ESUG 2023, Lyon (France)

PharJS

Hijack the JavaScript Ecosystem

Noury Bouraqadi & Dave Mason

IMT Nord Europe
École Mines-Télécom
IMT-Université de Lille

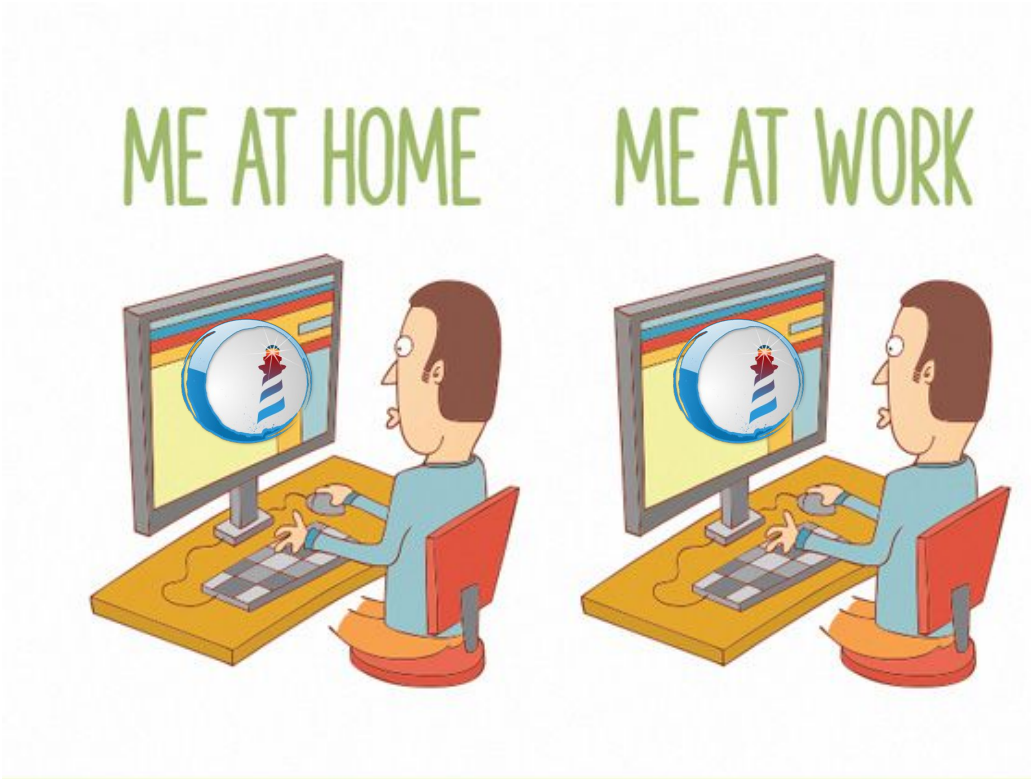
Toronto Metropolitan University

I am an **Addict**!

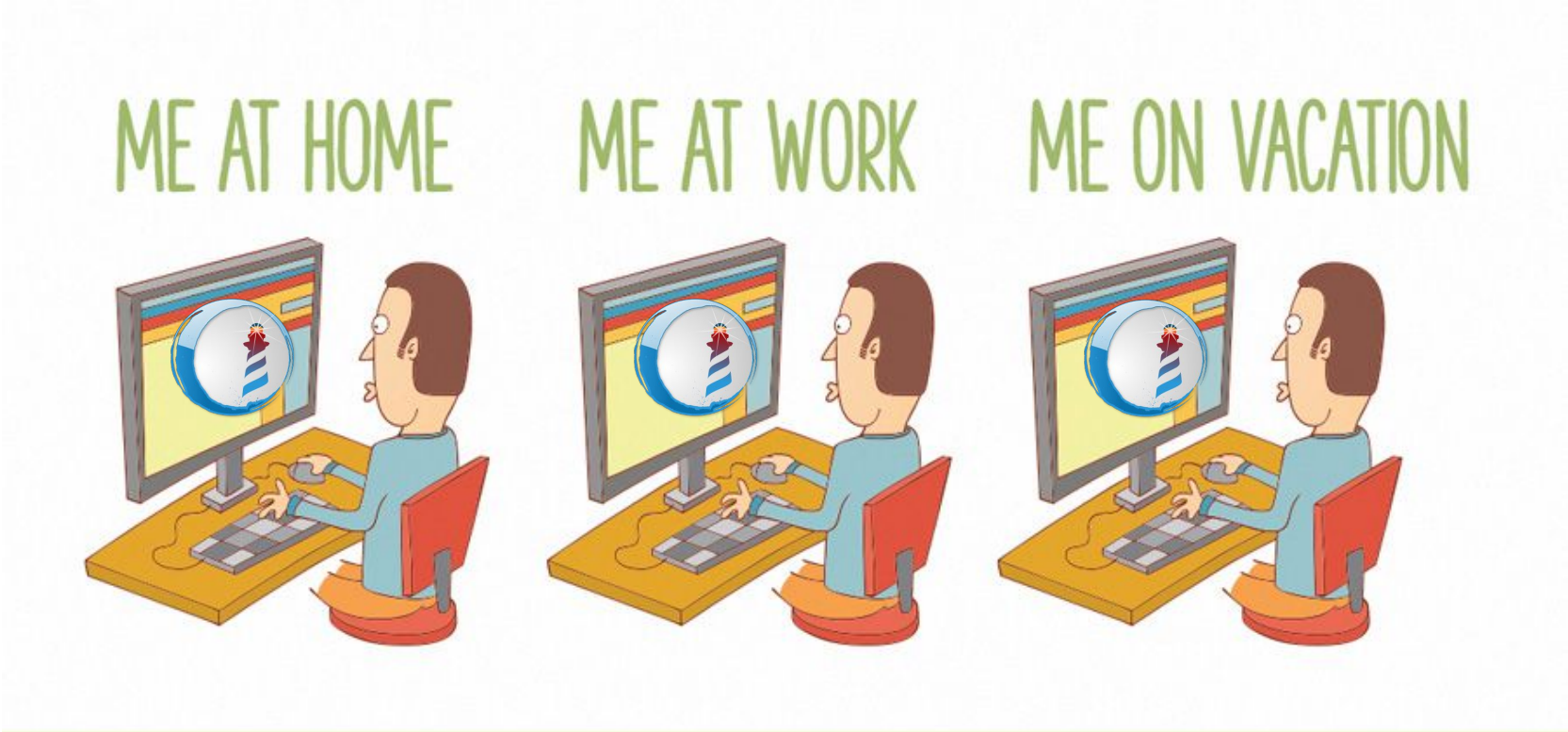
Not That Kind of Addict!

I am a Smalltalk Addict!

I am a Smalltalk Addict!



I am a Smalltalk Addict!



I am **Lazy**!

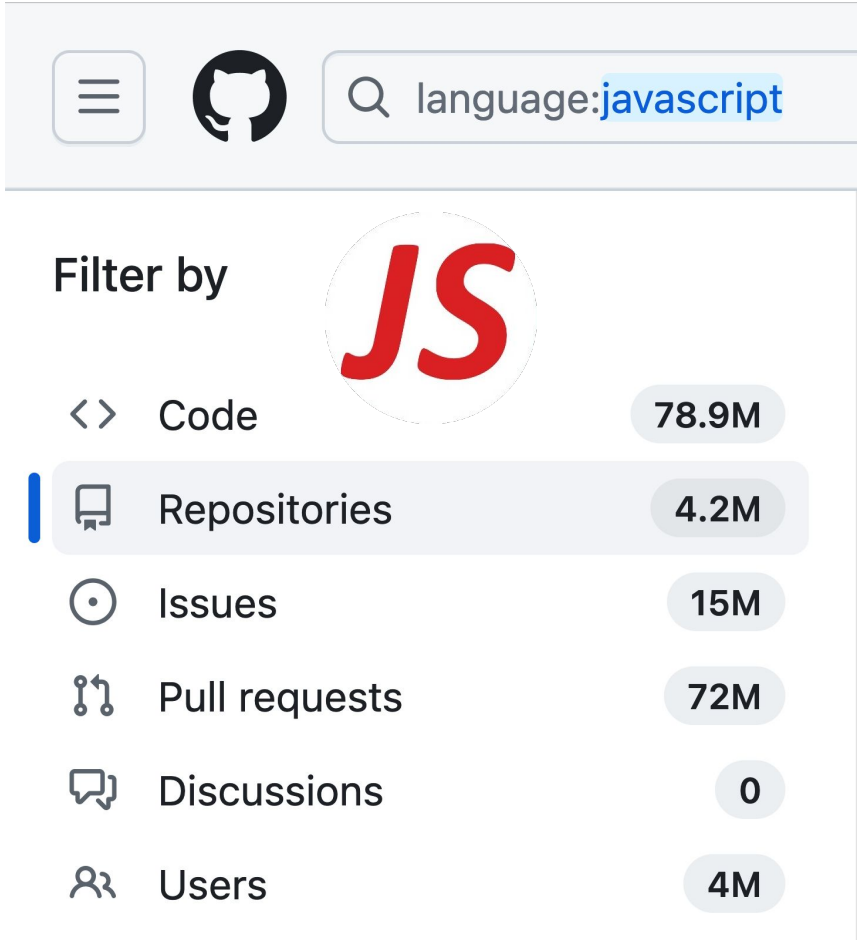
I am a Lazy Developer!

pharo-open-documentation /
awesome-pharo

A categorized community-driven collection of awesome Pharo libraries, tools, frameworks and software.

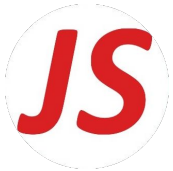
Thank You
Cyril Ferlicot

I am a Lazy Developer!



Addict + Lazy = PharJS

+

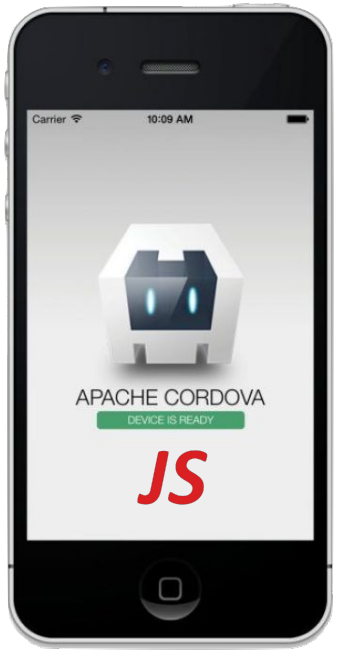


Development

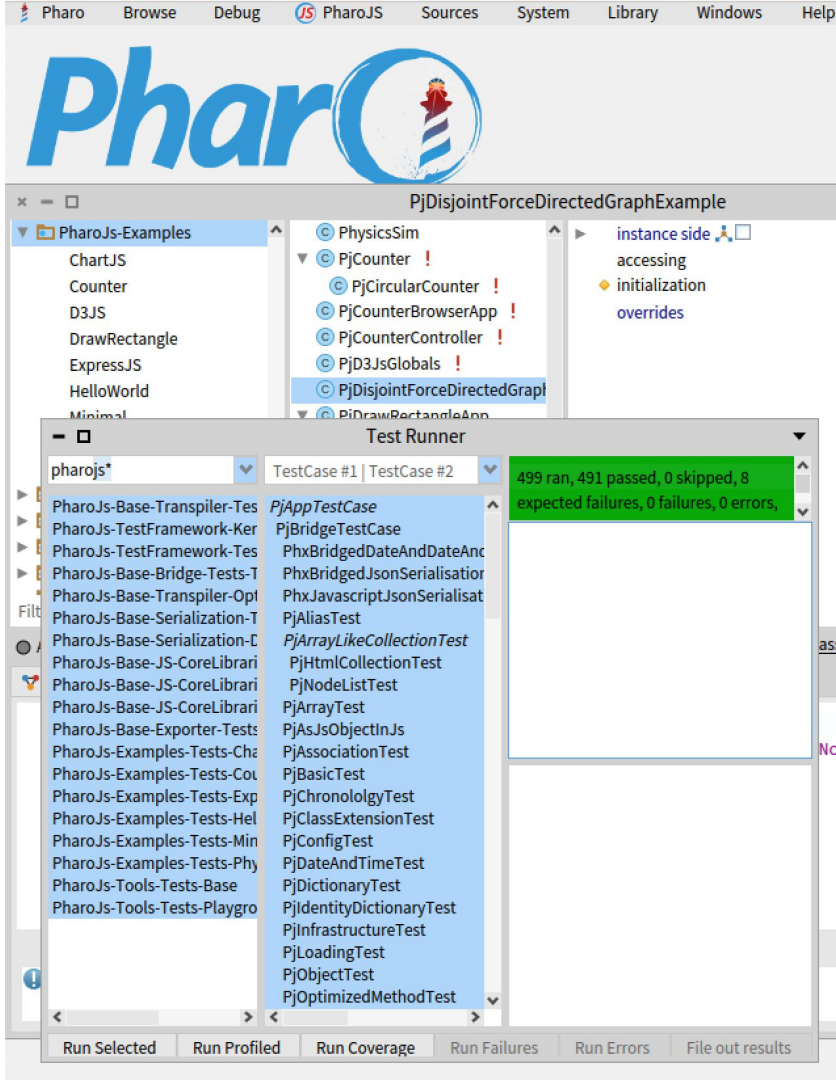
Libraries
&
Run-Time

- **Transpiler:** Converts Pharo Code to JavaScript
- **Framework:** Develop JS applications in Pharo
- **Libraries:** Extend JS Objects with Pharo's Behavior
- **Tools:** Playground + Inspector for JS Objects
- **Test Framework:** Test JS Code

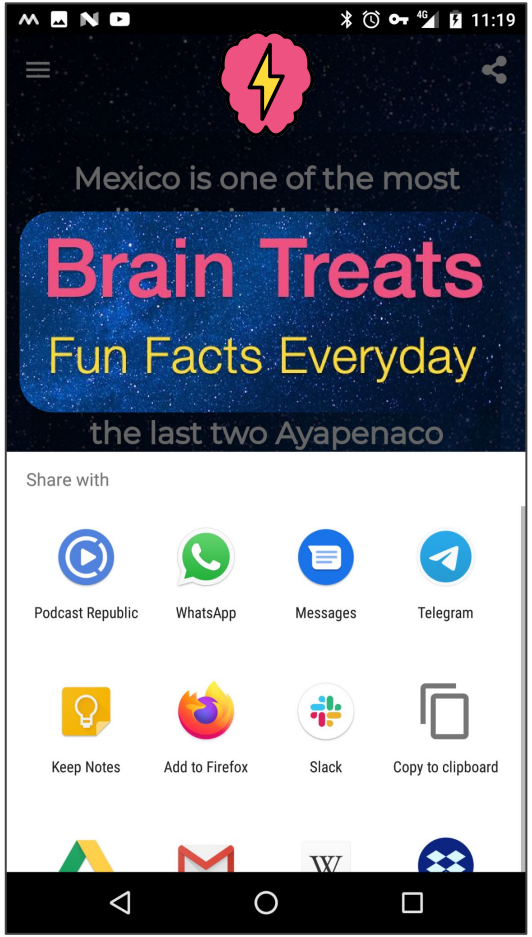
Mobile Apps with PharJS



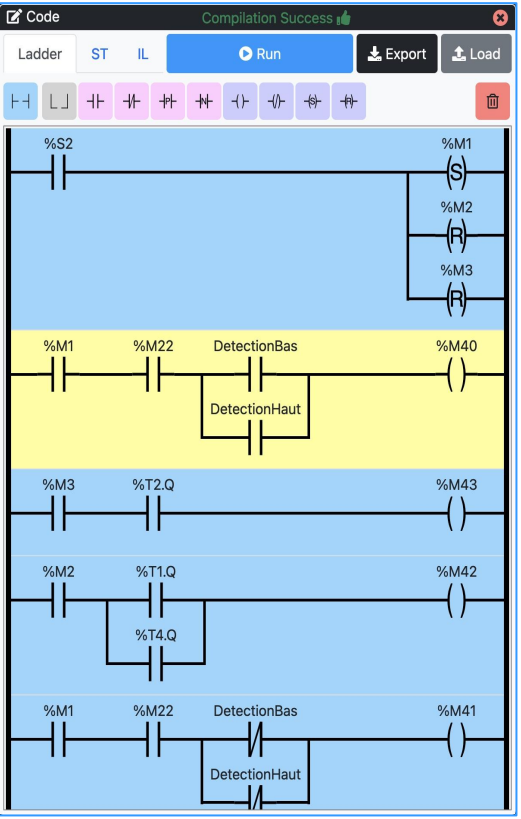
PharJS

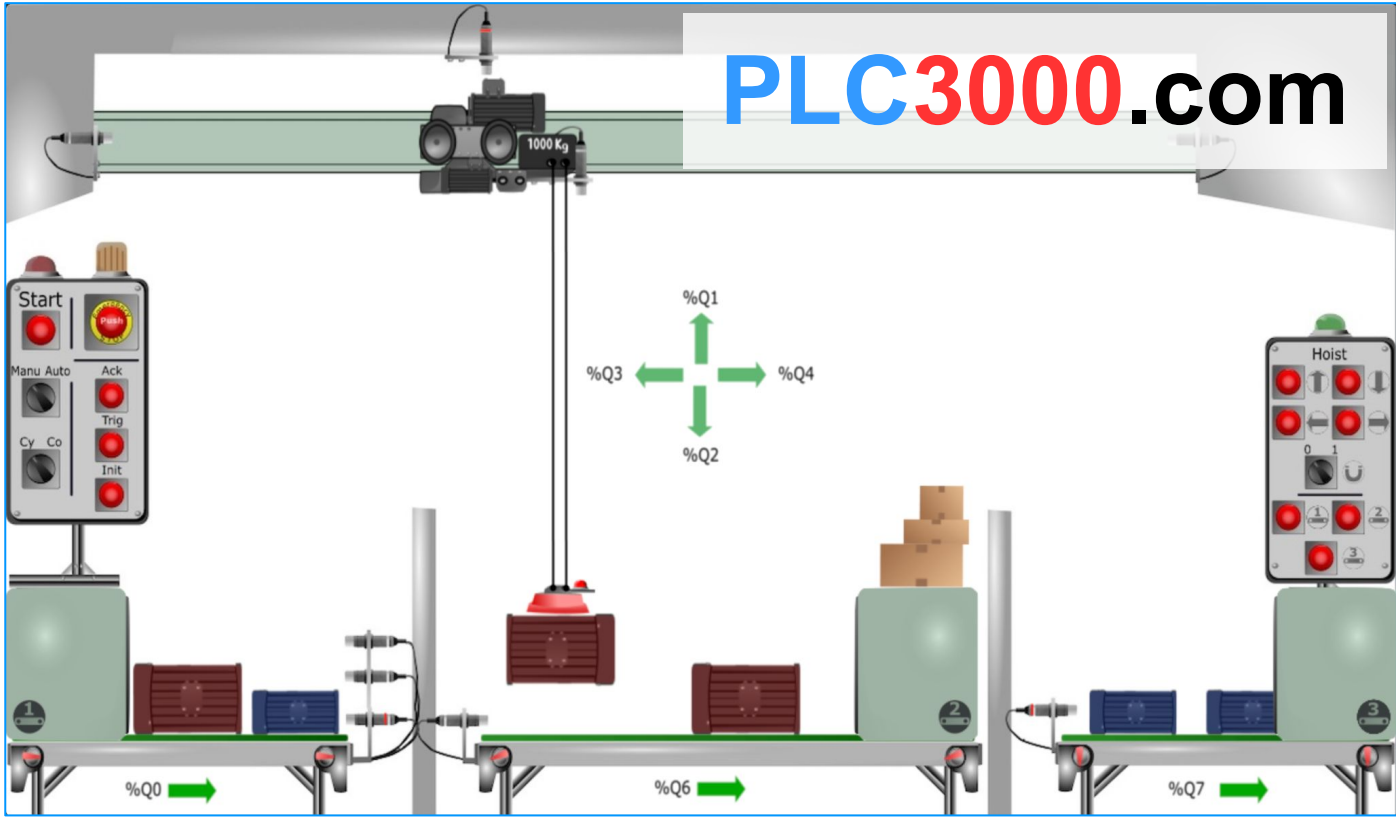


Mobile Apps with PharJS

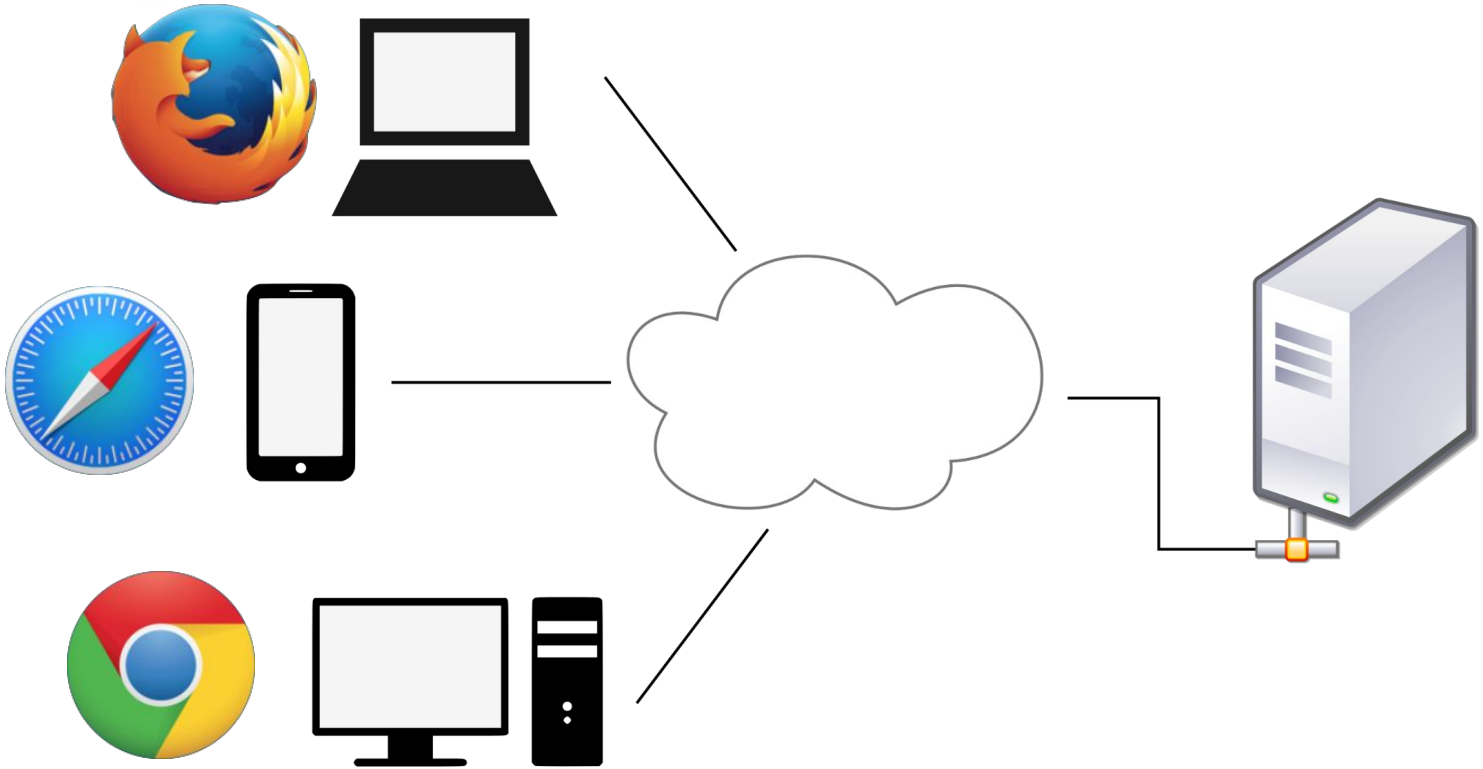


Web Apps with PharJS

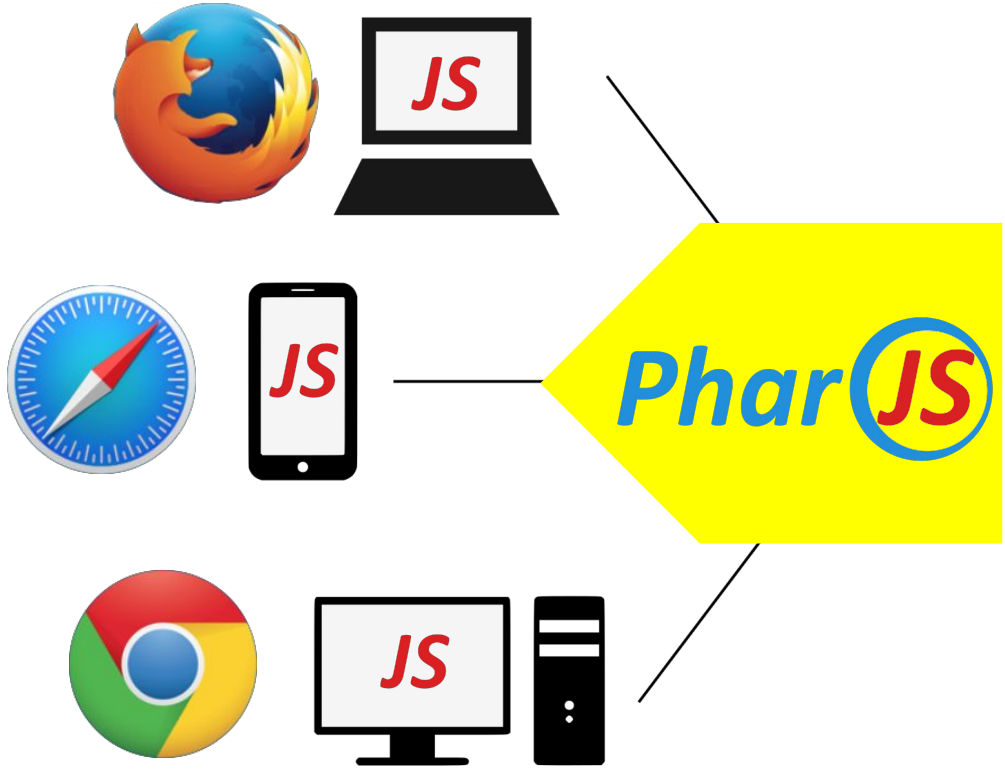


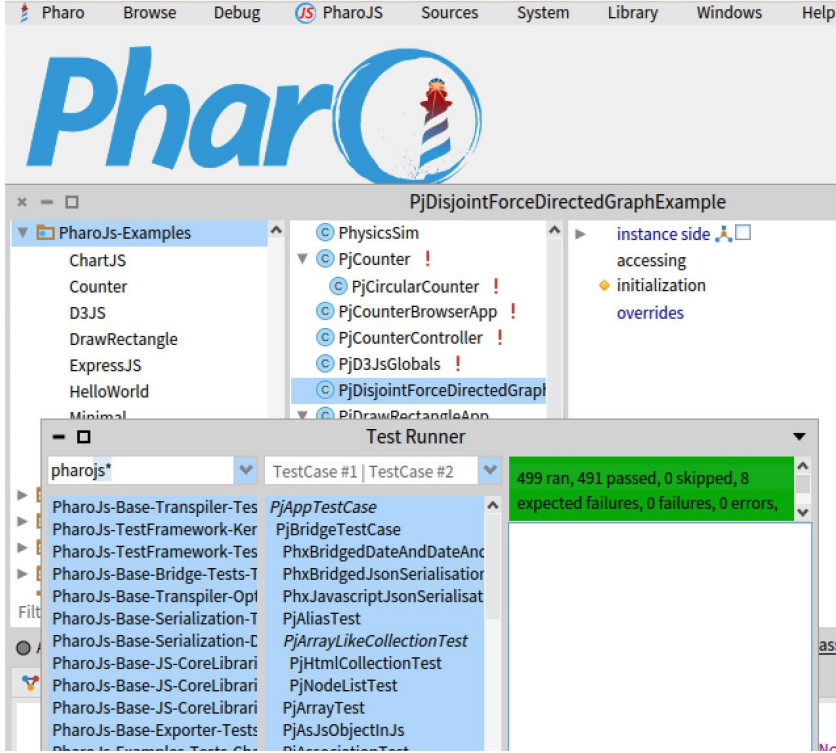


PLC3000.com Architecture



PLC3000.com Clients

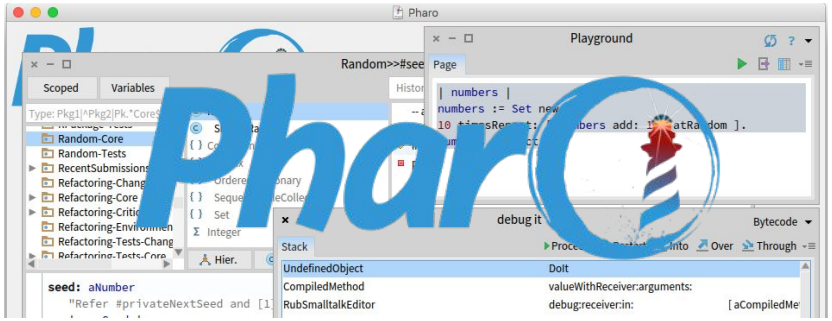


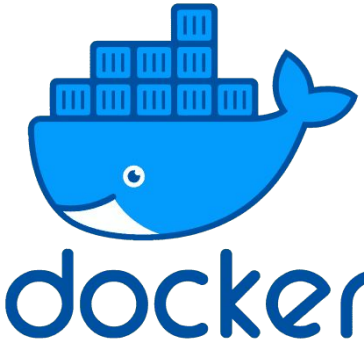


+

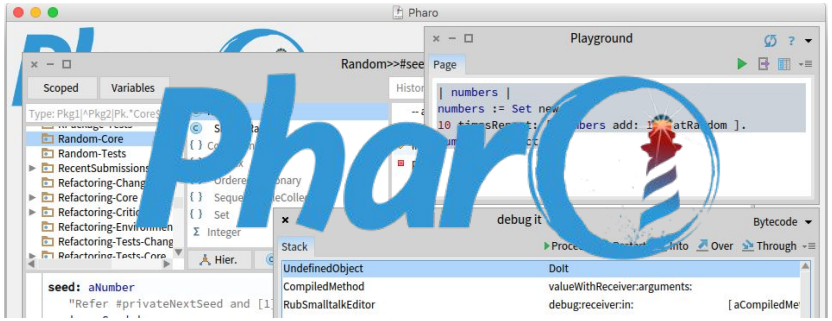
matter.js

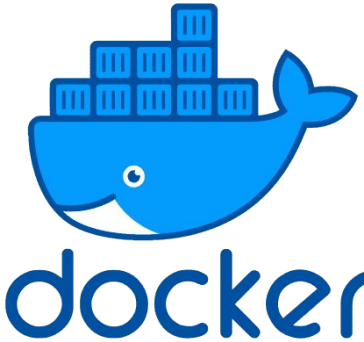
PLC3000.com Server





PLC3000.com Server

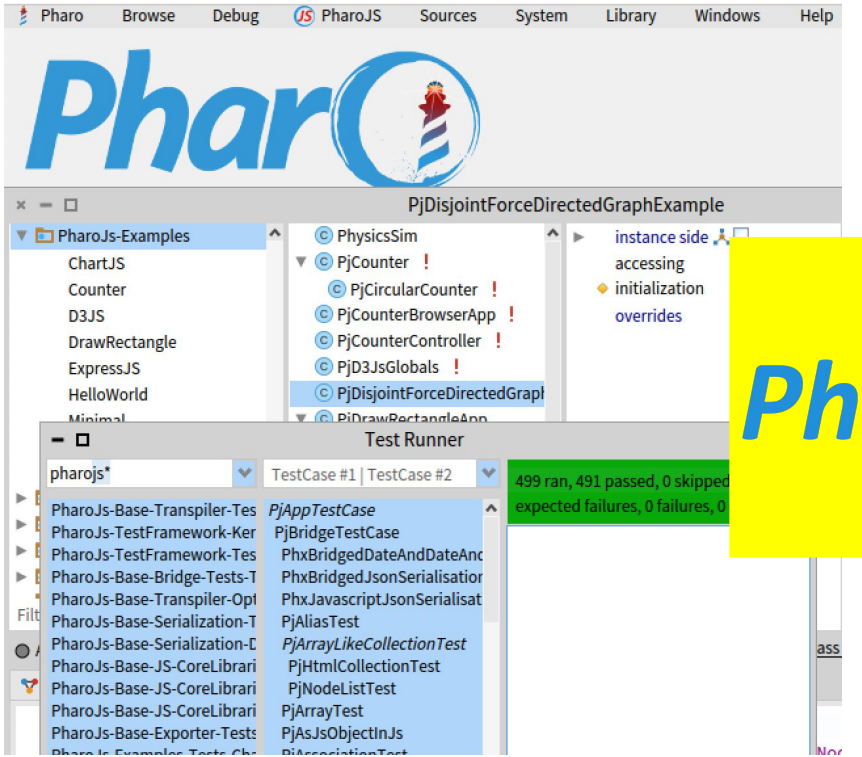




Thank you
Buenos Aires
Smalltalk

Thank you
Gabriel Cotteli

JS Server Generation?



PharJS

ExpressJS

node
JS

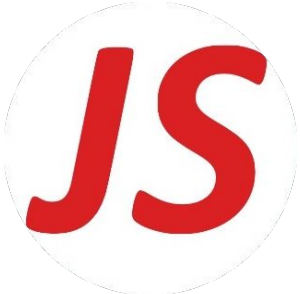
Example: Minimal Web Server

ExpressJS

- GET /data = read a string from memory
- POST /data = save a string to memory

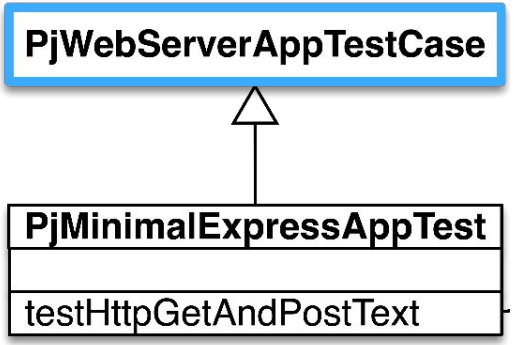
Pharo 100%

1. Write Tests
2. Pass the tests
3. Export to JS

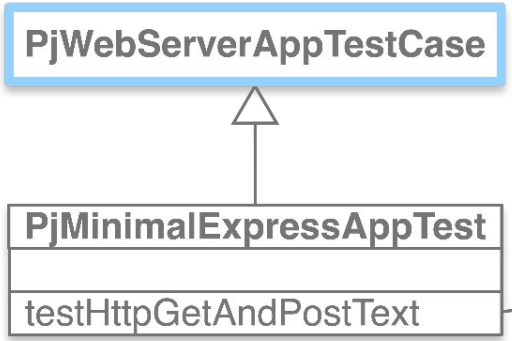


100% Javascript

Testing Minimal Web Server with PharJS

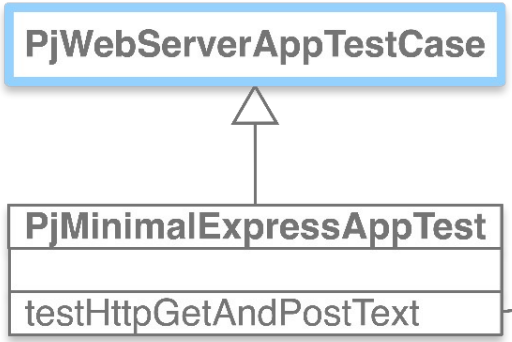


Testing Minimal Web Server with PharJS




```
testHttpGetAndPostText
    | response |
    self assert: (self get: '/data') contents isNil.
    response := self post: '/data' text: 'PharoJS'.
    self assert: response code equals: 200.
    self assert: (self get: '/data') contents equals: 'PharoJS'
```

Testing Minimal Web Server with PharJS

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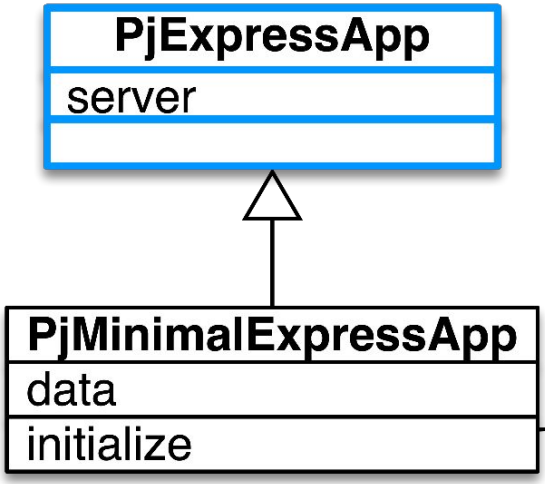
```

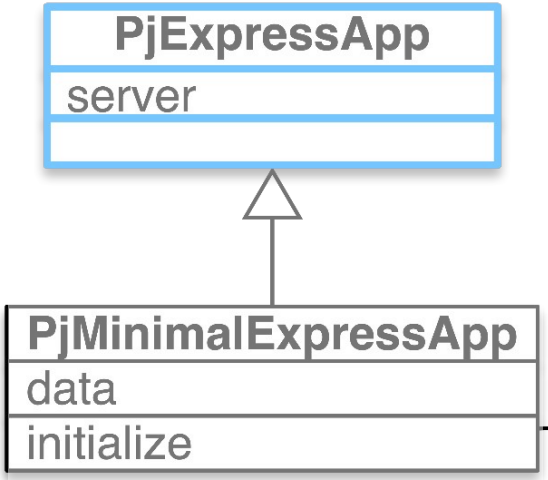
Relies on **Zinc HTTP**

Thank you Sven

Minimal Web Server with PharJS

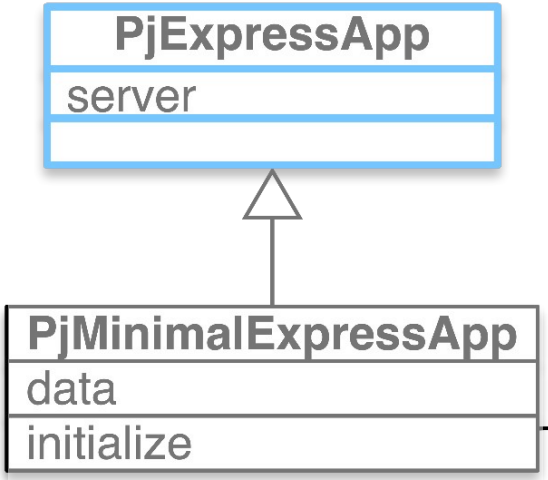


Minimal Web Server with PharJS




```
initialize
    super initialize.
    server
        get: '/data'
        handler: [ :req :res | res send: data].
    server
        post: '/data'
        handler: [ :req :res |
                    data := req body.
                    res send: data ].
```

Minimal Web Server with PharJS




```
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    super initialize.
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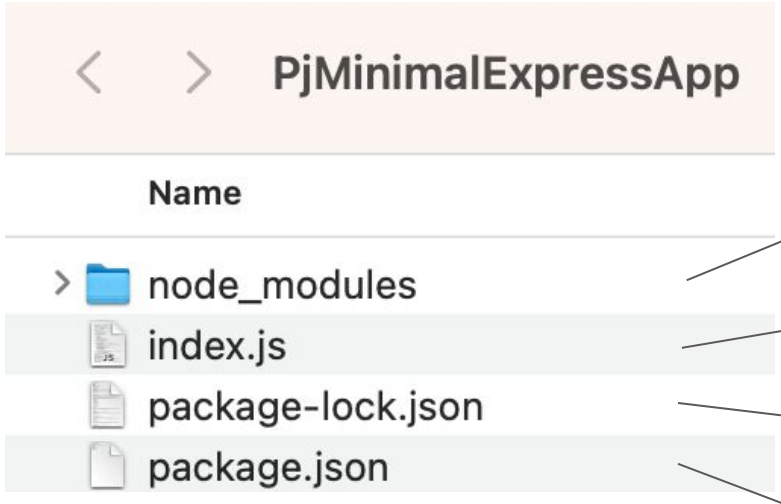
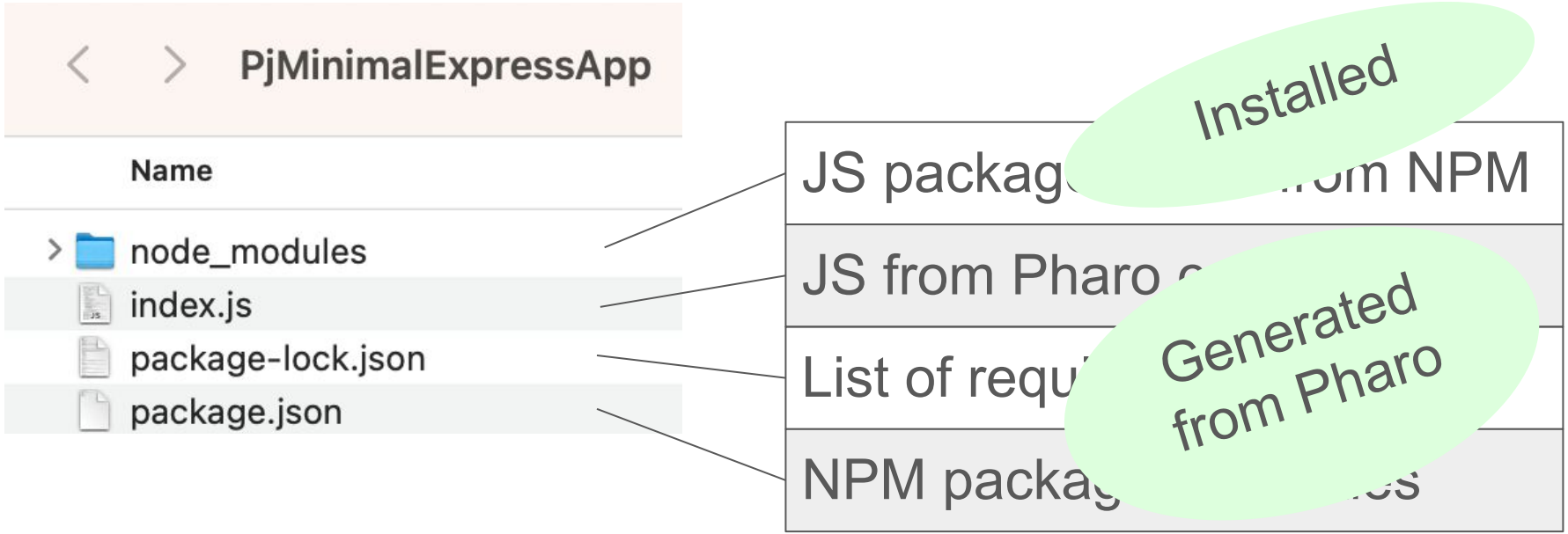
    server
        post: '/data'
        handler: [ :req :res |
                    data := req body.
                    res send: data ].
```

All JS Code is Managed by PharJS



- JS packages code from NPM
- JS from Pharo code
- List of required JS packages
- NPM package properties

All JS Code is Managed by PharJS

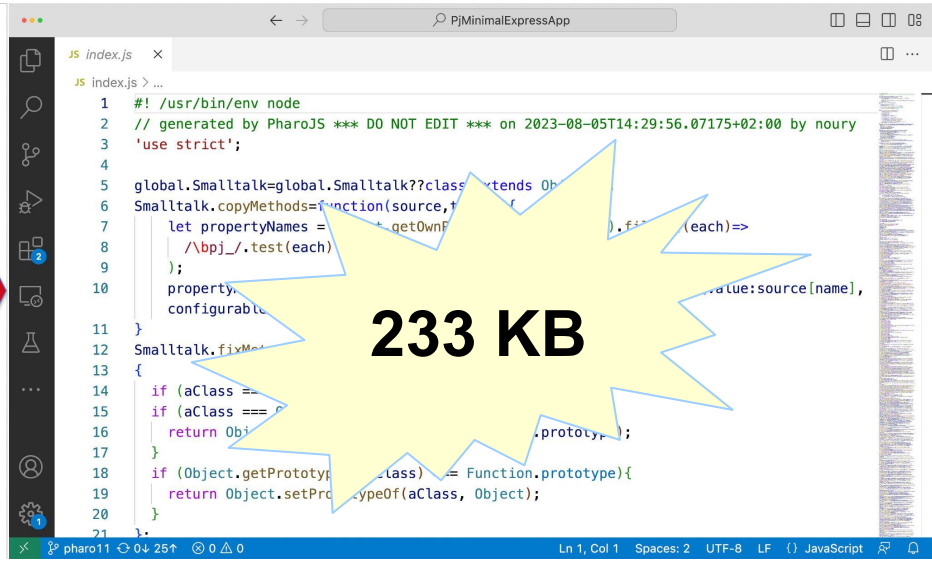


Server JS Code Generated with PharoJS

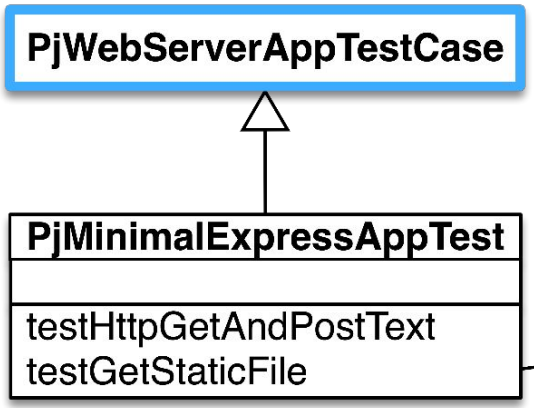
Pharo 100%

Development → Production

JS 100% Javascript

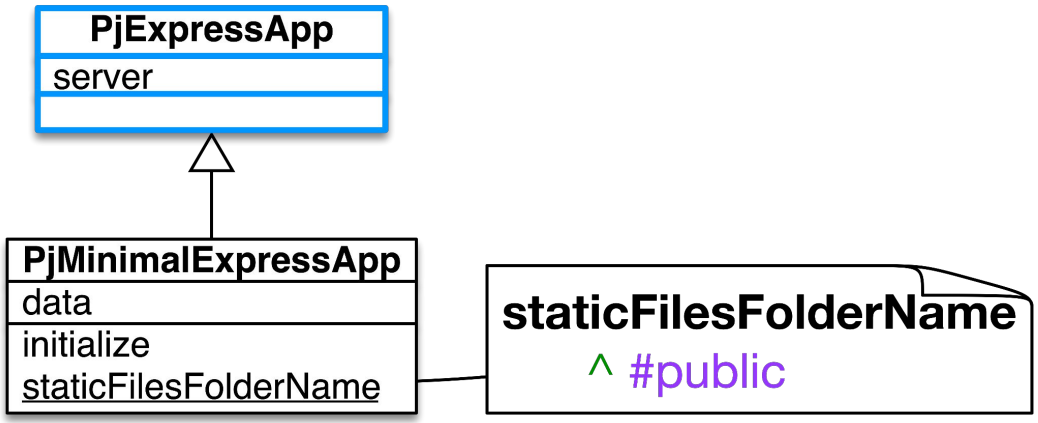


Testing Static File Serving with PharJS

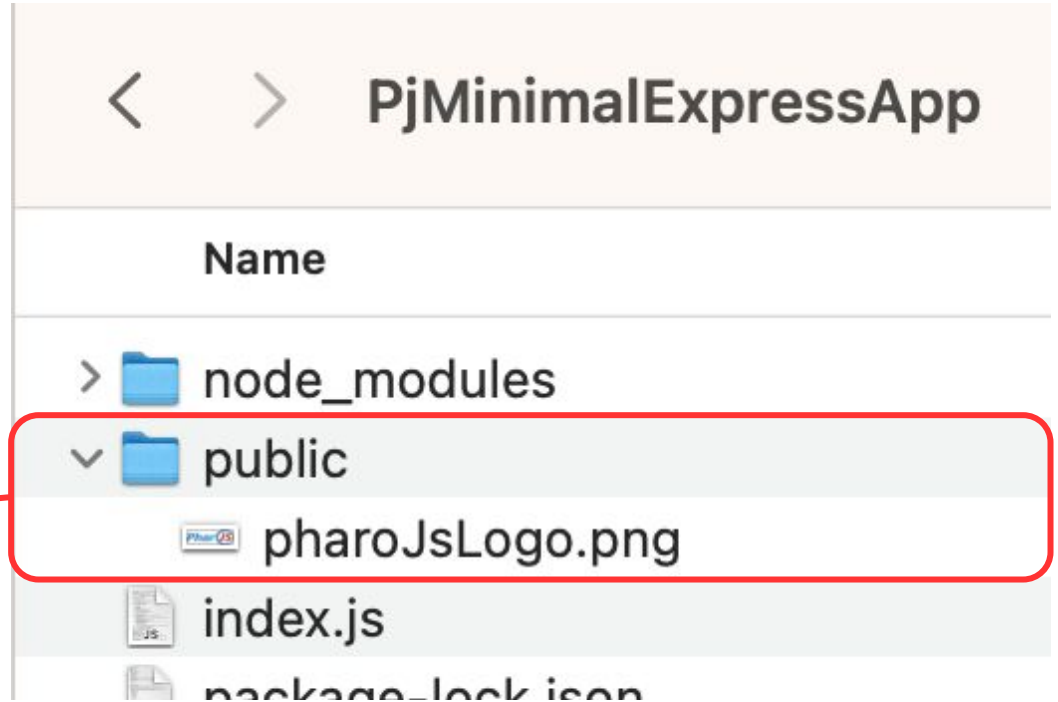



```
testGetStaticFile
    | response |
    response := self get: '/pharoJsLogo.png'.
    self assert: response code equals: 200.
    self assert: response contents size equals: 31251
```

Serving Static Files with PharJS



Serving Static Files with PharoJS

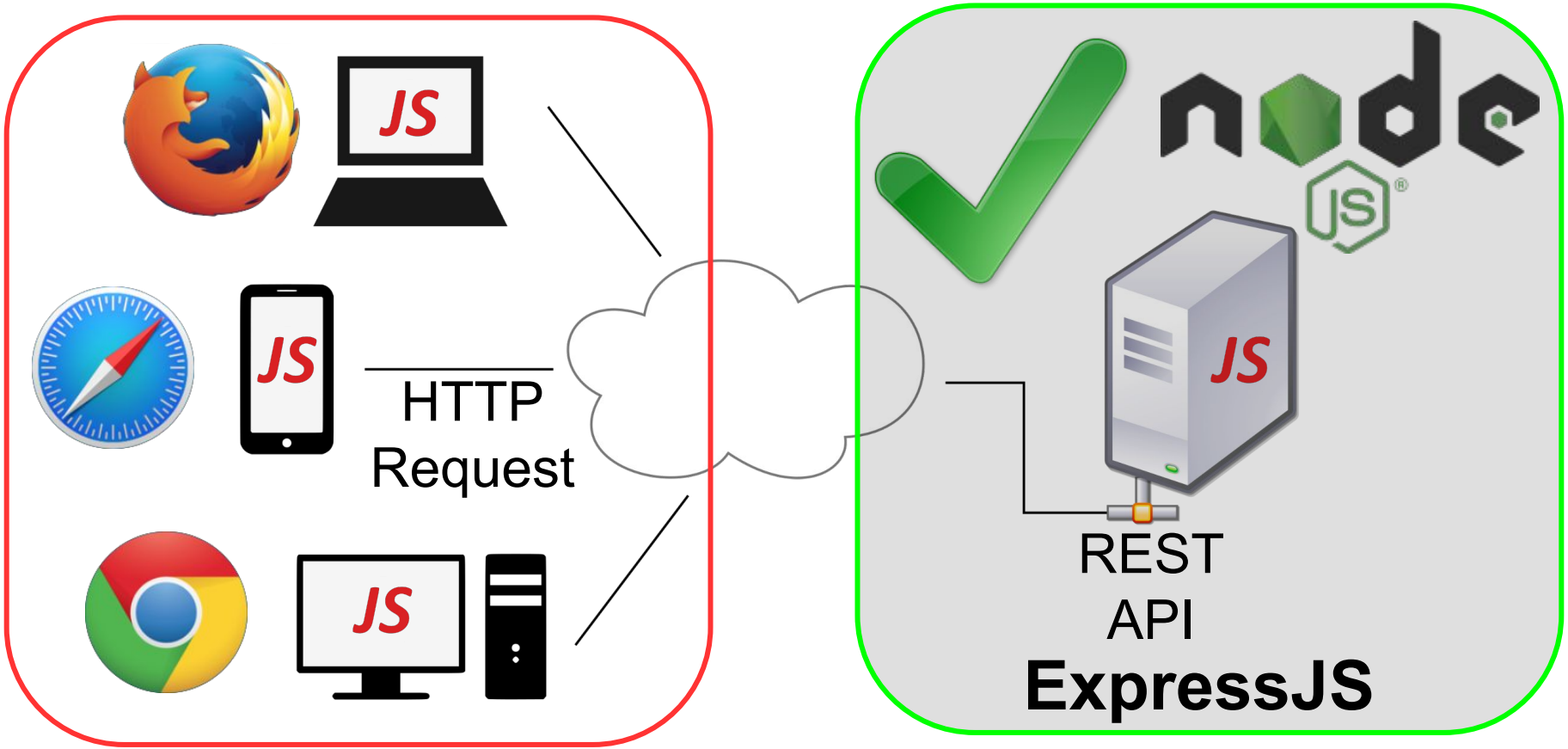


PjExpressApp
server

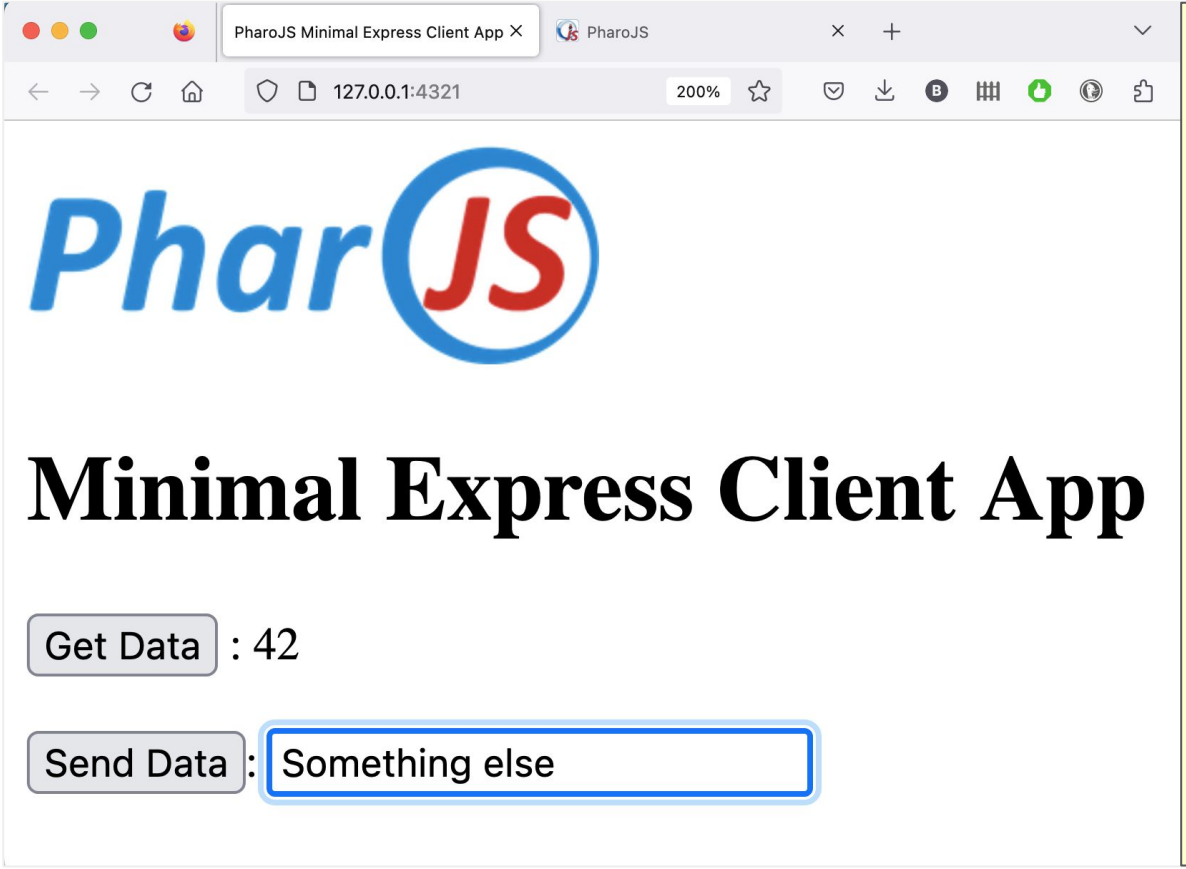
PjMinimalExpressApp
data
initialize
staticFilesFolderName

staticFilesFolderName
^ #public

Let's Address the Client



Web Client HTML



index.html

```
<img…>
<h1>...</h1>
<button…>...</button>
<span…>...</span>
<button…>...</button>
<input …>
<script …></script>
```

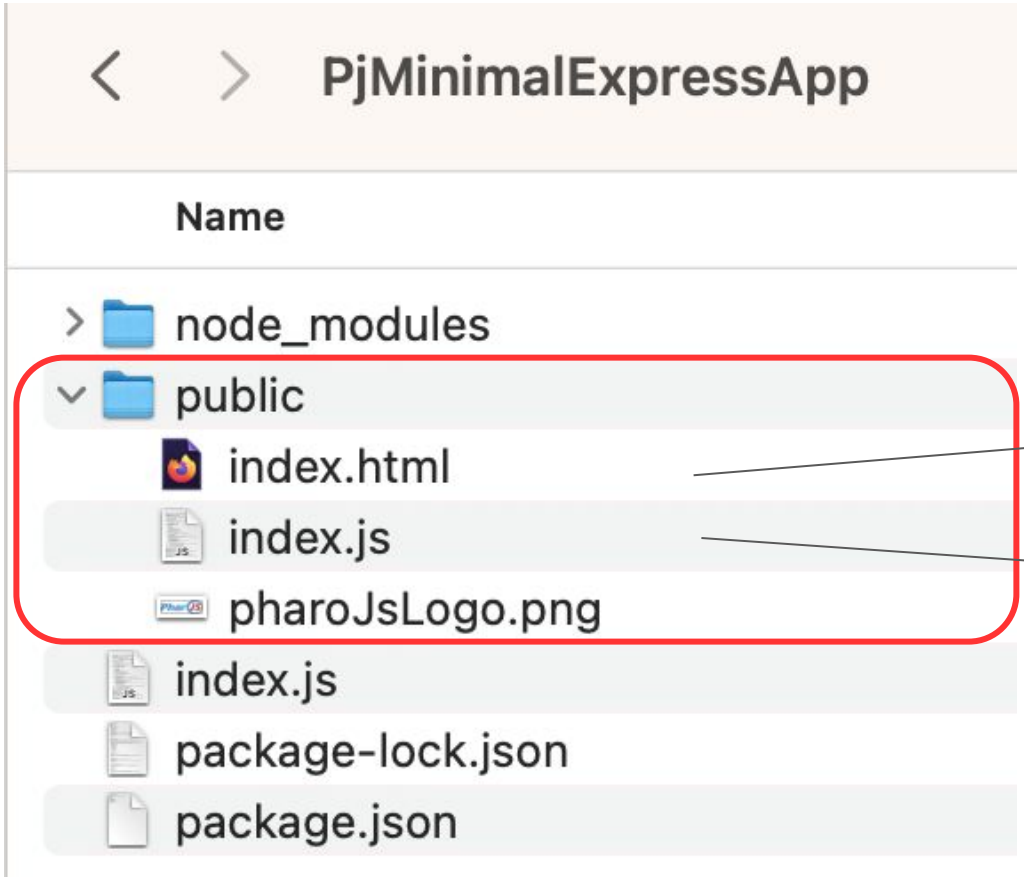
Html Loads JS Generated by PharJS

```
<html>
<body>
    <img src="pharoJsLogo.png">
    <h1>Minimal Express Client App</h1>
    <button id="getDataButton">Get Data</button> :
    <span id="dataDisplaySpan"></span>
    <br><br>
    <button id="postDataButton">Send Data</button> :
    <input type="text" id="dataInput">
    <script src="index.js"></script>
</body>
</html>
```

Html IDs for Integration with PharJS

```
<html>
<body>
    <img src="pharoJsLogo.png">
    <h1>Minimal Express Client App</h1>
    <button id="getDataButton">Get Data</button> :
    <span id="dataDisplaySpan"></span>
    <br><br>
    <button id="postDataButton">Send Data</button> :
    <input type="text" id="dataInput">
    <script src="index.js"></script>
</body>
</html>
```

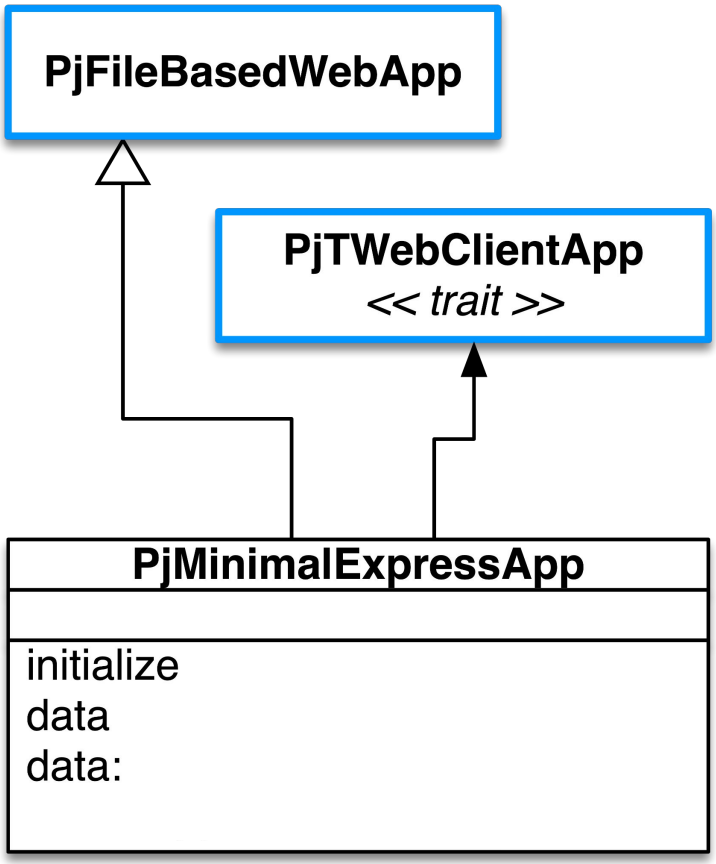
Web Client HTML & JS Served Statically



Client HTML file

Client JS from Pharo code

Web Client Pharo Code with PharJS




```
initialize
    super initialize.
    self
        onClick: #getDataButton
        do: [ self get: '/data' withTextDo: [ :text | self data: text ] ].
    self
        onClick: #postDataButton
        do: [ self post: '/data' text: self data ]
```

```
data
    ^ (self elementAt: #dataInput) value
```

```
data: aString
    (self elementAt: #dataDisplaySpan) textContent: aString
```

PharJS Talks to Server

```
initialize
    super initialize.
    self
        onClick: #getDataButton
        do: [ self get: '/data' withTextDo: [ :text | self data: text ] ].
    self
        onClick: #postDataButton
        do: [ self post: '/data' text: self data ]
```

```
data
    ^ (self elementAt: #dataInput) value
```

```
data: aString
    (self elementAt: #dataDisplaySpan) textContent: aString
```

PharJS Links DOM Objects using HTML IDs

```
initialize
    super initialize.
    self
        onClick: #getDataButton
        do: [ self get: '/data' withTextDo: [ :text | self data: text ] ].
    self
        onClick: #postDataButton
        do: [ self post: '/data' text: self data ]
```

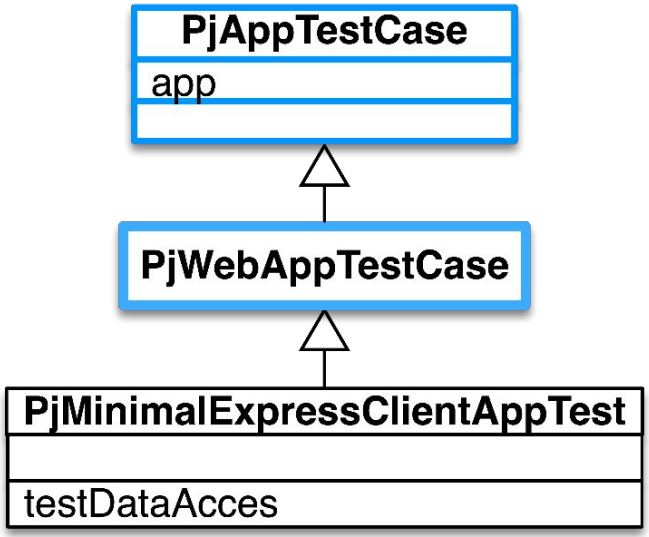
```
data
    ^ (self elementAt: #dataInput) value
```

```
data: aString
    (self elementAt: #dataDisplaySpan) textContent: aString
```

Web Client Test with PharoJS

Instance of
PjMinimalExpressClientApp

JS Object
in the Web Browser



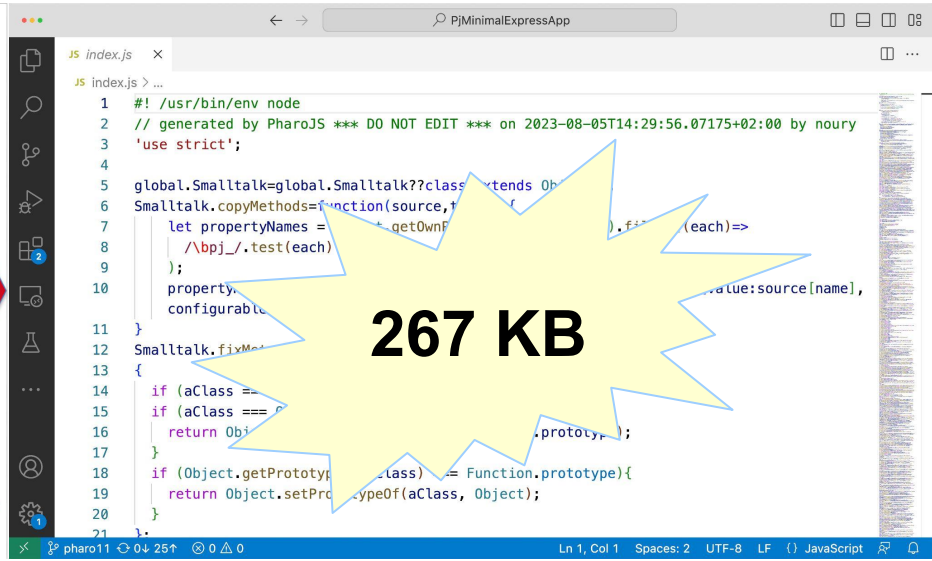

```
testDataAcces
    | display |
    display := app elementAt: #dataDisplaySpan.
    self assert: display textContent isEmpty.
    (app elementAt: #dataInput) value: '42'.
    self clickElementById: #postDataButton.
    self clickElementById: #getDataButton.
    self waitUntil: [ display textContent = '42' ]
```

Client JS Code Generated with PharJS

Pharo 100%

Development → Production

JS 100% Javascript



Summary

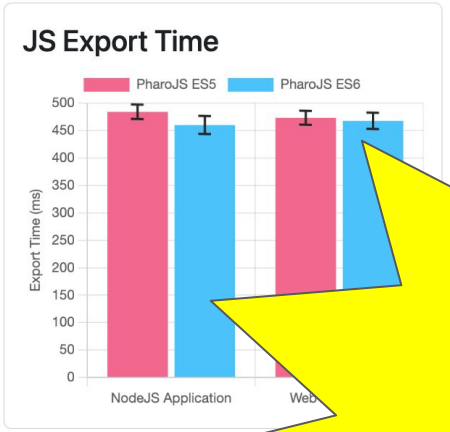
PharJS for both Server & Client Sides

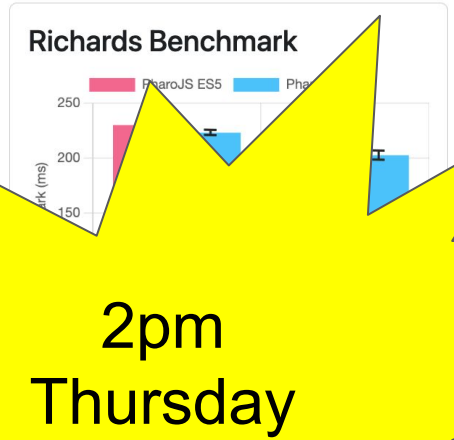
- Reuse JS Libraries & Run-Time
- Write 100% Pharo Code
- Test + Debug in Pharo with JS Objects
- Support Different Architectures & Workflows

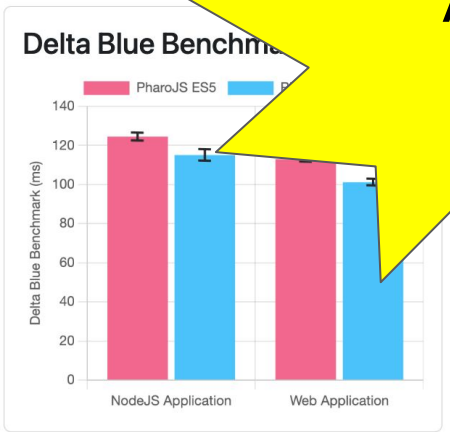
Other News of PharJS

- Current Stable = Pharo 11
- Continuous Integration
  - SmalltalkCI
  - GitHub Actions
- Improved Performance

IWST Talk on Performance of PharJS







2pm
Thursday
August 31st

Papa Parse

CSV Parser JS Lib

Chart.js

Charting JS Lib

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GitHub

Thanks to all the contributors!