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IDIS: progresses towards a Virtual Observatory in Planetary Science

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Abstract. The Integrated and Distributed Information Service (IDIS) is as a network activity inside the Europlanet-RI FP7 program. Based on a network of thematic nodes, IDIS aims at building the basis of a Planetary Science Virtual Observatory (VO). The large range of scientific fields (Solar system bodies interiors and surfaces, atmospheres, plasmas, small bodies and dust, dynamics and extraterrestrial matter) requires to create a very open data model to define data contents, structure and context, but also protocols to access the relevant data.

Moreover this action is embedded in the context of VO normalization where many tasks have already been completed. IDIS needs interoperability and interactions with other projects, in particular with SPASE,¹ International Virtual Observatory Alliance, International Planetary Data Alliance, Virtual Atomic and Molecular Data Centre, and HELIO. Most of these programs are presented in this meeting. We will present the status of the different elements composing the IDIS VO infrastructure.

1. Introduction

EuroPlaNet-RI (EPN) project is a European Union funded initiative under the Seventh Framework Programme (FP7). EPN coordinates a series of research and service activities linked to planetology. IDIS (Integrated and Distributed Information System) is part of this project and aims at defining the grounds of a Planetary Science Virtual Observatory (VO). IDIS is composed of five nodes Interior and Surface Node, Atmosphere Node, Plasma Node, Small Bodies and Dust Node and Planetary Dynamics Node. The

¹Space Physics Archive Search and Extract (SPASE) <http://www.spase-group.org>

IDIS nodes work on defining all the elements required to construct a Virtual Observatory for Planetary Science taking into account the previous job done by the International Virtual Observatory Alliance (IVOA), the International Planetary Data Alliance, SPASE and HELIO. The current IDIS VO Architecture is presented here.

2. VO Architecture

The Virtual Observatory is an architecture built of components usually hidden from the end-user but necessary in order to reach and compare automatically the data from various sources. We will describe these different components:

- The Data Model that provides a complete and shared descriptions of all data sources.
- The Data Access Layer that allows one to query in a standard way all resources of all data providers.
- The data exchange format that allows one to retrieve data in a standardised way, including metadata.
- The registry, which is the heart of the information system. It centralises all the data services compliant with VAMDC and the first level of the content and capability description.

3. IDIS DATA MODEL

Data Model (DM) is a master piece of VO infrastructure. It define the structure of data services, the content and context of data in a standard way. It also defines metadata describing the data content. The IDIS DM working group tries to identify all the metadata relevant to the data used by the planetary science community, in order to build a unified DM for the various datasets of Europlanet science nodes.² From this work and the study of other DM (SPASE, IVOA) the result have been fit into an extension of ObsCore and Characterisation from IVOA. This semantic model allows to be IVOA-compatible with a large possibility of extensions in a structured schema.

For specific data like Laboratory Solid Spectroscopy, a dedicated DM have been constructed and will be compatible with the standards defined in the Virtual Atomic and Molecular Data Centre (VAMDC) Dubernet et al. (2010)

4. IDIS DATA ACCESS LAYER

IDIS will have to use different protocols to access the data :

- PDAP built by the space agencies to access PDS / PSA databases. IDIS has proposed extensions to PDAP, to allow a larger access to multiple data. First

²Europlanet-IDIS Data model: a Data Model for a Planetology Virtual Observatory”, B Cecconi and the IDIS-DM-SWG, PV-2011 proceedings, 2011

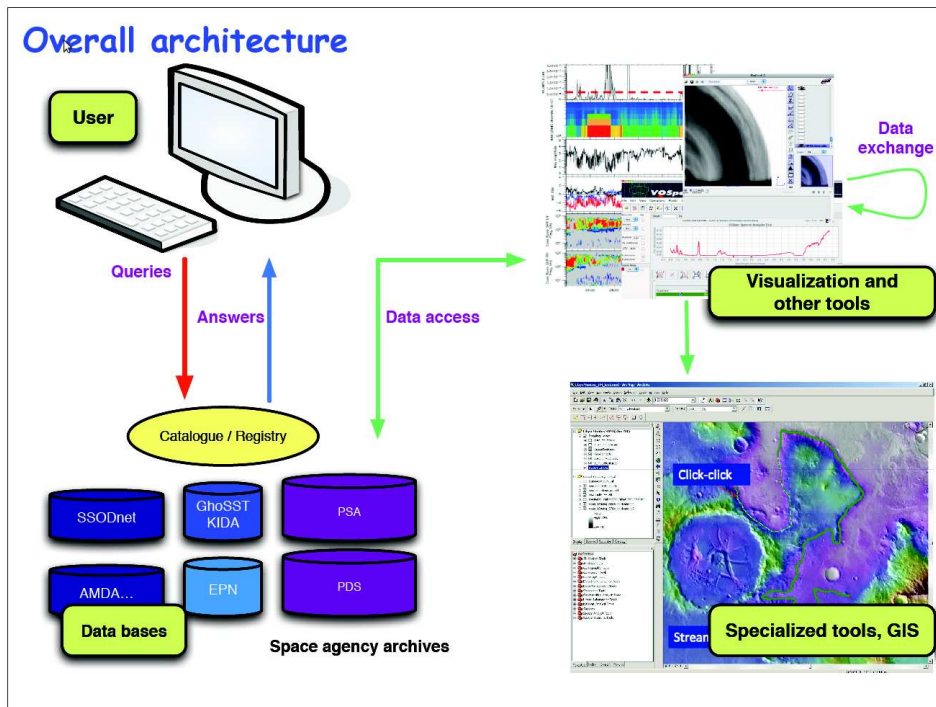


Figure 1. Schema of IDIS VO Architecture

tests have been made by CDPP and VOParis to implement this protocol. A portal is accessible at <http://voparis-srv.obspm.fr/portal/ipda.php>

- TAP VAMDC to access solid spectroscopy data from GhoSST,³
- IDIS-TAP is directly derived from TAP Dowler et al. (2011), the IVOA Table Access Protocol (TAP) protocol designed to access tabular data and catalogues. This very generic protocol is designed for relational databases access. It supports different query languages (Astronomical data query language ADQL is mandatory). This generic protocol can be associated with a DM like IVOA ObsTap.⁴ We propose to associate it with the IDIS-DM to form an IDIS-Tap.

5. REGISTRY

The registry is the heart of the information system. It is both a database and a web service holding metadata that describes all the IDIS resources. This part is still under definition but for IDIS-Tap the IVOA registry could be a good starting point.

³Grenoble Astrophysics and Planetology Solid Spectroscopy and Thermodynamics (GhoSST) , <http://ghosst.obs.ujf-grenoble.fr>

⁴Observation Data Model Core Components and its Implementation in the Table Access Protocol, Version 1.0, <http://www.ivoa.net/Documents/ObsCore/index.html>

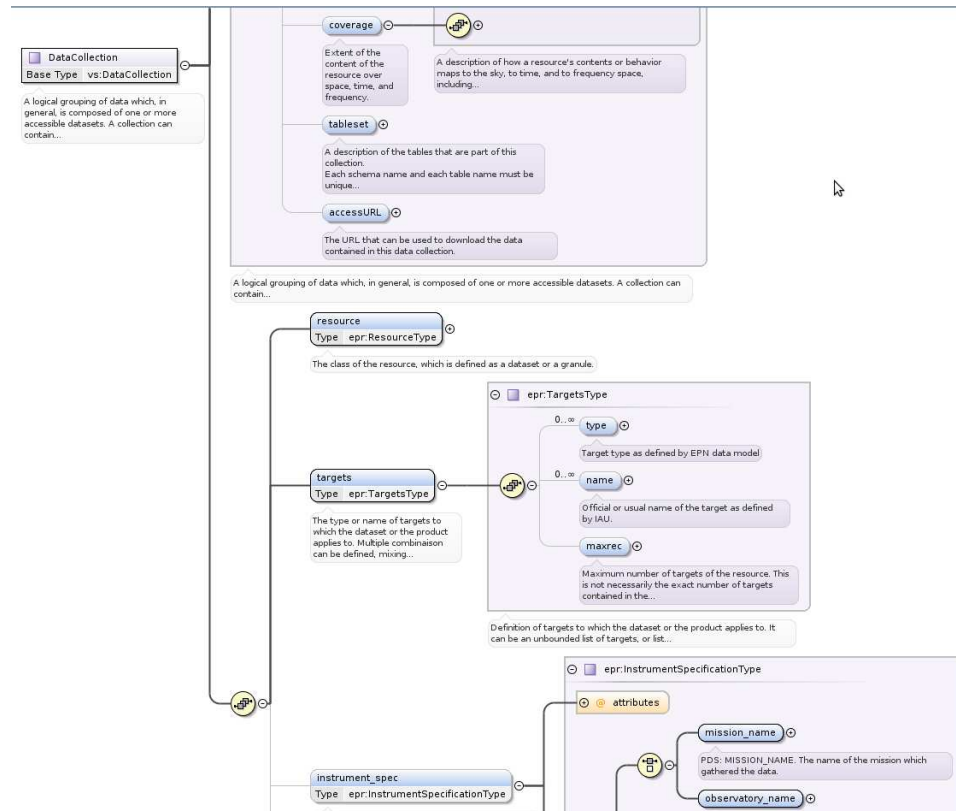


Figure 2. detail of IDIS DM

6. Conclusion

IDIS aims at prototyping a planetary science VO, allowing to discover datasets of interest for a given request in terms of target, time interval, or instrumentation. A Data Model is developed to describe IDIS' broad range of dataset. PDAP is already implemented and a web portal is up and running.

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