PDS4 Challenges in the Planetary Science Archive (PSA)


Introduction

The Planetary Science Archive (PSA) is the central repository where to store products from all ESA planetary missions, those following the PDS4 standard along with legacy PDS3 missions. Combining PDS4 structures for new missions while being compatible with previously existing PDS3 products in the same archive has driven a design with several difficulties to overcome.

In addition, using the PDS4 standard on a multi-mission environment implies a number of challenges to confront.

ESA Planetary Missions

Common Data Model

- PDS4 defines the metadata keywords that may be used in the label files that accompany and describe the data to be archived.
- These keywords are used by the PSA to index planetary data and to enable user-defined searches for viewing and retrieving mission data.
- PDS keywords have changed slightly from PDS3 to PDS4. The PSA is able to handle both versions, in order to provide a single interface.

Bundle data types

- PDS4 data in the PSA is organized in several types of bundles the ingester has to discriminate and take care of:
  - PSA master bundle, comprising information about the archive itself and about targets.
  - Mission bundles, with mission specific data such as investigation, instruments and instrument hosts.
  - Instrument bundles, which include instrument related information, collections and actual products.
  - SPICE bundles (not yet available), containing SPICE kernels that are applicable to the stored missions.

Validation

Validating PDS4 deliveries for the PSA involves a multi-step process:

1. Validate Delivery Package
2. Validate Transfer Manifest
3. Validate Structure (Scheme)
4. Validate Values (Scenarios)
5. Validate Label Files
6. Ingest

Validation against the schema implies an appropriate handling of PDS4 Information Model versions (see below).

Versioning

The PSA contemplates two ways of data evolution:

1. Products, collections, and bundles may evolve over time. The PDS4 concept of UD-VID supports that. The User Interface allows to search either for latest versions of products or for a specific version.
2. As the PSA gathers and provides data for several ESA planetary missions that follow PDS4, it has been designed to provision different PDS4 Information Model versions simultaneously. Common Java interfaces with an Abstract Factory abstract client code from the actual JAXB schema implementation.

Bundle Generator

- Every delivery to the PSA coming from a PDS4 mission is expected to provide products within a bundle. However, bundles have no trivial structure.
- To facilitate generating delivery files to data providers, it is allowed to send isolated products. The ingestion software fills then the proper bundle layout.

Deleter & Updater

- Missions may request the PSA to delete some private products that are not yet consolidated.
- The database could also be updated from stored products, with information not initially ingested.

References


Contact Info

Jaime Sáiz Santos
Phone: +34 91 813 1295
jsaiz@esa.int
European Space Astronomy Centre (ESAC)
Camino Bajo del Castillo s/n, 28692 Villanueva de la Cañada, Madrid, Spain