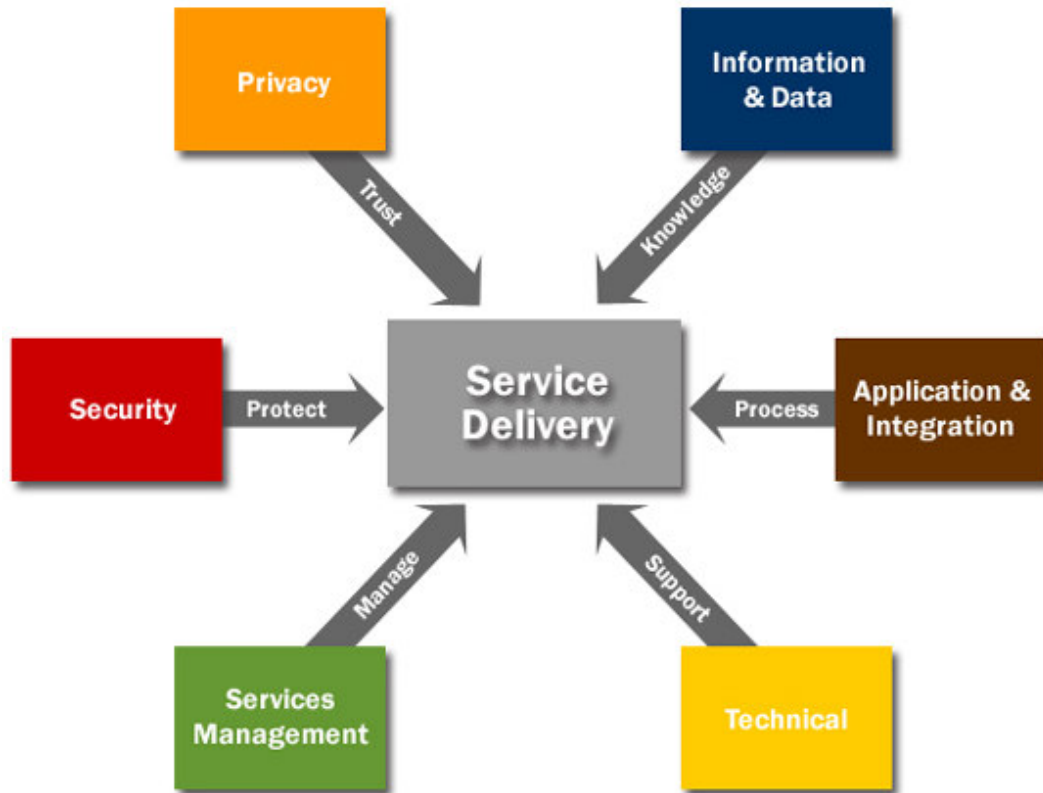# Government of Manitoba

Enterprise Architecture

Frameworks for Managing

Information Communication Technology

Manitoba

Building for the Future

Document Summary
Revision History

Date of this revision: March, 2005		Date of next revision:	

Revision Number	Revision Date	Summary of Changes	Changes Marked
0.1	July 12, 2004	Document created.	N
1.0	September 20, 2004	Document Released	Draft
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1.02	March, 2005	Version 1 Release	N

Table of Contents

Executive Summary

Manitoba's Enterprise Architecture (EA) articulates a set of strategic architectural principles, guidelines, directions, models and standards designed to support and improve the delivery of Government services

Manitoba's Enterprise Architecture

The Enterprise Architecture provides guidance and direction to help decision-makers make technology-related decisions by documenting consistent processes, technology approaches and standards to be used across various technology platforms. Also included are high-level implementation plans (or roadmaps) to unite and align ICT deployment with the government's service delivery goals and information requirements.

The Enterprise Architecture is a living document that will evolve with changes in technology and business needs.

Manitoba benefits from the Enterprise Architecture in three ways – better value, faster development and deployment of solutions and reduced risk.

Manitoba Information and Communications Technologies (MICT) has been assigned the responsibility to develop, and implement Manitoba's Enterprise Architecture. MICT has worked with departments and key organizations to achieve that goal. This consultative process will continue in order to ensure that the linkages between the government's goals and the Enterprise Architecture remain strong and current.

ICT Architecture Guiding Principles

ICT Architecture Guiding Principles Guide ICT investment and articulate the strategies for supporting the principles.

The Enterprise Architecture sets out a logical and consistent set of ICT architectural principles and functionality requirements. They are influenced by Manitoba's business drivers and service delivery requirements and are used to guide all ICT investments and operations. The six Guiding Principles are:

1. ICT systems and services must be designed to accommodate rapid change to government programs and services.

2. ICT systems and services must facilitate legitimate access to information while providing strict control over the collection, management, and security of this information in accordance with freedom of information and privacy (FIPPA & PHIA) legislation.

3. ICT systems and services must support and encourage interaction between constituents and the government.

4. ICT systems and services must promote the accessibility and integration of government services by providing a standards based enterprise view of services that cross organizational boundaries.

5. ICT systems and services must align with the program planning and delivery requirements of the government and its stakeholders

6. ICT systems and services must facilitate access to government services with a goal of "anywhere at anytime".

Applied Design Principles

The Enterprise Architecture is made up of six domains focussed on specific technology areas. Each domain contains a number of applied design principles that guide decision making related to the areas contained in the domain. Some examples of Applied Principles are:

Applied Design Principles state the direction and actions to support the Architecture Guiding Principles

- Information Protection policies, standards, procedures and systems must be implemented in accordance with Government of Manitoba policy to ensure alignment with service delivery requirements.

- Application development will encourage the reuse of existing components, and will identify and communicate opportunities for developing standard, shareable, and reusable components, processes, and services.

- Consistent application development, integration and maintenance processes will be used across government.

- Applications must be developed to minimize barriers to delivery across multiple access channels.

- Application and integration components should be bought vs. built where they adhere to the Enterprise Architecture and Standards.

- Technology standards and solutions will be driven by business requirements gathered from stakeholders to encourage the development of shareable services that can be leveraged.

Implementation Plan

As a living document the EA must reflect government's changing operational requirements as well as innovations in technology that bring with them new opportunities and challenges.

The next steps in implementing the EA are to:

- Communicate the purpose, and content to decision makers, ICT staff and vendors.

- Work with Departments to map our current technology environments and capabilities to the EA to identify gaps and degree of alignment.

- Establish an EA management framework to sustain the Enterprise Architecture and provide a forum for EA decision making.

- The EA is part of the ICT restructuring initiative currently underway. Changes to the processes and administration of the EA will result and be reflected in subsequent updates.

- Build on the content of the current EA.

1   Introduction

1.1   Background

In the mid-1990's, Manitoba's Information Communications Technology (ICT) infrastructure was not a standards based environment. The technology landscape featured approximately 80 different types of computers, 13 incompatible network operating systems, and 23 different versions of word processing, spreadsheet, database and presentation software. Lack of corporate standards made it impossible to share information across departments. Services and costs were duplicated, uneven and fragmented. There was an inability to respond effectively to viruses and security issues, and to manage a unified, corporate response against those threats. Manitoba also faced a critical shortage of human resources with skills and experience to deal with a rapidly changing and emerging technology environment.

In response to these challenges a centrally managed desktop environment, provincial data network, central financial system (SAP) and the Better Systems Initiative were created. These initiatives established a set of core systems and services that form the preliminary foundation of Manitoba's Enterprise Architecture.

Manitoba's application development environment is primarily managed by departments and has remained quite diverse. A single comprehensive guideline was not developed to steer the development, use and operation of all ICT resources across the Manitoba Government. As a result, Manitoba's application development and core information architecture environments are composed of many individual applications running on multiple platforms. This environment limits the Government's ability to share information, infrastructures and support the applications and technology in place.

1.2   Purpose

Manitoba's Enterprise Architecture (EA) articulates a set of strategic architectural principles, guidelines, directions, models and standards designed to support and improve the delivery of Government services. This is achieved by providing guidance and direction through consistent processes and technology approaches across Manitoba's various technical components, platforms and organizations.

Managing and co-ordinating our Information Technology assets is essential in order for systems to respond quickly to: changing business needs; Manitoba resident's expectations; new service requirements; and methods of accessibility. The EA not only establishes the frameworks for standards and systems, but also helps to manage the government wide ICT environment using a Service Delivery Framework model.

The EA provides guidance for decision-makers to make technology-related decisions that support, develop and maintain a unified information technology structure. The Enterprise Architecture is a living document that will evolve with changes in technology and business needs.

The Enterprise Architecture:

- Specifies a common architecture and technology infrastructure required to meet Manitoba's business needs, service delivery and information requirements.
- Provides a framework for the effective integration of new and existing applications and systems, as well as for data sharing and information access across business and technology boundaries.
- Provides support for organizational learning and innovation, by maintaining a repository of information on models, standards, approaches and technologies.
- Presents the direction or target design models for applications and supporting technology foundations based on input from departments, citizens and external entities (such as: vendors, suppliers.)
- Is based on a logically consistent set of ICT design principles and functionality requirements that are derived from Manitoba's business drivers and service delivery requirements.
- Provides a clearly defined road map for migrating existing systems and implementing new application solutions.
- Provides a mechanism for the senior management and business sector representatives to direct the development of ICT systems and applications that support program delivery.

Manitoba benefits by implementing an Enterprise Architecture in three ways – better value, faster development and deployment of solutions and reduced risk.

Better Value – An Enterprise Architecture supports the development of information that has a common meaning for users across the organization. Common definitions for data makes information easier to interpret, make comparisons and collaboration with other departments and jurisdictions across the organization possible. Common standards and models allow for the sharing of infrastructures, supports and human resources. Savings in direct costs and efforts can be achieved through the sharing of common ICT infrastructures, bulk purchases and comprehensive vendor agreements.

Faster Development and Deployment of Solutions – The interoperability of systems enables rapid business process reengineering so that Manitoba can rapidly respond to both internal and external business drivers.

Reduced Risk – The risk of unexpected outcomes is reduced with a consistent approach to information communication technology acquisition, development and project management.

1.3   Driving Forces behind the EA

Manitoba residents and businesses want services and information available to them at a time, place and format that are convenient for them. Manitoba's ability to provide various service delivery options, including self-service and service that are integrated, requires a robust human, technical, and regulatory infrastructure supported by flexible

information systems. The expectation for flexible services implies that there must be integration of information both within and across departments. Jurisdictions will be required to allow systems to exchange information in a timely and efficient manner while respecting privacy and legislation.

The Enterprise Architecture is influenced by and reflects a number of external and internal drivers and service delivery requirements as shown in Figure 1 below. By understanding the impacts of these drivers, government can direct the selection, use and operation of technologies needed to support government business requirements.

Figure 1

2 Architectural Direction

2.1   Business Requirements & ICT Linkages

The linkage between business needs and ICT systems and services is the key component of the Enterprise Architecture. The ICT systems of the Government of Manitoba must directly support or enhance a business need. To achieve this linkage, ICT systems when viewed from a business context must:

- be business oriented
- support the mission and strategic business objectives of the government. ICT services must support timely and effective decision making at all organizational levels.
- add value
- promote and enhance effectiveness, efficiency, functional capabilities and/or cost reduction/avoidance.
- support access to information by Government of Manitoba staff, citizens and stakeholders.
- be built upon a set of accepted standards.
- treat data as an asset
- manage the quality, integrity, sharing and security of data.

2.2   ICT Guiding Principles

ICT organizations within the government and the services they deliver must be aligned with the goals and objectives of government. In order to ensure alignment, the principles guide the provisioning of ICT systems and services focusing on improving government's ability to deliver services to Manitobans.

It is also important to understand the current position of ICT within the overall organization. This is done by performing a scan of the environment to understand relevant factors affecting ICT, and the ICT investment profile of the government. The principles that guide the development and provision of ICT services in the government are:

#1 ICT SYSTEMS AND SERVICES MUST BE DESIGNED TO ACCOMMODATE RAPID CHANGE TO GOVERNMENT PROGRAMS AND SERVICES.

Rationale   Legislation, regulation and policy affect how government services are delivered. A flexible design approach to ICT systems and services can reduce the impacts of change and enable the government to respond to economic and program opportunities in new ways.

Implications   New ICT systems and services must be designed to be flexible and responsive, with the ability to adapt to changing legislation, regulation and policy.

Strategies   1.1   Build applications using open, portable, web-enabling technology that facilitate interfaces and linkages among applications, databases and legacy systems.
1.2   Re-use already developed components in application development.
1.3   Develop enterprise-wide standards and processes based on industry generic standards and products where practical and possible.

#2 ICT SYSTEMS AND SERVICES MUST FACILITATE LEGITIMATE ACCESS TO INFORMATION WHILE PROVIDING STRICT CONTROL OVER THE COLLECTION, MANAGEMENT, AND SECURITY OF THIS INFORMATION IN ACCORDANCE WITH FREEDOM OF INFORMATION AND PRIVACY (FIPPA & PHIA) LEGISLATION.

Rationale   While Manitobans want broad access to information and more "open government", it is crucial that their personal information privacy and rights are protected. ICT systems and services must respond to this need by providing access only to the level required and restricting access to those without legitimate access. In addition, the collection and management of this information must be tightly controlled according to the regulations governing information access.

Implications   New ICT systems will to be designed to meet the requirements outlined in the freedom of information and privacy legislation. Existing systems should be reviewed and updated to meet the requirements of this legislation.

Strategies   2.1   Implement content and knowledge management frameworks that address the creation, capture, maintenance, accessibility, dissemination, and use of information.
2.2   Promote a librarian function for these frameworks.
2.3   Review and update existing systems to meet the requirements of freedom of information and privacy legislation.
2.4   Leverage inter-jurisdictional efforts in user authentication.

#3 ICT SYSTEMS AND SERVICES MUST SUPPORT AND ENCOURAGE INTERACTION BETWEEN CONSTITUENTS AND THE GOVERNMENT.

Rationale   Technology is an enabler that can dramatically improve communication between the government and its constituents. It will improve the ability of Government to receive and respond to public input. ICT can help foster new opportunities to integrate traditional information

communication technology with communication technologies and other key public service channels like telephony and in-person, as well as the Internet.

Implications   As the government develops new systems it should look for additional opportunities to facilitate this dialogue. Solutions may include Internet-based access to services, electronic delivery of services and access to information repositories.

Strategies   3.1   Use technologies such as the Internet, electronic information repositories, online transaction processing, telephone, and facsimile to facilitate multi-channel access to services and encourage open communications.

3.2   Investigate opportunities to better serve the public through meaningful partnerships with other levels of government.

3.3   Establish a reliable, end-to-end financial infrastructure to allow on-line transactions, payments, and procurement for information and services.

#4 ICT SYSTEMS AND SERVICES MUST PROMOTE THE ACCESSIBILITY AND INTEGRATION OF GOVERNMENT SERVICES BY PROVIDING A STANDARDS BASED ENTERPRISE VIEW OF SERVICES THAT CROSS ORGANIZATIONAL BOUNDARIES.

Rationale   A key goal of the government is to provide easily accessible and integrated government services. ICT systems and services must be selected or developed based on their ability to support this goal. The Enterprise Architecture provides enterprise-level guidance on principles, standards, and practices to ensure ICT services and systems improve the integration of service delivery by the government.

Implications   Departments must take an enterprise view of services that cross organizational boundaries using the Enterprise Architecture as a guide to make technology decisions.

Strategies   4.1   Provide a single, consistent and accurate source of information.

4.2   Integrate applications and implement data standards to achieve information consistency across all access channels.

4.3   Manage projects as an inter-related group of activities (i.e., not in isolation of each other). Opportunities for reuse of infrastructure components such as shared servers, networks, databases, information, and software, will be identified.

4.4   Provide an easy-to-navigate interface, allowing citizens and businesses to interact with government, and civil servants with access to the information and systems they need to deliver services.

4.5   Maintain an ICT infrastructure that is based on standards.

#5 ICT SYSTEMS AND SERVICES MUST ALIGN WITH THE PROGRAM PLANNING AN DELIVERY REQUIREMENTS OF THE GOVERNMENT AND ITS STAKEHOLDERS

Rationale   Adaptive systems require business and program organizations and ICT staff to share a common and cohesive vision of both the business and the role of technology in supporting the business. This alignment of ICT systems and services with program requirements helps the government meet changing business needs and public expectations, and providing citizens with the results they need.

Implications   During the selection or development of ICT systems and services, it is critical that the requirements of the business users are properly captured and reflected. Active participation by both groups is essential for success in the development of plans, project management, and on-going operations. This requires ICT staff to have a significant understanding of the business.

Strategies   5.1 ICT investment decisions will be based on the established priorities of the government's program planning and delivery requirements.
5.2 An investment management framework will be followed to develop ICT business cases.
5.3 Provide staff with the appropriate technology and training needed to meet increasing expectations from a technically well-informed citizenry.

#6 ICT SYSTEMS AND SERVICES MUST FACILITATE ACCESS TO GOVERNMENT SERVICES WITH A GOAL OF "ANYWHERE AT ANYTIME" WHERE PRACTICAL.

Rationale   We are becoming a more mobile society in both the private sector and workplace. Citizens have greater expectations that services and information are available whenever they are needed. Access to government services should be provided via new technologies without restrictions.

Implications   Technology is a key enabler of extending services by providing alternative methods of access, extending the availability and accessibility. ICT systems and services should be implemented that extend the reach of government services where economically feasible. Departments should look for opportunities to use ICT services and systems that support human, internet, phone and mail/fax methods to extend the availability and accessibility.

Strategies   6.1   Develop applications in a manner that minimizes dependence on the channel used to access the service.
6.2   Make information systems available to all users 7x24 where the demand for a particular service warrants it.
6.3   Develop a Business Resumption Plan to ensure that continuous service is maintained

3 Enterprise Architecture Framework

3.1   The Enterprise Architecture Framework

The EA provides guidance and direction through consistent processes and technology approaches across various technology platforms.   It also outlines a high-level implementation plan (or roadmap) to unite and align ICT deployment with service delivery goals and government information requirements.

The Enterprise Architectural framework consists of a series of communication tools to express architectural intent. Developed by information communication technology specialists in collaboration with the leaders of the organization, these communication tools include:

A set of ICT guiding principles

A set of ICT applied design principles and functional requirements

**A set of information communication technology standards and models**

A set of information communication technology practices guidelines

A target architecture and migration strategy

A repository of information on technology product sets

A timeline indicating architectural implementation targets and milestones

Each of these communication tools must be able to trace back to Manitoba's business direction and strategy. Together they provide guidance and direction to decision makers so that each decision that affects Manitoba's ICT environment incrementally serves to build a unified whole.   The goal of the Enterprise Architecture is to guide the management of ICT so that government can achieve its business vision.
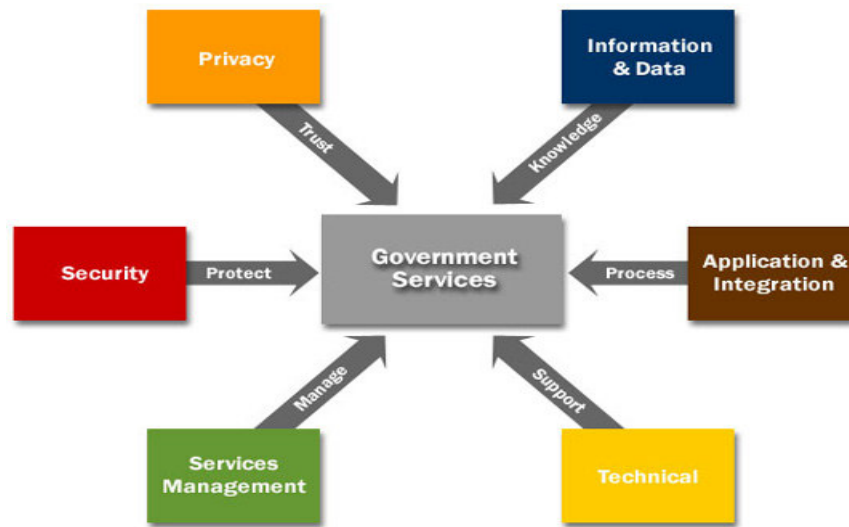
Figure 2: Government of Manitoba Enterprise Architecture

Figure 2 illustrates the structure of the Enterprise Architecture which contains a number of unique domains that provide guidance and direction on specific ICT areas that support the delivery of government services.

3.2   ICT Domains

ICT domains provide guidance to the enterprise on selection, development and implementation of ICT systems and services and provide a more detailed enterprise view of the government's ICT direction.

There are six specific domains as well as a number of supporting components:

1. **Security Domain** – Describes how ICT systems are to be designed to ensure that the government is protecting its information and IT system assets.

2. **Privacy Domain** – Describes how ICT systems must manage information that the government collects in order to comply with regulations and legislation.

3. **Data & Information Domain** - Describes how information collected is managed, and shared by applications.

4. **Application & Integration Domain** – Describes the models and frameworks for the integration, development, and use of applications across government.

5. **Technical Domain** – Describes the design, selection, and implementation of the ICT hardware and software platforms and WAN/LAN network.

6. **ICT Service Management Domain** - Supports other ICT domains by describing models for how ICT services and systems will be delivered and managed.

•   **ICT Standards** – Provides detailed information on Manitoba's technology standards and migration paths for existing technology components.

•   **EA Repository** – Contains detailed information and technical topics referenced in the Enterprise Architecture.

4 Management

4.1 Enterprise Architecture Management

An Enterprise Architecture Management framework ensures that the linkages between the Enterprise Architecture and government direction and objectives remain strong and current. The management framework supports decision-making by establishing four business processes and the management structure to execute these processes. The four processes within the Enterprise Architecture Management Framework are:

- Enterprise Architecture Framework Definitions

- Enterprise Architecture Compliance

- Enterprise Architecture Renewal

- Enterprise Architecture Communication

4.2 Implementation

As a living document the EA must reflect government's changing operational requirements as well as innovations in technology that bring with them new opportunities and challenges.

The next steps in implementing the EA are to:

- Communicate the purpose, and content to decision makers, ICT staff and vendors.

- Work with Departments to map our current technology environments and capabilities to the EA to identify gaps and degree of alignment.

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