REST in a Snap(let)

Building Web Resources in Haskell

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Background

CoffeeScript

node.js™

express

This Talk

Why Haskell?

This ain't your Java's type system

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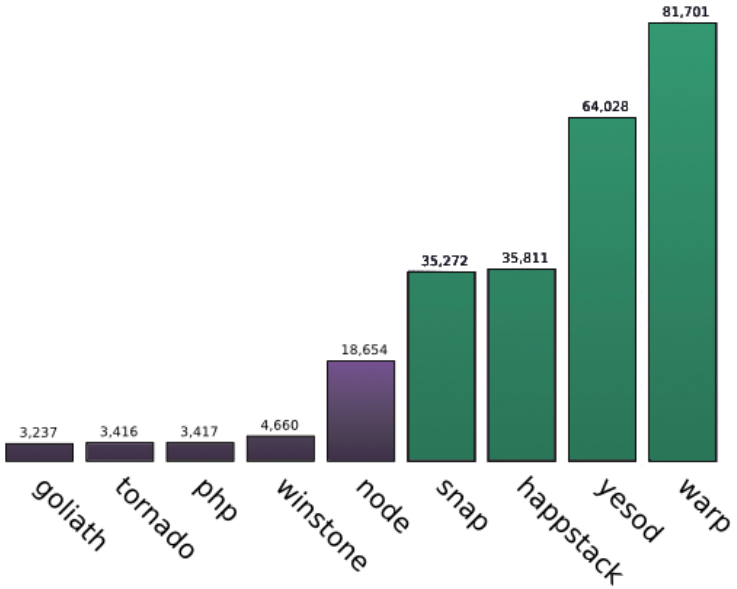
Runs natively



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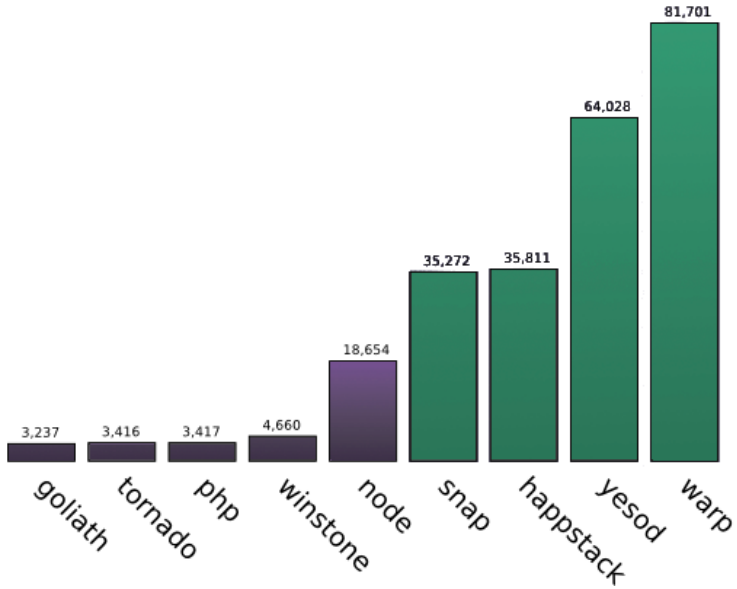

Open Source!

Why Haskell?

Haskell on the Web

Snap

Get started quickly

```
import Snap

quickHttpServe (writeText "Hello, world!")
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For bigger projects:

```
$ snap init
```

Snap Routing

Routes are data structures

```
serveUsers = path "/user"
    (method GET readUser <|> method POST createUser)
```

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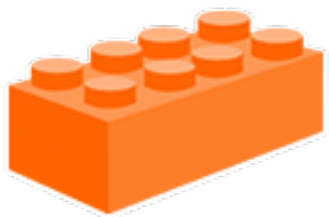
They compose easily

```
routes = ifTop serveHomePage <|> serveUsers
```

Snaplets



Snaplets

Embeddable components

```
data MySite = MySite {
    heist :: Snaplet Heist,
    db    :: Snaplet Sqlite
}
```

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Embeddable components

```
data MySite = MySite {
    heist :: Snaplet Heist,
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}
```

MySite is a Snaplet too!

```
data YourSite = YourSite {
    subSite :: Snaplet MySite
}
```

Building a Snaplet for REST

CRUD

Building a Snaplet for REST

CRUD

Methods

PUT, DELETE...

Building a Snaplet for REST

CRUD

Methods

PUT, DELETE...

Content Negotiation

Accept: `application/json`

Don't hate the player, HATEOAS the game

Hypermedia

```
<link href="/person/tim">
    <method>GET</method>
    <method>PATCH</method>
</link>
```

Content negotiation is hard

Accept: `application/json; q=0.8, text/*; q=0.2`

Content-Type: `application/xml; charset=utf-8`

Foundational Packages

http-media

```
parseAccepts header >>= mapAccept
    [ ("text/html",         asHTML)
    , ("application/json", asJSON)
    ]
```

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```

snap-accept

```
accept "text/html" asHTML
    <|> accept "application/json" asJSON
    <|> send406Error
```

snaplet-rest

Prototyping – up and running quickly

snaplet-rest

Prototyping – up and running quickly

Use a CRUD model to produce a REST interface

snaplet-rest

Prototyping – up and running quickly

Use a CRUD model to produce a REST interface

Doing the right thing should be easy

User Resource

```
data User = User {
    user :: Username,
    name :: String,
    age  :: Int
}

type Username = CaseInsensitive String
```

User Resource

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data User = User {
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deriveJSON ''User
```

Aw CRUD

```
createUser :: User → m ()
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```
createUser :: User → m ()

readUser   :: id → m [User]
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Aw CRUD

```
createUser :: User → m ()

readUser   :: id → m [User]

deleteUser :: id → m Bool
```

Aw CRUD

```
createUser :: User → m ()

readUser   :: id → m [User]

deleteUser :: id → m Bool

updateUser :: id → diff → m Bool
```

Quite partial

```
data UserPart = UserPart {
    pName :: Maybe String,
    pAge  :: Maybe Int
}

deriveJSON ''UserPart
```

Quite partial

```
data UserPart = UserPart {
    pName :: Maybe String,
    pAge  :: Maybe Int
}

deriveJSON ''UserPart

type UserId = Either Username UserPart
```

Filling in the gaps

```
createUser :: User → m ()

readUser   :: UserId → m [User]

deleteUser :: UserId → m Bool

updateUser :: UserId → UserPart → m Bool
```

Putting it all together

```
serveUser = serveResource $ resource
    & addMedia  jsonFromInstances
    & setCreate createUser
    & setRead   readUser
    & setUpdate updateUser
    & setDelete deleteUser
```

A counter

```
data Count = Count { amount :: Int }
deriveJSON ''Count

data App = App { count :: Count }

serveCount = serveResource $ resource
    & addMedia  jsonFromInstances
    & setRead   (λ() → with count get)
    & setUpdate (λ() → with count · put)
```

What's next?

Automating partial structure

Nested resources

Online

github.com/zmthy/snaplet-rest

```
$ cabal update
$ cabal install snaplet-rest
```