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Message Handling Systems

BSI STANDARDS

TECHNICAL GUIDE

Technical Guide to Message Handling Systems

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Contents

1
Introduction

This Technical Guide is about Message Handling Systems as a distributed application in an OSI framework. The material is tutorial in nature and serves as an introductory text. The standards to which this Guide refers are the definitive documents.

1.1 BACKGROUND TO ELECTRONIC MESSAGING

Electronic Messaging has its origins in the Telex and Telegraphy services. These were later followed by Computer Based Messaging Systems (CBMS) implemented on computer timesharing systems in the 1960s and public Facsimile and Teletex services in the late 1970s. Most computer and office systems manufacturers now offer some form of proprietary local Electronic Messaging service based on CBMS techniques. These are installed widely by users. CBMS techniques were also developed into public mailbox systems such as Telecom Gold. See Figure 1.1.

The result of this history of uncoordinated development of messaging technologies is a

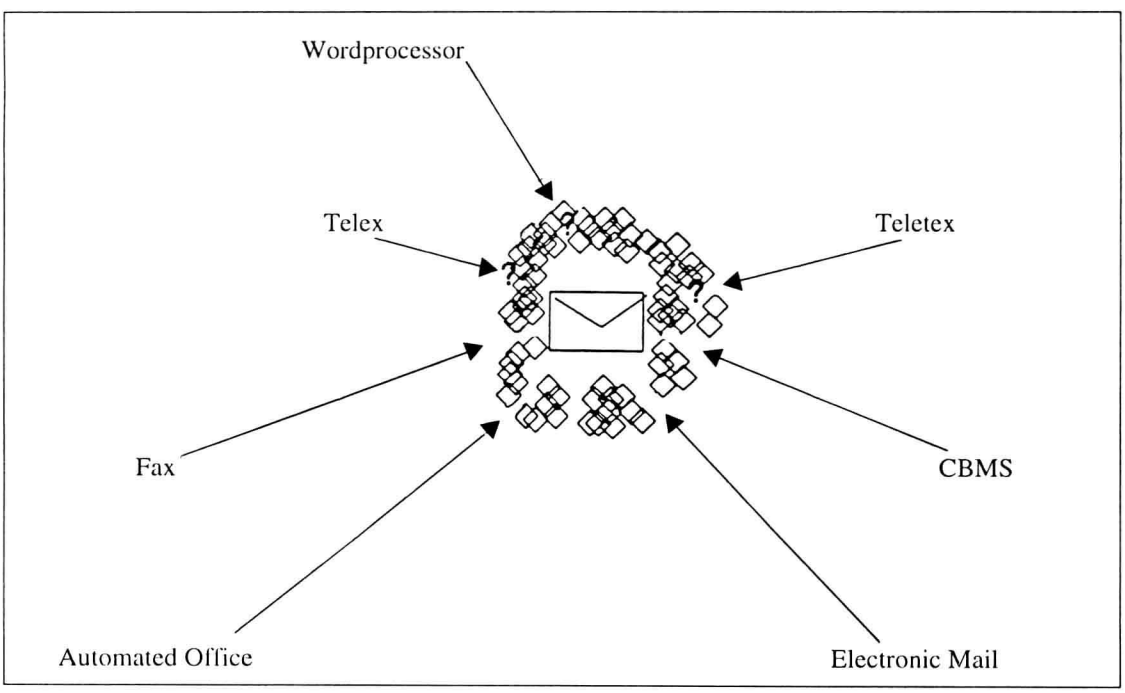

Figure 1.1 Electronic Messaging

multitude of separate systems and services each offering different facilities through different equipment and user interfaces, and each using different internal system technology. This makes it difficult for systems to interchange messages and their respective user communities remain isolated despite the requirement of any communications service to provide communications between as many users as possible.

This situation has many disadvantages. The use of any one service has limited attraction because of the relatively small number of other users connected; new services have a hard time creating the desired critical mass of users to become viable and interesting; a multitude of small isolated services limits traffic and imposes limits to their viability in commercial terms.

From the point of view of Electronic Messaging service providers then, there is a major incentive to arrange for interworking between the different electronic messaging systems to achieve a critical mass of interconnected users large enough to justify the systems provision and use, and ultimately to create a new communications media and market.

A further impetus to this requirement of interconnection arises from computer and office automation systems suppliers and system users who needed to integrate systems from different manufacturers into a single, organisation wide service. Broadly similar arguments to those above apply also here, but the emphasis is more on the creation of an integrated computing/office environment from a set of quite different systems already in existence. From the suppliers' point of view there is the additional requirement of a standard to which they can develop new electronic messaging products in the future. These requirements are seen as a logical continuation of the Open Systems Interconnection ideology.

A way of interconnecting existing Electronic Messaging services and designing new systems in a standard way which could rapidly form a critical mass of users was therefore seen as essential by users, manufacturers and service providers alike.

Interconnection could have been attempted on an ad hoc basis with provision of a separate gateway between each different pair of systems but, apart from the large number of different gateways (N^2 where N is the number of different systems), this would have led to the unsatisfactory situation where user communities based on different systems would have quite different facilities and the useful set of facilities common to all users would be limited to the lowest common denominator. Naming and addressing of users in such an interconnected community would pose additional and significant problems.

The alternative approach, dealt with in this Technical Guide, was to develop a set of technical standards, known as MHS Standards, to form a framework towards which existing systems could adapt or migrate and to which new systems could be designed.

Several factors had prepared the way for these standards:

- growing mass of Personal Computers with communications capability;
- availability of Open Systems Interconnection standards and products;
- availability of private and public data networks;
- rapid advances of Office Automation Technology and products.

1.2 HISTORY OF STANDARDISATION

Standards for Electronic Messaging have been under development since the late 1970s, initially within the International Federation for Information Processing. Their ideas and models were adopted by the ISO, the CCITT and ECMA as a basis for further development. Differences in organisation and perceived scope of the standards bodies involved led to their respective standards being progressed in slightly different directions. CCITT ratified the initial 'Message Handling Systems' X.400 series Recommendations in 1984. In the same period, the ISO were progressing equivalent work under the title of 'Message Oriented Text Interchange System' (MOTIS).

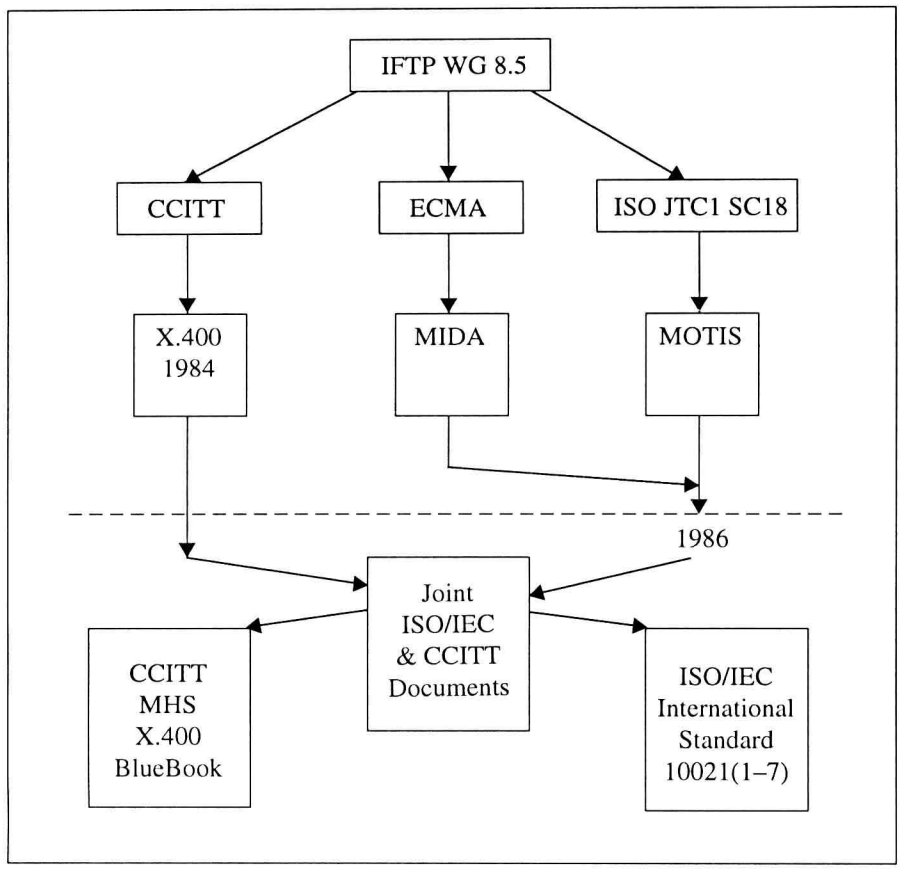

Figure 1.2 The 1988 Recommendations and Standards

In 1986, the ISO froze their work and decided that further development should be in cooperation with the CCITT, the aim being to produce joint CCITT Recommendations and International Standards in 1988. ECMA, having already ratified their first version of the equivalent 'Message Interchange Distributed Application' (MIDA) also joined this endeavour. This resulted in the ISO/IEC 10021 series of International Standards and the CCITT X.400 1988 Blue Book – the subjects of this Technical Guide. This is illustrated in Figure 1.2. Systems designed to conform to these standards are referred to throughout this guide as Message Handling Systems or MHS.

1.3 TYPES OF STANDARDS

Several forms of standardisation are associated with MHS.

- Base Standards are produced by CCITT and ISO. They define standards which apply in many different situations and are of a general nature. Because of this, options are left open.
- To apply the base standards in a specific instance, it is generally necessary to specify requirement for these options. A document selecting these options is referred to as Functional Standard. Functional Standards reduce the risk that different implementations

will not interwork correctly because of differences in choice of these options.

- Procurement specifications may be developed by users to specify any options which remain after functional standardisation as a matter of preferences of the user. These reference the base and functional standards, but ultimately contain other things such as user interface, administration and operational requirements.
- Finally the CCITT Recommendations specify how conformance testing should be done and also specify a basic set of Conformance tests for X.400 (1984). These conformance tests must be tailored to suit the Functional Standards.

The standards developed so far only deal with certain aspects of messaging. These are the services and facilities available to MHS's end users (the *Elements of Service*), the protocol syntax and semantics used in communication between different MHS system components, and, to some extent, the procedures to be carried out by the system components. So far, no standards cover the administrative, operational and management issues. User interface aspects are not specified and probably will not be standardised in the short term.

2
Concepts of Messaging – A Postal Analogy

Message Handling has many parallels with the Postal System. The analogy is used here to illustrate the concepts of Message Handling.

In the postal services letters and packages consist of three basic components indicated in Figure 2.1:

- **Message Body.** The subject matter of the communication – the text of the message or goods in the packet;
- a **Header.** Header or cover note explaining to the recipient the purpose of the letter or package;
- an **envelope,** in which the header and body (content) of the message are conveyed through the postal system. The envelope is marked with instructions to the postal authority on how the message is to be delivered, to whom and at what grade of service (urgent or normal).

The mail originator assembles the message body perhaps by writing some parts, copying documents and photographs to form the body of the mail item and completing a set of instructions to the recipient

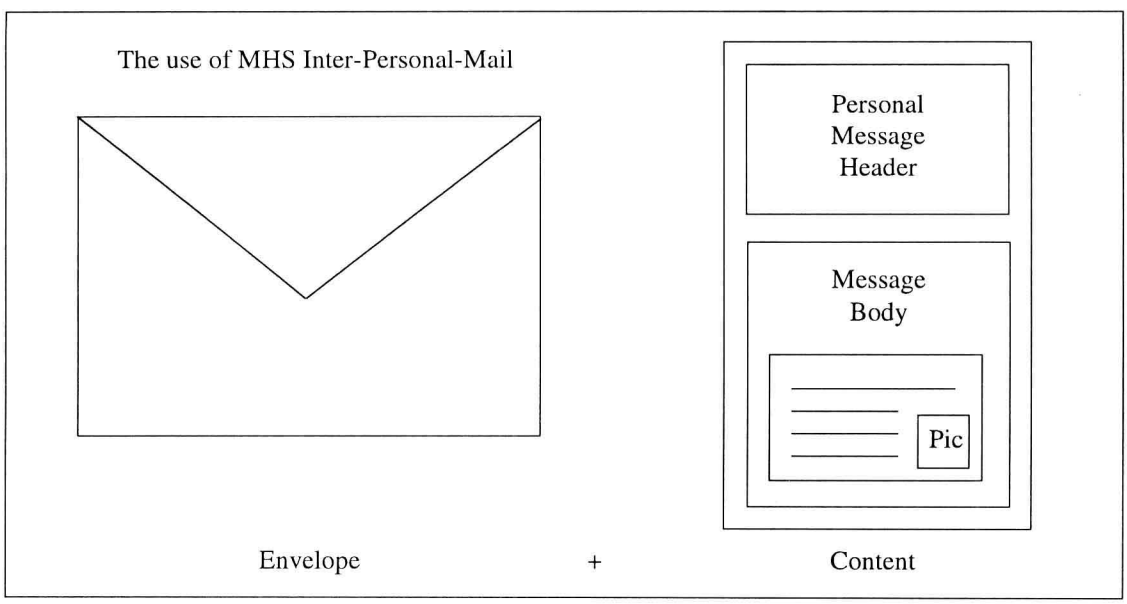

Figure 2.1 A Postal Analogy

in the form of a memo or compliment slip. The message body and recipient instructions are placed in an envelope. The envelope is addressed, delivery instructions are marked on the envelope (first class; handle with care; personal; recorded delivery; registered) and the envelope is posted.

The postal authority collects the envelope from the post box, interprets the instructions on the envelope, relays it through a series of one or more sorting offices and finally delivers the envelope through the letter box of the intended recipient as shown in Figure 2.2.

The principle of MHS is not unlike this, but the mail item (Body Parts), recipient instructions (Message Header) and Envelope are electronically encoded and the delivery system consists of message switches acting on the electronically encoded envelope instructions. Messages are 'pushed' through MHS to the recipient.

The postal system conveys a wide variety of items such as letters and small objects. MHS is also required to convey information having quite different forms such as Text, Graphics, Digitally Encoded Voice and Electronic Data. MHS is consequently required to be transparent to message contents.

The postal system offers different levels of service such as First and Second Class, Registered, Express, etc reflecting the importance or urgency of the mail being conveyed.

MHS also offers a range of service levels which may be selected to suit the type of message being conveyed. Different message contents such as Personal messages, Publications, Office Documents and Trade Data may all have different requirements of MHS in terms of urgency, importance, security and auditability.

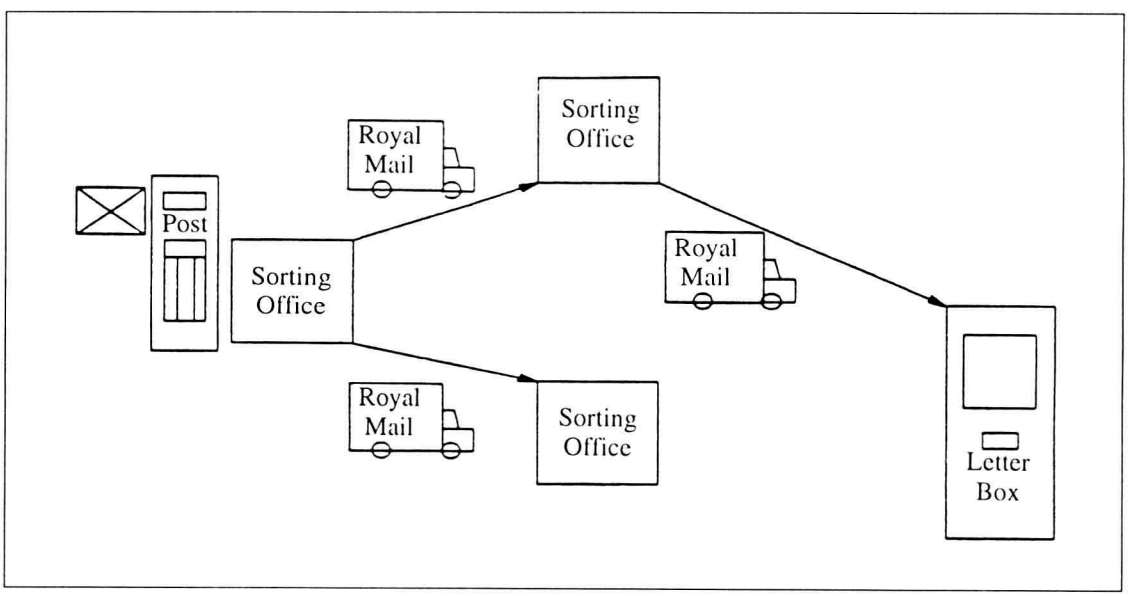

Figure 2.2 Postal System

3
The Standards Requirement

Despite this apparent variability in service requirement, it is useful to offer one single and generally applicable message conveyance method (represented by a standard envelope) which can be enhanced with security and other features if required for particular messages. User service requests, applicable to all message types, and which are of concern to the message delivery service, are encoded on the message envelope and those services not of concern to the message delivery service, but which are of relevance to the message recipient, are encoded inside the envelope on the header or covering note. The standard envelope can be used to carry a range of different message types. Each message type is distinguished by a different type header.

To realise a standard MHS representing the functionality outlined so far, standards must be agreed for the following things:

- **Data Communications** to ensure that the MHS components can exchange message data;
- messaging **Elements of Service** (facilities provided for on the envelope and headers) to ensure a consistent service offering to all users;
- message **formats and protocols**, the encodings of information contained in message bodies, headers and envelopes;
- the **naming and addressing** conventions used to identify users of the service.

These aspects have been standardised in ISO/IEC 10021 and the CCITT X.400 series Recommendations.

4
The Components of the MHS Service

In line with the model of envelope and content, MHS specifies two different services. These are the Message Transfer Service (MT-Service-Envelope) and the Inter-Personal Messaging Service (IPMS-Header).

4.1 THE MESSAGE TRANSFER SERVICE (MTS)

The Message Transfer System is a general electronic 'postal delivery service' providing a widely applicable message transfer mechanism known as the Message Transfer Service. It carries out the instructions and service requests specified by the user on the message envelope. The MTS is normally transparent to the message content, allowing any kind of information encoding or data message content to pass through it. Apart from a message body conversion facility. Its users may be persons or computer processes. This is illustrated in Figure 4.1.

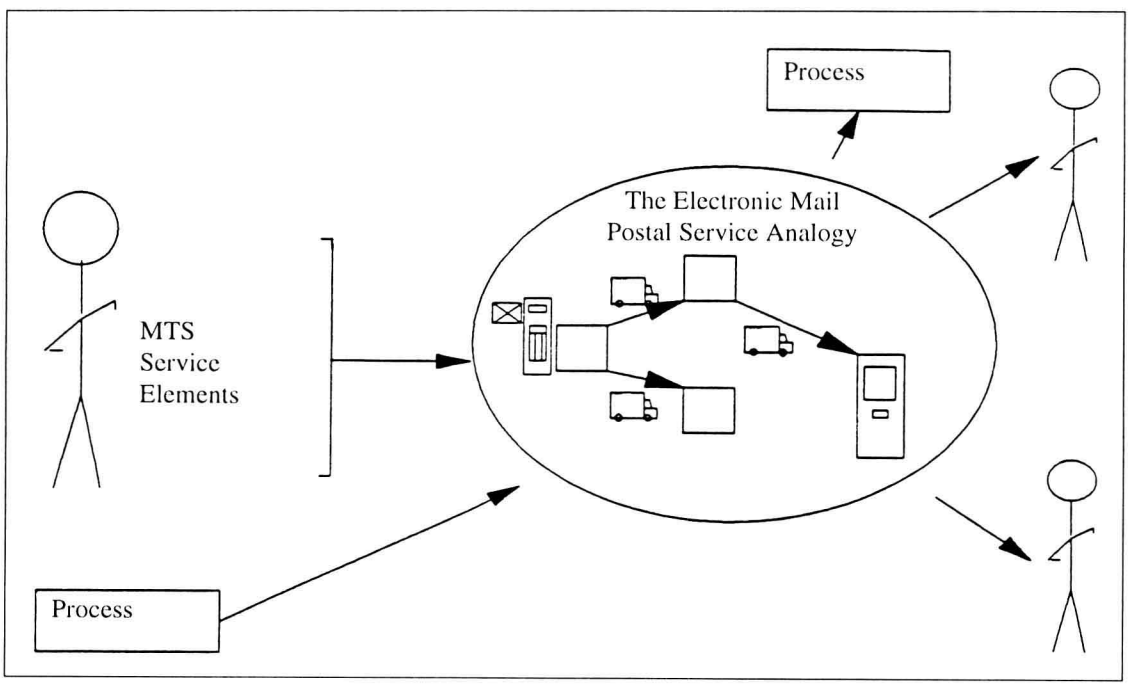

Figure 4.1 The Message Transfer Service