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Information technology — Text Communication — Message-Oriented Text Interchange Systems (MOTIS) —

Part 7: Interpersonal Messaging System

*Technologies de l'information — Communication de texte — Systèmes d'échange
de texte en mode message —*

Partie 7: Système de messagerie de personne à personne



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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 10021-7 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 10021-7 consists of the following parts, under the general title: *Information technology — Text Communication — Message-Oriented Text Interchange Systems (MOTIS)* —

- *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*

Annexes A, B, C, D, E, F, G, H, I, J and L form an integral part of this part of ISO/IEC 10021. Annexes K, M, N and O are for information only.

Introduction

This part of ISO/IEC 10021 is one of a number of parts of ISO/IEC 10021 (the International Standards for Message-Oriented Text Interchange Systems (MOTIS)). ISO/IEC 10021 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, it 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 part of ISO/IEC 10021 defines the Message Handling application called *Interpersonal Messaging*, specifying in the process the message content type and associated procedures known as *P2*.

The text of this part of ISO/IEC 10021 is the subject of joint CCITT-ISO agreement. The corresponding CCITT specification is Recommendation X.420.

Information technology - Text Communication - Message-Oriented Text Interchange Systems (MOTIS) - Part 7 : Interpersonal Messaging System

Section one - Introduction

1 Scope

This part of ISO/IEC 10021 defines **Interpersonal Messaging**, a form of Message Handling tailored for ordinary interpersonal business or private correspondence.

This part of ISO/IEC 10021 is one of a series on Message Handling. ISO/IEC 10021-2 constitutes the introduction to the series and identifies the other documents in it.

The architectural basis and foundation for Message Handling are defined in still other International Standards. ISO/IEC 10021-2 identifies those documents as well.

This part of ISO/IEC 10021 is structured as follows. Section one is this introduction. Section two defines the kinds of information objects exchanged in Interpersonal Messaging. Section three defines the associated abstract service. Section four specifies how it is provided. Annexes provide important supplemental information.

The requirements for conformance to this part of ISO/IEC 10021 are given in clause 22.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 10021. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 10021 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of ISO and IEC maintain registers of currently valid International Standards.

2.1 Open Systems Interconnection

This part of ISO/IEC 10021 cites the following OSI specification:

ISO 8824:1990, *Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO 8825:1990, *Information processing systems - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

2.2 Message Handling Systems

This part of ISO/IEC 10021 cites the following Message Handling System specifications:

ISO/IEC 10021:1990, *Information technology - Text communication - Message-Oriented Text Interchange Systems (MOTIS) -*

Part 1: Service and system 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.

CCITT X.408:1988 *Message handling systems: Encoded information type conversion rules.*

CCITT X.420:1984 *Message handling systems: Interpersonal messaging user agent layer.*

2.3 Directory Systems

This part of ISO/IEC 10021 cites the following Directory System specification:

ISO/IEC 9594-2:1990, *Information technology - Open Systems Interconnection - The Directory - Part 2: Models.*

2.4 Language Code

This part of ISO/IEC 10021 cites the following Language Code specification:

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

2.5 Character Sets

This part of ISO/IEC 10021 cites the following Character Set specifications:

ISO 2375:1985, *Data processing - Procedure for registration of escape sequences.*

ISO 8859-1:1987, *Information processing - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1.*

2.6 Telematic Services

This part of ISO/IEC 10021 cites the following Telematic Service specifications:

CCITT T.4:1988, *Standardization of group 3 facsimile apparatus for document transmission.*

CCITT T.30:1988, *Procedures for document facsimile transmission in the general switched telephone network.*

CCITT T.100:1988, *International information exchange for interactive videotex.*

CCITT T.101:1988, *International interworking for videotex services.*

CCITT T.330:1988, *Telematic access to IPMS.*

3 Definitions

For the purposes of this part of ISO/IEC 10021, the definitions given in ISO/IEC 10021-2 apply.

4 Abbreviations

For the purposes of this part of ISO/IEC 10021, the abbreviations given in ISO/IEC 10021-2 apply.

5 Conventions

This part of ISO/IEC 10021 uses the descriptive conventions identified below.

5.1 ASN.1

This part of ISO/IEC 10021 uses for the indicated purposes the following ASN.1-based descriptive conventions:

- a) To define the information objects of Interpersonal Messaging, and other data types and values of all kinds, ASN.1 itself.
- b) To define the functional objects of Interpersonal Messaging, the OBJECT and REFINE macros of ISO/IEC 10021-3.
- c) To define the abstract service of Interpersonal Messaging, the PORT and ABSTRACT-OPERATION and -ERROR macros of ISO/IEC 10021-3.
- d) To define the *heading extensions*, the HEADING-EXTENSION macro of clause 7.2.17.
- e) To define *extended body part types*, the EXTENDED-BODY-PART-TYPE macro of clause 7.3.12.
- f) To define MS attributes, the ATTRIBUTE macro of ISO/IEC 9594-2.

The various uses of the ASN.1 notation are summarized in Table 1. With the two exceptions evident from the table, whenever ASN.1 is employed, it appears both in the body of this part of ISO/IEC 10021 to aid the exposition, and again, largely redundantly, in an annex for reference.

Table 1
Uses of the ASN.1 Notation

Subject Matter	Exposition	Reference
Object Identifiers	-	annex D
Abstract information objects	section two	annex E
Functional objects	clauses 10, 11, 16	annex F
Abstract service	clauses 12-13	annex G
Heading extensions	annex A	annex H
Extended body part types	annex B	annex I
Message store attributes	annex C	annex J
Upper bounds	-	annex K

If differences are found between the ASN.1 used in the exposition and that supplied for reference, a specification error is indicated.

ASN.1 tags are implicit throughout the ASN.1 module the annex defines; the module is definitive in that respect.

NOTES

1. The use of ASN.1 to describe a class or piece of information does not in itself imply that that information is transported between open systems. The fact that the information, by virtue of its description in ASN.1 and of ASN.1's Basic Encoding Rules, has a concrete transfer syntax may be immaterial. Information actually conveyed between systems is designated as such by its inclusion in an application protocol.

2. The use of the ABSTRACT-OPERATION and -ERROR macros, derived from the correspondingly named macros of Remote Operations, does not imply that the abstract operations and errors are invoked and reported across the boundary between open systems. The fact that the abstract operations and errors, by virtue of their description using these macros and with minimal additional specification, actually could be invoked via ROS is immaterial in the present context.

5.2 Grade

This part of ISO/IEC 10021 uses the concept of grade as developed in ISO/IEC 10021-2.

5.3 Terms

Throughout this part of ISO/IEC 10021, terms are rendered in **bold** when defined, in *italic* when referenced prior to their definitions, without emphasis upon all other occasions.

Terms that are proper nouns are capitalized, generic terms are not.

Section two – Abstract Information Objects

6 Overview

This section abstractly describes the information objects that users exchange in Interpersonal Messaging. They are of two kinds, *interpersonal messages (IPMs)* and *interpersonal notifications (IPNs)*. One of the latter acknowledges a user's receipt of one of the former.

```
InformationObject ::= CHOICE {
    ipm [0] IPM,
    ipn [1] IPN}
```

This section covers the following topics:

- a) Interpersonal messages;
- b) Interpersonal notifications.

NOTES

1. The use, throughout this section, of words such as "originator" and "recipient" anticipates the fact that *IPMs* and *IPNs* are conveyed between users as the contents of messages (see clause 20). These words, therefore, refer to the roles users and DLs play in such transmittals.
2. An *IPM* may appear (see clause 7.3.8) in the *Body* of another *IPM* which itself is conveyed as the content of a message. The words "originator" and "recipient" shall be understood in the context of an *IPM*'s conveyance as the (entire) content of a message, not as a component of the *Body* of another *IPM* so conveyed.
3. An *IPM* or *IPN* makes various assertions about its own transmittal (e.g., who originates the message containing it). Furthermore, an *IPN* makes assertions about the transmittal of the *IPM* to which it responds. All of these assertions are unverified.

7 Interpersonal Messages

An **interpersonal message (IPM)** is a member of the primary class of information object conveyed between users in Interpersonal Messaging.

```
IPM ::= SEQUENCE {
    heading Heading,
    body Body}
```

It has the following components:

- a) **Heading:** A Set of **heading fields** (or **fields**), each an information item that gives a characteristic of the IPM (e.g., its importance).
- b) **Body:** A Sequence of **body parts**, each an information object that the IPM is intended to convey between users (e.g., a document).

```
Body ::= SEQUENCE OF BodyPart
```

The structure of an IPM is depicted in Figure 1.

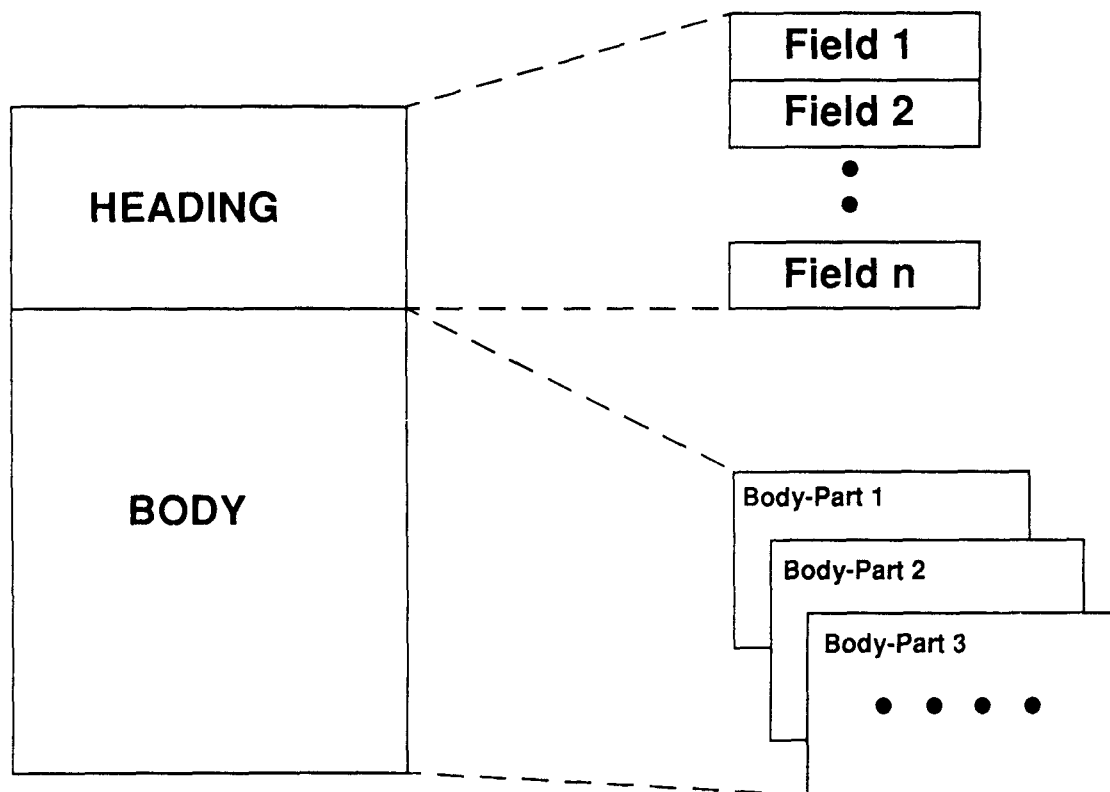


Figure 1
An Interpersonal Message

This clause defines and describes the most prominent Heading field component types and the defined Heading fields and body part types.

NOTE - An IPM may be likened to a business memo. In fact, the terms "Heading" and "Body" appeal to that analogy.

7.1 Heading Field Component Types

Information items of several kinds appear throughout the Heading. These Heading field component types--*IPM identifier*, *recipient specifier*, and *O/R descriptor*--are defined and described below.

7.1.1 IPM Identifier

An **IPM identifier** is an information item that unambiguously and uniquely identifies an IPM, distinguishing it from all other IPMs ever conveyed by any user.

```
IPMIdentifier ::= [APPLICATION 11] SET {
    user ORAddress OPTIONAL,
    user-relative-identifier LocalIPMIdentifier}
```

An IPM identifier has the following components:

- a) **User (O)**: Identifies the user who originates the IPM. One of the user's O/R addresses. This component's omission is discouraged.

- b) **User-relative-identifier** (M): Uniquely and unambiguously identifies the IPM, distinguishing it from all other IPMs that the user who is identified by the User component originates. A Printable String. A length of zero is discouraged.

```
LocalIPMIdentifier ::= PrintableString
    (SIZE (0..ub-local-ipm-identifier))
```

NOTE - The "11" in IPMIdentifier is the only ASN.1 application-wide tag this part of ISO/IEC 10021 assigns.

7.1.2 Recipient Specifier

A **recipient specifier** is an information item that identifies a (preferred) recipient of an IPM and that may make certain requests of him.

```
RecipientSpecifier ::= SET {
    recipient          [0] ORDescriptor,
    notification-requests [1] NotificationRequests DEFAULT {},
    reply-requested     [2] BOOLEAN DEFAULT FALSE}
```

A recipient specifier has the following components:

- a) **Recipient** (M): Identifies the preferred recipient in question. An *O/R descriptor*.

If the *Notification-requests* or *Reply-requested* component makes a request of the preferred recipient, the *Formal-name* component of the *O/R descriptor* above shall be present.

- b) **Notification-requests** (D no values): May make certain requests of the preferred recipient denoted by the Recipient component.

```
NotificationRequests ::= BIT STRING {
    rn          (0),
    nrn         (1),
    ipm-return(2)}
```

This component may assume any of the following values simultaneously, except that the value *rn* shall not be selected unless the value *nrn* is selected:

- i) *rn*: A *receipt notification* is requested in the circumstances prescribed in clause 8.
 - ii) *nrn*: A *non-receipt notification* is requested in the circumstances prescribed in clause 8.
 - iii) *ipm-return*: It is requested that the IPM be returned in any *non-receipt notification*.
- c) **Reply-requested** (D *false*): Indicates whether a reply is requested of the preferred recipient denoted by the Recipient component. A Boolean.

A **reply** is one IPM sent in response to another. A user may reply to an IPM even though no reply is requested of him and, indeed, even if he is not among the IPM's preferred recipients. Furthermore, a user of whom a reply is requested may refrain from replying.

7.1.3 O/R Descriptor

An **O/R descriptor** is an information item that identifies a user or DL.

```
ORDescriptor ::= SET {
    formal-name          ORName OPTIONAL,
    free-form-name       [0] FreeFormName OPTIONAL,
    telephone-number     [1] TelephoneNumber OPTIONAL}
```

An O/R descriptor has the following components:

- a) **Formal-name (C)**: Identifies the user or DL in question. One of its O/R names.

This conditional component shall be present if (but not only if) one or more of the following criteria are satisfied:

- i) The *Free-form-name* component is absent.
- ii) The O/R descriptor appears in the *Reply Recipients* heading field.
- iii) The O/R descriptor is the Recipient component of a recipient specifier and the conditions stated in item a of clause 7.1.2 are satisfied.

- b) **Free-form-name (O)**: Identifies the user or DL in question. A Teletex String, chosen from the graphic subset of the Teletex String character set. A length of zero is discouraged.

FreeFormName ::= TeletexString (SIZE (0..ub-free-form-name))

- c) **Telephone-number (O)**: Provides the telephone number of the user or DL in question. A Printable String, chosen from the graphical subset of the Printable String character set. A length of zero is discouraged.

TelephoneNumber ::= PrintableString (SIZE (0..ub-telephone-number))

NOTE - One or more O/R descriptors may appear in each of the following heading fields: Originator, Authorizing Users, Primary Recipients, Copy Recipients, Blind Copy Recipients, and Reply Recipients. In addition, an O/R descriptor may appear in the following notification fields (see clause 8): IPN Originator and IPM Preferred Recipient.

7.2 Heading Fields

The fields that may appear in the Heading of an IPM are defined and described below.

```
Heading ::= SET (
    this-IPM                ThisIPMField,
    originator               [0] OriginatorField OPTIONAL,
    authorizing-users        [1] AuthorizingUsersField OPTIONAL,
    primary-recipients       [2] PrimaryRecipientsField DEFAULT {},
    copy-recipients          [3] CopyRecipientsField DEFAULT {},
    blind-copy-recipients    [4] BlindCopyRecipientsField OPTIONAL,
    replied-to-IPM           [5] RepliedToIPMField OPTIONAL,
    obsoleted-IPMs           [6] ObsoletedIPMsField DEFAULT {},
    related-IPMs             [7] RelatedIPMsField DEFAULT {},
    subject                  [8] EXPLICIT SubjectField OPTIONAL,
    expiry-time              [9] ExpiryTimeField OPTIONAL,
    reply-time               [10] ReplyTimeField OPTIONAL,
    reply-recipients         [11] ReplyRecipientsField OPTIONAL,
    importance               [12] ImportanceField DEFAULT normal,
    sensitivity              [13] SensitivityField OPTIONAL,
    auto-forwarded           [14] AutoForwardedField DEFAULT FALSE,
    extensions               [15] ExtensionsField DEFAULT {})
```

Some fields have components and thus are composite, rather than indivisible. A field component is called a **sub-field**.

7.2.1 This IPM

The **This IPM** heading field (M) identifies the IPM. It comprises an IPM identifier.

ThisIPMField ::= IPMIdentifier

7.2.2 Originator

The **Originator** heading field (O) identifies the IPM's originator. It comprises an O/R descriptor.

OriginatorField ::= ORDescriptor

7.2.3 Authorizing Users

The **Authorizing Users** heading field (C) identifies the zero or more users who are the IPM's *authorizing users*. It comprises a Sequence of sub-fields, each an O/R descriptor, one for each such user.

AuthorizingUsersField ::= SEQUENCE OF AuthorizingUsersSubfield

AuthorizingUsersSubfield ::= ORDescriptor

An **authorizing user** is a user who, either individually or in concert with others, authorizes the origination of an IPM. The word "authorizes" above is not precisely defined by this part of ISO/IEC 10021; it is given meaning by users.

This conditional field shall be present if, and only if, the authorizing users are other than the IPM's originator alone.

NOTE - Suppose, e.g., that a manager instructs his secretary to originate an IPM on his behalf. In this case, the secretary, the IPM's originator, might consider the manager the authorizing user.

7.2.4 Primary Recipients

The **Primary Recipients** heading field (D no subfields (i.e., elements)) identifies the zero or more users and DLs who are the "primary recipients" of the IPM. It also identifies the responses the authorizing users ask of each of those users and of each member of those DLs. It comprises a Sequence of sub-fields, each a recipient specifier, one for each primary recipient.

PrimaryRecipientsField ::= SEQUENCE OF PrimaryRecipientsSubfield

PrimaryRecipientsSubfield ::= RecipientSpecifier

The phrase "primary recipients" above is not precisely defined by this part of ISO/IEC 10021; it is given meaning by users.

NOTE - The primary recipients, e.g., might be those users and those DLs whose members are expected to act upon the IPM.

7.2.5 Copy Recipients

The **Copy Recipients** heading field (D no subfields (i.e., elements)) identifies the zero or more users and DLs who are the "copy recipients" of the IPM. It also identifies the responses the authorizing users ask of each of those users and of each member of those DLs. It comprises a Sequence of sub-fields, each a recipient specifier, one for each copy recipient.

CopyRecipientsField ::= SEQUENCE OF CopyRecipientsSubfield

CopyRecipientsSubfield ::= RecipientSpecifier

The phrase "copy recipients" above is not precisely defined by this part of ISO/IEC 10021; it is given meaning by users.

NOTE - The copy recipients, e.g., might be those users to whom, and those DLs to whose members the IPM is conveyed for information.

7.2.6 Blind Copy Recipients

The **Blind Copy Recipients** heading field (C) identifies zero or more users and DLs who are intended *blind* copy "recipients" of the IPM. It also identifies the responses the authorizing users ask of each of those users and of each member of those DLs. It comprises a Sequence of sub-fields, each a recipient specifier, one for each *blind* copy recipient.

BlindCopyRecipientsField ::= SEQUENCE OF BlindCopyRecipientsSubfield

BlindCopyRecipientsSubfield ::= RecipientSpecifier

The phrase "copy recipients" above has the same meaning as in clause 7.2.5. A **blind** copy recipient is one whose role as such is disclosed to neither primary nor copy recipients.

In the instance of an IPM intended for a blind copy recipient, this conditional field shall be present and identify that user or DL. Whether it shall also identify the other blind copy recipients is a local matter. In the instance of the IPM intended for a primary or copy recipient, the field shall be absent or identify no users or DLs.

7.2.7 Replied-to IPM

The **Replied-to IPM** heading field (C) identifies the IPM to which the present IPM is a reply. It comprises an IPM identifier.

RepliedToIPMField ::= IPMIdentifier

This conditional field shall be present if, and only if, the IPM is a reply.

NOTE - In the context of *forwarding*, care should be taken to distinguish between the *forwarding IPM* and the *forwarded IPM*. This field should identify whichever of these two IPMs to which the reply responds.

7.2.8 Obsolete IPMs

The **Obsolete IPMs** heading field (D no subfields (i.e., elements)) identifies zero or more IPMs that the authorizing users of the present IPM consider it to obsolete. It comprises a Sequence of sub-fields, each an IPM identifier, one for each IPM.

ObsoleteIPMsField ::= SEQUENCE OF ObsoleteIPMsSubfield

ObsoleteIPMsSubfield ::= IPMIdentifier

NOTE - In the context of *forwarding*, care should be taken to distinguish between the *forwarding IPM* and the *forwarded IPM*. This field should identify whichever of these two IPMs the present IPM obsoletes.

7.2.9 Related IPMs

The **Related IPMs** heading field (D no subfields (i.e., elements)) identifies zero or more IPMs that the authorizing users of the present IPM consider related to it. It comprises a Sequence of sub-fields, each an IPM identifier, one for each IPM.

RelatedIPMsField ::= SEQUENCE OF RelatedIPMsSubfield

RelatedIPMsSubfield ::= IPMIdentifier

The word "related" above is not precisely defined by this part of ISO/IEC 10021; it is given meaning by users.

NOTES

1. A related IPM, e.g., might be one discussed in the Body of the present IPM.

2. In the context of *forwarding*, care should be taken to distinguish between the *forwarding IPM* and the *forwarded IPM*. This field should identify whichever of these two IPMs is related to the present IPM.

7.2.10 Subject

The **Subject** heading field (O) identifies the subject of the IPM. It comprises a Teletex String, chosen from the graphic subset of the Teletex String character set. A length of zero is discouraged.

```
SubjectField ::= TeletexString (SIZE (0..ub-subject-field))
```

7.2.11 Expiry Time

The **Expiry Time** heading field (O) identifies when the authorizing users consider the IPM to lose its validity. It comprises a date and time.

```
ExpiryTimeField ::= Time
```

7.2.12 Reply Time

The **Reply Time** heading field (O) identifies by when the authorizing users request (but do not demand) that any replies to the present IPM be originated. It comprises a date and time.

```
ReplyTimeField ::= Time
```

7.2.13 Reply Recipients

The **Reply Recipients** heading field (C) identifies zero or more users and DLs whom the authorizing users request (but do not demand) be among the preferred recipients of any replies to the present IPM. It comprises a Sequence of sub-fields, each an O/R descriptor, one for each user or DL.

```
ReplyRecipientsField ::= SEQUENCE OF ReplyRecipientsSubfield
```

```
ReplyRecipientsSubfield ::= ORDescriptor
```

This conditional field shall be present if, and only if, the desired reply recipients are other than the originator of the present IPM alone.

NOTE - If this field is present and identifies several users and DLs, the originator may include himself among them. If he elects not to do so, he will not be considered among the desired reply recipients.

7.2.14 Importance

The **Importance** heading field (D *normal*) identifies the importance that the authorizing users attach to the IPM. It may assume any one of the following values: *low*, *normal*, or *high*.

```
ImportanceField ::= ENUMERATED {
    low    (0),
    normal (1),
    high   (2)}
```

The values above are not defined by this part of ISO/IEC 10021; they are given meaning by users.

7.2.15 Sensitivity

The **Sensitivity** heading field (C) identifies the sensitivity that the authorizing users attribute to the IPM.

```
SensitivityField ::= ENUMERATED (
    personal          (1),
    private           (2),
    company-confidential(3))
```

This field may assume any one of the following values:

- a) *personal*: The IPM is conveyed to its preferred recipients as individuals, rather than in their professional capacities.
- b) *private*: The IPM should be conveyed to no one other than its preferred recipients.
- c) *company-confidential*: The IPM contains information that should be handled according to company-specific procedures.

This conditional field shall be present if, and only if, the IPM is sensitive.

7.2.16 Auto-forwarded

The **Auto-forwarded** heading field (D *false*) indicates whether the IPM is the result of *auto-forwarding*. It is a Boolean.

```
AutoForwardedField ::= BOOLEAN
```

7.2.17 Extensions

The **Extensions** heading field (D no *extensions* (i.e., members)) conveys information accommodated by no other heading field. It comprises a Set of zero or more **heading extensions** (or **extensions**), each conveying one such information item.

```
ExtensionsField ::= SET OF HeadingExtension

HeadingExtension ::= SEQUENCE (
    type OBJECT IDENTIFIER,
    value ANY DEFINED BY type DEFAULT NULL NULL)
```

Each extension has the following components:

- a) **Type** (M): Identifies the semantics and restricts the abstract syntax of the *Value* component. An Object Identifier.
- b) **Value** (D null): An information item whose abstract syntax is restricted only by the Type component. An Any.

The Type components of all the extensions in the Extensions field shall differ. Not every defined extension need appear in the field.

All extensions are defined in annex A. Thus each extension's Type component shall have one of the values given in that annex. An extension whose Type component has another value shall be ignored.

Every extension is defined by means of the following macro.

```
HEADING-EXTENSION MACRO ::=
BEGIN
    TYPE NOTATION ::= "VALUE" type | empty
    VALUE NOTATION ::= value (VALUE OBJECT IDENTIFIER)
END
```

An instance of the macro's type notation identifies the data type to which the extension's Value component shall be restricted. If no type is identified explicitly, Null is implied.

An instance of the macro's value notation identifies the Object Identifier that shall appear as the extension's Type component.

NOTE - Future addenda to this part of ISO/IEC 10021 may define additional extensions. Furthermore, future addenda are likely to add information to the Heading only by means of this field.

7.3 Body Part Types

The types of body parts that may appear in the Body of an IPM are defined and described below.

```
BodyPart ::= CHOICE {
    ia5-text           [0] IA5TextBodyPart,
    voice             [2] VoiceBodyPart,
    g3-facsimile       [3] G3FacsimileBodyPart,
    g4-class1          [4] G4Class1BodyPart,
    teletex            [5] TeletexBodyPart,
    videotex           [6] VideotexBodyPart,
    encrypted          [8] EncryptedBodyPart,
    message            [9] MessageBodyPart,
    mixed-mode         [11] MixedModeBodyPart,
    bilaterally-defined [14] BilaterallyDefinedBodyPart,
    nationally-defined  [7] NationallyDefinedBodyPart,
    externally-defined  [15] ExternallyDefinedBodyPart}
```

Body parts of some of the types defined below have two components, *Parameters* and *Data*. The **Parameters** component (M) comprises a Sequence of information items that describe the information object the body part represents and that typically are format and control parameters. The **Data** component (M) is the information object itself.

NOTES

1. In CCITT Recommendation X.420 (1984), context-specific tags 1 and 10 denote Telex and Simple Formattable Document body parts, respectively, which are no longer defined. These tags, therefore, are avoided in BodyPart.

2. Under some circumstances, an IPM may be subjected to conversion while in transit between users. Such a transmittal event may alter a body part's type.

7.3.1 IA5 Text

An **IA5 Text** body part represents IA5 text. It has Parameters and Data components.

```
IA5TextBodyPart ::= SEQUENCE {
    parameters IA5TextParameters,
    data       IA5TextData}

IA5TextParameters ::= SET {
    repertoire [0] Repertoire DEFAULT ia5}

IA5TextData ::= IA5String
```

The Parameters component comprises the following parameters:

- a) **Repertoire (D IA5):** Identifies the character set to which the Data component is constrained.

```
Repertoire ::= ENUMERATED {
    ita2(2),
    ia5 (5)}
```

This parameter may assume any one of the following values:

- i) **ITA2:** The Data component shall be limited to the ITA2 (i.e., Telex) character set.

- ii) *IA5*: The Data component may draw upon the full IA5 character set.

The Data component is the text, an IA5 String. It may contain lines of any length. Whenever the component is rendered (e.g., displayed to or printed for a user), all (rather than only a part) of the text must be communicated (e.g., lines may be folded but shall not be truncated).

NOTE - Many terminals have a maximum line length of 80 characters. Therefore, lines that do not exceed that length are most likely to be satisfactorily rendered (e.g., are most likely to avoid being folded).

7.3.2 Voice

A Voice body part represents speech. It has Parameter and Data components.

```
VoiceBodyPart ::= SEQUENCE (
    parameters VoiceParameters,
    data       VoiceData)

VoiceParameters ::= SET -- for future standardization

VoiceData ::= BIT STRING -- for future standardization
```

The parameters of such a body part, and the digitized speech encoding technique that those parameters might identify and parameterize, may be the subject of future standardization.

The Data component is the speech, a Bit String.

7.3.3 G3 Facsimile

A G3 Facsimile body part represents Group 3 facsimile images. It has Parameters and Data components.

```
G3FacsimileBodyPart ::= SEQUENCE (
    parameters G3FacsimileParameters,
    data       G3FacsimileData)

G3FacsimileParameters ::= SET (
    number-of-pages      [0] INTEGER OPTIONAL,
    non-basic-parameters [1] G3FacsimileNonBasicParameters OPTIONAL)

G3FacsimileData ::= SEQUENCE OF BIT STRING
```

The Parameters component comprises the following parameters:

- a) **Number-of-pages** (O): Identifies the number of pages of Group 3 facsimile data present in the Data component. A non-negative Integer.
- b) **Non-basic-parameters** (C): Identifies the non-basic parameters (NBPs) for Group 3 facsimile that characterize the Data component. A G3 NBPs descriptor.

This conditional parameter shall be present if (but not only if) the Body contains two or more G3 Facsimile body parts.

The Data component is the facsimile images, a Sequence of Bit Strings, each encoding a single page of Group 3 facsimile data as dictated by CCITT Recommendations T.4 and T.30.

NOTES

1. The Number-of-pages component identifies the number of elements in the Sequence that constitutes the Data component and is thus redundant.
2. If the Body comprises a single such body part, its NBPs may (but need not) be conveyed by means of the envelope of the message that contains the IPM.

7.3.4 G4 Class 1

A **G4 Class 1** body part represents a final-form document of the sort that is processable by Group 4 Class 1 facsimile terminals. It comprises a Sequence of protocol elements which describe the document's layout structure.

```
G4Class1BodyPart ::= SEQUENCE OF ProtocolElement
```

7.3.5 Teletex

A **Teletex** body part represents a Teletex document. It has Parameters and Data components.

```
TeletexBodyPart ::= SEQUENCE (
    parameters TeletexParameters,
    data       TeletexData)

TeletexParameters ::= SET (
    number-of-pages      [0] INTEGER OPTIONAL,
    telex-compatible     [1] BOOLEAN DEFAULT FALSE,
    non-basic-parameters [2] TeletexNonBasicParameters OPTIONAL)

TeletexData ::= SEQUENCE OF TeletexString
```

The Parameters component comprises the following parameters:

- a) **Number-of-pages** (O): Identifies the number of pages of Teletex text present in the Data component. A non-negative Integer.
- b) **Telex-compatible** (D *false*): Indicates whether the document in the Data component is telex-compatible. A Boolean.

If this parameter has the value *true*, every Teletex String in the Data component shall be restricted to the ITA2 character set. No line shall exceed 69 characters in length.

- c) **Non-basic-parameters** (C): Identifies the NBPs for Teletex that characterize the Data component. A Teletex NBPs descriptor.

This conditional parameter shall be present if (but not only if) the Body contains two or more Teletex body parts.

The Data component is the document, a Sequence of Teletex Strings, each of which encodes one of its pages.

NOTES

1. The Number-of-pages component identifies the number of elements in the Sequence that constitutes the Data component, and is thus redundant.
2. If the Body comprises a single such body part, its NBPs may (but need not) be conveyed by means of the envelope of the message that contains the IPM.

7.3.6 Videotex

A **Videotex** body part represents Videotex data. It has Parameters and Data components.

```
VideotexBodyPart ::= SEQUENCE (
    parameters VideotexParameters,
    data       VideotexData)

VideotexParameters ::= SET (
    syntax [0] VideotexSyntax OPTIONAL)

VideotexData ::= VideotexString
```

The Parameters component comprises the following parameters:

- a) **Syntax (O):** Identifies the syntax of the Data component. In the parameter's absence, the syntax shall be considered unspecified.

```
VideotexSyntax ::= INTEGER {
    ids          (0),
    data-syntax1(1),
    data-syntax2(2),
    data-syntax3(3)}
```

This parameter may assume any one of the following values, each of which denotes as follows one of the Videotex syntaxes defined in CCITT Recommendations T.100 and T.101:

- i) *ids*: The IDS syntax.
- ii) *data-syntax1*: Data Syntax 1.
- iii) *data-syntax2*: Data Syntax 2.
- iv) *data-syntax3*: Data Syntax 3.

The Data component is the Videotex data, a Videotex String. It shall conform to the Videotex syntax denoted by the Syntax parameter.

7.3.7 Encrypted

An **Encrypted** body part represents the result of encrypting a body part of a type defined by this part of ISO/IEC 10021. It has Parameters and Data components.

```
EncryptedBodyPart ::= SEQUENCE {
    parameters EncryptedParameters,
    data       EncryptedData}
```

```
EncryptedParameters ::= SET -- for future standardization
```

```
EncryptedData ::= BIT STRING -- for future standardization
```

The parameters of such a body part, and the encryption technique that those parameters might identify and parameterize, may be the subject of future standardization.

The Data component is the encrypted body part, a Bit String. The bits of the Bit String shall encrypt a data value of (ASN.1) type BodyPart encoded in accordance with the Basic Encoding Rules of ISO 8825.

7.3.8 Message

A **Message** body part represents an IPM and, optionally, its delivery envelope. It has Parameters and Data components.

```
MessageBodyPart ::= SEQUENCE {
    parameters MessageParameters,
    data       MessageData}
```

```
MessageParameters ::= SET {
    delivery-time      [0] MessageDeliveryTime OPTIONAL,
    delivery-envelope [1] OtherMessageDeliveryFields OPTIONAL}
```

```
MessageData ::= IPM
```

The Parameters component comprises the following parameters:

- a) **Delivery-time (O)**: The date and time the IPM was delivered. The presence of this component in the absence of the Delivery-envelope component is discouraged.
- b) **Delivery-envelope (O)**: The IPM's other message delivery fields. The presence of this component in the absence of the Delivery-time component is discouraged.

The Data component is the IPM.

Including one IPM in another as described in the present clause is called **forwarding** that IPM. The enclosing IPM is called the **forwarding IPM**, the enclosed IPM the **forwarded IPM**.

NOTES

1. The possible future inclusion of a message identifier in the Parameters component may be the subject of future standardization. Its present omission provides compatibility with CCITT Recommendation X.420 (1984).

2. That the IPM and purported delivery envelope of a Message body part are, in any sense, genuine is unverified.

7.3.9 Mixed-mode

A **Mixed-mode** body part represents a final-form document of the sort that is processable by mixed-mode Teletex terminals and Group 4 Classes 2 and 3 facsimile terminals. It comprises a Sequence of protocol elements which describe the document's layout structure.

`MixedModeBodyPart ::= SEQUENCE OF ProtocolElement`

7.3.10 Bilaterally Defined

A **Bilaterally Defined** body part represents an information object whose semantics and abstract syntax are bilaterally agreed by the IPM's originator and all of its potential recipients. It comprises an Octet String.

`BilaterallyDefinedBodyPart ::= OCTET STRING`

NOTE - The use of this body part type is discouraged. It predates the Externally Defined body part type and is retained for backward compatibility with CCITT Recommendation X.420 (1984). The Externally Defined body part type provides the same capabilities and more, and its use is preferred, e.g., because such use clearly distinguishes between the body parts defined by one community of users and those defined by another.

7.3.11 Nationally Defined

A **Nationally Defined** body part represents an information object whose semantics and abstract syntax are nationally defined by a country whose identity is bilaterally agreed by the IPM's originator and all of its potential recipients. It comprises an Any.

`NationallyDefinedBodyPart ::= ANY`

NOTES

1. This body part type is intended for use in domestic communication where the country in question is implicitly that of the originator and all of the potential recipients.

2. The use of this body part type is discouraged. It predates the Externally Defined body part type and is retained for backward compatibility with CCITT Recommendation X.420 (1984). The Externally Defined body part type provides the same capabilities and more, and its use is preferred, e.g., because such use clearly distinguishes between the body parts defined by one country and those defined by another.

7.3.12 Externally Defined

An **Externally Defined** body part represents an information object whose semantics and abstract syntax are denoted by an Object Identifier which the body part carries. It has Parameters and Data components.

```
ExternallyDefinedBodyPart ::= SEQUENCE {
    parameters [0] ExternallyDefinedParameters OPTIONAL,
    data          ExternallyDefinedData}

ExternallyDefinedParameters ::= EXTERNAL

ExternallyDefinedData ::= EXTERNAL
```

The Parameters and Data components are Externals (see clause 32 of ISO 8824). Their Direct-reference components shall be present, their Indirect-reference and Data-value-descriptor components absent.

On the basis of the Externally Defined body part type, all body part types are divided into two important classes as follows:

- a) **basic:** Said of any body part type except Externally Defined. Denoted by an integer (an ASN.1 context-specific tag).

All basic body part types are defined in this part of ISO/IEC 10021.

- b) **extended:** Said of the Externally Defined body part type restricted to any one value of the Direct-reference component of the Data component of such a body part. Denoted by an Object Identifier.

Some (but not necessarily all) extended body part types are defined in annex B of this part of ISO/IEC 10021.

Every extended body part type this part of ISO/IEC 10021 defines is defined by means of the following macro. Every extended body part type defined elsewhere shall be so defined as well.

```
EXTENDED-BODY-PART-TYPE MACRO ::=
BEGIN
    TYPE NOTATION ::= Parameters Data
    VALUE NOTATION ::= value (VALUE OBJECT IDENTIFIER)

    Parameters    ::= "PARAMETERS" type "IDENTIFIED" "BY" value (OBJECT IDENTIFIER) | empty
    Data          ::= "DATA" type
END
```

An instance of the macro's type notation defines, by means of its PARAMETERS clause, the type of the data value that is represented by the Parameters component of such an (Externally Defined) body part (an External), and the Object Identifier that appears in the Direct-reference component of this Parameters component. The omission of the Parameters component is implied by the omission of this clause. An instance of the type notation also defines, by means of its DATA clause, the type of the data value that is represented by the Data component of such a body part (an External).

An instance of the macro's value notation defines the Object Identifier that appears as the Direct-reference component of the Data component of such an (Externally Defined) body part. The Object Identifier identifies the encoding rules for the body part. Those body parts whose types this Recommendation defines shall be encoded using ASN.1's basic encoding rules.

NOTES

1. This body part type enables the exchange of information objects of all kinds, each unambiguously and uniquely identified. This identification relies upon the Direct-reference component mentioned above, which is an Object Identifier. Object Identifiers are easily obtained, e.g., by national bodies and private organizations.

2. If an Externally Defined body part has a Parameters component, the Object Identifier in its Direct-reference component is allocated at the same time and by the same naming authority as that in the Direct-reference component of the Data component.

3. Like body parts of other types, an Externally Defined body part may be subjected to conversion. However, specification of the conversion algorithms may be outside the scope of CCITT Recommendation X.408.

4. The basic body part types exist for purely historical reasons, predating the Externally Defined body part type.

8 Interpersonal Notifications

An **interpersonal notification (IPN)** is a member of a secondary class of information object conveyed between users in Interpersonal Messaging.

```
IPN ::= SET (
    -- common-fields -- COMPONENTS OF CommonFields,
    choice [0] CHOICE (
        non-receipt-fields [0] NonReceiptFields,
        receipt-fields      [1] ReceiptFields))
```

An IPN may take either of the following forms:

- a) **non-receipt notification (NRN)**: An IPN that reports its originator's failure to receive, to accept, or his delay in receiving, an IPM.

```
NRN ::= IPN -- with non-receipt-fields chosen
```

- b) **receipt notification (RN)**: An IPN that reports its originator's receipt, or his expected and arranged future receipt, of an IPM.

```
RN ::= IPN -- with receipt-fields chosen
```

The IPM to which an IPN refers is called the **subject IPM**. Only a UA to which the subject IPM is actually delivered shall originate an IPN relating to it, and it shall originate at most one such IPN which shall be conveyed to the subject IPM's originator alone.

An actual recipient shall originate an IPN only in accordance with the Notification-requests component of the *subject recipient specifier*. The **subject recipient specifier** is that recipient specifier in the subject IPM's Heading as a result of which the subject IPM is delivered to that user.

The subject recipient specifier is determined by examining the Sequences of recipient specifiers that constitute the subject IPM's Primary, Copy, and Blind Copy Recipients heading fields. The fields are examined in the order in which they are mentioned in the preceding sentence. Within each field, the specifiers are examined in the order in which they appear there. The subject recipient specifier is the first one found whose Recipient component has as its value an O/R descriptor whose Formal-name component is present and has as its value an O/R name of the preferred recipient as a result of which the subject IPM was delivered to the user on whose behalf the examination is performed.

An IPN comprises a Set of information items called **notification fields (or fields)**, each of which is of one of the following classes:

- a) **common field**: A notification field applicable to both NRNs and RNs.
- b) **non-receipt field**: A notification field applicable to NRNs alone.
- c) **receipt field**: A notification field applicable to RNs alone.

The structure of an IPN is depicted in Figure 2.

The fields, in each of the above classes, that may appear in an IPN are defined and described below.

8.1 Common Fields

The common fields are defined and described below.

```
CommonFields ::= SET {
    subject-ipm                SubjectIPMField,
    ipn-originator              [1] IPNOriginatorField OPTIONAL,
    ipm-preferred-recipient     [2] IPMPreferredRecipientField OPTIONAL,
    conversion-eits             ConversionEITsField OPTIONAL}
```

8.1.1 Subject IPM

The **Subject IPM** common field (M) identifies the subject IPM. It comprises an IPM identifier.

```
SubjectIPMField ::= IPMIdentifier
```

8.1.2 IPN Originator

The **IPN Originator** common field (O) identifies the IPN’s originator. It comprises an O/R descriptor.

```
IPNOriginatorField ::= ORDescriptor
```

If the IPN’s originator is a preferred recipient of the subject IPM, the O/R descriptor above shall be precisely that which is the value of the Recipient component of the subject recipient specifier.

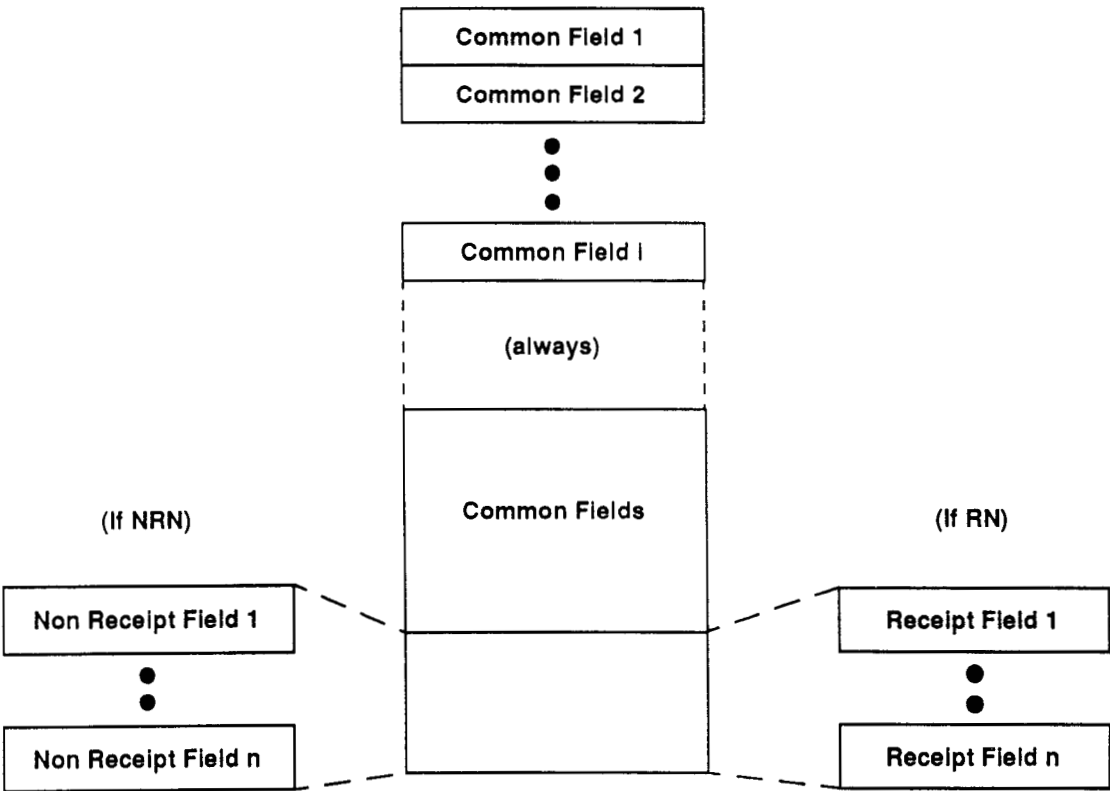


Figure 2
An Interpersonal Notification

8.1.3 IPM Preferred Recipient

The **IPM Preferred Recipient** common field (C) identifies the preferred recipient of the subject IPM who gives rise to its delivery to the IPN's originator (an alternate, (DL) member, or substitute recipient). It comprises an O/R descriptor.

IPMPreferredRecipientField ::= ORDescriptor

The O/R descriptor above shall be precisely that which is the value of the Recipient component of the subject recipient specifier.

This conditional field shall be present if, and only if, it would identify a user other than the IPN's originator or a DL.

8.1.4 Conversion EITs

The **Conversion EITs** common field (C) identifies the EITs of the subject IPM upon delivery to the IPN's originator. It comprises an EITs descriptor.

ConversionEITsField ::= EncodedInformationTypes

This conditional field shall be present if, and only if, the IPM was subjected to conversion for delivery to the IPN's originator.

8.2 Non-receipt Fields

The non-receipt fields are defined and described below.

```
NonReceiptFields ::= SET {
    non-receipt-reason      [0] NonReceiptReasonField,
    discard-reason         [1] DiscardReasonField OPTIONAL,
    auto-forward-comment   [2] AutoForwardCommentField OPTIONAL,
    returned-ipm           [3] ReturnedIPMField OPTIONAL}
```

8.2.1 Non-receipt Reason

The **Non-receipt Reason** non-receipt field (M) indicates why the NRN's originator has not received the subject IPM (even though it was delivered to him).

```
NonReceiptReasonField ::= ENUMERATED {
    ipm-discarded      (0),
    ipm-auto-forwarded(1)}
```

This field may assume any one of the following values:

- a) *ipm-discarded*: The IPM was discarded. This case is further illumined by the *Discard Reason* field.
- b) *ipm-auto-forwarded*: The IPM was auto-forwarded. This case is further illumined by the *Auto-forward Comment* field.

8.2.2 Discard Reason

The **Discard Reason** non-receipt field (C) indicates why the subject IPM was discarded (subsequent to its delivery to the NRN's originator and prior to its receipt).

```
DiscardReasonField ::= ENUMERATED {
    ipm-expired          (0),
    ipm-obsolete         (1),
    user-subscription-terminated(2)}
```

This field may assume any one of the following values:

- a) *ipm-expired: Auto-discard* was in effect, expired IPMs were being discarded, and the time identified by the subject IPM's Expiry Time heading field had arrived.
- b) *ipm-obsolete: Auto-discard* was in effect, obsolete IPMs were being discarded, and the Obsolete IPMs heading field of another IPM, delivered to the NRN's originator, identified the subject IPM.
- c) *user-subscription-terminated*: The Interpersonal Messaging subscription of the NRN's originator was terminated.

This conditional field shall be present only if the Non-receipt Reason field has the value *ipm-discarded*.

8.2.3 Auto-forward Comment

The **Auto-forward Comment** non-receipt field (C) is information pre-supplied for this purpose by the NRN's originator. It comprises a Printable String. A length of zero is discouraged.

```
AutoForwardCommentField ::= AutoForwardComment
```

```
AutoForwardComment      ::= PrintableString
                           (SIZE (0..ub-auto-forward-comment))
```

The value of this field shall be precisely the auto-forward-comment argument of the *Change Auto-forwarding* abstract operation as a result of which the subject IPM was auto-forwarded.

This conditional field shall be present if, and only if, the Non-receipt Reason field has the value *ipm-auto-forwarded* and the auto-forward-comment argument above was supplied.

8.2.4 Returned IPM

The **Returned IPM** non-receipt field (C) is precisely the subject IPM.

```
ReturnedIPMField ::= IPM
```

This conditional field shall be present if, and only if, *ipm-return* is among the values of the Notification-requests component of the subject recipient specifier and the subject IPM was not subjected to conversion for delivery to the NRN's originator.

8.3 Receipt Fields

The receipt fields are defined and described below.

```
ReceiptFields ::= SET {
    receipt-time      [0] ReceiptTimeField,
    acknowledgment-mode [1] AcknowledgmentModeField DEFAULT manual,
    suppl-receipt-info [2] SupplReceiptInfoField DEFAULT ""}
```

8.3.1 Receipt Time

The **Receipt Time** receipt field (M) identifies when the RN's originator received the subject IPM. It comprises a date and time.

```
ReceiptTimeField ::= Time
```

8.3.2 Acknowledgment Mode

The **Acknowledgment Mode** receipt field (D *manual*) identifies the manner in which the RN was originated.

```
AcknowledgmentModeField ::= ENUMERATED {
    manual    (0),
    automatic(1)}
```

This field may assume any one of the following values:

- a) *manual*: The RN was originated by means of the *Originate RN* abstract operation.
- b) *automatic*: The RN was originated as a result of *auto-acknowledgment*.

8.3.3 Suppl Receipt Info

The **Suppl Receipt Info** receipt field (O) gives supplementary information about the receipt of the subject IPM by the RN's originator. It comprises a Printable String.

```
SupplReceiptInfoField ::= SupplementaryInformation
```

Section three - Abstract service Definition

9 Overview

This section defines the abstract service that characterizes Interpersonal Messaging, and describes the environment in which that service is supplied and consumed. It does both using the abstract service definition conventions of ISO/IEC 10021-3.

This section covers the following topics:

- a) Primary object types;
- b) Primary port types;
- c) Abstract operations;
- d) Abstract errors;
- e) Other capabilities.

10 Primary Object Types

The environment in which Interpersonal Messaging takes place can be modelled as an abstract object which is hereafter referred to as the **Interpersonal Messaging Environment (IPME)**.

```
ipme OBJECT
    ::= id-ot-ipme
```

When refined (i.e., functionally decomposed), the IPME can be seen to comprise lesser objects which interact by means of ports.

```
ipme-refinement REFINE ipme AS
    ipms
        origination [S] PAIRED WITH ipms-user
        reception   [S] PAIRED WITH ipms-user
        management  [S] PAIRED WITH ipms-user
    ipms-user RECURRING
    ::= id-ref-primary
```

The lesser objects are referred to as the **primary objects** of Interpersonal Messaging. They include a single, central object, the *Interpersonal Messaging System (IPMS)*, and numerous peripheral objects called *Interpersonal Messaging System users (IPMS users)*.

The structure of the IPME is depicted in Figure 3.

The primary object types are defined and described below. The types of ports by means of which they interact are discussed in clause 11.

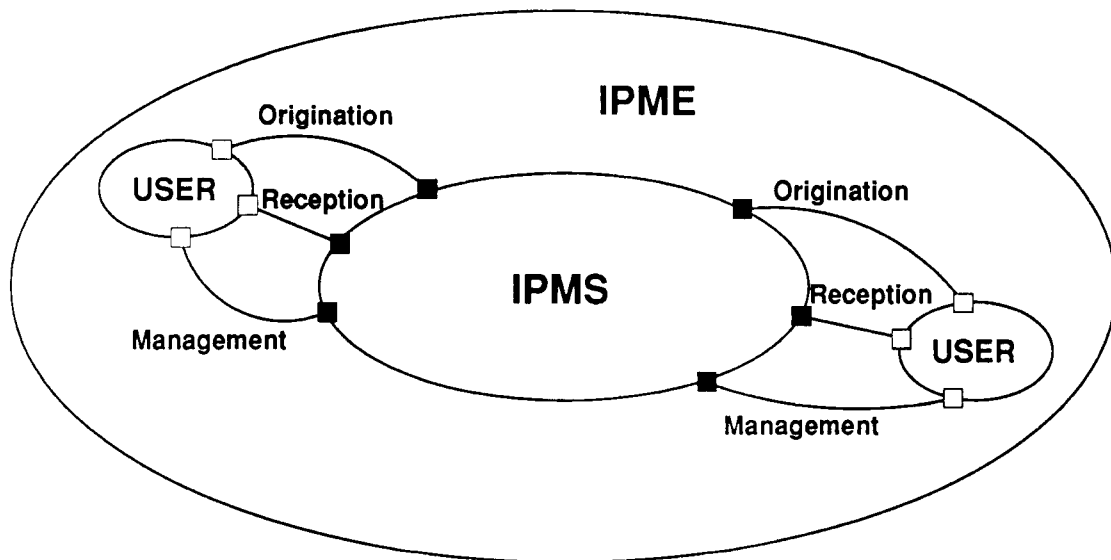


Figure 3
The Interpersonal Messaging Environment

10.1 Interpersonal Messaging System User

An **Interpersonal Messaging System user (IPMS user)** is a user that engages in Interpersonal Messaging. An IPMS user originates, receives, or both originates and receives information objects of the types defined in section two.

```
ipms-user OBJECT
  PORTS {
    origination [C],
    reception   [C],
    management  [C]}
  ::= id-ot-ipms-user
```

The IPME comprises any number of IPMS users.

NOTES

1. As its name suggests, Interpersonal Messaging is typically an activity of people. Often, therefore, this part of ISO/IEC 10021 uses personal pronouns (e.g., "he") to refer to IPMS users. This practice, however, is not intended to preclude other, atypical uses of Interpersonal Messaging in which IPMS users are not people.
2. For brevity, the term "user" is used throughout the rest of this part of ISO/IEC 10021 with the meaning of "IPMS user".

10.2 Interpersonal Messaging System

The **Interpersonal Messaging System (IPMS)** is the object by means of which all users communicate with one another in Interpersonal Messaging.

```
ipms OBJECT
  PORTS {
    origination [S],
    reception   [S],
    management  [S]}
  ::= id-ot-ipms
```

The IPME comprises exactly one IPMS.

11 Primary Port Types

The primary objects of Interpersonal Messaging are joined to and interact with one another by means of ports. These ports, which the IPMS supplies, are referred to as the **primary ports** of Interpersonal Messaging. They are of the three types defined below.

NOTE - In clause 16 to follow, the IPMS is decomposed into still lesser objects, among which is the MTS. This fact is anticipated in the present clause by the inclusion of certain MTS capabilities in the IPMS Abstract Service.

11.1 Origination

An **origination port** is the means by which a single user conveys to the IPMS messages containing information objects of the types defined in section two. Through such a port the user originates *interpersonal messages* and *receipt notifications*. In addition, the user may originate probes through such a port.

The IPMS supplies one origination port to each user (with the exception of indirect users served by PDAUs--see clause 16.5).

11.2 Reception

A **reception port** is the means by which the IPMS conveys to a single user messages containing information objects of the types defined in section two. Through such a port the user receives *interpersonal messages* and *interpersonal notifications*. In addition, the user may receive reports through such a port.

The IPMS supplies one reception port to each user.

11.3 Management

A **management port** is the means by which a single user changes information about himself on file with the IPMS. By means of such a port the user enables and disables *auto-discard*, *-acknowledgment*, and *-forwarding*.

The IPMS supplies one management port to each user (with the exception of indirect users served by PDAUs--see clause 16.5).

12 Abstract Operations

The **IPMS Abstract Service** is the set of capabilities that the IPMS provides to each user by means of one origination, one reception, and one management port. Those capabilities are modelled as abstract operations, which may encounter abstract errors when invoked.

The abstract operations available at origination, reception, and management ports, respectively, are defined and described below. The abstract errors they may provoke are the subject of clause 13.

NOTES

1. The IPMS Abstract Service involves neither abstract bind nor abstract unbind operations.
2. The IPMS authenticates (i.e., establishes the identity of) the typical user before offering the IPMS Abstract Service to him. By this means it can verify, e.g., that the user is an IPMS subscriber. Authentication, where required, is implicit (rather than explicit) in the definition of the IPMS Abstract Service.
3. The purpose of the IPMS Abstract Service definition is not to prescribe the user interfaces of implementations of portions of the IPMS, but rather to clarify the meaning and intended use of the information objects of section two. A user interface need not provide commands in one-to-one correspondence to the service's abstract operations, nor indeed even divide the labour between the user and the IPMS as the service does. Also, the IPMS Abstract Service definition does not model the facilities provided by a Message Store.