PDS 2010 System Design Report

PDS Management Council

April 2, 2009

Distributed Infrastructure Design Team

Topics

System Architecture

- Objectives
- Scope
- Roadmap
- Accomplishments

System Design

- Design Team
- Objectives
- Scope
- Roadmap
- Engineering Approach
- Technology
- Services
- Next Steps

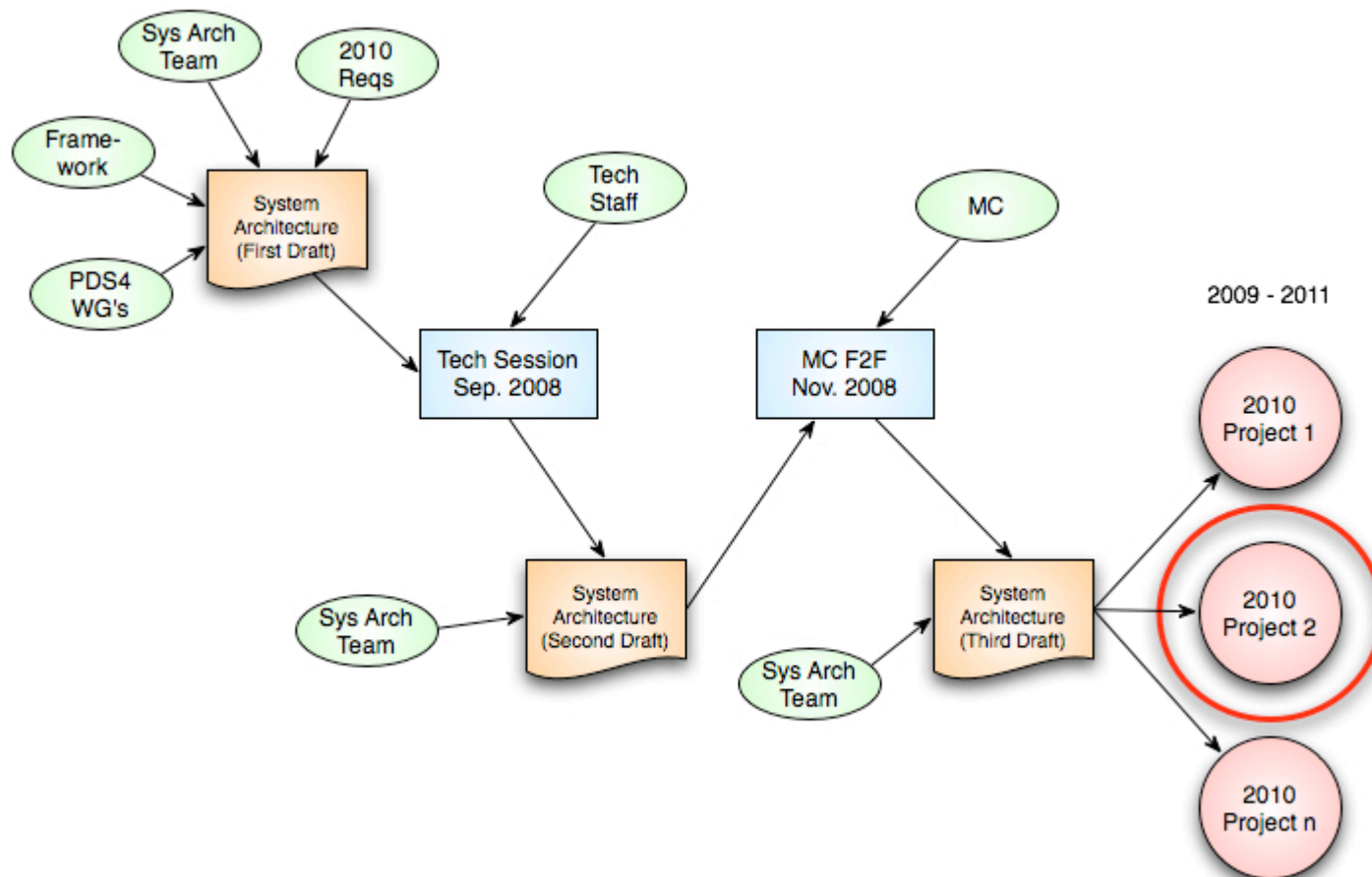# System Architecture
Objectives

- Define a System Architecture for PDS, which will encompass PDS 2010 and future projects.
  - This includes projects developed at the Engineering Node,
  - As well as projects within the scope of the System Architecture at the Discipline Nodes.

- The System Architecture is a solid base for design and development of PDS 2010.

System Architecture
Scope
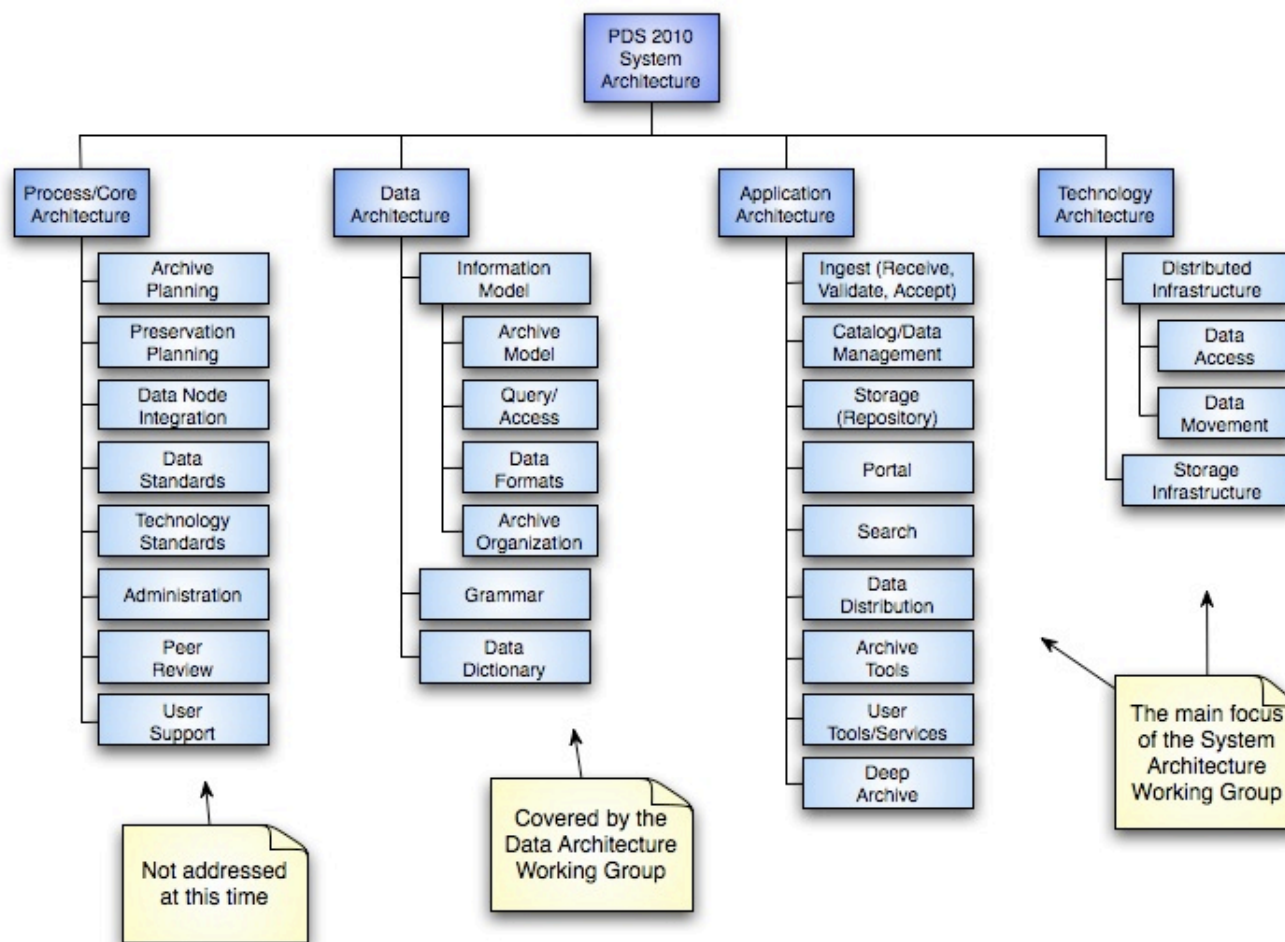
System Architecture
Roadmap

Initiated the Distributed Infrastructure project with the System Architecture as a guide.

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System Architecture
Accomplishments

- Specifically addressed each of the Architectural Drivers that were derived from the PDS Roadmap.

- Defined a set of Architectural Principles to guide the system design.

- Identified and defined the views and viewpoints for communicating the System Architecture.

- Identified and defined the services and their provisioning within the system.

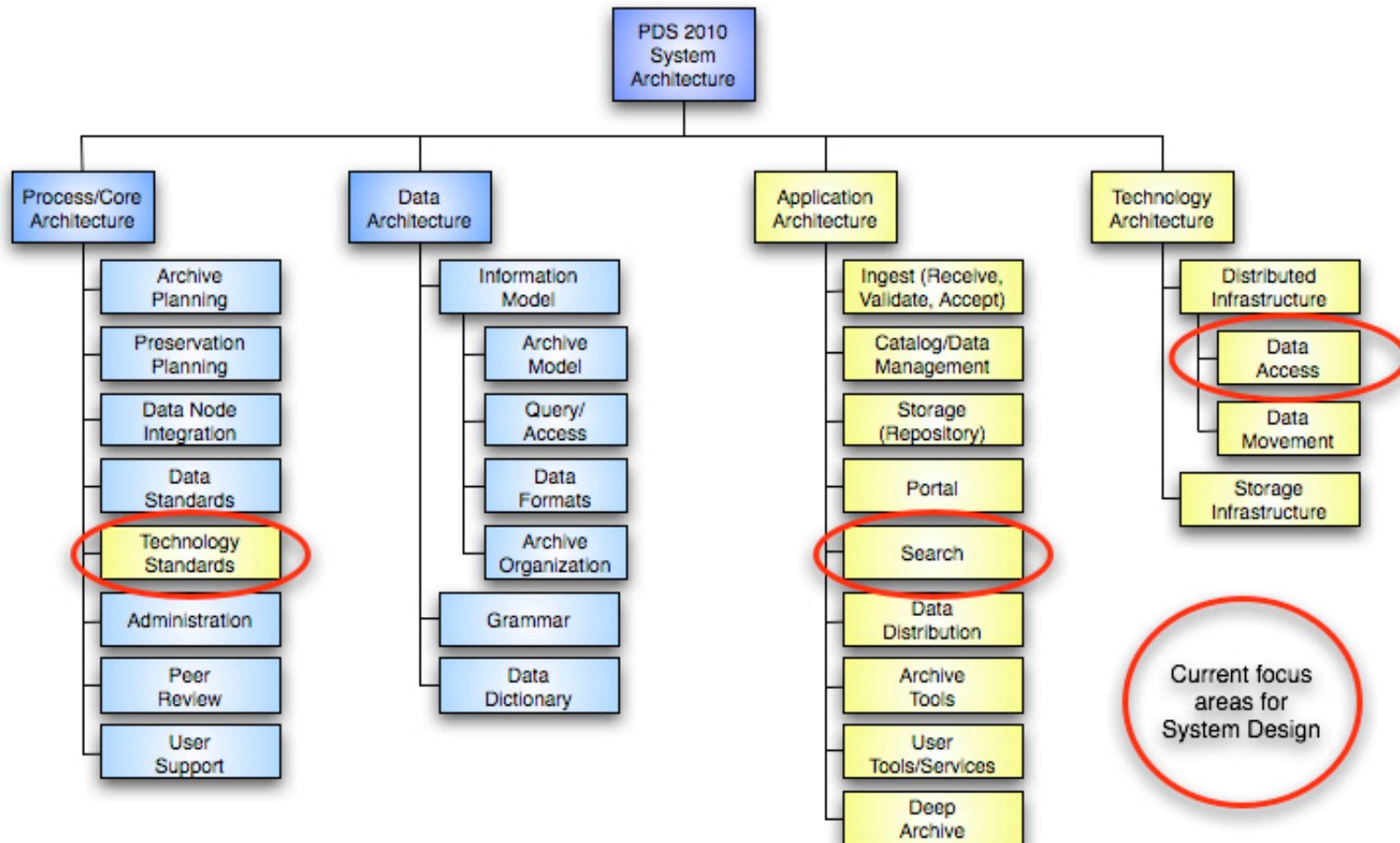# Transition from Architecture to Design

System Design
Design Team

- Formed the design team back in January, which consists of the following personnel:
  - Sean Hardman (Engineering)
  - Todd King (PPI)
  - Mike Martin (Management)
  - Paul Ramirez (Engineering)
  - Alice Stanboli (Imaging)
  - Tom Stein (Geosciences)
- Weekly teleconferences (more or less) are held on Thursday afternoons.
- Current artifacts are captured on the PDS Wiki and Engineering Node web sites:
  - http://oodt.jpl.nasa.gov/wiki/pages/viewpage.action?pageId=2600
  - http://pds-engineering.jpl.nasa.gov/index.cfm?pid=100&cid=134

System Design
Objectives

- Investigate and select the core technologies to be utilized in the development and operation of PDS 2010.

- Initiate development of some of the core services that will serve as building blocks for development of the system.
  - Core services include: Registry, Security, Report, Dictionary and Distributed Access Infrastructure.

- Capture technology standards and service development guidelines for the PDS.

System Design
Scope

System Design
Roadmap

| Phase I (Core Services) Jan 2009 - Oct 2009 | Phase II (Search Infrastructure) Jun 2009 - Oct 2010 | Phase III (Search Infrastructure) Jun 2010 - Feb 2011 |

Investigate Current Practice

Present current progress at Tech Session and then incorporate input.

Requirements / Design

Dependent on data models (draft and then final versions).

Implement / Test

Release / Deploy

Requirements / Design

Implement / Test

Implementation and test carried out at the EN.

Release

Registry, Security and Report Services. Dictionary Service may require more work depending on model and standards adoption.

Deploy

Intermediate release for beta testing.

Implement / Test

Release / Deploy

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System Design
Engineering Approach

- Prepare a brief white paper identifying the state-of-the-art for each service and whether there are COTS or open source options available.
- Identify use cases and/or requirements for the service.
- Prepare a design for implementing the service from scratch or for integrating a COTS or open source solution.
- Implement/integrate the service per the design.
- Test the service against the requirements.
- Deploy the system to the target environment (e.g., DN, EN).

System Design
Technology Standards

- This team and future design teams will investigate technology options for PDS.

- Findings and recommendations will be captured on a new Technology Standards page hosted on the EN web site.

- Current investigations include:
  - SOAP versus REST
  - UDDI versus ebXML

- Details to be presented at the upcoming Technical Session and future sessions to obtain community buy-in.

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System Design
Technology Layering

Depicts a high-level view of possible technologies and standards for PDS 2010.

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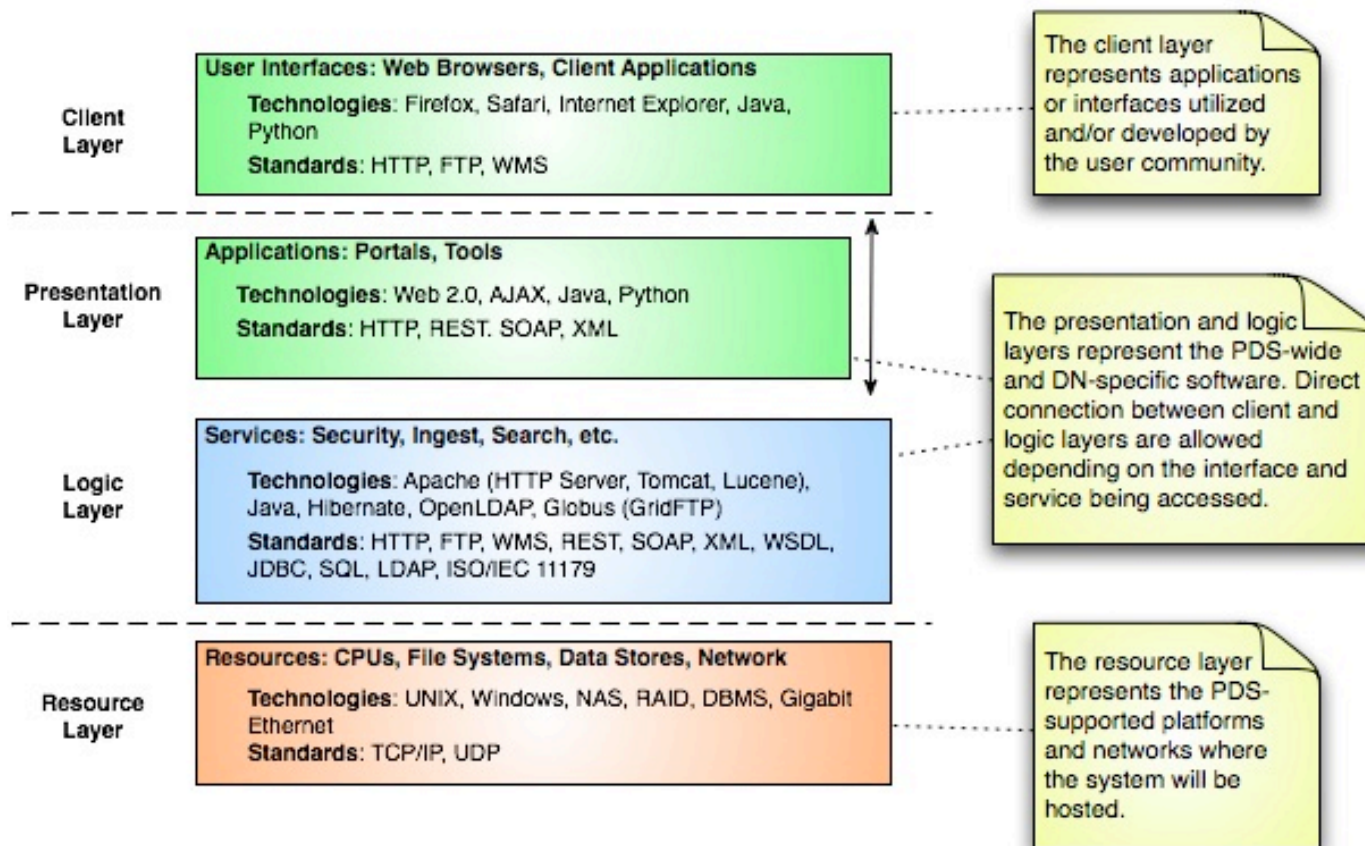
System Design
Core Services

- Registry
  - Provide end-to-end tracking of artifacts and standard interfaces for remote access
- Security
  - Provide a service for managing username/passwords so common tools that require authentication can reuse
  - Will investigate open source solutions for integration.
- Dictionary
  - Provide an online service for managing the PDS data dictionary.
  - Partner with DDWG to define standard data dictionary structure
- Report
  - Provide centralized metrics (e.g., FTP, web site, etc.) collection and reporting across all nodes.
  - Initial impressions are that a COTS solution is appropriate.
- Search/Access(focusing on the distributed access to PDS data and metadata)
  - Facilitate remote access to catalog and data product resources.

System Design
Service Vision

- Currently working towards a Service-Oriented Architecture solution that suits PDS.

- Plans include developing a Service Specification to guide future service development for PDS personnel.
  - Will provide details on such things as interface and message content requirements.
  - Will facilitate development of node-specific services (e.g., transformation) that can be integrated with PDS 2010 services.

- The goal is to design and build an extensible system that can grow and have functionality added to over time.

Next Steps

- Continue design work in preparation for the upcoming Technical Session.
- Incorporate input from Technical Session into the approach/design of the target services.
- Create Technology Standards reference and populate with technology/standards investigation results.
- Generate plan for incorporation of PDS4 data models into the PDS 2010 system software.
- Begin development/integration of initial services (e.g., Registry, Security).

Questions/Comments