

Cabinet Office

Office of the e-Envoy

e-Services Development Framework



Table of Contents

1. Introduction	3
2. Objectives	3
3. Relationship with Other Documents in the e-GIF Family	3
4. The e-Services Development Framework	4
5. High Level Information Architecture	5
The Government Common Information Model (GCIM)	5
The Government Message Reference Model (GMRM)	5
The Government Data Standards Catalogue (GDSC)	5
e-GIF Technical Specifications	5
6. Context of the Information Architecture	5
7. Document Control	8

1. Introduction

The e-Service Development Framework provides a structure for developing semantic specifications and standards for e-Services. An e-Service is any electronic service involving interoperability between computer systems. It includes, but is not limited to, electronic data interchange and messaging services. The focus is on preserving the information content so that it can be used by the information receiver without loss or change of meaning.

The Framework will help to implement the vision, set out in the e-government strategy (April 2000) and supported by the e-Government Interoperability Framework (e-GIF), of interoperability and seamless information flow across government as well as the wider public sector.

The benefits of good standards-based e-services accrue to all stakeholders – users, suppliers, out-sourcers, government IT departments and the general public. They include:

- reduced duplication of data and data entry
- risk reduction and avoidance of duplication of development through re-use of technical patterns, components and resources
- easier system integration and reduced maintenance.

2. Objectives

This Framework provides a forward-thinking direction and method for achieving the vision and benefits of e-government. It will ensure consistency and coherence between specifications, which will support and enable joined-up business processes operating across traditional boundaries.

In particular it will contribute substantially towards the realisation of the vision of joined-up government and movement from what can be termed “e-paper” – that is, the computerisation of paper-based systems – towards genuine e-systems, with true interoperability based on common meanings of data.

Developers of e-services should in future have regard to this Framework and the accompanying documents detailed below, and use the processes, guidelines and standards-based approach to achieve the objectives of the e-GIF.

3. Relationship with Other Documents in the e-GIF Family

This document is one of a family that describes the Framework for the development of specifications for e-services, and forms a fundamental part of the e-GIF implementation strategy. Other documents in this family are as follows:

- **High Level Information Architecture Models.** This document provides the top-level cornerstones of the framework to provide top-down coherence and consistency. It contains details of:
 - The Government Common Information Model (GCIM)
 - The Government Message Reference Model (GMRM)
- **Government Data Standards Catalogue.** This document describes the data elements and data types, which are referred to in both GCIM and GMRM
- **e-GIF Technical Specifications.** These are top-level e-GIF guidelines and technical specifications for using XML or other technologies as documented in the e-GIF, and infrastructure elements such as the Government Gateway.

- **e-Service Development Process Guidelines.** This describes the process for developing e-services, providing a bottom-up view. It is supported by detailed guidelines for:
 - Requirements Specification
 - Design Specification
 - Technology implementation (e.g. XML schema)
- **XML Schema Development Guidelines.** This document provides guidelines and best practice for developing XML schema within the e-GIF context.
- Reusable Resources will be made available on UK Govtalk to support the development of standards. These include:
 - Reusable Business Patterns
 - Coding Schemes and Vocabularies
 - Reusable Design Components
 - Reusable Technology Components

All documents in this family will be made available on the GovTalk web site <http://www.govtalk.gov.uk>.

4. The e-Services Development Framework

The Framework operates at three levels of detail:

Level 1 is the High Level Information Architecture. This provides a single set of top-level specifications and standards to be used for developing government e-Services. It is described in more detail in the next Section.

Level 2 provides sets of reusable patterns, components and resources. The availability of these reusable resources will improve consistency and reduce costs.

Level 3 covers the development of specific e-Services. This has three main aspects: Requirements, Design and Implementation. The end result is a consistent set of specifications and standards, for use by government organisations and their suppliers.

An overview of the Framework is shown in Figure 1 below. Shaded boxes indicate that multiple documents may be produced.

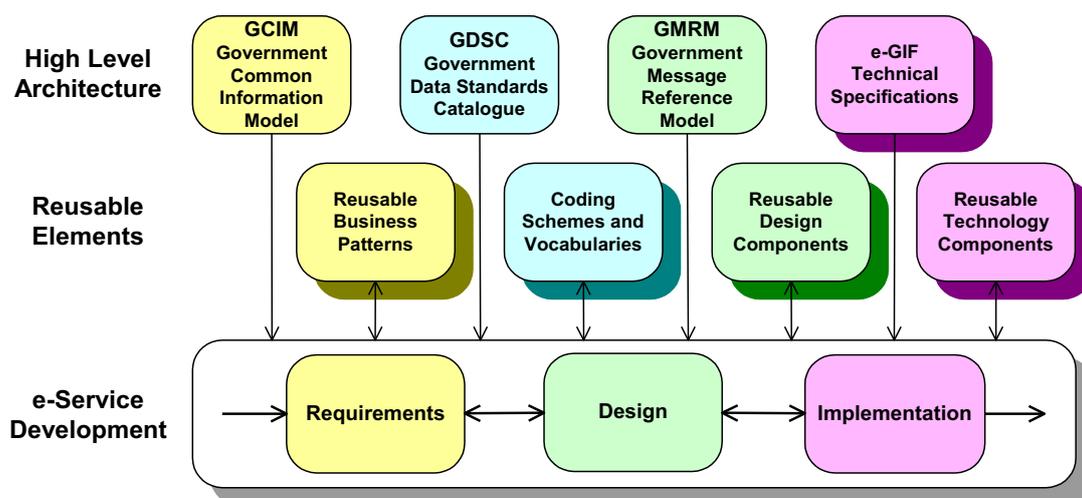


Figure 1 The e-Service Development Framework

The process is iterative, and should not be thought of as being a traditional “waterfall” model. The two-way arrows indicate the iterative aspect of the approach.

The Requirements specification is the first stage in the development of e-Service standards. This detailed specification uses the Government Common Information Model (GCIM), Reusable Business Patterns, the Government Data Standards Catalogue (GDSC), Coding Schemes and Vocabularies.

The second aspect is the Design of the service standard in a technology neutral form. This takes the output from the Requirements stage and specifies messages and services with reference to the language and structures set out in the Government Message Reference Model (GMRM) and Reusable Design Components.

The third aspect is the development of technology implementations, such as XML schema. For example, development of XML schema takes the output from the Design stage and uses XML Architectural Schema and other Reusable Technology Components to produce Message Schema that will be consistent with other schema produced under this Framework.

5. High Level Information Architecture

The High Level Information Architecture provides the top layer of the Framework. It has four dimensions:

The Government Common Information Model (GCIM)

This is a high level model of business activities. It provides a reference for setting the Requirements for joined-up business processes, both within and between organisations. At the centre of the model is the concept of a Service Interaction. This is because our focus is on interoperability. Full details of the model are available on the UKGovTalk™ Web site.

The second level of this dimension will provide re-usable business patterns for common business tasks.

The Government Message Reference Model (GMRM)

This is a high-level reference model of information that is exchanged between applications. It is used to ensure that messages and message content are structured in a consistent and coherent way. This should substantially reduce the costs of developing interfaces and building links between applications.

At the second level, a set of reusable design components provide templates for commonly used sets of information. Full details of the model are available on the UKGovTalk™ Web site.

The Government Data Standards Catalogue (GDSC)

This describes the data elements and data types, which are referred to in both GCIM and GMRM. These include the naming and definition of each data type used.

At the second level, there is a repository for coding schemes. The GDSC is available at <http://www.govtalk.gov.uk/interoperability/egif.asp?order=title>.

e-GIF Technical Specifications

This view provides supporting guidelines and technical specifications for implementations using XML or other technologies, and infrastructure elements such as the Government Gateway. At the second level this provides re-usable technology-specific resources. Full details of the Technical Specifications are available on the UKGovTalk™ Web site.

6. Context of the Information Architecture

The development of standards to enable interoperability across government is a key priority. Not all departments start from the same place. Different types of data architecture are used

across the public sector, supporting a wide variety of business domains. These can be grouped into two main categories, homogeneous and heterogeneous.

Homogeneous business domains have services provided by a single provider, with centralised IS architecture solutions and central bases of data supporting these solutions. Examples include DWP, IR, HMCE and DVLA. Heterogeneous domains have multiple local IS architecture solutions and diverse local bases of data supporting these solutions. Examples include the NHS, local authorities, the police and DfES. Here the focus of standardisation is on the interchange of data between different types of system, which is non-trivial. Links between different centralised systems are problems of heterogeneity.

The core problem is one of semantic integrity. If data items held by both the sender and receiver do not match exactly on a one-to-one basis, then some sort of translation is required and data distortion is a real risk. Standards can reduce the cost of interfaces and links and lead to improved data quality.

Traditional systems analysis focuses on the activities (data and business process definitions) that underpin each IS solution. On the other hand the message integrator focuses on the static information exchanged between systems, for example as XML. This Framework combines both of these approaches, first focussing on business activities to develop requirements specifications and then on message or service content to produce the design specifications that can be implemented using XML schema or other technologies.

The context of e-Service standards development is shown below (Figure 2). The boxes at the left-hand side represent various joined-up services, such as Register Birth, Register Death, Change of Residence etc, which impact multiple departments. The circles on the right hand side represent the various information domains that may be involved, such as DWP, NHS, local authorities etc. Note that the different domains may be within the same organisation, not necessarily outside.

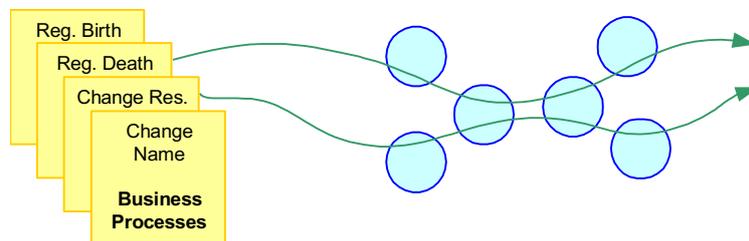


Figure 2 Joined-up services affect multiple business domains

The Government Common Information Model (GCIM) provides a generic structure for talking about these common elements (Figure 3). A common understanding of different information domains is the essential first step in developing joined up processes and moving away from “silo” systems.

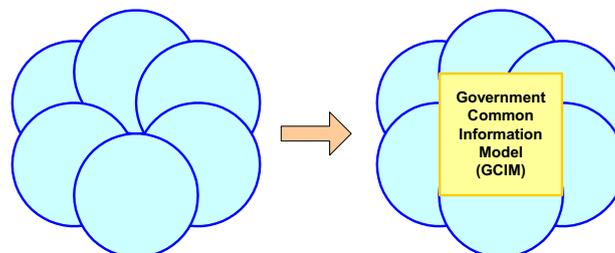


Figure 3 GCIM covers common information across domains

The next step is to identify and specify the transactions that involve the exchange of information between different systems. Here the need is for the information to be transferred in an unambiguous format, to be understood by different computer systems. The structure of the message being exchanged will not (usually) be the same as the data representations used

by either the sending or receiving system. Consistency and coherence between messages is achieved by referencing the common structure of elements specified in the Government Message Reference Model (GMRM) and the Government Data Standards Catalogue (GDSC).

The re-use of these elements across the public sector will lead to substantial economies of effort. The centre of the star at the right of Figure 4 indicates a single specification being used for linking the six domains. This replaces the fifteen separate specifications shown on the left hand side. The benefits increase, the more parties are involved, because the number of interfaces needed to connect N systems increases using the formula $(N^2-N)/2$. Linking 100 different systems would need nearly 5000 interfaces.

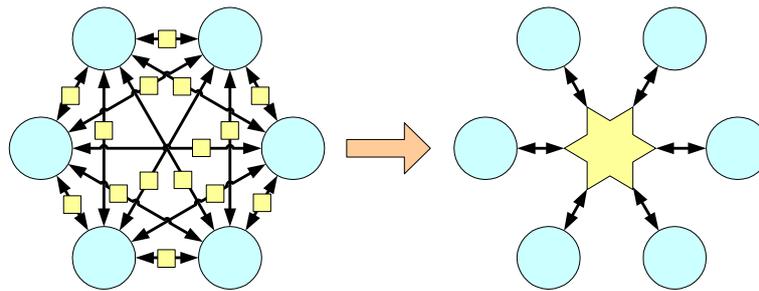


Figure 4 GMRM enables standards for interoperability

The Government Data Standards Catalogue (GDSC) is the third main component of the High level Information Architecture. This is the repository of the data types and coding schemes (the nuts and bolts) used to build the standards. The GDSC provides a link between the requirements specification, from the business view (GCIM), and the design specification based on the technical reference model (GMRM) (Figure 5).

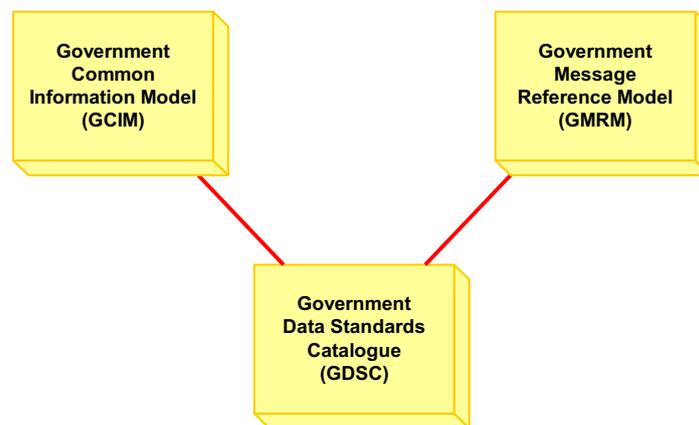


Figure 5 GDSC underpins both requirements and design specifications

7. Document Control

Version	Date	Description	Author
V0.1	15 Oct 2001	Initial draft prepared for internal workshop 16/10/01, combining earlier papers.	Tim Benson
V0.2	24 Oct 2001	Draft for internal discussion	Tim Benson
V0.3	29 Oct 2001	For discussion at workshop on 30/10/01	Tim Benson
V0.4	2 Nov 2001	For discussion at GPG 7/11/01	Tim Benson
V0.4a	12 Nov 2001	For discussion at GSG 21/11/01	Tim Benson
V0.4b	27 Nov 2001	For discussion at GIG 4/12/01 (includes updated framework diagram and labels)	Tim Benson
V 0.5	26 Nov 2001	Final draft for endorsement at Interoperability working group 4/12/01	John Borrás
V1.0	5 Dec 2001	Approved by Interoperability Group plus modified framework diagram	OeE