Australian Government
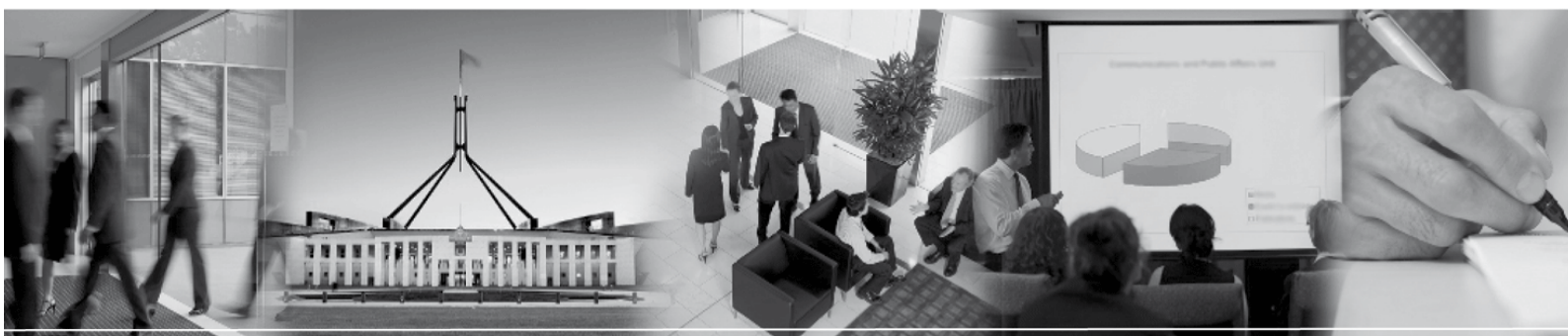Department of Finance and Deregulation

Australian Government Architecture
Reference Models

August 2011

Version 3.0

Foreword

In developing the Australian Government Architecture framework (AGA) we have adapted an established and proven framework based on the Federal Enterprise Architecture Framework (FEAF) developed by the United States Government. This framework is being used in a number of other countries and some state governments in Australia. The framework and these reference models have been endorsed by the Australian Government's Chief Information Officers' Committee.

Developing an architecture framework is a large undertaking and one that is never really finalised. As a result, we decided to release the AGA in a series of versions, with each new version building on the last.

This version adds value by incorporating the Performance Reference Model, further feedback from agencies and a substantial revision of the Business Reference Model. We look forward to further feedback as the reference models are used by agencies for projects and proposals.

Agencies are not required to replace their existing frameworks with the AGA. However, for those that do not already have an architecture in place, or have one that is under review, we strongly recommend that you adopt the AGA.

A sound architecture framework will support government by providing a useful context for decision-making and help agencies develop capabilities needed for the future. In particular, it will support agencies to operate across traditional boundaries to improve service delivery and deliver more responsive policy implementation.

While this version extends the use of Australian examples, there are several US examples, some US terminology and other parts that are yet to be assessed. Their replacement with contemporary Australian examples will continue over time, but at present they have been retained.

The framework contains five reference models. In this version, we present the Business Reference Model and have also refreshed the Service, Data and Technical Reference Models.

ii

Ann Steward

Australian Government Chief Information Officer
Australian Government Information Management Office
Department of Finance and Deregulation

This page is
intentionally blank

Contents

iv

V

LIST OF FIGURES

vii

viii

This page is
intentionally blank

ix

1   Whole-of-Government Enterprise Architecture Program

The intent of this Australian Government Architecture (AGA) framework is to assist in the delivery of more consistent and cohesive services to citizens and support cost-effective delivery of Information and Communications Technology (ICT) services by government, providing a framework that:

- **provides a common language**: provides a common language for agencies involved in the delivery of cross-agency services
- **enhances collaboration**: supports the identification of duplicate, re-usable and sharable services
- **assists in describing and analysing IT investments**:   provides a basis for the objective review of investment by government
- **assists in transforming Government** (citizen-centric, results-oriented, market-based): enables more cost-effective and timely delivery of ICT services through a repository of standards, principles and templates that assist in the design and delivery of ICT capability and, in turn, business services to citizens.

This document describes the third release of the reference models. The reference models form the basis of a common language between agencies and structure a repository of architectural artefacts (including standards, guidelines, designs and solutions) that may be used by agencies to deliver an increasing range of whole-of-government services. It introduces the Performance Reference Model and the Metamodel. Both of these were developed in conjunction with the Chief Information Officers' Committee and the Australian Government Services Architecture Working Group (AGSAWG). Updates have been made to the other reference models based on feedback received from agencies.

10

1.1 Audience

This document is targeted at architects from all disciplines practicing within Australian Government agencies including those that do not have an enterprise architecture practice or are just initiating an EA within their agency. Those involved in program management (e.g. program/project managers, business and investment analysts, systems engineers, application architects, systems developers, etc) should also refer to this document.

While agencies are not required to replace existing architectural frameworks with the AGA, they should be able to classify their architectures using the AGA reference models. For those agencies that do not already have an architecture in place, or have one that is under review, it is strongly recommended that you adopt the AGA.

1.2 Related Material

- Cross-Agency Services Architecture Principles
  (http://www.finance.gov.au/e-government/strategy-and-governance/australian-government-architecture.html)
- Australian Government Architecture "How to Use" Guide including the Australian Government Architecture Investment Templates
  (http://www.finance.gov.au/e-government/strategy-and-governance/australian-government-architecture.html)

1.3 Governance

In 2006, the CIOC endorsed AGIMO's adoption of the FEAF developed by the US Office of Management and Budget's (OMB) Office of E-Government (E-Gov) and Information Technology (IT) as a model framework. The FEAF is a comprehensive business-driven blueprint of the entire US Federal Government and has been adopted by a number of other countries and Australian Government agencies.

This version of the AGA Reference Models, including the AGA Metamodel, was endorsed by the CIOC in April 2011.

1.4 Contact Information

If you have any questions regarding the AGA reference models or suggestions for future enhancements, these should be directed to: AGA@finance.gov.au.

11

2   Reference Model Overview

The AGA contains a set of inter-related 'reference models' designed to facilitate cross-agency analysis and the identification of duplicate investments, gaps and opportunities for collaboration within and across agencies. Collectively, the reference models comprise a framework for describing important elements of the AGA in a common and consistent manner. Refer to *Figure 2-1* for details.
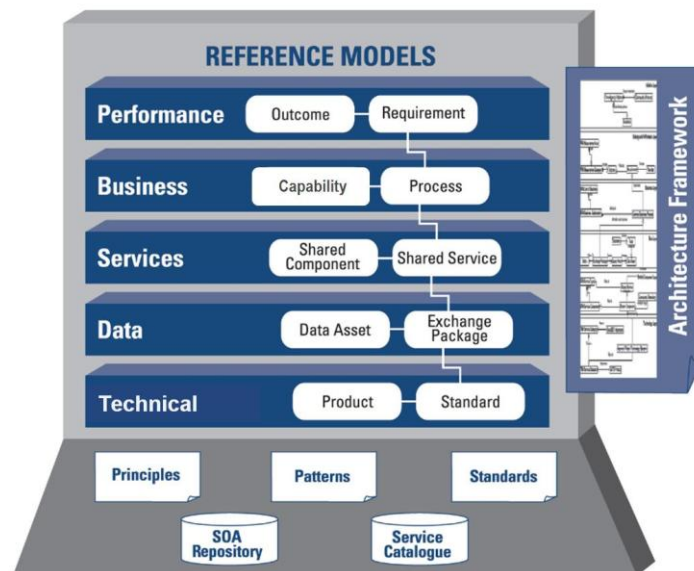
Figure 2-1:   Australian Government Architecture (AGA)

Through the use of this common enterprise architecture framework and vocabulary, ICT portfolios can be better managed and leveraged across the Australian Government. This section introduces the purposes and structures of the five AGA reference models:

Performance Reference Model (PRM)

Business Reference Model (BRM)

Service Reference Model (SRM)

Data Reference Model (DRM)

Technical Reference Model (TRM).

2.1 Performance Reference Model

The PRM is an outcome-focused measurement framework that can assist government agencies in the design and implementation of effective business measurement systems and performance architectures. It is made up of a hierarchical meta-model that helps identify measurement needs; a classification framework that describes the types of measurement that can support the identified needs; and a measurement indicator framework that helps define effective measurement indicators. When combined, these elements form a PRM that:

- promotes strong alignment between business initiatives and agency and government strategies and outcomes
- facilitates efficient and effective business operation
- supports transparency and accountability in government.

The PRM is flexible and can be applied within any government agency at any level of government to support planning, management and evaluation activities. It consolidates, aligns and extends existing measurement

systems and process frameworks, such as the Information Technology Infrastructure Library (ITIL) and the Portfolio, Programme and Project Management Maturity Model (P3M3), and reduces the implementation and operational burden on agencies.

The objective of the PRM is to support the development of a measurement 'line of sight' between the inputs of government and the effective and efficient realisation of outcomes. The 'line of sight' captures and describes the cause-and-effect relationship that exists between the input of resources, the efficiency of business processes and the effectiveness of agencies in realising outcomes.

The PRM aligns with the Outcome Process Model, supporting planning and management (execution) activities within an organisation. It facilitates the alignment and consolidation of existing measurement frameworks and the definition of new measurement indicators that capture and describe:

- the efficiency, effectiveness and alignment of resource inputs allocated to government programs
- the efficiency, effectiveness and alignment of the processes and activities associated with delivering government programs
- the quality and value of the outputs produced by government programs, including services
- how successfully program outputs (products and services etc.) meet the needs of customers and government
- how efficiently and effectively the delivered program has realised the intended outcomes of government
- the cause-and-effect relationships that exist between all of the above measurements when linked to an agency architectural implementation.

When implemented within an agency, the measurement framework delivers a line of sight for agency executives to the resource inputs allocated to an initiative (program, project, section, branch or division) and the intended outcomes of that initiative. The line of sight also captures the efficiency and effectiveness of the work processes involved, the quality of outputs produced and the impact of output usage levels by targeted customers.
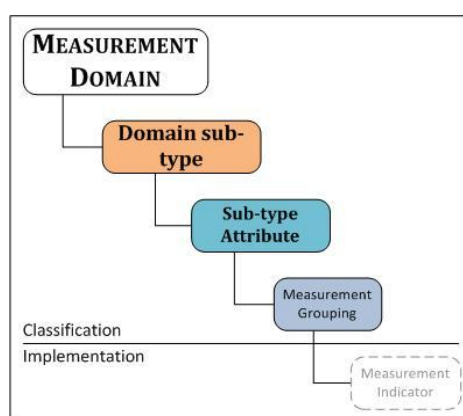
Figure 2-2:   The PRM structure

There are five measurement domains within the AGA PRM: Inputs; Processes and Activities; Outputs; Usage; and Outcomes. As detailed above, these domains correspond to the five discrete areas of activity described in the Government and Business Operation Model, the Inputs–Transformation–Outcome Model, and the Outcomes Process Model presented in Section 4: Performance Reference Model.
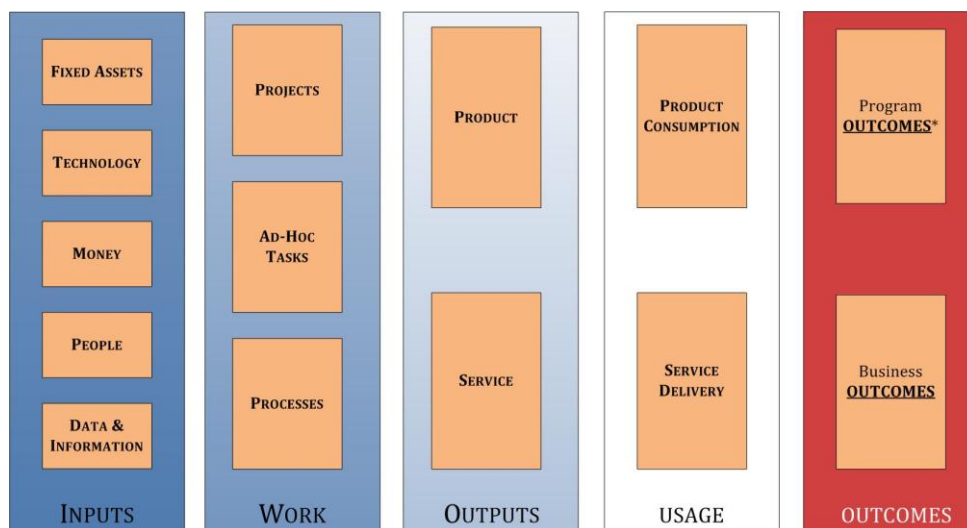
Figure 2-3: The PRM Classification Framework

* Program outcomes take their themes from the AGIFT and align with the lines of business in the BRM Services for Citizens segment.

Within the five measurement domains, there are 14 measurement domain sub-types:

1. The *Inputs domain* contains fixed assets, technology, people, data and information, and finances (the types of input).
2. The *Work domain* contains ad hoc tasks, projects and processes and operations (business as usual)—the types of work.
3. The *Outputs domain* contains products and services (the types of output).
4. The *Usage domain* contains product consumption and service delivery (the types of usage).
5. The *Outcomes domain* contains program outcomes and business outcomes (the types of outcome).

Under each of the measurement domain sub-types are categories that correspond to the attributes of the domain sub-type, and below the attribute measurement categories are measurement groupings that provide theme groupings for attribute measurements should they be required.

2.2 Business Reference Model

The Business Reference Model (BRM) provides a framework facilitating a whole-of-government functional view of the Australian Government's Lines of Business (LoBs), independent of the agencies performing them.

The BRM extends the 'line of sight' concept described in the Performance Reference Model, by articulating the government business required for achieving the desired performance outcomes and business objectives, and linking the government business through to the business processes supported by service components described in the Service Reference Model.

The BRM describes the Australian Government around common business areas instead of through a stove-piped, agency-by-agency view. It promotes agency collaboration and serves as the underlying foundation for the AGA and e-Government strategies.

The functional approach promoted by the BRM to help accomplish the e-Government strategic goals will be achieved when it is incorporated into business-focused enterprise architectures and the management processes of agencies.

The BRM is structured into a tiered hierarchy representing the business functions of the Australian Government. Business areas are at the highest level, broken down into lines of business that are comprised of a collection of business capabilities at the lowest level of functionality in the BRM.

At an agency level, these business capabilities are represented by business services that are enacted through the business processes created by the agencies. Business processes are, in turn, delivered and supported by service components that are described in the Service Reference Model.

Refer to *Figure 2-4* for the BRM tiered hierarchy[1] and its relationship to business services and business processes.
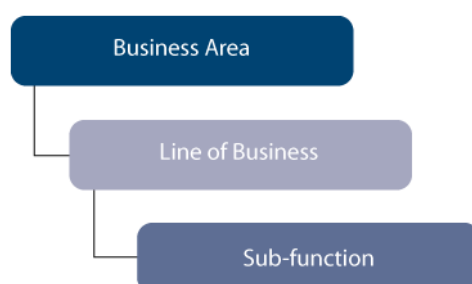
Figure 2-4:   BRM Structure

2.3 Service Reference Model

The Service Reference Model (SRM) is a business-driven, functional framework classifying services according to how they support business and performance objectives. It serves to identify and classify horizontal and vertical service components supporting agencies and their ICT investments and assets. The model aids in recommending service capabilities to support the re-use of business components and services across the Australian Government.

The SRM is organised across horizontal service areas, independent of the business functions, providing a foundation for sharing and re-use of business services, applications, application capabilities and components. Refer to *Figure 2-5*5 for the SRM hierarchical structure.
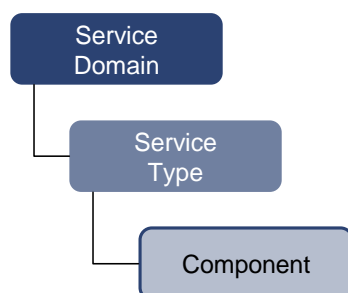
Figure 2-5:   SRM Structure

15

---

[1] In the AGA Reference Models Version 1.0 and in the Business Process Interoperability Framework (August 2007) the Business Capability layer of the BRM hierarchy was referred to as the Sub-function layer.

2.4 Data Reference Model

The Data Reference Model (DRM) is a flexible, standards-based framework to enable information sharing and re-use across the Australian Government via the standard description and discovery of common data and the promotion of uniform data management practices. The DRM provides a standard means by which data may be described, categorised and shared.

Figure 2-6 reflects this within each of the DRM's three standardisation areas:

- **Data Description**: provides a means to uniformly describe data, thereby supporting its discovery and sharing.
- **Data Context**: facilitates discovery of data through an approach to the categorisation of data according to taxonomies. Additionally, it enables the definition of authoritative data assets within a Community of Interest (COI[2]).
- **Data Sharing**: supports the access and exchange of data where access consists of ad-hoc requests (such as a query of a data asset) and exchange consists of fixed, recurring transactions between parties. It is enabled by capabilities provided by both the Data Context and Data Description standardisation areas.
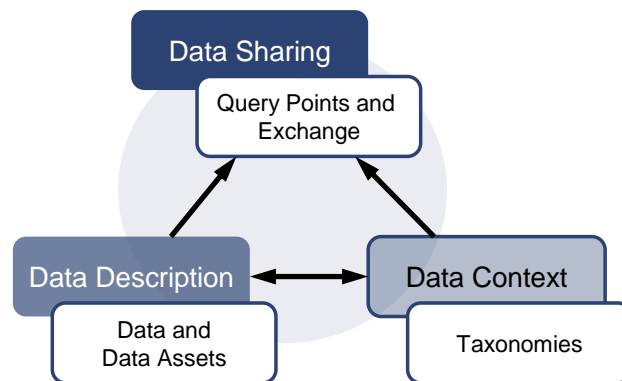
Figure 2-6: DRM Structure

The DRM provides a frame of reference to:

- facilitate COIs (which may be aligned with the LoBs delineated in the AGA Business Reference Model) in establishing common language
- enable needed conversations to reach credible cross-agency agreements around governance, data architecture and an information sharing architecture.

The DRM provides guidance to enterprise architects and data architects for implementing repeatable processes to enable data sharing in accordance with government-wide agreements, including agreements encompassing state, territory and local governments, as well as other public and private non-government institutions. The intent is to mature, advance and sustain their data agreements in an iterative manner.

The DRM can provide value for agency data architecture initiatives by:

- providing a means to consistently describe data architectures. The DRM's approach to Data Description, Data Context and Data Sharing enables data architecture initiatives to uniformly describe their data artefacts, resulting in increased opportunities for cross-agency and cross-COI interactions

---

[2] Communities of Interest are collaborative groups of users who require a shared vocabulary to exchange information in pursuit of common goals, interests and business objectives.

- bridging data architectures. The DRM provides a 'Rosetta Stone'[3] to facilitate communications between enterprise and data architects about data and data architecture in their efforts to support the business/mission needs of the COIs that they support

- facilitating compliance with requirements for data architectures. The DRM's standardisation areas provide a foundation for agency data architecture initiatives to put forth requirements that can result in increased compatibility between agency data architectures.

As a reference model, the DRM is presented as an abstract framework from which concrete implementations can be derived. The abstract nature will enable agencies to use multiple implementation approaches, methodologies and technologies while remaining consistent with the foundational principles of the DRM.

The DRM abstract model can be implemented using different combinations of technical standards. As one example, the Exchange Package concept in the Data Sharing standardisation area may be represented via different messaging standards (e.g. eXtensible Markup Language [XML] schema, Electronic Data Interchange [EDI] transaction set) in a concrete system architecture for purposes of information sharing. Other ways to implement DRM capabilities may be put forward by other agencies or stakeholders.

By associating elements of concrete architectures with the DRM abstract model, those concrete elements may be associated with each other, helping to promote interoperability between cross-agency architectures/implementations. Thus the abstract nature of the DRM as a reference model provides tremendous implementation flexibility.

---

[3] 'The term 'Rosetta Stone' has become idiomatic as something that is a critical key to a process of decryption or translation of a difficult problem.' (*http://www.wikipedia.org/*)

2.5 Technical Reference Model

The Technical Reference Model (TRM) is a component-driven, technical framework categorising the standards and technologies to support and enable the delivery of services and capabilities. It also unifies existing agency TRMs and whole-of-government guidance by providing a foundation to advance the re-use and standardisation of technology and service components from a government-wide perspective.

Aligning agency capital investments to the TRM leverages a common, standardised vocabulary, allowing inter-agency discovery, collaboration and interoperability. Agencies and the Australian Government will benefit from economies of scale by identifying and re-using the best solutions and technologies to support their business functions, mission and target architecture. Refer to *Figure 2-7* for the TRM structure.
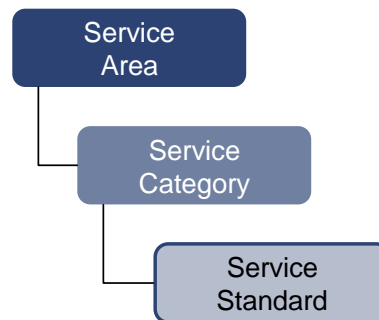
Figure 2-7:   TRM Structure

18

This page is
intentionally blank

3   Metamodel

3.1 Introduction

The Australian Government Architecture (AGA) Metamodel describes the alignment of agency entities to the AGA Reference Models.

3.2 Structure

This document is organised into the following sections:

SECTION	DESCRIPTION
Metamodel concepts	Introduces the key concepts of the AGA Metamodel and provides an overview of the AGA Reference Models.
Metamodel elements by layer	Describes each metamodel element in detail, including all entity types, type attributes and relationships. These elements are grouped logically into layers aligning with the AGA Reference Models.

3.3 Metamodel concepts

To understand this document, it is important to be aware of some of the key concepts of enterprise architecture modelling.

The AGA Metamodel defines the types of information described by the AGA Reference Models. The types of data the metamodel describes are called **entity types**. Conceptually, related entity types are grouped into **layers** which are described below in *Table 1: Description of the AGA Metamodel Layers*.

Each entity type contains one or more **attributes** describing the entity. Further, each entity type may be conceptually linked to one or more other entity types in a **relationship** of some kind.

3.3.1   AGA Metamodel layers

Enterprise Architecture frameworks are organised into layers, or perspectives.   The Australian Government Architecture Reference Models define the five layers of enterprise architecture (Performance, Business, Service, Technical and Data).

This version of the AGA Metamodel outlines the Business, Service and Technical layers. A short description of these layers is in *Table 2-1*.

LAYER	DESCRIPTION
Performance	This will align to the AGA Performance Reference Model (PRM).
Business	Describes government initiatives and business processes, aligned to the AGA Business Reference Model (BRM).

LAYER	DESCRIPTION
Service	Describes the services and the components that implement business processes, aligned to the AGA Service Reference Model (SRM).
Technical	Describes the technology and the standards that implement the Components of the Service Layer, aligned to the AGA Technical Reference Model (TRM).
Data	This will align to the AGA Data Reference Model (DRM).

Table 2-1: Description of the AGA Metamodel layers

The layers are organised from top to bottom in the order described above with the AGA Reference Models and the Agency context is separated for clarity.

3.3.2   Common attributes

There is a set of entity attributes common to all entity types. These are:

Attributes	Type	Description
Name	String	An instance name that uniquely identifies the entity instance
Description	String	A brief description of the entity instance.

21

Metamodel overview diagram[4]
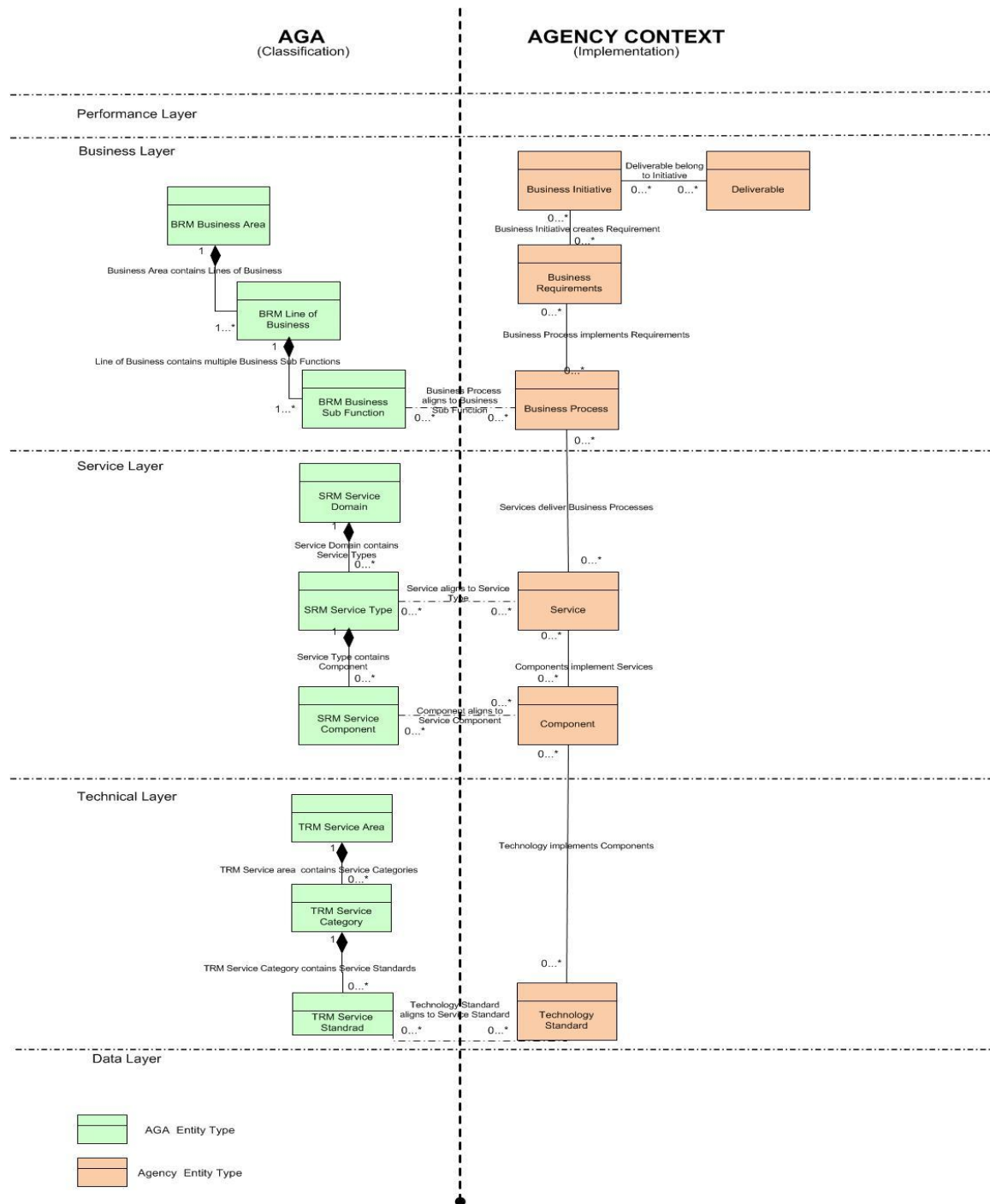
Figure 3-1: Metamodel Overview

3.4 Metamodel elements by layer

3.4.1 Performance layer

This section is still being developed, and will be released in a future version of the AGA.

3.4.2 Business layer

The Business layer describes the relationship between a Business entity and:

- The AGA Business Reference Model
- The Service layer Service.
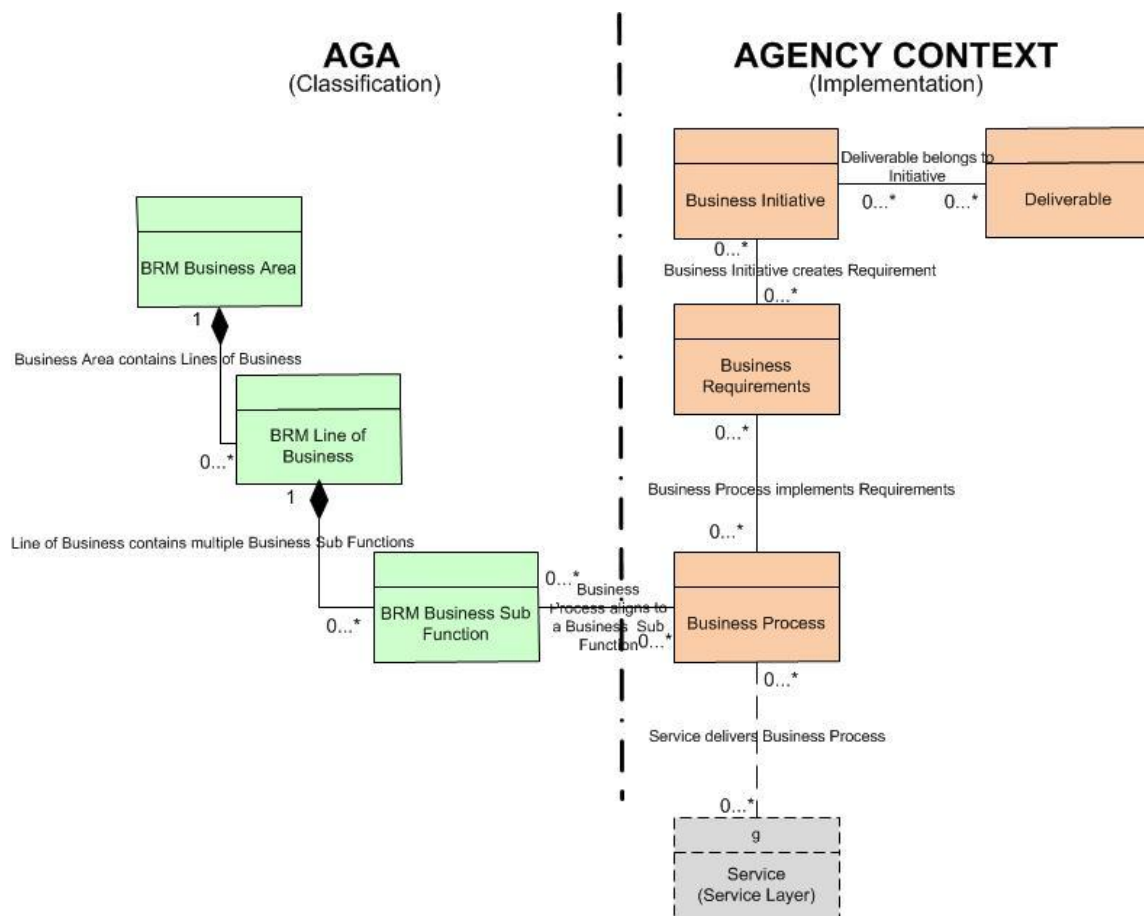
Figure 3-2: Business Layer

Entity Name	BRM Business Area	
Entity Description	Used to classify the government functionality and activities surrounding the operations of government.	
Relationships	BRM Line of Business	
Examples	1 Services for Citizens 2 Service Paths	
Entity Source	AGA Reference Models	
Attributes	**Type**	**Description**
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	BRM Line of Business	
Entity Description	Used to classify various sectors of government including support services, service delivery paths and managing government resources.	
Relationships	BRM Business Area BRM Business Sub function	
Examples	1 Financial management 2 Health care 3 Credit and insurance	
Entity Source	AGA Reference Models	
Attributes	**Type**	**Description**
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	BRM Business Sub function	
Entity Description	Used to breakdown the BRM Line of Business into smaller, more precise business functions.	
Relationships	BRM Line of Business Business layer Business Process	
Examples	1 Payments to citizens 2 Health Insurance schemes 3 Community health services	
Entity Source	AGA Reference Models	

Attributes	Type	Description
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	Business Initiative		
Entity Description	A government initiative underpinned by legislation or any agency level initiative to attain measurable benefit. A government initiative is also known as a Program at the Australian Government level. A Business Initiative defines business requirements and has deliverables.		
Relationships	Business layer Deliverable Business layer Business Requirement		
Examples	1 Australian Childhood Immunisation Program 2 Aged Care Program		
Attributes	**Type**	**Description**	
Legislation	String	Any associated legislation tied to this initiative	
Scheduled date	Date	Date initiative is or was expected to be available	
Actual date	Date	Date initiative was actually made available	

Entity Name	Deliverable		
Entity Description	A product which forms the output of a Business Initiative.		
Relationships	Business layer Business Initiative		
Examples	1 Australian Childhood Immunisation Register 2 Online system for tracking immunisation for citizens		
Attributes	**Type**	**Description**	
Scheduled date	Date	Date deliverable is or was expected to be available	
Actual date	Date	Date deliverable was actually made available	
Is delivered	Boolean	Whether deliverable is currently available for use	
Version number	String	Current version of the deliverable	

Entity Name	Business Requirement
Entity Description	A Business Requirement details the Business Initiative to be delivered including the Business Processes required. A Business Requirement should be SMART (specific, measureable, attainable, relevant and time-bound). Business Requirements will be bound by any legislation that underpins the Business Initiative. There will usually be more than one Business Requirement to each Business Initiative.
Relationships	Business layer Business Process Business layer Business Initiative
Examples	1 "Australian childhood immunisation should maintain a register for each individual child to track what immunisation they have received so far and what they are scheduled to receive".

	2	"All agencies should have IPv6 capable hardware and software platforms by 2012".[5]

Attributes	Type	Description
Requirement source	String	Legislation or other directive underpinning the requirement

Entity Name	Business Process
Entity Description	"A business process is a sequence of linked activities that creates value by turning inputs into a more valuable output. This value creation can be performed by human participants or information and communications technology (ICT), or both".[6] A BRM Business Sub function can be decomposed into multiple Business Processes. A Business Process will implement a Business Requirement and will contain a series of work events that can be either manual or automated. There will usually be more than one Business Process to each Business Requirement.
Relationships	BRM Sub function Business layer Business Requirements Service layer Service
Examples	1 Registration for a program 2 Payment process for a program 3 Reporting process

Attributes	Type	Description
Process Id	String	Unique id to represent the process
Description	String	Description of high level steps of the business process
Process Owner	String	Agency formally charged with ownership of a common process

26

3.4.3 Service layer

The Service layer describes the relationship between a Service entity and:

- AGA Service Reference Models
- Business layer Business Process
- Technical layer Technology Standard.
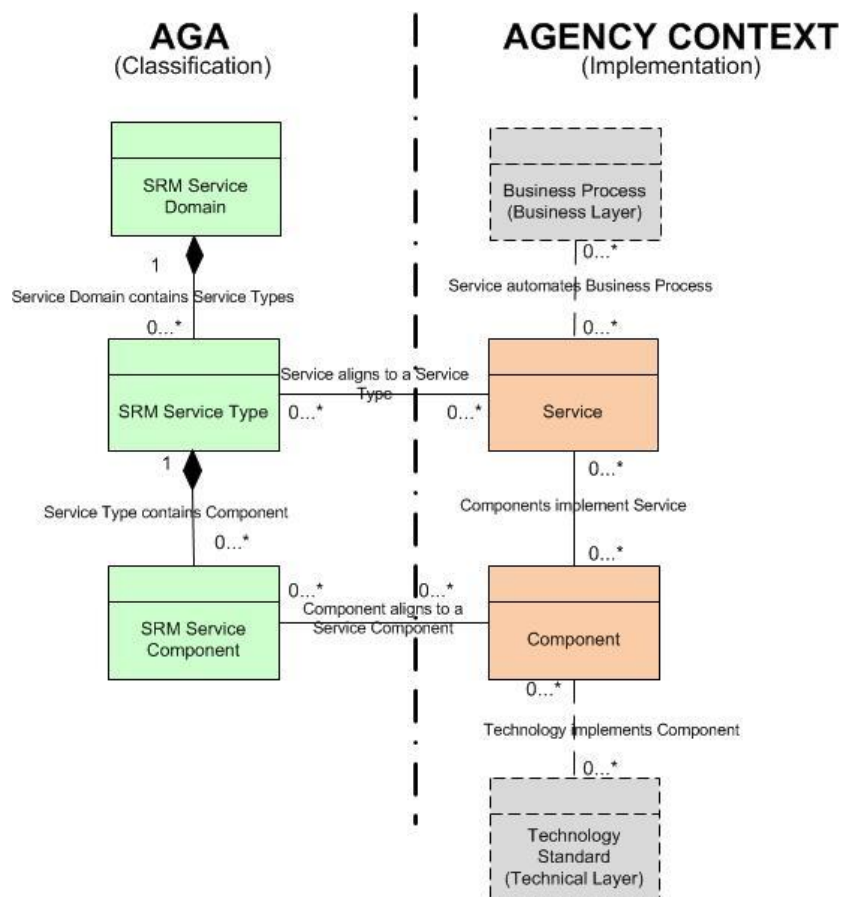
Figure 3-3:   Service Layer

Entity Name	SRM Service Domain
Entity Description	Used to classify the services, capabilities and processes. Service Domains are comprised of SRM Service Types.
Relationships	SRM Service Type
Examples	1 Customer services 2 Back office services
Entity Source	AGA Reference Models

Attributes	Type	Description
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	SRM Service Type
Entity Description	Used to breakdown the SRM Service Domain through providing the business context for a specific SRM Service Component.
Relationships	SRM Service Component Service layer Service
Examples	1 Customer relationship management 2 Data management 3 Tracking & workflow
Entity Source	AGA Reference Models

Attributes	Type	Description
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	SRM Service Component
Entity Description	Used to classify a self-contained Business Process or Service with predetermined functionality that is exposed through a business or technical interface
Relationships	SRM Service Type Service layer Component
Examples	1 Online help 2 Change management 3 Content authoring 4 Case Management
Entity Source	AGA Reference Models

Attributes	Type	Description
Code	String	Unique identity code assigned to this instance in the AGA Reference Models

Entity Name	Service	
Entity Description	A Service consists of people, processes and systems and may be delivered by a single agency or by multiple agencies. A Service aligns with the SRM Service Type and may be implemented by multiple Components. A Service is an abstract resource that represents one or more Capabilities. A Capability presents a coherent functionality from the point of view of agencies	
Relationships	SRM Service Type Service Layer Component	
Examples	1 Medicare Customer management 2 Medicare Human resources division 3 Standard Business Reporting	
Entity Source	BRM Line of Business or government initiative	
Attributes	**Type**	**Description**
Service provider	String	Agency providing the service
Service level agreement	String	Description of service level agreement for the service

Entity Name	Component	
Entity Description	Logical building blocks of a service. Aligns with the SRM Service Component.	
Relationships	SRM Service Component Service Layer Service TRM Technology Standard	
Examples	1 Forms for registration 2 Authentication 3 Customer search 4 Cheque printing 5 Electronic Funds Transfer 6 Smart forms.	
Entity Source	BRM Line of Business or government initiative	
Attributes	**Type**	**Description**
Agency service register identification attributes can be used here if required.		

3.4.4 Technical layer

The Technical Layer describes the relationship between the technical entities and:

- the AGA Technical Reference Model (TRM)

- the Service layer Component.
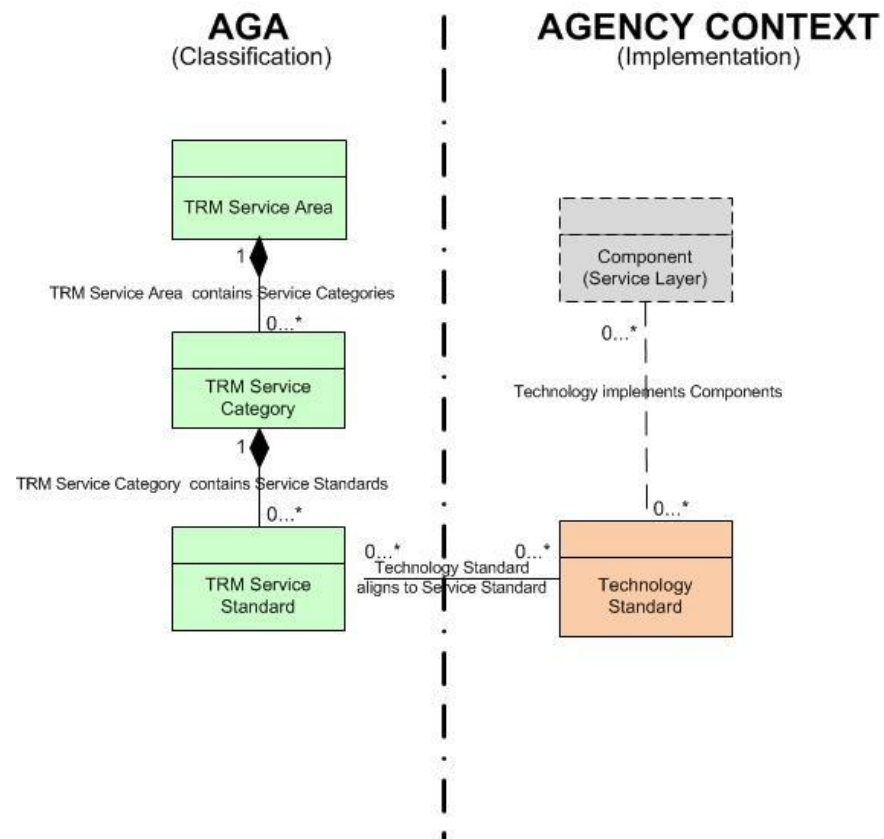
Figure 3-4: Technical Layer

Entity Name	**TRM Service Area**		
Entity Description	Used to classify the technology and standards that support the construction, exchange and delivery of Service Layer Components. The TRM Service Area may consist of multiple TRM Service Categories.		
Relationships	TRM Service Category		
Examples	1 Component framework 2 Service interface and integration		
Entity Source	AGA Reference Models		
Attributes	**Type**	**Description**	
Code	String	Unique identity code assigned to this instance in the AGA Reference Models	

Entity Name	**TRM Service Category**		
Entity Description	Used to classify lower level technologies and standards by the business or technology function they serve. A TRM Service Category will contain TRM Service Standards.		
Relationships	TRM Service Standard		
Examples	1 Security 2 Database/storage 3 Access channels		
Entity Source	AGA Reference Models		
Attributes	**Type**	**Description**	
Code	String	Unique identity code assigned to this instance in the AGA Reference Models	

Entity Name	**TRM Service Standard**		
Entity Description	Used to define the technologies and standards supporting a TRM Service Category.		
Relationships	TRM Service Category Technical layer Technology Standard		
Examples	1 Web server 2 Web browser 3 Server 4 Computer		
Entity Source	AGA Reference Models		
Attributes	**Type**	**Description**	
Code	String	Unique identity code assigned to this instance in the AGA Reference Models	

Entity Name	Technology Standard	
Entity Description	Used to define the technologies, standards and specifications used by agencies in implementing a Service Layer Component. A Technical Standard aligns to the TRM Service Standard.	
Relationships	TRM Service Standard Service layer Component	
Examples	1 AGIMO policies and frameworks 2 international and Australian industry standards 3 browser technology 4 languages 5 document standards	
Attributes	**Type**	**Description**
Asset / Licence / Standard ID	String	Uniquely identifies the hardware equipment / software licence identifier / identifier (ID) of a particular Standard issued by a recognised standards body.

3.4.5   Data layer

This section is still being developed, and will be released in a future version of the AGA.

32

This page is
intentionally blank

4 Performance Reference Model

4.1 Introduction

4.1.1 Measurement and the Australian Public Service

Measurement and evaluation have been used in the Australian Public Service (APS) since the early 1980s. The Portfolio Evaluation Program was a centralised program aimed at integrating program evaluation with the central budgetary process in an effort to place greater focus on outcomes and cost effectiveness, rather than simply on inputs and processes. Although successful at first, the Portfolio Evaluation Program was ultimately abandoned in the early 1990s because it was argued that it had become too resource intensive to be effective and was seen to be too cumbersome and prohibitive of government innovation, and because there were shortages of skilled evaluation practitioners.

Despite more recent evolutions in government policy associated with measurement and evaluation that devolve responsibility for measurement and evaluation to government agencies (the 1997 Outcomes and Outputs Framework and the revised 2009 Programs and Outcomes Policy), there continue to be ongoing challenges in establishing and operating a robust, effective measurement and evaluation framework.

In a recent presentation, the Secretary of the Department of Finance and Deregulation, Mr David Tune, stated that the availability of useful evaluation information across the APS is uneven with some agencies maintain a best practice, coherent and well-coordinated evaluation function, with well developed and stable internal evaluation capability and partnerships with external expert consultants. However, others appear to be less focused, which can lead to problems with the usefulness, objectivity, transparency and openness of the data that is collected.

What is needed is a measurement framework capable of operating in all government agencies, and capable of simplifying and streamlining the measurement and evaluation process.

4.1.2 Performance Reference Model

The Performance Reference Model (PRM) (*Figure 4-1*) has a measurement framework that aligns with the Inputs–Transformation–Outcome (ITO) Model[7], the Outcome Process Model (OPM)[8] and the Government Business Operation model. It supports the identification and definition of measures that are able to capture and describe for business:

- the efficiency of government agencies in their utilisation of public funds and resources in the delivery of business outputs
- the effectiveness of the outputs produced by agencies in realising desired outcomes for the government and the agency
- the overall efficacy (ability to execute) of agencies and the delivery of government programs.

When implemented in support of business intelligence systems, balanced scorecards, enterprise architecture or other measurement systems, this framework for measurement delivers to agency executives a line of sight between the inputs of a business initiative and the realisation of outcomes from that initiative.

---

[7] J Smyrk, *The ITO Model: a framework for developing and classifying performance indicators*, Australasian Evaluation Society, International Conference, Sydney, Australia, 2005. The ITO Model is used under a Creative Commons Version 2.5 licence.

[8] The OPM is based on the Inputs–Transformation–Outcome (ITO) model of business process theory developed by John Smyrk. The model has been widely adapted within the economics and finance professions and is included here because it describes abstractly the unbreakable relationship that exists between outcomes and inputs.
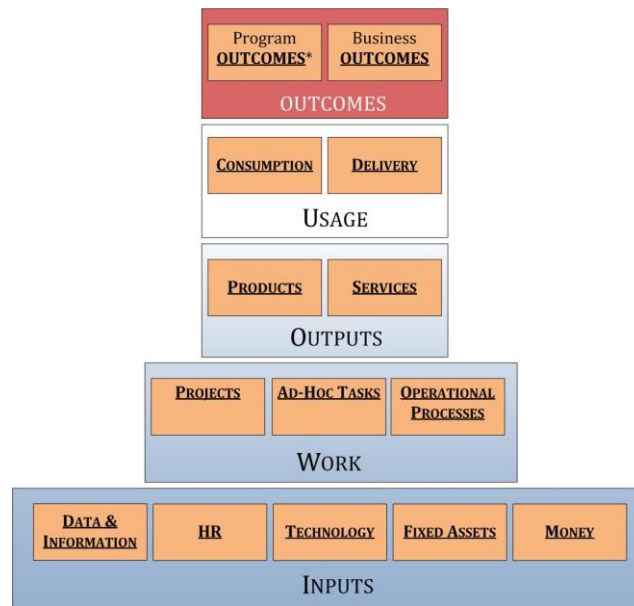
Figure 4-1:   The PRM Classification Framework

There are five measurement domains within the PRM, and within the five measurement domains there are 14 domain sub-types. Under each of the measurement domain sub-types are groupings for sub-type attributes that correspond to the characteristics of the domain sub-type, and below the sub-type attributes are measurement groupings that provide further refinement of attributes that possess multiple variables.

Domain	Domain Sub-Type
[1] Outcomes	[11] Program outcomes [12] Business outcomes
[2] Usage	[21] Product consumption [22] Service delivery
[3] Outputs	[31] Products [32] Services
[4] Work	[41] Projects [42] Ad hoc tasks [43] Processes and operations (BAU)
[5] Inputs	[51] Human Resources [52] Data and information [53] Technology [54] Fixed Assets [55] Money

The classification framework and hierarchical structure of the PRM have been shaped by the measurement and evaluation frameworks that existed in government in the past, operate in government today, and will support government into the future. By design, the PRM has been derived from pre-existing Australian Government initiatives such as:

- the 1997 Outcomes and Outputs Framework
- the 2009 Outcomes and Programs Policy
- the Strategic Review Framework.

The drivers for the framework and structure are straightforward. The PRM must:

- be easy to understand and implement within the Australian Government
- not require large reinvestment of agency resources by establishing a new regime
- lessen the existing burden of measurement and evaluation in government.

4.1.3   Australian Government Architecture Reference Models

The PRM is included alongside the other AGA reference models[9], but it is distinctly different from them in both form and function (*Figure 4-2*). Where the other reference models are intended to assist in the development of architecture within a specific domain, or layer, of an organisation, the PRM is intended to facilitate measurement across all domains and layers of the organisation.

Within the PRM Framework there are subjects, topics and terms that align with and are directly attributable to the other reference models of the AGA; when the PRM is used in concert with them, their functionality and effectiveness are significantly improved.

---

[9] AGIMO, *Australian Government Architecture Framework, version 2.0*, Commonwealth of Australia, 2009, Canberra.
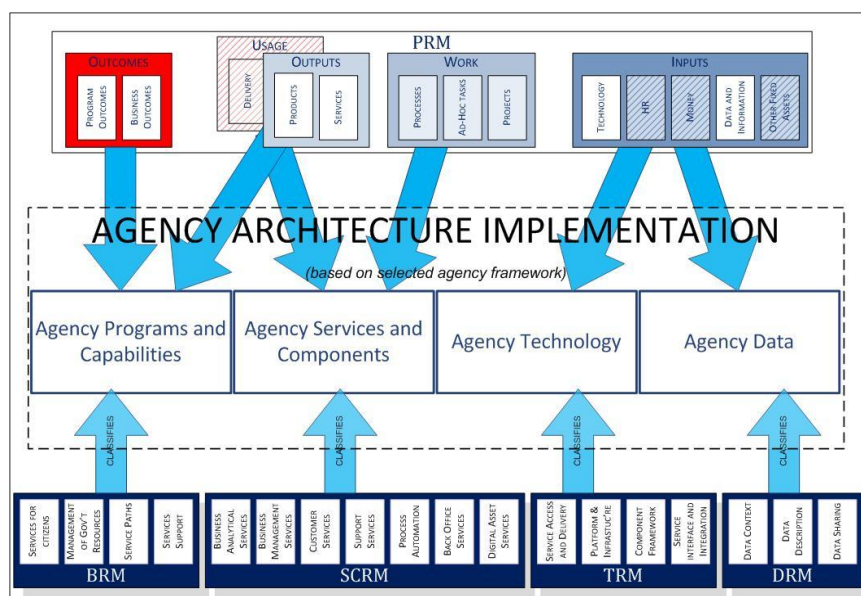
Figure 4-2: Linking the PRM to the AGA Reference Models and Agency Architecture

4.1.3.1 Business Reference Model

The Business Reference Model (BRM) provides a framework that facilitates a whole-of-government functional view of the Australian Government's lines of business (LoBs), independent of the agencies performing them, providing a clear view of what government does.

The BRM is structured into a tiered hierarchy representing the business functions of the Australian Government. Business areas are at the highest level, broken down into lines of business that comprise a collection of business capabilities at the lowest level of functionality in the BRM.

At the agency level, those business capabilities are represented by business services that are enacted through the business processes created by the agency. Business processes are, in turn, delivered and supported by service components that are described in the Service Reference Model.

The BRM outlines the government business required to enable the realisation of government outcomes and business objectives, and links the operation and structure of business to the business processes supported by service components that are described in the Service Reference Model.
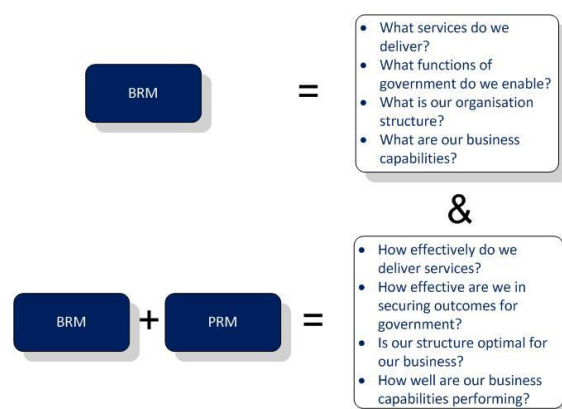
Figure 4-3: Combining the BRM and the PRM

The PRM outcomes measurement domain is intended to support the evaluation (success or failure) of the products and services the government delivers to citizens (program outcomes), and the evaluation of internal government agency operation (business outcomes). While the BRM is not the direct source of outcome sub-

types and outcome themes in the PRM, there is a strong alignment between the two reference models because of their shared relationship with the AGIFT. This strong alignment allows the straightforward coupling of the PRM to the BRM based on the themes of government and the themes of outcomes the government is seeking.

When architectures combine the PRM and the BRM in the definition and documentation of agency business operations, capabilities and functions, they create not only is a picture of what an agency does, but also a map of how well the agency is performing.

4.1.3.2 Service Reference Model

The Service Reference Model (SRM) is a business-driven, functional framework classifying services according to how they support business and their performance objectives. It supports agency ICT investments and asset management activities by facilitating the re-use of business components and services.

The PRM supports the evaluation of new service creation and commission through the conducting of a fit-for-purpose evaluation within the Outputs measurement domain, and through the ongoing evaluation of service performance through efficiency measurements defined within the Operations and Processes segment of the Work measurement domain. The separation of 'fit for purpose' measurement and efficiency-focused measurement set out by the PRM makes it simpler to target measurement based on organisational needs (i.e. performance in the Work domain, conformance in the Output domain).
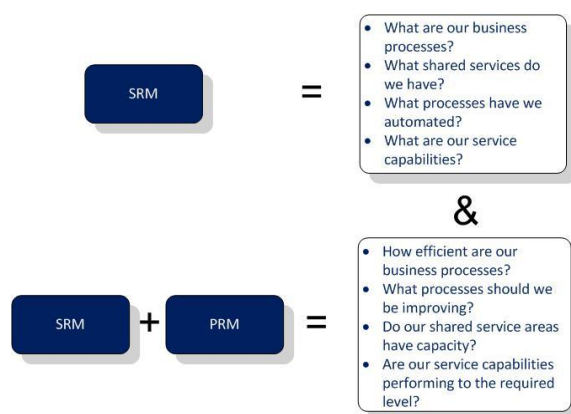
Figure 4-4: Combining the SRM and the PRM

While the SRM will help an agency to define and understand its functional capabilities, incorporation of the PRM allows an agency to determine the performance characteristics (when is it available, how efficient is it, what is the service level agreement?) of those capabilities and target operational improvements to areas where maximum benefit will be obtained.

4.1.3.3 Technical Reference Model

The Technical Reference Model (TRM) is a component-driven technical framework categorising the standards and technologies that support and enable the delivery of services and capabilities within an agency. It provides a foundation to advance the re-use and standardisation of technology and service components from a whole-of-government perspective by forming a catalogue of the component standards implemented in government agencies.
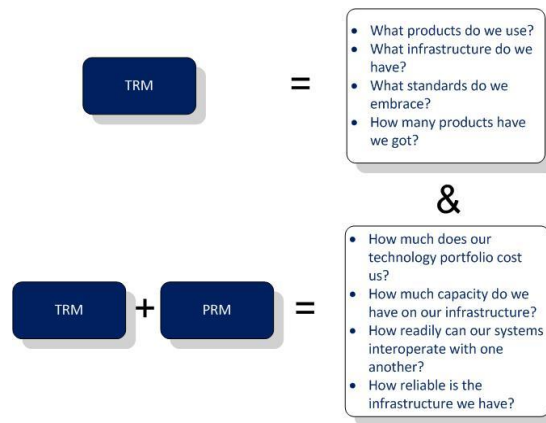
Figure 4-5:   Combining the TRM and the PRM

Technology exists as a domain sub-type of the Inputs measurement domain. Within the sub-type are attribute classifications that are the common measurable characteristics of all variants of technology.

When the PRM and TRM are combined, not only is the 'standard' of technology used by an agency and government captured, but so are its costs, capacity, utilisation, reliability and interoperability, leading to improved strategic investment decisions and more targeted tactical decisions. Combining the TRM and the PRM helps agencies and the Australian Government to benefit from economies of scale by identifying and re-using the best solutions and technologies to support business functions, agency strategies and government outcomes.

4.1.3.4   Data Reference Model

The Data Reference Model (DRM) is a flexible, standards-based framework that enables information sharing and re-use across the Australian Government via the standard description and discovery of common data and the promotion of uniform data management practices. The DRM provides a standard means by which data may be described, categorised and shared.

The PRM considers data to be an input of business, as well as a product of business, so the measurement and evaluation of data are addressed in both the Inputs and Outputs measurement domains. If data is an output of a government activity, such as the publication of the national accounts data, the dataset would be assessed against fit-for-purpose characteristics as defined by the program requirements. As an input to a business initiative, the PRM supports the evaluation of data attributes such as standardisation, quality and relevance.

Combining the DRM and the PRM is a simple process. Where the DRM defines a dataset by specifying its functional characteristics, format, interchange protocol and metadata, the PRM describes the non-functional characteristics of the same dataset, such as continuity, reliability, completeness and accuracy.

39
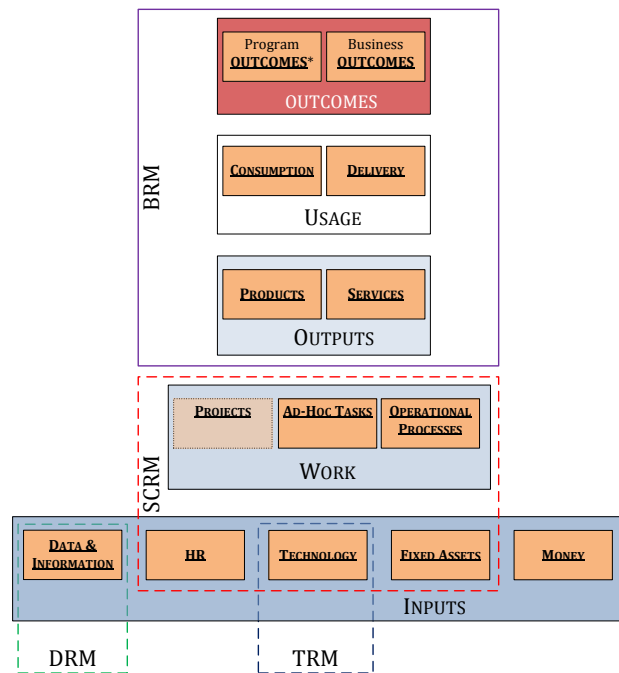
Figure 4-6: PRM coverage of the BRM, SRM, TRM and DRM

4.1.4   Related Models and Frameworks

4.1.4.1   The United States Government Federal Enterprise Architecture Framework

The Australian Government Architecture (AGA) Framework is a localised adaptation of the United States Federal Enterprise Architecture Framework (FEAF). However, where the former reference models (TRM, SCRM, BRM) of the AGA Framework were heavily influenced by the reference models specified by the FEAF, the AGA PRM is significantly different in both structure and function.

The FEAF PRM was designed to operate at the whole-of-government level as an instrument to assist in effective ICT investment decisions. While the AGA Framework PRM is capable of supporting that type of activity, it also operates equally effectively within the agency context, supporting organisational design, project initiation, and internal investment and performance improvement.

While the AGA Framework PRM is based on the US FEAF PRM, there are some significant differences. The intent of the PRM in both architectural contexts is the same: to deliver a line of sight between inputs and outcomes; however, the way in which this is supported and realised is different. The AGA is built around a generic business pattern that is able to be applied flexibly. In other words, the AGA Framework PRM is not as prescriptive as the FEAF PRM.

The AGA PRM also has a stronger business focus than the FEAF PRM. This is reflected in the framework of the AGA Framework PRM, which places equal emphasis on all inputs to government business, not just ICT. It also sets out generic measurement concepts for measuring business processes and supports the measurement of any type of output.

Figure 4-7 shows an abstract Outcome Process Model (OPM) applicable to the transformation of inputs, also known as resources, into the realisation of outcomes. The model represents the most fundamental end-to-end business process. All other higher order business processes, such as grants management processes and service delivery processes, can be identified as instances of this process.
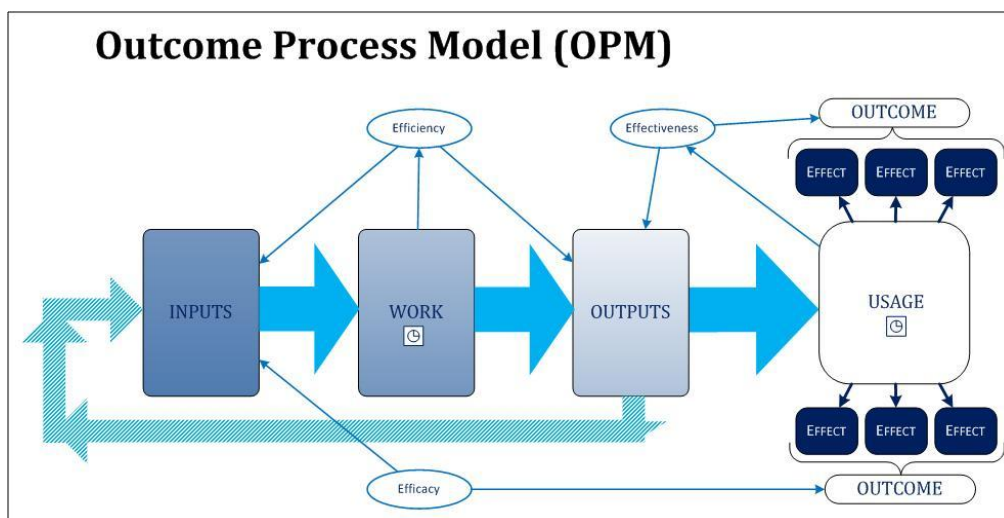
Figure 4-7: The Outcome Process Model

The relationship with the OPM must underpin the PRM if agencies are to define an effective measurement line of sight between inputs and outcomes. The line of sight will then allow agencies to understand the cause-and-effect relationship between their input resources, process performance and outcomes realisation.

OPM	Definition	Examples
Inputs	The resources that a government agency is able to direct towards the attainment of an outcome.	• Financial resources (money) • Staffing resources (people) • Data (information) • Technology resources (ICT) • Other physical resources (assets)
Work	The act of applying labour resources (people and technology) to other supplied resources (money, information, assets and other materials) in accordance with business operational parameters and business processes.	• Project-based business processes • Processes and operations (business as usual) • Ad hoc tasks and activities
Outputs	The direct results arising from the application of physical or technological labour (work) and the supply of resources to business process within a government agency.	• Social services • Infrastructure • Campaigns • Legislation/regulation
Usage	The access to and utilisation of the outputs produced through work, by the intended consumer of an agency/government initiative.	• The consumption, by a targeted demographic, of a service provided by government • Utilisation of public infrastructure, such as a hospital

OPM	Definition	Examples
Effects	The observable, measurable impacts that the usage of outputs has on any state of the world.[10]	• Fewer arrests for drink-driving offences • A decline in concentrations of pollutants found in national waterways
Outcomes	The qualitative, cumulative impacts that can be **inferred** through the observation/measurement of the effects produced as outputs are used. Outcomes cannot be directly measured.	• Greater efficiency in government functions • Reduced environmental impact of heavy industry in Australia • Reduction of long-term unemployment

4.1.4.3   Key concepts of the Outcome Process Model

While the model is robust in its application to the process of transforming inputs into outcomes, it does not include a formal representation of time. Time is an implicit attribute of the model components of work and usage. Work is effort applied over time, and usage is consumption conducted over time.

Determining the efficiency and effectiveness of an initiative is often contingent on the attribute of time. 'Were outputs delivered on time? Was work completed in a timely manner? Were deliveries made on time?' For this reason, efficiency and effectiveness are embedded in the model as attributes of work and usage.

Project management methodologies, such as PMBoK and Prince2, do not make a distinction between project outputs and outcomes and often use the two terms interchangeably. The OPM emphasises the difference between outputs and outcomes, and that separation carries through to the PRM framework. While the PRM is suitable for the effective measurement of 'project' performance, care needs to be taken to ensure that stated project outcomes and outputs are correctly identified within scope statements in order for the model to deliver maximum value.

The three types of 'work' that may be conducted within agencies—ad hoc tasks, projects and operational processes—are not directly represented in this model, as they possess common characteristics and fundamentally achieve the same result: the production of an output. For more information on the handling of work by the PRM, see the detailed *PRM Framework and implementation Guide*.

Demonstrations of the OPM's applicability to business activity planning and operational management are provided in .

4.1.4.4   Department of Finance and Deregulation's 'Outcomes and Programs' Policy

The AGA Framework PRM is designed to support and reinforce the 'Outcomes and Programs' guidance issued by the Department of Finance and Deregulation for the development of agency outcome statements and the formation of effective program key performance indicators (KPIs).

This alignment makes the PRM:

- explicitly applicable to all agencies within federal government, as all agencies have budget outcome statements that can easily be mapped to the PRM

- simpler for agencies to implement, as many measurements will already be established

- a logical choice of measurement framework for agencies.

---

[10] A 'state of the world' is defined as the 'observable reality that surrounds government'.

The PRM is structured in a way that supports existing agency measurement and reporting obligations set out by the Department of Finance and Deregulation's Outcomes and Programs policy (*Figure 4-8*), and extends the traceability of measurement and accountability.
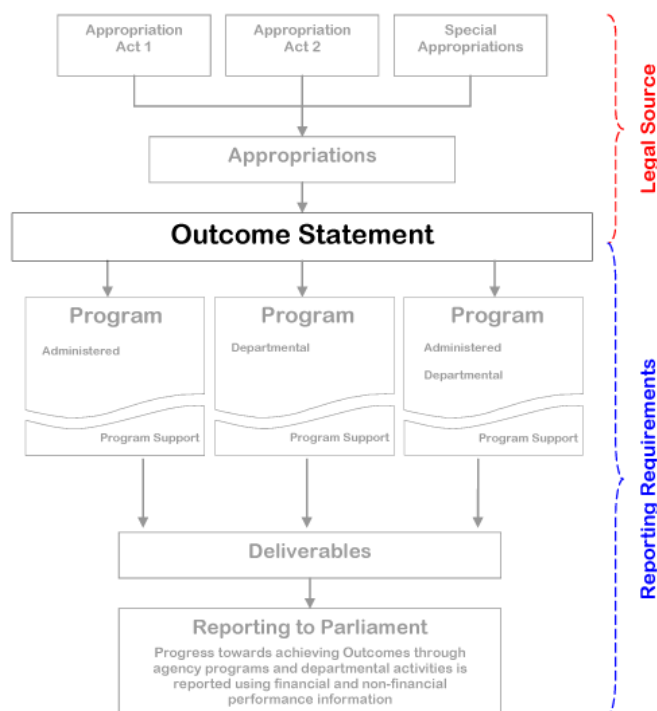
Figure 4-8: The Department of Finance and Deregulation Outcomes and Programs Policy

Under the Outcomes and Programs arrangements, all General Government Sector agencies are required to report to parliament annually on the progress of program implementation or the success of program implementation and outcome realisation.

The intent of the Outcomes and Programs Policy was to introduce program-based reporting that was able to span traditional portfolio and agency boundaries and deliver transparency and accountability for government spending through an increased emphasis on performance management, measurement and reporting.

Outcomes are defined in outcome statements, and they articulate the objectives of government.[11] In the financial operation of the federal government, outcome statements serve three main purposes:

- to explain the purposes for which annual appropriations are approved by the parliament for use by agencies
- to provide a basis for annual budgeting, including financial reporting against the use of appropriated funds and the control thereof
- to measure and assess agency and program non-financial performance in contributing to government policy objectives.

Programs are the logical building blocks of government operation that provide a tangible link between the decisions of government, government activities, the deliverables of government and the observable impacts of those actions and deliverables.

---

[11] Department of Finance and Deregulation, 'Outcomes and Programs Policy', Commonwealth of Australia, 2009.

The PRM and the Outcomes and Programs framework (*Figure 4-9*) align very closely when the PRM is applied at the government program level. The PRM is designed to apply at multiple levels and supports agency and business unit performance reporting.
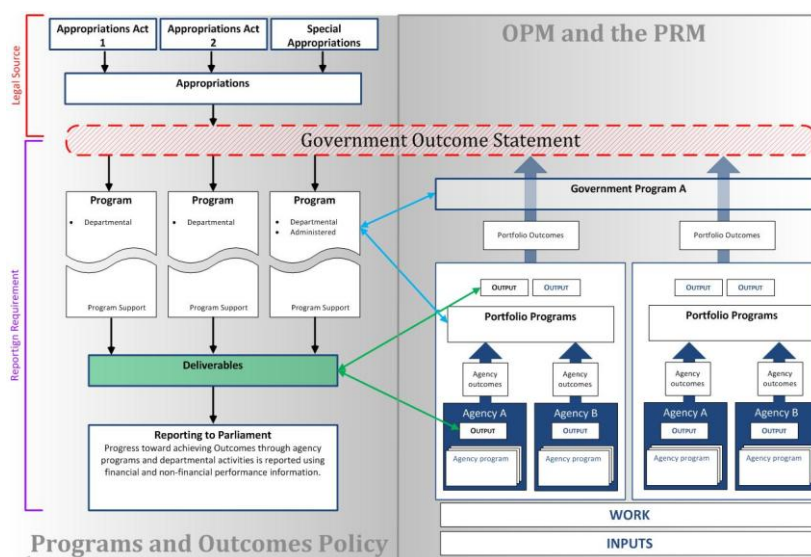
Figure 4-9:   The PRM's alignment with outcomes and programs

The process model that underpins the PRM can be applied at any level of an organisation or program. It can be applied effectively at lower functional levels of government (project, team, branch etc.) to support any initiative (social, financial, environmental), and is able to establish an effective performance measurement and evaluation line of sight extending beyond the program deliverables of government agencies.

In this way, the PRM is able to support not only Outcomes and Programs Policy implementation (*Figure 4-10*), but also more detailed reporting for agency managers.
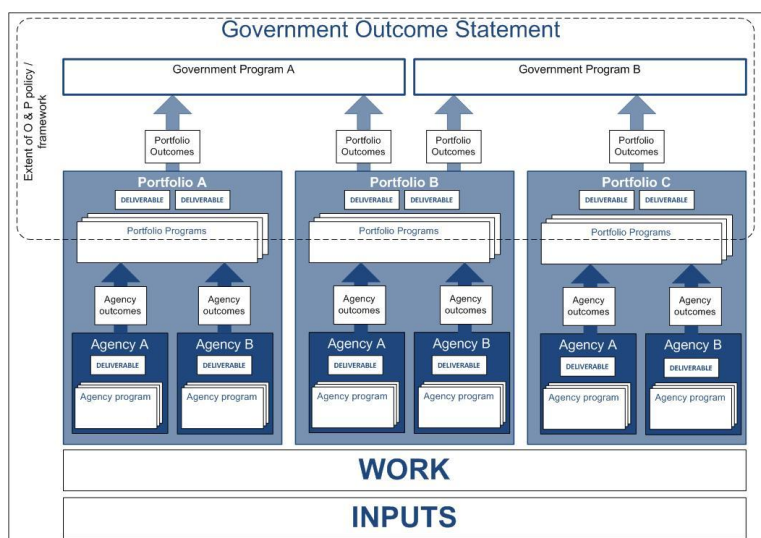
Figure 4-10:   The PRM operating beyond outcomes and programs

4.1.4.5   Other References

Australian Government Information Management Office (2009). *Australian Government Architecture Framework, Version 3.0,* Commonwealth of Australia, Canberra, Australia. http://www.finance.gov.au/e-government/strategy-and-governance/australian-government-architecture.html

Australian National Audit Office. *Better practice guide: Performance management*, Commonwealth of Australia, Canberra, Australia. http://anao.gov.au/Publications/Better-Practice-Guides

Australian National Audit Office (2007). *Better practice guide: Corporate governance*, Commonwealth of Australia, Canberra, Australia. http://anao.gov.au/Publications/Better-Practice-Guides[]

Department of Finance and Deregulation (2009). *Outcomes and Programs Policy*, Commonwealth of Australia.

Eccles RG (1991). 'The performance management manifesto', *Harvard Business Review*, January 1991, Harvard Business School Publishing Corporation, USA.

Federal Enterprise Architecture Program Management Office (2005). *How to use the Performance Reference Model*, United States Government, USA. http://www.cio.gov

Kaplan RS and Norton DP (2005). 'Using the balanced scorecard as a strategic management system', *Harvard Business Review*, Harvard Business School Publishing Corporation, USA.

Kaplan RS and Norton DP (2005). 'Having trouble with your strategy? Then map it', *Harvard Business Review*, Harvard Business School Publishing Corporation, USA.

National Archives of Australia (2005). *Australian Government Interactive Functions Thesaurus (AGIFT)*, 2005, Commonwealth of Australia. http://www.naa.gov.au

PRINCE2 (Projects in controlled environments) website: http://www.prince2.com

Project Management Institute (2009). *Reference guide to the project management body of knowledge (PMBoK)*, 4th edition, Project Management Institute, USA. http://www.pmi.org

Smyrk J (1995). *The ITO Model: a framework for developing and classifying performance indicators*, Australasian Evaluation Society, International Conference, Sydney, Australia.

45

4.1.5 Use by Australian Government Agencies

Direct benefits resulting from the implementation of the PRM are first realised at the agency level. As usage increases throughout government and agency implementations become more mature, indirect benefits are then realised at the whole-of-government level.

The PRM is able to evaluate any form of business process and any form of business output (*Figure 3-6*). It operates effectively at a major government program and portfolio level and at the functional level of an individual team.

It helps define government programs by quantifying government outcomes and promoting the alignment of program outputs and activities. At the same time, it supports the delivery of program outcomes by defining and tracking relevant performance information that is needed for effective evaluation and management.

In the same way, it helps define agency business plans by translating the outcomes demanded by government programs into quantifiable agency-level outcomes and promoting the alignment of agency outputs and activities. The PRM supports the delivery of agency outcomes by defining and tracking the performance information needed for agency-based management and activity evaluation.

4.1.5.1 The PRM as an evaluation tool

The PRM is able to evaluate any form of business process and any form of business output (*Figure 4-11*). It operates effectively at a major government program and portfolio level and at the functional level of an individual team.

It helps define government programs by quantifying government outcomes and promoting the alignment of program outputs and activities. At the same time, it supports the delivery of program outcomes by defining and tracking relevant performance information that is needed for effective evaluation and management.

In the same way, it helps define agency business plans by translating the outcomes demanded by government programs into quantifiable agency-level outcomes and promoting the alignment of agency outputs and activities. The PRM supports the delivery of agency outcomes by defining and tracking the performance information needed for agency-based management and activity evaluation.

This pattern continues down the organisational structure.
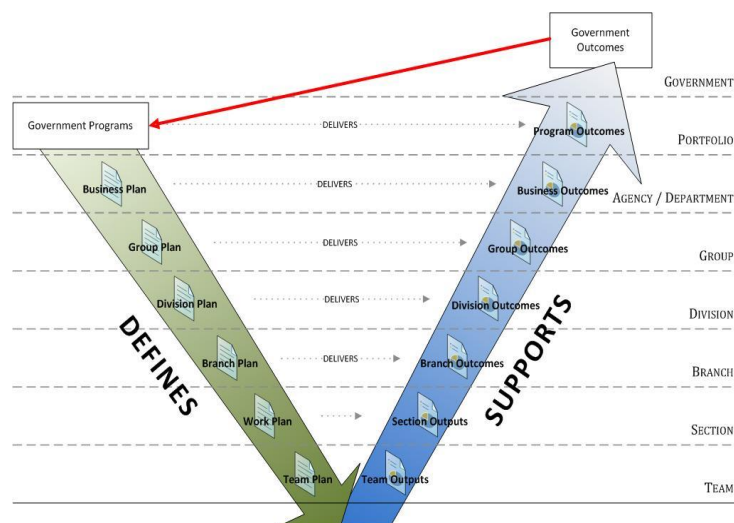
Figure 4-11:   PRM support for cascading planning and execution

The PRM is able to:
- support planning and execution and evaluation of business activities at both a macro and a micro level
- support portfolio, program and project evaluation (P3M3), as well as individual project evaluation
- assist agencies to develop strategic and business plans at the same time as assisting individual sections and teams to define work plans.

The PRM (*Figure 4-12*) also supports non-hierarchical business operation models that have an iterative process leading to outcome realisation, where the outputs of one process are intermediate and are not intended to realise an outcome in their own right.
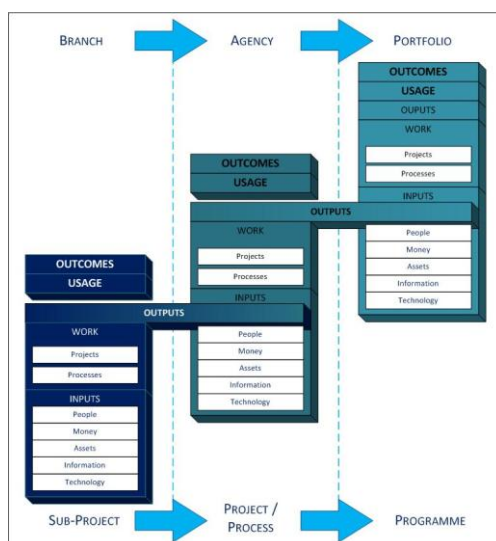
Figure 4-12:   PRM aggregation

In a non-hierarchical business operation model:
- the outputs of lower order work processes are taken as 'value-added' inputs to higher order work processes, along with additional resource inputs
- usage of value-added inputs in higher order work processes represents usage of outputs produced in the lower order work processes
- a portion of overall outcome realisation (benefit) can be attributed to the delivery of outputs at lower levels, and this line of sight can be established, traced and measured.

For example: a project has an ICT system as a deliverable. The delivery of the ICT system in itself will not realise an outcome, but when the ICT system is implemented to support a business process, it gets used and an outcome can be realised.

This flexibility translates into implementation within a government agency in a manner consistent with the operational and strategic needs of the agency.

The PRM supports the operation and improvement of both core and extending business capabilities at any level within any government agency. Some examples of where the PRM can be of particular benefit to an agency include:
- ongoing business process performance improvement
- management of service level agreements
- compliance with customer charter provisions
- employee performance management
- benchmarking and improving ICT performance

- internal investment management
- portfolio, program and project management
- portfolio, program and project management maturity evaluation (P3M3)
- ITIL-based service management processes.

For more information on how the PRM supports and extends these activities, consult the AGA *How to Use Guide*.

4.1.5.2   *Direct Benefits of the Performance Reference Model*

The direct benefits to be realised by an implementing agency include:

Direct Benefit	This is achieved by:
An increased ability to develop accurate cost models for ICT activities, and support for realistic agency ICT budgetary allocations	• Establishing a framework that measures resource utilisation and value (costs) at all levels of agency operation, from the costs of resources consumed by ICT, to the costs attributable to business process execution, to the value of the outputs produced, and finally to the costs associated with promoting and ensuring output use by customers • Transparently demonstrating to business the true cost of ICT operations attributable to the realisation of specific business outcomes.
An increased effectiveness of internal capital investments	• Supporting the development of transparent, objective agency business cases that are based on standardised language and objective measurements, and are able to clearly demonstrate the contribution of the proposal to overall business objectives.
An increased alignment between government outcomes, business initiatives and ICT operations	• Promoting and supporting a planning framework that seeks clear and measurable definition of desired outcomes first, then outputs (deliverables), work (processes), and inputs (resources).
An increased strategic and tactical effectiveness	• Providing decision makers with factual data on agency operations spanning input allocation through to outcome realisation, independent of hierarchical or functional boundaries; and by articulating the cause-and-effect relationship that exists between elements of the business.
An increased efficiency of business operations (management)	• Supporting the definition and gathering of measurement information that can be used to determine performance at all levels of business operation.
An increased transparency in operations and reporting on progress and performance	• Providing a standardised language for measurement and delivering a framework for the definition of objective measurement indicators able to withstand scrutiny (these measurement indicators are quantifiable, contextual and comprehensive and are based on scientific method).

4.1.5.3 Indirect Benefits

The indirect benefits that are cumulatively realised at the whole-of-government level as agency implementations mature include:

Indirect Benefit	This is achieved by:
Support for the Open Government Initiative	• Establishing a culture of transparent, objective measurement of government programs, and implementing a framework that supports the definition and gathering of a comprehensive dataset for government programs that can be shared with third parties.
Increased interoperability across government	• Standardising the language all agencies use to describe their measurement practices, and by establishing a baseline technique for defining measurement indicators that can be readily understood by all other government agencies, the public, and third-party industry and commercial enterprises.
Improved business case development across government and increased value from government investment management	• Facilitating the development of objective business cases based on transparent, factual data in all government agencies, allowing effective comparison between business case proposals and the directing of investment to proposals that represent the greatest value for money for government.
Increased ability to design and deliver efficient and effective programs to support government outcomes, independent of APS portfolio boundaries	• Maintaining a component and function performance repository that allows program designers to plan for and use the most efficient and effective processes and delivery mechanisms.

4.2 Structure

The Performance Reference Model (PRM) has a hierarchical structure (*Figure 4-13*) designed to facilitate the easy identification and understanding of measurements that describe and explain the effectiveness and efficiency of business initiatives.

The PRM is organised using measurement domains, domain sub-types, sub-type attributes, and measurement groupings (variables) at the classification level, and then measurement indicators within the agency implementation.

Unlike traditional taxonomies, in some places the PRM contains duplicate entries with the same definition. This is intentional and results in a more usable framework that provides better support for management tools such as balanced scorecards and strategy maps. Sub-type attributes and domain sub-types can readily be reversed within the hierarchy without altering the intent of the measurement.
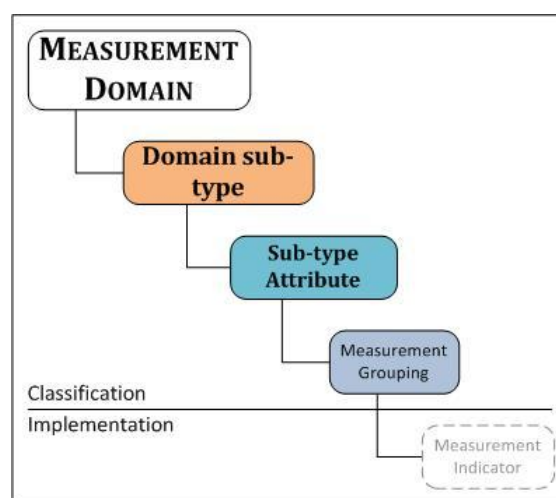
Figure 4-13:   PRM structure

The tiers are:

Level 1	Measurement domains	Measurement domains are the highest level collections in the PRM and correspond to the domains described in the Outcome Process Model.
Level 2	Domain sub-types	Measurement domain sub-types are the second-level organising framework of the PRM and are structured to align with the forms that the measurement domains take. For example, in the Inputs measurement domain, the domain sub-types are types of input, or input types, and include HR, Money, Information etc.
Level 3	Sub-type attributes	Sub-type attributes are collections within each measurement domain sub-type describing the common attributes or characteristics of the sub-type that are able to be measured. For example, HR as an Input resource has the following measurable attributes: Costs, Expertise and Availability.

Level 4	Measurement groupings	Measurement groupings facilitate further refinement of sub-type attributes when there are multiple variables applicable to the attribute. For example, HR as an Input resource has a Cost attribute, but there are multiple variables to HR costs, including remuneration costs, overheads, recruitment costs, training costs and so on. Each variable may need to be captured using multiple measurement indicators, and it is up to the agency to determine whether a sub-grouping is appropriate.
Level 5	Measurement indicators	Measurement indicators are specific, quantifiable measures defined by the implementing agency to suit the measurement purpose and the measurement domain in which it resides. In its guidance to agencies on the development of effective outcome statements, the Department of Finance and Deregulation provides detailed guidance on developing measurement indicators in the Outcomes domain. The underlying themes of that guidance can be applied in other domains of the PRM.

4.2.1　Terminology

A number of terms in the PRM have specific contextual meanings. These definitions have been aligned with the definitions published in the *Australian Government Interactive Functions Thesaurus* (AGIFT) to maintain consistency of language throughout government publications.

Where the meaning of terms could not be determined using the AGIFT, industry-recognised definitions have been applied. These terms and their definitions are presented in the AGA Glossary and should be read before reading the document.

The following terms are used extensively in the PRM Classification Framework, and it is important to fully understand the contextual definitions before attempting to interpret the model:

- *business initiative*: any block of work that an agency has committed to undertaking
- *multivariate attributes*: attributes that are measured by a second or higher order measurement indicator that requires comparison between two or more first order measurement indicators
- *univariate attributes*: attributes that are able to be measured by a single first order measurement indicator.

4.3 Outcomes Domain

The Outcomes domain (*Figure 4-14*) differs from the other measurement domains in that the division and identification of types of outcomes can be structured in many different ways. The structure that has been defined is intended to facilitate alignment of agency activities with the Australian Government's Outcomes and Programs Policy, and breaks outcomes into program outcomes and business outcomes.

Measurement indicators defined within the Outcomes domain measure the effects attributable to the delivery of a business initiative, not the outcome itself, which is inferred from the observed effects. By combining and weighting the observed effects according to an algorithm, the outcome is qualitatively evaluated.

1 OUTCOMES

11 Program Outcomes

1101 Business support	1114 Indigenous affairs
1102 Civic infrastructure	1115 International relations
1103 Communications	1116 Justice
1104 Community services	1117 Maritime services
1105 Cultural affairs	1118 Natural resources
1106 Defence	1119 Primary industries
1107 Economic management	1120 Science
1108 Education and training	1121 Security
1109 Employment	1122 Sport and recreation
1110 Environment	1123 Statistical services
1111 Governance	1124 Tourism
1112 Health care	1125 Trade
1113 Immigration	1126 Transport

12 Business Outcomes

1201 Business Management	1205 HR management
1202 Communications Management	1206 ICT management
1203 Facilities Management	1207 Information and knowledge management
1204 Financial management	1208 Security management

Figure 4-14:   Outcomes domain

The program outcomes sub-type is structured around the themes of the *Australian Government Interactive Functions Thesaurus* (AGIFT), which describes the functions of government independent of agency structures. This is intended to classify the outcomes sought through business initiatives in a way that clearly illustrates the alignment between agency initiative and government initiative and the contribution of business outcome to government outcome.

The business outcomes sub-type is structured around the common themes of organisational function—the things that every agency does in order to operate.

4.3.1 Program outcomes

The following outcome themes (*Figure 4-15*) are derived from the functional themes of government set out in the AGIFT.

11 Program Outcomes	
1101 Business support	1114 Indigenous affairs
1102 Civic infrastructure	1115 International relations
1103 Communications	1116 Justice
1104 Community services	1117 Maritime services
1105 Cultural affairs	1118 Natural resources
1106 Defence	1119 Primary industries
1107 Economic management	1120 Science
1108 Education and training	1121 Security
1109 Employment	1122 Sport and recreation
1110 Environment	1123 Statistical services
1111 Governance	1124 Tourism
1112 Health care	1125 Trade
1113 Immigration	1126 Transport

Figure 4-15:   Program outcomes measurement branch

Subtype	Measures of effects that indicate successful outcome realisation in the areas of:
[1101] Business support	- supporting the private sector, including small business and non-profit organisations - assisting business growth and management - business advocacy programs - funding and administration of business regulatory bodies.
[1102] Civic infrastructure	- supporting the growth of towns and cities - managing urban development and maintaining essential services - installing buildings and services to meet the administrative, social and recreational needs of local residents.
[1103] Communications	- growth and management of industries that facilitate the transmission of information - postal and telecommunication services - standards for information management, information dissemination and information technology.
[1104] Community services	- assistance to citizens - welfare services and financial support - disaster and emergency assistance programs.
[1105] Cultural affairs	- support for arts and cultural organisations such as museums, libraries and galleries - management of cultural collections and artefacts - stimulation of growth in cultural industries - sponsorship for activities and events that celebrate the diversity of Australian culture.
[1106] Defence	- the safety of Australia - building, maintaining and deploying military resources - the defence of the nation, region and allies.

53

Subtype	Measures of effects that indicate successful outcome realisation in the areas of:
[1107] Economic management	- administration of public funds and other resources - raising revenue and regulating expenditure - monitoring economic indicators and forecasting trends - government financial planning.
[1108] Education and training	- providing skills and knowledge to Australian citizens - education availability to the community - funding provided to schools, universities, colleges, academies or community groups that provide education and training - programs that develop and manage educational institutions.
[1109] Employment	- employment growth and regulation of public and private sector working environments - workplace relations, productivity and performance - labour market programs - workplace regulatory bodies and arbitration services.
[1110] Environment	- management of natural and built environments - long-term sustainable benefits for industry, tourism and the community - protection of natural and built environments of special significance.
[1111] Governance	- executing legislative processes in houses of parliament, assemblies or councils - committees that report to legislative bodies - elections of government representatives and sponsorship of major community celebrations - machinery of government processes at all levels of government.
[1112] Health care	- prevention, diagnosis and treatment of disease or injury - provision of health care services and medical research - regulatory schemes for health care products and pharmaceuticals.
[1113] Immigration	- people wishing to enter Australia on a permanent or temporary basis - enforcing entry and deportation requirements for migrants and visitors - management of illegal immigrants.
[1114] Indigenous affairs	- the advancement of the Aboriginal and Torres Strait Islander people - delivery of services to Aboriginal and Torres Strait Islander people - protection of areas associated with Aboriginal and Torres Strait Islander culture.
[1115] International relations	- relationships with other countries and international organisations - protection and advancement of national interests - international security, economic development, the environment, democratic principles and human rights.
[1116] Justice	- legislation, regulations and by-laws - regulation of the conduct of individuals, business and government - operation of the justice system.
[1117] Maritime services	- seaborne transport - passage of sea transport and maritime jurisdiction - maritime infrastructure - safety of seagoing vessels, pilots and personnel - marine search and rescue - navigational assistance and infrastructure.

Subtype	Measures of effects that indicate successful outcome realisation in the areas of:
[1118] Natural resources	- sustainable use and management of energy, mineral, land and water supplies - resource consumption and exploitation practices - regulating and supporting industries that realise the economic potential of resources.
[1119] Primary industries	- support for and regulation of rural and marine industries - efficient and sustainable primary industry operations - administration of compliance programs relating to national and international standards.
[1120] Science	- support for research and systematic studies - administration of scientific bodies - monitoring industry research and development programs - research into living things and their environments, natural laws and the application of knowledge to practical problems.
[1121] Security	- maintaining the safety of Australia at all levels of society - developing policy and programs to guard against internal or external threats to peace and stability - funding for law enforcement, community protection and corrective services - intelligence gathering and international security activities.
[1122] Sport and recreation	- developing policy and programs to encourage community participation in organised games or leisure activities - implementing promotional strategies, providing funding and administering regulatory bodies.
[1123] Statistical services	- statistical collection, compilation, analysis and dissemination - statistical methodology and standards development - statistics coordination across government.
[1124] Tourism	- encouraging recreational visitors to a region - supporting and regulating the tourism industry - tourism development and cross-jurisdictional project coordination - tourism promotional campaigns.
[1125] Trade	- purchase, sale and exchange of commodities - balance of trade, industry protection and subsidy schemes - trade agreements.
[1126] Transport	- road, rail and air transportation systems and regulation - people and freight movement - vehicle safety - transport infrastructure.

4.3.2   Business outcomes

Business outcomes (*Figure 4-16*) are outcomes that are the targets of government agencies in their management and operation of the inputs to business (people, technology, assets, money etc.). Business outcomes could take the form of:

- increased transparency in financial management practices within an agency
- increased level of P3M3 maturity and compliance
- reduced employee absenteeism
- reduced operational overheads for facilities management.

The structure of the business outcomes measurement domain sub-type, below the broad-level themes of business operation, will be determined by individual agencies and the initiatives they define to maintain and improve their performance in those areas of operation.

12 Business Outcomes	
1201 Business management	1205 HR management
1202 Communications management	1206 ICT management
1203 Facilities management	1207 Information & knowledge management
1204 Financial management	1208 Security management
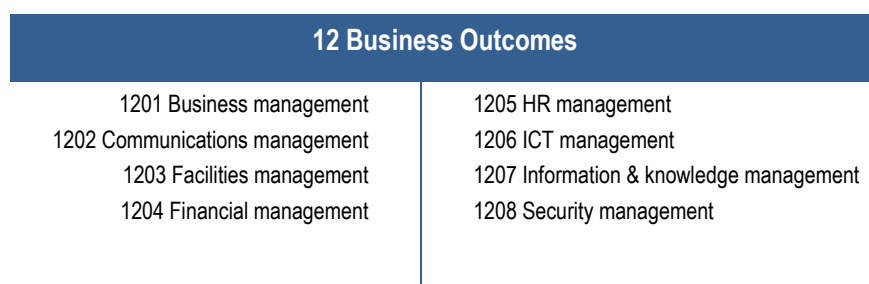
Figure 4-16:   Business outcomes measurement branch

Measurement Area	Measures of effects that indicate successful outcome realisation in the areas of:
[1201] Business management	- portfolio, program and project management - governance - program administration - strategic planning - business planning - capability planning - business continuity - legal services.
[1202] Communications management	- media relations - government correspondence - internal communications - reporting - event management - publications.
[1203] Facilities management	- building and installation management - fleet management - non-ICT infrastructure management.

Measurement Area	Measures of effects that indicate successful outcome realisation in the areas of:
[1204] Financial management	- departmental funding - departmental investment management - employee remuneration agreements - budget management - procurement.
[1205] HR management	- recruitment and termination - performance management - leave - workforce planning - training and development - workplace consultation - OH&S - payroll services - employee support and assistance.
[1206] ICT management	- ICT software initiatives (including operational and developmental) - ICT hardware initiatives (including operational and developmental) - ICT infrastructure initiatives (including operational and developmental) - ICT support initiatives - ICT capabilities initiatives - ICT service delivery initiatives.
[1207] Information and knowledge management	- library services - information sharing and collaboration - information management.
[1208] Security management	- physical security - ICT security - information security.

57

4.4 Usage domain

Usage is the mechanism by which the outputs produced by a business initiative realise the outcomes of the initiative. Without some form of usage by a customer, the outputs of government programs, projects and processes will be unable to realise any form of benefit for an agency.

Some projects and processes are quite large and produce intermediate outputs that are consumed in the delivery of a much larger output. While the intermediate outputs have value, they are not measured within the Usage domain because they are not intended to realise an outcome in their own right. Only those outputs that are intended to directly contribute to the realisation of an outcome are measured within the Usage domain.

```
                          ┌───────────────────────────┐
                          │        2 USAGE            │
                          └───────────────────────────┘
                   ┌────────────────────┴────────────────────┐
        ┌──────────────────────┐              ┌──────────────────────┐
        │ 21 Product consumption│              │  22 Service delivery  │
        └──────────────────────┘              └──────────────────────┘
```

21 Product consumption	22 Service delivery
2101 Timeliness (product)	2201 Availability (service)
A - delivery	A – Service capacity
2102 Accessibility (product)	B – Service utilisation
A – Access cost	C – Service demand
B – Access time	2202 Coverage (service)
C – Access effort	A – Demographic
2103 Consumption (product)	B – Geographic
A – Cost	C - Temporal
B – Supply	2203 Effectiveness (service)
C - Demand	A – Customer impact
2104 Coverage (product)	B – Customer satisfaction
A - Geographic	C – Service quality
2105 Effectiveness (product)	2204 Accessibility (service)
A – Customer impact	A – Access cost
B – customer satisfaction	B – Access time
C – Product quality	C – Access effort
	2205 Timeliness and responsiveness (service)
	A – Inquiries and requests
	B - Delivery

Figure 4-17:   Usage domain

The requirements that specify the composition and function of the outputs of a project, process or program may include specifications of performance-related characteristics for the output, known as 'non-functional requirements'. While those requirements can be partially measured as an attribute of the output within the Outputs domain, it is only by measuring the actual performance of the output within the Usage domain that a requirement can be assessed as being met or not. Furthermore, any requirements that have a dimension of operation and time, such as hours of availability for a service, can only be measured within the Usage domain.

Some forms of usage, which may or may not be measurable, are:

- the one-off consumption of a product
- the sustained usage of infrastructure
- the accessing of a service or information
- acknowledgment of an accomplishment (binary state in the customer)
- adjustment of behaviour.

4.4.1   Product consumption

21 Product consumption

2101 Timeliness (product)	2104 Coverage (product)
A - Delivery	A - Geographic
2102 Accessibility (product)	2105 Effectiveness (product)
A – Access cost	A – Customer impact
B – Access time	B – Customer satisfaction
C – Access effort	C – Product quality
2103 Consumption (product)	
A – Cost	
B – Supply	
C - Demand	

Figure 4-18:   Product consumption measurement branch

Many of these attribute measurements will affirm or validate the operational (non-functional) fitness for purpose requirements of the outputs produced by agencies.

Measurement Area	Rationale	Defined by
[2101] Timeliness (product)	The timeliness attribute of a product is determined by how long it takes to deliver the product. Inquiries made by customers about a product are addressed by utilisation of a delivered service (such as a hotline).	A. Deliveries Quantitative measures of how much time elapses between the placing of an order for a product and the delivery of that product to a consumer.
[2102] Accessibility (product)	Product accessibility is a multivariate attribute combining the cost, effort and time expended by a customer in identifying and procuring a product. The accessibility of a product is a key determinant of its consumption. Products with low levels of accessibility will experience either low levels of consumption or high levels of customer dissatisfaction, while those with high accessibility are more likely to experience the opposite.	A. Access cost Quantitative measures that capture how much financial resource (money) has been expended by a customer in procuring a product. For example, did a user have to pay for a taxi fare in order to purchase the product? B. Access effort Quantitative measures that describe the amount of effort that was expended by a customer in procuring a product. For example, how many sales outlets (shopfronts) did the customer have to visit in order to be supplied with the product? C. Access time Quantitative measures of how much time a customer expended in procuring the product. This measurement is always from the customer's point of view, and the measurement commences from the moment the customer identifies the need or desire for a product, even if they are unaware of the specific product they seek.

59

[2103] Consumption (product)	The volume of product consumed is a key determinant in the realisation of an outcome. Products produced by government must be consumed by customers of government if the outcomes of government are to be realised. If a product is being produced and not consumed or accessed, either the product is not needed in order for the outcome to be realised (surplus to requirement), is unsuitable for consumption (not fit for purpose) or is not adequate to realise the outcome (ineffective). Understanding the significance of product consumption in outcome realisation requires knowledge of the product cost, the volume consumed by customers, the supply of product available, and the demand for the product.	A. Product cost Quantitative measures of how much a product costs in the marketplace. This measurement should correspond to the market value measurement of the output. B. Volume Quantitative measures of the quantity of product consumed by customers. C. Supply Quantitative measures of the total volume of product available to customers. This should be identical to the volume of outputs produced through work. D. Demand Quantitative measures of the known or forecast, but unpresented, demand for a product.
[2104] Availability (product)	The availability attribute of a product output refers to its spatial and temporal availability for customers to procure. The spatial and temporal availability of a product will be a determinant of the volume of product consumed by customers and, ultimately, of the realisation of outcomes.	A. Geographic Qualitative measurements that describe the geographic extent of product availability (points of product sale, extent of product delivery networks). For example, is a product available in metropolitan areas only, or Australia-wide? B. Temporal Qualitative measures that describe the designated times that a product is made available to consumers (for example, 'standard business hours'; '5 days a week'; 'Quarter 1 2010' etc.).
[2105] Effectiveness (product)	Product effectiveness is a qualitative measurement dependent upon multiple qualitative variables. Its determination relies on the custom definition of a series of higher order measurement indicators that are able to relate realised outcomes to the outputs produced and delivered by an initiative, in terms of impact, satisfaction and quality.	A. Customer impact Qualitative measures of the impact of the product on the customer. B. Customer satisfaction Qualitative measures of how satisfied the targeted customer is with the product that has been produced. C. Product quality Qualitative measures of the quality associated with a produced product.

4.4.2   Service delivery

Figure 4-19: *Service delivery measurement branch*

Measurement Area	Rationale	Defined by
2201 Availability (service)	The availability of a service is a function of supply and demand. What capacity of processing is supplied by the service, and how much of that capacity is currently utilised (demand)? The values and definitions of *service* availability measurements within the *Usage* domain should correspond to those of *process* availability measurements within the *Work* domain, especially for complex or nested projects and processes, where outputs produced by one process become inputs to another process.	A. Supply (capacity) Quantitative measures of the maximum levels of utilisation that can be sustained and met by a service. Measures would include peak or burst capacity and sustained load capacity. B. Demand (utilisation) Quantitative measures of the current volume of service utilisation. C. Forecast demand Quantitative measures or predictions of the known or anticipated, but unrealised, demand for a service.
2202 Coverage (service)	Coverage of service usage is a multivariate attribute that describes when, where, how and to whom a service was made available for access. The intended (expected) coverage of a service is normally defined by the fit-for-purpose characteristics of the service when it was first commissioned. Measuring the coverage of a service within the Usage domain is a measurement of the actual (as opposed to expected) coverage of the service.	A. Demographic Qualitative measures of the proportion of a target population covered by the service points of presence. B. Geographic Qualitative measures of the geographic area covered by service points of presence. C. Temporal Qualitative measures of the hours of availability and validity of a service.

Measurement Area	Rationale	Defined by
2203 Quality (service)	The service quality attribute is a univariate measurement that is framed by the context of the service. Quality is a subjective metric based on the experiences and expectations of the customer in accessing the services delivered. For services delivered by government that are intended to benefit individual entities, customer satisfaction is the appropriate measure. If the service is intended to influence the actions of the customer and benefit the government, customer impact is the appropriate measure. The quality of a service is linked to the accessibility of the service and the utilisation of the service.	A. Customer satisfaction Qualitative measurements that describe how satisfied the targeted customer is with the product that has been produced. As this is a qualitative measurement, some form of customer survey will need to be developed to ascertain it. B. Customer impact Qualitative measurements that describe the impact of the service on the targeted customer. As this is a qualitative measure, a customer survey will need to be developed in order to capture it.
2204 Accessibility	Service accessibility is an industry-recognised multivariate attribute combining the cost, effort and time expended by a customer in identifying and accessing a service. The accessibility of a service is a key determinant of its utilisation. Services with low levels of accessibility will experience either low levels of usage or high levels of customer dissatisfaction, while those with high accessibility are more likely to experience the opposite.	A. Access cost Quantitative measurements that capture how much financial resource (money) has been expended by a customer in accessing a service. For example, did a user have to pay for a taxi fare in order to access a service? B. Access effort Quantitative measurements that describe the amount of effort that was expended by a customer in accessing a service. For example, if the service is an electronic service delivered via a website, how many times did the user have to try to access the web age (page refresh etc.)? C. Access time Quantitative measurements that capture how much time a customer expended in accessing a service. This measurement is always from the customer's point of view, and the measurement commences from the moment the customer identifies the need for assistance, even if they are unaware of the service they need.

62

Measurement Area	Rationale	Defined by
2205 Timeliness and responsiveness	The timeliness and responsiveness of a service is linked to the accessibility of the service and, through that accessibility, to utilisation of the service and the realisation of outcomes.	A. Inquiries and requests Quantitative measurements of how much time elapses between an inquiry or request being lodged with a service and the response of the service to the customer. B. Delivery Quantitative measurements of how much time elapses in the delivery of a service to a customer.

4.5 Outputs domain

Outputs of processes and activities can take one of two forms: a new artefact or an altered artefact. An artefact is any physical or virtual entity that is created or sustained as the result of processes and activities being executed within an agency. The outputs of work are intended to be made available for consumption and utilisation by targeted customers, constituents, citizens or consumers. Outputs are the interfaces and mechanisms through which the government provides services for citizens.

Examples of outputs include:

- a publication
- a piece of infrastructure
- a service
- a payment
- a plan.

An *alterant* is the output of a process or activity that changes the state of an existing product (physical or virtual). The key identifier of an alterant as an output is the existence of the object or service before the process takes place, and it is somehow changed as a result of the process.

Outputs that are alterants include, but are not limited to:

- improved user understanding
- improved financial management procedures
- improved service.

Outputs can be delivered at various times throughout the undertaking of work, and need not be used directly by customers, citizens etc. Some outputs produced by processes, activities or projects are fed into other work processes, known as intermediate outputs, which then create a more valuable output that is made available for use or consumption by the targeted constituency.

Measurement of intermediate outputs is necessary if a complete line of sight is to be established and maintained.

A service, when first established by a project, is an output. Once the project is complete, the service is operational and its sustainment is transitioned into business-as-usual (BAU) work. Once the service has been transitioned into BAU work, it produces outputs of its own.
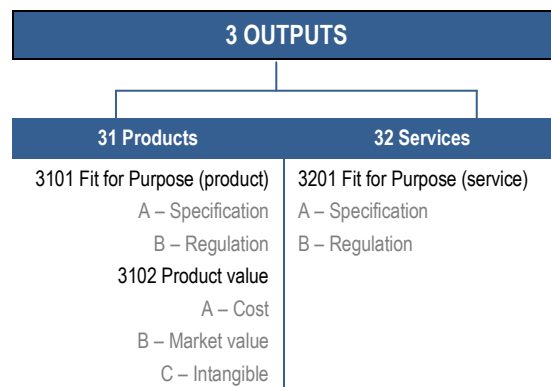
Figure 4-20:   Outputs Domain

The outputs of government operations are the linkage between internal government functions and the delivery of government programs, ultimately resulting in the realisation of government policy outcomes. In order to ensure that government programs are successes and policy outcomes are realised, it is essential to have outputs that are fit for purpose.

In addition to program-defined requirements, some of the outputs produced and delivered by government are subject to safety regulations, operational standards, security legislation and other forms of regulation. Those additional requirements must also be assessed as part of determining the fitness for purpose of an output.

If a government program fails to realise intended outcomes, it is possible that the outputs delivered by government programs were not suitable as the program delivery mechanism (that is, the outputs were not fit for purpose).

65

4.5.1 Products

Products are physical or digital artefacts that can be observed and possess attributes that can be measured.

31 Products	
3101 Fit for Purpose (product)	3102 Product value
A – Specification	A – Cost
B – Regulation	B – Market value
	C – Intangible

Figure 4-21: Products Output Measurement Branch

Measurement Area	Rationale	Defined by
[3101] Fit for purpose (products)		**A. Specification** Qualitative measurement of the delivered product against specifications of the planned product as defined by requirements of the business initiative. These may take the form of: • user requirements (ICT systems) • technical design schematics (roadways, bridges etc.) • eligibility and assessment criteria (government legislation) • procedural instructions (law enforcement). **B. Regulation** Qualitative measures that describe the fit-for-purpose specifications of an output that are prescribed by legislation and regulatory frameworks.

Measurement Area	Rationale	Defined by
[3102] Value (products)	Products possess two attributes of value: financial (cash) value and intangible (intrinsic) value. The financial value of a product includes book value and market value. The book value of a product is how much it cost to produce and is calculated as the sum value of the input resources consumed in production plus the value of the labour required. Market value is how much a product is worth on the open market. Intangible value is a representational value of the contribution a product makes to realising or maintaining intangible outcomes, such as reputation, trust, recognition and so on. The value of outputs produced is an essential measurement used in assessing agency efficiency and effectiveness.	**A. Cost** Quantitative measures that record the financial cost to the consumer for purchase of the product. Useful information derived from this indicator includes product cost variance across geographic zones within Australia. **B. Value** Quantitative measures of the financial value of an output produced. Measurements against this variable would include: • book value—what something cost to make • market value—what something is worth on the market. • contributory value—the apportioned value of the product in realising an outcome. **C. Intangible** Qualitative measures of the non-financial value associated with the contribution of an output towards the realisation of an outcome. Intangible values include qualitative measures of: • brand recognition • agency reputation • social benefit.

4.5.2   Services

Services are classified as outputs only when they are first established by a project. This measurement branch should not be used to measure the operation of a service. Services are measured as operational processes that deliver an output of their own. When a service is commissioned (that is, when it is an output), it has only fit-for-purpose attributes.

```
┌─────────────────────────────────────────────┐
│              32 Services                     │
└─────────────────────────────────────────────┘
                  │
3201 Fit for Purpose (service) ──────┘
A – Specification
B – Regulation
```
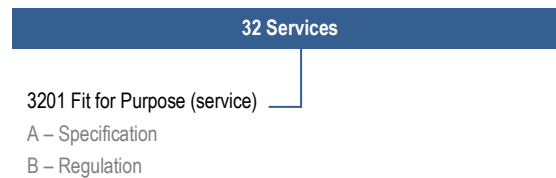
Figure 4-22:   Services Output Measurement Branch

Measurement Area	Rationale	Defined by
[3201] Fit for purpose (services)	Services as outputs have a fit-for-purpose attribute, which is multivariate. Like products, services must meet the business requirements against which they are being established as well as any legislative requirements that may be applicable. **4.1.1**	**A. Specification** Qualitative measures of the service for compliance with business initiative requirements and specifications. These are typically non-functional requirements that do not have a time lapse dimension to them, such as: • service points of presence • service delivery medium • service telephony provisions. **B. Regulation** Qualitative measurement of the service for compliance with requirements prescribed in applicable regulatory frameworks, legislative provisions and operational rulings, such as: • OH&S regulations • construction guidelines • rules of engagement.

4.6 Work domain

'Work' is the general term applied to the business processes and activities executed within government agencies. Work is the conversion of input resources into outputs via processes. There are only three different types of work:

- *Ad hoc tasks* have a typically short duration period and largely informal control structures. They can occur as a one-time activity or on a regular basis and may have the ability to change an organisation, but that is undesirable for the organisation.
- *Operations and business as usual (BAU)* are often referred to as processes and may have a short or long duration. They have highly formalised control structures (rules and governance), are highly repetitive and are designed specifically to not realise change.
- *Projects* have a long duration, are intended to realise change (achieve an outcome), have highly formalised control structures (governance), and by definition are executed only once.
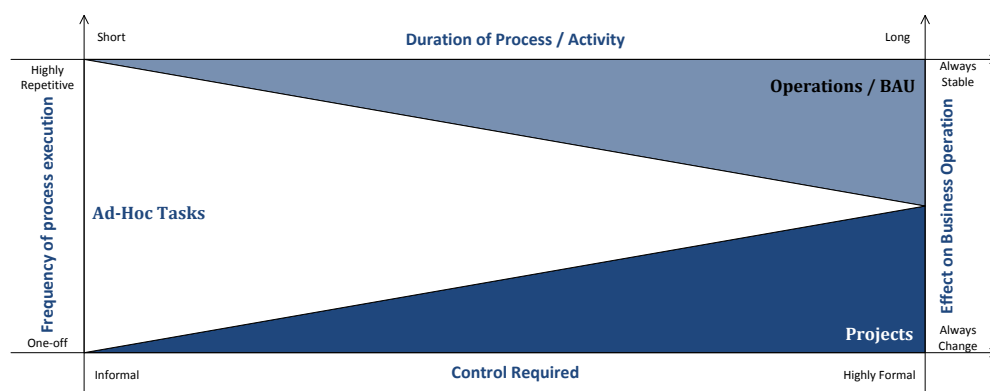
Figure 4-23:   Forms of Work

Projects can never become operational processes. Projects may develop new operational processes that are commissioned and executed by business, but this represents the establishment of a new process, not a continuation of the project.

Projects may also be established in order to define a new service. When associated with the project and its execution, the service is an output. However, once the service is operational it produces outputs of its own, and the sustainment of the service is considered to be work.

Work accommodates processes executed both by people (manual labour) and by ICT systems (technology labour). ICT systems and the work they do are most commonly associated with operational and BAU processes (routine transaction processing).

4 WORK

41 Projects	42 Ad-hoc tasks	43 Processes and operations (BAU)	
4101 Project (efficiency)	4201 Task efficiency	4301 Process efficiency	4304 Process complexity
A – Resource consumption	A – Resource consumption	A – Resource consumption	A – Coverage
B – Time consumption	B – Time consumption	B – Time consumption	B – Specification
4102 Project control	4202 Task safety	C – Cycle time	C – Usability
A – Accountability	A – Risk	D – Volume	4305 Process adaptability
B – Auditability	4203 Task complexity	4302 Process control	A – Flexibility
C – Compliance	A – Coverage	A – Accountability	B – Re-usability
4103 Project adaptability	B – Usability	B – Auditability	C – Standardisation
A – Flexibility		C – Compliance	4306 Process maturity
4104 Complexity		4303 Process availability	A – Standard
A – Coverage		A – Capacity	4307 Process safety
B – Specification		B – Utilisation	A – Risk
C – Usability		C - Responsiveness	4308 Process reliability
4105 Project safety			A – Stability
A - Risk			B – Consistency
			C - Accuracy

Figure 4-24:   Work domain

We measure 'work' so we can assess the efficiency and effectiveness of a business initiative in realising outcomes for an agency or the government, and establish the performance relationships that exist between inputs and outputs.

4.6.1 Projects

41 Projects

4101 Project (efficiency)	4103 Project adaptability
A – Resource consumption	A – Flexibility
B – Time consumption	4104 Complexity
4102 Project control	A – Coverage
A – Accountability	B – Specification
B – Auditability	C – Usability
C – Compliance	4105 Project safety
	A - Risk
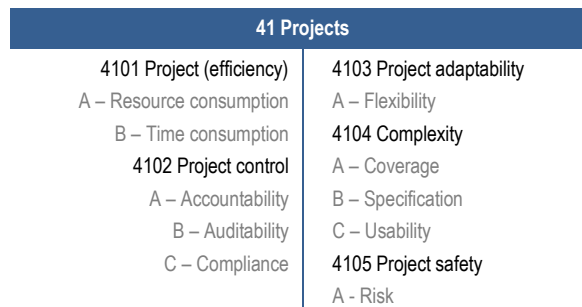
Figure 4-25:   Projects Measurement Branch

In adhering to endorsed project management methodologies, performance indicators for projects should be defined when projects are planned, and measurements should be taken at regular intervals throughout project execution. Because of the novel nature of projects, most of the measurement indicators defined for a project are likely to be unique to that project and not suitable for re-use. However, projects can generically be measured for adherence to planned budget and for earned value over time being within stated tolerance parameters (for example, budget +/– 2% of plan).

The attributes for project measurement described here are those characteristics of projects that are common regardless of the purpose of the project or the agency undertaking the project. These attributes are not intended to be an exhaustive list of all possible measurement attributes for a project. Some project management methodologies (such as PMBoK) prescribe performance measurements for measuring project process efficiency and effectiveness.

Measurement Area	Rationale	Defined by
[4101] Project Efficiency	When applied to projects, efficiency is a measure of how efficiently a project is consuming its allocated resources in delivering the outputs of the project (expressed in a different way, how much value a project is earning per unit of resource invested).	**A. Resource consumption** Quantitative measures of the volume of resources that are consumed in the execution of a business process or activity. Resources include financial resources (money), material resources (fuel, electricity etc.) and labour. **B. Time consumption** Quantitative measures of the time taken to execute a business process or activity that is non-repetitive (i.e. non-BAU). The measurement grouping contains indicators for non-repetitive business processes and activities only, such as those involved in the delivery of projects, research activities and innovation. **C. Earned value** Quantitative measures of how much resource (time and money) has been expended by an agency in achieving the milestones of a project.
[4102] Project Control	The level of control applied to a project is a determining factor in the efficiency and effectiveness of the project in delivering its required outputs in accordance with defined scope statements.	**A. Accountability** Qualitative measures derived from an agency-defined scale that corresponds to agency accountability frameworks and operational needs. **B. Auditability** Qualitative measures of how easily a project may be audited. This is directly proportional to the quality of project documentation and project management processes. **C. Compliance** Qualitative measures of how well project governance requirements as set out by agency PMOs are being met by a project.
[4103] Project Adaptability	Qualitative measures of the agility a project possesses. Agility is inferred through a subjective assessment of the governance framework that controls a project in the context of the organisation.	

Measurement Area	Rationale	Defined by
[4104] Project Complexity	Measurement of the complexity of a project is a necessary step in the assessment of the *internal* risk that is associated with the project. It is through that assessment process that measurement of complexity helps to inform project investment decisions.	**A. Coverage (project)** Qualitative measures that describe the scope coverage of a project in relation to the overall government program. This is important when assessing project complexity and risk. Segmented government programs (multiple projects) carry increased exposure to the risk of project outputs being ineffective in realising intended outcomes. **B. Specialisation (project)** Qualitative measures that describe the levels of non-generic skills and qualifications that will be required in order for a project to be completed in conformance with applicable regulation and legislation and to satisfactory levels.
[4105] Risk	Qualitative measures of the risk exposure that a project is subject to. These measures are indices derived from the agency-endorsed risk management framework.	

72

4.6.2   Ad hoc tasks

Figure 4-26:   Tasks measurement branch

Measurement Area	Rationale	Defined by
[4201] Task Efficiency	Efficiency as an attribute of an ad hoc task is an empirical measure of how much time and resource was consumed in completing the task. Because of the unstructured nature of ad hoc tasks, using efficiency information for process improvement or input–output relationship analysis is not possible or practical.	**A. Resource consumption** Quantitative measures of the volume of resources consumed in the execution of an ad hoc task. Resources include financial resources (money), material resources (fuel, electricity etc.) and labour (hours of effort). **B. Time consumption** Quantitative measures of the time taken to complete an ad hoc task.
[4202] Task Safety	The safety of a task is a measurement of the risk exposure of the task to possible negative outcomes that could be realised through the completion of the task.	
[4203] Task Complexity	Measurement of the complexity of a task is a possible necessity in the investigation of failed outcomes, or the assessment of risk that may be associated with a business function.	A. Coverage Quantitative measurement of the number of sub-tasks that a task is dependent upon for completion. Sub-tasks are smaller elements of work than the original task, and are completed by different employees. B. Usability Qualitative measures of the degree of difficulty experienced by employees learning how to do a task and being able to complete it competently and autonomously.

4.6.3   Processes and operations (BAU)

Processes and operations are the repeated tasks that are undertaken on a regular basis within an agency. Typically, they are scripted processes designed to deliver exactly the same output every time they are executed, and they support the core operation of the agency as well as the primary business of the agency (for example, delivering services).

43 Processes and operations (BAU)

4301 Process efficiency	4304 Process complexity
A – Resource consumption	A – Coverage
B – Time consumption	B – Specification
C – Cycle time	C – Usability
D – Volume	4305 Process adaptability
4302 Process control	A – Flexibility
A – Accountability	B – Re-usability
B – Auditability	C – Standardisation
C – Compliance	4306 Process maturity
4303 Process availability	A – Standard
A – Capacity	4307 Process safety
B – Utilisation	A – Risk
C - Responsiveness	4308 Process reliability
	A – Stability
	B – Consistency
	C - Accuracy

Figure 4-27:   Processes and operations measurement branch

Understanding the performance relationships between agency inputs and process outputs requires targeted measurement of process efficiency, process control, process reliability, process availability and process complexity. For effective planning and management of processes and operations, information on existing process maturity levels, process safety and process adaptability is required.

Common examples of operational processes include:

- ICT maintenance processes (ITIL)
- ICT change and release management processes (ITIL)
- service sustainment processes (call centre services)
- financial management processes (purchasing and tendering)
- invoicing and revenue collection processes
- annual agency activity reporting
- ministerial briefings.

Measurement Area	Rationale	Defined by
[4301] Process Efficiency	Efficiency as an attribute of operational processes is a multivariate comparison of the inputs supplied to a process with the outputs produced by the process over a given period. Common measures of process efficiency include cycle time and the value of outputs produced per unit of input resources.	**A. Resource consumption** Quantitative measures of the volume of input resources consumed in the operation of a process over a defined period. **B. Cycle time** Quantitative measures of how long it takes to execute an operational process (BAU). **C. Volume** Quantitative measures of the quantity of output produced by a process over a defined period.
[4302] Process Control	Measuring the control of a process is important when agencies are deciding on the re-use of existing processes or are seeking to establish shared service agreements with other agencies or providers.	**A. Accountability** Qualitative measures of how clearly responsibility and authority for a process have been defined. **B. Auditability** Qualitative measures of how transparent a process is, determined by agency-defined indices that may be based on metrics covering recordkeeping, documentation and so on. **C. Compliance** Qualitative measures that describe the compliance of a process with agency, portfolio or government policies, regulations and legislation.

75

[4303] Process Availability	Process availability is a multivariate attribute that is important in designing and operating efficient and effective systems and services. Process availability is a comparison between available processing capacity and existing processing utilisation, and is often best measured and presented as process responsiveness.	**A. Capacity** Quantitative measures of how many executions (cycles) of the process can be accommodated based on its nominal resourcing allocation (labour, materials, information, tools etc.). **B. Utilisation** Quantitative measures of the consumed, reserved or committed executions (cycles) of the process over a given period. **C. Responsiveness** Qualitative measures that capture the time lapse between successive executions (cycles) of a process and interpret those values in the context of business needs.
[4304] Process Complexity	Measurement of the complexity of an operational process is a necessary step in the assessment of the *internal* risk that is associated with a business process or activity. It is through that assessment process that measurement of complexity helps to inform tactical and strategic decisions.	**A. Process fragmentation** Qualitative measures that describe the amount of fragmentation (process broken into sub-processes) that exists within a process or activity, and the make-up of sub-process work types (For example: 90% project work, 10% processes). Process fragmentation measures the number of discrete steps involved in executing a process allocated to different operational units, and whether those steps are executed synchronously or asynchronously, and in parallel or in sequence. **B. Process coverage** Qualitative measures that describe the scope coverage of a process in relation to the end-to-end business process. This is important when assessing process complexity and subsequent risk, as segmented business processes carry the possibility of process disconnect and data loss, which may compromise the larger process execution and output delivery. **C. Specialisation** Qualitative measures of non-generic skills and qualifications that are required for a process to be completed in conformance with applicable regulation and legislation and to satisfactory levels. **D. Usability** Qualitative measures of the degree of difficulty associated with employees learning a particular process and being able to competently apply it within business.

[4305] Process Reliability	Process reliability is defined as the failure-free execution of an operational process or activity and is determined by measuring two things: consistency and stability.	**A. Consistency** Qualitative measures that describe how successful a process is in producing consistent outputs under any execution load. **B. Stability** Quantitative measures of the rate of error and/or the rate of failure of agencies' processes. The sources of error and failure for a business process or activity will depend on the nature of the process, whether it is automated or manual, whether it is geographically dispersed or localised, whether it supports a service or delivers a product, and so on.
[4306] Process Adaptability	Process adaptability is a qualitative multivariate attribute derived by equating and comparing process flexibility, re-usability and standardisation. Process adaptability is an early indicator of how readily a process can be re-used to deliver other business outputs (services).	**A. Flexibility** Qualitative measures that describe how rigid an operational process is; most commonly represented as an index. **B. Re-usability** Qualitative measures of how readily a business process can be re-used to deliver alternative outputs. **C. Standardisation** Qualitative records of the standards supported and implemented by a process.
[4307] Process Maturity	Enough information needs to be captured under this measurement category to indicate how mature a process is. Often, maturity is inferred from a number of measurement indicators that cross multiple measurement categories. For example, a mature enterprise architecture practice is a productive, efficient practice, which has high degrees of standardisation, resulting in low task complexity. A measurement indicator for maturity will be specific to the methodology being used to benchmark and measure the process. This information should be recorded within any measurement indicator.	**A. Standard** Qualitative measures that describe the formalised level of maturity the process being measured has, based on recognised industry standards, such as ITIL, P3M3 and so on. Not all business processes and activities will have a maturity level indicator, as there are many business processes and activities present within an organisation where no formal, recognised maturity scale exists. Agencies may choose to use this indicator for internal performance improvement purposes, provided a method of measurement and a maturity scale are defined within the measurement indicator(s).

| [4308]
Process Safety | Because a process can be manual or automated, and because the output of a process may be a product such as the construction of a road, undertaking law enforcement or carrying out military actions, the safety of the process that delivers the output becomes very important. | A. Risk
Qualitative measures of the risk that is applicable to the execution of processes and activities within an agency or government program. Risk as it is referred to here is defined by AS/NZS ISO 31000:2009 and encompasses topics including, but not limited to:
• risks to personal safety
• risks to privacy
• risks to output delivery
• internal risks associated with process execution. |

4.7 Inputs domain

It could be argued that there are really only three types of input to business: time, labour and money. However, in the interests of usability, the Inputs measurement domain has been organised into sub-types that are recognised by government agencies as the forms of resource they possess and deploy in pursuit of government and business outcomes.

5 INPUTS				
51 Human resources	**52 Data and information**	**53 Technology**	**54 Fixed assets**	**55 Money**
5101 Costs (HR)	5201 Costs (data)	5301 Costs (technology)	5401 Costs (asset)	5501 Costs (money)
A – Recruitment	A – Acquisition	A – Acquisition	A – Acquisition	A – Operation
B – Remuneration	B – Sustainment	B – Sustainment	B – Operation	B – Sustainment
C – Training	C – Disposal	C – Operation	C – Sustainment	5502 Availability (money)
5102 Expertise	5202 Quality (data)	D – Disposal	D – Disposal	A – Capacity
A – Skills	A – Continuity / completeness	5302 Availability	5402 Availability (asset)	B - Commitment
B – Experience	B – Currency	A – Utilisation	A – Capacity	
C – Training	C – Accuracy	B – Capacity	B – Utilisation	
D – Qualifications	5203 Accessibility (data)	C – Efficiency	5403 Reliability (asset)	
5103 Availability (HR)	A – Standardisation	5303 Reliability (technology)	A – Age	
A – Capacity	5204 Relevance	A – Age	B – Wear	
B - Utilisation		B – Wear	C - Stability	
		C – Stability		
		5304 Compatibility (technology)		
		A – Standardisation		
		B - Customisation		

Figure 4-28:   PRM Inputs Domain

4.7.1 Human resources

Human resources (HR) represent the pool of labour available to an agency. The costs of HR are the full cost of labour borne by an agency, the expertise of human resources is the skills base and knowledge capital an agency possesses, and the availability of human resources is the pool of labour that an agency can draw on to support business initiatives.

51 Human resources
5101 Costs (HR)
A – Recruitment
B – Remuneration
C – Training
5102 Expertise
A – Skills
B – Experience
C – Training
D – Qualifications
5103 Availability (HR)
A – Capacity
B - Utilisation
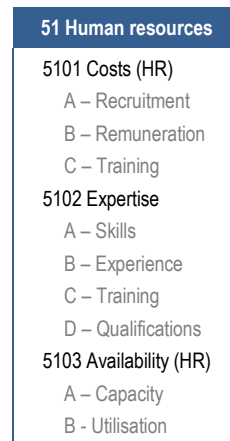
Figure 4-29: HR Measurement Branch

Understanding HR as an input to business is central to the comprehension of cause-and-effect relationships that exist between inputs, outputs and ultimately outcomes. The input costs of HR influence the efficiency of output delivery as a ratio of output value to input cost, and the skills HR possess will determine the efficiency and effectiveness of the business processes that are used to convert inputs to outputs. To design and manage business operations requires a solid understanding of HR and their abilities.

Measurement Area	Rationale	Defined by
[5101] Costs (HR)	The costs associated with HR are often the greatest financial expense agencies incur in the delivery of government programs and business initiatives. HR costs are a key determinant in measuring the efficiency of agency activities and government programs, as the processes that support and deliver the initiatives and programs are often dependent upon humans to design, develop, implement and sustain them. Understanding the full cost of HR allows an agency to accurately determine the costs of the labour component of a business process.	**A. Recruitment** Quantitative measures of the financial value of non-process oriented financial resources expended on the acquisition of staffing resources. The costs being measured may include: • advertising costs • recruitment services costs • costs of professional and independent scribes. **B. Remuneration** Quantitative measures of the financial costs attributable to the retention of HR. Measurements should capture the full cost of remuneration, including: • salary costs • superannuation expenses • leave entitlements • other salary package components. **C. Training** Quantitative measures of the financial value of resources an agency has expended in ensuring that it has suitably qualified and skilled employees for the activities which the employees have been allocated.

Measurement Area	Rationale	Defined by
[5102] Expertise	It can be difficult to measure employee expertise in a quantitative way. What often happens is that the factual recordings of employee attributes in the multiple variables described below (skills, experience, training and qualifications) are translated into an inferred, agency-defined, qualitative indicator of employee expertise. Understanding the expertise of agency employees facilitates business continuity and workforce planning activities; if labour resources allocated to the delivery of a government program are not suitably trained and qualified or lack necessary experience, there is an increased likelihood that the required outputs will not perform to required levels. Furthermore, knowing the expertise possessed by the employees allocated to a business process is fundamental to explaining the level of performance (efficiency) of that process or activity, and the quality of the output it delivers.	**A. Skills and experience** Qualitative measures of the informal/on-the-job training and skills that employees have acquired through their employment within an agency or through previous employment. **B. Training** Qualitative measures of the formalised training provided by an agency, but not endorsed or recognised by a professional body. Examples include: • undertaking security training within government departments • ICT induction training • contract and procurement training. **C. Qualifications** Qualitative measures of the formal training undertaken by and qualifications held by agency employees. These measures include both agency-funded training programs and other programs completed by employees outside of the agency.
[5103] Availability (HR)	The availability of HR as an input is a measure of how much employee labour is available for the execution of business processes (the undertaking of work). Availability is a quantitative multivariate attribute that compares the total volume of employee labour available (capacity) with the volume of employee labour already consumed or committed (utilisation). Knowing the availability of HR facilitates efficient capacity management of agency-run projects, operational processes and other activities the agency engages in.	**A. Capacity** Quantitative measures of the maximum workload that can be accommodated by an employee allocated to a business process. Sources of data for this variable include: • total number of hours an employee is available for work • FTE hours funded by a business initiative for work • part-time employee hours available to a business initiative. **B. Utilisation** Quantitative measures of the employee labour consumed by, or reserved for, the undertaking of work. Utilisation of an HR resource is the amount of employee time consumed servicing a business initiative.

4.7.2 Data and information

In the information age, data is a commodity in the same way that employee labour and financial resources are, and as such it must be managed in order to ensure that agencies are using the data and information that they possess effectively and efficiently. To manage and use data in an effective and efficient way, agencies need to understand the data that they hold; this requires agencies to measure it.

52 Data and information
5201 Costs (data)
A – Acquisition
B – Sustainment
C – Disposal
5202 Quality (data)
A – Continuity / completeness
B – Currency
C – Accuracy
5203 Accessibility (data)
A – Standardisation
5204 Relevance

Figure 4-30: Data and Information measurement branch

Measurement Area	Rationale	Defined by
[5201] Costs (data)	Data and information, like other business resources, impose a financial cost on agencies to acquire, create, maintain and dispose of. Therefore, the cost attribute of data as an input is multivariate, and to fully understand the cost of data requires measuring data and information costs within each of the attribute variables outlined below.	**A. Acquisition** Quantitative measures of how much financial resource is expended on the procurement (purchase or creation) of data to support the delivery of government programs and the operation of the agency. Procurement costs can include: • purchase of data from third-party providers • costs of running field acquisition activities • legal fees for consultancies engaged to manage tender processes • costs associated with the printing of surveys etc. **B. Sustainment** Quantitative measures of the how much financial resource is expended through custodianship activities for the data assets held by agencies. **C. Disposal** Quantitative measures of the financial resources expended in the disposal of data. Costs in this measurement grouping would include items such as: secure shredding of paper-based information destruction of ICT equipment that has held sensitive information (DAT, HDD) costs associated with the physical transfer of data between agencies when control and responsibility are transferred (secure courier etc.)

83

Measurement Area	Rationale	Defined by
[5202] Quality (data)	Despite apparent similarities, the assessment of quality as described in this section of the PRM is not the same as performing statistical data confidence assessments for datasets or defining a confidence interval as part of a formal statistical or scientific study. Measurements of quality within the PRM framework can be interpreted as assessments of the risk of data inaccuracy, data inappropriateness and data irrelevancy as an input to a business initiative. However, it is recognised that there are scenarios in which data and information used by government agencies in the delivery of programs do have formal confidence levels, as defined by science and statistical practices.	**A. Continuity** Qualitative measures of gaps that are present in time-series based data and information that the agency is using, and descriptions of the risks associated with that use of data. **B. Completeness** Qualitative measures of gaps present in non-time-series datasets used in agencies and descriptions of any possible risks that may be associated with that usage of data. Those risks will contribute to an overall assessment of confidence in the data used by an agency. **C. Currency** Quantitative measures that record the time and date of the capture of time-sensitive datasets. Such measurements will help guide the formation of an overall data quality and confidence indicator. For example, customer satisfaction survey results from three years ago will not be particularly useful in making strategic decisions regarding ICT investments, but they may be all that is available. **D. Accuracy** Qualitative measures that describe the degree of detail of the data and information being used by an agency, as both a direct input to the output that is created and as guidance to the work processes that deliver that output.
[5203] Accessibility (data)	The accessibility of data and information, when measured as an input, is determined by measuring the level of standardisation of underlying data. Knowing the accessibility of data assets an agency holds will assist agencies in determining how easily they may be able to share their data with other agencies and third parties, and whether or not they are able to re-use existing data to support new business initiatives.	**A. Standardisation** Qualitative measures of the level of compliance of data and information with recognised standards. Agencies must be aware of the standards compliance of data and information they hold in order to understand how accessible their holdings are.

Measurement Area	Rationale	Defined by
[5204] Relevance	Measuring the relevance of data is a highly contextual and subjective process aimed at ascertaining whether data used, or to be used, by a business initiative is appropriate for use by that initiative. The attributes of data that are considered to be of importance when assessing relevance will vary from agency to agency, and from business initiative to business initiative. The only common characteristic of data relevance indicators between agencies is that they are qualitative higher order measurements that are defined entirely by the agency within which they are used. For this reason, there is limited guidance on what relevance is, and no guidance on the types of measurements that could assist in determining what data relevance is. It is included within the PRM because data relevance is important, and agencies should consider defining an indicator for it.	

4.7.3 Technology

Technology as an input to agency business covers technical equipment and software, such as:

- desktop and server computing equipment (PCs, clusters, mid-range, mainframe etc.)
- network and telecommunications infrastructure (switches, routers, cables, firewalls etc.)
- commercial and in-house developed software (desktop and server, customised and uncustomised)
- major office machines (photocopiers, scanners, fax machines)
- scientific equipment
- video conferencing and telephony equipment.

For a more exhaustive list of technology inputs, refer to the AGA Technical Reference Model.

53 Technology	
5301 Costs (technology)	5303 Reliability (technology)
A – Acquisition	A – Age
B – Sustainment	B – Wear
C – Operation	C – Stability
D – Disposal	5304 Compatibility (technology)
5302 Availability	A – Standardisation
A – Utilisation	B - Customisation
B – Capacity	
C – Efficiency	

Figure 4-31:   Technology Measurement Branch

Understanding the performance relationships (effectiveness and efficiency) between technology as an input and the realisation of business initiative outcomes requires an understanding of technology costs, technology availability, technology reliability and technology accessibility.

Measurement Area	Rationale	Defined by
[5301] Cost (technology)	Technology cost is a key determinant in assessing the performance of technology investments and, through such assessments, of the overall performance of an agency in realising effective outcomes for government in an efficient manner. Technology cost is a multivariate attribute. Understanding the full cost of technology requires measuring the costs associated with acquiring the technology, sustaining the technology, operating the technology and disposing of the technology.	**A. Acquisition** Quantitative measures of the non-labour attributable financial costs associated with the procurement of technology within an agency. Those costs include, but may not be limited to: • the purchase price of hardware • licensing costs for software • fee-for-service costs attributable to the acquisition of a technology capability. **B. Sustainment** Quantitative measures of the non-labour-based financial costs attributable to the maintenance of technologies. Costs recorded within this grouping may include, but are not limited to: • outsourcing contracts for the support and maintenance of technology • fee-for-service costs attributable to the maintenance of a technology capability • costs associated with the replacement of faulty technology subcomponents, such as a hard drive within a server cleaning and servicing costs for major office machines. **C. Operation** Quantitative measures of the non-labour financial costs incurred by an agency that are attributable to the operation of technology within the agency. Measurements within this grouping may include, but are not limited to: • proportion of electrical costs attributable to a technology • proportion of mechanical costs attributable to a technology (for example, air-conditioning) • value of the floor space occupied by piece of technology in a data centre facility. **D. Disposal** Quantitative measures of the non-labour financial costs incurred by an agency when a piece of technology is decommissioned and disposed of. Measurement indicators within this grouping may include, but are not limited to: • early termination penalties for support contracts • data cleansing fees • commissions payable to auctioneers.

Measurement Area	Rationale	Defined by
[5302] Availability (technology)	Measuring the availability of technology as an input is measuring how much technical labour is available for the execution of business processes and tasks (undertaking of work). Availability is a bivariate attribute that compares the total volume of technology labour available (capacity) with the volume of technology labour already consumed or committed (utilisation). Knowing the availability of technology resources facilitates efficient capacity management of agency projects, operational processes and other activities the agency engages in.	**A. Capacity** Quantitative measures of the maximum workload that a piece of technology is able to service. Measurement indicators within this grouping may include: • maximum bandwidth of a networking switch • maximum number of concurrent connections a database can maintain • how much data a storage device can hold • how much processing power a piece of equipment has (desktop, server, mainframe etc.). **B. Utilisation** Quantitative measures of the technology labour consumed by or reserved for the execution of business processes. Utilisation of technology resources is the amount of processing power (labour) consumed in servicing a particular process or activity. Measurement indicators within this grouping could include: • percentage of processor time consumed • volume of disk space consumed • volume of network bandwidth consumed.
[5303] Reliability (technology)	The reliability attribute of technology can be both multivariate and univariate. When employed as an indicator of empirical performance (stability), univariate measurement will suffice. When used to inform risk management and activity planning exercises, a multivariate measurement that incorporates age and physical impairment (wear) is necessary.	**A. Age** Qualitative measures of the age of technology, as age can be a determinant of the reliability of the technology. For example, the incidence of failure of magnetic tape as a storage medium increases over time because the magnetic particles embedded in the tape lose their ability to hold charge over time. **B. Stability** Quantitative measures of the rates of error and rates of failure of technology. Measurements of technology reliability include, but are not limited to: • mean time between hardware failures • average rate of software errors • volume of networking and telecommunications outages • frequency of data centre outages.

Measurement Area	Rationale	Defined by
[5304] Compatibility (technology)	The compatibility attribute of technology is multivariate and qualitative. It describes the degree of ease with which an element of technology can be integrated with other elements of technology operating within an agency by measuring the standardisation of the technology (against industry standards) and the customisation of the product. Measurement of the attribute is intended to facilitate improved planning capabilities for capability development within agencies.	**A. Standardisation** Qualitative measures of the level of industry-endorsed standardisation applicable to a technology in operation within an agency. B. **Customisation** Qualitative measures (indices) that describe how customised a technology product has been in its implementation within an agency.

89

4.7.4 Fixed assets

Fixed assets are the physical assets an agency possesses and/or uses in the delivery of business initiatives. Other fixed assets include, but are not limited to:

- office buildings, commercial tenancies, residential properties
- data centres
- motor vehicles, aeroplanes, boats, satellites etc.
- plant, equipment and machinery for example, air conditioning)
- non-IT office equipment (safes, televisions, cameras, security systems)
- building fit-outs (desks, chairs, tables, fridges etc.)
- military equipment (both consumable and non-consumable).

54 Fixed assets	
5401 Costs (asset) A – Acquisition B – Operation C – Sustainment D – Disposal	5402 Availability (asset) A – Capacity B – Utilisation 5403 Reliability (asset) A – Age B – Wear C - Stability

Figure 4-32: Asset measurement branch

Understanding the performance relationships (efficiency and effectiveness) between fixed asset inputs and the outcomes of business initiatives requires an understanding of the costs attributable to the asset, the availability of the asset and the reliability of the asset.

Measurement Area	Rationale	Defined by
[5401] Cost (assets)	The cost attribute for other fixed assets is multivariate, containing four possible measurement groupings: acquisition, sustainment, operation and disposal. Measuring the total cost of an asset throughout its lifecycle requires measuring within each of those groupings.	**A. Acquisition** Quantitative measures of the non-labour financial costs incurred by agencies attributable to acquiring assets. Acquisition costs include, but are not limited to: • purchase prices for motor vehicles, plant, equipment etc. • upfront lease costs for office premises • legal fees paid to third-party consultants regarding the purchase of assets • external costs associated with procurement activities, such as probity. **B. Operation** Quantitative measures of the non-labour financial costs attributable to the ongoing operation of fixed assets. These costs differ from sustainment costs in that operation costs represent the cost of resource consumption of the asset, as opposed to the maintenance costs of the asset. Costs recorded under this measurement grouping would include, but not be limited to: • fuel consumption costs for motor vehicles etc. • electricity consumption costs for buildings and offices • water consumption costs for gardens and parks etc. • other material consumption costs. **C. Sustainment** Quantitative measures of how much it costs an agency to maintain an asset once the asset is purchased. Sustainment costs include, but are not limited to: • motor vehicle servicing fees • building cleaning fees • building maintenance • ongoing lease costs. **D. Disposal** Quantitative measures of the non-labour financial costs incurred by an agency through the disposal of non-IT assets. Cost measurements recorded under this grouping could include, but are not limited to: • early termination fees for building leases • building demolition fees • commissions payable to auctioneers.

Measurement Area	Rationale	Defined by
[5402] Availability (asset)	Measuring the availability of assets as an input is measuring the quantity (supply) of an asset made available to support the execution of business processes and tasks (undertaking of work). Availability is a bivariate attribute that compares the total volume of assets available (capacity) with the volume of assets already consumed or committed (utilisation). Knowing the availability of assets facilitates efficient capacity management of agency projects, operational processes and other activities the agency engages in.	**A. Capacity** Quantitative measures of how much utilisation a fixed asset is able to sustain at both nominal loads and peak loads. Capacity measurement indicators include: • seating capacity of transport vehicles • seating capacity of office buildings and tenancies • accommodation capacity of medical facilities (hospitals, clinics etc.) • data and power transmission capacity for network infrastructure. **B. Utilisation** Quantitative measures of the volume of usage that a non-IT asset is currently subject to, or reserved for.
[5403] Reliability (asset)	Understanding the reliability of a fixed asset is essential in understanding effectiveness and efficiency relationships between inputs and outputs. For example, a school bus is an input resource to an operational process that delivers students to school. If students fail to get to school because the bus continually breaks down (unreliable), then the overall objective of a schooling program (educating students) is not going to be realised. Asset reliability is a multivariate attribute. An indicator of reliability that not only describes the actual performance of the asset but also attempts to explain why that level of performance has been attained (which will assist in risk management) will include agency-defined indices that factor in the age of the asset, the wear of the asset (diminished functional capacity) and the stability of the asset (how often it fails).	**A. Age** Quantitative measures of the age of an asset in a time unit appropriate to the asset. For example: • **hours of flight time (planes)** • **years in service (buses).** **B. Wear** Qualitative measures of the functional and physical impairment an asset is subject to as a result of prior service. **C. Stability** Quantitative measures of the rates of error and rates of failure of an asset. Measurements of asset reliability include, but are not limited to: • mean time between vehicular failures • frequency between maintenance outages.

92

4.7.5 Money

```
┌─────────────────────────────────┐
│           55 Money              │
├─────────────────────────────────┤
│  5501 Costs (money)             │
│  A – Operation                  │
│  B – Sustainment                │
│  5502 Availability (money)      │
│  A – Capacity                   │
│  B - Commitment                 │
└─────────────────────────────────┘
```

Figure 4-33:   Money Measurement Branch

Measurement Area	Rationale	Defined by
[5501] Costs (Money)	As an input resource, money can incur additional operational costs to an agency. Those costs can be associated with the acquisition of money and the operation of that money.	**A. Acquisition** Quantitative measures of the financial costs incurred by agencies in acquiring financial capital. Measurements of this attribute could include: • interest payable on loans • credit card interest. **B. Operation** Quantitative measures of the financial burden borne by agencies in gaining access to and distributing financial capital. Measurements could include: • penalties payable to banking institutions for early term deposit withdrawal • credit card fees • account servicing fees.
[5502] Availability (Money)	The availability of money is determined in the same way the availability of other input resources is determined, by comparing the total volume of money available to the volume of money that is already committed.	**A. Capacity** Quantitative measures of the total volume of money available to an agency for a particular business initiative. **B. Commitment** Quantitative measures of the amount of money consumer by or committed to a business initiative.

93

4.8 Performance Reference Model measurement indicators

Measurement indicators are 'containers' for the definitions and values of measurement data defined and captured by agencies to support their business operations.

4.8.1   Quantitative versus qualitative

There are two types of data: qualitative data and quantitative data. The type of data that will result from measuring an attribute of an entity will depend on the sub-type attribute being measured, the entity, and the focus of the domain in which the measurement is being defined.

For example:

> *The cost* (attribute) *of a technology entity* (sub-type) *as an input* (domain) *will be a quantitative value, whereas the effectiveness* (attribute) *of an information entity* (sub-type) *as an input* (domain) *will be a qualitative indicator.*

Qualitative data is a categorical measurement expressed by means of a natural language description; for example, temperature = 'hot'. The categories applicable to a measurement indicator may have an order applied to them, which can be either natural or artificial.

When the ordering of the categories is artificial, they are referred to as *nominal* categories. Examples might be gender, race, religion or sport. When the categories have a natural order, they are called *ordinal* categories (or variables).

Categorical variables that are ordinal include those that judge size (small, medium, large etc.) and customer attitudes (strongly disagree, disagree, neutral, agree, strongly agree), but without additional information it is difficult to ascertain which of the values is the best or worst.

Quantitative data is a numerical measurement expressed not by means of a natural language description, but rather in terms of numbers, but not all numbers are continuous, measurable and quantitative. For example, a Medicare or Centrelink reference number is a number, but not something that one can add or subtract with any integrity.

Quantitative data is always associated with a scale measure (or ratio scale variable), such as:

- currency: dollars and cents
- temperature: Celsius scale
- distance: metres, kilometres
- weight: grams, kilograms, tonnes
- time: seconds, hours, years etc.

4.8.2   Types of measurement indicator

The PRM framework is designed to accommodate three forms of measurement indicator:

1. *First order indicators*, also known as primary indicators, are basic quantitative measures that describe a single attribute (dimension) of an entity only in a single domain of the PRM.
2. *Second order indicators*, also known as secondary indicators, are complex quantitative measures that combine and compare multiple first order indicators from multiple PRM domains, or a single PRM domain, to describe an attribute of an entity in a single domain of the PRM.
3. *Higher order indicators* are qualitative (subjective) measures derived from the combination of multiple first and second order indicators. They are possibly represented as an index value or matrix-based imperative.

	First order	Second order	Higher order
Definition	• Measurements are taken within a single measurement domain • One-dimensional • Non-composite (simple) unit of measurement • Describes an entity without intent.	• Multiple measures from two measurement domains • Two-dimensional • Two or more first order indicators • Composite unit of measurement • Describes an entity with intent.	• Measurements taken from two or more measurement domains • Multidimensional representations • Agency indices that factor multiple first and second order indicators • Units of measurement are invented.
Type of data	Quantitative	Quantitative	Qualitative
Domain suitability	Inputs, outputs	Work, usage, inputs, outputs	Inputs, outputs, work usage, outcomes
Example	• Price • Duration • Volume	• Process efficiency • Program effectiveness • Agency efficacy	• SWOT rankings • Risk assessments • Project health • Vehicle reliability • Process flexibility • Grades
Example units	• Dollars • Hours • Tonnes	• Success rate • $/output • Cycles/second • Kg/unit	• 0 and 1 (balanced scorecard) • High, low, medium (risk) • Hot, moderate, cool

4.8.3 Indicator framework

What a measurement indicator will look like (what attributes it has) is largely at the discretion of the agency, and is likely to be dependent upon the agency's motivations for establishing the measurement indicator (for example, for conformance or performance evaluations).

This section provides a framework for measurement indicator definition (*Figure 4-34*). Not all agency measurement indicators will define values for every attribute of the indicator framework. If the indicator is intended to operate as an output performance indicator, it will contain attributes such as 'baseline value', 'target value', 'schedule' and 'current value', whereas an output conformity indicator is likely only to include attributes such as 'target value' and 'current value', and will not specify a 'schedule' for measurement, as compliance for an output is measured only on delivery.

Figure 4-34:   Measurement Indicator Framework

Measurement Indicator	Rationale
Unit of measurement	The unit of measurement attribute holds the unit of measurement of the measurement indicator. A unit of measurement can be a composite measurement unit, such as: • cycles/second • complaints/customer • customers served / hour • dollars/unit • output/dollar. or a base measurement unit, such as: • percentage • dollars • hours.
Method of measurement	This attribute describes the method of measurement to be employed in the gathering of data and gives an explanation of what the results of measurement mean.
Baseline	This indicator attribute contains the measurement value at the commencement of a business initiative and will be used as the comparison value for conformance and performance determinations.
Target value	If the measurement indicator is intended to be a performance indicator, then a target measurement value should be specified so that current value measurements can be

Measurement Indicator	Rationale
	compared to it and a performance determination can be made.
Current value	Measurements that are intended to be taken in accordance with a schedule over time will involve the capturing of a measurement value for the current value multiple times. Subsequent measurements will replace the pre-existing values of this attribute.
Schedule	The schedule attribute entails a list of times and dates when the measurement is to be taken. The schedule attribute is most applicable in the measurement of outcomes, as outcomes are realised through the utilisation of outputs over time. While outputs such as public infrastructure are capable of providing benefits indefinitely, it is important to define a target date by which target levels of benefits must be secured from an initiative.
Trend	The trend attribute indicates the direction of movement in a measurement indicator value: increasing, decreasing or stable.
Forecast	The forecast attribute indicates the predicted value of the metric at a prescribed time, or multiple times, in the future.

4.9 Demonstrating the Outcome Process Model

4.9.1   Example 1: OPM used in activity planning

Operation of the Outcome Process Model (OPM) in reverse provides a powerful outcome-focused business planning framework capable of supporting strategic and tactical business planning, project planning, workforce planning, business case development and investment management.
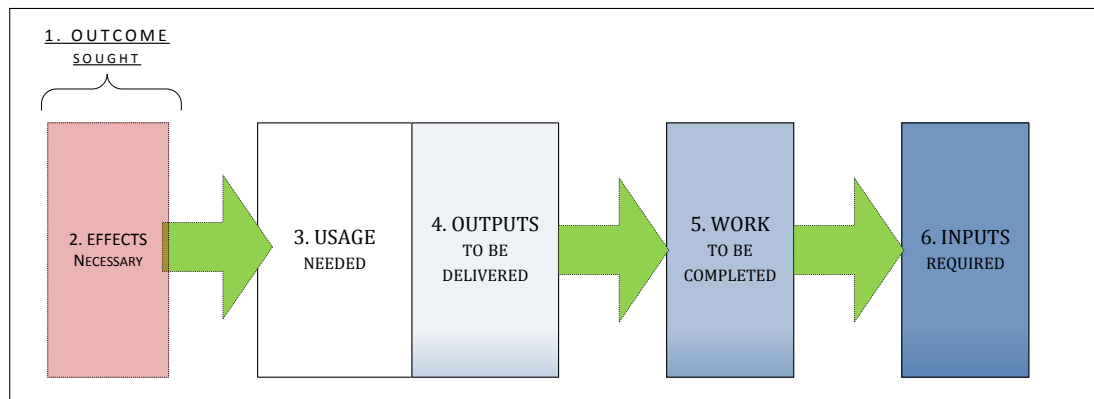
Figure 4-35:   The OPM and business planning

OPM	Business Planning task
Step 1 Define the outcome(s) sought	Desired outcomes are defined at the beginning of any tactical or strategic planning exercise. They take the form of a statement of the objectives that are sought to be realised through a planned body of work and can be social, economic or environmental.
Step 2 Identify the necessary effects	Once an understanding of the outcome is reached, it is possible to identify the group of effects that need to be realised and in what timeframes, in order for the outcome to be deemed to be secured.
Steps 3 and 4 Specify the outputs and determine the levels of usage needed	Following the identification of effects necessary to secure the outcome, it is possible to determine any outputs and the levels of usage required to generate the effects we are seeking to realise. Note that 'usage' is the OPM term that encapsulates, for example: • the consumption of a product • the utilisation of a service • the discharge of an enforcement action • the operation of a military campaign • the completion of an advertising campaign.
Step 5 Determine the work to be completed	Once a government agency knows what types and volumes of outputs it must create, it is able to determine the work (business processes and activities) and rate of production required to produce them.
Step 6 Specify the inputs required	By knowing what types of outputs must be produced and the work processes that are required to produce them, agencies are able to determine the volume and mix of inputs that are required to sustain work processes and output production levels.

4.9.2 Example 2: OPM used in operations management

The following scenarios demonstrate the concepts of the OPM in the management (execution) context of various government organisations:

- the construction of a new roadway (infrastructure)
- the development of new legislation (policing)
- the delivery of a public awareness campaign (health)
- the execution of a military campaign (defence).

Note that these examples are provided to illustrate the operational concepts of this model and are simplified versions of very complex scenarios.
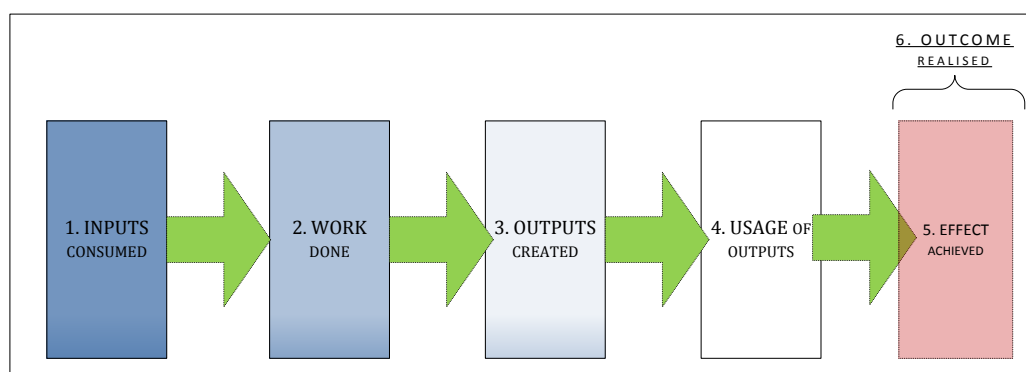
Figure 4-36:   OPM and business operations

OPM	Business Operation task
INPUTS	The necessary composition and quantity of resources are allocated to an initiative in accordance with endorsed plans, and provided as inputs to the processes and activities (work) that will be executed by the organisation: - money - construction materials and equipment - construction personnel - legislative staffers, constitutional lawyers, ministers - public affairs professionals, media professionals - legislative framework information - police personnel - military intelligence information - military personnel.
Work	Work consumes physical and technological labour by applying it to the execution of business processes and activities that convert the input resources into the specified outputs. The sustained effort necessitated by the provision of a service for the public is also considered to be work: - design and planning for infrastructure - construction of transport infrastructure - formation and ratification of legislation - development of a publicity campaign - planning operations for policing action - planning operations and logistics for a military action.

OPM	Business Operation task
OUTPUTS	Produced outputs are consistent with the definitions of the business processes that were executed in order to create them. The outputs of work could include: • a roadway constructed and ready for use • public information campaigns on the risks of smoking approved for implementation • legislation prohibiting the operation of a motor vehicle while under the influence of alcohol, and police officers trained in undertaking the policing action • military operation plans, such as the INTERFET plan, approved and ready for execution, and soldiers trained and ready to be deployed for the operation.
USAGE	The outputs that have been produced do not in themselves realise an outcome unless the output of an activity was the removal of an obstruction to what would otherwise be normal 'state of the world'. Outputs must be utilised in order to create an effect or realise an outcome. Usage includes activities such as: • using a new roadway as a means of travelling to work or transporting goods • adjusting personal behaviour as a result of public information campaigns run by government, such as anti-smoking campaigns • executing of policing action targeting drink-driving with random breath tests • executing a military action, such as the INTERFET military operation in East Timor.
EFFECTS	The usage of outputs causes effects that are observable and measurable: • Traffic congestion in a particular locale is eased and transit times are reduced—*because people are using the new roadway* • The number of deaths resulting from smoking-related illness declines—*because people are aware of the dangers of smoking and are getting help to quit.* • The number of people arrested for drink-driving declines—*because people are aware of the consequences of drink-driving (arrest or possible death).* • The number of alcohol-related road accidents declines—*because police are conducting random breath tests and arresting drink-drivers.* • Free and democratic elections are held in East Timor—*because of the actions and ongoing presence of Australian and international troops*.
OUTCOMES	The outcome realised by the program can be inferred through the observed and measured effect. Based upon the examples provided above, it could be argued that: • the construction of new infrastructure has facilitated socioeconomic benefits, as was intended • the anti-smoking campaign was successful in reducing the incidence of smoking-related fatalities • legislating against driving under the influence of alcohol successfully reduced the number of road accidents involving alcohol • the INTERFET military action succeeded in securing the independence of East Timor.

100

This page is
intentionally blank

5 Business Reference Model

5.1 Introduction

The Business Reference Model (BRM) provides a framework that facilitates a functional (as opposed to organisational) view of the Australian Government's Lines of Business (LoB). This functional view includes the Australian Government's internal operations and services for citizens, individuals, businesses and other organisations, independent of the agencies performing them.

The BRM promotes agency collaboration by describing the Australian Government around common business areas instead of a siloed, agency-by-agency view. It serves as the underlying foundation for the AGA framework, the 2006 e-Government strategy *Responsive Government: A New Service Agenda*, and the *Business Process Interoperability Framework* (BPIF).

The BRM has been developed using the *Australian Governments' Interactive Functions Thesaurus* (AGIFT)[12] and the US Government's *Federal Enterprise Architecture Business Reference Model* (FEA-BRM) as base documents, with some adjustments to more accurately reflect the Australian Government.

The AGIFT was developed by the National Archives of Australia at the request of the Online Council of Ministers to enhance the utility of AGLS[13] metadata. The AGIFT is a three-level hierarchical thesaurus that describes the business functions carried out across Commonwealth, State, Territory and local governments in Australia.

The BRM has been based on the first two levels of the AGIFT and on the FEA-BRM. Entries in the BRM that are based on the AGIFT are marked with 'ᴬ' symbols. Entries based on the FEA-BRM are marked with 'ᶠ' symbols.

While the BRM provides an improved way of thinking about government operations, it is only a model: its true utility can only be realised when it is effectively used. The functional approach promoted by the BRM can do little to help accomplish the goals of whole-of-government initiatives if not incorporated into enterprise business architectures and management processes of Australian Government agencies.

5.2 Structure

The structure of the BRM is a tiered hierarchy representing the business functions of the Australian Government. The tiers are:

Level 1	Business Areas	describes government functionality and activities surrounding the operations of government.
Level 2	Lines of Business (LoB) (within each Business Area)	relates to government functions at the middle level of the BRM hierarchy.
Level 3	Business Sub Functions (under each LoB)	relates to government sub-functions, at the lowest level of the BRM hierarchy.

At an agency level, Business Capabilities are represented by Business Services that are enacted and supported through Business Processes, which are in turn supported and delivered by Service Components described in the Service Reference Model. The functional relationships are illustrated in the AGA metamodel snapshot *(Figure 5-1)*.

---

[12] The AGIFT online site is at: http://www.naa.gov.au/records-management/publications/agift/index.htm

[13] The AGLS Metadata Standard is a set of descriptive properties to improve visibility and availability of online resources. AGLS is published as Australian Standard AS 5044-2010.
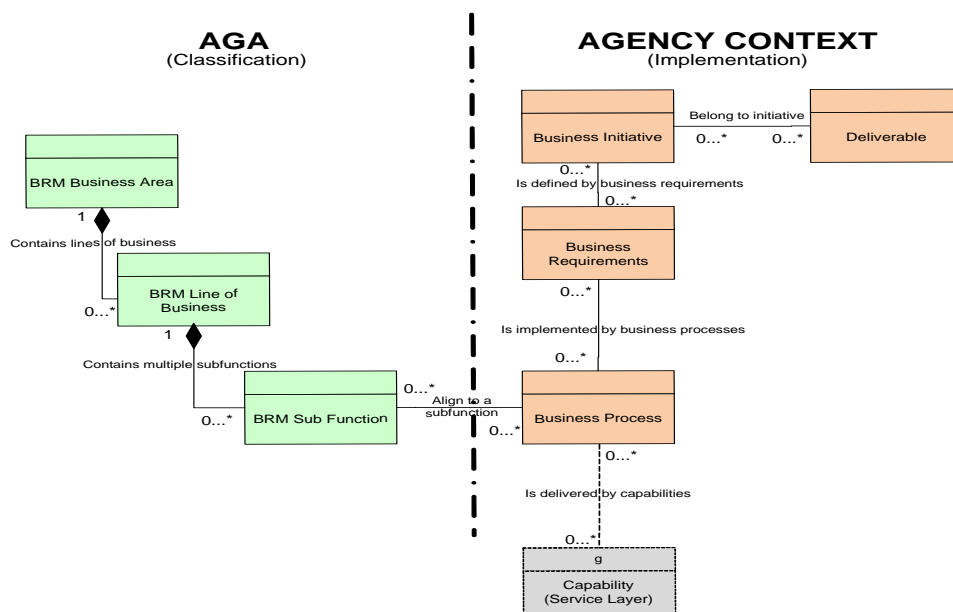
Figure 5-1: BRM Functional Relationships

The BRM Business Areas *(Figure 5-2)* separate government operations into high-level categories around four common business themes:

[10] Services for Citizens	provided by the government to and on behalf of individuals, businesses and other organisations, relating to the purpose of government.
[20] Service Paths	provides the avenues through which government services for citizens are provided.
[30] Services Support	provides the policy, programs and managerial foundation to government operations.
[40] Management of Government Resources	internal operations that enable the government to operate effectively and efficiently.
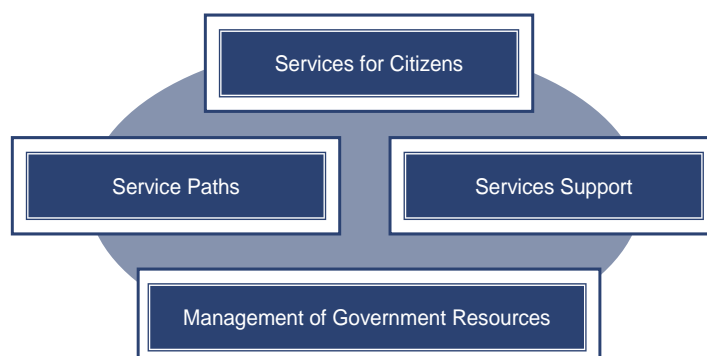
Figure 5-2: BRM Business Areas

The following sections define the LoB and Business Capabilities for each Business Area of the BRM. Where entries are based on the AGIFT, LoB correspond to the Level 1 functions and Business Capabilities correspond to Level 2 functions. Where entries are based on the FEA-BRM, Business Capabilities correspond to the Sub Functions for each LoB.

[10] Services for Citizens

[101] Business Support

[10101] Association Registration

[10102] Business Accounting and Reporting

[10103] Business Registration and Licensing

[10104] Business Sponsorship

[10105] Consumer Protection

[10106] Fair Trading

[10107] Financial Institutions Control

[10108] Industry Assistance Schemes

[10109] Industry Development

[10110] Insurance

[10111] Professional Accreditation

[10112] Small Business Services

[10113] Stock Market Control

[102] Civic Infrastructure

[10201] Civic Management

[10202] Energy Supply

[10203] Integrated Essential Services

[10204] Public Housing

[10205] Public Land Management

[10206] Regional Development

[10207] Transport Network Maintenance

[10208] Waste Management

[10209] Water Supply

[103] Communications

[10301] Advertising Standards

[10302] Broadcasting

[10303] Communications Infrastructure

[10304] Electronic Commerce

[10305] Media Ownership Control

[10306] Postal Services

[10307] Publishing

[10308] Radio Communication

[10309] Satellite Communication

[10310] Telecommunications

[104] Community Services

[10401] Accommodation Services

[10402] Community Support

[10403] Counselling Services

[10404] Emergency Services

[10405] Financial Assistance

[10406] Natural Disasters

[10407] Rural Community Development

[10408] Social Justice and Equity

[10409] Transport Access Schemes

[105] Cultural Affairs

[10501] Arts Development

[10502] Collection Access

[10503] Collection Management

[10504] Collection Promotion

[10505] Cultural Awards and Scholarships

[10506] Cultural Festivals

[10507] Cultural Gifts

[10508] Multicultural Heritage Promotion

[106] Defence

[10601] Australian Defence Force

[10602] Civilian Event Protective Support

[10603] Emergency Protective Support

[10604] Humanitarian Protective Support

[10605] Peacekeeping Protective Support

[107] Economic Management

[10701] Commonwealth State and Territory Funding

[10702] Currency

[10703] Financial Investment

[10704] Financial System Management

[10705] Fiscal Policy

[10706] Foreign Investment Control

[10707] International Monetary Policy

[10708] Monetary Policy

[10709] Payments to Government

[10710] Retirement Income

[10711] Taxation Services

[108] Education and Training

[10801] Arts Education

[10802] Community Education

[10803] Curriculum Development

[10804] Early Childhood Education

[10805] Military Education and Training

[10806] Overseas Skills Recognition

[10807] School Education

[10808] Tertiary Education

[10809] Vocational Education

[109] Employment

- [10901] Human Resources Development
- [10902] Industrial Awards and Conditions
- [10903] Labour Markets
- [10904] Workplace Agreements

[1010] Environment

- [101001] Built Environment
- [101002] Business and Community Assistance
- [101003] Environment Information Services
- [101003] Conservation
- [101005] Environmental Impact Assessment
- [101006] Historic Relic Protection
- [101007] Marine Life Protection
- [101008] Natural Heritage Protection
- [101009] Oceans Governance
- [101010] Pollutant Prevention
- [101011] World Heritage Listings

[1011] Health Care

- [101101] Community Health Services
- [101102] Defence Health Services
- [101103] Health Insurance Schemes
- [101104] Health Protocols
- [101105] Hospital Services
- [101106] Medical Research
- [101107] Public Health Services
- [101108] Special Needs Services
- [101109] Veterans' Health Services

[1012] Immigration

- [101201] Citizenship
- [101202] Deportation
- [101203] Detention
- [101204] Migrant Services
- [101205] Refugee Services
- [101206] Travel Authorisation

[1013] Indigenous Affairs

- [101301] Indigenous Cultural Heritage
- [101302] Indigenous Enterprise Development
- [101303] Indigenous Health Services
- [101304] Indigenous Heritage Conservation
- [101305] Indigenous Reconciliation
- [101306] Indigenous Welfare

[1014] International Relations

- [101401] Consular Services
- [101402] Defence Liaison
- [101403] Diplomatic Missions
- [101404] International Affairs
- [101405] International Treaties
- [101406] Overseas Aid
- [101407] Overseas Promotion
- [101408] Passport Services

[1015] Justice

- [101501] Administrative Law
- [101502] Associations and Corporate Law
- [101503] Civil Law
- [101504] Commissions of Inquiry
- [101505] Coronial Law
- [101506] Court Reporting
- [101507] Criminal Law
- [101508] Human Rights Obligations
- [101509] Juvenile Justice
- [101510] Legal Aid Services
- [101511] Local Laws and Ordinances
- [101512] Military Law
- [101513] Native Title Claims
- [101514] Privacy Protection
- [101515] Prosecution Services

[1016] Maritime Services

- [101601] Cargo Control
- [101602] Harbour Management
- [101603] Marina Management
- [101604] Navigation
- [101605] Pilotage Management
- [101606] Port Management
- [101607] Sea Passengers
- [101608] Search and Rescue
- [101609] Ship Personnel
- [101610] Ship Safety

[1017] Natural Resources	[1018] Primary Industries	[1019] Science	[1020] Security	[1021] Sport and Recreation	[1022] Statistical Services	[1023] Tourism	[1024] Trade	[1025] Transport
[101701] Crown Land Management	[101801] Chemical and Pesticide Control	[101901] Agricultural Sciences	[102001] Corrective Services	[102101] Caravan and Camping Services	[102201] Census	[102301] Tourism Industry Development	[102401] Export Control	[102501] Air Transport
[101702] Energy Resources	[101802] Marine and Rural Support	[101902] Animal and Veterinary Sciences	[102002] External Security	[102102] Community Recreation	[102202] Statistical Compilation and Analysis	[102302] Tourist Event Promotion	[102402] Import Control	[102502] Freight Movement
[101703] Land Use Management	[101803] Quarantine	[101903] Applied Sciences	[102003] Information Security	[102103] Gaming Industry Control	[102203] Statistical Standards	[102303] Travel Missions	[102403] Intellectual Property Protection	[102503] Passenger Services
[101704] Land Valuation	[101804] Rural Field Day Promotion	[101904] Biological Sciences	[102004] Intelligence	[102104] Park and Reserve Services	[102204] Statistics Coordination		[102404] International Trade Agreements	[102504] Rail Transport
[101705] Mineral Resources	[101805] Rural Partnerships	[101905] Earth Sciences	[102005] Law Enforcement	[102105] Sport and Fitness Development	[102205] Statistics Dissemination		[102405] Interstate Trade Agreements	[102505] Road Transport
[101706] Pollution Emission Control		[101906] Mathematical Sciences	[102006] National Security	[102106] Sports Drugs Control			[102406] Trade Development	[102506] Transport Infrastructure Development
[101707] Water Resources		[101907] Medical and Health Sciences					[102407] Trade Expositions	
		[101908] Physical Sciences						
		[101909] Spatial Information Research						

Figure 5-3: Services for Citizens Business Area

5.3 Services for Citizens Business Area

The Services for Citizens Business Area describes the mission and purpose of the Australian Government in terms of the services it provides both to and on behalf of Australian individuals, businesses and other organisations. It includes the provision of externally-focused government services and the obligations of the Australian Government to support and protect the nation's population. The majority of the functional definitions contained within the Services for Citizens Business Area have been adapted from the AGIFT.

The structure of the Services for Citizens Business Area *(Figure 5-3)* incorporates the Lines of Business and Business Capabilities.

5.3.1   [101] Business Support [A]

Business Support includes supporting the private sector, including small business and non-profit organisations; supporting strategies to assist business growth and management; supporting advocacy programs and advising on regulations surrounding business activities; and assisting businesses to comply with reporting requirements of the government.

Business Sub Function	Defines the set of Business Capabilities that
10101 Association Registration	• support the registration of associations; • recording the details of incorporated associations; • assess applications and issuing registration numbers; • maintain records of registered details; • process registration updates and renewals.
10102 Business Accounting and Reporting	• support and assist businesses and organisations in their efforts to maintain accounts and records of their business activities, and to satisfy business reporting requirements of the government; • review the performance or financial management, of businesses and organisations; • provide verification for statements or claims made in official reports; • provide recommendations for improvement in business processes and operations.
10103 Business Registration and Licensing	• support the registration of businesses; • record the details of companies and corporations; • assess applications and issue registration numbers; • maintain records of registered details; • process registration updates and renewals; • issue licenses and permits, such as those required for fundraising, the sale of alcohol or signage and displays.
10104 Business Sponsorship	• support corporate funding of organisations and events; • advise on regulations and restrictions on products and services at events; • provide information about sponsorship applications and how to meet obligations in relation to marketing and merchandising.

Business Sub Function	Defines the set of Business Capabilities that
10105 Consumer Protection [A]	• safeguard the purchasers of goods and services; • provide information to consumers and business about their rights and obligations; • handle complaints and manage dispute resolution procedures.
10106 Fair Trading [A]	• support and ensure the ethical conduct of business and protect consumers from excessive prices or faulty products (including price surveillance); • ensure product safety and quality, and compliance with competition, fair trading and consumer protection laws; • promote trading practices that support market competition.
10107 Financial Institutions Control [A]	• control banks, credit unions, building societies and friendly societies; • advise on rules for capital adequacy; • monitor the activities of financial institutions and investigate suspected breaches of prudential regulations.
10108 Industry Assistance Schemes [A]	• support the growth and management of primary, secondary and tertiary industries; • identify markets or investment opportunities; • encourage businesses to adopt innovative practices, processes and products; • provide advice on production methods and business management to improve competitiveness.
10109 Industry Development [A]	• support the development of primary, secondary and tertiary industries; • advise on industry development regulations and operating standards; • provide quality assurance mechanisms; • issue licenses for controlled activities; • certify products and production methods; • conduct assessments and inspections to ensure compliance with standards and policy; • investigate suspected breaches of regulations.
10110 Insurance [A]	• support and control schemes that provide financial guarantees against risk of loss or harm; • maintain prudential oversight of insurance providers; provide assistance and advice to citizens seeking insurance; • provide advice on regulations relating to insurance.
10111 Professional Accreditation [A]	• support the certification of individuals as meeting official requirements to perform a skilled occupation (including processing applications, managing examinations and advising on conditions on the right to apply qualifications in certain fields).

Business Sub Function	Defines the set of Business Capabilities that

Business Sub Function	Defines the set of Business Capabilities that
10112 Small Business Services ᴬ	• support and assist commercial enterprises of limited size or capital; • provide advisory services to support the start-up and ongoing operation of small businesses; • encourage the adoption of innovative practices, processes and products (including the establishment of communication networks or resource centres).
10113 Stock Market Control ᴬ	• support and control the buying, selling and trading of shares and securities; • monitor the activities of stock exchanges and stockbrokers (including issuing licenses and investigating suspected breaches of regulations).

5.3.2   [102] Civic Infrastructure ᴬ

Civic Infrastructure includes supporting the growth of towns and cities; supporting the management of sustainable urban development and maintaining essential services; and supporting the installation of buildings and services to meet the administrative, social and recreational needs of local residents.

Business Sub Function	Defines the set of Business Capabilities that
10201 Civic Management ᴬ	• support the provision of integrated support for town planning and building projects; • support the coordination of building projects and manage input from multiple parties (including provision of architectural and engineering services, building approvals and advice on building regulations, guidelines and standards); • advise on responsibilities for projects that cross jurisdictional boundaries.
10202 Energy Supply ᴬ	• support the provision of energy resources and other utilities; • support the installation of infrastructure to facilitate energy supply; • advise on energy supply regulations; • monitor providers to ensure all citizens receive an adequate level of service to meet basic requirements; • encourage consumers to conserve energy support renewable energy development.
10203 Integrated Essential Services ᴬ	• support the provision of essential community services in a coordinated and equitable manner; • support the evaluation of land use and town planning objectives; • support the essential service requirements of particular districts; • bring together related essential services, according to the target audience.

Business Sub Function	Defines the set of Business Capabilities that
10204 Public Housing [A]	• support the supply of low cost accommodation; • advise on guidelines that direct the design of public housing; • evaluate the need for public housing and setting construction targets; • support ongoing maintenance.
10205 Public Land Management [A]	• support the control and maintenance of buildings or areas of land set aside for community use; • advise on guidelines that direct the use of public land; • support ongoing maintenance; • provide advice for planning purposes of public land.
10206 Regional Development [A]	• support the management of infrastructure projects to support multiple districts, such as building schools or hospitals; • support the extension of facilities beyond urban boundaries to supply services to remote or rural areas; • support the installation of equipment to enable communications.
10207 Transport Network Maintenance [A]	• support the management of public transport networks at a local level; • support the development of interconnecting services for road, rail and air transport; • support the maintenance of public car parks, bus shelters, train stations, footpaths and cycle ways.
10208 Waste Management [A]	• support the provision of services to collect and dispose of garbage; • support the operation of waste management centres, landfill sites, recycling depots and sewerage facilities; • promote and support consumer waste minimisation.
10209 Water Supply	• support the provision of the sustainable development, on-going operation and management of water supply services.

5.3.3   [103] Communications [A]

Communications includes supporting the growth and management of industries that enable and facilitate the communication and transmission of information; supporting the provision of communications services to all citizens; and advising on regulations, standards and guidelines surrounding communications services and technologies.

Business Sub Function	Defines the set of Business Capabilities that
10301 Advertising Standards [A]	• support the content and presentation of marketing material disseminated via any medium; • advise on regulations governing marketing material and guidelines guarding against misleading or offensive advertising (including advertising guidelines and advice on advertising standards; monitoring compliance).

Business Sub Function	Defines the set of Business Capabilities that
10302 Broadcasting ᴬ	• support industries that transmit content simultaneously to many recipients (including local, national and international broadcasting); • provide advice on broadcasting regulations, guidelines and standards; • provide advice on the introduction of new technology and the effects of government communications policy on the broadcasting industry; • encourage the use of mass marketing and content distribution strategies; • manage publicly owned broadcasting media outlets and issue commercial broadcasting licenses; • support the editorial and programming independence of national broadcasters (including liaison with arts and cultural sectors).
10303 Communications Infrastructure	• support the provision and management of physical communication infrastructures on behalf of the public in order to enable and facilitate communication; • support industries that provide mechanisms for access to government information and knowledge, and mechanisms for the public to communicate with the government (including access for people with special needs); • advise on the availability of new communications technology and the implications for conducting business with the government.
10304 Electronic Commerce ᴬ	• support Australian participation in the global information economy; • advise on regulations, standards and guidelines; • promote information and communications technology for conducting business; • support initiatives in electronic commerce (including online authentication infrastructures and guidelines).
10305 Media Ownership Control ᴬ	• support Australian control of domestic communication channels; • advise on limits on who can own and control Australian media outlets; • encourage diversity among the more influential broadcasting services.
10306 Postal Services ᴬ	• support the collection and delivery of letters, parcels and other mail; • advise on guidelines; • advise on standards for pricing and processing, such as ensuring dangerous goods are intercepted; • design and issue postage stamps.
10307 Publishing	• support industries that publish and distribute information via print or electronic media (including industries that edit and publish material in printed formats); • advise on publishing regulations, standards and guidelines; • monitor and ensure compliance with copyright; • manage publicly owned publishing media outlets.

Business Sub Function	Defines the set of Business Capabilities that
10308 Radio Communication [A]	• support the operation of wireless communications infrastructure; • advise on radio communication regulations and standards; • maintain and provide advice on the regulatory framework for the radio communications industry; • support market entry, enable firms to acquire spectrum to introduce new technologies (including radio licensing, spectrum management and liaison across jurisdictions on radio communications issues).
10309 Satellite Communication [A]	• support industries that relay radio and television signals via equipment located in space; • advise on satellite communication regulations and standards; • manage government-owned satellite equipment; • provide advice on the introduction of new technology and the effects of government policy on the satellite communication industry (including liaison with international bodies on shared access to satellite equipment).
10310 Telecommunications [A]	• support industries that transmit signals via wire, fibre, wireless spectrum or cable to a receiver; • advise on telecommunications regulations and standards; • provide advice on the introduction of new technology and the effects of government policy on the telecommunications industry (including carrier and equipment licensing and consultation with peak industry bodies).

5.3.4   [104] Community Services [A]

Community Services includes supporting assistance to citizens in a particular district or those with common interests and needs; providing welfare services and financial support; and supporting disaster and emergency assistance.

Business Sub Function	Defines the set of Business Capabilities that
10401 Accommodation Services [A]	• support the provision of accommodation and housing to defence personnel and community members in need (including defence housing, public housing, emergency accommodation and refuges); • provide eligibility criteria for services; • support the assistance to specific community groups at risk of homelessness (including liaison with areas responsible for public housing construction to determine short-term and long-term community housing needs).
10402 Community Support [A]	• support family units by providing assistance surrounding adoption, aged care, child care, child and youth support, defence community support, family reunions and veterans support; • support targeted services and programs to foster relationships and develop community self-reliance (including cooperation with other jurisdictions and non-government organisations).

Business Sub Function	Defines the set of Business Capabilities that
10403 Counselling Services [A]	- support the provision of group therapy or psychological advice to individuals, families and community groups; - support the treatment of drug addiction, emotional or behavioural problems (including assistance to people who have been ordered through the courts to undertake counselling).
10404 Emergency Services [A]	- support the provision of urgent assistance in times of crisis or unforeseen circumstances (including ambulance and firefighting services, emergency funding, and organisational and logistical support from the defence forces); - advise on equipment standards and regulations regarding the use of volunteers; - coordinate government and community-based services within a region in times of emergency (including coordinating land-based search and rescue operations outside urban areas).
10405 Financial Assistance [A]	- support the provision of monetary support to individuals in the community in need; - provide eligibility criteria and appropriate delivery mechanisms for providing financial assistance; - advise on eligibility criteria and entitlements; - assess eligibility for entitlements and making payments (including ongoing and one-off payments, rebates and subsidies).
10406 Natural Disasters [A]	- support the provision of urgent assistance during emergencies caused by the elements – such as floods, droughts, earthquakes, cyclones, storms or major bushfires (including disaster recovery and disaster relief assistance); - monitor conditions to anticipate the likelihood and effects of natural disasters; - coordinate government and community-based services and advise on regulations regarding the use of volunteers (including liaison with defence forces that supplement civil community assistance by providing organisational and logistical support).
10407 Rural Community Development [A]	- support outback and country communities through targeted services and programs to develop self-reliance; - support the establishment of social networks and activities; - provide support for community-based or volunteer organisations (including activities to improve rural access to government services and liaising with local business to support community projects).
10408 Social Justice and Equity [A]	- support the fair treatment of all people, regardless of gender, race, colour, ethnicity, age, marital or parental status, sexual preference, disability or religious belief; - ensure that government services are implemented with fairness and sensitivity to community needs; - review services and make recommendations to improve access; - promote equal opportunity and anti-discrimination principles (including liaison with target groups to evaluate the effectiveness of equity programs).

Business Sub Function	Defines the set of Business Capabilities that
10409 Transport Access Schemes [A]	• ensure public transport facilities are readily available to all sectors of the community; • support the provision of transport services to those in need; • support the assistance of specific community groups; • provide eligibility criteria for concessions (including liaison with areas responsible for public transport construction to determine short-term and long-term community transport needs).

5.3.5 [105] Cultural Affairs [A]

Cultural Affairs includes supporting the arts and cultural organisations such as museums, libraries and galleries; supporting the development and management of cultural collections and artefacts, and stimulating growth in cultural industries; and sponsoring activities and events to celebrate the diversity of Australian culture.

Business Sub Function	Defines the set of Business Capabilities that
10501 Arts Development [A]	• provide support for the production of skilled performance or craft; • support the promotion of the arts, and encouraging participation from across the community; • assist the growth of artistic companies through business advice and planning (including support for work spaces and liaison with education and exhibition facilities).
10502 Collection Access [A]	• support and assist the location and use of items held by cultural institutions; • support access procedures to meet legislative requirements; • provide advice about opening hours and membership or registration requirements (including provision of online information to support remote access).
10503 Collection Management [A]	• support the acquisition, storage and preservation of cultural material and artefacts; • advise on standards and guidelines for collection management procedures to ensure the safety of fragile or highly valuable items (including liaison with other institutions about the management of cultural materials).
10504 Collection Promotion [A]	• support strategies to raise the profiles of cultural institutions and their holdings; • coordinate programs of events and publications; • advise on guidelines to support exhibitions and marketing campaigns.
10505 Cultural Awards and Scholarships[A]	• support the provision of prizes for achievement in artistic, literary or heritage-related activities; • support cultural-sector students of high merit (including promotional activities, assessing applications and managing payments).
10506 Cultural Festivals [A]	• support and promote events that highlight artistic, literary or heritage related activities; • support the organisation of festivals, performances and joint ventures with community groups where events focus on a particular genre or collection (including participation in international cultural festivals).

Business Sub Function	Defines the set of Business Capabilities that
10507 Cultural Gifts ^A	• manage donations of cultural materials made under arts incentive schemes; • examine materials to ensure they conform to collection development policies; • advise on guidelines for the acceptance of gifts; • advise on access restrictions, intellectual property rights and legal title over materials; • organise independent valuations and making submissions to the relevant taxation incentives body.
10508 Multicultural Heritage Promotion ^A	• support, protect and promote Australia's cultural diversity; • sponsoring community events and activities; • recognise internationally significant dates and events; • encourage research into multicultural experiences; • initiate projects to compile and document ethnic oral histories and folklore.

5.3.6   [106] Defence ^A

Defence includes supporting the defence and protection of the nation, region and allies; ensuring the safety of Australia by building, maintaining and deploying military resources; and providing protective support by defence service personnel at major civilian events, emergency operations, humanitarian operations and peacekeeping efforts.

Business Sub Function	Defines the set of Business Capabilities that
10601 Australian Defence Force ^A	• support the national and cross-jurisdictional defence and protection of the Australian people through the Australian Defence Force; • protect Australia's borders and ensuring Australia's ability to resist foreign aggression or attack; • provide defence support for the security and protection of Australia's region and allies through the deployment of military resources.
10602 Civilian Event Protective Support	• provide defence services support for the protection of civilians and participants at major civilian ceremonial, civic and sporting events (including counter-terrorism support).
10603 Emergency Protective Support	• provide defence services support for the protection of civilians during cross-jurisdictional operations dealing with large-scale crises and unforeseen circumstances (including domestic and overseas emergencies).
10604 Humanitarian Protective Support	• provide defence services support for the protection of civilians during humanitarian disasters and adversities (including protection for victims of domestic and overseas natural disasters and catastrophes, war activities or terrorist attacks, and operations involving interventional initiatives against adverse living conditions of civilians).

Business Sub Function	Defines the set of Business Capabilities that
10605 Peacekeeping Protective Support	• support international peacekeeping efforts to protect the civilians of Australia's allies and other countries within the Australian region; • assist efforts to restore peace and stability in war-torn countries; • support and assist with the protection of civilians involved in rehabilitation and reconstruction efforts in war-torn countries.

5.3.7 [107] Economic Management A

Economic Management includes supporting the economic management of public funds and other resources; supporting appropriate strategies for raising revenue and regulating expenditure; providing advice on investment regulations; and monitoring economic indicators and forecasting trends to enable financial planning.

Business Sub Function	Defines the set of Business Capabilities that
10701 Commonwealth State and Territory Funding A:	• provide Commonwealth financial support to State and Territory governments; • conduct analysis to determine the appropriate distribution across jurisdictions (including general grants and specific-purpose payments allocated in accordance with the Commonwealth Grants Commission's determinations).
10702 Currency A:	• support the minting and distribution of monetary notes and coins; • implement security techniques such as watermarks to prevent counterfeiting; • issue new or commemorative coins.
10703 Financial Investment A	• encourage safe and legitimate investment practices; • maintain prudential oversight of financial instruments and participants in financial markets; • advise on prudential regulations relating to investment.
10704 Financial System Management A	• maintain stability in the financial system (including managing arrangements that allow consumers, business, other organisations, and financial institutions to transfer funds from one to another).
10705 Fiscal Policy A	• support the strategic management and distribution of public money; • determine overall levels of public spending required to maintain economic stability; • advise on regulations regarding public borrowing and levels of public debt.
10706 Foreign Investment Control A	• control the participation of overseas parties in Australian commercial or financial ventures; • advise on regulations regarding the ownership of Australian assets by foreigners.
10707 International Monetary Policy A	• monitor international currency markets and identify trends; • forecast market movements; • implement strategies to maintain stable Australian markets.

Business Sub Function	Defines the set of Business Capabilities that
10708 Monetary Policy [A]	• maintain stability of the currency, improve economic performance and employment levels (including monitoring exchange rates and setting inflation targets); • set interest rates by buying and selling in money markets (including activities to control inflation within predefined limits).
10709 Payments to Government	• support and facilitate the payment of monies to the Australian Government by individuals, businesses or other organisations, from both foreign and domestic sources.
10710 Retirement Income [A]	• safeguard the savings of individuals who have left the workforce; • advise on criteria for evaluating a retiree's assets, for tax or benefits purposes; • advise on standards for the operation of superannuation funds; • implement mechanisms to support retirement saving by individuals.
10711 Taxation Services [A]	• support individuals and businesses towards compliance with taxation requirements and surrendering of taxes and levies to the government (including the issuing of tax file numbers, assistance with income assessments and taxation documentation submitted by individuals, businesses and organisations, provision of taxation advice, provision of tax collection and recovery mechanisms and procedures).

5.3.8   [108] Education and Training [A]

Education and Training includes supporting the provision of skills and knowledge to citizens; supporting strategies to make education available to the broadest possible cross-section of the community; supporting schools, universities, colleges, academies or community groups that provide education and training; and supporting the development and management of educational institutions.

Business Sub Function	Defines the set of Business Capabilities that
10801 Arts Education [A]	• support the provision of training and facilities to support the production of skilled performance or craft; • manage specialised institutions or schemes to foster artistic talent at individual or community level (including the provision of scholarships and study grants).
10802 Community Education [A]	• support the provision of training designed to assist target groups of citizens; • initiate joint ventures with not-for-profit groups and local businesses. • Community education is usually offered outside formal institutional structures (including first aid and fire safety training).
10803 Curriculum Development [A]	• outline study programs for any education sector; • outline the courses and units to be completed (including liaison across jurisdictions to support consistency across education authorities).
10804	• foster the development of young children, usually under the age of five years;

Business Sub Function	Defines the set of Business Capabilities that
Early Childhood Education [A]	• advise on standards and guidelines to support teachers (including determining enrolment criteria).
10805 Military Education and Training [A]	• instruct and exercise defence recruits (including training for military personnel, officers, cadets and army reserves); • manage specialised institutions or facilities to provide suitable training for active personnel; • initiate joint ventures to provide tertiary level education or residential schools for service personnel.
10806 Overseas Skills Recognition [A]	• endorse or accredit educational qualifications obtained outside Australia; • recognise Australians who have studied overseas or migrants wishing to apply their qualifications in Australia (including processing applications, managing examinations and advising on conditions on the right to apply qualifications in certain fields).
10807 School Education [A]	• support the provision of instruction to children to impart knowledge and develop skills; • provide public school education for children in Years K to 12 (including assistance for children with special needs or behavioural issues); • advise on regulations regarding non-government schools; • support the management of school facilities; • advise on standards and guidelines to support teachers (including the provision of scholarships and study grants); • assist children's travel to and from school; • advise on regulations around school transport services.
10808 Tertiary Education [A]	• support the provision of instruction beyond secondary school education to impart knowledge and develop skills; • advise on entry requirements; • manage tertiary education institutions and facilities; • advise on standards and guidelines to support lecturers (including the provision of scholarships and study grants).
10809 Vocational Education [A]	• support the provision of training and further education for work-related disciplines (including apprenticeships, traineeships, workplace and on-the-job training); • advise on standards and guidelines to support the operation of vocational education programs; • initiate joint ventures with industry, schools and tertiary institutions to make use of facilities (including the provision of scholarships and study grants).

118

5.3.9   [109] Employment [A]

Employment includes supporting employment growth and working environments; supporting strategies to improve workplace relations, productivity and performance; and supporting labour market stability and growth.

Business Sub Function	Defines the set of Business Capabilities that
10901 Human Resources Development [A]	• provide support for staff development and management; • provide career planning advice, professional development and training; • conduct research into recruitment, retention and organisational demographics to support long-term planning for human resources development.
10902 Industrial Awards and Conditions [A]	• support the establishment and use of industrial awards and conditions; • issue awards with regard to rates of pay and working conditions; • advise on regulations regarding the conduct of employers and employees across a particular industry or occupation; • hear disputes and offer independent arbitration services.
10903 Labour Markets [A]	• support the growth and stability of labour markets (including initiatives to increase employment among individuals in target groups or across specific industries); • provide mechanisms for managing and disseminating job vacancy data; • issue licenses to organisations or individuals who provide employment services.
10904 Workplace Agreements [A]	• support the establishment and use of workplace agreements (including enterprise codes of practice); • certify agreements with regard to rates of pay and working conditions; • advise on regulations regarding the conduct of employers and employees across a particular organisation, or between an employer and an individual employee.

5.3.10 [1010] Environment ^A

Environment includes supporting the management of the surrounding natural and built environments; balancing competing requirements to generate long term sustainable benefits for industry, tourism and the community; and protecting elements of the natural and built environment that are of special significance. It includes the conservation of the national estate and world heritage concerns.

Business Sub Function	Defines the set of Business Capabilities that
101001 Built Environment ^A	• support the protection of structures of particular historic, scientific or social significance; • advise on standards for maintaining and preserving elements of the built environment; • support joint projects with business or the community.
101002 Business and Community Assistance	• Assist communities and industry to face climate and environmental challenges (including information and assistance for adapting to, and effectively responding to climate change, and innovating to mitigate climate change impacts).
101003 Environment Information services ^A	• provide climatic advice, information on prevailing conditions and weather forecasts; • issue alerts for severe weather (including drought monitoring and updates on seasonal climate variability).
101004 Conservation ^A	• support the maintenance of land-based areas of the natural environment that are culturally or scientifically significant in their native state; • support the conservation of plant or animal life in a land-based region to protect and sustain ecosystems; • promote community awareness and participation in conservation activities.
101005 Environmental Impact Assessment ^A	• evaluate the effects of industry, tourism or community use on the natural and built environments; • conduct inspections of premises, equipment or operations; • provide advice on proposed infrastructure projects, commercial or residential developments (including emergency assessments following industrial accidents or natural disasters).
101006 Historic Relic Protection ^A	• support the protection of built artefacts of particular heritage, scientific or social significance; • advise on standards for maintaining and preserving historic relics; • support joint projects with business or the community.
101007 Marine Life Protection ^A	• support the maintenance of sea-based areas of the natural environment that are culturally or scientifically significant in their native state; • support the conservation of plant or animal life in a marine region, to protect and sustain ecosystems; • promote community awareness and participation in conservation activities.

Business Sub Function	Defines the set of Business Capabilities that
101008 Natural Heritage Protection [A]	• support the management and conservation of elements of the biological environment that have particular historic, scientific or social significance; • advise on standards for maintaining and preserving natural heritage areas, such as access and development restrictions or regeneration requirements.
101009 Oceans Governance [A]	• support the management and protection of marine environments; • support the sustainable development of ocean resources; • conduct negotiations across jurisdictions to ascertain authority over particular ocean regions.
101010 Pollutant Prevention [A]	• support initiatives to reduce contamination of the air, water and land by emissions and waste; • advise on standards around pollutant prevention; • support initiatives to counteract the effects of pollutants if accidents occur; • raise awareness and support community activities to change common practice; • promote environmentally friendly alternatives.
101011 World Heritage Listings [A]	• support the maintenance of items or areas registered by UNESCO in accordance with the World Heritage Convention for protection and conservation; • assess natural, Indigenous and historic sites in Australia for possible inclusion on international heritage lists (including liaison with international bodies and community groups to manage the listing process).

5.3.11 [1011] Health Care [A]

Health Care includes supporting the prevention, diagnosis and treatment of disease or injury; supporting the provision of health care services and medical research; supporting regulatory schemes for health care products and pharmaceuticals; and controlling the registration and conduct of health practitioners.

Business Sub Function	Defines the set of Business Capabilities that
101101 Community Health Services [A]	• support the protection of the physical and mental wellbeing of community members in a particular district; • support the provision of direct assistance to individuals or groups and address the needs of the local community; • monitor community health services to ensure adequate levels of care.
101102 Defence Health Services	• support the protection of the physical and mental wellbeing of Defence personnel and their families (including health services for defence service personnel serving overseas).
101103 Health Insurance Schemes [A]	• support the provision of financial guarantees against risk of disease or injury; • support the operation of universal health insurance schemes; • allow subsidised medical treatment within the public health system.

Business Sub Function	Defines the set of Business Capabilities that
101104 Health Protocols A	• support activities that are fundamental to the promotion of health and prevention of disease and the consistency of health procedures across jurisdictions; • advise on health regulations, standards and guidelines (including drugs and poisons control and food hygiene); • control the registration and conduct of health care providers.
101105 Hospital Services A	• support the provision of hospital services and health care through institutions offering a wide range of treatments and services (including liaison across jurisdictions to coordinate services and operations).
101106 Medical Research A	• support the scientific investigation of human health and disease; • advise on medical research regulations and standards for ethical conduct; • support the availability of medical equipment or research services; • advise on criteria for the allocation of funding to medical research.
101107 Public Health Services A	• support the protection of the physical and mental wellbeing of all people at a broad level; • support the understanding and control of the determinants of disease; • reduce public exposure to risks encountered as part of lifestyle or the environment.
101108 Special Needs Services A	• support the protection of the physical and mental wellbeing of people with particular requirements; • assist target groups with special health care needs (including advisory and support services for individuals with a particular medical condition).
101109 Veterans' Health Services A	• support the protection of the physical and mental wellbeing of returned defence service personnel and their families; • address the specific health care needs of veterans; • provide eligibility criteria for access to health services.

5.3.12   [1012] Immigration ^A

Immigration includes assisting people wishing to enter Australia on a permanent or temporary basis; providing and advising on entry or deportation requirements for migrants and visitors. It includes strategies for the management of illegal immigrants.

Business Sub Function	Defines the set of Business Capabilities that
101201 Citizenship ^A	• support Australian nationality (including the rights and obligations of citizens); • define the legal status of Australian citizens and the management of citizenship when people migrate; • provide criteria for the naturalisation of immigrants; • promote the value of Australian citizenship.
101202 Deportation ^A	• remove foreign nationals whose presence in Australia is unlawful or poses an unacceptable level of threat to the community; • arrange the deportation of non-citizens who have committed serious crimes and those whose visas have expired (including the exclusion of unauthorised arrivals who are not refugees).
101203 Detention ^A	• provide custodial schemes for people who have or who are suspected to have entered Australia illegally, those refused entry at international airports and seaports, and those whose visas are cancelled or expired; • manage facilities for the detention of illegal or suspected illegal immigrants; • provide food and amenities, medical care, recreation, social support and education.
101204 Migrant Services ^A	• provide information and support to foreign nationals who intend to settle in Australia; • evaluate the needs of migrants; • provide advice before embarkation and upon arrival (including liaison with community groups and across jurisdictions to ensure appropriate support).
101205 Refugee Services ^A	• provide assistance to asylum seekers and victims of human rights violations; • assess applications for refugee status; • arrange health checks, counselling, community support and special services as required (including liaison with community groups and across jurisdictions to ensure appropriate support.).
101206 Travel Authorisation ^A	• support the entry and presence of non-citizens or foreign nationals in Australia; • provide advice on travel regulations and eligibility criteria, visa classes and entry conditions; • provide on-arrival immigration clearance through the passenger entry control system.

5.3.13 [1013] Indigenous Affairs ᴬ

Indigenous Affairs involves supporting the advancement of Aboriginal and Torres Strait Islander people; and supporting the provision and management of Indigenous services to Aboriginal and Torres Strait Islander people. This includes protecting areas directly associated with Aboriginal and Torres Strait Islander culture.

Business Sub Function	Defines the set of Business Capabilities that
101301 Indigenous Cultural Heritage ᴬ	• support the protection and promotion of the material, intellectual and spiritual traditions of Aboriginal and Torres Strait Islander peoples; • encourage research into Indigenous culture; • establish and maintain cultural resource collections; • negotiate special custodial arrangements with Indigenous peoples; • initiate projects to compile and record indigenous oral histories, genealogies and languages.
101302 Indigenous Enterprise Development ᴬ	• support the growth of businesses owned or operated by Aboriginal and Torres Strait Islander communities or individuals; • provide advice and services to assist the establishment of new ventures.
101303 Indigenous Health Services ᴬ	• support the protection of the physical and mental wellbeing of members of Aboriginal or Torres Strait Islander communities; • conduct planning and evaluation in consultation with local authorities; • encourage participation to ensure community needs are adequately addressed.
101304 Indigenous Heritage Conservation ᴬ	• support the protection of areas directly associated with Aboriginal and Torres Strait Islander culture; • advise on standards for maintaining and preserving Indigenous heritage areas, such as control of public access; • support joint projects with business or the community; • develop land use agreements and site management plans.
101305 Indigenous Reconciliation ᴬ	• support and promote understanding and agreement between Indigenous and non-Indigenous Australians; • ensure government policy encompasses respect for the aspirations and rights of Aboriginal and Torres Strait Islander communities; • support activities to increase tolerance and cross-cultural awareness.
101306 Indigenous Welfare ᴬ	• support the provision of social support services specific to Aboriginal or Torres Strait Islander communities; • support the expansion of Indigenous access to education and employment services, improvement in living conditions and assisting families in crisis.

5.3.14   [1014] International Relations ^A

International Relations involves building and maintaining relationships with other countries and international organisations; protecting and advancing national interests; and contributing to international security, economic development, the environment, democratic principles and human rights through aid programs, treaties and diplomatic services.

Business Sub Function	Defines the set of Business Capabilities that
101401 Consular Services ^A	• establish and maintain Australian Government representation overseas, such as high commissions, embassies or consulates; • protect the interests of Australian citizens travelling or living overseas; • provide country-specific trade or travel advice, and direct assistance where necessary (including services to Australians who are hospitalised or imprisoned in other countries); • advise the families of Australians who are missing and coordinating evacuations from high-risk areas.
101402 Defence Liaison ^A	• co-operate with other countries to ensure Australia's ability to resist foreign aggression or attack (including defence attaches, international defence cooperation, personnel exchanges between defence forces); • provide military advice to senior government representatives; • provide defence and strategic advice; • negotiate agreements for the deployment of defence resources; • participate in joint exercises and development programs.
101403 Diplomatic Missions ^A	• provide services to representatives of foreign governments or international organisations; • assist representatives to establish and maintain diplomatic missions, such as high commissions, embassies or consulates (including advice on protocol guidelines and consular responsibilities for countries without diplomatic representation in Australia).
101404 International Affairs ^A	• represent the Australian governments and provide diplomatic advice overseas; • conduct consultations with foreign governments and international organisations to maintain relationships and protect national interests.
101405 International Treaties ^A	• negotiate a formal agreement or convention between Australia and one or more other countries; • form a bilateral partnership or a multilateral alliance which is binding under international law; • amend an existing treaty or withdrawing from a treaty (including consultation with stakeholders, the development of declarations that may contribute to the development or interpretation of treaties); • monitor treaty, convention or agreement conditions.

Business Sub Function	Defines the set of Business Capabilities that
101406 Overseas Aid [A]	• assist developing countries to reduce poverty, promote sustainable economic growth and recover from conflict or disasters (including development assistance and overseas student scholarships); • work in partnership with other governments, businesses, non-government organisations and international agencies; • foster links between the Australian community and the people of developing countries (including contributions to multilateral development banks and direct assistance packages).
101407 Overseas Promotion [A]	• undertake liaison activities to raise Australia's international profile; • support cultural exchange programs; • advocate the benefits of international business; • establish corporate networks and reciprocal visitor programs (including identifying and negotiating opportunities to promote Australia overseas, such as participating in international expositions, hosting major sporting events or cultural festivals).
101408 Passport Services [A]	• issue passports and travel documents to Australian citizens in Australia and overseas; • manage applications and renewals, provide advice and liaise with outlets that provide lodgement services.

5.3.15   [1015] Justice

Justice involves providing, interpreting and applying legislation, regulations or by-laws; providing advice on regulations regarding the conduct of individuals, business and government to conform to agreed rules and principles; and supporting the operation of the justice system.

Business Sub Function	Defines the set of Business Capabilities that
101501 Administrative Law [A]	• apply the body of law that relates to the executive functions of government; • establish the relationship between the government and the citizens of its jurisdiction; • advise on regulations regarding the powers, duties and organisation of public administration authorities.
101502 Associations and Corporate Law [A]	• apply the body of law that relates to companies or other organisations that have a distinct legal identity from that of their members; • advise on regulations regarding the formation, governance and dissolution of such organisations and the limits of their powers or liability.
101503 Civil Law [A]	• apply the body of law that relates to social behaviour and the ordinary private matters of individuals; • establish and advise on property rights; • determine legal relationships and responsibilities.

Business Sub Function	Defines the set of Business Capabilities that
101504 Commissions of Inquiry A	• investigate a special matter or designated subject; • conduct inquiries; • hear evidence; • receive submissions and report findings (including Royal Commissions and other bodies charged with similar duties).
101505 Coronial Law A	• apply the body of law that supports inquests into any death clearly not due to natural causes; • undertake investigations on behalf of the coroner into the manner and cause of examinable deaths, or fires and explosions which damage property.
101506 Court Reporting A	• capture and make accessible a record of what is said in a court or other judicial decision-making body (including recording and publishing a statement of facts, arguments and judgements of a proceeding in the form of a transcript).
101507 Criminal Law A	• apply the body of law that governs actions punishable by the state; • provide and advise on rules of statute and common law to define criminal behaviour, specific penalties and the conduct of legal proceedings.
101508 Human Rights Obligations A	• ensure the freedoms to which all people are entitled are upheld; • advise on and monitor principles which may be constitutionally entrenched and guaranteed, recognised at common law, or declared by an international legal instrument (including investigations into breaches and promotion of human rights obligations and principles).
101509 Juvenile Justice A	• conduct special courts for the trial of children and young persons under a statutory age; • support diversionary programs as an alternative to sentencing, opportunities for restorative justice and reintegration into the community.
101510 Legal Aid Services A	• provide financial assistance for the purpose of legal proceedings in courts; • facilitate access to legal advice and services according to an income-based scale.
101511 Local Laws and Ordinances A	• apply legal processes at town or district level; • advise on public regulations and conducting courts with limited civil or criminal jurisdiction (including management of permits, rates and registration of domestic or native animals).
101512 Military Law A	• apply the body of law that relates to the discipline, trial and punishment of defence personnel; • establish military courts and conducting hearings to determine whether a command is lawful or if service personnel have met their obligations; • advise on and apply regulations regarding the treatment of prisoners of war and captured civilians in times of war.

Business Sub Function	Defines the set of Business Capabilities that
101513 Native Title Claims ^A	• assess Indigenous interest in or rights to the use of specified areas of land or water; identify traditional customs and connections with a particular region (including processing applications, providing advice and support for litigation).
101514 Privacy Protection ^A	• protect an individual's rights to the confidentiality of their personal information; • advise on information privacy laws and privacy principles for individuals, businesses and organisations; • monitor compliance with legislation and guidelines (including investigating breaches of privacy and evaluating new technology for potential risks to individual privacy).
101515 Prosecution Services ^A	• bring individuals or organisations to trial for criminal offences; • carry on of legal proceedings against a party in the interests of the public.

5.3.16   [1016] Maritime Services ^A

Maritime Services involves negotiating passage for sea transport and maritime jurisdiction; advising on regulations regarding the use of the sea as a means of transport; providing and managing maritime infrastructure; controlling the carriage of cargo; monitoring the safety of seagoing vessels, pilots and personnel; supporting marine search and rescue, and the development of navigational aids; and monitoring the environmental impact of maritime activities.

128

Business Sub Function	Defines the set of Business Capabilities that
101601 Cargo Control ^A	• support the transportation of goods by sea; • advise on regulations and international standards for carriage of hazardous materials, dangerous goods and oversize containers (including advice on best practice cargo handling, loading and management).
101602 Harbour Management ^A	• support the building and maintenance of infrastructure to provide protection for ships from wind, waves and currents; • support commercial and recreational use of harbour facilities; • advise on the environmental impact of activities (including liaison to promote coordination and consistency among harbour authorities from different jurisdictions).
101603 Marina Management ^A	• support the building and maintenance of facilities offering dockage and other services for watercraft; • license operators of private marinas; • advise on regulations regarding boating activities to protect waterways and marine industries from environmental impact (including inspections and assessment of procedures for managing sewage, spills and other discharge).

Business Sub Function	Defines the set of Business Capabilities that
101604 Navigation [A]	• support the management of shipping channels and monitoring the movement of ships at sea; • advise on regulations regarding the movement of ships and other commercial or private vessels; • provide advice on standards for safe and efficient navigation; • support the building and maintenance of infrastructure to support maritime navigation.
101605 Pilotage Management [A]	• support the provision of qualified operators to steer vessels into and out of ports; • advise on pilotage procedures; • clarify the responsibilities of pilots and pilotage providers; • provide advice on standards for pilotage operations that support international requirements.
101606 Port Management [A]	• support the management of sea-based entry and exit points; • support the building and maintenance of infrastructure to allow ships to load or unload passengers and cargo; • monitor activities of private terminal operators; • provide advice on regulations regarding port activities to protect against environmental impacts; • assess the integration of road, rail and air transport infrastructure with maritime services (including liaison to promote coordination and consistency among port authorities from different jurisdictions).
101607 Sea Passengers [A]	• support the transportation of people by sea; • advise on pricing regulations and the provision of appropriate facilities for passenger convenience (including services such as timetables, route maps or ticketing).
101608 Search and Rescue [A]	• support and protect the safety of individuals, vessels or aircraft that become lost at sea; • manage reporting systems; • advise on standards and response requirements (including support for community-based services); • advise on regulations regarding the use of volunteers; • coordinate maritime emergency services.
101609 Ship Personnel [A]	• support the operation of private or commercial marine vessels; • advise on regulations regarding ship personnel to improve security and reduce the risk of accidents or emergencies; • advise on standards and guidelines for operational practices and crew competencies (including cooperation on maritime personnel safety across jurisdictions).

Business Sub Function	Defines the set of Business Capabilities that
101610 Ship Safety [A]	• support and protect the safety of marine vessels; • advise on regulations regarding the design, construction and maintenance of private or commercial marine vessels; • advise on standards and guidelines for safety equipment, seaworthiness, noise or emissions; • investigate the circumstances and causes of marine accidents; • promote safety awareness across the maritime industry.

130

Business Sub Function	Defines the set of Business Capabilities that

5.3.17   [1017] Natural Resources [A]

Natural Resources involves supporting the sustainable use and management of energy, mineral, land and water supplies; evaluating resource consumption and exploitation practices; and advising on related regulations and supporting industries that realise the economic potential of resources.

Business Sub Function	Defines the set of Business Capabilities that
101701 Crown Land Management [A]	• manage tenure of government property; • support the sale, purchase, resumption, lease, license or transfer of Crown land; • provide sustainable property services to government agencies such as those associated with national parks and government housing.
101702 Energy Resources [A]	• support the use of energy resources; • apply legislation relating to fossil fuels, renewable and other energy industries; • provide advice on energy market reform, research and development, and environmental assessments.
101703 Land Use Management [A]	• support the effective management and allocation of land resources; • promote strategies for integrated land use and balancing competing interests; • provide advice on rural and urban developments; • conduct surveys and demographic analysis; • forecast needs for infrastructure and facilities; • identify heritage and significant areas.
101704 Land Valuation [A]	• support the assessment of land resources to estimate their material worth for rating and taxation purposes; • provide advice on the unimproved value of land or in acquisition compensation disputes (including valuations for heritage-listed land and rating concessions where land is held under nominated lease or tenure from the Crown).
101705 Mineral Resources [A]	• support the management of mineral resources and the economic development of related industries; • apply legislation relating to mining and mineral processing; • negotiate partnership programs with the traditional owners of mineral-rich lands.
101706 Pollution Emission Control [A]	• support the control of pollutant emissions; • advise on and monitor compliance with standards for the discharge of industrial contaminants and waste; • advise on regulations regarding industry practices through waste minimisation strategies and pollutant inventories (including assessment, inspections and providing emissions information to the community).

Business Sub Function	Defines the set of Business Capabilities that
101707 Water Resources [A]	• support water industry partnerships and cooperative approaches to the management and use of water; • apply legislation relating to waterways and water resources, including rivers, groundwater, wetlands and urban water; • advise on regulations regarding the exploitation of water resources to ensure sustainable quality and availability for household, industrial and agricultural use.

5.3.18   [1018] Primary Industries [A]

Primary Industries involves supporting rural and marine industries; advising on related regulations. Implementing strategies for efficient and sustainable operations; monitoring current practices to meet national and international standards. This includes liaison with industry bodies and across jurisdictions in relation to the needs of primary industries.

Business Sub Function	Defines the set of Business Capabilities that
101801 Chemical and Pesticide Control [A]	• support the control of chemicals and pesticides; • advise on and monitor the use of substances to control weeds, insects and other pests that affect primary production; • maintain a register of approved agricultural or veterinary chemicals and pesticides; • assess product applications; • specify conditions of use and maximum residue limits; • conduct routine inspections to ensure compliance.
101802 Marine and Rural Support [A]	• support and assist the growth and management of sea-based or farming industries; • identify markets and facilitate trade or investment opportunities; • support and provide financial assistance for marine and rural initiatives; • provide advice on marine and rural regulation (including quality assurance programs and operating standards); • support and encourage efficient and sustainable cultivation practices.
101803 Quarantine [A]	• protect the health of Australia's plant and animal populations from risks associated with exotic pests and disease; • conduct inspections at borders, ports, airports and other entry or exit points; • manage isolation and disinfection facilities; • advise on quarantine regulations and investigating breaches.
101804 Rural Field Day Promotion [A]	• support shows, exhibitions and conferences to encourage agricultural innovation (including financial assistance and advice on planning and marketing strategies).

Business Sub Function	Defines the set of Business Capabilities that
101805 Rural Partnerships A	• initiate cooperative projects to support change in the operation of primary industries and agricultural business ventures; • assist rural enterprises and communities adjust to changing commercial conditions to improve profitability and competitiveness; • provide advice, training and project funding assistance.

5.3.19 [1019] Science A

Science involves supporting and promoting research and systematic studies; and supporting scientific bodies and monitoring industry research and development programs. This includes research into living things and their environments, natural laws and the application of knowledge to practical problems.

Business Sub Function	Defines the set of Business Capabilities that
101901 Agricultural Sciences A	• conduct research into forestry, food, fibre and other crops or plants grown for commercial purposes; • provide input into quality control for the processing of agricultural products (including scientific advice on soil, weed and pest management, and information on new plant species).
101902 Animal and Veterinary Sciences A	• conduct research into the health care and management of wild and domestic animals; • provide scientific advice on nutrition, breeding, diagnosis and treatment of diseases (includes livestock, pets and other domestic animals, fish, birds and native animals – in the wild or in captivity).
101903 Applied Sciences A	• conduct research into the active use of scientific knowledge and principles from a range of fields and disciplines; • provide advice and practical solutions to problems in various sectors, such as industry, security, communications and health care.
101904 Biological Sciences A	• conduct research into the lives of plants, animals and micro-organisms; • investigate their origin, distribution, behaviour and physical make-up (including studies of evolution, ecosystem dynamics, identification and manipulation of biological processes).
101905 Earth Sciences A	• conduct research into geological, water and atmospheric processes; • provide scientific advice on the sustainable management of land and water resources, exploitation of mineral resources, hazard and disaster assessment.
101906 Mathematical Sciences A	• conduct research into quantities, magnitudes and forms by the use of numbers; • provide data analysis, simulation or mathematical modelling to illustrate trends and predict outcomes; • perform optimisation tests to determine the best operating conditions for a process (including training and consultancy in mathematical analysis).

Business Sub Function	Defines the set of Business Capabilities that
101907 Medical and Health Sciences ^A	• conduct experimental research into the causes, effects and symptoms of illness; • apply knowledge from a range of scientific disciplines to advance the diagnosis, treatment and prevention of disease; • develop products and processes to improve community health; • provide advice on diet, nutrition and the use of pharmaceuticals (including safety assessments for therapeutic goods and the development of new surgical techniques).
101908 Physical Sciences ^A	• conduct research into the properties of inanimate matter, substances and energy; • analyse and manipulate such material to identify the principles and processes that govern its behaviour (including the development of new methods to exploit physical substances or energy).
101909 Spatial Information Research ^A	• investigate practical applications for geographical data; • provide advice on standards, protocols and specifications for spatial information systems (including developing integrated access to information via the Internet, mobile information systems and global positioning systems [GPS]).

5.3.20 [1020] Security ^A

Security involves maintaining the safety of Australia at all levels of society; guarding against internal or external threats to peace and stability; supporting law enforcement, community protection and corrective services; and coordinating intelligence gathering and international security activities.

Business Sub Function	Defines the set of Business Capabilities that
102001 Corrective Services ^A	• support the punishment of individuals who have been convicted of an offence; • advise on standards and guidelines for correctional facilities and staff; • manage probation and parole activities (including support for inmates' families).
102002 External Security ^A	• protect Australia's international security interests; • maintain peace in external territories and the region; • evaluate risks to Australian citizens, territories and property overseas (including liaison with international security and law enforcement bodies).
102003 Information Security ^A	• protect government-held data and information, government networks, and information systems and procedures (including data and information on private individuals, businesses and organisations); • advise on protection guidelines and standards; • advise on research into cryptology and the development of codes; • monitor compliance with government security policy; • provide advice and tools to assist businesses and organisations to assess and improve their information systems.

Business Sub Function	Defines the set of Business Capabilities that
102004 Intelligence ^A	• support the collection of information by covert means, to protect Australia from threats to national security; • conduct surveillance operations and investigating the use of technology to facilitate intelligence gathering (including foreign intelligence gathering in relation to strategic, political, economic or scientific activities).
102005 Law Enforcement ^A	• reduce violence and the use of illicit substances; • improve public safety and reduce repeat offences; • advise on rules and regulations that govern the actions of citizens; • coordinate the services of law enforcement agencies across jurisdictions (including activities to address 'white-collar' and corporate crime).
102006 National Security ^A	• protect the Australian continent; • identify and apprehend individuals who may pose a threat to national security; • review the powers of the security and intelligence services.

5.3.21   [1021] Sport and Recreation ^A

Sport and Recreation refers to supporting, promoting and encouraging community participation in organised games or leisure activities; and advising on regulations regarding sport and recreation.

Business Sub Function	Defines the set of Business Capabilities that
102101 Caravan and Camping Services ^A	• support caravan and camping activities; • advise on regulations regarding the provision of sites where caravans, tents and other temporary dwellings may be erected; • certify the safety of campsite facilities and the hygiene of amenities; • provide advice to operators on administration, emergency procedures and insurance (including public information services such as the production of maps and promotional literature.)
102102 Community Recreation ^A	• encourage public fitness and physical activity across the community; • support the provision of organised activities to members of the public; • hold events for exercise, relaxation and enjoyment; • support specific groups, such as school children or senior citizens (including activities provided across public facilities such as swimming pools, libraries, community halls, sports centres, arts and cultural centres); • support groups and individuals who offer their time and labour to the community free of charge, and community-based and non-profit organisations that promote friendship and recreation.

Business Sub Function	Defines the set of Business Capabilities that
102103 Gaming Industry Control [A]	• support and promote responsible gambling practices and allocating revenue from gaming activities to community projects; • issue licences and provide training to licence holders; • monitor gambling and betting activities to ensure compliance with legislation; • conduct audits of accounts, procedures and machines in organisations with gaming facilities; • assist people with compulsive betting problems or gambling addictions.
102104 Park and Reserve Services [A]	• support the provision of access to areas of public land set aside for sport and recreational activities; • manage bookings, programs and payments; • control access and issue permits for the use of parks and reserves; • supervise the allocation of sponsorships and corporate memberships; • ensure the availability of staff such as referees or umpires.
102105 Sport and Fitness Development [A]	• support the growth of competitive sports and associated industries; • encourage increased participation and funding for sports and fitness programs (including organising, promoting and managing major sporting events, and providing funding through athletic scholarships, fundraising, donations and sporting grants); • provide training institutions and facilities for elite athletes.
102106 Sport Drugs Control [A]	• support the reduction of the supply and use of banned or performance-enhancing substances; • provide criteria to determine whether a substance is illegal and investigating breaches; • improve accountability in the prescription of sports drugs; • support research into doping detection tests; • collaborate with scientists and sporting bodies to share information and research.

5.3.22 [1022] Statistical Services

Statistical Services refers to providing a high quality, objective and responsive statistics service to assist and encourage informed decision making, research and discussion within governments and the community.

Business Sub Function	Defines the set of Business Capabilities that
102201 Census	• collect information from people, households, businesses and the administrative systems of government agencies (including the Population Census, household surveys, business surveys and information collections from government agencies).
102202 Statistical Compilation and Analysis [A]	• compile and analyse numerical facts (statistics) to identify trends and significant information – categories may focus on economic or social matters, government activities or the population in general (including liaison with other organisations to coordinate the collection of statistics).

Business Sub Function	Defines the set of Business Capabilities that
102203 Statistical Standards	• support and provide standards for numerical facts issued to the Australian community to ensure the information is coherent, comprehensible and consistent; • represent Australia on international standards bodies (such as the System of National Accounts and the Balance of Payments Manual); • advise official bodies within Australia about existing statistical standards; • consult on the development of new standards.
102204 Statistics Coordination	• support the co-ordinated collection of statistics across official bodies in Australia to ensure the national statistical information base is efficiently collected, with the least possible imposition on the public and businesses; • ensure that statistics that are coherent, relatable and fit for purpose.
102205 Statistics Dissemination [A]	• compile and disseminate statistical information for use by a broad cross-section of the community, businesses, the research sector, the media, government departments and agencies, other governments and international agencies – statistical categories may focus on the population, economic or social matters, environmental matters or government activities relevant to the Australian public.

5.3.23   [1023] Tourism ^A

Tourism refers to encouraging recreational visitors to a region; supporting the tourism industry and advising on regulations regarding tourism; supporting long-term strategies for tourism development and coordinating across jurisdictions on large-scale projects; and supporting promotional campaigns.

Business Sub Function	Defines the set of Business Capabilities that
102301 Tourism Industry Development ^A	• support the growth of businesses that provide travel products and other services to visitors; • identify the potential of new and emerging markets; • provide sponsorship; • encourage partnerships and coordinating initiatives to optimise tourism employment and create a favourable environment for investment (including recognising excellence in the Australian tourism industry through the presentation of awards).
102302 Tourist Event Promotion ^A	• support the development of special activities to draw visitors to a region; • market and promote events and attractions as catalysts for tourism growth; • manage publicity to increase awareness of tourism initiatives, exhibitions and trade fairs (including promotion of overseas tourist events).
102304 Travel Missions ^A	• support the marketing of activities carried out overseas for the promotion of Australia or specific regions as a travel and tourism destination; • organise meetings between members of the Australian tourism industry, travel agents and overseas tour operators (including familiarisation tours in Australia for international travel agents, tour operators and members of the travel press).

5.3.24   [1024] Trade [A]

Trade involves supporting the purchase, sale or exchange of commodities and advising on trade regulations; monitoring and providing advice on the balance of trade, industry protection and subsidy schemes – includes foreign and domestic activities and liaison across jurisdictions to support trade agreement negotiations.

Business Sub Function	Defines the set of Business Capabilities that
102401 Export Control [A]	• control the international sale and movement of goods from Australia; • ensure compliance with domestic and international protocols and guidelines; • issue export permits and licences, direct price regulation at port terminals and exit points (including monitoring international trade and consulting with primary producers, industry organisations and other stakeholders).
102402 Import Control [A]	• control the international purchase and movement of goods into Australia; • ensure compliance with domestic and international protocols and guidelines; • advise on quotas, import licensing arrangements and customs regulations (including inspections and cargo clearance).
102403 Intellectual Property Protection [A]	• protect the rights of creative workers in literary, artistic, industrial or scientific fields (including registration of copyright, designs, patents and trademarks and providing advice on intellectual property regulations); • protect proprietary knowledge such as development of new plant varieties, new inventions or commercial trade secrets.
102404 International Trade Agreements [A]	• support the supply and consumption of goods and services between countries; • advise on international trade legislation, policy and protocols; • negotiate treaties to reduce international trade restrictions and promote regional economic links.
102405 Interstate Trade Agreements [A]	• support the supply and consumption of goods and services across Australia; • advise on interstate trade legislation, policy and protocols; • negotiate agreements that promote commerce between states and territories and encourage competition (including agreements on quarantine zones, transport and infrastructure arrangements in support of trade).
102406 Trade Development [A]	• assist local businesses to compete in regional or international markets and win overseas or interstate contracts (including attracting investment to Australia, liaising with other governments and industry partners, and providing practical assistance such as identifying foreign investment partners and providing grants).

Business Sub Function	Defines the set of Business Capabilities that
102407 Trade Expositions ᴬ	• support the organisation of national and international events to promote trade and maximise marketing opportunities; • participate in trade fairs and develop exhibits (including activities to raise business profiles in a specific industry or across a range of sectors).

5.3.25 [1025] Transport ᴬ

Transport refers to supporting road, rail and air transportation systems and advising on transport regulations; supporting the movement of people or freight; monitoring and advising on the safety of vehicles and their operators; and supporting the development of transport infrastructure.

Business Sub Function	Defines the set of Business Capabilities that
102501 Air Transport ᴬ	• support the airline industry and supporting all aspects of private or commercial aviation (including air transport safety, aircraft standards and airport services); • provide advice on air transport regulations; • support air transport standards, air security and air services; • maintain air transport infrastructure (including liaison with other governments and international bodies to negotiate air-lanes and airspace jurisdiction).
102502 Freight Movement ᴬ	• support the transportation of goods by air, rail or road; • advise on regulations for carriage of hazardous materials, dangerous goods and oversized containers; • monitor compliance with freight regulations and investigate breaches; • provide advice on best practice logistics and standardised freight movement across jurisdictions.
102503 Passenger Services ᴬ	• support the transportation of people by air, rail or road; • advise on, and monitor compliance with, pricing regulations and the provision of appropriate facilities for passenger convenience (including services such as timetables, route maps or ticketing).
102504 Rail Transport ᴬ	• support the railway industry and all aspects of the rail network system (including rail harmonisation, rail land acquisition, rail transport safety, railway maintenance and rolling stock); • provide advice on rail transport regulations; • support rail transport standards, rail transport security and rail transport services, and licensing of rail transport operators (including liaison to promote coordination and consistency among rail authorities from different jurisdictions).

Business Sub Function	Defines the set of Business Capabilities that
102505 Road Transport [A]	- support the road transport industry and all aspects of private or commercial road usage (including road traffic code, road transport safety, road surface maintenance, vehicle registration, vehicle standards and driving licenses); - provide advice on road transport and road traffic regulations; - support road transport standards, road transport security and road transport services (including liaison across jurisdictions to provide uniform road regulations and enforcement practices).
102506 Transport Infrastructure Development [A]	- support the provision of infrastructure for the movement of people or goods; - install facilities to support a network of air, rail and road transport services; - assess existing infrastructure and planning for future requirements (including providing transport corridors, links to airport and rail terminals, and collaborating across jurisdictions on infrastructure development).

5.4 Service Paths Business Area

The Service Paths Business Area represents the functions used by the Australian Government in providing its Services for Citizens.

A Service Path provides an avenue, or pathway, through which government services are provided to Australian individuals, businesses and other organisations. A given service for citizens may involve a number of these avenues.

For example, providing small business services may involve government grants, subsidies, tax incentives, advising and consulting, information and knowledge dissemination, permits and licensing, inspections and auditing and government regulations. Alternatively, business services associated with advertising standards may only involve information and knowledge dissemination or advising and consulting.

Figure 5-4 shows the structure of the Service Paths Business Area, including the Business Capabilities for each LoB.
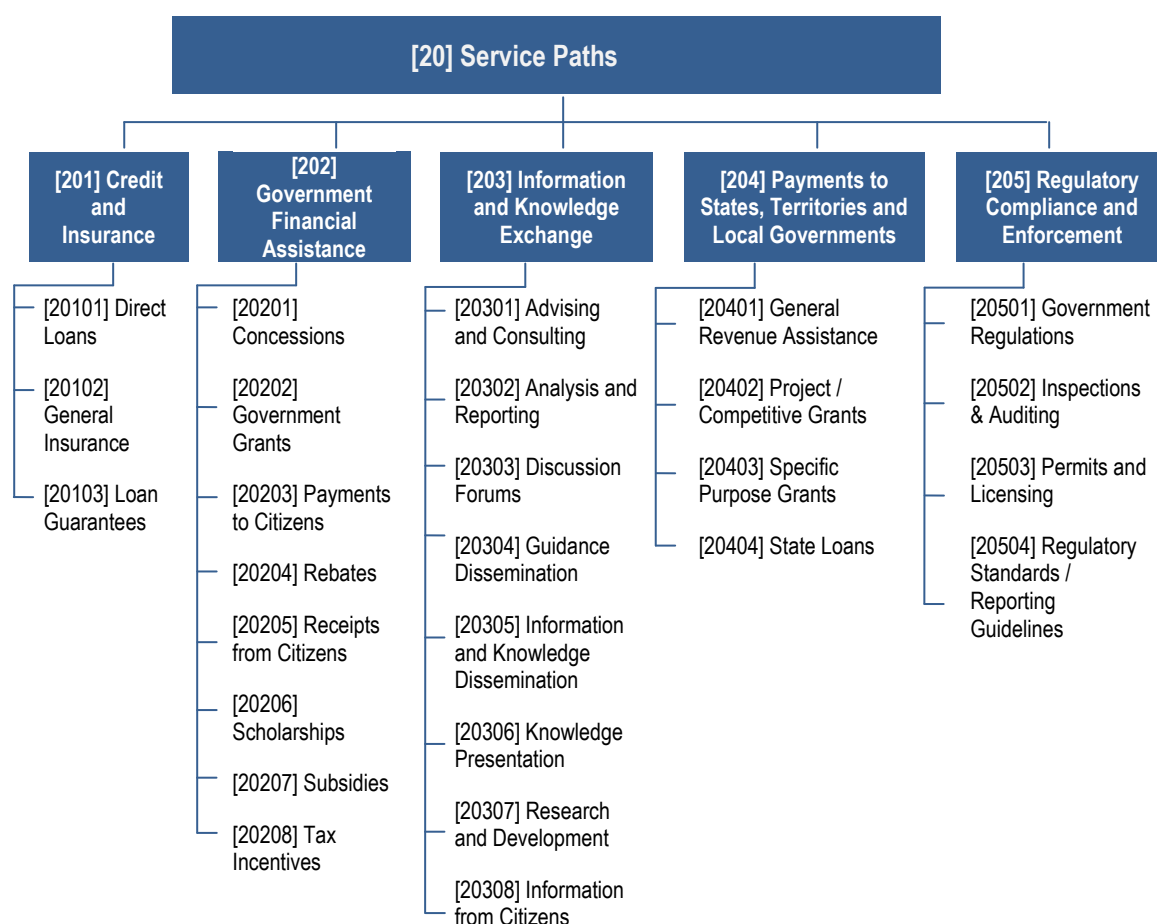
Figure 5-4:   Service Paths Business Area

5.4.1 [201] Credit and Insurance F

Credit and Insurance involves the use of government funds to cover the subsidy cost of a direct loan or loan guarantee or to protect/indemnify members of the public from financial losses.

Business Sub Function	Defines the set of Business Capabilities that
20101 Direct Loans F	• affect the disbursement of funds by the government to a non-government borrower under a contract that requires the repayment of such funds with or without interest. • An example of a direct loan is the Higher Education Loan Program (HELP) for tertiary students.
20102 General Insurance F	• affect the provision of protection to individuals or entities against specified risks. The specified protection generally involves risks that private sector entities are unable or unwilling to assume or subsidise and where the provision of insurance is necessary to achieve social objectives.
20103 Loan Guarantees F	• affect any guarantee, insurance, or other pledge with respect to the payment of all or a part of the principal or interest on any debt obligation of a non-government borrower to a non-government lender, but which does not include the insurance of deposits, shares, or other withdraw-able accounts in financial institutions.

5.4.2 [202] Government Financial Assistance F

Australian Government Financial Assistance refers to the provision of earned and unearned financial or monetary-like benefits to individuals, groups, or corporations. This includes support and facilitation of the payment of monies to the government from individuals, businesses and other organisations.

Business Sub Function	Defines the set of Business Capabilities that
20201 Concessions	• affect government financial assistance through concessions that do not directly involve money (including health and travel concessions).
20202 Government Grants F	• affect the disbursement of funds by the government to a non-government entity to help fund projects or activities (including the processes associated with grant administration, including the publication of funds availability notices, development of the grant application guidance, determination of grantee eligibility, coordination of the peer review/evaluation process for competitive grants, the transfer of funds and monitoring/oversight as appropriate).
20203 Payments to Citizens	• affect the discretionary and non-discretionary disbursement of funds from the government to beneficiaries (individuals or organisations) who satisfy government eligibility requirements, with or without restrictions imposed on the recipient as to how the money is spent. • Payments include both earned and unearned government entitlement programs such as welfare assistance, unemployment benefits, medical benefits, etc.

Business Sub Function	Defines the set of Business Capabilities that
20204 Rebates	• affect the reimbursement by the government of financial costs or levies already paid by citizens.
20205 Receipts from Citizens	• affect the provision of avenues for individuals, businesses and other organisations to make payments to the government.
20206 Scholarships	• affect the provision of government financial assistance through scholarships to eligible students for education and training activities (including academic and athletic activities).
20207 Subsidies [F]	• affect government financial assistance which reduces costs and/or increases revenues of producers or service providers.
20208 Tax Incentives [F]	• affect special exclusions, exemptions, or deductions from gross income or which provide a special credit, a preferential rate of tax, or a deferral of tax liability designed to encourage certain kinds of activities or to aid taxpayers in special circumstances.

5.4.3 [203] Information and Knowledge Exchange

Information and Knowledge Exchange refers to activities supporting avenues through which the government exchanges information and explicit knowledge with individuals, businesses and organisations within the community – this includes research and development, the creation of explicit knowledge, advice, reporting and the dissemination of information and regulatory guidance.

Business Sub Function	Defines the set of Business Capabilities that
20301 Advising and Consulting [F]	• provide advice, guidance and consultative services to support the implementation of a specific service for citizens; • transfer knowledge and experience to citizens through advice, information and guidance.
20302 Analysis and Reporting	• perform analysis on sets of information and reporting on the results.
20303 Discussion Forums	• provide public forums to promote, facilitate and enable the transfer and exchange of information and knowledge through discussion (including organised and facilitated public gatherings and meetings, and electronic / online forums).
20304 Guidance Dissemination	• publish or broadcast guidelines to assist in the interpretation and implementation of regulations.
20305 Information and Knowledge Dissemination [F]	• publish or broadcast government information – this addresses those instances where the primary method used in providing a service is through the publishing or broadcasting of information. • It is not intended to address circumstances where the publication of information is a by-product of an actual service path. For example, an agency might perform research (the service path) addressing a particular service for citizens (for example environmental management) and as a result publish a report on the findings. In this instance, the research would be the service path and publishing the report would be a services support activity.

Business Sub Function	Defines the set of Business Capabilities that
20306 Knowledge Presentation	• capture, catalogue and organise sets of government information or explicit knowledge into formats ready for people to use such as documents, publications, knowledge bases and information bases (including information types such as policies, procedures, facts, results of experience, problem solutions, standards, guidelines, rules, education and training materials, agency profiles, etc).
20307 Research and Development	• research and gather data and information and disseminating the results; • research, develop and evaluate new products, services, technologies, methodologies and ideas.
20308 Information from Citizens	• provide avenues for individuals, businesses and other organisations to submit information to the government about their person, business or organisation; • provide avenues for individuals, businesses and other organisations to view information held about them by the government, and to check the progress and status of information transactions with the government.

5.4.4 [204] Payments to States, Territories and Local Governments [F]

Payments to States, Territories and Local Governments involve the transfer of funds or financial assistance from the Australian Government to state, territory and local governments.

Business Sub Function	Defines the set of Business Capabilities that
20401 General Revenue Assistance [F]	• affect the allocation of money to states and territories or their subdivisions in accordance with distribution formulas prescribed by law or administrative regulation for activities of a continuing nature.
20402 Project/Competitive Grants [F]	• affect the funding, for fixed or known periods, of projects. • Project/Competitive grants can include fellowships, scholarships, research grants, training grants, traineeships, experimental and demonstration grants, evaluation grants, planning grants, technical assistance grants, survey grants and construction grants.
20403 Specific Purpose Grants [F]	• affect the distribution of money to state, territory and local governments for a named purpose or service usually specifically noted by the Australian Government in appropriations language or other program authorising language.
20404 State Loans [F]	• affect the disbursement of funds by the government to a state, territory or local government entity under a contract that requires the repayment of such funds with or without interest.

5.4.5 [205] Regulatory Compliance and Enforcement F

Regulatory Compliance and Enforcement involves the direct monitoring and oversight of a specific individual, group, industry, or community participating in a regulated activity via market mechanisms, command and control features, or other means to control or govern conduct or behaviour.

Business Sub Function	Defines the set of Business Capabilities that
20501 Government Regulations	• affect the implementation of government regulations governing conduct or behaviour in specific areas (including administering regulatory bodies and applying penalties for breaches of regulations).
20502 Inspections & Auditing F	• affect the methodical examination and review of regulated activities to ensure compliance with standards for regulated activity.
20503 Permits and Licensing F	• affect activities associated with granting, revoking, and the overall management of the documented authority necessary to perform a regulated task or function.
20504 Regulatory Standards / Reporting Guidelines F	• affect the establishment of allowable limits associated with a regulated activity and reporting requirements necessary to monitor and control compliance with allowable limits (including requirements for product sampling and testing, emissions monitoring and control, incident reporting, financial filings, etc).

146

5.5 Services Support Business Area

The Services Support Business Area provides the critical policy, programmatic and managerial foundation to support government operations in the provision of government services to Australian individuals, businesses and other organisations.

For example, services for citizens under the Maritime Services LoB may be supported by government operations involving legislative drafting, regulation development, public consultation, public relations, sale of goods and services, and user fee collection. Alternatively, taxation services may be supported by only legislative drafting, customer services and tax collection.

Figure 5-5 illustrates the LoB and Business Sub Functions in the Services Support Business Area.
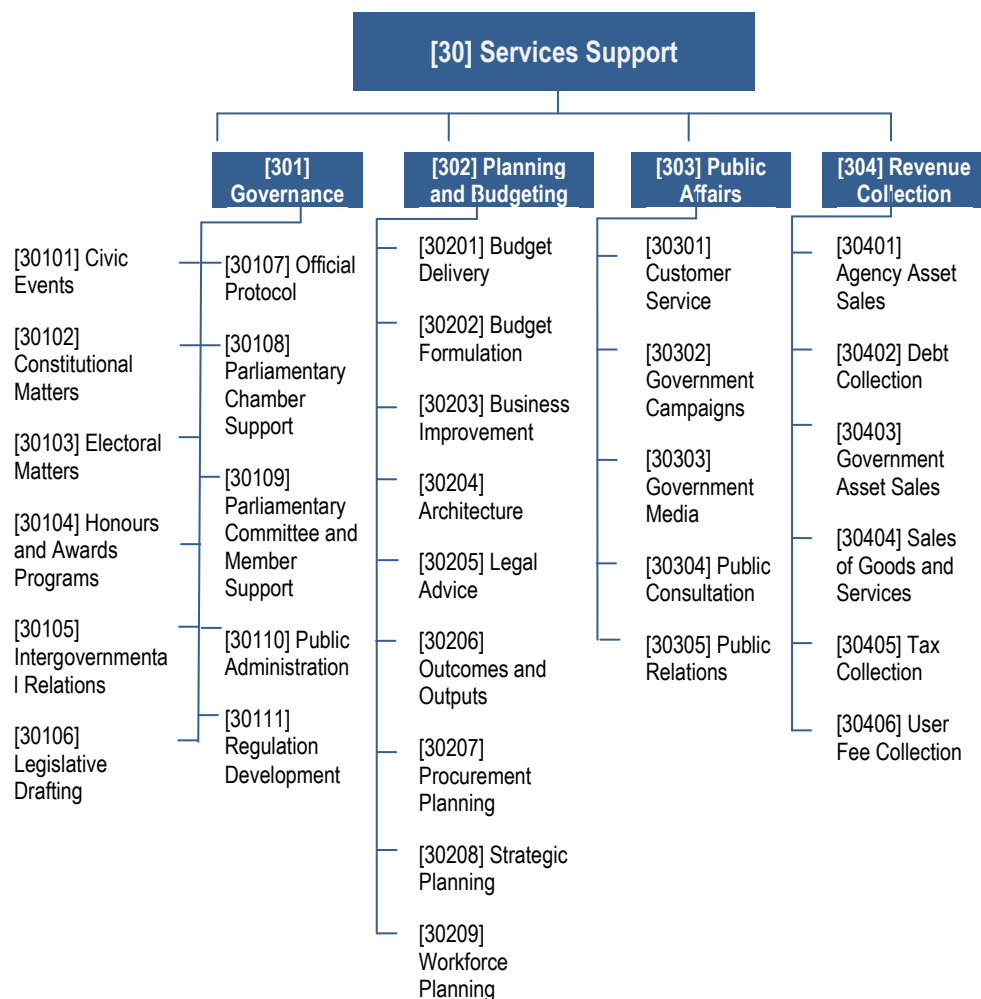
Figure 5-5:   Services Support Business Area

5.5.1   [301] Governance ^A

Governance includes executing legislative processes in Houses of Parliament, assemblies or councils, where officers are elected to represent citizens; administering committees that report to legislative bodies; managing elections of government representatives and sponsoring major community events. This includes official duties carried out by the titular head of the government or municipality (including managing the machinery of government processes at all levels of government).

Business Sub Function	Defines the set of Business Capabilities that
30101 Civic Events ^A	organise community events and ceremonies to mark significant occasions; coordinate security, publicity and entertainment; arrange adequate public facilities, car parking and seating (including liaison with local businesses, volunteers and community groups).
30102 Constitutional Matters ^A	manage the system of fundamental principles that provide the governance framework for a nation, state, territory or municipality; administer policy and procedures for constitutional review and amendment; provide advice on the implications of intervention in constitutional litigation (including the activities of committees involved in constitutional matters).
30103 Electoral Matters ^A	administer voting to elect representatives for public office; conduct referenda to amend the constitution; maintain electoral rolls and enrolment procedures; provide polling booths, ballot papers and scrutiny of electoral processes; distribute the results of elections via any medium (including electoral information and education programs).
30104 Honours and Awards Programs ^A	coordinate and promote ceremonies to pay tribute to notable achievements; establish selection criteria and the framework of levels of honour; design and produce medals; research and evaluate nominations; maintain a register of awards; prepare congratulatory messages.
30105 Intergovernmental Relations ^A	develop cooperative associations between Australian government jurisdictions; host forums and consultation processes to assess policy proposals and their potential impacts; administer inter-jurisdictional bodies, grants and reforms; negotiate interstate agreements on matters other than trade.
30106 Legislative Drafting ^A	prepare legal instruments for the parliament of any jurisdiction; analyse government policy and the constitutional environment; interpret the legal effect of existing legislation; provide advice on legislative proposals.

Business Sub Function	Defines the set of Business Capabilities that
30107 Official Protocol [A]	• support the activities of high-level government representatives in carrying out their official duties; • determine appropriate conventions, customs and arrangements required during formal procedures and functions, either in Australia or overseas (including research, advice and support services for occasions where official protocol is to be followed).
30108 Parliamentary Chamber Support [A]	• provide corporate assistance and security services to Houses of Parliament, assemblies or governing councils; • make arrangements for accommodation, equipment and catering; • oversee building and maintenance requirements; • supervise broadcasts of parliamentary proceedings.
30109 Parliamentary Committee and Member Support [A]	• supply administrative assistance to elected members in all tiers of government in Australia to help them fulfil their duties; • manage secretariat support and secretarial staff; • provide access to reference and research services; • offer advice on procedures and the interpretation of standing orders.
30110 Public Administration [A]	• develop and administering programs to implement the policies and initiatives of the executive and elected representatives; • review and evaluate the performance of such programs; • develop policy and guidelines to improve public administration.
30111 Regulation Development	• develop and establish regulations governing conduct or behaviour in specific areas (including researching and drafting proposed and final regulations).

5.5.2 [302] Planning and Budgeting [F]

Planning and Budgeting involves the government activities of determining strategic direction, identifying and establishing programs, services and processes, and allocating resources (capital and labour) among those programs and processes.

Business Sub Function	Defines the set of Business Capabilities that
30201 Budget Delivery [F]	• affect the legal appropriation and managerial distribution of budget authority to achieve results consistent with the formulated budget.
30202 Budget Formulation [F]	• affect the activities undertaken to determine priorities for future spending and to develop an itemised forecast of future funding and expenditures during a targeted period of time (including the collection and use of performance information to assess the effectiveness of programs and develop budget priorities).
30203 Business Improvement [F]	• affect the efforts to gauge the ongoing effectiveness and efficiency of business services and business processes and identify opportunities for re-engineering or restructuring; • plan and support innovation to business solutions, products and government services.

Business Sub Function	Defines the set of Business Capabilities that
30204 Architecture F	• affect the activities involved in describing the current state and defining the target state for the Australian Government's business, information, organisation, people, processes and technology (including establishment of a transition strategy for achieving the target state).
30205 Legal Advice	• affect the activities involved in obtaining legal advice and resolving legal issues during procurement processes and the development of policies and programs (including legal advice obtained in-house or through appropriate external legal advisors).
30206 Outcomes and Outputs F	• affect the activities that align government resources allocated through budget formulation, execution and management actions with examinations of program objectives, performance, and demonstrated results (including the review and evaluation of outputs and outcomes).
30207 Procurement Planning F	• affect the processes for ensuring that appropriate investments are selected for capital and operational expenditures.
30208 Strategic Planning F	• affect the determination of annual and long-term goals and the identification of the best approach for achieving those goals (including formulation of business, financial, human resources, ICT and information strategies).
30209 Workforce Planning F	• affect the processes for identifying the workforce competencies required to meet the agency's strategic goals and for developing the strategies to meet these requirements.

150

5.5.3 [303] Public Affairs F

Public Affairs involve the exchange of information and communication between the government, citizens and stakeholders in direct and indirect support of citizen services, public policy, and/or the national interest.

Business Sub Function	Defines the set of Business Capabilities that
30301 Customer Service F	• affect the activities associated with providing citizens with information regarding the government's agency's service offerings and government operations, and managing the interactions and relationships with those citizens as customers of the government; • ensure appropriate availability of government information and protecting the rights of citizens to access government information that is legally available to them under Freedom of Information legislation; • manage facilities where trained personnel are available to answer questions or provide advice via the telephone; • promote the use of call centres to facilitate public access to government information (including AGIFT: Call Centre Administration).
30302 Government Campaigns F	• affect the marketing of government services products and programs to the general public in an attempt to promote awareness and increase the number of customers / beneficiaries of those services and programs.

Business Sub Function	Defines the set of Business Capabilities that
30303 Government Media [A]	• affect the managing government advertising and communications activities; • develop advertisements and advertising campaign material (including production of media releases, public notices, commercial and employment opportunities).
30304 Public Consultation [F]	• affect the activities of soliciting, maintaining and responding to public comments regarding proposed government policy and regulations.
30305 Public Relations [F]	• affect the efforts to promote an organisation's image through the effective handling of citizen concerns.

5.5.4 [304] Revenue Collection [F]

Revenue Collection includes the collection of government income from all sources.

Business Sub Function	Defines the set of Business Capabilities that
30401 Agency Asset Sales	• affect the activities associated with the receipt of monies through the disposal and sale of government agency assets to the private sector (e.g. government furniture, office fittings, computing hardware).
30402 Debt Collection [F]	• affect the activities associated with the collection of money owed to the government from both foreign and domestic sources (including monies from individuals, businesses and other organisations).
30403 Government Asset Sales [F]	• affect the activities associated with the acquisition, oversight, tracking, and sale of non-internal assets managed by the government with a commercial value and sold to the private sector (including public infrastructure, utilities and enterprises. It does not include assets owned by government agencies).
30404 Sales of Goods and Services	• affect the sales of goods and services to the public and other non-government entities. Examples include: • the retail of goods sold by Australia Post Shops; • maps and other publications sold by AUSLIG; • services such the Bureau of Meteorology's subscription packages for weather forecasts and other meteorological services.
30405 Tax Collection	• affect the activities associated with the collection of taxes and levies from business and the community; • assess and review the operation of the tax system.
30406 User Fee Collection [F]	• affect the collection of fees imposed on individuals or organisations for the provision of government services and for the use of government goods or resources (e.g. national parks).

5.6 Management of Government Resources Business Area

The Management of Government Resources Business area refers to the support activities that enable the government to operate effectively and efficiently.

For example, in order to provide services for citizens, government resources may be involved in managing changes to the business environment and the service delivery environment, managing finances to fund the provision of the services and their supporting operations, managing human resources to administer and support the services, and managing the working environment. The government must also manage and protect the data and information generated through these activities.

Figure 5-6 illustrates the Lines of Business and Business Capabilities in this Business Area.

152

[40] Management of Government Resources Business Area

[401] Administrative Management
- [40101] Accommodation Management
- [40102] Facilities, Fleet and Equipment Management
- [40103] Help Desk Services
- [40104] Physical Security Management
- [40105] Travel
- [40106] Workplace Policy Development and Management

[402] Business Management
- [40201] Business Change Management
- [40202] Business Services and Processes Management
- [40203] Business Partnership Management
- [40204] Business Relationship Management
- [40205] Business Reporting
- [40206] Business Risk and Mitigation
- [40207] Capability Management

[403] Financial Management
- [40301] Accounting
- [40302] Asset and Liability Management
- [40303] Collections and Receivables
- [40304] Cost Accounting / Performance Measurement
- [40305] Financial Reporting
- [40306] Financial Resource Management
- [40307] Management of Public Monies
- [40308] Payments
- [40309] Procurement

[404] Human Resource Management
- [40401] Benefits Management
- [40402] Employee Performance Management
- [40403] Organisation and Position Management
- [40404] Recruitment
- [40405] Remuneration Management
- [40406] Separation Management
- [40407] Training and Development
- [40408] Workplace Relations

[404] ICT Management
- [40501] ICT Operations & Infrastructure Management
- [40502] ICT Resource Access Management
- [40503] ICT Service Assistance
- [40504] ICT Service Management
- [40505] ICT Solution Delivery and Maintenance
- [40506] ICT Supplier Relationship Management

[405] Information and Knowledge Management
- [40601] Document and Records Management
- [40602] Information Exchange Standards
- [40603] Information Management Standards
- [40604] Information Rights Management
- [40605] Information Security Management
- [40606] Knowledge Management
- [40607] Library Management

Figure 5-6: Management of Government Resources Business Area

5.6.1 [401] Administrative Management ^F

Administrative Management involves the day-to-day management and maintenance of the internal infrastructure.

Business Sub Function	Defines the set of Business Capabilities that
40101 Accommodation Management	• affect the determination and management of accommodation needs; • plan for, acquire and maintain accommodation furnishings.
40102 Facilities, Fleet, and Equipment Management ^F	• affect the maintenance, administration and operation of office buildings, fleets, machinery, and other capital assets that are possessions of the government.
40103 Help Desk Services ^F	• affect the management of a service centre to respond to government and contract employees' technical and administrative questions.
40104 Physical Security Management ^F	• affect the physical protection of an organisation's personnel, assets and facilities (including security clearance management). • Note: Activities related to securing data and information are addressed under the Information Security Management Business sub function.
40105 Travel ^F	• affect the activities associated with planning, preparing and monitoring of business related travel for an organisation's employees.
40106 Workplace Policy Development and Management ^F	• affect the activities involved in developing and disseminating workplace policies such as dress codes, time reporting requirements, telecommuting, etc.

5.6.2 [402] Business Management

Business Management involves activities associated with the management of how the government conducts its business and changes to that business in order to achieve planned outcomes and outputs.

Business Sub Function	Defines the set of Business Capabilities that
40201 Business Change Management	• affect the activities involved in managing changes to how the government conducts its business in providing government services to individuals, businesses and other organisations (including managing the resulting changes to business requirements, as well as their impacts on stakeholders of the government business solutions).
40202 Business Services and Processes Management	• affect the activities involved in managing the range of business services that represent government Business Capabilities and the business processes that enact those business services (including re-engineering and restructuring of business services and processes resulting from business changes).

Business Sub Function	Defines the set of Business Capabilities that
40203 Business Partnership Management	• manage business partnerships and relationships between government agencies and other agencies, businesses, organisations and individuals that contribute to government business solutions; • promote and facilitate business interoperability between government agencies, and between the government and the private sector.
40204 Business Relationship Management	• manage the relationship between business owners and stakeholders of the services being delivered and parties that deliver the services; • ensure that business needs are being met by services supplied.
40205 Business Reporting	• provide information, analyse and report on the health, quality, efficiency and effectiveness of how government conducts its business through programs and initiatives.
40206 Business Risk and Mitigation	• affect the activities involved in analysing exposure to risk and determining appropriate counter-measures in response to a catastrophic or disastrous event (including assessing and ensuring an organisation's ability to continue business activities, planning for contingency actions to mitigate damaging events, and developing disaster recovery plans for resuming operations following a catastrophe).
40207 Capability Management	• manage the sets of capabilities* needed by government to deliver desired outcomes (including the design of new capabilities as well as the assessment of existing capabilities for their efficiency and effectiveness). • *a capability consists of people + process + technology

5.6.3 [403] Financial Management ᶠ

Financial Management involves the agency use of financial information to measure, operate and predict the effectiveness and efficiency of an entity's activities in relation to its objectives. The ability to obtain and use such information is usually characterised by having in place policies, practices, standards and a system of controls that reliably capture and report activity in a consistent manner.

Business Sub Function	Defines the set of Business Capabilities that
40301 Accounting ᶠ	• account for assets, liabilities, revenues and expenses associated with the maintenance of government programs and expenditure of government appropriations in accordance with applicable standards.
40302 Asset and Liability Management ᶠ	• account for support for the management of assets and liabilities of the government (including the major assets and liabilities presented on the government balance sheet that contribute towards the net debt and net worth of the Australian Government[14]).

---

[14] *Asset and Liability Management* – description partly derived from the Australian Government 2007-08 Budget Paper No.1, Statement 7: Asset and Liability Management.

Business Sub Function	Defines the set of Business Capabilities that
40303 Collections and Receivables F	• affect the deposits, fund transfers, and receipts for sales or service.
40304 Cost Accounting / Performance Measurement F	• accumulate, measure, analyse, interpret, and report cost information useful to both internal and external groups concerned with the way in which an organisation uses, accounts for, safeguards and controls its resources to meet its objectives. • Cost accounting information is necessary in establishing strategic goals, measuring service efforts and accomplishments and relating efforts to accomplishments. • Cost accounting, financial accounting and budgetary accounting all draw information from common data sources.
40305 Financial Reporting F	• provide financial information, report and analyse financial transactions.
40306 Financial Resource Management A	• affect the management of government financial assets; • provide advice on legislative responsibilities and reporting requirements; • manage the efficient, effective and ethical use of government resources.
40307 Management of Public Monies F	• affect the management of the government budget process including the development of plans and programs, budgets, and performance outputs as well as financing government programs and operations through appropriation and apportionment of direct and reimbursable spending authority, fund transfers, investments and other financing mechanisms.
40308 Payments F	• affect the disbursements of government funds, via a variety of mechanisms, to government and private individuals, government agencies, state, territory, local and international governments, and the private sector, to effect payment for goods and services, or distribute entitlements, benefits, grants, subsidies, loans or claims.
40309 Procurement	• affect the whole process of acquiring property and services. It begins when an agency has identified a need and decided on its procurement requirement. • Procurement continues through the processes of risk assessment, seeking and evaluating alternative solutions, contract award, delivery of and payment for the property or services and, where relevant, the ongoing management of a contract and consideration of options related to the contract.

5.6.4 [404] Human Resource Management [F]

Human Resource Management involves all activities associated with the recruitment and management of personnel.

Business Sub Function	Defines the set of Business Capabilities that
40401 Benefits Management [F]	• affect the design, development and implementation of benefit programs that attract, retain and support current and former agency employees (including establishing and communicating benefits programs); • process benefits actions; • interact as necessary with third party benefits providers.
40402 Employee Performance Management [F]	• affect the design, development and implementation of a comprehensive performance management approach to ensure agency employees are demonstrating competencies required of their work assignments; • design, develop and implement a comprehensive performance management strategy that enables managers to make distinctions in performance and links individual performance to agency goal and mission accomplishment (including managing employee performance at the individual level and evaluating the overall effectiveness of the agency's employee development approach).
40403 Organisation and Position Management [F]	• affect the design, development and implementation of organisational and position structures that create a high-performance, competency-driven framework that both advances the agency mission and serves agency human capital needs.
40404 Recruitment [F]	• establish procedures for recruiting and selecting high-quality, productive employees with the right skills and competencies, in accordance with merit system principles (including developing a staffing strategy and plan); • establish an applicant evaluation approach; • announce the vacancy; • source and evaluate candidates against the competency requirements for the position; • initiate pre-employment activities; • hire employees.
40405 Remuneration Management [F]	• affect the design, development and implementation of compensation programs that attract, retain and fairly compensate agency employees. • In addition, the design, development and implementation of pay for performance compensation programs to recognise and reward high performance, with both base pay increases and performance bonus payments (including developing and implementing compensation programs; administering bonus and monetary awards programs; administering pay changes; managing time, attendance, leave and pay; and managing payroll).

Business Sub Function	Defines the set of Business Capabilities that
40406 Separation Management F	• conduct efficient and effective employee separation programs that assist employees in transitioning to non-Government employment; • facilitate the removal of unproductive, non-performing employees; • assist employees in transitioning to retirement.
40407 Training and Development F	• affect the design, development and implementation of a comprehensive employee development approach to ensure that agency employees have the right competencies and skills for current and future work assignments (including conducting employee development needs assessments; designing employee development programs; administering and delivering employee development programs; and evaluating the overall effectiveness of the agency's employee development approach).
40408 Workplace Relations F	• affect the design, development and implementation of programs that strive to maintain an effective employer-employee relationship that balances the agency's needs against its employees' rights. • It also manages the relationship between the agency and its unions and bargaining units. This includes negotiating and administering labour contracts and collective bargaining agreements; managing negotiated grievances; and participating in negotiated third party proceedings.

5.6.5 [405] Information and Communications Technology (ICT) Management F

Information and Communications Technology Management involves the coordination of information and technology resources and solutions required to support or provide a service.

Business Sub Function	Defines the set of Business Capabilities that
40501 ICT Operations and Infrastructure Management	• affect the activities associated with managing and maintaining standard operations within the ICT environment and supporting the ICT infrastructure; • minimise the likelihood and consequences of disaster or disruption to normal service operations and recovery of business services and applications following disastrous events or disruptions.
40502 ICT Resource Access Management	• manage user access to ICT resources; • authenticate and verify user identity and authority to access; • log, track and monitor user access activities; • provide, restrict and remove rights to access.
40503 ICT Service Assistance	• provide a primary point of contact for users of ICT services regarding requests for service or incidents causing disruption to normal service operation or reduction in quality of service; • provide first level of resolution and support for requests and incidents or referring on to more specialised support; • initiate change to remedy causes of disruption or service quality reduction.

Business Sub Function	Defines the set of Business Capabilities that
40504 ICT Service Management	• affect the activities and processes involved in providing quality ICT services (including managing the ability to meet demand for services; managing the agreed levels of service between the ICT service provider and the service customer; managing the ICT configuration that's supports service provision; and includes managing change to ICT resources).
40505 ICT Solution Delivery and Maintenance	• affect the activities associated with delivering and maintaining software services and applications to meet business and corporate needs. Business solutions may include in-house, inter-agency and vendor-supplied software services and applications.
40506 ICT Supplier Relationship Management	• affect the activities involved in managing the contractual relationships between the organisation and suppliers of ICT services and software solutions; • establish, monitor and report on achievement of agreed service levels.

5.6.6 [406] Information and Knowledge Management [F]

Information and Knowledge Management involves the ownership or custody of information and intellectual assets held by the government, and the governance of information collection, arrangement, storage, maintenance, retrieval, dissemination and destruction – it includes maintaining the policies, guidelines and standards regarding information management and governance.

Business Sub Function	Defines the set of Business Capabilities that
40601 Document and Records Management [F]	• affect the operations surrounding ownership or custody, management, preservation, destruction and discovery of the official documents and records for an agency (including management and stewardship of information held by a government agency; management and maintenance of ongoing operational information; archival and retrieval of ageing or obsolete information; and destruction of material no longer legally required to be kept.)
40602 Information Exchange Standards	• establish standards to facilitate business interoperability and the exchange of data and information between government agencies, and between the government and private individuals, businesses and organisations (including information infrastructures for government use).
40603 Information Management Standards [A]	• establish standards around the creation, capture, management and disposal of government records and documentation; • provide guidelines for ensuring the accessibility of government information to individuals including people with special needs; • support the organisation and use of government information; • encourage the implementation of best practice information management strategies.
40604 Information Rights Management	• affect the activities surrounding the management of information rights such as freedom of information, intellectual property and copyright, and privacy of information.

158

Business Sub Function	Defines the set of Business Capabilities that
40605 Information Security Management	• affect the activities involved in protecting government information from unauthorised access, use, disclosure, disruptions, modification or destruction; • affect the creation, maintenance and implementation of security policies, procedures and controls; • affect the exposure, monitoring and management of security breaches.
40606 Knowledge Management	• affect the activities involved in managing and maintaining the content of the intellectual assets of the government comprising explicit knowledge (recorded, formal, structured) and tacit knowledge (not recorded, unspoken, informal). • *Explicit knowledge* includes bodies of information created for the use and benefit of government resources and members of the public, such as knowledge artefacts, knowledge bases and information bases that are accessible, presentable, transmittable, and can be held online or in hard copy formats. • *Tacit knowledge* includes information held by a person or between a group of people derived from personal experience and interpretation. • *Knowledge management* includes converting tacit knowledge into explicit knowledge through collaborative means of recording and formalising this experience and interpretation.
40607 Library Management	• affect the activities surrounding acquisition, classification, preservation, retrieval and lending of published materials such as books, periodicals, journals, manuscripts and other information artefacts.

5.7 Examples of Business Sub Function Relationships

The following examples illustrate the range of government activities that are invoked in order to provide services to Australian individuals, businesses and other organisations. The topics of focus for the examples have been chosen to show different citizen, business and community situations for which government services are provided, and different types of Business Capabilities invoked for each topic, whilst highlighting government activities that are affected by all types of situation.

These government activities are represented by Business Capabilities that reside under their respective lines of business within the four business areas. Some Business Capabilities are directly implicated when providing a service to citizens, whilst others pertain to activities that support and facilitate the provision of a service for citizens or in maintaining the impacted resources and environment in which the service for citizens is provided.

For each focus topic nominated, a range of supporting government activities is listed, followed by an illustration depicting the Business Capabilities involved. The descriptions for the Business Capabilities listed can be found within the main body of the BRM under their respective LoB and business area.

160

Example 1: Financial Assistance to Citizens in Need

This example outlines various Business Capabilities across the four business areas that may be invoked in order to provide financial assistance to citizens who have no source of income or low income levels, such as unemployed people, people with disabilities, families with low incomes and full-time students.

Financial assistance is provided to citizens in need through government programs that deliver monetary support through ongoing and one-off payments or through direct loans such as the HECS-HELP payment to students. In order to make these payments and loans possible, a range of activities occur within the government environment, such as:

- government policy and legislation drafted and set in place to enable financial assistance to be provided to citizens in need

- financial resources planned and appropriated in the annual budget

- business services that represent the Business Capabilities surrounding financial assistance created, and their supporting business processes are created, maintained and managed

- human resources organised and trained to deliver and administer the business services

- the ICT environment which delivers automated business services and processes is established, maintained and managed

- related data and information created, managed and protected from inappropriate or unauthorised access

- citizens informed of government financial assistance available to them, and assisted in their efforts to access financial assistance, including assessment of their circumstances to determine the extent of their eligibility for financial assistance.

Citizens are also provided with a means for repaying monies owed back to the government resulting from overpayment of entitlements or loan repayments such as withholdings or direct repayments.

Figure 5-7 illustrates Business Capabilities across the business areas that may be affected in providing financial assistance to citizens in need.
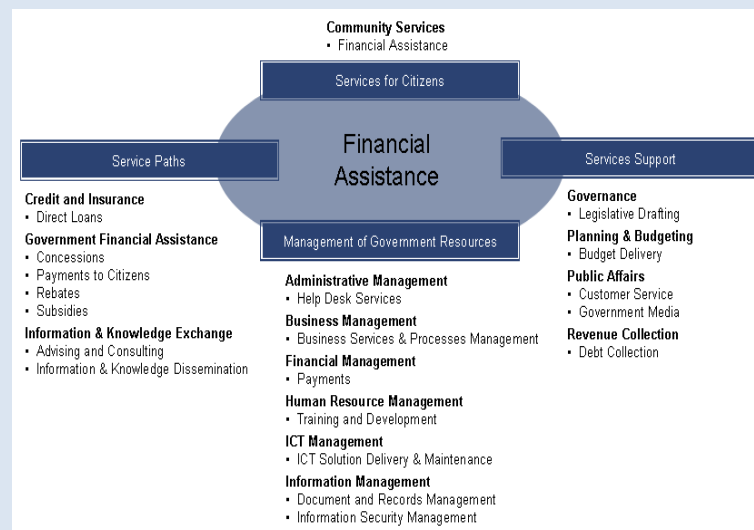
Figure 5-7:   Example – Financial Assistance Business Capabilities

Example 2:   Recreational Gambling Within the Community

This example outlines various Business Capabilities across the four business areas that may be invoked in the provision of government services surrounding recreational gambling activities within the community. Recreational gambling activities include betting on races and sports events, playing poker machines, casino gambling, lotto, etc.

Recreational gambling is heavily regulated under gaming industry legislation that governs the behaviour of citizens partaking in or providing gambling activities.

Government activities surrounding recreational gambling include:

- gaming industry policy, legislation and regulations drafted, implemented and maintained by government resources
- licences issued to gambling operators who fulfil preset criteria and licence holders are trained in responsible gambling practices and informed of their legal responsibilities to the government
- gambling activities inspected and audited to ensure compliance with gaming regulations
- penalties for breaches of gaming regulations determined and applied
- citizens and the community informed of government gaming regulations
- gambling revenue collected and reallocated back into the community through community projects
- human resources trained and deployed to administer gaming regulations and to collect gaming revenue
- business services that represent the Business Capabilities surrounding gambling, and their supporting business processes, created, managed and maintained
- ICT solutions that support the collection and redistribution of gaming revenue established, managed and maintained
- related data and information created, managed and protected from inappropriate or unauthorised access.

Figure 5-8 illustrates Business Capabilities across the business areas that are impacted by gambling activities.

Figure 5-8:   Example – Recreational Gambling Business Capabilities

6 Service Reference Model

6.1 Introduction

The Service Reference Model (SRM) *(Figure 6-1)* is a business-driven, functional framework classifying Service Components with respect to how they support business and performance objectives. It serves to identify and classify Service Components that support agencies and their investments and assets. The model aids in recommending service capabilities to support the re-use of business components and services across the Australian Government.
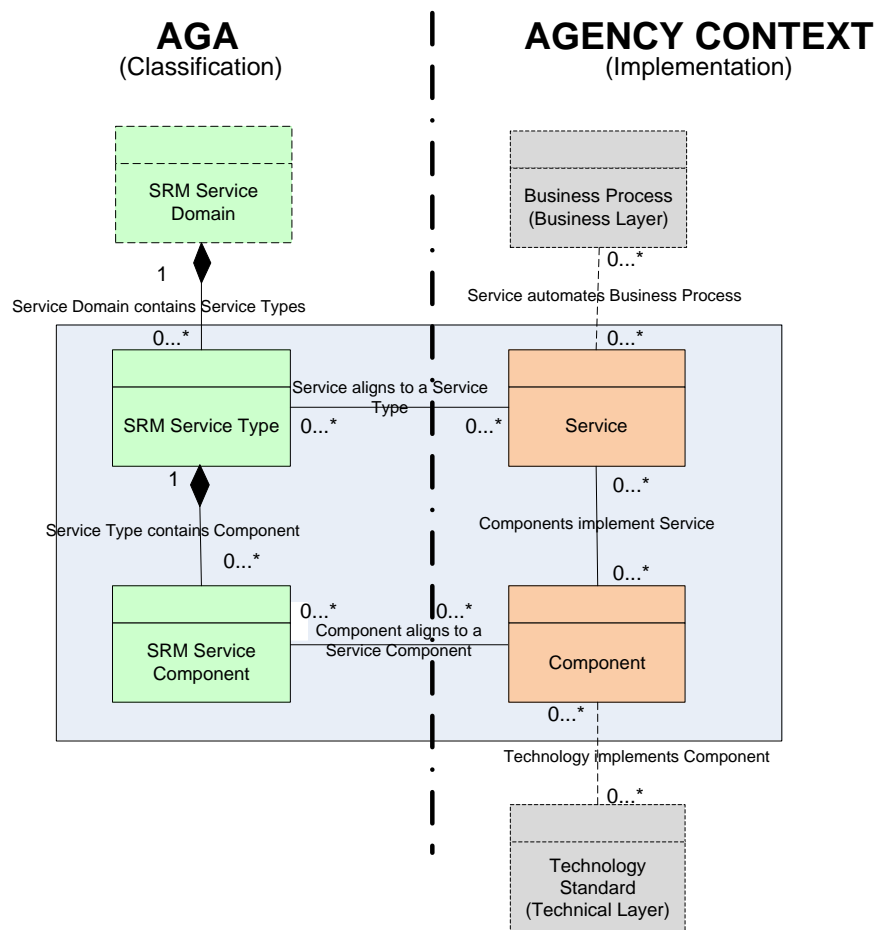
Figure 6-1:   Service Reference Model

6.2 Structure

The SRM has been structured across service areas that, independent of the business functions, can provide a foundation for the sharing and re-use of applications, application capabilities, components and business services. The SRM is constructed hierarchically around Service Domains, Service Types, and Service Components.

The SRM Service Domains provide a high-level view of the services and capabilities that support enterprise and organisational processes and applications.   Service Domains are differentiated by their business-oriented capability and are comprised of Service Types that further categorise and define the capabilities of each Domain. As illustrated in *Figure 6-2*, each Service Domain is classified into one or more Service Types that group similar capabilities in support of the domain.

Service Types provide an additional layer of categorisation that defines the business context of a specific Service component within a given domain. Each Service Type includes one or more Service Components that provide the 'building blocks' to deliver the Service Component capability to the business.

A Service Component is defined as 'a self contained business process or service with predetermined functionality that may be exposed through a business or technology interface'.

The Service Types and Service Components are numbered in a sequential manner. The numbers themselves do not imply or describe a structure within the model.

Service Domains	Service Types
Customer Services	[1001] Customer Relationship Management [1002] Customer Preferences [1003] Customer Initiated Assistance
Process Automation Services	[1101] Tracking and Workflow [1102] Routing and Scheduling
Business Management Services	[1201] Management of Process [1202] Organisational Management [1203] Investment Management [1204] Supply Chain Management
Digital Asset Services	[1301] Content Management [1302] Document Management [1303] Knowledge Management [1304] Records Management
Business Analytical Services	[1401] Analyses and Statistics [1402] Visualisation [1403] Knowledge Discovery [1404] Business Intelligence [1405] Reporting
Back Office Services[15]	[1501] Data Management [1502] Human Resources [1503] Financial Management [1504] Assets/Materials Management [1505] Development and Integration [1506] Human Capital / Workforce Management
Support Services	[1601] Security Management [1602] Collaboration [1603] Search [1604] Communication [1605] Systems Management [1606] Forms Management

Figure 6-2: SRM Overview

---

[15] In the Australian Government, the term 'Corporate Services' is often used rather than 'Back Office Services', which often refers to non-client-facing processing of client transactions within the Australian Government context.

6.3 Customer Services Domain

The Customer Services Domain *(Figure 6-3)* defines the set of capabilities that are directly related to an internal or external customer, the business's interaction with the customer and the customer-driven activities or functions. The Customer Services Domain represents those capabilities and services that are at the front end of a business and interface at varying levels with the customer.

```
                          [100] Customer Services
        ┌──────────────────────────┬──────────────────────────┐
 [1001] Customer Relationship   [1002] Customer        [1003] Customer Initiated
        Management                 Preferences                 Assistance
```

- [100101] Call Centre Management
- [100102] Customer Analytics
- [100103] Sales and Marketing
- [100104] Product Management
- [100105] Brand Management
- [100106] Customer/Account Management
- [100107] Contract and Profile Management
- [100108] Partner Relationship Management
- [100109] Customer Feedback
- [100110] Surveys

- [100201] Personalisation
- [100202] Subscriptions
- [100203] Alerts and Notifications

- [100301] Online Help
- [100302] Online Tutorials
- [100303] Self-Service
- [100304] Reservations/Registration
- [100305] Multi-Lingual Support
- [100306] Assistance Request
- [100307] Scheduling

Figure 6-3: Customer Services Domain

6.3.1   [1001] Customer Relationship Management

Capabilities within this Service Type are used to plan, schedule and control the activities between the customer and the enterprise, both before and after a product or service is offered.

Service Component	Defines the set of capabilities that
100101 Call Centre Management	Handle telephone sales and/or service to the end customer
100102 Customer Analytics	Allow for the analysis of an organisation's customers, as well as the scoring of third-party information as it relates to an organisation's customers
100103 Sales and Marketing	Facilitate the promotion of a product or service and capture of new business
100104 Product Management	Facilitate the creation and maintenance of products and services
100105 Brand Management	Support the application of a trade name to a product or service as well as developing an awareness for the name
100106 Customer/Account Management	Support the retention and delivery of a service or product to an organisation's clients
100107 Contact and Profile Management	Provide a comprehensive view of all customer interactions, including calls, e-mail, correspondence and meetings; also provides for the maintenance of a customer's account, business and personal information
100108 Partner Relationship Management	Provide a framework to promote the effective collaboration between an organisation and its business partners, particularly members of the distribution chain (e.g. channel and alliance partners, resellers, agents, brokers and dealers) and other third parties that support operations and service delivery to an organisation's customers; includes performance evaluation of partners, if necessary
100109 Customer Feedback	Is used to collect, analyse and handle comments and feedback from an organisation's customers
100110 Surveys	Are used to collect useful information from an organisation's customers

166

6.3.2   [1002] Customer Preferences

Capabilities within this Service Type allow an organisation's customers to change a user interface and the way that data is displayed.

Service Component	Defines the set of capabilities that
10201 Personalisation	Change a user interface and how data is displayed
100202 Subscriptions	Allow a customer to join a forum, listserv, or mailing list
100203 Alerts and Notifications	Allow a customer to be contacted in relation to a subscription or service of interest

6.3.3   [1003] Customer Initiated Assistance

Capabilities within this Service Type allow customers to proactively seek assistance and service from an organisation.

Service Component	Defines the set of capabilities that
100301 Online Help	Provide an electronic interface to customer assistance
100302 Online Tutorials	Provide an electronic interface to educate and assist customers
100303 Self-Service	Allow an organisation's customers to sign up for a particular service at their own initiative
100304 Reservations/Registration	Allow electronic enrolment and confirmations for services
100305 Multi-Lingual Support	Allow access to data and information in multiple languages
100306 Assistance Request	Support the approach from a customer for support
100307 Scheduling	Define the set of capabilities that support the plan for performing work or service to meet the needs of an organisation's customers

6.4 Process Automation Services Domain

The Process Automation Services Domain *(Figure 6-4)* defines the set of capabilities that support the automation of process and management activities that assist in effectively managing the business. The Process Automation Services domain represents those services and capabilities that serve to automate and facilitate the processes associated with tracking, monitoring and maintaining liaison throughout the business cycle of an organisation.
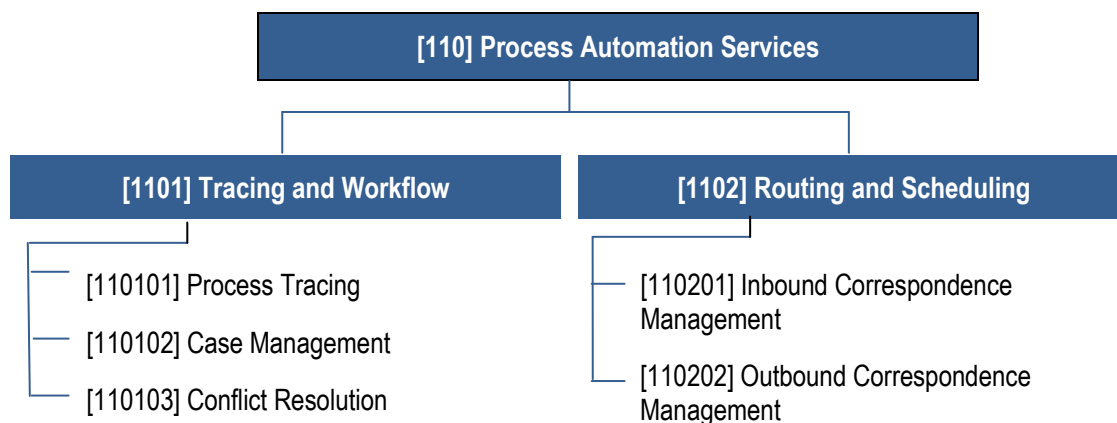
Figure 6-4: Process Automation Services Domain

6.4.1 [1101] Tracking and Workflow

Capabilities within this Service Type provide automatic monitoring and routing of documents to the users responsible for working on them to support each step of the business cycle.

Service Component	Defines the set of capabilities that
110101 Process Tracking	Allow the monitoring of activities within the business cycle
110102 Case Management	Manage the life cycle of a particular claim or investigation within an organisation to include creating, routing, tracing, assignment and closing of a case as well as collaboration among case handlers
110103 Conflict Resolution	Support the conclusion of contention or differences within the business cycle

6.4.2   [1102] Routing and Scheduling

Capabilities within this Service Type provide automatic directing and assignment or allocation of time for a particular action or event.

Service Component	Defines the set of capabilities that
110201 Inbound Correspondence Management	Manage externally initiated communication between an organisation and its stakeholders
110202 Outbound Correspondence Management	Manage internally initiated communication between an organisation and its stakeholders

6.5 Business Management Services Domain

The Business Management Services Domain *(Figure 6-5)* defines the set of capabilities that support the management of business functions and organisational activities that maintain continuity across the business and value-chain participants. The Business Management Services Domain represents those capabilities and services that are necessary for projects, programs and planning within a business operation to be successfully managed.
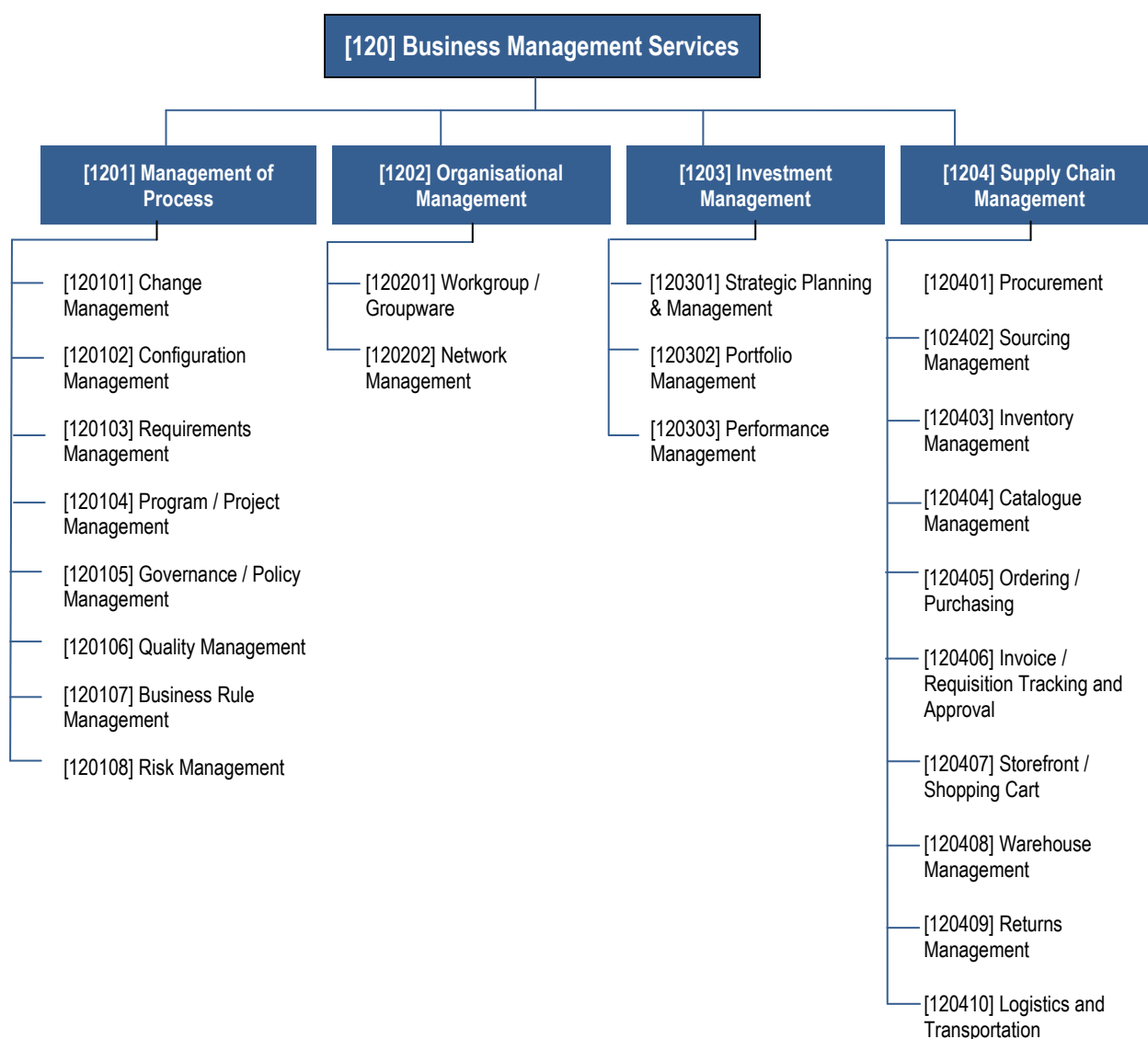
Figure 6-5: Business Management Services Domain

6.5.1 [1201] Management of Process

Capabilities within this Service Type regulate the activities surrounding the business cycle of an organisation.

Service Component	Defines the set of capabilities that
120101 Change Management	Control the process for updates or modifications to the existing documents, software or business processes of an organisation
120102 Configuration Management	Control the hardware and software environments, as well as documents of an organisation
120103 Requirements Management	Gather, analyse and fulfil the needs and prerequisites of an organisation's efforts
120104 Program/Project Management	Manage and control a particular effort of an organisation
120105 Governance/Policy Management	Influence and determine decisions, actions, business rules and other matters within an organisation
120106 Quality Management	Help determine the level that a product or service satisfies certain requirements
120107 Business Rule Management	Manage the enterprise processes that support an organisation and its policies
120108 Risk Management	Support the identification and probabilities or chances of hazards as they relate to a task, decision or long-term goal; includes risk assessment and risk mitigation

6.5.2 [1202] Organisational Management

Capabilities within this Service Type support both collaboration and communication within an organisation.

Service Component	Defines the set of capabilities that
120201 Workgroup/Groupware	Support multiple users working on related tasks
120202 Network Management	Monitor and maintain a communications network in order to diagnose problems, gather statistics and provide general usage

6.5.3   [1203] Investment Management

Capabilities within this Service Type manage the financial assets and capital of an organisation.

Service Component	Defines the set of capabilities that
120301 Strategic Planning and Management	Support the determination of long-term goals and the identification of the best approach for achieving those goals
120302 Portfolio Management	Support the administration of a group of investments held by an organisation
120303 Performance Management	Measure the effectiveness of an organisation's financial assets and capital

172

6.5.4   [1204] Supply Chain Management

Capabilities within this Service Type plan, schedule and control a supply chain and the sequence of organisations and functions that mine, make or assemble materials and products from manufacturer to wholesaler to retailer to consumer.

Service Component	Defines the set of capabilities that
120401 Procurement	Support the ordering and purchasing of products and services
120402 Sourcing Management	Support the supply of goods or services as well as the tracking and analysis of costs for these goods
120403 Inventory Management	Provide for the balancing of customer service levels with inventory investment
120404 Catalogue Management	Support the listing of available products or services that an organisation offers
120405 Ordering/Purchasing	Allow the placement of request for a product
120406 Invoice/Requisition Tracking and Approval	Support the identification of where a shipment or delivery is within the business cycle
120407 Storefront/Shopping Cart	Support the online equivalent of the supermarket cart, where orders and merchandise are placed
120408 Warehouse Management	Provide for the storage and movement of materials within a warehouse, including these processes: material receipt, order picking, packaging, labelling and shipping
120409 Returns Management	Collect, analyse and resolve product returns or service cancellations
120410 Logistics and Transportation	Provide for efficient freight and traffic management

6.6 Digital Asset Services Domain

The Digital Asset Services Domain *(Figure 6-6)* defines the set of capabilities that support the generation, management and distribution of intellectual capital and electronic media across the business and extended enterprise.
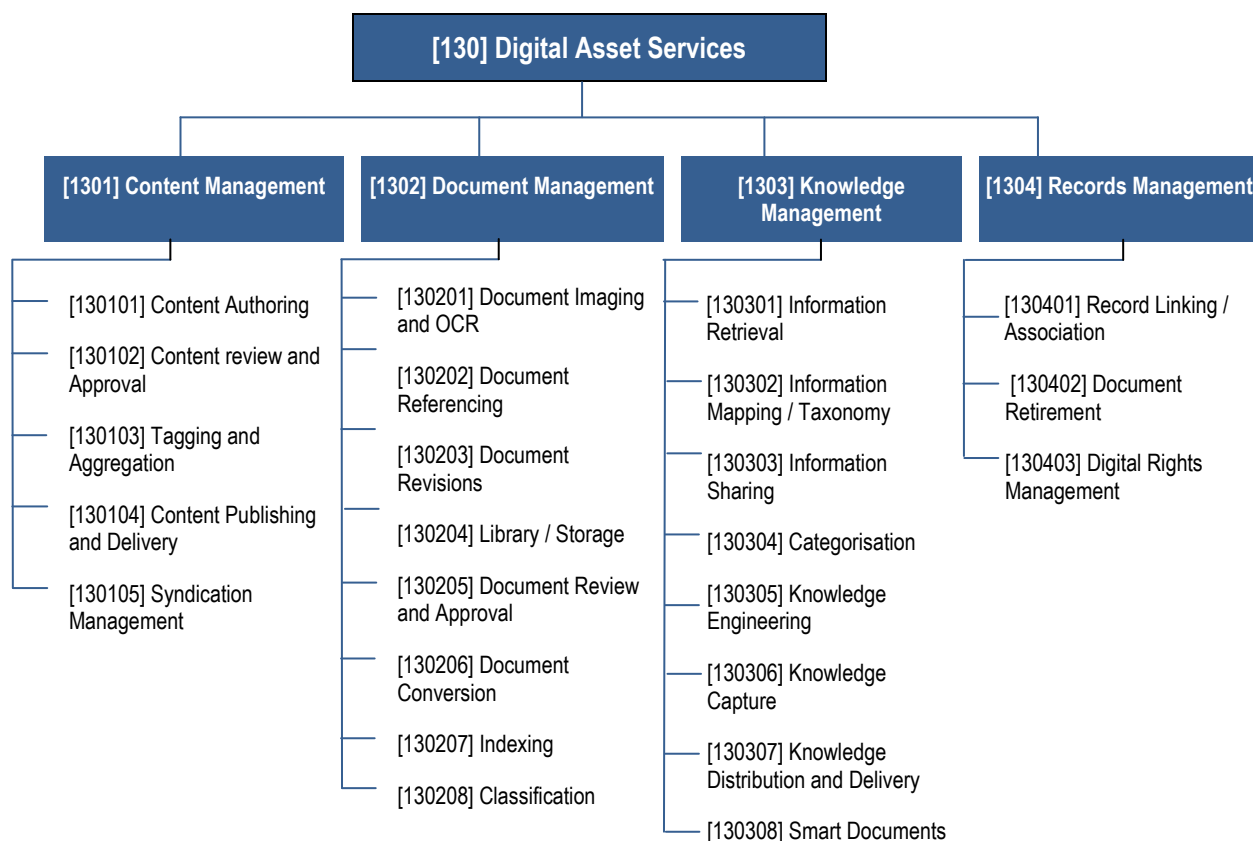
Figure 6-6: Digital Asset Services Domain

6.6.1 [1301] Content Management

Capabilities within this Service Type manage the storage, maintenance and retrieval of documents and information of a system or website.

Service Component	Defines the set of capabilities that
130101 Content Authoring	Allow for the creation of tutorials, CBT courseware, websites, CD-ROMs and other interactive programs
130102 Content Review and Approval	Allow for the approval of interactive programs
130103 Tagging and Aggregation	Support the identification of specific content within a larger set of content for collection and summarisation
130104 Content Publishing and Delivery	Allow for the propagation of interactive programs
130105 Syndication Management	Control and regulate an organisation's brand

6.6.2 [1302] Document Management

Capabilities within this Service Type control the capture and maintenance of an organisation's documents and files.

Service Component	Defines the set of capabilities that
130201 Document Imaging and OCR	Support the scanning of documents
130202 Document Referencing	Support the redirection to other documents and information for related content
130203 Document Revisions	Support the versioning and editing of content and documents
130204 Library/Storage	Support document and data warehousing and archiving
130205 Document Review and Approval	Support the editing and commendation of documents before releasing them
130206 Document Conversion	Support the changing of files from one type of format to another
130207 Indexing	Support the rapid retrieval of documents through a structured numbering construct
130208 Classification	Support the categorisation of documents

6.6.3 [1303] Knowledge Management

Capabilities within this Service Type identify, gather and transform documents, reports and other sources into meaningful information.

Service Component	Defines the set of capabilities that
130301 Information Retrieval	Allow access to data and information for use by an organisation and its stakeholders
130302 Information Mapping/Taxonomy	Support the creation and maintenance of relationships between data entities, naming standards and categorisation
130303 Information Sharing	Support the use of documents and data in a multi-user environment for use by an organisation and its stakeholders
130304 Categorisation	Allow classification of data and information into specific layers or types to support an organisation
130305 Knowledge Engineering	Support the translation of knowledge from an expert into the knowledge base of an expert system
130306 Knowledge Capture	Facilitate collection of data and information
130307 Knowledge Distribution and Delivery	Support the transfer of knowledge to the end customer
130308 Smart Documents	Support the interaction of information and process (business logic) rules between users of the document (i.e. the logic and use of the document is embedded within the document itself and is managed within the document parameters)

6.6.4　[1304] Records Management

Capabilities within this Service Type store, protect, archive, classify and retire documents and information.

Service Component	Defines the set of capabilities that
130401 Record Linking / Association	Support the correlation between logical data and information sets
130402 Document Retirement	Support the termination or cancellation of documents and artefacts used by an organisation and its stakeholders
130403 Digital Rights Management	Support the claim and ownership of intellectual capital and artefacts belonging to an organisation

176

6.7 Business Analytical Services Domain

The Business Analytical Services Domain *(Figure 6-7)* defines the set of capabilities supporting the extraction, aggregation and presentation of information to facilitate decision analysis and business evaluation.

[140] Business Analytical Services

[1401] Analysis and Statistics
- [140101] Mathematical
- [140102] Structural / Thermal
- [140103] Radiological
- [140104] Forensics

[1402] Visualisation
- [140201] Graphic / Charting
- [140202] Imagery
- [140203] Multimedia
- [140204] Mapping / Geospatial / Elevation / GPS
- [140205] CAD

[1403] Knowledge Discovery
- [140301] Data Mining
- [140302] Modelling
- [140303] Simulation

[1404] Business Intelligence
- [140401] Demand Forecasting / Management
- [140402] Balanced Scorecard
- [140403] Decision Support and Planning

[1405] Reporting
- [140501] Ad hoc
- [140502] Standardised / Canned
- [140503] OLAP

Figure 6-7: Business Analytical Services Domain

6.7.1 [1401] Analysis and Statistics

Capabilities within this Service Type examine business issues, problems and their solutions.

Service Component	Defines the set of capabilities that
140101 Mathematical	Support the formulation and mathematical analysis of probabilistic models for random phenomena and the development and investigation of methods and principles for statistical inference
140102 Structural/Thermal	Support the use of data flow and data modelling diagrams for applying systematic analysis of data
140103 Radiological	Support the use of radiation and x-ray technologies for analysis and scientific examination
140104 Forensics	Support the analysis of physical elements using science and technology for investigative and legal purposes

6.7.2 [1402] Visualisation

Capabilities within this Service Type convert data into graphical or picture form.

Service Component	Defines the set of capabilities that
140201 Graphing/Charting	Support the presentation of information in the form of diagrams or tables
140202 Imagery	Support the creation of film or electronic images from pictures or paper forms
140203 Multimedia	Support the representation of information in more than one form to include text, audio, graphics, animated graphics and full motion video
140204 Mapping / Geospatial / Elevation / GPS	Provide for the representation of position information through the use of attributes such as elevation and latitude and longitude coordinates
140205 CAD	Stands for Computer Aided Design and supports the design of products with computers

6.7.3   [1403] Knowledge Discovery

Capabilities within this Service Type facilitate the identification of useful information from data.

Service Component	Defines the set of capabilities that
140301 Data Mining	Provide for the efficient discovery of non-obvious, valuable patterns and relationships within a large collection of data
140302 Modelling	Develop descriptions to adequately explain relevant data for the purpose of prediction, pattern detection, exploration or general organisation of data
140303 Simulation	Utilise models to mimic real-world processes

6.7.4   [1404] Business Intelligence

Capabilities within this Service Type provide information that pertains to the history, current status or future projections of an organisation.

Service Component	Defines the set of capabilities that
140401 Demand Forecasting / Management	Facilitate the prediction of sufficient production to meet an organisation's sales of a product or service
140402 Balanced Scorecard	Support the listing and analysis of both positive and negative impacts associated with a decision
140403 Decision Support and Planning	Support the analysis of information and predict the impact of decisions before they are made

6.7.5   [1405] Reporting

Capabilities within this Service Type organise data into useful information.

Service Component	Defines the set of capabilities that
140501 Ad Hoc	Support the use of dynamic reports on an as-needed basis
140502 Standardised/Canned	Support the use of pre-conceived or pre-written reports
140503 OLAP	[Online Analytical Processing]. Supports the analysis of information that has been summarised into multidimensional views and hierarchies

6.8 Back Office Services Domain

The Back Office Services Domain [16](Figure 6-8) defines the set of capabilities that support the management of enterprise planning and transactional-based functions.

[150] Back Office Services

[1501] Data Management
- [150101] Data Exchange
- [150102] Data Mart
- [150103] Data Warehouse
- [150104] Metadata Management
- [150105] Data Cleansing
- [150106] Extraction and Transformation
- [150107] Loading and Archiving
- [150108] Data Recovery
- [150109] Data Classification

[1502] Human Resources
- [150201] Recruiting
- [150202] Resume Management
- [150203] Career Development and Retention
- [150204] Time Reporting
- [150205] Awards Management
- [150206] Benefit Management
- [150207] Retirement Management
- [150208] Personnel Administration
- [150209] Education / Training
- [150210] Health and Safety
- [150211] Travel Management

[1503] Financial Management
- [150301] Billing and Accounting
- [150302] Credit / Charge
- [150303] Expense Management
- [150304] Payroll
- [150305] Payment / Settlement
- [150306] Debt Collection
- [150307] Revenue Management
- [150308] Internal Controls
- [150309] Auditing
- [150310] Activity-based Management
- [150311] Currency Translation

[1504] Asset / Materials   Management
- [150401] Property / Asset Management
- [150402] Asset Cataloguing / Identification
- [150403] Asset Transfer, Allocation and Maintenance
- [150404] Facilities Management
- [150405] Computers / Automation Management

[1505] Development and   Integration
- [150501] Legacy Integration
- [150502] Enterprise Application Integration
- [150503] Data Integration
- [150504] Instrumentation and Testing
- [150505] Software Development

[1506] Human Capital / Workforce Management
- [150601] Resource Planning and Allocation
- [150602] Skills Management
- [150603] Workforce Directory / Locator
- [150604] Team / Organisation Management
- [150605] Contingent Workforce Management
- [150606] Workforce Acquisition / Optimisation

Figure 6-8:   Back Office Services Domain

---

[16]This domain may also be known as 'Corporate Services Domain'.

6.8.1 [1501] Data Management

Capabilities within this Service Type provide for the usage, processing and general administration of unstructured information.

Service Component	Defines the set of capabilities that
150101 Data Exchange	Support the interchange of information between multiple systems or applications; includes verification that transmitted data was received unaltered
150102 Data Mart	Support a subset of a data warehouse for a single department or function within an organisation
150103 Data Warehouse	Support the archiving and storage of large volumes of data
150104 Metadata Management	Support the maintenance and administration of data that describes data
150105 Data Cleansing	Support the removal of incorrect or unnecessary characters and data from a data source
150106 Extraction and Transformation	Support the manipulation and change of data
150107 Loading and Archiving	Support the population of a data source with external data
150108 Data Recovery	Support the restoration and stabilisation of data sets to a consistent, desired state
150109 Data Classification	Allow the classification of data

6.8.2 [1502] Human Resources

Capabilities within this Service Type provide for the recruitment and management of personnel.

Service Component	Defines the set of capabilities that
150201 Recruiting	Support the identification and hiring of employees for an organisation
150202 Resume Management	Support the maintenance and administration of an employee's professional or work experience and qualifications
150203 Career Development and Retention	Support the monitoring of performance as well as the professional growth, advancement and retention of an organisation's employees
150204 Time Reporting	Support the submission, approval and adjustment of an employee's hours
150205 Awards Management	Support the recognition of achievement among employees of an organisation
150206 Benefit Management	Support the enrolment and participation in an organisation's compensation and benefits programs
150207 Retirement Management	Support the payment of benefits to retirees

Service Component	Defines the set of capabilities that
150208 Personnel Administration	Support the matching between an organisation's employees and potential opportunities as well as the modification, addition and general upkeep of an organisation's employee-specific information
150209 Education/Training	Support the active building of employee competencies, to include the range of training from professional development to general awareness training
150210 Health and Safety	Support the security and physical well-being of an organisation's employees
150211 Travel Management	Support the transit and mobility of an organisation's employees for business purposes

6.8.3 [1503] Financial Management

Capabilities within this Service Type provide the accounting practices and procedures that allow for the handling of revenues, funding and expenditures.

Service Component	Defines the set of capabilities that
150301 Billing and Accounting	Support the charging, collection and reporting of an organisation's accounts
150302 Credit/Charge	Support the use of credit cards or electronic funds transfers for payment and collection of products or services
150303 Expense Management	Support the management and reimbursement of costs paid by employees or an organisation
150304 Payroll	Involve the administration and determination of employees' compensation
150305 Payment/Settlement	Support the process of accounts payable
150306 Debt Collection	Support the process of accounts receivable
150307 Revenue Management	Support the allocation and re-investment of earned net credit or capital within an organisation
150308 Internal Controls	Support the methods and procedures used by the organisation to safeguard its assets, produce accurate accounting data and reports, contribute to efficient operations, and encourage staff to adhere to management policies and mission requirements
150309 Auditing	Support the examination and verification of records for accuracy
150310 Activity-Based Management	Support a defined, specific set of finance-related tasks for a given objective
150311 Currency Translation	Support the calculations and difference between multiple mediums of exchange

6.8.4 [1504] Assets/Materials Management

Capabilities within this Service Type support the acquisition, oversight and tracking of an organisation's assets.

Service Component	Defines the set of capabilities that
150401 Property/Asset Management	Support the identification, planning and allocation of an organisation's physical capital and resources
150402 Asset Cataloguing/Identification	Support the listing and specification of available assets
150403 Asset Transfer, Allocation and Maintenance	Support the movement, assignment, and replacement of assets
150404 Facilities Management	Support the construction, management and maintenance of facilities for an organisation
150405 Computers/Automation Management	Support the identification, upgrade, allocation and replacement of physical devices, including servers and desktops, used to facilitate production and process-driven activities

6.8.5 [1505] Development and Integration

Capabilities within this Service Type provide communication between hardware/software applications and the activities associated with deployment of software applications.

Service Component	Defines the set of capabilities that
150501 Legacy Integration	Support the communication between newer generation hardware/software applications and the previous major generation of hardware/software applications
150502 Enterprise Application Integration	Support the redesigning of disparate information systems into one system that uses a common set of data structures and rules
150503 Data Integration	Support the organisation of data from separate data sources into a single source using middleware or application integration as well as the modification of system data models to capture new information within a single system
150504 Instrumentation and Testing	Support the validation of application or system capabilities and requirements
150505 Software Development	Support the creation of both graphical and process application or system software

6.8.6 [1506] Human Capital/Workforce Management

Capabilities within this Service Type provide for the planning and supervision of an organisation's personnel.

Service Component	Defines the set of capabilities that
150601 Resource Planning and Allocation	Support the determination of strategic direction, the identification and establishment of programs and processes and the allocation of resources (capital and labour) among those programs and processes
150602 Skills Management	Support the proficiency of employees in the delivery of an organisation's products or services
150603 Workforce Directory/Locator	Support the listing of employees and their whereabouts
150604 Team/Organisation Management	Support the hierarchy structure and identification of employees within the various sub-groups of an organisation
150605 Contingent Workforce Management	Support the continuity of operations for an organisation's business through the identification of alternative organisation personnel
150606 Workforce Acquisition/Optimisation	Support the hiring and re-structuring of employees and their roles within an organisation

184

6.9 Support Services Domain

The Support Services Domain *(Figure 6-9)* defines the set of cross-functional capabilities that can be leveraged independent of Service Domain objective and/or mission.

[160] Support Services

[1601] Security Management
- [160101] Identification and Authentication
- [160102] Access Control
- [160103] Cryptography
- [160104] Digital Signature Management
- [160105] Intrusion Prevention
- [160106] Intrusion Detection
- [160107] Incident Response
- [160108] Audit Trail Capture and Analysis
- [160109] Certification and Accreditation
- [160110] ISM Management and Reporting
- [160111] Virus Protection

[1602] Collaboration
- [160201] Email
- [160202] Threaded Discussions
- [160203] Document Library
- [160204] Shared Calendaring
- [160205] Task Management
- [160206] Social Networking

[1603] Search
- [160301] Query
- [160302] Precision/Recall Ranking
- [160303] Classification
- [160304] Pattern Matching

[1604] Communication
- [160401] Real Time/Chat
- [160402] Instant Messaging
- [160403] Audio Conferencing
- [160404] Video Conferencing
- [160405] Event/News Management
- [160406] Community Management
- [160407] Computer/Telephony Integration
- [160408] Voice Communications

[1605] Systems Management
- [160501] License Management
- [160502] Remote Systems Control
- [160503] System Resource Monitoring
- [160504] Software Distribution
- [160505] Issue Tracking

[1606] Forms Management
- [160601] Forms Creation
- [160602] Forms Modification

Figure 6-9:   Support Services Domain

6.9.1   [1601] Security Management

Capabilities within this Service Type protect an organisation's information and information systems.

Service Component	Defines the set of capabilities that
160101 Identification and Authentication	Support obtaining information about those parties attempting to log on to a system or application for security purposes and the validation of those users
160102 Access Control	Support the management of permissions for logging onto a computer, application, service or network; includes user management and role/privilege management
160103 Cryptography	Support the use and management of ciphers, including encryption and decryption processes, to ensure confidentiality and integrity of data
160104 Digital Signature Management	Support the use and management of electronic signatures to support authentication and data integrity; includes Public Key Infrastructure (PKI)
160105 Intrusion Prevention	Include penetration testing and other measures to prevent unauthorised access to a government information system
160106 Intrusion Detection	Support the detection of unauthorised access to a government information system
160107 Incident Response	Provide active response and remediation to a security incident that has allowed unauthorised access to a government information system
160108 Audit Trail Capture and Analysis	Support the identification and monitoring of activities within an application, system, or network
160109 Certification and Accreditation	Support the certification and accreditation of Australian Government information systems
160110 ISM Management and Reporting	Support management and reporting of compliance with the Australian Government Information Security Manual (ISM: formerly ASCI 33)
160111 Virus Protection	Provide anti-virus service to prevent, detect and remediate infection of government computing assets

6.9.2 [1602] Collaboration

Capabilities within this Service Type allow for the simultaneous communication and sharing of content, schedules, messages and ideas within an organisation.

Service Component	Defines the set of capabilities that
160201 E-mail	Support the transmission of memos and messages over a network
160202 Threaded Discussions	Support the running log of remarks and opinions about a given topic or subject. Examples include: blogs, bulletin boards and twitter.
160203 Document Library	Support the grouping and archiving of files and records on a server
160204 Shared Calendaring	Allow an entire team as well as individuals to view, add and modify each other's schedules, meetings and activities
160205 Task Management	Support a specific undertaking or function assigned to an employee
160206 Social networking	Support the ability to share content and build relationships.

6.9.3 [1603] Search

Capabilities within this Service Type provide for the probing and lookup of specific data from a data source.

Service Component	Defines the set of capabilities that
160301 Query	Support retrieval of records that satisfy specific query selection criteria
160302 Precision/Recall Ranking	Support selection and retrieval of records ranked to optimise precision against recall
160303 Classification	Support selection and retrieval of records organised by shared characteristics in content or context
160304 Pattern Matching	Support retrieval of records generated from a data source by imputing characteristics based on patterns in the content or context

6.9.4   [1604] Communication

Capabilities within this Service Type transmit data, messages and information in multiple formats and protocols.

Service Component	Defines the set of capabilities that
160401 Real Time/Chat	Support the conferencing capability between two or more users on a local area network or the Internet
160402 Instant Messaging	Support keyboard conferencing over a Local Area Network or the Internet between two or more people
160403 Audio Conferencing	Support audio communication sessions among people who are geographically dispersed
160404 Video Conferencing	Support video communication sessions among people who are geographically dispersed
160405 Event/News Management	Monitor servers, workstations and network devices for routine and non-routine events
160406 Community Management	Support the administration of online groups that share common interests
160407 Computer/Telephony Integration	Support the connectivity between server hardware, software and telecommunications equipment into a single logical system
160408 Voice Communications	Provide telephony or other voice communications

6.9.5   [1605] Systems Management

Capabilities within this Service Type support the administration and upkeep of an organisation's technology assets, including the hardware, software, infrastructure, licences and service components that comprise those assets.

Service Component	Defines the set of capabilities that
160501 Licence Management	Support the purchase, upgrade and tracking of legal usage contracts for system software and applications
160502 Remote Systems Control	Support the monitoring, administration and usage of applications and enterprise systems from locations outside of the immediate system environment
160503 System Resource Monitoring	Support the balance and allocation of memory, usage, disk space and performance on computers and their applications
160504 Software Distribution	Support the propagation, installation and upgrade of written computer programs, applications and service components
160505 Issue Tracking	Receive and track user-reported issues and problems in using IT systems, including help desk calls

6.9.6 [1606] Forms Management

Capabilities within this Service Type support the creation, modification and usage of physical or electronic documents used to capture information within the business cycle.

Service Component	Defines the set of capabilities that
160601 Forms Creation	Support the design and generation of electronic or physical forms and templates for use within the business cycle by an organisation and its stakeholders
160602 Forms Modification	Support the maintenance of electronic or physical forms, templates and their respective elements and fields

This page is

intentionally blank

7   Data Reference Model

7.1 Introduction

The Data Reference Model (DRM) is a framework whose primary purpose is to enable information sharing and re-use across the Australian Government via the standard description and discovery of common data and the promotion of uniform data management practices. The DRM describes artefacts which can be generated from the data architectures of Australian Government agencies. The DRM provides a flexible and standards-based approach to accomplish its purpose. The scope of the DRM is broad; it may be applied within a single agency, within a Community of Interest (COI)[17], or cross-COI.

7.2 Structure

The DRM is structured as follows:

Overview of the DRM	provides a brief overview of the DRM, its value to agencies, a summary of the DRM standardisation areas and more	
	DRM Implementation Framework	presents the DRM guidance and rationale for the standardisation areas, the purpose of each standardisation area and a brief usage example for each standardisation area.
	DRM Abstract Model	presents the DRM abstract model, which is described in greater detail in subsequent chapters.
	Security and Privacy	discusses security and privacy considerations for the DRM
Data Context	describes the Data Context standardisation area of the DRM	
Data Description	describes the Data Description standardisation area of the DRM	
Data Sharing	describes the Data Sharing standardisation area of the DRM	
Abstract Model	provides a consolidated view of the DRM Abstract Model	

7.3 Overview of the DRM

The DRM provides a standard means by which data may be described, categorised and shared. These are reflected within each of the DRM's three standardisation areas:

1. **Data Context**: facilitates discovery of data through an approach to the categorisation of data according to taxonomies. Additionally, it enables the definition of authoritative data assets within a COI

2. **Data Description**: provides a means to uniformly describe data, thereby supporting its discovery and sharing

3. **Data Sharing**: supports the access and exchange of data where access consists of ad-hoc requests (such as a query of a data asset) and exchange consists of fixed, recurring transactions between

---

[17] Communities of Interest are collaborative groups of users who require a shared vocabulary to exchange information in pursuit of common goals, interests and business objectives.

parties. This is enabled by capabilities provided by both the Data Context and Data Description standardisation areas.

The DRM is the AGA mechanism for identifying what data the Australian Government has and how that data can be shared in response to business/mission requirements. The DRM provides a frame of reference to:

- facilitate COIs (which may be aligned with the LoB delineated in the AGA Business Reference Model) in establishing a common language and standards
- enable needed conversations to reach credible cross-agency agreements around governance, data architecture and an information sharing architecture.

The DRM provides guidance to enterprise architects and data architects for implementing repeatable processes to enable data sharing in accordance with government-wide agreements, including agreements encompassing state, territory and local governments, as well as other public and private non-government institutions. The intent is to mature, advance and sustain these data agreements in an iterative manner.

The DRM can provide value for agency data architecture initiatives by:

- providing a means to consistently describe data architectures. The DRM's approach to Data Description, Data Context and Data Sharing enables data architecture initiatives to uniformly describe their data and information, resulting in increased opportunities for cross-agency interactions.
- bridging data architectures. The DRM provides the capability to enable cross-agency communications about data and data architecture.
- enabling greater commonality cross-agency architectures. The DRM's standardisation areas provide a foundation for increased compatibility between agency data architectures.

As a reference model, the DRM is presented as an abstract framework from which concrete implementations may be derived. The DRM's abstract nature will enable agencies to use multiple implementation approaches, methodologies and technologies while remaining consistent with the foundation principles of the DRM. For example, the DRM abstract model can be implemented using different combinations of technical standards. As one example, the Exchange Package concept in the Data Sharing standardisation area may be represented via different messaging standards (e.g. eXtensible Markup Language [XML] schema[18], Electronic Data Interchange [EDI] transaction set) in a concrete system architecture for the purposes of information sharing.

Other ways to implement DRM capabilities may be put forward by other agencies or stakeholders. By associating elements of concrete architectures with the DRM abstract model, those elements may therefore be associated with each other, which can help promote interoperability between cross-agency architectures/implementations. Thus the abstract nature of the DRM as a reference model provides tremendous implementation flexibility.

The DRM can accelerate enterprise and joint action around new opportunities afforded by standardised approaches for accomplishing goals such as the following:

- enabling increased visibility and availability of data and data artefacts[19]
- fostering increased information sharing
- facilitating harmonisation within and across COIs to form common data entities that support shared missions
- increasing the relevance and re-use of data and data artefacts via uniform categorisation techniques.

---

[18] The word 'schema' in this context refers to any of a number of XML-based schema languages.

[19] In this specification, the term 'data' is often used alone to collectively mean data, data artefacts (e.g. documents, XML schemas, etc.) and data assets. At times, the term 'data artefact' and/or 'data asset' may be used separately, or together with 'data', as appropriate for the intended meaning. The reader should consider the context of each reference.

7.4 DRM Implementation Framework

The DRM Implementation Framework is shown in *Figure 7-1* below. This framework provides a roadmap to be used by enterprise architects and data architects to guide their efforts in supporting data sharing within the COIs that they support. The roadmap is based upon the following basic assertions:

- **Data Context:** is a standardisation area within the DRM. A COI should agree on the context of the data needed to meet its shared mission business needs. A COI should be able to answer basic questions about the Data Assets that it manages. 'What are the data (subject areas) that the COI needs? What organisation(s) is(are) responsible for maintaining the data? What is the linkage to the AGA Business Reference Model (BRM)? What services are available to access the data? What database(s) is(are) used to store the data?' Data Context provides the basis for data governance within the COI.

- **Data Description:** is a standardisation area within the DRM. A COI should agree on the meaning and structure of the data that it needs in order to effectively use the data.

- **Data Sharing:** is a standardisation area within the DRM. A COI should have common capabilities to enable information to be accessed and exchanged. Hence, the DRM provides guidance for the types of services that should be provided within a COI to enable this information sharing.

<table>
<tr><td colspan="2"></td><td colspan="3">DRM Sections</td></tr>
<tr><td colspan="2"></td><td>Context</td><td>Description</td><td>Sharing</td></tr>
<tr><td rowspan="3">DRM Sub-sections</td><td>Introduction</td><td>What are the data needed to support the business/mission needs of a COI?

What core information does the COI need to make the data discoverable and establish governance?</td><td>How will the meaning and structure of the data be conveyed?</td><td>What is the data sharing architecture? (i.e. how will the data be made sharable?)

What volume of data will be shared?</td></tr>
<tr><td>Guidance</td><td>Define subject areas and entities of interest

Identify data sources and stewardship

Establish governance</td><td>Establish semantic and syntactic standards</td><td>Establish the data sharing services required to support the data sharing needs of the COI</td></tr>
<tr><td>Abstract Model</td><td>Document in accordance with the DRM Abstract Model</td><td>Document in accordance with the DRM Abstract Model</td><td>Describe services specifications in accordance with the DRM abstract model</td></tr>
</table>

Figure 7-1: DRM Implementation Framework

The three standardisation areas are shown in *Figure 7-22* below:
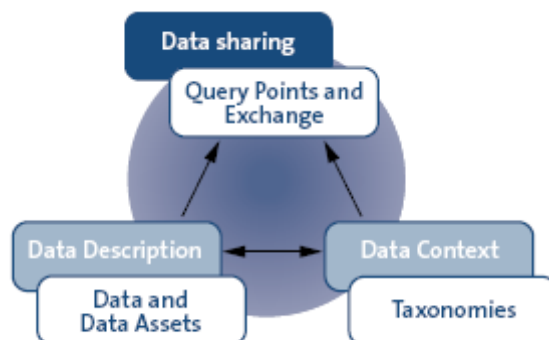
Figure 7-2:   DRM Standardisation Areas

The arrangement of the standardisation areas in the above figure indicates how Data Sharing is supported by the capabilities provided by the Data Description and Data Context standardisation areas and how Data Description and Data Context capabilities are mutually supportive. These relationships will become clearer in the subsequent sections where the standardisation areas are described in detail.

The following is a brief description of each standardisation area, along with its purpose and a usage example.

Standardisation Area	Description
Data Context	The Data Context standardisation area establishes an approach to the categorisation of data assets using taxonomies and other descriptive information. In general, data context answers key questions about the data required within a COI and establishes the basis for data governance. Data context also enables discovery of data and can provide linkages to the other AGA reference models, which are themselves taxonomies. It should be noted that context also includes business rules. However, business rules will be covered in a later version of the DRM. *Figure 7-3* provides a usage example for the Data Context standardisation area: *Figure 7-3: Data Context Usage Example*

Standardisation Area	Description
Data Description	The Data Description standardisation area provides a means to uniformly capture the semantic and syntactic structure of data. This enables comparison of metadata (data about data) for purposes of harmonisation and supports the ability to respond to questions regarding what is available in terms of data descriptions (metadata). *Figure* depicts a usage example for the Data Description standardisation area: *Figure 7-4: Data Description Usage Example*
Data Sharing	The Data Sharing standardisation area describes the access and exchange of data, where access consists of ad-hoc requests (such as a query of a Data Asset) and exchange consists of fixed, recurring information exchanges between parties. Data sharing is enabled by capabilities provided by both the Data Context and Data Description standardisation areas. The Data Sharing standardisation area is supported by the Data Description and Data Context standardisation areas in the following ways: • **Data Description:** uniform definition of Exchange Packages and Query Points supports the capability to effectively share them within and between COIs. • **Data Context:** categorisation of Exchange Packages and Query Points supports their discovery and their subsequent use in data access and data exchange.

7.5 DRM Abstract Model

Error! Reference source not found. presents the DRM abstract model. It shows the major concepts from each standardisation area and the relationships between them. Concepts highlighted in dark blue boxes are described further below. Concepts are expressed as boxes, while relationships are expressed as arrows.
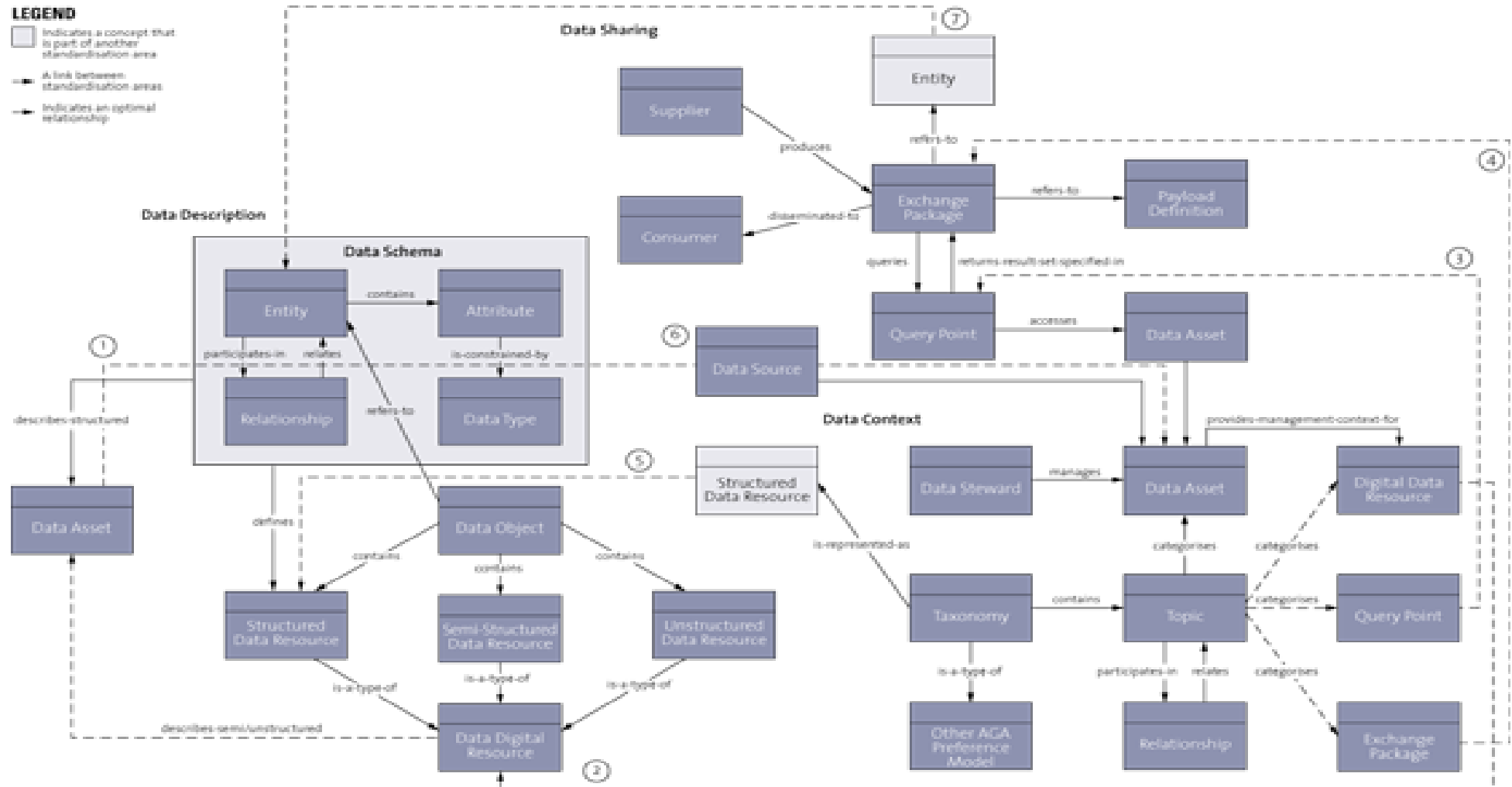
Figure 7-5: DRM Abstract Model

The DRM abstract model is an architectural pattern to optimise agency data architectures. It is abstract in that it allows multiple technical implementations; for example, one agency could use the US DOD Discovery Metadata Specification (DDMS) for Digital Data Resource attributes while another agency may choose to use the AGLS Metadata Standard[20] elements and both could demonstrate how their implementation maps to the DRM abstract model.

This architectural pattern is designed to optimise an agency's data architecture for information integration, interoperability, discovery and sharing. The pattern achieves this optimisation by defining, arranging and relating the standard concepts in a data architecture, specifying common attributes for each concept (presented in tables following the abstract model section figure in each chapter) and demonstrating a use case of the model in each chapter. **Error! Reference source not found.** shows all the concepts and relationships in the DRM abstract model.

Before defining each concept, it is important to understand the highlights of the model in the three standardisation areas:

- **Data Context standardisation area**: the focus is on management mechanisms to capture the context of data in an organisation or COI. Those mechanisms are Taxonomies (a hierarchical set of Topics connected by relationships) and a Data Asset description (captured in an inventory). A Data Asset is a collection of Digital Data Resources that is managed by an organisation, categorised for discovery and governed by a data steward. A key attribute of a Data Asset is whether it is authoritative and, if so designated, authoritative on which Entity or Attribute of the logical data model (see Data Schema in the Data Description section of the DRM abstract model). Implementation of Taxonomies could take the form of eXtensible Markup Language (XML) Topic Maps, Web Ontology Language (OWL) hierarchies or ISO 11179 Classification schemes. Implementation of a Data Asset inventory could be records in a metadata registry.

- **Data Description standardisation area**: the focus is on understanding the data at two levels of abstraction: the metadata artefacts required to understand the data and how those metadata artefacts are aggregated into a managed Data Asset. There are two basic types of metadata recommended in the Data Description section of the DRM abstract model: logical data models to describe Structured Data Resources and Digital Data Resource metadata (such as AGLS Metadata Standard elements) to describe Semi-Structured and Unstructured Data Resources. The division of data along these two axes is intended to support harmonisation (via comparison of logical data models) and registration (via description of universal resource attributes). Implementation of the Data Schema concept group would take the form of Entity-Relationship diagrams, class diagrams, etc. Implementation of the Digital Data Resource could be records in a content management system or metadata catalogue.

- **Data Sharing standardisation area**: the focus is on how information is packaged for and/or exposed to members of a COI. The key concepts are Exchange Packages as containers for fixed messages and Query Points as descriptions of data access points. Implementation of Exchange Packages could be standard XML messages or EDI transaction sets. Implementation of Query Points could be descriptions in a Universal Description, Discovery and Integration (UDDI) or ebXML registry of a data access web service.

Taken as a whole, the DRM abstract model should be used by agencies to assess the current state of their data architectures and to chart a roadmap to an improved architecture. In inter-agency collaborations, this abstract model provides the capability to decipher specific implementations of these common concepts and thus speed effective communication to deliver cross-organisational agility to a COI.

Subsequent sections will 'drill down' into the details of this abstract model. *Section 7.9* of this document describes the DRM Abstract Model in its entirety. Each section of the DRM abstract model represents the core concepts and the relationship of those concepts within its respective standardisation area. Each section represents the *minimal* level of detail necessary to convey the major concepts for the standardisation area, with COIs extending the model as necessary for their implementations.

---

[20] The AGLS Metadata Standard is a set of 19 descriptive elements which government departments and agencies can use to improve the visibility and accessibility of their services and information over the Internet.

7.6 Security and Privacy

Security and privacy considerations apply to all three of the DRM's standardisation areas. Security defines the methods of protecting information and information systems from unauthorised access, use, disclosure, disruption, modification or destruction in order to provide integrity, confidentiality and availability, whether in storage or in transit. Privacy addresses the acceptable collection, storage, use and disclosure of information, and its accuracy.

The DRM allows for the integration of existing Australian Government information security and privacy policies within each of its standardisation areas. The table below describes several sets of security policies and legislation that are applicable to the DRM.

Policy/Legislation	Description
Australian Government Information Security Manual (ISM, formerly ACSI 33)	Developed by the Defence Signals Directorate (DSD) to provide policies and guidance to Australian Government agencies on how to protect their ICT systems.
Privacy Act 1988 (Commonwealth)	Commonwealth and ACT government agencies must comply with 11 Information Privacy Principles which are set out at section 14 of the *Privacy Act 1988 (Cth)*. These are based on the 1980 OECD guidelines governing the protection of privacy and transborder flows of personal data.
Archives Act	Commonwealth agencies must comply with National Archives Act
Protective Security Policy Framework (PSPF)	Commonwealth agencies must comply with the PSPF.

An institutional process that includes roles and responsibilities for data stewardship for each project or program in the agency needs to be defined as part of a policy that governs data quality, security and privacy.

There are a number of areas that should be addressed in building such a policy. These include:

- constructing a policy that is compliant with legislation and standards
- addressing sensitivity of information that eliminates possible compromise of sources and methods of information collection and analysis
- establishing the practices of data stewardship
- addressing specific data access policies defined by the responsible steward, for example:
  - data is available for open, unrestricted access
  - data is accessible only to a defined group of persons or organisations
  - data access is dependent on the identity of the accessing person, data about that person (e.g. current position) and data about the environment (e.g. physical location)
  - data is self-protecting through digital rights management[21] or similar technologies.

The successful categorising, describing and sharing of data are dependent on the implementation of security regarding the data being exchanged. Security and privacy requirements must be considered at each level of the DRM and, in particular, regarding the sharing of data. The DRM is designed to allow for the integration of existing Australian Government information security policies and privacy legislation within each of its standardisation areas.

---

[21] Digital Rights Management is also abbreviated DRM. Hence, the reader should be aware of context when this abbreviation is encountered.

7.7 Data Context Standardisation Area

This section describes the Data Context standardisation area of the DRM. The purpose of the Data Context standardisation area is to enable identification and discovery of data and to provide linkages to the other AGA reference models. The content of the Data Context captured by each COI is determined by its needs and the need to support the related LoB.

Data Context is the basis for data governance. Understanding Data Context provides the means for informed government decision-making with regard to its information holdings.

This section also describes the overall structures, methods and benefits for providing data with context and gives practical examples on their use.

The Data Context section is organised as follows:

Contents	
Introduction	provides introductory information regarding the Data Context standardisation area, explaining why there is a Data Context section of the DRM abstract model and what can be done because of it.
Guidance	provides a description of how to start the process of creating Data Context artefacts and the goals of the process.
Data Context Section of the DRM Abstract Model	presents and describes the Data Context section of the DRM abstract model. Documenting Data Context in compliance with this section of the DRM abstract model provides a common mechanism for communication within the COI and among COIs.
Data Context Attributes	expands on the concepts presented above to include attributes that are associated with each concept in the Data Context section of the DRM abstract model.
Data Context Example	provides a usage example to further explain the Data Context standardisation area.

7.7.1   Introduction

7.7.1.1   *What is Data Context and Why is it Important?*

Data Context is any information that provides additional meaning to data to relate it to the purposes for which it was created and used. It is the information that makes it possible to provide a Context Awareness Service to support a COI or collaboration among COIs. Within a Context Awareness Service, one identifies the existence of a Data Asset and enables a user to discover whether it is potentially relevant to a given information need. The service makes Data Context artefacts, developed in accordance with the Data Context section of the DRM abstract model, available for use. These artefacts are chosen by the COI to reflect government-related business needs and contain adequate information to support government related decision-making. Typical examples of Data Context for a given Data Asset may include a Topic identifying a subject area, a data stewardship assignment, sources of record, etc. At a minimum, the Data Context for a given Data Asset should answer the following questions:

- What are the data (subject areas/topics and entities of interest) contained within the Data Asset?
- What organisation is responsible for maintaining the Data Asset?
- What is the linkage to the AGA BRM?
- What services are available to access the Data Asset? (See: Data Sharing)

There may be more than one context for a Data Asset. Context can be considered a 'lens' and one may view something through a number of different 'lenses', one for each of the different contexts in which a Data Asset may be of interest. Data Context artefacts should be developed to reflect the understanding of the relevant Data Assets from the perspective of a COI.

To satisfy a broad, general audience, as in the case of citizen access to public information, modern search engines are an effective means of discovering and retrieving unstructured and semi-structured information. Search technology, like the popular Google™ search engine, indexes unstructured and semi-structured documents (like web pages) and returns a result set in response to a keyword-based query. The speed of the returned results often offsets the large quantity of hits (or matches) in the result set. Organisations involved in search technologies are also working on improving support for discovering (and generically utilising) structured data. In summary, search technology effectively serves information sharing to citizens and the techniques expressed in this section effectively serve information sharing within communities of interest.

Agencies and organisations participating in COIs are called upon to categorise their data using taxonomies that may be defined and/or exchanged using the DRM's Data Context standardisation area. Once shared in data registries, these taxonomies become vehicles for discovering data that offers value for data sharing. Additionally, data consumers can subscribe to topics published within data registries, further enhancing data discovery. Lastly, for citizen access to semi-structured and unstructured information, enterprise search technologies should be used.

7.7.1.2   *Purpose of the Data Context Section of the DRM Abstract Model*

The Data Context section of the DRM abstract model exists to identify the structures[22] used for Data Context artefacts.

Context often takes the form of a set of terms, i.e. words or phrases that are themselves organised in lists, hierarchies or trees; they may be referred to as 'context items'. Collectively, Data Context can also be called 'categorisation' or 'classification'. In this case, the groupings of the context items can be called 'categorisation schemes' or 'classification schemes'. More complex Data Context artefacts may also be generated, e.g. networks of classification terms or schemes.

Classification schemes can include simple lists of terms (or terms and phrases) that are arranged using some form of relationship such as:

- sets of equivalent terms
- a hierarchy or a tree relationship structure
- a general network.

Many classification schemes are formally created and administered by organisations or consortiums using a set of rules. These rules describe how concepts are named and designated as terms, and how related artefacts are designed and how they can be used. In some applications of context an entity may be related to one or more terms in a classification scheme in a formal manner. In other applications, these associations are more informal and a relationship may be only implied or exist just in the form of a co-occurrence. One example of a more complex scheme is a high-level directory that brings together important terms from multiple classification schemes; it may also show their relationships.

---

[22] The term 'structure' is used here in the formal Computer Science sense of a data structure. Examples are networks, trees and hierarchies. The choice of a specific data structure impacts on the type of relationships that can be represented.

7.7.2 Guidance

7.7.2.1 The COI, its Participants and Processes

Data Context artefacts are generated by members of COIs, so the first step to be taken by an agency's enterprise architect is to identify them. The Data Assets maintained or accessed by the Australian Government describe facts about:

- the physical world
- the world of social relationships
- the individuals within those worlds
- the joint interactions within those worlds over time.

Agencies, foreign governments, state, territory and local governments, private sector organisations and individual persons differ as to what facts and relationships are of interest, but share some interests in common. It is therefore through the COIs that it is possible to meaningfully establish contexts in which data sharing should be supported. Therefore COIs may be organised around an LoB, a sub-part of the LoB or be cutting across several LoB. The data architect of an agency may well be aware of current COIs; over time some COIs may become less active and new ones may be created.

For the DRM, the role of the members of the COI is to agree on the form and content of the context data needed to meet shared mission business needs. A COI should be able to answer basic questions about the Data Assets that it manages, such as those shown earlier in Section 4.2.1. Being able to answer these questions enables governance over all the relevant artefacts.

Having identified subject areas/Topics and the entities of interest, the COI should determine the syntax and semantics of its own data. The principle is that it should be able to explain its data to its own community first. That means obtaining agreement on relevant terms, their organisation and structures before trying to explain them to others. In many areas there are external organisations that have done related work and this work should be built upon wherever possible.

The next step should be the designation of data sources within a COI. A data source is a Data Asset distinguished by the type of business rules that are used to ensure its data integrity. For any data there is a time when the data is first recorded in a government system. The government may be the original collector of the data or it may acquire it from an external organisation. As soon as the data is collected, there is a quality control step associated with it. That step could be a data integrity check which might cause a data item to be rejected and therefore not retained. The step, however, might merely record the time and, possibly, other environmental variables surrounding the data acquisition process or it could be more complex. The above description applies to base data, i.e. data that is recorded without further processing. Some base data is the input to other processes and the resulting data is of more interest. This data may become a separate Data Asset. Examples are:

- materialised views in formatted databases
- document versions, perhaps time-stamped
- 'Level-X' datasets in a repository of scientific data.

In the end some organisation or perhaps a federated set of organisations within the COI maintains the system(s) with the data. This organisation or federation becomes the data source in one of two senses:

- A 'data source of record' is a Data Asset that satisfies the following business rule: the data contained within it is designated by the owning organisation as having been generated by policy compliant business processes that ensures its integrity.
- A 'data source of reference' is a Data Asset containing data that is replicated from a data source of record.

On an ongoing basis the data within an organisation undergoes transformations, such as changes and deletions or versioning; the same is true for Data Context artefacts. There should be a person who can determine if this

activity, as well as the initial creation, is being performed in accordance with policy after properly following the correct procedures. That person is a Data Steward; there should be a Data Steward for both data sources of record and of reference.

For each COI, once a data source and a Data Steward are identified, a governance process can be put in place to ensure that there are Data Context artefacts to provide the services described in *Section 7.8*.

### 7.7.2.2   The Data Context Artefact Creation Activity

Within a COI, it is recognised that data categorisation, or better still, a more strict classification through a controlled vocabulary, aids in the process of data discovery, comprehension and data sharing. The vocabulary terms provide a perspective, significance and connotation of the contents of the Asset and an understanding of the environment in which a Data Asset is defined and used. This consistent method of defining, using and sharing information about a Data Asset's context improves the likelihood of data sharing and re-use across diverse and large organisations, including the government as an enterprise and all of its stakeholders.

The members of the COI recognise that a hierarchy is one of the most effective techniques for organising the *terms*: single words and phrases: that are commonly used to identify concepts of interest. These hierarchies normally go from more general concepts to more specific ones. The terminology most often associated with these hierarchies is 'taxonomy'. This term can be understood loosely in the sense above or in a stricter, more mathematical sense. In this document the looser sense is used. Similarly the word 'term' will be used synonymously below with the less precise word 'topic'.

The COIs may be totally within the government, in which case the selection of terms is at the discretion of the program managers. Many COIs, however, interact with other non-government organisations or bodies. In such cases there are often externally developed taxonomies. Common terms that reflect such taxonomies should be used to establish a Data Context to increase data sharing potential.

7.7.3   Data Context Section of the DRM Abstract Model

The Data Context section (**Figure6**) of the DRM abstract model illustrates the concepts that comprise the Data Context standardisation area and the relationships between them. Concepts are expressed as boxes, while relationships are expressed as arrows.
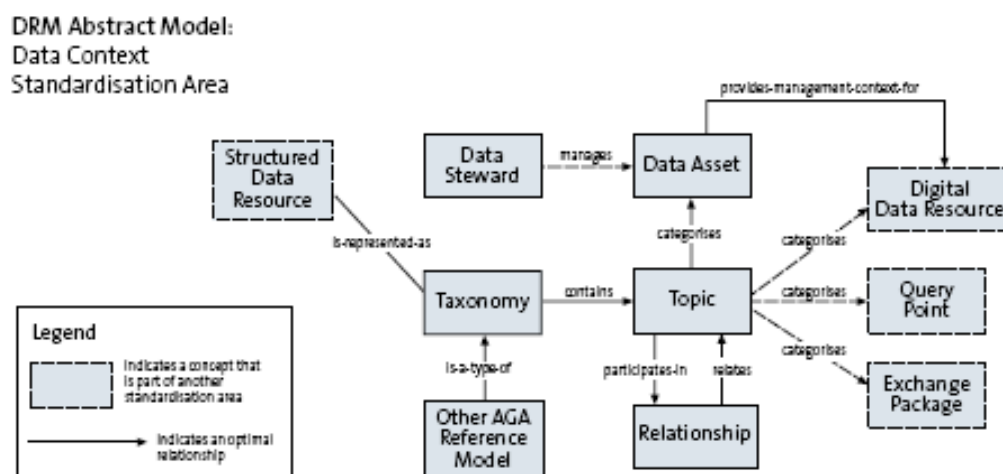
Figure 7-12: Data Context Section of the DRM Abstract Model

The following are definitions for each of the concepts and relationships within **Figure** shown above. The conventions used are:

- Only 'outbound' relationships are listed (i.e. those that originate from the concept).
- The concepts are presented in an order that will ensure the best possible understanding and specific examples are provided where appropriate.

- Though cardinality is not expressed in the figure, the descriptions below may include cardinality (e.g. 'one or more') for purposes of clarity.
- Concept names will be capitalised (e.g. 'Data Asset'), while relationship names will be expressed in italics and without any hyphens that may appear in the relationship name (e.g. *'provides management context for'*). This is done so that the definitions below can take on as narrative a tone as possible. The reader should therefore be able to easily visually navigate through the figure as they read the definitions below.
- Each concept will be referred to in a quantity of one (e.g. 'A Topic *categorises* a Data Asset') for purposes of simplicity as the figure does not depict cardinality. However, implementations based on the DRM will introduce cardinality as needed according to their requirements.
- In some cases, concepts that are part of another standardisation area are included in definitions and examples below. These concepts will not be described further in this section; the reader should reference the pertinent section for definitions and examples of those concepts.

Term	Definition
Taxonomy	A taxonomy is a collection of controlled vocabulary terms organised into a hierarchical structure. Taxonomies provide a means for categorising or classifying information within a reasonably well-defined associative structure, in which each term in a Taxonomy is in one or more parent/child (broader/narrower) relationships to other terms in the Taxonomy. A common example of a Taxonomy is the hierarchical structure used to classify living things within the biological sciences from Carolus Linnaeus (*Figure 7-7*). <table><tr><td>**Category**</td><td>**Value for Humans**</td></tr><tr><td>Kingdom</td><td>Animalia</td></tr><tr><td>Phylum</td><td>Chordata</td></tr><tr><td>Class</td><td>Mammals</td></tr><tr><td>Order</td><td>Primates</td></tr><tr><td>Family</td><td>Hominidae</td></tr><tr><td>Genus</td><td>Homo</td></tr><tr><td>Species</td><td>Sapiens</td></tr></table> *Figure 7-7: Carolus Linnaeus Taxonomy* Relationships: • A Taxonomy *contains* a Topic. • A Taxonomy *is represented as* a Structured Data Resource[23]. Example: a taxonomy expressed in W3C Web Ontology Language (OWL) format.
Structured Data Resource	See the Data Description section.

---

[23] Because a Taxonomy is represented as a Structured Data Resource and a Data Asset provides management context for a Digital Data Resource, it follows that a Taxonomy may be stored and managed within a Data Asset.

Term	Definition
Topic	A topic is a category within a Taxonomy. A Topic is the central concept for applying context to data. For example, an agency may have a Taxonomy that represents their organisational structure. In such a Taxonomy, each role in the organisational structure (e.g. CIO) represents a Topic. Topic is often synonymous with 'node'. Relationships: • A Topic *categorises* a Data Asset. • A Topic *may categorise* a Digital Data Resource. • A Topic *may categorise* a Query Point. • A Topic *may categorise* an Exchange Package. A Topic *participates in* a Relationship with another Topic.
Digital Data Resource	See the Data Description section.
Query Point	See the Data Sharing Section
Exchange Package	See the Data Sharing section.
Relationship	This describes the relationship[24] between two Topics. Relationships: • A Relationship *relates* a Topic. Example: A 'Person' Entity may be represented in one Data Asset in a 'Customer' context because it is part of a CUSTOMER_INFO table. However, the same Entity may be represented in a 'Suspect' context on a law enforcement website. The metadata that is associated with the 'Person' Entity would be different in each context: for example, the 'Suspect' context would likely include physical characteristic metadata (height, hair colour, etc.), while the 'Customer' context would not.
Data Asset	A Data Asset is a managed container for data. In many cases this will be a relational database. However, a Data Asset may also be a website, a document repository, a directory or a data service. Relationships: • A Data Asset *provides management context for* a Digital Data Resource. Example: A document that is stored and managed within a data asset (such as a document repository) has management context provided for it through the metadata that is associated with that document within the document repository. Such metadata may include the AGLS Metadata Standard attributes that are described in the Data Description section.
Data Steward	A Data Steward is the person responsible for managing a Data Asset. Relationships: • A Data Asset *may be managed by* a Data Steward.

204

---

[24] It should be noted that the term 'relationship' is used in two ways here. The concept named 'Relationship' participates in relationships with other concepts in the abstract model and also defines the relationship between topics when it is applied to a specific scenario.

Term	Definition
Other AGA Reference Models	This concept represents the four other AGA reference models: the Business Reference Model (BRM), the Service Reference Model (SRM), the Technical Reference Model (TRM) and the Performance Reference Model (PRM). Its purpose is to provide a linkage to these other reference models, which are themselves Taxonomies. These are depicted as a special kind of Taxonomy due to their importance in the overall classification of information. Relationships: • The other AGA Reference Models *are types of* Taxonomies.

7.7.4   Data Context Attributes

This section expands on the concepts presented above to include attributes that are associated with each concept in the Data Context section of the DRM abstract model. A description will be provided for each attribute, along with an example where necessary for clarity.

Concept	Attribute	Description	Example
Taxonomy	Identifier[25]	A unique string associated with a Taxonomy for identification purposes.	'200XCB'
	Name	The name of a Taxonomy.	'Geographic Areas'
	Description	A description of a Taxonomy.	
Topic	Name	The name of a Topic.	'Country'
	Description	A description of a Topic.	
Relationship	Name	The name of a Relationship.	'part-of'
	Origin	Name of the concept that is the origin (i.e. the 'from' concept) of a Relationship.	
	Destination	Name of the concept that is the destination (i.e. the 'to' concept) of a Relationship.	
Data Asset	Identifier	A unique string associated with a Data Asset for identification purposes.	'333XBD'
	Type	Type of Data Asset - e.g. database, website, registry, directory, data service, etc.	'database'
	Geospatial Enabled	Designates whether or not the Data Asset supports or provides Geospatial data.	'yes'
Data Steward	Employee ID	Data Steward's employee ID.	
	Department	Department for which the Data Steward works.	
	Initial Date	The date that the Data Steward became associated with the Data Asset.	

---

[25] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.

Concept	Attribute	Description	Example
Other AGA Reference Model	Acronym	Reference model acronym.	'BRM'
	Name	Reference model name.	'Business Reference Model'

7.7.5   Data Context Example

One or more contexts for an entity may be conveyed by creating an association between the entity and a context item that is part of a classification scheme. For example, an exam may be given at a university for different purposes. One purpose may be to evaluate the student's ability to meet the requirements of a course, as with a midterm or final exam for a given semester. Another purpose may be that of a comprehensive exam for a graduate program, in which the exam is intended to evaluate the student's capabilities as an expert in their primary field of graduate study. In each of these cases, the 'exam' entity has a different context because it is associated with a different context item: one context item relating to a semester, another relating to a graduate program. Each of these context items can be considered to be part of a classification scheme involving types of exams.

This section provides a usage example for the Data Context standardisation area. It is based on an existing implementation of the DRM at the US Government's Department of the Interior (DOI), for the Recreation One Stop initiative.

Figure 7-8 depicts examples of five different classification schemes as applied to a single entity within the DOI DRM implementation.

The entity in this example is a data entity called RECREATION-AREA. Classification scheme (1), which provides subject area and information class context, represents part of a high-level data architecture listing subject areas and information classes. Two topics (more precisely, a topic and a subtopic) from this classification scheme are shown, and a 'subclass-of' relationship exists between the parent[26] topic RECREATION and the child topic RECREATION INVENTORY. This conveys that the RECREATION-AREA is part of the RECREATION INVENTORY.

Classification scheme (2), which provides organisation context, represents part of an organisation hierarchy for a federal department. One topic from this classification scheme is shown and relating the RECREATION-AREA entity this topic ('National Park Service') indicates that a recreation area is used or processed by the organisation known as National Park Service. This categorisation capability also provides a mechanism to identity common data across organisations.

---

[26] In a Taxonomy, given any topic, a second topic is a parent topic if it is higher in the hierarchy or a child topic if it is directly lower in the hierarchy.
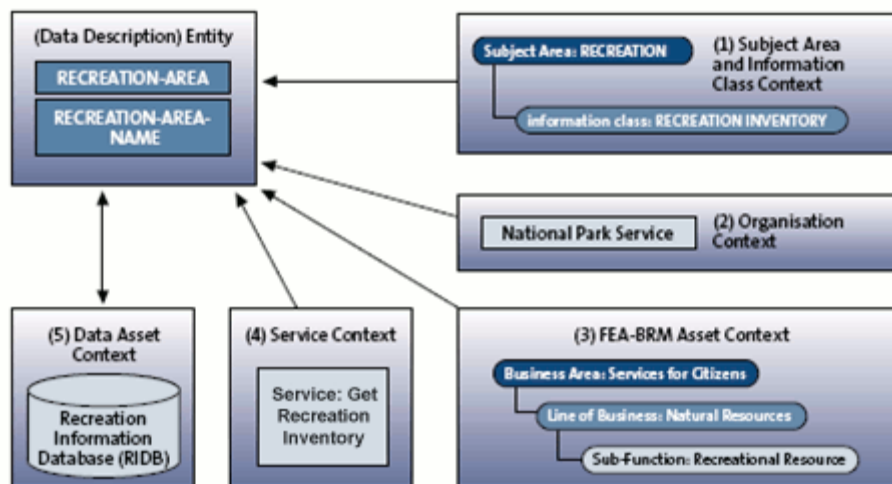
Figure 7-8: US DOI DRM Classification Schemes

Classification scheme (3), which provides business context using the AGA BRM, represents part of the AGA BRM taxonomy. One particular sub-function topic ('Recreational Resource') is shown, along with the parent hierarchy topics for LoB ('Natural Resources') and Business Area ('Service for Citizens'). The RECREATION-AREA entity is related to the AGA BRM sub-function of 'Recreational Resource', which establishes the business context for this entity. This indicates that data about a RECREATION-AREA is typically created, updated, processed or deleted by systems that support the Recreational Resource sub-function.

Classification scheme (4), which provides service context, indicates specific services related to the processing of RECREATION-AREA data. One topic from this classification scheme, which represents the specific purpose of a given service, is shown. Relating the RECREATION-AREA entity this topic ('Service: Get Recreation Inventory') indicates that the entity RECREATION-AREA is part of the information model associated with this service, i.e. it is a key piece of data that is provided when this service is invoked and indicates the exact recreation area for which an inventory of recreation assets should be obtained.

Classification scheme (5), which provides data asset context, indicates specific systems, applications or physical data stores that process data related to RECREATION-AREAs. One topic from this classification scheme is shown and relating the RECREATION-AREA entity to this topic ('Recreation Information Database' (RIDB)) indicates that instances of RECREATION-AREA data exist as records in the RIDB. This type of context may also describe the process method that a particular system may apply to an entity, such as creating instances of the entity, updating instances, deleting instances or simply referencing instances.

7.7.6   Data Description Standardisation Area

This section describes the Data Description standardisation area of the DRM. The purpose of this standardisation area is to enable the uniform description of data in order to enable mission-critical capabilities such as data discovery, re-use, harmonisation, sharing and exchange, as well as rapid co-ordination and communication clarity in cross-government actions.

The Data Description section is organised as follows:

Contents	
Introduction	provides introductory information regarding the Data Description standardisation area, the nature of the related business issues and the business reasons for sound Data Description.
Guidance	provides a description of the key issues affecting Data Description.
Data Description Section of the DRM Abstract Model	presents and describes the Data Description section of the DRM abstract model.
Data Description Attributes	
Data Description Example	provides a usage example to further explain the Data Description standardisation area.

7.7.7   Introduction

The Data Description standardisation area addresses the question 'How do you understand what data is available and what it means?' .Through the generation of Data Description artefacts, data within an agency can be categorised, discovered and shared. It further enables data to be clearly tied to LoB and specific agency missions.

The section establishes guidance for the description of the types of data shown in the DRM abstract model.

7.7.7.1   What is Data Description and why is it important?

The purpose of the Data Description standardisation area is to provide a means for a COI to agree to the structure (syntax) and meaning (semantics) of the data that it uses. Within the context of the DRM, these agreements are documented as Data Description artefacts that are captured in accordance with the DRM abstract model. Hence, Data Description artefacts are an output of the process of providing data syntax and semantics and a meaningful identification for a data resource so as to make it visible and usable by a COI.

It must be recognised that data has a significant role in the AGA. Historically, when executives, managers, operations personnel, etc. hear the terms 'data' and 'data management', they have equated it to a low level, 'bits and bytes' technical task that is taken care of by data people on application development projects. In reality, the data in a COI are the basis for sound business decision-making. If Data Description is effectively developed it has a positive impact on mission effectiveness. If not, it impedes that effectiveness, sometimes with disastrous results when data needed for decision- making cannot be found.

Comprehensive management of data, throughout its life cycle, is critical to providing high quality information to all aspects of government operations. The inclusion of the DRM in the AGA not only elevates the significance of sound data management practices, it should also be a catalyst for Australian Government agencies to improve the quality, efficiency and effectiveness of their data. Data Description is the foundation of those practices. It enables the following critical mission support capabilities:

- **Data Discovery:** the capability to quickly and accurately identify and find data that supports mission requirements. This is possible through the means of uniformly describing data that are presented in this

section, as well as through the categorisation, search and query capabilities described in subsequent sections.

- **Data Re-use:** the capability to increase utilisation of data in new and synergistic ways in order to innovatively and creatively support missions.
- **Data Sharing:** the identification of data for sharing and exchange within and between agencies and COIs, including international, state, territory and local governments, as appropriate.
- **Data Entity Harmonisation:** an enhanced capability to compare data artefacts across government through a common, well-defined model that supports the harmonisation of those artefacts and the creation of 'common entities'.
- **Semantic Interoperability[27]:** implementing information-sharing infrastructures between discrete content owners (even when using service-oriented architectures or business process-modelling approaches) still presents problems with different contexts and their associated meanings. Semantic interoperability is a capability that enables enhanced automated discovery and usage of data due to the enhanced meaning (semantics) that are provided for data.

Data Sharing services (*Section7.8)* describe the underlying capabilities that enable a COI to successfully perform these functions when the data within a COI has been adequately described.

7.7.7.2   Purpose of the Data Description Section of the DRM Abstract Model

The Data Description section of the DRM abstract model exists to identify the various data types used for Data Description artefacts and their interrelationships. They are the artefacts also generated and used as a matter of course in good data management practices. The specific focus of the section is twofold; the identification of entities and the designation of the information describing them. The process of identifying entities is part of the analysis as to what data supports what aspects of a LoB. When the Data Description artefacts are developed with high quality standards, they support an agency's or COI's data architecture and enable Data Sharing services.

7.7.7.3   Guidance

The guidance for data architects is straightforward: generate the appropriate artefacts for the data collections that will have the greatest benefit if they become shared. The artefacts used for Data Description are the ones that data architects have been using for decades. They are Data Schemas and document descriptions that provide metadata to be associated with the various databases, documents and files that are stored on the agency's or COI's computers. The DRM abstract model shows the relationships of those artefacts. Data architects should create them and make them available to provide Data Sharing services that are described in *Section 7.8*.

As a first step in realising these capabilities, data needed within a COI should be architecturally tied to the LoB that it supports. This linkage is established by processes that will be chosen by data architects and documented within an enterprise architecture. The artefacts of the Data Description standardisation area, as defined in the Data Description section of the DRM abstract model, however, were purposely defined at the most abstract level. Thus, if used by data architects, they will support data architecture at various levels (e.g. agency, COI).

Metadata developed and provided in accordance with the DRM abstract model should be appropriate for each type of data. This activity should be guided by the data architect and incorporate several phases, with each observing the broad Pareto principle. During the transition to Enterprise Architecture (EA) processes that incorporate support for the DRM's Data Sharing activity, data architects should interact with the COIs that can identify and prioritise key data collections and related services within their domain of expertise; these may already exist or they may be in development. This prioritised list will provide a focus for near-term COI initiatives to create metadata, to advertise the data and ensure that the data is available in a stakeholder-accessible space. Artefacts may need to be mapped to the Data Description section of the DRM abstract model. When creating

---

[27] From *Adaptive Information,* by Jeffery T. Pollock and Ralph Hodgson, John Wiley and Sons, Inc., ISBN 0-471-48854-2, 2004. p. 6.

such artefacts there is an opportunity to adopt practices that would improve maturity scores on the EA Assessment Framework.

When a COI is established, the architect should support a mechanism to capture common semantic and syntactic information (e.g. a data dictionary). The Data Description section of the DRM abstract model shows that there are Structured Data Resources. These are distinguished by having a description, a Data Schema and a pre-defined self-consistent form, one independent of the actual values of the data that it describes. Such data is typically managed with a tool suite that supports documentation of Data Schemas. The Data Description artefacts should be generated using those tools. They provide the syntax of the structured data and some associated data semantics. Further, best practices require that the names of the Entities and Attributes in the Data Schemas should be associated with an additional textual description of their meaning. Taken together, these textual descriptions are called a data dictionary. When Data Schemas are published for databases, they should be accompanied by their data dictionaries, which are also instances of a Structured Data Resource.

The Data Description section of the DRM abstract model further identifies that, in addition to Structured Data Resources, there are Unstructured Data Resources and Semi-Structured Data Resources. The latter combines the former two. The latter two also have a *contains* relationship to a Document, meaning that a Document may contain unstructured and/or semi-structured data. The distinction is made at a high level of abstraction because the government's data holdings encompass textual material, fixed field databases, web page repositories, multimedia files, scientific data, geospatial data, statistical data, simulation data, manufactured product data and data in other more specialised formats. Whatever the type of data, however, COIs specialising in them have developed within the government and external stakeholder organisations. These COIs have a long history of understanding how such data should be described. The standards which these groups use should guide Australian Government Data Description efforts.

7.7.8 Data Description Section of the DRM Abstract Model

The Data Description section of the DRM abstract model is shown in *Figure 7-9*: It illustrates the concepts that comprise the Data Description standardisation area and the relationships between them. Concepts are expressed as boxes, while relationships are expressed as arrows. A *concept group,* an aggregation of related concepts, is also expressed in this section of the DRM abstract model as the *Data Schema* concept group.

Note: The 'Document' concept below represents an example of one kind of data object.
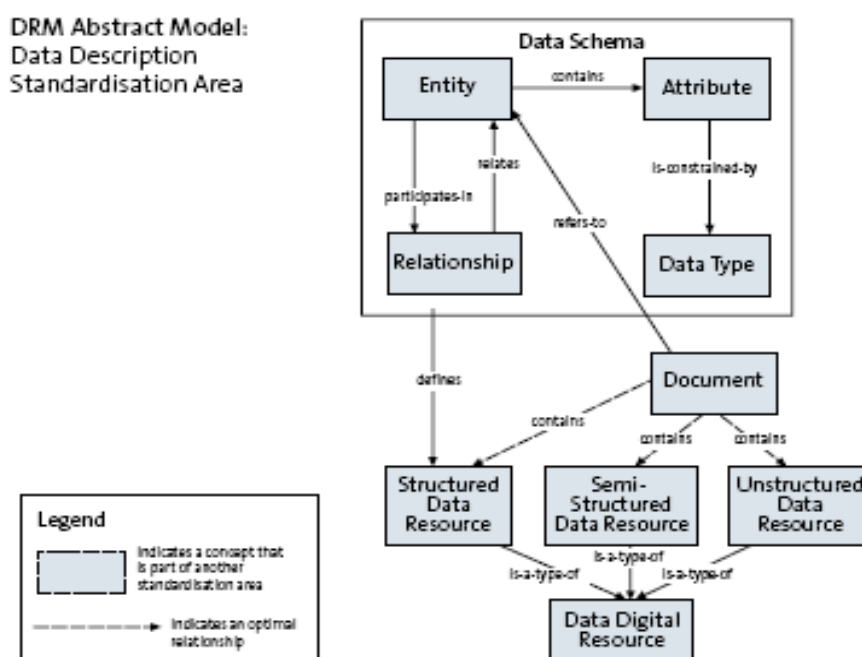
Figure 7-9: DRM Data Description Abstract model

The following are definitions for each of the concepts and relationships within *Figure 7-9* shown above. The conventions used are:

- Only 'outbound' relationships are listed (i.e. those that originate from the concept).
- The concepts are presented in an order that will ensure the best possible understanding and specific examples are provided where appropriate.
- Though cardinality is not expressed in the figure, the descriptions below may include cardinality (e.g. 'one or more') for purposes of clarity.
- Concept names will be capitalised (e.g. 'Digital Data Resource'), while relationship names will be expressed in italics and without any hyphens that may appear in the relationship name (e.g. *'is constrained by'*). This is done so that the definitions below can take on as narrative a tone as possible. The reader should therefore be able to easily visually navigate through the figure as they read the definitions below.
- Each concept will be referred to in a quantity of one (e.g. 'An Entity *contains* an Attribute') for purposes of simplicity as figure does not depict cardinality. However, implementations based on the DRM will introduce cardinality as needed according to their requirements.

Term	Definition
Data Schema	A Data Schema is a representation of metadata, often in the form of data artefacts such as logical data models or conceptual data models. The *Data Schema* concept group is comprised of those concepts pertaining to the representation of structured data. A Data Schema provides a means to provide data sharing services that is independent of the values of the data in the data resource that it describes. Relationships: • A Data Schema *defines a Structured* Data Resource. • A Data Schema *describes a Structured* Data Asset.
Entity	An Entity is an abstraction for a person, place, object, event or concept described (or characterised) by common Attributes. For example, 'Person' and 'Agency' are Entities. An *instance* of an Entity represents one particular occurrence of the Entity, such as a specific person or a specific agency. Relationships: • An Entity *contains* an Attribute. • An Entity *participates in* a Relationship with another Entity.
Data Type	A Data Type is a constraint on the type of physical representation that an instance of an Attribute may hold (e.g. 'string' or 'integer'). Relationships: • none
Attribute	An Attribute is a characteristic of an Entity whose value may be used to help distinguish one instance of an Entity from other instances of the same Entity. For example, an Attribute of a 'Person' Entity may be 'Social Security Number (SSN)'. An SSN is used to distinguish one person (i.e. one instance of a 'Person' Entity) from another. Relationships: • An Attribute *is constrained by* a Data Type. Example: The 'SSN' Attribute of a 'Person' Entity may have a Data Type of 'string' (if hyphens are included with the SSN) or 'integer' (if hyphens are not included).

Term	Definition
Relationship	This describes the relationship[28] between two Entities. Relationships: • A Relationship *relates* an Entity. Example: a 'Person' Entity may have a Relationship with an 'Agency' Entity of 'works for'
Digital Data Resource	A Digital Data Resource is a digital container of information, typically known as a file. A Digital Data Resource may be one of three specific types of data resources, each corresponding to one of the three types of data described earlier and each described below (see 'Structured Data Resource', 'Semi-Structured Data Resource', and 'Unstructured Data Resource'). It will be a container for the metadata about the data resource. Relationships: • A Digital Data Resource *describes* a *Semi-Structured* Data Asset. • A Digital Data Resource *describes* an *Unstructured* Data Asset.
Structured Data Resource	A Structured Data Resource is a Digital Data Resource containing structured data. This data can be accessed in a uniform manner, independent of data values, once the Data Schema is known. Relationships: • A Structured Data Resource is *a type of* Digital Data Resource.
Semi-Structured Data Resource	A Semi-Structured Data Resource is a Digital Data Resource containing semi-structured data. This will generally consist partly of structured data and partly of unstructured data. Relationships: • A Semi-Structured Data Resource is *a type of* Digital Data Resource.
Unstructured Data Resource	An Unstructured Data Resource is a Digital Data Resource containing unstructured data. Unstructured data is a collection of data values that are likely to be processed only by specialised application programs. Relationships: • An Unstructured Data Resource is *a type of* Digital Data Resource.

---

[28] It should be noted that the term 'relationship' is used in two ways here. The concept named 'Relationship' participates in relationships with other concepts in the abstract model, and also defines the relationship between entities when it is applied to a specific scenario.

Term	Definition
Document (human readable)	A Document is a file containing Unstructured and/or Semi-Structured Data Resources. Relationships: - A Document *may* contain an Unstructured or Semi-Structured Data Resource. - A Document *refers* to an Entity. Example (relationship with Entity): a query that states 'Find all Documents in which the following person is referenced'. **Note**: While a Document can contain structured data, it normally has explanatory material included, which would cause it to therefore be considered semi-structured. It is for this reason that there is no *'contains'* relationship from Document to Structured Data Resource. It is very important to separate Documents from Structured Data Resources because they are processed very differently. The difference between a Document and a Digital Data Resource, therefore, is that a Digital Data Resource can contain structured data.

7.7.9 Data Description Attributes

This section will expand on the concepts presented above to include attributes[29] that are associated with each concept in the Data Description section of the DRM abstract model. A description will be provided for each attribute, along with an example where necessary for clarity. All Unstructured Data Resource attributes and their descriptions are taken from the National Archives of Australia's AGLS Metadata Element Set. All references to 'resource' within descriptions of Unstructured Data Resource should therefore be interpreted as 'Unstructured Data Resource'. The above URL provides additional information on attribute descriptions and usage.

Concept	Attribute	Description	Example
Entity	Identifier[30]	A unique string associated with an Entity for identification purposes	'200XCB'
	Name	The name of an Entity	'Person'
	Description	A description of an Entity	
Data Type	Name	The name of a Data Type	'string'
	Description	A description of a Data Type	
Attribute	Name	The name of an Attribute	'Date Of Birth'
	Description	A description of an Attribute	
Relationship	Name	The name of a Relationship	'works-for'
	Origin	Name of the concept that is the origin (i.e. the 'from' concept) of a Relationship	
	Destination	Name of the concept that is the destination (i.e. the 'to' concept) of a Relationship	
Digital Data Resource	See 'Structured Data Resource', 'Semi-Structured Data Resource', and 'Unstructured Data Resource'[31]		
Structured Data Resource	See all concepts within 'Data Schema' group		
Semi-Structured Data Resource	See 'Structured Data Resource' and 'Unstructured Data Resource'		
Unstructured Data Resource	Title	A name given to the resource. Typically, the name by which the resource is formally known.	'The Mortimer Report'
	Resource	An unambiguous reference to the	'200XCB'

---

[29] It should be noted that the term 'attribute' is used here in a different way than for the concept named 'Attribute'. Here, an 'attribute' is used to describe the characteristics of each of the concepts in the abstract model.

[30] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.

[31] As shown in the abstract model, a Digital Data Resource may be one of these three specific types of data resources. The same general idea applies to the entries for the 'Semi-Structured Data Resource' and 'Data Object' concepts above.

| Concept	Attribute	Description	Example
	Identifier	resource within a given context.	
	Date	A date of an event in the lifecycle of the resource. Typically, Date will be associated with the creation or availability of the resource.	'2001-05-01'
	Creator	An entity primarily responsible for making the content of the resource. Examples of a Creator include a person or an organisation.	'corporateName=Family Law Council;jurisdiction=Commonwealth of Australia'
	Format	The physical or digital manifestation of the resource. Typically, Format may include the media-type or dimensions of the resource. Format may be used to determine the software, hardware or other equipment needed to display or operate the resource.	'650 megabytes; 72 minutes'
	Description	An account of the content of the resource. Description may include but is not limited to: an abstract, table of contents, reference to a graphical representation of content (e.g. a thumbnail of an image) or a free-text account of the content.	'This site provides information for parents on the location of child care services.'
	Source	A reference to a resource from which the present resource is derived. The present resource may be derived from the Source resource in whole or in part.	'ISBN 0 55555 0000'
	Subject	A subject and/or topic of the content of the resource. Typically, a Subject will be expressed as keywords, key phrases or classification codes that describe a topic of the resource content.	'Health Thesaurus'
	Resource Type	The nature or genre of the content of the resource. Type includes terms describing general categories, genres or aggregation levels for content.	'Service'
	Publisher	An entity responsible for making the resource available. This field is often the name of the organisation that owns or controls or publishes the resource.	'corporateName=High Court;jurisdiction=Commonwealth of Australia'
	Contributor	An entity responsible for making a contribution to the content of the resource. Typically, a contributor will be an entity that has played an important but secondary role in	'corporateName=WebDesign; e-mail=webdesign@hereweare.com.au'

Concept	Attribute	Description	Example
		creating the content of the resource and is not specified in the creator element.	
	Language	A language of the intellectual content of the resource. Recommended best practice for the values of the Language element is defined by RFC 3066 [RFC 3066] which includes a two-letter Language Code (taken from the ISO 639 standard [ISO 639]), followed optionally by a two-letter Country Code (taken from the ISO 3166 standard [ISO 3166]).	'fr-CA'
	Relation	A reference to a related resource.	'Standards Australia, Records Management (AS 4390), Homebush, 1996'
	Coverage	The extent or scope of the content of the resource. Coverage will typically include spatial location (a place name or geographic coordinates), temporal period (a period label, date, or date range) or jurisdiction (such as a named administrative entity).	'New South Wales'
	Rights Management	Information about rights held in and over the resource. Typically, the Rights element will contain a rights management statement for the resource or refer to a service providing such information.	'Copyright Commonwealth of Australia 2001'
	Availability	How the resource can be obtained or contact information for obtaining the resource. The Availability element is primarily used for non-electronic resources to provide information on how to obtain physical access to the resource.	'Medical assistance is available by contacting the medical hotline on 1800 123456'
	Function	The business function of the organisation to which the resource relates. Used to indicate the business role of the resource in terms of business functions and activities.	'Community Services'
	Audience	A target audience of the resource. Types of audiences commonly used in this element include particular industry sectors, education levels, skill levels, occupations and EEO categories.	'Upper Primary'

Concept	Attribute	Description	Example
	Mandate	A specific warrant which requires the resource to be created or provided. The element is useful to indicate the specific legal mandate which requires the resource being described to be created or provided to the public.	'http://www.austlii.edu.au/au/ legis/cth/num_act/laa1989192/'
Document	See 'Structured Data Resource' and 'Semi-Structured Data Resource'		

7.7.10　Data Description Example

This section provides a usage example for the Data Description standardisation area. It is based on an existing implementation of the DRM at the US Department of the Interior (DOI), for the Recreation One Stop initiative[32].

The DOI recreation functions deliver services that make up Recreation One Stop. DOI has created various 'information classes' that describe the data required for Recreation One Stop (*Figure 7-10*).
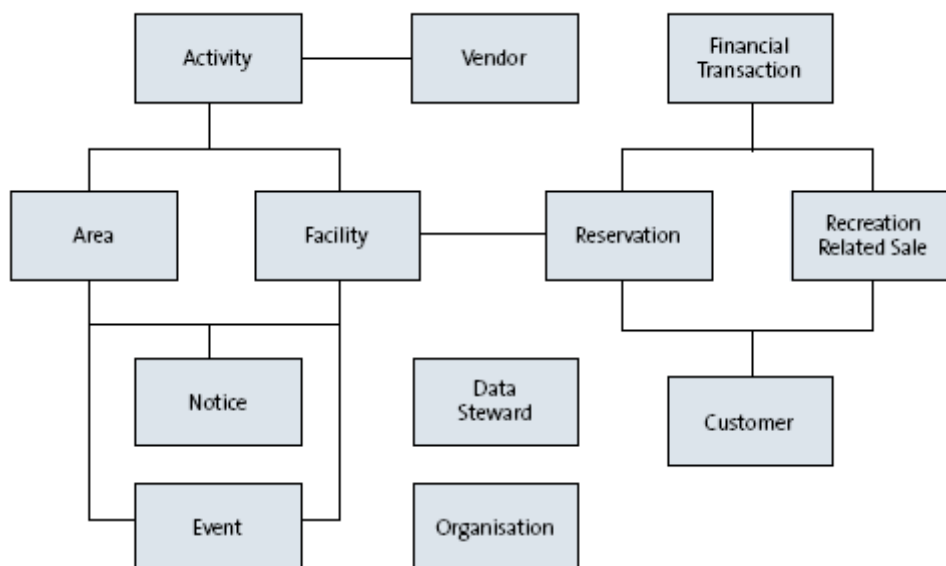
*Figure 7-10:　US Recreation One Stop Information Classes*

The above figure represents a conceptual data model, in which each information class is equivalent to Data Description's Entity. Attributes are not represented in the conceptual data model; however, they are represented in logical data models that are derived from the conceptual data model. Names of relationships between classes are omitted from the above figure for purposes of simplicity; however, some are generally evident (such as Customer makes a Reservation).

DOI used the International Organisation for Standardisation/International Electrotechnical Commission (ISO/IEC) 11179 Metadata Registries standard for the metadata attributes that describe its data. ISO/IEC 11179 is a Metadata Registry standard that can be used by implementations based on the DRM to register and represent the metadata describing data within their data assets.

---

[32] As it is taken from an existing operational system, the terminology used in the description may differ from that described in the DRM abstract model, but it is offered to demonstrate the various ways that an agency uses a variety of logical data models to characterise the data description/sharing constructs.

Using techniques that are standard in data architecture, DOI identified those data subject areas[33] that needed to be shared between business areas of the DOI enterprise. *Figure 7-11* depicts one such example involving three 'business focus areas' and the citizen. Several information classes shown earlier are evident, for example:

- customer
- event[34]
- financial transaction.
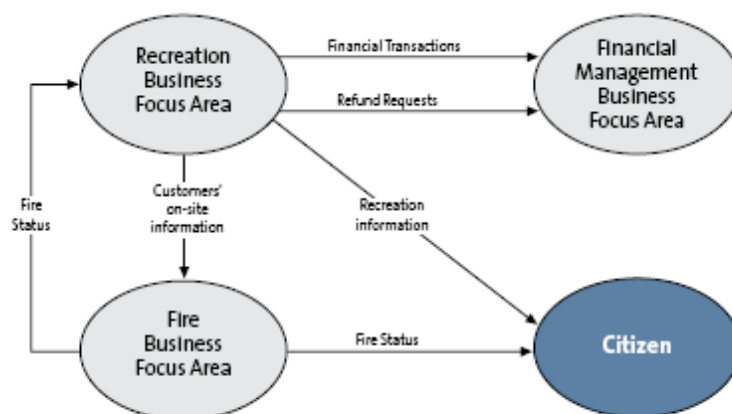
Figure 7-11:   US DOI Three Business Focus Areas

Common data and data sharing opportunities were also identified using identified data subject areas as a unifying mechanism across COIs, as shown in *Figure 7-12*:
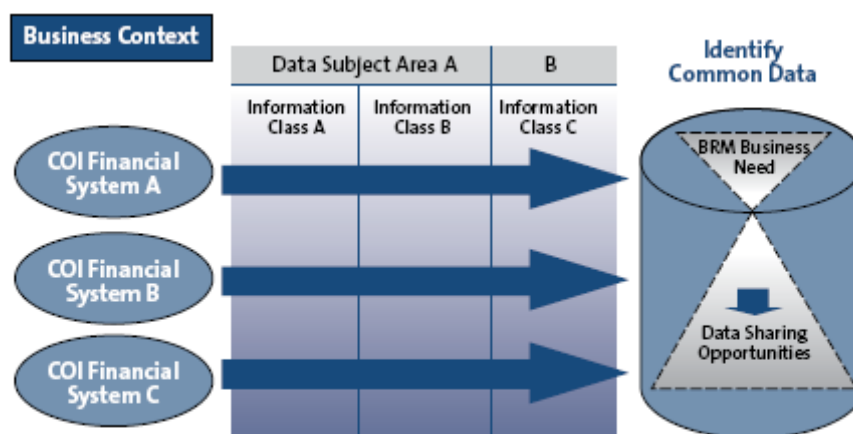
Figure 7-12:   COIs Identified Data Subject Areas

Logical data models were also developed according to business context, using the US Government's Federal Enterprise Architecture (FEA) BRM. *Figure 7-13* is an example of one such logical data model:

---

[33] A data subject area is comprised of one or more information classes.
[34] In this example, a specific type of event is depicted (a fire).
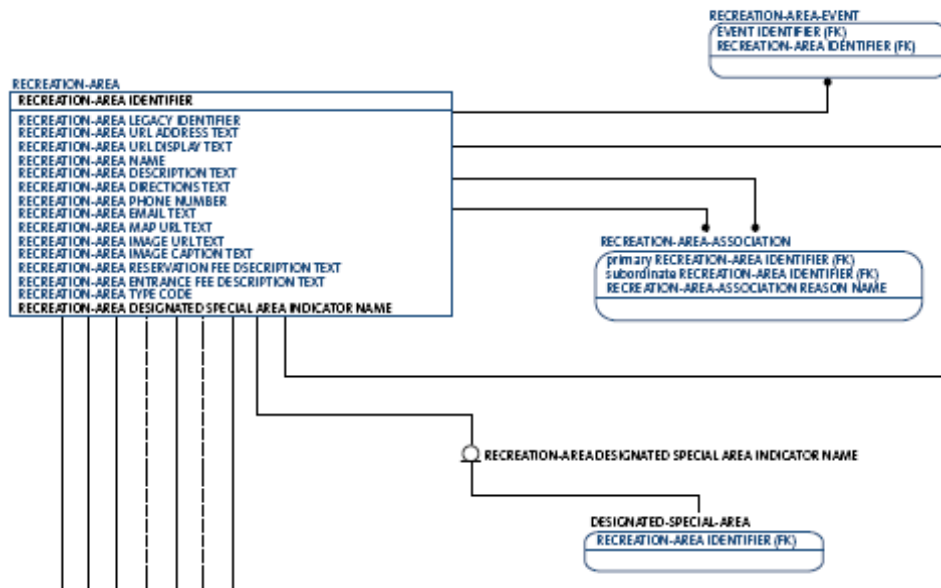
Figure 7-13:   US FEA BRM Logical Data Models

This figure depicts a RECREATION-AREA entity along with various attributes (RECREATION-AREA LEGACY, RECREATION-AREA URL, etc.). Each attribute name is followed by its data type (e.g. 'IDENTIFIER', 'TEXT') and several relationships are shown. For example, the relationship between a RECREATION-AREA entity and a RECREATION-AREA-EVENT entity is shown at the top right, with the relationship based on a mapping between a RECREATION-AREA identifier and an EVENT identifier.

7.8 Data Sharing Standardisation Area

This section describes the Data Sharing standardisation area of the DRM. This section conveys an architectural pattern for the sharing and exchange of data with examples for its use. To guide architects in its use, a Data Supplier-To-Consumer Matrix is provided for planning the services required for data access and exchange within and between COIs to support their business/mission needs. These COIs may include international, federal, state, territory and local governments, as well as other public and private non-government institutions. The section also provides guidance on how architects can document these services using the DRM Abstract Model as a guide. The concepts and relationships of Data Sharing to the Data Description and Data Context standardisation areas were introduced in the Overview.

Content	
The Data Sharing section is organised as follows:	
Introduction	provides introductory information regarding the Data Sharing standardisation area, explaining why there is a Data Sharing element to the DRM and what can be done because of it.
Guidance	provides a description of how to start the process of creating Data Services and the goals of the process.
Data Sharing Section of the DRM Abstract Model	presents and describes the Data Sharing section of the DRM abstract model. Documenting data sharing in compliance with the Data Context section of the DRM abstract model provides a common mechanism for communication within the COI and among COIs.
Data Sharing Example	provides a usage example to further explain the Data Sharing standardisation area.

7.8.1   Introduction

7.8.1.1   What is Data Sharing and Why is it Important?

Data sharing is the use, by one or more consumers of information that is produced by a source other than the consumer. The need for data sharing often manifests itself in ways that are difficult to predict in advance. This is illustrated by a July 2005 *Washington Post* article entitled 'Pilots Claimed Disability but Kept Flight Status'. In this article, the *Washington Post* reported a curious correspondence between records from Social Security Administration (SSA) and Federal Aviation Administration (FAA). Forty pilots who claimed to FAA they were fit to fly were arrested in Northern California because they had reported debilitating illnesses to SSA that should have grounded them. The data sharing between FAA and SSA that led to the discovery of criminal wrongdoing was somewhat ad hoc in this case. However, it demonstrates how the approaches to data sharing that are described in this section could facilitate uncovering many other correlations of interest.

Such Data Sharing is of importance at the local to federal level as well. On 17 August 2005, in an article entitled 'L.A. Holdups Linked to Islamic Group, Possible Terrorist Plot', the *Washington Post* reported that a police probe of gas station hold-ups in Los Angeles grew into an investigation of a possible terrorist plot with connections to a radical Islamic group. The local investigation into the hold-ups was taken over by the FBI's Joint Terrorism Task Force when L.A. police discovered jihadist literature, bulletproof vests and a list of addresses for local synagogues, the Israeli consulate, National Guard centres and more in the home of one of the suspects. An anonymous U.S. official was quoted as saying there was reason to believe that terrorist attacks were planned with some of these locations as targets.

220

While it may have been physical evidence that led the local authorities to contact the FBI in this case, it is easy to imagine how the FBI might have decided to become involved by examining the data collected (reported) by L.A. police.

7.8.1.2   What is the Purpose of the Data Sharing Section of the DRM Abstract Model?
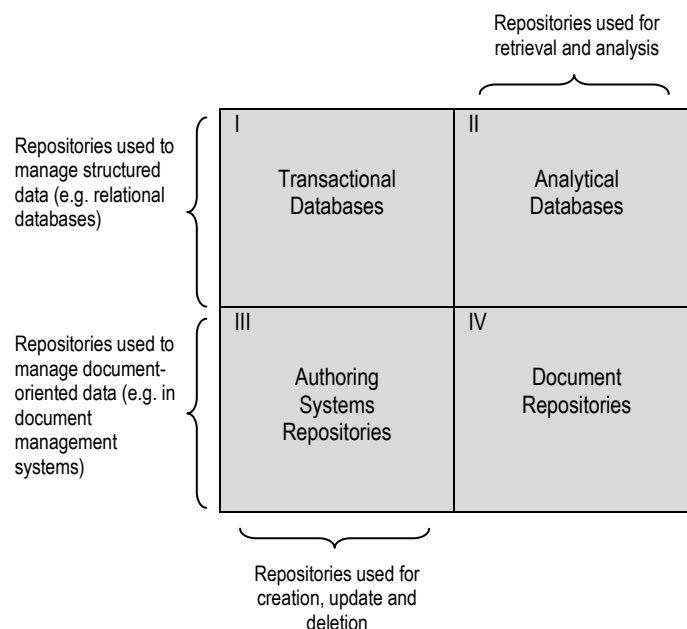
The data sharing section of the DRM abstract model exists to provide a reference for describing the services offered by a COI to enable access to and exchange of data.

7.8.1.3   Structures Used for Data Sharing

The constructs used for data sharing are depicted in the *Data Supplier-to-Consumer Matrix*. An architect can use this matrix to ascertain which services should be provided to support an agency's or COI's information sharing requirements. This section also defines the principles for identifying a capability or service for sharing data. The section also identifies standards or best practices and technologies that support repeatable consistent exchange or discoverable and presented content.

7.8.1.4   Data Supplier-to-Consumer Matrix Overview

Data is managed and stored in ways to optimise its use. The *Data Supplier-to-Consumer Matrix* is organised by the typical optimisation patterns and can be used for identifying the use of a data repository (from the perspective of a COI), the information exchange methods appropriate for these uses and the services that should be provided for each use. Note that these repositories are Data Assets within the DRM abstract model. The Matrix is comprised of four quadrants, each related to the primary use of an underlying data repository. *Figure 7-14* below shows the *Data Supplier-to-Consumer Matrix*:

Repositories used for retrieval and analysis

Repositories used to manage structured data (e.g. relational databases)

| I Transactional Databases | II Analytical Databases |
| III Authoring Systems Repositories | IV Document Repositories |

Repositories used to manage document-oriented data (e.g. in document management systems)

Repositories used for creation, update and deletion

Figure 7-14:   Data Supplier-to-Consumer Matrix

The four quadrants contained within the matrix are as follows:

Quadrant I: Transactional Databases	These databases contain structured data objects that support business process and workflow. These structured databases, when well designed, tend to be highly normalised and optimised for transactional performance. Quadrant I repositories include the databases supporting On-Line Transaction Processing (OLTP) Systems, Enterprise Resource Management Systems (ERPs), and other 'back-office' systems that implement core business processes and workflows. The data within these repositories tend not to be directly accessible to create, read, update and delete (CRUD) operations, except through services usually in the form of application program interfaces (APIs) because of the need to enforce business logic and referential integrity within the database.
Quadrant II: Analytical Databases	These databases contain structured data objects that support query and analysis. These structured databases tend to be purposefully de-normalised and optimised for query ease and performance. The data in these repositories is typically obtained from one or more Quadrant I databases and structured to support the answering of specific questions of business and/or mission interest. Quadrant II repositories include On-Line Analytical Processing (OLAP) systems, data warehouses and data marts. Quadrant II also includes directories (e.g. repositories that support the Light Weight Directory Access Protocol (LDAP) or X.500). Data in these repositories tends to be directly accessible for query and read. Create, update and delete operations are typically performed more indirectly than in transactional databases through an extract, transform and load (ETL) process.
Quadrant III: Authoring Systems Repositories	The term 'document' within the DRM context is broadly defined to encompass a wide range of information objects. These objects may be in any of a variety of formats: multimedia, text documents with embedded graphics, XML Schema or DTD instances. Generically, in this context, the term 'authoring system' is equally broad in scope. At one extreme, an 'authoring system' may be a digital camera. At the other, an authoring system may implement a complex workflow used for the production of a formal publication. In either extreme, the products of an authoring system are documents. The most common underlying repositories used by authoring systems may also be of any of a variety of constructs to store data objects, file systems and relational databases. In general, as in Quadrant I repositories, direct data-level access to the repositories underlying enterprise-level authoring systems is not prudent. Bypassing the business logic within the authoring system may affect the integrity of the data (e.g. version control of documents).
Quadrant IV: Document Repositories	Like Quadrant II repositories, document repositories store data objects so as to optimise discovery, search and retrieval. These repositories include the file systems underlying websites, relational databases underlying content management systems, XML registries and repositories. In general, as in Quadrant II repositories, data tends to be directly accessible to query. Create, update and delete operations are not generally available to end users, but are provided through a publication function performed through an authoring system.

7.8.1.5   Sharing Data through Data Exchange Services

Using the *Data Supplier-to-Consumer Matrix* shown, the types of data interchanges between repositories (data assets, database-to-database information sharing) were analysed focusing on the Exchange Package payload using tangible examples of such payloads. These information exchanges vary in their structure based upon the data objects being exchanged.

Based upon this analysis, the architect may specify several types of services to support the sharing of information between databases within a collection used by a COI. These services address the *data exchange* element of the DRM abstract model. These services fall within the following categories:

Extract, Transform, Load (ETL) (Structured Data to Structured Data)	the process of reading structured data objects from a data source (the extract), changing the format of the data objects to match the structure required by a target database (transform) and updating the target database with the transferred data objects (load). Services that perform ETL processes range from extremely simple to extremely complex. They may also be a component of other services. The payloads for all of these exchanges are structured data. This service applies to exchanges between:

Supplier	Consumer
Transactional (I)	Transactional (I)
Transactional (I)	Analytical (II)
Transactional (I)	Authoring (III)
Analytical (II)	Transactional (I)
Analytical (II)	Analytical (II)
Analytical (II)	Authoring (III)
Authoring (III)	Transactional (I)
Authoring (III)	Analytical (II)

Publication (Structured data or documents to aggregate documents)	the process of assembling a document from its component pieces, putting it into a desired format and disseminating it to target databases. The payload of this type of service is a document. This service applies to exchanges between:

Supplier	Consumer
Transactional (I)	Document Repository (IV)
Analytical (II)	Document Repository (IV)
Authoring (III)	Authoring (III)
Authoring (III)	Document Repository (IV)

Entity/Relationship Extraction (Unstructured documents to structured documents or structured data objects):	the process of identifying and pulling out specified facts from documents. Entities are nouns that designate a specific person, place or thing. Relationships are the association or affiliation of one entity to another. Typically, the entities identified during an entity/relationship extraction process may be incorporated into the source document as metadata, inserted into a separate document (such as a metadata record used to support discovery) or incorporated into a structured database. The payloads for all of these exchanges are structured data. This service applies to exchanges between:

Supplier	Consumer
Document Repository (IV)	Transactional (T)
Document Repository (IV)	Analytical (II)

| Document Translation (Document to document) | the process of transforming a document from its original format to a format required to support a target application. The transformations may be structural (e.g. transforming MS Word to PDF format), language-oriented (e.g. changing English to French) or special purpose (e.g. the development of abstracts from longer documents). The payload of this type of service is a document. This service applies to exchanges between: |

Supplier	Consumer
Document Repository (IV)	Authoring (II)
Document Repository (IV)	Document Repository (IV)

7.8.1.6   Sharing Data through Data Access Services

The discussion above focused on the transfer of data between repositories. Additional services are required to make data accessible to other services, to the applications that use them and, ultimately, to the consumers of the data. The DRM Team performed a similar analysis to determine the services required to implement data access. The architect should ascertain the services that are required to support the COI in the use of its collection. These services address the *data exchange* element of the DRM abstract model.

The services that the architect may be required to provide to support a COI's information sharing requirements are delineated below.

- Context Awareness Services: allows the users of a collection to rapidly identify the context (as defined above) of the data assets managed by the COI. Context information may be captured in a formalised data architecture, a metadata registry or a separate database. The architect should plan for this service for *all* quadrants.
- Structural Awareness Services: allows data architects and database administrators to rapidly identify the structure of data within a data asset (i.e. a structural awareness service makes the Data Description as defined within the DRM available for use). Data Description information may be captured in a formalised data architecture, a metadata registry or a separate database. Also, a number of commercial products are available to analyse and report data structures. The architect should plan for this service for *all* quadrants.
- Transactional Services: enables transactional create, update or delete operations to an underlying data store while maintaining business and referential integrity rules. These services allow external services or end users to execute data-related functions as part of a workflow or business process. Most commercial products provide application programming interfaces that implement this type of service. The architect should plan to provide these services for the transactional and document authoring quadrants.
- Data Query Services: enables a user, service or application to directly query a repository within a collection. The architect should plan to provide these services for the transactional and analytical quadrants.
- Content Search and Discovery Services: enables free text search or search of metadata contained within the documents in a repository. The searchable metadata should include the Data Context as defined within the DRM abstract model. The architect should plan to provide these services for the authoring and document repository quadrants.
- Retrieval Services: enables an application to request return of a specific document from a repository based upon a unique identifier, such as a URL. The architect should plan to provide these services for the authoring and document repository quadrants.
- Subscription Services: enables another service or an end user to nominate themselves to automatically receive new documents added to a repository in accordance with a predetermined policy or profile. The

architect should plan to provide these services for the transactional, authoring and document repository quadrants.

- Notification Services: automatically alerts another service or an end user of changes to the content of a repository in accordance with a predetermined policy or profile. The architect should plan to provide these services for the transactional, authoring and document repository quadrants.

7.8.2   Guidance

As stated in the Overview, once the Data Context and the Data Description standardisation areas for a COI have been defined, the COI should then plan and implement common capabilities to enable information to be accessed and exchanged.

Enterprise architects and data architects supporting COIs *may* use the following table as a guide to plan implementation of data exchange and access services for each data asset under management within the COI.

Data Sharing Service Requirements Matrix Table

Supplier	Service Requirement	Consumer
Data Asset Identifier (see abstract model below)	Data Exchange Service Type (e.g. Extract, Transform, Load)	Data Asset Identifier
—(populate as needed)	—	—
Data Asset Identifier	Access Service Type (e.g. Context Awareness)	*Access Services typically support many consumers. Generally, there is no need to populate these cells.*
—(populate as needed)	—	—

Once the architect has populated this matrix, he or she has a clear understanding of the types of data access and exchange services that they should provide to support a COI's information sharing requirements. Once these requirements are captured, the architect may use the Data Sharing section of the DRM abstract model to fully document the data access and the exchange services required to support the COI.

7.8.3   Data Sharing Section of the DRM Abstract Model

The Data Sharing section of the DRM abstract model covers two primary aspects of data sharing:

- Data Exchange: fixed, recurring transactions between parties, such as the regular exchange of environmental testing data among federal, state and local entities. These exchanges, as described above, are implemented with data exchange services.
- Data Access: requests for data services, such as a query of a Data Asset[35]. These requests, as described above, are supported by Data Access Services.

The Data Sharing standardisation area is supported by the Data Description and Data Context standardisation areas in the following ways:

- Data Description: uniform definition of Exchange Packages and Query Points supports the capability to effectively share them within and between COIs.
- Data Context: categorisation of Exchange Packages and Query Points supports their discovery and their subsequent use in data access and data exchange.

---

[35] The term 'data asset' is synonymous with 'data source'. It is described within the Data Context section.

Detailed information about these aspects is defined within the DRM. As described above, the architect may use the Data Sharing section of the DRM abstract model as a means to organise and share information about the information sharing within the agency/COI that he or she supports.

The Data Sharing section of the DRM abstract model is shown in *Figure 7-1515*. As in all previous sections, it depicts the concepts that are relevant to the chapter. In this instance the model depicts the Data Sharing concepts for the DRM and the relationships between them. Concepts are expressed as boxes, while relationships are expressed as arrows.
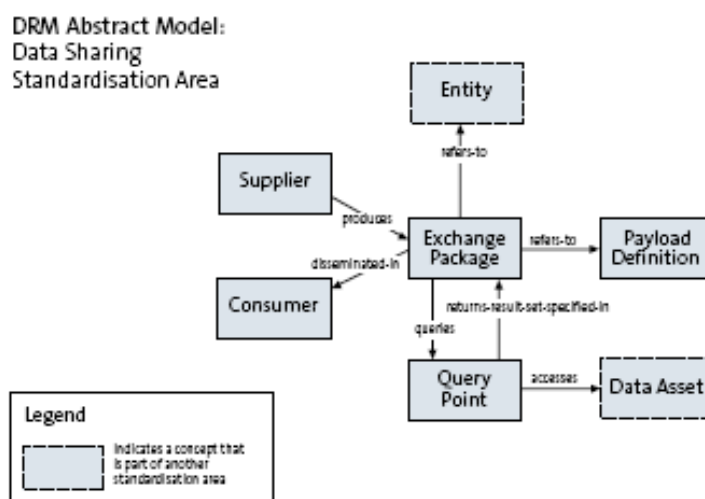
Figure 7-15:   Data Sharing Section of the DRM Abstract Model

The following are definitions for each of the concepts and relationships within *Figure 7-1515* above. The conventions used are:

- Only 'outbound' relationships are listed (i.e. those that originate from the concept).
- The concepts are presented in an order that will ensure the best possible understanding and specific examples are provided where appropriate.
- Though cardinality is not expressed in the figure, the descriptions below may include cardinality (e.g. 'one or more') for purposes of clarity.
- Concept names will be capitalised as in the figure itself (e.g. 'Exchange Package'), while relationship names will be expressed in italics and without any hyphens that may appear in the relationship name in the figure (e.g. *'refers to'*). This is done so that the definitions below can take on as narrative a tone as possible. The reader should therefore be able to easily visually navigate through the figure as they read the definitions below.
- Each concept will be referred to in a quantity of one (e.g. 'An Exchange Package *refers to* an Entity') for purposes of simplicity as the figure does not depict cardinality. However, implementations based on the DRM will introduce cardinality as needed according to their requirements.
- In some cases, concepts that are part of another standardisation area are included in definitions and examples below. These concepts will not be described further in this section; the reader should reference the pertinent section for definitions and examples of those concepts.

Term	Definition
Exchange Package	An Exchange Package is a description of a specific recurring data exchange between a Supplier and a Consumer. An Exchange Package contains information (metadata) relating to the exchange (such as Supplier ID, Consumer ID, validity period for data, etc.), as well as a reference to the Payload (message content) for the exchange. An Exchange Package can also be used to define the result format for a query that is accepted and processed by a Query Point in a data sharing scenario. Relationships: • An Exchange Package *refers to* an Entity. • An Exchange Package *is disseminated to* a Consumer. • An Exchange Package *queries* a Query Point. • An Exchange Package *refers to* a Payload Definition. Example: an Exchange Package describes a specific recurring data exchange involving shipment information.
Entity	See the Data Description chapter.
Supplier	A Supplier is an entity (person or organisation) that supplies data to a Consumer. Relationships: • A Supplier *produces* an Exchange Package. Example: a federal agency that supplies data to one or more other federal agencies.
Consumer	A Consumer is an entity (person or organisation) that consumes data that is supplied by a Supplier. Relationships: • none Example: an Australian Government agency that consumes data from one or more other Australian Government agencies.
Payload Definition	A Payload Definition is an electronic definition that defines the requirements for the Payload (data) that is exchanged between a Supplier and a Consumer. Relationships: • none Example: A specific message set expressed as an XML schema or an EDI transaction set that contains information about a 'Person' entity.
Query Point	A Query Point is an endpoint that provides an interface for accessing and querying a Data Asset. A concrete representation of a Query Point may be a specific URL at which a query Web Service may be invoked. Relationships: • A Query Point *accesses* a Data Asset. Example: a sp*ecific URL* at which a data service may be invoked. • A Query Point *returns a result set specified in* an Exchange Package.
Data Asset	See the Data Context section.

7.8.4 Data Sharing Attributes

This section will expand on the concepts presented above to include attributes that are associated with each concept. A description will be provided for each attribute, along with an example where necessary for clarity.

Concept	Attribute	Description	Example
Exchange Package	Identifier[36]	A unique string associated with an Exchange Package for identification purposes.	'200XCB'
	Name	The name of an Exchange Package.	'Bill of Lading Message Set'
	Description	A description of an Exchange Package.	
	Classification	The security classification for an Exchange Package.	'U' (Unclassified)
	Frequency	The frequency at which the exchange occurs.	'Daily'
Supplier	Identifier	A unique string associated with a Supplier for identification purposes.	'04091967J'
	Name	The name of a Supplier.	
	Primary Contact	The name and contact information for the Supplier's primary contact for this particular exchange.	
Consumer	Identifier	A unique string associated with a Consumer for identification purposes.	'03081956K'
	Name	The name of a Consumer.	
	Primary Contact	The name and contact information for the Consumer's primary contact for this particular exchange.	
Payload Definition	Identifier	A unique string associated with a Payload Definition for identification purposes.	'B5102078L'
	Name	The name of a Payload Definition.	'Bill of Lading XML Schema'
Query Point	Identifier[37]	A unique string associated with a Query Point for identification purposes.	http://www.example.com/querypoint3
	Name	The name of a Query Point.	'Latest Monthly Report Information'
	Description	A description of a Query Point.	
	Query Languages	A stipulation of the query languages that are supported by a Query Point (e.g. SQL-92, CQL (Z39.50), XQuery, HTTP GET, etc.).	'SQL-92'

228

---

[36] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.
[37] For a Query Point, an identifier represents the electronic address at which the Query Point may be accessed.

7.9 DRM Abstract Model

This section presents the DRM abstract model. The DRM abstract model depicts the major concepts from each standardisation area and the relationships between them. It represents an architectural pattern that contains the minimum level of detail necessary to convey the major concepts for the standardisation area, with COIs extending the architectural pattern as necessary for their implementations.

The DRM Abstract Model section is organised as follows:

Contents
Introduction
Data Description Section of the DRM Abstract Model
Data Context Section of the DRM Abstract Model
Data Sharing Section of the DRM Abstract Model
Data Sharing Attributes

7.9.1   Introduction

The DRM abstract model is shown in *Figure 7-16*. The three DRM standardisation areas are arranged in the same general configuration as in **Error! Reference source not found.** (i.e. with the Data Sharing standardisation area on top, supported by the Data Description and Data Context standardisation areas). The following conventions are used:

- Concepts are expressed as boxes, while relationships are expressed as arrows.
- Only 'outbound' relationships are listed (i.e. those that originate from the concept).
- Links between standardisation areas are marked as indicated in the legend and each is provided a circled number intended for reference in the explanation of that link in the table below.
- Cardinality (e.g. one-to-many, many-to-many) is not depicted in the abstract model. Implementations based on the DRM will introduce cardinality as needed according to their requirements.

Subsequent parts of this section will 'drill down' into the details of this abstract model and describe the concepts that comprise each standardisation area's section of the DRM abstract model.

LEGEND

Indicates a concept that is part of another standardisation area

A link between standardisation areas

Indicates an optional relationship

Data Sharing

Data Description

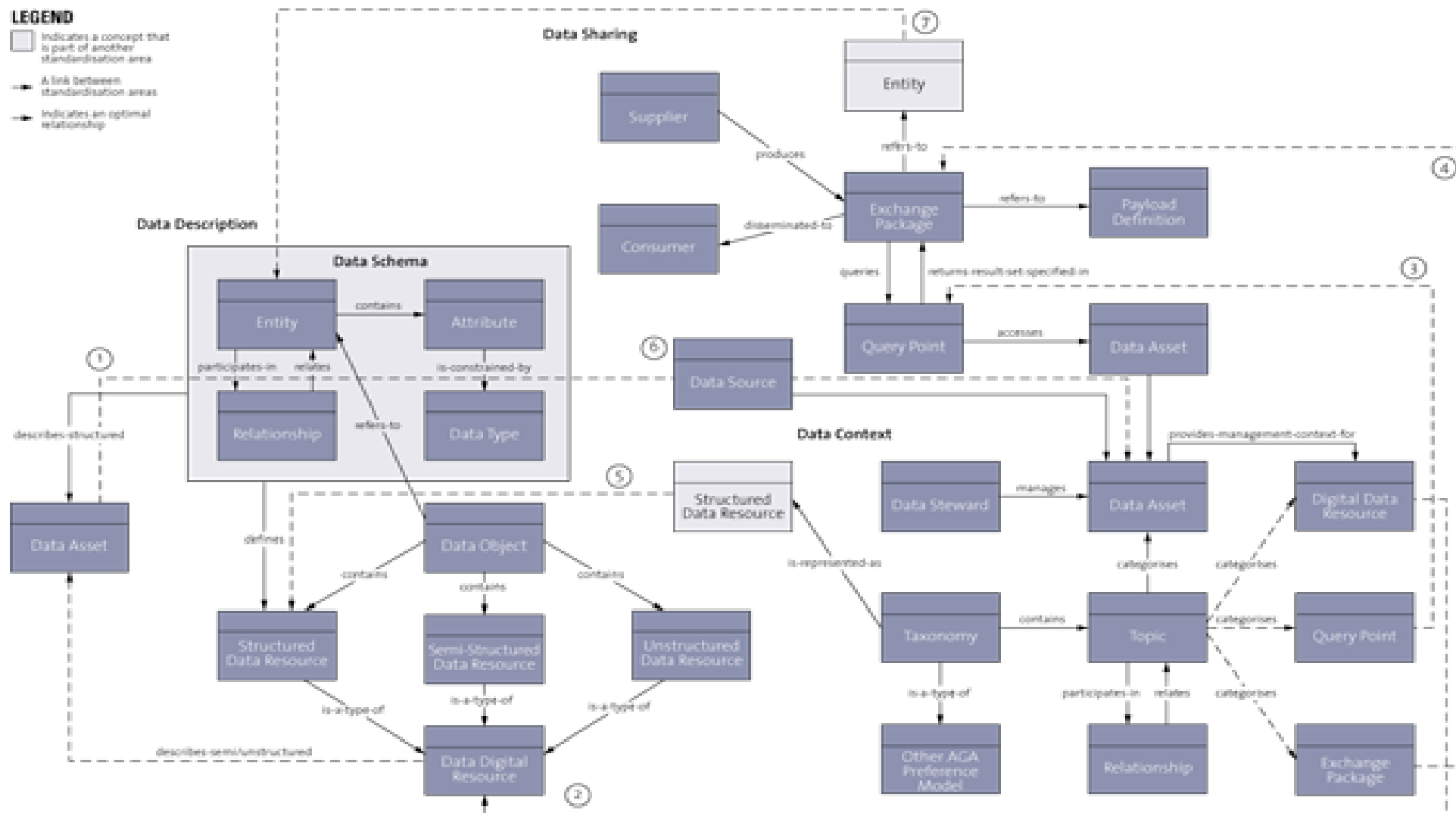**Data Schema**

Data Context

Figure 7-16: DRM Abstract Model

The table below summarises each of the links between each standardisation area's section of the DRM abstract model. It is intended to help the reader navigate through the DRM abstract model. The following information is provided for each link:

- link number: the circled number from the DRM abstract model that represents the link
- from standardisation area: the standardisation area that is the source of the link
- to standardisation area: the standardisation area that is the destination of the link
- concept: the concept that is common (i.e. linked) between the two standardisation areas.

Link Number	From Standardisation Area	To Standardisation Area	Concept
	Data Description	Data Context	Data Asset
	Data Context	Data Description	Digital Data Resource
	Data Context	Data Description	Query Point
	Data Context	Data Sharing	Exchange Package
	Data Context	Data Description	Structured Data Resource
	Data Sharing	Data Context	Data Asset
	Data Sharing	Data Description	Entity

The concepts that comprise each standardisation area will now be described in detail.

7.9.2 Data Description Section of the DRM Abstract Model

The Data Description section of the DRM abstract model is shown in *Figure 7-1717*. Links between this standardisation and other standardisation areas are indicated by the link number that corresponds to the link number in the DRM abstract model.
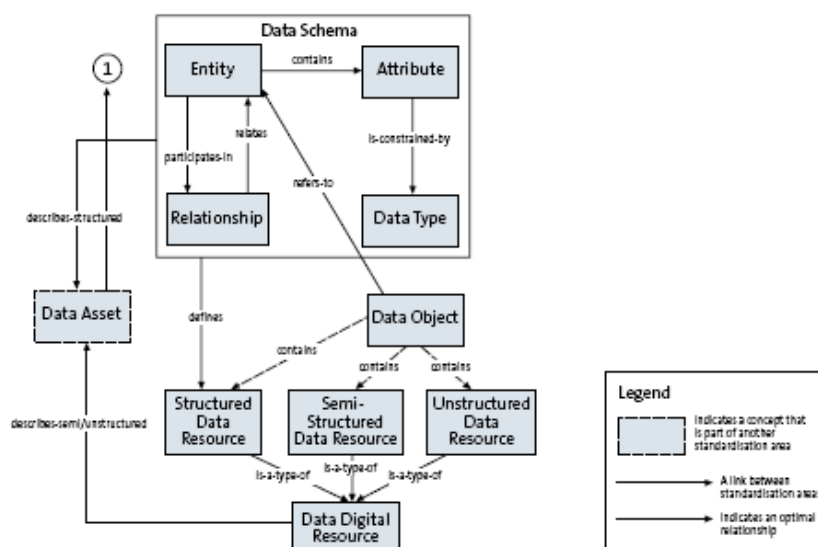
Figure 7-17: DRM Data Description Abstract Model

The following are definitions for each of the concepts and relationships shown above. The following conventions are used:

- The concepts are presented in an order that will ensure the best possible understanding and specific examples are provided where appropriate.
- Though cardinality is not expressed in the figure, the descriptions below may include cardinality (e.g. 'one or more') for purposes of clarity. Each concept will be referred to in a quantity of one (e.g. 'An Entity *contains* an Attribute') for purposes of simplicity.
- Concept names will be capitalised as in the figure itself (e.g. 'Digital Data Resource'), while relationship names will be expressed in italics and without any hyphens that may appear in the relationship name in the figure (e.g. *'is constrained by'*). This is done so that the definitions below can take on as narrative a tone as possible. The reader should therefore be able to easily visually navigate through the figure as they read the definitions below.

Term	Definition
Data Schema	A Data Schema is a representation of metadata, often in the form of data artefacts such as logical data models or conceptual data models. The Data Schema concept is actually a *concept group,* which is an aggregation of related concepts. The *Data Schema* concept group is comprised of those concepts pertaining to the representation of structured data. Relationships: • A Data Schema *defines* a Structured Data Resource. • A Data Schema *describes* a Structured Data Asset.
Entity	An Entity is an abstraction for a person, place, object, event or concept described (or characterised) by common Attributes. For example, 'Person' and 'Agency' are Entities. An *instance* of an Entity represents one particular occurrence of the Entity, such as a specific person or a specific agency. Relationships: • An Entity *contains* an Attribute. • An Entity *participates in* a Relationship with another Entity.
Data Type	A Data Type is a constraint on the type of data that an instance of an Attribute may hold (e.g. 'string' or 'integer'). Relationships: • none
Attribute	An attribute is a characteristic of an Entity whose value may be used to help distinguish one instance of an Entity from other instances of the same Entity. For example, an Attribute of a 'Person' Entity may be 'Social Security Number (SSN)'. An SSN is used to distinguish one person (i.e. one instance of a 'Person' Entity) from another. Relationships: • An Attribute *is constrained by* a Data Type. Example: the 'SSN' Attribute of a 'Person' Entity may have a Data Type of 'string' (if hyphens are included with the SSN) or 'integer' (if hyphens are not included).
Relationship	This describes the relationship[38] between two Entities. Relationships:

232

---

[38] It should be noted that the term 'relationship' is used in two ways here. The concept named 'Relationship' participates in relationships with other concepts in the abstract model and also defines the relationship between entities when it is applied to a specific scenario.

Term	Definition
	• A Relationship *relates* an Entity. Example: a 'Person' Entity may have a Relationship with an 'Agency' Entity of 'works for'.
Digital Data Resource	A Digital Data Resource is a digital container of information, typically known as a file. A Digital Data Resource may be one of three specific types of data resources, each corresponding to one of the three types of data described earlier and each described below (see 'Structured Data Resource', 'Semi-Structured Data Resource', and 'Unstructured Data Resource'). Relationships: • A Digital Data Resource *describes* a Semi-structured Data Asset. • A Digital Data Resource *describes* an Unstructured Data Asset.
Structured Data Resource	A Structured Data Resource is a Digital Data Resource containing structured data. Relationships: • A Structured Data Resource *is a type of* Digital Data Resource.
Semi-Structured Data Resource	A Semi-Structured Data Resource is a Digital Data Resource containing semi-structured data. Relationships: • A Semi-Structured Data Resource *is a type of* Digital Data Resource.
Unstructured Data Resource	An Unstructured Data Resource is a Digital Data Resource containing unstructured data. Relationships: • An Unstructured Data Resource *is a type of* Digital Data Resource.
Document	A Document is a file containing Unstructured and/or Semi-Structured Data Resources. Relationships: • A Document *may contain* an Unstructured or Semi-Structured Data Resource. • A Document *refers to* an Entity. Example (relationship with Entity): a query that states 'Find all Documents in which the following person is referenced'. **Note**: While a Document can contain structured data, it normally has explanatory material included, which would cause it to therefore be considered semi-structured. It is for this reason that there is no *'contains'* relationship from Document to Structured Data Resource. It is very important to separate Documents from Structured Data Resources because they are processed very differently. The difference between a Document and a Digital Data Resource, therefore, is that a Digital Data Resource can contain structured data.

The table below provides attributes[39] that are associated with each concept in the Data Description section of the DRM abstract model. A description will be given for each attribute, along with an example where necessary for clarity. All Unstructured Data Resource attributes and their descriptions are taken from the National Archives of Australia's AGLS Metadata Element Set. All references to 'resource' within descriptions of Unstructured Data Resource should therefore be interpreted as 'Unstructured Data Resource'. The above URL provides additional information on attribute descriptions and usage.

---

[39] It should be noted that the term 'attribute' is used here in a different way than for the concept named 'Attribute'. Here, an 'attribute' is used to describe characteristics of each of the concepts in the abstract model.

Concept	Attribute	Description	Example
Entity	Identifier[40]	A unique string associated with an Entity for identification purposes.	'200XCB'
	Name	The name of an Entity.	'Person'
	Description	A description of an Entity.	
Data Type	Name	The name of a Data Type.	'string'
	Description	A description of a Data Type.	
Attribute	Name	The name of an Attribute.	'Date Of Birth'
	Description	A description of an Attribute.	
Relationship	Name	The name of a Relationship.	'works-for'
	Origin	Name of the concept that is the origin (i.e. the 'from' concept) of a Relationship.	
	Destination	Name of the concept that is the destination (i.e. the 'to' concept) of a Relationship.	
Digital Data Resource	See 'Structured Data Resource', 'Semi-Structured Data Resource', and 'Unstructured Data Resource'[41]		
Structured Data Resource	See all concepts within 'Data Schema' group		
Semi-Structured Data Resource	See 'Structured Data Resource' and 'Unstructured Data Resource'		
Unstructured Data Resource	Title	A name given to the resource. Typically, the name by which the resource is formally known.	'The Mortimer Report'
	Resource Identifier	An unambiguous reference to the resource within a given context.	'200XCB'
	Date	A date of an event in the lifecycle of the resource. Typically, Date will be associated with the creation or availability of the resource.	'2001-05-01'

234

---

[40] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.

[41] As shown in the abstract model, a Digital Data Resource may be one of these three specific types of data resources. The same general idea applies to the entries for the 'Semi-Structured Data Resource' and 'Data Object' concepts above.

Concept	Attribute	Description	Example
	Creator	An entity primarily responsible for making the content of the resource. Examples of a Creator include a person, or an organisation.	'corporateName=Family Law Council;jurisdiction=Commonwealth of Australia'
	Format	The physical or digital manifestation of the resource. Typically, Format may include the media-type or dimensions of the resource. Format may be used to determine the software, hardware or other equipment needed to display or operate the resource.	'650 megabytes; 72 minutes'
	Description	An account of the content of the resource. Description may include but is not limited to: an abstract, table of contents, reference to a graphical representation of content (e.g. a thumbnail of an image) or a free-text account of the content.	'This site provides information for parents on the location of child care services.'
	Source	A reference to a resource from which the present resource is derived. The present resource may be derived from the Source resource in whole or in part.	'ISBN 0 55555 0000'
	Subject	A subject and/or topic of the content of the resource. Typically, a Subject will be expressed as keywords, key phrases or classification codes that describe a topic of the resource content.	'Health Thesaurus'
	Resource Type	The nature or genre of the content of the resource. Type includes terms describing general categories, genres or aggregation levels for content.	'Service'
	Publisher	An entity responsible for making the resource available. This field is often the name of the organisation that owns or controls or publishes the resource.	'corporateName=High Court;jurisdiction=Commonwealth of Australia'

235

Concept	Attribute	Description	Example
	Contributor	An entity responsible for making a contribution to the content of the resource. Typically, a contributor will be an entity that has played an important but secondary role in creating the content of the resource and is not specified in the creator element.	'corporateName=WebDesign; email=webdesign@hereweare.com.au'
	Language	A language of the intellectual content of the resource. Recommended best practice for the values of the Language element is defined by RFC 3066 which includes a two-letter Language Code (taken from the ISO 639), followed optionally by a two-letter Country Code (taken from the ISO 3166 standard).	'fr-CA'
	Relation	A reference to a related resource.	'Standards Australia, Records Management (AS 4390), Homebush, 1996'
	Coverage	The extent or scope of the content of the resource. Coverage will typically include spatial location (a place name or geographic coordinates), temporal period (a period label, date or date range) or jurisdiction (such as a named administrative entity).	'New South Wales'
	Rights Management	Information about rights held in and over the resource. Typically, the Rights element will contain a rights management statement for the resource or refer to a service providing such information.	'Copyright Commonwealth of Australia 2001'
	Availability	How the resource can be obtained or contact information for obtaining the resource. The Availability element is primarily used for non-electronic resources to provide information on how to obtain physical access to the resource.	'Medical assistance is available by contacting the medical hotline on 1800 123456'
	Function	The business function of the organisation to which the resource relates. Used to indicate the business role of the resource in terms of business functions and activities.	'Community Services'

236

Concept	Attribute	Description	Example
	Audience	A target audience of the resource. Types of audiences commonly used in this element include particular industry sectors, education levels, skill levels, occupations and EEO categories.	'Upper Primary'
Document	See 'Structured Data Resource' and 'Semi-Structured Data Resource'		

7.9.3   Data Context Section of the DRM Abstract Model

The Data Context section of the DRM abstract model is shown in *Figure 7-18* below.
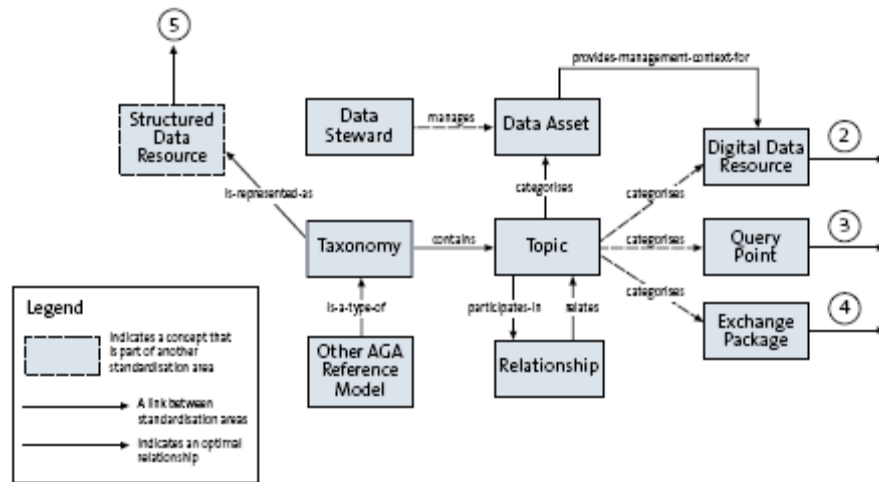
Figure 7-18:   Data Context Section of the DRM Abstract Model

The following are definitions for each of the concepts and relationships shown above.

Term	Definition
Taxonomy	A Taxonomy is a collection of controlled vocabulary terms organised into a hierarchical structure. Taxonomies provide a means for categorising or classifying information within a reasonably well-defined associative structure, in which each term in the Taxonomy is in one or more parent/child (broader/narrower) relationships to other terms in the Taxonomy. A common example of a Taxonomy is the hierarchical structure used to classify living things within the biological sciences from Carolus Linnaeus, as shown in the table below. <table><tr><th>Category</th><th>Value for Humans</th></tr><tr><td>Kingdom</td><td>Animalia</td></tr><tr><td>Phylum</td><td>Chordata</td></tr><tr><td>Class</td><td>Mammals</td></tr><tr><td>Order</td><td>Primates</td></tr><tr><td>Family</td><td>Hominidae</td></tr><tr><td>Genus</td><td>Homo</td></tr><tr><td>Species</td><td>Sapiens</td></tr></table> Relationships: - A Taxonomy *contains* a Topic. - A Taxonomy *is represented as* a Structured Data Resource[42]. Example: a taxonomy expressed in W3C Web Ontology Language (OWL) format.
Structured Data Resource	See the Data Description section.
Topic	A Topic is a category within a Taxonomy. A Topic is the central concept for applying context to data. For example, an agency may have a Taxonomy that represents their organisational structure. In such a Taxonomy, each role in the organisational structure (e.g. CIO) represents a Topic. Topic is often synonymous with 'node'. Relationships: - A Topic *categorises* a Data Asset. - A Topic *may categorise* a Digital Data Resource. - A Topic *may categorise* a Query Point. - A Topic *may categorise* an Exchange Package. - A Topic *participates in* a Relationship with another Topic.
Digital Data Resource	See the Data Description section.

---

[42] Because a Taxonomy is represented as a Structured Data Resource and a Data Asset provides management context for a Digital Data Resource, it follows that a Taxonomy may be stored and managed within a Data Asset.

Term	Definition
Query Point	See the Data Sharing section.
Exchange Package	See the Data Sharing section.
Relationship	A Relationship describes the relationship[43] between two Topics. Relationships: • A Relationship *relates* a Topic. Example: A 'Person' Entity may be represented in one Data Asset in a 'Customer' context because it is part of a CUSTOMER_INFO table. However, the same Entity may be represented in a 'Suspect' context on a law enforcement website. The metadata that is associated with the 'Person' Entity would be different in each context e.g., the 'Suspect' context would likely include physical characteristic metadata (height, hair colour, etc.), while the 'Customer' context would not.
Data Asset	A Data Asset is a managed container for data. In many cases, this will be a relational database; however, a Data Asset may also be a website, a document repository, a directory or data service. Relationships: • A Data Asset *provides management context for* a Digital Data Resource. Example: A document that is stored and managed within a Data Asset (such as a document repository) has management context provided for it through the metadata that is associated with that document within the document repository. Such metadata may include the AGLS Metadata Standard attributes that are described in the Data Description section.
Data Steward	A Data Steward is a person responsible for managing a Data Asset. Relationships: • A Data Asset *may be managed by* a Data Steward.
Other AGA Reference Models	This concept represents the four other AGA reference models: the Business Reference Model (BRM), the Service Reference Model (SRM), the Technical Reference Model (TRM) and the Performance Reference Model (PRM). Its purpose is to provide a linkage to these other reference models, which are themselves Taxonomies. These are depicted as a special kind of Taxonomy due to their importance in the overall classification of information. Relationships: • The other AGA Reference Models *are types of* Taxonomies.

240

---

43 It should be noted that the term 'relationship' is used in two ways here. The concept named 'Relationship' participates in relationships with other concepts in the abstract model and also defines the relationship between topics when it is applied to a specific scenario.

The table below provides attributes that are associated with each concept in the Data Context section of the DRM abstract model.

Concept	Attribute	Description	Example
Taxonomy	Identifier[44]	A unique string associated with a Taxonomy for identification purposes.	'200XCB'
	Name	The name of a Taxonomy.	'Geographic Areas'
	Description	A description of a Taxonomy.	
Topic	Name	The name of a Topic.	'Country'
	Description	A description of a Topic.	
Relationship	Name	The name of a Relationship.	'part-of'
	Origin	Name of the concept that is the origin (i.e. the 'from' concept) of a Relationship.	
	Destination	Name of the concept that is the destination (i.e. the 'to' concept) of a Relationship.	
Data Asset	Identifier	A unique string associated with a Data Asset for identification purposes.	'333XBD'
	Type	Type of Data Asset, e.g. database, website, registry, directory, data service, etc.	'database'
	Geospatial Enabled	Designates whether or not the Data Asset supports or provides Geospatial data.	'yes'
Data Steward	Employee ID	Data Steward's employee ID.	
	Department	Department for which Data Steward works.	
	Initial Date	The date that the Data Steward became associated with the Data Asset.	
Other AGA Reference Model	Acronym	Reference model acronym.	'BRM'
	Name	Reference model name.	'Business Reference Model'

---

[44] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.

7.9.4   Data Sharing Section of the DRM Abstract Model

The Data Sharing section of the DRM abstract model is shown in *Figure 7-1919*.
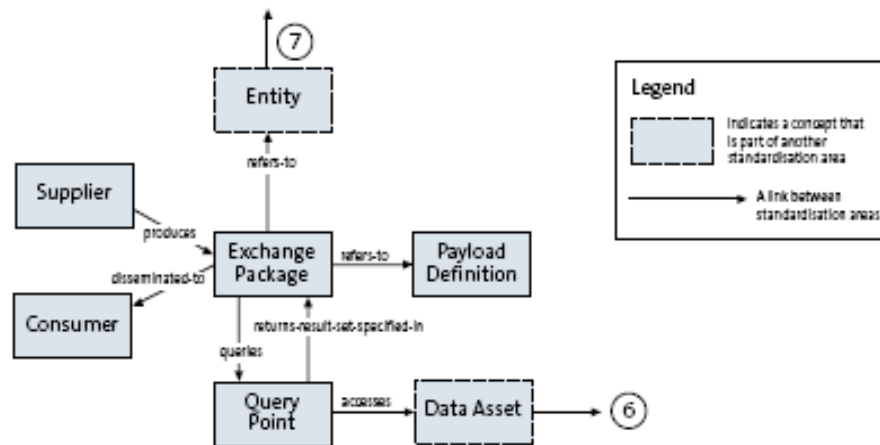
Figure 7-19:   Data Sharing Section of the DRM Abstract Model

The following are definitions for each of the concepts and relationships shown above.

Term	Definition
Exchange Package	An Exchange Package is a description of a specific recurring data exchange between a Supplier and a Consumer. An Exchange Package contains information (metadata) relating to the exchange (such as Supplier ID, Consumer ID, validity period for data, etc.), as well as a reference to the Payload (message content) for the exchange. An Exchange Package can also be used to define the result format for a query that is accepted and processed by a Query Point in a data sharing scenario. Relationships: - An Exchange Package *refers to* an Entity. - An Exchange Package *is disseminated to* a Consumer. - An Exchange Package *queries* a Query Point. - An Exchange Package *refers to* a Payload Definition. Example: An Exchange Package describes a specific recurring data exchange involving shipment information.
Entity	See the Data Description section.

Supplier	A Supplier is an entity (person or organisation) that supplies data to a Consumer. Relationships: • A Supplier *produces* an Exchange Package. Example: a federal agency that supplies data to one or more other federal agencies.
Consumer	A Consumer is an entity (person or organisation) that consumes data that is supplied by a Supplier. Relationships: • none Example: a federal agency that consumes data from one or more other federal agencies.
Payload Definition	A Payload Definition is an electronic definition that defines the requirements for the Payload (data) that is exchanged between a Supplier and a Consumer. Relationships: • none Example: a specific message set expressed as an XML schema or an EDI transaction set that contains information about a 'Person' entity.
Query Point	A Query Point is an endpoint that provides an interface for accessing and querying a Data Asset. A concrete representation of a Query Point may be a specific URL at which a query Web Service may be invoked. Relationships: • A Query Point *accesses* a Data Asset. Example: a specific URL at which a data service may be invoked.
Data Asset	See the Data Context section.

7.9.5   Data Sharing Attributes

This section will expand on the concepts presented above to include attributes that are associated with each concept. A description will be provided for each attribute, along with an example where necessary for clarity.

Concept	Attribute	Description	Example
Exchange Package	Identifier[45]	A unique string associated with an Exchange Package for identification purposes.	'200XCB'
	Name	The name of an Exchange Package.	'Bill of Lading Message Set'

---

[45] The 'Identifier' attribute is described at an abstract level in order to be consistent with the abstract nature of the reference model. Therefore, there are no references to aspects such as identifier uniqueness, representation format or similar. Implementations based on the DRM will introduce such aspects as needed according to their requirements.

Concept	Attribute	Description	Example
	Description	A description of an Exchange Package.	
	Classification	The security classification for an Exchange Package.	'U' (Unclassified)
	Frequency	The frequency at which the exchange occurs.	'Daily'
Supplier	Identifier	A unique string associated with a Supplier for identification purposes.	'04091967J'
	Name	The name of a Supplier.	
	Primary Contact	The name and contact information for the Supplier's primary contact for this particular exchange.	
Consumer	Identifier	A unique string associated with a Consumer for identification purposes.	'03081956K'
	Name	The name of a Consumer.	
	Primary Contact	The name and contact information for the Consumer's primary contact for this particular exchange.	
Payload Definition	Identifier	A unique string associated with a Payload Definition for identification purposes.	'B5102078L'
	Name	The name of a Payload Definition.	'Bill of Lading XML Schema'
Query Point	Identifier[46]	A unique string associated with a Query Point for identification purposes.	http://www.example.com/querypoint3
	Name	The name of a Query Point.	'Latest Monthly Report Information'
	Description	A description of a Query Point.	
	Query Languages	A stipulation of the query languages that are supported by a Query Point (e.g. SQL-92, CQL (Z39.50), XQuery, HTTP GET, etc.).	'SQL-92'

244

---

[46] For a Query Point, an identifier represents the electronic address at which the Query Point may be accessed.

This page is
intentionally blank

8 Technical Reference Model

8.1 Introduction

The Technical Reference Model (TRM) *(Figure 8-1)* is a component-driven, technical framework categorising the standards and technologies to support and enable the delivery of Service Components and capabilities. It also unifies existing agency TRMs and whole-of-government guidance by providing a foundation to advance the re-use and standardisation of technology and Service Components from a government-wide perspective.

Aligning agency capital investments to the TRM leverages a common, standardised vocabulary, allowing interagency discovery, collaboration and interoperability. Agencies and the Australian Government will benefit from economies of scale by identifying and re-using the best solutions and technologies to support their business functions, mission and target architecture.

Figure 8-1:   Technical Reference Model

8.2 Structure

Organised in a hierarchy, the TRM categorises the standards and technologies that collectively support the secure delivery, exchange and construction of business and application Service Components that may be used and leveraged in a component-based or service-oriented architecture (CBA or SOA, used synonymously from here onward).

The TRM consists of:

Level 1	Service Areas	represent a technical tier supporting the secure construction, exchange, and delivery of Service Components. Each Service Area aggregates the standards and technologies into lower-level functional areas. Each Service Area consists of multiple Service Categories and Service Standards. This hierarchy provides the framework to group standards and technologies that directly support the Service Area.
Level 2	Service Categories	classify lower levels of technologies and standards with respect to the business or technology function they serve. In turn, each Service Category is comprised of one or more Service Standards.
Level 3	Service Standards	define the standards and technologies that support a Service Category. To support agency mapping into the TRM, many of the Service Standards provide illustrative specifications or technologies as examples.

A high-level outline of the TRM is shown in *Figure 8-2.*

Service Areas	Service Categories
Service Access and Delivery	[3001] Access Channels [3002] Delivery Channels [3002] Service Requirements [3003] Service Transport
Service Platform and Infrastructure	[3101] Support Platforms [3102] Delivery Servers [3103] Software Engineering [3104] Databases/Storage [3105] Hardware/Infrastructure
Component Framework	[3201] Security [3202] Presentation/Interface [3203] Business Logic [3204] Data Interchange [3205] Data Management
Service Interface and Integration	[3301] Integration [3302] Interoperability [3303] Interface

Figure 8-2: TRM Overview

8.3 Service Access and Delivery Service Area

The Service Access and Delivery Service Area *(Figure 8-3)* defines the collection of Access and Delivery Channels that will be used to leverage the Service Component, and the legislative requirements that govern its use and interaction.
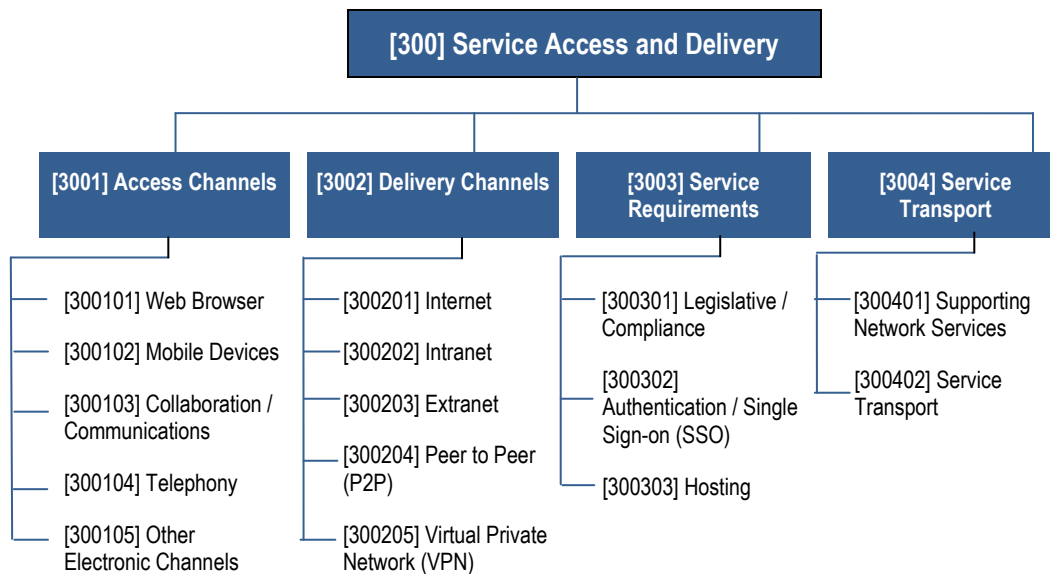
Figure 8-3:   Service Access and Delivery Service Area

The Service Access and Delivery Service Categories and Standards are defined in the sections below. Examples are provided to assist with clarity only.

Agencies should consult whole of government policies, frameworks and standards together with their agency SOE to determine product requirements.

8.3.1   [3001] Access Channels

Access channels define the interface between an application and its users, whether it is a browser, smart phone, tablet or other medium.

Service Standards	Defined by	Examples
[300101] Web Browser	The program that serves as your front end to the World Wide Web on the Internet. In order to view a site, you type its address (URL) into the browser's location field.	Examples of web browsers include: • Microsoft Internet Explorer (IE) • Mozilla Firefox • Google Chrome • Apple Safari • Opera
[300102] **Mobile Devices**	The devices that use transmission via the airwaves. A pocket-sized computing device, typically having a display screen with touch input and/or a miniature keyboard	Examples of mobile device technology include: • **Smart Phone:** allows users access to more features and usually has increased connectivity compared to a conventional mobile phone. Examples of the features may include the ability to browse the Internet, a QWERTY keyboard, the ability to play music/movies, etc. Smart phones are offered by various mobile phone providers • **Tablet Computer:** A tablet computer is a portable personal computer with a touchscreen as the primary input device, and designed to be owned and operated by an individual. • **Blackberry**: an email-enabled wireless device
[300103] **Collaboration /** **Communications**	The forms of electronic exchange of messages, documents or other information. Electronic communication provides efficiency through expedited time of delivery.	Examples of collaboration communications include: • **Social networking services:** services which build online communities of people who exchange content based on shared relationships and/or interests, for example, Facebook, Twitter and YouTube. • **short message service** (SMS): text communication service component of phone, web or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices • **interactive voice response** (IVR): a telephony technology in which someone uses a touch-tone telephone to interact with a database to acquire information from or enter data into the database. • **voice over internet protocol** (VOIP) – is an internet technology, communication protocol and transmission technology for delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks. Other terms frequently encountered and often used synonymously with VoIP are IP telephony, Internet telephony, voice over broadband (VoBB), broadband telephony, and broadband phone. Internet telephony refers to communications services—voice, fax, SMS, and/or voice-messaging applications—that are transported via the Internet, rather than the public switched telephone network (PSTN).

Service Standards	Defined by	Examples
		• **electronic mail (email)**: the exchange of computer generated and stored messages by telecommunication. An e-mail can be created manually via messaging applications or dynamically/programmatically such as via automated response systems • **kiosk**: a small physical structure (often including a computer and a display screen) that displays information for people walking by. Kiosks are common in public buildings. Kiosks are also used at trade shows and professional conferences.
[300104] Telephony	Technology associated with the electronic transmission of voice, fax and other information over distances, specifically by connecting telephones to each other.	
[300105] **Other Electronic Channels**	The other various mediums of information exchange and interface between a user and an application.	Examples of other electronic channels include: • **system to system**: involves at least two computers that exchange data or interact with each other independent of human intervention or participation • **web services**: (sometimes called application services) are services (usually including some combination of programming and data, but possibly including human resources as well) that are made available from a business's web server for web users or other web-connected programs • **uniform resource locator (URL):** the global address of documents and other resources on the World Wide Web. The first part of the address indicates what protocol to use (i.e. http://), and the second part specifies the IP address or the domain name where the resource is located (i.e. www.australia.gov.au).

250

8.3.2   [3002] Delivery Channels

Delivery channels define the level of access to applications and systems based upon the type of network used to deliver them.

Service Standards	Defined by	Examples
300201 Internet	The worldwide system of computer networks in which users at any one computer can, if they have permission, get information from any other computer.	
300202 Intranet	The private network that is contained within an enterprise. It may consist of many interlinked local area networks and is used to share company information and resources among employees.	
300203 Extranet	The private network that uses the Internet protocol and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the company.	
300204 Peer to Peer (P2P)	The class of applications that operate outside the Domain Name System (DNS), have significant or total autonomy from central servers and take advantage of resources available on the Internet.	
300205 Virtual Private Network (VPN)	The use of the public telecommunication infrastructure, maintaining privacy through the use of a tunnelling protocol and security procedures.	

8.3.3 [3003] Service Requirements

Service requirements define the necessary aspects of an application, system or service including legislation, performance and hosting aspects.

Service Standards	Defined by	Examples
300301 Legislation / Compliance	The prerequisites that an application, system or service must have, as mandated by the Australian Government or other governing bodies.	Examples of legislation/compliance technology include: • **customisation and bespoke development**: refers to the ICT Customisation and Bespoke Development Policy, which mandates specific requirements that agencies must follow when they customise or bespoke development software. • **open source**: refers to the Open Source Software Policy, which mandates that agencies consider any available open source software in all software procurements. • **IPv6:** refers to the IPv6 Transition Strategy (A Strategy for the Implementation of IPv6 in Australian Government Agencies), which requires all agencies to transition their equipment and systems used to offer or obtain external services to IPv6 by December 2012. • **interoperability:** refers to the Australian Government Interoperability Framework. The framework addresses the information, business process and technical dimensions of interoperability. It sets the principles, standards and methodologies that support the delivery of integrated and seamless services. The framework includes the Business Process Interoperability Framework, the Information Interoperability Framework, and the Technical Interoperability Framework. • **web content accessibility**: refers to the Web Accessibility National Transition Strategy, which outlines the Australian Government's adoption and implementation of Web Content Accessibility Guidelines version 2.0 (WCAG 2.0) • **security**: refers to the policy and procedures that protect data against unauthorised access, use, disclosure, disruption, modification or destruction • **privacy: Platform for Privacy Preferences (P3P)**: a specification that will allow users' web browsers to automatically understand websites' privacy practices. Privacy policies will be embedded in the code of a website. Browsers will read the policy, and then automatically provide certain information to specific sites based on the preferences set by the users. For instance, if the site is an e-commerce site, the browser will automatically provide shipping information. If the site is requesting demographic information, then the browser will know to provide it anonymously. The P3P specification was developed by the W3C P3P Syntax, Harmonisation, and Protocol Working Groups, including W3C Member organisations and experts in the field of web privacy. P3P is based on W3C specifications that have already been established,

Service Standards	Defined by	Examples
		including HTTP, XML and Resource Description Framework (RDF). Privacy is policy that deals with the degree to which an individual can determine which personal information is to be shared with whom and for what purpose.
300302 Authentication / Single Sign-on (SSO)	The method that provides users with the ability to login one time, getting authenticated access to all their applications and resources.	
300303 Hosting	The service provider who manages and provides availability to a website or application, often bound to a Service Level Agreement (SLA). The Hosting entity generally maintains a server farm with network support, power backup, fault tolerance, load balancing and storage backup.	Examples of hosting technology include: • **internal (within agency)**: the hosting of a website or application within an agency. The agency is responsible for the maintenance, support and availability of the website or application • **external (ISP/ASP)**: the outsourcing of a website or application with a managed service provider. An Internet Service Provider (ISP) provides telecommunications circuits, server co-location and website and application hosting. An Application Service Provider (ASP) offers software-based services for high-end business applications and specific needs applications such as payroll, sales force automation and human resources.

8.3.4 [3004] Service Transport

Service transport defines the end-to-end management of the communications session to include the access and delivery protocols.

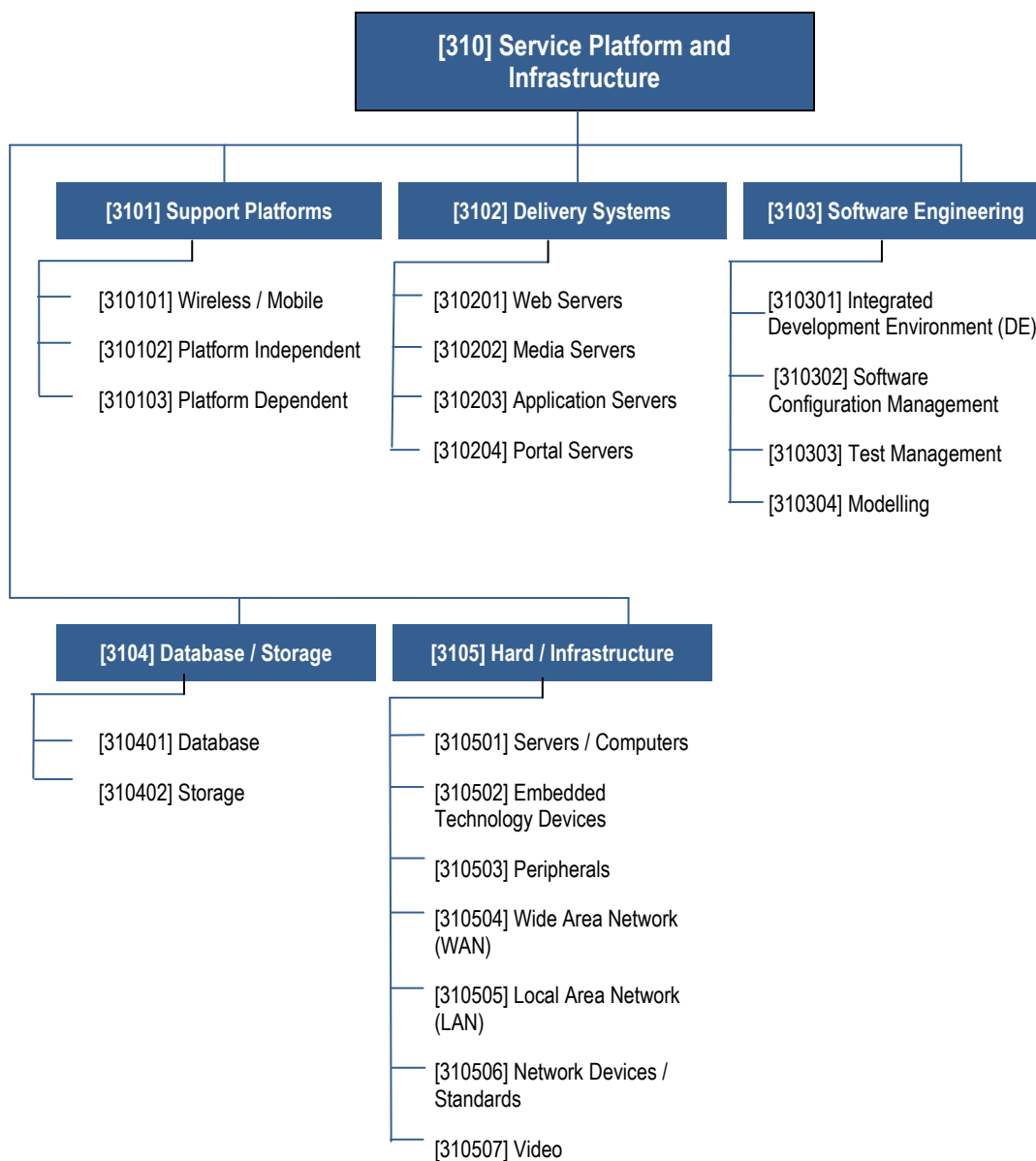| Service Standards	Defined by	Examples
300401 Supporting Network Services	The protocols that define the format and structure of data and information that is either accessed from a directory or exchanged through communications.	Examples of support network services technology include: • **Internet Message Access Protocol/Post Office Protocol (IMAP/POP3)**: allows a client to access and manipulate electronic mail messages on a server. IMAP permits manipulation of remote message folders, called 'mailboxes', in a way that is functionally equivalent to local mailboxes. IMAP also provides the capability for an offline client to re-synchronise with the server. • **Multipurpose Internet Mail Extensions (MIME)**: an Internet Standard that extends the format of e-mail to support text in character sets other than US-ASCII, non-text attachments, multi-part message bodies and header information in non-ASCII character sets. MIME support allows compliant e-mail clients and servers to accurately communicate embedded information to internal and external users • **Simple Mail Transfer Protocol (SMTP)**: facilitates the transfer of electronic mail messages. It specifies how two systems are to interact and the message format used to control the transfer of electronic mail • **Extended Simple Mail Transfer Protocol (ESMTP)**: allows new service extensions to SMTP to be defined and registered with Internet Assigned Numbers Authority (IANA) • **T.120**: an International Telecommunications Union (ITU) standard which contains a series of communication and application protocols and services that provide support for real-time, multipoint data communications. These multi-point facilities are important building blocks for collaborative applications, including desktop data conferencing and multi-user applications • **H.323**: an International Telecommunications Union (ITU) standard, addresses Video (Audiovisual) communication on Local Area Networks, including Corporate Intranets and packet switched networks generally • **Simple Network Management Protocol (SNMP)**: eliminates several of the security vulnerabilities in earlier versions • **Lightweight Directory Access Protocol (LDAP)**: a subset of X.500 designed to run directly over the TCP/IP stack. LDAP is, like X.500, both an information model and a protocol for querying and manipulating it. LDAPv3 is an update developed in the Internet Engineering Task Force (IETF) which address the limitations found during deployment of the previous version of LDAP

Service Standards	Defined by	Examples
		• **Directory Services (X.500)**: a network service that discovers and identifies resources on a network and makes them accessible to users and applications. The resources include users, e-mail addresses, computers, mapped drives, shared folders and peripherals such as printers and PDA docking stations. Users and computers access these resources without the need to know how or where the resources are connected • **Dynamic Host Configuration Protocol (DHCP)**: a protocol for assigning dynamic IP addresses to devices on a network. A device can receive a different IP address for every connection. Dynamic addressing provides reduced network administration when deploying and connecting user and peripheral devices • **Domain Name System (DNS)**: a protocol used for translating domain names (i.e. www.finance.gov.au) to their respective IP addresses. DNS is collectively a network of devices which store query results. As one DNS server or device cannot provide the translated IP address, it queries other DNS devices. This process is invisible to the user • **Border Gateway Protocol (BGP)**: refers to a routing protocol used to exchange routing information between routers on a network, enabling more efficient routing of data. BGP is part of RFC 1771 • **X.400**: an ISO and ITU standard for e-mail message addressing and transporting. X.400 supports Ethernet, X.25, TCP/IP and dial-up transport methods.
300402 Service Transport	The protocols that define the format and structure of data and information that is either accessed from a directory or exchanged through communications. .	Examples of Service Transport technologies include: • **Transmission Control Protocol (TCP)** - provides transport functions which ensure that the total number of bytes sent is received correctly at the destination • **Internet Protocol (IP)**: the protocol of the Internet and has become the global standard for communications. IP accepts packets from TCP, adds its own header and delivers a 'datagram' to the data link layer protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network • **Hyper Text Transfer Protocol (HTTP)**: the communications protocol used to connect to servers on the World Wide Web. Its primary function is to establish a connection with a web server and transmit HTML pages to the client browser • **Hyper Text Transfer Protocol Secure (HTTPS)**: the protocol for accessing a secure web server. Using HTTPS in the URL instead of HTTP directs the message to a secure port number rather than the default web port number of 80. The session is then managed by a security protocol • **Wireless Application Protocol (WAP)**: an open, global specification that empowers users of digital mobile phones, pagers, personal digital assistants and other wireless devices to securely access and interact with Internet/intranet/extranet content, applications and services

255

Service Standards	Defined by	Examples
		• **File Transfer Protocol (FTP)**: a protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). For example, after developing the HTML pages for a website on a local machine, they are typically uploaded to the web server using FTP • **IP Security (IPSEC)**: a set of protocols used to secure IP packet exchange. Tunnel and Transport are the two modes supported by IPSEC. IPSEC uses certificates and Public Keys to authenticate and validate the sender and receiver

256

8.4 Service Platform and Infrastructure Service Area

The Service Platform and Infrastructure Service Area *(Figure 8-4)* defines the collection of platforms, hardware and infrastructure standards that enable Component Based Architectures and Service Component re-use.

Figure 8-4:   Service Platform and Infrastructure Area

The Service Platform and Infrastructure Service Categories and Standards are defined in the sections below. Examples are provided to assist with clarity only. Agencies should consult whole of government policies, frameworks and standards together with their agency SOE to determine product requirements.

8.4.1 [3101] Support Platforms

Support platforms are hardware or software architectures. The term originally dealt only with hardware and it is still used to refer to a CPU model or computer family.

Service Standards	Defines	Examples
310101 Wireless/Mobile	The radio transmission via the airwaves. Various communications techniques are used to provide wireless transmission including infrared 'line of sight', cellular, microwave, satellite, packet radio and broad spectrum.	An example of wireless/mobile technology includes: • **Java 2 Platform, Micro Edition (J2ME):** Sun's Java environment for devices. It promises a relatively portable environment for those using Java for other tiers of the architecture.
310102 Platform Independent	The description of the operating systems that are able to execute and run on any platform or operating system. A platform is the underlying hardware and software comprising a system.	Examples of platform independent technologies include: • **Hypervisor:** also called a virtual machine manager, is a program that allows multiple operating systems to share a single hardware host**.** • **Java 2 Platform Enterprise Edition (J2EE):** Sun's J2EE and Microsoft's .Net are the two dominant distributed computing architecture frameworks. J2EE provides portability of a single language (Java) over multiple operating systems and hardware platforms • **Linux**: an open source operating system that runs on multiple hardware platforms. With the ability to run on many platforms, including the PC and Macintosh, Linux has become an alternative to proprietary systems. • **Eclipse:** a collection of open source projects built on the Equinox OSGi run-time.
310103 Platform Dependent	The description of the operating systems that are able to execute and run on a specific platform or operating system. A platform is the underlying hardware and software comprising a system.	Examples of platform dependent technologies include: • **Windows**: Microsoft family of operating systems for personal computers. • **Mac OS**: Apple's UNIX-based operating system based on industry standards. • **Net:** Microsoft's .Net and Sun's J2EE are the two dominant distributed computing architecture frameworks. The .Net framework supports a wide range of languages but is primarily tied to the Microsoft Windows operating system and Intel hardware

258

8.4.2 [3102] Delivery Servers

Delivery Servers are front-end platforms that provide information to a requesting application. It includes the hardware, operating system, server software and networking protocols. Front-end platforms stop where the front-end engages with the back-end or client management using service integration.

Service Standards	Defines	Examples
310101 Web Servers	The computer that provides world wide web services on the Internet. It includes the hardware, operating system, web server software, TCP/IP protocols and the website content (web pages). If a web server is used internally, and not by the public, it may be known as an 'intranet server'.	Examples of web server technologies include: • **Apache**: a widely used, public domain, UNIX-based web server from the Apache Group (www.apache.org). It is based on, and is a plug-in replacement for, NCSA's HTTP server Version 1.3. The name came from a body of existing code and many 'patch files' • **Internet Information Server**: web server software from Microsoft that runs under various versions of Microsoft Windows. It supports Netscape's SSL security protocol and turns a Windows-based PC into a website.
310102 Media Servers	The provision of optimised management of media-based files such as audio and video streams and digital images.	Examples of Media Servers include: • **Real Audio**: streaming media server solution designed to supply desktop and mobile content • **Windows Media Services**: part of Microsoft Windows Server editions, optimised to deliver streaming media and dynamic digital content over intranet and Internet delivery channels.
310103 Application Servers	In an n-tier environment, a separate computer (application server) performs the business logic, although some part may still be handled by the user's machine. Business Rules Engine are software systems that executes one or more business rules in a runtime production environment.	Examples of application servers include: • IBM's WebSphere Application Server • Oracle Application Server Examples of business rules engines include: • IBM's WebSphere ILOG JRules • Oracle Business Rules: a component of Oracle Application Server • Microsoft Business Rules Framework – a Microsoft .NET-compliant class library.
310104 Portal Servers	Focus points for interaction, providing integration and single source corporate information.	

8.4.3   [3103] Software Engineering

Software engineering covers the technology associated with building software systems, as well as technical solutions supporting management issues such as testing, modelling and versioning. The TRM is concerned with component technical architecture, not engineering processes.

Service Standards	Defines	Examples
310301 Integrated Development Environment (IDE)	The combination of hardware, software and technology that facilitate the development of software applications and systems.	Examples of technologies supporting an IDE include: • **Rational Application Developer** • **VS.Net**
310302 Software Configuration Management	The technology applicable to all aspects of software development from design to delivery, specifically focused on the control of all work products and artefacts generated during the development process. Several technical solutions on the market provide the integration of the software configuration management functions.	Examples of functions supporting software configuration management for which technical solutions may be available include: • **version management**: refers to tracking and controlling versions of files. Version Management includes capabilities such as labelling, branching, merging, version content comparisons and security and permission management across version controlled projects • **defect tracking**: refers to the identification, assignment and management of discovered defects within an application, product or solution. Defect tracking tools provide searchable defect data to identify urgent and related defects or bugs. The architecture should be built to facilitate the pushing of software patches across the enterprise • **issue management**: refers to the management of business, technical and infrastructure issues throughout the entire life-cycle of a project • **task management**: requirements, testing and issues assignments are transformed into prioritised tasks. Task Management tools provide automation features for managing, delivering, assigning, reminding and collaborating task management and execution • **change management**: refers to the management of application code and content changes across the software development lifecycles • **deployment management**: refers to the capability of software delivery to remote networked desktops, servers and mobile devices across an enterprise. Deployment automation tools provide centralised and accelerated delivery of applications to users via push technologies, eliminating the need for manual installation and configuration • **requirements management and traceability**: consists of information discovery, capture, storage and dissemination. Requirements management reduces software development costs and associated risks through documenting, measuring and analysing deviations to project requirements. Traceability refers to tracking requirements artefacts to their source, and changes in requirements to include the impact analysis of the

260

Service Standards	Defines	Examples
		change. Requirements traceability is an integral component in quality software implementation and the management of document succession.
310303 Test Management	The technology which supports the consolidation of all testing activities and results. Test Management activities include test planning, designing (test cases), execution, reporting, code coverage and heuristic and harness development.	Examples of functions supporting test management for which technical solutions may be available include: • **functional testing**: focuses on any requirements that can be traced directly to use cases (or business functions), business rules and design • **business cycle testing**: refers to the emulation of activities performed over a period of time that is relevant to the application under test • **usability testing (508 Testing)**: refers to a test to ensure that the application navigation, functionality and Graphical User Interface (GUI) allows users to effectively and efficiently do their work in a way that they are satisfied with the application • **performance profiling**: refers to a performance test that measures and evaluates response times and transaction rates • **load/stress/volume testing**: refers to tests that measure and evaluate how a system performs and functions under varying workloads, large amounts of data and/or resource utilisation • **security and access control testing**: focuses on the technical, administrative and physical security controls that have been designed into the system architecture in order to provide confidentiality, integrity and availability • **reliability testing**: refers to the verification that failover methods are invoked properly and the system recovers properly • **configuration testing**: refers to a test to ensure that the application or system can handle all hardware and software variables and requirements that have been defined • **installation testing**: refers to the verification that the software installation process works properly in different environments and among varying conditions.
310304 Modelling	The provision of support for the process of representing entities, data, business logic and capabilities for aiding in software engineering.	Examples of modelling technology include: • **Unified Modelling Language (UML)**: a general-purpose notational language for specifying and visualising complex software, especially large, object-oriented projects • **Computer Aided Software Engineering (CASE) software**: provides a development environment for programming teams. CASE systems offer tools to automate, manage and simplify the development process.

261

8.4.4 [3104] Database/Storage

Database/storage refers to programs that enable storage, modification and extraction of information from a database, and various techniques and devices for storing large amounts of data.

Service Standards	Defines	Examples
310401 Database	A collection of information organised in such a way that a computer program can quickly select desired pieces of data. A database management system (DBMS) is a software application providing management, administration, performance, and analysis tools for databases.	Examples of Database technologies include: • **Database 2 (DB2)**: a family of relational database products offered by IBM. DB2 provides an open database environment that runs on a wide variety of computing platforms • **Oracle**: a relational database product; the first to support the SQL language • **SQL Server**: a data management server product developed by Microsoft • **Sybase**: a data management and synchronisation server products developed by Sybase.
310402 Storage	Devices designed to provide shared storage access across a network. These devices provide extended storage capabilities to the network with reduced costs compared to traditional file servers.	Examples of Storage technologies include: • **network attached storage (NAS)**: a server that is dedicated to file sharing • **storage area network (SAN)**: a high-speed sub-network of shared storage devices. A storage device is a machine that contains nothing but a disk or disks for storing data.

8.4.5 [3105] Hardware/Infrastructure

Hardware/infrastructure defines the physical devices, facilities and standards providing the computing and networking within and between enterprises.

Service Standards	Defines	Examples
310501 Servers / Computers	The various types of programmable machines which are capable of responding to sets of instructions and executing programs.	Examples of server/computer technologies include: • **enterprise server**: a computer or device on a network that manages network resources and shared applications for multiple users • **mainframe**: a very large computer capable of supporting hundreds, or even thousands, of users simultaneously. Mainframes support simultaneous programs.
310502 Embedded Technology Devices	The various devices and parts that make up a server or computer as well as devices that perform specific functions outside of a server or computer.	Examples of embedded technology devices include: • **random access memory (RAM)**: a type of computer memory that can be accessed randomly; i.e. any byte of memory can be accessed without touching the preceding bytes. RAM is the most common type of memory found in computers and other devices, such as printers • **hard disk drive**: refers to the area of a computer where data is stored • **microprocessor**: a silicon chip that contains a CPU. In the world of personal computers, the terms microprocessor and CPU are used interchangeably. At the heart of all personal computers and most workstations sits a microprocessor • **redundant array of independent disks (RAID)**: an assembly of disk drives that employ two or more drives in combination for fault tolerance and performance. RAID disk drives are used frequently on servers but are not generally necessary for personal computers. RAID is generally configured as mirrored or striped. Mirrored RAID (Level 1) provides a failover drive. Striped RAID (Levels 0, 3, and 5) write data across multiple disk drives so that a single disk failure can be recovered from the data on the remaining drives. There are three types of RAID systems: failure resistant disk systems (that protect against data loss due to disk failure): failure tolerant disk systems (that protect against loss of data access due to failure of any single component); and disaster tolerant disk systems (that consist of two or more independent zones, either of which provides access to stored data).

Service Standards	Defines	Examples
310503 Peripherals	Computer devices that are not part of the essential computer (i.e. the memory and microprocessor). Peripheral devices can be external and internal.	Examples of peripherals are: • **printer**: a device that copies text or illustrations onto paper. There are many different types of printers. • **scanner**: a device that can read text or illustration sprinted on paper and translate the information into a form the computer can use. A scanner works by digitising an image, dividing it into a grid of boxes and representing each box with either a zero or a one, depending on whether the box is filled in. • **facsimile (fax)**: the digitised image of text and/or pictures, represented as a services of dots (bitmap). Faxes are sent and received through telecommunication channels such as the telephone or internet. • **graphics tablets**: a pad-like device that uses a pen-like instrument to allow users to hand-draw images that appear on a computer screen. • **cameras**: a device that allows users to capture an image of their surroundings. The images may be still or moving and the images can be stored electronically or physically on film. • **assistive devices:** These devices allow users to input information using a different medium than what is usually used. Assistive devices are often used to ensure greater accessibility for people with disabilities. An example of an assistive device would be speech recognition software, which converts audible human speech into words on a computer screen.
310504 Wide Area Network (WAN)	A data network extending a LAN outside a building or beyond a campus. This is typically created by using bridges or routers to connect geographically separated LANs.	WANs include commercial or educational dialup networks such as CompuServe, Internet and BITNET. Examples of WAN technologies include: • **frame relay**: a packet-switching protocol for connecting devices on a WAN. Frame Relay networks in the U.S. support data transfer rates at T1 (1.544 Mbps) and T3 (45 Mbps) speeds • **asynchronous transfer mode (ATM)**: a high bandwidth, high speed, controlled delay, fixed-size packet-switching and transmission system integrating multiple data types (voice, video and data). It uses fixed-size packets also known as 'cells' (ATM is often referred to as 'cell relay').

| Service Standards	Defines	Examples
310505 Local Area Network (LAN)	A network that interconnects devices over a geographically small area, typically in one building or a part of a building. The most popular LAN type is Ethernet. LANs allow the sharing of resources and the exchange of both video and data	Examples of LAN technologies include: • **Ethernet**: LAN architecture that uses a bus or star topology and supports data transfer rates of 10 Mbps, 100 Mbps (fast Ethernet) or 1 Gbps (Gigabit Ethernet). The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. • **Token ring**: a type of computer network in which all the computers are arranged (schematically) in a circle. A token, which is a special bit pattern, travels around the circle. To send a message, a computer catches the token, attaches a message to it and then lets it continue to travel around the network • **virtual LAN (VLAN)**: a network of computers that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN. VLANs are configured through software rather than hardware, which makes them extremely flexible. One of the biggest advantages of VLANs is that when a computer is physically moved to another location, it can stay on the same VLAN without any hardware reconfiguration.
310506 Network Devices/Standards	Network devices/standards are a group of stations (computers, telephones or other devices) connected by communications facilities for exchanging information. Connection can be permanent, via cable, or temporary, through telephone or other communications links. The transmission medium can be physical (e.g. fibre optic cable) or wireless (e.g. satellite).	Examples of network devices/standards include: • **hub**: a common connection point for devices in a network. Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets • **switch**: in networks, a device that filters and forwards packets between LAN segments. Switches operate at the data link layer (layer 2) and sometimes the network layer (layer 3) of the OSI Reference Model, and therefore support any packet protocol. LANs that use switches to join segments are called switched LANs or, in the case of Ethernet networks, switched Ethernet LANs • **router**: a device or setup that finds the best route between any two networks, even if there are several networks to traverse. Like bridges, remote sites can be connected using routers over dedicated or switched lines to create WANs • **network Interface Card (NIC)**: an expansion board inserted into a computer so the computer can be connected to a network. Most NICs are designed for a particular type of network, protocol and media, although some can serve multiple networks • **transceivers**: short for transmitter receiver, a device that both transmits and receives analogue or digital signals. The term is used most frequently to describe the component in local area networks (LANs) that actually allows signals onto the network wire and detects signals passing through the wire. For many LANs, the transceiver is built into the network interface card (NIC). Some types of networks, however, require an external transceiver • **gateways**: points of entrance to and exit from a communications network. Viewed as a physical entity, a gateway is that node that translates between two otherwise incompatible networks or network segments

Service Standards	Defines	Examples
		• **integrated services digital network (ISDN)**: a system of digital phone connections which has been available for over a decade. This system allows data to be transmitted simultaneously across the world using end-to-end digital connectivity
		• **T1/T3**: T1 service delivers 1.544 Mbps. It typically channels into 24 DS0s, each capable of carrying a single voice conversation or data stream. The European T1 or E1 transmission rate is 2.048 Mbps. A T3 circuit communicates at 45 Mbps, or 28 T1 lines
		• **digital subscriber line (DSL)**: refers collectively to all types of digital subscriber lines, the two main categories being ADSL and SDSL. Two other types of DSL technologies are High data rate DSL (HDSL) and Very high DSL (VDSL)
		• **firewall**: refers to the network device that is designed to prevent unauthorised access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorised Internet users from accessing private networks connected to the Internet, especially intranets. There are several types of firewall techniques and firewalls may implement one or more simultaneously. Packet filtering inspects inbound and outbound packets, validating against defined business rules. Application gateways apply security rules against applications. Circuit level gateways apply security rules against physical connection attempts to and from the network. Proxy servers mask the internal requestor by inspecting and augmenting the packet header. Four common architectures of firewalls include the packet filtering router, the screened host firewall system, the dual-homed host firewall and the screened subnet firewall (with a DMZ), which is one of the most secure implementations.
310507 Video	Video conferencing provides communication across long distances with video and audio contact that may also include graphics and data exchange. Digital video transmission systems typically consist of camera, codec (coder decoder), network access equipment, network and audio system.	Examples of network devices/standards include: • **bridge**: a bridge connects three or more conference sites so that they can simultaneously pass data, voice or video. Video conferencing bridges are often called MCUs (multipoint conferencing units) • **codec**: a video codec converts analogue video signals from a video camera to digital signals for transmission over digital circuits and then converts the digital signals back to analogue signals for display • **receiver**: an electronic device which enables a particular videoconference signal to be separated from all others being received by an earth station and converts the signal format into a format for video, voice or data.

266

8.5 Component Framework Service Area

The Component Framework Service Area *(Figure 8-5)* defines the underlying foundation and technical elements by which service components are built, integrated and deployed across component-based and distributed architectures.

The component framework consists of the design of application or system software that incorporates interfaces for interacting with other programs and for future flexibility and expandability. This includes, but is not limited to, modules that are designed to interoperate with each other at run-time.

Components can be large or small, written by different programmers using different development environments and may be platform independent. Components can be executed on stand-alone machines, a LAN, intranet or the Internet.
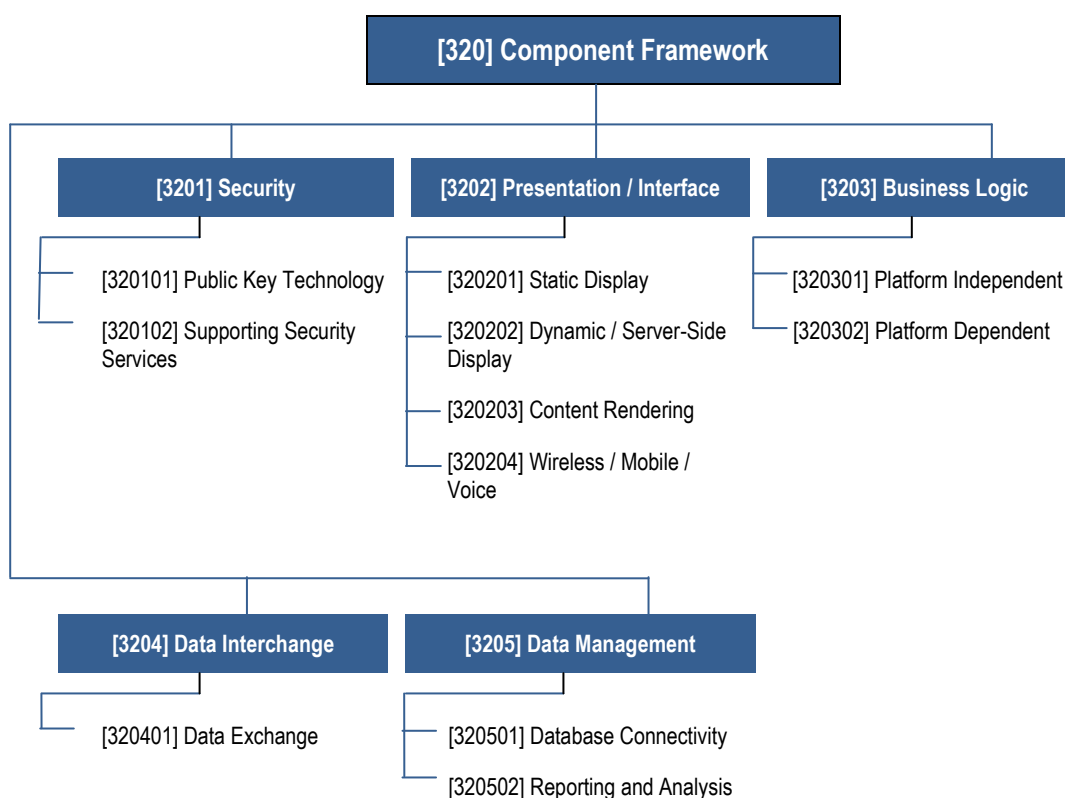
Figure 8-5:   Component Framework Service Area

The Component Framework Service Categories and Standards are defined in the sections below.

Agencies should consult whole of government policies, frameworks and standards together with their agency SOE to determine product requirements.

8.5.1 [3201] Security

Security defines the methods of protecting information and information systems from unauthorised access, use, disclosure, disruption, modification or destruction in order to provide integrity, confidentiality and availability. Use of biometrics, two factor identification, and encryption technologies should align with the requirements of the Australian Government's Information Security Manual (ISM).

Service Standards	Defines	Examples
320101 Public Key technology	Software and services used by a Certification Authority (CA) to generate digital keys and certificates to secure access to information.	Examples of public key technologies include: • Digital certificates generated under ITU-T X.509 standard Agencies requiring encryption technologies should seek evaluated products listed on DSD's Evaluated Products List (EPL).
320102 Supporting security services	The different protocols and components to be used to support public key technologies.	Examples of supporting security services technologies include: • **Secure Sockets Layer (SSL)**: an open, non-proprietary protocol for securing data communications across computer networks. SSL sits between the application protocol (such as HTTP, Telnet, FTP and NNTP) and the connection protocol (such as TCP/IP, UDP). SSL provides server authentication, message integrity, data encryption and optional client authentication for TCP/IP connections. • **Transport Layer Security (TLS)**: a standard for the next generation SSL. TLS provides communications privacy over the Internet. The protocol allows client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering or message forgery • **Secure Shell (SSH)**: a strong method of performing client authentication. Because it supports authentication, compression, confidentiality and integrity, SSH is used frequently on the Internet. SSH has two important components: RSA certificate exchange for authentication and Triple DES for session encryption. • **Secure Multipurpose Internet Mail Extensions (S/MIME)**: provide a consistent way to send and receive secure MIME data. Based on the Internet MIME standard, S/MIME provides cryptographic security services for electronic messaging applications: authentication, message integrity and non-repudiation of origin (using digital signatures) and data confidentiality (using encryption). S/MIME is not restricted to mail: it can be used with any transport mechanism that transports MIME data, such as HTTP • **OpenPGP Message Format:** Open-PGP software uses a combination of strong public-key and symmetric cryptography to provide security services for electronic communications and data storage. These services include confidentiality, key management, authentication, and digital signatures. • **IPSec:** a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session. Also includes protocols for establishing mutual authentication between

268

Service Standards	Defines	Examples
		agents at the beginning of the session and negotiation of cryptographic keys to be used during the session.
		• **Web Services Security (WS Security)**: describes enhancements to SOAP (Simple Object Access Protocol) messaging to provide message integrity, message confidentiality and single message authentication. These mechanisms can be used to accommodate a wide variety of security models and encryption technologies, including X.509, Kerberos and SAML
		• **Security Assertion Markup Language (SAML)**: an XML-based framework for exchanging security information expressed in the form of assertions about subjects, where a subject is an entity (either human or computer) that has an identity in some security domain. SAML is supported by both the Liberty Alliance and WS Security

8.5.2   [3202] Presentation/Interface

Presentation/interface defines the connection between the user and the software, and consists of the presentation that is physically represented on the screen.

Service Standards	Defined as	Examples
320201 Static Display	The software protocols that are used to create a pre-defined, unchanging graphical interface between the user and the software	An example of static display technology includes: • **Hypertext Markup Language (HTML)**: the language used to create web documents and a subset of Standard Generalised Markup Language (SGML) • **Portable Document Framework (PDF/A/X)**: an open standard file format for representing two-dimensional documents in a device independent and resolution independent format.
320202 Dynamic / Server Side Display	The software that is used to create graphical user interfaces with the ability to change while the program is running.	Examples of dynamic/server side display technologies include: • **Java Server Pages (JSP)**: part of Sun's J2EE architecture and provide template capabilities for presenting dynamically generated web content. JSPs are text files written in a combination of standard HTML tags, JSP tags and Java code • **Active Server Pages (ASP)**: a web server technology from Microsoft that allows for the creation of dynamic, interactive sessions with the user • **Active Server Pages .Net (ASP.Net)**: a set of technologies in the Microsoft.NET Framework for building web applications and XML web services. ASP.NET pages execute on the server and generate markup such as HTML, WML or XML that is sent to a desktop or mobile browser.

269

Service Standards	Defined as	Examples
320203 Content Rendering	The software and protocols used for transforming data for presentation in a graphical user interface.	Examples of content rendering technologies include: • **Dynamic HTML (DHTML)**: a collective term for a combination of new Hypertext Markup Language (HTML) tags and options, style sheets and programming that will allow web pages that are more animated and more responsive to user interaction than previous versions of HTML • **Extensible HTML (XHTML)**: a family of document types and modules that reproduce, subset, and extend HTML, reformulated in XML • **Cascading Style Sheets (CSS)**: a style sheet format for HTML documents endorsed by the World Wide Web Consortium. CSS1 (Version 1.0) provides hundreds of layout settings that can be applied to all the subsequent HTML pages that are downloaded • **Extensible 3D Graphics (X3D)**: the ISO standard for real-time 3D computer graphics which features the ability to scene in an XML syntax.
320204 Wireless / Mobile / Voice	The software and protocols used for wireless- and voice-enabled presentation devices.	Examples of wireless/mobile/voice technologies include: • **Wireless Markup Language (WML)**: an XML-based protocol designed for Wireless devices • **XHTML Mobile Profile (XHTMLMP)**: designed for resource-constrained web clients that do not support the full set of XHTML features, such as mobile phones, PDAs, pagers and set top boxes. It extends XHTML Basic with modules, elements and attributes to provide a richer authoring language. XHTML replaces the Wireless Markup Language (WML) **Voice XML (VXML)**: an XML vocabulary for specifying IVR (Integrated Voice Response) Systems.

270

8.5.3 [3203] Business Logic

Business logic defines the software, protocol or method by which business rules are enforced within applications.

Service Standards	Defines	Examples
320301 Platform Independent languages	A description of all software languages that are able to execute and run on any type of operating system or platform.	Examples of platform independent technologies include: • **Enterprise Java Beans (EJB)**: a software component in Sun's J2EE platform which provides a pure Java environment for developing and running distributed applications • **C, C++**: a procedure programming language. C++ is an object-oriented version of C that has been widely used to develop enterprise and commercial applications • **JavaScript**: a scripting language that runs within a web browser
320302 Platform Dependent languages	A description of the programming languages and methods for developing software on a specific operating system or platform.	Examples of platform dependent technologies include: • **Visual Basic**: a version of the BASIC programming language from Microsoft specialised for developing Windows applications • **Visual Basic.Net (VB.Net)**: a version of the BASIC programming language from Microsoft specialised for developing Windows applications that is used within Microsoft's .NET environment • **C-Sharp (C#)**: an object-oriented programming language from Microsoft that is based on C++ with elements from Visual Basic and Java • **VB Script**: a scripting language from Microsoft. A subset of Visual Basic, VBScript is widely used on the web for both client processing within a web page and server side processing in Active Server Pages (ASPs).

8.5.4   [3204] Data Interchange

Data interchange defines the methods in which data is transferred and represented in and between software applications.

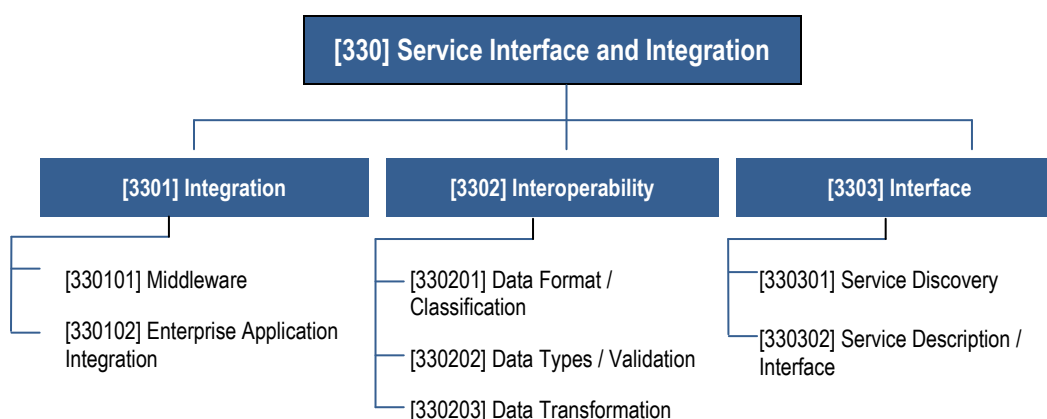| Service Standards	Defines	Examples
320401 Data Exchange	The sending of data over a communications network and the definition of data communicated from one application to another. Data exchange provides the communications common denominator between disparate systems.	Examples of data exchange technologies include: • **XML Metadata Intercharge (XMI)**: enables easy interchange of metadata between modelling tools (based on the OMG UML) and metadata repositories (OMG MOF based) in distributed heterogeneous environments. XMI integrates three key industry standards: XML, UML and MOF. The integration of these three standards into XMI marries the best of OMG and W3C metadata and modelling technologies, allowing developers of distributed systems to share object models and other metadata over the Internet • **XQuery**: a language used for processing and evaluating XML data. The XQuery language provides results of expressions allowing the use of evaluations to the implementation of XQuery • **Simple Object Access Protocol (SOAP)**: provides HTTP/XML based remote procedure call capabilities for XML Web Services • **Electronic Business using XML (be-XML)**: a modular suite of specifications that enables enterprises to conduct business over the Internet: exchanging business messages, conducting trading relationships, communicating data in common terms and defining and registering business processes • **Resource Description Framework (RDF)**: provides a lightweight ontology system to support the exchange of knowledge on the web. It integrates a variety of web-based metadata activities including sitemaps, content ratings, stream channel definitions, search engine data collection (web crawling), digital library collections and distributed authoring, using XML as interchange syntax. RDF is the foundation for the Semantic Web envisioned by Tim Berners-Lee: an extension of the current web in which information is given well-defined meaning, to better enable computers and people to work in cooperation • **Web Services User Interface (WSUI)**: uses a simple schema for describing a WSUI 'component' that can be used in a portal to call back-end SOAP and XML services. WSUI uses XSLT style sheets to construct user facing views to enable users to interact with the services.

8.5.5 [3205] Data Management

Data management is the management of all data/information in an organisation. It includes data administration, the standards for defining data and the way in which people perceive and use it.

Service Standards	Defines	Examples
320501 Database Connectivity	The protocol or method in which an application connects to a data store or database.	Examples of database connectivity technologies include: • **Java Database Connectivity (JDBC)**: provides access to virtually any tabular data source from the Java programming language. It provides cross-DBMS connectivity to a wide range of SQL databases and other tabular data sources, such as spreadsheets or flat files • **Open Database Connectivity (ODBC)**: a database programming interface from Microsoft that provides a common language for Windows applications to access databases on a network. ODBC is made up of the function calls programmers write into their applications and the ODBC drivers themselves • **Active Data Objects (ADO)**: a programming interface from Microsoft that is designed as *'the'* Microsoft standard for data access. First used with Internet Information Server, ADO is a set of COM objects that provides an interface to OLE DB. The three primary objects are Connection, Command and Record set • **Active Data Objects .Net (ADO.Net)**: the data access component of Microsoft's .NET Framework. It provides an extensive set of classes that facilitate efficient access to data from a large variety of sources, enabling sophisticated manipulation and sorting of data • **Object Linking and Embedding/Database (OLE/DB)**: a Microsoft low-level API designed to provide connections to different data sources. OLE/DB allows connectivity to ODBC-based SQL providers/sources as well as other formats such as text and comma delimited • **Data Access Objects (DAO)**: the Microsoft library for accessing Microsoft Jet engine data sources such as Microsoft Office based applications. DAO is replaced by ADO and ADO.Net • **DB2 Connector**: an IBM connectivity API to access DB2 sources.

| 320502 Reporting and Analysis | The tools, languages and protocols used to extract data from a data store and process it into useful information. | Examples of reporting and analysis technologies include:

• **Extensible Business Reporting Language (XBRL)**: an open specification which uses XML-based data tags to describe financial statements for both public and private companies

• **Java Online Analytical Processing (JOLAP)**: a Java API for the J2EE environment that supports the creation and maintenance of OLAP data and metadata, in a vendor independent manner

• **Online Analytical Processing (OLAP)**: decision support software that allows the user to quickly analyse information that has been summarised into multidimensional views and hierarchies

• **XML for Analysis**: uses the Simple Object Access Protocol (SOAP) to let web browser-based programs access backend data sources for data analysis. The specification allows companies to build online analytical processing (OLAP) and data mining applications that work over the web. |

274

8.6 Service Interface and Integration Service Area

The Service Interface and Integration Service Area *(Figure 8-6)* defines the discovery, interaction and communication technologies joining disparate systems and information providers. SOAs leverage and incorporate Service Interface and Integration standards to provide interoperability and scalability.

Figure 8-6: Service Interface and Integration Area

The Service Interface and Integration Categories and Standards are defined in the sections below. Examples are provided for clarity only

Agencies should consult whole of government policies, frameworks and standards together with their agency SOE to determine product requirements.

8.6.1   [3301] Integration

Integration defines the software services enabling elements of distributed business applications to interoperate. These elements can share function, content and communications across heterogeneous computing environments. In particular, service integration offers a set of architecture services such as platform and service location transparency, transaction management, basic messaging between two points, and guaranteed message delivery.

Service Standards	Defines	Examples
330101 Middleware	Middleware increases the flexibility, interoperability and portability of existing infrastructure by linking or 'gluing' two otherwise separate applications.	Examples of middleware technologies include: • **Remote Procedure Call (RPC)**: a protocol allowing a program on a client computer to invoke a program on a server computer • **Message Oriented Middleware (MOM): IBM WebSphere MQ**: software solution providing APIs, queue management, message routing, automatic failover and workload balancing. Message Oriented Middleware (MOM) is software residing on both sides of the client/server architecture providing support for asynchronous calls, or messages, between applications. Message queues are used to track and store requests waiting for execution by the source application. Messaging allows otherwise complex programming and networking details to be abstracted from the developer • **Message Oriented Middleware (MOM): Microsoft Message Queue (MSMQ)**: software technology providing synchronous and asynchronous message queuing, routing and security. MOM is software residing on both sides of the client/server architecture providing support for asynchronous calls, or messages, between applications. Message queues are used to track and store requests waiting for execution by the source application. Messaging allows otherwise complex programming and networking details to be abstracted from the developer • **Database Access: PL/SQL**: Oracle's procedural extension to industry standard SQL. Database Access provides access to and across multiple database technologies in a distributed environment. Database Access is provided through the use of native database Application Programming Interfaces (APIs), client side APIs or server side database gateways • **Database Access: ISQL/w**: Microsoft's implementation of ANSI SQL. Database Access provides access to and across multiple database technologies in a distributed environment. Database Access is provided through the use of native database APIs, client-side APIs or server-side database gateways • **Database Access: NET8**: (called SQL*Net prior to Oracle8) Oracle's client/server middleware product that offers transparent connection from client tools to the database, or from one database to another. SQL*Net/ NET8 works across multiple network protocols and operating systems. Previous versions referred to as SQL*Net. Database Access provides access to and across multiple database technologies in a distributed environment. Database Access is provided through the use of native database APIs, client side APIs or server side database gateways

276

Service Standards	Defines	Examples
		• **Transaction Processing Monitor**: software providing synchronous messaging and queuing along with other transaction management services designed to support the efficient processing of high volumes of transactions. Core services include load balancing, rollback/commit and recovery. Transaction processing provides cost-effective scalability to applications and database systems by managing and throttling transactions on behalf of the database system • **Object Request Broker (ORB)**: a technology enabling distributed objects to communicate and exchange data with remote objects. ORB encapsulates the locality and implementation of the objects, allowing users to develop applications that leverage components by accessing the components' interface • **Object Request Broker (ORB): Common Object Request Broker Architecture (CORBA)**: an architecture that enables objects to communicate with one another irrespective of programming language or operating system. • **Object Request Broker (ORB): Component Object Model (COM)**: a software architecture created by Microsoft to design and build component-based applications. COM object capabilities are accessible from exposed interfaces. • **Object Request Broker (ORB): Distributed Component Object Model (DCOM)**: an extension of the Component Object Model (COM) that allows COM components to communicate across network boundaries. Traditional COM components can only perform inter-process communication across process boundaries on the same machine. • **Object Request Broker (ORB): Component Object Model + (COM+)**: an extension of the COM that provides a runtime and services that are readily used from any programming language or tool. It enables extensive interoperability between components regardless of how they were implemented.
330102 Enterprise Application Integration (EAI)	The processes and tools specialising in updating and consolidating applications and data within an enterprise. EAI focuses on leveraging existing legacy applications and data sources so that enterprises can add and migrate to current technologies.	Examples of functions supporting EAI for which technologies might be available include: • **business process management**: this process is responsible for the definition and management of cross application business processes across the enterprise and/or between enterprises • **application connectivity**: this process provides reusable, non-invasive connectivity with packaged software. This connectivity is provided by uni- or bi-directional adapters • **transformation and formatting**: this process is responsible for the conversion of data, message content, information structure and syntax to reconcile differences in data among multiple systems and data sources.

8.6.2 [3302] Interoperability

Interoperability defines the capabilities of discovering and sharing data and services across disparate systems and vendors.

Service Standards	Defines	Examples
330201 Data Format / Classification	The structure of a message file. There are hundreds of file formats and every application has many different variations (database, word processing, graphics, executable program, etc.). Each format defines its own layout of the data. The file format for text is the simplest.	Examples of Data Format/Classification technologies include: • **Extensible Markup Language (XML)**: emerged as the standard format for web data and is beginning to be used as a common data format at all levels of the architecture. Many specialised vocabularies of XML are being developed to support specific government and industry functions • **XML Linking Language (XLINK)**: a language used to modify XML documents to include links, similar to hyperlinks, between resources. XLINK provides richer XML content through advanced linking integration with information resources • **Namespaces** –are qualified references to URI (Uniform Resource Identifier) resources within XML documents • **Electronic Data Interchange (EDI)**: defines the structure for transferring data between enterprises. EDI is used mainly for purchase-related information. ANSI X.12 refers to the approved EDI standards.
330202 Data Types / Validation	The standards used in identifying and affirming common structures and processing rules. This technique is referenced and abstracted from the content document or source data.	Examples of data types/validation technologies include: • **Document Type Definition (DTD)**: used to restrict and maintain the conformance of an XML, HTML, or SGML document. The DTD provides definitions for all tags and attributes within the document and the rules for their usage. Alterations to the document are validated with the referenced DTD • **XML Schema**: defines the structure, content, rules and vocabulary of an XML document. XML Schemas are useful in automation through embedding processing rules.
330203 Data Transformation	The protocols and languages that change the presentation of data within a graphical user interface or application.	Examples of data transformation technologies include: • **Extensible Style Sheet Language Transform (XSLT)**: transforms an XML document from one schema into another. Used for data transformation between systems using different XML schema or mapping XML to different output devices.

8.6.3 [3303] Interface

Interface defines the capabilities of communicating, transporting and exchanging information through a common dialogue or method. Delivery channels provide the information to reach the intended destination, whereas interfaces allow the interaction to occur based on a pre-determined framework.

Service Standards	Defines	Examples
330301 Service Discovery	The method in which applications, systems or web services are registered and discovered.	An example of service discovery technology includes: • **Universal Description Discovery and Integration (UDDI)**: provides a searchable registry of XML Web Services and their associated URLs and WSDL pages.
330302 Service Description / Interface	The method for publishing the way in which web services or applications can be used.	Examples of Service description/interface technologies include: • **Web Services Description Language (WSDL)**: an XML-based Interface Description Language for describing XML Web Services and how to use them • **Application Program Interface (API) / Protocol**: a language and message format used by an application program to communicate with the operating system or some other control program such as a database management system (DBMS) or communications protocol. APIs are implemented by writing function calls in the program which provide the linkage to the required sub-routine for execution. Thus, an API implies that some program module is available in the computer to perform the operation or that it must be linked into the existing program to perform the tasks.

279

Appendix A - Glossary of Terms

Term	Definition
Abstract Model **[top]**	An architectural pattern that optimises a data architecture for Data Description, Data Context and Data Sharing. (DRM usage) A theoretical construct that represents physical, biological or social processes, with a set of variables and a set of logical and quantitative relationships between them. (Answers.com) An abstract model is one way to establish a consistent set of concepts. An abstract model is a tool for the description of complex behaviour — it is not a template for an implementation, although it should not stray so far away from reality that it is impossible to recognise how the required behaviours would be implemented. (W3C XML Protocol Abstract Model)
Ad Hoc Query **[top]**	A query (i.e. search question) formed or used for specific or immediate problems or needs.
AGA **[top]**	See Australian Government Architecture.
AGA Reference Models **[top]**	The Australian Government Architecture (AGA) consists of a set of interrelated 'reference models' designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across agencies (http://www.finance.gov.au/e-government/index.html). The Australian Government Architecture (AGA) Reference Models are based on the US Government's Federal Enterprise Architecture (FEA) Reference Models.
AGIFT **[top]**	See Australian Governments' Interactive Functions Thesaurus.
Australian Government Architecture (AGA) **[top]**	A business-based framework for Australian government-wide improvement developed by the Australian Government Information Management Office (AGIMO) of the Department of Finance and Deregulation (http://www.finance.gov.au/e-government/index.html).
Australian Governments' Interactive Functions Thesaurus (AGIFT) **[top]**	The AGIFT is a three-level hierarchical thesaurus that describes the business functions carried out across Commonwealth, State, Territory and local governments in Australia, developed by the National Archives of Australia. AGIFT online site: (http://www.naa.gov.au/records-management/publications/agift.aspx)

Term	Definition
Australian Government Locator Service (AGLS) Metadata Element Set [top]	The AGLS Metadata Standard is a set of 19 descriptive elements that agencies can use to improve the visibility, accessibility and interoperability of their web services. It has been mandated for use by Australian Government agencies. AGLS is published as Australian Standard AS 5044. The *Australian Government Implementation Manual for AGLS Metadata* provides practical advice and direction for staff using the AGLS metadata set. It is maintained by the National Archives of Australia. Further information can be found at http://www.naa.gov.au/records-management/publications/AGLS-Element.aspx
Analytical Database [top]	A database that contains structured data objects that support query and analysis and that tends to be purposefully de-normalised and optimised for query ease and performance.
Application Programming Interface (API) [top]	A set of definitions of the ways one piece of computer software communicates with another. It is a method of achieving abstraction, usually (but not necessarily) between higher-level and lower-level software.
Architectural Pattern [top]	A description of an archetypal solution to a recurrent design problem that reflects well-proven design experience. (American Science Institute of Technology)
Attribute [top]	A characteristic of an Entity whose value may be used to help distinguish one instance of an Entity from other instances of the same Entity. (DRM usage) A characteristic or property of an object, such as weight, size or colour. A construct whereby objects or individuals can be distinguished. (WordNet)
Authoring System Repository [top]	A broad term related to document storage. At one extreme, an 'authoring system' may be a digital camera. At the other, an authoring system may implement a complex workflow used for the production of a formal publication. In both cases, the products of an authoring system are documents. (DRM usage)
BRM [top]	See Business Reference Model.
BRM Business Area [top]	The top tier of the BRM. Business Areas separate government operations into high-level functional categories relating to the purpose of government (Services for Citizens), the avenues through which the government provides services to citizens (Service Paths), the support functions necessary to conduct government operations (Services Support) and the resource management functions that support all areas of the government's business (Management of Government Resources).
BRM Business Capability [top]	The lowest tier of the BRM. Business Capabilities relate to the government sub-functions within each line of business. Each business capability is described in terms of the activities or operations involved in performing its related functionality. At an agency level, business capabilities are represented by business services that are enacted and supported through business processes and service components.
BRM Hierarchy [top]	A three-tiered taxonomy categorising and describing the functions of the Australian government at a whole-of-government level, independent of government agency structures.
BRM Line of Business	The middle tier of the BRM. Lines of Business (LoBs) represent the categories

Term	Definition
(LoB) [top]	of government services for citizens, and the internal operations performed by the government towards providing services for citizens, independent of the agencies, bureaus and offices that perform them. BRM LoBs are represented in a whole-of-government context rather than an agency context.
Broader Term [top]	A term to which another term or multiple terms are subordinate in a hierarchy. In thesauruses the relationship indicator for this type of term is BT. (ANSI/NISO Z39.19-200x)
Business [top]	The people or organisations that are described by the BRM. In the Universal Description, Discovery and Integration standard businesses are defined by a business Entity. While quite often these are in fact businesses in the usual sense of the word, they need not be. For example, the 'businesses' in a registry internal to a business might well be internal organisations. (UDDI)
Business Area [top]	The highest level of functional category in the BRM taxonomy, broken down into lines of business that collectively contain the business capabilities of the Australian Government. Refer to 'BRM Business Area' for further detail.
Business Capability [top]	The lowest level of functional category in the BRM taxonomy, relating to the sub-functions of each line of business within the business areas. Refer to 'BRM Business Capability' for further detail.
Business Context [top]	The formal description of a specific business circumstance as identified by the values of a set of Context Categories, allowing different business circumstances to be uniquely distinguished (UN/CEFACT Core Components Technical Specification, Version 2.01). For example, in the AGA SRM, Service Types provide an additional layer of categorisation that defines the business context of a specific component within a given Service Domain.
Business Process [top]	A sequence of linked activities that creates value by turning inputs into a more valuable output. This value creation can be performed by human participants or information and communications technology (ICT), or both. In the context of the BRM, business processes are orchestrated, created and enacted through government agencies in order to provide a business service that represents a government business capability. Delivery of a business process may include activities created or enacted by one or more government agencies or external providers.
Business Reference Model (BRM) [top]	One of the five AGA reference models. The BRM provides a framework that facilitates a functional (rather than organisational) view of the government's Lines of Business (LoBs), including its internal operations and its services for citizens, independent of the agencies, bureaus and offices that perform them.
Business Rule [top]	Policies and other restrictions, guidelines and procedures governing the administration and operation of a service. (Data Dictionary for Preservation Metadata: Final Report of the PREMIS Working Group, May 2005)

282

Term	Definition
Business Service [top]	An activity that provides value to its consumers through the enactment of a defined business process. In the context of the BRM, business services represent the business capabilities of the BRM within an agency context, enacted through business processes and service components that are orchestrated and created by government agencies. Provision of a particular business service may involve activities performed through one or more government agencies, and may include external service providers on behalf of a government agency. A complex business service may include other discrete business services in its mix of activities and business processes.
Categorisation [top]	The process of associating something with a category within a categorisation scheme. (DRM Usage)
Categorisation Scheme [top]	A group of categories that are related in some manner and that may be used for purposes of categorisation. Categorisation schemes may be less formal than classification schemes. (DRM Usage)
Category [top]	A grouping of terms that are semantically or statistically associated but which do not constitute a strict hierarchy based on genus/species, parent/child or part/whole relationships. (ANSI/NISO Z39.19-200x)
Class [top]	A description of a set of objects that share the same attributes, operations, methods, relationships and semantics. (ISO/IEC 11179-3) Classes are the 'blueprints' for objects. A class wraps attributes (data) and behaviours (methods or functions) into a single distinct entity. Objects are instances of classes. (Practical UML: A Hands-On Introduction for Developers)
Class Diagram [top]	A UML diagram that shows a collection of declarative (static) UML model elements such as classes and types, with their contents and relationships. (OMG Terms and Acronyms) A class diagram gives an overview of a system by showing its classes and the relationships among them. Class diagrams are static - they display what interacts but not what happens when they do interact. (Practical UML: A Hands-On Introduction for Developers)
Class Model [top]	The process of associating something with a category within a classification scheme. (DRM Usage)
Classification [top]	The process of associating something with a category within a classification scheme. (DRM Usage)
Classification Scheme [top]	A method of organisation according to a set of pre-established principles, usually characterised by a notation system and a hierarchical structure of relationships among the nodes. (ANSI/NISO Z39.19-200x)
Collection [top]	An aggregation of information resources used to support a major business function. In each of these collections data is created, retrieved, updated and deleted. (DRM usage)

283

Term	Definition
Common Entities **[top]**	A desired product of data entity harmonisation in which the semantics and characteristics of data artefacts (elements) are compared across a Community of Interest (COI), an LoB or government-wide to reach some level of consensus (DRM usage). Examples might include Person, Organisation, Location, or Terrorist. This concept is sometimes called 'entities of interest' in certain communities.
Common Gateway Interface (CGI) **[top]**	A standard, language-neutral web technology that enables a client web browser to request data from a program executed on the web server. CGI, invented in 1993 by NCSA, specifies a standard for passing data between the client and the program.
Communities of Practice (COPs) or Communities of Interest (COIs) **[top]**	Collaborative groups of users who require a shared vocabulary to exchange information in pursuit of common goals, interests and business objectives. Within the context of the DRM they may include LoBs within the government and external organisations that are dedicated to the support of business functions.
Common Query Language (CQL) **[top]**	A formal language for representing queries to information retrieval systems such as web indexes, bibliographic catalogues and museum collection information. (CQL home page)
Concept **[top]**	A unit of thought, formed by mentally combining some or all of the characteristics of a concrete or abstract, real or imaginary object. Concepts exist in the mind as abstract entities independent of terms used to express them. (ANSI/NISO Z39.19-200x)
Conceptual Data Model **[top]**	A data model that represents an abstract view of the real world. (ISO/IEC 11179-3) A higher-level data artefact that is often used to explore domain concepts with project stakeholders. Logical data models are often derived from conceptual data models. At this level, the data modeller attempts to identify the highest-level relationships among the different entities. (More: Conceptual, Logical and Physical Data Models)
Confidentiality **[top]**	International Organisation for Standardisation (ISO) defines the term as "ensuring that information is accessible only to those authorised to have access" and is one of the cornerstones of information security. Confidentiality is one of the design goals for many crypto-systems, made possible in practice by the techniques of modern cryptography. Security defines the methods of protecting information and information systems from unauthorised access, use, disclosure, disruption, modification or destruction in order to provide confidentiality, integrity and availability, whether in storage or in transit. (DRM usage)
Consumer **[top]**	An entity (person or organisation) that consumes data that is supplied by a Supplier. (DRM usage)

Term	Definition
Context [top]	As related to data, 'context' can describe the perspective, significance, connotation and/or environment of data assets. Context is the relationship of data assets to other concepts that aid in their discovery, use and comprehension. See Data Context (DRM Usage) Enables the intended meaning of data to be more clearly known. This is often done through categorisation of data. Such categorisation also facilitates the discovery of data. (Context also includes business rules which will be covered in a later version of the DRM.)
Context Artefact [top]	An example of a Context Artefact is a Taxonomy.
Context Item [top]	A set of terms or phrases that are organised in lists, tree structures or networked relationships.
Controlled Vocabulary [top]	A list of terms that have been enumerated explicitly. This list is controlled by and is available from a controlled vocabulary registration authority. All terms in a controlled vocabulary must have an unambiguous, non-redundant definition. NOTE: This is a design goal that may not be true in practice; it depends on how strict the controlled vocabulary registration authority is regarding registration of terms into a controlled vocabulary. At a minimum, the following two rules should be enforced: 1. If the same term is commonly used to mean different concepts in different contexts, then its name is explicitly qualified to resolve this ambiguity. 2. If multiple terms are used to mean the same thing, one of the terms is identified as the preferred term in the controlled vocabulary and the other terms are listed as synonyms or aliases. (ANSI/NISO Z39.19-200x)
Controlled Vocabulary Registration Authority [top]	An entity that controls and makes available the set of terms within a controlled vocabulary.
CRUD [top]	Database operations Create, Read, Update, and Delete.
Data [top]	A value, or set of values, representing a specific concept or concepts. Data becomes 'information' when analysed and possibly combined with other data in order to extract meaning and to provide context. The meaning of data can vary according to its context. (DRM usage) Information in a specific physical representation, usually a sequence of symbols that have meaning; especially a representation of information that can be processed or produced by a computer. (RFC2828, Internet Security Glossary) A re-interpretable representation of information in a formalised manner suitable for communication, interpretation or processing. (ISO/IEC 11179-3) A representation of facts, concepts or instructions in a formalised manner, suitable for communication, interpretation or processing by humans or by automatic means. (ISO/IEC 2382-4 as per ISO/IEC 11179-1)
Data Access [top]	Requests for data services, such as a query of a Data Asset. (DRM usage) See Query and Query Point.

Term	Definition
Data Architecture [top]	Defines how data is stored, managed and used in a system. It describes how data is persistently stored, how components and processes reference and manipulate this data, how external/legacy systems access the data, interfaces to data managed by external/legacy systems and implementation of common data operations. Data architecture establishes common guidelines for data operations that make it possible to predict, model, gauge and control the flow of data in the system. (Carnegie Mellon Software Engineering Institute)
Data Artefact [top]	A collective term for electronic artefacts related to the presentation, description, representation or storage of data. Examples are documents and XML Schemas.
Data Asset [top]	A managed container for data; examples include a relational database, website, document repository, directory or data service. (DRM usage)
Data Context [top]	Any information that provides additional meaning to data. Data Context typically specifies a designation or description of the application environment or discipline in which data is applied or from which it originates. It provides perspective, significance and connotation to data and is vital to the discovery, use and comprehension of data. See Context. (DRM usage)
Data Context Standardisation Area [top]	One of the three main parts of the DRM Abstract Model. The Data Context standardisation area facilitates discovery of data through an approach to the categorisation of data according to taxonomies and provides linkages to the other AGA reference models. (DRM usage)
Data Description Standardisation Area [top]	One of the three main parts of the DRM Abstract Model. The Data Description standardisation area provides a means to richly describe data, thereby supporting its discovery and sharing. (DRM usage)
Data Dictionary [top]	A database used for data that refers to the use and structure of other data, i.e. a database for the storage of metadata. [ANSI X3.172-1990] See also data element dictionary. (ISO/IEC 11179-1)
Data Discovery [top]	The process of discovering data that exists within a data asset. (DRM usage) Locating a resource on the enterprise, using a process (such as a search engine) to obtain knowledge of information content or services that exploit metadata descriptions of enterprise IT resources stored in Directories, Registries and Catalogues. (DDMS)
Data Element Definition [top]	A textual phrase or sentence associated with a data element within a data dictionary that describes the data element, gives the data element a specific meaning and differentiates the data element from other data elements. A good definition is precise, concise, non-circular and unambiguous. Definitions should not refer to terms or concepts that might be misinterpreted by others or that have different meanings based on the context of a situation. Definitions should not contain acronyms that are not clearly defined or linked to other precise definitions. Standards such as the ISO/IEC 11179 - Metadata Registry specification also give guidelines for creating precise data element definitions.
Data Element Dictionary [top]	An information resource that lists and defines all relevant data elements. (ISO/IEC 11179-1)

286

Term	Definition
Data Element Registry **[top]**	An information resource kept by a registration authority that describes the meaning and representational form of data elements, including registration identifiers, definitions, names, value domains, metadata and administrative attributes, etc. See also Register. (ISO/IEC 11179-1)
Data Entity **[top]**	An entity that describes data.
Data Exchange **[top]**	Fixed, recurring transactions between parties, such as the regular exchange of environment testing data among federal, state and local entities. (DRM usage)
Data Harmonisation **[top]**	The process of comparing two or more data entity definitions and identifying commonalities among them that warrant their being combined (harmonised) into a single data entity.
Data Integrity **[top]**	The property that data has not been changed, destroyed or lost in an unauthorised or accidental manner. (RFC2828, Internet Security Glossary)
Data Management **[top]**	Principles, processes and systems for the sharing and management of data. (CMMI V1.1)
Data Model **[top]**	A representation of the information required to support the operation of any set of business processes and/or the systems used to automate them. (DRM usage) A description of the organisation of data in a manner that reflects an information structure. (ISO/IEC 11179-1) A graphical and/or lexical representation of data, specifying its properties, structure and inter-relationships. (ISO/IEC 11179-3) A model that describes in an abstract way how data is represented in a business organisation, an information system or a database management system.
Data Object **[top]**	An aggregation of data that represents discrete information about a subject area. (DRM usage)
Data Reference Model (DRM) **[top]**	One of the five reference models of the Australian Government Architecture (AGA). The DRM is a framework whose primary purpose is to enable information sharing and re-use across the federal government via the standard description and discovery of common data and the promotion of uniform data management practices.
Data Registry **[top]**	An information system that manages and maintains metadata about data and data-related items, such as digital data resources and data assets. A data registry is often paired with a repository. (DRM usage)
Data Repository **[top]**	A central place where data is stored and maintained. A repository can be a place where multiple databases or files are located for distribution over a network, or a repository can be a location that is directly accessible to the user without having to travel across a network.
Data Representation **[top]**	Describes how data is described within the property and object layers. (DRM usage)

287

Term	Definition
Data Schema [top]	A representation of metadata, often in the form of data artefacts such as logical data models or conceptual data models. The Data Schema concept group is comprised of those concepts pertaining to the representation of structured data. (DRM usage)
Data Service [top]	An automated process that provides a related and well described set of data-related functions to other applications, systems and processes or to the end user. Data services can be invoked through query points which identify the service and its location in a web environment; or by a platform-neutral service (such as a web service) that provides access to data assets. (DRM usage)
Data Sharing Standardisation Area [top]	One of the three main parts of the DRM Abstract Model. Describes the sharing and exchange of data, where sharing may consist of ad-hoc requests (such as a one-time query of a particular data asset), scheduled queries, and/or exchanges characterised by fixed, recurring transactions between parties. Data sharing is enabled by capabilities provided by both the Data Context and Data Description standardisation areas. Data sharing involves exchanges within and between agencies and COIs to support mission-critical capabilities. These COIs may include international, state and local governments. Data sharing eliminates duplication and/or replication of data, thereby increasing data quality and integrity. (DRM usage)
Data Steward [top]	Person or organisation delegated the responsibility for managing a specific set of data resources. (ISO/IEC 11179-1)
Data Stewardship [top]	Identifying, defining, specifying, sourcing and standardising data assets across all business areas within a specific business subject area consisting of some set of entity types, e.g. person.
Data Supplier-to-Consumer Matrix [top]	Presents a planning matrix to describe Data Sharing services that should be considered in meeting an agency's or COI's information sharing requirements; comprised of four quadrants: transactional databases, analytical databases, authoring systems repositories and document repositories. (DRM usage)
Data Type (or Datatype) [top]	A constraint on the type of data that an instance of an Attribute may hold (e.g. 'date', 'string', 'float' or 'integer'); defines the kind of data that can be stored in a variable or data element. (DRM usage)

The format used for the collection of letters, digits and/or symbols to depict values of a data element, determined by the operations that may be performed on the data element. (ISO/IEC 11179-1) |
| Digital Data Resource [top] | A digital container of information, typically known as a file; may be a structured, semi-structured or unstructured data resource (DRM usage). The difference between a Document and a Digital Data Resource is that a Digital Data Resource can contain structured data, whereas a Document cannot. See also Document. |

288

Term	Definition
Digital Rights Management (DRM) **[top]**	An umbrella term referring to any of several technical methods used to control or restrict the use of digital media content on electronic devices with such technologies installed. The media most often restricted by DRM techniques include music, visual artwork, computer and video games, and movies. Because the 'rights', actually technical capabilities, that a content owner grants are not the same as the legal rights of a content consumer, DRM critics argue that the phrase 'digital rights management' is a misnomer and the term 'digital restrictions management' is a more accurate characterisation of the functionality of DRM systems. Note: This should not be confused with the Data Reference Model of the AGA (also known as the DRM).
Directory **[top]**	An entity in a file system which contains a group of files and other directories. In Microsoft Windows a directory is called a 'folder'.
Document **[top]**	A file containing Unstructured and/or Semi-Structured Data Resources. A discrete and unique electronic aggregation of data produced with the intent of conveying information. All data within a document may be in the same format, e.g. text, or a document may be a composite that consists of sets of data in a variety of formats, e.g. MS Word files containing embedded graphics. The term 'discrete' implies that a document requires no linkage to other data to convey its meaning. The term 'unique' implies that each instance or version of a document can be distinguished from all others, i.e. it can be assigned a unique identifying number. Documents may be unstructured, meaning that the document follows no rigid, machine-interpretable structural convention or it may contain self describing metadata that is machine-interpretable. For example, an ASCII document is unstructured. Alternatively, documents may be semi-structured, meaning that they conform to a machine-interpretable structural convention or contain embedded self-describing metadata that is machine-interpretable. A Microsoft Word document with headings and sub-headings is considered semi-structured, as is an XHTML document. (DRM usage) See also Digital Data Resource.
Document Metadata **[top]**	Describes an electronic document as well as the data required to file and retrieve it. It includes information fields such as To, From, Date, Subject, Document Type, Format, Location, Record Number, Version Number, File Tag and Originating Organisation. XML is the preferred format for storing document metadata. Examples of document metadata include MS Office document 'Properties' or 'meta' tags in HTML/XHTML. MS Office Properties include: Title, Subject, Author, Date Modified, etc. For comparison, the AGLS metadata elements are Creator, Date, Title, Availability, Function, Resource, Publisher, Subject, Audience, Contributor, Coverage, Description, Format, Language, Mandate, Relation, Rights, Source and Type. (DRM Usage)
Document Repository **[top]**	A data asset whose primary role is the storage and maintenance of documents.
Document Type Definition (DTD) **[top]**	A set of declarations that conform to a particular mark-up syntax and that describe a class, or 'type', of SGML, HTML or XML documents, in terms of constraints on the structure of those documents. In a DTD, the structure of a class of documents is described via element and attribute-list declarations.

289

Term	Definition
DRM **[top]**	See Data Reference Model. Also see Digital Rights Management.
e-Government Strategy, 2006 **[top]**	Published in March 2006 by the Australian Government Information Management Office (AGIMO), the 2006 e-Government Strategy documents a strategy to 'deliver a more co-ordinated and citizen-driven focus to the government's e-government initiatives' (http://www.finance.gov.au/e-government/index.html).
Electronic Data Interchange (EDI) **[top]**	A standard format for exchanging business data. The North American standard for EDI is called ANSI X12. (TechTarget.com) Computer-to-computer exchange of structured information, by agreed message standards, from one computer application to another by electronic means and with a minimum of human intervention. EDI is still the data format used by the vast majority of electronic commerce transactions in the world.
Enterprise Architecture (EA) **[top]**	The explicit description and documentation of the current and desired relationships among business and management processes and information technology. An EA describes the 'current architecture' and 'target architecture' to include the rules and standards and systems life cycle information to optimise and maintain the environment which the agency wishes to create and maintain by managing its ICT portfolio. The EA must also provide a strategy that will enable the agency to support its current state and also act as the roadmap for transition to its target environment. These transition processes will include an agency's capital planning and investment control processes, agency EA planning processes and agency systems life cycle methodologies.
Enterprise Business Architecture (EBA) **[top]**	Defines and describes the business aspects of the EA in terms of the current and target business environments. The business aspects include the people (internal and external resources directly involved in or impacting on the business), the organisational structure (formal and informal structures and social networks), the financial factors (budget funding, debts, investments), and process (management, operational, support, business solutions, metaprocesses). EBA includes business strategies for transition from the current business environment to the target business environment.
Entity **[top]**	An abstraction for a person, place, object, event or concept described (or characterised) by common Attributes. (DRM usage) Any concrete or abstract thing that exists, did exist or might exist, including associations among these things. (ISO/IEC 11179-3)
Entity of Interest **[top]**	An abstraction for a person, place, object, event or concept described (or characterised) by common Attributes that is central to the information sharing requirements of a COI. (DRM Usage)
E-R (Entity-Relationship) Diagram (ERD) **[top]**	A data modelling technique that creates a graphical representation of the entities and the relationships between entities, within an information system. It also includes cardinality.
E-R (Entity-Relationship) Model **[top]**	A way of graphically representing the logical relationships of entities (or objects) in order to create a database.

290

Term	Definition
Exchange Package [top]	A description of a specific recurring data exchange between a Supplier and a Consumer. An Exchange Package contains information (metadata) relating to the exchange (such as Supplier ID, Consumer ID, validity period for data, etc.), as well as a reference to the Payload (message content) for the exchange. An Exchange Package can also be used to define the result format for a query that is accepted and processed by a Query Point in a data sharing scenario. (DRM usage)
Extract, Transform, Load (ETL) [top]	The process of reading structured data objects from a data source (the extract), changing the format of the data objects to match the structure required by a target database (transform) and updating the target database with the transferred data objects (load).
FEA Reference Model [top]	A series of interrelated taxonomies that comprise the FEA and that are designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across Federal Agencies. (http://www.whitehouse.gov/omb/e-gov/fea) The Australian Government Architecture (AGA) Reference Models are heavily based on the US FEA reference models.
Federal Enterprise Architecture (FEA) [top]	A business-based framework for US government-wide improvement developed by the US Office of Management and Budget (OMB). (http://www.whitehouse.gov/omb/e-gov/fea)
Federated Registries [top]	Registries may be federated in order to enable their contents to be shared amongst other registries, causing them to appear to a user and to automated processes (such as queries) as a single registry.
Formal Classification [top]	Classification that involves formal relationships between topics and includes specific rules or constraints for those relationships.
Geospatial [top]	Pertaining to the geographic location and characteristics of natural or constructed features and boundaries on, above or below the earth's surface. Especially referring to data that is geographic and spatial in nature. (http://dictionary.reference.com/)
Harmonisation [top]	Act of bringing or coming to agreement or harmony. (http://dictionary.reference.com/)
Hierarchy [top]	Broader (generic) to narrower (specific) or whole-part relationships which are generally indicated in a controlled vocabulary through codes or indentation. (ANSI/NISO Z39.19-200x)
HTTP (HyperText Transfer Protocol) [top]	The primary method used to convey information on the World Wide Web. HTTP is a request/response protocol between clients and servers.
HTTP GET [top]	The most common method used to request a specified URL. When a user clicks on most web links (other than web forms), they are causing their browser to issue an HTTP GET request for a particular page or resource from a web server.

291

Term	Definition
HyperText Markup Language (HTML) **[top]**	A markup language designed for the creation of web pages and other information viewable in a browser. HTML is used to structure information, denoting certain text as headings, paragraphs, lists and so on, and can be used to define the semantics of a document. Originally defined by Tim Berners-Lee and further developed by the IETF with a simplified SGML syntax, HTML is now an international standard. (ISO/IEC 15445:2000) Later HTML specifications are maintained by the World Wide Web Consortium (W3C).
Informal Classification **[top]**	Classification in which there may or may not be specific types of topics and the topics that are defined may or may not have formally defined relationships. Many websites and search utilities offer a basic classification that may be considered informal classification.
ISO/IEC 11179 **[top]**	A standard for representing metadata for an organisation in a metadata registry. The specification is formally known as the ISO/IEC 11179 Metadata Registry Standard and consists of six sections: Part 1 - Framework, Part 2: Conceptual Schema, Part 3: Registry Metamodel and Basic Attributes, Part 4: Formulation of Data Definitions, Part 5: Naming and Identification Principals and Part 6: Registration. The specification defines how data elements are classified, specified, defined, named and registered.
Lightweight Directory Access Protocol (LDAP) **[top]**	In computer networking, LDAP is a standardised networking protocol designed for querying and modifying directory services. LDAP defines a relatively simple protocol for updating and searching directories running over TCP/IP. No specific type of directory is an 'LDAP directory'. One could reasonably use the term to describe any directory accessible using LDAP and which can identify objects in the directory with X.500 identifiers. LDAP directory entries feature a hierarchical structure that reflects political, geographic and/or organisational boundaries, usually with DNS names at the top level.
Lines of Businesses (LoBs) **[top]**	The middle level of functional category in the BRM taxonomy relating to major government business functions within each business area. Each LoB is comprised of a collection of business capabilities. Forty LoBs are identified in the BRM across four business areas. Of these, 25 are externally-focussed, found in the Services for Citizens Business Area to describe the purpose of government in functional terms. The remaining 15 are internally-focussed LoBs that describe avenues for provision of government services and support functions conducted by the government in order to effectively and efficiently provide services for citizens. Refer to 'BRM Line of Business' for further detail.
List **[top]**	A limited set of terms arranged as a simple alphabetical list or in some other logically evident way; the simplest type of controlled vocabularies.
Logical Data Model **[top]**	Describes the same data as a conceptual data model but as structured in an information system. It is often referred to as a Model of the Information System. A logical data model can be directly used for database design. (ISO/IEC 11179-3) A graphical representation of the information requirements of a business area, it is not a database. (More: Barbara A Carkenord, The Knowledge Exchange Company, "Why Build a Logical Data Model", Embarcadero Technologies Inc, At this level, the data modeller attempts to describe the data in as much detail as possible, without regard to how they will be physically implemented in the database.

292

Term	Definition
Management Context **[top]**	A data artefact that represents the concepts (entities) that are specific to a domain, their attributes and the relationships between the concepts. Logical data models may also contain data types for attributes.
Metadata **[top]**	A number of characteristics or attributes of data are defined, i.e. 'data that describes data' (ISO/IEC 11179-3).
	For any particular datum, the metadata may describe how the datum is represented, ranges of acceptable values, its relationship to other data and how it should be labelled. Metadata may also provide other relevant information, such as the responsible steward, associated laws and regulations, and access management policy. Each of the types of data described above has a corresponding set of metadata. Two of the many metadata standards are the National Archives of Australia's AGLS Metadata Set and the US Department of Defense Discovery Metadata Standard (DDMS). The metadata for structured data objects describes the structure, data elements, inter-relationships and other characteristics of information, including its creation, disposition, access and handling controls, formats, content, and context, as well as related audit trails. Metadata includes data element names (such as Organisation Name, Address, etc.), their definition and their format (numeric, date, text, etc.). Metadata may include metrics about an organisation's data including its data quality (accuracy, completeness, etc.). (DRM usage)
Metadata Registry **[top]**	An information system for registering metadata (ISO/IEC 11179). A metadata registry provides a shared understanding about the metadata that describes a data object. (DRM usage)
Metamodel **[top]**	A structure used to create models. For example, an XML Schema defines how to create XML vocabularies and structure XML data. In relational terms, data definition language (DDL) is used to generate (one or more) database schema (made up of related database tables) from which data can be entered. A data model that specifies one or more other data models. (More: ISO/IEC 11179-3)
Narrower Term **[top]**	A term that is subordinate to another term or to multiple terms in a hierarchy. In thesauruses, the relationship indicator for this type of term is NT. (More: ANSI/NISO Z39.19-200x)
Node **[top]**	A specific concept or term in a taxonomy, thesaurus, classification scheme or categorisation scheme. (DRM Usage)
Node Relationship **[top]**	A semantic relationship (e.g. narrower-term) between nodes. (DRM Usage)
Object **[top]**	Anything perceivable or conceivable.
	Note: Objects may also be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. a conversion ratio, a project plan) or imagined (e.g. a unicorn). (More: ISO/IEC 11179-3)
Office of Management and Budget (OMB) **[top]**	The United States Office of Management and Budget is a body within the Executive Office of the President of the United States which is tasked with coordinating United States Federal agencies. It is a senior management team of the White House. The OMB performs this coordination by gathering and filtering budget requests, by issuing circulars dictating agency management practices and by reviewing agency regulations. (More: http://www.whitehouse.gov)

Term	Definition
Object Management Group (OMG) **[top]**	A consortium that sets standards in object-oriented programming as well as system modelling. The OMG created the Common Object Request Broker Architecture (CORBA) standard in 1991 and, more recently, the standard for Unified Modelling Language (UML) and the related technologies of Meta-Object Facility (MOF) and XML Metadata Interchange (XMI). It has further expanded into Model Driven Architecture (MDA). (More: http://www.omg.org)
On-Line Analytical Processing (OLAP) **[top]**	An approach to quickly provide the answer to complex analytical queries, providing the ability to analyse metrics in different dimensions such as time, geography, gender, product, etc. The OLAP Report has proposed the FASMI test, Fast Analysis of Shared Multidimensional Information.
On-Line Transaction Processing (OLTP) **[top]**	A form of transaction processing conducted via computer network. Some applications of OLTP include: electronic banking; order processing; employee time clock systems; e-commerce; and e-trading. In large applications, efficient OLTP may depend on sophisticated transaction management software and/or database optimisation tactics to facilitate the processing of large numbers of concurrent updates. OLTP is often integrated into service-oriented architecture and web services.
Ontology **[top]**	A controlled vocabulary expressed in a representation language that has a grammar for using vocabulary terms to express something meaningful within a specified domain of interest. The grammar contains formal constraints (e.g. specifies what it means to be a well-formed statement, assertion, query, etc.) on how terms in the ontology's controlled vocabulary can be used together. (ANSI/NISO Z39.19-200x)
OWL (Web Ontology Language) **[top]**	A markup language for publishing and sharing data using ontologies on the internet and a vocabulary extension of RDF. Together with RDF and other components, these tools make up the Semantic Web project. (More: W3C)
Payload **[top]**	The set of data objects which a data service exchanges during a transaction; the message content. (DRM usage)
Payload Definition **[top]**	An electronic definition that defines the requirements for the Payload (data) that is exchanged between a Supplier and a Consumer. Examples include XML Schema and EDI transactions.
Performance Reference Model (PRM) **[top]**	One of the five AGA reference models. The PRM is a framework for performance measurement providing common output measurements throughout the Australian Government.
Physical Data Model **[top]**	A representation of a data design which takes into account the facilities and constraints of a given database management system. It is typically derived from the Logical Data Model and may include all the database artefacts required to create relationships between tables or achieve performance goals, such as indexes, constraint definitions, linking tables, partitioned tables or clusters. At this level, the data modeller specifies how the logical data model will be realised in the database schema. (Conceptual, Logical, and Physical Data Models)
Polyhierarchy **[top]**	Networked relationships where each item may be related to one or more other items without the direct notion of a parent-child pair.

294

Term	Definition
Preferred Term **[top]**	One of two or more synonyms or lexical variants selected as a term for inclusion in a controlled vocabulary. (ANSI/NISO Z39.19-200x)
Privacy **[top]**	Addresses the acceptable collection, storage, use, disclosure and accuracy of information. Requirements are enshrined in the Australian Government *Privacy Act 1988* (Cth).
PRM **[top]**	See Performance Reference Model.
Query **[top]**	An instruction given to access a Data Asset; a request issued to receive data. A Query may be ad hoc when it is issued as an isolated access to a Data Asset (e.g. a one-time database query) or a Query may be part of a pre-planned, methodical operation, in which case it is recurring and often scheduled. (DRM usage)
Query Point **[top]**	An endpoint that provides an interface for accessing and querying a Data Asset. A concrete representation of a Query Point may be a specific URL at which a query Web Service may be invoked. (DRM usage) See Exchange Package.
Recreation Markup Language (RecML) **[top]**	An XML vocabulary that defines terms for: recreation areas (parks); facilities (trails, campgrounds, etc.); activities (hiking, wildlife viewing, etc.); alerts (temporary closures); events and similar recreation elements. RecML is a voluntary data sharing specification for recreation information developed by a US COI, namely the recreation community, including the private sector and government organisations at the federal, tribal, state, and local levels. (More: http://www.recreation.gov)
Recreation One-Stop **[top]**	A United States of America citizen-focused eGovernment Initiative managed by the US Department of the Interior with two main goals: (1) customer-friendly recreation portal (Recreation.gov) with information for planning visits to Federal recreation sites and making campground/tour reservations; and (2) consistent information about Federal recreation areas via different channels (databases, websites and publications), by standardising data and interfacing recreation-related computer systems. (More: http://www.whitehouse.gov/omb/egov)
Reference Models **[top]**	A structure which allows the modules and interfaces of a system to be described in a consistent manner. An abstract framework for understanding significant relationships among the entities of some environment and for the development of consistent standards or specifications supporting that environment. A reference model is based on a small number of unifying concepts and may be used as a basis for education and explaining standards to a non-specialist. A reference model is not directly tied to any standards, technologies or other concrete implementation details but it does seek to provide common semantics that can be used unambiguously across and between different implementations. (The Australian Government Architecture Framework is defined in terms of reference models)
Register **[top]**	A set of files (paper, electronic or a combination) containing the assigned data elements and the associated information. See also Data Element Registry. (ISO/IEC 11179-1)

295

Term	Definition
Registration **[top]**	The assignment of an unambiguous identifier to a data element in a way that makes the metadata about those data elements available to interested parties. (ISO/IEC 11179-1)
Related Term **[top]**	A term that is associatively but not hierarchically linked to another term in a controlled vocabulary. In thesauruses, the relationship indicator for this type of term is RT. (ANSI/NISO Z39.19-200x)
Relationship **[top]**	Association between two entities in an ERD. Each end of the relationship shows the degree of how the entities are related and the optionality. (Oracle FAQ at http://www.oracle.com)
Resource Description Framework (RDF) **[top]**	A family of specifications for a metadata model. The RDF family of specifications is maintained by the World Wide Web Consortium (W3C). The RDF metadata model is based upon the idea of making statements about resources in the form of a subject-predicate-object expression and is a major component in what is proposed by the W3C's Semantic Web activity: an evolutionary stage of the World Wide Web in which automated software can store, exchange and utilise metadata about the vast resources of the Web, in turn enabling users to deal with those resources with greater efficiency and certainty. RDF's simple data model and ability to model disparate, abstract concepts has also led to its increasing use in knowledge management applications unrelated to Semantic Web activity.
Result Set **[top]**	A Query Point provides the result set for an Exchange Package. (DRM usage) In SQL, a result set is a set of rows from a database, as well as meta-information about the query such as number of results returned and the column names. More generally, it is the data returned by any type of query (search).
Schema **[top]**	The structure of a data set, database, Exchange Package, etc. See also XML Schema.
Security **[top]**	The methods of protecting information and information systems from unauthorised access, use, disclosure, disruption, modification or destruction in order to provide integrity, confidentiality and availability, whether in storage or in transit. (DRM usage) A condition that results from the establishment and maintenance of protective measures that ensures a state of inviolability from hostile acts or influences. With respect to classified matter, the condition that prevents unauthorised persons from having access to official information that is safeguarded in the interests of national security. Measures taken by a military unit, an activity or installation to protect itself against all acts designed to, or which may, impair its effectiveness.
Semantic Linking **[top]**	A method of linking terms according to their meaning or meanings. (ANSI/NISO Z39.19-200x)

296

Term	Definition
Semantic Web **[top]**	A representation in two (or possibly three) dimensions of the semantic relationships between and among terms and the concepts they represent. (ANSI/NISO Z39.19-200x)
	The Semantic Web provides a common framework that allows data to be shared and re-used across application, enterprise and community boundaries. It is a collaborative effort led by W3C with participation from a large number of researchers and industrial partners. It is based on the Resource Description Framework (RDF), which integrates a variety of applications using XML for syntax and URIs for naming. (W3 Semantic Web home page)
	It refers to a suite of technologies that aim to enhance the performance of the Internet for the functions of businesses, organisations and individuals by increasing capabilities to interpret and determine meaning in web-based data and information.
Semi-Structured Data (Resource) **[top]**	Data that has characteristics of both structured and unstructured data, such as an e-mail (with structured data such as sender and subject, and unstructured text). (DRM usage)
	Semi-structured data is the term database theorists use to denote data that exhibits any of the following characteristics: numerous repeating fields and structures in a naive hierarchical representation of the data, which lead to large numbers of tables in a second- or third-normal form representation; wide variation in structure; and/or sparse tables. (C. M. Sperberg-McQueen) (More: series of ACM Queue articles.)
Service Oriented Architecture (SOA) **[top]**	Expresses a software architectural concept that defines the use of services to support the requirements of business. In an SOA environment, nodes on a network make resources available to other participants in the network as independent services that the participants access in a standardised way. Most definitions of SOA identify the use of web services (using SOAP and WSDL) in its implementation. However, one can implement SOA using any service-based technology with loose coupling among interacting software agents.
Service Reference Model (SRM) **[top]**	A business and performance-driven, functional framework that classifies Service Components with respect to how they support business and/or performance objectives. The SRM is intended for use to support the discovery of government-wide business and application Service Components in ICT investments and assets. The SRM is structured across horizontal and vertical service domains that, independent of the business functions, can provide a leverage-able foundation to support the re-use of applications, application capabilities, components and business services. Service domains include: Customer Services, Process Automation Services, Business Management Services, Digital Asset Services, Business Analytical Services, Back Office Services, and Support Services (http://www.finance.gov.au/e-government/index.html).

297

Term	Definition
SQL-92 **[top]**	SQL is a database sublanguage that is used for accessing relational databases. The proper pronunciation is 'ess cue ell', and not 'sequel' as is commonly heard. SQL-92 was designed to be a standard for relational database management systems (RDBMSs) developed by the ANSI X3H2 committee. SQL-92 does not address objects in any way. Nevertheless, SQL-92 forms the basis for JDBC and other specifications. Depending on the source, 'SQL' stands for SQL Query Language (recursive expansion) or Structured Query Language.
SRM **[top]**	See Service Reference Model.
Standardisation Area **[top]**	The three aspects of data that the DRM addresses, namely Data Description, Data Context and Data Sharing. The DRM's standardisation areas provide a foundation for agency data architecture initiatives to put forth requirements that can result in increased compatibility between agency data architectures. (DRM usage)
Structured Data Object **[top]**	An entity within a data store. These entities, in turn, contain attributes that describe the object. Such objects rely on the structure and relationships defined in the data store to assign their meaning. Databases are examples of collections of structured data objects. (DRM usage)
Structured Data (Resource) **[top]**	Data described via the E-R (Entity-Relationship) or class model, such as logical data models and XML documents. Structured data is organised in well-defined semantic 'chunks' called entities. (DRM usage)
Subject Area **[top]**	A topic of interest shared within a community. The full list of subject areas of interest to a community form the context for that community. A super type is a subject area that spans multiple COIs. (DRM usage)
Supplier **[top]**	An entity (person or organisation) that supplies data to a Consumer. Note that the Supplier may or may not be the original producer of the data. For this reason the name 'Producer' was not used. (DRM usage)
Synonym **[top]**	A word or term having exactly or very nearly the same meaning as another word or term. (ANSI/NISO Z39.19-200x)
Synonym Ring **[top]**	A group of terms that are considered equivalent for the purposes of retrieval. (ANSI/NISO Z39.19-200x)
Target Architecture **[top]**	The set of products that portrays the future or end-state enterprise, generally captured in the organisation's strategic thinking and plans; commonly referred to as the 'To-Be' architecture.
Taxonomy **[top]**	A collection of controlled vocabulary terms organised into a hierarchical structure. Each term in a taxonomy is in one or more parent/child (broader/narrower) relationships to other terms in the taxonomy. There can be different types of parent/child relationships in a taxonomy (e.g. whole/part, genus/species, type/instance), but good practice limits all parent-child relationships to a single parent to be of the same type. Some taxonomies allow poly-hierarchy, which means that a term can have multiple parents and, although the term appears in multiple places, it is the same term. If the parent term has children in one place in a taxonomy, then it has the same children in every other place where it appears. (ANSI/NISO Z39.19-200x)

Term	Definition
Technical Reference Model (TRM) [top]	A component-driven, technical framework used to categorise the standards, specifications and technologies that support and enable the delivery of service components and capabilities. The TRM provides a foundation to categorise the standards, specifications and technologies to support the construction, delivery and exchange of business and application components (Service Components) that may be used and leveraged in a Component-Based or Service-Oriented Architecture. The TRM unifies existing Agency TRMs and E-Gov guidance by providing a foundation to advance the re-use of technology and component services from a government-wide perspective. Service areas include: Service Access and Delivery, Service Platform and Infrastructure, Component Framework, and Service Interface and Integration (http://www.finance.gov.au/e-government/index.html).
Term [top]	One or more words designating a concept. (ANSI/NISO Z39.19-200x)
Term Record	A collection of information associated with a term in a controlled vocabulary, including the history of the term, its relationships to other terms and, optionally, authorities for the term. (ANSI/NISO Z39.19-200x)
Thesaurus [top]	A networked collection of controlled vocabulary terms. A thesaurus uses equivalence (synonym), hierarchical (broader/narrower) and associative relationships. The expressiveness of the associative relationships in a thesaurus varies and can be as simple as 'related to term', as in 'term A is related to term B'. (ANSI/NISO Z39.19-200x)
Topic [top]	A category within a Taxonomy. A Topic is the central concept for applying context to data. For example, an agency may have a Taxonomy that represents its organisational structure. In such a Taxonomy, each role in the organisational structure (e.g. CIO) represents a Topic. Topic is often synonymous with Node. (DRM usage)
Top Term [top]	The broadest term in a controlled vocabulary hierarchy. (ANSI/NISO Z39.19-200x)
Transaction [top]	An exchange of information between two or more services (or an entity and a service) in the performance of an operation or function. (DRM usage)
Transactional Database [top]	A database that support transactions. A database transaction is a unit of interaction with a database management or similar system that is treated in a coherent and reliable way independent of other transactions that must be either entirely completed or aborted.
Tree Structure [top]	A controlled vocabulary display format in which the complete hierarchy of terms is shown. Each term is assigned a tree number or line number which leads from the alphabetical display to the hierarchical one; the latter is also known as systematic display or classified display. (ANSI/NISO Z39.19-200x)
TRM [top]	See Technical Reference Model.
Unified Modeling Language (UML) [top]	A non-proprietary, object modelling and specification language. As a graphical notation, UML can be used for modelling hardware (engineering systems) and is commonly used for business process modelling, systems engineering modelling, software engineering and representing organisational structure. UML was designed to be used to specify, visualise, construct and document

Term	Definition
	the artefacts of an object-oriented software-intensive system under development. It represents an integrated compilation of best engineering practices that have proven to be successful in modelling large, complex systems, especially at the architectural level. (More: OMG's UML Resource Page) See also OMG.
Unstructured Data (Resource) **[top]**	Data that is of a more free-form format, such as multimedia files, images, sound files or unstructured text. Unstructured data does not necessarily follow any format or hierarchal sequence, nor does it follow any relational rules. (DRM usage) Unstructured data refers to masses (usually) of computerised information which do not have a data structure which is easily readable by a machine. Examples of unstructured data may include audio, video and unstructured text such as the body of an e-mail or word processor document. Data mining techniques are used to find patterns in, or otherwise interpret, this information. Merrill Lynch estimates that more than 85 percent of all business information exists as unstructured data - commonly appearing in e-mails, memos, notes from call centres and support operations, news, user groups, chats, reports, letters, surveys, white papers, marketing material, research, presentations and web pages. (More: Robert Blumberg, Shaku Atre, 'The Problem with Unstructured Data'. Published Information Management Magazine, February 2003, http://www.information-management.com/issues/20030201/6287-1.html)
Vocabulary Control **[top]**	The process of organising a list of terms to: a) indicate which of two or more synonymous terms is authorised for use b) distinguish between homographs c) indicate hierarchical and associative relationships among terms in the context of a controlled vocabulary or subject heading list. (ANSI/NISO Z39.19-200x)
Web Services **[top]**	A software system designed to support interoperable machine-to-machine interaction over a network. It has an interface that is described in a machine-processable format such as WSDL. Other systems interact with the web service in a manner prescribed by its interface using messages, which may be enclosed in a SOAP envelope, or follow a REST approach. These messages are typically conveyed using HTTP, and are normally comprised of XML in conjunction with other web-related standards. (More: W3C Web Services Activity)
X.500 **[top]**	A series of computer networking standards covering electronic directory services. The X.500 series was developed in order to support the requirements of X.400 electronic mail exchange and name lookup. ISO/IEC was a partner in developing the standards, incorporating them into the Open Systems Interconnect suite of protocols, ISO/IEC 9594. X.509, the portion of the standard providing for an authentication framework, is now also widely used outside of the X.500 directory protocols for public-key certificates. Because of the complexity of the protocols, a simplified alternative known as LDAP was developed implementing only a subset of the protocols.

300

Term	Definition
eXtensible Markup Language (XML) **[top]**	Extensible Markup Language has at least two distinct meanings: (1) a set of generic syntax rules to enable the creation of specialised markup languages that follow similar conventions; and (2) an ever-growing collection of standard, de facto standard and special purpose languages based on XML syntax (e.g. XSLT, UBL, ebXML, XML Schema, XHTML, RDF, OWL, SVG, etc.). Sometimes the term 'XML' is used incorrectly when 'XML Schema' is actually intended. (More: W3C XML home page)
XML Document **[top]**	A storage unit (i.e. a file) containing XML markup and content. (DRM usage)
	A data object is an XML document if it is well-formed as defined in this specification. A well-formed XML document may, in addition, be valid if it meets certain further constraints. (XML 1.0 Recommendation, Third Edition)
XML Registries and Repositories **[top]**	An information system that securely stores XML artefacts (e.g. XML schemas, data elements, etc.) and non-XML artefacts (e.g. other e-business objects), as well as details (metadata) about the artefacts. The storage facility (e.g. a file system or database) that holds registered objects is known as a *repository*, while the part of the information system that maintains the metadata for the registered objects is known as a registry (ebXML document).
XML Schema **[top]**	Defines the vocabulary (elements and attributes), the content model (structure, element nesting and text content) and data types (value constraints) of a class of XML documents. When written with a capital 'S', the term refers specifically to the XML Schema Definition (XSD or WXS) language developed by the W3C. However, when written with a lower case 's', the meaning is more generic, referring to any of several schema languages for use with XML, such as DTDs, RELAX NG, Schematron, etc. In both cases, an XML schema is used to validate XML instances to verify that the instances conform to the model that the schema describes.
XML Path Language (XPath) **[top]**	A terse non-XML syntax for addressing portions of an XML document. A path expression is written as a sequence of steps to get from one set of nodes to another set of nodes. XPath also allows more conventional expressions, involving arithmetic and Boolean operators and a range of functions to perform string manipulation, etc.
XML Query (XQuery) **[top]**	A query language with some programming language features designed to query collections of XML data. It is semantically similar to SQL and is being developed by the XML Query working group of the W3C. The work is closely coordinated with the development of XSLT 2.0 by the XSL Working Group; the two groups share responsibility for XPath 2.0, which is a subset of XQuery 1.0. At the time of writing, XQuery is a W3C Candidate Recommendation, although dozens of implementations are available in various states of completeness. In addition to XPath addressing, it provides SQL-like FLWOR expressions based on five possible clauses: FOR, LET, WHERE, ORDER BY, RETURN.
	Note: XQuery 1.0 does not include features for updating XML documents or databases. It also lacks full text search capability. These features are both under active development for a subsequent version of the language. (More: W3C XML Query page)

301

Term	Definition
XSL Transformations (XSLT) **[top]**	A XML-based declarative language used for the transformation of XML documents. The original document is not changed; rather, a new XML document is created based on the content of the original document. The new document may be serialised (output) by the processor in standard XML syntax or in another format, such as HTML or plain text. XSLT is most often used to convert data between different XML Schemas or to convert XML data into web pages or PDF documents. It can also be used to extract portions of an XML document. (More: W3C XSL page)

Note: 'XSL' stands for Extensible Stylesheet Language, which includes XSLT, XSL-FO (XSL Formatting Objects), and XPath. |
| XSLT Stylesheets **[top]** | A transformation expressed in XSLT is called a stylesheet. A stylesheet contains a set of template rules. A template rule has two parts: a pattern which is matched against nodes in the source tree and a template which can be instantiated to form part of the result tree. This allows a stylesheet to be applicable to a wide class of documents that have similar source tree structures. (More: W3C XSLT 1.0 Recommendation). |
| Z39.50 **[top]** | National Information Standards Organisation (NISO) Z39.50 Information Retrieval Protocol (ANSI/NISO Z39.50 or ISO 23950). A computer protocol that can be implemented on any platform and defines a standard way for two computers to communicate for the purpose of information retrieval. A Z39.50 implementation enables one interface to access multiple systems providing the end-user with nearly transparent access to other systems. (NISO Z39.50 Resource Page)

Despite a common misconception to the contrary, Z39.50 is not simply used by libraries. The standard specifies a client/server-based protocol for searching and retrieving information from remote databases. (More: Z39.50 Maintenance Agency Page at the US Library of Congress) |

Notes:

1. Sources are indicated in parentheses. The phrase '(DRM usage)' denotes either a term that is unique to the DRM or that has a slightly different connotation when used in the context of the DRM.

2. Many of the context-related definitions are taken from the Z39.19-200x document, Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies. The glossary starts on page 172 of the PDF version of the document.