Australian Government

Ansto

Nuclear-based science benefiting all Australians

GumTree Decoded

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Sydney, Australia

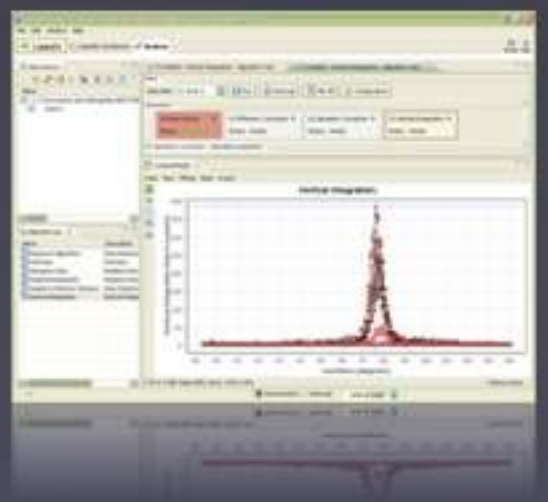
GumTree Decoded

1 single application

2 aspects: instrument control & data analysis

3 main languages: Java, Python, Adobe Flex

4 countries involved: Australia (ANSTO), South Africa (NESCA), Switzerland (PSI), France (ESRF)



5 years of development

6 neutron scattering instruments supported

150+ plug-ins developed

200+ third party plug-ins used

2,000,000+ LOC

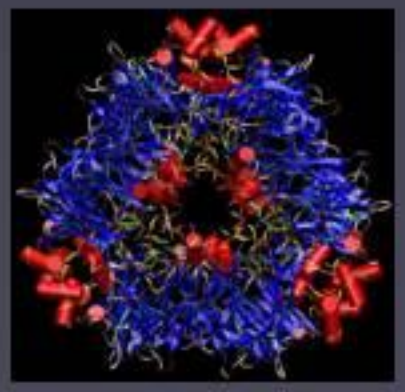
Neutron Scattering

Neutron Source

Neutrons

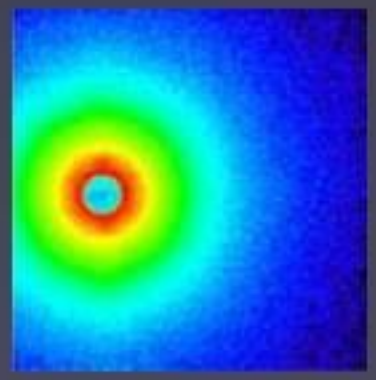
Instrument Optics

Sample



Science

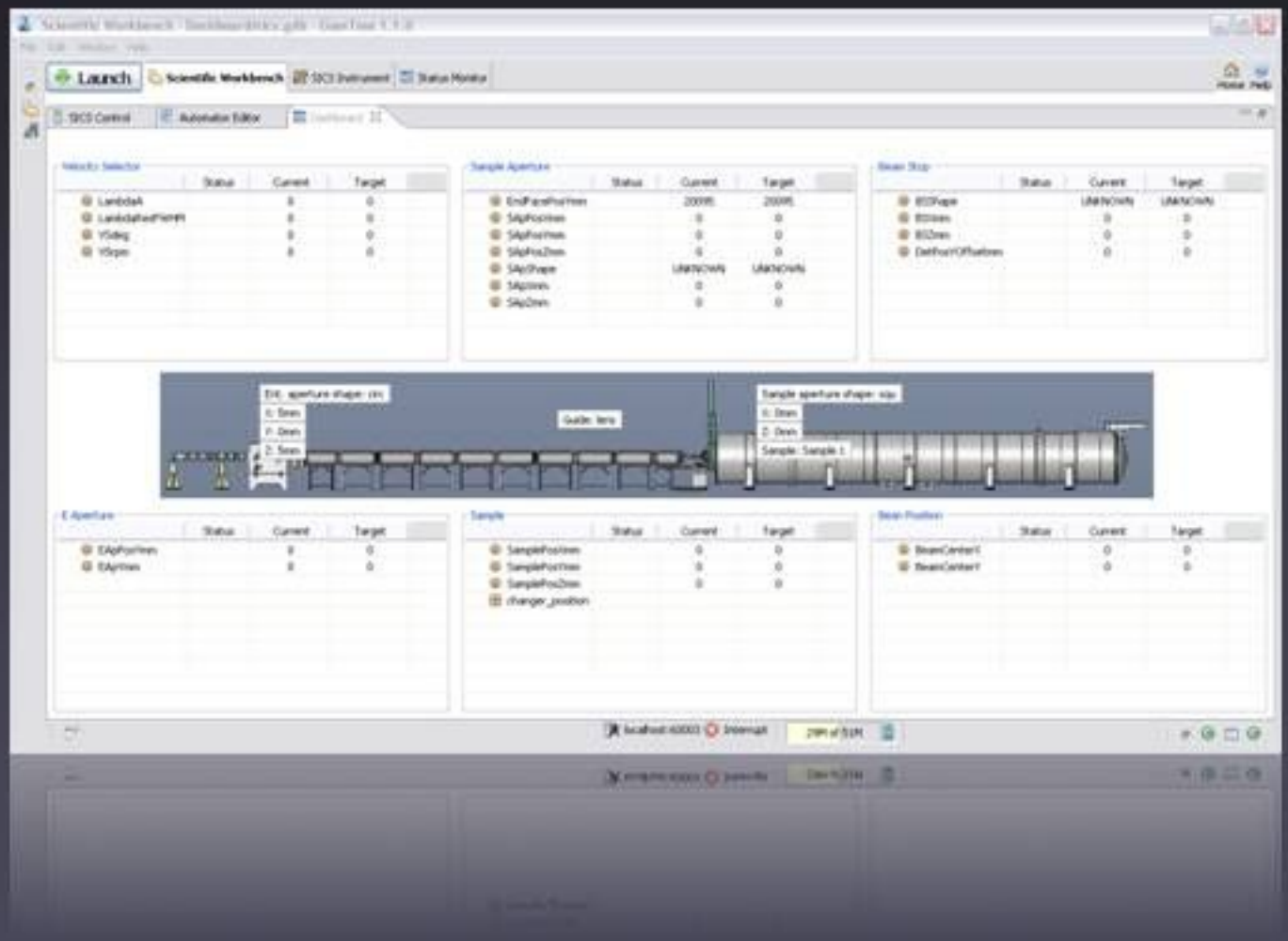
analysis



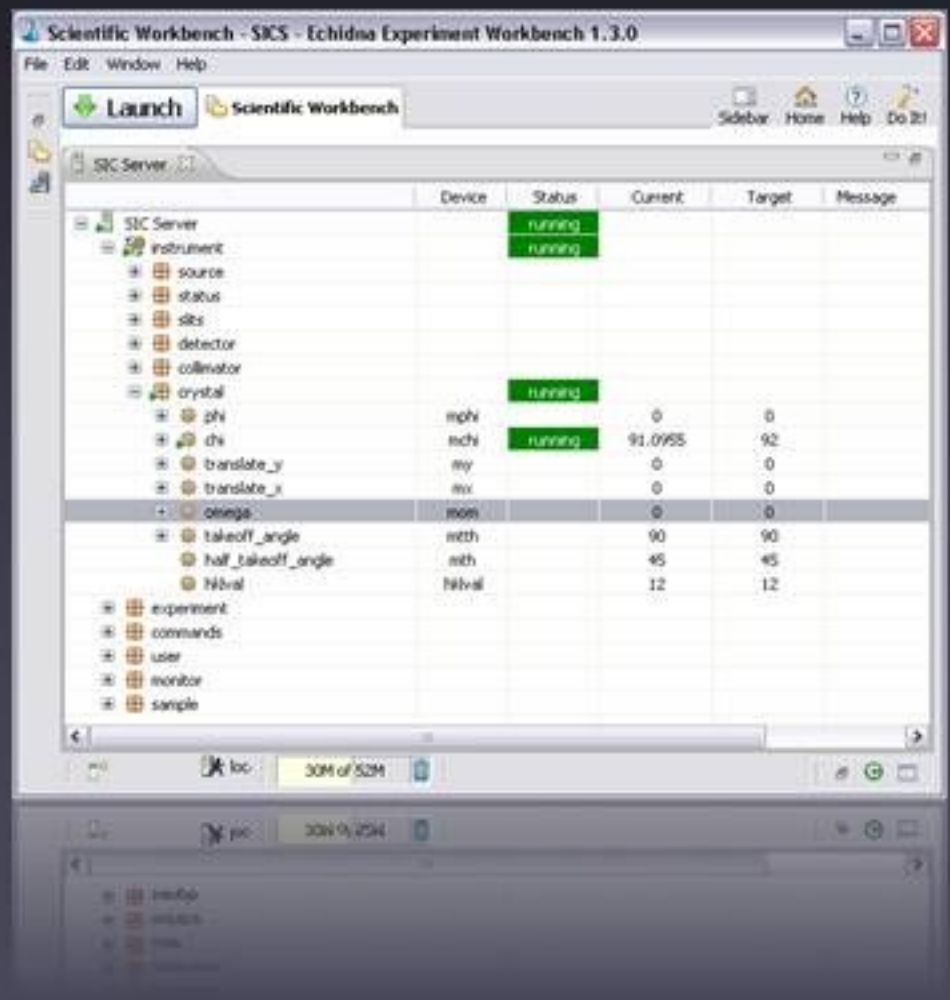
Result

acquisition

Instrument Control Client

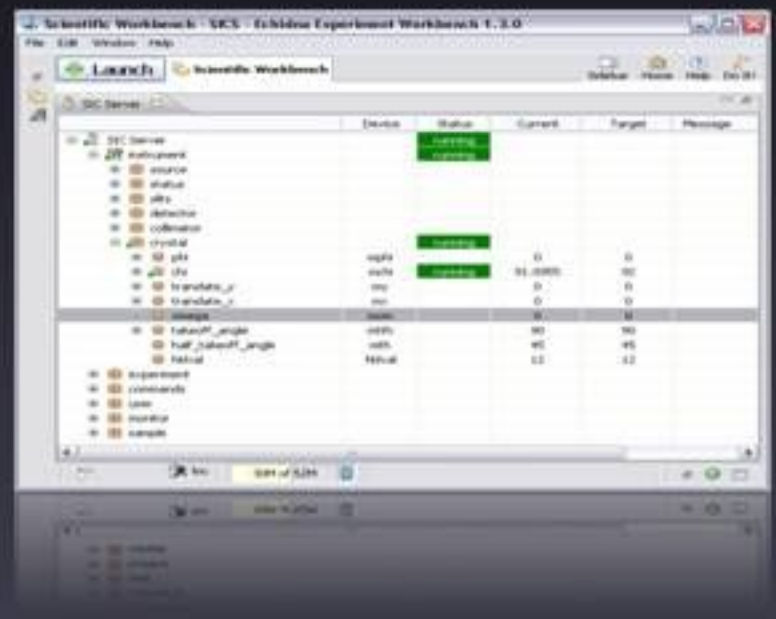


Synoptic Control
& Status Display

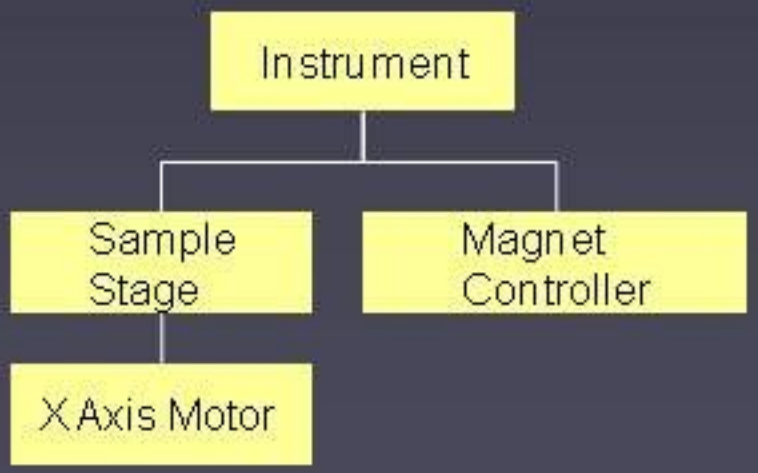


Tree Based
Instrument & Device
Control

Instrument Control Client



Instrument Model:



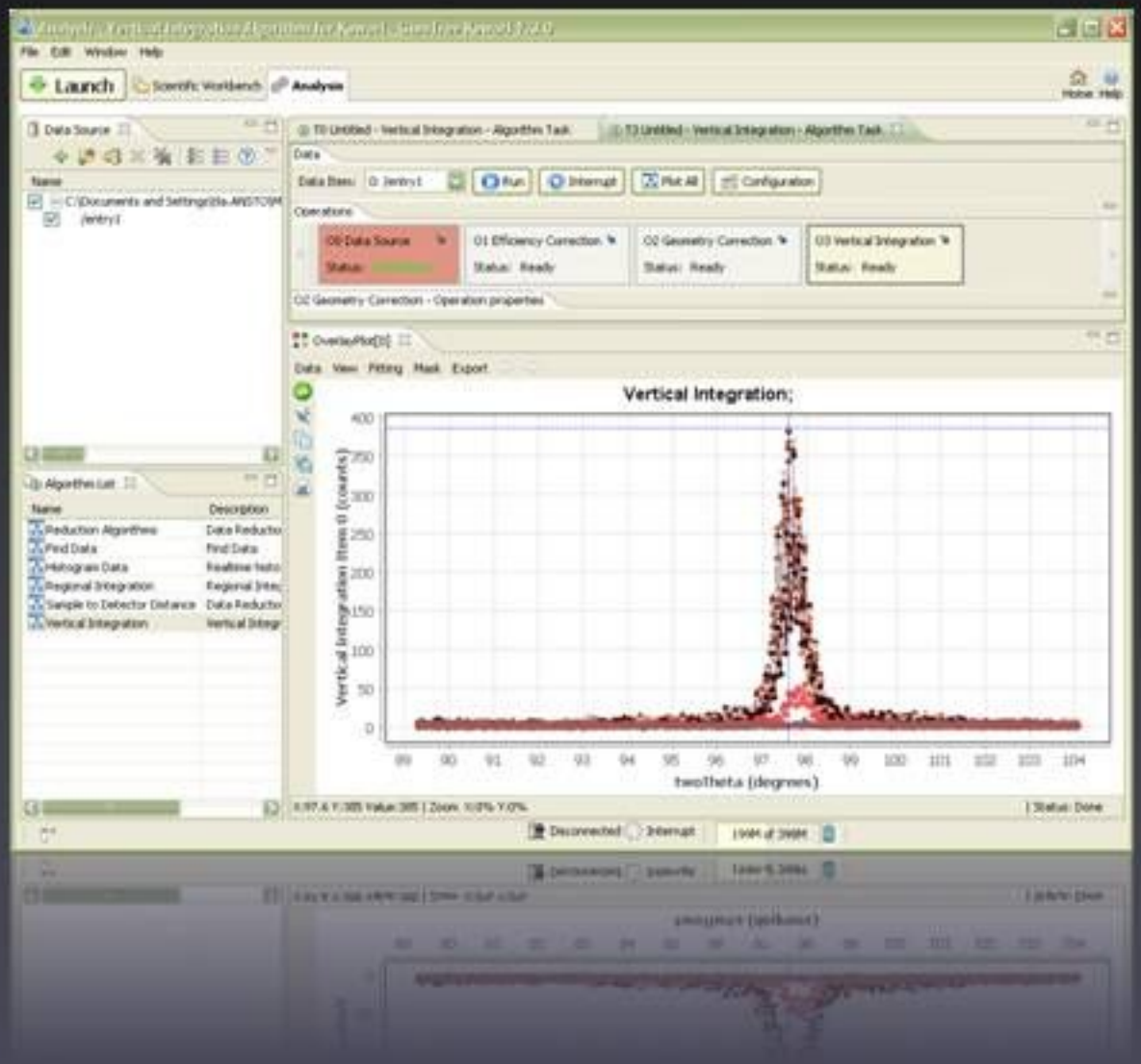
transported and serialised using Service Data Object (**SDO**)

SICS Instrument Control System

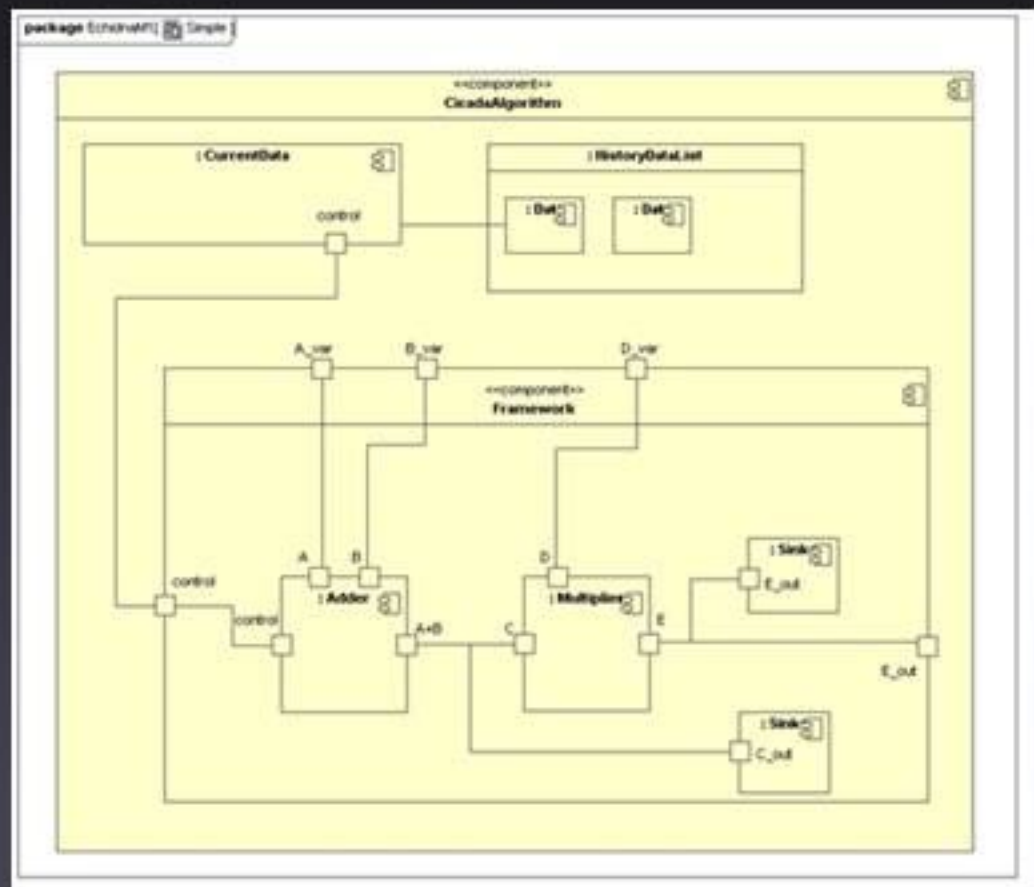
JSON Protocol:

```
{
 "transaction":101,
 "object":"motor1",
 "data":{
          "position":10.4,
          "unit":"mm"
        }
}
```

Data Analysis Tool



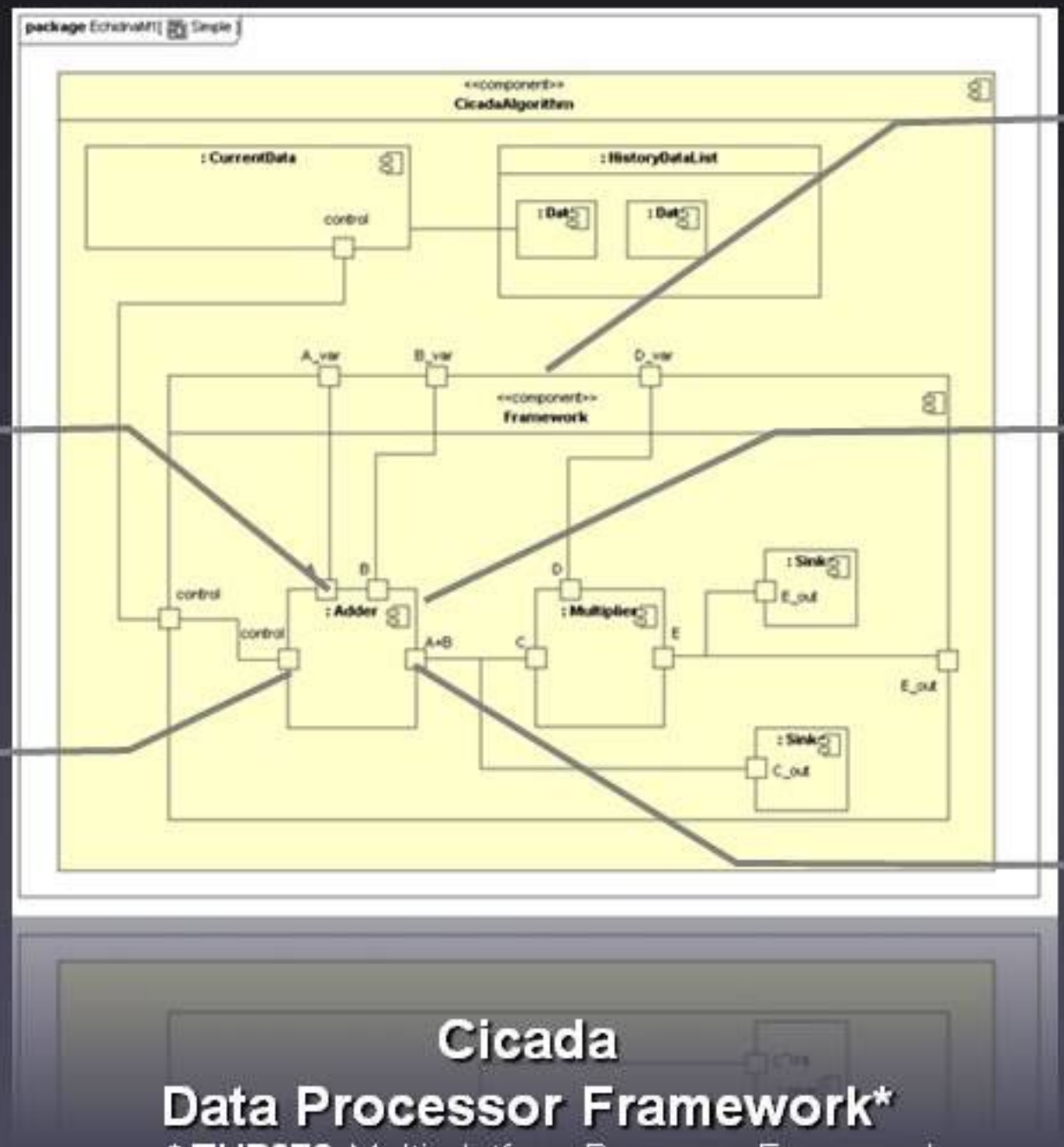
Kakadu
Data Analysis Suite



Cicada
Data Processor Framework*

* **THP076**: Multi-platform Processor Framework for Data Analysis, Data Acquisition and Simulation

Data Analysis Tool



Processors are composed and linked by XML

Tuner Port

Input Port

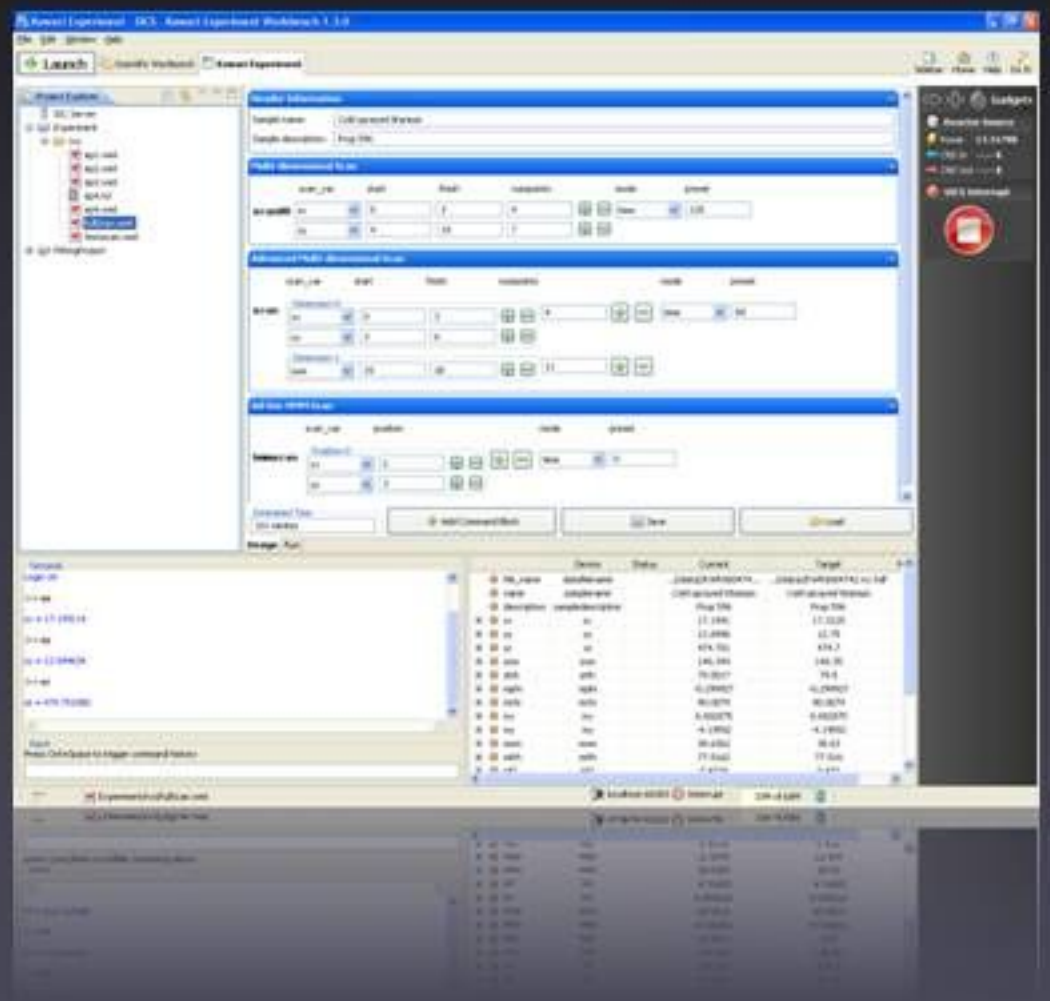
Pluggable Algorithm

Output Port

Cicada
Data Processor Framework*

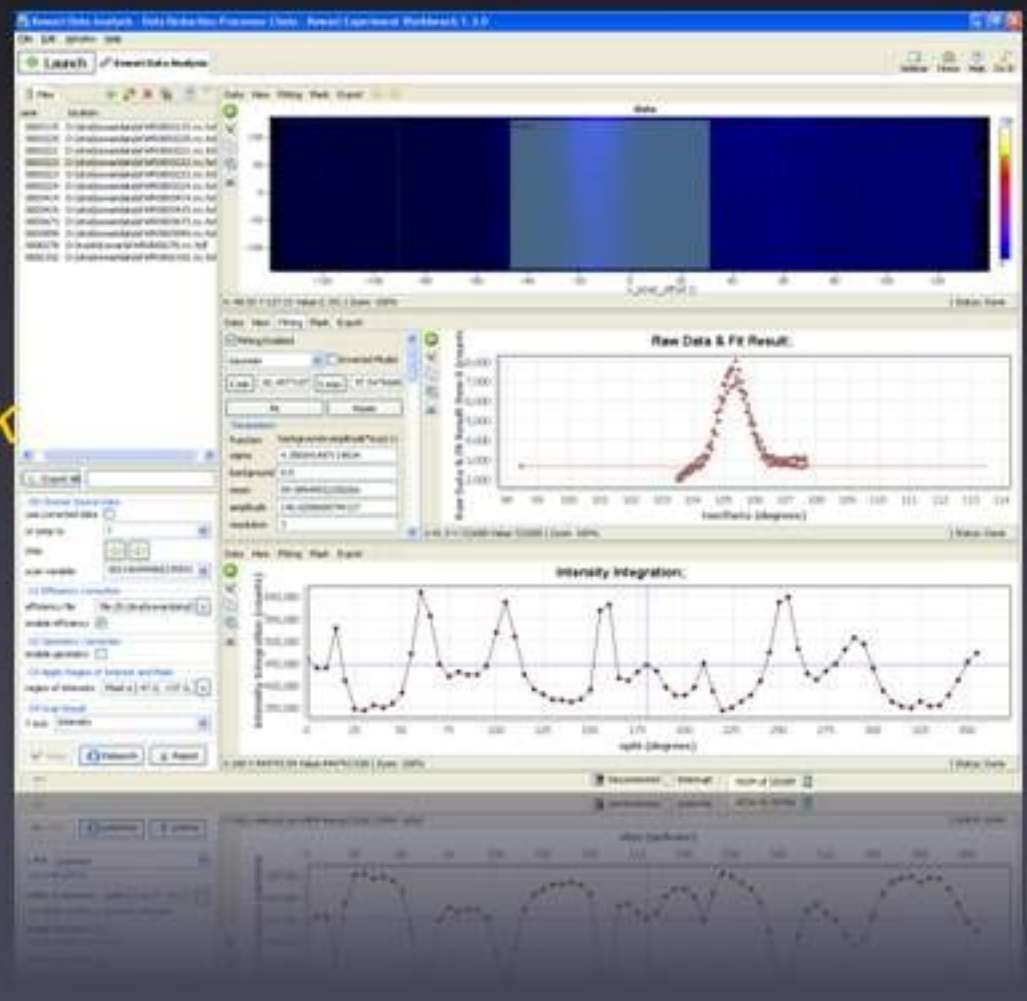
* **THP076**: Multi-platform Processor Framework for Data Analysis, Data Acquisition and Simulation

Automated Experiment Control



Visual Experiment Planning Window

3. FEEDBACK



Live Data Reduction Window

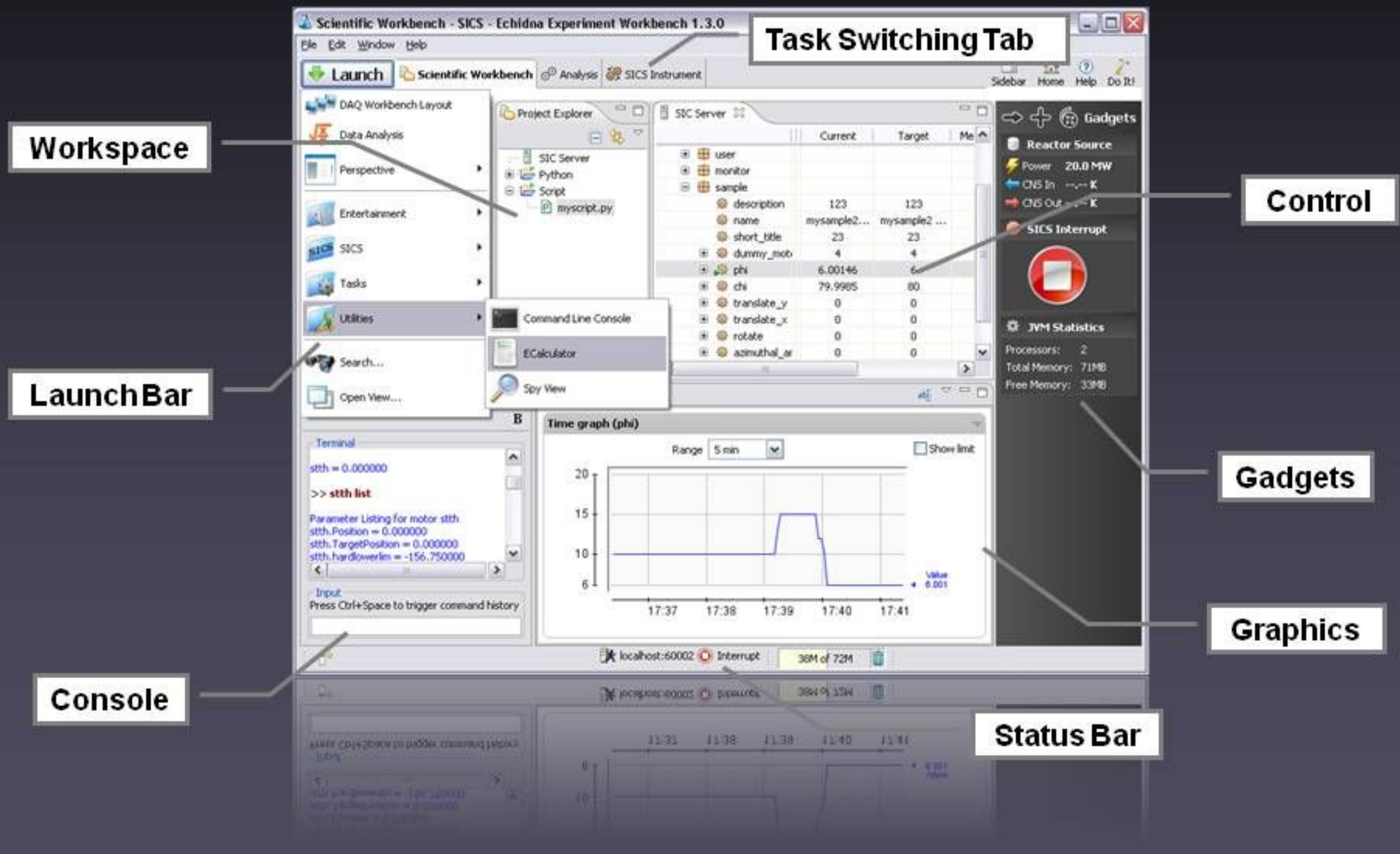
1. CONTROL

SICS Instrument Control System

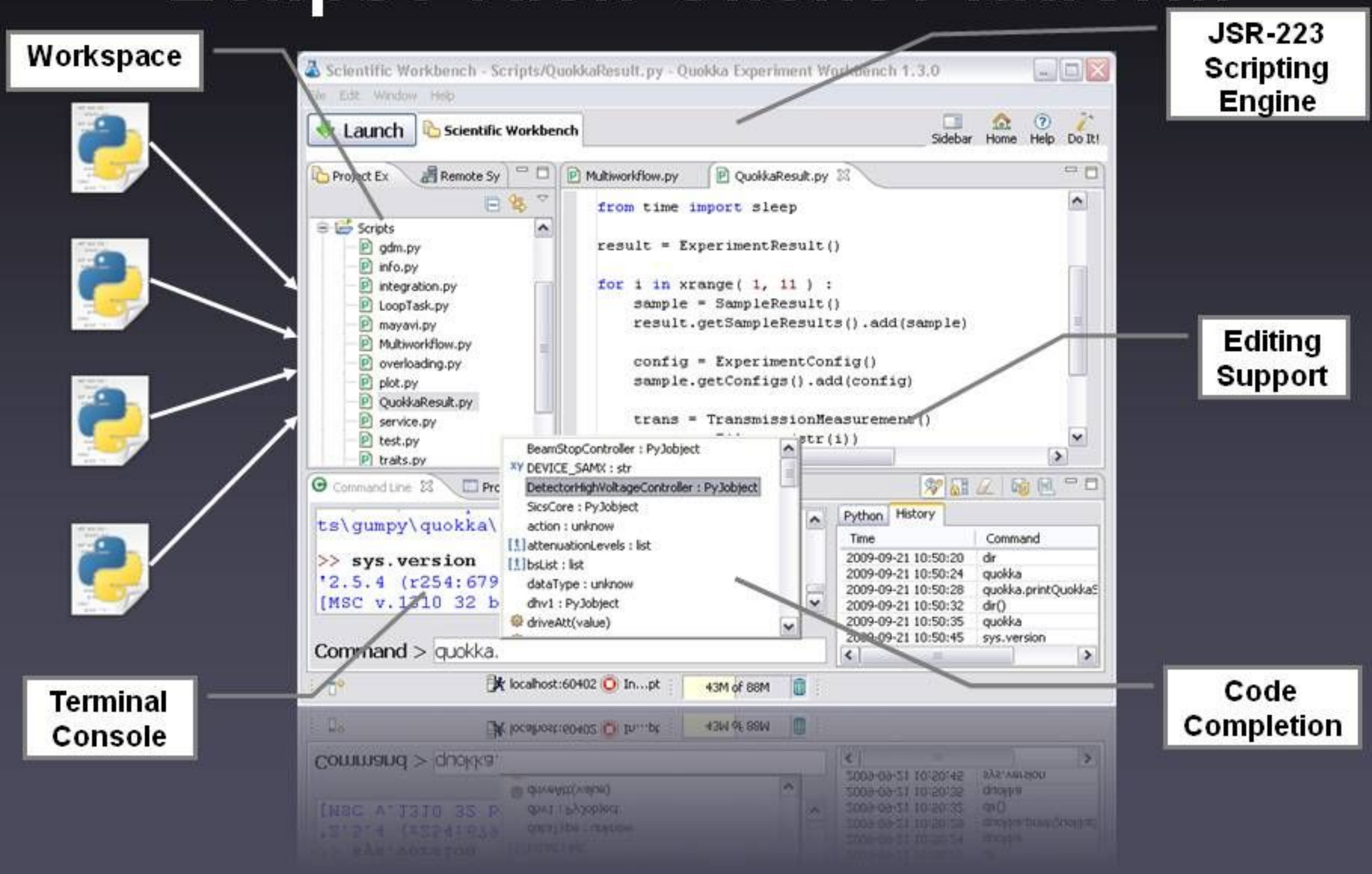
2. DATA

JFreeChart
.netCDF
Spring
Restlet
SDO
EMF
Eclipse
OSGi
xStream
JAS3
SLF4J
HDF
OpenGL
db4o
Python
DOM4J
Java
Log4J

Eclipse Rich Client Platform

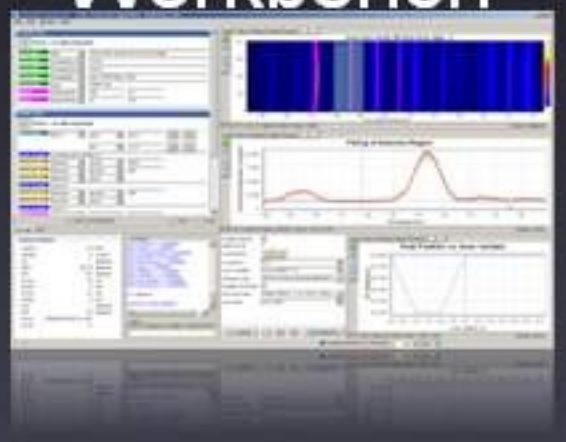


Eclipse Rich Client Platform

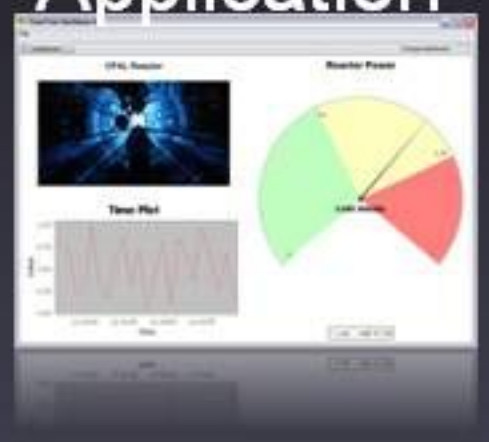


Single Sourcing Technique

Scientific Workbench



Standalone Application



Web Server

Background Process

Customised Workbench		
Control System	Data Analysis	UI Framework
OGSi		

Small Application
UI Framework
OSGi

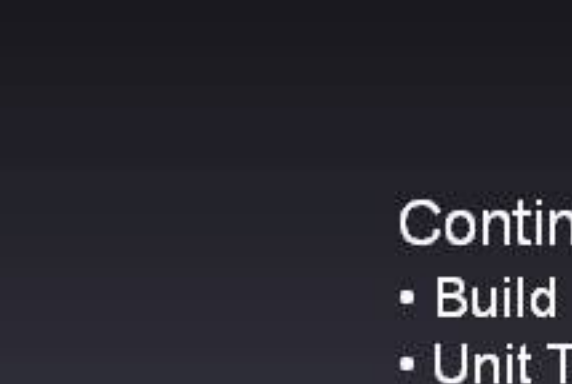
REST Application	
Control System	Web Server
OSGi	

Management Application
Control System
OSGi

Platform + Frameworks + Customisation

Deployment Model

Continuous Integration System
- Build
- Unit Testing
- Code analysis (PMD)
- Document generation (docbook)



Developer

Commit

Subversion
Code Repository

Fetch

cruisecontrol

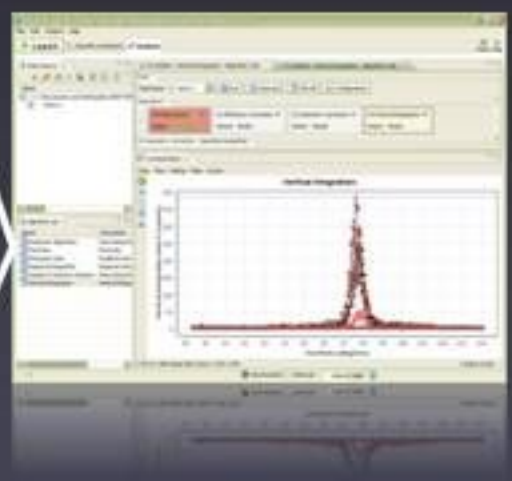
Deploy

Snapshot
Plug-in
Repository

Deploy

Production
Plug-in
Repository

New Production
Plug-in
Repository



Plug-in link mechanism

http://gumtree.codehaus.org

Photo of the **QUOKKA** (Small-Angle Neutron Scattering) Instrument