Binding applications with PLASTIC

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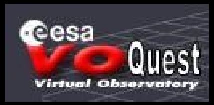
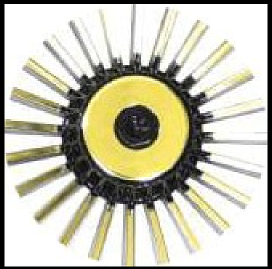




Plastic

AstroScope

Topcat

PLASTIC is...

- A specification for how astronomy tools on a user's desktop can talk to each other
- **Simple**
- Extensible
- A collaboration between the Aladin, AstroGrid, Topcat, VisIVO teams and others

Contents

- PLASTIC – why and how?
- Demos
- Where are we now?
- What next?

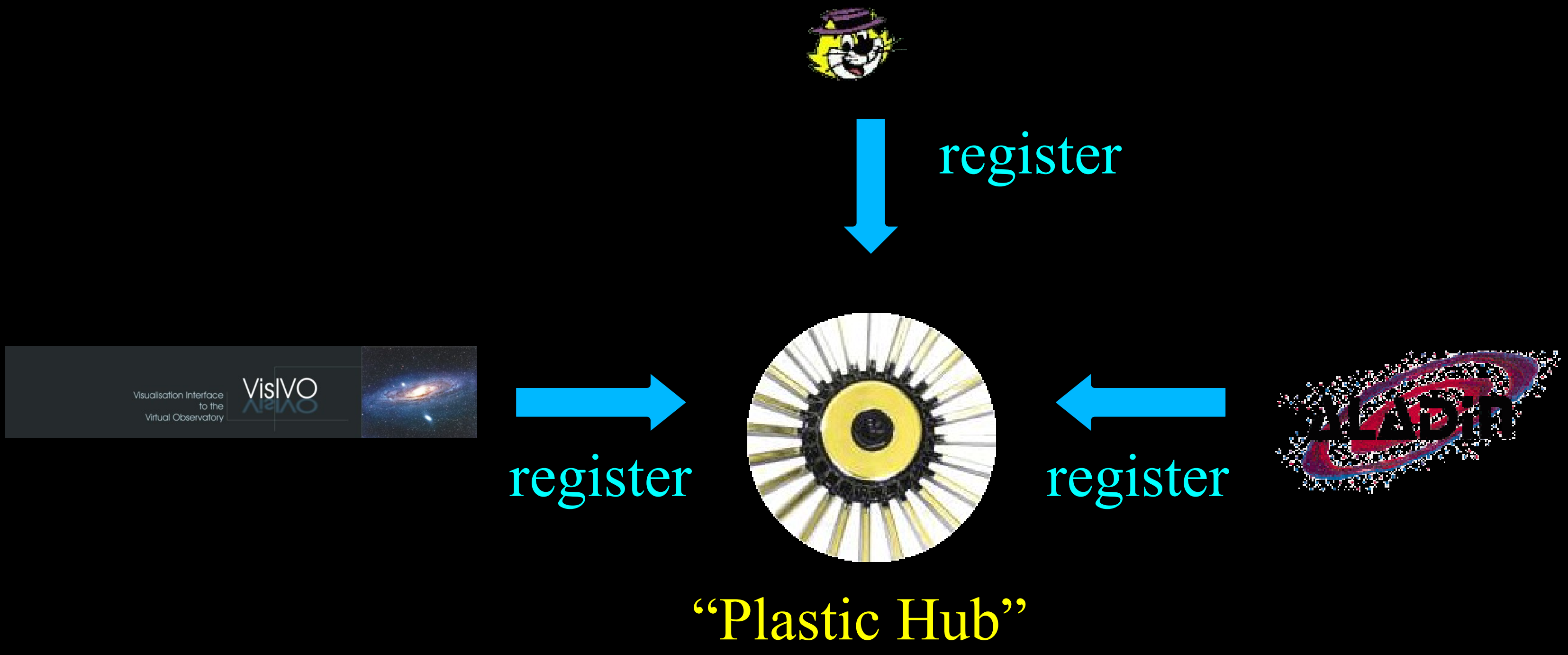
Why?

- We needed a quick and easy way for apps to communicate
  - Don't need guaranteed delivery, encryption, security, other bells and whistles
- Most of the interesting stuff is working out the ways that apps should communicate once they can.

Some history...

- VisIVO & Aladin interoperability (Becciani, Comparato, Gheller...)
- The Aladin plugin interface (Boch, Fernique...)
- The Astro Client Runtime (Winstanley)
- SC4DEVO meetings (Mann)

Architecture: publish-subscribe



register

register

register

“Plastic Hub”

Architecture: multiple “protocols”

Pyt
C

Look Familiar?
Exactly the same options that you get in the AR - if you use Plastic you get all the facilities of the AR “for free” (and vice versa)

What do messages look like?

Why are these IVORNS?

In the future we might want to register them to

- make it easier to search for applications that have certain capabilities
- Guarantee uniqueness
- Facilitate auto-generation of UIs for sending messages?

....

What do messages look like?

- Messages can carry arguments, and return values

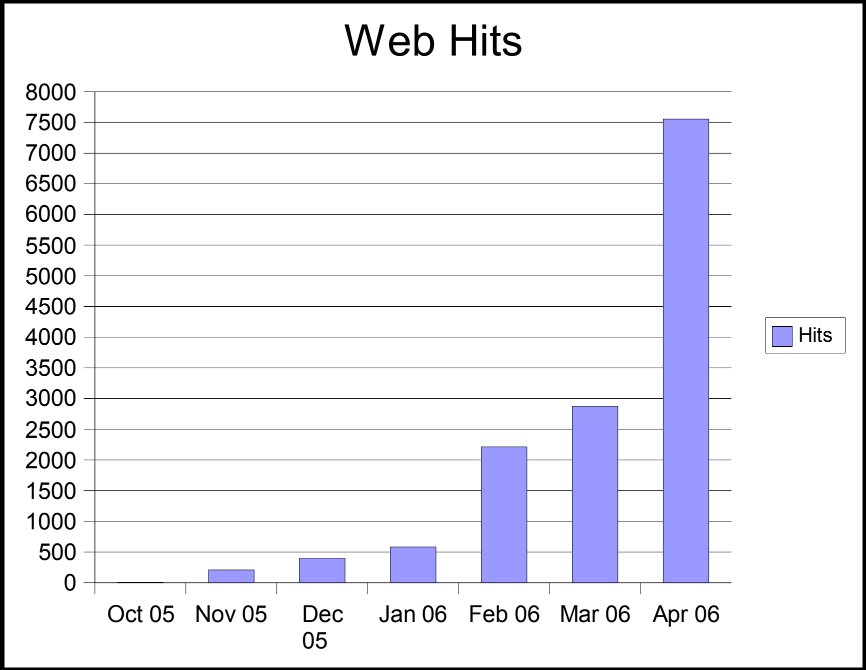
Demos

- Plastic for beginners - JDT
- Integrating Topcat and Aladin – Thomas Boch
- Various other presentations will include asides on PLASTIC

Where are we now?

- An implementation of a Plastic Hub in the AR.
- Plastic-compatible tools:

  Aladin
  Topcat
  VOSpec
  VisIVO (C++)
  AstroScope
  Xmdv-lite
  TabView
  VAST

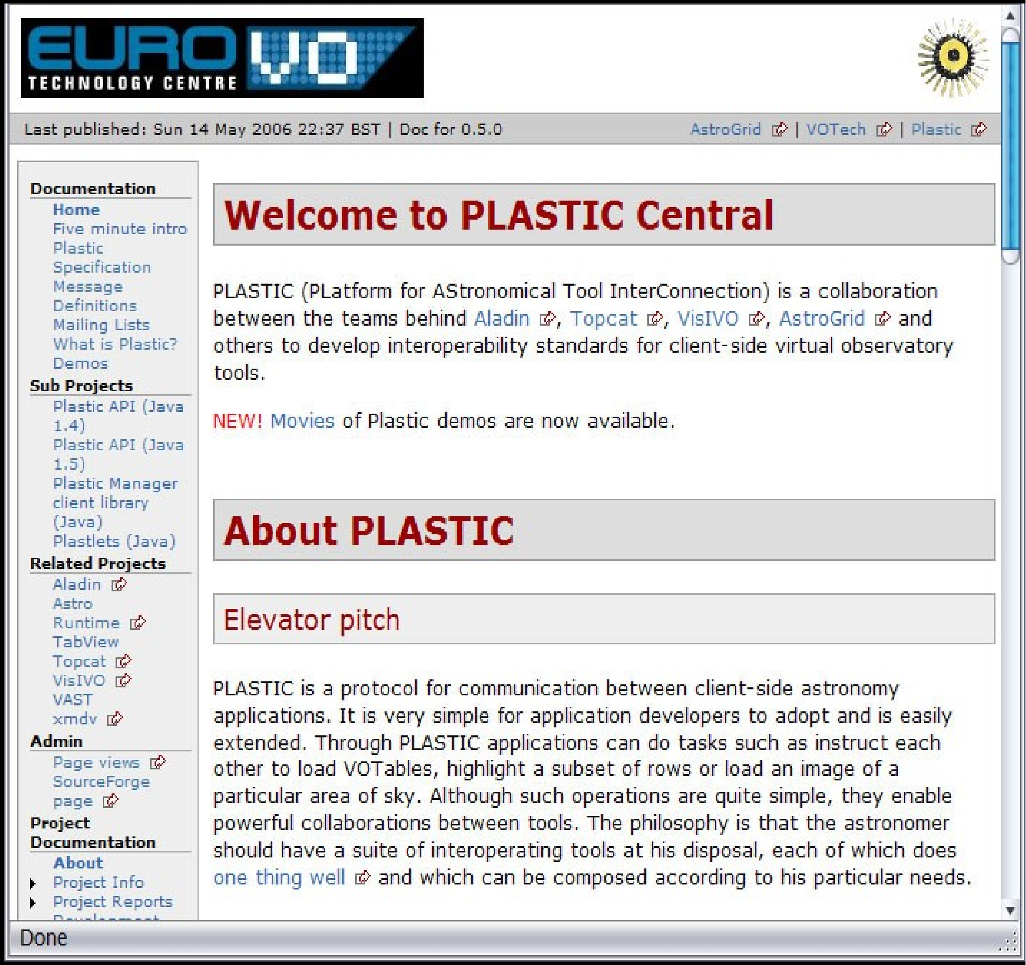


- Coming soon:

  Anomaly Detector,Eirik? VOEvent (Perl) ? VOQuest

Where are we now II?

- Bindings available for R, Python
- Coming soon: IDL?
- Java libraries for accessing plastic hub
- Website:
  http://plastic.sourceforge.net
- Mailing lists:
  http://plastic.sourceforge.net/mail-lists.html



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Welcome to PLASTIC Central

PLASTIC (PLatform for AStronomical Tool InterConnection) is a collaboration between the teams behind Aladin, Topcat, VisIVO, AstroGrid and others to develop interoperability standards for client-side virtual observatory tools.

NEW! Movies of Plastic demos are now available.

About PLASTIC

Elevator pitch

PLASTIC is a protocol for communication between client-side astronomy applications. It is very simple for application developers to adopt and is easily extended. Through PLASTIC applications can do tasks such as instruct each other to load VOTables, highlight a subset of rows or load an image of a particular area of sky. Although such operations are quite simple, they enable powerful collaborations between tools. The philosophy is that the astronomer should have a suite of interoperating tools at his disposal, each of which does one thing well and which can be composed according to his particular needs.

Hidden slides with code examples to follow....

Plasticizing your apps: Java

(non-programmers, please talk amongst yourselves)
Also see:
http://plastic.sourceforge.net/multiproject/plastic-lib

- Implement the PlasticListener interface:

```
Object perform(URI sender, URI
  message, Object[] args)
```

- Obtain a reference to the PlasticHub
- Register your application

```
id = hub.registerRMI(“myapp”,
  messages, this)
```

- Send messages to other apps:

```
Map responses = hub.request(id,
  message, args)
```

Plasticizing your apps: xml-rpc (Python)

(non-programmers, please talk amongst yourselves)

- Run an xml-rpc server in your app (with an off-the-shelf-library)
- Obtain the URL of the hub's xml-rpc server
- Register your application

```
id =
  s.plastic.hub.registerXMLRPC(“myapp
  ”,[], myURL)
```

- Send messages to other apps:

```
responses =
  s.plastic.hub.request(id, message,
  args)
```

Plasticizing your apps: scripting

You can also use Plastic to visualise data directly from your favourite scripting environment (Python in this case)

- Obtain the URL of the hub's xml-rpc server
- Register your application

```
id = s.plastic.hub.registerNoCallback(“myapp”)
```

- Send messages to other apps:

```
responses = s.plastic.hub.request(id, message, args)
```

PLASTIC

Platform for Astronomy Tool InterCommunication

- Moulded by

  Thomas Boch
  Marco Comparato
  John Taylor
  Mark Taylor
  Noel Winstanley

- Other contributors:

  Alasdair Allan
  Sebastien Derriere
  Pierre Fernique
  Doug Tody

C++

Perl

Anomaly Detection

- Using:
  CEA
  ACR
  Plastic
  Aladin/Topcat/....everything, really
- Credits:
  Andy Connolly (Pitt)
  Bob Mann (Edi)
  John Taylor (Edi)
  The AstroGrid & Plastic teams

University of Pittsburgh

Anomaly Detection – what & why

- Two prototype applications showcasing what you can do with the ACR and Plastic.
- Quick to write – all the real work is done by ACR, CEA and any Plastic applications.
- Prototype/demo software, driving development of infrastructure but still doing something “useful”.
- Datamining half of DS6
- Collaboration outside VOTech

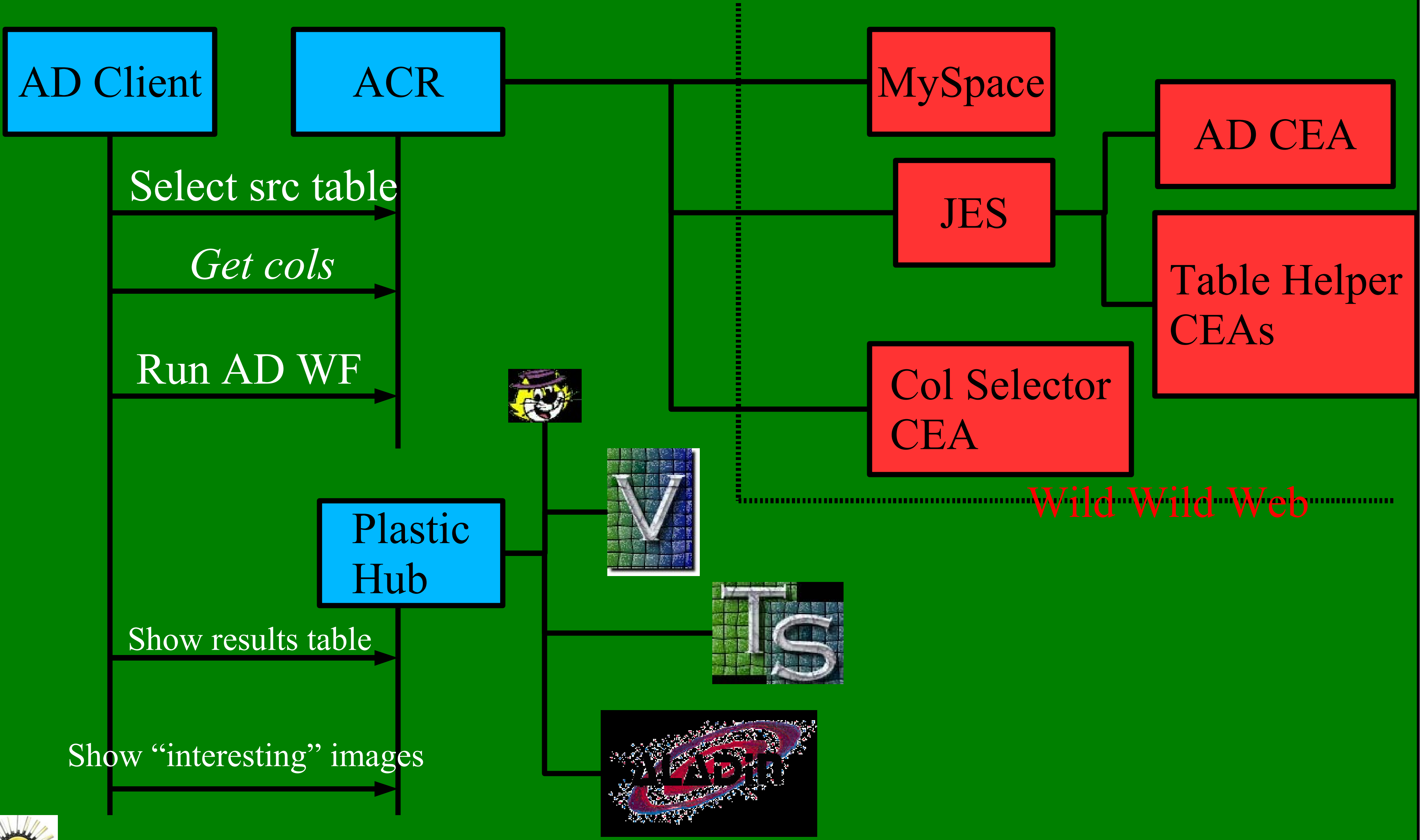
Anomaly Detection Application

- Integrate into the AstroGrid infrastructure in 3 ways:
  - Server application (CEA)
  - Desktop application (ACR)
  - Hybrid application:
    - All the grunt is done on the server
    - Presents the user with a more friendly, powerful UI than is available through the vanilla ACR task launcher
- The same AnomalyDetection algorithm is available as
  - A CEA app
  - *A parameterised workflow*
  - A hybrid ACR-CEA app

Anomaly Detection Application

- Take a source VOTable (e.g. From MySpace)
- *Run a remote task that extracts the column headings*
- *Get the user to select the column headings of interest, and reduce the table to these columns*
- Create a workflow document that sends this table to the Anomaly Detector CEA application (plus does some table format stuff)
- Submit the workflow to JES
- Visualise the results via Plastic

Anomaly Detection Application



AD Client

ACR

Select src table

Get cols

Run AD WF

Plastic Hub

Show results table

Show “interesting” images

MySpace

JES

AD CEA

Table Helper CEAs

Col Selector CEA

Wild Wild Web