

# Decommissioning of legacy systems: A methodology for indentifying and preserving records of ongoing business value in legacy business systems

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## ABSTRACT

This paper provides an overview of the methodology and supporting advice developed by Queensland State Archives to help Queensland government departments undertaking the disposal or replacement of legacy ICT assets to lawfully manage the information content of those systems.

Before deleting or investing in any preservation effort on records in decommissioning candidate systems, agencies need to have a clear understanding of:

- which records need to be kept and for how long
- how to seek disposition authorisation for records which may have no ongoing value to the organisation, and
- what is and is not deemed a suitable preservation environment for managing records of ongoing value, from a recordkeeping perspective.

Developed with the non-record professional in mind, a key message underpinning the methodology is that records as evidence of business activity are strategic assets in their own right, not just a byproduct of the business process, owned by the application. [Gartner 2011]

## General Terms

Strategic environment, preservation strategies and workflows, case studies and best practice.

## Keywords

Legacy business systems, Methodology, Disposition, Preservation

## 1. INTRODUCTION

In 2012, the Queensland government undertook an audit of significant ICT assets across the 20 Queensland state government departments. The Audit, the first of its kind in Queensland, was undertaken by the Queensland Government Chief Information Office and identified that a large number of central government

business systems are run on unsupported, or soon to be unsupported technology: presenting a high risk to government.

### 2012 ICT Audit - Headline findings [Queensland Government. 2012]

- 1730 systems reported to the ICT systems audit
- 904 (54%) are “legacy ICT systems”, potential candidates for rationalisation or decommissioning
- 91% of the 1730 systems will be at end of life within 5 years

In response to the audit findings, the Queensland government set out to realise cost savings of up to AUD 10 million per annum by decommissioning legacy ICT systems no longer in active use. The Audit and its recommendations largely focused on the systems: remaining largely silent on the value of their information content.

Queensland State Archives role as lead agency for recordkeeping signaled to Government that most of these legacy business systems contain public records which must be managed in accordance with the *Public Records Act 2002* (the Act) and set out to answer two questions for impacted agencies: Which records could be legally disposed of and how? and Which records need to be retained and preserved?

The ICT Audit and the subsequent drive to rationalise a substantial number of legacy business systems has brought to the forefront digital records preservation and disposal issues. Issues which systems administrators, Chief Information Officers and others charged with the commissioning and decommissioning of ICT assets within an organisation typically do not engage with.

## 2. EXISTING METHODOLOGIES AND FRAMEWORKS

Before developing new tools, Queensland State Archives examined the suitability of any existing methodologies and frameworks which could be referenced either from within the Queensland government, or elsewhere.

The Queensland government’s *Application Rationalization Methodology* (ARM) was developed by the Queensland Government Chief Information Office. Used primarily by IT

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personnel and focusing on systems, the methodology does include a chapter on recordkeeping obligations which had been developed in consultation with Queensland State Archives. At the time of its original publication however, key aspects of Queensland State Archives appraisal and sentencing (selection) of records in business systems were under review. Consequently the ARM provides little practical guidance on the application of disposition authorities to digital records.

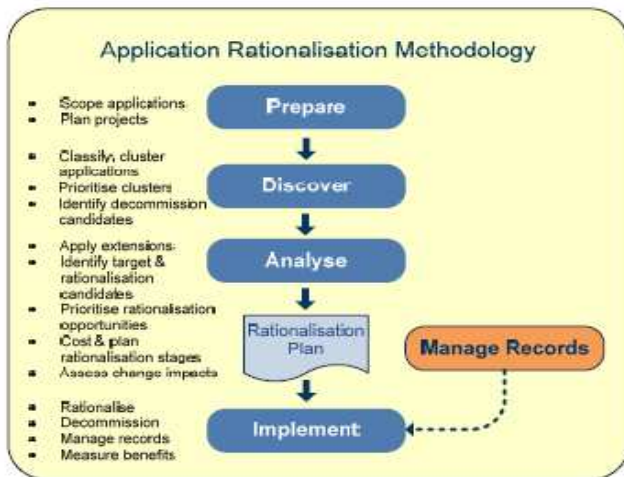


Figure 1: Queensland Government Chief Information Office Application Rationalisation Methodology [Queensland Government Chief Information Office. 2011]

While appraisal and disposition authorisation processes at Queensland State Archives were well established before the 2012 Audit, the potential for disposition authorisation requests arising from agencies potentially under pressure to decommission systems presented two particular challenges for Queensland State Archives:

- Queensland State Archives' capacity to process a large number of requests for disposition authorisation quickly
- The potential expectation which agencies might have that authorisation would be given, given the priority given to the issue by government.

For these reasons, Queensland State Archives recognised that a number of artifacts were required to meet this demand:

- A methodology that clearly set out the expectations and obligations which all agencies were expected to meet
- A transparent and defensible set of criteria which would be used to assess any applications for disposal and that would stand up to public scrutiny
- Mechanisms for seeking special consideration for certain types of records and for reporting records that were already lost
- Advice to supplement known gaps in Queensland State Archives existing policy framework which brought together relevant advice 'under one roof'.

## Decommissioning business systems workflow

Queensland State Archives

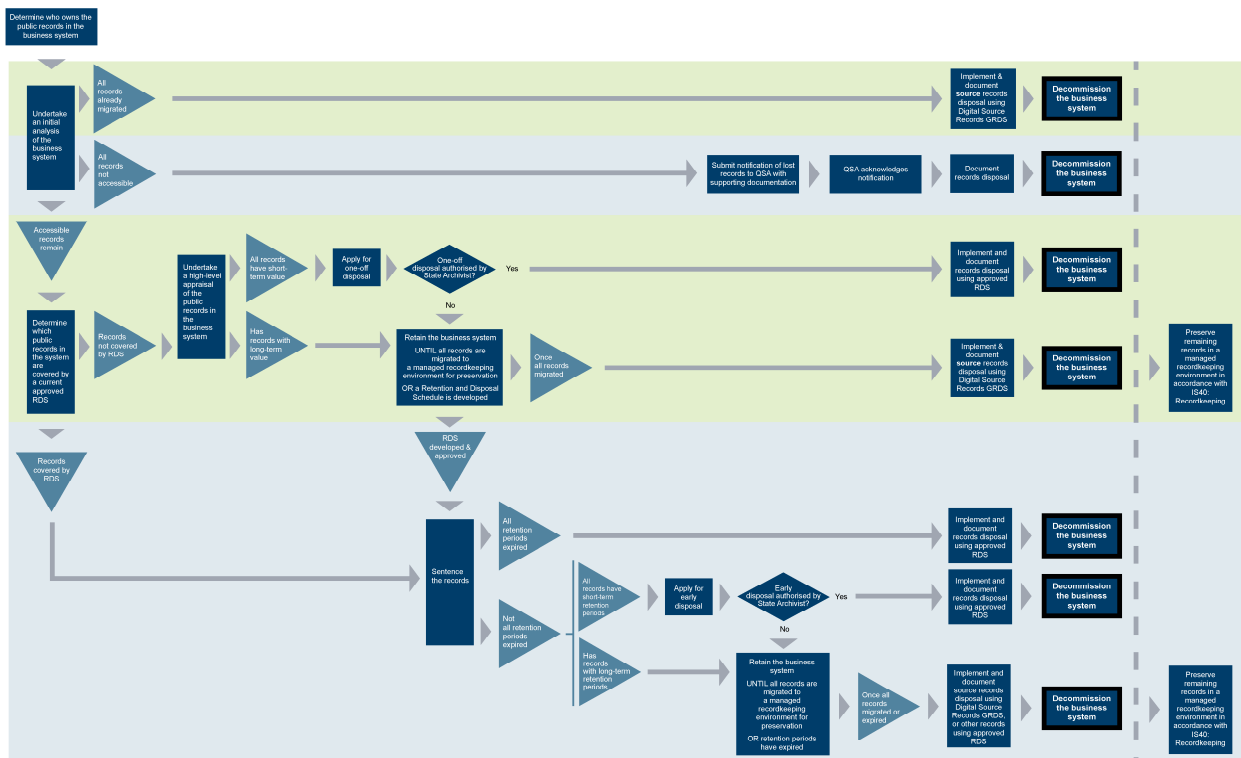


Figure 2: Queensland State Archives' Managing public records when decommissioning systems workflow

### 3. ABOUT THE METHODOLOGY

Queensland State Archives' Decommissioning Methodology [Queensland State Archives 2013a] comprises an interactive workflow, supported by a suite of advice around the core challenges of:

- identifying if a system contains public records
- managing the separate requirements of public records in the same system requiring temporary or permanent retention
- managing the disposal process for public records which have not yet reached their minimum retention period or which are not yet covered by a Retention and Disposal Schedule approved by the State Archivist
- determining the most appropriate digital preservation strategy for the public records.

Depending on a number of variable factors, for some agencies these challenges will be easily or already resolved, for others the agency would need to undertake more detailed analysis of the system and its content. These variables are depicted in figure 2 above as four different disposition/preservation scenarios or pathways. A higher resolution version of the document can be found on the Queensland State Archives web site<sup>1</sup>.

In the first scenario, all records have already been migrated to another system - that is, the system contains 'copies' of data no longer relied on as the record of the agency but which may have been retained because the agency lacked confidence that the copies could be lawfully deleted. Agencies in this scenario are able to delete the source records without further approval from the State Archivist provided they have met all migration conditions in Queensland State Archives' *General Retention and Disposal Schedule for Digital Source Records* [Queensland State Archives 2012].

The second scenario deals with the situation where all records in the business system are no longer accessible, that is, they can no longer be opened or interpreted. Conscious that this pathway could be used as a potential easy option by agencies unwilling to invest in the ongoing management of the records, Queensland State Archives nevertheless acknowledged that there may be a limited number of legitimate cases where the records in the systems were already effectively lost due to some catastrophic system failure or obsolescence. To guard against this, a number of checks and balances were built into the disposal approval process. For example, agencies are required to notify Queensland State Archives of the circumstances surrounding the 'loss' prior to their deletion. Agencies in this scenario cannot delete the records without first providing evidence to the State Archivist that the records are irretrievable.

The next scenario deals with records in a business system that are still accessible and are covered by a current disposition authority approved by the State Archivist which sets out the minimum legal retention period for the records in the system. Agencies in this scenario are able to delete the records in the system without seeking further authorisation from the State Archivist if their minimum authorised retention periods have expired. However their deletion must be approved by the legal owner of the records - that is, the agency which owns the function to which the records

relate, not the IT system owner. For those records which have not met their minimum retention period, agencies need to consider the best way to preserve the records for the remaining retention period. In some cases, permanently.

The final scenario deals with those records in systems which are not covered by a current disposition authority and therefore the minimum legal retention period for the records is unknown. Because under Queensland's *Public Records Act 2002* records cannot be disposed of without authorisation, agencies in this scenario have the option to either undertake an appraisal and disposition authorisation exercise, or make arrangements for the preservation and management of the records.

Of course, these scenarios are not necessarily mutually exclusive. For example, it is possible that a system might contain records, some of which are covered by an existing disposition authority and others that are not. In such cases, more than one pathway of the methodology may need to be followed to finally determine if the records are for disposal or preservation candidates. To keep the workflow diagram as simple as possible, all possible variations have not been depicted.

### 3.1 Key Issues Discussed in the Toolkit

#### 3.1.1 Do business systems contain public records?

Queensland's *Public Records Act 2002* (the Act) takes a broad definition of 'public records.' A public record is any form of recorded information, either received or created by a public authority, which provides evidence of the business or affairs of that public authority. Based on this definition Queensland State Archives took the view that most, if not all, business systems within the scope of the *Queensland Government 2012 ICT Audit* would contain some public records. Any system containing copies of records (for example, where data had already been migrated to another system) were also viewed as holding public records, based on the express provision in the Act which states that a public record includes a copy of a public record.

Further, the Toolkit references Queensland State Archives' existing published advice on the topic *What is a public record in the digital environment* [Queensland State Archives 2013b] and to ISO 16175-3:2010 [International Standards Organisation 2010] to help identify the records.

#### 3.1.2 How long do those records need to be kept?

For those records which are covered by an existing disposition authorisation, the retention periods are clearly defined. But for those records which have never been appraised, planning the preservation needs of the records in systems earmarked for decommissioning without an objective appraisal of the value of records would be difficult/almost impossible.

As Queensland State Archives had no published guidance on how to determine retention periods for records (though advice existed around justifying retention periods), a high level appraisal matrix needed to support this important step in the workflow.

The high-level appraisal advice guides public authorities through a simple appraisal exercise to determine (at a high level) how long those public records are **likely** to be required to meet business, legal, social, historical and other needs.

If this appraisal determines that the records are low value and could actually be past their potential 'use by date', agencies may seek a one-off approval to dispose of those records. Importantly, undertaking the high level appraisal does not waive the

<sup>1</sup>[http://www.archives.qld.gov.au/Recordkeeping/BusinessSystems/DecomWorkflow/Documents/Full workflow diagram.pdf](http://www.archives.qld.gov.au/Recordkeeping/BusinessSystems/DecomWorkflow/Documents/Full%20workflow%20diagram.pdf)

requirement to seek the State Archivist's authorisation to dispose of the records.

Since the release of the Methodology and Toolkit, the Public Records Office of Victoria has undertaken its own study into the state of significant databases across the Victorian government. The final report highlights, among other things, the value of a high level appraisal tool such as the one developed by Queensland State Archives to help public authorities identify which system contain high value permanent and long term records as a first step to managing their legacy systems. In the absence of other published models, this particular tool may well have interest to other archives beyond Queensland's borders.

### *3.1.3 Separating temporary and permanent value records in systems for disposal or preservation*

Despite many Queensland public authorities having a current disposition authorisation, some agencies continue to struggle to maintain effective control over their digital information through the proactive deletion of records. Anecdotally, Queensland State Archives is aware that there are several reasons why this is the case, including:

- many systems do not have disposal functionality enabling time-expired records to be removed from the system
- the quality of some record metadata is such that the task of matching records to record classes in disposition authorisations may be onerous.

The Toolkit advice on sentencing (selection) essentially empowers agencies to take a risk management approach: giving them an understanding of the issues and implications of sentencing public records at the individual record level or the system level. For practical reasons, the advice leans towards sentencing at the system level, as record level sentencing is generally more time consuming and may be impractical even if the system has the technical capabilities. In cases where, taking into account the longest retention period applicable to records in the system, the records are nearing expiry, the cost of preserving the entire system may be more cost effective than sentencing and disposing of portions of the data. This is a judgment which individual public authorities ultimately need to make, but their decision will hopefully be a more informed one.

### *3.1.4 What factors need to be weighed when determining the most appropriate preservation solution?*

In the absence of digital preservation services or infrastructure or a comprehensive Queensland government preservation framework, Queensland State Archives approach to the issue of how best to ensure records in decommissioning candidate systems are preserved for as long as they are legally required has been to provide agencies with advice on a number of acceptable options. Each option has benefits and risks which need to be evaluated by a public authority, with appropriate mitigation strategies put in place to address all risks. The options presented are:

- Migrate the records and preserve them in a managed recordkeeping environment:
- Actively manage the records in the original business system by either virtualisation methods or retaining the system on the original software and hardware platform

Printing records to paper is addressed but discounted as the option of 'last resort' in answer to the suggestion frequently put forward

by some agencies in discussions with Queensland State Archives on decommissioning issues, as an appropriate (i.e. financially practical) solution. Print to paper is not encouraged firstly because any record which can be printed to PDF can be retained in digital form without the need to print, and because a static representation of records designed to be used and viewed in a variety of ways inevitably reduces the completeness, usability, and authenticity of the original records.

## **4. IMPLEMENTATION**

Between August and November 2014, a review is being undertaken to test whether the methodology achieved its intended outcomes. Key findings from this benefit review are expected to be finalized by the end of the year. Queensland State Archives will survey and interview all 20 state government departments to find out:

- The extent of uptake of the methodology
- Whether agencies apply the methodology to real systems
- Key areas for revision or additional guidance needed
- Learnings in relation to how the methodology was applied to different types of systems and records.

Interim results at time of writing show that:

- Agencies have decommissioned a number of systems using the methodology
- Agencies use a risk management approach in assessing the likelihood that business systems and databases contained high value long term records
- In most of these systems the records have been completely migrated to new business systems, and so the systems were decommissioned under the General Retention and Disposal Schedule for digital source records
- Many agencies see successive migration as a viable strategy to preserve high value long term records for as long as required.
- Agencies want the ability to transfer periodic snapshots of permanent value records held in agency business systems to a permanent whole-of-government digital archive
- Agencies wanted help to devise strategies to make the records accessible and to keep them accessible, especially with more complex formats such as GIS and business systems
- Records in some business systems have been exported in formats such as PDF or spreadsheets and stored in the agency electronic digital records management systems.
- Some records were exported and printed to paper
- The relational database layer in some business systems was exported to an SQL relational database management system with some stock queries and reports designed to answer common questions
- Most of these exported records were of a short term temporary nature, but others were at risk of loss through technological obsolescence
- Agencies used the toolkit to devise new policies, tools, check lists and templates to ensure that recordkeeping and disposal is considered during the design of replacement systems and

that the record migration methodology is adequately documented.

## 5. FOLLOW ON WORK

Queensland State Archives intends to improve the toolkit and include practical examples based on real-life implementations.

Queensland State Archives has undertaken to report periodically on the number of applications for disposition authorisation and notifications of lost digital records, to the Public Records Review Committee and Queensland's integrity agencies. However, to date no applications have been received.

Queensland State Archives will develop methodologies to allow agencies to identify, preserve and provide access to long term value records that remain in their custody after the business system that created them is decommissioned and no longer operational.[Fitzgerald 2013] The methodologies will be used where the business function has ceased and no replacement system exists, to provide periodic snapshots of records in an existing business system or in business systems being superseded and its records being migrated to a new system.

One possible methodology for relational database backed business systems involves mapping the archival records required to document system functions and transactions to the application screens and reports, identifying the corresponding SQL queries and adding these as views to the database layer before archiving with a database archiving tool such as the Swiss Federal Archives' SIARD tool. Preserving corresponding screen shots and report samples will enable agencies to reconstruct facsimiles of these from the archived data to provide more authentic and meaningful access when the business system is no longer available. The aim is to enable agencies to use this methodology to preserve and provide appropriate and meaningful access to long term value records in their custody or to create a Submission Information Package for transfer to a digital archive.

The ICT Audit highlighted the need for agencies to focus on the design of systems, to ensure that recordkeeping and disposal functionality is embedded in new business systems, processes and services from the outset, as it is difficult to resolve these matters effectively at the end of the life of the system. Queensland State Archives will build on the foundations of ISO 16175-3:2010: *Guidelines and functional requirements for records in business systems* [International Standards Organisation 2010] to produce

policies, checklists, templates, tools, practical guidelines and case studies for specific business process types and include the policies, tools and templates developed by agencies to ensure new systems and services address these issues during design and implementation.

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