INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

# T.190

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(08/95)

## TERMINALS FOR TELEMATIC SERVICES

# COOPERATIVE DOCUMENT HANDLING (CDH) – FRAMEWORK AND BASIC SERVICES

## ITU-T Recommendation T.190

(Previously "CCITT Recommendation")

## FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation T.190 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 11th of August 1995.

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NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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# SUMMARY

This Recommendation specifies ODA document communication services to be provided on top of existing base standards or profiles, giving constraints on them and rules on how to use and combine them.

This Recommendation specifies basic services, like storing-and-retrieval or manipulation of documents. Complex services, such as asynchronous document production or joint document presentation, are founded on basic services, and are specified in other Recommendations. Some of these complex services are introduced in this Recommendation in order to more clearly understand the complex services that could be built on top of the basic ones.

# COOPERATIVE DOCUMENT HANDLING (CDH) – FRAMEWORK AND BASIC SERVICES

*(Geneva, 1995)*

## 1 Scope

The Open Document Architecture (ODA) base Recommendations | International Standards and associated profiles specify the means to represent and interchange complex documents.

Communication base Recommendations | International Standards and associated profiles, specifying interchange, remote manipulation and management of documents at the application layer of the Open Systems Interconnection (OSI) reference model, have also been specified, as Document Transfer And Manipulation (DTAM) and Document Filing and Retrieval (DFR).

Standardizing document communication services will help implementors and service providers to extend the use and acceptance of these services. Furthermore, the standardization of document communication service profiles will facilitate interworking.

This Recommendation specifies ODA document communication services to be provided on top of existing base standards or profiles, giving constraints on them and rules on how to use and combine them.

This Recommendation specifies basic services, like storing-and-retrieval or manipulation. Complex services, such as asynchronous document production or joint document presentation, are founded on basic services, and are specified in other Recommendations. Some of these complex services are introduced in this Recommendation in order to more clearly understand the complex services that could be built on top of the basic ones.

## 2 References

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of currently valid ITU-T Recommendations is regularly published.

### 2.1 Identical Recommendations | International Standards

- ITU-T Recommendation T.411 (1993) | ISO/IEC 8613-1:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Introduction and general principles.*
- ITU-T Recommendation T.412 (1993) | ISO/IEC 8613-2:1995, *Information technology – Open Document Architecture (ODA) and interchange format: Document structures.*
- ITU-T Recommendation T.413 (1994) | ISO/IEC 8613-3:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Abstract interface for the manipulation of ODA documents.*
- ITU-T Recommendation T.414 (1993) | ISO/IEC 8613-4:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Document profile.*
- ITU-T Recommendation T.415 (1993) | ISO/IEC 8613-5:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Open Document Interchange Format.*
- ITU-T Recommendation T.416 (1993) | ISO/IEC 8613-6:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Character content architectures.*
- ITU-T Recommendation T.417 (1993) | ISO/IEC 8613-7:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Raster graphics content architectures.*

- ITU-T Recommendation T.418 (1993) | ISO/IEC 8613-8:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Geometric graphics content architectures.*
- ITU-T Recommendation T.422 (1995) | ISO/IEC 8613-12:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Identification of document fragments.*
- ITU-T Recommendation T.122 (1993), *Multipoint communication service for audiographics and audiovisual conferencing service definition.*
- ITU-T Recommendation T.125 (1994), *Multipoint communication service protocol specification.*
- ITU-T Recommendation X.500 (1993) | ISO/IEC 9594-1:1990, *Information technology – Open Systems Interconnection – The Directory – Overview of concepts, models and services.*
- ITU-T Recommendation X.501 (1993) | ISO/IEC 9594-2:1990, *Information technology – Open Systems Interconnection – The Directory – Models.*
- ITU-T Recommendation X.509 (1993) | ISO/IEC 9594-8:1990, *Information technology – Open Systems Interconnection – The Directory – Authentication framework.*
- ITU-T Recommendation X.511 (1993) | ISO/IEC 9594-3:1990, *Information technology – Open Systems Interconnection – The Directory – Abstract service definition.*
- ITU-T Recommendation X.518 (1993) | ISO/IEC 9594-4:1990, *Information technology – Open Systems Interconnection – The Directory – Procedures for distributed operation.*
- ITU-T Recommendation X.519 (1993) | ISO/IEC 9594-5:1990, *Information technology – Open Systems Interconnection – The Directory – Protocol specification.*
- ITU-T Recommendation X.520 (1993) | ISO/IEC 9594-6:1990, *Information technology – Open Systems Interconnection – The Directory – Selected attribute types.*
- ITU-T Recommendation X.521 (1993) | ISO/IEC 9594-7:1990, *Information technology – Open Systems Interconnection – The Directory – Selected object classes.*

## 2.2 Additional references

- ITU-T Recommendation T.435 (1995), *Document Transfer And Manipulation (DTAM) – Services and protocols – Abstract service definition and procedures for confirmed document manipulation.*
- ITU-T Recommendation T.436 (1995), *Document Transfer And Manipulation (DTAM) – Services and protocols – Protocol specifications for confirmed document manipulation.*
- CCITT Recommendation T.522 (1992), *Communication application profile BT1 for document bulk transfer.*
- ISO/IEC 10021:1990, *Information technology – Text communication – Message-Oriented Text Interchange Systems (MOTIS).*
- ISO/IEC 10166-1:1991, *Information technology – Text and office systems – Document Filing and Retrieval (DFR) – Part 1: Abstract service definition and procedures.*
- ISO/IEC 10166-1:1991/Cor. 1 and Cor. 2:1994, *Information technology – Text and office systems – Document Filing and Retrieval (DFR) – Part 1: Abstract service definition and procedures – Technical corrigendum 1 and Technical corrigendum 2.*
- ISO/IEC 10166-2:1991, *Information technology – Text and office systems – Document Filing and Retrieval (DFR) – Part 2: Protocol specification.*
- ISO/IEC ISP 10610-1:1993, *Information technology – International standardized profile FOD11 – Open document format: Simple document structure – Character content architecture only – Part 1: Document Application Profile (DAP).*
- ISO/IEC ISP 10611-1:1994, *Information technology – International standardized profiles – AMH1n – Message Handling Systems – Common messaging – Part 1: MHS service support.*
- ISO/IEC ISP 10611-2:1994, *Information technology – International standardized profiles – AMH1n – Message Handling Systems – Common messaging – Part 2: Specification of ROSE, RTSE, ACSE, presentation and session protocols for use by MHS.*

- ISO/IEC ISP 10611-3:1994, *Information technology – International standardized profiles – AMH1n – Message Handling Systems – Common messaging – Part 3: AMH11 – Message transfer (P1).*
- ISO/IEC ISP 10611-4:1994, *Information technology – International standardized profiles – AMH1n – Message Handling Systems – Common messaging – Part 4: AMH12 – MTS access (P3).*
- ISO/IEC ISP 10611-5:1994, *Information technology – International standardized profiles – AMH1n – Message Handling Systems – Common messaging – Part 5: AMH13 – MS access (P7).*
- ISO/IEC ISP 11181-1:1993, *Information technology – International standardized profile FOD26 – Open document format: Enhanced document structure – Character, raster graphics and geometric graphics content architectures – Part 1: Document Application Profile (DAP).*
- ISO/IEC ISP 11182-1:1993, *Information technology – International standardized profile FOD36 – Open document format: Extended document structure – Character, raster graphics and geometric graphics content architectures – Part 1: Document Application Profile (DAP).*
- ISO/IEC ISP 12062-1:1995, *Information technology – International standardized profiles – AMH2n – Message Handling Systems – Interpersonal messaging – Part 1: IPM MHS service support.*
- ISO/IEC ISP 12062-2:1995, *Information technology – International standardized profiles – AMH2n – Message Handling Systems – Interpersonal messaging – Part 2: AMH21 – IPM content.*
- ISO/IEC ISP 12062-3:1995, *Information technology – International standardized profiles – AMH2n – Message Handling Systems – Interpersonal messaging – Part 3: AMH22 – IPM requirements for Message Transfer (P1).*
- ISO/IEC ISP 12062-4:1995, *Information technology – International standardized profiles – AMH2n – Message Handling Systems – Interpersonal messaging – Part 4: AMH23 – IPM requirements for MTS Access (P3).*
- ISO/IEC ISP 12062-5:1995, *Information technology – International standardized profiles – AMH2n – Message Handling Systems – Interpersonal messaging – Part 5: AMH24 – IPM requirements for Enhanced MS Access (P7).*
- ISO/IEC ISP 12069, *Information technology – International standardized profiles – Application profiles for Document Filing and Retrieval (DFR).*
- ISO/IEC ISP, *Information technology – International standardized profiles AODnn – Application profiles for Open Document Architecture (ODA): Profiles for interactive manipulation of ODA documents.*

## 3 Definitions

For the purposes of this Recommendation, all the definitions, if any, given in the Recommendations | International Standards listed in References apply.

For the purposes of this Recommendation, the following definitions apply.

**3.1** **basic service**: A fundamental service which can be a stand-alone service or part of more complex services.

**3.2** **client**: A communicating entity requesting services provided by a server.

**3.3** **communication application**: The whole of means and procedures to enable remote access, management and manipulation of information by a communicating entity, and to perform the transfer of information and operations between communicating entities. These may include remote access, management and manipulation of document stores, documents inside document stores and document fragments inside documents. A communication application uses communication modules to transfer information and operations.

**3.4** **communicating entity**: An entity which performs a communication application with the goal to communicate information and operations to or from a remote communicating entity, using a communication link. A communicating entity may be a human, hardware or software.

**3.5** **communication link**: A connection between two communicating entities.

**3.6** **communication module:** A standardized set of operations and protocols that belong to the application layer.

**3.7** **complex service**: A service which can be founded on basic services, providing an enhanced task of a document communication application.

**3.8** **document**: An ODA document.

**3.9** **document fragment**: An ODA document fragment.

**3.10** **document store**: A storage capacity with well-defined structure intended to contain documents.

**3.11** **full document**: A complete document which does not constitute a part of another document.

**3.12** **server**: A communicating entity which provides services for other communicating entities. A server may possess and administer a document store.

**3.13** **service**: A well-defined task of a document communication application.

**3.14** **set of document fragments**: One or more document fragments.

**3.15** **set of full documents**: One or more full documents.

**3.16** **user**: A human communicating entity.

## 4 Abbreviations

For the purposes of this Recommendation, the following abbreviations are used:

| | |
|---|---|
| ACSE | Association Control Service Element |
| ADF | Application profile for DFR |
| AFT | Application profile for FT |
| AMH | Application profile for MHS |
| AOD | Application profile for ODA |
| ASE | Application Service Element |
| ATS | Abstract Test Suite |
| BFT | Binary File Transfer |
| BS | Basic Service |
| BT | Bulk Transfer |
| CAP | Communication Application Profile |
| CCITT | International Telephone and Telegraph Consultative Committee |
| DAP | Document Application Profile |
| DFR | Document Filing and Retrieval |
| DM | Document Manipulation |
| DOAM | Distributed Office Applications Model |
| DST | DiSTribution basic service |
| DTAM | Document Transfer And Manipulation |
| DTAM-BT-NM | Document Transfer And Manipulation – Bulk Transfer – Normal Mode |
| DTAM-BT-TM | Document Transfer And Manipulation – Bulk Transfer – Transparent Mode |
| DTAM-DM | Document Transfer And Manipulation – Document Manipulation |
| DTAM-TK | Document Transfer And Manipulation – ToKen interchange |

| | |
|---|---|
| ECM | Error Correction Mode |
| ETS | European Telecommunication Standard |
| ETSI | European Telecommunications Standards Institute |
| FAX3 | Facsimile group 3 |
| FAX4 | Facsimile group 4 |
| FOD | Interchange Format and representation profile for ODA |
| FODA | Formal specification of ODA |
| FT | File Transfer |
| FTAM | File Transfer, Access and Manipulation |
| IEC | International Electrotechnical Commission |
| IPM | InterPersonal Messaging |
| ISDN | Integrated Services Digital Network |
| ISO | International Organization for Standardization |
| ISP | International Standardized Profile |
| ISR | Implementation Support Requirements |
| ITU-T | International Telecommunication Union – Telecommunication Standardization Sector |
| MCS | Multipoint Communication Service |
| MCU | Multipoint Control Unit |
| MHS | Message Handling System |
| MNP | MaNiPulation basic service |
| MPT | Multi-PoinTing basic service |
| MS | Message Store |
| MTS | Message Transfer System |
| N/A | Not Applicable |
| NM | Normal Mode |
| ODA | Open Document Architecture |
| OSI | Open Systems Interconnection |
| PNT | PoiNTing basic service |
| QOS | Quality of Service |
| ROA | Referenced Object Access |
| ROSE | Remote Operations Service Element |
| RTR | ReTRieval basic service |
| RTSE | Reliable Transfer Service Element |
| SAR | Storing-And-Retrieval basic service |
| SE | Service Element |
| STR | SToRing basic service |
| TE | Terminal Equipment |
| TK | ToKen exchange |
| TKI | ToKen-Interchange basic service |
| TM | Transparent Mode |

# 5 Introduction to document communication basic services

This Recommendation specifies services for document communication. Some of them are considered as basic services. More complex services, specified in other Recommendations, are defined in terms of the basic ones. In this Recommendation, a methodology for the specification of services is defined (see clause 9). However, it is only applied to basic services (see clause 10), while complex services are only introduced (see clause 6).

Basic services use existing document and communication base Recommendations | International Standards and profiles.

Two groups of basic services are considered:

- basic services that, apart from being used for specifying complex services, can be implemented as stand-alone services, and then provided to users;
- basic services that can only be used for specifying complex services.

A number is assigned to each Basic Service (BS).

The basic services that belong to the first group are:

- storing (BS 1);
- distribution (BS 2);
- retrieval (BS 3);
- storing-and-retrieval (BS 4);
- manipulation (BS 5).

Storing and distribution basic services apply to full documents only, while retrieval, storing-and-retrieval and manipulation basic services apply to full documents and to document fragments.

The basic services that belong to the second group are:

- pointing (BS 6);
- multi-pointing (BS 7);
- token-interchange (BS 8).

Pointing and multi-pointing basic services only apply to document fragments, while token-interchange basic service is independent of documents.

There are some subset relationships between some of the basic services, but a complete hierarchy between them does not exist. The relationships are:

- storing is a subset of distribution;
- storing is a subset of storing-and-retrieval;
- retrieval is a subset of storing-and-retrieval;
- storing-and-retrieval is a subset of manipulation;
- pointing is a subset of multi-pointing.

Basic services are introduced in the following subclauses with a description and some examples. Then, a classification is given in 5.3.

## 5.1 Basic services that can be stand-alone services

### 5.1.1 Storing basic service

#### 5.1.1.1 Description

This basic service provides for storing one or more full documents from a communicating entity (sender) to a remote document store (recipient). The sender is provided with the ability to store (create) new documents at the recipient's communicating entity, but cannot read, delete or modify already stored documents. Before storing, the documents are located in the sender's local store. This service does not cover the case where both the sender and the recipient are different from the requesting communicating entity (third party transfer).

#### 5.1.1.2 Examples of concrete applications

Examples of concrete applications are:

- transfer of documents to a remote system;
- a remote storage service, where users store documents in a common remote server.

### 5.1.2 Distribution basic service

#### 5.1.2.1 Description

This basic service provides for distribution of one or more full documents from a communicating entity (sender) to several remote document stores (recipients). This service is a generalization of the storing service in the case of more than one recipient.

#### 5.1.2.2 Examples of concrete applications

Examples of concrete applications are:

- document distribution service;
- distribution of electronic newsletters to registered subscribers.

### 5.1.3 Retrieval basic service

#### 5.1.3.1 Description

This basic service provides for searching and retrieval, from a remote document store, of one or more full documents or document fragments.

#### 5.1.3.2 Examples of concrete applications

Examples of concrete applications are:

- read-only document server;
- system for remote consultation of documents.

### 5.1.4 Storing-and-retrieval basic service

#### 5.1.4.1 Description

This basic service provides for both storing, into a remote document store, and retrieval, from a remote document store, of one or more full documents or document fragments. Stored documents or document fragments shall not be overwritten.

Searching for one or more documents or document fragments is also provided by this service.

This service is a superset of the retrieval basic service and of the storing basic service. However, it is not the joining of storing and retrieval basic services, since storing only applies to full documents, and storing-and-retrieval applies both to full documents and to document fragments.

#### 5.1.4.2 Examples of concrete applications

Examples of concrete applications are:

- storing and retrieval in a document server;
- joint composition of documents, where users are not allowed to modify existing text.

### 5.1.5 Manipulation basic service

#### 5.1.5.1 Description

With this basic service, one communicating entity (client) accesses remotely to another communicating entity (the document store, or server) in order to manipulate one or more documents or document fragments.

Manipulation includes searching and reading operations, like those provided by the retrieval basic service.

#### 5.1.5.2 Examples of concrete applications

Examples of concrete applications are:

- remote document editing;
- document reading, or browsing, to make comments on content.

## 5.2 Basic services that cannot be stand-alone services

### 5.2.1 Pointing basic service

#### 5.2.1.1 Description

This basic service provides for a communicating entity to identify (to point to) a document fragment inside a document at a remote communicating entity.

#### 5.2.1.2 Examples of concrete applications

Examples of concrete applications are:

- to build a complex service like joint viewing of documents, where one user presents documents to another user;
- to provide the facility for two users to interchange views on documents; for example one user shows, to the remote user, specific parts of a document.

### 5.2.2 Multi-pointing basic service

#### 5.2.2.1 Description

This basic service provides for a communicating entity to identify (to point to) a document fragment inside a document in several remote communicating entities.

#### 5.2.2.2 Examples of concrete applications

Examples of concrete applications are:

- to build a complex service like joint viewing of documents, where one user presents documents to several other users;
- to provide a complex service like joint editing of documents by several users, where, before modifications, affected document fragments are shown and discussed (for example, by associated telephone conversation).

### 5.2.3 Token-interchange basic service

#### 5.2.3.1 Description

This basic service provides for application token interchange between two communicating entities. The token indicates which communicating entity has the turn to perform further operations.

#### 5.2.3.2 Examples of concrete applications

Examples of concrete applications are:

- to build a complex service, like two users jointly editing a document in an interactive way, where the token is used to interchange the turn between users;
- to build a complex service, like work flow guided document production, where a token is used to inform users about their turn to work on the document (for example, a travel order).

## 5.3 Classification of basic services

Table 1 classifies the basic services taking into account:

- services that can be implemented as stand-alone ones;
- services working on full documents and/or document fragments; a third case is services independent of documents;

– type of operations provided:

  1) reading: information is only searched and retrieved;

  2) adding: information is added to the documents or to the document store;

  3) modifying: information in the documents or document store is modified;

– one communicating entity associated to another communicating entity or one communicating entity associated to several communicating entities.

The following abbreviations for the basic services are used in Table 1:

– storing: STR;

– distribution: DST;

– retrieval: RTR;

– storing-and-retrieval: SAR;

– manipulation: MNP;

– pointing: PNT;

– multi-pointing: MPT;

– token-interchange: TKI.

TABLE 1/T.190

**Classification of basic services**

| | Basic services | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | STR | DST | RTR | SAR | MNP | PNT | MPT | TKI |
| Can be stand-alone service | √ | √ | √ | √ | √ | | | |
| Can be used for complex services | √ | √ | √ | √ | √ | √ | √ | √ |
| Works on full documents | √ | √ | √ | √ | √ | | | |
| Works on document fragments | | | √ | √ | √ | √ | √ | |
| Independent of documents | | | | | | | | √ |
| Reading operations | | | √ | √ | √ | | | |
| Adding operations | √ | √ | | √ | √ | | | |
| Modifying operations | | | | | √ | | | |
| One to one communicating entities | √ | | √ | √ | √ | √ | | √ |
| One to several communicating entities | | √ | | | | | √ | |

## 6 Introduction to document communication complex services

Recommendations in this Series specify services for document communication. This Recommendation specifies basic services, clause 5 gives an introduction and clause 10 the formal definition of basic services. Complex services are defined in terms of basic ones and are formally specified in other Recommendations of this Series of Recommendations.

Some of the possible complex services are introduced in this clause, these complex services are:

- asynchronous document production;
- sequential document production;
- joint synchronous editing;
- joint document presentation/viewing.

For each of these services, the following subclauses give a description and some service construction rules that highlight the basic services on which the complex service is founded and how these basic services are combined together. A figure is used for this purpose. Finally, one or more examples of concrete applications to emphasize the interest of having considered such a complex service are given.

## 6.1 Asynchronous document production

### 6.1.1 Description

Several users have remote access to a common central store in order to edit a document. Every user is involved in the editing process whose main objective is the production of a finalised document. They may all have needs to access the shared document in no specific order. They can have access to the document and document fragment at the same time and are not necessarily informed about the changes carried out to the document by the other users. This service can have several options, two of these options are:

- only one user can at a time manipulate one given document fragment;
- it is possible for several users to manipulate the same document fragment at the same time, in this case each of them works on a copy of the given fragment.

### 6.1.2 Service construction rules

Figure 1 gives an overview of the asynchronous document production complex service.

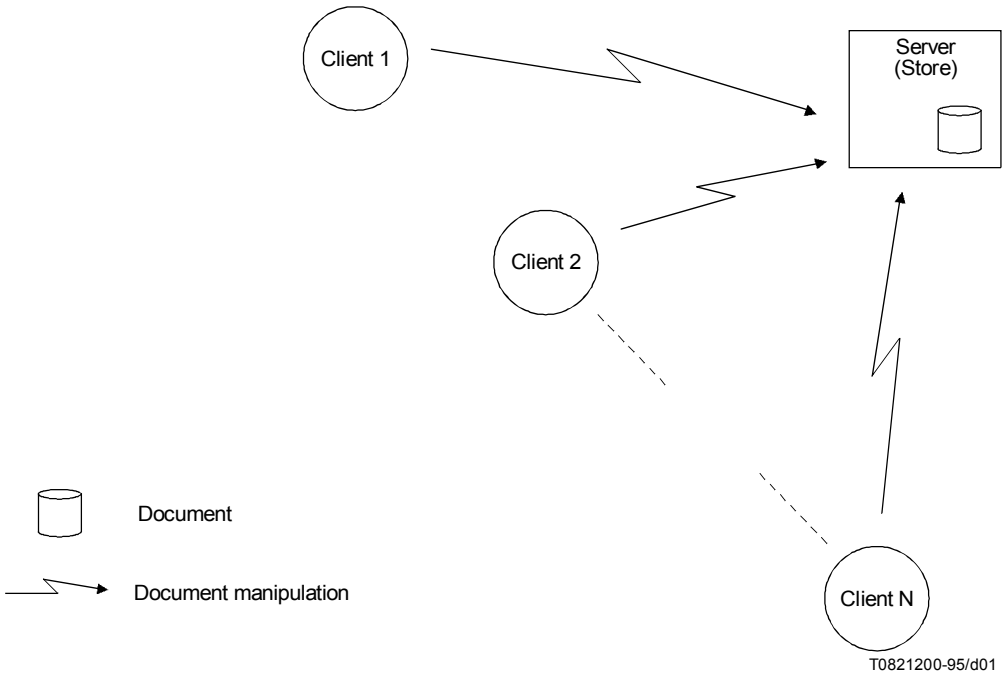


FIGURE 1/T.190

**Asynchronous document production**

The asynchronous document production complex service is based on the following basic service:

- manipulation.

The manipulation basic service is used by every user to manipulate the document remotely.

### 6.1.3 Example of concrete applications

- Several users are in charge of the production of one document, for instance functional or implementation specifications, manuals, guides, etc. These users can be several experts from different companies or from different units of the same company remotely located. Each of them may have needs to:
  - read some parts of the document in order to get or receive some information;
  - add new parts to the document;
  - update some parts of the document.

## 6.2 Sequential document production

### 6.2.1 Description

Several users are involved in the production of a document, but at one given moment, only one user has access to the document and can manipulate it. At the end of his contribution, the document is sent to the next user for further manipulation. The choice of this next user is made following several kinds of rules:

- fully deterministic rules: it is perfectly known who will be the next user to access and manipulate the document;
- rules which provide a list of users from which the current manipulating user can choose who will be the next user to access and manipulate the document.

Those rules can be defined by:

- the application only;
- the application using some information contained in the document itself (for instance, the list of the participants).

This service provides the mechanisms to warn the users when they are in turn to access and manipulate the document.

### 6.2.2 Service construction rules

Depending on the document location and the number of stores, the three following cases are considered:

- Local manipulation of the document: Every user manipulates the document locally, the document is transferred between the user's local stores.
- Remote manipulation of the document on different stores: Every user manipulates the document remotely; the document is transferred between the document stores, each of them being accessible by only one user.
- Remote manipulation of the document on a central store: Every user manipulates the document remotely; the document is located in a central store to which every user has access.

Other cases are also possible, which are in fact all the possible combinations of the three cases above.

#### 6.2.2.1 Local manipulation of the document

In this case of the sequential document production complex service, every user manipulates the document locally, the document is transferred between the user's local stores. Figure 2 gives an overview of this case of the sequential document production complex service.

In this case, the sequential document production complex service is based on the following basic service:

- storing.

The storing service is used to transfer the document between the local stores. Manipulating the document is a local matter.

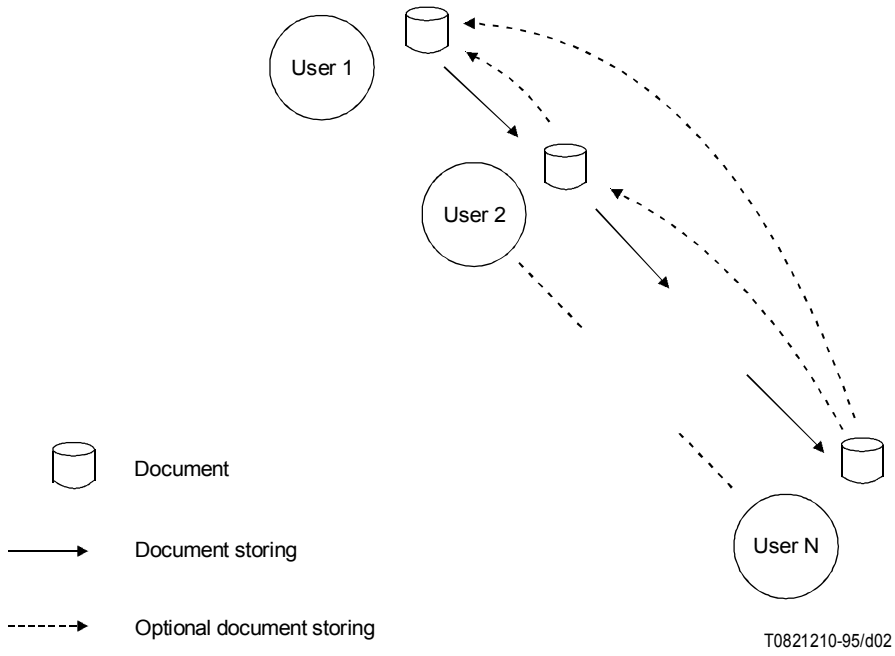


FIGURE 2/T.190

**Sequential document production: local manipulation of the document**

#### 6.2.2.2 Remote manipulation of the document on different stores

In this case of the sequential document production complex service, every user manipulates the document remotely, the document is transferred between the document stores, each of them being accessible by only one user. Figure 3 gives an overview of this case of the sequential document production complex service.

In this case, the sequential document production complex service is based on the following basic services.

- manipulation;
- storing;
- token-interchange (optional).

The manipulation basic service is used by the users to manipulate the document remotely, and the storing basic service is used to transfer the document between the document stores. When the token-interchange basic service is used, the purpose of the token is to know which user has access to the document.

#### 6.2.2.3 Remote manipulation of the document on a central store

In this case of the sequential document production complex service, every user manipulates the document remotely, the document is located in a central store to which every user has remote access. Figure 4 gives an overview of the sequential document production complex service.

In this case, the sequential document production complex service is based on the following basic services:

- manipulation;
- token-interchange (optional).

The manipulation basic service is used by the users to manipulate the document remotely. When the token-interchange basic service is used, the purpose of the token is to know which user has access to the document.

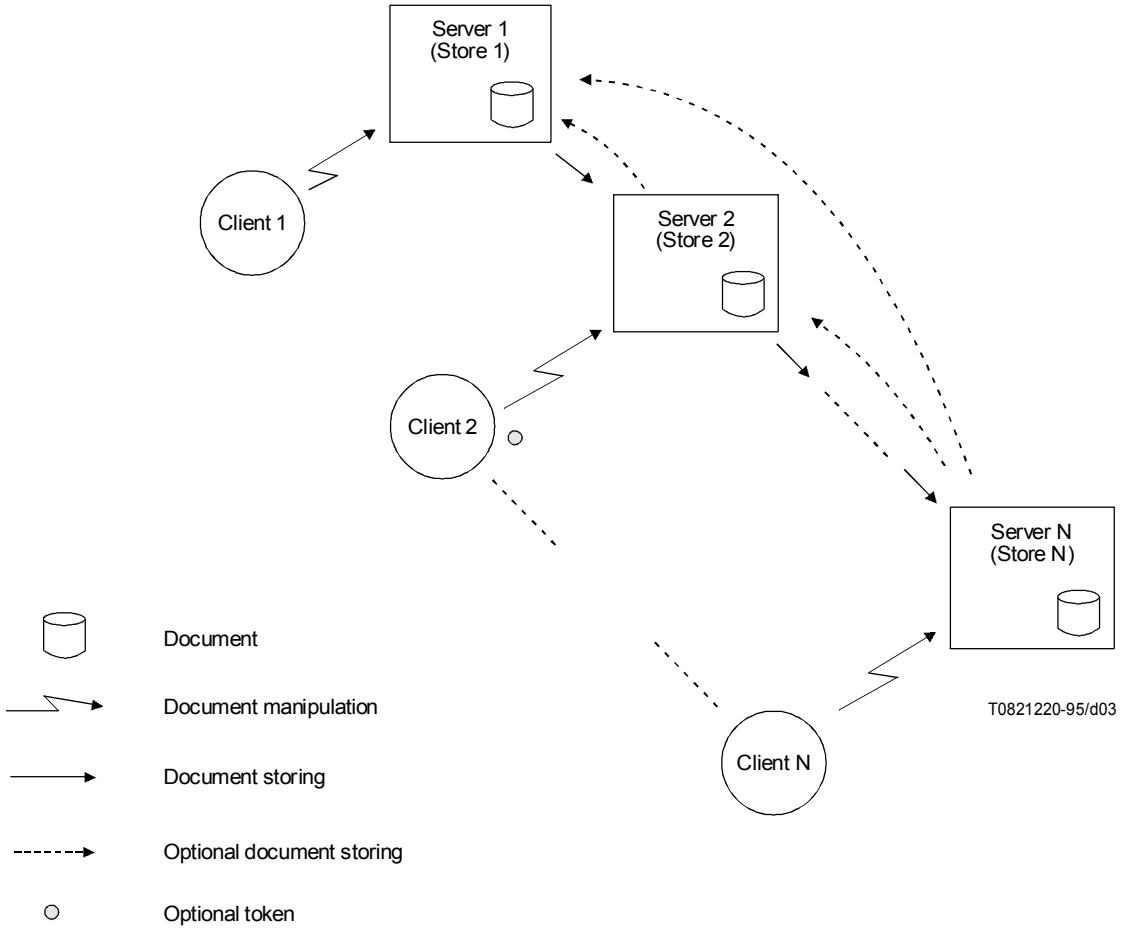


FIGURE 3/T.190

**Sequential document production: remote manipulation of the document on different stores**

### 6.2.3 Examples of concrete applications

– Employees of big companies or Administrations usually belong to a hierarchical structure reflecting the different responsibility levels. Therefore, strict administrative rules require that some documents (for instance letters, reports, official requests, official claims, etc.) follow that hierarchy road before being received by the person(s) to whom the document is intended. At each level, every user can:

  1) update the document;

  2) add some comments;

  3) give personal opinions, conclusions;

  4) move the document to another level of the hierarchy.

– In the standardization world, final draft Recommendations | International Standards on the way to be approved, still have to be checked out by several international expert groups and this in a previously established and more or less strict order. The sequential document production complex service can be used for this purpose.

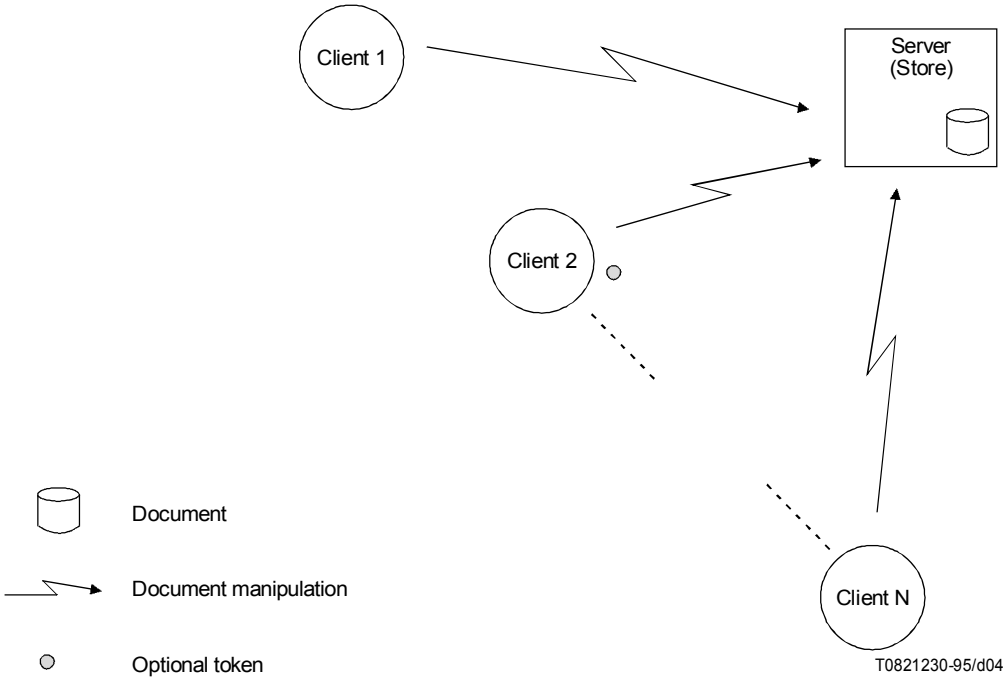


FIGURE 4/T.190

**Sequential document production: remote manipulation of the document on a central store**

## 6.3 Joint synchronous editing and remote presentation

### 6.3.1 Using MCS

#### 6.3.1.1 Description

This complex service consists on the remote editing of documents by several users in an interactive way. Basically, only one user can manipulate the document, while the others can confirm the result of these manipulations. A token control may be supported to handle which user can manipulate the document at a time.

This complex service is an exceptional case of the multipoint communication.

In this configuration, document process works on each terminal, and the same copy of the document to be manipulated is stored on each terminal. In order to have multipoint communication, there exist one or more Multipoint Control Units (MCUs). Each MCU is connected to other MCUs or terminals. On each MCU, the protocol for multipoint communication (that is MCS: Multipoint Communication Service) is invoked, which delivers the PDU for manipulation or pointing from one sender to all the other recipients or all the designated recipients.

If a terminal has the manipulation token, then the terminal works as client, while the others work as servers. If the terminal who has the manipulation token releases the token after token procedure, then the role of the terminal changes from client to server. In this case, each terminal plays a role of both client and server sequentially. On the other hand, MCU may play a role of neither client nor server at the basic service level defined in this Recommendation. MCU may only deliver the PDU to provide multipoint association. Therefore, MCS provides basic services with terminal-to-terminal association (or end-to-end association) on top of multipoint association.

Hence, this complex service supports multipoint joint editing and remote presentation by combining basic services with MCS.

### 6.3.1.2 Service construction rules

Figures 5 and 6 give an overview of the complex service joint synchronous editing and remote presentation using MCS.

Figure 5 indicates the situation where terminal 3 has a manipulation token.

Figure 6 indicates the result when the manipulation token has moved from terminal 3 to terminal 1 after token procedure.

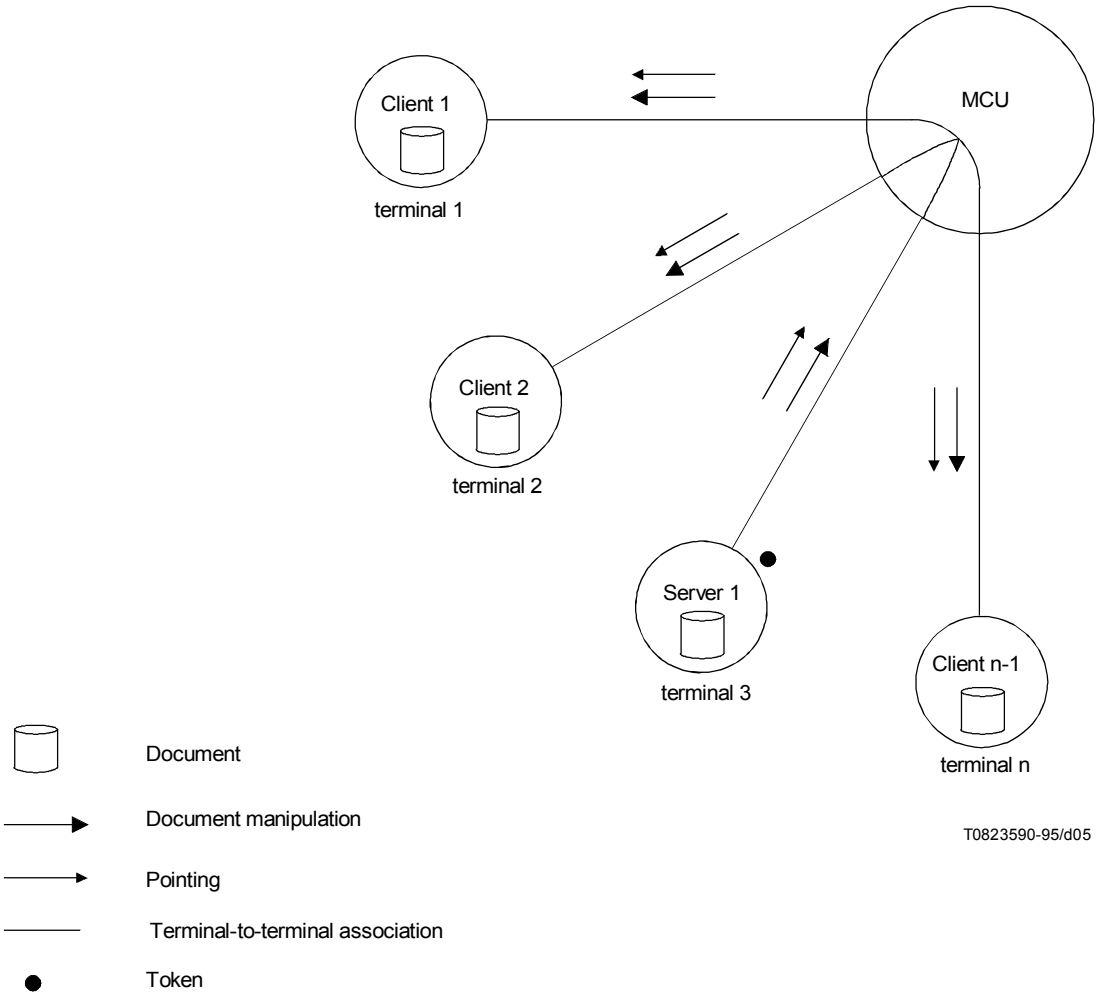


FIGURE 5/T.190

**Joint synchronous editing and remote presentation using MCS (In the case that terminal 3 has the manipulation token)**

The complex service joint synchronous editing and remote presentation using MCS is based on the following basic services:

- manipulation;
- token-interchange;
- pointing.

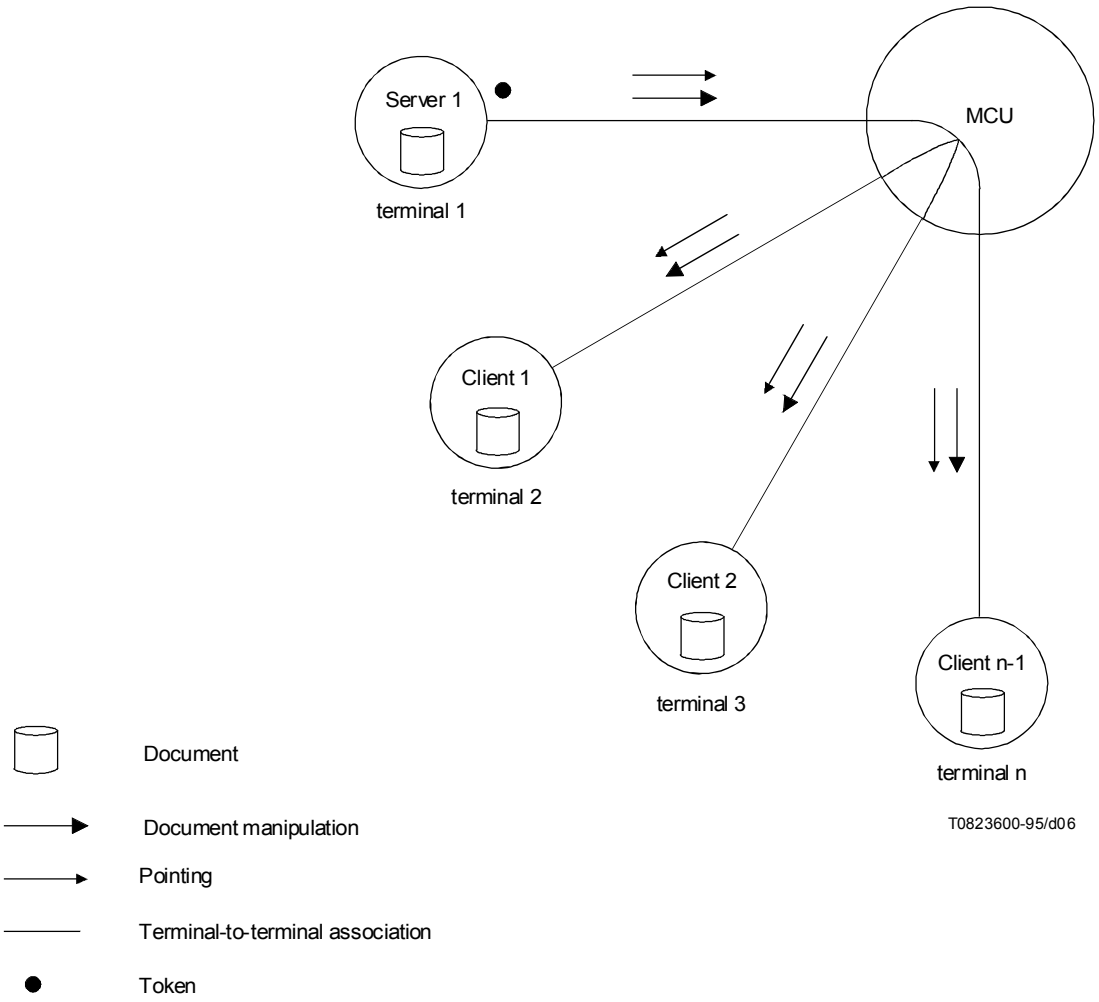


FIGURE 6/T.190

**Joint synchronous editing and remote presentation using MCS**
**(In the case that the manipulation token moves from terminal 3 to terminal 1)**

The manipulation basic service is used by the users to manipulate remote documents, and the pointing basic service is used to show the selection of document fragments to remote users for the remote presentation application.

When the token-interchange basic service is used, the purpose of the token is to know which user has access to the document.

#### 6.3.1.3 Example of concrete applications

– Typical examples of concrete applications are document conference and remote education:

1) In the case of document conferencing, two or more users geographically distributed can edit the shared document on a real-time basis. If one user edits some part of the shared document, the events for manipulation such as “create”, “delete”, etc., are delivered to the other terminal. These recipient terminals have the same result by editing the shared document stored locally.

2) In the case of remote education, one teacher or speaker who has the pointer token can point a part of the document, or change the displayed page. On the other hand, the student or the audience can see the same part of the document or the same page synchronously.

### 6.3.2 Without MCS

#### 6.3.2.1 Joint synchronous editing

##### 6.3.2.1.1 Description

This service consists of the remote editing of a document by several users in an interactive way (all of them are aware of the editing process, but not necessarily always online). There is no specific order in which the users access and manipulate the document.

Several copies of the document may exist. Only one of these copies can be manipulated, that can be seen as the master copy and is located in a central store to which every user has remote access. Local copies of the document may exist as well, that can be useful to avoid data transfer overheads when some users view the document.

Only one user can at a time manipulate the document, while the others optionally view. A token is used to know which user is in turn to manipulate the document. Furthermore, the central store sends updates of the document to the other users (the viewers).

##### 6.3.2.1.2 Service construction rules

Figure 7 gives an overview of the joint synchronous editing without MCS complex service.

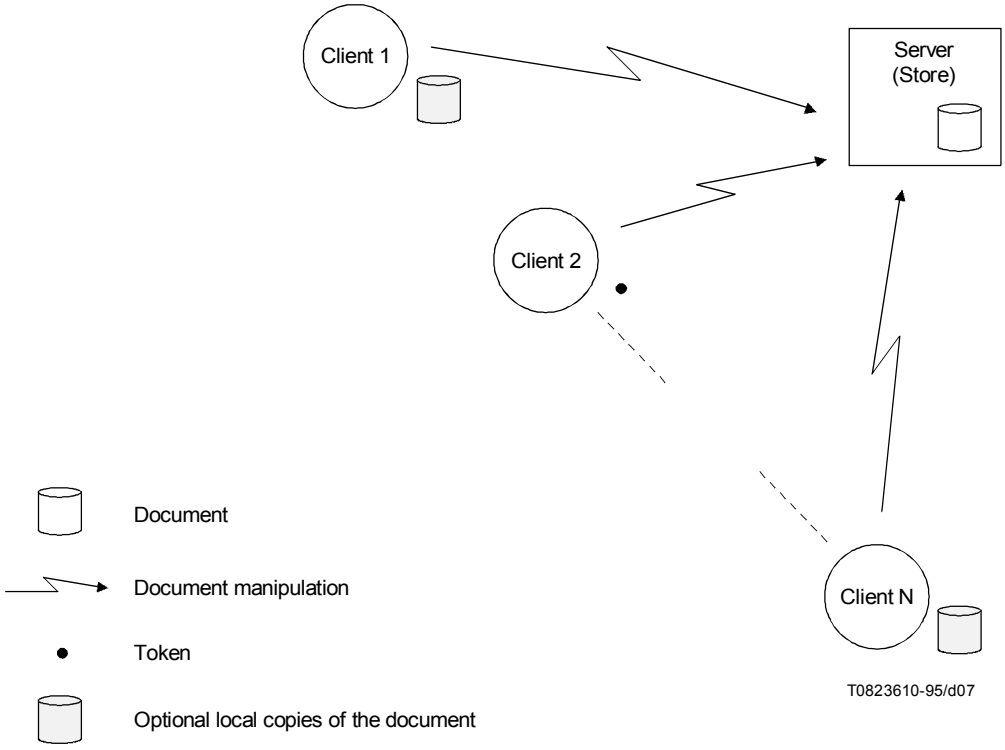


FIGURE 7/T.190

**Joint synchronous editing without MCS**

### 6.3.3 Example of concrete applications

– Two users, remotely located, edit at the same time the same document. Alternatively, one user modifies the document while the other user views the document. Each user is immediately informed (updates are sent to the user) and can view the changes carried out by the other user.

## 6.4 Joint document presentation/viewing

### 6.4.1 Description

This service consists of the remote presentation or joint viewing of a document, where a user (the presenter) broadcasts the content of a document to the other users (the viewers). Before presentation starts, every user has a local copy of the document, otherwise a copy is sent to the users not having one.

### 6.4.2 Service construction rules

Depending on the number of users who can present the document to the other users, the two following cases are considered:

- Only one user can present the document to the others.
- More than one user can present the document to the other users, but at a given time, only one user presents while the others view.

Other cases are also possible, that correspond to all other possible values of the number of users that can present the document.

#### 6.4.2.1 Only one user can present

In this case of the joint document presentation/viewing complex service, only one user is provided with the ability to present the document to the other users.

Figure 8 gives an overview of this case of the joint document presentation/viewing complex service.

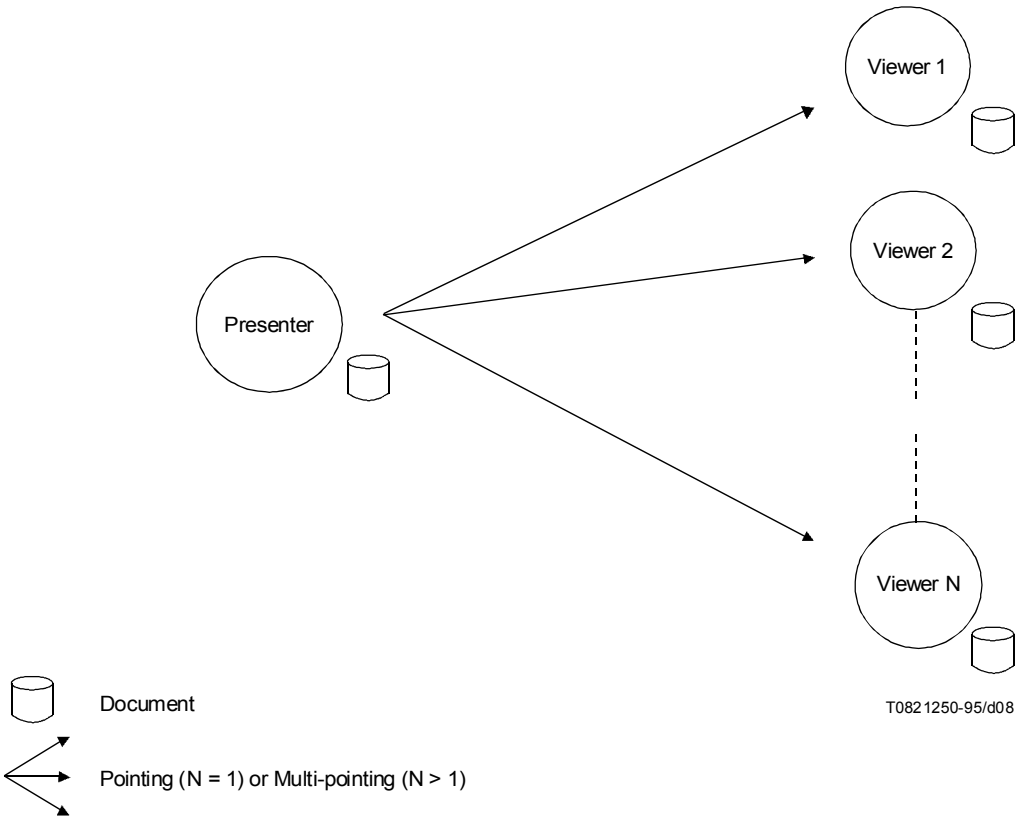


FIGURE 8/T.190

**Joint document presentation/viewing: only one user can present**

In this case, the joint document presentation/viewing complex service is based on the following basic services:

– pointing (if there is only one viewer) or multi-pointing (if there are more than one viewer);

– storing (optional).

The pointing and multi-pointing basic services are used because the presenter needs to identify document fragments to one or several viewers, respectively. The storing basic service is optional, only used if some users do not have a copy of the document before presentation starts.

#### 6.4.2.2 All users can present

In this case of the joint document presentation/viewing complex service, all users are provided with the ability to present the document to the other users, but at a given time, only one user presents while the others view.

Figure 9 gives an overview of this case of the joint document presentation/viewing complex service.

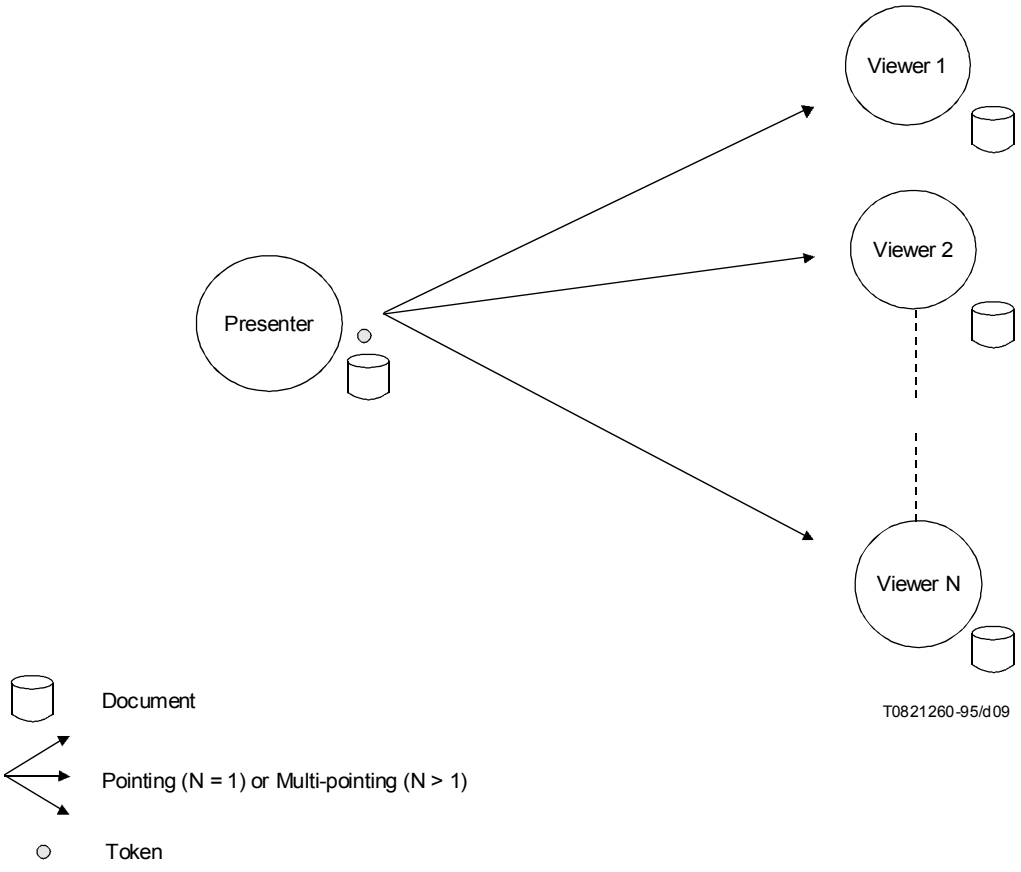


FIGURE 9/T.190

**Joint document presentation/viewing: all users can present to the other users**

In this case, the joint document presentation/viewing complex service is based on the following basic services:

- pointing (if there is only one viewer) or multi-pointing (if there are more than one viewer);
- token-interchange;
- storing (optional).

The pointing and multi-pointing basic services are used because the presenter needs to identify document fragments to one or several viewers, respectively. The purpose of the token is to know which user is in turn to present the document. The storing basic service is optional, only used if some users do not have a copy of the document before presentation starts.

#### 6.4.3 Example of concrete applications

- One or more experts submit the conclusions of a report to other experts. A remote presentation of the report, using text and graphics, can be done. Then, a discussion can take place, supported for example by a telephone conversation.

## 7 Document aspects

This Recommendation specifies services for document communication. Then, two aspects are considered:

- document aspects;
- communication aspects.

This clause specifies the document aspects of the services. Communication aspects are specified in clause 8.

### 7.1 Introduction

This Recommendation considers the ODA Recommendations and International Standards, T.410-Series of Recommendations | ISO/IEC 8613, jointly developed by ITU and ISO, as the method for representing and interchanging. Then, services specified in this Recommendation shall apply to ODA documents.

Documents are intended to be handled by means of communication applications. Handling of documents includes interchanging, storing, retrieving and manipulating full documents and document fragments.

What in this Recommendation is called a full document, refers to a document as specified in the ODA Recommendations | International Standards. Document fragments, and the ways to identify them are specified in ITU-T Rec. T.422 | ISO/IEC 8613-12.

Operations on ODA document fragments are specified in the abstract interface for the manipulation of ODA documents, ITU-T Rec. T.411 | ISO/IEC 8613-1. This abstract interface is used in conjunction with the DTAM-DM services, as explained in clause 8.

Documents can be stored in a server in any format. However, servers shall provide an ODA interface to the documents.

The rest of this clause describes the existing ODA Document Application Profiles (DAPs) (see 7.2), and specifies which of them and how shall be used by the services specified in this Recommendation (see 7.3).

### 7.2 ODA DAPs

A Document Application Profile (DAP) is a standardized implementable subset of the ODA features, intended for easy interworking of ODA applications.

There are two groups of ODA DAPs:

- DAPs for document processing applications;
- DAPs for image applications.

Every DAP is part 1 of a different International Standardized Profile (ISP), published by ISO/IEC. For every ISP, there are two more parts. The second one includes the Implementation Support Requirements (ISR), while the third one includes the Abstract Test Suite (ATS).

### 7.2.1 DAPs for document processing applications

The three existing DAPs for document processing applications are identified as:

- FOD011: Simple document structure – Character content architecture only, ISO/IEC ISP 10610-1;
- FOD026: Enhanced document structure – Character, raster graphics and geometric graphics content architectures, ISO/IEC ISP 11181-1;
- FOD036: Extended document structure – Character, raster graphics and geometric graphics content architectures, ISO/IEC ISP 11182-1.

They form a hierarchy where FOD011 has the lowest functionality. FOD011 is a subset of FOD026, while FOD026 is a subset of FOD036.

NOTE – While the mentioned DAPs where published in 1993, parts 2 and 3 of the ISPs have different status. The most stable drafts are those related to FOD026.

FOD011 supports simple logical and layout structures and character only content type. FOD026, in turn, supports complex logical and layout structures, including footnotes and multi-columns; furthermore, it also allows geometric graphics and raster graphics content types. Finally, FOD036 provides for the interchange of even more complex multimedia documents with features such as tables, forms, and overlapping illustrations.

### 7.2.2 DAPs for image applications

Concerning image applications, two profiles are currently being defined. They are intended for the interchange of large format raster images between equipment designed for image processing.

The two DAPs are known as (see Appendix III):

- FOD112;
- FOD126.

FOD112 only contains raster images, while FOD126 allows, in addition, more complex structures and character and geometric graphics content.

NOTE – FOD112 is at draft status, while FOD126 still needs further development.

## 7.3 Use of ODA DAPs

Most of the basic services, and all the complex services, specified in this Recommendation apply to documents. Those documents shall follow the ODA Recommendations | International Standards and, in particular, they shall conform to one standardized DAP.

This Recommendation only considers DAPs for document processing applications. Then, documents shall conform to one of the following DAPs:

- FOD011;
- FOD026;
- FOD036.

When establishing application associations for the services specified in this Recommendation, the DAP level will be negotiated.

# 8 Communication aspects

After the consideration of document aspects in clause 7, this clause specifies the communication aspects of the services.

## 8.1 Introduction

To allow the construction of communication applications which are modular and easy to extend, it is highly desirable to keep the applications as much as possible independent from the underlying communication means. It is outside the scope of this Recommendation to specify new protocols or network components, and this Recommendation will not change existing protocol or network specifications.

This Recommendation takes into account existing standardized communication modules which are used for document communication.

This clause summarizes the characteristics of communication modules to be used by services of this Recommendation. The newest results of standardization bodies in this area, for example the combined use of DFR and DTAM-DM or the support of access and manipulation of document fragments, are taken into consideration.

This clause also specifies how the communication modules shall be used, and which general restrictions shall be applied, in the services of this Recommendation.

The following communication modules are dealt with in this clause:

- Document Filing and Retrieval (DFR);
- Document Transfer And Manipulation – Bulk Transfer – Normal Mode (DTAM-BT-NM);
- Document Transfer And Manipulation – Document Manipulation (DTAM-DM);
- Document Transfer And Manipulation – ToKen Exchange (DTAM-TK);
- Combined use of DFR and DTAM-DM (DFR/DTAM-DM);
- Message Handling Systems (MHS);
- Multipoint Communication Service (MCS).

Further communication modules which can be used by services of this Recommendation for ODA document communication are described in Appendix I.

Whenever a service of this Recommendation makes use of one of these communication modules, the rules given in the corresponding Recommendations or Standards shall apply.

Specific restrictions of communication modules and dynamic constraints on them, required by dedicated services of this Recommendation are defined in clause 10.

For each of the identified communication modules above, subsequent subclauses give information about the following, as far as it is relevant for the services of this Recommendation:

- description;
- services, protocols and profiles;
- use for document communication.

## 8.2 Document Filing and Retrieval (DFR)

### 8.2.1 Description

The DFR communication module provides for managing documents and other objects inside remote document stores in distributed office systems. An information model describes the hierarchical structure of document stores, an operational model defines the abstract operations to be performed on document stores.

DFR communication applications are based on the end-to-end communication principle. The communicating entities have a client/server relationship.

### 8.2.2 Services, protocols and profiles

The DFR abstract services are contained in the DFR Service Element (SE) and are defined in ISO/IEC 10166-1.

The DFR protocol is specified in ISO/IEC 10166-2. The DFR protocol makes use of the Association Control Service Element (ACSE), the Remote Operation Service Element (ROSE) and the presentation service. The Reliable Transfer Service Element (RTSE) can be used optionally.

Two groups of Application profiles for DFR (ADF), which define functional subsets of DFR, are specified in ISO/IEC ISP 12069. They are:

- ADF1;
- ADF2.

The first group of application profiles, ADF1, is intended to be used for common filing and retrieval applications, and contains the following profiles:

- ADF11 (read only profile): The DFR operations included in this profile allow only to retrieve stored documents or to search for documents, but they do not allow to store new information or to change existing information.
- ADF12 (archiving profile): The DFR operations included in this profile allow to store new documents and to read them, but they do not allow changes to stored information.
- ADF13 (document store manipulation profile): All DFR operations are included in this profile.

The ADF1 profiles are defined hierarchically with ADF11 having the lowest functionality and ADF13 the highest. The ADF11 read only profile is a subset of the ADF12 archiving profile, and the ADF12 archiving profile is a subset of the ADF13 document store manipulation profile.

The second group of application profiles, ADF2, is intended to be used for remote store management, and contains the following profiles:

- ADF21 (simple management profile): This profile provides a minimum functionality for list and search operations to support other inner document handling applications.
- ADF22 (full management profile): This profile provides for list, search and manipulation (but without read and create) operations, to support other document handling applications.

The ADF21 simple management profile is a subset of the ADF22 full management profile.

### 8.2.3 Use for document communication

DFR is designed for the management of document stores with defined structures in distributed environments. DFR communicating entities have to know and maintain the store structures. DFR is used to transfer all kinds of documents, because the document contents are handled transparently.

The DFR ADF profiles are to be combined with DTAM-DM AOD1 profiles (see 8.4.2) for applications that provide for the possibility of working on document stores and also on document fragments inside the documents. This combination shall be done by the communication applications using these profiles.

## 8.3 Document Transfer And Manipulation – Bulk Transfer – Normal Mode (DTAM-BT-NM)

### 8.3.1 Description

The DTAM-BT-NM communication module is used to transfer documents between two communicating entities.

DTAM-BT-NM is designed as common protocol platform for telematic services. DTAM-BT-NM communication applications are based on the end-to-end communication principle. DTAM-BT-NM allows the negotiation of application capabilities between communicating entities during the association establishment phase.

### 8.3.2 Services, protocols and profiles

The DTAM-BT-NM services are contained in the DTAM SE and are subdivided into several functional units. DTAM-BT-NM makes use of the DTAM association use control functional unit for association establishment and termination, the DTAM capability functional unit for capability negotiation purposes, and the DTAM document bulk transfer functional unit for the data transfer phase.

The DTAM-BT-NM protocol makes use of RTSE, ACSE and the presentation service.

DTAM-BT-NM is defined in Recommendation T.522.

### 8.3.3 Use for document communication

DTAM-BT-NM is used to transfer complete ODA documents. DAP levels, specifying the degree of complexity of the ODA documents, among other application capabilities, can be negotiated during the association establishment phase.

## 8.4 Document Transfer And Manipulation – Document Manipulation (DTAM-DM)

### 8.4.1 Description

The DTAM-DM communication module is used to manipulate document fragments of documents at a remote communicating entity.

DTAM-DM communication applications are based on the end-to-end communication principle. DTAM-DM allows the negotiation of application capabilities between communicating entities during the association establishment phase.

### 8.4.2 Services, protocols and profiles

The DTAM-DM abstract services are contained in the DTAM-DM SE and are defined in Recommendation T.435.

The DTAM-DM protocol is specified in Recommendation T.436. The DTAM-DM protocol makes use of ACSE, ROSE and the presentation service.

Three manipulation levels for DTAM-DM abstract services, which define functional subsets of DTAM-DM, are specified in Recommendation T.436:

- Basic read only level: The DTAM-DM abstract operations included in this level allow only to get and search document fragments, but they do not allow to add new information or to change existing information.
- Basic manipulation level: The DTAM-DM abstract operations included in this level allow to get and search document fragments and, additionally, to add new information, to delete or to change information.
- Extended level: All DTAM-DM abstract operations on document fragments are included in this level.

The manipulation levels are defined hierarchically with the basic read only level having the lowest functionality and the extended level the highest. The basic read only level is a subset of the basic manipulation level, and the basic manipulation level is a subset of the extended level.

The DTAM-DM abstract point service, which allows to identify document fragments, is optionally available in each manipulation level.

An abstract interface for the manipulation of ODA documents is defined in ITU-T Rec. T.413 | ISO/IEC 8613-3, that specifies how to manipulate ODA document fragments.

Two groups of Application profiles for ODA (AOD), which define functional subsets of operations of the abstract interface for the manipulation of ODA documents, are specified in ISO/IEC ISP AODnn. They are:

- AOD1;
- AOD2.

The first group of application profiles, AOD1, whose abstract interface operations are intended to be used in conjunction with the corresponding abstract services of DTAM-DM, contains the following profiles:

- AOD11 (DTAM/Read-only profile): Abstract interface operations included in this profile are intended for reading and searching document fragments.
- AOD12 (DTAM/Insert profile): Abstract interface operations included in this profile are intended for reading, searching, creating, copying and reserving document fragments.
- AOD13 (DTAM/Manipulation profile): All abstract interface operations for manipulating document fragments are included in this profile.

The AOD1 profiles are defined hierarchically with AOD11 having the lowest functionality and AOD13 the highest. The AOD11 DTAM/Read-only profile is a subset of the AOD12 DTAM/Insert profile, and the AOD12 DTAM/Insert profile is a subset of the AOD13 DTAM/Manipulation profile.

A mapping of operations and operation arguments between the abstract interface for manipulation of ODA documents and the DTAM-DM abstract services is provided in Annex A of ITU-T Rec. T.413 | ISO/IEC 8613-3.

The second group of application profiles, AOD2, is intended to be used in conjunction with Message Handling Systems (MHS), and is described in 8.7.

#### 8.4.3 Use for document communication

DTAM-DM is used for the remote interactive manipulation of ODA documents. DTAM-DM abstract services are aligned and combined with the operations of the abstract interface for the manipulation of ODA documents.

The DTAM-DM AOD1 profiles are to be combined with DFR ADF profiles (see 8.2.2) for applications that provide for the possibility of working on a document store and also on document fragments inside the documents. This combination shall be done by the communication applications using these profiles.

### 8.5 Document Transfer And Manipulation – ToKen Exchange (DTAM-TK)

#### 8.5.1 Description

The DTAM-TK communication module is used to synchronize two communicating entities through the exchange of an application token.

DTAM-TK communication applications are based on the end-to-end communication principle.

#### 8.5.2 Services, protocols and profiles

The DTAM-TK abstract services are contained in the DTAM-TK SE and are defined in Recommendation T.435.

The DTAM-TK protocol is specified in Recommendation T.436. The DTAM-TK protocol makes use of ROSE and the presentation service.

#### 8.5.3 Use for document communication

DTAM-TK is used to synchronize communicating entities in document communication applications.

### 8.6 Combined use of DFR and DTAM-DM (DFR/DTAM-DM)

#### 8.6.1 Description

The DFR/DTAM-DM communication module combines DFR and DTAM-DM functionality.

In such a combined application, DFR is used for remote document store management and DTAM-DM provides for the remote interactive manipulation of the documents inside the document store.

DFR/DTAM-DM communication applications are based on the end-to-end communication principle. The communicating entities have a client/server relationship.

#### 8.6.2 Services, protocols and profiles

The statements in 8.2.2 about “DFR services, protocols and profiles”, and 8.4.2 about “DTAM-DM services, protocols and profiles” apply.

Only one application entity, which includes the DFR SE and the DTAM-DM SE, is necessary in the communicating entities. The communication link between the two communicating entities may be established either through one DFR-Bind or one DTAM-DM-Bind operation.

The DTAM-DM abstract operation DM-DOCUMENT-LIST shall not be used in the DFR/DTAM-DM communication module; the DFR List and DFR Search abstract operations are to be used instead.

#### 8.6.3 Use for document communication

DFR/DTAM-DM is used for the remote document store manipulation and management together with the remote interactive manipulation of documents inside the document store.

The DFR ADF profiles (see 8.2.2) are to be combined with the DTAM-DM AOD1 profiles (see 8.4.2). Clause 10 specifies the rules and restrictions on how to combine them to be used within the basic services of this Recommendation.

## 8.7 Message Handling Systems (MHS)

### 8.7.1 Description

The MHS communication module is used to distribute messages from one communicating entity to one or more remote communicating entities.

MHS is based on the store-and-forward transmission principle in conjunction with the possibility of multi-addressing.

### 8.7.2 Services, protocols and profiles

The MHS services and protocols are defined and specified in CCITT X.400-Series of Recommendations | ISO/IEC 10021.

Two groups of Application profiles for MHS (AMH), which define functional subsets of MHS, are specified in ISO/IEC ISP 10611 and ISO/IEC ISP 12062. They are:

- AMH1;
- AMH2.

The first group of application profiles, AMH1, is intended to be used for common messaging, and contains the following profiles:

- AMH11: Message transfer (P1);
- AMH12: MTS access (P3);
- AMH13: MS access (P7).

The group of AMH1 profiles are independent of the content of the interchanged messages.

The second group of application profiles, AMH2, is intended to be used for InterPersonal Messaging (IPM), and contains the following profiles:

- AMH21: Message content;
- AMH22: Message transfer (P1);
- AMH23: MTS access (P3);
- AMH24: MS access (P7).

The group of AMH2 profiles apply to a particular message content, the IPM content.

One group of Application profiles for ODA (AOD), which defines functional subsets of operations of the abstract interface for the manipulation of ODA documents is specified in ISO/IEC ISP AODnn, and is intended to be used in conjunction with MHS.

This group of application profiles, AOD2, contains only one profile:

- AOD23 (MHS/Manipulation profile): The operations from the abstract interface for the manipulation of ODA documents included in this profile are intended for manipulating documents.

The AOD23 MHS/Manipulation profile has the maximum complexity of manipulation operations, since there are no operation subsets.

NOTE – The AOD23 MHS/Manipulation profile is not stable enough at the time of publication of this Recommendation; therefore, the AOD23 profile has not been considered.

### 8.7.3 Use for document communication

MHS is used for message distribution in communication environments with multi-addressing functionality.

ODA documents can be distributed as OdaBodyParts using O/R addresses to identify source and destination(s). The type of the body part shall be "oda [12] IMPLICIT OCTET STRING". Sending ODA documents in this way does not require any special use of MHS, except controlling the maximum allowed size of messages. This procedure shall be used in the storing and distribution basic services.

Because of its non-deterministic behaviour (in relation with the time needed to distribute a message), MHS is less suited for interactive applications. But in some applications, if the reading or updating of the documents is not really interactive, the MHS communication module is used for the remote store management or remote interactive manipulation of documents. In this case, MHS interactive applications are to be seen as delayed interactive applications.

When an interactive operation is requested, it shall be encoded as a DFR or DTAM-DM abstract operation with the appropriate arguments, as specified in the DFR standards or DTAM-DM Recommendations. The encoded abstract operation will be sent in MHS messages, and results will be received afterwards in new MHS messages. The type of the body part shall be "externally-defined [15] ExternallyDefinedBodyPart".

This solution shall be used in the retrieval, storing-and-retrieval and manipulation basic services when there is a requirement to use store-and-forward communication.

NOTE – This solution is an interim one before relevant profiles are developed. An example of this kind of profiles is AOD23. Once AOD23 is developed, the rules specified in that profile should substitute the rules given here.

The number of BS shall be identified by bilateral agreements or by use of the Directory.

When MHS is used, the profiles AMH11, AMH12, AMH13, AMH21, AMH22, AMH23 and AMH24 shall be used depending on the available protocols.

## 8.8 Multipoint Communication Service (MCS)

### 8.8.1 Description

MCS specifies service and protocol for AGC (Audiographic Conference) to support multipoint communication using MCU (Multipoint Control Unit). MCS has communication services for:

- multipoint data transfer;
- channel management;
- domain (or group) management;
- token management.

### 8.8.2 Services and profile

The MCS service and protocol are defined and specified in Recommendations T.122 and T.125 respectively.

No profile for MCS is defined.

### 8.8.3 Use for document communication

The MCS communication module is used to provide the multicast function to other interactive document communication modules such as DTAM-DM module. In other words, multipoint document communication is realized by interactive document communication modules on top of MCS multipoint communication platform.

# 9 Components and design rules for basic services

This clause provides a common base for the formal definition of basic services. It provides the rules to make such a formal definition.

Basic services perform operations on service objects by using communication modules. Service objects are document stores, documents, document fragments, communicating entities and communication links. Some objects are more related to document aspects, others are related to communication aspects.

Services are specified in terms of attributes, which describe their features. Attributes take values from a well-defined set of attribute values.

Two service attribute sets are defined:

- document related service attributes;
- communication related service attributes.

For each attribute set, all attributes and their values are described. Throughout the text of this Recommendation, the names of service attributes are embedded in quotation marks, i.e. "attribute-name", and the values of service attributes are embedded in apostrophes, i.e. 'attribute-value'.

If the attribute "example-attribute" takes the value 'example-value', the following notation is used:

"example-attribute" = 'example-value'

Subclause 9.3 defines the way in which the attribute values are assigned to the document and communication related attributes for the specification of basic services.

Rules for the selection and restriction of the communication modules, which shall be used by the basic services, are also specified.

Finally, application rules are provided, which may include further dynamic constraints on operations of the selected and restricted communication module when applying the basic services in communication applications. They are introduced in 9.3.

## 9.1 Definition of document related service attributes

This subclause defines the document related service attribute set.

The document related service attributes are:

- "document location";
- "document copies";
- "document access rights";
- "store access rights";
- "document format";
- "functionality level".

The following subclauses describe the meaning of these document related service attributes, their values and the meaning of those values.

### 9.1.1 The service attribute "document location"

This service attribute determines where the information, which is subject for the communication application, is located.

The service attribute "document location" may take one of the following values:

- 'local';
- 'remote'.

If access to the information is possible without using a communication link, the attribute has the value 'local'.

If access to the information is only possible using a communication link, the attribute has the value 'remote'.

### 9.1.2 The service attribute "document copies"

This service attribute indicates how many identical instances of the information, which is subject for the communication application, do exist.

The service attribute "document copies" may take one of the following values:

- 'one';
- 'several'.

The document or the document fragment can exist only as 1 instance, called original. In this case the service attribute has the value 'one'. If there exist the original and some copies, located somewhere, the service attribute has the value 'several'.

### 9.1.3 The service attribute "document access rights"

This service attribute determines the rights which are given to the user to access document fragments.

The service attribute "document access rights" may take one or more of the following values:

- 'no-access';
- 'read-only';
- 'extended-read';
- 'add-only';
- 'delete-only';
- 'modify';
- 'full-access'.

Unauthorized users have no access right to the document, and therefore, no possibility to access any document fragment inside the document. In this case, the attribute has the value 'no-access'.

Other users are allowed to read document fragments, but not to add, delete or modify document fragments inside the document. In this case, the attribute has the value 'read-only'.

If "document access rights" = 'extended-read', the user can read document fragments. If hidden information is contained inside the document, the user will be informed about this fact, but the hidden information is not accessible to him. If the value 'extended-read' is not given, the user will not recognize this fact.

The attribute value 'add-only' allows adding but not reading, deleting or modifying document fragments.

The attribute value 'delete-only' allows for deleting document fragments.

'Modify' means changing the values of existing document fragment attributes, without adding or deleting attributes.

The 'full-access' right includes all other access rights except 'no-access'.

Document access rights may be cumulated, for example, the attribute "document access rights" may take the values 'read-only' and 'modify'.

### 9.1.4 The service attribute "store access rights"

This service attribute determines the rights which are given to the user to access the document store.

The service attribute "store access rights" may take one or more of the following values:

- 'no-access';
- 'read-only';
- 'extended-read';
- 'add-only';
- 'delete-only';
- 'modify';
- 'full-access'.

Unauthorized users have no access right to the document store, and therefore, no possibility to access any document inside the document store. In this case, the attribute has the value 'no-access'.

Other users are allowed to read documents, but not to add, delete or modify documents inside the document store. In this case, the attribute has the value 'read-only'.

If "store access rights" = 'extended-read', the user can read documents. If hidden information is contained inside the document store, the user will be informed about this fact, but the hidden information is not accessible to him. If the value 'extended-read' is not given, the user will not recognize this fact.

The attribute value 'add-only' allows adding but not reading, deleting or modifying documents in the document store.

The attribute value 'delete-only' allows for deleting documents from the document store.

'Modify' means changing the values of existing attributes of documents, without adding or deleting documents.

The 'full-access' right includes all other access rights except 'no-access'.

Store access rights may be cumulated, for example, the attribute "store access rights" may take the values 'read-only' and 'add-only'.

These store access rights have an equivalent meaning for documents in document stores as the document access rights have for document fragments in documents, but store access rights supersede document access rights. For example, if "store access rights" = 'add-only' and "document access rights" = 'delete-only', a communicating entity is not allowed to delete document fragments of any document.

### 9.1.5 The service attribute "document format"

This service attribute determines the structure of the document which is subject of the communication application.

The service attribute "document format" may take one of the following values:

- 'FOD011';
- 'FOD026';
- 'FOD036'.

The service attribute "document format" has the value 'FOD011' if the document conforms to the FOD011 DAP, which supports simple document structures; it takes the value 'FOD026' if the document conforms to the FOD026 DAP, which supports enhanced document structures and the value 'FOD036' is assigned if the document conforms to the FOD036 DAP, which provides for extended document structures. Clause 7 of this Recommendation gives further information about DAPs and their use in this Recommendation.

### 9.1.6 The service attribute "functionality level"

A service may deal with service objects like document stores, documents or document fragments, on which operations may be performed. The service attribute "functionality level" determines a set of service objects and operations.

The service attribute "functionality level" may take one of the following values:

- 'I';
- 'D';
- 'F';
- 'F-SF';
- 'DS-F-SF';
- 'DM-F-SF';
- 'D-F-SF'.

The meaning of these attribute values is:

- 'I' (Independent): There are no service objects; the operations are those provided by the selected communication module and do not depend on the document store, documents or document fragments.

- 'D' (Documents): The service objects are one or more documents; the operations on these objects are those provided by the selected communication module.

- 'F' (document Fragment): The service object is one document fragment; the operations on this object are those provided by the selected communication module.

- 'F-SF' (document Fragment, Set of document Fragments): The service objects are one or more document fragments; the operations on these objects are those provided by the selected communication module.

- 'DS-F-SF' (Document Selection, document Fragment, Set of document Fragments): The service objects are one or more document fragments; the operations on these objects, and the operations for selection and reservation of the document which contains these objects, are those provided by the selected communication module.

- 'DM-F-SF' (Document Management, document Fragment, Set of document Fragments): The service objects are one or more document fragments; the operations on these objects, and the operations of managing the document which contains these objects, are those provided by the selected communication module.

- 'D-F-SF' (Documents, document Fragment, Set of document Fragments): The service objects are the document store, one or more documents and one or more document fragments; the operations on these objects are those provided by the selected communication module.

The operations on service objects provided by the selected communication module may be restricted by rules given in the "Application rules" subclauses of the formal definitions of document communication basic services in clause 10.

## 9.2 Definition of communication related service attributes

This subclause defines the communication related service attribute set.

The communication related service attributes are:

- "number of communicating entities";

- "communication type";

- "communication modules".

The following subclauses describe the meaning of these communication related service attributes, their values and the meaning of those values.

### 9.2.1 The service attribute "number of communicating entities"

This service attribute gives the number of communicating entities, in a communication application, on both sides of the communication link.

The service attribute "number of communicating entities" may take one of the following values:

- 'one-to-one';

- 'one-to-several'.

In a communication application, at least two communicating entities are involved, which are connected via a communication link. In this case, the service attribute takes the value 'one-to-one'; if one communicating entity is connected via several communication links to several remote communicating entities, it takes the value 'one-to-several'.

### 9.2.2 The service attribute "communication type"

This service attribute specifies the way in which the communication process is carried out.

The service attribute "communication type" may take one of the following values:

- 'end-to-end';
- 'store-and-forward'.

If the communication link between two communicating entities has been established and remains fixed during the communication phase, the value of "communication type" is 'end-to-end'. This means communication can take place on-line. A request from one communicating entity can be responded at once by the remote communicating entity. Therefore, interactive applications are possible.

If the communication link between two communicating entities has not been established in a separate action before the communication phase, and may change during the communication phase, the value of "communication type" is 'store-and-forward'. In this case, interactive applications are to be seen as delayed interactive applications because of the non-deterministic time constraints between request and response of an operation.

### 9.2.3 The service attribute "communication module"

This service attribute specifies the communication module which is used by the service to carry out the communication process.

The service attribute "communication module" may take one of the following values:

- 'DFR';
- 'DTAM-BT-NM';
- 'DTAM-DM';
- 'DTAM-TK';
- 'DFR/DTAM-DM';
- 'MHS'.

In the case of "communication module" = 'DFR', the communication module DFR shall be used. In the case of "communication module" = 'DTAM-BT-NM', the communication module DTAM-BT-NM shall be used. In the case of "communication module" = 'DTAM-DM', the communication module DTAM-DM shall be used. In the case of "communication module" = 'DTAM-TK', the communication module DTAM-TK shall be used. In the case of "communication module" = 'DFR/DTAM-DM', the communication module DFR/DTAM-DM shall be used. In the case of "communication module" = 'MHS', the communication module MHS shall be used.

Characteristics of these communication modules are summarized in clause 8.

## 9.3 Rules for the formal definition of basic services

For the formal definition of basic services, given in clause 10, four steps are followed:

- assignment of values to the document related service attributes;
- assignment of values to the communication related service attributes;
- selection of the communication modules;
- specification of application rules.

Rules and notation to follow these steps are given in the following subclauses.

### 9.3.1 Rules and notation for the assignment of values to the document related service attributes

The assignment of values to the document related service attributes is done using the notation depicted in Table 2 below:

TABLE 2/T.190

**Values for document related service attributes for a basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'local'<br>'remote' | |
| "document copies" | 'one'<br>'several' | |
| "document access rights" | 'no-access'<br>'read-only'<br>'extended-read'<br>'add-only'<br>'delete-only'<br>'modify'<br>'full-access' | |
| "store access rights" | 'no-access'<br>'read-only'<br>'extended-read'<br>'add-only'<br>'delete-only'<br>'modify'<br>'full-access' | |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | |
| "functionality level" | 'I'<br>'D'<br>'F'<br>'F-SF'<br>'DS-F-SF'<br>'DM-F-SF'<br>'D-F-SF' | |

In the "Service attribute" column, names of document related service attributes are given.

In the 'Attribute value(s)' column, all possible values of all service attributes are given for reference.

For each document related service attribute, tables in clause 10 (formal definition of basic services) provide, in the 'Attribute value(s)' column, either a unique value or a list of values. In the first case, the unique value is the one that the attribute shall take. In the second case, one and only one value shall be selected, as specified in the last column of the tables. This rule does not apply to the "document access rights" and "store access rights" service attributes, that may take more than one value (they are multi-valued attributes, as explained in 9.1.3 and 9.1.4), depending on the service. In this case, the attribute shall take all the values.

For some basic services, attributes may be not applicable. In this case, 'N/A' is given in the 'Attribute value(s)' column of the tables.

The "Value description" column is used, in tables in clause 10, to explain the choice of the values and the possible dependencies the chosen value may have on values of other service attributes.

### 9.3.2 Rules and notation for the assignment of values to the communication related service attributes

The assignment of values to the communication related service attributes is done using the notation depicted in Table 3 below:

TABLE 3/T.190

**Values for communication related service attributes for a basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one'<br>'one-to-several' | |
| "communication type" | 'end-to-end'<br>'store-and-forward' | |
| "communication module" | 'DFR'<br>'DTAM-BT-NM'<br>'DTAM-DM'<br>'DTAM-TK'<br>'DFR/DTAM-DM'<br>'MHS' | |

In the "Service attribute" column, names of communication related service attributes are given.

In the 'Attribute value(s)' column, all possible values of all service attributes are given for reference.

For each communication related service attribute, tables in clause 10 (formal definition of basic services) provide, in the 'Attribute value(s)' column, either a unique value or a list of values. In the first case, the unique value is the one that the attribute shall take. In the second case, one and only one value shall be selected, as specified in the last column of the tables.

The "Value description" column is used, in tables in clause 10, to explain the choice of the values and the possible dependencies the chosen value may have on values of other service attributes.

### 9.3.3 Rules and notation for the selection of the communication modules

The selection of the communication modules and their possible restrictions (e.g. profiles) is done using the notation depicted in Table 4 below, using the selection mechanism described after the table.

The selection mechanism consists of a sequence of the following steps, that are to be followed to select a communication module and its restrictions (e.g. profiles) from Table 4 above:

- Step 1: Choice of one item of the column "functionality level"; this item selects a row of the table.
- Step 2: Choice of one value of the service attribute "communication type"; in the case of the value 'end-to-end', all columns of the table below this chosen value are selected; in the case of the value "store-and-forward", all columns of the table below this chosen value are selected.
- Step 3: Choice of one value of the service attribute "communication module"; this choice selects exactly one of the resulting columns of step 2, that is the communication module to be used for this service.
- Step 4: Choice of the table entry at the cross point of the selected row from step 1 and the selected column from step 3.
- Step 5: If the table entry is empty, the basic service cannot be performed with the chosen combination of "functionality level" and "communication module"; otherwise, the table entry contains the restrictions that shall be applied to the selected communication module. Further dynamic constraints on operations of the restricted communication module may be specified in the 'Application rules' subclause.

TABLE 4/T.190

**Selection of communication modules for a basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | | | | | | |
| 'F' | | | | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

#### 9.3.4 Application rules

Application rules specify further dynamic constraints on operations of the restricted communication module when applying a basic service in communication applications.

The application rules may, in relation to the operations in the communication modules:

- prohibit to perform some operations;
- allow some operations only under certain conditions;
- allow some operations only with specific arguments;
- prescribe a certain order of operations.

## 10 Formal definition of document communication basic services

This clause defines all the basic services using the rules given in clause 9.

### 10.1 Storing basic service

#### 10.1.1 Document related service attributes

For each document related service attribute, Table 5 below provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

#### 10.1.2 Communication related service attributes

For each communication related service attribute, Table 6 below provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 5/T.190

**Values for document related service attributes for the storing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'local' | The document(s) to be stored is (are) local to the communicating entity that sends the document(s). |
| "document copies" | 'one' | Only one copy of each document to be stored is necessary. |
| "document access rights" | N/A | Document fragment(s) shall not be accessed. |
| "store access rights" | 'add-only' | Storing basic service performs add-only operations in the remote store. |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | This service attribute shall take only one of the possible values, depending on the desired document format. |
| "functionality level" | 'D' | The storing basic service provides for the storing of full document(s). Document fragment(s) shall not be accessed. |

TABLE 6/T.190

**Values for communication related service attributes for the storing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | One communicating entity sends the document(s) to the other remote communicating entity. |
| "communication type" | 'end-to-end'<br>'store-and-forward' | The storing basic service can be accomplished either using end-to-end communication, where both communicating entities (client and server) are directly connected to perform the service, or using store-and-forward communication. Appendix II gives some rules to select a value for this service attribute. |
| "communication module" | 'DFR'<br>'DTAM-BT-NM'<br>'MHS' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.1.3. |

### 10.1.3 Selection of communication modules

The selection of communication modules depends on the values of the attributes "functionality level" and "communication type". For the storing basic service, there is only one possible value for the "functionality level" service attribute. The communication module restrictions specified in Table 7 shall be used.

Table 7 indicates the communication module restrictions to use. When DFR is used, a profile is provided; in other cases, the only restrictions to the communication module are those provided in the application rules (see 10.1.4).

When "communication type" = 'end-to-end' is selected, two values of the service attribute "communication module" are possible, then Appendix II gives some rules to select a value for this service attribute.

The communication module profile presented in Table 7 is defined in clause 8.

TABLE 7/T.190

**Selection of communication modules for the storing basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | ADF12 | See 10.1.4.2 | | | | See 10.1.4.3 |
| 'F' | | | | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

The storing basic service can also be implemented using other communication modules which are given in Appendix I.

### 10.1.4 Application rules

The storing basic service may be used as a stand-alone service or to build complex document communication services. In the latter case, how to use the storing basic service is specified in the corresponding complex service specification (in other ITU-T Recommendations).

This subclause specifies the rules the storing basic service shall follow when using communication modules.

#### 10.1.4.1 Application rules when using DFR

DFR, restricted to the ADF12 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DFR association shall be established with DFR-Bind, identifying BS 1.
- Step 2: The DFR Create operation shall be issued, as many times as necessary, in order to add the document(s) to the remote communicating entity.
- Step 3: The DFR association shall be released with DFR-Unbind.

#### 10.1.4.2 Application rules when using DTAM-BT-NM

DTAM-BT-NM is used to transfer ODA documents following the rules given in 8.3. No specific application rules are given here.

#### 10.1.4.3 Application rules when using MHS

When the service is requested, the following step shall be followed:

- Step 1: One MHS message containing the document or documents to store shall be sent, following the rules given in 8.7.3 concerning the distribution of ODA documents. BS 1 shall be identified.

Step 1 can be repeated.

## 10.2 Distribution basic service

This subclause defines the distribution basic service using the rules given in clause 9.

### 10.2.1 Document related service attributes

For each document related service attribute, Table 8 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

TABLE 8/T.190

**Values for document related service attributes for the distribution basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'local' | The document(s) to be stored is (are) local to the communicating entity that distributes the document(s). |
| "document copies" | 'one' | Only one copy of each document to be distributed is necessary. |
| "document access rights" | N/A | Document fragment(s) shall not be accessed. |
| "store access rights" | 'add-only' | Distribution basic service performs add-only operations in the remote stores. |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | This service attribute shall take only one of the possible values, depending on the desired document format. |
| "functionality level" | 'D' | The distribution basic service provides for the distribution of full document(s). Document fragment(s) shall not be accessed. |

### 10.2.2 Communication related service attributes

For each communication related service attribute, Table 9 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 9/T.190

**Values for communication related service attributes for the distribution basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-several' | One communicating entity distributes the document(s) to n remote communicating entities (remote stores). |
| "communication type" | 'end-to-end'<br>'store-and-forward' | The distribution basic service can be accomplished either using end-to-end communication where the communicating entity that distributes the document(s) establishes a direct connection with the n remote communicating entities, or using store-and-forward communication. Appendix II gives some rules to select a value for this service attribute. |
| "communication module" | 'DFR'<br>'DTAM-BT-NM'<br>'MHS' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.2.3. The distribution basic service is accomplished using only one communication module, therefore, this service attribute shall take only one of the given values. A distribution service using several different communication modules can be seen as a complex service based on the distribution basic service defined here. |

### 10.2.3 Selection of communication modules

The selection of communication modules depends on the values of the attributes "functionality level" and "communication type". For the distribution basic service, there is only one possible value for the "functionality level" service attribute. The communication module restrictions specified in Table 10 shall be used.

Table 10 indicates the communication module restrictions to use. When DFR is used, a profile is provided; in other cases, the only restrictions to the communication module are those provided in the application rules (see 10.2.4).

When "communication type" = 'end-to-end' is selected, two values of the service attribute "communication module" are possible, then Appendix II gives some rules to select a value for this service attribute.

The communication module profile presented in Table 10 is defined in clause 8.

The distribution basic service can also be implemented using other communication modules which are given in Appendix I.

TABLE 10/T.190

**Selection of communication modules for the distribution basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | ADF12 | See 10.2.4.2 | | | | See 10.2.4.3 |
| 'F' | | | | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

### 10.2.4 Application rules

The distribution basic service may be used as a stand-alone service or to build complex document communication services. In the latter case, how to use the distribution basic service is specified in the corresponding complex service specification (in other ITU-T Recommendations).

This subclause specifies the rules the distribution basic service shall follow when using communication modules.

#### 10.2.4.1 Application rules when using DFR

DFR, restricted to the ADF12 profile, is used.

When the service is requested, with each of the n remote communication entities to receive documents, the following steps shall be followed:

- Step 1: A DFR association shall be established with DFR-Bind, identifying BS 2.
- Step 2: The DFR Create operation shall be issued, as many times as necessary, in order to add the document(s) to the remote communicating entity.
- Step 3: The DFR association shall be released with DFR-Unbind.

#### 10.2.4.2 Application rules when using DTAM-BT-NM

DTAM-BT-NM is used to transfer ODA documents following the rules given in 8.3. No specific application rules are given here.

If n is the number of remote communicating entities to receive documents, then n DTAM associations are established, one with each of the remote communicating entities (recipients).

#### 10.2.4.3 Application rules when using MHS

When the service is requested, the following step shall be followed:

– Step 1: One MHS message, containing the document or documents to store, shall be sent to the n recipients, following the rules given in 8.7.3 concerning the distribution of ODA documents and the multi-addressing capabilities offered by MHS. BS 2 shall be identified.

Step 1 can be repeated.

## 10.3 Retrieval basic service

This subclause defines the retrieval basic service using the rules given in clause 9.

### 10.3.1 Document related service attributes

For each document related service attribute, Table 11 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

TABLE 11/T.190

**Values for document related service attributes for the retrieval basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'remote' | The communicating entity that retrieves the document(s) or document fragment(s) is in a location remote to the document(s). If not, retrieval is a local matter. |
| "document copies" | 'one' | When documents or document fragments are retrieved, they are copied to the client communicating entity. From a global point of view, there is always only one copy of the documents: that of the remote store. |
| "document access rights" | 'read-only' | Retrieval basic service performs document or document fragment read-only operations. |
| "store access rights" | 'read-only' | Retrieval basic service performs read-only operations from the remote store. |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | This attribute shall take only one of the possible values, depending on the document format desired.<br>The selection of a value for this attribute depends on the selected value for the "functionality level" attribute. In particular, FOD011 shall never be chosen if "functionality level" is different to 'D'. |
| "functionality level" | 'D'<br>'F-SF'<br>'DS-F-SF'<br>'D-F-SF' | This service attribute shall take only one of the possible values, depending on the functionality level desired. |

### 10.3.2 Communication related service attributes

For each communication related service attribute, Table 12 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 12/T.190

**Values for communication related service attributes for the retrieval basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | One communicating entity (client) makes the retrieval from the other communicating entity (server, remote store). Complex services may extend this basic service with more clients on the same store. |
| "communication type" | 'end-to-end'<br>'store-and-forward' | End-to-end communication, where both communicating entities (client and server) are directly connected to perform the service, is the natural selection for the retrieval basic service. However, store-and-forward communication can also be used. Appendix II gives some rules to select a value for this service attribute. |
| "communication module" | 'DFR'<br>'DTAM-DM'<br>'DTAM-DM/DFR'<br>'MHS' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.3.3. |

### 10.3.3 Selection of communication modules

Depending on the chosen values of the attributes "functionality level" and "communication type", the communication module restrictions specified in Table 13 shall be used.

For "communication type" = 'end-to-end', three different communication modules are possible depending on the chosen value of the "functionality level" attribute. Table 13 indicates the communication module restrictions to use.

For a given combination of values of "communication type" and "functionality level", only one specific value of the attribute "communication module" is allowed, as specified in Table 13.

The communication module profiles presented in Table 13 are defined in clause 8. The DFR Reserve operation of ADF21 profile shall not be used.

### 10.3.4 Application rules

The retrieval basic service may be used as a stand-alone service or to build complex document communication services. In the latter case, how to use the retrieval basic service is specified in the corresponding complex service specification (in other ITU-T Recommendations).

This subclause specifies the rules the retrieval basic service shall follow when using communication modules.

#### 10.3.4.1 Application rules when using DFR

In this case, the retrieval basic service is only applicable to full documents. DFR, restricted to the ADF11 profile, is used.

TABLE 13/T.190

**Selection of communication modules for the retrieval basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | ADF11 | | | | | See 10.3.4.4 |
| 'F' | | | | | | |
| 'F-SF' | | | AOD11 | | | See 10.3.4.4 |
| 'DS-F-SF' | | | | | ADF21+ AOD11 | See 10.3.4.4 |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | ADF11+ AOD11 | See 10.3.4.4 |

When the service is requested, the following steps shall be followed:

- Step 1: A DFR association shall be established with DFR-Bind, identifying BS 3.
- Step 2: The operations provided in the ADF11 profile can be issued, in order to perform the required retrieval operations.
- Step 3: The DFR association shall be released with DFR-Unbind.

### 10.3.4.2 Application rules when using DTAM-DM

In this case, the retrieval basic service is only applicable to document fragments. DTAM-DM, restricted to the AOD11 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 3.
- Step 2: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 3: The operations provided in the AOD11 profile can be issued, in order to perform the required retrieval operations.
- Step 4: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 5: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3 and 4 can be repeated.

### 10.3.4.3 Application rules when using DFR in combination with DTAM-DM

In this case, the retrieval basic service is applicable to both documents and document fragments. DFR combined with DTAM-DM is used and restricted.

There are two possible cases depending on the value of the "functionality level" attribute:

a) *"functionality level" = 'DS-F-SF'*

In this case, the functionality of the operations on full documents is limited to the possibility of selecting a document. The ADF21 and AOD11 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 3.
- Step 2: Optionally, one or more documents shall be selected with ADF21 operations.
- Step 3: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 4: The operations provided in the AOD11 profile can be issued, in order to perform the required retrieval operations on document fragments.
- Step 5: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

b) *"functionality level" = 'D-F-SF'*

In this case, the ADF11 and AOD11 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 3.
- Step 2: The operations provided in the ADF11 profile can be issued, in order to perform the required retrieval operations.
- Step 3: Optionally, one or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 4: If step 3 has been performed, the operations provided in the AOD11 profile can be issued, in order to perform the required retrieval operations on document fragments.
- Step 5: If step 4 has been performed, the open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

#### 10.3.4.4 Application rules when using MHS

In this case, the retrieval basic service is applicable to full documents only, to document fragments only, and to documents and document fragments.

When the service is requested, the following steps shall be followed:

- Step 1: The required retrieval operations are sent in one or more MHS messages, following the rules given in 8.7.3; BS 3 shall be identified.
- Step 2: Optionally, results are returned in new MHS messages, following the rules given in 8.7.3.

Steps 1 and 2 can be repeated.

## 10.4 Storing-and-Retrieval basic service

This subclause defines the storing-and-retrieval basic service using the rules given in clause 9.

### 10.4.1 Document related service attributes

For each document related service attribute, Table 14 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

### 10.4.2 Communication related service attributes

For each communication related service attribute, Table 15 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 14/T.190

**Values for document related service attributes for the storing-and-retrieval basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'remote' | The user is in a location remote to the document(s). If not, storing-and retrieval of document(s) or document fragment(s) is a local matter. |
| "document copies" | 'one' | When documents or document fragments are retrieved, they are copied to the client communicating entity, while when documents or document fragments are stored, they are copied to the remote store. From a global point of view, there is always only one copy of the documents: that of the remote server. |
| "document access rights" | 'read-only'<br>'add-only' | Retrieval operations are document (or document fragment) read-only operations, while storing operations are document (or document fragment) add-only operations. |
| "store access rights" | 'read-only'<br>'add-only' | Retrieval operations are read-only operations in the remote store, while storing operations are add-only operations. |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | This service attribute shall take only one of the possible values, depending on the desired document format.<br>The selection of a value for this attribute depends on the selected value for the "functionality level" attribute. In particular, FOD011 shall never be chosen if "functionality level" is different to 'D'. |
| "functionality level" | 'D'<br>'F-SF'<br>'DS-F-SF'<br>'D-F-SF' | This service attribute shall take only one of the possible values, depending on the functionality level desired. |

### 10.4.3 Selection of communication modules

Depending on the chosen values of the attributes "functionality level" and "communication type", the communication module restrictions (profiles in this case) specified in Table 16 shall be used.

For "communication type" = 'end-to-end', three different communication modules are possible depending on the chosen value of the "functionality level" attribute. Table 16 indicates the communication profile to use. For a given combination of values of "communication type" and "functionality level", only one specific value of the attribute "communication modules" is allowed, as specified in Table 16.

The communication module profiles presented in Table 16 are defined in clause 8. The DFR Reserve operation of ADF21 profile shall not be used.

TABLE 15/T.190

**Values for communication related service attributes for the storing-and-retrieval basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | One communicating entity (client) makes the storing/retrieval to/from another communicating entity (server). |
| "communication type" | 'end-to-end'<br>'store-and-forward' | End-to-end communication, where both communicating entities (client and server) are directly connected to perform the service, is the natural selection for the storing-and-retrieval basic service. However, store-and-forward communication can also be used. Appendix II gives some rules to select a value for this service attribute. |
| "communication module" | 'DFR'<br>'DTAM-DM'<br>'DFR/DTAM-DM'<br>'MHS' | The selection of the communication module is restricted by the chosen values of the "functionality level" and "communication type" attributes, as specified in 10.4.3. |

TABLE 16/T.190

**Selection of communication modules for the storing-and-retrieval basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | ADF12 | | | | | See 10.4.4.4 |
| 'F' | | | | | | |
| 'F-SF' | | | AOD12 | | | See 10.4.4.4 |
| 'DS-F-SF' | | | | | ADF21+ AOD12 | See 10.4.4.4 |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | ADF12+ AOD12 | See 10.4.4.4 |

### 10.4.4 Application rules

The storing-and-retrieval basic service may be used as a stand-alone service or to build complex document communication services. In the latter case, how to use the storing-and-retrieval basic service is specified in the corresponding complex service specification (in other ITU-T Recommendations).

This subclause specifies the rules the storing-and-retrieval basic service shall follow when using communication modules.

#### 10.4.4.1 Application rules when using DFR

In this case, the storing-and-retrieval basic service is only applicable to full documents. DFR, restricted to the ADF12 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DFR association shall be established with DFR-Bind, identifying BS 4.
- Step 2: The operations provided in the ADF12 profile can be issued, in order to perform the required storing and retrieval operations.
- Step 3: The DFR association shall be released with DFR-Unbind.

#### 10.4.4.2 Application rules when using DTAM-DM

In this case, the storing-and-retrieval basic service is only applicable to document fragments. DTAM-DM, restricted to the AOD12 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 4.
- Step 2: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 3: The operations provided in the AOD12 profile can be issued, in order to perform the required storing and retrieval operations.
- Step 4: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 5: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3 and 4 can be repeated.

#### 10.4.4.3 Application rules when using DFR in combination with DTAM-DM

In this case, the storing-and-retrieval basic service is applicable to both documents and document fragments. DFR combined with DTAM-DM is used and restricted.

There are two possible cases depending on the value of the "functionality level" service attribute:

a) *"functionality level" = 'DS-F-SF'*

In this case, the functionality of the operations on full documents is limited to the possibility of selecting a document. The ADF21 and AOD12 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 4.
- Step 2: Optionally, one or more documents shall be selected with ADF21 operations.
- Step 3: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 4: The operations provided in the AOD12 profile can be issued, in order to perform the required storing and retrieval operations on document fragments.
- Step 5: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

b) *"functionality level" = 'D-F-SF'*

In this case, the ADF12 and AOD12 profiles shall be used.

When the service is requested, the following steps shall be followed:

– Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 4.

– Step 2: The operations provided in the ADF12 profile can be issued, in order to perform the required storing and retrieval operations.

– Step 3: Optionally, one or more documents shall be open with DM-DOCUMENT-OPEN.

– Step 4: If step 3 has been performed, the operations provided in the AOD12 profile can be issued, in order to perform the required storing and retrieval operations on document fragments.

– Step 5: If step 4 has been performed, the open documents shall be closed with DM-DOCUMENT-CLOSE.

– Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

#### 10.4.4.4 Application rules when using MHS

In this case, the storing-and-retrieval basic service is applicable to full documents only, to document fragments only, and to documents and document fragments.

When the service is requested, the following steps shall be followed:

– Step 1: The required storing and retrieval operations are sent in one or more MHS messages, following the rules given in 8.7.3; BS 4 shall be identified.

– Step 2: Optionally, results are returned in new MHS messages, following the rules given in 8.7.3.

Steps 1 and 2 can be repeated.

## 10.5 Manipulation basic service

This subclause defines the manipulation basic service using the rules given in clause 9.

### 10.5.1 Document related service attributes

For each document related service attribute, Table 17 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

### 10.5.2 Communication related service attributes

For each communication related service attribute, Table 18 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

### 10.5.3 Relationship to communication modules

Depending on the chosen values of the attributes "functionality level" and "communication type", the communication module restrictions (profiles in this case) specified in Table 19 shall be used.

For "communication type" = 'end-to-end', three different communication modules are possible depending on the chosen value of the "functionality level" attribute. Table 19 indicates the communication profile to use. For a given combination of values of "communication type" and "functionality level", only one specific value of the attribute "communication modules" is allowed, as specified in Table 19.

The communication module profiles presented in Table 19 are defined in clause 8.

TABLE 17/T.190

**Values for document related service attributes for the manipulation basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'remote' | The user is in a location remote to the document(s). If not, manipulation is a local matter. |
| "document copies" | 'one' | The server communicating entity has the only copy of the document. The client communicating entity orders the manipulation operations, that are performed on the remote store. |
| "document access rights" | 'full access' | Manipulation requires full access rights to the document(s). |
| "store access rights" | 'full access' | Manipulation requires full access rights to the remote store. |
| "document format" | 'FOD011'<br>'FOD026'<br>'FOD036' | This attribute shall take only one of the possible values, depending on the document format desired.<br>The selection of a value for this attribute depends on the selected value for the "functionality level" attribute. In particular, FOD011 shall never be chosen if "functionality level" is different to 'D'. |
| "functionality level" | 'D'<br>'F-SF'<br>'DS-F-SF'<br>'DM-F-SF'<br>'D-F-SF' | This attribute shall take only one of the possible values, depending on the functionality level desired. |

TABLE 18/T.190

**Values for communication related service attributes for the manipulation basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | One client manipulates documents in the remote store (server). |
| "communication type" | 'end-to-end'<br>'store-and-forward' | End-to-end communication, where both communicating entities (client and server) are directly connected to perform the service, is the natural selection for the manipulation basic service. However, store-and-forward communication can also be used. Appendix II gives some rules to select a value for this service attribute. |
| "communication module" | 'DFR'<br>'DTAM-DM'<br>'DFR/DTAM-DM'<br>'MHS' | The selection of the communication modules is restricted by the chosen values of the "functionality level" and "communication type" attributes, as specified in 10.5.3. |

TABLE 19/T.190

**Selection of communication modules for the manipulation basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | ADF13 | | | | | See 10.5.4.4 |
| 'F' | | | | | | |
| 'F-SF' | | | AOD13 | | | See 10.5.4.4 |
| 'DS-F-SF' | | | | | ADF21+ AOD13 | See 10.5.4.4 |
| 'DM-F-SF' | | | | | ADF22 + AOD13 | See 10.5.4.4 |
| 'D-F-SF' | | | | | ADF13+ AOD13 | See 10.5.4.4 |

### 10.5.4 Application rules

The manipulation basic service may be used as a stand-alone service or to build complex document communication services. In the latter case, how to use the manipulation basic service is specified in the corresponding complex service specification (in other ITU-T Recommendations).

This subclause specifies the rules the manipulation basic service shall follow when using communication modules.

#### 10.5.4.1 Application rules when using DFR

In this case, the manipulation basic service is only applicable to full documents. DFR, restricted to the ADF13 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DFR association shall be established with DFR-Bind, identifying BS 5.
- Step 2: The operations provided in the ADF13 profile can be issued, in order to perform the required manipulation operations.
- Step 3: The DFR association shall be released with DFR-Unbind.

#### 10.5.4.2 Application rules when using DTAM-DM

In this case, the manipulation basic service is only applicable to document fragments. DTAM-DM, restricted to the AOD13 profile, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 5.
- Step 2: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 3: The operations provided in the AOD13 profile can be issued, in order to perform the required manipulation operations.
- Step 4: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 5: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3 and 4 can be repeated.

#### 10.5.4.3 Application rules when using DFR in combination with DTAM-DM

In this case, the manipulation basic service is applicable to both documents and document fragments. DFR combined with DTAM-DM is used and restricted.

There are three possible cases depending on the value of the "functionality level" attribute:

a) *"functionality level" = 'DS-F-SF'*

In this case, the functionality of the operations on full documents is limited to the possibility of selecting a document. The ADF21 and AOD13 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 5.
- Step 2: Optionally, one or more documents shall be selected with ADF21 operations.
- Step 3: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 4: The operations provided in the AOD13 profile can be issued, in order to perform the required manipulation operations on document fragments.
- Step 5: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

b) *"functionality level" = 'DM-F-SF'*

In this case, the functionality of the operations on full documents is limited to the possibility of selecting a document, and managing the document store. The ADF22 and AOD13 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 5.
- Step 2: Optionally, one or more documents shall be selected and the document store shall be managed with ADF22 operations.
- Step 3: One or more documents shall be open with DM-DOCUMENT-OPEN.
- Step 4: The operations provided in the AOD13 profile can be issued, in order to perform the required manipulation operations on document fragments.
- Step 5: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

c) *"functionality level" = 'D-F-SF'*

In this case, the ADF13 and AOD13 profiles shall be used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 5.
- Step 2: The operations provided in the ADF13 profile can be issued, in order to perform the required manipulation operations.

– Step 3: Optionally, one or more documents shall be open with DM-DOCUMENT-OPEN.

– Step 4: If step 3 has been performed, the operations provided in the AOD13 profile can be issued, in order to perform the required manipulation operations on document fragments.

– Step 5: If step 4 has been performed, the open documents shall be closed with DM-DOCUMENT-CLOSE.

– Step 6: The DTAM-DM association shall be released with DTAM-DM-Unbind.

The sequence of steps 2, 3, 4 and 5, and the sequence of steps 3, 4 and 5 can be repeated.

#### 10.5.4.4 Application rules when using MHS

In this case, the manipulation basic service is applicable to full documents only, to document fragments only, and to documents and document fragments.

When the service is requested, the following steps shall be followed:

– Step 1: The required manipulation operations are sent in one or more MHS messages, following the rules given in 8.7.3; BS 5 shall be identified.

– Step 2: Optionally, results are returned in new MHS messages, following the rules given in 8.7.3.

Steps 1 and 2 can be repeated.

## 10.6 Pointing basic service

This subclause defines the pointing basic service using the rules given in clause 9.

### 10.6.1 Document related service attributes

For each document related service attribute, Table 20 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

TABLE 20/T.190

**Values for document related service attributes for the pointing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'remote' | The user is in a location remote to the document. If not, pointing is a local matter. |
| "document copies" | 'one' | The server has the only copy of the document. The client orders the pointing operation, that is performed on the server. |
| "document access rights" | 'read-only' | Pointing is a document fragment read-only operation. |
| "store access rights" | N/A | There are no operations on the store. |
| "document format" | 'FOD026'<br>'FOD036' | This service attribute shall take only one of the possible values, depending on the desired document format. |
| "functionality level" | 'F' | Pointing is only possible on a document fragment. |

### 10.6.2 Communication related service attributes

For each communication related service attribute, Table 21 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 21/T.190

**Values for communication related service attributes for the pointing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | One client points to a document fragment inside a document in a remote server. |
| "communication type" | 'end-to-end' | Pointing is accomplished using end-to-end communication: Both communicating entities (client and server) are directly connected to perform the service. |
| "communication module" | 'DTAM-DM' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.6.3. |

### 10.6.3 Selection of communication modules

The selection of communication modules depends on the values of the attributes "functionality level" and "communication type". For the pointing service, there is only one possible value for each of them. The communication module restriction specified in Table 22 shall be used.

Table 22 indicates the communication module restrictions to use.

The communication module restriction is not specified as a profile, but as a "Manipulation Level Selection", as specified in DTAM-DM service, Recommendation T.435. The 'Basic Read Only Level' manipulation level selection shall be used including the DM-POINT operation, that is defined as optional in that manipulation level.

### 10.6.4 Application rules

The pointing basic service shall be used to build complex document communication services. Details on how to use the pointing basic service when building complex services are specified in the corresponding complex service specification (in other ITU-T Recommendations).

#### 10.6.4.1 Application rules when using DTAM-DM

This is the only possibility for the pointing basic service. DTAM-DM, restricted to the basic read only level, is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 6.
- Step 2: The document where to point shall be opened with DM-DOCUMENT-OPEN.
- Step 3: The DM-POINT operation shall be used to point to a document fragment inside the open document.
- Step 4: The open documents shall be closed with DM-DOCUMENT-CLOSE.
- Step 5: The DTAM-DM association shall be released with DTAM-DM-Unbind.

Step 3 and the sequence of steps 2, 3 and 4 can be repeated.

## 10.7 Multi-pointing basic service

This subclause defines the multi-pointing basic service using the rules given in clause 9.

TABLE 22/T.190

**Selection of communication modules for the pointing basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | | | | | | |
| 'F' | | | Basic Read Only Level | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

### 10.7.1 Document related service attributes

For each document related service attribute, Table 23 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

### 10.7.2 Communication related service attributes

For each communication related service attribute, Table 24 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

### 10.7.3 Selection of communication modules

The selection of communication modules depends on the values of the attributes "functionality level" and "communication type". For the multi-pointing service, there is only one possible value for each of them. The communication module restriction specified in Table 25 shall be used.

Table 25 indicates the communication module restrictions to use.

The communication module restriction is not specified as a profile, but as a "Manipulation Level Selection", as specified in DTAM-DM service, Recommendation T.435. The 'Basic Read Only Level' manipulation level selection shall be used including the DM-POINT operation, that is defined as optional in that manipulation level.

### 10.7.4 Application rules

The multi-pointing basic service shall be used to build complex document communication services. Details on how to use the multi-pointing basic service when building complex services are specified in the corresponding complex service specification (in other ITU-T Recommendations).

TABLE 23/T.190

**Values for document related service attributes, for the multi-pointing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | 'remote' | The user is in a location remote to the document. If not, multi-pointing is a local matter. |
| "document copies" | 'several' | Every server in which a document fragment is pointed shall have either a copy of the full document or a document fragment in which all pointing operations will be performed. The client orders the multi-pointing operation, that is performed, as a single pointing, on every server. |
| "document access rights" | 'read-only' | Multi-pointing is a document fragment read-only operation. |
| "store access rights" | N/A | There are no operations on the store. |
| "document format" | 'FOD026'<br>'FOD036' | This service attribute shall take only one of the possible values, depending on the desired document format. |
| "functionality level" | 'F' | Multi-pointing is only possible on a document fragment. |

TABLE 24/T.190

**Values for communication related service attributes for the multi-pointing basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-several' | One communicating entity (client) points a document fragment to n remote communicating entities (servers). |
| "communication type" | 'end-to-end' | Multi-pointing is accomplished using end-to-end communication: Both communicating entities (client and server) are directly connected to perform the service. |
| "communication module" | 'DTAM-DM' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.7.3. |

TABLE 25/T.190

**Selection of communication modules for the multi-pointing basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | | | |
| 'D' | | | | | | |
| 'F' | | | Basic Read Only Level | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

#### 10.7.4.1 Application rules when using DTAM-DM

This is the only possibility for the multi-pointing basic service. DTAM-DM, restricted to the basic read only level, is used.

When the service is requested, the following steps shall be followed (n is the number of communicating entities in which a document will be pointed to):

- Step 1: n DTAM-DM associations shall be established with DTAM-DM-Bind, identifying BS 7.
- Step 2: The document where the point shall be opened with DM-DOCUMENT-OPEN in the n communicating entities with which the association is established.
- Step 3: The DM-POINT operation shall be used to point to a document fragment inside the open document (in the n communicating entities).
- Step 4: The open documents shall be closed with DM-DOCUMENT-CLOSE (in the n communicating entities).
- Step 5: The n DTAM-DM associations shall be released with DTAM-DM-Unbind.

Step 3 and the sequence of steps 2, 3 and 4 can be repeated.

## 10.8 Token-interchange basic service

This subclause defines the token-interchange basic service using the rules given in clause 9.

### 10.8.1 Document related service attributes

For each document related service attribute, Table 26 provides attribute value(s) and value description, following the rules and notation specified in 9.3.1.

TABLE 26/T.190

**Values for document related service attributes for the token-interchange basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "document location" | N/A | The token-interchange basic service is document independent. |
| "document copies" | N/A | The token-interchange basic service is document independent. |
| "document access rights" | N/A | The token-interchange basic service is document independent. |
| "store access rights" | N/A | The token-interchange basic service is document store independent. |
| "document format" | N/A | The token-interchange basic service is document independent. |
| "functionality level" | 'I' | The token-interchange basic service is independent of document store, documents and document fragments. |

### 10.8.2 Communication related service attributes

For each communication related service attribute, Table 27 provides attribute value(s) and value description, following the rules and notation specified in 9.3.2.

TABLE 27/T.190

**Values for communication related service attributes for the token-interchange basic service**

| Service attribute | Attribute value(s) | Value description |
|---|---|---|
| "number of communicating entities" | 'one-to-one' | The token is exchanged between two communicating entities. |
| "communication type" | 'end-to-end' | Token-interchange is accomplished using end-to-end communication: Both communicating entities are directly connected to perform the service. |
| "communication modules" | 'DTAM-TK' | The selection of the communication module is restricted by the values of the "functionality level" and "communication type" attributes, as specified in 10.8.3. |

### 10.8.3 Selection of communication modules

The selection of communication modules depends on the values of the attributes "functionality level" and "communication type". For the token-interchange basic service, there is only one possible value for each of them. The communication module restriction specified in Table 28 shall be used.

Table 28 indicates the communication module restrictions to use.

"Full service element" means that no restrictions are to be applied and that the full service element of the DTAM-TK communication module, comprising the TK-TOKEN-PLEASE and TK-TOKEN-GIVE operations, shall be used (see 8.5).

TABLE 28/T.190

**Selection of communication modules for the token-interchange basic service**

| | "communication type" | | | | | |
|---|---|---|---|---|---|---|
| | 'end-to-end' | | | | | 'store-and-forward' |
| | "communication module" | | | | | |
| "functionality level" | 'DFR' | 'DTAM-BT-NM' | 'DTAM-DM' | 'DTAM-TK' | 'DFR/ DTAM-DM' | 'MHS' |
| 'I' | | | | Full service element | | |
| 'D' | | | | | | |
| 'F' | | | | | | |
| 'F-SF' | | | | | | |
| 'DS-F-SF' | | | | | | |
| 'DM-F-SF' | | | | | | |
| 'D-F-SF' | | | | | | |

### 10.8.4 Application rules

The token-interchange basic service shall be used to build complex document communication services. Details on how to use the token-interchange basic service when building complex services are specified in the corresponding complex service specification (in other ITU-T Recommendations).

#### 10.8.4.1 Application rules when using DTAM-TK

This is the only possibility for the token-interchange basic service. The full service element of DTAM-TK is used.

When the service is requested, the following steps shall be followed:

- Step 1: A DTAM-DM association shall be established with DTAM-DM-Bind, identifying BS 8.
- Step 2: The operations provided in the DTAM-TK SE can be issued, in order to request and/or interchange the application token.
- Step 3: The DTAM-DM association shall be released with DTAM-DM-Unbind.

# Appendix I

## Use of further communication modules

(This appendix does not form an integral part of this Recommendation)

This appendix contains restrictions needed when using some of the services defined in this Recommendation in conjunction with communication modules not considered in clause 8.

This appendix considers the following communication modules, which can be used for facsimile communication or file transfer purposes:

- Document Transfer And Manipulation – Bulk Transfer – Transparent Mode (DTAM-BT-TM);
- Facsimile group 3 (FAX3);
- File Transfer, Access and Manipulation (FTAM).

For each of these communication modules, the following subclauses give information about:

- description;
- services, protocols and profiles;
- use for document communication;

as far as they are relevant for some services of this Recommendation.

Whenever a service of this Recommendation makes use of one of these communication modules, the rules given in the corresponding Standards or Recommendations apply. Constraints and restrictions to communication modules required by services of this Recommendation are defined in clause 10.

Furthermore, this appendix considers the following communication applications, that are known as telematic services in the CCITT/ITU-T nomenclature:

- Facsimile group 4 (FAX4) application;
- Binary File Transfer (BFT) application.

These communication applications are specified on top of communication modules that are mentioned in this Recommendation.

### I.1 Document Transfer And Manipulation – Bulk Transfer – Transparent Mode (DTAM-BT-TM)

#### I.1.1 Description

The communication module DTAM-BT-TM is used to transmit full documents between two communicating entities, following the end-to-end communication principle.

The DTAM-BT-TM protocol maps directly to the session services. An adaptation to the X.215/X.225 session (see III.2.1) is defined in Recommendation T.62 *bis* (see III.2.1).

#### I.1.2 Services, protocols and profiles

The DTAM-BT-TM services are defined in Recommendation T.432 (see III.2.2).

The DTAM-BT-TM protocol is specified in Recommendation T.433 (see III.2.2), and conforms to the Communication Application Profile (CAP) defined in Recommendation T.521 (see III.2.2).

#### I.1.3 Use for document communication

The communication module DTAM-BT-TM provides the protocol platform for the CCITT/ITU-T telematic services facsimile group 4 and binary file transfer. These communication applications are introduced at the end of this appendix.

The communication module DTAM-BT-TM may be used by the following basic services of this Recommendation:

- storing basic service;
- distribution basic service.

In this case, the following procedures and restrictions apply:

- full documents of any document format can be transmitted as binary files, but cannot be distinguished from other binary files;
- the document format is not negotiable in the association establishment phase;
- document communication in the sense of this Recommendation can only be carried out through bilateral agreement between communicating entities.

## I.2 Facsimile group 3 (FAX3)

### I.2.1 Description

The communication module FAX3 is used to transmit full documents between two communicating entities, following the end-to-end communication principle.

Two optional facilities may be used for the transfer of ODA documents:

- ODA/PM26 facility: transmission of data streams conforming to the ODA document format PM-26 (see III.1.2);
- BFT facility (see I.5).

These optional facilities are described in Recommendation T.30 (see III.2.3).

### I.2.2 Services, protocols and profiles

The ODA/PM26 facility is negotiated during the establishment phase, and the negotiation is limited to the indication of the facility supported by the receiver and selected by the sender.

The ODA/PM26 facility requires the use of the Error Correction Mode (ECM) option.

### I.2.3 Use for document communication

ODA documents conforming to the PM-26 document format and binary files can be transmitted using FAX3 options.

The communication module FAX3 may be used by the following basic services of this Recommendation:

- storing basic service;
- distribution basic service.

In the case of ODA documents conforming to the PM-26 document format, the following procedures and restrictions apply:

- ODA documents are transmitted using the ECM option;
- the document format PM-26 is negotiated in the connection establishment phase.

Otherwise, the following procedures and restrictions apply:

- full documents of any document format can be transmitted as binary files, but cannot be distinguished from other binary files;
- the document format is not negotiable in the connection establishment phase for BFT purposes;
- document communication in the sense of this Recommendation can only be carried out through bilateral agreement between communicating entities.

## I.3 File Transfer, Access and Manipulation (FTAM)

### I.3.1 Description

The communication module FTAM allows for communicating entities to access and manage remote virtual file stores. FTAM enables the transfer of files that are contained in the virtual file stores.

FTAM files are not related to ODA documents.

FTAM communication applications are based on the end-to-end communication principle.

### I.3.2 Services, protocols and profiles

The FTAM services and protocols are defined and specified in ISO/IEC 8571 (see III.2.5).

The following application profiles for FTAM are defined:

- AFT11: Simple file transfer;
- AFT12: Positional file transfer (Flat);
- AFT13: File transfer service (Hierarchical);
- AFT22: Positional file access (Flat);
- AFT23: Full file access (Hierarchical);
- AFT3: File management;
- AFT4: File store management service.

Two additional profiles AFTnn give general definitions and constraints (see III.2.5).

### I.3.3 Use for document communication

ODA documents can be transmitted by FTAM and have to be identified as "ISO FTAM Unstructured Binary" document type. However, since files that do not contain ODA documents can have the same document type, it is left to the user of the communication application that remotely access files using FTAM to know that a given file contains an ODA document.

The communication module FTAM may be used by the following basic services of this Recommendation:

- storing basic service;
- distribution basic service.

In this case, the following procedures and restrictions apply:

- full documents of any document format can be transmitted as binary files, but cannot be distinguished from other binary files;
- the document format is not negotiable in the connection establishment phase;
- document communication in the sense of this ITU-T Recommendation can only be carried out through bilateral agreement between communicating entities.

## I.4 Facsimile group 4 (FAX4) application

### I.4.1 Description

The communication application profile for FAX4 is used to transmit full documents between two communicating entities, following the end-to-end communication principle.

FAX4 documents are a subset of ODA documents belonging to the raster graphics content architecture level and the formatted document architecture class. FAX4 documents can only be transferred and managed but cannot be manipulated.

### I.4.2 Services, protocols and profiles

The transmission protocol conforms to the CAP given in Recommendation T.521 (see III.2.2), if the DTAM-BT-TM communication module is used.

FAX4 documents conform to the DAP defined in Recommendation T.503 (see III.2.6).

### I.4.3 Use for document communication

The communication application profile for FAX4 is used with BFT to realize the following basic services of this Recommendation:

- storing basic service;
- distribution basic service.

In this case, the following procedures and restrictions apply:

- full documents of any document format can be transmitted as binary files, but cannot be distinguished from other binary files;
- the document format is not negotiable in the association establishment phase;
- document communication in the sense of this Recommendation can only be carried out through bilateral agreement between communicating entities.

## I.5 Binary File Transfer (BFT) application

### I.5.1 Description

The communication application BFT is used to transmit full documents between two communicating entities, following the end-to-end communication principle.

BFT documents are amounts of binary information which is arranged as a linear sequence of octets with synchronization points set every n octets. BFT documents can only be transferred and managed but cannot be manipulated. BFT documents are not related to ODA documents.

BFT, as an option of telematic services, uses the DTAM-BT-NM or DTAM-BT-TM communication modules for file transmission. Furthermore, BFT can be carried out using FAX3, MHS or Teletex communication modules.

### I.5.2 Services, protocols and profiles

If BFT is based on the communication module DTAM-BT-NM, the transmission protocol conforms to the CAP defined in Recommendation T.522.

If BFT is based on the communication module DTAM-BT-TM, the transmission protocol conforms to the CAP given in Recommendation T.521 (see III.2.2).

### I.5.3 Use for document communication

ODA documents can be transmitted as binary files.

The communication application BFT may be used by the following basic services of this Recommendation:

- storing basic service;
- distribution basic service.

In this case, the following procedures and restrictions apply:

- full documents of any document format can be transmitted as binary files, but cannot be distinguished from other binary files;
- the document format is not negotiable in the connection establishment phase;
- document communication in the sense of this Recommendation can only be carried out through bilateral agreement between communicating entities.

# Appendix II

## Implementation guidelines

(This appendix does not form an integral part of this Recommendation)

This appendix contains guidelines for implementors of the basic services defined in this Recommendation.

In subclause II.1, general aspects are considered which are valid for every basic service.

Subsequent subclauses give specific guidance to implement the following basic services of this Recommendation:

- storing basic service;
- distribution basic service;
- retrieval basic service;
- storing-and-retrieval basic service;
- manipulation basic service;
- pointing basic service;
- multi-pointing basic service;
- token-interchange basic service.

## II.1 General implementation guidelines

In this subclause, general topics, valid for every basic service, are considered.

### II.1.1 Amount of information to be transferred

Message Handling Systems may restrict the transferable overall message size to some value that may not be sufficient for document transfers. Therefore, a different mechanism to transmit high-volume documents is necessary.

One solution is to use other communication modules than MHS.

Another solution is to put a reference on these high-volume documents in a MHS message and send this MHS message to the remote communicating entity or entities. The documents represented by the reference can be accessed upon request using other communication modules. Implementations of this mechanism of external references may be based on the Distributed Office Applications Model (DOAM) (see III.2.1) using Referenced Object Access (ROA) protocols (see III.2.1).

### II.1.2 Mapping of DFR access rights to access rights of this Recommendation

Table II.1 provides a mapping of DFR access rights, defined in ISO/IEC 10166-1 to store access rights of this Recommendation, defined in 9.1.4.

NOTE – In DFR, 'no access' is not explicitly stated but has the same effect if all other rights are absent. 'Add-only' does not exist in DFR. Therefore, the ITU-T Recommendation store access rights are a superset of the DFR access rights. This is because this Recommendation considers document fragments too, which is outside the scope of DFR.

### II.1.3 Quality of Service (QOS)

QOS is defined, in the context of communication applications, as the collective effect of service performances which determine the degree of satisfaction of a user of the service or communication application.

QOS is defined and measured in terms of parameters related to speed, accuracy and dependability of the normal phases of the communication between communicating entities; i.e. access, information transfer, and disengagement.

TABLE II.1/T.190

**Mapping of DFR access rights to store access rights of this Recommendation**

| DFR access rights | Recommendation T.190 store access rights |
|---|---|
| – | 'no access' |
| read | 'read-only' |
| – | 'add-only' |
| extended-read | 'extended-read' |
| read-modify | 'read-only' and 'modify' |
| read-modify-delete | 'read-only' and 'modify' and 'delete-only' |
| owner | 'full-access' |

In the context of the services specified in this Recommendation, those kinds of QOS parameters are left to the communication modules used. Then, QOS is related to the services as far as it is related to the involved communication modules.

Then, the QOS is related to particular service attributes specified in clause 9. These are:

- "document format";
- "functionality level";
- "communication type";
- "communication module".

These are the service attributes that are chosen by implementors, subject to the rules specified in this Recommendation. The selection of values for these attributes implies the quality of the service.

As explained in 9.3, the normal way of giving values to these attributes is the following, that also affects the final QOS of the service:

- a DAP level is chosen (value of "document format" service attribute). This implies a level of QOS. This selection has no effect in the rest of selections;
- a functionality level (i.e., on which objects the service will be applied) is chosen (value of the "functionality level" service attribute). This selection will limit the possibilities of selection for the rest of attributes;
- end-to-end or store-and-forward communication type is chosen (value of "communication type" service attribute). This selection has a clear implication on some QOS of the services. For example, selection of store-and-forward communication for a strongly interactive application will affect global performance of the service. It may happen that there is no possibility to implement a given service with the chosen communication type (and, may be, functionality level). In any case, the selection of the communication type may restrict the possible communication modules;
- for the combination of values of the two previous attributes, the normal situation is that only one possible communication module is possible. In this case, the QOS of that module will affect the QOS of the service. It also may happen that there are no possible communication modules for the given combination of attribute values. In this case, a new selection has to be made, changing then the QOS parameters. Finally, sometimes a choice has to be made between more than one communication module, that, normally, will imply different QOS parameter values.

### II.1.4 Security

A security architecture for open systems is defined in ISO 7498-2 (see III.2.1).

Security can be achieved by administrative, logical or physical means. Only logical means are considered by this Recommendation, and should be provided mainly by the communication modules.

Logical means to provide security are built on specific implemented mechanisms such as:

- Authentication: It is used to verify the identity of the communicating entity using the peer-to-peer authentication of layers in the OSI structure. A simple possibility makes use of password techniques. A more sophisticated approach is the use of cryptographic means and exchange of public or secret keys.

- Access control: It is achieved by limiting the ability of communicating entities to access data in host systems. It is supported in communication applications by using profiles, which allow reading, archiving, modifying, full access, etc. Profiles have to be identified during the communication establishment phase. Communication application providers may maintain black lists to control (and block if necessary) the access to their systems.

- Data confidentiality: It means protection of data against unauthorised reading when it is transmitted or stored. Mechanisms are file encryption/decryption technics in document stores, servers or communication applications.

- Data integrity: It is provided by use of reliable transfer protocols and error detection/correction algorithms.

Implementations of applications, which use the basic services of this Recommendation, should use existing security mechanisms of the OSI structure or should adapt or develop their own security features, considering the hints above.

## II.2 Specific implementation hints for the storing basic service

The storing basic service has only one possible value for the "functionality level" attribute. Then, the first selection to be made is between end-to-end and store-and-forward type of communication. For the first option, there is also a choice between two possible communication modules (DFR or DTAM-BT-NM); for the second option, only MHS can be used.

The following hints may be useful for implementors of this basic service:

- if only some of the three possible communication modules are available, the selection can be done between those already available;

- the selection of the communication module heavily depends on the available communication modules of the intended recipients of the documents. Those should be used;

- the availability of other services, like distribution, may also constrain the selection of the communication module. It is better not to use different communication modules;

- use of DFR takes precedence when documents are sent to stores with a particular DFR structure;

- when none of the previous hints need to be applied, DTAM-BT-NM is the best selection.

## II.3 Specific implementation hints for the distribution basic service

The distribution basic service has only one possible value for the "functionality level" attribute. Then, the first selection to be made is between end-to-end and store-and-forward type of communication. For the first selection, there is also a choice between two possible communication modules (DFR or DTAM-BT-NM); for the second, only MHS can be used.

The following hints may be useful for implementors of this basic service:

- if only some of the three possible communication modules are available, the selection can be done between those already available;

- the selection of the communication module heavily depends on the available communication modules of the intended recipients of the documents. Those should be used;

– the availability of other services, like storing, may also constrain the selection of the communication module. It is better not to use different communication modules;

– use of DFR takes precedence when documents are sent to stores with a particular DFR structure;

– when none of the previous hints need to be applied, MHS is the best selection when the number of recipients is big enough, because the distribution of the document(s) could be implemented with only one operation.

## II.4 Specific implementation hints for the retrieval basic service

The retrieval basic service has several possible values for the "functionality level" attribute. Then, a second selection to be made is between end-to-end and store-and-forward type of communication. For the first selection, and for a given functionality level, only one communication module is possible (DFR, DTAM-DM or DFR/DTAM-DM, depending on the chosen functionality level); for the second, only MHS can be used.

The following hints may be useful for implementors of this basic service:

– the first decision should be the communication type. In principle, end-to-end is preferred, because this is normally an interactive service. However, if only MHS is available, or if it is not really required to have interactive retrieval operations, store-and-forward communication can be chosen;

– if end-to-end communication is chosen, the functionality level should be the criteria that, following the rules given in clause 10, allow to select a communication module. However, if there is an impossibility or a restriction to implement that communication module, then the preferred communication module will force the functionality level to implement.

## II.5 Specific implementation hints for the storing-and-retrieval basic service

The storing-and-retrieval basic service has several possible values for the "functionality level" attribute. Then, a second selection to be made is between end-to-end and store-and-forward type of communication. For the first selection, and for a given functionality level, only one communication module is possible (DFR, DTAM-DM or DFR/DTAM-DM, depending on the chosen functionality level); for the second, only MHS can be used.

The following hints may be useful for implementors of this basic service:

– the first decision should be the communication type. In principle, end-to-end is preferred, because this is normally an interactive service. However, if only MHS is available, or if it is not really required to have interactive storing and retrieval operations, store-and-forward communication can be chosen;

– if end-to-end communication is chosen, the functionality level should be the criteria that, following the rules given in clause 10, allow to select a communication module. However, if there is an impossibility or a restriction to implement that communication module, then the preferred communication module will force the functionality level to implement.

## II.6 Specific implementation hints for the manipulation basic service

The manipulation basic service has several possible values for the "functionality level" attribute. Then, a second selection to be made is between end-to-end and store-and-forward type of communication. For the first selection, and for a given functionality level, only one communication module is possible (DFR, DTAM-DM or DFR/DTAM-DM, depending on the chosen functionality level); for the second, only MHS can be used.

The following hints may be useful for implementors of this basic service:

- the first decision should be the communication type. In principle, end-to-end is preferred, because this is normally an interactive service. However, if only MHS is available, or if it is not really required to have interactive manipulation operations, store-and-forward communication can be chosen. However, this is only expected in very specific cases;

- if end-to-end communication is chosen, the functionality level should be the criteria that, following the rules given in clause 10, allow to select a communication module. However, if there is an impossibility or a restriction to implement that communication module, then the preferred communication module will force the functionality level to implement.

## II.7 Specific implementation hints for the pointing basic service

The pointing basic service has only one possible value for the "functionality level", "communication type" and "communication module" attributes. Then, no hints for implementors are given for this basic service.

## II.8 Specific implementation hints for the multi-pointing basic service

The multi-pointing basic service has only one possible value for the "functionality level", "communication type" and "communication module" attributes. Then, no hints for implementors are given for this basic service.

## II.9 Specific implementation hints for the token-interchange basic service

The token-interchange basic service has only one possible value for the "functionality level", "communication type" and "communication module" attributes. Then, no hints for implementors are given for this basic service.

# Appendix III

# Bibliography

(This appendix does not form an integral part of this Recommendation)

This bibliography provides additional information about document and communication architectures, so far as they are relevant for this Recommendation.

## III.1 Document architectures

### III.1.1 Open Document Architecture (ODA) extensions


- ITU-T Recommendation T.419 (1994) | ISO/IEC 8613-9:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Audio content architecture.*

- ISO/IEC 8613-10:1991, *Information processing – Text and office systems – Open Document Architecture (ODA) and interchange format – Part 10: Formal specifications.*

- ITU-T Recommendation T.421 (1994) | ISO/IEC 8613-11:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Tabular structures and tabular layout.*

- ITU-T Recommendation T.424 (1994) | ISO/IEC 8613-14:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Temporal relationships and non-linear structures.*

### III.1.2 ODA profiles

- ISO/IEC ISP 12064:1994, *Information technology – International standardized profile FOD112 – Interchange Format and representation profile for ODA: Image applications profile.*
- ISO/IEC ISP, *Information technology – International standardized profile FOD126 – Interchange Format and representation profile for ODA: Image applications profile.*
- CCITT Recommendation T.505 (1991), *Document application profile PM-26 for the interchange of mixed content documents in processable and formatted forms.*

## III.2 Communication architectures

### III.2.1 Base documents

- CCITT Recommendation T.62 *bis* (1988), *Control procedures for teletex and G4 facsimile services based on Recommendations X.215 and X.225.*
- CCITT Recommendation X.200 (1988) | ISO 7498:1984, *Reference model of Open Systems Interconnection for CCITT applications.*
- ISO 7498-2:1989, *Information processing systems – Open Systems Interconnection – Basic reference model – Part 2: Security architecture.*
- CCITT Recommendation X.215 (1988), *Session service definition for Open Systems Interconnection for CCITT applications.*
- ISO/8326:1987, *Information processing systems – Open Systems Interconnection – Basic connection oriented session service definition.*
- CCITT Recommendation X.225 (1988), *Session protocol specification for Open Systems Interconnection for CCITT applications.*
- ISO 8327:1987, *Information processing systems – Open Systems Interconnection – Basic connection oriented session protocol specification.*
- CCITT Recommendation X.216 (1988), *Presentation service definition for Open Systems Interconnection for CCITT applications.*
- ISO/IEC 8822:1994, *Information Technology – Open Systems Interconnection – Presentation service definition.*
- CCITT Recommendation X.226 (1988), *Presentation protocol specification for Open Systems Interconnection for CCITT applications.*
- ISO/IEC 8823-1:1994, *Information Technology – Open Systems Interconnection – Connection oriented presentation protocol: Protocol specification.*
- CCITT Recommendation X.217 (1988), *Association control service definition for Open Systems Interconnection for CCITT applications.*
- ISO 8649:1988, *Information processing systems – Open Systems Interconnection – Service definition for the Association Control Service Element.*
- CCITT Recommendation X.227 (1988), *Association control protocol specification for Open Systems Interconnection for CCITT applications.*
- ISO 8650:1988, *Information processing systems – Open Systems Interconnection – Protocol specification for the Association Control Service Element.*
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