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Cooperative document handling (CDH) – Joint synchronous editing (point-to-point)

ITU-T Recommendation T.191

(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.191 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 3rd of July 1996.

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 one complex service, "joint synchronous editing (point-to-point)", where two users are communicating for the purpose to produce a new document, revise an existing document and view an existing document jointly.

COOPERATIVE DOCUMENT HANDLING (CDH) – JOINT SYNCHRONOUS EDITING (POINT-TO-POINT)

(Geneva, 1996)

1 Scope

The T.190-Series of Recommendations specify the 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.

The Open Document Architecture (ODA) and associated profiles specify the means to represent and interchange multimedia documents.

The Document Transfer and Manipulation (DTAM) and Document Filing & Retrieval (DFR) specify interchange, remote manipulation and management of documents at the application layer of the Open Systems Interconnection (OSI).

Recommendation T.190 defines the framework for document communication services and set of basic services. Based on the framework and the basic services, the T.190-Series of Recommendations define a set of complex services such as Asynchronous document production, Sequential document production, Joint synchronous editing and Joint presentation/viewing, by combining basic services.

This Recommendation specifies one complex service, "joint synchronous editing (point-to-point configuration)", where two users are communicating for the purpose to produce a new document, revise an existing document and view an existing document jointly.

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 the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation T.190 (1995), *Cooperative Document Handling (CDH) – Framework and basic services.*
- CCITT Recommendation T.431 (1992), *Document Transfer and Manipulation (DTAM) – Services and protocols – Introduction and general principles.*
- CCITT Recommendation T.432 (1992), *Document Transfer and Manipulation (DTAM) – Services and protocols – Service definition.*
- CCITT Recommendation T.433 (1992), *Document Transfer and Manipulation (DTAM) – Services and protocols – Protocol specification.*
- 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.*
- 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, *Information technology – Text and office systems – Document Filing and Retrieval (DFR) – Part 1: Abstract service definition and procedures – Technical Corrigendum 1: 1994 and Technical corrigendum 2: 1994.*

- ISO/IEC 10166-2:1991, *Information technology – Text and office systems – Document Filing and Retrieval (DFR) – Part 2: Protocol specification.*
- CCITT Recommendation T.522 (1992), *Communication application profile BT1 for document bulk transfer.*
- ITU-T Recommendation T.502 (1994), *Document application profile PM-11 for the interchange of simple structure, character content documents in processable and formatted forms.*
- ITU-T Recommendation T.505 (1994), *Document application profile PM-26 for the interchange of enhanced structure, mixed content documents in processable and formatted forms.*
- ITU-T Recommendation T.506 (1993), *Document Application Profile PM-36 for the interchange of extended document structure and mixed content documents in processable formatted forms.*
- ISO/IEC ISP, *International Standard Profiles ADF12069 – Application profiles for Document Filing and Retrieval (DFR).*
- ISO/IEC ISP, *International Standard Profiles AOD15129 – Application profiles for Open Document Architecture (ODA): Profiles for interactive manipulation of ODA documents.*

3 Definitions

For the purposes of this Recommendation, the definitions given in Recommendation T. 190 apply.

4 Abbreviations

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

ACSE	Association Control Service Element
ADF	Application profile for DFR
AOD	Application profile for ODA
CAP	Communication Application Profile
DAP	Document Application Profile
DFR	Document Filing and Retrieval
DTAM	Document Transfer and Manipulation
DTAM-BT	DTAM Bulk Transfer
DTAM-DM	DTAM Document Manipulation
DTAM-TK	DTAM application Token
ODA	Open Document Architecture
OSI	Open Systems Interconnection
ROSE	Remote Operations Service Element
RTSE	Reliable Transfer Service Element

5 Overview of joint synchronous editing (point-to-point)

Joint synchronous editing (point-to-point) supports document creation or presentation by two-users cooperatively on real-time basis. The communication model of this complex service is based on extended client-to-server model where two communication entities play the role of both client and server simultaneously. In this communication model, all clients have the copy of the same document and document processing capabilities, which are in line with features required by this Recommendation.

In order to keep consistency of the document copies located at the client, floor control (token control) is used. This ensures that the possibility for the two clients to manipulate the document is limited. Therefore with the result of modification or presentation, all the document copies located at the client must be always the same during and after the joint synchronous editing service.

Joint synchronous editing covers various kinds of applications, such as co-writing of multimedia documents, co-development of software, computer base training and educating (CBT), electronic contract, remote CAD system, medical application.

This Recommendation specifies the profiles for the standard document, i. e. "Document Application profile", and the profile for the standard communication protocol, i.e. "Communication Application profile" and "terminal characteristics", which may be used for joint synchronous editing service.

5.1 Basic procedures of joint synchronous editing (point-to-point)

The basic procedure of the joint synchronous editing consists of document pre-manipulation/presentation phase, and joint synchronous editing phase as illustrated in Figure 1.

1) *Document Pre-manipulation /Presentation phase* (optional)

   In this phase, all the documents to be revised or viewed are transmitted to the other terminal before joint synchronous editing. Storing and retrieving all the documents to/from the document store at the remote site, both terminals possess the same copies of the documents at the start of the joint synchronous editing service. This phase must require document bulk transfer function or document filing & retrieval function.

   This phase is optionally used.

2) *Joint Synchronous editing Phase* (mandatory)

   This phase includes the following sub-procedures, association establishment, opening of the documents, manipulation/presentation of the opened documents (including token interchange), closing of the documents, and association release. During this phase, both users can manipulate or view a part of the documents, i.e. document fragments remotely.

   NOTE – New documents used to be revised or viewed jointly may be created locally. This is out of the scope of this Recommendation.

5.2 Configuration of joint synchronous editing (point-to-point)

Joint synchronous editing is based on the extended server client model, where two users play the role of both server and client alternately. In this model, all the conference terminals have the same document processing capabilities and the same document.

In this service, two users can manipulate or present documents by using the basic services defined in Recommendation T.190. Each communication entity consists of the document process, the basic services, the documents and the application as illustrated in Figure 2. Application is out of scope of this Recommendation.

Figure 2 a) shows the situation where terminal 1 plays the role of the client and terminal 2 plays the role of the server. In this situation, terminal 1 which possesses an application token can manipulate the copy of the documents.

If, for example, the terminal 1 edits document fragment, then the local editing process is executed by the local document process. At the same time, the local editing command may be converted to standardized protocol data by basic services at the client, and the standardized protocol data may be conveyed to the remote server. At the server, standardized protocol data may be converted to the corresponding local editing command via basic services at the remote server. Finally, local editing command is executed by the document process at the server.

After the token interchange procedure, Figure 2 b) shows the situation where the terminal 2 plays the role of the client and the terminal 1 plays the role of the server.

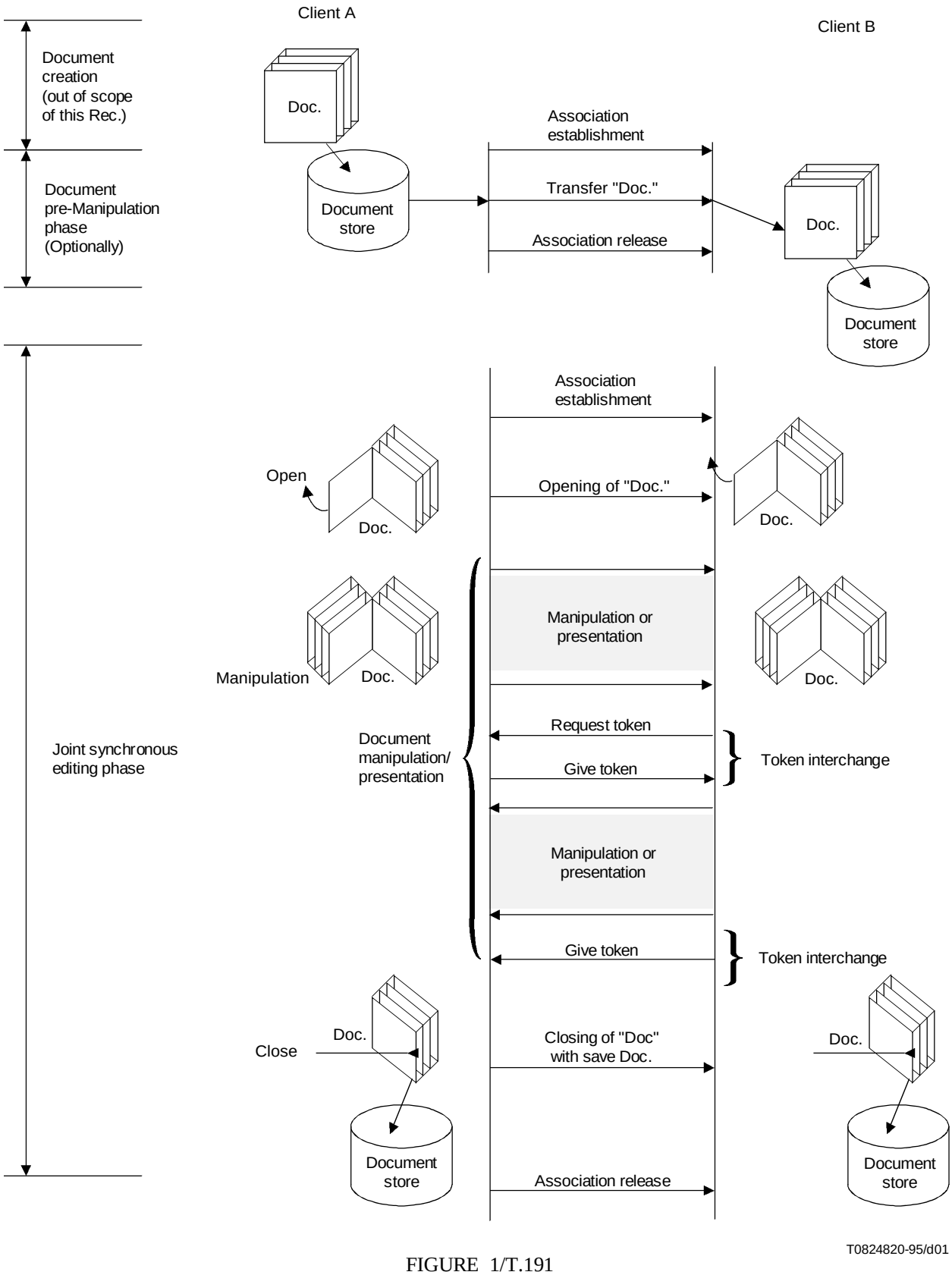

FIGURE 1/T.191

Basic procedures of joint synchronous editing

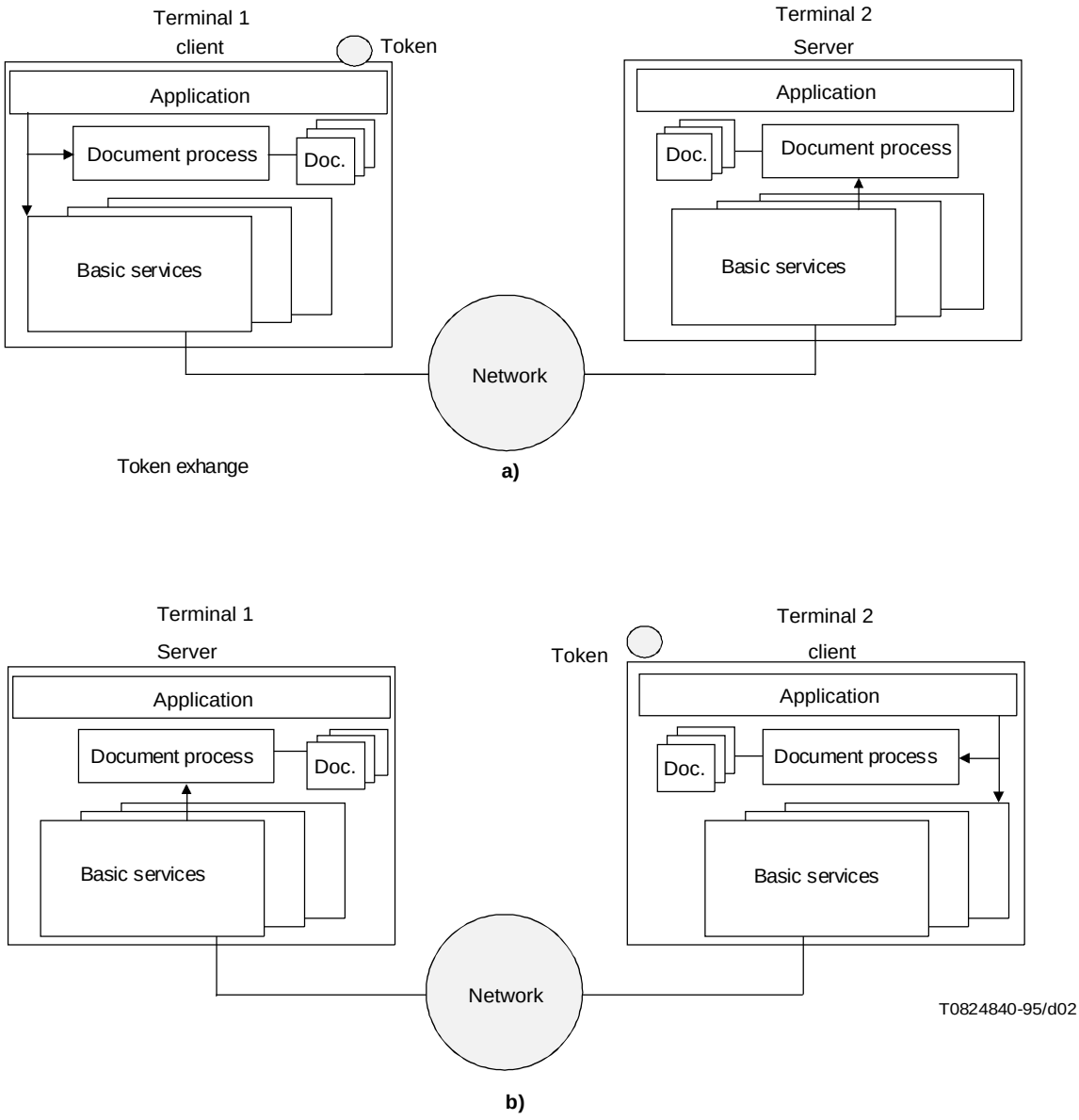

FIGURE 2/T.191

Configuration of joint synchronous editing (point-to-point)

6 Definition of document conferencing and remote presentation service

6.1 The use of basic services

Basic services which are the fundamental document communication service, are defined in Recommendation T.190. By combining these basic services, new complex services may be defined. The following basic services are used to realize joint synchronous editing (point-to-point).

1) *Storing basic service* (optional)

   Storing basic service may be optionally used to transfer the document at pre-manipulation/presentation phase defined in 5.1.

2) *Storing and Retrieval basic service* (optional)

   If each terminal supports document store, Storing and Retrieval basic service may be optionally used to transfer or retrieve the document at pre-manipulation/presentation phase defined in 5.1.

   In the case that pre-manipulation/presentation phase is supported, either storing basic service or storing & retrieval basic service shall be used.

3) *Manipulation basic service* (mandatory)

   Manipulation basic service shall be used to manipulate the remote document fragments stored in the peer entity during the joint synchronous editing phase defined in 5.1.

4) *Token interchange basic service* (mandatory)

   Token interchange basic service shall be used to control the application token during the joint synchronous editing phase defined in 5.1. In this service, the terminal which possesses an application token can manipulate the document or the document fragments.

5) *Pointing basic service* (mandatory)

   Pointing basic service shall be used to inform the peer user of the specific document fragment to be paid attention to.

6.2 Formal definition of joint synchronous editing (point-to-point)

This subclause defines the joint synchronous editing by means of the components and design rules for basic services, defined in Recommendation T.190

6.2.1 Document related service attributes

This complex service may be formalized by using the following document related service attributes defined in Recommendation T.190.

6.2.1.1 document location

In this complex service, the client manipulates the remote document at the peer entity, i.e. the server. Furthermore, the client has also the local copy of the documents which are identical to the documents at the remote server because the role of client/server may be altered by the token interchange. Therefore, the value of the service attribute "document location" shall take 'local' and 'remote'.

6.2.1.2 document copies

As defined in 6.2.1.1, each user has completely the same copy of the documents. Therefore, the value of the service attribute "document copies" shall take 'several'.

6.2.1.3 document access rights

This complex service requires to read, delete, add and modify the existing document fragments. Therefore, the value of the service attribute "document access rights" shall take 'full access'.

6.2.1.4 store access rights

This complex service requires to read the existing document, update the modified document or add a new document. On the other hand, this complex service does not allow to delete the existing document. Therefore, the value of the service attribute "store access rights" shall take 'read-only', 'modify', and 'add-only'.

6.2.1.5 document format

This complex service shall take one of the following possible values, depending on the desired document format.

'FOD11 (PM11)', 'FOD26 (PM26)', 'FOD36 (PM36)'

6.2.1.6 functionality level

The service object for this complex service shall be document store, one or more documents and one or more document fragments. Therefore, the value of service attributes "functionality level" shall take 'D-F-SF'.

Table 1 shows the summary of the document related service attribute, attribute value(s) and value description.

TABLE 1/T.191

Values for document related service attributes for the conferencing and remote presentation type of CDH

Service attribute	Attribute value(s)	Value description
"document location"	'local' and 'remote'	The client has also the local copy of the documents which are identical to the documents at remote the server
"document copies"	'several (two)'	Each user has completely the same copy of the documents
"document access rights"	'full access'	Both users can manipulate the document fragments
"store access rights"	'read-only', 'modify' and 'add-only'	Both users can read the existing document, update the modified document, and add a new document, but cannot delete the existing documents
"document format"	'FOD11 (PM11)' 'FOD26 (PM26)' 'FOD36 (PM36)'	This service attribute shall take only one of the possible values, depending on the desired document format
"functionality level"	D-F-SF	Document store, one or more documents and one or more document fragments shall be used

6.2.2 Communication related service attributes

This complex service may be formalized by using the following communication related service attributes defined in Recommendation T.190.

6.2.2.1 number of communicating entities

This complex service is based on the point-to-point configuration. Therefore, the value of service attributes "number of communicating entities" shall take 'one-to-one'.

6.2.2.2 communication type

In this complex service, both communicating entities (a client and a server) are directly connected to perform the services. Therefore, the value of service attributes "communication type" shall take 'end-to-end'.

6.2.2.3 communication module

DTAM-DM communication module shall be used to manipulate one or more document fragments at the remote server. DTAM-TK communication module shall be used to control the application token to prevent from simultaneous access by both users. DTAM-BT communication module may be optionally used to transfer document during pre-manipulation/presentation phase defined in this Recommendation. If this complex service supports management functions at the remote document store such as list, search or etc. DFR/DTAM-DM shall be used instead of DTAM-DM, in order to manipulate one or more document fragments at the remote server and to manage the document store at the remote server.

Table 2 shows the summary of the communication related service attribute, attribute value(s) and value description.

TABLE 2/T.191

Values for communication related service attributes for the joint synchronous editing (point-to-point)

Service attribute	Attribute value(s)	Value description
"number of communicating entities"	'one-to-one'	Both clients manipulate documents in the peer remote servers alternatively
"communication type"	'end-to-end'	Both communicating entities (clients and servers) are directly connected to perform the service
"communication module"	'DTAM-DM' 'DTAM-TK' 'DTAM-BT' 'DFR/DTAM-DM'	The selection of the communication modules is restricted by the chosen values of the "functionality level" and "communication type" attributes as specified in Rec. T.190

7 Profiles for joint synchronous editing

7.1 Document application profile for joint synchronous editing

This complex service, specified in this Recommendation, is intended to be used with ODA document format. For other formats, see 7.1.2.

7.1.1 ODA document format

Joint synchronous editing supports various types of documents depending on the specific applications.

7.1.1.1 DAPs based on the processable form

As for the processable form, some useful DAPs have already been defined in Recommendation T.190. This complex service shall use one of the three DAPs defined in Recommendation T.190.

Using FOD011(PM11) documents, effective collaboration or coordination of the software development may be realized by multi-user interactions. On the other hand, using FOD026(PM26) or FOD036(PM36) documents, the multimedia co-editing applications may be realized.

7.1.1.2 DAPs based on the formatted form (further study)

This subclause is for further study.

Formatted documents are useful for simple remote presentation, electronic contract to fill the form, or shared-navigation. Table 3 shows the examples of DAPs based on the formatted form. FOD112 and FOD126 may be used by the remote presentation/viewing service. The table mode is a new DAP which includes the tabular structures or the spreadsheet. This mode is a typical DAP to make an electronic contract with the users at a remote site. In this case, an electronic invoice can be created by the cooperation of two users.

As the extension of the formatted form, hypermedia documents can also be considered as a new DAP for this complex service. Using the hypermedia documents (e.g. including moving pictures), the attractive navigation can be realized.

TABLE 3/T.191

Example of DAPs for CDH

Document Type	Examples of DAPs	Objective
Processable form document	FOD026 (PM26), FOD036 (PM36) FOD011 (PM11)	Co-editing Co-developing software
Formatted form document (further study)	FOD112 FOD126 Table mode Hypermedia mode	Presentation-type Presentation-type Electronic contract Shared-navigation

7.1.2 Other formats

Coding method such as MHEG, JPEG, JBIG, SGML or proprietary formats may be optionally used for this complex service in order to cover the various types of joint synchronous editing applications.

JPEG or JBIG may be considered as one "type of coding" of ODA attributes. In such a case, JPEG or JBIG document is specified by using DAP.

Other formats may also be used.

7.2 Communication modules for joint synchronous editing (point-to-point)

7.2.1 DTAM-DM communication module

The DTAM-DM communication module is used to manipulate the document fragments of the documents at the remote server. This complex service shall use DTAM-DM except for the case that DFR/DTAM-DM is used.

The DTAM-DM communication module is defined in Recommendation T.190.

7.2.1.1 Profile for DTAM-DM

This complex service shall make use of either Basic Manipulation level or Basic Read Only level.

Extended level shall not be used for this complex service.

- In the case that this complex service selects 'basicReadOlnyLevel', then open, close, list, get, point, search abstract services shall be used.
- In the case that this complex selects 'basicManipulationLevel', then open, save, discard, close, list, get, point, search, create, delete, modify and copy abstract services shall be used.

See Table 4.

7.2.1.2 Profile for ODA abstract interface

Mapping of arguments between Abstract Interface and DTAM-DM operation is defined in Table A.1/ T.413.

7.2.1.3 The units of manipulation

The units of manipulation depend on the specific document format and communication interface. If, for example, ODA is used in conjunction with ODA Abstract Interface (AI), the units are manipulated as a document fragment which can be assigned to an object identifier.

If manipulation of smaller units than document fragment is required for easy modification of one character, the content location model needs to be introduced, which is still under study.

TABLE 4/T.191

Selection of DTAM-DM abstract service

DTAM-DM abstract service	basicReadOlnyLevel	basicManipulationLevel
DM-DOCUMENT-OPEN	m	m
DM-DOCUMENT-SAVE	–	m
DM-DOCUMENT-DISCARD	–	m
DM-DOCUMENT-CLOSE	m	m
DM-POINT	m	m
DM-DOCUMENT-LIST	c	c
DM-GET	m	m
DM-SEARCH	m	m
DM-CREATE	–	m
DM-DELETE	–	m
DM-MODIFY	–	m
DM-COPY	–	m
DM-MOVE	–	–
DM-REPLACE	–	–
DM-RESERVE	–	–
DM-UNRESERVE	–	–
DM-MACRO-CALL	–	–
DM-GROUP-BEGIN	–	–
DM-GROUP-END	–	–

m Mandatory
c Conditional
– Not used for this complex service

7.2.2 DTAM-TK communication module

The DTAM-TK communication module shall be used to control the application token to prevent from simultaneous access by both users. This complex service shall make use of the DTAM-TK.

The DTAM-TK communication module is defined in Recommendation T.190.

7.2.3 DTAM-BT communication module

The DTAM-BT communication module is used for transferring full documents between communication entities. This complex service may make use of the DTAM-BT communication module optionally.

The DTAM-BT communication module is defined in Recommendation T.190.

7.2.4 DFR/DTAM-DM communication module

The DFR/DTAM-DM communication module is used to manipulate the document fragments of the documents at the remote server or to manage the full document at the remote server. This complex service shall make use of the DFR/DTAM-DM except for the case that the DTAM-DM is used.

The DFR/DTAM-DM communication module is defined in Recommendation T.190.

7.3 Summary of modules for joint synchronous editing (point-to-point)

Figure 3 shows the summary of modules for Joint Synchronous Editing (point-to-point).

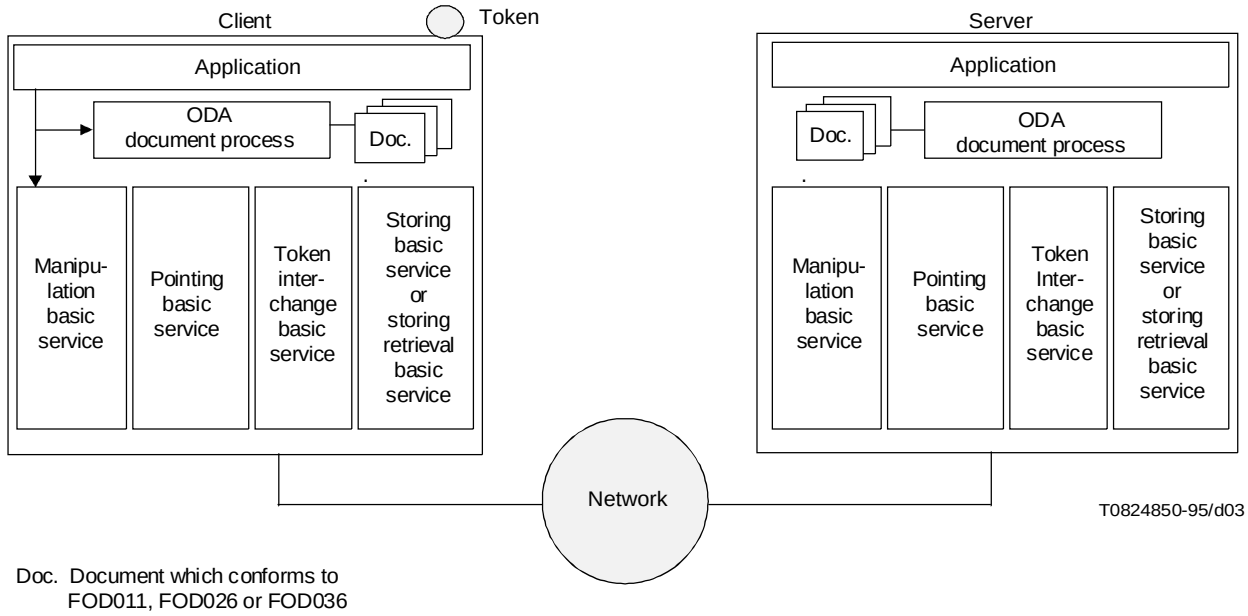

FIGURE 3/T.191

The summary of modules for joint synchronous editing (point-to-point)

8 The use of service primitives and parameters for communication modules

8.1 DTAM-DM service primitives and parameters

8.1.1 Abstract-bind operation

DTAM service definition and parameters are defined in Recommendation T.435. This subclause specifies the parameter of DTAM-DM for Joint Synchronous Editing.

8.1.1.1 Bind-Argument parameters

The parameter of Abstract-Bind service for this complex service are used as follows. See also Table 5.

1) *DTAM protocol version*

   "version-1" is specified in this complex service.

2) *Manipulation capabilities*

   This parameter is defined in Recommendation T.435. The DTAM-DM selects "manipulation level selection."

   This complex service shall make use of either 'Basic Manipulation level' or 'Basic Read Only level'.

3) *ODA application capabilities*

This "application capabilities" is defined in Recommendation T.435 and the following sub-parameters are used:

i) oda document application profile;

This parameter is defined in Recommendation T.432.

ii) non-basic document characteristics;

This parameter is defined in Recommendation T.432.

4) *Bilateral information*

i) server name;

This parameter is defined in Recommendation T.435.

ii) information;

This parameter is defined in Recommendation T.435.

5) *Application requirements*

This parameter is defined in Recommendation T.435.

TABLE 5/T.191

Use of Bind-Argument parameters

Parameter name	Class
dtamProtocolVersion	m
dtamManipulationCapabilities	m
odaApplicationCapabilities	m
dfrCapabilities	–
bilateralInformation	m
applicationRequirement	o

m Mandatory
o Optional
– Not used for this complex service

8.1.1.2 Bind-Result parameters

The parameter of Abstract-Bind service for this complex service are used as follows (see Table 6):

1) *server selected DTAM protocol version*

"version-1" is specified in this complex service.

2) *ODA application capabilities*

This "application capabilities" parameter is defined in Recommendation T.435 and the following sub-parameters are used:

i) oda document application profile;

This parameter is defined in Recommendation T.432.

ii) non-basic document characteristics;

This parameter is defined in Recommendation T.432.

3) *Bilateral information*

i) server name;

This parameter is defined in Recommendation T.435.

ii) information;

This parameter is defined in Recommendation T.435.

TABLE 6/T.191

Use of Bind-Result parameters

Parameter name	Class
serverSelectedDtamProtocolVersion	m
odaApplicationCapabilities	m
serverSelectedDfrVersion	–
bilateralInformation	o
m Mandatory o Optional – Not used for this complex service	

8.1.1.3 Bind-error parameters

Bind-error parameters are defined in Recommendation T.435.

8.1.2 Unbind service parameters

There are no argument or errors associated with the unbind-operation.

8.1.3 The use of A-ABORT service parameters

The parameter of this service is defined in Recommendation T.435.

8.1.4 DTAM Remote Document Manipulation Services and parameters

8.1.4.1 Service parameters for remote document access services

Remote document access functional unit consists of DM-DOCUMENT-OPEN service, DM-DOCUMENT-SAVE service, DM-DOCUMENT-CLOSE service, DM-DOCUMENT-DISCARD service and DM-DOCUMENT-LIST service.

1) *DM-DOCUMENT-OPEN service parameters*

Both basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. The usage of arguments/results of the DM-DOCUMENT-OPEN abstract service and the OPEN abstract interface is specified in ISP AOD11.

2) *DM-DOCUMENT-CLOSE service parameters*

Both basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. The usage of arguments/results of the DM-DOCUMENT-CLOSE abstract service and the CLOSE abstract interface is specified in ISP AOD11.

3) *DM-DOCUMENT-SAVE service parameters*

The basicManipulationLevel makes use of this abstract service. Table 7 contains the DM-DOCUMENT-SAVE arguments as defined in Recommendation T.435, and defines which of them are to be supported by this complex service.

TABLE 7/T.191

DM-DOCUMENT-SAVE

Argument	Class
documentID	m
dfrName	–
documentReference	m
unique-reference	m
descriptive-reference	–
documentName	–
nonPermanentIdentifier	–

m Mandatory
– Not used for this complex service

There is no corresponding AI operation with the DM-DOCUMENT-SAVE abstract service.

The result argument of this abstract service shall not be used for this complex service.

4) *DM-DOCUMENT-DISCARD service parameters*

The basicManipulationLevel makes use of this abstract service. Table 8 contains the DM-DOCUMENT-DISCARD arguments as defined in Recommendation T.435, and defines which of them are to be supported by this complex service.

TABLE 8/T.191

DM-DOCUMENT-DISCARD

Argument	Class
documentID	m
dfrName	–
documentReference	m
unique-reference	m
descriptive-reference	–
documentName	–
nonPermanentIdentifier	–

m Mandatory
– Not used for this complex service

There is no corresponding AI operation with the DM-DOCUMENT-DISCARD abstract service.

The result argument of this abstract service shall not be used for this complex service.

5) *DM-DOCUMENT-LIST service parameters*

Both basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. The usage of arguments/results of the DM-DOCUMENT-LIST abstract service and the LIST abstract interface is specified in ISP AOD11.

8.1.4.2 Service parameters for the remote document manipulation services

8.1.4.2.1 Store type of manipulation

This type of manipulation is used to convey document fragments from the client to the server. In other words, this type of manipulation updates documents in the server by sending the document fragments created by the client. The Create, the Modify services are for this category.

1) *DM-CREATE service parameters*

The basicManipulationLevel makes use of this abstract service. The usage of arguments/results of the DM-CREATE abstract service and the invocation of the Create ODA abstract interface is specified in ISP AOD12. As the exceptional case of this complex service, content argument may not be used (see Annex B).

2) *DM-MODIFY service parameters*

The basicManipulationLevel makes use of this abstract service. Table 9 defines the DM-MODIFY arguments as defined in Recommendation T.435, and defines which of them are to be supported by this complex service.

TABLE 9/T.191

DM-MODIFY

Argument	Class	Description
object	m	
documentIdentifier	o	
dfrName	–	
documentReference	–	
documentName	–	
nonPermanentIdentifier	m	The value shall be an INTEGER
objectValue	o	
odaExpression	m	The value shall be a Constituent-locator
otherExpression	–	
anyExpression	–	
modifications	m	
odaModifications	m	
attributeValue	m	
deleting	m	
otherModifications	–	
anyModifications	–	

m Mandatory
o Optional
– Not used for this complex service

Table 10 defines AI delete argument as defined in Recommendation T.413.

TABLE 10/T.191

AI modify operation

Argument	Class
location-in-document	m
document	m
permanent	–
non-permanent	m
location	m
attributeValue	m
deleting	m

m Mandatory
– Not used for this complex service

The AI "location" argument is equivalent to the DTAM-DM "odaExpression" argument.

The result argument of this abstract service and operation shall not be used for this complex service.

8.1.4.2.2 Retrieve type of manipulation

This type of manipulation is used to convey the document fragments from the server to the client. In other words, this type of manipulation retrieves the document fragments from the remote server. The Get and Search services are for this category.

1) *DM-GET abstract service parameters*

   Both, basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. The usage of arguments/result of the DM-GET abstract service and the GET abstract interface is specified in ISP AOD11.

2) *DM-SEARCH abstract service parameters*

   Both, basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. The usage of arguments/result of the DM-SEARCH abstract service and the Search abstract interface is specified in ISP AOD11.

8.1.4.2.3 Action type of manipulation

This type of manipulation does not convey document fragments, but causes specific document operation to document process on remote servers. The Delete, Copy, Move and Point services are for this category.

1) *DM-DELETE service parameters*

   The basicManipulationLevel makes use of this abstract service. Table 11 defines the DM-DELETE arguments as defined in Recommendation T.435, and defines which of them are to be supported by this complex service.

   Table 12 defines AI delete argument as defined in Recommendation T.413.

   The AI "location" argument is equivalent to the DTAM-DM "odaExpression" argument.

   The result argument of this abstract service and operation shall not be used for this complex service.

TABLE 11/T.191

DM-DELETE

Argument	Class	Description
object	m	
documentIdentifier	o	
dfrName	–	
documentReference	–	
documentName	–	
nonPermanentIdentifier	m	The value shall be an INTEGER
objectValue	o	
odaExpression	m	The value shall be a Constituent-locator
otherExpression	–	
anyExpression	–	

m Mandatory
o Optional
– Not used for this complex service

TABLE 12/T.191

AI delete operation

Argument	Class
location-in-document	m
document	m
permanent	–
non-permanent	m
location	m

m Mandatory
– Not used for this complex service

2) *DM-COPY service parameters*

The basicManipulationLevel makes use of this abstract service. The usage of arguments/results of the DM-COPY abstract service and the Copy abstract interface is specified in ISP AOD12. As the exceptional case of this complex service, source argument may not be used (see Annex B).

3) *DM-POINT service parameters*

Both basicReadOnlyLevel and basicManipulationLevel make use of this abstract service. Table 13 defines the DM-POINT arguments as defined in Recommendation T.435, and defines which of them are to be supported by this complex service.

TABLE 13/T.191

DM-POINT

Argument	Class	Description
object (objet)	m	
documentIdentifier	o	
dfrName	–	
documentReference	–	
documentName	–	
nonPermanentIdentifier	m	The value shall be an INTEGER
objectValue	o	
odaExpression	m	The value shall be a Constituent-locator
otherExpression	–	
anyExpression	–	

m Mandatory
o Optional
– Not used for this complex service

There is no corresponding AI operation with the DM-POINT abstract service.

The result argument of this abstract service shall not be used for this complex service.

NOTE – The DM-POINT does not cause a modification of the remote document, but only points to the location of the document fragment. This service may also be used for transmitting pointing events caused by a mouse/tablet, a cursor and caret. In such a case, the situation when pointing events are sent frequently and continuously as a moving mouse or cursor, is not considered. To prevent from the above situation, a mechanism to send several pointing events at one time may be realized. However, the realization of such a mechanism is out of the scope of this Recommendation.

8.2 DTAM-TK service primitives and parameters

8.2.1 TK-TOKEN-PLEASE service parameters

The parameters of this service are used as defined in Recommendation T.435.

There is no corresponding AI operation with TK-TOKEN-PLEASE abstract service.

The argument and result argument of this abstract service shall not be used for this complex service.

8.2.2 TK-TOKEN-GIVE service parameters

The parameters of these services are used as defined in Recommendation T.435.

There is no corresponding AI operation with TK-TOKEN-GIVE abstract service.

The argument and result argument of this abstract service shall not be used for this complex service.

8.3 DTAM-BT service primitives and parameters

In this complex service, both, manipulation and bulk transfer association shall not be used simultaneously but shall be used subsequently.

The bulk transfer function for this complex service may optionally use DTAM normal mode on top of RTSE, ACSE and presentation layer.

DTAM-BT normal mode is defined in Recommendation T.522.

8.4 DFR/DTAM-DM service primitives and parameters

Document Filing and Retrieval (DFR) may be optionally used to support the manipulation of the full document at the remote server.

8.4.1 Abstract-bind operation

DTAM service definition and parameters are defined in Recommendation T.435. This subclause specifies the parameter of the DTAM-DM for Joint Synchronous Editing.

8.4.1.1 Bind-Argument parameters

The parameter of Abstract-Bind for this complex service are used as follows (see Table 14):

TABLE 14/T.191

Use of Bind-Argument parameters

Parameter name	Class
dtamProtocolVersion	m
dtamManipulationCapabilities	m
odaApplicationCapabilities	m
dfrCapabilities	m
bilateralInformation	m
applicationRequirement	o

m Mandatory
o Optional

1) *DTAM protocol version*

   "version-1" is specified in this complex service.

2) *Manipulation capabilities*

   This parameter is defined in Recommendation T.435. The DTAM-DM selects "manipulation level selection."

   This complex service shall make use of either Basic Manipulation level or Basic Read Only level.

3) *ODA application capabilities*

   This "application capabilities" is defined in Recommendation T.435 and the following sub-parameters are used:

   i) oda document application profile;

      This parameter is defined in Recommendation T.432.

   ii) non-basic document characteristics;

      This parameter is defined in Recommendation T.432.

4) *DFR Capabilities*

   This "application capabilities" is defined in Recommendation T.435 and the following sub-parameters are used:

   i) DFR protocol version;

      "version-2" is specified in this complex service

   ii) DFR profile;

   This complex service shall use either ADF11 or ADF13, depending on the specific applications.

5) *Bilateral information*

i) server name;

This parameter is defined in Recommendation T.435.

ii) information;

This parameter is defined in Recommendation T.435.

6) *Application requirements*

This parameter is defined in Recommendation T.435.

8.4.1.2 Bind-Result parameters

The parameter of Abstract-Bind result for this complex service are used as follows (see Table 15):

TABLE 15/T.191

Use of Bind-Result parameters

Parameter name	Class
serverSelectedDtamProtocolVersion	m
odaApplicationCapabilities	m
serverSelectedDfrVersion	m
bilateralInformation	o

m Mandatory
o Optional

1) *server selected DTAM protocol version*

"version-1" is specified in this complex service.

2) *ODA application capabilities*

This "application capabilities" is defined in Recommendation T.435 and the following sub-parameters are used:

i) oda document application profile;

This parameter is defined in Recommendation T.432.

ii) non-basic document characteristics;

This parameter is defined in Recommendation T.432.

3) *Server Selected DFR version*

This "application capabilities" is defined in Recommendation T.435.

"version-2" is specified in this complex service.

4) *Bilateral information*

i) server name;

This parameter is defined in Recommendation T.435.

ii) information;

This parameter is defined in Recommendation T.435.

8.4.1.3 Bind-error parameters

Bind-error parameters are defined in Recommendation T.435.

8.4.2 Unbind service parameters

There are no argument or errors associated with the unbind-operation.

8.4.3 The use of A-ABORT service parameters

The parameter of this service is defined in Recommendation T.435.

8.4.4 The use of DTAM-DM Remote Document Manipulation Services and parameters

The use of the DTAM-DM remote manipulation service and parameters for the DFR/DTAM-DM communication module are identical to the use of the DTAM-DM communication module defined in 8.1.4.

Annex A

Examples of remote manipulations using DTAM abstract service and ODA abstract interface

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

Figure A.1 shows an example of the remote manipulation using DTAM abstract service and ODA abstract interface.

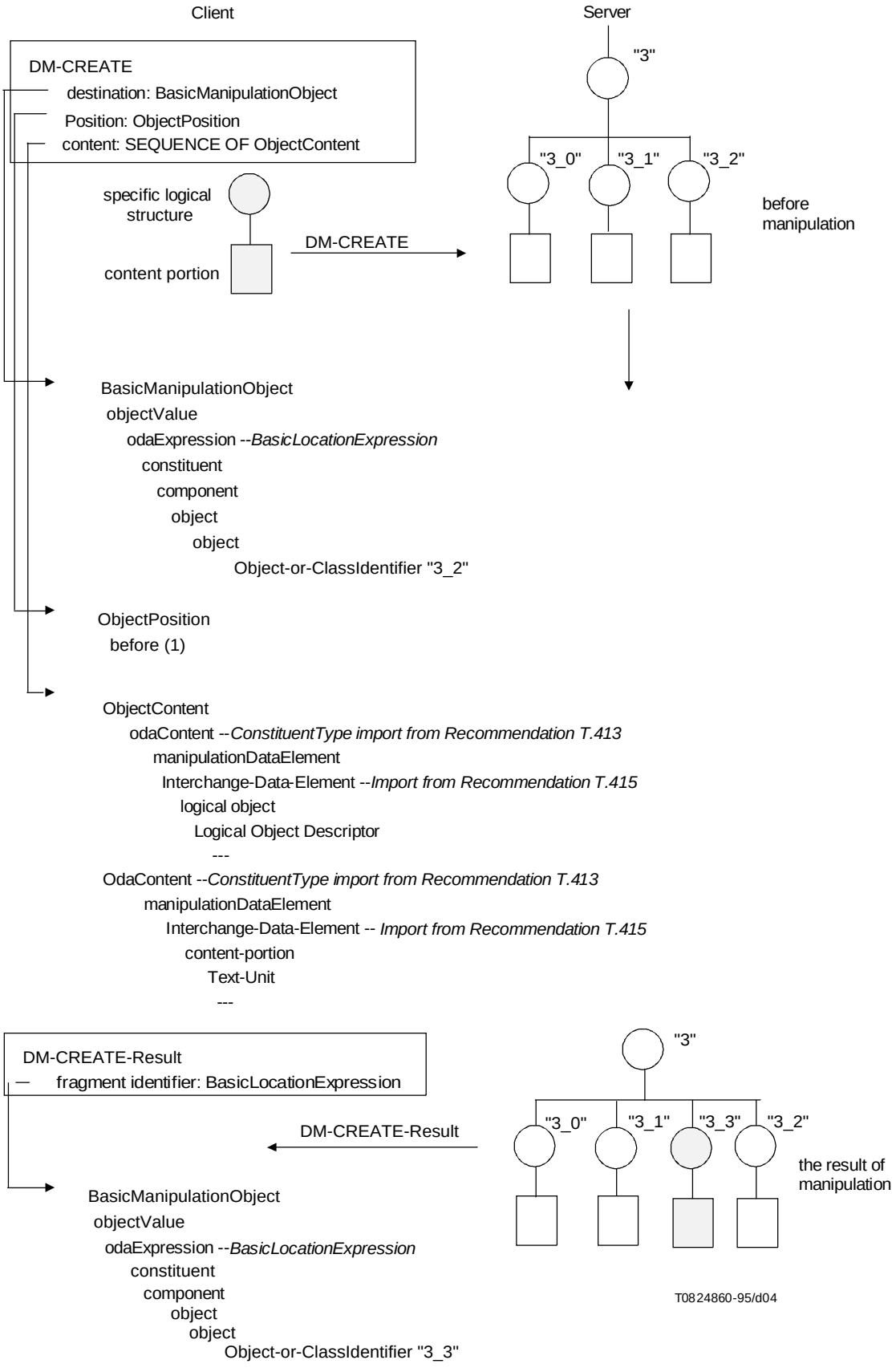

FIGURE A.1/T.191

DM-CREATE abstract service

Annex B

Some examples of use of parameters for the remote document manipulation

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

B.1 DM-CREATE abstract service

Normally the DM-CREATE abstract service is used to add the document fragments to an existing document. Exceptionally the DM-CREATE abstract service may be used to create a new object with empty content such as a specific logical structure under the restriction of generic structures.

In this case, the DM-CREATE abstract service does not carry the document fragments. Therefore, the parameter "content" is not used. See Figures B.1 and B.2.

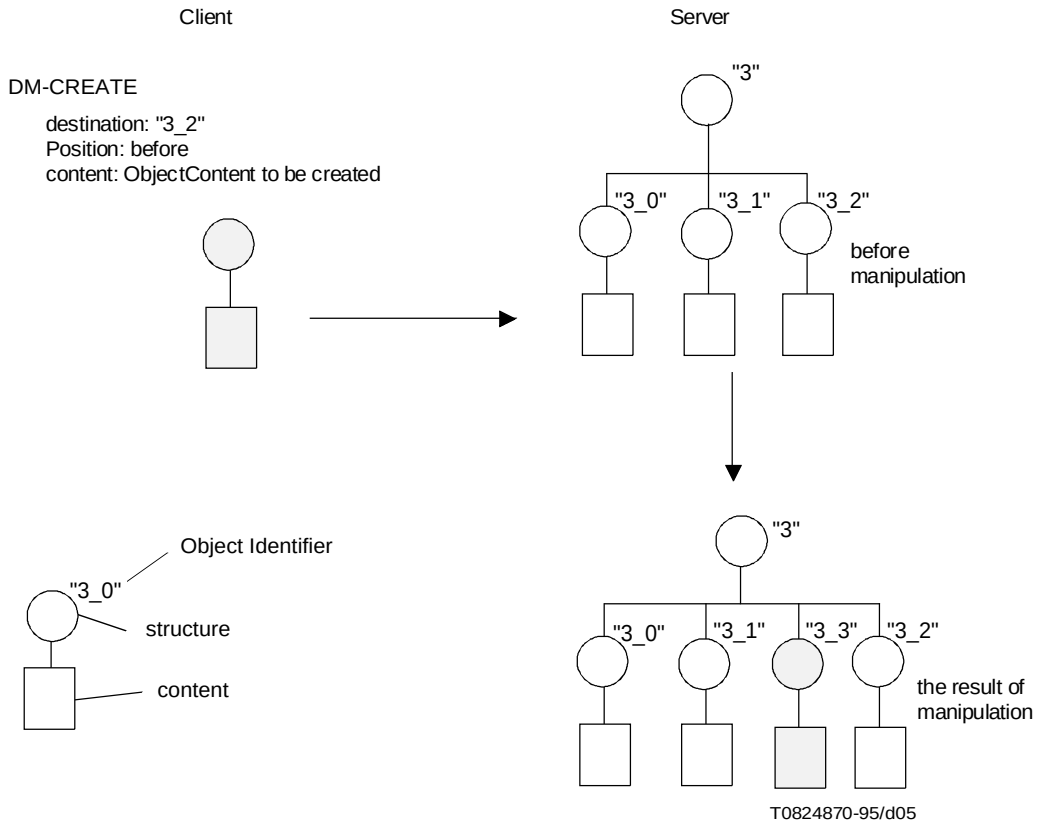

FIGURE B.1/T.191

Normal use of the DM-CREATE abstract service

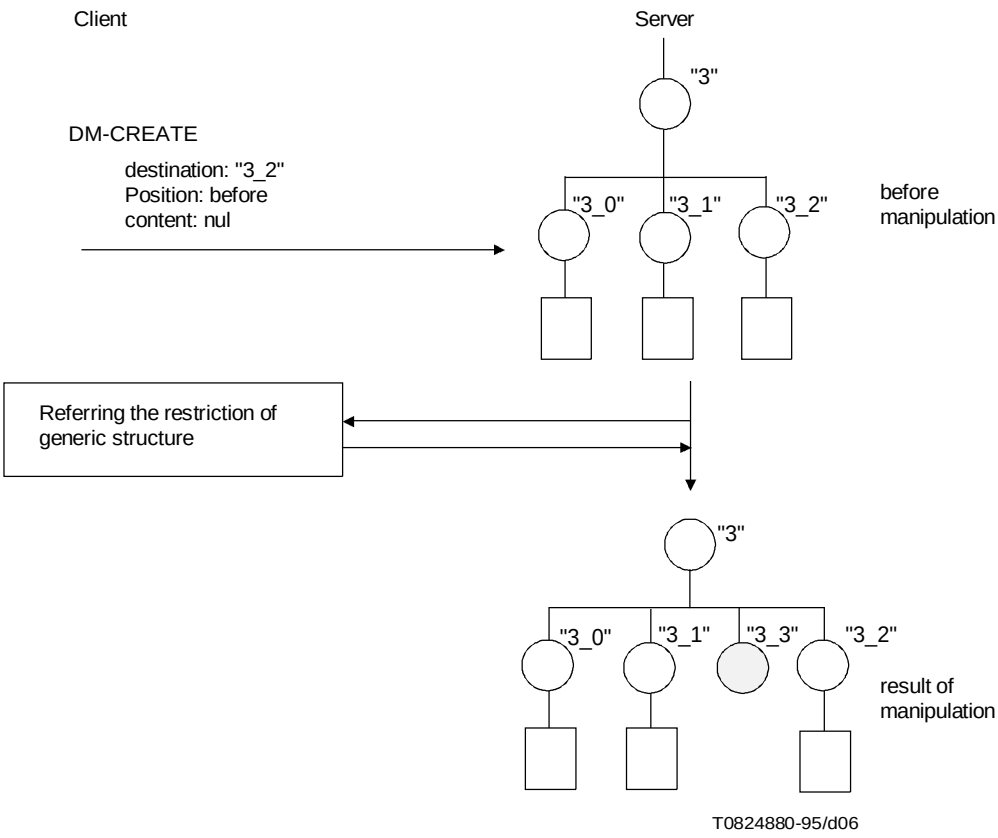

FIGURE B.2/T.191

Exceptional use of the DM-CREATE abstract service

B.2 DM-DELETE abstract service

Man machine interface provided by most of the editing tools or window systems supports a cut/copy/paste function. The Cut operation is used to delete document fragments and store them into the cut buffer. The Copy operation is used to store document fragment into the cut buffer without modifications of the original document. The Paste operation is used to extract document fragments from the cut buffer into the document.

Cut operation corresponds to DM-DELETE abstract service. It is out of scope of this Recommendation whether deleted document fragments may be stored into the cut buffer or not.

Figure B.3 illustrates the cut process.

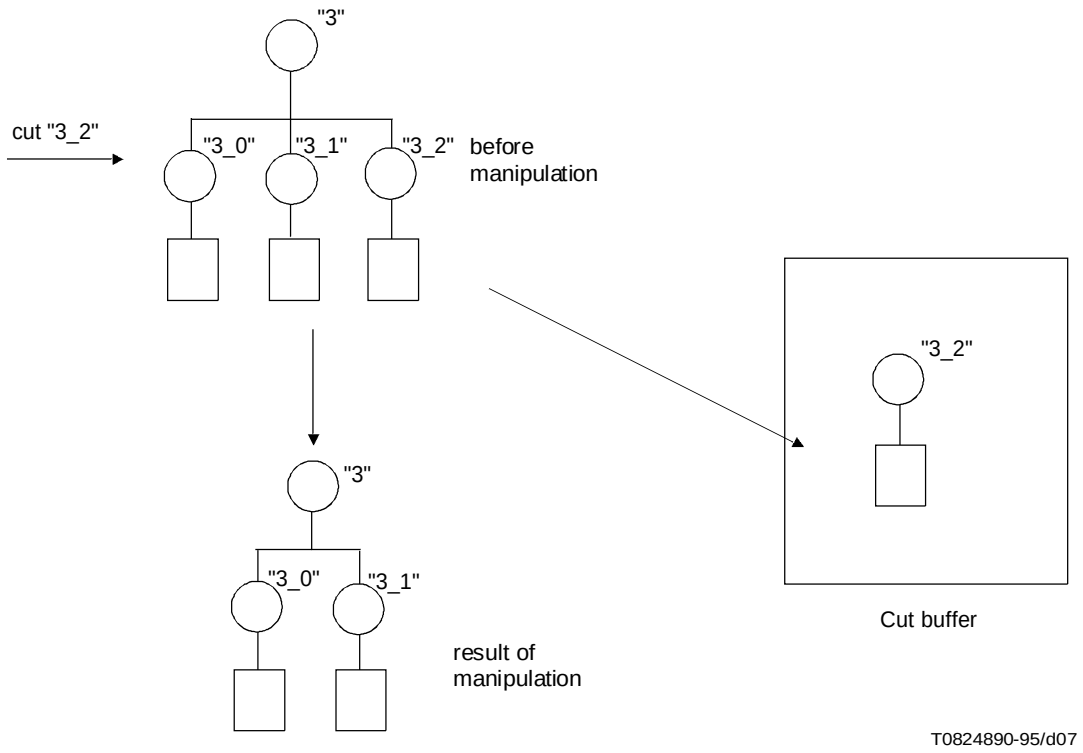

FIGURE B.3/T.191

An example of delete operation

B.3 DM-COPY abstract service

The Copy and Paste operation may be replaced by the DM-COPY abstract service. To be precise, if the client requires copy operation which is used to extract the document fragments from the document store at the remote server and to put into the remote cut buffer, then the only service parameter "source" is specified. If DTAM user wishes to make a paste operation which is used to extract the document fragment from the cut buffer at the remote server and to put into the document at the remote server, then both, service parameter "destination" and "position" should be specified.

Figure B.4 illustrates copy process using DM-COPY abstract service.

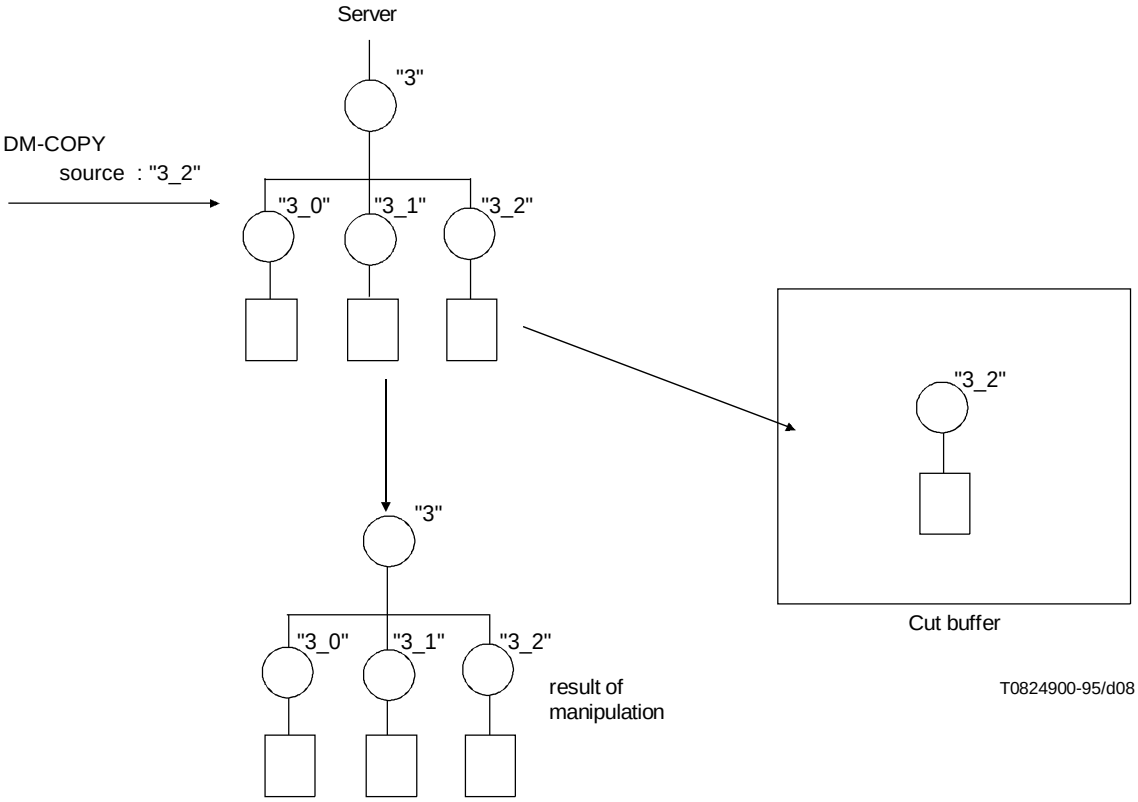

FIGURE B.4/T.191

An example of copy operation

Figure B.5 illustrates copy process using the DM-COPY abstract service.

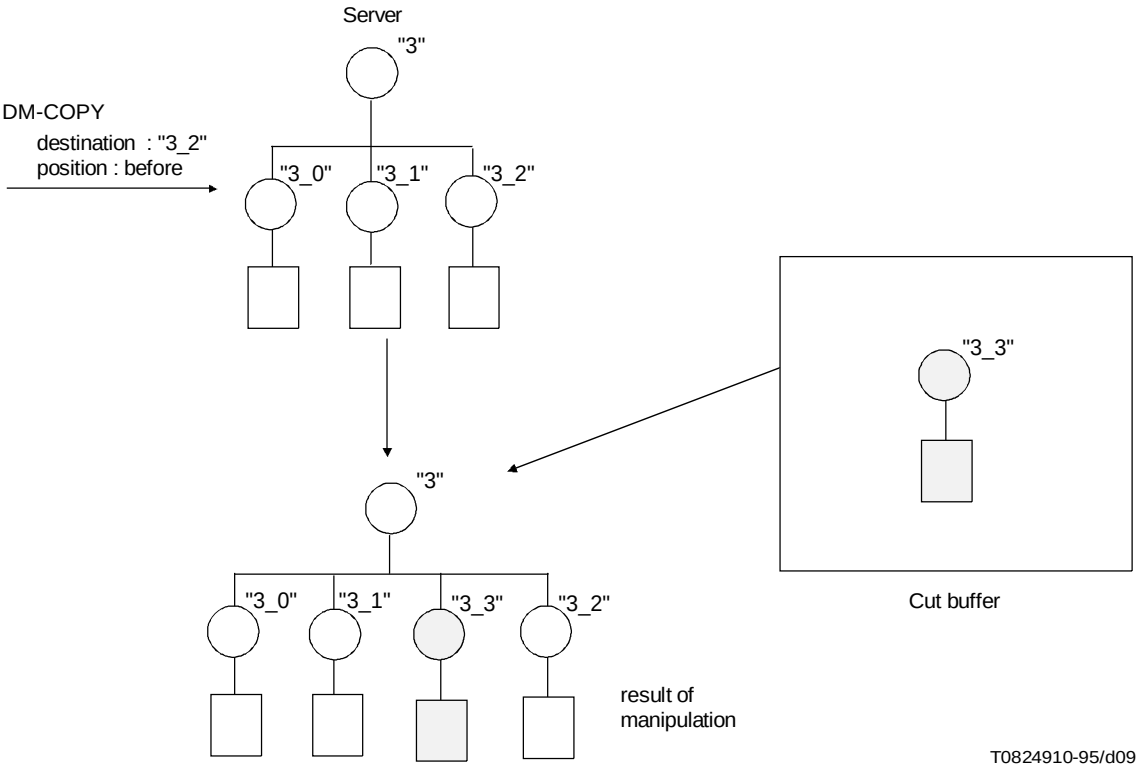

FIGURE B.5/T.191

An example of copy operation

Annex C

Error Handling of manipulation service by CDH application

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

Rollback mechanism

In the case of Joint Synchronous Editing, each client has the same document process. Some systems may issue the manipulation service and manipulate the local document before receiving the confirmation of the manipulation service from the remote client. Therefore, if the requester of the manipulation has successfully manipulated locally and the responder fails to manipulate the document at the responder, then the requester undoes the last manipulation in order to keep consistency between local and remote document.

If some errors are detected by the remote server, the following recovery mechanisms are specified.

– *Mechanism 1*

The terminal does not support error handling of the manipulation service.

– *Mechanism 2*

If an error is detected by the terminal, then the terminal aborts DTAM association. In this case, the detector of an error should abort the DTAM association.

– *Mechanism 3*

If an error is detected by the terminal, then the terminal discards the series of manipulations after the last saved document. In this case, the detector of an error should discard the series of manipulations.

If a fatal error is detected by the terminal, the terminal aborts the DTAM association. In this case, the detector of an error should abort the DTAM association.

– *Mechanism 4*

If a recoverable error is detected, the terminal retries to issue the same manipulation service as the last one.

If it has been clear that an error is unrecoverable after some retry procedures, or serious errors are detected, then the terminal discards the series of manipulations after the last saved document. In this case, the detector of an error should discard the series of manipulations.

If a fatal error is detected by the terminal, the terminal aborts the DTAM association. In this case, the detector of an error should abort the DTAM association.

Figure C.1 illustrates the flow of mechanism 4.

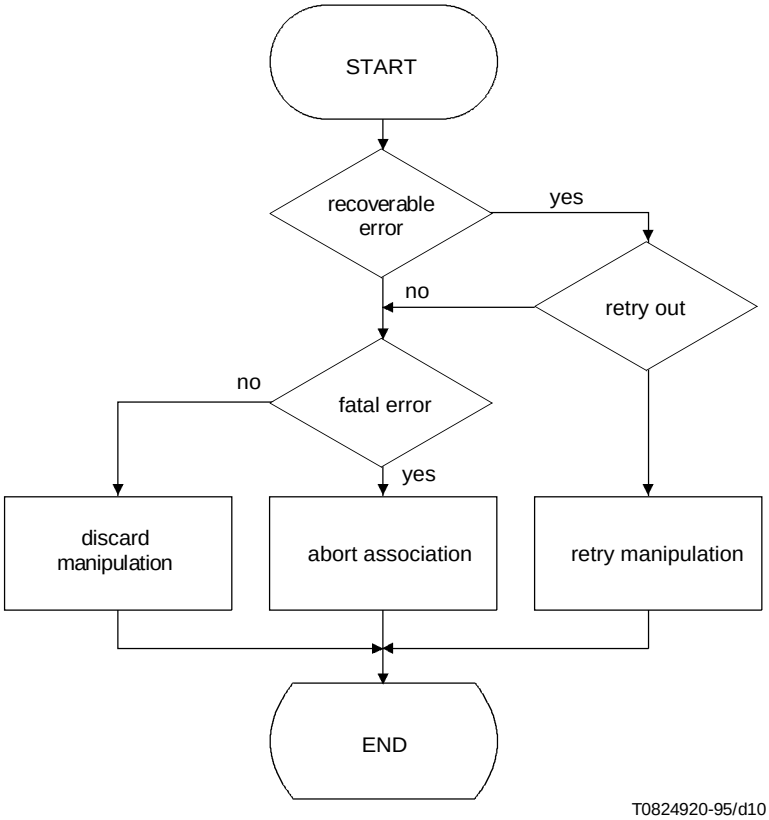

FIGURE C.1/T.191

Flow of mechanism 4

Negotiation mechanisms for those error handlings are for further study.