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Information Model Translation to Support a Wider Science Community

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The Planetary Data System (PDS), NASA's long-term archive for solar system exploration data, has just released PDS4, a modernization of the PDS architecture, data standards, and technical infrastructure. This next generation system positions the PDS to meet the demands of the coming decade, including big data, international cooperation, distributed nodes, and multiple ways of analysing and interpreting data. It also addresses three fundamental project goals: providing more efficient data delivery by data providers to the PDS, enabling a stable, long-term usable planetary science data archive, and enabling services for the data consumer to find, access, and use the data they require in contemporary data formats.

The PDS4 information architecture is used to describe all PDS data using a common model. Captured in an ontology modeling tool it supports a hierarchy of data dictionaries built to the ISO/IEC 11179 standard and is designed to increase flexibility, enable complex searches at the product level, and to promote interoperability that facilitates data sharing both nationally and internationally.

A PDS4 information architecture design requirement stipulates that the content of the information model must be translatable to external data definition languages such as XML Schema, XMI/XML, and RDF/XML. To support the semantic Web standards we are now in the process of mapping the contents into RDF/XML to support SPARQL capable databases. We are also building a terminological ontology to support virtually unified data retrieval and access.

This paper will provide an overview of the PDS4 information architecture focusing on its domain information model and how the translation and mapping are being accomplished.