Introduction

Adopting PDS4 as the standard for new missions, while being compatible with previously existing PDS3 products in the same archive, is managed with a common data model that matches the equivalent concepts of both standards. Additionally, PDS4 follows its own evolution. Roughly every six months, a new version of the PDS4 standard is released by the PDS. This implies evaluating a number of options, both by the missions as well as by the archive. In order to facilitate the decision making to data providers by not imposing additional constraints, ESA's Planetary Science Archive (PSA) has built a flexible layout where various PDS4 versions are supported simultaneously.

ESA Missions using PDS4

Impact on PSA processes

The following diagram depicts the PSA ingestion processes:

These processes are programmed in Java. As PDS4 is based on XML, it implies some way to read and write XML data with this programming language. This functionality is provided by JAXB. The JAXB xjc tool produces a set of Java classes that model the entities of the applicable XML schema. Different schema versions produce different sets of classes. As the missions incorporate or evolve their target PDS4 information model, the dependency of the PSA processes on the corresponding generated JAXB classes forces client code to deal with a growing number of sets of Java classes, which in the end results in a big maintenance overhead.

PDS4 Evolution options

Every data provider has to confront a number of decisions when a new PDS4 version is released by the PDS. Among them we can think of the following:

- Which information model version do we use? And more specifically:
  - How do we continue generating products with the former one or do we adapt to the last one?
  - How often do we migrate to the last version?
  - Do we upgrade all existing products to the new version?

Moreover, if every mission decides to use a different schema version, how should they be managed by the PSA?

Common Interface set

To avoid client code being impacted by the usage of new information model versions, the implemented solution employs a combination of the Abstract Factory and Adapter design patterns[1] so that the PSA processes that handle PDS4 data are confronted with common interfaces rather than with the generated JAXB classes directly.

References

1. Planetary Science Archive (PSA): psa.esa.int
3. Planetary Data System (PDS): pds.nasa.gov/home/about

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