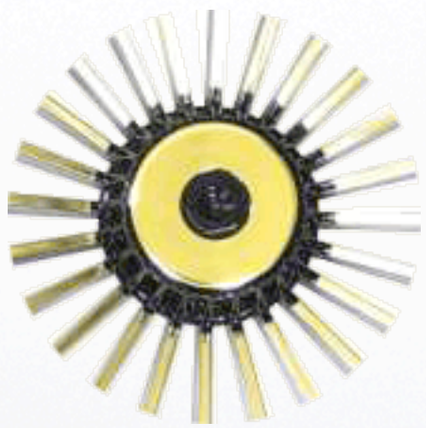
PLASTIC 0.5



PLASTIC 0.5

SAMP v1.0

?

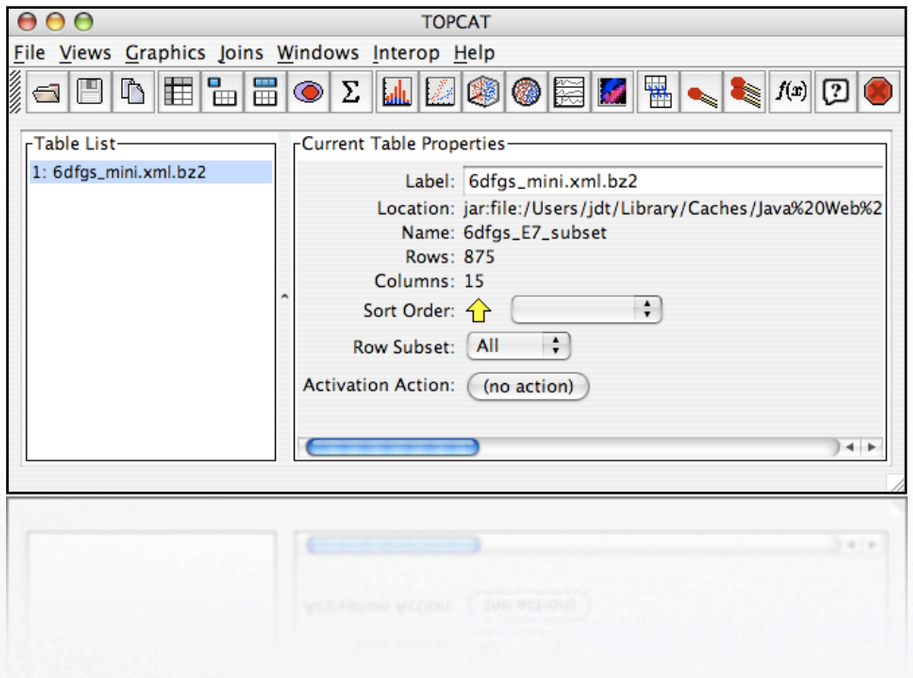
PLASTIC design goals

PLASTIC design goals

- Simplicity
- Easy for client developers - at the expense of infrastructure developers
- Pragmatism - go with what works most of the time

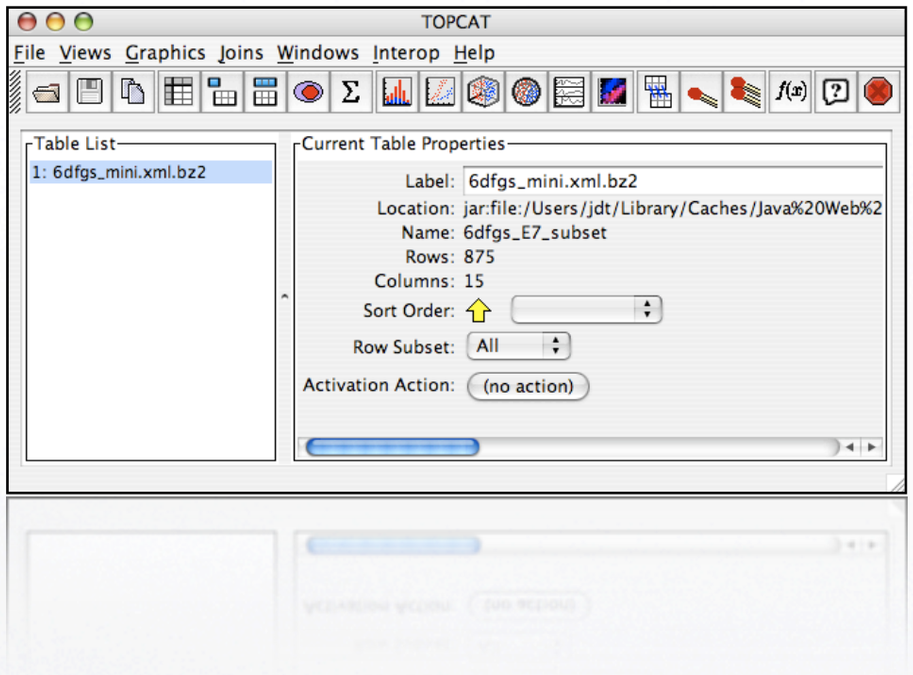
Overview of PLASTIC

Overview of PLASTIC



Client Application

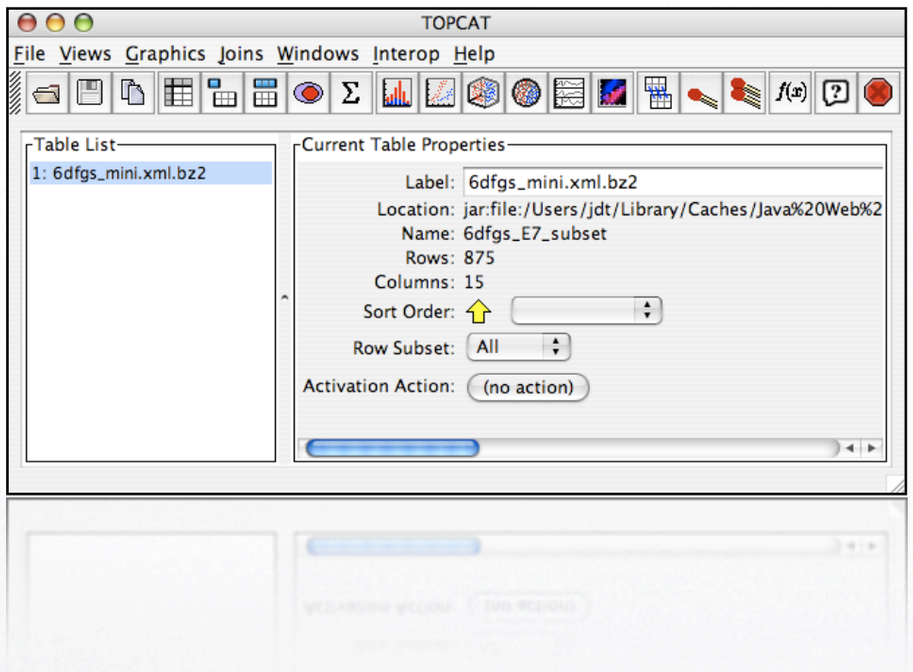
Overview of PLASTIC



Client Application

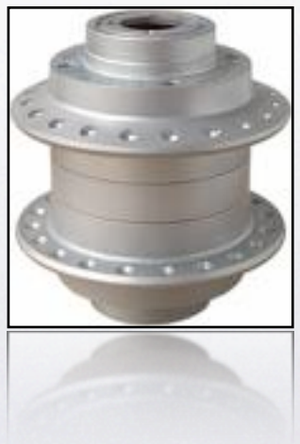
Hub

Overview of PLASTIC

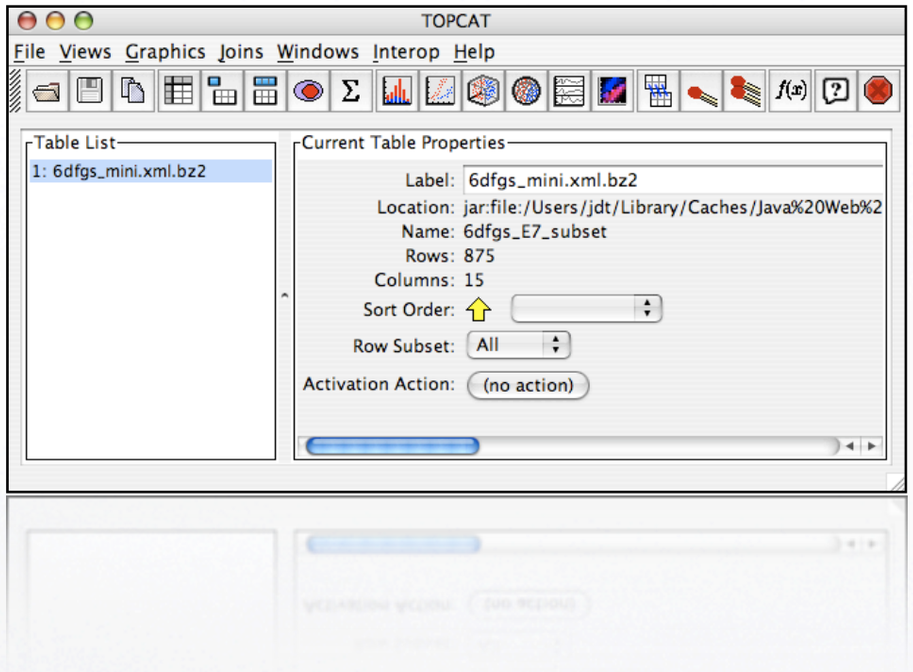


register

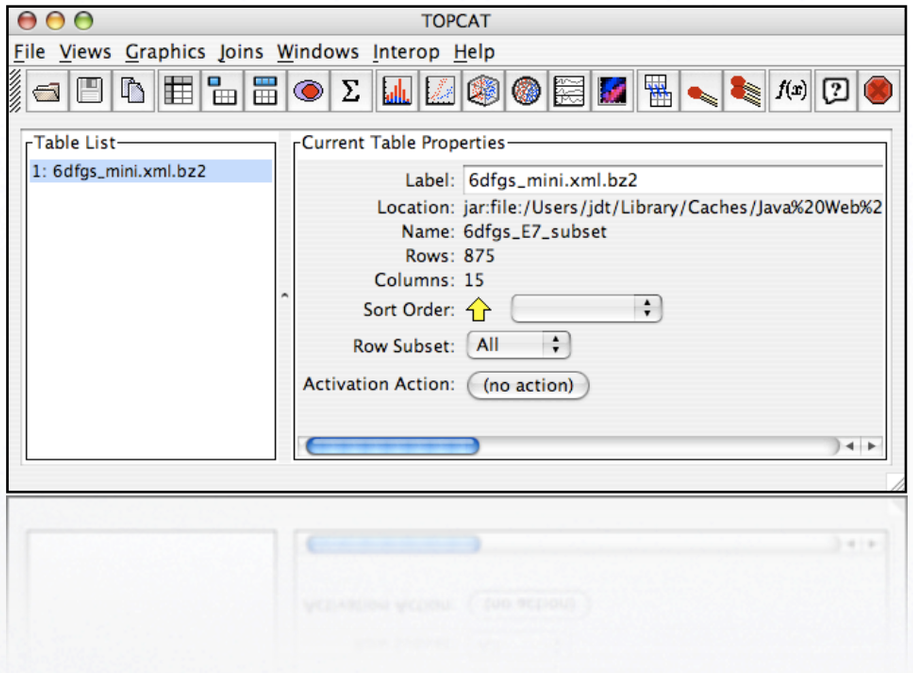
"My name is Topcat.
I understand messages:
foo, bar, donkey"

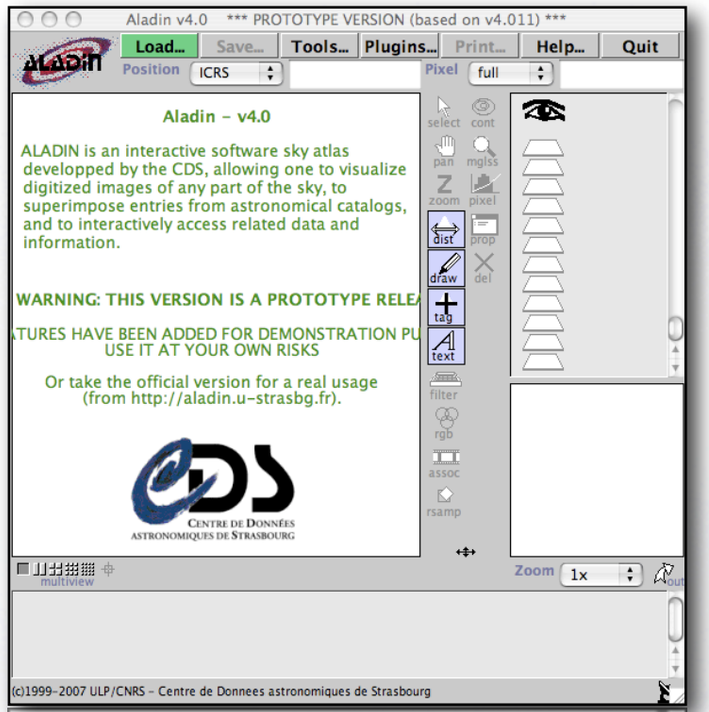


Overview of PLASTIC

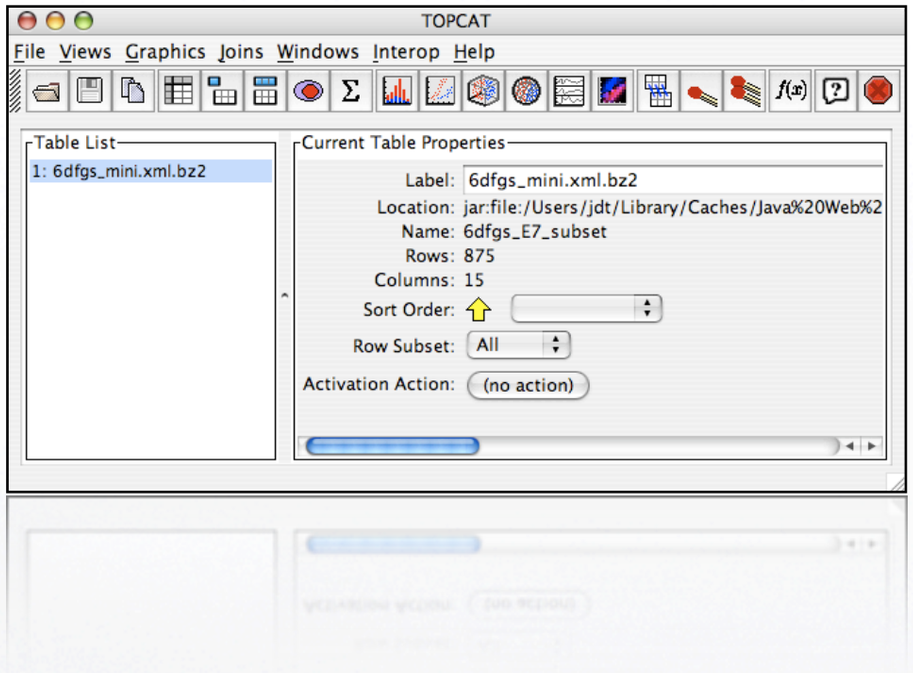


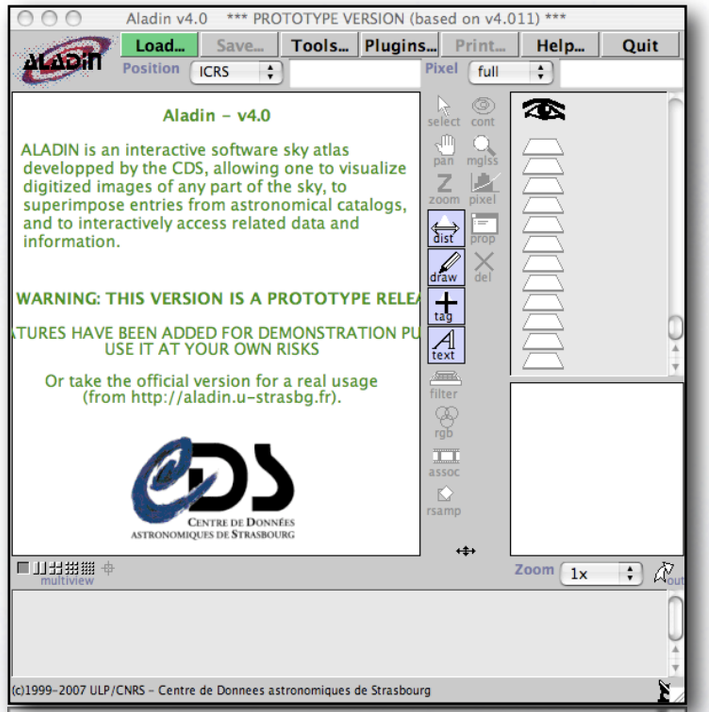
Overview of PLASTIC





Overview of PLASTIC



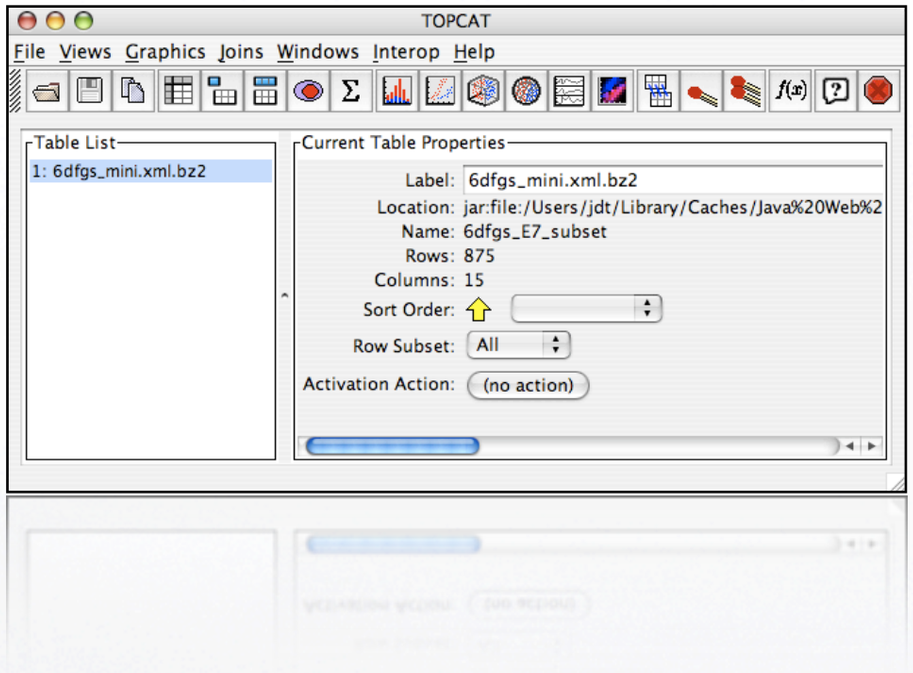


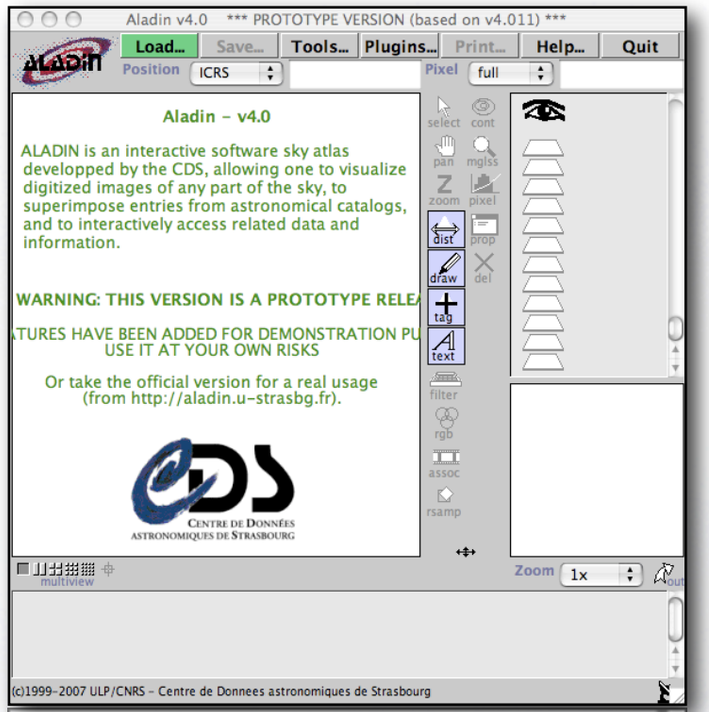
register

"an app has registered"

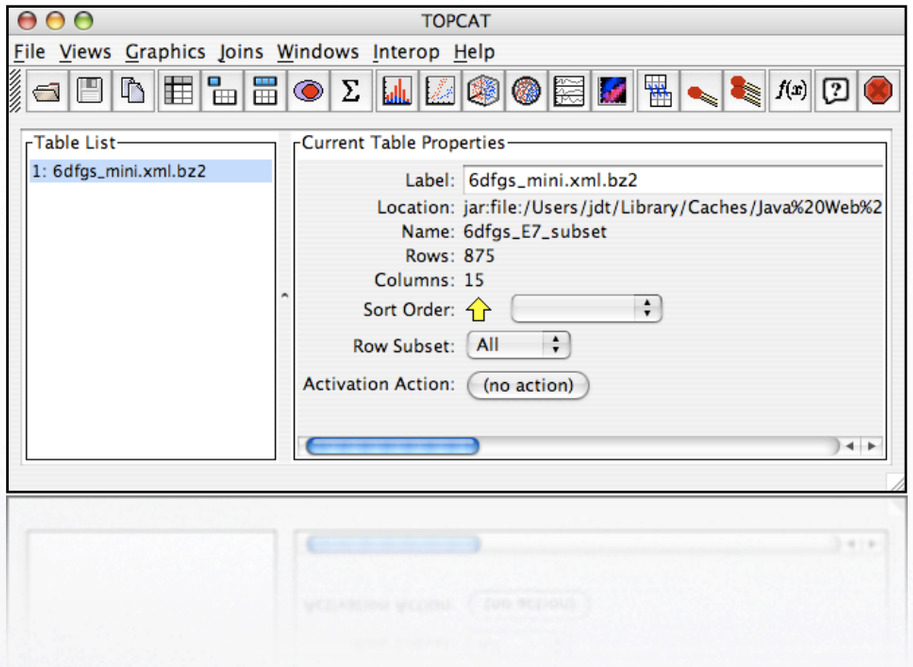
"My name is Aladin. I understand message 'load table'"

Overview of PLASTIC

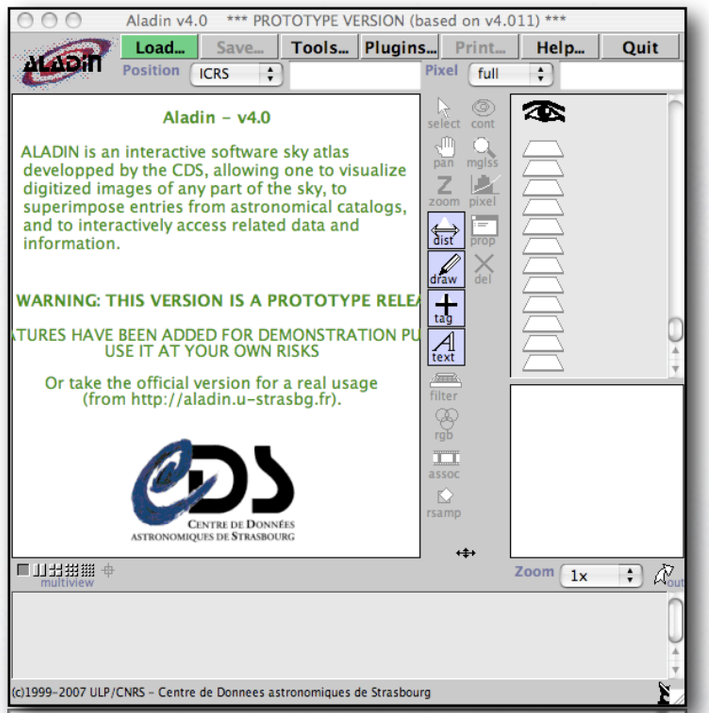




Overview of PLASTIC



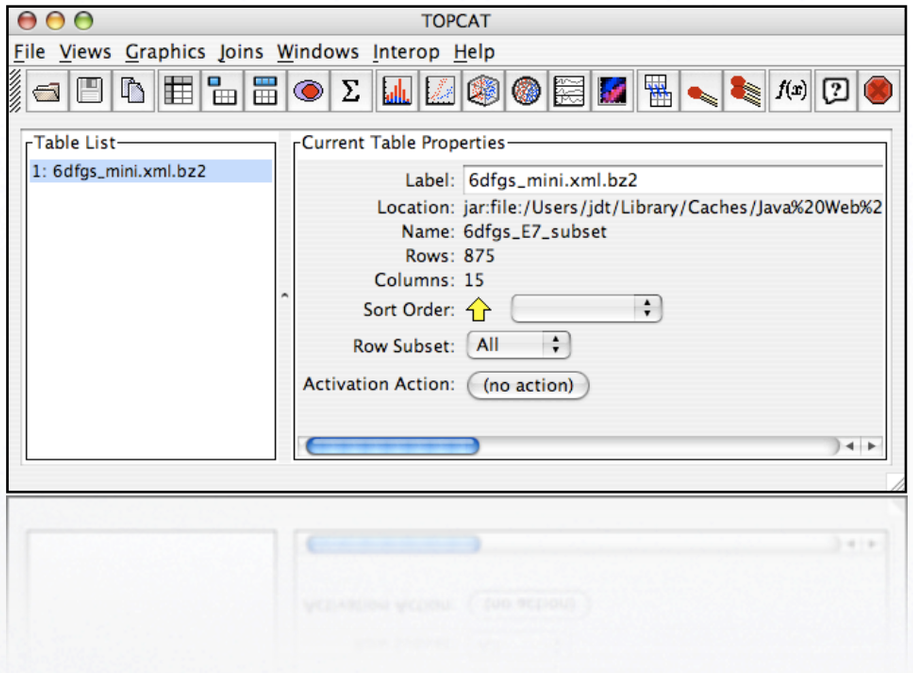
"load table"

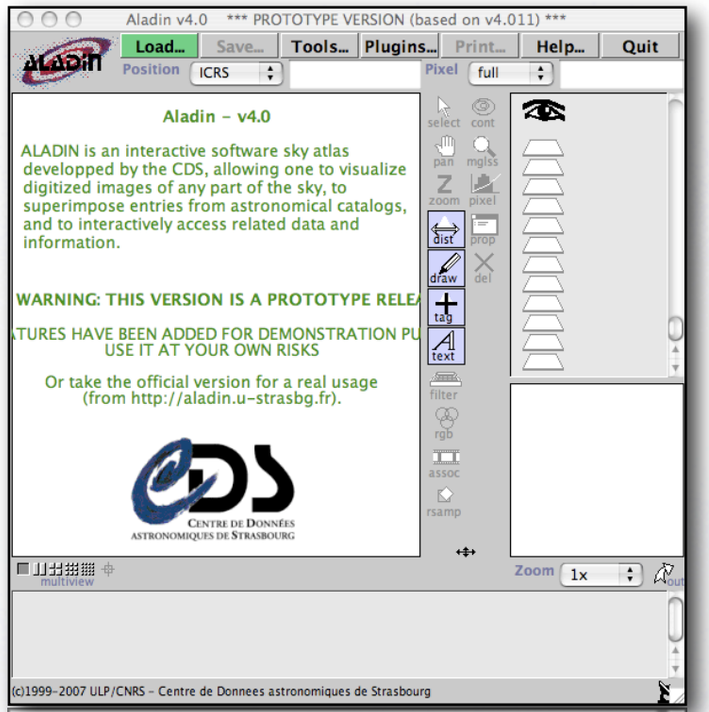


Overview of PLASTIC

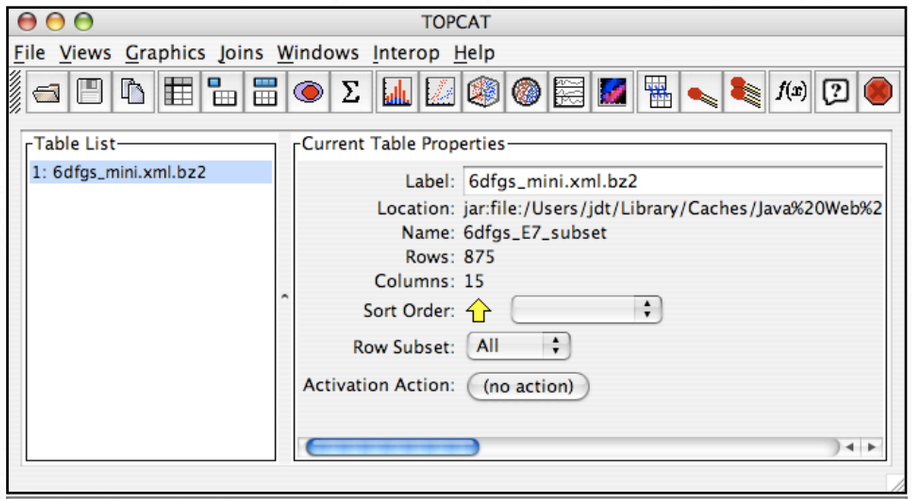
- Hub permits synchronous and "asynchronous" messaging
- Broadcast to all, or point to point
- Hub filters on message type

Overview of PLASTIC

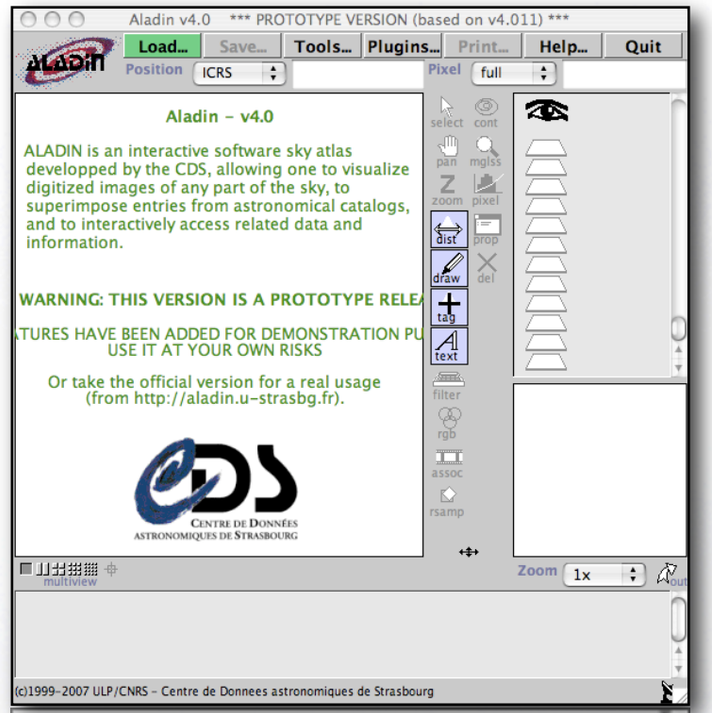




Overview of PLASTIC



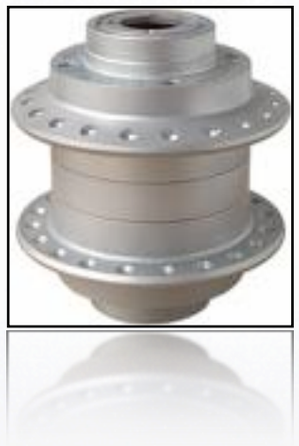
unregister



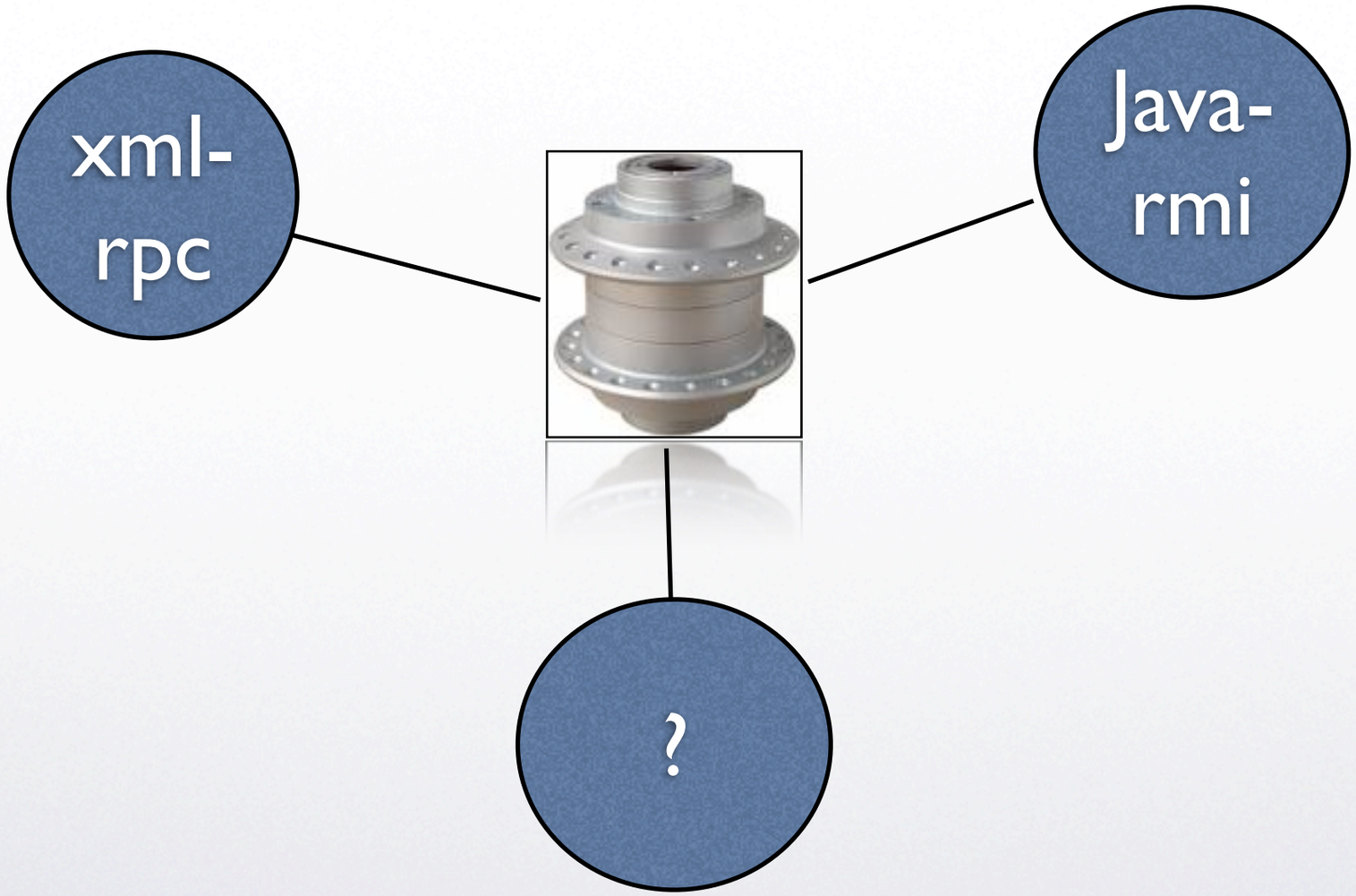
"Aladin has unregistered"

Transports:

Transports:



Transports:



What's a message?

What's a message?

- A Plain Old URI (typically an ivorn)
- A bunch of parameters

ivo://votech.org/votable/loadFromUrl
(id, url)

What's a message?

- A Plain Old URI (typically an ivorn)
- A bunch of parameters
- The URI is opaque and defines the syntax and the semantics (to a greater or lesser extent)
- Message types developed ad-hoc by devs

What's a message?

What's a message?

- Messages vary in type and specificity
  - Specific command: "show this area of sky"
  - General command: "here's a bunch of data points, do something"
  - Event: "The hub is about to shut down"
- No formal taxonomy

PLASTIC=>SAMP

PLASTIC=>SAMP

http://www.ivoa.net/twiki/bin/view/IVOA/PlasticOnePointOh

12 changes

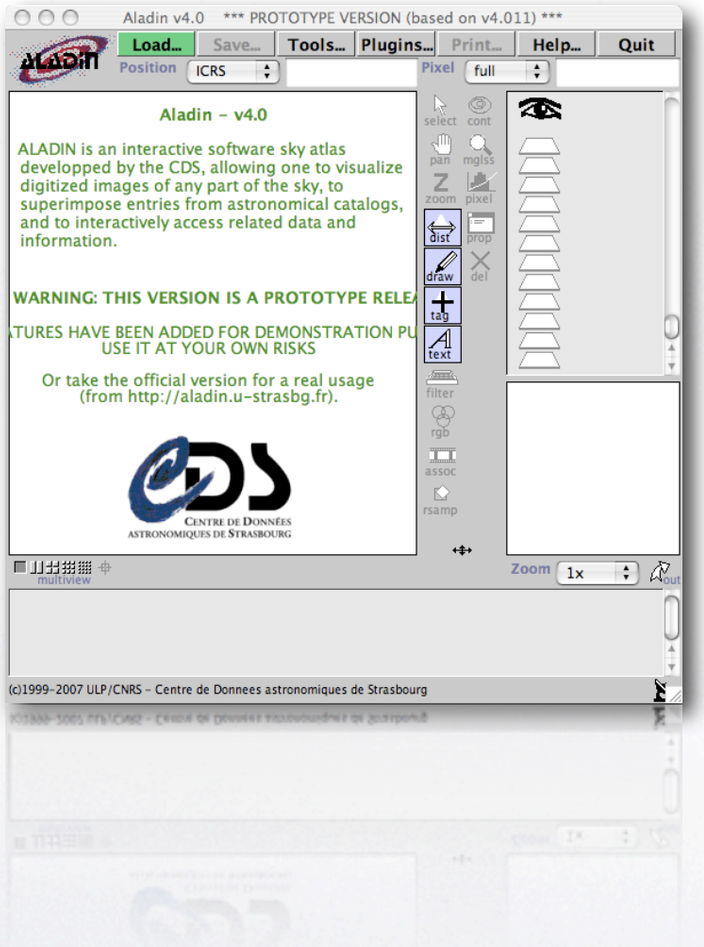
“API” & infrastructure

Refactor “API”

Refactor "API"

- Necessary for the other changes
- Specifically:
  - Separate the registration and metadata declaration phases

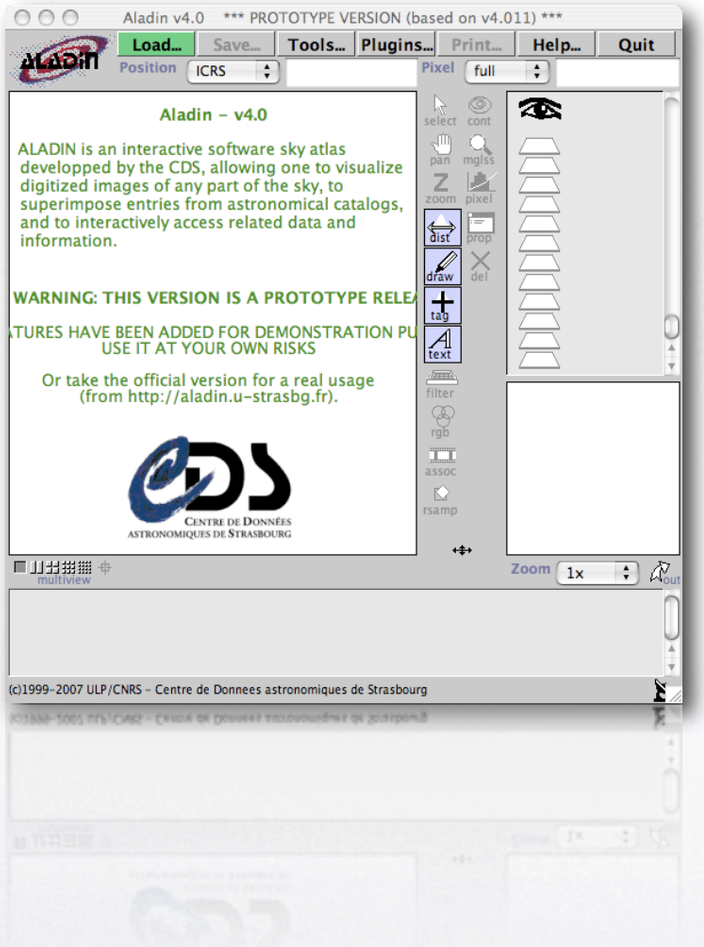
App


Aladin v4.0 *** PROTOTYPE VERSION (based on v4.011) ***
Load...
Save...
Tools...
Plugins...
Print...
Help...
Quit
Position
ICRS
Pixel
full
Aladin - v4.0
ALADIN is an interactive software sky atlas developped by the CDS, allowing one to visualize digitized images of any part of the sky, to superimpose entries from astronomical catalogs, and to interactively access related data and information.
WARNING: THIS VERSION IS A PROTOTYPE RELEA
TURES HAVE BEEN ADDED FOR DEMONSTRATION PU
USE IT AT YOUR OWN RISKS
Or take the official version for a real usage
(from http://aladin.u-strasbg.fr).
CENTRE DE DONNÉES ASTRONOMIQUES DE STRASBOURG
select
cont
pan
mgiss
zoom
pixel
dist
prop
draw
del
tag
text
filter
rgb
assoc
rsamp
multiview
Zoom
1x
out
(c)1999-2007 ULP/CNRS - Centre de Donnees astronomiques de Strasbourg

Now:

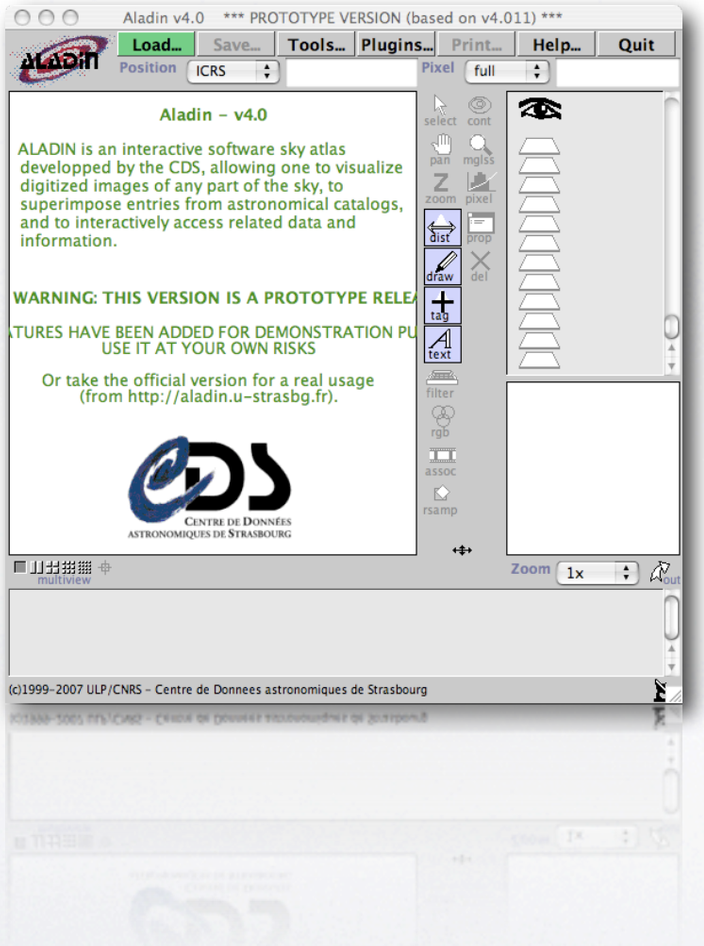
Hub

Now:



register(name, messages)

Now:

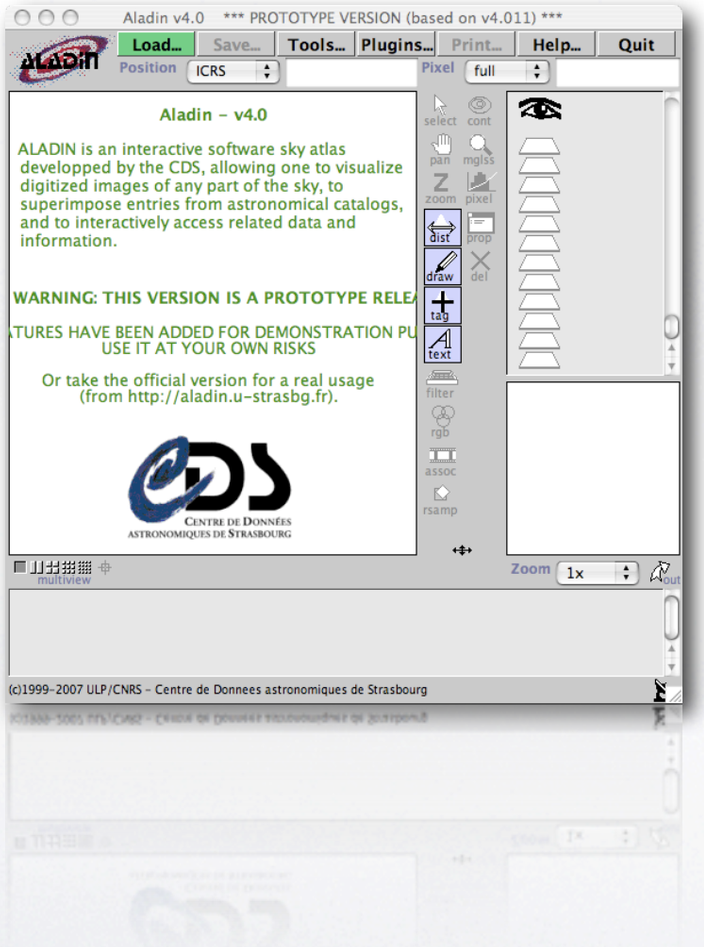


register(name, messages)

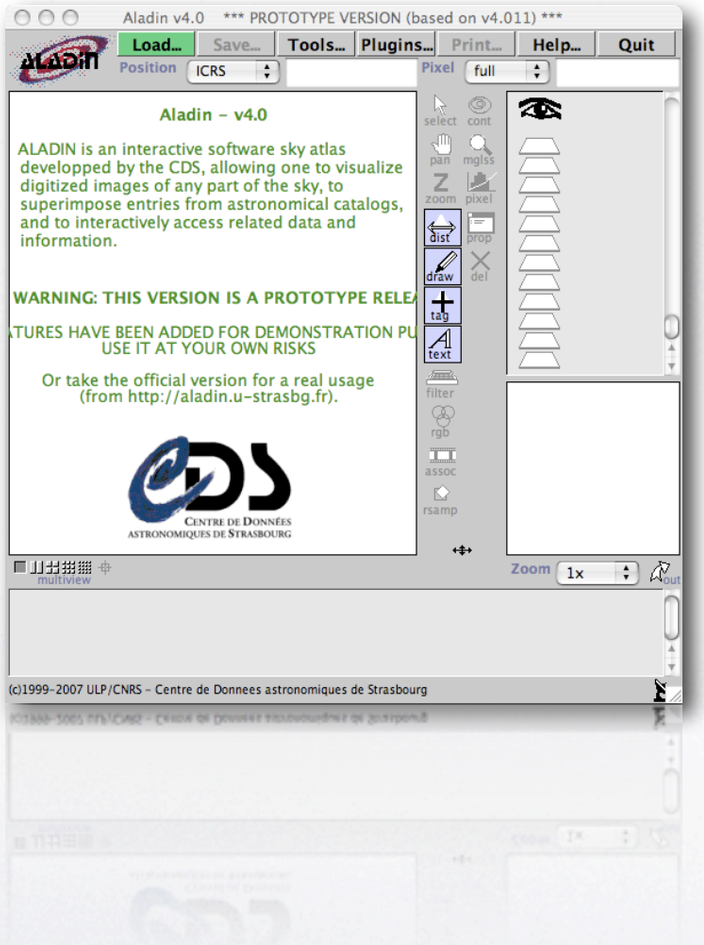
id

“app registered”

Proposal:


Aladin v4.0 *** PROTOTYPE VERSION (based on v4.011) ***
Load...
Save...
Tools...
Plugins...
Print...
Help...
Quit
Position
ICRS
Pixel
full
Aladin - v4.0
ALADIN is an interactive software sky atlas developped by the CDS, allowing one to visualize digitized images of any part of the sky, to superimpose entries from astronomical catalogs, and to interactively access related data and information.
WARNING: THIS VERSION IS A PROTOTYPE RELEA
TURES HAVE BEEN ADDED FOR DEMONSTRATION PU
USE IT AT YOUR OWN RISKS
Or take the official version for a real usage
(from http://aladin.u-strasbg.fr).
CENTRE DE DONNÉES ASTRONOMIQUES DE STRASBOURG
select
cont
pan
mgiss
zoom
pixel
dist
prop
draw
del
tag
text
filter
rgb
assoc
rsamp
multiview
Zoom
1x
out
(c)1999-2007 ULP/CNRS - Centre de Donnees astronomiques de Strasbourg

Proposal:

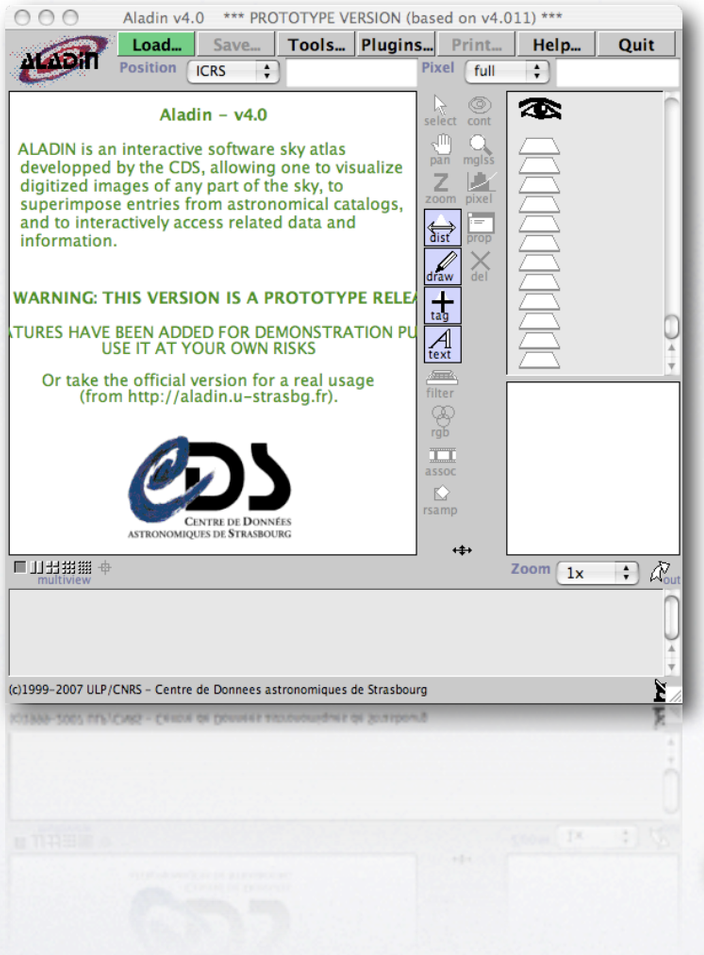


register()

id

"app registered"

Proposal:



register()

id

declareMetaData(name etc)

“metadata changed”

Refactor API

Refactor API

- Pros
  - Allows metadata to change
  - Conceptually “cleaner”
- Cons
  - Makes registration two step

Generalise Metadata

Currently:

Currently:

- Register with:
  - Name topcat
  - Supported Messages ivo://votech.org/...

Currently:

- Register with:
  - Name topcat
  - Supported Messages ivo://votech.org/...
- Respond via messages for
  - name, description, logo, ivorn

ivo://votech.org/info/getIconURL 

Current system

Current system

- Pros:
  - Extendable via new messages
- Cons:
  - Split of registration/message metadata
  - Inefficient
  - Can’t be supplied by “unmessagable” apps

Proposal

Proposal

- Declare all metadata post-registration, store in Hub

```
ivoa.name=Topcat
ivoa.description=TOol for Processing...
ivoa.logoUrl=http://..../tc3.gif
```

Proposal

- Declare all metadata post-registration, store in Hub
- Metadata can be updated at will
- IVOA-defined keys for "common" metadata, but extendable ad-hoc

ivoa.name=Topcat
ivoa.description=*TOol for Processing...*
ivoa.logoUrl=http://..../tc3.gif
ivoa.logo16X16Url=http://...../smaller.gif

Proposal

- Declare all metadata post-registration, store in Hub
- Metadata can be updated at will
- IVOA-defined keys for "common" metadata, but extendable ad-hoc

```
ivoa.name=Topcat
ivoa.description=TOol for Processing...
iraf.worker=true
```

Proposal

- Declare all metadata post-registration, store in Hub
- Metadata can be updated at will
- IVOA-defined keys for “common” metadata, but extendable ad-hoc
- All metadata optional (clients must fall back gracefully).

Generalise metadata

- Include supported message type metadata, or declare separately?

```
ivoa.name=My App
ivoa.mtypes=foo, bar, donkey
```

Message IDs (new)

Message IDs (new)

- The hub will assign a session-unique ID to each “request” message
- The ID will be reused by “reply” messages
- Essential to pair up requests and responses under asynchronous mode (cf JSON-RPC)

Bootstrap method

Bootstrap method

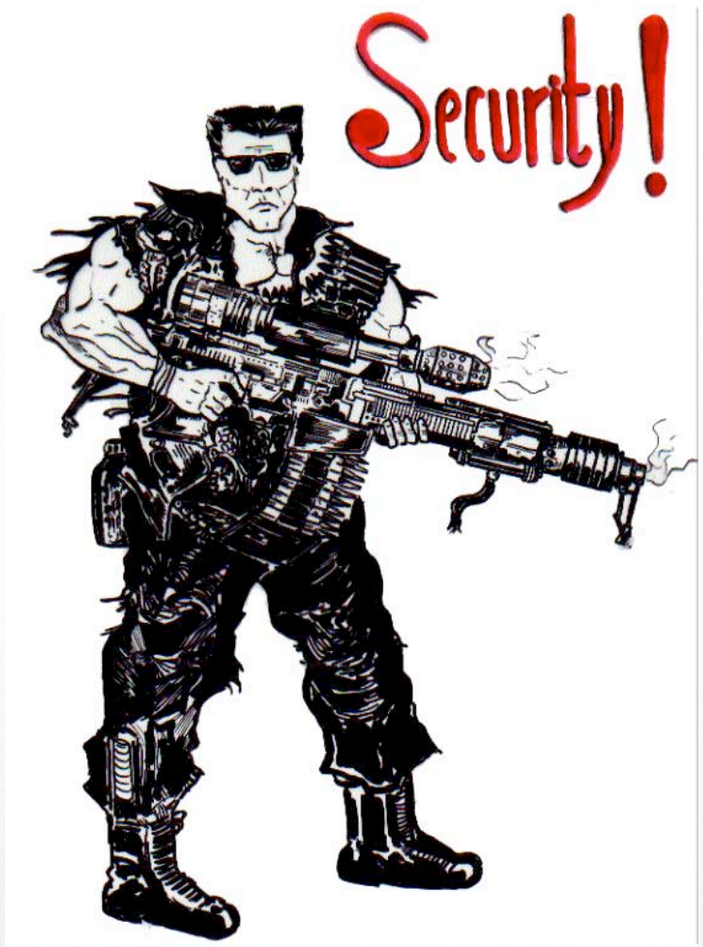
- Now:
  - Read a file in a “well-known” location

```
#PLASTIC server uk.ac.starlink.plastic.ServerSet
#Sun May 13 23:35:52 BST 2007
plastic.xmlrpc.url=http\://john-taylors-computer.local\:2112/
uk.ac.starlink.plastic.servid=uk.ac.starlink.plastic.ServerSet@7a6686
plastic.version=0.4
plastic.rmi.port=1099
```

Bootstrap method

- Now:
  - Read a file in a “well-known” location
- Pros:
  - Simple, widely accessible
- Cons:
  - Inelegant, unreliable?

Security



Security

- Proposal is to add a basic level of security without complicating the protocol
- Currently vulnerable to:
  - Port scans
  - App spoofing

Now:

Now:

Now:

port scan

Now:

sendMessage(gaia_id,“exec”,“rm -r *”)

Risk reduced by using a firewall, but still vulnerable on multiuser machines

Now:

sendMessage(gaia_id,“exec”,“rm -r *”)

Risk reduced by using a firewall, but still vulnerable on multiuser machines

Now:

unregister(aladin_id)

sendMessage(gaia_id,“exec”,“rm -r *”)

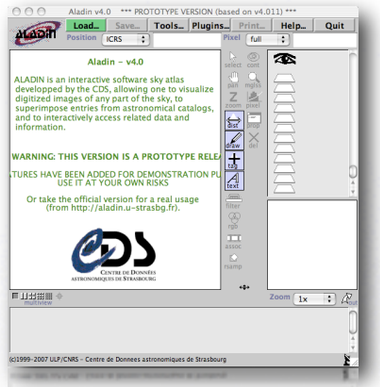
Risk reduced by using a firewall, but still vulnerable on multiuser machines

Proposal:

Proposal:

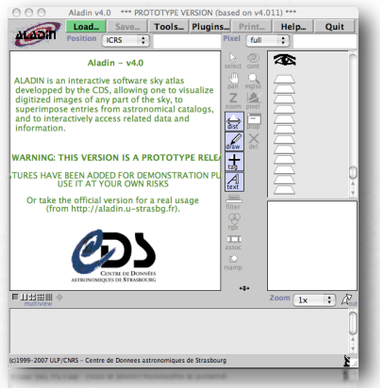

Aladin v4.0 *** PROTOTYPE VERSION (based on v4.011) ***
Load...
Save...
Tools...
Plugins...
Print...
Help...
Quit
Position
ICRS
Pixel
full
Aladin – v4.0
ALADIN is an interactive software sky atlas developped by the CDS, allowing one to visualize digitized images of any part of the sky, to superimpose entries from astronomical catalogs, and to interactively access related data and information.
WARNING: THIS VERSION IS A PROTOTYPE RELEA
TURES HAVE BEEN ADDED FOR DEMONSTRATION PU
USE IT AT YOUR OWN RISKS
Or take the official version for a real usage
(from http://aladin.u-strasbg.fr).
Zoom
1x
©1999-2007 ULP/CNRS - Centre de Donnees astronomiques de Strasbourg

Proposal:



register()

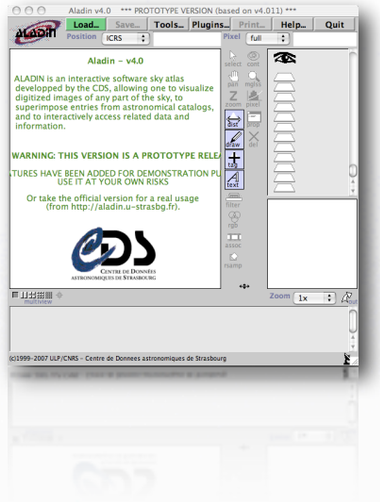
Proposal:



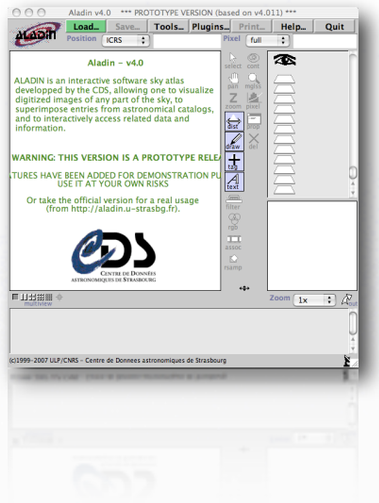
~~register()~~

register(secret)

Proposal:


Aladin v4.0 *** PROTOTYPE VERSION (based on v4.011) ***
Load...
Save...
Tools...
Plugins...
Print...
Help...
Quit
Position
ICRS
Pixel
full
Aladin – v4.0
ALADIN is an interactive software sky atlas developped by the CDS, allowing one to visualize digitized images of any part of the sky, to superimpose entries from astronomical catalogs, and to interactively access related data and information.
WARNING: THIS VERSION IS A PROTOTYPE RELEA
TURES HAVE BEEN ADDED FOR DEMONSTRATION PU
USE IT AT YOUR OWN RISKS
Or take the official version for a real usage
(from http://aladin.u-strasbg.fr).
Zoom
1x
©1999-2007 ULP/CNRS - Centre de Donnees astronomiques de Strasbourg

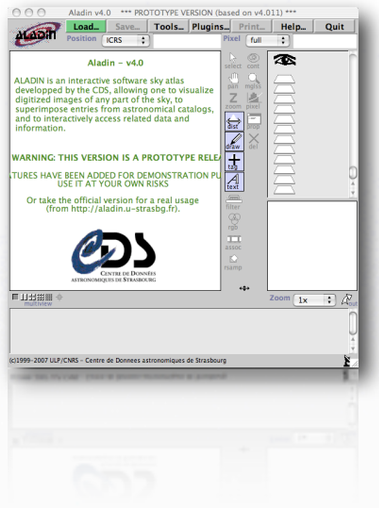
Proposal:



id

sendMessage(sender_id, destination_id,...)

Proposal:

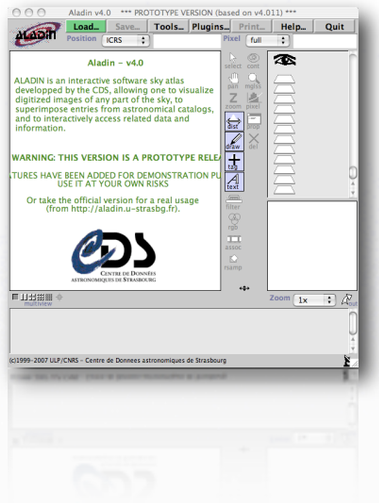


private
id

aladin: public_id

sendMessage(sender_id, destination_id,...)

Proposal:



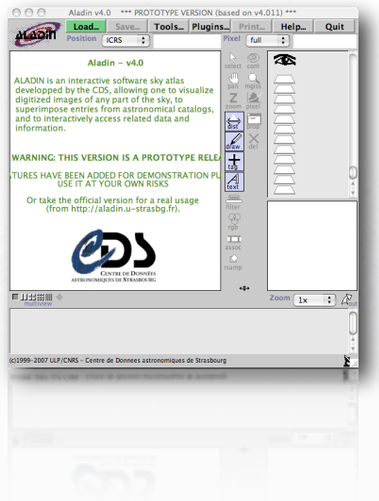
private
id

aladin: public_id

~~sendMessage(sender_id, destination_id,...)~~

sendMessage(sender_priv_id, destination_pub_id,...)

Proposal:



private
id

aladin: public_id

~~sendMessage(sender_id, destination_id,...)~~

sendMessage(sender_priv_id, destination_pub_id,...)

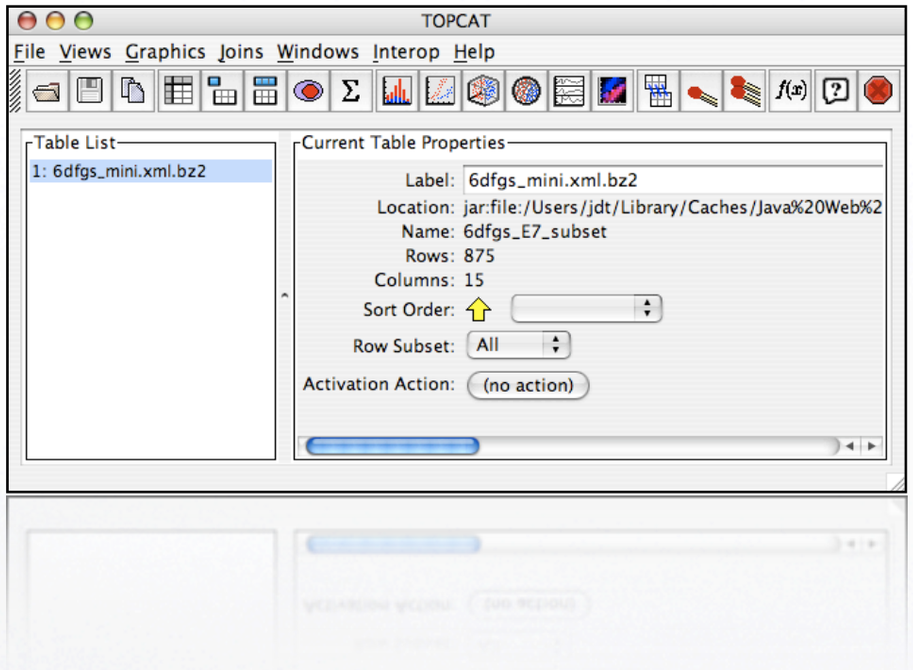
Security

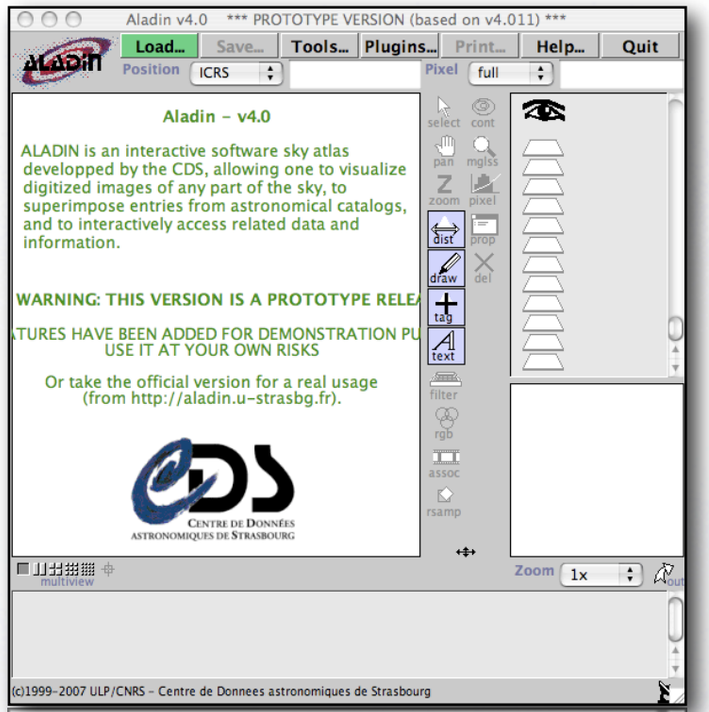
Security

- Do we allow anonymous access?

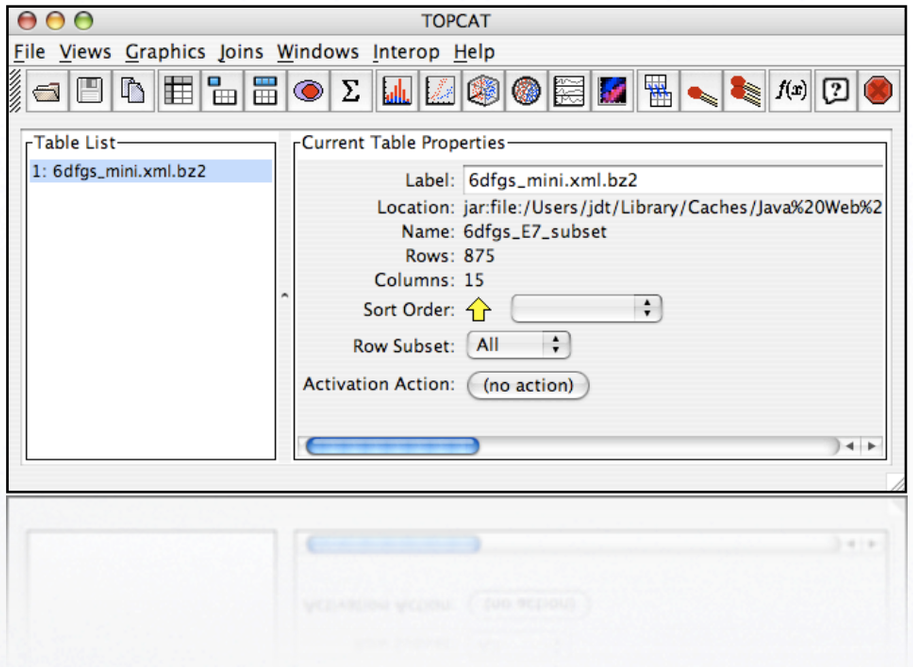
Synch vs Asynch

Synch vs Asynch

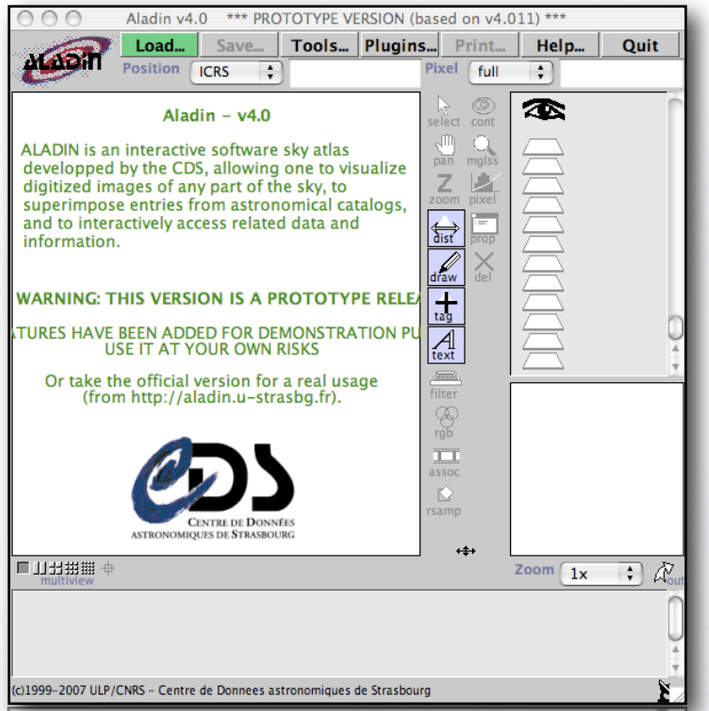




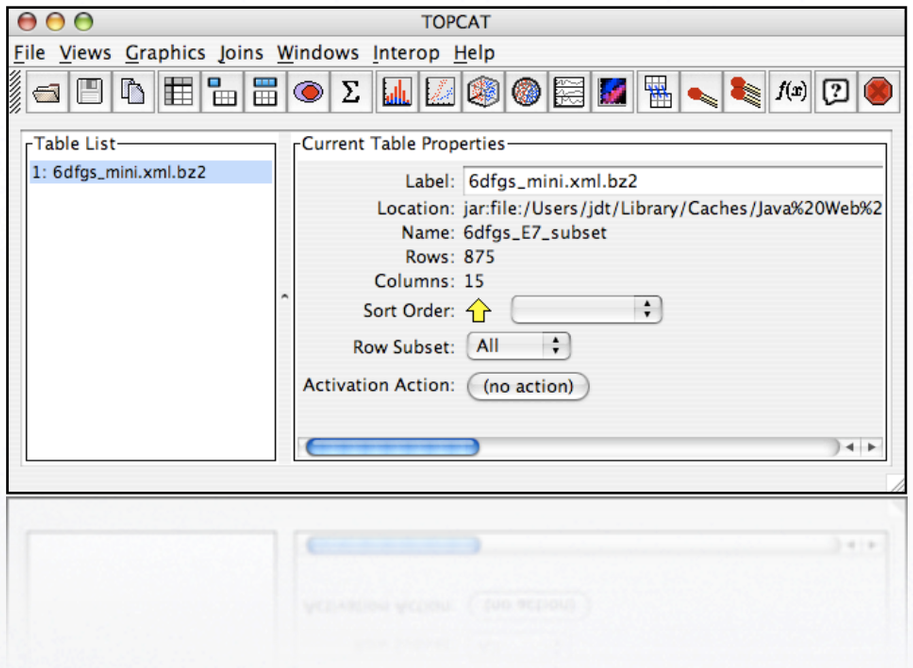
Currently:



Synch

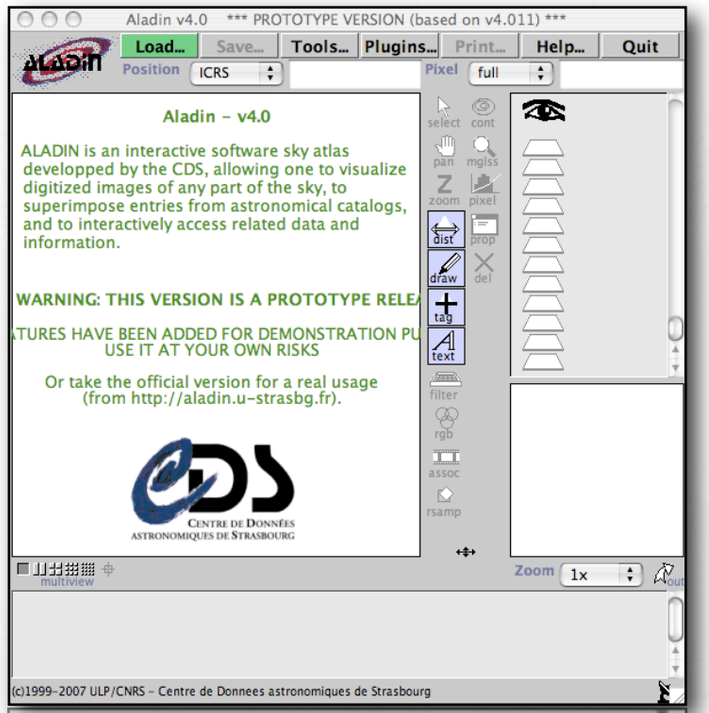


Currently:

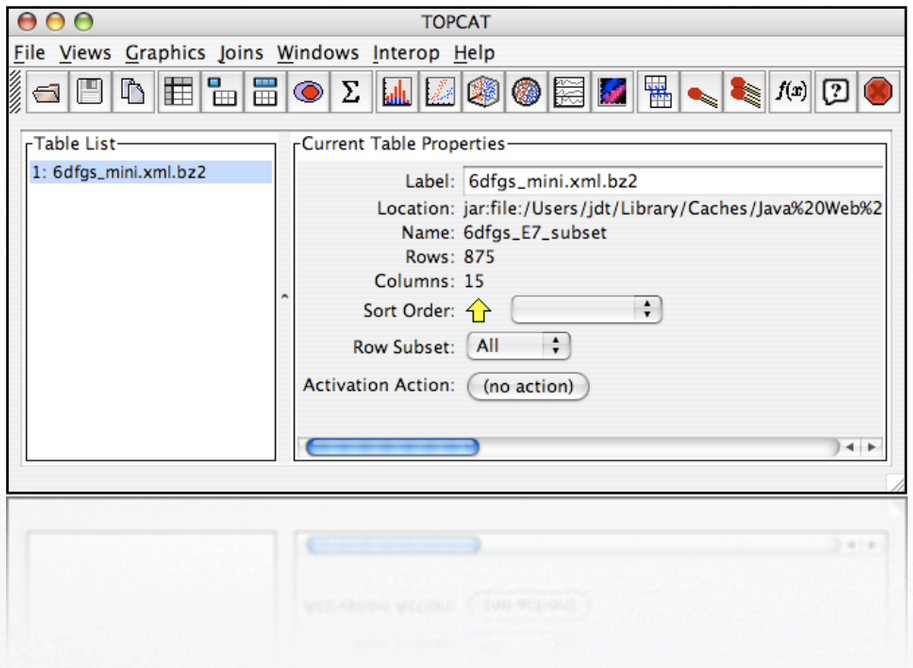


Synch

request

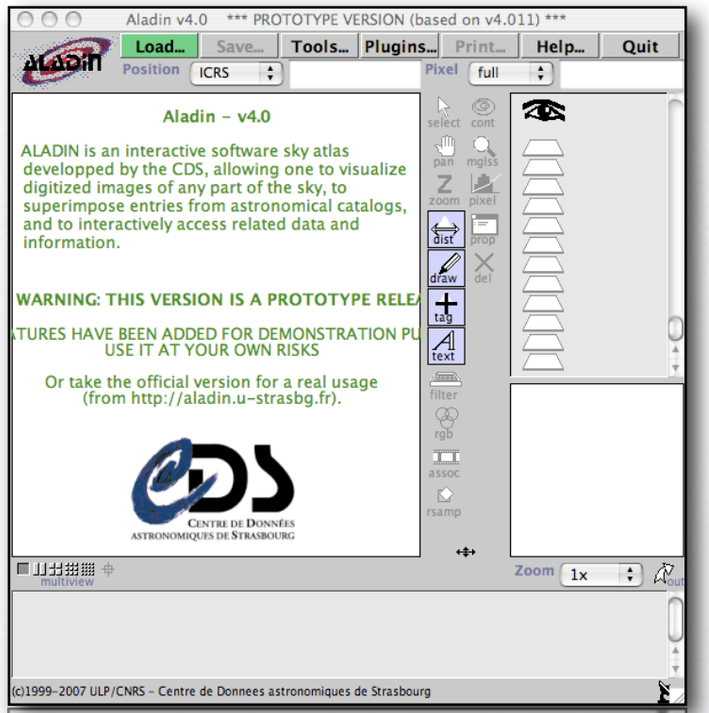


Currently:

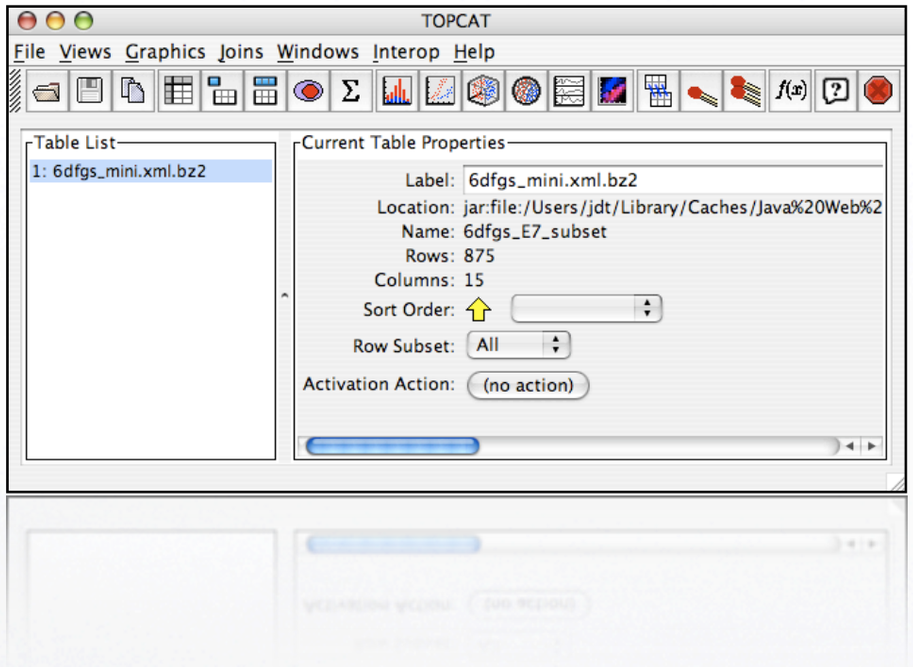


Synch

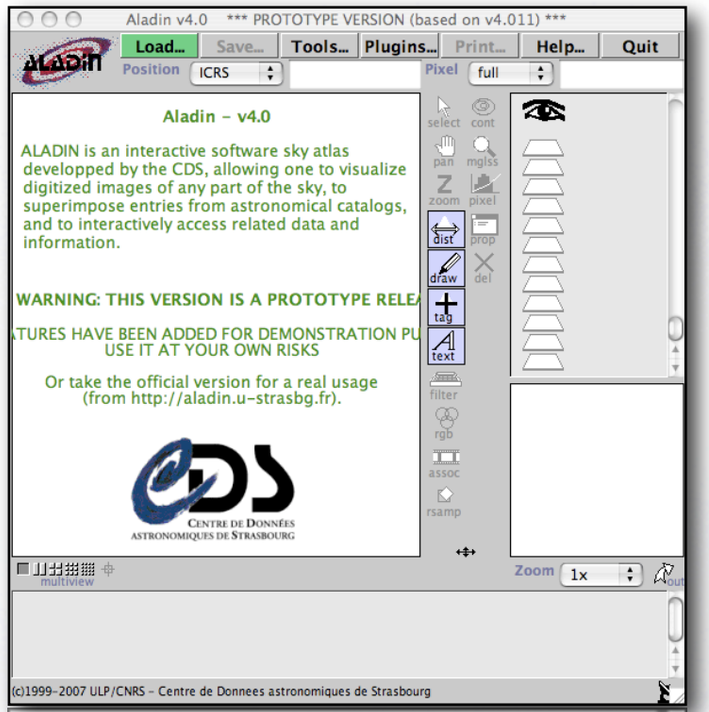
response



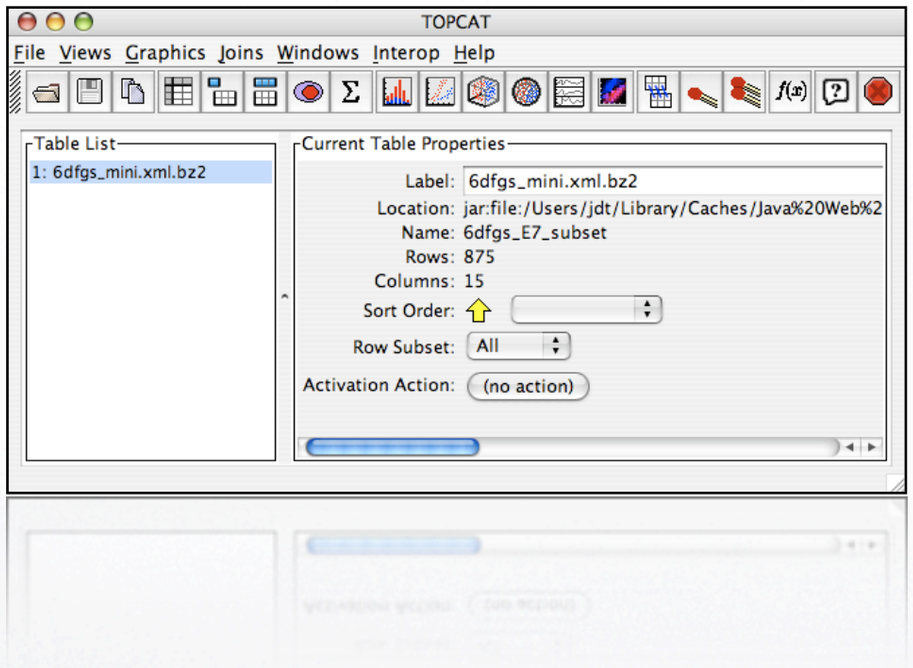
Currently:



Asynch

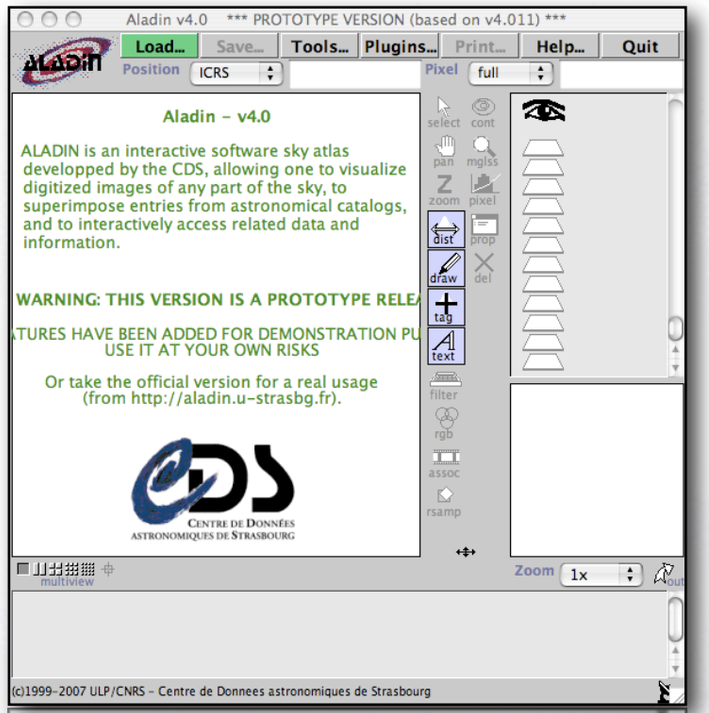


Currently:

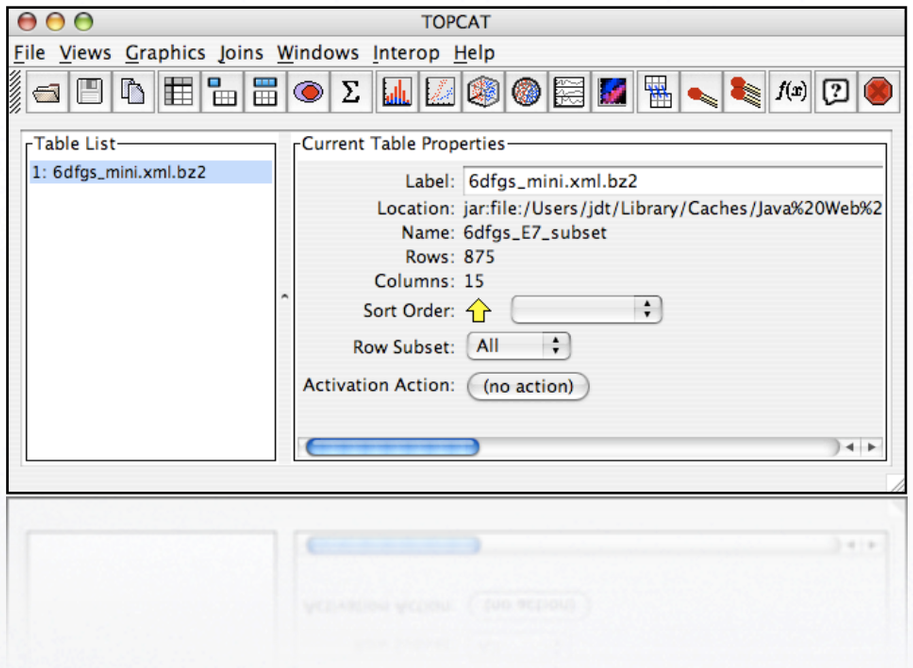


Asynch

request



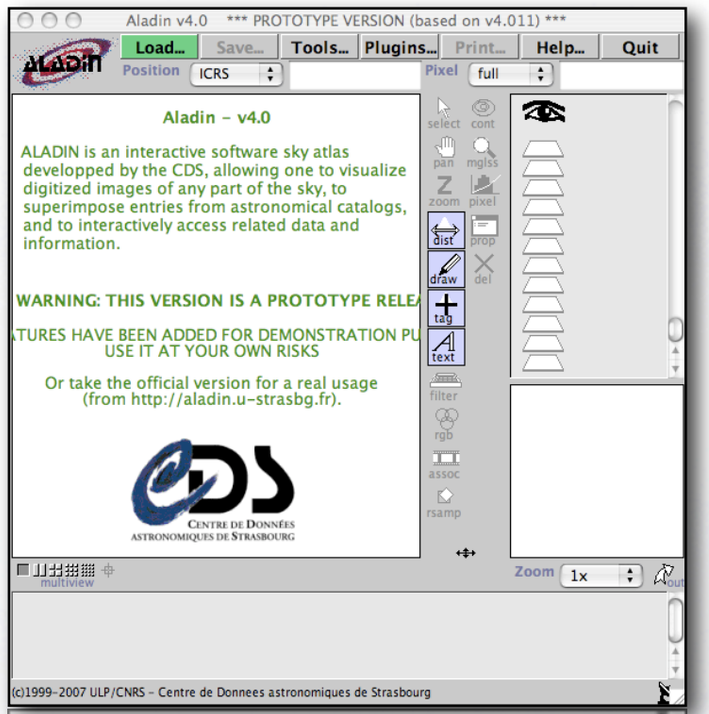
Currently:



Asynch

response

(discarded by hub)



Synch vs Asynch?

- Stay as we are
- Use of message ids to tie together asynch request & response messages
- Drop synch messaging altogether

Messages

Message param typing

Message param typing

- Now:
  - Messages are typed using a subset of XML-RPC types

Tag	Type	Example
<i4> or <int>	four-byte signed integer	-12
<boolean>	0 (false) or 1 (true)	1
<string>	string	hello world
<double>	double-precision signed floating point number	-12.214
<dateTime.iso8601>	date/time	19980717T14:08:55
<base64>	base64-encoded binary	eW91IGNhbid0IHJlYWQgd(

Message param typing

- Now:
  - Messages are typed using a subset of XML-RPC types
- Proposal: everything a string, array, struct
- Why? What do we gain from typing?

Named Message Params

- Now: parameters identified by position
- Proposal: parameters identified by name
  - Pros: Easier to make messages extendable and parameters optional
  - Greater clarity

mtypes vs ivorns

mtypes vs ivorns

- Why IVORNS?
  - Dereferencable URIs

  - Provide a human (and machine?)-readable definition of a message type
  - Searchable: find me an application that understands this message type

mtypes vs ivorns

- Why IVORNS?
  - ...ferencable URIs
  - ...ine?)-readable
    - defini...
  - Searchable: find me an applicat... understands this message type

No message IVORN has ever been registered

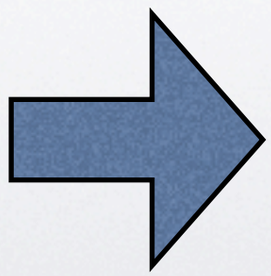
Message annotations

Message annotations

- Annotations allow the recipients of messages to annotate mtypes in order to narrow down the semantics but do not change the syntax of a message

Message annotations

- Annotations allow the recipients of messages to annotate mtypes in order to narrow down the semantics but do not change the syntax of a message
- A hypothetical example:

process.votable.url 

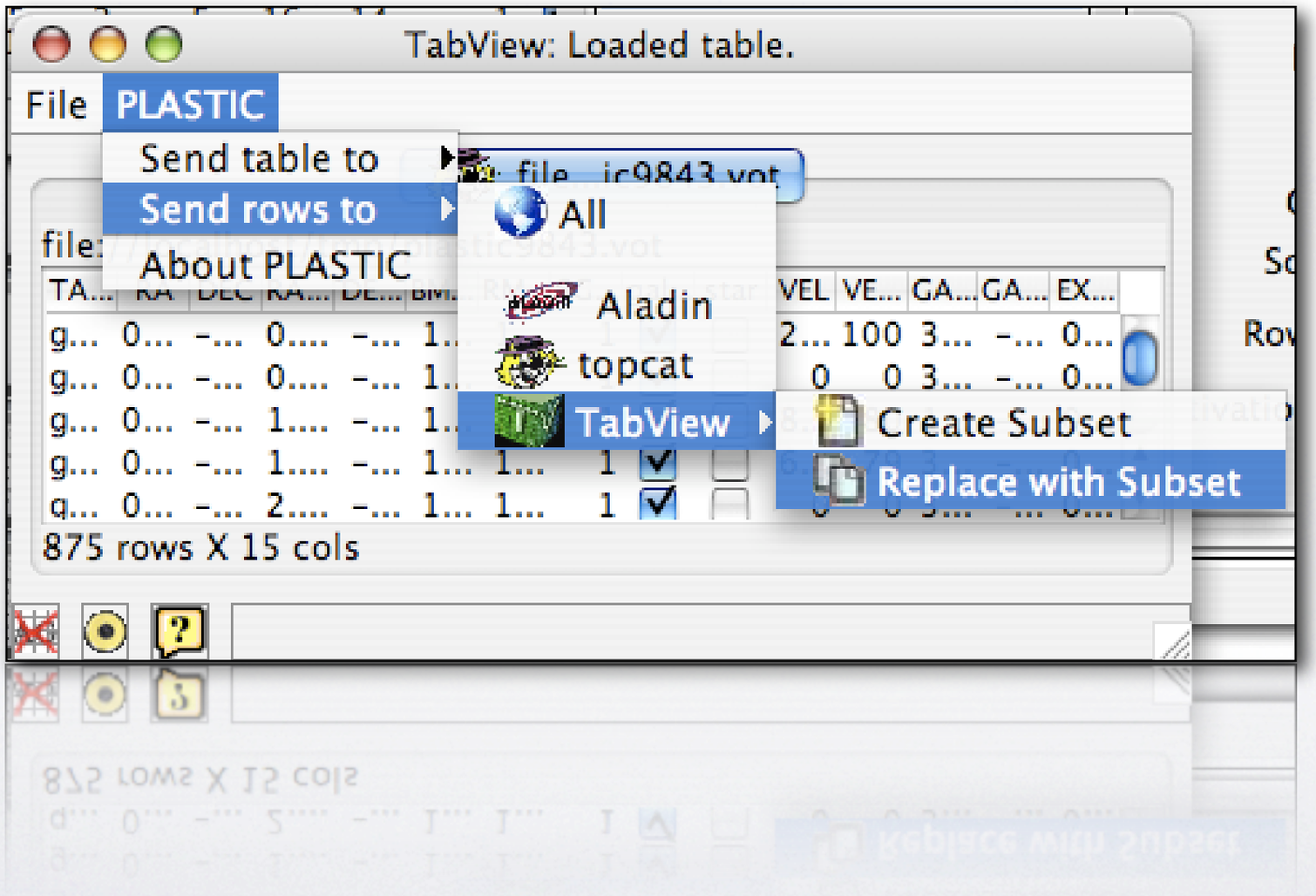
You will receive a URL
It points to a VOTable
The params are: id, url

Message annotations

- A receiving client declares that it understands
  - process.votable.url@load
  - process.votable.url@overwrite
- A sending client does not understand load, overwrite - they're merely used as labels for the user of the client.

Example

Example


TabView: Loaded table.
File
PLASTIC
Send table to
Send rows to
About PLASTIC
All
Aladin
topcat
TabView
Create Subset
Replace with Subset
875 rows X 15 cols

Message Annotations

- Does not preclude more specialised mtypes such as display.votable.url that *map to the same functionality*
- Pros:
  - Flexible, extendable, dynamic

Distinguish refs

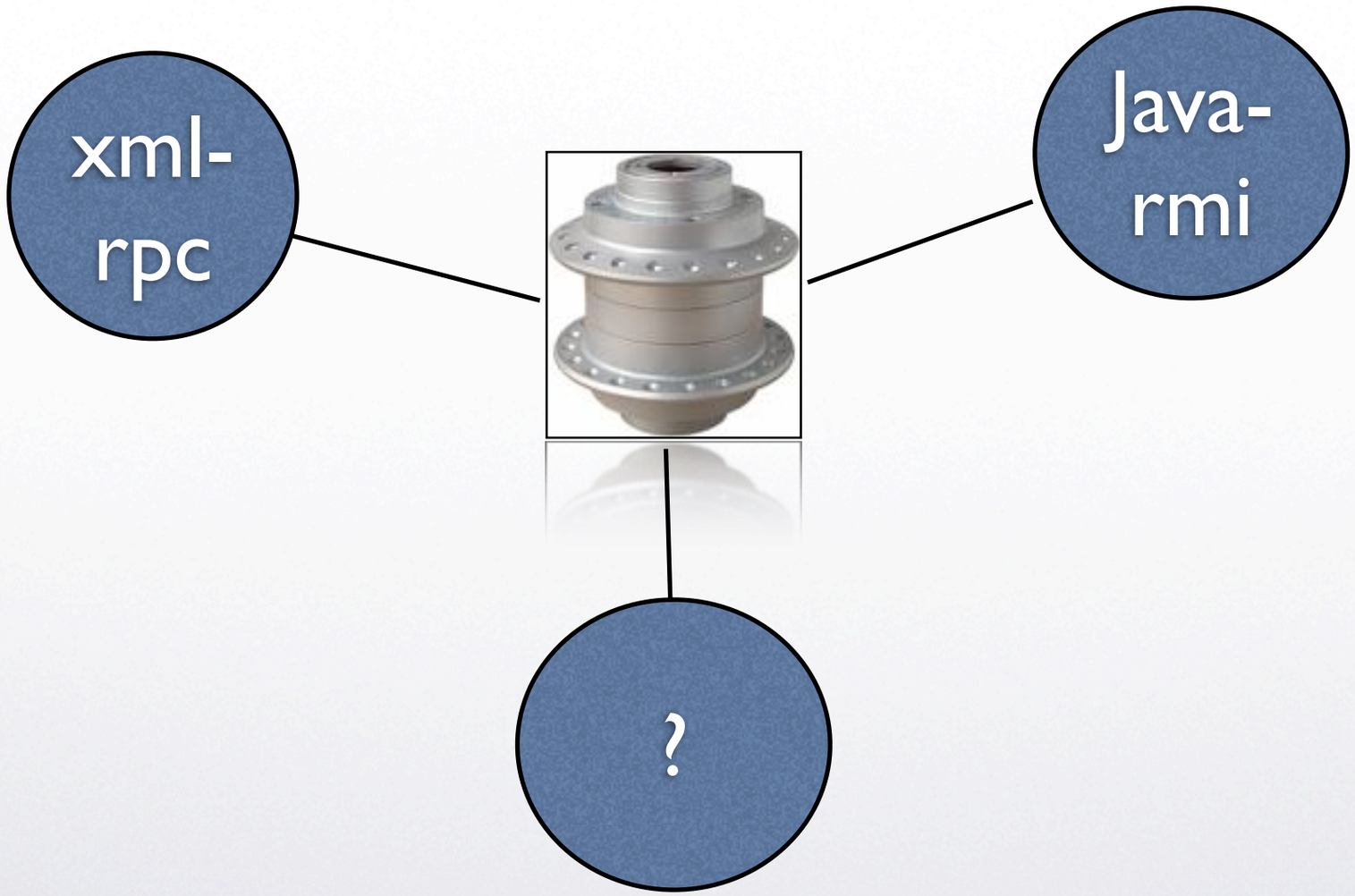
Distinguish refs

Dropped

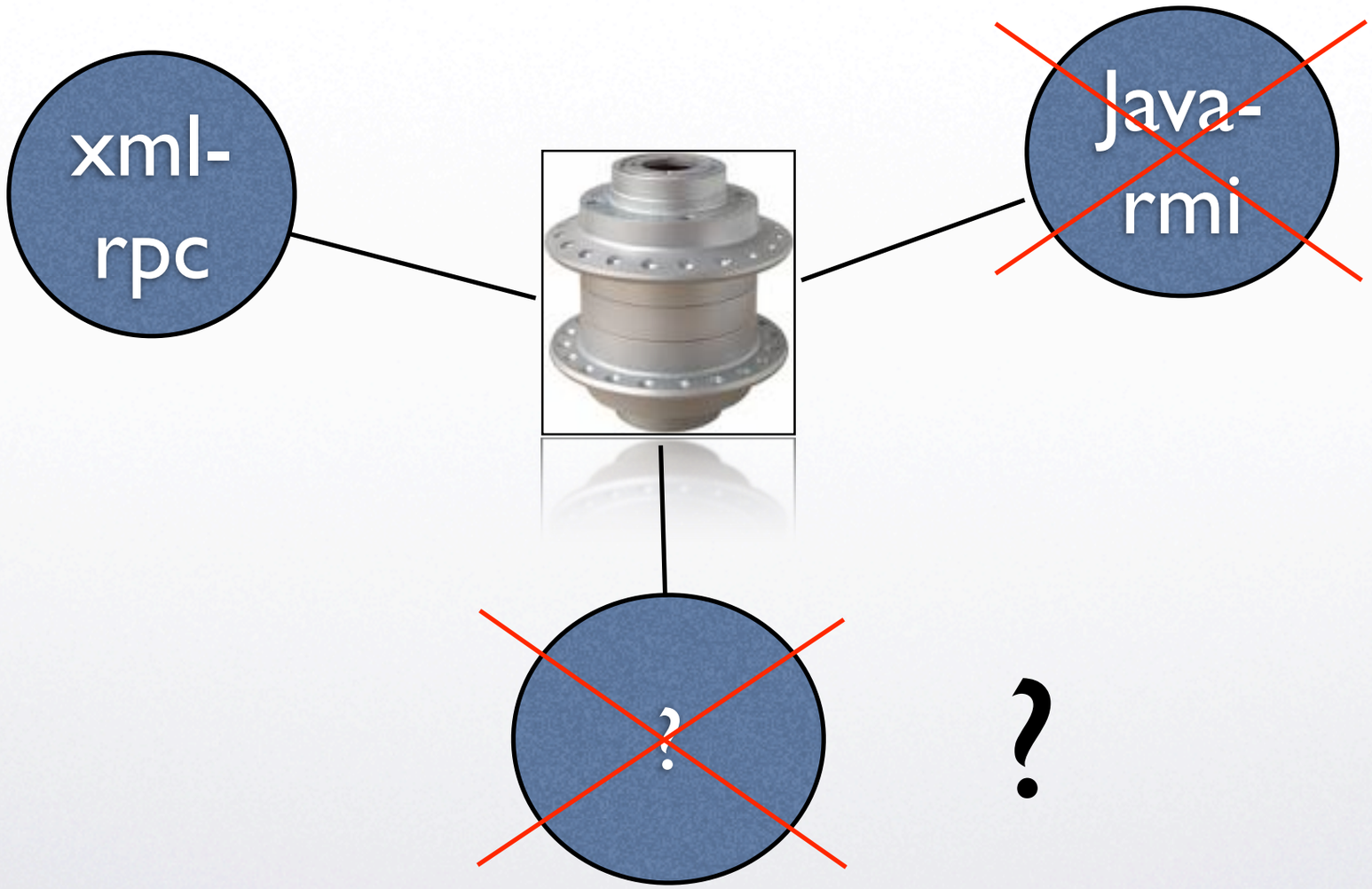
Transport

Recap:

Recap:



Recap:



Transport options:

- Exactly one protocol 7:4
  - XML-RPC?
- One mandatory protocol + optional ones? 6:3
- All protocols optional? 0:11

Let battle commence...

Let battle commence...