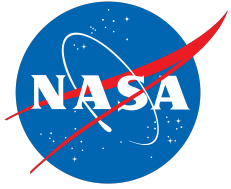




APIs and Interfaces

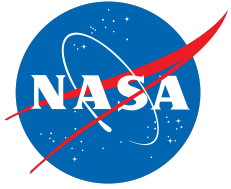
PDS Technical Session
Pasadena, California
September 21-23, 2016

Sean Hardman



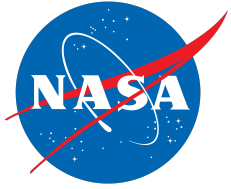
Topics

- Overview
- Registry API
- Search API
- Transport API



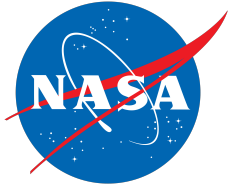
Overview

- One of the goals early on in development was to provide REST-based interfaces for the service components.



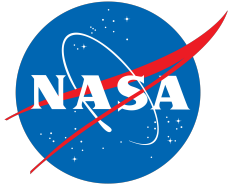
Registry API

- Registry protocol implemented as a REST-based interface over HTTP.
 - <http://pds.nasa.gov/services/registry-pds3>
 - <http://pds.nasa.gov/services/registry-pds4>
- Supports return of paged results in a defined structure (e.g., XML or JSON).
- Documentation for the protocol can be found at the /docs end point from any instance.



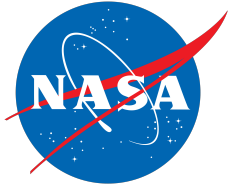
Search API Aspects

- Data Discovery
 - Focuses on discovering content, whether at the catalog or product level.
 - Facilitated by support for search parameters and paged result sets.
- Data Access
 - Focuses on retrieval of product files.
- Service Linking
 - Focuses on passing search parameters from one service to another.
 - Deployment of the Search Service facilitates parameter passing and integration.



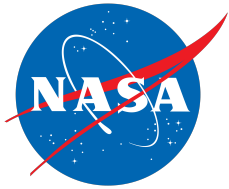
PDS Search Protocol

- PDS search protocol implemented as a REST-based interface over HTTP.
 - <http://pds.nasa.gov/search?target=mars>
- Supports return of paged results in a defined structure (e.g., XML or JSON).
- Implementation of this protocol across PDS facilitates parameter passing and integration.



PDS Search Protocol (cont)

- Common PDS-based parameters
 - identifier, instrument, investigation, etc.
- Supports simple and advanced syntaxes
 - Simple syntax closely follows HTTP
 - Advanced syntax closely follows Apache Lucene/Solr
- Supports multiple result set formats
 - Default format available in XML and JSON
- All the above detailed in the PDS Search Protocol document.



Search for Venus Data

Via REST-Based Interface (PDS Protocol)

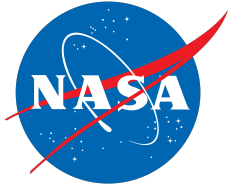
<https://pds.nasa.gov/services/search/search?target=venus&return-type=xml>

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
- <response>
- <lst name="responseHeader">
  <int name="status">0</int>
  <int name="QTime">1</int>
  - <lst name="params">
    <str name="target">venus</str>
    <str name="return-type">xml</str>
  </lst>
</lst>
- <result name="response" numFound="301" start="0" maxScore="7.700706">
- <doc>
  - <arr name="instrument_type">
    <str>RADAR</str>
  </arr>
  - <arr name="form-instrument-type">
    <str>RADAR</str>
  </arr>
  - <arr name="search_engine_type">
    <str>VENUS</str>
  </arr>
  <str name="title">Magellan Image Search</str>
  <str name="search_id">SearchTool_Magellan Image Search</str>
  <str name="identifier">SearchTool_Magellan Image Search</str>
  - <arr name="investigation_name">
    <str>MAGELLAN</str>
  </arr>
  - <arr name="form-investigation">
    <str>MAGELLAN</str>
  </arr>
</doc>
</result>
</response>
```

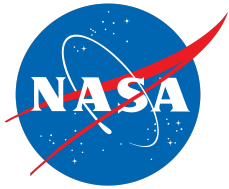
Paged result set returned in XML format. This protocol also supports JSON format.

Libraries available (e.g., Java, Javascript, Python, etc.) for interfacing with Apache Solr.



PDAP Search Protocol

- PDAP search protocol implemented as a REST-based interface over HTTP.
 - http://pds.nasa.gov/search/pdap?TARGET_NAME=MARS
- Supports return of paged results in the VOTABLE structure.
- Currently limited to data set search support.
- All the above detailed in the PDAP Search Protocol document.



Search for Venus Data

Via REST-Based Interface (PDAP Protocol)

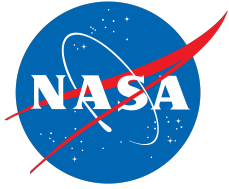
https://pds.nasa.gov/services/search/pdap?TARGET_NAME=VENUS&RESOURCE_CLASS=DATA_SET

```
Source of: https://pds.nasa.gov/services/search/pdap?TARGET_NAME=VENUS&RESOURCE_CLASS=DATA_SET

1 <?xml version="1.0" ?>
2 <VOTABLE version="1.1">
3   <RESOURCE type="results">
4     <DESCRIPTION>NASA Planetary Data System PDAP Query Service</DESCRIPTION>
5     <INFO name="PDAP VERSION" value="1.1"/>
6     <INFO name="QUERY STATUS" value="OK"/>
7     <PARAM name="TOTAL RECORDS" value="283"/>
8     <PARAM name="PAGE NUMBER" value="1"/>
9     <PARAM name="PAGE SIZE" value="50"/>
10    <TABLE>
11      <FIELD ID="DATA_SET.DATA_SET_ID" ucd="DATA_SET_ID" utype="pdap:DATA_SET.DATA_SET_ID" datatype="char"
12      <FIELD ID="DATA_ACCESS_REFERENCE" ucd="DATA_ACCESS_REFERENCE" utype="pdap:DATA_ACCESS_REFERENCE" data
13      <FIELD ID="DATA_SET.DATA_SET_NAME" ucd="DATA_SET_NAME" utype="pdap:DATA_SET.DATA_SET_NAME" datatype="
14      <FIELD ID="DATA_SET.INSTRUMENT_ID" ucd="INSTRUMENT_ID" utype="pdap:DATA_SET.INSTRUMENT_ID" datatype="
15      <FIELD ID="DATA_SET.INSTRUMENT_HOST_NAME" ucd="INSTRUMENT_HOST_NAME" utype="pdap:DATA_SET.INSTRUMENT
16      <FIELD ID="DATA_SET.INSTRUMENT_TYPE" ucd="INSTRUMENT_TYPE" utype="pdap:DATA_SET.INSTRUMENT_TYPE" data
17      <FIELD ID="DATA_SET.INSTRUMENT_NAME" ucd="INSTRUMENT_NAME" utype="pdap:DATA_SET.INSTRUMENT_NAME" datatype="char" arrays
18      <FIELD ID="DATA_SET.PRODUCER.INSTITUTION_NAME" ucd="INSTITUTION_NAME" utype="pdap:DATA_SET.INSTITUTION_NAME" datatype="char" ar
19      <FIELD ID="DATA_SET.PRODUCER.NODE_NAME" ucd="NODE_NAME" utype="pdap:DATA_SET.NODE_NAME" datatype="char" arrays
20      <FIELD ID="DATA_SET.PRODUCER.FULL_NAME" ucd="FULL_NAME" utype="pdap:DATA_SET.PRODUCER.FULL_NAME" datatype="char" arrays
21      <FIELD ID="DATA_SET.MISSION_NAME" ucd="MISSION_NAME" utype="pdap:DATA_SET.MISSION_NAME" datatype="char" arrays
22      <FIELD ID="DATA_SET.START_TIME" ucd="START_TIME" utype="pdap:DATA_SET.START_TIME" datatype="char" arrays
23      <FIELD ID="DATA_SET.STOP_TIME" ucd="STOP_TIME" utype="pdap:DATA_SET.STOP_TIME" datatype="char" arrays
24      <FIELD ID="DATA_SET.TARGET_TYPE" ucd="TARGET_TYPE" utype="pdap:DATA_SET.TARGET_TYPE" datatype="char" arrays
25      <FIELD ID="DATA_SET.TARGET_NAME" ucd="TARGET_NAME" utype="pdap:DATA_SET.TARGET_NAME" datatype="char" arrays
26      <FIELD ID="RESOURCE_CLASS" ucd="RESCCLASS" utype="pdap:RESOURCE_CLASS" datatype="char" arrays
27      <FIELD ID="DATA_SET.REFERENCE_FORMAT" ucd="REFERENCE_FORMAT" utype="pdap:DATA_SET.REFERENCE_FORMAT" datatype="char" arrays
28      <FIELD ID="DATA_SET.PUBLISHER" ucd="PUBLISHER" utype="pdap:DATA_SET.PUBLISHER" datatype="char" arrays
29      <FIELD ID="DATA_SET.CONTRIBUTOR" ucd="CONTRIBUTOR" utype="pdap:DATA_SET.CONTRIBUTOR" datatype="char" arrays
30      <FIELD ID="DATA_SET.PUBLISHING_DATE" ucd="PUBLISHING_DATE" utype="pdap:DATA_SET.PUBLISHING_DATE" datatype="char" arrays
31      <FIELD ID="DATA_SET.RIGHTS" ucd="RIGHTS" utype="pdap:DATA_SET.RIGHTS" datatype="char" arrays
32    </TABLE>
33    <TABLEDATA>
34      <TR>
35        <TD>VEX-V-VRA-1/2/3-NMP-0027-V1.0</TD>
36        <TD>http://psa.esac.esa.int:8000/aio/jsp/metadata.jsp?DATA_SET_ID=VEX-V-VRA-1/2/3-NMP-0027-V1.0&RETURN_TYPE=HTML</TD>
37        <TD>VEX-V-VRA-1/2/3-NMP-0027-V1.0</TD>
38        <TD>VRA</TD>
39        <TD></TD>
40        <TD></TD>
41        <TD>VENUS EXPRESS ORBITER RADIO SCIENCE</TD>
42        <TD>esa</TD>
43        <TD>psa</TD>
44        <TD>VENUS EXPRESS RADIO SCIENCE TEAM</TD>
45        <TD>VENUS EXPRESS</TD>
```

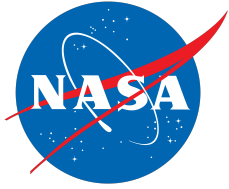
Paged result set returned in VOTable format.

Still working on a full implementation of the PDAP Protocol.



Transport API

- Transport protocol implemented as a REST-based interface over HTTP.
 - <http://pds.nasa.gov/services/transport-ofsn?ofsn=>
 - <http://pds.nasa.gov/services/transport-registry?identifier=>
- The OFSN service has an interface of its own.
- The Registry service protocol is much closer to the PDS Search Protocol and is described in the same document.



Next Steps

- As previously stated, the PDAP protocol support needs to be completed.
- In addition, the PDS protocol needs to provide support for additional parameters.
 - The initial implementation focused on parameters to support mapping to PDS3 parameters.

Questions/Comments