Plan Document

NASA Planetary Data System

PDS 2010 System

Build 3 Test Plan

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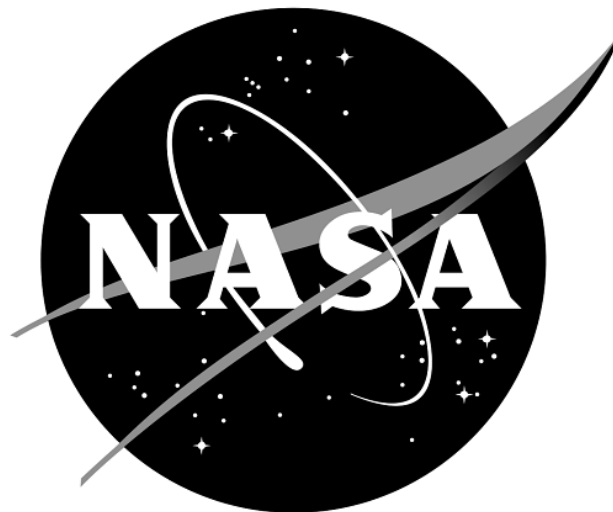
Change Log

Revision	Date	Description	Author
Draft		Initial draft release.	

Contents

1 Introduction

For over fifteen years, the Planetary Data System (PDS) has been NASA's official data system for archiving and distribution of data from planetary exploration missions. It has been a leader in defining data standards, working with missions and instrument teams, and developing data system technologies. The PDS has been instrumental in changing the scientific culture by working with the planetary science community to publicly release and peer review the data it captures. It has also been used as a model by other science data systems interested in establishing distributed scientific networks organized by independent discipline nodes at facilities that are doing leading-edge scientific research.

While PDS has been a leader in developing and exploiting new technologies and ideas, an increasing workload and substantial increases in the volume of delivered data are now threatening the system's ability to accomplish its primary missions of both archiving planetary science data and distributing it to working scientists. PDS identified these challenges in its Roadmap published in 2006. In addition to these challenges, the ten year Roadmap outlined several goals including improving the PDS data standards, increasing user services by leveraging newer technologies and technical standards, and re-architecting PDS to ensure efficient operations of the system while supporting the increasing demands on PDS by both the data providers and end users.

In response to these challenges and goals, PDS has developed a plan for the next generation. The vision, as defined by the PDS Management Council at its April 2008 meeting, includes:

- Simplified, but rigorous, archiving standards that are consistent, easy to learn, and easy to use
- Adaptable tools for designing archives, preparing data, and delivering the results efficiently to PDS
- On-line services allowing users to access and transform data quickly from anywhere in the system
- A highly reliable, scalable computing infrastructure that protects the integrity of data, links the nodes into an integrated data system, and provides the best service to both data providers and users

1.1 Purpose

This Integration and Test Plan with procedures will be utilized by next generation PDS. The System Integration Team will coordinate the testing while defining the scope and depth of testing as confirmed by the Project Manager. The purpose of this Test Plan is to define the plan to be used

to ensure that the new system and the new Standards called "PDS4" are compliant with requirements, meet customer's needs and are free of major defects. This document describes the integration and test activities and contains test cases that demonstrate compliance to requirements. It documents the test scenarios for verification and validation of the system components and data products in an integrated manner. These scenarios are traced to the new PDS system design requirements that in turn are traced to high level of PDS requirements.

1.2 Scope

This test plan describes the plan for verification and validation of Build 3 of the PDS next generation system and Standards. This test plan document identifies the planned test cases for ensuring that specific requirements are implemented and working correctly at the system level. The specific test procedures will be documented in the Build 3 Test Procedure and Report document designed to report specific test steps and results of the tests that demonstrate compliance with PDS requirements. Test resource will include EN and DB staff to perform integration testing. Build 3 Test Report will be generated upon completion.

1.3 Document Revision

Revisions of this document will be held in the PDS Engineering Node website through the use of its document history functionality. Previous versions of this document can be accessed through the use of that tool.

1.4 Applicable Documents

1.4.1 Controlling Documents

[1] Planetary Data System Strategic Roadmap 2006 - 2016, February 2006.

[2] Planetary Data System Level 1, 2 and 3 Requirements, March 2010.

1.4.2 Referenced Documents

[3] PDS 2010 Project Plan, February 2010.

[4] PDS 2010 Operations Concept, February 2010.

[4] System Architecture Specification, May 2010.

[5] General System Requirements, June 11, 2011.

[6] Software Requirements and Design, 2012

[7] PDS4 Documents, 2012

2 Test Approach

The PDS 2010 build structure is organized such that the system can be tested and verified early on and to ensure that transition will be seamless. The builds will ensure there is a coordinated testing and deployment of functionality coupled with upgrades of the data standards.

Build 3 Integration testing is the execution and management of tests by the Operations Team and Discipline Nodes to ensure that the release of Build 3 meets the intended functionality. The process of verification testing includes the selection of verification items, and integration testing.

Any functionality that is added to the system is treated as a new verification item. However, code is not the only type of verification item. Verification items also include documentation and the test code associated. They are as follows:

- Software (operational and test code) in Configuration Management
- The documentation associated with the build
- The PDS4 Standards

3 Test Cases

Every type of PDS4 product will be run through one of the three sequences below to verify that the PDS next generation system properly handles them. These tests will be run as regression to re-test the system after software changes.

Sequence 1 consists of test cases SEQ.A1 to SEQ.A7.

Test Case ID	SEQ.A1
Description	Create a PDS4 Product Label using a design tool. PDS provides the schema specification.
Requirements	L4.PRP.1
Success Criteria	Design tool produces a syntactically valid PDS Product Label else indicates where the label is invalid.

Test Case ID	SEQ.A2
Description	Validate PDS4 label
Requirements	L4.PRP.3
Success Criteria	Validation tool validates a file or all eligible products in a directory tree, indicates the schemas utilized during the validation, and ensures that a product label is well formed XML and conforms to its schemas.

Test Case ID	SEQ.A3
Description	Harvest PDS4 labels
Requirements	L4.REG.3, L4.SEC.1
Success Criteria	Harvest tool, based on criteria given in a user-edited configuration file, discovers all matching artifacts and for each submits metadata to the Registry service. Tools to view the registry show the metadata of the matching artifacts. If the registry is controlled, the security service verifies that the user of Harvest has proper permission.

Test Case ID	SEQ.A4
Description	Search for PDS4 data
Requirements	L4.QRY.*
Success Criteria	Given adequate search terms, Search's results show the data harvested in the previous step.

Test Case ID	SEQ.A5 *not ready
Description	Get PDS4 data
Requirements	

Success Criteria	Download both local and remote data files upon request. Files should match harvested files from step SEQ.A.3

Test Case ID	SEQ.A6 *not ready
Description	Visualize data
Requirements	L4.PRP.5
Success Criteria	Visualize PDS4 data given its corresponding, valid metadata.

Test Case ID	SEQ.A7
Description	Create reports on PDS archiving and distribution
Requirements	L4.RPT.*
Success Criteria	Given sufficient time, reports reflect data harvested and retrieved in earlier steps.

Sequence 2 consists of test cases SEQ.B1, then SEQ.A2 to SEQ.A7.

Test Case ID	SEQ.B1
Description	Create a PDS4 Product Label using Generate, then execute steps SEQ.A2 to SEQ.A7 with parameters relevant to the new label.
Requirements	L4.PRP.2
Success Criteria	Generate produces a syntactically valid PDS Product Label else indicates where the input is invalid.

Sequence 3 consists of test cases SEQ.C1, then SEQ.A4 to SEQ.A7.

Test Case ID	SEQ.C1
Description	Catalog ingests valid PDS3 files into the PDS4 registry, then execute steps SEQ.A4 to SEQ.A7
Requirements	L4.REG.3, L4.SEC.1
Success Criteria	Catalog successfully ingests the PDS3 files into the registry else indicates where the input is invalid. Tools to view the registry show the metadata of the PDS3 files. If the registry is controlled, the security service verifies that the user of Harvest has proper permission.

The table below gets copied into the test procedures…

In the table below, the first column lists (comprehensively as of schema PDS4_0.9.0.0b) the PDS4 product types, while the subsequent columns list the test cases through which the product types have passed. The Build 3 Test Procedures document copies this table, expands some product types into type/subtype for product types like Product_Observational, and fills the cells in with the node(s) that created metadata of the given product type that passed the given test case.

	Design & Validate or Generate & Validate or Catalog	Harvest SEQ.A3	Search SEQ.A4	Retrieve SEQ.A5	Visualize SEQ.A6
Product_Browse					
Product_Bundle					
Product_Collection					
Product_Context					
Product_Document					
Product_File_Text					
Product_Observational					
Product_SPICE_Kernel					
Product_Thumbnail					
Product_Update					
Product_XML_Schema					
PDS4 Context Products Only:					
Ingest_DD					
Product_AIP					
Product_Attribute_Definition					
Product_DIP					
Product_DIP_Deep_Archive					
Product_Data_Set_PDS3					
Product_Delivery_Manifest					
Product_File_Repository					
Product_Instrument_Host_PDS3					
Product_Instrument_PDS3					
Product_Mission_PDS3					
Product_Proxy_PDS3					
Product_SIP					
Product_Service					
Product_Software					
Product_Subscription_PDS3					
Product_Target_PDS3					
Product_Volume_PDS3					
Product_Volume_Set_PDS3					
Product_Zipped					

4 Requirements Traceability

This following lists the requirement number, the ID of the planned test case that tests the requirement, and the system component that the requirement applies to. The first column of the table is just a count of the requirements.

For Test case specific procedures, please refer to the test procedure and report document.

Count	System Component	Requirement #	Test case ID
1	Design	L4.PRP.1	SEQ.A1
2	Generate	L4.PRP.2	SEQ.B1
3	Validate	L4.PRP.3	SEQ.A2
4	Visualize	L4.PRP.5	SEQ.A6
5	Registry	L4.PRP.5	SEQ.A3
6	Report	L4.RPT.*	SEQ.A7
7	Search	L4.QRY.*	SEQ.A4
8	Security	L4.SEC.1	SEQ.A3
9	Harvest	L4.REG.3	SEQ.A3
10	Storage	*not ready	SEQ.A3
11	Transport	*not ready	SEQ.A5

5 Configuration Management and Issue Tracking

Build 3 release will be uniquely identified and under configuration management. PDS Configuration Management (CM) process will be utilized. It will be followed and maintained by the Operations Team who will act as the configuration management process engineer.

The established PDS JIRA system will be used to capture discrepancies found during testing. The system is located at:

http://oodt.jpl.nasa.gov/jira/

6 Test Environment

Build 3 integration and test environment encompasses the following:

Hostname	OS	Memory	Application
localhost (mac)	Mac OS X 10.6.8	4GB RAM	Design, Generate, Validate, Visualize, Harvest
potato	Linux	24GB	Registry, Security, Storage, Transport
pdsbeta	Linux	16GB	Search
pdsops	Linux	12GB	Report

Appendix A: Acronyms

CM – Configuration Management
DN – PDS Discipline or Data Node
GUI – Graphical User Interface
EN – PDS Engineering Node
I&T – Integration and Test
NASA – National Aeronautics and Space Administration
OS – Operating System
PDS – Planetary Data System
PDS3 – Version 3.8 of the PDS Data Standards
PDS4 – Version 4.0 of the PDS Data Standards
PDS 2010 – PDS 2010 Project
PDS MC – PDS Management Council
SDD – Software Design Document
SRD – Software Requirements Document