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TELEPHONE NETWORK AND ISDN

OPERATION, NUMBERING, ROUTING AND MOBILE SERVICE

ROUTING PRINCIPLES AND GUIDANCE FOR UNIVERSAL PERSONAL TELECOMMUNICATIONS (UPT)

ITU-T Recommendation E.174

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation E.174 was prepared by ITU-T Study Group 2 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 21st of April 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 identifies the international call routing principles and guidance in the user plane for the restricted short-term UPT service scenario, the basic UPT service scenario and the beginnings of the enhanced UPT service scenario which are applicable to UPT InCalls, UPT OutCalls and UPT to UPT calls.

This Recommendation is intended to enable early implementations without providing exhaustive or restrictive lists of implementations.

Recommendation E.174

ROUTING PRINCIPLES AND GUIDANCE FOR UNIVERSAL PERSONAL TELECOMMUNICATIONS (UPT)

(Geneva, 1995)

1 Introduction

The set-up of calls from a UPT user and calls to a UPT user requires routing arrangements to be established. In fixed telecommunication networks, users are associated with the network access point of the terminal. With UPT, the fixed association between terminal and user identification is removed. The identification of UPT users is treated separately from the addressing of terminals and network access points.

This Recommendation provides for information on the routing of UPT calls from terminals connected to the PSTN and the ISDN, either fixed or mobile terminals.

2 Keywords

Assisting network

Called UPT User

Calling UPT User

UPT access code

UPT access number

UPT number

UPT routing

UPT service profile

UPT serving exchange

3 Scope

This Recommendation identifies the international call routing principles and guidance in the user plane for near-term and long-term implementations which are applicable to UPT InCalls, UPT OutCalls, UPT to UPT calls and UPT service profile management calls. The Recommendation will enable early implementations without providing exhaustive or restrictive lists of implementations. These routing principles are not precluded for national use.

Examples of specific applications are provided in this Recommendation.

The exact mechanism for obtaining the routing information and its implications on security, charging, etc. are outside the scope of this Recommendation.

In general, the routing of UPT calls follows the routing principles in Recommendations E.170 through E.173.

The service description for UPT Service Set 1 may be found in Recommendation F.851.

The service interactions with non-UPT services and UPT supplementary services are outside of the scope of this Recommendation.

4 References

The following ITU-T Recommendations 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 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. A list of the currently valid ITU-T Recommendations is regularly published.

- Recommendation E.164, *Numbering plan for the ISDN era.*
- Recommendation E.168, *Application of the E.164 numbering plan for UPT.*
- Recommendation E.170, *Traffic routing.*
- Recommendation E.171, *International telephone routing plan.*
- Recommendation E.172, *ISDN routing plan.*
- Recommendation E.173, *Routing plan for interconnection between public land mobile networks and fixed terminal networks.*
- Recommendation F.850, *Principles of universal personal telecommunication (UPT).*
- Recommendation F.851, *Universal Personal Telecommunication (UPT) – Service description (Service Set 1).*
- Recommendation D.280, *Principles for charging and billing, accounting and reimbursements for Universal Personal Telecommunication (UPT).*
- Recommendation I.373, *Network capabilities to support Universal Personal Telecommunication (UPT).*
- Recommendation Q.761, *Functional description of the ISDN user part of Signalling System No. 7.*
- Recommendation Q.762, *General function of messages and signals of the ISDN user part of Signalling System No. 7.*
- Recommendation Q.763, *Formats and codes of the ISDN user part of Signalling System No. 7.*
- Recommendation Q.764, *Signalling System No. 7 – ISDN user part signalling procedures.*

5 Terms and definitions

For the purposes of this Recommendation, the following definitions apply.

5.1 assisting network: The assisting network provides UPT capabilities that allow queries to other UPT capable networks, for example to the home network of the UPT user. An assisting network can be used for calls originating from a non-UPT capable network. An assisting network may also be used in calls from a UPT capable network when capabilities of the originating network are not used. An assisting network may also provide transit functions.

5.2 destination terminal number (DTN): The E.164 number assigned to the network terminal or interface which is registered in the UPT user's service profile as that user's current destination choice for incoming calls.

5.3 InCall: This is a UPT call type which permits a UPT user to have calls to that user's UPT number routed to the terminal specified by the user.

5.4 OutCall: This UPT call type permits a UPT user to make calls from any network terminal, which are charged to the UPT user based on that user's UPT number.

5.5 **UPT access code**: An access code defined in Recommendation F.851.

5.6 **UPT access number**: An access number defined in Recommendation E.168. A number the UPT user may need to dial, when using certain terminals and networks in order to contact his service profile (provider).

5.7 **UPT number**: A UPT number is an Recommendation E.164 number. It is defined as a number in E.168 using the service description of Recommendation F.851. A UPT number is assigned to, and uniquely identifies, each UPT user. A UPT number is used by a caller to reach a UPT user, regardless of the current location of the UPT user. A UPT user may have more than one UPT number (for example, a business UPT number for business calls and a private UPT number for private calls).

5.8 **UPT service profile**: The UPT service profile is a record containing all the information related to the UPT user in order to provide that user with the UPT service. Each UPT service profile is associated with a single UPT number.

5.9 **UPT service profile management**: This allows the UPT user to access, interrogate, and change the UPT user's service profile. (See Note 1, clause 8.)

5.10 **UPT serving exchange**: This is any exchange that has the technical capabilities necessary to access a UPT service profile.

5.11 **UPT to UPT call**: This is any outgoing call from a UPT user which terminates as an incoming call to another UPT user.

6 Abbreviations

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

DTN Destination Terminal Number

ISDN Integrated Services Digital Network

ISUP ISDN User Part

ITU-T International Telecommunication Union – Telecommunication Standardization

UPT Universal Personal Telecommunication

7 UPT call types

This Recommendation provides the routing principles for three UPT call types:

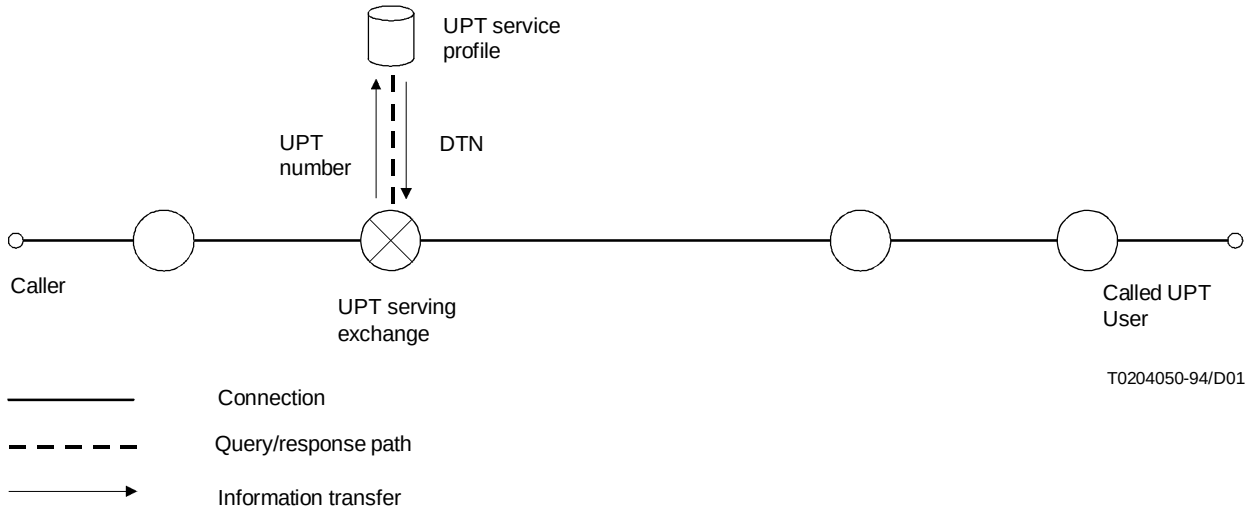
a) UPT InCall: Clauses 8 and 9;

b) UPT OutCall: Clause 10;

c) UPT to UPT Call: Clause 11.

8 UPT InCall general routing model

Figure 1 provides the general routing model for the UPT InCall. In the general model, a call is routed to an appropriate UPT serving exchange, where the call is recognized as UPT (It is possible that the call may have been identified as UPT at a previous exchange) and a query is sent to the UPT user's service profile which is identified by means of the dialled UPT number. The UPT user's service profile is interrogated to provide the translation of the dialled UPT number into the destination terminal number associated with the terminal at the current location designated by the called UPT user, and returns this number and possibly other routing information to the UPT serving exchange. Upon receipt of this number, the UPT serving exchange routes the call to the destination according to the routing principles in Recommendations E.170 to E.173, as appropriate.



NOTES

1 It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

2 The UPT serving exchange may be an originating exchange.

FIGURE 1/E.174

General UPT InCall routing model

9 Applications of the InCall general routing model

Under the InCall general routing model, a number of applications are possible; the main distinction among them being how or where the UPT service profile is accessed. The identification of the applications below is not intended to be exclusionary, i.e. other applications may be possible under the general routing model.

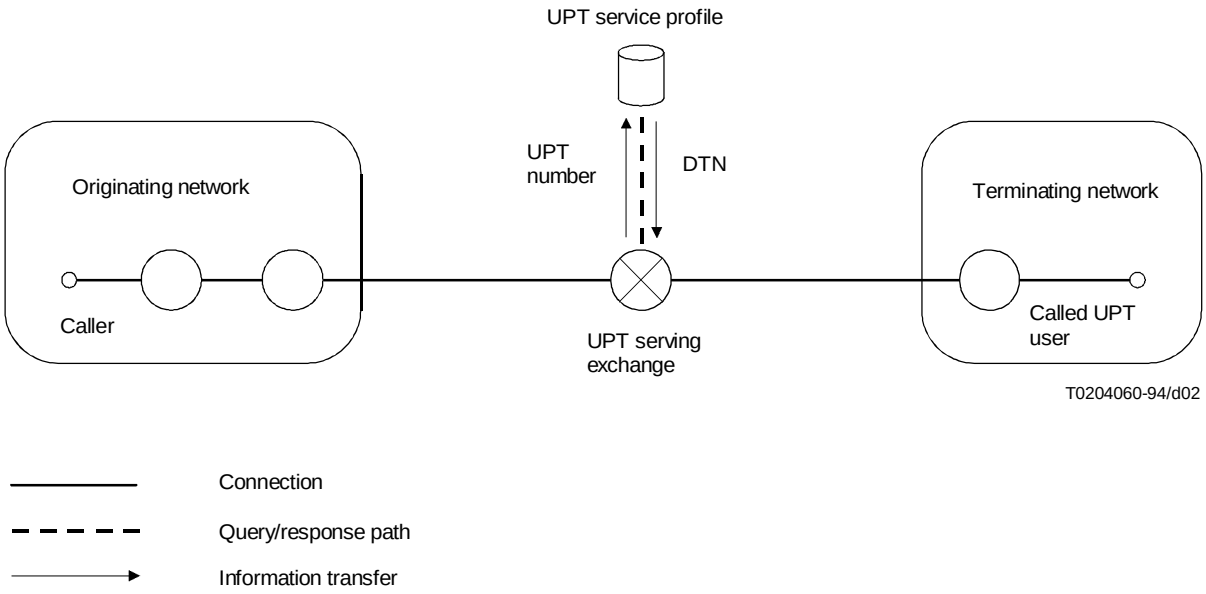
NOTES

1 When the called number is a UPT number and is translated in one or several data bases, there is a risk of circular routing or of exceeding the number of links. Means should be provided to restrict the number of UPT translations. This concern is only for InCalls. If the limit of the number of the links as defined in Recommendations E.171 to E.173 is exceeded, then the Quality of Service may be impacted. The location of the UPT serving exchange in the network or the use of signalling to avoid circuit connections may be a solution.

2 In order to maintain the recommended transmission quality, the location of the UPT serving exchange must be carefully chosen.

9.1 "UPT service provider-based" routing

A "UPT service provider-based" application of the InCall general routing model is depicted in Figure 2. In this application, the call to a UPT user is routed to the UPT serving exchange. The UPT serving exchange interrogates the service profile of the called UPT user to determine the destination terminal number. The call is then progressed from the serving UPT exchange to the destination, or alternatively, a new call is established from the UPT serving exchange to the destination, following the routing principles in Recommendations E.170 to E.173, as appropriate.



NOTE – It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

FIGURE 2/E.174

"UPT service provider-based" routing

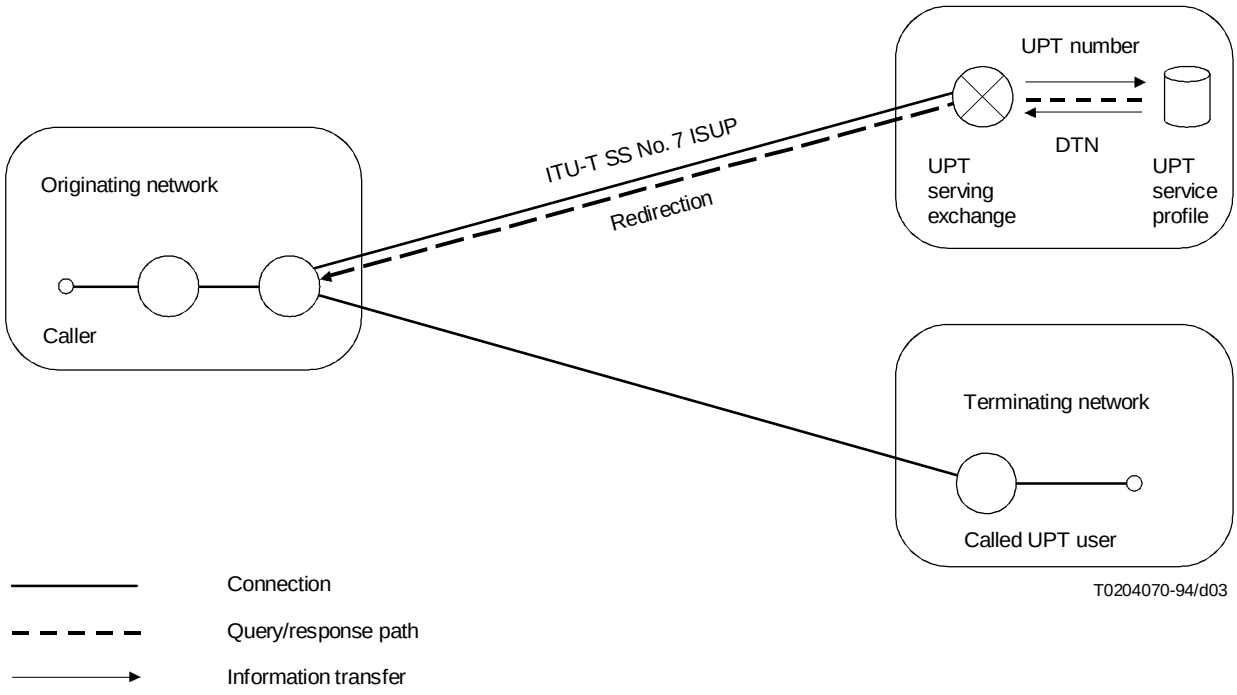
9.2 Call routing using ITU-T SS No. 7 ISUP redirection capabilities

An application of the InCall general routing model using ITU-T SS No. 7 redirection is shown in Figure 3. In this application, the call to a UPT user is progressed to the UPT serving exchange using voice circuits operated with ITU-T SS No. 7 ISUP signalling with redirection capabilities. The UPT service profile is interrogated to determine the current destination terminal number of the called UPT user. But instead of progressing the call onward to the terminating network (or launching a new call to the terminating network), the call is released backward to the controlling ITU-T SS No. 7 ISUP exchange, where the call is routed directly to the number specified by the called UPT user, following the routing principles in Recommendations E.170 to E.173, as appropriate.

NOTE – The definition of controlling ITU-T SS No. 7 ISUP exchange is included in ISUP Recommendations (Q.761 to Q.764).

9.3 "Service profile query" procedure

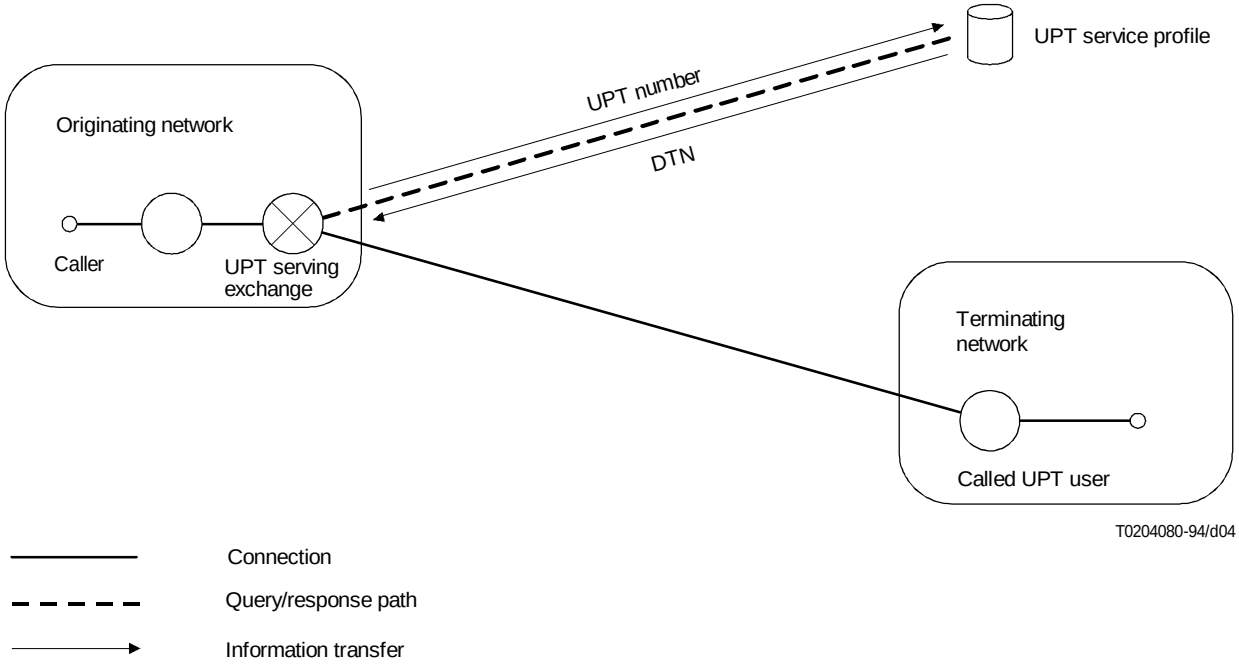
An application of the InCall general routing model using a "service profile query" procedure is shown in Figure 4. In this application, the UPT serving exchange in the call originating network initiates an interrogation to the UPT user's service profile using ITU-T SS No. 7, in order to obtain the current destination terminal number of the called UPT user. The service profile returns the destination terminal number and possibly other routing information to the UPT serving exchange in the call originating network. The UPT serving exchange then routes the call to the destination according to the routing principles in Recommendations E.170 to E.173, as appropriate.



NOTE – It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

FIGURE 3/E.174

Routing with ITU-T SS No. 7 ISUP redirection capabilities



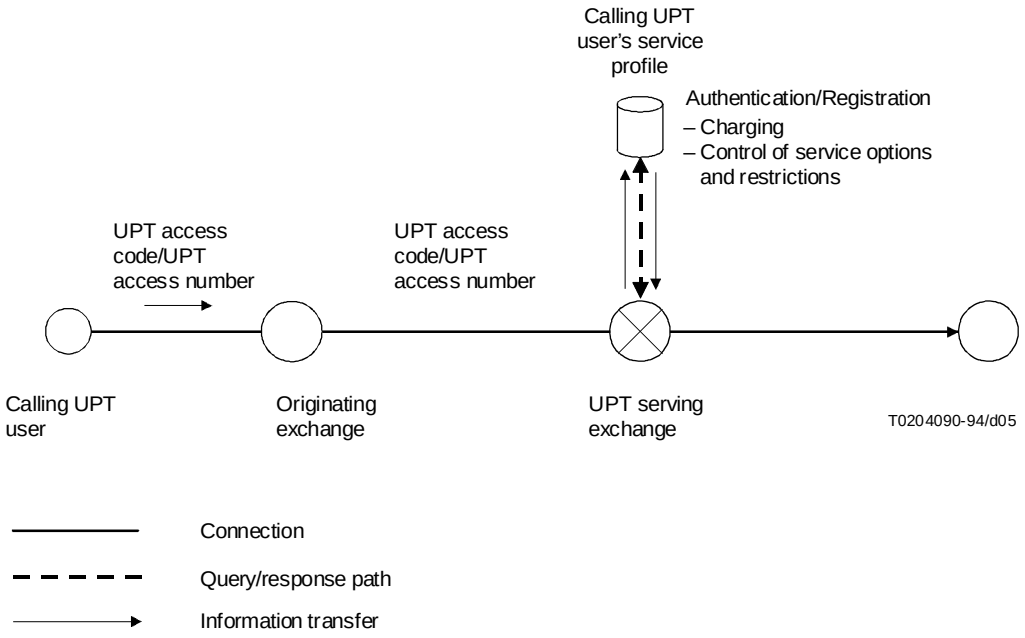
NOTE – It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

FIGURE 4/E.174

"Service profile query" procedure

10 UPT OutCall routing

In order to perform the UPT OutCall function, a UPT user must first be authenticated at a terminal according to the procedures set by that user's UPT service provider. The OutCall registration is an option in Recommendation F.851. OutCall registration procedures are not addressed in this Recommendation. Once authenticated, the UPT user can make call(s) (multiple calls allowed if follow-on service option is provided) from the terminal(s) (see Figure 5).



OutCall set-up functions

UPT user accesses a UPT serving exchange with a UPT access code or a UPT access number.

– Authentication (Identification, Charging, Service Options).
– UPT user dials the called party number.

The call is then routed according to the principles in Recommendations E.170 to E.173, as appropriate.

NOTES

1 It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

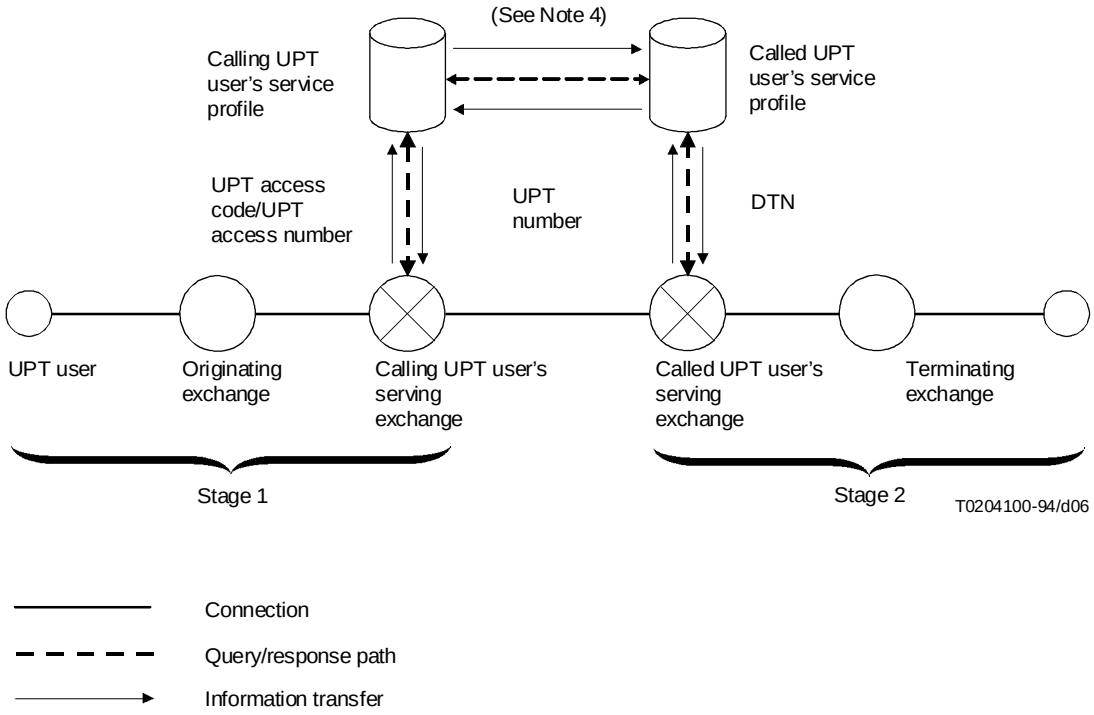
2 When the called number is a UPT number and is translated in one or several data bases, there is a risk of circular routing or of exceeding the number of links. Means should be provided to restrict the number of UPT translations. This concern is only for InCalls. Il the limit of the number of the links as defined in Recommendations E.171 to E.173 is exceeded, then the Quality of Service may be impacted. The location of the UPT serving exchange in the network or the use of signalling to avoid circuit connections may be a solution.

FIGURE 5/E.174

UPT OutCall routing

11 UPT to UPT routing

In this model, there are two stages when making a call. The general model is indicated in Figure 6. In the first stage, UPT OutCall set-up functions are performed with the calling user's service profile according to clause 6 of this Recommendation. In the second stage, UPT InCall set-up functions are performed with the called user's service profile according to clause 5 of this Recommendation to obtain the destination terminal number. There may be a transfer of routing information between serving exchanges. After these stages, the UPT serving exchange routes the call to the terminating exchange according to the routing principles in Recommendations E.170 to E.173 as appropriate.



NOTES

1 It is important to note that the UPT service profile and/or the UPT serving exchange may be located in the originating network, an assisting network or the terminating network.

2 When the called number is a UPT number and is translated in one or several data bases, there is a risk of circular routing or of exceeding the number of links. Means should be provided to restrict the number of UPT translations. This concern is only for InCalls. If the limit of the number of the links as defined in Recommendations E.171 to E.173 is exceeded, then the Quality of Service may be impacted. The location of the UPT serving exchange in the network or the use of signalling to avoid circuit connections may be a solution.

3 In the general model, the called and calling UPT serving exchanges may be the same. In this case, the routing between serving exchanges is not relevant.

4 Path that could be established subject to bilateral agreement starting with IN capability set 2.

FIGURE 6/E.174

General model UPT to UPT routing

As Figure 6 shows, two UPT serving exchanges may be needed to route a call from a UPT user to a UPT user.

Especially in this case the limit of the links as defined in Recommendations E.170 to E.173 may be exceeded and the Quality of Service may be affected. The locations of the UPT serving exchanges in the network may be a solution.

In the short-term, one UPT serving exchange can perform both OutCall and InCall functions, if both UPT service profiles are in the same location. In the long-term, this is possible with new signalling capabilities even if UPT service profiles are located in different networks.

12 History

First published in 1995.