BEAM Language Ecosystem Past, Present and Future

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Code BEAM Brasil

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Efene, Interfix, EFE

Language Interop @ ErlEF

Co-creator of Erlang
LFE, Luerl, Erlog

Language Interop @ ErlEF

State of the BEAM Language Ecosystem

LISP

- LFE
- Clojerl
- Joxa

Perl / Python / Ruby / Perl / PHP

- Reia
- Elixir
- Efene
- EPHP

State of the BEAM Language Ecosystem

Rust / OCaml / SML / F#

- Alpaca
- Fez
- Gleam
- Caramel

Haskell / Elm

- Purerl
- Hamler

First Wave

1. Reia: reia-lang.org
2. Elixir
3. LFE
4. Efene

New Wave

1. Alpaca
2. Purerl
3. Gleam
4. Hamler
5. Whatsapp's Typed Erlang?

Middle Road

Success / Progressive Typing

1. Type Specs
2. Dialyzer
3. Whatsapp's Typed Erlang?

Porting Existing Languages

Mechanical Sympathy

"You don't have to be an engineer to be a racing driver, but you do have to have Mechanical Sympathy."

– Jackie Stewart, racing driver

1. Functional
2. Immutable
3. Eager Evaluation

Impedance Mismatch

Impedance matching problem exists when transferring sound energy from one medium to another. If the acoustic impedance of the two media are very different most energy will be reflected (or absorbed), rather than transferred across

1. “Object Oriented”
2. Mutable
3. Lazy Evaluation

“OOP to me means only messaging, local retention and protection and hiding of state-process, and extreme late-binding of all things”

-- Alan Kay

Languages inspired by existing ones but playing to the BEAM strengths tend to work better

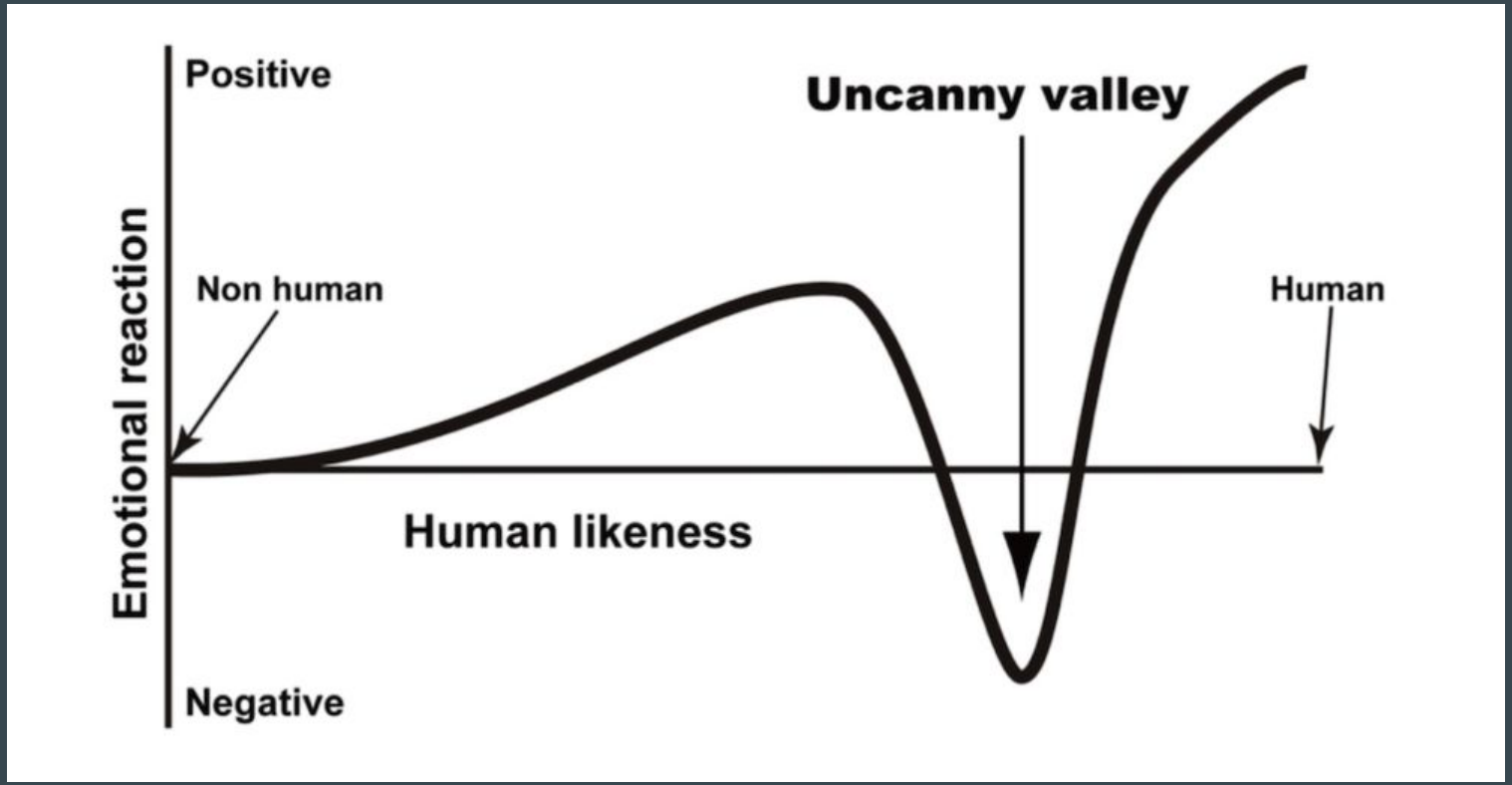
Happens on other platforms too

JVM: Scala, Clojure*, Kotlin, Groovy

.NET: F#, Clojure*

Javascript: Typescript, Clojurescript*

The Uncanny Valley of Compatibility



Language Design / Implementation Tradeoffs

Case: Elixir

Designing a Common Lisp inspired programming language

Porting a mutable dynamically typed language

Porting a logical programming language

Erlog

How much is shared across languages?

- Lexer
- Pre Processor: includes, macros

Streams

- Parser: absform / AST
- Core Erlang
- Kernel Erlang

Trees

- SSA

Graph

- Codegen

Stream

Elixir Flavoured Erlang

github.com/marianoguerra/efe
github.com/marianoguerra/otp.ex

```elixir
def sort([[x, y] | l]) do
  case l do
    [] ->
      [y, x]

    [z] when x <= z ->
      [[y, x] | l]

    [z] when y <= z ->
      [y, z, x]

    [z] ->
      [z, y, x]

    _ ->
      split_2(x, y, l, [], [])
  end
end
```

lists:sort

```elixir
def cast({:global, name}, request) do
  try do
    :global.send(name, cast_msg(request))
  catch
    :error, e -> {:EXIT, {e, __STACKTRACE__}}
    :exit, e -> {:EXIT, e}
    e -> e
  end

  :ok
end

def cast({:via, mod, name}, request) do
  try do
    mod.send(name, cast_msg(request))
  catch
    :error, e -> {:EXIT, {e, __STACKTRACE__}}
    :exit, e -> {:EXIT, e}
    e -> e
  end

  :ok
end
```

gen_server:cast

Interoperability Challenges

“There are only two kinds of languages: the ones people complain about and the ones nobody uses.”

— *Bjarne Stroustrup, C++ Creator*

1. Records / Structs
2. Sum Types
3. Namespaces / Modules
4. Naming Conventions
5. Statically Typed Languages calling Dynamically Typed Code
6. Code Dependencies across Languages

The Future

"The best way to predict the future is to create it."

1. Polyglot Projects
2. Minimal Interop Friction
3. BEAM as the obvious choice for languages / systems research

🐦 @warianoguerra

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Typing Message Passing

Interoperability and Backward Compatibility

Why not add some mutability to the BEAM