NARA Research Prototype Persistent Archives

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Data Grid Support for Preservation

• Authenticity – the assurance that the records are what they purport to be
  – Support for metadata necessary to maintain the provenance of the records
  – Support for maintaining the essential characteristics of the records across transformations

• Integrity - the assurance that the electronic records are not corrupted
  – Support for integrity metadata (audit trails, access controls, checksums, replicas)
  – Support for distributed environments (replication, federation)

• Infrastructure Independence
  – Standard operations across databases
  – Standard operations across storage repositories
National Archives and Records Administration - Research Prototype Persistent Archives

Powerful Platform for Collaborative Research

- Synchronization across zones
- Interoperability across diverse platforms
- Sufficient metadata to ensure complete and authentic records
- Mitigation of risk of data loss
  - Replication of data
  - Federation of catalogs
- Deep archive

Federation of Three Independent Data Grids
A Collaborative Project: Electronic Access Project (EAP)

- Electronic Access Project (EAP collection)
  - 123,617 records digitized: 1997-1999
  - Cross-section of NARA holdings across 1056 record series
  - Described in NARA Archival Information Locator (NAIL) database

- Hierarchical Archival Description
  - ISAD(G) / ISAAR(CPF)-like catalog
  - Record Group or Collection / Record Series / File Unit / Item /
  - Separate descriptive metadata for each level of the hierarchy
Challenge

• Reinstantiate the hierarchical EAP collection in the Research Prototype Persistent Archives
  – Validate the metadata
  – Dynamically re-create the metadata hierarchy from the metadata actually present in the NAIL files and build a metadata catalog
  – Link the hierarchical description to the records
  – Provide a way to browse based on the hierarchy
  – Provide access to replicas located in one of the three federated data grids
## Storage Resource Broker 3.3.1

### Preservation Processes (Accession to Access)

<table>
<thead>
<tr>
<th>Application</th>
<th>Unix Shell</th>
<th>Linux I/O</th>
<th>NT Browser, Kepler Actors</th>
<th>DLL / Python, Perl, Windows</th>
<th>HTTP, DSpace, OpenDAP, GridFTP</th>
<th>OAI, WSDL, (WSRF)</th>
</tr>
</thead>
</table>

### Federation Management

- Consistency & Metadata Management / Authorization, Authentication, Audit
- Logical Name Space
- Latency Management
- Data Transport
- Metadata Transport

### Database Abstraction

- Databases - DB2, Oracle, Sybase, Postgres, mySQL, Informix

### Storage Repository Abstraction

- Archives - Tape, Sam-QFS, DMF, ORB
- File Systems - Unix, NT, Mac OSX
- Databases - DB2, Oracle, Sybase, Postgres, mySQL, Informix

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**Infrastructure Independence**

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San Diego Supercomputer Center
Registration of the data in the grid
Registration of the data in the grid
Federation of data grids
Replication between data grids
Rigorous Validation of Metadata or Records

- Schema-driven validation
- Regular expressions
- Syntactic Validation (well-formed)
- Semantic Validation (valid)