



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION
OF ITU

T.436

(08/95)

TERMINALS FOR TELEMATIC SERVICES

**DOCUMENT TRANSFER AND MANIPULATION
(DTAM) – SERVICES AND PROTOCOLS –
PROTOCOL SPECIFICATIONS FOR
CONFIRMED DOCUMENT MANIPULATION**

ITU-T Recommendation T.436

(Previously “CCITT Recommendation”)

FOREWORD

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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.436 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.

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 defines the communication protocol for document remote access, presentation, editing and transfer. It defines the protocol of two new applications service elements for interactive confirmed document manipulation, aligned with, and provided for, the integrated use with applications defined under the Distributed Office Application Model (DOAM). The two application service elements are the DTAM-TM and DTAM-TK. The use of the DTAM-DM application service element is mandatory for document manipulation applications and is used in conjunction with the ACSE and ROSE services elements. Optionally, it may be combined with the DFR-SE (for filing and retrieval purposes) and with the DTAM-TK service element for exchange of an application token in multi-user conferences.

DOCUMENT TRANSFER AND MANIPULATION (DTAM) – SERVICES AND PROTOCOLS – PROTOCOL SPECIFICATIONS FOR CONFIRMED DOCUMENT MANIPULATION

(Geneva, 1995)

1 Scope

Recommendation T.435 defines the abstract services of the application service elements DTAM-DM and DTAM-TK.

The DTAM-DM abstract services provide facilities to allow remote operations on any kind of documents or document fragments.

The DTAM-TK application service element provides for the handling of an application token to structure a dialogue, if two or more users are involved in conference type of applications.

This Recommendation specifies the protocols between DTAM users which apply the DTAM-DM or the DTAM-TK abstract services.

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

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.435 (1995), *Document Transfer And Manipulation (DTAM) – Services and protocols – Abstract service definition and procedures for confirmed document manipulation.*

The references listed in Recommendation T.435 apply also to this Recommendation.

3 Definitions

The definitions given in Recommendation T.435 apply also to this Recommendation.

Additionally, the following definitions are used in this Recommendation.

- 3.1 **DTAM-DM user:** DTAM-DM client or DTAM-DM server.
- 3.2 **DTAM-TK user:** DTAM-TK client or DTAM-TK server.
- 3.3 **DTAM client:** DTAM-DM client or DTAM-TK client.
- 3.4 **DTAM server:** DTAM-DM server or DTAM-TK server.
- 3.5 **DTAM user:** DTAM client or DTAM server.

4 Abbreviations

The abbreviations defined in Recommendation T.435 apply also to this Recommendation.

Additionally, the following abbreviations are used in this Recommendation.

ACSE	Association Control Service Element
DFR-SE	Document Filing and Retrieval Service Element
DTAM-DM-SE	DTAM-DM Service Element
DTAM-TK-SE	DTAM-TK Service Element
ROSE	Remote Operation Service Element

5 Conventions

The conventions described in Recommendation T.435 apply also to this Recommendation.

6 Overview of the protocol specifications

This clause provides an introduction to the protocol model, its addition to the Telematic Protocol Architecture (TPA) and the DTAM-DM and DTAM- TK protocol specifications. The formal specification of the protocols is given in clause 7: “Formal specification of protocols”.

6.1 The protocol model

Figure 1 illustrates the model for communication applications based on this Recommendation.

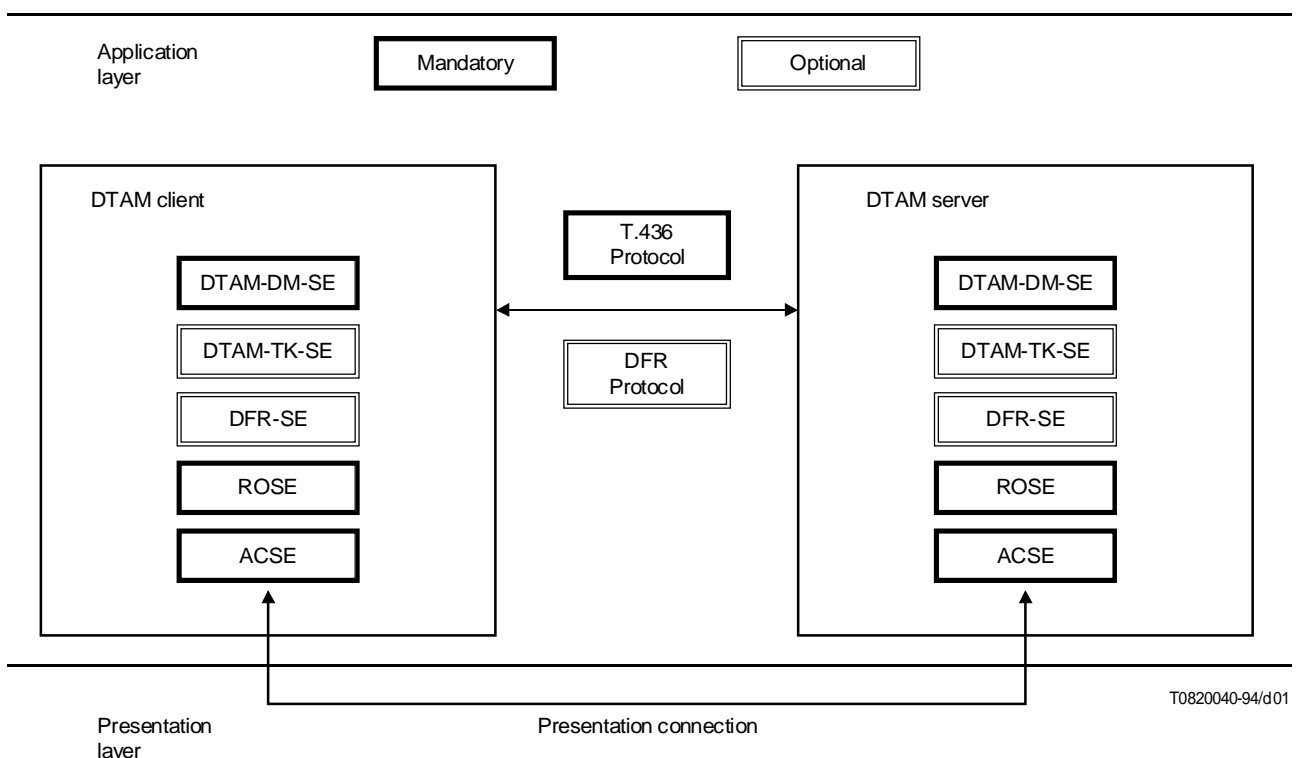


FIGURE 1/T.436
The protocol model

The protocol model comprises the DTAM-DM, DTAM-TK, DFR, RO and AC application service elements. The DTAM-TK and DFR application service elements are used optionally.

6.2 Refinement of the TPA model

The Telematic Protocol Architecture (TPA) model is described in Recommendation T.431 and illustrated in Figure 1/T.431.

This Recommendation provides a refinement of the TPA model for communication applications based on this Recommendation. Figure 2 gives an overview.

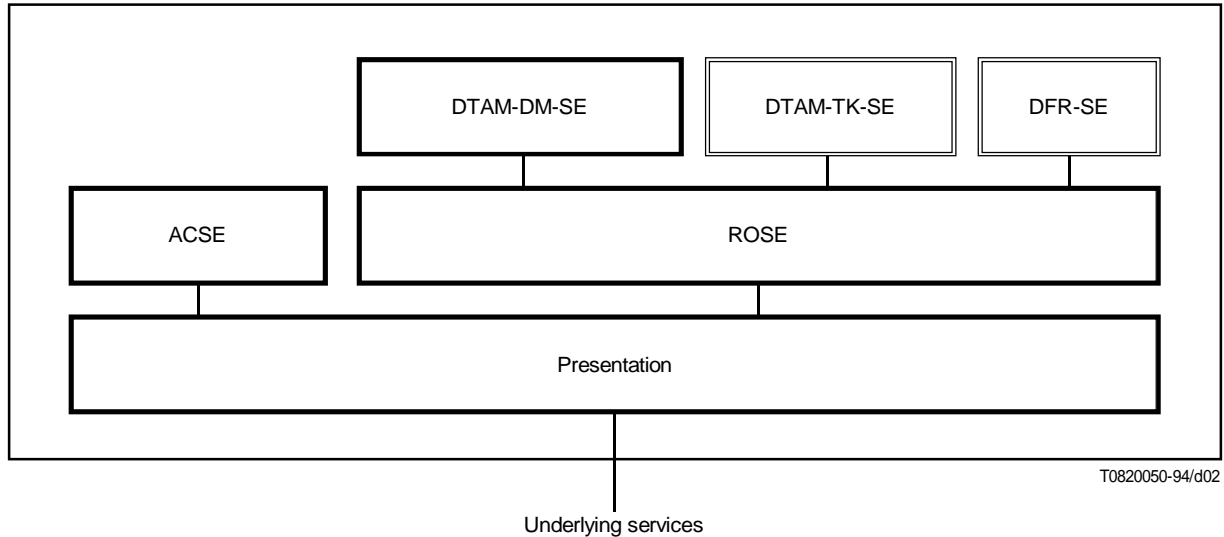


FIGURE 2/T.436

Refinement of the TPA model

The DTAM-DM application service element makes use of the remote operations which are provided by ROSE.

DTAM-TK and DFR are used optionally and are both ROSE-based.

All application service elements make use of the presentation service.

6.3 Abstract services provided by the DTAM-DM service element

The DTAM-DM service element provides the following DTAM-DM abstract services:

- DM-DOCUMENT-OPEN;
- DM-DOCUMENT-SAVE;
- DM-DOCUMENT-DISCARD;
- DM-DOCUMENT-CLOSE;
- DM-DOCUMENT-LIST;
- DM-GET;
- DM-SEARCH;
- DM-CREATE;
- DM-DELETE;
- DM-MODIFY;
- DM-COPY;
- DM-MOVE;
- DM-REPLACE;
- DM-RESERVE;
- DM-UNRESERVE;

- DM-POINT;
- DM-MACRO-CALL;
- DM-GROUP-BEGIN;
- DM-GROUP-END.

6.4 Abstract services provided by the DTAM-TK service element

The DTAM-TK service element provides the following DTAM-TK abstract services:

- TK-TOKEN-GIVE;
- TK-TOKEN-PLEASE.

7 Formal protocol specifications

This clause provides the formal specification for the DTAM-DM and DTAM-TK protocols.

7.1 Formal specification of the DTAM-DM protocol

The protocol is described in terms of DTAM-DM data units exchanged between the peer DTAM-DM-SEs. The PDUs are specified using ASN.1 and the Remote operations OPERATION and ERROR external macros defined in Recommendation X.219.

```
-- DTAM-DM protocol
DTAM-DM-Protocol { ccitt recommendation t 436 modules(0) dm-protocol(1) }
DEFINITIONS ::= BEGIN
EXPORTS

-- DTAM-DM SE
    dTAM-DM-SE;
IMPORTS

-- Application service elements and application contexts
    APPLICATION-SERVICE-ELEMENT, APPLICATION-CONTEXT,
    aCSE, rOSE
        FROM Remote-Operation-Notation-extension
        { joint-iso-ccitt remote-operation(4) notation-extension(2) }

    dFRSE
        FROM DFRAccessProtocol
        { iso standard 10166 part-2(2) modules(0) access-protocol(1) }

-- DTAM-DM abstract services
    DM-DOCUMENT-OPEN, DM-DOCUMENT-SAVE, DM-DOCUMENT-DISCARD,
    DM-DOCUMENT-CLOSE, DM-DOCUMENT-LIST,
    DM-GET, DM-SEARCH,
    DM-CREATE, DM-DELETE, DM-MODIFY, DM-COPY,
    DM-MOVE, DM-REPLACE, DM-RESERVE, DM-UNRESERVE, DM-POINT,
    DM-MACRO-CALL, DM-GROUP-BEGIN, DM-GROUP-END,

-- DTAM-DM abstract errors
    DM-DocumentError,
    DM-AccessError,
    DM-ReservationError,
    DM-FragmentError,
    DM-SaveError,
    DM-ServiceError,
    DM-ContentError,
    DM-AttributeError,
    DM-ListError

        FROM DTAM-DM-AbstractServices
        { ccitt recommendation t 435 dm(1) modules(0) abstract-services(1) }
```



```

-- DTAM-DM object identifiers
    id-ase-dtam-dm, id-ase-dtam-tk,
    id-as-dtam-dm, id-as-dtam-tk
        FROM DTAM-DM-TK-ProtocolObjectIdentifiers
        { ccitt recommendation t 436 modules(0) object-identifiers(0) }

-- DFR object identifiers
    id-as-acse, id-as-dfrse, id-as-dfr-ext-attr
        FROM DFRProtocolObjectIdentifiers
        { iso standard 10166 part-2(2) modules(0) object-identifiers(0) };

-- DTAM-DM application context
dtam-dm    APPLICATION-CONTEXT
           APPLICATION SERVICE ELEMENTS
           { aCSE }
           BIND DtamBind
           UNBIND DtamUnbind
           REMOTE OPERATIONS { rOSE }
           INITIATOR CONSUMER OF { dTAM-DM-SE }
           ABSTRACT SYNTAXES
           {
               id-as-acse,          -- of ACSE
               id-as-dtam-dm,      -- of DTAM-DM-SE
           }
           ::= id-ac-dtam-dm

-- DTAM-DM/DTAM-TK combined application context
dtam-dm-tk APPLICATION-CONTEXT
           APPLICATION SERVICE ELEMENTS
           { aCSE }
           BIND DtamBind
           UNBIND DtamUnbind
           REMOTE OPERATIONS {rOSE}
           OPERATIONS OF { dTAM-DM-SE, dTAM-TK-SE }
           ABSTRACT SYNTAXES
           {
               id-as-acse,          -- of ACSE
               id-as-dtam-dm,      -- of DTAM-DM-SE
               id-as-dtam-tk      -- of DTAM-TK-SE
           }
           ::= id-ac-dtam-dm-tk

-- DTAM-DM/DFR combined application context
dtam-dm-dfr APPLICATION-CONTEXT
           APPLICATION SERVICE ELEMENTS
           { aCSE }
           BIND DtamBind
           UNBIND DtamUnbind
           REMOTE OPERATIONS { rOSE }
           INITIATOR CONSUMER OF { dTAM-DM-SE, dFRSE }
           ABSTRACT SYNTAXES
           {
               id-as-acse,          -- of ACSE
               id-as-dtam-dm,      -- of DTAM-DM-SE
               id-as-dfrse,        -- of DFR-SE
               id-as-dfr-ext-attr  -- of DFR extension attribute set
           }
           ::= id-ac-dtam-dm-dfr

-- DTAM-DM service element
dTAM-DM-SE APPLICATION-SERVICE-ELEMENT
           CONSUMER INVOKES
           {
               dm-document-open,
               dm-document-save,
               dm-document-discard,
               dm-document-close,
               dm-document-list,
           }

```

```

        dm-get,
        dm-search,
        dm-create,
        dm-delete,
        dm-modify,
        dm-copy,
        dm-move,
        dm-replace,
        dm-reserve,
        dm-unreserve,
        dm-point,
        dm-macro-call,
        dm-group-begin,
        dm-group-end }
SUPPLIER INVOKES
{
}
 ::= id-ase-dtam-dm

-- Remote operations
    dm-document-open          DM-DOCUMENT-OPEN          ::= 13
    dm-document-save          DM-DOCUMENT-SAVE          ::= 14
    dm-document-discard       DM-DOCUMENT-DISCARD       ::= 15
    dm-document-close         DM-DOCUMENT-CLOSE         ::= 16
    dm-document-list          DM-DOCUMENT-LIST          ::= 17
    dm-get                     DM-GET                     ::= 18
    dm-search                  DM-SEARCH                  ::= 19
    dm-create                  DM-CREATE                  ::= 20
    dm-delete                  DM-DELETE                  ::= 21
    dm-modify                  DM-MODIFY                  ::= 22
    dm-copy                    DM-COPY                    ::= 23
    dm-move                    DM-MOVE                    ::= 24
    dm-replace                 DM-REPLACE                 ::= 25
    dm-reserve                 DM-RESERVE                 ::= 26
    dm-unreserve               DM-UNRESERVE               ::= 27
    dm-point                   DM-POINT                   ::= 28
    dm-macro-call              DM-MACRO-CALL              ::= 29
    dm-group-begin             DM-GROUP-BEGIN             ::= 30
    dm-group-end               DM-GROUP-END               ::= 31

-- Remote errors
    dm-document-error          DM-DocumentError          ::= 14
    dm-access-error            DM-AccessError            ::= 15
    dm-reservation-error       DM-ReservationError       ::= 16
    dm-fragment-error          DM-FragmentError          ::= 17
    dm-save-error              DM-SaveError              ::= 18
    dm-service-error           DM-ServiceError           ::= 19
    dm-content-error           DM-ContentError           ::= 20
    dm-attribute-error         DM-AttributeError         ::= 21
    dm-list-error              DM-ListError              ::= 22

END -- of DTAM-DM-Protocol

```

7.2 Formal specification of the DTAM-TK protocol

The abstract syntax specification of the DTAM-TK protocol is as follows:

```

DTAM-TK-Protocol { ccitt recommendation t 436 modules(0) tk-protocol(2) }
DEFINITIONS ::= BEGIN
EXPORTS
-- DTAM-TK ASE
    dtam-tk-se;
IMPORTS

```

```

-- Application service elements and application contexts
    APPLICATION-SERVICE-ELEMENT, APPLICATION-CONTEXT,
    rOSE
    FROM Remote-Operation-Notation-extension
    { joint-iso-ccitt remote-operation(4) notation-extension(2) }

-- DTAM-TK abstract services
    TK-TOKEN-GIVE, TK-TOKEN-PLEASE,

-- DTAM-TK abstract errors
    TK-ServiceError
    FROM DTAM-TK-AbstractServices
    { ccitt recommendation t 435 tk(2) modules(0) abstract-services(1) };

-- DTAM-DM/DTAM-TK combined application context
    dtam-dm-tk  APPLICATION-CONTEXT
                APPLICATION SERVICE ELEMENTS
                { aCSE }
    BIND      DtamBind
    UNBIND    DtamUnbind
    REMOTE OPERATIONS { rOSE }
    OPERATIONS OF { dTAM-DM-SE, dTAM-TK-SE }
    ABSTRACT SYNTAXES
    {
        id-as-acse,          -- of ACSE
        id-as-dtam-dm,      -- of DTAM-DM-SE
        id-as-dtam-tk       -- of DTAM-TK-SE
    }
    ::= id-ac-dtam-dm-tk

-- DTAM-TK service element
    DTAM-TK-SE  APPLICATION-SERVICE-ELEMENT
                OPERATIONS { tk-token-give, tk-token-please }
                ::= id-ase-dtam-tk

-- Remote operations
    tk-token-give      TK-TOKEN-GIVE      ::= 32
    tk-token-please    TK-TOKEN-PLEASE    ::= 33

-- Remote errors
    tk-service-error   TK-ServiceError    ::= 23

END -- of DTAM-TK-Protocol

```

7.3 Definition of abstract syntax for DTAM-DM

This Recommendation assigns the ASN.1 object identifier value:

```

id-as-dtam-dm OBJECT IDENTIFIER ::=
{ ccitt recommendation t 436 abstract-syntax (2) dtam-dm (0) }

```

as an abstract syntax name for the set of presentation data values, each of which is either a value of the ASN.1 type:

ROSEapdus from Remote-Operations-APDUs

as defined in Recommendation X.229 with the argument, result or error component filled according to the definitions in the DTAM-DM protocol or a value of one of the ASN.1 type:

BIND from Remote-Operation-Notation.
UNBIND from Remote-Operation-Notation

as defined in Recommendation X.229 with the argument, result or error component filled according to the definitions of DTAM-DMBind and DTAM-DMUnBind in the DTAM-DM protocol.

7.4 Definition of abstract syntax for DTAM-TK

This Recommendation assigns the ASN.1 object identifier value:

id-as-dtam-tk OBJECT IDENTIFIER ::=
{ ccitt recommendation t 436 abstract-syntax (2) dtam-tk (1) }

as an abstract syntax name for the set of presentation data values, each of which is either a value of the ASN.1 type:

ROSEapdus from Remote-Operations-APDUs

as defined in Recommendation X.229 with the argument, result or error component filled according to the definitions in the DTAM-TK protocol.

8 Conformance

This clause provides conformance statements which have to be fulfilled by communication applications based on the DTAM-DM or DTAM-TK protocols.

8.1 Conformance to the DTAM-DM protocol

A DTAM-DM communication application claiming conformance to the DTAM-DM protocol specified in this Recommendation shall comply with the requirements noted below.

8.1.1 Static requirements

The system shall:

- conform to the abstract-syntax definitions of subclause 7.1: “Formal specification of the DTAM-DM protocol”;
- conform to one of the application-contexts of subclause 7.1: “Format specification of the DTAM-DM protocol”.

8.1.2 Dynamic requirements

The system shall:

- supply operations conforming to subclause “Formal definition of DTAM-DM abstract services” of Annex B/T.435;
- conform to the use of underlying services as defined in presentation service (Recommendation X.216), ACSE (Recommendation X.217) and ROSE (Recommendation X.219).

8.2 Conformance to the DTAM-TK protocol

A DTAM-TK communication application claiming conformance to the DTAM-TK protocol specified in this Recommendation shall comply with the requirements noted below.

8.2.1 Static requirements

The system shall:

- conform to the abstract-syntax definitions of subclause 7.2 “Formal specification of the DTAM-TK protocol”;
- conform to one of the application-contexts of subclause 7.2 “Formal specification of the DTAM-TK protocol” of this Recommendation.

8.2.2 Dynamic requirements

The system shall:

- supply operations conforming to subclause “Formal definition of DTAM-TK abstract services” of Annex B/T.435;
- conform to the use of underlying services as defined in presentation service (Recommendation X.216) and ROSE (Recommendation X. 219).

Annex A

Formal assignment of object identifiers

(This annex forms an integral part of this Recommendation)

All object identifiers which are used in this Recommendation are formally assigned in this annex using the ASN. 1 notation:

DTAM-DM-TK-Protocol { ccitt recommendation t 436 modules(0) object-identifiers(0) }

DEFINITIONS ::=

BEGIN

-- *EXPORTS everything*

ID ::= OBJECT IDENTIFIER

id-dtam-tk-dm-protocol ID ::= { ccitt recommendation t 436 }

-- *Categories*

id-mod ID ::= { id-dtam-dm-tk-protocol 0 } -- *modules*

id-ac ID ::= { id-dtam-dm-tk-protocol 1 } -- *application context*

id-as ID ::= { id-dtam-dm-tk-protocol 2 } -- *abstract syntax*

id-ase ID ::= { id-dtam-dm-tk-protocol 3 } -- *application service element*

-- *Modules*

id-mod-object-identifiers ID ::= { id-mod 0 }

id-mod-dm-protocol ID ::= { id-mod 1 }

id-mod-tk-protocol ID ::= { id-mod 2 }

-- *Application context*

id-ac-dtam-dm ID ::= { id-ac 0 }

id-ac-dtam-dm-tk ID ::= { id-ac 1 }

id-ac-dtam-dm-dfr ID ::= { id-ac 2 }

-- *Abstract syntax*

id-as-dtam-dm ID ::= { id-as 0 }

id-as-dtam-tk ID ::= { id-as 1 }

-- *Application service element*

id-ase-dtam-dm ID ::= { id-ase 0 }

id-ase-dtam-tk ID ::= { id-ase 1 }

END -- *of DTAM-DM-TK-ProtocolObjectIdentifiers*