NDHA
NATIONAL DIGITAL HERITAGE ARCHIVE

Securing the Future: Digital Preservation at the National Library of New Zealand

Pacific Rim Digital Library Alliance (PRDLA)
Singapore, October 2008

Steve Knight,
Associate Director National Digital Library
National Library of New Zealand

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Riding Instructions 1

What I was asked to talk about

- Digital preservation system development with Ex Libris
- Relationship with Digitool & development of the new system
- Usability issues & resource discovery issues (for users)
- Ingest and management issues for librarians
- Deposit and ingest issues for users
- Cataloguing and metadata issues for librarians
- Relationships between items in the NDHA and other repositories/systems at the National Library
- Workflow issues for staff involved in the NDHA and other library systems

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What I'm going to talk about

How I hope to touch on these topics this morning

- The digital environment
- NLNZ drivers
    - legislation, Legal deposit
- NLNZ, Ex Libris and DPS
- Organisational issues
    - Business change
    - Migration
    - Integration
    - Capability and capacity
    - Performance measurement
- A national strategy
- Digital preservation as the sine qua non

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The 'digital environment'

The digital native

Isn't it amazing what kids know?

- Democratization of information production and access
- Citizen's created content and will impact on our collecting and preservation processes.
- 'New Zealanders connected to information important to all aspects of their lives'.
- Paradigm shift in client expectations of how knowledge and information should be made available to them
- Relevance and viability of national libraries determined by their ability to respond to these changing expectations
- Digital preservation will become an increasingly important component of New Zealand's knowledge infrastructure.
- Digital preservation as part of an overall strategic and holistic approach to the surfacing of our collections.

The Problem Statement

Garrett, J. & Waters, D. (eds). (1996).

Preserving digital information

' the problem of preserving digital information for the future is not only, or even primarily, a problem of fine tuning a narrow set of technical variables. It is not a clearly defined problem … rather, it is a grander problem of organizing ourselves over time and as a society to maneuver effectively in a digital landscape. It is a problem of building … the various systematic supports … that will enable us to tame the anxieties and move our cultural records naturally and confidently into the future.'

The National Library Act 2003
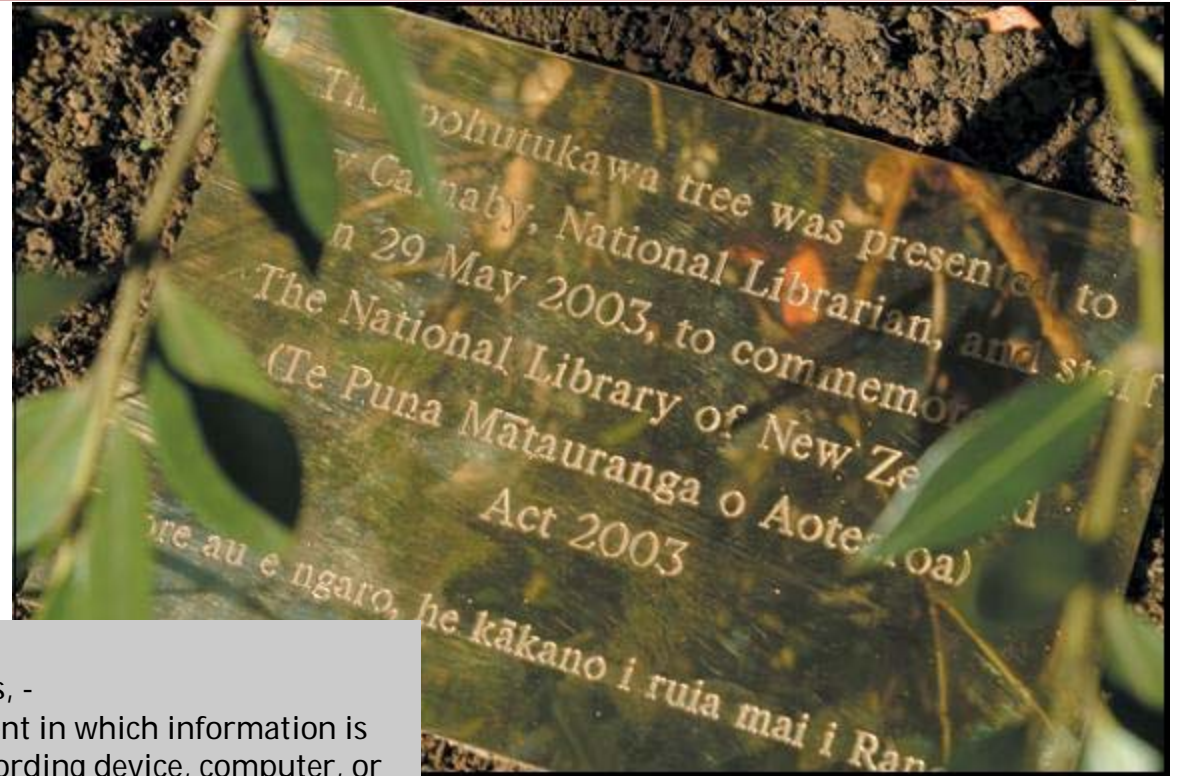
Part 4, 29 (1)
In this part, unless the context otherwise requires, -
electronic Document, means a public document in which information is
stored or displayed by means of an electronic recording device, computer, or
other electronic medium, and includes an internet document
internet Document, means a public document that is published on the
Internet, whether or not there is any restriction on access to the document;
and includes the whole or part of a website
make a copy, in relation to an internet document, means to make a copy of
the document for the purpose of storing and using it in accordance with this
Part; and includes circumventing any technological protection measures that
would otherwise prevent or hinder the copying, storage or use of the
document

Electronic legal deposit

Why the government wants two copies of your CD

Right of reply

National librarian Penny Carnaby responds to Owen McShane's comments on the National Library's plans to archive all digital material (NBR, Oct 1).

KEY POINTS

- Electronic documents collected by the National Library will be permanently housed in its digital archive
- Internet documents that avoid any loss of access through obsolescence of hardware and software. Although the library will migrate electronic documents published in office formats, it will

heedless manner. We are not going to ignore the concerns of the publishers. The library will establish access terms and conditions that ensure it protects the commercial interests of publishers and creators.

We are aware and concerned about the problems of piracy,

The government's new policy – 'steal this record'

The government declares itself in favour of the knowledge economy and is a serious promoter of New Zealand art and culture.

Yet, curiously the National Library seems determined to undermine these policies.

The National Library Act of 2003 requires all publishers in New Zealand to lodge three copies of their works with the library to build a collection of all local works. These are available to the public. So far so good. This is common practice overseas.

However, the library now proposes that the "documents" which must be lodged in their collection include electronic media such as audiotape, videotape, CDs, CD Roms and DVDs.

So if you are planning to make a CD of one of New Zealand's choirs singing French medieval music, or a DVD of the history of Chinese families who settled in New Zealand you must lodge three copies with the library.

Even this may not seem unreasonable.

The problem is that the library will digitise this on the worldwide web for all and sundry to listen to, download and copy.

The National Library seems unconcerned by the risk of copying. It ingeniously points out that normal copyright protection is available to any author, composer or publisher whose material is unlawfully copied.

Please tell me, how can a specialist music club or historical society afford to take

legal action against some unknown person in France or Hong Kong who decides to download and copy a hundred CDs for sale to French or Chinese enthusiasts?

Why would anyone invest in a film in New Zealand if the film is to be digitised and posted on the web for all and sundry to download and copy? What will Creative New Zealand say when its successful productions are posted on the web for all to steal?

The library is suggesting a time limit of three years or more before posting such material on the web. This may be OK for the latest song by some New Zealand Idol. But what about work which has a longer life?

New Zealand has pro-

duced, and continues to produce, its fair share of world-class opera singers and musicians, who will simply make sure their records are produced in jurisdictions which don't aid and abet the theft of their intellectual property.

The assaults on private property on the foreshore and farms have been bad enough. But at least the government was stealing land from a few New Zealanders to hand over to other New Zealanders.

Why would any government want to steal the artistic works of New Zealanders to hand them over to foreigners?

I just hope I'm missing something here.

Our cyberspace publications will be available to future historians

THROWING OPEN THE DOORS

The National Library steps onto the path of the information de[...]

⊙ **BY RUSSELL BROWN**

These are exciting times in which to be a librarian. And more so, as it happens, to be a librarian in New Zealand.

The past decade and a half has seen an extraordinary

the provisions in the act is an extension of the legal requirements for deposit with the library. Legal deposit now encompasses digital publications, such as CDs and DVDs – three copies of which must be deposited with the library.

Environment for Change

Legislation

Strategic Vision

International Community

The Other Problem Statement

Technology as the enemy?

The evolution of technology environments

Windows xxx?
Word xxxx?

Windows xxx?
Word xxxx?

Windows Vista
Word 2007

Windows XP
Word 2000

INFORMATION OBJECT

Danger Point

INFORMATION OBJECT

2004

TIME LINE

2030

NDHA Programme

Goal

Collection, preservation and access in perpetuity
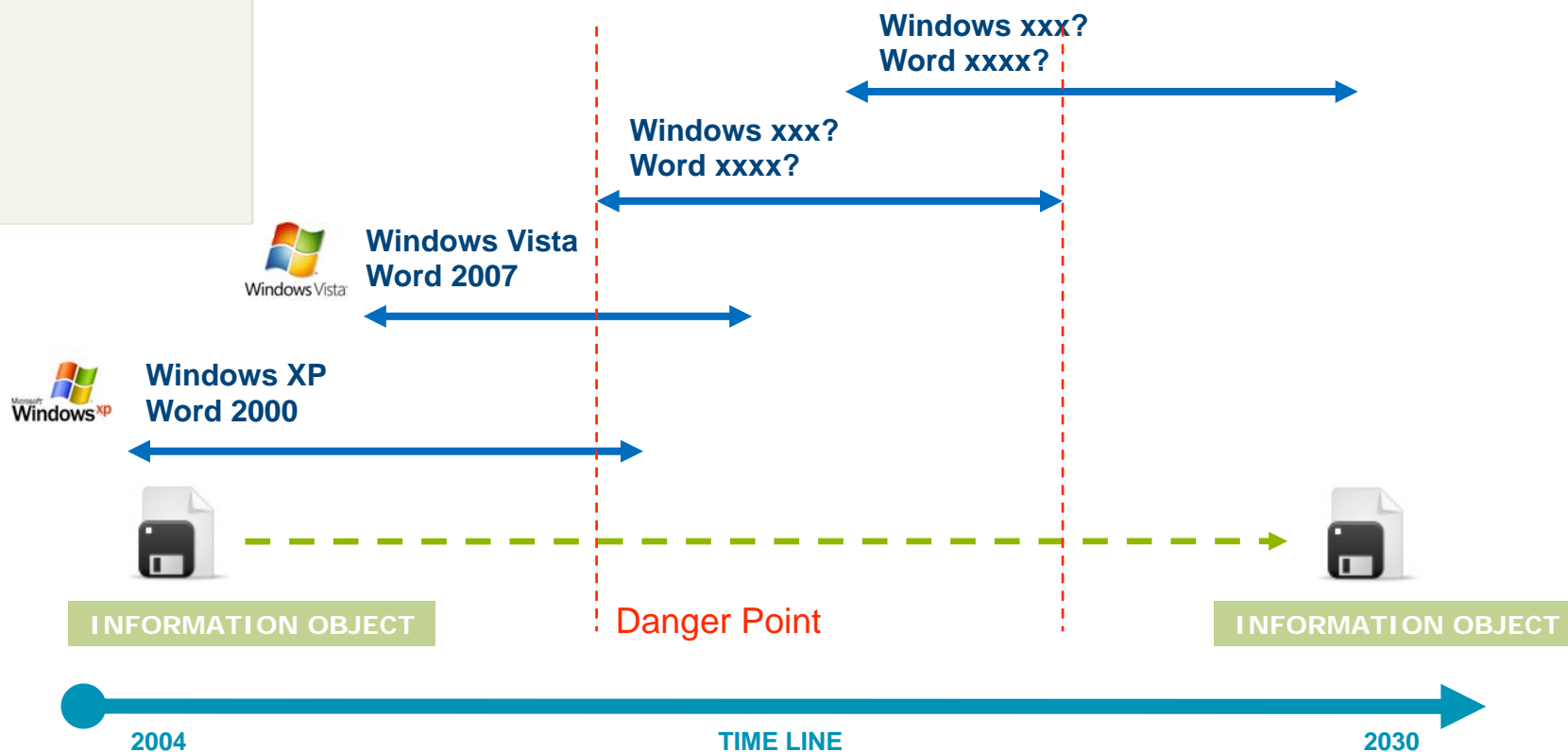
To establish the National Digital Heritage Archive to enable the National Library of New Zealand to meet its mandate to collect, make accessible, and preserve in perpetuity, New Zealand's digital heritage, as defined by the Library's current collection policy

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Securing the Future

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Partnership 1

Partnership

We cannot do this alone

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Design & Build

Sun Centre of Excellence

Ex Libris FROM LIBRARY SYSTEMS TO INFORMATION SERVICES

Sun microsystems

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Partnership 2

Some philosophical questions

Buy or build?

Proprietary or open source?

Or are they religious questions?

- Commercial solution vs. building it yourself vs. project based company
  - User community
  - Enhancements
  - Continuity
  - Open source 80% (Jhove, Droid)
- Important to look at the required institutional outcome
- Repository solutions, digital archiving solutions and digital preservation systems are unlikely to be the same thing

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Partnership 3

Not a National Library of New Zealand cul-de-sac

It is important from NLNZ perspective that the solution is not NLNZ specific

- Digital Preservation System (DPS)
  - generic software solution for the wider market
  - broad ranging digital preservation solution for a range of community interests

- NDHA - the NLNZ implementation of DPS
  - wider functionality and business change are required for practical digital preservation within any given institution

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Partnership 4

Peer review Group

What to do when the business (NLNZ) and the vendor (Ex Libris) can't agree on an issue

Partnership 5

New Haven

London

Glasgow

Ithaca

Helsinki

Los Angeles

Beijing

The Hague

Jerusalem

Wellington

Singapore
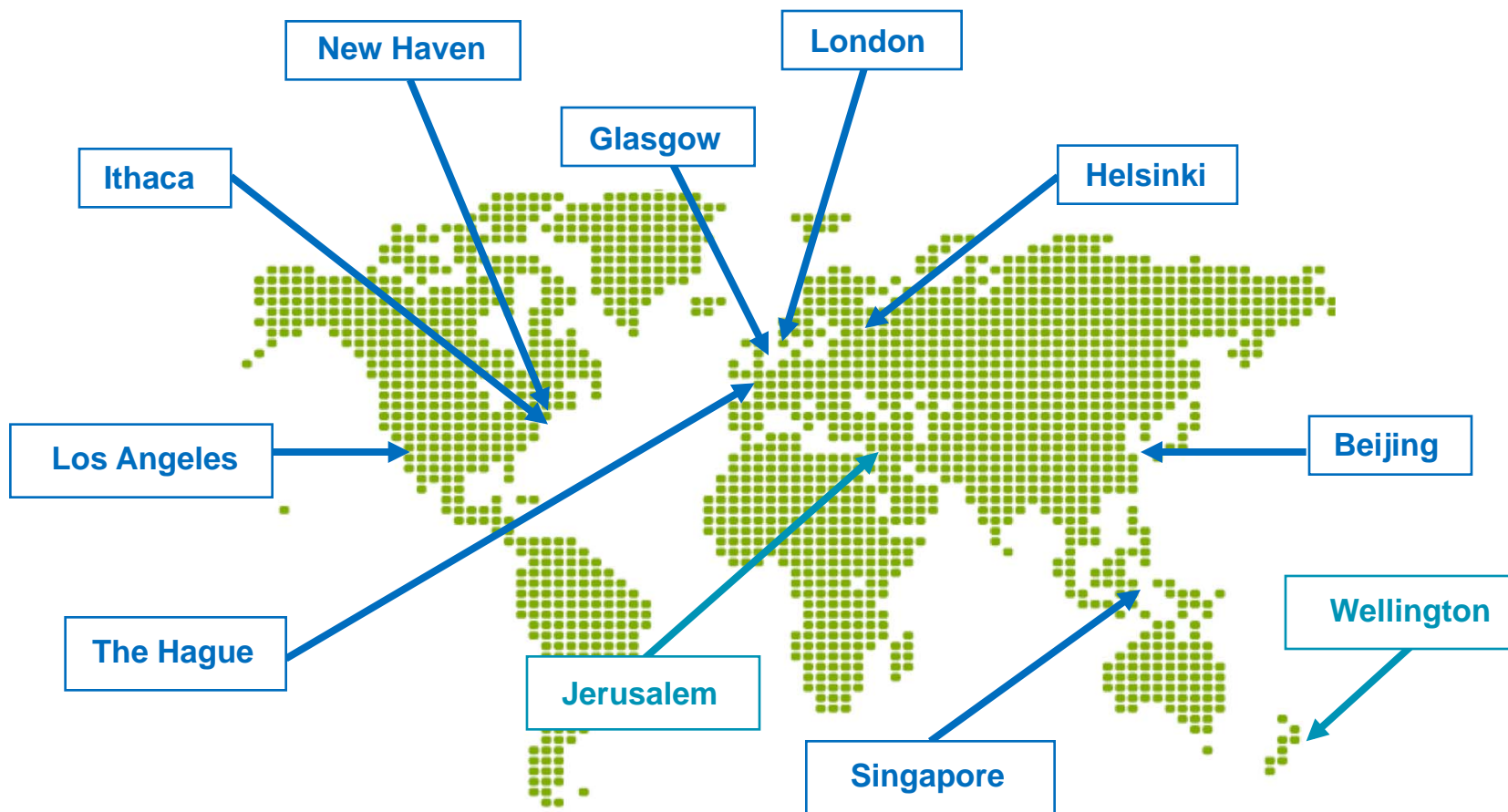
Stakeholders

Stakeholder

"anyone who is affected by – or - can influence, the decision or outcome"

NDHA Cross Government Group

- ACC
- Archives New Zealand
- Crown Law Office
- Customs NZ
- Department of Building & Housing
- Department of Child, Youth & Family Services
- Department of Internal Affairs
- Department of Labour
- Department of the Prime Minister & Cabinet
- Inland Revenue Department
- Land Information New Zealand
- Ministry for Culture & Heritage
- Ministry for the Environment
- Ministry of Agriculture & Forestry
- Ministry of Defence
- Ministry of Economic Development
- Ministry of Education
- Ministry of Justice
- Ministry of Research, Science & Technology
- Ministry of Social Development
- NZ on Air
- Parliamentary Library
- State Services Commission
- Statistics New Zealand
- Te Puni Kōkiri
- The Film Archive
- The Treasury

Gap Analysis

Gap Analysis

What's the gap between what we want and what they've got?

- Analysis of the gap between the Library's functional requirements for digital preservation and the level of functionality available in the Ex Libris DigiTool product

- 9 categories of gaps
  - Deposit
  - Staging
  - Data model
  - Repository
  - Validation
  - Hardware
  - Permanent
  - Ingest
  - Preservation

72 Gaps

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Gap 17: Data Model - Events

Gap Analysis

Quite a bit as it turns out ;-)

- **G17** - Some of the events should be stored as provenance information
- At present, 83 separate events are required to be monitored within the system
- Information relating to some of these events is required to be kept permanently as part of the provenance data for an object going into the future

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Gap 17: Data Model - Events

Gap Analysis

Such as a range of provenance events.

Event 4   – System generates fixity information/values
Event 17 – System deletes a viewing copy
Event 20 – System performs a virus check on a
                        SIP/manifestation
Event 22 – System updates the file fixity Metadata
Event 24 – System validates the file format
Event 38 – Create viewing copies of the files
Event 42 – System creates a manifestation
Event 50 – System deletes a manifestation from
                archival storage
Event 54 – System stores metadata in the repository
Event 57 – System performs a fixity check on a
                        SIP/manifestation
Event 79 – System runs preservation action on
                        manifestation

Out of scope gaps

Out of scope

10 gaps were explicitly stated to be out of scope

Hardware

NG1 - support for backup
NG2 - support for disaster recovery
NG3 - support for disaster recovery (off-site backup)
NG4 - any component in the hardware configuration should be duplicated

Third party applications

NG5 - hardware support for external components
NG8 - support for the Library's internal systems
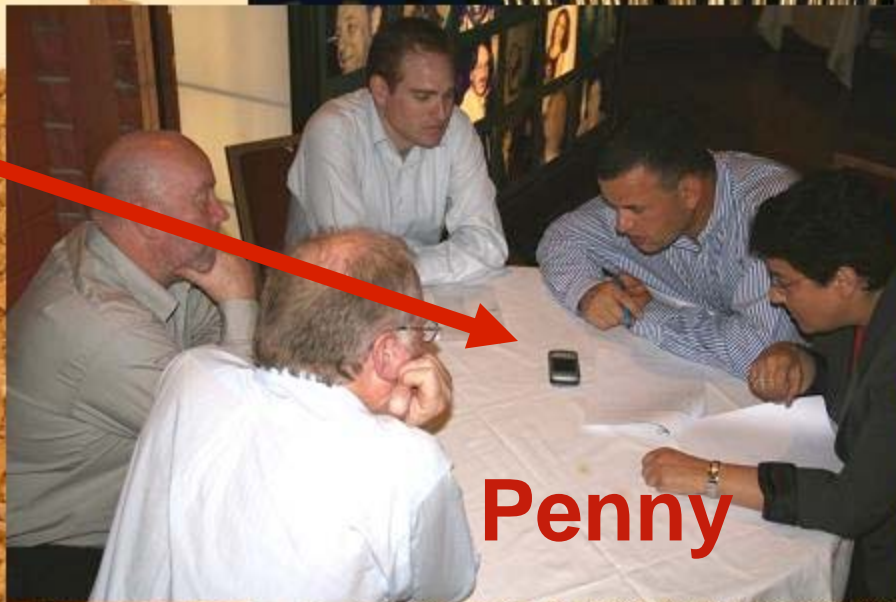NG9 - support for conversion of current applications into the preservation system
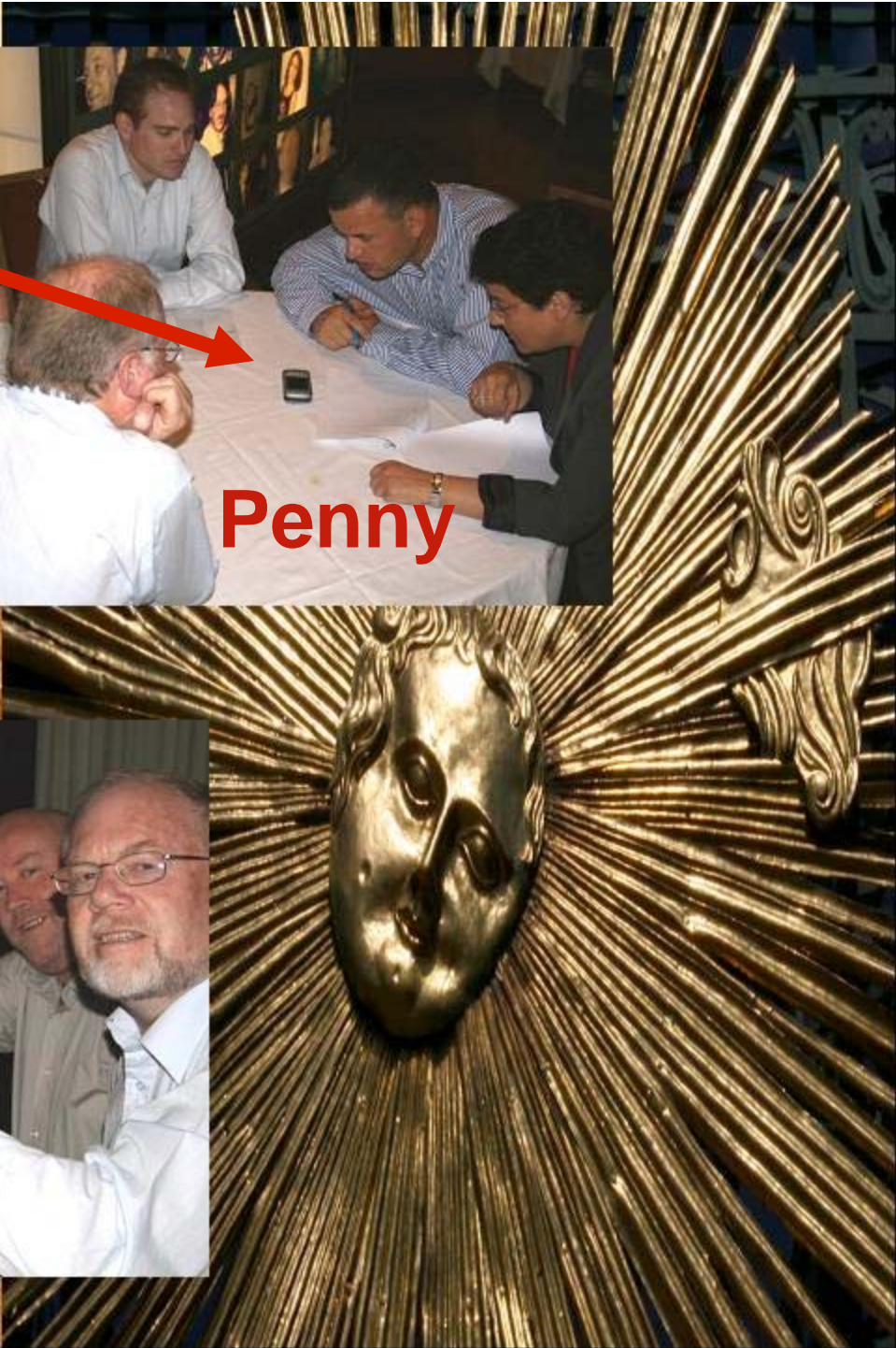NG10 - support for internal access applications

Infrastructure

NG6 - ability to monitor the system

Repository

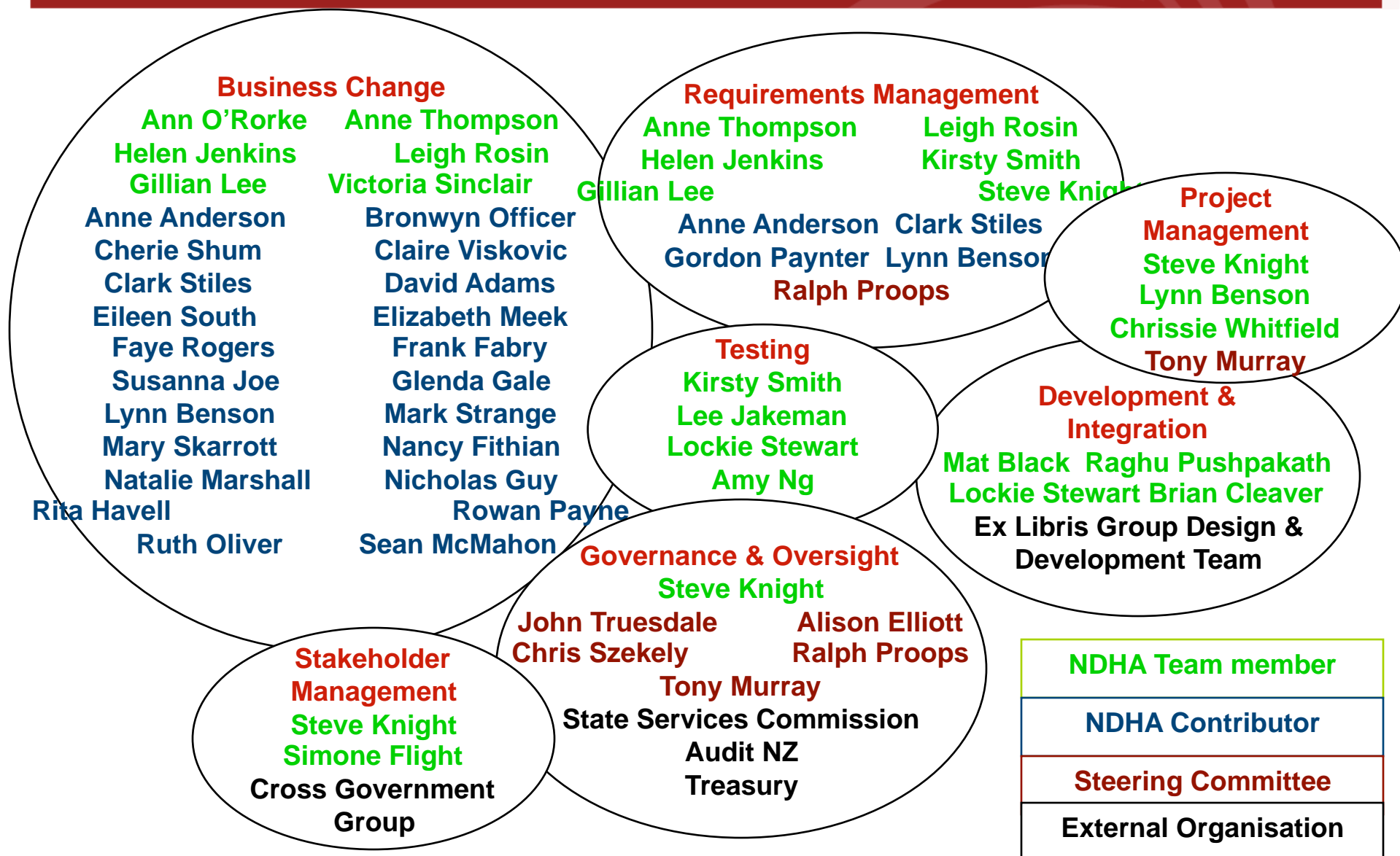NG7 - support for generating reports on usage and other info

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Penny

Team

Business Change

Ann O'Rorke   Anne Thompson
Helen Jenkins   Leigh Rosin
Gillian Lee   Victoria Sinclair
Anne Anderson   Bronwyn Officer
Cherie Shum   Claire Viskovic
Clark Stiles   David Adams
Eileen South   Elizabeth Meek
Faye Rogers   Frank Fabry
Susanna Joe   Glenda Gale
Lynn Benson   Mark Strange
Mary Skarrott   Nancy Fithian
Natalie Marshall   Nicholas Guy
Rita Havell   Rowan Payne
Ruth Oliver   Sean McMahon

Requirements Management

Anne Thompson   Leigh Rosin
Helen Jenkins   Kirsty Smith
Gillian Lee   Steve Knight
Anne Anderson Clark Stiles
Gordon Paynter Lynn Benson
Ralph Proops

Project Management

Steve Knight
Lynn Benson
Chrissie Whitfield
Tony Murray

Testing

Kirsty Smith
Lee Jakeman
Lockie Stewart
Amy Ng

Development & Integration

Mat Black Raghu Pushpakath
Lockie Stewart Brian Cleaver
Ex Libris Group Design & Development Team

Governance & Oversight

Steve Knight
John Truesdale   Alison Elliott
Chris Szekely   Ralph Proops
Tony Murray
**State Services Commission
Audit NZ
Treasury**

Stakeholder Management

Steve Knight
Simone Flight
Cross Government Group

NDHA Team member
NDHA Contributor
Steering Committee
External Organisation

Phased Approach

Phase 1 – **Live Production System**   75%

First delivery of system for acceptance testing → Testing → Training → Phase I Acceptance → **COMPLETED**

NDHA operational for INGEST STORAGE ACCESS

Phase 2 – **Fully Operational**   100%

Delivery of system for acceptance testing → Testing → Training → Phase 2 Acceptance → **GO LIVE**

NDHA operational for DIGITAL PRESERVATION

plus the balance of the functionality

OAIS Reference Model
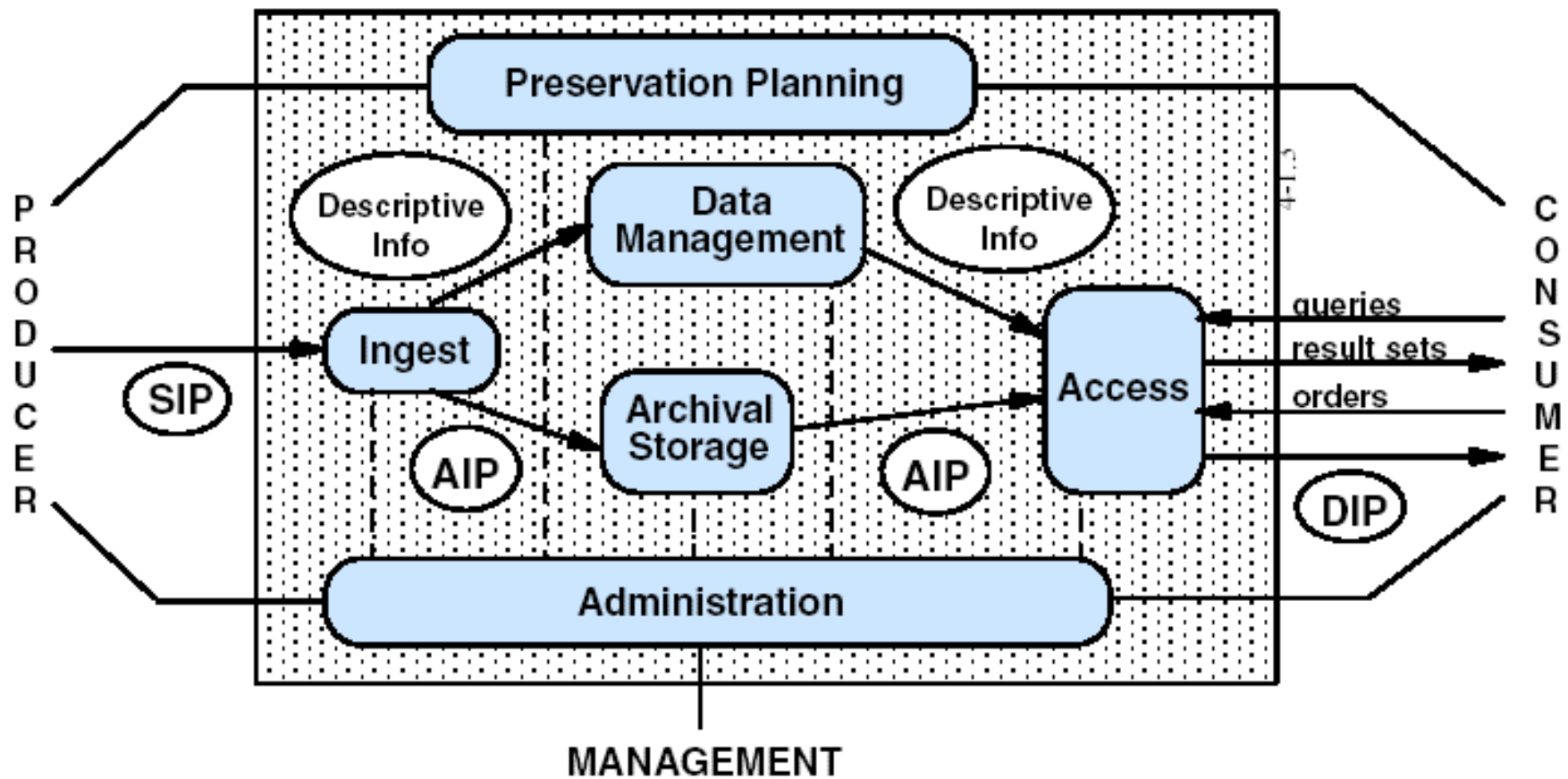
OAIS base map

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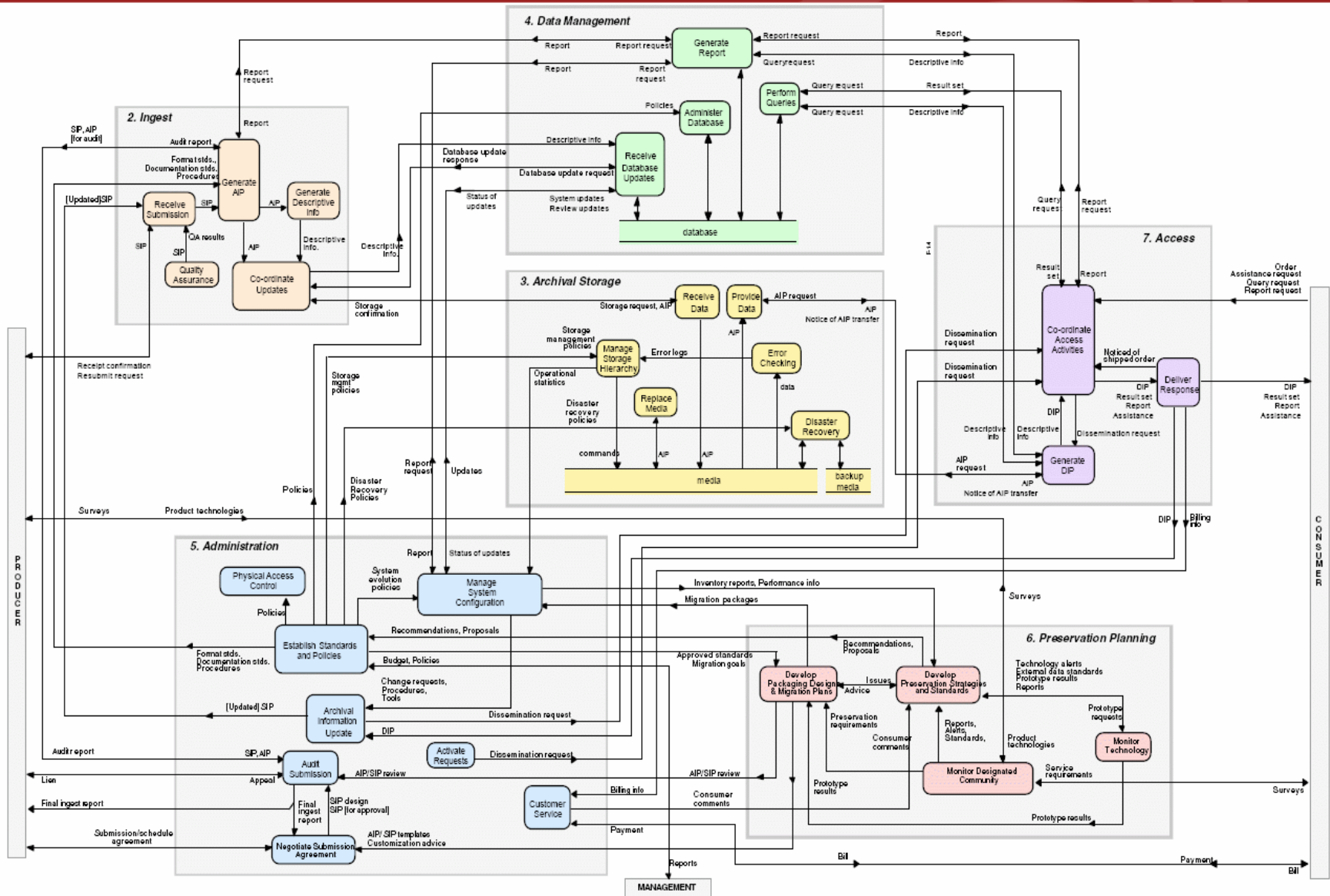
DPS & the NDHA

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NDHA Administration

SUBMISSION TOOLS   ACCESS TOOLS

Web Curator Tool

Voyager, Tapuhi OPACs

Other Published & Unpublished Material

Digital Preservation System

Timeframes, Papers Past

Digitisation & Sound Preservation

Other Access Applications

TECHNOLOGY INFRASTRUCTURE

COLLECTION MANAGEMENT SYSTEMS

IAMS

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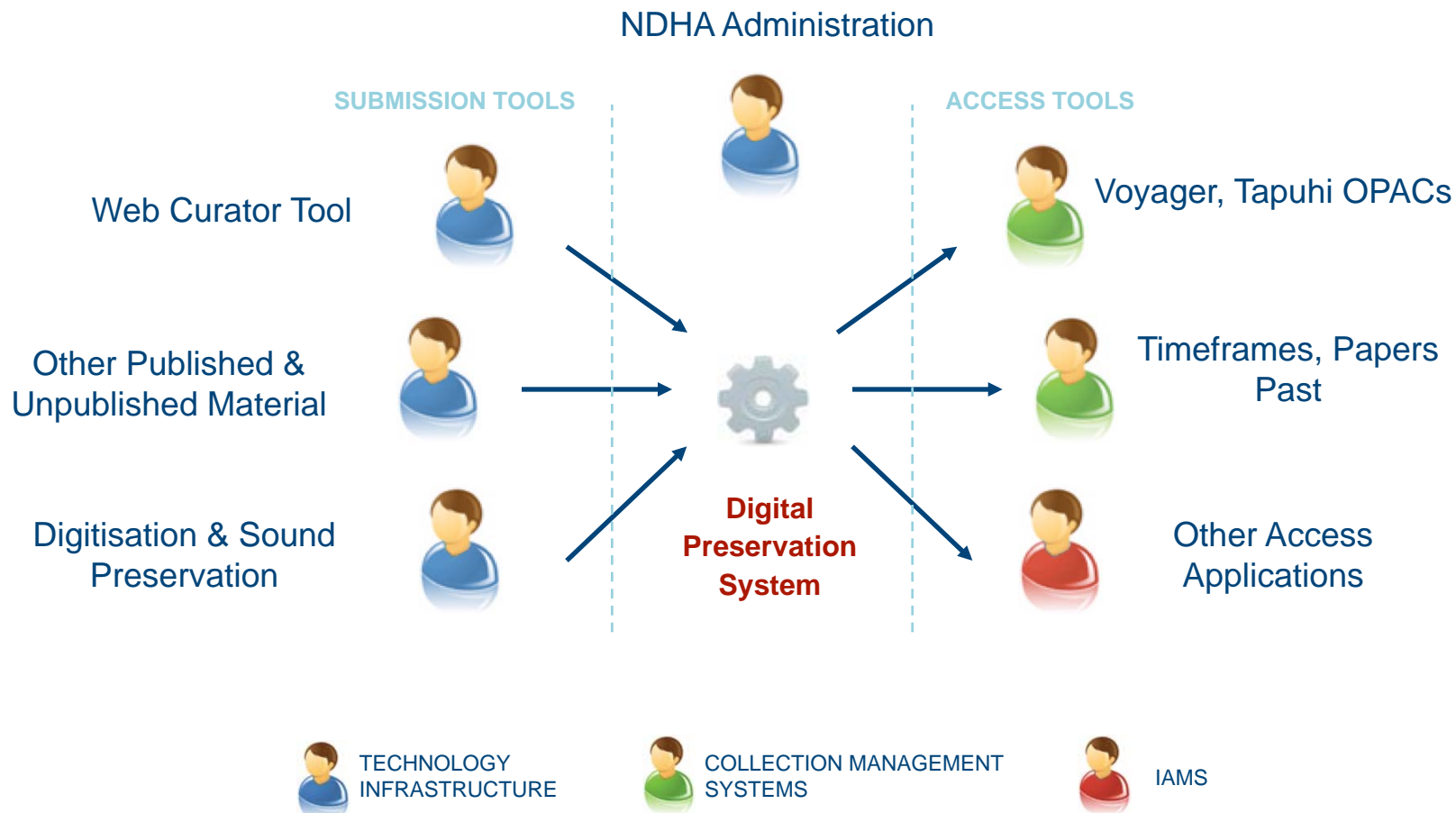
Work Streams

Business Change

Business Analysis - Process Mapping - Resource Mapping - Socialisation - User & System Documentation - Training

Requirements Management

FRS

Gap Analysis

Scope / Deliverables Management - Change Control

Systems Development

Specify - Code - Unit Test - System Test - Performance Test

DPS R1

Systems Integration

CMS - Resource Discovery - Deposit Applications

DPS R2

Acceptance Testing

Criteria - Planning - Scenario - Scripting - Test Data - Testing

July 2004   Dec 2006   June 2007   Sept 2007   Oct 2008   Oct 2009

DPS functionality at Day 1

Phase 1 Specifications

From producer management ➔ workflow automation ➔ delivery, audit trails & reporting

- User management
- Producer management
- Deposit 1
- Deposit 2
- Validation stack
- Intellectual Entity (IE) data model
- Submission Information Package (SIP) submission
- SIP processing
- Deposit registration
- Technical analyst
- Workbench

- Consolidated appraisal workbench
- DPS transformers
- Deposit Application Programme Interface (API)
- Audit & provenance
- Process management
- User management API
- Permanent repository
- Delivery
- Meditor
- Reports
- Back office configuration

Phase 2 delivery

Phase 2 Specifications

Preservation planning and action are in Phase 2 to allow for extended requirements analysis prior to development

- Format Library
- Risk analysis
- Preservation action
- Enhanced set import/export management for preservation actions
- Maintenance and management functions in Staging NOT permanent
- Enhanced configurability

It's not just hardware and software

Organisational readiness

Legislation and strategies are not sufficient

'No job will be unchanged'
Chief Executive/ National Librarian
October 2007

Digital preservation requires interaction with all the organisation's processes and procedures -

- Business Processes
  - workflows, procedures and policies
- Capacity & Capability
  - resources and skills
- Performance Measures
  - reporting and measuring
- Internal Training
  - system & staff training
- Producer Management
  - service, marketing & training
- Business & Technical Support
  - between departments
- Communication
  - a constant

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The NDHA challenge

Challenge

If the only goal were to ingest and preserve digital content in complete isolation from the other systems and processes then digital preservation would be a much simpler task.

Organisational readiness
Resources, services and infrastructure supporting digital preservation

Integration with existing systems

INDIGO   WEB CURATOR TOOL

Migration of digital assets
80,000 intellectual entities made up of around 280,000 files

Measuring success
60 key performance measures

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Integration

Integration work stream

It's not all about the Digital Preservation System

- Deposit applications development

- Existing collection management systems integration

- Browser based content delivery systems development

- Existing resource discovery and delivery systems integration

- Reporting systems

- Common services integration

- Data migration

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Integration so far

Milestones
Y
Y
Y
Y
Y

- Staff deposit application

- HTTrack to ARC converter utility

- Archived website migration tools

- OMS data migration tools

- Content aggregator

- Delivery viewers

What is INDIGO

INDIGO

Forms …

Romanic: indicum, indicus

Spanish: indico

Portugese: endego

Dutch: Indigo

NDHA: in dey go

Internal Submission Application

- Submission Information Package (SIP) Creation Tool (Templates, Hotkey support

Packages up

- Files (supports complex digital objects)

- Metadata (Structure map creation – METS)

- Digital object structure – multiple representations

- Fixity generation (MD5)

- Links to descriptive record – CMS integration

- Links producer records

Submits SIP to the NDHA

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Migration 1

Object Management
System (OMS) 2005

What to do with all
our digital data

- Supporting Legal deposit while NDHA is developed
  - Published material deposited under Legal deposit
  - Digitised material from the Library's digitisation programme
  - Websites harvested as part of the Library's web archiving programme
  - Material will be migrated as new content

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Migration 2

Object Management System (OMS) 2005

Data for testing end-to-end DPS functionality

- This will:
  - test initial workflows and process configurations
  - Impose the same metadata constraints (referential integrity, data validation)
  - Impose the same validation checks (fixity verification, virus check, format identification and metadata extraction)
  - Impose the same enrichment tasks (CMS identifier association, access derivative generation)

  that will be applied in a live operational setting.

- This should give an indication of the amount of effort required to migrate the rest of the National Library's digitized content into the NDHA system.

Performance Measures

How do we measure what we're doing?

From widgets to outcomes

- A move to management information with over 60 key performance indicators including:
    – Key performance indicators

    – Reporting

    – Audit

    – internal ingest

    – + response actions, ie for over/ under delivery

Technology infrastructure

Maturity

How ready is our infrastructure for digital preservation?

Processes

People

System

Information

Training
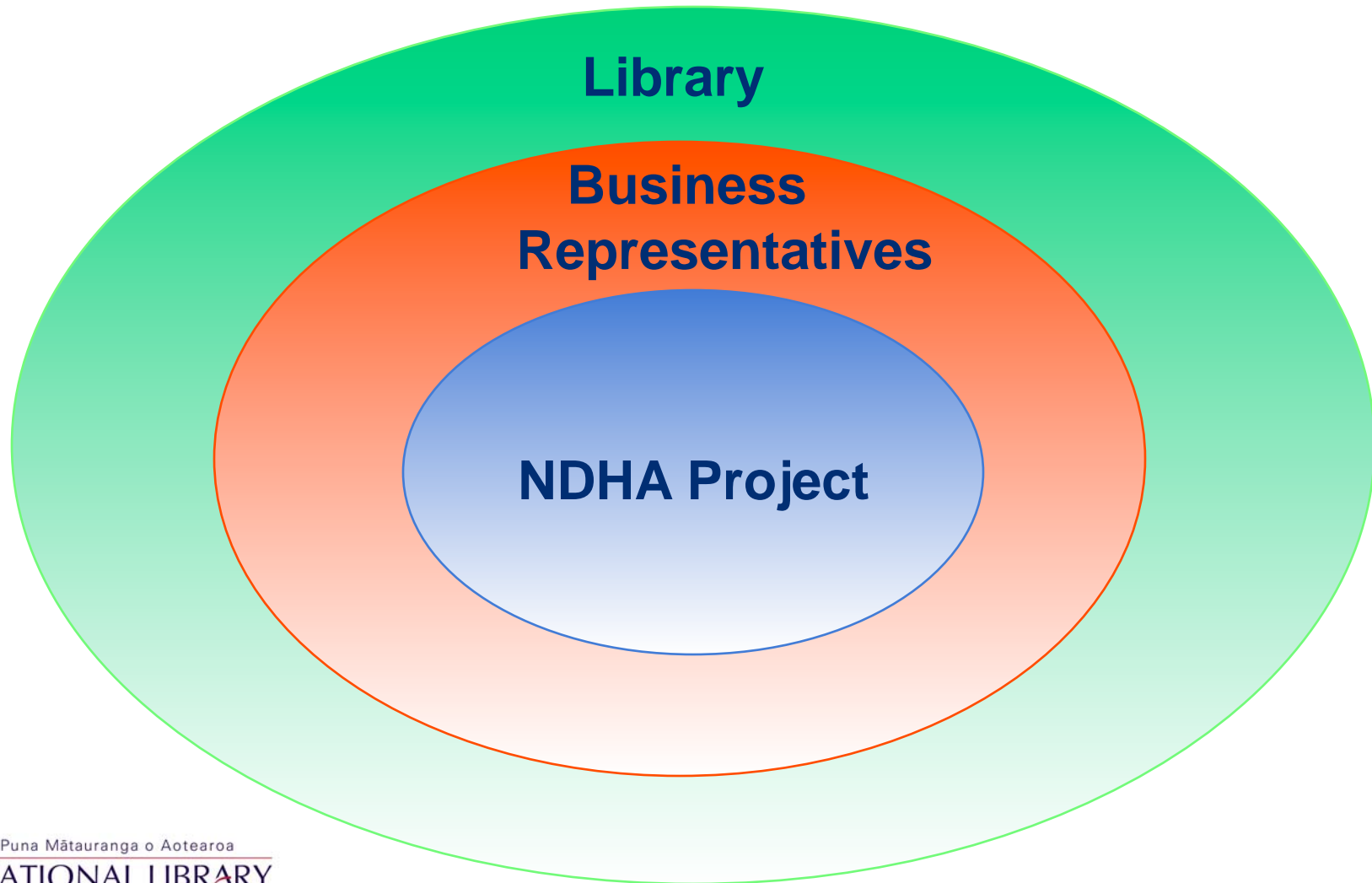
Sustainable change
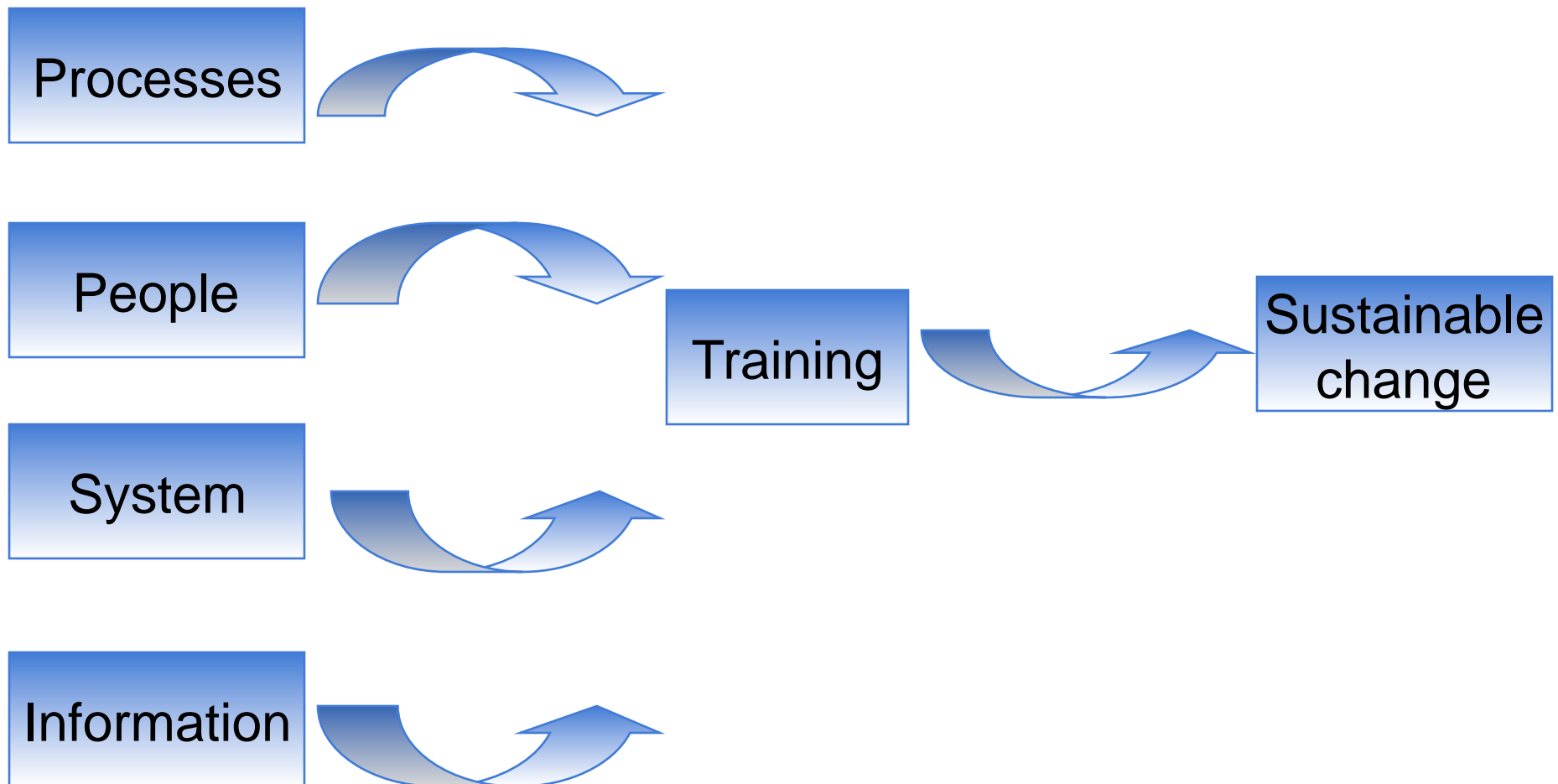
Subject Matter Experts (SMEs)

Library → **NDHA**

- Ensuring that the NDHA solution and business change take into account Library needs

- Lead analysis as and when required

←
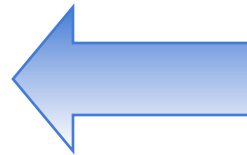
- Library experts on the NDHA

Business process

Most Business Representatives

Envision

- Map current processes ✔
- Design NDHA processes

Enable

- Review gap between current and future processes
- Contribute to development of high level implementation plan
- Support managers, curators and team leaders in developing local implementation plan

Enact

- Support local implementation

Performance measures

Most Business Representatives

Envision	Enable	Enact
	• Propose measurement methodologies	• Support implementation

Internal training

All Business Representatives	Envision	Enable	Enact
		• Advise on and review required adaptations to training materials and exercises for target audience • Receive training	• Deliver training • Provide NDHA expertise to Department

Producer management

Most Business Representatives

Envision

Analyse current producers

Identify future producers

Develop producer strategies

Enable

- Prepare communications for producers
- Contribute to development of generic producer workflows
- Develop individual producer workflows
- Identify producers for testing
- Adapt training plans and exercises for target audiences
- Receive training

Enact

- Deliver producer training
- Set up individual producer workflows
- Update training programme following evaluation

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Business and technical support

Most Business Representatives

Envision

Review support requirements

Review current SLAs

Develop support plan

Enable

- Contribute to development of SLAs
- Design client support arrangements
- Design escalation arrangemnets
- Design transitional arrangements

Enact

- Support implementation

A National strategy

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New Zealand's Digital Strategy: the three Cs
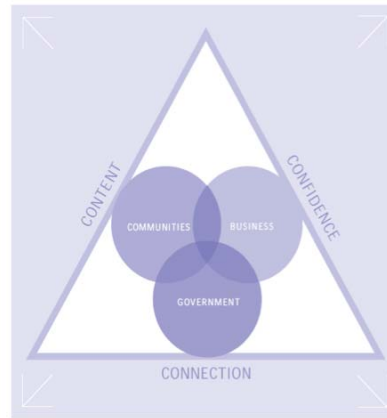
The 'C' framework

connection

New Zealand will be in the top quarter of the OECD for broadband uptake by 2010.

content

To unlock New Zealand's stock of content and provide all New Zealanders with seamless, easy access to the information that is important to their lives, businesses, and cultural identity.

confidence

To provide all New Zealanders with the digital skills and confidence to find and use the information they need; and to ensure that telecommunications and the Internet in New Zealand are reliable and secure.

Five-Element Framework

The power of five

Creating and protecting content

Accessing and discovering content

Sharing and using content

Managing and preserving content

Understanding and awareness of content
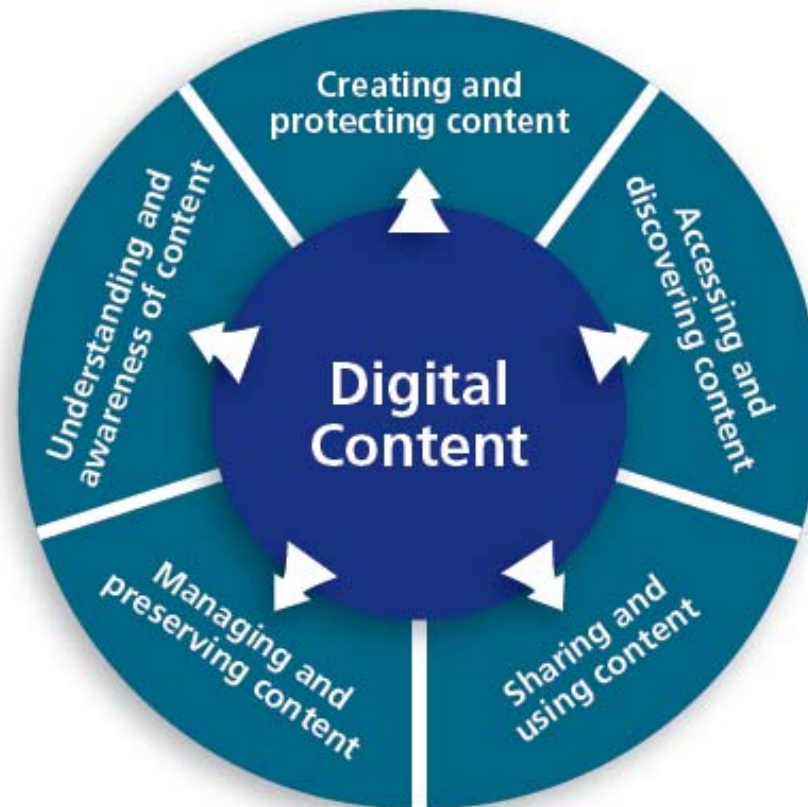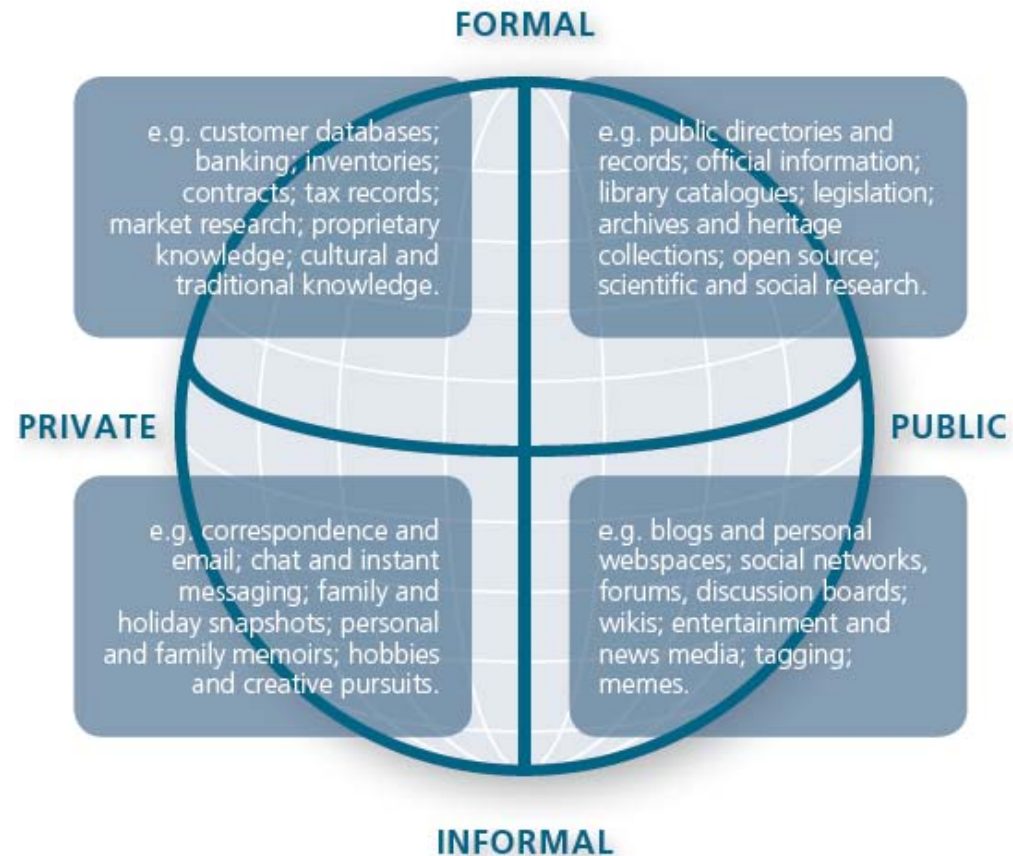
The Digital Space

A classification system

Content as:

Formal/Informal

Public/Private

FORMAL

e.g. customer databases; banking; inventories; contracts; tax records; market research; proprietary knowledge; cultural and traditional knowledge.

e.g. public directories and records; official information; library catalogues; legislation; archives and heritage collections; open source; scientific and social research.

PRIVATE

PUBLIC

e.g. correspondence and email; chat and instant messaging; family and holiday snapshots; personal and family memoirs; hobbies and creative pursuits.

e.g. blogs and personal webspaces; social networks, forums, discussion boards; wikis; entertainment and news media; tagging; memes.

INFORMAL

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New Zealand Ideas

Digital New Zealand

Joined up government

Public access to legislation

KRIS – NZ science and research

Research data sets

Curriculum resources

The public record

Digital NZ

Digital New Zealand

Aotearoa People's Network - community repositories

Access Radio

NZ Film Archive

NZ Sound Archive

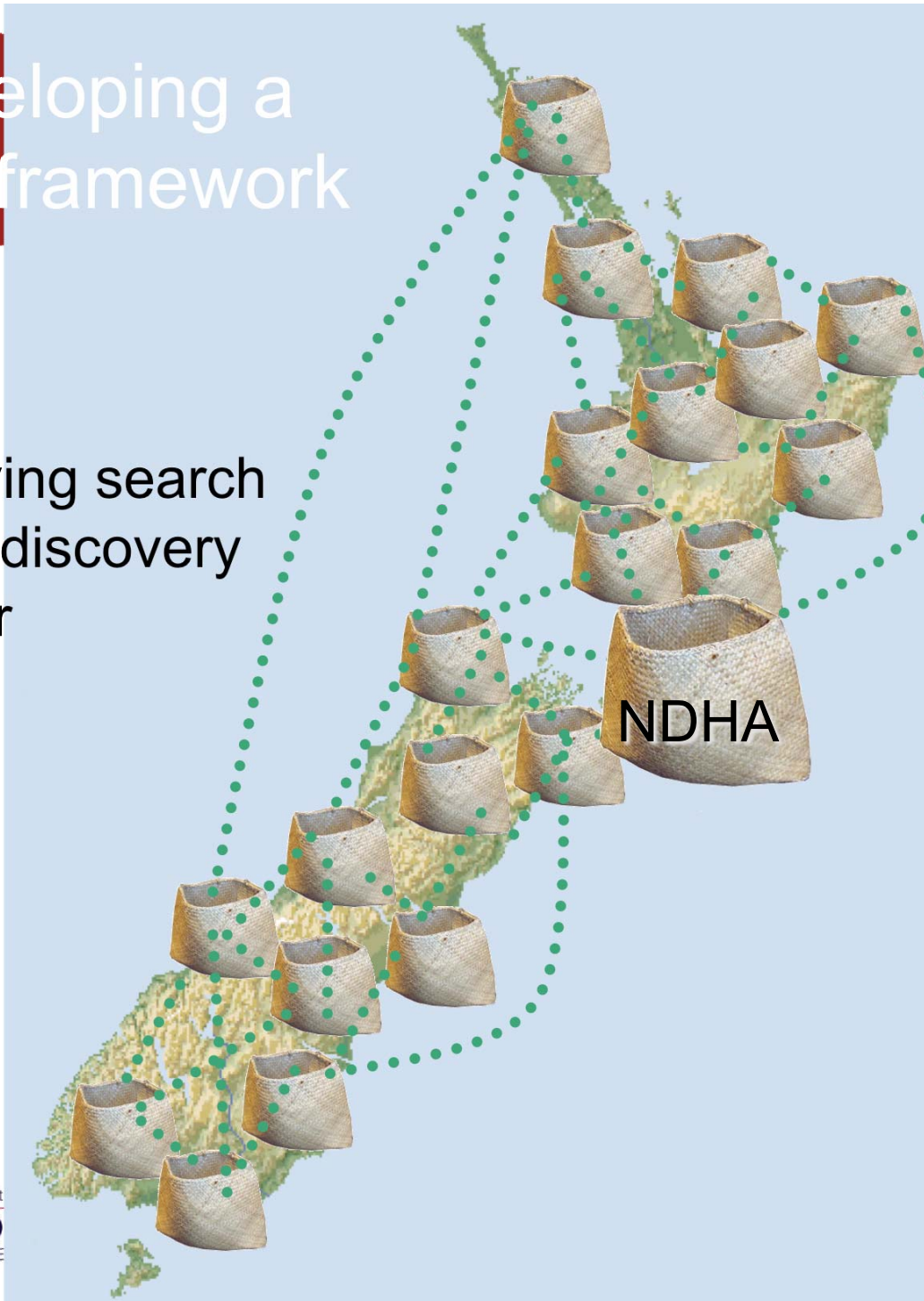Te Ara – The Online Encyclopedia

Broadcasting

Television

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Developing a
NZ framework

NATIONAL DIGITAL
HERITAGE ARCHIVE

Unifying search
and discovery
layer

NDHA

Digital NZ

Te Puna Māt
NATIO
OF NEW ZE

Summary

NATIONAL DIGITAL
HERITAGE ARCHIVE

connection

content

confidence

Digital Content

Creating and protecting content

Accessing and discovering content

Understanding and awareness of content

Managing and preserving content

Sharing and using content

nzresearch.org.nz
Kiwi Research Information Service

Please enter a search term

Digital NZ

ICT Strategic Framework for Education
2006–07

:MATAPIHI

epic

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content

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confidence

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continuity

Digital preservation is the glue which will make this happen and where sustainability of our work in the digital domain occurs.

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National Digital Heritage Archive
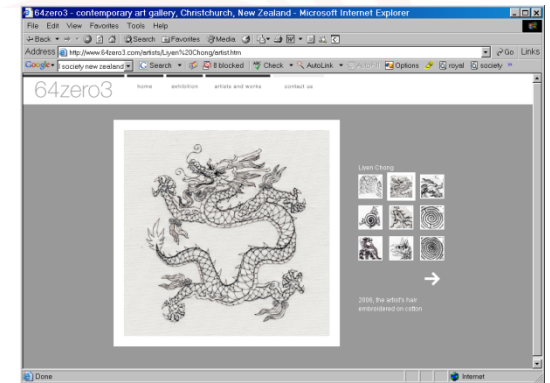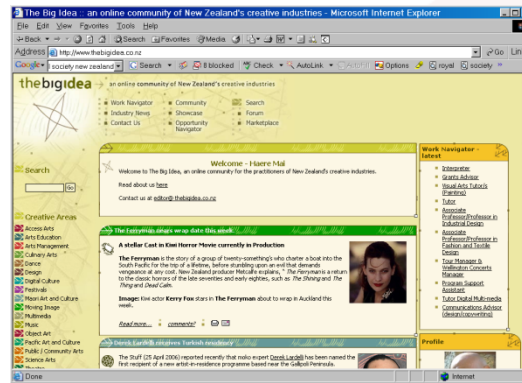
Collecting, preserving and making accessible New Zealand's published digital heritage

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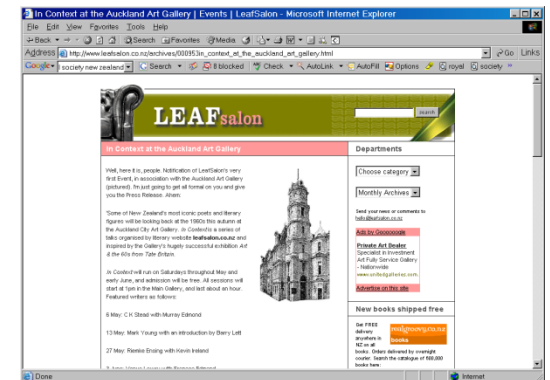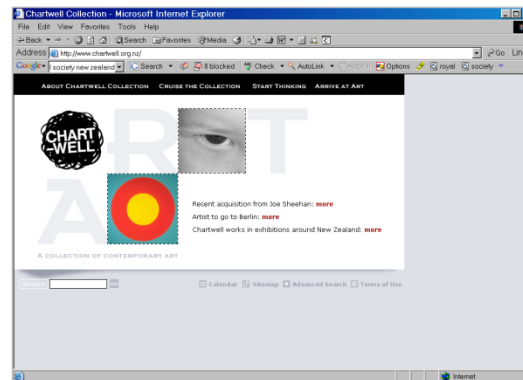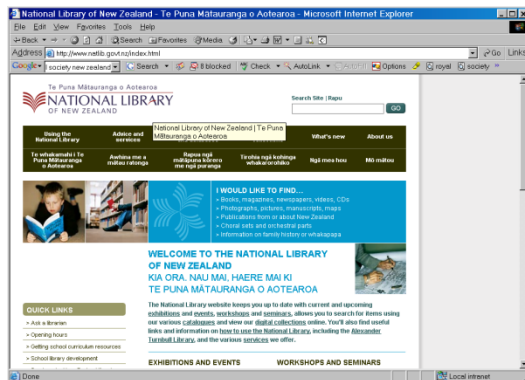
Challenges Ahead

Digital preservation must be a national issue

Does digital preservation require an international response?

- Digital preservation is at the heart of our business in 5 years
- Citizen's created content impacting on our collection, description and preservation processes
- Content (ie digital preservation) systems are our core operational systems, not the catalogue
- Digital preservation as a component of a national knowledge infrastructure
- Quality assurance of products and tools
- Professional services market
- Agreed lexicon describing what we mean by digital preservation and what we want from digital preservation systems

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Getting Everything right

Preservation without content, content without description and search and retrieval and connection mechanisms, and search mechanisms without user friendly front end access are not sufficient in themselves. One missing element degrades the value of all the others. It is important to look at digital preservation in the context of an overall strategic and holistic approach to the surfacing of our collections.

National Libraries and National Identity

What is a national library for?

"A National Library is a place where a nation nourishes its memory and exerts its imagination – where it connects with its past and invents its future."

Pierre Ryckmans. 1996. "Perplexities of an electronically illiterate old man." Quad-rant, September 1996, No 329.

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Securing the Future

Thank You

Steve Knight

Associate Director National Digital Library

National Library of New Zealand