Getting started with Fable and Fable Elmish

A first steps in the wonderful world of F# for web development

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A naive approach

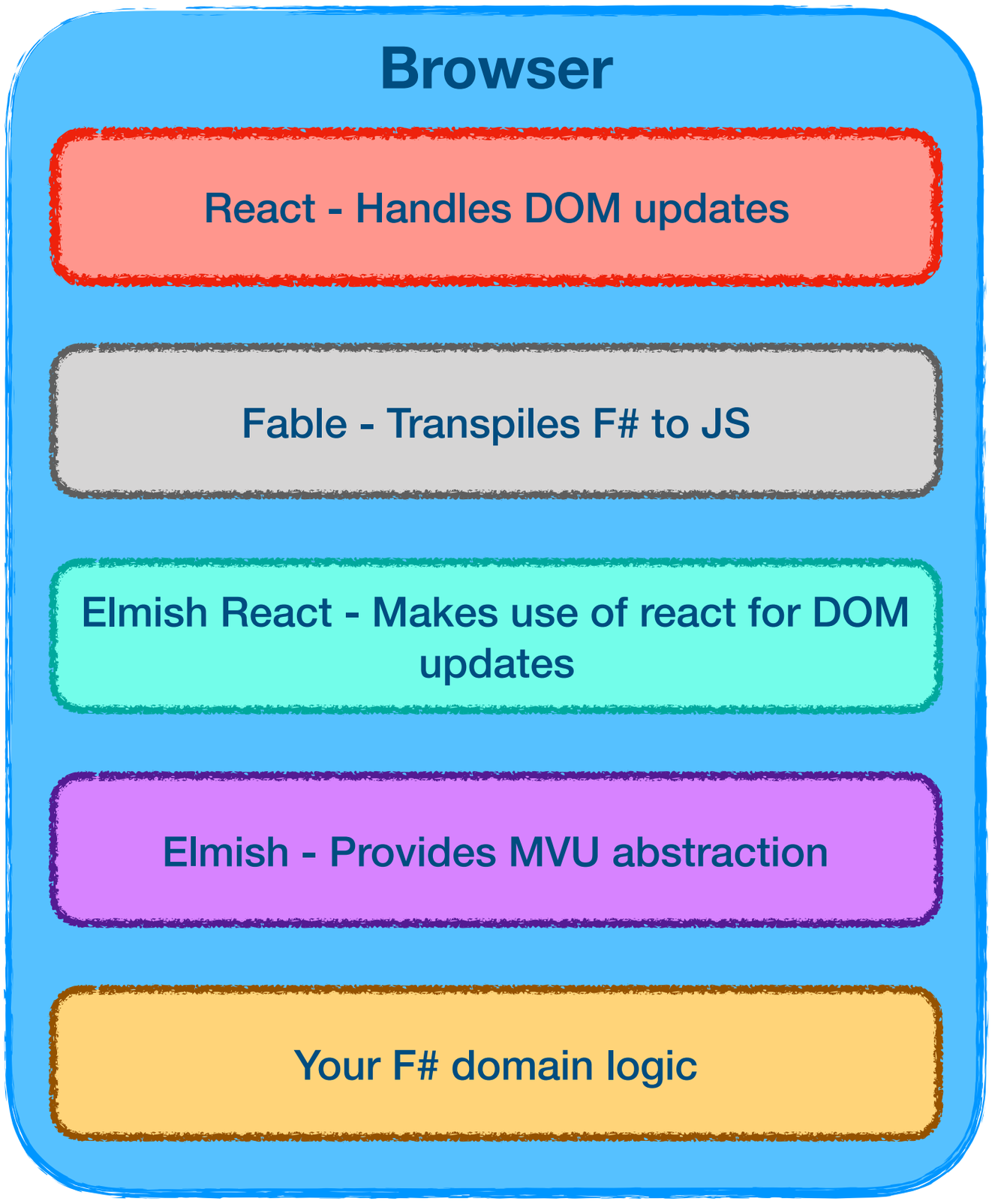
```
<html>
    <body>
    <button onclick="--counter; update();">-</button>
    <div id="counter"></div>
    <button onclick="++counter; update();">+</button>
    <script>
        var counter = 0;

        function update() {
        document.getElementById("counter").textContent = "" + counter;
        }

        update();
    </script>
    </body>
</html>
```

Can you spot some issues?

- **mutating the global variable *counter***
- **coupling business logic to the UI**
- **referencing the DOM element with its name**
- **embedded domain logic directly in the event**

Fable is an F#-to-JavaScript (JS) compiler powered by Babel, designed to produce readable and standard JS code.

Elmish is a set of simple abstractions for writing user interfaces in F# applications in a functional style following the **model-view-update** architecture made famous by Elm.



Model

```
type Model =
    { x : int }

type Msg =
    | Increment
    | Decrement

let init _ = ({ x = 0 }, Cmd.none)
```

I'm typed

I'm typed too!

You wouldn't believe.
I'm typed and ready for async

View

Let's dispatch a command

```
let view model dispatch =
    div []
        [ button [ OnClick (fun _ -> dispatch Decrement) ]
                 [ str "-" ]
          div []
              [ str (model.x.ToString()) ]
          button [ OnClick (fun _ -> dispatch Increment) ]
              [ str "+" ] ]
```

This is Fable.React bindings

Update

Match with conditions

```
let update (msg:Msg) (model:Model) : Model * Cmd<Msg> =
    match msg with
    | Increment -> ({ x = model.Value + 1 }, Cmd.none)
    | Decrement -> ({ x = model.Value - 1 }, Cmd.none)
```

This check is exhaustive

Glue it together

Produces new commands

```
Program.mkProgram init update view
#if DEBUG
|> Program.withDebugger
#endif
|> Program.withReact "fable-elmish-counter"
|> Program.run
```

Creates a message loop

Where to start?

dotnet template

```
dotnet new myAwesomeApp -n fable_elmish_counter -lang f#
cd myAwesomeApp
yarn install
npx webpack-dev-server
```

Html to Elmish

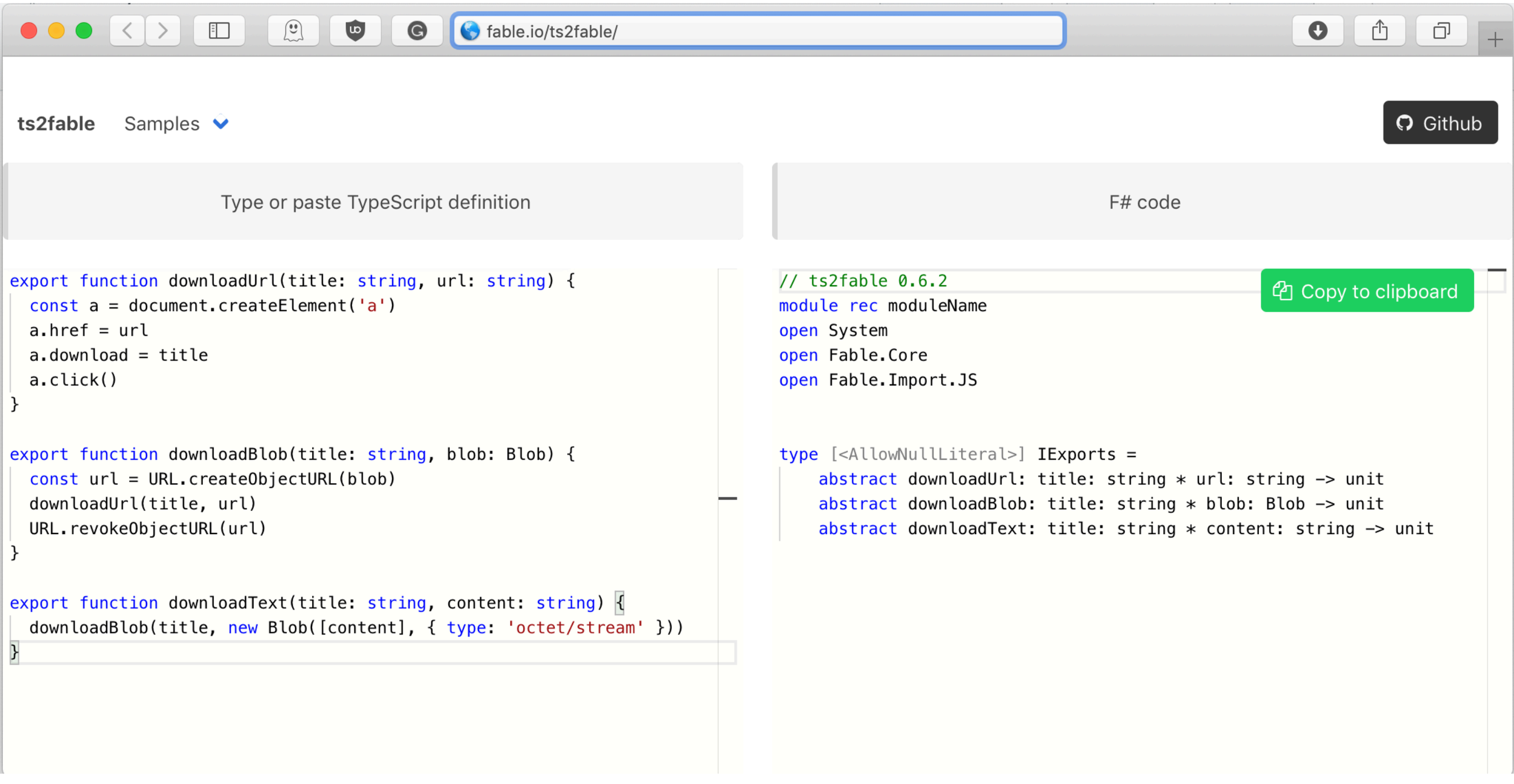
When things are going sour…

- Fable compiler cannot compile many frameworks to JS (FSharp.Data, System.IO etc)

- Porting native JS libraries can be super simple or extremely difficult

- Documentation is fragmented

TS 2 Fable


fable.io/ts2fable/
ts2fable
Samples
Github
Type or paste TypeScript definition
F# code
export function downloadUrl(title: string, url: string) {
const a = document.createElement('a')
a.href = url
a.download = title
a.click()
}
export function downloadBlob(title: string, blob: Blob) {
const url = URL.createObjectURL(blob)
downloadUrl(title, url)
URL.revokeObjectURL(url)
}
export function downloadText(title: string, content: string) {
downloadBlob(title, new Blob([content], { type: 'octet/stream' }))
}
// ts2fable 0.6.2
Copy to clipboard
module rec moduleName
open System
open Fable.Core
open Fable.Import.JS
type [<AllowNullLiteral>] IExports =
abstract downloadUrl: title: string * url: string -> unit
abstract downloadBlob: title: string * blob: Blob -> unit
abstract downloadText: title: string * content: string -> unit

Fabulous bonus

```
type Model =
  { x : int }

type Msg =
  | Increment
  | Decrement

let init () = ({ x = 0 }, Cmd.none)

let update msg model =
  match msg with
  | Increment -> ({ x = model.x + 1 }, Cmd.none)
  | Decrement -> ({ x = model.x - 1 }, Cmd.none)

let view (model: Model) dispatch =
  View.ContentPage(
    content = View.StackLayout(padding = 20.0, verticalOptions = LayoutOptions.Ce
      children = [
        View.Label(text = sprintf "%d" model.x, horizontalOptions = LayoutOptions
        View.Button(text = "Increment", command = (fun () -> dispatch Increment),
        View.Button(text = "Decrement", command = (fun () -> dispatch Decrement),
      ]))

// Note, this declaration is needed if you enable LiveUpdate
let program = Program.mkProgram init update view
```

“Yesterday I did anon record support in FCS. Today it got integrated to VF# master. @ChetHusk integrated and made a new FCS release, @k_cieslak made a new Ionide release (I think), @alfonsogcnunez made a new Fable release. What an amazing community!”

– Don Syme

- Safe Stack - https://safe-stack.github.io/
- Fable - https://fable.io
- WTF# Elmish - https://wtfsharp.net/wtf-is-elmish
- F# Interop with Javascript in Fable - https://medium.com/@zaid.naom/f-interop-with-javascript-in-fable-the-complete-guide-ccc5b896a59f
- Sample project - https://github.com/poborin/fable-elmish-counter
- Fabulous bonus - https://github.com/poborin/fabulous_bonus

Thank you!