A Flexible Framework to Support Collaborative Software Evolution Analysis

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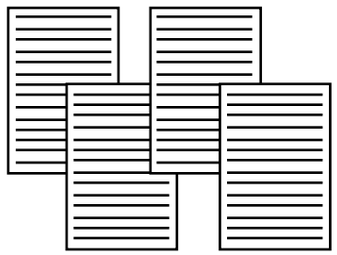
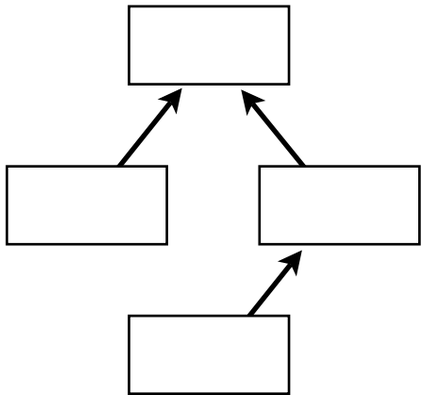
Switzerland

Software Evolution Analysis

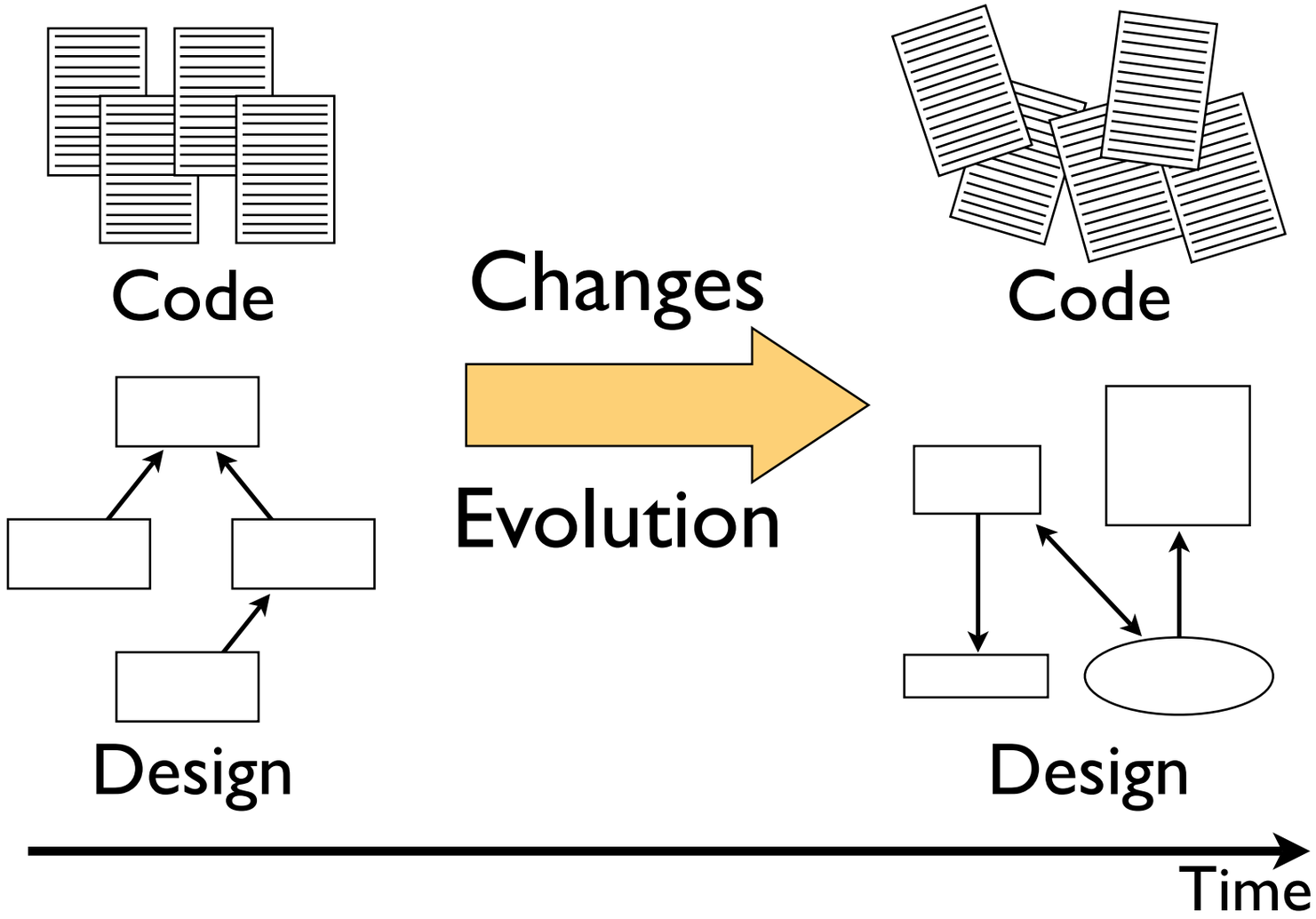


Code

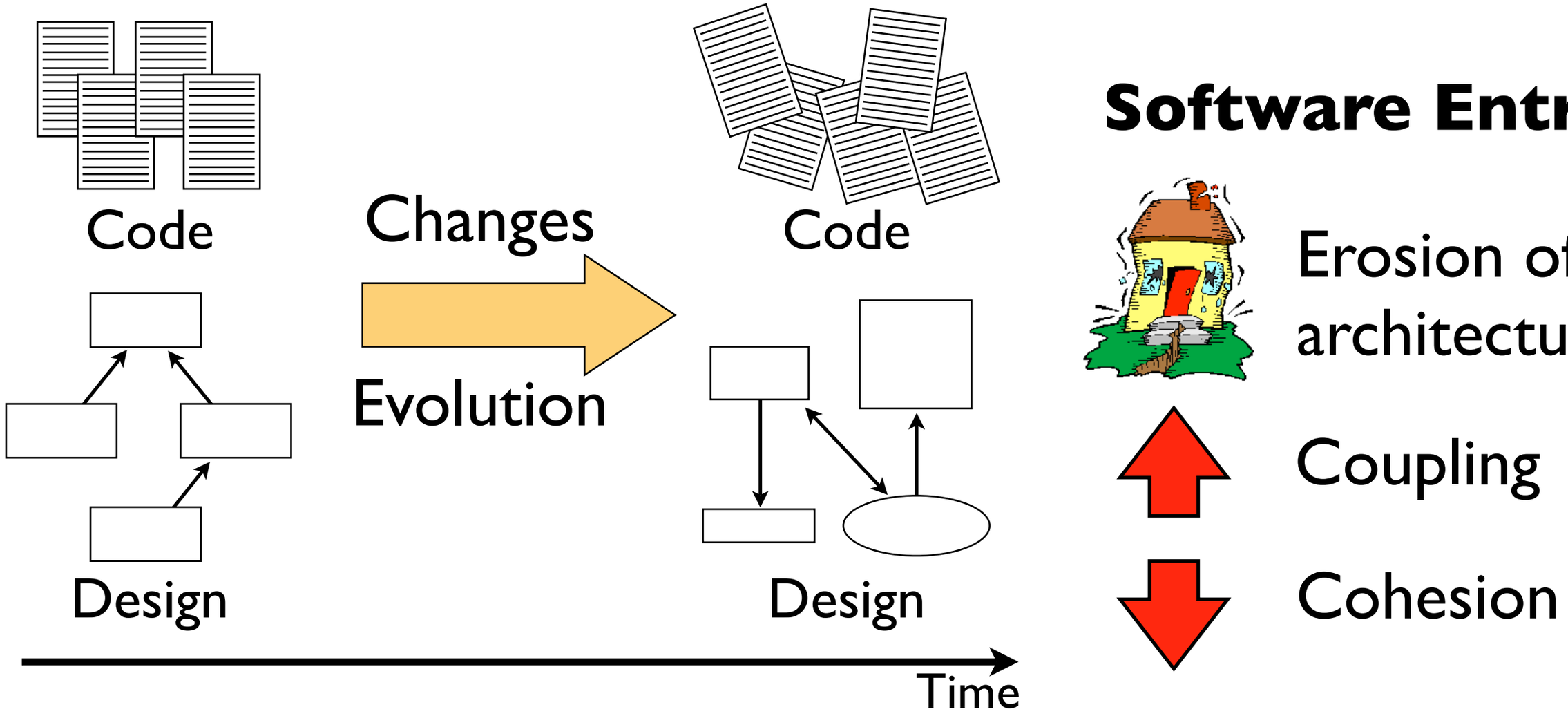


Design

Software Evolution Analysis



Software Evolution Analysis



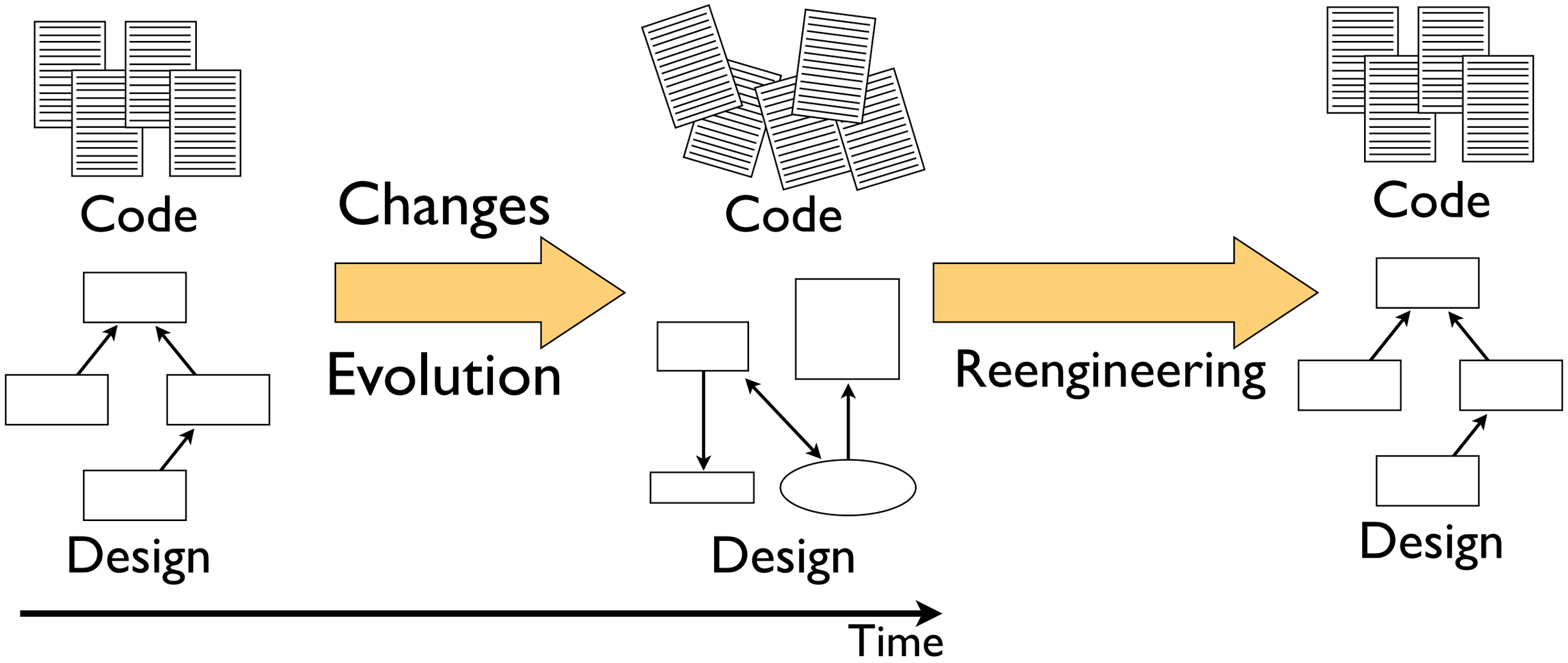
Software Entropy

Erosion of architecture

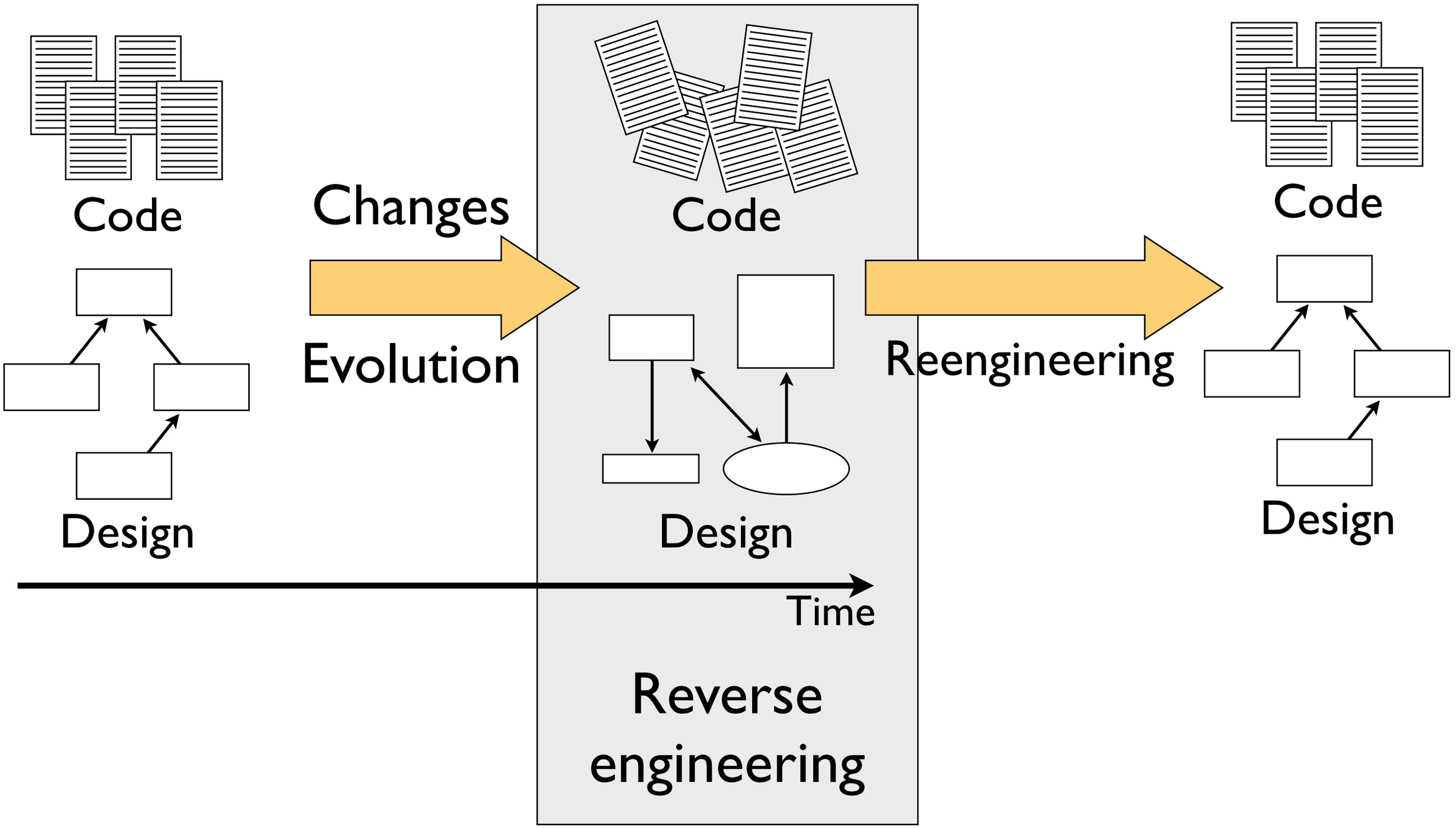
Coupling

Cohesion

Software Evolution Analysis



Software Evolution Analysis



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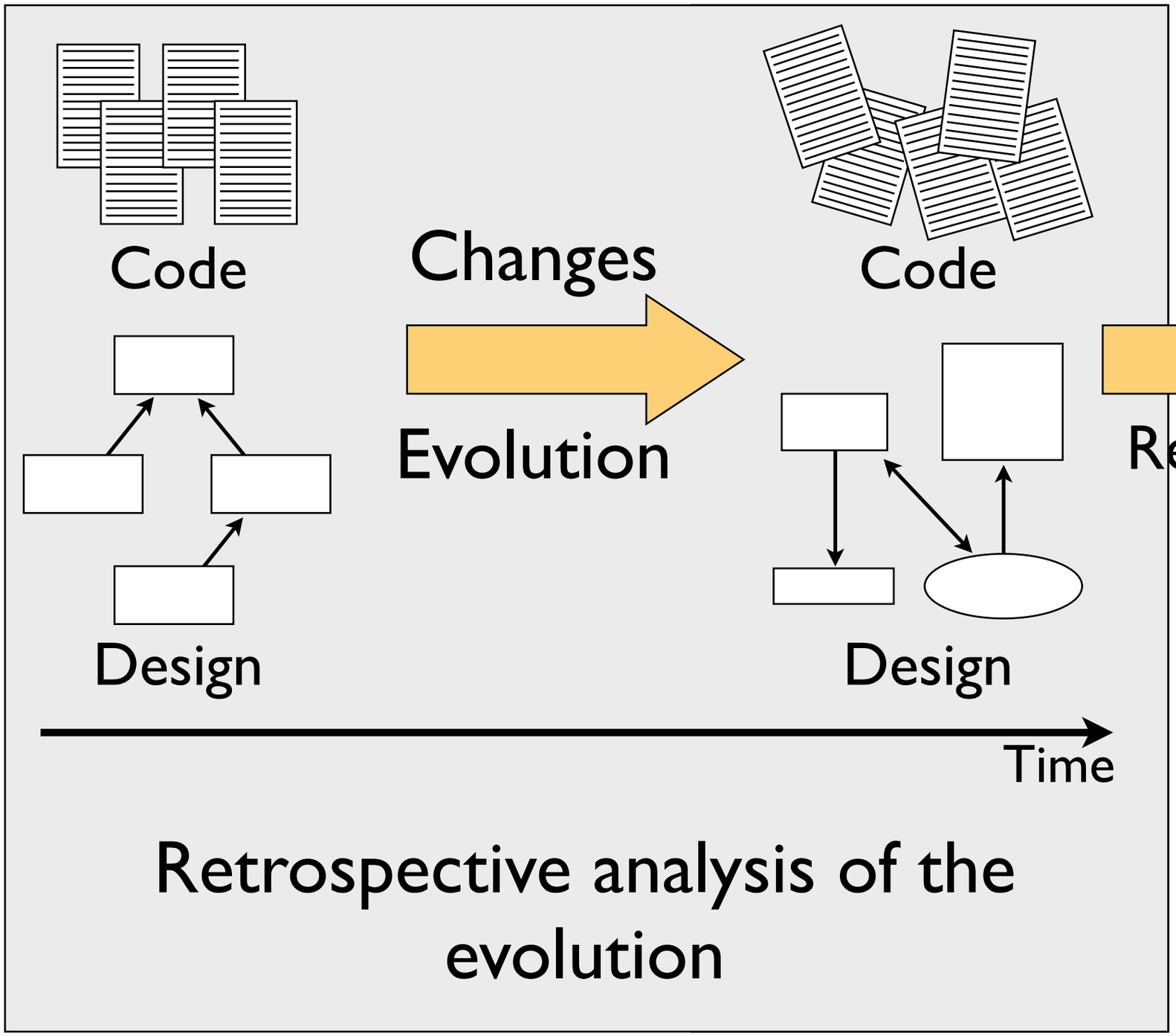


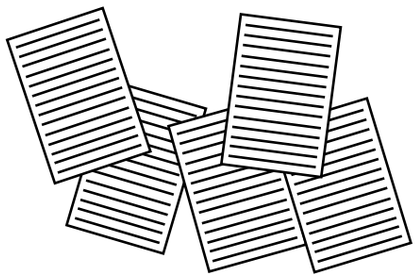
Software Evolution Analysis

Goal

Detecting potential shortcoming in the architecture, design and logical structure of the system

The Ideal Loop

Software System



The Ideal Loop

Software System

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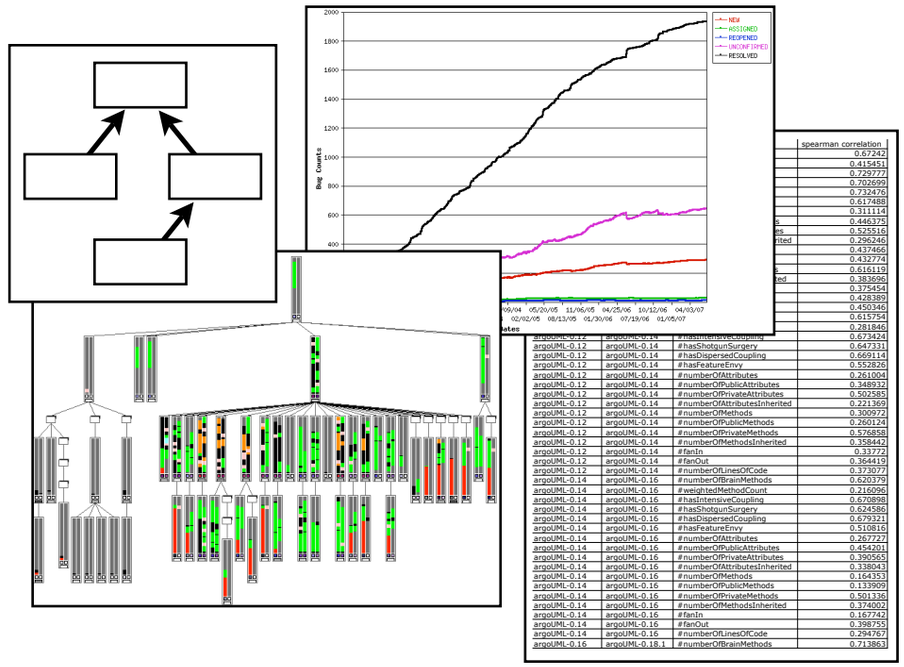

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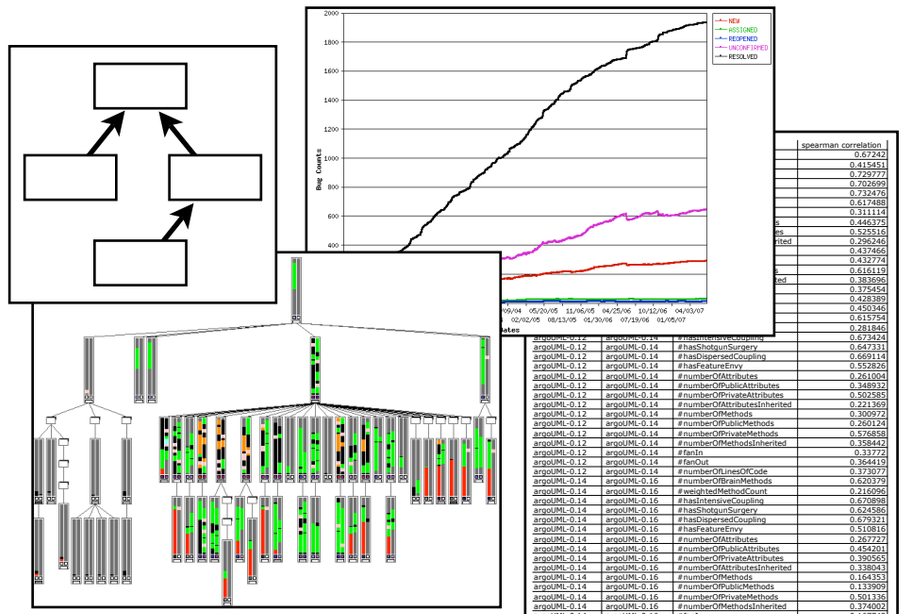
The Ideal Loop

Software System



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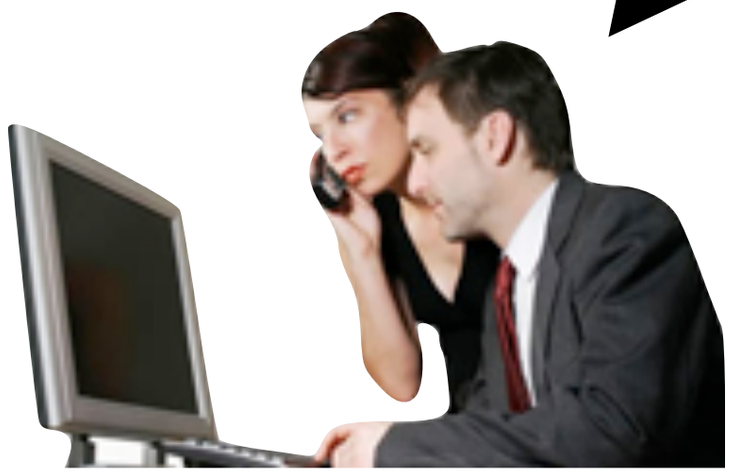

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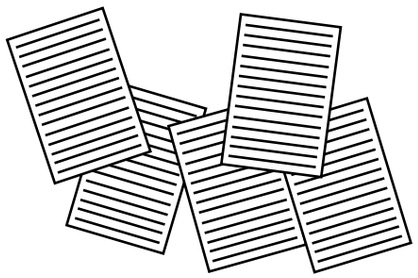

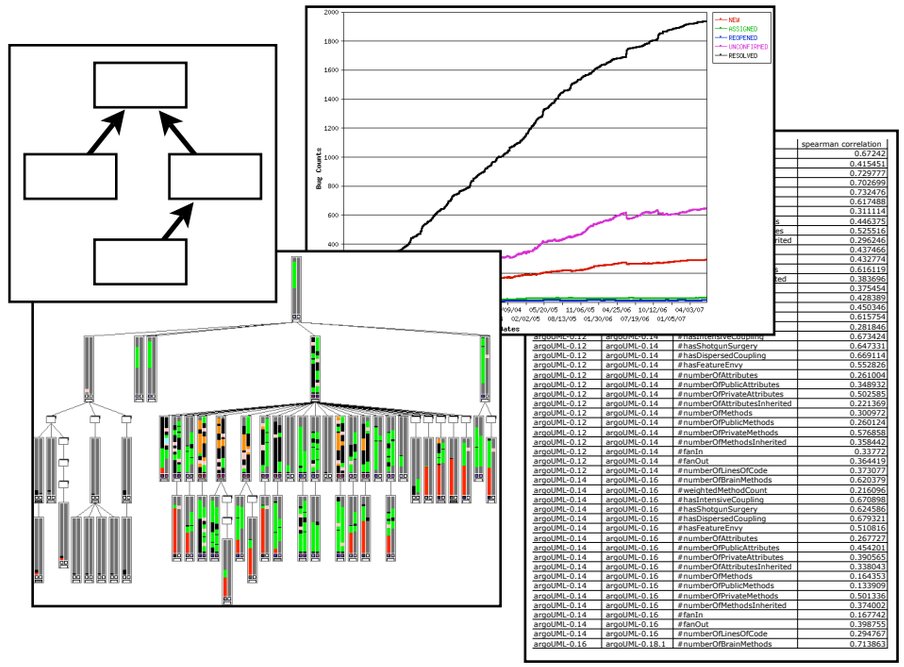

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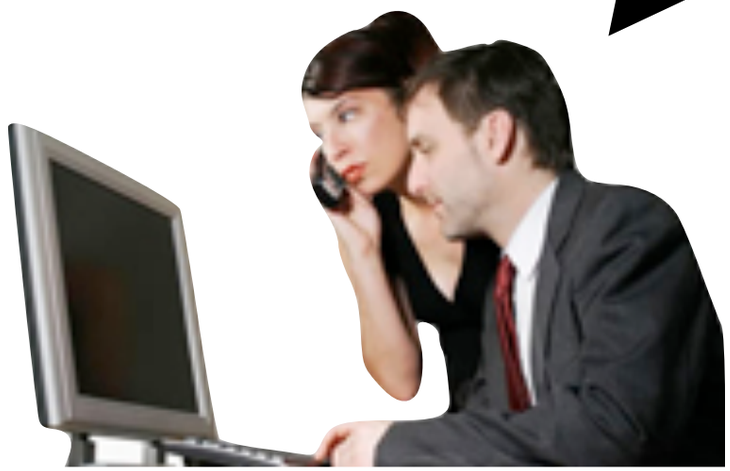
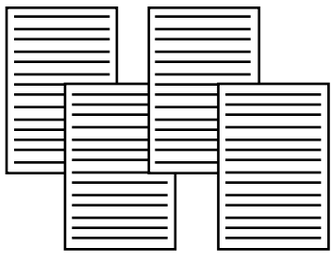
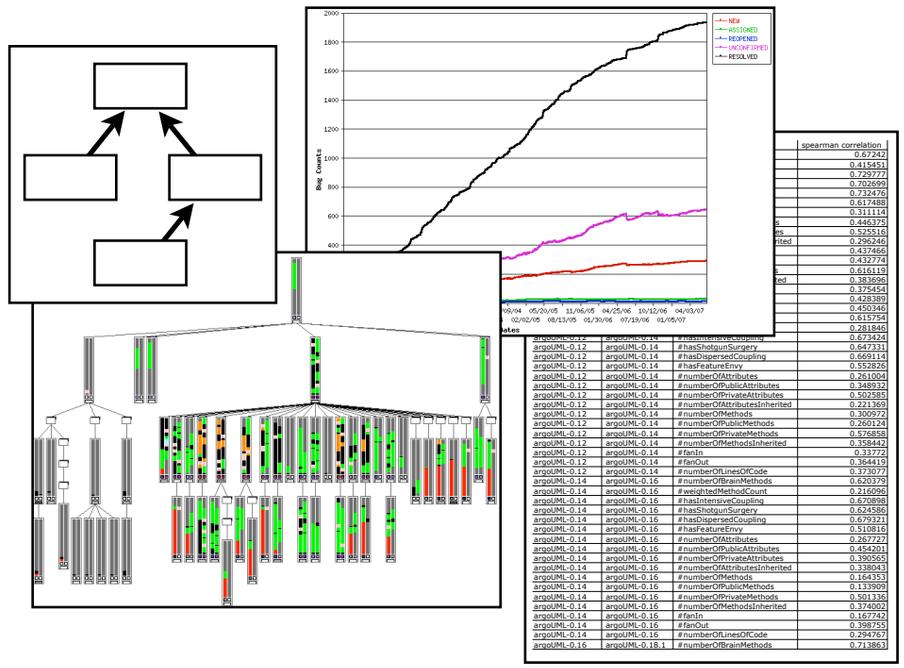


The Ideal Loop

Software System





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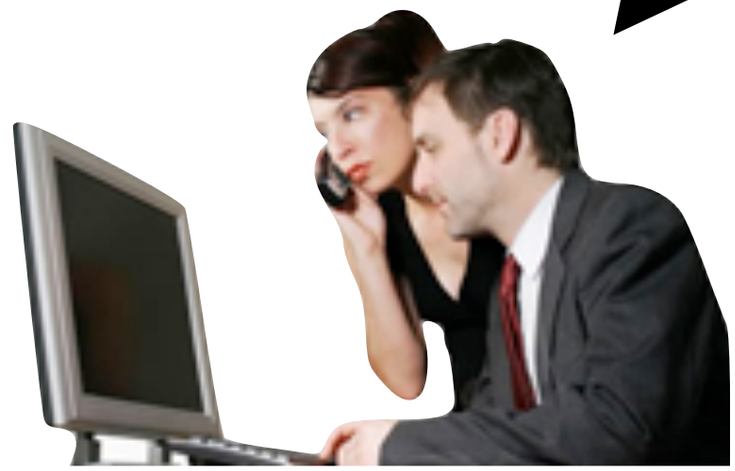
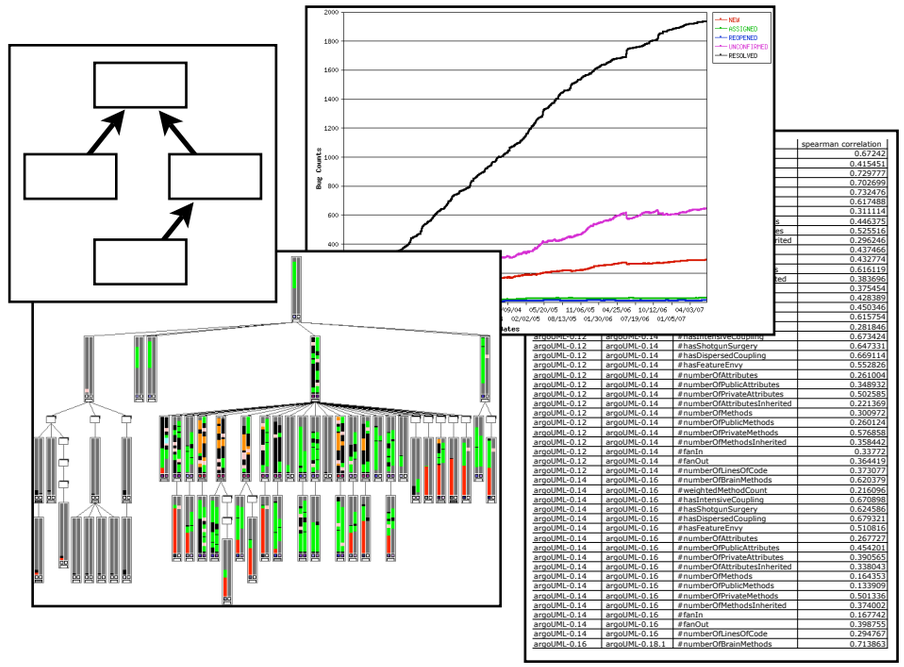


The Real Loop

Software System



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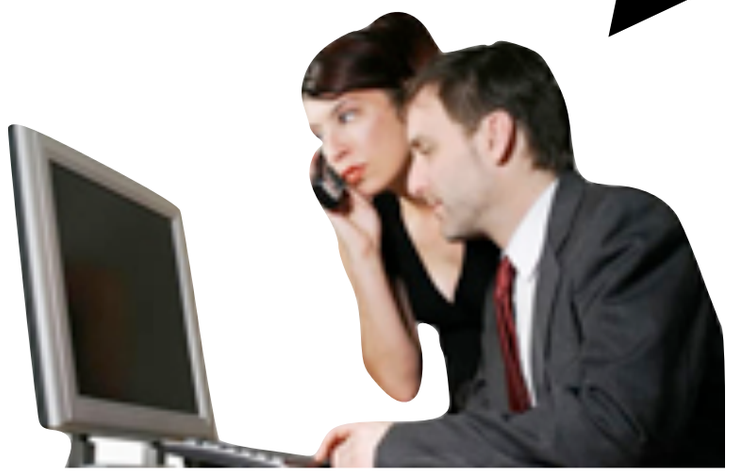
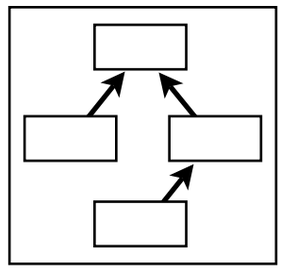


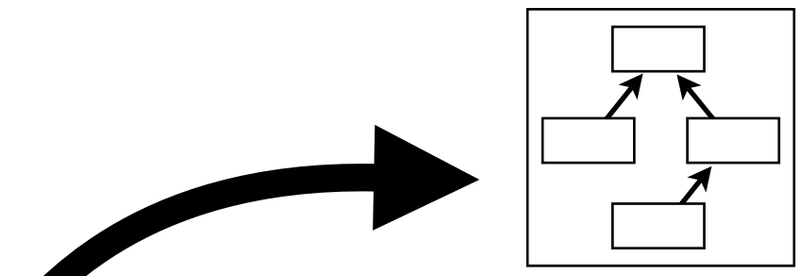
The Real Loop

Software System



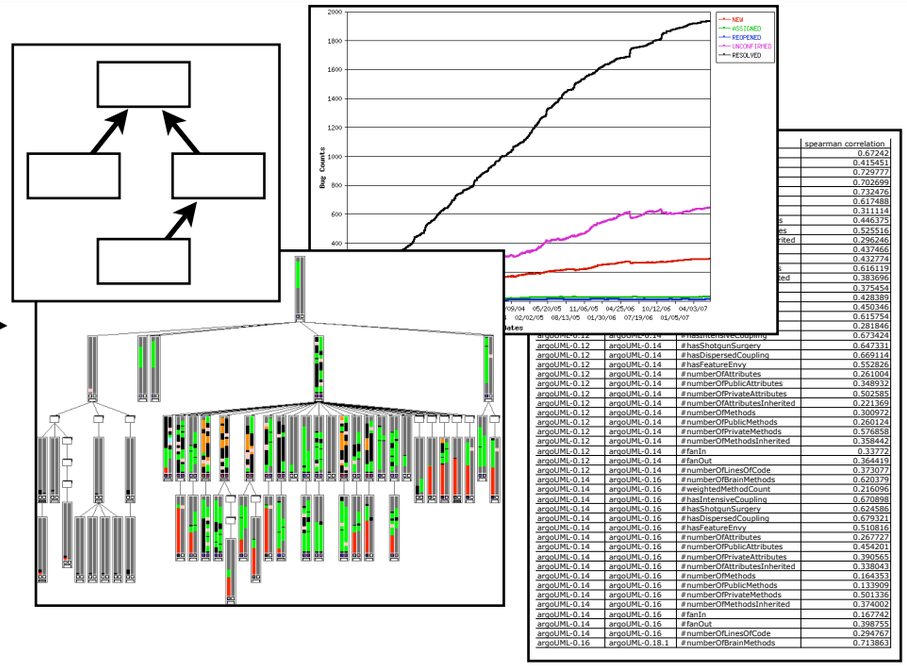
The Real Loop

Software System



Questions

Software System



			spearman correlation
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argoUML-0.12	argoUML-0.14	#hasDispersedCoupling	0.415451
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argoUML-0.12	argoUML-0.14	#numberOfPrivateAttributes	0.617488
argoUML-0.12	argoUML-0.14	#numberOfAttributesInherited	0.311114
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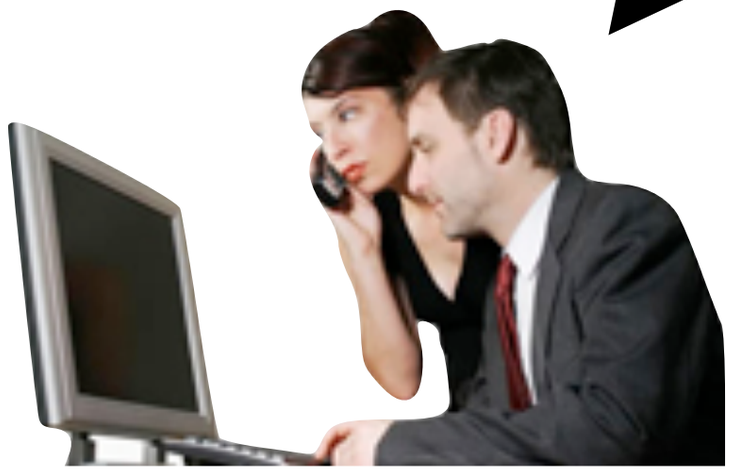
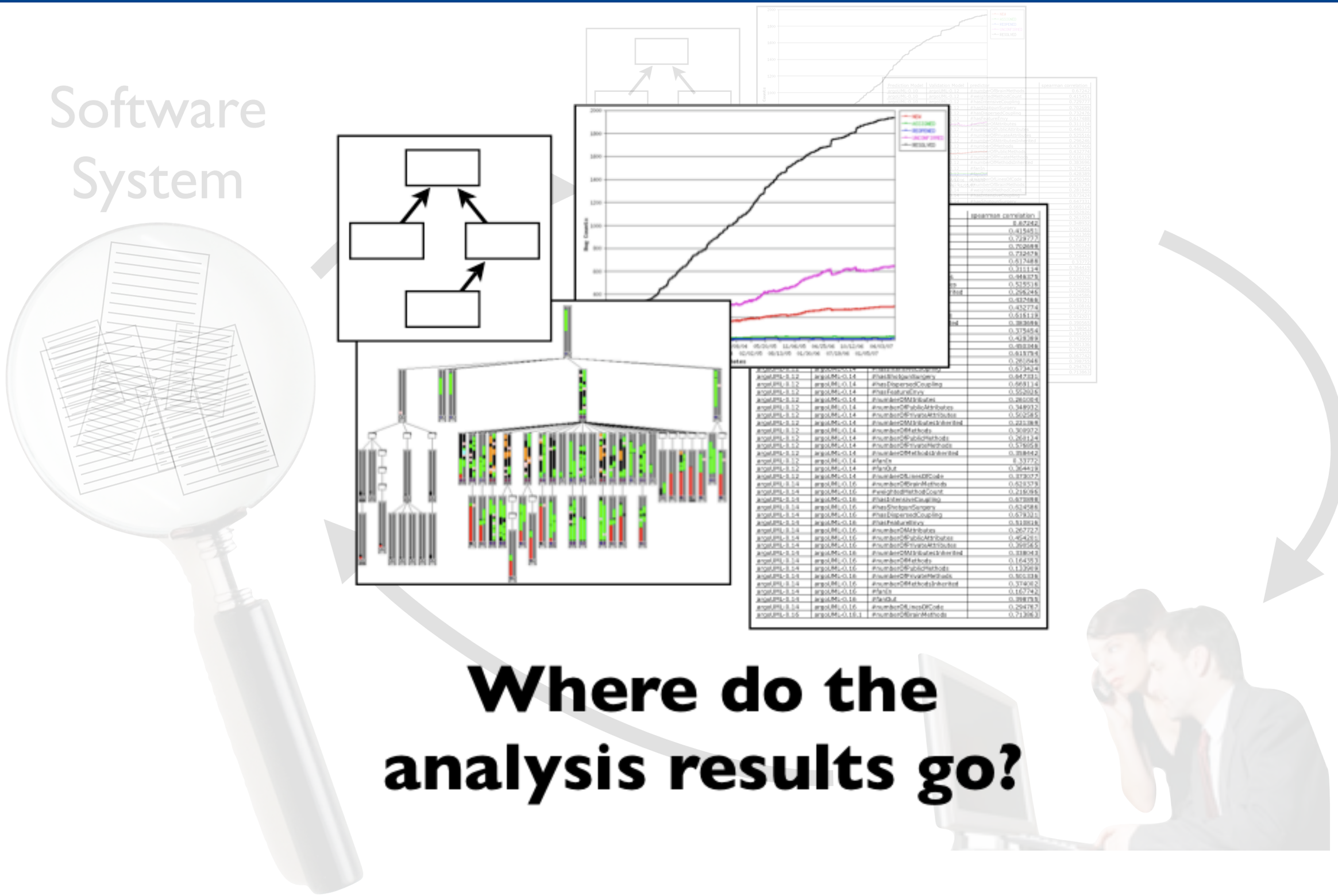


Questions

Questions



(Some) Perspectives on Evolution

(Some) Perspectives on Evolution

Change impact analysis

Co-change analysis

Aspects evolution

Evolution metrics

Architecture recovery

Effort estimation

Traceability analysis

Source: ERCIM Software Evolution Working Group

(Some) Perspectives on Evolution

Change impact analysis

Co-change analysis

Aspects evolution

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Traceability analysis

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Evolution of:

- Requirement specifications
- Programs
- Architectures
- Test cases
- Log files
- Models
- Documentation
- Meta-models
- Version control information
- Language descriptions
- Bug reports
- APIs
- Release histories
- Protocols

Claims

... between software evolution analysts with different expertises

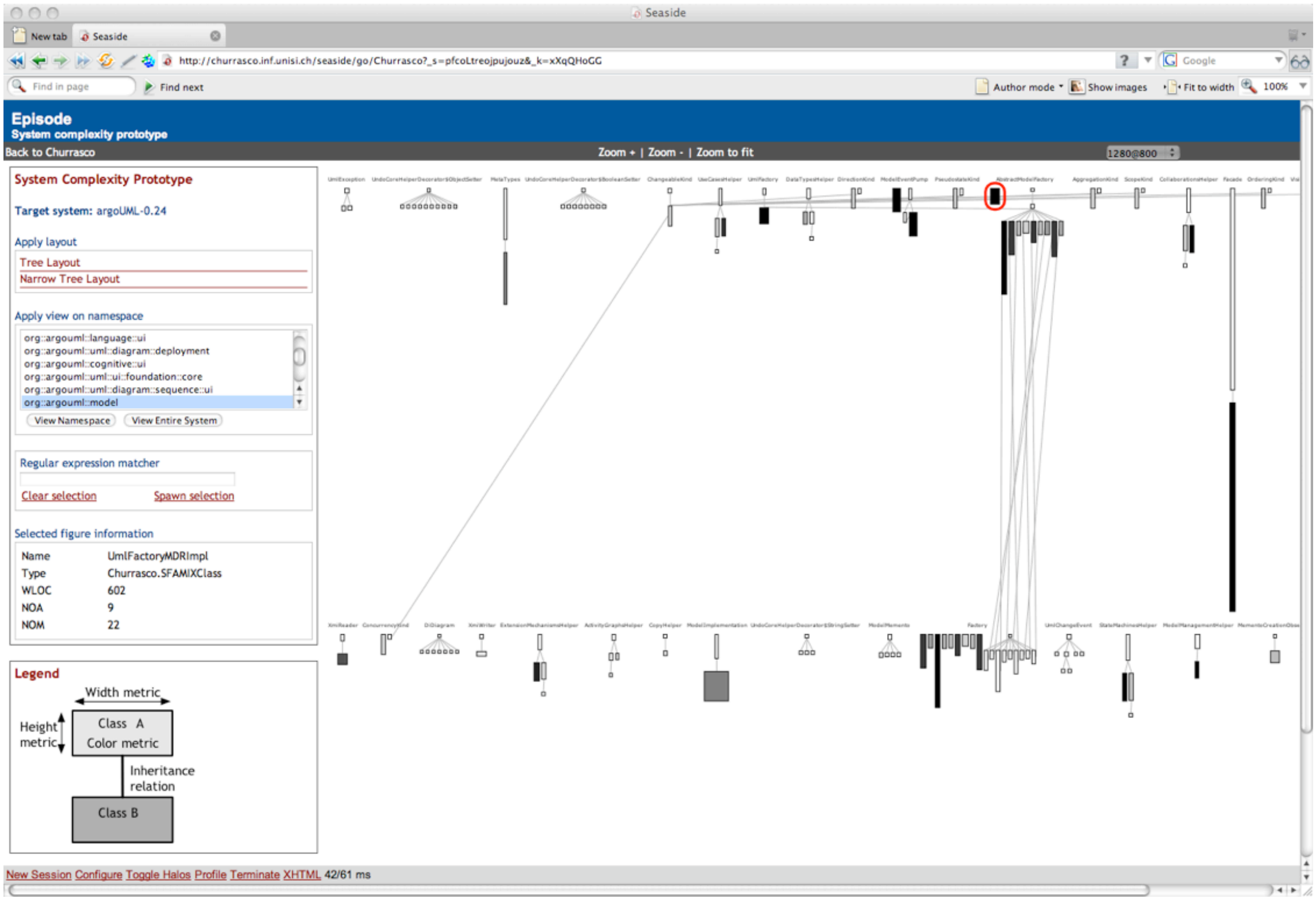
... between software evolution analysts and developers

... allowing "collaboration over time"

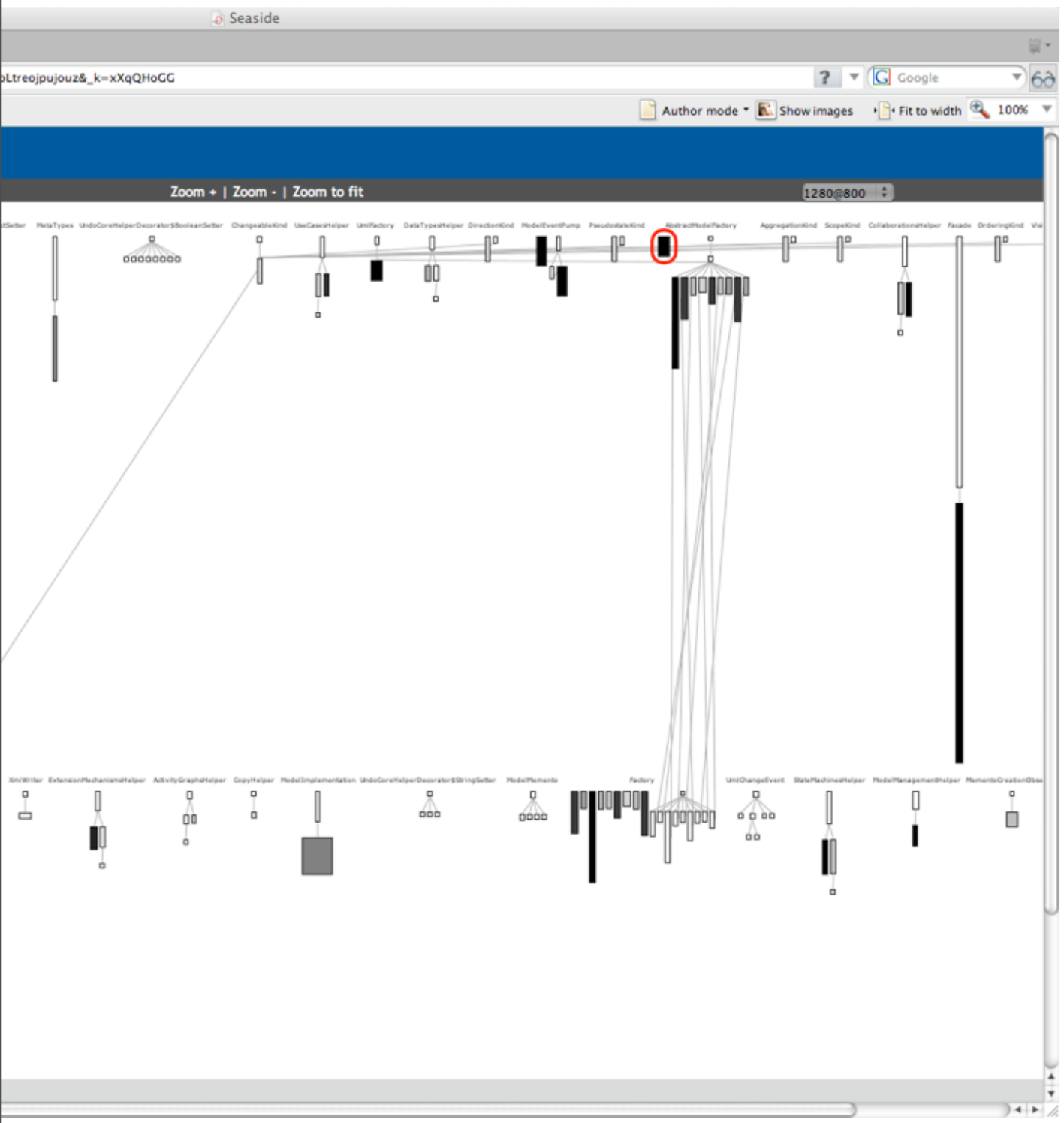
Software evolution analysis should be a collaborative activity

Analysis results should be part of the software system model itself

Churrasco


Seaside
New tab
Seaside
http://churrasco.inf.unisi.ch/seaside/go/Churrasco?_s=pfcoLtreojpujouz&_k=xXqQHoGG
Google
Find in page
Find next
Author mode
Show images
Fit to width
100%
Episode
System complexity prototype
Back to Churrasco
Zoom + | Zoom - | Zoom to fit
1280@800
System Complexity Prototype
Target system: argoUML-0.24
Apply layout
Tree Layout
Narrow Tree Layout
Apply view on namespace
org::argouml::language::ui
org::argouml::uml::diagram::deployment
org::argouml::cognitive::ui
org::argouml::uml::ui::foundation::core
org::argouml::uml::diagram::sequence::ui
org::argouml::model
View Namespace
View Entire System
Regular expression matcher
Clear selection
Spawn selection
Selected figure information
Name UmlFactoryMDRImpl
Type Churrasco.SFAMIXClass
WLOC 602
NOA 9
NOM 22
Legend
Width metric
Height metric
Class A
Color metric
Inheritance relation
Class B
New Session Configure Toggle Halos Profile Terminate XHTML 42/61 ms

Churrasco



Features

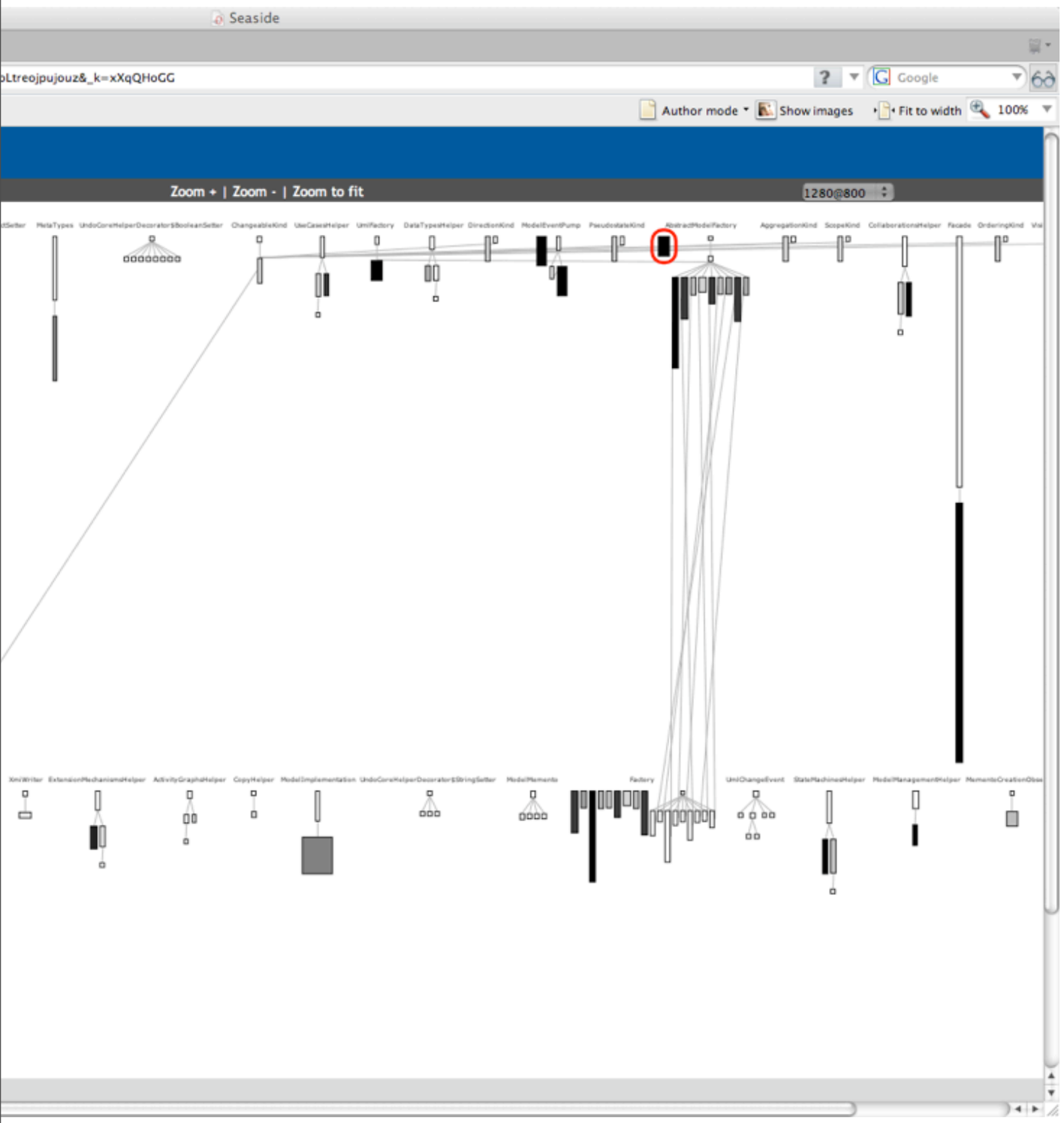
Software visualization

Persistent annotations

Flexible meta-model

Entirely web-based

Churrasco



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Bugzilla

Bug history

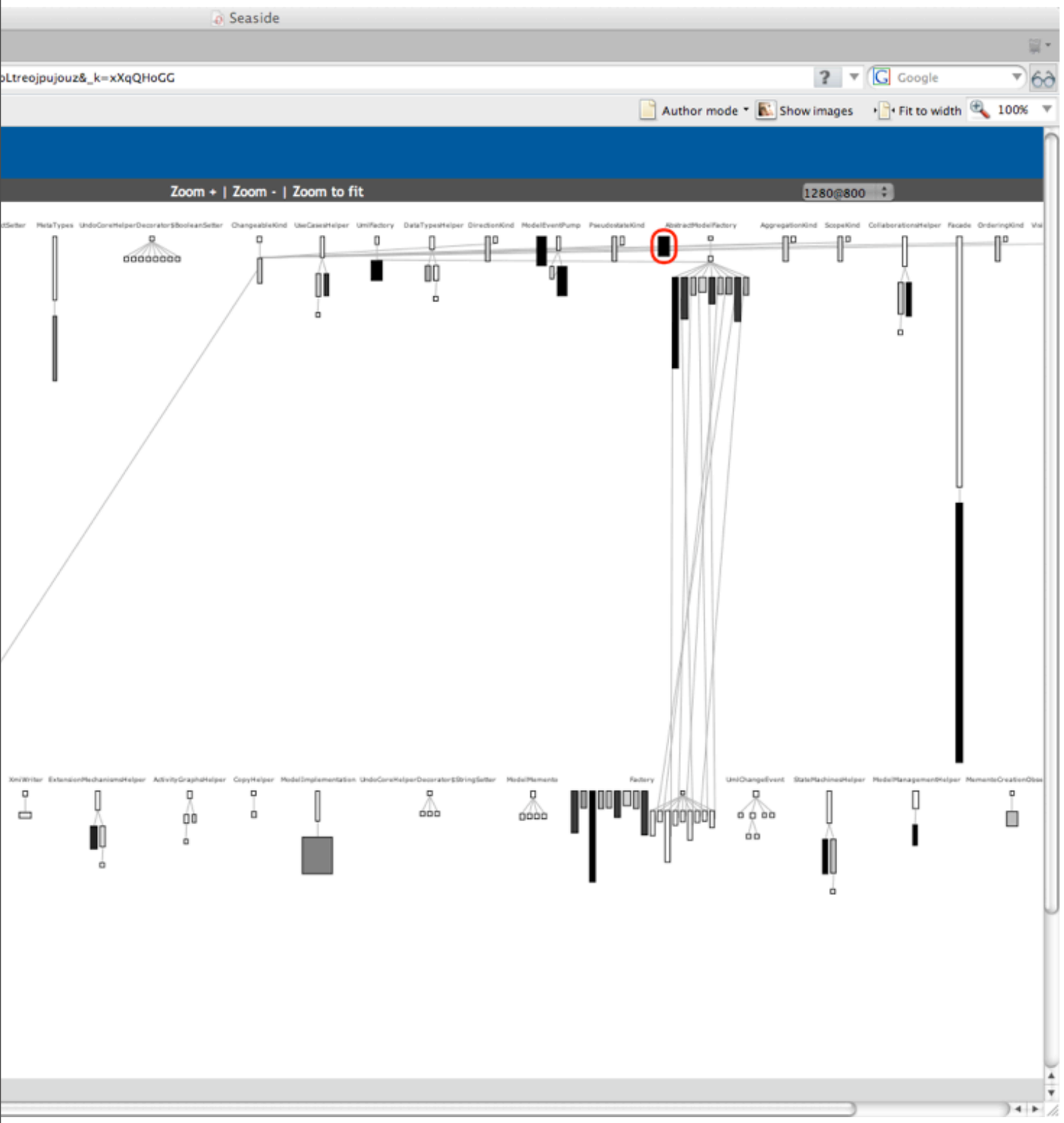
CVS

SVN

Issuezilla

FAMIX

Churrasco



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FAMIX

Systems

ArgoUML

Eclipse Jdt

JEdit

Gcc

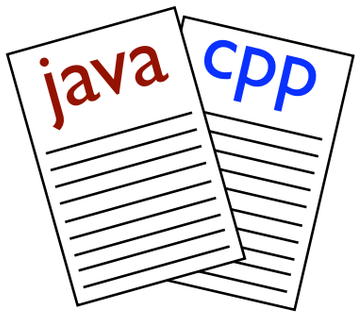
AspectJ

The Churrasco Architecture

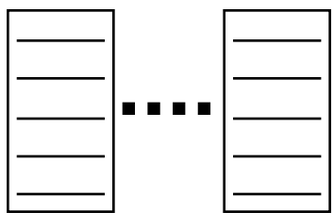
Software System	Model	Analysis

The Churrasco Architecture

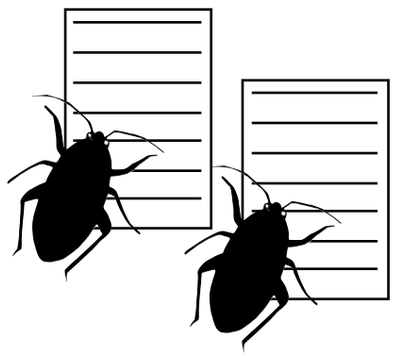
Software System



Source code



cvs / svn



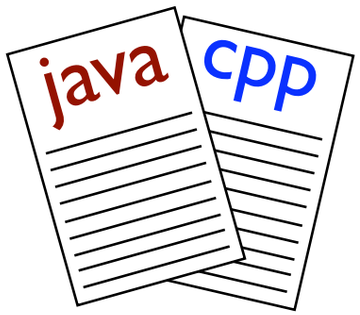
Bugzilla / Issuezilla

Model

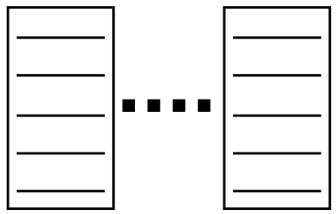
Analysis

The Churrasco Architecture

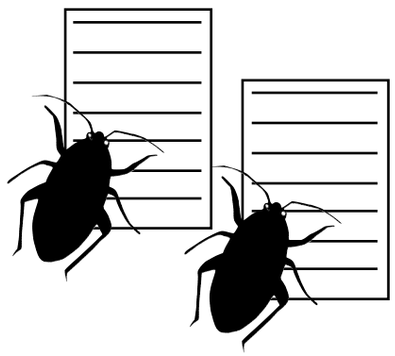
Software System



Source code

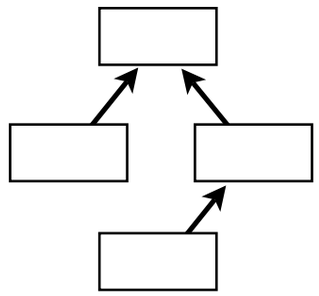


cvs / svn

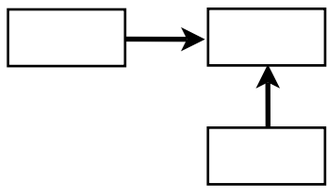


Bugzilla / Issuezilla

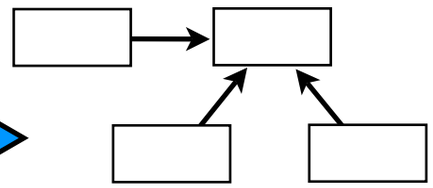
Model



FAMIX model



History model



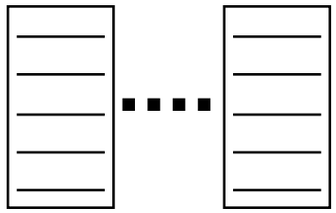
Bug model
(with history)

Analysis

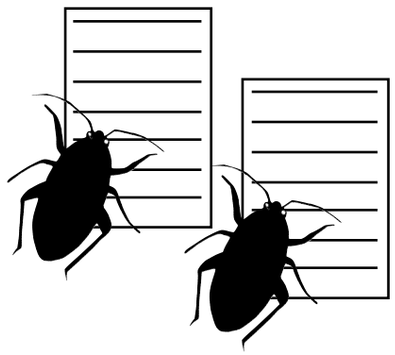
The Churrasco Architecture

Software System

Source code

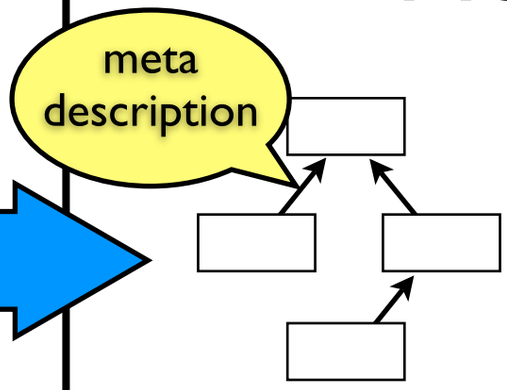


cvs / svn

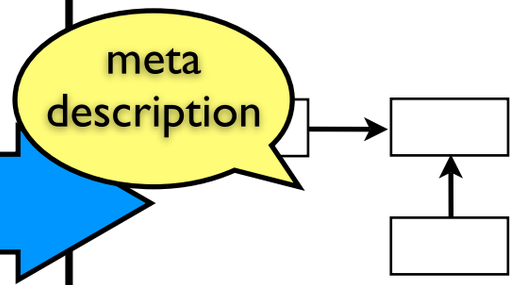


Bugzilla / Issuezilla

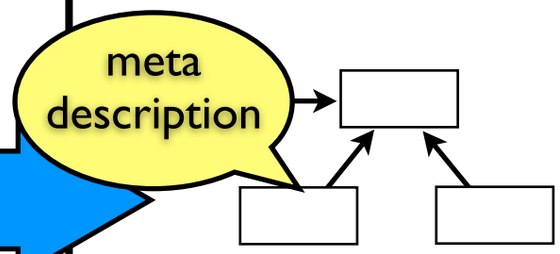
Model



FAMIX model



History model

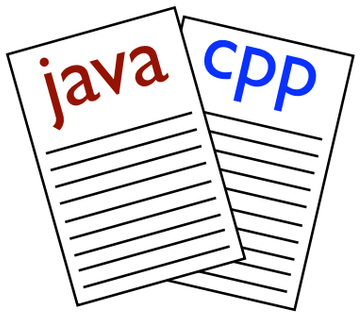


Bug model
(with history)

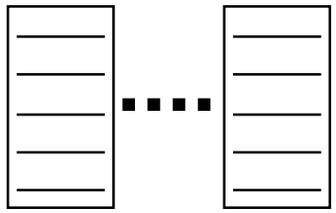
Analysis

The Churrasco Architecture

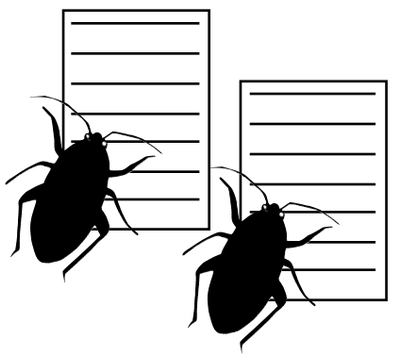
Software System



Source code

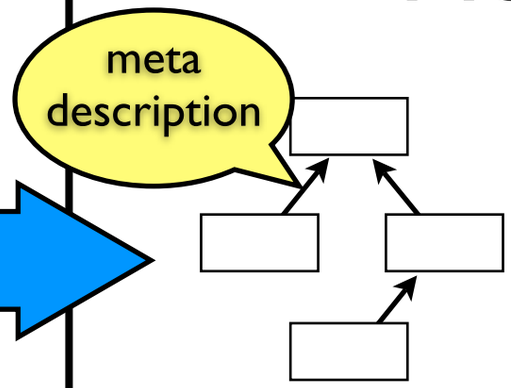


cvs / svn

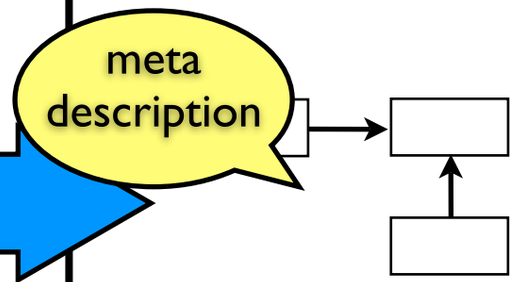


Bugzilla / Issuezilla

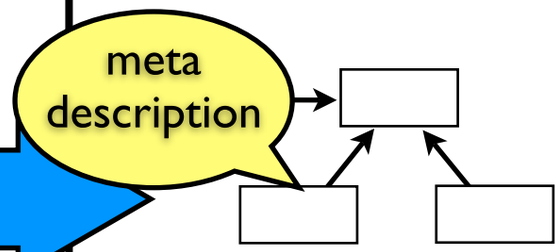
Model



FAMIX model

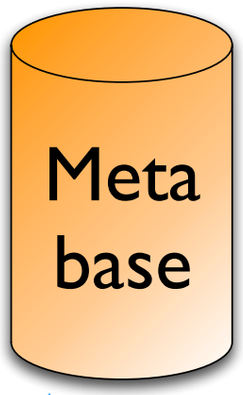


History model



Bug model
(with history)

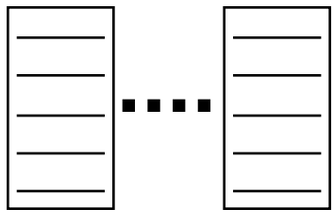
Analysis



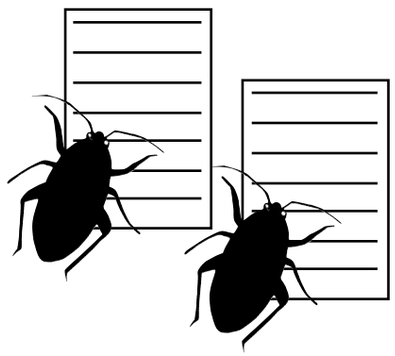
The Churrasco Architecture

Software System

Source code

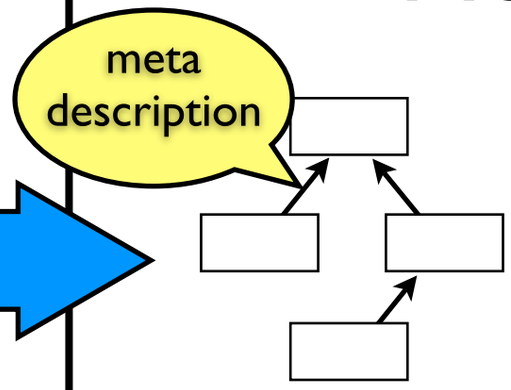


cvs / svn

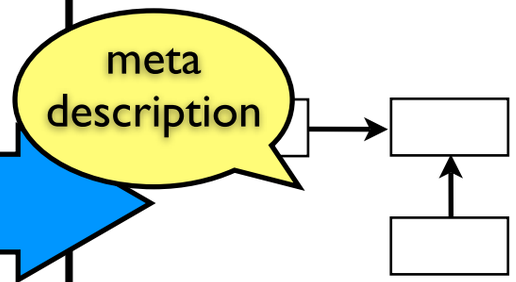


Bugzilla / Issuezilla

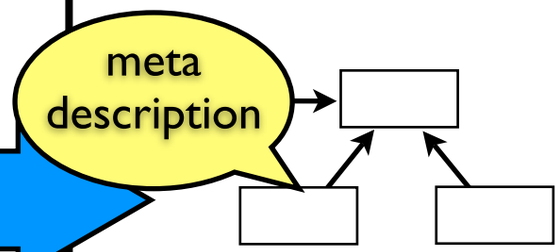
Model



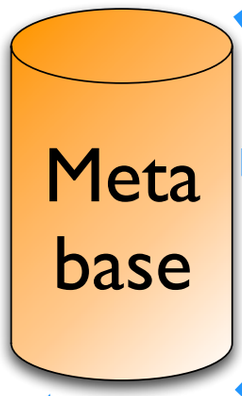
FAMIX model



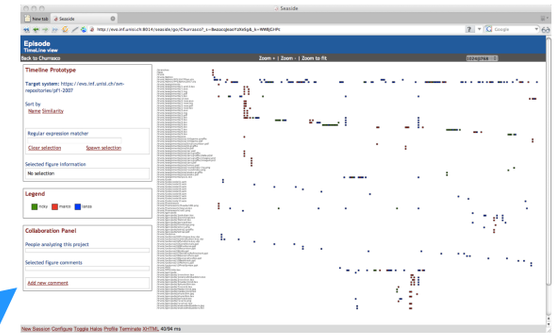
History model



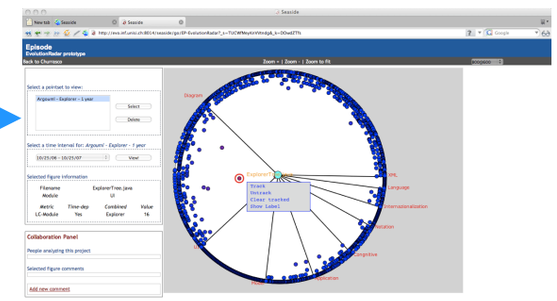
Bug model
(with history)



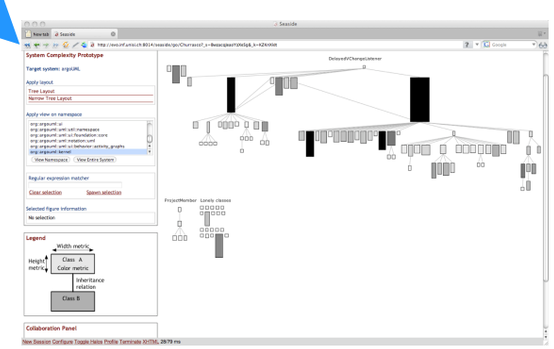
Analysis



Timeline



Evolution radar

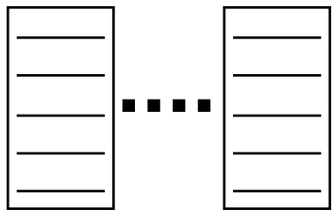


System complexity

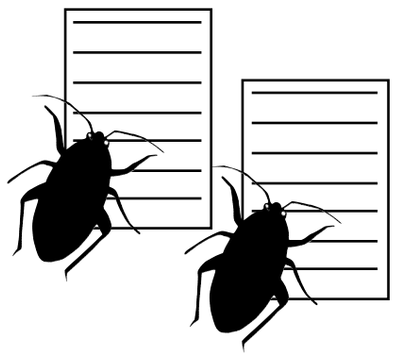
The Churrasco Architecture

Software System

Source code

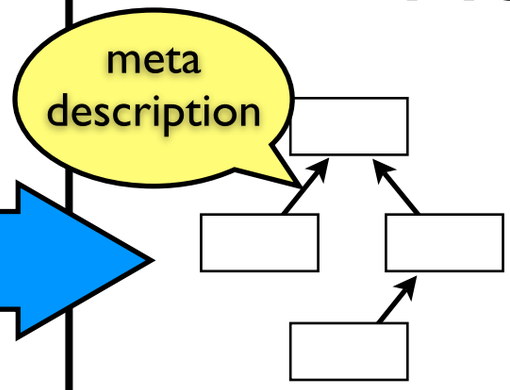


cvs / svn

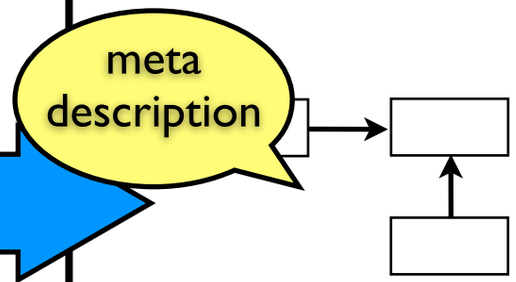


Bugzilla / Issuezilla

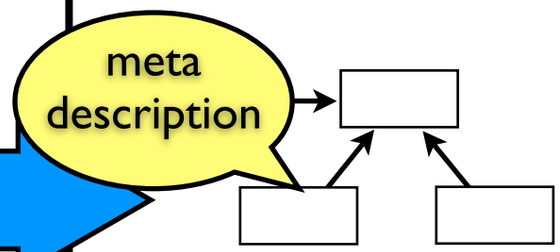
Model



FAMIX model

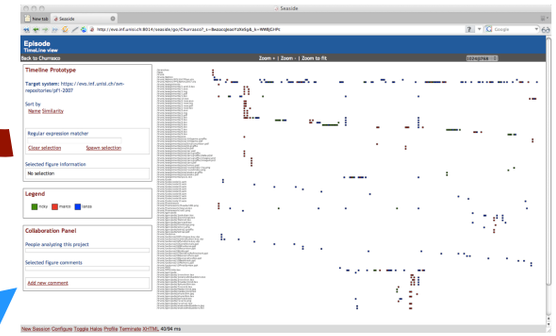


History model

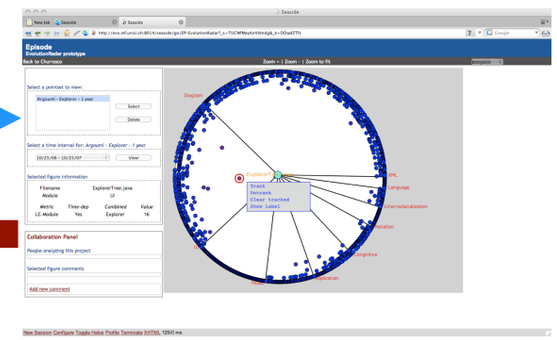


Bug model
(with history)

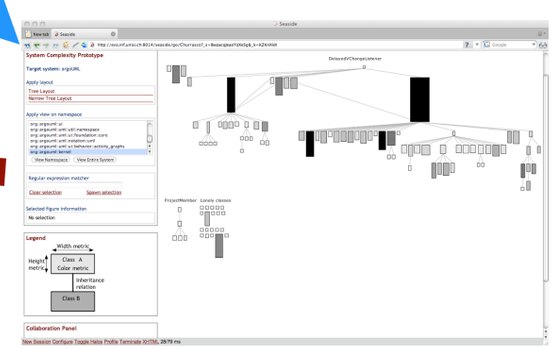
Analysis



Timeline



Evolution radar



System complexity

The Churrasco Architecture

Software System

Repository url

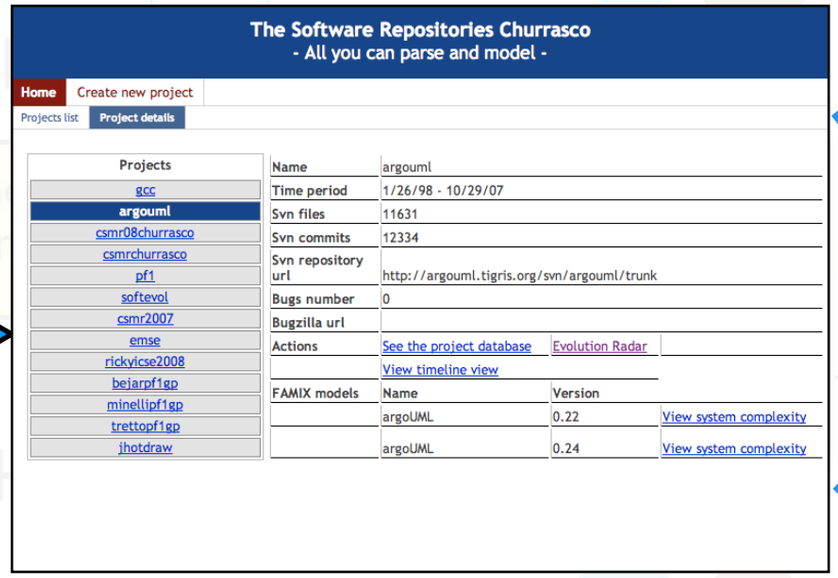
cvs / svn

Source code

Bugzilla / Issuezilla

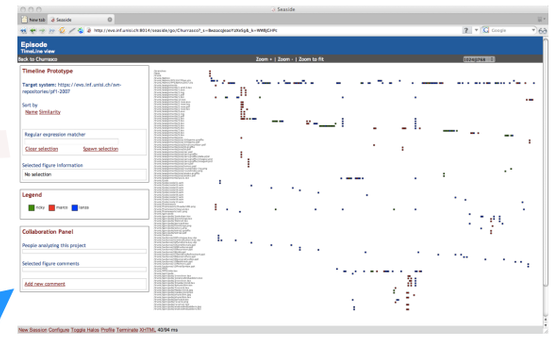
Bug model (with history)

Model

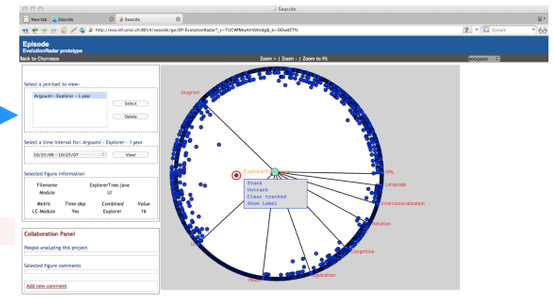


Churrasco web portal

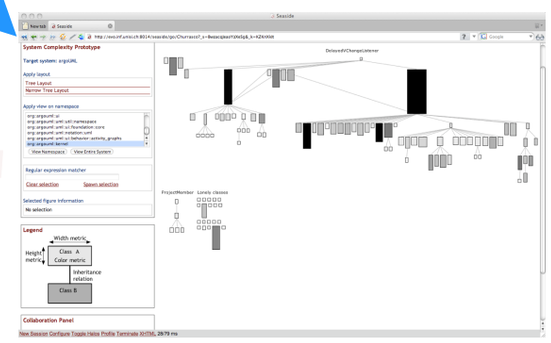
Analysis



Timeline

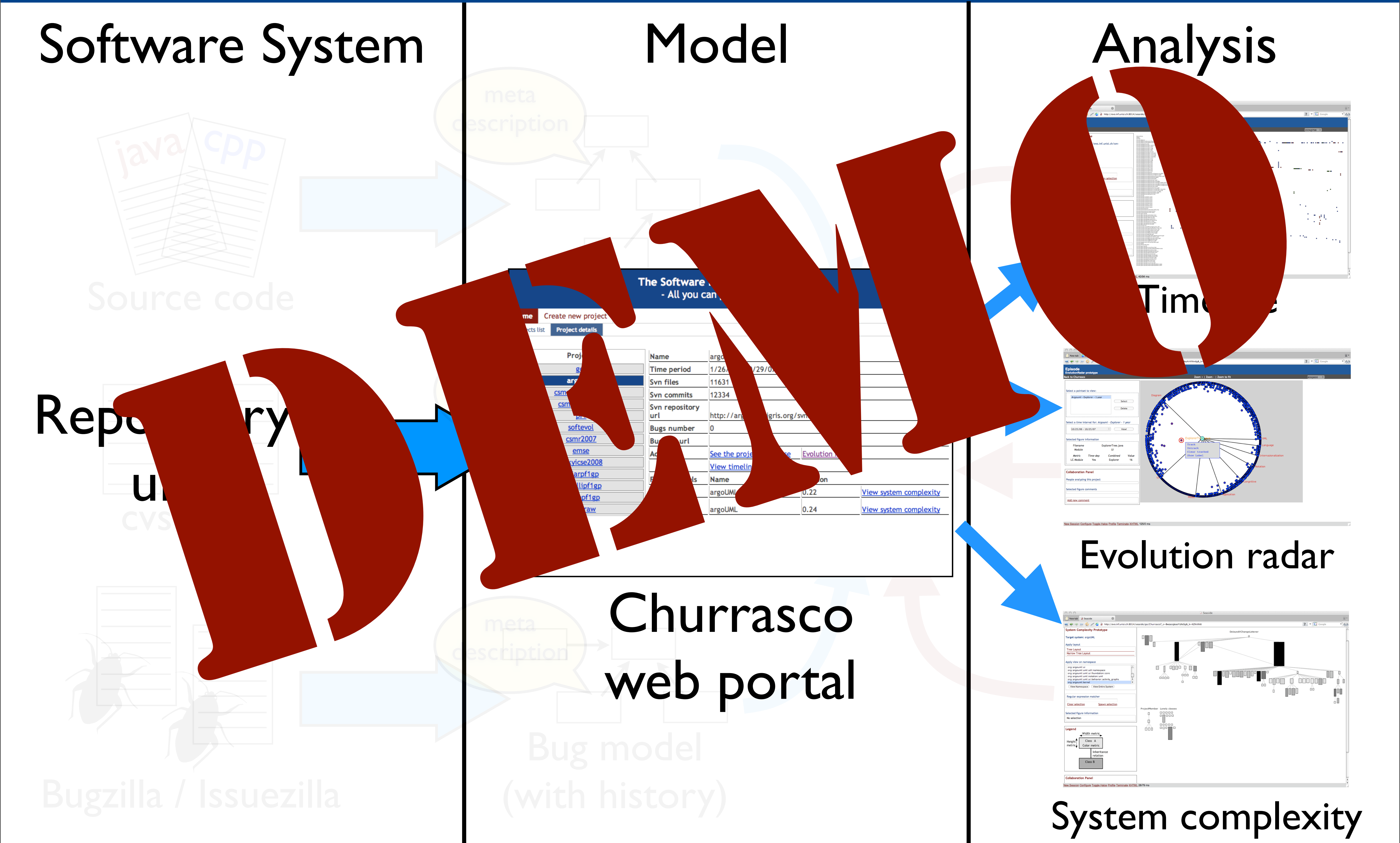


Evolution radar



System complexity

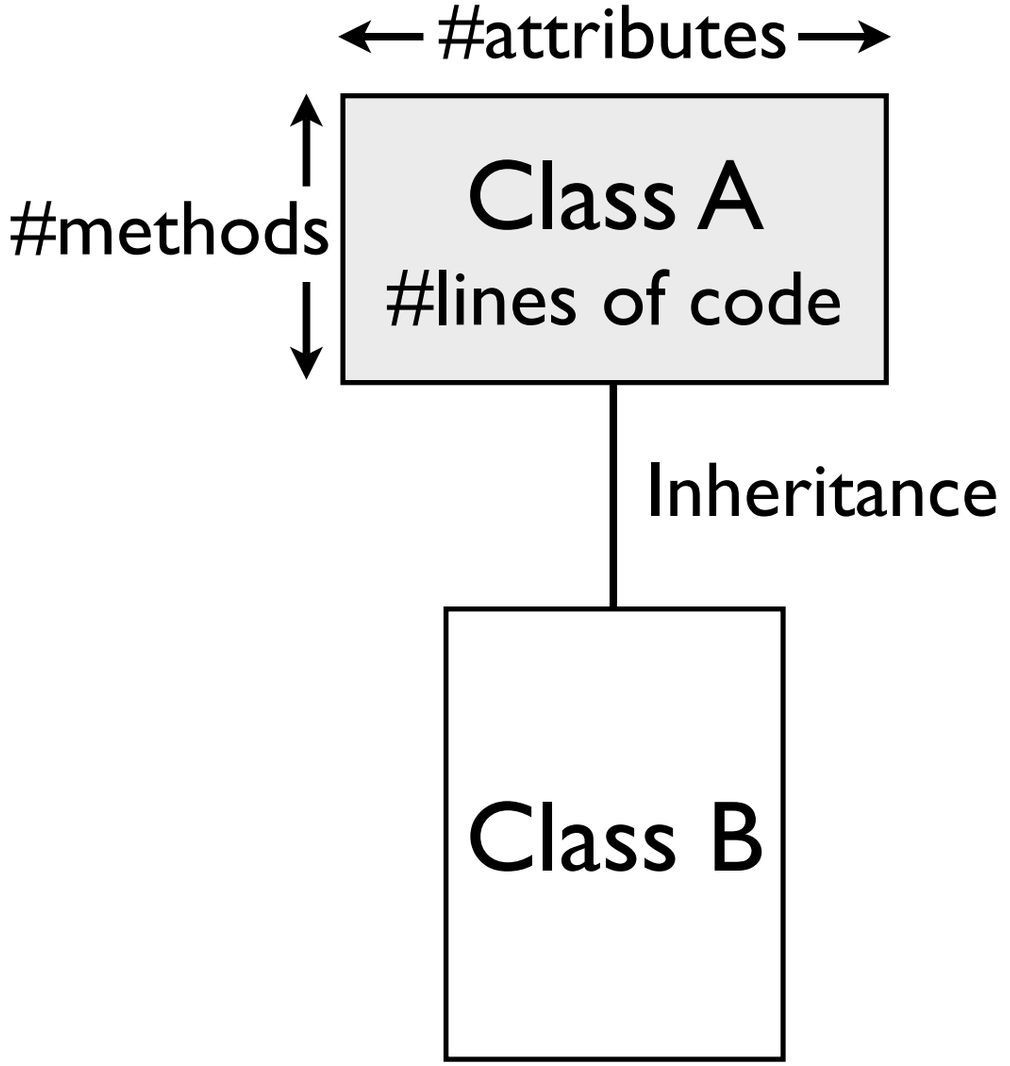
The Churrasco Architecture



Example scenario

Marco: Newcomer

Ricky: Expert

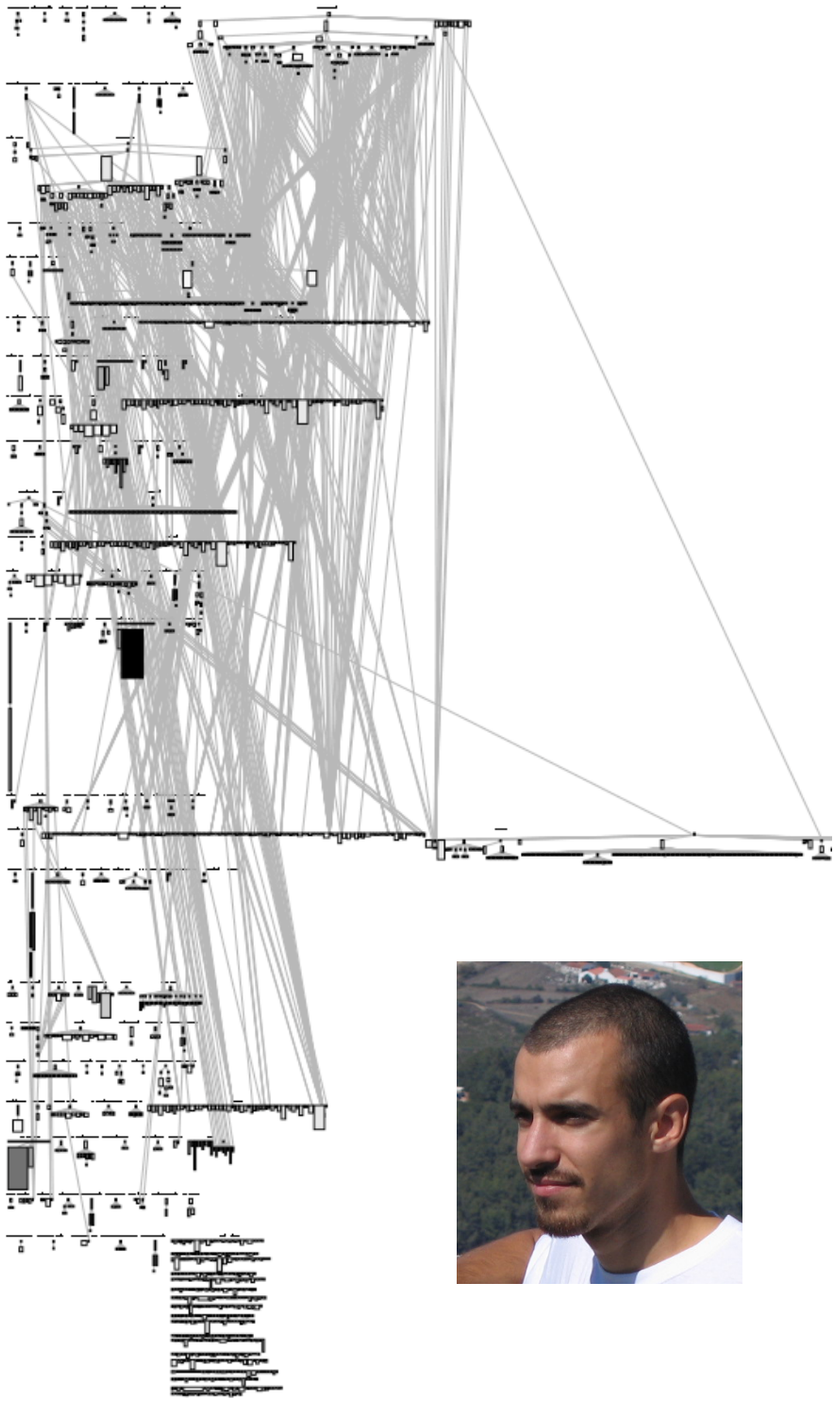


System: ArgoUML

Task: Detection of bad smells in "*Model*"

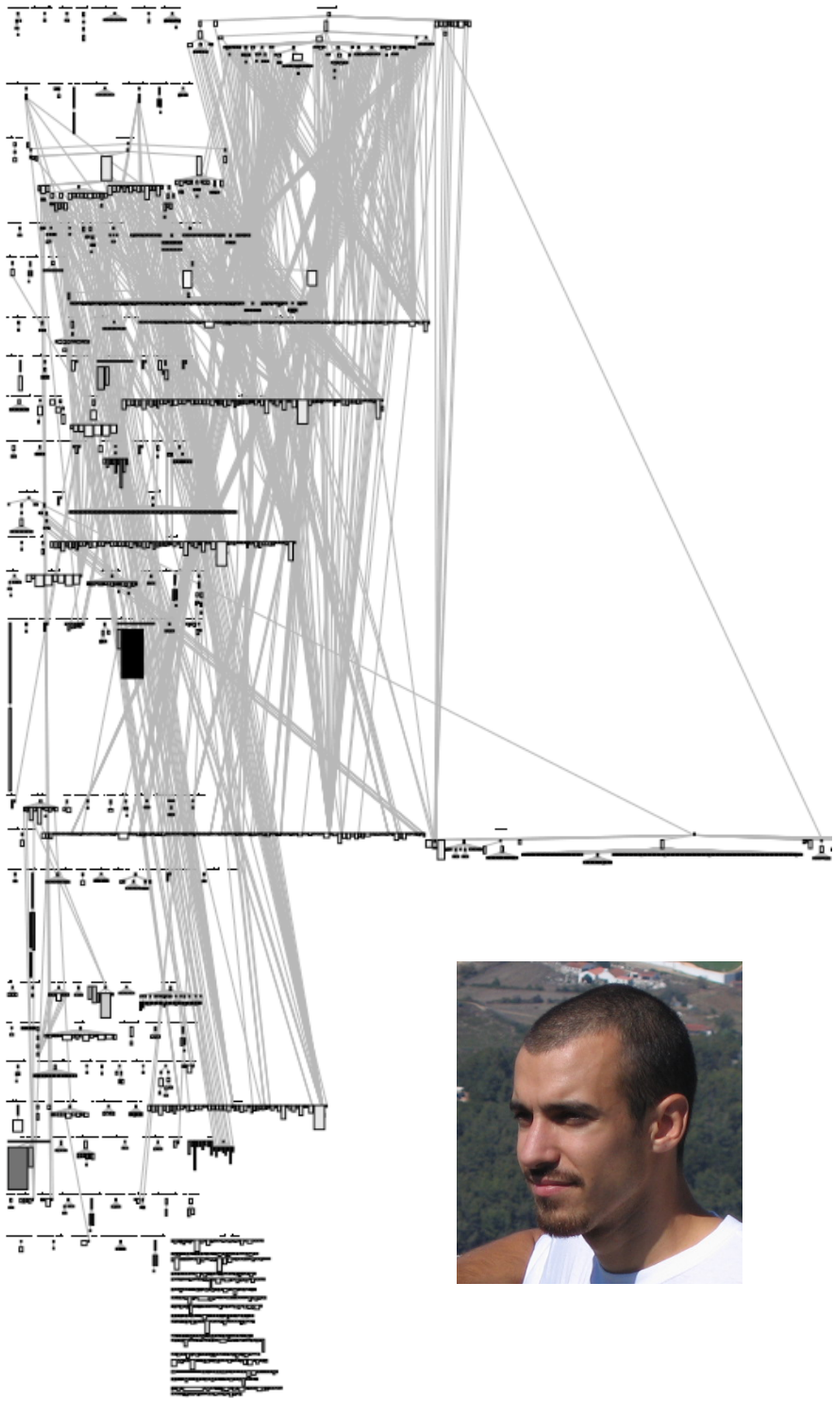
Marco's View

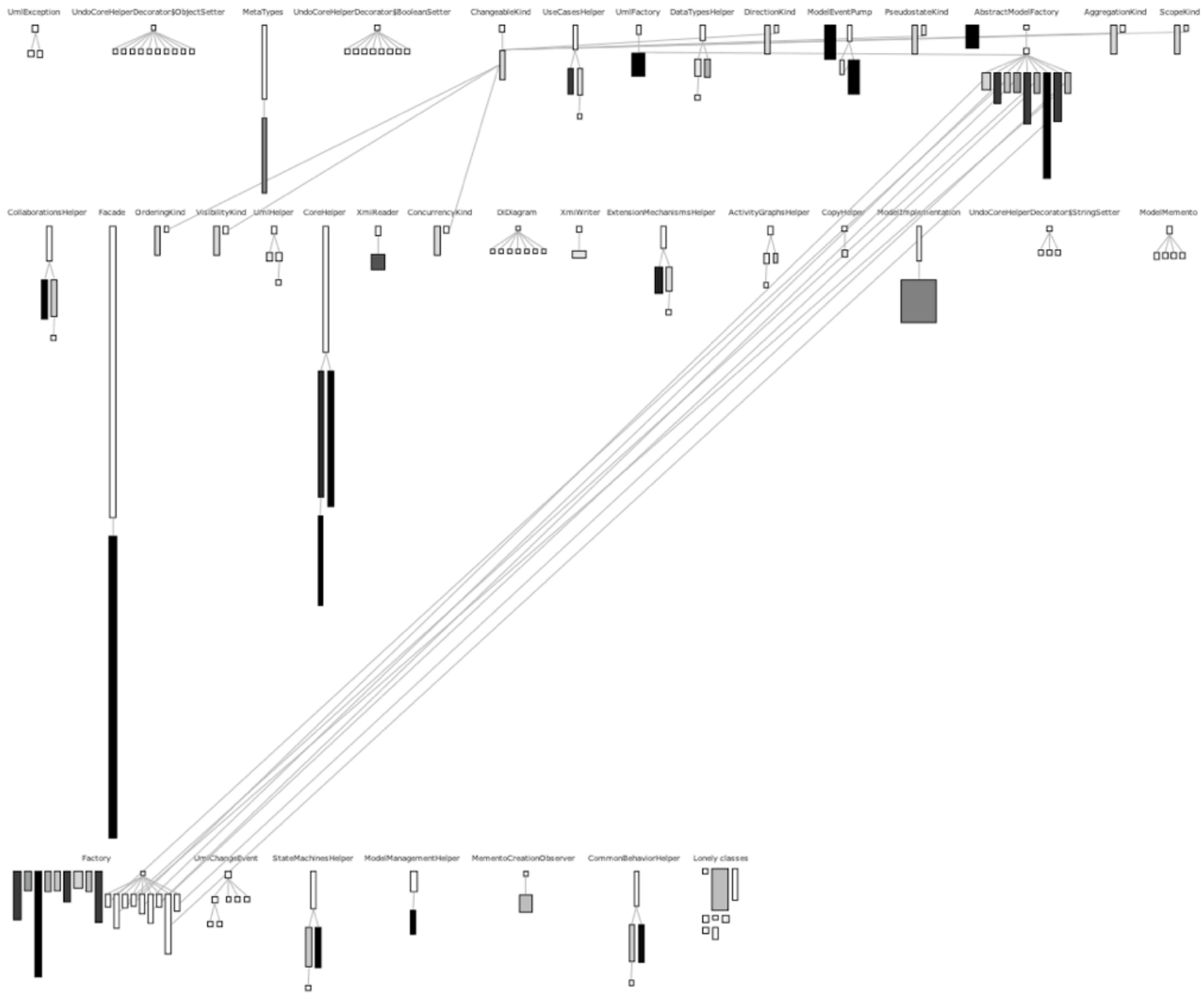
Version 0.26



Marco's View

Version 0.26

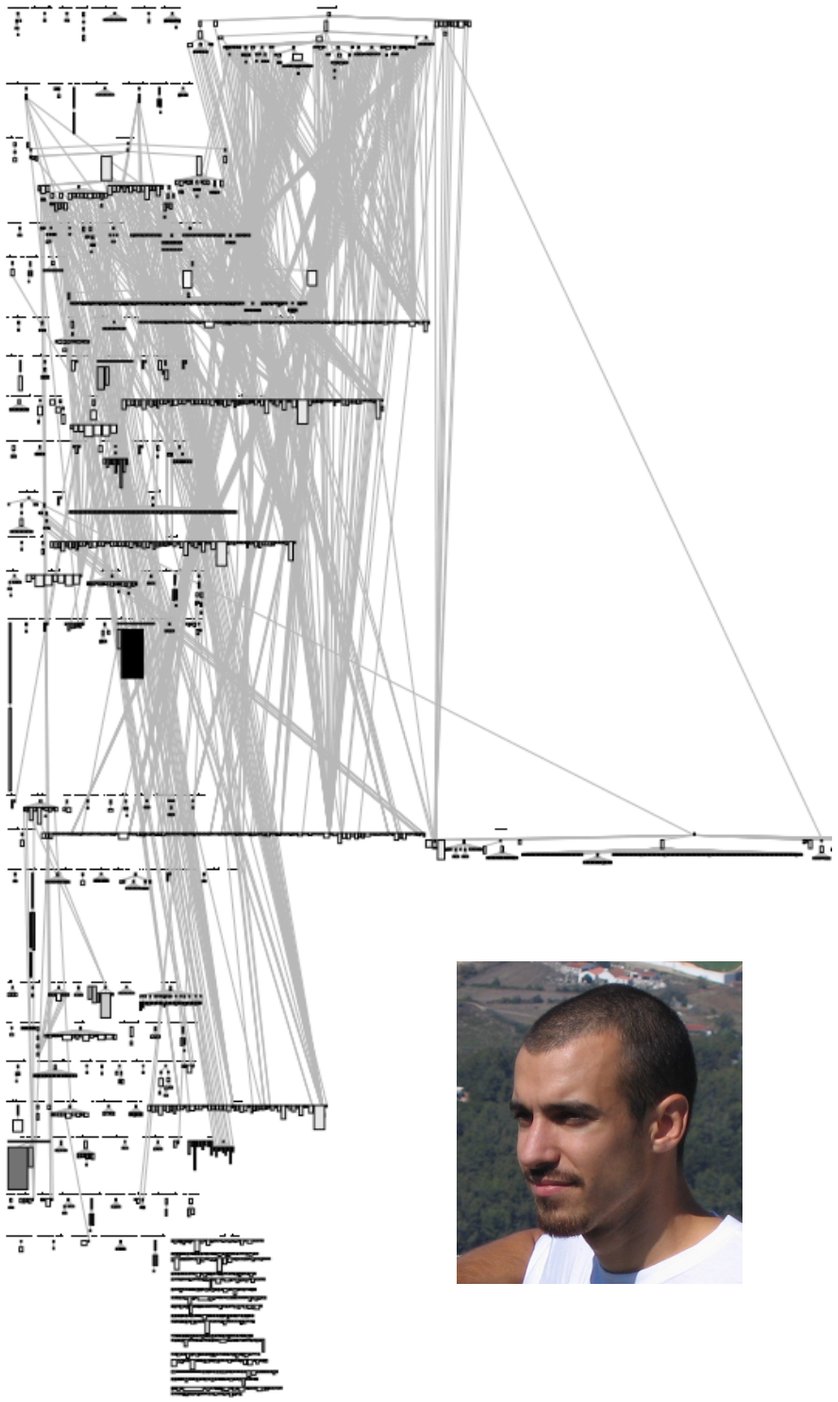


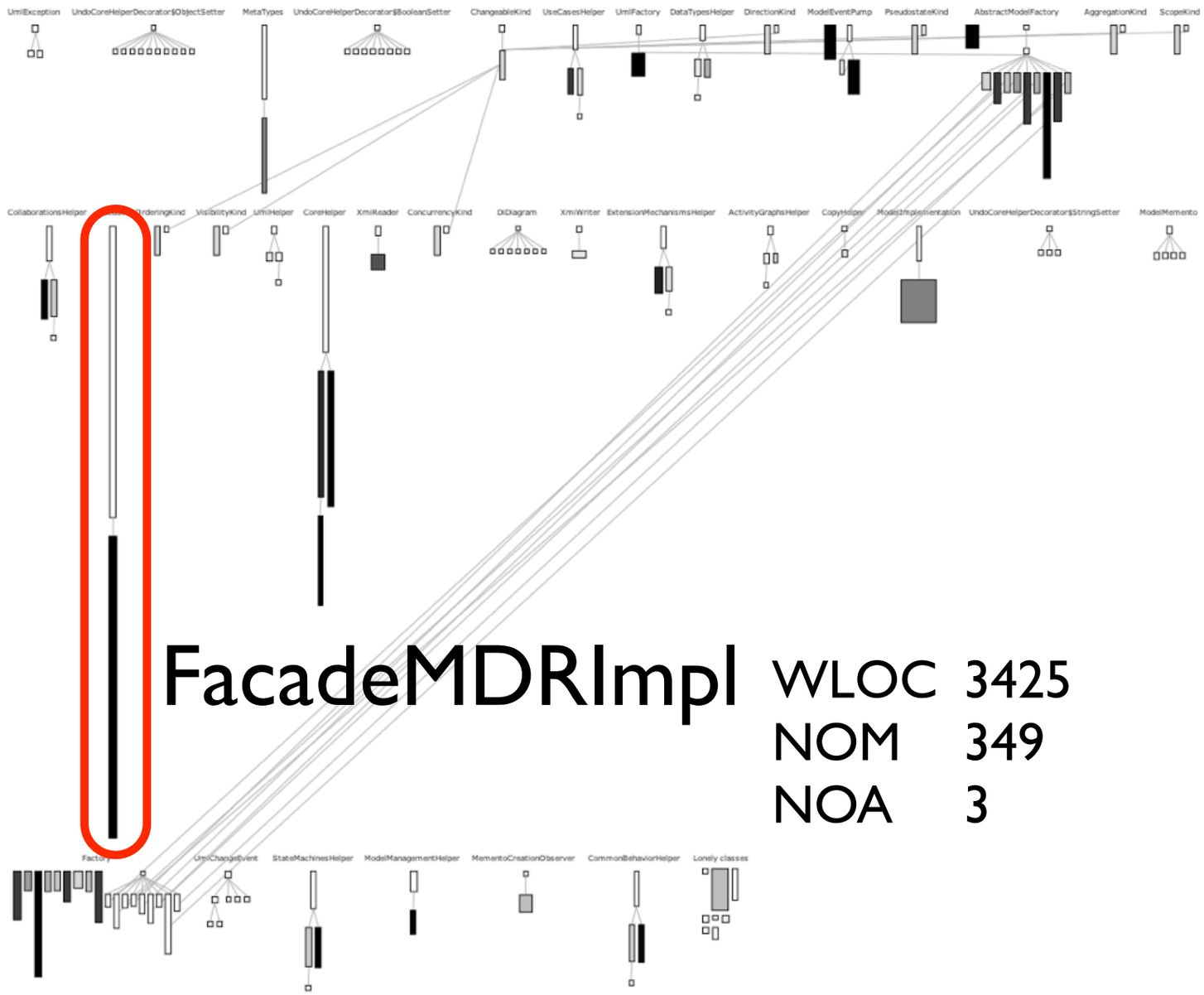


Model package

Marco's View

Version 0.26





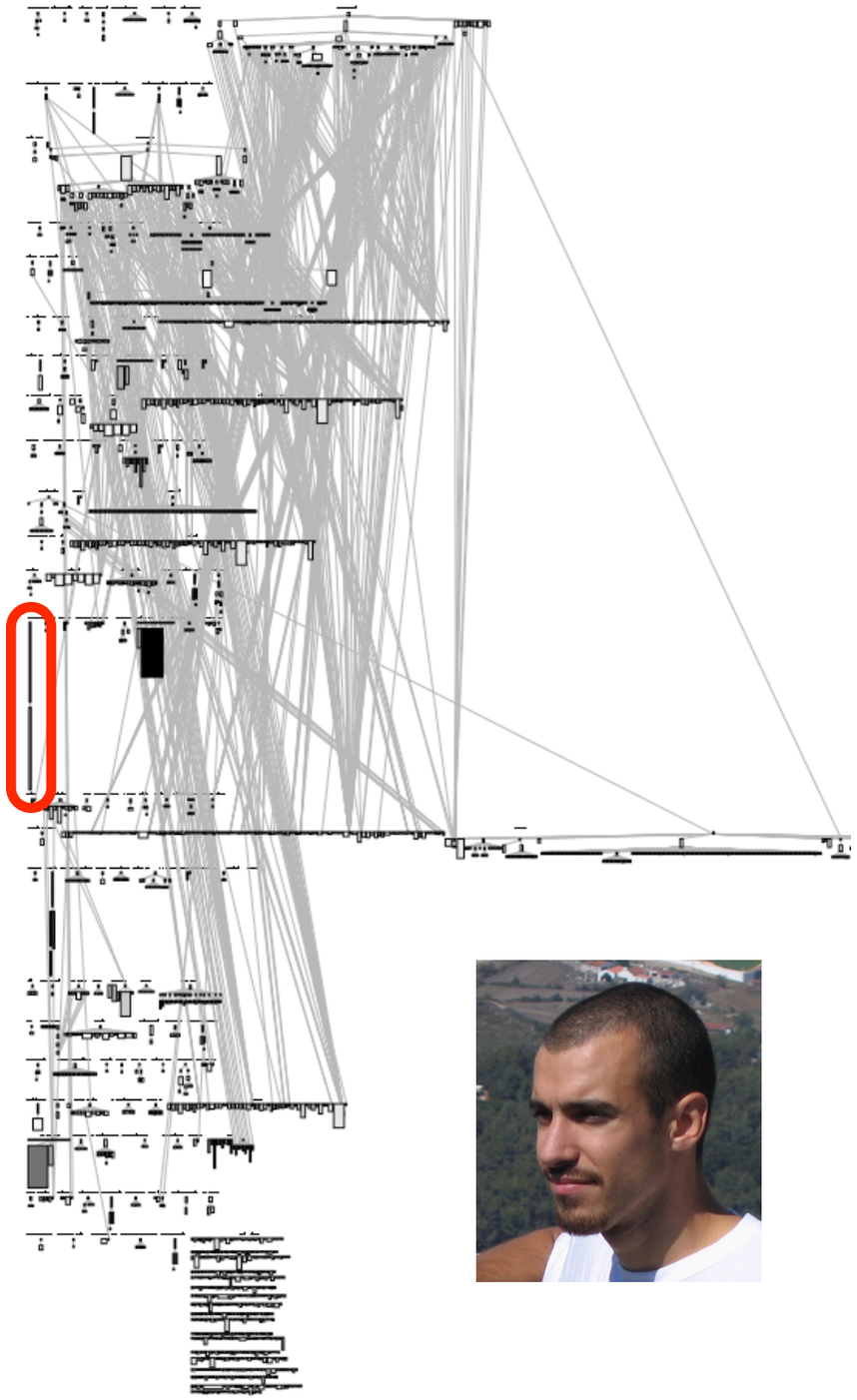
FacadeMDRImpl

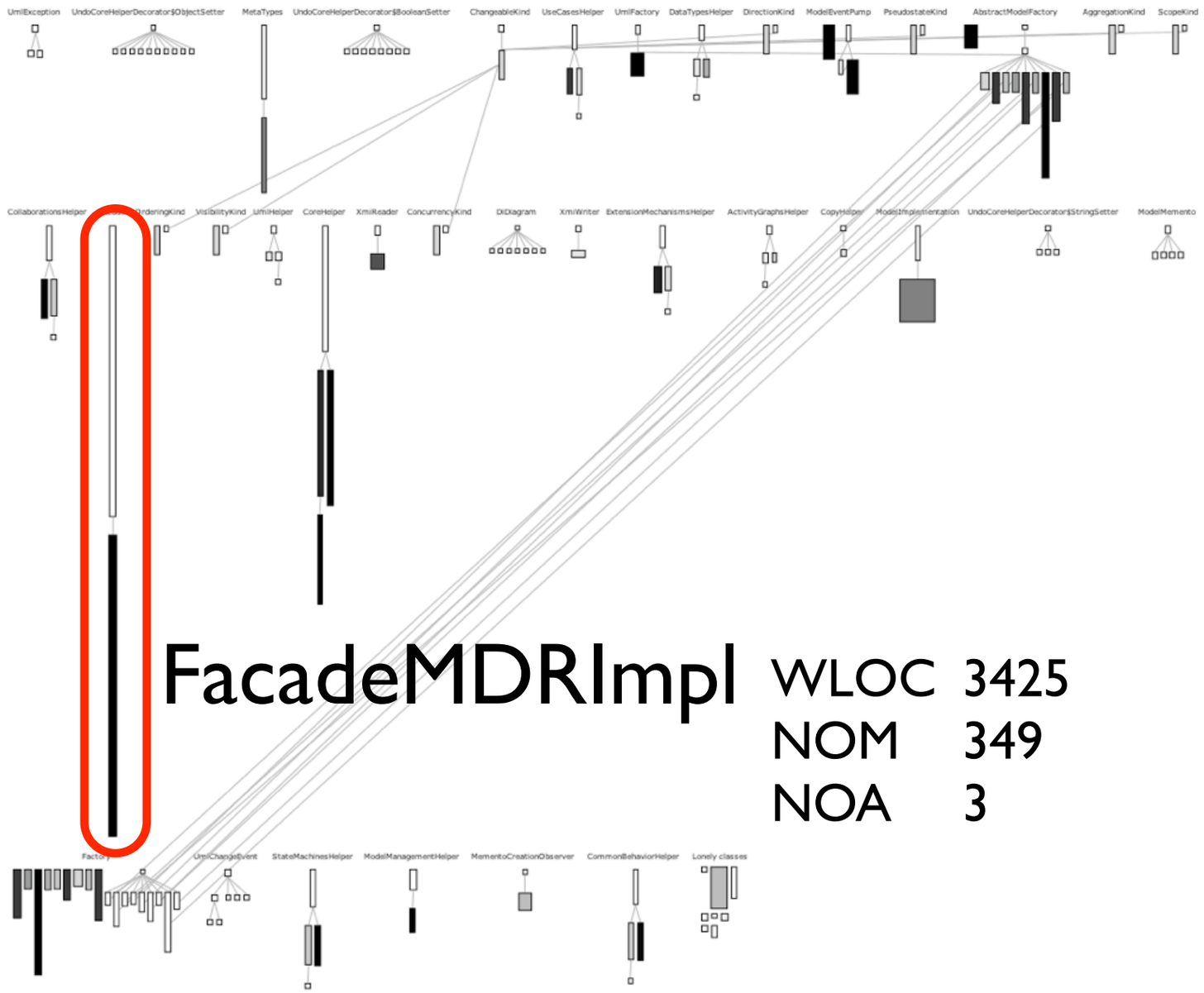
WLOC	3425
NOM	349
NOA	3

Model package

Marco's View

Version 0.26





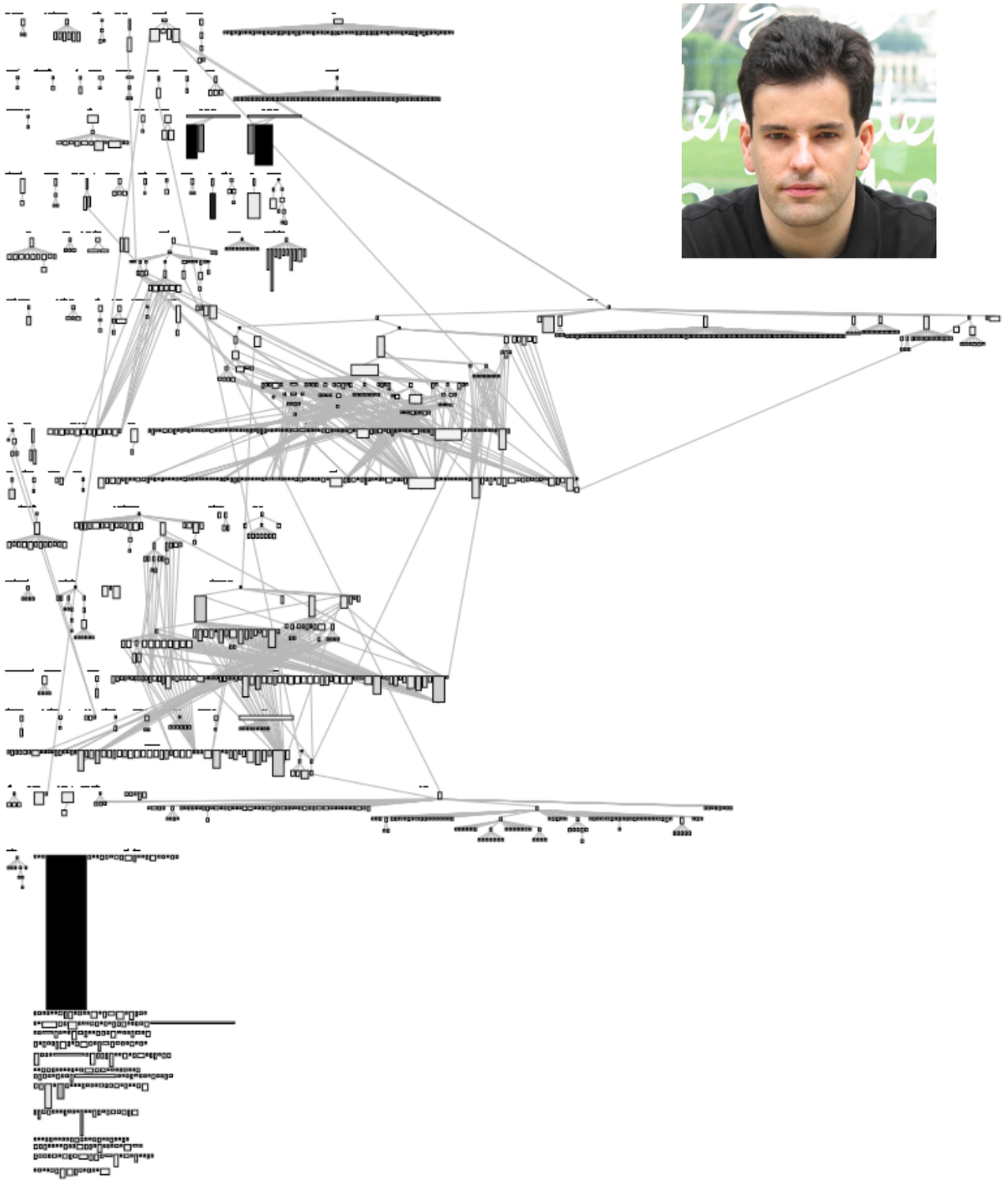
FacadeMDRImpl

WLOC	3425
NOM	349
NOA	3

Model package

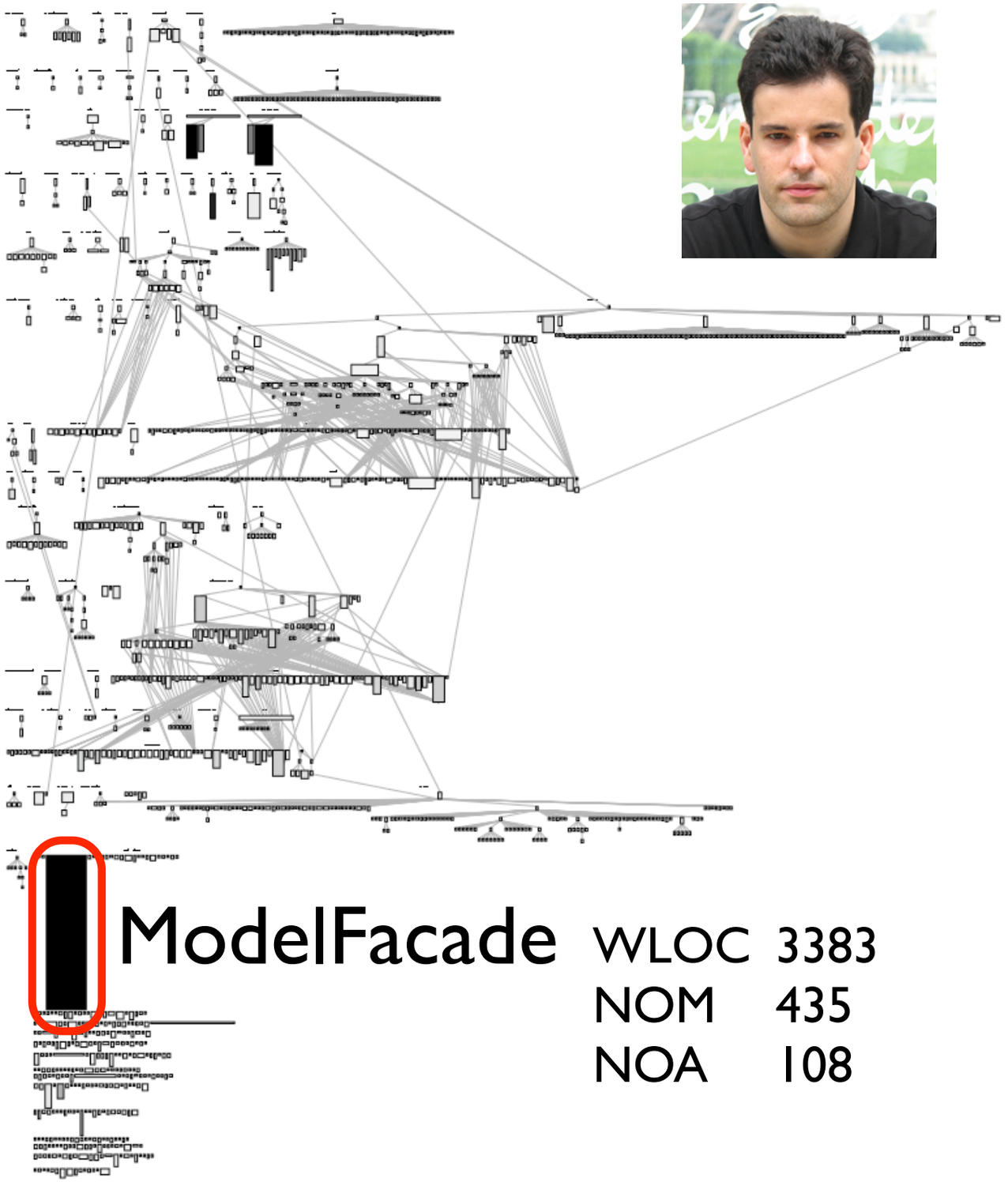
Ricky's View

Version 0.16



Ricky's View

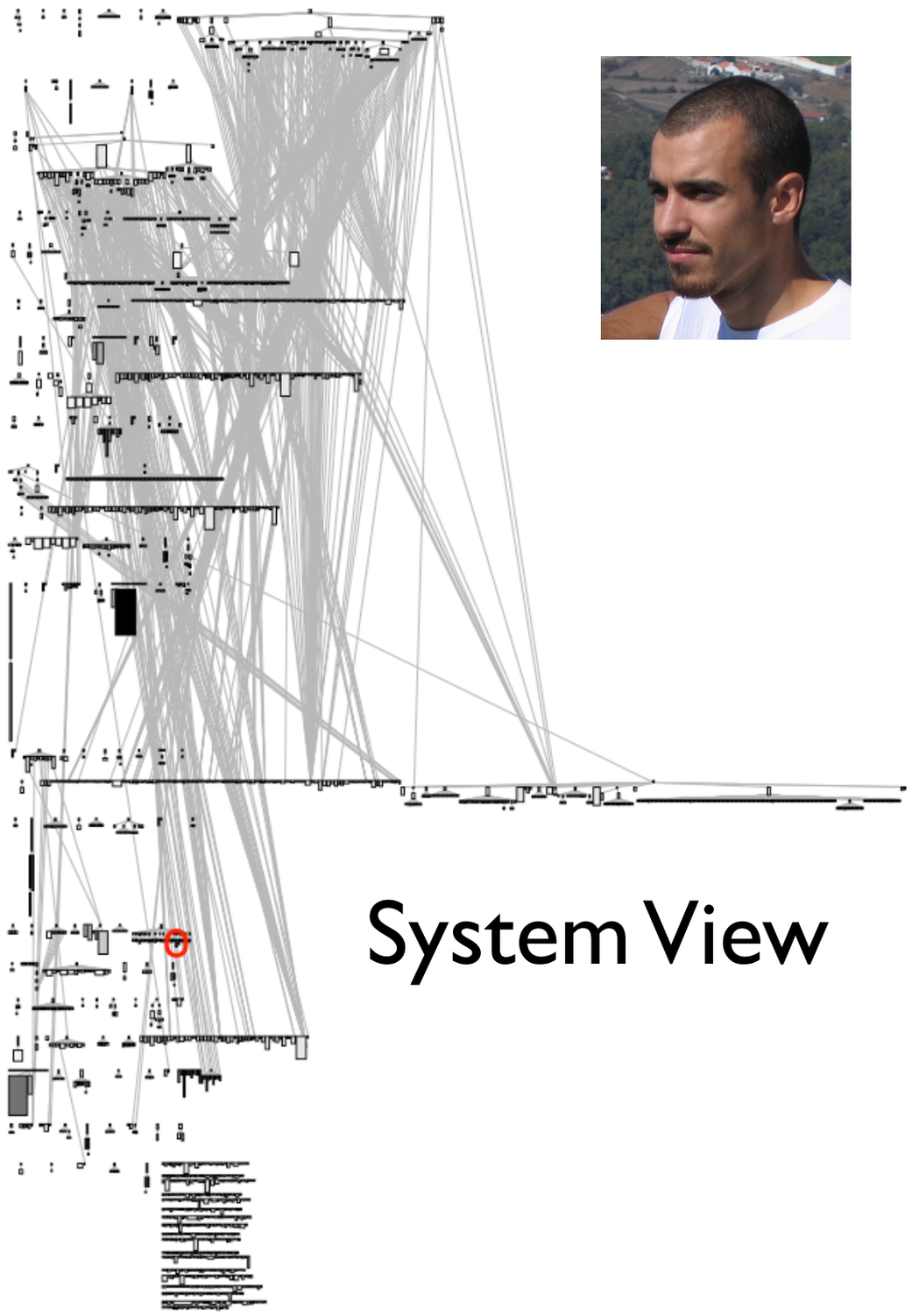
Version 0.16



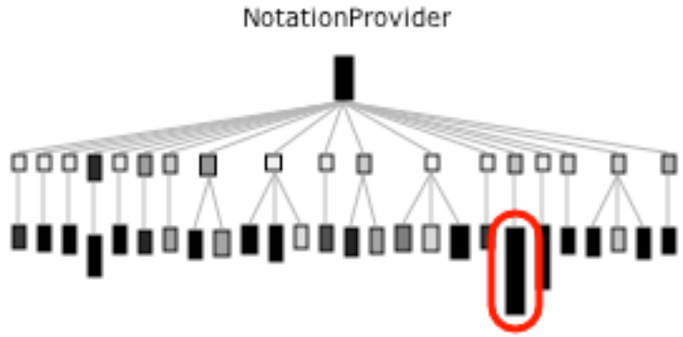
ModelFacade

WLOC 3383
NOM 435
NOA 108

Marco looks at Ricky's annotation

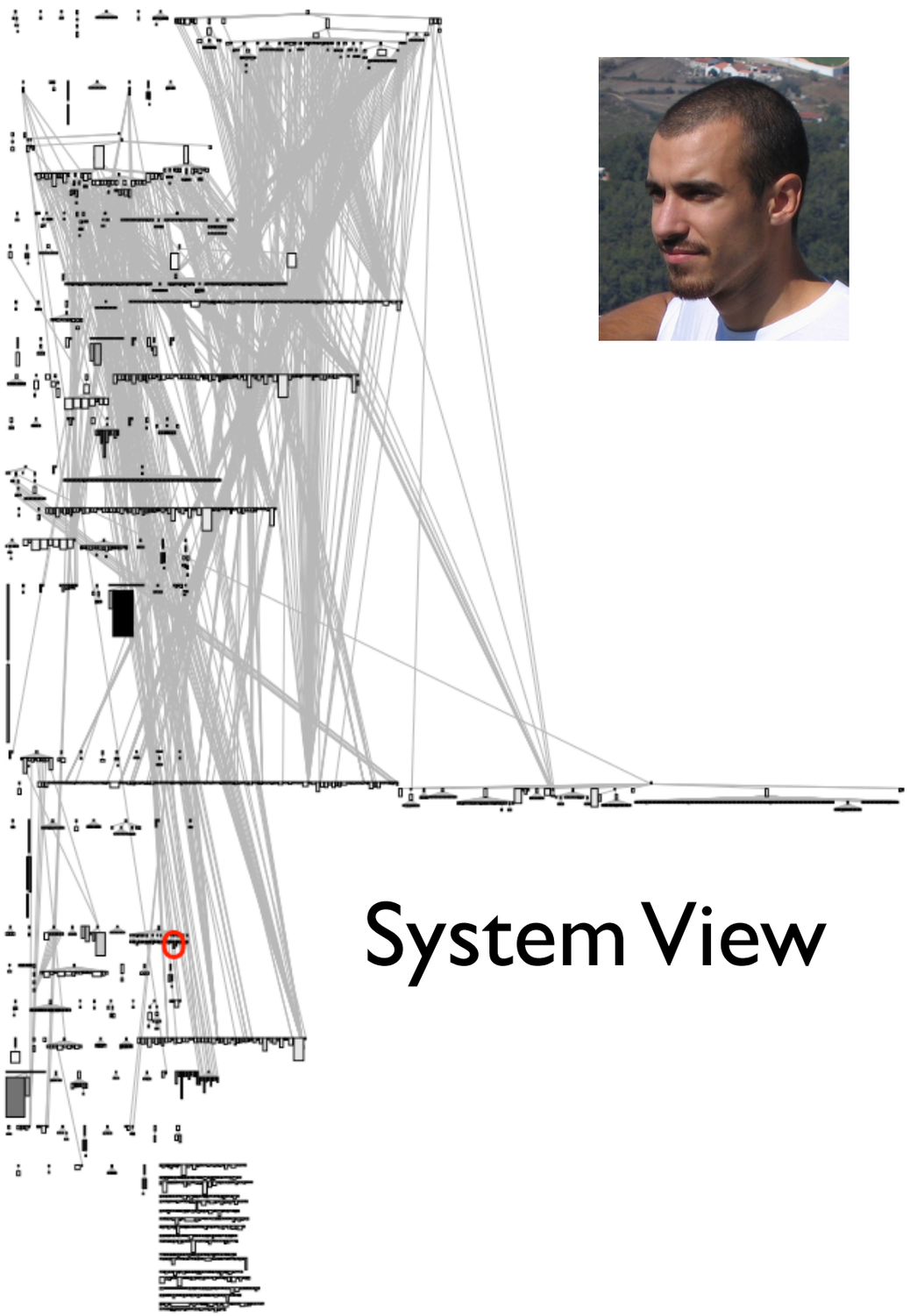


System View

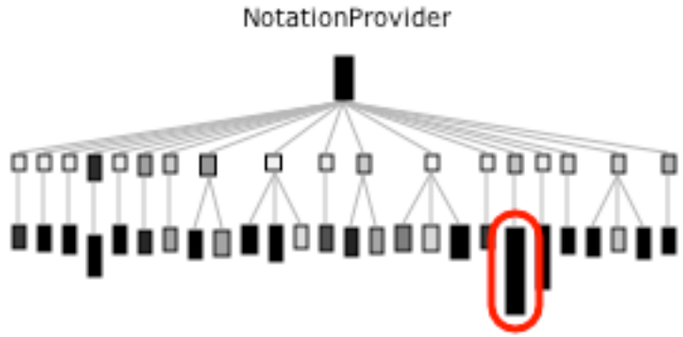


Package View

Marco looks at Ricky's annotation



System View



Package View

Class

MessageNotationUml

Properties

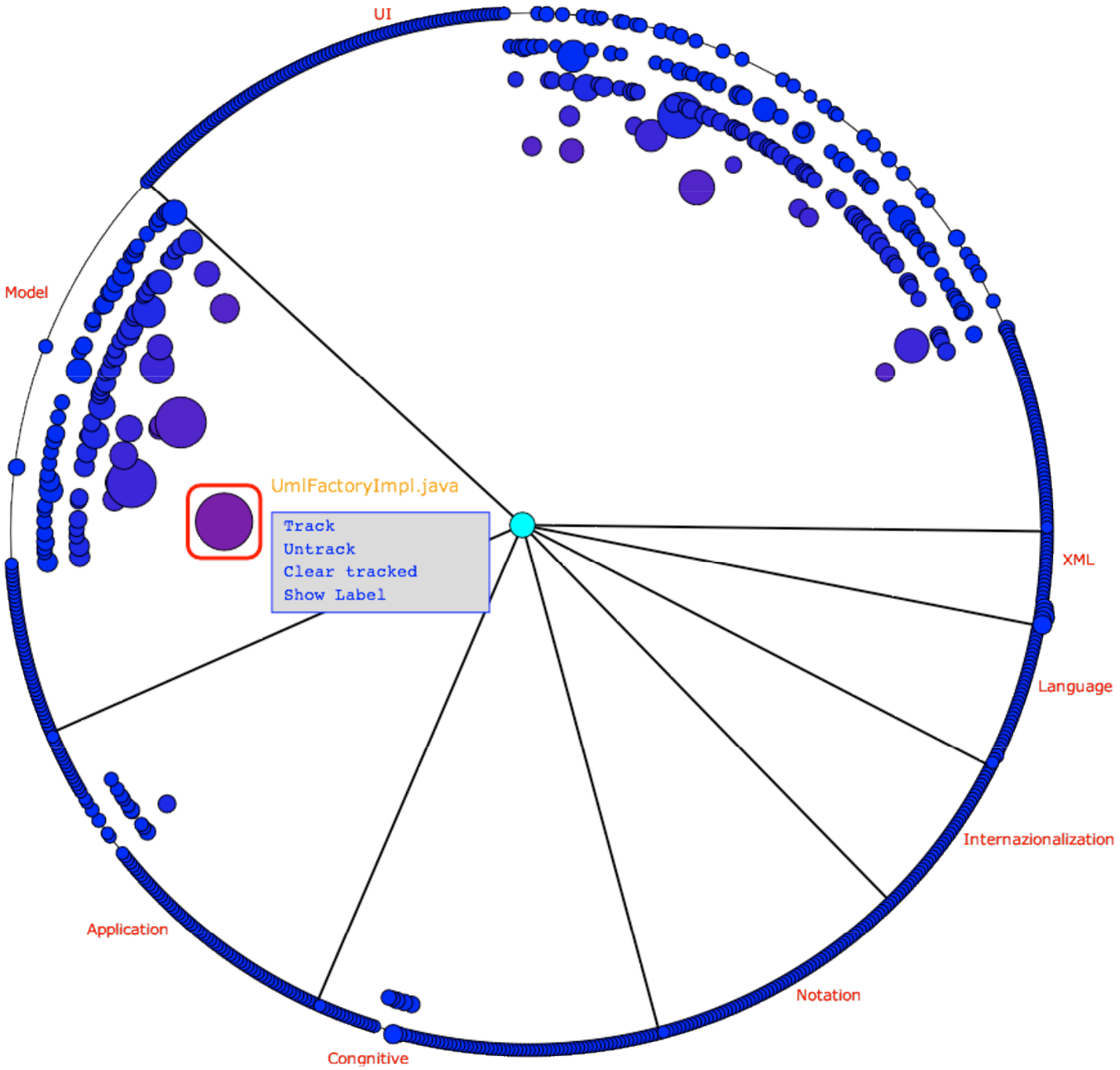
WLOC1297
NOM 29
NOA 2

Ricky's comment

This is a God class with several brain methods

Combining Perspectives

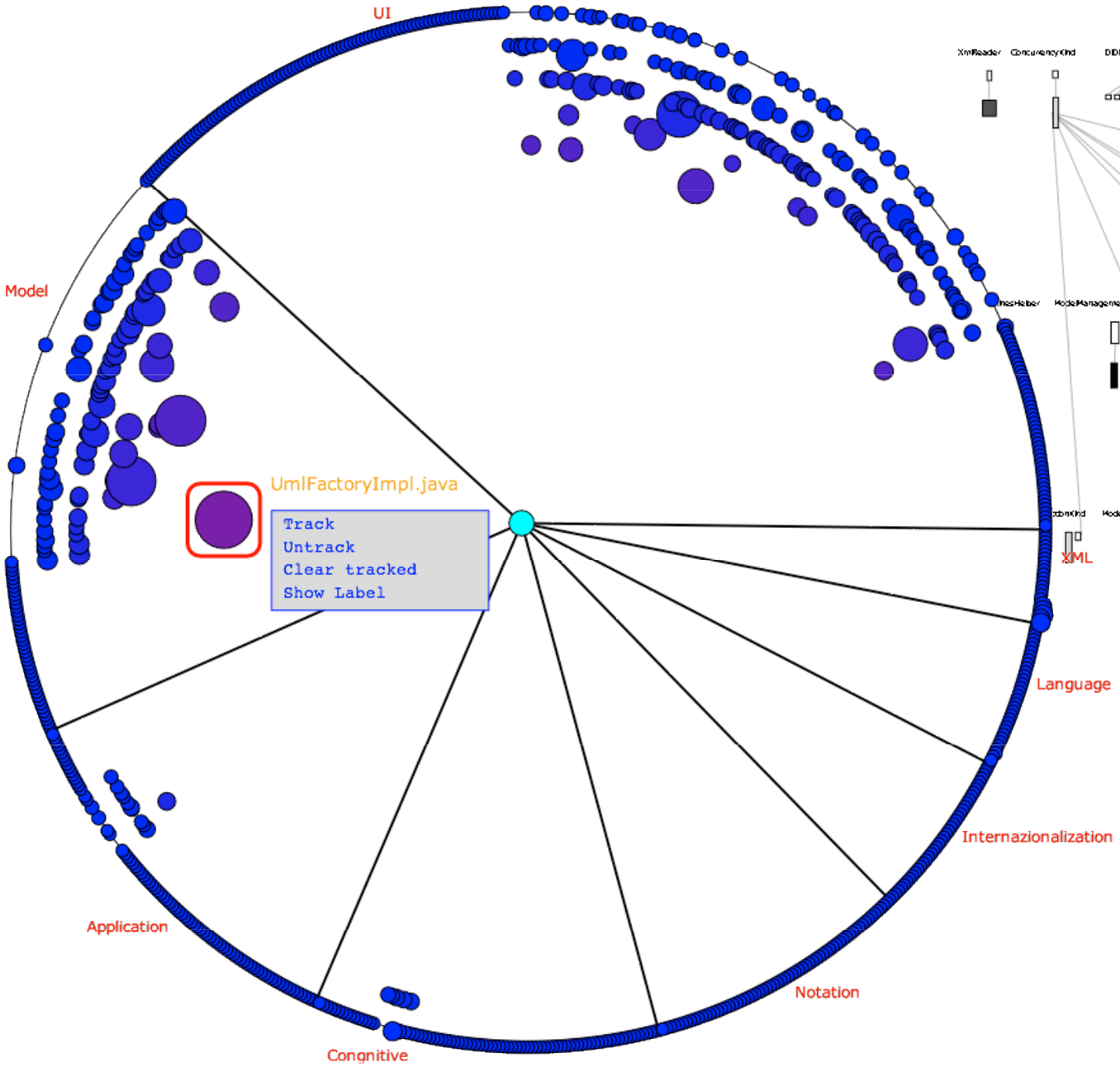
UMLFactoryImpl.java



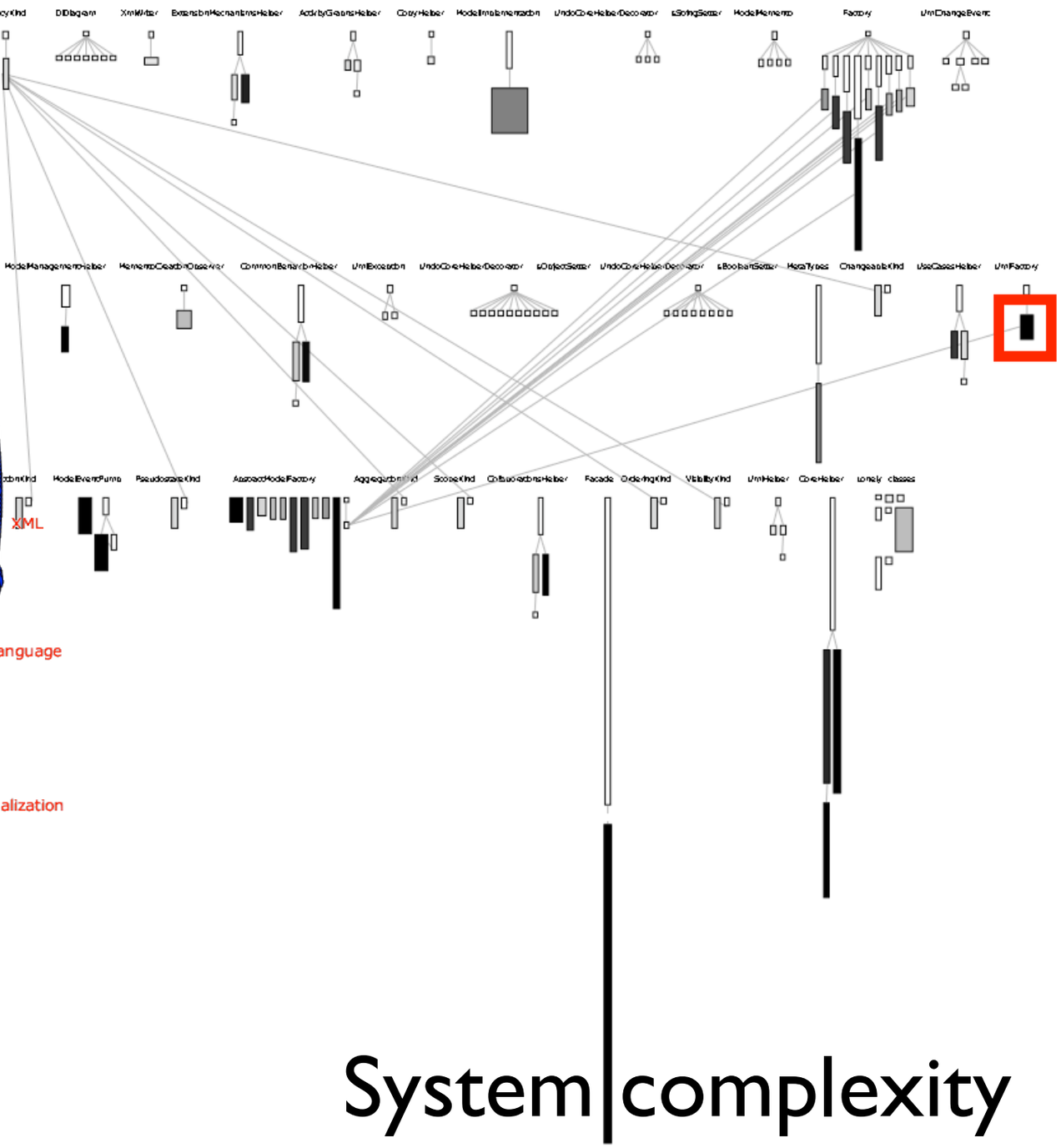
Change coupling analysis

Combining Perspectives

UMLFactoryImpl.java



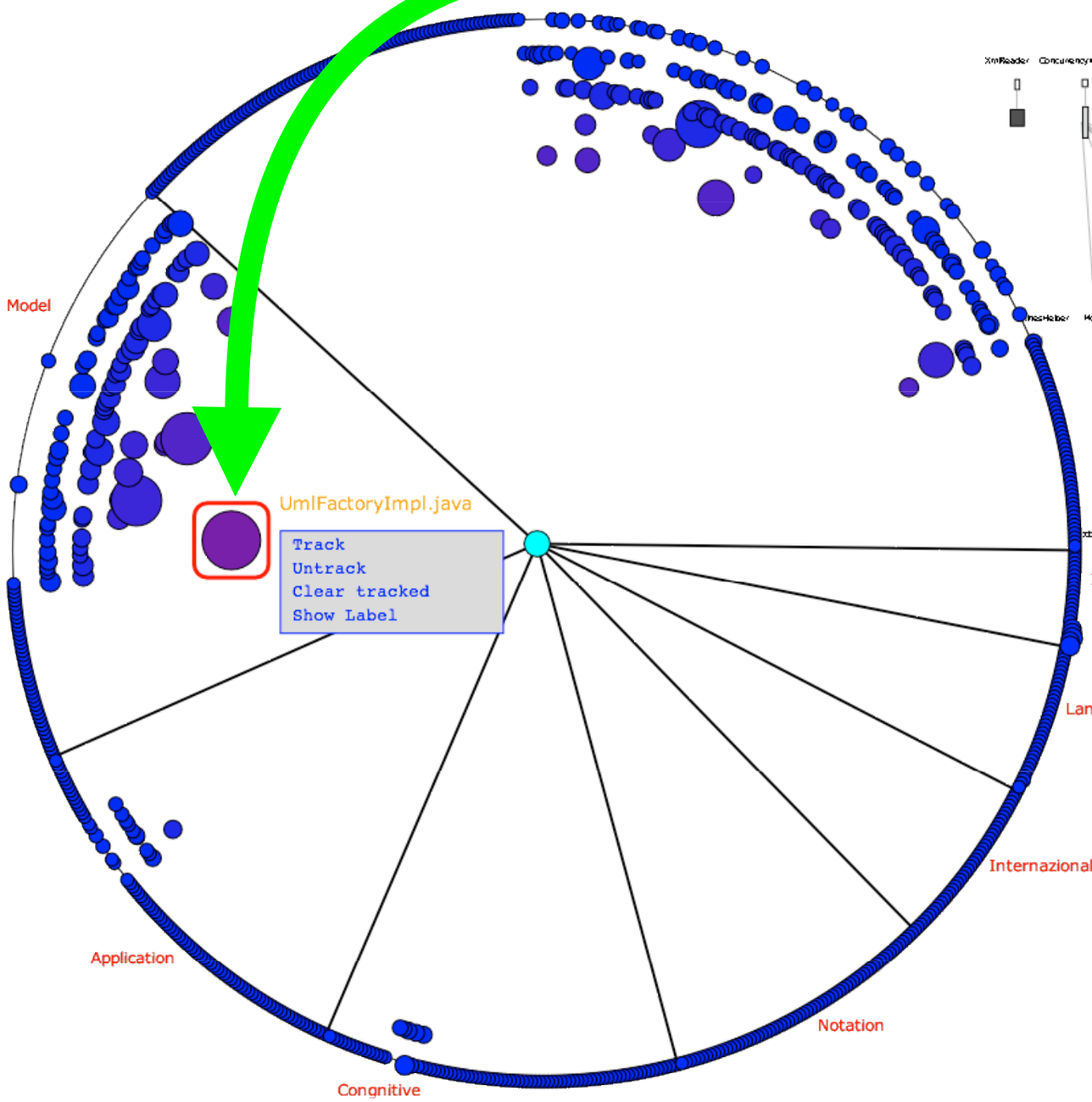
Change coupling analysis

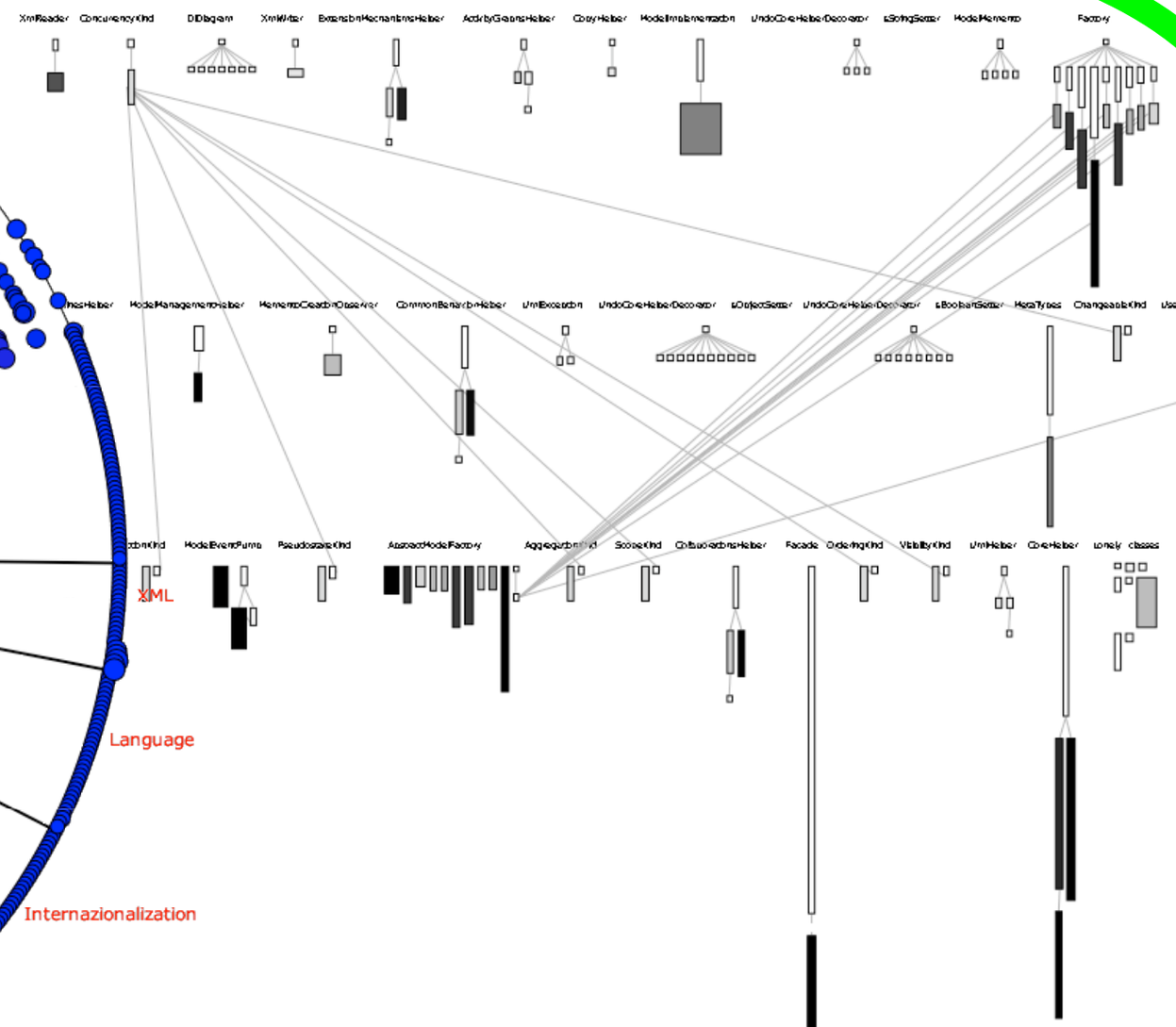


System complexity

Combining Perspectives

UMLFactoryImpl.java

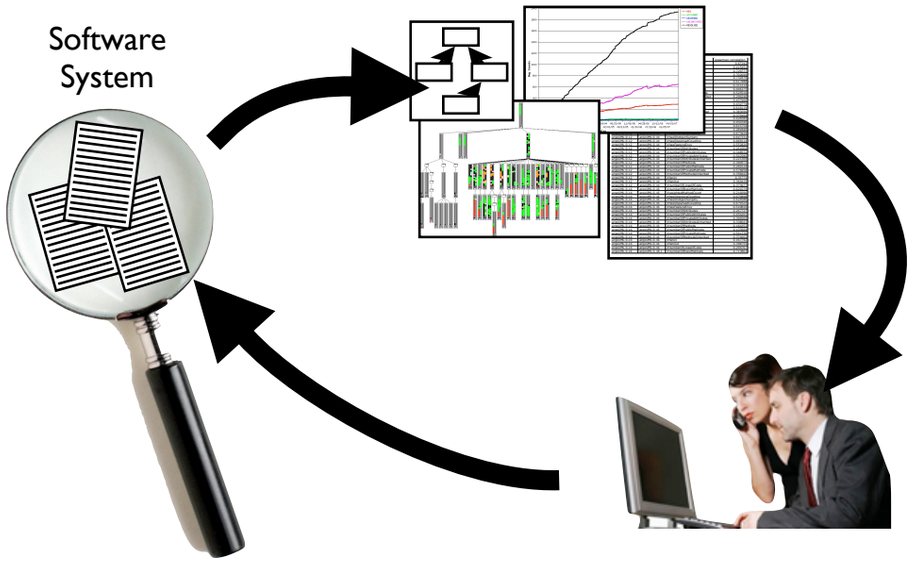




Change coupling analysis

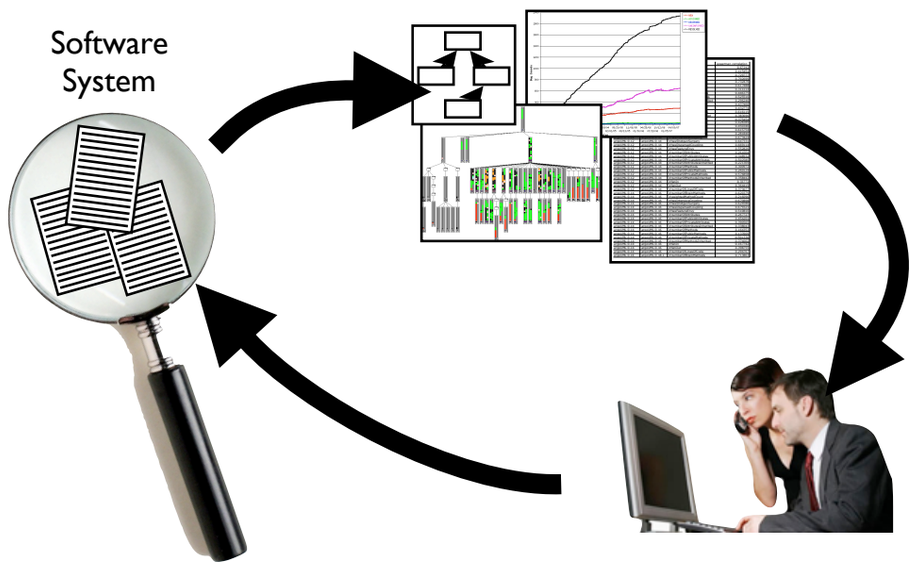
System complexity

Conclusion

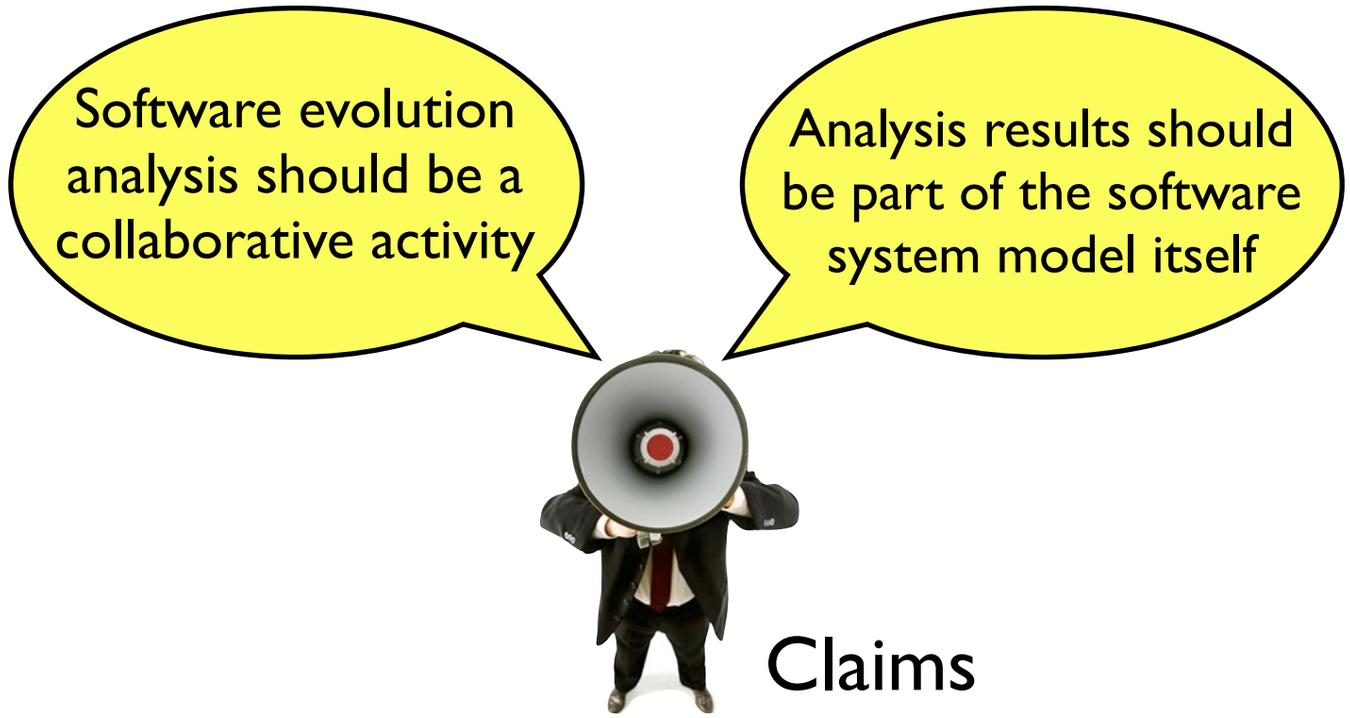


Software Evolution Loop

Conclusion

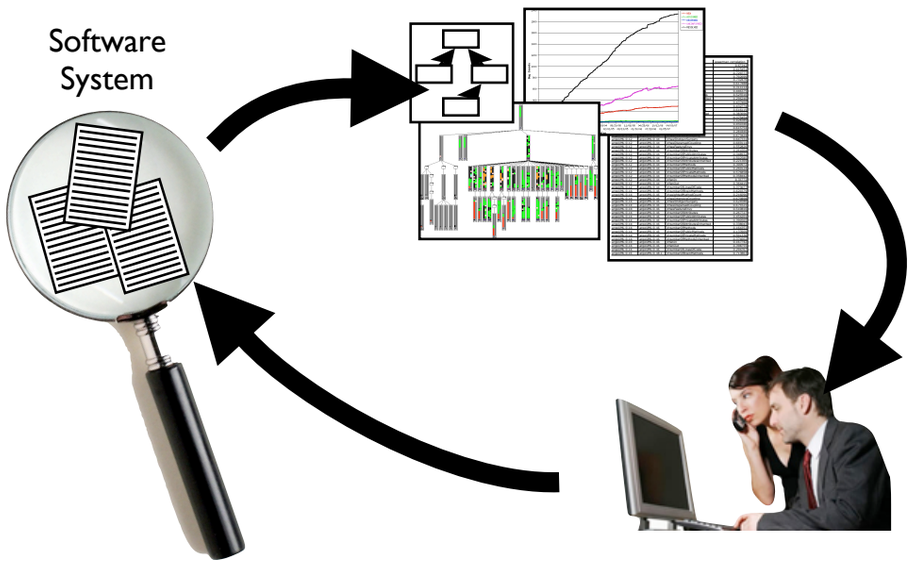


Software Evolution Loop

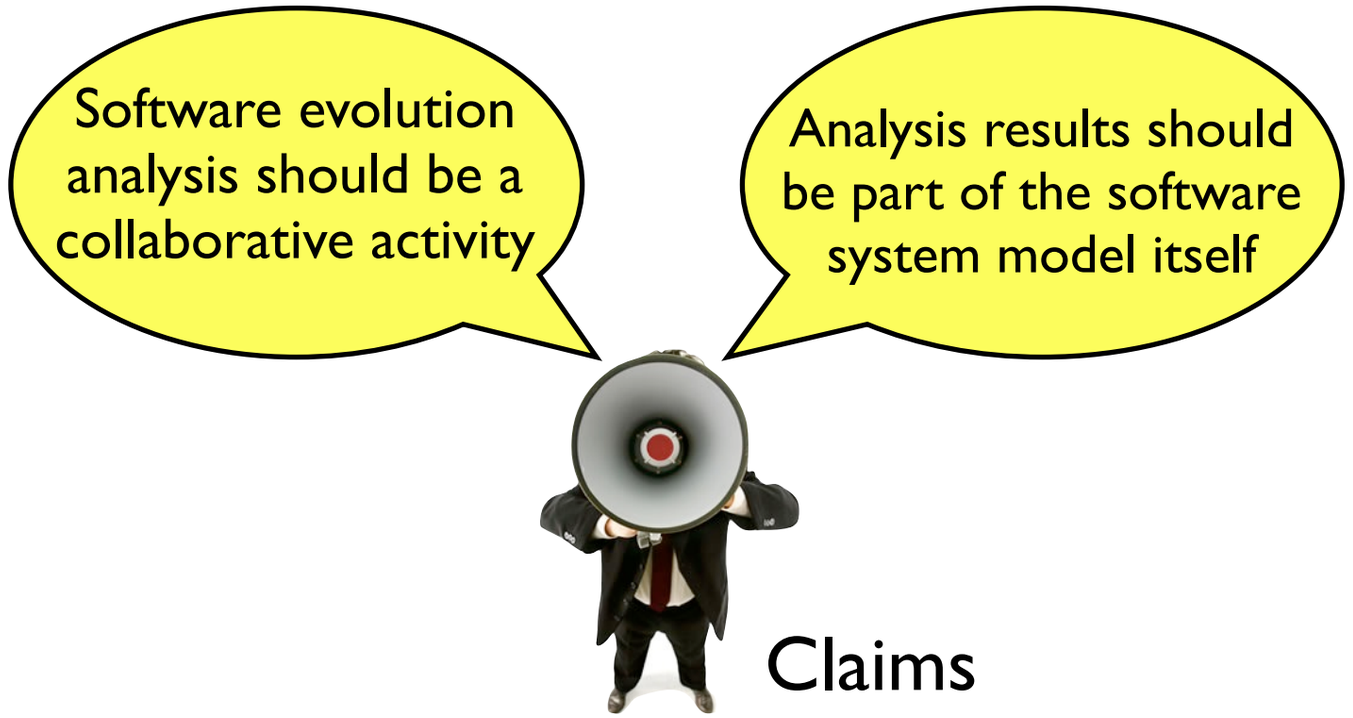


Claims

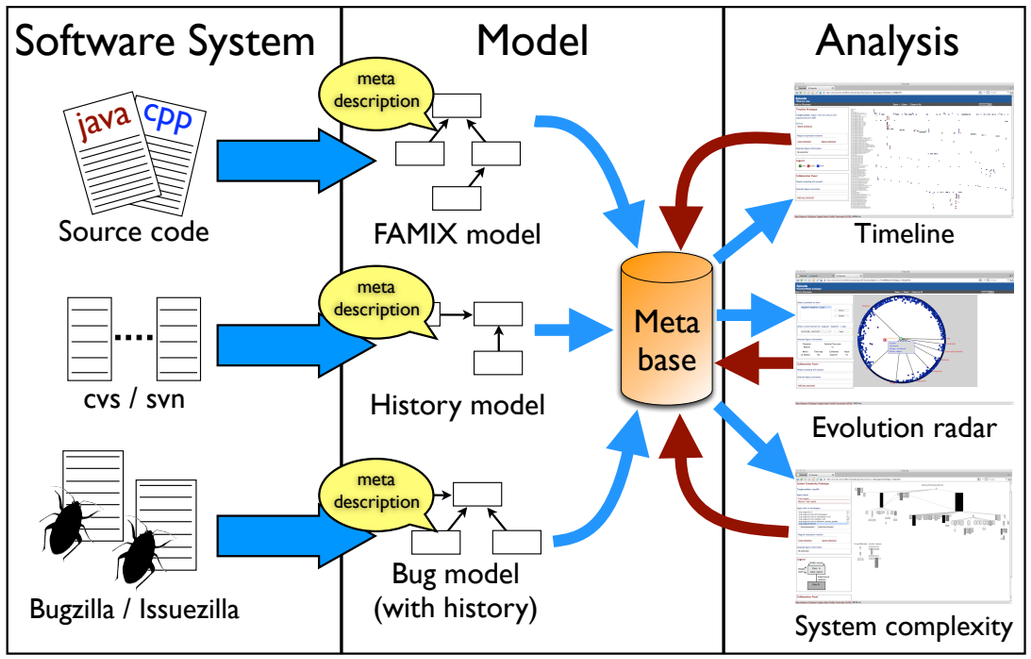
Conclusion



Software Evolution Loop

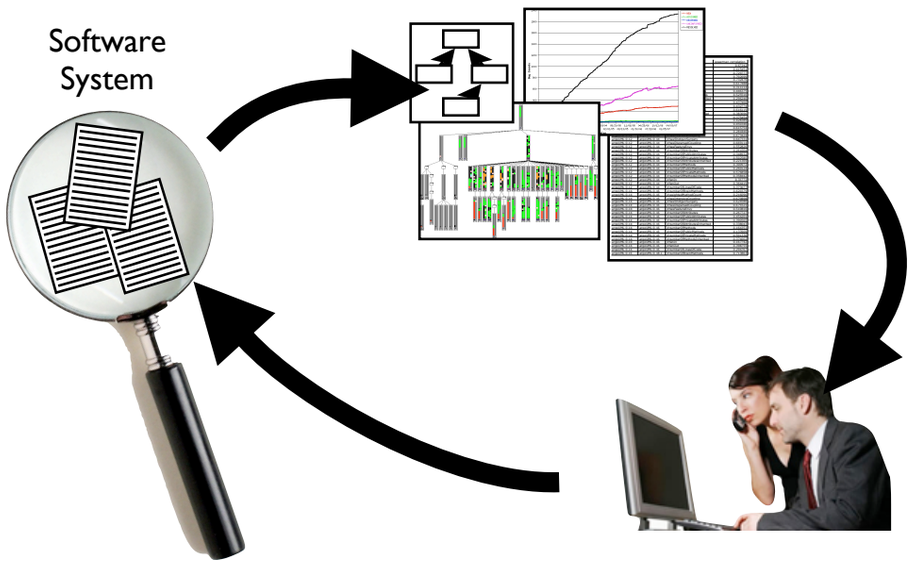


Claims

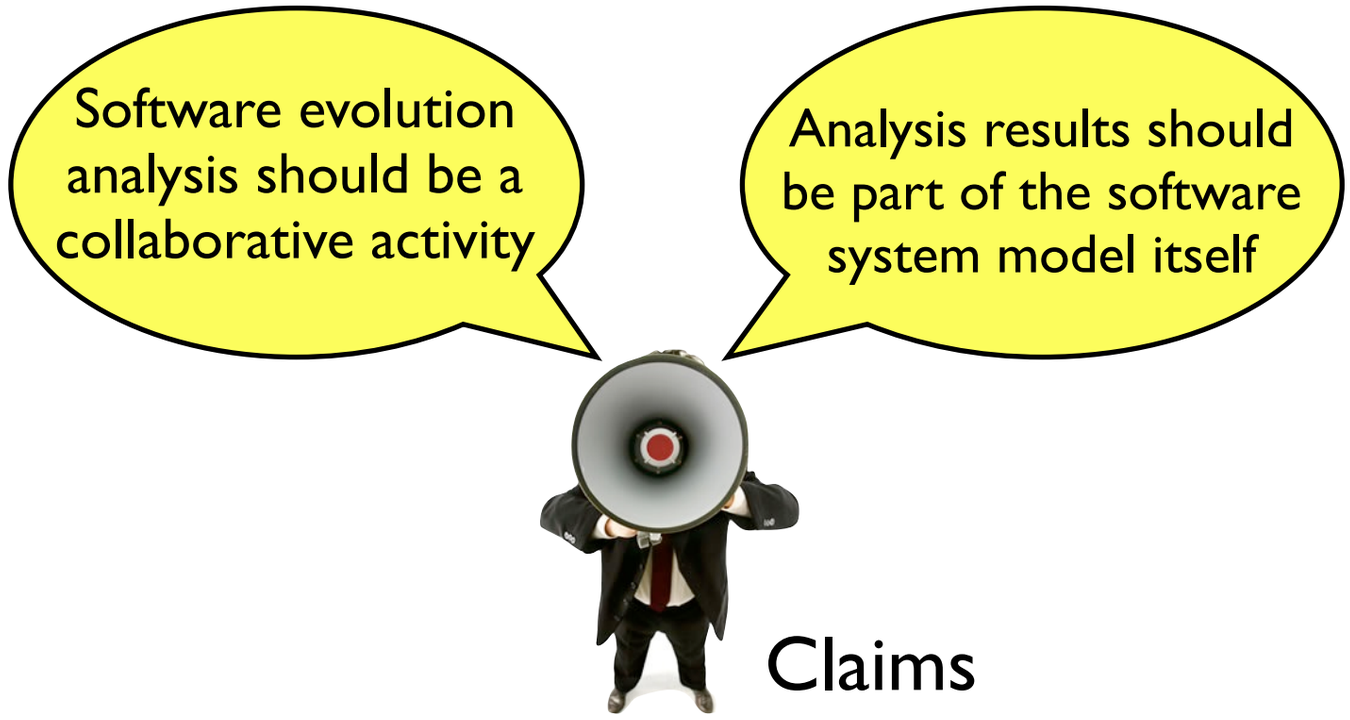


Churrasco Architecture

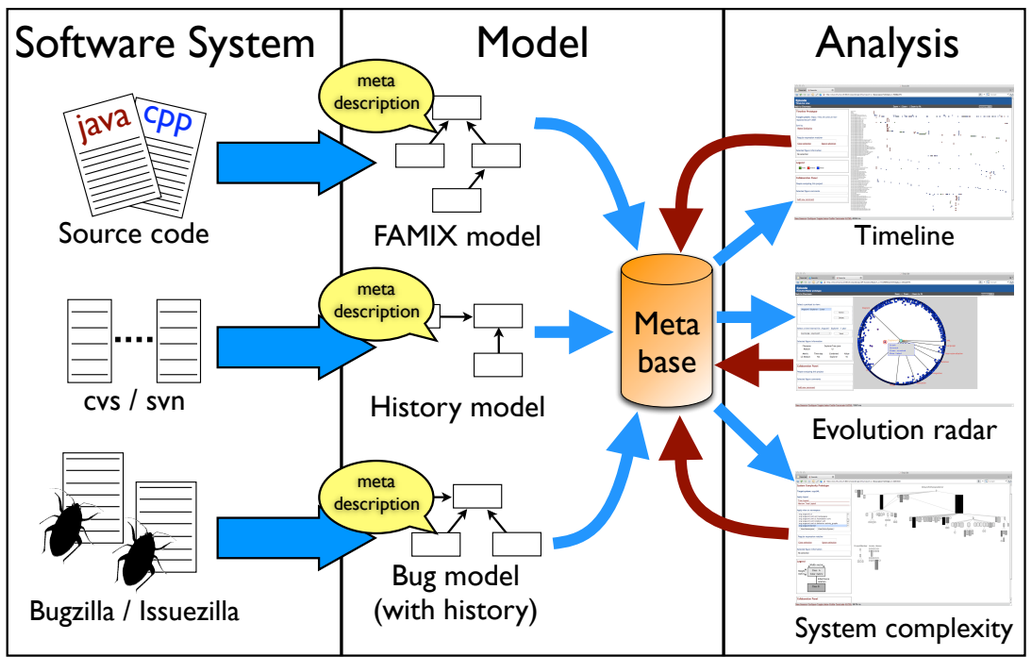
Conclusion



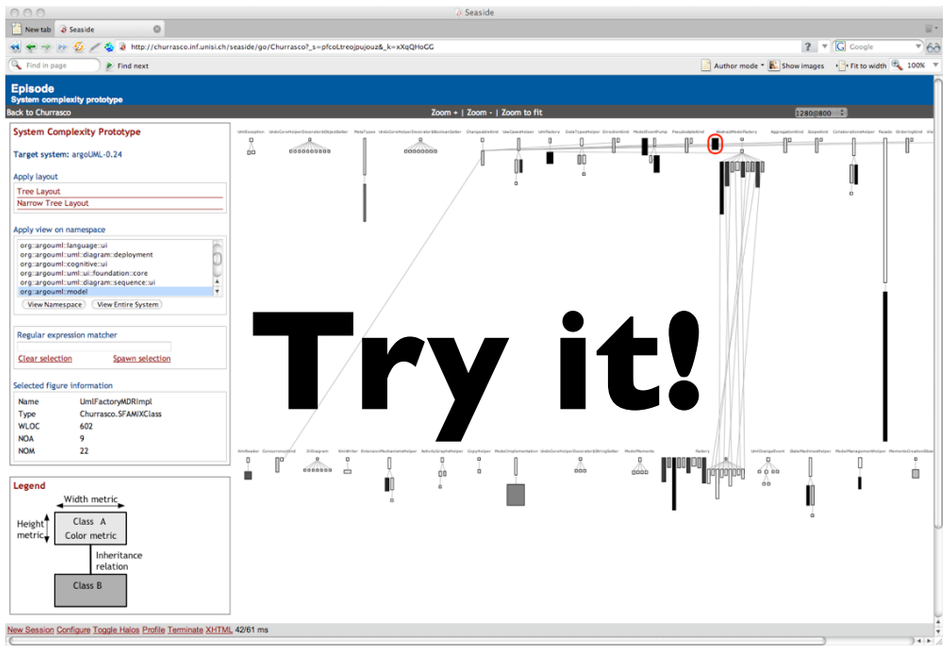
Software Evolution Loop



Claims



Churrasco Architecture



http://churrasco.inf.unisi.ch/