PDS4 Tools Overview

PSG PDS4 Training Session
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Topics

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Overview

- ## PDS Engineering Node (EN) focuses on developing and maintaining core PDS tools
  - This includes generation, validation, transformation and inspection of PDS products

- ## Updates are released every six months
  - Around March and September each year
  - Updates coincide with releases to the PDS4 Data Information Model

- ## Presentation will focus on giving a high-level description of each of the core PDS tools

Generate Tool

- Creates PDS4 labels from PDS3 metadata using the Velocity template engine
- Java Based Command-Line Tool, although it can be used as a library
- There are a couple of feature requests in the queue to expand metadata input options
  - Currently, the tool accepts a PDS3 label or a similarly formatted file such as a list of key-value pairs.
- There are plans for consolidating the various Velocity templates written by end users into a singular place for easy retrieval
  - Encourages reuse and helps to avoid any duplication efforts
  - Helps new users of Velocity on how to write their own templates if needed
  - The Velocity web site and Generate Tool Operational Guide also provide help on how to write up a Velocity Template

https://pds.nasa.gov/tools/about/generate/

Validate Tool

- Java Based Command-Line Tool
- Performs syntactic and semantic validation via the XML Schema and 350+ Schematron rules pertaining to PDS4 label structure and content
- Performs data content validation of tables and arrays against the label description
- For bundles ready to be archived, the tool can perform Bundle and Collection referential integrity checking
- Tool allows you to provide your own Schemas and Schematrons to validate against
  - For Europa, mission-specific dictionaries will be created so this feature allows you to validate with these custom dictionaries against the products being created by the mission

https://pds.nasa.gov/tools/about/validate/

Transform Tool

- Java Based Command-Line Tool
- Transforms PDS3 and PDS4 product labels and product data into common formats
- The tool supports approximately 29 transformations as of the latest release
- Notable PDS4 Transformations include
  - Array_2D_Image, Array_3D_Image, Array_3D_Spectrum to JPG, JPEG 2000, GIF, PNG, TIFF
  - Table_Binary, Table_Character, Table_Delimited to CSV
- Actively adding in new transformations with each release of the tool
  - Next release will add in Array_2D_Image to FITS

https://pds.nasa.gov/tools/about/transform/

Inspect Tool

- Desktop application that will provide support for visualizing PDS4 and PDS3 products
  - Currently only supports PDS4 products
  - Actively working on supporting PDS3 products
- Eventually planned to replace NASAView
- Currently available as a prototype
  - Release planned for end of year 2018
  - Recently made available to the PDS Tool Working Group so that they could provide us some initial comments and feedback

Tool Registry

- Web application that enables search and discovery of tools, services, and APIs that work with PDS data
- Tools have been submitted by the PDS community
  - 84 currently registered
- Interface
  - Allows for search and discovery of these tools
  - Allows tool providers to submit software for inclusion into the registry

http://pds.nasa.gov/tools/tool-registry

Libraries

- ## If interested in writing your own software, the PDS EN has a couple of libraries that might be of help
  - ### Core
    - Underlying library that is called by the Validate Tool
    - Does most, if not all, of the heavy lifting of the validation functionality
  - ### PDS4-Tools
    - Accesses contents of the PDS4 data objects
    - Called by Validate Tool to assist in data content validation
    - Called by Transform Tool to transform PDS4 products into common formats
- ## Both software packages have been approved for Open Source release (available on GitHub later this year)

https://pds.nasa.gov/tools/about/core/
https://pds.nasa.gov/tools/about/pds4-tools/

Wrap Up

- ## Generate, Validate, and Transform Tool are Command-Line Based Tools
  - However, they can be incorporated into a Pipeline Service for automation purposes (e.g. AMMOS-PDS Pipeline Service)

- ## Software is made available from the PDS site
  - Links to each tool can be found at the bottom of each slide
  - Inspect Tool will be released by the end of this year

- ## Before attempting to write your own software, visit the Tool Registry first to see if a relevant tool already exists

- ## Helpful Resources
  - PDS4 Standards Reference: https://pds.nasa.gov/datastandards/documents/sr/
  - PDS4 Information Model: https://pds.nasa.gov/datastandards/documents/im/
  - PDS4 Schemas: https://pds.nasa.gov/datastandards/schema/

Questions/Comments