Porting of VisualWorks® code to Pharo

Pavel Krivanek

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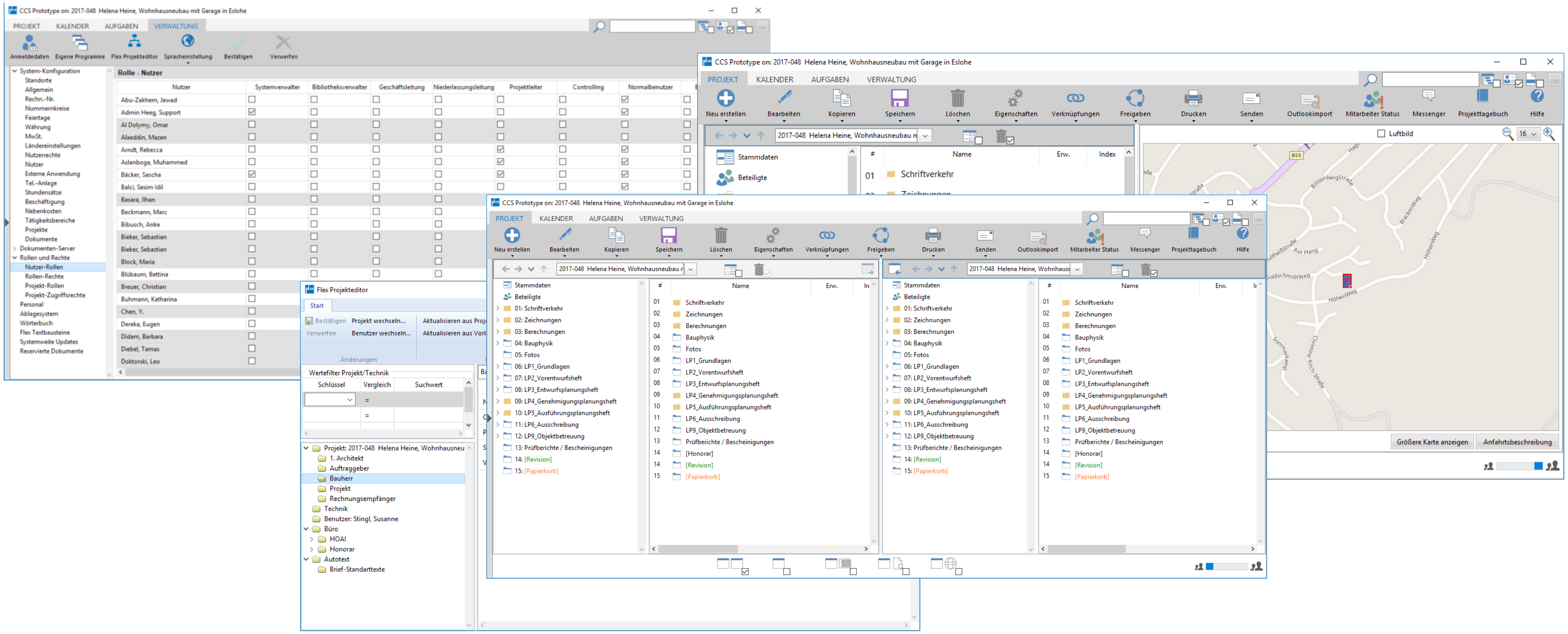
per-documaps


CCS Prototype on: 2017-048 Helena Heine, Wohnhausneubau mit Garage in Eslohe

PROJEKT KALENDER AUFGABEN VERWALTUNG

Anmeldedaten | Eigene Programme | Flex Projekteditor | Spracheinstellung | Bestätigen | Verwerfen

- System-Konfiguration
  - Standorte
  - Allgemein
  - Rechn.-Nr.
  - Nummernkreise
  - Feiertage
  - Währung
  - MwSt.
  - Ländereinstellungen
  - Nutzerrechte
  - Nutzer
  - Externe Anwendung
  - Tel.-Anlage
  - Stundensätze
  - Beschäftigung
  - Nebenkosten
  - Tätigkeitsbereiche
  - Projekte
  - Dokumente
- Dokumenten-Server
- Rollen und Rechte
  - Nutzer-Rollen
  - Rollen-Rechte
  - Projekt-Rollen
  - Projekt-Zugriffsrechte
- Personal
- Ablagesystem
- Wörterbuch
- Flex Textbausteine
- Systemweite Updates
- Reservierte Dokumente

Rolle - Nutzer

Nutzer	Systemverwalter	Bibliotheksverwalter	Geschäftsleitung	Niederlassungsleitung	Projektleiter	Controlling	Normalbenutzer
Abu-Zakhem, Jawad	☐	☐	☐	☐	☐	☐	☑
Admin Heeg, Support	☑	☐	☐	☐	☐	☐	☑
Al Dolymy, Omar	☐	☐	☐	☐	☐	☐	☐
Alaeddin, Mazen	☐	☐	☐	☐	☐	☐	☐
Arndt, Rebecca	☐	☐	☐	☐	☑	☐	☑
Aslanboga, Muhammed	☐	☐	☐	☐	☑	☐	☑
Bäcker, Sascha	☑	☐	☐	☐	☑	☐	☑
Balci, Sesim Idil	☐	☐	☐	☐	☐	☐	☑
Basara, Ilhan	☐	☐	☐	☐			
Beckmann, Marc	☐	☐	☐	☐			
Bibusch, Anke	☐	☐	☐	☐			
Bieker, Sebastian	☐	☐	☐	☐			
Bieker, Sebastian	☐	☐	☐	☐			
Block, Maria	☐	☐	☐	☐			
Blübaum, Bettina	☐	☐	☐	☐			
Breuer, Christian	☐						
Buhmann, Katharina	☐						
Chen, Y.	☐						
Dereka, Eugen	☐						
Didam, Barbara	☐						
Diebel, Tamas	☐						
Doktorski, Leo	☐						

Flex Projekteditor

Start

Bestätigen | Projekt wechseln... | Aktualisieren aus Proj
Verwerfen | Benutzer wechseln... | Aktualisieren aus Vorl

Änderungen

Wertefilter Projekt/Technik

Schlüssel	Vergleich	Suchwert
	=	
	=	

- Projekt: 2017-048 Helena Heine, Wohnhausneu
  - 1. Architekt
  - Auftraggeber
  - Bauherr
  - Projekt
  - Rechnungsempfänger
- Technik
- Benutzer: Stingl, Susanne
- Büro
  - HOAI
  - Honorar
- Autotext
  - Brief-Standarttexte

CCS Prototype on: 2017-048 Helena Heine, Wohnhausneubau mit Garage in Eslohe

PROJEKT KALENDER AUFGABEN VERWALTUNG

Neu erstellen | Bearbeiten | Kopieren | Speichern | Löschen | Eigenschaften | Verknüpfungen | Freigeben | Drucken | Senden | Outlookimport | Mitarbeiter Status | Messenger | Projekttagebuch | Hilfe

2017-048 Helena Heine, Wohnhausneubau m

- Stammdaten
- Beteiligte
- 01: Schriftverkehr
- 02: Zeichnungen
- 03: Berechnungen
- 04: Bauphysik
- 05: Fotos
- 06: LP1_Grundlagen
- 07: LP2_Vorentwurfsheft
- 08: LP3_Entwurfsplanungsheft
- 09: LP4_Genehmigungsplanungsheft
- 10: LP5_Ausführungsplanungsheft
- 11: LP6_Ausschreibung
- 12: LP9_Objektbetreuung
- 13: Prüfberichte / Bescheinigungen
- 14: [Revision]
- 15: [Papierkorb]

#	Name	Erw.	Index
01	Schriftverkehr		
02	Zeichnungen		
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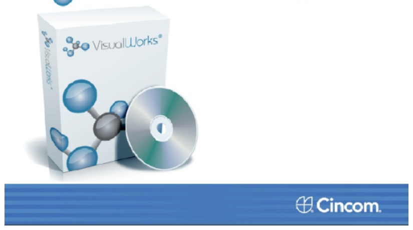
12	LP9_Objektbetreuung		
13	Prüfberichte / Bescheinigungen		
14	[Honorar]		
14	[Revision]		
15	[Papierkorb]		

Luftbild

Größere Karte anzeigen | Anfahrtsbeschreibung per-documaps

VisualWorks®



DELTA
library

GLORP

Office

Why to keep VisualWorks?

- Solid Smalltalk implementation, long tradition
- Good database support
- Windows support (target platform for PDM)
- Native Windows UI (±), UI Designer
- Business ready, proven solution
- Vendor support
- Existing code

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Why to leave VisualWorks?

- Slow progress
- Decreasing return value
- Loss of vendor interest
- Loss of developers interest
- Licensing politics

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Alternative?

Alternative?

Pharo as an alternative?

- Solid Smalltalk implementation, long tradition ?
- Good database support ?
- Windows support ?
- Native Windows UI, UI Designer ?
- Business ready, proven solution ?
- Vendor support ?
- Existing code X

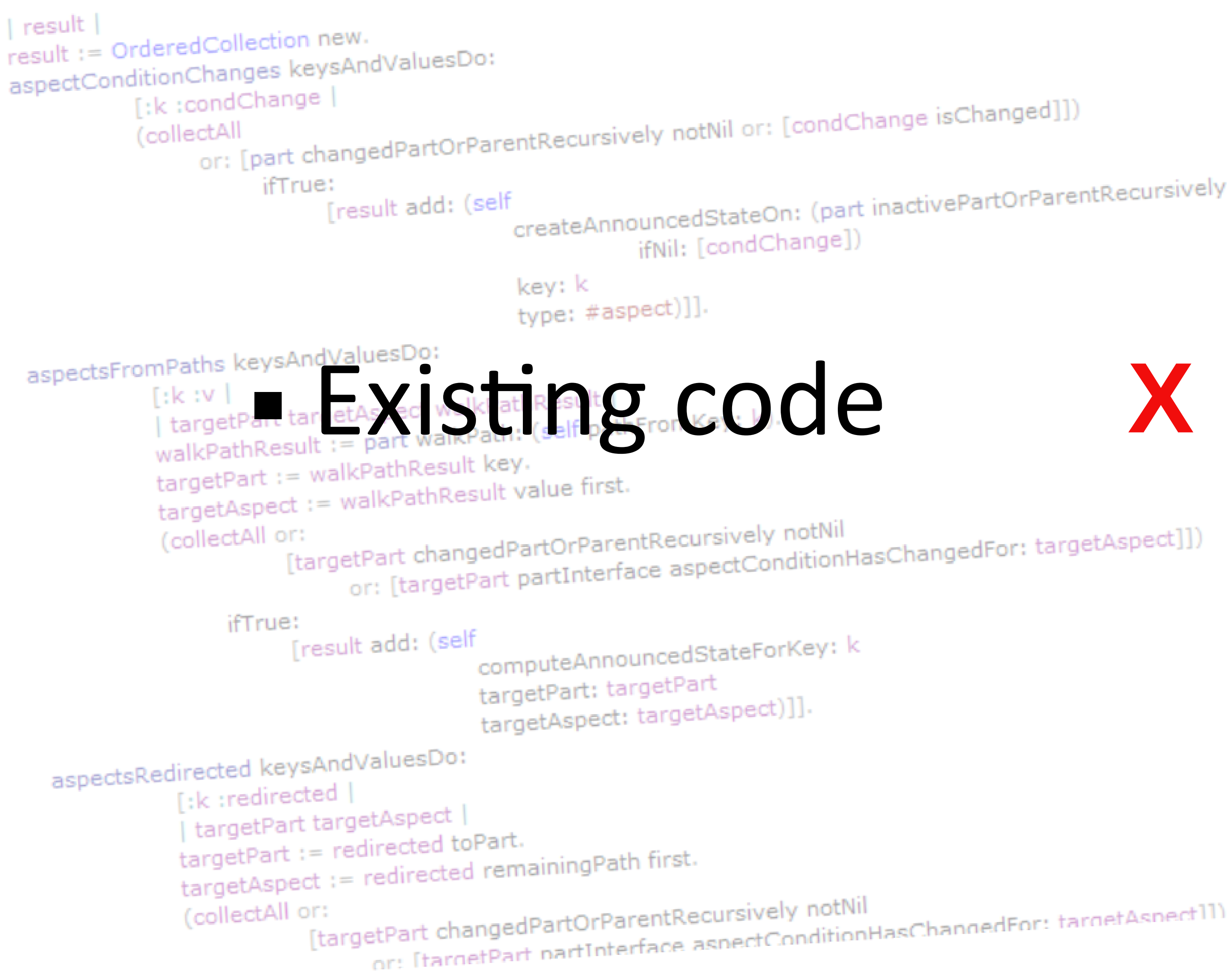
Vendor support

Pharo consortium

RMod

Inria
INVENTEURS DU MONDE NUMÉRIQUE

...what is not, we will improve!



```
| result |
result := OrderedCollection new.
aspectConditionChanges keysAndValuesDo:
        [:k :condChange |
        (collectAll
            or: [part changedPartOrParentRecursively notNil or: [condChange isChanged]])
                ifTrue:
                    [result add: (self
                                createAnnouncedStateOn: (part inactivePartOrParentRecursively
                                        ifNil: [condChange])

                                key: k
                                type: #aspect)]].

aspectsFromPaths keysAndValuesDo:
        [:k :v |
        | targetPart targetAspect walkPathResult |
        walkPathResult := part walkPath: (self pathFromKey: k).
        targetPart := walkPathResult key.
        targetAspect := walkPathResult value first.
        (collectAll or:
                [targetPart changedPartOrParentRecursively notNil
                    or: [targetPart partInterface aspectConditionHasChangedFor: targetAspect]])

            ifTrue:
                [result add: (self
                            computeAnnouncedStateForKey: k
                            targetPart: targetPart
                            targetAspect: targetAspect)]].

aspectsRedirected keysAndValuesDo:
        [:k :redirected |
        | targetPart targetAspect |
        targetPart := redirected toPart.
        targetAspect := redirected remainingPath first.
        (collectAll or:
                [targetPart changedPartOrParentRecursively notNil
                    or: [targetPart partInterface aspectConditionHasChangedFor: targetAspect]])
```

- Existing code X

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Code conversion challenges

- How to import code?
- Different VCS?
- Language differences?
- Semantics?
- Different UI frameworks?

Code conversion challenges

- Application still under active development
  - bi-directional transformations
- Target platform under active development
  - Spec2
- Limited timescale, human resources

Code import

- VW: XML based *.pst files
  - XML Parser
  - cannot be loaded directly
    - language differences
    - dependencies
    - system corruption risk
  - not stable order during saving
    - not suitable for versioning

Code import

- models using Ring 2
  - need of modified scanner & parser
  - allows code transformations
  - simple export to Tonel format
  - code management in Git
  - no risk of system corruption
  - tools
  - export to *.pst format

Language differences

- namespaces

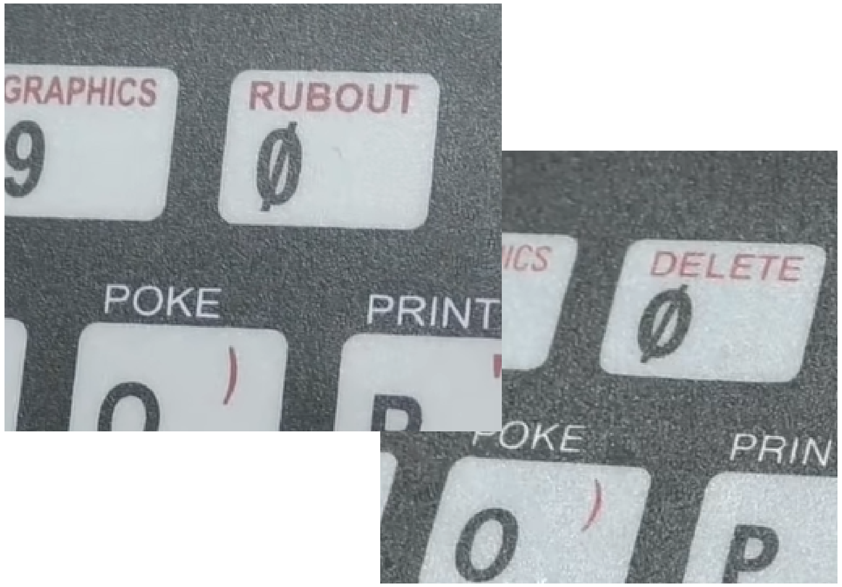
```
Store.Model
UI.Model
```

- qualified literals

```
#{UI.CheckBoxSpec}
```

- shared variables
- class definitions
- FFI calls

```
<C:typedef int64_t (*callb_after_send_t)(unsigned char* handlerID, int
PortServerID, unsigned char* inputBuffer, int cbInput)>
```



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Pharo extensions

- dynamic arrays

```
{1. 2. 1+2}
```

- traits
- slots
- comments

```
"Pharo has ""quotes"" inside comments"
```

Transformations

- hints as comments

```
login := Login new.
"VW_TRANSLATION:Glorp.Login:Login"
```

- methods with metadata

```
visualWorksMetadata

   ^ #(

      'superclassNamespace' 'UI'

   )
```

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Differences in semantics

Differences in semantics

- object initialization (`new`)
  - inherit from class that behaves differently
- same methods with different behavior (`Pragma>>#selector`)
- dependencies mechanism
- no Wipe mechanism
- `(#Smalltalk = 'Smalltalk') = false`
- `'asdf' readStream upToAll: 'd'; upToEnd`
  - `'f'` in Pharo, `'df'` in VisualWorks

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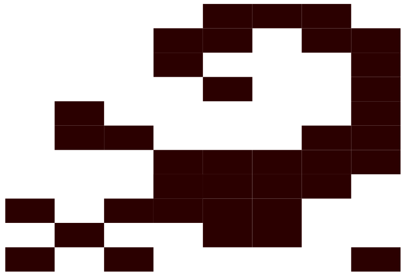
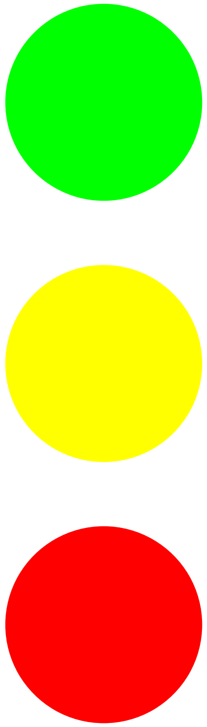
Differences in semantics



- `nil` responds to `#size`
- `#(nil nil) asSet size` (VW: `0`, Pharo: `1`)
- `'ab' endsWith: $c` (VW: true)
- `1.0 == 1.0` (VW: false)
- `'' asNumber` (VW: `0`, Pharo: error)
- `method instVarNamed: 'sourceCode'`
- `Dictionary new keys` (VW: Set, Pharo: Array)

Tests!



- many small hidden incompatibilities
- hard to detect with static analysis
- good code coverage, mutation testing, UI tests
- useful for the platform updates too

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System design

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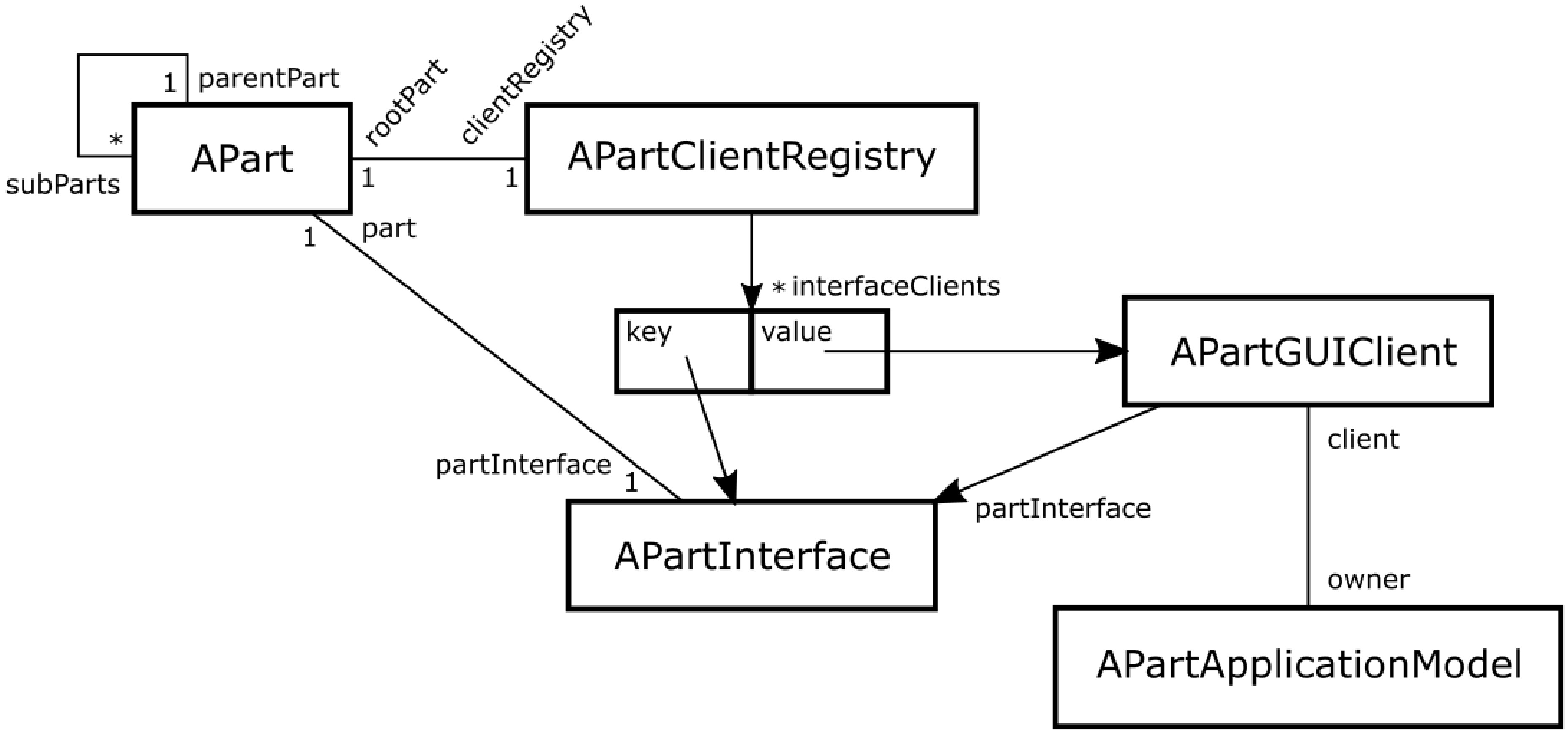
apart FRAMEWORK

- layers separation
- minimize redundancy, improve re-usability
- minimize work required for the UI and “glue” layers
- improve testability
- support for the common business application patterns
- ...

production quality small business application in few days

Clients separation



apart FRAMEWORK

- describes applications using well-defined first-class entities (parts, conditions, actions, use-cases...)

```
partInterface
        createAction: #submit
        do: [ self submit ]
        if: (APCondition on: [self isDirty] ifNot: #NoChange)
        helpText: 'Submit the form'.
```

- predefined parts (for lists, trees...)
- enumerations (combo-boxes, menus...)

apart FRAMEWORK

- aspects redirection

```
partInterface createAspectNamed: #statesList
    redirectTo: #(state enumerationTextList).
```

- layouts, UI configurations

```
aValueConfiguration addConfigElement: (APValueConfigElementList
    onPart: aValueConfiguration key: #options
    preInit: [:el | el rawList: options; yourself]
    postInit: [:el | el labelBefore: 'Options');
        expectedLines: 10; yourself])
```

apart FRAMEWORK

- generic UI clients
- interactions recording, automatic UI tests generation

```
self afterDoing: [
        self setAspect: #stringField value: 'foo'. ]
    expectStates: [
        APExpectedStates
            expectAllInactive: #(#clearNumber #confirmNumber #saveData)
            expectAllActive: #(#clearString #confirmString
                #disableInput #intField #stringField) ].
```

- prompts, modal windows
- Glorp, Trachel...

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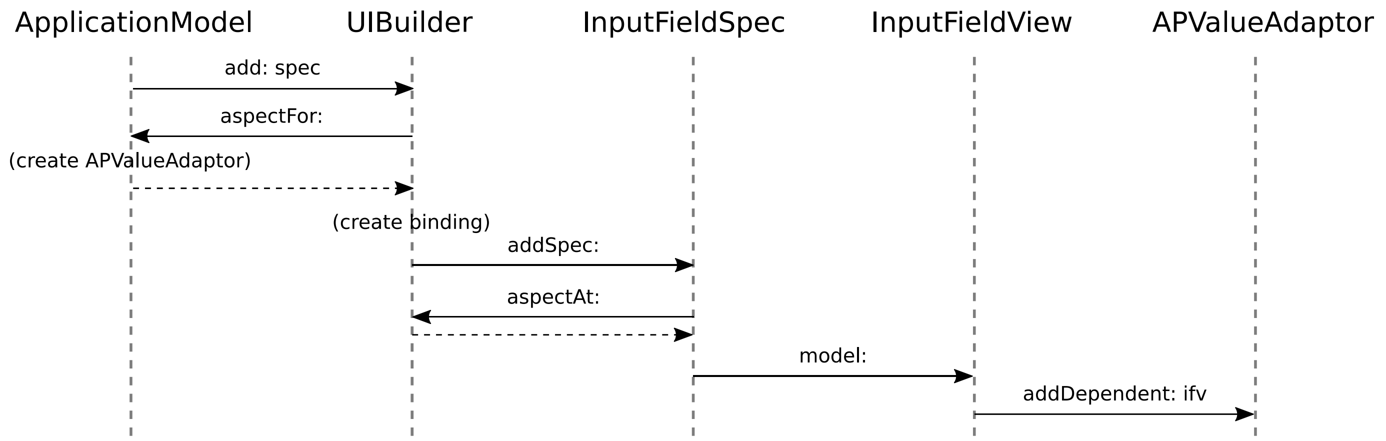
UI layers adoption

- VW: Aspect adaptors
  - closer relationship between the model and a widget
- Pharo: Value holders (in Slots)

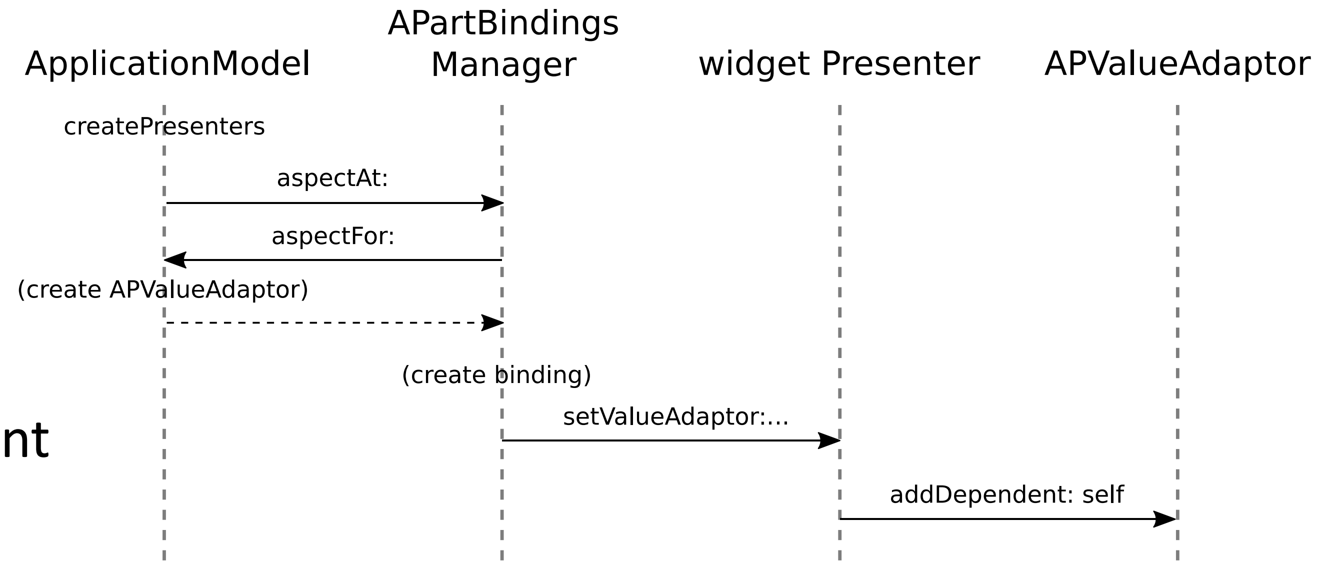
- Different dependencies management

UI layers adoption

- VisualWorks



- Pharo
  - "compatible" ApplicationModel
  - UIBuilder replacement



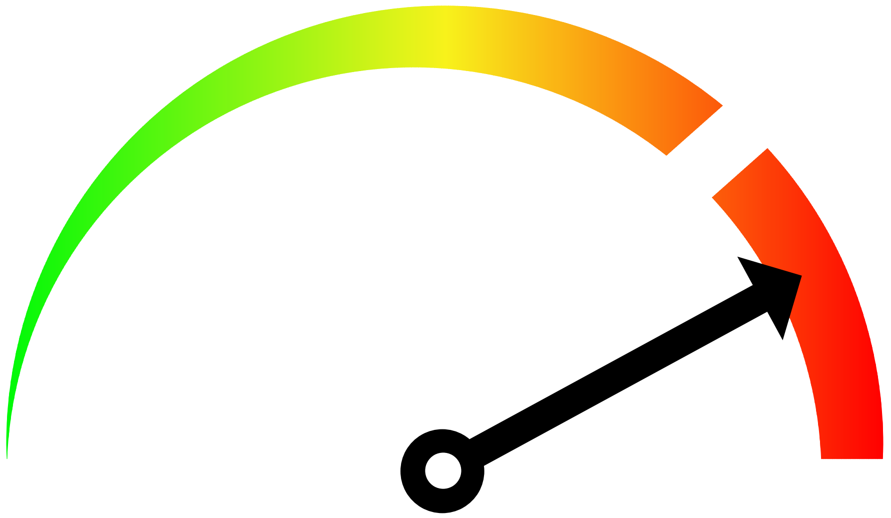
Bindings

- Delta library
  - Bernd Elkemann
  - polling as intermediate step

- C#, MS Office connection to Pharo
  - Benedikt Ehl

Acceleration of infrastructure improvements

- Consortium:
  - Threaded FFI
  - Spec 2
  - GTK for Spec 2
  - Better Windows VM
  - Headless VM
  - ...



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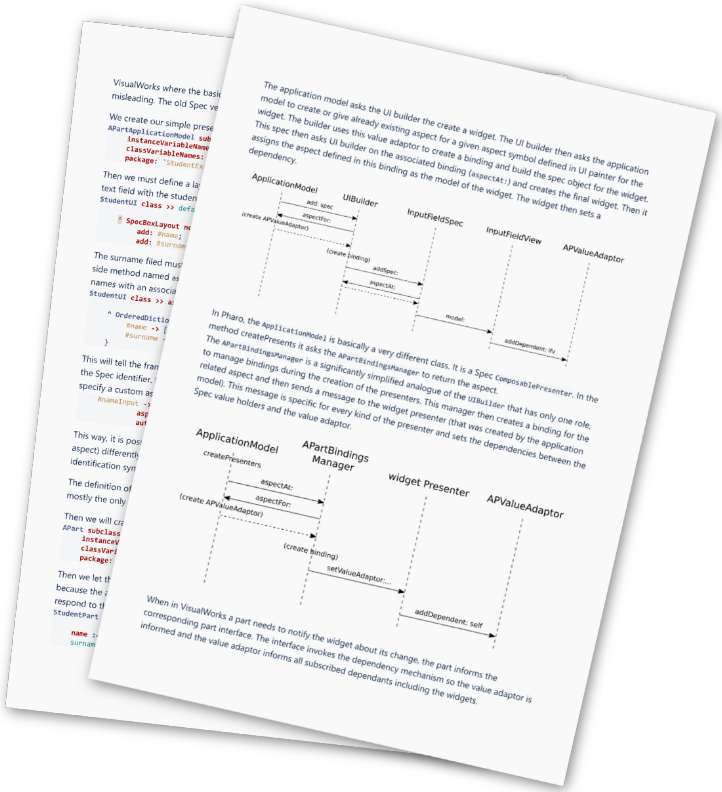
apart FRAMEWORK

- will be open-sourced
- user-friendly documentation
- complex examples with Glorp



The application model asks the UI builder the create a widget. The UI builder then asks the application model to create or give already existing aspect for a given aspect symbol defined in UI painter for the widget. The builder uses this value adaptor to create a binding and build the spec object for the widget. This spec then asks UI builder on the associated binding (aspectAt:) and creates the final widget. Then it assigns the aspect defined in this binding as the model of the widget. The widget then sets a dependency.

In Pharo, the ApplicationModel is basically a very different class. It is a Spec ComposablePresenter. In the method createPresents it asks the APartBindingsManager to return the aspect. The APartBindingsManager is a significantly simplified analogue of the UIBuilder that has only one role, to manage bindings during the creation of the presenters. This manager then creates a binding for the related aspect and then sends a message to the widget presenter (that was created by the application model). This message is specific for every kind of the presenter and sets the dependencies between the Spec value holders and the value adaptor.

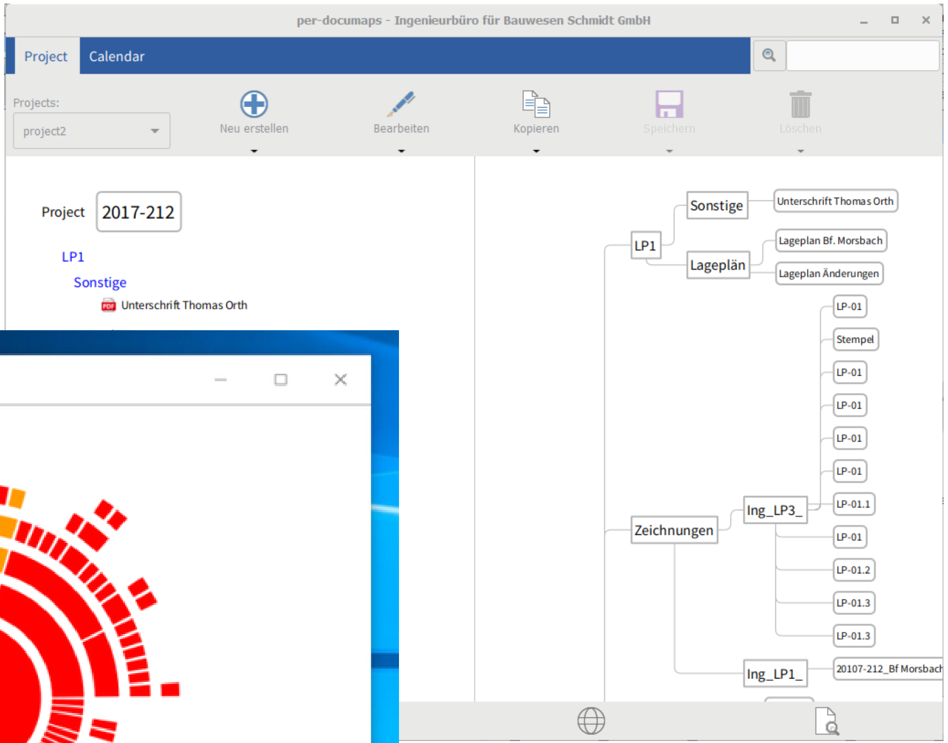
When in VisualWorks a part needs to notify the widget about its change, the part informs the corresponding part interface. The interface invokes the dependency mechanism so the value adaptor is informed and the value adaptor informs all subscribed dependants including the widgets.

Glorp

Pharo	PDM (VW)	latest (VW)
8.0.1	8.2	8.3.1-23

- Pharo version repackaging to fit VW structure again
- Pharo changes analysis, formatting
- VisualWorks code conversion
- merging
- testing

Trachel/Roassal on GTK



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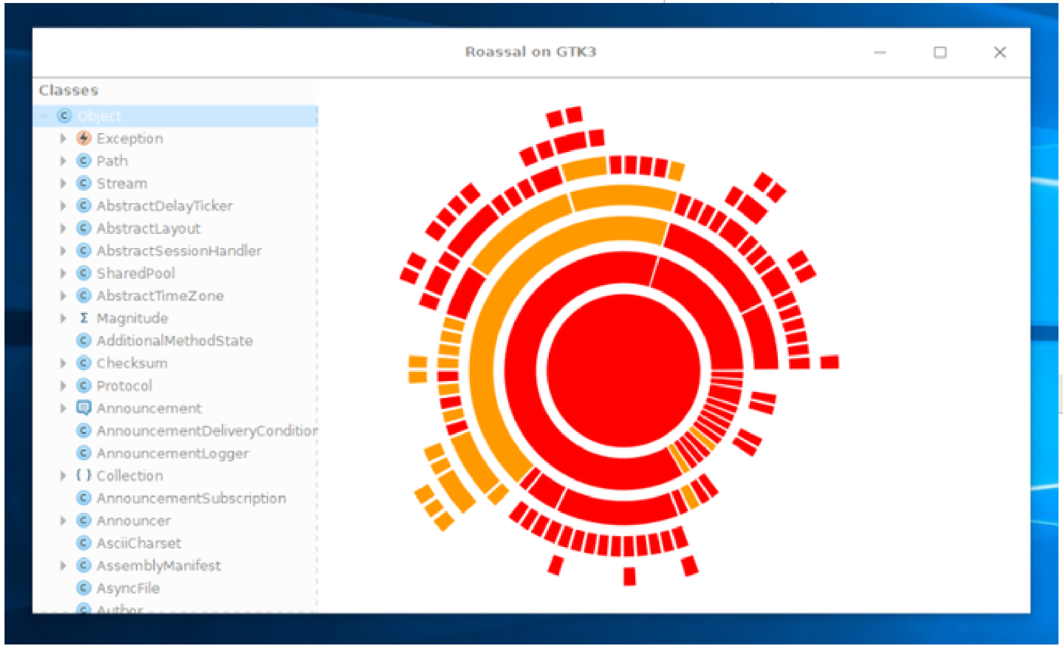
Projects: project2

Project 2017-212

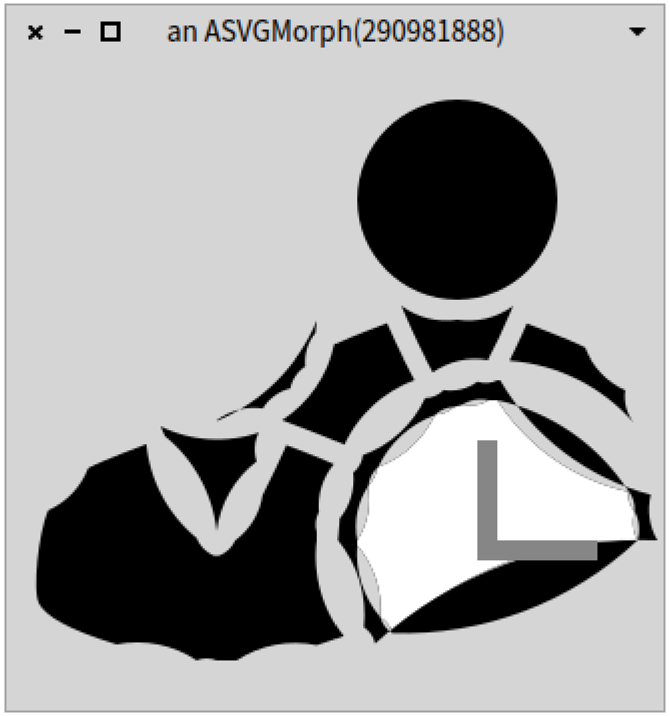
LP1
Sonstige
Unterschrift Thomas Orth



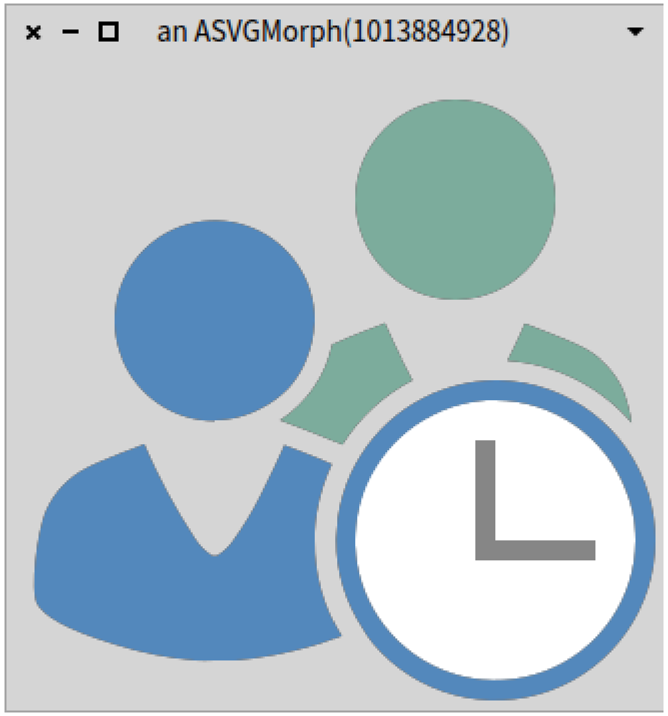
Roassal on GTK3

Classes
- Object
- Exception
- Path
- Stream
- AbstractDelayTicker
- AbstractLayout
- AbstractSessionHandler
- SharedPool
- AbstractTimeZone
- Magnitude
- AdditionalMethodState
- Checksum
- Protocol
- Announcement
- AnnouncementDeliveryConditior
- AnnouncementLogger
- Collection
- AnnouncementSubscription
- Announcer
- AsciiCharset
- AssemblyManifest
- AsyncFile
- Author

SVG support



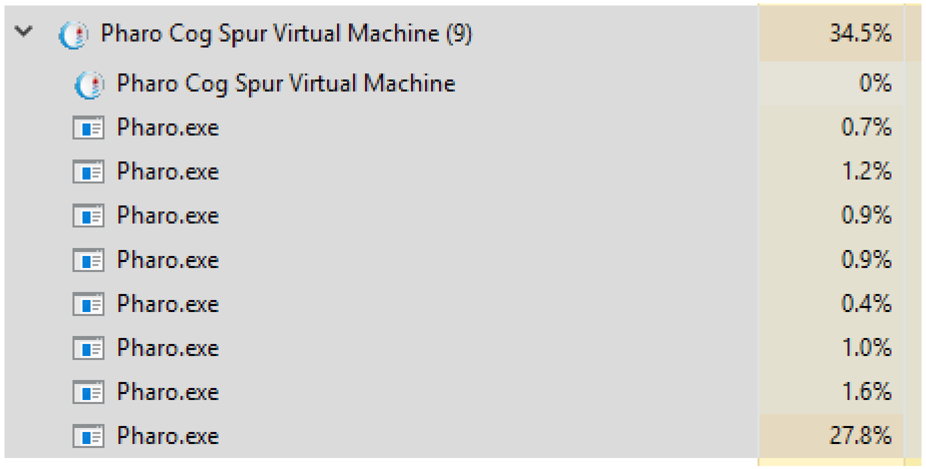
original



fixed in PDM
(CSS parsing, arcs)

Read-only image mode

- Multiple headless instances of the same image (specialized workers)
- Seamless connections
- TaskIt futures



```
Pharo Cog Spur Virtual Machine (9)    34.5%
  Pharo Cog Spur Virtual Machine        0%
  Pharo.exe                           0.7%
  Pharo.exe                           1.2%
  Pharo.exe                           0.9%
  Pharo.exe                           0.9%
  Pharo.exe                           0.4%
  Pharo.exe                           1.0%
  Pharo.exe                           1.6%
  Pharo.exe                          27.8%
```

Gettext - update

- Pharo library for locale-aware translations of strings that use standard GNU gettext file formats

```
Metacello new
  baseline: 'Gettext';
  repository: 'github://pharo-contributions/Gettext/source';
  load.
```

Do you want to port your application to Pharo?

- improve your tests
- clean your architecture
- tell us about your needs
- participate
- Pharo is not just a free alternative...

```
converter := VWToTonelConverter new.
converter
    convert: files
    into: 'result' asFileReference.
```

Pharo is yours

RMod

Pharo consortium

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better Pharo for you business