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SERIES I: INTEGRATED SERVICES DIGITAL NETWORK

Overall network aspects and functions – General network requirements and functions

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Network capabilities to support multimedia services: general aspects

ITU-T Recommendation I.375.1

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION I.375.1

NETWORK CAPABILITIES TO SUPPORT MULTIMEDIA SERVICES: GENERAL ASPECTS

Summary

This Recommendation specifies the general aspects of network capabilities for the support of multimedia services, including audiovisual services. Network capabilities to support multimedia services and applications are described by means of reference configurations and corresponding network architectures. Functional blocks in the architecture are identified and the physical and logical relationships among these blocks are described. Although assumptions must necessarily be made regarding the functionality of Customer Premises Equipment (CPE), specific requirements for CPE are outside the scope of this Recommendation.

Source

ITU-T Recommendation I.375.1 was prepared by ITU-T Study Group 13 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 1st of June 1998.

Keywords

Functional groups, Multimedia services, Network capabilities, Reference configuration.

FOREWORD

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Recommendation I.375.1

NETWORK CAPABILITIES TO SUPPORT MULTIMEDIA SERVICES: GENERAL ASPECTS[1]

(Geneva, 1998)

1 Scope

This Recommendation specifies the general aspects of network capabilities for the support of multimedia services, including audiovisual services. Network capabilities to support multimedia services and applications are described by means of reference configurations and corresponding network architectures. Functional blocks in the architecture are identified and the physical and logical relationships among these blocks are described. Although assumptions must necessarily be made regarding the functionality of Customer Premises Equipment (CPE), specific requirements for CPE are outside the scope of this Recommendation.

Relationships between service provider(s), content provider(s) and network provider(s) are outside the scope of this Recommendation.

2 General network requirements for multimedia service classes

According to Recommendation F.700 (Framework for Multimedia Services), the following multimedia service classes are considered:

- conference services;
- conversation services;
- distribution services;
- retrieval services;
- collection services;
- message services.

Figure 1 shows the reference configuration which is applicable to all multimedia service classes.

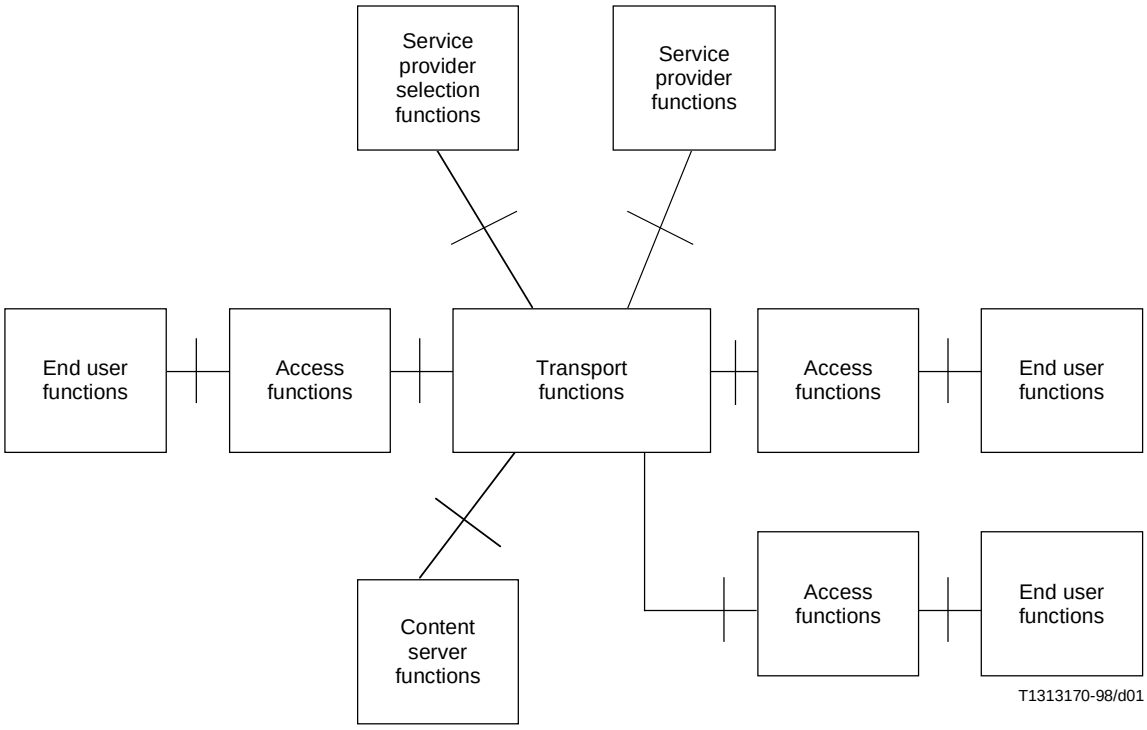

Figure 1/I.375.1 – Reference configuration applicable to all classes of multimedia services

[1] This Recommendation replaces Recommendation I.374: *Network Capabilities to support multimedia services*.

The functional groups of this reference configuration contain functions which are required to support all multimedia service classes, as follows:

NOTE 1 – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the content server via the service provider. They differ from service to service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from service to service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.
  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.
  - Bearer channel concentration.
  - Signalling and packet information multiplexing/demultiplexing.
  - Circuit emulation for the ATM transport.
  - Multiplexing/demultiplexing.
  - Cross-connect function including grooming and configuration.
- *Transport functions*
  - Transport of bearer information (user information).
  - Transport of protocol information for signalling.
  - Transport of protocol information for operation and maintenance.
  - Network control functions.
- *Service provider selection functions*
  - Termination of network control functions.
  - Selection of service provider.
  - Navigation functions related to the service provider, including directory functions.
- *Service provider functions*
  - Distribution (duplication) functions.
  - Collection (merge) functions.
  - Content selection functions.
  - Broker functions.

– Billing functions.

– Navigation functions related to the content.

- *Content server functions*

  – Application preparation and storage.

  – Termination of application control functions.

  – Information generation.

NOTE 2 – The Servers from which content is loaded on to the Content Server Functions as well as the network through which this process is carried out are outside the scope of this Recommendation.

These functional groups are separated by the indicated reference points. The naming, definition and description of the reference points is for further study.

The following subclauses describe reference configurations which are specific to a particular service class.

2.1 Multimedia conference services class

Multimedia conference services are characterized *by multipoint communication and bidirectional information exchange.* Multipoint service can be provided by a transport function or service function (e.g. MCU). The reference configuration for the multimedia conference services class is shown in Figure 2. It presents the functions of multimedia conference services to be supported by network capabilities.

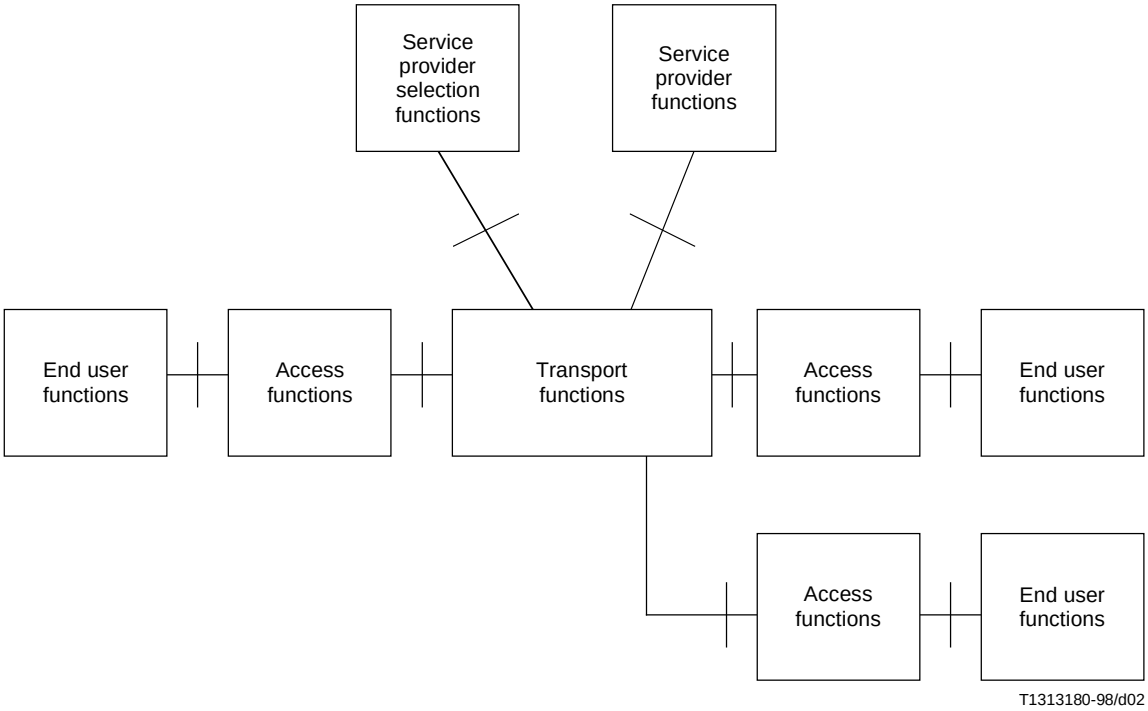

Figure 2/I.375.1 – Reference configuration for multimedia conference services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*

  – Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the service provider. They differ from conference service to conference service and will therefore not be described on this level.

– Network control functions:

  These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from conference service to conference service and will therefore not be described on this level.

– Information handling functions, e.g.:

  - Access control functions:

    These functions are related to security aspects, e.g. needed to ensure authentication and authorization.

  - Information encoding and decoding.
  - Information encryption and decryption.

– Data stream termination functions, e.g.:

  - ATM termination (if applicable).
  - Information conversion.
  - MPEG-2 transport stream termination (if applicable).
  - Error correction handling.

- *Access functions*
  – End user interface termination function.
  – Transport interface termination function.
  – Access bearer handling.
  – Bearer channel concentration.
  – Signalling and packet information multiplexing/demultiplexing.
  – Circuit emulation for the ATM transport.
  – Multiplexing/demultiplexing.
  – Cross-connect function including grooming and configuration.
- *Transport functions*
  – Multipoint transport of bearer information (user information).
  – Multipoint transport of protocol information for signalling.
  – Multipoint transport of protocol information for operation and maintenance.
  – Network control functions.
- *Service provider selection functions*
  – Termination of network control functions.
  – Selection of service provider.
  – Navigation functions related to the service provider, including Directory functions.
- *Service provider functions*
  – Distribution (duplication) functions.
  – Collection (merge) functions.
  – Broker functions.
  – Billing functions.
  – Reservation function.

These functional groups are separated by reference points. The definition and description of the reference points is for further study.

2.2 Multimedia conversation services class

Multimedia conversation services are characterized *by point-to-point communication and bidirectional information exchange*. The reference configuration for the multimedia conversation services class is shown in Figure 3. It presents the functions of multimedia conversation services to be supported by network capabilities.

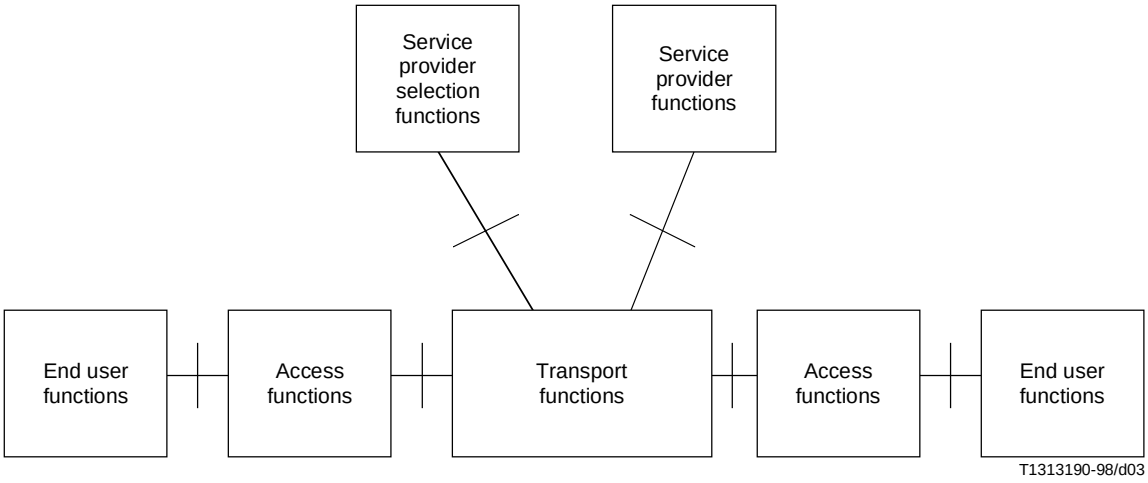

Figure 3/I.375.1 – Reference configuration for multimedia conversation services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the service provider. They differ from conversation service to conversation service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from conversation service to conversation service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.
  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.

- Bearer channel concentration.
- Signalling and packet information multiplexing/demultiplexing.
- Circuit emulation for the ATM transport.
- Multiplexing/demultiplexing.
- Cross-connect function including grooming and configuration.

- *Transport functions*
  - Point-to-point transport of bearer information (user information).
  - Point-to-point transport of protocol information for signalling.
  - Point-to-point transport of protocol information for operation and maintenance.
  - Network control functions.
- *Service provider selection functions*
  - Termination of network control functions.
  - Selection of service provider.
  - Navigation functions related to the service provider, including Directory functions.
- *Service provider functions*
  - Broker functions.
  - Billing functions.

These functional groups are separated by reference points. The definition and description of the reference points is for further study.

2.3 Multimedia distribution services class

Multimedia distribution services are characterized by *point-to-multipoint communication and unidirectional information exchange*. The reference configuration for the multimedia distribution services class is shown in Figure 4. It presents the functions of multimedia distribution services to be supported by network capabilities.

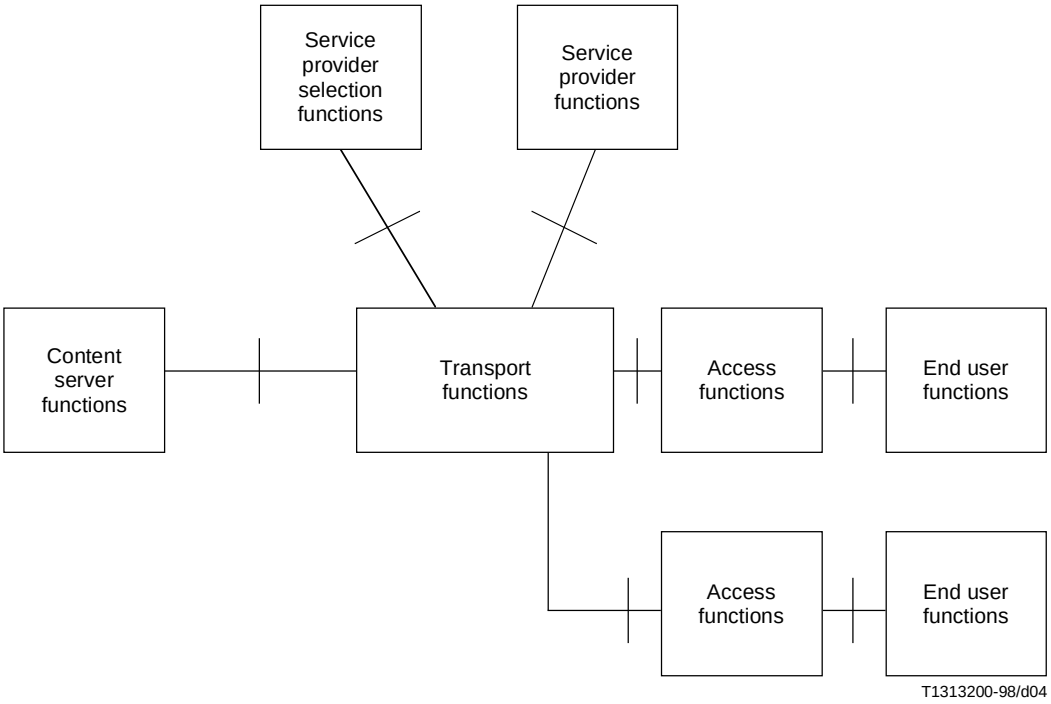

Figure 4/I.375.1 – Reference configuration for multimedia distribution services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the content server via the service provider. They differ from distribution service to distribution service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from distribution service to distribution service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.
  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.
  - Circuit emulation for the ATM.
  - Multiplexing/demultiplexing.
  - Cross-connect function including grooming and configuration.
- *Transport functions*
  - Point-to-multipoint transport of bearer information (user information).
  - Point-to-multipoint transport of protocol information for signalling.
  - Point-to-multipoint transport of protocol information for operation and maintenance.
  - Network control functions.
- *Service provider selection functions*
  - Termination of network control functions.
  - Selection of service provider.
  - Navigation functions related to the service provider, including Directory functions.
- *Service provider functions*
  - Distribution (duplication) functions.
  - Content selection functions.
  - Broker functions.
  - Billing functions.
  - Navigation functions related to the content.

- *Content server functions*
  - Application preparation and storage.
  - Termination of application control functions.

These functional groups are separated by reference points. The definition and description of the reference points is for further study.

2.4 Multimedia retrieval services class

Multimedia retrieval services are characterized by *point-to-point communication and unidirectional information exchange*. The reference configuration for the multimedia retrieval services class is shown in Figure 5. It presents the functions of multimedia retrieval services to be supported by network capabilities.

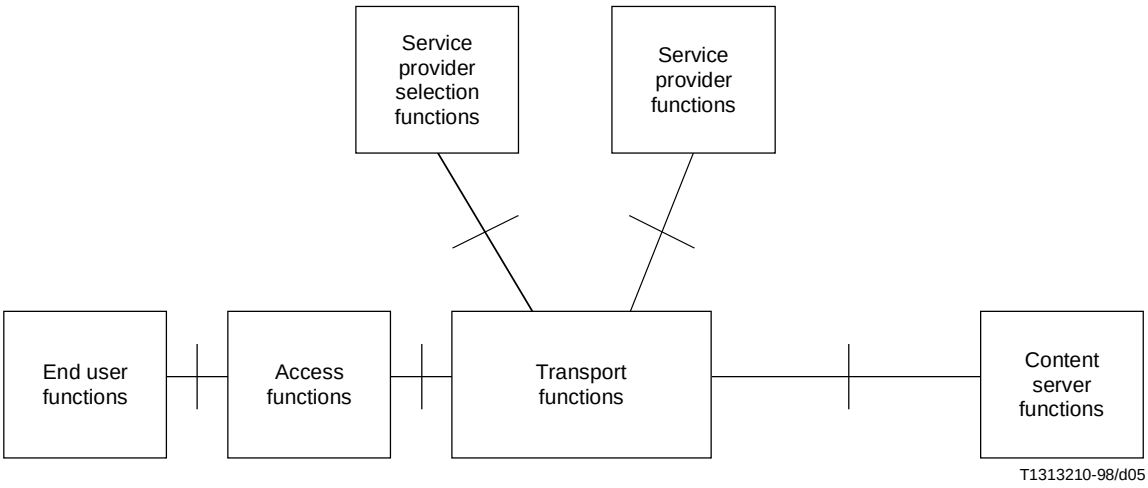

Figure 5/I.375.1 – Reference configuration for multimedia retrieval services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the content server via the service provider. They differ from retrieval service to retrieval service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from retrieval service to retrieval service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.

  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.
  - Bearer channel concentration.
  - Signalling and packet information multiplexing/demultiplexing.
  - Circuit emulation for the ATM transport.
  - Multiplexing/demultiplexing.
  - Cross-connect function including grooming and configuration.
- *Transport functions*
  - Point-to-point transport of bearer information (user information).
  - Point-to-point transport of protocol information for signalling.
  - Point-to-point transport of protocol information for operation and maintenance.
  - Network control functions.
- *Service provider selection functions*
  - Termination of network control functions.
  - Selection of service provider.
  - Navigation functions related to the service provider, including Directory functions.
- *Service provider functions*
  - Content selection functions.
  - Broker functions.
  - Billing functions.
  - Navigation functions related to the content.
- *Content server functions*
  - Application preparation and storage.
  - Termination of application control functions.

These functional groups are separated by reference points. The definition and description of the reference points is given for an example of the multimedia retrieval services (Vod service) in Recommendation I.375.2.

2.5 Multimedia collection services class

Multimedia collection services are characterized by *multipoint-to-point communication and unidirectional information exchange*. The reference configuration for the multimedia collection services class is shown in Figure 6. It presents the functions of multimedia collection services to be supported by network capabilities.

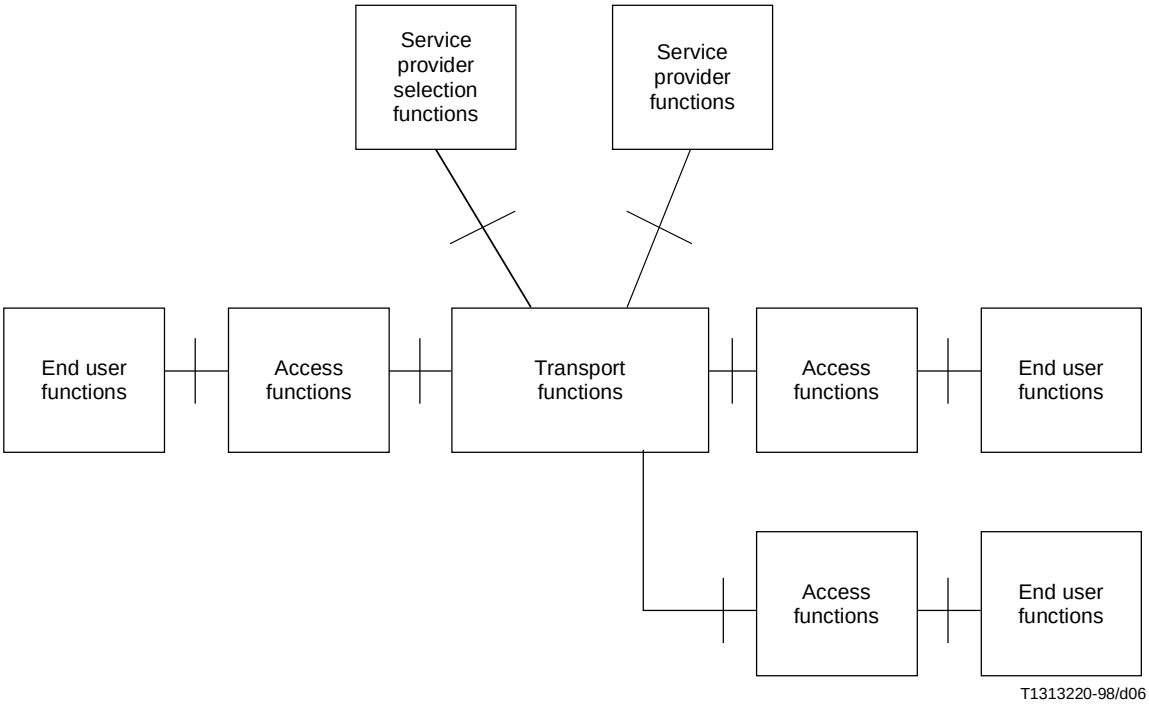

Figure 6/I.375.1 – Reference configuration for multimedia collection services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the service provider. They differ from collection service to collection service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from collection service to collection service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.
  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.

– Bearer channel concentration.

– Signalling and packet information multiplexing/demultiplexing.

– Circuit emulation for the ATM transport.

– Multiplexing/demultiplexing.

– Cross-connect function including grooming and configuration.

- *Transport functions*

  – Multipoint-to-point transport of bearer information (user information).

  – Point-to-multipoint transport of protocol information for signalling.

  – Point-to-multipoint transport of protocol information for operation and maintenance.

  – Network control functions.

- *Service provider selection functions*

  – Termination of network control functions.

  – Selection of service provider.

  – Navigation functions related to the service provider, including Directory functions.

- *Service provider functions*

  – Collection (merge) functions.

  – Broker functions.

  – Billing functions.

These functional groups are separated by reference points. The definition and description of the reference points is for further study.

2.6 Multimedia message services class

Multimedia message services are characterized by *non-realtime point-to-point or point-to-multipoint communication and unidirectional information exchange*. The reference configuration for the multimedia message services class is shown in Figure 7. It presents the functions of multimedia message services to be supported by network capabilities.

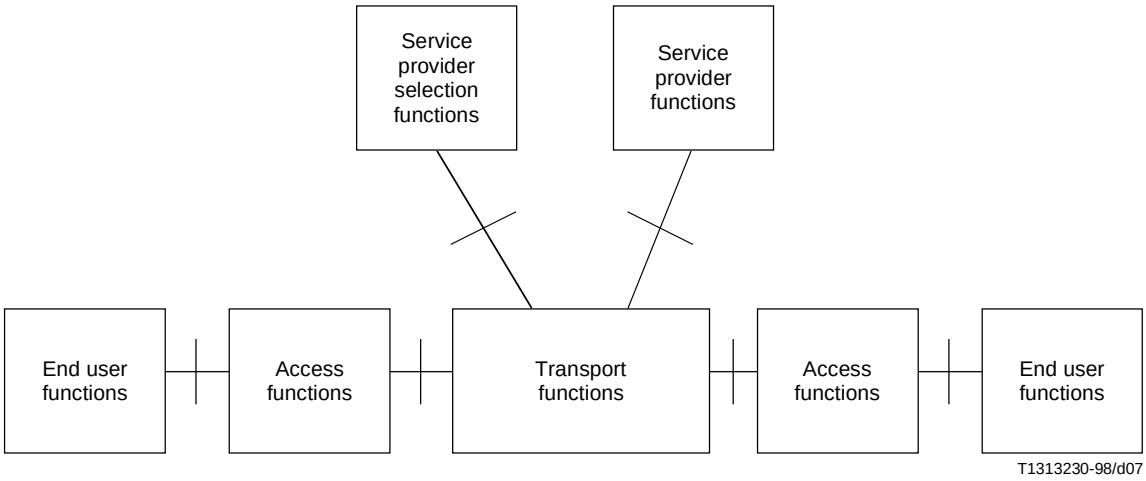

Figure 7/I.375.1 – Reference configuration for multimedia message services class

The functional groups contain the following functions to be supported:

NOTE – The following lists may not necessarily be exhaustive.

- *End user functions*
  - Application control functions:

    These functions are needed to control the application by the exchange of messages between the end user and the service provider. They differ from message service to message service and will therefore not be described on this level.
  - Network control functions:

    These functions are needed to control the network by the exchange of messages between the end user and the service provider. They also differ from message service to message service and will therefore not be described on this level.
  - Information handling functions, e.g.:
    - Access control functions:

      These functions are related to security aspects, e.g. needed to ensure authentication and authorization.
    - Information conversion.
    - Information encoding and decoding.
    - Information encryption and decryption.
  - Data stream termination functions, e.g.:
    - ATM termination (if applicable).
    - MPEG-2 transport stream termination (if applicable).
    - Error correction handling.
- *Access functions*
  - End user interface termination function.
  - Transport interface termination function.
  - Access bearer handling.
  - Bearer channel concentration.
  - Signalling and packet information multiplexing/demultiplexing.
  - Circuit emulation for the ATM transport.
  - Multiplexing/demultiplexing.
  - Cross-connect function including grooming and configuration.
- *Transport functions*
  - Non-realtime point-to-point or point-to-multipoint transport of bearer information (user information).
  - Point-to-point transport of protocol information for signalling.
  - Point-to-point transport of protocol information for operation and maintenance.
  - Network control functions.
- *Service provider selection functions*
  - Termination of network control functions.
  - Selection of service provider.
  - Navigation functions related to the service provider, including Directory functions.
- *Service provider functions*
  - Store-and-forward functions.
  - Distribution (duplication) functions (if not provided by the transport functions).
  - Broker functions.
  - Billing functions.

These functional groups are separated by reference points. The definition and description of the reference points is for further study.

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