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The origin of Redux

Introduction to Elm Architecture

enolive.github.io/intro-to-elm-architecture

ELM CORE LANGUAGE

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Quick Facts

- since 2012 (current version 0.19.1)
- purely functional, static typed language
- syntactic "Haskell-light"
- single purpose language for Frontend Development
- inspiration for Redux

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Ecosystem

elm	compiler
elm-format	opinionated formatter
elm-test	testing framework for examples and properties
elm-live	better dev server with hot reload

install by `npm i <tool> -g`

Example

elm

```elm
isEven : Int → Bool
isEven x = remainderBy 2 x == 0

pow2 : Int → Int
pow2 x = x^2

List.range 1 10
  |> List.filter isEven
  |> List.map pow2
-- [4, 16, 36, 64, 100]
```

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Simple Elm Frontend App

ELM ARCHITECTURE

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How to mutate state?

```elm
counter = counter + 1
```

→ Does not compile!

> …
>
> The `counter` value is defined directly in terms of itself, causing an infinite loop.
>
> Are you are trying to mutate a variable? Elm does not have mutation, so when I see counter defined in terms of counter, I treat it as a recursive definition. Try giving the new value a new name!
>
> …

Functional approach

elm

```elm
type alias Model = Int

inc : Model -> Model
inc counter = counter + 1
```

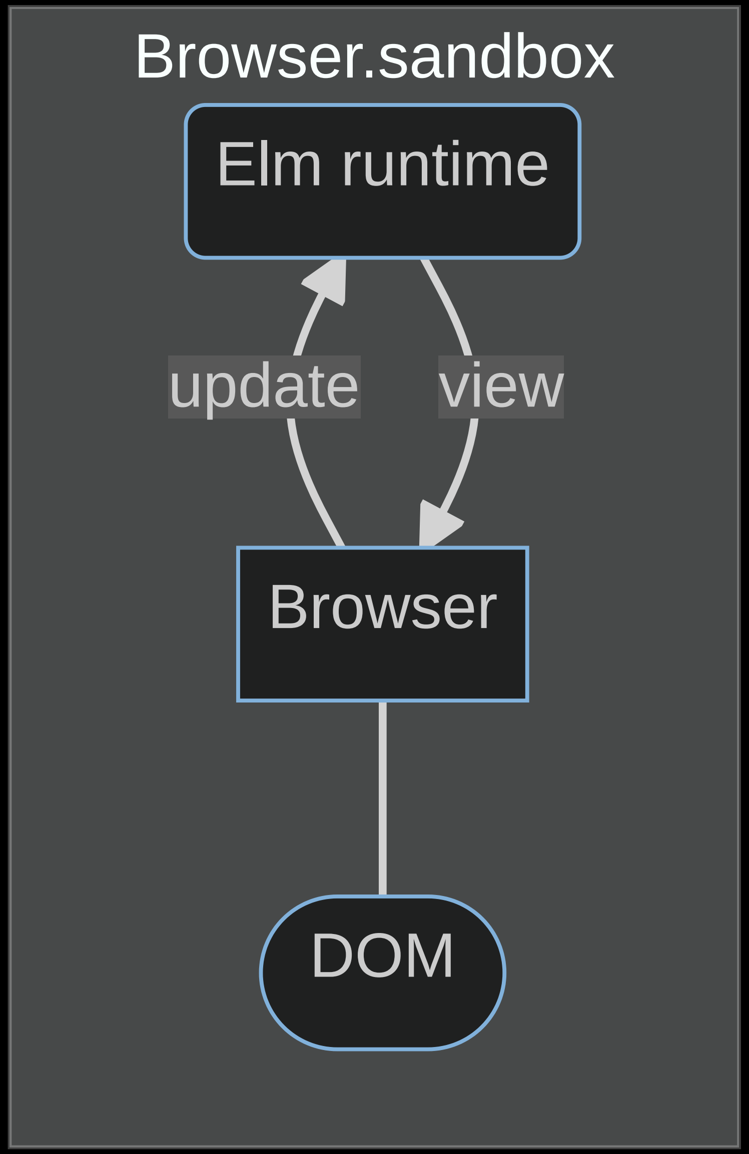
more generic version

elm

```elm
type alias Model = { counter : Int }
type Msg = Increment

update : Msg -> Model -> Model
update msg model =
  case msg of
    Increment -> { model | counter = model.counter + 1 }
```

Minmial Stateful App



```elm
main = Browser.sandbox
  { init = init, view = view, update = update }

type alias Model = ...
type Msg = ...

init : Model
...
view : Model -> Html Msg
...
update : Msg -> Model -> Model
...
```

Stateful Demo

WHAT ABOUT SIDE EFFECTS?

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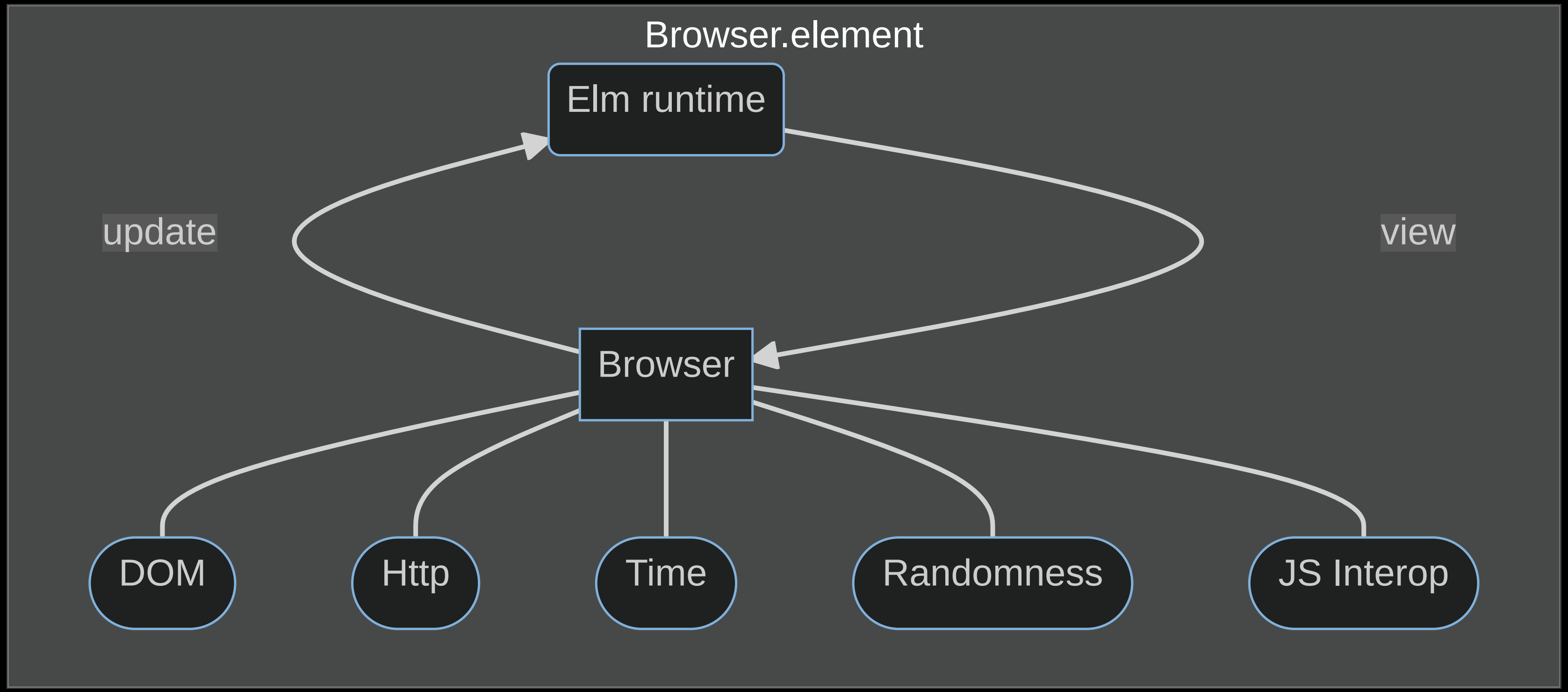
Commands and Subscriptions

- *Cmd* : command Elm to do an effectful operation
  - Http
  - Random
  - Time
  - `Cmd.none`
- *Sub* : subscribe to an effect from the outside world
  - Interval
  - Ports
  - `Sub.none`

Minmial Effectful App



```elm
main = Browser.element
  {
    init = init,
    view = view,
    update = update,
    subscriptions = subscriptions
  }

type alias Model = ...
type Msg = ...

init : () → (Model, Cmd Msg)
...
view : Model → Html Msg
...
update : Msg → Model → (Model, Cmd Msg)
...

subscriptions : Model → Sub Msg
...
```

Effectful Demo

```
app.get('/', (req, res) => {
  res.sendFile(__dirname + '/index.html');
});

app.post("/", (req, res) => {
  const crypto = req.body.crypto;
  const fiat = req.body.fiat;

  const baseURL = "https://apiv2.bitcoinaverage.com/indices/global/ticker/";
  const finalURL = baseURL + crypto + fiat;
  request(finalURL, (error, response, body) => {
    const data = JSON.parse(body);
    const price = data.last;

    const currentDate = data.display_timestamp;
    res.write("<p>The current date is " + currentDate + "</p>");
    res.write('<h1>The current price of' + crypto + " is" + price + fiat + "</h1>");

    res.send("<h1>The current price of bitcoin is " + price + "</h1>");
    res.send();
  });
});
```

CONCLUSION

IMHO

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Elm is a good intro to

- pure functional programming
- functional frontend apps
- Model View Update architecture

Elm is not the

- best programming language
- best way to develop frontend apps
- silver bullet architecture for state management concerns

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💗 for joining me!

- enolive.github.io/intro-to-elm-architecture
- Elm Guide
- Web Apps in Elm
- Javascript Interop
- Component testing with elms-program-test