Day Three

ERA System Design Review

May 11, 2005
Preparation Design

ERA SDR – DAY THREE
RID Discussion

Physical Design

Design Highlights / Trades

Service Design

Functional Architecture

Key Requirements

Description of Functionality

Presentation - Agenda
Preservation provides services necessary to manage the preservation of the electronic records to ensure their continued existence, accessibility, and authenticity over time.

- Management functionality for Preservation Assessments, Preservation and Service Level Plans, Data Type Descriptors, and Digital Adaptation Descriptors.

Preservation Description
Planning preservation assessments and facility for LMS 1.1, LMS 9 - Centralized facility for LMS 5, LMS 6, LMS 26 - Extensible preservation processing services for LMS 1 - Centralized facility for LMS 1.
Key Features:

- Framework
- Adaptation
- Digital Processing
- Deterministic Registry
- Data Type Registry
- Digital Adaptation

Preservation Functional Architecture
Preservation within SOA
Integrates preservation planning into the life cycle management.

Relationship to Disposition Agreement

- be executed automatically

Facilitates creation of determinisitic preservation plans, which can

- Preservation Objective Model

Ensures consistent treatment of similar records

- Planning Based on Record Types and not File Types

Preservation Planning Highlights
Represented by a Preservation Objective Model

Records

- Allows preserver to specify the authenticity requirements for the authenticity requirements
- Records and their relative importance

- Allows preserver to specify the essential characteristics for the essential characteristics requirements

- Allows preserver to define the access requirements
- Service Level Planning

- Preservation Processing
- Allows preserver to decide whether records should undergo preservation and Service Level Plans

Preservation Highlights
Preservation Planning & Processing

Preservation Framework as described in the LM Team's "Authenticity" White Paper
- Authenticity Approach

Format "White Paper"
- Intellectual Framework as described in the LM Team's "Persistent Object"
- Digital adaptation processors evaluated within context of an established intellectual
- Persistence Approach

Preservation Objective Model
- Describes the capabilities of a digital adaptation processor
- Frameworks & Registrars
- Flexible and extensible framework and registries allows new data types
- Over time

Investment and research decisions for supporting new functionality
Preservation Planning & Processing combined provide input into
- Supports best-fit adaptation based on preservation objectives
- Extensible to support new Digital Adaptation Processors
- Extensible to support new Data Types

Key Features:

Digital Adaptation Framework

Preservation Design Details
Descriptors

Digital Adaptation

Matching for Two

Preservation

Example of

Adaptation Processor

Objective Model for a Digital

Example Preservation

Preservation Design Details - Example
processors to be incorporated into ERA seamlessly.

- Framework allows both developed and COTS digital adaptation over time

- Answer really depends on a case-by-case basis, and will change
digital adaptation

Investigated whether existing COTS products could implement

Preservation Design Trades
the common COTS-based infrastructure in LSAC Services developed as J2EE Web Services, with support from Control Design charts Applications VLAN, which is described in the Local Services & Reservation Services are implemented on the System/Business
**Conclusions**

- Developed White Papers
- Captures archival judgment and policy decisions
- Provides deterministic Preservation Planning and Processing Objective Model
- Enable collaborative development of digital adaptations
- Ensure durable design
- Provide Frameworks and Register...
Archival Storage Design

ERA SDR - DAY THREE
RID Discussion
Initial Product Selections
Physical Design
Service Design
Functional Architecture
Key Requirements

Agenda
Archival Storage
Archival Storage Key Requirements

LM10.1.4 - Active State-Store Architecture

LM10.2.4 - Virtual File System Interface

LM11.3 - Storage Management Application

LM12.1 - Solution that is not storage media

LM13.1.2, LM31.3 - Scalable and extensible

or supplier dependent

solution
Architectural Features:

- Extensible
- Scalable
- Media Abstraction
- Interface
- Virtual File Store
- Active Store

Storage Functional Architecture
Archival Storage

Archival Storage includes

Storage Services (archival component)

Archival Storage within SOA
Virtual File System Concepts

Archival Storage Design Details
Record Safe-Store Concept (continued)

Archival Storage Design Details
Record Safe-Store Concept
Archival Storage Design Details
<table>
<thead>
<tr>
<th>Policy based data segregation (i.e., Title 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy based levels of service</td>
</tr>
<tr>
<td>Redundancy of records (i.e., Primary &amp; Safe-Store)</td>
</tr>
<tr>
<td>Scalable to virtually unlimited number of directories</td>
</tr>
</tbody>
</table>

**Proposed Directory Structure**

**Archival Storage Design Details**
Scalability Characteristics

Archival Storage Design Details
Selected an architecture that meets the price performance needs of NARA.

Long term archive
Reduced storage technology options to those suitable for archival.

Considered trade-offs between the various options.

Conducted cost performance and suitability study.

Archival Storage Design Trades
Archival Storage Design Trades
Archival Storage Physical Design

- Term archival storage
  - Magnetic tape being used for long-term archival storage
  - Performance-based caches
  - Network attached RAID for many locations
  - Switched fabric VLAN allowing high-bandwidth access to and from
- Archival Storage Architecture
  - Using a combination of technologies
  - Selected a hybrid storage approach

System Business Application VLAN

File Switch

Channel Switch

Ethernet Switch

Library

Tape

Archival Storage VLAN
Required
- Addition of ERA instances to ensure a solution that will scale as
- Provide for the incremental addition of storage media
- Virtual File System and Abstraction of Mass Storage
  Incremental Scalability
  Changes to the other services
- Allows new device and media technology to be introduced without
  - Provides a medium and supplier-independent storage solution

Abstraction of Mass Storage
- Chain of the asset
- Identifier, GID, of the asset and not the physical location or media
- Request to read an asset only needs to know the globally unique
- Provides a consistent interface to the other services.

Virtual File System
- Failures
  - Preparing to recover from hardware, software, network, and instance
  - Provides archive backup copies of its assets, continuously

Active Sate Store

Archival Storage - Conclusions
LUNCH
RID Discussion
Initial Product Selections
Physical Design
Service Design
Functional Architecture
Key Requirements
Description of Functionality

Agenda
Dissemination Design
A framework to enable the use of multiple viewers for preservation of assets

Rich choice of searching capabilities across assets and their contents

A framework to enable the use of multiple search engines offering a within the ERA System

Functionality to manage search and access requests for assets

Dissemination provides

Dissemination Description
Dissimination Requirements

LM19 - Flexible framework to support different kinds of searches

LM20 - Flexible framework for providing access to assets

LM20.4, LM20.5 - Interface between Dissimination and digital adaptation

Dissimination services in preservation

ERASM System boundary

ERASM System Design Review - Day 3
Lockheed Martin Proprietary Information
Key Features:

- Indexes
- Search
- Manage Orders
- Framework
- Access
- Framework
- Search

Dissemination Functional Architecture
Dissemination includes SOA
Provides a way to certify accessed assets
Certification
Supports output and presentation of different kinds of assets
Access Framework
Comprehensiveness, responsiveness, and cost
Hybrid approach which offers different trade-offs between
Search Strategy
Content
Arrangement, description content, record life cycle data, record
Search Framework
Supports different kinds of searches, including searching by

Dissemination Design Highlights
Search Framework

Dissimilation Design Details

Key Features:
- Multiple Search Engines
- Multiple Entity Extractors
- Select "best-fit" Services
- Search for particular needs
Data types
Record life-cycle data
Hierarchical
Concept
Content

Investigate various search approaches

Use COTS targeted entity extraction to extract metadata from

Search engines

Use a framework to abstract ERA from details of specific COTS

Use COTS search engine products to facilitate search

**Dissemination Design Trades**
Future modeling work will refine the models and provide inputs such as...

Established initial models and framework for search

Dissemination Design Models
Local Services & Control Design Charts

System/Business Applications VLAN, which is described in the

Dissemination services are implemented on the

Dissemination Physical Design
Provide Access Framework
- Supports different kinds of access viewers
- Encapsulates proprietary details of COTS products
- Allows new access viewers to be added over time

Provide Search Framework
- Encapsulates proprietary details of search products
- Allows new search engines to be added over time

Optimal Search Strategy
- Balances trade-offs between comprehensiveness, responsiveness, and cost
- Offers a reasonable approach to providing content search
RID-LMCO0126 Order Data in the IRD

RID-LMCO0124 Access of Non-Electronic Records

RID-LMCO0122 Mediated Searches

RID-LMCO0121 Search Capabilities

Dissemination RIDs
BREAK
Centralized ERA Help Desk

Centralized configuration management services

Centralized services to manage the ERA System

Centralized system monitoring services

ERA Management Provides

ERA Management Description
RID Discussion

Initial Product Selections

Physical Design

Service Design

Functional Architecture

Key Requirements

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Agenda

Management Design
among instances instance and the global load balancing
LM32 - Clustering of servers for each
system assets
LM28 - Centralized tracking of all the ERA
management, and Remote administration
LM27 - Centralized monitoring,
LM26 - Comprehensive reporting
LM25 - Centralized roll-up of event logs
Desk
LM23.3 - Interface with the NARA Help
LM23.1 - Integrated user assistance
LM22 - Centralized Directory Service

ERA Management Driving Requirements
Key Features:
ERA Management includes

Centralized Common Infrastructure Services

ERP, EHS, GMD

ERA Management Within SOA
execution and problem tracking in the test environment
- Provides tools for the management of test data, test scripts, test

Test Management
and software
- Provides automated deployment of configuration managed hardware
- Provides a centralized monitoring and management of facility and
  network loads, and the balancing of user and interface load across
  applications and databases, storage, and networks
- Provides centralized monitoring and management for servers,

System Management
and comprehensive view
- Systems, COTS products, and security appliances into a cohesive
  - Centralized tools pull together the logs from the individual operating
    and analyses
  - Includes error, event, and audit logs, and tools for interactive query

Accountability

ERA Management Design Highlights
CM controlled process
- Deployment on service-by-service basis
Software Deployment tools and processes
- Leverage processes and configurations from existing datacenters
- StorageTek Global Storage Manager
- Cisco Works
- CA Unicenter

System Monitoring and Management tools and processes

Management

ERA Management – System

Lockheed Martin Property Information System Design Review – Day 3
ERe System Design Review – Day 3

Reports
- Includes the capability for standard ( canned) reports and ad hoc reporting
- Requests to the archival staff
- Internal NARA IT assistance and for referring researcher assistance
- Includes a “warm handoff” interface to the NARA Help Desk for
- Includes a continually-updated knowledge base
- Provides user assistance and problem reporting for the ERa System

Help Desk
- Consumable inventory is not tracked after receipt
- Accountable inventory are tracked and cost accounted
- Audited
- Media containing electronic records and assets are tracked and

Inventory Management

ERa Management Design Highlights
Operations
- Data replication to enable centralized management and distributed
  - Unified dashboard with consistent look and feel
- Event correlation
  - Manager of Managers to provide:
    - Server, applications, databases, storage, network
  - Enterprise Systems Management
  - Leverage COTS products to provide core infrastructure services
  - Business service components
    - ERA Management provides centralized core services to manage
    - Business service components
    - LSRC provides distributed core services that are leveraged by
      - Collected common infrastructure services into core packages
      - Implementation a Service Oriented Architecture

ERAD (Enterprise Resource Automation Design)
- Includes administrative workstations on fire-walled LAN segment
  - Network, and is isolated with a firewall
  - Connected to the rest of the ERA System with an out-of-band configurations
    - Scales vertically and horizontally to larger or smaller clustering
    - Includes dedicated servers where needed for performance or scalability, operations, and management
    - Physical server in a manner that is convenient for deployment,
      - Allows unrelated service components to be hosted on the same
      - Includes partitioned servers
        - Instances within a Federation
        - Service servers required to remotely monitor and manage the
          - Contains all of the monitoring and management infrastructure
          - Exists at one primary and one fail-over facility within each

ERAM Management VLAN

ERAM Management Physical Design
Centralized Management and cost

Optimal Systems Management Solution that balances automation,

- Provides automated software deployment
- Tracks problems and their resolution
- Ensures operational performance levels are maintained
- Provides a unified view into the health and status of a federation

Centralized System Management

ERA Management - Conclusions
ERA System Design Review – Day 3

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ERA Management RIDS

RID-LMC00132 Use of MS2003 Products
External Interface Design

ERSA SDR - DAY THREE

May 11, 2005
- Transferring Entities Systems
- Help Desk Systems
- Non-Electronic Records Tracking Systems
- Financial Systems

ICD for each interface class:

Establish standards, protocols and messages for exchanging information between the Interface Class and the ERA System

Interface Control Documents
Implemented via XML/Soap web service

tolerable

Near real time not required, but excessive response wait time not

- Asynchronous

Error handling includes timeout

- Calling system, "blocks and waits"

Implemented via request/response XML/Soap web service

Near real time interaction required

- Synchronous

ERA Medication Services supports Interface Connections:

ERA System provides service-based Interface to external systems

External Interfaces within SOA
External Interfaces Within SOA
Denial of Authorization
- Authorization to Proceed
- User Information
- Total Cost of Order

Asynchronous - Receive:
- Order Cancelled
- Order Produced
- Resources Required
- Updated User Identification
- User Identification
- Product Order Shipping Information
- Product Order Delivery Information

Asynchronous - Send:

Messages
Financial Systems Interface:
- Notification
- Notification
- Notification
- Service Order Shipping Information
- Service Order Delivery Information
- Service Order Payment Information
- Service Order Billing Information

Synchronous - Send:

Synchronous - Receive:

Messages (continued)
Message Receipt Notification
Records Destroyed
Scheduled for Destruction
Returned to Agency
Notification of Arrival Status

Asynchronous Receive:

Message Receipt Notification
Change in Disposition
Notification of Schedule Arrival

Asynchronous Send

Interface: Messages
Non-Electronic Records Tracking System
Messages
Help Desk System Interface:
- Notification
- Help Desk Ticket Updates
- Help Desk Ticket Resolution
- Help Desk Ticket
- Asynchronous - Send & Receive
Messages

Transfer: Entity System Interface

- Notification
- Description
- Records Transfer
  Asynchronous - Receive
  Asynchronous - Send
### Synchronous Message Schema

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Asynchronous Message Scheme

Message:
Support ERA PMO Legacy system transition planning

Increment 2 PDR
Increment 1 PDR
Increment 1 PDR
Increment 1 PDR

Financial Systems Interface
Transfer-Routing Entity Systems Interface
Help Desk Systems Interface
Non-Electronic Records Tracking

Detailed message specification defined:

Interfaces - Forward Plan
END DAY THREE