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## **Information technology — Message Handling Systems (MHS): Overall Architecture**

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

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## CONTENTS

|   | <i>Page</i> |
|---|-------------|
| SECTION 1 – INTRODUCTION .....          | 1           |
| 1 Scope .....                           | 1           |
| 2 Normative references .....            | 3           |
| 2.1 Open Systems Interconnection .....  | 3           |
| 2.2 Directory Systems .....             | 4           |
| 2.3 Message Handling Systems .....      | 4           |
| 2.4 Country Codes .....                 | 5           |
| 2.5 Network Addresses .....             | 5           |
| 2.6 Language Code .....                 | 5           |
| 2.7 Character Sets .....                | 5           |
| 3 Definitions .....                     | 5           |
| 3.1 Open Systems Interconnection .....  | 5           |
| 3.2 Directory Systems .....             | 6           |
| 3.3 Message Handling Systems .....      | 7           |
| 4 Abbreviations .....                   | 7           |
| 5 Conventions .....                     | 7           |
| 5.1 ASN.1 .....                         | 7           |
| 5.2 Grade .....                         | 7           |
| 5.3 Terms .....                         | 7           |
| SECTION 2 – ABSTRACT MODELS .....       | 8           |
| 6 Overview .....                        | 8           |
| 7 Functional Model .....                | 8           |
| 7.1 Primary Functional Objects .....    | 8           |
| 7.1.1 The Message Handling System ..... | 9           |
| 7.1.2 Users .....                       | 9           |
| 7.1.3 Distribution Lists .....          | 9           |
| 7.2 Secondary Functional Objects .....  | 9           |
| 7.2.1 The Message Transfer System ..... | 10          |
| 7.2.2 User Agents .....                 | 10          |
| 7.2.3 Message Stores .....              | 10          |
| 7.2.4 Access Units .....                | 10          |
| 7.3 Tertiary Functional Objects .....   | 11          |
| 7.3.1 Message Transfer Agents .....     | 11          |
| 7.4 Selected AU Types .....             | 11          |
| 7.4.1 Physical Delivery .....           | 11          |
| 7.4.2 Telematic .....                   | 11          |
| 7.4.3 Telex .....                       | 12          |
| 8 Information Model .....               | 12          |
| 8.1 Messages .....                      | 12          |
| 8.2 Probes .....                        | 13          |
| 8.3 Reports .....                       | 13          |
| 9 Operational Model .....               | 13          |
| 9.1 Transmittal .....                   | 13          |
| 9.2 Transmittal Roles .....             | 14          |
| 9.3 Transmittal Steps .....             | 15          |
| 9.3.1 Origination .....                 | 15          |
| 9.3.2 Submission .....                  | 16          |
| 9.3.3 Import .....                      | 16          |
| 9.3.4 Transfer .....                    | 16          |
| 9.3.5 Export .....                      | 16          |
| 9.3.6 Delivery .....                    | 16          |
| 9.3.7 Retrieval .....                   | 16          |
| 9.3.8 Receipt .....                     | 17          |

|  | <i>Page</i> |
|--|-------------|
| 9.4 Transmittal Events .....                             | 17          |
| 9.4.1 Splitting.....                                     | 17          |
| 9.4.2 Joining.....                                       | 17          |
| 9.4.3 Name Resolution.....                               | 18          |
| 9.4.4 DL Expansion .....                                 | 18          |
| 9.4.5 Redirection.....                                   | 18          |
| 9.4.6 Conversion .....                                   | 18          |
| 9.4.7 Non-delivery .....                                 | 18          |
| 9.4.8 Non-affirmation .....                              | 18          |
| 9.4.9 Affirmation .....                                  | 18          |
| 9.4.10 Routing .....                                     | 19          |
| 10 Security Model.....                                   | 19          |
| 10.1 Security Policies.....                              | 19          |
| 10.2 Security Services.....                              | 19          |
| 10.2.1 Origin Authentication Security Services.....      | 20          |
| 10.2.2 Secure Access Management Security Service.....    | 21          |
| 10.2.3 Data Confidentiality Security Services .....      | 21          |
| 10.2.4 Data Integrity Security Services.....             | 22          |
| 10.2.5 Non-Repudiation Security Services .....           | 23          |
| 10.2.6 Message Security Labelling Security Service ..... | 23          |
| 10.2.7 Security Management Services .....                | 23          |
| 10.3 Security Elements.....                              | 24          |
| 10.3.1 Authentication Security Elements.....             | 24          |
| 10.3.2 Secure Access Management Security Elements.....   | 25          |
| 10.3.3 Data Confidentiality Security Elements .....      | 26          |
| 10.3.4 Data Integrity Security Elements .....            | 26          |
| 10.3.5 Non-repudiation Security Elements .....           | 27          |
| 10.3.6 Security Label Security Elements .....            | 27          |
| 10.3.7 Security Management Security Elements.....        | 27          |
| 10.3.8 Double Enveloping Technique.....                  | 27          |
| 10.3.9 Encoding for Encryption and Hashing.....          | 27          |
| SECTION 3 – CONFIGURATIONS .....                         | 27          |
| 11 Overview .....  | 27          |
| 12 Functional Configurations .....                       | 28          |
| 12.1 Regarding the Directory.....                        | 28          |
| 12.2 Regarding the Message Store.....                    | 28          |
| 13 Physical Configurations.....                          | 28          |
| 13.1 Messaging Systems .....                             | 29          |
| 13.1.1 Access Systems.....                               | 30          |
| 13.1.2 Storage Systems .....                             | 30          |
| 13.1.3 Access and Storage Systems .....                  | 30          |
| 13.1.4 Transfer Systems.....                             | 30          |
| 13.1.5 Access and Transfer Systems.....                  | 30          |
| 13.1.6 Storage and Transfer Systems.....                 | 30          |
| 13.1.7 Access, Storage, and Transfer Systems.....        | 30          |
| 13.2 Representative Configurations .....                 | 30          |
| 13.2.1 Fully Centralized.....                            | 30          |
| 13.2.2 Centralized Message Transfer and Storage.....     | 31          |
| 13.2.3 Centralized Message Transfer.....                 | 31          |
| 13.2.4 Fully Distributed .....                           | 31          |
| 14 Organizational Configurations .....                   | 31          |
| 14.1 Management Domains .....                            | 31          |
| 14.1.1 Administration Management Domains .....           | 32          |
| 14.1.2 Private Management Domains .....                  | 32          |
| 14.2 Representative Configurations .....                 | 32          |
| 14.2.1 Fully Centralized.....                            | 32          |
| 14.2.2 Directly Connected .....                          | 32          |
| 14.2.3 Indirectly Connected.....                         | 32          |

|   | <i>Page</i> |
|---|-------------|
| 15 The Global MHS .....                                     | 32          |
| SECTION 4 – NAMING, ADDRESSING, AND ROUTING .....           | 33          |
| 16 Overview .....   | 33          |
| 17 Naming .....   | 34          |
| 17.1 Directory Names .....                                  | 34          |
| 17.2 OR-Names .....   | 34          |
| 18 Addressing .....   | 34          |
| 18.1 Attribute Lists .....                                  | 35          |
| 18.2 Character Sets .....                                   | 35          |
| 18.3 Standard Attributes .....                              | 36          |
| 18.3.1 Administration-domain-name .....                     | 37          |
| 18.3.2 Common-name .....                                    | 37          |
| 18.3.3 Country-name .....                                   | 37          |
| 18.3.4 Extension-postal-OR-address-components .....         | 38          |
| 18.3.5 Extension-physical-delivery-address-components ..... | 38          |
| 18.3.6 Local-postal-attributes .....                        | 38          |
| 18.3.7 Network-address .....                                | 38          |
| 18.3.8 Numeric-user-identifier .....                        | 38          |
| 18.3.9 Organization-name .....                              | 38          |
| 18.3.10 Organizational-unit-names .....                     | 39          |
| 18.3.11 Pds-name .....                                      | 39          |
| 18.3.12 Personal-name .....                                 | 39          |
| 18.3.13 Physical-delivery-country-name .....                | 39          |
| 18.3.14 Physical-delivery-office-name .....                 | 39          |
| 18.3.15 Physical-delivery-office-number .....               | 39          |
| 18.3.16 Physical-delivery-organization-name .....           | 39          |
| 18.3.17 Physical-delivery-personal-name .....               | 39          |
| 18.3.18 Post-office-box-address .....                       | 40          |
| 18.3.19 Postal-code .....                                   | 40          |
| 18.3.20 Poste-restante-address .....                        | 40          |
| 18.3.21 Private-domain-name .....                           | 40          |
| 18.3.22 Street-address .....                                | 40          |
| 18.3.23 Terminal-identifier .....                           | 40          |
| 18.3.24 Terminal-type .....                                 | 40          |
| 18.3.25 Unformatted-postal-address .....                    | 40          |
| 18.3.26 Unique-postal-name .....                            | 41          |
| 18.4 Attribute List Equivalence .....                       | 41          |
| 18.5 OR-Address Forms .....                                 | 41          |
| 18.5.1 Mnemonic OR-Address .....                            | 42          |
| 18.5.2 Numeric OR-Address .....                             | 42          |
| 18.5.3 Postal OR-Address .....                              | 43          |
| 18.5.4 Terminal OR-Address .....                            | 43          |
| 18.5.5 Determination of Address Forms .....                 | 44          |
| 18.6 Conditional Attributes .....                           | 44          |
| 19 Routing .....  | 44          |
| SECTION 5 – USE OF THE DIRECTORY .....                      | 45          |
| 20 Overview .....   | 45          |
| 21 Authentication .....                                     | 45          |
| 22 Name Resolution .....                                    | 46          |
| 23 DL Expansion .....                                       | 46          |
| 24 Capability Assessment .....                              | 46          |
| SECTION 6 – OSI REALIZATION .....                           | 47          |
| 25 Overview .....   | 47          |

|   | <i>Page</i> |
|---|-------------|
| 26 Application Service Elements .....                     | 47          |
| 26.1 The ASE Concept.....                                 | 47          |
| 26.2 Symmetric and Asymmetric ASEs.....                   | 48          |
| 26.3 Message Handling ASEs.....                           | 49          |
| 26.3.1 Message Transfer .....                             | 49          |
| 26.3.2 Message Submission.....                            | 49          |
| 26.3.3 Message Delivery.....                              | 49          |
| 26.3.4 Message Retrieval.....                             | 49          |
| 26.3.5 Message Administration.....                        | 50          |
| 26.4 Supporting ASEs.....                                 | 50          |
| 26.4.1 Remote Operations.....                             | 50          |
| 26.4.2 Reliable Transfer.....                             | 50          |
| 26.4.3 Association Control.....                           | 50          |
| 27 Application Contexts.....                              | 50          |
| SECTION 7 – ABSTRACT SERVICE DEFINITION CONVENTIONS ..... | 51          |
| 28 Overview .....   | 51          |
| 29 Components of the Abstract Model.....                  | 51          |
| 29.1 Abstract Objects.....                                | 51          |
| 29.2 Abstract Contracts.....                              | 51          |
| 29.3 Connection Packages .....                            | 52          |
| 29.4 Abstract Ports.....                                  | 52          |
| 29.5 Abstract Operations and Abstract Errors.....         | 52          |
| 30 ROS Realization.....                                   | 52          |
| Annex A – Directory Object Classes and Attributes .....   | 54          |
| A.1 Object Classes.....                                   | 54          |
| A.1.1 MHS Distribution List.....                          | 54          |
| A.1.2 MHS Message Store.....                              | 54          |
| A.1.3 MHS Message Transfer Agent.....                     | 54          |
| A.1.4 MHS User .....                                      | 55          |
| A.1.5 MHS User Agent.....                                 | 55          |
| A.2 Attributes.....                                       | 55          |
| A.2.1 MHS Acceptable EITs .....                           | 55          |
| A.2.2 MHS Deliverable Classes .....                       | 56          |
| A.2.3 MHS Deliverable Content Types .....                 | 56          |
| A.2.4 MHS DL Archive Service.....                         | 56          |
| A.2.5 MHS DL Members.....                                 | 56          |
| A.2.6 MHS DL Policy .....                                 | 56          |
| A.2.7 MHS DL Related Lists.....                           | 57          |
| A.2.8 MHS DL Submit Permissions.....                      | 57          |
| A.2.9 MHS DL Subscription Service.....                    | 57          |
| A.2.10 MHS Exclusively Acceptable EITs.....               | 57          |
| A.2.11 MHS Maximum Content Length.....                    | 57          |
| A.2.12 MHS Message Store Directory Name .....             | 57          |
| A.2.13 MHS OR-Addresses.....                              | 58          |
| A.2.14 MHS OR-Addresses with Capabilities.....            | 58          |
| A.2.15 MHS Supported Attributes.....                      | 58          |
| A.2.16 MHS Supported Automatic Actions .....              | 58          |
| A.2.17 MHS Supported Content Types .....                  | 58          |
| A.2.18 MHS Supported Matching Rules .....                 | 59          |
| A.2.19 MHS Unacceptable EITs.....                         | 59          |
| A.3 Attribute Syntaxes.....                               | 59          |
| A.3.1 DL Submit Permission .....                          | 59          |
| A.3.2 DL Policy .....                                     | 60          |
| A.3.3 OR-Address.....                                     | 62          |
| A.3.4 OR-Address with Capabilities.....                   | 62          |
| A.3.5 OR-Name .....                                       | 63          |

|  | <i>Page</i> |
|--|-------------|
| A.4 Contexts .....   | 63          |
| A.4.1 DL Administrator Annotation .....  | 63          |
| A.4.2 DL Nested DL .....   | 64          |
| A.4.3 DL Reset Originator .....  | 64          |
| A.5 Certificate Subject Alternative Names .....  | 64          |
| A.5.1 MTA Name .....   | 64          |
| Annex B – Reference Definition of Object Identifiers .....   | 65          |
| Annex C – Reference Definition of Directory Object Classes and Attributes .....  | 67          |
| Annex D – Security Threats .....   | 74          |
| D.1 Masquerade .....   | 74          |
| D.2 Message Sequencing .....   | 74          |
| D.3 Modification of Information .....  | 75          |
| D.4 Denial of Service .....  | 75          |
| D.5 Repudiation .....  | 76          |
| D.6 Leakage of Information .....   | 76          |
| D.7 Other Threats .....  | 76          |
| Annex E – Provision of Security Services in ITU-T Rec. X.411   ISO/IEC 10021-4 .....   | 77          |
| Annex F – Representation of OR-Addresses for Human Usage .....   | 78          |
| F.1 Purpose .....  | 78          |
| F.2 Scope .....  | 78          |
| F.3 Format .....   | 78          |
| F.3.1 General .....  | 78          |
| F.3.2 Labelled format .....  | 79          |
| F.3.3 Self-explanatory format .....  | 81          |
| F.4 User Interface .....   | 81          |
| Annex G – Use of OR-Addresses by Multinational Organizations .....   | 83          |
| G.1 Addressing principles .....  | 83          |
| G.2 Example configurations .....   | 84          |
| G.2.1 Multiple Independent PRMDs .....   | 84          |
| G.2.2 A single PRMD, named from a "home" country .....   | 84          |
| G.2.3 A single PRMD with multiple country and domain names .....   | 85          |
| G.3 Alias OR-addresses .....   | 86          |
| Annex H – Use of Protected Passwords for Message Store Access .....  | 87          |
| Annex I – Differences Between ISO/IEC 10021-2 and ITU-T Rec. X.402 .....   | 90          |
| Annex J – Summary of Changes to Previous Editions .....  | 91          |
| J.1 Differences between ISO/IEC 10021-2:1990 and CCITT Rec. X.402 (1992) .....   | 91          |
| J.2 Differences between CCITT Rec. X.402 (1992) and ITU-T Rec. X.402 (1995)  <br>ISO/IEC 10021-2:1996 .....                        | 91          |
| J.3 Differences between ITU-T Rec. X.402 (1995)   ISO/IEC 10021-2:1996 and ITU-T Rec. X.402<br>(1999)   ISO/IEC 10021-2:1999 ..... | 91          |
| Annex K – Index .....  | 92          |

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 10021-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.402.

This third edition cancels and replaces the second edition (ISO/IEC 10021-2:1996), which has been technically revised. It also incorporates Technical Corrigendum 1:1998.

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 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*
- *Part 10: MHS routing*
- *Part 11: MHS Routing — Guide for messaging systems managers [Technical Report]*



## 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.

**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 Recommendations | parts of 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 Rec. X.403. The detailed rules by which the MTS converts the contents of messages from one EIT to another are defined in Rec. 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 Rec. T.330. The EDI Messaging Service is described in CCITT Rec. F.435 | ISO/IEC 10021-8, and the EDI Messaging System, another application of Message Handling, is defined in CCITT Rec. X.435 | 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.

**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.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                                       | X.412 | MHS Routing  |
| 10021-11                                       | X.404 | MHS Routing: Guide for system managers                                   |
| + MHS Management                               |       |  |
| 11588-1  | X.460 | Management: Model and Architecture                                       |
| 11588-3  | X.462 | Logging Information  |
| 11588-8  | X.467 | Message Transfer Agent Management  |
| +-----+-----+-----+-----+-----+-----+          |       |  |

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.

**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                          |
| 9594-10 | X.530 | System Management for administration |

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 7498. 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 ITU-T Rec. X.227 | ISO 8650-1. The means for reliably conveying APDUs over associations, the RTSE, is defined in ITU-T Rec. X.218 | ISO/IEC 9066-1 and CCITT Rec. X.228 | 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.

**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         |

This Recommendation | International Standard is structured as follows. Section one gives a general overview. Section two presents abstract models of Message Handling. Section three specifies how one can configure the MHS to satisfy any of a variety of functional, physical, and organizational requirements. Section four describes the naming and addressing of users and distribution lists and the routing of information objects to them. Section five describes the uses the MHS may make of the Directory. Section six 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 seven. Annexes provide important supplemental information.

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

## 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 editions of the Recommendations and Standards listed below. Members of ISO and IEC maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of 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:

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model.*
- CCITT Recommendation X.800 (1991), *Security architecture for Open Systems Interconnection for CCITT applications.*  
ISO 7498-2:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 2: Security Architecture.*
- ITU-T Recommendation X.216 (1994) | ISO/IEC 8822:1994, *Information technology – Open Systems Interconnection – Connection-oriented 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.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.*
- 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.*
- 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.*
- ITU-T Recommendation X.666 (1997) | ISO/IEC 9834-7:1998, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: Assignment of international names for use in specific contexts.*
- ITU-T Recommendation X.680 (1997) | ISO/IEC 8824-1:1998, *Information technology – Abstract Syntax Notation One (ASN.1) – Specification of Basic Notation.*
- ITU-T Recommendation X.681 (1997) | ISO/IEC 8824-2:1998, *Information technology – Abstract Syntax Notation One (ASN.1) – Information Object Specification.*
- ITU-T Recommendation X.682 (1997) | ISO/IEC 8824-3:1998, *Information technology – Abstract Syntax Notation One (ASN.1) – Constraint Specification.*
- ITU-T Recommendation X.683 (1997) | ISO/IEC 8824-4:1998, *Information technology – Abstract Syntax Notation One (ASN.1) – Parameterization of ASN.1 Specifications.*
- ITU-T Recommendation X.690 (1997) | ISO/IEC 8825-1:1998, *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 Realisations: Remote Operations Service Element (ROSE) Service Definition.*
- ITU-T Recommendation X.882 (1994) | ISO/IEC 13712-3:1995, *Information technology – Remote Operations – OSI Realisations: Remote Operations Service Element (ROSE) Protocol Specification.*

## 2.2 Directory Systems

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

- ITU-T Recommendation X.500 (1997) | ISO/IEC 9594-1:1998, *Information technology – Open Systems Interconnection – The Directory – Overview of concepts, models, and services.*
- ITU-T Recommendation X.501 (1997) | ISO/IEC 9594-2:1998, *Information technology – Open Systems Interconnection – The Directory – Models.*
- ITU-T Recommendation X.509 (1997) | ISO/IEC 9594-8:1998, *Information technology – Open Systems Interconnection – The Directory – Authentication framework.*
- ITU-T Recommendation X.511 (1997) | ISO/IEC 9594-3:1998, *Information technology – Open Systems Interconnection – The Directory – Abstract service definition.*
- ITU-T Recommendation X.518 (1997) | ISO/IEC 9594-4:1998, *Information technology – Open Systems Interconnection – The Directory – Procedures for distributed operation.*
- ITU-T Recommendation X.519 (1997) | ISO/IEC 9594-5:1998, *Information technology – Open Systems Interconnection – The Directory – Protocol specifications.*
- ITU-T Recommendation X.520 (1997) | ISO/IEC 9594-6:1998, *Information technology – Open Systems Interconnection – The Directory – Selected attribute types.*
- ITU-T Recommendation X.521 (1997) | ISO/IEC 9594-7:1998, *Information technology – Open Systems Interconnection – The Directory – Selected object classes.*
- ITU-T Recommendation X.525 (1997) | ISO/IEC 9594-9:1998, *Information technology – Open Systems Interconnection – The Directory – Replication.*
- ITU-T Recommendation X.530 (1997) | ISO/IEC 9594-10:1998, *Information Technology – Open Systems Interconnection – The Directory: Use of systems management for administration of the Directory.*

## 2.3 Message Handling Systems

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

- CCITT Recommendation T.330 (1988), *Telematic access to interpersonal messaging system.*
- ITU-T Recommendation F.400/X.400 (1999), *Message handling: System and service overview.*  
ISO/IEC 10021-1:1999, *Information technology – Message Handling Systems (MHS) – Part 1: System and service overview.*
- CCITT Recommendation X.408 (1988), *Message handling systems: Encoded information type conversion rules.*
- ITU-T Recommendation X.411 (1999) | ISO/IEC 10021-4:2003, *Information technology – Message Handling Systems (MHS) – Message transfer system : Abstract service definition and procedures.*
- ITU-T Recommendation X.413 (1999) | ISO/IEC 10021-5:1999, *Information technology – Message Handling Systems (MHS) – Message store: Abstract service definition.*
- ITU-T Recommendation X.419 (1999) | ISO/IEC 10021-6:2003, *Information technology – Message Handling Systems (MHS) – Protocol specifications.*
- ITU-T Recommendation X.420 (1999) | ISO/IEC 10021-7:2003, *Information technology – Message Handling Systems (MHS) – Interpersonal messaging system.*
- ITU-T Recommendation F.435 (1999), *Message handling: Electronic Data Interchange Messaging Service.*  
ISO/IEC 10021-8:1999, *Information technology – Message Handling Systems (MHS) – Part 8: Electronic Data Interchange Messaging Service.*
- ITU-T Recommendation X.435 (1999) | ISO/IEC 10021-9:1999, *Information technology – Message Handling Systems (MHS) – Electronic Data Interchange Messaging System.*
- ITU-T Recommendation X.412 (1999) | ISO/IEC 10021-10:1999, *Information technology – Message Handling Systems (MHS) – MHS Routing.*
- ITU-T Recommendation X.404 (1999) | ISO/IEC TR 10021-11:1999, *Information technology – Message Handling Systems (MHS) – MHS Routing: Guide for Messaging System Managers.*
- 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 (1996) | ISO/IEC 11588-3:1997, *Information technology – Message Handling Systems (MHS) Management – Logging Information.*
- ITU-T Recommendation X.467 (1996) | ISO/IEC 11588-8:1997, *Information technology – Message Handling Systems (MHS) Management – Message Transfer Agent Management.*

## 2.4 Country Codes

This Specification cites the following Country Code specifications:

- ISO 3166-1:1997, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes.*
- ITU-T Recommendation X.121 (1996), *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.*

## 2.6 Language Code

This Specification cites the following Language Code specification:

- ISO 639:1988, *Code for the representation of names of languages.*

## 2.7 Character Sets

This Specification cites the following Character Set specifications:

- ISO 10646-1:1993, *Information technology – Universal Multiple-Octet Coded Character Set (UCS) – Part 1: Architecture and Basic Multilingual Plane.*