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ITU-T

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STANDARDIZATION SECTOR
OF ITU

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SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES

Data transmission services

Service and operational principles for public data transmission service

ITU-T Recommendation F.600

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ITU-T Recommendation F.600

Service and operational principles for public data transmission service

Summary

This Recommendation contains the general service and operational principles to be followed for the international public data transmission service. The general model of international public data transmission service is outlined. This Recommendation includes important aspects of data transmission service – addressing, quality of service, call progress signals, multicast operation, user classes of service and optional user facilities. The general provisions between Administrations and the general provisions between the Administration and the customer are also described.

The overview of the interrelationship between the relevant Recommendations necessary for offering data transmission service is in the scope of this Recommendation.

Source

ITU-T Recommendation F.600 was approved on 29 April 2004 by ITU-T Study Group 17 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation F.600

Service and operational principles for public data transmission service

1 Scope

1.1 The establishment in various countries of public data networks creates the need to produce Recommendations to facilitate the provision of international public data transmission services. This Recommendation lays down the general service and operational principles to be followed for international data transmission services.

This Recommendation provides an overview of interrelationship between the relevant Recommendations necessary for establishing, maintaining and offering the public data transmission service.

1.2 Public Data Transmission Service (PDTS) is a service established by an Administration and provides exchange of data between service users.

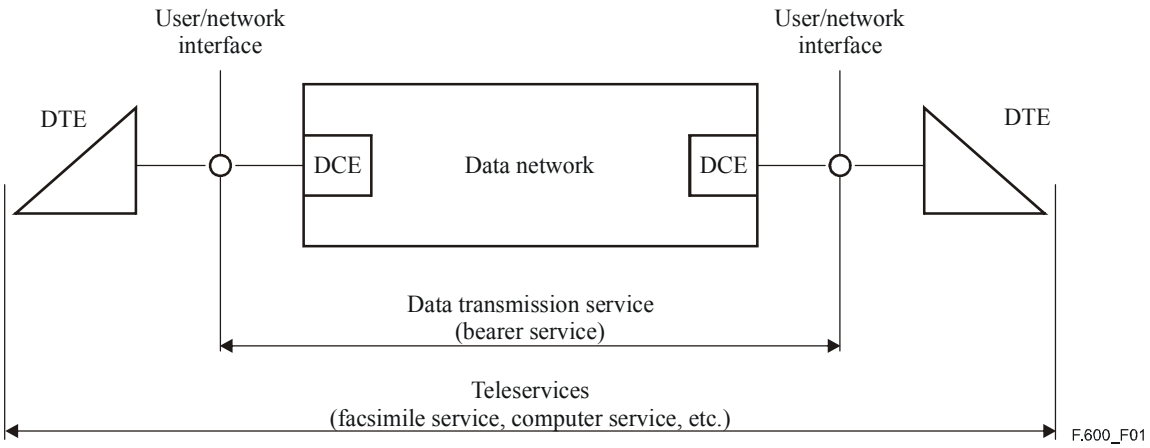
NOTE – In this Recommendation, the expression "Administration" is used to indicate both a telecommunication administration and a Recognized Operating Agency (ROA). An international PDTS may be provided through the interworking of national Public Data Networks (PDNs) and Integrated Services Digital Networks (ISDNs). Public data networks are established and operated by the Administration for the specific purpose of providing data transmission service.

1.3 Public data networks and public data transmission services do not include the Data Terminal Equipment (DTE). Therefore, additional capabilities arise because DTEs do not belong to PDNs and PDTSs. PDTS is assumed to be equivalent to the bearer service (see the definition of bearer service in ITU-T Recs I.112 and I.230). Public Data Networks in Open Systems Interconnection (OSI) environments typically provide three lower layers: physical layer, data link layer and network layer (see ITU-T Recs X.200 | ISO/IEC 7498-1 and X.300).

Various services based on PDTS may be operated by Administrations. Those services are assumed to be equivalent to teleservices (refer to ITU-T Recs I.112 and I.240 for the definition of teleservice). See Figure 1.

1.4 Four types of data transmission services are identified: circuit switched, packet switched, frame relay and leased circuit PDTS. Those services are based on Circuit-Switched Public Data Networks (CSPDNs), Packet-Switched Public Data Networks (PSPDNs), Frame Relay Public Data Networks (FRPDNs) and Leased Circuits.

1.5 This Recommendation does not cover international leased circuit PDNs. Also, this Recommendation does not cover public data transmission services offered by Integrated Services Digital Networks (ISDNs). Access to PDTS in one country through the Public Switched Telephone Network (PSTN) in another country is also out of the scope of this Recommendation. This Recommendation does not cover data transmission possibilities provided by IP-based networks or data transmission possibilities provided by modems on Public Switched Telephone Network (PSTN).



DTE Data terminal equipment (subscriber's terminal, teleservice server, etc.)
DCE Data circuit-terminating equipment

Figure 1/F.600 – The environment for data transmission service

2 References

The following ITU-T 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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

– ITU-T Recommendation E.116 (1997), *International telecommunication charge card service.*

– ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan*.

– ITU-T Recommendation F.17 (1992), *Operational aspects of service telecommunications.*

– ITU-T Recommendation I.112 (1993), *Vocabulary of terms for ISDNs.*

– ITU-T Recommendation I.230 (1988), *Definition of bearer service categories.*

– ITU-T Recommendation I.240 (1988), *Definition of teleservices.*

– ITU-T Recommendation X.1 (2000), *International user classes of service in, and categories of access to, public data networks and Integrated Services Digital Networks (ISDNs).*

– ITU-T Recommendation X.2 (2000), *International data transmission services and optional user facilities in public data networks and ISDNs.*

– ITU-T Recommendation X.6 (1997), *Multicast service definition,* plus Amendment 1 (2000), *Frame relay PVC multicast service definition.*

– ITU-T Recommendation X.7 (2004), *Technical characteristics of data transmission services.*

– ITU-T Recommendation X.92 (1988), *Hypothetical reference connections for public synchronous data networks.*

– ITU-T Recommendation X.96 (2000), *Call progress signals in public data networks.*

– ITU-T Recommendation X.110 (2002), *International routing principles and routing plan for Public Data Networks.*

– ITU-T Recommendation X.111 (2003), *Principles for the routing of international frame relay traffic*.

– ITU-T Recommendation X.115 (1995), *Definition of address translation capability in public data networks.*

– ITU-T Recommendation X.116 (1996), *Address translation registration and resolution protocol*.

– ITU-T Recommendation X.121 (2000), *International numbering plan for public data networks.*

– ITU-T Recommendation X.130 (1988), *Call processing delays in public data networks when providing international synchronous circuit-switched data services.*

– ITU-T Recommendation X.131 (1988), *Call blocking in public data networks when providing international synchronous circuit-switched data services.*

– ITU-T Recommendation X.135 (1997), *Speed of service (delay and throughput) performance values for public data networks when providing international packet-switched services.*

– ITU-T Recommendation X.136 (1997), *Accuracy and dependability performance values for public data networks when providing international packet-switched services.*

– ITU-T Recommendation X.137 (1997), *Availability performance values for public data networks when providing international packet-switched services.*

– ITU-T Recommendation X.144 (2003), *User information transfer performance parameters for public frame relay data networks.*

– ITU-T Recommendation X.145 (2003), *Connection establishment and disengagement performance parameters for public Frame Relay data networks providing SVC services.*

– ITU-T Recommendation X.146 (2000), *Performance objectives and quality of service classes applicable to frame relay.*

– ITU-T Recommendation X.147 (2003), *Frame Relay network availability.*

– ITU-T Recommendation X.180 (1988), *Administrative arrangements for international Closed User Groups (CUGs).*

– ITU-T Recommendation X.181 (1988), *Administrative arrangements for the provision of international permanent virtual circuits (PVCs).*

– ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic reference model: The basic model.*

– ITU-T Recommendation X.272 (2000), *Data compression and privacy over frame relay networks*.

– ITU-T Recommendation X.300 (1996), *General principles for interworking between public networks and between public networks and other networks for the provision of data transmission services.*

– ITU-T Recommendation X.371/Y.1402 (2001), *General arrangements for interworking between Public Data Networks and the Internet.*

3 Terminology

The definitions of terms used in this Recommendation are in ITU-T Rec. X.7.

NOTE – Within this Recommendation the term "Frame Relay Public Data Network (FRPDN)" is used. Some other Recommendations use the term "Public Frame Relay Data Network (PFRDN)". Both terms have absolutely the same meaning.

4 Abbreviations

This Recommendation uses the following abbreviations:

CSPDN Circuit-Switched Public Data Network

CUG Closed User Group

DCE Data Circuit-terminating Equipment

DTE Data Terminal Equipment

FRPDN Frame Relay Public Data Network

IDSE International Data Switching Exchange

ISDN Integrated Services Digital Network

OSI Open Systems Interconnection

PSPDN Packet-Switched Public Data Network

PDN Public Data Network

PDTS Public Data Transmission Service

PSTN Public Switched Telephone Network

PVC Permanent Virtual Circuit

ROA Recognized Operating Agency

5 General model of international PDTS

5.1 An international PDTS is based on an interconnection of national PDTSs. Such an interconnection is achieved with the interconnection of International Data Switching Exchanges (IDSEs) in relevant countries. The route for a call consists of three parts (see Figure 2):

- an originating national network part, from calling DTE to originating IDSE through the originating national PDN;
- an international network part, from the originating IDSE to the destination IDSE;
- a destination national network part, from the destination IDSE to the called DTE through the destination national PDN.

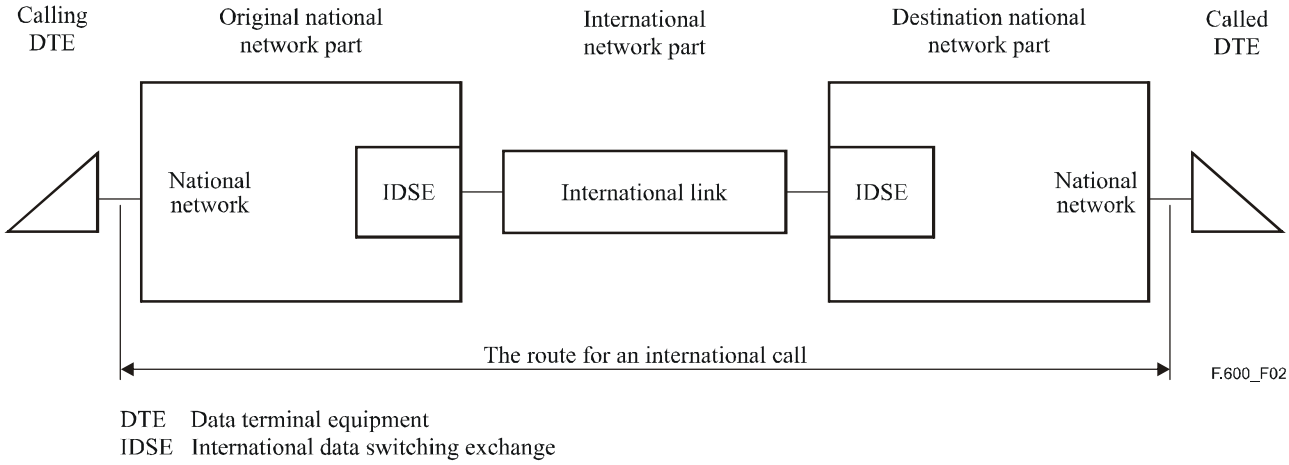


Figure 2/F.600 – Components of an international call

5.2 Various types of PDNs (and/or other networks) may interwork within a national network part. The originating national network part and the destination national network part may be different types of PDNs (or other networks). The international network part may consist of interworked IDSEs belonging to different networks of various countries. See ITU-T Recs X.1 and X.7 for possible interworking between networks providing data transmission. See ITU-T Rec. X.371/Y.1402 for interworking between PDNs and the Internet.

5.3 The planning of originating and destination PDNs is a national matter. Planning of originating and destination traffic routes is also a national matter. However, the quality of service of an international PDTS has to be taken into account when planning national PDNs, originating and destination traffic routes.

The planning of international traffic routes is the responsibility of the concerned Administrations and is subject to bilateral agreement.

5.4 Interworked national PDNs may be interconnected directly or via intermediate countries. For PSPDNs, FRPDNs and CSPDNs, routing principles of international data traffic are outlined in ITU-T Recs X.110 and X.111.

5.5 Administrations should compile information concerning service parameters of their networks for dissemination upon the request of the interested Administrations to enable the selection of the PDN for interworking and the planning of such interworking.

5.6 The total connection should comply with ITU-T Rec. X.92 for PSPDN and CSPDN. Hypothetical Reference Connections for FRPDNs are for further study.

5.7 Access to a national PDTS may be either *direct access* (without any intermediate switched network) or *port access* (via an intermediate switched network). Planning of access is a national matter. Access to a destination national PDTS via a PSTN or an ISDN of an originating country should be referred to as port access.

5.8 General aspects of PDTSs including technical characteristics of PDTSs in PDNs are outlined in ITU-T Rec. X.7.

6 Addressing aspects

6.1 Numbering in PDNs should comply with the International Numbering Plan specified in ITU-T Rec. X.121. PDNs may identify some DTEs by numbers from the E.164 numbering plan. FRPDNs may use either the X.121 or E.164 numbering plans.

6.2 Customers of PSPDNs and FRPDNs may use (where provided) alternative addressing, which does not correspond to the requirements of ITU-T Recs X.121 and E.164, for example some kinds of user-friendly addresses such as mnemonic addresses. In this case, PSPDN and FRPDN should have an address translation service which enables the PDNs to route calls to the proper X.121/E.164 address when the called address is out of the scope of X.121/E.164 addressing. Usage of the address translation service within the national PDNs is a national matter. Offering address translation capability in an international PDTS requires special provisions agreed between the Administrations concerned.

6.3 The definition of the address translation capability is outlined in ITU-T Recs X.115 and X.116.

7 Quality of service

7.1 Quality of service of an international PDTS is a subject of common responsibility of the Administrations concerned. Quality of service of a national network part is the responsibility of each relevant Administration. Quality of service of an international network part is the responsibility of the concerned (including transit) Administrations.

7.2 Apportioning of quality of service parameter values (national and international portions) should comply with ITU-T Recs X.135, X.136 and X.137 for PSPDN; ITU-T Recs X.130, X.131 for CSPDN; ITU-T Recs X.144, X.145, X.146 and X.147 for FRPDN.

7.3 Apportioning of quality of service parameter values of international network part is subject to agreement between all Administrations involved in the provision of international network part.

8 Call progress signals

8.1 Call progress signals inform the caller about the progress of the call including the circumstances which may have prevented the connection.

8.2 Call progress signals for CSPDN, PSPDN and FRPDN are defined in ITU-T Rec. X.96.

9 Multicast operation

9.1 Multicast service facilitates the provision of point-to-multipoint (multicast) data service. Using a multicast service, the customer (sender) must first establish a connection to the entity called multicast server, and after that data units are transferred by multicast server to other participants of the multicast service (receivers).

9.2 Establishment of national multicast services and methods of establishing multicast services (inside or outside the national PDN), etc., are a national matter. Establishment of international multicast services (establishing of international multicast groups, principles of interworking of national multicast servers) is subject to agreement between concerned Administrations.

9.3 Multicast services in PSPDN and FRPDN are defined in ITU-T Rec. X.6.

10 User classes of service, categories of access

10.1 PDTSs offer to users so-called "basic user facilities". Basic user facilities are defined by user classes of service and categories of access.

10.2 User class of service is a category of PDTS in which the DTE operation mode, data signalling rate, call control signalling rates and code structure (in start-stop mode) are standardized.

10.3 User classes of service within the national PDTS is a national matter; user classes of service provided internationally are subject to agreement between the concerned Administrations. Nationally and internationally provided user classes of service may not coincide.

10.4 Category of access identifies the method by which the DTE gains access to a specific data transmission service. Direct or port access may be used. Usage of category of access is a national matter.

10.5 User classes of service and categories of access are outlined in ITU-T Rec. X.1.

11 Optional user facilities

11.1 Optional user facilities modify or complement basic user facilities. An optional user facility cannot be offered to a user as a stand-alone facility; it may be offered only in association with a basic user facility.

11.2 Optional user facilities for international PDTS are outlined in ITU-T Rec. X.2.

11.3 Concerned Administrations should procure internationally all the essential user facilities (see ITU-T Rec. X.2). Additional optional user facilities may or may not be provided.

12 Data compression and security

Techniques for data compression and security may be provided in FRPDNs according to ITU-T Rec. X.272.

13 Administrative arrangements for international Closed User Groups

13.1 Closed User Group (CUG) facilities (example of an optional user facility) enable users for access to/from users having one or more of these facilities. The basic facility enables customers to belong to one or more CUGs and to make/receive calls only to/from other customers in the same CUG.

13.2 Concerned Administrations should observe the following when managing CUGs:

- For each international CUG, a "responsible subscriber" has to be nominated. Such a nomination is subject to agreement between all participants of the CUG.
- The Administration of the country hosting the "responsible subscriber" (coordinating Administration) shall act as a controlling and coordinating Administration for that CUG and shall carry out discussions with the responsible subscriber about changes to the CUG. The coordinating Administration shall also be responsible for the allocation of international CUG numbers.

13.3 Administrative arrangements for international CUGs are defined in ITU-T Rec. X.180.

14 Administrative arrangements for international Permanent Virtual Circuits

14.1 The international application of the Permanent Virtual Circuit (PVC) service is subject to agreement between the concerned Administrations. Subscribers to be connected to an international PVC shall nominate a "responsible subscriber". That subscriber is responsible for all organizational matters relating to the international PVC.

14.2 The Administration of the country hosting the responsible subscriber (source Administration) shall act as a controlling and coordinating Administration for that international PVC and shall carry out the discussions with the responsible subscriber about any changes to the international PVC.

14.3 Provisions of the international PVC are defined in ITU-T Rec. X.181.

15 Charging principles

Charging principles for PDNs are defined in ITU-T D-series Recommendations.

16 Duration of service

International PDTSs are, in principle, continuously available. Duration of the service should not be limited, unless this contravenes national law.

17 Outages

17.1 Administrations may temporarily withdraw the whole or part of the service from operation for the purpose of maintenance and enhancements necessary to ensure that the service is kept in a proper working condition.

17.2 Administrations shall endeavour to minimize the impact of such service withdrawals. It is the responsibility of an Administration planning to withdraw a service to notify other concerned Administrations. Aspects relating to network availability and service outages for PSPDNs and FRPDNs are covered in ITU-T Recs X.137 and X.147 respectively.

18 Service calls

18.1 Service telecommunications should be established among the interested Administrations to facilitate the exchange of information necessary to administer and maintain services, network management, accounting, handling of customer complaints, etc.

18.2 Administrations are encouraged to make service telecommunications free of charge.

18.3 Aspects of service telecommunications are laid down in ITU-T Rec. F.17.

19 General provisions between Administrations

19.1 The international PDTS should be operated in the automatic mode.

19.2 Administrations should reach mutual agreement on the information needed to be exchanged to sustain the international PDTS and facilities offered. Administrations are not obliged to offer internationally all facilities available nationally.

19.3 Administrations should reach mutual agreement on the upgrading, enhancement and expansion of the service. Each Administration should supply the concerned Administrations with a number of copies of its subscriber directories (see below).

20 General provisions between Administration and customer

20.1 The Administration should inform the customers about the data transmission services available internationally. This should include information on:

- service offered, including user classes of service, categories of access, optional user facilities;
- charges;
- quality of service expected, including priority and service classes;
- call progress signals, error messages, diagnostic codes and their meaning;
- fault reporting procedures;
- procedures for resolving disputes including billing disputes;
- directory facilities;
- other information relating to service problems.

20.2 Customers may select user classes of service, categories of access, optional user facilities, priority and service classes.

20.3 Administrations must assist customers with the changing capabilities of the services offered. Customer Help Facility should be established. The exact organization of Customer Help Facility is a national matter, but at least the following customer assistance should be offered:

- availability of services;
- information and notification on planned outages;
- directory service.

20.4 The International Telecommunication Charge Card Service allows the holder of a telecommunication charge card to make use of a variety of services provided by the card acceptor (i.e., the public data network from which services are being obtained) and to have the charges billed to the customer's account by the card issuer. The scope of public data transmission services for which the card applies will be subject to agreements between the card issuer and card acceptor.

This Recommendation specifically entails the use of a telecommunication charge card issued by an ROA in compliance with ITU-T Rec. E.116.

The use of the International Telecommunication Charge Card Service in a public data network depends on agreements between the card acceptors and card issuers. Major items to be covered may include:

– types of service for which cards may be used;
– basis for settlement of service charges and surcharges;
– prevention of fraudulent use of cards;
– procedures for uncollectible and unbillable services.

20.5 Directory services available to the customers should be in accordance with national laws and regulations regarding the suitability of publication of the information and the form in which it is published. Directories may be issued in form of printed materials. Electronic directories are also recommended.

20.6 Printed directories for international use should be updated at least once a year. Customers may decide to be excluded from the directory. The page size should not be larger than an A4 format. The directory for international use should be set in roman letters. The number published shall be the one that the calling customer must transmit to obtain the called customer. The directory normally has to be written in a language used in the country; use of explanatory notes in whatever official ITU language is recommended.

20.7 Electronic directories should be accessed from a DTE of the data network providing the PDTS. Access from other DTEs is also encouraged. Principles of electronic directories for PDTSs (e.g., according ITU-T X.500-series Recommendations) are for further study.

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