NewDISS Concept for Evolution of ESE Data and Information Systems and Services

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Background

- **Team chartered in August 1998 to produce plan for an ESE "NewDISS" documenting how ESE can best make available data and information in a timely manner during the first decade of 2000.**
- **Draw upon EOSDIS and other ESE "Lessons Learned":**
  - Information technology outpaces the time required to build large, operational data systems and services.
  - Data systems and services should leverage off emerging information technology; and not try to drive it.
  - A single data system should not attempt to be all things to all users.
  - A single, large design and development effort stifles creativity.
  - Future information systems will be distributed and heterogeneous in nature.
- **While acknowledging the need to create distributed, flexible, responsive systems, there is at some level necessary a framework to integrate ESE activities:**
  - NASA must provide leadership to identify requirements, set priorities, and link requirements to cost and functionality.
  - Management of NewDISS will be fundamentally different and a more abstract function than provided by NASA currently, concentrating on managing key standard interfaces and integrating suitable data service capabilities.

Principles

- **Future requirements will be driven by a high data volume, and increasing demand for a variety of data products by a diverse user base.**
- **Science questions and priorities must determine the design and function of systems and services.**
- **Technological change will occur rapidly: systems and services, and the enabling networks, must be able to take advantage of these changes.**
- **Competition is a key NASA tool for selection of NewDISS components and infrastructure.**
- **Long term stewardship and archiving must occur.**
- **PI-processing and PI-led data management will be a significant part of future missions and science.**

Recommendations

- **Support a spectrum of heterogeneous participants and approaches to NewDISS.**
- **Support a spectrum of heterogeneous technological approaches to NewDISS.**
- **Clearly define the components of NewDISS, and ensure suitable management of the interfaces between them.**
- **Employ a NewDISS infrastructure that includes active liaison with service providers both within NASA and within the private sector for procurement of common operations activities.**
- **Employ competition and peer-review in the process used for choosing NewDISS components.**
- **Empower science investigators with an appropriate degree of responsibility and authority for NewDISS data system development, processing, archive and distribution.**
- **Use lessons learned from the current, experimental ESE federation as a step towards the NewDISS, and proceed with the Federation Experiment with this evolution in mind.**

NewDISS Concept

- **Lessons learned and principles lead logically to a set of NewDISS components, based on a dynamic network of interconnected elements.**
- **Published, open "Standards and Practices" kept by NewDISS management, complied by NewDISS participants, included in Research Announcements for Mission Data Systems, and Science Data Centers**
- **Open Interfaces are key element to allow NewDISS technologies to be participatory as opposed to being centrally managed.**
- **Adherence to interface standards allows "ecosystem" concept of data systems and services, i.e. allows for number and size of nodes to change - maintaining flexibility in evolution to support changing ESE needs.**

Examples of Technology Challenges

- **Support Transparent Data Access:**
  - Format translation, Subsetting
  - Visualization and Coincidence Mapping
- **Enable Effective Information Extraction:**
  - Data mining and information harvesting
  - Content-based search
- **Expand Distribution Bandwidth**
  - Data compression
  - higher density distribution media,
  - mirrored access and distribution sites
- **Establish Interchangeable Subsystem Components**
  - Product generation
  - Search and access
  - Data archive
- **Define Standards:**
  - Information exchange
  - Metadata
  - Data exchange
- **Improve Archive Effectiveness:**
  - Data migration and media refresh
  - Lower cost and higher capacity / bandwidth archive