Enterprise Architecture Policy

Service Oriented Architecture Protocol

1. Purpose
This Protocol describes the mandatory steps for applying Service Oriented Architecture (SOA) principles and concepts in the design and delivery of common functionality within the Department of Health.

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 the protocol statements:

- use of service-oriented architecture concepts within the department
- guidance for service providers and service consumers.

The following items are explicitly out of scope of the protocol statements:

- enterprise-wide SOA enablement of business applications
- organisational changes required to make better use of service-oriented architecture concepts within the department
- systems development methodology changes required to design, develop, deploy and support services
- governance processes for services.

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)
- Information Security Protocol
Department of Health: Service Oriented Architecture Protocol

- Information System Sustainability Protocol
- Interoperability Protocol
- Systems Integration Protocol
- Using Directories & Directory Technology Protocol (under development)
- Enterprise Architecture Development Method Procedure
- Integration Patterns Procedure.

4. Related documents
- Queensland Government Enterprise Architecture Framework 2.0
- Department of Health Information Security Policy.

5. Approach
Service Oriented Architecture (SOA) is a design approach that enables application functionality to be delivered as software services which can be reused by multiple applications that would otherwise provide duplicate functionality.

The future direction is to:
- adopt service-oriented principles and practices where appropriate to enable better design and implementation of reusable components
- support National E-Health Transition Authority’s (NEHTA) adoption of a services based approach.

Queensland Health has already built a number of reusable components. However, these are not true SOA-style services as they are not generally established as re-usable services across the system. The current services include:
- Web services associated with the Clinical Data Repository (CDR) which are currently used by The Viewer and Enterprise Discharge Summary (EDS) applications.
- Integration services developed by the Health Services Information Agency’s (HSIA) Systems Integration Team for use by various consuming applications (e.g. Client Directory web services).

6. Service Oriented Architecture (SOA)
6.1 Deploy SOA services in an incremental fashion
The Department of Health shall deploy SOA services in an incremental and planned fashion as funding permits.

Implications
- There is currently no intention to progress SOA within the department as a system-wide program (i.e. there will be no ‘big-bang’ approach or systematic re-engineering of existing systems into services with a view to orchestrating these services into business processes).
- A key focus area is to adopt SOA principles and practices to enable better design and implementation of reusable components, such as shared electronic health record services.
- The Department of Health will continue to rely heavily on the integration of a large heterogeneous portfolio of applications (primarily COTS packages). Large applications such as the Integrated Electronic Medical Record (ieMR) system will co-exist with numerous
specialty systems for the foreseeable future. The rate of deployment of SOA-enabled applications and services will be limited by how quickly vendors adopt SOA in their products. Although there is an industry trend in this direction, most vendors are still focussed on providing complete solutions rather than offering SOA-enabled solutions.

- The Strategy & Architecture Office will define and document what department wide key services are required. This will be informed by business demand, Enterprise Architecture target state and industry trends (e.g. HSSP services, NEHTA).
- There will be an increase in department applications consuming services external to the system due to NEHTA adoption of a services based approach.

**Note:** ‘Services’ in the context of this protocol refer to re-usable, software-based capabilities that can be accessed by other information systems. These services are not the same as those services listed in the Health Services Information Agency ICT Service Catalogue, or the health services offered to the public by Hospital and Health Services, or those services provided by the Health Services Support Agency or as defined in Department of Health’s Clinical Services Capability Framework.

### 6.2 Use third party services in preference to in-house services

Third party services shall be acquired and used in preference to building in-house services. This is an application of the ‘reuse, before buy, before build’ enterprise architecture principle.

**Implications**

- Queensland Government and national services should be used in preference to building in-house services.
- Third party subscription services should be considered where they meet the requirements of Department of Health policies and specifications.

### 7. Service architecture

#### 7.1 Only acquire services when predefined service criteria are satisfied

In order to be considered a candidate for a common service, a piece of functionality shall provide a common business capability that is delivered in a reusable manner, and managed as a shared asset independently of the business facing applications that use it.

**Implications**

- Any service which appears to be a suitable candidate for a service should be assessed in accordance with defined service criteria (refer to Appendix A).
- In future, COTS packages may be delivered with some web services capability. In general, these services will not be suitable as services, as they may have their own information model, and may expose implementation details of the vendor package. It may be possible to make these suitable service candidates by adding a more meaningful Department of Health interface (i.e. ‘wrapping’, or putting a façade over the service). Providing a component of a vendor’s solution in this way needs to fit within the performance capabilities of the vendor product, security model of the vendor product, vendors licensing, support and warranty constraints.
- Asset management processes (e.g. governance / ownership lifecycle management etc.) for enterprise services should be defined and implemented.
7.2 Use deployed services wherever the capability fits the requirement

Once a new service is deployed, it shall be used by all applications where the service capability fits the application requirement.

Implications
- When a new service is deployed, all subsequent application implementations depending on such capability will use the service (either directly via the service interface or indirectly via message integration or data extracts).
- Applications will use services in preference to an equivalent internal capability.
- Applications should use the primary service interface to invoke the service (e.g. a web service) where possible rather than using data integration.
- Existing applications which duplicate the service capability will be changed to use the new service, subject to cost/benefit assessment.

7.3 Design services without being constrained by existing consuming applications

New services shall be designed without being constrained by how consuming applications will use the service.

Implications
- Even though the initial consuming applications may be known at design time, service design should not be unduly influenced, constrained or compromised by how the initial consumer(s) intends to use the service. To the extent practical, the design of the service should take a broader view than the needs of existing consuming applications or any single consuming application, and be agnostic and independent of consuming applications.
- An exception to this is where key consumer applications, which are not capable of consuming a service directly, have to be supported by a data integration interface (see the following section). In this case, the data integration interfaces should take the needs of the consumer into account.

7.4 Support non service-enabled applications with data integration

Applications should use the primary service interface to invoke the service (e.g. a web service) rather than using data integration, but it is recognised that this is not always possible. Applications which are not capable of consuming a service directly shall be supported by message-based integration or data extract.

Implications
- Service providers will generally not provide a data integration interface to their service unless there is a need to support applications (e.g. COTS packages) which are not capable of consuming services directly. This will allow these applications to access extracted service data to populate their own internal application database. This requires a batch load and synchronisation process for the COTS package to consume the shared data.
- Service providers may provide a data extract to enable adoption of the service by key consumers which are not service-enabled.
Applications which cannot invoke services may need to implement the service functionality internally in a way that is consistent with the intent of the service.

Applications that duplicate a service’s functionality, and cannot invoke the service, may need to use data extracts or master data management techniques to ensure that any relevant updates made within the application are propagated back to the service’s data store (i.e. propagated back to the authoritative source).

Note: Refer to Department of Health Using Directories and Directory Technology Protocol.

7.5 Access service data via the provided service interfaces

Data available via a service shall only be accessed via the provided service interfaces.

Implications

- Service interface should not be bypassed to access the service’s database directly. Data is encapsulated within the service and only available via the service interface.
- Databases supporting services should withhold access to other applications or users.
- Applications which cannot consume the service directly should source the information from a data extract provided by and managed by the application custodian.

7.6 Do not use services designed for transactional use in business intelligence applications

Business intelligence applications shall not consume services used for real time transactional purposes.

Implication

- Business intelligence applications use of data is classified as ‘secondary use’. Therefore in accordance with the principle that operational data should be separated from analytical data, business intelligence applications should only use web services and supporting data stores that are specifically established for secondary use (i.e. a data warehouse, data mart or other secondary use data store).

7.7 Use common security mechanisms

Enterprise services shall have common mechanisms for handling security.

Implications

- Re-use the existing security mechanisms.
- Proprietary security implementations should be internalised.

8. Operational infrastructure

8.1 Insulate service consumers from having to know service locations

Services shall be implemented in a way which allows consumers to access a service without having to know about where the service is located.
Implications

- Consuming applications that access the service via the enterprise integration platform will not need to know which server the service is hosted on or the actual URL of the source service.
- Service discovery shall be limited to determining the location of services which were known at design time. Dynamic discovery where services are determined on the fly at run time will not be implemented in the foreseeable future.

9. ICT systems lifecycle

9.1 Manage enterprise services as shared assets

Enterprise services need management throughout their lifecycle.

Implications

- Enterprise services should be deployed on a highly available, resilient platform to meet shared requirements and mitigate risks to business continuity.
- Enterprise services should have Service Level Agreements (SLAs) which outline the quality of service availability to consumers as well as consumers’ responsibilities for consumption of services.
- Consumers need to be aware of SLAs to ensure that the service meets their requirements (e.g. if the consumer application is 24 x 7, need to ensure that service availability is also 24 x 7).

9.2 Publish services in a central design time directory

All services should be published in a central design time directory and promoted across the organisation.

Implications

- Solution Architects, designers and other key project staff need to be aware of existing and emerging services. Existing services should be listed in the central integration register described in the Department of Health– Systems Integration Protocol.
- In the longer term a repository tool may be needed to support the management of a range of service assets and artefacts (e.g. design documents, WSDL files, process flows) throughout their lifecycles. The need for a repository tool will be driven by the management complexity of the growing portfolio of services.
- When a new service or reusable integration service is created, appropriate documentation needs to be produced including interface descriptions and usage guide. In the short term these should be published in a central location (e.g. may be linked to from the integration register, or published in SharePoint). In the longer term they should reside in the service management repository.

9.3 SOA-style services are centrally governed

Strategy and Architecture Office is the central point of governance for SOA-style services.

9.4 Include service capability requirements in all procurement offers

When selecting new applications, the capability of the application to consume or provide services is highly desirable, and shall be included as a requirement of the application and assessed as part of the procurement process.
Implications

- Procurement questions to vendors should be expanded to include specific questions about the ability of the application to consume or provide services.

- In the short to medium term this is not expected to change the outcome of the procurement process in any significant way, as most healthcare applications are not delivered with service capabilities at this stage. The benefits of this approach will increase as more service-enabled applications enter the market, and the Department of Health has more services for COTS applications to consume.

- Vendor SOA implementations will vary and their SOA capabilities should be verified to ensure that they are capable of delivering the expected benefits to the Department of Health.

9.5 Separate service provision from service consumption

Where possible, service provision shall be separated from service consumption.

Implications

- The teams of people designing and building services should be independent of the teams of people who design and build systems that consume these services.

10. Review

This Protocol is due for review on: 16 June 2016

Date of Last Review: N/A

Supersedes: New

11. Business Area Contact

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

12. Definitions of terms used in this protocol

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Source</th>
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<tbody>
<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 system 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>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>
</tr>
<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>
</tr>
<tr>
<td>Enterprise Service Bus (ESB)</td>
<td>Enterprise Service Bus is an application infrastructure component (or suite of components) that enables services to be made available across the system to consuming applications or business</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Term</td>
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<tr>
<td>Healthcare Services Specification Project (HSSP)</td>
<td>The Healthcare Services Specification Project is a collaboration effort involving standards groups (Health Level Seven and Object Management Group are the charter organisations) collaborating to address interoperability challenges within the healthcare sector.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Mediation Services</td>
<td>Mediation services use the integration brokering capabilities of the integration platform to make functionality from legacy or packaged applications available to other applications as services. Examples are the Order Management, Scheduling Management and Referral Management services defined in the eHealth System map.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Queensland Health Services</td>
<td>Re-usable, software-based capabilities that can be accessed by other information systems. These services are not the same as those services listed in the Health Services Information Agency Service Catalogue, or the health services offered to the public by Hospital and Health Services, or those services provided by the Health Services Support Agency or as defined in Queensland Health’s Clinical Services Capability Framework.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Service Registry</td>
<td>The service registry provides a well known location for the registration of Services specifications, i.e. service endpoints and contracts. The registry supports service discovery and invocation.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Service Repository</td>
<td>A service repository manages a multitude of IT assets and artefacts throughout their life cycles (for example, analysis, architecture, design, development, deployment, operations and retirement). Important IT software assets and artefacts related to the ESB include Unified Modelling Language designs, Web Services Description Language files, Business Process Execution Language flows, components, services and applications.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Service Oriented Architecture (SOA)</td>
<td>Service Oriented Architecture is a design approach that enables application functionality to be delivered as single software services and reused within those applications that would otherwise redundantly provision that functionality. The functionality is typically deployed as a collection of interoperable services that can be used within multiple separate systems from one or more business domains. Services are abstracted away from the implementation of any consuming application using standards-based interfaces. SOA is independent of specific technologies.</td>
<td>Department of Health Strategy and Architecture Office</td>
</tr>
<tr>
<td>Web Service</td>
<td>A Web service is a standardised way of integrating Web-based applications using open standards (such as Extensible Markup Language [XML], Simple Object Access Protocol [SOAP], Web Service Definition Language [WSDL]) over an Internet protocol backbone. Web services are commonly used to implement SOA services (although SOA services can be implemented without web services).</td>
<td>Department of Health Strategy and Architecture Office</td>
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</table>
13. Approval and Implementation

Policy Custodian:
Senior Director Strategy Governance and Architecture, Planning, Engagement and Performance Directorate, Health Services Information Agency (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>
<th>Date</th>
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<th>Comments</th>
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<tr>
<td>1.0</td>
<td>30/05/2014</td>
<td>ICT Policy</td>
<td>Finalised for CIO approval</td>
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Appendix A  Service criteria and characteristics

In order to be considered a candidate for a service, a piece of functionality should exhibit the following characteristics:

- The technical asset provides a capability that has the potential to be reused in other contexts (applications or processes). It may only be used by one application initially.
- The technical asset is exposed and delivered in a reusable manner (the interface is not specific to a single business facing application).
- The technical asset is managed as a shared asset independently of the business facing applications that use it.
- The technical asset conforms to the service characteristics described in the next section.

Other criteria that may be taken into account in assessing suitability for a service:

- The technical asset encapsulates functionality that can be consumed by partners or patients and general public.
- The technical asset exposes legacy functionality for ease of integration with other systems.
- The technical asset enables standard processing across the system.
- The technical asset provides access to third-party functions not available internally within Queensland Health.
- The technical asset provides a key flexibility point in the architecture, enabling switching to alternative service providers for the service implementation. (If this flexibility benefit is strong enough, it could justify introduction of a service that is only used by a single consumer).

Service Characteristics

- Loosely coupled – services support loose coupling between service provider and service consumer. This loose coupling provides flexibility in business applications making it easier to change or replace services.
- Abstracted - services encapsulate a discrete segment of business functionality and are independent of specific software systems or technologies. (Services should not expose implementation details of the underlying system in their interfaces). This eliminates the need for service consumers to be dependent on the provider’s implementation and helps to insulate consumers from the impact of changes to service implementation.
- Platform independent – services are delivered in a platform neutral technology (e.g. using standards based web services). This allows services to be provided to and consumed by consumers on different platforms.
- Agility – services should be designed to facilitate future change. This goes beyond loose coupling to ensuring that the service design is general enough to support a wider range of requirements in future, and to support wider range of types of consumers. Services at the boundaries between applications and technologies can minimise the impact of changes to consumers or providers.
• Right granularity – services should be designed with a level of granularity that is meaningful to the consumer. In general terms, services should be coarse grained business services, but services that are very generic (overly coarse grained) lose meaning for the consumer and are not easy to use. Similarly too fine grained services can be difficult to use directly. Finer grained services are useful where they are used as building blocks to aggregate or compose them into higher level coarse grained services.

• Service specification - services should have a documented service specification to ensure providers and consumers have a clear understanding of their responsibilities in providing and consuming the service. The service specification should describe what the service does, any pre and post conditions, quality of service and service level agreements.

• Standards-based – services should comply with appropriate technology standards and business standards.

• Discoverable – services should be published in such a way that they are easily discovered and consumed without action having to be taken by the provider. In the short to medium term, this means design-time discovery via a shared service repository.

• Managed – services should be managed as assets throughout their lifecycle from concept to deployed software service. There will be a system-wide service portfolio plan, and service procurement should align with this service portfolio plan.

• Authoritative – in SOA, services become authoritative for the data or logic they encapsulate instead of the databases of non-SOA applications. This is especially important for data services as they hide the complexity of where data is physically located and maintain knowledge of which data store should be accessed for different types of data at different points in time. The data service removes the burden from the data consumers of needing to know where to go for data. In doing this, the data service becomes the authoritative source.