

HOW TO PUBLISH IMAGES/SPECTRA

DALTOOLKIT



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1 INTRODUCTION

1.1 Purpose and scope

SIAP (Simple Image Access Protocol) and SSAP (Simple Spectrum Access Protocol) are two successful protocols in the Virtual Observatory context. Due to the simplicity and flexibility of these two simple protocols, it is easy to adapt existing archives to be VO compliant. It is also easy to make use of the available protocols to consume images and spectra in the VO context with appropriate clients and tools.

The goal of this hands-on session is to publish astronomical images/spectra according to the SIAP/SSAP standards. After creating their own database and ingest test FITS files locally (to be done during previous session on MEx, Metadata Extractor), final users will be able to locally publish them making use of the software and the support we will provide.

At the end of the day, people who wish to work with their own data will be able to perform the necessary tasks to achieve such result. The session aims to support either people with few images/spectra who plan to create a personal service or data centre with large amount of data. Also people interested in receiving our complete support for publication of their data on our server will be attended.

During this hands-on session, the user will follow all the necessary steps to create real SIAP/SSAP services on their machine. Users will be able to configure and install their own service which will display the data in SIAP/SSAP format.

The service will be tested and displayed in the end using either Aladin (for images) or VOSpec (for spectra).

1.2 Acronyms and definitions

Below you will find a list of VO related acronyms (and its definitions) widely used across the document.

DAL Data Access Layer.

IVOA International Virtual Observatory Alliance.

PLASTIC PLatform for AStronomical Tool InterConnection.

From the web page: A communication protocol for client-side VO Tools.

SIAP Simple Image Access Protocol.

SSAP Simple Spectrum Access Protocol.

VO Virtual Observatory.

VOTABLE

Excerpt from the specification: “ [...] XML standard for the interchange of data represented as a set of tables [...]”

2 SYSTEM AND SOFTWARE REQUIREMENTS

2.1 *System Requirements*

This hands-on session has been designed to work on different operating systems. The users must have installed one of the following:

- GNU Linux
- MacOSX 10.4.x
- Windows XP

Along the session you should follow different steps depending on the operating system you are running. Therefore instructions for **Linux**, **MacOSX** and **Windows** will have a RED, GREEN and BLUE frame colour respectively.

2.2 *Software Requirements*

To complete the hands-on session we need first to have installed the underlying programming language (Java), the web application server on which to deploy it (Tomcat) and the database where the data is located (MySQL). To be able to compile, pack and install the DALToolKit Server locally we use a Java-based build tool called Ant (a kind of Make).

The software versions required to run the session are the following:

- Java JDK 5.0 update 15
- Ant 1.7.0
- Tomcat 5.5.26
- MySQL 5.0.51

3 ENVIRONMENT SET UP

In this section we will indicate the necessary steps to follow to set up your environment. Please note that there might be some steps you might have to skip or go through only when it is not the first hands-on session you run in the EURO-VO Workshop.

At this point Java, Tomcat and MySQL should have been installed on your machine already. If this is not the case please follow the installation procedures that you can find at:

<http://cds.u-strasbg.fr/twikiDCA/bin/view/EuroVODCA/DcaJune2008Software>

Now, you have to create a working directory in which to copy all the necessary files to run this hands-on session. These files are available at:

http://www.euro-vo.org/dcaworkshop2008/HandsOn/mex_daltoolkit/

, and should have already been downloaded and extracted during the previous MEx session. Finally, you have to set a home variable for such working directory.

Linux:

```
/bin/csh  
setenv WORKDIR <working-directory>, e.g. /home/brino/eurovodca/mex_daltoolkit  
cd $WORKDIR
```

MacOSX:

```
/bin/csh
setenv WORKDIR <working-directory>, e.g. /home/brino/eurovodca/mex_daltoolkit
cd $WORKDIR
```

Windows:

Start -> Control Panel -> System ->Advanced (tab) -> Environment Variables
Set WORKDIR user variable (e.g. to C:\eurovodca\mex_daltoolkit)

4 SERVER CONFIGURATION AND DEPLOYMENT

Now, assuming that the database server is up and running, everything is ready to start to configure the DALToolKit Server and deploy it locally.

4.1 Configuration

4.1.1 SERVER CONFIGURATION

The DALToolKit Server provides a web interface to query the metadata previously ingested into the database server using the DAL protocols (SIAP and SSAP). To do so, it uses a configuration file where the database connection and some other parameters are set. You need to edit the file and set your MySQL password (jdbcPassword) as follows:

Linux:

```
nedit $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/ServiceConfig.properties for images
nedit $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/ServiceConfig.properties for spectra
```

MacOSX:

```
pico $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/ServiceConfig.properties for images  
pico $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/ServiceConfig.properties for spectra
```

Windows:

```
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SIAP-v1.0-mex\ServiceConfig.properties for images  
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SSAP-v0.1-mex\ServiceConfig.properties for spectra
```

4.1.2 METADATA INFORMATION

The DALToolKit Server web application needs to know about the metadata information it will use to filter and describe the FITS files served. Here are the main parameters that need to be configured:

- *ColumnName* is used to build the SQL query to the database.
- *ParamName* determines if a parameter is used for filtering.
- *UTypeName* determines if a parameter appears in the output
- *FitsKeyword* indicates the value to extract from the FITS file

At this step you will have a look at the configuration files being used by the DALToolKit Server and, eventually, edit some of its content. You may take some time now, look at these files and check the attributes that can be set to describe the metadata.

Linux:

```
nedit $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/RequiredParams.xml
nedit $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/OptionalParams.xml
for images
nedit $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/RequiredParams.xml
nedit $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/OptionalParams.xml
for spectra
```

MacOSX:

```
pico $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/RequiredParams.xml
pico $WORKDIR/DALToolKit/src/conf/SIAP-v1.0-mex/OptionalParams.xml
for images
pico $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/RequiredParams.xml
pico $WORKDIR/DALToolKit/src/conf/SSAP-v0.1-mex/OptionalParams.xml
for spectra
```

Windows:

```
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SIAP-v1.0-mex\RequiredParams.xml
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SIAP-v1.0-mex\OptionalParams.xml
for images
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SSAP-v0.1-mex\RequiredParams.xml
Edit C:\<WORKDIR-PATH>\DALToolKit\src\conf\SSAP-v0.1-mex\OptionalParams.xml
for spectra
```

4.2 Deployment

To deploy the DALToolKit Server you have to compile it first. To compile the source code (Java) you will be using Ant, a Java based build tool. Once you have compiled the DALToolKit Server source code, you have to package it as a standard web application file (WAR) and install it into the web application server (Tomcat) where the service will be finally up and running. Prior to any of these steps you need to start up Tomcat.

4.2.1 START UP THE WEB SERVER

To start up the web server and check that it is working, please follow these steps:

Linux:

```
$TOMCAT_HOME/bin/startup.sh
```

Open URL <http://localhost:8080/> in your default browser

MacOSX:

```
$TOMCAT_HOME/bin/startup.sh
```

Open URL <http://localhost:8080/> in your default browser

Windows:

Go to the Windows Taskbar, right click on Apache Tomcat and select *Start service*

Open URL <http://localhost:8080/> in your default browser

4.2.2 COMPILE AND DEPLOY THE APPLICATION

To deploy the DALToolKit Server go to the working directory, enter into the DALToolKit directory and run a couple of Ant commands.

Linux:

```
cd $WORKDIR/DALToolKit
$ANT_HOME/bin/ant build
$ANT_HOME/bin/ant deploy
```

MacOSX:

```
cd $WORKDIR/DALToolKit
$ANT_HOME/bin/ant build
$ANT_HOME/bin/ant deploy
```

Windows:

```
From command line (See 6.2.1): cd "%WORKDIR%\DALToolKit
"%ANT_HOME%\bin\ant build
"%ANT_HOME%\bin\ant deploy
```

5 TEST APPLICATION

5.1 *Web Interface Test*

You may open the following URL in your default browser to test that the DALToolKit Server previously deployed is working fine. You should see a simple web form corresponding to the parameters you configured as input. You can now try to send queries to the server and to obtain the corresponding responses in VOTable format.

<http://localhost:8080/SIAP-v1.0-mex/> *for images*
<http://localhost:8080/SIAP-v1.0-mex/> *for spectra*

If the recently deployed DALToolkit Server contains astronomical images or spectra we will be using Aladin or VOSpec to test it respectively.

5.2 Test SIAP service using Aladin

As we created a local server, external applications cannot access it from the Internet. Hence, it is necessary to use a work around to test the server results.

With Aladin you can open local FITS files as well as SIAP VOTables. To do so, save the server response on your hard drive and open it with Aladin. Select the Load button, Others File and open your file. The list of FITS files will be added to the graphic panel, you may click on Submit to get them processed by Aladin.

<http://aladin.u-strasbg.fr/java/nph-aladin.pl>

5.3 Test SSAP service using VOSpec

As we created a local server, external applications cannot access it from the Internet. Hence, it is necessary to use a work around to test the server results.

With VOSpec you can open local FITS files as well as SSAP VOTables. To do so, save the server response on your hard drive and open it with VOSpec. Select the Edit button, Add from SSAP Wrapper and open your file. The list of FITS files will be added to the graphic panel, you may click on Display to get them processed by VOSpec.

To access the standard version of the VOSpec accessing operational services you can visit the following link:

<http://esavo.esac.esa.int/vospec>

5.4 Shutdown services

You can now shutdown the Tomcat web server and the MySQL database server as follows:

Linux:

```
$TOMCAT_HOME/bin/shutdown.sh  
$MYSQL_HOME/bin/mysqladmin shutdown -u root -p
```

MacOSX:

```
$TOMCAT_HOME/bin/shutdown.sh  
$MYSQL_HOME/bin/mysqladmin shutdown -u root -p
```

Windows:

Go to the Windows Taskbar, right click on Apache Tomcat and select *Stop service*
Go back to the MySQL Command Line prompt and type exit (mysql > exit)

6 HANDS-ON SESSION WITH PARTICIPANTS DATA

You will now be able to publish your own images/spectra using the DALToolKit technology demonstrated before. You will receive dedicated support from the session advisors to do so. Good luck!

7 LINKS

[1] IVOA, <http://www.ivoa.net>

[2] IVOA DAL (and related), <http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDAL>

[3] IVOA DATA MODEL, <http://www.ivoa.net/twiki/bin/view/IVOA/IvoaDataModel>

[4] IVOA VOTABLE, <http://www.ivoa.net/twiki/bin/view/IVOA/IvoaVOTable>

[5] SIMPLE SPECTRUM ACCESS PROTOCOL,
<http://www.ivoa.net/Documents/latest/SSA.html>

[6] SIMPLE IMAGE ACCESS PROTOCOL,
<http://www.ivoa.net/Documents/latest/SIA.html>

[7] DALToolKit Server presentation

<http://www.ivoa.net/internal/IVOA/InteropSept2006DAL/DALToolKit.ppt>

[8] EUROVO DCA, <http://cds.u-strasbg.fr/twikiDCA/bin/view/EuroVODCA/WebHome>

[9] ESAVO, <http://esavo.esac.esa.int>