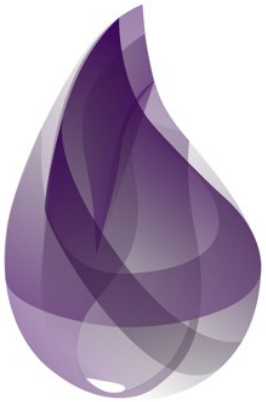
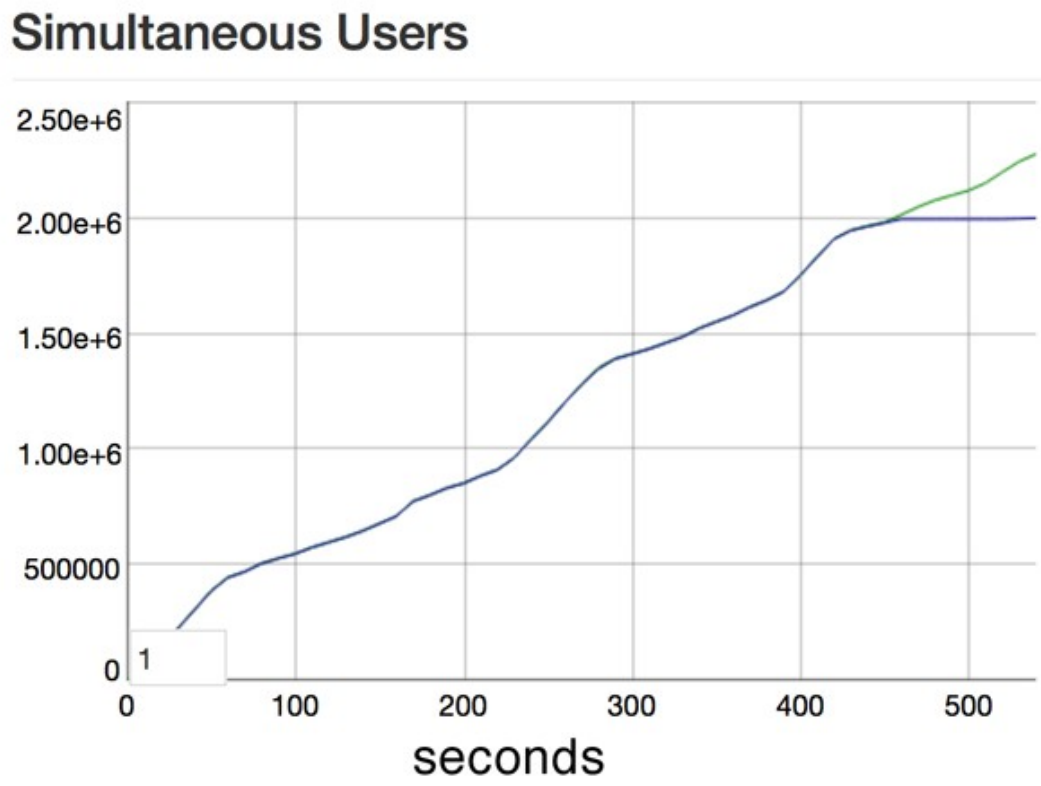
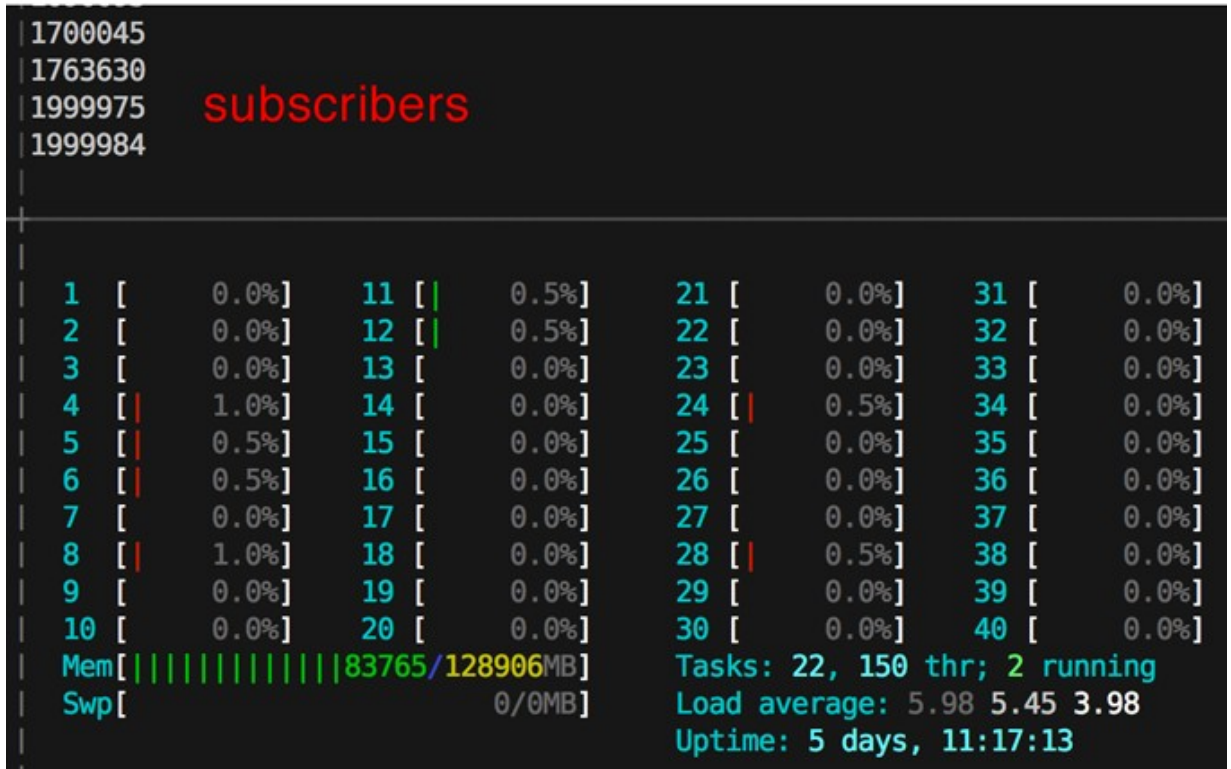


elixir


Simultaneous Users
2.50e+6
2.00e+6
1.50e+6
1.00e+6
500000
0
1
0
100
200
300
400
500
seconds


1700045
1763630
1999975
1999984
subscribers
1 [0.0%] 11 [| 0.5%] 21 [0.0%] 31 [0.0%]
2 [0.0%] 12 [| 0.5%] 22 [0.0%] 32 [0.0%]
3 [0.0%] 13 [0.0%] 23 [0.0%] 33 [0.0%]
4 [| 1.0%] 14 [0.0%] 24 [| 0.5%] 34 [0.0%]
5 [| 0.5%] 15 [0.0%] 25 [0.0%] 35 [0.0%]
6 [| 0.5%] 16 [0.0%] 26 [0.0%] 36 [0.0%]
7 [0.0%] 17 [0.0%] 27 [0.0%] 37 [0.0%]
8 [| 1.0%] 18 [0.0%] 28 [| 0.5%] 38 [0.0%]
9 [0.0%] 19 [0.0%] 29 [0.0%] 39 [0.0%]
10 [0.0%] 20 [0.0%] 30 [0.0%] 40 [0.0%]
Mem[||||||||||||83765/128906MB]
Swp[0/0MB]
Tasks: 22, 150 thr; 2 running
Load average: 5.98 5.45 3.98
Uptime: 5 days, 11:17:13

Framework	Throughput (req/s)	Latency (ms)	Consistency (σ ms)
Gin	59001.07	1.84	1.35
Phoenix	31417.81	3.52	3.50
Express Cluster	26244.35	3.92	3.25
Martini	12493.48	10.15	10.70
Sinatra	8334.84	7.46	3.38
Express	9477.14	10.56	1.39
Rails	3452.58	17.96	7.73
Plug	53815.76	2.67	4.07
Play	66405.81	2.72	10.25

José Valim
@josevalim

Folgen

Reminder it is 2016. Almost everything you do must be using all CPUs: compiling code, booting, running tests... Easy math on the wins here.

RETWEETS 56 GEFÄLLT 67

07:03 - 29. Feb. 2016

Elixir and Phoenix

fast, concurrent and explicit

Tobias Pfeiffer
@PragTob
pragtob.info

LIEFERY

Elixir and Phoenix

fast, concurrent and explicit

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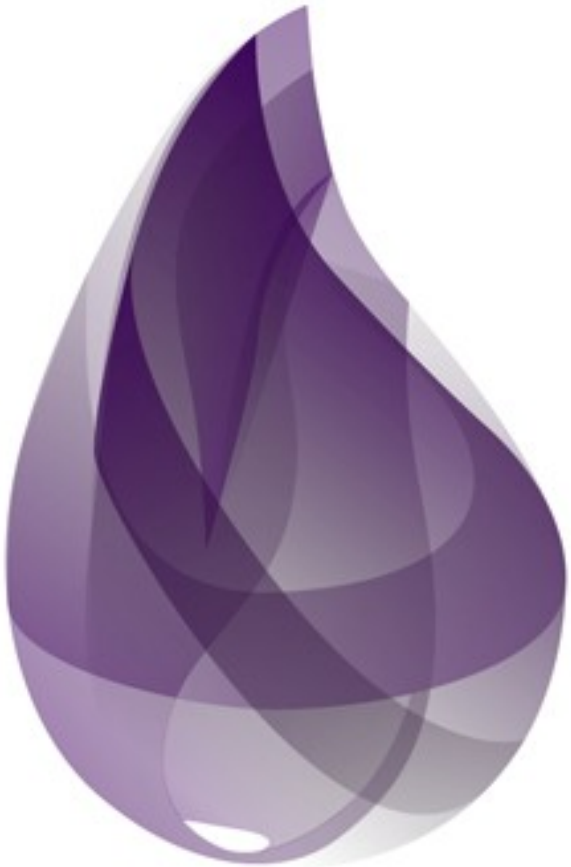
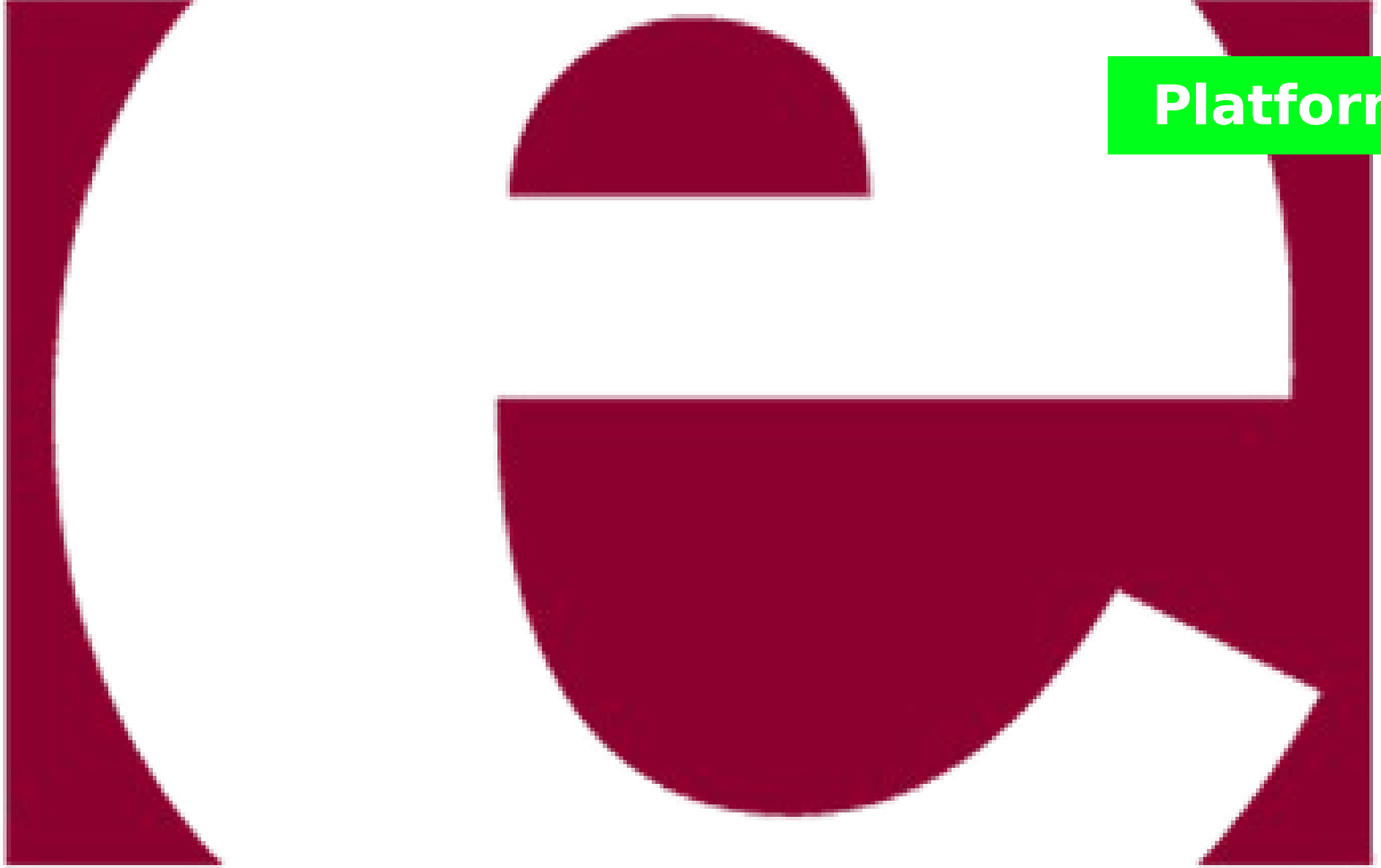
LIEFERY



elixir



Platform

ERLANG

```elixir
defmodule MyMap do

  @doc """
  iex> MyMap.map [1, 2, 3, 4], fn(i) -> i + 1 end
  [2, 3, 4, 5]
  """
  def map(list, function) do
    Enum.reverse do_map([], list, function)
  end

  defp do_map(acc, [], _function) do
    acc
  end
  defp do_map(acc, [head | tail], function) do
    do_map([function.(head) | acc], tail, function)
  end
end
```

Ruby-like Syntax

```
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  end

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    do_map([function.(head) | acc], tail, function)
  end
end
```


WOLF IN
SHEEP'S CLOTHING
-BOV

First-class functions

```
defmodule MyMap do

  @doc """
  iex> MyMap.map [1, 2, 3, 4], fn(i) -> i + 1 end
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  def map(list, function) do
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end
```

ail-Call Optimizatio

```
defmodule MyMap do

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end
```

Pattern Matching

```
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  end
end
```

Pattern Matching

```
defmodule Patterns do
  def greet(%{name: name, age: age}) do
    IO.puts "Hi there #{name}, what's up at #{age}?"
  end
  def greet(%{name: "Denis Defreyne"}) do
    IO.puts "Hi Denis, are you all set for your talk?"
  end
  def greet(%{name: name}) do
    IO.puts "Hi there #{name}"
  end
  def greet(_) do
    IO.puts "Hi"
  end
end

Patterns.greet %{name: "Tobi", age: 27, something: :else}
Patterns.greet %{name: "Denis Defreyne"}
Patterns.greet %{name: "Tobi"}
Patterns.greet ["Mop"]
```

Pattern Matching

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Patterns.greet %{name: "Denis Defreyne"}
Patterns.greet %{name: "Tobi"}
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```

Doctesting

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  """
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    Enum.reverse do_map([], list, function)
  end

  defp do_map(acc, [], _function) do
    acc
  end
  defp do_map(acc, [head | tail], function) do
    do_map([function.(head) | acc], tail, function)
  end
end
```

Meta Programming

```
defmacro plug(plug, opts \\ []) do
  quote do
    @plugs {unquote(plug), unquote(opts), true}
  end
end
```

Polymorphism

```
defprotocol Blank do
  @doc "Returns true if data is considered blank/empty"
  def blank?(data)
end

defimpl Blank, for: List do
  def blank?([]), do: true
  def blank?(_),  do: false
end

defimpl Blank, for: Map do
  def blank?(map), do: map_size(map) == 0
end

defimpl Blank, for: Atom do
  def blank?(false), do: true
  def blank?(nil),   do: true
  def blank?(_),     do: false
end
```

Polymorphism

```
defprotocol Blank do
  @doc "Returns true if data is considered blank/empty"
  def blank?(data)
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  def blank?([]), do: true
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end

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  def blank?(map), do: map_size(map) == 0
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  def blank?(false), do: true
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  def blank?(_),     do: false
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```

Polymorphism

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defprotocol Blank do
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  def blank?(map), do: map_size(map) == 0
end

defimpl Blank, for: Atom do
  def blank?(false), do: true
  def blank?(nil),   do: true
  def blank?(_),     do: false
end
```

mplemented in itself

```
@spec all?(t) :: boolean
@spec all?(t, (element -> as_boolean(term))) :: boolean

def all?(enumerable, fun \\ fn(x) -> x end)

def all?(enumerable, fun) when is_list(enumerable) and
is_function(fun, 1) do
  do_all?(enumerable, fun)
end
```

Optional Type Annotations

```
@spec all?(t) :: boolean
@spec all?(t, (element -> as_boolean(term))) :: boolean

def all?(enumerable, fun \\ fn(x) -> x end)

def all?(enumerable, fun) when is_list(enumerable) and
is_function(fun, 1) do
  do_all?(enumerable, fun)
end
```

“Interfaces”

```
defmodule Plug do
  @type opts :: tuple | atom | integer | float | [opts]

  @callback init(opts) :: opts
  @callback call(Plug.Conn.t, opts) :: Plug.Conn.t
end
```

“Interfaces”

```
defmodule Plug do
  @type opts :: tuple | atom | integer | float | [opts]

  @callback init(opts) :: opts
  @callback call(Plug.Conn.t, opts) :: Plug.Conn.t
end
```

“Interfaces”

```
defmodule Plug.Head do
  @behaviour Plug

  alias Plug.Conn

  def init([]), do: []

  def call(%Conn{method: "HEAD"} = conn, []) do
   %{conn | method: "GET"}
  end
  def call(conn, []), do: conn
end
```

“Interfaces”

```
defmodule Plug.Head do
  @behaviour Plug

  alias Plug.Conn

  def init([]), do: []

  def call(%Conn{method: "HEAD"} = conn, []) do
   %{conn | method: "GET"}
  end
  def call(conn, []), do: conn
end
```

Functional Programming?


turbine
generator
water
coal
EXIT


turbine
generator
water
coal
EXIT


turbine
generator
water
coal
EXIT

Where to call functions

```
2.2.2 :001 > [1, 2, 3, 4].map { |i| i + 1 }
 => [2, 3, 4, 5]
```

VS

```
iex(2)> Enum.map [1, 2, 3, 4], fn(i) -> i + 1 end
[2, 3, 4, 5]
```

Transformation of Data

Pipe

```
people = DB.find_customers
orders = Orders.for_customers(people)
tax    = sales_tax(orders, 2013)
filing = prepare_filing(tax)
```

Pipe

```
filing = DB.find_customers
          |> Orders.for_customers
          |> sales_tax(2013)
          |> prepare_filing
```

Pipe

```
filing =
  prepare_filing(sales_tax(
    Orders.for_cusstomers(DB.find_customers), 2013))
```

Pipe

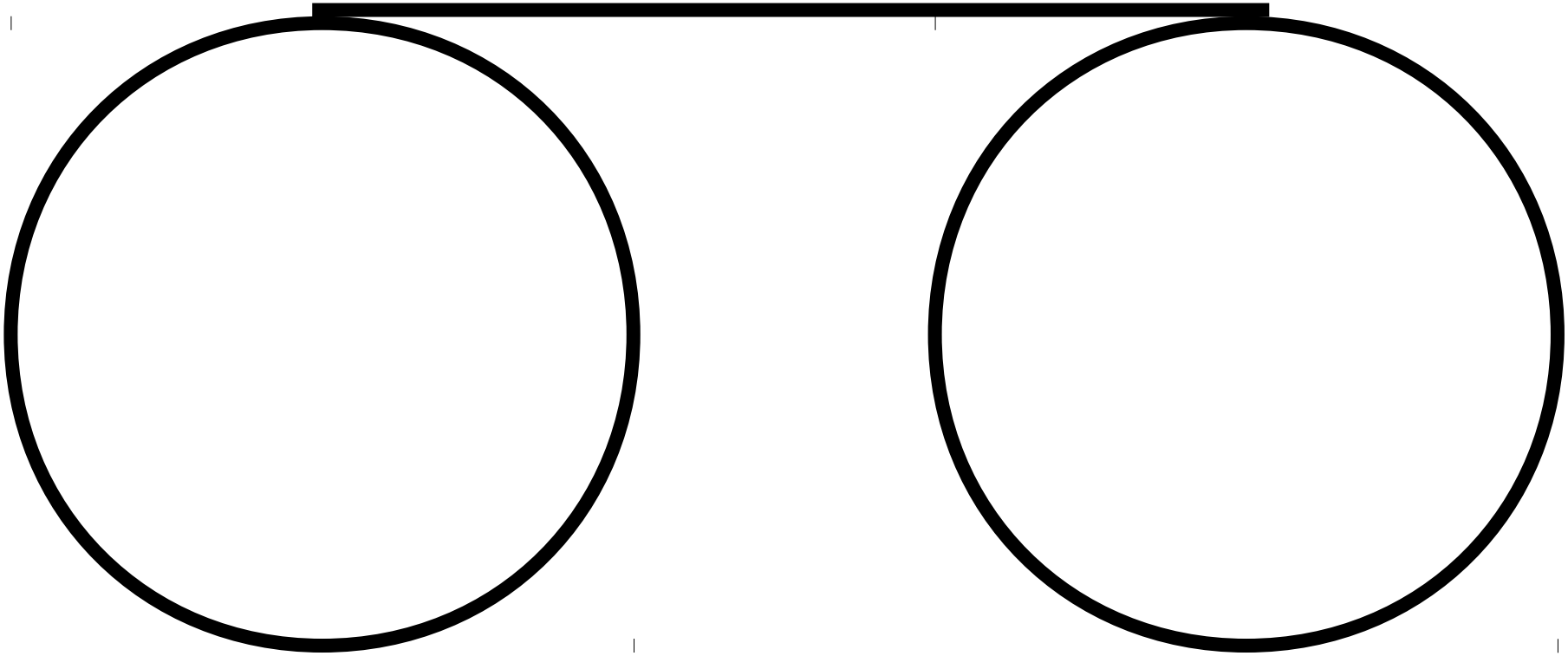
```
filing = DB.find_customers
          |> Orders.for_customers
          |> sales_tax(2013)
          |> prepare_filing
```

Immutable Data

```
person = Person.new(attributes)
do_something(person)
insert_in_db(person)
```

Immutable Data

```
person = Person.new(attributes)
person = do_something(person)
insert_in_db(person)
```



Principles vs Power

Minimize state

vs

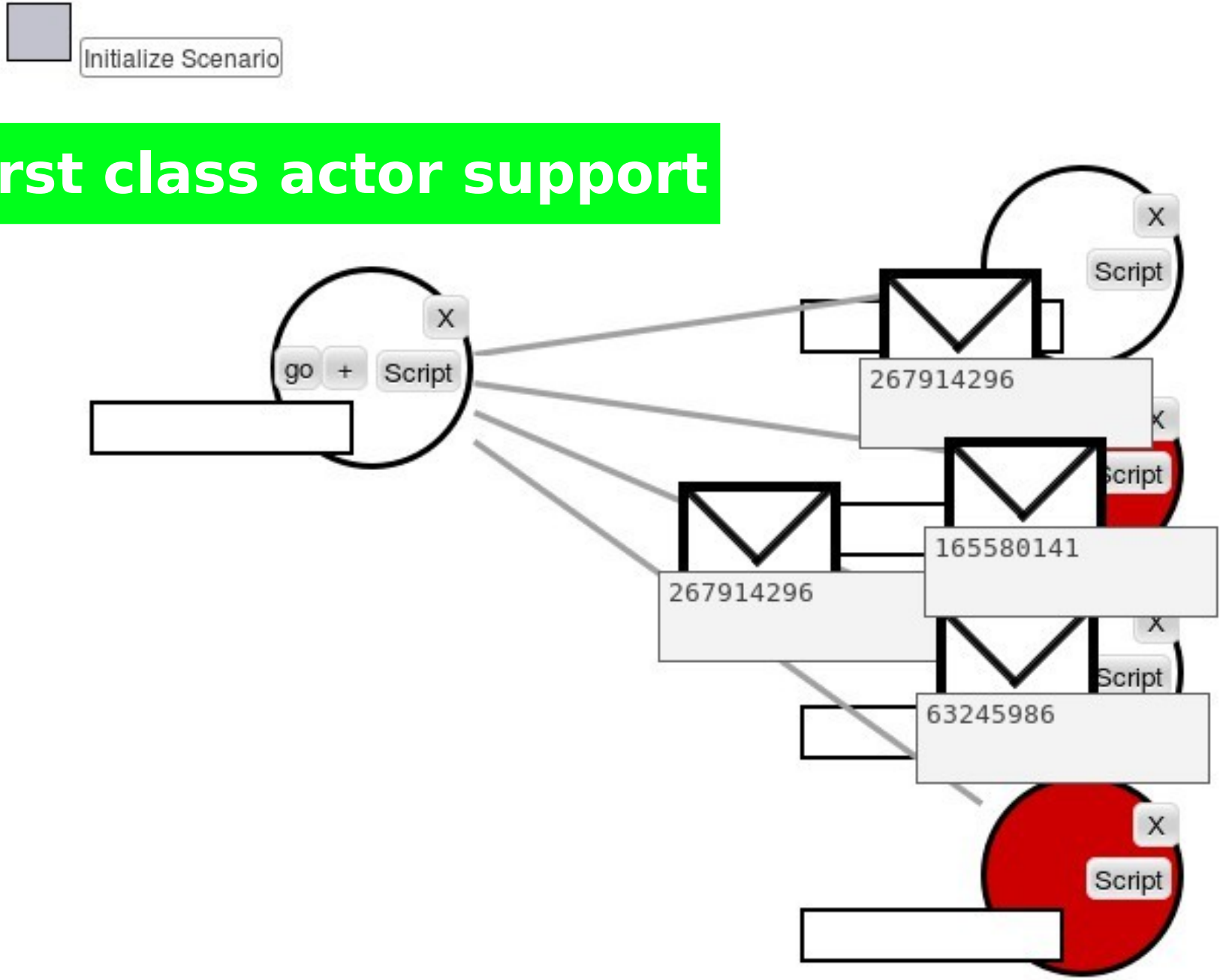
Hiding state

Same Input,
Same Output

Testing++

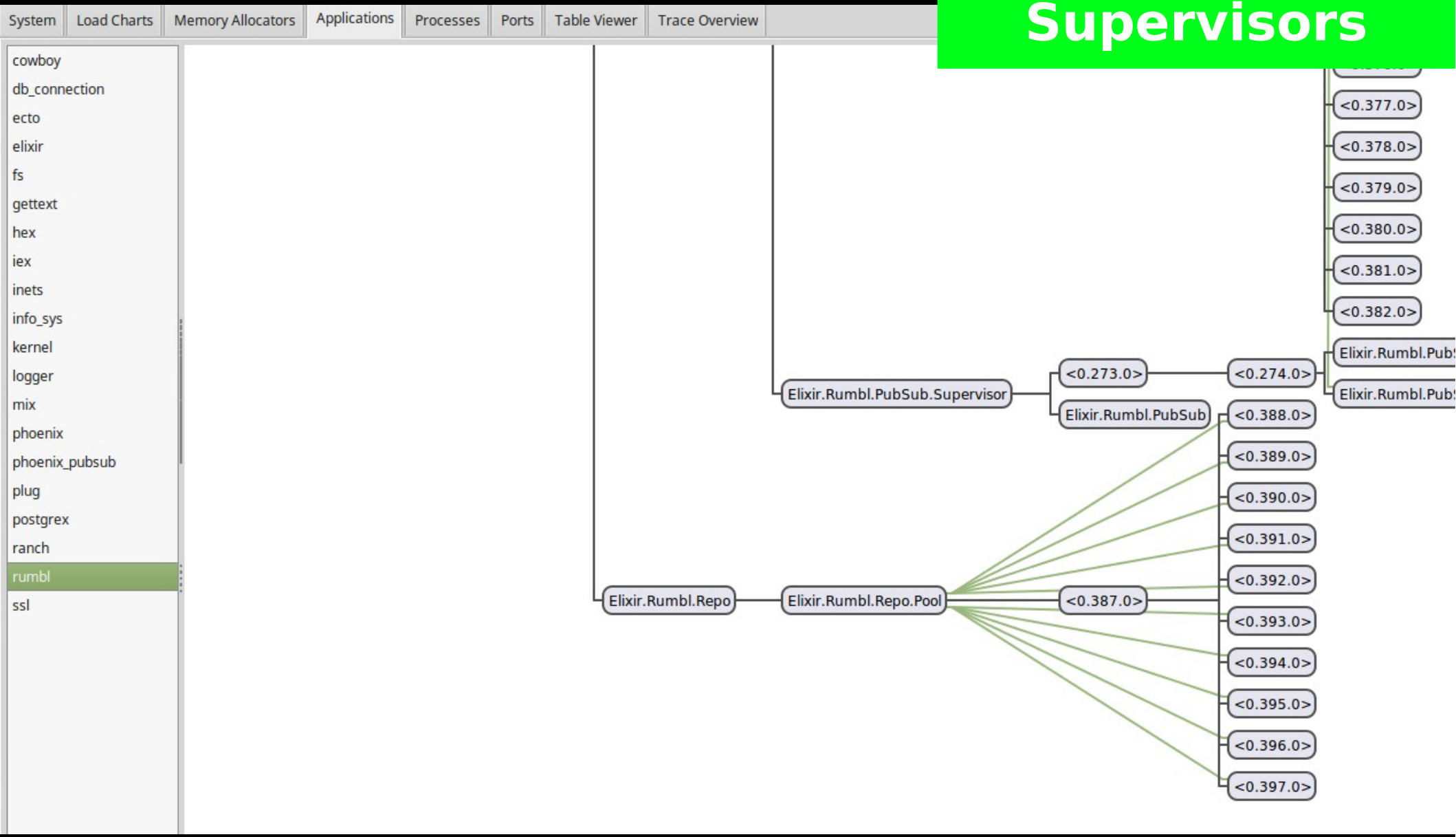
Readability

First class actor support

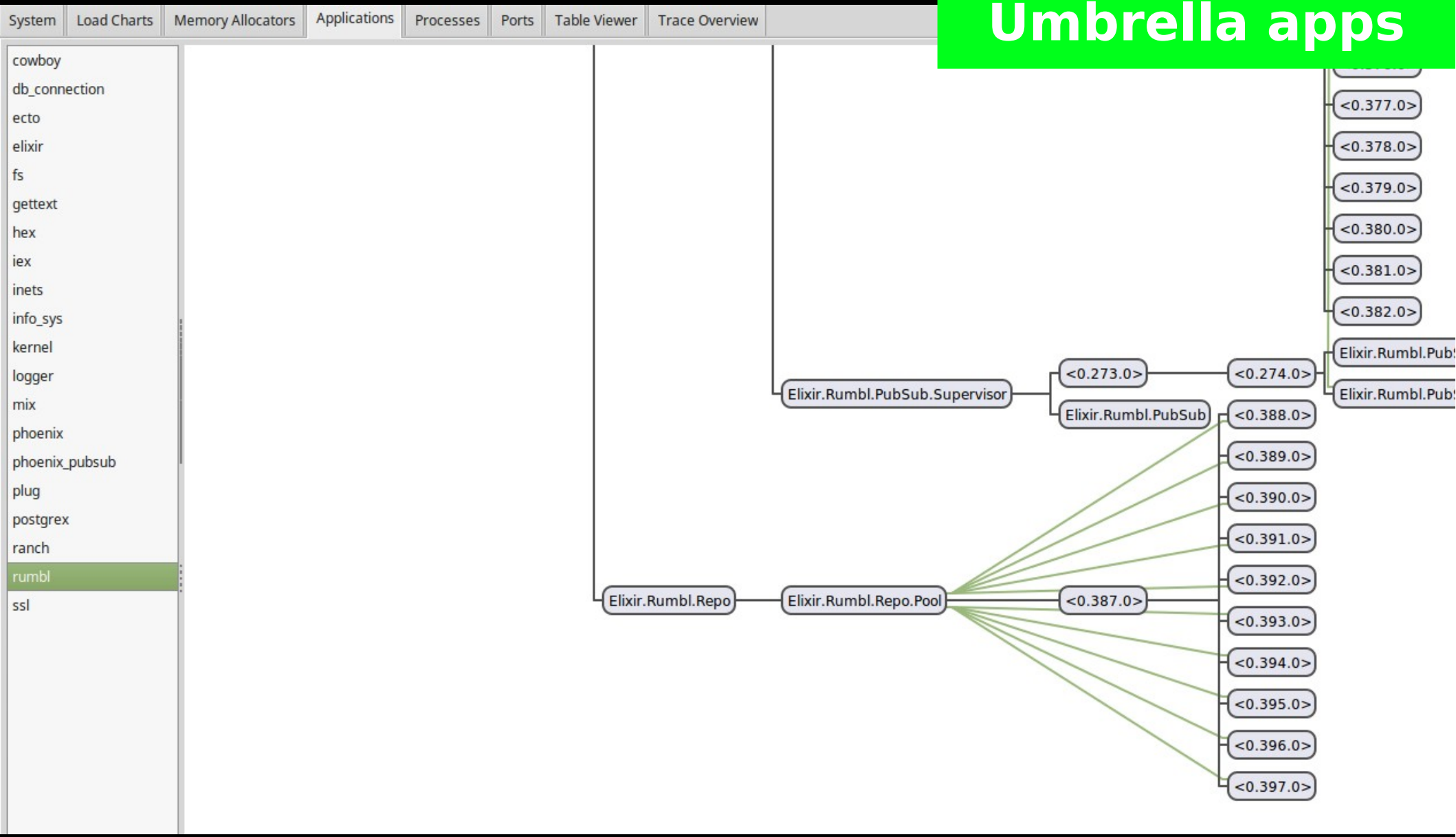


OTP

Supervisors



Umbrella apps




TM

Flow

```
connection
 |> endpoint
 |> router
 |> pipelines
 |> controller
 |> model
 |> view
```

Routes

```
scope "/", Rumbl do
  pipe_through :browser

  get "/", PageController, :index

  resources "/users", UserController,
            only: [:index, :show, :new, :create]
  resources "/sessions", SessionController,
            only: [:new, :create, :delete]
  get "/watch/:id", WatchController, :show

end
```

Routes

```
scope "/", Rumbl do
  pipe_through :browser

  get "/", PageController, :index

  resources "/users", UserController,
            only: [:index, :show, :new, :create]
  resources "/sessions", SessionController,
            only: [:new, :create, :delete]
  get "/watch/:id", WatchController, :show

end
```

Pipelines

```
pipeline :browser do
  plug :accepts, ["html"]
  plug :fetch_session
  plug :fetch_flash
  plug :protect_from_forgery
  plug :put_secure_browser_headers
  plug Rumbl.Auth, repo: Rumbl.Repo
end

pipeline :api do
  plug :accepts, ["json"]
end
```

Controller

```
def new(conn, _params) do
  changeset = User.new_changeset(%User{})
  render conn, "new.html", changeset: changeset
end
```

Model

```
defmodule Rumbl.User do
  use Rumbl.Web, :model

  schema "users" do
    field :name,          :string
    field :username,      :string
    field :password,      :string, virtual: true
    field :password_hash, :string
    has_many              :videos, Rumbl.Video

    timestamps
  end

  # ...

end
```

View

```
defmodule Rumbl.UserView do
  use Rumbl.Web, :view
  alias Rumbl.User

  def first_name(%{name: name}) do
    name
    |> String.split(" ")
    |> Enum.at(0)
  end
end
```

Template

```
<%= form_for @changeset, user_path(@conn, :create), fn
form -> %>
  <div class="form-group">
    <%= text_input form, :name, placeholder: "Name",
class: "form-control" %>
    <%= error_tag form, :name %>
  </div>
  <div class="form-group">
    <%= text_input form, :username, placeholder:
"Username", class: "form-control" %>
    <%= error_tag form, :username %>
  </div>
  <div class="form-group">
    <%= password_input form, :password, placeholder:
"Password", class: "form-control" %>
    <%= error_tag form, :password %>
  </div>
  <%= submit "Create User", class: "btn btn-primary" %>
<% end %>
```


TM

Changesets

```
def new_changeset(model, params \\ %{}) do
  model
  |> cast(params, ~w(name username), [])
  |> unique_constraint(:username)
  |> validate_length(:username, min: 1, max: 20)
end

def registration_changeset(model, params) do
  model
  |> new_changeset(params)
  |> cast(params, ~w(password), [])
  |> validate_length(:password, min: 6, max: 100)
  |> put_pass_hash()
end
```

Changesets

```
def create(conn, %{"user" => user_params}) do
  changeset = User.registration_changeset(%User{}, user_params)
  case Repo.insert changeset do
    {:ok, user} ->
      conn
      |> Rumbl.Auth.login(user)
      |> put_flash(:info, "You successfully registered!")
      |> redirect(to: user_path(conn, :index))
    {:error, changeset}->
      render conn, "new.html", changeset: changeset
  end
end
```

Channels

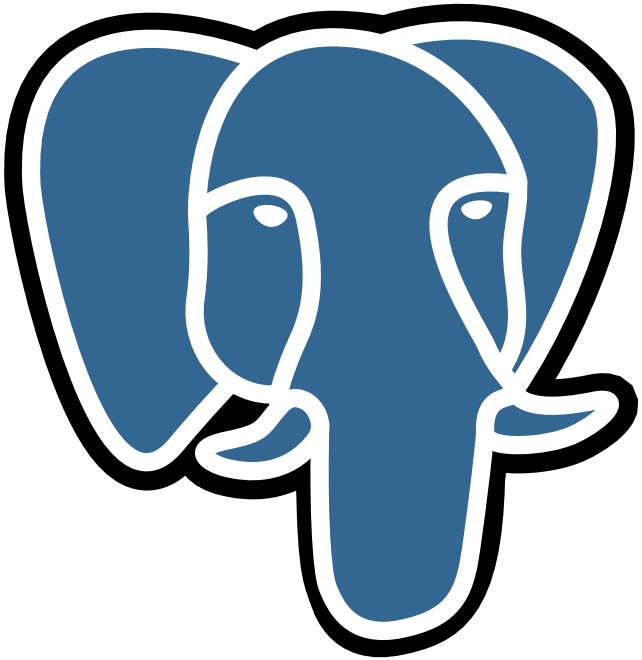
```
defmodule Rumbl.VideoChannel do
  use Rumbl.Web, :channel

  def join("videos:" <> video_id, _params, socket) do
    {:ok, socket}
  end

  def handle_in("new_annotation", params, socket) do
    broadcast! socket, "new_annotation", %{
      user: %{username: "anon"},
      body: params["body"],
      at: params["at"]
    }

    {:reply, :ok, socket}
  end
end
```

The right tool



Explicit preloading

```
iex(13)> user = Repo.get_by(User, name: "Homer")
iex(14)> user.videos
#Ecto.Association.NotLoaded<association :videos is not
loaded>
```

Explicit preloading

```
iex(13)> user = Repo.get_by(User, name: "Homer")
iex(14)> user.videos
#Ecto.Association.NotLoaded<association :videos is not
loaded>
```

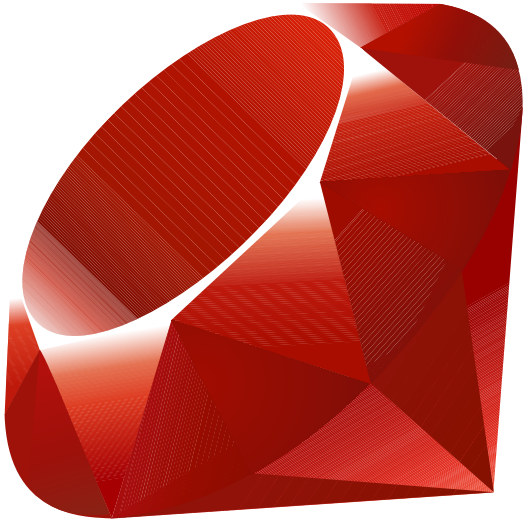
Explicit preloading

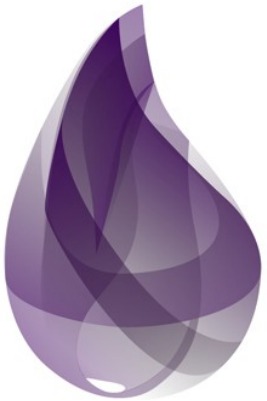
```
iex(15)> Repo.preload(user, :videos)
iex(16)> user.videos
#Ecto.Association.NotLoaded<association :videos is not
loaded>
```

Explicit preloading

```
iex(17)> user = Repo.preload(user, :videos)
iex(18)> user.videos
[%Rumbl.Video{__meta__: #Ecto.Schema.Metadata<:loaded>,
  category: #Ecto.Association.NotLoaded<association
:category is not loaded>,
  category_id: nil, description: "such great many wow", id:
3,
  inserted_at: #Ecto.DateTime<2016-02-28T18:42:41Z>, title:
"Hubidubiee",
  updated_at: #Ecto.DateTime<2016-02-28T18:42:41Z>, url:
"www.lol.com",
  user: #Ecto.Association.NotLoaded<association :user is
not loaded>,
  user_id: 5}]
```

So we all go and do Elixir and Phoenix now?





elixir


Dirtiness

Baggage


Eco-System


A new land

Q&A question #1

So, would you start a new project in Elixir and Phoenix now?

IT DEPENDS

IT DEPENDS

Thanks & Enjoy Elixir

Tobias Pfeiffer
@PragTob
pragtob.info

LIEFERY

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