Enterprise Architecture Policy

Information System Sustainability Protocol

1. Purpose
This Protocol describes the mandatory steps for establishing and maintaining sustainable information systems in the delivery of healthcare. The primary focus is future-proofing information systems and enabling legacy systems to ensure that Queensland Health information systems meet ongoing business requirements within accepted cost, technology and quality constraints.

2. Scope
This protocol applies to all employees, contractors and consultants within the Department of Health divisions, agencies and commercialised business units.

The following items are within the scope of this document:

- enabling legacy applications to interoperate with new components
- extending the life of existing applications through ‘future proofing’
- acquiring sustainable information systems.

The following items are explicitly out of scope of this document:

- general ICT infrastructure sustainability (e.g. server platform).

3. Supporting documents

Authorising Policy and Standard/s:

- Enterprise Architecture Policy
- Enterprise Architecture Framework Implementation Standard
- Enterprise Architecture Foundations Implementation Standard
- Enterprise Business Architecture Implementation Standard
- Enterprise Information Architecture Implementation Standard
- Enterprise Applications Architecture Implementation Standard
- Enterprise Technology Architecture Implementation Standard

Procedures, Guidelines and Protocols:

- ICT Cabling Protocol (under development)
- Identity Management and Demographics Protocol (under development)
- Interoperability Protocol
- Service Oriented Architecture Protocol
- Systems Integration Protocol
- Using Directories & Directory Technology Protocol (under development)
- Enterprise Architecture Development Method Procedure
4. Related documents

Queensland Government Enterprise Architecture (QGEA), Department of Science, Information Technology, Innovation and the Arts (DSITIA):
- Queensland Government Enterprise Architecture Framework 2.0
- Software currency

Department of Health:
- Deloitte: Review of Health Services Information Agency
- Information Security Policy
- Solution Trade Off/Options Analysis Procedure (under development)

5. Approach

The goal of information system sustainability is to have sustainable information systems that meet business requirements within accepted cost and quality constraints. This includes:
- Optimising the investment in existing systems
- Acquiring, designing and implementing new applications that are responsive to change, and that do not constrain the Department of Health at the time of implementation or in the future
- Applying legacy enablement technologies to extend existing systems beyond original purpose where there is no other alternative.

This is in alignment with the Blueprint for Better Healthcare in Queensland which states that patients and people who use health services in Queensland must have access to safe, sustainable and responsive modes of delivery.

6. Application components

6.1 Reuse application functionality before buying or building

Reuse application functionality before buying or building new components.

Implications
- The components considered for reuse should align with the position statements in this protocol. While reuse is advocated, only those components that are sustainable and fit for purpose should be considered.
- Where a business area requires an application with similar functionality to one already deployed elsewhere in the organisation, that application should be considered before acquiring another one.
- Reusable components, such as enterprise services, require a degree of abstraction from the specific problem domains in which they are used. They need to capture the behaviours and information common across various potential uses of the component.
- Reusable components need to be understandable, easy to use and well documented.
- Effective reuse requires the reusable component to be loosely coupled with no other dependencies. Tightly coupled components are more difficult to reuse.
Whole-of-government applications or services should be used in preference to Department of Health components where they are fit for purpose, cost effective, and can meet a Queensland Health business and clinical need.

To reuse components, planners, architects and designers need to know they exist. Available components should be documented and accessible.

6.2 Acquire applications with interchangeable components

Preference should be given to applications that are modular with interchangeable components that enable components to be upgraded or replaced without having to replace the entire system. Further preference should be given to applications where individual modules are technically and commercially able to be reused (for their intended purpose) elsewhere throughout the application architecture i.e. components can be reused by other applications in other solutions.

Implications

- Commercial-off-the-shelf (COTS) applications should be delivered as separate modules that can be implemented and replaced separately to facilitate maintenance, support, and accommodate upgrades.
- The ability to reuse application components allows new solutions and enterprise services to be rapidly deployed.
- Solutions should be designed in a modular fashion to allow parts to be replaced without having to replace the entire system. Within an application, components should be designed so current capabilities can be updated, and new capabilities added, without rework of the component or any components that depend on it.
- Modified and new components should be able to integrate with the system with minimal impact on existing components, capabilities, and procedures. System extensibility should also minimise the impact of change on system management, maintenance and training.

6.3 Consolidate common functionality into reusable services

Consolidate common functionality into reusable services and reuse system-wide where appropriate.

Implications

- Candidates for reusable enterprise services should be identified using defined criteria to assess their suitability as a enterprise service. In order to be considered a candidate for an enterprise service, a piece of functionality should provide a common capability that is delivered in a reusable manner, and managed as a shared asset independently of the business facing applications that use it.

  Note: Refer to Department of Health Service Oriented Architecture Protocol for further details on types of enterprise services and the characteristics that assist in identifying them.

- Applications which duplicate the service functionality need to be modified to consume the service directly, or use a data integration mechanism to cache the service data.

  Note: Refer to Department of Health Service Oriented Architecture Protocol and Integration Patterns Procedure for further details on service integration mechanisms.

- Services need to be centrally documented and accessible. This includes both internal services and those provided by external providers.

6.4 Tailor through configuration in preference to customisation

Tailor applications through configuration in preference to customisation (software code changes).
Implications

- Wherever possible, application tailoring should be done by configuring options and parameters rather than having software developers making code changes to the application. Configuration should be user driven, and capable of being completed by “power users” (or business analysts) as opposed to technical specialists.

6.5 Minimise customisation of COTS applications

Where customisation is unavoidable, minimise extent of customisation and implement in a way that does not impede package upgrades. Where appropriate, make adjustments to business processes to better accommodate the application, in preference to customisation (provided that this can be achieved without a major adverse impact on business outcomes).

Implications

- Assess the cost, risk and business impact of changing the business process to fit the application versus changing the application to fit the business process. There will be cases where customisation is unavoidable e.g. customisation may be required to enable an overseas package to operate in the Australian healthcare environment.
- Customisations should not impede the ability to receive application upgrades. i.e. avoid customising in a way that makes application upgrades difficult or impossible.
- Customisation to COTS applications should be maintained and supported by the vendor.
- Where appropriate, negotiate with the vendor to include customisations into future releases of the base application.

6.6 Configure user interfaces to provide common look and feel across applications

Preference should be given to applications that have configurable user interface components. These features should be used to configure a common look and feel across information systems.

Implications

- Presentation look and feel should be configurable (e.g. via style sheets, templates), to enable easy fit with the Department of Health Information Model (e.g. tailored screen data item labels, tailored drop down lists etc.).
- Personalisation, where supported, should be configurable.
- Forms for data capture should be easily configured.

7. Legacy transformation

7.1 Enable clinical applications to use clinical context sharing

Enable existing applications to use context sharing using presentation integration technology where appropriate.

Implications

- Clinical applications that will be used in a setting where clinicians frequently switch amongst multiple applications should be able to share context.
- Clinical applications should use available context management technology to enable users to preserve patient context when users switch applications.
7.2 Selectively use specialised user interface components

Use presentation integration components to improve the user experience beyond the capabilities of the application where this adds high business value.

Example: A clinician is creating an electronic medications order and the order entry system only has a flat drop-down list available for selecting the desired medication and a free-text field for inputting the dose. Using a third-party component that specialises in handling medications lists in a user-friendly way, it is possible to use presentation integration technologies to:

- automatically launch the third-party component for the clinician to locate the desired medication
- input the dosage and have the dosage validated using pre-defined rules
- on behalf of the clinician, select the desired medication into the flat drop-down list and enter the validated dosage into the dosage free-text field in the clinician’s order entry system.

8. Data

8.1 Synchronise cached data with an authoritative source

Information systems with their own data cache should synchronise with an authoritative source.

Implications

- Where information is cached it needs to be kept synchronised in a timely manner.
- Some enterprise services may provide a data integration mechanism, but the consuming application is responsible for applying the information to its own cache.

8.2 Hide internal data models and terminologies from external systems

Do not expose the proprietary internal data models and terminologies of transactional information systems to other systems.

Expose data through the integration platform using a canonical model derived from the Department of Health Information Model.

Implications

- The interfaces delivered with applications should be wrapped to hide the complexity of internal data from consumers of the information. Preference is for this to be done through the integration platform.

8.3 Data from transactional information systems should only be accessed by other systems via the integration platform

Other applications should not access data from transactional information systems directly.

Implications

- Integration should be consistent with the endorsed integration approach.

Note: Refer to Department of Health Systems Integration Protocol for further details.

- Real time interaction should be via standards-based service interfaces, or message-based interfaces using endorsed message exchange standards.

Note: Refer to Department of Health Interoperability Protocol for further details.
Batch interaction should be via managed data extracts using endorsed ETL (extract, transform, load) tools.

8.4 Leverage authoritative sources of data

Where an application has not been classified as the authoritative source it should not duplicate the functionality but rather leverage the existing authoritative source of information.

**Implications**

- Avoid creating an additional authoritative source of data.
- Where there are consolidated sources of authoritative data, preference should be given to using these technologies e.g. PCEHR.
- This approach requires standards to govern data interoperability (e.g. exchange, and transformation).

*Note:* Refer to Department of Health Interoperability Protocol, Department of Health Systems Integration Protocol for further details.

- This also reduces the need to keep data in transactional information systems for long term use by other business functions.

9. Standards

9.1 Adopt standards

Queensland Government standards, Australian standards and international standards should be adopted where applicable. Adopt Queensland Government and Australian standards first, then international standards, and then industry standards where the adoption of a standard is mandated or deemed beneficial.

**Implications**

- Where a standard does not exist, a Department of Health specific alternative should be defined.
- Systems may need to be modified if standards change.

10. Application management

10.1 Maintain currency of commercial applications

Applications shall remain on supported versions of the vendor’s software using an ‘N-1’ approach wherever possible.

This means running on the latest version, or previous version of software. There should be a version nominated as the ‘supported’ (current) version, with the previous version having a ‘contained’ status.

**Implications**

- Development and test environments should be in place to enable upgrades to be tested and migrated.
- Upgrades should be planned such that the Department of Health can maintain currency of its applications.
- Some upgrades are major technology refreshes. The full cost of the upgrade needs to be taken into account, including any data migration and platform upgrades required.
10.2 Innovate with care

- Balance innovative technologies for organisational benefit with the need for reliable, stable systems.

Implications

- Department of Health will generally not adopt new software versions until they are proven stable in the market place.

10.3 Manage diversity of applications and components required to provide a particular application function

- Consolidate to a smaller number of systems that provide each piece of functionality.
- Use existing applications in preference to acquiring new applications unless there is a compelling business reason to adopt a new system.
- Where specialty solutions are used, the same specialty solution should be used in all areas that require that solution.

Implications

- Before purchasing new components or systems, an assessment of the suitability of existing components or systems should be undertaken. A trade-off analysis should be conducted and documented to support a decision not to use an existing component or system. Multiple solutions for the same business functions may lead to compromises having to be made to meet functional requirements.
- Large enterprise systems are not always fit for purpose for all deployment requirements (e.g. application used by large tertiary hospital may not be appropriate for smaller sites).
- Specialties that offer Clinical Services Capability Framework Level 1 services may not need the same systems to support their service as those that offer Level 6 services.
- Service delivery and configuration requirements may differ between facilities however preference should be given to using the same specialty solution across all areas of Queensland Health with that specialty (e.g. Cardiology, Oncology), provided that the solution is fit for purpose.

10.4 Document applications

Applications should be documented to a minimum agreed standard to transition the application to the business as usual environment including but not limited to:

- Design
- As built configuration
- Development
- Testing
- Training
- Change and release management
- Operational support and service level arrangements.

A roadmap should be produced for all core applications.
Department of Health: Information System Sustainability Protocol

Implications

- Applications shall not be implemented without appropriate documentation. Project management processes should ensure this documentation is completed.
- Roadmaps shall be used to assist with planning for maintenance, upgrade, replacement and retirement of applications.

11. Review

This Protocol is due for review on: 16 June 2016

Date of Last Review: N/A

Supersedes: New

12. Business Area Contact

Director, Strategy and Architecture Office, Planning, Engagement and Performance Directorate, Health Services Information Agency (HSIA)

13. Definitions of terms used in this protocol

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition / Explanation / Details</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>Abstraction</td>
<td>In the context of this paper, abstraction refers to an integration approach where existing system interface is made available externally to the application via an abstraction layer using the integration platform.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<tr>
<td>Application component</td>
<td>A generic term that applies to an entire business application or a modular, deployable, and replaceable part of a system that encapsulates its contents and exposes its functionality through a set of interfaces.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<tr>
<td>Authoritative source</td>
<td>An authoritative source is the one data source from a set of competing data sources that is designated by the enterprise as the most trusted and complete and representative of the ‘truth’. Any emergent discrepancies between competing data sources will be resolved by reference to the authoritative source. The term ‘source of truth’ is synonymous with the term ‘authoritative source’ with the latter being the preferred term.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<tr>
<td>Clinical Application</td>
<td>A system dedicated to collecting, storing, manipulating and making available clinical information that applies at the point of care. Clinical applications include electronic medical record systems, clinical data repositories, and decision support programs (such as clinical guidelines and drug interaction checking). They may also incorporate devices for collecting data and viewing reference material, imaging modalities and communication tools, e.g. electronic messaging systems.</td>
<td>Australian Standard AS 2828.2 ‘Health Records – Digitized (scanned) health record system requirements’ for Clinical Information System (CIS)</td>
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<tr>
<td>Commercial off-the-shelf (COTS)</td>
<td>Commercial off-the-shelf refers to products that are sold in the commercial marketplace.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>Data Integration</td>
<td>Used when applications need to share data from files or databases, as opposed to integration via the business logic layer. This style of integration is widely applied in the Business Intelligence domain for population of analytical repositories such as Data Warehouses and Data Marts. There are also still many applications where File Transfer is used to move large volumes around. Data Integration is widely supported by vendors, non-</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>invasive to the application, and can handle large volumes of data.</td>
<td>Encapsulation is an integration approach that enables existing system functionality to be exposed in a way where that functionality is ONLY able to be consumed as an integration service through the integration platform – applications cannot bypass the integration layer to access the functionality directly.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>The central integration capability (currently JCAPS and e*Gate) managed by the HSIA Systems Integration Team. In future this will be the new ESB/EAI platform.</td>
<td>Enterprise Integration Platform</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>Extract, transform and load (ETL)</td>
<td>Extract, transform and load is a process in database usage and especially in data warehousing that involves extracting data from data sources; transforming the data to fit target needs; and loading it into the end target.</td>
<td>Department of Health Strategy and Architecture Office</td>
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<tr>
<td>Enterprise Services</td>
<td>Enterprise Services provide core business functionality that is common to multiple applications (e.g. Clinical Data Service, Provider Directory Service etc)</td>
<td>Department of Health Strategy and Architecture Office</td>
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<tr>
<td>The Department of Health Information Model refers to the collection of models, data set specifications (DSS) and standards that have been iteratively developed across the organisation. Key sources of data standards include the Queensland Health Data Dictionary and the Corporate Reference Data System. Within the department, the information model equates to an enterprise information model.</td>
<td>Information Model</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>Java Composite Application Platform Suite</td>
<td>JCAPS</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>An existing application that continues to be used, typically because it still meets the business needs, even though more modern technologies or approaches are now available. These applications may be mission critical applications in which the organisation continues to invest time and money. Legacy applications are not necessarily old.</td>
<td>Legacy application</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>A technique to rebuild legacy applications in a new technology or platform, with the same or enhanced functionality.</td>
<td>Legacy transformation</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>To ensure applications remain on supported versions of the vendor’s software the ‘N-1’ approach shall be used wherever possible. Applications running on the latest version are denoted as N and the prior version of software as N-1.</td>
<td>N-1 approach</td>
<td>Adapted from QGCIO Software Currency Policy</td>
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<td>A characteristic attributed to an application if it can be used in a computer environment other than the one in which it was created without requiring major rework.</td>
<td>Portability</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>Includes older technologies such as screen scraping, web page links and newer technologies such as portal integration and presentation integration servers.</td>
<td>Presentation Integration</td>
<td>Department of Health Strategy and Architecture Office</td>
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<td>The Department of Health and the Hospital and Health Services (HHSs), making up the public healthcare system, is known as Queensland Health</td>
<td>Queensland Health</td>
<td>Office of the Health Statutory Agencies</td>
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<td>Screen scraping is a presentation integration approach that enables an application to access data and functions from another application via that application’s terminal screen interface. An Application Programming Interface is used to access the data presented on terminal screens, allowing a desktop program to</td>
<td>Screen scraping</td>
<td>Department of Health Strategy and Architecture Office</td>
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### 14. Approval and Implementation

**Policy Custodian:**
Senior Director Strategy Governance and Architecture, Planning, Engagement and Performance Directorate, HSIA

**Responsible Executive Team Member:**
Chief Information Officer, HSIA

**Approving Officer:**
Ray Brown, Chief Information Officer, HSIA

**Approval date:** 16 June 2014

**Effective from:** 16 June 2014

### Version Control

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<th>Version</th>
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<th>Prepared by</th>
<th>Comments</th>
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<td>1.0</td>
<td>30/05/2014</td>
<td>ICT Policy</td>
<td>Finalised for CIO approval</td>
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