Phoenix per principianti

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Slide a
connettiva.eu/phoenix-per-principianti.pdf

Ovvero...

2005: Conoscenza(Ruby) == 0 → Rails

2014: Conoscenza(Elixir) == 0 → Phoenix

Imparare Elixir mentre si impara Phoenix

- Le guide di Phoenix

http://www.phoenixframework.org/docs/overview

- I generatori per i controller

Per ambientarsi

- Phoenix è MVC
- È giovane ma si innalza sulle spalle dei giganti
- Per chi conosce Rails:
  - Models e Controllers → Models e Controllers
  - Views → Template
  - Helpers → Views (circa)
  - Cables (Rails 5) → Channels (da sempre)
  - ActiveRecord → Ecto
  - Migrations → Migrations

Creare una web app

http://www.phoenixframework.org/docs/up-and-running

```
mix phoenix.new bologna_2015
git add .gitignore config/ lib/ mix.* package.json priv/ README.md test/ web/
git commit -a -m "Demo for today!"
```

config/dev.exs

```
config :bologna_2015, Bologna_2015.Repo,
  adapter: Ecto.Adapters.Postgres,
  username: "bologna_2015",
  password: "RJP4Q1_2vPYX4UOR",
  database: "bologna_2015_dev",
  hostname: "localhost",
  pool_size: 10
```

Lancio della web app

```
$ mix phoenix.run # rails s
```

```
$ iex -S mix # rails c + rails s
```

http://localhost:4000

```
$ mix -h  # rake -T
```

web/router.ex

```
defmodule Bologna_2015.Router do
  use Bologna_2015.Web, :router
  scope "/", Bologna_2015 do
    pipe_through :browser
    get "/", PageController, :index
    resources "/users", UserController
  end
end
```

Restful routes

$ mix phoenix.routes

```
page_path  GET     /                 Bologna_2015.PageController :index
user_path  GET     /users            Bologna_2015.UserController :index
user_path  GET     /users/:id/edit Bologna_2015.UserController :edit
user_path  GET     /users/new        Bologna_2015.UserController :new
user_path  GET     /users/:id        Bologna_2015.UserController :show
user_path  POST    /users            Bologna_2015.UserController :create
user_path  PATCH   /users/:id        Bologna_2015.UserController :update
           PUT     /users/:id        Bologna_2015.UserController :update
user_path  DELETE  /users/:id        Bologna_2015.UserController :delete
```

I controller

```
def show(conn, %{"id" => id}) do
    user = Repo.get!(User, id)
    render(conn, "show.html", user: user)
end
```

o anche:

```
conn
|> assign(:user, user)
|> render("show.html")
```

API JSON

```
def show(conn, %{"id" => id}) do
  user = Repo.get!(User, id)
  json conn, %{ id: user.id, email: user.email, inserted_at: user.inserted_at, updated_at: user.updated_at }
end
```

GET /admin/users/1

```
{"updated_at":"2015-10-10T09:47:04.528266Z",
"inserted_at":"2015-10-10T09:47:04.528266Z",
"id":1,"email":"paolo.montrasio@connettiva.eu"}
```

Redirect

```
def delete(conn, %{"id" => id}) do
    user = Repo.get!(User, id)
    conn
    |> put_flash(:info, "User deleted successfully.")
    |> redirect(to: user_path(conn, :index))
end
```

Cos'è un flash?

web/templates/layout/app.html.eex

```
<p class="alert alert-info" role="alert">
  <%= get_flash(@conn, :info) %>
</p>

<p class="alert alert-danger" role="alert">
  <%= get_flash(@conn, :error) %>
</p>

<%= @inner %>
```

Porting di una app a Phoenix

- Customers analytics per CheckBonus http://checkbonus.it/
- Web app Rails
- Le pagine fanno richieste a Rails per mostrare tabelle e grafici
- Risposte JSON

Modelli

```
$ mix phoenix.gen.html Retailer retailers name:string internal_id:integer
    * creating web/controllers/retailer_controller.ex
    * creating web/templates/retailer/edit.html.eex
    * creating web/templates/retailer/form.html.eex
    * creating web/templates/retailer/index.html.eex
    * creating web/templates/retailer/new.html.eex
    * creating web/templates/retailer/show.html.eex
    * creating web/views/retailer_view.ex
    * creating test/controllers/retailer_controller_test.exs
    * creating priv/repo/migrations/20150919101354_create_retailer.exs
    * creating web/models/retailer.ex
    * creating test/models/retailer_test.exs
```

Migrazioni con Ecto

```
$ mix ecto.migrate          # up
```

```
$ mix ecto.rollback         # down di uno
```

http://hexdocs.pm/ecto/Ecto.html

Adapter per PostgreSQL, MySQL, MariaDB, MSSQL, MongoDB.

Il modello generato

```
defmodule Bologna_2015.Retailer do
  use Bologna_2015.Web, :model

  schema "retailers" do
    field :name, :string
    field :internal_id, :integer
    timestamps
    has_many :shops, Bologna_2015.Shop
    has_many :visits, Bologna_2015.Visit
  end

  @required_fields ~w(name)
  @optional_fields ~w(internal_id)

  def changeset(model, params \\ :empty) do
    model
    |> cast(params, @required_fields,
               @optional_fields)
  end
end
```

Validazioni

```
def changeset(model, params \\ :empty) do
  model
  |> cast(params, @required_fields, @optional_fields)
  |> validate_confirmation(:password)
  |> validate_length(:password, min: 12)
  |> validate_number(:age)
  |> validate_inclusion(:age, 18..130)
  |> validate_format(:email, ~r/@/)
end
```

Registrazione e autenticazione

- L'ostacolo più grande all'adozione di Phoenix
- No framework con copertura di tutto lo use case
  - Registrazione
  - Invio mail di attivazione
  - Non ho ricevuto il link di attivazione
  - Ho perso la password
  - Faccio login / faccio logout
  - Mi autentico con FB / Tw / G+ / OAuth

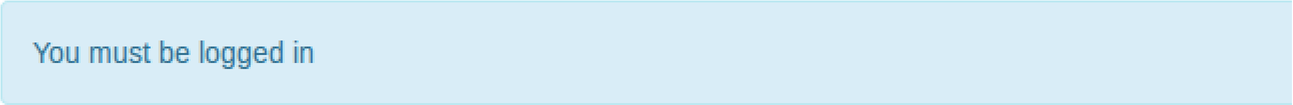
Soluzioni

- Addict https://github.com/trenpixster/addict
  - POST JSON per registrazione, login, logout, recupero e reset password: OK per SPA.
  - Mail via Mailgun
- Passport https://github.com/opendrops/passport
  - No routes, no controllers: un SessionManager da usare nel proprio codice
- Do it yourself

  http://nithinbekal.com/posts/phoenix-authentication/

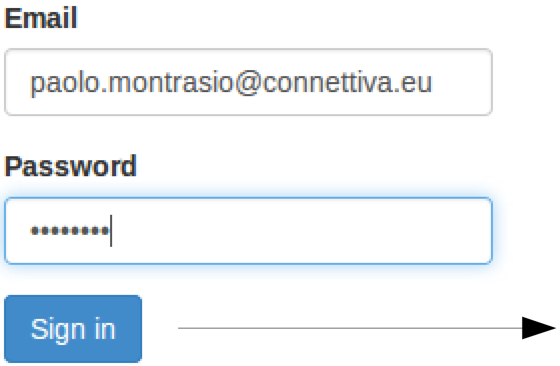
Do It Yourself: solo la login

/admin/users/5



You must be logged in

/sessions/new



Email

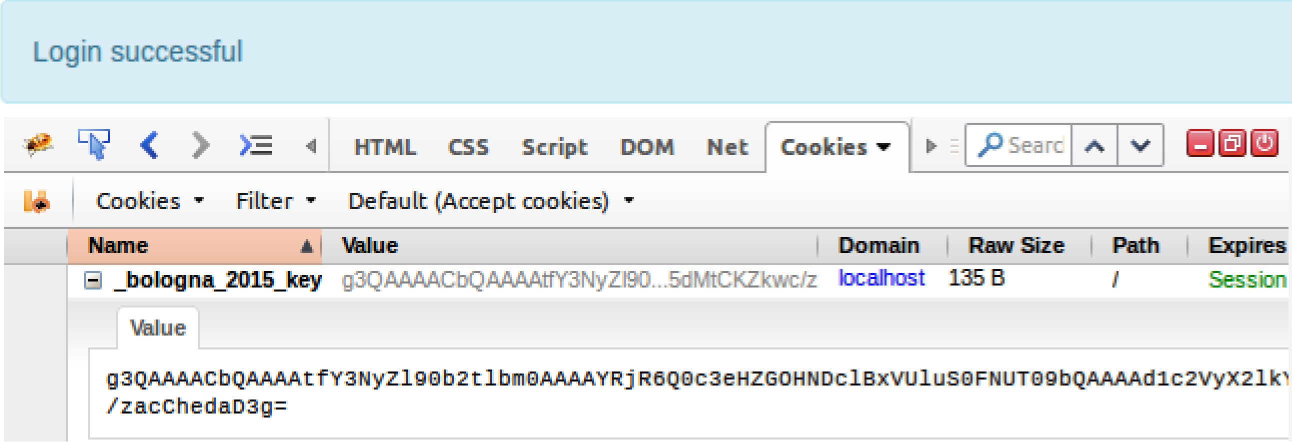
paolo.montrasio@connettiva.eu

Password

•••••••••

→ /sessions/create

/admin/users/5



Login successful

Name ▲	Value	Domain	Raw Size	Path	Expires
⊟ _bologna_2015_key	g3QAAAACbQAAAAtfY3NyZl90...5dMtCKZkwc/z	localhost	135 B	/	Session

Value

```
g3QAAAACbQAAAAtfY3NyZl90b2tlbm0AAAAYRjR6Q0c3eHZGOHNDclBxVUluS0FNUT09bQAAAAd1c2VyX2lk
/zacChedaD3g=
```

I file necessari

```
resources "/sessions", SessionController,
      only: [ :new, :create, :delete ]
```

web/models/user.ex

web/controllers/session_controller.ex

web/views/session_view.ex

web/templates/session/new.html.eex

lib/bologna_2015/authentication.ex

lib/bologna_2015/must_be_logged_in.ex

Modello e cifratura password

```
schema "users" do
    field :email, :string
    field :encrypted_password, :string
end
@required_fields ~w(email encryped_password)
def hash(plaintext) do
   Base.encode16(:crypto.hash(:sha256, to_char_list(plaintext)))
end
```

https://www.djm.org.uk/cryptographic-hash-functions-elixir-generating-hex-digests-md5-sha1-sha2/

Inserimento utenti

```
$ iex -S mix

alias Bologna_2015.User

changeset = User.changeset(%User{},
%{email: "paolo.montrasio@connettiva.eu",
    encrypted_password: User.hash("password")})

alias Bologna_2015.Repo

Repo.insert(changeset)
```

Form di login

```
<form action="/sessions" method="post">
  <input type="hidden" name="_csrf_token"
            value="<%= get_csrf_token() %>">
  Email
  <input name="user[email]" type="email" value="" />
  Password
  <input name="user[password]" type="password" />
  <input type="submit" value="Sign in" />
</form>
```

Controller per le sessioni

```
def create(conn, %{ "user" => %{ "email" => email, "password" => password }}) do
  case User.find(email, password) do
  [user] ->
    fetch_session(conn)
    |> put_session(:user_id, user.id)           # user.id nella sessione per i controller
    |> put_flash(:info, "Login successful")
    |> redirect(to: page_path(conn, :index))
  [ ] ->
    fetch_session(conn)
    |> put_flash(:error, "Login failed")
    |> redirect(to: session_path(conn, :new))
  end
end
```

```
def find(email, password) do
  enc_pwd = hash(password)
  query = from user in User,
   where: user.email == ^email and
    user.encrypted_password == ^enc_pwd,
   select: user
  Repo.all(query)
end
```

Plug di autenticazione

```
defmodule Bologna_2015.Plugs.Authentication do
  import Plug.Conn
  alias Bologna_2015.User
  alias Bologna_2015.Repo
  def init(default), do: default
  def call(conn, _default) do
    user = nil
    user_id = get_session(conn, :user_id)
    unless user_id == nil do
      user = Repo.get(User, user_id)
    end
    assign(conn, :current_user, user)
  end
end
# conn.assigns[:current_user]
```

web/router.ex

```
defmodule Bologna_2015.Router do
  use Bologna_2015.Web, :router

  pipeline :browser do
    plug :accepts, ["html"]
    plug :fetch_session
    plug :fetch_flash
    plug :protect_from_forgery
    plug :put_secure_browser_headers
    plug Bologna_2015.Plugs.Authentication
  end
```

Plug di autorizzazione

```
defmodule Bologna_2015.Plugs.MustBeLoggedIn do
  import Plug.Conn
  import Phoenix.Controller

  def init(default), do: default
  def call(conn, _default) do
    if conn.assigns[:current_user] == nil do
      conn
      |> put_flash(:info, "You must be logged in")
      |> redirect(to: "/") |> halt
    else
      conn
    end
  end
end
```

web/controllers/admin/user_controller.ex

```
defmodule Bologna_2015.Admin.UserController do
  use Bologna_2015.Web, :controller

  plug Bologna_2015.Plugs.MustBeLoggedIn
```

Funziona? mix test

```
defmodule Bologna_2015.SessionControllerTest do
  use Bologna_2015.ConnCase
  alias Bologna_2015.User
  @valid_attrs %{"email" => "paolo.montrasio@connettiva.eu", "password" => "password"}
  setup do
    conn = conn()
    {:ok, conn: conn}
  end
  test "creates session and redirects when data is valid", %{conn: conn} do
    changeset = User.changeset(%User{}, %{email: @valid_attrs["email"],
                                           encrypted_password: User.hash(@valid_attrs[“password"])})
    {:ok, user } = Repo.insert(changeset)
    conn = post conn, session_path(conn, :create), user: @valid_attrs
    assert redirected_to(conn) == page_path(conn, :index)
    assert get_session(conn, :user_id) == user.id
  end
end
```

API JSON – di nuovo e meglio

```
pipeline :api do
    plug :accepts, ["json"]
    scope "/api", Bologna_2015, as: :api do
        resources "/retailers", API.RetailerController,
                    only: [:index] do
            resources "/visits", API.VisitController,
                    only: [:index]
        ...
```

```
api_retailer_path       GET /api/retailers                         Bologna_2015.API.RetailerController :index
api_retailer_visit_path  GET /api/retailers/:retailer_id/visits Bologna_2015.API.VisitController :index
```

Visit: migrazione e modello

```
defmodule Bologna_2015.Repo.Migrations.CreateVisit do
  use Ecto.Migration
  def change do
    create table(:visits) do
      add :retailer_id, :integer
      add :started_at, :timestamp
      add :duration, :integer
    end
  end
end
```

```
defmodule Bologna_2015.Visit do
  use Bologna_2015.Web, :model
  schema "visits" do
    belongs_to :retailer, Bologna_2015.Retailer
    field :started_at, Ecto.DateTime
    field :duration, :integer
  end
  @required_fields ~w(retailer_id, started_at,
                                  duration)
  @optional_fields ~w()
  def changeset(model, params \\ :empty) do
    model
    |> cast(params, @required_fields,
              @optional_fields)
  end
end
```

Generazione controller

```
mix phoenix.gen.json API.Visit visits --no-model
* creating web/controllers/api/visit_controller.ex
* creating web/views/api/visit_view.ex
* creating test/controllers/api/visit_controller_test.exs
* creating web/views/changeset_view.ex
```

Il controller

```
def index(conn, _params) do
  retailer_id = conn.assigns[:retailer].id  # da dove arriva?
  query = from visit in Visit,
    where: visit.retailer_id == ^retailer_id,
    select: visit

  visits = Repo.all(query)
  render(conn, "index.json", visits: visits) # dov'è il template?
end
```

Assign del modello

```
plug :assign_retailer


defp assign_retailer(conn, _options) do
  retailer = Repo.get!(Bologna_2015.Retailer,
             conn.params["retailer_id"])
  assign(conn, :retailer, retailer)
end
```

Il template / 1

```
# web/views/api/visit_view.ex
def render("index.json", %{visits: visits}) do
    %{data: render_many(visits, Bologna_2015.API.VisitView,
                                   "visit.json")}
end
# render_many? Circa equivalente a
Enum.map(visits, fn user ->
    render(Bologna_2015.API.VisitView, "visit.json”, visit: visit)
end)
```

Il template / 2

```
# web/views/api/visit_view.ex
def render("visit.json", %{visit: visit}) do
      %{id: visit.id}
end

- %{id: visit.id}
+ %{started_at: visit.started_at, duration: visit.duration}
```

La richiesta

```
GET /retailers/1/visits
{"data":[
{"started_at":"2015-09-29T20:11:00Z","duration":6},
{"started_at":"2015-09-29T20:41:00Z","duration":6},
…
]}
```

Benchmark Phoenix

```
query = from visit in Visit,
  where: visit.retailer_id == ^retailer_id,
  select: visit
visits = Repo.all(query)
```

(252), 147, 134, 145, 133, 142 → **media 140 ms**

per 5000+ visits

Benchmark Rails

```
visits = Visit.where(
    retailer_id: params[:retailer_id]).
    pluck(:started_at, :duration)
```

(149), 117, 112, 124, 109, 122 → **media 116 ms**

Benchmark Rails

```
visits = Visit.where(
    retailer_id: params[:retailer_id]).
    pluck(:started_at, :duration)
```

(149), 117, 112, 124, 109, 122 → **media 116 ms**

Ma è un confronto onesto?

select * vs select started_at, duration

Benchmark Rails select *

```
visits = Visit.where(
           retailer_id: params[:retailer_id])
```

(265), 236, 233, 230, 259, 282 → **media 248 ms**

Benchmark Phoenix

```
query = from visit in Visit,
  where: visit.retailer_id == ^retailer_id,
  select: [visit.started_at, visit.duration]
visits = Repo.all(query)
```

(193), 85, 72, 79, 70, 68 → **media 74 ms**

Benchmark: riassunto

select * from visits

Phoenix	140	ms	
Rails	248	ms	x 1.71

select started_at, duration from visits

Phoenix	74	ms	
Rails	116	ms	x 1.56

Benchmark: riassunto

select * from visits

Phoenix	140	ms	
Rails	248	ms	x 1.71
Ruby senza AR	219	ms	
PostgreSQL	2.97	ms	

select started_at, duration from visits

Phoenix	74	ms	
Rails	116	ms	x 1.56
Ruby senza AR	88	ms	
PostgreSQL	3.47	ms	

Fastidi

- alias / import / require all'inizio di ogni file
- Mancanza di un framework di autenticazione
- Dover chiamare ogni tanto Erlang
- Dover scrivere due volte lo schema, nella migrazione e nel modello

Delizie

- Hot reload
- iex -S mix
- Channels
  - https://medium.com/@azzarcher/the-simplicity-and-power-of-elixir-the-ws2048-case-b510eaa568c0

Domande e contatti

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