

DART, a New Solution to Deploy and Access Astronomical Data

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Abstract. We present a new software solution, based on Java, which allows to deploy and access astronomical catalogs in relational database form, with their associated data products. It is already used to provide the public VVDS data via VO and manage zCosmos data within the Italian COSMOS community; it is also used as the second generation Web interface to the XMM-LSS master catalog. DART (Database Access and Retrieval Tool) supplies a Web interface which allows to query catalogs, filter data by conditions on the columns values (even complex expressions), view the results and export them in private user files; it is also possible to make simple plots or retrieve the related data products. The software supports access to more than one catalog at a time (e.g. for multi-band usage) either in parallel, or as a couple linked by pre-built correlation tables, or even viewing the result of an identification among several catalogs as a single virtual table. DART has been designed as a general tool capable of accessing any collection of astronomical database tables and related products. It is highly (and easily) customizable editing simple configuration files and (for an increased flexibility specially concerning data product access) populating appropriately a few administrative database tables. It supports ConeSearch, SSA and SIA Virtual Observatory protocols. DART will be soon released to the astronomical community from the PANDORA Web site (<http://cosmos.iasf-milano.inaf.it/pandora/dart.html>).

1. Introduction

In order to better perform the operations of data retrieval and analysis which are tightly linked to the scientific research work based on astronomical catalogs, a powerful and in the same time easy-to-use tool is needed. On the other hand, from the point of view of the data administrator, what is needed is a flexible and easily customizable integrated system which provides database access and data products retrieval facilities.

In the following, we present DART (Database Access and Retrieval Tool), a new answer to the requirements raised above, based on J2EE technology, which allows to deploy and access astronomical catalogs in relational database form, with their associated data products.

To make the data provider's life easier and do not compel him/her to build up a new database interface every time he/she has to manage a new dataset, DART has been designed as a general tool capable of accessing any collection of astronomical database tables and related data products. It is highly (and easily) customizable editing simple configuration files and (for an increased flexibility specially concerning data product access) populating a few administrative database tables. DART provides also a customizable self-documentation of the

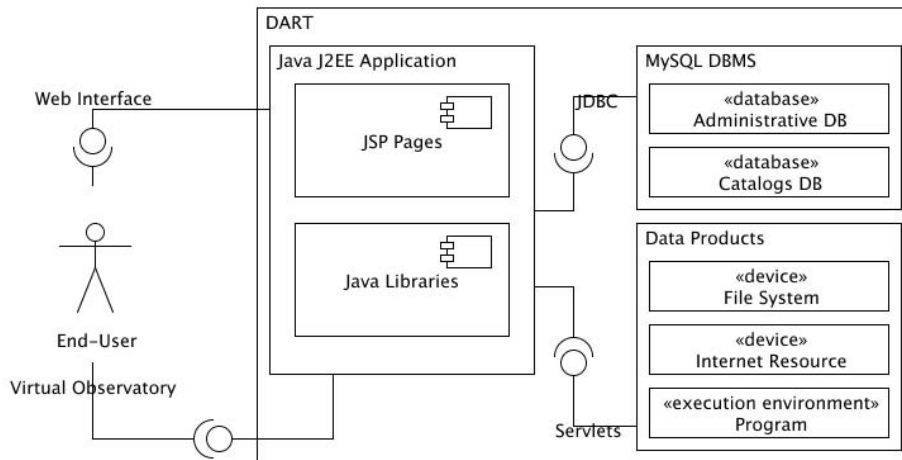


Figure 1. UML diagram showing the general components and interfaces of a typical deployment of DART. The user access the data through a Web interface. The Web interface is a front-end to a Java J2EE Web Application that exploits a database for any administrative task and another database to access the astronomical catalogues (currently there is a minimal dependency on MySQL we aim to remove in the next future). The application also allows to access the data products thanks to a set of servlets (even for the VO services).

tables (table help, column help, data product help, floating short description, etc.).

2. DART Capabilities

To make the end-users' life easier, DART supplies a Web interface which allows to query catalogs and filter data by conditions on the columns values; all this can be performed using a simple interface for a quick query composition, or an advanced interface, which allows to compose complex expressions exploiting the SQL syntax. Once executed the query, the Web interface allows to view the results and export them in private user files (ASCII, FITS and VOTable); it is also possible to make simple plots (exported as GIF, JPEG and EPS formats) or retrieve the related data products linked to each catalog queried (images, spectra, links to external sites, etc.).

The software supports access to more than one catalog at a time (e.g. for multi-band analysis) either in parallel, or as a couple linked by pre-built correlation tables (defined by the database administrator as a result of a pre-analysis), or even viewing the result of an identification among several catalogs as a single virtual table (also defined by the administrator by means of MySQL views). On the whole, DART features make it a powerful tool for data access and science analysis as well.

DART provides also a system to expose the public datasets (catalogs, images and spectra) through the Virtual Observatory. The ConeSearch (Williams et al. 2006), SIAP (Tody & Plante 2004) and SSAP (Tody et al. 2007) interface

implementations¹ are adaptable to any dataset deployed with DART, thanks to a configuration file.

Even if the V.O. capabilities are still under development in order to follow the last V.O. protocol definitions and to improve the implementation architecture itself, DART is already used to export public data to the Virtual Observatory (see below).

3. Current Applications

DART is already used to provide the public VVDS (Le Fèvre et al. 2005) data via V.O. and manage zCosmos² (Lilly et al. 2007) data within the Italian COSMOS community; it is also used as the second generation Web interface to the XMM-LSS³ (Chiappetti et al. 2005, Pierre et al. 2007) master catalog. Recently it has been adopted as Web interface to the private data of the VVDS-SINFONI⁴ ESO Large Program on high redshift galaxies dynamics.

DART will be soon released under GNU General Public License and announced on our PANDORA team site⁵. For the time being, if you are interested, don't hesitate to contact us via the site or via the author mail.

References

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¹We also aim to implement the incoming TAP interface.

²<http://cosmosdb.iasf-milano.inaf.it/CosmosDB>

³<http://cosmosdb.iasf-milano.inaf.it/XMM-LSS>

⁴<http://cosmosdb.iasf-milano.inaf.it/VVDS-SINFONI>

⁵<http://cosmos.iasf-milano.inaf.it/pandora/dart.html>