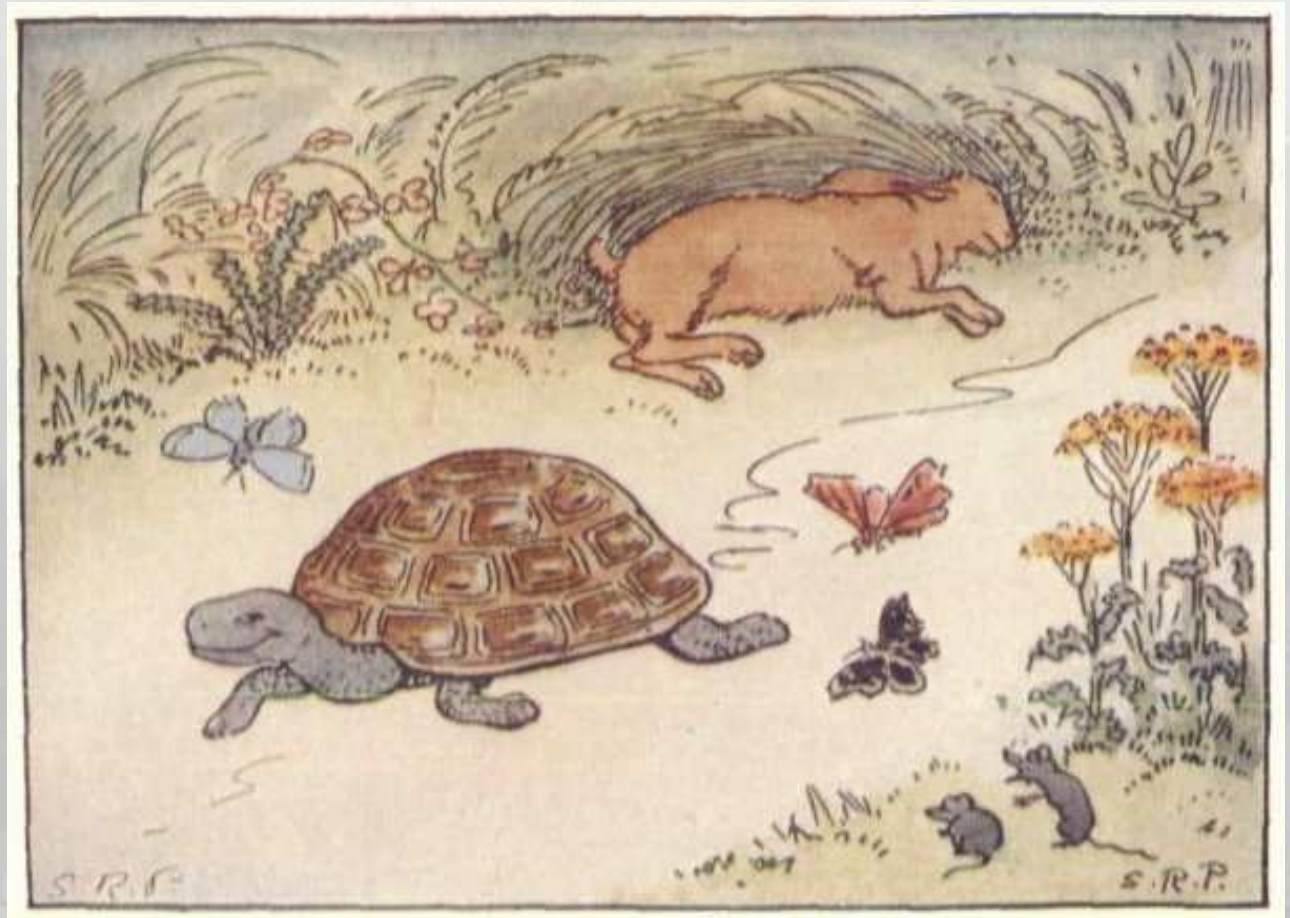
# A Fable



THE TORTOISE AND THE HARE

# The Idea of Fable

- Build a professional graphical workbench for analysing scientific data produced at synchrotrons
- Combine two types of experts to produce one integrated software product :
  - Scientist Programmers for Data Analysis
  - Software Engineers for the User Interface
- TotalCryst decided to risk trying this approach

New and emerging science and technology (NEST)

# What is Fable ?

- *TotalCryst* produced many individual programs :
  - ImageD11
  - QNFS
  - PolyXSim
  - GrainSpotter
  - GrainSweeper
  - FitAllB
  - Fable (the GUI)
  - ...
- Strictly speaking *Fable* is the Graphical User Interface
- *Fable* is sometimes used to refer to the whole suite ...

# Fable Goals

- *Aim of Fable*
  - Build a scientific workbench for analysing polycrystalline diffraction data for TotalCryst which can be extended to other scientific domains
- *Technical goals*
  - ***Separate User Interface from Algorithms***
  - Support Algorithms written in multiple languages
  - Build on top of an open source commercial quality framework
  - Open Source with public access to code
- *Technology chosen*
  - Eclipse/RCP for graphical framework and Java for user interface
  - Python and C for algorithms, Project repository on Sourceforge

# The Fable Workbench Challenge

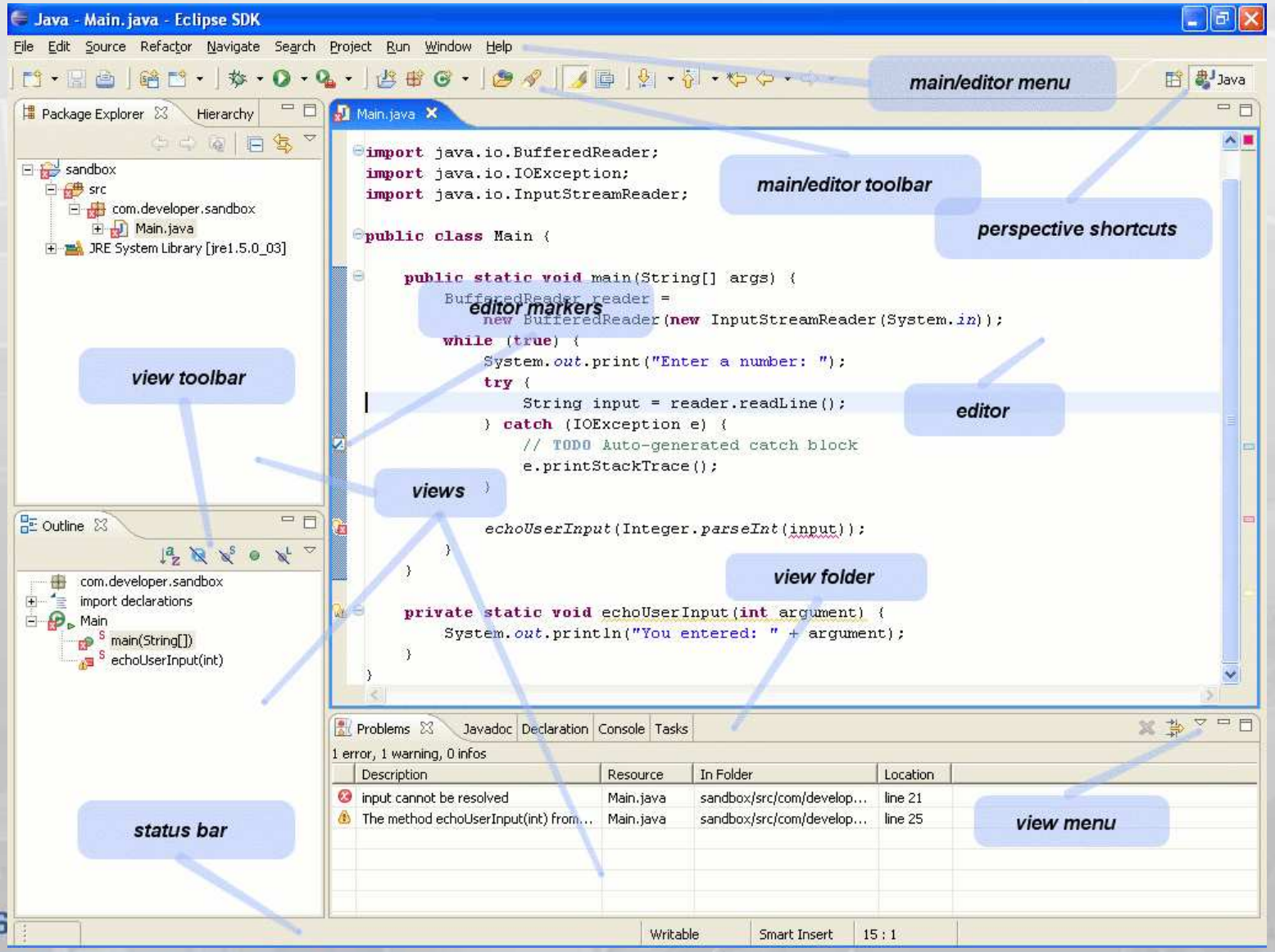
- *Andy*
- *Scientists*
- *Python*
- *Tk*

- *Gaelle*
- *Engineers*
- *Java*
- *Eclipse*

# The Workbench Concept

# The Ultimate Workbench ?

# The Eclipse Workbench



# Why Java ?

- A good language with good tools
- Almost as fast as compiled C
- Large number of developers, wide range of libraries for certain domains e.g. user interfaces, web
- Easy to deploy – Java Virtual Machine hides differences between operating systems
- Disadvantage – not widely adopted in science

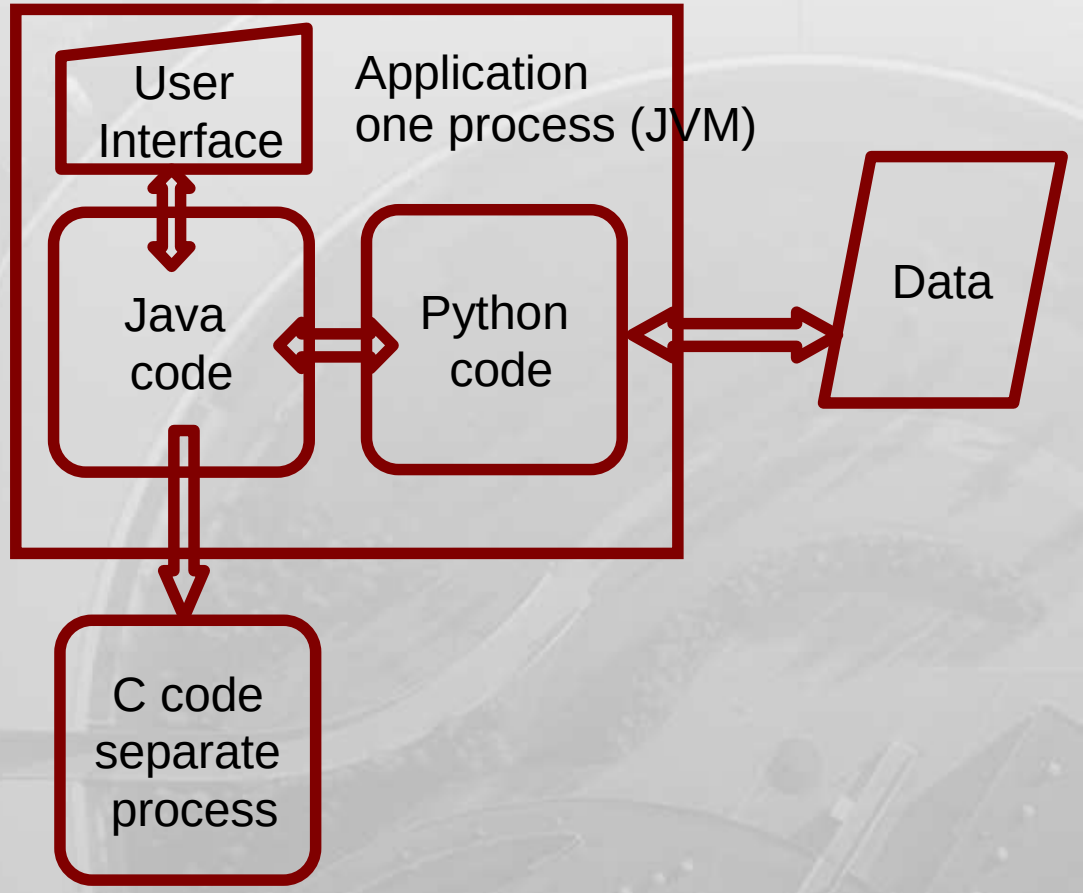
# Why Python ?

- Is easy to learn and compact to write
- Python is widely accepted by scientists

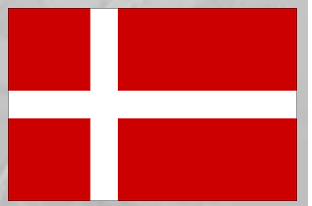

- It has a powerful array manipulation package (numpy)
- TotalCryst had Python Programmers
- *Zen of Python : there should be one-- and preferably only one --obvious way to do it*
- *Zen of TotalCryst : use Java AND Python*

# Fable Multi-language support

- Currently supported :
  - Java
  - Python
  - C
- What about :
  - Matlab/Octave
  - Fortran
  - IDL
  - ...
- Not for now



# *"Why is Lego the most ingenious toy in the world?"* - Sophie's World (J.Gaarder)

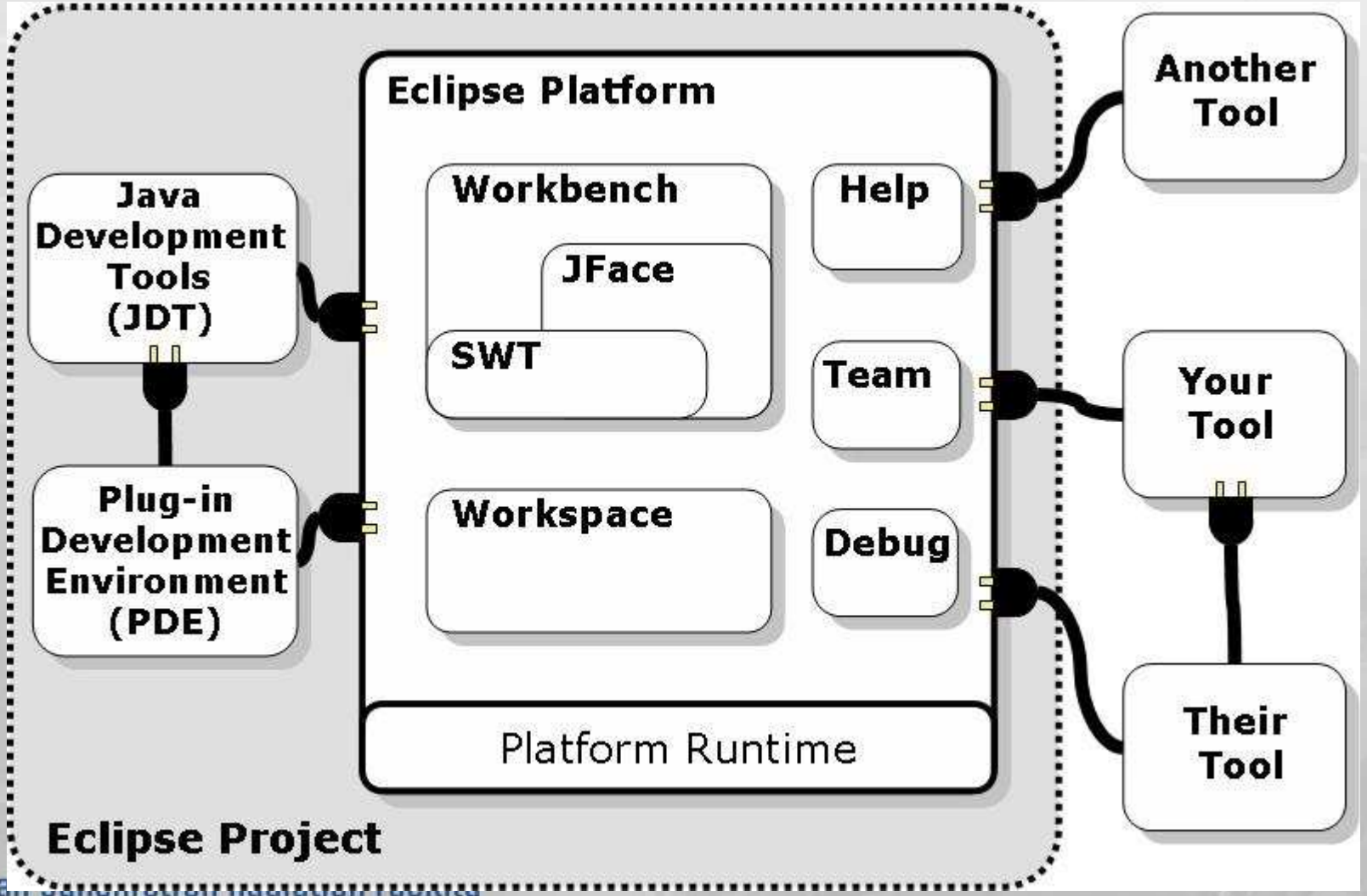


# What is a Plugin ?

- stykke software (Dansk)
- „Erweiterungsmodul“ (Deutsch)
- ***a plug-in or extension consists of a computer program that interacts with a host application (a web browser or an email client, for example) to provide a certain function "on demand"***

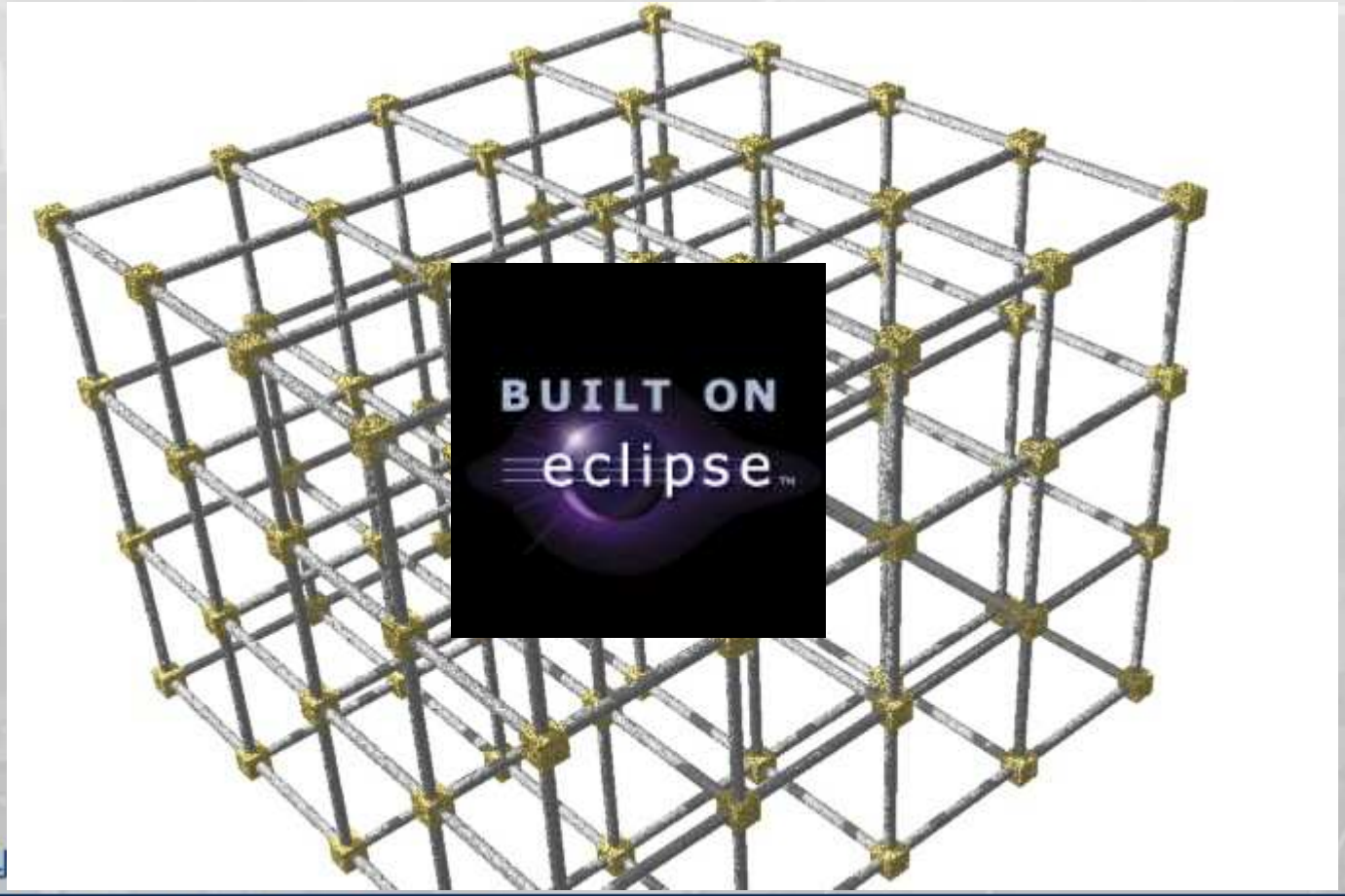
# Firefox plugins

# Software Lego – Eclipse Plugins



# Fable Framework

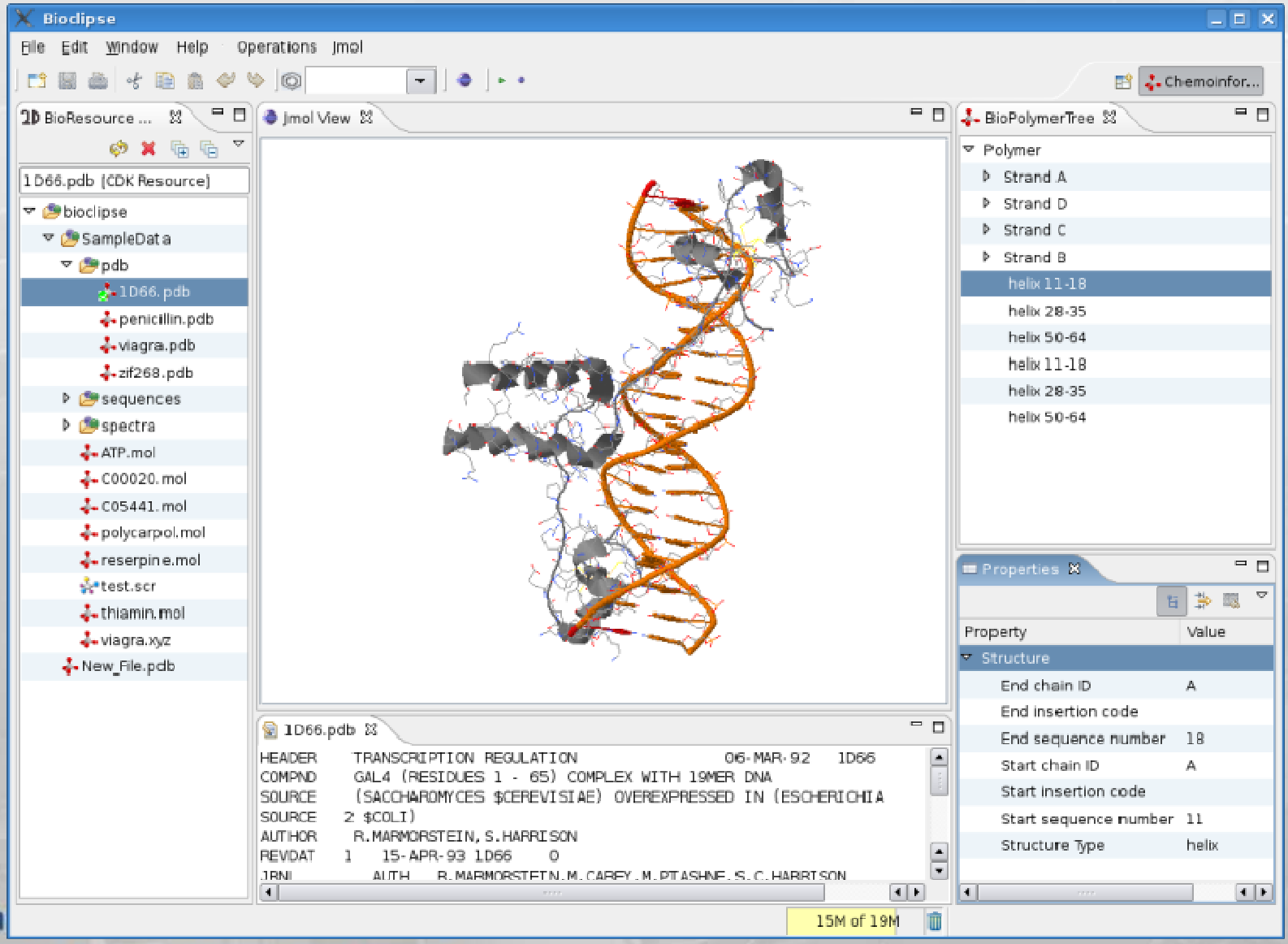
- Eclipse/RCP is the Fable plugin framework



# Eclipse-based Scientific Applications

- *Gumtree* – ANSTO beamline control system UI
- *GDA* – Diamond beamline control system UI
- *CSS* – EPICS control system UI
- *Bioclipse* - visual platform for chemo- and bioinformatics
- *MAEviz* – Mid-America Earthquake Center
- *G-Eclipse* – graphical client for Grid

# Bioclipse


Bioclipse
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Properties
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AUTHOR R.MARMORSTEIN,S.HARRISON
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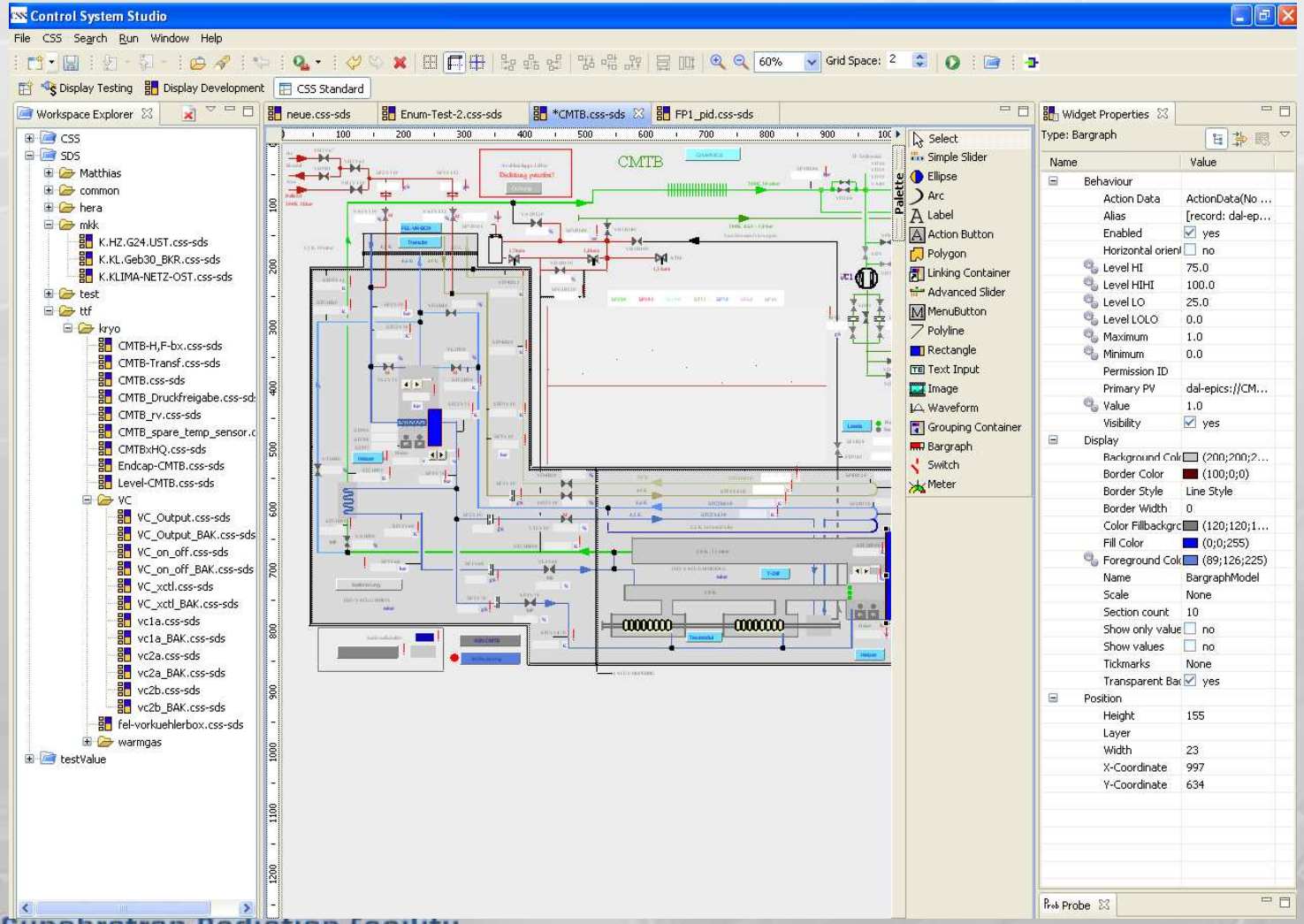
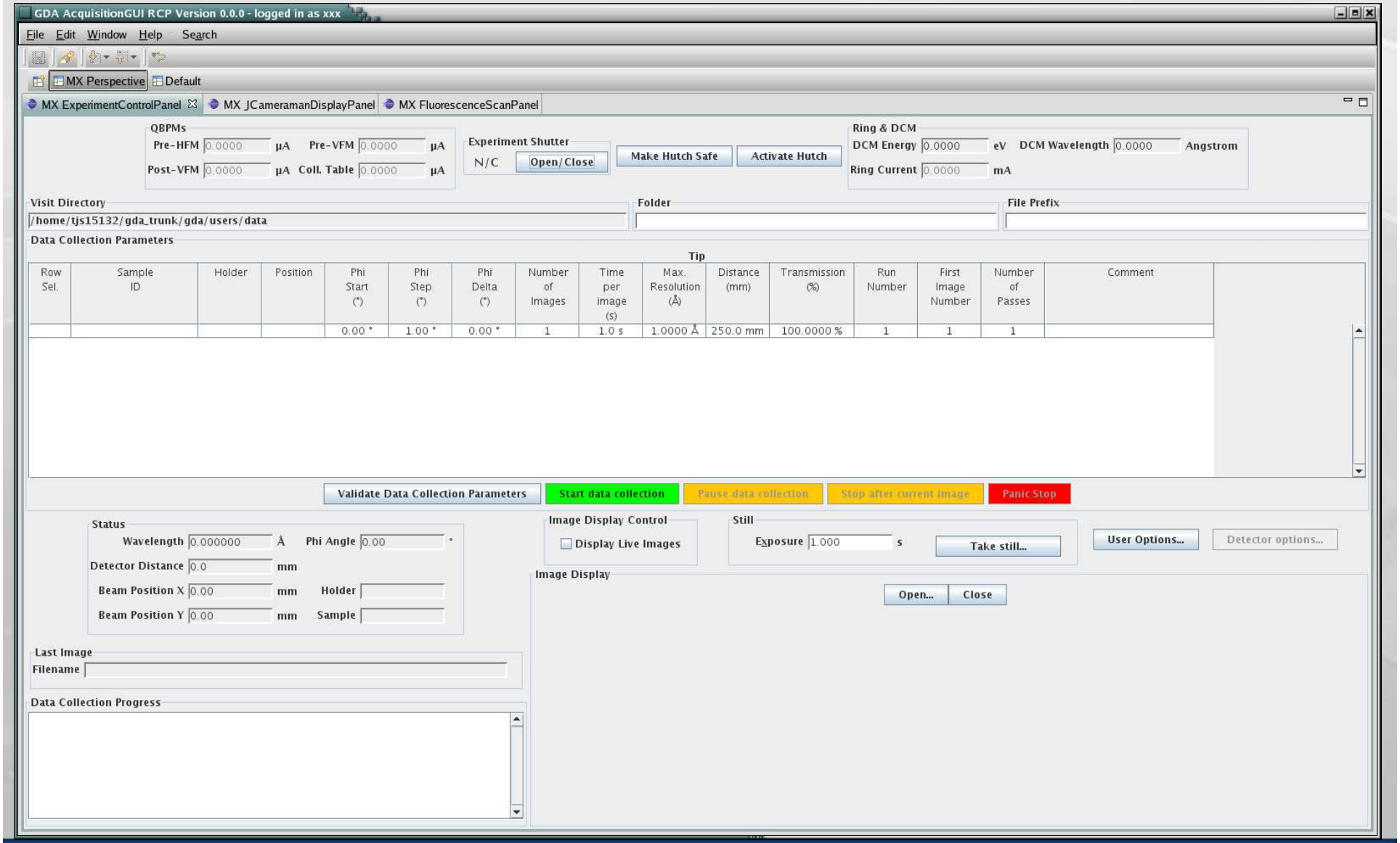
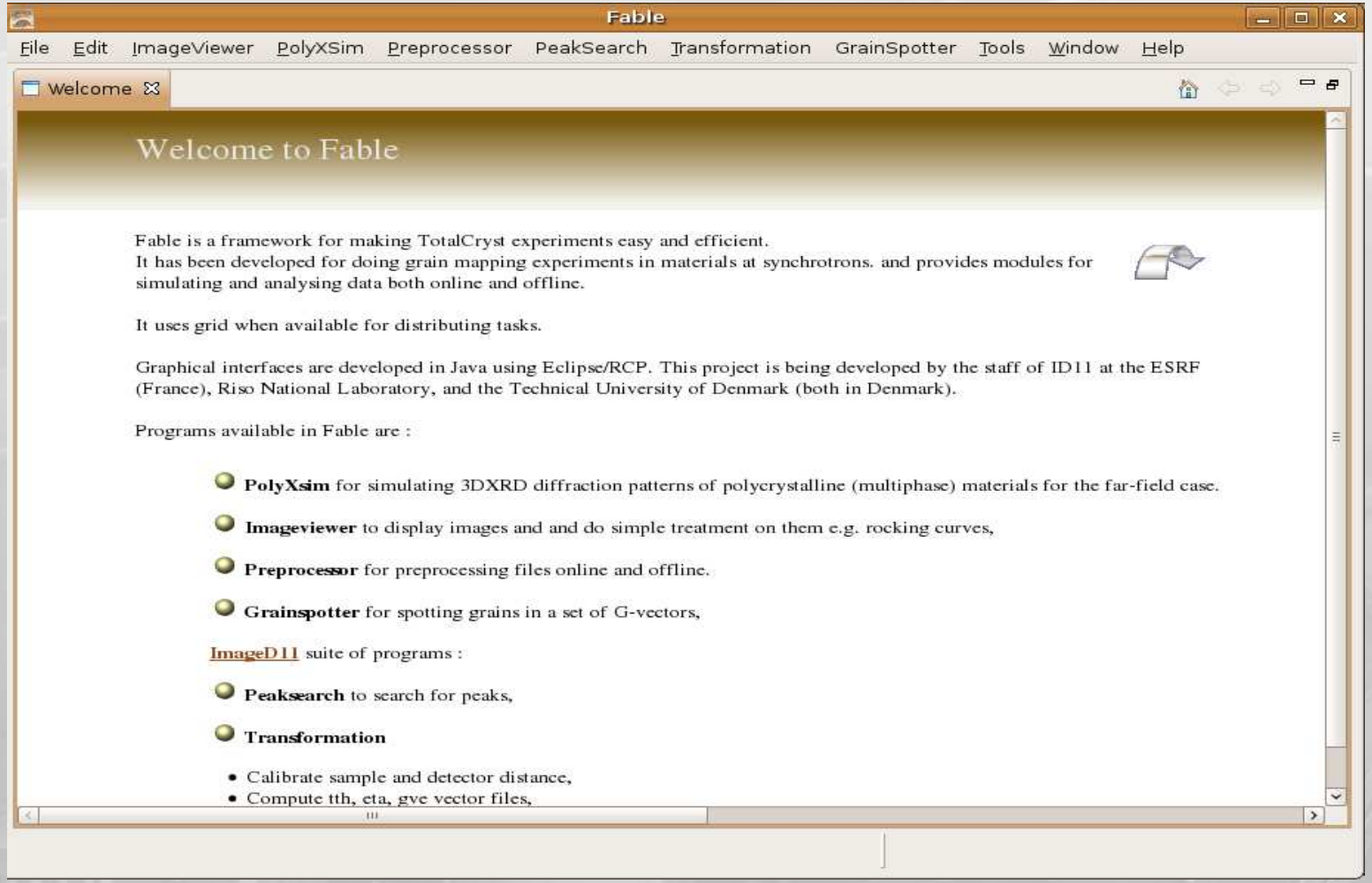
# EPICS Control System Studio



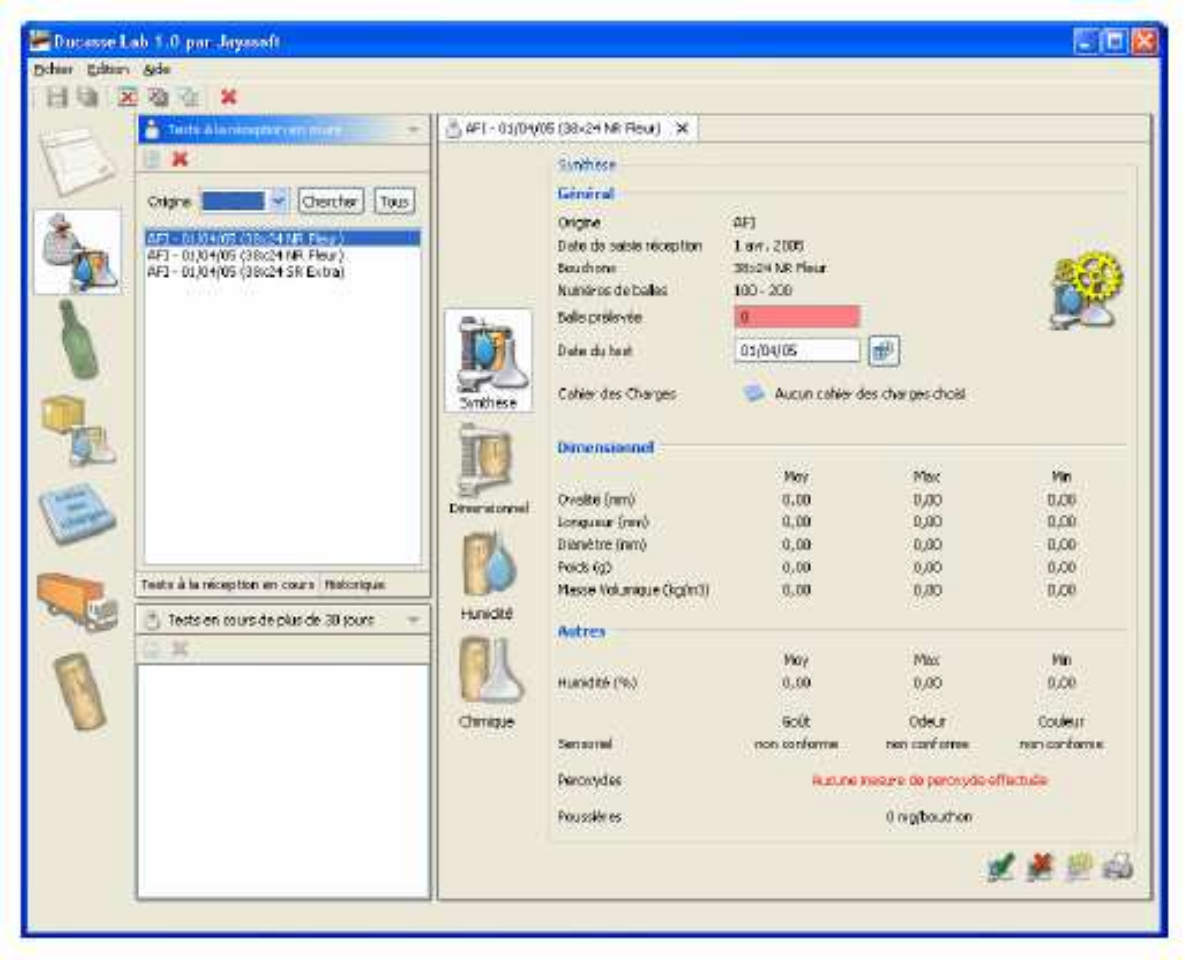
# Diamond's GDA



# Fable - Welcome



# Eclipse + French Wine



# What did we achieve ?

- An open source graphical workbench for running a subset of TotalCryst data analysis programs
- Another 2D image viewer
- An application which (we think) is useful
- Demonstrated technological choices were adapted

# What did Fable cost ?

# Ohloh Analysis

**Project Cost**

This calculator estimates how much it would cost to hire a team to write this project from scratch. More »

| | |
|---|---|
| Include | Markup, Code |
| Codebase | 556,874 |
| Effort (est.) | 150 Person Years |
| Avg. Salary | $ 55000 year |
| | **$ 8,228,842** |

ohloh ohloh:Root

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## fable

**GENERAL**
Summary
Journal Entries
Reviews
Links
News
Managers
Widgets

**DEVELOPMENT**
**Code Analysis**
Contributors
Commits
Enlistments

Updated 31 Mar 2009 12:53 UTC

### Licenses

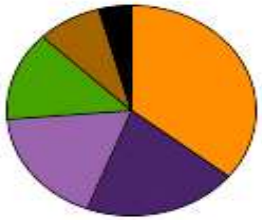
Ohloh searches the source code for individual license declarations. These licenses can differ from the project's official license.

| | |
|---|---|
| GNU General Public License 2.0 | 233 files |
| Common Public License 1.0 | 6 files |
| GNU Lesser General Public License 2.1 | 5 files |
| Eclipse Public License | 3 files |

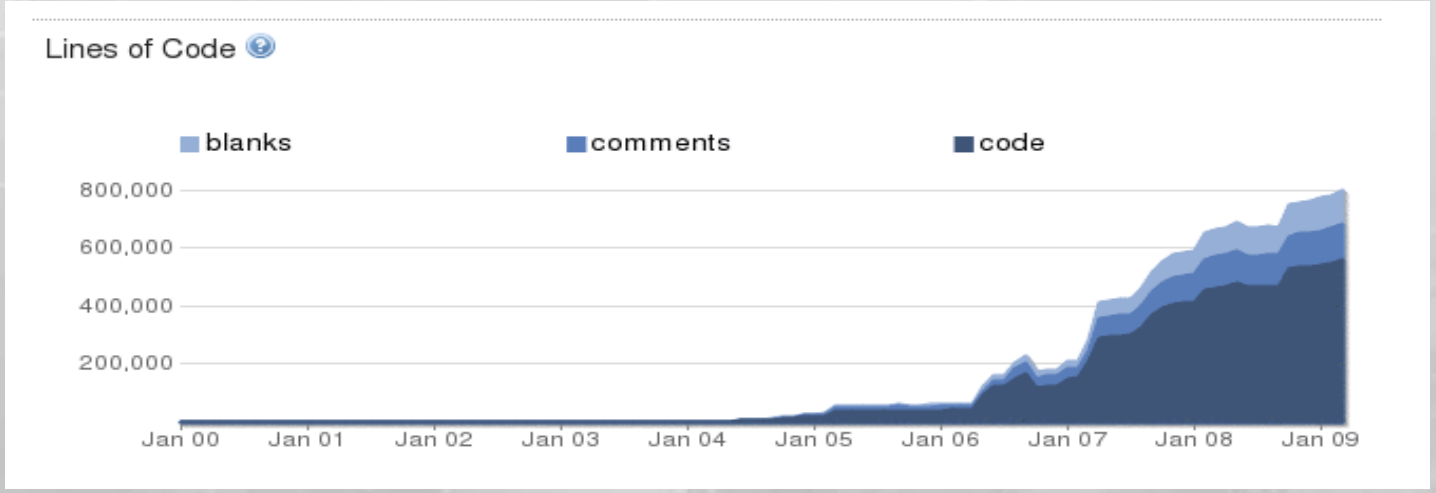
### Languages

Ohloh analyzes the project source code and determines the language of each line of code, excluding comments and blanks.

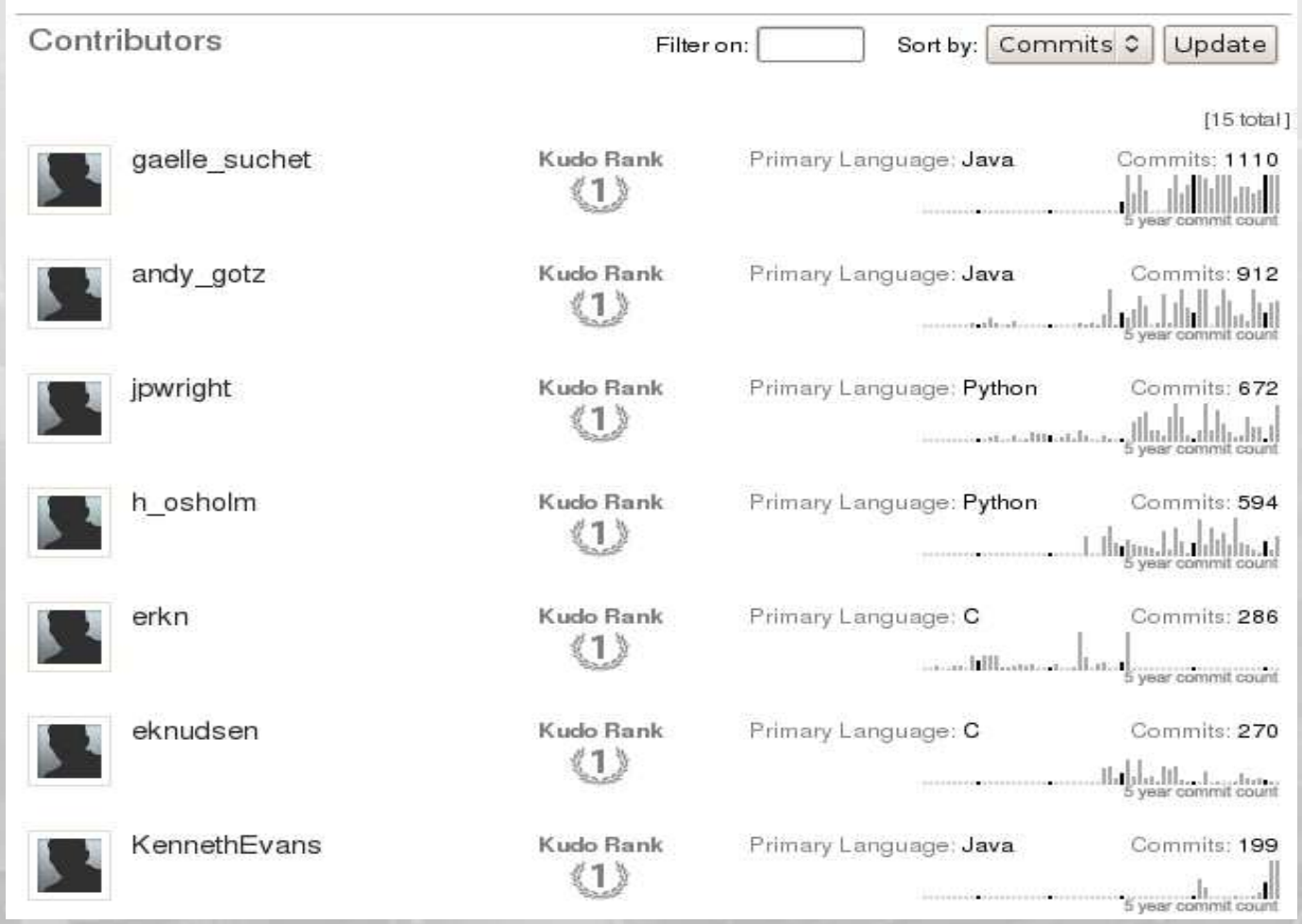
| | |
|---|---|
| C | 34% |
| Python | 19% |
| Java | 17% |
| HTML | 13% |
| Matlab | 8% |
| Other | 4% |



# Fable – Lines of Code



# Fable Top Contributors



# ***Fable Programmers***

- ESRF
  - Jon Wright
  - Gaelle Suchet
  - Andy Gotz
- Risoe
  - Henning Osholm
  - Soeren Schmidt
  - Jette Odersheder
  - Erik Knudsen
- APS
  - Ken Evans
- Testers

THANK YOU to EVERYBODY !

# Fable Tester Competition

- Winner of the Best Fable Tester bottle of wine - a 1988 Chateau Clarke :


# What we did not achieve

- A graphical application for running all of TotalCryst data analysis programs
- Missing programs are Fabric, Grain Mapping, ...
- A complete set of 1D, 2D, 3D visualisation tools
- A better data format e.g. HDF, database

# ***Fable - Short Term Future***

- Handling Multiple-Image Binary Files
- Histogram of Image
- Export Slices of Images
- Add tools like :
  - Background maker
  - Fit2dcake
  - ...

# ***Fable - Short to Medium Term Future***

- Project Navigator
- Integrate Experimental Parameters
- Plot Rodrigues Vectors, Q-Space, Debye-Scherrer rings, ...
- Make all Input File Views to Editors
- Double-click and Drag-n-Drop on Input Files
- Add support for HDF and Databases

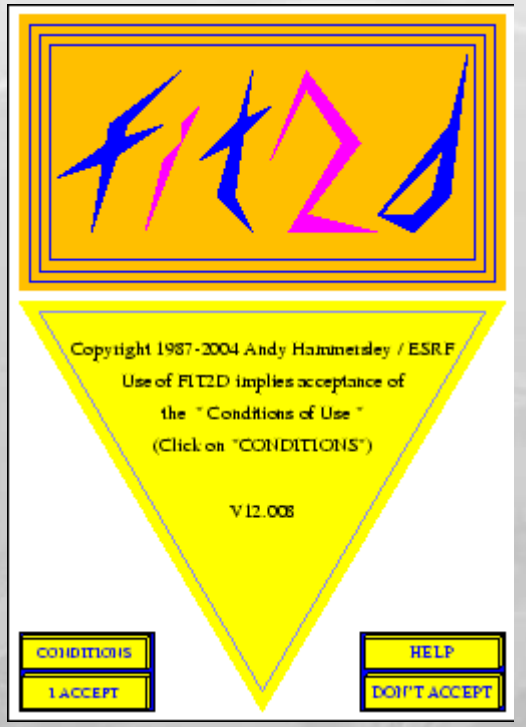
# ***Fable - Long Term Future***

- 1D Peak Fitting
- Visualisation
  - 3D Reciprocal Space
  - Volume Rendering of Grains
  - Center of Mass Grain Maps
  - Pole Figures
- Online Data Analysis
  - User Interface to configure, run and monitor ODA
- Powder diffraction ...

# ***Powder Diffraction Workbench***

- Develop yet another alternative for analysing Powder Diffraction *a la* Fit2d, XOP, ...

- Typical tasks to implement are :
  - Calibrate beam center, detector tilt, ...
  - Radial integration
  - Fit powder rings
  - 3D volume visualisation
  - Element and phase analysis
  - Online data analysis



# Fable - Conclusion

- Fable will continue to be developed and maintained for


- Fable will be further developed to provide a richer 1D, 2D and 3D plotting tool
- Fable will be integrated into the ESRF Upgrade Program for the next 10 years to do e.g. :
  - Online Data Analysis,
  - Powder diffraction
- Fable with collaborate with APS, DLS and others

# Fable has a long term future ...