



INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

T.432

(09/92)

**TERMINAL EQUIPMENT AND PROTOCOLS
FOR TELEMATIC SERVICES**

**DOCUMENT TRANSFER AND MANIPULATION
(DTAM) SERVICES AND PROTOCOLS –
SERVICE DEFINITION**



Recommendation T.432

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation T.432 was revised by Study Group VIII and was approved under the Resolution No. 2 procedure on the 18th of September 1992.

CCITT NOTE

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

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INTRODUCTION

This Recommendation defines the services provided by an application-service-element, the Document Transfer and Manipulation Service Element (DTAM), to support applications in a distributed Telematic systems environment. This Recommendation is one of a set of Recommendations defining the services for sets of application-service-elements specifically used by a number of applications.

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Recommendation T.432**DOCUMENT TRANSFER AND MANIPULATION (DTAM)
SERVICES AND PROTOCOLS – SERVICE DEFINITION***(revised 1992)***1 Scope and field of application**

This Recommendation defines in an abstract way the Document Transfer and Manipulation (DTAM) service within the OSI application layer in terms of

- a) the primitive actions and events of the service;
- b) the parameter data associated with each primitive action and event;
- c) the relationship between, and the valid sequences of, these actions and events.

The DTAM service is provided in conjunction with the Reliable Transfer Service Element (RTSE) service (Recommendation X.218), the Association Control Service Element (ACSE) service (Recommendation X.217), and the Presentation service (Recommendation X.216). In the Transparent mode, DTAM service is provided in conjunction with the Session service (Recommendation X.215) according to the rules of Recommendation T.62*bis*.

This Recommendation does not specify individual implementations or products, nor does it contain the implementation of entities and interfaces within a telematic system.

2 References

References are listed in Recommendation T.431.

3 Definitions and abbreviations

Terms and abbreviations are defined in Recommendation T.431.

4 Conventions

This Recommendation defines services for the DTAM following the descriptive conventions defined in Recommendation X.210. In § 9, the definition of each DTAM service includes a table that lists the parameters of its primitives. For a given primitive, the presence of each parameter is described by one of the following values:

blank	not applicable
M	presence mandatory
U	presence is a user option
C	presence is conditional on a successful negotiation of another parameter in previous primitive
D	presence is a DTAM-SE service-provider option
R	presence subject to conditions defined in Recommendation X.218
A	presence subject to conditions defined in Recommendation X.217
P	presence subject to conditions defined in Recommendation X.216

In addition, the notation (=) indicates that a parameter value is semantically equal to the value to its left in the table.

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5 Model of the DTAM service

This Recommendation uses the abstract model for a service defined in the OSI service conventions in Recommendation X.210 (see Note 1). The model defines the interactions between the two DTAM-service-users and the DTAM-service-provider that take place between application entities. Information is passed between a DTAM-service-user and the DTAM-service-provider by DTAM service primitives which may carry parameters.

One of the DTAM-service-users is defined as the initiator and the other is defined as the responder.

The model of the DTAM service is illustrated in Figure 1/T.432.

The DTAM service defines a single activity between the initiator and the responder (see Note 2).

Note 1 – Recommendation X.210 defines a model for the service provided by a layer of the OSI Reference Model.

Note 2 – At any one time, an application entity may be involved in more than one instance of the DTAM service activity, and each instance is based on a separate application association.

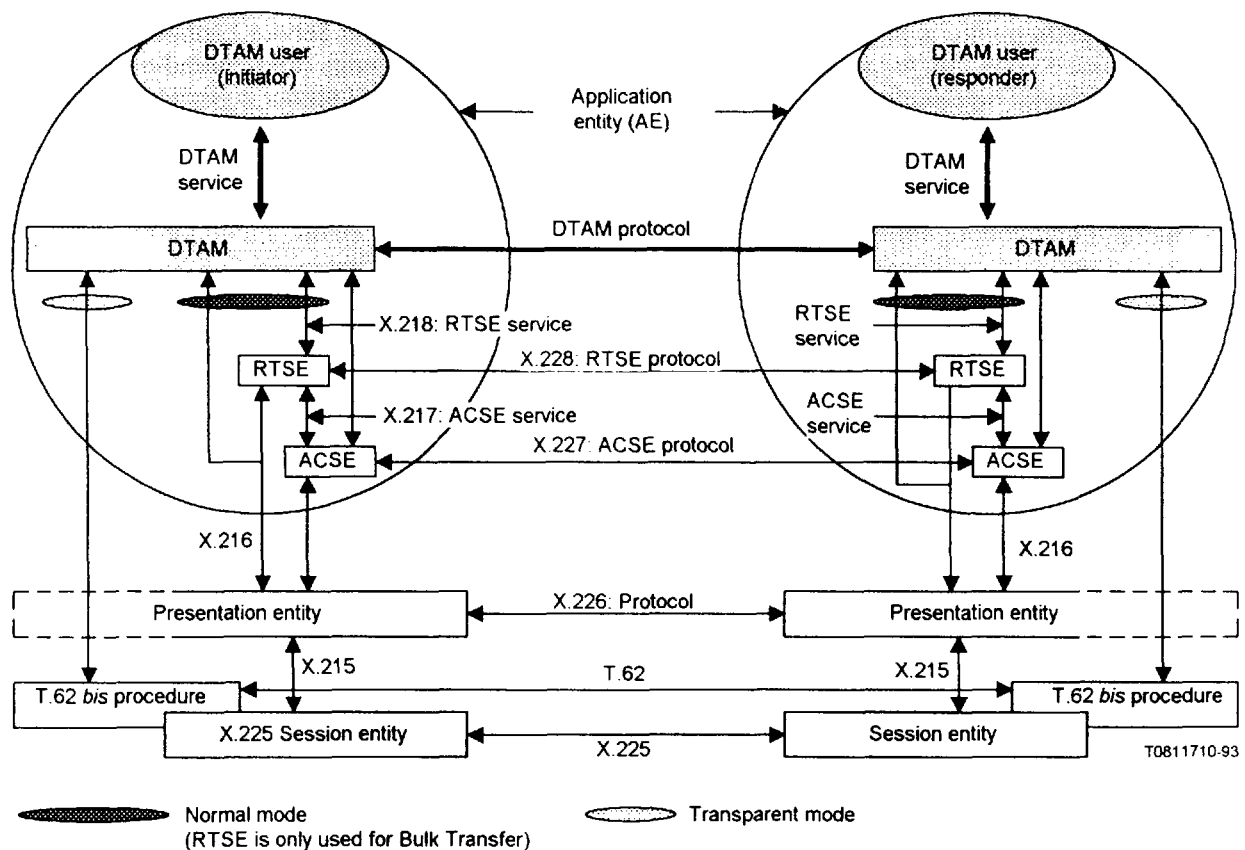


FIGURE 1/T.432
Model of DTAM service

The DTAM is provided in two modes of operations:

a) *Transparent Mode*

This mode is provided solely to allow interworking with older implementations based on Recommendation T.73 - 1984. This mode implies some restriction in use of DTAM services.

b) *Normal Mode*

This mode is provided to allow full use of DTAM services based on the OSI service definition and protocol specification.

Note – It should be taken into account that in some cases the two modes also differ in the means in which the DTAM services are used. An important example is the use of the D-CAPABILITY service (see also § 6.2).

6 DTAM services

This section provides a short description of the services of the DTAM service. The services and the primitives by which they are invoked are defined in § 9. For each service, the user of the service (the application entity that begins the sequence of primitives) is stated.

6.1 DTAM association use control

Three services are associated with DTAM association use control:

- a) the DTAM establishment service is used by the initiator to create a DTAM association for the application association linking the two DTAM-service-users;
- b) the DTAM termination service is used by either the initiator or the responder being subject to owning the data token to dissolve the DTAM association between the DTAM-service-user and the DTAM-service-provider;

Note – The DTAM termination service is not restricted to map into A-RELEASE service provided by ACSE or RT-CLOSE service provided by RTSE.

- c) the DTAM abort service is used by either the service users or the service provider to dissolve the DTAM association unconditionally.

6.2 DTAM negotiation capability

DTAM negotiation capabilities are expressed by means of the D-INITIATE and D-CAPABILITY services for indication and invocation of application and communication characteristics during an association.

Using the D-INITIATE service, an initial set of characteristics must be indicated, which partially can be modified or invoked by using the D-CAPABILITY service. These characteristics are in effect up to the next subsequent D-CAPABILITY service invocation. A D-CAPABILITY service is used by either the initiator or the responder being subject to owning the data token to indicate or invoke the above characteristics.

Attention is drawn to the fact that the concept of how to use the D-INITIATE and D-CAPABILITY services is different for the two modes defined for the DTAM bulk transfer.

- a) Under the DTAM Transparent Mode, one set of application capabilities must be indicated in the D-INITIATE service. This set can be modified during the association. The parameters of the D-CAPABILITY service are mapped to the S-CAPABILITY-DATA service parameters. The invocation of specific characteristics, used in the following document, is achieved by using the S-ACTIVITY-START service element. The service parameters of the S-ACTIVITY-START request are derived from the “document profile” which is not directly transferred to the receiving side under the DTAM Transparent Mode. However, the document profile is generated at the receiving side from the service parameters of S-ACTIVITY-START indication.
- b) Under the DTAM Normal Mode, several sets of application capabilities may be indicated (at least one set must be present) in the D-INITIATE service. There are no means to modify these parameters during the association.

One specific set of application capabilities may be invoked by using the D-CAPABILITY service to indicate the specific characteristics of the document which will be subsequently transmitted.

6.3 *Document bulk transfer*

DTAM provides a function to transmit a document in bulk from one DTAM user to a peer under the communications environment defined by the DTAM association use and the DTAM capability functions.

6.4 *Document unconfirmed manipulations*

DTAM provides a function to partially modify a document seen by both users, by generating, revising or deleting structures (pages, blocks, etc.) of an existing document, or to create a new document by generating structure without any confirmation of the manipulation. Five services are associated with document manipulation:

- a) the unconfirmed create operation service is used by both sides to add the constituents of ODA and Operational Structure to an existing document or to create constituents of ODA and Operational Structure;
- b) the unconfirmed delete operation service is used by both sides to delete the constituents of ODA and Operational Structure of an existing document;
- c) the unconfirmed modify operation service is used by both sides to modify the attributes of the constituents of ODA and Operational Structure of an existing document;
- d) the unconfirmed call operation service is used by both sides to request to address or to read an object of the Operational Structure which contains a sequence of the DTAM protocol data units. These protocol data units are applicable to the existing document;
- e) the unconfirmed rebuild operation service is for further study.

6.5 *Document confirmed manipulations (for further study)*

DTAM provides a function to partially modify a document seen by both users, by generating, revising or deleting structure of an existing document or to create a new document by generating structure with a confirmation of the manipulation.

6.6 *Typed data transmission*

DTAM optionally provides the function of typed data transmission which is independent of the data token control.

6.7 *Token control*

Within DTAM, the right to transfer and manipulate documents is controlled in the following way:

- the control of document transfer is associated with document bulk transfer;
- the data token is associated with document manipulation.

Token control provides services for exchanging the control of document transfer and for exchanging the data token.

6.8 *Exception report*

DTAM optionally provides two exception reporting functions for exceptional error control during the DTAM communication:

- provider exception report (for further study);
- user exception report (for further study).

6.9 *Document selection control (for further study)*

Four services are associated with document selection control:

- a) the document selection service is used by the initiator to select an existing document and to bind the specified document to the DTAM application-association;

- b) the document deselection service is used by the initiator to release the binding between the DTAM application-association and the specified document;
- c) the document creation service is used by the initiator to create a specified document and to select the newly created document;
- d) the document deletion service is used by the initiator to release an existing selection in such a way that the previously selected document ceases to exist.

6.10 *Document management (for further study)*

Two services are associated with document management:

- a) the read attributes service is used by the initiator to interrogate the document attributes of the selected document;
- b) the change attributes service is used by the initiator to modify the document attributes of the selected document.

6.11 *Document open control (for further study)*

Two services are associated with document open control:

- a) the document open service is used by the initiator to establish the presentation context and the concurrency and commitment controls for data transfer;
- b) the document close service is used by the initiator to release the context established by the document open service.

6.12 *Grouping control (for further study)*

Two services are associated with grouping control:

- a) the beginning of grouping service is used by the initiator to indicate the start of a set of grouped primitives which are to be processed and responded to as a group;
- b) the end of grouping service is used by the initiator to indicate the end of a set of grouped primitives which are to be processed and responded to as a group.

7 **Functional units**

DTAM service classes in Recommendation T.431 and in functional units are logical groupings of related services defined in this Recommendation for the purpose of

- negotiation of the DTAM-service-user's requirements during DTAM application-association establishment;
- reference by other CCITT Recommendations.

7.1 *Association use control functional unit*

The DTAM provides the trigger for the establishment and use of the association. The association use control unit supports the basic DTAM services for unique discrimination of both application entities (AEs), selection of functional units, set of an initial DTAM capability, establishment, termination and abort of association use.

7.2 *Capability functional unit*

The DTAM context is the communication environment depending on the document architecture (ODA and Operational Structure) used for data transmission on an association. In addition to the initial DTAM context setting at the start of association use, a context management unit is optionally used to set a more detailed communication environment, such as optional application capabilities.

7.3 *Data transmission functional units*

The DTAM provides document transfer methods, such as bulk document transfer, document manipulation and typed data transmission. The data transmission unit consists of the following four units.

7.3.1 *Document bulk transfer functional unit*

The DTAM has a function to transmit the document in bulk to the other DTAM user under the communication environment defined at the start of the association use and/or the capability control. The documents represented by the Document Interchange Format defined in Recommendations T.415 and T.441 are transmitted using the document bulk transfer unit. Other types of data may be transferred by using the transfer option defined for the DTAM bulk transfer.

Note – The detailed definition of Recommendation T.441 (Interchange Format of Operational Structure) depends on the ongoing work on Operational Structure.

7.3.2 *Document unconfirmed manipulation functional unit*

DTAM provides a function to partially modify a document by generating, revising or deleting structures of an existing document or to create a new document. The DTAM user uses a document manipulation unit to manipulate structures of an existing document or to create a new document.

7.3.3 *Document confirmed manipulation functional unit*

Use of this functional unit is for further study.

7.3.4 *Typed data transmission functional unit*

The DTAM provides a function to pass these units directly to the DTAM user as typed data. User information (e.g. transmission interrupt) can be transported by typed transmission units without being subject to token control.

7.4 *Exception report functional unit*

The DTAM provides exception reporting services for exceptional conditions occurring in the DTAM user or DTAM-service-provider.

7.5 *Session management functional units*

The DTAM manages dialogue control functions provided by the session layer, the following functional units being available for DTAM communication environment.

7.5.1 *Token control functional unit*

Transmission rights required for document transfer and document manipulations are controlled with the token control unit. This functional unit will be selected in the case of the half duplex communication mode.

For the Document manipulation functional unit, only the "data token" is required in nature. However, the right to use the Document manipulation is handled as follows:

- when the Document bulk transfer functional unit is selected in addition to the Document manipulation, D-CONTROL-GIVE service is used;
- when only the Document manipulation functional unit is selected, D-TOKEN-GIVE service is used.

7.6 *Other functional units*

The DTAM will provide a document selection control, a document management, an open control and a grouping control. These DTAM functions are left for further study.



Documents

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8 Service overview

This Recommendation defines the following services for the management of document transfer and manipulation facilities:

- a) D-INITIATE;
- b) D-TERMINATE;
- c) D-P-ABORT;
- d) D-U-ABORT;
- e) D-CAPABILITY;
- f) D-TRANSFER;
- g) D-TYPED-DATA;
- h) D-CREATE;
- i) D-DELETE;
- j) D-MODIFY;
- k) D-CALL;
- l) D-REBUILD;
- m) D-TOKEN-GIVE;
- n) D-CONTROL-GIVE;
- o) D-TOKEN-PLEASE;
- p) D-U-EXCEPTION-REPORT; and
- q) D-P-EXCEPTION-REPORT.

8.1 D-INITIATE service

Enables a DTAM-service-user to request the establishment of a DTAM application-association with another AE.

8.2 D-TERMINATE service

Enables the association initiating or responding DTAM-service-user to request the termination of the established application-association. It may do so only if it possesses the data token.

8.3 D-P-ABORT service

Enables a DTAM-service-provider to abort the application-association.

8.4 D-U-ABORT service

Enables a DTAM-service-user to abort the application- association.

8.5 D-CAPABILITY service

Enables the DTAM service user to invoke or negotiate some applications and communication characteristics during the life-time of the association.

8.6 D-TRANSFER service

Enables a DTAM-service-user that possesses the data token to request the bulk document transfer over an application-association.

8.7 D-TYPED-DATA service

Enables a DTAM-service-user to request the data transmission without being subject to token control, which is different from the document transfer service.

8.8 D-CREATE, D-DELETE and D-MODIFY services

Enable a DTAM service user that possesses the data token to request the creation, deletion and modification of the architectural objects and content-portions of a document.

8.9 D-CALL service

Enables a DTAM-service-user that possesses the data token to request to address or to read an object of the Operational Structure which contains a sequence of DTAM protocol data units (with some restrictions, i.e. that only D-CREATE, D-DELETE and D-MODIFY can appear in this sequence). These protocol data units are applicable to the existing document.

8.10 D-REBUILD service is for further study.

8.11 D-TOKEN-GIVE service

Enables a DTAM-service-user to relinquish the data token to its peer. It may do so only if it possesses the data token.

8.12 D-CONTROL-GIVE service

Enables a DTAM-service-user to relinquish all the tokens (control) to its peer. It may do so only if it possesses all the tokens.

8.13 D-TOKEN-PLEASE service

Enables a DTAM-service-user to request the data token. It may do so only if it does not already possess the data token. The data token is requested by either DTAM-service-user to allow the DTAM-service-user to transfer documents.

8.14 D-U-EXCEPTION-REPORT service

Provides an exception reporting service for exceptional conditions occurring in either DTAM-service-user. This service is for further study.

8.15 D-P-EXCEPTION-REPORT service

Provides an exception reporting service for exceptional conditions occurring in the DTAM-service-provider. This service is for further study.

9 Service definition

9.0 DTAM service

Is a logical interface for data handling between the DTAM user and DTAM service provider. The DTAM services are listed in Table 1/T.432.

9.1 D-INITIATE service

The DTAM user notifies the DTAM-service-provider of the start of association use with the D-INITIATE service primitive. This service primitive includes parameter sets for

- unique discrimination of both AEs;
- selection of functional units for the DTAM service used; and
- establishment of a common communication environment in both systems.

The related service structure consists of four events, as illustrated in Figure 2/T.432.



TABLE 1/T.432

DTAM services summary

Service	Type
D-INITIATE	Confirmed
D-TERMINATE	Confirmed
D-P-ABORT	Provider-initiated
D-U-ABORT	Unconfirmed
D-CAPABILITY	Confirmed
D-TRANSFER	Provider-confirmed
D-TYPED-DATA	Unconfirmed
D-CREATE	Unconfirmed
D-DELETE	Unconfirmed
D-MODIFY	Unconfirmed
D-CALL	Unconfirmed
D-REBUILD (Note)	Unconfirmed
D-TOKEN-GIVE	Unconfirmed
D-CONTROL-GIVE	Unconfirmed
D-TOKEN-PLEASE	Unconfirmed
D-P-EXCEPTION-REPORT (Note)	Provider-initiated
D-U-EXCEPTION-REPORT (Note)	Unconfirmed

Note – D-REBUILD, D-P-EXCEPTION-REPORT and D-U-EXCEPTION-REPORT services are for further study.

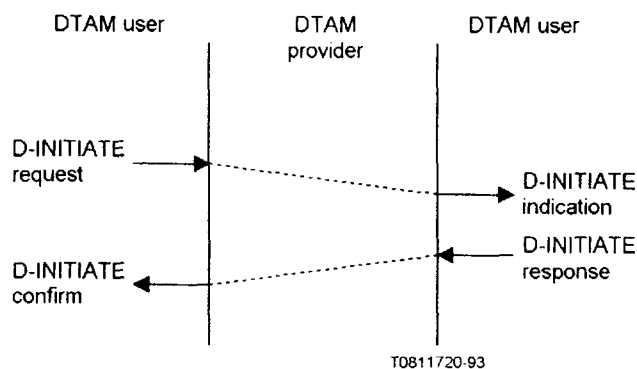


FIGURE 2/T.432

D-INITIATE service events