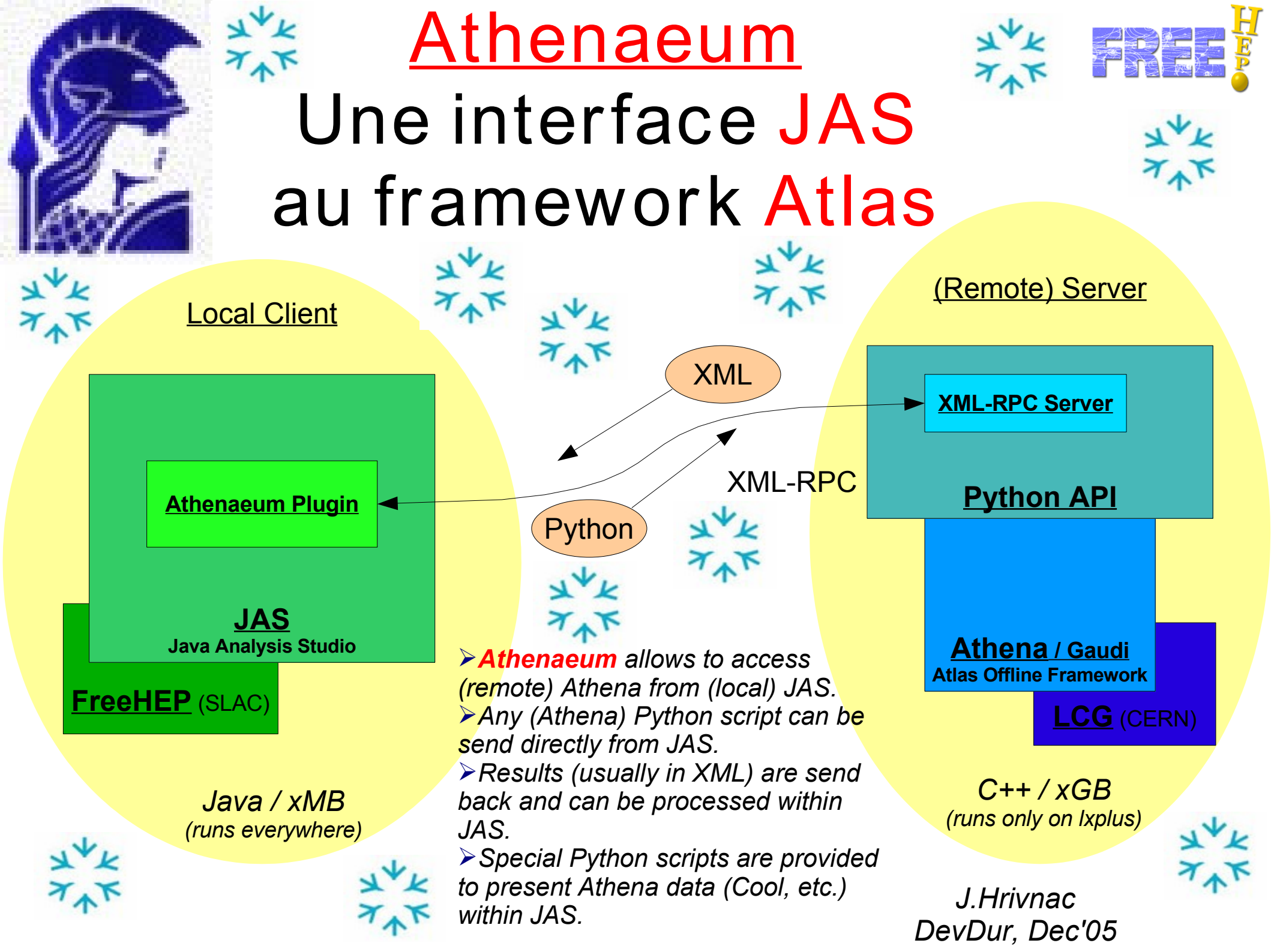
Athenaeum

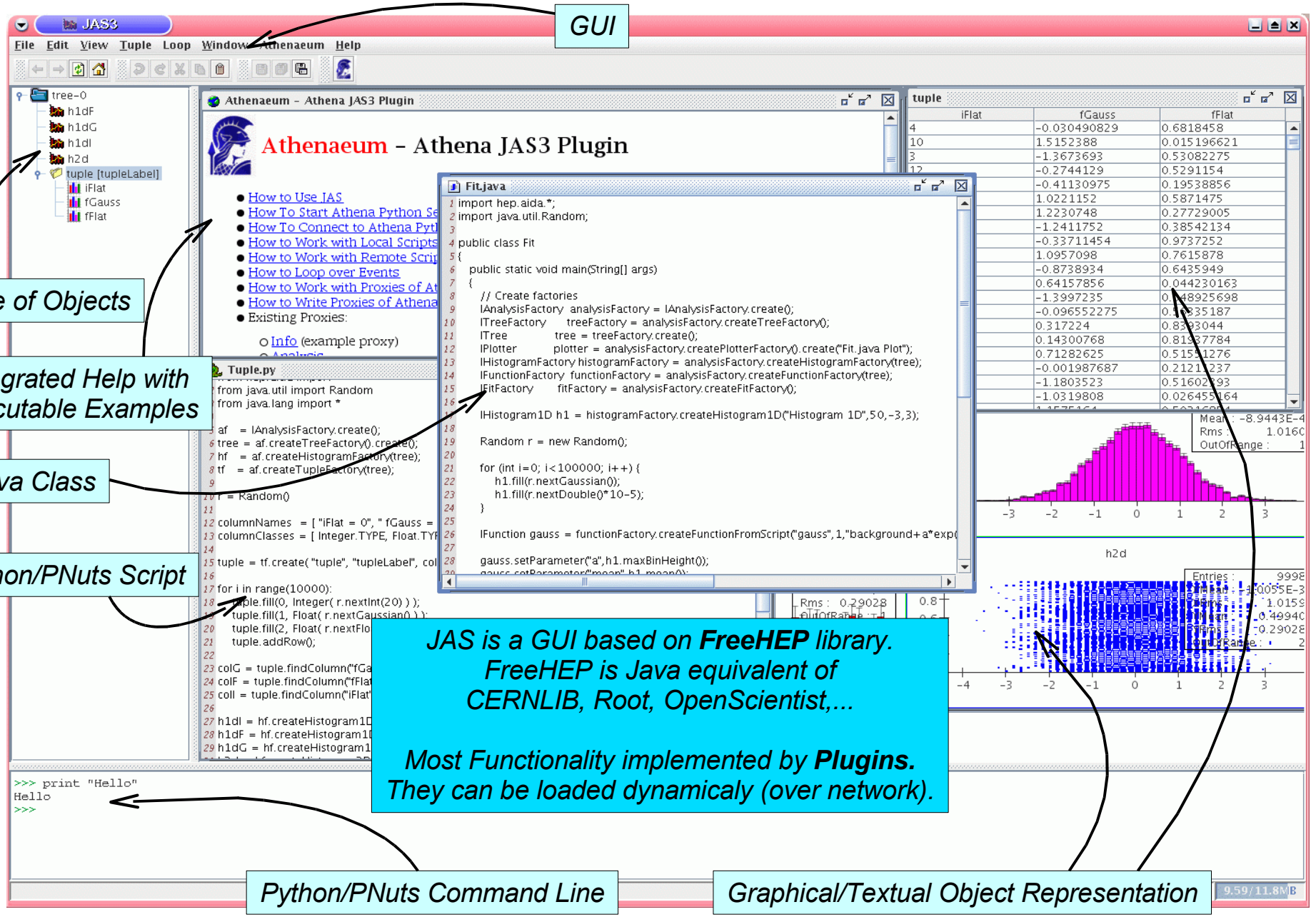
Une interface JAS au framework Atlas



- ***Athenaeum*** *allows to access (remote) Athena from (local) JAS.*
- *Any (Athena) Python script can be send directly from JAS.*
- *Results (usually in XML) are send back and can be processed within JAS.*
- *Special Python scripts are provided to present Athena data (Cool, etc.) within JAS.*

J.Hrivnac
DevDur, Dec'05

Java Analysis Studio



Open Connection to Athena

On Client
(Any platform with JAS + Athenaeum Plugin)

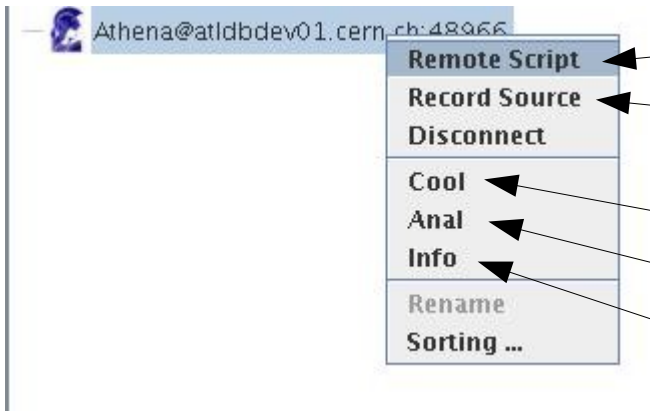
$ **athena.py -i -s jobOptions.py**
.....
XML-RPC server 'atldbdev01.cern.ch:48966' created
method 'process()' registered
Waiting for requests...

On Server
(Linux with Athena)

.....
execfile ("InteractiveServer.py")
server = InteractiveServer
server.start()

Server script written by Atlantis team

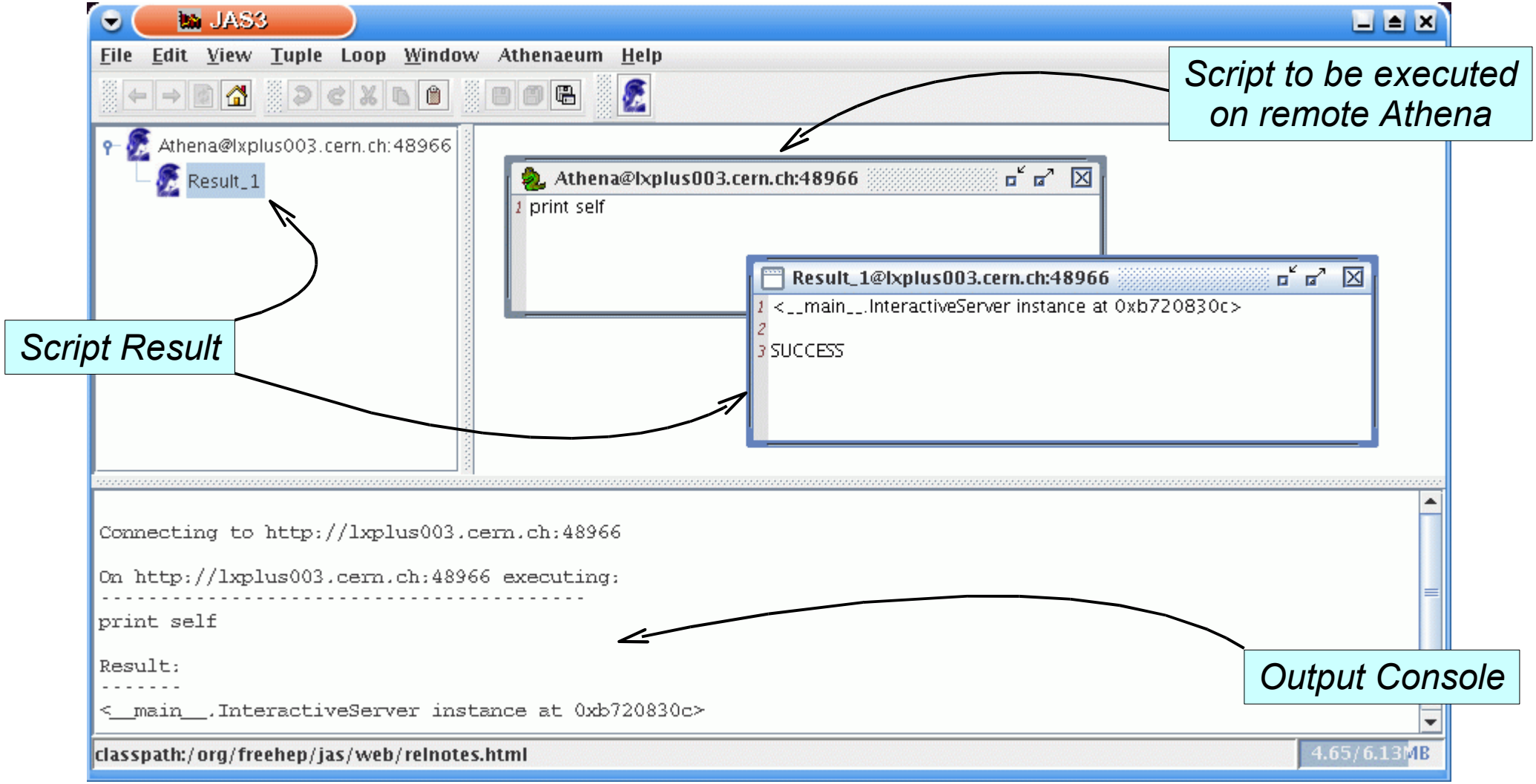
Interact with Athena



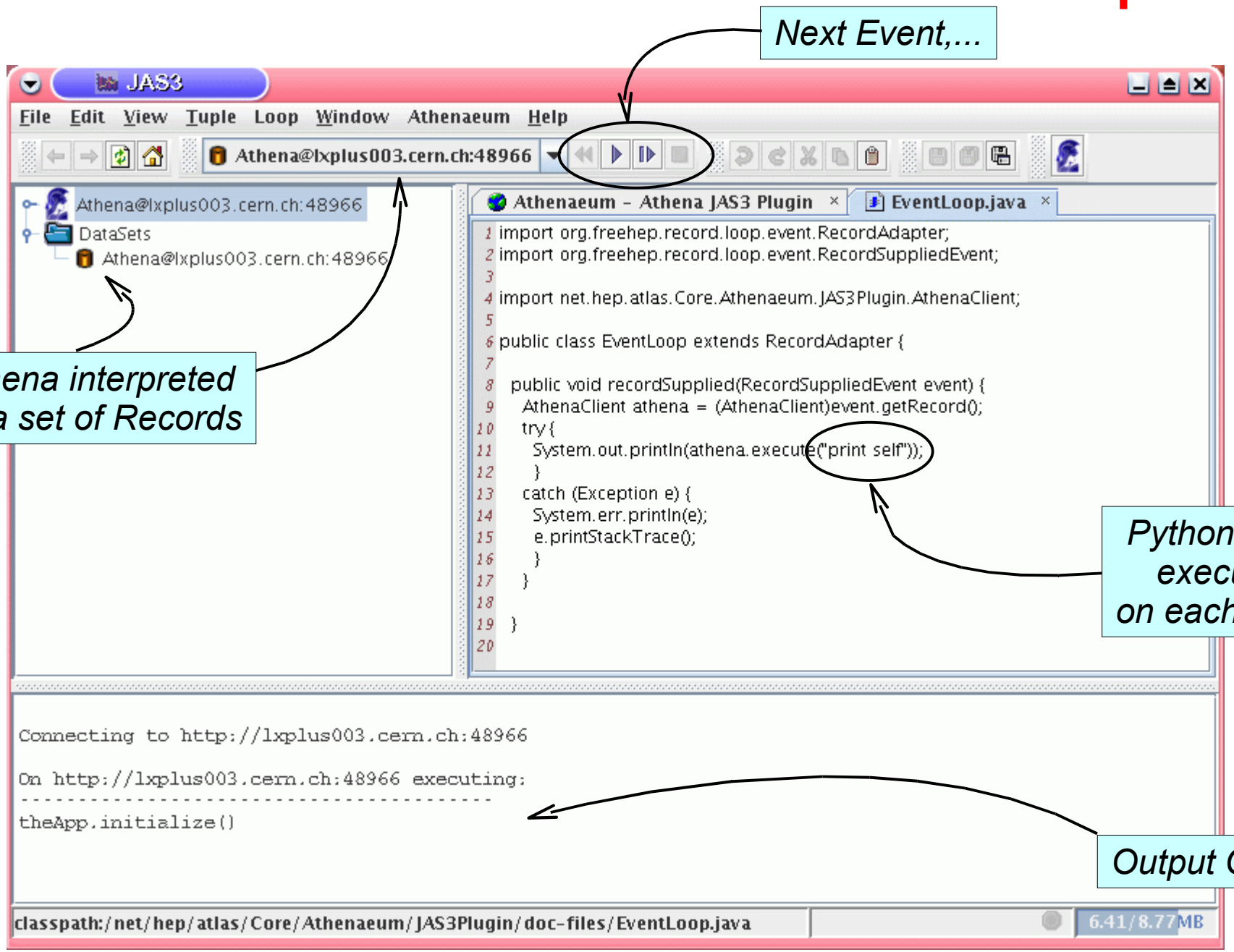
- Execute a Python script on Athena Server, get results back
- Steer Athena Event Loop from JAS
- **Access Cool data**
- Access Particle data (prototype)
- Get Information about Athena Server environment (loaded dictionaries, paths,...)

*Registered **Proxies** implementing concrete handling of connection to specific (Athena) functionality:*
- Athena Python script to extract data from Athena
- JAS wrapper to present/handle data inside JAS
- XML schema to describe data
When implementing pre-defined interfaces from Athenaeum, those Proxies will make themselves automatically available inside JAS system in an organic way.

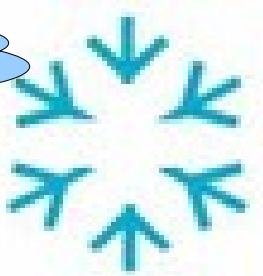
Execute Python on Athena



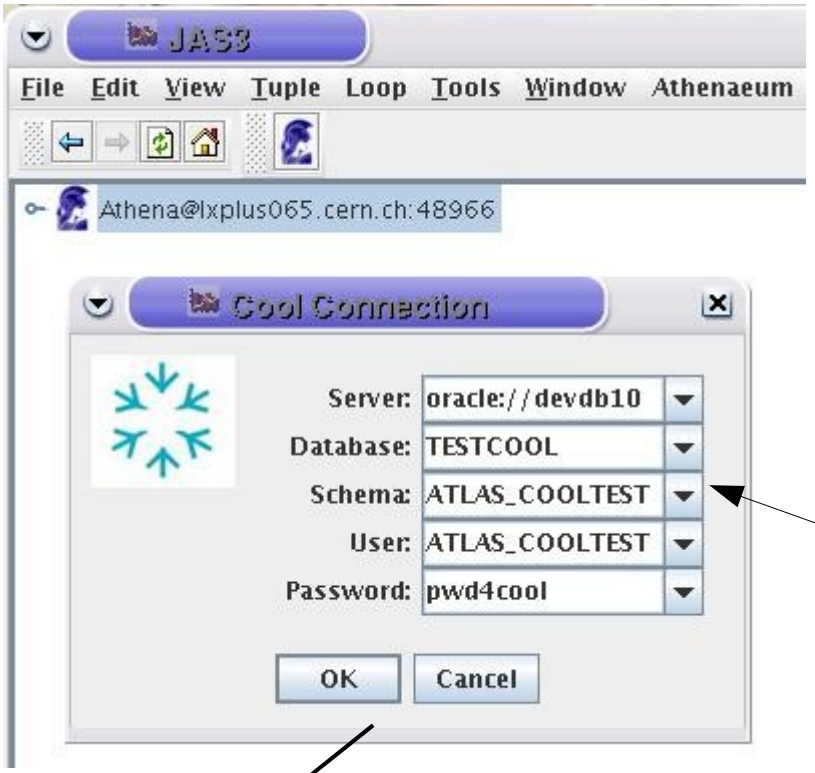
Steer Athena Event Loop



LCG Conditions Database



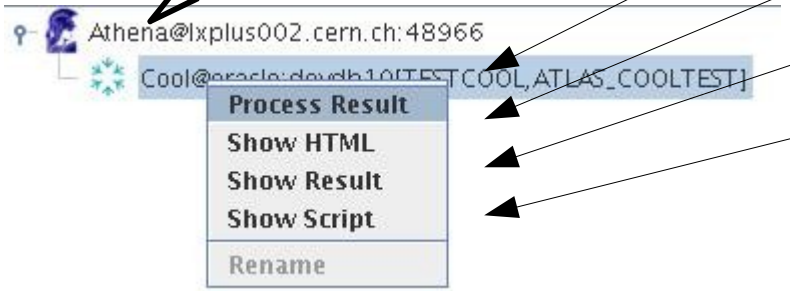
Interact with Cool



JAS + Athenaeum Client

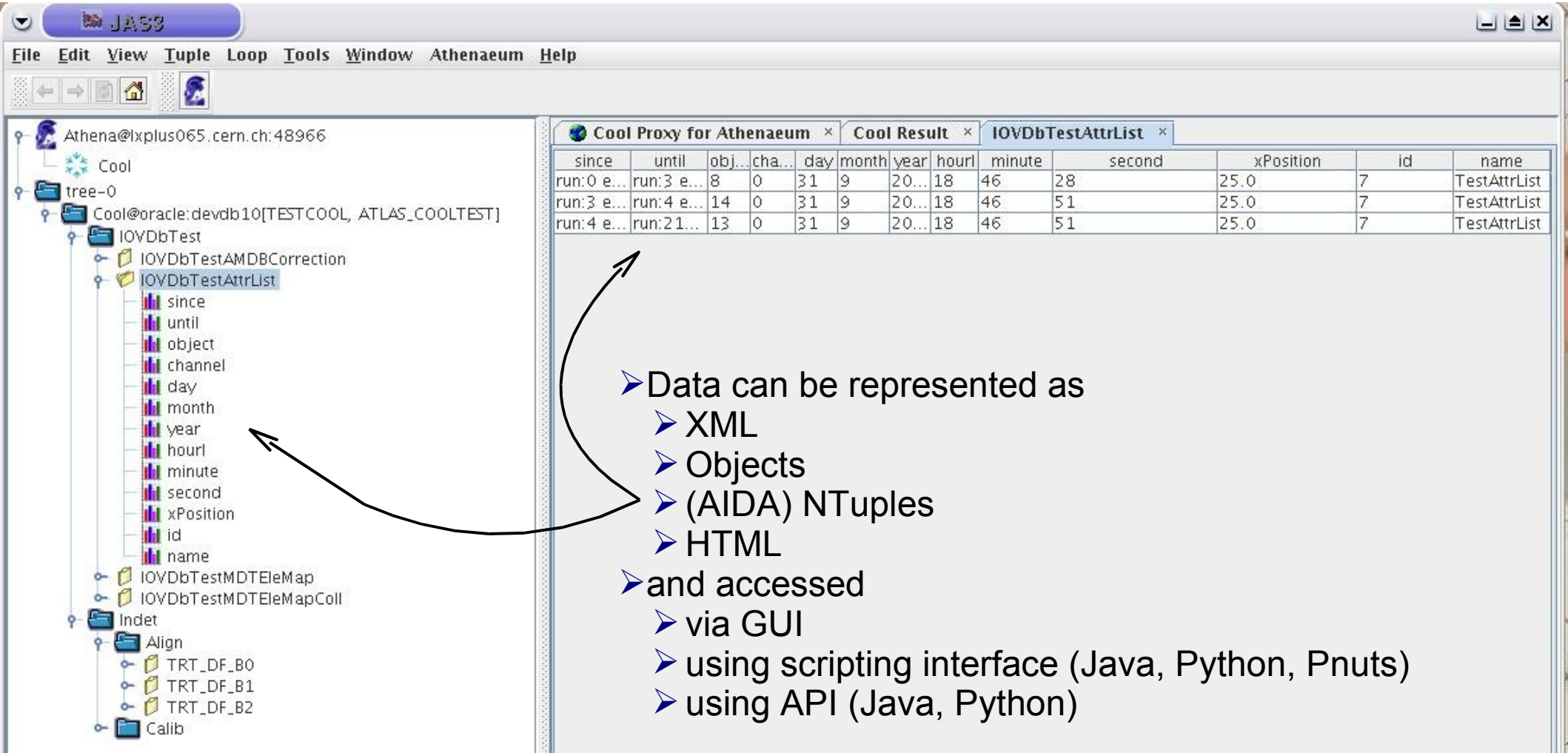
Athena/PyCool Server

Cool DB Server



- Open connection to Cool DB
- Interpret data (as AIDA NTuples)
- Show data as HTML
- Show data as XML
- Show Python script used to get data

Work with Cool



- Data can be represented as
  - XML
  - Objects
  - (AIDA) NTuples
  - HTML
- and accessed
  - via GUI
  - using scripting interface (Java, Python, Pnuts)
  - using API (Java, Python)

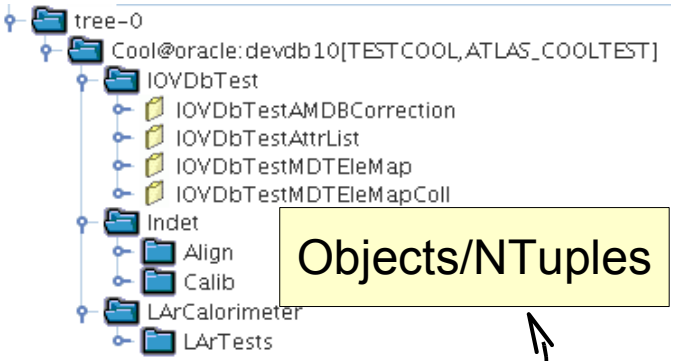
Cool XML

/IOVDbTest/IOVDbTestAttrList[1326]

Inserted:	24/10/2005 at 4:58:13
FOLDER_IOVTABLENAME:	TESTCOOL_F1326_IOVS
FOLDER_TAGTABLENAME:	TESTCOOL_F1326_TAGS
FOLDER_IOV2TAGTABLENAME:	TESTCOOL_F1326_IOV2TAG
Channels:	0,
TypeName:	AthenaAttributeList
TimeStamp:	run-event
Symlinks:	
ServiceType:	71
Clid:	40774348

period		object	channel	insert	xPosition [float]	id [int]	name [string]
run:0 event:0	run:3 event:3	8	0	24/10/2005 at 5:0:17	25.0	7	TestAttrList
run:3 event:3	run:4 event:3	14	0	24/10/2005 at 5:0:41	25.0	7	TestAttrList
run:4 event:3	run:2147483647 event:4294967295	13	0	24/10/2005 at 5:0:41	25.0	7	TestAttrList

HTML View



Objects/NTuples

Java

/IOVDbTest/IOVDbTestAttrListColl[1327]

Inserted:	24/10/2005 at 4:58:46
FOLDER_IOVTABLENAME:	TESTCOOL_F1327_IOVS
FOLDER_TAGTABLENAME:	TESTCOOL_F1327_TAGS
FOLDER_IOV2TAGTABLENAME:	TESTCOOL_F1327_IOV2TAG
Channels:	16, 26, 36, 46, 56,
TypeName:	CondAttrListCollection
TimeStamp:	run-event
Symlinks:	
ServiceType:	71
Clid:	1238547719

XSLT

```
<folder name='/IOVDbTest/IOVDbTestMDTEleMapColl'
        id='1331' day='24' month='10' year='2005' hour='5' minute='2' second='36' >
 <attributes>
  <attribute name='FOLDER_IOVTABLENAME' value='TESTCOOL_F1331_IOVS'/>
  <attribute name='FOLDER_TAGTABLENAME' value='TESTCOOL_F1331_TAGS'/>
  <attribute name='FOLDER_IOV2TAGTABLENAME' value='TESTCOOL_F1331_IOV2TAG'/>
  </attributes>
 <channels>
  <channel>0</channel>
  </channels>
 <description>
  <timeStamp>run-event</timeStamp>
  <addrHeader><address_header service_type="71" clid="155887251" /></addrHeader>
  <typeName>IOVDbTestMDTEleMapColl</typeName>
  </description>
 <signature>
  <item name='PoolRef' type=' string'/>
  </signature>
 <payload since='run:0 event:0' until='run:2147483647 event:4294967295'
          object='1' channel='0' day='24' month='10' year='2005' hour='5' minute='3' second='6' >
  <entry name='PoolRef' value='[...]'/>
  </payload>
 </folder>
```

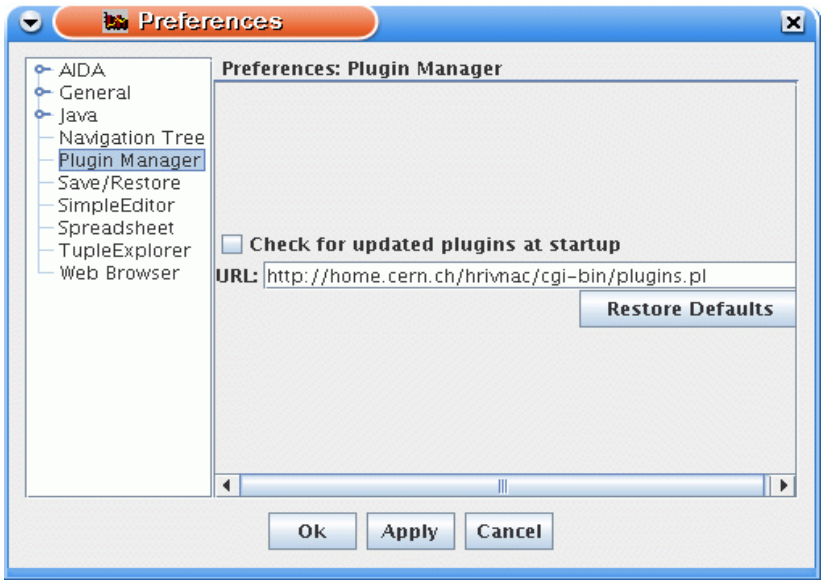
XML View

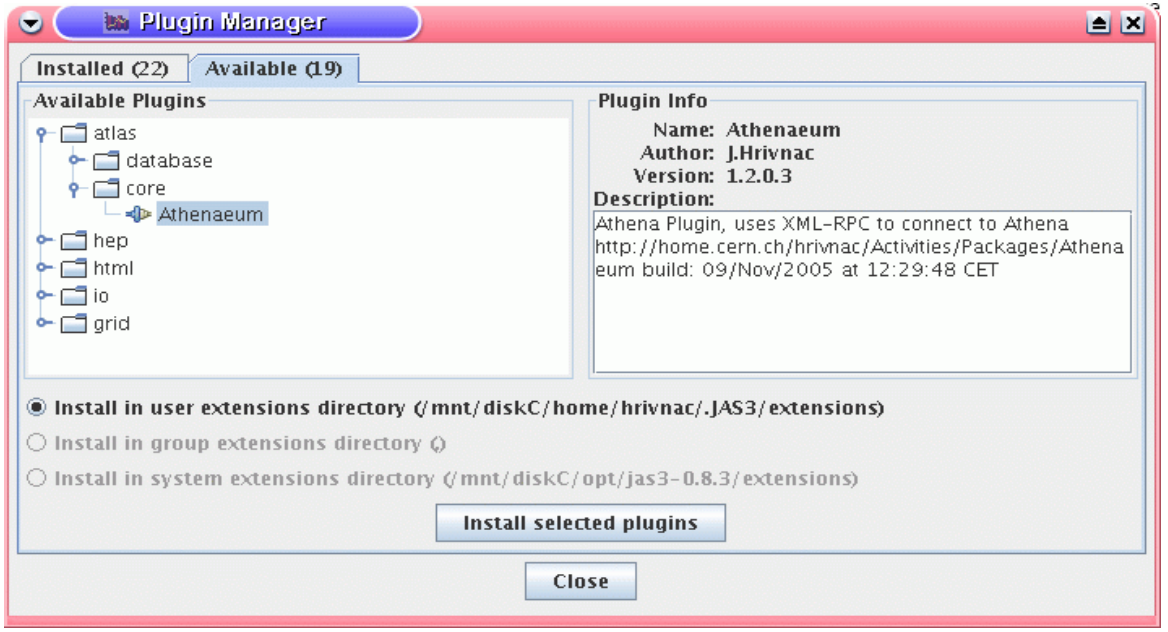
XML Schema

Python

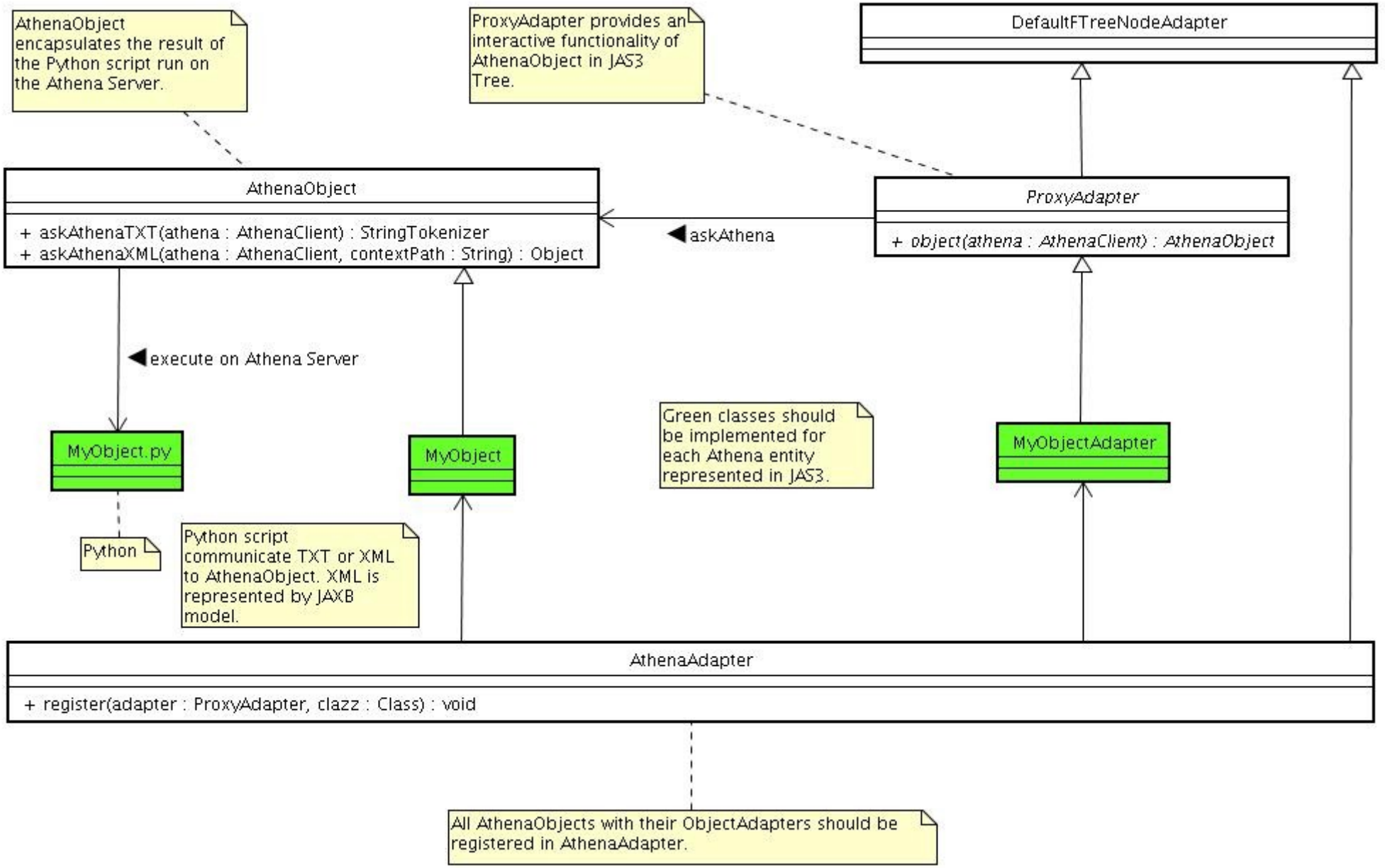
How To Start

- Within CERN AFS:
  - . /afs/cern.ch/sw/java/share/bin/setjdk sun 1.5.0_02
  - /afs/cern.ch/atlas/offline/external/JAS/jas3/jas3
- Elsewhere (any platform):
  - Get Java 1.5
  - Get JAS from http://jas.freehep.org/jas3 (Linux, MS, MacOSX,...)
  - Set Plugin Server (View - Preferences...)
  - Get Plugin (View – Plugin Manager...)

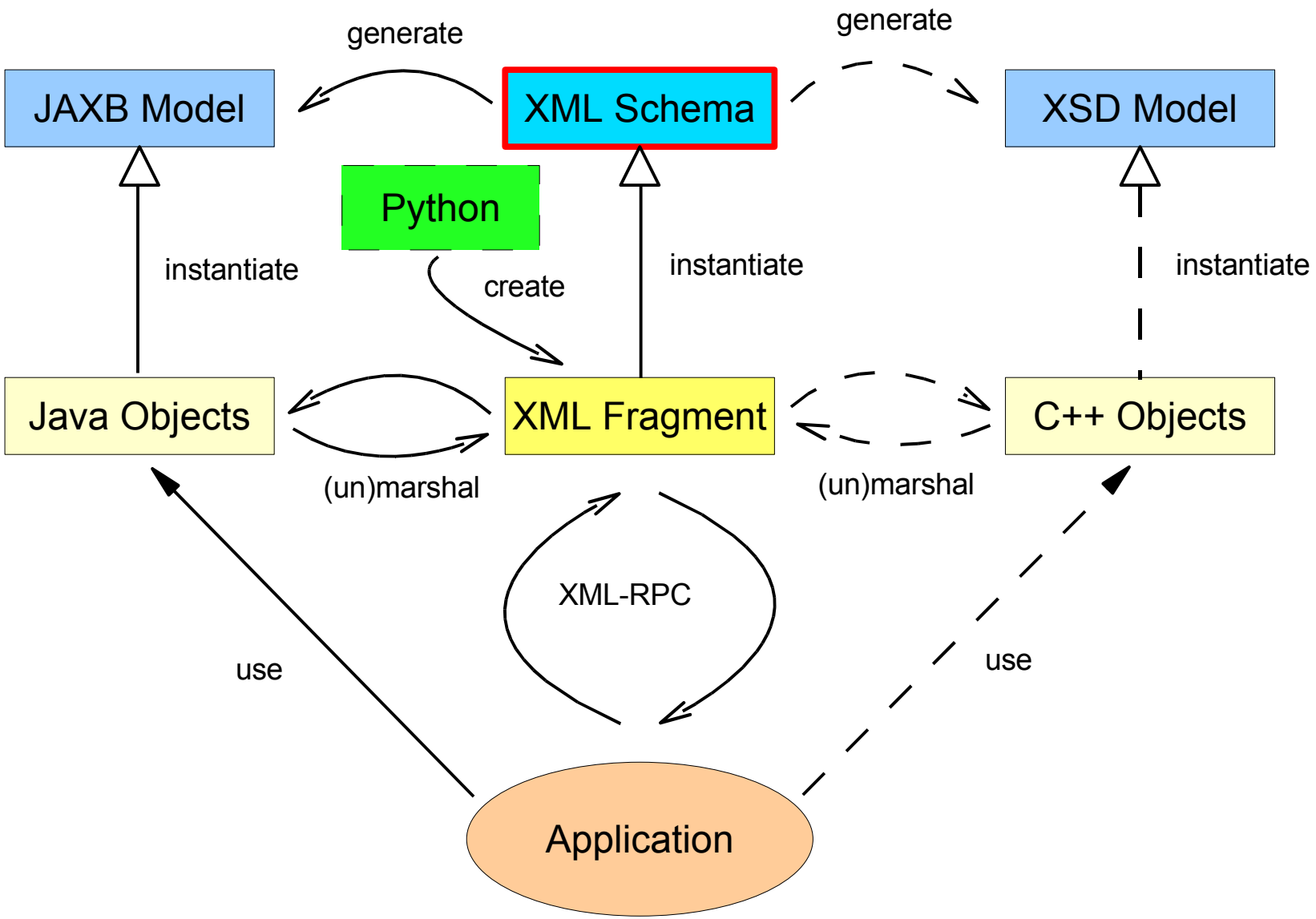




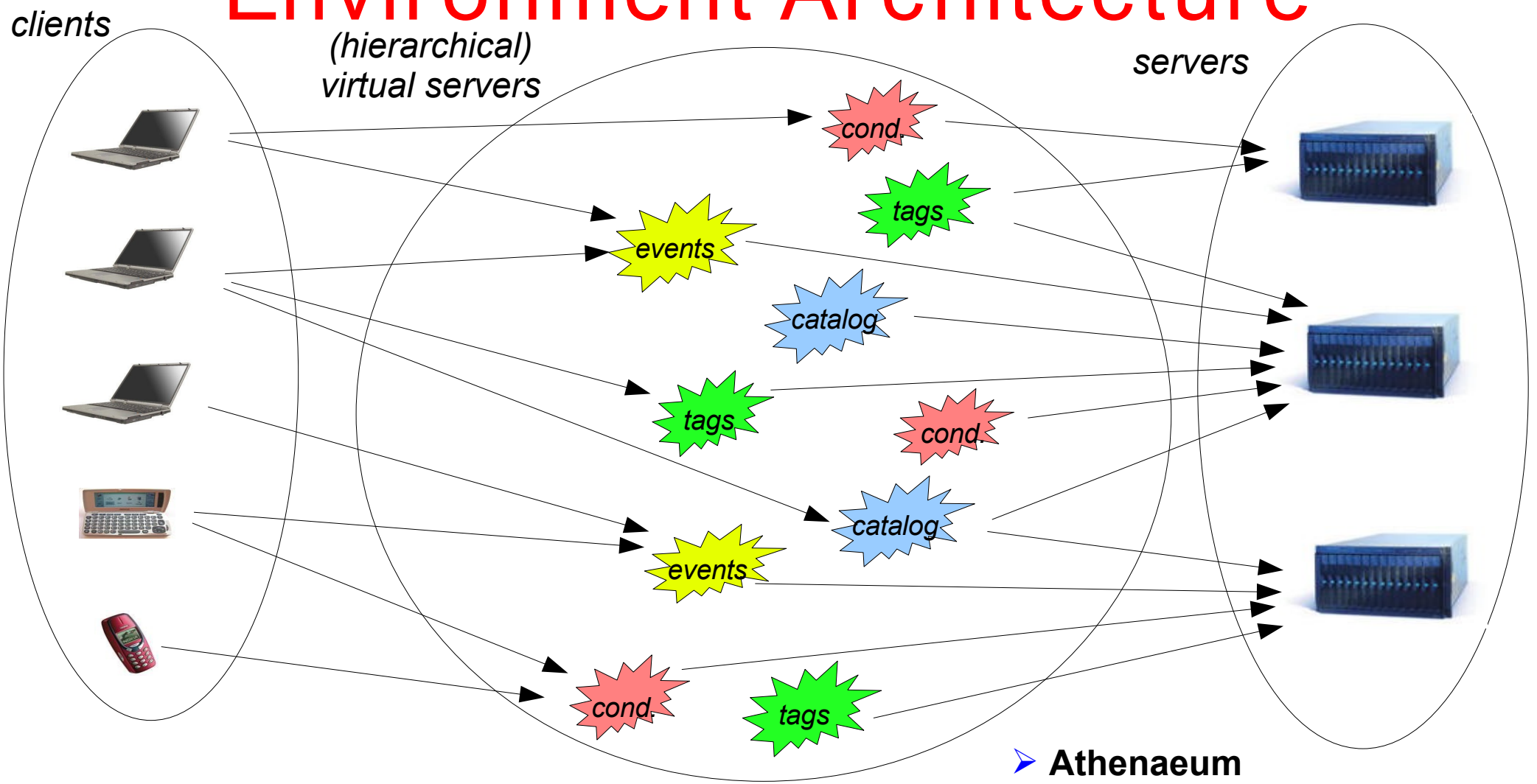
How To Write New Proxy



XML Schema Representations



Distributed Interactive Environment Architecture



- Only user code + access layer in clients
- Data access and standard processing in servers
- Orchestration and optimization in virtual servers
- Passed data described by common (XML) Schema

- **Athenaeum**
- SQLTuple/ColMan
- Sequoia
- *EJB*
- *(CMS) Clarens*

Architecture Advantages

- Light local client
  - Running on any platform, any release
  - Fully interactive GUI, scripting and API in several languages
  - Easily extensible by modular plugins
- Server on a powerful machine, close to data, replicated and hierarchised when useful
- Standard communication protocols
  - XML-RPC for the Control Flow and small data
  - Eventually performant protocols (JDBC, xrootd,...) for big data

Problems

- PyAthena (Python API to Athena)
  - **Incomplete** (only a subset of C++ API is available via Python)
  - **Undocumented** (C++ Doxygen is not enough for documentation of its Python API; it is not easy to guess the meaning of weakly-typed methods; code fragments on Web/Wiky are often out-of-date)
  - **Unstable** (too many things change too often)
- Data
  - **No abstract data definition** is available, the actual data model is hidden very deep in the C++ header files forest
    - Athenaeum **XSD Schema** has been written for data passed around; XML, Java, Python and C++ incarnations can be created from them

To Do Next

- Athenaeum
  - Lazy & Compressed data transport (to speed up)
  - Generic XML GUI
  - User-customizable XSLT
  - More Proxies (Analysis objects, Generic StoreGate access, ...)
  - Athena startable from Athenaeum (remotely)
  - Deployment of *Athena Servers*
  - Merge of the Server script changes back to Atlantis script
- Cool Browser
  - Interpretation of Tokens & AttributeLists
  - Query with Tags & Time Intervals
  - Merge XSD & XSLT with Shaun Roe
  - Better Graphics
  - Possibility to write/update Cool DB

Help

- http://home.cern.ch/hrivnac/Activities/Packages/Athenaeum
- https://uimon.cern.ch/twiki/bin/view/Atlas/HowToUseJAS
- JAS integrated Help (with executable examples)