

Intro to WebSockets

The WebSocket Protocol – RFC 6455

The WebSocket Protocol enables two-way communication between a client running untrusted code in a controlled environment to a remote host that has opted-in to communications from that code.

[RFC 6455](#)

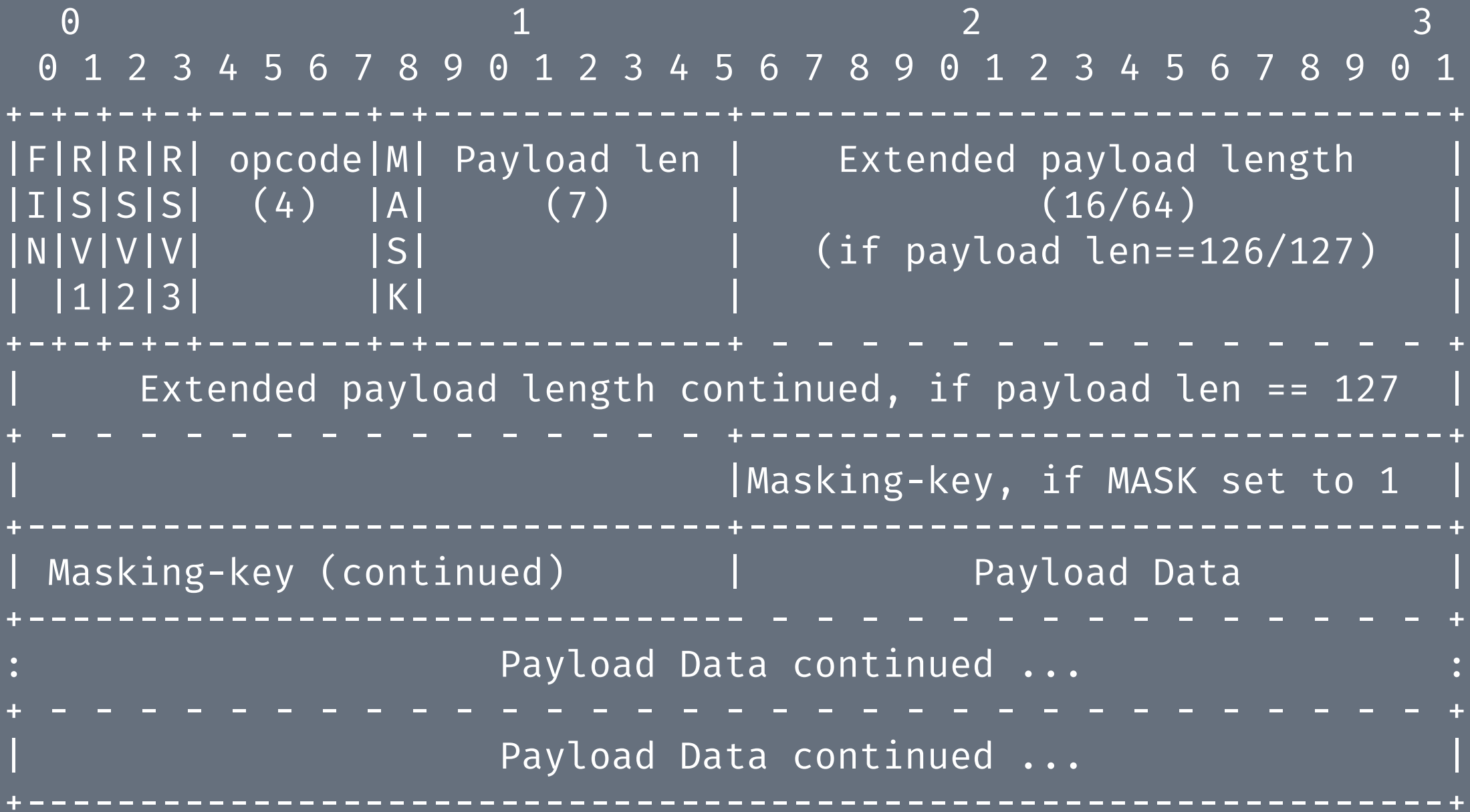
Basics

- Binary Protocol
- Upgrades HTTP 1.1
- Uses frames

Frames

- Used for controlling the socket and sending data
- Contains a header that explains the data message

Frames (cont.)



Basic Flow

- Normal HTTP Connection
- HTTP 1.1 Upgrade to WebSocket
- Frames are sent back and forth

Backends

Cowboy WebSocket Handler

- Low level websockets
- Dealing with frames directly

Phoenix Channels

- Higher Level
- Abstraction around websockets
- Implements its own protocol on top of websockets

```
defmodule Web.CharacterSocket do
  use Phoenix.Socket

  channel("chat:*", Web.ChatChannel)

  def connect(%{"token" => token}, socket) do
    case Phoenix.Token.verify(socket, "character socket", token) do
      {:ok, character_id} ->
        {:ok, assign(socket, :character_id, character_id)}

      {:error, _reason} ->
        :error
    end
  end
end

def id(socket), do: "characters:#{socket.assigns.character_id}"
end
```

```
defmodule Web.ChatChannel do
  use Phoenix.Channel

  def join("chat:" <> channel, _message, socket) do
    case Map.has_key?(socket.assigns, :character_id) do
      true ->
        assign_character(socket, channel)

      false ->
        {:error, %{reason: "character required"}}
    end
  end
end
```

Clients

Elixir

→ WebSockex

→ Gun

WebSockets

- Callback inspired approach
- Only a websocket client

```
defmodule Gossip.Socket do
  use WebSockex

  def start_link() do
    WebSockex.start_link(url(), __MODULE__, state, [name: Gossip.Socket])
  end

  def handle_connect(_conn, state) do
    {:ok, state}
  end

  def handle_frame({:text, message}, state) do
    {:ok, state}
  end
end
```

JavaScript

Phoenix Socket JS

```
let socket = new Socket("/socket", {params: {token: token}});  
socket.connect();
```

```
let channel = socket.channel("chat:global", {})  
channel.on("broadcast", (data) => {  
  console.log(data);  
});  
channel.join().  
  receive("ok", (e) => {  
    console.log("Connected!");  
  });;
```

Inspecting WebSockets

- Open the dev tools -> Networking -> WS
- Click on the connection -> Frames

ElementsConsoleSourcesNetworkPerformanceMemoryApplicationSecurityAudits

View:Group by framePreserve logDisable cacheOfflineOnline

Filter

☐ Hide data URLsAllXHRJSCSSImgMediaFontDocWSManifestOther

20 ms40 ms60 ms80 ms100 ms120 ms140 ms160 ms180 ms200 ms220 ms240 ms260 ms280 ms300 ms320 ms340 ms360 ms380 ms400 ms420 ms

Name

websocket?token=SFMyNTY...

×HeadersFramesCookiesTiming

All

Data

	Length	Time
↑["1","1","telnet:6ce58b08-530e-991e-685d-37cb457d210c","phx_join",{}]	69	16:37:06.020
↓["1","1","telnet:6ce58b08-530e-991e-685d-37cb457d210c","phx_reply",{"status":"ok","response":{}}]	97	16:37:06.100
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","echo",{"sent_at":"2018-12-04T21:37:06.061238Z","message":"\nExVenture v0.27.0\nxKl oX, OX.\n\n':. xM; XM.\n\nKx0NxoXX; x000K, ...	620	16:37:06.101
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","prompt",{"sent_at":"2018-12-04T21:37:06.061357Z","message":"\nWhat is your player name? (Enter {command})create{/command} for ...	201	16:37:06.105
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:06.074132Z","module":"Config.Update","data":{"regen_notifications":false,"prompt":"%h/%...	249	16:37:06.109
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:06.074227Z","module":"Config.Actions","data":{"actions":{"type":"skill","key":"80d21d4c...	577	16:37:06.110
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","echo",{"sent_at":"2018-12-04T21:37:06.074627Z","message":"\nWelcome, eric!\n\nThanks for checking out my game. If you come into...	392	16:37:06.113
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","echo",{"sent_at":"2018-12-04T21:37:06.075785Z","message":"\n{command send=Sign In}[Press enter to continue]{/command}\n"}]	182	16:37:06.116
↑["1","2","telnet:6ce58b08-530e-991e-685d-37cb457d210c","recv",{"message":""}]	77	16:37:07.664
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:07.675603Z","module":"Character.Info","data":{"name":"eric","level":9,"class":{"name":"k...	203	16:37:07.710
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:07.675698Z","module":"Character.Skills","data":{"skills":{"points":5,"name":"Fire ball","k...	938	16:37:07.712
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:07.676802Z","module":"External.Discord.Status","data":{"starttime":1543959426,"game":{"M...	197	16:37:07.712
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:07.680416Z","module":"Room.Info","data":{"zone":{"name":"Clay Brook","id":2,"y":4,"x...	549	16:37:07.716
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","gmcpc",{"sent_at":"2018-12-04T21:37:07.680512Z","module":"Zone.Map","data":{"map":"Clay Brook\n\n\n\n\n - {map:dark-gree...	715	16:37:07.720
↓[null,null,"telnet:6ce58b08-530e-991e-685d-37cb457d210c","echo",{"sent_at":"2018-12-04T21:37:07.680657Z","message":"\n{room}Lucie's/{room}\n-----\n\nLucie stands behind the counter wi...	1073	16:37:07.721

1 / 4 requests | 0 B / 3.2 KB trans...

Questions?