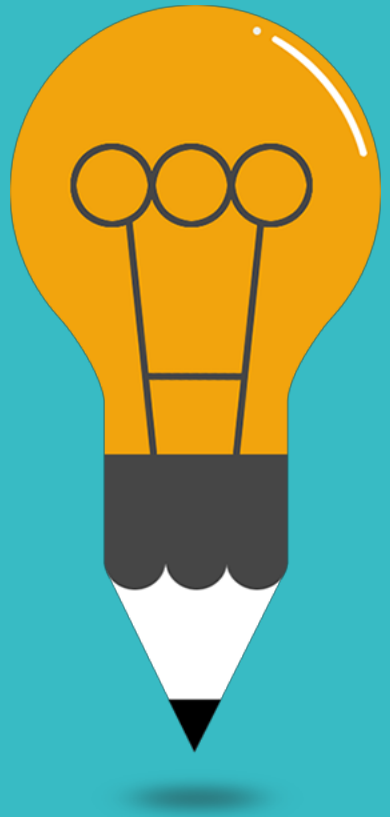

Pharo
in the Corner Cases of the Enterprise

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01 Background, Motivation, and Driving Questions

02 Case Descriptions

(code named: X, Y, and Z)

03 Observations, Reflections, and Suggestions

04 Wrapping up and Q&A

01

My [Smalltalk] Background

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Smalltalk enterprise-type projects
in Advertising, Banking, Insurance,
Telco industries, in Australia and the US.
(D/V, VW, VA, Enfin, ST/X,…)

Leaving the Big Cor
p IT and Going
Independent

1987 — **’90s** — **-20y** — **-5y** — **-3y** — **2018**

First Smalltalk course!
Dr. Artur Krepski,
Institute of Computer Science,
Warsaw, Poland.

Architect work, in different guises (Technical, Solution, Appli
cation, Enterprise, etc.) in Telco, M
edical, Government/State.

Using Smalltalk for project work again (
Pharo 4/5/6)

01

My Perspective and Potential Biases

Being Independent *typically* means:

- Small teams (<1 to 2-3 FT people)
- Small budgets
- Short timeframes
- Relative freedom of choice in approach and tooling …
- … But bearing the full risk for the choices made
- Having to assume broad responsibilities (for requirements, design, implementation, testing, deployment, monitoring, etc.)

Pragmatic Focus:

- Solutions involve both business *and* software elements
- Driving the solution rather than waiting for it to happen
- Dealing with the reality of underspecified requirements
- Limited opportunity for extended experimentation
- Still being open to outside-the-box solutions

01

Motivation and Driving Questions

- What are the areas (if any) where Pharo can be *successfully* used in an enterprise [systems] context?

- What are some of the effective ways of introducing Pharo to *non-mainstream-technology-averse* organizations?

- What in Pharo is *attractive* for the independents and small companies working in an enterprise context?

- What in Pharo is attractive in that context and what could be improved to increase its attractiveness?

02

Sample Corner Cases

X

Legacy Archeological Dive

Recovering ’90s Social Services App for replacement

Y

Creating Self-Service Portals

Web-based Data Validation On-Demand for End-Users

Z

Chatbot-Enablement

Grokking Chatbot, Corpus for a Financial System

X

Legacy Archeological Dive

Recovering ’90s Social Services App for Replacement

Background and Goals

1990’s System to manage social service-related funds (~$6B/yr) between the State and the Counties (53 offices, 4k employees). ***No longer maintainable.***

Before replacing it/creating an RFP, it needs:

- Use Cases, Business Rules
- A Component/Realization Model
- Navigation, Control and Data Flows, etc.

Tooling

- FoxPro IDE
- FoxPro decon er
- Sparx EA
- Pharo 4 (mid-2015)
- GT
- PetitParser
- Roassal2
- Telescope

Challenges and Insights

- No implementation documentation or know-how available; implementation language is complex and has no grammar available
- Manual analysis impractical; combination of automated processing and manual input required
- Tool support and visualizations needed; static analysis should provide usable information for the effort

Outcomes

- Use Cases established (Sparx EA)
- An environment for examining relationships among realization artifacts, supporting visualizing, navigating, annotating these relationships
- Use Cases mapped to Realization artifacts
- Identification of key components and key areas for Business Rules analysis

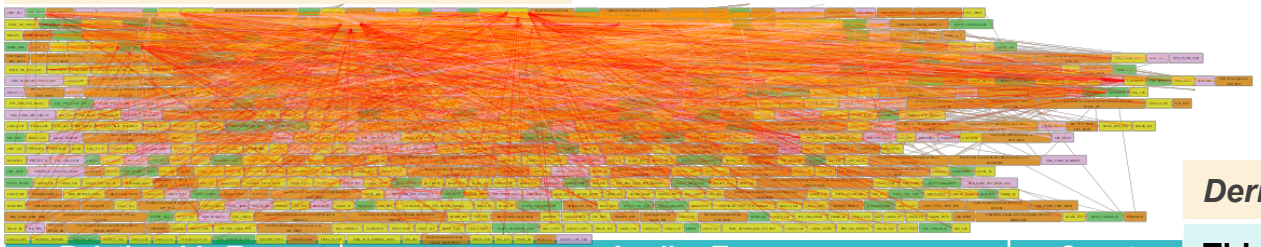
Legacy Archeology Dive

Top-Level Artifacts and Analysis

Realization Artifacts

- 125 Tables
- 335 Programs (incl. code pieces in S creens, Reports, and Libraries)
- 126 Screens
- 146 Reports

Relationships among the Artifacts



Relationship Type	Applies To	Count
Reads Or Writes To	*Components interacting with Tables*	**1122**
Opens UI	*Screens opening UIs (Screens or Reports)*	**562**
Executes	*Programs or Procedures executing other Programs or Procedures*	**560**
Reads From	*Read accessed from Tables, typically in Reports*	**397**

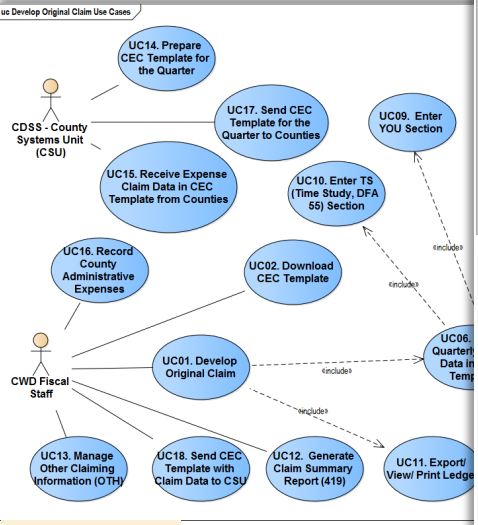
Derived Characterization

This is a Direct Data Entry app
% of Screens – Tables direct interactions
This is a Report Generation app
% Tables - Reports vs Screens - Tables
Support for Business Process is limited
% User-initiated interactions in the Screens
Simple inter-Program interactions
Program-Program vs # Program
…

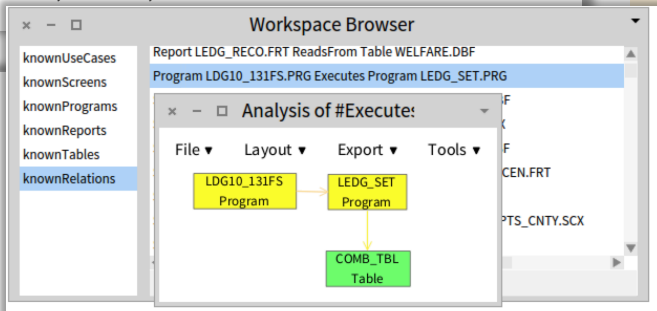
Legacy Archeological Dive

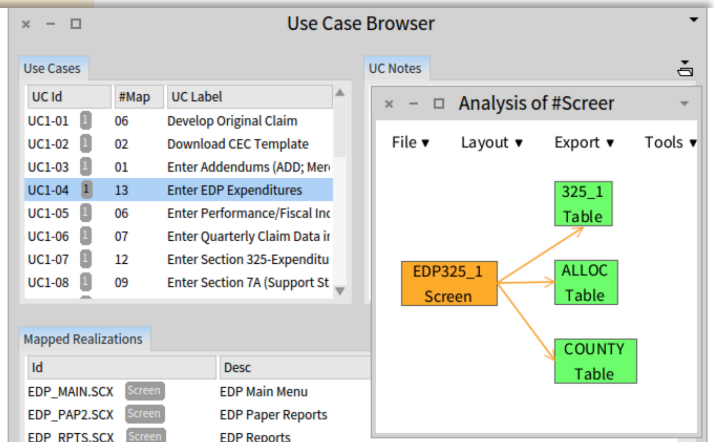
Exploration Workspace, Tools, Drill-Downs

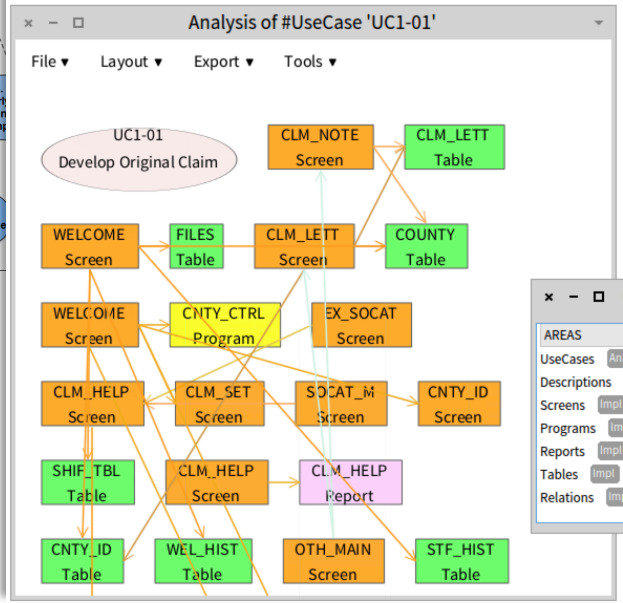
Sparx EA

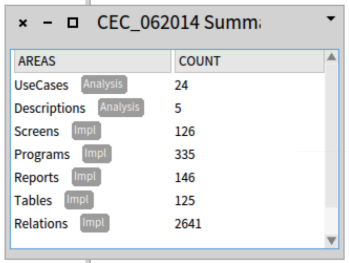


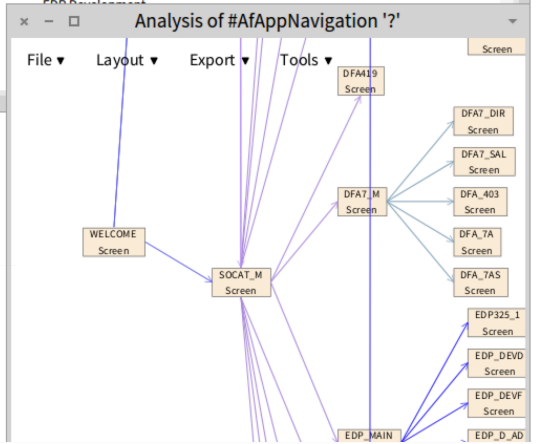
Pharo 4











Self-Service Data Validation Portals

Fast Data Validation and Reporting for Data Migration

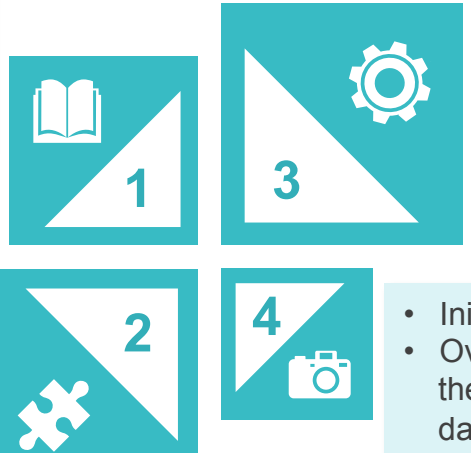
Background and Goals

Part of a +$500M project replacing +1000 disparate financial systems in a single State.

- This requires multi-stage data validation and migration as part of on-boarding.
- The existing processing procedures could not scale.

Tooling

- Pharo 5/6 (2016-18)
- Seaside + Bootstrap + extensions
- NeoCSV + DataFrame + extensions
- STON
- Used pieces of Deltawerken's Story Board



Challenges and Insights

- Replace the initial stages of validation/migration at the target with self-service using internal portals
- Allow data set submittal for integration only after quality thresholds have been met in self-service portals
- Data layout specs are in flux
- Error/warning rules are in flux

Outcomes

- Initially, a single Portal for financial data
- Over time, two additional separate portals for other data set types: file interfaces and security data
- +500 registered users on a single Portal instance
- Fast processing between page switches
- Downloadable reports
- Support for Validation Lifecycle

Self-Service Data Validation Portals

Fast Data Validation and Reporting for Data Migration

Trivial Sample: a Web Page Fragment

File Validation Summary

File 'CNVAR001A_0981_ABLE_M3_01252018_005'

File Name:	Status	Row Count	Records w/o Errors	Errors Detected	File Updated On
CNVAR001A_0981_ABLE_M3_01252018_005	Ready to Submit	10 rows	90.0%	1 error	2018-01-25T14:51:32-08:00

Validation Issues Detected for Layout 'CNVAR001A'

Download Issues to File

Row	Field	Value	Error
1. 'X790' 'FED858DOTFHWA01' ...	Field 'ADD_DT'	01/01/3901	Unacceptable year value

The file is ready for submission to Staging for detailed validation outside the Portal.

Submit **NOTE: You won't be able to Submit a different file for this Data Set until Staging Validation is completed.**

Self-Service Data Validation Portals

Spec-Driven Validation: Field-Level Simple Samples

A Layout Def may have +100 field definitions; they can be inter-dependent

Field 'VIN' 'Asset VIN'
Conditionally Required IF: 'ASSET_TYPE' **value is equal to:** '060'
Type: AlphaNum
Size max: 18 chars

Field 'ZZ_PROJECT' 'Legacy Chartfield - Project'
Optional
Explicit error conditions:
IF (('ZZ_PROJECT' **has no value**) **AND** ('ZZ_FUND' **value is equal to**: '0890'))
THEN FAIL with message: 'Project ID is required if ZZ_FUND = 0890.'
Type: AlphaNum
Size min: 0 chars max: 15 chars

Self-Service Data Validation Portals

Spec-Driven Validation: Row-Level Simple Samples

A Layout Def may have ~60 row-level rules, some inhumanly long (400+ lines) and inter-dependent

ROW Rule 'Rule 6009 Defined in ROLE_MAPPING':
IF (ROW **has ALL values in FIELDS**: 'RM.ZZ_AR_ITEM_RQST', 'RM.ZZ_AR_ITEM_PROC')
THEN (**WARN** with MESSAGE: 'Assignment of roles (AR Item Requestor and AR Item Processor) are in conflict with State Separation of Duties (SOD) policy.')

ROW Rule '50XY Defined in REQUISITION_APPROVER':
IF ((ROW **has a value in FIELD**: 'RA.ZZ_REQ_AD_HOC_APPR')
AND (ROW **has at LEAST ONE value in FIELDS**: 'RA.ZZ_REQ_APPROVER_1', 'RA.ZZ_REQ_APPROVER_2'))
THEN (**FAIL** with MESSAGE: 'If Requisitions Ad Hoc Approver is identified, then other Requisitions approver levels must not be identified')

Chatbot-Enablement

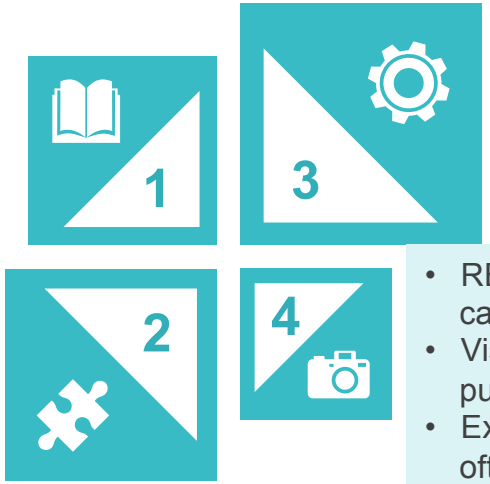
Making sense of APIs and Long-Term Maintainability

Background and Goals

- Provide Chatbot services to +2k end-users
- Determine simple ways of interacting with I BM Watson
- Integrate Chatbot with existing PeopleSoft LOB system
- Identify what is needed for maintaining the Corpus by the SMEs

Challenges and Insights

- Simple REST interactions with complex no de.js or JDK SDKs provided by IBM
- Most first/naïve tests fail (terminology …)
- Inherited PoC with JS/Angular2 code neithe r easily testable, documented, nor maintain able
- Excel-based initial Corpus has logical/struct ural problems and is not maintainable
- REST API exploratory tooling needed
- Corpus exploratory tooling needed



Tooling

- Pharo 6
- Seaside
- Bootstrap
- Telescope
- DataFrame

Outcomes

- REST API testbed to figure out Watson authenti cation and authorization conventions
- Visualizing for the SMEs existing and target Cor pus structure
- Exploring integration mechanisms with PeopleS oft
- WIP; future: Web-based multi-user Corpus edit or with version control?

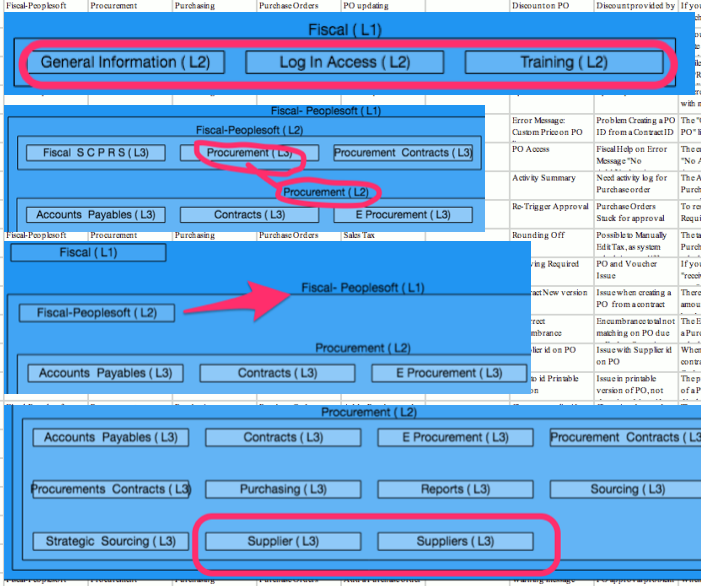
Chatbot-Enablement

Towards a Reasonable Structure/Maintainable Corpus

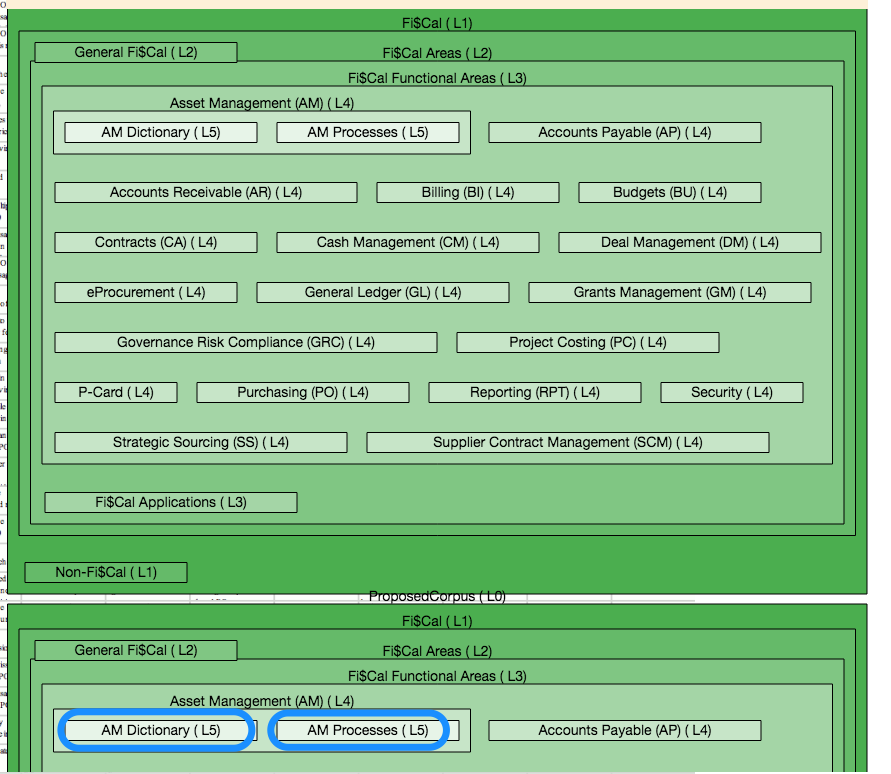
Pharo 6 + Telescope + Corpus Model

Initial Excel Corpus and its Issues

Sr No	Domain	SubDomain	Sub Category1	Sub Category2	Sub Category3	Sub Category4	Issue Type	Issue Description	Resolution	Question 1	Question 2
a	Fiscal-Peoplesoft	Procurement	Purchasing	Receipts	Chartfields		Chartfield not appearing	Error Message When Creating a Receipt	When a Buyer leaves a department, FIS Cal will	When trying to save Receipt system gives	Chartfields not appearing on Recei
5	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	PO Updating		Change Conflict error	Change conflict Error on PO	The "Change Conflict" error occurs when the	Facing change conflict error while saving PO	Notable to save PO Getting error messa
7	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	PO Updating		Accounting Date issue	Accounting Date Error and Budget	FIS Cal does not allows user to save any	Accounting date error message is appearing	Notable to save PO Accounting date is
8								closing Order	Once a Purchase Order is closed and	How to Close a PO?	How to Disencumbered th
9								o change ls of PO	You must create a Change Order on a	Notable to Change Chartfield of PO	How can I change chartfields, fund,
10	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	PO updating		Discount on PO	Discount provided by	If you need to create a	How can I add discounted Price on	PO calculating sales on Discounted pric
14									ea PDF print of a	PDF file of PO showing as Draft	PDF file not showi signature of
15									RS data during the	Facing issue while uploading SCPRS file	Notable to upload SCPRS data file.
16									create a Requisition with multiple chartfield	Notable to Split chart fields at Requisition	How can add Multi chartfields on PO
17	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	Sales Tax		Error Message: Custom Price on PO	Problem Creating a PO ID from a Contract ID	The "Custom Price on PO" line error message	While saving PO created from Contract	Getting error messa as Custom Price on
19							PO Access	Fiscal Help on Error Message "No	The error message "No Add-Update	Notable to edit PO of Other Buyer	While Opening PO getting error Messa
20							Activity Summary	Need activity log for Purchase order	The Activity Log of a Purchase Order will	Need Activity Log of Purchase order.	How can I check activity summary of
21							Re-Trigger Approval	Purchase Orders Stuck for approval	To resubmit a Requisition for	How can I Re-Submit my Purchase Order	My PO not went to desired approver f
23	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	Sales Tax		Rounding Off	Possible to Manually Edit Tax, as system	The tax calculation on a Purchase Order is	Fiscal System is calculating different tax	System is rounding the sales tax which
25							ving Required	PO and Voucher Issue	If you have received a "receiving required"	Facing Match exception as receiving	Match Exception in Voucher as Receiv
27							ct New version	Issue when creating a PO from a contract	There is a maximum amount on the contract	Contract not available to be copied in PO	Facing issues while creating PO copy in
28							rect mbrance	Encumbrance total not matching on PO due	The Encumbrance on a Purchase Order is	PO not calculating the correct encumbrance	encumbrance balan not showing on PO
29							ller id on PO	Issue with Supplier id on PO	When adding a LPA contract in Purchase	Supplier id changed in PO	Issue with supplier of PO, it changed
30							to id Printable	Issue in printable version of PO, not	The printable version of a Purchase Order	Printable version of Purchase Order not	issues in printable version. Ship to id
31									m only anging of the	Notable to change supplier id on PO	How can I change supplier id on PO
32									Orders can even if a	Can I close the PO if it has not been paid yet	How to close the Partially paid Purch
33									urchase as been closed	Closed PO not available for Receiving	PO has been closed mistake. Now it is
34									to edit a Order which	Need to make changes on dispatched po	Notable to change merchandise amou
37									r message ntract	while saving PO warning message is	Getting warning message new versi
38									ve a Budget ror on a	Getting budget error in requisition	Please help in this is Budget error on PO
39								Budget error or	receiving the warning message	A warning message is appearing while	Getting error mess while approving P
40	Fiscal-Peoplesoft	Procurement	Purchasing	eProcurement	Add Requisition	ChartFields	Project Code issue	Project code	The Project Code is associated with Project	Project code value not appearing on	Unable to find my project code value
41	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	Sales Tax		Tax Adjustments	How do you add different taxes to a PO?	To adjust tax rates on a Purchase Order, you	How to adjust tax on Purchase Order	How to use separat tax on PO
42	Fiscal-Peoplesoft	Procurement	Accounts Payables	Vouchers	Voucher Creation		Searching PO to copy on Voucher	Searching PO to copy on Voucher	A Purchase Order having Receiving	Notable to pull PO.	Facing issues in searching PO while	Need help in copying PO to voucher.	Assistance required in pulling PO.	Notable to find PO in search resulton	How to link a PO to a Voucher?				PO not found for copying into voucher
43	Fiscal-Peoplesoft	Procurement	Purchasing	Purchase Orders	Chartfields		Change project ID on a PO.	Notable to Change project ID on a PO.	The Project ID can be changed if no Receipt	Change project ID on a PO.	Can we change project ID on PO.	Project ID needs to be changed on PO.	Help in changing project ID on PO.	Issues in changing project ID on PO.	How do I change the Project ID on my PO?	I can't change the Project ID on my PO.				Unable to Change project ID on a PO.
45	Fiscal-Peoplesoft	Procurement	Purchasing	Receipts	Comments		Comments on Receipt	Comments from Req.	In order for	Comments from	PO comments are not	Cannot see PO	How to get the	Need assistance in	Why can't the					Why can't the



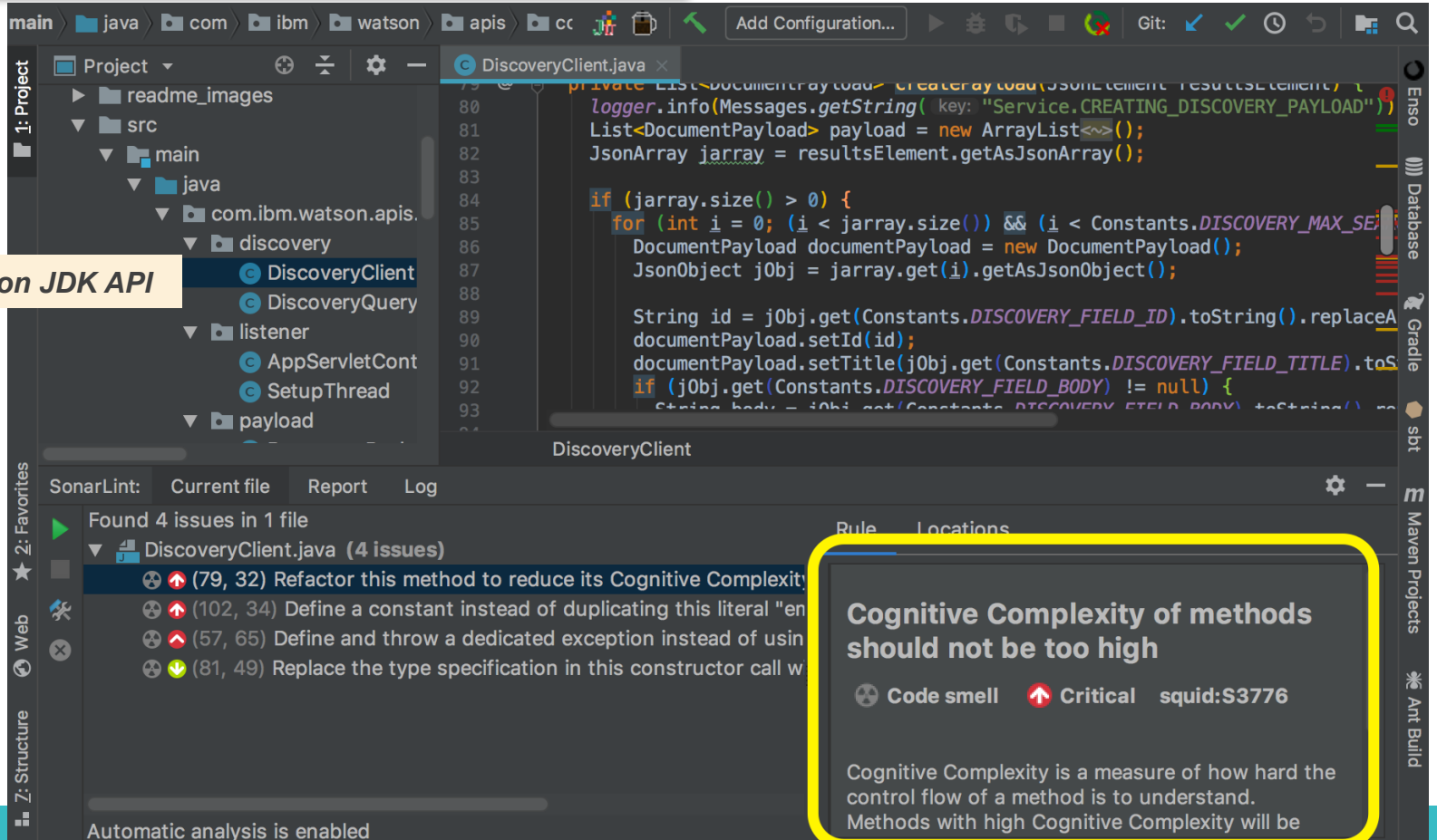
Proposed Corpus Structure – Interactive Exploration



Chatbot-Enablement

Dealing with the Unnecessary Complexity

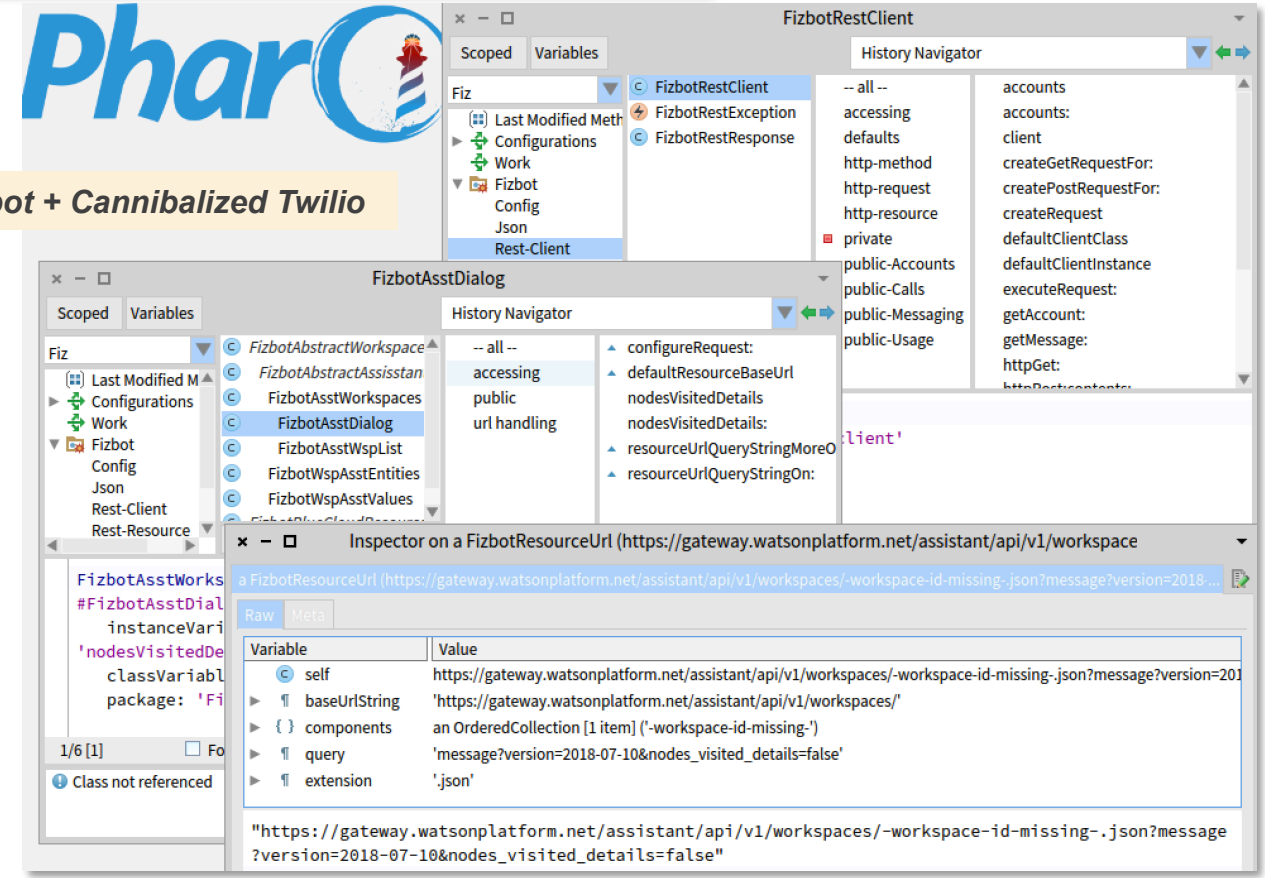
IntelliJ + Watson JDK API



Chatbot-Enablement

Making Sense of the Provider API & its Pitfalls

Pharo 6 + Zinc + Teapot + Cannibalized Twilio



02

Sample Corner Cases – Wrapping Up

- Any visible similarities?
- Any patterns perhaps?
- Any Questions?

03

Observations and Reflections

- Areas where Pharo can be used successfully in the enterprise
- Ways of introducing Pharo to non-mainstream-technology-averse orgs
- Attractive facets of Pharo for the independents and small IT companies
- Areas for improvement in Pharo to increase its attractiveness

03

Fertile Enterprise Areas for Pharo

Generally, any area with the following features is a promising shot:

- Where a solution must be provided at a fraction of time and cost and resources, compared to what the mainstream approaches require
- Where out-of-the-box approach might be the only way to go in order to satisfy the above
- Which is not central to the Enterprise (not a LOB system) but still has a demonstrable business value

It helps (at least for starters) if:

- There is an urgency about having the solution
- It has a known (non-eternal) lifespan
- It does not require massive scalability

03

Introducing Pharo to Non-Friendlies

In ***non-mainstream-technology-averse*** organizations:

- Do use Pharo ***to provide a solution***
  - … to tangible and clear *business* problems
  - … rather than to *solely technical* problems

- ***Do not*** make it a panaceum (silver bullet):
  - It cannot be a solution to vague or incorrect requirements
  - It cannot be a solution to fundamental SDLC problems, etc.

- ***Do not*** introduce it solely on its technical merits:
  - This is likely to be a *non-starter* or even an *end* to the conversation

03

Making Pharo Acceptable

Build acceptability on:

- ***Delivering the solution in the first place***, despite the constraints
- Adopting reasonable (unit, integration, functional) testing to decrease reliance on the testing performed by others
- Making the solution modifiable and maintainable
- Improving the functional scope and reliability over time in a predictable way

03

Attractive Facets of Pharo

- Open Source: less because of the cost, more of the typical red tape and procurement cycle that is capable of killing any promising approach; and because it is *Source* after all
- ~~Location, location~~ Productivity, Productivity, Productivity!
- Habitability, moldability, and the overall unmatched pleasantness of working in the environment

- Small hardware/resource demands (compared to the mainstream)
- Standard Class Library and a number of good facilities (Seaside, Zinc, parser build ers, etc.)

- Small but passionate community with many young people

03

Areas for Improvement, 1 of 2

- Making the habit of providing at least a minimal documentation of the submitted packages
  - Many packages do not have class comments or even package comments
  - Unfortunately, this can be a self-disqualification
  - Creating a curated list of Pharo packages on GitHub?

- Improvements in Version and Configuration Control
  - Keeping around what has worked just fine (e.g., gitfiletree)
  - Being clear about the status and road map of key components (Iceberg?)
  - Having reliable dependency specs in packages that work when loading
    - Using CI to test dependencies of key packages?

03

Areas for Improvement, 2 of 2

- Better information about the level of maturity of a given tool or package
  - Maturity levels in Squeak *are* useful
  - Is there a way of mechanically approximating the maturity level?

- Better managing of the release cycle:
  - Reconsidering the push for the bleeding edge
  - Perhaps even/odd-numbered stable/bleeding edge releases?
  - Clarity about fitness-for-purpose of the new features/tools
  - Keeping things that work available

- Promoting how small operators (including the independents) can support development of Pharo, with emphasis on the *financial* support and what this can *buy everyone*

04

Final Thoughts

Over the years, I came to believe that the *actual value* of (a specific piece of) technology lies in its *ability to change people's attitudes and behaviors* in IT.

Pharo/Smalltalk has that ability.

Starting with the small or the non-central (the *corner cases*) within the big and the complex (the *enterprise*) can help realize that capability, while producing good/usable solutions and making the *enterprise* a bit more bearable in the process.

Thank you

Comments, suggestions, feedback, etc.: please email piotr@palacz.net