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SERIES Q: SWITCHING AND SIGNALLING

Q3 interface

Routing management model

ITU-T Recommendation Q.826

(Formerly CCITT Recommendation)

ITU-T Q-SERIES RECOMMENDATIONS

SWITCHING AND SIGNALLING

SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE	Q.1–Q.3
INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING	Q.4–Q.59
FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN	Q.60–Q.99
CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS	Q.100–Q.119
SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5	Q.120–Q.249
SPECIFICATIONS OF SIGNALLING SYSTEM No. 6	Q.250–Q.309
SPECIFICATIONS OF SIGNALLING SYSTEM R1	Q.310–Q.399
SPECIFICATIONS OF SIGNALLING SYSTEM R2	Q.400–Q.499
DIGITAL EXCHANGES	Q.500–Q.599
INTERWORKING OF SIGNALLING SYSTEMS	Q.600–Q.699
SPECIFICATIONS OF SIGNALLING SYSTEM No. 7	Q.700–Q.799
General	Q.700
Message transfer part (MTP)	Q.701–Q.709
Signalling connection control part (SCCP)	Q.711–Q.719
Telephone user part (TUP)	Q.720–Q.729
ISDN supplementary services	Q.730–Q.739
Data user part	Q.740–Q.749
Signalling System No. 7 management	Q.750–Q.759
ISDN user part	Q.760–Q.769
Transaction capabilities application part	Q.770–Q.779
Test specification	Q.780–Q.799
Q3 INTERFACE	**Q.800–Q.849**
DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1	Q.850–Q.999
PUBLIC LAND MOBILE NETWORK	Q.1000–Q.1099
INTERWORKING WITH SATELLITE MOBILE SYSTEMS	Q.1100–Q.1199
INTELLIGENT NETWORK	Q.1200–Q.1699
SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000	Q.1700–Q.1799
BROADBAND ISDN	Q.2000–Q.2999

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation Q.826

Routing management model

Summary

This Recommendation provides a management information model which covers the management aspects of the "routing and digit analysis" function in an exchange. The scope is further limited to the exchange aspects of circuit switched networks. This model is restricted to the Operations Systems to Network Element (Q3) interface.

Source

ITU-T Recommendation Q.826 was prepared by ITU-T Study Group 4 (1997-2000) and approved under the WTSC Resolution 1 procedure on 4 February 2000.

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 Conference (WTSC), 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 WTSC 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.

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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.

CONTENTS

Page

ITU-T Recommendation Q.826

Routing management model

1 Scope

This Recommendation provides a management information model ITU-T X.720 [11] which covers the management aspects of the "routing and digit analysis" function in an exchange. The scope is further limited to the exchange aspects of circuit switched networks. This model is restricted to the Operations Systems to Network Element (Q3) interface (see ITU-T M.3010 [1]).

The information to be managed is limited to the signalling systems DSS1 (Digital Subscriber Signalling System No. 1), C5 (Signalling System CCITT No. 5), SS No. 7 (Signalling System No. 7 – ISUP (ISDN User Part) only) and R2 (Regional Signalling 2). (SS No. 7 with TUP (Telephone User Part) level 4 is not considered.) The information for routing purposes, which needs to be maintained by the manager, depends on the signalling systems used by the exchange. This information model can be applied for exchanges with the known standardized signalling systems DSS1, SS No. 7, R2, C5. Because of the existence of different signalling systems, not all attributes and objects will be applicable for all exchanges. Information about applicability can be found in the object classes behaviour.

As this model only offers an element management layer view (i.e. limited to a switch) of the routing information, and only shows the partial view a switch has of its network environment, and does not show the whole network picture, it does not provide all the information needed for network-wide management application.

The information model covers the management of following aspects:

– incoming digit rebuilding;
– locally originating, locally terminating (up to recognizing that the DN (Directory Number) belongs to the exchange), and transit calls;
– digit analysis;
– circuit end point selection;
– outgoing digit preparation;

as far as they are relevant for routing. It does not cover management of:

– DN portability (this is covered in ITU-T Q.18xx);
– CTM (Cordless Terminal Mobility);

due to lack of stable requirements at the time of writing this Recommendation.

The information model includes entry/exit points (via instances of specific OC) for:

– customer administration (see ITU-T Q.824.x [13]);
– subscriber controlled input (no standard exists yet);
– IN (Intelligent Network) (see Q.18xx);
– specific treatments as, e.g. announcements.

The information model does not cover routing or digit analysis aspects of the following topics:

– traffic management (see ITU-T Q.823 [16]);
– call-control;
– broadband;
– supplementary services;

– IN (Intelligent Network);
– customer administration;
– other services of which the definition is still under study (e.g. tariff management);
– PABX (Private Automatic Branch Exchange) as exchanges or as termination points of subscriber lines (because this is covered by customer administration);
– centrex implementations;
– mobility issues like cellular and personnel mobility;

neither the following specific points:

– characterization of non-blockable digits (e.g. emergency numbers);
– characterization of destinations for which carrier dialling is not allowed or ignored, e.g. service numbers, emergency calls, specific local calls;
– numbering plans for virtual private networks;
– blocking of national and/or international traffic due to subscriber permission;
– echo suppressor handling depending on selected routing possibility;
– use of propagation delay counter;
– permanent connections.

However, the model defined by this Recommendation is designed to be extended to support the routing administration of broadband and mobile networks.

Because the borders between call processing, digit analysis, routing and traffic management are not always clear, the following rules have been used to differentiate between call processing, digit analysis and routing, and traffic management:

– digit analysis and routing processes are related to the end point selection. If a managed item has no relation with the choice of the end point selection, then this managed item is not included in this model;
– call control processes are related to whether or when a call is required to be routed. These processes do not influence the end point selection;
– the border between traffic management and routing is determined by the following conditions:
  • routing management deals with individual calls under normal conditions;
  • traffic management optimizes overall traffic flow in case of overload or network failure.

Modelling described here does not imply any sequencing of call processing activities.

2 Normative 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.

[1] ITU-T M.3010 (2000), *Principles for a Telecommunications Management Network.*

[2] ITU-T E.164 (1997), *The international public telecommunication numbering plan.*

[3] ITU-T E.170 (1992), *Traffic Routing.*

[4] ITU-T M.3100 (1995), *Generic Network Information Model.*

[5] ITU-T Q.115 (1999), *Logic for the control of echo control devices*.

[6] ITU-T Q.751.1 (1995), *Network element management information model for the Message Transfer Part (MTP).*

[7] ITU-T Q.763 (1999), *Signalling System No. 7 – ISDN User Part formats and codes.*

[8] ITU-T Q.764 (1999), *Signalling System No. 7 – ISDN User Part signalling procedures*.

[9] ITU-T Q.850 (1998), *Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part.*

[10] ITU-T Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control*.

[11] ITU-T X.720 (1992) | ISO/IEC 10165-1:1993, *Information Technology – Open Systems Interconnection – Structure of Management Information: Management Information Model*.

[12] ITU-T X.721 (1992) | ISO/IEC 10165-2:1992, *Information Technology – Open Systems Interconnection – Structure of management information: Definition of Management Information.*

[13] ITU-T Q.824.x, *Stage 2 and stage 3 description for the Q3 Interface – Customer Administration.*

[14] ITU-T X.746 (2000) | ISO/IEC 10164-15:1995, *Information Technology – Open Systems Interconnection – Systems Management: Scheduling Function*.

[15] ITU-T E.410 (1998), *International network management – General information.*

[16] ITU-T Q.823 (1996), *Stage 2 and Stage 3 functional specifications for traffic management.*

[17] ITU-T Q.440 (1988), *General*.

[18] ITU-T Q.441 (1988), *Signalling Code.*

[19] ITU-T X.710 (1997) | ISO/IEC 9595:1998, *Information Technology – Open Systems Interconnection – Common Management Information Service*.

[20] ITU-T Q.822 (1994), *Stage 1, stage 2 and stage 3 description for the Q3 Interface – Performance management*.

[21] ITU-T X.739 (1993) | ISO/IEC 10164-11:1994, *Information technology – Open Systems Interconnection – Systems Management: Metric objects and attributes*.

3 Definitions and abbreviations

3.1 Definitions

This Recommendation defines the following terms:

3.1.1 call routing: The process consisting of digit rebuilding, carrier selection, destination selection, routing possibility selection and digit preparation.

3.1.2 carrier selection: The process of selecting the carrier for a call. The process first determines the type of call based on origin and dialled digits. Customer administration data (which is outside the scope of this Recommendation) is then used to determine the carrier for this type of call. The carrier is then used as part of the routing process.

3.1.3 circuit: Transmission means which allow communication between two exchanges (same definition as in ITU-T E.410 [15]).

3.1.4 circuit end point: Terminates a circuit.

3.1.5 circuit end point subgroup: Terminates a circuit subgroup or (second definition) a set of circuit end points with common characteristics, i.e. the same signalling characteristics, the same bearer capabilities and other characteristics. All circuits in a circuit end point subgroup shall connect the exchange with the same adjacent exchange.

3.1.6 circuit group: The set of all switched circuits which directly interconnects one exchange with another (same definition as in ITU-T E.410 [15]).

3.17 circuit subgroup: A set of circuits within a circuit group which is uniquely identifiable for operational or technical reasons (i.e. because they have same signalling characteristics, same bearer capabilities or other common characteristics). A circuit group may consist of one or more circuit subgroups (same definition as in ITU-T E.410 [15]).

3.1.8 destination: A country, an area, an exchange or other location, or a special service, in which a terminal point is located from an exchange point of view.

3.1.9 end point: A physical point in an exchange where any connection set-up inside an exchange starts or ends, e.g. circuit end point, local destination.

3.1.10 exchange: The aggregate of traffic carrying devices, switching stages, controlling and signalling means at a network node that enables subscriber lines to be interconnected and/or packets to be forwarded as required by individual users.

3.1.11 routing: In the scope of the present document, it has the same meaning as call routing.

3.1.12 routing possibility: Abstraction of possible end points to which the call can be routed.

3.1.13 terminal point: Unique geographical address in a telecommunication network where a connection set-up leaves the network because of the conditions given by the connection set-up initiating subscriber and by the telecommunication network (e.g. subscriber line, PABX access, announcement machine, processor or bytes on a tape or on an optical disc).

3.1.14 treatment: The handling of calls in specific situations (e.g. routing to an announcement for incorrect dialled digits).

3.2 Abbreviations

This Recommendation uses the following abbreviations:

ASN.1	Abstract Syntax Notation One
C5	Signalling System CCITT No. 5
CAC	Carrier Access Code
CC	Country Code
CIC	Circuit Identification Code
CTM	Cordless Terminal Mobility
DCME	Digital Circuit Multiplication Equipment
DN	Directory Number
DSS1	Digital Subscriber Signalling System No. 1
E-R	Entity Relationship
ETS	European Telecommunication Standard
FIFO	First In First Out
I-ETS	Interim European Telecommunication Standard
IN	Intelligent Network

IPI	ISDN Preferred Indicator
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
LIFO	Last In First Out
NDC	National Destination Code
NM	Network Management
OC	Object Class
ORM	Object Model for Call Routing Management
OS	Operations System
PABX	Private Automatic Branch eXchange
PCM	Pulse Code Modulation
PSTN	Public Switched Telephone Network
R2	Regional Signalling 2
RDN	Relative Distinguished Name
SCI	Subscriber Controlled Input
SMO	Scheduled Managed Object
SN	Subscriber Number
SO	Scheduler Object
SS No. 7	Signalling System No. 7
TMN	Telecommunication Management Network
TMR	Transmission Medium Requirement
TNS	Transit Network Selection
TUP	Telephone User Part

4 Functional requirements

The ORM Object Model for call routing management is a description of an interface which will be restricted by requirements. This clause gives the functional requirements of the routing process itself and will therefore have its influence on the ORM.

General requirements

R.1 It is required to find the destination based on at least the digit code.

R.2 The routing process can be divided into several phases: digit rebuilding, destination selection, routing possibility selection, digit preparation, exception handling.

R.3 The model shall support the ability to identify the selecting objects of any target objects (given a knowledge of the target) in an efficient manner. For example, the model should be able to identify what routing data structures are applicable for a specific circuit subgroup.

Digit rebuilding

R.4 Digit rebuilding manages the insertion of digits into the digit code (e.g. for prefixing).

R.5 The model shall support digit rebuilding based on incoming circuit subgroup.

R.6 The model shall support digit rebuilding based on nature of address.

R.7 The model shall support digit rebuilding based on group of subscribers.

Carrier selection

R.8 The model shall support the ability to determine the type of carrier according to origin and dialled digits.

R.9 The model shall support the ability to ignore or intercept the carrier selected for certain calls.

Destination selection

R.10 The model shall support the translation of a digit code into a nature of address and vice versa.

R.11 The destination shall be determined by the dialled digits and, in addition, possibly by nature of address, selected carriers or others.

R.12 The model shall support modification of digit codes.

R.13 The model shall support treatment as a result of destination selection.

R.14 The model shall support identification of the carrier.

R.15 The model shall support time dependent selection of destination.

R.16 The model shall support destination selection based on incoming circuit subgroup.

R.17 The model shall support destination selection based on group of subscribers.

Routing possibility selection

R.18 It shall be possible to handle a call as local or outgoing. Depending on special characteristics, a local call can be changed into an outgoing call in the routing sense (e.g. a call arriving within the digital exchange will be routed to the PABX either directly or via the analogue exchange. See Figure 1).

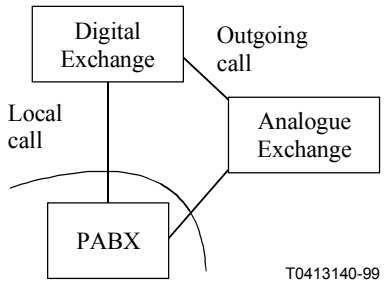


Figure 1/Q.826 – Routing possibility selection

R.19 Treatment is needed when certain routing possibility selection criteria are encountered (e.g. when an IPI/TMR is not supported, an announcement has to be triggered).

R.20 Selection of routing possibility is influenced by parameters as signalling capability, bearer capability, presence of echo suppressor on outgoing circuit subgroup, number of satellite links, or others.

R.21 This distribution of traffic on different carriers/destinations has to be possible (by means of network providers or administration):

– on a percentage basis;

– on the proportion of the available outgoing capacity;

– on the proportion of the incoming traffic.

R.22 The model shall support crankback as described in ITU-T E.170 [3].

R.23 The model shall support time dependent selection of routing possibility.

R.24 The model shall support routing possibility selection based on incoming circuit subgroup.

R.25 The model shall support routing possibility selection based on group of subscribers.

Digit preparation

R.26 Digit preparation shall support modification of digit codes based on parameters as, e.g. selected routing possibility, incoming or outgoing circuit subgroups.

R.27 The model shall support digit preparation based on incoming circuit subgroup.

R.28 The model shall support digit preparation based on group of subscribers.

Exception handling

R.29 It shall be possible to associate a treatment with the following exceptional conditions: missing database entry for call routing and cause value received during call routing (refer to ITU-T Q.850 [9]).

5 Information model

5.1 Information model overview

Because the routing function has grown independently of the switching systems, manufacturer specific characteristics are modelled optionally (i.e. with conditional packages).

In order to describe the management aspects of routing, the routing function has been divided into the following parts:

1) The translation of incoming dialled digits so that they can be processed by digit analysis.

2) The identification of the type of call (local, long distance, etc*.)* based on the origin of the call and the dialled digits. This information is used as part of carrier selection.

3) The identification of the destination is made by analysis of the digit codes and by means of other information.

4) The selection of a free circuit within a set of suitable circuits on which the call may be progressed. In case the destination is inside the exchange the appropriate terminal point(s) has to be selected.

5) The preparation of the digit string before it is sent to the next exchange.

Exceptional (and error) cases are treated by a finial part.

Accordingly, five fragments were defined as:

5.1.1 Digit rebuilding fragment

Digit rebuilding is an activity on incoming digits.

It is possible that digits shall be added to or withdrawn from the original digits before analysis. As an example, this is sometimes necessary if R2 signalling is used.

With digit rebuilding the offered digits themselves can be modified. Examples where this can occur are service numbers, emergency numbers. (See Figure 2.)

5.1.2 Carrier selection fragment

Carrier selection is used by originating traffic. The carrier to be used for the call is selected based on the type of call (e.g. local, local toll, long distance, etc.). The type of call is determined by both the origin of the call and the destination of the call as indicated by the dialled digits. Once the type of call is determined then the particular carrier for this type of call for this customer can be extracted from the customer administration data. (The modelling of this information is outside the scope of this Recommendation.) Once the carrier is identified this information can be used by the destination selection fragment. (See Figure 3.)

5.1.3 Destination selection fragment

Other information of the call, combined with the digit codes, is obtained in order to determine the call destination.

Information, similar to signalling system call parameters, is stored in an exchange and grouped, so that calls matching these parameters will all be routed to the same destination or handled by alternative actions like announcements. Additionally, for locally originating calls also the nature of address and the called numbering plan might be determined for signalling systems which require this. (See Figure 4.)

5.1.4 Routing possibility selection fragment

For circuit selection, management aspects are covered to correlate destination and additional information with a suitable set of circuits. This correlation includes the traffic assignment rules to circuits within the possible set. (See Figure 5.)

5.1.5 Digit preparation fragment

Digit preparation is an activity on outgoing digits. After selection of a free circuit, digit code might need to be prepared for the adjacent exchange. (See Figure 6.)

5.1.6 Exception handling fragment

Exception handling associates a treatment with the following exceptional conditions: missing database entry for call routing and cause value received during call routing. (See Figure 7.)

5.2 Information model diagrams

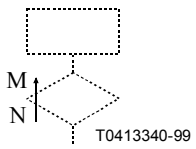
The following information model diagrams have been drawn for the purpose of clarifying the relations between the different object classes of routing management. Three types of diagrams are presented:

– E-R Relationship diagrams, showing relations between the different object classes;

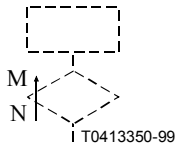
– naming hierarchy showing the derivations of names for managed objects (i.e. the different naming paths for instances of managed objects);

– inheritance hierarchy diagram.

Legend:

– Classes and relation in dotted lines 

mean that the class or relation does not belong to this fragment. The functionality represented by it is covered in another fragment.

– Classes and relation in dashed lines 

mean that the class or relation does not belong to this Recommendation. The functionality represented is covered in another standard.

– Relationship cardinality is normally N → M with N an integer (0...) and M an integer (1...). Other cases are explicitly specified.

– OR means that any or all branches can be present; XOR means that exactly one branch can be present.

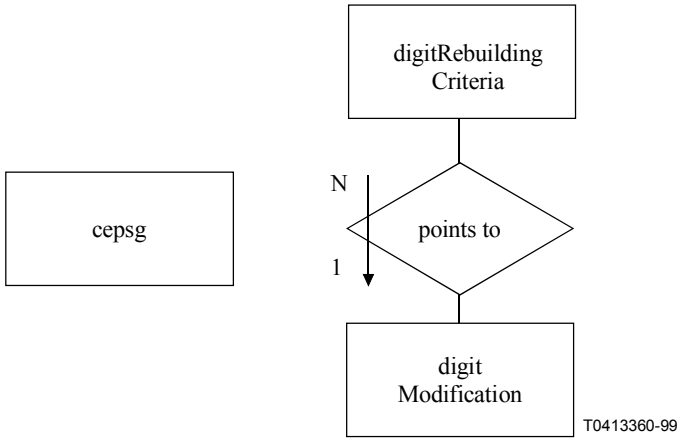


Figure 2/Q.826 – E-R Diagram 1 – Digit rebuilding fragment

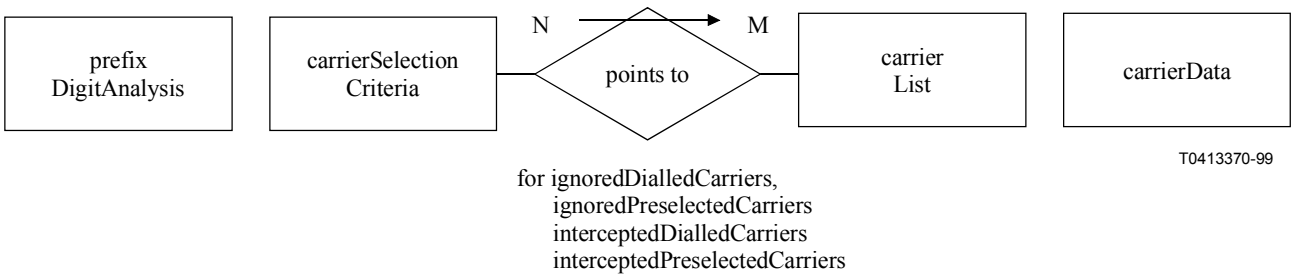
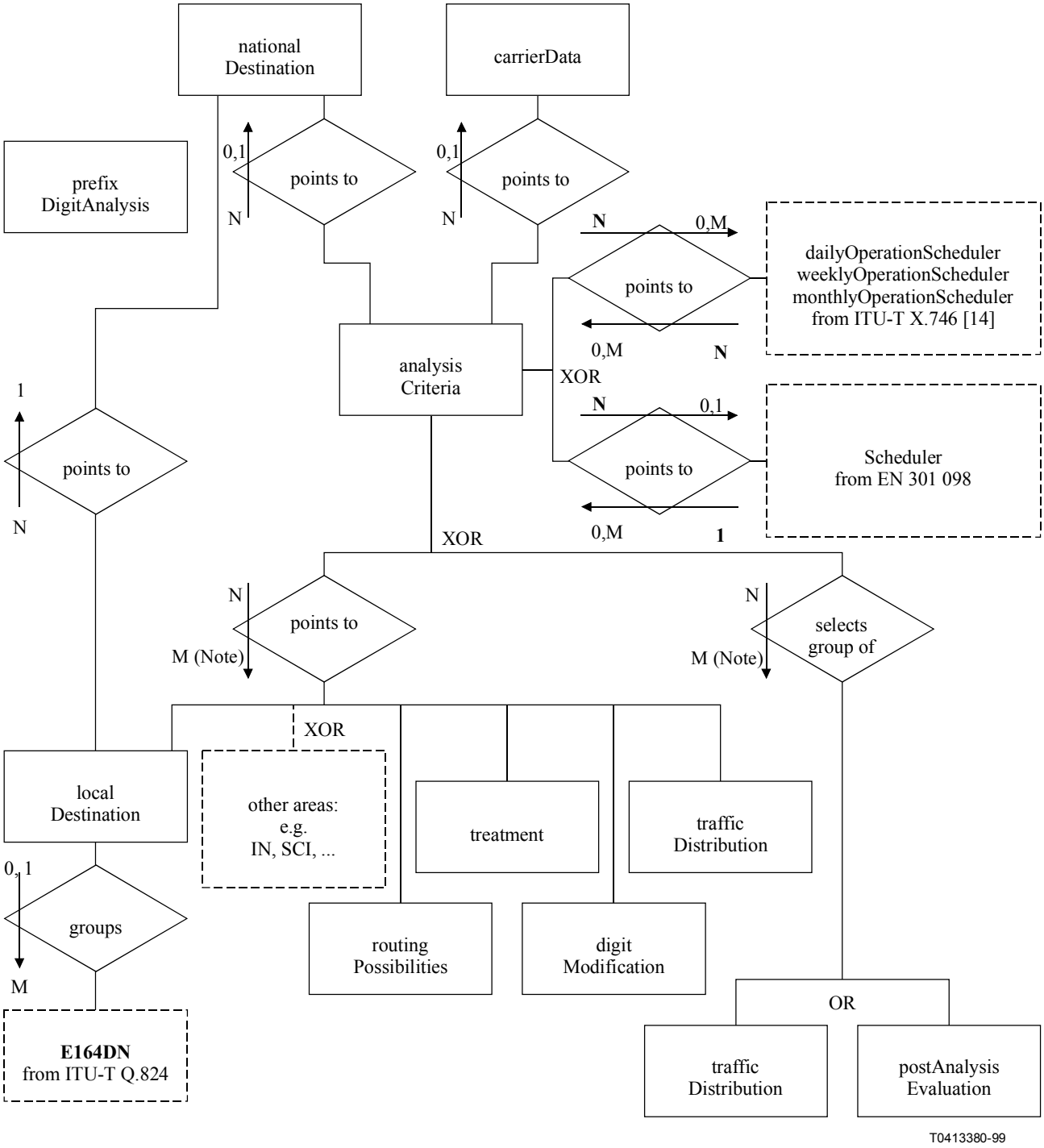
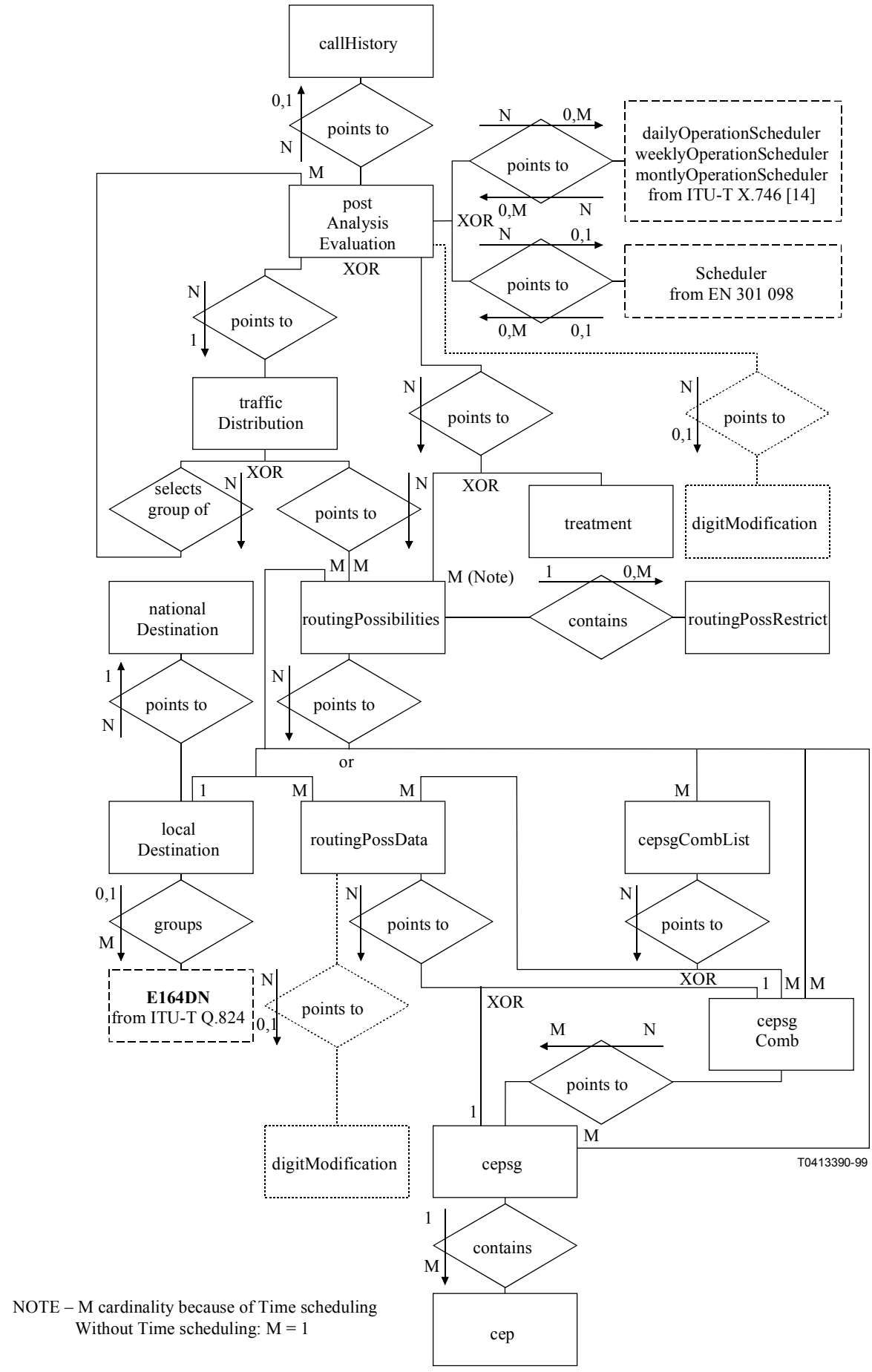


Figure 3/Q.826 – E-R Diagram 2 – Carrier selection fragment



NOTE – M-cardinality because of Time scheduling;
Without Time scheduling: M = 1

Figure 4/Q.826 – E-R Diagram 3 – Destination selection fragment



NOTE – M cardinality because of Time scheduling
Without Time scheduling: M = 1

Figure 5/Q.826 – E-R Diagram 4 – Routing possibility selection fragment

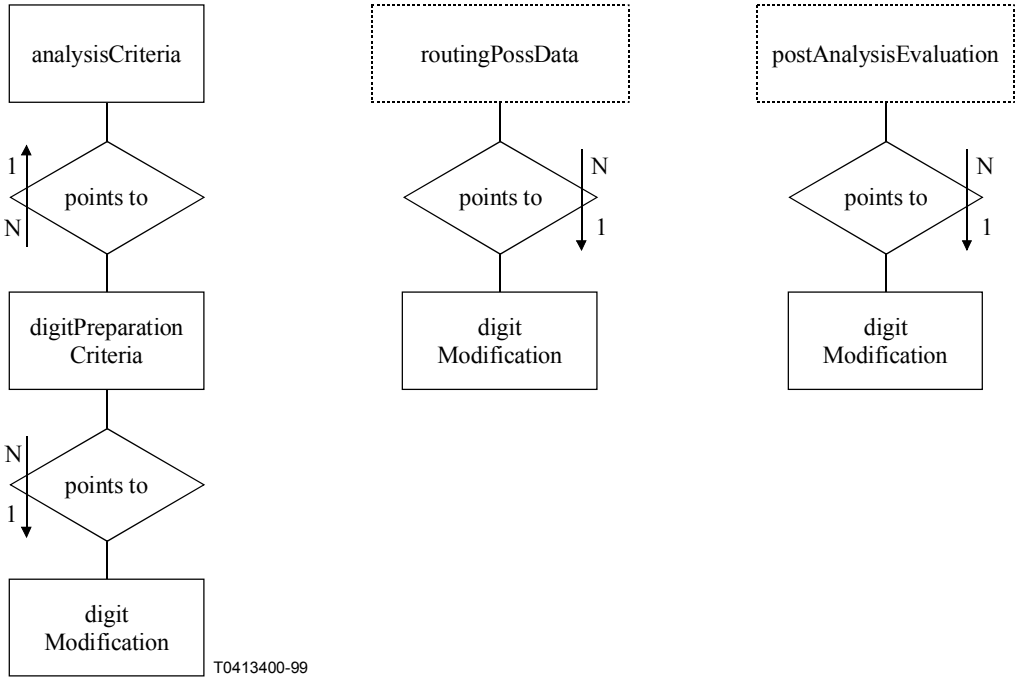


Figure 6/Q.826 – E-R Diagram 5 – Digit preparation fragment

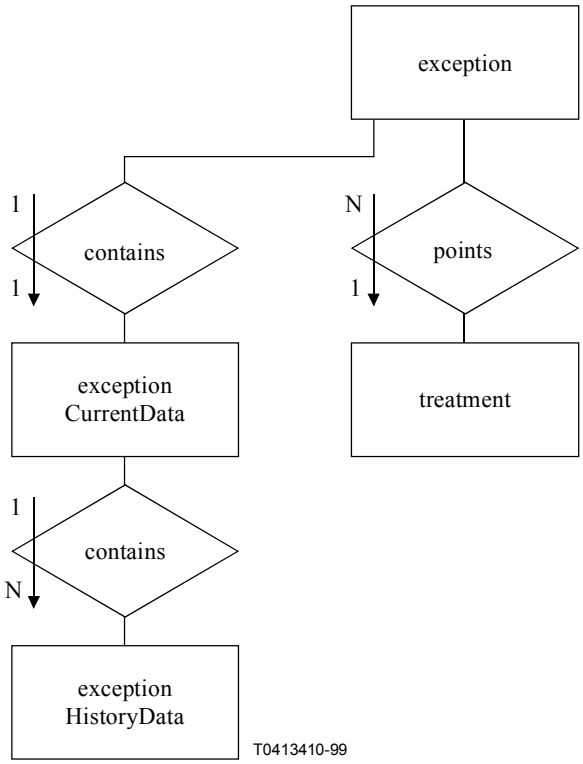


Figure 7/Q.826 – E-R Diagram 6 – Exception handling fragment

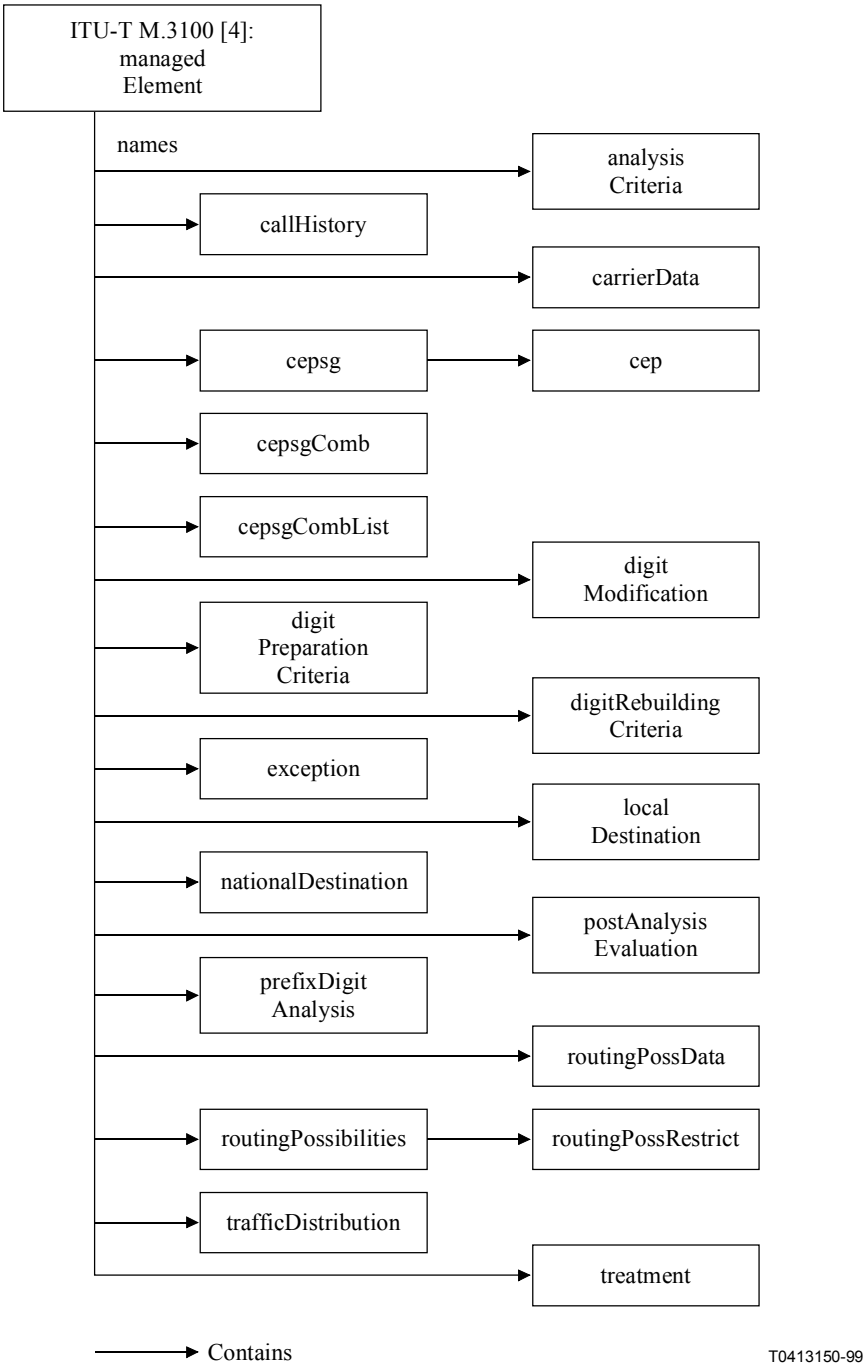


Figure 8/Q.826 – Diagram 7 – Naming relations

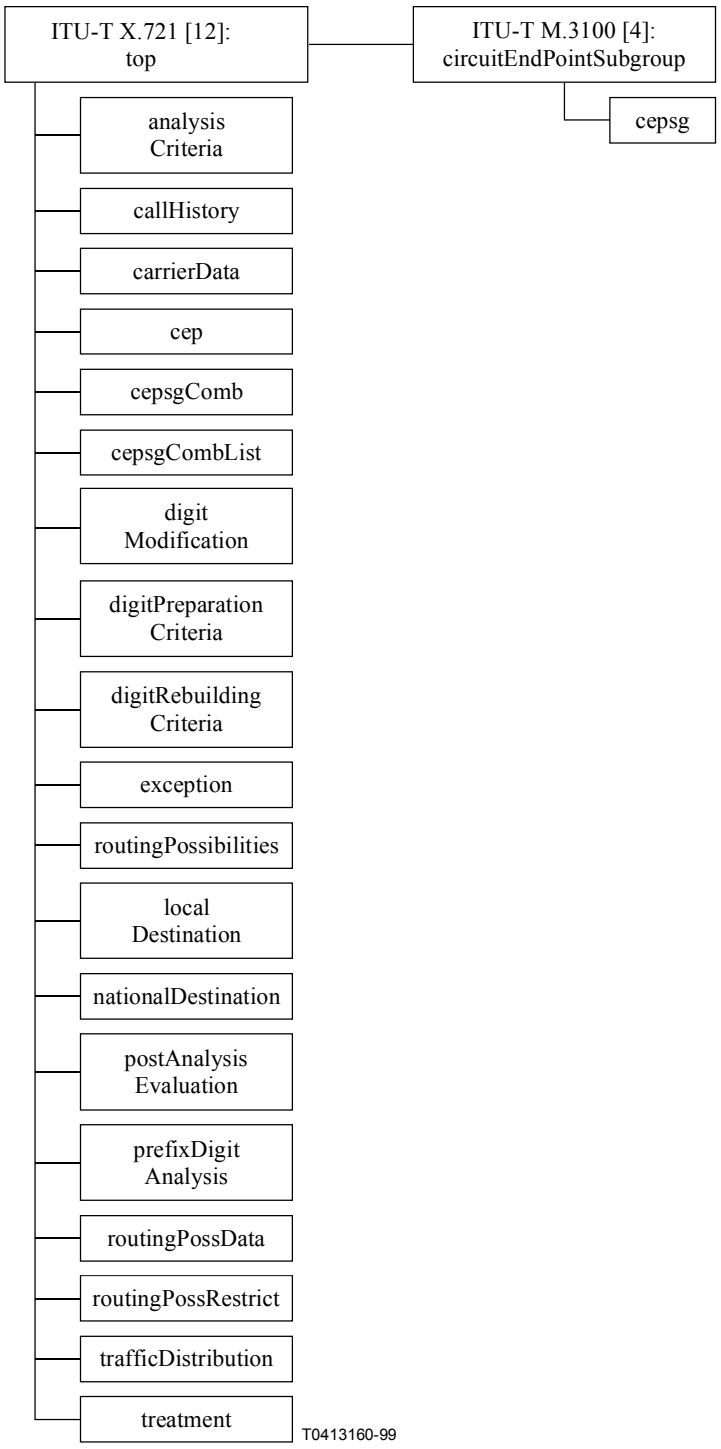


Figure 9/Q.826 – Diagram 8 – Inheritance tree

6 Information model description

In this clause the object classes of the information model are described. For object classes description Table 1 is used.

Table 1/Q.826 – Object class description

Object Class: "Object class name"			
Attributes	**M/C**	**Value Set**	**Operation**
Actions	**M/C**		
Notifications	**M/C**		

The column M/C indicates whether the information presented by the attributes/actions/notifications is mandatory (M) or conditional (C).

The column "Value Set" indicates whether the attribute is single-valued or set-valued (see 5.1.2.2/X.720 [11]).

The column "Operation" indicates the operations possible on the attribute.

Combination of key-attributes value shall be unique among all instances of a given object class. An asterisk "*" following an attribute name indicates a key attribute.

Important notice:

The conflict resolution that shall occur when several instances of a given object class match a specific call is out of the scope of this Recommendation.

6.1 analysisCriteria

The OC analysisCriteria describes the management information needed to make a selection among possible destinations.

For certain calls, e.g. service numbers and originating calls of virtual private networks, it is possible that initial digits need to be modified before the destination can be identified. The destination associated with this new digit string can then be determined by another instance of OC analysisCriteria. (See Table 2.)

Table 2/Q.826 – analysisCriteria

Object Class: analysisCriteria			
Attributes	**M/C**	**Value Set**	**Operation**
analysisCriteriaId	M	Single	GET SET-BY-CREATE
destinationCode*	M	Single	GET-REPLACE
analysisOrigin*	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
activeDestination	M	Single	GET SET-BY-CREATE
	C		REPLACE
callingPartyCategory*	C	Single	REPLACE-WITH-DEFAULT GET-REPLACE

Table 2/Q.826 – analysisCriteria *(concluded)*

Object Class: analysisCriteria			
Attributes	**M/C**	**Value Set**	**Operation**
nationalDestinationInstance*	C	Single	GET SET-BY-CREATE
destinationType*	C	Single	GET SET-BY-CREATE
extSchedulingAttribute	C	Set	GET-REPLACE ADD-REMOVE
"ITU-T Recommendation X.746 [14]": externalSchedulerName	C	Single	GET-REPLACE
numberOfDigits*	C	Single	GET SET-BY-CREATE
carrierDataInstance*	C	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC analysisCriteria:

– analysisCriteriaId

This attribute is the naming attribute (RDN) of OC analysisCriteria.

– destinationCode

This attribute characterizes a destination by specifying the country code, or/and area code, or/and exchange identifying code, or/and individual line number, etc. to which the call can be routed.

– analysisOrigin

This attribute identifies the originForAnalysis group value. originForAnalysis can be defined in, e.g. incoming or two-ways cepsg or in subscriber data as described in Customer Administration Model. An instance of the OC analysisCriteria being independent of the analysis origin gets the value anyOrigin.

– activeDestination

This attribute either references an object instance or selects a group of instances via a label. If scheduling is supported, then this attribute contains the target, which is currently selected by the scheduler object. This attribute is read only in case of a scheduler being connected, otherwise read/write.

– callingPartyCategory

This attribute identifies the calling party category (according to ITU-T Q.763 [7], ITU-T Q.440 [17], or ITU-T Q.441 [18]) which have to be considered for routing purposes. Calling party categories include operator, test or normal subscriber call.

– nationalDestinationInstance

This attribute identifies the instance of OC nationalDestination which is applicable if the destinationCode value has to be assigned unambiguously to a national destination.

– destinationType

This attribute indicates the type of destination.

– extSchedulingAttribute

This attribute provides the scheduling information in the SMO, if external scheduling is supported as in ITU-T X.746 [14].

– externalSchedulerName

This attribute is used in the SMO for referencing the external SOs. (See ITU-T X.746 [14].)

– numberOfDigits

This attribute indicates the number of digits in the digit string. The existence of multiple analysisCriteria instances with different values for this attribute allows the administration of variable length digit strings that shall be routed to the same destination. It also allows the specification of a destination that depends not only on the leading digits as indicated in the attribute destinationCode, but also on the length of the digit string. In this way digit strings with identical leading digits, but with different lengths can be routed to different destinations.

When a specific number of digits is specified, this number cannot be smaller than the number of digits in the digit string as specified in the destinationCode attribute.

– carrierDataInstance

This attribute allows the selection of destinations depending on the dialled or assigned carrier code of the call.

6.2 callHistory

This OC describes criteria and/or restrictions related to the history of a call, e.g. the number of satellite links. It can be used, for example, to restrict the propagation delay. (See Table 3.)

Table 3/Q.826 – callHistory

Object Class: callHistory			
Attributes	**M/C**	**Value Set**	**Operation**
callHistoryId	M	Single	GET SET-BY-CREATE
echoSuppressor*	C	Single	GET-REPLACE
numberOfSatLinks*	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation M.3100 [4]": attributeValueChangeNotificationPackage	C		

The following attributes describe the OC callHistory:

– callHistoryId

This attribute is the naming attribute (RDN) of OC callHistory.

– echoSuppressor

This attribute reflects whether an echo suppressor is required or not depending on whether an echo suppressor has already been included. If an echo suppressor is required, then cepsgs of suitable capability need to be identified, if the exchange does not provide the use of echo control devices inserted from a common pool (see ITU-T Q.115 [5]).

– numberOfSatLinks

This attribute represents the number of satellite links in the history of the call. The number of hops allowed for a certain call can be limited. In general, the limitation values for telephony are zero or one, for data no limitations are present.

6.3 carrierData

This OC represents – via the carrier code – carriers that can be used in the exchange for call routing purposes. (See Table 4.)

Table 4/Q.826 – carrierData

Object Class: carrierData			
Attributes	**M/C**	**Value Set**	**Operation**
carrierDataId	M	Single	GET SET-BY-CREATE
carrierCode*	M	Single	GET SET-BY-CREATE
ownCac	M	Single	GET-REPLACE
carrierType*	C	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC carrierData:

– carrierDataId

This attribute is the naming attribute (RDN) of OC carrierData.

– carrierCode

This attribute describes the unambiguous carrier specific code that identifies a carrier. It can be dialled by a subscriber or supplied by the exchange.

– ownCac

This attribute describes whether the carrier access code identifies the network where the exchange is located.

– carrierType

This optional attribute identifies this carrierData object as pertaining to this carrier when performing the role as a carrier of this type. A carrier (with a particular carrierCode) may perform as several different types of carrier. The routing data may need to be different when the carrier is acting as these different carrier types due to a variety of reasons (for example regulator requirements). When present, this key attribute allows the same carrier (i.e. the same carrier code) to have different routing data when acting as different types of carriers.

6.4 carrierList

This OC is referenced by attributes in the carrierSelectionCriteria OC. It is used to define a list of carriers that are either ignored or intercepted. (See Table 5.)

Table 5/Q.826 – carrierList

Object Class: carrierList			
Attributes	**M/C**	**Value Set**	**Operation**
carrierListId	M	Single	GET SET-BY-CREATE
listOfCarriers	M	Set	GET-REPLACE ADD-REMOVE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC carrierList:

– carrierListId

This attribute is the naming attribute (RDN) of OC carrierList.

– listOfCarriers

This attribute contains a list of carriers.

6.5 carrierSelectionCriteria

This OC is used to determine the kind of call (for carrier selection purposes) based on the called destination and the origin of the call. It also allows carrier selection to be ignored for certain dialled or preselected carriers. If carrier selection is ignored for certain carriers, then either call processing can continue with the network provider default carrier or the call can be intercepted with some form of treatment. (See Table 6.)

Table 6/Q.826 – carrierSelectionCriteria

Object Class: carrierSelectionCriteria			
Attributes	**M/C**	**Value Set**	**Operation**
carrierSelectionCriteriaId	M	Single	GET SET-BY-CREATE
destinationCode*	M	Single	GET-REPLACE
carrierSelectionOrigin*	M	Single	GET-REPLACE
selectedCarrierType	M	Single	GET-REPLACE
ignoredDialledCarriers	C	Single	GET-REPLACE
ignoredPreselectedCarriers	C	Single	GET-REPLACE
interceptedDialledCarriers	C	Single	GET-REPLACE
interceptedPreselectedCarriers	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC carrierSelectionCriteria:

– carrierSelectionCriteriaId

  This attribute is the naming attribute (RDN) of OC carrierSelectionCriteria.

– destinationCode

  This attribute describes the destination for which carrier type is to be selected.

– carrierSelectionOrigin

  This attribute describes the origin for this carrier type selection. It is related to data in the customer administration model identifying a set of customers (e.g. rate centre).

– selectedCarrierType

  This attribute describes the type of carrier selected. The syntax of this attribute is a CarrierType or NULL. If it contains a CarrierType then an attribute that is identified by this CarrrierType in the customer administration data and associated with the customer originating the call will contain the selected carrier identification information (carrierCode). This value is used to match the value of the carrierCode attribute in the carrierData OC. If the value of this attribute is NULL then the network provider default selection mechanism will be used to select the carrier. (The definition of the network provider default selection mechanism is outside the scope of this Recommendation.)

– ignoredDialledCarriers

  This attribute points to carrierList OC that contains a list of carriers that will be ignored if selected by customer dialling for this type of call. Call processing will continue. The network provider default selection mechanism will be used to select the carrier.

– ignoredPreselectedCarriers

  This attribute points to a carrierList OC that contains a list of carriers that will be ignored if preselected for this type of call. Call processing will continue. The network provider default selection mechanism will be used to select the carrier.

– interceptedDialledCarriers

  This attribute points to carrierList OC that contains a list of carriers that will be intercepted with either an announcement or treatment if selected by customer dialling for this type of call.

– interceptedPreselectedCarriers

  This attribute points to a carrierList OC that contains a list of carriers that will be intercepted with either an announcement or treatment if preselected for this type of call.

6.6 cep

This OC describes a circuit end point.

One cep belongs only to one set of circuit end points, the cepsg (circuit end point subgroup). (See Table 7.)

Table 7/Q.826 – cep

Object Class: cep			
Attributes	**M/C**	**Value Set**	**Operation**
cepId	M	Single	GET SET-BY-CREATE
"ITU-T Recommendation X.721 [12]": administrativeState	M	Single	GET-REPLACE
"ITU-T Recommendation X.721 [12]": usageState	M	Single	GET
ctpbInstance*	M	Single	GET SET-BY-CREATE
circuitNumber	M	Single	GET SET-BY-CREATE
officeEquipment*	C	Single	GET SET-BY-CREATE
cic	C	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation X.721 [12]": stateChange	M		

The following attributes describe the OC cep:

– cepId

This attribute is the naming attribute (RDN) of OC cep.

– administrativeState

This attribute indicates whether the circuit end point is administratively permitted to carry traffic (value "unlocked") or not (value "locked"). When in the locked state normal traffic may not be carried (i.e. the usage state must be idle). If placed directly into the locked state any existing call is cleared. If placed into the shutting down state an existing call is not cleared but when the call does clear via normal means the administrative state will transition to the locked state (and the cep will have a usage state of idle). Test calls and other testing procedures may be performed in the locked state.

– usageState

This attribute indicates whether there is traffic using the cep. Changes to the value of this attribute do not generate state change notifications. Note that the value of this attribute may not accurately reflect the usage of the cep if it is queried using multiple object operations. The initial value is idle.

– ctpbInstance

This attribute points to an instance of a subclass of the OC "ITU-T Recommendation M.3100 [4]": connectionTerminationPointBidirectional. Only one cep in the switch may point to a particular connectionTerminationPoint managed object.

– circuitNumber

This attribute indicates the logical circuit end point number within the containing circuit end point subgroup. It is unique within the containing circuit end point subgroup. It provides for the ordering of the cep instances contained within a circuit end point subgroup to support such functions as hunting.

– officeEquipment

This attribute references the physical equipment the circuit end point is associated with. If the inst choice is used, it references an instance of OC "ITU-T Recommendation M.3100 [4]": circuitPack. If the string choice is used, the value is technology specific.

– cic

This attribute indicates the circuit identification code (CIC) of the circuit which is terminated by the circuit end point. This attribute is applicable if SS No. 7 is used.

6.7 cepsg

This OC represents a circuit end point subgroup. An instance of cepsg has directionality one-way incoming, one-way outgoing or two-way. This OC is in fact a subclass of OC circuitEndPointSubgroup registered in ITU-T M.3100 [4] as M3100ObjectClass 31. (See Table 8.)

Table 8/Q.826 – cepsg

Object Class: cepsg			
Attributes	**M/C**	**Value Set**	**Operation**
"ITU-T Recommendation M.3100 [4]": transmissionCharacteristics	M	Single	REPLACE
"ITU-T Recommendation M.3100 [4]": labelOfFarEndExchange	M	Single	REPLACE
"ITU-T Recommendation X.721 [12]": administrativeState	M	Single	GET-REPLACE
assocSignRouteSetNePart	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
boundaryCrossing	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
prefixDigits	C	Single	REPLACE-WITH-DEFAULT GET-REPLACE
searchMethod	C	Single	GET-REPLACE
originForRebuilding	C	Single	GET-REPLACE
originForAnalysis	C	Single	GET-REPLACE
originForRouting	C	Single	GET-REPLACE
originForPreparation	C	Single	GET-REPLACE
termForPreparation	C	Single	GET-REPLACE
languageDigitProc	C	Single	REPLACE-WITH-DEFAULT GET-REPLACE

Table 8/Q.826 – cepsg *(concluded)*

Object Class: cepsg			
Attributes	**M/C**	**Value Set**	**Operation**
prefTrafficDirect	C	Single	GET-REPLACE
suppressOwnCac	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation X.721 [12]": stateChange	M		

The following attributes describe the OC cepsg:

– transmissionCharacteristics

This attribute is inherited from OC "ITU-T Recommendation M.3100 [4]": circuitEndPointSubgroup. Operation REPLACE is added here.

– labelOfFarEndExchange

This attribute is inherited from OC "ITU-T Recommendation M.3100 [4]": circuitEndPointSubgroup. Operation REPLACE is added here.

– administrativeState

This attribute – defined in ITU-T X.721 [12] – indicates whether the circuit end point subgroup is administratively permitted to be offered traffic (value "unlocked") or not (value "locked"). When moved to the locked state calls are **not** automatically cleared. Note that this state does not control traffic originating on ceps contained in this cepsg. Only the locked and unlocked values are supported (i.e. shutting down is not a valid value).

– assocSignRouteSetNePart

This attribute references a sigSetNePart instance (ITU-T Q.751.1 [6]) which represents the signalling point of the adjacent exchange connected by the cepsg. The attribute references no object instance (default value) for non SS No. 7 procedures.

– boundaryCrossing

This attribute indicates whether the circuit end point subgroup contains only circuit end points terminating circuits which cross international or organizational boundaries. The default value is "national".

– prefixDigits

This attribute defines the digit string which has to be inserted in front of the destination code arriving at the exchange. An empty digit string, which is the default value, means that no digits have to be inserted. The attribute is only applicable for circuit end point subgroups which have directionality incoming or two-way.

– searchMethod

The attribute is applicable if the circuit end point subgroup has directionality one-way outgoing or two-way.

This attribute describes the method to select idle circuits within a circuit end point subgroup. The following algorithms are defined for that purpose:

- **fifoEvenElseLifoOdd**: The idle circuits are distributed in two lists. One list contains only idle circuits with even CICs, the other list contains only idle circuits with odd CICs. The circuits of the even CIC list are first choice, the circuits of the odd CIC list

are selected if the even CIC list is empty. The FIFO method is used for the even CIC list, the LIFO method is used for the odd CIC list.

- **fifoOddElseLifoEven**: The idle circuits are distributed in two lists. One list contains only idle circuits with even CICs, the other list contains only idle circuits with odd CICs. The circuits of the odd CIC list are first choice, the circuits of the even CIC list are selected if the odd CIC list is empty. The FIFO method is used for the odd CIC list, the LIFO method is used for the even CIC list.
- **fifoEvenGrpElseLifoOddGrp** (for PCM 30 circuits): The idle circuits are distributed in two lists. One list contains only idle circuits with an even value of the integer part of the expression CIC divided by 16, the other list contains only idle circuits with an odd value for the integer part of the expression CIC divided by 16. The circuits of the even group CIC list are first choice, the circuits of the odd group CIC list are selected if the even group CIC list is empty. The FIFO method is used for the even group CIC list, the LIFO method is used for the even group CIC list.
- **fifoOddGrpElseLifoEvenGrp** (for PCM 30 circuits): The idle circuits are distributed in two lists. One list contains only idle circuits with an even value of the integer part of the expression CIC divided by 16, the other list contains only idle circuits with an odd value for the integer part of the expression CIC divided by 16. The circuits of the odd group CIC list are first choice, the circuits of the even group CIC list are selected if the odd group CIC list is empty. The FIFO method is used for the odd group CIC list, the LIFO method is used for the even group CIC list.
- **fifo**: This algorithm uses only one list for the idle circuits. The FIFO method is used to select the circuits.
- **forwardSequential**: This algorithm selects the idle circuit with the lowest circuit/CIC number.
- **backwardSequential**: This algorithm selects the idle circuit with the highest circuit/CIC number.
- **forwardOddElseBackwardEven**: This algorithm selects the idle circuit with the lowest odd circuit/CIC number. If no idle circuit with an odd circuit/CIC number is available, it selects the idle circuit with the highest even circuit/CIC number.
- **forwardEvenElseBackwardOdd**: This algorithm selects the idle circuit with the lowest even circuit/CIC number. If no idle circuit with an even circuit/CIC number is available, it selects the idle circuit with the highest odd circuit/CIC number.
- **forwardCyclic**: This algorithm selects the idle circuit with the lowest circuit/CIC number that is larger than the circuit/CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle circuit/CIC with the lowest circuit/CIC number that is less than the circuit/CIC number of the previously selected circuit.
- **backwardCyclic**: This algorithm selects the idle circuit with the highest circuit/CIC number that is less than the circuit/CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle circuit/CIC with the highest circuit/CIC number that is larger than the circuit/CIC number of the previously selected circuit.
- **random**: This algorithm selects an idle circuit at random.

– originForRebuilding, originForAnalysis, originForRouting, originForPreparation

These attributes are applicable if the circuit end point subgroup has directionality incoming or two-way. They represent the origin groups to which circuit end point subgroups belong. This grouping can influence digit rebuilding, digit analysis, call routing, digit preparation, respectively.

– termForPreparation

This attribute is applicable if the circuit end point subgroup has directionality outgoing or two-way. It represents the group to which circuit end point subgroups belong. This grouping can influence digit preparation.

– languageDigitProc

This attribute indicates whether the language digit has to be extracted from the transmitted digit string for incoming calls and has to be included into the transmitted digit string for outgoing calls on the position specified by the signalling systems R2 or C5 for international transit or terminating traffic. The default value is FALSE. The attribute is applicable if one of these signalling systems is used.

– prefTrafficDirect

This attribute specifies for circuit end point subgroups with directionality two-way the preferred traffic direction in case of seizure conflicts. If two exchanges at the end of a circuit subgroup try to seize the same circuit, then this attribute determines how to resolve the conflict.

- incoming: the incoming seizure is preferred for this circuit end point subgroup;
- outgoing: the outgoing seizure is preferred for this circuit end point subgroup;
- outgoingFirstChoiceList: the outgoing seizure is preferred for this circuit end point subgroup, if the seizure is performed on a circuit end point of the first choice list. This value can only be used if the attribute searchMethod indicates an algorithm that uses a first choice list.

Otherwise the incoming seizure is preferred.

– suppressOwnCac

This attribute describes whether the own CAC (carrier access code) shall be suppressed, i.e. whether the TNS parameter will be suppressed and/or whether CAC will be taken out of digit string. This attribute is applicable if the possibility to administer suppression of own carrier codes has to be provided and if the circuit end point subgroup has directionality one-way incoming or two-way.

6.8 cepsgComb

This OC describes a set of cepsgs for which a certain algorithm is used to assign traffic to a circuit end point subgroup (of the traffic offered to the set). This includes the detailed information how the traffic is distributed over the elements in the set. The instances of the OC cepsg, which are used in an instance of the OC cepsgComb can be of different characteristics, but shall be of the directionality outgoing or two-way.

Three algorithms are identified to assign traffic to the set of cepsgs:

– the sequential algorithm

For the sequential algorithm, the cepsgs are ordered in a list. The sequential algorithm starts searching for an available cepsg always at the first element of the list.

– the cyclic algorithm

For the cyclic algorithm the cepsgs are also ordered in a list. The cyclic algorithm remembers the cepsg found in the previous search (for another call) and starts searching for an available cepsg beginning with the next element in the list.

– the "proportional bidding" algorithm

Traffic is distributed over "rows" according to a certain assigned percentage. Every "row" consists of cepsgs of an ordered list. If a call is assigned to a "row", then the search for an available cepsg will be done in a sequential way within the ordered list (see Table 9). The sum of "rows" percentage shall be 100%.

Table 9/Q.826 – Example of proportional bidding

ROW: percentage	cepsgCombSelection ----> descending "priority"
"ROW 1": 50%	cepsgId="a", cepsgId="c", cepsgId="f"
"ROW 2": 30%	cepsgId="f", cepsgId="g", cepsgId="i"
"ROW 3": 20%	cepsgId="c", cepsgId="i", cepsgId="g"

It is also possible that each row consists of a list of all the cepsgIds of the cepsgComb, but each time in a shifted permutation (see Table 10), or with a common overflow (see Table 11).

Table 10/Q.826 – Example of proportional bidding with overflow

ROW:percentage	cepsgCombSelection ----> descending "priority"
"ROW 1": 50%	cepsgId="a", cepsgId="c", cepsgId="f"
"ROW 2": 30%	cepsgId="c", cepsgId="f", cepsgId="a"
"ROW 3": 20%	cepsgId="f", cepsgId="a", cepsgId="c"

Table 11/Q.826 – Example of proportional bidding with common overflow

ROW:percentage	cepsgCombSelection ----> descending "priority"
"ROW 1": 50%	cepsgId="a", cepsgId="d", cepsgId="e"
"ROW 2": 30%	cepsgId="b", cepsgId="d", cepsgId="e"
"ROW 3": 20%	cepsgId="c", cepsgId="d", cepsgId="e"

Table 12/Q.826 – cepsgComb

Object Class: cepsgComb			
Attributes	**M/C**	**Value Set**	**Operation**
cepsgCombId	M	Single	GET SET-BY-CREATE
cepsgCombSelection	M	Set/Single	GET-REPLACE
possibilitiesInList	M	Set	GET
usedAlgorithm	M	Single	GET-REPLACE
"ITU-T Recommendation M.3100 [4]": userLabel	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC cepsgComb:

– cepsgCombId

  This attribute is the naming attribute (RDN) of OC cepsgComb.

– cepsgCombSelection

  If the sequential or cyclic algorithms are used, this attribute gives the ordered list of cepsgs belonging to this cepsgComb. If the proportional bidding algorithm is used, this attribute gives the percentage value and the ordered cepsg list, for every "row".

– possibilitiesInList

  This attribute gives the set of cepsgs found in cepsgCombSelection. It is automatically updated to be kept in synchronization as the cepsgs are updated in cepsgCombSelection. This attribute is used to support filtering.

– usedAlgorithm

  This attribute describes the algorithm that is used: sequential, cyclic or proportional bidding.

– userLabel

  This attribute assigns a user friendly name to a cepsgComb object instance. This attribute is defined in ITU-T M.3100 [4].

6.9 cepsgCombList

This OC describes a set of instances of OC cepsgComb or routingPossData for which a certain algorithm is used to assign traffic to a member of the set. (See Table 13.)

Table 13/Q.826 – cepsgCombList

Object Class: cepsgCombList			
Attributes	**M/C**	**Value Set**	**Operation**
cepsgCombListId	M	Single	GET SET-BY-CREATE
cepsgCombListSelection	M	Set/Single	GET-REPLACE
possibilitiesInList	M	Set	GET
usedAlgorithm	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC cepsgCombList:

– cepsgCombListId

  This attribute is the naming attribute (RDN) of OC cepsgCombList.

– cepsgCombListSelection

  This attribute gives a list of instances on which the selection algorithm found in the attribute usedAlgorithm is to apply. These instances can be instances of OC routingPossData or of OC cepsgComb.

– possibilitiesInList

  This attribute gives the set of cepsgComb and routingPossData found in cepsgCombListSelection. It is automatically updated to be kept in synchronization as the cepsgComb or routingPossData object instances are updated in cepsgCombListSelection. This attribute is used to support filtering.

– usedAlgorithm

This attribute describes the algorithm that is used: sequential, cyclic or proportional bidding.

6.10 digitModification

The OC digitModification defines how a sequence of digits is to be modified. The cases in which the sequence of digits is to be modified are described by the OCs digitRebuildingCriteria, routingPossData, analysisCriteria, postAnalysisEvaluation and digitPreparationCriteria.

Digit codes modification triggered by instances of OC digitRebuildingCriteria is used, for example, to insert digits into the digit string, which arrives at the exchange, and so to define a new digit sequence. The new digit sequence is used as input for the OC analysisCriteria.

For the OCs analysisCriteria and postAnalysisEvaluation, digit string modification is used, for example, to replace or suppress digits. If necessary, the resulting digit string can be further analysed to determine the ultimate destination.

For the OCs digitPreparationCriteria and routingPossData, the digits can be prepared before they are sent to the next (adjacent) exchange. (See Table 14.)

Table 14/Q.826 – digitModification

Object Class: digitModification			
Attributes	**M/C**	**Value Set**	**Operation**
digitModificationId	M	Single	GET SET-BY-CREATE
digitSuppress	M	Set	GET-REPLACE ADD-REMOVE
digitCombReplace	M	Set	GET-REPLACE ADD-REMOVE
digitCombInsert	M	Set	GET-REPLACE ADD-REMOVE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitModification:

– digitModificationId

This attribute is the naming attribute (RDN) of OC digitModification.

– digitSuppress, digitCombReplace, digitCombInsert

These three attributes define which sequence of digits needs to be suppressed, to be replaced (and by which digit string) or to be inserted (and at which position in the digit string), respectively.

All three attributes work independently on the same digit string that has to be modified. Therefore, no precedence is defined for suppression, replacement and insertion. Each attribute is set-valued in order to allow multiple operations of the same kind on the same digit string. Double insertion at one position is not allowed. For the replace and suppress activities, the integer value of the endPosition shall be greater than the startPosition.

6.11 digitPreparationCriteria

The OC digitPreparationCriteria provides the management information for digit preparation for the next exchange. If the attributes preparationOrigin, preparationTerm, analysisCriteriaInstance match with information from a call then the identified instance of OC digitModification is applicable. (See Table 15.)

Table 15/Q.826 – digitPreparationCriteria

Object Class: digitPreparationCriteria			
Attributes	**M/C**	**Value Set**	**Operation**
digitPreparationCriteriaId	M	Single	GET SET-BY-CREATE
preparationOrigin*	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
preparationTerm*	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
analysisCriteriaInstance*	M	Single	GET-REPLACE
digitModificationInstance	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitPreparationCriteria:

– digitPreparationCriteriaId

  This attribute is the naming attribute (RDN) of OC digitPreparationCriteria.

– preparationOrigin

  This attribute identifies a group of instances of the OC cepsg (directionality: incoming or two-way) or of subscribers. The corresponding grouping attribute in OC cepsg is originForPreparation. The corresponding grouping attribute for subscribers is the responsibility of customer administration area. An instance of the OC digitPreparationCriteria that is independent of the digit preparation origin gets the default value anyOrigin.

– preparationTerm

  This attribute identifies a group of instances of the OC cepsg (directionality: outgoing or two-way) or of subscribers. The corresponding grouping attribute in OC cepsg is termForPreparation. The corresponding grouping attribute for subscribers is the responsibility of customer administration area. An instance of the OC digitPreparationCriteria that is independent of the digit preparation termination gets the default value anyTerm.

– analysisCriteriaInstance

  This attribute indicates the instance of OC analysisCriteria which has to match.

– digitModificationInstance

  This attribute identifies the instance of OC digitModification which is applicable if key-attributes match with call information.

6.12 digitRebuildingCriteria

The OC digitRebuildingCriteria provides management information for the digit code rebuilding process before the digits are analysed by OC analysisCriteria. This part of the digit rebuilding is independent of incoming digits.

If information, extracted from a call, matches with the attributes rebuildingOrigin, natureOfAddress and calledNumberingPlan, then the digit codes will be modified according to the instance of OC digitModification, addressed by the attribute digitModificationInstance. (See Table 16.)

Table 16/Q.826 – digitRebuildingCriteria

Object Class: digitRebuildingCriteria			
Attributes	**M/C**	**Value Set**	**Operation**
digitRebuildingCriteriaId	M	Single	GET SET-BY-CREATE
rebuildingOrigin*	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
natureOfAddress*	M	Single	GET-REPLACE
calledNumberingPlan*	M	Single	GET-REPLACE
digitModificationInstance	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitRebuildingCriteria:

– digitRebuildingCriteriaId

  This attribute is the naming attribute (RDN) of OC digitRebuildingCriteria.

– rebuildingOrigin

  This attribute identifies a group of instances of the OC cepsg (directionality: incoming or two-way) or of subscribers. The corresponding grouping attribute in OC cepsg is originForRebuilding. The corresponding grouping attribute for subscribers is the responsibility of customer administration area. An instance of the OC digitRebuildingCriteria that is independent of the digit rebuilding origin gets the default value anyOrigin.

– natureOfAddress

  This attribute identifies the natureOfAddress that has to be considered for digit rebuilding process. Possible values are defined by ITU-T Q.763 [7] (e.g. national, international or local).

– calledNumberingPlan

  This attribute identifies the value of called numbering plan that has to be considered for digit rebuilding process. Possible values are defined by ITU-T Q.763 [7] (e.g. ISDN/PSTN, data, telex and operator specific values).

– digitModificationInstance

  This attribute identifies the instance of OC digitModification which is applicable if key-attributes match with call information.

6.13 exception

The OC exception provides management information to handle exception situations (e.g. of call routing). It applies if:

– a particular instance of an OC is required but not available

The specific OC type is given by the attribute matchesIf. In case of successful routing the OC exception will not be used.

– a particular cause value is received or generated

The specific cause is given by the attribute matchesIf and has been defined in the Cause Indicator Field defined in ITU-T Q.850 [9]. (See Table 17.)

Table 17/Q.826 – exception

Object Class: exception			
Attributes	**M/C**	**Value Set**	**Operation**
exceptionId	M	Single	GET SET-BY-CREATE
matchesIf*	M	Set	GET-REPLACE ADD-REMOVE
treatmentInstance	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC exception:

– exceptionId

This attribute is the naming attribute (RDN) of OC exception.

– matchesIf

This attribute gives the cause values and/or the OC types for which the instance of OC exception is applicable. A particular cause value or OC type shall not appear in different instances of the OC exception.

– treatmentInstance

This attribute identifies the treatment which applies if an instance of this OC matches.

6.14 exceptionCurrentData

The OC exceptionCurrentData provides the count of the number of times the containing exception has occurred in the granularity interval. This OC is a subclass of currentData found in ITU-T Q.822 [20]. (See Table 18.)

Table 18/Q.826 – exceptionCurrentData

Object Class: exceptionCurrentData			
Attributes	**M/C**	**Value Set**	**Operation**
exceptionCount	M	Single	GET
Notifications			

The following attribute describes the OC exceptionCurrentData:

– exceptionCount

This attribute is the count of the occurrences of the exception during the current granularity period.

6.15 exceptionHistoryData

The OC exceptionHistoryData provides storage of the count of the number of times the containing exception has occurred in a previous granularity interval. This OC is a subclass of HistoryData found in ITU-T Q.822 [20]. (See Table 19.)

Table 19/Q.826 – exceptionHistoryData

Object Class: exceptionHistoryData			
Attributes	**M/C**	**Value Set**	**Operation**
exceptionCount	M	Single	GET
Notifications			

The following attribute describes the OC exceptionCurrentData:

– exceptionCount

This attribute is the count of the occurrences of the exception during this history period.

6.16 localDestination

The OC localDestination represents the grouping of directory numbers of an exchange (e.g. DNs of local subscribers, PABXs). (See Table 20.)

Table 20/Q.826 – localDestination

Object Class: localDestination			
Attributes	**M/C**	**Value Set**	**Operation**
localDestinationId	M	Single	GET SET-BY-CREATE
nationalDestinationInstance	M	Single	GET SET-BY-CREATE
initialSubscriberCodes	M	Single	GET-REPLACE
excludedSubscriberCodes	C	Set	GET-REPLACE ADD-REMOVE
Actions			
modifyNumberingScheme	M		
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC localDestination:

– localDestinationId

This attribute is the naming attribute (RDN) of OC localDestination.

– nationalDestinationInstance

This attribute identifies the instance of OC nationalDestination which is applicable.

– initialSubscriberCodes

This attribute contains the codes which characterize the initial digits of a subscriber number (refer to ITU-T E.164 [2]).

A directory number belongs to this local destination:

- if the directory number is a member of the local area defined by the nationalDestinationInstance;
- if an initial digit string part of the SN part of the directory number (SN part see ITU-T E.164 [2]) matches with one of the codes of this attribute;
- if it is not excluded by attribute excludedSubscriberCodes.

– excludedSubscriberCodes

This attribute is present if it is necessary to exclude DNs from the local destination. It contains the codes, which characterize the initial digits of a subscriber number (refer to ITU-T E.164 [2]). It is possible to specify with this attribute entire SNs explicitly or only initial strings of SNs.

A directory number is excluded from this local destination:

– if the directory number is a member of the local area defined by the nationalDestinationInstance attribute; and

– if an initial digit string part of the SN part of the directory number matches with one of the codes of this attribute (excludedSubscriberCodes).

The following action is defined for the OC localDestination:

– modifyNumberingScheme

This action operation modifies data of OC localDestination instance and the directory number instances which belong to it. This action does not change the implicit relationship between the directory numbers and the local destination: a directory number that belonged/did not belong to the local destination before the action belongs/does not belong to it after the action is executed on the localDestination instance.

6.17 nationalDestination

The OC nationalDestination describes the national destinations codes (refer to ITU-T E.164 [2]) that are supported in the exchange. (See Table 21.)

Table 21/Q.826 – nationalDestination

Object Class: nationalDestination			
Attributes	**M/C**	**Value Set**	**Operation**
nationalDestinationId	M	Single	GET SET-BY-CREATE
nationalDestinationCode*	M	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": createDeleteNotificationsPackage	M		

The following attributes describe the OC nationalDestination:

– nationalDestinationId

  This attribute is the naming attribute (RDN) of OC nationalDestination.

– nationalDestinationCode

  This attribute describes a national destination code.

6.18 postAnalysisEvaluation

The OC postAnalysisEvaluation evaluates additional call characteristics to the ones analysed in the OC analysisCriteria. (See Table 22.)

Table 22/Q.826 – postAnalysisEvaluation

Object Class: postAnalysisEvaluation			
Attributes	**M/C**	**Value Set**	**Operation**
postAnalysisEvaluationId	M	Single	GET SET-BY-CREATE
destinationGroupLabel*	M	Single	GET-REPLACE
callHistoryInstance*	M	Single	GET-REPLACE
routingOrigin*	M	Single	REPLACE-WITH-DEFAULT GET-REPLACE
callingPartyCategory*	C	Single	GET-REPLACE
reqBearerCapability*	C	Single	GET-REPLACE
reqSignCapability*	C	Single	GET-REPLACE
digitModificationInstance	C	Single	GET-REPLACE
trafficDistributionInstance	C	Single	GET-REPLACE
schedulingAttribute	C	Set	GET-REPLACE ADD-REMOVE
"ITU-T Recommendation X.746 [14]": externalSchedulerName	C	Single	GET-REPLACE
activeRoutingPossibilities	C	Single	GET
	C		REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC postAnalysisEvaluation:

– postAnalysisEvaluationId

  This attribute is the naming attribute (RDN) of OC postAnalysisEvaluation.

– destinationGroupLabel

  This attribute determines the destination group to which this instance belongs. To make this instance of OC postAnalysisEvaluation applicable, this attribute has to match the group selected by the instance of OC analysisCriteria or of OC trafficDistribution.

– callHistoryInstance

  This attribute points to an instance of OC callHistory.

– routingOrigin

This attribute identifies a group of instances of the OC cepsg (directionality: incoming or two-way) or of subscribers. The corresponding grouping attribute in OC cepsg is originForRouting. The corresponding grouping attribute for subscribers is the responsibility of customer administration area. An instance of the OC postAnalysisEvaluation that is independent of the routing origin gets the default value anyOrigin.

– callingPartyCategory

This attribute identifies the calling party category (according to ITU-T Q.763 [7], ITU-T Q.440 [17] or ITU-T Q.441 [18]) which has to be considered for routing purposes. Calling party categories include operator, test or normal subscriber call.

– reqBearerCapability

– reqSignCapability

These two attributes, respectively Required Bearer Capability and Required Signalling Capability, describe the required characteristics of the outgoing termination point subgroup to be used for determining the routing of the call. If SS No. 7 is used then the reqSignCapability is given by the ISDN User Part (ISUP) Preference indicator. Other signalling systems may have other values. Possible values are, e.g. ISUP Preferred, any signalling capability (defined in ITU-T Q.763 [7]).

These two attributes are conditional because they are not necessary in situations where only one signalling system (e.g. ISUP) is used for circuits.

– digitModificationInstance

This attribute points to an instance of OC digitModification if digit manipulation is needed.

– trafficDistributionInstance

This attribute points to an instance of OC trafficDistribution.

– schedulingAttribute

This attribute provides a set of indexes with associated object instances. When an external scheduler indicates that a specific index is valid, the corresponding object instance in the scheduling attribute replaces the object instance in the attribute activeRoutingPossibilities.

– externalSchedulerName

This attribute is used in the SMO for referencing the external SO (see 8.4.11/X.746 [14]).

– activeRoutingPossibilities

This attribute – which is instantiated if trafficDistributionInstance attribute is not present – contains the value of the instance of OC routingPossibilities which is applicable (or also treatment instance when required). activeRoutingPossibilities attribute is updated if a new index is selected by the scheduling mechanism. REPLACE operation is added to the GET operation when no scheduling attributes are instantiated.

6.19 prefixDigitAnalysis

The OC prefixDigitAnalysis is necessary when destination type is required by OC analysisCriteria and when this information cannot be derived from other means (e.g. ISUP nature of address). It can also indicate the presence of a carrier code in the received digits, e.g. when it is not signalled separately (TNS field). (See Table 23.)

Table 23/Q.826 – prefixDigitAnalysis

Object Class: prefixDigitAnalysis			
Attributes	**M/C**	**Value Set**	**Operation**
prefixDigitAnalysisId	M	Single	GET SET-BY-CREATE
prefixCode*	M	Single	GET-REPLACE
destinationType	C	Single	GET SET-BY-CREATE
carrierCodePresent	C	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC prefixDigitAnalysis:

– prefixDigitAnalysisId

This attribute is the naming attribute (RDN) of OC prefixDigitAnalysis.

– prefixCode

This attribute represents the leading dialled digits which are necessary to determine destination type and/or carrier.

– destinationType

This attribute indicates the values of destinationType. Possible values are related to the values defined by ITU-T Q.763 [7] and ITU-T Q.931 [10].

– carrierCodePresent

This attribute indicates, by its presence or absence, whether or not carrier code is present in the digit string.

6.20 routingPossData

The OC routingPossData contains information that is applicable for the routing possibility that is using this OC instance. (See Table 24.)

Table 24/Q.826 – routingPossData

Object Class: routingPossData			
Attributes	**M/C**	**Value Set**	**Operation**
routingPossDataId	M	Single	GET SET-BY-CREATE
trafficCategory	M	Single	GET-REPLACE
cepsgCombOrCepsgInstance	M	Single	GET SET-BY-CREATE
languageDigit	C	Single	GET SET-BY-CREATE
suppressCac	C	Single	GET-REPLACE
digitModificationInstance	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC routingPossData:

– routingPossDataId

  This attribute is the naming attribute (RDN) of OC routingPossData.

– trafficCategory

  This attribute describes the traffic category (national, international transit or international terminating) that applies to the call.

– cepsgCombOrCepsgInstance

  This attribute determines the cepsg instance or the cepsgComb instance this routingPossData points to.

– languageDigit

  This attribute describes which language digit has to be used, if the language digit for a call was not yet fixed. In cepsg the language digit will then be fixed depending on this language digit.

– suppressCac

  This attribute describes whether a CAC has to be suppressed or not, i.e. that no TNS field will be sent and/or that CAC will be taken out of the digits string.

– digitModificationInstance

  This attribute determines the digitModification instance applicable to this routingPossData instance.

6.21 routingPossibilities

Instances of this class are results of digitAnalysis, of postAnalysisEvaluation or traffic distribution. This class provides routing possibilities, on which call traffic has to be distributed. There are routing possibilities to other exchanges or to local destinations and there are additional alternatives (e.g. announcement machines, test equipment). In case of crankback (refer to ITU-T E.170 [3]), it is possible to restrict the routing possibilities. (See Table 25.)

Table 25/Q.826 – routingPossibilities

Object Class: routingPossibilities			
Attributes	**M/C**	**Value Set**	**Operation**
routingPossibilitiesId	M	Single	GET SET-BY-CREATE
routingPossibilitiesSelection	M	Set/Single	GET-REPLACE
possibilitiesInList	M	Set	GET
usedAlgorithm	M	Single	GET-REPLACE
crankbackAdminState	C	Single	REPLACE-WITH-DEFAULT GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		
"ITU-T Recommendation M.3100 [4]": stateChange	C		

The following attributes describe the OC routingPossibilities:

– routingPossibilitiesId

  This attribute is the naming attribute (RDN) of OC routingPossibilities.

– routingPossibilitiesSelection

  This attribute gives a list of instances on which the selection algorithm found in the attribute usedAlgorithm is to apply. These instances can be instances:

  • of OC routingPossData; or
  • of OC localDestination; or
  • of OC cepsgCombList; or
  • of OC cepsgComb; or
  • of OC cepsg; or
  • of OC routingPossibilities.

– possibilitiesInList

  This attribute gives the set of object instances found in routingPossibilitesSelection. It is automatically updated to be kept in synchronization as the object instances are updated in routingPossibilitesSelection. This attribute is used to support filtering.

– usedAlgorithm

  This attribute describes the algorithm used to select a member within the list described by attribute routingPossibilitiesSelection. Three algorithms are identified: sequential, cyclic and proportional (refer to OC cepsgComb, clause 6.8).

– crankbackAdminState

  This attribute describes whether crankback has to be performed (unlocked) or not (locked).

6.22 routingPossRestrict

The OC routingPossRestrict stores the data needed for crankback or other data influencing selection of individual targets. (See Table 26.) For more information about crankback refer to ITU-T E.170 [3].

Table 26/Q.826 – routingPossRestrict

Object Class: routingPossRestrict			
Attributes	**M/C**	**Value Set**	**Operation**
routingPossRestrictId	M	Single	GET SET-BY-CREATE
skipGroupSignal1	C	Set	GET-REPLACE ADD-REMOVE
skipGroupSignal2	C	Set	GET-REPLACE ADD-REMOVE
Notifications			
"ITU-T Recommendation M.3100 [4]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation M.3100 [4]": attributeValueChangeNotificationPackage	C		

The following attributes describe the OC routingPossRestrict:

– routingPossRestrictId

  This is the naming attribute (RDN) of OC routingPossRestrict.

– skipGroupSignal1

  This attribute lists routing possibilities (e.g. routingPossData, cepsg) that have to be skipped if signal1 (refer to ITU-T E.170) arrives from a cepsg reachable via one of these routing possibilities.

– skipGroupSignal2

  This attribute lists routing possibilities (e.g. routingPossData, cepsg) that have to be skipped if signal2 (refer to ITU-T E.170) arrives from a cepsg reachable via one of these routing possibilities.

6.23 trafficDistribution

The OC trafficDistribution provides management data needed to distribute traffic according to percentage values determined by available outgoing capacity, incoming traffic load or operator command.

The OC trafficDistribution points to instances contained in selectedInstances attribute according to algorithm detailed in inputCriteriaDataForAlgorithm and to traffic data given by attribute trafficDistributionData. destinationGroupLabel represents the destination group this instance belongs to. (See Table 27.)

Table 27/Q.826 – trafficDistribution

Object Class: trafficDistribution			
Attributes	**M/C**	**Value Set**	**Operation**
trafficDistributionId	M	Single	GET SET-BY-CREATE
inputCriteriaDataForAlgorithm	M	Single	GET-REPLACE
trafficDistributionData	M	Single	GET
selectedInstances	M	Single	GET-REPLACE
possibilitiesInList	M	Set	GET
destinationGroupLabel*	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [4]": objectManagementNotificationsPackage	M		

The following attributes describe the OC trafficDistribution:

– trafficDistributionId

  This attribute is the naming attribute (RDN) of OC trafficDistribution.

– inputCriteriaDataForAlgorithm

  The attribute defines the criteria and data which are used to calculate the data (e.g. percentage values assigned to a carrier) applied by the distribution algorithm. Examples for corresponding criteria are "fixed percentage quota", "available outgoing circuit subgroup capacity" or "amount of incoming traffic".

– trafficDistributionData

  This attribute lists – for the proportional (without overflow) algorithm – the current valid percentage values on which the distribution of call bids is performed. This attribute is read-only and might be updated during the lifetime of the instance automatically, depending on the inputCriteriaForAlgorithm attribute. The userLabel components (carrier names) are present in this attribute, depending on the presence of these userLabels in the inputCriteriaDataForAlgorithm attribute.

  The initial value of the trafficDistributionData attribute is derived at creation of this instance or at modification time of the attribute inputCriteriaDataForAlgorithm from the value of the attribute inputCriteriaDataForAlgorithm.

– selectedInstances

  This attribute references object instances with an ordered list.

– possibilitiesInList

  This attribute gives the set of object instances found in selectedInstances. It is automatically updated to be kept in synchronization as the object instances are updated in selectedInstances. This attribute is used to support filtering.

– destinationGroupLabel

  This attribute determines the destination group to which this instance belongs. To make this instance of OC trafficDistribution applicable, this attribute has to match the group selected by the instance of OC analysisCriteria. This attribute is present if the relationship "selects group of" (see E-R diagram 4) is used.

6.24 treatment

This OC represents treatments, e.g. announcements which are applied in specific situations such as:

– a specific instance of OC analysisCriteria

  For example, for certain "invalid" combinations of digits, an announcement may be applied.

– a specific instance of OC postAnalysisEvaluation

  If, e.g. a certain destination (temporarily) can be reached for only a limited set of bearer capabilities, an announcement can be used to inform why the other requested bearer capabilities are not supported.

– a cause

  A cause is a reason why the call is not forwarded.

– a specific instance of OC exception

  An exception occurs when none of the criterion type of object instances match for a specific call.

The specific treatment is not part of the standard and is system dependent. Therefore each system provider has to subclass this OC to add its own specific treatments. (See Table 28.)

Table 28/Q.826 – treatment

Object Class: treatment			
Attributes	**M/C**	**Value Set**	**Operation**
treatmentId	M	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [4]": createDeleteNotificationsPackage	M		

The following attribute describes the OC treatment:

– treatmentId

This is the naming attribute (RDN) of OC treatment.

7 Object class definitions

This clause contains the formal object class definitions.

7.1 Managed object class definitions

The following behaviour is used to describe what happens when the uniqueness constraint for key parameters (see clause 6) is violated by a REPLACE operation.

uniquenessConstraintViolationSetBeh BEHAVIOUR
DEFINED AS
"When System Management protocol attempts to set the value of a key attribute of this object (as indicated in clause 6) that would cause a violation of the key uniqueness constrain on attribute values specified in clause 6, the value of the attribute shall not be set and the uniquenessConstraintViolation value of the GeneralErrorCause shall be returned. When this occurs the relatedObjects value of the M.3100 GeneralError syntax shall indicate the identity of the managed object instance that would match on key attributes if the set were to succeed."

7.1.1 analysisCriteria

```
analysisCriteria MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                analysisCriteriaPackage PACKAGE
                        BEHAVIOUR
                                uniquenessConstraintViolationSetBeh,
                    analysisCriteriaPackageBeh BEHAVIOUR
                                DEFINED AS
                                        "See clause 6.1
                                        Value combination of attributes (key-attributes) destinationCode,
                                        callingPartyCategory, analysisOrigin, nationalDestinationInstance,
                                        destinationType, numberOfDigits, carrierDataInstance shall be unique
                                        among all instances of this object class.";;
                        ATTRIBUTES
                                analysisCriteriaId
                                        GET SET-BY-CREATE,
                                destinationCode
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter,
                                analysisOrigin
                                        REPLACE-WITH-DEFAULT
                                        DEFAULT VALUE ASN1TypeModule.defaultAnalysisOrigin
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter,
                                activeDestination
```

```
                    GET
                    SET-BY-CREATE;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
    CONDITIONAL PACKAGES
        callingPartyCategoryPackage
            PRESENT IF "calling party category has to be evaluated.",
        nationalDestinationInstancePackage PACKAGE
            ATTRIBUTES
                nationalDestinationInstance
                    GET
                    SET-BY-CREATE;
            REGISTERED AS {package 1};
                PRESENT IF "the destinationCode value has to be assigned unambiguously to a
                national destination.",
        destinationTypePackage
            PRESENT IF "the destination type has to be used to unambiguously identify the destination
            in addition to destinationCode.",
        extSchedulingPackage PACKAGE
            BEHAVIOUR
                extSchedulingPackageBeh BEHAVIOUR
                    DEFINED AS
                        "This package is used in the SMO to enable external scheduling e.g. as
                        with OC multiScheduler from ITU-T X.746 [14].";;
            ATTRIBUTES
                extSchedulingAttribute
                    GET-REPLACE;
            REGISTERED AS {package 2};
                PRESENT IF "external index scheduling is used for the attribute activeDestination.",
        externalSchedulerPackage
                PRESENT IF "external scheduling by a SO is supported.",
        activeDestinationPackage PACKAGE
            BEHAVIOUR
                activeDestinationPackageBeh BEHAVIOUR
                    DEFINED AS
                        "This package allows to perform a REPLACE operation additionally to
                        the GET operation on the activeDestination attribute, in case the
                        scheduling packages are not instantiated.";;
            ATTRIBUTES
                    activeDestination
                        REPLACE;
            REGISTERED AS {package 3};
                PRESENT IF "no scheduling is used",
        numberOfDigitsPackage PACKAGE
            ATTRIBUTES
                numberOfDigits
                    GET
                    SET-BY-CREATE;
            REGISTERED AS {package 4};
                PRESENT IF "an instance supports it",
        carrierDataInstancePackage PACKAGE
            ATTRIBUTES
                carrierDataInstance
                    GET
                    SET-BY-CREATE;
            REGISTERED AS {package 5};
                PRESENT IF "carrier dependent analysis is required and the carrier code is not part
                of the destination code";
REGISTERED AS {managedObjectClass 1};
```

7.1.2 callHistory

```
callHistory MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                callHistoryPackage PACKAGE
                        BEHAVIOUR
                                uniquenessConstraintViolationSetBeh ,
                            callHistoryPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.2
                                                Value combination of attributes (key-attributes) echoSuppressor,
                                                numberOfSatLinks shall be unique among all instances of this object
                                                class.";;
                        ATTRIBUTES
                                callHistoryId
                                        GET SET-BY-CREATE;;,
          "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
       CONDITIONAL PACKAGES
          echoSuppressorPackage PACKAGE
                ATTRIBUTES
                        echoSuppressor
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter;
                        REGISTERED AS {package 6};
                                PRESENT IF "an instance supports it",
          numberOfSatLinksPackage PACKAGE
                        ATTRIBUTES
                                numberOfSatLinks GET-REPLACE
                                "ITU-T Recommendation M.3100":generalErrorParameter;
                        REGISTERED AS {package 7};
                                PRESENT IF "an instance supports it",
                "ITU-T Recommendation M.3100":attributeValueChangeNotificationPackage
                                PRESENT IF "an instance supports it";
REGISTERED AS {managedObjectClass 2};
```

7.1.3 carrierData

```
carrierData MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                carrierDataPackage PACKAGE
                        BEHAVIOUR
                                carrierDataPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.3
                                                Values of the set of attributes (key-attributes) carrierCode and
                                                carrierType (if present) shall be unique among all instances of this object
                                                class.";;
                        ATTRIBUTES
                                carrierDataId
                                        GET SET-BY-CREATE,
                                carrierCode
                                        GET
                                        SET-BY-CREATE,
                                ownCac
                                        GET-REPLACE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
        CONDITIONAL PACKAGES
                carrierTypePackage PACKAGE
                        ATTRIBUTES
                                carrierType GET SET-BY-CREATE;
                REGISTERED AS {package 8 };
```

```
            PRESENT IF "carrier type selection is supported and if it is needed for this carrier data";
REGISTERED AS {managedObjectClass 3};
```

7.1.4 carrierList

```
carrierList MANAGED OBJECT CLASS
  DERIVED FROM "ITU-T Recommendation X.721":top;
  CHARACTERIZED BY
    carrerListPackage PACKAGE
      BEHAVIOUR
        carrierListBehaviour BEHAVIOUR
          DEFINED AS
            "See clause carrierList";;
      ATTRIBUTES
        carrierListId GET SET-BY-CREATE,
        listOfCarriers GET-REPLACE ADD-REMOVE;;,
    "Rec. M.3100 : 1995":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 4};
```

7.1.5 carrierSelectionCriteria

```
carrierSelectionCriteria MANAGED OBJECT CLASS
  DERIVED FROM      "ITU-T Recommendation X.721":top;
  CHARACTERIZED BY
    carrierSelectionCriteriaPackage PACKAGE
    BEHAVIOUR
                uniquenessConstraintViolationSetBeh,
              carrierSelectionCriteriaBehaviour BEHAVIOUR
                      DEFINED AS
                        "See clause carrierSelectionCriteria";;
              ATTRIBUTES
                carrierSelectionCriteriaId GET SET-BY-CREATE,
                destinationCode GET-REPLACE
                      "ITU-T Recommendation M.3100":generalErrorParameter,
                carrierSelectionOrigin INITIAL VALUE ASN1TypeModule.initialValueOrigin
                                                      GET-REPLACE
                      "ITU-T Recommendation M.3100":generalErrorParameter,
                selectedCarrierType GET-REPLACE;;,
    "Rec. M.3100 : 1995":objectManagementNotificationsPackage;
CONDITIONAL PACKAGES
    ignoredDialledCarriersPackage PACKAGE
      ATTRIBUTES
        ignoredDialledCarriers GET-REPLACE;
    REGISTERED AS {package 9};
    PRESENT IF   "if the ability to ignore dialled carriers is required",
    ignoredPreselectedCarriersPackage PACKAGE
      ATTRIBUTES
        ignoredPreselectedCarriers GET-REPLACE;
    REGISTERED AS {package 10};
    PRESENT IF   "the ability to ignore preselected carriers is required",
    interceptedDialledCarriersPackage PACKAGE
      ATTRIBUTES
        interceptedDialledCarriers GET-REPLACE;
    REGISTERED AS {package 11};
    PRESENT IF   "an announcement or a treatment for a dialled carrier is
      required",
    interceptedPreselectedCarriersPackage PACKAGE
      ATTRIBUTES
        interceptedPreselectedCarriers GET-REPLACE;
    REGISTERED AS {package 12};
    PRESENT IF   "an announcement or a treatment for a preselected carrier
      is required";
REGISTERED AS {managedObjectClass 5};
```

7.1.6 cep

```
cep MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                cepPackage PACKAGE
                        BEHAVIOUR
                                cepPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.6.";;
                        ATTRIBUTES
                                cepId
                                        GET SET-BY-CREATE,
                                "ITU-T Recommendation X.721":administrativeState
                                        GET-REPLACE,
                                "ITU-T Recommendation X.721": usageState
                                INITIAL VALUE ASN1TypeModule.initialValueIdle
                                GET,
                                ctpbInstance
                                        GET
                                        SET-BY-CREATE,
                                circuitNumber
                                        GET
                                        SET-BY-CREATE;;,
                "ITU-T Recommendation M.3100":createDeleteNotificationsPackage,
                "ITU-T Recommendation M.3100":stateChangeNotificationPackage;
        CONDITIONAL PACKAGES
                cicPackage PACKAGE
                        ATTRIBUTES
                                cic
                                        GET
                                        SET-BY-CREATE;
                        REGISTERED AS {package 13};
                                        PRESENT IF "SS No. 7 is used for signalling.",
                officeEquipmentPackage PACKAGE
                        BEHAVIOUR
                                officeEquipmentPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "Value of attribute (key-attribute) officeEquipment shall be unique
                                                among all instances of this object class ";;
                        ATTRIBUTES
                                officeEquipment
                                        GET
                                        SET-BY-CREATE;
                        REGISTERED AS {package 14};
                            PRESENT IF "an instance supports it.";
REGISTERED AS {managedObjectClass 6};
```

7.1.7 cepsg

```
cepsg MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation M.3100":circuitEndPointSubgroup;
        CHARACTERIZED BY
                cepsgPackage PACKAGE
                        BEHAVIOUR
                                cepsgPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.7.
                                                This OC represents a set of circuit end points with similar characteristics.
                                                A circuit end point subgroup can be of type one-way incoming, one-way
                                                outgoing, or two-way. For type two-way, conditional packages
                                                incomingCepsgPackage and outgoingCepsgPackage have both to be
                                                instantiated";;
```

```
            ATTRIBUTES
                "ITU-T Recommendation M.3100":transmissionCharacteristics
                    REPLACE,
                "ITU-T Recommendation M.3100":labelOfFarEndExchange
                    REPLACE,
                "ITU-T Recommendation X.721":administrativeState
                    PERMITTED VALUES ASN1TypeModule.AdminLockedUnlocked
                    GET-REPLACE,
                assocSignRouteSetNePart
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ASN1TypeModule.defaultAssocSignRouteSetNePart
                    GET-REPLACE,
                boundaryCrossing
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ASN1TypeModule.defaultBoundaryCrossing
                    GET-REPLACE;;,
        "ITU-T Recommendation M.3100":stateChangeNotificationPackage;
CONDITIONAL PACKAGES
        incomingCepsgPackage PACKAGE
            ATTRIBUTES
                prefixDigits
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ASN1TypeModule.defaultPrefixDigits
                    GET-REPLACE;
            REGISTERED AS {package 15};
                PRESENT IF "the circuit end point subgroup is of type incoming or two-way",
        outgoingCepsgPackage PACKAGE
            ATTRIBUTES
                searchMethod
                    GET-REPLACE;
            REGISTERED AS {package 16};
                PRESENT IF "the circuit end point subgroup is of type outgoing or two-way",
        originForRebuildingPackage PACKAGE
            ATTRIBUTES
                originForRebuilding
                    GET-REPLACE;
            REGISTERED AS {package 17};
                PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if
                origin dependent digit rebuilding is required.",
        originForAnalysisPackage PACKAGE
            ATTRIBUTES
                originForAnalysis
                    GET-REPLACE;
            REGISTERED AS {package 18};
                PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if
                origin dependent digit analysis is required.",
        originForRoutingPackage PACKAGE
            ATTRIBUTES
                originForRouting
                    GET-REPLACE;
            REGISTERED AS {package 19};
                PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if
                origin dependent call routing is required.",
        originForPreparationPackage PACKAGE
            ATTRIBUTES
                originForPreparation
                    GET-REPLACE;
            REGISTERED AS {package 20};
                PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if
                origin dependent digit preparation is required.",
        termForPreparationPackage PACKAGE
            ATTRIBUTES
                termForPreparation
```

```
                        GET-REPLACE;
                REGISTERED AS {package 21};
                        PRESENT IF "the circuit end point subgroup is of type outgoing or two-way and if
                        outgoing cepsg dependent digit preparation is required.",
        specificSignSystemPackage PACKAGE
                ATTRIBUTES
                        languageDigitProc
                                REPLACE-WITH-DEFAULT
                                DEFAULT VALUE ASN1TypeModule.defaultLanguageDigitProc
                                GET-REPLACE;
                REGISTERED AS {package 22};
                        PRESENT IF "one of the signalling systems R2 or C5 is used.",
        twowayCepsgPackage PACKAGE
                ATTRIBUTES
                        prefTrafficDirect
                                GET-REPLACE;
                REGISTERED AS {package 23};
                        PRESENT IF "the circuit end point subgroup is of type two-way.",
        carrierPackage PACKAGE
                ATTRIBUTES
                        suppressOwnCac GET-REPLACE;
                REGISTERED AS {package 24};
                        PRESENT IF "the option to administer suppression of own carrier has to be provided
                        and if the circuit end point subgroup is of type incoming or two-way.";
REGISTERED AS {managedObjectClass 7};
```

7.1.8 cepsgComb

```
cepsgComb MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                cepsgCombPackage PACKAGE
                        BEHAVIOUR
                                cepsgCombPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.8

                                                Also note that the values of the possibilitiesInList attribute are
                                                automatically updated to be kept in synchronization with object instances
                                                referenced in the cepsgCombSelection attribute. ";;
                        ATTRIBUTES
                                cepsgCombId
                                        GET SET-BY-CREATE,
                                cepsgCombSelection
                                        GET-REPLACE,
                                possibilitiesInList
                                        GET,
                                usedAlgorithm
                                        GET-REPLACE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
        CONDITIONAL PACKAGES
                userLabelPackage PACKAGE
                        ATTRIBUTES
                                "ITU-T Recommendation M.3100":userLabel
                                        GET-REPLACE;
                REGISTERED AS {package 25};
                        PRESENT IF "an instance supports it.";
REGISTERED AS {managedObjectClass 8};
```

7.1.9 cepsgCombList

```
cepsgCombList MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                cepsgCombListPackage PACKAGE
                        BEHAVIOUR
                                cepsgCombListPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.9

                                                Also note that the values of the possibilitiesInList attribute are
                                                automatically updated to be kept in synchronization with object instances
                                                referenced in the cepsgCombListSelection attribute.";;
                        ATTRIBUTES
                                cepsgCombListId
                                        GET SET-BY-CREATE,
                                cepsgCombListSelection
                                        GET-REPLACE,
                                possibilitiesInList
                                        GET,
                                usedAlgorithm
                                        GET-REPLACE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 9};
```

7.1.10 digitModification

```
digitModification MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                digitModificationPackage PACKAGE
                        BEHAVIOUR
                                digitModificationPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.10";;
                        ATTRIBUTES
                                digitModificationId
                                        GET SET-BY-CREATE,
                                digitSuppress
                                        GET-REPLACE
                                        ADD-REMOVE,
                                digitCombReplace
                                        GET-REPLACE
                                        ADD-REMOVE,
                                digitCombInsert
                                        GET-REPLACE
                                        ADD-REMOVE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 10};
```

7.1.11 DigitPreparationCriteria

```
digitPreparationCriteria MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                digitPreparationCriteriaPackage PACKAGE
                        BEHAVIOUR
                                uniquenessConstraintViolationSetBeh,
                           digitPreparationCriteriaPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.11
```

```
                                    Value combination of attributes (key-attributes) preparationOrigin,
                                    preparationTerm and analysisCriteriaInstance shall be unique among all
                                    instances of this object class.";;
                ATTRIBUTES
                        digitPreparationCriteriaId
                                GET SET-BY-CREATE,
                        preparationOrigin
                                REPLACE-WITH-DEFAULT
                                DEFAULT VALUE ASN1TypeModule.defaultPreparationOrigin
                                GET-REPLACE
                                "ITU-T Recommendation M.3100":generalErrorParameter,
                        preparationTerm
                                REPLACE-WITH-DEFAULT
                                DEFAULT VALUE ASN1TypeModule.defaultPreparationTerm
                                GET-REPLACE
                                "ITU-T Recommendation M.3100":generalErrorParameter,
                        analysisCriteriaInstance
                                GET-REPLACE
                                "ITU-T Recommendation M.3100":generalErrorParameter,
                        digitModificationInstance
                                GET-REPLACE;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 11};
```

7.1.12 DigitRebuildingCriteria

```
digitRebuildingCriteria MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                digitRebuildingCriteriaPackage PACKAGE
                        BEHAVIOUR
                                uniquenessConstraintViolationSetBeh,
                        digitRebuildingCriteriaPackageBeh BEHAVIOUR
                                DEFINED AS
                                        "See clause 6.12
                                        Value combination of attributes (key-attributes) rebuildingOrigin,
                                        natureOfAddress and calledNumberingPlan shall be unique among all
                                        instances of this object class.";;
                        ATTRIBUTES
                                digitRebuildingCriteriaId
                                        GET SET-BY-CREATE,
                                rebuildingOrigin
                                        REPLACE-WITH-DEFAULT
                                        DEFAULT VALUE ASN1TypeModule.defaultRebuildingOrigin
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter,
                                natureOfAddress
                                        GET-REPLACE
                                         "ITU-T Recommendation M.3100":generalErrorParameter,
                                calledNumberingPlan
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter,
                                digitModificationInstance
                                        GET-REPLACE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 12};
```

7.1.13 exception

```
exception MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                exceptionPackage PACKAGE
```

```
                BEHAVIOUR
                        uniquenessConstraintViolationSetBeh,
                exceptionPackageBeh BEHAVIOUR
                        DEFINED AS
                                "See clause 6.13
                                Any particular set-element value of attribute (key-attribute) matchesIf
                                shall be unique among all instances of this object class.";;
                ATTRIBUTES
                        exceptionId
                                GET SET-BY-CREATE,
                        matchesIf
                                GET-REPLACE
                                ADD-REMOVE
                                "ITU-T Recommendation M.3100":generalErrorParameter,
                        treatmentInstance
                                GET-REPLACE;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 13};
```

7.1.14 exceptionCurrentData

```
exceptionCurrentData MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation Q.822":currentData;
        CHARACTERIZED BY
                exceptionCurrentDataPackage PACKAGE
                        BEHAVIOUR
                        exceptionCurrentDataPackageBeh BEHAVIOUR
                                DEFINED AS
                                        "This OC is used to count the number of occurrences of a particular
                                        exception. The value of exceptionCount will be zero at the start of the
                                        granularity period.";;
                        ATTRIBUTES
                                exceptionCount
                                        GET;;;
                REGISTERED AS {managedObjectClass 14};
```

7.1.15 exceptionHistoryData

```
exceptionHistoryData MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation Q.822":historyData;
        CHARACTERIZED BY
                exceptionHistoryDataPackage PACKAGE
                        BEHAVIOUR
                                exceptionHistoryDataPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "This OC is used to store the count of the number of occurrences of a
                                                particular exception";;
                        ATTRIBUTES
                                exceptionCount
                                                GET;;;
        REGISTERED AS {managedObjectClass 15};
```

7.1.16 localDestination

```
localDestination MANAGED OBJECT CLASS
        DERIVED FROM          "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                localDestinationPackage PACKAGE
                        BEHAVIOUR
                                localDestinationPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.16";;
                        ATTRIBUTES
```

```
                localDestinationId
                        GET SET-BY-CREATE,
                nationalDestinationInstance
                        GET
                        SET-BY-CREATE,
                initialSubscriberCodes
                        GET-REPLACE;
        ACTIONS
                modifyNumberingScheme ACTION
                        BEHAVIOUR
                                modifyNumberingSchemeBeh BEHAVIOUR
                                    DEFINED AS
                                "This action operation modifies data of OC localDestination instance and
                                the directory number instances which belong to it. This action does not
                                change the implicit relationship between the directory numbers and the
                                local destination: a directory number that belonged/did not belong to the
                                local destination before the ACTION belongs/does not belong to it after
                                the ACTION is executed on the localDestination instance. To keep this
                                relationship, the initialSubscriberCodes attribute is a SEQUENCE OF i.o.
                                a SET OF value.
                                Information components (see ASN1TypeModule definitions):
                                        newNationalDestInstance:
                                This component describes the value for the new local area code for the
                                localDestination instance. If the excludedSubscriberCodesPackage is
                                present, the members of the excludedSubscriberCodes attribute have to
                                be adapted accordingly in their digit string part, representing the local
                                area code. The local area code related attribute parts of the directory
                                numbers of OC E164DN, which belong to the local destination, have to be
                                updated accordingly.
                                        newInitialSubscriberCodes:
                                This component describes the new value of the attribute
                                initialSubscriberCodes in the addressed object instance of the OC
                                localDestination. The initial subscriber code related attribute parts of the
                                directory numbers of OC E164DN, which belong to the local destination,
                                have to be updated accordingly. The newInitialSubscriberCodes
                                component must contain the same number of elements as the
                                initialSubscriberCodes attribute of the addressed object instance.
                                Reply component:
                                All attribute values of the local destination instance after the execution of
                                the ACTION operation.";;
                        MODE CONFIRMED;
                        WITH INFORMATION SYNTAX
                                        ASN1TypeModule.ModifyNumberingSchemeInfo;
                        WITH REPLY SYNTAX
                                        ASN1TypeModule.ModifyNumberingSchemeReply;
                REGISTERED AS {action 1};;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
    CONDITIONAL PACKAGES
        excludedSubscriberCodesPackage PACKAGE
                ATTRIBUTES
                        excludedSubscriberCodes
                                GET-REPLACE
                                ADD-REMOVE;
                REGISTERED AS {package 26};
PRESENT IF "it is necessary to exclude DNs from the local destination.";
REGISTERED AS {managedObjectClass 16};
```

7.1.17 nationalDestination

```
nationalDestination MANAGED OBJECT CLASS
    DERIVED FROM  "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        nationalDestinationPackage PACKAGE
```

```
                BEHAVIOUR
                        nationalDestinationPackageBeh BEHAVIOUR
                                DEFINED AS
                                "See clause 6.17
                                Value of attribute (key-attribute) nationalDestinationCode shall be unique
                                among all instances of this object class.";;
                ATTRIBUTES
                        nationalDestinationId
                                GET SET-BY-CREATE,
                        nationalDestinationCode
                                GET
                                SET-BY-CREATE;;,
        "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
REGISTERED AS {managedObjectClass 17};
```

7.1.18 postAnalysisEvaluation

```
postAnalysisEvaluation MANAGED OBJECT CLASS
    DERIVED FROM  "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        postAnalysisEvaluationPackage PACKAGE
            BEHAVIOUR
                uniquenessConstraintViolationSetBeh,
        postAnalysisEvaluationPackageBeh BEHAVIOUR
                DEFINED AS
                    "See clause 6.18
                    Value combination of attributes (key-attributes) destinationGroupLabel,
                    callHistoryInstance, routingOrigin, reqBearerCapability,
                    reqSignCapability and callingPartyCategory shall be unique among all
                    instances of this object class.";;
            ATTRIBUTES
                postAnalysisEvaluationId
                    GET SET-BY-CREATE,
                destinationGroupLabel
                    GET-REPLACE
                    "ITU-T Recommendation M.3100":generalErrorParameter,
                callHistoryInstance
                    GET-REPLACE
                    "ITU-T Recommendation M.3100":generalErrorParameter,
                routingOrigin
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ASN1TypeModule.defaultRoutingOrigin
                    GET-REPLACE
                    "ITU-T Recommendation M.3100":generalErrorParameter;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
    CONDITIONAL PACKAGES
        callingPartyCategoryPackage
            PRESENT IF "calling party category has to be evaluated.",
        requiredCapabilitiesPackage PACKAGE
            BEHAVIOUR
                requiredCapabilitiesPackageBeh BEHAVIOUR
                    DEFINED AS
                        "See clause 6.18";;
            ATTRIBUTES
                reqBearerCapability
                    GET-REPLACE
                    "ITU-T Recommendation M.3100":generalErrorParameter,
                reqSignCapability
                    GET-REPLACE
                    "ITU-T Recommendation M.3100":generalErrorParameter;
            REGISTERED AS {package 27};
                PRESENT IF "an instance requires it.",
```

```
            digitModificationInstancePackage
                  PRESENT IF "digit codes modification is needed.",
            trafficDistributionInstancePackage PACKAGE
                  BEHAVIOUR
                        trafficDistributionInstancePackageBeh BEHAVIOUR
                              DEFINED AS
                                    "See clause 6.18";;
                  ATTRIBUTES
                        trafficDistributionInstance
                              GET-REPLACE;
                  REGISTERED AS {package 28};
                        PRESENT IF "activeRoutingPossibilitiesPackage is not instantiated and if this
                        instance of OC postAnalysisEvaluation shall not be referred by any instances of OC
                        trafficDistribution.",
            schedulingAttributePackage PACKAGE
                  BEHAVIOUR
                        schedulingAttributePackageBeh BEHAVIOUR
                              DEFINED AS
                                    "This package is used in the SMO (Scheduled Managed Object) to enable
                                    external scheduling e.g. as with OC timeControlledSelector from
                                    X.746 [14].";;
                  ATTRIBUTES
                        schedulingAttribute
                              GET-REPLACE;
                  REGISTERED AS {package 29};
                        PRESENT IF "external index scheduling is used for the activeRoutingPossibilities
attribute.",
            externalSchedulerPackage
                        PRESENT IF "external scheduling by a SO is supported.",
            activeRoutingPossibilitiesPackage PACKAGE
                  BEHAVIOUR
                        activeRoutingPossibilitiesPackageBeh BEHAVIOUR
                              DEFINED AS
                                    "This attribute contains the value of the instance of OC
                                    routingPossibilities which is applicable (or also treatment instance when
                                    required).";;
                  ATTRIBUTES
                        activeRoutingPossibilities
                              GET;
                  REGISTERED AS {package 30};
                        PRESENT IF "trafficDistributionInstancePackage is not instantiated.",
            replaceActiveRoutingPossibilitiesPackage PACKAGE
                  BEHAVIOUR
                        replaceActiveRoutingPossibilitiesPackageBeh BEHAVIOUR
                              DEFINED AS
                                    "This package allows to perform a REPLACE operation additionally to
                                    the GET operation on the activeRoutingPossibilities attribute, in case the
                                    scheduling packages are not instantiated.";;
                  ATTRIBUTES
                        activeRoutingPossibilities
                              REPLACE;
                  REGISTERED AS {package 31};
                        PRESENT IF "activeRoutingPossibilitiesPackage is instantiated and if scheduling
                        packages are not instantiated.";
REGISTERED AS {managedObjectClass 18};
```

7.1.19 prefixDigitAnalysis

```
prefixDigitAnalysis MANAGED OBJECT CLASS
      DERIVED FROM  "ITU-T Recommendation X.721":top;
      CHARACTERIZED BY
            prefixDigitAnalysisPackage PACKAGE
```

```
                BEHAVIOUR
                        uniquenessConstraintViolationSetBeh,
                        prefixDigitAnalysisPackageBeh BEHAVIOUR
                                DEFINED AS
                                        "See clause 6.19
                                        Value of attribute (key-attribute) prefixCode shall be unique among all
                                        instances of this object class.";;
                ATTRIBUTES
                        prefixDigitAnalysisId
                                GET SET-BY-CREATE,
                        prefixCode
                                GET-REPLACE
                                "ITU-T Recommendation M.3100":generalErrorParameter;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
        CONDITIONAL PACKAGES
                destinationTypePackage
                        PRESENT IF "the destination type has to be derived from the prefixCode.",
                carrierCodePresentPackage PACKAGE
                        BEHAVIOUR
                                carrierCodePresentPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.19";;
                        ATTRIBUTES
                                carrierCodePresent
                                        INITIAL VALUE ASN1TypeModule.initialCarrierCodePresent
                                        GET;
                        REGISTERED AS {package 32};
                                PRESENT IF "the presence of a carrier code in prefixCode has to be indicated.";
REGISTERED AS {managedObjectClass 19};
```

7.1.20 routingPossData

```
routingPossData MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                routingPossDataPackage PACKAGE
                        BEHAVIOUR
                                routingPossDataPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.20";;
                        ATTRIBUTES
                                routingPossDataId
                                        GET SET-BY-CREATE,
                                trafficCategory
                                        DEFAULT VALUE ASN1TypeModule.defaultTrafficCategory
                                        GET-REPLACE,
                                cepsgCombOrCepsgInstance
                                        GET
                                        SET-BY-CREATE;;,
                "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
        CONDITIONAL PACKAGES
                operatorLanguagePackage PACKAGE
                        BEHAVIOUR
                                operatorLanguagePackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "Characterizes the operator language.";;
                        ATTRIBUTES
                                languageDigit
                                        GET
                                        SET-BY-CREATE;
                        REGISTERED AS {package 33};
                                PRESENT IF "signalling system supports it and if it is needed on this routing
                                possibility.",
```

```
            suppressCacPackage PACKAGE
                  ATTRIBUTES
                        suppressCac
                              GET-REPLACE;
                  REGISTERED AS {package 34};
                        PRESENT IF "the option to administer suppression of CAC has to be provided.",
            digitModificationInstancePackage
                        PRESENT IF "digit string modification is needed for the instance of OC
                        routingPossData.";
REGISTERED AS {managedObjectClass 20};
```

7.1.21 routingPossibilities

```
routingPossibilities MANAGED OBJECT CLASS
      DERIVED FROM  "ITU-T Recommendation X.721":top;
      CHARACTERIZED BY
            routingPossibilitiesPackage PACKAGE
                  BEHAVIOUR
                        routingPossibilitiesPackageBeh BEHAVIOUR
                              DEFINED AS
                                    "See clause 6.21

                                    Also note that the values of the possibilitiesInList attribute are
                                    automatically updated to be kept in synchronization with object instances
                                    referenced in the routingPossibilitiesSelection attribute.";;
                  ATTRIBUTES
                        routingPossibilitiesId
                              GET SET-BY-CREATE,
                        routingPossibilitiesSelection
                              GET-REPLACE,
                        possibilitiesInList
                              GET,
                        usedAlgorithm
                              GET-REPLACE;;,
            "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
      CONDITIONAL PACKAGES
            crankbackAdminStatePackage PACKAGE
                  ATTRIBUTES
                        crankbackAdminState
                              REPLACE-WITH-DEFAULT
                              DEFAULT VALUE ASN1TypeModule.defaultCrankbackAdminState
                              GET-REPLACE;
                  NOTIFICATIONS
                        "ITU-T Recommendation X.721":stateChange;
                  REGISTERED AS {package 35};
PRESENT IF "locking-unlocking of crankback is needed.";
REGISTERED AS {managedObjectClass 21};
```

7.1.22 routingPossRestrict

```
routingPossRestrict MANAGED OBJECT CLASS
      DERIVED FROM  "ITU-T Recommendation X.721":top;
      CHARACTERIZED BY
            routingPossRestrictPackage PACKAGE
                  BEHAVIOUR
                        routingPossRestrictPackageBeh BEHAVIOUR
                              DEFINED AS
                                    "See clause 6.22";;
                  ATTRIBUTES
                        routingPossRestrictId
                              GET SET-BY-CREATE;;,
            "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
```

```
        CONDITIONAL PACKAGES
                skipGroupSignal1Package PACKAGE
                        BEHAVIOUR
                                skipGroupSignal1PackageBeh BEHAVIOUR
                                    DEFINED AS
                                      "It is not allowed that a routing possibility is present in different instances of OC
                                      routingPossRestrict contained in the same instance of OC routingPossibilities.";;
                        ATTRIBUTES
                                skipGroupSignal1
                                        GET-REPLACE
                                        ADD-REMOVE;
                        REGISTERED AS {package 36};
PRESENT IF "crankback with one or two signals (see ITU-T E.170 [3]) is supported",
                skipGroupSignal2Package PACKAGE
                        BEHAVIOUR
                                skipGroupSignal2PackageBeh BEHAVIOUR
                                    DEFINED AS
                                        "It is not allowed that a routing possibility is present in different instances of
                                        OC routingPossRestrict contained in the same instance of OC
                                        routingPossibilities.";;
                        ATTRIBUTES
                                skipGroupSignal2
                                        GET-REPLACE
                                        ADD-REMOVE;
                        REGISTERED AS {package 37};
PRESENT IF "crankback with two signals (see ITU-T E.170 [3]) is supported",
                "ITU-T Recommendation M.3100":attributeValueChangeNotificationPackage
                        PRESENT IF "an instance supports it";
REGISTERED AS {managedObjectClass 22};
```

7.1.23 trafficDistribution

```
trafficDistribution MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                trafficDistributionPackage PACKAGE
                        BEHAVIOUR
                                uniquenessConstraintViolationSetBeh,
                                trafficDistributionPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.23.
                                                The number of list elements in attributes trafficDistributionData,
                                                selectedInstances and inputCriteriaDataForAlgorithm has to be identical.
                                                The data with corresponding list positions in these attributes belong
                                                together.
                                                The sum of the percentage values within each of the attributes
                                                trafficDistributionData and inputCriteriaDataForAlgorithm has to be
                                                100%.
                                                The trafficDistributionData attribute is derived from the value of the
                                                inputCriteriaDataForAlgorithm attribute at creation of the instance or
                                                modification of the attribute inputCriteriaDataForAlgorithm.
                                                Modification of the userLabels in the attribute
                                                inputCriteriaDataForAlgorithm triggers an update of userLabel specified
                                                in the attribute trafficDistributionData. It does not trigger an update of
                                                the percentage values contained in the trafficDistributionData
                                                Component of attribute inputCriteriaDataForAlgorithm being:
                                                – out: causes percentage calculation from outgoing circuit subgroup
                                                capacity for the component 'percentage' of attribute
                                                trafficDistributionData;
                                                – perc: causes transfer of percentage value for component 'percentage' of
                                                attribute trafficDistributionData
```

```
                                        – inc: causes transfer of percentage value, periodical recalculation of
                                        percentage values according to the incoming carried traffic on specified
                                        incoming circuit subgroups after defined intervals for component
                                        'percentage' of attribute trafficDistributionData.
                                        The attribute selectedInstances references instances of OC
                                        routingPossibilities or (exclusive or) OC postAnalysisEvaluation (this last
                                        choice is possible, if this instance shall not be referred by any instances of
                                        OC postAnalysisEvaluation). All referenced instances of this attribute
                                        belong to the same OC.

                                        Also note that the values of the possibilitiesInList attribute are automactic
                                        updated to be kept in synchronization with object instances referenced in
                                        the selectedInstances attribute.";;
                ATTRIBUTES
                        trafficDistributionId
                                GET SET-BY-CREATE,
                        inputCriteriaDataForAlgorithm
                                GET-REPLACE,
                        trafficDistributionData
                                GET,
                        selectedInstances
                                GET-REPLACE,
                        possibilitiesInList
                                GET;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
        CONDITIONAL PACKAGES
                destinationGroupLabelPackage PACKAGE
                        BEHAVIOUR
                                destinationGroupLabelPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "Value of attribute (key-attribute) destinationGroupLabel shall be
                                                unique among all instances of this object class.";;
                        ATTRIBUTES
                                destinationGroupLabel
                                        GET-REPLACE
                                        "ITU-T Recommendation M.3100":generalErrorParameter;
                        REGISTERED AS {package 38};
                                PRESENT IF "the relationship 'selects group of'  is used.";
REGISTERED AS {managedObjectClass 23};
```

7.1.24 treatment

```
treatment MANAGED OBJECT CLASS
        DERIVED FROM  "ITU-T Recommendation X.721":top;
        CHARACTERIZED BY
                treatmentPackage PACKAGE
                        BEHAVIOUR
                                treatmentPackageBeh BEHAVIOUR
                                        DEFINED AS
                                                "See clause 6.24";;
                        ATTRIBUTES
                                treatmentId
                                        GET SET-BY-CREATE;;,
                "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
REGISTERED AS {managedObjectClass 24};
```

7.2 Reused packages definitions

7.2.1 callingPartyCategoryPackage

```
callingPartyCategoryPackage PACKAGE
        ATTRIBUTES
                callingPartyCategory
                        REPLACE-WITH-DEFAULT
                        DEFAULT VALUE ASN1TypeModule.defaultCallingPartyCategory
                        GET-REPLACE
                        "ITU-T Recommendation M.3100":generalErrorParameter;
REGISTERED AS {package 39};
```

7.2.2 destinationTypePackage

```
destinationTypePackage PACKAGE
        BEHAVIOUR
                destinationTypePackageBeh BEHAVIOUR
                        DEFINED AS
                                "Characterizes unambiguously the type of destination.";;
        ATTRIBUTES
                destinationType
                        GET
                        SET-BY-CREATE;
REGISTERED AS {package 40};
```

7.2.3 digitModificationInstancePackage

```
digitModificationInstancePackage PACKAGE
                        ATTRIBUTES
                                digitModificationInstance
                                        GET-REPLACE;
                        REGISTERED AS {package 41};
```

7.2.4 externalSchedulerPackage

```
externalSchedulerPackage PACKAGE
        BEHAVIOUR
                externalSchedulerPackageBeh BEHAVIOUR
                        DEFINED AS
                                "This package is used in the SMO (Scheduled Managed Object) for reference to the
                                external SO's.";;
        ATTRIBUTES
          "ITU-T Recommendation X.746":externalSchedulerName
                GET-REPLACE;
REGISTERED AS {package 42};
```

7.3 Attributes definitions

7.3.1 activeDestination

```
activeDestination ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ActiveDestination;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                activeDestinationBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute either references an object instance or selects a group of instances via a
                                label.";;
REGISTERED AS {attribute 1};
```

7.3.2 activeRoutingPossibilities

```
activeRoutingPossibilities ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                activeRoutingPossibilitiesBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC routingPossibilities or of OC treatment.";;
REGISTERED AS {attribute 2};
```

7.3.3 analysisCriteriaId

```
analysisCriteriaId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 3};
```

7.3.4 analysisCriteriaInstance

```
analysisCriteriaInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstanceOrNull;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                analysisCriteriaInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC analysisCriteria.";;
REGISTERED AS {attribute 4};
```

7.3.5 analysisOrigin

```
analysisOrigin ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Origin;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 5};
```

7.3.6 assocSignRouteSetNePart

```
assocSignRouteSetNePart ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstanceOrNull;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                assocSignRouteSetNePartBeh BEHAVIOUR
                        DEFINED AS
                                "Identifies the SS No. 7 signalling resource (ITU-T Recommendation Q.751.1:
                                signRouteSetNePart).";;
REGISTERED AS {attribute 6};
```

7.3.7 boundaryCrossing

```
boundaryCrossing ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.BoundaryCrossing;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                boundaryCrossingBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute indicates whether the circuit end point subgroup contains only circuit
                                end points terminating circuits which cross international or organizational
                                boundaries.";;
REGISTERED AS {attribute 7};
```

7.3.8 calledNumberingPlan

```
calledNumberingPlan ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.CalledNumberingPlan;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 8};
```

7.3.9 callHistoryId

```
callHistoryId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 9};
```

7.3.10 callHistoryInstance

```
callHistoryInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstanceOrNull;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                callHistoryInstanceBeh BEHAVIOUR
                        DEFINED AS
"This attribute points to an instance of OC callHistory.";;
REGISTERED AS {attribute 10};
```

7.3.11 callingPartyCategory

```
callingPartyCategory ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.CallingPartyCategory;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 11};
```

7.3.12 carrierCode

```
carrierCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.CarrierCode;
        MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
        BEHAVIOUR
                carrierCodeBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes the unambiguous carrier specific code used to distinguish
                                from other carriers. It can be dialled by the customer or supplied by the exchange.";;
REGISTERED AS {attribute 12};
```

7.3.13 carrierCodePresent

```
carrierCodePresent ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.CarrierCodePresent;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 13};
```

7.3.14 carrierDataId

```
carrierDataId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 14};
```

7.3.15 carrierDataInstance

```
carrierDataInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
```

```
            carrierDataInstanceBeh BEHAVIOUR
                DEFINED AS
                        "This attribute references an instance of the OC carrierData. It allows the
                        selection of destinations depending on the dialled or assigned carrier code of the
                        call.";;
REGISTERED AS {attribute 15};
```

7.3.16 carrierListId

```
carrierListId ATTRIBUTE
    DERIVED FROM rDNId;
REGISTERED AS {attribute 16};
```

7.3.17 carrierSelectionCriteriaId

```
carrierSelectionCriteriaId ATTRIBUTE
    DERIVED FROM rDNId;
REGISTERED AS {attribute 17};
```

7.3.18 carrierSelectionOrigin

```
carrierSelectionOrigin ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1TypeModule.Origin;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        carrierSelectionOriginBeh BEHAVIOUR
        DEFINED AS
            "This attribute defines the origin information used for carrier selection.  It matches customer
    administration data. See section carrierSelectionCriteria ";;
    REGISTERED AS {attribute 18 };
```

7.3.19 carrierType

```
carrierType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1TypeModule.CarrierType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        carrierTypeBeh BEHAVIOUR
        DEFINED AS
            "This attribute identifies a type of carrier (e.g. local, long distance)";;
        REGISTERED AS {attribute 19 };
```

7.3.20 cepId

```
cepId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 20};
```

7.3.21 cepsgCombId

```
cepsgCombId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 21};
```

7.3.22 cepsgCombListId

```
cepsgCombListId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 22};
```

7.3.23 cepsgCombListSelection

```
cepsgCombListSelection ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SelectionForAlgorithm;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                cepsgCombListSelectionBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute gives a list of instances on which an algorithm is to apply. These
                                instances can be instances of OC routingPossData or of the OC cepsgComb.";;
REGISTERED AS {attribute 23};
```

7.3.24 cepsgCombOrCepsgInstance

```
cepsgCombOrCepsgInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                cepsgCombOrCepsgInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC cepsgComb or to an instance of OC cepsg
                                (beside it remains possible for this attribute to point to other OCs as e.g. test
                                equipment).";;
REGISTERED AS {attribute 24};
```

7.3.25 cepsgCombSelection

```
cepsgCombSelection ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SelectionForAlgorithm;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                cepsgCombSelectionBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute gives a list of instances of OC cepsg on which an algorithm is to
                                apply.";;
REGISTERED AS {attribute 25};
```

7.3.26 cic

```
cic ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Cic;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                cicBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute indicates the circuit identification code (CIC) of a circuit and is
                                applicable for SS No.7.";;
REGISTERED AS {attribute 26};
```

7.3.27 circuitNumber

```
circuitNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.CircuitNumber;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                circuitNumberBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute indicates the logical circuit end point number within the containing
                                circuit end point subgroup.";;
REGISTERED AS {attribute 27};
```

7.3.28 crankbackAdminState

```
crankbackAdminState ATTRIBUTE
        DERIVED FROM  "ITU-T Recommendation X.721":administrativeState;
        BEHAVIOUR
                crankbackAdminStateBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes whether crankback is locked or unlocked.";;
REGISTERED AS {attribute 28};
```

7.3.29 ctpbInstance

```
ctpbInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                ctpbInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC ITU-T Recommendation M.3100:
                                connectionTerminationPointBidirectional which has the channelNumber attribute.  It
                                identifies the transmission resource that supports a given cep.";;
REGISTERED AS {attribute 29};
```

7.3.30 destinationCode

```
destinationCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DestinationCode;
        MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
        BEHAVIOUR
                destinationCodeBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute characterizes a destination of a call by specifying the country code,
                                or/and area code, or/and exchange identifying code, or/and individual line number
                                etc.";;
REGISTERED AS {attribute 30};
```

7.3.31 destinationGroupLabel

```
destinationGroupLabel ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                destinationGroupLabelBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute specifies - via a label - the destination group the instance belongs to";;
REGISTERED AS {attribute 31};
```

7.3.32 destinationType

```
destinationType ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DestinationType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                destinationTypeBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute indicates the type of destination as a named integer value. The
                                destinationType is either derived from the called party number information element
                                (nature of address indicator in ITU-T Q.763 or type of number in ITU-T Q.931) or
                                determined by the prefix digit analysis.";;
REGISTERED AS {attribute 32};
```

7.3.33 digitCombInsert

```
digitCombInsert ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DigitCombInsert;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 33};
```

7.3.34 digitCombReplace

```
digitCombReplace ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DigitCombReplace;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 34};
```

7.3.35 digitModificationId

```
digitModificationId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 35};
```

7.3.36 digitModificationInstance

```
digitModificationInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                digitModificationInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC digitModification.";;
REGISTERED AS {attribute 36};
```

7.3.37 digitPreparationCriteriaId

```
digitPreparationCriteriaId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 37};
```

7.3.38 digitRebuildingCriteriaId

```
digitRebuildingCriteriaId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 38};
```

7.3.39 digitSuppress

```
digitSuppress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DigitSuppress;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 39};
```

7.3.40 echoSuppressor

```
echoSuppressor ATTRIBUTE
        WITH ATTRIBUTE SYNTAX    ASN1TypeModule.YesNo;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 40};
```

7.3.41 exceptionId

```
exceptionId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 41};
```

7.3.42 exceptionCount

```
exceptionCount ATTRIBUTE
        DERIVED FROM  "ITU-T Recommendation X.721":counter;
        BEHAVIOUR
        exceptionCountBeh BEHAVIOUR
                DEFINED AS
                        "This attribute gives the number of times an exception has occurred in the granularity
                        period";;
REGISTERED AS {attribute 42};
```

7.3.43 excludedSubscriberCodes

```
excludedSubscriberCodes ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ExcludedSubscriberCodes;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 43};
```

7.3.44 extSchedulingAttribute

```
extSchedulingAttribute ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ExtSchedulingAttribute;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                extSchedulingAttributeBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute provides the scheduling information in the SMO, for external index
                                scheduling as in ITU-T X.746 (2000) [14] ";;
REGISTERED AS {attribute 44};
```

7.3.45 ignoredDialledCarriers

```
ignoredDialledCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1TypeModule.CarrierList;
        MATCHES FOR    EQUALITY;
        BEHAVIOUR ignoredDialledCarriersBeh BEHAVIOUR
DEFINED AS        "See clause carrierSelectionCriteria.";;
REGISTERED AS {attribute 45};
```

7.3.46 ignoredPreselectedCarriers

```
ignoredPreselectedCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1TypeModule.CarrierList;
        MATCHES FOR    EQUALITY;
        BEHAVIOUR ignoredPreselectedCarriersBeh BEHAVIOUR
DEFINED AS        "See clause carrierSelectionCriteria.";;
REGISTERED AS {attribute 46};
```

7.3.47 interceptedDialledCarriers

```
interceptedDialedCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1TypeModule.CarrierList;
        MATCHES FOR    EQUALITY;
        BEHAVIOUR interceptedDialledCarriersBeh BEHAVIOUR
DEFINED AS        "See Subclass carrierSelectionCriteria.";;
REGISTERED AS {attribute 47};
```

7.3.48 interceptedPreselectedCarriers

```
interceptedPreselectedCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1TypeModule.CarrierList;
        MATCHES FOR    EQUALITY;
        BEHAVIOUR interceptedPreselectedCarriersBeh BEHAVIOUR
```

```
DEFINED AS        "See Subclass carrierSelectionCriteria.";;
REGISTERED AS {attribute 48};
```

7.3.49 initialSubscriberCodes

```
initialSubscriberCodes ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.InitialSubscriberCodes;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 49};
```

7.3.50 inputCriteriaDataForAlgorithm

```
inputCriteriaDataForAlgorithm ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.InputCriteriaDataForAlgorithm;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 50};
```

7.3.51 languageDigit

```
languageDigit ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.LanguageDigit;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                languageDigitBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes the operator language.";;
REGISTERED AS {attribute 51};
```

7.3.52 languageDigitProc

```
languageDigitProc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.YesNo;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                languageDigitProcBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute indicates whether the language digit has to be extracted from the
                                transmitted digit string for incoming calls and has to be included into the transmitted
                                digit string for outgoing calls on the position specified by the signalling systems R2 or
                                C5 for international transit or terminating traffic. The attribute is applicable if the
                                circuit end point subgroup is of type incoming or two-way and one of the above
                                signalling systems is used.";;
REGISTERED AS {attribute 52};
```

7.3.53 listOfCarriers

```
listOfCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1TypeModule.ListOfCarriers;
        MATCHES FOR    EQUALITY, SET-INTERSECTION, SET-COMPARISON;
        BEHAVIOUR listOfCarriersBeh BEHAVIOUR
DEFINED AS        "See clause carrierList.";;
REGISTERED AS {attribute 53};
```

7.3.54 localDestinationId

```
localDestinationId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 54};
```

7.3.55 matchesIf

```
matchesIf ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.MatchesIf;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 55};
```

7.3.56 nationalDestinationCode

```
nationalDestinationCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NationalDestinationCode;
        MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
        BEHAVIOUR
                nationalDestinationCodeBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes the national destination code; its size is limited as described
                                in ITU-T E.164 [2] or any successor document.";;
REGISTERED AS {attribute 56};
```

7.3.57 nationalDestinationId

```
nationalDestinationId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 57};
```

7.3.58 nationalDestinationInstance

```
nationalDestinationInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                nationalDestinationInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute references an instance of OC nationalDestination.";;
REGISTERED AS {attribute 58};
```

7.3.59 natureOfAddress

```
natureOfAddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NatureOfAddress;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 59};
```

7.3.60 numberOfDigits

```
numberOfDigits ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NumberOfDigits;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 60};
```

7.3.61 numberOfSatLinks

```
numberOfSatLinks ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NumberOfSatLinks;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 61};
```

7.3.62 officeEquipment

```
officeEquipment ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.OfficeEquipment;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
```

```
            officeEquipmentBeh BEHAVIOUR
                DEFINED AS
                    "This attribute references the physical equipment the circuit end point is associated
                    with. If the inst choice is used, it references an instance of  OC ITU-T Recommendation
                    M.3100: circuitPack. If the string choice is used, the value is technology specific.";;
REGISTERED AS {attribute 62};
```

7.3.63 originForAnalysis

```
originForAnalysis ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        originForAnalysisBeh BEHAVIOUR
            DEFINED AS
                "This attribute determines the group assigned to the circuit end point subgroup for
                digit analysis purpose.";;
REGISTERED AS {attribute 63};
```

7.3.64 originForPreparation

```
originForPreparation ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        originForPreparationBeh BEHAVIOUR
            DEFINED AS
                "This attribute determines the group assigned to the incoming circuit end point
                subgroup for digit preparation purpose.";;
REGISTERED AS {attribute 64};
```

7.3.65 originForRebuilding

```
originForRebuilding ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        originForRebuidingBeh BEHAVIOUR
            DEFINED AS
                "This attribute determines the group assigned to the circuit end point subgroup for
                digit rebuilding purpose.";;
REGISTERED AS {attribute 65};
```

7.3.66 originForRouting

```
originForRouting ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        originForRoutingBeh BEHAVIOUR
            DEFINED AS
                "This attribute determines the group assigned to the circuit end point subgroup for
                post-analysis evaluation purpose.";;
REGISTERED AS {attribute 66};
```

7.3.67 ownCac

```
ownCac ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.OwnCac;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        ownCacBeh BEHAVIOUR
```

```
                DEFINED AS
                        "This attribute describes whether the carrier access code identifies the network where
                        the exchange is located.";;
REGISTERED AS {attribute 67};
```

7.3.68 possibilitiesInList

```
possibilitiesInList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX    ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
        possibilitesInListBeh BEHAVIOUR
        DEFINED AS
                        "This attribute is used to mirror the contents of complex attributes in order to allow simple
        filtering to determine how target object instances are referenced.";;
REGISTERED AS {attribute 68};
```

7.3.69 postAnalysisEvaluationId

```
postAnalysisEvaluationId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 69};
```

7.3.70 prefixCode

```
prefixCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.PrefixCode;
        MATCHES FOR EQUALITY, SUBSTRINGS;
REGISTERED AS {attribute 70};
```

7.3.71 prefixDigitAnalysisId

```
prefixDigitAnalysisId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 71};
```

7.3.72 prefixDigits

```
prefixDigits ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.PrefixDigits;
        MATCHES FOR EQUALITY, SUBSTRINGS;
        BEHAVIOUR
                prefixDigitsBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute defines the digits which have to be inserted in front of the dialled digits.
                                An empty string means that no digits have to be inserted. The attribute is present if the
                                circuit end point subgroup is of type incoming or two-way.";;
REGISTERED AS {attribute 72};
```

7.3.73 prefTrafficDirect

```
prefTrafficDirect ATTRIBUTE
WITH ATTRIBUTE SYNTAX  ASN1TypeModule.PrefTrafficDirect;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 73};
```

7.3.74 preparationOrigin

```
preparationOrigin ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Origin;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 74};
```

7.3.75 preparationTerm

```
preparationTerm ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Term;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 75};
```

7.3.76 rDNId

```
rDNId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
        MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
        BEHAVIOUR
                                        "ITU-T Recommendation X.721":rDNIdBehaviour;
REGISTERED AS {attribute 76};
```

7.3.77 rebuildingOrigin

```
rebuildingOrigin ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Origin;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 77};
```

7.3.78 reqBearerCapability

```
reqBearerCapability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ReqBearerCapability;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 78};
```

7.3.79 reqSignCapability

```
reqSignCapability ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ReqSignCapability;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 79};
```

7.3.80 routingOrigin

```
routingOrigin ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Origin;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 80};
```

7.3.81 routingPossDataId

```
routingPossDataId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 81};
```

7.3.82 routingPossibilitiesId

```
routingPossibilitiesId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 82};
```

7.3.83 routingPossibilitiesSelection

```
routingPossibilitiesSelection ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SelectionForAlgorithm;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
```

```
        routingPossBeh BEHAVIOUR
            DEFINED AS
                "This attribute gives a list of instances on which an algorithm is to apply. These
                instances can be instances of OC routingPossData or of OC localDestination or
                of OC cepsgComb or of OC cepsg or of OC routingPossibilities. ";;
REGISTERED AS {attribute 83};
```

7.3.84 routingPossRestrictId

```
routingPossRestrictId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 84};
```

7.3.85 schedulingAttribute

```
schedulingAttribute ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SchedulingAttribute;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        schedulingAttributeBeh BEHAVIOUR
            DEFINED AS
                "This attribute provides the scheduling information in the SMO, for external index
                scheduling as in ITU-T X.746 (2000) [14].";;
REGISTERED AS {attribute 85};
```

7.3.86 searchMethod

```
searchMethod ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SearchMethod;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        searchMethodBeh BEHAVIOUR
            DEFINED AS
                "detailed under searchMethod in clause 6.7";;
REGISTERED AS {attribute 86};
```

7.3.87 selectedCarrierType

```
selectedCarrierType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1TypeModule.SelectedCarrierType;
    MATCHES FOR    EQUALITY;
    BEHAVIOUR
        selectedCarrierTypeBeh BEHAVIOUR
            DEFINED AS
                "see clause carrierSelectionCriteria.";;
REGISTERED AS {attribute 87};
```

7.3.88 selectedInstances

```
selectedInstances ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SelectedInstances;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        selectedInstancesBeh BEHAVIOUR
            DEFINED AS
                "This attribute references object instances with an ordered list. Instances are of OC
                routingPossibilities or postAnalysisEvaluation. All referenced instances of this
                attribute belong to the same OC.";;
REGISTERED AS {attribute 88};
```

7.3.89 skipGroupSignal1

```
skipGroupSignal1 ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SkipGroup;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                skipGroupSignal1Beh BEHAVIOUR
                        DEFINED AS
                                "This attribute lists routing possibilities (e.g. routingPossData, cepsg) that have to be
                                skipped if signal1 (refer to ITU-T E.170) arrives from a cepsg reachable via one of
                                these routing possibilities.";;
REGISTERED AS {attribute 89};
```

7.3.90 skipGroupSignal2

```
skipGroupSignal2 ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SkipGroup;
        MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                skipGroupSignal2Beh BEHAVIOUR
                        DEFINED AS
                                "This attribute lists routing possibilities (e.g. routingPossData, cepsg) that have to be
                                skipped if signal2 (refer to ITU-T E.170) arrives from a cepsg reachable via one of
                                these routing possibilities.";;
REGISTERED AS {attribute 90};
```

7.3.91 suppressCac

```
suppressCac ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.SuppressCac;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                suppressCacBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes whether a CAC has to be suppressed or not.";;
REGISTERED AS {attribute 91};
```

7.3.92 suppressOwnCac

```
suppressOwnCac ATTRIBUTE
        DERIVED FROM  suppressCac;
        BEHAVIOUR
                suppressOwnCacBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes whether the network's own CAC has to be suppressed or
                                not.";;
REGISTERED AS {attribute 92};
```

7.3.93 termForPreparation

```
termForPreparation ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                termForPreparationBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute determines the group assigned to the outgoing circuit end point
                                subgroup for digit preparation purpose.";;
REGISTERED AS {attribute 93};
```

7.3.94 trafficCategory

```
trafficCategory ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.TrafficCategory;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                trafficCategoryBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes the traffic category that is assigned to the call. This attribute
                                is not the same as the parameter calling party's category of ITU-T Q.763.
                                The ASN.1 type TrafficCategory comprises the following values:
                                – nationalTraffic: This value is used for traffic that does not cross international
                                boundaries and when no other specific value of the ASN.1 type TrafficCategory is
                                appropriate.
                                – internationalTransitTraffic: This value is used for traffic that crosses international
                                boundaries and when the adjacent exchange serves as international transit exchange
                                for the traffic.
                                – internationalTerminatingTraffic: This value is used for traffic that crosses
                                international boundaries and when the adjacent exchange serves as an international
                                terminating exchange.";;
REGISTERED AS {attribute 94};
```

7.3.95 trafficDistributionData

```
trafficDistributionData ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.TrafficDistributionData;
        MATCHES FOR EQUALITY;
REGISTERED AS {attribute 95};
```

7.3.96 trafficDistributionId

```
trafficDistributionId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 96};
```

7.3.97 trafficDistributionInstance

```
trafficDistributionInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                trafficDistributionInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC trafficDistribution.";;
REGISTERED AS {attribute 97};
```

7.3.98 treatmentId

```
treatmentId ATTRIBUTE
        DERIVED FROM  rDNId;
REGISTERED AS {attribute 98};
```

7.3.99 treatmentInstance

```
treatmentInstance ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ObjectInstance;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                treatmentInstanceBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute points to an instance of OC treatment.";;
REGISTERED AS {attribute 99};
```

7.3.100 usedAlgorithm

```
usedAlgorithm ATTRIBUTE
        WITH ATTRIBUTE SYNTAX  ASN1TypeModule.UsedAlgorithm;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
                usedAlgorithmBeh BEHAVIOUR
                        DEFINED AS
                                "This attribute describes the algorithm used to select a member within a list.";;
REGISTERED AS {attribute 100};
```

7.4 Namebindings

The following behaviour is referenced in Name Bindings that have the possibility of the uniqueness constraint being violated on their creation.

```
uniquenessConstraintViolationCreateBeh  BEHAVIOUR
DEFINED AS
"When System Management protocol attempts to create an instance of a managed object class that violates the
key uniqueness constraint on attribute values specified in clause 6 of this Recommendation, the managed object
shall not be created and the uniquenessConstraintViolation value of the GeneralErrorCasue shall be returned.
When this occurs the relatedObjects value of the M.3100 GeneralError syntax shall indicate the identity of the
managed object instance that would match on the key attribute values.";
```

The following behaviour is referenced in Name Bindings that have the possibility of the still being referenced delete error.

```
stillBeingReferencedDelBeh BEHAVIOUR
DEFINED AS "When System Management protocol attempts to delete an instance of this managed object class
that is still being referenced by one or more other managed object instances, the managed object shall not be
deleted and the stillBeingReference value of the  GeneralErrorCause shall be returned.  When this occurs the
relatedObjects value of the M.3100 GeneralError syntax shall indicate the identifier of the referencing objects";
```

7.4.1 analysisCriteria-managedElement

```
analysisCriteria-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS analysisCriteria
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                analysisCriteriaId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh ,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 1};
```

7.4.2 callHistory-managedElement

```
callHistory-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS callHistory
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                callHistoryId;
```

```
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh ,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
                "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 2};
```

7.4.3 carrierData-managedElement

```
carrierData-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS carrierData
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                carrierDataId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh ,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
                "ITU-T Recommendation M.3100":generalErrorParameter;
REGISTERED AS {nameBinding 3};
```

7.4.4 carrierList-managedElement

```
carrierList-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS carrierList AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS
   "ITU-T Recommendation M.3100":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE carrierListId;
BEHAVIOUR       stillBeingReferencedDelBeh;
  CREATE;
  DELETE "ITU-T Recommendation M.3100":generalErrorParameter;
REGISTERED AS {nameBinding 4};
```

7.4.5 carrierSelectionCriteria-managedElement

```
carrierSelectionCriteria-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS carrierSelectionCriteria AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS
   "ITU-T Recommendation M.3100":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE carrierSelectionCriteriaId;
BEHAVIOUR       uniquenessConstraintViolationCreateBeh;
  CREATE "ITU-T Recommendation M.3100":generalErrorParameter;
  DELETE;
REGISTERED AS {nameBinding 5};
```

7.4.6 cep-cepsg

```
cep-cepsg NAME BINDING
        SUBORDINATE OBJECT CLASS cep
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS
                "ITU-T Recommendation M.3100":circuitEndPointSubgroup
                AND SUBCLASSES;
        WITH ATTRIBUTE
                cepId;
```

```
        BEHAVIOUR uniquenessConstraintViolationCreateBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE ; REGISTERED AS {nameBinding 6};
```

7.4.7 cepsg-managedElement-DelCep

```
cepsg-managedElement-DelCep NAME BINDING
        SUBORDINATE OBJECT CLASS cepsg
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                "ITU-T Recommendation M.3100":circuitEndPointSubgroupId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE DELETES-CONTAINED-OBJECTS
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 7};
```

7.4.8 cepsg-managedElement-NoDelCep

```
cepsg-managedElement-NoDelCep NAME BINDING
        SUBORDINATE OBJECT CLASS cepsg
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                "ITU-T Recommendation M.3100":circuitEndPointSubgroupId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE ONLY-IF-NO-CONTAINED-OBJECTS
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 8};
```

7.4.9 cepsgComb-managedElement

```
cepsgComb-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS cepsgComb
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                cepsgCombId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 9};
```

7.4.10 cepsgCombList-managedElement

```
cepsgCombList-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS cepsgCombList
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                cepsgCombListId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 10};
```

7.4.11 digitModification-managedElement

```
digitModification-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS digitModification
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                digitModificationId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 11};
```

7.4.12 digitPreparationCriteria-managedElement

```
digitPreparationCriteria-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS digitPreparationCriteria
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                digitPreparationCriteriaId;
        BEHAVIOUR uniquenessConstraintViolationCreateBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE ;
REGISTERED AS {nameBinding 12};
```

7.4.13 digitRebuildingCriteria-managedElement

```
digitRebuildingCriteria-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS digitRebuildingCriteria
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                digitRebuildingCriteriaId;
        BEHAVIOUR uniquenessConstraintViolationCreateBeh;
```

```
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE ;
REGISTERED AS {nameBinding 13};
```

7.4.14 exception-managedElement

```
exception-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS exception
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                exceptionId;
        BEHAVIOUR uniquenessConstraintViolationCreateBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE ;
REGISTERED AS {nameBinding 14};
```

7.4.15 exceptionCurrentData-exception

```
exceptionCurrentData-exception NAME BINDING
        SUBORDINATE OBJECT CLASS exceptionCurrentData
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS exception
                AND SUBCLASSES;
        WITH ATTRIBUTE
                "ITU-T Recommendation X.739 | ISO/IEC 10164-11":scannerId;
        CREATE WITH-REFERENCE-OBJECT,
                        WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 15};
```

7.4.16 localDestination-managedElement

```
localDestination-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS localDestination
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                localDestinationId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 16};
```

7.4.17 nationalDestination-managedElement

```
nationalDestination-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS nationalDestination
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
```

```
        WITH ATTRIBUTE
                nationalDestinationId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
                "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 17};
```

7.4.18 postAnalysisEvaluation-managedElement

```
postAnalysisEvaluation-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS postAnalysisEvaluation
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                postAnalysisEvaluationId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 18};
```

7.4.19 prefixDigitAnalysis-managedElement

```
prefixDigitAnalysis-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS prefixDigitAnalysis
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                prefixDigitAnalysisId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE ;
REGISTERED AS {nameBinding 19};
```

7.4.20 routingPossData-managedElement

```
routingPossData-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS routingPossData
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                routingPossDataId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
```

```
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 20};
```

7.4.21 routingPossRestrict-routingPossibilities

```
routingPossRestrict-routingPossibilities NAME BINDING
        SUBORDINATE OBJECT CLASS routingPossRestrict
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS routingPossibilities
                AND SUBCLASSES;
        WITH ATTRIBUTE
                routingPossRestrictId;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE ;
REGISTERED AS {nameBinding 21};
```

7.4.22 routingPossibilities-managedElement

```
routingPossibilities-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS routingPossibilities
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                routingPossibilitiesId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 22};
```

7.4.23 trafficDistribution-managedElement

```
trafficDistribution-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS trafficDistribution
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
        WITH ATTRIBUTE
                trafficDistributionId;
        BEHAVIOUR       uniquenessConstraintViolationCreateBeh,
                        stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING
                "ITU-T Recommendation M.3100":generalErrorParameter;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 23};
```

7.4.24 treatment-managedElement

```
treatment-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS treatment
                AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElement
                AND SUBCLASSES;
```

```
        WITH ATTRIBUTE
                treatmentId;
        BEHAVIOUR       stillBeingReferencedDelBeh;
        CREATE
                WITH-REFERENCE-OBJECT,
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
        "ITU-T Recommendation M.3100":generalErrorParameter ;
REGISTERED AS {nameBinding 24};
```

7.5 ASN.1 type definitions

7.5.1 Rules of extensibility

The following types will be indicated as being extensible:

– ENUMERATED;

– named INTEGER;

– named BIT STRING;

– tagged SET;

– tagged SEQUENCE;

– tagged CHOICE.

Under the rules of extensibility new enumerations (for ENUMERATED types), new bit name assignments (for named BIT STRING types), new named numbers (for named INTEGER types), and new tagged elements (for tagged SET, SEQUENCE, and CHOICE types) may be added in future versions of this Recommendation.

When processing information in a System Management Application Protocol (SMAP) PDU, the accepting SMAP-machine shall ignore:

– enumerations not recognized;

– unrecognized named numbers;

– unrecognized named bits;

– unrecognized tagged elements of sets, sequences, and choices.

7.5.2 ASN.1 type definition module

```
ASN1TypeModule { itu-t recommendation q routing(826) informationModel(0) asn1Modules(2)
asn1DefinedTypesModule(0)}

DEFINITIONS ::=
BEGIN

IMPORTS
ObjectClass, ObjectInstance, Attribute
FROM CMIP-1 {joint-iso-ccitt ms (9) cmip (1) module(0) protocol (3)}
AdministrativeState, UsageState
FROM Attribute-ASN1Module {joint-iso-ccitt ms (9) smi(3) part2(2) asn1Module(2) 1}
NameType, GeneralErrorCause
FROM ASN1DefinedTypesModule {ccitt recommendation m gnm(3100) informationModel(0) asn1Modules(2)
        asn1DefinedTypesModule (0)};

informationModel                OBJECT IDENTIFIER::={ itu-t recommendation q routing(826)
        informationModel(0)}
standardSpecificExtension       OBJECT IDENTIFIER::={informationModel standardSpecificExtension(0)}
routingAdminError               OBJECT IDENTIFIER::={standardSpecificExtension routingAdminError(0)}
managedObjectClass              OBJECT IDENTIFIER::={informationModel managedObjectClass(3)}
package                         OBJECT IDENTIFIER::={informationModel package(4)}
```

```
nameBinding                 OBJECT IDENTIFIER::={informationModel nameBinding(6)}
attribute                   OBJECT IDENTIFIER::={informationModel attribute(7)}
action                      OBJECT IDENTIFIER::={informationModel action(9)}
notification                OBJECT IDENTIFIER::={informationModel notification(10)}

-- default values
defaultAnalysisOrigin            Origin                ::= anyOrigin: NULL
defaultAssocSignRouteSetNePart   ObjectInstanceOrNull  ::= null: NULL
defaultBoundaryCrossing          BoundaryCrossing      ::= national
defaultCallingPartyCategory      CallingPartyCategory  ::= anyCategory: NULL
defaultCrankbackAdminState       AdministrativeState   ::= unlocked
defaultLanguageDigitProc         YesNo                 ::= FALSE
defaultPrefixDigits              PrefixDigits          ::= ""
defaultPreparationOrigin         Origin                ::= anyOrigin: NULL
defaultPreparationTerm           Term                  ::= anyTerm: NULL
defaultRebuildingOrigin          Origin                ::= anyOrigin: NULL
defaultRoutingOrigin             Origin                ::= anyOrigin: NULL
defaultTrafficCategory           TrafficCategory       ::= nationalTraffic

-- initial values
initialCarrierCodePresent        CarrierCodePresent    ::= NULL
initialValueIdle                 UsageState            ::= idle
initialValueOrigin               Origin                ::= anyOrigin: NULL

-- routing administrative errors
stillBeingRefererenced           GeneralErrorCause     ::= globalValue : {routingAdminError (1)}
uniquenessConstraintViolation    GeneralErrorCause     ::= globalValue  : {routingAdminError (2) }

-- ASN.1 Types
ActiveDestination   ::= CHOICE {
                        destination          [0]   ObjectInstance,
                        destinationGroup     [1]   DestinationGroup }

-- Permitted value for cepsg admin state
AdminLockedUnlocked ::= AdministrativeState ( locked | unlocked )

BoundaryCrossing            ::= INTEGER {
        national                                  (0),
        international                             (1)}
CalledNumberingPlan         ::= BIT STRING (SIZE(4))
-- Value according ITU-T Q.763
CallingPartyCategory        ::= CHOICE {
        anyCategory                         [0]   NULL,
        definedCategory                     [1]   BIT STRING(SIZE(8)),
-- Values of 'definedCategory' according ITU-T Q.763
        extendedCategory                    [2]   OBJECT IDENTIFIER}
CarrierCode                 ::= IA5String(FROM("0".."9"|"A".."F"))
CarrierCodePresent          ::= NULL
CarrierList ::= CHOICE{     noList          [0]   NULL,
                            listOfCarriers  [1]   ObjectInstance}
CarrierType::= CHOICE{      objectIdentifier      OBJECT IDENTIFIER,
                            name                  NameType }
Cic                         ::= INTEGER
CircuitNumber               ::= INTEGER
DestinationCode             ::= IA5String(FROM("0".."9"|"A".."F"))
DestinationGroup            ::= SEQUENCE{
        objectClass             [0]   ObjectClass OPTIONAL,
        label                   [1]   NameType}
DestinationType             ::= INTEGER {
        international                       (0),
        national                            (1),
        local                               (2),
        other                               (3) }
```

```
DigitComb                       ::= IA5String(FROM("0".."9"|"A".."F"))
DigitCombInsert                 ::= SET OF SEQUENCE {
        startPosition                   [0]     INTEGER,
        combination                     [1]     DigitComb }
DigitCombReplace                ::= SET OF SEQUENCE {
        startPosition                   [0]     INTEGER,
        endPosition                     [1]     INTEGER,
        combination                     [2]     DigitComb }
DigitSuppress                   ::= SET OF SEQUENCE {
        startPosition                   [0]     INTEGER,
        endPosition                     [1]     INTEGER }
ExcludedSubscriberCodes::= SET OF IA5String(FROM("0".."9"|"A".."F"))
ExtSchedulingAttribute          ::= SET OF SEQUENCE {
        objectOrGroup                   [0]     CHOICE {
                                        destination             [0]     ObjectInstance,
                                        destinationGroup        [1]     DestinationGroup},
        index                           [1]     INTEGER }
IncCepsg                        ::= ObjectInstance
-- instances of OC cepsg for one-way incoming or two-way direction
InitialSubscriberCodes          ::= SEQUENCE OF IA5String(FROM("0".."9"|"A".."F"))
InputCriteriaDataForAlgorithm   ::= CHOICE {
    out   [0]   SEQUENCE OF SEQUENCE {
                        outCepsgs               SET OF OutCepsg,
                        userLabel               GraphicString OPTIONAL},
    perc  [1]   SEQUENCE OF SEQUENCE {
                        percentage              INTEGER(0..100),
                        userLabel               GraphicString OPTIONAL},
    inc   [2]   SEQUENCE OF SEQUENCE {
                        incCarriedCallsQuota    SEQUENCE{
                                                incCepsgs       SET OF IncCepsg,
                                                percentage      INTEGER (0..100)},
                        userLabel               GraphicString OPTIONAL}}
InstanceOrName                  ::= CHOICE {
        objectInstance          [0]     ObjectInstance,
        symbolic                [1]     NameType}
LanguageDigit                   ::= INTEGER {
        french                          (1),
            english                     (2),
            german                      (3),
            russian                     (4),
            spanish                     (5)} (0..15)
-- the number of the language corresponds to the language numbers in the calling party's
-- category field in ITU-T Q.763

ListOfCarriers ::= SET OF CarrierCode

MatchesIf       ::= SET OF CHOICE {
        criteria                [0]     ObjectClass,
            cause               [1]     BIT STRING}
-- causes as defined in ITU-T Q.850
ModifyNumberingSchemeInfo ::= SEQUENCE {
            newNationalDestInstance     [0]     ObjectInstance          OPTIONAL,
            newInitialSubscriberCodes   [1]     InitialSubscriberCodes  OPTIONAL }
ModifyNumberingSchemeReply      ::= SET OF Attribute
NationalDestinationCode ::= IA5String(FROM("0".."9"))
-- size is limited as in ITU-T E.164 [2] or any successor document
NatureOfAddress                 ::= BIT STRING (SIZE(7))
-- Value according ITU-T Q.763
NumberOfDigits                  ::= INTEGER
NumberOfSatLinks                ::= INTEGER
ObjectInstanceOrNull            ::= CHOICE {
            objectInstance          [0]     ObjectInstance,
            null                    [1]     NULL}
```

```
-- Definition similar to PointerOrNull from ITU-T M.3100 [4]
ObjectInstances                         ::= SET OF ObjectInstance
OfficeEquipment   ::= CHOICE {
                  string                [0]   PrintableString,
                  inst                  [1]   ObjectInstance}
Origin            ::= CHOICE {
                  anyOrigin             [0]   NULL,
                  namedOrigin           [1]   NameType,
                  extendedOrigin        [2]   OBJECT IDENTIFIER}
OutCepsg                          ::= ObjectInstance
-- instance of OC cepsg for out/bothway direction
OwnCac                      ::= BOOLEAN
PrefixCode                  ::= IA5String(FROM("0".."9"|"A".."F"|"*"|"#"))
PrefixDigits                ::= IA5String (FROM("0".."9"|"A".."F"))
PrefTrafficDirect           ::= INTEGER {
                  incoming              (1),
                  outgoing              (2),
                  outgoingFirstChoice   (3) }
ReqBearerCapability       ::= INTEGER {
                  speech                (0),
                  r64kbitsUnrestricted  (1),
                  r56kbitsDigitalRestricted (2),
                  r3point1kHzAudio      (3),
                  r7kHzAudio            (4),
                  r64kbitPref           (5) }
ReqSignCapability         ::= INTEGER {
                  isupRequired          (0),
                  isupPreferred         (1),
                  anySignalling         (2) }
SchedulingAttribute         ::= SET OF SEQUENCE {
                  object          [0]   ObjectInstance,
                  index           [1]   INTEGER}
SearchMethod                ::= INTEGER {
      fifoEvenElseLifoOdd                 (0),   -- priority for idle list with even CIC
      fifoOddElseLifoEven                 (1),   -- priority for idle list with odd CIC
      fifoEvenGrpElseLifoOddGrp           (2),   -- priority for idle list with even group CIC
      fifoOddGrpElseLifoEvenGrp           (3),   -- priority for idle list with odd group CIC
      fifo                                (4),   -- FIFO method for idle list
      forwardSequential                   (5),   -- idle circuit with lowest CIC
      backwardSequential                  (6),   -- idle circuit with highest CIC
      forwardOddElseBackwardEven          (7),   -- lowest odd CIC or highest even CIC
      forwardEvenElseBackwardOdd          (8),   -- lowest even CIC or highest odd CIC
      forwardCyclic                       (9),   -- cyclic search ascending order of CICs
      backwardCyclic                      (10),  -- cyclic search descending order of CICs
      random                              (11)}  -- random idle circuit

SelectedCarrierType ::= CHOICE {    networkProviderSelectionMechanism   [0]   NULL,
                                    selectedCarrierType   [1]   CarrierType}

SelectedInstances           ::= SEQUENCE OF CHOICE{
            routingPossibilitiesInstance        [0]   ObjectInstance,
            postAnalysisEvaluationGroup   [1]   DestinationGroup}
SelectionForAlgorithm     ::=
      CHOICE {
            ordered           [0]   SEQUENCE OF ObjectInstance,
            proportional      [1]   SET OF SEQUENCE {
                                    percentage  [0]   INTEGER(0..100),
                                    list        [1]   SEQUENCE OF ObjectInstance}
            }
SkipGroup                               ::= ObjectInstances
-- list of instances of OCs localDestination, routingPossData, cepsgComb, cepsg,
-- routingPossibilities.
SuppressCac                       ::= BOOLEAN
```

```
Term ::= CHOICE {
                anyTerm     [0]     NULL,
                namedTerm   [1]     NameType}
TrafficCategory     ::= INTEGER{
                nationalTraffic                     (0),
                internationalTransitTraffic         (1),
                internationalTerminatingTraffic     (2) }
TrafficDistributionData     ::= SEQUENCE OF SEQUENCE {
                percentage                  [0]     INTEGER(0..100),
                userLabel                   [1]     GraphicString OPTIONAL}

UsedAlgorithm           ::= INTEGER {
                sequential          (0),
                cyclic              (1),
                proportionalBidding (2) }
YesNo                   ::= BOOLEAN
END
```

8 Action service

This Recommendation uses the following descriptive conventions defined in ITU-T Rec. X.210 | ISO/TR 8509.

The following notation is used in the service parameter tables:

M The parameter is mandatory.

C The parameter is conditional. The condition(s) are defined by the text which describes the parameter.

(=) The value of the parameter is identical to the corresponding parameter in the interaction described by the preceding related service primitive.

U The use of the parameter is a service-user option.

– The parameter is not present in the interaction described by the primitive concerned.

P The parameter is subject to the constraints imposed by ITU-T Rec. X.710 | ISO/IEC 9595.

NOTE – The parameters which are marked "P" in service tables of this specification are mapped directly onto the corresponding parameters of the CMIS service primitive, without changing the semantics or syntax of the parameters. The remaining parameters are used to construct an MAPDU.

The modify numbering scheme service allows the number scheme of local destinations and related directory numbers to be changed as defined in clauses localDestination and localDestination. This service uses the CMISE M-ACTION service and procedures as defined in ITU-T X.710 [19]. (See Table 29.)

Table 29/Q.826 – Modify numbering scheme

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Mode	P	–
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Managed object class	–	P
Managed object instance	–	P

Table 29/Q.826 – Modify numbering scheme *(concluded)*

Parameter name	Req/Ind	Rsp/Conf
Access control	P	–
Synchronization	P	–
Action type	M	M(=)
Action information		
New national destination	U	–
New initial subscriber codes	U	–
Action reply		
Attributes	–	M

9 Functional units

The following functional units are defined in this Recommendation:

a) Digit rebuilding functional unit: This functional unit allows a manager to configure the processing of incoming digits before analysis.

b) Carrier selection functional unit: This functional unit allows a manager to configure what type of carrier is selected for a given call and then configure routing based on carrier.

c) Time dependent functional unit: This functional unit allows a manager to control time dependent routing.

d) Destination selection direct functional unit: This functional unit allows a manager to configure routing decision directly based on the dialled number.

e) Destination selection indirect functional unit: This functional unit allows routes to be selected on a more flexible basis.

f) Routing possibilities selection MINIMAL: This functional unit allows a manager to configure routing possibilities.

g) Routing restrictions functional unit: This functional unit allows a manager to configure routing restrictions.

h) Local routing to PBXs functional unit: This functional unit allows a manager to configure additional routing for combinations of circuit end point subgroups.

i) Post analysis evaluation WITHOUT traffic distribution functional unit: This functional unit allows a manger to configure post analysis evaluation.

j) Post analysis evaluation with distribution of traffic functional unit: This functional unit extends the previous one by allowing traffic distribution.

k) Digit preparation functional unit: This functional unit allows a manager to define digit preparation criteria.

l) Exception (ordinary) functional unit: This functional unit allows a manager to configure exception handling.

m) Exception with measurements functional unit: This functional unit extends the previous one and indicates that the agent supports the measurement of exceptions.

n) Prefix digit analysis: This functional unit allows a manager to define how digits are processed before analysis.

o) Prefix digit analysis in support of carrier selection: This functional unit allows a manager to define how digits are processed before they are used as part of the carrier selection process.

p) Routing through combinations of circuit end point subgroups: This functional unit allows a manager to configure routing possibilities by selecting groups of circuit end point subgroups.

In order to ensure interoperability, the manager and the agent have to share at least one common functional unit and a common set of object class.

9.1 Functional units from other Recommendations

Besides the above functional units, this Recommendation also supports the following functional units out of other ITU-T Recommendations:

i) Event report management functional unit (ITU-T X.734).

9.2 Negotiation of functional units

This Recommendation assigns the following object identifier value:

{joint-iso-ccitt ms(9) function Recommendation(0) q(17) q826(826) functionalUnitPackage(1)}

as a value of the ASN.1 type FunctionalUnitPackageId defined in ITU-T X.701 for negotiating the availability of one of the following functional units:

0 Digit rebuilding function unit
1 Carrier selection
2 Time dependent
3 Destination selection direct
4 Destination selection indirect
5 Routing possibilities selection minimal
6 Routing restrictions
7 Local routing to PBXS
8 Post analysis evaluation without traffic distribution
9 Post analysis evaluation with distribution of traffic
10 Digit preparation
11 Exception (ordinary)
12 Exception with measurements
13 Prefix digit analysis
14 Prefix digit analysis in support of carrier selection
15 Routing through combinations of circuit end point subgroups

where the number identifies the bit position in the BIT STRING assigned to the functional units, and the names referencing the functional units.

Within the systems management application context, the mechanism for negotiating the functional units is described by ITU-T X.701.

10 Relationship with other Recommendations

- This Recommendation uses definitions from ITU-T X.721, Definitions of management information.

- This Recommendation uses services defined in ITU-T X.730, Object management function, for the creation and deletion of managed objects, retrieval and update of attributes, the notifications on object creation, object deletion and attribute value changes.
- This Recommendation uses services defined in ITU-T X.731, State management function, for the notification of state changes.
- This Recommendation uses definitions and services from ITU-T X.734, Event report management function.
- This Recommendation uses definitions and services from ITU-T X.746, Scheduling function.
- This Recommendation uses definitions from ITU-T M.3100, Generic network information model.
- This Recommendation uses definitions and services from ITU-T Q.822, Performance management.

11 Conformance

Implementations claiming to conform to this Recommendation shall comply with the conformance requirements as defined in the following clauses.

11.1 Static conformance

The implementation shall conform to the requirements of this Recommendation in the manager role, the agent role, or both roles. An implementation conformance statement shall claim conformance to at least one role when the ICS is available.

Table 30/Q.826

Functional unit	Object classes	Packages and choices
A	cepsg, digitRebuildingCriteria, digitModification	
B	carrierSelectionCriteria, carrierList, carrierData	
C	analysisCriteria must be supported with packages as defined at right	extSchedulingPackage, externalSchedulerPackage
	postAnalysisEvaluation if supported must support packages as defined at right (Note 1)	schedulingAttributePackage externalSchedulerPackage
D	analysisCriteria, routingPossibilities, treatment, localDestination, nationalDestination, trafficDistribution, digitModification	the activeDestination attribute of analysisCriteria must support the destination syntax choice
E	analysisCriteria, trafficDistribution, postAnalysisEvaluation (Note 2)	the activeDestination attribute of analysisCriteria must support the destinationGroup syntax choice
F	routingPossibilities, routingPossData, cepsg, cep, digitModification	
G	routingPossRestrict (Note 3)	
H	localDestination, nationalDestination (Note 4)	
I	postAnalysisEvaluation, callHistory	
J	trafficDistribution (Note 5)	

Table 30/Q.826 *(concluded)*

Functional unit	Object classes	Packages and choices
K	DigitPreparationCriteria, digitModification	
L	exception, treatment	
M	all objects in L and associated currentData and historyData	
N	PrefixDigitAnalysis	
O	prefixDigitAnalysis (Note 6)	
P	cepsgCombList, cepsgComb	
NOTE 1 – In addition a scheduler managed object from ITU-T X.746 must be supported. NOTE 2 – D must also be supported. NOTE 3 – F or H must also be supported. NOTE 4 – F must also be supported. NOTE 5 – I must also be supported. NOTE 6 – B must also be supported.		

To claim conformance in either a manager or an agent role an implementation shall support the following capabilities:

– Functional units D and F.

– Multiple object selection functional unit and filter functional unit of ITU-T X.710 must also be supported to claim conformance.

11.2 Dynamic conformance

This system shall, in the role(s) for which conformance is claimed, support the elements of the procedure defined in:

- ITU-T X.730 for the PT-GET, PT-CREATE, PT-DELETE, PT-SET services.
- ITU-T X.730 for the object creation report, object deletion reporting and attribute value change reporting services if the appropriate object class is supported.
- ITU-T X.731 for the state change report service if the appropriate object class is supported.

APPENDIX I

Object class configuration examples

I.1 Introduction

This appendix illustrates how to use the object classes of the present Recommendation for routing information management. It shows that it is possible to solve one routing scenario with different configurations of object classes and relations between them.

Among all possibilities described in the standard itself, different solutions are shown by means of the E-R diagrams showing only the relevant relations between object classes.

In the scenarios below, instances of object classes are illustrated within exchange 'A'. Only successful cases are considered.

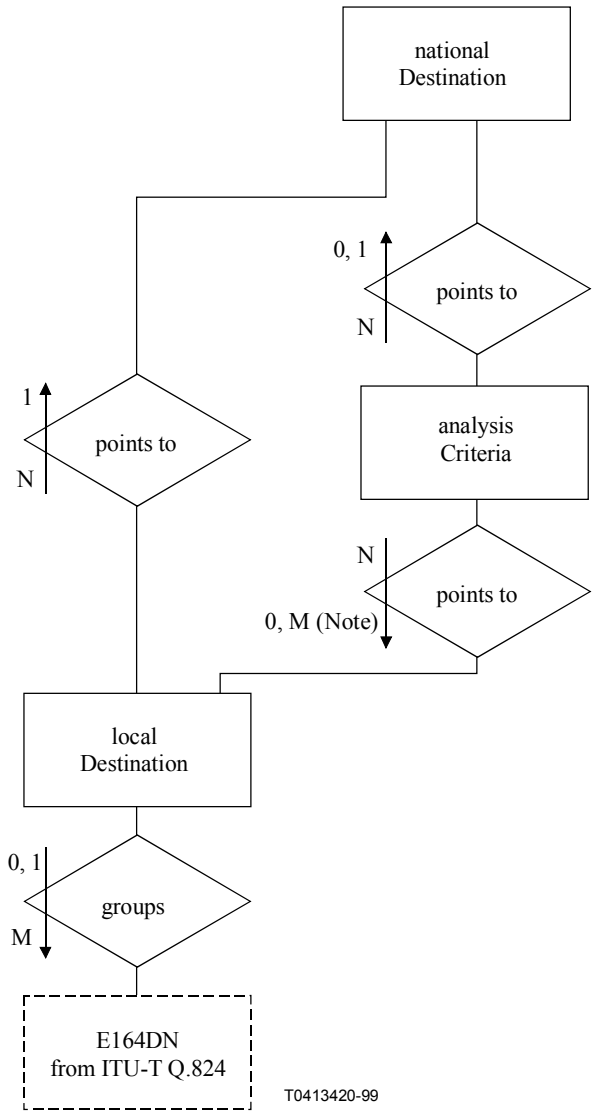
I.2 Scenario 1

Call from a local subscriber to a local subscriber.

I.2.1 First solution

The digit rebuilding fragment, the digit preparation fragment, the routing possibility selection fragment and the exception handling fragment are not needed.

With the help of the OC analysisCriteria the exchange will recognize a local destination. The call will be routed to the local subscriber administration, which analyses the total dialled digit code to identify the corresponding subscriber. See Figure I.1.



NOTE – M-cardinality because of Time scheduling;
Without Time scheduling: M = 1

Figure I.1/Q.826 – E-R Diagram 2 – Destination selection fragment

I.2.2 Second solution

For this scenario, the call from a local subscriber to another local subscriber, only E-R Diagrams 2 and 3 are relevant. See Figures I.2 and I.3.

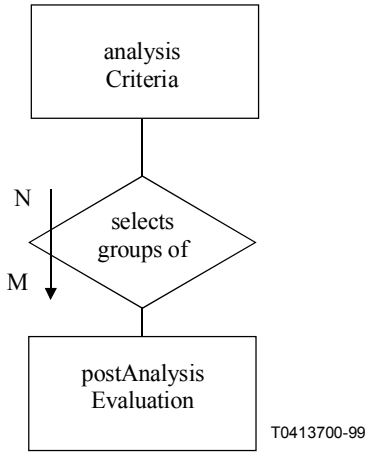


Figure I.2/Q.826 – E-R Diagram 2 – Destination selection fragment

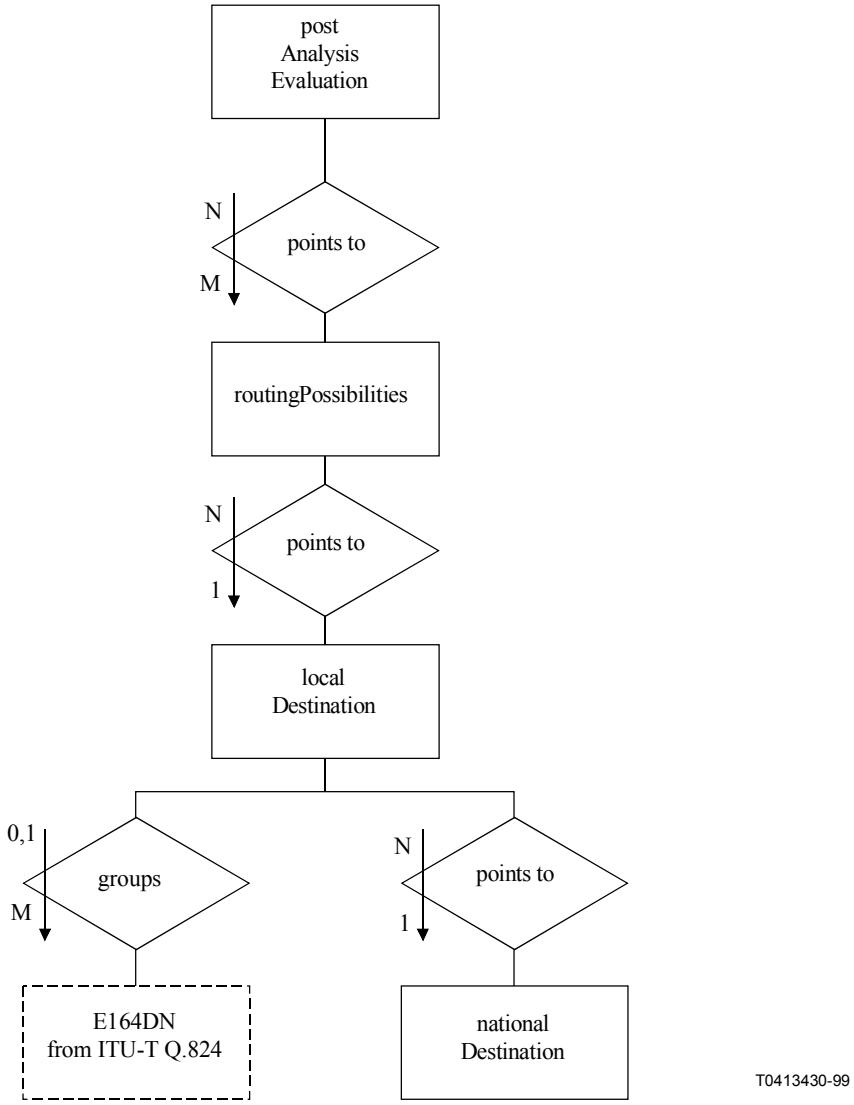


Figure I.3/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.3 Scenario 2

Call incoming exchange "A" via cepsg to be directed to destination (for this example "D") via exchange "B" or via exchange "C". See Figure I.4.

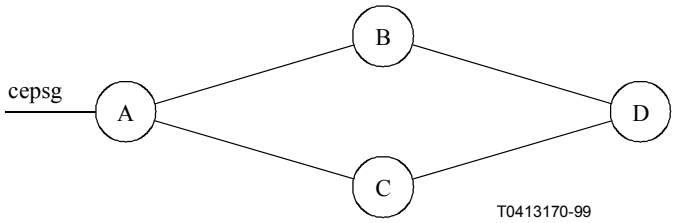


Figure I.4/Q.826

I.3.1 First solution

In the digit rebuilding fragment the called digit code can be modified due to the nature of address of the call set-up request. It is also possible to insert a digit due to the cepsg via which the call set-up request arrives in the exchange. See Figure I.5.

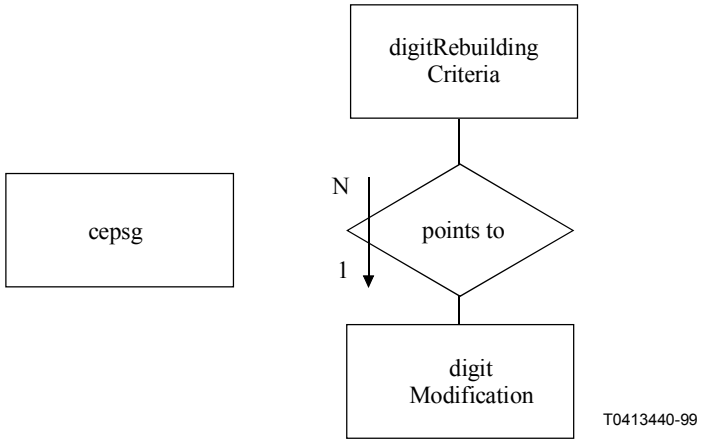


Figure I.5/Q.826 – E-R Diagram 1 – Digit rebuilding fragment

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC postAnalysisEvaluation to evaluate e.g. routing origin and calling party category. See Figure I.6.

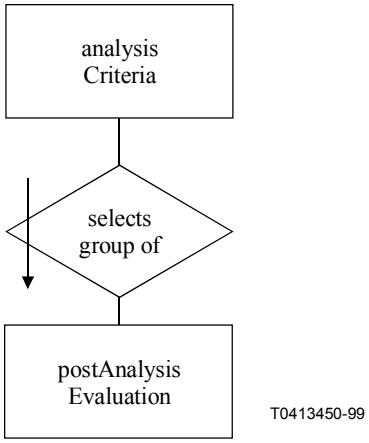


Figure I.6/Q.826 – E-R Diagram 2 – Destination selection fragment

The result of the analysis with the help of the OC postAnalysisEvaluation will be an instance of the OC routingPossibilities, which offers a list of instances either of the OC cepsgCombList or of the OC cepsgComb or of the OC cepsg. Hence, if the first selected instance of the list is not available the remaining instances in the list are to be checked, whether they are available. The process of the routing possibilities selection shall be continued via circuit end point subgroups (OC cepsg) down to the circuit end points (OC cep).

The exchanges B and C can be associated either to two respective instances of OC cepsgCombList or to two respective instances of OC cepsgComb or to two respective instances of OC cepsg. See Figure I.7.

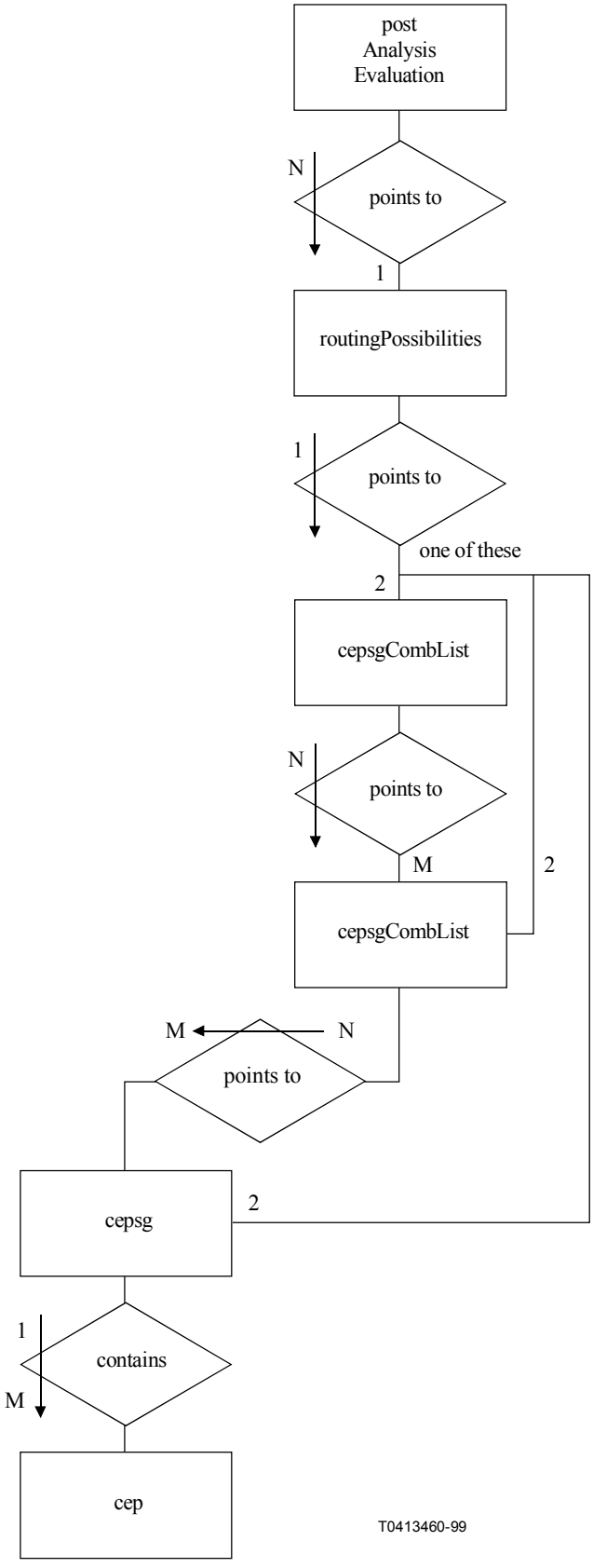


Figure I.7/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

In the digit preparation fragment the called digit code can be modified either due to the incoming and the finally outgoing circuit end point subgroup (OC digitPreparationCriteria) or just after the post analysis evaluation. See Figure I.8.

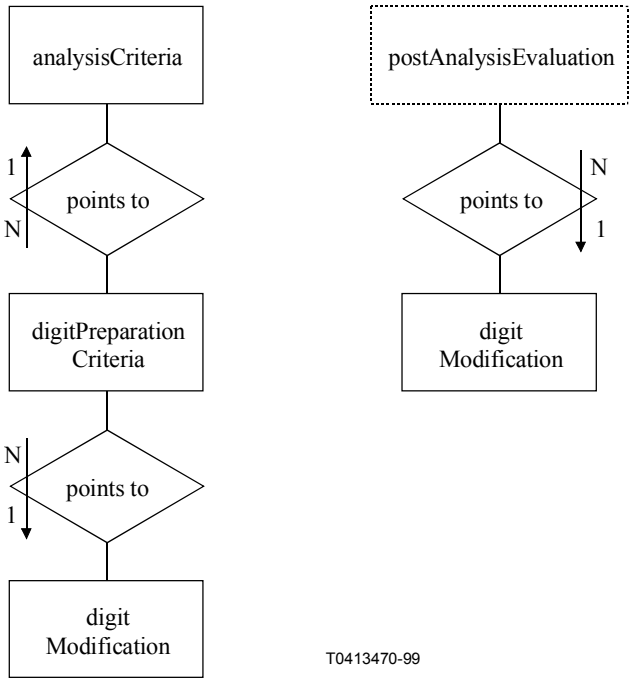


Figure I.8/Q.826 – E-R Diagram 4 – Digit preparation fragment

The exception handling fragment is not needed for a successful call.

I.3.2 Second solution

If no insertion of digits is needed before the digit analysis has to start, then no object class of the "digit rebuilding" fragment has to be administered.

With the help of the OC analysisCriteria, the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC routingPossibilities afterwards, to select a way (routing possibility) to exchange "D" via exchange "B" or exchange "C". See Figure I.9.

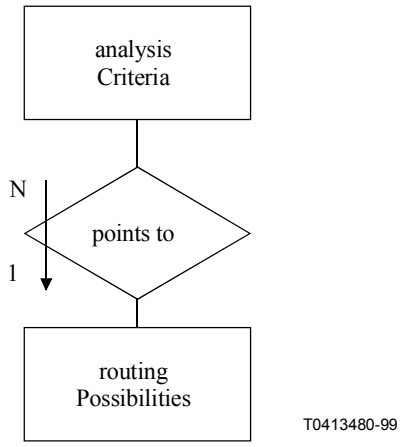


Figure I.9/Q.826 – E-R Diagram 2 – Destination selection fragment

The instance of the OC routingPossibilities determines the sequence of the different routing possibilities from exchange "A" to exchange "D" via exchange "B" or "C". The number of routing possibilities depends on the number of circuit subgroups from exchange "A" to exchange "B" and "C" and whether these circuit subgroups are combined to circuit subgroup clusters or not. If no circuit subgroups are combined to circuit subgroup clusters, then the E-R diagram below can be further simplified. The OC cepsgComb is not required in that case. For every routing possibility an instance of the OC routingPossData provides additional information (e.g. handling of nature of address indicator), if call processing selects this routing possibility. See Figure I.10.

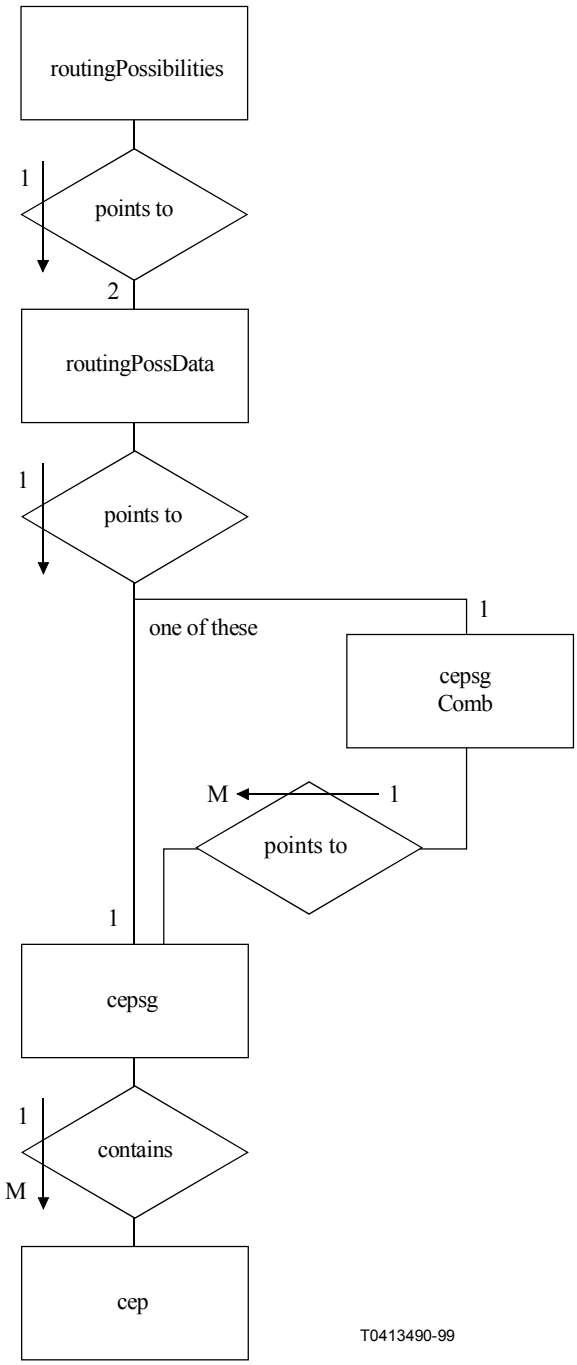


Figure I.10/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

If no modification of the called digits for the next exchange "B" or "C" is required (usual case), then no object class of the digit preparation fragment (E-R Diagram 4) has to be administered.

The "exception handling" fragment (E-R Diagram 5) is not needed for a successful call.

I.3.3 Third solution

E-R Diagram 1 shows that the possibility exists for adding prefix digits in front of the incoming digit string on the incoming circuit subgroup.

E-R Diagram 2 shows that the system always uses a link to OC postAnalysisEvaluation from OC analysisCriteria.

E-R Diagram 3 shows that alternative routes are implemented via a linked-list mechanism that creates a chain of instances of OC routingPossibilities.

E-R Diagram 4 shows that the possibility exists to manipulate the digits that are sent out on the outgoing circuit.

E-R Diagram 5 is not applicable for this scenario.

Figure I.11/Q.826 – E-R Diagram 1 – Digit rebuilding fragment

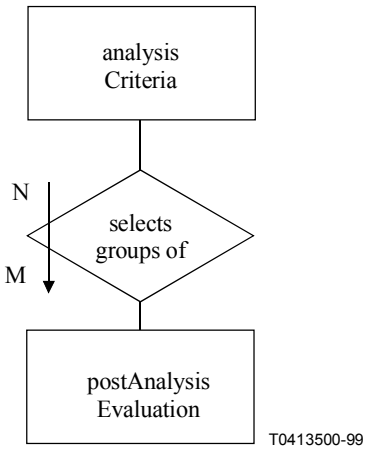


Figure I.12/Q.826 – E-R Diagram 2 – Destination selection fragment

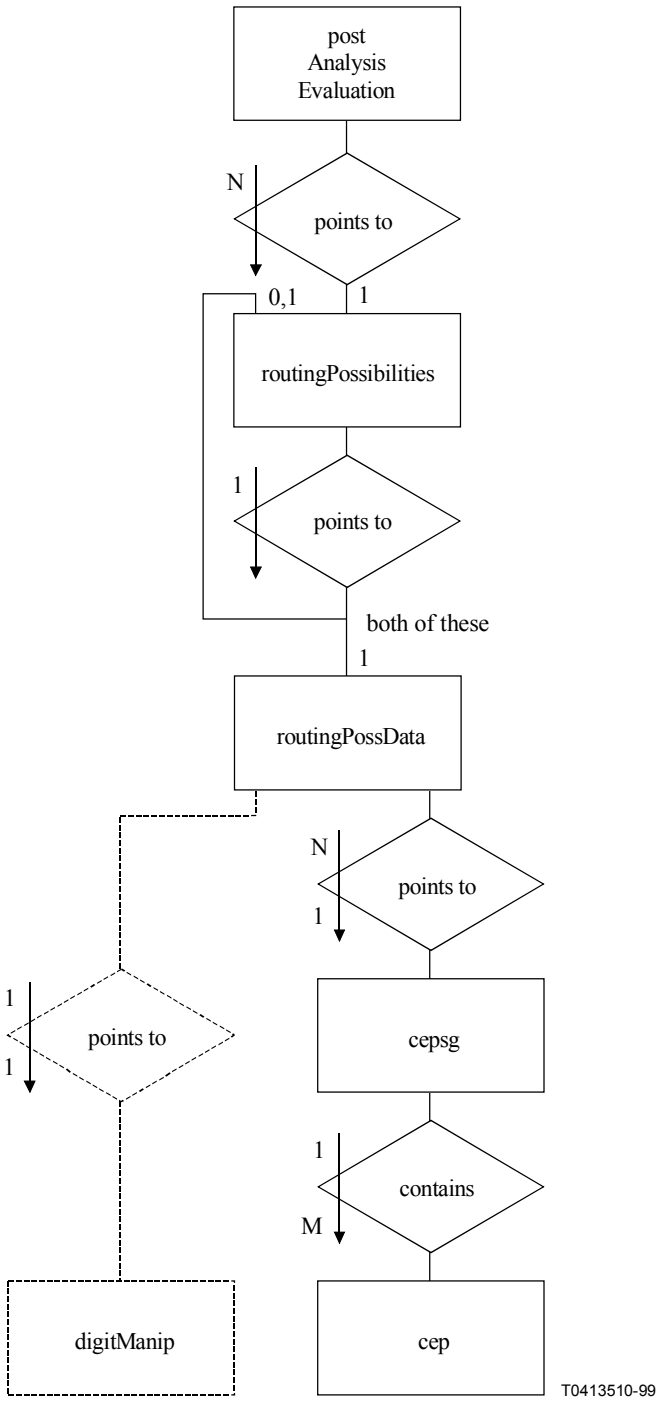


Figure I.13/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

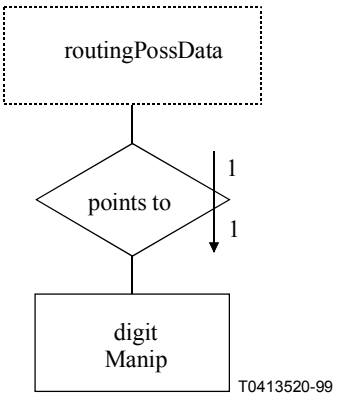


Figure I.14/Q.826 – E-R Diagram 4 – Digit preparation fragment

I.4 Scenario 3

Call incoming via cepsg in exchange "A" to a destination outside this exchange with traffic distribution based on carriers, routingPossibilities selection based on required bearer capability.

I.4.1 First solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to the first solution for scenario 2.

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The next step handles the post analysis evaluation with the help of the OC postAnalysisEvaluation. See Figure I.15.

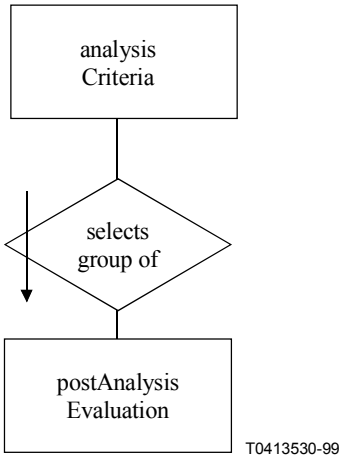


Figure I.15/Q.826 – E-R Diagram 2 – Destination selection fragment

In the routing possibilities selection fragment, the call will, e.g. market dependently be handled first by the OC postAnalysisEvaluation to evaluate routing origin, bearer capability and calling party category and then the traffic distribution to distribute the traffic among different carriers. The remaining steps are the usual routing possibilities selection procedure. See Figure I.16.

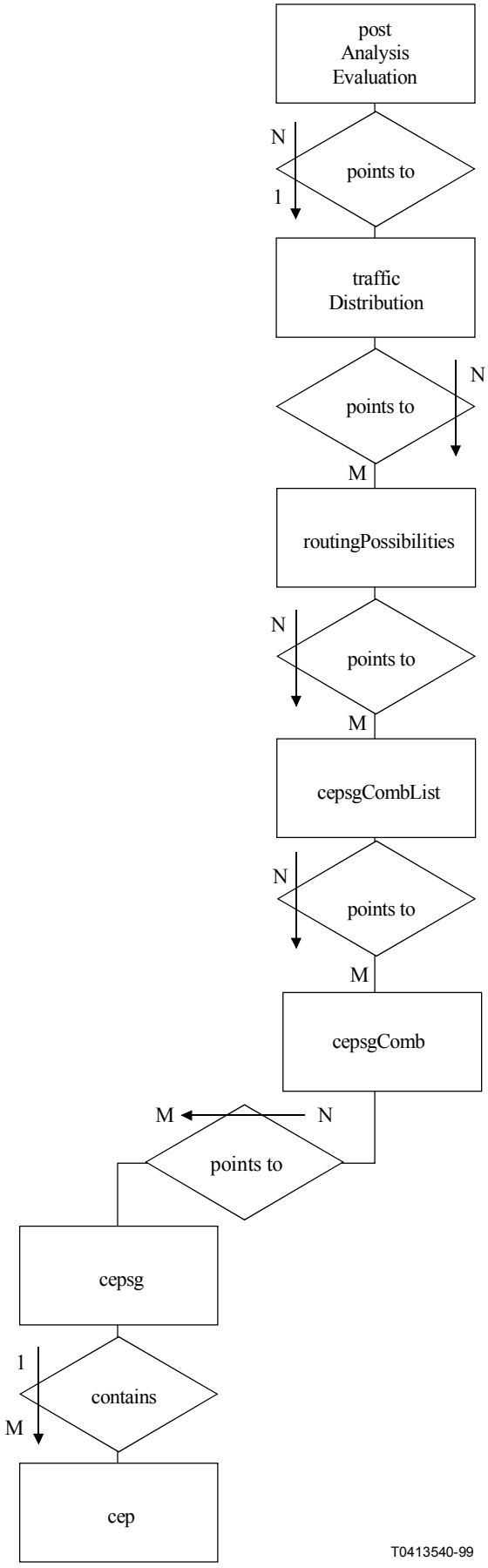


Figure I.16/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.4.2 Second solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to the first solution for scenario 2.

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The next step handles the traffic distribution on carriers by the help of the OC traffic distribution. This choice depends on the market requirements. See Figure I.17.

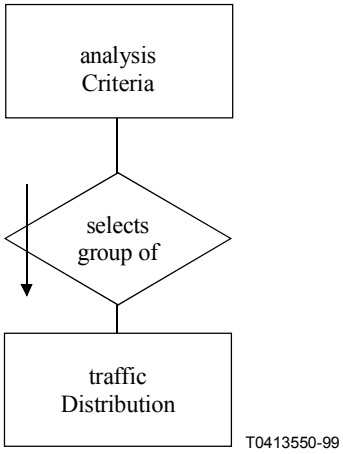


Figure I.17/Q.826 – E-R Diagram 2 – Destination selection fragment

In the Routing Possibilities Selection Fragment, the call will, e.g. market dependently be handled first by the traffic distribution to distribute the traffic among different carriers and then by the OC postAnalysisEvaluation to evaluate routing origin, bearer capability and calling party category. The remaining steps are the usual routing possibilities selection procedure. See Figure I.18.

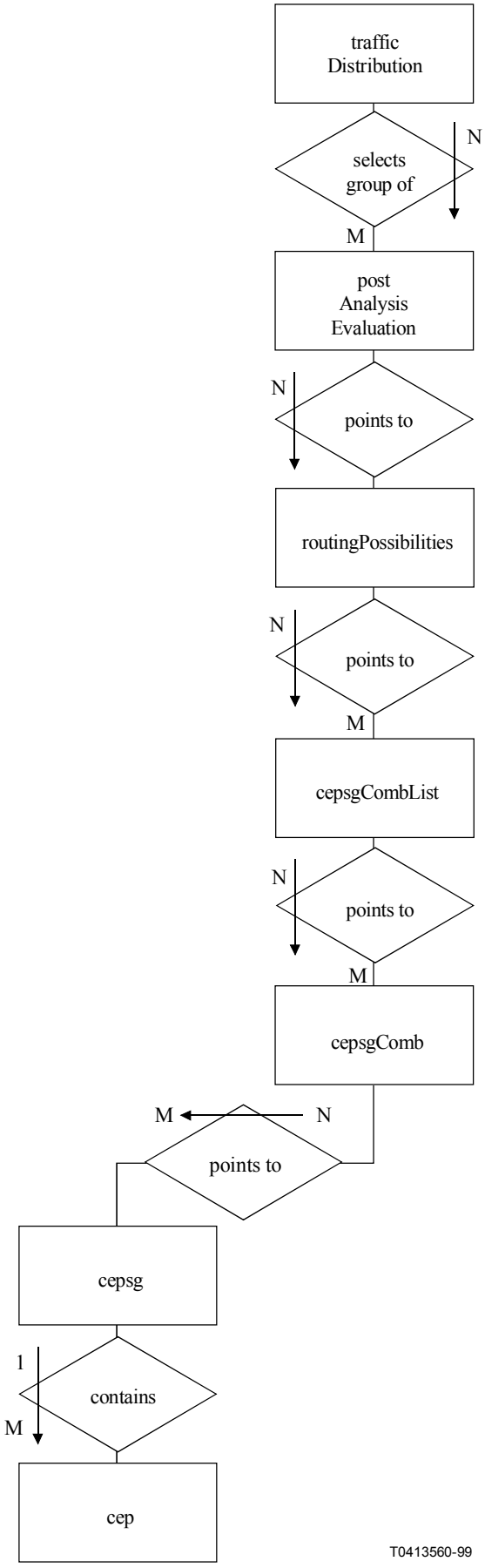


Figure I.18/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.4.3 Third solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to the second solution for scenario 2.

With the help of the object class analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. As a result of the digit analysis, a group of postAnalysisEvaluation instances is preselected. The routing of a call depending on the bearer capability follows in the next step. See Figure I.19.

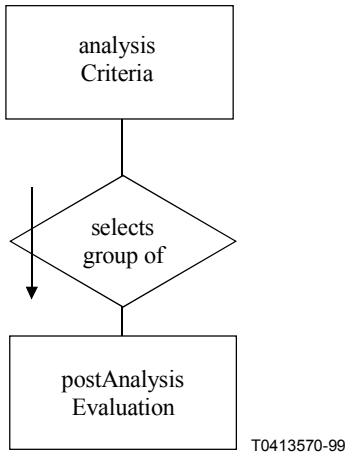


Figure I.19/Q.826 – E-R Diagram 2 – Destination selection fragment

In the Routing Possibility Selection Fragment, the required bearer capability of the call will be used to screen all postAnalysisEvaluation instances, preselected by the Destination Selection Fragment. The postAnalysisEvaluation instance which matches the required bearer capability selects an instance of the OC trafficDistribution. With the help of this instance, the traffic is distributed among different carriers which offer their routingPossibilities. The remaining steps are the usual routing possibilities selection procedures. See Figure I.20.

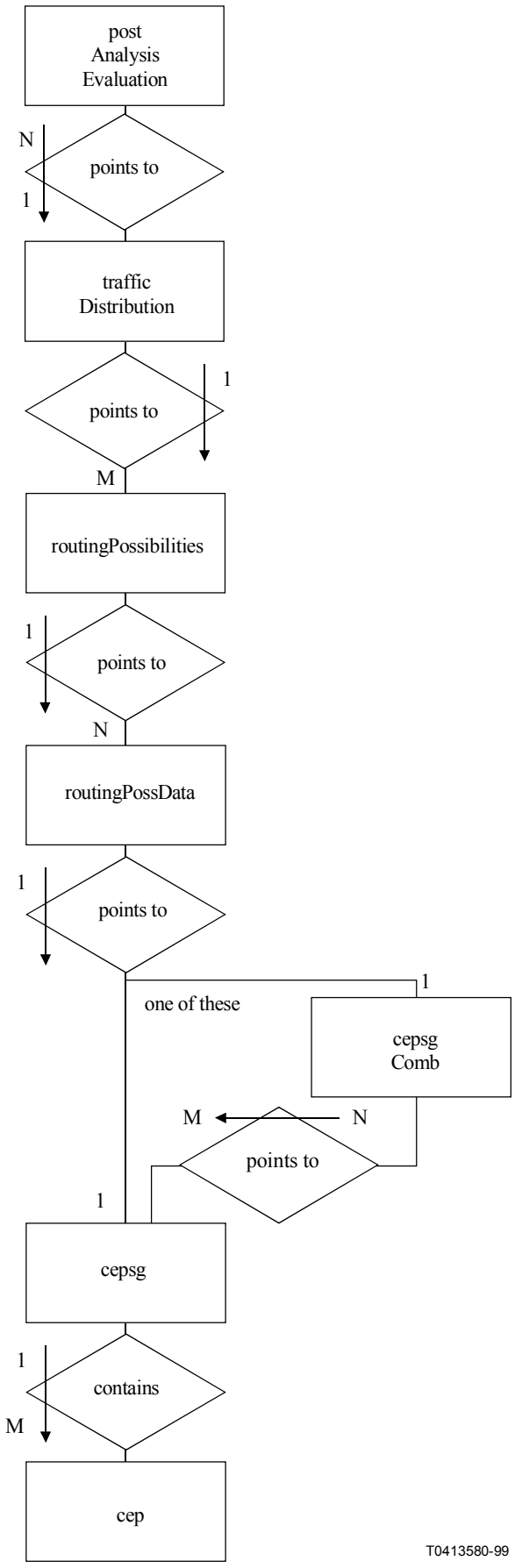


Figure I.20/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.4.4 Fourth solution

The digit rebuilding fragment and digit preparation fragment are not repeated in this example. It works in analogy with solution 3 of scenario 2.

E-R Diagram 2 shows that the system uses a link to OC trafficDistribution from OC analysisCriteria. For this system, proportional bidding is implemented in the same way as traffic distribution based on carriers (see scenario 3).

E-R Diagram 3 shows that alternative routes are implemented via a linked-list mechanism that creates a chain of instances of OC routingPossibilities. The diagram also shows the trafficDistribution that is used for proportional bidding. The overflow mechanism is again implemented via a linked-list of instances of OC routingPossibilities.

E-R Diagram 5 is not applicable to this scenario.

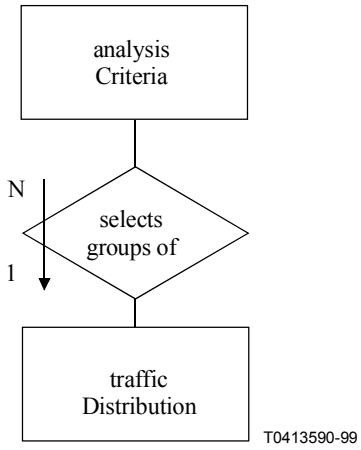


Figure I.21/Q.826 – E-R Diagram 2 – Destination selection fragment

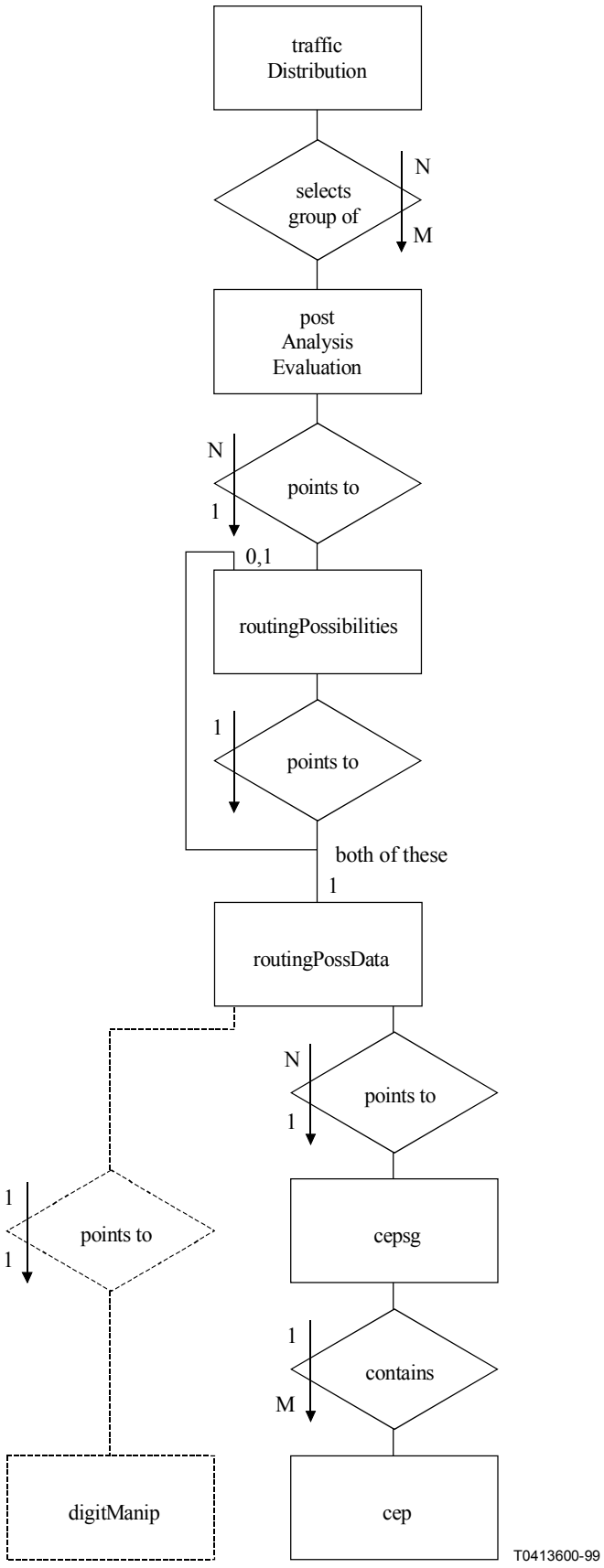
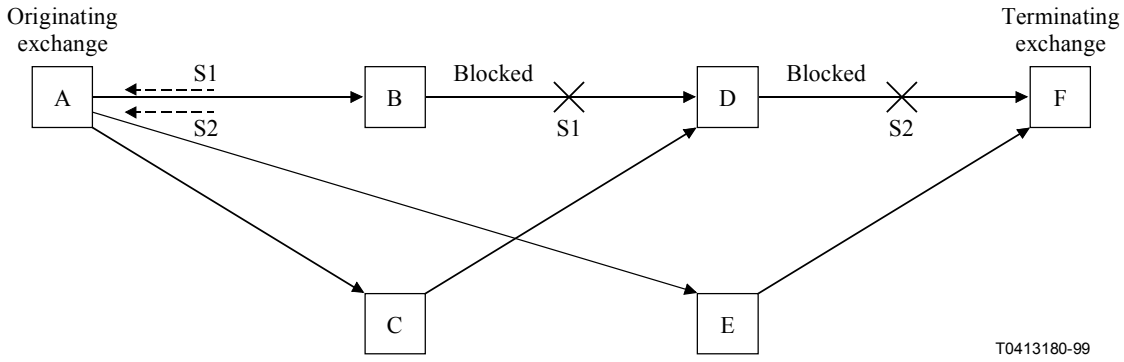


Figure I.22/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.5 Scenario 4

Crankback processing (see Figure I.23 below which corresponds with ITU-T E.170 [3], Figure 4).



NOTE – Blocking from B to D activates signal S1 to A. Blocking from D to F activates signal S2 to A.

Figure I.23/Q.826 – Crankback processing

I.5.1 Solution

The E-R diagrams of the fragments "digit rebuilding", destination selection", "digit preparation" and "exception handling" are not influenced by the requirements of scenario 4.

The OC routingPossibilities determines for exchange "A" the sequence of the selectable routing possibilities from exchange "A" to exchange "F" via the transit exchanges "B", "C", "D" and "E".

According to scenario 4 (Figure I.23), the following sequence can be selected:

Routing possibility 1: "A" ==> "B" (==> "D" ==> "F")

Routing possibility 2: "A" ==> "C" (==> "D" ==> "F")

Routing possibility 3: "A" ==> "E" (==> "F")

The OC routingPossRestrict excludes those routing possibilities of the containing instance of OC routingPossibilities, which may not be used in the rerouting case in exchange "A", if signal S1 or signal S2 is received in exchange "A".

Excluded routing possibilities, if signal S1 is received in exchange "A":

Routing possibility 1: "A" ==> "B" (==> "D" ==> "F")

Excluded routing possibilities, if signal S2 is received in exchange "A":

Routing possibility 1: "A" ==> "B" (==> "D" ==> "F")

Routing possibility 2: "A" ==> "C" (==> "D" ==> "F")

The remaining steps are the usual routing possibilities selection procedures. See Figure I.24.

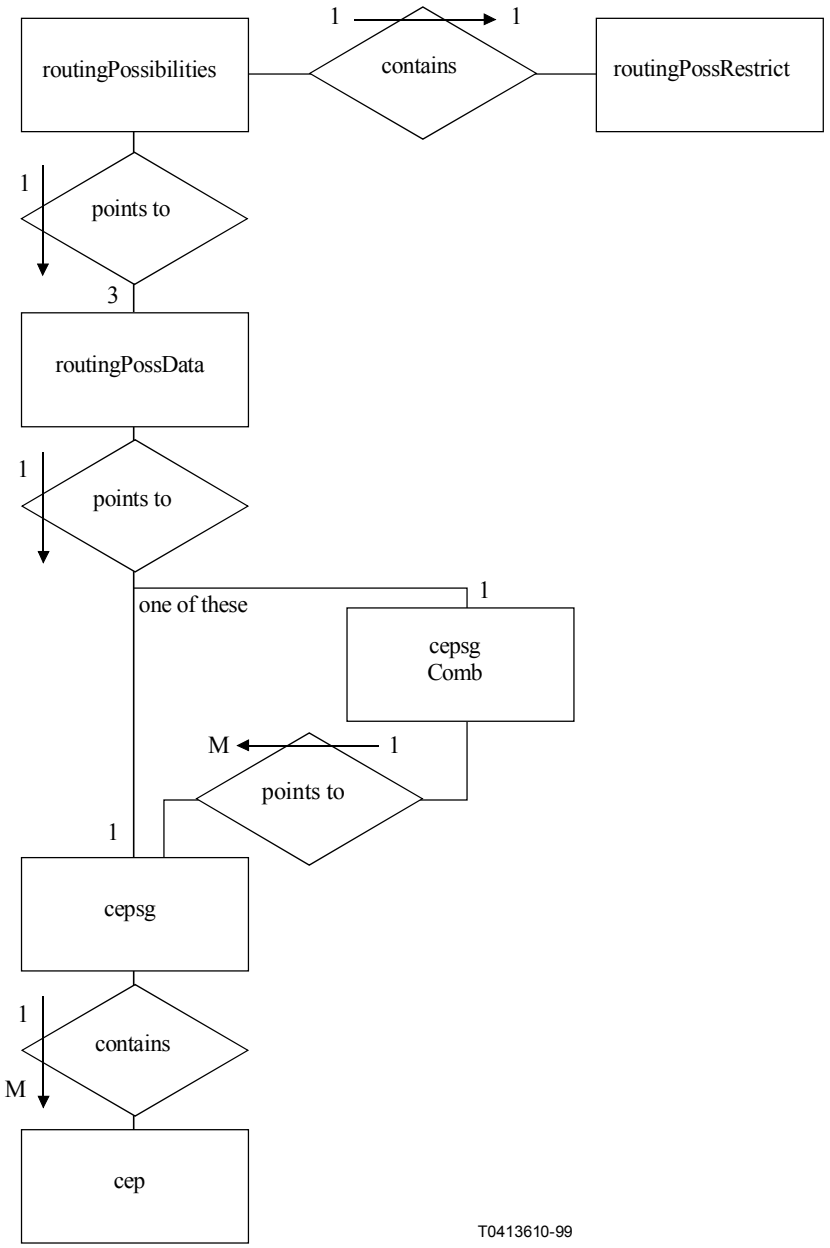


Figure I.24/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.6 Scenario 5

Call incoming exchange "A" via cepsg with, for example, destination "D" with proportional bidding so that 50% of the traffic is diverted via exchange "B" and 50% via exchange "C". See Figure I.25.

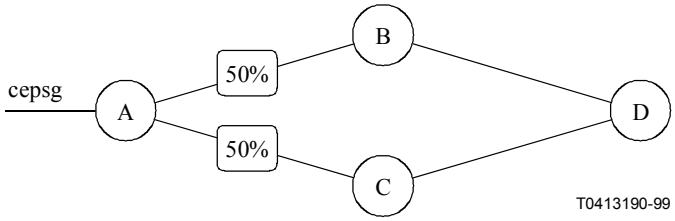


Figure I.25/Q.826

I.6.1 First solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to the first solution for scenario 2.

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC postAnalysisEvaluation to evaluate routing origin and calling party category. See Figure I.26.

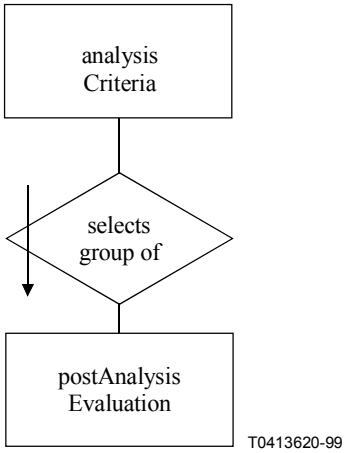


Figure I.26/Q.826 – E-R Diagram 2 – Destination selection fragment

The result of the analysis with the help of the OC postAnalysisEvaluation will be an instance of the OC routingPossibilities. The remaining routing process continues in the usual way. The proportional bidding algorithm can be realized on the level of the OC routingPossibilities, of the OC cepsgCombList or of the OC cepsgComb. See Figure I.27.

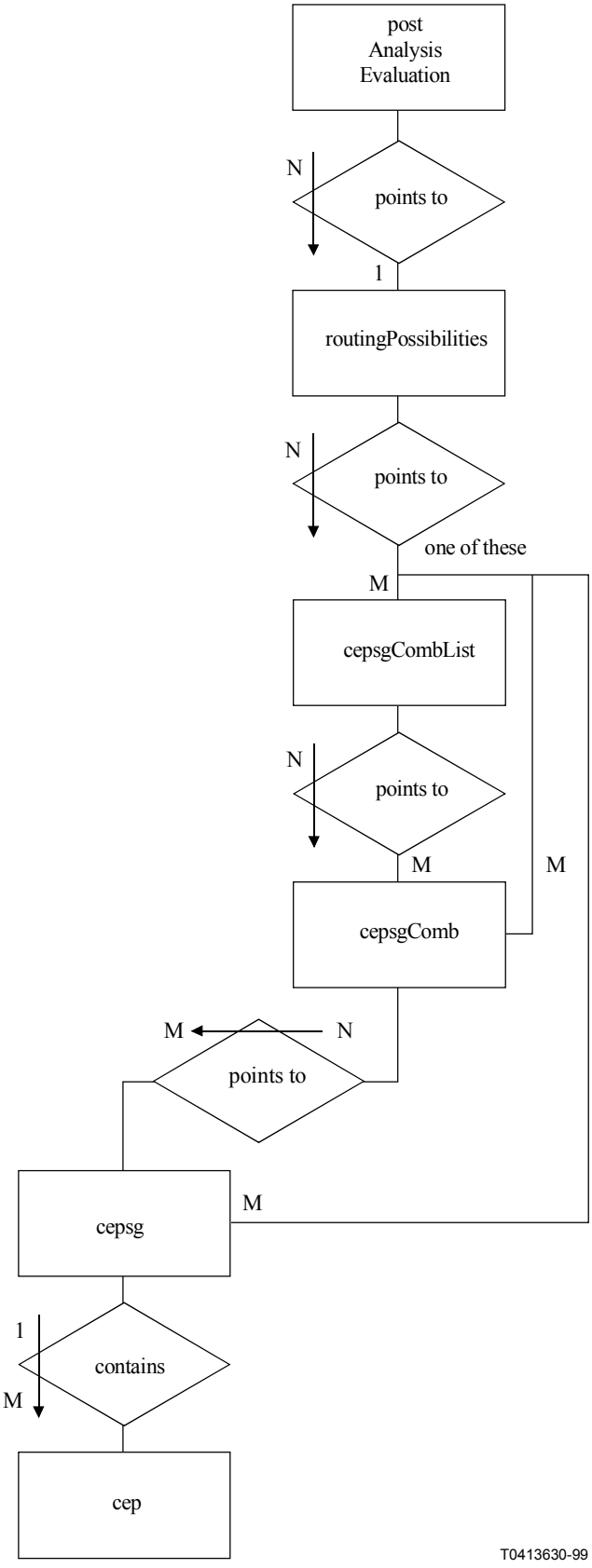


Figure I.27/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.6.2 Second solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to the second solution for scenario 2.

With the help of the object class analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. A result of the analysis is a trafficDistribution instance. See Figure I.28.

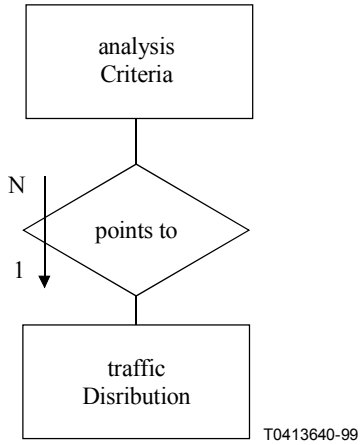


Figure I.28/Q.826 – E-R Diagram 2 – Destination selection fragment

The proportional bidding algorithm will be executed in the OC trafficDistribution. See Figure I.29.

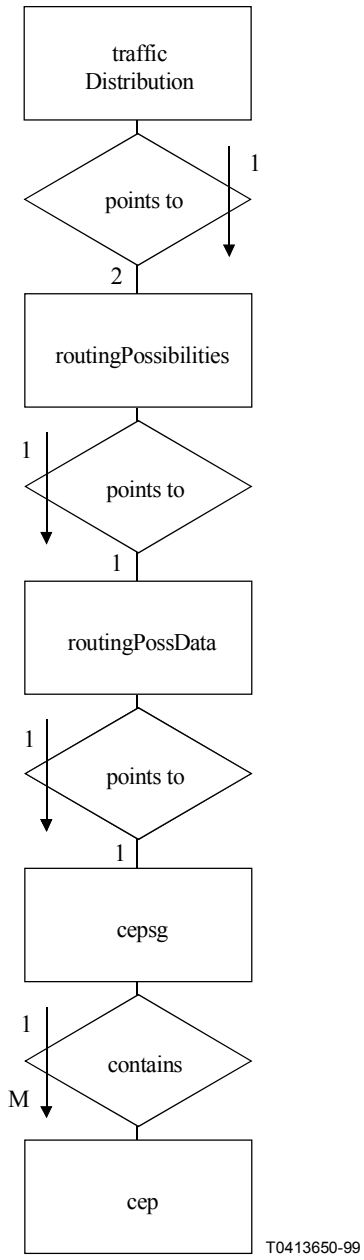


Figure I.29/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.6.3 Third solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to the second solution for scenario 2.

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC routingPossibilities afterwards, to select a way (routing possibility) to exchange "D" via exchange "B" or exchange "C" by 50%. See Figure I.30.

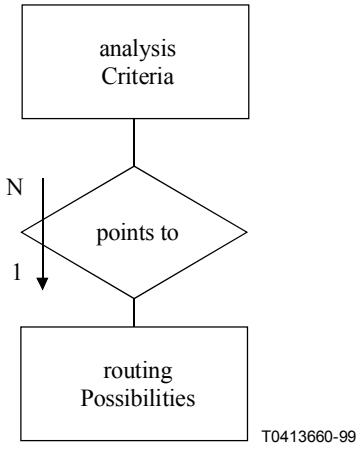


Figure I.30/826 – E-R Diagram 2 – Destination selection fragment

The proportional bidding algorithm will be executed in the OC routingPossibilities. See Figure I.31.

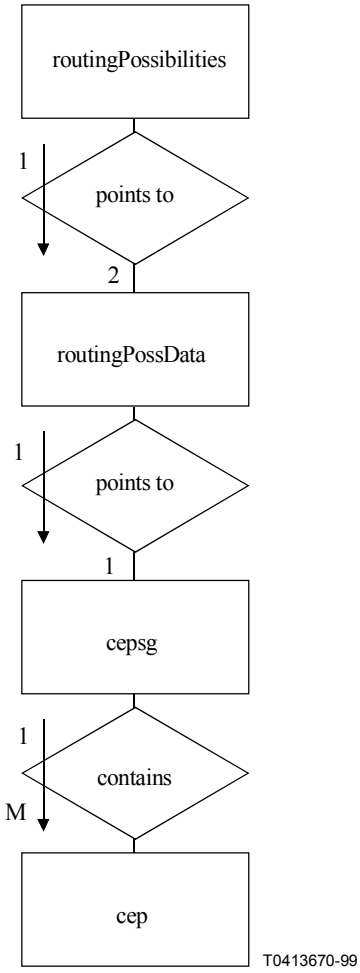


Figure I.31/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

I.6.4 Fourth solution

The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to the second solution for scenario 2.

With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC routingPossibilities afterwards. See Figure I.32.

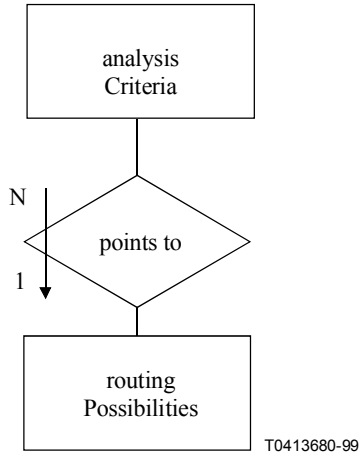


Figure I.32/Q.826 – E-R Diagram 2 – Destination selection fragment

The proportional bidding algorithm will be executed in the OC cepsgComb. See Figure I.33.

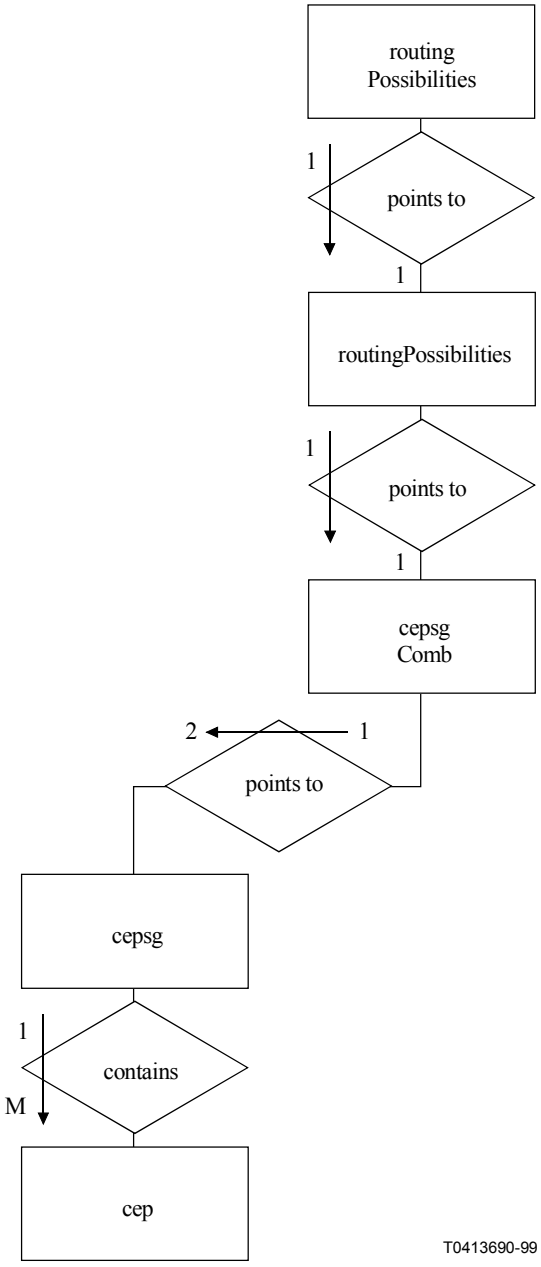


Figure I.33/Q.826 – E-R Diagram 3 – Routing possibility selection fragment

APPENDIX II

Object instance configuration examples

II.1 Introduction

This appendix gives, in a given situation and interpretation, a representation of used object instances with their links.

II.2 Example 1: illustrates bearer capability dependent routing

This example outlines call routing of calls in exchange "A" which originate in exchange "A", "O", "P" or "Q" and terminate in exchange "B", "C" or "D".

Topology as described in Figure II.1:

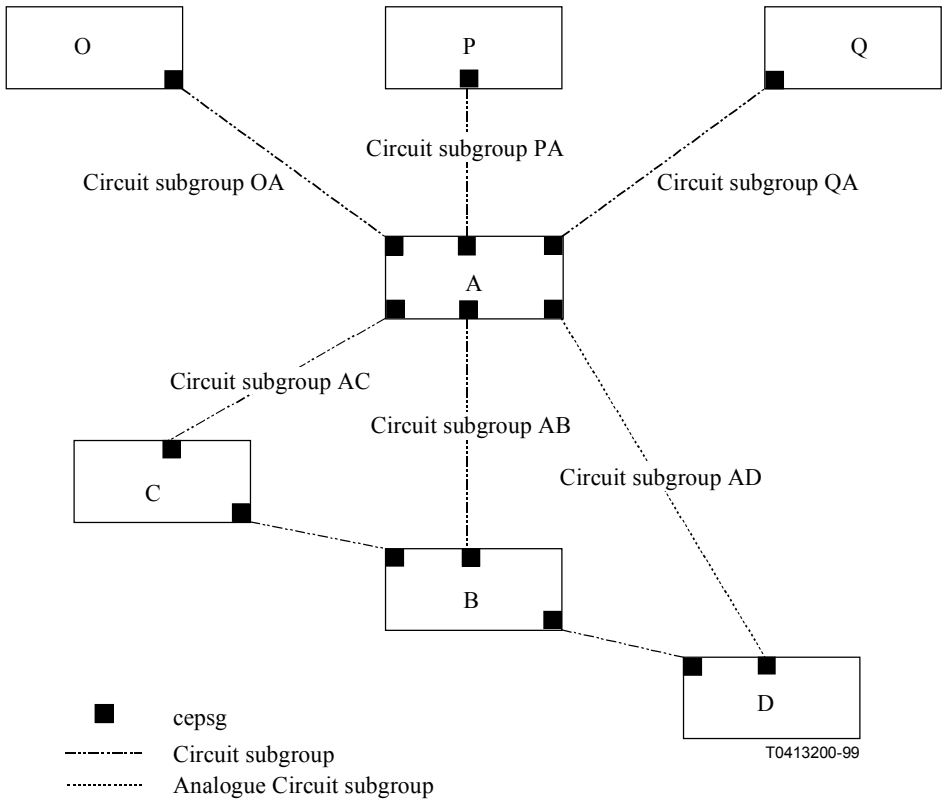


Figure II.1/Q.826 – Bearer capability dependant routing

with assumptions:

1) Circuit subgroups "AC", "AB", "CB", "BD" can support any bearer capability.
2) Circuit subgroup "AD" is an analogue line, only capable of supporting the bearer capability "r3point1kHzAudio" and "speech".
3) Exchange "A" requires special routing to the exchange "D" dependent on the required bearer capability of the call.
4) Routing requirements from the network provider are as follows, see Table II.1:

Table II.1/Q.826 – Routing requirements

Calls from/to	Required Bearer capability	Routed via/to
"A" to "B"		first choice: "AB" second choice: "AC"→"CB"
"A" to "C"		first choice: "AC" second choice: "AB"→"BC"
"A" to "D"	r3point1kHzAudio or speech	first choice: "AD" second choice: "AB"→"BD"
"A" to "D"	r64kbitsUnrestricted	first choice: "AB"→"BD" second choice: "AC"→"CB"→"BD"
"A" to "D"	others than above	announcement

II.2.1 First solution

The system shown here uses the "label" method to link analysisCriteria instances with postAnalysisEvalution instances. Overflow during routing is done with a linked-list mechanism for the routePossibilities instances. See Figure II.2.

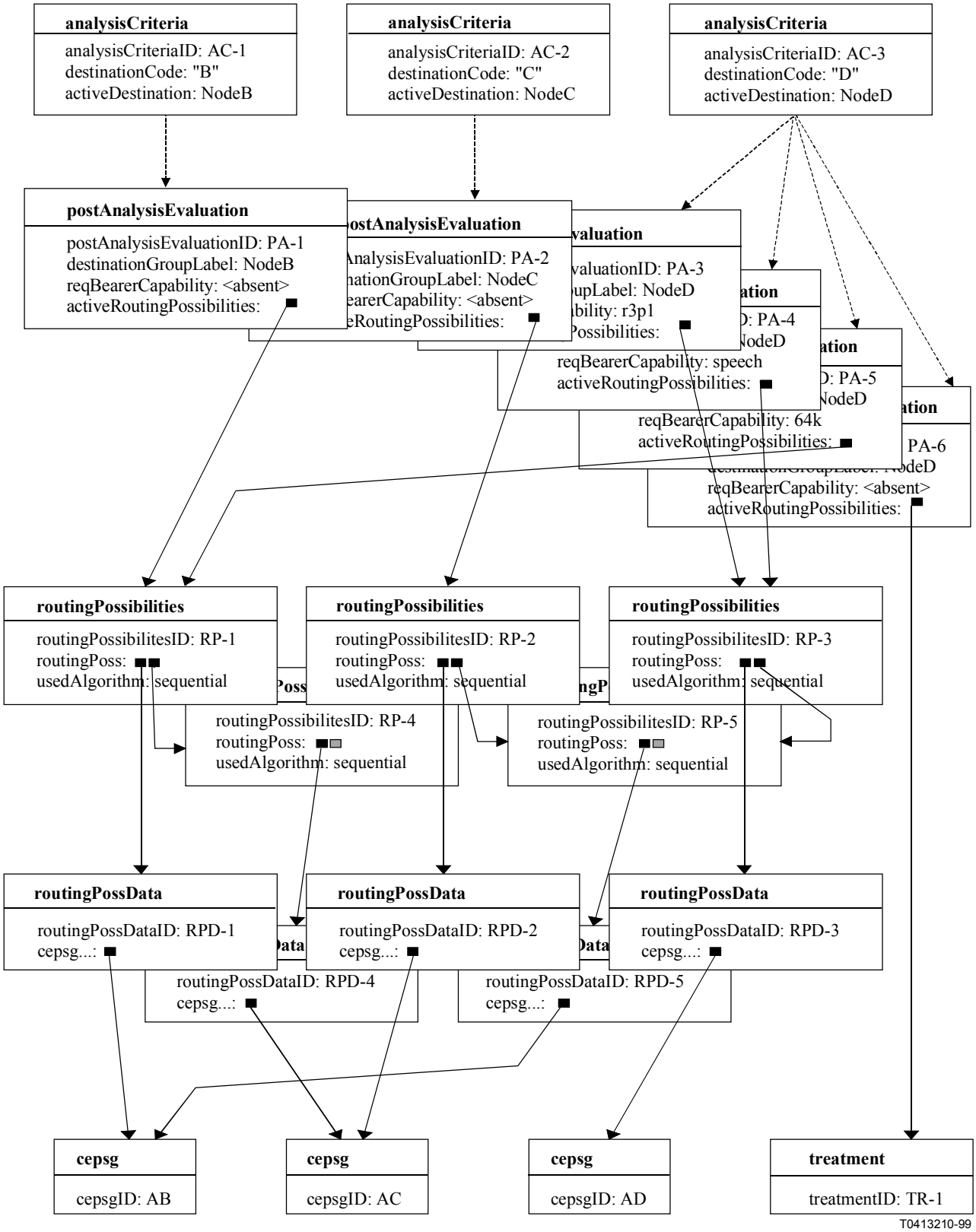


Figure II.2/Q.826

II.2.2 Second solution

The representation shown here uses the "label" method to link analysisCriteria instances with postAnalysisEvaluation instances where the bearer capability shall be evaluated and the "pointer" method to link analysisCriteria instances with routingPossibilities instances when it is not. The postAnalysisEvaluation instances provide the selection of a suitable routing possibility list (OC routingPossibilities) according to the required and available bearer capability. Overflow during routing is done by defining all applicable routing possibilities within one routingPossibilities instance. See Figure II.3.

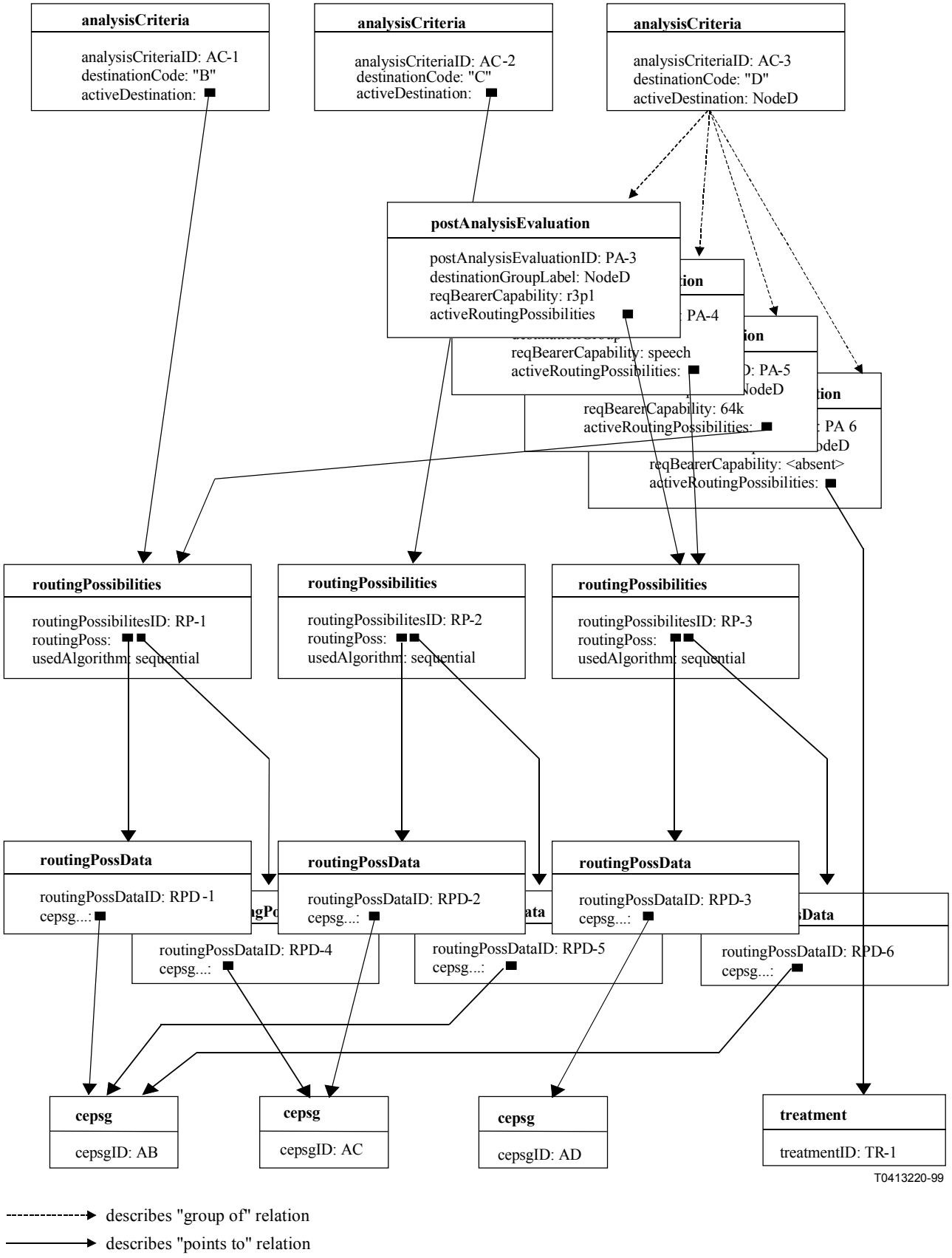


Figure II.3/Q.826

II.2.3 Third solution

See Figure II.4.

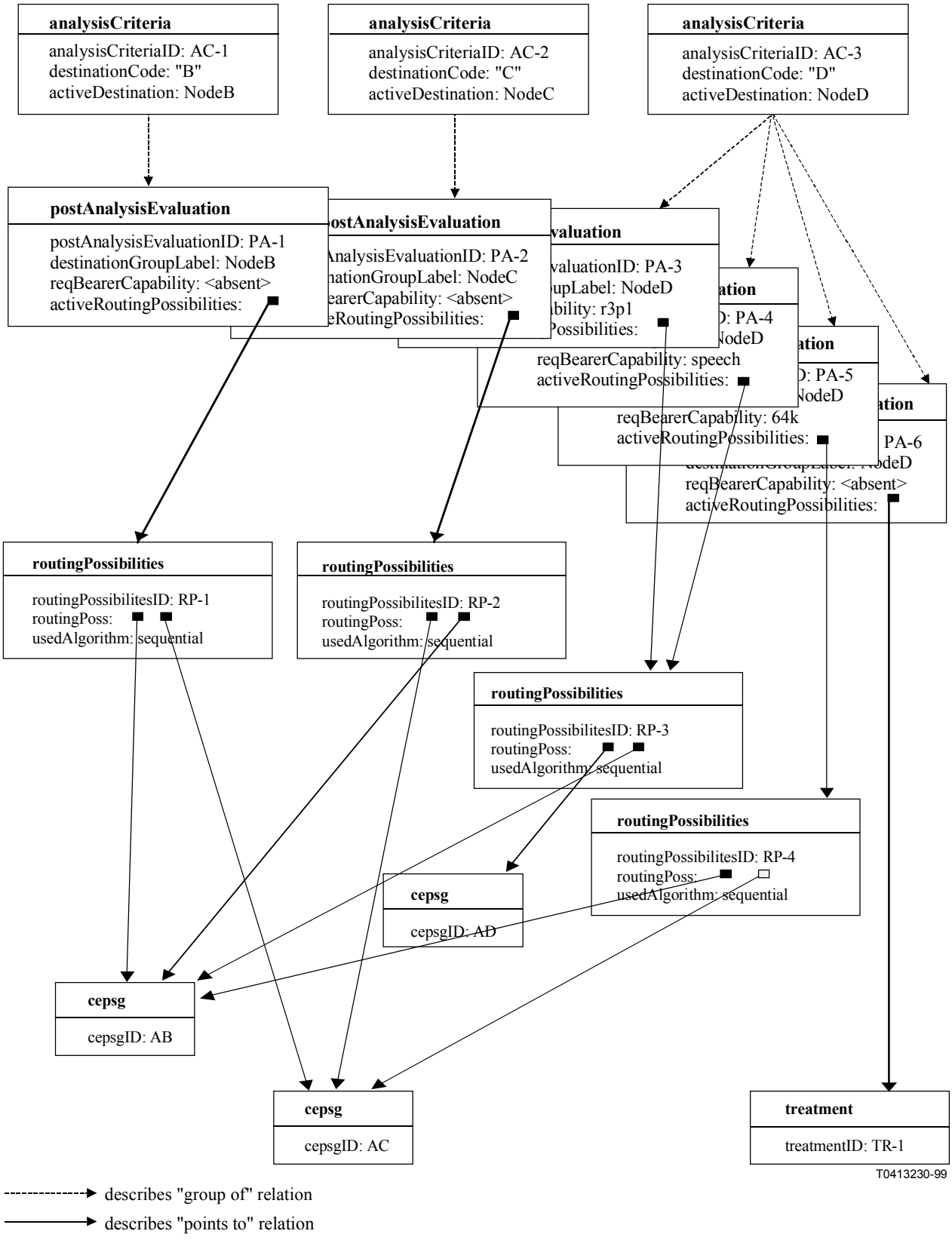


Figure II.4/Q.826

Supposed that exchange D is reached with the bearer capability 64 kbit/s unrestricted, then the following instances are concerned in exchange A.

When the digit string arrives in exchange A, then one instance of the Object Class analysisCriteria can be found matching this string. The value of the attribute activeDestination of this instance identifies a group of instances of the OC postAnalysisEvaluation.

The instances of this group differ from each other by different values of the attribute reqBearerCapability. The bearer capability 64 kbit/s matches on the instance with the identifier PA-5. The instance PA-5 of the OC postAnalysisEvaluation points to the instance RP-4 of the OC routingPossibilities, which says that the selection algorithm on the routing possibilities listed in the attribute routingPoss shall be sequential with fixed start.

II.3 Example 2: illustrates origin dependent routing

Topology as described in Figure II.5:

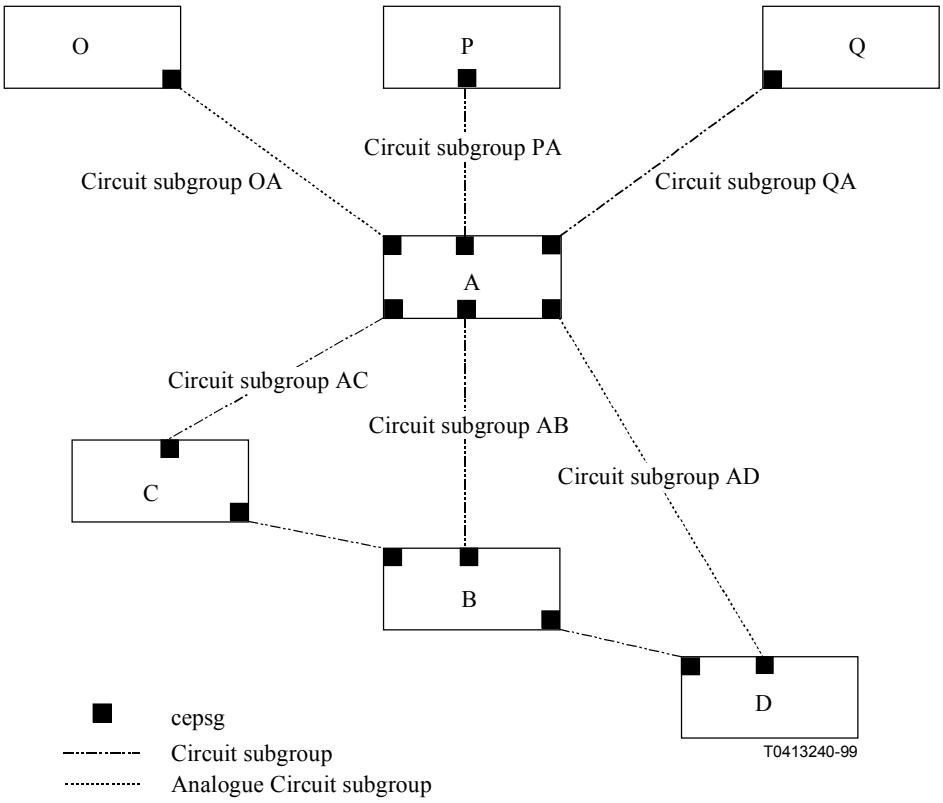


Figure II.5/Q.826 – Origin dependent routing

with assumptions:

1) Circuit subgroup "OA" is an analogue line, only capable of supporting the required bearer capability "r3point1kHzAudio" or "speech".
2) Circuit subgroup "AD" is an analogue line, only capable of supporting the required bearer capability "r3point1kHzAudio" or "speech".
3) All other subgroups support all bearer capabilities.
4) Bearer capability supported by incoming or outgoing cepsg result in the following routing requirements. See Table II.2.

Table II.2/Q.826 – Routing requirements

Calls from/to	Routed via/to
"O" to "B"	first choice: "AB" second choice: "AD"→"DB"
"O" to "C"	first choice: "AC" second choice: "AB"→"BC"
"O" to "D"	first choice: "AD" second choice: "AB"→"BD"
"P","Q" to "B"	first choice: "AB" second choice: "AC"→"CB"
"P","Q" to "C"	first choice: "AC" second choice: "AB"→"BC"
"P","Q" to "D"	first choice: "AB"→"BD" second choice: "AC"→"CD"

II.3.1 First solution

See Figure II.6.

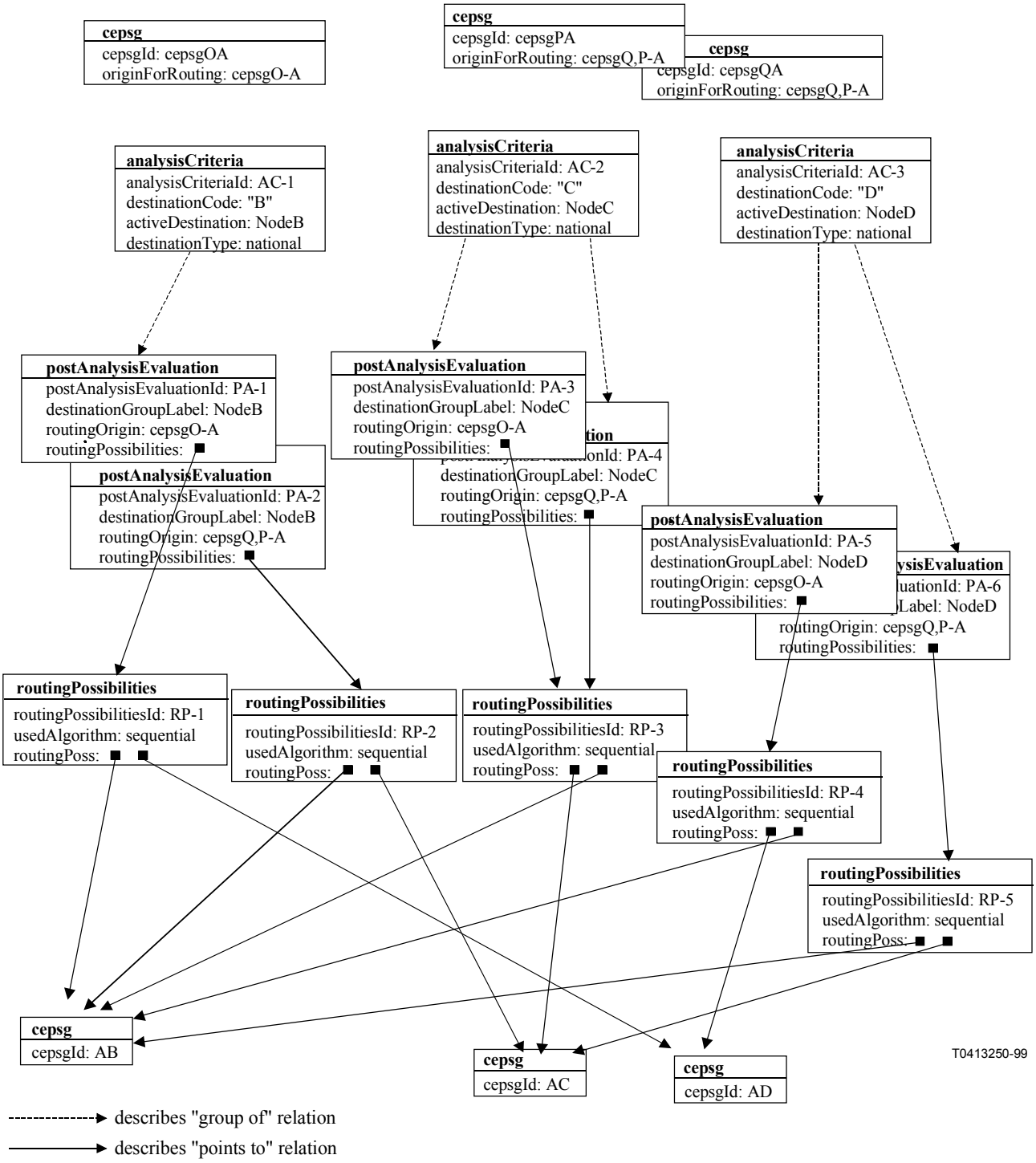


Figure II.6/Q.826

Supposed that there is a call set-up arriving at exchange A originating in exchange O, which is destined for exchange D.

When the digit string arrives in exchange A, then one instance of the OC analysisCriteria, identified by the analysisCriteriaId AC-3 can be found matching this string. The value of the attribute activeDestination of this instance identifies a group of instances (PA-5, PA-6) of the OC

postAnalysisEvaluation. The instances of this group differ from each other by different values of the attribute routingOrigin. For the reason that the circuit endpoint subgroup, via which the call is arriving, belongs to cepsgO-A, the only matching instance of the OC postAnalysisEvaluation is the instance PA-5. The instance PA-5 of the OC postAnalysisEvaluation points to the instance RP-4 of the OC routingPossibilities, which says that the selection algorithm on the routing possibilities listed in the attribute shall be sequential with fixed start.

The routing possibilities, which are found in the attribute routingPoss of the instance RP-4 are a list of two circuit endpoint subgroups with cepsgId equal to AD or AB. The sequential selection algorithm with the fixed start cepsgId AD ensures that the circuit endpoint subgroup AD is always accessed first to get a free circuit endpoint to exchange D. Only if all circuit endpoints of the circuit endpoint subgroup AD are found busy, shall the circuit endpoint subgroup AB be accessed to find a free circuit endpoint to exchange B. Exchange B has to provide a connection to exchange D by itself.

II.3.2 Second solution

The representation shown here uses the "pointer" method to link analysisCriteria instances with routingPossibilities instances. This configuration of instances routes in exchange "A" any call, coming from the exchanges "O", "P" or "Q" according to the requirements of the network operator (see Table II.2).

Suppose there is a call set-up arriving at exchange "A" originating at exchange "O", which is destined for exchange "D".

The call that arrives in exchange "A" uses the circuit subgroup OA. Due to the data of the circuit endpoint subgroup in exchange "A" the call characteristic orig1 is assigned to the call. Only the object instance of the OC analysisCriteria, identified by the analysisCriteriaId AC-3, matches with the call characteristics. The attribute activeDestination of this instance identifies exactly one instance of the OC routingPossibilities with routingPossibilitiesId RP-3.

The routingPossibilities, which are found in the attribute routingPoss of the instance RP-3, lead via intermediate routingPossData instances to circuit endpoint subgroups with cepsgId equal to AB or AD. The sequential selection algorithm of the routingPossibilities instance RP-3 ensures that the circuit endpoint subgroup AD is always accessed first to get a free circuit endpoint to exchange D. Only if all circuit end points of the circuitendpoint subgroup AD are found busy, shall the circuit endpoint subgroup AB be accessed to find a free bcircuit endpoint to exchange B. Exchange B has to provide a connection to exchange D by itself. See Figure II.7.

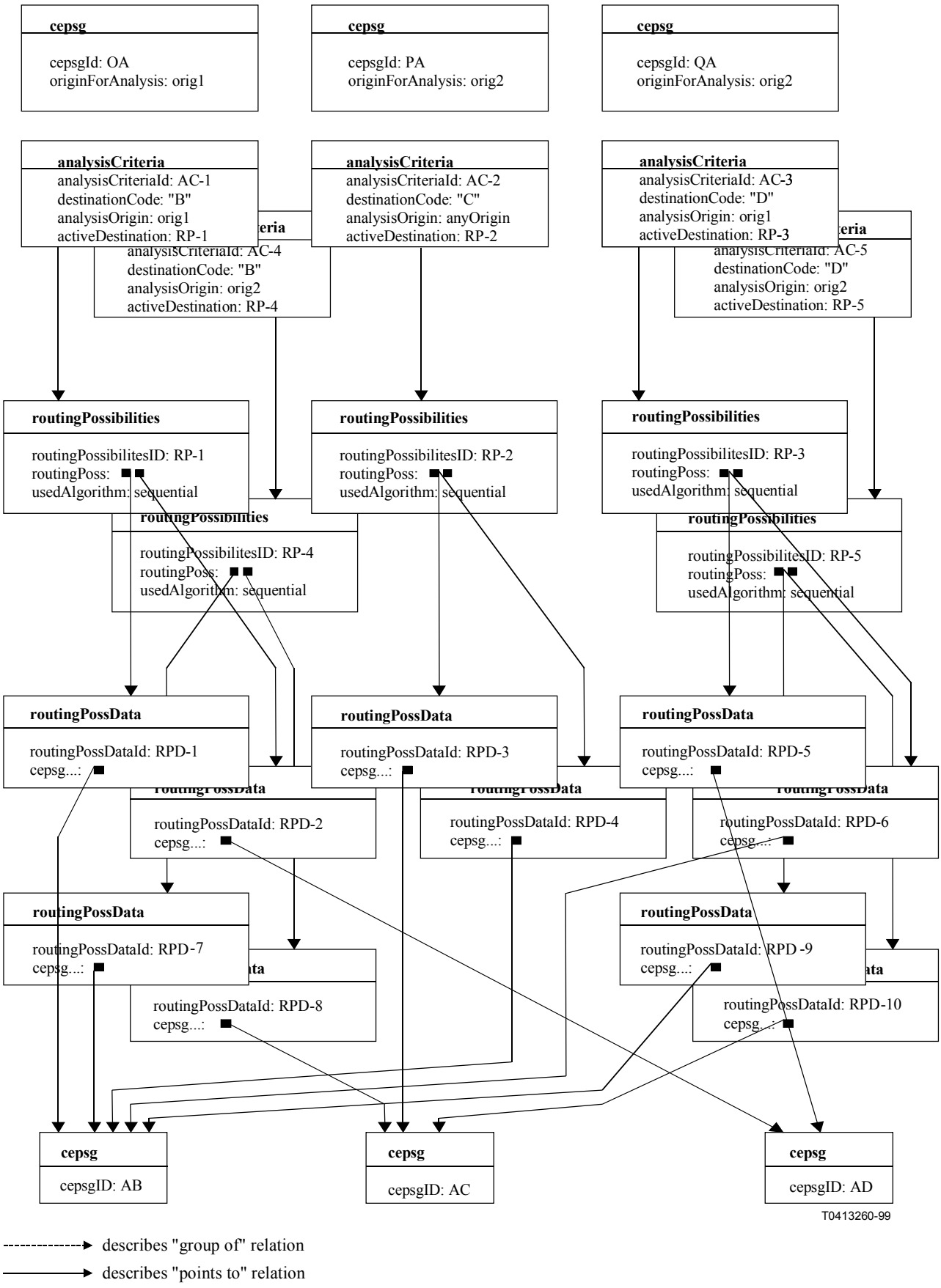


Figure II.7/Q.826

II.4 Example 3: illustrates proportional bidding

Topology as described in Figure II.8:

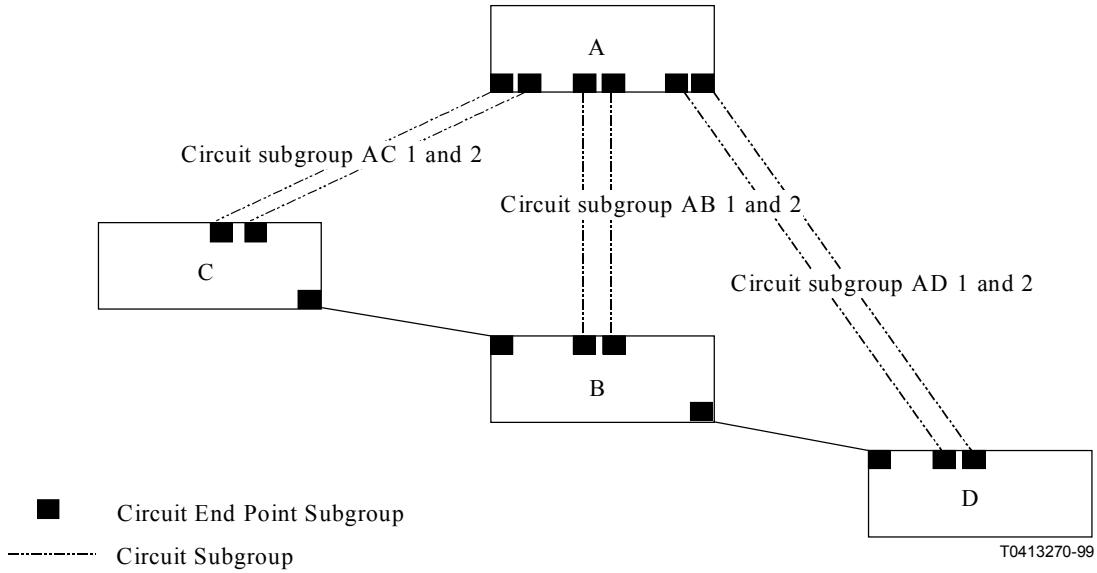


Figure II.8/Q.826 – Proportional bidding

with assumptions:

1) Connections A-B, A-C, A-D consist of 2 circuit end point subgroups.
2) Calls from A to B only are considered.

Table II.3/Q.826

first choice	second choice
AB1, AB2, sequential	proportional bidding 50% via C AC1, AC2, cyclic
	proportional bidding 50% via D AD1, AD2, cyclic

II.4.1 First solution

See Figure II.9.

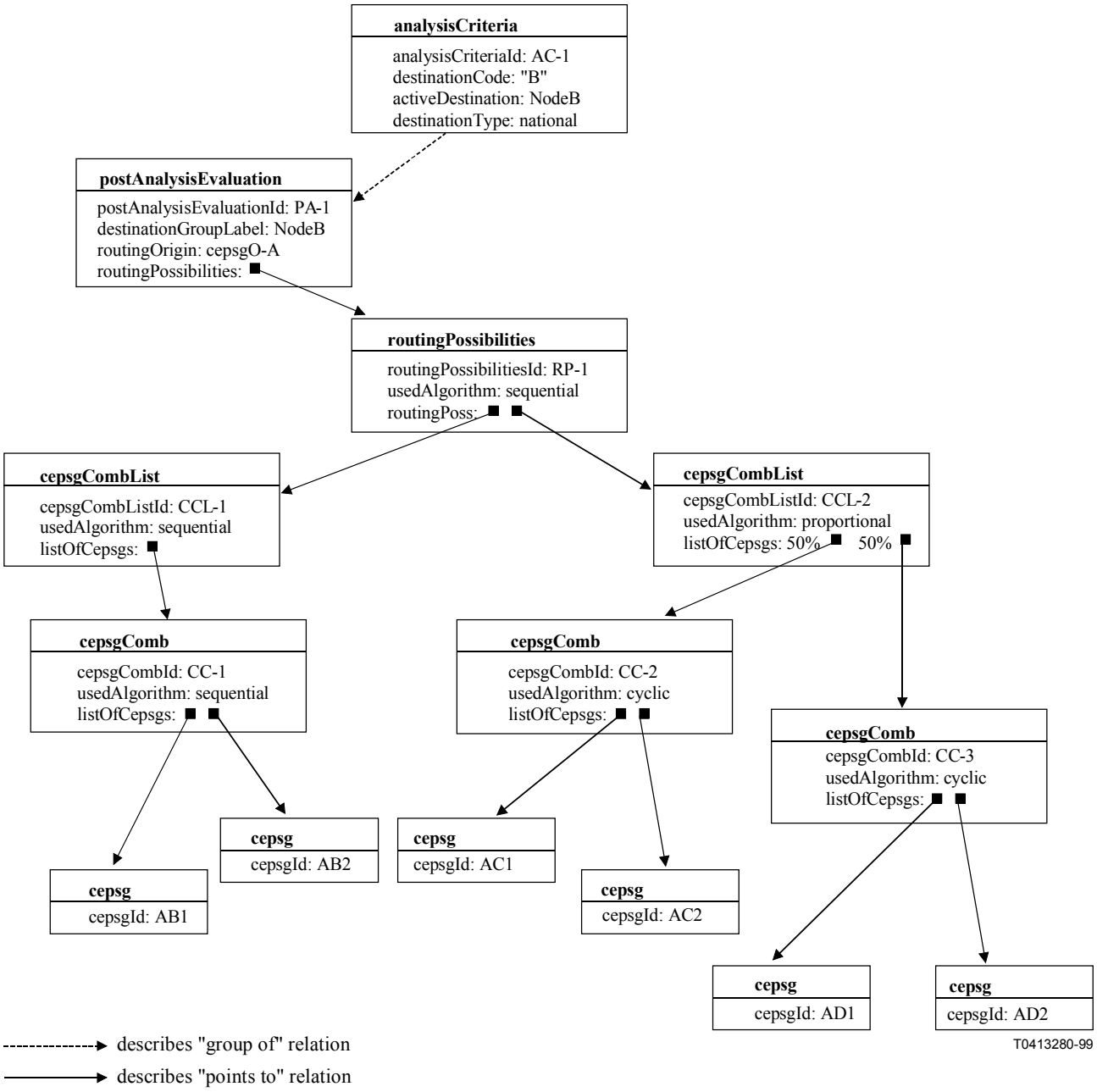


Figure II.9/Q.826

Supposing that there is a call set-up arriving at exchange A, which is destined for exchange B, the analysis of the incoming dialled digits shall lead to the instance RP-1 of the OC routingPossibilities:

– The instance RP-1 gives two groups of exchanges, via which the call can be routed. The one group consists only of the target exchange B, represented by the instance CCL-1 of the OC cepsgCombList, and the other group consists of the exchanges C and D, represented by the instance CCL-2 of the OC cepsgCombList.

– Supposed that the direct connection to exchange B is blocked, i.e. routing via the instance CCL-1 is not possible, then the call traffic is distributed in equal parts to the exchanges C and D, represented by the instance CC-2 and CC-3 of the OC cepsgComb, respectively. This distribution is an example for the proportional bidding selection algorithm.

– Supposed that the considered call set-up request is assigned to the instance CC-2, the call set-up request will be continued by a sequential selection algorithm with cyclic start over the two instances AC or AC2 of the OC cepsg.

II.5 Example 4

Usual local call. The call remains within one area.

Assumption: Subscriber 1 in local area 1, identified by areacode 321, is calling the subscriber 2 with local DN 43562 in local area 1.

II.5.1 First solution

See Figure II.10.

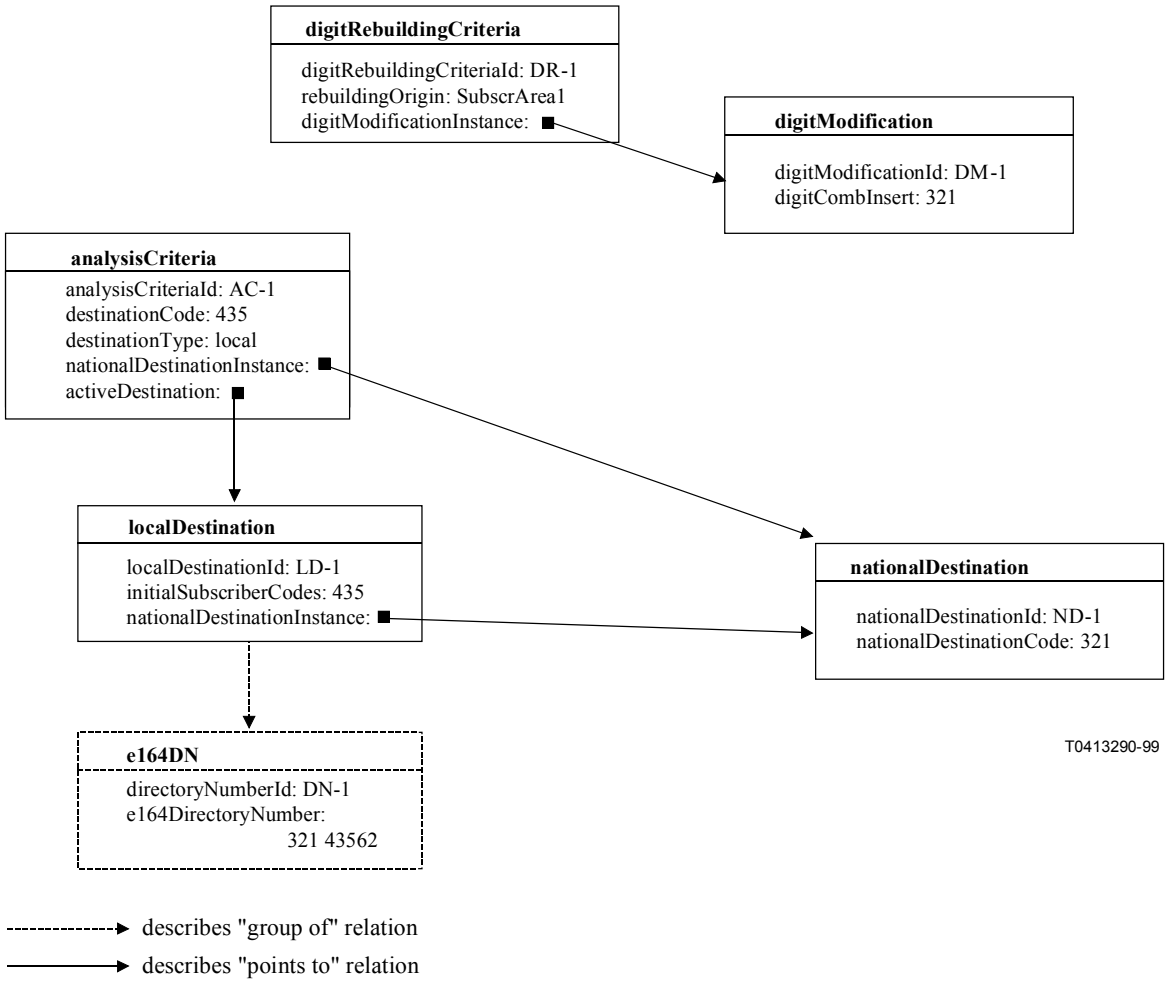


Figure II.10/Q.826

In the case that subscriber 1 does not dial the area code of the directory number of subscriber 2, then digit rebuilding will insert the missing area code. That is, an instance DR-1 of the OC digitRebuildingCriteria will match, depending on the subscriber's origin, and will point to a

corresponding instance DM-1 of the OC digitModification, where the area code which has to be inserted at the beginning of the incoming digit string can be found.

Afterwards an instance AC-1 of the OC analysisCriteria fits to the conditions given by the dialled and modified subscriber code and given by some other criteria. This instance AC-1 points to an instance ND-1 of the OC nationalDestination and to one instance LD-1 of the OC localDestination.

The instance LD-1 contains the initial digits of the subscriber number of the dialled E164 directory number and points to the same instance ND-1 of the OC nationalDestination as the instance AC-1 does. The instance ND-1 contains the national area code of subscriber B as attribute value (here identical to subscriber A). The further processing of the call set-up request is handled by the customer administration area. The entry point to the customer administration is the e164DN instance of the subscriber.

II.5.2 Second solution

See Figure II.11.

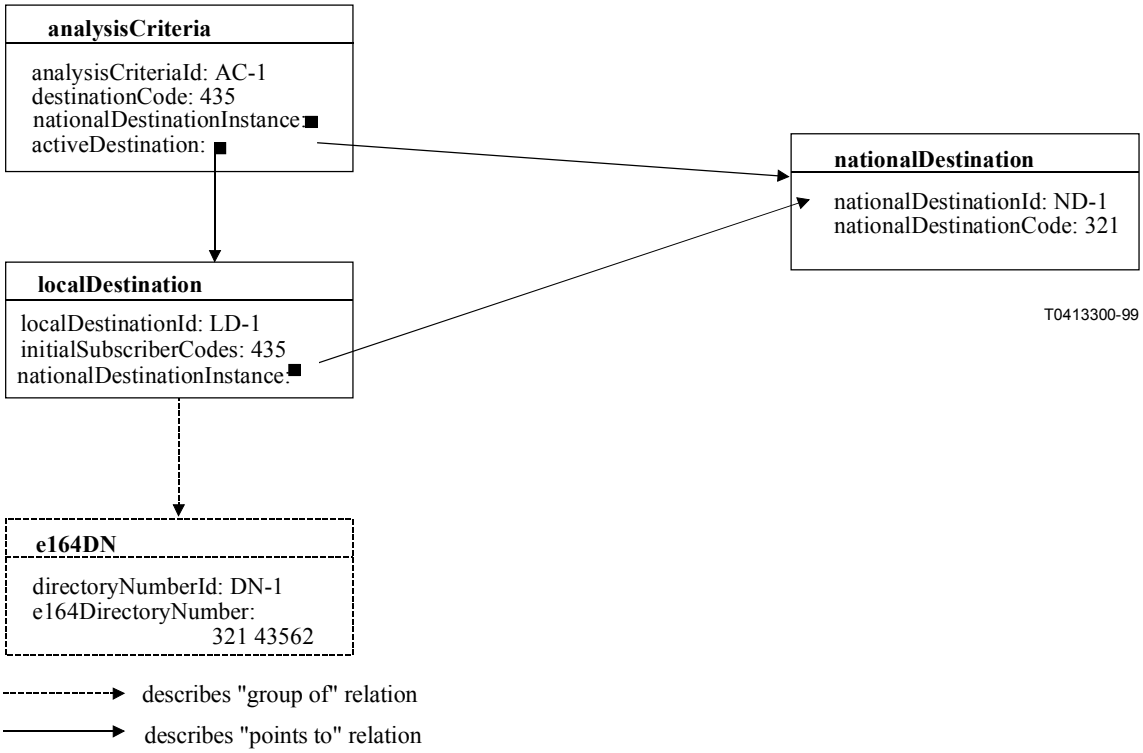


Figure II.11/Q.826

In the case that subscriber 1 does not dial the area code of the directory number of subscriber 2 (no national prefix is dialled), then a system automatically associates the area code 321 to the call.

In the case that subscriber 1 dials the area code of the directory number of subscriber 2 (the dialled number starts with a national prefix e.g. 0), then a system can "separate" the area code 321 from the dialled digits with the national destination instance.

In both cases the system knows the national destination and the subscriber number.

The instance AC-1 matches exactly to the characteristics of the call (national destination and initial string of subscriber number) and leads via localDestination LD-1 and directory number DN-1 of subscriber B.

The further processing of the call set-up request is handled by the customer administration area. The entry point to the customer administration is the e164DN instance of the subscriber.

II.6 Example 5

Multiple areas exchange.

Assumption: Subscriber A and subscriber B have the same area code, e.g. '333'.

Subscriber A' and Subscriber B' have the same area code, '111', being different from the area code of the subscribers A and B. Subscriber B and B' have the same subscriber number, e.g. '5252'.

II.6.1 First solution

a) Subscriber A and Subscriber A' dial the code '5252' without area code. Subscriber A has to reach subscriber B, and subscriber A' has to reach subscriber B', see Figure II.12.

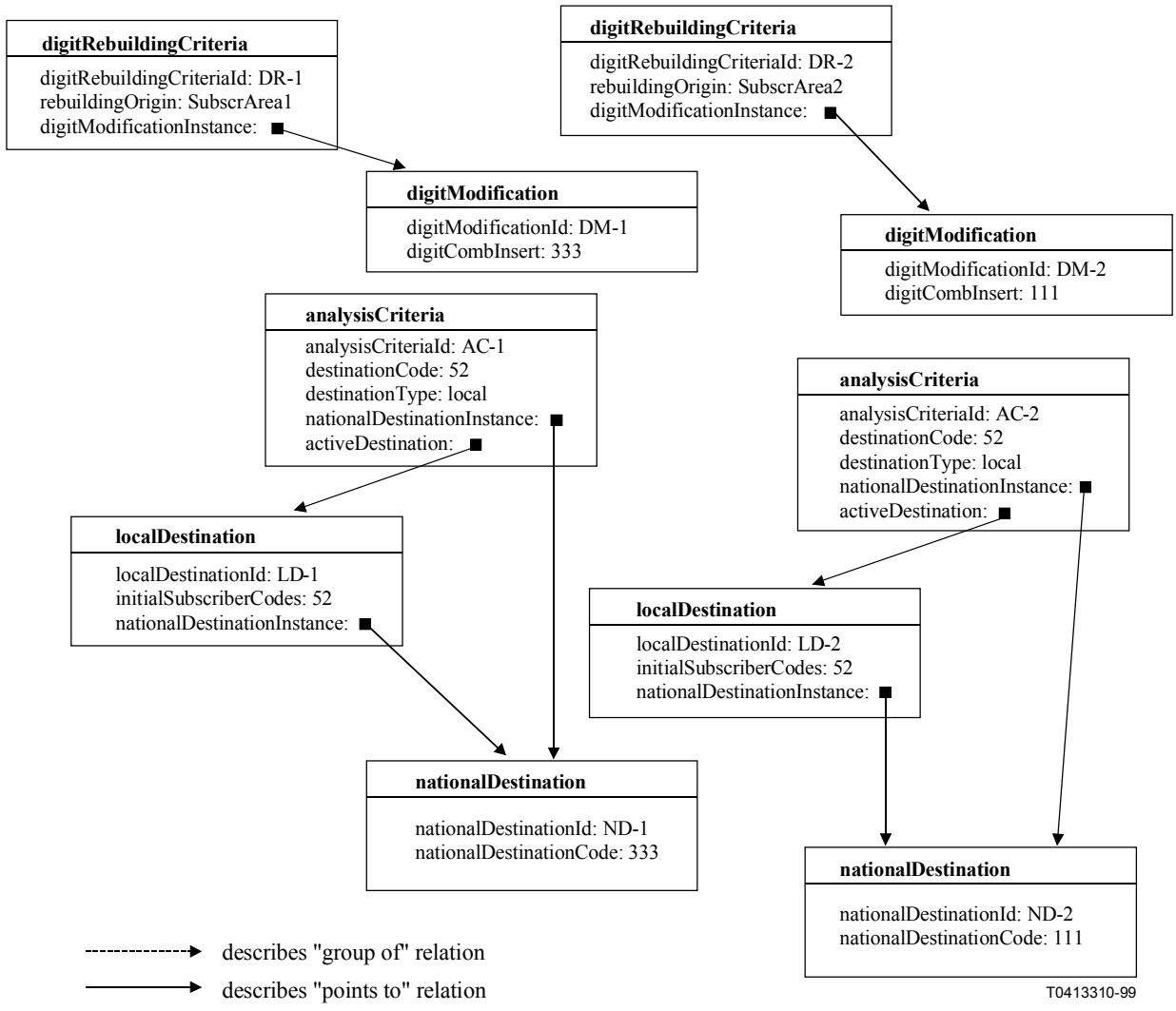


Figure II.12/Q.826

In the case that subscriber A does not dial the area code, then digit rebuilding will insert the missing area code '333', and if subscriber A' does not dial the area code, then digit rebuilding will insert the missing area code '111'. That is, an instance DR-1 or DR-2 of the OC digitRebuildingCriteria will match, depending on the subscriber's origin, and will point to a corresponding instance DM-1 or DM-2 of the OC digitModification, where the area code

can be found, which has to be inserted at the beginning of the incoming digit string, respectively.

Afterwards an instance AC-1 or AC-2 of the OC analysisCriteria fits the conditions given by the dialled and modified subscriber code and given by some other criteria. This instance AC-1 or AC-2 points to an instance ND-1 or ND-2 of the OC nationalDestination and to one instance LD-1 or LD-2 of the OC localDestination, respectively.

The instance LD-1 and LD-2 contain the initial digits of the subscriber number of the dialled E164 directory number, respectively, and point to the corresponding instances ND-1 or ND-2 of the OC nationalDestination. The instance ND-1 contains the national area code of the subscriber B as attribute value, the instance ND-2 contains the national area code of the subscriber B' as attribute value. The further processing of the call set-up request is handled by the customer administration area.

b) For example, subscriber A dials the code '111 5252' of subscriber B'. Subscriber A has to reach subscriber B'. The configuration used for this scenario is an extract from a), see Figure II.13.

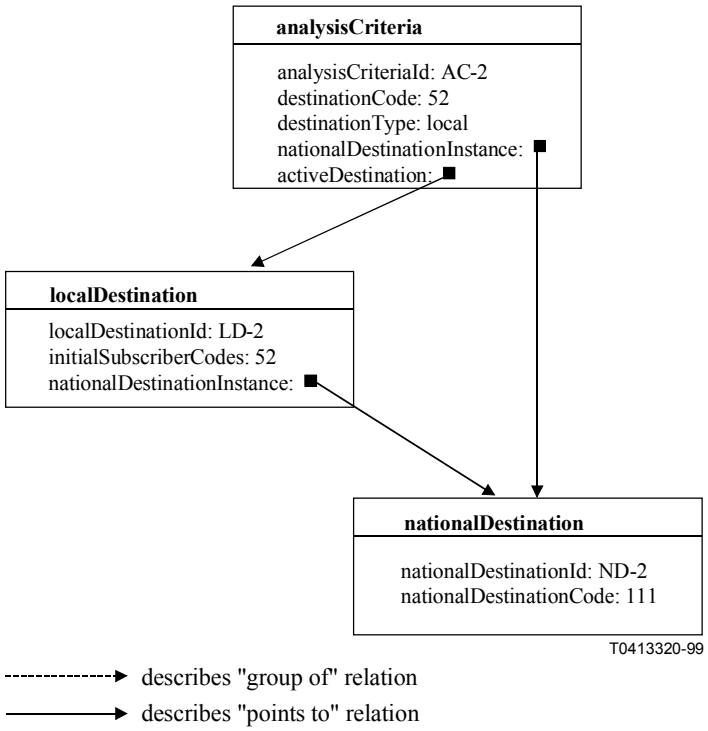


Figure II.13/Q.826

Digit rebuilding need not be done, because subscriber A dials the area code of the directory number of subscriber B', which belongs to another local area as subscriber A.

An instance AC-2 of the OC analysisCriteria fits to the conditions given by the dialled subscriber code and by some other criteria, e.g. the analysis origin of subscriber A. This instance AC-2 points to an instance ND-2 of OC nationalDestination and to one instance LD-2 of OC localDestination.

The instance LD-2 contains the initial digits of the subscriber number of the dialled E164 directory number and points to the same instance ND-2 of OC nationalDestination as the instance AC-2 does. The instance ND-2 contains the national area code of subscriber B' as attribute value. The further processing of the call set-up request is handled by the customer administration.

II.6.2 Second solution

See Figure II.14.

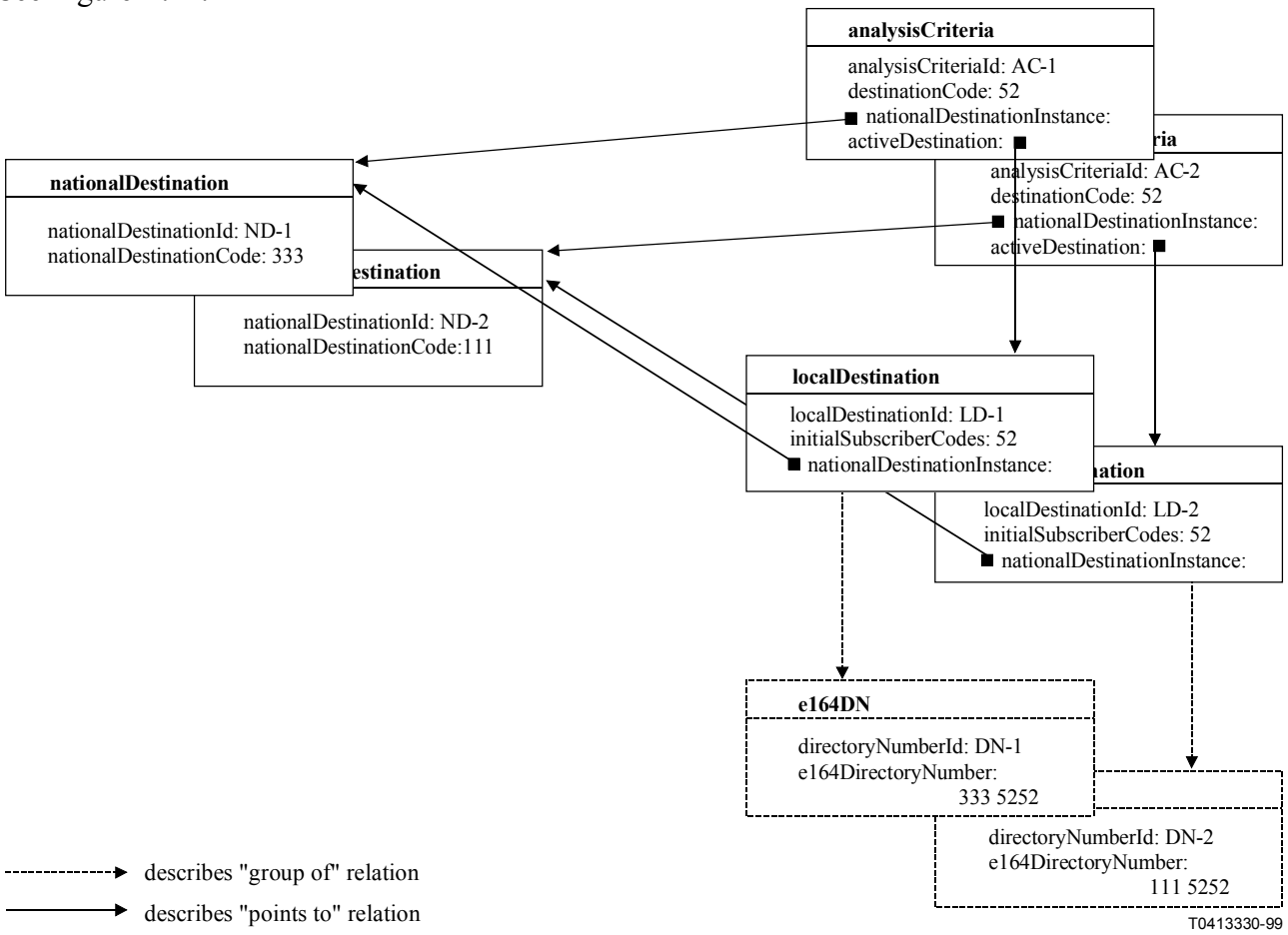


Figure II.14/Q.826

a) Subscriber A and Subscriber A' dial the code '5252' without area code. Subscriber A has to reach subscriber B, and subscriber A' has to reach subscriber B':

Subscriber A dials 5252 and reaches subscriber B.

As subscriber A only dials 5252 without a national prefix (e.g. 0), a system associates automatically the own area code 333 to the call. The call with the characteristics of the dialled code 5252 and the assigned area code 333 matches with analysisCriteria instance AC-1 (the national destination instance and the initial subscriber code is matching) and leads via localdestination LD-1 and directory number DN-1 to subscriber B.

Subscriber A' dials 5252 and reaches subscriber B'.

As subscriber A' only dials 5252 without a national prefix (e.g. 0), a system associates automatically the own area code 111 to the call. The call with the characteristics of the dialled code 5252 and the assigned area code 111 matches with analysisCriteria instance AC-2 (the national destination instance and the initial subscriber code is matching) and leads via localdestination LD-2 and directory number DN-2 to subscriber B'.

b) Subscriber A dials e.g. the code '0111 5252' of subscriber B'. Subscriber A has to reach subscriber B':

As subscriber A dials a number with a national prefix (in this example 0), a system can separate the area code from the subscriber number in the dialled digit code by checking the nationalDestination instance ND-1 and ND-2. In this case ND-2 is matching, with the result

that the call is for a subscriber with subscriber number 5252 in the local area ND-2 (with area code 111). The call to local area ND-2 with subscriber number 5252 matches with analysisCriteria AC-2 (the national destination instance and the initial subscriber code is matching) but not with AC-1. The analysisCriteria instance AC-2 leads via localDestination LD-2 and directory number DN-2 to subscriber B'.

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