



Government of Sultanate of Oman



Information Technology Authority

Oman eGovernment Architecture Framework (OeGAF) Information Reference Model (IRM)

Revision History

Version	Date of Revision	Prepared / Updated By	Reviewed By	Reason for Change	Affected Sections
1.0	17 Mar 10	IDA International	OeGAF Steering Committee and Core Team	-	-
1.3	30 November 2013	Dileesh	OeGAF Project Manager	Replaced 'IT' with 'ICT'; Replaced 'Ministry of National Economy' & 'Supreme Committee for Town Planning' with 'Supreme Committee for Planning'; Replaced 'Sohar Development Office' with 'Sohar Municipality'; Replaced 'Dhofar Development Office' with 'Dhofar Municipality'; Replaced 'Ministry of Agriculture' & 'Ministry of Fisheries' with 'Ministry of Agriculture & Fisheries'	All
1.6	20 February 2014	Project Manager	OeGAF Core Team	Added architecture vision for IRM as section 2; added list of figures & tables (and	All

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				re-number figures & tables); removed technical standards into separate sections; removed current architecture and renamed target architecture to 'data hub details'; removed central initiatives; removed codes tables appendix; removed standards classification; removed IRM Checklist; added OeGAF Obsolete Technologies Compliance List	

Table of Contents

1	Overview	7
1.1	Document Purpose	7
1.2	Objectives and Benefits of IRM.....	8
1.3	Background on Oman eGovernment Architecture Framework	8
1.4	Relation to Other OeGAF Reference Models	10
1.5	Scope of Information Reference Model.....	12
1.6	Target Audience	12
1.7	Information Architecture Design Principles	14
1.8	Governance of IRM.....	15
2	Making the Most of Government Information	17
2.1	Intent.....	17
2.2	Importance of Data Sharing	17
2.3	Guide to Improve Government Information Management	18
3	Data Definition.....	24
3.1	Intent.....	24
3.2	Data Dictionary	24
3.2.1	Structured Data	26
3.2.2	Spatial Data.....	29
3.2.3	Data Ownership.....	30
3.3	Conceptual Data Model.....	32
3.4	Data Elements Naming Convention.....	34
3.5	Data Security Classification	36
3.6	Data Hub.....	37
3.6.1	Relation between Data Hubs.....	37
3.7	Code Table	38
4	Data Management Domain	40
4.1	Intent.....	40
4.2	Domain Design Principles	40
4.3	Technology Categories and Technology Components	43
4.4	Architecture Design Considerations	47
4.4.1	Enterprise Schema Management.....	47

4.4.2	Data Backup and Recovery.....	48
4.4.3	Business Intelligence.....	48
4.5	General and Technical Standards	51
4.6	Best Practices.....	52
4.6.1	Data Management.....	52
4.7	Obsolete Technology.....	57
Appendix A – Data Hub Details.....		58
A1.	People Hub	59
A2.	Establishment Hub.....	66
A3.	Land Hub	82
Appendix B – Other Data Sources.....		93
B1.	Ministry of Education	94
B2.	Ministry of Higher Education	100
B3.	Ministry of Manpower.....	108
B4.	Ministry of Civil Services	121

List of Figures and Tables

Figure IA-1: OeGAF Reference Architecture	9
Figure IA-2: Relation to Other OeGAF Reference Models	11
Figure IA-3: OeGAF Version 2.0 Architecture Vision.....	18
Figure IA-4: Oman Government Information & Data	19
Figure IA-5: Data Dictionary	25
Figure IA-7: Data Entity and Layers of Spatial Data.....	26
Table IA-1: Structured Data Entity Attributes.....	27
Table IA-2: Structured Data Element Attributes	27
Figure IA-8: Illustration of Information Captured for Structured Data	28
Table IA-3: Spatial Data Entity Attributes	29
Table IA-4: Spatial Data Layer Attributes	30
Figure IA-9: Illustration of Information Captured for Spatial Data	30
Figure IA-10: An example of Conceptual Data Model	33
Table IA-5: Modelling Notations	33
Table IA-6: Data Element Naming Format	35
Table IA-7: List of Code Tables.....	39
Figure IA-11: Mapping of Categories, Components and Standards for Data Management Domain	43
Table IA-8: Data Management Technology Categories and Components	47
Figure IA-12: People Hub Conceptual Data Model	59
Figure IA-13: Establishment Hub Conceptual Data Model	66
Figure IA-14: Land Hub Conceptual Data Model.....	82

1 Overview

1.1 Document Purpose

The purpose of the Information Reference Model (IRM) is to provide the agencies of the Sultanate of Oman with a core reference architecture model covering data and information. The IRM provides reference patterns to discover and manage data, describe data and to share and reuse data in a manner that is consistent across the government.

The IRM also provides standards, best practices, practical examples, tools and guidelines to enable information sharing and reuse across agencies via a standard description and discovery of common data and information.

IRM will be used:

- (a) As a reference model for best practices and standards in information management
- (b) As an enabler of government business functions and government services
- (c) As a critical input to common and shared government applications and application components.
- (d) From a central agency perspective like the Information Technology Authority (ITA) to form and govern central initiatives
- (e) From an individual government agency perspective when developing their own Information Architecture (IA).

1.2 Objectives and Benefits of IRM

The key objectives of the IRM are the following:

- (a) Pursuing the goal of Information Sharing through consistent mechanisms for data discovery and description
- (b) Identifying authoritative sources of information across government
- (c) Developing a common procedure for information sharing among agencies
- (d) Developing shared vocabularies to facilitate reuse of data across communities.
- (e) Reducing cost from the redundant collection of citizen and organisation data
- (f) Providing citizens with an integrated view of the government.

When adopted by agencies, the IRM will potentially bring about the following benefits:

- (a) Drives sharing of information at the business and services layer to ease access to more, better, personalised and integrated services
- (b) Improved practices for sharing of information
- (c) Identifying and cataloguing the data assets of the agencies will improve their discovery and hence sharing
- (d) Enhance interoperability across government agencies at the information layer
- (e) Optimise the investments in ICT.

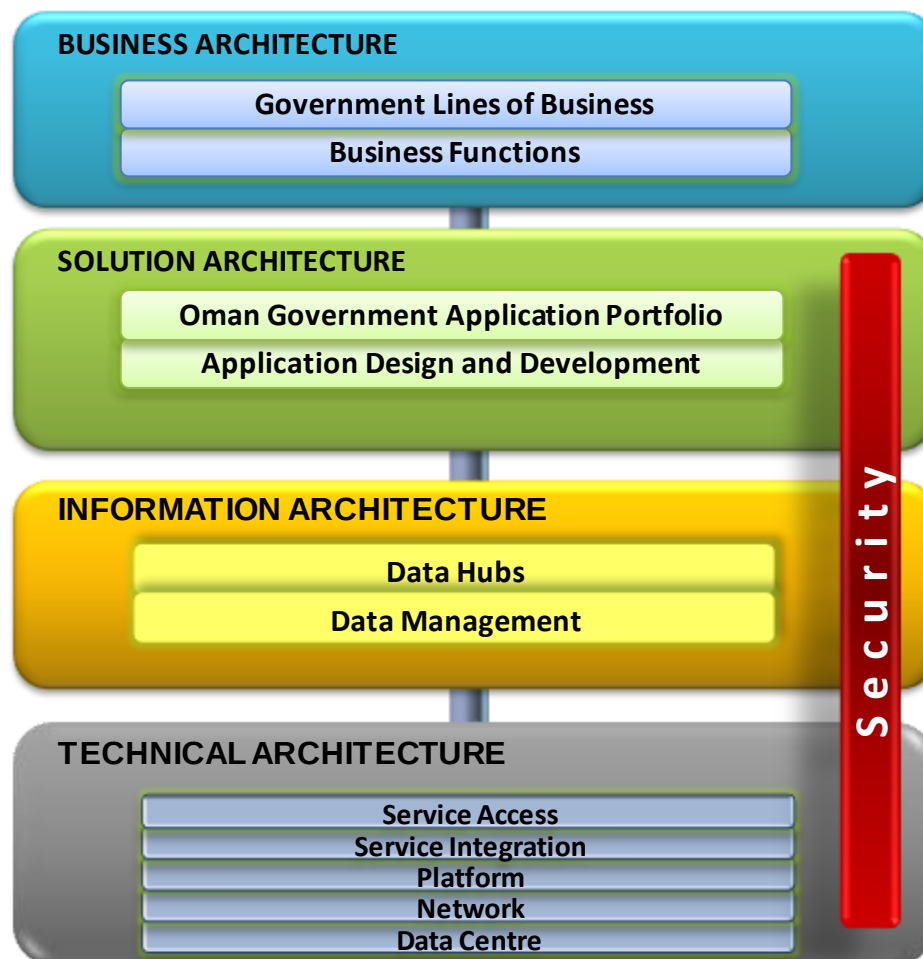
1.3 Background on Oman eGovernment Architecture Framework

OeGAF consists of four main architectures as follows:

- (f) Business Architecture
- (g) Solution Architecture

- (h) Information Architecture
- (i) Technical Architecture.

Each of the architecture has a corresponding Reference Model. Each Reference Model describes a framework to define and organise the architecture elements. Figure [IA-1](#) depicts the overall OeGAF Reference Architecture.



(need to replace diagram)

Figure IA-1: OeGAF Reference Architecture

The OeGAF four Reference Models are:

The **Business Reference Model (BRM)** describes the different lines of business and the associated government functions of the Oman Government that cut across the boundaries of different agencies.

The **Solution Reference Model (SRM)** describes the common applications and application components that can be shared across the Oman Government. It includes the technical standards and security considerations pertaining to the design and implementation of solutions and applications.

The **Information Reference Model (IRM)** lists the data definitions and data elements of common and shared data that are used across the Oman Government. IRM describes the data pertaining to 'Person', 'Establishment' and 'Land' data hubs which are commonly used by various agencies' applications. It also defines technical standards, design and security considerations and best practices related to the management of data.

The **Technical Reference Model (TRM)** defines the infrastructure technologies and their respective technical standards to enable better system integration and interoperability across the Oman Government. It also defines the security considerations and standards related to the infrastructure technologies.

The mention of the technologies and technical standards in the TRM, IRM and SRM is to provide logical and easy reference for readers.

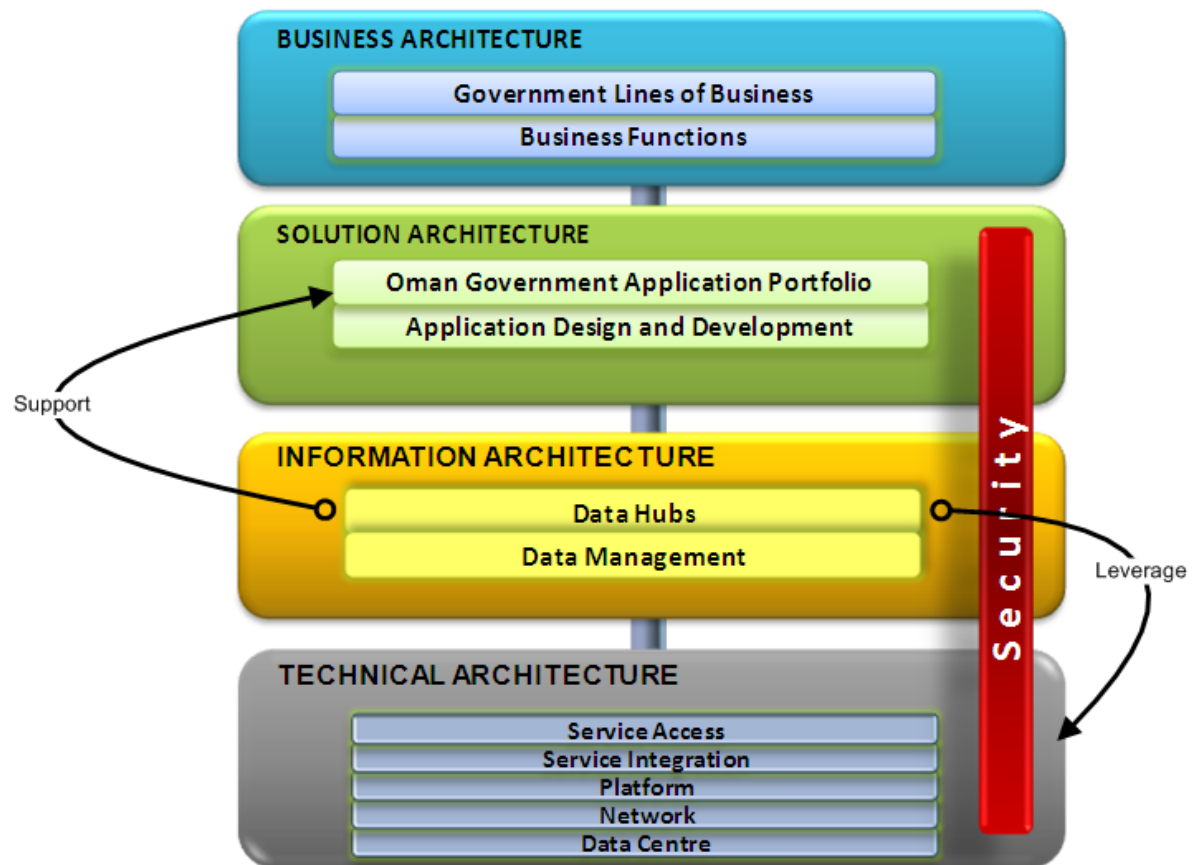
1.4 Relation to Other OeGAF Reference Models

The IRM leverages on the infrastructure technologies and technical standards in the TRM to ensure secure and effective data management.

The IRM identifies the data hubs and data management technologies which are referenced by SRM to develop and deploy applications and eServices.

The IRM establishes common and shared data by representing them as data hubs. BRM references these data indirectly through the applications and components identified in SRM.

Figure IA-2 below provides a pictorial overview of how the IRM is related to SRM and TRM.



(need to replace diagram)

Figure IA-2: Relation to Other OeGAF Reference Models

1.5 Scope of Information Reference Model

- 2 An abstract conceptual model that describes the major concepts and relationships that are commonly covered in information management practices. The model describes data description, data context and data sharing as three key building blocks of information management.
- 3 Data Description: this section describes the mechanisms to describe structured as well as unstructured data. While structured data is more commonly described using entity-relationship diagrams, metadata standards based on the Dublin Core Metadata Initiative (DCMI) have been designed for describing various types of information, including unstructured data.
- 4 Data Context: this section provides an approach for categorising agency data assets into Data Asset Catalogues through multiple perspectives, i.e. contexts. Categorising data leads to faster data discovery and improved opportunities for sharing. This section also identifies the authoritative datasets within the government, i.e. data hubs, and describes each hub using entity-relationship models. Data management and architecture considerations are further covered in this section.
- 5 Data Sharing: this section describes the procedure for Government Information Sharing supported with templates. It also provides an overview and best practices in Open Government Data.

The IRM also provides reference for technical standards and best practices. A section on newer technologies that could potentially be of use to agencies is provided as well.

5.1 Target Audience

The primary audience of this document are the following:

-
- (a) Agencies' ICT Directors/ Managers
ICT Directors/ Managers should use this document for strategic planning and identify opportunities for information sharing and optimisation.
 - (b) Agencies' ICT Planners/ Architects
ICT Planners/ Architects should use this document to align and understand the common data definition for the design, development and maintenance of ICT systems.
 - (c) Agencies' Data Owners
Data Owners should use this document to manage their data assets and to describe them adequately.
 - (a) Database Administrators
Database Administrators should use this document to verify and maintain data tables and data integrity within the database.
 - (d) ICT Vendors
ICT Vendors should use this document to propose and implement ICT projects that will comply with the mandated technical standards and also to implement solutions that comply with the data sharing policy

5.2 Information Architecture Design Principles

Design principles, which describe the preferred directions, aspired attributes and practices, are required to guide the development of the architecture. The following are the overarching Information Architecture design principles

Principle 1: Data is to be managed as a Valuable Asset

Data is a key information asset, managed by specified governmental custodians on behalf of the citizens and businesses. The successful delivery of government services depends on the availability of accurate, well-maintained, and secure data. Protecting data is essential and must be performed subject to the laws, regulations, and policies governing data security and privacy. Failure to protect the data greatly diminishes its value. As with any asset, data should be leveraged to maximise its potential.

Principle 2: Share and Re-use Government Data where possible to Increase Data Consistency and Remove Redundancies

Sharing data reduces the inefficiency and the effort of reproducing the same set of data. The cost to reproduce the same set of data would also be reduced. Sharing and re-using of data increases data consistency among the government agencies to provide better background for decision making.

Principle 3: Ensure Confidentiality and Privacy in the Development and the Management of Government Data

Ensure government data that are collected, stored or transferred are kept confidential and secure at the appropriate level that would reduce the impact of the data getting lost, modified or misused.

Principle 4: Adopt Open and Vendor-Neutral Standards & Best Practices with Wide Industry Acceptance

To protect investments in government data management solutions, it is logical not to be locked into a single vendor. Choose solutions with wide industry acceptance as the vendors would have catered to mass requirements and be able to provide sufficient support.

Principle 5: Identification and Use of Authoritative Sources of Data Within and Across Organisational Boundaries Enhances Data Accuracy and Consistency.

An authoritative source of data is trusted to be accurate and consistent. Authoritative data can either be created and defined within an agency or derived from another external agency and maintained within an agency.

While data can be used by more than one agency, a single agency must be identified as the authoritative source for that data. Identification could be defined by royal decrees or by the business function of the agency. Each agency must identify and document the authoritative source for all data that it uses in an information system. Each data element should have a defined authoritative source and assigned custodian. The custodian is responsible for defining, establishing, and maintaining the accuracy of data collected into the authoritative source.

Principle 6: Common vocabulary, data and metadata definitions should be adopted in order to enable interoperability

A common vocabulary will facilitate effective communications and enable sharing of data. The data to be exchanged across the government should have a common definition with an agreed format and meaning of the data items. Agencies should have their data dictionary and metadata repositories defined.

5.3 Governance of IRM

The ongoing management and execution of IRM is part of the overall governance of OeGAF as stated in the final OeGAF document.

Ongoing management of the IRM may include reviewing of existing documented standards. Further updates and additions to the reference model in the area of technology, technical standards, best practices and data hubs may also be undertaken.

2 Making the Most of Government Information

2.1 Intent

The intent of this section is to aid government agencies in managing and sharing data required for the implementation of the right ICT solutions that support the business functions and processes.

2.2 Importance of Data Sharing

All government agencies will need to interact with the public that includes citizens, residents and commercial establishments. As part of the eGovernment Transformation Plan, government agencies have to provide useful eServices and information to the public. There are many data that have been collected and managed by various government agencies. To improve the management of public data and eServices, it is extremely important that public data are being shared among the government agencies.

Data about a citizen, for example, need not be captured by all government agencies in particular when the citizen visits a government agency. Instead, by using the Citizen ID, the basic or public information about the citizen can be extracted from the right sources among the government agencies. This action has dual positive effects. Firstly, the citizen will be pleased that he or she need not fill up all the personal details in order to transact with the government. Secondly, using the Citizen ID, the extraction of the latest data about the citizen would improve the performance of the government agencies.

In short, sharing of data among the government agencies would aid the following:

- (a) Increase public satisfaction
- (b) Improve government agencies' performance
- (c) Ensure data accuracy (without data duplication).

As part of the National Open Data Initiative, government agencies are encouraged to share as much data with the public. The list of the currently available data can be found in the website.

2.3 Guide to Improve Government Information Management

The Figure [IA-3](#) below shows the OeGAF Architecture Vision and how IRM plays a part of it.

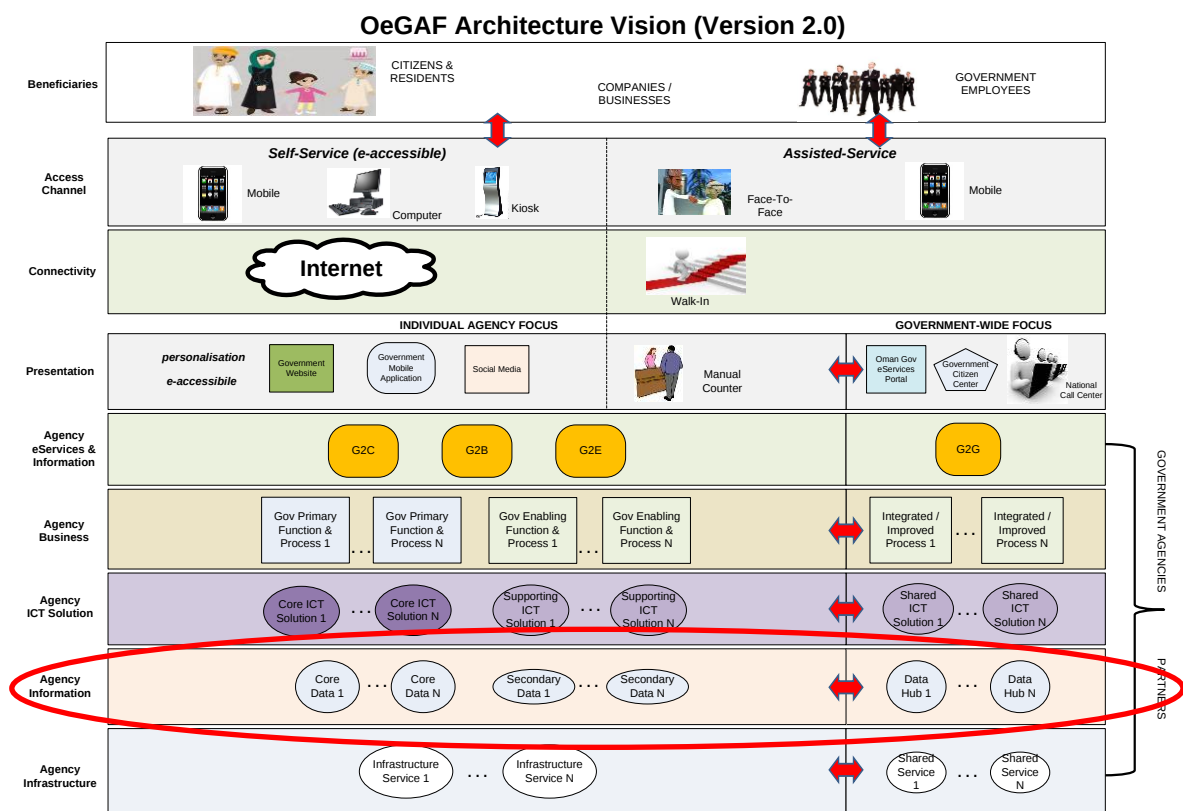


Figure IA-3: OeGAF Version 2.0 Architecture Vision

The data or information used in the government agencies are required to support the respective ICT solutions, that in turn, support the agencies' business functions and processes. From a government-wide focus (on the right part of the diagram), there are data hubs that will be commonly used by government agencies.

When we zoom in, Figure [IA-4](#) describes the detailed vision for information and data management. It also provides a graphical illustration of the key data components to be implemented both within a government agency and as government-wide initiatives.

OeGAF Architecture Vision (Version 2.0) Oman Government Information & Data

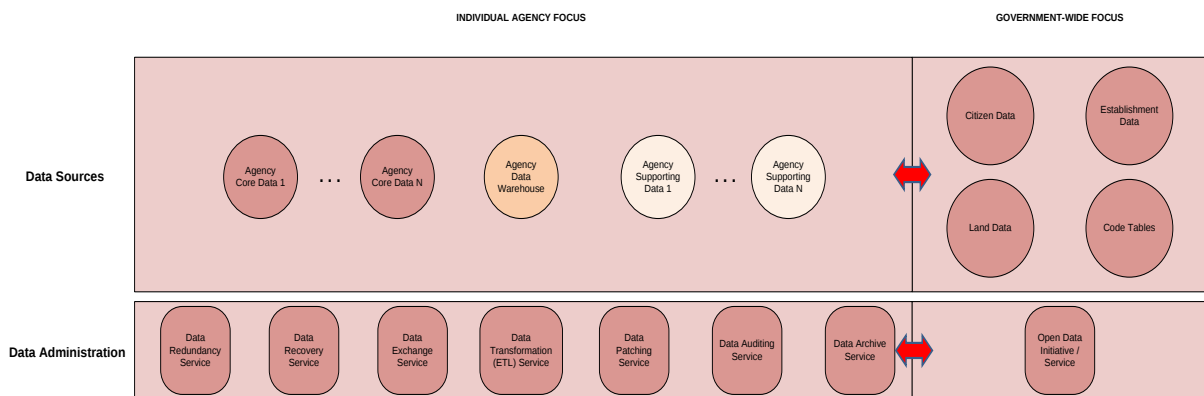


Figure IA-4: Oman Government Information & Data

The following steps will guide government agencies to implement and manage effectively the information and data:

(i) Understand The Data Sources

For a start, government agencies must understand the actual data sources so as to prevent data duplication and data inaccuracy. Within an agency, the data may originate from a particular division who is typically the data owner. Agencies can refer to the Appendix to understand the Data Source for some of the key information in Government.

By analysing the data sources, the data can be grouped as core data or supporting data. Core data would normally have a direct use by the primary business function or business processes of the government

agency. Similarly, the supporting data would be used by the enabling business function or processes.

It would be useful, although not mandatory, for government agencies with voluminous data to consolidate their related core and supporting data elements into a data warehouse. A data warehouse will be extremely effective for trend analysis, data mining, statistics production and management report generation.

From a government-wide focus, government agencies must support the use of government data hubs such as Citizen, Commercial Establishment, Land and Code Tables. Instead of capturing these data, government agencies should get the updated data from the respective owners. Data from these hubs can be easily populated into the government agencies' respective local databases.

(ii) Consolidate Agency Data Sources

It is a norm that ICT systems and databases were developed in silos, i.e. these systems were developed to serve one division or department. Over time, a government agency would have many ICT systems and databases, leading to data duplication problems.

By understanding the actual data sources, government agencies can consolidate their core data, followed by consolidating their supporting data. Thus, the first implementation step is for government agencies to consolidate their numerous databases into a few relevant, agency-wide databases.

For management and data analysis, it is recommended to consolidate the relevant data elements into a data warehouse.

(iii) Stop Data Capturing of Data Hubs' Data Elements

As part of the eGovernment Transformation Plan, government agencies must stop capturing data elements that are found in the data hubs. For example, a citizen does not need to fill all his / her personal particulars like home address, email id and family particulars. Using his / her Citizen ID, the relevant data elements can be extracted from the Citizens Data Hub.

Government agencies must ensure that the public fill minimal information in their eServices. This would improve public satisfaction level on the use of government eServices and enhance government agencies efficiencies and integration. Please refer to Shared Services and Central Initiatives for more details.

(iv) Develop Data Administration Services

As part of Service-Oriented Architecture (SOA), government agencies are highly recommended to develop their own data administration services that can be called or referenced by the actual eServices or ICT solutions. This set of data administration services would speed up the development of quality eServices. Below is the recommended set of data administration services to be developed by each government agency:

(a) Data Redundancy Service

For critical or important data transactions, there is a need to make data redundant. While there is daily data backup (typically provided by the ICT infrastructure or technical team), there may be many lost data transactions between the data backup window period. For example, if a daily back up is taken at 6am, it is possible that all new data transactions, after 6am to the next day 6am, can be lost due to factors such as hardware failure, electricity unavailability and other forms of disaster.

Thus, for critical data transactions, it is recommended to develop a service that periodically duplicates the data transactions and stored

in a separate data repository. Note that this data service aids the business continuity requirements.

(b) Data Recovery Service

The data recovery service complements the data redundancy service. When there are redundant data, it is easier and faster to recover lost data transactions. Like the above, this service aids the business continuity and recovery.

(c) Data Exchange Service

In the provision of eServices, there is a need for many data exchanges among government agencies. Instead of implementing data exchange on project-basis, it would be more efficient to develop comprehensive data exchange services that will be used by multiple projects within the government agency. The data exchange service can be internal (i.e. exchanging data among databases or divisions within the government agency) or external (i.e. exchanging data with other government agencies and private companies). These data exchange services should be developed at logical data levels that can be understood by data owners. Examples are ObtainCitizenData, ObtainEstablishmentData, ObtainLandData, ObtainVehicleData, ObtainEmployeeData, SendTrainingRecords, SendApprovedPermits and SendPayments.

(d) Data Transformation (ETL) Service

Since there are many data sources in different data formats, this data service aids the extraction, transformation and loading (ETL) into the consolidated data repository or data warehouse. For this service to be useful, it must provide the ability to search and extract the relevant data, and convert into different data formats. Refer to Section 4.4.2 Business Intelligence for more details.

(e) Data Patching Service

While all data inputs and updates have to be carried out through their respective ICT solutions, there is still a need to patch data that have incorrect values. This service, upon approval by the respective data owner, will patch the data with the corrected values. Note that, as per audit requirements, all data patch transactions would be recorded.

(f) **Data Auditing Service**

This data service would extract all the relevant data transactions and records for auditing purposes.

(g) **Data Archive Service**

As per Royal Decree requirement, data has to be archived for a specified period depending on the data classification. This service would archive the set of data that meets the criteria.

(v) Leverage on National Open Data Initiative

The National Open Data Initiative aims to promote the publication of open data for public reference. To support transparency, open data allows the public to review and analyse the government data.

Government agencies are highly recommended to provide open data sets that can be referenced by the public. Government agencies can also download some of these open data sets for their own consumption.

3 Data Definition

3.1 Intent

Currently government agencies capture their data in silos. Data is usually obtained through filling of forms during over-the-counter transactions and manually entered into the systems. Without data sharing, each agency would have to capture its own set of data about a person or a business. The above scenario leads to redundant data entry effort, human errors, data duplication and data inconsistency.

Data Definition describes data through the use of data dictionary, conceptual data model and naming convention to provide a consistent platform for communication and sharing of data across ministries and agencies.

With Data Hubs, as defined in Section 3.6 'Data Hub' of this document, government agencies would have a single source of data reference when building their own ICT solutions that require interfacing with other agencies.

3.2 Data Dictionary

Data is best described through a data dictionary as shown below in Figure [IA-5](#).

A1.1 Person Entity

Data Entity Name	Person
Description	Personal details of a citizen or resident
Security Classification	Internal Use Only
Data Entity Owner	Royal Oman Police (ROP)
Frequency of Update	Daily

	Data Element Name	Description	Type	Validation	Data Source	Remarks
1.	CivilNumber	Unique number assigned to the person	String(8)		ROP	This is an 8 digit number registered in the Civil ID card.
2.	FullEnglishName	Full name of the person in English	String(100)		ROP	
3.	FullArabicName	Full name of the person in Arabic	String(100)	Must support Arabic	ROP	
4.	Address	Address of the person	String(200)		ROP	
5.	BirthDate	Date of birth of the person	Date	dd/mm/yyyy	ROP	
6.	CardExpiryDate	Expiry date of the Civil ID card	Date	dd/mm/yyyy	ROP	

(need to update table especially data element 1 where String(9))

Figure IA-5: Data Dictionary

Data can be structured or spatial. Structured data refers to text-based data while spatial data denotes data that identifies geographical characteristics. Both structured and spatial data is broadly made up of:

- (a) Data entity which denotes an object or event with a defined set of data attributes (e.g. Person).
- (b) Data element or data layer which denotes a set of attributes that describes an entity (e.g. attributes for an entity 'Person' are gender and address).

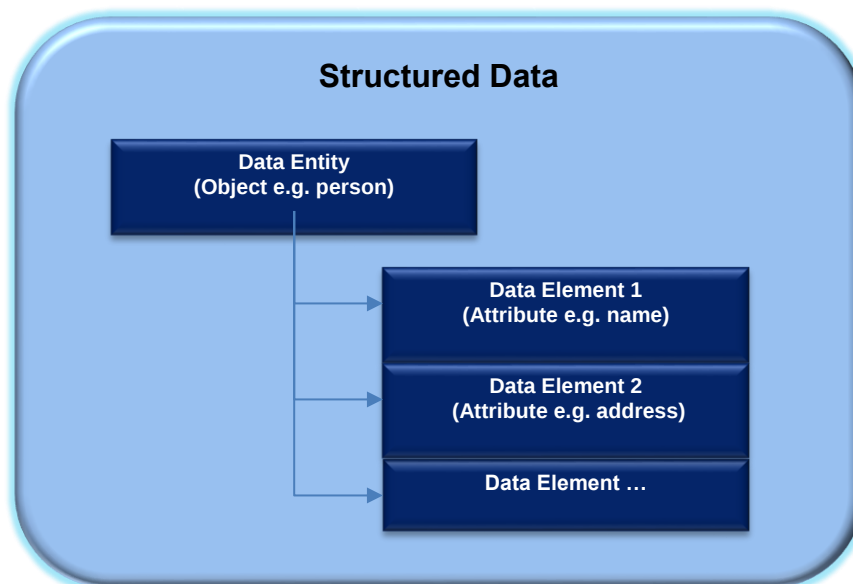


Figure IA-6: Data Entity and Elements of Structured Data

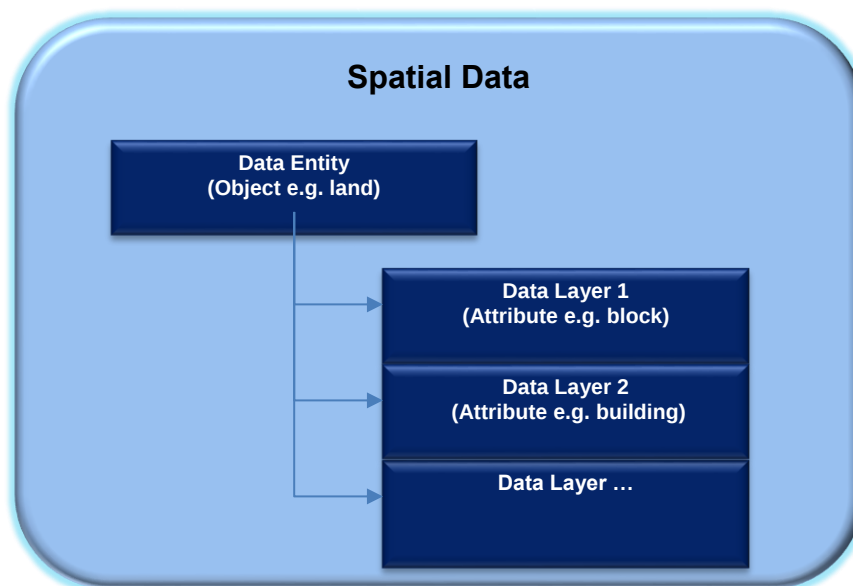


Figure IA-7: Data Entity and Layers of Spatial Data

3.2.1 Structured Data

(a) Data Entity

The information describing each data entity consists of the following as shown in Table [IA-1](#) below.

Attribute	Description
-----------	-------------

Data Entity Name	Name of the entity (e.g. Person).
Description	Statement describing the data entity.
Security Classification	Security classification of the data entity. Refer to Section 2.5 'Data Security Classification' of this document.
Data Entity Source	Full name of the ministry or agency that manages the data entity (e.g. Ministry of Commerce and Industry). The owner is responsible for the integrity and accuracy of the data and will also be the authority to grant access to the data.
Frequency of Update	Frequency of updates to the data entity to ensure the information is current (i.e. daily, weekly and monthly)

Table IA-1: Structured Data Entity Attributes

(b) Data Element

The information describing each data element consists of the following as shown in Table [IA-2](#) below.

Attribute	Description
Data Element Name	Name of the data element (e.g. Name).
Description	Description of the data element.
Type	Data type and length.
Validation	Validation rules for the data element (e.g. validation for date is 'dd/mm/yyyy').
Data Element Source	Full name of the ministry or agency that provides the data and is responsible for the data integrity and accuracy (e.g. Ministry of Commerce and Industry).
Remarks	Any other comments or special requirements.

Table IA-2: Structured Data Element Attributes

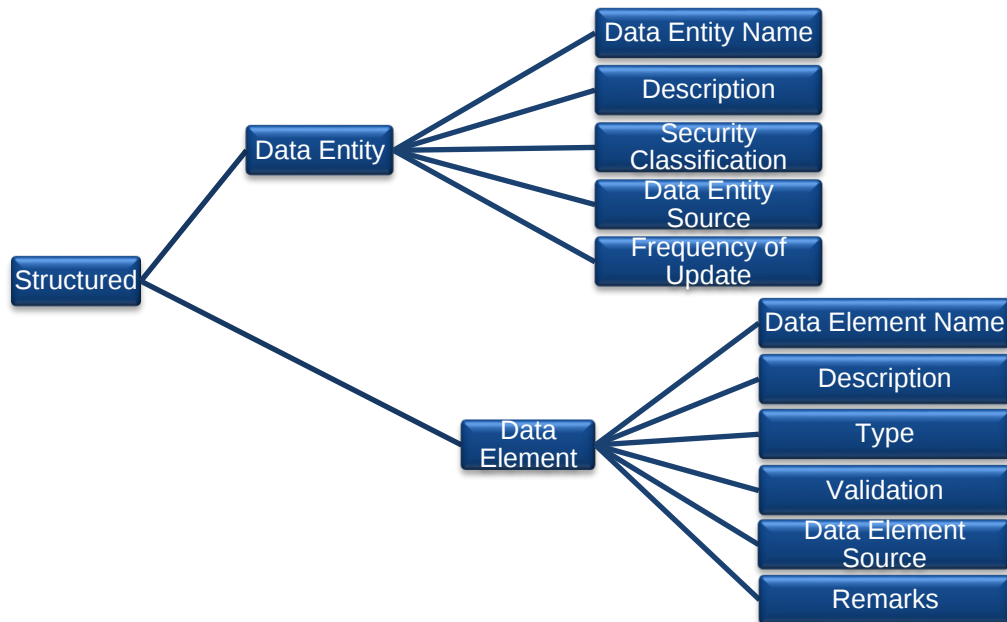


Figure IA-8: Illustration of Information Captured for Structured Data

3.2.2 Spatial Data

(a) Data Entity

The information describing each data entity consists of the following as shown in Table [IA-3](#) below.

Attribute	Description
Data Entity Name	Name of the entity (e.g. Land).
Description	Statement describing the data entity.
Security Classification	Security classification of the data entity. Refer to Section 2.5 'Data Security Classification' of this document.
Data Entity Source	Full name of the ministry or agency that manages the data entity (e.g. Ministry of National Economy). The owner is responsible for the integrity and accuracy of the data and will also be the authority to grant access to the data.
Frequency of Update	Frequency of updates to the data entity to ensure the information is current.

Table IA-3: Spatial Data Entity Attributes

(b) Data Layer

The information describing each data layer consists of the following as shown in Table [IA-4](#) below.

Attribute	Description
Data Layer Name	Name of the data layer (e.g. Block).
Description	Description of the data layer.
Feature Type	Feature type of the data layer. Feature types available are: ▪ Geometry Point – Point on a map (usually to depict a specific spot e.g. peak of a mountain or centre of a town) ▪ Geometry Line – Line on a map (usually to depict a linear object e.g. river or road)

	Geometry Polygon – Plane bounded by at least 3 line on a map (usually to identify an area e.g. outline of a town or water body)
Validation	Validation rules for the data layer (e.g. must not overlap another land plot).
Textual Attribute	Textual attribute in the data layer (e.g. BlockNumber).
Data Layer Source	Full name of the ministry or agency that provides the data and is responsible for the data integrity and accuracy (e.g. Ministry of National Economy).
Remarks	Any other comments or special requirements.

Table IA-4: Spatial Data Layer Attributes

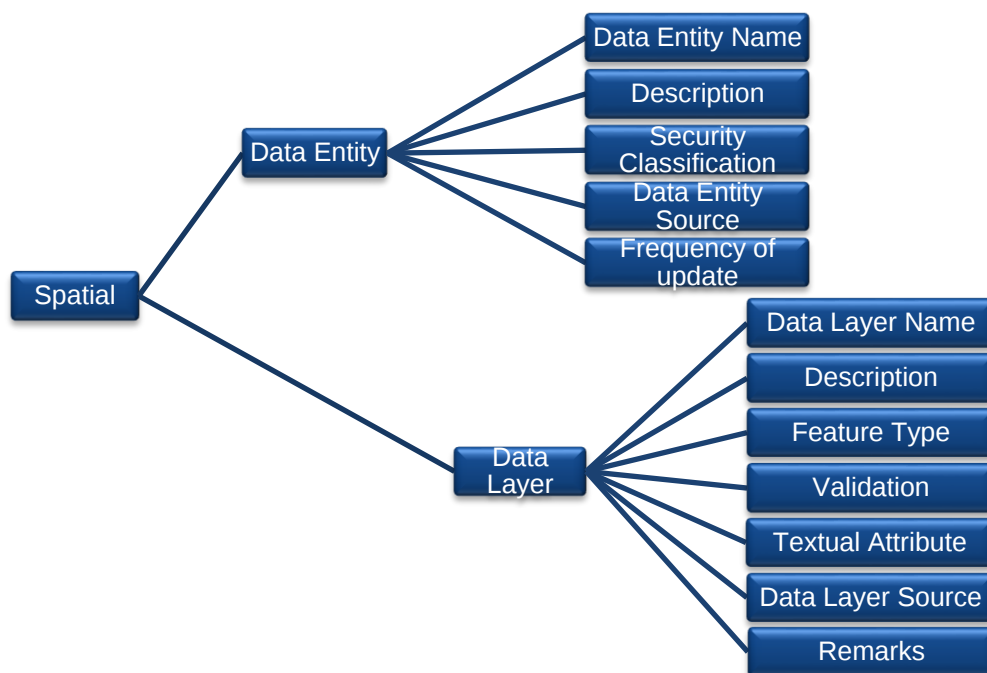


Figure IA-9: Illustration of Information Captured for Spatial Data

3.2.3 Data Ownership

Data, being a key asset of the government, must be correct, up-to-date, complete and secure (quality data). Data owner would have to define policies to govern the quality of the data and conduct regular reviews to ensure the policies are adhered to. The following are some guidelines when establishing the data ownership policy:

-
- (a) List of senior level managers supporting the enforcement of the policy
 - (b) List of data entities covered under the policy
 - (c) The ownership model (process of identifying or allocating an owner) for each data entities
 - (d) Roles associated with data ownership and their reporting structure
 - (e) Responsibilities of each role
 - (f) Resolution process during any dispute.

Data owner can be broadly identified from two categories:

(a) Data Source

Data source is the agency that the data originates or captured from (e.g. Ministry of Commerce and Industry and 'Establishment' data). Key activities performed in this category are:

- Act as the first point of data capture
- Inform the 'Data Custodian' about the list of data (current and new) being captured
- Inform the 'Data Custodian' about any revisions and changes to the data
- Participate in the committee for data governance (Committee for multi-agencies communication and dispute resolution).

(b) Data Custodian

Data custodian is the agency that is delegated the role to manage the data (e.g. Information Technology Authority and 'Establishment' data). Key activities performed in this category are:

- Periodically confirm the list of data with the respective 'Data Source'
- Inform all users of data about any revisions and modifications (both current and upcoming)
- Inform the 'Data Source' about the users of the data. Users could include business owners, system owners, technical infrastructure groups
- Act as an enabler to establish data exchange mechanism between 'Data Source' and data user when possible

- Establish a committee for data governance (Committee for multi-agencies communication and dispute resolution)
- Act as an intermediary between 'Data Source' and data user.

In the event where the data is owned by multiple agencies, it has to be clearly indicated in the governance policy, the role of each agency. Data in such a case would still have to be from a single source or from a robust environment where data is kept in sync between all participating agencies. Data owner is identified and captured in the data dictionary. Any change to the data owner will require the update to be reflected in the data dictionary.

3.3 Conceptual Data Model

Conceptual data model provides a conceptual view of relationship between data entities. Conceptual data model helps to convey, at high level, relationship that is easily understandable and complement with the data dictionary to provide a holistic representation of a data. It is important to note that conceptual data model is not database design and is not meant to be technical. An example of a conceptual data model is shown below in Figure [IA-10](#).

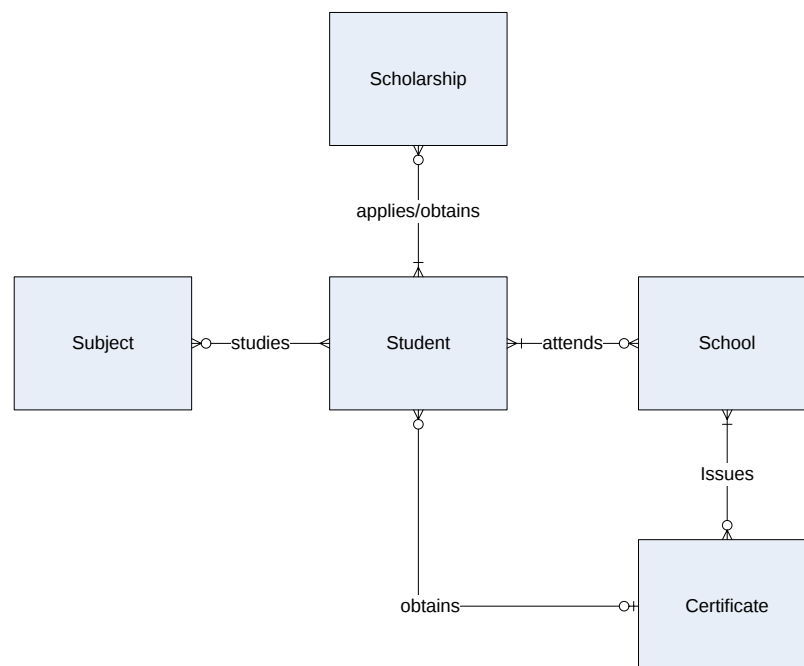


Figure IA-10: An example of Conceptual Data Model

(a) Notation

The following are notations that should be adopted when designing the conceptual data model as shown in Table [IA-5](#).

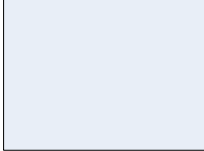
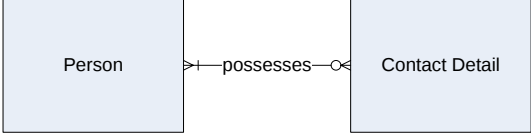
Subject	Notation
Data entity	
Label for data entity (e.g. Person)	
One only association	
Zero or one association	
Zero or many association	
One or many association	
Many association	
Label for association (e.g. possesses)	

Table IA-5: Modelling Notations

(b) Association

Labelling the association is done using a verb (e.g. possesses) to reflect the relationship between two data entities.

3.4 Data Elements Naming Convention

Naming of each data element especially within each data entity must be unique and meaningful.

In order to improve readability and understanding of the data dictionary, the following naming convention should be adopted:

(a) Format

Naming format for each data element should be structured according to the components as indicated below:

Data Entity Name + Attribute Name + Type + Count

The description of each component is shown in Table [IA-6](#) below.

Component	Description
Data Entity Name	Name of an object or event with defined boundary to which the data element is an attribute of. This is optional as a prefix and should be used when there are similar attributes within different entities (e.g. 'IssueDate' should be further defined as 'PassportIssueDate' and 'VisaIssueDate' if 'IssueDate' is found both in 'Passport' entity as well as the 'Visa' entity).
Attribute Name	Name of the characteristic of an entity (e.g. 'Name' or 'Occupation').
Type	Value of the characteristic. This is optional when the Attribute Name already consist a Type as part of its name (e.g. BirthDate) or the Attribute Name itself is meaningful (e.g. Nationality). A controlled set of value is listed below: (a) Address (b) Amount (c) Code (d) Date (e) Flag (f) Name

	(g) Number (h) Text (i) Type (j) Quantity
Count	This is optional and should be used only if necessary. Counting will be used in cases when there is a need to have multiple elements to store the same attribute (e.g. 'Address' defined as 'Address1' and 'Address2').

Table IA-6: Data Element Naming Format

Examples of data elements are:

- (i) CivilNumber
- (ii) BirthDate.

(b) Capitalisation

Upper camel case (also commonly known as Pascal case) should be used to define the names of all data elements. Examples of upper camel case are:

- (i) UniqueNumber
- (ii) RegistrationDate.

(c) Uniqueness

Each data element within an entity should be unique (e.g. 'Date' element should be further defined as 'BirthDate' and 'RegistrationDate').

(d) Language and Grammar

The language to be used is British English and all words are to be in singular form (e.g. 'Organisation' in British English instead of 'Organization' for American English). Words used should be a noun in the singular form (e.g. 'Branch' and not 'Branches').

(e) Ambiguity

Avoid names with ambiguous meaning (e.g. the word 'Round' can mean circular or series of events). Ambiguity can be avoided by placing it in context (e.g. 'NumberOfRound').

(f) **Synonym**

Use controlled list of vocabulary in order to prevent having different data elements which convey or indicate the same meaning (e.g. 'MobilePhoneNumber' and 'CellPhoneNumber' or 'RegistrationDate' and 'ApplicationDate').

3.5 Data Security Classification

Data security is of main concern to government agencies as they are responsible for creation and management of sensitive data. With the ever increasing need to share data across agencies, the concerns of data misuse and theft by external threats are apparent. Data security classification segregates data based on sensitivity and impact (in the event of loss), thus ensuring only relevant data is exposed to the right audience.

For government data security and its classifications, please refer to the Royal Decree 118/2011.

The following data security classifications are used within the context of OeGAF:

- (a) Public
- (b) Internal Use Only
- (c) Confidential.

For more information on the above data security classifications, please consult ITA.

3.6 Data Hub

A data hub is a logical concept about consolidating and centralising common data used across the government agencies to provide a single source of reference. Data hub will reduce the need for each agency to maintain duplicate data and sets a common framework for data sharing, thus providing a platform for all interested agencies to retrieve a consistent set of data. The data hubs documented here are in relation to the person (citizen or resident), establishments (business companies) and land (geographical area).

As part of the initial EA development, 'Person', 'Establishment' and 'Land' data hubs have been identified to be critical and have the highest impact to the government's operations. Ongoing revision of the IRM may result in more data hubs to be identified such as 'Health' and 'Education'.

3.6.1 Relation between Data Hubs

The key objective of establishing data hub is to consolidate data and promote data reuse. Conceptualisation of each data hub is independent and does not consider the relationship between them. Data hub is designed to function independently as a source of reference but potentially, an abstracted layer could be built (e.g. application) to utilise data from each data hub to suit individual business requirement or present a richer form of information to its users.

An attempt was made to identify the relationship between the three recommended data hubs. It was recognised that currently there is no mechanism to relate common elements (e.g. "RegionCode") between these data hubs. However, in the future, the various data source owners could come together to establish a common application framework to enhance the value of data kept in each data hub. Example, from an establishment's address, the company can be now located accurately on a map and even identify potential partners in its vicinity.

The details of the 'Person', 'Establishment' and 'Land' data hubs can be found in Appendix A 'Data Hub Details' of this document. There are also other sources of valuable data from key government agencies that can be referred in Appendix B 'Other Data Sources'.

3.7 Code Table

Code table contains a list of codes and their description which are applicable to a data element (e.g. country code). The codes documented here are based on national, international and common codes used within Oman government. The goal is to have government agencies adopt a standardised common code to improve sharing and communication among themselves.

A number of these code tables are now available for public download as part of the National Open Data Initiative. Government agencies are recommended to obtain the latest code tables from the open data initiative. At the same time, government agencies are also advised to provide data sets for the public to download.

Code Table	Description
Country	List of country codes defined by UN
Region	List of region codes in Oman
Wilayat	List of wilayat codes in Oman
Town	List of town codes in Oman
Nationality	List of nationality codes
Occupation	List of occupation codes used in Gulf Arab region
Education Level	List of education level codes
Marital Status	List of marital status codes
Address Type	List of address type codes
Company Legal Status	List of legal status codes for a company
Company Registration Status	List of registration status codes for a company
International Standard Industrial Classification (ISIC)	List of economic activity code defined nationally based on ISIC

Table IA-7: List of Code Tables

4 Data Management Domain

4.1 Intent

The Data Management Domain defines the domain design principles, central IT initiatives, data management technology categories, technology components and associated standards. Data management covers the aspects of designing the data, database management, data exchange, data security, data storage and data backup. It also highlights key architecture design considerations and recommends best practices.

4.2 Domain Design Principles

The following are the Data Management design principles:

Principle 1: Data is a Valuable Information Asset

Data is a key information asset, managed by specified governmental custodians on behalf of the citizens and businesses. The successful delivery of government services depends on the availability of accurate, well-maintained, and secure data.

Protecting the data is essential and must be performed subject to the laws, regulations, and policies governing data security and privacy. Failure to protect the data greatly diminishes its value.

As with any asset, data should be leveraged to maximise its potential.

Principle 2: Implementing Widely Adopted Standards for Data Design, Definition, Management, and Exchange can Facilitate the Adaptability, Cost-effectiveness, and Reuse of Information.

Use of existing, widely adopted standards leverages the expertise, resources, and vetting processes inherent within the standards. Adopting existing standards reduces the cost of entry versus the need to develop and implement new standards.

Examples of existing standards are as follows:

- (a) Industry Standards (e.g. ANSI, ISO, W3C, OASIS, IETF)
- (b) De Facto Standards (e.g. ODBC, JDBC, ADO.Net).

Principle 3: Identification and Use of Authoritative Sources of Data Within and Across Organisational Boundaries Enhances Data Accuracy and Consistency.

An authoritative source of data is trusted to be accurate and consistent. Authoritative data can either be created and defined within an agency or derived from another external agency and maintained within an agency.

While data can be used by more than one agency, a single agency must be identified as the authoritative source for that data. Identification could be defined by royal decrees or by the business function of the agency. For example, Royal Oman Police (ROP) would be an authoritative source for the "Civil Registration Number".

Each agency must identify and document the authoritative source for all data that it uses in an information system. Each data element should have a defined authoritative source and assigned custodian. The custodian is responsible for defining, establishing, and maintaining the accuracy of data collected into the authoritative source. The custodians must:

- (a) Provide accurate business definitions of data.
- (b) Develop enterprise-wide business views of shared data.
- (c) Provide business drivers to support centralised data administration.
- (d) Make complete data dictionary available for each data element shared from the authoritative source.
- (e) Define security requirements for data.

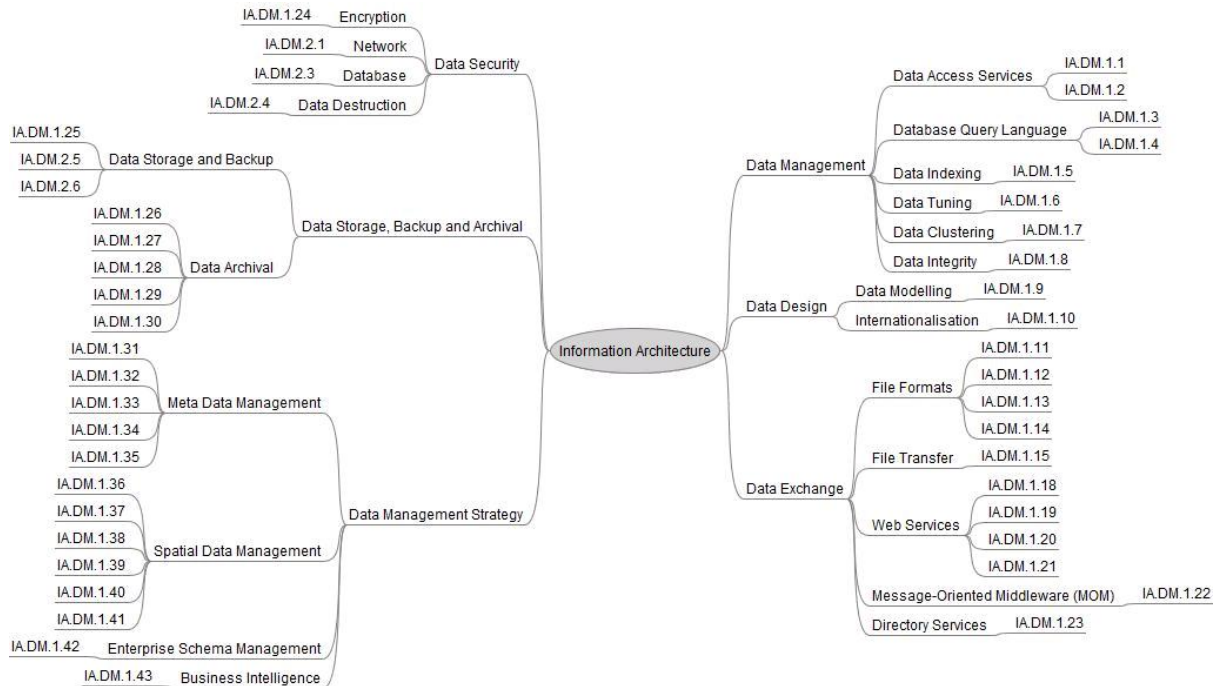
Principle 4: Reuse and Sharing of Data Within and Across Organisational Boundaries Greatly Reduces Redundancy, Cost, and Leads to Improved Decision-making.

Information systems must be designed to accommodate data re-use and data sharing beyond the borders of a government agency to address the larger communities of interest. Sharing of data greatly reduces data redundancy, data entry, cost, and maintenance efforts. Shared data definitions ensure data accuracy, integrity, and consistency.

Data sharing reduces the overall resources required to maintain data across the enterprise. Data sharing should leverage on an established infrastructure, such as the Official eGovernment Services Portal, for widespread data access.

4.3 Technology Categories and Technology Components

Figure IA-11 shows the association between the technology categories, technology components and its relevant standards.



(need to replace diagram)

Figure IA-11: Mapping of Categories, Components and Standards for Data Management Domain

Table IA-8 describes both the technology categories and technology components of the data management domain. Some technology components below have standards while technology components without standards are covered under design considerations or best practices.

Technology Categories	Technology Components
Database Management This category addresses components that define the standards for creating and maintaining a database.	Data Access Services This component consists of software applications (e.g. Relational Database Management System or RDBMS) and data access standards that are designed

Technology Categories	Technology Components
This category is to be considered when selecting or managing a database.	to arrange and store data for ease and speed of search and retrieval.
	Database Query Language This component addresses the database query languages used to make query into databases and information systems.
	Data Indexing This component describes the data structure that allows faster retrieval of data.
	Database Tuning This component describes the optimisation methods that improve the performance of a database.
	Data Clustering This component describes the method of clustering data with similar characteristics to improve efficiency in data retrieval.
	Data Integrity This component describes the data that is correct and conforms to business rules and data structure.
Database Design This category addresses component that defines the standards for describing the organisation of the database.	Data Modelling This component describes the modelling language that allows users to describe the attributes and tables of the organisation of a database and is often created as an entity relationship diagram.

Technology Categories	Technology Components
	Internationalisation This component describes the encoding of data for multi-language support.
Data Exchange This category addresses components that define the standards for exchanging of data which fosters collaboration and interoperability between different physical data stores and databases.	File Formats This refers to types of file format that can be read, written or modified during data exchange.
	File Transfer This refers to the components used to transfer data files over the network. File transfer can be carried out between two servers, and also between a client and a server
	Web Services Web Services are defined as self-contained, self-describing, loosely coupled software components that can be published, discovered, and invoked over a network.
	Message Oriented Middleware (MOM) This is an infrastructure that transfers messages over the network. Data is enveloped into messages so that they are platform independent.
	Directory Services A directory is an information source used to store information about objects, such as users, applications, and network resources, in a hierarchical tree format that

Technology Categories	Technology Components
	can be set up to represent an organisation chart.
Data Security This category addresses components that define the standards for securing and protection of data.	Network This component defines an infrastructure of interconnected hardware for sharing of information and resources.
	Database This component defines a collection of information stored in a computer system for the purpose of access by other application systems.
	Data Encryption This component defines the use of algorithm to transform information into an undecipherable state usually using an encryption key.
	Data Destruction This component defines the complete removal of data from a media such that no residue of the data remains.
Data Storage, Backup and Archival This category addresses component that defines the standards for storing and backup of data.	Data Storage and Backup This component defines the storage and backup management.
	Data Archival This component defines the long term storage of data.
Data Management Strategy This category addresses components that define the various management strategies to enhance the management and usage of data.	Spatial Data Management This component defines the access, manipulate and analyse geographical spatial data.
	Enterprise Schema Management

Technology Categories	Technology Components
	This component defines the management of schema from disparate systems across an organisation.
	Business Intelligence This component defines technologies that provide analytical information from an aggregated data.

Table IA-8: Data Management Technology Categories and Components

4.4 Architecture Design Considerations

4.4.1 Enterprise Schema Management

A schema is a collection of meta data, consisting of a set of schema components. For an organisation with multiple disparate systems, each disparate system can have its own set of schemas. The objective of the Enterprise Schema Management is to define and maintain a central repository of schemas in an organisation. This will help to link disparate data systems and promote data sharing between organisations in a meaningful way.

Areas of consideration when implementing Enterprise Schema Management:

- (a) Select the right product to manage the Enterprise Schema. The product should typically have characteristics to support import function of schemas from the various systems (metadata definitions, taxonomy, and vocabulary), definition of stakeholders and its associated relationships and making the schema available to the subscribing systems
- (b) When a new schema is created, it is important to check the Enterprise Schema repository to avoid duplication and ensure Enterprise wide usage of common formats.

4.4.2 Data Backup and Recovery

Data is a key asset to government agencies. Loss of data can negatively impact the image of the public service. Data backup and recovery is a set of capabilities needed to perform back up and support the restoration and stabilisation of data sets in a consistent, desired state. It is crucial to have an efficient data backup and recovery strategy for each business and operational area of the organisation.

Areas of consideration when implementing data backup and recovery:

- (a) Criticality of the data (synchronous backup vs. asynchronous backup)
- (b) Size of data (type of storage media for backup)
- (c) How often the data is used (online backup or offline backup)
- (d) How quickly the data needs to be recovered (full backup versus incremental backup)
- (e) How long the backup copy needs to be kept (type of storage media and archival policy).

4.4.3 Business Intelligence

Business Intelligence (BI) refers to technology that provides analytical information based on derived data from an aggregated level to support the business decision making process. Components of BI include:

(a) Data Warehouse

A data warehouse is the result of the need to integrate data spread across various organisations/departments from multiple sources. The data in a data warehouse is typically historical and static in nature and is used in supporting decision-making in an organisation or enterprise. The data is usually updated in batch mode and stored in separate databases from the application system for Online Analytical Processing (OLAP) purpose.

(b) Data Mining

Data mining is the process of analysing the database for patterns or future trends by using pattern recognition technologies as well as mathematical or statistical techniques.

(c) Analytics

Analytics allows users to analyse information by drilling down to lower level of detail, slicing across different dimensions.

Areas of consideration when implementing BI:

- (a) Key data needs to be identified and stored in the data warehouse
- (b) Identify functions and algorithms that suits the need of your organisation as customisation may be complex and costly
- (c) Identify flexibility for integration with other systems (e.g. through use of Application Programming Interface or API)
- (d) Ease of configuring user defined business rules
- (e) Identify business roles of user to provide the correct tools for report generation
- (f) Support open standards for data source connectivity (e.g. ODBC)
- (g) The tools used in BI are:
 - (i) Extract, Transform and Load (ETL)
ETL provides the ability to extract data from multiple sources, transforms data into a common format (based on business rules) and load data into its target location. ETL tools should be used when large amounts of data need to be moved, transformed, and manipulated from multiple data sources to a target source. ETL should be scheduled during off peak hours so as not to impact operations and end users access to source and target systems.
 - (ii) Online Analytical Processing (OLAP)
OLAP tools view information in the form of cubes, or multiple dimensions and allow user to drill down to more details, slice and dice information across different dimensions (e.g. time or commodity). These tools are generally used by business analyst

in conducting research to answer business questions as part of decision making process. The software tools obtained for OLAP should minimally have drill-down capability, OLAP export and easy cube manipulation (the interface to manipulate data in a cube via “point and click” or “drag and drop”).

4.5 General and Technical Standards

Please refer to OeGAF Technical Standards for general and technical standards of IRM for compliance.

4.6 Best Practices

4.6.1 Data Management

Best practices for Data Management include:

- (a) Index only key data as over-indexing generally lowers database performance
- (b) Tune the performance of data query before deploying it in production database to prevent inefficient queries from affecting database performance
- (c) Cluster critical databases to ensure high availability
- (d) Ensure all data integrity constraints are specified (e.g. Primary Keys and Foreign Keys) and enforced
- (e) Taking performance into consideration, auditing (audit log) should be enabled on critical databases or tables.
- (f) Implement data masking when utilising sensitive data in development environment
- (g) Validate all data at the point of capture or exchange before the data is recorded in the database
- (h) Document agreed exchange format or schema and the form of transport
- (i) Encrypt data during data exchange especially over non-trusted network
- (j) Validate the data being exchanged is for the intended recipient based on the data security classification
- (k) Test recovery of backup data to ensure both process and integrity of data backup are verified
- (l) Establish data retention and archiving strategies as part of the solution deployment for driving the archiving and purging strategies
- (m) Maintain a centralised repository for meta data
- (n) Maintain version control of all schemas
- (o) Embed data integrity constraints as part of the metadata in the metadata repository
- (p) Adhere to naming conventions in both database and meta data to ensure common interpretation

- (q) Evaluate if existing spatial data layer has the available data before creating a new layer
- (r) Implement same geodetic system (e.g. WGS84) to ensure coordinates are interpreted in similar fashion for spatial data.

4.6.2 Data Access

Agencies will ensure that data is requested and shared on the principle that it will be made available only on a justifiable 'need to know' basis. This means that staff will have access to data only if the function they are required to fulfil in relation to a particular service .

As far as possible Agencies need to retrieve the data from the Source Ministry and should try to avoid creating duplicate database of the source Ministry data. In other words if an agency is connecting to ROP NRS system to retrieve the person records then the agency should not try to replicate the entire NRS database to the agency. Agency need to make a judicious decision regarding when to store the data and when to retrieve based on the criticality of the upto date information as required by the Business process. For report generation and query of statistical information it may be worth while to store some basic information to ensure optimum system performance.

Agencies need to develop a comprehensive webservice with multiple methods and permissions at method level is implemented rather than developing multiple webservices based on the request and need of different ministries.

Webservices should have features like Audit trail, usage statistics. It should also be possible to levy charges on consumers based on data consumption either on single record or as package if required in the future.

Some of the best practices are listed below:

- User has limited number of tries for querying external Agency web service. The data integration web service should have configuration option such as:
 - Number of tries before user is blocked
 - Duration of block on web service

- Notification email in case when user makes violation.
- Each request should be logged in file in following format:
<Webservice> call initiated by: <person ID number>, using method:
<name of the service method>, requested id number: <person ID
number used in query>. Web service responded with: <status code
of response>
- Email should be triggered automatically to designated members
during violation and audit trail of webservice calls should be possible
to monitor misuse of data webservice usage.

4.6.3 Data Exchange Adapters

4.6.3.1 Data Web Service

As a part of Data sharing approach, Agencies need to analyse and come up with core Agency data that may be shared with other agencies and implement webservices to share data with other agencies who may be required to integrate with Agency.

Agencies need to build data webservice to share the data elements for which Agency is the data owner

The Data Sharing adapters should comply with the standards mentioned in IRM and should support batch update as well as online integration. For cases of batch update the system should show the last updates time, status for each record and should also allow the end user to initiate an on demand update from the external agencies to check for the latest update.

4.6.3.2 Process Web Service

Similarly, entities needs to identify the processes that potentially be initiated from a work flow of an external agency. The integration should support initiating relevant processes from an external agency and process such requests. External agency

should also be provided with webservice interfaces to periodically check the status of such processes initiated by external agencies.

4.6.4 Data Exchange Form

Your contact information	
*Your name:	*Organization/Company name
Please provide your full name	Organization or Company for which you request the access
*Phone:	*Email
Mobile number	E-mail address
Choose web-service of your interest	
☐ Name of the Web service method	
A short description of the Webservice method and what information is available by consuming this method.	
☐ Name of the Web Service method 2	
A short description of the Webservice method and what information is available by consuming this method.	
More information	
Availability Requirements	
☐ Business Hours Only	
☐ Fulltime – 24/7	

Estimated Number of Requests

- ☐ Less than 100 requests per month
☐ Between 100 and 10.000 requests per month
☐ More than 10.000 requests per month

Integration Mode

- ☐ Business processes will depend on the availability of the service
☐ Business processes can be completed if service is not working
☐ Service availability does not affect business processes

ITA requested information

- ☐ Are you in MPLS?
☐ Do you have ITA ISD security devices?

*Your IP which will call our Staging Web Service
Web Service

Phone

*Your IP which will call our Production

Questions and Comments

Please provide additional comments or questions about how you plan to make use of web services

External Entity

Your Ministry

Name _____

Name _____

Designation _____

Designation _____

Signature _____

Signature _____

Date & Seal _____

Date _____

Seal _____

&

Activation date _____

4.7 Obsolete Technology

Please refer OeGAF Obsolete Technology Compliance List to ensure that government agencies do not use any obsoleted technologies.

Appendix A – Data Hub Details

The purpose of target architecture is to record the future state of Person and Establishment entities which represents the architectural goal that the Oman Government hopes to achieve. Government agencies should reference the target architecture when implementing new systems or upgrading current systems.

Note:

The data dictionary in this appendix was recorded based on the guideline defined in Information Reference Model Section 2.2 'Data Dictionary' and 2.4 'Data Elements Naming Convention' of this document.

The naming of the data elements is in no way representative of the database field names in the database which the information is derived from (e.g. CivilNumber could be CN or CIVIL_NUMBER field in the database). Therefore the element name serves as a reference and it is up to the discretion of the reader to design their own database field names.

For better understanding of the usage of data hubs e.g. Person and Establishment, refer to the two Lines of Business reference architecture.

A1. People Hub

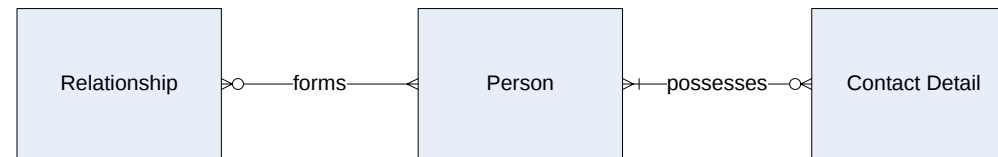


Figure IA-12: People Hub Conceptual Data Model

A1.1 Person Entity

Data Entity Name	Person
Description	Personal details of a citizens or residents
Security Classification	Internal Use Only
Data Entity Source	Royal Oman Police (ROP)
Frequency of Update	Daily

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1.	CivilNumber	Unique number assigned to a person	String(14)		ROP	This is an 8 digit number registered in the Civil ID card.

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
2.	PersonEnglishFirstName	First name of the person in English	String(25)		ROP	
3.	PersonEnglishSecondName	Second name of the person in English	String(25)		ROP	Father's name for a citizen
4.	PersonEnglishThirdName	Third name of the person in English	String(25)		ROP	Grand father's name for a citizen
5.	PersonEnglishFourthName	Fourth name of the person in English	String(25)		ROP	Great grand father's name for a citizen
6.	PersonEnglishFamilyName	Family name of the person in English	String(25)		ROP	Family name for a citizen
7.	PersonEnglishTribeName	Tribe name of the person in English	String(25)		ROP	Tribe's name for a citizen
8.	PersonArabicFirstName	First name of the person in Arabic	String(25)	Must support Arabic	ROP	
9.	PersonArabicSecondName	Second name of the person in Arabic	String(25)	Must support Arabic	ROP	Father's name for a citizen
10.	PersonArabicThirdName	Third name of the person in Arabic	String(25)	Must support Arabic	ROP	Grand father's name for a citizen
11.	PersonArabicFourthName	Fourth name of the person in Arabic	String(25)	Must support Arabic	ROP	Great grand father's name for a citizen
12.	PersonArabicFamilyName	Family name of the person in Arabic	String(25)	Must support Arabic	ROP	Family name for a citizen
13.	PersonArabicTribeName	Tribe name of the person in Arabic	String(25)	Must support Arabic	ROP	Tribe's name for a citizen

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
14.	GenderCode	Gender of the person	String(1)		MOH	M – Male F – Female
15.	BirthDate	Date of birth	Date	dd/mm/yyyy	MOH	
16.	DeathDate	Date of death	Date	dd/mm/yyyy	MOH	
17.	BirthCountry	Country of birth	String(3)		MOH	Refer to Appendix C1 'Country'
18.	NationalityCode	Nationality of the person	String(5)		ROP	Refer to Appendix C5 'Nationality'
19.	MaritalStatusCode	Marital status of the person	String(2)		MOJ	Refer to Appendix C8 'Marital Status'
20.	OccupationCode	Occupation of the person	String(7)		MOMP	Refer to Appendix C6 'Occupation'
21.	EducationLevelCode	Educational level of the person	String(7)		MOE, MOHE	Refer to Appendix C7 'Education Level'
22.	EmploymentStatusCode	Employment status of the person	String(2)		MOMP	1 – Working 2 – Non working 3 – Retired
23.	HealthStatusCode	Health status of the person	String(1)		MOH	1 – Healthy 2 – Disabled
24.	BloodGroupType	Type of blood group of the person	String(2)		MOH	1 – A+ 2 – B- 3 – B+ 4 – B- 5 – O+ 6 – O- 7 – AB+

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
						8 – AB- 9 – NA
25.	CardExpiryDate	Date of expiry of the ID card	Date	dd/mm/yyyy	ROP	
26.	PersonPhoto	Photo of the person	BLOB		ROP	Photo image file

A1.2 Contact Detail Entity

Data Entity Name	ContactDetail
Description	Contact information of a person
Security Classification	Confidential
Data Entity Source	Royal Oman Police (ROP)
Frequency of Update	Daily

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1.	CivilNumber	Unique number assigned to a person	String(14)		ROP	
2.	AddressTypeCode	Type of address of the person	String(2)		ROP	Refer to Appendix C9 'Address Type'
3.	CountryCode	Country of the address	String(3)		ROP	Refer to Appendix C1 'Country'
4.	RegionCode	Region of the address	String(5)		ROP	Refer to Appendix C2 'Region'
5.	WilayatCode	Wilayat of the address	String(5)		ROP	Refer to Appendix C3 'Wilayat'
6.	TownCode	Town or village of the address	String(5)		ROP	Refer to Appendix C4 'Town'
7.	BlockNumberCode	Block number of the address	String(7)		ROP	

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
8.	StreetArabicName	Street name of the address in Arabic	String(60)	Must support Arabic	ROP	
9.	StreetEnglishName	Street name of the address in English	String(60)		ROP	
10.	WayNumber	Way number of the address	Number(7)		ROP	
11.	LaneNumber	Lane number of the address	Number(7)		ROP	
12.	BuildingNumber	Building number of the address	String(7)		ROP	
13.	POBoxNumber	PO box number	Number(7)		ROP	
14.	PostalOfficeCode	Post office where the PO box is located	String(7)		ROP	
15.	PostalCode	Postal or zip code of the address	Number(7)		ROP	Meant to capture foreign address
16.	City	City of the address	String(25)		ROP	Meant to capture foreign address
17.	StateProvince	State or province of the address	String(25)		ROP	Meant to capture foreign address
18.	TelephoneNumber	Telephone number (land line)	String(20)		ROP	
19.	MobileNumber	Mobile/GSM phone number	String(20)		ROP	
20.	Email	Email address	String(50)		ROP	

A1.3 Relationship Entity

Data Entity Name	Relationship
Description	Details of the relationship between two person
Security Classification	Confidential
Data Entity Source	Royal Oman Police (ROP)
Frequency of Update	Daily

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1.	CivilNumber	Civil number of the person	String(14)		ROP	Captures the civil number of the husband, father or mother
2.	RelatedCivilNumber	Civil number of the person related to	String(14)		ROP	Captures the civil number of the wife or child
3.	RelationshipType	Type of relationship	String(1)		ROP	H – Husband F – Father M – Mother

A2. Establishment Hub

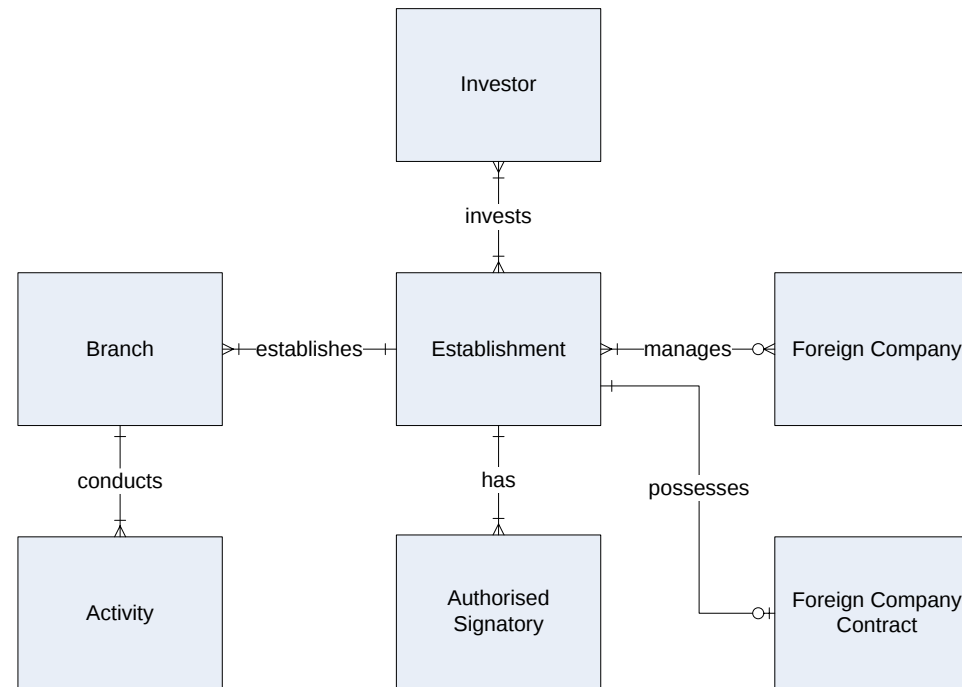


Figure IA-13: Establishment Hub Conceptual Data Model

A2.1 A2.1 Establishment Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1.	CompanyRegistrationNumber	Registration number of the commercial entity	String(255)		MOCI	De facto, it is 7 characters long and numeric
2.	FullArabicName	Full name of company in Arabic	String(255)		MOCI	
3.	FullEnglishName	Full name of company in English	String(255)		MOCI	
4.	ShortArabicName	Short name of company in Arabic	String(255)		MOCI	Not used
5.	ShortEnglishName	Short name of company in English	String(255)		MOCI	Not used
6.	CapitalCash	Capital in cash	Number(20)	Accurate to 3 decimal	MOCI	

				places NNNN.NNN		
7.	CapitalAsset	Capital in assets	Number(20)	Accurate to 3 decimal places NNNN.NNN	MOCI	
8.	CapitalTotal	Capital in total	Number(20)	Accurate to 3 decimal places NNNN.NNN	MOCI	
9.	ShareTotal	Total shares of the company	Number(20)	Has to be a positive integer	MOCI	
10	ShareValue	Value of individual share	Number(20)	Accurate to 3 decimal places NNNN.NNN	MOCI	
11	LegalStatusCode	Legal Status Code	String(50)		MOCI	Refer to Appendix C10

						'Company Legal Status'
12	EstablishmentDate	Date of establishment	Date	dd/mm/yyyy	MOCI	
13	CompanyPeriod	Period of time the company will be registered for	Number(10)		MOCI	Length of period specified during registration, after which the company registration expires and has to be renewed
14	FiscalYear	Fiscal year end date for the company	String(4)		MOCI	Declared end of company

						fiscal year end
15	LastBudgetDate	Date of the latest annual report submitted by the company	Date	dd/mm/yyyy	MOCI	
16	RegistrationStatus	Company registration status	String(50)		MOCI	Refer to Appendix C11 'Company Registration Status'
17	RegistrationDate	Date of initial company registration	Date	dd/mm/yyyy	MOCI	
18	RegistrationExpiryDate					Not recorded
19	RegistrationCancellationDate	Date of registration cancellation	Date	dd/mm/yyyy	MOCI	
20	RegistrationSuspensionDate	Date of registration suspension	Date	dd/mm/yyyy	MOCI	

21	RegistrationRenewalDate					Not recorded
22	RegistrationReservedDate					Not recorded
24	CompanyBlockNumber	The block number where the company is situated	Number (8)		MOCI	
25	CompanyBuildingNumber	The building number where the company is situated	String (10)		MOCI	
26	CompanyEmail	The email of the company	String (100)		MOCI	
27	CompanyFax	The fax number of the company	String (100)		MOCI	
28	CompanyMobile	The GSM number of the company	String (100)		MOCI	
29	CompanyPhone	The phone number of the company	String (100)		MOCI	
30	CompanyLatitude	Latitude of the company location	Number (8)	Six decimal places	MOCI	
31	CompanyLongitude	Longitude of the company location	Number (8)	Six decimal places	MOCI	
32	CompanyPostalCode	Postal code of the company			MOCI	

33	CompanyStreetAr	Arabic street name of the company's address	String (255)		MOCI	
34	CompanyStreetEn	English street name of the company's address	String (255)		MOCI	
35	CompanyPOBox	PO Box of the company	Number (8)		MOCI	
36	CompanyWayNo	Way number where the company is situated	Number (10)		MOCI	
37	CompanyLocation	Geographical Area where the company is situated	Number (19)		MOCI	

Foreign Company Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	ForeignCompanyEnglishName	Name of the foreign company in English	String(200)		MOCI	
2	ForeignCompanyArabicName	Name of the foreign company in Arabic	String(200)	Must support Arabic	MOCI	
3	HeadQuarterCountry	Country where the parent company is located	Number (3)		MOCI	Country ISO code

4	LegalForm	Legal form of the foreign company	String (50)		MOCI	
5	EstablishmentDate	Date of establishment of the foreign company	Date	dd/mm/yyyy	MOCI	
13	Address	The address of the foreign parent company	String(120)		MOCI	
14	RegistrationCode	Equivalent of commercial registration number in other countries	String (40)		MOCI	
15	SubjectToForeignInvestment	Indicator whether or not the parent foreign company has foreign investors	Number (1)		MOCI	Since GCC countries are treated similarly to local companies, there is need to differentiate between natural

						GCC companies and foreign ventures in GCC countries
--	--	--	--	--	--	---

A2.2 Foreign Company Contract Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	EntityArabicName	Arabic name of the foreign company holding a contract	String (200)	Must support Arabic	MOCI	
2	EntityEnglishName	English name of the foreign company holding a contract	String (200)		MOCI	
5	ContractStartDate	Start date of the contract	Date	dd/mm/yyyy	MOCI	
6	ContractEndDate	End date of the contract	Date	dd/mm/yyyy	MOCI	
8	ContractCopy	Actual contract copy	File		MOCI	

A2.3 Investor Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	Shares	Number of shares held by the investor	Number (14)		MOCI	
2	InvestorDesignation	Designation of the investor	String (20)		MOCI	
3	RegistrationDate	Date of registration of the investor	Date	dd/mm/yyyy	MOCI	
4	EndDate	End date of an investment	Date	dd/mm/yyyy	MOCI	
5	InvestorEnglishName	Investor name in English	String (120)		MOCI	
6	InvestorArabicName	Investor name in Arabic	String (120)		MOCI	
7	InvestorGender	Gender of the investor	String (1)		MOCI	
8	Nationality	Nationality of the investor	Number (3)		MOCI	Country ISO code
9	ResidenceCountry	Country of residence of the investor	Number (3)		MOCI	Country ISO code
10	ArabicAddress1	Address of residence in Arabic			MOCI	Not collected for persons. For Omani entity
11	ArabicAddress2	Address of residence in Arabic			MOCI	
12	EnglishAddress1	Address of residence in English			MOCI	

13	EnglishAddress2	Address of residence in English			MOCI	investors see the Establishment entity. For foreign company investors see below
14	PhoneNumber	Investor phone number	Number (20) + String (100)		MOCI	Contains country code + phone number
15	FaxNumber	Investor fax number	Number (20) + String (100)		MOCI	Contains country code + fax number
16	MobileNumber	Investor GSM number	Number (20) + String (100)		MOCI	Contains country code + mobile number
17	EmailAddress	Investor Email	String (100)		MOCI	

19	BirthDate	Investor birthdate	Date	dd/mm/yyyy	MOCI	
21	IDNumber	Civil number of the investor	String (20)		MOCI	
22	CRNumber	Company registration number of the investor	String(255)		MOCI	
23	EntityInvestorEnglishName	Name of investing entity in English	String(200)		MOCI	String(200)
24	EntityInvestorArabicName	Name of investing entity in Arabic	String(200)	Must support Arabic	MOCI	String(200)
25	EntityInvestorLegalStatus	Legal status of the investing entity	String (50)		MOCI	
26	Address	Address of the investor	String(120)		MOCI	
27	HeadquarterCountry	Country of origin of the foreign company investor	Number (3)		MOCI	Country ISO code
28	PassportNo	Passport number of the person	String (20)		MOCI	
29	PassportCountry	Country that issued the investor's passport	Number (3)		MOCI	Country ISO code
30	PassportIssueDate	Date when passport was issued	Date	dd/mm/yyyy	MOCI	

A2.4 Place of Activity (Replacement of Branch) Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	LocationID	Location of the place of activity	Number (8)		MOCI	This is the code of the location where the place of activity is situated
2	PostalCode	Postal code of the place of activity	String (20)		MOCI	
3	POBox	PO Box of the place of activity	Number (8)		MOCI	
4	StreetArabicName	Name of street in Arabic	String (255)		MOCI	
5	StreetEnglishName	Name of street in English	String (255)		MOCI	
6	WayNumber	Way number of the residential property	Number (20)		MOCI	
7	BuildingNumber	Building number of the residential property	String (10)		MOCI	
9	PhoneNumber	Land line of the residential property	Number (20)		MOCI	Contains country code +

						phone number
10	FaxNumber	Fax line of the place of activity	Number (20)		MOCI	Contains country code + fax number
11	MobileNumber	Mobile/GSM phone number	Number (20)		MOCI	Contains country code + mobile number
12	EmailAddress	Email	String (100)		MOCI	
13	RegistrationDate	Date of registration of the place of activity	Date	dd/mm/yyyy	MOCI	
14	CancellationDate	Date of cancellation of the place of activity	Date	dd/mm/yyyy	MOCI	
15	BranchId	Identificator of the place of activity	String (100)		MOCI	
17	POAStatus	Status of the place of activity	String (20)		MOCI	
18	BlockNumber	Block number where the POA is situated	Number (8)		MOCI	

19	UnitNumber	Unit number where the POA is situated	String (50)		MOCI	
20	Latitude	Latitude of the POA location	Number (8)	Six decimal places	MOCI	
21	Longitude	Longitude of the POA location	Number (8)	Six decimal places	MOCI	

A2.5 Activity Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	ISICCode	ISIC Code	Number (10)		MOCI	
2	RegistrationDate	Date of registration	Date	dd/mm/yyyy	MOCI	
3	CancellationDate	Date of cancellation	Date	dd/mm/yyyy	MOCI	
4	ActivityArabicDescription	Description of activity in Arabic	String (1000)	Must support Arabic	MOCI	
5	ActivityEnglishDescription	Description of activity in English	String (1000)		MOCI	

A2.6 Authorized Signatory Entity

	Data Element Name	Description	Type	Validation	Data Element Source	Remarks
1	SignatoryDesignation	Designation code of the signatory	String (50)		MOCI	
2	SignatoryType	Type of signatory	String (10)		MOCI	
3	AuthorisationLimit	Limit of the financial authorization	Number (20)	Accurate to 3 decimal places	MOCI	
5	RegistrationDate	Date when signatory was registered	Date	Dd/mm/yyyy	MOCI	
6	EndDate	End date of authorisation	Date	Dd/mm/yyyy	MOCI	
7	HasAdministrative	Indicator that signatory has administrative authority	Number (1)		MOCI	
8	HasFinancial	Indicator that signatory has financial authority	Number (1)		MOCI	
9	HasTechnical	Indicator that signatory has technical authority	Number (1)		MOCI	
10	HasFull	Indicator that signatory has full authority	Number (1)		MOCI	

A3. Land Hub



Figure IA-14: Land Hub Conceptual Data Model

Purpose of Land Hub

Land data facilitates an agency in strategic planning (policy and operation) and decision making, therefore, correctness and accuracy of the data is critical. Consolidating land data reduces the redundancy currently created across the various agencies and provides an up-to-date source of reference for all interested agencies. Land data could potentially be provided to private businesses (subject to national laws, regulations and security considerations) to provide value-added services (e.g. sales of property, shortest driving route).

Land data is currently kept and used by more than ten agencies. Some of these agencies include:

- Ministry of Housing
- Muscat Municipality
- Supreme Council for Planning.

The following Land Hub architecture has been identified based on data collected from the above stated agencies. Data was also obtained from the 'Study for Establishing a National Geographic Information System Authority (NGISA) in Sultanate of Oman' report produced by Ministry of National Economy on January 2005.

A3.1 Land Entity

Data Entity Name	Land
Description	Details of the land area bounded within the Sultanate of Oman
Security Classification	Internal Use Only
Data Entity Source	Supreme Council for Planning
Frequency of Update	Daily

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
1.	Region	Boundaries of the regions and governorates within the Sultanate of Oman.	Geometry Polygon	Closed polygon. Must not overlap another region.	▪ RegionCode(String)	Ministry of Information, National Survey Authority		
2.	Wilayat	Boundaries of the wilayats within a region.	Geometry Polygon	Closed polygon. Must not overlap another wilayat.	▪ WilayatCode(String)	Ministry of Information		
3.	Town	Boundaries of the towns within a Wilayat.	Geometry Polygon	Closed polygon. Must not overlap another town.	▪ TownCode(String)	Ministry of Information		
4.	Block	Boundaries of the blocks within a town.	Geometry Polygon	Closed polygon. Must not overlap another block.	▪ BlockNumberCode(String)	Ministry of Housing		
5.	Plot	Boundaries of the plots of land.	Geometry Polygon	Closed polygon. Must not overlap another plot.	▪ PlotIDNumber(Number)	Muscat Municipality, Sohar Municipality,		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
					- PlotAreaSizeNumber(Num ber) - PlotUseCode(String)	Dhofar Municipality, Regional Municipality		
6.	Address	Location of addresses.	Geometry Point		- AddressIDNumber(Nu mber) - RegionCode(String) - WilayatCode(String) - TownCode(String) - BlockNumberCode(Stri ng) - RoadID(String) - BuildingIDNumber(Nu mber) - AddressUseCode(Strin g)	Muscat Municipality, Dhofar Municipality, Ministry of Regional Municipality, Ministry of Housing		
7.	Building	Outline of building structures.	Geometry Polygon	Closed polygon. Must not overlap another building.	BuildingIDNumber(Nu mber)	Muscat Municipality, Sohar Municipality, Dhofar Municipality, Regional Municipality		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
8.	Landmark	Location of prominent objects (e.g. clock tower, monument).	Geometry Point		- AddressIDNumber(Nummber) - LandmarkName(String)	Muscat Municipality, Municipality, Dhofar Municipality, Regional Municipality		
9.	Road	Line indicating the roads.	Geometry Line	Must not overlap another building.	- RoadID(String) - RoadName(String)	Ministry of Transport and Communications, Muscat Municipality, Sohar Municipality, Petroleum Development Oman		
10.	Parking Area	Outline of parking areas.	Geometry Polygon	Closed polygon. Must not overlap another parking area.	RoadSurfaceType(String)	Public Authority of Electricity and Water, National Survey Authority, Muscat Municipal, Sohar Municipality		
11.	Geodetic Control Point	Control/survey points which will include surface levelling.	Geometry Point		- PointID(String) - PointType(String)	National Survey Authority		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
12.	Topographic Name	Name of a location.	Geometry Point		- NameID(String) - NameCategoryCode(String)	National Survey Authority, Ministry of Information		
13.	Park	Outline of parks.	Geometry Polygon	Closed polygon. Must not overlap another park.	LocationName(String)	Supreme Council of Planning, Public Authority of Electricity and Water, National Survey Authority, Sohar Municipality		
14.	Open Space	Outline of parks, open spaces, playgrounds, sports fields and green areas.	Geometry Polygon	Closed polygon. Must not overlap another open space.	- OpenSpaceName(String) - OpenSpaceType(String)	Supreme Council of Planning, Public Authority of Electricity and Water, National Survey Authority, Sohar Municipality		
15.	Electricity	Line indicating various forms of electrical cables.	Geometry Line		- Medium(String) - Status(String)	Public Authority of Electricity and Water, Sohar Municipality		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
16.	Oil and Gas	Lines indicating pipelines and installations carrying oil or gas.	Geometry Line		- Medium(String) - Status(String)	Petroleum Development Oman		
17.	Telecommunication	Line indicating various forms of telecommunication lines and installations.	Geometry Line		- Medium(String) - Status(String)	Omantel, Nawras		
18.	Water	Line indicating pipelines and installations carrying water.	Geometry Line		- Medium(String) - Status(String)	Public Authority of Electricity and Water, Sohar Municipality		
19.	Wastewater	Line indicating pipelines and installations carrying wastewater and sewerage.	Geometry Line		- Medium(String) - Status(String)	Muscat Municipality, Sohar Municipality, Oman Wastewater Service Company		
20.	Catchment Area	Outline of areas which drains naturally to a wadi.	Geometry Polygon			Minister of Environment and Climate Affairs		
21.	Coastline	Line between the sea and land area.	Geometry Line			National Survey Authority		
22.	Dam	Outline of man-made barriers to contain the flow of water.	Geometry Polygon			Minister of Environment and		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
						Climate Affairs, Public Authority of Electricity and Water		
23.	Falaj	Outline of man-made structures to channel water for irrigation.	Geometry Polygon			Minister of Environment and Climate Affairs, Public Authority of Electricity and Water		
24.	Flood Zone	Outline of areas prone to flooding.	Geometry Polygon			Minister of Environment and Climate Affairs, Public Authority of Electricity and Water		
25.	Wadi	Outline of dry or seasonal river beds.	Geometry Polygon		▪ WadiName(String)	Minister of Environment and Climate Affairs, Public Authority of Electricity and Water, National Survey Authority		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
26.	Well	Location of holes drilled into the ground to access water source	Geometry Point			Minister of Environment and Climate Affairs, Public Authority of Electricity and Water		
27.	Digital Elevation Model	Elevation data of contoured surfaces.	Geometry Point			Muscat Municipality, National Survey Authority		
28.	Orthophoto	Aerial photograph images.	N.A.			National Survey Authority		
29.	Satellite Image	Satellite photograph images.	N.A.			Supreme Council for Planning, Muscat Municipality		
30.	Historical Site	Outline of archaeological and antiquity sites.	Geometry Polygon			Ministry of Heritage and Culture		
31.	Farm and Plantation	Outline of farms and cultivated land area.	Geometry Polygon			Supreme Council for Planning		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
32.	Protected Area	Outline of preservation areas holding exceptional natural characteristics (e.g. rich biodiversity, sites of outstanding beauty).	Geometry Polygon			Ministry of Environment and Climate Affairs		
33.	Wildlife	Outline of areas containing animal living in a natural environment.	Geometry Polygon			Minister of Environment and Climate Affairs , Ministry of Heritage and Culture		
34.	Vegetation	Outline of areas containing trees and plants	Geometry Polygon			Supreme Council for Planning		
35.	Pollution	Outline of areas defined by the state of harmful environmental contamination.	Geometry Polygon			Minister of Environment and Climate Affairs		
36.	Soil	Outline of areas defined by its minerals and organic material makeup.	Geometry Polygon			Ministry of Agriculture & Fisheries		
37.	Land Use	Outline of areas defined by its planned utilisation.	Geometry Polygon			Supreme Council for Planning, Ministry of Housing		

	Data Layer Name	Description	Type	Validation	Textual Attribute*	Data Source	Layer	Remarks
38.	Agricultural	Location with statistical figures on agricultural.	Geometry Point			Ministry of Agriculture & Fisheries		
39.	Demographic	Location with statistical figures on population demographic.	Geometry Point			Supreme Council for Planning		
40.	Socio Economic	Location with statistical figures on population socio economic status.	Geometry Point			Supreme Council for Planning		

* Note: As all the agencies, from which the information was collected, uses geospatial application tools (i.e. ArcGIS), data type length in the 'Textual Attribute' is therefore not available.

Appendix B – Other Data Sources

The purpose of this appendix is solely for reference and use by the government agencies when planning or designing an application system. This appendix is not meant to be comprehensive but may subsequently be enhanced.

These other data sources are from the perspective of documenting data that are currently with key ministries that are associated to education and employment. This data might be complementary while developing some solutions or considering enhancement to the data hub (e.g. Person) that is already defined as part of this document.

The data dictionary is divided into sections where each section addresses ministries and their key data entities. This is as denoted below:

- 1 Ministry (e.g. Ministry of Education)
 - 1.1 Key data entities (e.g. Student)

Note: In the data entities, only key fields captured are represented in the data dictionary. Some rationalisation has been done to align with the naming convention of this document.

B1. Ministry of Education

The following are key data entities available from the Ministry of Education.

Data Entity	Description
Student	Personal particulars of a student
School	Details of a school
Result	Details of the result obtained by a student
Transfer History	Details of the transfer history of a student

B1.1 Student Entity

Data Entity Name	Student
Description	Personal particulars of a student
Data Entity Source	Ministry of Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Unique registration number assigned to the student	String(5)		
2.	CivilNumber	Civil number of the student	String(50)		
3.	StudentName	Name of the student	String(200)		
4.	SchoolCode	School the student is studying in	Number(5)		
5.	StudentGradeCode	Grade attained by the student	Number(5)		
6.	ClassNumber	Class attended by the student	Number(5)		
7.	GenderCode	Gender of the student	String(50)		
8.	NationalityCode	Nationality of the student	String(100)		

B1.2 School Entity

Data Entity Name	School
Description	Details of a school
Data Entity Source	Ministry of Education

	Name	Description	Format (length)	Validation	Remarks
1.	SchoolCode	Unique code used to identify each school	Number(5)		
2.	SchoolName	Name of the school	String(60)		
3.	AcademicYear	Academic year of the school record	String(21)		
4.	RegionCode	Region where the school is located	Number(20)		
5.	WilayatCode	Wilayat where the school is located	Number(20)		
6.	TownCode	Town or village where the school is located	Number(20)		
7.	SchoolAddress	Address of the school	String(60)		
8.	SchoolGenderType	Gender of student accepted by the school	Number(4)		

	Name	Description	Format (length)	Validation	Remarks
9.	SchoolDirectorGeneralName	Name of the Director General overseeing the school	String(60)		
10.	SchoolManagerName	Name of the school's manager	String(60)		
11.	WebAddress	Web address (URL) of the school	String(50)		
12.	TelephoneNumber	Telephone number of the school	String(15)		
13.	FaxNumber	Fax number of the school	String(15)		

B1.3 Result Entity

Data Entity Name	Result
Description	Details of the result obtained by a student
Data Entity Source	Ministry of Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	Number(5)		
2.	SubjectCode	Unique identifier of the subject taken by the student	String(6)		
3.	SubjectName	Name of the subject	String(50)		
4.	Result	Result of the subject	Number(5)	Accurate to 2 decimal place	

B1.4 Transfer History Entity

Data Entity Name	TransferHistory
Description	Details of the transfer history of a student
Data Entity Source	Ministry of Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	Number(5)		
2.	PreviousSchoolName	School the student was previously from	String(100)		
3.	CurrentSchoolName	School the student is currently studying in	String(100)		

B2. Ministry of Higher Education

The following are key data entities available from the Ministry of Higher Education.

Data Entity	Description
Student	Personal particulars of a student
Address	Address of a student
Qualification	Details of the latest qualification of a student
Scholarship	Details of the scholarship obtained by the student

B2.1 Student Entity

Data Entity Name	Student
Description	Personal particulars of a student
Data Entity Source	Ministry of Higher Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	String(15)		
2.	CivilNumber	Civil number of the student	String(15)		
3.	TitleCode	Salutation title	Number(1)		
4.	EnglishFirstName	First name in English	String(200)		
5.	EnglishSecondName	Second name in English	String(200)		
6.	EnglishThirdName	Third name in English	String(200)		
7.	EnglishLastName	Last name in English	String(200)		
8.	ArabicFirstName	First name in Arabic	String(200)		
9.	ArabicSecondName	Second name in Arabic	String(200)		
10.	ArabicThirdName	Third name in Arabic	String(200)		
11.	ArabicLastName	Last name in Arabic	String(200)		
12.	GenderCode	Gender of the student	String(1)		

	Name	Description	Format (length)	Validation	Remarks
13.	MaritalStatusCode	Marital Status of the student	String(1)		
14.	IDCardIssueDate	Date of issue of the ID card	Date	dd/mm/yyyy	
15.	IDCardExpiryDate	Date of expiry of the ID card	Date	dd/mm/yyyy	
16.	StudentPassNumber	Unique number of the student pass	String(15)		
17.	StudentPassIssueDate	Date of issue of the student pass	Date	dd/mm/yyyy	
18.	StudentPassExpiryDate	Date of expiry of the student pass	Date	dd/mm/yyyy	
19.	StudentStatusCode	Current status of the student	Number		
20.	StudyType	Type of study	String(2)		
21.	BirthDate	Date of birth of the student	Date	dd/mm/yyyy	
22.	BirthCountryCode	Country of birth	Number		
23.	AcademicYear	Year of academic study	Number		

B2.2 Address Entity

Data Entity Name	Address
Description	Address of a student
Data Entity Source	Ministry of Higher Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	String(15)		
2.	Address	Address of the student	String(255)		
3.	TownCode	Town or village of the address	String(100)		
4.	HomeTelephoneNumber	Home telephone number (land line)	String(15)		
5.	WorkTelephoneNumber	Workplace telephone number (land line)	String(15)		
6.	MobileNumber	Mobile GSM number	String(15)		
7.	POBoxNumber	PO box number	String(15)		
8.	PostCode	Postal code of the address	String(15)		
9.	EmailAddress	Email address of the student	String(150)		

B2.3 Qualification Entity

Data Entity Name	Qualification
Description	Details of the latest qualification of a student
Data Entity Source	Ministry of Higher Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	String(15)		
2.	SchoolType	Type of school	Number(2)		Government or private school
3.	SchoolStudyType	Type of study	Number(2)		
4.	SchoolName	Name of the school	String(150)		
5.	SchoolAddress	Address of the school	String(255)		
6.	SchoolGraduationDate	Date when the student graduated	Date		
7.	SchoolGraduationAverage	Average result upon graduation	Number(6)	Accurate to 3 decimal place	GPA
8.	SchoolQualificationLevel	Qualification level attained by the student	Number(2)		
9.	SchoolTotalMark	Total mark scored by the student	String(5)		
10.	SchoolCountryCode	Country of the school	Number		

	Name	Description	Format (length)	Validation	Remarks
11.	CertificateCode	Certificate obtained by the student upon graduation	Number		
12.	UniversityCode	University attended by the student	Number		
13.	MajorCode	Major studied by the student	Number		
14.	UniversityStartDate	Date when the student started study in the university	Date		
15.	UniversityGraduationDate	Date when the student graduated from the university	Date		
16.	UniversityGraduationAverageNumber	Average result upon graduation	Number(9)	Accurate to 3 decimal place	
17.	UniversityGraduationGradeType	Grade obtained by the student	String(50)		
18.	UniversityTotalMarkNumber	Total marks scored in University by the student	String(2)		

B2.4 Scholarship Entity

Data Entity Name	Scholarship
Description	Details of the scholarship obtained by the student
Data Entity Source	Ministry of Higher Education

	Name	Description	Format (length)	Validation	Remarks
1.	StudentNumber	Registration number of the student	String(15)		
2.	ScholarshipType	Type of scholarship	Number		
3.	SponsorCode	Code of the sponsor	Number		
4.	PrimaryMajorCode	Major studied by the student	Number		
5.	SecondaryMajorCode	Second major studied by the student	Number		
6.	UniversityCode	University attended by the student	Number		
7.	UniversityCollegeCode	College attended by the student	Number		
8.	CertificateCode	Certificate obtained by the student upon graduation	Number		
9.	CountryCode	Country where the university is located	Number(3)		

	Name	Description	Format (length)	Validation	Remarks
10.	StartDate	Date when the student obtained the scholarship	Date		
11.	ExpiryGraduationDate	Final date that the student has to graduate	Date		
12.	GraduationDate	Date of graduation of the student	Date		

B3. Ministry of Manpower

The following are key data entities available from the Ministry of Manpower.

Data Entity	Description
Manpower Register	Details of a person registered with Ministry of Manpower
Sponsor	Details of a sponsor primarily from Ministry of Commerce and Industry and Oman Chamber of Commerce and Industry.
Employee Movement	Details of the job history of a person

B3.1 Manpower Register Entity

Data Entity Name	ManpowerRegister
Description	Details of a person registered with Ministry of Manpower
Data Entity Source	Ministry of Manpower

	Name	Description	Format (length)	Validation	Remarks
1.	RegistrationNumber	Unique identification number of the person	Number(15)		
2.	CivilNumber	Civil ID number of a person	String(10)		
3.	CategoryCode	Indicator of whether the person is working in the private or public sector	Number(3)		
4.	SubCategoryCode	Sub category of sector the person is working in	Number(3)		
5.	PassportNumber	Passport number of a person	String(25)		
6.	PassportIssueDate	Issue date of the passport	Date		
7.	RegistrationOffice	Manpower office where the registration took place	Number(2)		
8.	RegistrationDate	Date of the registration	Date		
9.	ArabicFirstName	First name of the person in Arabic	String(25)		

	Name	Description	Format (length)	Validation	Remarks
10.	ArabicSecondName	Second name of the in Arabic	String(25)		
11.	ArabicThirdName	Third name of the person in Arabic	String(25)		
12.	ArabicTribeName	Tribe name of the person in Arabic	String(25)		
13.	EnglishFirstName	First name of the person in English	String(40)		
14.	EnglishSecondName	Second name of the person in English	String(40)		
15.	EnglishThirdName	Third name of the person in English	String(40)		
16.	EnglishTribeName	Tribe name of the person in English	String(40)		
17.	BirthDate	Date of birth	Date		
18.	BirthPlace	Place of birth	String(25)		
19.	GenderType	Gender of the person	String(1)		
20.	BloodGroupType	Type of blood group of the person	String(15)		
21.	MaritalStatusCode	Marital status of the person	Number(2)		
22.	PermanentRegionCode	Region of the permanent address	Number(3)		
23.	PermanentWilayatCode	Wilayat of the permanent address	Number(3)		
24.	PermanentTownCode	Town or village of the permanent address	Number(3)		

	Name	Description	Format (length)	Validation	Remarks
25.	PermanentStreetAddress	Street name of the permanent address	String(50)		
26.	PermanentHouseAddress	House of the permanent address	String(25)		
27.	PermanentWayNumber	Way number of the permanent address	String(25)		
28.	PermanentComplexNumber	Building complex number of the permanent address	String(25)		
29.	ResidentialRegionCode	Region of the residential address	Number(3)		
30.	ResidentialWilayatCode	Wilayat of the residential address	Number(3)		
31.	ResidentialTownCode	Town or village of the residential address	Number(3)		
32.	ResidencialStreetAddress	Street name of the residential address	String(50)		
33.	ResidencialHouseAddress	House of the residential address	String(25)		
34.	ResidentialWayNumber	Way number of the residential address	String(25)		
35.	ResidentialComplexNumber	Building complex number of the residential address	String(25)		
36.	ResidentialPOBoxNumber	PO box number of the residential address	String(5)		
37.	ResidentialPostalCode	Postal code of the residential address	String(10)		

	Name	Description	Format (length)	Validation	Remarks
38.	ResidentialNationalityCode	Country code of the residential address	Number(3)		
39.	PrimaryTelephoneNumber	Main telephone number	Number(15)		
40.	SecondaryTelephoneNumber	Alternate telephone number	Number(15)		
41.	QualificationFlag	Indicator of whether the person has any educational qualification	Number(1)		
42.	VocationalFlag	Indicator of whether the person has attended any training institute	Number(1)		
43.	HealthStatus	Health condition of the person	Number(1)		
44.	HandicapType	Type of handicap suffered by the person	Number(1)		
45.	ExperienceFlag	Indicator of whether the person has any working experience	Number(1)		
46.	JobStatus	Current job status of the person	Number(1)		Working or not working
47.	DrivingFlag	Indicator of whether the person possesses a driving license	Number(1)		
48.	DrivingType	Type of driving license	String(1)		
49.	NationalityCode	Nationality of the person	Number(3)		
50.	EmploymentJobStatus	Indicator of whether the person has been offered a job by MOMP	Number(2)		e.g. Recommended
51.	EmploymentBlockStatus	Indicator of whether the person has been blacklisted	Number(2)		

	Name	Description	Format (length)	Validation	Remarks
52.	DesignationCode	Designation of the person	Number(9)		
53.	OccupationCode	Occupation of the person	String(7)		
54.	SponsorNumber	Sponsor of the person	Number(10)		
55.	CurrentEmploymentDate	Date when the person was employed	Date		
56.	EducationCode	Education level obtain by the person	Number(3)		Degree or training certificate
57.	BasicSalaryAmount	Basic salary of the person	Number(12)	Accurate to 3 decimal places	
58.	TotalAllowance	Total allowance received by the person	Number(12)	Accurate to 3 decimal places	
59.	PrivateWork	Indicator of whether the person has other private occupation	String(1)		
60.	RegularSource	Indicator of whether the person has any regular income source	String(1)		
61.	SocialBenefitFlag	Indicator of whether the person is on social benefit	String(1)		Can be used by MOSD
62.	SocialBenefitNumber	Unique identifier for the social benefit account	Number(6)		
63.	TraineeFlag	Indicator of whether the person is receiving training from MOMP	String(1)		

	Name	Description	Format (length)	Validation	Remarks
64.	ActivityCode	Type of field the person is working in	Number(6)		
65.	SponsorBranchesID	Branch ID of the company sponsoring the person	Number(10)		
66.	BranchActivityID	Activity of the company sponsoring the person	Number(10)		
67.	SponsorOutsiderID	ID of the foreign company sponsoring the person	Number		
68.	MobileNumber	Mobile/GSM number of the person	Number(15)		

B3.2 Sponsor Entity

Data Entity Name	Sponsor
Description	Details of a sponsor primarily from Ministry of Commerce and Industry and Oman Chamber of Commerce and Industry.
Data Entity Source	Ministry of Manpower

	Name	Description	Format (length)	Validation	Remarks
1.	SponsorNumber	Unique identification number of the sponsor	Number(10)		
2.	SponsorTypeCode	Type of sponsor	Number(2)		
3.	LabourOfficeCode	Labour office that registered the sponsor	Number(3)		
4.	SponsorArabicName	Name of sponsor in Arabic	String(70)		
5.	SponsorEnglishName	Name of sponsor in English	String(50)		
6.	EstablishDate	Company established date	Date		
7.	InitialExpiredDate	Expiry date of company registration with MOCI	Date		
8.	SubsequentExpiredDate	Expiry date of registration with OCCI	Date		
9.	IDIssueDate	Date when the Civil ID card was issued	Date		

	Name	Description	Format (length)	Validation	Remarks
10.	IDExpiryDate	Date when the Civil ID card expires	Date		
11.	EndorseName	Authorised signatory of the sponsor	String(50)		
12.	NationalityCode	Nationality of the sponsor	Number(3)		When sponsor is a person
13.	JobEndorse	Job of the authorised signatory	String(30)		
14.	CapitalOwnership	Owner of the company	Number(2)		
15.	LegalFormCode	Type of company	Number(2)		
16.	GradeCode	Grade obtain from OCCI	Number(2)		
17.	Address	Address of the company or person	String(100)		
18.	RegionCode	Region of the permanent address	Number(3)		
19.	WilayatCode	Wilayat of the permanent address	Number(3)		
20.	TownCode	Town or village of the permanent address	Number(3)		
21.	POBoxNumber	PO box number of the address	String(20)		
22.	PostalCode	Postal code of the address	String(20)		
23.	PrimaryPhoneNumber	Main phone number	String(10)		
24.	SecondaryPhoneNumber	Alternate phone number	String(10)		

	Name	Description	Format (length)	Validation	Remarks
25.	FaxNumber	Fax number	String(10)		
26.	EmailAddress	Email address of the sponsor	String(100)		
27.	ContactPerson	Contact person when sponsor is a company	String(50)		
28.	WebAddress	Website URL address of the sponsor	String(50)		
29.	PassportNumber	Passport number of the sponsor	String(10)		
30.	CivilNumber	Civil ID number of the sponsor	String(10)		
31.	CategoryCode	Category of the company	String (1)		
32.	MainBranch	Location of the main branch	String(70)		
33.	RegistrationDate	Company registration date	Date		
34.	TotalCapital	Total capital of the sponsor	Number(11)		
35.	ExpiryTaxDate	Expiry of the tax date set by the Muscat taxation (MOF)	Date		
36.	SponsorWorkPlace	Work place of the sponsor	String (50)		
37.	Salary	Salary of the sponsor	Number (13)	Accurate to 3 decimal places	
38.	CompanyRegistrationNumber	Company registration number of the sponsor	Number (10)		

B3.4 Employee Movement Entity

Data Entity Name	EmployeeMovement
Description	Details of the job history of a person
Data Entity Source	Ministry of Manpower

	Name	Description	Format (length)	Validation	Remarks
1.	MovementIDNumber	Unique identifier for the movement record	Number(15)		
2.	ReferenceNumber	Vacancy reference number	Number(10)		
3.	VACDetailIDNumber	Vacancy detail reference number	Number(9)		
4.	RegistrationNumber	NMR registration number	Number(15)		
5.	RecordingOfficeCode	MOMP office that provided the recommendation	Number (3)		
6.	RejectionOfficeCode	MOMP office that rejected the application	Number (3)		
7.	RejectionCode	Reason for the rejection	Number (4)		
8.	InterviewOfficeCode	Office that conducted the interview	Number (3)		
9.	InterviewFlag	Indicator of whether the person was accepted or rejected	String (1)		

	Name	Description	Format (length)	Validation	Remarks
10.	SelectedOfficeCode	Office where job was offered to the person	Number (3)		Office that sets the person from unemployed to employed
11.	SelectedType	Appointment type of the job that was offered	String (1)		
12.	SelectedDate	Date the person was offered for the job	Date		
13.	SelectedSalary	Salary of the job that was offered	Number (9)		
14.	SelectedAllowance	Total allowance of the job that was offered	Number (9)		
15.	SelectedHAllowance	Housing allowance of the job that was offered	String (1)		
16.	SelectedTAllowance	Transport allowance of the job that was offered	String (1)		
17.	SelectedOAllowance	Other allowance of the job that was offered	String (1)		
18.	TerminationOfficeCode	Office where termination was recorded	Number (3)		
19.	TerminationDate	Date when the termination was recorded	Date		
20.	SponsorNumber	Unique identifier of the sponsor	Number (10)		
21.	ActivityCode	Business activity of the sponsor	Number (6)		
22.	OccupationCode	Occupation of the sponsor	String(7)		

	Name	Description	Format (length)	Validation	Remarks
23.	SponsorBranchNumber	Branch number of the sponsor	Number (9)		
24.	BranchActivityID	Business activity of the branch	Number (10)		
25.	TraStartDate	Training start date	Date		
26.	TraEndDate	Training end date	Date		
27.	InstituteID	Training institute	Number (9)		
28.	TrainingID	Course taken by the person	Number (9)		
29.	TrainingLevelID	Level of course taken	Number (9)		

B4. Ministry of Civil Services

The following are key data entity available from the Ministry of Civil Services.

Data Entity	Description
Employee	Details of a person employed under the civil service

B4.1 Employee Entity

Data Entity Name	Employee
Description	Details of a person employed under the civil service
Data Entity Source	Ministry of Civil Services

	Name	Description	Format (length)	Validation	Remarks
1.	EmployeeNumber	Unique identifier for the person employed by the government	Number(8)		
2.	CivilNumber	Unique number assigned to a person	Number(8)		
3.	EmployeeGroupCode	Employment group of the person	String(2)		
4.	EmployeeGrade	Grade level of the person	String(2)		
5.	AppointmentDate	Date when the person was employed by the ministry	Number(8)	YYYYMMDD	
6.	BirthDate	Date of birth	Number(8)	YYYYMMDD	
7.	BasicSalaryAmount	Salary of the person	Number(9)		
8.	ReligionCode	Religion practised by the person	String(2)		
9.	GenderCode	Gender of the person	String(1)		
10.	MaritalStatusCode	Marital status of the person	String(1)		

	Name	Description	Format (length)	Validation	Remarks
11.	DesignationCode	Designation of the person	Number(9)		
12.	NationalityCode	Country code of the person	Number(7)		
13.	AppointmentType	Type of appointment	Number(1)		e.g. Local or foreign
14.	EmployeeName	Name of the person	String(50)		
15.	MinistryCode	Ministry the person is working at	String(3)		
16.	MinistryBudgetingUnitCode	Budget code assigned to the ministry	String(5)		
17.	BranchCode	Branch of the ministry the person is working at	String(1)		
18.	DepartmentCode	Department of the ministry the person is working at	String(2)		