Ontario

Government of Ontario

Government of Ontario IT Standard (GO ITS)

GO-ITS Number 56.3

Information Modeling Standard

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Status: Approved

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Document History

DATE	SUMMARY
YYYY-MM-DD	**Created:** GO-ITS xx.x DRAFT v0.1
2007-08-08	**Created: GO-ITS 56.0 – Draft v1.0**
2007-12-19	**Approved:** Approved by IT Standards Council
2008-02-21	**Approved:** Approved by Architecture Review Board
2008-07-24	**Changed: GO-ITS 56.3 – v1.1.** Information Modeling Handbook – Appendices (4.x) changed to adopt the version number (1.x) from the GO-ITS 56.0 standard document. The changes to the Appendices are based on the latest Information Architecture (IA) artefact revisions as approved by the Architecture Review Board on July 24, 2008.
2009-09-24	**Changed: GO-ITS 56.3 – v1.2.** The changes to Appendix A were based on revisions to the Information Modeling Handbook completed in September 2009.
2009-12-08	**Changed: GO-ITS 56.3 – v1.3.** The changes to Appendix A were based on revisions to the Information Modeling Handbook completed in December 2009.
2011-01-11	**Changed: GO-ITS 56.3 – v1.4.** The changes to Appendix A were based on revisions to the Information Modeling Handbook completed in September 2010 and January 2011.
2013-03-26	**Changed: GO-ITS 56.3 – v1.5.** The changes to Appendix A were based on revisions to the Information Modeling Handbook completed in July 2012 and March 2013.
2015-11-24	**Changed: GO-ITS 56.3 – v1.6.** The changes to Appendix A were based on revisions to the Information Modeling Handbook completed in November 2015.

Table of Contents

1. Foreword

Government of Ontario Information Technology Standards (GO ITS) are the official publications on the IT standards adopted by the Ministry of Government Services for use across the government's IT infrastructure.

These publications support the responsibilities of the Ministry of Government Services (MGS) for coordinating standardization of Information & Information Technology (I&IT) in the Government of Ontario.

In particular, GO ITS describe where the application of a standard is mandatory and specify any qualifications governing the implementation of standards.

2. Introduction

2.1. Background and Rationale

Data modeling is an integral part of information modeling in the OPS. To that end the OPS has developed an Information Modeling Handbook (see Appendix A) that provides standards, guidelines and best practices in the field of data / information modeling for Data/Information Architects and Modelers.

In 2002 the Information Architecture Domain Working Group (IADWG) recognized the need to have a consistent approach for modeling information within the Ontario Government. A consistent modeling approach facilitates opportunities for integration, reuse and data sharing, and extends knowledge sharing between the business and the IT communities.

With the endorsement of the Corporate Architecture Core Team, IADWG published the first release of the Information Modeling Handbook (IMH) (see Appendix A) in August 2002.

The IMH (see Appendix A) provides standards, guidelines and best practices for information modeling and it reflects common industry standards and recommended practices across the OPS.

The IMH remains methodology and tool independent.

2.2. Target Audience

The standard applies to all Government of Ontario technology solutions providers, and all application development and integration initiatives.

The primary audience of the Standard is Data/Information Architects and Modellers, Database Administrators and anyone performing those roles. The secondary audience includes those performing the roles of Business Analysts, Data Stewards, Data Custodians, Quality Assurance and Project Managers.

2.3. Scope

The Information Modeling Standard (the Standard) must be followed by all OPS I&IT projects when developing data models.

2.4. Applicability Statements

2.4.1. Organization

All ministries and clusters are subject to Government of Ontario IT Standards.

All adjudicative and advisory agencies are subject to Government of Ontario IT Standards.

All other agencies that are using OPS information and information technology products or services are required to comply with Government of Ontario IT standards if they are subject to either the *Management and Use of I& IT Directive* OR Government of Ontario IT Standards by Memorandum of Understanding.

As new GO IT standards are approved, they are deemed mandatory on a go-forward basis (Go-forward basis means at the next available project development or procurement opportunity).

When implementing or adopting any Government of Ontario IT standards or IT standards updates, ministries, I&IT Clusters and applicable agencies must follow their organization's pre-approved policies and practices for ensuring that adequate change control, change management and risk mitigation mechanisms are in place and employed. For the purposes of this document, any reference to ministries or the Government includes applicable agencies.

2.5. Roles and Responsibilities

2.5.1. Contact Information

Accountable Role:
Title: Chief Architect
Ministry/Cluster: Treasury Board Secretariat
Division: I&IT Strategy and Cyber Security
Branch: I&IT Strategy, Policy and Enterprise Architecture

Responsible Organization(s):
Ministry/Cluster: Treasury Board Secretariat
Division: I&IT Strategy and Cyber Security
Branch: I&IT Strategy, Policy and Enterprise Architecture

Support Role (Editor):
Ministry/Cluster: Treasury Board Secretariat
Division: I&IT Strategy and Cyber Security
Branch: I&IT Strategy, Policy and Enterprise Architecture
Section: Enterprise Architecture and Change Management
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2nd Support Role (if applicable):
Section: Enterprise Architecture and Change Management
Job Title: Chief Architect
Name: John Violette
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3. Technical Specification

3.1. Purpose of the Appendix A: Information Modeling Handbook

The Information Modeling Handbook (IMH) (see Appendix A) provides standards, guidelines and best practices for information modeling. Guidelines and best practices should be followed and standards must be applied in order to produce high quality data models.

The Ontario Government has adopted the Enterprise Architecture as a way to document and reuse knowledge. IT projects incorporate business perspectives (knowledge) as they develop applications to meet the business requirements.

The Information Architecture Domain Working Group (IADWG) recognized the need to have a consistent approach to modeling information within the Ontario Government. A consistent modeling approach will support opportunities for integration, reuse, data sharing, and extend knowledge sharing between the business and the IT communities.

3.2. Focus

The IMH (see Appendix A) is primarily focused on describing types of models within the information domain and the recommended techniques and standards used to define and produce models. When a project team produces a data model, the data model:

- Should leverage existing enterprise data models by using them as a starting point.
- Must be aligned with existing enterprise data models to ensure that the specifics of the application fit within the “bigger picture”.
- Must be modeled at a level of abstraction and/or level of operational detail suitable to the type of project.
- Must be mapped against process requirements and further refined for completeness.
- Must be managed and further detailed throughout the transformation stages.

What is covered:

- Components of the different data model types (conceptual, logical, physical, dimensional models and XML schema models).
- Data naming standards.
- Data modeling notations.
- Guidelines for information models.

What is not covered:

- Aspects of data management other than information modeling.
- Procedures for managing models within modeling tools.

- Information modeling tools.
- Educational aspects of information and data modeling.
- Data model QA checklists.

3.3. Components of a Data Model

Data modeling involves identifying things (entities) of importance for an organization, the properties (attributes) of those things and how the things are related to each other (relationships).

A data model should be used to model the data or information requirements for Information Management Systems (MIS, CRM), Online Transaction Processing (OLTP) systems, Online Analytical Process (OLAP) systems (i.e. Data Warehouses and/or Data Marts), XML Schemas, and for general business understanding.

A data model must consist of the following elements:

- **Diagram -** A graphical representation showing entities, attributes that further describe the entities, and the relationships between the entities.
- **Entity** - An object about which the business collects data. It is a class of uniquely identifiable persons, places, things, events or concepts of interest to the business.
- **Attribute** - A property or characteristic that describes an entity. The attributes of an entity represent the information kept about the entity, which is relevant to the business operations and business functions.
- **Relationship** - An association that exists between two entities, based on business policy. A relationship represents a business rule.
- **Data Dictionary** - A centralized collection of metadata about a data model. It includes data definitions and characteristics of all data items and also includes cross-reference lookups and usage rules.

3.4. Levels of Data Models

In terms of the Enterprise Architecture Framework, Table 1 outlines the different data model types, where each type of data model represents a different level of abstraction.

EA Level	Data Model Type	Data Model Scope	Entity Level	Relationship Level	Attribute Level
Scope (Contextual)	Business Resource Types	Enterprise or Project (One list of Resource Types per scope)	Business definitions	N/A	N/A
Business Model (Conceptual)	Conceptual Data Model (CDM)	Enterprise or Project (Single CDM per scope)	Business Data Entities: key entities identified, named and described	Business Data Relationships: identified, named and described	Business Data Attributes: representative attributes named, and described
System Model (Logical)	Logical Data Model (LDM)	Enterprise or Project (Single LDM per scope)	Data Entities: normalized and fully defined with properties	Data Relationships: final and fully defined with properties	Data Attributes: all attributes identified, final and fully defined with properties
Technology Model (Physical)	Physical Data Model (PDM)	Enterprise or Project (May consist of multiple PDMs per scope)	Tables or XML elements: final and fully defined with properties	Keys: final and fully defined with properties	Columns or XML elements: final and fully defined with properties
Detailed Representation (Out of Context)	Data Definition (DDL)	N/A	N/A	N/A	N/A
	Physical File Definition	N/A	N/A	N/A	N/A
	XML Schema Definition	N/A	N/A	N/A	N/A
Functioning Enterprise	Data (Database)	N/A	N/A	N/A	N/A
	Messages / Documents	N/A	N/A	N/A	N/A

Table 1: Types of Data Models

Note: The focus of the Information Modeling Standards is on the conceptual, logical and physical data models. See Appendix A for the full Information Modeling Handbook.

4. Related Standards

4.1. Impacts to Existing Standards

Identify any Standards that reference or are referenced by this Standard and describe the impact.

GO-IT Standard	Impact	Recommended Action
None	N/A	

4.2. Impacts to Existing Environment

Impacted Infrastructure	Impact	Recommended Action
None	N/A	

5. Compliance Requirements

The definitions of data models, dimensional models and XML schemas, the metadata requirements for each model and the data model diagram samples provided in the GO-ITS 56 OPS Enterprise Architecture (EA): Appendix B: Corporate Enterprise Architecture Review Requirements Guidebook should be compliant to the contents of the GO-ITS 56.3 Information Modeling Standard Appendix A.

When some changes are made in GO-ITS 56.3 standard, the standard owner must make sure the new changes are either not affecting the content of GO-ITS 56 Standard Appendix B, or the relevant section(s) of GO-ITS 56 Standard Appendix B are also updated to reflect the new changes in information modeling standard.

5.1. Implementation and Metrics

The intention of the OCCIO is to advertise and promote this standard as being a mandatory component throughout government. However, in order to effectively manage its implementation, ministries, clusters and applicable agencies are expected to adopt and monitor compliance to this standard.

6. Acknowledgements

Consulted:

Organization Consulted (Ministry/Cluster)	Division	Branch	Date
Ministry of Finance	Central Agency I&IT Cluster	Strategy, Planning and Services	Sept. 2015, Nov. 2015
Ministry of Community and Social Services	Children, Youth and Social Services I&IT Cluster	Information Management and Architecture	July 2015, Sept. 2015, Oct. 2015, Nov. 2015
Ministry of Education	Community Services I&IT Cluster	Data Collection & Decision Support Solutions	July 2015, Sept. 2015, Oct. 2015, Nov. 2015
Ministry of Government Services	Government Services Integration I&IT Cluster	I&IT Strategy, Planning and Enterprise Architecture	July 2015, Sept. 2015, Oct. 2015, Nov. 2015
Ministry of Health and Long-Term Care	Health Services I&IT Cluster	I&IT Strategy and Architecture	Sept. 2015, Oct. 2015, Nov. 2015
Ministry of Natural Resources	Land and Resource I&IT Cluster	Strategy, Information & Program Management	July 2015, Sept. 2015, Oct. 2015, Nov. 2015
Ministry of Transportation	Labour and Transportation I&IT Cluster	Architecture, Information Management & Labour Solutions	Sept. 2015, Oct. 2015, Nov. 2015
Treasury Board Secretariat	I&IT Strategy, Policy and Enterprise Architecture	I&IT Strategy, Policy and Enterprise Architecture	July 2015, Sept. 2015, Oct. 2015, Nov. 2015

Committee/Working Group Consulted	Date
Information Architecture Domain Working Group (IADWG)	May 2015 – November 2015
Corporate Architecture Core Team (ACT)	December 2015
Corporate Architecture Review Board (ARB)	December 2015

Informed:

Organization Informed (Ministry/Cluster)	Division	Branch	Date
N/A			

Committee/Working Group Informed	Date
N/A	

7. Recommended Versioning and/or Change Management

Changes (i.e. all revisions, updates, versioning) to the standard require authorization from the "responsible" organization(s).

Once a determination has been made by the responsible organization to proceed with changes, ICS as custodians of the I&IT Rules Refresh Plan will coordinate and provide assistance with respect to the approvals process.

The approval process for changes to standards will be determined based on the degree and impact of the change. The degree and impact of changes fall into one of two categories:

Minor updates *- require confirmation from ARB, and communication to stakeholders and ITELC. Changes are noted in the "Document History" section of the standard. Minor updates generally consist of:*

- Editorial corrections (spelling, grammar, references, etc.) made with the intention to eliminate confusion and produce consistent, accurate, and complete work.
- Formatting changes (due to template updates or to improve readability of document).
- Documented organizational changes e.g. renaming of committees, approved transition of committee responsibilities, approved reporting relationship changes.

Standard revisions *- require consultation with stakeholders, ARB endorsement, and ITELC approval. Standard revisions consist of any updates to the I&IT Rules Refresh Plan that are not considered minor and may:*

- represent new standard or significant revision to an existing standard
- represent a major version change to one or more specifications
- impact procurement
- require configuration changes to current solutions
- impact other standards
- respond to legislative, policy or procurement changes

7.1. Publication Details

All approved Government of Ontario IT Standards (GO ITS) are published on the OCCIO Intranet web site. Please indicate with a checkmark below if this standard is also to be published on the public, GO ITS Internet Site.

Standard to be published on both the OPS Intranet and the GO ITS Internet web site (available to the public, vendors etc.)	☑

8. Requirements Levels

Within this document, certain wording conventions are followed. There are precise requirements and obligations associated with the following terms:

Must	This word, or the terms "REQUIRED" or "SHALL", means that the statement is an absolute requirement.
Should	This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore the recommendation, but the full implications (e.g., business functionality, security, cost) must be understood and carefully weighed before choosing a different course.