



The New Zealand Government
State Services Commission

E-Government Unit

A New Zealand E-Government Interoperability Framework (e-GIF)

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FOREWORD

The New Zealand e-Government Interoperability Framework (e-GIF) is a set of policies, technical standards and guidelines (recommended practices) covering data and information, information and communications technology (ICT), and inter-agency electronic business protocols in the public sector.

Working groups comprising government and vendors have worked on the production of this document over the months of October to December 2001. The partnering with IT and IM vendors has proven extremely invaluable in reaching consensus over the choice of open standards to achieve a framework for a 'joined-up' government.

As much as interoperability is about agencies working together to improve delivery of services, it also impacts the vendor community, in that they need to understand and provide services based on inter-agency business needs. Contribution by the vendor community in the formative stages of the New Zealand e-GIF is an important factor to ensuring the validity of the framework.

A document such as the e-GIF is "living" in that it must change as technology and business needs change. This will be assured through design of appropriate governance arrangements for the e-GIF, which will guide future change to the policies, standards and guidelines in a way that should be both measured and responsive.

This document uses technical material from a Referential Architecture produced as part of the Leveraging Infrastructure project of the E-government Unit. It also has incorporated parts of the United Kingdom's e-GIF document.¹

¹ The UK e-GIF copyright notice is reproduced in full in Appendix B. The following is a shortened version: **e-Government Interoperability Framework (e-GIF)** © Crown copyright 2001

A Who's Who of the e-GIF Contributing Agencies and Vendors



1. WHAT IS INTEROPERABILITY AND HOW WILL IT BE ACHIEVED?

1.1. Introduction

Version 2 of the New Zealand e-government strategy, published December 2001, defines Interoperability as:

"The ability of government organisations to share information and integrate information and businesses by use of common standards."

This ability (or more precisely, capability) clearly shows that the e-GIF is a core and collective public sector asset, providing one of the common foundations of the e-government environment.

It is critical to achievement of e-government goals, providing the capability for any agency to join with another electronically using known and agreed approaches to do so.

This capability underpins several e-government objectives. In particular, use of the e-GIF enhances the capability of agencies to:

- integrate information and services across agency boundaries; and
- provide easy electronic access to government information and services for individuals and businesses.

This means that the e-GIF supports improvement of the customer experience of government, and increases in the cost-effectiveness of government organisations. In effect, the Interoperability Framework performs the same function in e-government as the road code does on the highways.

1.2. How This Document Is Structured

This section describes way the e-GIF is organised and how to find the elements.

The material is arranged in five parts:

- Sections 1, 4 and Appendix B provide an overview of the framework, who was involved in its development, what interoperability means and the context for its use and an introduction to the key elements.
- Sections 2 and 3 provide the overarching principles and management policies for the management of inter-agency projects. Governance arrangements for the e-GIF will be summarised in this section, once they have been finalised and approved by Cabinet.
- Sections 5-8 contain what will become the essence of the e-GIF - the policies, standards and guidelines.
- Appendix A contains a summary table of all the technical standards within the e-GIF.
- Appendix C is a glossary of terms used within the e-GIF.

1.3. Why interoperate?

A primary purpose for an Interoperability Framework is to facilitate the delivery of integrated services between government agencies (refer §2.1.1).

The Interoperability Framework has two major components:

- 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’.

Interoperability is NOT about a central agency simply dictating common systems and process for agencies to adhere to. The policies, standards and guidelines provide a framework that removes the need to prescribe the use of the same hardware and software.

1.4. Achieving Interoperability

Interoperability, as a key public sector capability to be developed as part of the e-government strategy applies in the following cases:

Figure 1: Interoperability requirements

	Agency	All agencies	Community of Interest	Public	Business	Other jurisdictions including local government
Agency	Perhaps	Yes	Yes			
All agencies	Yes	Yes	Yes	Yes	Yes	Yes
Community of Interest	Yes	Yes	Yes	Yes	Yes	Yes
Public		Yes	Yes			
Business		Yes	Yes			
Other jurisdictions including local government		Yes	Yes			

Interoperability requirements: This table shows that interoperability will apply when the delivery of the service involves more than two agencies or a community of interest.

1.5. The Physical Environment

The primary assumption when using the e-GIF is that it is applied externally to agencies², that is, it defines the firewall-to-firewall environment for inter-agency projects. To achieve this, use of the e-GIF is based on the concept of a “bolt on” interface that can be applied to any government agency (and/or its contracted third parties).

The bolt-on interface uses open standard protocols as a means of communication and access using Internet protocols. Data sent through the interface is converted to a common standard understood by all the other government interfaces. Data received through an interface is converted to a form that can be understood by the individual agency back office systems.

Any two or more departments that have such an interface can communicate directly with each other and exchange data in a way that is clearly understood by both regardless of the back office systems in place. The implementation of these interfaces facilitates government department and agency interoperability for example by providing a framework to:

- exchanging structured data
- exchanging metadata
- provision and collection of metadata
- exchanging and/or integrating business processes
- exchanging documents
- exchanging images
- exchanging multimedia

² The adoption of the e-GIF must allow a period of transition. This means that with the publishing of the e-GIF Version 1.0, nil changes to **existing** systems (internal and external) are required in the absence of any change in agency environments. The e-GIF will be applied with the development of **new** inter-agency initiatives (and/or agency structural changes).

2. GUIDING PRINCIPLES

The following principles guide how the e-GIF is to be developed in the future, and define how agencies are expected to respond to it.

2.1.1. *Purpose*

The purpose of the e-GIF is to create a common basis across government for the cost-effective delivery of e-government to the public and business, and between government agencies. The design and content of e-GIF is driven by the need to enable inter-agency electronic business arrangements. Its primary value results from its application by agencies as part of their e-government efforts.

2.1.2. *Usage*

Subject to Cabinet agreement, mandatory adoption of the e-GIF will be required of:

- Agencies listed in the first schedule of the State Sector Act 1988;
- The New Zealand Defence Force
- The New Zealand Police
- The Government Communications Security Bureau
- The New Zealand Security Intelligence Service
- The Parliamentary Counsel Office
- The Office of the Clerk
- Parliamentary Services
- Offices of Parliament

Organisations in the wider State sector are encouraged to use the e-GIF. Local government is invited to use the e-GIF.

The e-GIF is open to use by non-government organisations, the business community, and the general public. It is also open to use by other jurisdictions.

2.1.3. *Alignment with international environment*

The e-GIF provides a framework that facilitates business solutions between agencies at a national level. It must also contribute to this across national borders. To meet this objective, design and maintenance of the e-GIF will ensure that it provides government agencies with a supportive framework that is aligned with the international environment of interoperability policies standards and guidelines.

The e-GIF is based on the use and adoption of internationally accepted standards; as such bespoke policies, standards and guidelines (i.e. those written by the NZ Government) will only be developed where deemed strictly necessary. Wherever feasible and relevant the e-GIF:

- utilise existing information and technology policies, standards and guidelines³ that are proving useful in the New Zealand public sector;
- mirror established and open international standards for interoperability (where relevant to NZ); and
- draw upon the interoperability Framework developed in other jurisdictions [e.g. The UK Government's E-government Interoperability Framework (UK e-GIF)].

2.1.4. Governance of the e-GIF

The e-GIF is an important public asset. The value of the asset must be maximised and maintained across time. A key to this is the governance arrangements that surround the e-GIF. The design of these arrangements will reflect the following key principles:

- The principles of ownership, stewardship and custodianship developed as part of the Policy Framework for Government-held Information should be reflected in the design of governance arrangements for e-government infrastructure
- Clarity of roles, responsibilities and accountabilities, and transparency of decision-making processes is essential.
- Consistency with legal arrangements, and prevailing conventions and practices of governance in the public sector is required.
- Balancing of the collective interests of government with the needs of individual agencies and their stakeholders must be possible.
- Development and implementation processes should be inclusive and as consensual as possible.
- Gaining confidence in, and commitment to, the e-GIF from its stakeholders is important.

Management of the e-GIF in a live environment forms part of the wider e-government programme initiative to determine governance of all operational components arising from the various projects. This initiative is in its early stages.

2.1.5. e-GIF enhances the capability of agencies

Use of the e-GIF provides an environment whereby government agencies can be more efficient through using the same standards and information exchange environments in different projects and with different agencies. This in turn enhances the value these agencies provide to their stakeholders. To assist agencies in capturing the benefits of the e-GIF, all interoperability policies, standards and guidelines will be clearly defined, beneficial, applicable to agencies of any size, and formulated to encourage good practice.

2.1.6. e-GIF complies with legislation

The e-GIF will comply with all relevant NZ legislation and Government policy. In particular, personal privacy and the security of data and information held by government are paramount, and are not to be compromised by the design or application of the e-GIF.

³ See [glossary](#)

3. OVERARCHING E-GIF POLICIES

The policies below are concerned with non-technical matters that are central to effective functioning of the e-GIF in the business environment of government agencies. Regardless of how any agency applies any of the other components of the e-GIF, these policies will have universal application and be regarded as mandatory requirements on all agencies that use the e-GIF.

3.1. Policy Statements

3.1.1. *Application of the Policy Framework for Government-held Information*

All aspects of the Policy Framework for Government-held Information apply to data and information that is shared, exchanged, or otherwise used or managed, under the specifications or coverage of the e-GIF.

(see: www.ssc.govt.nz/documents/policy_framework_for_Government_.htm)

This requirement extends to the e-GIF itself.

3.1.2. *Agencies to develop Interoperability Agreements*

Agencies involved in inter-agency projects will sign a formal Interoperability Agreement.

3.1.3. *Data and information quality*

Data and information quality is of critical importance to achieving the desired outcomes of service integration through the application of the e-GIF, and the inter-agency e-government initiatives it supports. In every instance where agencies exchange data or information under the auspices of the e-GIF, a formal agreement over management of data or information quality will be developed as part of the Interoperability Agreement noted above.

3.1.4. *Inter-agency cost recovery*

In instances where agencies need to recover operational costs⁴ arising from application of the e-GIF these costs will:

- be explicitly identified as part of an Interoperability Agreement; and
- accrue to the agency or agencies that are the principal beneficiaries of the transaction, except where:
- the attribution of cost and cost recovery is uneconomic; or
- public policy considerations justify partial or complete subsidy.

⁴ An example of operational costs are those that may accrue from the delivery and maintenance of different datasets, with one agency agreeing to act on behalf of another, and recovering the costs of doing so. Commitment for capital expenditure to achieve integrated services between agencies will follow normal business process; that is, normal business planning and budget cycles with agencies identifying and agreeing capex streams in advance of projects.

The following legislation, policies and/or guidelines will guide the process (where relevant):

- The Privacy Act 1993
- The Official Information Act 1982
- The Policy Framework for Government-held Information (pricing principles)
- Guidelines for setting charges in the public sector (The Treasury).

4. ELEMENTS OF INTEROPERABILITY

4.1. Five Elements

The e-GIF policies and standards are usefully divided up into five elements. Each element relies on previous categories being present and working, e.g. data for interoperability relies on interconnection for the delivery of the characters. Surrounding all of these categories is:

- the overarching e-GIF guiding principles and policies outlined in sections 3 and 4 of this document; and
- the governance framework for the e-GIF (once finalised).

Business Process Interface: covering matters needed to allow managers 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 e-GIF will be developed in future versions based on the work underway in the Government Services Online project

Service Delivery: covering matters needed to provide answers to queries from clients: what types of services will be provided, when services are to be expected, how directories that define available services will be maintained (relying on all other elements) –the NZGLS is a component (albeit with a specific focus).

Access: covering matters needed for obtaining access to information: security (authentication), expected features of defined access methods including presentation for disabled clients, range of expected transactions e.g. peer to peer (relying on data integration element) –the Web Standards are a component (albeit with a specific focus).

Information Sharing and Exchange (*Data Integration*): covering matters needed to allow for the recognition of data: codes, recognition methods, interpretation, including formats used (relying on interconnection elements).

Interconnection: covering matters needed for the exchange of information between a user and an entity of e-government: transmission mechanisms, transfer mechanisms (interfaces) that link the transfer medium (the Internet in this case) and an end party, security and protocols for managing the connection.

4.2. Layer Model

The following diagram presents a model of how the various elements interact to provide an interoperability solution between agencies.

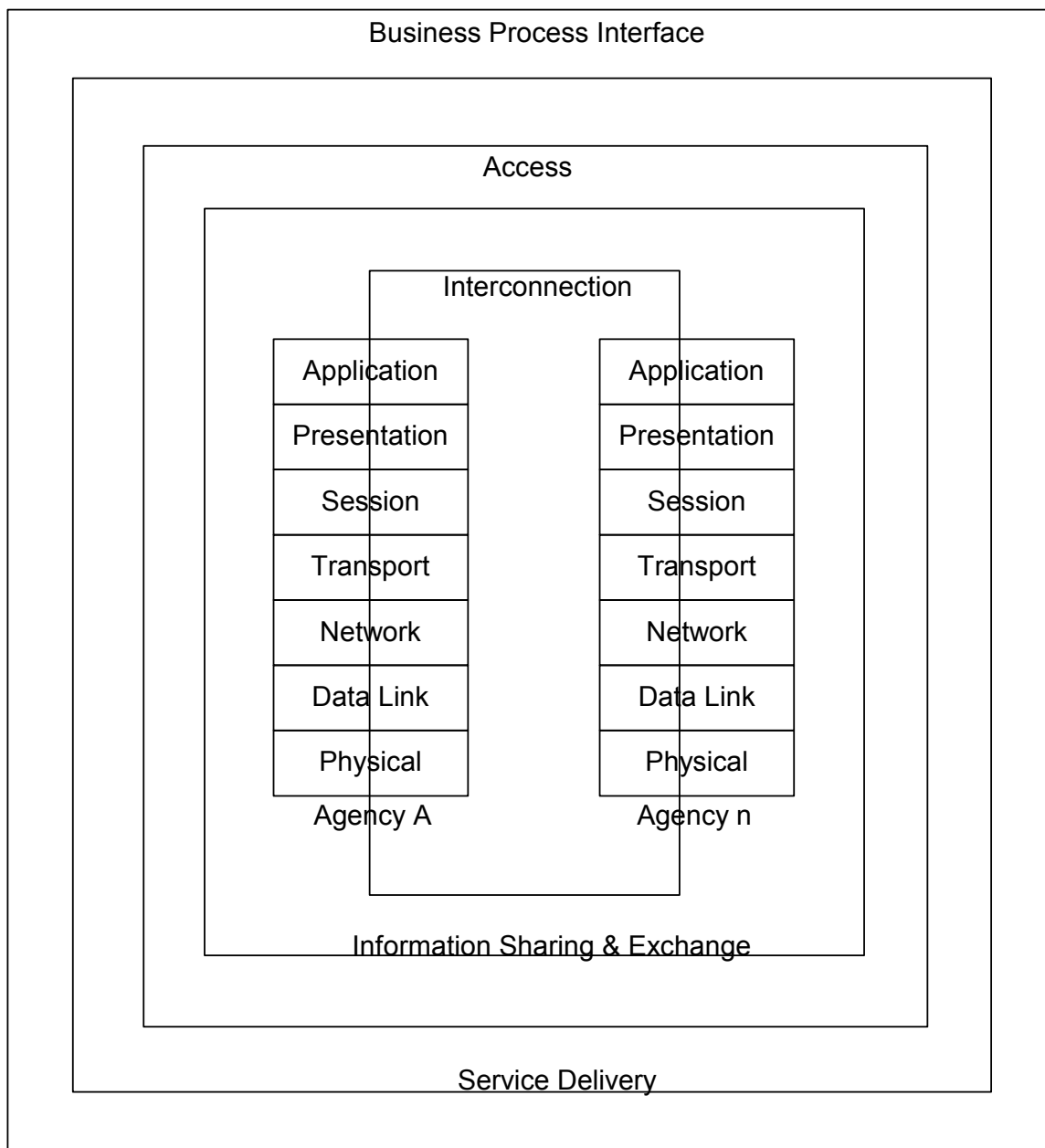
A business-oriented person would logically approach an inter-agency project with a business need that requires a solution. Managers in the agencies involved in the project would agree and sign-off on the need to produce an inter-agency solution. The provision of this solution would depend on the processes they require to solve their problem, the services or business functions they expect to use in solving their needs and which people they agree should get access to the solution and what data / information they may have access to and / or update. This may be called the outside-in approach.

Conversely, a technically oriented person, when presented with the business need and the functional requirements to 'build' a solution between agency firewalls would start with

determining which applications are required to “hand-shake”, and how. The data exchange would then be agreed between agencies, including formats (syntax and meanings) and translations as required to agreed schemas etc. Common access controls could then be applied using agreed directory schemas including the design of alternate presentation formats for various customer needs. The shared information / system could then be presented as a web service to be called from another location using agreed interfaces. This may be called the inside-out approach.

An assumption made in the presentation of the model is that agencies self-manage their internal environments, based on the application of the ISO 7 layer model.

Figure 3: The e-GIF Layer Model



5. INTERCONNECTION

5.1. Technical Policy Statements

5.1.1. Networks

Agencies are to interconnect networks using TCP/IP. IPv4 is acceptable for existing implementations. New implementations should adopt IPv6 with the ability to maintain backward compatibility for IPv4. By 2004 all implementations will adopt IPv6 as the standard.

5.1.2. Mail

Agencies will use SMTP to support email.

5.1.3. Directory

Agencies that require directory interconnection are to use LDAP v 3.0 for new inter-agency initiatives, while maintaining backward compatibility with LDAP v2.0.

Agencies will use DNS for Internet name-to-IP resolution

Notes: Agencies that require interconnection are to ensure that they are aware of the S.E.E. activities and recommendations with regards to [Directories](#).

5.1.4. Authentication

Agencies that require Authentication for electronic transactions between agencies are to be aware of and adhere to directives and recommendations from the S.E.E. project. Refer to [S.E.E. Public Key Infrastructure \(PKI\)](#)

5.1.5. Security

Protectively marked data will be handled and transmitted in accordance with the provisions of the [GCSB SIGD publication](#).

Where data exchanges require encryption, SSL v 3.0 128bit is the minimum recommendation for transport security. Where data exchange is to be secured with digital key technology, agencies are to adhere to the [S.E.E. PKI](#) requirements, i.e. using X.509 digital certificates.

Secure e-mail transfers are to adhere to the [S.E.E. mail](#) specifications. Also refer to the data exchange section of this document for current S/MIME specifications.

5.1.6. File Transfer

Standards for data transfer between agencies, including database interconnectivity, across networks are HTTP (or) for large transfers FTP. Where FTP is used, restart and recovery facilities are to be used.

5.2. Standards and Guidelines

Component	Standard for New Project	Guidelines
Networks (TCP/IP)	TCP IP IPv6	
Directory	LDAP v3⁵	
Security	GCSB NZSIT's GCSB SIGD SSL v3	
Mail Security	SEE MAIL SEE PKI	
File Transfer	FTP	
HTTP	HTTP 1.1	

⁵ Current systems in government are often constrained to using LDAP v2. New projects using the e-GIF will be required to use LDAP v3 and ensure backwards compatibility with v2.

6. INFORMATION SHARING AND EXCHANGE

6.1. Technical Policy Statements

6.1.1. Data Integration

NZ government policy is to use:

- NZGLS for the creation of discovery level metadata
- XML (standard),
 - GML, WMS and WFS schemas for data integration⁶
- UML and XMI for data modelling
- RDF for description
- XSL for data transformation

6.1.2. Metadata

Agencies will use the [New Zealand Government Locator Service \(NZGLS\)](#) metadata standard for the definition and discovery of government services and resources.

6.1.3. XML

The NZ government will base the use of XML on the recommendations of the World Wide Web Consortium (W3C) to avoid the use of any product specific XML products / extensions that are not being considered for open standardisation within the W3C⁷.

6.1.4. Agreed Schemas

Agencies will use Agreed Schemas as noted in the e-GIF. The purpose of using such schemas is to minimise divergence of descriptions and taxonomies across government. Registers for the storing of agreed schemas will either be ebXML or UDDI.

6.1.5. Presentation

Agencies have the choice of presenting text and images in either “open” or “locked” forms. Agencies choosing to exchange:

⁶ Business systems (current or legacy applications) that are tightly integrated or internal to agencies may use other processing environments. The introduction of current or legacy business systems into new inter-agency initiatives requires the capability to map the outputs of these systems to the agreed XML schemas.

⁷ Agencies currently using product specific XML should be planning to migrate to open standards XML by 2003.

- text in an open format will use XML or HTML 4.01
- text in a locked format will use PDF
- images in an open format will use GIF 89a or JPEG
- images in a locked format will use PDF

6.1.6. *Data Modelling*

Agencies will use a standard notation for the modelling of inter-agency business processes, systems and applications.

6.1.7. *Messaging*

MIME and S/MIME are the recommended messaging formats for communications between agencies.

6.1.8. *Services*

Standards for transporting and exchanging web-based services are SOAP and WSDL.

6.2. Standards and Guidelines

Component	Standard for New Project	Guidelines
Primary Character Set	UTF - 8 bit encoded	
Security	GCSB NZSIT's , GCSB SIGD , S.E.E.	
Metadata (Discovery)	NZGLS 2.0	
Thesaurus	NZGLS 2.0	
Presentation	GIF 89a , JPG - Open PDF - Locked	PNG , SVG
Agreed schemas	- Spatial (GML , WMS , WFS) - Name/Address XnAL	

Component	Standard for New Project	Guidelines
Text	XML , HTML 4.01 - Open PDF - Locked	
Transformation	XSL	
File Compression	. ZIP	
Data Modelling	UML	XMI
Internet Messaging	MIME , S/MIME	
Database exchange	XML 1.0	
File Transfer (Database Connectivity)	HTTP 1.1 , FTP	
Web Services (Description)	SOAP 1.2 , WSDL 1.1	
Modelling (structured data)		DOM , SAX
Schemas	W3C schemas , XML 1.0	
Registers	EbXML , UDDI	
Structured data description	RDF , DTD	

7. ACCESS

7.1. Technical Policy requirements

7.1.1. *Government website design, construction and maintenance*

When designing and constructing new government websites and/or updating old websites, agencies are to ensure that they use the NZ Government Web Guidelines.

7.1.2. *Access (S.E.E. PKI)*

(a) Agencies that provide access for staff from other agencies to services and / or business applications across firewalls are to be aware of and adhere to directives and recommendations from the S.E.E. project.

Refer to [S.E.E. Public Key Infrastructure \(PKI\)](#) (see §5.1.4).

(b) Agencies providing access for end users to services and/ or business applications are to be aware of the e-government Authentication project and discuss their needs with the Authentication project team.

7.2. Standards and Guidelines

Component	Standard for New Project	Guidelines
Web design and maintenance	NZ Government Web Guidelines 1.0	
Access	SEE PKI	

8. SERVICE DELIVERY

8.1. Policy statements

8.1.1. Service Delivery

Interoperability Agreements between agencies will include Service Level Agreements defining the operational requirements, budget, roles and responsibilities of all agencies participating in E-Government transactions.

8.1.2. Co-operative Project Approval

Government agencies participating in co-operative E-Government projects will agree on the project operational management processes prior to initiating significant expenditure on the project.

8.1.3. Information Systems Architecture

Information systems components that enable the integration of government services must conform to the Policies and Standards within the e-GIF. These services may include:

- Integration of business processes
- exchanging metadata in support of common business processes
- 'bundling' of common services provided to users
- integration of business applications to present a common information retrieval point for users

8.2. Standards and Guidelines

Further policy statements and the supporting standards for Service Delivery are under development in Phase II of the Government Services Online project.

9. APPENDIX A – SUMMARY OF TECHNICAL STANDARDS

Component	Standard for New Project	Guidelines
Networks (TCP/IP)	TCP IP IPv6	
Directory	LDAP v3⁸	
Security	GCSB NZSIT's GCSB SIGD SSL v3	
Mail Security	SEE MAIL SEE PKI	
File Transfer	FTP	
HTTP	HTTP 1.1	
Primary Character Set	UTF - 8 bit encoded	
Security	GCSB NZSIT's , GCSB SIGD , S.E.E.	
Metadata (Discovery)	NZGLS 2.0	
Thesaurus	NZGLS 2.0	
Presentation	GIF 89a , JPG - Open PDF - Locked	PNG , SVG
Agreed schemas	- Spatial (GML , WMS , WFS) - Name/Address XnAL	

⁸ Current systems in government are often constrained to using LDAP v2. New projects using the e-GIF will be required to use LDAP v3 and ensure backwards compatibility with v2.

Component	Standard for New Project	Guidelines
Text	XML , HTML 4.01 - Open PDF - Locked	
Transformation	XSL	
File Compression	. ZIP	
Data Modelling	UML	XMI
Internet Messaging	MIME , S/MIME	
Database exchange	XML 1.0	
File Transfer (Database Connectivity)	HTTP 1.1 , FTP	
Web Services (Description)	SOAP 1.2 , WSDL 1.1	
Modelling (structured data)		DOM , SAX
Schemas	W3C schemas , XML 1.0	
Registers	EbXML , UDDI	
Structured data description	RDF , DTD	
Web design and maintenance	NZ Government Web Guidelines 1.0	
Web construction	HTML 4.01	
Accessibility testing	Access Technology	

10. APPENDIX A UK E-GIF CROWN COPYRIGHT ACKNOWLEDGEMENT

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Referential Architecture (Proof of Concept)

Resources

Test Scenarios

Test Boxes / Servers

Code / Web Services / Applications / Test Files

Digital Certificates

Supplied by:

Gen-I

Optimization

State Services Commission

Social Change Online (Australia)

Gen-I

SolNet, Sun.com New Zealand

Optimization

Land Information New Zealand

Optimization

Social Change Online (Australia)

Baycorp Advantage

APPENDIX C - GLOSSARY

Agency	Any NZ government entity
Authentication	A way of making sure people are who they say they are so that the right people get access to the right information or service.
Directory	A central list of government agencies and staff that is used within government organisations to manage access to information systems within and between agencies.
DOM	Document Object Model - a tree-based representation of an XML document. The whole document is parsed before the document can be read - considered suitable for small XML documents.
DNS	Domain Name Server
ebXML	e-business XML - a joint project of the UN and OASIS to bridge electronic document interchange (EDI) and XML
FTP	File Transfer Protocol
GCSB	Government Communication Security Bureau
GML	Geography Markup Language
Guideline	A statement of desired, good or best practice approved by the Government, or its nominee (i.e. the e-GIF governing body). Generally non-compulsory.
HTML	Hypertext Markup Language - the lingua franca of the Internet
HTTP	Hypertext Transfer Protocol
LDAP	Lightweight Directory Access Protocol
Metadata	Electronic catalogue entries that describe information and services in a structure way. The information in a library card system is metadata that helps you find books you want.
MIME and S/MIME	Multi-Purpose Internet Mail Extensions and Secure Multi-Purpose Internet Mail Extensions
PKI	Public Key Infrastructure - a lock and key system that allows one person to scramble information before sending it to another in a way that can be unscrambled only by the person holding the appropriate key.
PNG	Portable Network Graphic
Policy	A formal statement of compulsory practice made by the Government.
RDF	Resource Description Framework

SAX	Simple API for XML - an event based parser for XML documents that is useful for reading large XML documents as they continue to load.
S.E.E. TM	Secure Electronic Environment
SOAP	Simple Object Access Protocol
Stakeholder	Any person or organisation with a vested interest in a public resource or the public good. While each agency will have its own definition of stakeholders, they will generally include, Parliament, the Government-of-the-day, individual Ministers, the public, customers, businesses, or other government agencies etc.
Standard	Either a) an agreed process/practice/tool promulgated by an internationally approved Standards setting body, or b .) where such a standard is required but not available, approved by the Government (e.g. NZGLS Metadata Standard). Generally, e-GIF standards are compulsory.
Structured Data	Information that has been organised to allow identification and separation of the context of the information from its content.
SVG	Scalar Vector Graphics
TCP/IP	Transmission Control Protocol / Internet Protocol
UDDI	Universal Description, Discovery and Integration
WFS	Web Feature Server
WMS	Web Map Server
WSDL	Web Services Definition Language
XMI	XML Metadata Interchange
XML Schema	W3C extensible markup language (XML) schema definition language for defining the structure, contents and semantics of XML documents.
XSL	Extensible Stylesheet Language