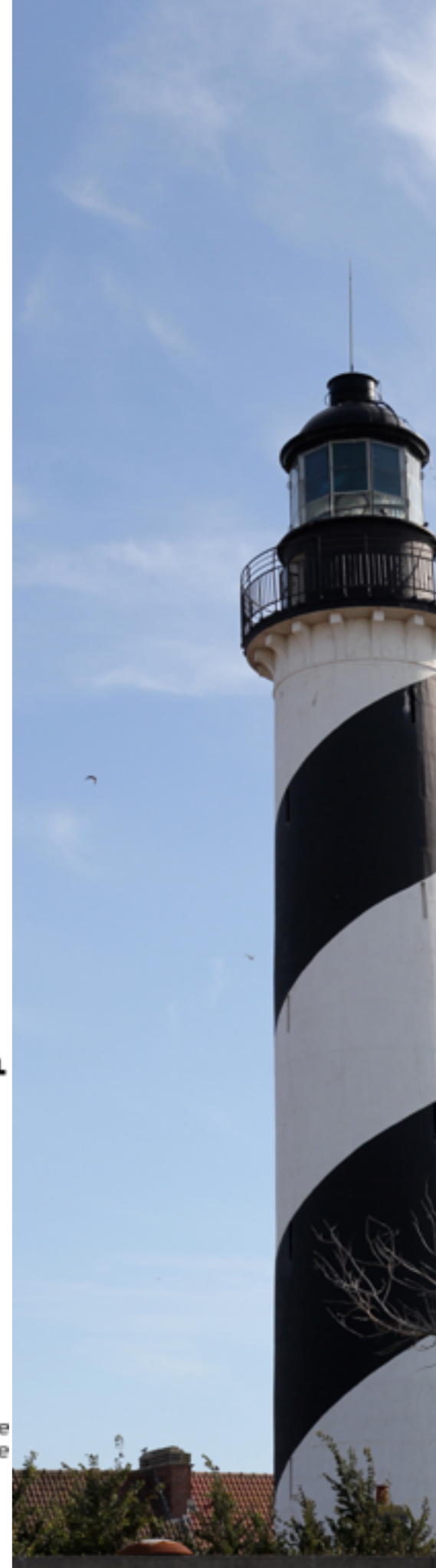


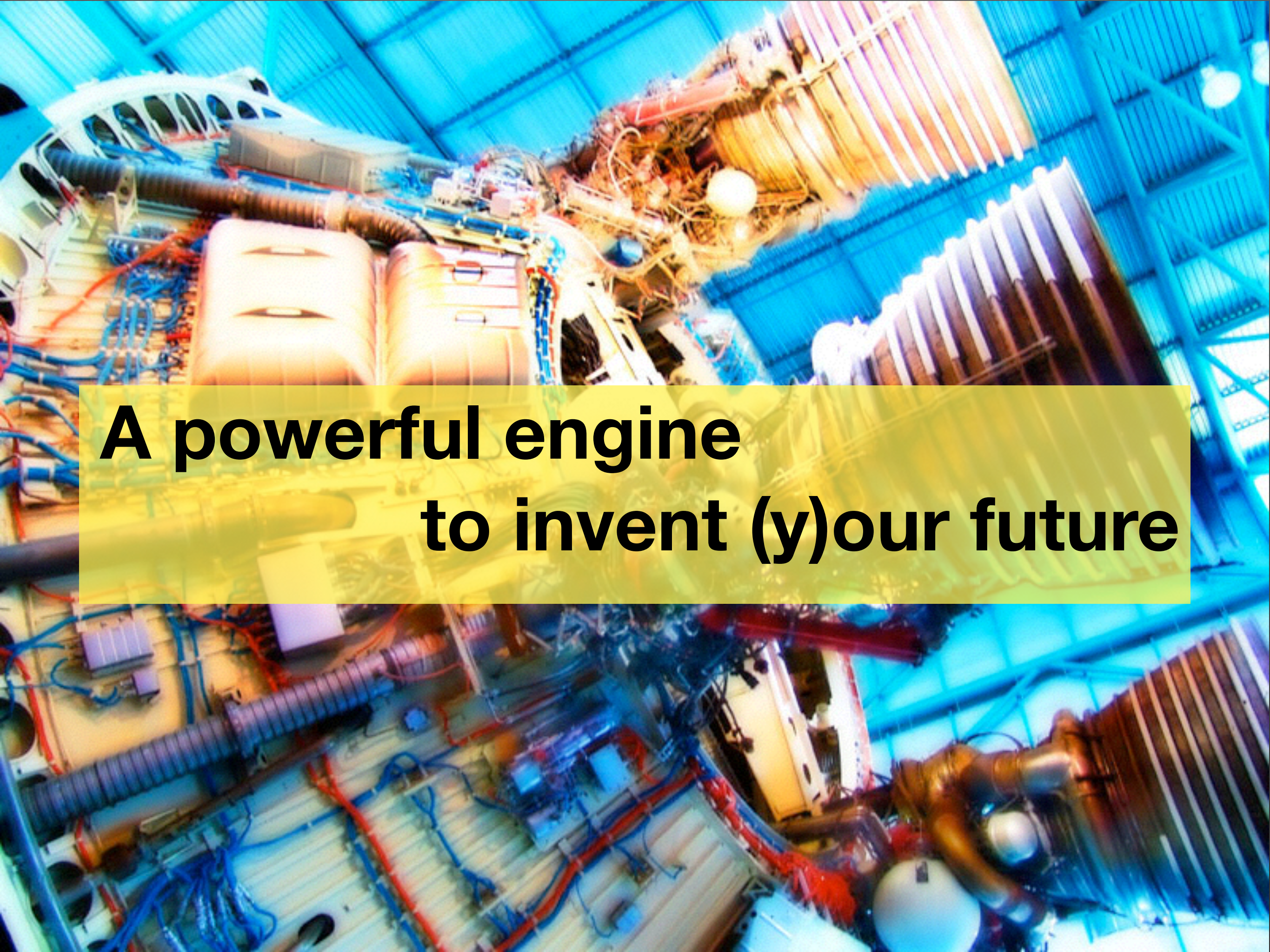
Pharo news

Consortium.pharo.org


<http://www.pharo.org>



You may remember...



**A powerful engine
to invent (y)our future**



**An ecosystem where
innovation/business bloom**

More Pharo's Teachers

- Uni. of Buenos Aires • Uni. of Bern • Uni. of Maroua • Uni. of Brussels • Ecole des Mines de Douai • Uni. de Savoie • Ivan Franko Nat. Uni. of Lviv • Czech Technical Uni. • CULS Prague
- Uni. of Quilmes • Uni. of La Plata • Northern Michigan Uni. • Uni. Technologica Nacional (UTN) • Uni. Catholic of Argentina • Uni. of Santiago • Uni. Policnica de Catalunya • Uni. de Bretagne Occidentale • Uni. of Tomsk • Uni. of Fernhagen • IT University of Copenhagen • Uni. Cat del Sacro Cuore of Brescia • Uni. of Yaounde • Uni. of Saint-Louis • Uni. of Lomé • INFIL • Uni. of Lyon • Uni. of Cagliari



More Tweets, blogs, buzz

- ✦ Pharo 3,904 tweets / 1,485 followers
- ✦ S. Ducasse tweets 1265 / 1083 followers
- ✦ S. Stinckwich 15.7K / 1506 followers
- ✦ Moose 998 tweets / 506 followers
- ✦ Youtube Pharo smalltalk: about 1540 videos!

Kind of a dream

Only one mail per month!

1300 happy subscribers

MailChimp

Here's a quick overview of your list.

Pharo News

1

Subscribed

0

Unsubscribed

1321

List Total

Blogs

- ✦ <http://pharo.org/blogs>
- ✦ <http://astares.blogspot.co.uk>
- ✦ <http://clementbera.wordpress.com>
- ✦ <http://pharoweekly.wordpress.com>

- Guille Polito, [Playing with Objects](#)
- Mariano Martinez Peck, [Sending messages](#)
- Igor Stasenko, [Computer Adventures](#)
- Laurent Laffont, [MaGaLoMa](#)
- Esteban Lorenzano, [The Martian Chronicles](#)
- Tudor Girba, [Humane assessment](#)

More Contributors

Over 100 contributors
for Pharo 5.0

****THANK** YOU ALL !!!**

There are more and more people that we
never met!

We need to drink a beer with you:)

More Research Groups

Lafhis (AR)

Software Composition
Group (CH)

CAR (FR)

RMOD (FR)

Ummisco (IRD)

Reveal (CH)

CEA-List (FR)

Uqbar (AR)

Lab-STICC (FR)

IGEVET (AR)

Pleiad (CL)

Rych (CL)

OC (FR)

CCMI-FIT (CZ)

ASEREG (BR)

AgileGroup (IT)

LabWare Consortium Matching Campaign

Any participation to the consortium will be doubled by LabWare, Feenk, ObjectProfile!

[http://consortium.pharo.org/web/
Membership](http://consortium.pharo.org/web/Membership)

[You may remember...]



Pharo is (y)our vehicule

Pharo is

yours



Pharo is not perfect

But ****every**** single day we improve it

Yes you can have an
impact in 1h per week

New books!!!

- Numerical Methods in Pharo Tx D. Besset
- Entreprise Pharo: a Web Perspective
- Soon “Updated Pharo by Example”
- Soon TinyBlog : a Web Tutorial (FR/EN)

<http://books.pharo.org>

Pharo Books

Pharo is a clean, innovative, open-source, live-programming environment.

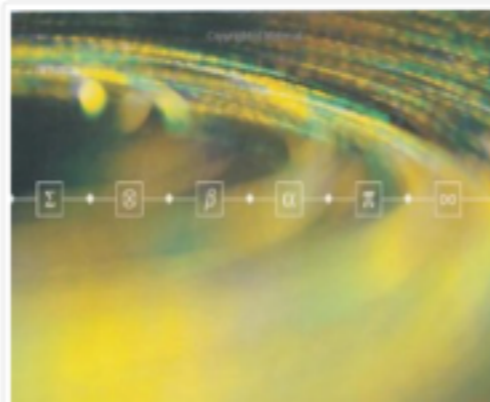
Contribute to the SquareBracketsAssociates community free books
<https://github.com/SquareBracketAssociates/>

Access the book compilation farm!



Pharo by Example, intended for both students and developers, will guide you gently through the Pharo language and environment by means of a series of examples and exercises.

[View details »](#)



Deep into Pharo is the second volume of a series of books covering Pharo. Whereas the first volume is intended for newcomers, this second volume covers deeper topics.

[View details »](#)



Enterprise Pharo is the third volume of the series. This book covers libraries and frameworks for enterprises, and in particular those doing web development.

[View details »](#)



ENTERPRISE *Phar*



*Damien Cassou
Stéphane Ducasse
Luc Fabresse
Johan Fabry
Sven Van Caekenberghe
and many others*

**a WEB
perspective**

On Sale @ ESUG

Agile Visualization

Crafting a visualization requires short and incremental developments, often costly both in time and effort. Agile Visualization promotes the use of the Renset and Flare interactive development environment to significantly reduce the cost of a visualization. Renset significantly averages a visualization development against traditional visualization frameworks and toolkits.

This book focuses on the Renset visualization framework. It covers the design and development of a visualization using Renset. The book covers the design and development of a visualization using Renset. The book covers the design and development of a visualization using Renset. The book covers the design and development of a visualization using Renset.

Agile Visualization covers aspects that are relevant for practitioners, business, and academia to successfully design and implement a visualization.



Alexandre Bergel is Assistant Professor and Director of the University of Chile. Alexandre Bergel and his collaborators carry out research in software engineering and software quality, more specifically in code profiling, testing and data visualization.



On Sale @ ESUG



Pharo MOOC on FUN

- 3000 registered people
- Around 300 finished all the exercises and got a credit
- Not sure we will do another iteration


<http://MOOC.Pharo.org>

- Everything is in Creative Commons
- 7 weeks / 1h videos a week
- 60 lectures/videos + 30 interactive videos
- Exercises + Challenges + Mini Projects
- subtitle: eng/french/(spanish we are looking for subwriters)

<http://MOOC.Pharo.org>

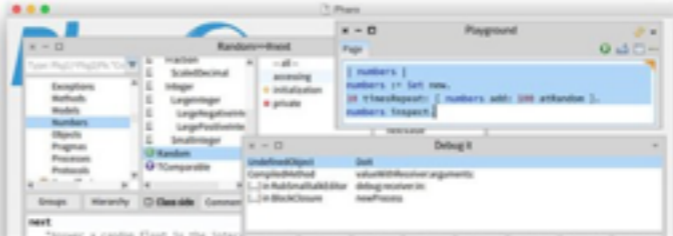
PharO Download Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Resources About

The Pharo MOOC



The immersive programming experience

Pharo is a pure object-oriented programming language and a powerful environment, focused on simplicity and immediate feedback (think IDE and OS rolled into one).



00:00 | -02:34

About this course

If you are either a beginner or an expert in object-oriented programming, this MOOC will change the way you program with objects: come and learn or rediscover object-oriented programming with Pharo! [more...](#)

Download Pharo

To get a version of Pharo ready for the MOOC, please follow these steps:

1. Download and install the [Pharo Virtual Machine \(VM\)](#)
Only for **linux users** (tested on Ubuntu 16.04):

```
sudo dpkg --add-architecture i386
sudo apt-get update
sudo apt-get install libx11-6:i386 libgl1-mesa-glx:i386 libfontconfig1:i386 libssl1.0.0:i386
curl http://get.pharo.org/vm50 | bash
# you now have a pharo-ui script in the current folder to launch pharo images
```

Pharo Starter Kit

- One USB Stick
- ****EVERYTHING**** packaged and ready

The screenshot displays the Pharo Starter Kit web application interface. At the top left, the 'unisciel' logo is visible. In the top right corner, there are navigation links for 'contenu', 'menu', 'navigation', and 'pied de page', along with the text 'PHAR'. The main content area is titled 'Teaser / Bande Annonce' and features a video player. The video player shows a man standing in front of a screen displaying a 3D visualization of a network or graph structure. The video player controls indicate a duration of 00:10 and a progress of -02:10. Below the video player, there is a placeholder for 'texte'. On the left side of the interface, there is a sidebar menu with a list of items: 'Teaser / Bande Annonce', 'Introduction', 'Teachers', 'Week 1 : Welcome on Board and Syntax Discovery', 'Week 2 : Pharo Syntax, Blocks and Inspector', 'Week 3 : Design, Class Methods and Collections', 'Week 4: Inheritance & Lookup and Web Development', 'Week 5 : Exception, Debugging and Reflection', 'Week 6 : Rethink lookup and Advanced Object-Oriented Design', and 'Week 7 : More on Object-Oriented Design and Testing'. At the bottom center, there is a yellow circular icon with a white arrow pointing upwards.

Pharo5.0

A Major Release



A Major Release

- ✦ Cog + Spur
- ✦ Complete New uFFI (compatible with NB)
- ✦ Many improvements
- ✦ New tools
- ✦ Massive cleaning

Pharo5.0

- ✦ Released Spring 2016
- ✦ >1700 Issues closed

'Small' stuff... Updates

- ✦ Improved Refactorings (Tx Mark)
- ✦ OSSubprocess (Tx Mariano)
- ✦ Quality Assistant (Tx Yuriy)
- ✦ Breakpoints (Tx Marcus)
- ✦ Rubric for Text (as a way to go to TxText (Tx Alain))
- ✦ 6MB Deployment Image (Tx Pavel/Guille)
- ✦ Browser and Tool cleanups (Tx Nicolai)
- ✦ New bytecode set (Tx Clément/Eliot)
- ✦ Compiler enhancements (Tx Marcus/Clement)

Dark Theme2

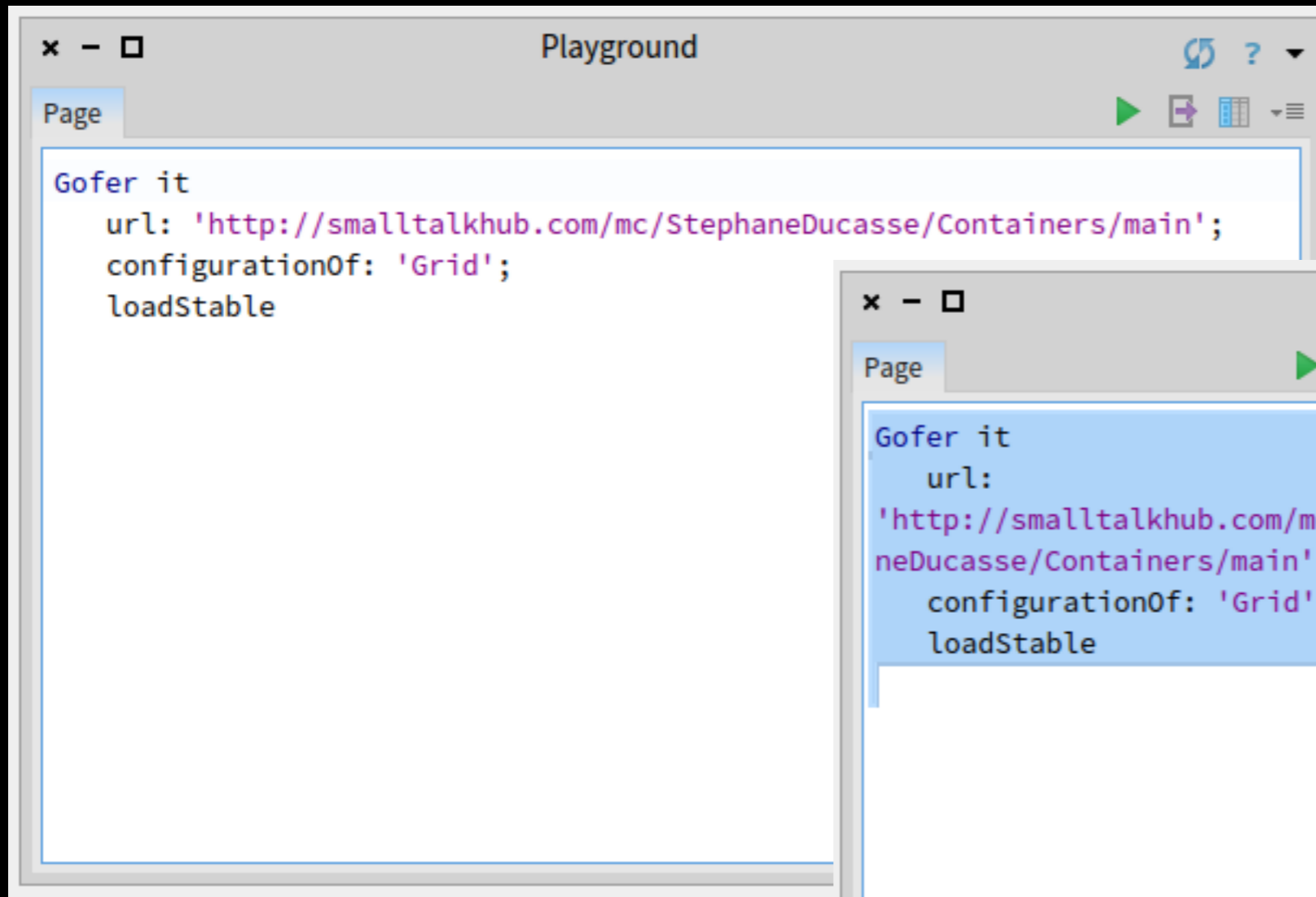
The screenshot displays the Pharo IDE interface in a dark theme. The main workspace shows a calculator application with a display of '3.141592653589793'. The calculator has buttons for mathematical operations like x^y, LOG, LN, e^x, CLEAR, SQRT, ARC, SIN, COS, TAN, 1/x, SWAP, ROLL, STO, RCL, ENTER, +/-, EE, CLx, and digits 0-9. The bottom right pane shows the Test Runner with a green status bar indicating '118 run, 118 passes, 0 skipped, 0 expected failures, 0 failures, 0 errors, 0 unexpected passes'. The Test Runner lists several test classes, including HP35-Calculator, HP35-CalculatorModelTests, HP35-CalculatorUIModelTests, and RPNCalculatorCoreTests. The bottom left pane shows a 'Test Finished' message for the RPNCalculatorCoreTests class. The top left pane shows the Pharo logo and the workspace content, including the command 'HP35CalculatorUIModel new inspect; openWithSpec.' and the object inspector for HP35CalculatorModel.

GT Tools

- ✦ Start to replace old tools
- ✦ Workspace + Inspector + Spotter

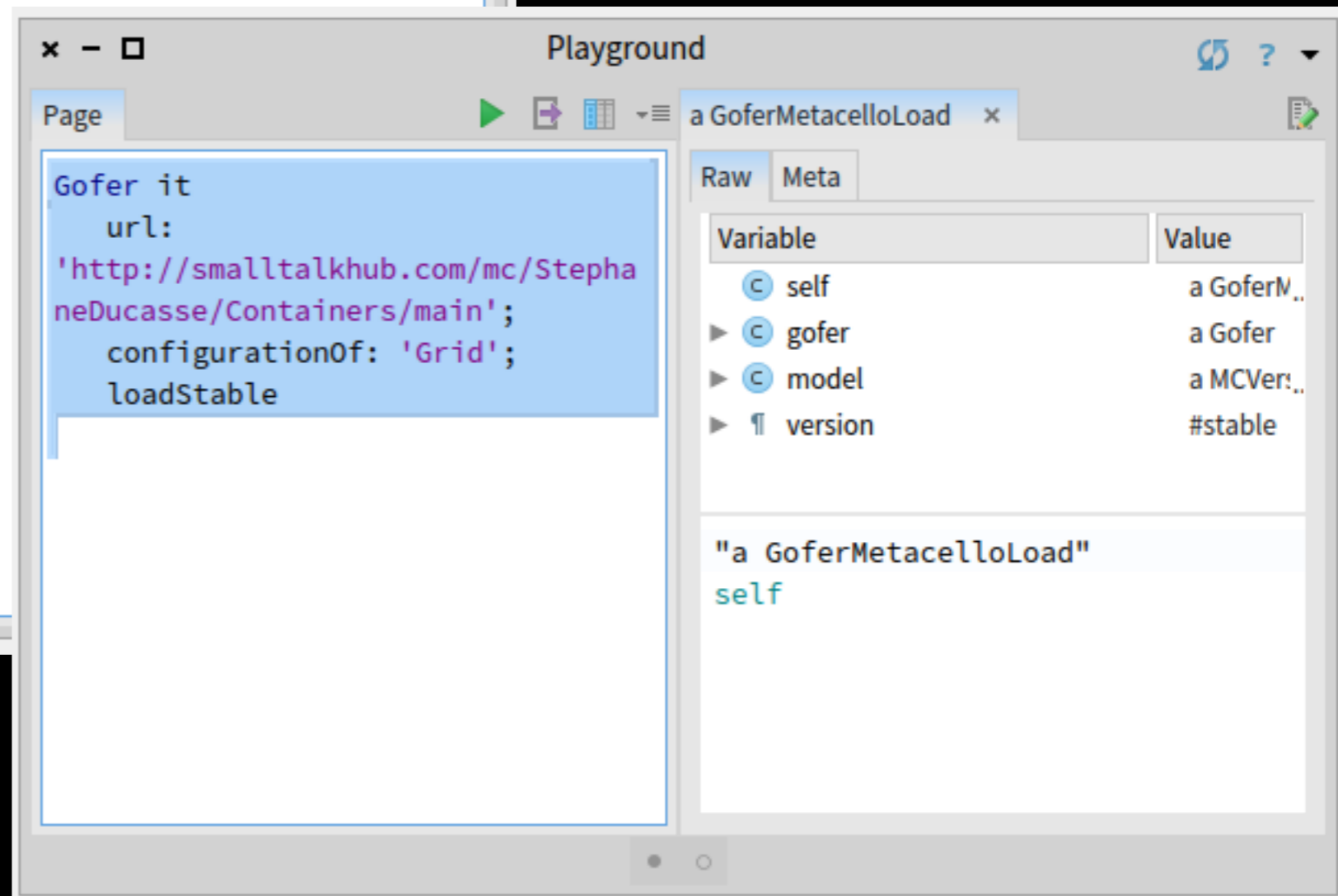
<http://gt.moosetechnology.org>

Playground: Workspace on steroids



A screenshot of the Playground workspace. The window title is "Playground". The code editor contains the following code:

```
Gofer it
url: 'http://smalltalkhub.com/mc/StephaneDucasse/Containers/main';
configurationOf: 'Grid';
loadStable
```



A screenshot of the Playground workspace, showing the same code as the first screenshot. The code is highlighted in blue. On the right side, there is a variable inspector window titled "a GoferMetacelloLoad". The inspector shows the following variables and their values:

Variable	Value
self	a GoferM..
gofer	a Gofer
model	a MCVer..
version	#stable

Below the table, the text "a GoferMetacelloLoad" and "self" are displayed.

GTInspector:
empower you to revisit your
interaction with your objects

a MethodDictionary [99 items] (#*->Point>...)



a CompiledMethod (Point>>#scaleTo:)



Items Raw Meta

Key	Value
#x	Point>>#x
#theta	Point>>#theta
#quadrantOf:	Point>>#quadrantOf:
#onLineFrom:to:within:	Point>>#onLineFrom:to:within:
#bitShiftPoint:	Point>>#bitShiftPoint:
#<	Point>>#<
#scaleFrom:to:	Point>>#scaleFrom:to:
#sideOf:	Point>>#sideOf:
#'\'	Point>>#'\'
#scaleTo:	Point>>#scaleTo:
#grid:	Point>>#grid:
#'/'	Point>>#'/'
#asIntegerPoint	Point>>#asIntegerPoint
#directionToLineFrom:to:	Point>>#directionToLineFrom:to:
#r	Point>>#r
#angleWith:	Point>>#angleWith:
#isInsideCircle:with:with:	Point>>#isInsideCircle:with:with:
#'>='	Point>>#>='
#negated	Point>>#negated
#translateBy:	Point>>#translateBy:
#squaredDistanceTo:	Point>>#squaredDistanceTo:
#flipBy:centerAt:	Point>>#flipBy:centerAt:
#octantOf:	Point>>#octantOf:

50 / 99

enter search query

I... E... S... A... Ir Dε... He... Met...

```

37 <20> pushConstant: 3.0
38 <D1> send: reciprocal
39 <69> popIntoTemp: 1
40 <10> pushTemp: 0
41 <CE> send: x
42 <70> self
43 <CE> send: x
44 <D2> send: asFloat
45 <B9> send: /
46 <6A> popIntoTemp: 2
47 <10> pushTemp: 0
48 <CF> send: y
49 <70> self
50 <CF> send: y
51 <D2> send: asFloat
52 <B9> send: /
53 <6B> popIntoTemp: 3
54 <12> pushTemp: 2
55 <13> pushTemp: 3
56 <B6> send: =
57 <9B> jumpFalse: 62
58 <12> pushTemp: 2

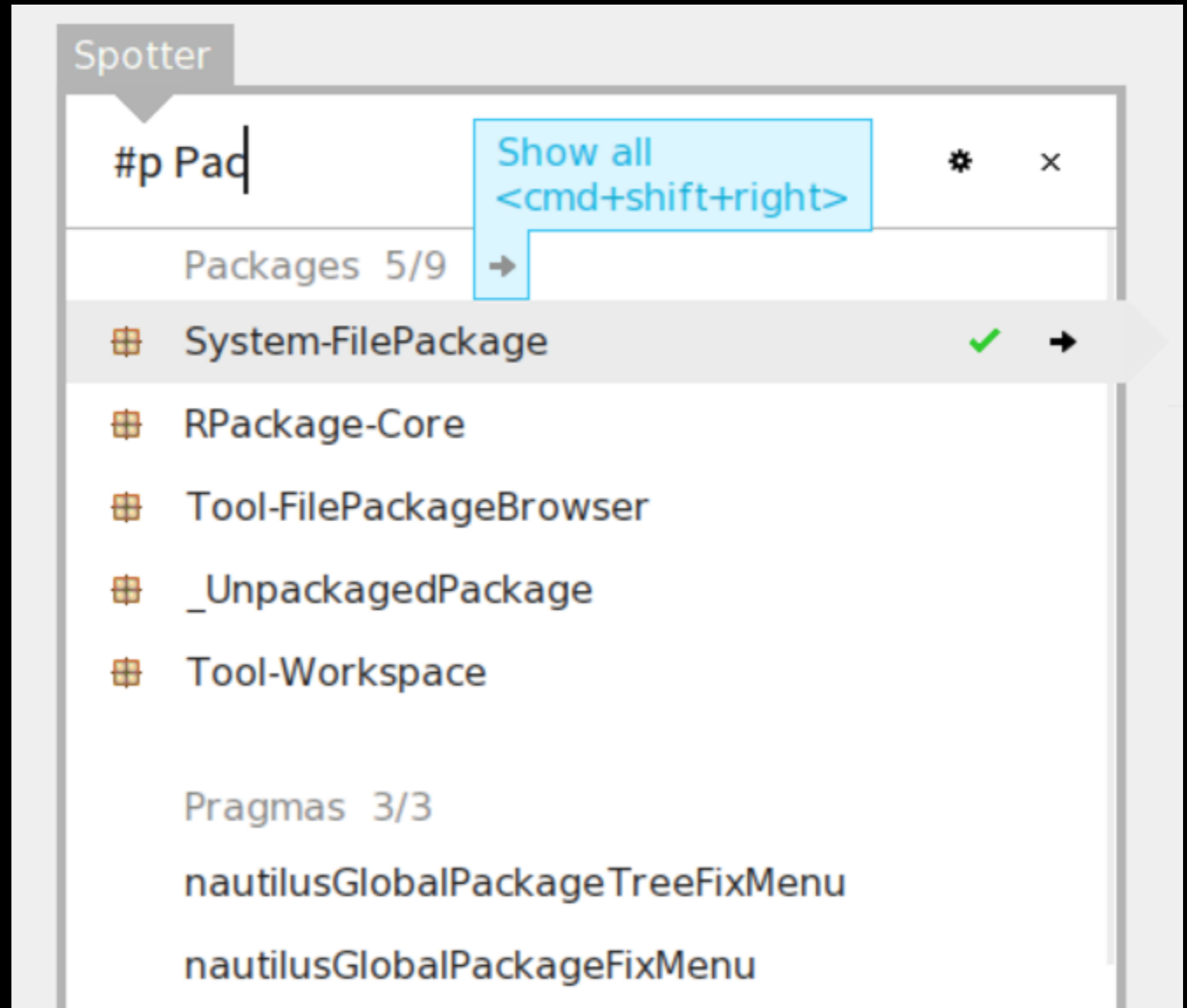
```

GTInspector is the killer
inspector!

Tx



Finding revisited



Soon Faster Than VW :)

- ✦ Now Cog+Spur is in par with VisualWorks :)
- ✦ Soon with Sista even a lot “more faster”
- ✦ Tx Eliot and Clement (and RMoD) for all this!!

A new GC: Spur

- New Object Layout
 - e.g. faster instantiation, larger hash
- Ephemerons, Fast Become:, Pinned Objects
- Immutable
- Double Performance

Yet easy to adopt

- ✦ Moose (152 packages) switched in two afternoons (two people)
- ✦ Others: “I just loaded my packages”

Pharo 6.0 in one
word!



Stabilisation



Stabilisation



Stabilisation

Epicea

- Replace .changes
- High level model:
 - aggregate changes (refactoring)
 - serialized to disk independent of source model

Epicea Log Browser

Prior+Trigger view Expand all

Event

more

Undo 24/1/2014 10:34

ExampleClass >> #fortyTwo 24/1/2014 10:34

Undo 24/1/2014 11:06

ExampleClass >> #fortyTwo 24/1/2014 11:06

#fortyTwo --> #forty2 24/1/2014 11:07

ExampleClass >> #forty2 24/1/2014 11:07 This is a comment

ExampleClass >> #fortyThree 24/1/2014 11:07

ExampleClass >> #fortyTwo 24/1/2014 11:07

'I didn't like the name' 24/1/2014 11:08

'' 24/1/2014 11:09

"'comment ' trim' 24/1/2014 12:52

EpEntryItem >> #displayWidget 24/1/2014 12:53

MC save: Epicea-MartinDias.470 on: <http://smalltalkhub.com/mc/MartinDias/Epicea/main/> 24/1/2014 12:55

Snapshot: /Users/tinchodias/Downloads/Epicea/Epicea-1.image 24/1/2014 12:55

'312312321' 24/1/2014 13:41

Content Filters

"protocol: #example"	"protocol: #example"
fortyThree ^ self fortyTwo + 1	fortyThree ^ self forty2 + 1

sampleInstance and example reconciled

```
CTGrid class >> grid22  
<sampleInstance>
```

```
l grid1 l  
grid1 := self new: 2.  
grid1 atRow: 1 atColumn: 1 put: 1.  
grid1 atRow: 1 atColumn: 2 put: 3.  
grid1 atRow: 2 atColumn: 1 put: 2.  
grid1 atRow: 2 atColumn: 2 put: 4.  
^ grid1
```

Reuse

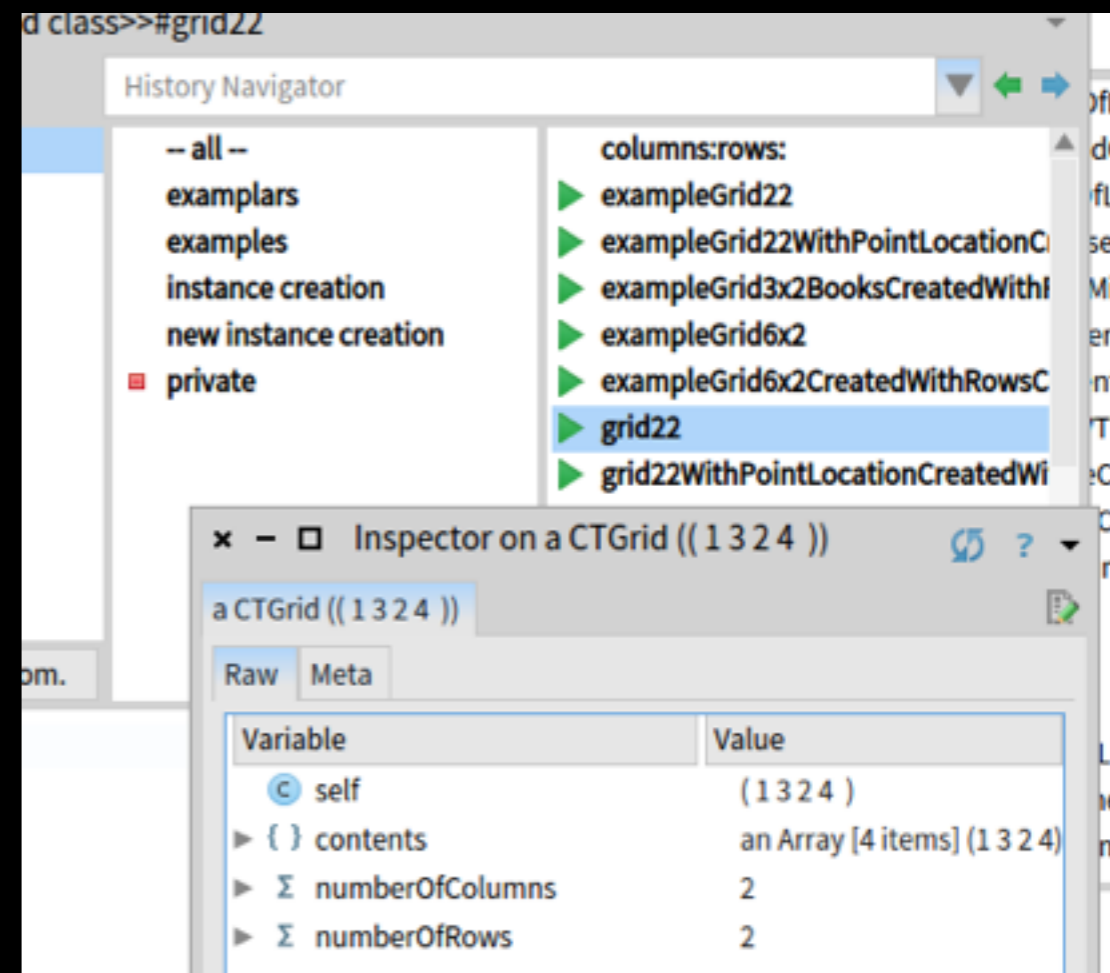
Exploration

```
CTGridTest >> grid22IsGreat
```

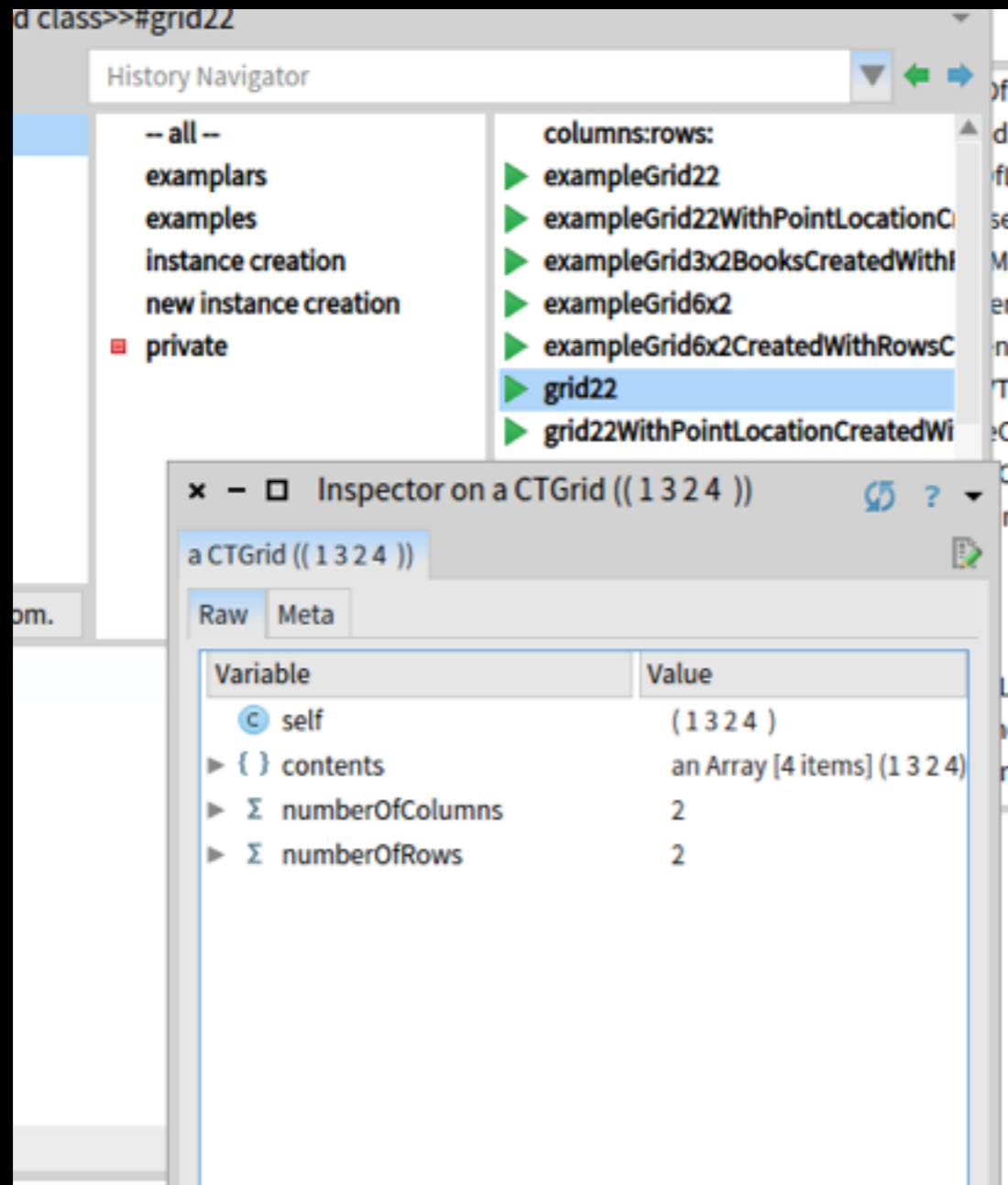
```
self assert: CTGrid grid22 isGreat
```

```
CTGrid class >> exampleFoo
```

Do whatever you want
Display whatever you want



sampleInstance and example reconciled



Exploration

Documentation

Access

New Match tool

The screenshot shows the MatchTool application interface. It is divided into several sections:

- Pattern code:** Contains the code ``@expr isNotNil ifTrue: [`.@contents]`. A checkbox labeled "Method" is unchecked.
- Test code:** Contains the code `engineVolume
 car isNotNil ifTrue: [
 car engine isNotNil ifTrue: [
 ^ car engine volume]] .`. A checkbox labeled "Method" is checked.
- Match button:** A green play button icon followed by the text "Match".
- Match results:** A list of matches:
 - ``@expr` `car engine`
 - ``.@contents` `^ car engine volume`
- Match preview:** A scrollable area showing the pattern code applied to the test code. The first match is highlighted in blue: `car isNotNil ifTrue: [car engine isNotNil ifTrue: [car engine isNotNil ifTrue: [^ car engine volume]]] .`

New Quality Model

Renaku

More rules

Better rules

Tx Yuriy

Ongoing Progress...

64 bits COG VM

- ✦ 64 bits in development
 - ✦ already working for linux and mac (it will be released in September for Pharo)
 - ✦ work in progress for windows
- ✦ Thanks Eliot and "all vm-dev team"

Bootstrap

- Define Pharo in Pharo with Pharo (not C)
- Rebuild the kernel from this definition
- Reload all the rest

Bootstrap in production

- Massive :)
- Massive improvements in quality (deadcode, hidden dependencies, modularity)
- Open the door to many improvements
- No more shrinking :)
- Tx Guille, Christophe and Pavel

Modern Version Control

- Iceberg
 - Git but not only
 - Pull Request

Cargo

- Package management system
- Meta data at the package level
- Support for package distribution (npm, ...)

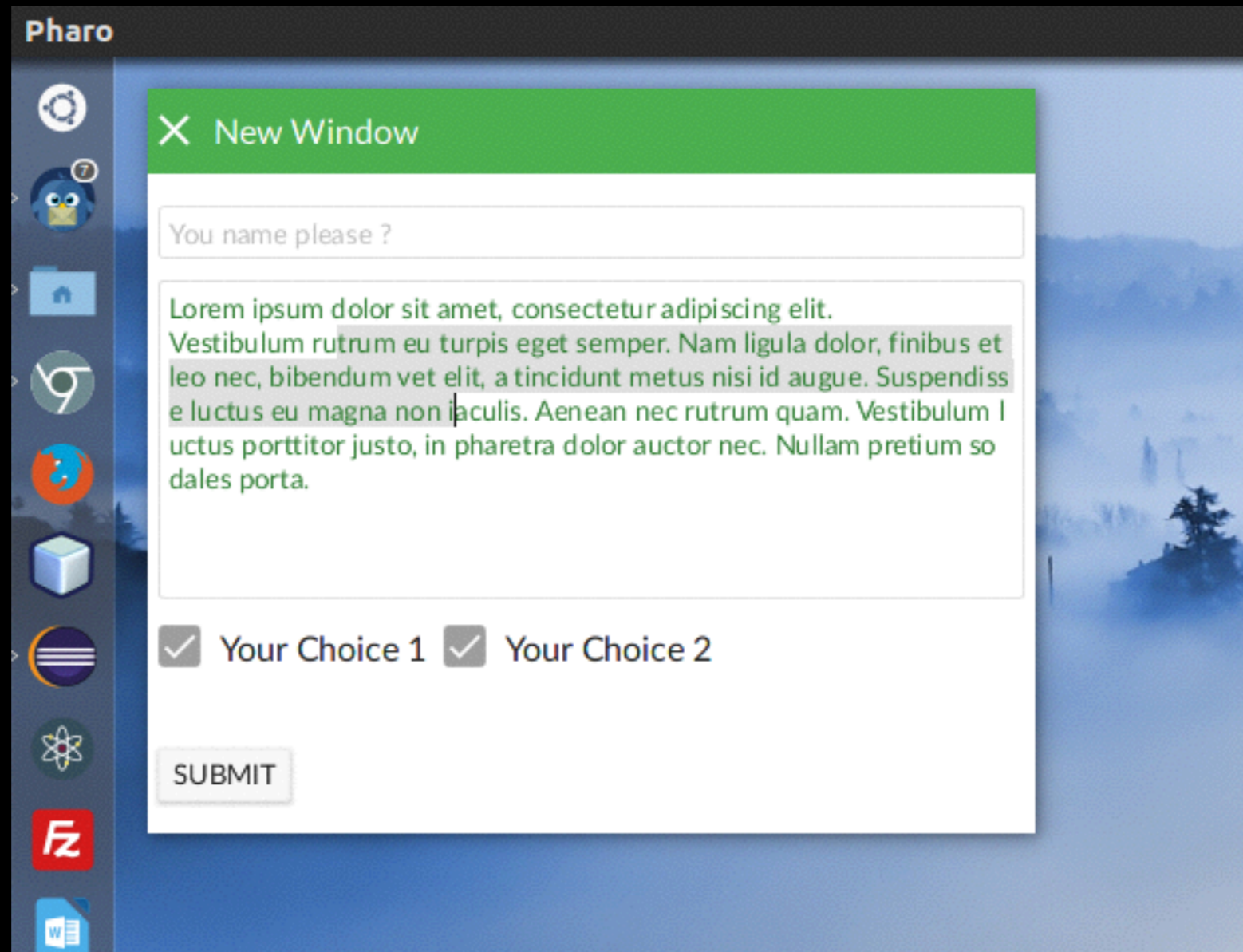
The Future is Bright

- ✦ Sista
- ✦ Bloc
- ✦ Brick
- ✦ ThreadedFFI

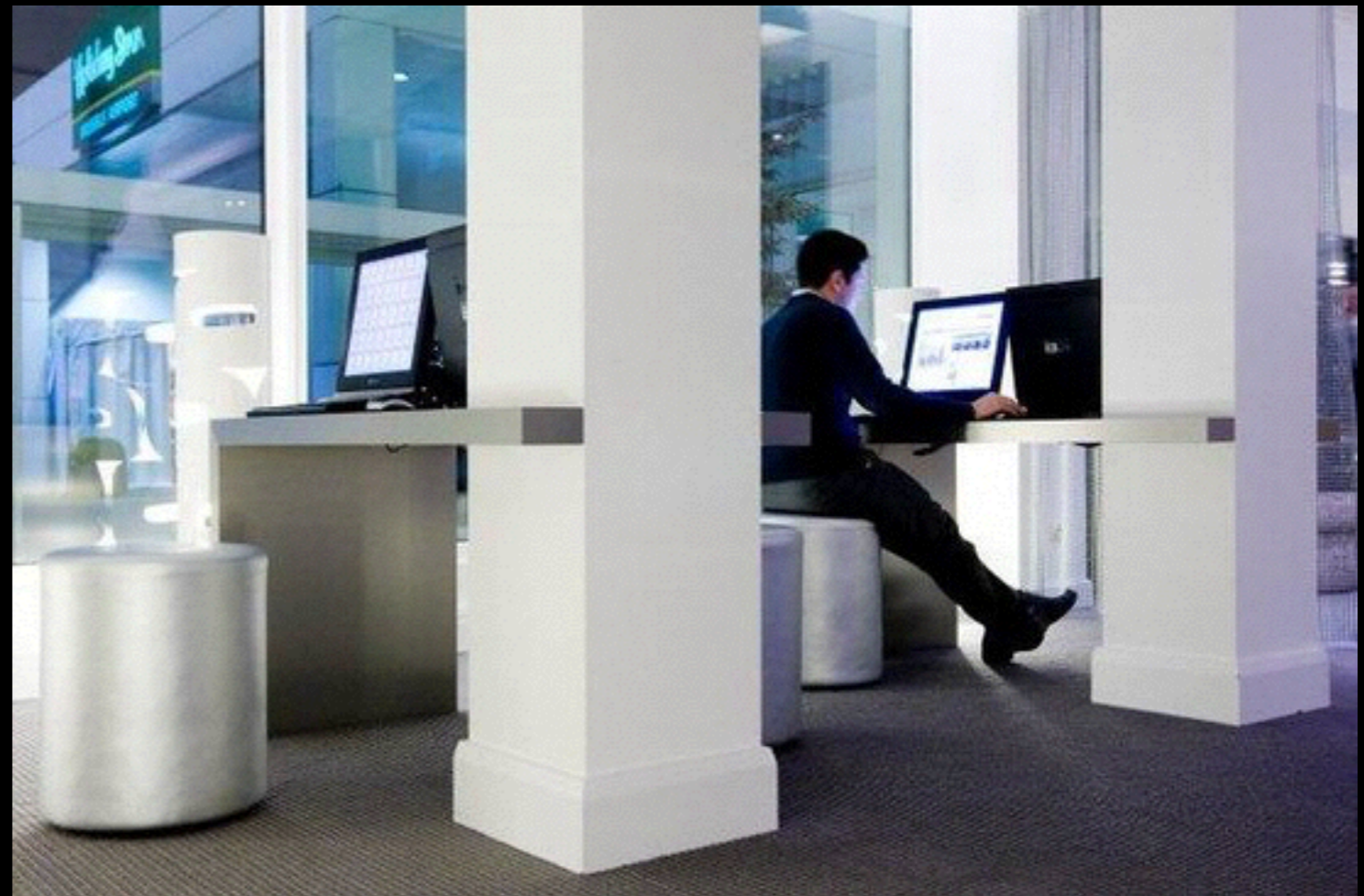
Sista: Runtime Optimizer is stabilizing :)

- ✦ Current JIT work per method
- ✦ Sista: detect hotspots, collect type info ==> Optimize
- ✦ Support 4th level optimisation of modern VMs (V8, Java)
- ✦ Bytecode-2-Bytecode
- ✦ Optimizer implemented in Pharo Image

Block[2] := Bloc anotherSpin



The Business corner



Some Success Stories

Pharo is ATM Like Device in Moscow

Вклады
выгодно быстро удобно

Вклады застрахованы
Система Гарантий Москва

МТС

Яндекс-деньги
Яндекс-деньги

КОММУНАЛЬНЫЕ ПЛАТЕЖИ
Москва
ЖКУ-Москва

Ростелеком
Большая ответственность

Сотовая связь

ЖКХ услуги

Оплата кредитов

Интернет
Телефония

Электронная коммерция

Денежные переводы

Телевидение

РАЗВЛЕЧЕНИЯ И ДОСУГ
ИГРЫ - СОЦ.СЕТИ - ЗНАКОМСТВА

Другие услуги

банке | копия ЧЕКА | Статус платежа

ПОИСК
найди своего провайдера

MobileTerminated ForwardSM

```

plan: SCCPGlobalTitle npISDN;
addr: destGT;
translation: 0;
yourself);

yourself.

forwardSM := ASN1Dictionary new
  at: 'sm-RP-DA' put: (ASN1Dictionary new
    at: 'imsi' put: destIMSI toTBCD;
    yourself);
  at: 'sm-RP-OA' put: (ASN1Dictionary new
    at: 'serviceCentreAddressOA' put: sourceSMSC toE164;
    yourself);
  at: 'sm-RP-UI' put: (ByteArray readHexFrom: '240c9194814813654200005110712195534010c8370bf0690a5ef3';
  yourself.
operationName := 'forwardSM'.

dialogue := ZHLR endPoint newDialogue.

invoke := dialogue
  requestTcInvokeNamed: operationName parameters: for
  class: 1 timeout: 500.

  invoke
  onReturn: [ ];
  onError: [ ];
  onReject: [ ];
  onReturnLast: [:result | ].

dialogue
  requestTcBeginDestinationAddress: imsiAddr
  originatingAddress: mscAddr
  applicationContextName: '0.4.0.0.1.0.25.2' asAsn1Oid .

```

Do it
Print it
Inspect it
Explore it
Debug it
Profile it
Find...
Find again
Extended search...
Do again
Undo

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0	2000	GSM S...	236	invoke forwardSM

Frame 1: 236 bytes on wire (1888 bits), 236 bytes captured (1888 bits)
Linux cooked capture
Internet Protocol Version 4, Src: 208.208.208.208, Dst: 208.208.208.208
Stream Control Transmission Protocol, Src Port: 2005 (2005), Dst Port: 2005 (2005)
MTP 3 User Adaptation Layer
Signalling Connection Control Part
Transaction Capabilities Application Part
GSM Mobile Application
GSM SMS TPOU (GSM 03.40) SMS-BELIEVER
0... .. = TP-RP: TP Reply Path parameter is not set in this SMS SUBMIT/DELIVER
.0.. = TP-UDHI: The TP UD field contains only the short message
..?.. = TP-SRI: A status report shall be returned to the SME
.... 0... = TP-LP: The message has not been forwarded and is not a spawned message
.... .1.. = TP-MMS: No more messages are waiting for the MS in this SC
.... ..00 = TP-MTI: SMS-BELIEVER (0)
TP-Originating-Address - (401884315624)
TP-PID: 0
TP-QCS: 0
TP-Service-Centre-Time-Stamp
TP-User-Data-Length: (16) depends on Data-Coding-Scheme
TP-User-Data
SMS text: Hello from Pharo

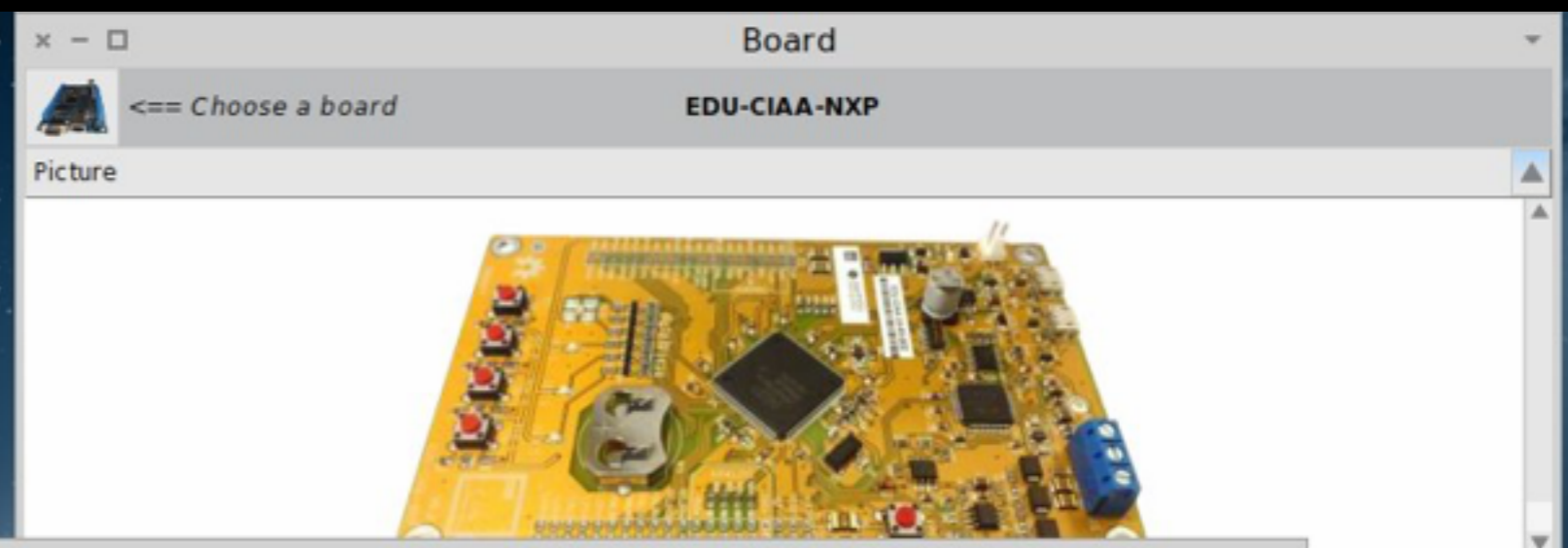
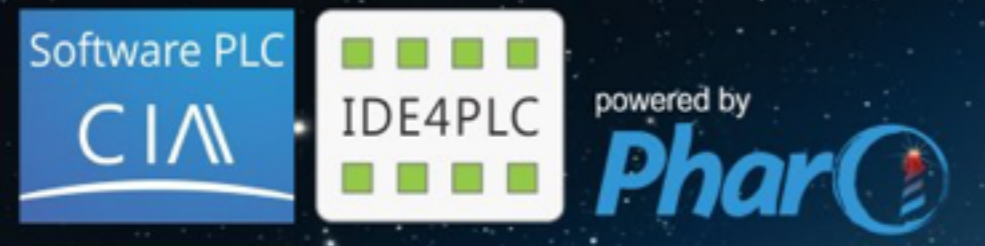
```

0000  62 68 48 84 01 08 08 09  6b 3e 20 1c 06 07 08 11  bH.....k.(.....
0008  85 85 01 01 01 08 11 68  07 80 82 87 80 a1 09 06  .....'.A.....
0016  07 84 00 00 01 08 19 02  6c 41 a1 3f 02 01 01 02  .....LA?.....
0024  01 2e 36 37 80 08 02 02  43 08 10 91 50 f9 84 08  ..07..b.Ch..P...
0032  91 94 51 97 10 08 08 08  04 21 24 0c 91 94 01 08  ..0.....!S....H
0040  13 65 42 00 00 51 18 71  21 95 53 08 10 c8 32 9b  ..e..q i..e..2.
0048  0d 85 95 e5 ef 36 08 0a  0e cb df 08  .....f.....

```

MobileTerminated ForwardSM

Sysmocom: Free Software for Mobile Communication



POU Variable Declarations Editor

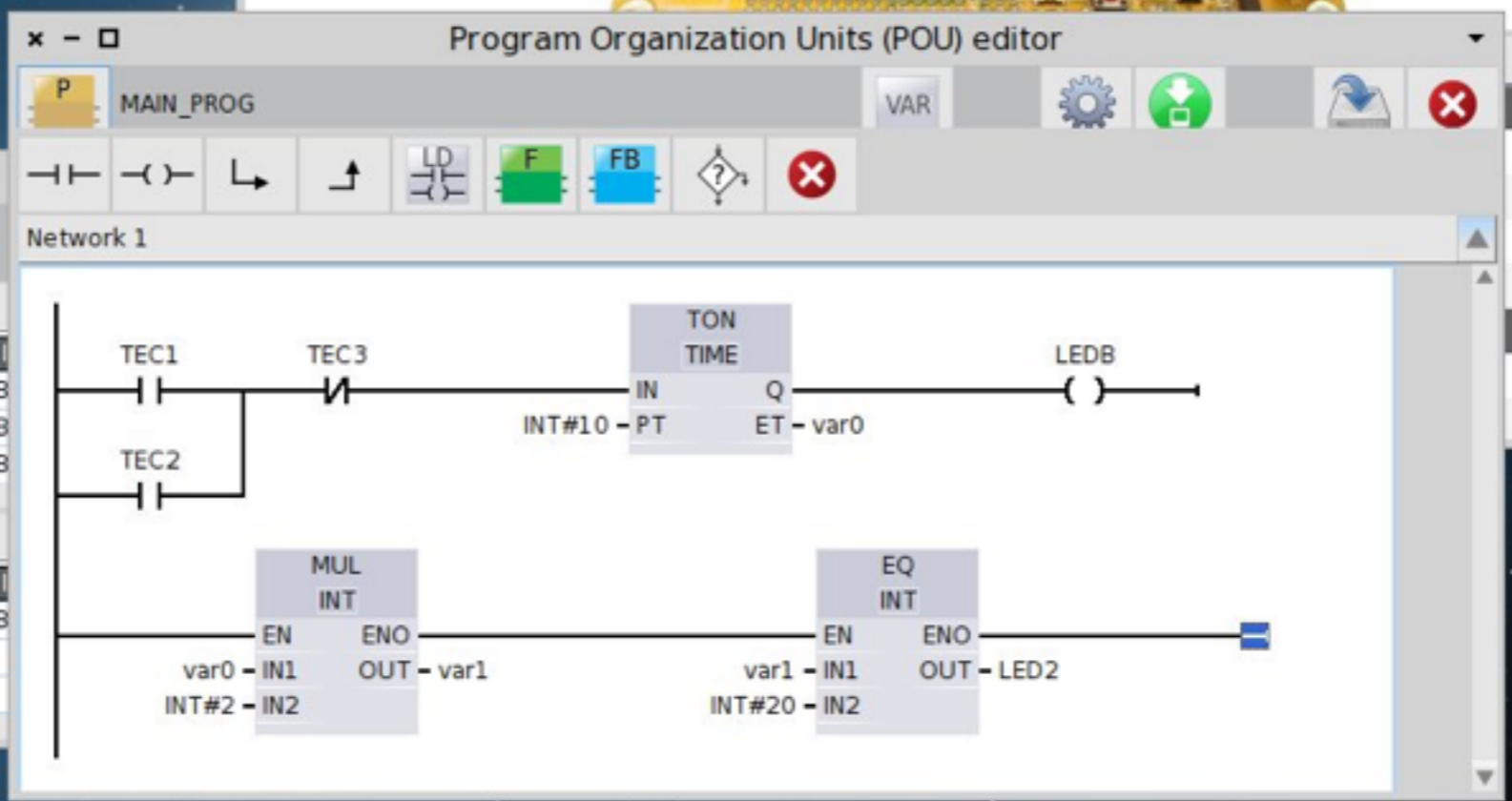
MAIN_PROG

Interface Variables

Category	Name	Datatype	
VAR_INPUT	TEC1	BOOL	B
VAR_INPUT	TEC2	BOOL	B
VAR_INPUT	TEC3	BOOL	B

Internal and External Variables

Category	Name	Datatype	
VAR	var0	BOOL	B
VAR	var1	INT	
VAR	var2	TIME	



Programmable Logic Controllers

EASY IT Managed CLOUD Services

Professional solutions that will suit your budget.

Read More



Fast, easily adaptable, high quality financial and investment platforms

SOLUTIONS



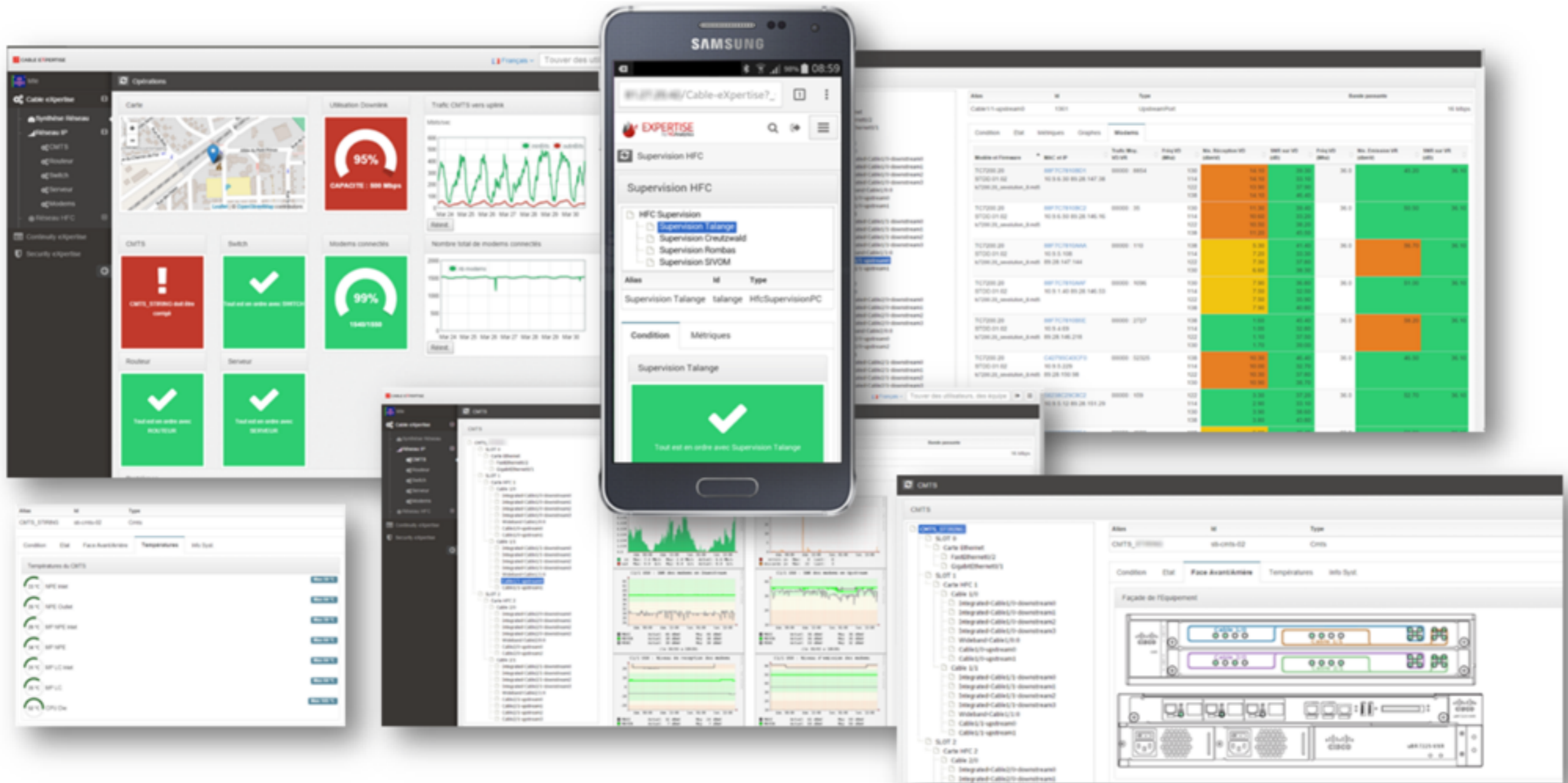
Software Development Services



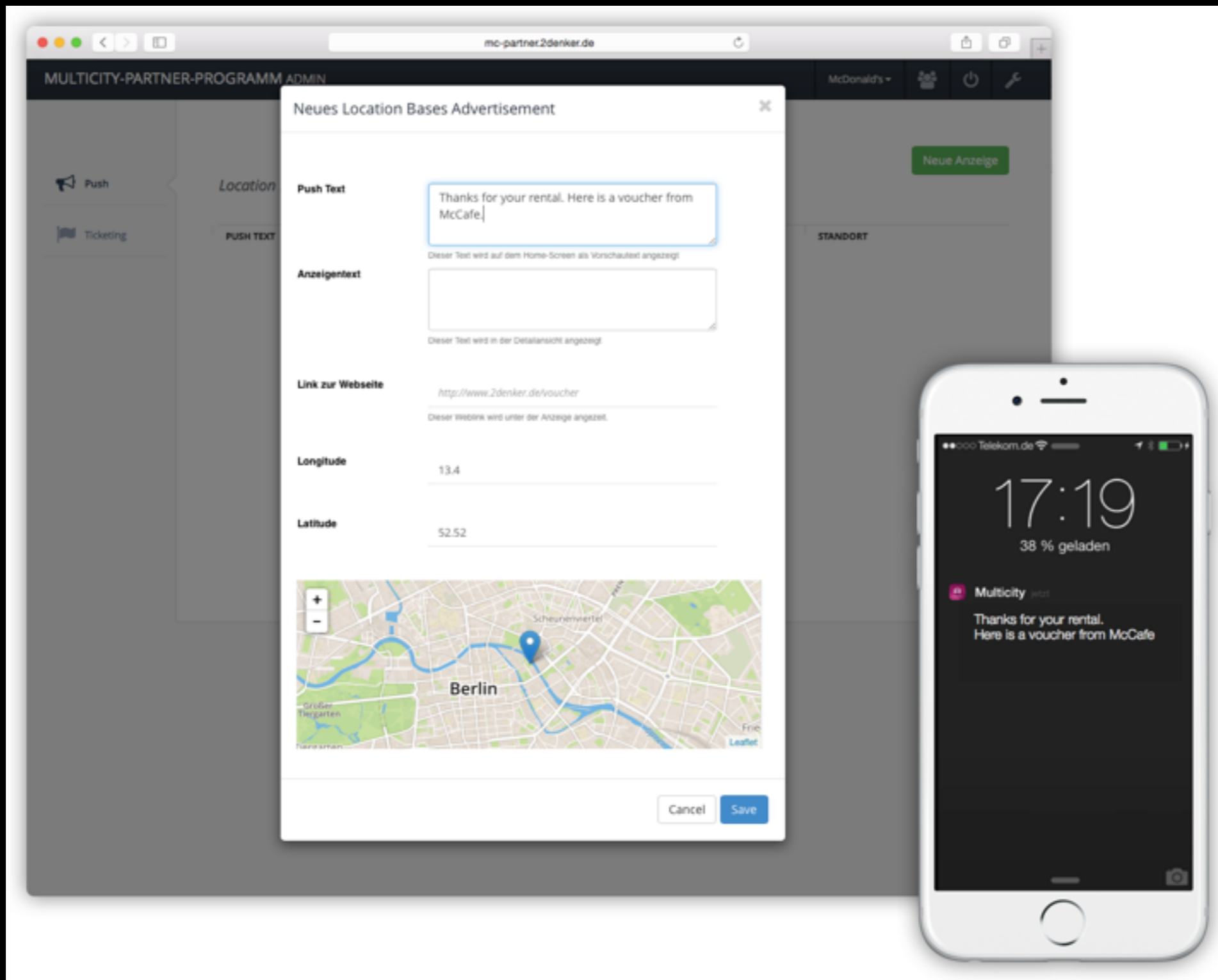
Investment Administration System



Our Clients



CableExpertise



MultiCity

SORABITO

「世界中の明日をつくる」それがSORABITO株式会社の想いだ。SORABITOは、働く機械の国際オンライン取引所『ALLSTOCKER』を運営する。



『ALLSTOCKER』は、建設機械や農業機械を中心とした産業機械の取引ができる業界唯一の中古産業機器のグローバルマーケットプレイス。メガバンク等との連携により実現した独自の決済機能、売り手の保管場所からDoor-to-Doorで世界中に機械を運送する物流機能、全国統一鑑定基準に基づき出張鑑定をする鑑定機能を一括で提供することで、これまで年に数回の限られた機会ではしか売買取引ができなかった上、タイムリーなマッチングが起こりづらかった産業機械流通の効率化を実現する。

茅場町スタートアップ「SORABITO」

Phar *Pro*

We can do better
to support your business!

Phar *Pro*

Pharo Pro

- ✦ Managed by the Pharo Consortium
- ✦ Professional Support

Pharo Pro Services

- ✦ Long Term Support (LTS)
- ✦ Supporting different platforms
- ✦ Supporting migration
- ✦ Specific development (libraries, bindings)

Pharo Pro

- ✦ Talk to us :)
- ✦ Esteban and me are here to talk to you

External projects

- ✦ Far too many to list them :)

Better Database support

- Garage provides a unified API
- Glorp up to date.

More support for NoSQL

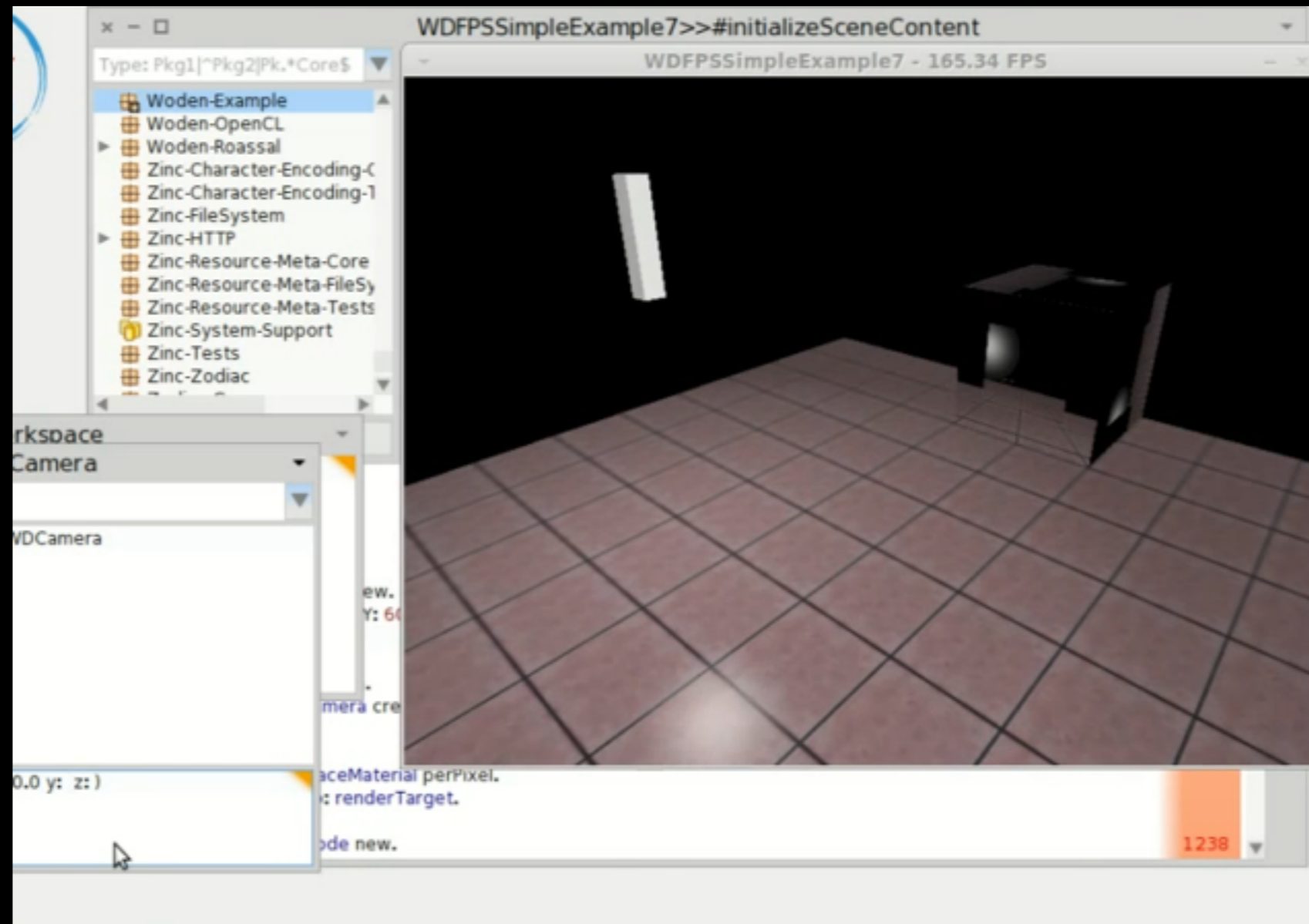
- Towards Voyage 2
 - PunQlite
 - Bug fixes

Pillar

- ✦ Epub, HTML, LaTeX, Markdown
- ✦ Books, slides, tutorials
- ✦ Tx Cyril, Yann, Thibault, Damien

Woden 3D ++

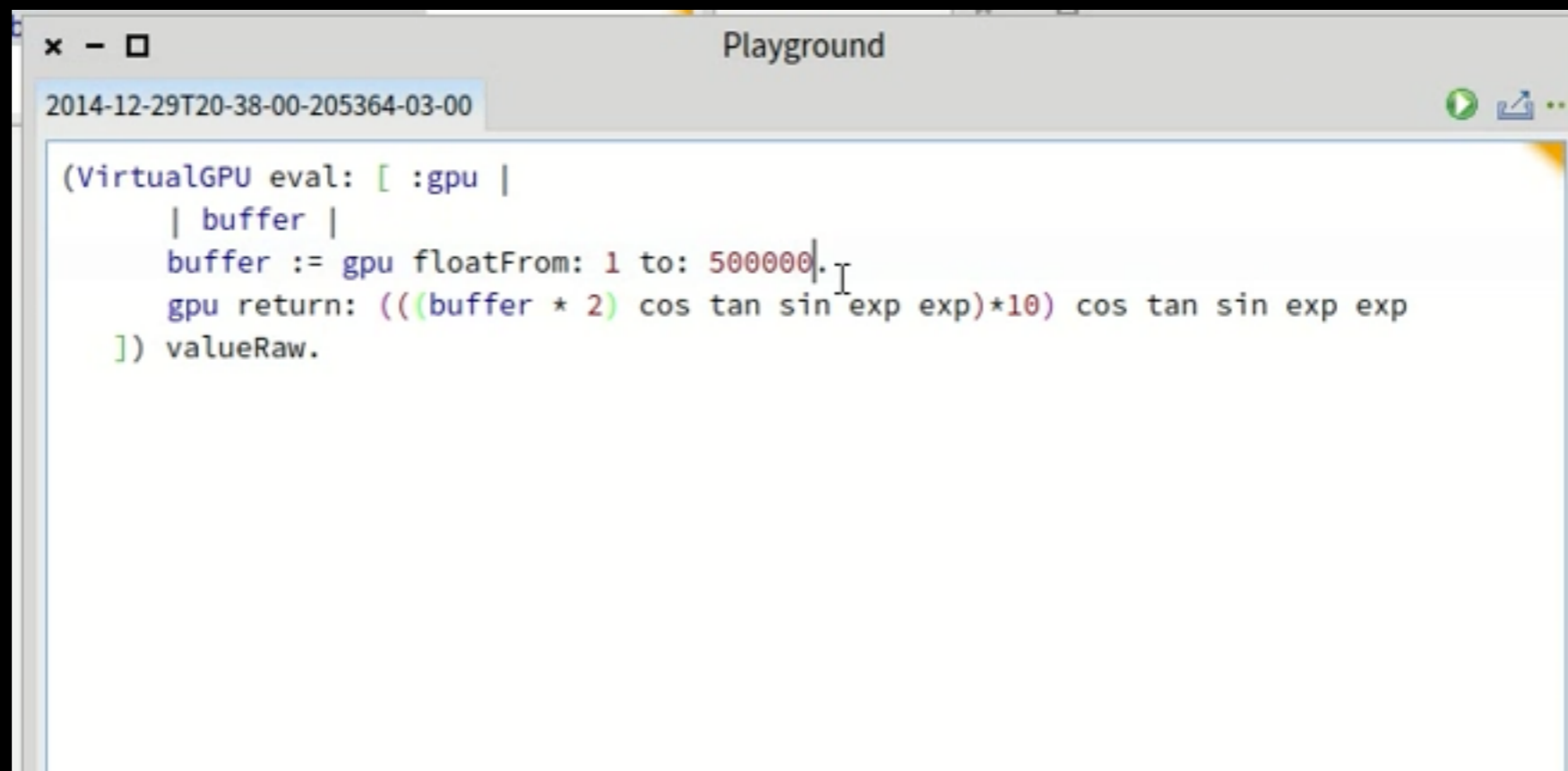
Vulkan
Metal
Direct3D



<https://www.youtube.com/watch?v=1Nze9tnwYxY>

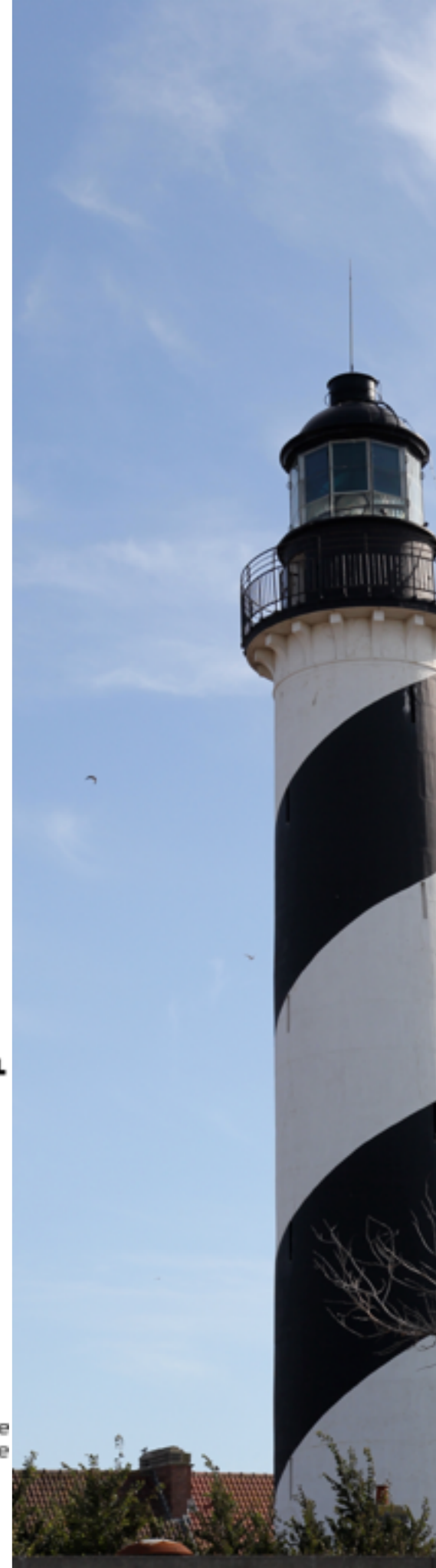
Virtual GPU

- The VirtualGPU is a simple DSL/framework for parallel algorithms.



```
(VirtualGPU eval: [ :gpu |
  | buffer |
  buffer := gpu floatFrom: 1 to: 500000.
  gpu return: (((buffer * 2) cos tan sin exp exp)*10) cos tan sin exp exp
]) valueRaw.
```

<https://www.youtube.com/watch?v=6xrq40kvSi4>





<http://pharo.org>

Fun, simple

Excellent for teaching

Pure & elegant

Highly productive

Empowering Tools

Full access