WebSockets

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Co to jest?

WebSocket jest technologią zapewniającą dwukierunkowy kanał komunikacji za pośrednictwem jednego gniazda TCP.

Jak to działa?

Handshake

Utworzenie połączenia TCP (full-duplex)

A dokładniej?

Draft

DRAFT

I jeszcze raz DRAFT!

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Handshake - client

```
GET /vim-rlz HTTP/1.1
Upgrade: WebSocket
Connection: Upgrade
Host: localhost
Origin: localhost
WebSocket-Protocol: tyskie-jest-lepsze
```

Upgrade: WebSocket

The Upgrade general-header allows the client to specify what additional communication protocols it supports and would like to use if the server finds it appropriate to switch protocols.

WebSocket-Protocol

The |WebSocket-Protocol| header is used in the WebSocket handshake. It is sent from the client to the server and back from the server to the client to confirm the subprotocol of the connection.

Handshake - server

```
HTTP/1.1 101 Web Socket Protocol Handshake
Upgrade: WebSocket
Connection: Upgrade
WebSocket-Origin: http://localhost
WebSocket-Location: ws://localhost/vim-rlz
WebSocket-Protocol: tyskie-jest-lepsze
```

WebSocket-Location

ws?

URI (identyfikacja zasobu)

A Uniform Resource Identifier (URI) is a compact string of characters for identifying an abstract or physical resource ws - websocket

wss - websocket TLS

Draft? Muhahaha!;-)

troll

```
require 'socket'

server = TCPServer.open(50000)

handshake = <<HAND
HTTP/1.1 101 Web Socket Protocol Handshake
Upgrade: WebSocket
Connection: Upgrade
WebSocket-Origin: http://localhost
WebSocket-Location: ws://localhost
WebSocket-Protocol: drug
\r
HAND

client = server.accept
client.write(handshake)
client.write("\x00Hacked BITCH!\xff")
```

Wszystkie nagłówki mogą być stworzone XMLHttpRequest...

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```
GET /websocket HTTP/1.1
Upgrade: WebSocket
Connection: Upgrade
Host: localhost
Origin: localhost
Sec-WebSocket-Key1: 12998 5 Y3 1  .P00
Sec-WebSocket-Key2: 4 @1  46546xW%0l 1 5
Sec-WebSocket-Protocol: drug

^n:ds[4U
```

```
HTTP/1.1 101 WebSocket Protocol Handshake
Upgrade: WebSocket
Connection: Upgrade
Sec-WebSocket-Origin: http://localhost
Sec-WebSocket-Location: ws://localhost/websoc
Sec-websocketWebSocket-Protocol: drug

8jKS'y:G*Co,Wxa-
```

Algorytm

Extract numbers at Key1(eg: 4 @1 46546xW%0l 1 5) and concatenate them

Count number of spaces at Key1

Devide #1 by #2

Change the format of #3 into "big-endian 32 bit integer"

Repeat #1 by #4 for Key2(eg: 12998 5 Y3 1 .P00)

Concatenate #4, #5, and the body(eg: ^n:ds[4U) of the request

Digest the result in MD5 format

```
num = key.gsub(/[^\d]/, "").to_i() / key.scan(/ /).size
[num].pack("N")
```

Jak używać z ruby?

```ruby
# Gemfile
gem 'em-websocket'

# server.rb
require 'lib/em-websocket'

EventMachine::WebSocket.start(:host => "0.0.0.0",
                              :port => 8080,
                              :debug=> true) do |ws|
  ws.onopen    { ws.send "Hello Client!" }
  ws.onmessage { |msg| ws.send "Pong: #{msg}" }
  ws.onclose   { puts "WebSocket closed" }
  ws.onerror   { |e| puts "Error: #{e.message}" }
end
```

```ruby
# Gemfile
gem 'cramp', :require => 'cramp/controller'

# config/initializers/cramp_server.rb
Cramp::Controller::Websocket.backend = :thin

# app/cramps/communications_controller.rb
class CommunicationsController < Cramp::Controller::Websocket
  periodic_timer :send_hello_world, :every => 2
  on_data :received_data

  def received_data(data)
    if data =~ /stop/
      render "You stopped the process"
      finish
    else
      render "Got your #{data}"
    end
  end

  def send_hello_world
    render "Hello from the Server!"
  end
end

# config/routes.rb
match "/communicate", :to => CommunicationsController
```

Przeglądarka

```
$(document).ready(function(){
  ws = new WebSocket("ws://localhost:10000");
  ws.onmessage = function(evt) { alert(event.data); }
  ws.onclose = function() { alert("socket closed"); };
  ws.onopen = function() {
    alert('socket open');
    ws.send("hello server");
  };
});
```

Idealne? Nie

proxy (low-level TCP)

Content-Length - brak

draft (ale czy to wada?)

Pytania?

http://en.wikipedia.org/wiki/WebSockets

http://www.ietf.org/mail-archive/web/hybi/current/msg02149.html

http://laktek.com/2010/02/16/building-real-time-web-apps-with-rails3/

http://tools.ietf.org/id/draft-hixie-thewebsocketprotocol-75.txt

http://tools.ietf.org/id/draft-hixie-thewebsocketprotocol-76.txt

https://github.com/igrigorik/em-websocket