IPDA Planetary Data Access Protocol(PDAP) v1.0

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Planetary Data Access Protocol

- Interoperability project created and main delivery:
  - **PDAP (Planetary Data Access Protocol)**

- Concept was born at the ESA/PSA and NASA/PDS Technical Interoperability Meeting, held January 10-12, 2006 in Madrid Spain
- Current version v1.0 draft, under review

- Protocol to access Datasets, products and map-projected data
  - Initially prepared by PSA(ESA) and PDS(NASA) technical experts. Now in collaboration with IPDA Technical experts
  - Four servers implementations (1 PDS, 1 PSA, 2 JAXA)
  - Two client implementations, different flavors
    - PSA Mars Map client: Geometrical searches for PDS/PSA products
    - PDS dataset/product browser: PSA datasets/products access through PDAP
    - Plans to include PDAP client in new archive versions

Planetary Data Access Protocol

- PDAP is a two steps protocol:

  - Metadata Access: Software Clients search for available data that match certain criteria. The matching criteria includes specific protocol metadata and PDS keywords

  - Data Retrieval: Software client retrieve through a synchronous HTTP GET/POST request using a reference URL returned from first step

- Any PDAP server service implementation should be registered. Registration allows service discovery and get access to publisher/curation information

  - Interchange default format is VOTable (XML). This format can be easily parsed by a client and displayed in different ways

VEX Interoperability Project Definition
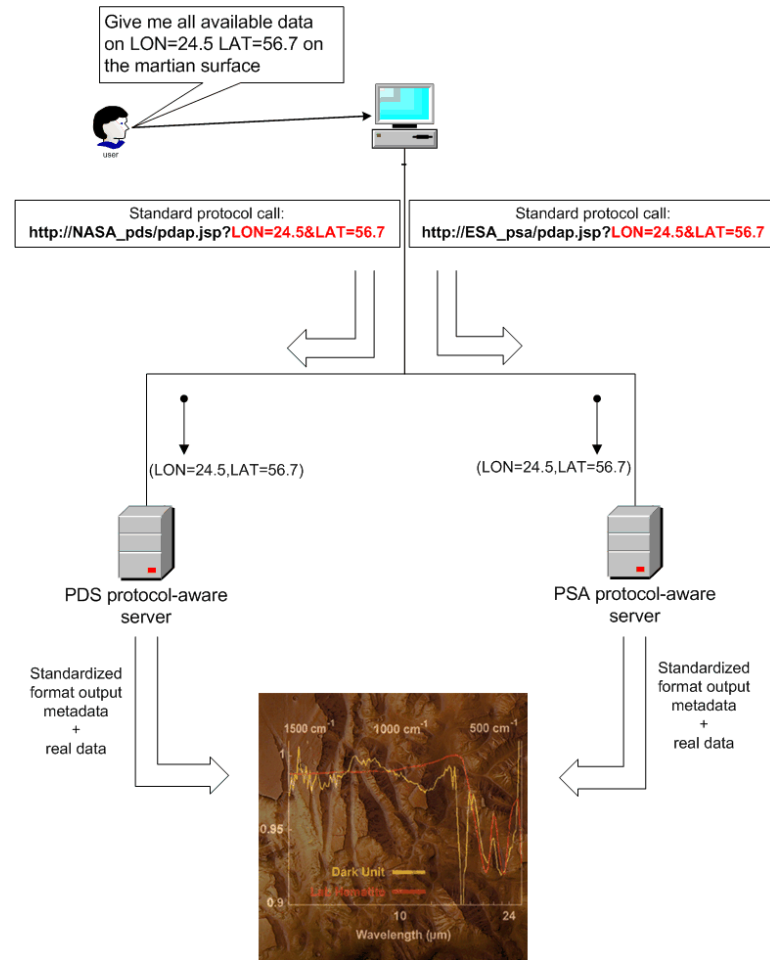
- PDS Atmospheres Node should have access to VEX Datasets @ PSA
- PDS Atmospheres Node should not need to copy across the data from PSA but data location URLs will point to PSA
- PDS Atmospheres Node should be able to create a uniform display for datasets located at PDS and at PSA

- **PDAP approach to the use case:**
  - PDS Atmospheres Node will query for new data sets at PSA and the corresponding VOTable(s) data set descriptions
  - Using a VOTable parser, a view of the dataset will be displayed at PDS pages
  - URL Pointers are provided, so the server has the freedom to use static or dynamic links

Project description

- Create first public version of PDAP
- Problems found to find stable version of the protocol:
    - New data types to be analyzed
    - Not standard way to publish proprietary data
    - Not standard way to use pagination
    - Free query language not defined
    - ...
- However, there is a need from some projects to have a stable version in order to enter in operations phase
- **Proposal:** Simple/basic PDAP protocol to be agreed within IPDA context
- Start recommendation process within IPDA context of this protocol
- Try to decouple minimal requirements of a PDAP specification and identify possible extensions

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Feedback from community…

- **What would you like the VO to do?**

  Handle planetary science data !

- **Have you ever used any VO tools?**

  Visualization tools + archive search

- **Did you like them?**

  Basic functions are correctly handled in Astronomy context

- **How would you improve them?**

  Enlarge currently existing protocols to support planetary science data. Support specific planetary science protocols (PDAP, currently under definition) so as to include at least the major space data archives. Support conversions from specific data formats (PDS.) Coordinate systems conversion (not only alpha/delta, but also latitude/longitudes and control point networks) Solar system name resolver

- **Are there any tools that you would like to see in the VO?**

  Possibly external interfaces to Geographic Information Systems. Handling of pixel structure / footprint in mapping tools (for imaging spectrometers)

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Changes in version 1.0

- **Resource Class**: Only data set, product and map-projected data is described in the specification. It is described how to extend these basic classes and this would be done in separate documents.
- **Version handling:** Added
- **Pagination**: Not added. To be explained later
- **Ellipse** has been removed as possible footprint due to the lack of use and difficult geometrical definition. Only polygon, circle and landmark supported (need for more?)
- **Registration of services:** External link to registry work in IPDA or other registration efforts. Details out of the scope of PDAP
- **BNF removed** as considered by some authors as not very useful and confusing . To be extracted as a separate document
- **Image services called now Map-projected data** services as it defines products with a footprint attached. (is there a better word for that?)
- **References** added
- **Basic UML added** to clarify interrelations between the various resource classes and to clarify where PDAP extensions could be developed.
- **Propietary data:** Not added. To be explained later

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Free Query Syntax

- Need of a better granularity in the PDAP queries; in SQL syntax availability of "SELECT" and "WHERE" free conditions
- Introduction of RESULT parameter as per Steve Hughes proposal
- Similar work done in IVOA context (TAP Table Access Protocol)
    - This is an example1 of the URL for a synchronous ADQL query on *r* magnitude:

        `http://example.com/tap/sync?REQUEST=doQuery&LANG=ADQL&`

        `QUERY=SELECT * FROM magnitudes as m where m.r>10 and m.r<16`
    - The URL for an equivalent PQL query would be:

        `http://example.com/tap/sync?REQUEST=doQuery&LANG=PQL&`

        `FROM=magnitudes&WHERE=r,10/16`
- Option 2 could be included in a basic PDAP version but authors seem to prefer option 1 for a full support
- This implies a full query language (SQL like or similar)
- **New recommendation needed 1:**
  Definition of a query language for planetary data

Version handling

- A PDAP compliant output **SHOULD** contain an INFO tag with name PDAP_VERSION and value the PDAP specification version implemented by the service. This INFO tag must be inside the RESOURCE tag due to VOTable compatibility. (see RESOURCE_CLASS=METADATA output as an example). This information should appear in a RESOURCE_CLASS=METADATA discovery query.

- This tag has two different uses:
    - Provide information to client applications about the version of the PDAP specification implemented by the PDAP server so clients could prevent parsing problems.
    - Allow automatically discover version information by registry servers.

```
<INFO name="PDAP_VERSION" value="0.5"/>
```

Pagination handling

- Neither IVOA data access protocols nor OpenGIS protocols offer pagination tags
- Only IVOA registry offers pagination and pure Google kml services can be paginated
- There is not standard way to add pagination info in VOTable header
    - IVOA VOTable group and VOTable parsers developers contacted on this particular point
- This could be considered a deviation from this other VOs but it could be added in PDAP v1.0 if TEG members consider it necessary
- **Action 1: TEG to decide if version 1.0 should contain pagination tags. If yes:**
- **Action 2: TEG to decide tags and PDAP authors to update document accordingly**

New resource classes

– Flyby discussion

New resource classes (II)
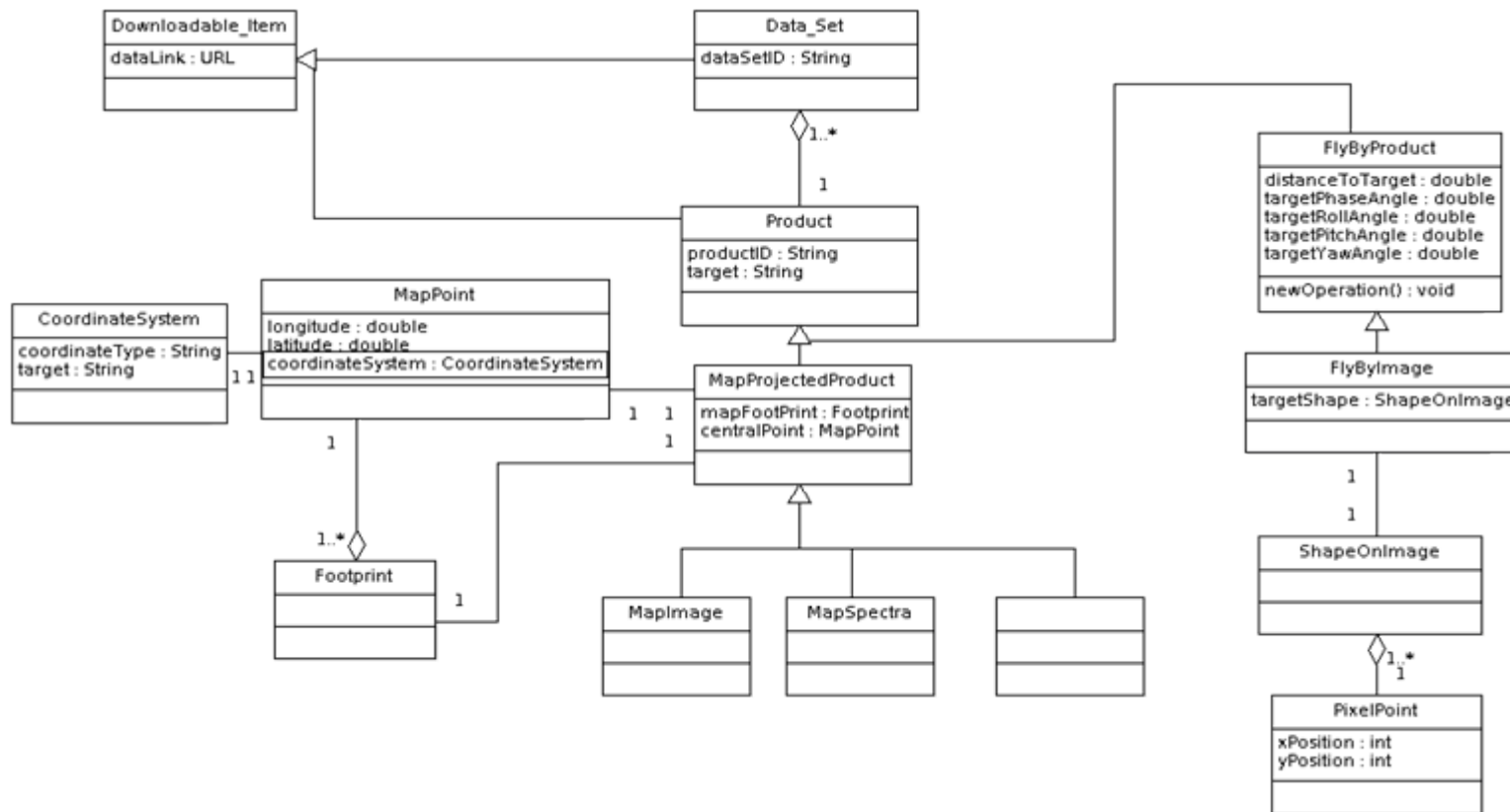
- PDAP is and object based protocol
- Not all the possible extensions of product can be defined inside PDAP. Two options:
  - Update PDAP specification every time a new resource class is defined
  - Define a way to create new resource classes
- Option 2 is the one recommended by PDAP authors
- New resource classes can be created. These would be extensions of products so a client should be able to instance these new services in product mode
- **Action 3:**

  Describe in PDAP how to create new resource classes (Done)
- **New recommendation needed 2:**

  Fly-by and single file access definitions (these can be used as a reference for future extensions)

Registration of PDAP services

– Details of registration removed from PDAP specification

– Link to registry group effort. Decision to be taken:

  – PDS profile service; almost ready

  – Use/adapt EuroVO registry; this could be useful for some datasets
    that can have complementary VO resources

– Approaches does not exclude each other

– **New recommendation needed 3:**

  Registration of services within IPDA

– **Action 4:**

  **Steering Committee to decide if IPDA services should/can be
  registered in, e.g. IVOA registries**

Proprietary data

- PDAP services are only fully described for public data
- For proprietary data some issues need to be solved:
    - Which secure protocol should be used?
    - Do we need single-sign-on?
    - Should the users centralized in a single place? (users can have different roles/names/privileges in different planetary data centers)
- As the previous points are difficult to be solved in a basic PDAP specification, fully support has not been included
- Simple tag to show datasets/products in the response but alerting that the data cannot be retrieved by non-authorized users??
- **New recommendation needed 4:**

    User handling within IPDA

OpenGIS Service Map

- PDAP map-projected services are not very far from kml services required by Google API

- Some differences:
  - PDAP services are designed to expose science data. Google is oriented to general public (fully process data)
  - Most of the data cannot be easily exposed in a Google "Map"

- It was discussed within PDAP authors the creation of a standard return_type=kml so PDAP can be consumed by Service Map kml services

- A PDAP to KML converter (e.g. XSLT) could be generated to allow the display of PDAP services on top of Google Map like applications

- **New IPDA project:**

  Server translator (XSLT?) PDAP -> Map Service

Summary of actions and recommendations

- **New recommendation needed 1:** Definition of a query language for planetary data
- **New recommendation needed 2:** Fly-by and single file access definitions (these can be used as a reference for future extensions)
- **New recommendation needed 3:** Registration of services within IPDA
- **New recommendation needed 4:** User handling within IPDA
- **New possible IPDA project:**

  Server translator (XSLT?) PDAP to Map Service
- **Action 1:** TEG to decide if version 1.0 should contain pagination tags. If yes:
- **Action 2:** TEG to decide tags and PDAP authors to update document accordingly
- **Action 3:** Describe in PDAP how to create new resource classes (Done)
- **Action 4:** Steering Committee to decide if IPDA services should/can be registered in, e.g. IVOA registries

THANK YOU

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IPDA PDAP v1.0

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