ECHO
Enabling Interoperability with NASA Earth Science Data and Services

ESIP
Univ. of New Hampshire
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Agenda

- NASA Data and Services
- Challenges
- ECHO introduction
- Supporting Interoperability at three levels
- Leveraging ECHO
- A Generic Client
NASA’s ESDIS – Serving the EO Community

- Providing access to EO data and Services
- Evolving user community
- Resources
  - Data resources
    - Petabytes of data
    - Multiple locations
  - Service resources
    - Providing functions to manage and optimize of that data and computing resources
      - Publishing, Discovery, Assessment, Transformation, Access, Models, Decision Support Systems
Challenges

- Volume of Data
- Diversity
  - Data
    - Types, formats, usage
    - Location, Access Methods, Security (Visibility and Access)
  - User Community
    - Science, Education, Decision Makers
- Optimizing Resource usage
- Finding what matters
  - What data is applicable?
  - What part of that data?
  - What can I do with that data?
ECHO’s role in the enterprise

- **ECHO as Middleware**
  - Services with programmatic interfaces
  - Metadata and Service Registries

- **Provides an SOA platform**
  - Publish, Find, Understand, Access (online and ordering)
  - Security, Governance

- **Supporting Providers and Consumers**

- **Multiple Providers**
  - Legacy Systems
  - Multiple provider types
    - Data, Service, Client

- **Enabling**
  - More efficient data usage
  - Innovation of client application
  - Partner organizations to focus on their mission

Interoperability
The need for interoperability

- Scientist wants to investigate how rainfall affects sea surface temperature and validate his model for sea surface temperature with remote observations.

- The scenario – “Before”
The need for interoperability

Technology environment

Functions/algorithms to transform

Different formats

Different access methods

Different sources

Finding the right kind of data

- Rainfall data
- Sea surface temperature
Data Interoperability within ECHO

Context of Discovery
• Data set level
• Inventory Level

Common Data Model
• Based on NASA’s ECS data model
• Mapped to ISO 19115

One metadata language for query, results from different sources of differing types, formats and intended usage

Architected for Extensibility
• Adapters and translators
• Additional Services
Publishing Data to ECHO

Common metadata model

Native data format and metadata model
- Standards-based Services Registry
  - UDDI, WSDL
- Multiple service types
- Taxonomies for Service Categorization
  - Data Set
  - Data Format
  - Service Type (ISO 19119)
  - Others in discussion
- Enabling Orchestration
Interoperability between Data and Services

- Integrating data from one source with services from another source
  - Neither was necessarily intended to work specifically with each other
- The “right-mouse click”
  - “What can I do with this?”
- Supported through Data and Service categorizations
- Software interface for discovering relevant services
Leveraging ECHO

- **Services for**
  - Participation
  - Publication
  - Discovery
  - Ordering
  - Brokering
  - Eventing

- **ECHO Services**
  - Web Services
    - WSDL available:
      - http://api.echo.nasa.gov/echo-wsdl/v10/<SvcName>.wsdl

- **Documentation**
Warehouse Inventory Search Tool (WIST)

Users are able to submit cross-discipline queries using spatial and temporal criteria, examine search results for relevancy using built-in tools, and submit orders via ECHO to the appropriate data provider(s).

Community served: Provides search and order capabilities across the full set of data provider holdings in the ECHO catalogue.

Contact info

- Reference to client:
  - http://wist.echo.nasa.gov
- Submit questions or comments to the WIST Support Team at:
  - Wist_Support@echo.nasa.gov
Summary

- ECHO provides an SOA platform that enables
  - Resource Sharing
  - Innovation
  - Interoperability

- Supporting Three Levels of interoperability
  - Data
  - Service
  - Data-Service