PDS4 Information Model Requirements

PDS4 Data Model Working Group

-Draft-

Action Items:
- New Requirements derived from use cases.
  << To be done when Use Cases are finalized. >>
- Full tech review

Preface

Members of the PDS4 Data Model Working Group

       Todd King (lead)
       Steven Hughes
       Ed Guinness
       Lyle Huber
       Chris Isbell

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1. Scope

This document defines the requirements for the fourth generation of the Planetary Data System (PDS) Information Model. The moniker for this effort is "PDS4". The intent of the PDS4 Information Model is to provide an enduring data model that can describe the relevant attributes of data and ancillary information collected as part of planetary science activities. This information is to be included in the Planetary Data System archive that is described in the PDS Roadmap [1] as:

> The PDS archives and makes available space-borne, ground-based, and laboratory experiment data from over 50 years of NASA-based exploration of comets, asteroids, moons, and planets.

> The archives include data products derived from a very wide range of measurements, e.g., imaging experiments, gravity and magnetic field and plasma measurements, altimetry data, and various spectroscopic observations.

The PDS has defined a set of level 1, 2, and 3 requirements [2] that set the scope for the PDS4 Information Model. From these requirements the following requirements are derived for the PDS4 Information Model:

- The PDS Information Model shall provide an explicit information model for documenting and describing digital data from planetary science and solar system exploration [PDS 1.4, PDS 1.4.1]

- The PDS Information Model shall define a standard set of attributes (e.g., data elements, terms), values and relationships for describing and relating the data maintained in the PDS archive [PDS 1.4.2]

- The PDS Information Model shall identify a minimum set of attributes required for archiving a data set [PDS 1.4.5]

2. Audience

This document is written for those who will evaluate the vision for the system components and for those who will design and implement the system. The expected audience includes the following member of PDS:
- Managers and administrators
- Engineering Staff
- Technical Staff

3. Introduction

To derive the requirements for the PDS4 Information Model we have collected a set of use cases which illustrate the common activities, tasks and goals related to archiving and using data within PDS archive. The use cases are described in the "PDS4 Information

Model Use Cases" [3] document. The requirements specified in this document are derived from the use cases and the level 1-3 system requirements.

4. Requirements

The level 1-3 requirements that relate to the PDS4 Data model are:

1.4 Archiving Standards: PDS will have archiving standards for planetary science data

    1.4.1   PDS will define a standard for organizing, formatting, and documenting planetary science data

    1.4.2   PDS will maintain a dictionary of terms, values, and relationships for standardized description of planetary science data

    1.4.3   PDS will define a standard grammar for describing planetary science data

    1.4.4.   PDS will establish minimum content requirements for a data set (primary and ancillary data)

    1.4.5   PDS will establish minimum sets of archival data from missions and other major data providers

    1.4.6   PDS will develop, publish and implement a process for managing changes to the archive standards

    2.1.2   PDS will track the status of data deliveries from data providers through the PDS to the deep archive

2.3 Peer Review: PDS will conduct peer reviews of all data submissions to ensure completeness, accuracy, and scientific usability of content.

    2.3.5   PDS will track the status of each peer review

2.4 Acceptance: PDS will accept or reject submitted data.

    2.4.1   PDS will develop and publish procedures for accepting archival data

    3.1   Search: PDS will allow and support searches of its archival holdings

    3.1.3   PDS will provide a means to locate caveats and errata associated with archival data sets, volumes, and products

4.1 Long-Term Preservation: PDS will determine requirements for and ensure long-term preservation of the data

    4.1.1   PDS will develop and implement procedures for periodically ensuring the integrity of the data

The new requirements derived from the use cases for the PDS4 Data Model are:

--- Needs work ---

- The PDS Information Model shall maintain attributes for tracking the archived state of the data including data delivery to PDS, peer review, and delivery to the NSSDC [PDS 2.2.2, PDS 2.4.5]

- The PDS Information Model shall provide standards for distributed discovery and access to data across the archive [PDS 2.8.1, PDS 2.8.2, PDS 2.8.3]

- The PDS Information Model shall provide standards to enable searching the archive [PDS 3.1]

- The PDS Information Model shall support long term preservation of the data in the PDS archive [PDS 4.1]

- The PDS Information Model shall support long term use of the data in the PDS archive [PDS 4.2]

5. References

[1] PDS Roadmap February 2006
[2] PDS Level 1,2,3 Requirements, August 2006
[3] PDS4 Information Model Use Cases, 2008