



# PPI Node Server

PDS Technical Session  
April 6, 2005

# Basis

- Do the most needed in the most direct way.
  - Efficiency is important.
  - Don't overburden a solution with technology.  
(Layered models help understand the problem, but are not the best solution)
- Metadata is the enabler
  - Metadata must be portable.
    - Never use the filesystem for metadata.  
(directory structure/names, file names, etc..)
    - Volume structure is for people.
  - Databases are transient.
    - Only the label is persistent
- Keep management close to the source.
  - Inventories should reside with the products.
  - Incremental build of datasets.

# PPI Node Server

- Application server

- Servlet

- A servlet for each function (division of tasks).
    - Quick response (extension of server).
    - Easy to extend.
    - Portable – broad commercial support.
    - Well documented and supported interface.

- Can be personalized

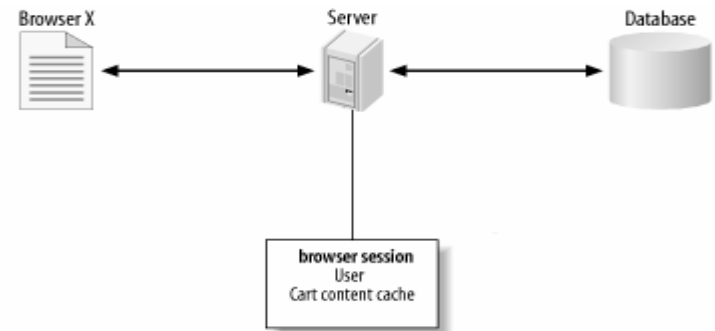
- “portal” philosophy
    - “.pds” file type

- Datacart

- Shopping for data.

# Data Cart

- A user can add a product to the cart while inspecting inventory.
- A user can take delivery of the cart contents as a single zip file.
- Contents of zip file are organized like a PDS volume.  
(i.e. data in a DATA directory, documents in a DOCUMENT directory)





# Tools and Servlets

All Tools and servlets are written in Java.

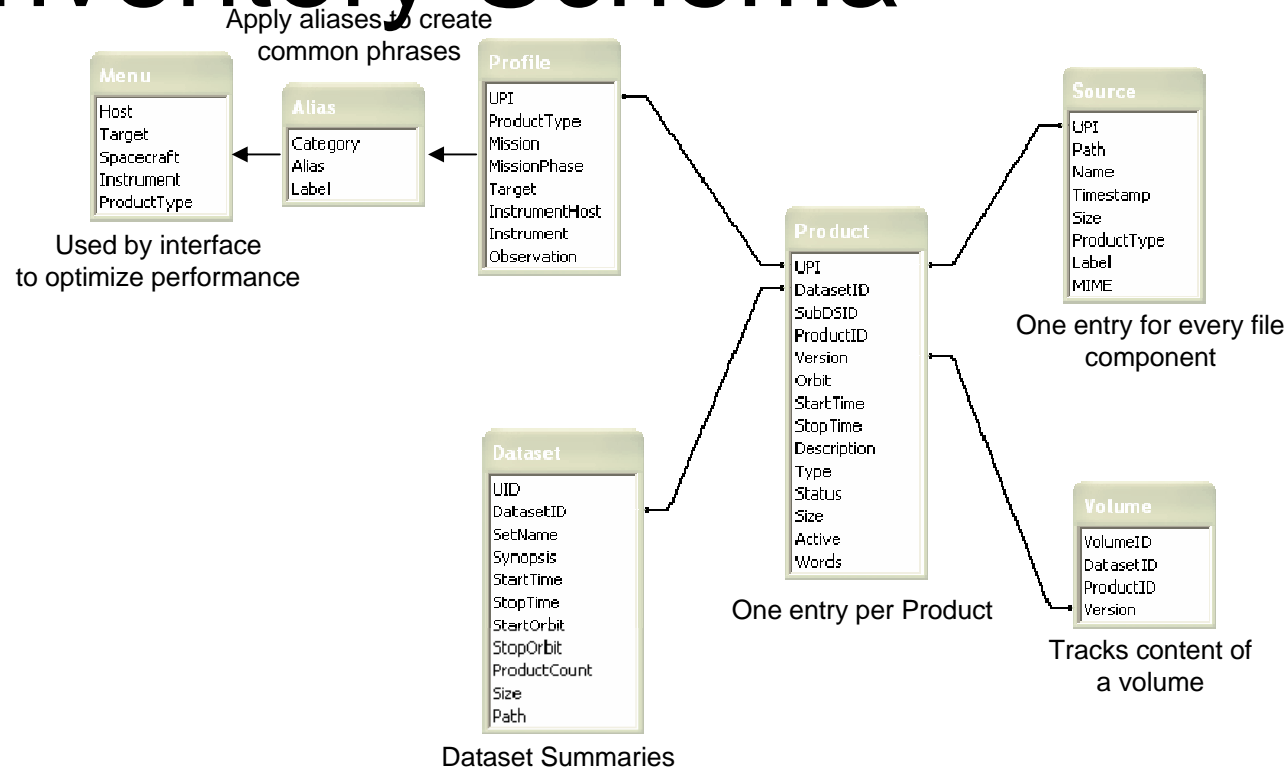
- inventory: Scans labels and catalog files, extracts metadata and updates inventory database.
- labeler: A label generator with plug-ins.
- PDSLabel: A label parser class used by “inventory” and “labeler”.
- servlets – simple and task specific.



# Servlets

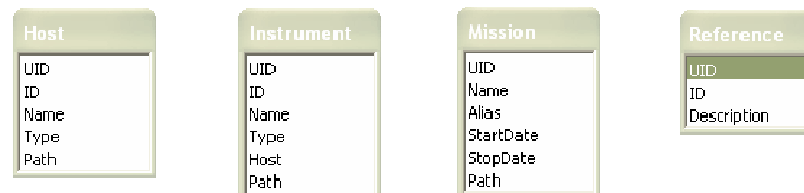
- AddCartServlet: Adds an item to the data cart.
- DatasetServlet: Queries for datasets.
- DeliverServlet: Package and stream products or data cart.
- DitdosServlet: Primary entry point, routes requests to specialized servlets.
- HostServlet: Queries host (spacecraft) table.
- InstrumentServlet: Queries instrument table.
- MissionServlet: Queries mission table.
- OptionsServlet: Access and management of session options.
- PageletServlet: Streams snippets of HTML.
- ProductServlet: Queries for products.
- ProfileServlet: Queries for profiles.
- ReferenceServlet: Queries the references table.
- SearchServlet: Presents search menus and routes requests.
- ShowCartServlet: View and manage the data cart.
- SourceServlet: Queries source file table.
- ViewServlet: Stream a file for viewing.

# Inventory Schema



## Catalog Tables

Used to provide depth for ID lookup



# The Interface

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Planetary Data System  
**Planetary Plasma Interactions**

Home Overview Data Software Personnel Related Sites About PDS

Preferences Search Deliver View Cart

Target Spacecraft Instrument Product Type Time Clear Apply Show Product

☐ Deep Space 1  
☐ Interplanetary Cruise  
☐ Mars Global Surveyor  
☐ Pioneer Venus Orbiter  
☐ Voyager 2

☐ Galileo  
☐ Magellan  
☐ Mars Odyssey  
☐ Voyager 1

Selections: Matching products: 273,515

PDS Nodes: Atmospheres Central Geosciences Imaging NAIF PPI Rings Small Bodies

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Planetary Plasma Interactions

Home Overview Data Software Personnel Related Sites About PDS

Preferences Search Deliver View Cart

Target Spacecraft Instrument Product Type Time Clear Apply Show Product

Selections: Target: Jupiter; Spacecraft: Galileo; Product Type: Data

Sort on: Dataset Product Start Time Stop Time

Total: 10,566 Displaying: 1 to 20 Pages: 1 2 3 4 5 6 7 8 9 10 11 ... 222

GO-JEPD-2-BEOR-HIGHRES-SECTOR-V1.0-C\_ORB\_02\_1996\_255\_P5X\_16.t  
+ Add To Cart  
C\_ORB\_02\_1996\_255\_P5X\_16.TAB contains Galileo EPD high resolution (LPV) 16 sector data pitch angle distribution data that have been corrected for detector cycle gaps. The da  
Version: 1; Size: 1.43 MB; Time: 1996-0-9-11: 0:2:38:24 - 1996-0-9-11: 0:3:17:48; Orbit: 2; Type: DATA  
Details

GO-JEPD-2-BEOR-HIGHRES-SECTOR-V1.0-C\_ORB\_02\_1996\_255\_P5X\_32.t  
+ Add To Cart  
C\_ORB\_02\_1996\_255\_P5X\_32.TAB contains Galileo EPD high resolution (LPV) 32 sector data pitch angle distribution data that have been corrected for detector cycle gaps. The da  
Version: 1; Size: 633.29 KB; Time: 1996-0-9-11: 0:2:38:24 - 1996-0-9-11: 0:3:17:48; Orbit: 2; Type: DATA  
Details

GO-JEPD-2-BEOR-HIGHRES-SECTOR-V1.0-C\_ORB\_02\_1996\_255\_P5X\_64.t  
+ Add To Cart  
C\_ORB\_02\_1996\_255\_P5X\_64.TAB contains Galileo EPD high resolution (LPV) 64 sector data pitch angle distribution data that have been corrected for detector cycle gaps. The da  
Version: 1; Size: 643.02 KB; Time: 1996-0-9-11: 0:2:38:24 - 1996-0-9-11: 0:3:17:48; Orbit: 2; Type: DATA  
Details

GO-JEPD-2-BEOR-HIGHRES-SECTOR-V1.0-C\_ORB\_03\_1996\_310\_TAR\_16.t  
+ Add To Cart  
C\_ORB\_03\_1996\_310\_TAR\_16.TAB contains Galileo EPD high resolution (LPV) 16 sector data pitch angle distribution data that have been corrected for detector cycle gaps. The da  
Version: 1; Size: 1.52 MB; Time: 1996-1-1-05: 0:7:04:37 - 1996-1-1-05: 0:7:43:59; Orbit: 3; Type: DATA  
Details

GO-JEPD-2-BEOR-HIGHRES-SECTOR-V1.0-C\_ORB\_03\_1996\_310\_TAR\_32.t  
+ Add To Cart  
C\_ORB\_03\_1996\_310\_TAR\_32.TAB contains Galileo EPD high resolution (LPV) 32 sector data pitch angle distribution data that have been corrected for detector cycle gaps. The da  
Version: 1; Size: 889.99 KB; Time: 1996-1-1-05: 0:7:04:37 - 1996-1-1-05: 0:7:44:00; Orbit: 3; Type: DATA  
Details



# What's Been Learned

- Connections to databases must be established at initialization.
  - Establishing a connection can take many seconds, so resident services (like servlets) are better than non-resident (cgi).
- Using a different connection for each type of query improves performance because of results caching.
  - Initial query (loading the cache) may take several seconds.
  - Subsequent queries can take 10th of a second.
- Scalability is a real issue.
  - The larger the inventory the longer it takes.
  - It appears that dividing inventory into many tables (i.e., one per dataset?) will improve performance.
- Choose the right time for locking in structure.
  - Incremental building of datasets means a volume isn't a volume until sometime in the future.
- Stability of Sun's Application Server is questionable.

# Other Considerations

## ■ Could OODT be used?

- The Node server is a local service so multiple layers of abstraction is unnecessary.
- Currently queries are to a MySQL database which resides on the same server. Any database system could be used.

## ■ System Design

- Define messages not implementations

### because

- Success of the web is URLs and HTML.
- PDS labels are effective because they are independent of implementation.
- All components of an implementation should be replaceable. Message content (metadata) is persistent.
- Nodes and projects have different environments and need flexibility in implementation.

# System Wide Services

## ■ System Design

□ Define messages not implementations

### **because**

- Success of the web is URL and HTML.
- PDS labels are effective because they are independent of implementation.
- All components of an implementation should be replaceable. Message content (metadata) is persistent.
- Nodes and projects have different environments and need flexibility in implementation.
- Single interface (multiple implementations)

# System Wide Search Service

