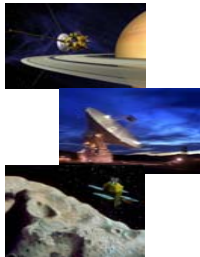




International Planetary Data Alliance

IPDA Architecture Project Report



IPDA Architecture Project

IPDA Steering Committee Meeting
July 2, 2009
Rome, Italy



Outline

- Project Purpose
- Deliverables
- Architecture Definition
- Requirements
- IPDA Support to Data Lifecycle
- Data Architecture Artifacts
- Technical Architecture Artifacts
- Process Architecture Artifacts
- Recommendations to Steering Committee

IPDA Architecture Project

- IPDA, as a virtual system, requires an architecture to enable sharing of data from agency data systems
- Per the IPDA Charter,
 - "It is the belief ... that a worldwide alliance focused on achieving interoperability primarily by agreeing on common data models and dictionaries. As a consequence, distributed archival systems are expected to be developed and maintained by the individual partners in a coordinated manner."
- Architecture project is focused on defining the elements of the architecture and ensuring compliance to the IPDA level 1 and 2 requirements.

Deliverables

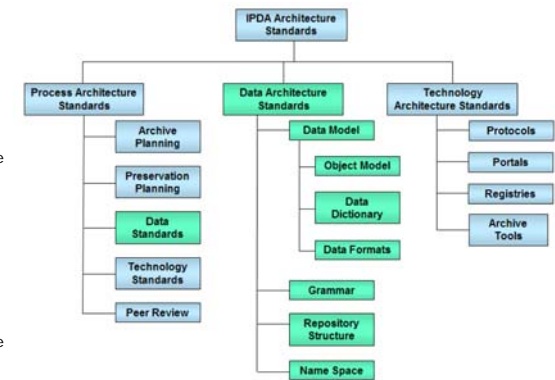
- Produced Architecture Specification posted at
- http://planetarydata.org/standards/IPDA_SystemArch_20090518.pdf/view
- Produced this overview
- Highly related to PDS 2010 effort

Architecture

- Architecture: The fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution. (ANSI/IEEE Std. 1471-2000)
- PDS Reference System Architecture is decomposed into three core pieces:
 - Process Architecture
 - Describes the core processes PDS follows for its system
 - PDS examples: archive management, preservation planning, peer review, standards management, etc
 - Don't expect major changes here
 - Data Architecture
 - Describes the information models and data standards IPDA follows for its system
 - Examples: IPDA data model, IPDA data dictionary, ODL (Grammar), etc
 - Technology Architecture
 - Portals, registry, interfaces, etc
- We care about architecture because it sets the context for how individual parts of IPDA fit together

IPDA System Architecture

- IPDA Reference System Architecture is decomposed into three core pieces:
 - Process Architecture
 - Describes a set of standard processes for planetary science archive data systems
 - Data Architecture
 - Describes a set of data standards for planetary science archive data systems
 - Technology Architecture
 - Describes a set of standards for enabling interoperability between planetary science archive data systems
- IPDA has initiated projects in each of these areas
 - NOTE: Some missing projects which need to be addressed



IPDA Architecture Framework

Requirements

Non-Functional Requirements (i.e. not driving requirements for architecture, but on the organization of IPDA)

- 1.1 IPDA members will represent the interests of archiving activities at their respective international space agency or institution
- 2.3 IPDA will encourage international planetary data archives to share and exchange data using IPDA data standards
- 4.1 IPDA will adopt existing international standards, where necessary, to ensure interoperability and reuse of existing scientific tools
- 4.2 IPDA will encourage member agencies to share, exchange and reuse tools as allowed by their local institutional policies

Functional Requirements on IPDA as an organization

- 2.4 IPDA will maintain a website to help planetary data providers and users to use IPDA standards

Requirements cont...

System Architecture Requirements Drivers

- 2.1 IPDA will develop recommendations for interoperability within a federation of international planetary data archive systems

Technical Architecture Requirements Drivers

- 3.8 IPDA will develop and publish protocols for sharing data between planetary data systems
- 3.9 IPDA will publish standards for querying planetary data system catalogs including standard query models, protocols, and templates of user interfaces

Requirements cont...

Data Architecture Requirements Drivers

- 3.9 IPDA will publish standards for querying planetary data system catalogs including standard query models, protocols, and templates of user interfaces
- 1.3 IPDA will provide guidelines and examples for designing, organizing and including data products and metadata in an archive
- 3.1 IPDA will provide standards for archiving of science data produced during planetary science research including related metadata, calibration data, ancillary data, documented reduction algorithms and processing software
- 3.2 IPDA will develop, maintain, and publish processes for maintaining IPDA data standards
- 3.3 IPDA will maintain a structured data dictionary containing definitions of data elements, their relations, and their scopes in aim to enable standardized descriptions of planetary science data
- 3.4 IPDA will maintain an information model of object classes, their attributes, and relationships to support the archive, search, and management of planetary science data
- 3.5 IPDA will define a standard grammar for describing planetary science data
- 3.6 IPDA will establish minimum required content for a planetary science dataset including both primary and ancillary data
- 3.7 IPDA will structure its data standards to allow planetary data systems to develop their own profiles, i.e. to adopt and extend the standards for local agency, mission and data provider uses

Requirements cont...

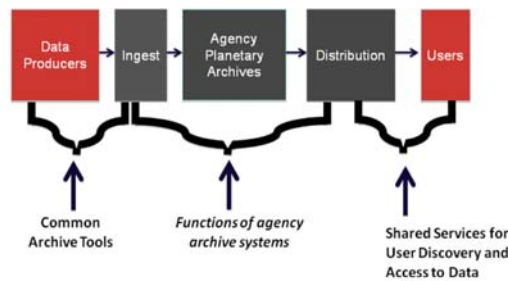
Process Requirements Drivers

- 1.2 IPDA will provide guidelines for data archiving functions including planning, implementing and operating planetary archive systems.
- 1.4 IPDA will provide guidelines for preparing and including documentation and reduction algorithms or software in an archive
- 2.2 IPDA will develop recommendations to support owners of international planetary science data archives in making their data available online

NOTE: No projects currently exist for these requirements drivers

IPDA Support for Data Lifecycle

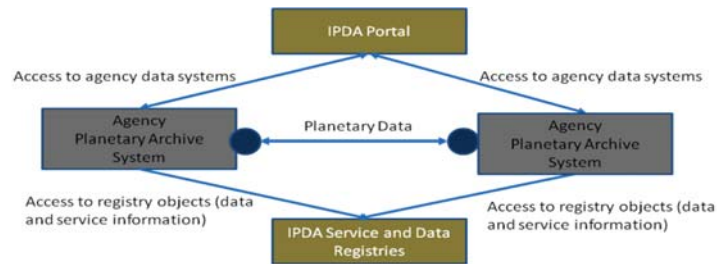
- Data/Process Standards
- Shared archive tools
- Interoperable services



IPDA Data Architecture

Element	Description
Information Model	Identifies the major objects, product types, and query model for IPDA-compliant data
Grammar	Identifies the syntactic structure used to document metadata
Data Dictionary	Identifies the standard keywords used by IPDA
Repository Standards	Identifies the organizational structure for an archive
Name Space Architecture	Identifies the name space structure for IPDA standards

IPDA Data Access and Sharing



IPDA Technical Architecture

Element	Description
Planetary Data Access Protocol	Standard protocol to query data set and product-level catalogs
Registry Services	Catalogs of IPDA service offerings and standard data values
Portal(s)	Access to IPDA information and data

IPDA Process Architecture

Element	Description
IPDA Standards Reference	Identifies minimal standards to be IPDA compliant and includes examples
IPDA Archive Process Guide	Identifies standard process for archiving data

Recommendations to SC

- Close system architecture project
 - However, an action on TEG is to provide comments on the document to Dan
 - Recommend to go to the next level after more technical work is done in IPDA to ensure, for example, the data and technical pieces come together
 - A report on the architecture should be presented next year
- Initiate projects in gap areas (see next slide)
 - Standards identification
 - Shared tools
 - Registry plan

Focused Proposed Projects

Project	Requirement	Recommendation
Shared Tools	4.2	Develop a project that identifies tools developed by IPDA member agencies that can be shared. Post results to the website.
IPDA Standards Website	1.2	Develop a set of standards documents/online guides to navigate IPDA standards and processes. Post results to the website
Shared Registry Plan	2.3	Assemble a plan for sharing common data and information (e.g., missions, instrument information, etc) among member agencies. Present plan for data and services at the next Steering Committee.