;
  // ready state
  const unsigned short CONNECTING = 0;
  const unsigned short OPEN = 1;
  const unsigned short CLOSING = 2;
  const unsigned short CLOSED = 3;
  readonly attribute unsigned short readyState;
  readonly attribute unsigned long bufferedAmount;

  // networking
  attribute Function onopen;
  attribute Function onmessage;
  attribute Function onclose;
  boolean send(in DOMString data);
  void close();
};
WebSocket implements EventTarget;
```

Voorbeeld - client

```
let myWebSocket = new WebSocket("ws://www.websockets.org");
```

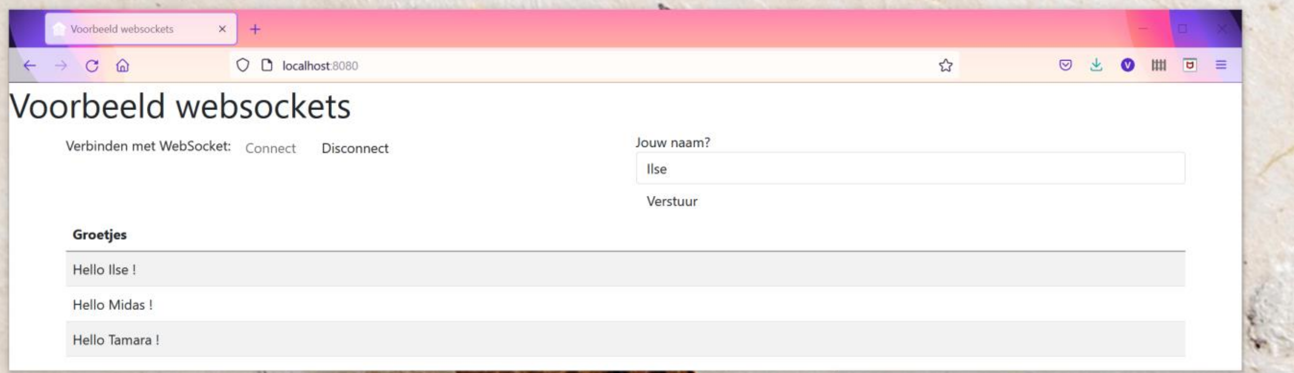
```
// connectie geopend
myWebSocket.addEventListener('open', function (event) {
    myWebSocket.send('Hello Server!');
});
// luisteren naar berichten
myWebSocket.addEventListener('message', function (event) {
    console.log('Message from server ', event.data);
});
// server sluit verbindin
myWebSocket.addEventListener('close', function(event) {
    alert("Connection closed.");
};
```

```
myWebSocket.send("Hello WebSockets!");
myWebSocket.close();
```

Overzicht

- Inleiding
- API
- Server

Voorbeeld



Voorbeeld websockets

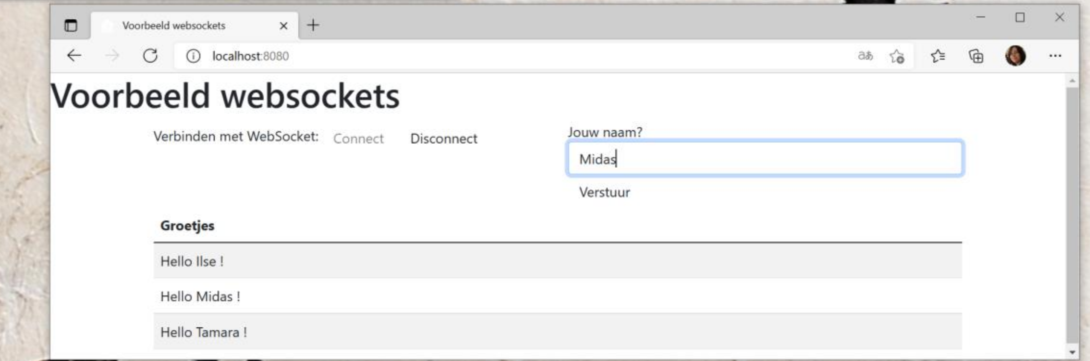
Verbinden met WebSocket: Connect Disconnect

Jouw naam?

Ilse

Verstuur

Groetjes
Hello Ilse !
Hello Midas !
Hello Tamara !



Voorbeeld websockets

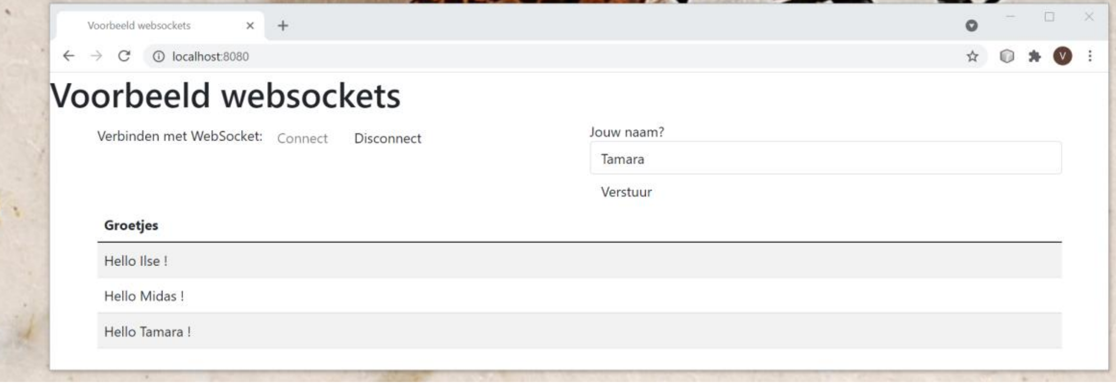
Verbinden met WebSocket: Connect Disconnect

Jouw naam?

Midas

Verstuur

Groetjes
Hello Ilse !
Hello Midas !
Hello Tamara !



Voorbeeld websockets

Verbinden met WebSocket: Connect Disconnect

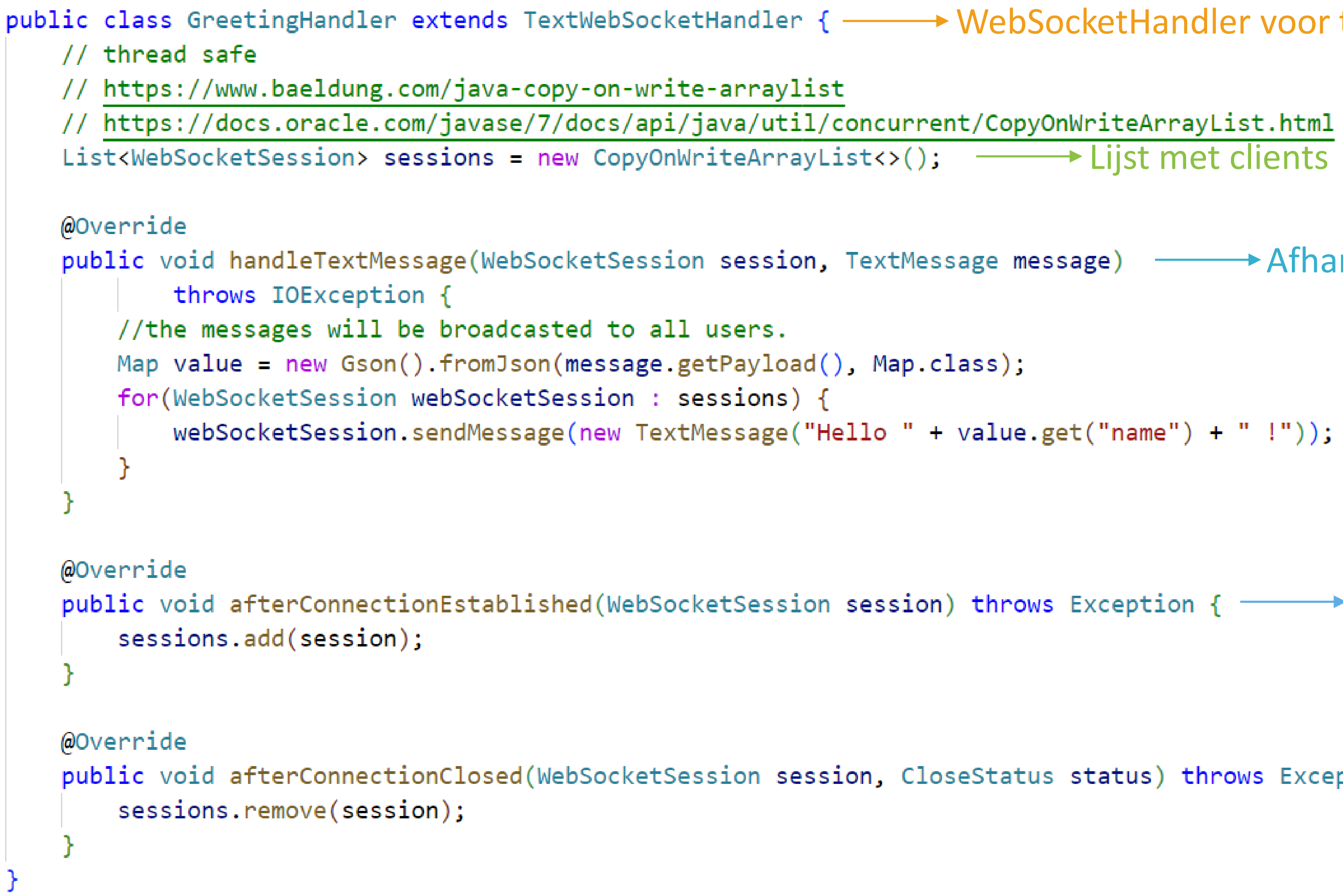
Jouw naam?

Tamara

Verstuur

Groetjes
Hello Ilse !
Hello Midas !
Hello Tamara !

Java Spring – aanmaken websockethandler



```java
public class GreetingHandler extends TextWebSocketHandler {
    // thread safe
    // https://www.baeldung.com/java-copy-on-write-arraylist
    // https://docs.oracle.com/javase/7/docs/api/java/util/concurrent/CopyOnWriteArrayList.html
    List<WebSocketSession> sessions = new CopyOnWriteArrayList<>();

    @Override
    public void handleTextMessage(WebSocketSession session, TextMessage message)
            throws IOException {
        //the messages will be broadcasted to all users.
        Map value = new Gson().fromJson(message.getPayload(), Map.class);
        for(WebSocketSession webSocketSession : sessions) {
            webSocketSession.sendMessage(new TextMessage("Hello " + value.get("name") + " !"));
        }
    }

    @Override
    public void afterConnectionEstablished(WebSocketSession session) throws Exception {
        sessions.add(session);
    }

    @Override
    public void afterConnectionClosed(WebSocketSession session, CloseStatus status) throws Exception {
        sessions.remove(session);
    }
}
```

→ WebSocketHandler voor tekstberichten

→ Lijst met clients

→ Afhandelen binnenkomende tekstberichten

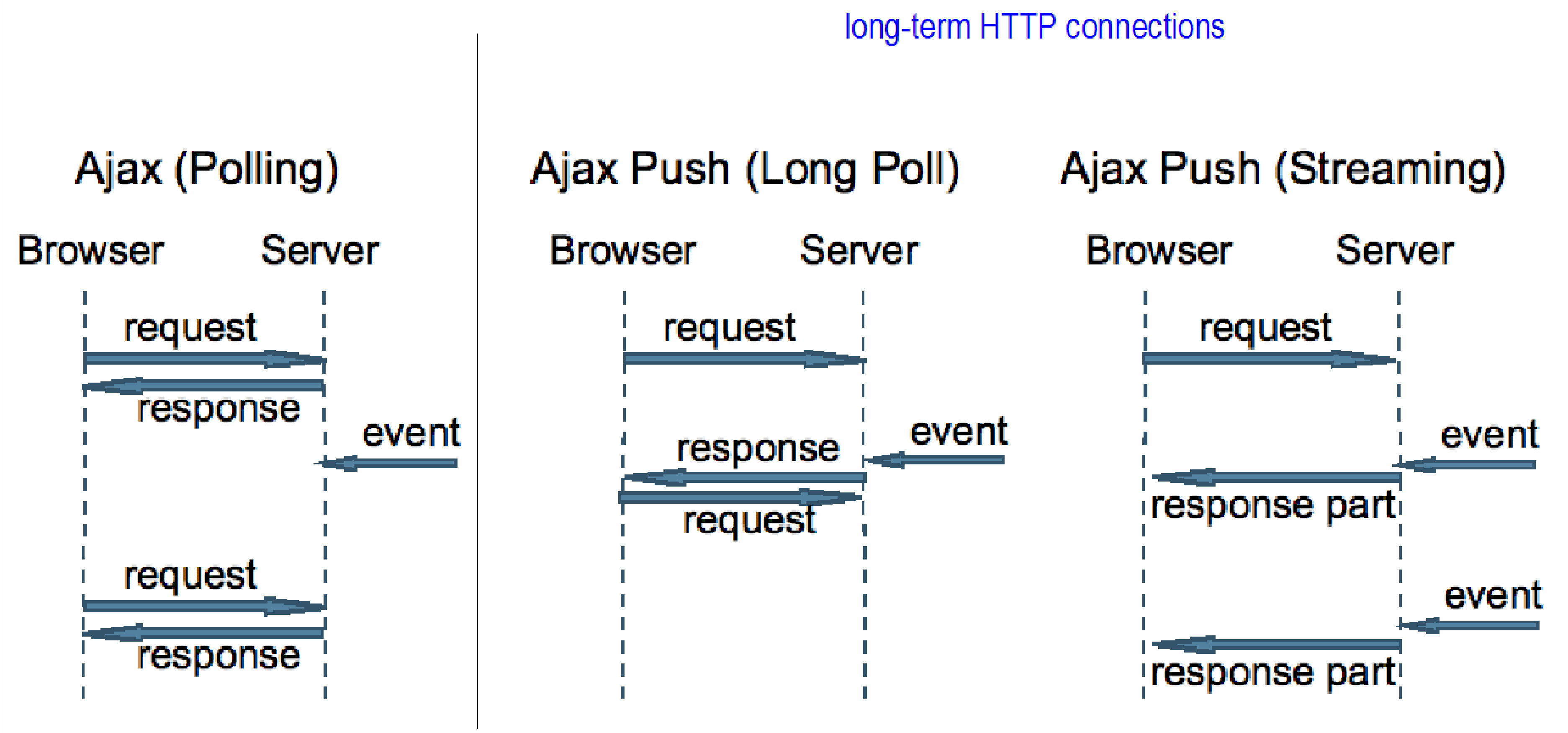
→ Na opzetten verbinding

→ Na afsluiten verbinding door client

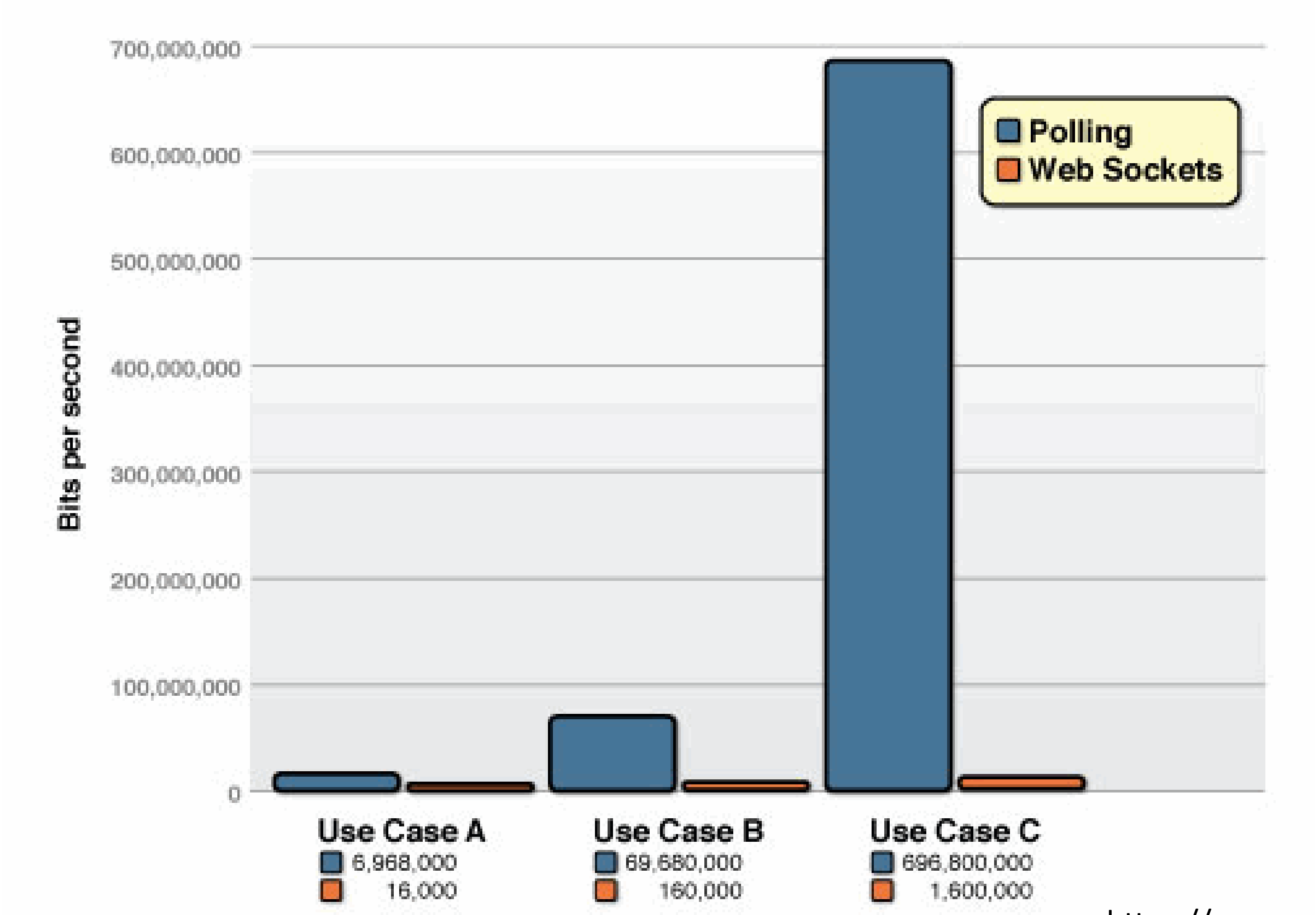
Overzicht

- Inleiding
- API
- Server
- Voordelen websockets

Voor websockets

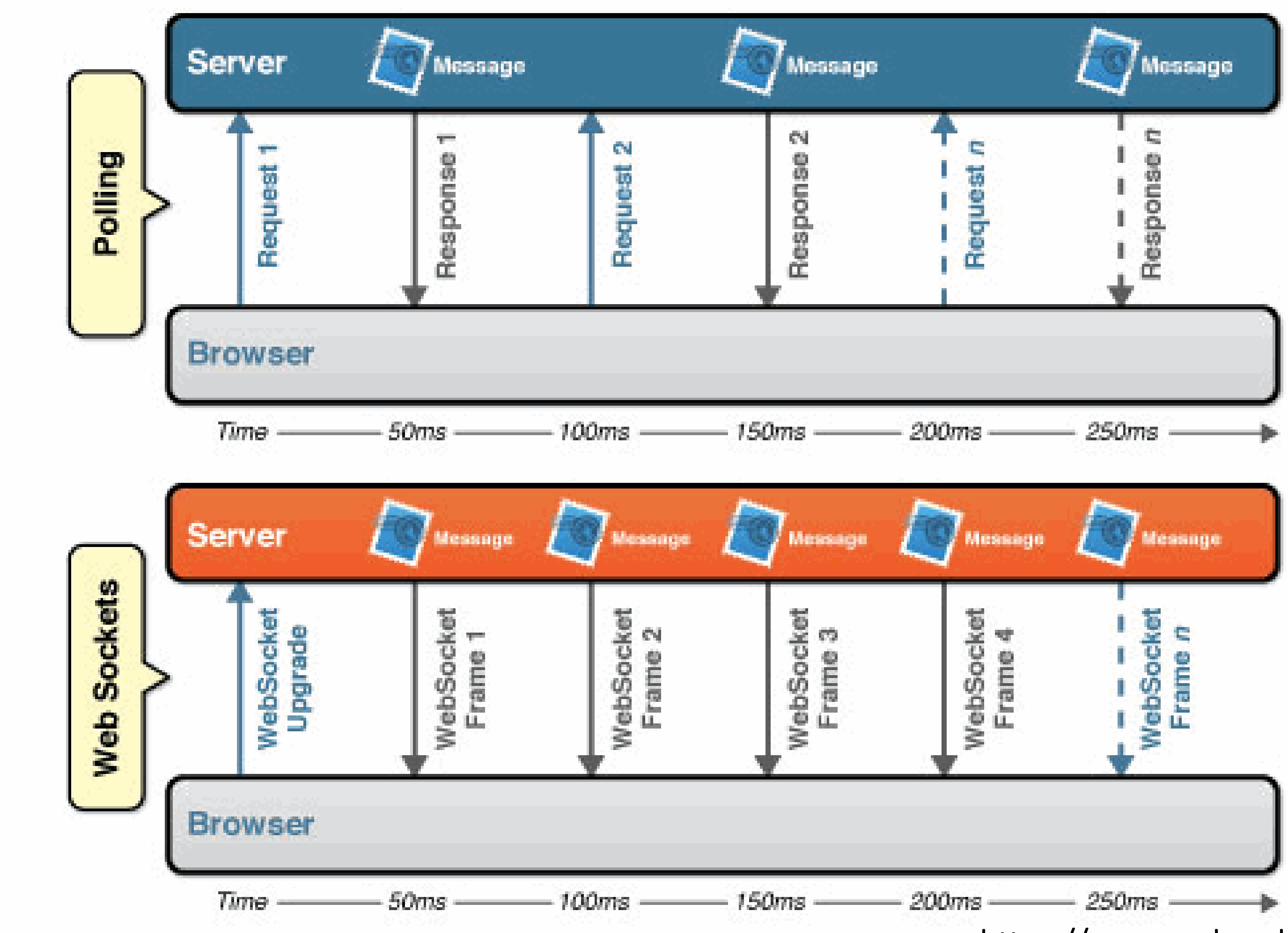


Waarom websockets?



https://www.websocket.org/quantum.html

Waarom websockets?



https://www.websocket.org/quantum.html