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ARTICLE



# Implementing a new archival management system for Queensland State Archives

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**ABSTRACT**
In June 2020, Queensland State Archives went live with a new archival management system including new access interfaces for agency and public users, the culmination of a 2-year project. This article reflects on the design and build experience using an agile development methodology.

**KEYWORDS**
Queensland State Archives; archival management systems; agile

Like many other institutions, Queensland State Archives' (QSA) road towards implementing digital archiving capability has been a long one and nirvana is still some way off. A key step was achieved in 2017 when funding was secured for 'Tranche 1′ of a broader program to deliver a digital archiving capability for the Queensland Government. Tranche 1 was scoped to implement 'foundation' capability – archival management and control with agency and public access as shown in Figure 1 – prior to implementing digital preservation and storage.

This approach was taken as QSA had an aged and out of support archival management system, ArchivesOne, and did not want to operate separate systems for the management of digital and physical records. This article reflects on QSA's experience from securing funding in 2017 to going live in June 2020: replacing its archival management system and public access interface, delivering an agency interface and working with a supplier using an agile sprint methodology and implementation of a new archival descriptive model.

While this article focuses on the experience of implementation, I would like to acknowledge the leadership of previous QSA representatives and the members of the earlier QSA digital archiving team/s for their work and determination over a long period. Securing funding was the result of their sustained commitment, extensive research and early market engagement and helped pre-position for the ultimately successful delivery of the foundation capability.

## Establishment of program

While the business case to secure the funding was delivered by QSA, an executive decision was taken to establish and deliver the program separately to QSA. This decision was taken to leverage highly skilled resources with proven capability in delivering complex, sensitive, and / or critical high-value ICT procurements and projects whilst allowing QSA to maintain its business as usual. To ensure archival expertise was embedded in the program, I and one other

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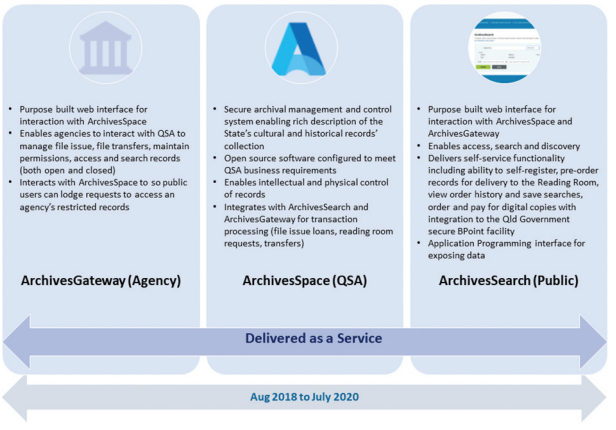


**Figure 1.** Tranche 1 scope.

QSA staff member were seconded to work full time on the program with our primary roles being archival business and technical integration specialists. In addition, there was extensive participation by various QSA subject matter experts (SMEs) – more on this later.

The segregation between QSA (as the key system user) and the program team (responsible for contract performance, delivery, scope, cost management, stakeholder expectation management and engagement) enabled on time and under budget delivery with stakeholder satisfaction. Archival expertise from QSA during the implementation ensured focus on delivering to QSA requirements and ensuring that business processes for archival management and control, access, search and discovery were documented, understood and available at the time of transition to the new services.

## Procurement and delivery approach

Following a competitive dialogue procurement process, the Queensland Government executed a contract with Gaia Resources, leading a consortium comprising Recordkeeping Innovation (business process change) and Hudson Molonglo (development). In accordance with Queensland Government requirements, the contract was established under an as-a-Service framework with the supplier responsible for ongoing service hosting, application support and management post go-live.[1]

The contract provided for the configuration of ArchivesSpace to meet QSA's requirements (including the Australian Series System) with the development of both public (ArchivesSearch) and agency (ArchivesGateway) facing interfaces.[2] This work was delivered via agile sprint methodology with selected user stories configured and tested in a two-week cycle.

## Requirements definition and design stage

QSA had identified a number of functional and non-functional requirements while developing the business case. These requirements were included in the procurement documentation and were pitched at a reasonably high level to inform procurement evaluation criteria. In

addition to the ability to deliver the functional requirements a strong emphasis was placed on other evaluation criteria including the expertise of the supplier, their experience in the GLAM sector and value for money as well as meeting non-functional requirements relating to matters such as security, service standards, service maintenance and ensuring evergreening to avoid technology obsolescence. As the as-a-Service model means that we would be working with the supplier for the life of the contract term, emphasis was also directed to identifying a supplier that understood QSA's needs and would work collaboratively and effectively with QSA and identified implementation stakeholders.

Following contract execution, the supplier held workshops with QSA to unpack the archival management and control, access, search and discovery business requirements into more detailed user stories during a 4-month design stage. As a result of this work, the 35 functional requirements were distilled into 80 user stories.

It became clear early in the design stage that certain high-level sentiments or guiding principles were required to support and help inform QSA decision-making and ensure that the implementation scope was well understood and could be managed in the time-frame for implementation. The Service Design Principles (see Figure 2) were approved by the executive decision-making group. They proved a useful tool to support QSA decision-making during the sprint process and were used as themes for wide stakeholder communications.

## Build stage – working with an agile sprint process

An agile sprint methodology is a development methodology which ensures solution users work collaboratively with software developers to incrementally and iteratively build and test software to the user requirements/user stories in cycles called 'sprints'. For our implementation, the build stage was approximately 13 months in duration and comprised 29 agile development sprints grouped into six initiatives, as detailed in Table 1.

QSA staff found the agile process demanding but worthwhile. The approach gave QSA confidence that the supplier was working to meet QSA needs in a responsive, reciprocal

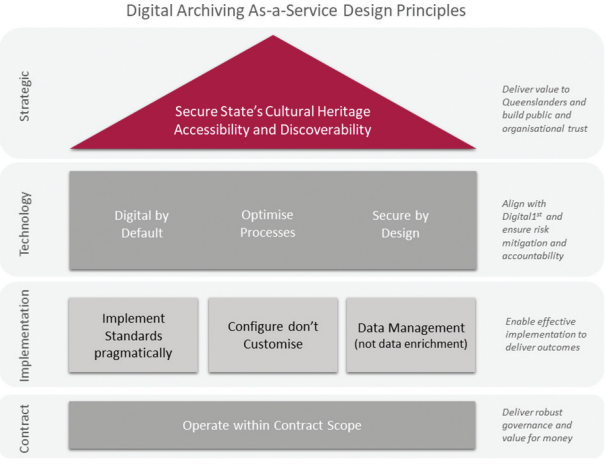


**Figure 2.** Digital archiving service: design principles.

**Table 1.** Sprint initiatives.

| Initiative | Number of sprints |
|---|---|
| Australian Series System | 5 |
| Agency touchpoints | 5 |
| Locations and movements | 2 |
| Restricted Access Periods and Preservation | 3 |
| Public Access | 8 |
| Open data and reporting | 6 |

way with QSA driving inputs rather than the supplier delivering in isolation. In addition, the sprint process enabled some decision re-visiting as the integration elements of the service were built.

However, the flip side of this deep involvement is that the agile process required dedicated QSA SME participation to maintain consistency of understanding and delivery momentum. At a minimum, SME participation in each fortnightly sprint cycle included a 1–2 h pre-engagement session where the user stories to be developed in the next sprint were analysed and discussed and proposed acceptance criteria confirmed; a 1-h showcase session where the supplier demonstrated the functionality deployed in the previous sprint, followed by approximately 2 days of user testing including collaborative discussion of test results to ensure the supplier more clearly understood what functionality needed further work to support intended business processes. In addition, the SMEs were also engaged in unpacking as-is and to-be business processes with some 15 business process workshops held.

## Build stage – business process

Whilst the sprint process focussed on building the integrated solution, QSA also needed to embrace and be prepared for business process change. In parallel with the sprint processes, a business process change stream was associated with each initiative. Recordkeeping Innovation, the supplier lead for this stream, facilitated half to full day 'Business Process Change' workshops held before, at the mid-point and on conclusion of each initiative.

The 'kick-off' (before) workshop considered the as-is business processes related to the initiative and current QSA pain points, with a focus on opportunities to improve, be more effective and gain process efficiencies with the new software. This reflected the service design principles of changing business processes rather than customisation of the software, and implementing standards pragmatically. These workshops were very valuable to set the scene for change and to dig deep into the 'why' behind as-is processes, and sometimes the answer was 'because that's the way it works in the legacy system', and there was obviously no imperative to continue doing it the same way.

At the mid-point workshops, Recordkeeping Innovation presented draft recommendations for QSA's consideration based on the progress of the technical build giving QSA insight into how much effort might be required should all recommendations be actioned.

At the conclusion of each initiative, Recordkeeping Innovation presented final recommendations for QSA to examine and determine what to action, and associated timeframes/deadlines – policies/procedures, public and agency communication/engagement, work instructions, etc. – to make best use of the developed functionality. In total, 74

business process change actions were delivered by QSA in readiness to transition to business as usual.

## Agile learnings

The implementation delivered four key learnings, which can be described in details as follows.

Learning 1: Sprints move fast and there is minimal time for escalating decisions up a hierarchy. Therefore, having knowledgeable SMEs that were funded to enable dedicated time to the project and empowered to make decisions, plus an acceptance within QSA that many decisions would be made by SMEs 'in the room' was essential. Staff found that their participation would be challenging if they were not adequately relieved from business-as-usual responsibilities to participate as a SME.

Learning 2: Agile processes require a culture of 'thinking outside the square' and an ability to deal with ambiguity. Having experienced and knowledgeable SMEs participating in sprints and business process activity meant active debate and decisions on which business processes should be changed, and easier acceptance within QSA of decisions and functionality being fit for purpose.

Learning 3: An agile methodology provides opportunities to revisit decisions if initial decisions lead to less than ideal outcomes. This leveraged QSA's strong emphasis on building a culture of innovation and risk-taking, which empowered both SMEs and other QSA staff to operate effectively in the program environment and make quick decisions without 'over-thinking' or 'paralysis by analysis'.

Leaning 4: Careful management is essential to prevent 'scope creep' and dependent budget/time increases. The iterative approach to defining, developing and testing when using an agile methodology, rather than commencing with detailed and fully defined requirements, gives many opportunities for new ideas and suggestions to arise. Scope was managed by having a strong focus, from the sponsor down, on minimum viable product – what the system needs to do to enable QSA to work and continue to deliver high-quality archival management and control services. In practice, this meant that the definition of the work for each initiative, the acceptance criteria for each sprint, and the feedback and results from testing were filtered through a prioritisation process which considered benefit, effort and relative importance – whether it was functionality that QSA could not operate without, or that would require extensive and time-consuming work-arounds for agency or public users or QSA staff, or that was a 'nice to have' that would make life easier for some users, but not all.

## Archival model

Some of the key decisions that needed to be made in early sprints related to how the Australian Series System should work with the new ArchivesSpace. Like other archives, prior to setting functional requirements for the new system, QSA had considered whether the series system was still the most relevant descriptive model when moving to digital archives and determined that it was, although greater flexibility was needed in its implementation. The input of Recordkeeping Innovation was valuable in challenging

and prompting QSA to consider how to move from QSA's current archival descriptive approach to a different approach.

Before I delve into this, for context it is important to explain the concept of a 'responsible agency' under the *Public Records Act 2002*. When records are transferred to Queensland State Archives, custody but not control is transferred and the 'responsible agency' retains decision-making responsibility for access, including setting Restricted Access Periods and granting access on request to closed records. Therefore, QSA must identify the current responsible agency for all records in its custody.

Figure 3 illustrates QSA's new archival descriptive model. Changes included the introduction of functions and mandates as entities, and of representations as the 'stuff' comprising an intellectual item.

The introduction of functions and mandates as entities was seen by QSA as particularly valuable for tracing and analysing Machinery of Government (MOG) changes. Like most governments in Australia, Queensland is blessed (or cursed) with a high frequency of MOGs. When a MOG occurs, QSA archivists need to analyse the Administrative Arrangements Orders which set out the new departments and agencies and which pieces of legislation they are responsible for administering, to identify and update the responsible agency for all records in its custody. Linking agencies and series to relevant functions and mandates aids this tracing and analysis.

For pragmatic reasons, only legislation and regulations will be defined as mandate types, at least initially. Consideration was given to converting Restricted Access Period (RAP) notices to mandates, but that would have resulted in complex data migration to transform existing RAP data fields against items into mandates, in addition to complex change management with agencies to redefine their understanding of RAPs.[3]

Entities are now linked in ArchivesSpace through explicit, time-bound relationships as detailed in Table 2.

In addition to the introduction of new entities, QSA also examined the lower levels of the 'record' entity. In QSA's previous archival management system items could be linked to each other in a parent/child relationship. Separated items could also be defined (for example, when a map was separated for preservation and storage purposes from the file it was part of). A separate module, Image Queensland, was used to manage digital access copies but this had many limitations. There was also a separate module for managing microfilm. This structure enabled QSA to manage the various 'stuff' it had, but we were

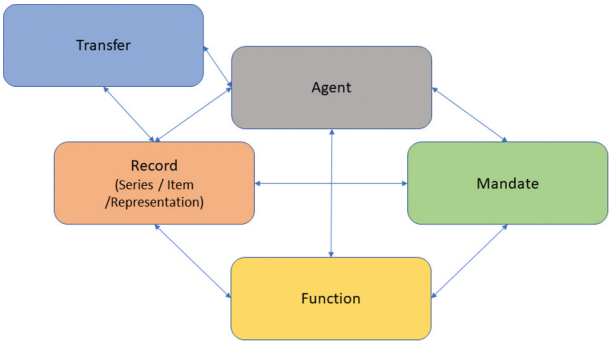


**Figure 3.** QSA archival descriptive model.

**Table 2.** Entity relationships.

| Relationship | Type | Labels L/R |
|---|---|---|
| Agent to Agent | Succession | Previous/Subsequent |
| | Containment | Contains/Contained within |
| | Ownership | Controls/Controlled by |
| | Association | Associated with/Associated with |
| Agent to Record (Series, Item) | Ownership | Controls/Controlled by |
| | Creation | Creates/Created by |
| Agent to Mandate | Administers | Administers/Is Administered by |
| | Creation | Established/Established by |
| | Abolition | Abolishes/Abolished by |
| Agent to Function | Administers | Administers/Is Administered by |
| Record (Series) to Record (Series) | Succession | Previous/Subsequent |
| | Association | Associated with/Associated with |
| | Ownership | Controls/Controlled by |
| Record (Series) to Record (Item) | Containment | Contains/Contained within<br>This is via the hierarchy in ArchivesSpace. It is not an explicit relationship. |
| Record (Item) to Record (Item) | Containment | Contains/Contained within |
| | Succession | Previous/Subsequent |
| Record (Item) to Representation | Held within Item Record | |
| Representation to Representation | Held within Item Record | |
| Mandate to Record (Series) | Ownership | Documents/Is documented by |
| | Restriction | Restricts/Is restricted by |
| Mandate to Function | Creation | Established/Established by |
| | Association | Associated with/Associated with |
| | Ownership | Controls/Is Controlled by |
| | Succession | Previous/Subsequent |
| | Abolition | Abolishes/Abolished by |
| Mandate to Function | Creation | Established/Established by |
| | Abolition | Abolished/Abolished by |
| | Association | Associated with/Associated with |
| Function to Record (Series) | Ownership | Documents/Is documented by |
| Function to Function | Containment | Contains/Contained within |
| | Association | Associated with/Associated with |
| | Succession | Previous/Subsequent |

aware that it would not cope with born digital or even hybrid records, that is 'records' comprising digital and physical elements. Recordkeeping Innovation proposed the introduction of a 'representation' model, based on the concept of representation from the PREMIS metadata standard, which would separate the description of the intellectual item/record from the 'stuff' – whether physical or digital – that needs to be managed.[4] The adoption of the representation model elegantly integrated all the different bits and pieces from the previous archival management system (separated items, microfilms, digital access copies) while also giving flexibility for the digital future. Figure 4 provides an example of the representation model.

In ArchivesSpace, representations 'belong' to an item and an item can have multiple representations.

## ArchivesGateway

The concept of 'responsible agency' also underpinned the development of ArchivesGateway, a secure portal for agency users. In the previous environment, agencies could only see the same collection information as members of the public

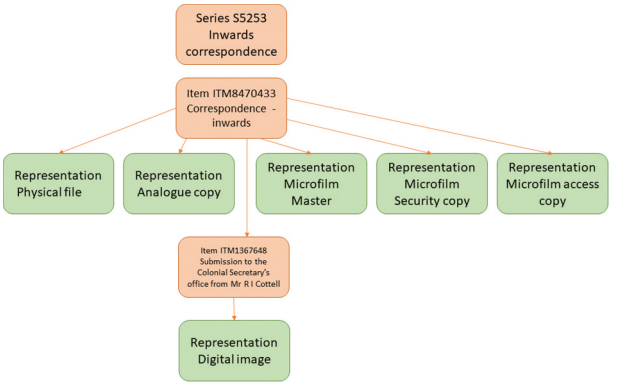


**Figure 4.** Representation model. Recordkeeping innovation and Gaia Resources, modelling items as records and representations, prepared for digital archiving program.

via the public access portal. QSA also operates a 'file issue' loan service where responsible agencies can request the temporary loan of records (often for right to information, redress, or legal purposes). Requests were made via email with data entry into the previous archival management system by QSA staff. The previous system had functionality to manage and track file issue loans and associated charges but had a lack of flexibility for when digital copies were provided instead of physical loans, and for setting different fees.

ArchivesGateway provides a portal where agencies can see and search the metadata for all records that they are responsible for, including where that metadata is not available in the public catalogue due to sensitivity. It also streamlines processes where they can request records either to the QSA Reading Room, as a physical file issue loan, or order a digital copy.

ArchivesGateway also provides a platform to manage the transfer process – physical at this stage, with the expectation that it will provide a foundation to support the transfer of digital records in the future. Agencies can propose a transfer, QSA staff can assess and approve, then agencies can upload item lists which are validated to ensure all mandatory metadata is provided.

ArchivesGateway is integrated with ArchivesSpace so that agency staff operate in ArchivesGateway and QSA staff use ArchivesSpace.

## ArchivesSearch

QSA's previous public access interface (also called ArchivesSearch) was implemented in 2007 and its search capability did not meet modern expectations for intuitive searching. The new ArchivesSearch enables users to start with very simple keyword searching but also build more complex searches, being able to filter, facet and refine searches. The presentation of different facets in the search interface enables users to 'orient' themselves to what is available, filtering and refining to delve further into the results.

A strong focus in ArchivesSearch is personalisation and self-service. The previous ArchivesSearch only supported ordering records when a user was on site in the QSA Reading Room. Now, users can create accounts and order records to the reading room for a date in the future, view their request history, save searches, order digital copies of records and lodge a request for access to restricted (closed) records. Through integration with ArchivesGateway and ArchivesSpace, a request for access to restricted records is emailed to the appropriate delegate in the responsible agency and only after this request is approved can QSA action it.

This feature highlights a very simple but significant improvement in ArchivesSearch. The previous system (both ArchivesOne and ArchivesSearch) did not tell users whether a record was open or restricted: users needed to look at the RAP period (for example 20 years), look at the end date of the record and work it out for themselves. ArchivesSpace now does the maths, and ArchivesSearch clearly displays whether a record is open, and if restricted, the expiry date of the restriction.

Tagging has also been implemented in ArchivesSearch where users can tag items with keywords to aid discovery.

## Response to the new system

The response of QSA clients, whether agency or public, to the new system has been very positive. Agencies have appreciated the greater visibility of 'their' records in QSA's custody, in addition to the self-service aspects of file issue and transfer.

Some of the more experienced researchers are excited about the new entities of function and mandate and the opportunities these provide for lines of exploration through the records.

## Future

At the time of writing, QSA continues to work collaboratively with the supplier under the as-a-service model to identify improvements and enhancements to the system to meet QSA and its clients emerging and evolving needs whilst the digital preservation and storage capability considerations for implementation are in their infancy.

## Notes

1. A separate article could be written on as-a-Service arrangements and there is not space to cover the territory in this reflection. Benefits of this approach generally include rapid scalability and economies of scale, particularly for storage costs. See Adrian Cunningham, Ken Thidobeau, Hrvoje Stančić and Gillian Oliver 'Exploring Digital Preservation in the Cloud', in Luciana Duranti and Corinne Rogers (eds), *Trusting Records in the Cloud*, Facet Publishing, London, 2019, pp. 179–206.
2. ArchivesSpace is open-source software originally developed following a grant from the Andrew W Mellon Foundation to integrate the former Archivists' toolkit and Archon into a single application. It has an active member community and governance framework to guide the ongoing development of the software. See <*https://archivesspace.org/about/history*>, accessed 15 October 2020.

3. Under the *Public Records Act 2002* responsible agencies are responsible for setting the closure periods for records via a 'Restricted Access Period' notice that they provide to QSA. The *Public Records Act 2002* does not have a default closure period and instead identifies maximum closure periods for different categories of records. It is not unusual for some series – for example a 'General Correspondence' series – to contain items with a multitude of different closure periods.
4. PREMIS Data Dictionary for Preservation Metadata version 3.0 June 2015, available at <*https://www.loc.gov/standards/premis/v3/premis-3-0-final.pdf*>, accessed 15 October 2020.

## Disclosure statement

No potential conflict of interest was reported by the author.

## Notes on contributor

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