

NASA PLANETARY DATA SYSTEM EN NODEM(PDS) PERFORMANCE REVIEW

PANEL EVALUATION OF PROPOSAL SUBMITTED IN RESPONSE TO NASA CALL NOV 11, 2015

Proposal Number: 16-PDSPR16-0001

Proposal Title: Planetary Data System Engineering Node Performance Review

Organization Name: CALIFORNIA INSTITUTE OF TECHNOLOGY

Principal Investigator: Daniel Crichton

BRIEF SUMMARY OF RESEARCH OBJECTIVES:

The Engineering Node plays a critical role in the overall architecture, implementation, and operations of the Planetary Data System (PDS), having led the recent development of PDS Version 4 (PDS4), the largest upgrade in the history of the PDS, to an online, distributed, model-driven, service-oriented architecture. This proposal discussed the performance and future plans for the PDS Engineering Node to continue providing support on the evolution and implementation of PDS4 across the PDS and internationally.

BRIEF SUMMARY OF OVERALL EVALUATION:

The proposal clearly demonstrates the Engineering Node (EN) expertise and efficiency in successfully leading the overall design, implementation and operational release of PDS4 within PDS. The implementation of the information model and the selected model-driven system/software architecture provide an efficient and consistent mechanism to adapt the system as the user needs evolve. EN has implemented a well-defined and rigorous design and development process, and follows good engineering practices. The PDS4 core services developed by EN provide a common framework for the PDS nodes and represent a very significant improvement to their operation as well as to its search and archiving services. EN has played a major role in the development of the International Planetary Data Alliance (IPDA) and the adoption of PDS4 by the international community.

EN provides a valuable support service not only to the PDS but also to the planetary community as a whole. EN has been exemplary in the design and implementation of PDS4. Minor weaknesses relate to the involvement and contribution of the Discipline Nodes (DNs) and end-user's feedback in the prioritization and roadmap of the planned activities.

Costs are reasonable for the proposed level of effort. Most resources are devoted to operations while considerable effort is still required in the development of new tools.

Overall Score: 4.0 - Very Good

Excellent 5.0	Very Good 4.0	Good 3.0	Fair 2.0	Poor 1.0
	X			

TECHNICAL MERIT (70%)

Science and Technical Merit Strengths:

EN provides leadership and critical system-wide support in the development and evolution of the PDS4 standards and in the archive infrastructure. Their expertise and efficiency has been demonstrated by successfully leading the overall design, implementation and operational release of PDS4 within PDS. Their role is essential to the continued successful migration and operation of PDS4 across PDS and internationally.

The implemented information architecture is adequate to balance common and discipline-mission specific needs, and to cope with the evolving needs of the planetary data users. The model-driven system/software architecture will allow changes to take minimal time to be implemented and tested, at both information model and system levels. This provides an efficient and consistent mechanism to adapt the system as user needs evolve.

EN has implemented a well-defined and rigorous design and development process, follows good engineering practices, and has established a Configuration Control Board (CCB) to formalize changes to the standards and tools/services. This has enhanced the quality and efficiency of their services, and allows timely feedback from the users on potential impacts as the system evolves.

PDS4 core services developed by EN provide a valuable common framework for PDS nodes (PDS4 REST-based design and service-oriented architecture). This represents a significant improvement in the PDS search capabilities with a registry-based central search and the availability of facet-based search enhancements.

EN has played a major role in the development of the International Planetary Data Alliance (IPDA), and this has strengthened the relationships with the international partners. This has been key to ensure acceptance of the PDS4 standards by the international community. EN support is essential to guarantee a smooth transition of international archives to PDS4.

Science and Technical Merit Weaknesses:

The proposal did not place enough emphasis on the important area of development of core tools for data manipulation, transformation and inspection-visualization tools. Extending the capabilities of the existing PDS4 tools with focus on the end-users is key at this stage to guarantee that the expectations of the end-users are fulfilled, and to promote the use of the data in the PDS. Early development of these tools will contribute to promote their use and adoption by the planetary community.

The proposal does not clearly demonstrate the involvement of the DNs in the roadmap and prioritization of the tools development. Coordination on the development of tools is needed to avoid unnecessary duplication and to promote the use of existing tools across the PDS and its community. Improved participation of the DNs in the development of the tools is needed, and frequent collaboration could be handled through a working group.

The proposal does not present a clear plan and roadmap for decommissioning of PDS3 (and associated tools) should be carefully considered; this could have a major impact on the end-users.

Minor - The proposal did not adequately justify the need for a new PDS portal. Better metrics comparing data searches through the PDS portal against data searches through DN portals could help to prioritize this with respect to other tasks and to determine whether an upgrade of the PDS portal is required. Feedback from data users would help to evaluate the need for upgrades to the search and retrieval services.

Minor - The proposal's description of the integration and consolidation of the User-Centered Design (UCD) function is adequate but further development and maintenance of some of the key tools produced and maintained by UCD (*i.e.* web-based validation tool and PDS4 label design tool) is not part of the current budget.

Science and Technical Merit Score: 4.0 Median

Excellent 5.0	E/VG 4.5	Very Good 4.0	VG/G 3.5	Good 3.0	Fair 2.0	Poor 1.0
1	2	5	1	1		

Realistic/Reasonable Cost (30%)

Cost Strengths:

The proposal provides information on the work effort associated with different tasks. Costs are reasonable for the proposed level of effort.

Cost Weaknesses:

Most resources are devoted to operations while considerable effort is still required in the development of new tools. Reducing the development budget will have a major impact on the end-users. Efficiency in operations should improve over time with existing/future tools, allowing for a reduction of the resources required in this area.

Rating of Cost Reasonableness: 3.5 – Very Good / Good

Very Good 4.0	VG/G 3.5	Good 3.0	Fair 2.0
1	7	2	

COMMENTS AND SUGGESTIONS FOR THE PROPOSER:

Additional Comments to the Proposer:

PDS4 tools and documentation releases should be aligned with Information Model releases; backwards compatibility of tools need to be carefully managed and coordinated with DNs.

Due to the increasing number of missions implementing PDS4, additional support might be required to guarantee a consistent implementation across missions. This may require a well-defined PDS training program for both data providers and data users. This requires close coordination with the DNs.

Additional Comments to NASA only:

The proposal shows that a reduction of the budget (and even the in-guide scenario) will severely impact the end-users. At this stage, this will compromise the evolution and objectives of the Planetary Data System as a whole.

The proposed trade study on virtualization and cloud-based services/storage could allow EN to find better solutions for distributing and making data more accessible to the users that would reduce costs long-term. Some members of the panel feel that the outcome of this study would be key to make decisions on the future strategy; currently only possible in over-guide scenario.