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Information technology — Message Handling Systems (MHS): Overall architecture

Technologies de l'information — Systèmes de messagerie (MHS): Architecture générale

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 10021-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.402.

This second edition cancels and replaces the first edition (ISO/IEC 10021-2:1990), which has been technically revised. It also incorporates Amendment 1:1994, Amendment 2:1994, Technical Corrigendum 1:1991, Technical Corrigendum 2:1991, Technical Corrigendum 3:1992, Technical Corrigendum 4:1992, Technical Corrigendum 5:1993, Technical Corrigendum 6:1994 and Technical Corrigendum 7:1994.

ISO/IEC 10021 consists of the following parts, under the general title *Information technology — Message Handling Systems (MHS)*:

— *Part 1: System and service overview*

— *Part 2: Overall architecture*

— *Part 3: Abstract service definition conventions*

— *Part 4: Message transfer system: Abstract service definition and procedures*

— *Part 5: Message store: Abstract service definition*

— *Part 6: Protocol specifications*

— *Part 7: Interpersonal messaging system*

— *Part 8: Electronic Data Interchange Messaging Service*

— *Part 9: Electronic Data Interchange Messaging System*

Annexes A to C and E form an integral part of this part of ISO/IEC 10021. Annexes D and F to I are for information only.

Introduction

This Specification is one of a set of Recommendations | International Standards for Message Handling. The entire set provides a comprehensive blueprint for a Message Handling System (MHS) realized by any number of cooperating open systems.

The purpose of an MHS is to enable users to exchange messages on a store-and-forward basis. A message submitted on behalf of one user, the originator, is conveyed by the Message Transfer System (MTS) and subsequently delivered to the agents of one or more additional users, the recipients. Access units (AUs) link the MTS to communication systems of other kinds (e.g. postal systems). A user is assisted in the preparation, storage, and display of messages by a user agent (UA). Optionally, he is assisted in the storage of messages by a message store (MS). The MTS comprises a number of Message Transfer Agents (MTAs) which collectively perform the store-and-forward message transfer function.

This Specification specifies the overall architecture of the MHS and serves as a technical introduction to it.

This Specification was developed jointly by ITU-T and ISO/IEC. It is published as common text as ITU-T Rec. X.402 | ISO/IEC 10021-2.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – MESSAGE HANDLING SYSTEMS (MHS): OVERALL ARCHITECTURE

SECTION 1 – INTRODUCTION

1 Scope

This Recommendation | International Standard defines the overall architecture of the MHS and serves as a technical introduction to it.

Other aspects of Message Handling are specified in other ITU-T Recommendations | ISO/IEC 10021. A non-technical overview of Message Handling is provided by ITU-T Rec. X.400 | ISO/IEC 10021-1. The conformance testing of MHS components is described in Recommendation X.403. The detailed rules by which the MTS converts the contents of messages from one EIT to another are defined in Recommendation X.408. The abstract service the MTS provides and the procedures that govern its distributed operation are defined in ITU-T Rec. X.411 | ISO/IEC 10021-4. The abstract service the MS provides is defined in ITU-T Rec. X.413 | ISO/IEC 10021-5. The application protocols that govern the interactions of MHS components are specified in ITU-T Rec. X.419 | ISO/IEC 10021-6. The Interpersonal Messaging System, an application of Message Handling, is defined in ITU-T Rec. X.420 | ISO/IEC 10021-7. Telematic access to the Interpersonal Messaging System is specified in Recommendation T.330. The EDI Messaging Service is described in CCITT Rec. F.435 and ISO/IEC 10021-8, and the EDI Messaging System, another application of Message Handling, is defined in CCITT Rec. X.435 and ISO/IEC 10021-9. The means by which messages may be routed through the MHS is specified in ISO/IEC 10021-10. Management information for MHS components is defined in the X.460-Series Recommendations | ISO/IEC 11588.

The ISO/IEC International Standards and ITU-T Recommendations on Message Handling are summarized in Table 1.

The Directory, the principal means for disseminating communication-related information among MHS components, is defined in the X.500-Series Recommendations | ISO/IEC 9594, as summarized in Table 2.

The architectural foundation for Message Handling is provided by other Recommendations | International Standards. The OSI Reference Model is defined in ITU-T Rec. X.200 | ISO/IEC 7498-1. The notation for specifying the data structures of abstract services and application protocols, ASN.1, and the associated encoding rules are defined in ITU-T Rec. X.680 | ISO/IEC 8824-1, ITU-T Rec. X.681 | ISO/IEC 8824-2, ITU-T Rec. X.682 | ISO/IEC 8824-3, ITU-T Rec. X.683 | ISO/IEC 8824-4 and ITU-T Rec. X.690 | ISO/IEC 8825-1. The means for establishing and releasing associations, the ACSE, is defined in ITU-T Rec. X.217 | ISO/IEC 8649 and CCITT Rec. X.227 | ISO/IEC 8650-1. The means for reliably conveying APDUs over associations, the RTSE, is defined in ITU-T Rec. X.218 and ISO/IEC 9066-1 and CCITT Rec. X.228 and ISO/IEC 9066-2. The means for making requests of other open systems, the ROSE, is defined in ITU-T Rec. X.880 | ISO/IEC 13712-1, ITU-T Rec. X.881 | ISO/IEC 13712-2 and ITU-T Rec. X.882 | ISO/IEC 13712-3.

The ISO/IEC International Standards and ITU-T Recommendations which form the foundation for Message Handling are summarized in Table 3.

This Recommendation | International Standard is structured as follows. Section 1 gives a general overview. Section 2 presents abstract models of Message Handling. Section 3 specifies how one can configure the MHS to satisfy any of a variety of functional, physical, and organizational requirements. Section 4 describes the naming and addressing of users and distribution lists and the routing of information objects to them. Section 5 describes the uses the MHS may make of the Directory. Section 6 describes how the MHS is realized by means of OSI. The conventions used in the definition of the abstract services provided by MHS components are defined in Section 7. Annexes provide important supplemental information.

No requirements for conformance to this Recommendation | International Standard are imposed.

Table 1 – Specifications for Message Handling Systems

ISO/IEC	ITU-T	Subject matter
Introduction		
10021-1	X.400	Service and system overview
10021-2	X.402	Overall architecture
Various aspects		
–	X.403	Conformance testing
–	X.408	Encoded information type conversion rules
Abstract services		
10021-4	X.411	MTS Abstract Service definition and procedures for distributed operation
10021-5	X.413	MS Abstract Service definition
Protocols		
10021-6	X.419	Protocol specifications
Interpersonal Messaging System		
10021-7	X.420	Interpersonal Messaging System
–	T.330	Telematic access to IPMS
Electronic Data Interchange Messaging System		
10021-8	F.435	EDI Messaging Service
10021-9	X.435	EDI Messaging System
Routing		
10021-10	–	MHS Routing
MHS Management		
11588-1	X.460	Management: Model and Architecture
11588-3	X.462	Logging Information
11588-8	X.467	Message Transfer Agent Management

Table 2 – Specifications for Directories

ISO/IEC	ITU-T	Subject matter
9594-1	X.500	Overview
9594-2	X.501	Models
9594-3	X.511	Abstract service definition
9594-4	X.518	Procedures for distributed operation
9594-5	X.519	Protocol specifications
9594-6	X.520	Selected attribute types
9594-7	X.521	Selected object classes
9594-8	X.509	Authentication framework
9594-9	X.525	Replication

Table 3 – Specifications for MHS foundations

ISO/IEC	ITU-T	Subject matter
Model		
7498-1	X.200	OSI Reference Model
ASN.1		
8824-1	X.680	Abstract Syntax Notation
8824-2	X.681	ASN.1 Information objects
8824-3	X.682	ASN.1 Constraint specification
8824-4	X.683	ASN.1 Parameterization
8825-1	X.690	Basic encoding rules
Association Control		
8649	X.217	Service definition
8650	X.227	Protocol specification
Reliable Transfer		
9066-1	X.218	Service definition
9066-2	X.228	Protocol specification
Remote Operations		
13712-1	X.880	Concepts, Model and Notation
13712-2	X.881	Service definition
13712-3	X.882	Protocol specification

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of ISO and IEC maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Open Systems Interconnection

This Specification and others in the set cite the following OSI specifications.

2.1.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994 | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*
- ITU-T Recommendation X.216 (1994) | ISO/IEC 8822:1994, *Information technology – Open Systems Interconnection – Presentation service definition.*
- ITU-T Recommendation X.217 (1995) | ISO/IEC 8649:1996, *Information technology – Open Systems Interconnection – Service definition for the Association Control Service Element.*
- ITU-T Recommendation X.227 (1995) | ISO/IEC 8650-1:1996, *Information technology – Open Systems Interconnection – Connection-oriented protocol for the Association Control Service Element: Protocol specification.*
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*

- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- ITU-T Recommendation X.690 (1994) | ISO/IEC 8825-1:1995, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*
- ITU-T Recommendation X.880 (1994) | ISO/IEC 13712-1:1995, *Information technology – Remote Operations: Concepts, model and notation.*
- ITU-T Recommendation X.881 (1994) | ISO/IEC 13712-2:1995, *Information technology – Remote Operations: OSI realizations – Remote Operations Service Element (ROSE) service definition.*
- ITU-T Recommendation X.882 (1994) | ISO/IEC 13712-3:1995, *Information technology – Remote Operations: OSI realizations: Remote Operations Service Element (ROSE) protocol specification.*

2.1.2 Paired Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation X.218 (1993), *Reliable Transfer: Model and service definition.*

  ISO/IEC 9066-1:1989, *Information processing systems – Text communication – Reliable Transfer – Part 1: Model and service definition.*
- CCITT Recommendation X.228 (1988), *Reliable Transfer: Protocol specification.*

  ISO/IEC 9066-2:1989, *Information processing systems – Text communication – Reliable Transfer – Part 2: Protocol specification.*

2.1.3 Additional references

- ISO 7498-2:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 2: Security Architecture.*

2.2 Directory Systems

This Specification and others in the set cite the following Directory System specifications.

2.2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.500 (1993) | ISO/IEC 9594-1:1995, *Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models, and services.*
- ITU-T Recommendation X.501 (1993) | ISO/IEC 9594-2:1995, *Information technology – Open Systems Interconnection – The Directory: Models.*
- ITU-T Recommendation X.509 (1993) | ISO/IEC 9594-8:1995, *Information technology – Open Systems Interconnection – The Directory: Authentication framework.*
- ITU-T Recommendation X.511 (1993) | ISO/IEC 9594-3:1995, *Information technology – Open Systems Interconnection – The Directory: Abstract service definition.*
- ITU-T Recommendation X.518 (1993) | ISO/IEC 9594-4:1995, *Information technology – Open Systems Interconnection – The Directory: Procedures for distributed operation.*
- ITU-T Recommendation X.519 (1993) | ISO/IEC 9594-5:1995, *Information technology – Open Systems Interconnection – The Directory: Protocol specifications.*
- ITU-T Recommendation X.520 (1993) | ISO/IEC 9594-6:1995, *Information technology – Open Systems Interconnection – The Directory: Selected attribute types.*
- ITU-T Recommendation X.521 (1993) | ISO/IEC 9594-7:1995, *Information technology – Open Systems Interconnection – The Directory: Selected object classes.*
- ITU-T Recommendation X.525 (1993) | ISO/IEC 9594-9:1995, *Information technology – Open Systems Interconnection – The Directory: Replication.*

2.3 Message Handling Systems

This Specification and others in the set cite the following Message Handling System specifications.

2.3.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.411 (1995) | ISO/IEC 10021-4:1996, *Information technology – Message Handling Systems (MHS): Message transfer system – Abstract service definition and procedures.*
- ITU-T Recommendation X.413 (1995) | ISO/IEC 10021-5:1996, *Information technology – Message Handling Systems (MHS): Message store: Abstract service definition.*
- ITU-T Recommendation X.419 (1995) | ISO/IEC 10021-6:1996, *Information technology – Message Handling Systems (MHS): Protocol specifications.*
- ITU-T Recommendation X.420 (1996) | ISO/IEC 10021-7:1996, *Information technology – Message Handling Systems (MHS): Interpersonal messaging system.*
- ITU-T Recommendation X.460 (1995) | ISO/IEC 11588-1:1996, *Information technology – Message Handling Systems (MHS) management: Model and architecture.*
- ITU-T Recommendation X.462[1)] | ISO/IEC 11588-3:...[1)], *Information technology – Message Handling Systems (MHS) management: Logging information.*
- ITU-T Recommendation X.467[1)] | ISO/IEC 11588-8:...[1)], *Information technology – Message Handling Systems (MHS) management: Message transfer agent management.*

2.3.2 Paired Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation F.400/X.400 (1993), *Message handling services: Message handling system and service overview.*

  ISO/IEC 10021-1:1990, *Information technology – Text Communication – Message-Oriented Text Interchange Systems (MOTIS) – Part 1: System and Service Overview.*
- CCITT Recommendation F.435 (1991), *Message handling: Electronic data interchange messaging service.*

  ISO/IEC 10021-8:1995, *Information technology – Message Handling Systems (MHS) – Part 8: Electronic Data Interchange Messaging Service.*
- CCITT Recommendation X.435 (1991), *Message Handling Systems: Electronic data interchange messaging system.*

  ISO/IEC 10021-9:1995, *Information technology – Message Handling Systems (MHS) – Part 9: Electronic Data Interchange Messaging System.*

2.3.3 Additional References

- CCITT Recommendation T.330 (1988), *Telematic access to interpersonal messaging system.*
- CCITT Recommendation X.408 (1988), *Message handling systems: Encoded information type conversion rules.*
- ISO/IEC 10021-10:...[1)], *Information technology – Message Handling Systems (MHS) – Part 10: MHS Routing.*

2.4 Country Codes

This Specification cites the following Country Code specifications:

- ISO 3166:1993, *Codes for the representation of names of countries.*
- CCITT Recommendation X.121 (1992), *International numbering plan for public data networks.*

2.5 Network Addresses

This Specification cites the following Network Address specification:

- CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era.*

3 Definitions

For the purposes of this Specification and others in the set, the following definitions apply.

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1) Presently at the stage of draft.