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OPERATION, NUMBERING, ROUTING AND MOBILE SERVICE

COMPUTERIZED DIRECTORY ASSISTANCE

ITU-T Recommendation E.115

(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.115 was revised by ITU-T Study Group 1 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 21st of February 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 gives a detailed description of the principles and procedures to be followed in interconnecting different national computerized directory assistance services, as in the existing version of Recommendation E.115.

Recommendation E.115

COMPUTERIZED DIRECTORY ASSISTANCE

(revised in 1994)

1 Introduction

As domestic Telephone Directory Assistance Services are widely based upon computerization' access should be given to operators in one country to telephone number-databases in foreign countries to facilitate the provision of an updated and efficient International Telephone Directory Assistance Service to customers and to reduce operational costs.

2 Scope

This Recommendation describes the principles and procedures to be followed on organizing and operating a Computerized International Telephone Directory Assistance Service.

3 Principles for the organization of an interconnected computerized international information service

For the organization of an interconnected computerized international information service, ROAs should abide by the following principles and principles given in Recommendation E.104 International Telephone Directory Assistance Service and Public Access:

a) The international system should be so designed that internal systems of ROAs can be used, each ROA should adapt its system to the international system by means of the appropriate interface procedures.

b) The operator should be able to supply the most adapted and selective search data in order to avoid a situation in which the number of subscribers matching the search criteria exceed the maximum capacity of a single reply message.

c) To overcome language difficulties, the questions put to a remote system containing the file to be consulted shall be formulated in the language used in the country concerned. This means that the language problems raised by certain inquiry and reply features must be resolved by the ROA making the inquiry.

   Language problems which may arise between operators may be surmounted by using the conversion capability of computers.

d) Where a given ROA has allocated the files to different computers integrated in a single system, access to the system from a foreign ROA should be possible via a designated computer.

   If a ROA has distributed the file regionally among several computers, the selection of the computers should not be made by the inquiring operator, but the system, by means of the locality name.

e) In order to allow each ROA to freely structure its own service and make use of the appropriate information technology, a standardized format and dialogue protocol which will make the different systems compatible, and thus capable of being interconnected, shall be used.

f) A question should give rise to only one reply message with no dialogue between computers. Any dialogue concerning all the information provided should be prepared by the inquiring system. The reply message may cover several subscribers where such subscribers match the search characteristics introduced in the system. The maximum number of subscribers mentioned in a reply message depends both on the limitations imposed by internal systems of ROAs and on the maximum capacity of the message. If the maximum limit of 3000 characters is exceeded, the system can subdivide the list of subscribers into several reply messages. If the system is capable of sending additional reply messages this shall be indicated by the message code. To obtain another reply message a new question indicating this must be sent.

g) With regard to the management of messages, there is no relationship between the inquiry and the reply; where for any reason the reply to a particular question has not been obtained, the inquiry must be reiterated by the inquiring ROA and on its initiative.

h) To realize the interconnection of computers of different ROAs, the network procedures described in Annex B should be used. The layer 4 will conform to Recommendations X.214 and X.224, Class 0. The layer 5 follows Recommendations X.215 and X.225 (BCS – Basic Combined Subset). Functional units "kernel" and "duplex" are only selected.

The profile of layers 4 and 5 are described in Annex D.

i) The structure and coding of the inquiry and reply formats will use the notation defined in Recommendations X.680 and X.690, and are described in Annex C.

j) A list of localities can be retrieved using the international inquiry format.

k) Special numbers for other services such as telefax may also appear in the reply message. The order of presentation for all numbers should remain as contained in the original database to preserve the subscriber's preference for the order of usage.

4 Standards used for inquiry and reply

When operator access is given via the system of one ROA into a directory inquiry system of foreign ROA, unless modified by bilateral agreement, the following minimum standards shall apply to the inquiry and reply process, to permit maximum flexibility in the national information service and compatibility with the international information service.

4.1 Inquiry information

4.1.1 The operator shall request information using the details supplied by the caller, according to the format given in Annex A.

4.1.2 Country code and surname are minimum requirements to receive information about subscribers. Country code and locality (or geographical area) are minimum requirements to receive a list of localities.

4.1.3 The replying system shall reply to every question asked. If the replying system indicates that the inquiry information supplied is insufficient, the question should be repeated with more selective information.

4.2 Reply information

4.2.1 The replying system should give the information as available in the database, in order to identify the accuracy of the telephone number according to the format given in Annex A.

The computer must supply the operator not only with the country code, national destination code and subscriber number, but also with all the elements of identification required in the reply form, as shown in the file, so that, on the basis of this information, the operator can check that the reply corresponds to the inquiry for information.

4.2.2 If the list of subscribers in the reply is incomplete, it should be possible to obtain the next sequence of 3000 characters.

4.2.3 Certain specified conditions, i.e. the number is not available (secret number, no listing, etc.) or further information has to be obtained, shall be indicated by a standardized coded reply.

4.3 Alphabet to be used

4.3.1 The minimum character set that shall be employed for inquiries and reply is:

– 26 small and capital letters a-z, A-Z (in the inquiry the distinction between small and capital letters has no significance);

– 10 figures 0-9;

– space, exclamation mark, quotation mark, per cent sign, ampersand, apostrophe, left parenthesis, right parenthesis, asterisk, plus sign, comma, hyphen, full stop, solidus, colon, semicolon, greater-than sign, equals sign, less-than sign, question mark, low line, number sign.

This minimum character set shall be coded in accordance with International Reference Alphabet (IRA) (see Recommendation T.50).

4.4 Conversion

The different parts of the inquiry formulated by the operator of the inquiring ROA should be converted by the inquiring system into the international standard format. The different parts of the reply transmitted in the international standard format should be converted by the inquiring system into its appropriate format.

4.5 Functionality

The international inquiry format can be used to have the system perform searches. There are two kind of searches, subscriber searches and locality searches.

An operator indicates to the system that a subscriber search is to be performed by entering information in the subscriber name field. All other fields are optional. The receiving system will take all entered fields into account.

An operator indicates to the system that a locality search is to be performed by entering information in the locality field and leaving the subscriber name field empty. All other fields are optional. The receiving system will take the following fields into account (when entered):

- locality name;
- county, state or province name;
- sequence number.

When an operator has indicated to the system that a subscriber search is to be performed, but the combination of locality name and province does not specify a single locality, nor is the combination absent, the request will be handled as being a request for a locality search, and a locality search will be performed. In this case be only the following fields will be taken into account:

- locality name;
- county, state or province name;

Either the locality name or the subscriber name field should be present.

NOTE – While encoding, a field is considered to be not present when it is not there altogether or when it has length zero.

Table 1 describes the possible cases, and what the result would be.

TABLE 1/E.115

Locality	County, state or province name	Subscriber	Result
Not present	Not present	Not present	Message code indicating that the request cannot be honoured (corresponding message code 43)
Not present	Not present	Present	Search performed in whole country or message code indicating “not supported” (corresponding message code 41)
Not present	Present	Not present	Message code indicating that the request cannot be honoured (corresponding message code 43)
Not present	Present	Present	Search performed in whole province or message code indicating “not supported” (42)
Present	Not present	Not present	Locality search
Present	Not present	Present	Subscriber search
Present	Present	Not present	Locality search
Present	Present	Present	Subscriber search

5 Operator manual

Each ROA that implements this Recommendation must supply a simple operator manual for foreign ROAs. This manual describes principally the main characteristics of its directory assistance system so as to indicate the best way to inquire for the remote operators.

Annex A

Description of standardized inquiry and reply messages

(This annex forms an integral part of this Recommendation)

The standard formats for inquiry and reply shown in Figures A.1 and A.2 shall be used.

A.1 Inquiry format

See Figure A.1.

Part 1					Part 2		
Message indicators	International indicators	Originating terminal code	Date and time	Message number	Locality	Subscriber name	Street name or equivalent

Part 2 (end)							
House number	Forename	Heading in the Guide	Profession code	Additional information for a selective search	County, State or Province	Category	Sequence number

NOTES

1 Questions entered by the operators.

2 The national computer recognizes each part of the question and converts it into the standard international format.

FIGURE A-1/E.115

International inquiry format

The question contains the following information:

a) *Part I*

1) *Obligatory*

– Message indicators identifying a request to the international inquiry service: 4 characters:

Form: $ C Q I.

– International indicators identifying the country of the inquiring and replying system; these codes consist of the country code (see Recommendation E.163); 8 characters:

Form: xxxxyyyy;

xxxx = country code of replying system;

yyyy = country code of inquiring system;

E.g.: 00310032 Belgium →Netherlands.

– *Code of the inquiring terminal* – This code should not be used by the replying system but should be repeated in identical fashion in the reply format; 8 characters.

2) *Optional*

– areas reproduced identically in the reply:

i) date and time of the origin of the inquiry: 12 characters:

format: YYMMDDHHMMSS;

ii) message number given by the inquiring system: 4 characters.

b) *Part 2*

1) *Basic data*

– *Locality* – Variable length (maximum 70 characters).

The name of the locality shall be introduced according to its exact spelling. Characters not included in the minimum character set (see 4.3) and the full stop shall be replaced by spaces and each space must be introduced as a space.

Abbreviations are not permitted, except for the words “Sint”, “Saint”, “Sankt”, “San”, ..., which are abbreviated by the letter “S” followed by a space.

The locality name and county, state or province name (if supported) may be truncated. If this combination, when a search for subscribers is requested, matches more than one locality, a locality list should be returned. If it identifies a single locality, the subscriber search should be performed. The mandatory minimum number of characters to be input should be fixed by each ROA and be mentioned in an operator’s manual. The inquiring system should check whether this minimum is respected. When a word is terminated by a full stop this implies that the word is complete, when a word is not terminated by a full stop this implies that the word might be either complete or not complete. When a specification consists of more than one word, the full stop is additional to the separating space. (DEN HAAG would be specified as “DEN.☐HAAG” and not “DEN.HAAG”, the ☐ is supposed to represent a blank).

The matching to be performed will be the following:

– words in the name can be truncated (can even be empty);

– completeness of a word can be indicated by a period that follows the word;

– absence of the above-mentioned period does not imply that the word is not complete.

To indicate that the words in the specification are all the words in the entry to be found the character “#” can be used, it will be inserted at the end of the field. Absence of the character “#” does not imply that not all words are present. If both the period, to indicate that the last word is complete, and the number sign are present, the period will precede the number sign.

– Surname or trade name of subscriber – Variable length (maximum 80 characters).

The subscriber’s surname should be input according to its exact spelling.

Characters not included in the minimum character set (see 4.3) and the full stop, should be replaced by spaces and each space must be introduced as a space. Abbreviations should not be allowed. The mandatory minimum number of characters to be input should be fixed by each country and be mentioned in the operator’s manual.

The inquiring system should check whether this minimum is respected. When a word is terminated by a full stop this implies that the word is complete, when a word is not terminated by a full stop this implies that the word might be either complete or not complete. When a specification consists of more than one word, the full stop is additional to the separating space. When the subscriber's surname or trade name is replaced by initials, the characters composing the acronym shall be introduced successively without being separated by special signs or spaces.

Numbers forming part of names or acronyms shall be introduced as numbers.

If this field is omitted then the reply will only contain a list of localities.

2) *Additional data (for making the search easier)*

– *Name of street or equivalent* – Variable length (maximum 70 characters).

The name of the street should be input according to its exact spelling, the complete name of the street being retained. Characters not included in the minimum character set (see 4.3) and the full stop, should be replaced by spaces and each space must be input as a space.

The words "Sint", "Saint", "Sankt", "San", ... should be abbreviated by the letter "S" followed by a space. The mandatory minimum number of characters to be input should be fixed by each ROA and be mentioned in the operator's manual. The inquiring system should check whether this minimum is respected. When a word is terminated by a full stop this implies that the word is complete, when a word is not terminated by a full stop this implies that the word might be either complete or not complete. When a specification consists of more than one word, the full stop is additional to the separating space. Numbers forming part of the name of the street shall be introduced as numbers.

– *House number* – Variable length (maximum 10 characters).

The numerical part of the house number shall precede the alphabetical part without separation. Non-significant zeros shall be omitted.

– *Subscriber's forename* – Variable length (maximum 60 characters).

Entire forenames, initials or a combination of forenames and initials shall always be separated by spaces.

– *Heading in the guide* – Variable length (maximum 30 characters).

The heading in the guide field is used as a filter on business heading.

– *Profession code* – Variable length (maximum 30 characters).

This data should only be introduced after bilateral agreements. The profession code field is used to send specific codes according to classification on business heading.

– *Additional information for a selective search* – Variable length (maximum 30 characters).

This data should only be introduced after bilateral agreements. Each ROA will have to identify its specific use of this field and describe it in the user manual.

– *County, State or Province* – Variable length (maximum 30 characters).

This data should only be introduced after bilateral agreements.

The matching to be performed will be the following:

– word in the name can be truncated (can even be empty);

– completeness of a word can be indicated by a period that follows the word;

– absence of the above-mentioned period does not imply the word is not complete.

– *Category* – variable length (maximum 30 characters).

The category to which the required subscriber number belongs: business, residential or public service (government).

The following codes have been defined: B for Business, R for Residential and G for Government.

– *Sequence number* – 1 character.

The reply should only contain a maximum of 3000 bytes. If the list of subscribers is too long to be contained in one reply it is possible to subdivide it into several replies.

The sequence number indicates which subdivision of the reply should be sent. The number 0 (zero) (or if the field is omitted) indicates the first 3000 bytes, the number 1 the second 3000 bytes, etc.

On the basis of the above data, the replying system searches in its files.

A.2 Reply format

See Figure A.2.

Part 1					Part 2		
Message indicators	International indicators	Originating terminal code	Date and time	Message number	Message code	Country code	Message

Part 3.1						
National destination code	Subscriber number	Locality	Subscriber name	Forename	Street name or equivalent	House number

Part 3.1 (end)						
Supplementary data	Subscriber message	Heading in the Guide	Profession code	Additional information for selective search	County State or Province	Category

Part 3.2 to 3.x
In all cases, the same as Part 3.1

NOTES

1 The reply is output to the screen.

2 The replying system replies to the inquiring system according to the following standardized international reply format.

3 The inquiring system presents data on the screen in its own format.

4 Total length: a maximum of 3000 characters.

FIGURE A-2/E.115

International reply format

The reply contains the following information:

a) *Part 1*

1) *Obligatory*

– Message indicators identifying an answer to the international inquiry service; 4 characters:

Form: $ C R I.

– International indicators identifying both the country of the replying and inquiring system; these codes consist of the country code (see Recommendation E.163); 8 characters:

Form: yyyyxxxx;

xxxx = country code of replying system;

yyyy = country code of inquiring system;

E.g.: 00320031 Netherlands → Belgium.

– Code of the inquiring terminal; 8 characters.

2) *Optional*

– Areas generated by the inquiring system:

i) date and time; 12 characters;

ii) message number; 4 characters.

b) *Part 2*

– Message code; 2 characters.

– Always included and common in all answer messages. The coded message must be converted to text by the inquiring system.

The message codes are defined in Annex E.

– *Country code* (in accordance with the ITU-T Recommendations); 4 characters: aligned from the left (if necessary, supplemented by spaces).

– *Message* – Variable length (maximum 80 characters) optional.

A free text field used in order to inform the operator with an urgent message. The message is in the English language.

E.g.: System will be out of order between 10 and 12 a.m. local time.

c) *Part 3.1*

– *National destination code* (in accordance with ITU-T Recommendations) – Variable length (maximum 13 characters).

Zeros if no subscriber has been found or a series of capital "X" characters if a subscriber's number is not to be disclosed.

Omitted if national destination code does not exist.

– *Subscriber's number* (in accordance with ITU-T Recommendations) – Variable length (maximum 14 characters).

Zeros if no subscriber has been found or a series of capital "X" characters if a subscriber's number is not to be disclosed.

The maximum combined length of the national destination code and subscribers number is 14.

– *Locality* – Variable length (maximum 70 characters).

Town under which the subscriber has been found or town found as part of a locality list.

If no subscriber has been found: the "Locality" field of the inquiry message.

– *Surname or tradename of subscriber* – Variable length (maximum 80 characters).

Surname or tradename of subscriber.

If no subscriber has been found: the "Surname or tradename of subscriber" field of the inquiry message.

– *Subscriber's forename* – Variable length (maximum 60 characters).

Subscriber's forename.

If no subscriber has been found: the "Subscriber's forename" field of the inquiry message.

– *Name of street of equivalent* – Variable length (maximum 70 characters).

Name of street or equivalent.

If no subscriber has been found: the "Name of street or equivalent" field of the inquiry message.

– *House number* – Variable length (maximum 10 characters).

Number of the house.

Non-significant zeros are omitted.

If no subscriber has been found: the "House number" field of the inquiry message.

– *Supplementary data* – Variable length (maximum 30 characters).

If the subscriber has "Supplementary data" regarding the kind of number retrieved.

The following keywords (length of 3 digits) are used according to ITU-T nomenclature:

FAX: fax number;

FTN: free tax number;

OLD: old telephone number;

ISD: ISDN number;

GSM: mobile telephone number;

other: to be defined.

If a locality list: supplementary data regarding a locality.

– *Subscriber message* – 1 character.

The coded message which must be converted into text by the inquiring system.

The following codes have been defined:

0 = no comment;

1 = subscriber changed address;

2 = refer to distant operator.

– *Heading in the guide* – Variable length (maximum 30 characters).

Heading in the guide.

If no subscriber has been found: the "Heading in the guide" field of the inquiry message.

– *Profession code* – Variable length (maximum 30 characters).

The Profession code is used to send specific codes according to classification on business heading.

If no subscriber has been found: the "Profession code" field of the Entry message.

– *Additional information for a selective search* – Variable length (maximum 30 characters).

Information as specified by each ROA in the user manual.

If no subscriber has been found: the "Additional information for a selective search" field of the inquiry message.

– *County, State or Province* – Variable length (maximum 30 characters).

County, State or Province.

If no subscriber has been found: the "County, State or Province" field of the inquiry message.

– *Category* – Variable length (maximum 30 characters).

Category.

If no subscriber has been found: the "Category" field of the Inquiry message.

d) *Part 3.2 to 3.x*

– Contains the continuation of the selection if other subscribers have been selected. Each supplementary selection uses the same form as in the layout of Part 3.1.

Annex B

Directory services interconnect bearer services

(This annex forms an integral part of this Recommendation)

B.1 Introduction

The interconnection of International Directory Databases should be network independent. The general structure for the arrangement of the physical link (OSI layer 1), link access (OSI layer 2) and network layer (OSI layer 3) are as outlined in Figure B.1. Where ROA have provided similar equipment, interconnection may be arranged by bilateral agreement to suit local requirements. This method of interconnection is solely the matter of the ROAs concerned.

B.2 Identification

The types of bearer services considered applicable for directory inquiry interconnect are:

i) Packet Switched Public Data Network (PSPDN);

ii) Circuit Switched Public Data Network (CSPDN);

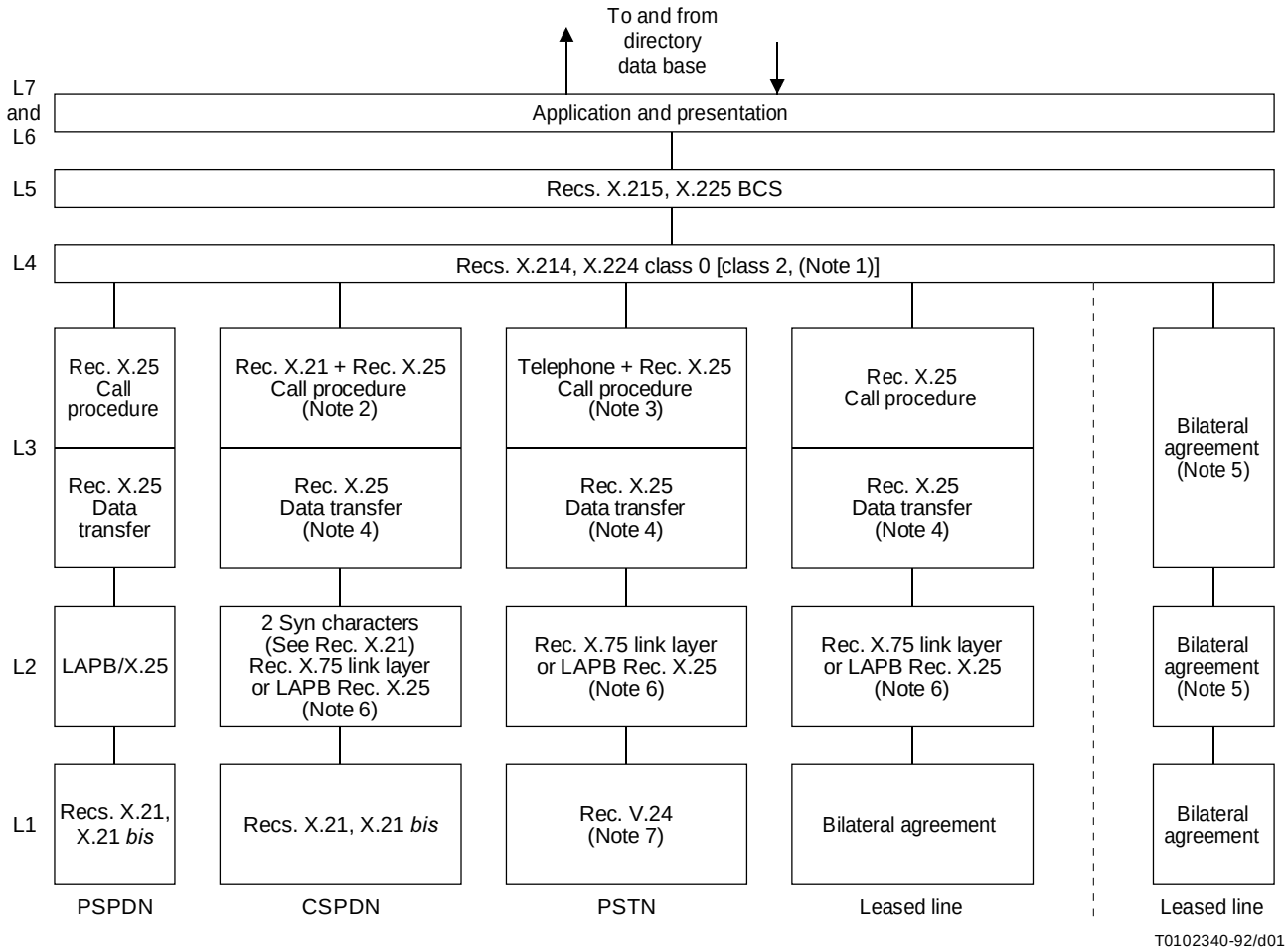
iii) Public Switched Telephone Network (PSTN);

iv) ROA leased line (point-to-point).

With possible evolution to ISDN, Signalling System No. 7 includes Message Transfer Part and message handling systems.

B.3 Network interconnection

The choice of network to be used for the interconnection of computer-based directory systems should be agreed bilaterally. However, to achieve commonality across all types of networks, the link, data transfer and call procedures, as specified in the appropriate Recommendations, should be used.



NOTES

1 In all cases, layer 4 must conform to Recommendations X.214 and X.224, class 0. However, by bilateral agreement, Recommendations X.214 and X.224, class 2 defaulting to class 0, may also be used.

2 The network connection is established by a two-stage selection; the first using normal X.21 procedures, and the second using X.25 call control procedures.

3 The network connection is established by a two-stage selection; the first using normal telephone network procedures, and the second using X.25 call control procedures.

4 The X.25 network layer is introduced in order to ensure a common procedure at layer 3 for all types of network connection.

5 Where Administrations have provided similar equipment, they may be interconnected in accordance with bilateral arrangements.

6 The link layer procedures are in accordance with Recommendation X.75 for single link operation.

7 For automatic calling and/or answering, Recommandation V.25 may be applied. For duplex operation using modems in accordance with the ITU-T, Recommandation V.32 is preferred.

FIGURE B.1/E.115

General interconnect structure

Annex C

(This annex forms an integral part of this Recommendation)

C.1 Formal definitions of directory messages

```
Directory Message                ::= CHOICE { telephone [0] Telephone }

Telephone                        ::= CHOICE { inquiry [0] Inquiry, reply [1] Reply }

Inquiry                          ::= SEQUENCE { InquiryPart 1, InquiryPart 2 }

InquiryPart 1                    ::= [ APPLICATION 0 ] IMPLICIT SET {
    messageIndicators            [0]    IMPLICIT IA5String,
    internationalIndicator       [1]    IMPLICIT IA5String,
    originatingTerminalCode      [2]    IMPLICIT IA5String,
    dateAndTime                  [3]    IMPLICIT IA5String OPTIONAL,
    messageNumber                [4]    IMPLICIT IA5String OPTIONAL }

InquiryPart 2                    ::= [ APPLICATION 1 ] IMPLICIT SET {
    locality                     [0]    IMPLICIT IA5String OPTIONAL,
    subscriberName               [1]    IMPLICIT IA5String OPTIONAL,
    streetName                   [2]    IMPLICIT IA5String OPTIONAL,
    houseNumber                  [3]    IMPLICIT IA5String OPTIONAL,
    forename                     [4]    IMPLICIT IA5String OPTIONAL,
    headingInTheGuide            [5]    IMPLICIT IA5String OPTIONAL,
    professionCode               [6]    IMPLICIT IA5String OPTIONAL,
    additionalInformationForASelectiveSearch    [7]
                                        IMPLICIT IA5String OPTIONAL,
    countyStateOrProvince        [8]    IMPLICIT IA5String OPTIONAL,
    category                     [9]    IMPLICIT IA5String OPTIONAL,
    sequenceNumber               [10]   IMPLICIT IA5STring OPTIONAL }


Reply                            ::= SEQUENCE {
ReplyPart 1,
ReplyPart 2,
ReplyPart 3 OPTIONAL }


    ReplyPart1                   ::= [ APPLICATION 3 ] IMPLICIT SET {
    messageIndicators            [0]    IMPLICIT IA5String,
    internationalIndicators      [1]    IMPLICIT IA5String,
    originatingTerminalCode      [2]    IMPLICIT IA5String,
    dateAndTime                  [3]    IMPLICIT IA5String OPTIONAL,
    messageNumber                [4]    IMPLICIT IA5String OPTIONAL }


ReplyPart 2                      ::= [ APPLICATION 4 ] IMPLICIT SET {
    messageCode                  [0]    IMPLICIT IA5String,
    countryCode                  [1]    IMPLICIT IA5String
    message                      [2]    IMPLICIT IA5String OPTIONAL }


ReplyPart 3                      ::= [ APPLICATION 5 ] IMPLICIT SET of Selection

Selection                        ::= SET {
    nationalDestinationCode      [0]    IMPLICIT IA5String OPTIONAL,
    subscriberNumber             [1]    IMPLICIT IA5String OPTIONAL,
    locality                     [2]    IMPLICIT IA5String,
    subscriberName               [3]    IMPLICIT IA5String OPTIONAL,
    forename                     [4]    IMPLICIT IA5String OPTIONAL,
    streetName                   [5]    IMPLICIT IA5String OPTIONAL,
    houseNumber                  [6]    IMPLICIT IA5String OPTIONAL,
    supplementaryData            [7]    IMPLICIT IA5String OPTIONAL,
    subscriberMessage            [8]    IMPLICIT IA5String OPTIONAL,
    headingInTheGuide            [9]    IMPLICIT IA5String OPTIONAL,
    professionCode               [10]   IMPLICIT IA5String OPTIONAL,
    additionalInformationForASelectiveSearch    [11]
                                        IMPLICIT IA5String OPTIONAL,
    countyStateOrProvince        [12]   IMPLICIT IA5String OPTIONAL,
    category                     [13]   IMPLICIT IA5String OPTIONAL }
```

C.2 Structure of the inquiry

INQUIRY message

1010 0000 Directory message (telephone)
LENGTH

1010 0000 Telephone (inquiry)
LENGTH

0011 0000 Inquiry
LENGTH

0110 0000 Part 1
LENGTH

1000 0000 Message indicators
LENGTH
Message indicators

1000 0001 International indicators
LENGTH
International indicators

1000 0010 Originating terminal code
LENGTH
Originating terminal code

1000 0011 Date and time (optional)
LENGTH
Date and time

1000 0100 Message number (optional)
LENGTH
Message number

0110 0001 Part 2
LENGTH

1000 0000 Locality (optional)
LENGTH
Locality

1000 0001 Subscriber name (optional)
LENGTH
Subscriber name

1000 0010 Street name (optional)
LENGTH
Street name

1000 0011 House number (optional)
LENGTH
House number

1000 0100 Forename (optional)
LENGTH
First name

1000 0101 Heading in the Guide (optional)
LENGTH
Heading in the Guide

1000 0110 Profession code (optional)
LENGTH
Profession Code

1000 0111 Additional information for a selective search (optional)
LENGTH
Additional information for a selective search

1000 1000 County, State or Province (optional)
LENGTH
County, State or Province

1000 1001 Category (optional)
LENGTH
Category

1000 1010 Sequence number (optional)
LENGTH
Sequence number

C.3 Structure of the reply

Reply message

1010 0000 Directory message (telephone)
LENGTH

1010 0001 Telephone (reply)
LENGTH

0011 0000 Reply
LENGTH

0110 0011 Part 1
LENGTH

1000 0000 Message indicators
LENGTH
Message indicators

1000 0001 International indicators
LENGTH
International indicators

1000 0010 Originating terminal code
LENGTH
Originating terminal code

1000 0011 Date and time (optional)
LENGTH
Date and Time

1000 0100 Message number (optional)
LENGTH
Message number

0110 0100 Part 2
LENGTH

1000 0000 Message code
LENGTH
Message code

1000 0001 Country code
LENGTH
Country code

1000 0010 Message (optional)
LENGTH
Message

0110 0101 Part 3 (optional)
LENGTH

0011 0001 Selection
LENGTH

1000 0000 National destination code (optional)
LENGTH
National Destination code

1000 0001 Subscriber number (optional)
LENGTH
Subscriber number

1000 0010 Locality
LENGTH
Locality

1000 0011 Subscriber name (optional)
LENGTH
Subscriber name

1000 0100 Forename (optional)
LENGTH
Forename

1000 0101 Street name (optional)
LENGTH
Street name

1000 0110 House number (optional)
LENGTH
House number

1000 0111 Supplementary data (optional)
LENGTH
Supplementary data

1000 1000 Subscriber message (optional)
LENGTH
Subscriber message

10000 1001 Heading in the Guide (optional)
LENGTH
Heading in the Guide

1000 1010 Profession code (optional)
LENGTH
Profession code

1000 1011 Additional information for a selective search (optional)
LENGTH
Additional information for a selective search

1000 1100 County, State or Province (optional)
LENGTH
County, State or Province (optional)

1000 1101 Category (optional)
LENGTH
Category

0011 0001 Selection
LENGTH

1000 0000 National Destination code (optional)
LENGTH
National destination code

Annex D

OSI Layers 4 and 5 profile for the Recommendation E.115

(This annex forms an integral part of this Recommendation)

D.1 Overview

This annex defines a profile of standardized OSI protocols (Session, Transport and Network Layers) to realize the interconnection of International Directory Inquiry systems as defined in this Recommendation. The starting point is based on the correspondence between a Session Connection and a E.115 query request. The main parts on the Session Profile defined for this Recommendation are outlined in this sublause and detailed in D.2.

All inquiry messages from a ROA A to another ROA B and associated reply messages are transmitted over the same Session Connection established by the inquiring ROA. Reciprocally, all inquiry messages from the ROA B to the ROA A and associated reply messages are transmitted over a second Session Connection, established by the inquiring ROA B.

To maintain high availability, each ROA may have duplicated its equipment for sending and receiving reply messages, and/or for receiving inquiry and sending reply messages (the equipment may have different network addresses). Additional Session Connections to or from such equipment is allowed. There should be a maximum of two sets of equipment.

Parallel Session Connections should normally not be used for other purposes. For handling simultaneous requests from different terminals, or terminals in physically different locations, the mechanism specified in Annex A should be used.

Between two ROAs , the number of connections should be minimized. Normally at most 8 Session Connections would be needed at the same time, 4 from ROA A to ROA B, and 4 from ROA B to ROA A.

The inquiring system is responsible for the Session Connection release. The Session Connection is released by sending a Session Release request after a certain amount on “inactivity time”. This parameter is chosen by the Session Service requestor. It should be maximum 5 minutes.

During a Session Connection, a Session Protocol data unit contains one and only one E.115 message. A E.115 message may not be segmented and transmitted in several Session Protocol data units.

D.2 Use of session services

D.2.1 Introduction

The Session Service and the Session Protocol are defined respectively in Recommendations X.215 and X.225.

Functional units “Kernel” and “Duplex” are selected.

D.2.2 Session Connection establishment phase

After receipt of an international inquiry request and if there is not already one active Session Connection with the requested ROA, the inquiring E.115 application will request the establishment of a Session Connection with this ROA by sending a SESSION-CONNECT request. If there exists duplicated equipment, the inquiring application may set up a Session Connection to this equipment, even if it already has an active Session Connection to this ROA.

When receiving the SESSION-CONNECT indication, the replying E.115 application may send a positive answer or a negative answer. Reciprocally the replying E.115 application may reject an incoming SESSION-CONNECT indication, for example in case of congestion. The reasons of the connection request failure are given in the “result” parameter of the SESSION-CONNECT response.

Session Connection SSDU:

D.2.2.1 Handling of different versions

It is expected that this Recommendation in the future may be changed, and that systems following the old and new Recommendation might not be completely compatible.

As it is not feasible to change all the interworking systems at the same time, there will exist different versions in the operational network at the same time. This will be handled by the following mechanism.

When a new version is agreed, it should also be agreed upon for how long time the old version should be supported. The maximum time should be one year. There should be at most two versions in the operational network at the same time. Because of this, it will not be possible to introduce a still newer version, during the time the old version should be supported.

This version is version 1.

NOTE – The 1993 Recommendation is version 0.

Version 0 should be supported until 1 April 1997.

Parameter	Request indication	Response confirmation
Session Connection Identifier	1	1
Calling SSAP address	2	2
Called SSAP address	2	2
Result		3
Quality of service (QOS)	4	4
Session requirements	5	5
Synchronization point serial number	1	1
Initial data token assignment	1	1
Initial minor synch. token assignment	1	1
Initial major/activity token assignment	1	1
Session service user data	6	6

1 This parameter is not used.

2 SESSION and TRANSPORT Layer Addressing is used.

3 The E.115 application may accept or reject the Session Connection indication. The Result parameter indicates which has occurred. The Session provider may also reject the connection request under certain circumstances. Valid incoming values of this parameter are defined in Recommendation X.225.

4 The QOS parameters "Extended control" and "Optimized dialogue transfer" are set to "not required". The remaining QOS parameters are set such that default values are used.

5 This parameter specifies the functional units to be used as listed in 2.1.

6 This parameter is used when negotiating versions as described in 2.2.1.

The version to be used will be negotiated when establishing a session. The user data of the Session Layer Connection request and confirm is used to communicate version number, defined as follows.

Version :: = INTEGER Default {version 0}

No user data means version 0.

The inquiring E.115 application indicates which version it wishes to use in the Session request. The replying E.115 application answers with which version it is able to connect in the Session Connection confirm.

The version to be used is negotiated in the following way.

Connection request	Connection confirm	Version used
Old	Old	Old
New	Old	Old
New	New	New
Old	New	The replying application should in this case have sent "old". The inquiring application should abort the Session due to protocol error. See 2.4.2.

NOTE – Systems following version 0 do not need to make any special provisions for negotiating versions, other than being able to receive and ignore the user data field in connection request and confirm. From version 1 on, the system should be able to down negotiate to the lower version, and from the higher version.

D.2.3 Data transfer phase

D.2.3.1 Action from the sending E.115 application

The sending E.115 application may issue a sequence of "Normal data transfer" requests. The "user data" parameter of these primitives contains one E.115 message. A message may not be segmented and transmitted on several SSDUs.

D.2.3.2 Action from the Receiving E.115 application

Reaction in abnormal circumstances: if the receiving E.115 application detects an incident during the message transfer phase, it may abort the connection by sending a SESSION-USER-ABORT request, as described in 2.4.

D.2.3.3 Data transfer SSDU

Parameter	Request/Indication
User data	

D.2.4 Session Connection Release phase

D.2.4.1 Orderly release

The inquiring E.115 application which has established the Session Connection is responsible for the connection release. However, the selected Session Profile does permit the connection release by the replying side and the inquiring E.115 application may not refuse this release request.

When the inquiring E.115 application has received no international inquiry request to a specific country for 5 minutes, it should release the connection. If this is not done the called E.115 application could abort the connection.

When the decision to close the Session Connection is taken, the sending E.115 application issues a SESSION-RELEASE request. Upon receiving the SESSION-RELEASE indication the receiving E.115 application issues a SESSION-RELEASE response.

Session Connection Release SSDU:

Parameter	Request/Indication	Response/Confirmation
Result SS-user data		(Note)
NOTE – The replying E.115 application will always accept the release.		

D.2.4.2 User initiated abort

On detection of a serious problem, the E.115 application may issue a SESSION-USER-ABORT request with "Reason" parameter for diagnostic purposes.

Its value can be one of:

– local system problem;

– invalid parameter, parameter returned;

– temporary problem;

– protocol error.

Session User Abort SSDU:

Parameter	Request/Indication
SS-user data	(Note)

NOTE – The User Data parameter contains an abort information data element, defined as follows:

```
Abortinformations      :=    SET {
                       [0]   IMPLICIT AbortReason OPTIONAL
parameterReturned      [1]   IMPLICIT BIT STRING OPTIONAL }

AbortReason            :: =  INTEGER {
localProblem           [0]
invalidParameter       [1]   -- parameter returned --
temporaryProblem       [3]   -- the application is not able --
                             -- to accept the Session Connection for the moment --
protocolError          [4]   -- as detected by the application -- }
```

D.2.4.3 Session Provider initiated Abort

The Session Provider may abort a Session Connection for any of a variety of reasons (for example, transport connection failure or local or remote provided problem), indicated by the reason parameter.

Session Provider Abort SSDU:

Parameter	Indication
Reason	(Note)

NOTE – The following reason codes may be supplied:
– transport disconnect;
– protocol error;
– undefined.

D.3 Lower layer protocols

D.3.1 Transport layer profile

Transport Service and protocol are respectively defined in Recommendations X.214 and X.224.

The class 0 is mandatory, class 2 (multiplexing class) optional and other classes are for further study.

Transport layer addressing is used.

Transport Expedited Service is not used.

D.3.2 Network, Link and Physical Layers

Service and protocol for layer 1 to 3 must conform with Recommendations:

- X.75 defining the procedure for Packet Switching Network Interconnection;
- X.213 defining the Network Service;
- X.122 defining the Network Addressing.

Optional user facilities such as “Reversed charge” or “Closed User Group” are not used.

Annex E

Message codes for the Recommendation E.115

(This annex forms an integral part of this Recommendation)

A message code reflects only a situation that occurs in the replying system. It may not be interpreted as an invitation not to adapt the system to this Recommendation.

The message codes are structured as follows:

- The first digit reflects the subdivision.
- The second digit reflects the detailed code within the subdivision.

The code giving the most detail about the message must be used where possible.

The following codes have been defined:

20 PROTOCOL ERROR

- Default code for this subdivision.
- The inquiry message is not structured according to this Recommendation.
- The inquiry message is returned when possible.

21 Lack of respect the ASN1 description of this Recommendation

- E.g. – Wrong structure of the inquiry message.
  - Mandatory fields not present in the inquiry message.

22 The syntax in a field is not in accordance to the E.115 description

- E.g. – The data specified in field “Sequence number” is not a number.

23 Characters not accepted by this Recommendation

- The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

30 SYSTEM ERROR

- Default code for this subdivision.
- The inquiry message is returned when possible.
- The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

31 Database not accessible

- e.g. – Locality list not working.
  - Database subsystem not working.
- The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

32 Congestion with the system

- The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

33 Error due to the application

- Please contact the replying system administrator.

40 REQUIRED SERVICE NOT SUPPORTED

– Default code for this subdivision.

– The inquiry message is returned.

41 Search for the subscriber within the whole country not supported

42 Search for the subscriber within the County, State or Province not supported

43 Service not supported by this Recommendation and not bilaterally agreed

44 Search for the subscriber without subscriber name not supported

50 REQUIRED SERVICE SUPPORTED BUT SEARCH IMPOSSIBLE BY LACK OF, OR INVALID, INPUT INFORMATION

– Default code for this subdivision.

– The inquiry message is returned.

51 Not enough information in the Locality name

52 Not enough information in the County, State or Province name

53 Not enough information in the subscriber's name

54 Not enough information in other fields (excluding Locality, County, State or Province, subscriber name)

55 The information in the additional information field is invalid – See manual

56 Invalid characters in the locality name – See manual

57 Invalid sequence number

– e.g. – Sequence number exceeds the limit of the replying system.

– Sequence number out of numerical sequence.

60 UNABLE TO DETERMINE THE GEOGRAPHICAL AREA IN WHICH TO SEARCH

– Default code for this subdivision.

– These codes may only be used when the called system cannot provide additional information by using the locality list.

An example can be that when a locality is not found within a specified County, State or Province, all selected localities within the Country are displayed in the locality list. Such a functionality is not required by this Recommendation, but is not rejected by it as well.

61 County, State or Province name does not exist in the system

62 Locality name does not exist in the system

63 The combination County, State or Province name – Locality name does not exist in the system

64 The combination Locality – Street name not defined

– The street name does not exist within the locality.

– Too many street names found within the locality.

65 Too many selections found

– Too many counties, states or provinces or localities found.

– The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

70 RETURNING A LOCALITY LIST

– A default code for the locality list is not appropriate as information about a complete or incomplete selection is needed.

71 The locality list is complete – No more information can be obtained

72 The locality list is incomplete – More information can be obtained

73 The locality list is incomplete (10th subdivision is given) – No more information can be obtained

74 The locality list is incomplete (10th subdivision is not reached) – No more information can be obtained

75 The locality list is probably incomplete – No more information can be obtained.

– Due to database difficulties, the replying system cannot assure that all selections are made

– The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

NOTE – A reply containing message code of subdivision 7 with a locality list should be sent if there is no subscriber name in the inquiry or if the locality given in the inquiry is ambiguous. Every entry in the locality list will describe a locality, it will include the locality name and the province name (if supported in that country), if there is a meaningful relation between localities and national destination code, the national destination code will also be included. In that case, the national destination code will be entered in the field "national destination code". Whenever there is additional information that could be useful to the end user, this will be entered in the field "Supplementary data".

The combination of locality name and province name (in the locality list) will be such that they can be used for an international inquiry format message, resulting in subscribers being returned.

80 RETURNING A SUBSCRIBER LIST

– A default code for the Subscriber list is not appropriate as information about a complete or incomplete selection is needed.

81 The subscriber list is complete – No more information can be obtained

82 The subscriber list is incomplete – More information can be obtained

83 The subscriber list is incomplete (the 10th subdivision is given) – No more information can be obtained

84 The subscriber list is incomplete (the 10th subdivision is not reached) – No more information can be obtained

85 The subscriber list is probably incomplete – No more information can be obtained.

– Due to database difficulties the replying system cannot assure that all selections are made

– The existence of this message code must not be taken as an invitation not to fully implement this Recommendation.

90 THE SEARCH RESULTS IN NO LOCALITY – OR SUBSCRIBER SELECTION

– Default code for this subdivision.

– The inquiry message is returned.

91 Heading in the guide not found

92 No subscriber information found

93 Too many selections found – Enter more selective information

94 No locality selection found with the specified sequence number

95 No subscriber information found with the specified sequence number

96 Subscriber's information not available for selected geographical area