INP TOULOUSE

ÈNIT ÉCOLE NATIONALE D'INGÉNIEURS DE TARBES

esug EUROPEAN SMALLTALK USER GROUP

Teaching ICT Trends with Pharo

AN EXPERIENCE FEEDBACK

Teaching ICT trends with Pharo

Cédrik Béler (cedreek#8178)

Assistant professor

- Researcher at LGP (Industrial Engineering)
  - Knowledge management, Information Systems
  - Prognostics Health Management **(Maintenance of Industrial Systems) using IoT**

- ENIT (National Engineering School of Tarbes)
  - Teaching computer science introductions mainly
    - Algorithmic and programming basics in Python
    - Relational Database and SQL Introduction
    - **ICT Trends** (was web technologies)
    - => academic member of Pharo consortium (2018)

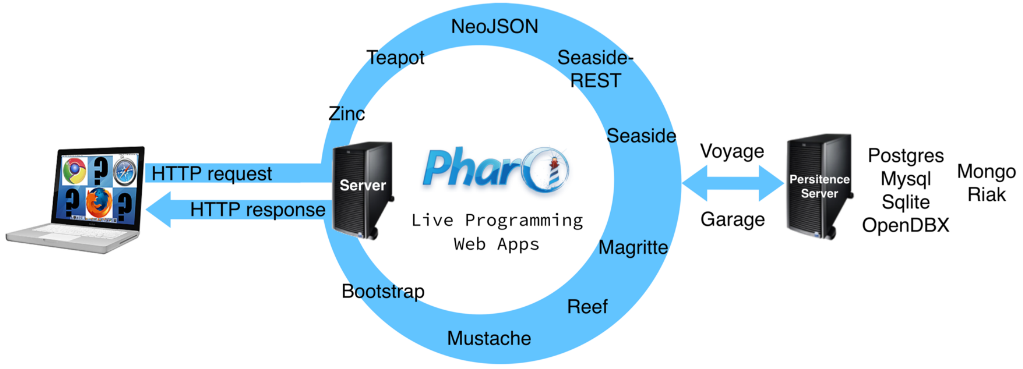
LGP
LABORATOIRE
GÉNIE DE PRODUCTION

ENIT
ÉCOLE NATIONALE D'INGÉNIEURS DE TARBES

Exploring ICT with Pharo

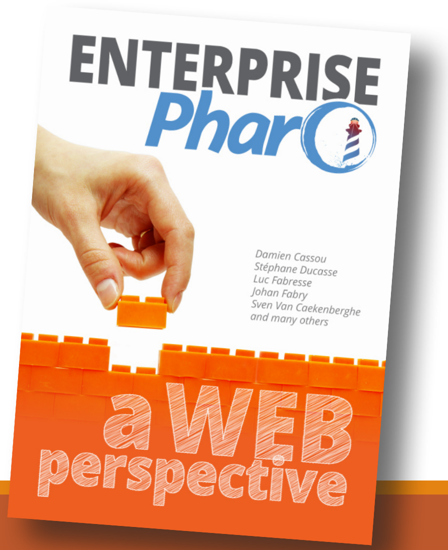
ICTT

- A general lecture on ICT trends
- ENIT students are not computer scientists !
  - Main objective: make them understand ICT are important for them too !
  - Practical approach



Organization

- 12 hours lecture (8h done by myself)
  - Presentation of concepts and trends
  - Network and Web technologies, IoT, Generative Design, AI (deeplearning), Semantic Web, …
- 18 hours of tutorial lectures
  - 6 hours to present Pharo !!! => quite a challenge ^_^
    - Theory, syntax, specificities
    - Basic network tutorial like **client/server**
  - 12 hours of "project” including a defense in English evaluated by their peers



“customized” Pharo 6.1 image

Code samples

- to learn syntax
- to train on ICT concepts
  - client/server (HTTP(S) mainly but more available)
    - URL creation and manipulation
    - Client request
    - (web) Server interaction
      - request processing
    - API calls
    - Webscrapping
  - Cryptography
  - NeuralNetwork
  - Visualization
  - …

Ready to support student “projects”

- Official 6.1 distribution + librairies
  - XMLSupport, HTML parser, Xpath,
  - CSV and JSON reader/writers,
  - Cryptography packages
  - Networks extra
  - Visualization (Roassal)
- Image code persistance
  - naive “DB” (save in the image)
  - serialization externally
- FTP repository to publish code creation

ONE OPEN SYSTEM (FUN AND EASILY USABLE)

*At least for me ^_^*

Feedback on using Pharo (1st try)

Lots of objectives !

Nearly all reached

Feedback on using Pharo (1st time)

CONS

- Aliens all the way down !
  - Syntax, image concept, code navigation and environment…
  - … even object orientation !
  - Difficult to go from scripting to programming
  - Class side vs. Instance side…

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- Impossible to use on school virtualized env.
- 99% of them use PC on windows !
  - The launcher was not working
  - I had prepared the image for OSX (oups)

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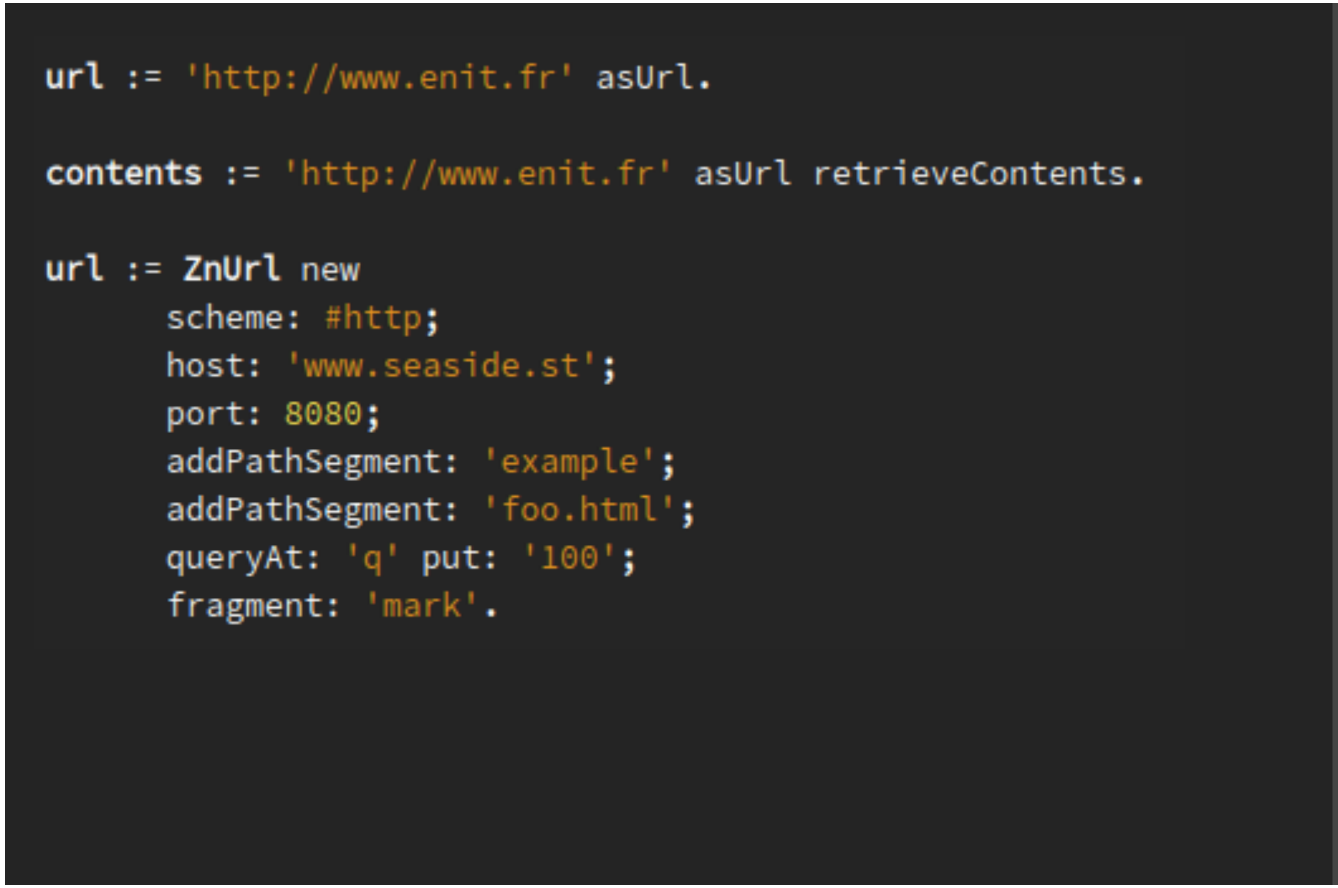
PROS

- Immersive and fun
- Tangible ICT technologies
- Some wow effects
- Lots of difficulties are not Pharo related anyway !
- FAR EASIER FOR ME

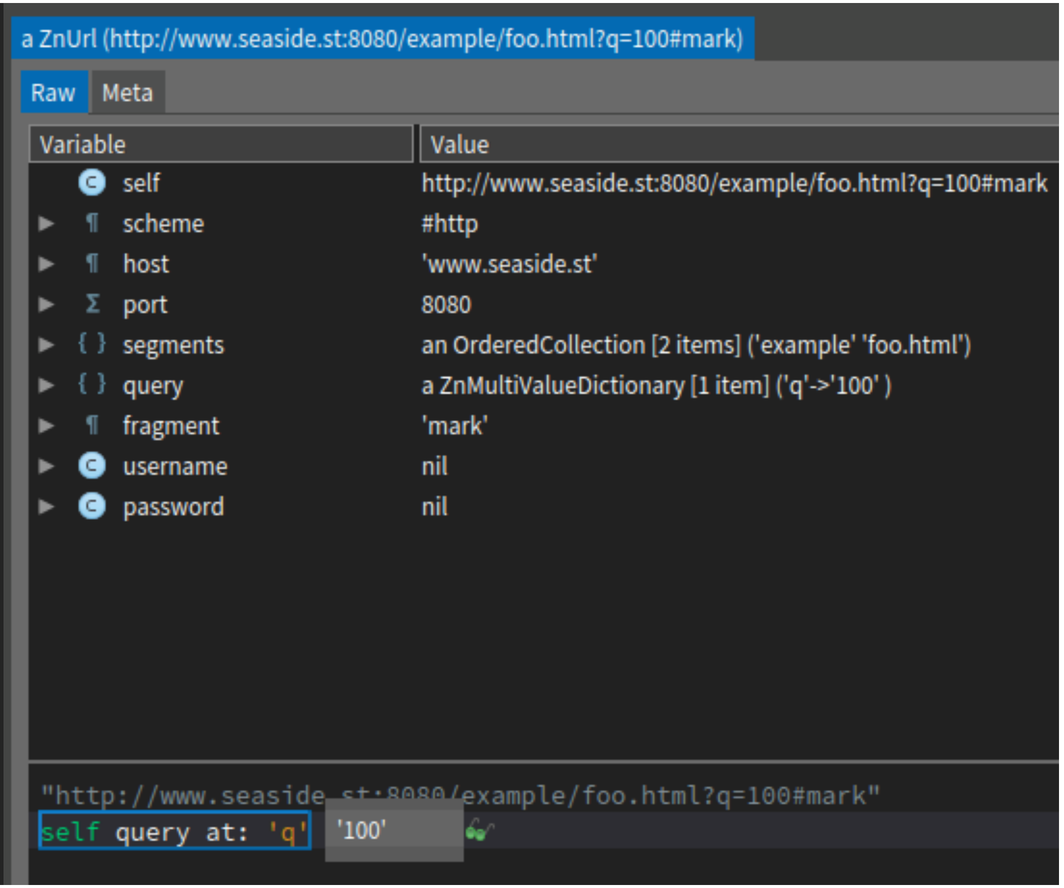
Code snippets

INSPECT IT / EXPLORE IT / DEBUG IT

URL



```
url := 'http://www.enit.fr' asUrl.

contents := 'http://www.enit.fr' asUrl retrieveContents.

url := ZnUrl new
      scheme: #http;
      host: 'www.seaside.st';
      port: 8080;
      addPathSegment: 'example';
      addPathSegment: 'foo.html';
      queryAt: 'q' put: '100';
      fragment: 'mark'.
```

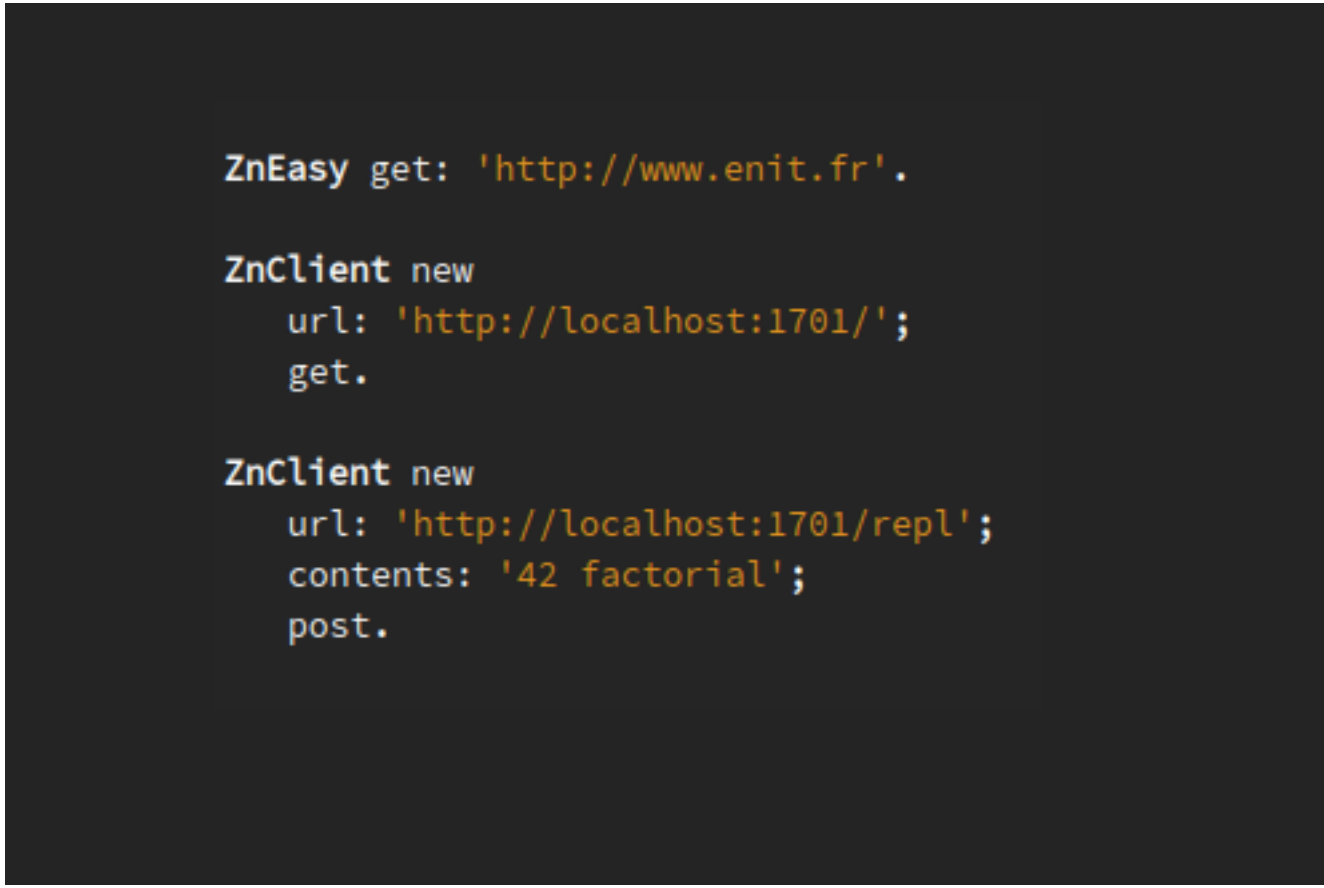


a ZnUrl (http://www.seaside.st:8080/example/foo.html?q=100#mark)

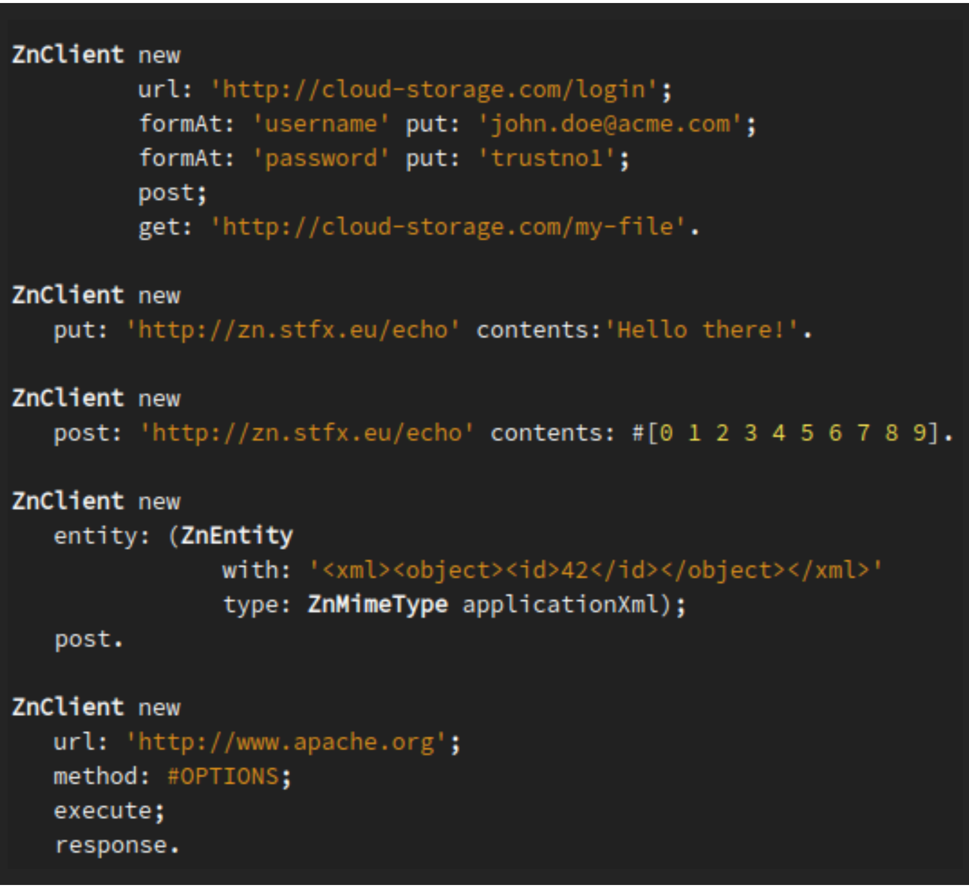
Variable	Value
self	http://www.seaside.st:8080/example/foo.html?q=100#mark
scheme	#http
host	'www.seaside.st'
port	8080
segments	an OrderedCollection [2 items] ('example' 'foo.html')
query	a ZnMultiValueDictionary [1 item] ('q'->'100')
fragment	'mark'
username	nil
password	nil

```
"http://www.seaside.st:8080/example/foo.html?q=100#mark"
self query at: 'q'    '100'
```

(Web) Client

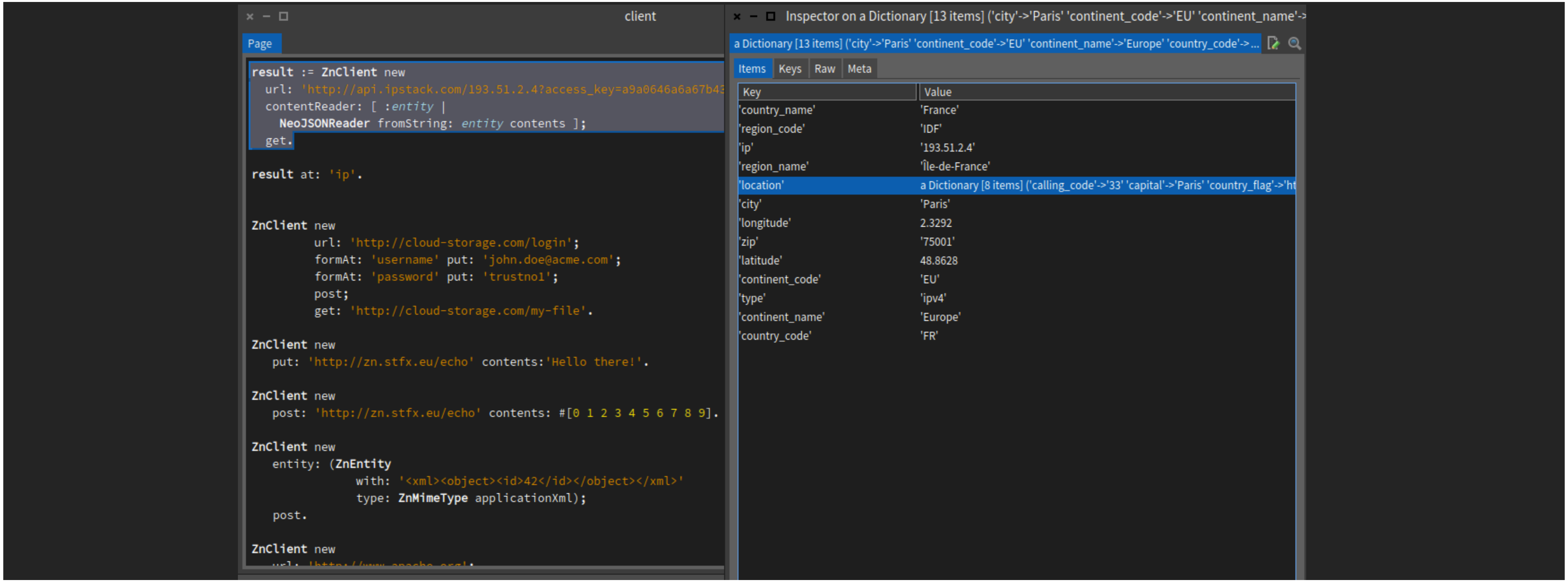


```
ZnEasy get: 'http://www.enit.fr'.

ZnClient new
   url: 'http://localhost:1701/';
   get.

ZnClient new
   url: 'http://localhost:1701/repl';
   contents: '42 factorial';
   post.
```



```
ZnClient new
         url: 'http://cloud-storage.com/login';
         formAt: 'username' put: 'john.doe@acme.com';
         formAt: 'password' put: 'trustno1';
         post;
         get: 'http://cloud-storage.com/my-file'.

ZnClient new
   put: 'http://zn.stfx.eu/echo' contents:'Hello there!'.

ZnClient new
   post: 'http://zn.stfx.eu/echo' contents: #[0 1 2 3 4 5 6 7 8 9].

ZnClient new
   entity: (ZnEntity
               with: '<xml><object><id>42</id></object></xml>'
               type: ZnMimeType applicationXml);
   post.

ZnClient new
   url: 'http://www.apache.org';
   method: #OPTIONS;
   execute;
   response.
```

(Web) Client – API CALL



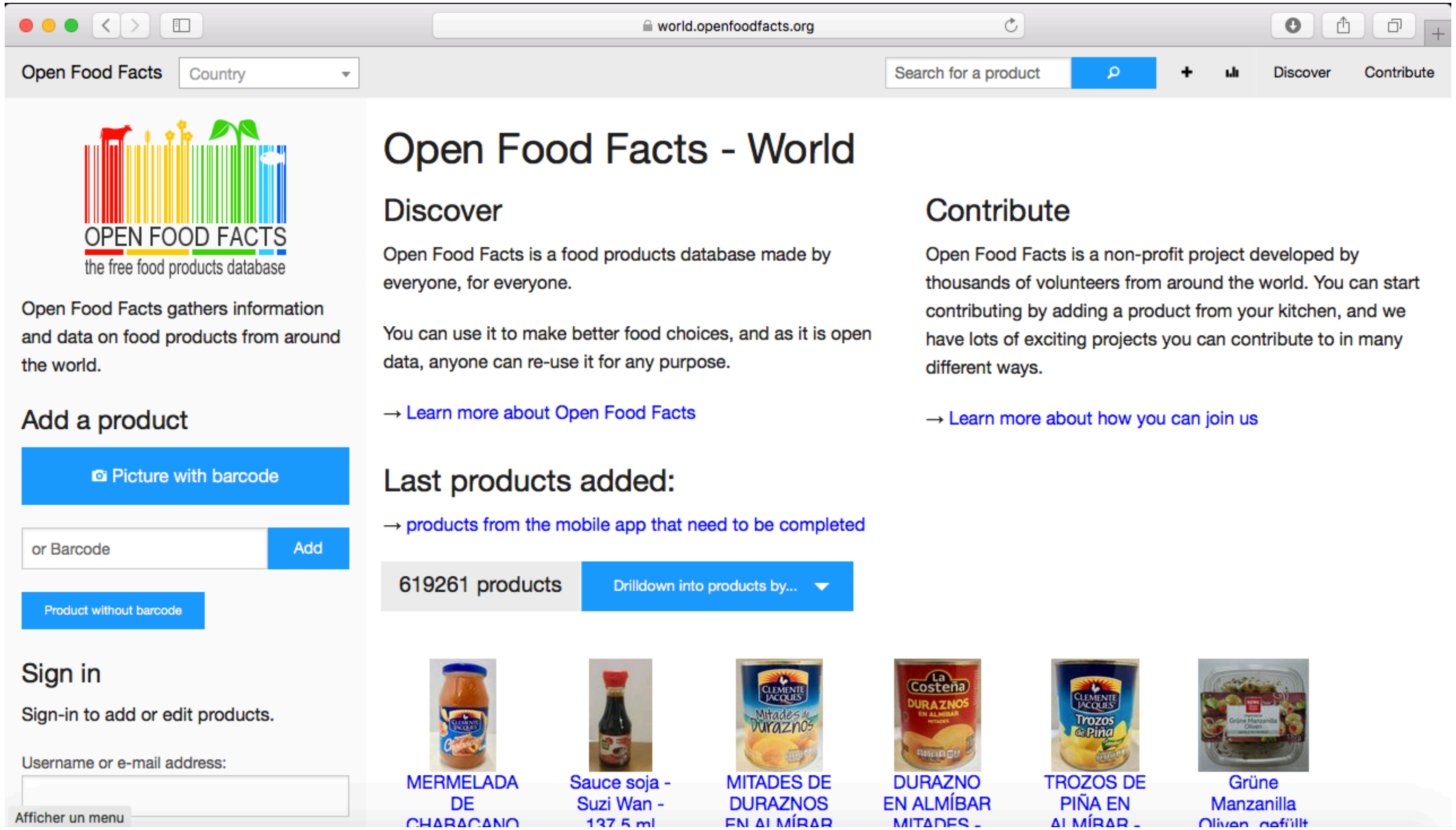
```
result := ZnClient new
  url: 'http://api.ipstack.com/193.51.2.4?access_key=a9a0646a6a67b43
  contentReader: [ :entity |
    NeoJSONReader fromString: entity contents ];
  get.

result at: 'ip'.


ZnClient new
         url: 'http://cloud-storage.com/login';
         formAt: 'username' put: 'john.doe@acme.com';
         formAt: 'password' put: 'trustno1';
         post;
         get: 'http://cloud-storage.com/my-file'.

ZnClient new
   put: 'http://zn.stfx.eu/echo' contents:'Hello there!'.

ZnClient new
   post: 'http://zn.stfx.eu/echo' contents: #[0 1 2 3 4 5 6 7 8 9].

ZnClient new
   entity: (ZnEntity
               with: '<xml><object><id>42</id></object></xml>'
               type: ZnMimeType applicationXml);
   post.

ZnClient new
   url: 'http://www.apache.org';
```

Inspector on a Dictionary [13 items] ('city'->'Paris' 'continent_code'->'EU' 'continent_name'->

a Dictionary [13 items] ('city'->'Paris' 'continent_code'->'EU' 'continent_name'->'Europe' 'country_code'->...

Key	Value
'country_name'	'France'
'region_code'	'IDF'
'ip'	'193.51.2.4'
'region_name'	'Île-de-France'
'location'	a Dictionary [8 items] ('calling_code'->'33' 'capital'->'Paris' 'country_flag'->'ht
'city'	'Paris'
'longitude'	2.3292
'zip'	'75001'
'latitude'	48.8628
'continent_code'	'EU'
'type'	'ipv4'
'continent_name'	'Europe'
'country_code'	'FR'

API OpenFoodFact



Open Food Facts gathers information and data on food products from around the world.

Add a product

Picture with barcode

or Barcode | Add

Product without barcode

Sign in

Sign-in to add or edit products.

Username or e-mail address:

Afficher un menu

Open Food Facts - World

Discover

Open Food Facts is a food products database made by everyone, for everyone.

You can use it to make better food choices, and as it is open data, anyone can re-use it for any purpose.

→ Learn more about Open Food Facts

Contribute

Open Food Facts is a non-profit project developed by thousands of volunteers from around the world. You can start contributing by adding a product from your kitchen, and we have lots of exciting projects you can contribute to in many different ways.

→ Learn more about how you can join us

Last products added:

→ products from the mobile app that need to be completed

619261 products | Drilldown into products by...

MERMELADA DE CHABACANO

Sauce soja - Suzi Wan - 137.5 ml

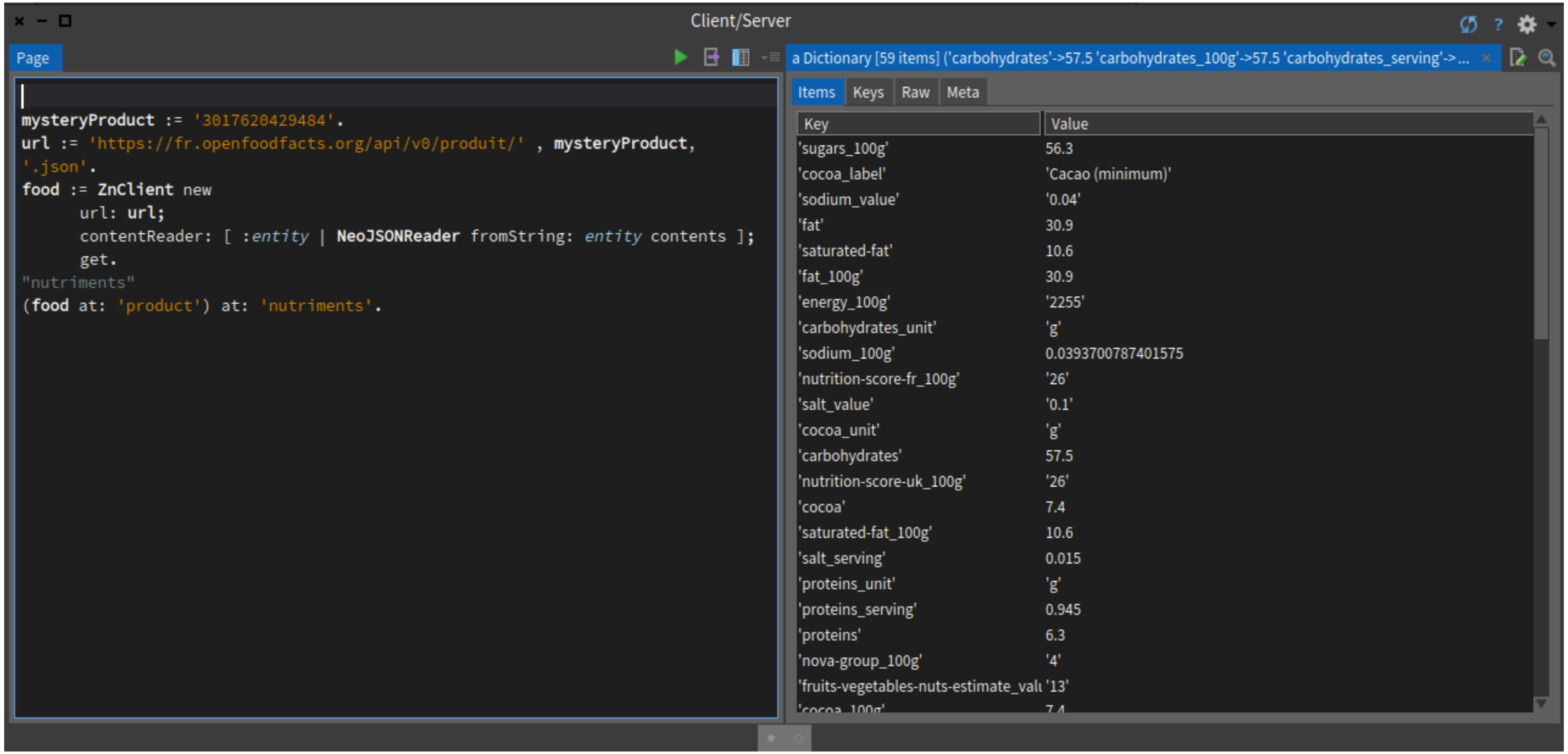
MITADES DE DURAZNOS EN ALMÍBAR

DURAZNO EN ALMÍBAR MITADES -

TROZOS DE PIÑA EN ALMÍBAR -

Grüne Manzanilla Oliven, gefüllt

(Web) Client – API CALL

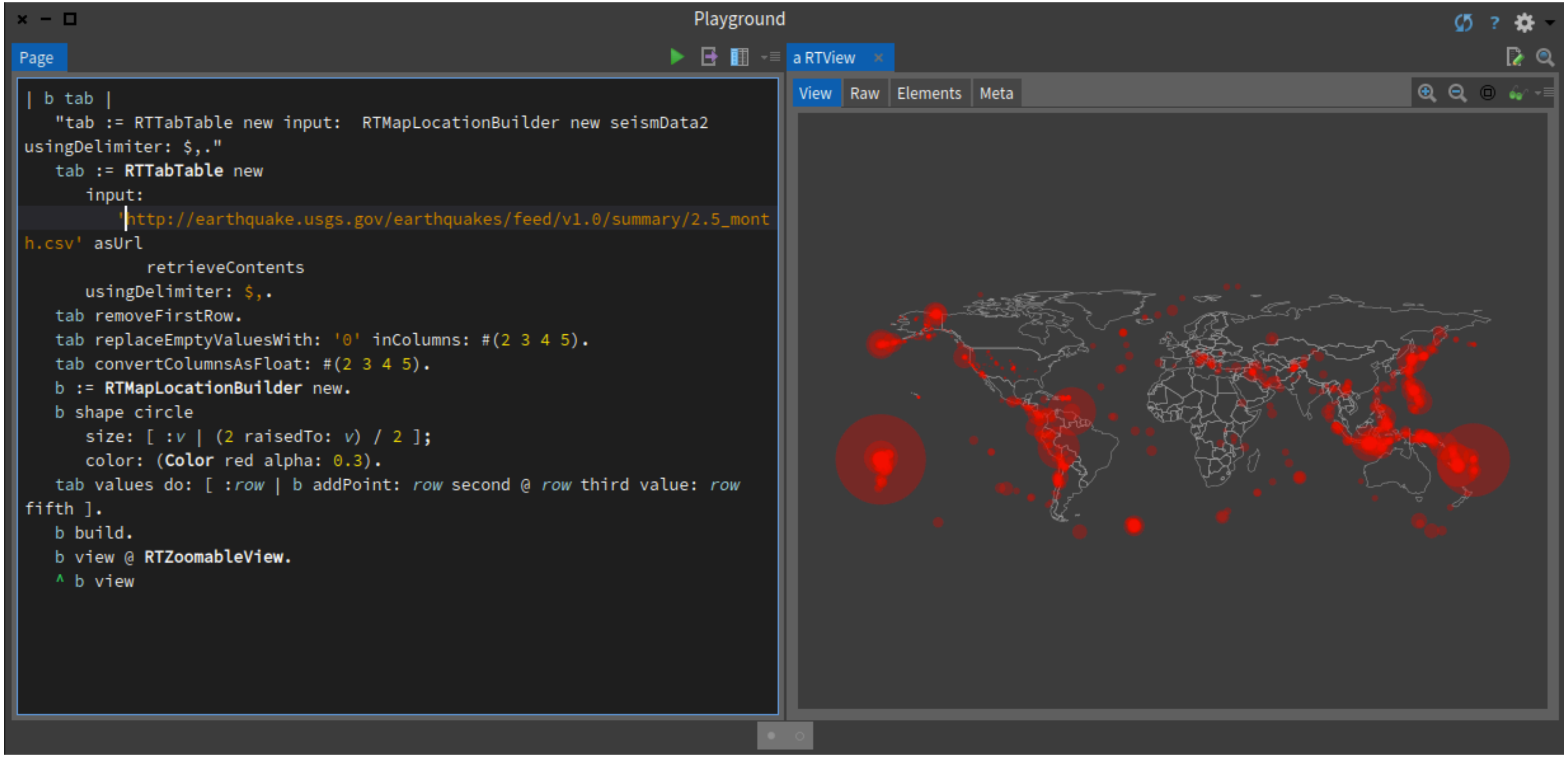


```
mysteryProduct := '3017620429484'.
url := 'https://fr.openfoodfacts.org/api/v0/produit/' , mysteryProduct,
'.json'.
food := ZnClient new
      url: url;
      contentReader: [ :entity | NeoJSONReader fromString: entity contents ];
      get.
"nutriments"
(food at: 'product') at: 'nutriments'.
```

a Dictionary [59 items] ('carbohydrates'->57.5 'carbohydrates_100g'->57.5 'carbohydrates_serving'->...

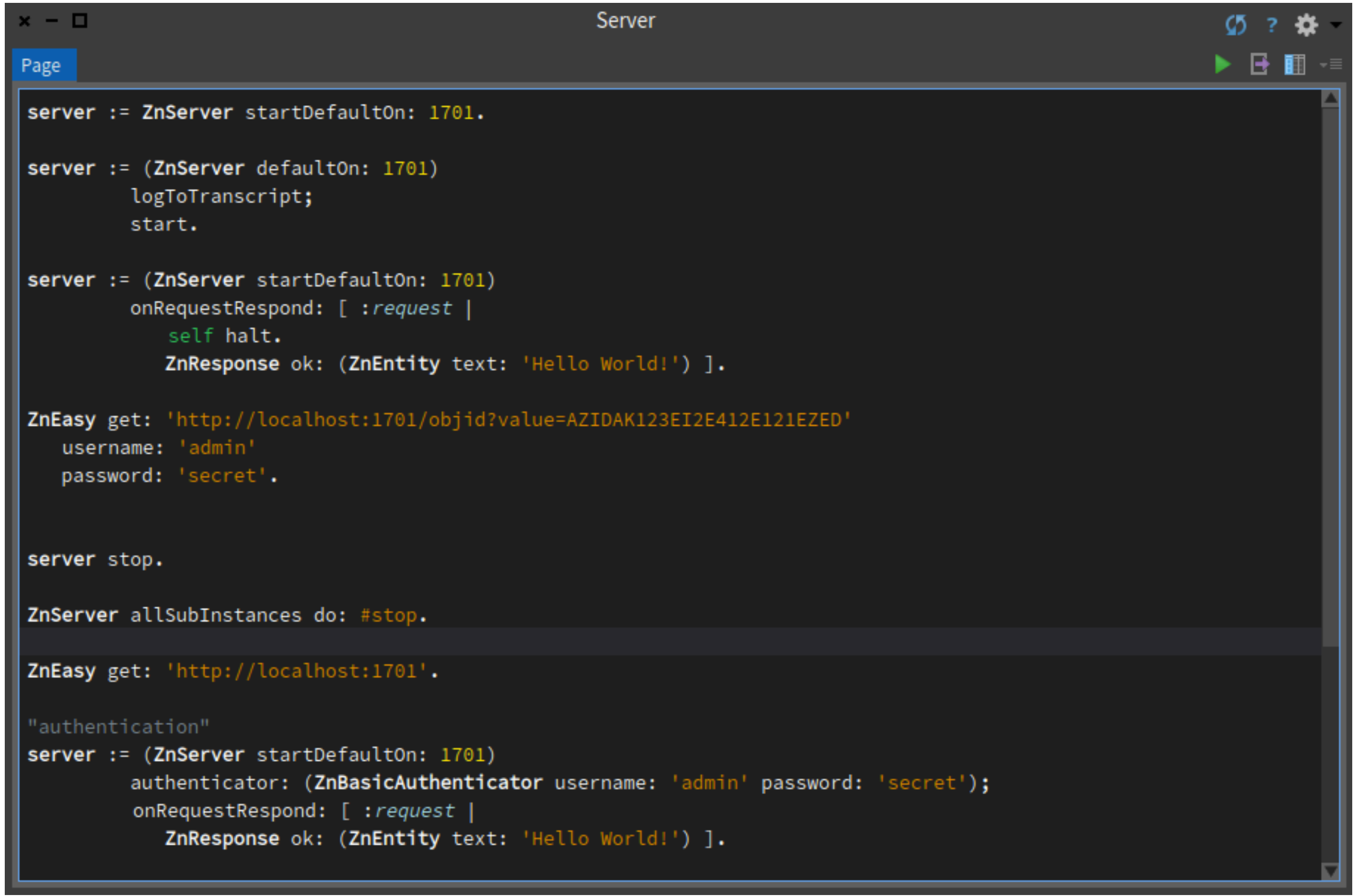
Key	Value
'sugars_100g'	56.3
'cocoa_label'	'Cacao (minimum)'
'sodium_value'	'0.04'
'fat'	30.9
'saturated-fat'	10.6
'fat_100g'	30.9
'energy_100g'	'2255'
'carbohydrates_unit'	'g'
'sodium_100g'	0.0393700787401575
'nutrition-score-fr_100g'	'26'
'salt_value'	'0.1'
'cocoa_unit'	'g'
'carbohydrates'	57.5
'nutrition-score-uk_100g'	'26'
'cocoa'	7.4
'saturated-fat_100g'	10.6
'salt_serving'	0.015
'proteins_unit'	'g'
'proteins_serving'	0.945
'proteins'	6.3
'nova-group_100g'	'4'
'fruits-vegetables-nuts-estimate_valı	'13'
'cocoa_100g'	7.4

(Web) Client – Visualization



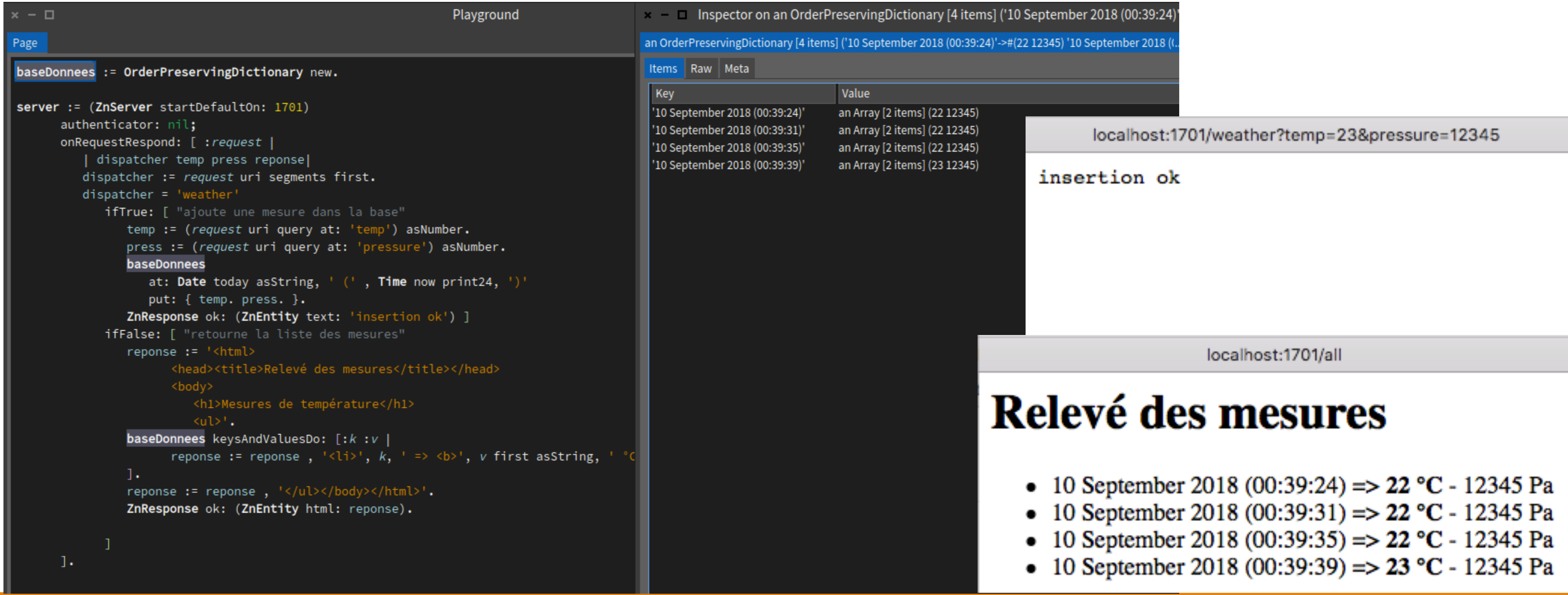
```
| b tab |
   "tab := RTTabTable new input:  RTMapLocationBuilder new seismData2
usingDelimiter: $,."
   tab := RTTabTable new
      input:
         'http://earthquake.usgs.gov/earthquakes/feed/v1.0/summary/2.5_mont
h.csv' asUrl
            retrieveContents
      usingDelimiter: $,.
   tab removeFirstRow.
   tab replaceEmptyValuesWith: '0' inColumns: #(2 3 4 5).
   tab convertColumnsAsFloat: #(2 3 4 5).
   b := RTMapLocationBuilder new.
   b shape circle
      size: [ :v | (2 raisedTo: v) / 2 ];
      color: (Color red alpha: 0.3).
   tab values do: [ :row | b addPoint: row second @ row third value: row
fifth ].
   b build.
   b view @ RTZoomableView.
   ^ b view
```

(Web) Server



```
server := ZnServer startDefaultOn: 1701.

server := (ZnServer defaultOn: 1701)
         logToTranscript;
         start.

server := (ZnServer startDefaultOn: 1701)
         onRequestRespond: [ :request |
            self halt.
            ZnResponse ok: (ZnEntity text: 'Hello World!') ].

ZnEasy get: 'http://localhost:1701/objid?value=AZIDAK123EI2E412E121EZED'
   username: 'admin'
   password: 'secret'.


server stop.

ZnServer allSubInstances do: #stop.

ZnEasy get: 'http://localhost:1701'.

"authentication"
server := (ZnServer startDefaultOn: 1701)
         authenticator: (ZnBasicAuthenticator username: 'admin' password: 'secret');
         onRequestRespond: [ :request |
            ZnResponse ok: (ZnEntity text: 'Hello World!') ].
```

(Web) Serveur - IoT



```
baseDonnees := OrderPreservingDictionary new.

server := (ZnServer startDefaultOn: 1701)
      authenticator: nil;
      onRequestRespond: [ :request |
         | dispatcher temp press reponse|
         dispatcher := request uri segments first.
         dispatcher = 'weather'
            ifTrue: [ "ajoute une mesure dans la base"
               temp := (request uri query at: 'temp') asNumber.
               press := (request uri query at: 'pressure') asNumber.
               baseDonnees
                  at: Date today asString, ' (' , Time now print24, ')'
                  put: { temp. press. }.
               ZnResponse ok: (ZnEntity text: 'insertion ok') ]
            ifFalse: [ "retourne la liste des mesures"
               reponse := '<html>
                     <head><title>Relevé des mesures</title></head>
                     <body>
                        <h1>Mesures de température</h1>
                        <ul>'.
               baseDonnees keysAndValuesDo: [:k :v |
                     reponse := reponse , '<li>', k, ' => <b>', v first asString, ' °C
               ].
               reponse := reponse , '</ul></body></html>'.
               ZnResponse ok: (ZnEntity html: reponse).

            ]
      ].
```

× − □
Inspector on an OrderPreservingDictionary [4 items] ('10 September 2018 (00:39:24)'
an OrderPreservingDictionary [4 items] ('10 September 2018 (00:39:24)'->#(22 12345) '10 September 2018 (
Items
Raw
Meta

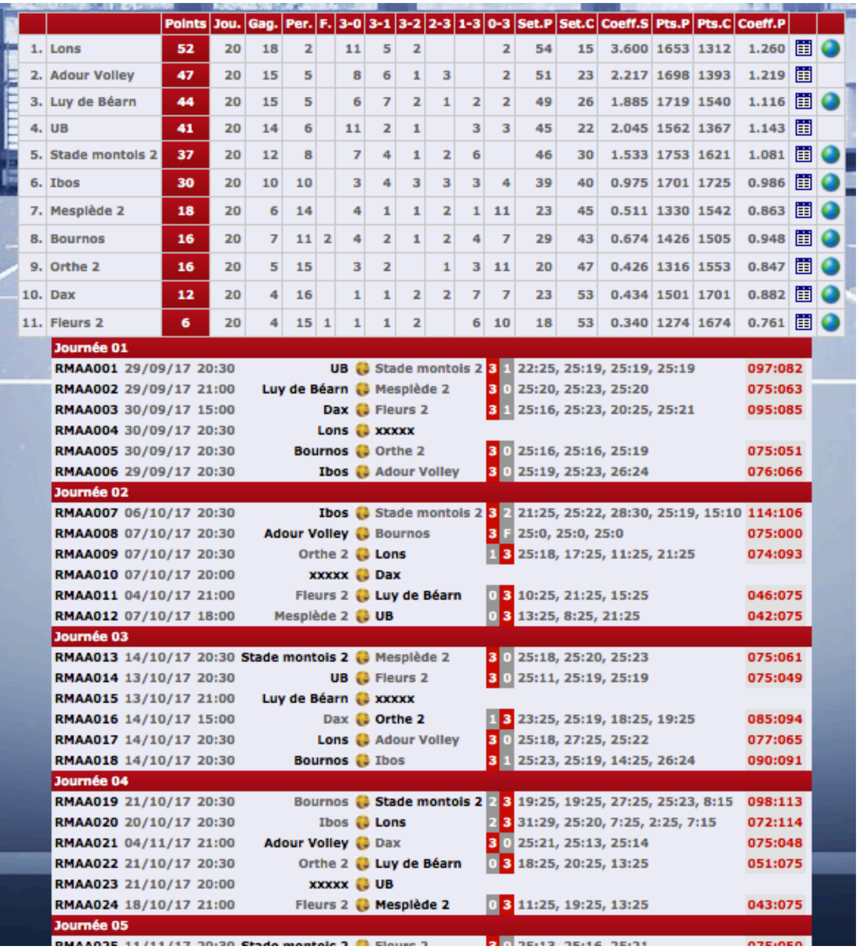
Key	Value
'10 September 2018 (00:39:24)'	an Array [2 items] (22 12345)
'10 September 2018 (00:39:31)'	an Array [2 items] (22 12345)
'10 September 2018 (00:39:35)'	an Array [2 items] (22 12345)
'10 September 2018 (00:39:39)'	an Array [2 items] (23 12345)

```
insertion ok
```

Relevé des mesures

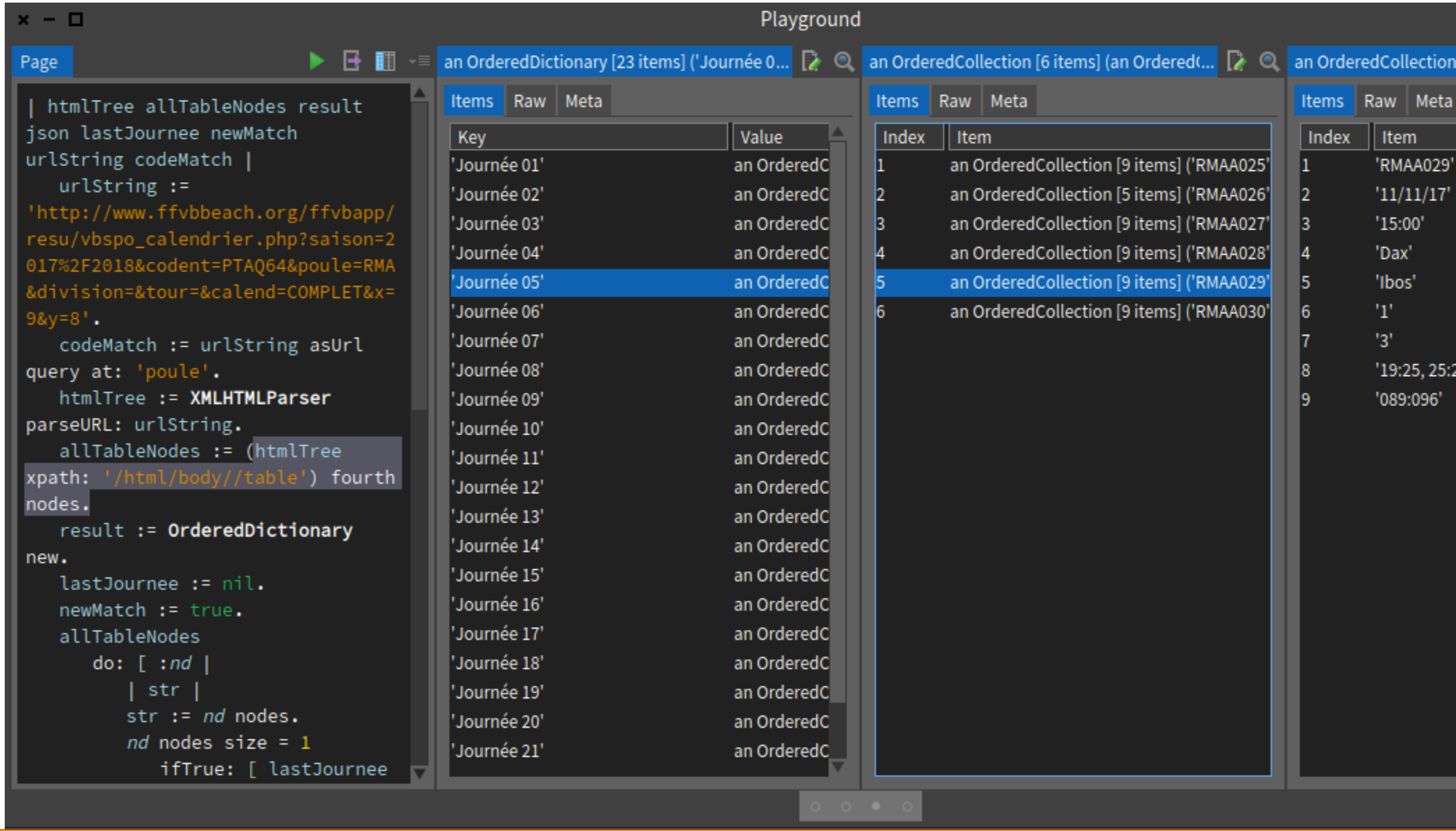
- 10 September 2018 (00:39:24) => **22 °C** - 12345 Pa
- 10 September 2018 (00:39:31) => **22 °C** - 12345 Pa
- 10 September 2018 (00:39:35) => **22 °C** - 12345 Pa
- 10 September 2018 (00:39:39) => **23 °C** - 12345 Pa

Webscrapping with XPath



		Points	Jou.	Gag.	Per.	F.	3-0	3-1	3-2	2-3	1-3	0-3	Set.P	Set.C	Coeff.S	Pts.P	Pts.C	Coeff.P
1.	Lons	52	20	18	2		11	5	2			2	54	15	3.600	1653	1312	1.260
2.	Adour Volley	47	20	15	5		8	6	1	3		2	51	23	2.217	1698	1393	1.219
3.	Luy de Béarn	44	20	15	5		6	7	2	1	2	2	49	26	1.885	1719	1540	1.116
4.	UB	41	20	14	6		11	2	1		3	3	45	22	2.045	1562	1367	1.143
5.	Stade montois 2	37	20	12	8		7	4	1	2	6		46	30	1.533	1753	1621	1.081
6.	Ibos	30	20	10	10		3	4	3	3	3	4	39	40	0.975	1701	1725	0.986
7.	Mesplède 2	18	20	6	14		4	1	1	2	1	11	23	45	0.511	1330	1542	0.863
8.	Bournos	16	20	7	11	2	4	2	1	2	4	7	29	43	0.674	1426	1505	0.948
9.	Orthe 2	16	20	5	15		3	2		1	3	11	20	47	0.426	1316	1553	0.847
10.	Dax	12	20	4	16		1	1	2	2	7	7	23	53	0.434	1501	1701	0.882
11.	Fleurs 2	6	20	4	15	1	1	1	2		6	10	18	53	0.340	1274	1674	0.761

Journée 01								
RMAA001	29/09/17	20:30	UB	Stade montois 2	3	1	22:25, 25:19, 25:19, 25:19	097:082
RMAA002	29/09/17	21:00	Luy de Béarn	Mesplède 2	3	0	25:20, 25:23, 25:20	075:063
RMAA003	30/09/17	15:00	Dax	Fleurs 2	3	1	25:16, 25:23, 20:25, 25:21	095:085
RMAA004	30/09/17	20:30	Lons	xxxxx				
RMAA005	30/09/17	20:30	Bournos	Orthe 2	3	0	25:16, 25:16, 25:19	075:051
RMAA006	29/09/17	20:30	Ibos	Adour Volley	3	0	25:19, 25:23, 26:24	076:066
Journée 02								
RMAA007	06/10/17	20:30	Ibos	Stade montois 2	3	2	21:25, 25:22, 28:30, 25:19, 15:10	114:106
RMAA008	07/10/17	20:30	Adour Volley	Bournos	3	F	25:0, 25:0, 25:0	075:000
RMAA009	07/10/17	20:30	Orthe 2	Lons	1	3	25:18, 17:25, 11:25, 21:25	074:093
RMAA010	07/10/17	20:00	xxxxx	Dax				
RMAA011	04/10/17	21:00	Fleurs 2	Luy de Béarn	0	3	10:25, 21:25, 15:25	046:075
RMAA012	07/10/17	18:00	Mesplède 2	UB	0	3	13:25, 8:25, 21:25	042:075
Journée 03								
RMAA013	14/10/17	20:30	Stade montois 2	Mesplède 2	3	0	25:18, 25:20, 25:23	075:061
RMAA014	13/10/17	20:30	UB	Fleurs 2	3	0	25:11, 25:19, 25:19	075:049
RMAA015	13/10/17	21:00	Luy de Béarn	xxxxx				
RMAA016	14/10/17	15:00	Dax	Orthe 2	1	3	23:25, 25:19, 18:25, 19:25	085:094
RMAA017	14/10/17	20:30	Lons	Adour Volley	3	0	25:18, 27:25, 25:22	077:065
RMAA018	14/10/17	20:30	Bournos	Ibos	3	1	25:23, 25:19, 14:25, 26:24	090:091
Journée 04								
RMAA019	21/10/17	20:30	Bournos	Stade montois 2	2	3	19:25, 19:25, 27:25, 25:23, 8:15	098:113
RMAA020	20/10/17	20:30	Ibos	Lons	2	3	31:29, 25:20, 7:25, 2:25, 7:15	072:114
RMAA021	04/11/17	21:00	Adour Volley	Dax	3	0	25:21, 25:13, 25:14	075:048
RMAA022	21/10/17	20:30	Orthe 2	Luy de Béarn	0	3	18:25, 20:25, 13:25	051:075
RMAA023	21/10/17	20:00	xxxxx	UB				
RMAA024	18/10/17	21:00	Fleurs 2	Mesplède 2	0	3	11:25, 19:25, 13:25	043:075
Journée 05								
RMAA025	11/11/17	20:30	Stade montois 2	Fleurs 2	3	0	25:13, 25:16, 25:21	075:050



Playground

```
| htmlTree allTableNodes result
json lastJournee newMatch
urlString codeMatch |
   urlString :=
'http://www.ffvbbeach.org/ffvbapp/
resu/vbspo_calendrier.php?saison=2
017%2F2018&codent=PTAQ64&poule=RMA
&division=&tour=&calend=COMPLET&x=
9&y=8'.
   codeMatch := urlString asUrl
query at: 'poule'.
   htmlTree := XMLHTMLParser
parseURL: urlString.
   allTableNodes := (htmlTree
xpath: '/html/body//table') fourth
nodes.
   result := OrderedDictionary
new.
   lastJournee := nil.
   newMatch := true.
   allTableNodes
      do: [ :nd |
         | str |
         str := nd nodes.
         nd nodes size = 1
            ifTrue: [ lastJournee
```

an OrderedDictionary [23 items] ('Journée 0...

Key	Value
'Journée 01'	an OrderedC
'Journée 02'	an OrderedC
'Journée 03'	an OrderedC
'Journée 04'	an OrderedC
'Journée 05'	an OrderedC
'Journée 06'	an OrderedC
'Journée 07'	an OrderedC
'Journée 08'	an OrderedC
'Journée 09'	an OrderedC
'Journée 10'	an OrderedC
'Journée 11'	an OrderedC
'Journée 12'	an OrderedC
'Journée 13'	an OrderedC
'Journée 14'	an OrderedC
'Journée 15'	an OrderedC
'Journée 16'	an OrderedC
'Journée 17'	an OrderedC
'Journée 18'	an OrderedC
'Journée 19'	an OrderedC
'Journée 20'	an OrderedC
'Journée 21'	an OrderedC

an OrderedCollection [6 items] (an Ordered(...

Index	Item
1	an OrderedCollection [9 items] ('RMAA025'
2	an OrderedCollection [5 items] ('RMAA026'
3	an OrderedCollection [9 items] ('RMAA027'
4	an OrderedCollection [9 items] ('RMAA028'
5	an OrderedCollection [9 items] ('RMAA029'
6	an OrderedCollection [9 items] ('RMAA030'

an OrderedCollection

Index	Item
1	'RMAA029'
2	'11/11/17'
3	'15:00'
4	'Dax'
5	'Ibos'
6	'1'
7	'3'
8	'19:25, 25:2
9	'089:096'

Other tools and materials

HTML templates

Adobe Cordova

MIT App Inventor

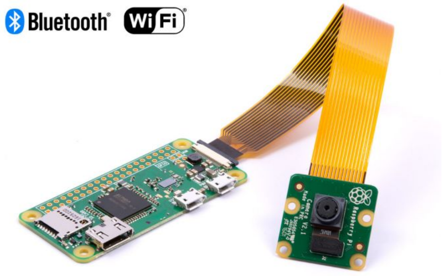
>> mainly GPS Logger

APACHE CORDOVA™

MIT APP INVENTOR

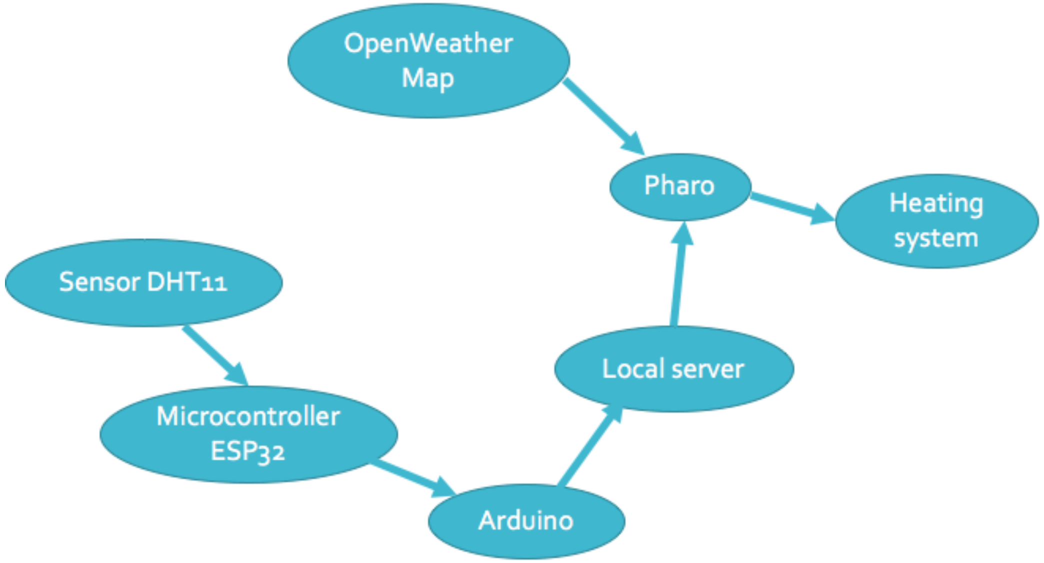
IoT materials

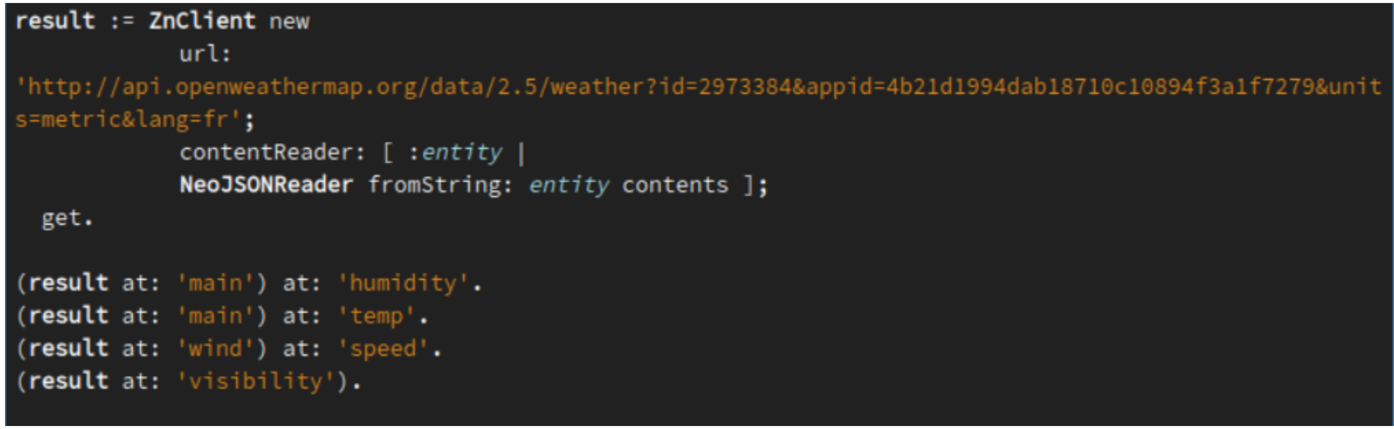
- Raspberry Pi3 and PiZeroW
  - Raspbian + Pharo (TelePharo)
- ESP32
  - Arduino IDE
  - ESP-IDF



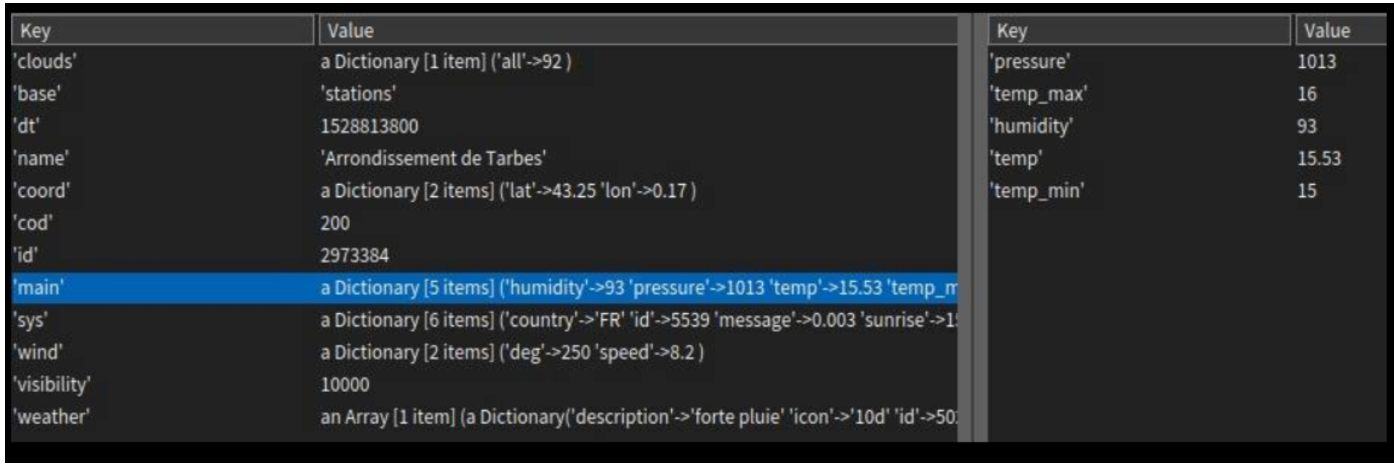
Selected projects

Project 1 – Heating System





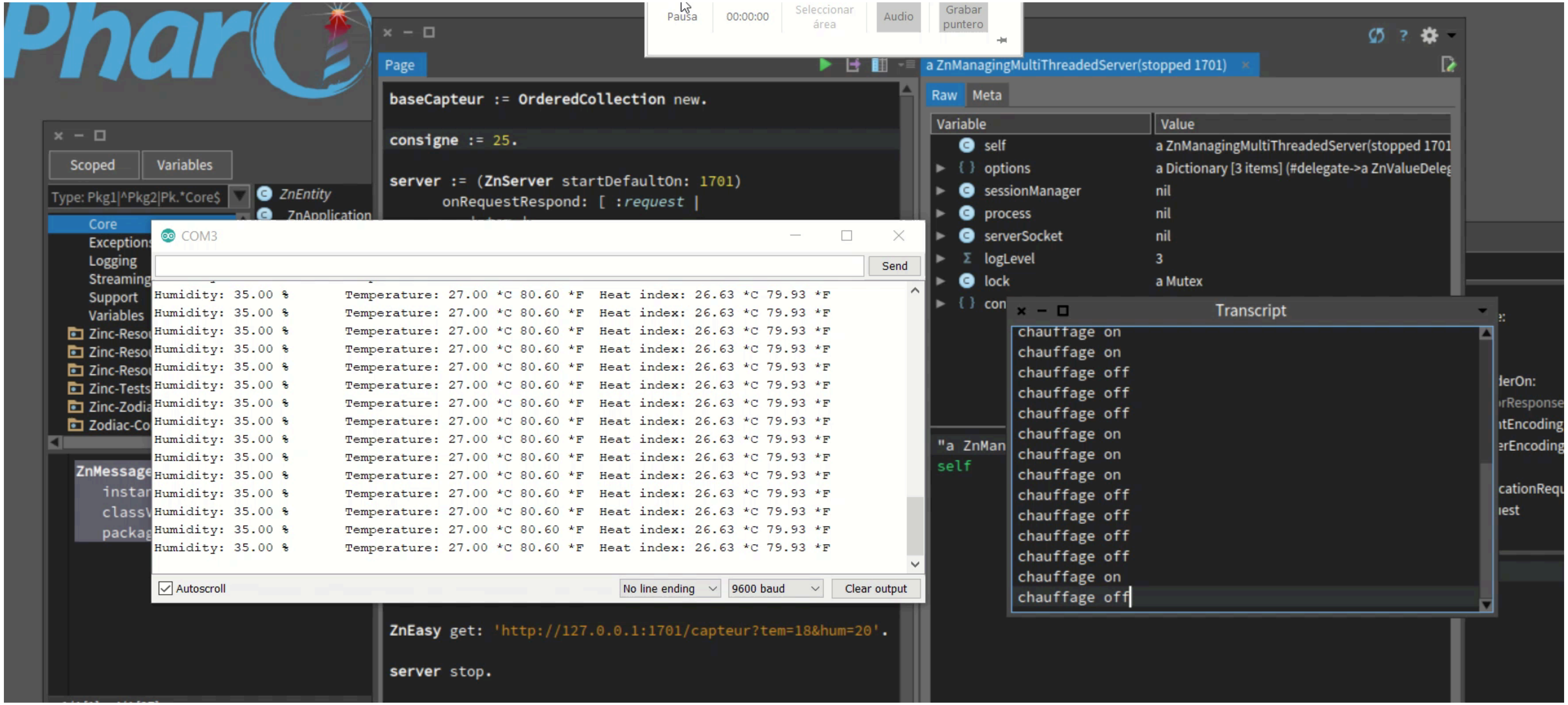
```
result := ZnClient new
            url:
'http://api.openweathermap.org/data/2.5/weather?id=2973384&appid=4b21d1994dab18710c10894f3a1f7279&unit
s=metric&lang=fr';
            contentReader: [ :entity |
            NeoJSONReader fromString: entity contents ];
  get.

(result at: 'main') at: 'humidity'.
(result at: 'main') at: 'temp'.
(result at: 'wind') at: 'speed'.
(result at: 'visibility').
```



Key	Value
'clouds'	a Dictionary [1 item] ('all'->92)
'base'	'stations'
'dt'	1528813800
'name'	'Arrondissement de Tarbes'
'coord'	a Dictionary [2 items] ('lat'->43.25 'lon'->0.17)
'cod'	200
'id'	2973384
'main'	a Dictionary [5 items] ('humidity'->93 'pressure'->1013 'temp'->15.53 'temp_m
'sys'	a Dictionary [6 items] ('country'->'FR' 'id'->5539 'message'->0.003 'sunrise'->1
'wind'	a Dictionary [2 items] ('deg'->250 'speed'->8.2)
'visibility'	10000
'weather'	an Array [1 item] (a Dictionary('description'->'forte pluie' 'icon'->'10d' 'id'->50

Key	Value
'pressure'	1013
'temp_max'	16
'humidity'	93
'temp'	15.53
'temp_min'	15

Project 1 – Heating System



```
baseCapteur := OrderedCollection new.

consigne := 25.

server := (ZnServer startDefaultOn: 1701)
      onRequestRespond: [ :request |
```

```
ZnEasy get: 'http://127.0.0.1:1701/capteur?tem=18&hum=20'.

server stop.
```

COM3

```
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
Humidity: 35.00 %       Temperature: 27.00 *C 80.60 *F  Heat index: 26.63 *C 79.93 *F
```

☑ Autoscroll   No line ending   9600 baud   Clear output

a ZnManagingMultiThreadedServer(stopped 1701)

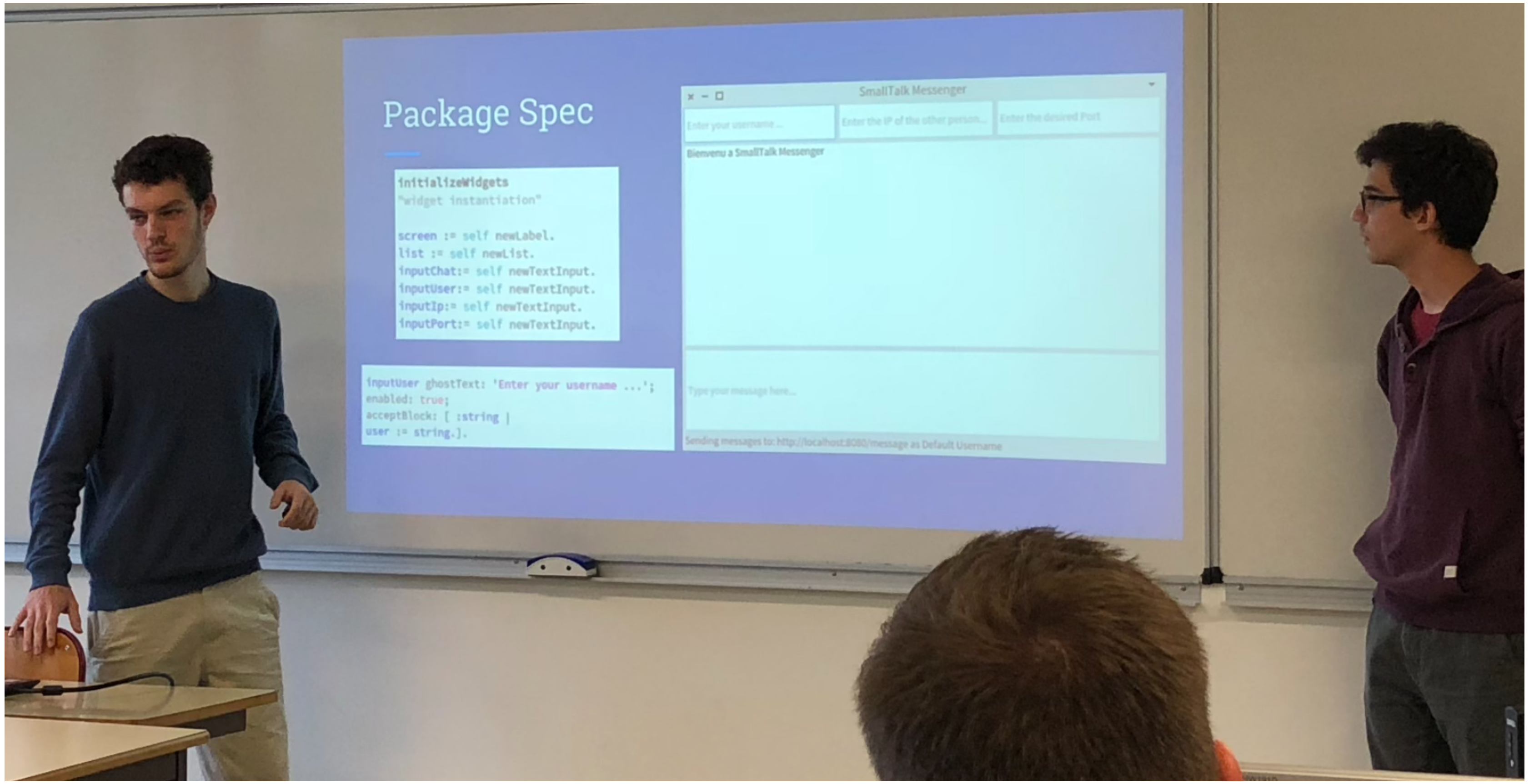
Variable	Value
self	a ZnManagingMultiThreadedServer(stopped 1701
options	a Dictionary [3 items] (#delegate->a ZnValueDeleg
sessionManager	nil
process	nil
serverSocket	nil
logLevel	3
lock	a Mutex
con	

```
"a ZnMan
self
```

Transcript

```
chauffage on
chauffage on
chauffage off
chauffage off
chauffage off
chauffage on
chauffage on
chauffage on
chauffage off
chauffage off
chauffage off
chauffage off
chauffage on
chauffage off
```

Project 2 – SmalltalkMessenger



Package Spec

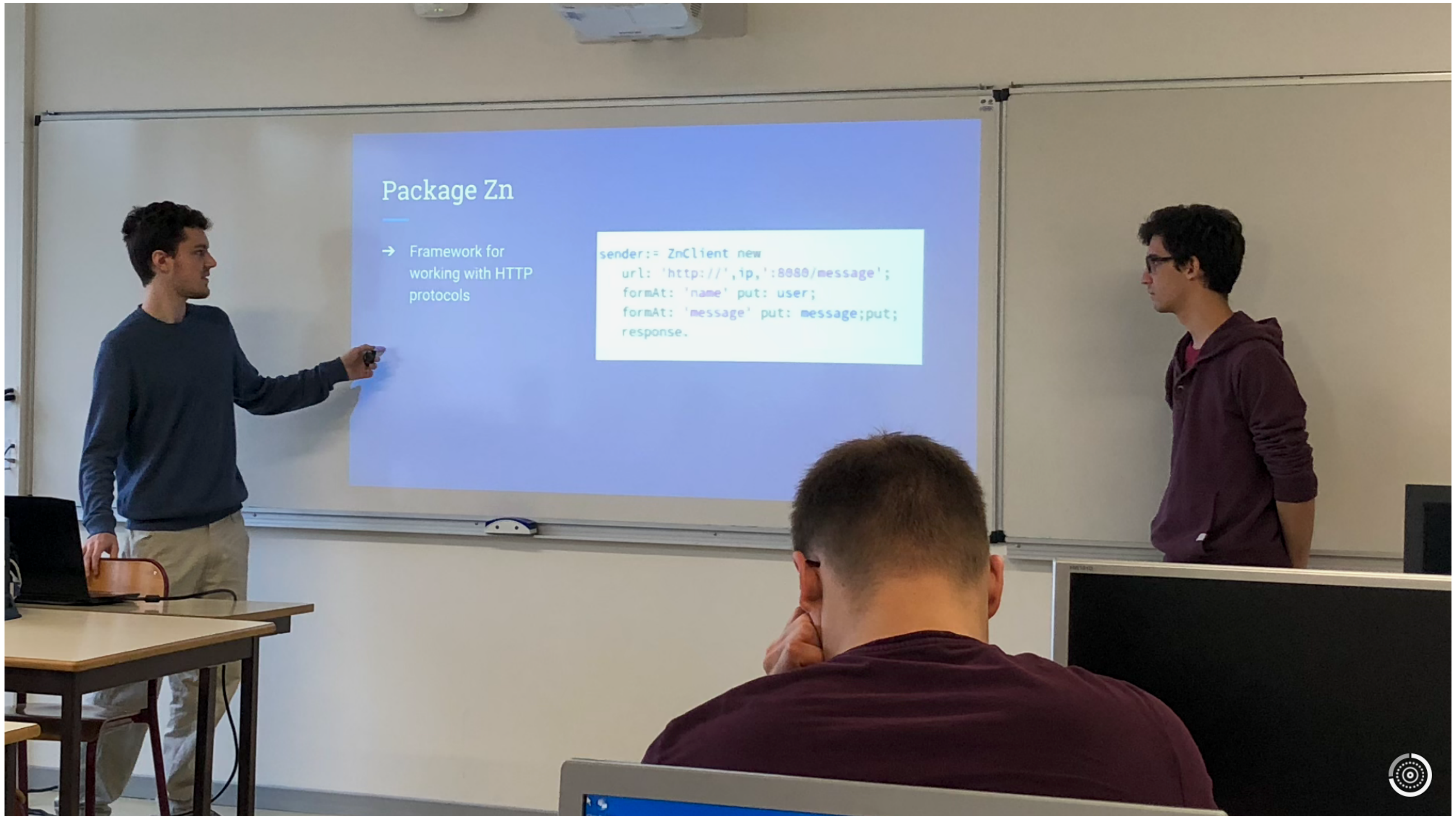
```
initializeWidgets
"widget instantiation"

screen := self newLabel.
list := self newList.
inputChat:= self newTextInput.
inputUser:= self newTextInput.
inputIp:= self newTextInput.
inputPort:= self newTextInput.
```

```
inputUser ghostText: 'Enter your username ...';
enabled: true;
acceptBlock: [ :string |
user := string.].
```

Bienvenu a SmallTalk Messenger

Sending messages to: http://localhost:8080/message as Default Username

Project 2 – SmalltalkMessenger

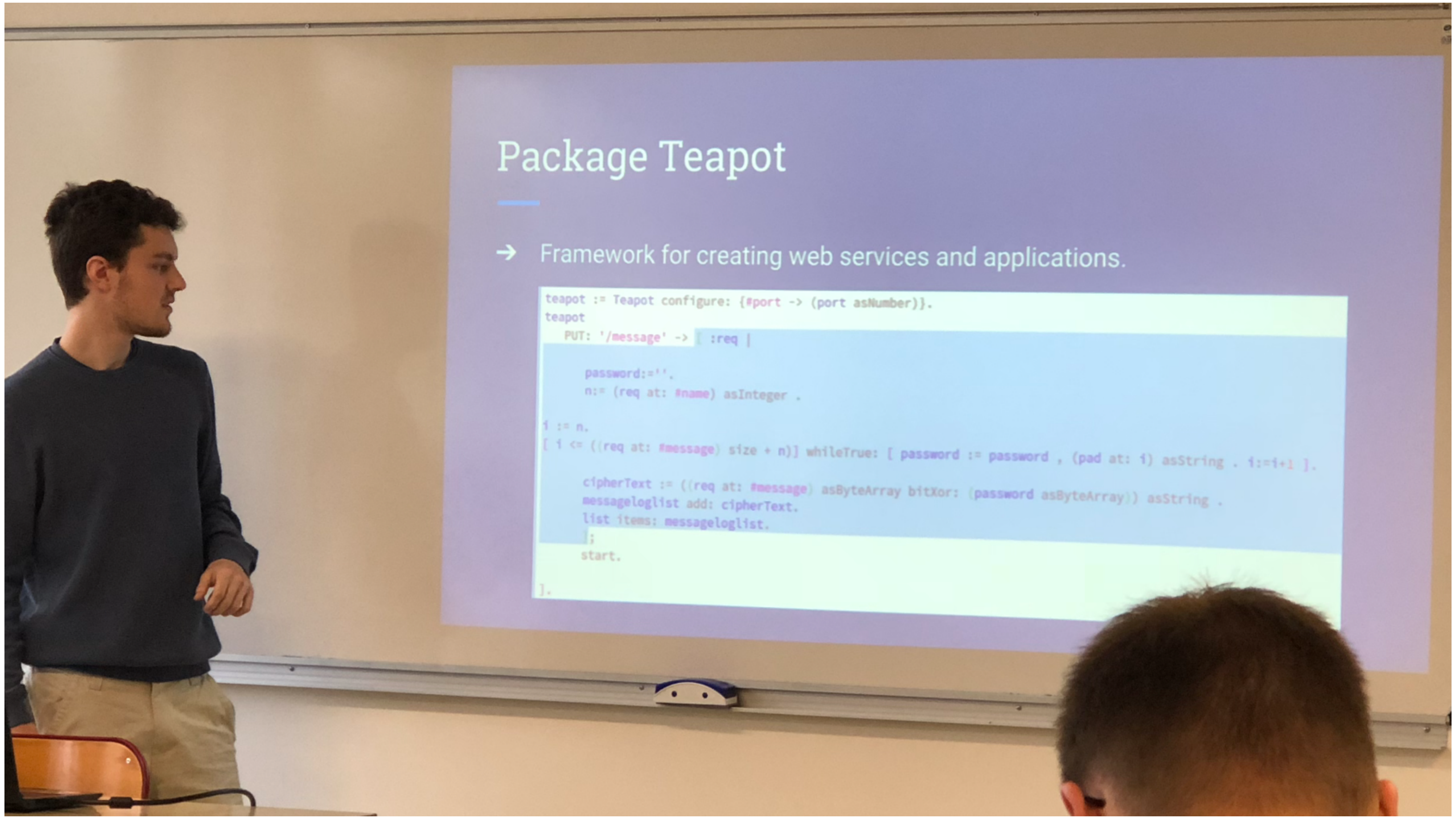


Package Zn

→ Framework for working with HTTP protocols

```
sender:= ZnClient new
   url: 'http://',ip,':8080/message';
   formAt: 'name' put: user;
   formAt: 'message' put: message;put;
   response.
```

Project 2 – SmalltalkMessenger

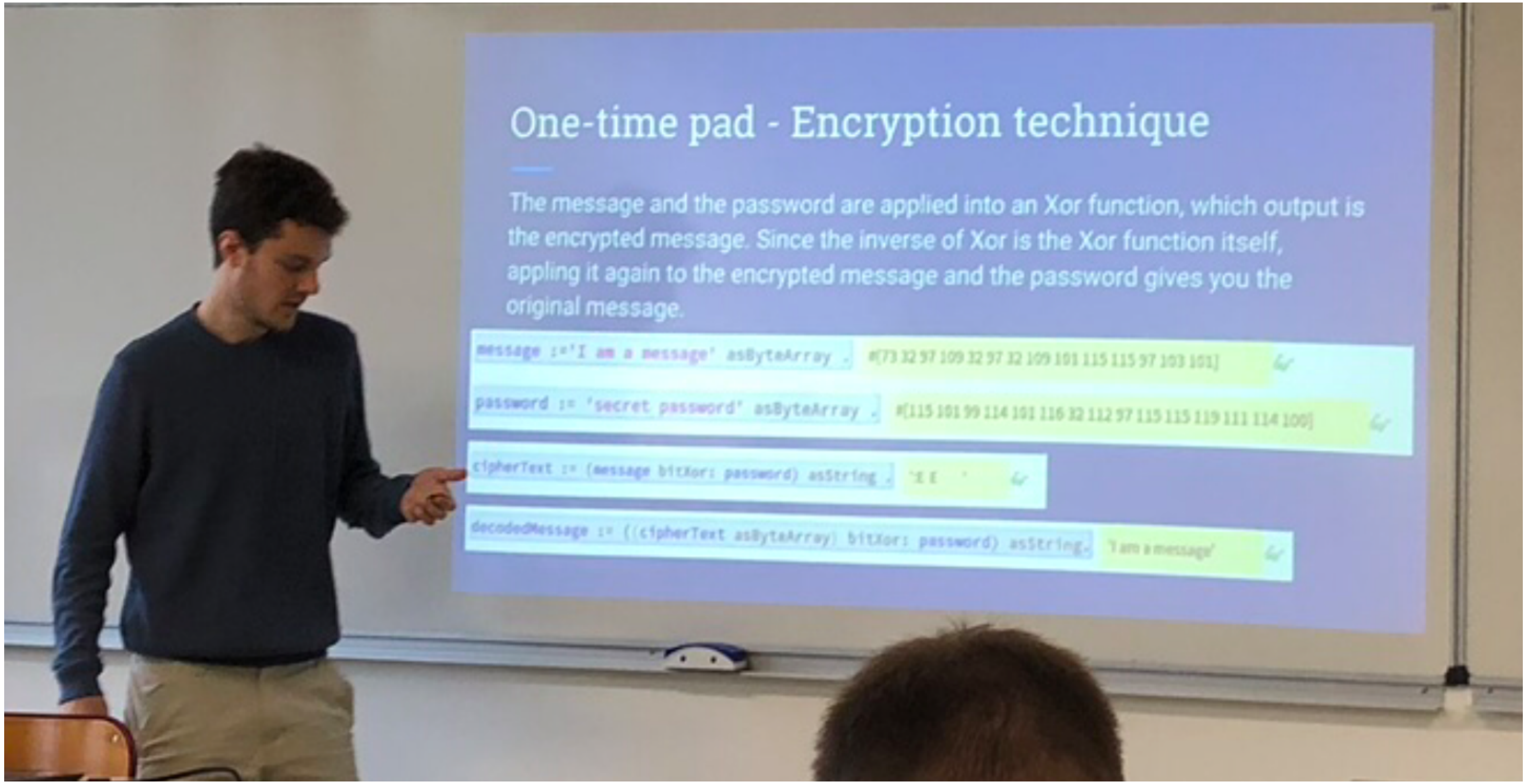


Package Teapot

→ Framework for creating web services and applications.

```
teapot := Teapot configure: {#port -> (port asNumber)}.
teapot
   PUT: '/message' -> [ :req |

      password:=''.
      n:= (req at: #name) asInteger .

i := n.
[ i <= ((req at: #message) size + n)] whileTrue: [ password := password , (pad at: i) asString . i:=i+1 ].

      cipherText := ((req at: #message) asByteArray bitXor: (password asByteArray)) asString .
      messageloglist add: cipherText.
      list items: messageloglist.
      ];
      start.

].
```

Project 2 – SmalltalkMessenger

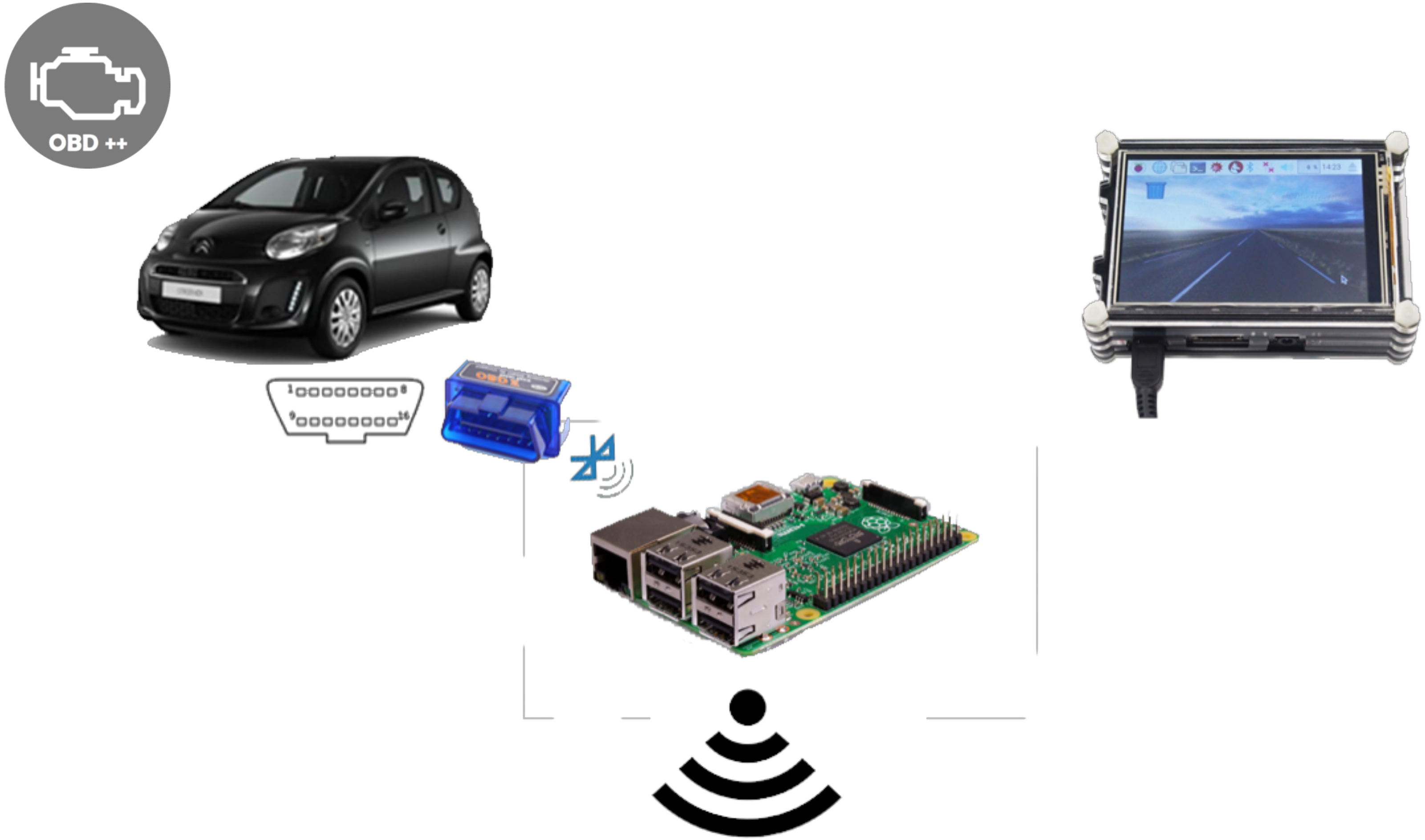


One-time pad - Encryption technique

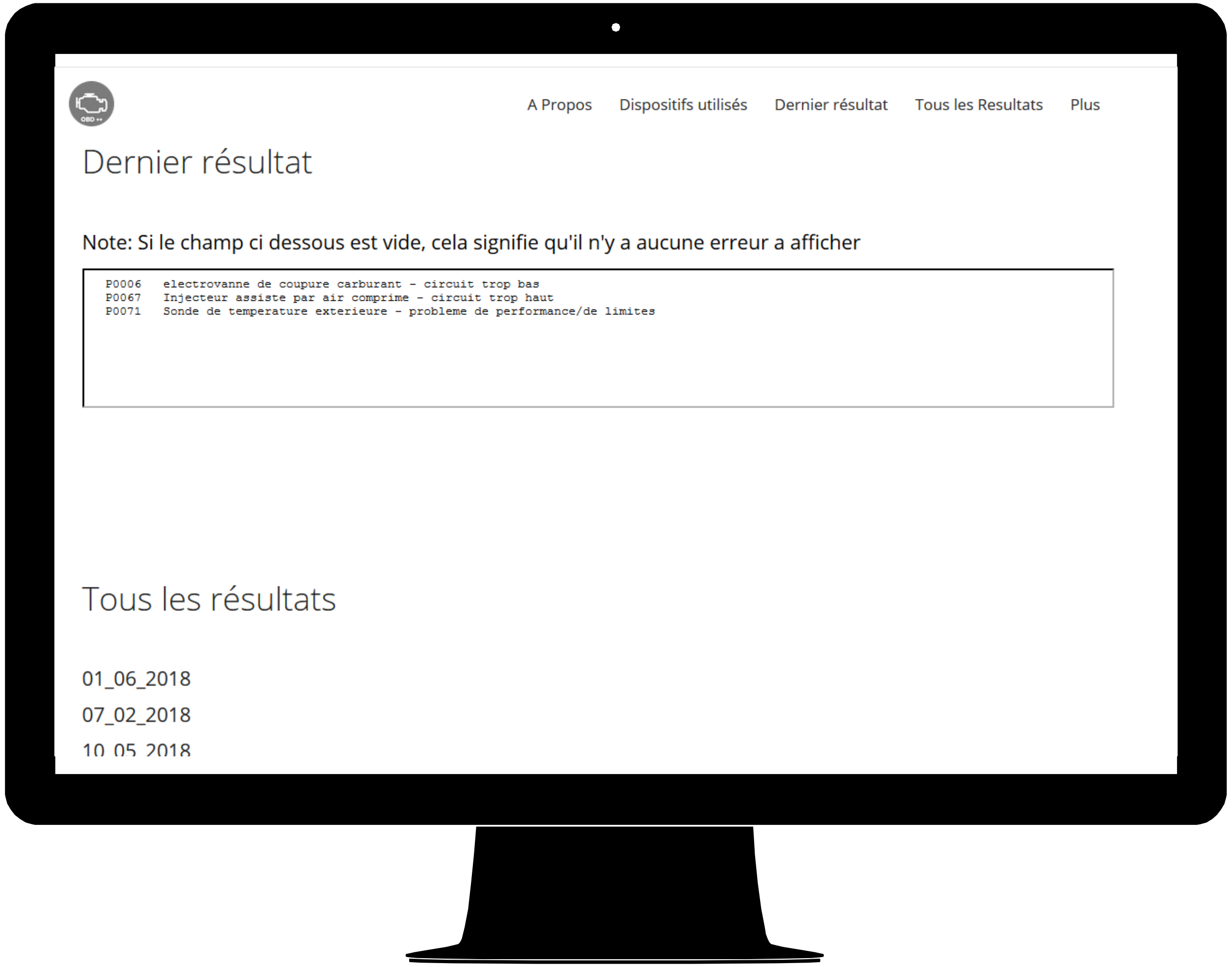
The message and the password are applied into an Xor function, which output is the encrypted message. Since the inverse of Xor is the Xor function itself, appling it again to the encrypted message and the password gives you the original message.

```
message :='I am a message' asByteArray .          #[73 32 97 109 32 97 32 109 101 115 115 97 103 101]
password := 'secret password' asByteArray .       #[115 101 99 114 101 116 32 112 97 115 115 119 111 114 100]
cipherText := (message bitXor: password) asString .          '[illegible]'
decodedMessage := ((cipherText asByteArray) bitXor: password) asString.          'I am a message'
```

Project 3 – OBD++



The interface



Dernier résultat

Note: Si le champ ci dessous est vide, cela signifie qu'il n'y a aucune erreur a afficher

```
P0006   electrovanne de coupure carburant - circuit trop bas
P0067   Injecteur assiste par air comprime - circuit trop haut
P0071   Sonde de temperature exterieure - probleme de performance/de limites
```

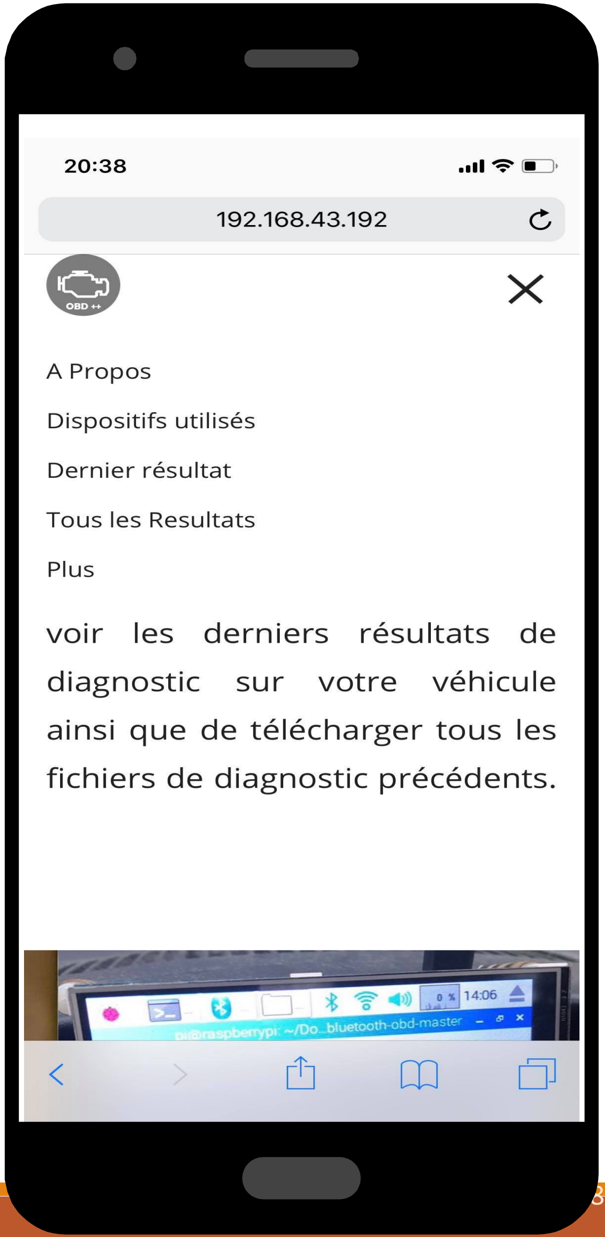
Tous les résultats

01_06_2018

07_02_2018

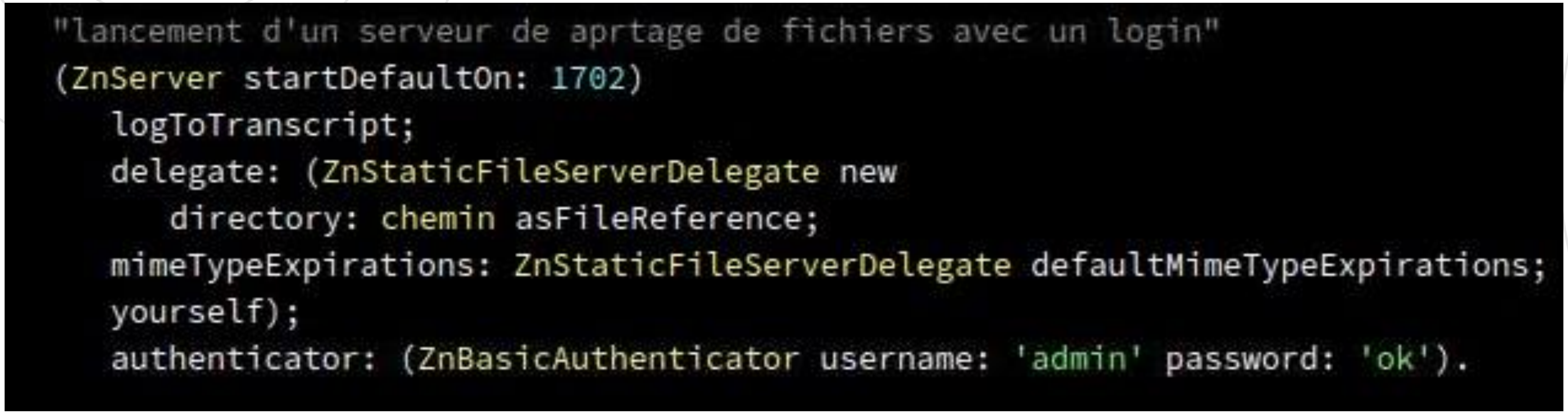
10_05_2018

A web application to consult and download error codes



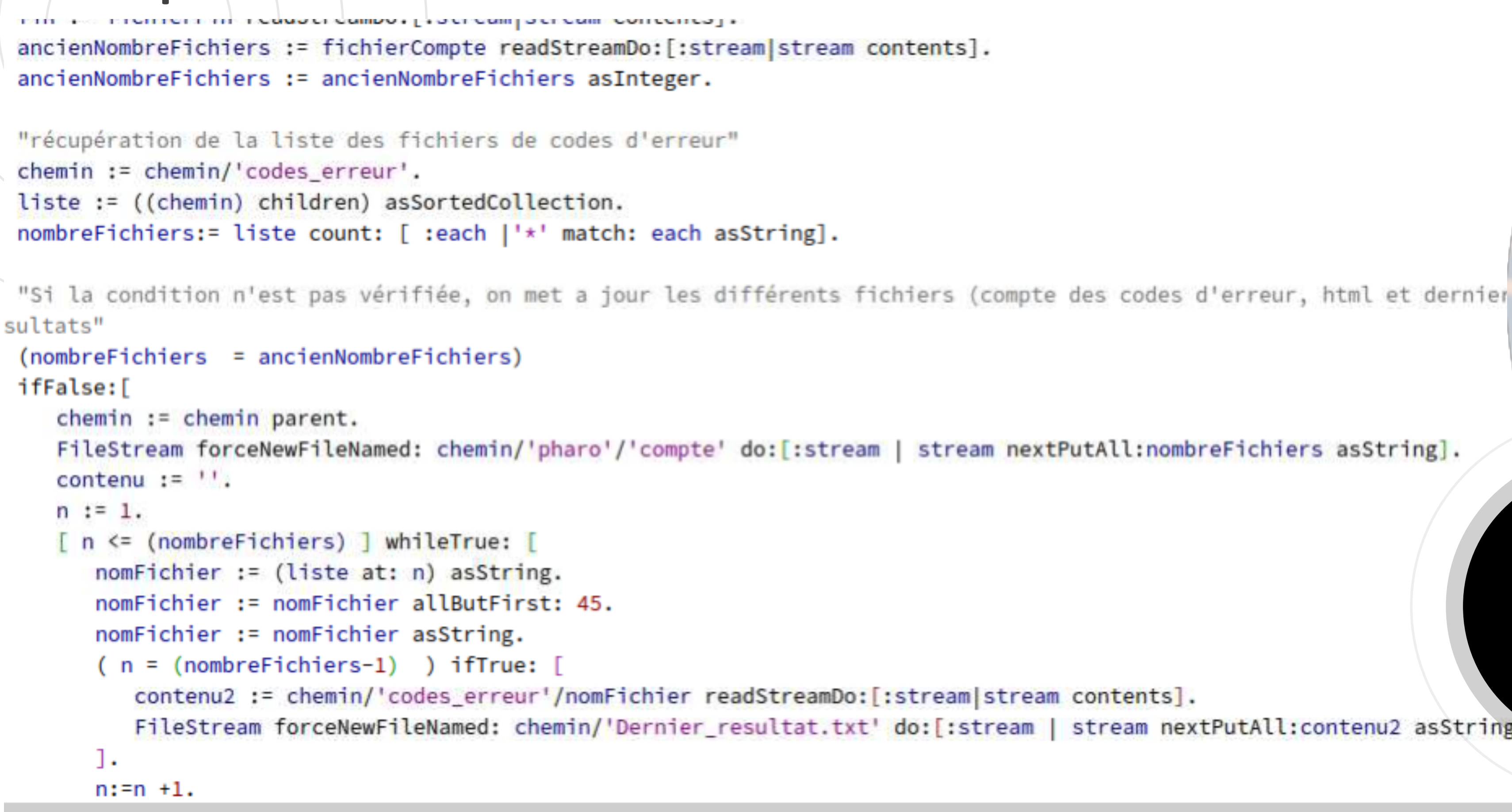
voir les derniers résultats de diagnostic sur votre véhicule ainsi que de télécharger tous les fichiers de diagnostic précédents.

To launch a Pharo server ?

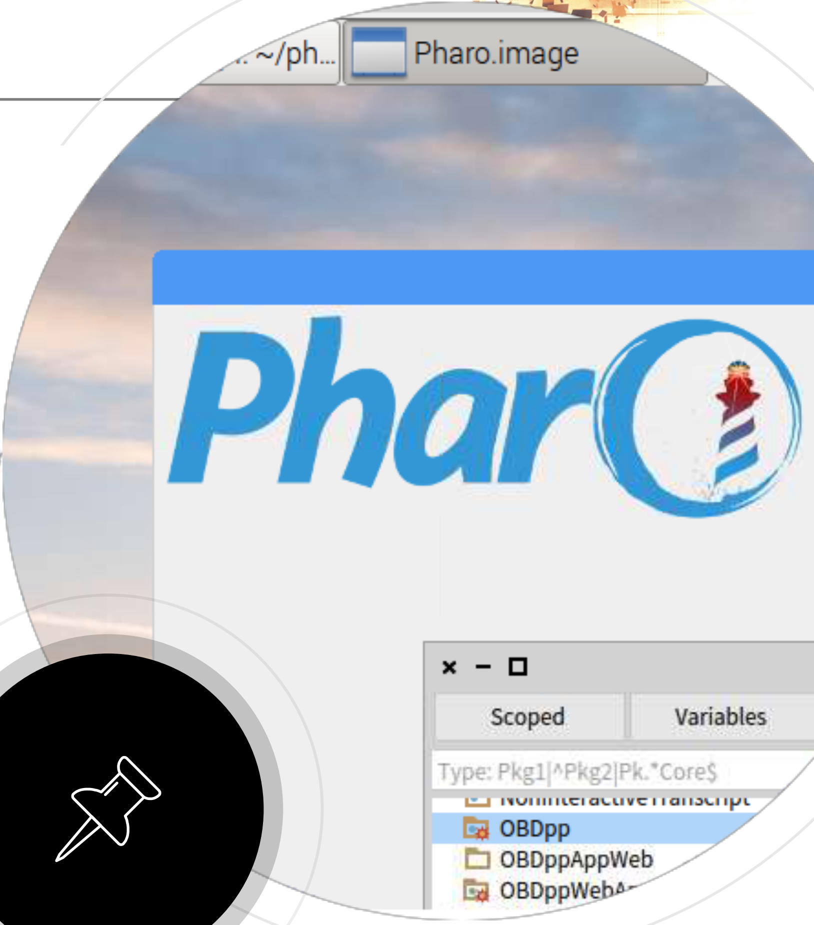


```
"lancement d'un serveur de aprtage de fichiers avec un login"
(ZnServer startDefaultOn: 1702)
   logToTranscript;
   delegate: (ZnStaticFileServerDelegate new
      directory: chemin asFileReference;
   mimeTypeExpirations: ZnStaticFileServerDelegate defaultMimeTypeExpirations;
   yourself);
   authenticator: (ZnBasicAuthenticator username: 'admin' password: 'ok').
```

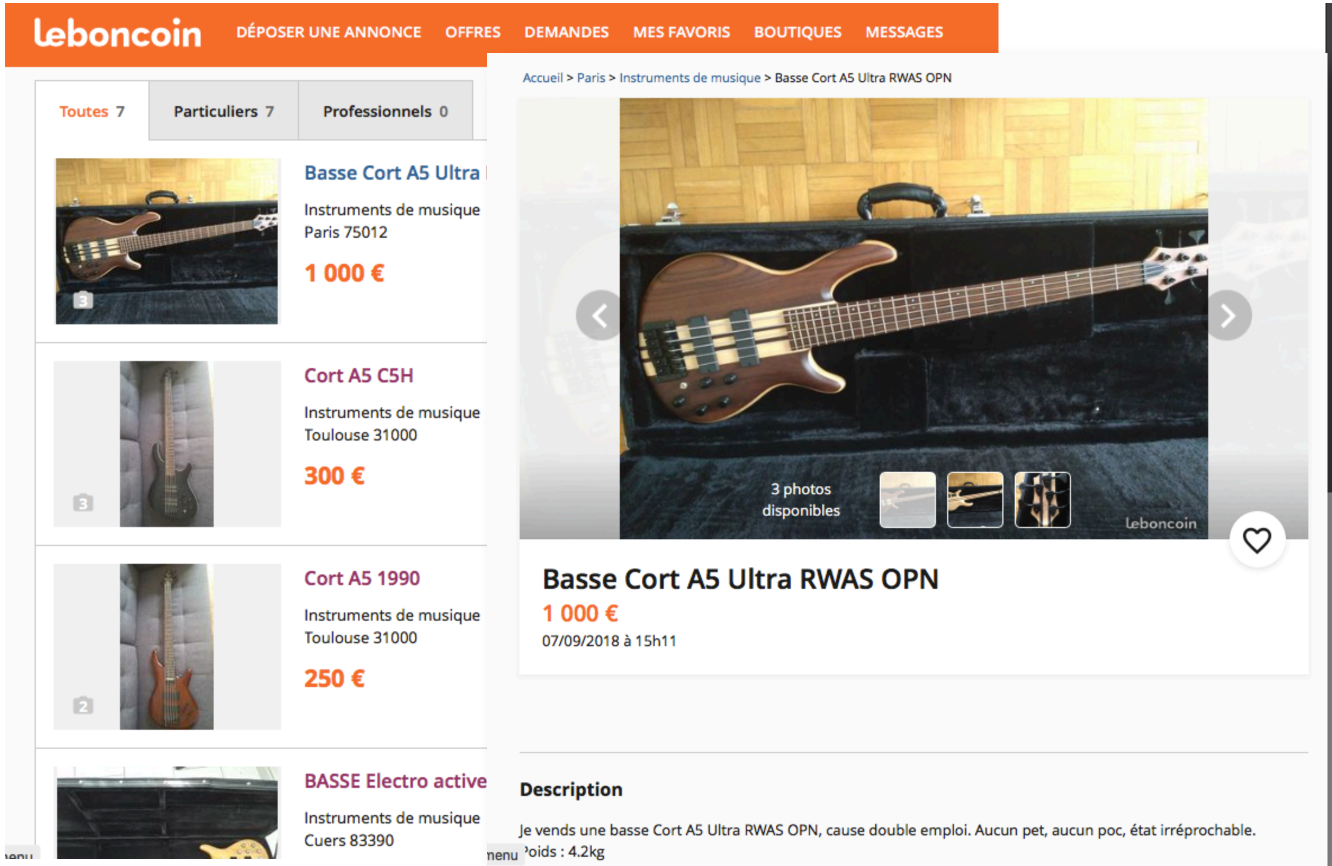
A peek at the code



```
fin := fichierFin readStreamDo:[:stream|stream contents].
ancienNombreFichiers := fichierCompte readStreamDo:[:stream|stream contents].
ancienNombreFichiers := ancienNombreFichiers asInteger.

"récupération de la liste des fichiers de codes d'erreur"
chemin := chemin/'codes_erreur'.
liste := ((chemin) children) asSortedCollection.
nombreFichiers:= liste count: [ :each |'*' match: each asString].

"Si la condition n'est pas vérifiée, on met a jour les différents fichiers (compte des codes d'erreur, html et dernier
sultats"
(nombreFichiers  = ancienNombreFichiers)
ifFalse:[
   chemin := chemin parent.
   FileStream forceNewFileNamed: chemin/'pharo'/'compte' do:[:stream | stream nextPutAll:nombreFichiers asString].
   contenu := ''.
   n := 1.
   [ n <= (nombreFichiers) ] whileTrue: [
      nomFichier := (liste at: n) asString.
      nomFichier := nomFichier allButFirst: 45.
      nomFichier := nomFichier asString.
      ( n = (nombreFichiers-1)  ) ifTrue: [
         contenu2 := chemin/'codes_erreur'/nomFichier readStreamDo:[:stream|stream contents].
         FileStream forceNewFileNamed: chemin/'Dernier_resultat.txt' do:[:stream | stream nextPutAll:contenu2 asString].
      ].
      n:=n +1.
```



Project 4 – LeBonTrouveur



leboncoin DÉPOSER UNE ANNONCE OFFRES DEMANDES MES FAVORIS BOUTIQUES MESSAGES

Toutes 7 | Particuliers 7 | Professionnels 0

Basse Cort A5 Ultra
Instruments de musique
Paris 75012
1 000 €

Cort A5 C5H
Instruments de musique
Toulouse 31000
300 €

Cort A5 1990
Instruments de musique
Toulouse 31000
250 €

BASSE Electro active
Instruments de musique
Cuers 83390

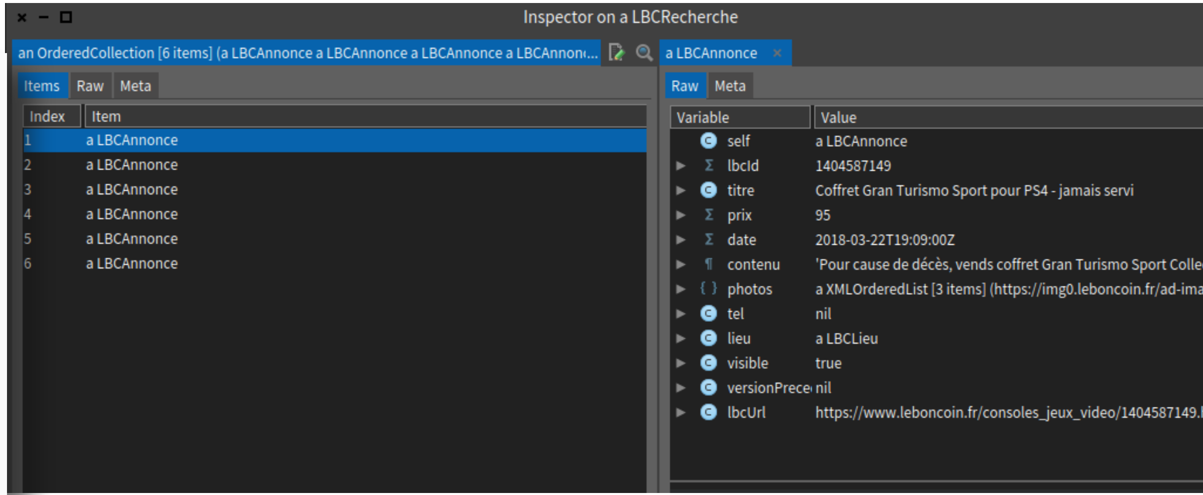
Accueil > Paris > Instruments de musique > Basse Cort A5 Ultra RWAS OPN

3 photos disponibles

Basse Cort A5 Ultra RWAS OPN
1 000 €
07/09/2018 à 15h11

Description

Je vends une basse Cort A5 Ultra RWAS OPN, cause double emploi. Aucun pet, aucun poc, état irréprochable.
Poids : 4.2kg



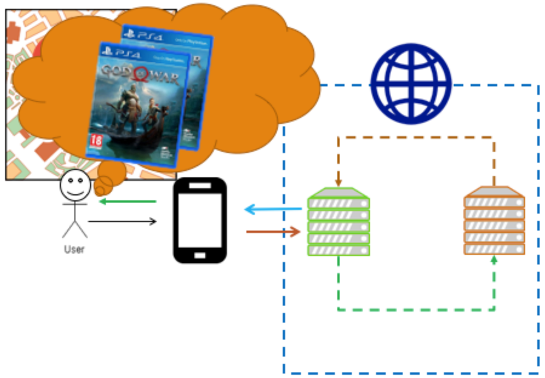
Inspector on a LBCRecherche

an OrderedCollection [6 items] (a LBCAnnonce a LBCAnnonce a LBCAnnonce a LBCAnnon... | a LBCAnnonce

Items Raw Meta | Raw Meta

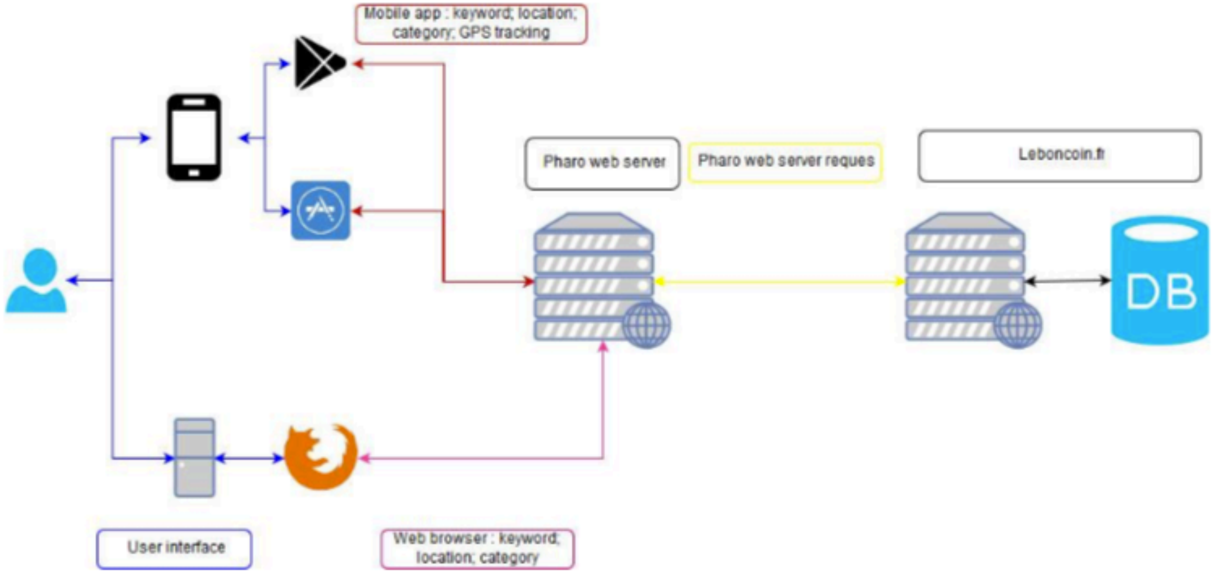
Index	Item
1	a LBCAnnonce
2	a LBCAnnonce
3	a LBCAnnonce
4	a LBCAnnonce
5	a LBCAnnonce
6	a LBCAnnonce

Variable	Value
self	a LBCAnnonce
lbcId	1404587149
titre	Coffret Gran Turismo Sport pour PS4 - jamais servi
prix	95
date	2018-03-22T19:09:00Z
contenu	'Pour cause de décès, vends coffret Gran Turismo Sport Colle
photos	a XMLOrderedList [3 items] (https://img0.leboncoin.fr/ad-ima
tel	nil
lieu	a LBCLieu
visible	true
versionPrece	nil
lbcUrl	https://www.leboncoin.fr/consoles_jeux_video/1404587149.



https://www.leboncoin.fr/recherche/?lat=39.22819697776414&lng=9.109482890255796&radius=200000

Project 4 – LeBonTrouveur



Mobile app : keyword; location; category; GPS tracking

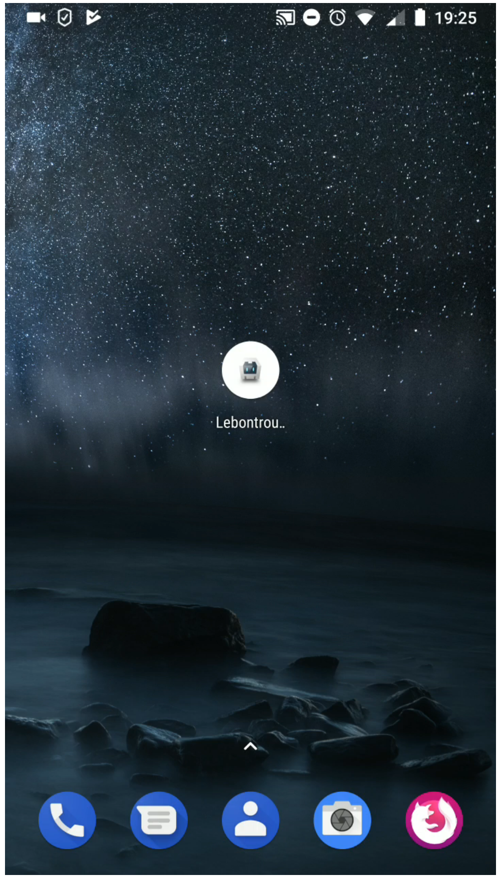
Pharo web server

Pharo web server reques

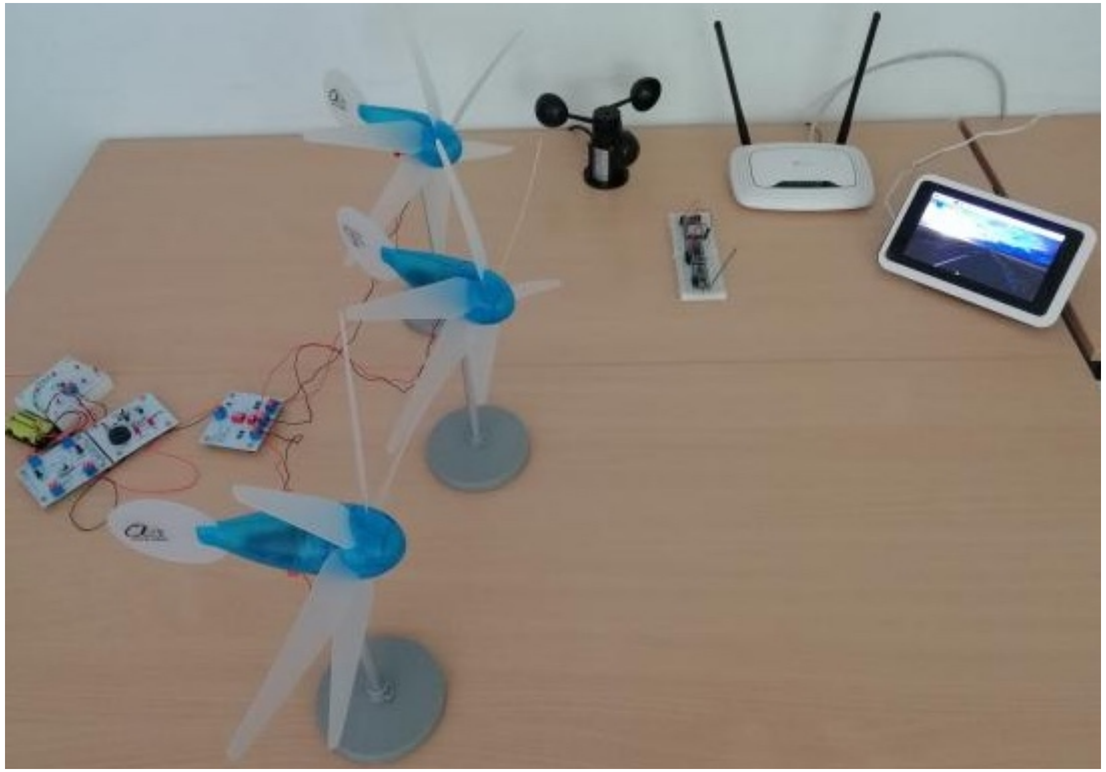
Leboncoin.fr

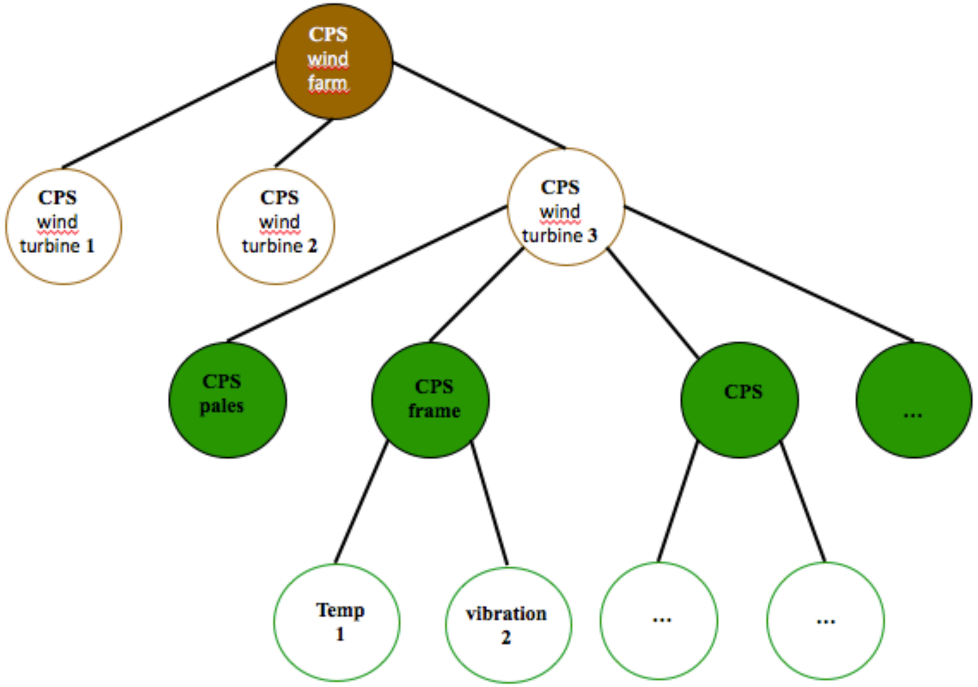
User interface

Web browser : keyword; location; category

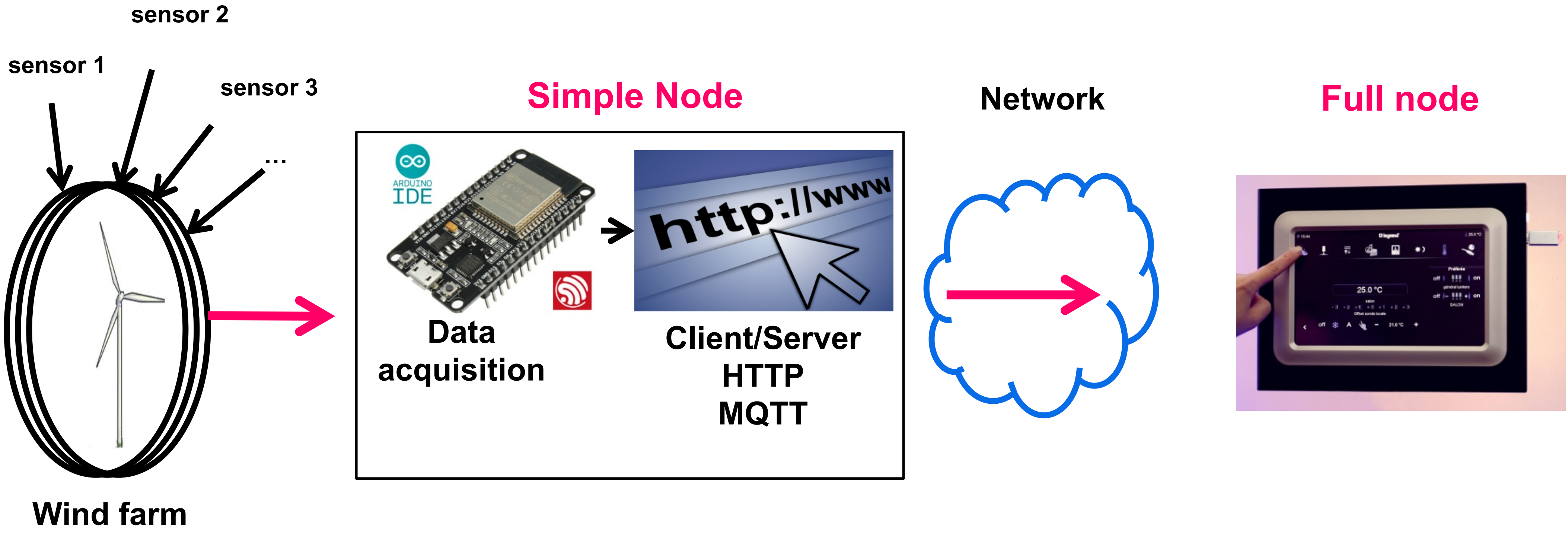


Project 5 – System surveillance





Project 5 – System surveillance



sensor 2

sensor 1

sensor 3

...

Simple Node

Network

Full node

Data acquisition

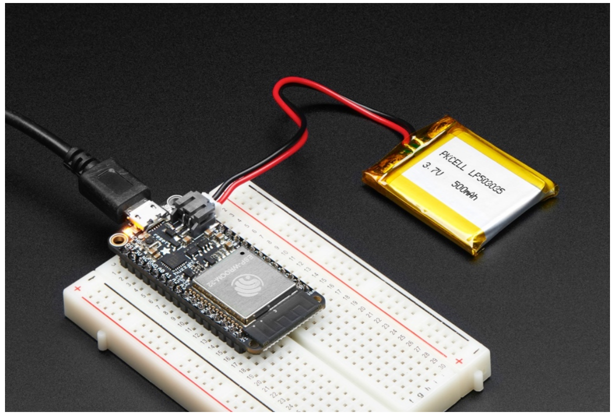
Client/Server
HTTP
MQTT

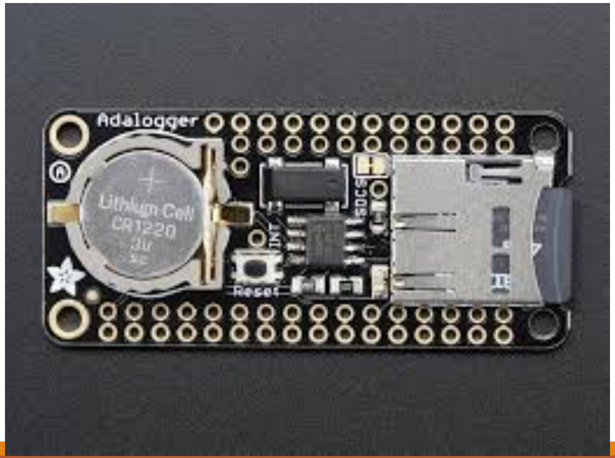
Wind farm

Project 5 – System surveillance

ESP32 (Partial Nodes)

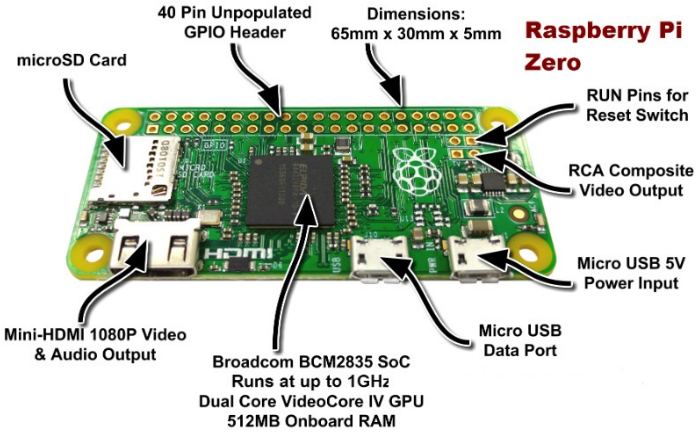
- microcontroller
- Communication buil-in, low energy…
  - Mode server(passif) et/ou client(actif)
    - Wifi, bluetooth, [BARCODE, RFID, GSM…]
  - Données par défaut
    - **autonomy**, **position**, administration
    - **timesince**, …, proc info…
- + Simple sensor and/or actuators
  - environmental, GPS,…
  - motor, driver, …
- + storage
- + **clock** (RTC)

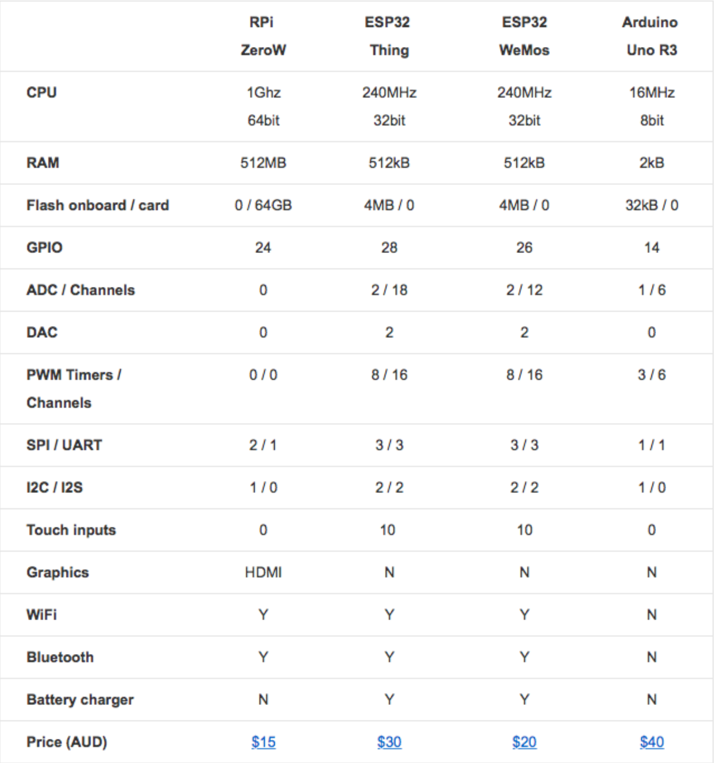




Project 5 – System surveillance

Raspberry Pi 3 and Pi Zéro (FULL NODES)
>> TelePharo

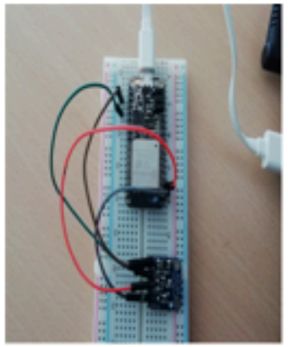

40 Pin Unpopulated GPIO Header
Dimensions: 65mm x 30mm x 5mm
Raspberry Pi Zero
microSD Card
RUN Pins for Reset Switch
RCA Composite Video Output
Micro USB 5V Power Input
Micro USB Data Port
Mini-HDMI 1080P Video & Audio Output
Broadcom BCM2835 SoC Runs at up to 1GHz Dual Core VideoCore IV GPU 512MB Onboard RAM

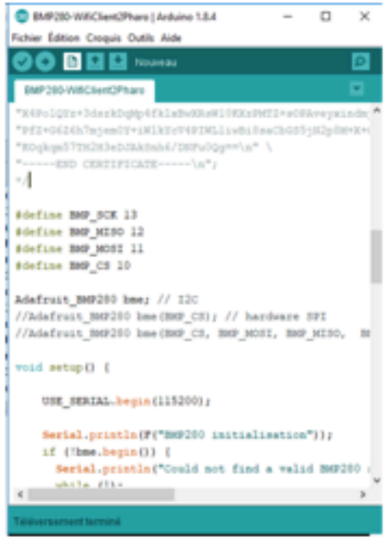


	RPi ZeroW	ESP32 Thing	ESP32 WeMos	Arduino Uno R3
CPU	1Ghz 64bit	240MHz 32bit	240MHz 32bit	16MHz 8bit
RAM	512MB	512kB	512kB	2kB
Flash onboard / card	0 / 64GB	4MB / 0	4MB / 0	32kB / 0
GPIO	24	28	26	14
ADC / Channels	0	2 / 18	2 / 12	1 / 6
DAC	0	2	2	0
PWM Timers / Channels	0 / 0	8 / 16	8 / 16	3 / 6
SPI / UART	2 / 1	3 / 3	3 / 3	1 / 1
I2C / I2S	1 / 0	2 / 2	2 / 2	1 / 0
Touch inputs	0	10	10	0
Graphics	HDMI	N	N	N
WiFi	Y	Y	Y	N
Bluetooth	Y	Y	Y	N
Battery charger	N	Y	Y	N
Price (AUD)	$15	$30	$20	$40

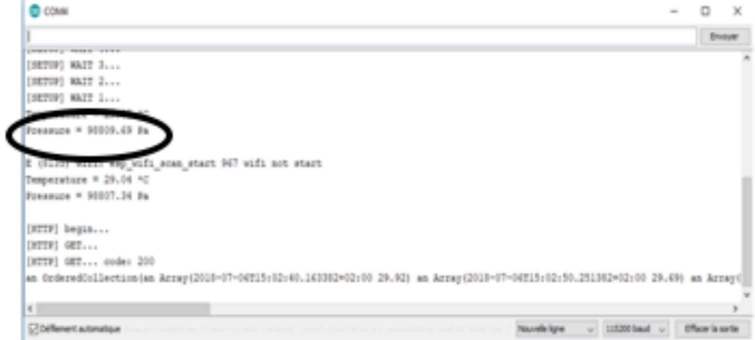
Project 5 – System surveillance

Client mode

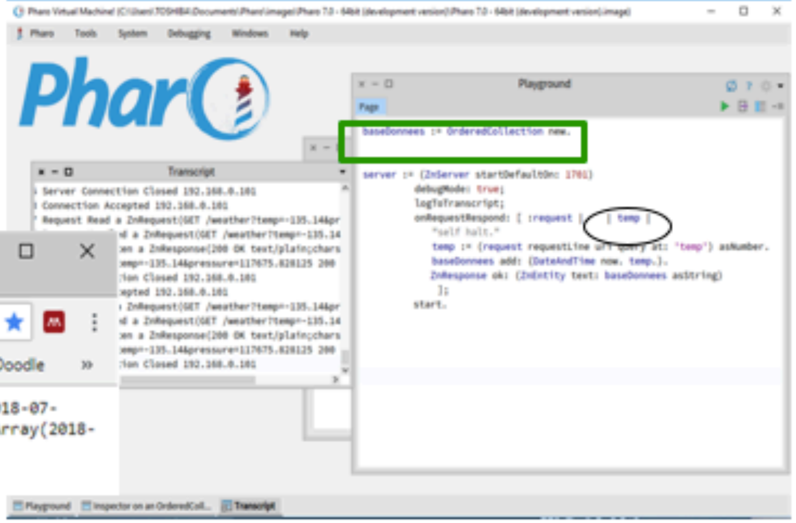



BMP280-WifiClient2Pharo | Arduino 1.8.4
Fichier Édition Croquis Outils Aide
Nouveau
BMP280-WifiClient2Pharo
Téléversement terminé

```
"X4PolQYz+3dezkDgMp6fklzBwXRsW10KKrPMTI+s0BAvrpyindm
"PfI+G6Z6h7mjemUY+iWlkYcV4PIWLlivBi8eaCbGS5jN2p8M+X+
"KOqkqm57TH2H3eDJAkSnh6/DNFu0Qg==\n" \
"-----END CERTIFICATE-----\n";
*/

#define BMP_SCK 13
#define BMP_MISO 12
#define BMP_MOSI 11
#define BMP_CS 10

Adafruit_BMP280 bme; // I2C
//Adafruit_BMP280 bme(BMP_CS); // hardware SPI
//Adafruit_BMP280 bme(BMP_CS, BMP_MOSI, BMP_MISO,  BM

void setup() {

    USE_SERIAL.begin(115200);

    Serial.println(F("BMP280 initialisation"));
    if (!bme.begin()) {
      Serial.println("Could not find a valid BMP280 s
      while (1);
```

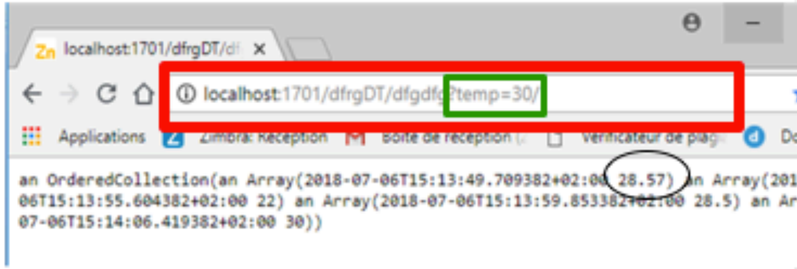


```
[SETUP] WAIT 3...
[SETUP] WAIT 2...
[SETUP] WAIT 1...
Pressure = 98809.49 Pa

E (8130) wifi: esp_wifi_scan_start 947 wifi not start
Temperature = 29.04 *C
Pressure = 98807.34 Pa

[HTTP] begin...
[HTTP] GET...
[HTTP] GET... code: 200
an OrderedCollection(an Array(2018-07-06T15:02:40.163382+02:00 29.92) an Array(2018-07-06T15:02:50.251382+02:00 29.69) an Array(
```


Pharo Virtual Machine! C:\Users\TOSHIBA\Documents\Pharo\images\Pharo 7.0 - 64bit (development version)\Pharo 7.0 - 64bit (development version).image
Pharo
Tools
System
Debugging
Windows
Help
Pharo
Transcript
Playground
Page
Playground
Inspector on an OrderedColl...
Transcript

```
Server Connection Closed 192.168.0.101
Connection Accepted 192.168.0.101
Request Read a ZnRequest(GET /weather?temp=-135.14&pr
d a ZnRequest(GET /weather?temp=-135.14
en a ZnResponse(200 OK text/plain;chars
emp=-135.14&pressure=117675.828125 200
ion Closed 192.168.0.101
epted 192.168.0.101
ZnRequest(GET /weather?temp=-135.14&pr
d a ZnRequest(GET /weather?temp=-135.14
en a ZnResponse(200 OK text/plain;chars
emp=-135.14&pressure=117675.828125 200
ion Closed 192.168.0.101
```

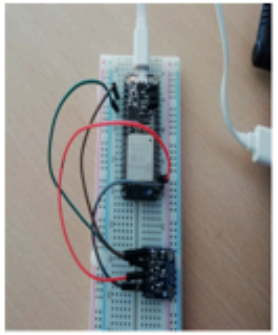
```
baseDonnees := OrderedCollection new.

server := (ZnServer startDefaultOn: 1701)
        debugMode: true;
        logToTranscript;
        onRequestRespond: [ :request |   | temp |
          "self halt."
          temp := (request requestLine uri query at: 'temp') asNumber.
          baseDonnees add: {DateAndTime now. temp.}.
          ZnResponse ok: (ZnEntity text: baseDonnees asString)
           ];
        start.
```

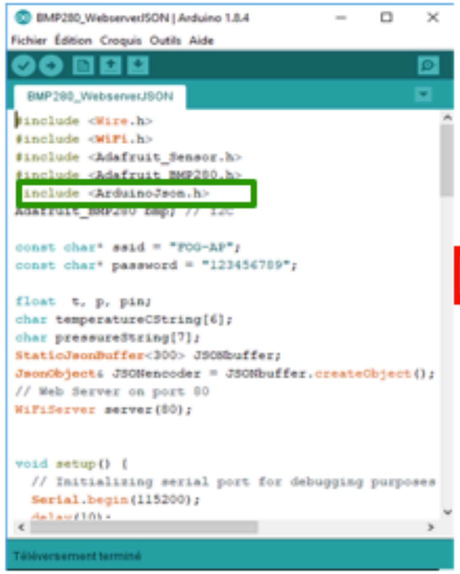


```
an OrderedCollection(an Array(2018-07-06T15:13:49.709382+02:00 28.57) an Array(2018-07-
06T15:13:55.604382+02:00 22) an Array(2018-07-06T15:13:59.853382+02:00 28.5) an Array(2018-
07-06T15:14:06.419382+02:00 30))
```

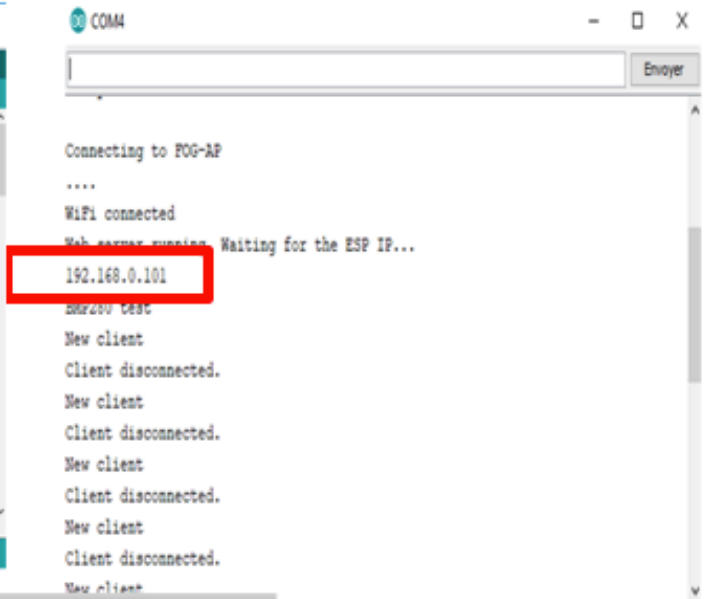
Project 5 – System surveillance

Serveur mode

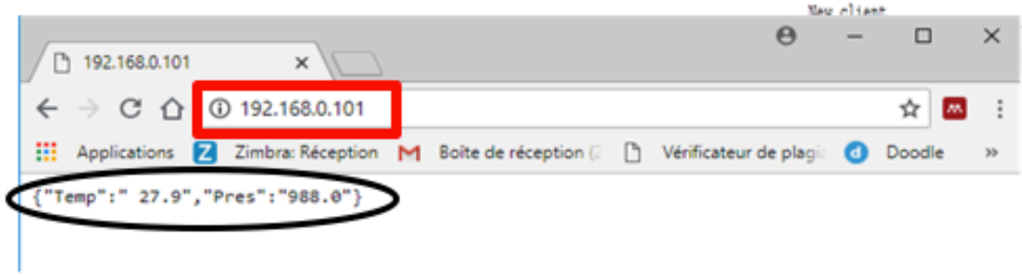



BMP280_WebserverJSON | Arduino 1.8.4
Fichier Édition Croquis Outils Aide
BMP280_WebserverJSON
Téléversement terminé

```
#include <Wire.h>
#include <WiFi.h>
#include <Adafruit_Sensor.h>
#include <Adafruit_BMP280.h>
#include <ArduinoJson.h>
Adafruit_BMP280 bmp; // I2C

const char* ssid = "FOG-AP";
const char* password = "123456789";

float  t, p, pin;
char temperatureCString[6];
char pressureString[7];
StaticJsonBuffer<300> JSONbuffer;
JsonObject& JSONencoder = JSONbuffer.createObject();
// Web Server on port 80
WiFiServer server(80);


void setup() {
  // Initializing serial port for debugging purposes
  Serial.begin(115200);
  delay(10);
```

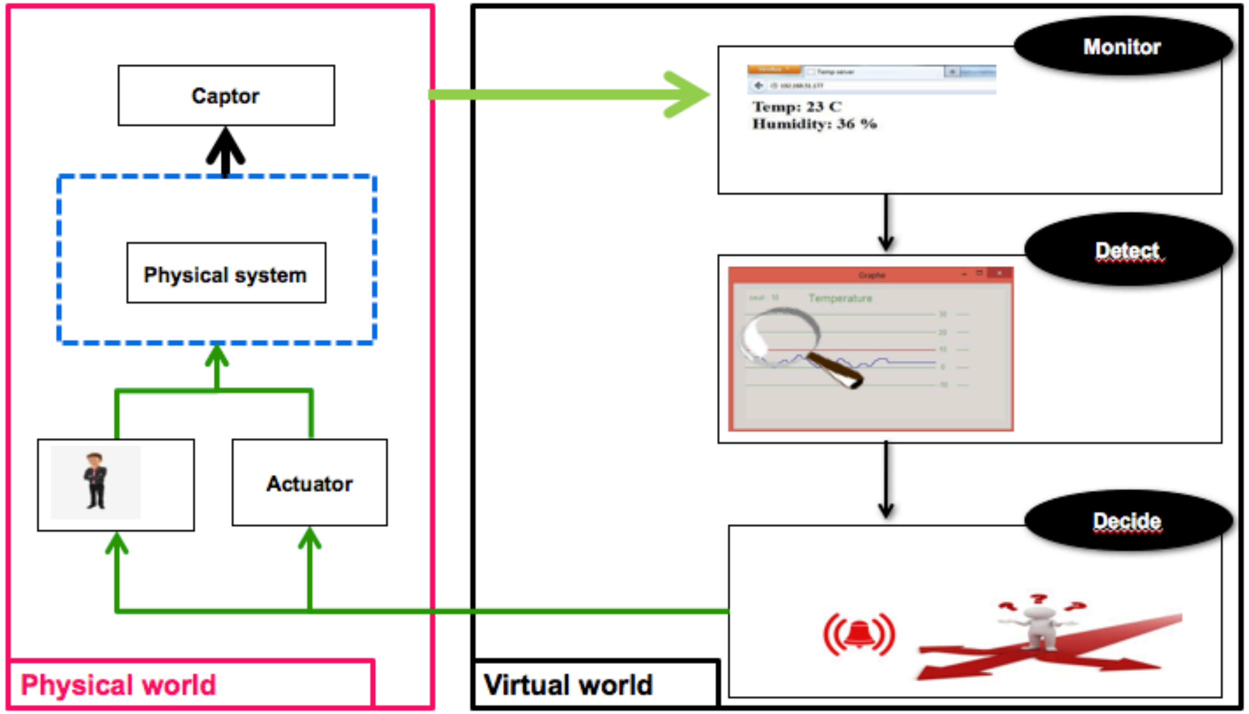


```
Connecting to FOG-AP
....
WiFi connected
Web server running. Waiting for the ESP IP...
192.168.0.101
BMP280 test
New client
Client disconnected.
New client
Client disconnected.
New client
Client disconnected.
New client
Client disconnected.
New client
```

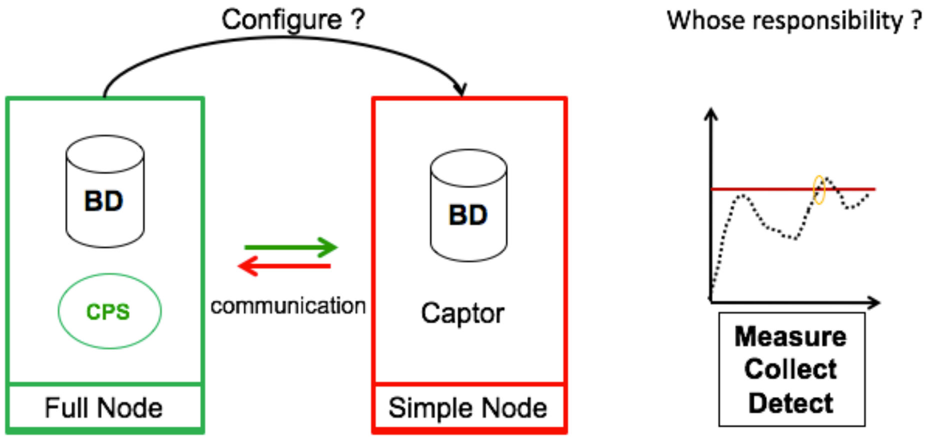


```
{"Temp":" 27.9","Pres":"988.0"}
```

Project 5 – System surveillance



Temp: 23 C
Humidity: 36 %



Conclusion

IoT Meeting tomorrow
around 6:00pm

Conclusion

A really exciting and cool experience

Second iteration

- Starting next week !

TO DO LIST

- Improve default image
- Usage of GIT/Github through Iceberg
- More deeplearning
  - TensorFlow, Keras through Pharo
- Provide a better skeleton and tutorial to store in-image data

Use in research

- **IoT** within **Maintenance for systems (cyber-physical-systems)**

WHEN YOU
DO SOMETHING OUT
OF LOVE, YOU DON'T
COUNT THE COST.
♥

to be continued