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Telecommunications Management Network (TMN); Functional specification of call routeing information management on the Operations System/Network Element (OS/NE) interface

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Contents

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Telecommunication Management Networks (TMN), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document provides a management information model [12] 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 Recommendation M.3010 [2]).

The information to be managed is limited to the signalling systems DSS 1 (Digital Subscriber Signalling System No 1), C5 (Signalling System CCITT No5), SS No.7 (Signalling System Number 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 purpose, 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 standardised signalling systems DSS 1, 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.

The information model covers the management of following aspects:

- incoming digit rebuilding;
- localy originating, localy terminating (up to recognising 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;
- CTM (Cordless Terminal Mobility);
- Dynamic Routing;

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

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

- customer administration (see ITU-T Recommendation Q.824.x [14] or ETS 300 291 [15]);
- subscriber controlled input (no standard exists yet);
- IN (Intelligent Network) (no standard exists yet);
- specific treatments as e.g. announcements.

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

- traffic management (see ITU-T Recommendation Q.823 [19] or I-ETS 300 637 [20]);
- 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 following specific points:

- characterisation of non-blockable digits (e.g. emergency numbers);
- 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.

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 following conditions:
  - routing management deals with individual calls under normal conditions;
  - traffic management optimises 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

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] I-ETS 300 293 (1993): "Telecommunications Management Network (TMN)".

[2] ITU-T Recommendation M.3010 (1992): "Maintenance: Telecommunications Management Network - Principles for a Telecommunications Management Network".

[3] ITU-T Recommendation E.164 (1991): "Telephone Network and ISDN Operation, Numbering, Routing and Mobile Service - Numbering Plan for the ISDN Era".

[4] ITU-T Recommendation E.170 (1992): "Telephone Network and ISDN Operation, Numbering, Routing and Mobile Service - Traffic Routing".

[5] ITU-T Recommendation M.3100 (1995): "Maintenance - Telecommunications Management Network - Generic Network Information Model".

[6] ITU-T Recommendation Q.115 (1993): "Control of Echo Suppressors and Echo Cancellers".

[7] ITU-T Recommendation Q.751.1 (1995): "Signalling System No.7 Managed Objects".

[8] ITU-T Recommendation Q.763 (1993): "Specifications of Signalling System No.7 - Formats and Codes of the ISDN User Part of Signalling System No.7".

[9] ITU-T Recommendation Q.764 (1993): "Signalling System No.7 - ISDN User Part Signalling Procedures".

[10] ITU-T Recommendation Q.850 (1993): "Digital Subscriber Signalling System No.1 - General - Usage of Cause and Location in the Digital Subscriber Signalling System No.1 and the Signalling System No.7 ISDN User Part".

[11] ITU-T Recommendation Q.931 (1993): "Digital Subscriber Signalling System No.1 - Network Layer - ISDN User-Network Interface Layer 3 Specification for Basic Call Control".

[12] ITU-T Recommendation X.720 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Management Information Model".

[13] ITU-T Recommendation X.721 (1992): "Information technology - Open Systems Interconnection - Structure of management information: definition of management information".

[14] ITU-T Recommendation Q.824.x (1995): "Q3 interface - Customer Administration - ISDN" series.

[15] ETS 300 291 (1995): "Network Aspects (NA) - Functional Specification of Customer Administration (CA) on the Operation System / Network Element (OS/NE) interface".

[16] DEN/TMN-00035 (1997): "Scheduling Function support object classes ".

[17] ITU-T Recommendation X.746 (1995): "Information technology - OSI Systems management - Scheduling function".

[18] ITU-T Recommendation E.410 (1992): "Telephone Network And ISDN - Quality Of Service, Network Management And Traffic Engineering - International Network Management - General Information".

[19] ITU-T Recommendation Q.823 (1996): "Stage 2 and Stage 3; Function Specification for Traffic Management".

[20] I-ETS 300 637 (1996): "Network Aspects (NA) - Functional Specification of Traffic Management on the Network Element/Operation System (NE/OS) Interface".

[21] ITU-T Recommendation Q.440 (1988): "Signalling System R2 - Interregister signalling - General".

[22] ITU-T Recommendation Q.441 (1988): "Signalling System R2 - Interregister signalling - Signalling code".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

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

circuit: Transmission means which allows communication between two exchanges (Same definition as in ITU-T Recommendation E.410 [18]).

circuit end point: Terminates a circuit.

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.

circuit group: The set of all switched circuits which directly interconnect one exchange with another (same definition as in ITU-T Recommendation E.410 [18]).

circuit subgroup: A set of circuits within a circuit group which are 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 Recommendation E.410 [18]).

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.

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.

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.

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

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

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).

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

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

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
DSS 1	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 Standardisation 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
RDN	Relative Distinguished Name
R2	Regional Signalling 2
SCI	Subscriber Controlled Input
SMO	Scheduled Managed Object
SN	Subscriber Number
SO	Scheduler Object
SS No. 7	Signalling System Number 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 section 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.

Digit Rebuilding

R.3 Digit rebuilding manages the insertion of digits into the digit code (e.g. for prefixing).

R.4 The model shall support digit rebuilding based on incoming circuit subgroup.

R.5 The model shall support digit rebuilding based on nature of address.

R.6 The model shall support digit rebuilding based on group of subscribers.

Destination Selection

R.7 The model shall support the translation of a digit code into a nature of address and vice versa.

R.8 The destination shall be determined by the dialled digits and, in addition, possibly by nature of address, selected carriers or others.

R.9 The model shall support modification of digit codes.

R.10 The model shall support treatment as result of destination selection.

R.11 The model shall support identification of the carrier.

R.12 The model shall support time dependent selection of destination.

R.13 The model shall support destination selection based on incoming circuit subgroup.

R.14 The model shall support destination selection based on group of subscribers.

Routing Possibility Selection

R.15 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).

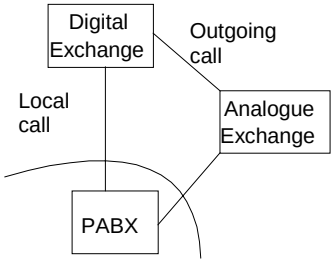


Figure 1

R.16 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.17 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.18 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.19 The model shall support crankback as described in ITU-T Recommendation E.170 [4].

R.20 The model shall support time dependent selection of routing possibility.

R.21 The model shall support routing possibility selection based on incoming circuit subgroup.

R.22 The model shall support routing possibility selection based on group of subscribers.

Digit Preparation

R.23 Digit preparation shall support modification of digit codes based on parameters as e.g. selected routing possibility, incoming or outgoing circuit subgroups.

R.24 The model shall support digit preparation based on incoming circuit subgroup.

R.25 The model shall support digit preparation based on group of subscribers.

Exception Handling

R.26 It shall be possible to associate a treatment with following exceptional conditions: missing database entry for call routing and cause value received during call routing (refer to ITU-T Recommendation Q.850 [10]).

5 Conformance

In order to claim conformance to this specification, a system needs to support the management functions for all managed object classes defined in clause 7 and described in clause 8 of this present document. Therefore the clauses 7 and 8 form the mandatory part of the present document.

6 Information Model

6.1 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 four parts:

1. The translation of incoming dialled digits so that they can be processed by digit analysis.
2. The identification of the destination is made by analysis of the digit codes and by means of other information.
3. 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.
4. The preparation of the digit string before it is sent to the next exchange.

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

Accordingly, five fragments were defined: defined as:

6.1.1 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.

6.1.2 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.

6.1.3 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.

6.1.4 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.

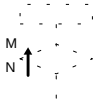
6.1.5 Exception Handling Fragment

Exception handling associates a treatment with following exceptional conditions: missing database entry for call routing and cause value received during call routing.

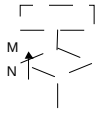
6.2 Information model diagrams

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 as 

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

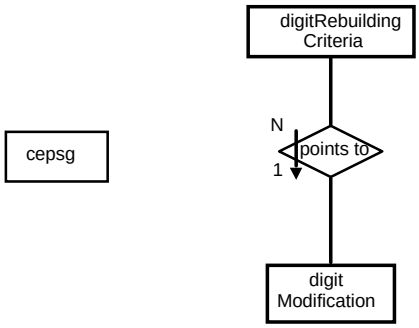
Classes and relation in dashed lines as 

mean that the class or relation do not belong to this document. The functionality represented is covered in another

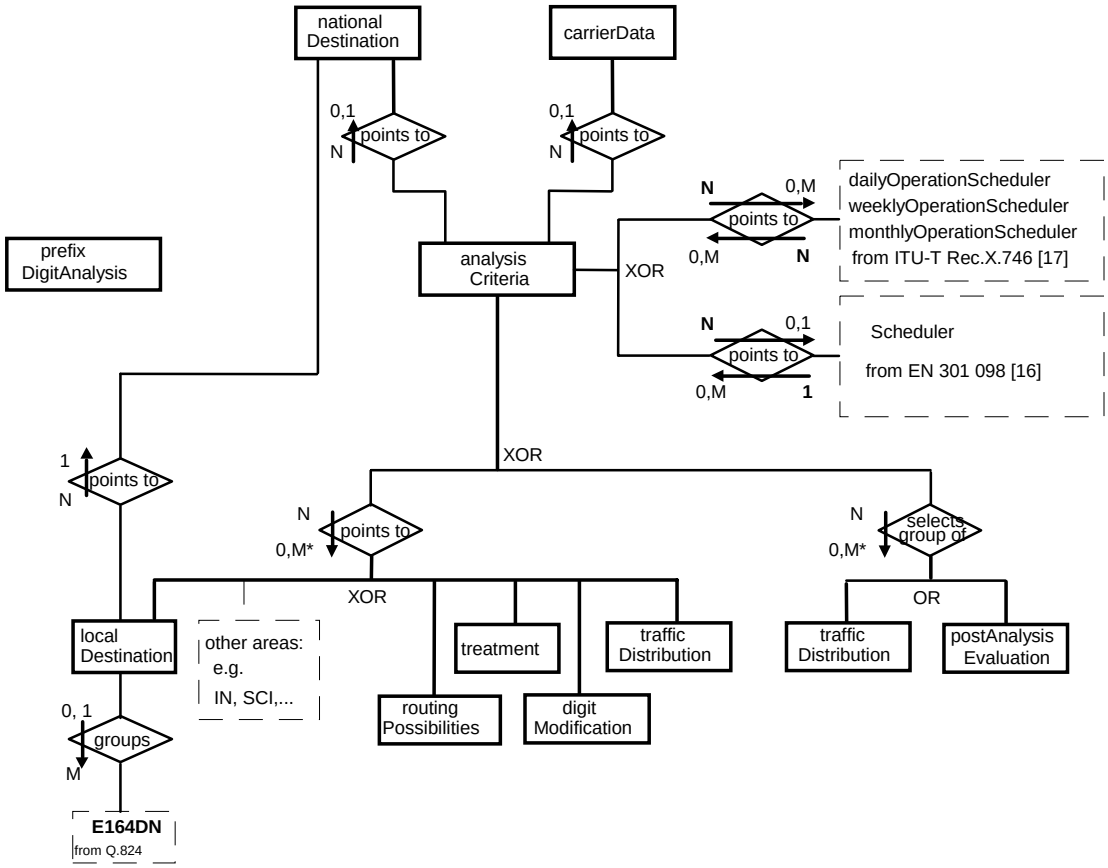
Relationship cardinality is normally N -> M with N an integer (0..) and M an integer

Other cases are explicitely specified.

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

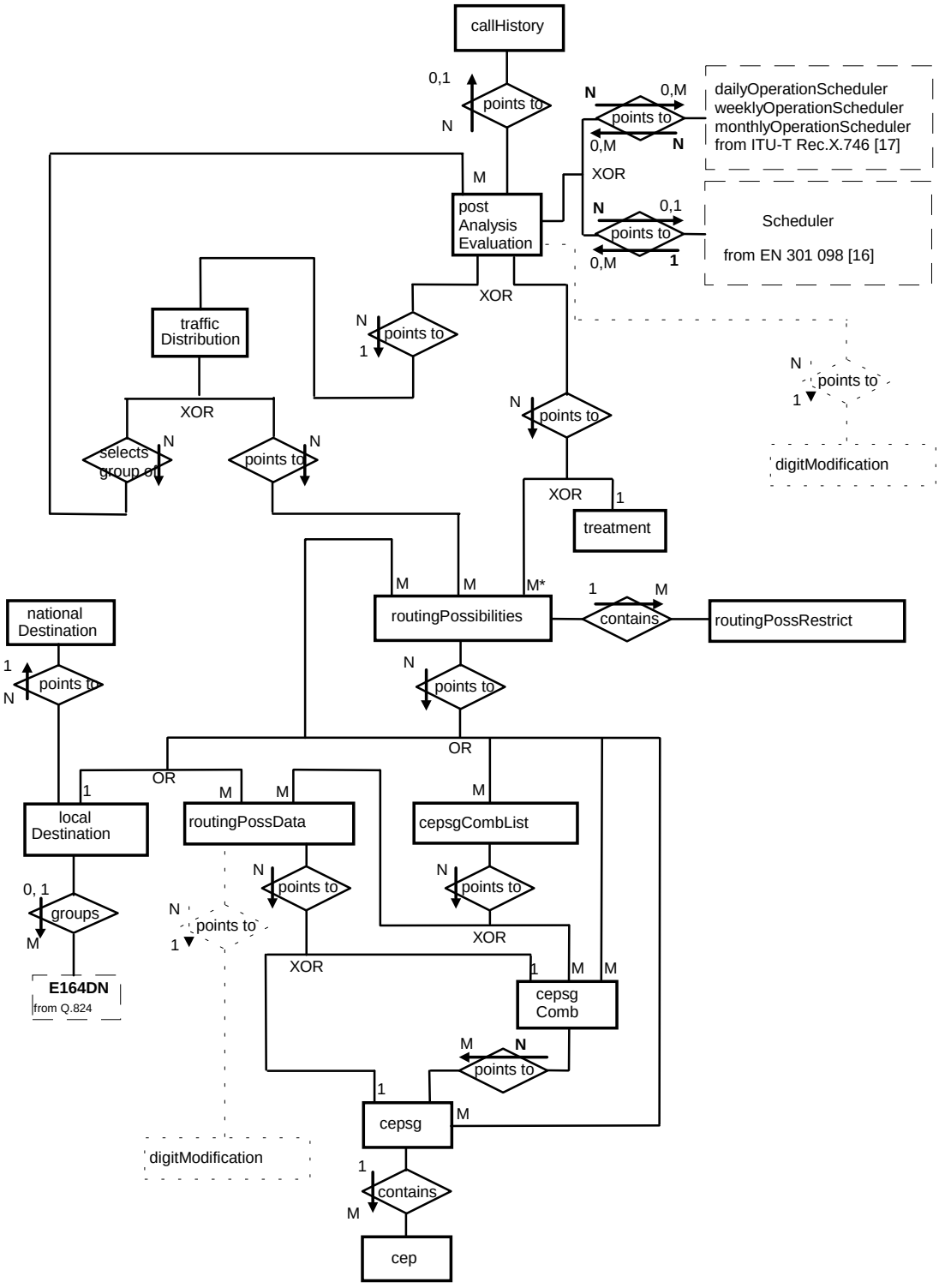


E-R Diagram 1: Digit Rebuilding Fragment



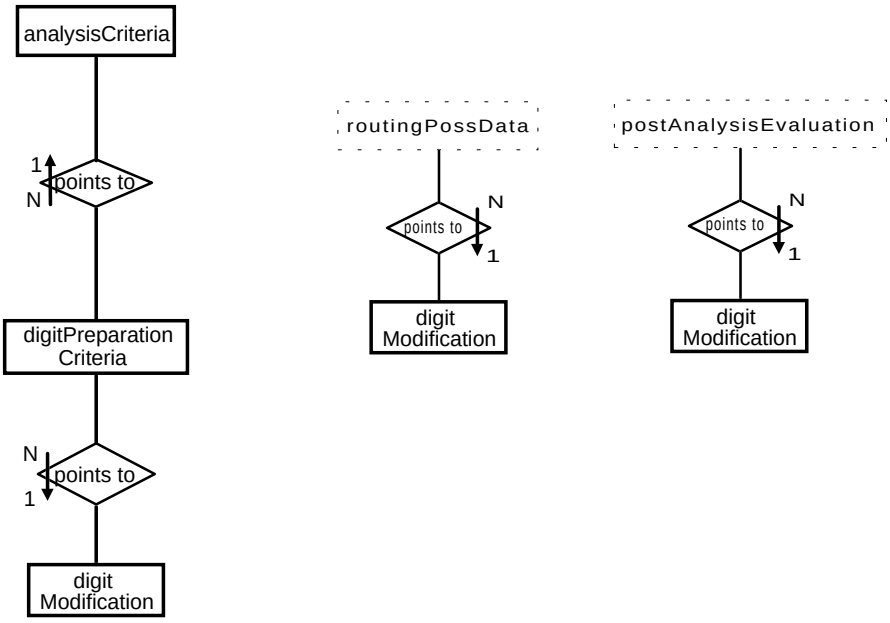
* : M-cardinality because of Time scheduling;
Without Time scheduling: M=1

E-R Diagram 2: Destination Selection Fragment

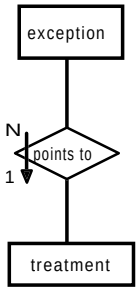


*: M cardinality because of Time scheduling
Without Time scheduling: M=1

E-R Diagram 3: Routing Possibility Selection Fragment



E-R Diagram 4: Digit Preparation Fragment.



E-R Diagram 5: Exception Handling Fragment

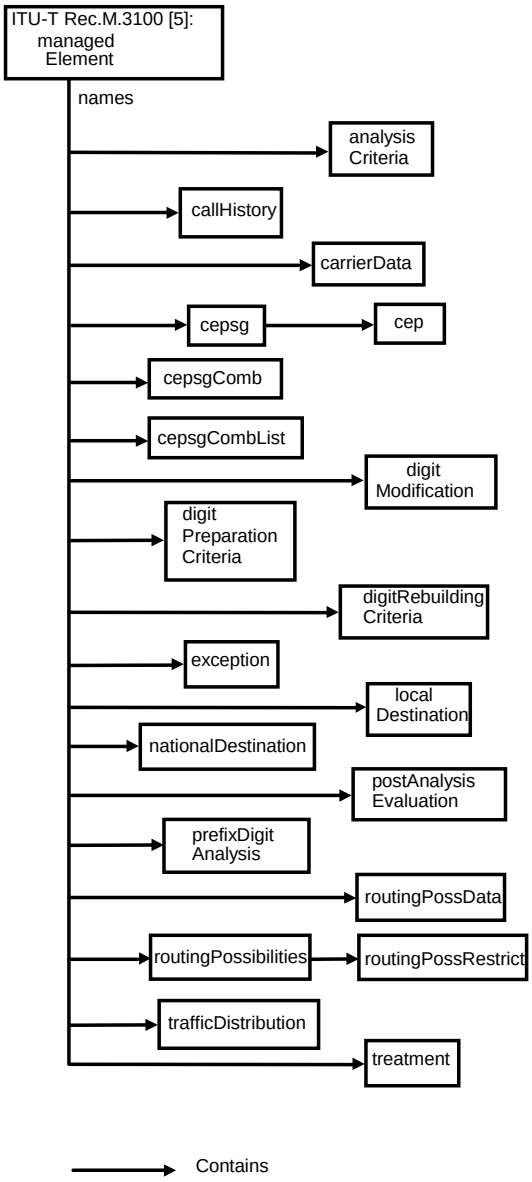


Diagram 6: Naming Relations

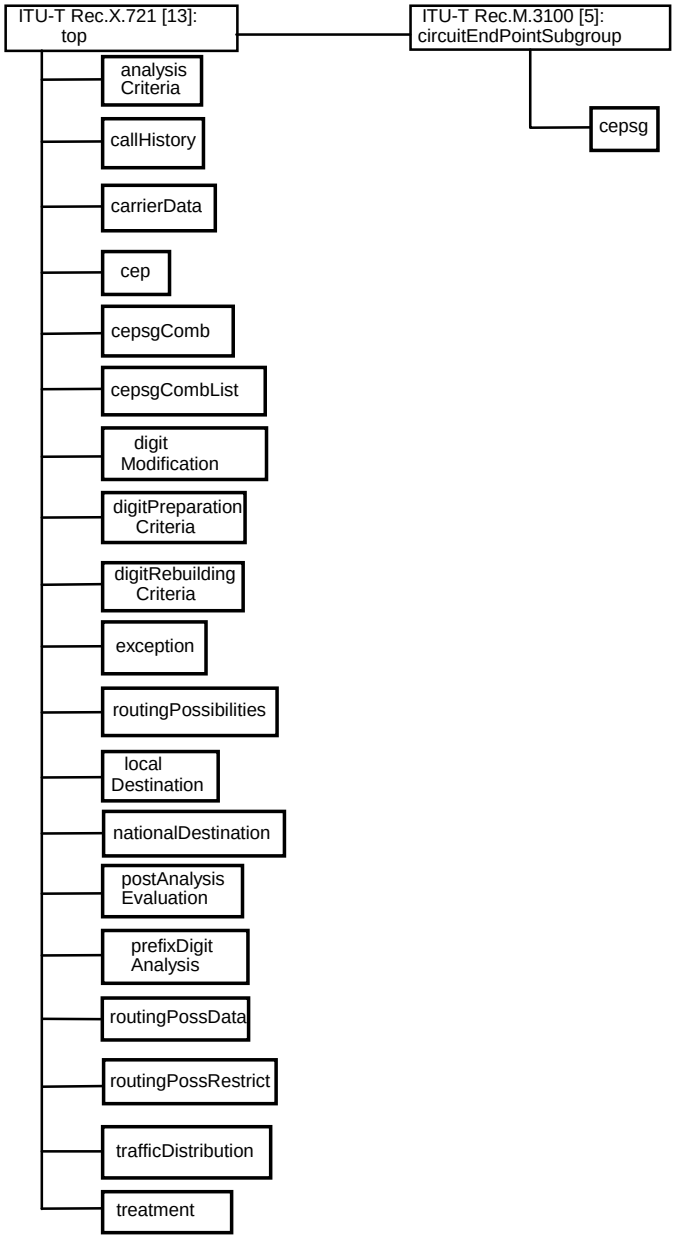


Diagram 7: Inheritance tree

7 Information model description

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

Table 1

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 ITU-T Recommendation X.720 [12], chapter 5.1.2.2).

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 asterisque '*' 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 the present document.

7.1 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.

Table 2

Object Class: analysisCriteria			
Attributes	M/C	Value Set	Operation
analysisCriteriaId	M	Single	GET
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
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 [17]": 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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC analysisCriteria:

- analysisCriteriaId

  This attribute is the object identifier attribute (RDN) of OC analysisCriteria.

- destinationCode

  This attribute characterises 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, mentions that a carrier access code is required but missing 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 ITU-T Recommendation Q.763 [8] or ITU-T Recommendation Q.440 [21], ITU-T Recommendation Q.441 [22]) 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 DEN/TMN-00035 [16].

- externalSchedulerName

  This attribute is used in the SMO for referencing the external SO's. (see ITU-T Recommendation X.746 [17])

- 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.

7.2 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.

Table 3

Object Class: callHistory			
Attributes	M/C	Value Set	Operation
callHistoryId	M	Single	GET
echoSuppressor*	C	Single	GET-REPLACE
numberOfSatLinks*	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation M.3100 [5]": attributeValueChangeNotificationPackage	C		

The following attributes describe the OC callHistory:

- callHistoryId

  This attribute is the object identifier 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 Recommendation Q.115 [6]).

- 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.

7.3 carrierData

This OC represents -via the carrier code- carriers that can be used in the exchange for call routing purposes.

Table 4

Object Class: carrierData			
Attributes	M/C	Value Set	Operation
carrierDataId	M	Single	GET
carrierCode*	M	Single	GET SET-BY-CREATE
ownCac	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC carrierData:

- carrierDataId

  This attribute is the object identifier 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.

7.4 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).

Table 5

Object Class: cep			
Attributes	M/C	Value Set	Operation
cepId	M	Single	GET
"ITU-T Recommendation X.721 [13]": administrativeState	M	Single	GET-REPLACE
"ITU-T Recommendation M.3100 [5]": channelNumber	M	Single	GET SET-BY-CREATE
circuitNumber	M	Single	GET SET-BY-CREATE
officeEquipment*	M	Single	GET SET-BY-CREATE
cic	C	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [5]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation X.721 [13]": stateChange	M		

The following attributes describe the OC cep:

- cepId

  This attribute is the object identifier attribute (RDN) of OC cep.

- administrativeState

  This attribute indicates whether the circuit end point subgroup is administratively permitted to carry traffic (value 'unlocked') or not (value 'locked').

- channelNumber

  This attribute indicates the PCM24 or PCM30 channel number of the circuit end point.

- circuitNumber

  This attribute indicates the logical circuit end point number within the containing circuit end point subgroup.

- officeEquipment

  This attribute references the physical equipment the circuit end point is associated with. The attribute value is technology specific.

- cic

  This attribute indicates the circuit identification code (CIC) of the circuit which is terminated by the circuit end point. The value of the CIC is identical in the two circuit end points which terminate the circuit. This attribute is applicable if SS No. 7 is used.

7.5 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 Recommendation M.3100 [5] as M3100ObjectClass 31.

Table 6

Object Class: cepsg			
Attributes	M/C	Value Set	Operation
"ITU-T Recommendation M.3100 [5]": transmissionCharacteristics	M	Single	REPLACE
"ITU-T Recommendation M.3100 [5]": labelOfFarEndExchange	M	Single	REPLACE
"ITU-T Recommendation X.721 [13]": 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
prefTrafficDirect	C	Single	GET-REPLACE
suppressOwnCac	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation X.721 [13]": stateChange	M		

The following attributes describe the OC cepsg:

- transmissionCharacteristics

  This attribute is inherited from OC ITU-T Recommendation M.3100 [5]:circuitEndPointSubgroup. Operation REPLACE is added here.

- labelOfFarEndExchange

  This attribute is inherited from OC ITU-T Recommendation M.3100 [5]:circuitEndPointSubgroup. Operation REPLACE is added here.

- administrativeState

  This attribute - defined in ITU-T Recommendation X.721 [13] - indicates whether the circuit end point subgroup is administratively permitted to carry traffic (value 'unlocked') or not (value 'locked').

- assocSignRouteSetNePart

  This attribute references a sigSetNePart instance (ITU-T Recommendation Q.751.1 [7]) 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 organisational 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 CIC number.

  - **backwardSequential**: This algorithm selects the idle circuit with the highest 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.

NOTE: Whenever circuit/CIC is mentioned, it is meant that if SS No. 7 is available, CIC shall be used, else circuit number is used.

- 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 to. 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 subgroup belong to. 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 endpoint subgroup;

  - outgoing: the outgoing seizure is preferred for this circuit endpoint subgroup;

  - outgoingFirstChoiceList: the outgoing seizure is preferred for this circuit endpoint subgroup, if the seizure is performed on a circuit endpoint 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.

7.6 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 7). The sum of "rows" percentage shall be 100 %.

Table 7: 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 8), or with a common overflow (see table 9).

Table 8: 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 9: 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 10

Object Class: cepsgComb			
Attributes	M/C	Value Set	Operation
cepsgCombId	M	Single	GET
cepsgCombSelection	M	Set/Single	GET-REPLACE
usedAlgorithm	M	Single	GET-REPLACE
"ITU-T Recommendation M.3100 [5]": userLabel	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC cepsgComb:

- cepsgCombId

  This attribute is the object identifier 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".

- 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 Recommendation M.3100 [5] section 5.54.

7.7 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.

Table 11

Object Class: cepsgCombList			
Attributes	M/C	Value Set	Operation
cepsgCombListId	M	Single	GET
cepsgCombListSelection	M	Set/Single	GET-REPLACE
usedAlgorithm	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC cepsgCombList:

- cepsgCombListId

  This attribute is the object identifier 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.

- usedAlgorithm

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

7.8 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 trigerred 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.

Table 12

Object Class: digitModification			
Attributes	M/C	Value Set	Operation
digitModificationId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitModification:

- digitModificationId

  This attribute is the object identifier 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.

7.9 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.

Table 13

Object Class: digitPreparationCriteria			
Attributes	M/C	Value Set	Operation
digitPreparationCriteriaId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitPreparationCriteria:

- digitPreparationCriteriaId

  This attribute is the object identifier 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 instance 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 subscriber 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.

7.10 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 and is only applicable for incoming calls (i.e. non-originating in this exchange).

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.

Table 14

Object Class: digitRebuildingCriteria			
Attributes	M/C	Value Set	Operation
digitRebuildingCriteriaId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC digitRebuildingCriteria:

- digitRebuildingCriteriaId

  This attribute is the object identifier 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 Recommendation Q.763 [8] (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 Recommendation Q.763 [8] (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.

7.11 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 Recommendation Q.850 [10].

Table 15

Object Class: exception			
Attributes	M/C	Value Set	Operation
exceptionId	M	Single	GET
matchesIf*	M	Set	GET-REPLACE ADD-REMOVE
treatmentInstance	M	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC exception:

- exceptionId

  This attribute is the object identifier 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.

7.12 localDestination

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

Table 16

Object Class: localDestination			
Attributes	M/C	Value Set	Operation
localDestinationId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC localDestination:

- localDestinationId

  This attribute is the object identifier 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 Recommendation E.164 [3]).

  A directory number belongs to this local destination,

  - if the directory number is 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 RecommendationE.164 [3]) 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 Recommendation E.164 [3]). 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 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.

7.13 nationalDestination

The OC nationalDestination describes the national destinations codes (refer to ITU-T Recommendation E.164 [3]) that are supported in the exchange.

Table 17

Object Class: nationalDestination			
Attributes	M/C	Value Set	Operation
nationalDestinationId	M	Single	GET
nationalDestinationCode*	M	Single	GET SET-BY-CREATE
Notifications			
"ITU-T Recommendation M.3100 [5]": createDeleteNotificationsPackage	M		

The following attributes describe the OC nationalDestination:

- nationalDestinationId

  This attribute is the object identifier attribute (RDN) of OC nationalDestination.

- nationalDestinationCode

  This attribute describes a national destination code.

7.14 postAnalysisEvaluation

The OC postAnalysisEvaluation evaluates additional call characteristics to the ones analysed in the OC analysisCriteria.

Table 18

Object Class: postAnalysisEvaluation			
Attributes	M/C	Value Set	Operation
postAnalysisEvaluationId	M	Single	GET
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 [17]": externalSchedulerName	C	Single	GET-REPLACE
activeRoutingPossibilities	C	Single	GET
	C		REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC postAnalysisEvaluation:

- postAnalysisEvaluationId

  This attribute is the object identifier attribute (RDN) of OC postAnalysisEvaluation.

- destinationGroupLabel

  This attribute determines the destination group to which this instance belongs to. 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 ITU-T Recommendation Q.763 [8] or ITU-T Recommendation Q.440 [21], ITU-T Recommendation Q.441 [22]) which have 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 Recommendation Q.763 [8]).

  These two attributes are conditional because they are not necessary in situation 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 ITU-T Recommendation X.746 [17] section 8.4.11).

- 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.

7.15 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).

Table 19

Object Class: prefixDigitAnalysis			
Attributes	M/C	Value Set	Operation
prefixDigitAnalysisId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC prefixDigitAnalysis:

- prefixDigitAnalysisId

  This attribute is the object identifier 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 defined by ITU-T Recommendation Q.763 [8] and ITU-T Recommendation Q.931 [11].

- carrierCodePresent

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

7.16 routingPossData

The OC routingPossData contains information that is applicable for the routing possibility that is using this OC instance.

Table 20

Object Class: routingPossData			
Attributes	M/C	Value Set	Operation
routingPossDataId	M	Single	GET
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 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC routingPossData:

- routingPossDataId

  This attribute is the object identifier attribute (RDN) of OC routingPossData.

- trafficCategory

  This attribute describes the traffic category (national traffic, 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 fixed yet. 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.

7.17 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 Recommendation E.170 [4]), it is possible to restrict the routing possibilities.

Table 21

Object Class: routingPossibilities			
Attributes	M/C	Value Set	Operation
routingPossibilitiesId	M	Single	GET
routingPossibilitiesSelection	M	Set/Single	GET-REPLACE
usedAlgorithm	M	Single	GET-REPLACE
crankbackAdminState	C	Single	REPLACE-WITH-DEFAULT GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		
"ITU-T Recommendation M.3100 [5]": stateChange	C		

The following attributes describe the OC routingPossibilities:

- routingPossibilitiesId

  This attribute is the object identifier 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 OCs localDestination and routingPossData or

of OC cepsgCombList or

of OC cepsgComb or

of OC cepsg or

of OC routingPossibilities.

In this list, only one instance of OC localDestination may be found.

- 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, subclause 7.6).

- crankbackAdminState

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

7.18 routingPossRestrict

The OC routingPossRestrict stores the data needed for crankback or other data influencing selection of individual targets. For more information about crankback refer to ITU-T Recommendation E.170 [4].

Table 22

Object Class: routingPossRestrict			
Attributes	M/C	Value Set	Operation
routingPossRestrictId	M	Single	GET
skipGroupSignal1	C	Set	GET-REPLACE ADD-REMOVE
skipGroupSignal2	C	Set	GET-REPLACE ADD-REMOVE
Notifications	M/C		
"ITU-T Recommendation M.3100 [5]": createDeleteNotificationsPackage	M		
"ITU-T Recommendation M.3100 [5]": attributeValueChangeNotificationPackage	C		

The following attributes describe the OC routingPossRestrict:

- routingPossRestrictId

  This is the object identifier 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 RecommendationE.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 RecommendationE.170) arrives from a cepsg reachable via one of these routing possibilities.

7.19 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.

Table 23

Object Class: trafficDistribution			
Attributes	M/C	Value Set	Operation
trafficDistributionId	M	Single	GET
inputCriteriaDataForAlgorithm	M	Single	GET-REPLACE
trafficDistributionData	M	Single	GET
selectedInstances	M	Single	GET-REPLACE
destinationGroupLabel*	C	Single	GET-REPLACE
Notifications			
"ITU-T Recommendation M.3100 [5]": objectManagementNotificationsPackage	M		

The following attributes describe the OC trafficDistribution:

- trafficDistributionId

  This attribute is the object identifier 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 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.

- destinationGroupLabel

  This attribute determines the destination group to which this instance belongs to. 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 diag.2) is used.

7.20 treatment

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

- a specific instance of OC analysisCriteria

  e.g. 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 matches 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.

Table 24

Object Class: treatment			
Attributes	M/C	Value Set	Operation
treatmentId	M	Single	GET
Notifications			
"ITU-T Recommendation M.3100 [5]": createDeleteNotificationsPackage	M		

The following attribute describes the OC treatment:

- treatmentId

  This is the object identifier attribute (RDN) of OC treatment.

8 Object class definitions

This clause contains the formal object class definitions.

8.1 Managed object class definitions

8.1.1 analysisCriteria

```
analysisCriteria MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        analysisCriteriaPackage PACKAGE
            BEHAVIOUR
                analysisCriteriaPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.1
                                    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,
```

```
        destinationCode
            GET-REPLACE,
        analysisOrigin
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ASN1TypeModule.defaultAnalysisOrigin
            GET-REPLACE,
        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 DEN/TMN-00035 [16].";;
        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};
```

8.1.2 callHistory

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

```
        callHistoryPackageBeh BEHAVIOUR
            DEFINED AS
                    "See subclause 7.2
                    Value combination of attributes (key-attributes) echoSuppressor,
                    numberOfSatLinks shall be unique among all instances of this object class.";;
        ATTRIBUTES
            callHistoryId
                GET;;,
      "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
    CONDITIONAL PACKAGES
      echoSuppressorPackage PACKAGE
        ATTRIBUTES
            echoSuppressor
                GET-REPLACE;
        REGISTERED AS {package 6};
                PRESENT IF "an instance supports it",
      numberOfSatLinksPackage PACKAGE
        ATTRIBUTES
            numberOfSatLinks GET-REPLACE;
        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};
```

8.1.3 carrierData

```
  carrierData MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
      carrierDataPackage PACKAGE
        BEHAVIOUR
            carrierDataPackageBeh BEHAVIOUR
                DEFINED AS
                        "See subclause 7.3
                        Value of attribute (key-attribute) carrierCode shall be unique among all
                        instances of this object class.";;
```

ATTRIBUTES

carrierDataId

GET,

carrierCode

GET

SET-BY-CREATE,

ownCac

GET-REPLACE;;,

"ITU-T Recommendation M.3100":objectManagementNotificationsPackage;

REGISTERED AS {managedObjectClass 3};

8.1.4 cep

cep MANAGED OBJECT CLASS

DERIVED FROM "ITU-T Recommendation X.721":top;

CHARACTERIZED BY

cepPackage PACKAGE

BEHAVIOUR

cepPackageBeh BEHAVIOUR

DEFINED AS

"See subclause 7.4

Value of attribute (key-attribute) officeEquipment shall be unique among all instances of this object class.";;

ATTRIBUTES

cepId

GET,

"ITU-T Recommendation X.721":administrativeState

GET-REPLACE,

"ITU-T Recommendation M.3100":channelNumber

GET

SET-BY-CREATE,

circuitNumber

GET

SET-BY-CREATE,

officeEquipment

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 8};

PRESENT IF "SS No. 7 is used for signalling.";

REGISTERED AS {managedObjectClass 4};

8.1.5 cepsg

cepsg MANAGED OBJECT CLASS

DERIVED FROM "ITU-T Recommendation M.3100":circuitEndPointSubgroup;

CHARACTERIZED BY

cepsgPackage PACKAGE

BEHAVIOUR

cepsgPackageBeh BEHAVIOUR

DEFINED AS

"See subclause 7.5.

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

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 9};
            PRESENT IF "the circuit end point subgroup is of type incoming or two-way",
    outgoingCepsgPackage PACKAGE
        ATTRIBUTES
            searchMethod
                GET-REPLACE;
        REGISTERED AS {package 10};
            PRESENT IF "the circuit end point subgroup is of type outgoing or two-way",
    originForRebuildingPackage PACKAGE
        ATTRIBUTES
            originForRebuilding
                GET-REPLACE;
        REGISTERED AS {package 11};
            PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if origin
            dependant digit rebuilding is required.",
    originForAnalysisPackage PACKAGE
        ATTRIBUTES
            originForAnalysis
                GET-REPLACE;
        REGISTERED AS {package 12};
```

PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if origin dependant digit analysis is required.",

originForRoutingPackage PACKAGE

ATTRIBUTES

originForRouting

GET-REPLACE;

REGISTERED AS {package 13};

PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if origin dependant call routing is required.",

originForPreparationPackage PACKAGE

ATTRIBUTES

originForPreparation

GET-REPLACE;

REGISTERED AS {package 14};

PRESENT IF "the circuit end point subgroup is of type incoming or two-way and if origin dependant digit preparation is required.",

termForPreparationPackage PACKAGE

ATTRIBUTES

termForPreparation

GET-REPLACE;

REGISTERED AS {package 15};

PRESENT IF "the circuit end point subgroup is of type outgoing or two-way and if outgoing cepsg dependant digit preparation is required.",

specificSignSystemPackage PACKAGE

ATTRIBUTES

languageDigitProc

REPLACE-WITH-DEFAULT

DEFAULT VALUE

ASN1TypeModule.defaultLanguageDigitProc

GET-REPLACE;

REGISTERED AS {package 16};

PRESENT IF "one of the signalling systems R2 or C5 is used.",

twowayCepsgPackage PACKAGE

ATTRIBUTES

prefTrafficDirect

GET-REPLACE;

```
        REGISTERED AS {package 17};
            PRESENT IF "the circuit end point subgroup is of type two-way.",
    carrierPackage PACKAGE
        ATTRIBUTES
            suppressOwnCac GET-REPLACE;
        REGISTERED AS {package 18};
            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 5};
```

8.1.6 cepsgComb

```
cepsgComb MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        cepsgCombPackage PACKAGE
            BEHAVIOUR
                cepsgCombPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.6";;
            ATTRIBUTES
                cepsgCombId
                    GET,
                cepsgCombSelection
                    GET-REPLACE,
                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 19};
                PRESENT IF "an instance supports it.";
REGISTERED AS {managedObjectClass 6};
```

8.1.7 cepsgCombList

```
cepsgCombList MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        cepsgCombListPackage PACKAGE
            BEHAVIOUR
                cepsgCombListPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.7";;
            ATTRIBUTES
                cepsgCombListId
                    GET,
                cepsgCombListSelection
                    GET-REPLACE,
                usedAlgorithm
                    GET-REPLACE;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 7};
```

8.1.8 digitModification

```
digitModification MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        digitModificationPackage PACKAGE
            BEHAVIOUR
                digitModificationPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.8";;
            ATTRIBUTES
                digitModificationId
                    GET,
                digitSuppress
                    GET-REPLACE
                    ADD-REMOVE,
                digitCombReplace
```

GET-REPLACE

ADD-REMOVE,

digitCombInsert

GET-REPLACE

ADD-REMOVE;;,

"ITU-T Recommendation M.3100":objectManagementNotificationsPackage;

REGISTERED AS {managedObjectClass 8};

8.1.9 digitPreparationCriteria

digitPreparationCriteria MANAGED OBJECT CLASS

DERIVED FROM "ITU-T Recommendation X.721":top;

CHARACTERIZED BY

digitPreparationCriteriaPackage PACKAGE

BEHAVIOUR

digitPreparationCriteriaPackageBeh BEHAVIOUR

DEFINED AS

"See subclause 7.9

Value combination of attributes (key-attributes) preparationOrigin, preparationTerm and analysisCriteriaInstance shall be unique among all instances of this object class.";;

ATTRIBUTES

digitPreparationCriteriaId

GET,

preparationOrigin

REPLACE-WITH-DEFAULT

DEFAULT VALUE ASN1TypeModule.defaultPreparationOrigin

GET-REPLACE,

preparationTerm

REPLACE-WITH-DEFAULT

DEFAULT VALUE ASN1TypeModule.defaultPreparationTerm

GET-REPLACE,

analysisCriteriaInstance

GET-REPLACE,

digitModificationInstance

GET-REPLACE;;,

"ITU-T Recommendation M.3100":objectManagementNotificationsPackage;

```
REGISTERED AS {managedObjectClass 9};
```

8.1.10 digitRebuildingCriteria

```
digitRebuildingCriteria MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        digitRebuildingCriteriaPackage PACKAGE
            BEHAVIOUR
                digitRebuildingCriteriaPackageBeh BEHAVIOUR
                    DEFINED AS
                                "See subclause 7.10
                                Value combination of attributes (key-attributes) rebuildingOrigin,
                                natureOfAddress and calledNumberingPlan shall be unique among all
                                instances of this object class.";;
            ATTRIBUTES
                digitRebuildingCriteriaId
                    GET,
                rebuildingOrigin
                    REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ASN1TypeModule.defaultRebuildingOrigin
                    GET-REPLACE,
                natureOfAddress
                    GET-REPLACE,
                calledNumberingPlan
                    GET-REPLACE,
                digitModificationInstance
                    GET-REPLACE;;,
        "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 10};
```

8.1.11 exception

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

```
        exceptionPackageBeh BEHAVIOUR
            DEFINED AS
                    "See subclause 7.11
                    Any particular set-element value of attribute (key-attribute) matchesIf shall be
                    unique among all instances of this object class.";;
    ATTRIBUTES
        exceptionId
            GET,
        matchesIf
            GET-REPLACE
            ADD-REMOVE,
        treatmentInstance
            GET-REPLACE;;,
  "ITU-T Recommendation M.3100":objectManagementNotificationsPackage;
REGISTERED AS {managedObjectClass 11};
```

8.1.12 localDestination

```
localDestination MANAGED OBJECT CLASS
  DERIVED FROM      "ITU-T Recommendation X.721":top;
  CHARACTERIZED BY
    localDestinationPackage PACKAGE
      BEHAVIOUR
        localDestinationPackageBeh BEHAVIOUR
          DEFINED AS
                    "See subclause 7.12";;
      ATTRIBUTES
        localDestinationId
          GET,
        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.

                        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. If the excludedSubscriberCodesPackage is present, the
                        members of the excludedSubcriberCodes attribute of the
                        localDestinationInstance have to be updated accordingly in their digit string
                        part, which corresponds to the initial subscriber code. 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.

                        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 20};
    PRESENT IF "it is necessary to exclude DNs from the local destination.";
    REGISTERED AS {managedObjectClass 12};
```

8.1.13 nationalDestination

```
nationalDestination MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        nationalDestinationPackage PACKAGE
            BEHAVIOUR
                nationalDestinationPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.13
                                    Value of attribute (key-attribute) nationalDestinationCode shall be unique
                                    among all instances of this object class.";;
            ATTRIBUTES
                nationalDestinationId
                    GET,
                nationalDestinationCode
                    GET
                    SET-BY-CREATE;;,
        "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
REGISTERED AS {managedObjectClass 13};
```

8.1.14 postAnalysisEvaluation

```
postAnalysisEvaluation MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        postAnalysisEvaluationPackage PACKAGE
            BEHAVIOUR
                postAnalysisEvaluationPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.14
                                    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,
            destinationGroupLabel
                GET-REPLACE,
            callHistoryInstance
                GET-REPLACE,
            routingOrigin
                REPLACE-WITH-DEFAULT
                DEFAULT VALUE ASN1TypeModule.defaultRoutingOrigin
                GET-REPLACE;;,
    "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 subclause 7.14";;
        ATTRIBUTES
            reqBearerCapability
                GET-REPLACE,
            reqSignCapability
                GET-REPLACE;
        REGISTERED AS {package 21};
                PRESENT IF "an instance requires it.",
    digitModificationInstancePackage
        ATTRIBUTE
            digitModificationInstance
                GET-REPLACE;
        REGISTERED AS {package 22};
        PRESENT IF "digit codes modification is needed.",
    trafficDistributionInstancePackage PACKAGE
```

BEHAVIOUR

trafficDistributionInstancePackageBeh BEHAVIOUR

DEFINED AS

"See subclause 7.14";;

ATTRIBUTES

trafficDistributionInstance

GET-REPLACE;

REGISTERED AS {package 23};

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 DEN/TMN-00035 [16].";;

ATTRIBUTES

schedulingAttribute

GET-REPLACE;

REGISTERED AS {package 24};

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 25};

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 26};
                PRESENT IF "activeRoutingPossibilitiesPackage is instantiated and if scheduling packages are not
                instantiated.";
REGISTERED AS {managedObjectClass 14};
```

8.1.15 prefixDigitAnalysis

```
prefixDigitAnalysis MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        prefixDigitAnalysisPackage PACKAGE
            BEHAVIOUR
                prefixDigitAnalysisPackageBeh BEHAVIOUR
                    DEFINED AS
                            "See subclause 7.15
                            Value of attribute (key-attribute) prefixCode shall be unique among all
                            instances of this object class.";;
            ATTRIBUTES
                prefixDigitAnalysisId
                    GET,
                prefixCode
                    GET-REPLACE;;,
        "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 subclause 7.15";;
        ATTRIBUTES
            carrierCodePresent
                INITIAL VALUE ASN1TypeModule.initialCarrierCodePresent
                GET;
        REGISTERED AS {package 27};
            PRESENT IF "the presence of a carrier code in prefixCode has to be indicated.";
REGISTERED AS {managedObjectClass 15};
```

8.1.16 routingPossData

```
routingPossData MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        routingPossDataPackage PACKAGE
            BEHAVIOUR
                routingPossDataPackageBeh BEHAVIOUR
                    DEFINED AS
                                "See subclause 7.16";;
            ATTRIBUTES
                routingPossDataId
                    GET,
                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
                                "Characterises the operator language.";;
```

```
        ATTRIBUTES
            languageDigit
                GET
                SET-BY-CREATE;
        REGISTERED AS {package 28};
                PRESENT IF "signalling system supports it and if it is needed on this routing possibility.",
    suppressCacPackage PACKAGE
        ATTRIBUTES
            suppressCac
                GET-REPLACE;
        REGISTERED AS {package 29};
                PRESENT IF "the option to administer suppression of CAC has to be provided.",
    digitModificationInstancePackage PACKAGE
        ATTRIBUTES
            digitModificationInstance
                GET-REPLACE;
        REGISTERED AS {package 30};
                PRESENT IF "digit string modification is needed for the instance of OC routingPossData.";
REGISTERED AS {managedObjectClass 16};
```

8.1.17 routingPossibilities

```
routingPossibilities MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        routingPossibilitiesPackage PACKAGE
            BEHAVIOUR
                routingPossibilitiesPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.17";;
            ATTRIBUTES
                routingPossibilitiesId
                    GET,
                routingPossibilitiesSelection
                    GET-REPLACE,
                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 31};
                    PRESENT IF " locking-unlocking of crankback is needed.";
REGISTERED AS {managedObjectClass 17};
```

8.1.18 routingPossRestrict

```
routingPossRestrict MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        routingPossRestrictPackage PACKAGE
            BEHAVIOUR
                routingPossRestrictPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.18";;
            ATTRIBUTES
                routingPossRestrictId
                    GET;;,
        "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
    CONDITIONAL PACKAGES
        skipGroupSignal1Package PACKAGE
            BEHAVIOUR
                skipGroupSignal1Beh 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 32};
            PRESENT IF "crankback with one or two signals (see ITU-T Recommendation E.170 [4]) is
            supported",
    skipGroupSignal2Package PACKAGE
        BEHAVIOUR
            skipGroupSignal2Beh 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 33};
            PRESENT IF "crankback with two signals (see ITU-T Recommendation E.170 [4]) is supported",
    "ITU-T Recommendation M.3100":attributeValueChangeNotificationPackage;
        PRESENT IF "an instance supports it";
REGISTERED AS {managedObjectClass 18};
```

8.1.19 trafficDistribution

```
trafficDistribution MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        trafficDistributionPackage PACKAGE
            BEHAVIOUR
                trafficDistributionPackageBeh BEHAVIOUR
                    DEFINED AS
                            "See subclause 7.19.

                            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 this attribute has to be 100 % (if applicable).

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 does not trigger an update of the percentage values in the trafficDistributionData but only an update of userLabel specified in this attribute.

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. ";;

ATTRIBUTES

trafficDistributionId

GET,

inputCriteriaDataForAlgorithm

GET-REPLACE,

trafficDistributionData

GET,

selectedInstances

GET-REPLACE;;,

"ITU-T Recommendation M.3100":objectManagementNotificationsPackage;

CONDITIONAL PACKAGES

destinationGroupLabelPackage PACKAGE

BEHAVIOUR

destinationGroupLabelBeh BEHAVIOUR

DEFINED AS

"Value of attribute (key-attribute) destinationGroupLabel shall be unique among all instances of this object class.";;

ATTRIBUTES

destinationGroupLabel

GET-REPLACE;

```
        REGISTERED AS {package 34};
            PRESENT IF "the relationship 'selects group of' (see E-R diag.2) is used.";
REGISTERED AS {managedObjectClass 19};
```

8.1.20 treatment

```
treatment MANAGED OBJECT CLASS
    DERIVED FROM    "ITU-T Recommendation X.721":top;
    CHARACTERIZED BY
        treatmentPackage PACKAGE
            BEHAVIOUR
                treatmentPackageBeh BEHAVIOUR
                    DEFINED AS
                                    "See subclause 7.20";;
            ATTRIBUTES
                treatmentId
                    GET;;,
        "ITU-T Recommendation M.3100":createDeleteNotificationsPackage;
REGISTERED AS {managedObjectClass 20};
```

8.2 Reused Packages Definitions

8.2.1 callingPartyCategoryPackage

```
callingPartyCategoryPackage PACKAGE
    ATTRIBUTES
        callingPartyCategory
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ASN1TypeModule.defaultCallingPartyCategory
            GET-REPLACE;
REGISTERED AS {package 35};
```

8.2.2 destinationTypePackage

```
destinationTypePackage PACKAGE
    BEHAVIOUR
        destinationTypePackageBeh BEHAVIOUR
            DEFINED AS
                    "Characterises unambiguously the type of destination.";;
```

ATTRIBUTES

destinationType

GET

SET-BY-CREATE;

REGISTERED AS {package 36};

8.2.3 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 37};

8.3 Attributes Definitions

8.3.1 activeDestination

activeDestination ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.ActiveDestination;

MATCHES FOR EQUALITY;

BEHAVIOUR

activeDestinationBeh BEHAVIOUR

DEFINED AS

"This attribute either references an object instance, mentions that a carrier access code is required but missing or selects a group of instances via a label.";;

REGISTERED AS {attribute 1};

8.3.2 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};

8.3.3 analysisCriteriaId

analysisCriteriaId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 3};

8.3.4 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};

8.3.5 analysisOrigin

analysisOrigin ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.Origin;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 5};

8.3.6 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};

8.3.7 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 organisational boundaries. ";;

REGISTERED AS {attribute 7};

8.3.8 calledNumberingPlan

calledNumberingPlan ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.CalledNumberingPlan;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 8};

8.3.9 callHistoryId

callHistoryId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 9};

8.3.10 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};

8.3.11 callingPartyCategory

callingPartyCategory ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.CallingPartyCategory;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 11};

8.3.12 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};
```

8.3.13 carrierCodePresent

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

8.3.14 carrierDataId

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

8.3.15 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};
```

8.3.16 cepId

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

8.3.17 cepsgCombId

cepsgCombId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 17};

8.3.18 cepsgCombListId

cepsgCombListId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 18};

8.3.19 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 19};

8.3.20 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 20};

8.3.21 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 21};

8.3.22 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 the circuit which is terminated by the circuit end point. The value of the CIC is identical in the two circuit end points which terminate the circuit. This attribute is applicable if SS No.7 is used.";;

REGISTERED AS {attribute 22};

8.3.23 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 23};

8.3.24 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 24};

8.3.25 destinationCode

```
destinationCode ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DestinationCode;
    MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
    BEHAVIOUR
        destinationCodeBeh BEHAVIOUR
            DEFINED AS
                    "It is a country code, or area code, or exchange identifying code, or individual line number,
                    or service code etc.";;
REGISTERED AS {attribute 25};
```

8.3.26 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 26};
```

8.3.27 destinationType

```
destinationType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.DestinationType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR
        destinationTypeBeh BEHAVIOUR
            DEFINED AS
                    "It 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 Recommendation Q.763 or type of number in ITU-T Recommendation Q.931) or
                    determined by the prefix digit analysis.";;
REGISTERED AS {attribute 27};
```

8.3.28 digitCombInsert

digitCombInsert ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitCombInsert;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

REGISTERED AS {attribute 28};

8.3.29 digitCombReplace

digitCombReplace ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitCombReplace;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

REGISTERED AS {attribute 29};

8.3.30 digitModificationId

digitModificationId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 30};

8.3.31 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 31};

8.3.32 digitPreparationCriteriaId

digitPreparationCriteriaId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 32};

8.3.33 digitRebuildingCriteriaId

digitRebuildingCriteriaId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 33};

8.3.34 digitSuppress

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

8.3.35 echoSuppressor

```
echoSuppressor ATTRIBUTE
    WITH ATTRIBUTE SYNTAX     ASN1TypeModule.YesNo;
    MATCHES FOR EQUALITY;
REGISTERED AS {attribute 35};
```

8.3.36 exceptionId

```
exceptionId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 36};
```

8.3.37 excludedSubscriberCodes

```
excludedSubscriberCodes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ExcludedSubscriberCodes;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 37};
```

8.3.38 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 DEN/TMN-00035 [16].";;
REGISTERED AS {attribute 38};
```

8.3.39 initialSubscriberCodes

initialSubscriberCodes ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.InitialSubscriberCodes;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 39};

8.3.40 inputCriteriaDataForAlgorithm

inputCriteriaDataForAlgorithm ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.InputCriteriaDataForAlgorithm;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 40};

8.3.41 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 41};

8.3.42 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 42};

8.3.43 localDestinationId

localDestinationId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 43};

8.3.44 matchesIf

matchesIf ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.MatchesIf;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

REGISTERED AS {attribute 44};

8.3.45 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 Recommendation E.164 [3] or any successor document.";;

REGISTERED AS {attribute 45};

8.3.46 nationalDestinationId

nationalDestinationId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 46};

8.3.47 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 47};

8.3.48 natureOfAddress

```
natureOfAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.NatureOfAddress;
    MATCHES FOR EQUALITY;
REGISTERED AS {attribute 48};
```

8.3.49 numberOfDigits

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

8.3.50 numberOfSatLinks

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

8.3.51 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.
                    The attribute value is technology specific.";;
REGISTERED AS {attribute 51};
```

8.3.52 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 52};

8.3.53 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 53};

8.3.54 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 54};

8.3.55 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 55};

8.3.56 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 56};

8.3.57 postAnalysisEvaluationId

postAnalysisEvaluationId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 57};

8.3.58 prefixCode

prefixCode ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.PrefixCode;

MATCHES FOR EQUALITY, SUBSTRINGS;

REGISTERED AS {attribute 58};

8.3.59 prefixDigitAnalysisId

prefixDigitAnalysisId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 59};

8.3.60 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 60};

8.3.61 prefTrafficDirect

prefTrafficDirect ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.PrefTrafficDirect;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 61};

8.3.62 preparationOrigin

preparationOrigin ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.Origin;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 62};

8.3.63 preparationTerm

preparationTerm ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.Term;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 63};

8.3.64 rDNId

rDNId ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;

MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;

BEHAVIOUR

rDNIdBeh BEHAVIOUR

DEFINED AS

"If the string choice for the syntax is used, matching on substrings is permitted. If the number choice for the syntax is used, then matching on ordering is permitted.";;

REGISTERED AS {attribute 64};

8.3.65 rebuildingOrigin

rebuildingOrigin ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.Origin;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 65};

8.3.66 reqBearerCapability

```
reqBearerCapability ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ReqBearerCapability;
    MATCHES FOR EQUALITY;
REGISTERED AS {attribute 66};
```

8.3.67 reqSignCapability

```
reqSignCapability ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.ReqSignCapability;
    MATCHES FOR EQUALITY;
REGISTERED AS {attribute 67};
```

8.3.68 routingOrigin

```
routingOrigin ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ASN1TypeModule.Origin;
    MATCHES FOR EQUALITY;
REGISTERED AS {attribute 68};
```

8.3.69 routingPossDataId

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

8.3.70 routingPossibilitiesId

```
routingPossibilitiesId ATTRIBUTE
    DERIVED FROM  rDNId;
REGISTERED AS {attribute 70};
```

8.3.71 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 OCs localDestination and routingPossData or of OC cepsgComb or of OC cepsg or of OC routingPossibilities. In this list, only one instance of OC localDestination may be found.";;

REGISTERED AS {attribute 71};

8.3.72 routingPossRestrictId

routingPossRestrictId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 72};

8.3.73 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 DEN/TMN-00035 [16].";;

REGISTERED AS {attribute 73};

8.3.74 searchMethod

searchMethod ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.SearchMethod;

MATCHES FOR EQUALITY;

BEHAVIOUR

searchMethodBeh BEHAVIOUR

DEFINED AS

"detailed under searchMethod in subclause 7.5";;

REGISTERED AS {attribute 74};

8.3.75 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 75};

8.3.76 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 RecommendationE.170) arrives from a cepsg reachable via one of these routing possibilities.";;

REGISTERED AS {attribute 76};

8.3.77 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 RecommendationE.170) arrives from a cepsg reachable via one of these routing possibilities.";;

REGISTERED AS {attribute 77};

8.3.78 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 78};

8.3.79 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 79};

8.3.80 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 80};

8.3.81 trafficCategory

trafficCategory ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.TrafficCategory;

MATCHES FOR EQUALITY;

BEHAVIOUR

trafficCategoryBeh BEHAVIOUR

DEFINED AS

"This attribute describes the traffic category which is assigned to the call that will be routed via the pointed cepsg or cepsgComb instance.
This attribute shall not be mixed up with the parameter calling party's category of Q.763.

The ASN.1 type traffic category comprises the following values:

- nationalTraffic: This value is used for traffic via the referenced cepsg/cepsgComb, if the referenced cepsg/cepsgComb to the adjacent exchange does not cross international boundaries and no other specific value of the ASN.1 type TrafficCategory is appropriate.

- internationalTransitTraffic: This value is used for traffic via the referenced cepsg/cepsgComb to an adjacent exchange, if the traffic crosses international boundaries and the adjacent exchange serves as transit exchange for the traffic.

- internationalTerminatingTraffic: This value is used for traffic via the referenced cepsg/cepsgComb to an adjacent exchange, if the traffic crosses international boundaries and the adjacent exchange serves as an international terminating exchange.";;

REGISTERED AS {attribute 81};

8.3.82 trafficDistributionData

trafficDistributionData ATTRIBUTE

WITH ATTRIBUTE SYNTAX ASN1TypeModule.TrafficDistributionData;

MATCHES FOR EQUALITY;

REGISTERED AS {attribute 82};

8.3.83 trafficDistributionId

trafficDistributionId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 83};

8.3.84 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 84};

8.3.85 treatmentId

treatmentId ATTRIBUTE

DERIVED FROM rDNId;

REGISTERED AS {attribute 85};

8.3.86 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 86};

8.3.87 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 87};

8.4 Name Bindings

8.4.1 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 1};

8.4.2 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 2};
```

8.4.3 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 3};
```

8.4.4 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
```

DELETE ;

REGISTERED AS {nameBinding 4};

8.4.5 cepsg-managedElement

cepsg-managedElement 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 5};

8.4.6 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 6};

8.4.7 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 7};

8.4.8 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 8};

8.4.9 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 9};

8.4.10 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 10};

8.4.11 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 11};

8.4.12 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 12};
```

8.4.13 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 13};
```

8.4.14 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 14};
```

8.4.15 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 15};

8.4.16 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 16};

8.4.17 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 17};

8.4.18 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 18};

8.4.19 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;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE ;

REGISTERED AS {nameBinding 19};

8.4.20 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;
    CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE ;
REGISTERED AS {nameBinding 20};
```

8.5 ASN.1 Type Definitions

```
ASN1TypeModule { ccitt(0) identified-organisation (4) etsi(0) callRoutingInformationManagement(292)
informationModel(0) asn1Module(2) asn1TypeModule(0)}

DEFINITIONS ::=

BEGIN

IMPORTS

ObjectClass, ObjectInstance, Attribute

FROM CMIP-1 {joint-iso-ccitt ms (9) cmip (1) module(0) protocol (3)}

AdministrativeState

FROM Attribute-ASN1Module {joint-iso-ccitt ms (9) smi(3) part2(2) asn1Module(2) 1}

NameType

FROM ASN1DefinedTypesModule {ccitt recommendation m gnm(3100) informationModel(0) asn1Modules(2)
asn1DefinedTypesModule (0)};

informationModel            OBJECT IDENTIFIER::={ccitt (0) identified-organisation (4) etsi (0)
    call-routing-information-management (292) informationModel (0)}

standardSpecificExtension   OBJECT IDENTIFIER::={informationModel standardSpecificExtension(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 value
initialCarrierCodePresent            CarrierCodePresent    ::= NULL
-- ASN.1 Types
ActiveDestination           ::= CHOICE {
        destination         [0] ObjectInstance,
        destinationGroup    [1] DestinationGroup,
        carrierRequired     [2] NULL }
BoundaryCrossing            ::= INTEGER {
        national            (0),
        international       (1)}
CalledNumberingPlan         ::= BIT STRING (SIZE(4))
-- Value according ITU-T Recommendation Q.763
CallingPartyCategory        ::= CHOICE {
        anyCategory         [0] NULL,
        definedCategory     [1] BIT STRING(SIZE(8)),
-- Values of 'definedCategory' according ITU-T Recommendation Q.763
        extendedCategory        [2] OBJECT IDENTIFIER}
CarrierCode                 ::= IA5String(FROM("0".."9"|"A".."F"))
CarrierCodePresent          ::= NULL
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 Recommendation Q.763
MatchesIf           ::= SET OF CHOICE {
        criteria        [0] ObjectClass,
        cause           [1] BIT STRING}
-- causes as defined in ITU-T Recommendation 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 Recommendation E.164 [3] or any successor document
NatureOfAddress     ::= BIT STRING (SIZE(7))
-- Value according ITU-T Recommendation Q.763
NumberOfDigits      ::= INTEGER
NumberOfSatLinks        ::= INTEGER
ObjectInstanceOrNull        ::= CHOICE {
        objectInstance      [0] ObjectInstance,
        null            [1] NULL}
```

```
-- Definition similar to PointerOrNull from ITU-T Recommendation M.3100 [5]
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
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
```

8.6 Cross Reference List

This list gives a cross reference between each attribute and the managed object classes in which it is used for their definition.

Table 25

Attribute Label	Registered as attribute #	Used in managedObjectClass #
activeDestination	1	1
activeRoutingPossibilities	2	14
analysisCriteriaId	3	1
analysisCriteriaInstance	4	9
analysisOrigin	5	1
assocSignRouteSetNePart	6	5
boundaryCrossing	7	5
calledNumberingPlan	8	10
cfieldallHistoryId	9	2
callHistoryInstance	10	14
callingPartyCategory	11	1, 14
carrierCode	12	3
carrierCodePresent	13	15
carrierDataId	14	3
carrierDataInstance	15	1
cepId	16	4
cepsgCombId	17	6
cepsgCombListId	18	7
cepsgCombListSelection	19	7
cepsgCombOrCepsgInstance	20	16
cepsgCombSelection	21	6
cic	22	4
circuitNumber	23	4
crankbackAdminState	24	17
destinationCode	25	1
destinationGroupLabel	26	14, 19
destinationType	27	1, 15
digitCombInsert	28	8

(continued)

Table 26 (continued)

Attribute Label	Registered as attribute #	Used in managedObjectClass #
digitCombReplace	29	8
digitModificationId	30	8
digitModificationInstance	31	9, 10, 14, 16
digitPreparationCriteriaId	32	9
digitRebuildingCriteriaId	33	10
digitSuppress	34	8
exceptionId	35	11
echoSuppressor	36	2
excludedSubscriberCodes	37	12
extSchedulingAttribute	38	1
initialSubscriberCodes	39	12
inputCriteriaDataForAlgorithm	40	19
languageDigit	41	16
languageDigitProc	42	5
localDestinationId	43	12
matchesIf	44	11
nationalDestinationCode	45	13
nationalDestinationId	46	13
nationalDestinationInstance	47	1, 12
natureOfAddress	48	10
numberOfDigits	49	1
numberOfSatLinks	50	2
officeEquipment	51	4
originForAnalysis	52	5
originForPreparation	53	5
originForRebuilding	54	5
originForRouting	55	5
ownCac	56	3
postAnalysisEvaluationId	57	14
prefixCode	58	15
prefixDigitAnalysisId	59	15
prefixDigits	60	5
prefTrafficDirect	61	5
preparationOrigin	62	9
preparationTerm	63	9
rDNId	64	
rebuildingOrigin	65	10

(continued)

Table 26 (concluded)

Attribute Label	Registered as attribute #	Used in managedObjectClass #
reqBearerCapability	66	14
reqSignCapability	67	14
routingOrigin	68	14
routingPossDataId	69	16
routingPossibilitiesId	70	17
routingPossibilitiesSelection	71	17
routingPossRestrictId	72	18
schedulingAttribute	73	14
searchMethod	74	5
selectedInstances	75	19
skipGroupSignal1	76	18
skipGroupSignal2	77	18
suppressCac	78	16
suppressOwnCac	79	5
termForPreparation	80	5
trafficCategory	81	16
trafficDistributionData	82	19
trafficDistributionId	83	19
trafficDistributionInstance	84	14
treatmentId	85	20
treatmentInstance	86	11
usedAlgorithm	87	6, 7, 17

Annex A (informative): Untitled

A.1 Introduction

This annex illustrates how to use the object classes of the present document 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 objects classes.

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

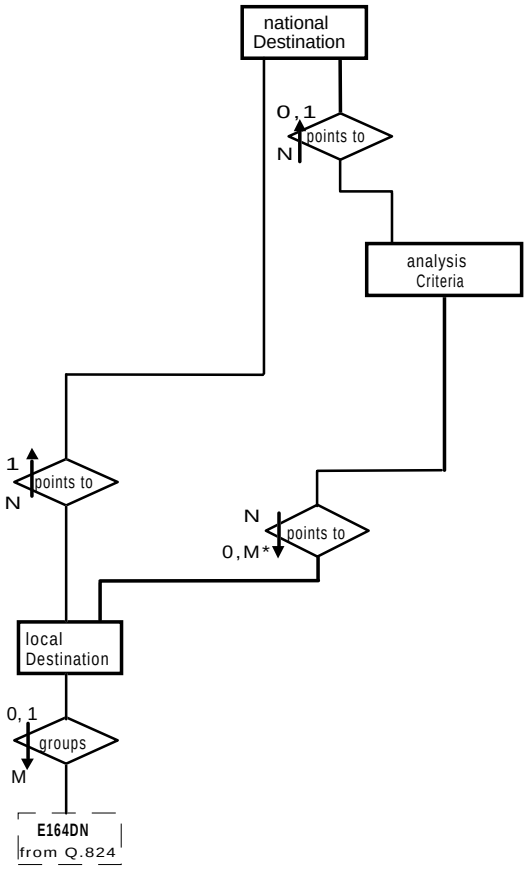
A.2 Scenario 1

Call from a local subscriber to a local subscriber.

A.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 analyzes the total dialled digit code to identify the corresponding subscriber.

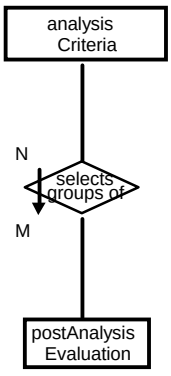


* : M-cardinality because of Time scheduling;
Without Time scheduling: M=1

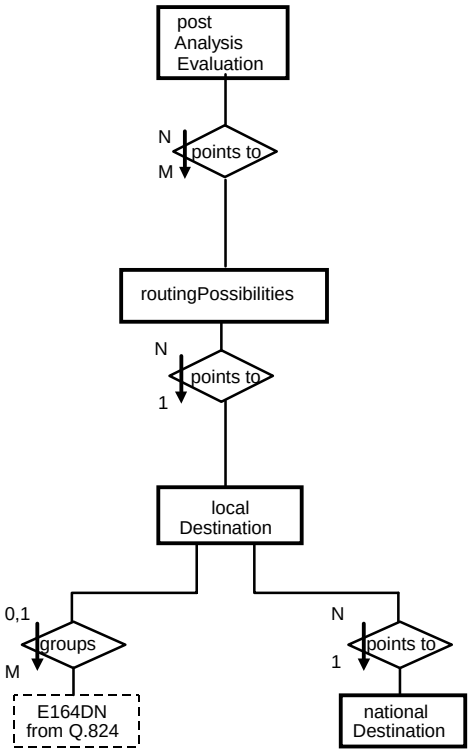
E-R Diagram 2: Destination Selection Fragment

A.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.



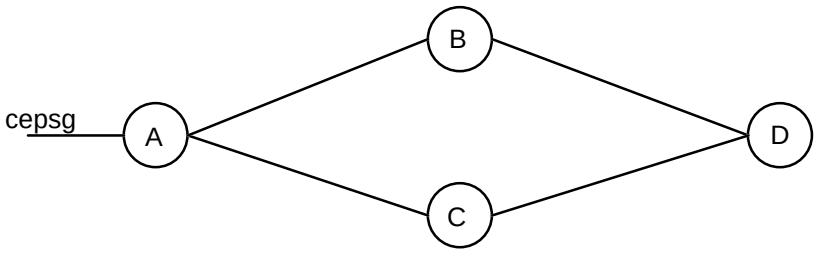
E-R Diagram 2: Destination Selection Fragment



E-R Diagram 3: Routing Possibility Selection Fragment

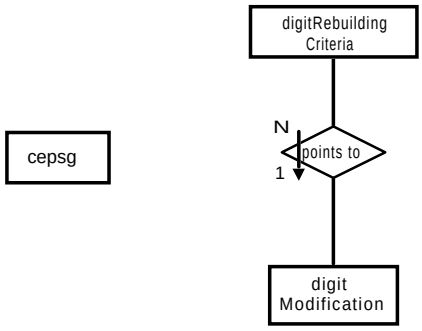
A.3 Scenario 2

Call incoming exchange 'A' via cepsg to be directed to destination (for this example 'D') via exchange 'B' or via exchange 'C'.



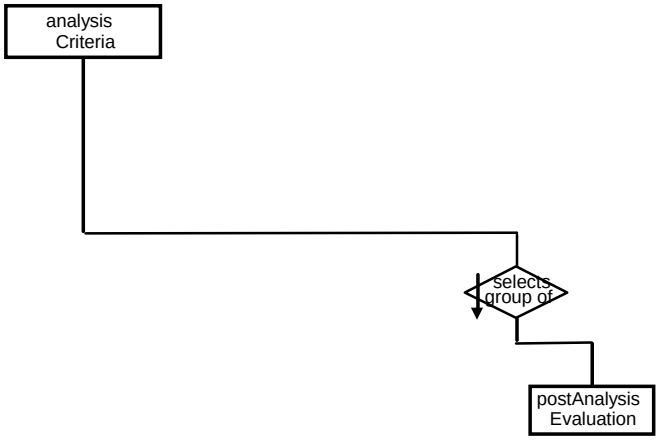
A.3.1 First solution

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.



E-R Diagram 1: Digit Rebuilding Fragment

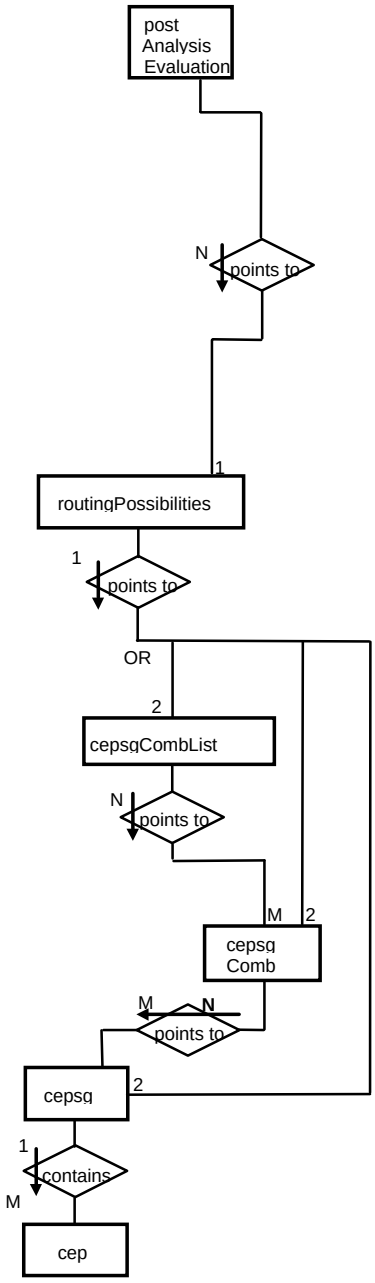
With the help of the OC analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. The call will be handled by the OC postAnalysisEvaluation to evaluate e.g. routing origin and calling party category.



E-R Diagram 2: Destination Selection Fragment

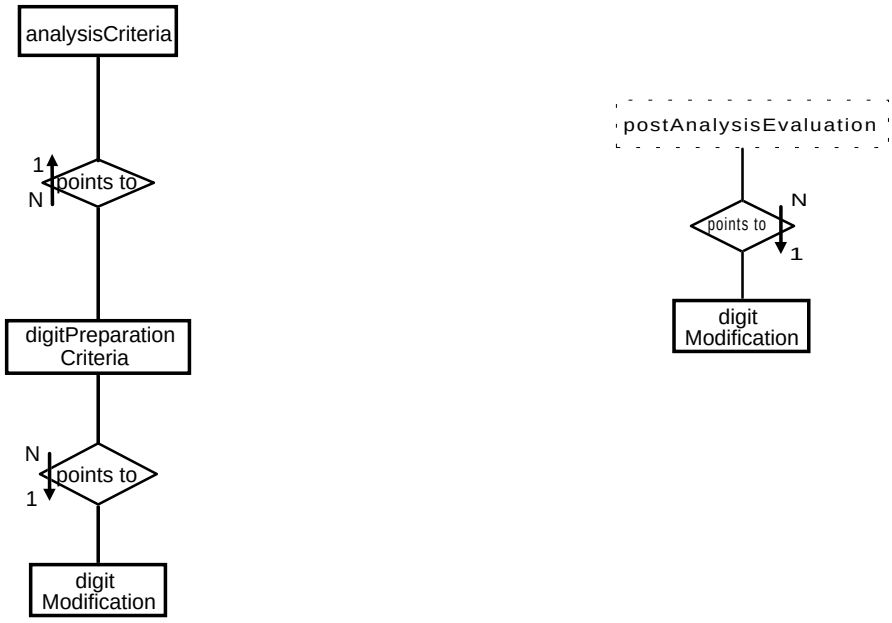
The result of the analysis by the help of the OC postAnalysisEvaluation will be an instance of the OC routingPossibilities, which offers a list of instances either of the OC cepsgCombList or of the OC cepsgComb or of the OC cepsg. Hence, if the first selected instance of the list is not available the 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 endpoint subgroups (OC cepsg) down to the circuit endpoints (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.



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 endpoint subgroup (OC digitPreparationCriteria) or just after the post analysis evaluation.



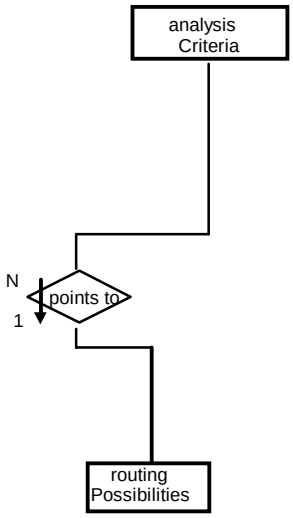
E-R Diagram 4: Digit Preparation Fragment

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

A.3.2 Second solution

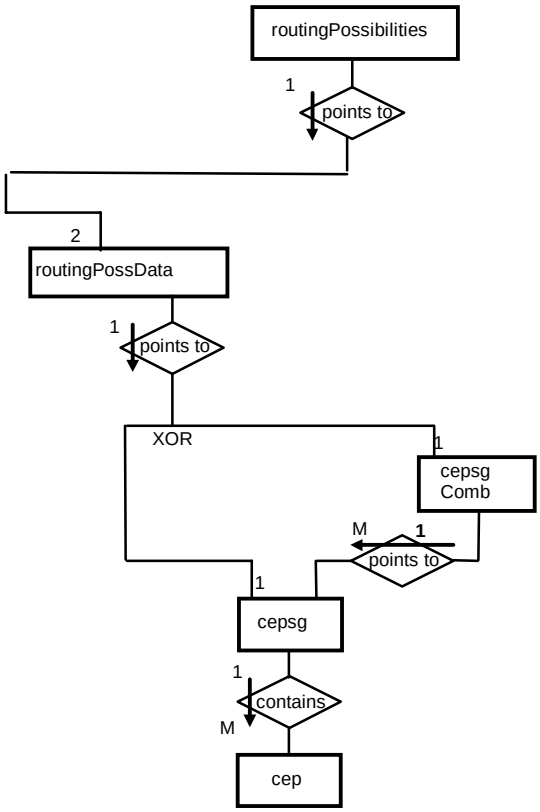
If no insertion of digits is needed before the digit analysis has to start, then no object class of the „digit rebuilding" fragment has to be administered.

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 routingPosssibilities afterwards, to select a way (routing possibility) to exchange 'D' via exchange 'B' or exchange 'C'.



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.



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.

A.3.3 Third solution

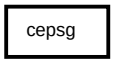
E-R diagram 1 shows that the possibility exists for implied digits on the incoming circuit subgroup.

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

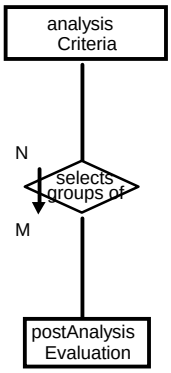
E-R diagram 3 shows that alternative routes are implemented via a linked-list mechanism that creates a chain of instances of OC routingPossibilities.

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

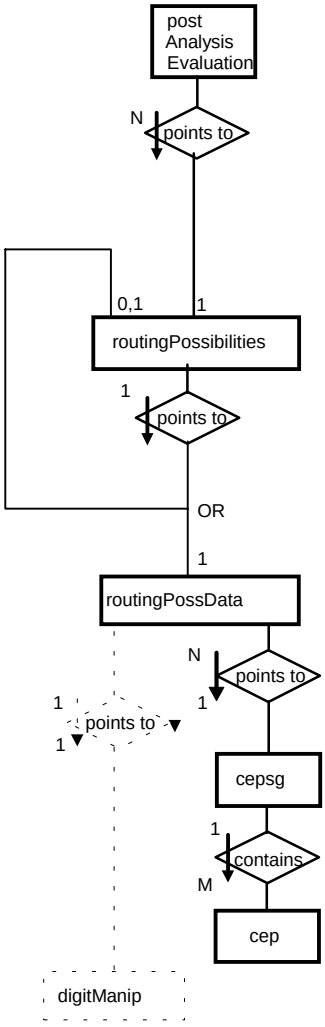
E-R diagram 5 is not applicable for this scenario.



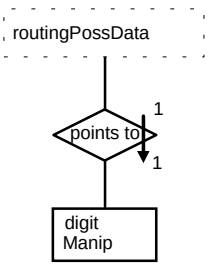
E-R Diagram 1: Digit Rebuilding Fragment



E-R Diagram 2: Destination Selection Fragment



E-R Diagram 3: Routing Possibility Selection Fragment



E-R Diagram 4: Digit Preparation Fragment

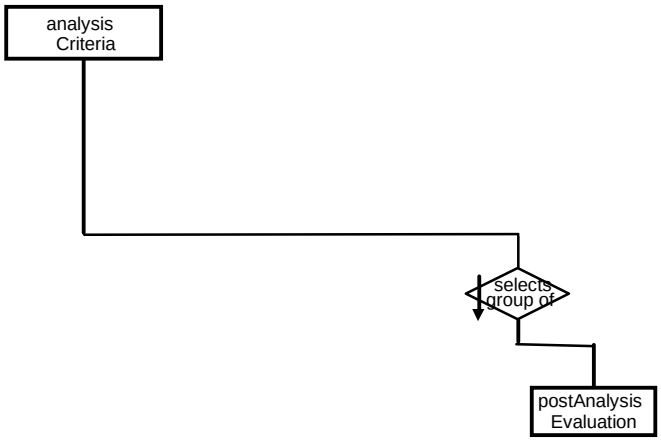
A.4 Scenario 3

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.

A.4.1 First solution

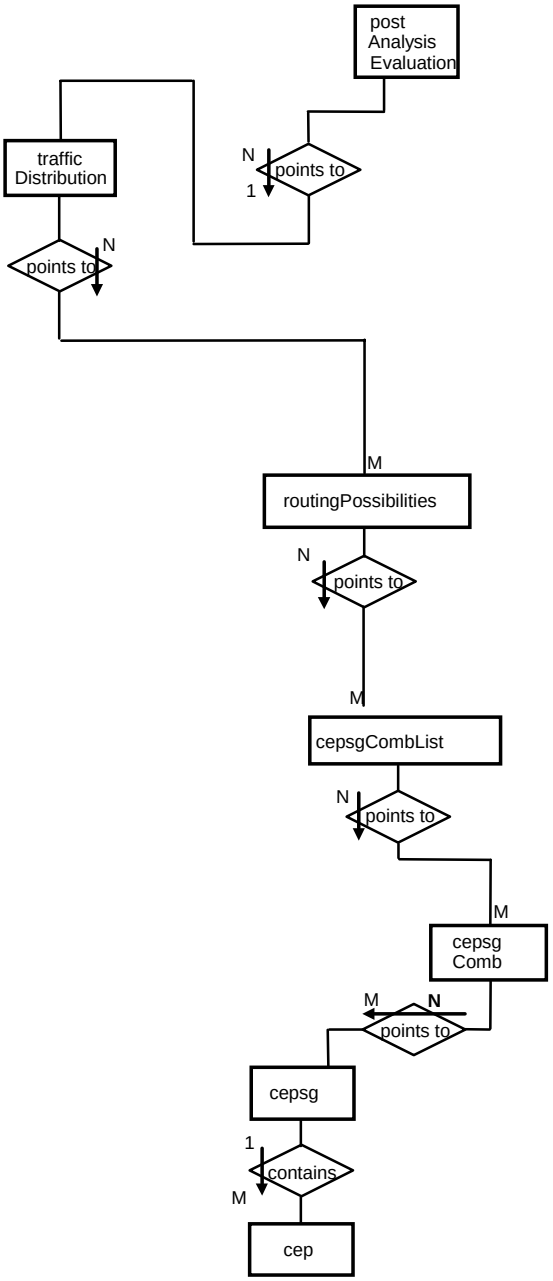
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to first solution for scenario 2.

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.



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.

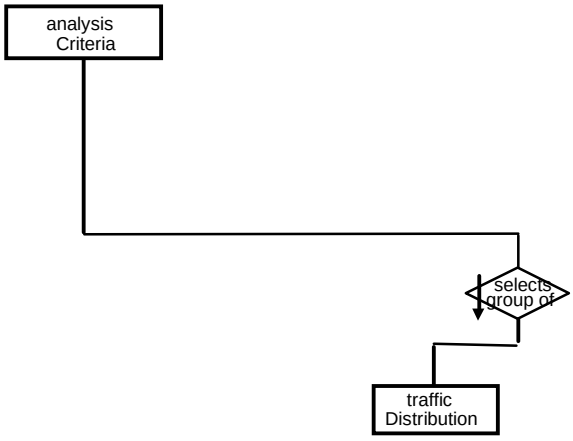


E-R Diagram 3: Routing Possibility Selection Fragment

A.4.2 Second solution

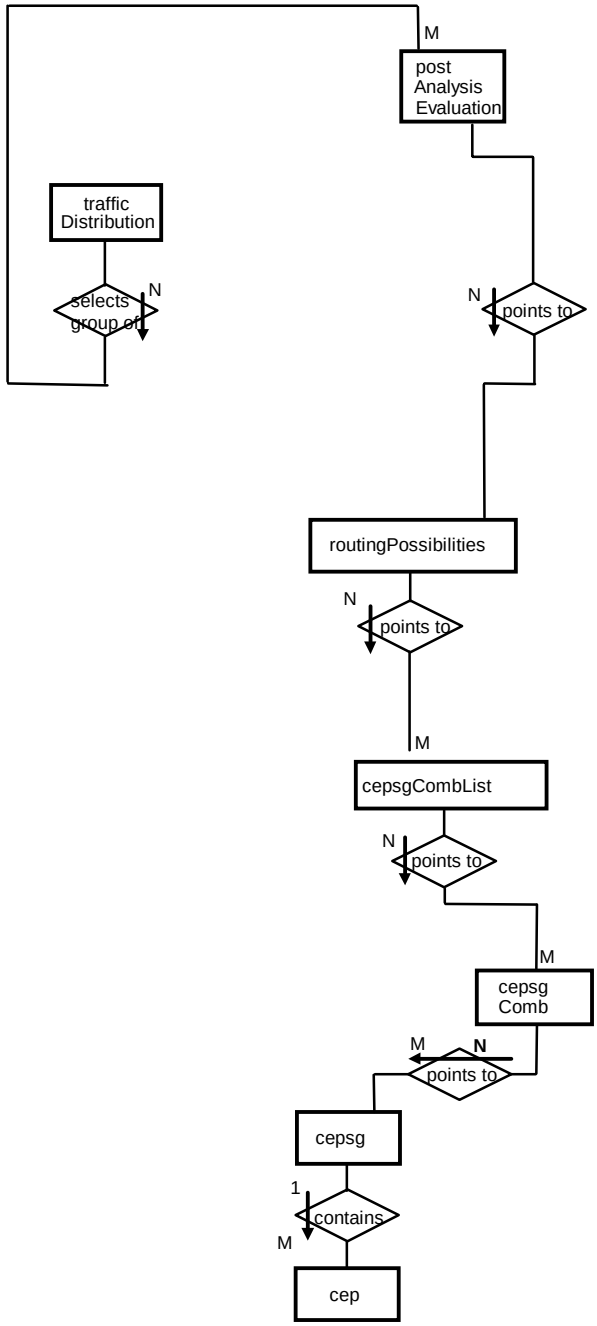
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to first solution for scenario 2.

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 is depending on the market requirements.



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.

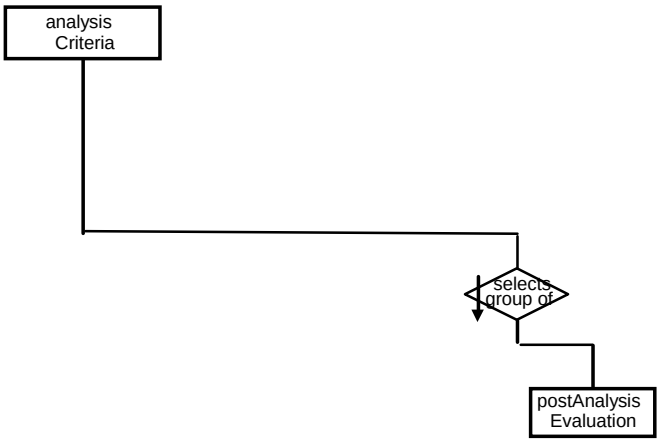


E-R Diagram 3: Routing Possibility Selection Fragment

A.4.3 Third solution

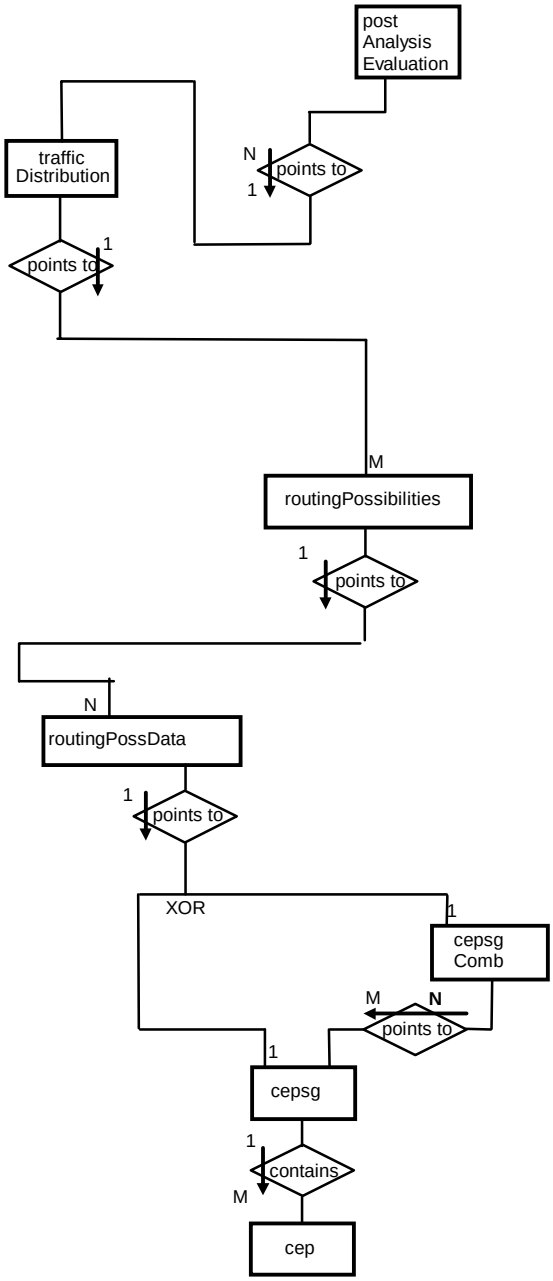
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to second solution for scenario 2.

With the help of the object class analysisCriteria the exchange will recognize that the call shall not be routed to a local destination. As 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.



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.



E-R Diagram 3: Routing Possibility Selection Fragment

A.4.4 Fourth solution

E-R diagram 1 shows that the possibility exists for implied digits on the incoming circuit subgroup.

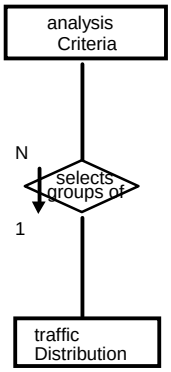
E-R diagram 2 shows that the system uses a link to OC trafficDistribution from OC analysisCriteria.

E-R diagram 3 shows that alternative routes are implemented via a linked-list mechanism that creates a chain of instances of OC routingPossibilities. This linked-list is also used for crankback processing. The diagram also shows the trafficDistribution, and the possibility of different routing results (local destination versus outgoing route), dependent on the matching instance of OC postAnalysisEvaluation.

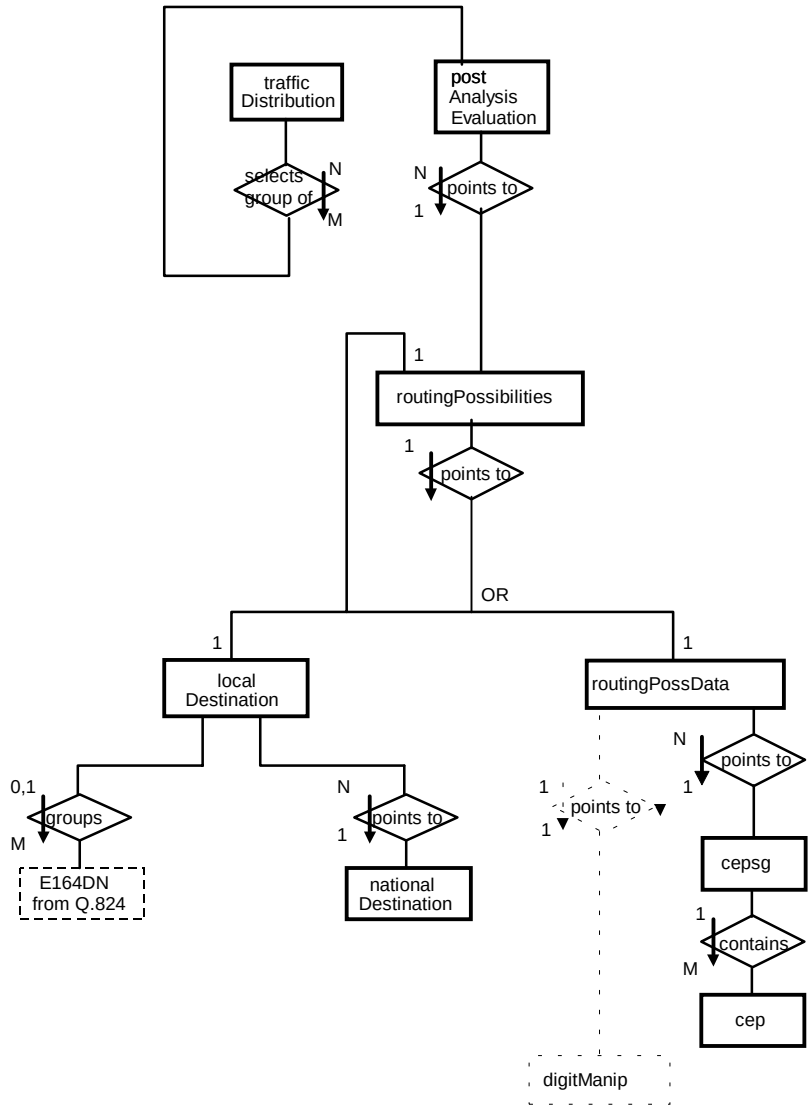
E-R diagram 4 shows that the possibility exists to manipulate the digits that are sent out on the outgoing circuit.

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

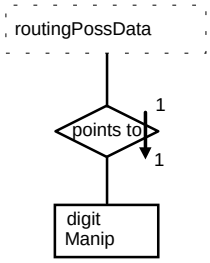
E-R Diagram 1: Digit Rebuilding Fragment



E-R Diagram 2: Destination Selection Fragment



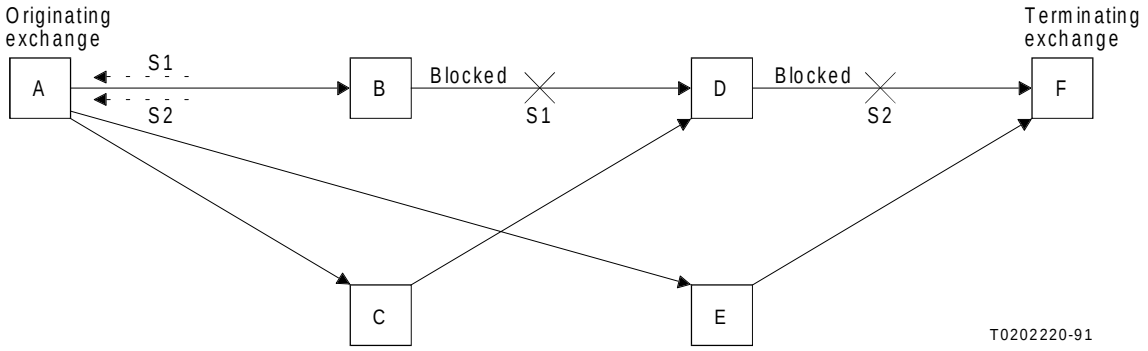
E-R Diagram 3: Routing Possibility Selection Fragment



E-R Diagram 4: Digit Preparation Fragment

A.5 Scenario 4

Crankback processing (see figure below imported from ITU-T Recommendation E.170 [4] picture 4)



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

Figure 4/E.170

A.5.1 First solution

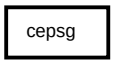
E-R diagram 1 shows that the possibility exists for implied digits on the incoming circuit subgroup.

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

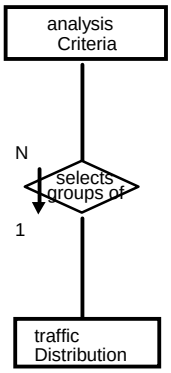
E-R diagram 3 shows that alternative routes are implemented via a linked-list mechanism that creates a chain of instances of OC routingPossibilities. The diagram also shows the trafficDistribution that is used for proportionate bidding. The overflow mechanism is again implemented via a linked-list of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

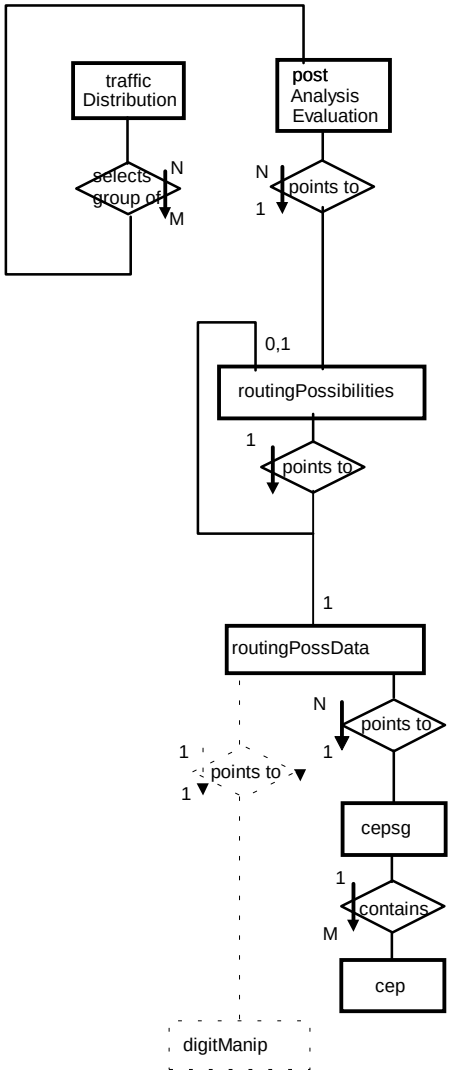
E-R diagram 5 is not applicable for this scenario.



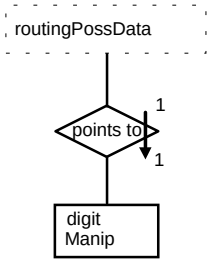
E-R Diagram 1: Digit Rebuilding Fragment



E-R Diagram 2: Destination Selection Fragment



E-R Diagram 3: Routing Possibility Selection Fragment



E-R Diagram 4: Digit Preparation Fragment

A.5.2 Second 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 possibilties from exchange "A" to exchange "F" via the transit exchanges "B", "C", "D" and "E".

According to the figure of scenario 4, 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":

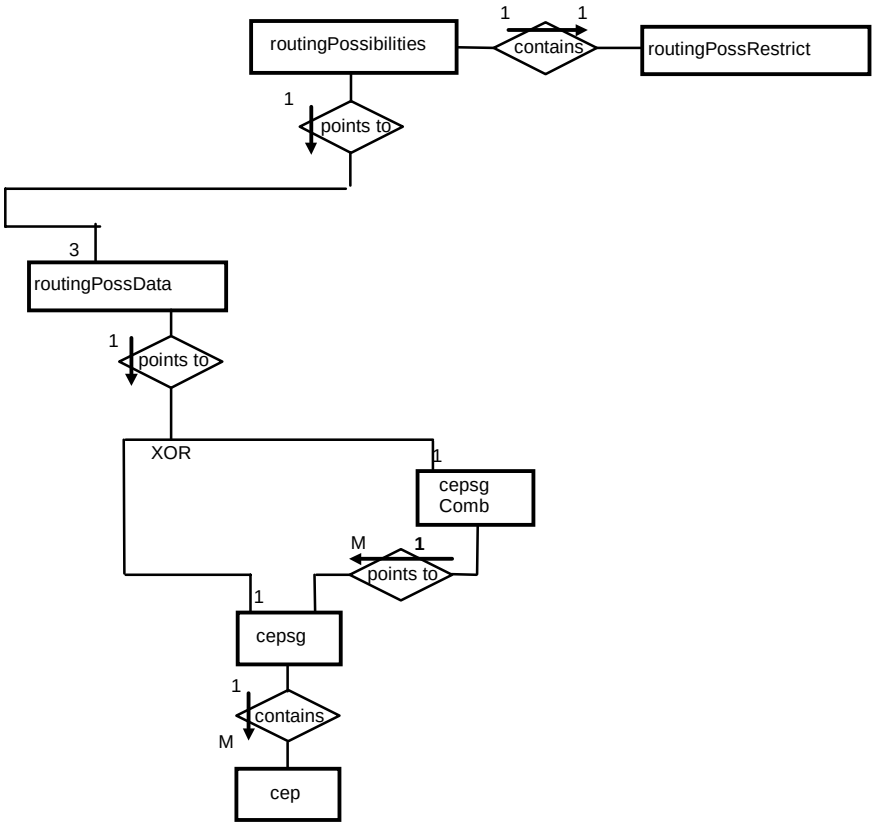
Routing possibility 1: "A" ==> "B" (==> "D" ==> "F")

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")

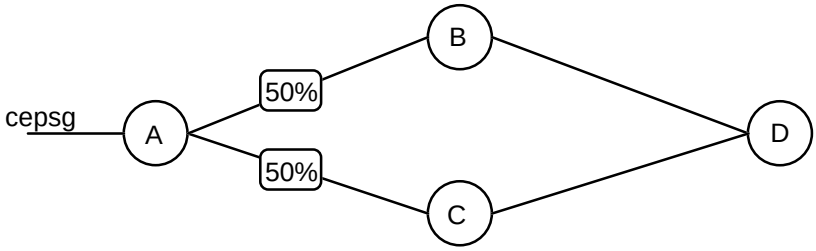
The remaining steps are the usual routing possibilities selection procedures.



E-R Diagram 3: Routing Possibility Selection Fragment

A.6 Scenario 5

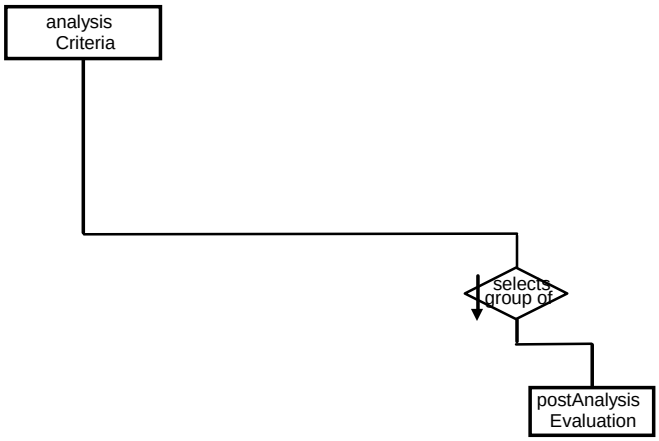
Call incoming exchange "A" via cepsg with for example destination "D" with proportional bidding so that 50 % of the traffic is diverted via exchange "B" and 50 % via exchange "C".



A.6.1 First solution

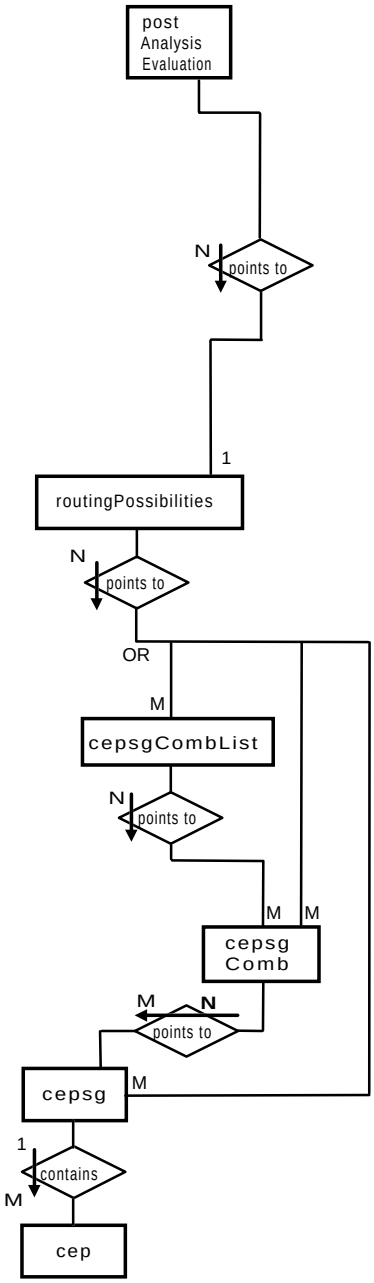
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be repeated in this example. It works in analogy to first solution for scenario 2.

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.



E-R Diagram 2: Destination Selection Fragment

The result of the analysis by 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.

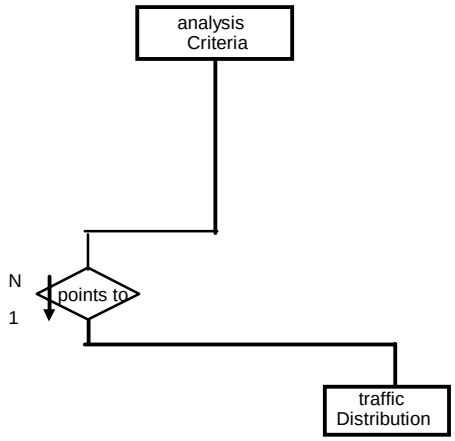


E-R Diagram 3: Routing Possibility Selection Fragment

A.6.2 Second solution

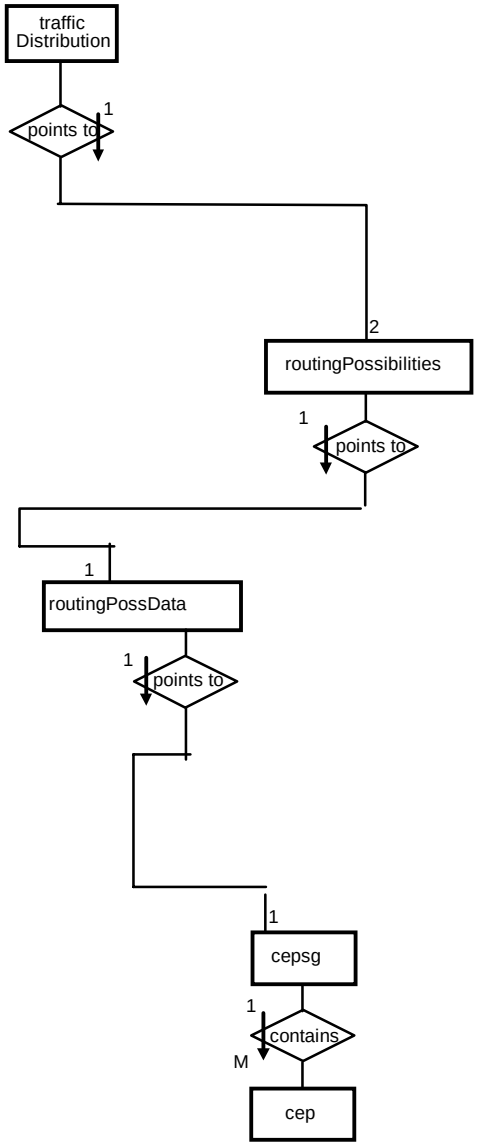
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to second solution for scenario 2.

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



E-R Diagram 2: Destination Selection Fragment

The proportional bidding algorithm will be executed in the OC trafficDistribution.

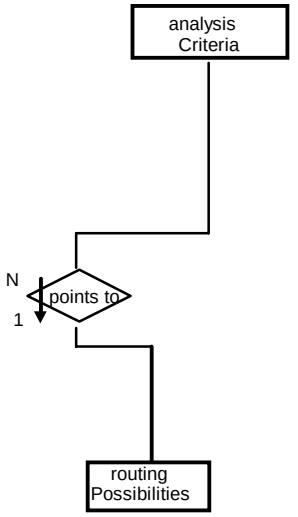


E-R Diagram 3: Routing Possibility Selection Fragment

A.6.3 Third solution

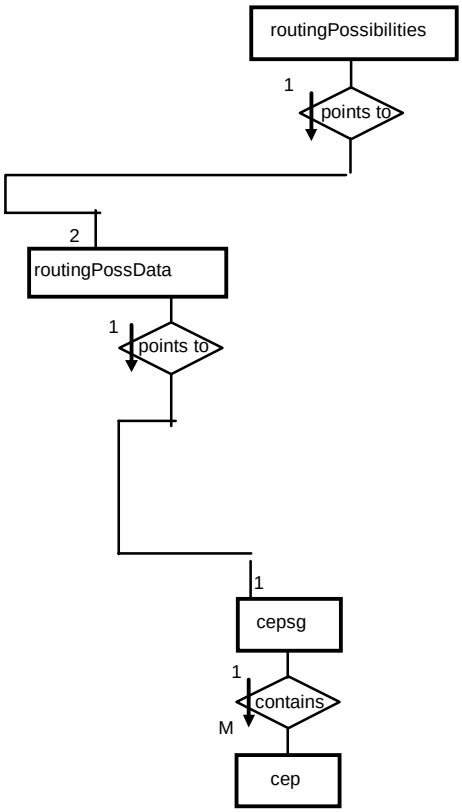
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to second solution for scenario 2.

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 %.



E-R Diagram 2: Destination Selection Fragment

The proportional bidding algorithm will be executed in the OC routingPossibilities.

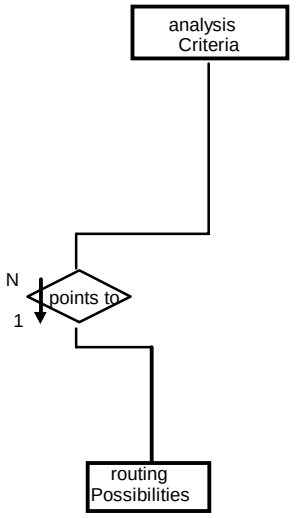


E-R Diagram 3: Routing Possibility Selection Fragment

A.6.4 Fourth solution

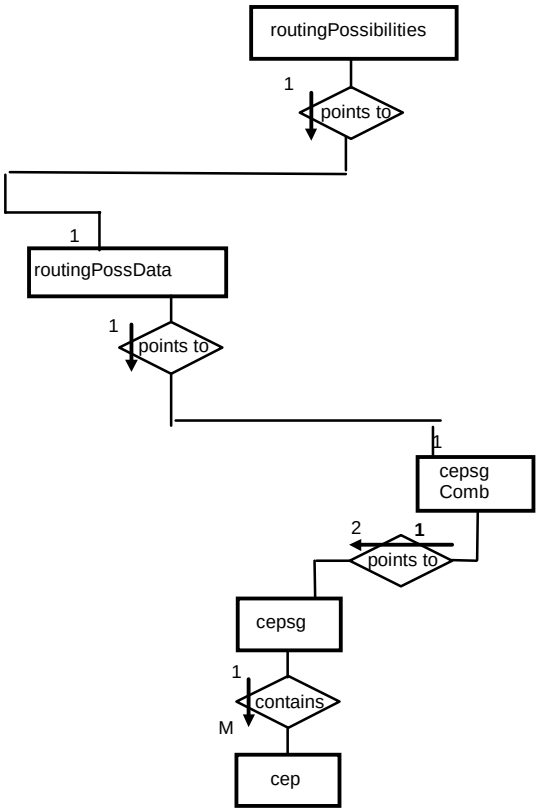
The digit rebuilding fragment, digit preparation fragment and exception handling fragment shall not be considered in this example. It works in analogy to second solution for scenario.

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.



E-R Diagram 2: Destination Selection Fragment

The proportional bidding algorithm will be executed in the OC cepsgComb.



E-R Diagram 3: Routing Possibility Selection Fragment

Annex B (informative): Untitled

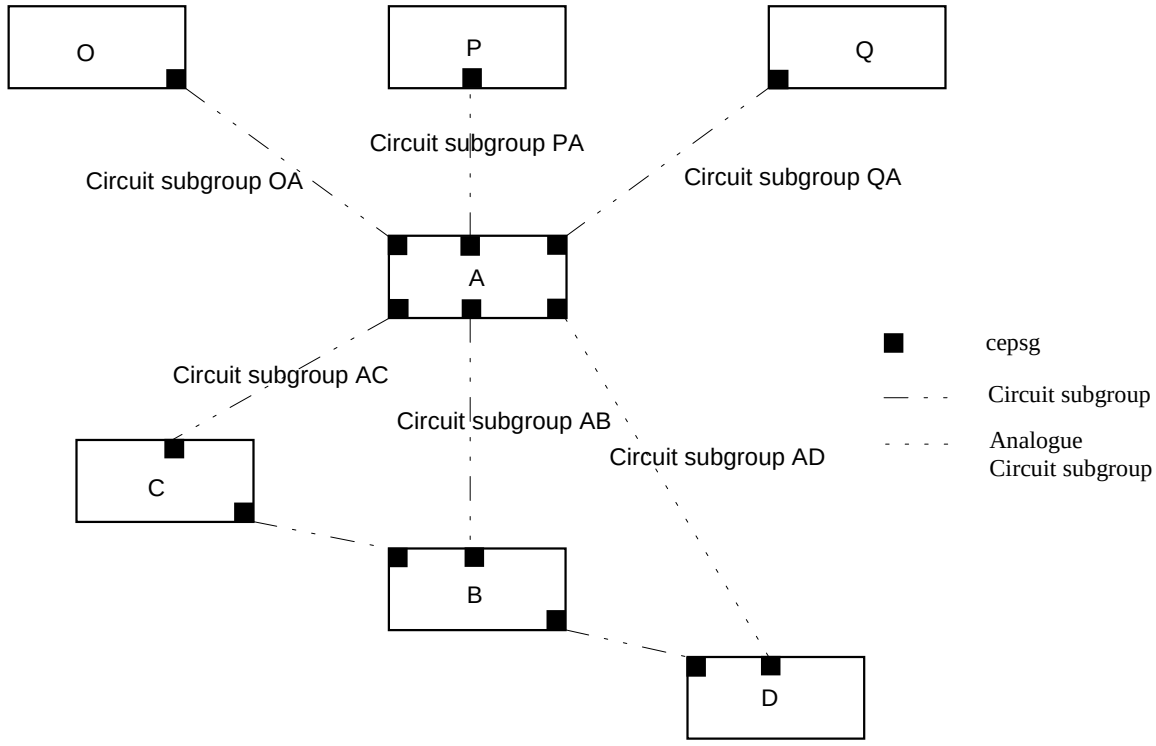
B.1 Introduction

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

B.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 below:



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".

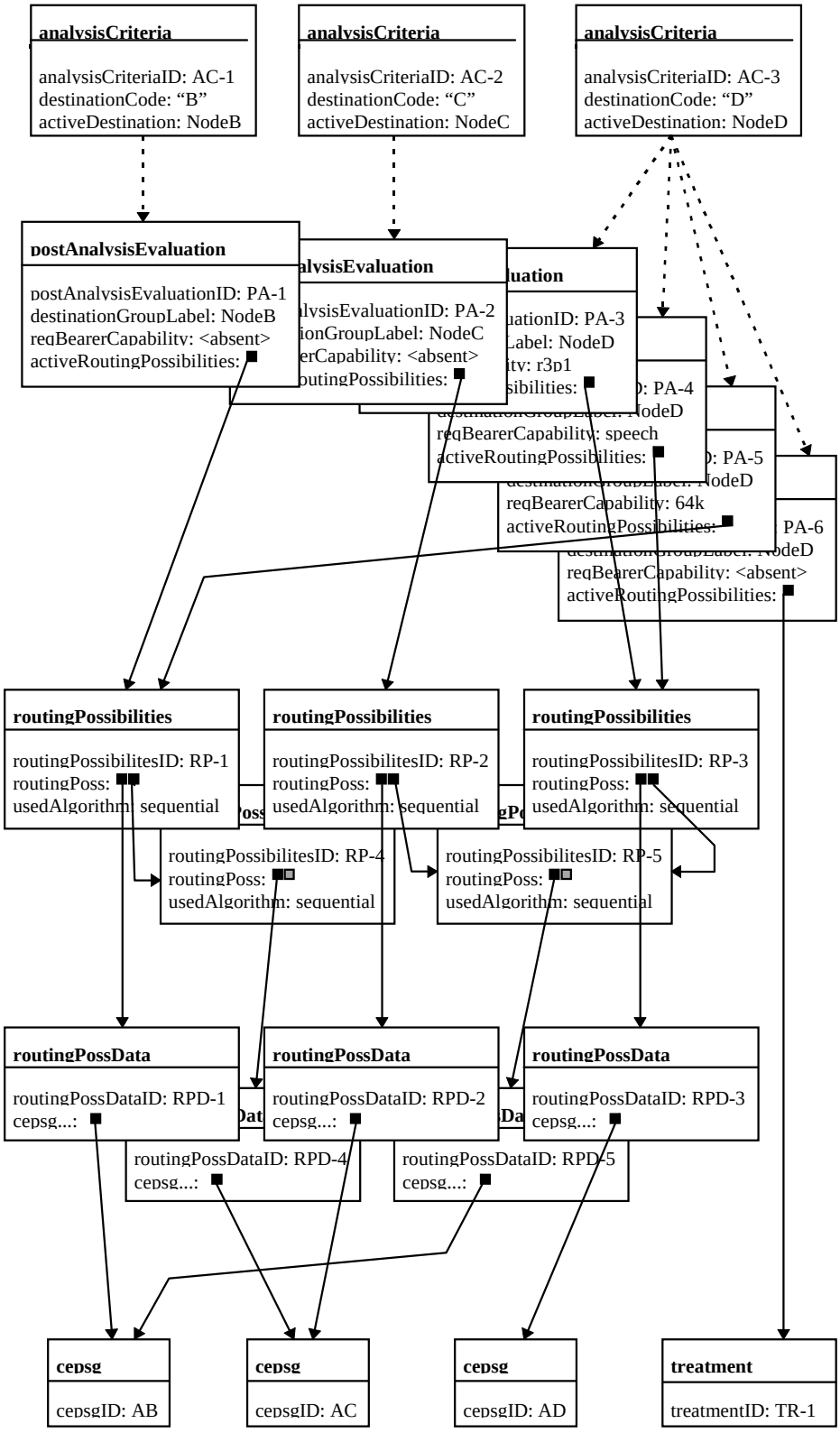
3 Exchange "A" requires special routing to the exchange "D" dependent on the required bearer capability of the call.

4 Routing requirements from the network provider as follows:

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

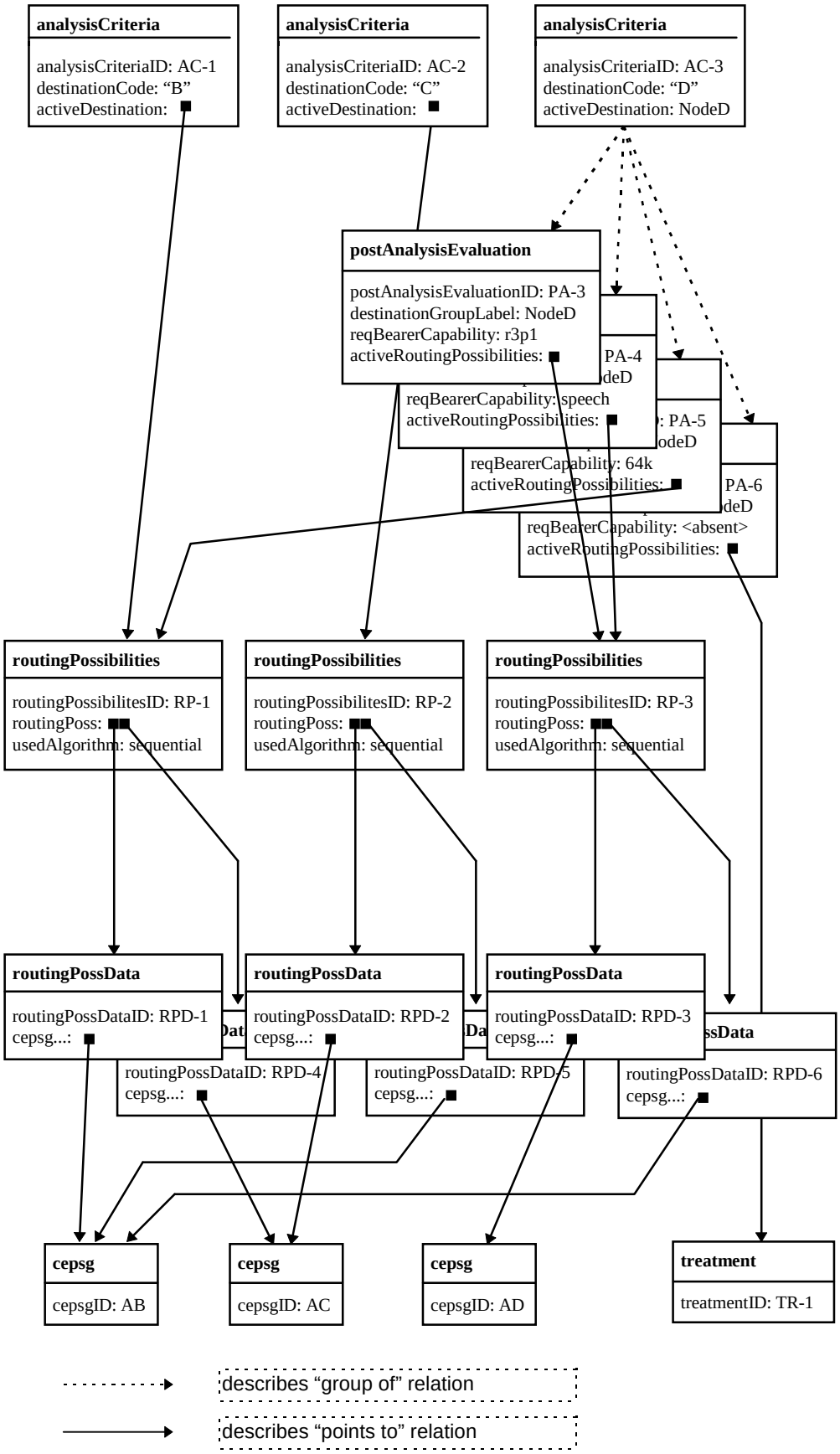
B.2.1 First solution

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.

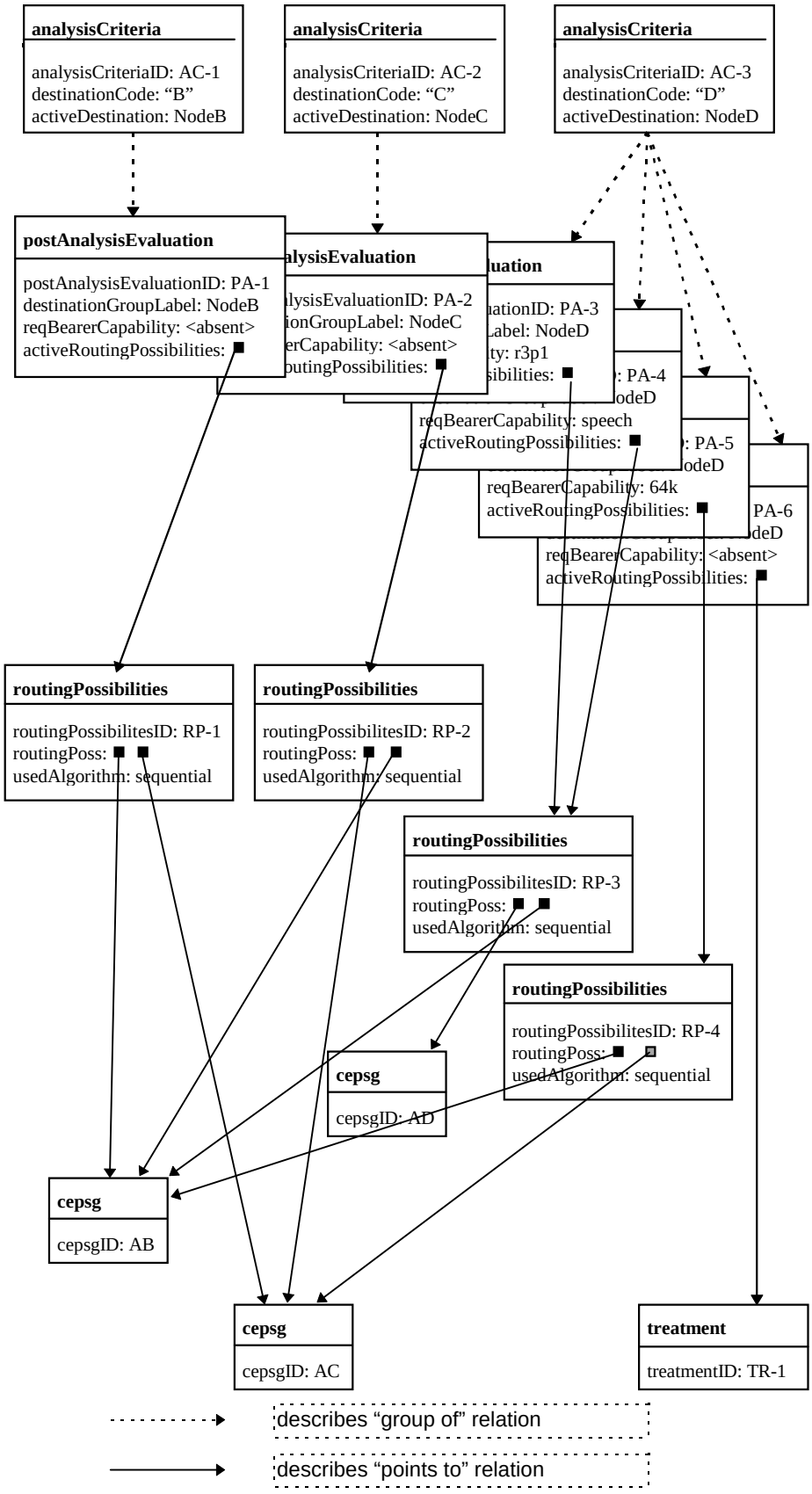


B.2.2 Second solution

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 the required and available bearer capability. Overflow during routing is done by defining all applicable routing possibilities within one routingPossibilities instance.


analysisCriteria
analysisCriteriaID: AC-1
destinationCode: “B”
activeDestination:
analysisCriteria
analysisCriteriaID: AC-2
destinationCode: “C”
activeDestination:
analysisCriteria
analysisCriteriaID: AC-3
destinationCode: “D”
activeDestination: NodeD
postAnalysisEvaluation
postAnalysisEvaluationID: PA-3
destinationGroupLabel: NodeD
reqBearerCapability: r3p1
activeRoutingPossibilities:
reqBearerCapability: speech
activeRoutingPossibilities:
reqBearerCapability: 64k
activeRoutingPossibilities:
reqBearerCapability: <absent>
activeRoutingPossibilities:
routingPossibilities
routingPossibilitesID: RP-1
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-2
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-3
routingPoss:
usedAlgorithm: sequential
routingPossData
routingPossDataID: RPD-1
cepsg...:
routingPossData
routingPossDataID: RPD-2
cepsg...:
routingPossData
routingPossDataID: RPD-3
cepsg...:
routingPossDataID: RPD-4
cepsg...:
routingPossDataID: RPD-5
cepsg...:
routingPossDataID: RPD-6
cepsg...:
cepsg
cepsgID: AB
cepsg
cepsgID: AC
cepsg
cepsgID: AD
treatment
treatmentID: TR-1
describes “group of” relation
describes “points to” relation

B.2.3 Third solution



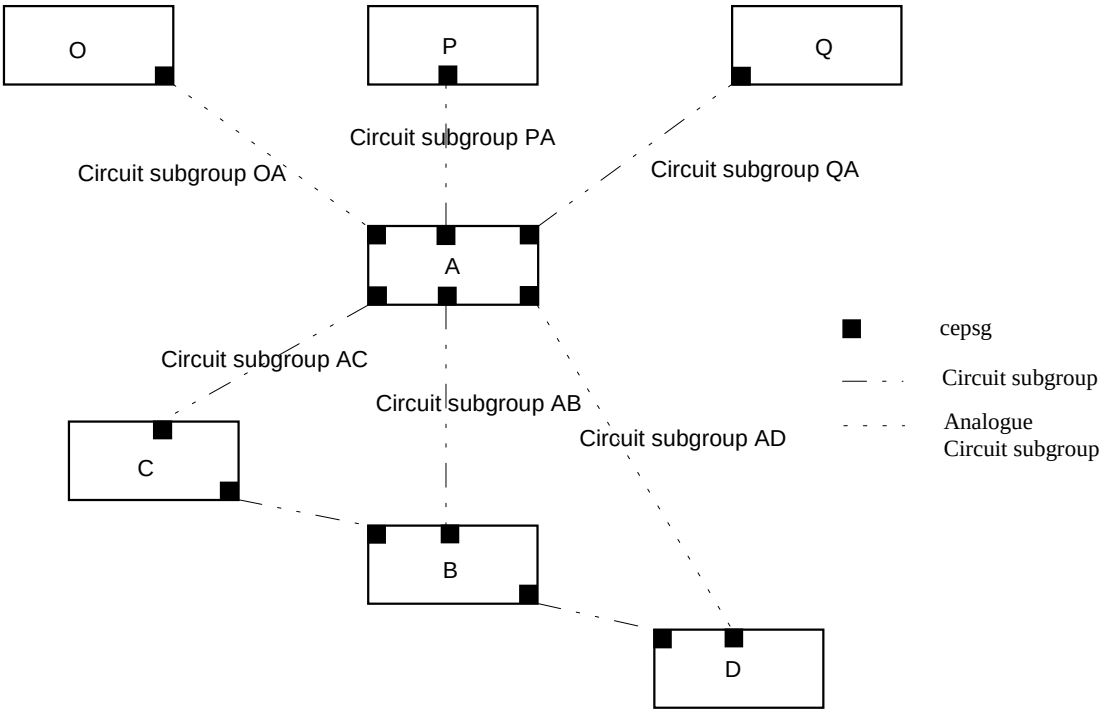
Supposed that the exchange D shall be reached with the bearer capability 64 kbit/s unrestricted, then the following instances are concerned in exchange A.

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.

B.3 Example 2: illustrates origin dependent routing

Topology as described below:



with assumptions:

1 Circuit subgroup "OA" is an analog line, only capable of supporting the required bearer capability "r3point1kHzAudio" or "speech".

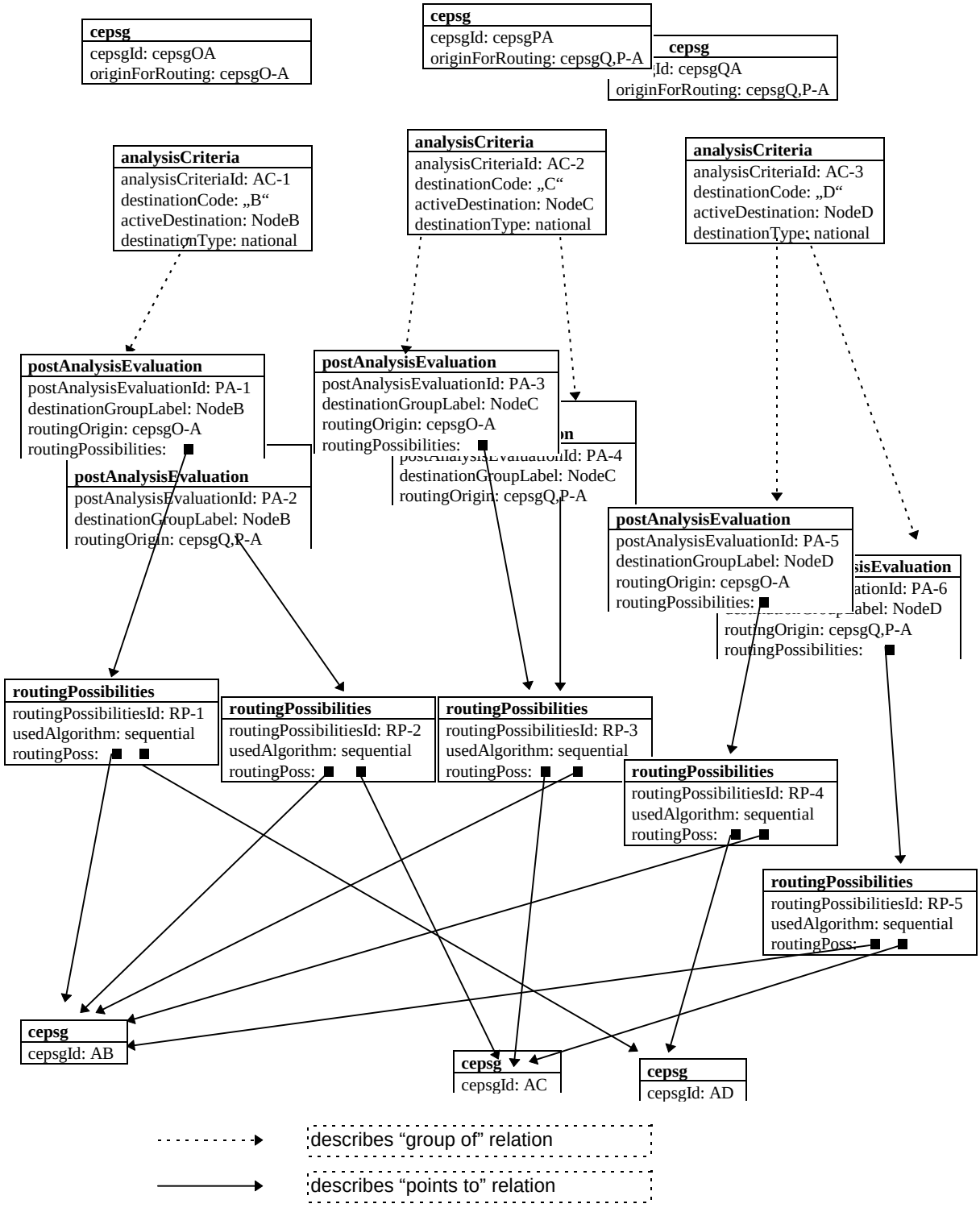
2 Circuit subgroup "AD" is an analog line, only capable of supporting the required bearer capability "r3point1kHzAudio" or "speech".

3 All other subgroup support all bearer capabilities.

4 Bearer capability supported by incoming or outgoing cepsg result in the following 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"

B.3.1 First solution



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 forces that always the circuit endpoint subgroup AD shall be 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, then the circuit endpoint subgroup AB shall be accessed to find a free circuit endpoint to exchange B. Exchange B has to provide a connection to exchange D by itself.

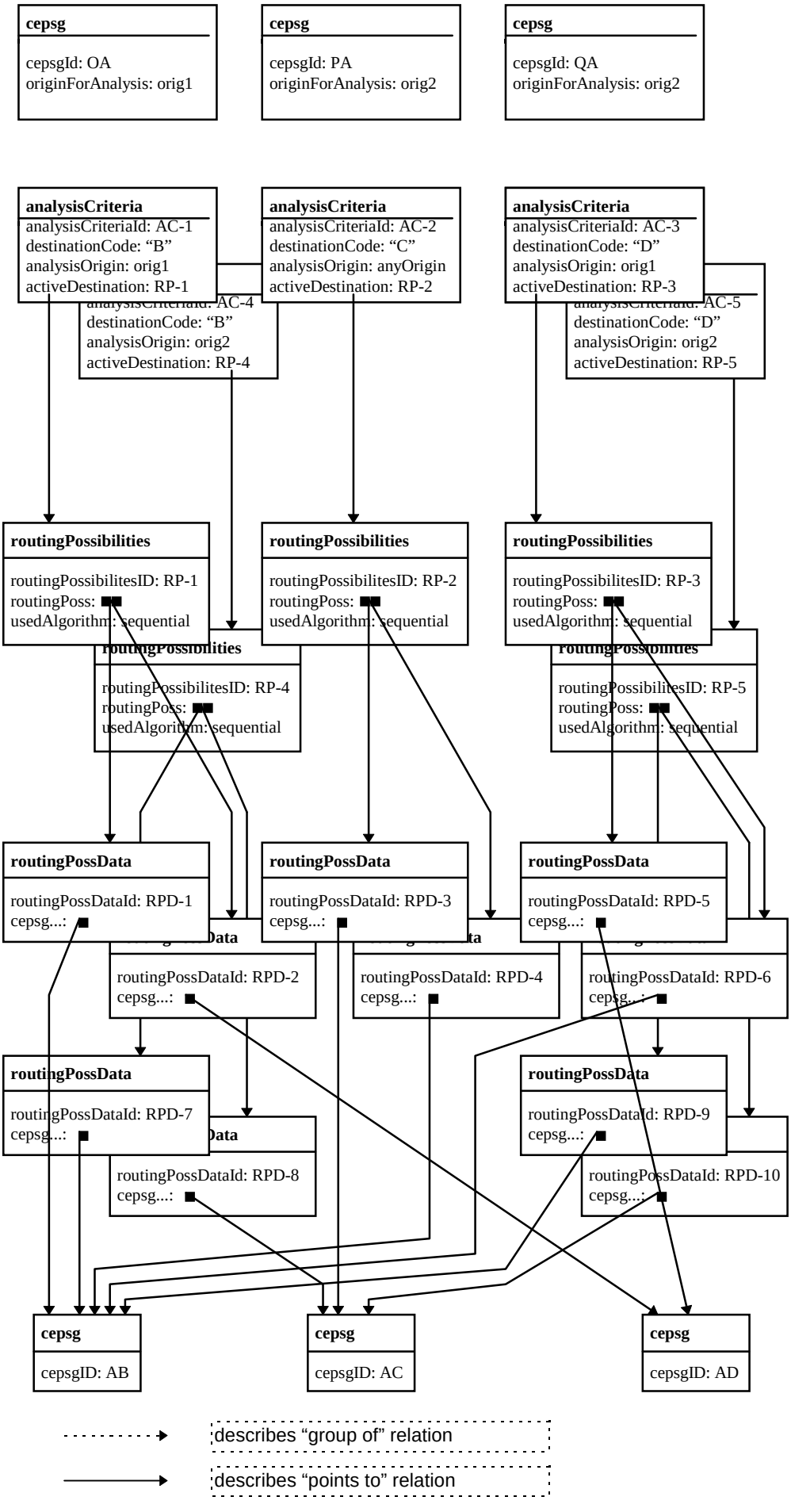
B.3.2 Second solution

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 the requirements of the network operator (see table above).

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

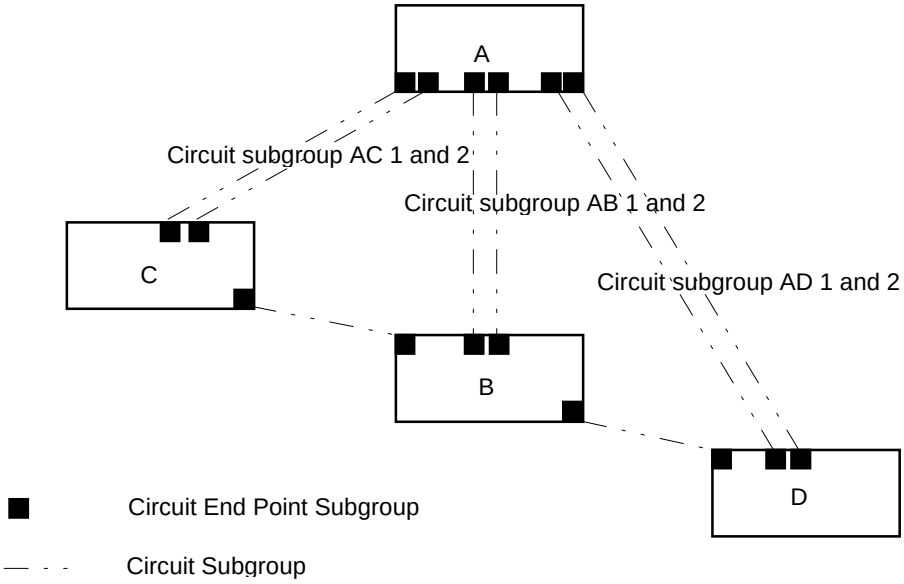
The call that arrives in exchange "A" uses the circuit subgroup OA. Due to the data of the circuit endpoint subgroup in exchange "A" the call characteristic orig1 is assigned to the call. Only the object instance of the OC analysisCriteria, identified by the analysisCriteriaId AC-3, matches with the 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 forces that always the circuit endpoint subgroup AD shall be 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, then the circuit endpoint subgroup AB shall be accessed be accessed to find a free bcircuit endpoint to exchange B. Exchange B has to provide a connection to exchange D by itself.


cepsg
cepsgId: OA
originForAnalysis: orig1
cepsg
cepsgId: PA
originForAnalysis: orig2
cepsg
cepsgId: QA
originForAnalysis: orig2
analysisCriteria
analysisCriteriaId: AC-1
destinationCode: "B"
analysisOrigin: orig1
activeDestination: RP-1
analysisCriteria
analysisCriteriaId: AC-2
destinationCode: "C"
analysisOrigin: anyOrigin
activeDestination: RP-2
analysisCriteria
analysisCriteriaId: AC-3
destinationCode: "D"
analysisOrigin: orig1
activeDestination: RP-3
destinationCode: "B"
analysisOrigin: orig2
activeDestination: RP-4
destinationCode: "D"
analysisOrigin: orig2
activeDestination: RP-5
routingPossibilities
routingPossibilitesID: RP-1
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-2
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-3
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-4
routingPoss:
usedAlgorithm: sequential
routingPossibilities
routingPossibilitesID: RP-5
routingPoss:
usedAlgorithm: sequential
routingPossData
routingPossDataId: RPD-1
cepsg...:
routingPossDataId: RPD-3
cepsg...:
routingPossData
routingPossDataId: RPD-5
cepsg...:
routingPossDataId: RPD-2
cepsg...:
routingPossDataId: RPD-4
cepsg...:
routingPossDataId: RPD-6
cepsg...:
routingPossData
routingPossDataId: RPD-7
cepsg...:
routingPossDataId: RPD-8
cepsg...:
routingPossData
routingPossDataId: RPD-9
cepsg...:
routingPossDataId: RPD-10
cepsg...:
cepsg
cepsgID: AB
cepsg
cepsgID: AC
cepsg
cepsgID: AD
describes "group of" relation
describes "points to" relation

B.4 Example 3: illustrates proportional bidding

Topology as described below:



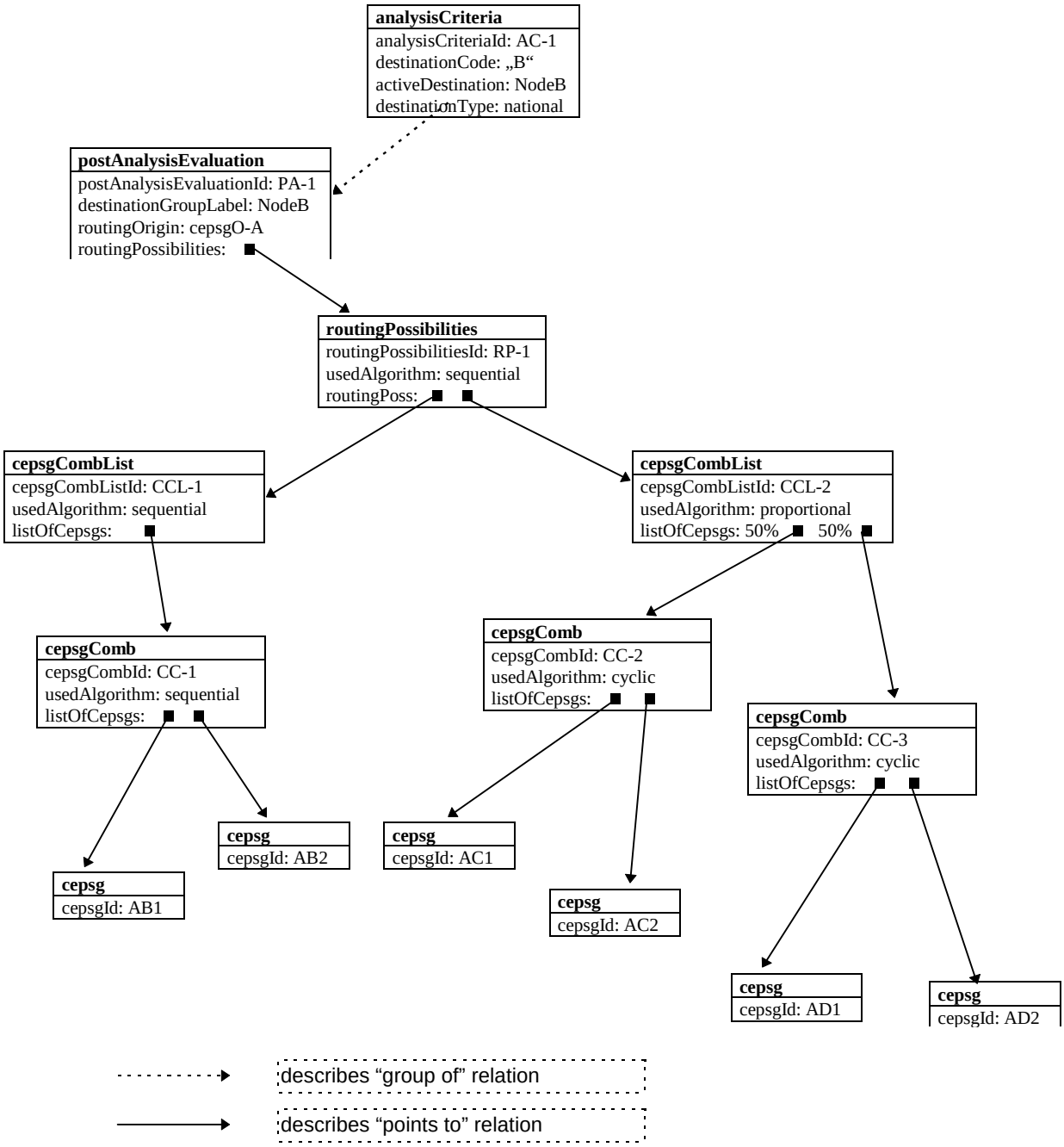
with assumptions:

1 Connections A-B, A-C, A-D consist of 2 circuit end point subgroups.

2 Calls from A to B only are considered.

first choice	second choice
AB1, AB2, sequential	prop. bid. 50 % via C AC1, AC2, cyclic
	prop. bid. 50 % via D AD1, AD2, cyclic

B.4.1 First solution



Supposed 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.

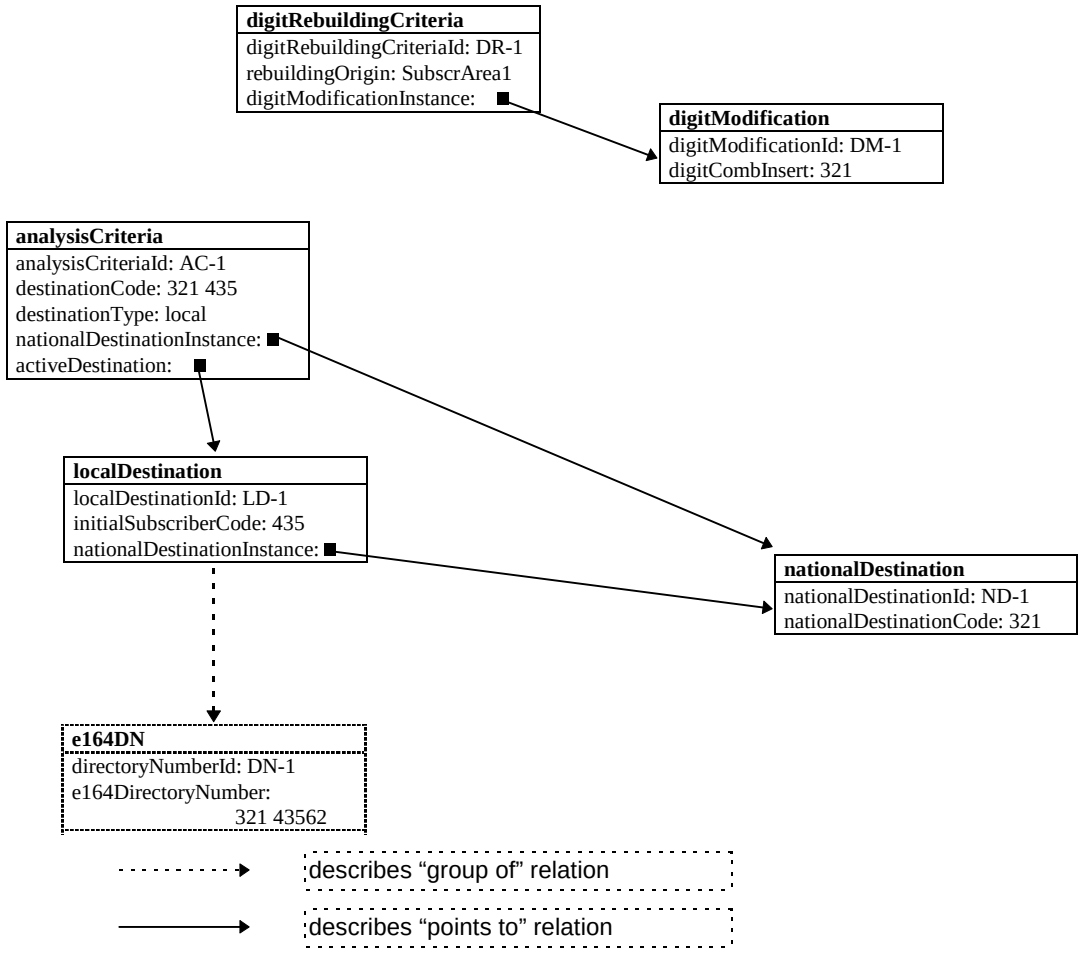
Supposed that the considered call set-up request is assigned to the instance CC-2, the call set-up request will be continued by a sequential selection algorithm with cyclic start over the two instances AC or AC2 of the OC cepsg.

B.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.

B.5.1 First solution

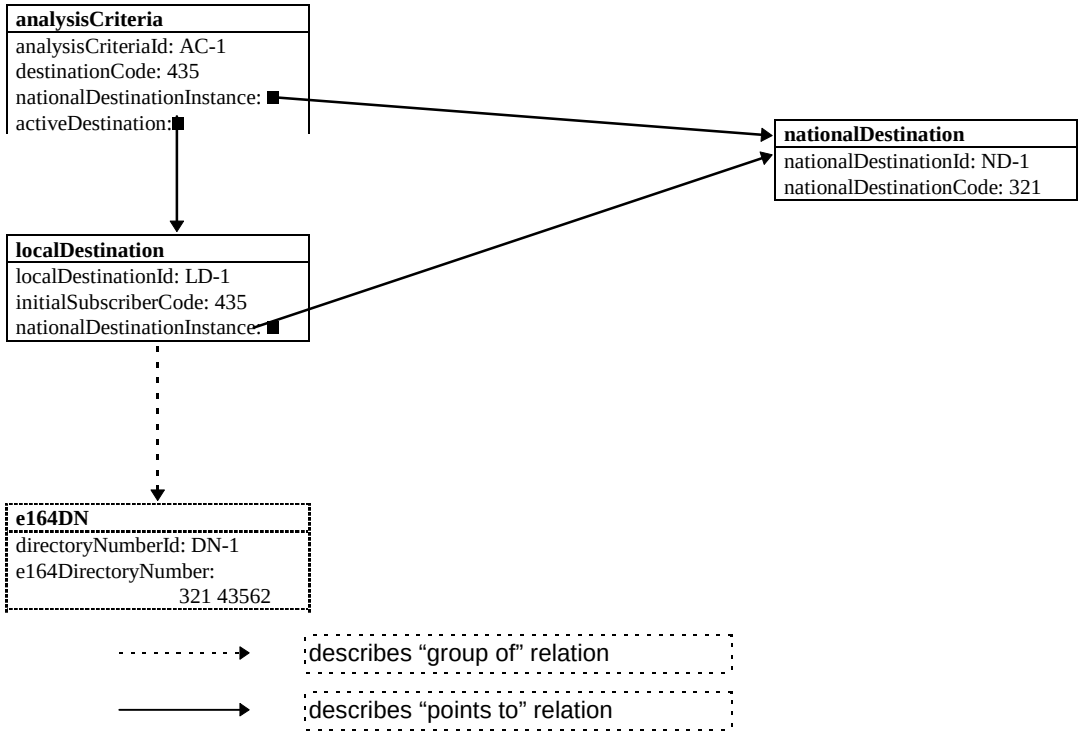


In the case that subscriber 1 does not dial the area code of the directory number of subscriber 2, then digit rebuilding will insert the missing area code. That is, an instance DR-1 of the OC digitRebuildingCriteria will match depending on the subscriber's origin and will point to a corresponding instance DM-1 of the OC digitModification, where the area code can be found, which has to be inserted at the beginning of the incoming digit string.

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.

B.5.2 Second solution



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.

B.6 Example 5

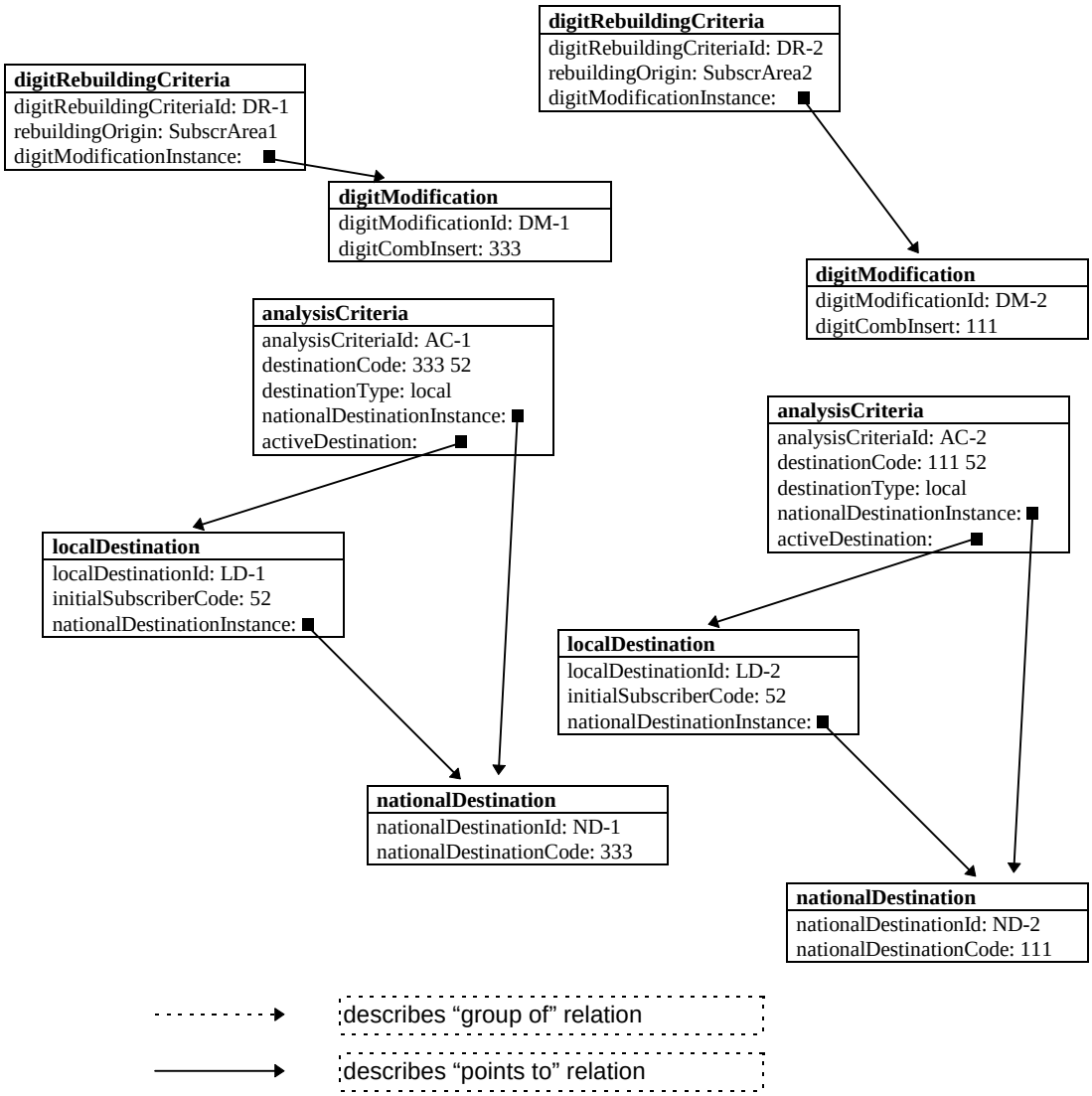
Multiple areas exchange.

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'

B.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':

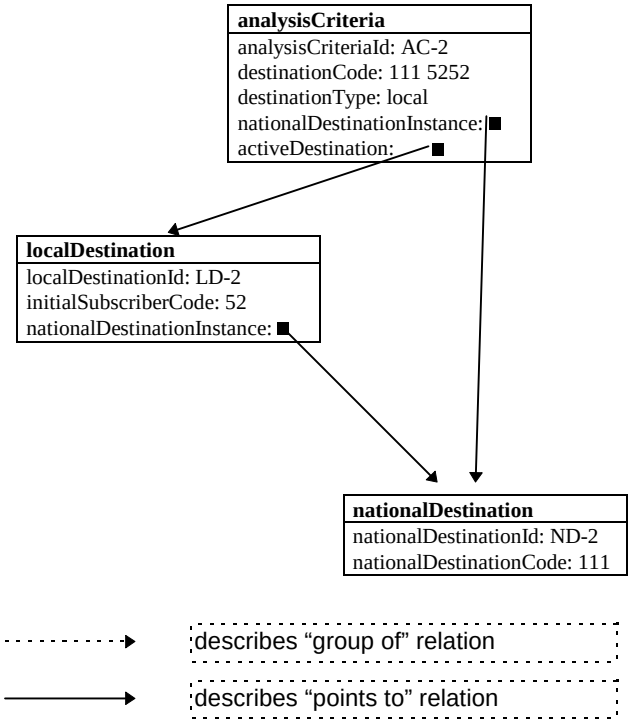


In the case that subscriber A does not dial the area code, then digit rebuilding will insert the missing area code '333', and if subscriber A' does not dial the area code, then digit rebuilding will insert the missing area code '111'. That is, an instance DR-1 or DR-2 of the OC digitRebuildingCriteria 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 to 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) Subscriber A dials e.g. 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):

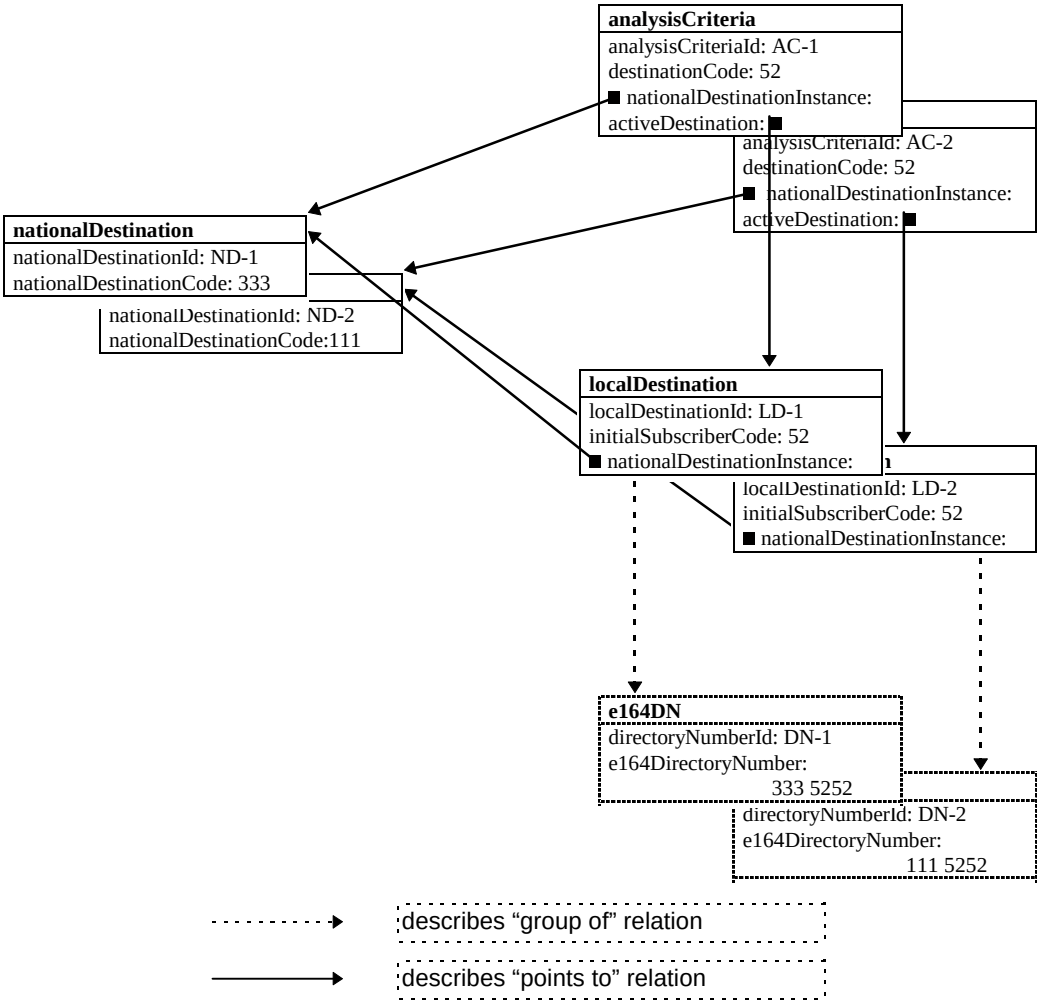


Digit rebuilding need not be done, because subscriber A dials the area code of the directory number of subscriber B', which belongs to another local area as subscriber A.

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.

B.6.2 Second 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':

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 the 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 the subscriber B'.

History

Document history				
V1.2.1	October 1997	Public Enquiry	PE 9807	1997-10-17 to 1998-02-13