

Section Three - Configurations

11. Overview

This section specifies how one can configure the MHS to satisfy any of a variety of functional, physical, and organizational requirements.

This section covers the following topics:

- a) Functional configurations
- b) Physical configurations
- c) Organizational configurations
- d) The Global MHS

12. Functional Configurations

This clause specifies the possible functional configurations of the MHS. The variety of such configurations results from the presence or absence of the Directory, and from whether a direct user employs an MS.

12.1 Regarding the Directory

With respect to the Directory, the MHS can be configured for a particular user, or a collection of users (e.g., see clause 14.1), in either of two ways: with or without the Directory. A user without access to the Directory may lack the capabilities described in section five.

Note A partially, rather than fully interconnected Directory may exist for an interim period during which the (global) Directory made possible by Recommendations for Directories is under construction.

12.2 Regarding the Message Store

With respect to the MS, the MHS can be configured for a particular direct user in either of two ways: with or without an MS. A user without access to an MS lacks the capabilities of Message Storage. A user in such circumstances depends upon his UA for the storage of information objects, a capability that is a local matter.

The two functional configurations identified above are depicted in Figure 7/X.402 which also illustrates one possible configuration of the MTS, and its linkage to another communication system via an AU. In the figure, user 2 is equipped with an MS while user 1 is not.

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Figure .F.:7/X.402 Functional Configurations Regarding the MS

Note While the users depicted in the figure are people, the figure applies with equal force and validity to users of other kinds.

13. Physical Configurations

This clause specifies the possible physical configurations of the MHS, i.e., how the MHS can be realized as a set of interconnected computer systems. Because the number of configurations is unbounded, the clause describes the kinds of messaging systems from which the MHS is assembled, and identifies a few important representative configurations.

13.1 Messaging Systems

The building blocks used in the physical construction of the MHS are called messaging systems. A .I.gl:messaging system; is a computer system (possibly but not necessarily an open system) that contains, or realizes, one of more functional objects.

Messaging systems are of the types depicted in Figure 8/X.402.

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Figure .F.:8/X.402 Messaging System Types

The types of messaging system, depicted in the figure, are listed in the first column of Table 8/X.402. For each type listed, the second column indicates the kinds of functional object--UAs, MSs, MTAs, and AUs--that may be present in such a messaging system, whether their presence is mandatory or optional, and whether just one or possibly several of them may be present in the messaging system.

The table is divided into two sections. Messaging systems of the types in the first section are dedicated to single users, those of the types in the second can (but need not) serve multiple users.

Table .T.:8/X.402 Messaging Systems

+-----+-----+ | | Functional Objects | | Messaging +-----+ | System | UA MS MTA

AU	+-----+-----+	A/SYS	1 - - -	S/SYS	- 1 - -	AS/SYS	1 1 - -
	+-----+-----+	T/SYS	- - 1 [M]	AT/SYS	M - 1 [M]	ST/SYS	- M 1 [M]
AST/SYS	M M 1 [M]	+-----+-----+ +- Legend -----+			M multiple [...] optional		
	+-----+-----+						

The messaging system types, summarized in the table, are individually defined and described in the clauses below.

Note The following major principles governed the admission of messaging system types:

- An AU and the MTA with which it interacts are typically co-located because no protocol to govern their interaction is standardized.
- An MTA is typically co-located with multiple UAs or MSs because, of the standardized protocols, only that for transfer simultaneously conveys a message to multiple recipients. The serial delivery of a message to multiple recipients served by a messaging system, which the delivery protocol would require, would be inefficient.
- No purpose is served by co-locating several MTAs in a messaging system because a single MTA serves multiple users, and the purpose of an MTA is to convey objects between, not within such systems. (This is not intended to exclude the possibility of several MTA-related processes co-existing within a single computer system.)
- The co-location of an AU with an MTA does not affect that system's behavior with respect to the rest of the MHS. A single messaging system type, therefore, encompasses the AU's presence and absence.

13.1.1 Access Systems

An .I.gl:access system; (.I.ab:A/SYS;) contains one UA and neither an MS, an MTA, nor an AU.

An A/SYS is dedicated to a single user.

13.1.2 Storage Systems

An .I.gl:storage system; (.I.ab:S/SYS;) contains one MS and neither a UA, an MTA, nor an AU.

An S/SYS is dedicated to a single user.

13.1.3 Access and Storage Systems

An .I.gl:access and storage system; (.I.ab:AS/SYS;) contains one UA, one MS, and neither an MTA nor an AU.

An AS/SYS is dedicated to a single user.

13.1.4 Transfer Systems

An .I.gl:transfer system; (.I.ab:T/SYS;) contains one MTA; optionally, one or more AUs; and neither a UA nor an MS.

A T/SYS can serve multiple users.

13.1.5 Access and Transfer Systems

An .I.gl:access and transfer system; (.I.ab:AT/SYS;) contains one or more UAs; one MTA; optionally, one or more AUs; and no MS.

An AT/SYS can serve multiple users.

13.1.6 Storage and Transfer Systems

An .I.gl:storage and transfer system; (.I.ab:ST/SYS;) contains one or more MSs; one MTA; optionally, one or more AUs; and no UA.

An ST/SYS can serve multiple users.

13.1.7 Access, Storage, and Transfer Systems

An .I.gl:access, storage, and transfer system; (.I.ab:AST/SYS;) contains one or more UAs; one or more MSs; one MTA; and optionally, one or more AUs.

An AST/SYS can serve multiple users.

13.2 Representative Configurations

Messaging systems can be combined in various ways to form the MHS. The possible physical configurations are unbounded in number and thus cannot be enumerated. Several important representative configurations, however, are described below and in Figure 9/X.402.

+---+	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	
22	23	24	25	26	27	28	29	+---+														

Figure .F.:9/X.402 Representative Physical Configurations

Notes

- While the users depicted in the figure are people, the figure applies with equal force and validity to users of other kinds.
- Besides the physical configurations that result from the "pure" approaches below, many "hybrid" configurations can be constructed.

13.2.1 Fully Centralized

The MHS may be fully centralized (panel a of the figure). This design is realized by a single AST/SYS which contains functional objects of all kinds and which can serve multiple users.

13.2.2 Centralized Message Transfer and Storage

The MHS may provide both Message Transfer and Message Storage centrally but user access distributedly (panel b of the figure). This design is realized by a single ST/SYS and, for each user, an A/SYS.

13.2.3 Centralized Message Transfer

The MHS may provide Message Transfer centrally but Message Storage and user access distributedly (panel c of the figure). This design is realized by a single T/SYS and, for each user, either an AS/SYS alone or an S/SYS and an associated A/SYS.

13.2.4 Fully Distributed

The MHS may provide even Message Transfer distributedly (panel d of the figure). This design involves multiple ST-SYNs or T-SYNs.

14. Organizational Configurations

This clause specifies the possible organizational configurations of the MHS, i.e., how the MHS can be realized as interconnected but independently managed sets of messaging systems (which are themselves interconnected). Because the number of configurations is unbounded, the clause describes the kinds of management domains from which the MHS is assembled, and identifies a few important representative configurations.

14.1 Management Domains

The primary building blocks used in the organizational construction of the MHS are called management domains.

A .I.gl:management domain; (.I.ab:MD;) (or .I.gl:domain;) is a set of messaging systems--at least one of which contains, or realizes, an MTA--that is managed by a single organization.

The above does not preclude an organization from managing a set of messaging systems (e.g., a single A/SYS) that does not qualify as an MD for lack of an MTA. Such a collection of messaging systems, a secondary building block used in the MHS' construction, "attaches" to an MD.

MDs are of several types which are individually defined and described in the clauses below.

14.1.1 Administration Management Domains

An .I.gl:administration management domain; (.I.ab:ADMD;) comprises messaging systems managed by an Administration. The major technical distinction between an ADMD and a PRMD is that the former is positioned above the latter in the MHS' hierarchical addressing (see clause 18) and routing (see clause 19) regimes.

Note An ADMD provides Message Handling to the public.

14.1.2 Private Management Domains

A .I.gl:private management domain; (.I.ab:PRMD;) comprises messaging systems managed by an organization other than an Administration. The major technical distinction between a PRMD and an ADMD is that the former is positioned below the latter in the MHS' hierarchical addressing (see clause 18) and routing (see clause 19) regimes.

Note A PRMD provides Message Handling, e.g., to the employees of a company, or to those employees at a particular company site.

14.2 Representative Configurations

MDs can be combined in various ways to form the MHS. The possible organizational configurations are unbounded in number and thus cannot be enumerated. Several important representative configurations, however, are described below and in Figure 10/X.402.

+---+ | 01 | | 02 | | 03 | | 04 | | 05 | | 06 | | 07 | | 08 | | 09 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | 19 | | 20 | | 21 | |
22 | | 23 | | 24 | | 25 | | 26 | | 27 | | 28 | | 29 | +---+

Figure .F.:10/X.402 Representative Organizational Configurations

Note Besides the organizational configurations that result from the "pure" approaches below, many "hybrid" configurations can be constructed.

14.2.1 Fully Centralized

The entire MHS may be managed by one organization (panel a of the figure). This design is realized by a single MD.

14.2.2 Directly Connected

The MHS may be managed by several organizations, the messaging systems of each connected to the messaging systems of all of the others (panel b of the figure). This design is realized by multiple MDs interconnected pair-wise.

14.2.3 Indirectly Connected

The MHS may be managed by several organizations, the messaging systems of one serving as intermediary between the messaging systems of the others (panel c of the figure). This design is realized by multiple MDs one of which is interconnected to all of the others.

15. The Global MHS

A major purpose of this Recommendation and others in the set is to enable the construction of the .I.gl:Global MHS;, an MHS providing both intra- and inter-organizational, and both intra- and international Message Handling world-wide.

The Global MHS almost certainly encompasses the full variety of functional configurations specified in clause 12.

The physical configuration of the Global MHS is a hybrid of the pure configurations specified in clause 13, extremely complex and highly distributed physically.

The organizational configuration of the Global MHS is a hybrid of the pure configurations specified in clause 14, extremely complex and highly distributed organizationally.

Figure 11/X.402 gives an example of possible interconnections. It does not attempt to identify all possible configurations. As depicted, ADMDs play a central role in the Global MHS. By interconnecting to one another internationally, they provide an international Message Transfer backbone. Depending upon national regulations, by interconnecting to one another domestically, they may also provide domestic backbones joined to the international backbone. ADMDs also serve as primary naming authorities in the assignment of O/R addresses to users and DLs. PRMDs play a peripheral role in the Global MHS, being connected to the ADMD backbone which serves as an intermediary between them.

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Figure .F.:11/X.402 The Global MHS