



**If we are going to transpile  
JavaScript, why not use  
ClojureScript?**

Shivek Khurana

# About me

- Apps since 2008, Clojure since 2017
- Consultant at Juxt Ltd.
- Enterprise Apps
- Currently building a system for Vodafone

JUXT



# Built an LMS from 2012 to 2016

Long projects == Living with your past mistakes

# Built an LMS from 2012 to 2016

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# JS Community Conundrum

*LI + EC = HVOD + C*

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# JS Community Conundrum

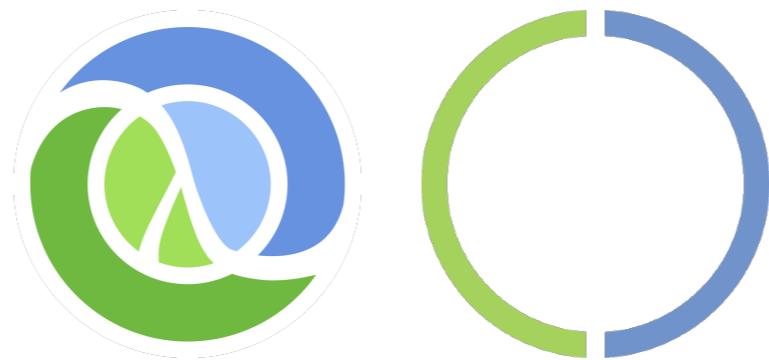
$$LI + EC = HVOD + C$$

Language  
Imperfections

Enthusiastic  
Community

High Velocity  
Open Source  
Development

Abandoned  
Libs & Ideas



# Clojure/Script

*All the best games are easy  
to learn and difficult to  
master.*

— Nolan Bushnell (Founder, Atari)

# ;; LISP – LISt Processing

```
'(1 2 3)
```

```
(+ 1 2 3)
```

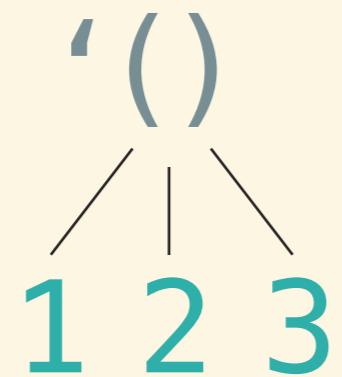
```
(defn sum [a b]  
  (+ a b))
```

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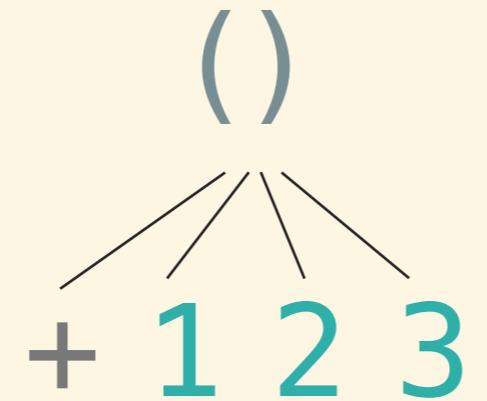


# ;; LISP – LISt Processing

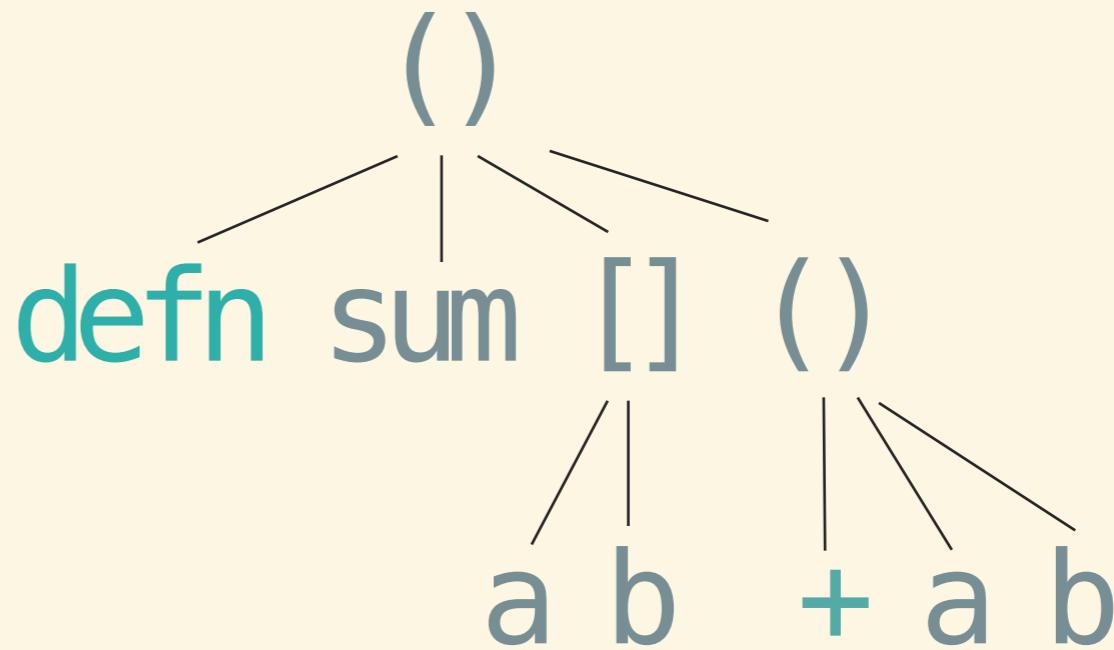
' (1 2 3)



(+ 1 2 3)



(defn sum [a b]  
(+ a b))



# ;; Functional

```
(def person
  {:_name "Vienaa"
   :age 24})  
  
(get person :name)
(get person :age)
```

```
class Person {
  init(name, age) {...}
  getName() => {...}
  getAge() => {...}
}  
  
const v = Person("Vienna", 24)
v.getName()
v.getAge()
```

JUST



;; Atoms  
;; thread safe/ mutable constructs

```
(defonce count (atom 0))  
(swap! count inc) ;; => 1  
count ;; => 1  
(reset! count 4) ;; => 4  
count ;; => 4
```

JUST



# ;; Homiconic ;; Code is data

' (1 2 4)

{name: "Shivek Khurana"}

[:a :b]

["apples", "mangoes", 8]

(defn sum [a b]  
(+ a b))

```
function sum(a, b) {  
    return a+b;  
}
```

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# **REPL - Developing inside the Runtime**

# Observation Driven Dev

Text Editor

Code



Transpile +  
Hot Swap

Runtime (Browser)

Updated App

Perform Actions  
Observe

Code

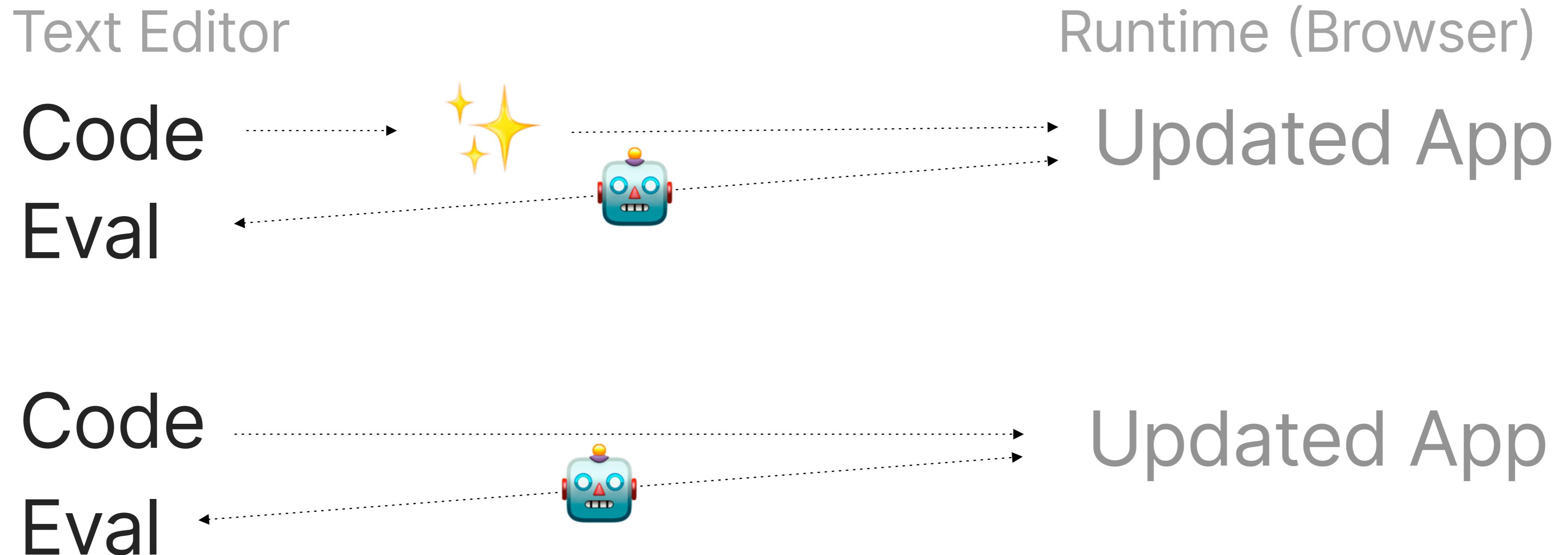
Updated App

Perform Actions  
Observe

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Krim  
Labs

# REPL Driven Dev



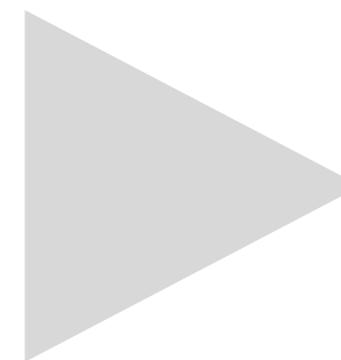
# REPL Demo - Tic Tac Toe

State

Lattice

```
[[{:x nil nil}  
[nil :x nil]  
[nil nil :o]]
```

Turn :o



React

**:o's turn**

x	-	-
-	x	-
-	-	o

Reset

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Krim  
Labs

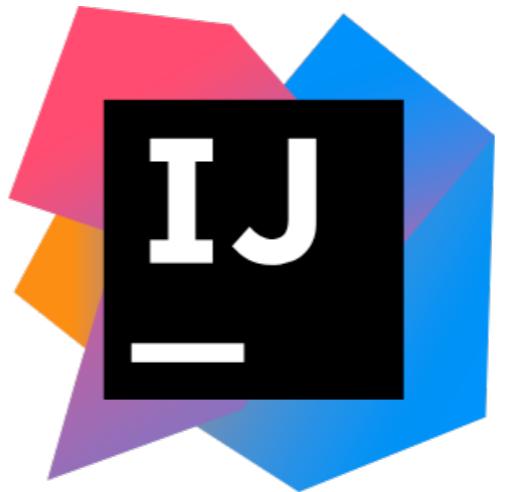
# With REPL - Develop only a function

- Precisely load the relevant function
- Test with inline feedback
- Rich Comments in git history

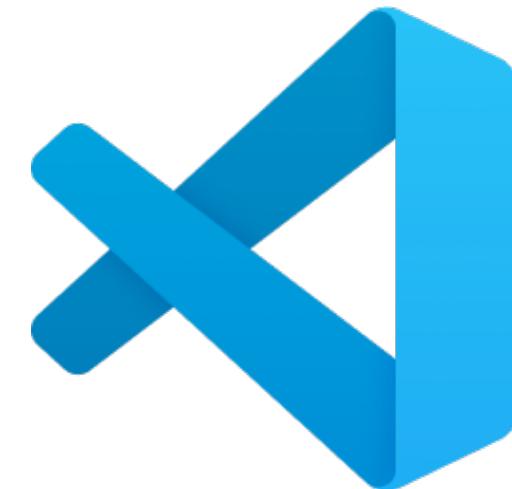
# Editor Integration



(cider[[ ]])



*Cursive*



(( )) *Calva*



**Fireplace**

# Interop with JS ecosystem

# Google Closure Compiler



- Open for 10+ years
- Google Closure Lib
- Cross Platform

# ;; Just add js/foo

```
(.getElementById js/document "root")
```

```
document.getElementById("root")
```

```
(new js/FormData)
```

```
new FormData()
```

```
(clj->js {:hello :world})
```

```
#js {:hello "world"}
```

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# ;; Consuming NPM Packages

```
( :require ["react-dom/server" :refer [renderToString]] )  
( renderToString react-element)
```

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# ;; Write Node Libs

```
(ns demo.lib)
(defn shdILrnTypScrpt []
  ;; hope that ts people are not paying attention
  (prn "really?")
  false)

{...
  {:target :node-library
   :output-to "out/demo-library/lib.js"
   :exports {:hello demo.lib/shdILrnTypScrpt}}}
```

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# ;; Write NPM Packages

```
(defn ^:export shdILrnTypScrpt [] ...)
```

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# ;; Write Node Libs

```
$ cd out/demo-library
$ node
> var x = require('./lib');
undefined
> x.shdILrnTypScrpt()
really?
false
```

JUST



# ;; React using Hiccup

```
(defn Settings [username realname email]
  [:div#settings.margin-all-3
   [:h3 username]
   [:div realname]
   [:div email]
   [:button {:onClick #()} "Edit"]])
```

JUST



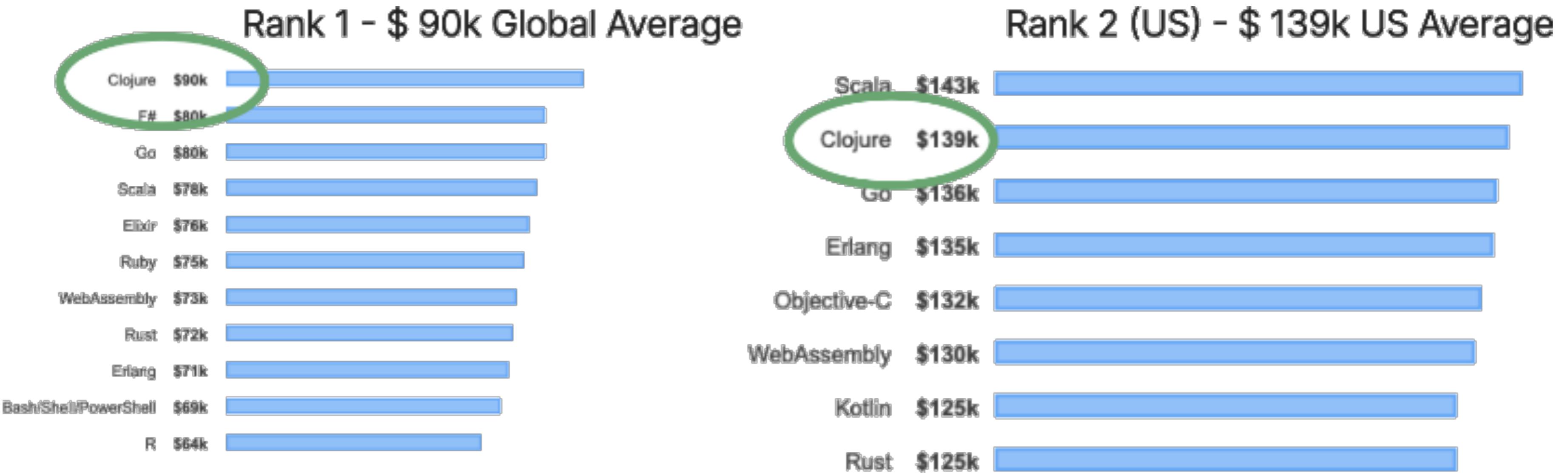
# ;; JS Equivalent

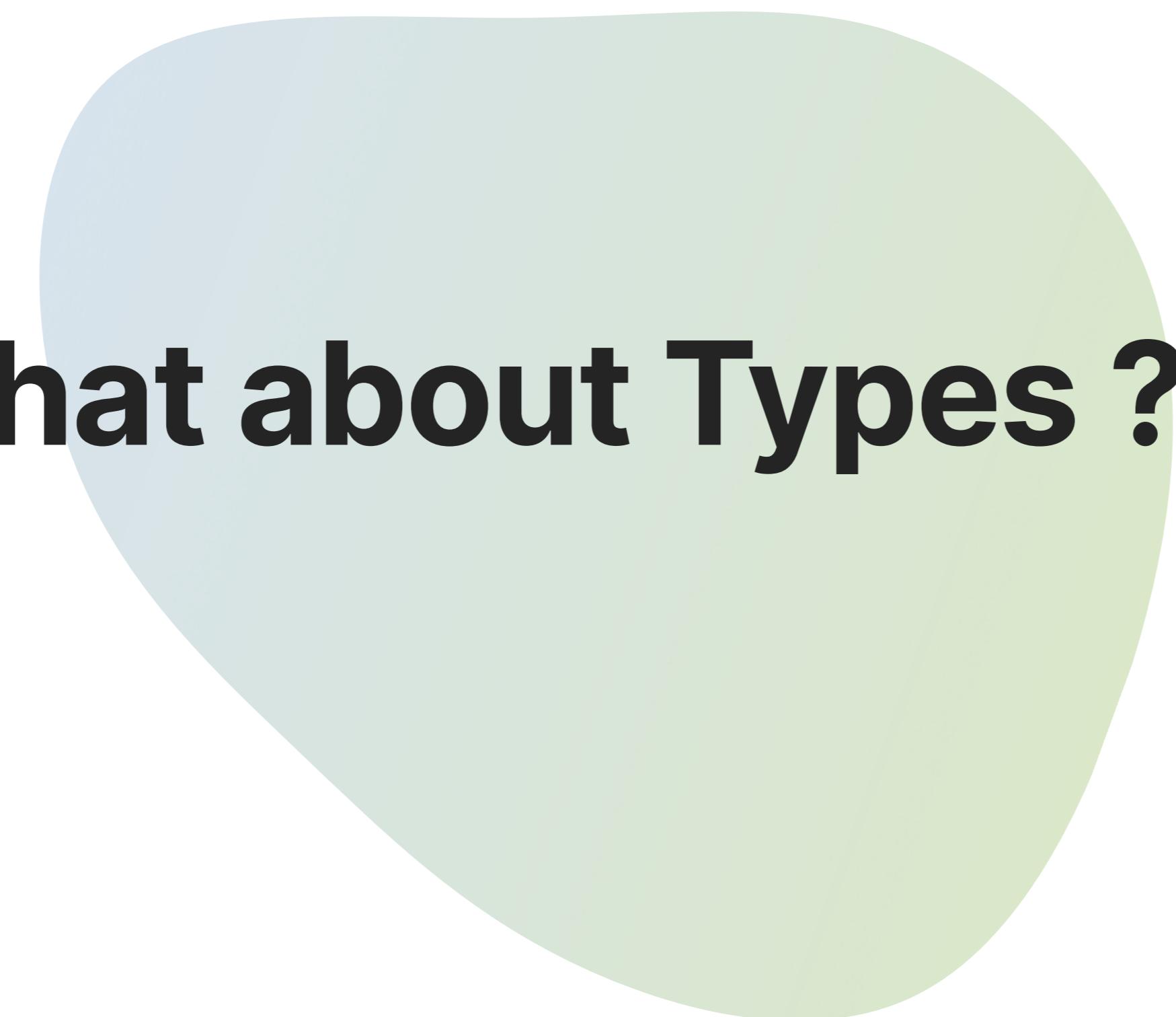
```
function Settings(username, realname, email) {
  return (<div id="settings" class="margin-all-3">
    <h3>{username}</h3>
    <div>{realname}</div>
    <div>{email}</div>
    <button onClick={() => {...}}>Edit</button>
  </div>);
}
```

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# Clojure Devs are best paid





# **What about Types ?**

# **clojure.spec**

- Optional type library
- Define types as predicates

# ;; Spec domain entities

```
(s/def ::first-name string?)  
(s/def ::last-name string?)  
(s/def ::phone-number (s/and int?  
                           #(<= % 9999999999)  
                           #(>= % 10000000) ))
```

```
(s/def ::person  
  (s/keys :req-un [::first-name ::last-name]  
          :opt-un [::phone-number]))
```

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# Spec Demo

State

```
:first-name  
:last-name  
:phone-number
```

Validation

```
(s/valid? ::person %)
```

API (Stub)

```
POST /person
```

# Spec Benefits

- Optional opt in
- Generative testing inside source
- Just predicates
- Spec code (not just data)\*

\*<https://clojure.org/guides/spec>

# ;; Spec - going crazy

@danielcompton/defn-spec

```
(s/def ::int int?)  
  
(ds/defn my-inc :- ::int  
  [a :- ::int]  
  (+ a 1))
```

@jeaye/orchestra

```
(defn-spec my-inc int?  
  [a int?]  
  (+ a 1))
```

JUST





# Going crazy demo

# Building on strong foundations

- Simple & robust semantics
- Language level functionality as lib
- Even bigger on the server side

# **Will stay in prod after 10 years ?**

# Getting started

# Build Systems



## Lein + Figwheel

<https://leinigen.org/>

<https://figwheel.org/>



## Shadow CLJS

<https://shadow-cljs.org>

# React Wrappers



**Reagent**

<https://reagent-project.github.io/>

*Reagent is what  
React hopes to be  
one day*

— Luke Whorton  
(<https://medium.com/@lwhorton/>)

# React Wrappers



**Reagent**

<https://reagent-project.github.io/>

**hx**

**hx**

<https://github.com/Lokeh/hx>

# People



**Rich Hickey**  
Creator of Clojure



**Stuart Halloway**  
Core Team Member



**Alex Miller**  
Core Team Member



**Stuart Sierra**  
Component; Reloaded



**Malcolm Sparks**  
Yada/Bidi/Tick



**James Reeves**  
Integrant/ Hiccup/ Medley



**Bruce Hauman**  
Figwheel



**Bozhidar Batsov**  
nrepl

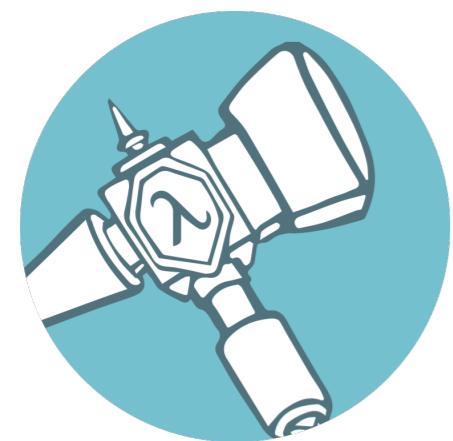


**David Nolen**  
ClojureScript



**David Miller**  
ClojureCLR

# Blogs & Docs



[bravecjure.com](http://bravecjure.com)

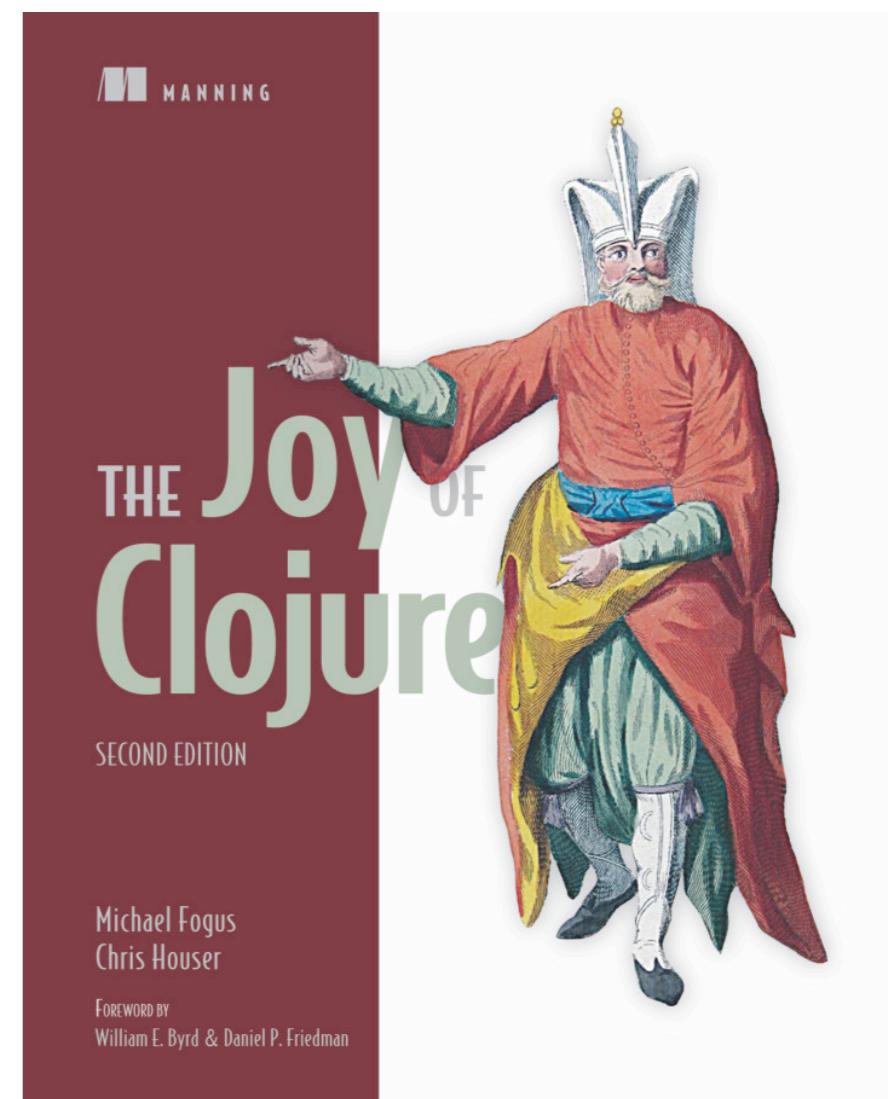
**JUXT**  
[juxt.pro/blog](http://juxt.pro/blog)

**PurelyFunctional.tv**  
[purelyfunctional.tv](http://purelyfunctional.tv)



CLOJURE KOANS

[clojurekoans.com](http://clojurekoans.com)  
[clojurescriptkoans.com](http://clojurescriptkoans.com)



The Joy of Clojure;  
By Fogus & Houser

**JUXT**  
 Krim  
Labs



# Thank You

Shivek Khurana

Clojure Consultant at **JUXT Inc**

Independant Consultant at **Krim Labs**

Around the web

[medium.com/@shivekkhurana](https://medium.com/@shivekkhurana)

[github.com/shivekkhurana](https://github.com/shivekkhurana)

[twitter.com/shivek\\_khurana](https://twitter.com/shivek_khurana)

