



Government of Ontario IT Standard (GO-ITS)

Number 56.0

Information Modeling Standards

Version #: 1.1

Status: Approved

Prepared for the Information Technology Standards Council (ITSC) under the delegated authority of the Management Board of Cabinet

Foreword

Government of Ontario Information Technology Standards (GO-ITS) are the official publications on the guidelines, preferred practices, standards and technical reports adopted by the Information Technology Standards Council (ITSC) under delegated authority of the Management Board of Cabinet (MBC). 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. Publications that set new or revised standards provide enterprise architecture guidance, policy guidance and administrative information for their implementation. In particular, GO-ITS describe where the application of a standard is mandatory and specify any qualifications governing the implementation of standards.

- 1. INTRODUCTION 4**
 - 1.1 BACKGROUND 4
 - 1.2 SCOPE..... 4
 - 1.3 APPLICABILITY STATEMENTS 4
 - 1.4 REQUIREMENTS LEVELS 5
 - 1.5 RECOMMENDED VERSIONING AND/OR CHANGE MANAGEMENT 5
 - 1.6 PUBLICATION DETAILS 5
- 2. TECHNICAL STANDARDS AND SPECIFICATIONS..... 6**
 - 2.1 PURPOSE OF THE INFORMATION MODELING HANDBOOK (SEE APPENDIX A) 6
 - 2.2 FOCUS 6
 - 2.3 COMPONENTS OF A DATA MODEL 6
 - 2.4 LEVELS OF DATA MODELS..... 7
- 3. CONTACT INFORMATION..... 9**
- 4. ACKNOWLEDGEMENTS 10**
- 5. DOCUMENT HISTORY 11**
- 6. COPYRIGHT INFORMATION..... 11**

1. Introduction

1.1 Background

Data modeling practice 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 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.

1.2 Scope

The Information Modeling Handbook (IMH) must be followed by all OPS I&IT projects when developing Data Models.

1.3 Applicability Statements

Government of Ontario IT Standards and Enterprise Solutions and Services apply (are mandatory) for use by all ministries/clusters and to all former Schedule I and IV provincial government agencies under their present classification (Advisory, Regulatory, Adjudicative, Operational Service, Operational Enterprise, Trust or Crown Foundation) according to the current agency classification system.

Additionally, this applies to any other new or existing agencies designated by Management Board of Cabinet as being subject to such publications, i.e. the GO-ITS publications and enterprise solutions and services - and particularly applies to Advisory, Regulatory, and Adjudicative Agencies (see also procurement link, OPS paragraph). Further included is any agency which, under the terms of its Memorandum of Understanding with its responsible Minister, is required to satisfy the mandatory requirements set out in any of the Management Board of Cabinet Directives (*cf.* Operational Service, Operational Enterprise, Trust, or Crown Foundation Agencies).

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 and I&IT Cluster 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.

1.4 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

1.5 Recommended Versioning and/or Change Management

Modifications during the life of the standard must be approved by the organizational owners of the document.

The organizational owners of this standard are:

Corporate Architecture Branch,
Office of the Corporate Chief Technology Officer,
Ministry of Government Services

Ministry of Government Services will follow the Gating Process (approval process) as described in the Government of Ontario I&IT Directive, and submit proposed revisions to the Information Technology Standards Council (ITSC) and the Architecture Review Board (ARB) for approval and publication.

1.6 Publication Details

All approved Government of Ontario IT Standards (GO-ITS) are published on the ITSC 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.)	<input checked="" type="checkbox"/>
--	-------------------------------------

2. Technical Standards and Specifications

2.1 Purpose of the Information Modeling Handbook (see Appendix A)

The Information Modeling Handbook (IMH) 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 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.

2.2 Focus

The IMH 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 and QA checklists 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.

2.3 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.

2.4 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, Project or Application	Business definitions	N/A	N/A
Business Model (Conceptual)	Conceptual Data Model (CDM)	Enterprise, Project or Application	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, Project or Application	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, Project or Application	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
	XML Schema Definition	N/A	N/A	N/A	N/A
Functioning Enterprise	Data (Database)	N/A	N/A	N/A	N/A
	XML Messages / Documents	N/A	N/A	N/A	N/A

Table: 1: Types of Data Models

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

3. Contact Information

	Contact 1	Contact 2
Full Name:	Linda Jarvis	Thomas Chen
Job Title:	Manager (A), Business and Information Architecture	Information Architect
Organization:	Ministry of Government Services	Ministry of Government Services
Division:	Office of the Corporate Chief Technology Officer	Office of the Corporate Chief Technology Officer
Branch:	Corporate Architecture Branch	Corporate Architecture Branch
Office Phone:	416-327-0313	416-327-2086
E-mail Address:	Linda.Jarvis@ontario.ca	Thomas.Chen@ontario.ca

4. Acknowledgements

4.1 Contributors to the Information Modeling Handbook

Name	Role	Organization
Anna Nadin	Contributing Author & Reviewer IADWG member	Justice Cluster
Daniel Chang	Reviewer Former IADWG member	Children, Youth and Social Services Cluster
Ellen Chen	Contributing Author & Reviewer IADWG member	Justice Cluster
Frank Cheng	Contributing Author & Reviewer IADWG member	Central Agency Cluster
Gennaro Giampaolo	Reviewer IADWG member	Applied Architecture Branch, Office of the Corporate Chief Technology Officer
George Berelidze	Contributing Author & Reviewer Former IADWG member	Applied Architecture Branch, Office of the Corporate Chief Technology Officer
Jane Liang	Contributing Author & Reviewer	Community Services Cluster
Joanne Venema	Editor / Contributing Author & Reviewer IADWG member	Health Services Cluster
Kamel Toubache	Contributing Author & Reviewer Former IADWG member	Community Services Cluster
Kathleen Youmans	Contributing Author & Reviewer Former IADWG member	Health Services Cluster
Larry Zehnle	Contributing Author IADWG member	Community Services Cluster
Les Piotrowski	Reviewer IADWG member	Land and Resource Cluster
Lien Truong	Contributing Author & Reviewer IADWG member	Children, Youth and Social Services Cluster
Norman Lee	Reviewer Former IADWG member	Children, Youth and Social Services Cluster
Richard Pelletier	Contributing Author & Reviewer IADWG member	Economic and Transportation Cluster
Sonia Gluppe	Editor	Health Services Cluster
Thomas Chen	Editor / Contributing Author & Reviewer IADWG member	Corporate Architecture Branch, Office of the Corporate Chief Technology Officer

5. Document History

Created: 2007-08-08

Approved: 2007-12-19

- Approved by IT Standards Council

Approved: 2008-02-21

- Approved by Architecture Review Board

Updated: 2008-07-24

- Document version number Information Modeling Handbook – Appendices (4.x) changed to adopt the version number (1.x) from the GO-ITS 56.0 standard document
- The following changes to the Appendices are based on the latest Information Architecture (IA) artifact revisions as approved by the Architecture Review Board on July 24, 2008:
 - Appendix A
 - Section 3.1.3 – Business Dimensional Model artifact name replaced with Fact and Dimension Matrix artifact name and description
 - Section 3.1.4 - Logical Dimensional Model revised to align with the Corporate EA Review Requirements Guidebook
 - Section 3.1.5 - Physical Dimensional Model revised to align with the Corporate EA Review Requirements Guidebook
 - Appendix A
 - Renamed Appendix A in the Information Modeling Handbook – Appendices document to Appendix A1 to eliminate the redundancy
 - Appendix D – Quality Assurance Review Checklists
 - Replaced QA checklist for Business Dimensional Model with new checklist for the Fact and Dimension Matrix
 - Revised checklists for Logical Dimensional and Physical Dimensional Models
 - Appendix E – Glossary of Terms
 - Replaced definition for Business Dimensional Model with definition for Fact and Dimension Matrix
 - Revised definitions for Logical Dimensional Model and Physical Dimensional Model

6. Copyright Information

© Queen's Printer for Ontario, 2008