

**Achievement of Market-Friendly Initiatives and Results Program
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Jordan e-Government Information Interoperability Framework

Final Report

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0.1 Document History

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0.2 Changes From Last Issue

First Release

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0.4 Distribution List

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0.5 Referenced Documents

Number	Title	Reference	Note
1.	UK e-GIF	Version 3	
2.	NZ e-GIF		
3.	"In the end, will it be ebXML?"		Internal EDS Report
4.			
5.			

0.6 Abbreviations

AES	Advanced Encryption Standard
COM	Component Object Model
CORBA	Common Object Request Broker Architecture
DCOM	Distributed Component Object Model
DES	Data Encryption Standard
DOM	Document Object Model
DSA	Digital Signature Algorithm
DTD	Document Type Definition
EbXML	Electronic Business XML
ECMA	European Computer Manufacturers' Association
EDI	Electronic Data Interchange
EGF	Electronic Government Framework
EJB	Enterprise Java Bean
ERP	Enterprise Resource Planning
ESP	Encapsulating Security Payload
FTP	File Transfer Protocol

GML	Geospatial Markup Language
GOJ	Hashemite Kingdom of Jordan Government
GUI	Graphical User Interface
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IEC	International Electrotechnical Commission
IETF	Internet Engineering Technical Forum
IIF	Information Interoperability Framework
IIOP	Internet Inter-ORB (Object Request Broker) Protocol
IP	Internet Protocol
IPSEC	Internet Protocol Security
ISO	International Standards Organization
IT	Information Technology
LDAP	Lightweight Directory Access Protocol
MIME	Multipurpose Internet Mail Extensions
MoICT	Ministry of Information & Communications Technology
OASIS	Organization for the Advancement of Structured Information Standards
PMO	Programme Management Office
RDF	Resource Description Framework
SGN	Secure Government Network
SMTP	Simple Message Transfer Protocol
SOAP	Simple Object Access Protocol
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UML	Unified Modelling Language
URL	Uniform Resource Locator
W3C	World Wide Web Consortium
XDR	XML Data Record
XMI	XML Metadata Interchange
XML	Extensible Markup Language
XSD	XML Schema Definition
XSDL	XML Schema Definition Language
XSL	eXtensible Stylesheet Language
XSLT	Extensible Style Language Transformation

0.7 Glossary

N/A

1 Executive Summary

The speed of innovations within information technologies is shifting the way people and businesses communicate and redefining the global marketplace. Current IT trends are leading to an environment where people will have nomadic access to their information and computing systems from publicly shared access points. This environment will raise fundamental questions: Who will own public access points? What will their capabilities be? And how will they interoperate? How will we know who is authorized to access them? This environment will heighten the need for a robust and secure infrastructure to govern and deliver services electronically.

According to current projections, the information economy will surpass industrial and agrarian economies in terms of percentage of GDP by 2003. This shift has implications beyond technology. Unlike the physical goods industry, many information-based services are geographically insensitive. The Internet is the symbol of this new world; it is forecasted to become the primary infrastructure for all enterprises, with two billion users predicted to be on-line worldwide by 2003.

It is essential that all organizations, including governments, align their info- and infra- structures to support electronic service delivery and operations. To enhance service delivery, a framework is needed to enable interoperability among government programs, both for information and for transactions. Today the Jordan e-Government initiative seeks to initiate the foundations required to build the policy framework for sustainable and affordable structures to support electronic service delivery. To enable the delivery of e-Government within Jordan, it is essential to have joined-up information systems and services. Systems working together, sharing information seamlessly through common standards and protocols across Government are key to providing efficient, cost effective, high quality services to citizens, business and government itself. The Jordan e-Government's response to this is the Information Interoperability Framework (IIF) that is the vehicle for defining and publicizing the policies and standards that will be adopted to achieve seamless Government interoperability, both internally and externally. The IIF is a fundamental component in enabling the government to meet its e-Government strategy. The IIF shall encourage interoperability both between government entities and between government entities and their customers (citizens, business or other governments).

The Jordan e-Government initiative does not seek to build its strategic information infrastructure from scratch. Initiatives to put in place an adaptable IT infrastructure will build on the government's considerable investments in existing infrastructure. This installed base, much of which will still be operational for years to come, provides both opportunities and challenges – opportunities to improve upon the existing infrastructure and information, and challenges to make it more interoperable. Shared infrastructure does exist, but most IT infrastructures were developed to optimise the strategies of single Government Entity or program. As a result, current infrastructures are not as effective as they could be in enabling the horizontality necessary for government-wide initiatives. In fact, some act as barriers to more integrated service delivery.

Within this context, the Jordan e-Government is taking action to enhance operations, enable seamless interoperability, draw on economies of scale and eliminate barriers to more responsive service options. The IIF seeks to create interoperability among government programs, both for information and transactions, to support citizen-centred service delivery. Interoperability ensures applications and computers from different suppliers can work together on a network and share information and processes as appropriate, thus the IIF strives to achieve seamless information flow among government entities, their customers and suppliers.

Infrastructures are complex and contain many pieces, so a framework is essential to identify the critical elements – or domains – needed to meet the government's business vision. The key stakeholders for the Jordanian e-Government initiative endorsed a federated architecture approach to infrastructure, which balances government-wide needs with those of individual government entities. This is illustrated below in Figure 1.1. Within the federated architecture framework, some components of the infrastructure must be commonly held and mandatory across the government to ensure that it achieves its service delivery goals. In other cases, groups of government entities may cluster around common solutions, for example a common data-centre. What will remain are standards-based components that can be tailored to the specific needs of individual government entities.

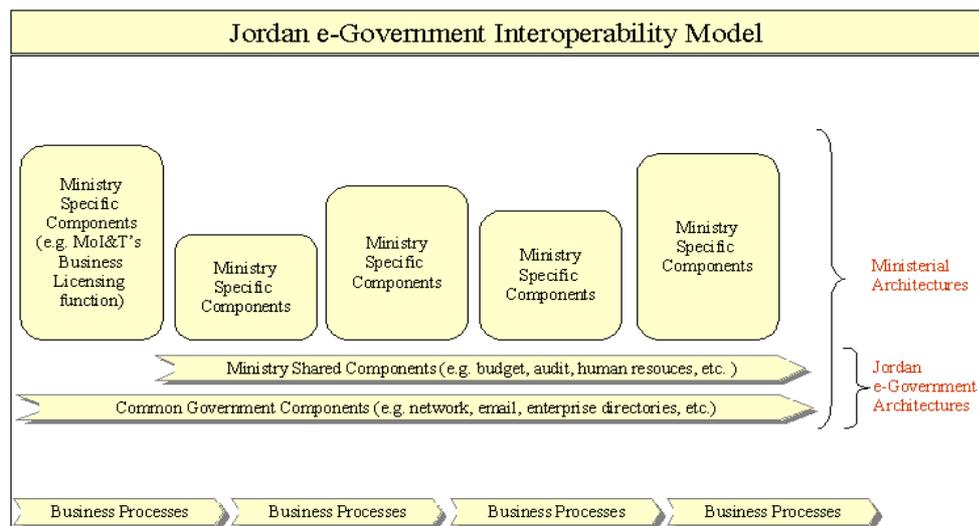


Figure 1 – Jordan e-Government Interoperability Model

The federated architecture:

- Specifies standards for common and shared parts of the infrastructure
- Facilitates inter-ministerial information sharing
- Optimises total cost of ownership by leveraging common facilities
- Enables access by all citizens, residents, businesses and government entities regardless of location

The successful adherence to and implementation of this infrastructure requires proper foundations and best practices for governance so that the principles of a federated architecture are widely shared. A formal approval process is the key to sound architecture development. However, defining policies and standards alone is not sufficient. A successful and trouble free introduction and implementation requires not only the definition of standards, but also a framework of support, best practice guidelines, tools and well-defined data standards. To ensure this happens the Government must establish forums within which all the issues surrounding developing and obtaining agreement over standards, common data schema(s), technical directions, etc. can be defined, discussed, baselined and communicated. The Government must look to both government entities and industry to contribute to these forums.

Adherence to the IIF standards and policies is mandatory. They shape the supporting infrastructure, enabling government entities to concentrate on serving the customer and building quality, efficient and effective information and services. It is expected that each Government Entity will actively consider how their internal business processes and services can be re-engineered to take full advantage of the potential offered by increased and standardised interoperability.

It is recognised that meeting the objectives of the IIF will not be a short-term activity. It is imperative that it is seen as a long-term objective that must be underpinned by robust and effective support processes. The supportive processes must be well defined with recognised authorities and defined responsibilities for key contributors, stakeholders and management. These processes are initially scoped out within this document and are expected to develop and mature over time.

To be of value the IIF must remain up to date and pertinent to its target audience. It must proactively recognise changes in industry that must be identified and embraced within it. In that spirit, the IIF change management process should itself utilise Web technology and capabilities.

The IIF does not seek to remove all IT related decision making from within government entities, it simply attempts to ensure that the policies, standards and guidelines provide a framework that removes the need to prescribe the use of the same hardware and software. The IIF ensures the independence of individual government entities but ensures that government entities if and when necessary have a common simple mechanism available to them through which it will be possible to interconnect.

2 Overview

2.1 Introduction

The GOJ e-Government Blueprint & Roadmap (Version 5.0) produced on 19/09/2001 identified the requirement to create an Interoperability Framework to assist with the evolution and implementation of electronic government in Jordan.

To enable the delivery of e-Government it is essential to have joined-up information systems and services. Systems working together, sharing information seamlessly through common standards and protocols across Government are key to providing efficient, cost effective, high quality services to citizens, business and government itself. This can all be realised by taking advantage of the explosive growth in the Internet and its associated technologies that enable global connection through a common capability.

The e-Government's response to this is the Information Interoperability Framework (IIF) that is the vehicle for defining and publicising the policies and standards that will be adopted to achieve seamless Government interoperability, both internally and externally. The IIF is a fundamental component in enabling the government to meet its e-Government blueprint and roadmap. All levels of government are included within its scope:

- All GOJ Entities
- GOJ Entities and the wider, global public sector
- GOJ Entities and foreign governments
- GOJ Entities and businesses (world wide)
- GOJ Entities and citizens, residents and businesses

The IIF standards are mandated for all new systems. Legacy systems which need to connect to the Secure Government Network (SGN), or any other electronic service provided via the SGN must interface based on these standards and policies.

The IIF has two areas of principal concern that must be addressed:

- A 'technical' framework of interoperability policies, standards and guidelines expected to be adopted by a range of government agencies; and
- Governance arrangements for the management and maintenance of the technical framework once it is 'operationalised'.

The IIF does not seek to remove all IT related decision making from within government entities, it simply attempts to ensure that the policies, standards and guidelines provide a framework that removes the need to prescribe the use of the same hardware and software. The IIF ensures the independence of individual government entities but ensures that government entities if and when necessary have a common simple mechanism available to them through which it will be possible to interconnect.

2.2 Main Features

At the highest level, the IIF may be considered as being comprised of three major components. These are as follows:

- Policies and standards,
- Strategy for common data schemas provision and
- Management processes

2.2.1 Policies and Standards

Specific technology policies and standards are detailed later within this document. It is envisaged that these are the 'minimum entry' into the Government interoperability environment. The policies and standards are relevant to all government entities, external organisations and third-party product developers who wish to interact with Government via the use of Internet-based technologies and services.

The policies and standards encompass four main categories regarding interoperability, these being:

- Interconnectivity of services
- Integration of data

- Access to information (data)
- Infrastructure standards

All of these categories have a very close affinity and dependency upon the advancements and standards associated with the Internet and World Wide Web.

2.2.2 Strategy for Common Data Schema Provision

A critical enabler for the long term successful implementation of the IIF framework is the recognition and adoption of the eXtensible Markup Language (XML) standard as the prime format for data integration. In association with this will be the development of standard XML schemas defining the data schematics that will be the information 'lifeblood' of interoperability within Government. In conjunction with the adoption and enforcement of XML as the data standard the complimentary eXtensible Stylesheet Language (XSL) standard must also be included.

Simply stating that XML and XSL are the standards is insufficient to realistically ensure full data interoperability. What is required is the definition and agreement of government-wide schemas detailing the definition of data standards and the development of information flows. Underpinning this is the need for clear communication mechanisms, best practice guidelines, and the identification of tools and toolkits to support schema definition and development.

To enable the above to happen the government must establish taskforces within both the Government and industry. This shall ensure that both environments can come together to discuss and agree on schemas for the free movement of information between all interested parties while at the same time ensuring that industry best practices shall be introduced within the public sector. These taskforces will be jointly managed by Government (MoICT) and industry and will publish all output including draft working papers for comment. It will also be this taskforce that must verify any authorised tools and best practice guidelines.

2.2.3 Management Processes

The introduction of a new initiative within any organization is not a simple matter and shall require change management. The implementation of IIF framework will require the management of a complex, ongoing set of processes. This is further complicated by the fact that the IIF is an evolving framework. As industry trends and capabilities move forward the IIF must consider their implications and when and how to intercept their adoption. These are detailed later and incorporate:

- The overall IIF management process, with identified owners, authorities and responsibilities
- A change management process enabling input from all interested and impacted parties, potentially on a global scale, looking to ensure full participation and engendering opportunities for involvement and new ideas.

2.3 Fit with Other Initiatives

The IIF is only one of a number of initiatives the Government is pursuing in its drive toward meeting its e-Government strategy. These initiatives include:

- **Secure Government Network (SGN)**, the development of a government-wide network infrastructure enabling any-to-any electronic communication; e.g. data exchange, e-mail, intranet, Internet access etc. It must be ensured that all design, development and implementation issues are discussed with a clear understanding of IIF direction through the PMO.
- **Government Messaging Services**, the development of a common government-messaging infrastructure to provide email, calendaring, scheduling and collaboration to all government entities. All of these services are to be provided based on the IIF standards. It must be ensured that all design, development and implementation issues are discussed with a clear understanding of IIF direction.
- **Government Security Policy**, the definition of the overall security policy that will be adopted for government participation in e-based services. This policy will also apply to all third parties that wish to engage with the government on an electronic basis. It must be ensured that the IIF adheres to all policy directives adopted within the Government Security Policy.
- **Government delivery of services** via electronic means, it must be ensured that all newly developed services adhere to the IIF.

3 Policies and Standards

3.1 Introduction

This section details the foundation of soft policies and standards that shall drive the initial efforts with regard to enabling interoperability across the Jordanian Government and associated agencies. The current scope incorporates interconnectivity of services, integration of data, access to information (data), and infrastructure. Specific policies and standards are defined for each of these areas. A fifth area that should be integrated into a later release of this document relates to business processes interfaces. This shall provide a framework to map processes to support inter-agency business solutions. These processes will also define the services to be presented based on the business solution. This element of the IIF may be developed in future versions based on the work underway within the PMO (Programme Management Office) work stream.

Also, the use of versioning is incorporated because as standards evolve and change it will be necessary to revisit and update these standards on a regular basis. Through utilisation of the Internet to publish e-Government documents, communication to the wider audience will be swift and effective when changes occur.

3.1.1 Adherence to Blueprint & Strategic Roadmap

At the top level, IIF is influenced by a number of key strategic policy decisions, these being:

- Utilize existing IT policies, standards and guidelines that are used within the Jordanian government currently
- Recognition and alignment with the Internet community of industry standards
- Acceptance of XML as the standard for data definition, integration and presentation
- Adherence of all involved government entities and agencies to the IIF framework.

There are also a number of more generic policy decisions that influence the overall IIF standards. IIF standards must be:

- Scalable – with the ability to enable the delivery of services irrespective of the volume demanded. This includes data volumes, number of users, number of interactions, etc.
- Market-centred – supported and available through third-party products and services within the mainstream of industry. This is a key requirement when reducing risk and cost to the Government.
- Open – all standards must be open, i.e. non-proprietary, embraced by a wide range of key industry bodies and standards organisations, available on a wide range of platforms and supported by a substantial body of third-party suppliers.
- Manageable – all infrastructure components must include intelligence enabling centralised, proactive, and where appropriate, remote management.

3.2 Interconnectivity of Services

This relates to how government services can be ensured to talk to one another from the network layer to the application layer. The policies for interconnectivity of services are:

- Network connectivity will be through utilisation of IP version 4. The policy recognises IP version 6 but does not expect its adoption in the short-term (a watching brief will be kept as to when IPv6 has the necessary widespread acceptance to merit being the main choice)
- Security will be through adherence to the Government's Security Policy.
- Messaging services (including the use of inter-personal e-mail, business-to-business e-mail and application-to-application e-mail) will utilise products that support interfaces conforming to SMTP/MIME. The use of S/MIME v3 will be used where the e-mail content requires levels of confidentiality, e.g. sending data via unprotected or unsecured networks.
- An Enterprise Directory will provide a centralised service enabling support of a range of e- based services including messaging, access to telephone numbers, a 'yellow pages/white pages' service, fax numbers, etc. It shall adhere to the Central Directory interconnectivity standard established in Table 1, i.e. "X.500 will be the Directory standard, with LDAP v3 a general-purpose directory access mechanism".
- Domain naming will be standardised across government. The use of IP addressing will conform, over time, to a government standard (Government Entity access to the SGN will be via a controlled IP addressing scheme and which adheres to this policy). The Domain Name System (DNS) will be the mechanism through which IP addresses will be resolved within the Intranet/Internet space (a conformant capability will be delivered as part of the SGN service).

- Data exchange for bulk data transfer will utilise the IPv4 conformant File Transfer Protocol (FTP). The use of FTP will take advantage of restart and recovery capabilities to ensure data integrity and completion.
- Access to government data, where applicable for all new service developments, will be based on Web-based technology.

The standards for interconnectivity of services are:

<i>Function</i>	<i>Standard</i>
Hypertext Transfer protocols	HTTP v1.1 (RFC 2616) Hypertext standards include the utilisation of on-line wide-area publishing services
E-mail	E-mail products that support interfaces that conform to SMTP/MIME. This includes RFC 2045; RFC 2046; RFC 2047; RFC 2048; RFC 2049; RFC 2231; RFC 2646; RFC 2821; RFC 2822; RFC 3023.
Naming and Addressing	Standards for naming and addressing within the SGN will be included within the SGN and its associated Network Management service.
E-mail security	S/MIME V3 shall be used where appropriate (subject to Security Policy conformance) for pan government messaging security unless specific security requirements necessitate otherwise. This includes RFC 2630 to RFC 2633.
Central Directory	X.500 will be the Directory standard, with LDAP v3 a general-purpose directory access mechanism.
File Transfer	FTP protocol (RFC 959), incorporating support for the restart and recovery capability. HTTP (RFC 2616) for file transfer.
Communications security	Conformance to the Government Security Policy
IP Security	IP-SEC (RFC 2402/2404) ESP (RFC 2406)
Network Inter-working	IPv4 (RFC 791)
Transport security	SSL v3/TLS (RFC 2246)
Encryption Algorithms	3DES, AES
For Signing	RSA, DSA
For Key Transport	RSA, DSA
For Hashing	SHA-1, MD5
Transport	TCP (RFC 793) UDP (RFC 768) (subject to conformance with Security Policy requirements)

Table 1 – Interconnectivity Standards

Note: Copies of the IETF RFCs can be found at www.ietf.org/rfc.html.

3.3 Integration of Data

This relates to how government services can be ensured to talk to one another at the data level. The policies for integration of data are:

- XML and XML schemas for data integration
- Unified Modelling Language (UML) and XMI for data modelling
- Resource Description Framework (RDF) for description language
- XSL for data transformation.

XML utilisation will conform to the recommendations and standards associated with the World Wide Web Consortium (W3C). The use of any 'proprietary' extensions to the W3C standards should be avoided wherever possible. Any use of such extensions must be agreed upon beforehand and must be potential 'early adoptions' within the W3C set of standards.

All XML schemas that are base-lined and approved through the IIF work groups will be published via the Internet.

The standards for integration of data are:

<i>Component</i>	<i>Standard</i>
Meta data/Meta language	XML as defined and published by the W3C www.w3.org/xml
Meta data definitions	XML-schemas (this incorporates the schemas approved and published via the IIF forums)
Data transformation tools	XSL as defined by W3C www.w3.org/tr/xsl
Data Modelling and Description Language	UML www.omg.org/technology/documents/formal/omg_modeling_specifications.avai.htm RDF as defined by W3C www.w3.org/tr/rec-rdf-syntax
Document modelling	DOM as defined by W3C www.w3.org/tr/rec-dom-level-1 www.w3.org/tr/dom-level-2
Data Definition and Schema Standardisation Process	As per the IIF work group
Minimum Interoperable Character Set	ISO/IEC 8859-6: 1999 Information technology-8-bit single-byte coded graphic character sets – Part 6: Latin/Arabic alphabet www.iso.ch/cate/d28250.html ISO/IEC 8859-15: 1999 Information technology-8-bit single-byte coded graphic character sets – Part 15: Latin alphabet No. 9 www.iso.ch/cate/d29505.html
Geospatial Data	Geospatial Markup Language (GML) as defined by Open Geographic Council. www.opengis.org/techno/specs.htm

Table 2 – Data Integration Standards

Further information regarding the W3C specifications can be found at: www.w3.org/tr.

3.4 Access to Information/Data

This relates to how government services can be ensured to standardize the manner of data interrogation through third party products such as Internet web browsers. The policies for access to information (data) are:

- Government information services will take advantage of data access and manipulation provisions present within industry standard and commercially available Web browsers
- Government information services will, where appropriate, be designed to be available via the Internet, either directly or via third-party development/services
- Government information systems will support the standards and specifications listed in the Browser standards and specifications table below using, where necessary, plug-ins to the Browser or dedicated viewers
- Government information systems will be designed to provide protection against security risks associated with connection to the Internet including the ability to protect against the vulnerability of downloading executable code that is not authenticated
- Government information systems will be designed to adopt as browser standards those common elements supported by commercial market leading products
- Additional middleware or plug-ins are to be used, when necessary, to enhance simple browsers
- Browser standards should support those features that a business or citizen may be assumed to have available or can download without incurring a licensing fee.
- Notwithstanding the policy requirement that all public sector information systems be accessible through browser based technology, other interfaces are permitted in addition to browser based ones
- Government information access systems will be designed for the long term to provide the ability to support the citizen in their own time and at their own pace i.e. for asynchronous operation as well as synchronous
- Government information systems will be designed to be accessible to the citizen via multiple channels to suit the specific needs of the citizen

- Government information systems will be designed so that essential information of a service is accessible to the citizen via browsers with limited capability, using appropriate personalisation technologies.

The standards and specifications for access to information (data) via browsers and viewers are:

<i>Component</i>	<i>Standard</i>
Hypertext Interchange Formats	HTML v3.2
Document File Types	Adobe Acrobat as (.pdf), minimum viewer version 4 Microsoft Word documents as (.htm) files. Rich Text Format as (.rtf) files. Plain/Formatted Text as (.txt) files Other product viewer as (.htm) files
Spreadsheet File Types	Proprietary product viewer as (.htm) files where the HTML generated conforms to the standard for Hypertext interchange format components and delimited file as (.csv) files.
Presentation File Types	Proprietary product viewer as (.htm) files where the HTML generated conforms to the standard for Hypertext interchange format components
Character Sets and Alphabets	UNICODE Amendment 1: 1996 to ISO/IEC 10646:1993: Transformation Format for 16 planes of group 00 (UTF- 16)
Graphical/Still Image Information Exchange Standards	Joint Photographic Experts Group /ISO 10918 (.jpg) Graphics Interchange Format (.gif) Portable Network Graphics (.png)
Moving Image and audio/visual information exchange standards	Moving Picture Experts Group (MPEG-1 /ISO 1172/(.mpg)). Conversion is provided by most mainstream packages
Audio/video streaming data	Real Audio Real Video Shockwave Windows Media Format (.wmf) Apple Quicktime Waveform Audio File Format (.wav) 8µ Law
Animation	Macromedia Flash (.swf) Dynamic html (.dhtml)
Scripting	ECMA 262 Script Java Virtual Machine - for browser enhancements (subject to Security Policy)
General purpose file compression	File types (.tar), (.zip) and (.gz)

Table 3 – Information Access Standards

3.5 Infrastructure

This relates to the hardware and operating systems upon which government electronic services shall run. Identifying all IT environmental standard for the Jordanian e-Government initiative will serve no purpose, thus the IIF focuses upon core infrastructure elements that are common to every facet of Jordan's information processing needs and that should be addressed in order to establish a common infrastructure facilitating the seamless transfer and processing of information. An initial attempt at addressing those elements and associated standards is provided below.

<i>Element</i>	<i>Standard</i>
Operating System Services	ISO/IEC 9945-1: 1996, Information Technology—Portable Operating System Interface (POSIX)—Part 1: System Application Program Interface ISO/IEC 9945-2: 1996, Information Technology—Portable Operating System Interface (POSIX)—Part 2: Shells and Utilities

<i>Element</i>	<i>Standard</i>
Data Communications Management	<p>IETF Standard 15/RFC 1157, Simple Network Management Protocol (SNMP), May 1990</p> <p>IETF Standard 16/RFC 1155/1212, Structure of Management Information, May 1990</p> <p>IETF Standard 17/RFC 1213, Management Information Base, March 1991</p> <p>IETF RFC 1757, Remote Network Monitoring Management Information Base (RMON 1), February 1995</p> <p>IETF RFC 2011, SNMPv2 Management Information Base for the Internet Protocol, November 1996</p> <p>IETF RFC 2012, SNMPv2 Management Information Base for the Transmission Control Protocol (TCP), November 1996</p> <p>IETF RFC 2013, SNMPv2 Management Information Base for the User Datagram Protocol (UDP), November 1996</p> <p>IETF RFC 2006, Definitions of Managed Objects for IP Mobility Support using SMIPv2, October 1996</p> <p>IETF RFC 2021, Remote Network Monitoring Management Information Base Version 2, using SMIPv2, January 1997</p> <p>IETF RFC 2248, Network Services Monitoring MIB, January 1998</p> <p>IETF RFC 2249, Mail Monitoring MIB, January 1998</p> <p>IETF RFC 2515, Definitions of Managed Objects for ATM Management, February 1999</p> <p>IETF RFC 2605, Directory Server Monitoring MIB, June 1999</p>

Table 4 – Infrastructure Standards

3.6 Priorities

The issues identified below are those that must be addressed by MoICT in the short term.

It is essential that the Policies and Standards function be managed. This is addressed in more details in [Section 5](#) to ensure that responsibility has been assigned for co-ordination and maintenance of cross government IT standards and policies. This role shall be provided via MoICT's Technology Group within the Programme Management Office. It is anticipated that the Technology Manager will convene a working group of e-Government participants to review the performance of the standards and update them as processes and technologies evolve. Such a review should occur annually (minimum).

Government entities participating in co-operative e-Government projects (AMIR or e-Gov funded) will agree on the project Terms of Reference prior to initiating significant expenditure on the project. The government entity primarily responsible for the project (The Project Owner) will prepare the e-Service's (both AMIR and MoICT) Terms of Reference and distribute it to other government entities participating in e-Government service/s addressed by the project and allow a reasonable period for comment from those other government entities. The Terms of Reference should be formally approved by the Secretary Generals of participating government entities, prior to the release of a portion of the budget (e.g. 20%) of the project budget through agreement by MoICT and MoF.

Service Level Agreements must be developed between both government and non-government entities participating in e-Government services. This will also have to be managed via the Programme Management Office of MoICT. If we consider the provisioning of Layer 1 communication services to the MoICT for the SGN implementation, two potential vendors exist, Batelco and JTC. When a preferred vendor has been selected, negotiations with regard to the SLA must be initiated between MoICT and the preferred data communication service provider. The Service Level Agreement will include the following:

- Fault escalation procedures
- Required Security

- Network performance
- Required transaction levels, latency and throughput
- Cost apportionment
- Business Continuity
- Compliance with Standards and Policies

It is anticipated that a single e-Government Service Level Agreement will exist between each relevant Government Entity with separate schedules for different classes of services. This shall provide a potential measure by which the success of an e-Government service implementation might be measured. Government entities participating in e-Government should agree to produce a quarterly schedule of their entities delivery of e-Government services against the service level agreement. The adherence of each government entity to a service level agreement should be distributed to the other parties to the SLAs and to the central agency responsible for the monitoring of e-Government. Any issues identified through this mechanism must be addressed in consultation with other participating entities and the plan for resolution of the issue(s) lodged with the monitoring agency (MoICT).

A final point to note is that industry best practice recommends that medium to large organizations should establish a technology policy that shall determine the technical direction that an organization must follow. This ensures economies of scale, guarantees the selection of best in class IT solution selection within GOJ and also ensures that a core technology is identified within GOJ that will allow cross pollination of knowledge within the organization. The technology policy establishes GOJ's view of technology and technology developments, which can be used as a basis for making decisions about information technology. It provides some guidance for making daily technology-related decisions across government and for leveraging existing and future capabilities. An effective technology view correlates sound business decisions made today to the long-term benefits that result from those decisions. To achieve its goals, the technology policy must consider the following factors, which create a continuous cycle of assessment and resolution:

- Emerging patterns
- Broad collaboration

4 Strategy for Common Data Schema Production

4.1 Introduction

Previously within this document there has been detailed specification of policies and standards that are to be attributed to interoperability and future development within the Government provision of electronic services. However, policies and standards are insufficient by themselves to actually encourage and manage true interoperability across, within Government and with the extended public sector community. To combat this, the following defines a strategy for investigating, developing, approving and communicating common data schemas. It provides implementation support through the production of centrally agreed, freely available, XML based data schemas that can be reused throughout the public sector to reduce the costs and risks of developing data interchange systems. The initiative aims to assist developers by providing information, best practice guidance and advice.

4.1.1 Overview of XML

One of the problems with trying to describe XML and its applications or potential applications is the fact that XML has many facets.

XML is a general language for naming things, elements and their properties, using ASCII to create plain text. It also provides a mechanism for expressing a structured, hierarchical organization of information and data. In addition, it then becomes possible to transfer and exchange this information using any available transport and network.

One of the reasons that so many possible applications have been found for XML is the fact that XML itself is very simple. The specification is only a little over 30 pages. When looking at the many uses for XML it can easily be overlooked that XML is all about simplicity. XML/EDI is simpler than traditional EDI. XML inter-component communication, using the Simple Object Access Protocol (SOAP) for example, is simpler than let's say traditional DCOM-IIOP bridges, etc. Simpler usually translates into less expensive, lower cost of entry into the market, shorter training time, more tools (which therefore are probably also less expensive), potentially faster adoption, more easily adapted, enhanced and improved, and made available on more platforms. Other similar examples are Java, which is simpler than C++, and the Lightweight Directory Access Protocol (LDAP), which is simpler than other, proprietary, directory service systems.

While HTML focuses on presentation and format (e.g. font, color, layout), XML focuses on structure. Providing a logical rather than a physical layout makes HTML documents portable by leaving the physical layout to the browsers. HTML tags do not really capture the meaning of any of the HTML document elements, but they describe what functions pieces of text have, e.g. <H1> is a header, etc. It is left to the browser how to render this information, and in fact, a browser may even decide to not display certain information at all. HTML does not have any standard way to express what any of the text means, and is usually thought of as a presentation language, though it doesn't really define presentation either since the actual rendering is left to the browsers. One of the reasons that HTML is very popular is the fact that the HTML tag set is relatively small and well defined, creating a 'lowest common denominator'. While the HTML tag set appears fixed, it has always been possible to extend it, if one goes through the W3C standards process, an often lengthy and time-consuming undertaking. The web originally was created with content aimed solely for human consumption; the goal was to facilitate the easy exchange of information between people or groups of people, researchers in particular.

HTML is well suited for this purpose, but over the years, the web really has developed into much more than a simple medium for information exchange. For one, using the Internet for commerce created some new requirements that were not addressed by HTML (it should be obvious that like all electronic content HTML is of course machine-readable, just not machine-understandable). Very shortly every business will be engaged or somehow involved in e-commerce, making e-commerce the default way of doing business, which means that every business has a vested interest in these issues. In addition, some of the current problems are really a result of the incredible success of the web. One of these problems is the fact that it can be very hard to find the information one is looking for. Because of the sheer amount of information available, combined with the lack of structure in the available data, searches can be frustrating and often unsuccessful.

XML is designed to bridge between machine understandable and human readable content by providing structure to information that can still be read by a person. This allows us to move to a model of automatic content generation combined with automatic content consumption. While XML greatly improves the prospects of increased data and information exchange and furthers the automation of business processes, its 'self-describing' properties should be kept in the right perspective. XML can add semantic information to information, but for example an <ADDRESS> tag is really only self-describing to a person, and only one who speaks English. An application must still be correctly programmed to recognize the tag as identifying someone's address. Therefore, while the XML DTD may dictate that an <ADDRESS> must contain elements such as <STREET>, <POSTALCODE>, etc., this by itself is not meaningful to a

computer. What XML (an XML parser) can do is make sure that any document that is supposed to contain address information, does in fact have all the required elements, in the correct order, etc., a great benefit for electronic commerce and other data exchange.

HTML defines a global, universal, common, and widely available presentation interface; Java defines a global, universal, and widely available language and platform; and XML defines a global, universal data format that makes data interchangeable. In other words, XML and Java are very much complementary as Java provides portable, platform independent language and an accompanying programming and component model, while XML provides a portable, platform-independent data mode, allowing the creation of portable and platform-independent Java applications, which can manipulate portable and platform-independent XML-structured data. Combining Java's and XML's features and applying it in the context and environment of the Internet and its open networking standards realizes universal solution-centric computing, moving from a platform-centric to a solution-centric business and IT systems model. The interesting observation in this area should be that even though the almost universal acceptance of open standards makes it theoretically possible to make use of the layered architectures to employ many different networking technologies and programming languages, that in practice there is a convergence towards a much smaller number of technologies. This means that in general, there is a move towards simpler, and better defined IT architectures, leveraging some of the benefits of simplicity, as discussed earlier. It is also important to note that this paradigm shift does not mean abandoning earlier and existing systems (legacy systems), but rather using some of the integration capabilities offered by open standards and technologies such as XML, to integrate existing systems, further increasing the return on investments. In return this allows new systems to leverage some of the strengths and experiences of existing systems in the area of scalability, transactions, and EDI (XML does not really replace EDI, but rather offers a simpler, more portable way of performing EDI, leveraging existing domain and vertical industry expertise).

XML and XML-related standards can be grouped into two broad categories. The first are the horizontal standards, including XML, XSL (XSLT), and SOAP. Standards in this category are created, or at a minimum approved by the W3C and in some cases the IETF (e.g. SOAP, which has been submitted to the IETF). The other classes of standards are the vertical standards, created for use by certain domains. There are standards specific to some type of manufacturing for example, or specific to the financial industry. There are also some vertical standards that span domains, which may be used to facilitate commerce and communication between manufactures and financial institutions for example. These standards are created by groups such as the Organization for the Advancement of Structured Information Standards (OASIS), the Open Applications Group (OAG), Rosetta Net, and the CommerceNet Consortium. In most cases there will only be one approved (adopted) horizontal standard for any particular issue or application. But there are currently often several competing vertical and domain 'standards' that have identical or at least very similar purposes. This means that there is the danger of fragmentation and duplication, reducing the value that XML can bring to information exchange and business automation. This risk had been recognized, and OASIS for example is working on addressing this issue.

In conclusion of this overview it should be noted that XML and its related standards and technologies do not solve all of the data and information exchange issues, but provide a solid foundation for greatly increasing data portability and go a long way in future proofing information. Some trade publications create the impression that can solve all IT related issues within an organization when in reality XML represents a very powerful tool and enabling technology that still will need to be used correctly and appropriately. XML does not replace HTML, middleware, or component models such as CORBA, COM, or EJB, nor does it obsolete any programming languages such as Java. While some efforts are underway to use XML for scripting for tasks such as GUI layouts [XwingML, IBM Bean Markup Language], XML is not primarily or suitably a programming language. XML can and will be used for inter-component communication [SOAP], inter-tier communication and other tasks that it well suited for. As more browsers are able to handle XML directly there will also be a notable improvement in areas such as the consumer online shopping experience. XML is an excellent example of the shifting, if not already shifted, attitude of valuing readability, portability and standards, over efficiency (e.g. machine, CPU, memory, etc.) and the move towards open standards and information and data exchange.

4.1.2 Evolution of XML

Currently no common mature direction has been established for the definition and development of XML specifications.

Two broad classes of schemas have been developed within XML specifications. One represents particular business objects, such as invoices or resumes. The other class defines a transaction, for example the submission of an invoice or a deposit into a particular account. Some specifications focus on common business objects and some on standardising complex transactions. Further, some proposed specifications include a single schema for a single business object, while others are frameworks that propose rules and structure for classes of schemas and may include more than a hundred individual schemas.

Currently ebXML is attracting a considerable degree of attention as the XML standard that might redefine data interoperability. It is clear from its intent that ebXML is not just another burgeoning standard. The intent of ebXML is

to be the standard through which XML-based e-business is performed. ebXML is not just a collection of DTDs, XSDs, or XDRs along with user documentation on the semantics of such XML-based documents. No, ebXML is much more than that. The goal of ebXML is to create “a standard way for companies to carry out common business practices.” At first glance, this statement does not clearly differentiate ebXML from any other so-called XML standards efforts like BizTalk, RosettaNet or OASIS. However, as more XML vendors pledge support and produce more software for ebXML, the uniqueness of the initiative will become clearer.

A key standard that will prove useful is the Unified Modelling Language (UML). ebXML makes extensive use of UML and it would benefit any organization to learn and employ UML in the analysis of its business information and processes.

It is expected that by mid 2003 it will become clearer which of the possible content specifications will be mature enough to be considered for inclusion as the default XML methodology for the Jordanian e-Government initiative.

4.2 Jordan e-Government IIF XML Taskforce

The taskforce shall be established and chaired through the MoICT. It shall be directed via the PMO group under the direct supervision of the technology manager. The XML Taskforce should only be established once the Jordan e-Government initiative has begun to redevelop inter and intra government entity services.

This taskforce will provide the necessary guidance and implementation support. This will be through the investigation, development, approval, production and communication of centrally agreed, freely available, XML-based data schemas. These schemas can be reused throughout the public sector to reduce the costs and risks of developing data interchange systems targeted at either government services or information.

The work group helps developers, internal and external, by providing information, best practice guidance, and toolkits for conversion of legacy data. It is intended to make adoption of the IIF policies and standards simple, attractive and cost effective.

4.3 Jordan e-Government IIF XML Taskforce Role and Membership

4.3.1 Role

MoICT shall manage the XML initiative within the information framework. As stated above the initial short-term goals of the IIF taskforce must be relate to educating the technical resources within the Jordanian government to the potential of XML, an understanding of what it is, how it can be developed, etc.

In the medium term, the taskforce may set up well-defined and managed subgroups to tackle specific topics and issues. These subgroups will report to the Government of Jordan IIF XML taskforce. Such subgroups could be for defining and providing a repository for XML schemas or identifying best practice guidance and toolkits for developing interfaces and performing data conversion. It is expected that these subgroups would seek to closely liase with other international initiatives, e.g. NZ e-Government (<http://www.e-government.govt.nz/>), GOL Network (<http://www.governments-online.org/>), UK GovTalk (<http://www.govtalk.gov.uk/>) and standards groups such as W3C, OASIS and other XML interest groups.

The primary role of the taskforce is to promote the production and management of the XML schemas necessary to support the data interoperability requirements of the e-Government blueprint/strategy. It is anticipated that XML schema specialist groups will be established to support specific projects, e.g. e-procurement. Alternatively, through the introduction of a Request For Proposal (RFP) process, the views and ideas of independent XML developers within the commercial sector can be sought. In addition, there will be opportunities for ‘suggestions’ on XML schemas from any interested third party without the need for an RFP response. Whichever route the schema is proposed, the Government of Jordan IIF XML taskforce will manage the process of acceptance, and where successful, publication and any subsequent change request. XML schemas that have been accepted and approved by the forum should be published on the Web and made widely available for information purposes, use and potential feedback.

The taskforce, or one of its nominated sub groups, will set the design rules to be used by the XML schema developers and will use these to validate schemas proposed for publication. The rules include compliance with W3C standards as highlighted above.

The taskforce will also track international XML standards development by forging close working links with W3C and with organisations such as OASIS, the Electronic Government Framework (EGF) and others. These links will provide access to provisional data schemas, which can be taken as one of the inputs for government wide consultation and adoption, where appropriate.

4.3.2 Membership

It is imperative that taskforce membership be as wide and varied as possible. It should incorporate representation from both the government and private sectors. To ensure this, government and private sector organisations working on government e-based interoperability projects may be invited to become full members. At this point in time, MoICT might utilise offers of assistance from the private sector (e.g. Microsoft) to assist with the development of the initial basic XML development framework. This should involve a selection of corporate entities to ensure that the outcome is a portable, scalable and vendor independent solution. Membership will require attendance at group meetings and participation in decision-making and direction setting. It is expected that membership will change over time as new interoperability projects are started and existing ones are completed.

Internal GOJ membership activity should stem from current initiatives such as the development of e-Government related services such as TRC. The consideration of the use of common data schemas shall also prove a catalyst to increase the degree of integration across Government entities. Each government entity to be affected as a result of the introduction of a particular e-service should be involved in the development of the associated data schemas. MoICT should provide an oversight function to assist with the creation of XML schemas and to ensure that the basic XML development framework is adhered to.

4.4 Priorities

The critical short-term priority for the Jordanian e-Government IIF XML Taskforce must be to establish buy in to assist with the development of a federated IT architecture and to ensure that services are enabled across government entities. Without the understanding of the potential cost reductions and efficiency gains that can be achieved by the introduction of end-to-end service implementations within government, no incentive will exist at the government entity level to wish to become involved with the e-Government e-services rollout.

XML is an enabler for change but cannot be considered the driver for change within an organization. Once a set of e-services have been designated for cross Government Entity implementation, then the taskforce may begin to ramp up. However in the short term champions should be identified within the Technology Team of the PMO group at MoICT. The nominated resources should be encouraged to attend relevant training courses, investigate developments within the field of XML and spread technical awareness of XML throughout government through initially training workshops to discuss benefits of its use. Also the taskforce could in the short term become a point of reference even for internal e-service developments that require assistance with development of XML schemas and deployments.

In the medium term, data schemas for generic services across departments should be priority for development. Facilitation of new, joined-up services and inter-departmental process developments will also be given precedence.

5 Management Processes

5.1 Introduction

The IT environment is moving at an ever increasing pace, to ensure that the standards outlined within the IIF are kept up to date and relevant it is essential that IIF is managed. Other benefits that shall be achieved through this include

- Global feedback mechanisms ensure quality of document
- Inclusion of all stakeholders in establishment of IIF standards ensures completeness and effectiveness of the information framework to be adopted

This section describes governance of the framework and how change will be managed. Governance covers roles and responsibilities, committees and compliance processes. Change management describes how the framework will be updated and introduces a process for consultation.

5.2 Overall Governance

The scope of IIF covers all aspects of Government, both internal and external (including interaction with businesses, suppliers and citizens). Therefore the roles and responsibilities are spread across all participating groups.

5.2.1 e-Government Entity - MoICT

The Ministry of Information & Communications Technology (MoICT) through the Programme Management Office's Technology Office shall be responsible for all facets of management relating to the IIF. The Secretary General of Ministry of Information & Communications Technology shall provide the executive sponsorship function for the management of the information interoperability framework.

The MoICT has a responsibility to oversee the development, adoption and communication of the IIF along with conformance to it by participating parties. This responsibility will encompass a wide range of activities, including:

- Leading the development of the IIF through the MoICT's Programme Management Office Technology Group.
- Providing necessary guidance and support as part of the overall management process through the MoICT's Programme Management Office.
- Managing co-ordination between all government entities and between government entities and the private sector.
- Managing the overall change process for IIF development, including interactions with industry leading developments and standards bodies.
- Managing the development of the XML taskforce to develop the Government XML schema through the MoICT's Programme Management Office Technology Group.
- Ensuring widespread adoption of a standard XML schema throughout Government
- Encouraging and authorise best practice guidelines and development of supportive tools
- Managing the compliance process and ensure that interoperability policies and roles are adhered to
- Managing co-ordination with other governments and international bodies
- Managing interaction with similar initiatives and specifications bodies elsewhere across the world including W3C, IETF, EGF, OASIS and others.

5.2.2 Government Entities

The IIF must be made available to all government entities, as the full participation of all government entities (ministries, departments, public sector agencies, etc) is essential to successfully delivering interoperability in the public sector.

The distributed government entities will be responsible to:

- Contribute to the continuous development and improvement of this framework
- Ensure that new developments conform to the IIF standards and legacy developments have a migration path to the new model
- Work with users of their services or data to identify those services that can usefully be made available to others
- Ensure that they have the necessary skill sets to define and implement the specifications needed for interoperability
- Establish a contact point who understands the impact of requests for change and can respond within the stated time period
- Budget for and supply resources to support the processes

- Identify the relevant customer(s) or stakeholders within their organisation and ensure their interests are represented
- Take the opportunity to rationalise processes (as a result of increased interoperability) to improve the quality of services and reduce the cost of provision.

5.2.3 Third-party Suppliers

The success of IIF is dependent upon not only government entities embracing IIF and delivering solutions based upon its contents, but also on third-party suppliers of products and services. These suppliers provide products and services that will be utilised by businesses and citizens in enabling them to meet their specific needs. To enable open Government and the adoption of IIF to be successful it is necessary for these suppliers to adopt the IIF standards and have their products capable of interoperability with Government e.g. support for XML and Internet communication protocols etc. To enable this, MoICT must:

- Develop working relationships with third-party suppliers
- Ensure clear and authoritative messages are given as to the direction and standards that the e-Government initiative wishes to adopt
- Encourage full participation in the development of the IIF by third-party suppliers through a controlled process of discussion, comment and authorisation via relevant taskforces to listen to the thoughts and ideas of third-party suppliers especially in the area of standards adoption and interception.

5.2.4 Areas Requiring Management

There are a number of areas that will require identification and subsequent management if the IIF is to be successful. This includes:

- Nominating champions within each government entity to ensure adoption and compliance with the IIF as well as acting as members of the overall MoICT management authority
- XML schema development, this management group will be responsible for ensuring the development, communication and conformance to approved XML schemas. It will also be responsible for the setting up and subsequent management of any XML subgroups that are generated, e.g. subgroups set up to look at specific business interoperability schemas.
- Developing the IIF, this group will be a combination of government and industry representatives who will take on the responsibility of identifying future IIF related standards and policies and management of the process to have them investigated, developed, authorised and implemented.

5.2.5 Management of Change

It is recognised from the outset that IIF will inevitably change and must have the capability to change quickly when required. The change management process must ensure that changes to adopted standards as well as interception of new standards are included. To ensure that change is properly managed, including understanding the potential impact of change, a set of formal and authoritative processes will have to be introduced, including:

- The setting up of forums through which close co-operation and consultation can take place. These forums will cover all aspects of interaction, i.e. government entity to government entity and government entity to business. All interested and impacted parties should be encouraged to participate. Some will be specifically targeted as key players who need to be involved to ensure its success. Ideas and comments are encouraged from all communities
- In certain circumstances the Government may wish to 'outsource' the development of a particular interoperability service and will use the common RFP mechanism to enable this
- In addition to Government generated requests it is hoped that ideas and innovations will be generated outside of Government. A process will be put in place whereby unsolicited communication regarding the IIF, its applicability, use of standards, etc. can be accepted and processed accordingly
- The IIF is an evolving entity and will need to be reviewed on a regular basis. To support this a process will be introduced where the full scope, content, applicability and relevance of the IIF will be reviewed by the MoICT, initially every 6 months (subject to ongoing review), to ensure it remains pertinent and viable. Any changes identified will be put through the normal processes detailed above.

6 Best Practices in Information Technology Governance

Previous sections of the IIF address the need for a change management process to engage all elements of the Jordanian national and local government entities in IT decision making. The benefits to be realised from adopting a standardised approach can be significant as outlined below.

- Streamlined decision making—in most cases technical direction has already been established,
- Increased flexibility—standardisation reduces the problem set associated with change,
- Leveraged buying power and enterprise licensing—standardisation increases economies of scale,
- Reduced training and maintenance costs—standardisation eliminates unnecessary diversity.

Organisations that fail to implement formal governance approaches to managing change in their information technology portfolio often ensure that IT resources (hardware, software and people) are not streamlined, nor effectively deployed, nor ensuring economies of scale and also most importantly results in an unclear direction be mapped for the IT function.

6.1 Phases in Implementing a Jordan e-Government IIF Governance Process

Jordan e-Government could realise significant additional benefit if its IIF change management process were closely linked to its IT procurement and capital planning processes. The process must be adaptable to changes in Jordan's IT planning processes, particularly as the Jordanian e-Government architecture matures. However, the introduction of the IIF and an associated governance process represent cultural change within the Government of Jordan and may in fact result also in organisational change. Therefore, it is recommended that the MoICT introduce an IT and IIF governance process in managed phases as described below.

- **Phase 1 (Current).** Define the IIF change management process as an enterprise business support process to increase awareness of the government's IT portfolio and serving to both gather and disseminate information necessary to implement Jordan's e-Government initiative. This will require full co-ordination of the IIF with all government entities.
- **Phase 2 (Recommended).** Link IIF change management to change management processes in business, data, applications, and infrastructure architectures.
- **Phase 3 (Recommended).** Link IIF change management to the Jordan Government's IT procurement and capital planning processes.

The concepts are illustrated in the figures below.

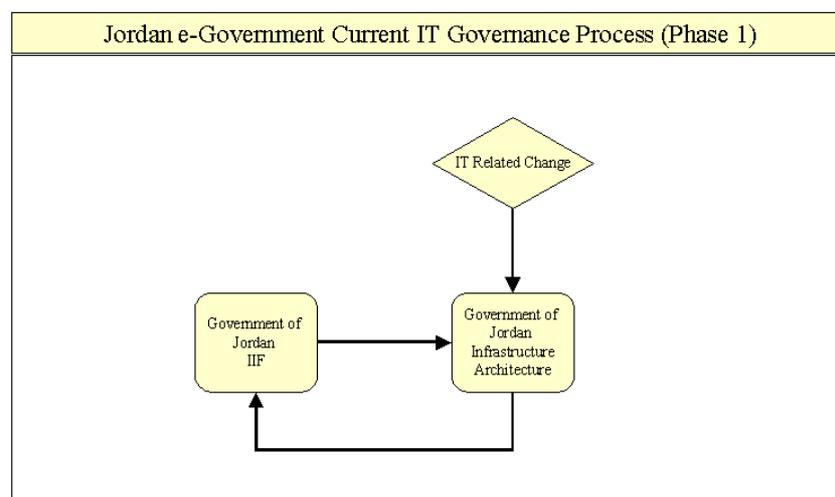


Figure 2 – Current IT Governance Process (Phase 1)

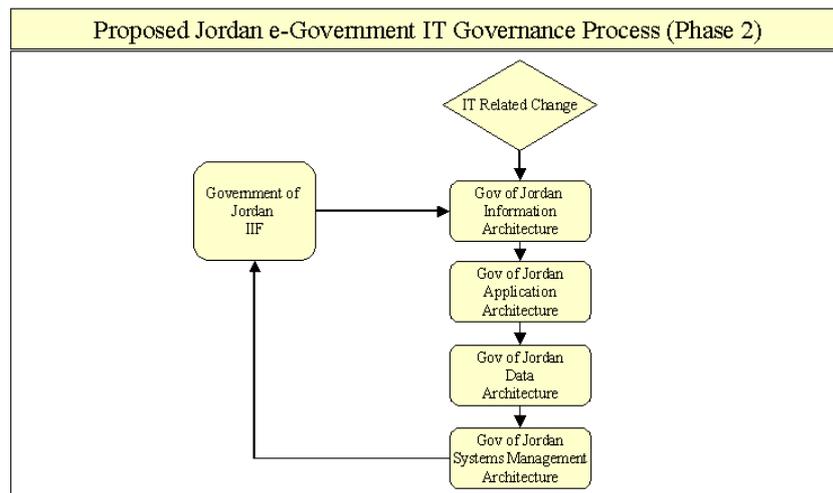


Figure 3 – Proposed IT Governance Process (Phase 2)

The four core elements that provide the foundation for the complete IT function are identified above in Figure 3. Information architecture identifies and defines critical information needed to support the all governmental business processes. The information architecture also considers the best distribution of information across multiple sites and platforms, to ensure the information is available when and where it is needed. From an IT point of view, where information crosses process boundaries or application boundaries that enable the processes, there are potential integration considerations and issues that must be recognized and addressed. The establishment and adoption of interoperability standards will be critical for the success of this initiative.

Application architecture defines a logical portfolio of applications for supporting business processes, in line with the business and IT direction. Application architecture also considers the best distribution of applications and application components across multiple sites and platforms, as well as identifying the systems services that the infrastructure must provide for applications. This might include standard components for pieces of programming code that can be reused. It may also include a common "look and feel" for all of e-Government web pages.

The technical or IT infrastructure provides a base or foundation on which to support the required information and applications. An infrastructure architecture defines the platforms (clients, servers, and I/O devices) networks, and common systems services that form the IT infrastructure. Common themes that shall have to be assessed would span both back-end and front-end systems such as internal governmental systems such as email and ERP and external facing systems such as payment gateways.

Systems management functions and associated technology are required to design, implement, manage, and support the IT elements addressed by the information, application, and infrastructure architectures. The systems management architecture defines those functions and the technology required to execute those functions. All the above components must be in place to ensure the scalable, secure and successful e-Government environment within the Jordan. Certain common themes are analyzed across each of the four domains, particularly with regard to security issues. A standardized approach should be designed, adopted, rolled out and followed by all entities falling under the e-Government umbrella.

The introduction of a technology policy that would establish a direction and provide guidance for all IT investments to be made by the Government of Jordan might be appropriate at this stage.

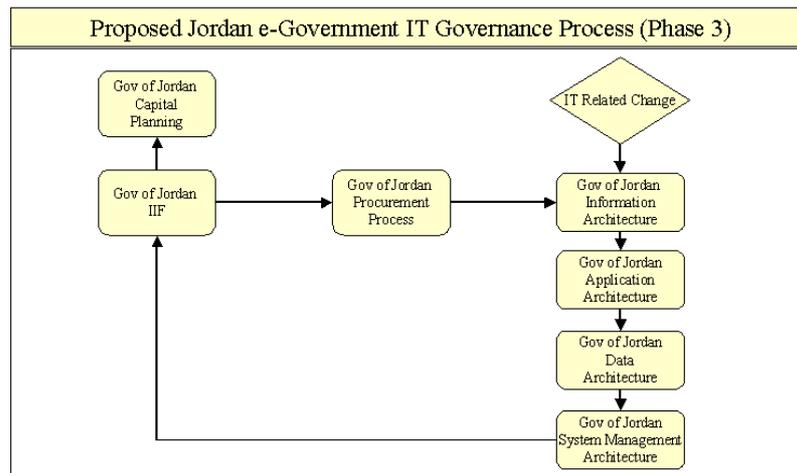


Figure 4 – Proposed IT Governance Process (Phase 3)

6.2 Sample Critical Success Factors

Processes are often characterised by their critical success factors. A cross section of IT governance critical success factors identified through interviews with numerous government agencies is outlined below. The IT governance process must:

- Guide but not control.
- Be simple and responsive.
- Enable constructive creativity but limit risk.
- Be adaptable to the organisation's evolving enterprise architecture.
- Recognise the already considerable workload carried by the organisation's information technology professionals at the departmental, ministry, and MoICT level.
- Enable the organisation's information technology professionals at every level to focus only on those issues relevant to their activities:
 - MoICT: Managing the enterprise and providing strategic direction,
 - Ministerial: Enabling the field and providing tactical direction,
 - Departmental: Supplying and delivering services.
- Serve as a means to increase knowledge and enterprise awareness of the organisation's technology portfolio and its proper employment.
- Foster shared awareness and appreciation for the value of the organisation's IT policies and standards-based solutions:
 - Improved interoperability,
 - Enterprise licensing and leveraged procurements and
 - Streamlined maintenance and training.

6.2.1 IT Governance Process Metrics

Though examples are not provided due to the wide range of process dependent possibilities, it should be noted the success of any process is ultimately defined by measurable criteria. Organisation's implementing IT change management and governance processes must define criteria to measure the success and effectiveness of the process.