Digital Archive Partnership

National Library of New Zealand
Sun Microsystems
Endeavor Information Systems

NDHA Programme Background

- *National Library of New Zealand (Te Puna Mātauranga o Aotearoa) Act 2003:*

  - requires the Library to collect, preserve and make accessible digital collections, along with the traditional paper collections, in ways that ensure current and future access to New Zealand's documentary heritage.

  - Extended legal deposit to include electronic documents

- *Consequence:*

  - NLNZ requires a reliable archive for the preservation of digital content to ensure its ongoing access

  - NLNZ business case for additional operational and capital funding to government approved May04

  - Establishment of NDHA programme with funding of $24m from Jul04-Jun08.

www.natlib.govt.nz

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NDHA Programme Goal

- Establish the National Digital Heritage Archive to enable the National Library of New Zealand Te Puna Mātauranga o Aotearoa to meet its mandate to collect, make accessible, and preserve in perpetuity, New Zealand's digital heritage, as defined by the Library's current collection policy.

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NDHA Programme Partnerships

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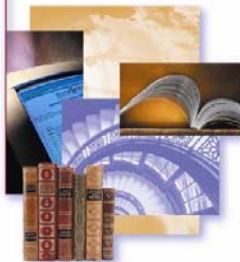**NATIONAL LIBRARY**
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Consecutive two contract partnership
1. Design
2. Build & Develop

Sun Centre of Excellence
Agreement

Endeavor
Information Systems

Marketing agreement

Sun
microsystems

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Solution Position Statement

- *The NDHA system is*

- based on a commercial software solution

- a cost effective and adaptable end-to-end solution (combining with new business processes and other organisation changes)

- standards-based with:

  - Automated deposit, storage and management of a wide range of formats and types of digital material

  - "Push" and "pull" mechanisms

  - Work-bench functionality for managing intervention to resolve metadata and file exceptions

  - A core set of preservation related functionality

  - Rights management mechanisms

  - Flexibility.

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What will the NDHA Programme deliver?

- The NDHA system is:

  - standards-based – OAIS, NARA/RLG (now OCLC) certification

  - has long term relationships for support, maintenance, enhancement

  - has repeatable relationship agreements, processes for legal deposit, purchase, donation

  - is capable of handling a variety of materials and formats

  - has web harvesting tools

  - is capable of being used by 3rd parties as a hosted archive.

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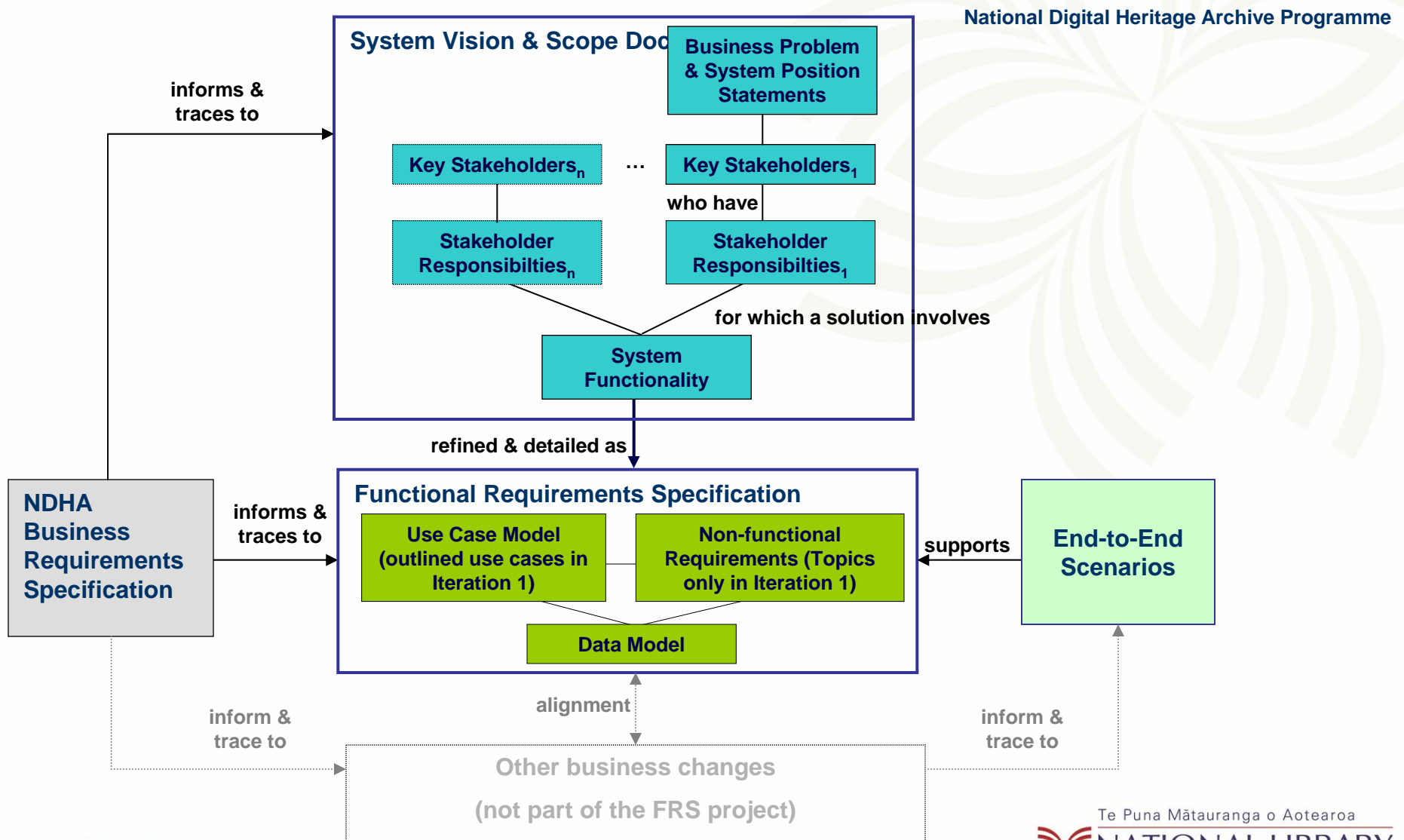# Partnership roles

NLNZ: Business Requirements Specifications (BRS), Functional Requirements Specifications (FRS), participate in design and standards.

Sun: Preservation Reference Architecture

Endeavor: Digital Preservation architecture, design and application implementation, and long term support

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FRS Methodology

System Vision & Scope Doc

Business Problem & System Position Statements

Key Stakeholders$_n$ ... **Key Stakeholders$_1$**

who have

Stakeholder Responsibilties$_n$

Stakeholder Responsibilties$_1$

for which a solution involves

System Functionality

refined & detailed as

informs & traces to

NDHA Business Requirements Specification

informs & traces to

Functional Requirements Specification

Use Case Model (outlined use cases in Iteration 1)

Non-functional Requirements (Topics only in Iteration 1)

Data Model

supports

End-to-End Scenarios

inform & trace to

alignment

inform & trace to

Other business changes

(not part of the FRS project)

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Technical Services Gap Analysis

- NDHA system

  – main software applications will be developed by Endeavor

  – major infrastructure components will be built with assistance from Sun

  – Library is the system integrator, and NDHA hosted in Library's data centre

  – may be expanded into a fully geographically redundant system

  – will leverage the capabilities of enterprise-wide ("common") services wherever this is deemed to be expedient

- An analysis identified

  – which services should properly be regarded as "common"

  – what Library's capabilities will need to be enhanced to cope with the additional load placed on them by the NDHA
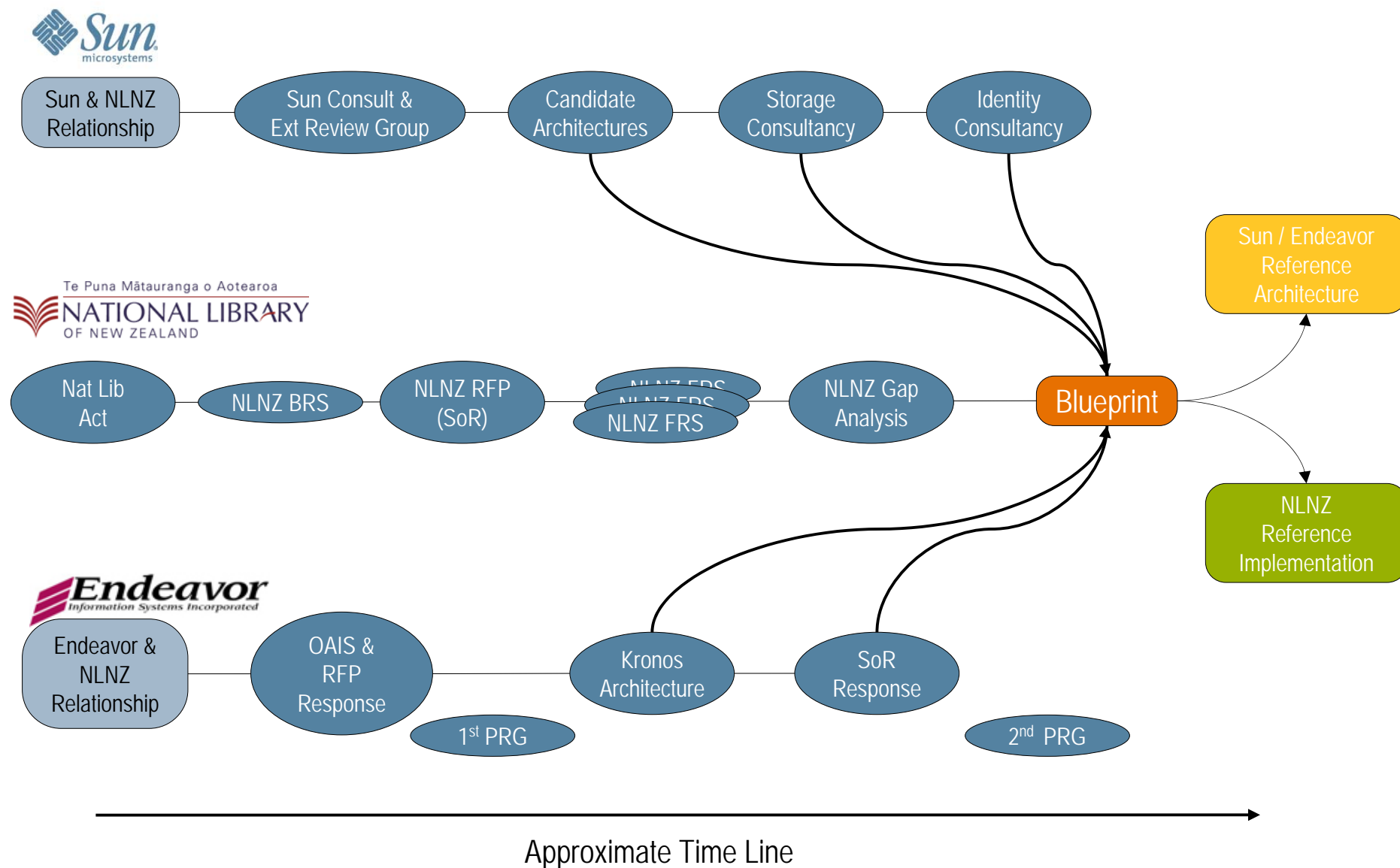
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A Blueprint for a National Digital Heritage Archive

For the National Library of New Zealand

Blueprint & Reference Architecture evolution

Sun microsystems

Sun microsystems

Sun & NLNZ Relationship — Sun Consult & Ext Review Group — Candidate Architectures — Storage Consultancy — Identity Consultancy

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Nat Lib Act — NLNZ BRS — NLNZ RFP (SoR) — NLNZ FRS / NLNZ FRS / NLNZ FRS — NLNZ Gap Analysis — **Blueprint**

Sun / Endeavor Reference Architecture

NLNZ Reference Implementation

Endeavor Information Systems Incorporated

Endeavor & NLNZ Relationship — OAIS & RFP Response — Kronos Architecture — SoR Response

1st PRG

2nd PRG

Approximate Time Line

A Methodology to develop the Blueprint & RI

Using Service Oriented Architecture to analyse and refine requirements

Identity Consultancy

Storage Consultancy

NLNZ FRS

NLNZ BRS

NLNZ Gap Analysis

NLNZ RFP (SoR)

Kronos Architecture

SoR Response

NDHA Requirements Helix

Service Catalog

Present

Process

Preserve

Technical Services

N-Tier

Security

Zones (P/S/D)

Service Oriented Architecture & Architecture Analysis

Project Guidance

Hardware Storage/Network

Software

Consult

Enterprise Capabilities

Selection Process

Procurement Process

NDHA Blueprint

Business Strategy

Project Portfolio Mgt

Architect

Implement

Manage

Enterprise Competencies

Activity Systems

NDHA Reference Implementation

NDHA Reference Architecture Service Catalogue

Service Categories: Present, Process & Preserve

Present

Public Portal

Producer Portal (PAM)

Administration Portal (Curator, Admin)

Submission Manager

Producer Adapter Listener

Digital Object Listener Pool

Digital Object Dissemination

Dissemination Bridge (API)

Digital Object Viewer (Transform)

Digital Object Exchange (Zone Mgr)

Digital Object Dissemination Pool

Process

Digital Object Ingest
Digital Object Work Bench (Arrange)
Digital Object Metadata Extraction
Digital Object Format Validation
Digital Object Fixity
Digital Object Security (Virus Screen)
Ingest Workflow
Digital Object Ingest Pool
Digital Object Warehouse
Digital Object Metadata Retrieval
Digital Object Metadata Validation
Warehouse Workflow
Digital Object Discovery & Retrieval
Digital Rights Management
Dissemination Index Engine
Dissemination Index Pool
Dissemination Access Manager
Dissemination Key Manager
Dissemination Workflow
Digital Object Transformation
Processing Grid & Management

Preserve

Preservation Manager
Preservation/Maintenance Pool
Preservation Workflow
Digital Object Metadata Repository
Digital Object File Repository
NDHA Identity Management
      -Access
      -Provision
      -Delegated Administration
      -Password Management
      -Credential Synchronisation
NDHA Identity Pool
NDHA Data Bus
NDHA Databases
NDHA System Replication
NDHA Planning Systems
NDHA Audit & Reporting

Systems Management – Security Management - Availability Management - Audit & Report Systems

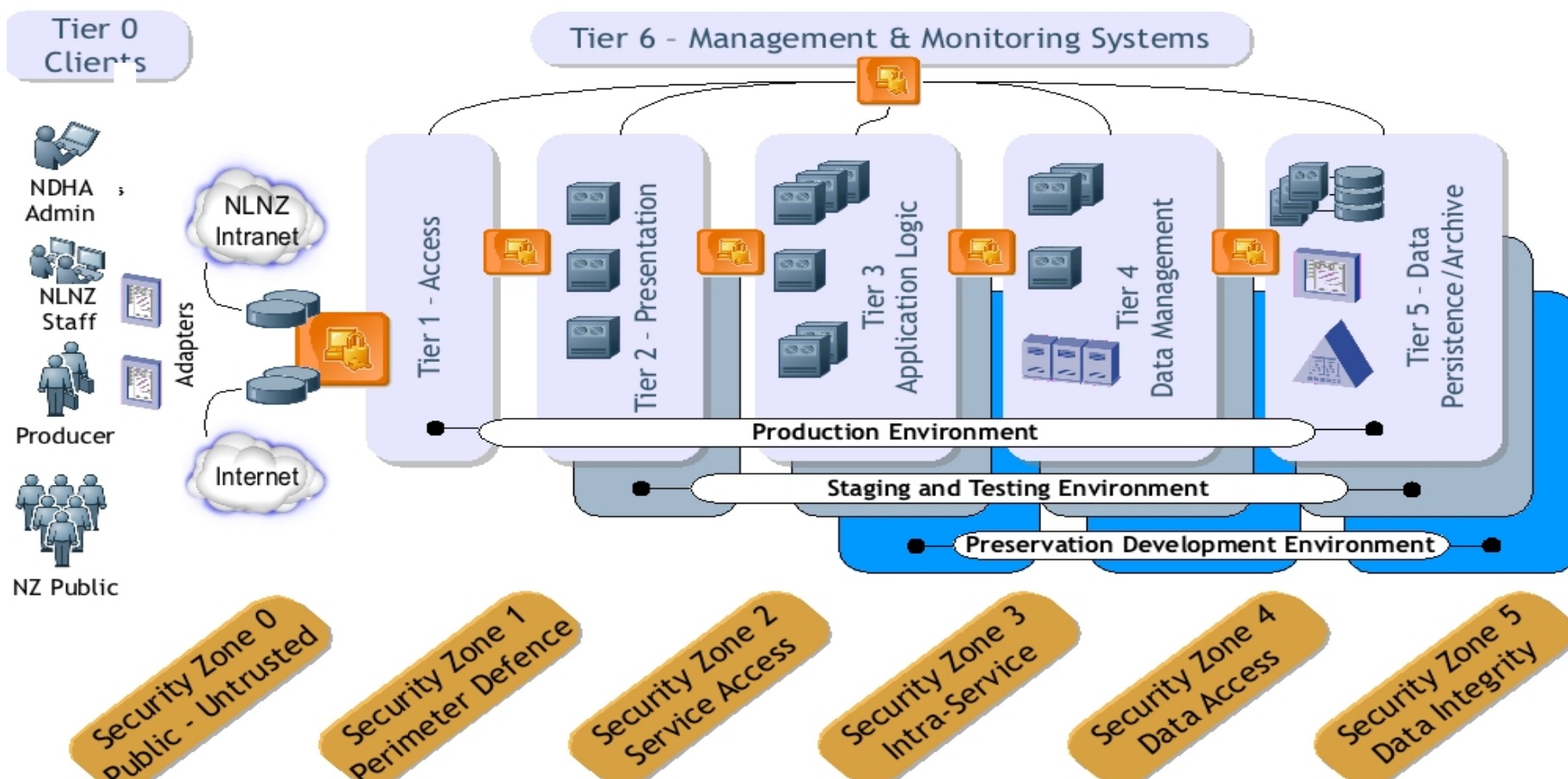# NDHA Technical Services: N-Tier Design
N-Tier Architecture, Service Tiers & Security Focus/Zones

A National Digital Heritage Archive Blueprint for NLNZ

NDHA Security Zones within an N-Tier Architecture

Tier 0 Clients

Tier 6 – Management & Monitoring Systems

NDHA Admin
NLNZ Staff
Producer
NZ Public

NLNZ Intranet
Internet
Adapters

Tier 1 - Access
Tier 2 - Presentation
Tier 3 Application Logic
Tier 4 Data Management
Tier 5 - Data Persistence/Archive

Production Environment
Staging and Testing Environment
Preservation Development Environment

Security Zone 0 Public - Untrusted
Security Zone 1 Perimeter Defence
Security Zone 2 Service Access
Security Zone 3 Intra-Service
Security Zone 4 Data Access
Security Zone 5 Data Integrity

A National Digital Heritage Archive Blueprint for NLNZ

NDHA Technical Services High Level Architecture

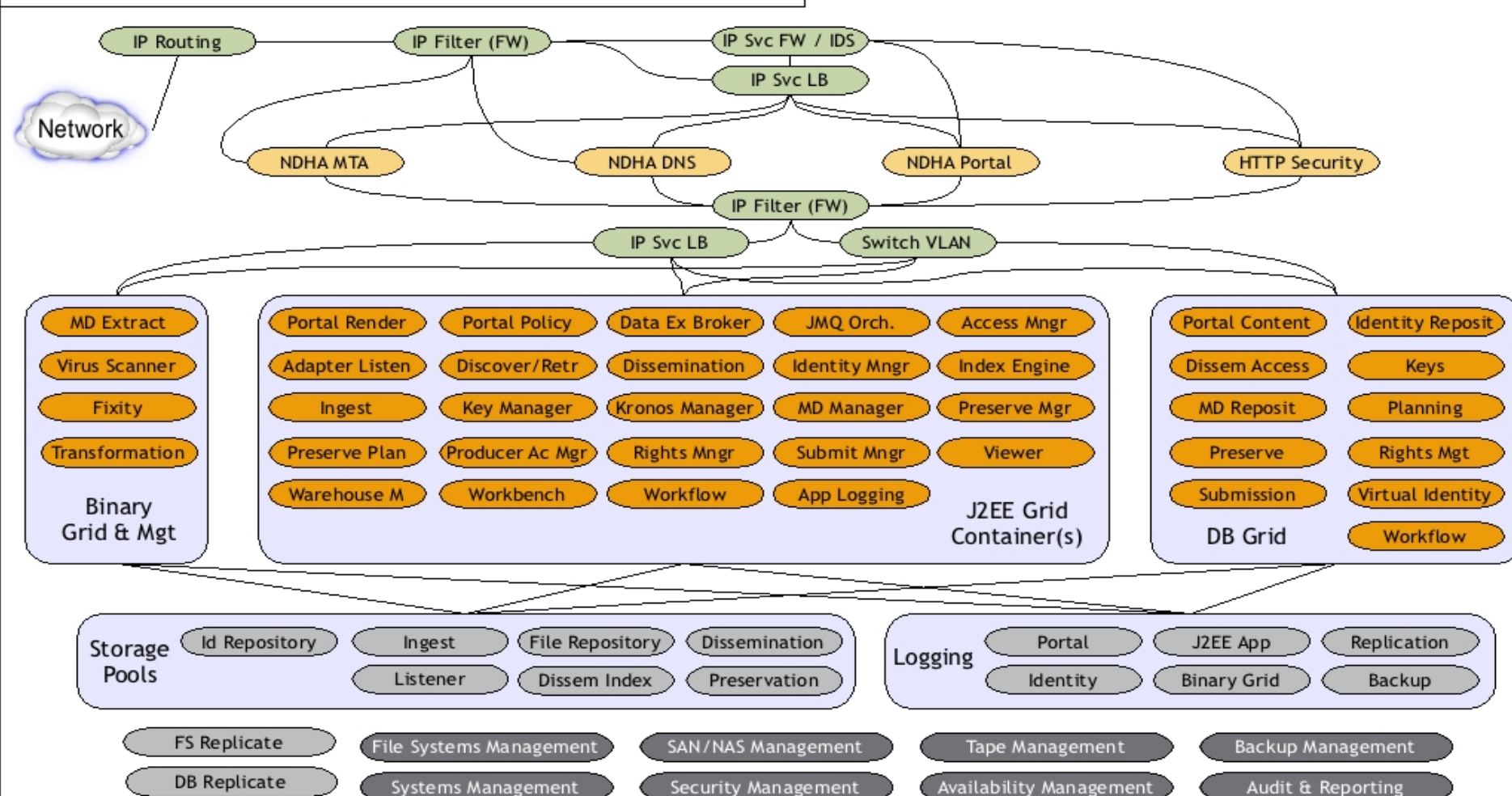Te Puna Mātauranga o Aotearoa
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IP Routing — IP Filter (FW) — IP Svc FW / IDS — IP Svc LB

Network

NDHA MTA — NDHA DNS — NDHA Portal — HTTP Security

IP Filter (FW)

IP Svc LB — Switch VLAN

Binary Grid & Mgt
- MD Extract
- Virus Scanner
- Fixity
- Transformation

J2EE Grid Container(s)
- Portal Render
- Adapter Listen
- Ingest
- Preserve Plan
- Warehouse M
- Portal Policy
- Discover/Retr
- Key Manager
- Producer Ac Mgr
- Workbench
- Data Ex Broker
- Dissemination
- Kronos Manager
- Rights Mngr
- Workflow
- JMQ Orch.
- Identity Mngr
- MD Manager
- Submit Mngr
- App Logging
- Access Mngr
- Index Engine
- Preserve Mgr
- Viewer

DB Grid
- Portal Content
- Dissem Access
- MD Reposit
- Preserve
- Submission
- Identity Reposit
- Keys
- Planning
- Rights Mgt
- Virtual Identity
- Workflow

Storage Pools
- Id Repository
- Listener
- Ingest
- Dissem Index
- File Repository
- Preservation
- Dissemination

Logging
- Portal
- Identity
- J2EE App
- Binary Grid
- Replication
- Backup

- FS Replicate
- DB Replicate
- File Systems Management
- Systems Management
- SAN/NAS Management
- Security Management
- Tape Management
- Availability Management
- Backup Management
- Audit & Reporting

Purpose of Endeavor's Kronos project

The Kronos project aims to put into the market the best-in-class repository system product line, firmly based on requirements recognized and articulated by customers in the National Library, Academic, Museum and Government markets for permanent access to digital information.

Kronos design requirements

Scalability: Designed to meet the needs of national libraries, archives and other institutions needing enterprise solutions for ingesting, storing, managing and preserving massive amounts of digital information

Flexibility: Component-based design and configurable workflow support ensures that Kronos integrates with the existing enterprise infrastructure, and protects current investments

Extensibility: Kronos offers add-on functionality including producer integration, thesaurus support, ILS integration, digital rights management, and custom access and delivery mechanisms

Minimal cost of ownership: Kronos delivers on the need for a standard, commercial solution for long-term digital preservation. Kronos enables the customer to avoid risky and costly custom development projects.

Durability: Kronos, as a commercial product being used by peer organizations, will be supported and enhanced according to the needs of the greater community and based on existing and emerging standards (such as OAIS)

Trusted digital repository: Kronos must be capable of being audited and certified as a trusted digital repository (RLG/NARA now OCLC)

Architectural principles

- Connecting other software tools should be as easy as possible
- Special software tools are not required by content producers to deposit content
- Low overhead and minimal barriers for producers
- The system can operate as a standalone system
- Modularity and expandability
- Lockstep upgrades should not be required

Kronos high level system architecture – schematic view
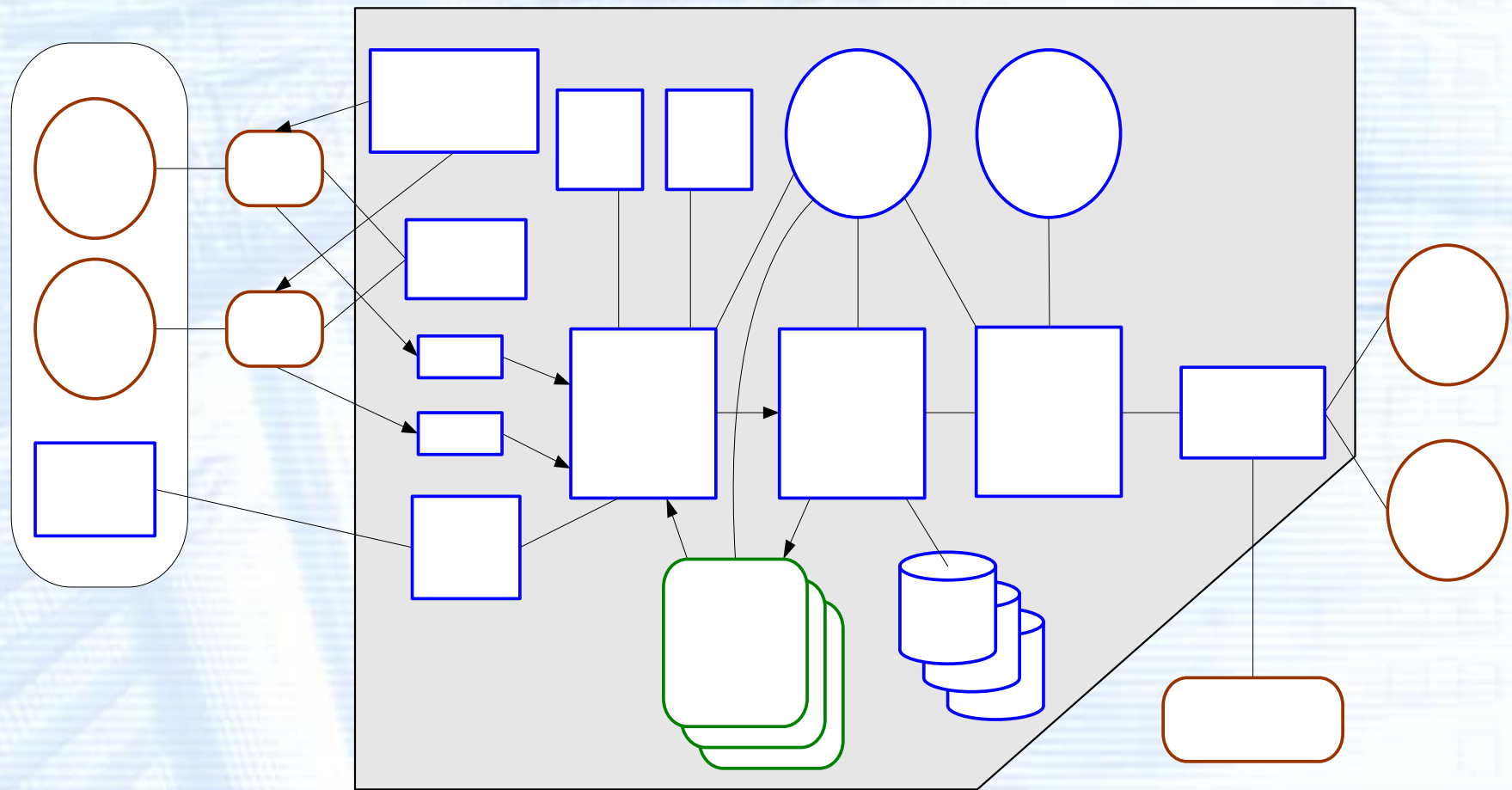
Producer

Implemen
Supp
Servi

Endeavor
Information Systems Incorporated

Kronos development schedule

- "Steel thread" Prototype is scheduled for completion by late 2006
- Version 1.0 – operational release by Summer 2007
- Version 2.0 (v1 + 6 months)
- Version 3.0 (v2 + 6 months)

Endeavor

Peer Review Group

- There is one *Peer Review Group* with two purposes initially:

- Provide input into *future* product direction. This will involve reviewing proposed NDHA/Kronos/Sun product roadmap, and discussing future (2-5 years out) requirements for a preservation system.

- Provide advice on priority of what problems / enhancements get tackled in what order (and what is generic versus customisation for NLNZ). The role will involve reviewing documentation, screen-shots, prototypes, demos and/or working modules to determine:

  - Will the functionality work, or are there concerns regarding the proposed product (i.e., a sanity check of the functionality)
  - Are the functional features of the system sufficiently generic (or are they specific to NLNZ)?
  - Does the workflow make sense for other libraries & organisations?

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Peer Review Group - outputs

- Review the direction of the product (i.e., comment on the product roadmap)

- Early flagging of whether the solution fits generic needs, and identification of what the generic solution is (versus NZ customisations or what's expedient for a commercial product)

- Identification of what the potential change impacts are for a broader base of organisations. This will give the partnership a view into the level of organisational change that is required for implementing a solution like this within different institutions (and specifically the institutions represented by the Peer Review group).

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NLNZ's key points about the partnership

- Preservation is a global activity requiring a global solution and no one organisation is going to be able to do it by itself

- Preservation is an enterprise solution - There comes a time when we have to move from the r&d space into implementing to meet our mandate. We know it's still only the beginning but we need to show willingness to do this stuff

- We believe in an open marketplace, as well as leveraging current relationships. Synergy with Sun/Endeavor was already strong so it was easy to expand from existing bilateral relationships into a trilateral agreement for NDHA.

- Desire to be contributing to the wider community, not just NZ

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