



INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD

I-ETS 300 292

January 1995

Source: ETSI TC-NA

Reference: DI/NA-043310

ICS: 33.080

Key words: Interface, management, routeing, TMN

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

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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Foreword

This Interim European Telecommunication Standard (I-ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have its life extended for a further two years, be replaced by a new version, or be withdrawn.

This I-ETS provides a management information model which covers the management aspects of the "routing and digit analysis" function in an exchange.

Proposed announcement date	
Date of latest announcement of this I-ETS (doa):	30 April 1995

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1 Scope

This Interim European Telecommunication Standard (I-ETS) provides a management information model which covers the management aspects of the "routeing and digit analysis" function in an exchange. The scope is further limited to the Network Element (NE) aspects of circuit switched networks. This model is restricted to the Operations Systems (OS) to NE (Q3) interface (see ETR 037). The information to be managed is limited to the signalling systems DSS1, C5, ISUP and R2. The signalling system No. 7 Telephone User Part (TUP) is not considered.

The information model covers the management of the routeing aspects of:

- local originating, local terminating, and transit calls;
- digit analysis;
- termination point selection;
- outgoing digit preparation;
- announcements.

The information model does not cover:

- traffic management (including circuit reservation, including dynamic aspects of proportionate bidding);
- management aspects of call-processing;
- management aspects for routeing of supplementary services;
- management aspects for Intelligent Network (IN);
- relation with customer administration information model;
- relations with other management services of which the definition is still in a premature state (e.g. charging);
- states of object classes (a mixed relation with traffic management);
- Private Automatic Branch Exchange (PABX) as NEs or Exchange Termination Points (XTPs) of subscriber lines (the scope excludes centrex implementations);
- mobility issues like cellular and personal mobility.

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 of this I-ETS. Therefore, clause 6 and clause 7 form the mandatory part of this I-ETS.

2 Normative references

This I-ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] I-ETS 300 293: "Telecommunications Management Network (TMN); Generic managed objects".
- [2] CCITT Recommendation M.3100 (1992): "Generic network information model".
- [3] CCITT Recommendation X.721 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- [4] ITU-T Recommendation Q.763 (1993): "Formats and codes".
- [5] ITU-T Recommendation Q.850 (1993): "Use of cause and location in digital subscriber signalling system No. 1 and Signalling System No. 7 ISDN user part".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this I-ETS, the following definitions apply:

analysis criteria: The basic set of information elements to determine the routingTarget or local destination.

circuit subgroup: A set of circuits between the same two exchanges having similar characteristics, i.e. having the same signalling characteristics, the same bearer capabilities and other characteristics. From an exchange view point, circuit subgroups are terminated by an Exchange Termination Point Subgroup (XTPSG).

circuit: A connection between two exchanges. From an exchange view point, circuits are terminated by an exchange termination point.

containment: A structuring relationship for managed objects in which the existence of a managed object is dependent on the existence of a containing managed object (CCITT Recommendation X.720). In this model this relationship (indicated in the diagrams as "contains") is represented by a name binding (also described in CCITT Recommendation X.720).

digit preparation criteria: The basic set of information elements to determine the modifications of the digits, which need to be prepared for the next exchange in the call set-up process.

digit rebuilding criteria: Are the basic set of information elements to determine the modification of incoming digits, which need to be replaced before the digits are analysed.

Exchange Termination Point (XTP): Terminates a circuit.

Exchange Termination Point Subgroup (XTPSG): A set of XTPs with similar characteristics for call routing, i.e. the same signalling characteristics, the same bearer capabilities, the same endpoints and other characteristics.

Network Element (NE): A network element consists of telecommunication equipment and support equipment that performs network element functions and has one or more standard Q-type interfaces (CCITT Recommendation M.3010).

Operations System (OS): Is the stand-alone system which performs operation system functions (CCITT Recommendation M.3010).

route selection criteria: are the basic set of information elements on which the set of possible XTPSGs to reach a routingTarget will be selected.

routing target: Is a set of terminal points, which are not distinguishable from a call routing point of view, as seen by a particular exchange, i.e. for all terminal points of the set, the same XTPSGs can be used.

terminal point: Is a point which has a unique geographical address in a network (which has been provided for by the network provider). It can be an exchange, a subscriber installation, etc. A terminal point is independent of the exchange in which the call is in progress.

3.2 Symbols and abbreviations

For the purposes of this I-ETS, the following symbols and abbreviations apply:

DCME	Digital Circuit Multiplication Equipment
CCS	Common Channel Signalling
E-R	Entity Relationship
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
NE	Network Element
NEM	Network Element Management
NM	Network Management
OS	Operations System
PABX	Private Automatic Branch Exchange
PSTN	Public Switched Telephone Network
TMN	Telecommunication Management Network
TUP	Telephone User Part
VPN	Virtual Private Network
XTP	Exchange Termination Point
XTPSG	Exchange Termination Point Subgroup

4 Description

The purpose of management of routing information in an exchange is to allow either a traffic or a routing manager to change the static routing information. In specifying the managed object classes for routing, certain requirements need to be met:

- define functionality in such a way that routing information may be changed easily;
- it shall be possible to switch between sets of routing information according to a predefined timing schedule, e.g. by introducing scheduling for routing information;
- it shall be possible to verify routing information in an exchange with a minimal distortion in the normal operation of an exchange;
- avoid redundant information at NEs by making use of objects, representing resources, which exist during run-time;
- it shall be possible to expand the model with future requirements, therefore, the specification of object classes for routing purposes shall be expandable.

The scope of this model is limited to the management aspects of digit analysis and call routing. Management of call processing information and traffic management are not covered. Because the borders between call processing, digit analysis, routing and traffic management are not always clear, some readers may find certain items missing, whereas other readers may find items which are not part of the scope.

The following rules are used to differentiate between call processing, digit analysis and routing, and traffic management:

- digit analysis and routing processes are related to the exchange termination point which the call ultimately "locally connects" with. If the managed item has no relation with the choice of the termination point, then this managed item is not part of the management of digit analysis and routing;
- call processing are processes related to whether or not a call is required to be routed and when the call is required to be routed. Those managed items do not influence the choice of termination point;
- the border between traffic management and routing is based on normal conditions which are foreseen as the routing behaviour and controls when unexpected conditions occur (traffic management).

The information for routing purposes, which needs to be maintained by the manager, depends on the signalling system used by the exchange. This information model can be applied for exchanges with the known standardized signalling systems (DSS1, CCS7, R2, C5). Because of the different signalling systems, not all attributes and objects will be applicable for all exchanges. Applicability in the behaviour of the object classes.

5 Information model

5.1 Information model description

The management information model in this I-ETS represents the management information of call routing. In order to describe the management aspects of routing, the routing function has been divided into two parts:

- a) the identification of the routingTarget for the call is made by analysis of the called number and by means of other information;
- b) 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 exchange termination point(s) has to be selected.

For identification of the routingTarget, information about the call is obtained to decide which incoming digits need to be modified. Other information of the call, combined with the digits (which may have been modified) is obtained in order to determine the identity of routingTarget.

For circuit selection, management aspects are covered to correlate the routingTarget and additional information with a suitable set of circuits. This correlation includes the traffic assignment rules to circuits within the possible set. After the selection of a free circuit the digits might need to be prepared for the adjacent exchange.

Identification of routingTarget fragment

Digit manipulation can be done for at least three reasons, digit rebuilding, digit preparation, digit translation.

Digit rebuilding is an activity on incoming digits, and digit preparation is an activity for outgoing digits. The transformation is additional to the original digits (i.e. before translation) and independent of the real original digits for these two cases. As an example both digit rebuilding and digit preparation are activities sometimes necessary if R2 signalling is used. The necessary management aspects are captured using the entities DigitRebuildingCriteria (rebuilding) and DigitPreparationCriteria (preparation).

With digit translation, the offered digits themselves are modified. Examples of when this occurs are so-called "service numbers" (i.e. the 800 series in the USA) emergency number (i.e. 911 in the USA) but also for Virtual Private Networks (VPNs), where the private dialling plan is translated to the wide area network numbering plan. The necessary management information is captured in the entity AnalysisCriteria.

The determination of the routingTarget is based on digits provided with the call, which may have gone through digit manipulation zero or more times.

Information, similar to signalling system call parameters, are stored in a switch and grouped, so that calls matching these parameters will all be routed according the same routingTarget (or handled by alternative actions like announcements). Additionally, for locally originated calls, the NatureOfAddress and CalledNumberingPlan may be determined for signalling systems which require this. All this information, necessary to be managed, is captured by the entity AnalysisCriteria.

Selection fragment

For the management aspects of the selection of a free circuit the entity routeSelectionCriteria is defined. The routeSelectionCriteria represent the simple criteria (like the routingTarget) on which the possible sets of circuit (sub)groups are chosen. Information associated with a call is compared with the criteria of the routeSelectionCriteria. For management purposes the routeSelectionCriteria can be used to control the selection function.

5.2 Information model diagrams

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

- Entity Relationship (E-R) 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).

The inheritance hierarchy is not presented because for this model it did not provide any additional explanation.

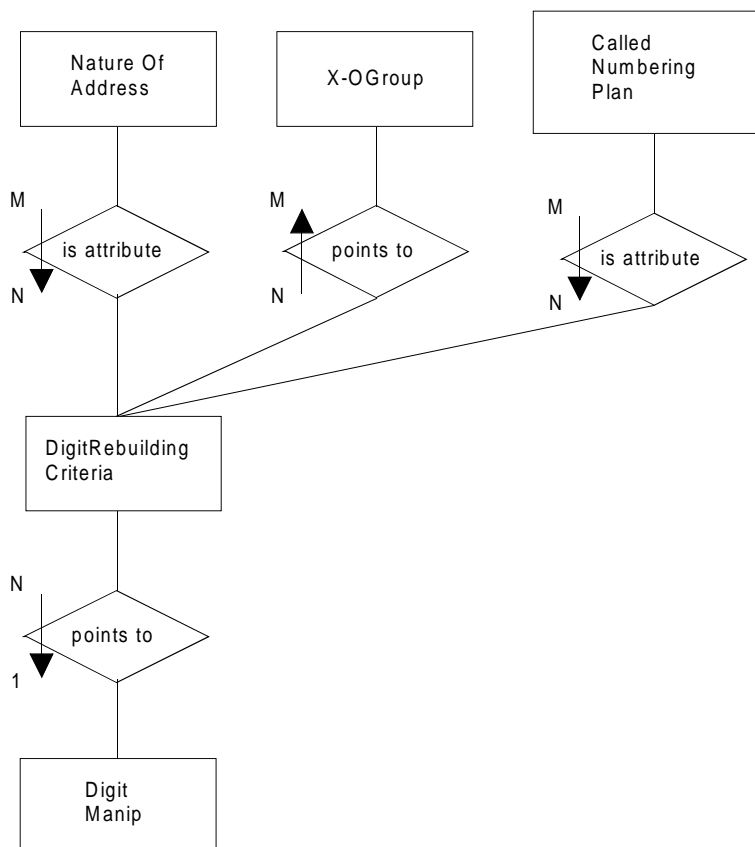


Figure 1: E-R diagram 1
Identification of routingTarget fragment; management aspects of digit rebuilding

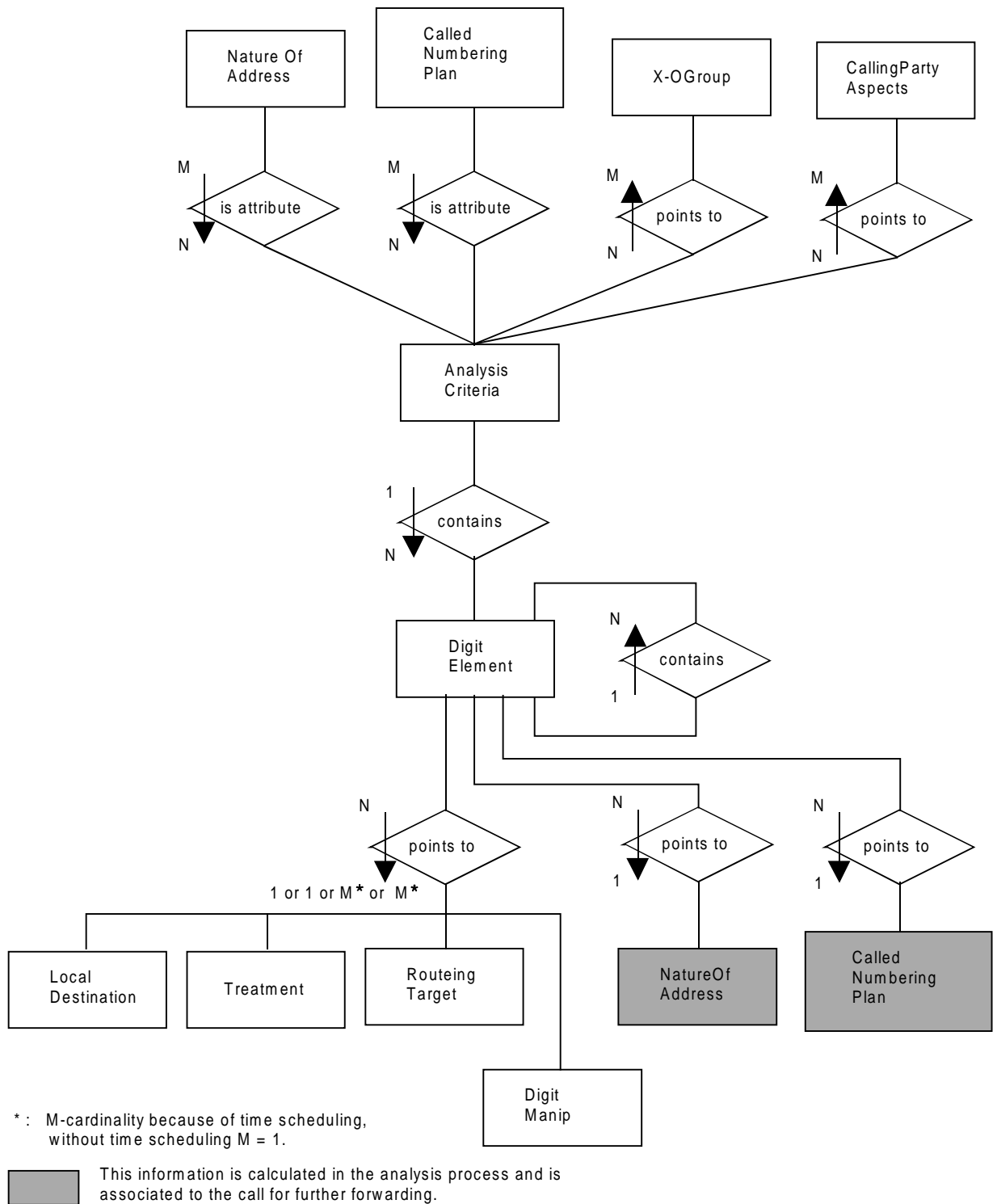
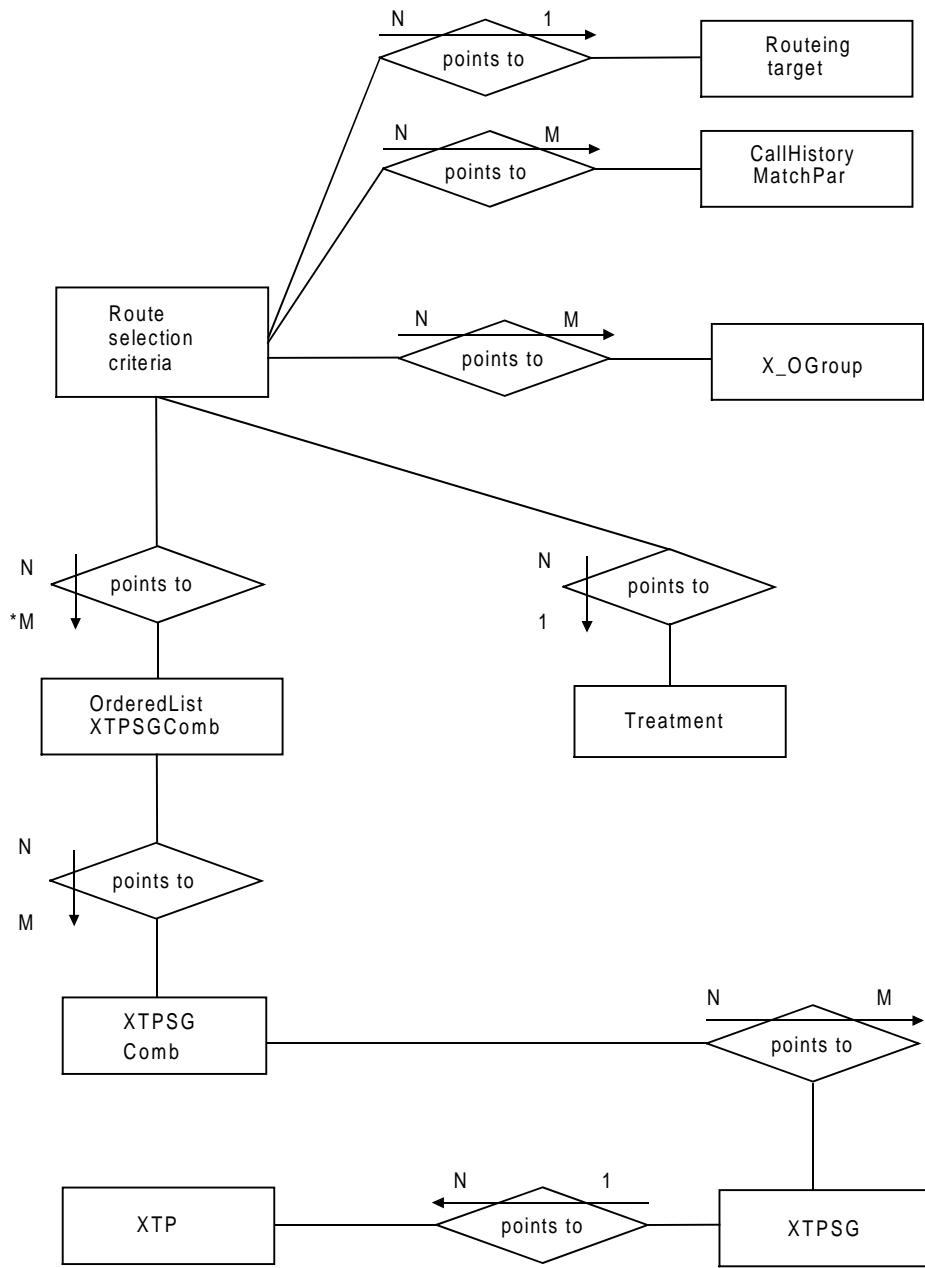


Figure 2: E-R diagram 2
Identification of routingTarget fragment; management aspects of digit translation and management aspects of the identification of the routingTarget



* M-cardinality because of time scheduling

Figure 3: E-R diagram 3
Selection fragment; management aspects of circuit selection

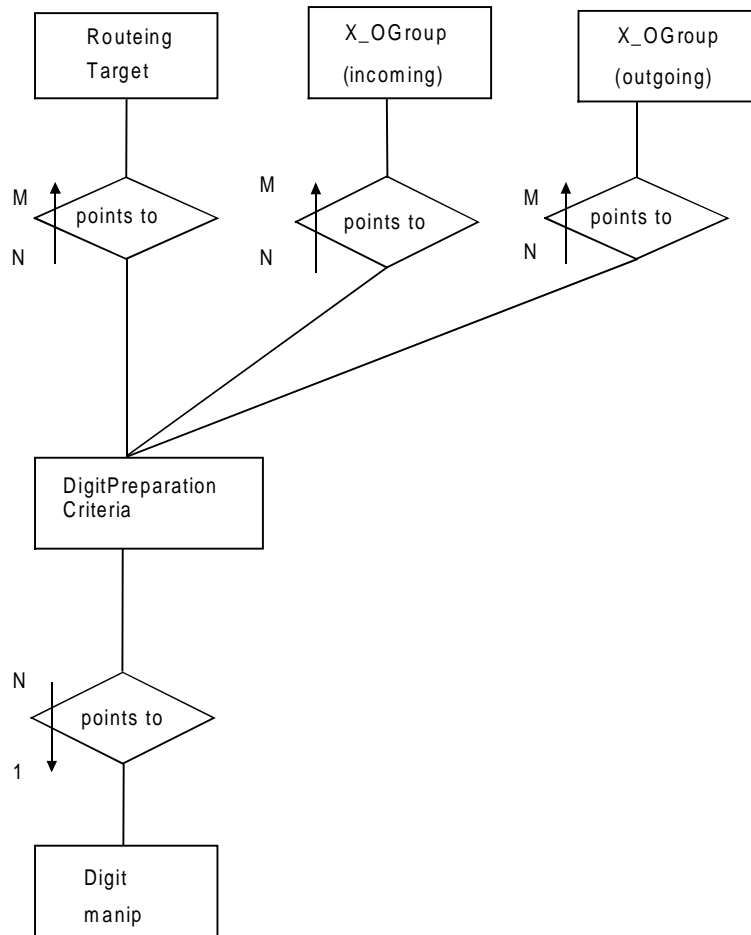


Figure 4: E-R diagram 4
Selection fragment; management aspects of digit preparation

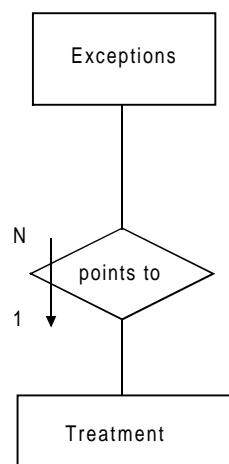


Figure 5: E-R diagram 5 - Additional

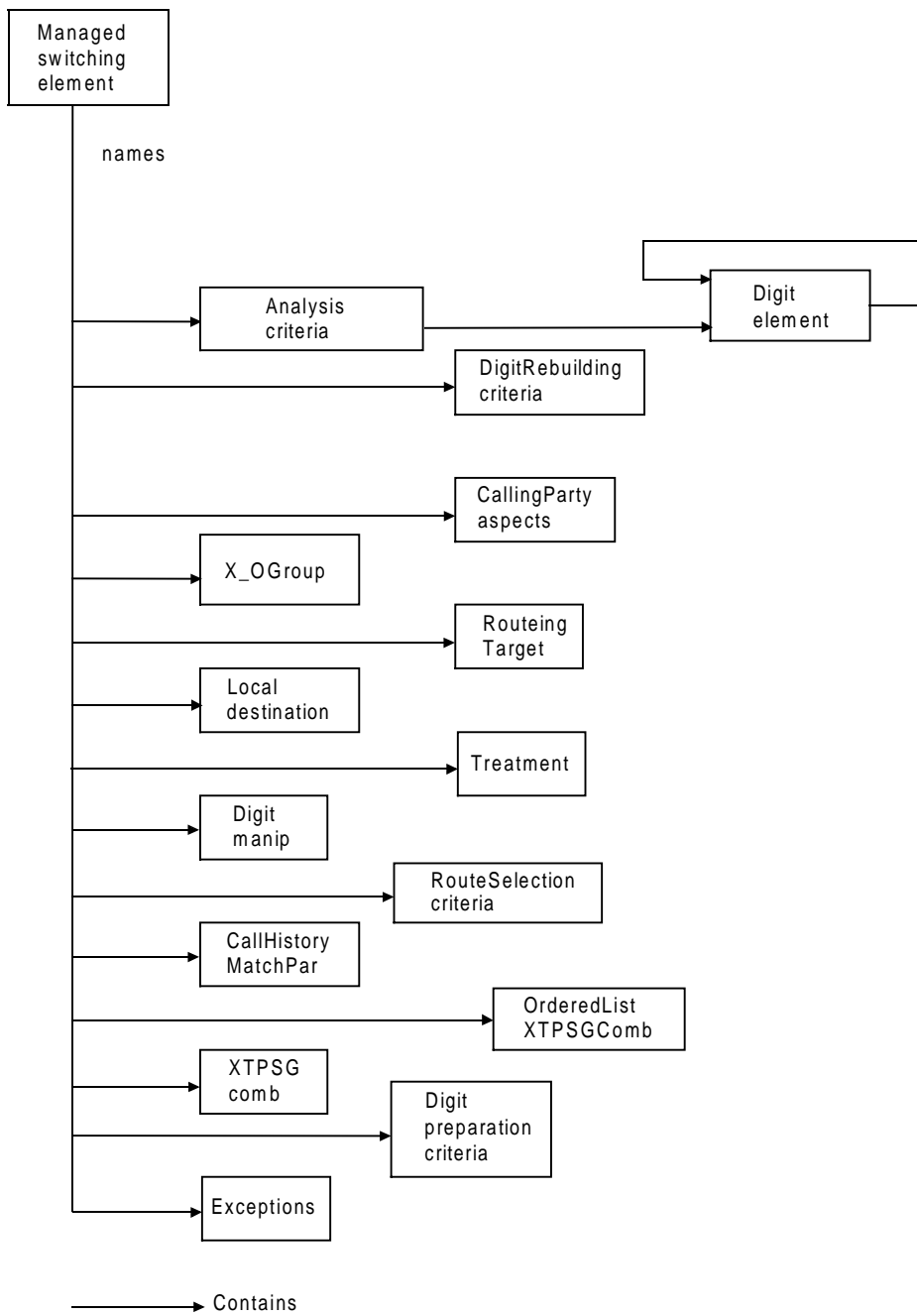


Figure 6: E-R diagram 6 - Naming relations

6 Information model description

In this clause, the entities of the information model are described. For the description of the entities, the format of table 1 is used.

Table 1

Entity: "entity name"		
Attributes	M/S	O/M

The column M/S indicates whether the attributes are multi-valued or single-valued:

- multi-valued means that more than one basic value can be assigned;
- single-valued means that only one basic value is assigned, e.g. an attribute with a syntax "Integer" or "Real".

These are attributes with a syntax "SET", "SET OF", "SEQUENCE", "SEQUENCE OF".

Multi-valued, as used in this I-ETS, has a different meaning than "set-valued" as used in OSI management (CCITT Recommendation X.720). According to CCITT Recommendation X.720, set-valued attributes are those attributes to which the add-remove capability can be applied. Those are attributes with a basic syntax of "SET OF", "SEQUENCE OF". Multi-valued, as used in this I-ETS, provides information about the cardinality between the entities.

The O/M indicates whether the information presented by the attributes is optional or mandatory. This does not mean that optional information always will be presented by conditional packages. Certain optionality is covered by "don't care" values (e.g. empty sets).

6.1 AnalysisCriteria

The entity AnalysisCriteria describes the management information needed in order to match for selection of the possible digittrees. A digittree is the complete structure of digitElements named (contained) by one instance of AnalysisCriteria (different trees are used, e.g. for originating calls and for calls with natureOfAddress "international"). The management information that needs to match, is given by the attributes calledNumberingPlans, callingPartyAspectList, natureOfAddresses and x-oGroups.

This entity contains a tree of digitElements, according to the name binding digitElement-analysisCriteria. Elements of this tree determine either the routeingTargetId, the local destination, DigitManip or Treatment. For originatingCalls also the NatureOfAddress and CalledNumberingPlan can be determined.

For service numbers and for originating calls of virtual private networks it is possible that the initial digits need to be replaced before the routeingTarget can be identified. Therefore, in this case the contained tree of digitElements points either to the routeingTarget, the digitManip or the treatment.

The four attributes, calledNumberingPlans, callingPartyAspectList, natureOfAddresses and x-oGroups unambiguously determine the entity. This means that a set of the four attribute values determine one and only one AnalysisCriteria instance.

Therefore, one instance of entity AnalysisCriteria points at a number of instances of object class callingPartyAspects and at a number of instances of object class X-OGroup.

Table 2

Entity: AnalysisCriteria		
Attributes	M/S	O/M
AnalysisCriteriaId	S	M
calledNumberingPlans	M	O
callingPartyAspectsList	M	O
natureOfAdresses	M	M
x-oGroups	M	M

The following attributes describe the entity AnalysisCriteria:

- calledNumberingPlans:
this attribute indicates the values of called-numbering plans, of which one element needs to match. Possible values are Integrated Services Digital Network/Public Switched Telephone Network (ISDN/PSTN), data, telex, and operator specific values;
- callingPartyAspectList:
this attribute indicates the set of entities callingPartyAspects, of which one element needs to match;
- natureOfAddresses:
this attribute indicates the values of natureOfAddress, of which one element needs to match. Possible values are, e.g. SubscriberNumber, NationalNumber, InternationalNumber;
- x-oGroups:
this attributes indicates the set of x-oGroups. This attribute matches if a call arrives on a member of the set.

6.2 CallingPartyAspects

This entity reflects the different characteristics of possible calling parties which are used to determine the routing of the call. Examples of values for this entity are: "virtual private network", "customer with priority", etc. Information extracted from a specific call is compared with the values of this analysis criteria.

One instance of CallingPartyAspects may be pointed at by several instances of AnalysisCriteria entity.

Table 3

Entity: CallingPartyAspects		
Attributes	M/S	O/M
CallingPartyAspectsId	S	M
CallingPartyCat	S	O
TransitNetworkSelection	S	O

The following attributes describe the entity CallingPartyAspects:

- CallingPartyCat:
the attribute reflects the calling party category. Examples of values are "operator with certain language", "ordinary calling subscriber" (a very customer-friendly name), "test call";
- TransitNetworkSelection:
this attribute reflects the preferred transit networks of the calling party.

6.3 CallHistoryMatchingParameters

This entity describes criteria and/or restrictions on a call, e.g. the number of satellite links. This information is used in the routing process to compare it with aspects of the history of the call. It covers aspects of resources already used. It can be used, for example, to restrict the propagation-delay. This entity covers only those parts of the history which is necessary for the management of routing information.

The information of a specific call will match with only one instance of this entity.

One exchange can contain several instances of the entity CallHistoryMatchingParameters. One instance of CallHistoryMatchingParameters may be pointed at by several instances of the entity RouteSelectionCriteria.

Table 4

Entity: CallHistoryMatchingParameters		
Attributes	M/S	O/M
HistoryId	S	M
NoOfSatLinks	S	M
EchoSuppressor	S	M

The following attributes describe the entity CallHistoryMatchingParameters:

- NoOfSatLinks (number of satellite links):

this attribute is related to the number of satellite links in the history of the call. Number of hops allowed for a certain call is limited. (The values for telephony are zero or one, for data no limitations are present). This attribute matches with information from a call if the number of hops in the history is equal to the value of the attribute;

- EchoSuppressor:

this information element reflects whether an echo suppressor is required or not because of the previous crossed exchanges. If an echo suppressor is required, then XTPSGs of suitable capability need to be identified.

A candidate for this entity is the "propagation delay counter". Because this aspect is not yet mature enough, it is left out of this I-ETS. It is considered that the routing aspects of Digital Circuit Multiplication Equipment (DCME) will be handled using the propagation delay counter.

6.4 DigitElement

The entity DigitElement is the building block of the digittrees as contained by the AnalysisCriteria. DigitElement can contain other DigitElement, where each DigitElement represent one digit, and thus forming a tree of digits. Elements in this tree determine the routeingTarget, local destination treatment or digitManip. Instances of DigitElement at the bottom of the tree shall indicate at least one decision.

Table 5

Entity: DigitElement		
Attributes	M/S	O/M
digitElementId	S	M
digitParticipationIndicator	S	M
decisions	M	O
decisionTypes	M	O
schedulingAttribute	M	O

The following attributes describe the entity DigitElement:

- digitElementId:
this attribute represents 1 digit of the string, which needs to be matched;
- digitParticipationIndicator:
this attribute identifies whether the digit element is part of the InternationalCode, AreaCode or Subscriber number. This kind of information shall be provided if flexible length for areas are used;
- decisionTypes:
this attribute defines the types of "decisions" this leaf of the tree determines. The types are given by the type of object class (routeingTarget, local destination, treatment, DigitManip, NatureOfAddress and CalledNumberingPlan);
- decisions:
this attribute identifies the object instances which are determined by this leaf of the digittree. The instances are instances of the classes given by the decisionType. This attribute is updated if a new index is selected by the scheduling mechanism;
- schedulingAttribute:
this attribute is a set of index values for objects of class routeingTarget or DigitManip for scheduling reasons. The index which is applicable for a specific time will be selected by the TimeControlledSelector (described in ETR 088).

6.5 DigitManipulation

The entity DigitManipulation 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 entities DigitRebuildingCriteria or AnalysisCriteria and DigitPreparationCriteria. DigitManipulation in DigitRebuildingCriteria is used, for example, to insert digits to define a unique digit sequence. The unique digit sequence is used as the input into the AnalysisCriteria. In AnalysisCriteria, DigitManipulation is used, for example, used to replace or suppress digits, to determine the ultimate routeingTarget for the service. For DigitPreparationCriteria, the digits are prepared for the next (adjacent) exchange.

Therefore, one instance of entity digitManipulation may be pointed at by a number of instances of entity digitRebuildingCriteria or a number of instances of entity digitElements, or a number of instances of entity DigitPreparationCriteria.

Table 6

Entity: DigitManipulation		
Attributes	M/S	O/M
DigitManipId	S	M
digitSuppress	M	O
digitCombReplace	M	O
digitCombInsert	M	O

The following attributes describe the entity DigitManipulation:

- digitSuppress, digitCombReplace, digitCombInsert:

these three attributes define which sequence of digits needs to be suppressed, to be replaced (and by what), and to be inserted, respectively.

All three attributes refer to the original digitstring, therefore, no ordering of activities is required. Each attribute can be set-valued in order to allow multiple activities of the same kind. The activity takes place after the starting position of the original string. Double insertion at one position is not allowed. For the replace and insert activities, the integer value of the endPosition shall be greater than the startPosition.

6.6 DigitPreparationCriteria

The entity DigitPreparationCriteria determines how the digits need to be modified after a free circuit has been identified. This entity captures management information for digit preparation for the next exchange. If the attributes incoming X-oGroup, outgoing X-oGroup, routeingTargetIds matches with information from a call then the identified instance of entity digitManip is applicable.

Therefore, one instance of DigitPreparationCriteria points at a number of instances of entity x-oGroup (a number of instances of x-oGroup to match with the group the call arrives on, and a number of instances to match with the group the call leaves at), a number of instances of entity routeingTarget but only at one instance of entity digitManip.

Table 7

Entity: DigitPreparationCriteria		
Attributes	M/S	O/M
DigitPreparationCriteriaId	S	M
incomingX-oGroup	M	O
outgoingX-oGroup	M	O
routeingTargetIds	M	M
digitManipInstance	S	M

The following attributes describe the entity DigitPreparationCriteria:

- incomingX-oGroup:
this attribute indicates the set of instances of x-oGroup, of which, one element needs to match. This attribute matches if the call arrives at an XTPSG or OriginGroup which makes part of the listed x-OGroups;
- outgoingX-oGroup:
this attribute indicates the set of instances of x-oGroup, of which, one element needs to match. This attribute matches if the call leaves at an XTPSG which makes part of the listed x-OGroups;
- routeingTargetIds:
this attribute indicates the set of instances of routeingTarget, of which, one element needs to match;
- digitManipInstance:
this attribute identifies the instance of entity DigitManip which is applicable if the relevant attributes matches with information from a call.

6.7 DigitRebuildingCriteria

The entity digitRebuildingCriteria captures management information ready for the digit manipulation process before the digits are analysed to determine the routeingTarget. This part of the digitRebuilding is independent of the incoming digits and is only applicable for non-originating calls.

If information, extracted from a call, matches with the attributes x-oGroups, natureOfAddresses, calledNumberingPlans then the digit will be manipulated according the instance of object class digitManip, which is given by the attribute digitManipId. The three attributes x-oGroups, natureOfAddresses, calledNumberingPlans unambiguously determine the entity. This means that a set of the three attribute values determine one and only one DigitRebuildingCriteria instance.

Therefore, one instance of entity digitRebuildingCriteria may point at several instances of entity X-OGroup, but may point at only one instance of entity digitManip.

Table 8

Entity: digitRebuildingCriteria		
Attributes	M/S	O/M
digitRebuildingCriteriaId	S	M
digitManipInstance	S	M
languageCodePosition	S	O
x-oGroups	M	O
natureOfAddresses	M	O
calledNumberingPlans	M	O

The following attributes describe the entity digitRebuildingCriteria:

- digitManipInstance:
this attribute points at the instance of entity digitManip that is applicable if information from a call matches the three attributes;
- languageCodePosition:
this attribute indicates the position of the language identifier. In signalling system R2 there is a languageCode with fixed length. This code needs to be extracted by digitRebuilding;

- x-oGroups:
this attribute indicates the set of X-OGroups. This attribute matches if a call arrives on a member of the set;
- calledNumberingPlans;
this attribute indicates the values of called-numbering plans, of which, one element needs to match. Possible values are ISDN/PSTN, data, telex, and operator specific values;
- natureOfAddresses:
this attribute indicates the values of natureOfAddresses, of which, one element needs to match. Possible values are e.g. SubscriberNumber, NationalNumber, InternationalNumber.

6.8 Exception

This entity matches for calls, if:

- no other criteria of a specific type matches:
the specific type is given by the attribute Matcheslf. If an instance of this entity matches, then the treatment identified by the attribute TreatmentId applies. This entity is additional for the criteria type of entities, so that for calls, a way to forward can always be applied. If all the routeing information is correct and complete, then instances of this entity will never be matched for;
- a cause applies:
the specific cause is given by the attribute Matcheslf. A cause is a reason why the call is not forwarded. A Cause has been defined in the Cause Indicator Field defined in ITU-T Recommendation Q.850 [5].

One instance of exception can point to only one instance of treatment.

Table 9

Entity: Exception		
Attributes	M/S	O/M
ExceptionId	S	M
Matcheslf	M	M
TreatmentInstance	S	M

The following attributes describe the entity Exception:

- Matcheslf:
this attribute identifies for which type it is the alternative match. It lists for which causes it applies and/or identifies the object class of the criterium types for which it alternatively matches;
- TreatmentInstance:
this attribute identifies the treatment which applies if an instance of this entity matches.

6.9 ExchangeTerminationPoint

A circuit is a connection between two points, e.g. between two exchanges. Circuits are terminated from an exchange point of view by XTPs. (The word "Exchange" is added to termination point so that a distinction can be made from a transmission point of view).

One XTP belongs only to one set of XTPs, the XTPSG. Therefore, one XTPSG points at several XTPs.

The formal definition of this entity is not defined in clause 7. The formal definition can be found in I-ETS 300 293 [1].

Table 10

Entity: XTP		
Attributes	M/S	O/M
XTPId	S	M
CIC	S	M

The following attribute describes the entity XTP:

- CIC (Circuit Identification Code):
this code is used to identify the circuit between two XTPs.

6.10 ExchangeTerminationPointSubGroup

An XTPSG is a set of XTPs with similar characteristics, that means the same signalling capabilities and the same bearer capabilities and others.

One instance of entity equipment may contain several instances of XTPSGs. One XTPSG points at several instances of XTPs. One XTPSG may be pointed at by several instances of entity XTPSGComb.

This entity will be defined by three object classes: a class for incoming, outgoing and bidirectional.

The formal definition of this entity is not defined in clause 9. The formal definition can be found in I-ETS 300 293 [1].

Table 11

Entity: XTPSG		
Attributes	M/S	O/M
AdjacentXid	S	M
TypeOfAdjacentX	S	M
SearchMethod	S	M
SignCapab	S	M
BearerCapab	S	M
SatelLink	S	M
EchoControl	S	M
PreffTrafficDirect	S	O
ContinCheck	S	O
Attenuator	S	M
DCME	S	M
Label	S	M

Changing attributes of an XTPSG will need in most cases a co-ordinated operation with peer XTPSGs (in adjacent exchanges). The co-ordination of such operations is outside the scope of this I-ETS.

The following attributes describe the entity XTPSG:

- AdjacentXid (adjacent exchange identification):
this attribute holds up information of the identity of the exchange to which this circuitSubGroup is connected;
- TypeOfAdjacentX (type of adjacent exchange):
this parameter indicates whether the adjacent exchange is an international, regional or local exchange;
- SearchMethod:
the way to search for an XTP within a XTPSG is indicated by this parameter. This parameter is only applicable for outgoing and bidirectional XTPSGs;
- SignCapab (signalling capability):
the parameter reflects the type of signalling used;
- BearerCapab (bearer capability):
this parameter reflects the bearer capabilities of the XTPSG (e.g. 64 kbit/s unrestricted);
- SatelLink (satellite link):
this parameter indicates whether this XTPSG terminates satellite circuits;
- EchoControl:
this parameter identifies whether echo-control is supported on the peer side of the XTPSG;
- PreffTrafficDirect (preferred traffic direction):
this parameter indicates the (preferred) direction of the XTPSG. This parameter is only applicable for bidirectional XTPSGs;
- ContinCheck (continuity check):
this parameter reflects the type of continuity check. Whether this parameter is necessary for routing purposes, is under study. It will be read-only from a management point of view;
- Attenuator:
this attribute indicates whether this XTPSG has an attenuator on the circuit or not;
- DCME:
this attribute indicates whether this XTPSG has a DCME on the circuit or not;
- Label:
this parameter gives extra possibilities for identification of the XTPSGs.

6.11 LocalDestination

The entity LocalDestination is similar to the entity routingTarget. The entity LocalDestination represents the set of terminal-points associated to the ManagedSwitchingElement on which calls are terminated.

One instance of LocalDestination can be pointed at by several instances of DigitElement.

Table 12

Entity: LocalDestination		
Attributes	M/S	O/M
LocalDestinationId	S	M

6.12 ManagedSwitchingElement

This entity will be used as the "root-entity" within the limited scope. This entity and the relation of this entity with the object class "managed element" as defined in CCITT Recommendation M.3100 [2] will be defined in I-ETS 300 293 [1]. Therefore, no formal definition is given in clause 7.

6.13 OrderedListXTPSGComb

This entity describes the possible set of instances of XTPSGComb for a given instance of the entity RouteSelectionCriteria. This entity describes also the traffic distribution over the set of XTPSGCombs per instance of RouteSelectionCriteria. Therefore, one instance of entity OrderedListXTPSGComb points to at least one instance of the entity XTPSGComb with a percentage or priority for each XTPSGComb, according to the algorithm given in the OrderedListXTPSGComb instance. The possible algorithms are the same ones as described in subclause 6.18 (XTPSGComb), except that the cyclic algorithm is not used (the descriptions are applicable if XTPSGId is replaced by XTPSGCombId).

One instance of an OrderedListXTPSGComb is pointed at by at least one instance of the entity RouteSelectionCriteria. One exchange may contain several instances of the entity OrderedlistXTPSGComb.

Table 13

Entity: OrderedListXTPSGComb		
Attributes	M/S	O/M
OrderedListXTPSGCombId	S	M
ListOfXTPSGCombs	M	M
UsedAlgorithm	S	M

The following attributes describe the entity OrderedListXTPSGComb:

- ListOfXTPSGCombs:

this attribute lists the entities XTPSGComb for a given instance of entity RouteSelectionCriteria. To the members of the set of XTPSGComb priorities or percentages are assigned, depending on the algorithm;
- UsedAlgorithm:

see subclause 6.18.

6.14 RouteSelectionCriteria

The entity RouteSelectionCriteria is described by a set of the entities routeingTarget, ReqBearerCapab, ReqSignCapab, X-OGroups and CallHistoryMatchingParameters. Information extracted from a specific call is compared with the values of entity RouteSelectionCriteria. Therefore, for a specific call only one instance of routeSelectionCriteria will match.

Table 14

Entity: RouteSelectionCriteria		
Attributes	M/S	O/M
RouteSelectionCriteriaId	S	M
routeingTargetInstance	S	M
ListOfHistory	M	O
X-OGroups	M	O
ReqBearerCapab	M	O
ReqSignCapab	M	O
ActiveOrderedListXTPSGComb	S	M
schedulingAttribute	M	O

The following attributes describe the entity RouteSelectionCriteria:

- routeingTargetInstance, ListOfHistory, X-OGroups:

these three attributes points to the entities routeingTarget and CallHistoryMatchingParameters and X-OGroups. The pointed entities need to match with information extracted from a call;
- ReqBearerCapab (Required Bearer Capability):

e.g. 64 kbit/s unrestricted;
- ReqSignCapab (Required Signalling Capability):

these two attributes describe the required characteristics of the outgoing termination point subgroup to be used for determining the routeing of the call. If CCS7 signalling is used then the ReqSignCapab 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 [4]);
- ActiveOrderedListXTPSGComb:

this attribute contains the value of the one instance of entity OrderedlistxtpSGComb which is applicable for the instance of RouteSelectionCriteria. This attribute is updated if a new index is selected by the scheduling mechanism;
- schedulingAttribute:

This attribute is a set of index values for objects of class OrderedlistXTPSGComb for scheduling reasons. The index which is applicable for a specific time will be selected by the TimeControlledSelector (described in ETR 088).

6.15 routeingTarget

A terminal point is a point which has a unique geographical address in a network (which has been provided by the network provider). It can be an exchange, a subscriber installation, etc. A terminal point is independent of the exchange currently processing the call.

The routeingTarget, in an exchange (e.g. exchange A in figure 7) is a representation (abstraction) of how to get to a set of terminalPoints. All calls offered to the exchange, that is to be routed to one of the set of terminalPoints (that is to a "member" of the routeingTarget) will use the same "algorithm". This algorithm is normally represented by one instance of object class "OrderedListXTPSGComb", but because of additional criteria (e.g. BearerCapability, SignallingCapability) a number of them may apply (identified using the object class RouteSelectionCriteria).

An example is presented to clarify this definition.

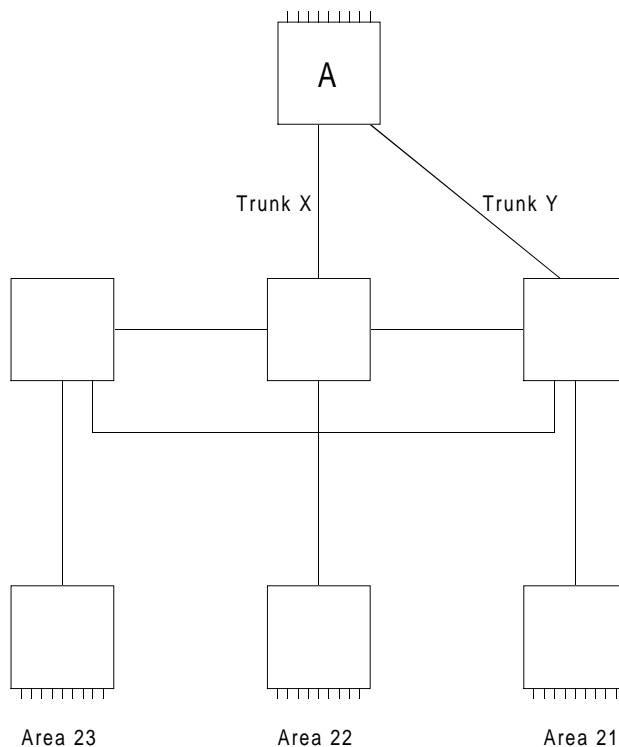


Figure 7: Example of the definition of the routeingTarget

Depending on the used algorithm in exchange A, the terminal points can be grouped together in different ways into the routeingTargets for Exchange A.

To route to <Area 21> Trunk Y gets first priority; to route to <Area 22> Trunk X gets first priority. Depending on whether, in order to reach <Area 23>, calls will be routed on Trunk Y or on Trunk X with first priority, the terminal points of <Area 23> are grouped into the routeingTarget of <Area 21> or into the routeingTarget of <Area 22>.

routeingTarget encompasses only the topological view of a network and, on that level, represents one or more switches via which a call can be progressed to its destination switch. One switch can also be represented by several routeingTargets, e.g. to separate common subscribers from game numbers. The network provider is responsible for making the best choices of routeingTargets.

For the last leg in a call routing, the routingTarget(s) represent the destination switch. In a particular switch a routingTarget indirectly points out a set of XTPSGs that directly or via intermediate switches can reach the routingTarget switch or switches. The routingTarget is used to identify all XTPSGs that can reach a desired area, independent of other characteristics like requested bearer capabilities, etc.

In an exchange, the routingTarget information element may appear as a local code. This code may be changed or created by the external manager.

Seen from one exchange, there may be several instances of routingTarget. One instance of routingTarget only exists in one exchange (because of the NE view). Whether the same grouping of terminal points is also valid for other exchanges is outside the scope of this I-ETS.

One instance of routingTarget may be pointed at by several instances of the entity RouteSelectionCriteria.

Table 15

Entity: routingTarget		
Attributes	M/S	O/M
routingTargetId	S	M

6.16 Treatment

This entity represents treatments such as e.g. announcements. A treatment is applied in specific situations. Specific situations can be:

- a place in the digittree:
e.g. for certain "invalid" combination of digits, an announcement may be applied;
- a specific entity of routeSelectionCriteria:
if, for example, a certain routingTarget (temporarily) can be reached for only a limited set of bearerCapabilities, an announcement can be used to inform why the other requested BearerCapabilities are not supported;
- a cause:
a cause is a reason why the call is not forwarded;
- an exception:
an exception occurs when none of the criterium type of object instances matches for a specific call. e.g. if none of the routeSelectionCriteria object instances match. Such a situation shall be informed to the manager (by a specific subclass of treatment).

Therefore, an instance of a treatment may be pointed at by several instances of DigitElement, several instances of RouteSelectionCriteria and several instances of exceptions.

Table 16

Entity: Treatment		
Attributes	M/S	O/M
TreatmentId	S	M

6.17 X-OGroup

This entity groups together XTPSGs and/or originGroups for a number of possible reasons.

Every "criterium" type of object class points to a set of XTPSGs and/or originGroups. Instead of maintaining in each instance of the criterium type class the set of XTPSGs and/or originGroups, this set can be modelled using the X-OGroup, e.g. if the same set of XTPSGs is used for the digitRebuildingCriteria, AnalysisCriteria and DigitPreparationCriteria then modification of this set shall be executed three times. Using the X-OGroup, only one modification is required. Therefore, there are no strict rules for using this object class, it is intended to optimize the set of XTPSGs and/or originGroups for different usage.

Table 17

Entity: X-OGroup		
Attributes	M/S	O/M
x-oGroupld	S	M
xtpsgList	M	O
originGroups	M	O

- xtpsgList (List of exchange termination point subgroup):

the set of XTPSG which makes part of the entity X-OGroup.

Most of the time the previous exchange identification is sufficient for selection of the termination point to forward the call. This means that, most of the time, all the XTPSGs coming from one exchange can be captured by one instance of X-OGroup (for the selection). In poor signalling systems, however, there is sometimes no number analysis. In those cases, there can be different outgoing subgroup for each incoming subgroup (even if the incoming subgroups are coming from the same exchange);

- originGroups:

the set of terminal points which makes part of the entity X-OGroup.

6.18 XTPSGComb

This entity describes a set of XTPSGs for which a certain algorithm is used to assign traffic to a XTPSG (of the traffic offered to the set). This includes the detailed information how the traffic is distributed over the elements in the set. The XTPSGs, which make part of the set described by the XTPSGComb, can have different characteristics.

Four algorithms are identified to assign traffic to the set of XTPSGs:

- the sequential algorithm:

for the sequential algorithm, the XTPSGs are ordered in a list. The sequential algorithm starts searching for an available XTPSG always at the first element of the list;

- the cyclic algorithm:

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

- two different versions of the "proportional bidding":

for the first version traffic is distributed over "rows" according to a certain assigned percentage. Every "row" consist of XTPSGs (ordered in a list). If a call is assigned to the "row", then the search for an available XTPSG will be done in a sequential way (of course, only those XTPSG who are listed for that row will be tried). If the search for all the XTPSGs of a specific row has failed, the call will be rejected.

Table 18

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

This version is called "proportional with alternatives".

In case of the second proportional bidding algorithm, a row consists of one XTPSGId. However, if the search now fails another row will be tried instead of rejecting the call. This version is called "proportional with overflow".

One instance of a XTPSGComb may be pointed at by at least one of the entity OrderedlistxtpSGComb. One instance of a XTPSGComb points to at least one instance of the entity XTPSG; for this relation the algorithms are used. An exchange may contain several instances of the entity XTPSGComb.

Table 19

Entity: XTPSGComb		
Attributes	M/S	O/M
XTPSGCombId	S	M
ListOfXTPSGs	M	M
UsedAlgorithm	S	M

The following attributes describe the entity XTPSGComb:

- ListOfXTPSGs:

this attribute lists the XTPSGs of the set and assigns to each XTPSG a certain priority or percentage depending on the type of algorithm;

- UsedAlgorithm;

three algorithms are identified to assign priorities or percentages to the members of the set.

7 Formal definitions

This clause contains the formal object class definitions, as specified in this I-ETS. Manufacturer dependent extensions can be introduced by subclassing and extensions of the attribute values (Named INTEGERS).

7.1 Definition of managed objects

7.1.1 Analysis criteria

```
analysisCriteria MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    analysisCriteriaPackage PACKAGE
      BEHAVIOUR
        acBeh BEHAVIOUR
          DEFINED AS "See subclause 6.1";
      ATTRIBUTES
        analysisCriteriaId          GET,
        calledNumberingPlans       GET-REPLACE ADD-REMOVE,
        callingPartyAspectList     GET-REPLACE ADD-REMOVE,
        x-oGroups                  GET-REPLACE ADD-REMOVE,
        natureOfAddresses          GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 9};
```

7.1.2 Call history matching parameters

```
callHistoryMatchingParameters MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    callHistoryMatchingParametersPackage PACKAGE
      BEHAVIOUR
        chmpBeh BEHAVIOUR
          DEFINED AS "See subclause 6.3";
      ATTRIBUTES
        historyId                  GET,
        noOfSatLinks              GET-REPLACE,
        echoSuppressor            GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 3};
```

7.1.3 Calling party aspects

```
callingPartyAspects MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    callingPartyAspectsPackage PACKAGE
      BEHAVIOUR
        cpaBeh BEHAVIOUR
          DEFINED AS "See subclause 6.2";
      ATTRIBUTES
        callingPartyAspectsId      GET,
        callingPartyCat            GET-REPLACE,
        transitNetworkSelection     GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 4};
```

7.1.4 Digit rebuilding criteria

```
digitRebuildingCriteria MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    digitRebuildingCriteriaPackage PACKAGE
      BEHAVIOUR
        dRebCritBeh BEHAVIOUR
          DEFINED AS "See subclause 6.7";
      ATTRIBUTES
        digitRebuildingCriteriaId    GET,
        digitManipInstance           GET-REPLACE,
        languageCodePosition         GET-REPLACE,
        x-oGroups                     GET-REPLACE ADD-REMOVE,
        natureOfAddresses             GET-REPLACE ADD-REMOVE,
        calledNumberingPlans         GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;
REGISTERED AS {managedObjectClass 8};
```

7.1.5 Digit element

```
digitElement MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    digitElementPackage PACKAGE
      BEHAVIOUR
        deBeh BEHAVIOUR
          DEFINED AS "See subclause 6.4";
      ATTRIBUTES
        digitElementId              GET,
        digitParticipationIndicator  GET-REPLACE,
        decisions                    GET-REPLACE ADD-REMOVE,
        decisionTypes               GET-REPLACE ADD-REMOVE,
        schedulingAttribute          GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;
REGISTERED AS {managedObjectClass 11};
```

7.1.6 Digit manipulation

```
digitManip MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    digitManipPackage PACKAGE
      BEHAVIOUR
        dmBeh BEHAVIOUR
          DEFINED AS "See subclause 6.5";
      ATTRIBUTES
        digitManipId                GET,
        digitSuppress                GET-REPLACE ADD-REMOVE,
        digitCombReplace             GET-REPLACE ADD-REMOVE,
        digitCombInsert              GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;
REGISTERED AS {managedObjectClass 12};
```

7.1.7 Digit preparation criteria

```
digitPreparationCriteria MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    digitPreparationCriteriaPackage PACKAGE
      BEHAVIOUR
        odCritBeh BEHAVIOUR
          DEFINED AS "See subclause 6.6";;
      ATTRIBUTES
        outDigitsPrimId GET,
        incomingX-oGroups      GET-REPLACE ADD-REMOVE,
        outgoingX-oGroups      GET-REPLACE ADD-REMOVE,
        routingTargetIds       GET-REPLACE ADD-REMOVE,
        digitManipInstance     GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 13};
```

7.1.8 Exceptions

```
exceptions MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    exceptionsPackage PACKAGE
      BEHAVIOUR
        excBeh BEHAVIOUR
          DEFINED AS "See subclause 6.8";;
      ATTRIBUTES
        exceptionsId GET,
        matchesIf      GET-REPLACE ADD-REMOVE,
        treatmentInstance GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 16};
```

7.1.9 Local destination

```
localDestination MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    localDestinationPackage PACKAGE
      BEHAVIOUR
        ldBeh BEHAVIOUR
          DEFINED AS "See subclause 6.11";;
      ATTRIBUTES
        localDestinationId GET;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion;;;
REGISTERED AS {managedObjectClass 15};
```

7.1.10 Ordered list XTPSG combination

```
orderedListXTPSGComb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    orderedListXTPSGCombPackage PACKAGE
      BEHAVIOUR
        olxcBeh BEHAVIOUR
          DEFINED AS "See subclause 6.13";;
      ATTRIBUTES
        orderedListXTPSGCombId GET,
        listOfXTPSGCombs      GET-REPLACE,
        usedAlgorithm          PERMITTED VALUES
                               ASNTYPEMODULE.UsedAlgorithmPValues -- 0,1,2
                               GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
REGISTERED AS {managedObjectClass 6};
```

7.1.11 Route selection criteria

```
routeSelectionCriteria MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    routeSelectionCriteriaPackage PACKAGE
      BEHAVIOUR
        rSelCritBeh BEHAVIOUR
          DEFINED AS "See subclause 6.14";
      ATTRIBUTES
        routeSelectionCriteriaId      GET,
        routeingTargetInstance        GET-REPLACE,
        listOfHistory                  GET-REPLACE ADD-REMOVE,
        activeOrderedListXTPSGComb    GET-REPLACE,
        schedulingAttribute            GET-REPLACE ADD-REMOVE,
        reqBearerCapab                GET-REPLACE ADD-REMOVE,
        reqSignCapab                  GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
  REGISTERED AS {managedObjectClass 7};
```

7.1.12 Routeing target

```
routeingTarget MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    routeingTargetPackage PACKAGE
      BEHAVIOUR
        routeingTargetBeh BEHAVIOUR
          DEFINED AS "See subclause 6.15";
      ATTRIBUTES
        routeingTargetId              GET;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion;;;
  REGISTERED AS {managedObjectClass 1};
```

7.1.13 Treatment

```
treatment MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    treatmentPackage PACKAGE
      BEHAVIOUR
        treatBeh BEHAVIOUR
          DEFINED AS "See subclause 6.16";
      ATTRIBUTES
        treatmentId                    GET;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion;;;
  REGISTERED AS {managedObjectClass 14};
```

7.1.14 X-O Group

```
x-oGroup MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    x-oGroupPackage PACKAGE
      BEHAVIOUR
        x-oGBeh BEHAVIOUR
          DEFINED AS "See subclause 6.17";
      ATTRIBUTES
        x-oGroupId                      GET,
        xtpsgList                       GET-REPLACE ADD-REMOVE,
        originGroups                    GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721":objectCreation,
        "Recommendation X.721":objectDeletion,
        "Recommendation X.721":attributeValueChange;;;
  REGISTERED AS {managedObjectClass 2};
```

7.1.15 XTPSG combination

```

xtpsgComb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721":top;
  CHARACTERIZED BY
    xtpsgCombPackage PACKAGE
      BEHAVIOUR
        xtpsgCombBeh BEHAVIOUR
          DEFINED AS "See subclause 6.18";;
  ATTRIBUTES
    xtpsgCombId          GET,
    listOfXTPSGs        GET-REPLACE,
    usedAlgorithm        GET-REPLACE;
  NOTIFICATIONS
    "Recommendation X.721":objectCreation,
    "Recommendation X.721":objectDeletion,
    "Recommendation X.721":attributeValueChange;;
REGISTERED AS {managedObjectClass 5};

```

7.2 Definition of attributes**7.2.1 activeOrderedListXTPSGComb**

```

activeOrderedListXTPSGComb ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR
    activeOrderedListXTPSGCombBeh BEHAVIOUR
      DEFINED AS "This attribute points to an object of class orderedListXTPSGComb";;
REGISTERED AS {attribute 1};

```

7.2.2 analysisCriteriaId

```

analysisCriteriaId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 2};

```

7.2.3 calledNumberingPlans

```

calledNumberingPlans ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.CalledNumberingPlans;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 3};

```

7.2.4 callingPartyAspectsId

```

callingPartyAspectsId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 4};

```

7.2.5 callingPartyAspectList

```

callingPartyAspectList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    callingPartyAspectListBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class callingPartyAspects";;
REGISTERED AS {attribute 5};

```

7.2.6 callingPartyCat

```

callingPartyCat ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.CallingPartyCat;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 6};

```

7.2.7 decisions

```

decisions ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.Decisions;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 7};

```

7.2.8 decisionTypes

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

7.2.9 digitCombInsert

```
digitCombInsert ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitCombInsert;  
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;  
  REGISTERED AS {attribute 8};
```

7.2.10 digitCombReplace

```
digitCombReplace ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitCombReplace;  
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;  
  REGISTERED AS {attribute 9};
```

7.2.11 digitElementId

```
digitElementId ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitElement;  
  MATCHES FOR EQUALITY;  
  REGISTERED AS {attribute 10};
```

7.2.12 digitManipId

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

7.2.13 digitManipInstance

```
digitManipInstance ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstance;  
  MATCHES FOR EQUALITY;  
  BEHAVIOUR  
    digitManipInstanceBeh BEHAVIOUR  
      DEFINED AS "This attribute points to an object of class digitManip";  
  REGISTERED AS {attribute 44};
```

7.2.14 digitParticipationIndicator

```
digitParticipationIndicator ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitParticipationIndicator;  
  MATCHES FOR EQUALITY;  
  REGISTERED AS {attribute 18};
```

7.2.15 digitSuppress

```
digitSuppress ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.DigitSuppress;  
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;  
  REGISTERED AS {attribute 12};
```

7.2.16 echoSuppressor

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

7.2.17 exceptionsId

```
exceptionsId ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;  
  MATCHES FOR EQUALITY;  
  REGISTERED AS {attribute 14};
```

7.2.18 historyId

```
historyId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 15};
```

7.2.19 incomingX-oGroups

```
incomingX-oGroups ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    incomingX-oGroupsBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class x-oGroup";
REGISTERED AS {attribute 16};
```

7.2.20 languageCodePosition

```
languageCodePosition ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NoOf;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 17};
```

7.2.21 listOfHistory

```
listOfHistory ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    listOfHistoryBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class callHistoryMatchingParameters";
REGISTERED AS {attribute 19};
```

7.2.22 listOfXTPSGs

```
listOfXTPSGs ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ListOfXTPSGs;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION, ORDERING;
REGISTERED AS {attribute 20};
```

7.2.23 listOfXTPSGCombs

```
listOfXTPSGCombs ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.TrafficAllocation;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION, ORDERING;
REGISTERED AS {attribute 21};
```

7.2.24 localDestinationId

```
localDestinationId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 22};
```

7.2.25 matchesIf

```
matchesIf ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.Conditions;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 23};
```

7.2.26 natureOfAddresses

```
natureOfAddresses ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NatureOfAddresses;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 24};
```


7.2.27 noOfSatLinks

```
noOfSatLinks ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NoOf;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 25};
```

7.2.28 orderedListXTPSGCombId

```
orderedListXTPSGCombId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 26};
```

7.2.29 originGroups

```
originGroups ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameTypeN;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  REGISTERED AS {attribute 27};
```

7.2.30 outDigitsPrimId

```
outDigitsPrimId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 28};
```

7.2.31 outgoingX-oGroups

```
outgoingX-oGroups ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    outgoingX-oGroupsBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class x-oGroup";
  REGISTERED AS {attribute 29};
```

7.2.32 digitRebuildingCriteriaId

```
digitRebuildingCriteriaId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 30};
```

7.2.33 reqBearerCapab

```
reqBearerCapab ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ReqBearerCapab;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  REGISTERED AS {attribute 31};
```

7.2.34 reqSignCapab

```
reqSignCapab ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ReqSignCapab;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  REGISTERED AS {attribute 32};
```

7.2.35 routeSelectionCriteriaId

```
routeSelectionCriteriaId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 33};
```

7.2.36 routeingTargetId

```
routeingTargetId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
  REGISTERED AS {attribute 34};
```

7.2.37 routingTargetIds

```
routingTargetIds ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    routingTargetIdsBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class routingTarget";
REGISTERED AS {attribute 35};
```

7.2.38 routingTargetInstance

```
routingTargetInstance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR
    routingTargetInstanceBeh BEHAVIOUR
      DEFINED AS "This attribute points to an object of class routingTarget";
REGISTERED AS {attribute 45};
```

7.2.39 schedulingAttribute

```
schedulingAttribute ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.SchedulingType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 47};
```

7.2.40 transitNetworkSelection

```
transitNetworkSelection ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 36};
```

7.2.41 treatmentId

```
treatmentId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 37};
```

7.2.42 treatmentInstance

```
treatmentInstance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR
    treatmentInstanceBeh BEHAVIOUR
      DEFINED AS "This attribute points to an object of class treatment";
REGISTERED AS {attribute 46};
```

7.2.43 usedAlgorithm

```
usedAlgorithm ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.UsedAlgorithm;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 38};
```

7.2.44 x-oGroupId

```
x-oGroupId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 39};
```

7.2.45 x-oGroups

```
x-oGroups ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR
    x-oGroupsBeh BEHAVIOUR
      DEFINED AS "This attribute points to objects of class x-oGroup";
REGISTERED AS {attribute 40};
```

7.2.46 xtpsgComblId

```
xtpsgCombId ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;  
  MATCHES FOR EQUALITY;  
  REGISTERED AS {attribute 41};
```

7.2.47 xtpsgList

```
xtpsgList ATTRIBUTE  
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ObjectInstances;  
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;  
  BEHAVIOUR  
    xtpsgListBeh BEHAVIOUR  
      DEFINED AS "This attribute points to objects of class xtpsg";  
  REGISTERED AS {attribute 42};
```

7.3 Name bindings

7.3.1 Analysis criteria

```
analysisCriteria-managedSwitchingElement NAME BINDING  
  SUBORDINATE OBJECT CLASS      analysisCriteria;  
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;  
  WITH ATTRIBUTE                analysisCriteriaId;  
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;  
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
  REGISTERED AS {nameBinding 9};
```

7.3.2 Call history matching parameters

```
callHistoryMatchingParameters-managedSwitchingElement NAME BINDING  
  SUBORDINATE OBJECT CLASS      callHistoryMatchingParameters;  
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;  
  WITH ATTRIBUTE                historyId;  
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;  
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
  REGISTERED AS {nameBinding 3};
```

7.3.3 Calling party aspects

```
callingPartyAspects-managedSwitchingElement NAME BINDING  
  SUBORDINATE OBJECT CLASS      callingPartyAspects;  
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;  
  WITH ATTRIBUTE                callingPartyAspectsId;  
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;  
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
  REGISTERED AS {nameBinding 4};
```

7.3.4 Digit rebuilding criteria

```
digitRebuildingCriteria-managedSwitchingElement NAME BINDING  
  SUBORDINATE OBJECT CLASS      digitRebuildingCriteria;  
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;  
  WITH ATTRIBUTE                digitRebuildingCriteriaId;  
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;  
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
  REGISTERED AS {nameBinding 8};
```

7.3.5 Digit manipulation

```
digitManip-managedSwitchingElement NAME BINDING  
  SUBORDINATE OBJECT CLASS      digitManipOut;  
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;  
  WITH ATTRIBUTE                digitManipOutId;  
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;  
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
  REGISTERED AS {nameBinding 14};
```

7.3.6 Digit preparation criteria

```
digitPreparationCriteria-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      digitPreparationCriteria;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 outDigitsPrimId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 15};
```

7.3.7 Digit element

```
digitElement-analysisCriteria NAME BINDING
SUBORDINATE OBJECT CLASS      digitElement;
NAMED BY SUPERIOR OBJECT CLASS analysisCriteria;
WITH ATTRIBUTE                 digitElementId;
CREATE WITH-REFERENCE-OBJECT;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 11};
```

```
digitElement-digitElement NAME BINDING
SUBORDINATE OBJECT CLASS      digitElement;
NAMED BY SUPERIOR OBJECT CLASS digitElement;
WITH ATTRIBUTE                 digitElementId;
CREATE WITH-REFERENCE-OBJECT;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 13};
```

7.3.8 Exceptions

```
exceptions-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      exceptions;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 exceptionsId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 18};
```

7.3.9 Local destination

```
localDestination-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      localDestination;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 localDestinationId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 17};
```

7.3.10 Ordered list XTPSG combination

```
orderedListXTPSGComb-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      orderedListXTPSGComb;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 orderedListXTPSGCombId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 6};
```

7.3.11 Route selection criteria

```
routeSelectionCriteria-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      routeSelectionCriteria;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 routeSelectionCriteriaId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 7};
```

7.3.12 Routeing target

```
routeingTarget-managedSwitchingElement NAME BINDING
SUBORDINATE OBJECT CLASS      routeingTarget;
NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
WITH ATTRIBUTE                 routeingTargetId;
CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 1};
```

7.3.13 Treatment

```
treatment-managedSwitchingElement NAME BINDING
  SUBORDINATE OBJECT CLASS      treatment;
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
  WITH ATTRIBUTE                 treatmentId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 16};
```

7.3.14 X-O Group

```
x-oGroup-managedSwitchingElement NAME BINDING
  SUBORDINATE OBJECT CLASS      x-oGroup;
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
  WITH ATTRIBUTE                 x-oGroupId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 2}
```

7.3.15 XTPSG combination

```
xtpsgComb-managedSwitchingElement NAME BINDING
  SUBORDINATE OBJECT CLASS      xtpsgComb;
  NAMED BY SUPERIOR OBJECT CLASS managedSwitchingElement;
  WITH ATTRIBUTE                 xtpsgCombId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 5};
```

7.4 ASN.1 defined types module

```

ASN1TypeModule {ccitt(0) identified-organization(4) etsi(0)
    callRouteingInformationManagement(292) informationModel(0)
    asn1Module(2) asn1TypeModule(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS
    -- CCITT Recommendation M.3100
    NameType
    FROM ASN1DefinedTypesModule {ccitt(0) recommendation m gnm(3100) informationModel(0)
        asn1Modules(2) asn1DefinedTypesModule(0)}
    -- CCITT Recommendation X.711
    Attribute,
    ObjectClass,
    ObjectInstance
    FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) version1(1) protocol(3)};

informationModel          OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0)
    callRouteingInformationManagement(292)
    informationModel(0)}

standardSpecificExtension OBJECT IDENTIFIER ::= {informationModel standardSpecificExtension(0)}
managedObjectClass       OBJECT IDENTIFIER ::= {informationModel managedObjectClass      (3)}
package                  OBJECT IDENTIFIER ::= {informationModel package                (4)}
parameter                OBJECT IDENTIFIER ::= {informationModel paramater            (5)}
nameBinding              OBJECT IDENTIFIER ::= {informationModel nameBinding          (6)}
attribute                OBJECT IDENTIFIER ::= {informationModel attribute            (7)}
attributeGroup           OBJECT IDENTIFIER ::= {informationModel attributeGroup       (8)}
action                   OBJECT IDENTIFIER ::= {informationModel action              (9)}
notification             OBJECT IDENTIFIER ::= {informationModel notification         (10)}

BitString                ::= BIT STRING

CalledNumberingPlans     ::= SET OF BitString (SIZE(4))
    -- Value acc. ITU-T Recommendation Q.763

CallingPartyCat          ::= BitString (SIZE(8))
    -- Value acc. ITU-T Recommendation Q.763

Conditions               ::= SET OF CHOICE {
    criteria              [1] ObjectClass,
    cause                 [2] BitString}
    -- causes as defined in ITU-T Recommendation Q.850

Decisions                ::= SET OF CHOICE {
    object                [1] ObjectInstance,
    attribute             [2] Attribute}

DecisionType             ::= SET OF OBJECT IDENTIFIER

DigitComb                ::= SEQUENCE OF DigitElement

DigitCombInsert          ::= SET OF SEQUENCE {
    startPosition        [0] INTEGER,
    combination          [1] DigitComb}

DigitCombReplace         ::= SET OF SEQUENCE {
    startPosition        [0] INTEGER,
    endPosition          [1] INTEGER,
    combination          [2] DigitComb}

DigitElement             ::= PrintableString
    (FROM ("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"|"*"|"#")|SIZE(1))

DigitParticipationIndicator ::= INTEGER {
    internationalCode    (0),
    areaCode             (1),
    subscriberNumber     (2)}

DigitSuppress            ::= SET OF SEQUENCE {
    startPosition        [0] INTEGER,
    endPosition          [1] INTEGER}

ListOfXTPSGs            ::= CHOICE {
    sequential           [0] ListXTPSG,
    proportional         [1] SET OF SEQUENCE {
        percentage       [0] INTEGER(0..100),
        listXTPSG        [1] ListXTPSG } }

```

```
ListXTPSG ::= SEQUENCE OF ObjectInstance -- instances of class xtpsg
ListXTPSGComb ::= SEQUENCE OF ObjectInstance -- instances of class xtpsgComb
NameTypeN ::= SET OF NameType
NatureOfAddresses ::= SET OF BitString (SIZE(7))
-- Value acc. ITU-T Recommendation Q.763
NoOf ::= INTEGER
ObjectInstances ::= SET OF ObjectInstance
ReqBearerCapab ::= SET OF ReqBearerCapability
ReqBearerCapability ::= INTEGER {
    speech (0),
    r64kbitsUnrestricted (1),
    r56kbitsDigitalRestricted (2),
    r3k1HzAudio (3),
    r7kHzAudio (4),
    r64kbitPref (5)}
ReqSignCapab ::= SET OF ReqSignCapability
ReqSignCapability ::= INTEGER {
    isupRequired (0),
    isupPreferred (1),
    anySignalling (2)}
SchedulingType ::= SET OF SEQUENCE {
    object ObjectInstance,
    index INTEGER}
TrafficAllocation ::= CHOICE {
    sequential [0] ListXTPSGComb,
    proportional [1] SET OF SEQUENCE {
        percentage [0] INTEGER(0..100),
        listXTPSGComb [1] ListXTPSGComb} }
UsedAlgorithm ::= INTEGER {
    sequential (0),
    proportionalWithAlt (1),
    proportionalWithOverflow (2),
    cyclic (3)}
UsedAlgorithmPValues ::= INTEGER (0..2)
YesNo ::= BOOLEAN
END -- of ASN1TypeModule
```

7.5 Cross reference list

Table 20 gives a cross reference between each attribute and the managed object classes in which it is used for their definition.

Table 20

Attribute Label	Registered as attribute #	Used in managedObjectClass #
activeOrderedListXTPSGComb	1	7
analysisCriteriaId	2	9
calledNumberingPlans	3	8, 9
callingPartyAspectsId	4	4
callingPartyAspectList	5	9
callingPartyCat	6	4
decisions	7	11
digitCombInsert	8	12
digitCombReplace	9	12
digitElementId	10	11
digitManipId	11	12, 13
digitParticipationIndicator	18	11
digitSuppress	12	12
echoSuppressor	13	3
exceptionsId	14	16
historyId	15	3
incomingX-oGroups	16	13
languageCodePosition	17	8
listOfHistory	19	7
listOfXTPSGs	20	5
listOfXTPSGCombs	21	6
localDestinationId	22	15
matchesIf	23	16
natureOfAddress	24	8, 9
noOfSatLinks	25	3
orderedListXTPSGCombId	26	6
originGroups	27	2
outDigitsPrimId	28	13
outgoingX-oGroups	29	13
digitRebuildingCriteriaId	30	8
reqBearerCapab	31	7
reqSignCapab	32	7
routeSelectionCriteriaId	33	7
routeingTargetId	34	1, 7
routeingTargetIds	35	13
transitNetworkSelection	36	4
treatmentId	37	14, 16
usedAlgorithm	38	5, 6
x-oGroupId	39	2
x-oGroups	40	8, 9
xtpsgCombId	41	5
xtpsgList	42	2
decisionTypes	43	11
digitManipInstance	44	8, 13
routeingTargetInstance	45	7
treatmentInstance	46	16
schedulingAttribute	47	7, 11

Annex A (informative): Explanation of object classes for routing information management

Introduction

This annex is intended to illustrate object classes for routing information management. It consists of a number of examples (at present two examples are evaluated). For every example, a small introduction is given of which items are simplified and which items are highlighted.

In the examples, the term CircuitSubGroup is used to illustrate the links between the exchanges. One CircuitSubGroup corresponds to only one XTPSG in the exchange considered.

EXAMPLE 1: Object classes associated with routeSelection Criteria.

This simple example is intended to illustrate the use of the object classes associated with routeSelection Criteria. The tables in this example refer to figure A.1.

In this example the following assumptions are made:

- basic routingTargets have been chosen. Only adjacent exchanges are routingTargets;
- a connection between two exchanges consists only of one circuit subgroup;
- no scheduling is involved;
- CircuitSubGroup "AC", "AB", "CB" and "BD" can support any required bearerCapability;
- CircuitSubGroup "AD" is an analogue line only capable of supporting the required BearerCapability "audio" and "telephony".

Instances of object class routingTarget

instance 1	instance 2	instance 3
Id = B	Id = C	Id = D

These instances have a one-to-one association with the switches drawn in figure A.1.

Instances of object class CallHistoryMatchingParameters

instance 1

NoOfSatLinks =	0
EchoSuppressor =	NO

Instances of object class X-OGroup

instance 1	instance 2	instance 3
XtpsgList = OA	XtpsgList = PA	XtpsgList = QA

Attribute originGroups is a "don't care".

These instances have a one to one association with the circuitSubGroups drawn in figure A.1.

This will result in the following instances of object class RouteSelectionCriteria.

Instances of object class RouteSelectionCriteria

instance 1

routeingTargetId = instance 1 (B)
x-oGroups = instance 1, 2, 3 (OA, PA, QA)
ListOfHistory = instance 1
ReqBearerCapab = audio, telephony, 64 kbit/s unrestricted
ReqSignCapab = (don't care)
OrderedList = "To-B"

This instance tells you that all traffic going to switch B will be routed according to OrderedList "To-B". Instance "To-B" can deduce, e.g. that circuitSubGroup "AB" will be selected with first priority, and circuitSubGroup "AC" with second priority. Example 3 details the definition of OrderedList.

The attribute OrderedList is according the precise definition of clause 6 attribute ActiveOrderedListXTPSGComb.

instance 2

routeingTargetId= instance 2 (C)
x-oGroups= instance 1, 2, 3 (OA, PA, QA)
ListOfHistory= instance 1
ReqBearerCapab= audio, telephony, 64 kbit/s unrestricted
ReqSignCapab= (don't care)
OrderedList= "To-C"

This instance tells you that all traffic going to switch C will be routed according to OrderedList "To-C". Instance "To-C" can deduce, e.g. that circuitSubGroup "AC" will be selected with first priority, and circuitSubGroup "AB" with second priority.

instance 3

routeingTargetId= instance 3 (D)
x-oGroups= instance 1, 2, 3 (OA, PA, QA)
ListOfHistory= instance 1
ReqBearerCapab= audio, telephony
ReqSignCapab= (don't care)
OrderedList= "To-D-audio/telephony"

This instance tells you that all traffic going to switch D, with required BearerCapability "audio" and "telephony" will be routed according to OrderedList "To-D-audio/telephony". Instance "To-D-audio/telephony" can deduce, e.g. that on circuitSubGroup "AD" will selected with first priority and circuitSubGroup "AB" with second priority.

instance 4

routeingTargetId= instance 3 (D)
x-oGroups= instance 1, 2, 3 (OA, PA, QA)
ListOfHistory= instance 1
ReqBearerCapab= 64 kbit/s unrestricted
ReqSignCapab= (don't care)
OrderedList= "To-D-unrestricted"

This instance tells you that all traffic going to switch D, with required BearerCapability "64 kbit/s unrestricted" will be routed according to OrderedList "To-D-unrestricted". Instance "To-D-unrestricted" can deduce, e.g. that one circuitSubGroup "AB" will be selected with first priority and circuitSubGroup "AC" with second. This is because the direct circuitSubGroup "AD" is not capable supporting the unrestricted capability.

In this case, the example uses different bearerCapabilities. Another example can be made to show different traffic distribution depending on the incoming circuit subgroup. In that case, you will get an instance of RouteSelectionCriteria per XTPSGId for one routingTarget. e.g.:

- traffic coming from "OA", going to "B" will use circuitSubGroup "AB" and circuitSubGroup "AC";
- traffic coming from "PA", going to "B" will use circuitSubGroup "AB" and circuitSubGroup "AD";
- traffic coming from "QA", going to "B" will use circuitSubGroup "AD" and circuitSubGroup "AC".

How the routing process would now work: information of an incoming call (incoming in switch A) is extracted from the incoming circuit (sub)group and from the signalling system. That information will perfectly match with:

- ONE instance of object routingTarget;
- ONE instance of object CallHistoryMatchingParameters;
- ONE instance of object X-OGroup.

The three instances together with the attributes reqBearerCap and reqSignCapab will result in the matching of ONLY ONE instance of object RouteSelectionCriteria. This instance of RouteSelectionCriteria can choose only one object orderedListXTPSGComb at one (time)moment.

EXAMPLE 2: Extensions on object class routingTarget.

This example is meant to illustrate more details about possible routingTargets (see figure A.2).

The assumptions for this example are the same as in example 1, but an extra routingTarget (E) is introduced.

routingTarget E consists of a number of exchanges. Those exchanges are, from a routing point of view for exchange A, all the same. In reality, routingTarget E could be a foreign country which is reachable by two international exchanges (C and D).

EXAMPLE 3: Object classes OrderedListXTPSGComb, XTPSGComb and XTPSG.

This example focus on the object classes OrderedListXTPSGComb, XTPSGComb and XTPSG. The example is split up in three scenarios.

Scenario 1:

The tables in this example refer to figure A.3. In this scenario the following assumptions are made:

- the same assumptions as in example 1, but: the connections between the exchange A and C, between A and B and between A and D consist of two circuit subgroups;
- traffic is offered to A and shall be routed to switch (target) D. This example goes into the details of instances 3 and 4 of object class RouteSelectionCriteria (of example 1).

If the required bearer capability is "audio" or telephony (RouteSelectionCriteria instance 3) then the direct link to "D" has the first priority. An alternative way is the link to "B". The attribute OrderedList of RouteSelectionCriteria instance 3 indicates that instance "To-D-audio/telephony" of object class OrderedListXTPSGComb defines the traffic distribution.

If the required bearer capability is "64 kbit/s unrestricted" (RouteSelectionCriteria instance 4) then the direct link to "B" has the first priority. An alternative way is the link to "C". The attribute OrderedList of RouteSelectionCriteria instance 4 indicates that instance "To-D-unrestricted" of object class OrderedListXTPSGComb defines the traffic distribution.

This results in the following definition of object classes.

Instances of object class OrderedlistxtpSGComb

Id = "To-D-audio/telephony"
 listOfXTPSGCombs = sequential {"To-D-direct", "To-B-direct"}
 ("To-D-direct" and "To-B-direct" are the names of instances of object class XTPSGComb).
 Id = "To-D-unrestricted"
 listOfXTPSGCombs = sequential {"To-B-direct", "To-C-direct"}
 ("To-B-direct" and "To-C-direct" are the names of instances of object class XTPSGComb)

Instances of object Class XTPSGComb

Id = "To-D-direct"
 listOfXTPSGs = sequential {"AD1", "AD2"}
 ("AD1", "AD2" are the names of instances of class XTPSG)
 Id = "To-B-direct"
 listOfXTPSGs = sequential {"AB1", "AB2"}
 ("AB1", "AB2" are the names of instances of class XTPSG)
 Id = "To-C-direct"
 listOfXTPSGs = sequential {"AC1", "AC2"}
 ("AC1", "AC2" are the names of instances of class XTPSG)

Scenario 2:

The tables in this scenario also refer to figure A.3. In this scenario, the following assumptions are made:

- the same assumptions as in example 1, but the connections between the exchange A and C, between A and B and between A and D consist of two circuit subgroups.

In this scenario, traffic is offered to exchange "A" and shall be routed to exchange "B". The traffic offered has the required BearerCapability "audio". For this scenario not all the instances of RouteSelectionCriteria of example 1 are applicable. Therefore, we assume to replace RouteSelectionCriteria instance 1 by RouteSelectionCriteria instance 5 and 6.

RouteSelectionCriteria instance 5 defines that traffic going to target "B", coming from any adjacent with required bearer capability "audio" or "telephony" will be routed according instance "To-B-audio/telephony" of object class OrderedlistxtpSGComb. RouteSelectionCriteria instance 6 defines the traffic distribution for the other required bearer capabilities.

Traffic according RouteSelectionCriteria instance 5 will be distributed according the following rules:

- first the direct link to "B" will be tried;
- secondly, as an alternative, the traffic will be equally shared over the link to "D" and to "C".

This results in the following definition of object classes.

Instances of object class OrderedlistxtpSGComb

Id = "To-B-audio/telephony"
 listOfXTPSGCombs = sequential {"To-B-direct", "Alt-To-B-direct"}
 ("To-B-direct" and "Alt-To-B-direct" are the names of instances of object class XTPSGComb).

Instances of object Class XTPSGComb

Id = "To-B-direct": see previous scenario.
 Id = "Alt-To-B-direct"
 listOfXTPSGs = proportional {{ 50%, {"AC1", "AC2"}
 { 50%, {"AD1", "AD2"}}
 ("AC1", "AC2", "AD1" and "AD2" are the names of instances of class XTPSG).

Scenario 3:

The tables in this example refer to figure A.4. In this scenario the following assumptions are made:

- all circuit subgroups support all required bearer capabilities;
- traffic is offered to exchange "A" and shall be routed to routingTarget "E";
- an instance of RouteSelectionCriteria will be applicable; the value of the attribute OrderedList (of this instance) is "To-E";
- the offered traffic (for target E) will be equally shared over adjacent exchange "C" and "D".

This results in the following definition of object classes.

Instances of object class OrderedlistxtpSGComb

```
Id = "To-E"
listOfXTPSGCombs = proportional {{ 50%, {"To-B-direct"}
                                { 50%, {"To-D-direct"}}
("To-B-direct" and "To-D-direct" are the names of instances of object class XTPSGComb).
```

Instances of object Class XTPSGComb

```
Id = "To-B-direct": see scenario 1.
Id = "To-D-direct": see scenario 1.
```

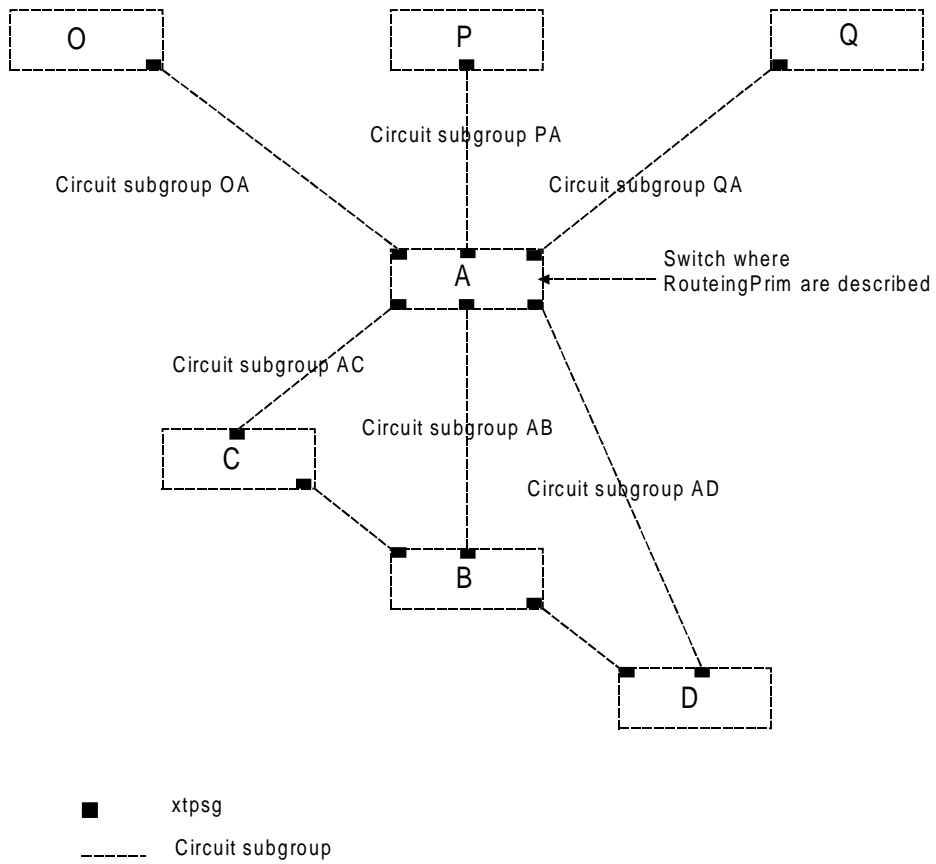


Figure A.1: Network topology, example 1

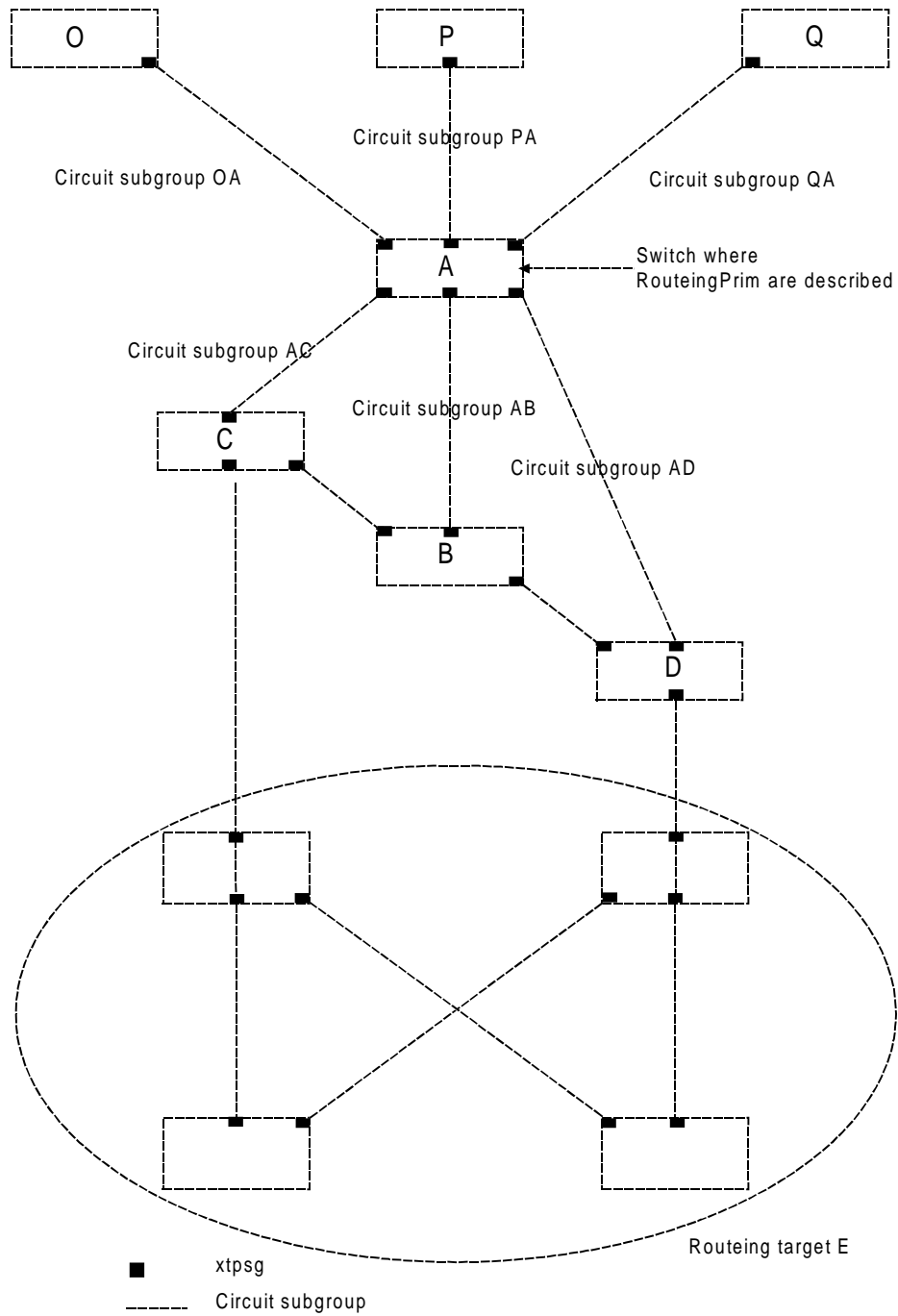


Figure A.2: Network topology, example 2

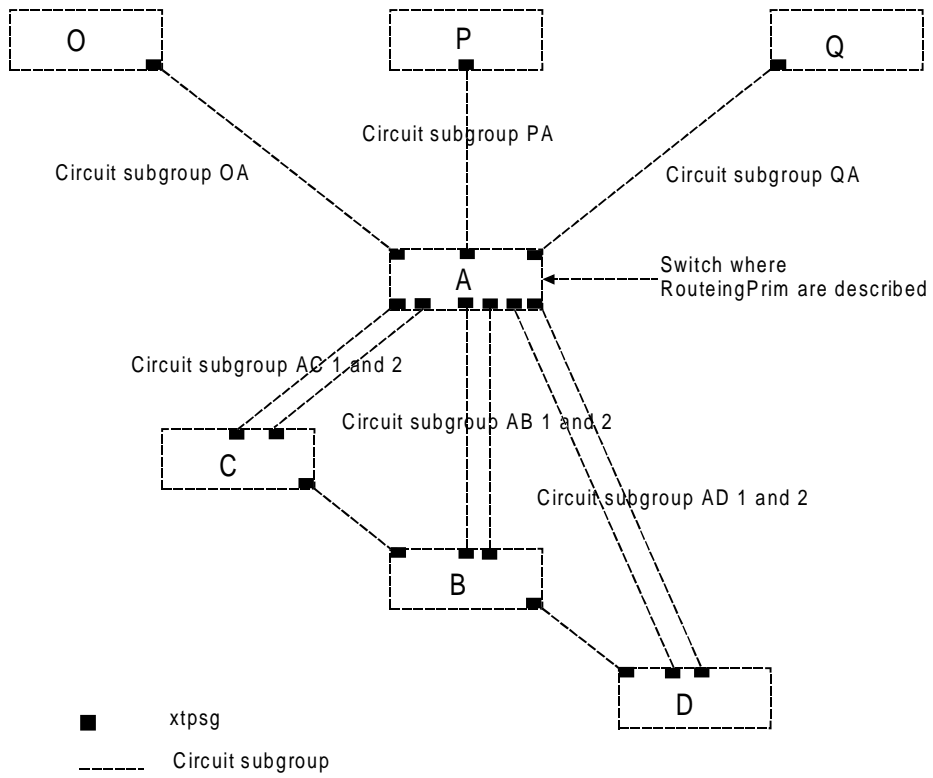


Figure A.3: Network topology, example 3, scenarios 1 and 2

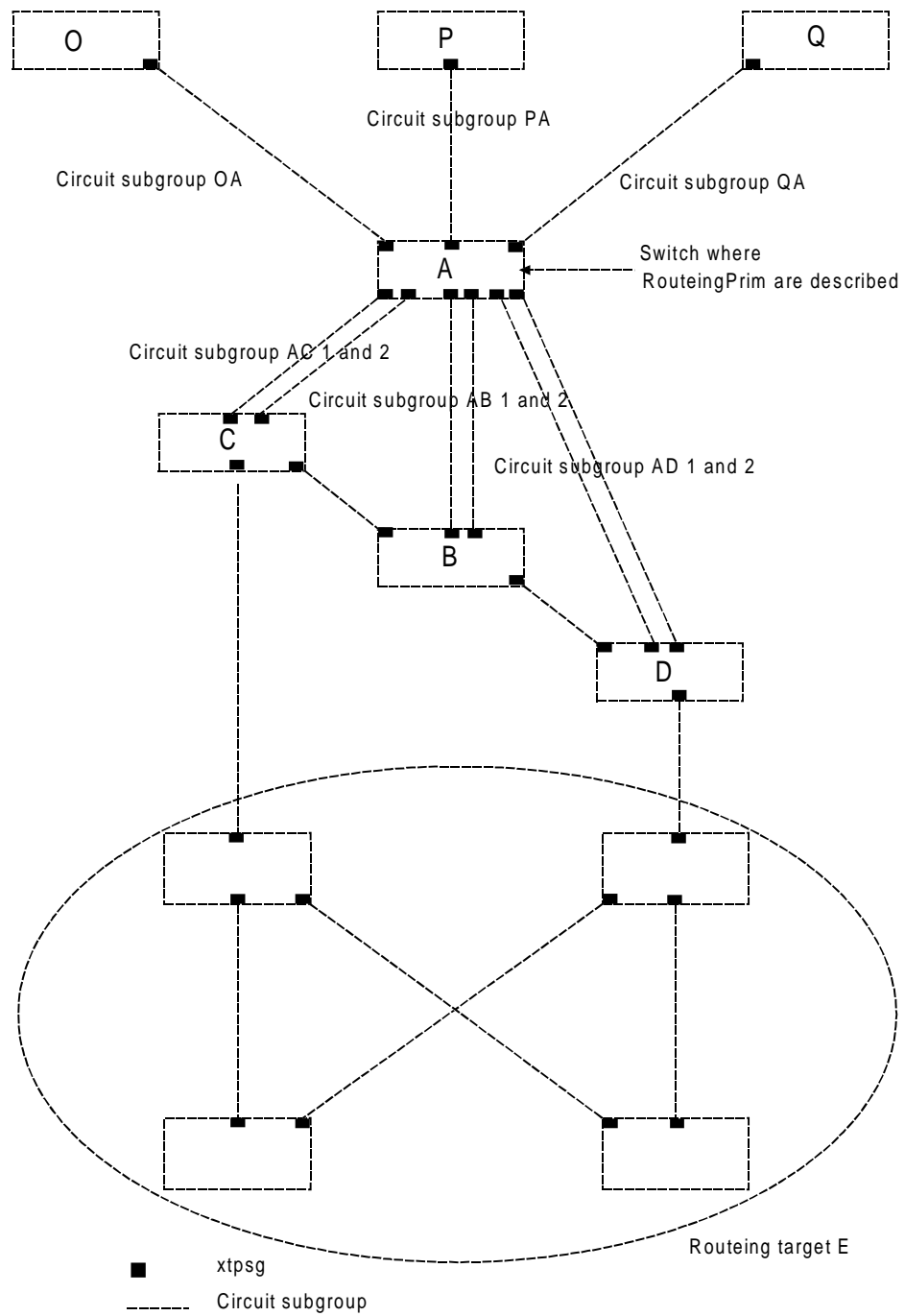


Figure A.4: Network topology, example 3, scenario 3

Annex B (informative): Explanation of object classes for management of test calls

This annex provides information about how testing of new routing information can be applied using this I-ETS:

- one instance of object class "CallingPartyAspects" is created; the attribute "CallingPartyCat" of this object shall have the value <testcall> as defined in ITU-T Recommendation Q.763 [4];
- one or more instances of object class "AnalysisCriteria" can be created. All those instances will have in common that they point to the instance of "CallingPartyAspects" which was created above. Those new instances of "AnalysisCriteria" are in fact the new routing data;
- calls, recognized as testcalls, will be analyzed according the above created "AnalysisCriteria", and routed accordingly. Only testcalls can match the instance of "CallingPartyAspects", and therefore only testcalls will be analyzed according the "AnalysisCriteria";
- normal calls, not identified as testcalls will be analyzed according the normal rules. In such a way it is possible to test a part of the routing information, without affecting the running business;
- if the new routing information needs to be activated, the value of attribute "CallingPartyCat" of the object created at the first bullet, should be replaced by a new value.

Additionally it is possible to simulate testcalls via the XTPSGs. In such a case the "availabilityStatus" of the XTPSG will be set to "inTest".

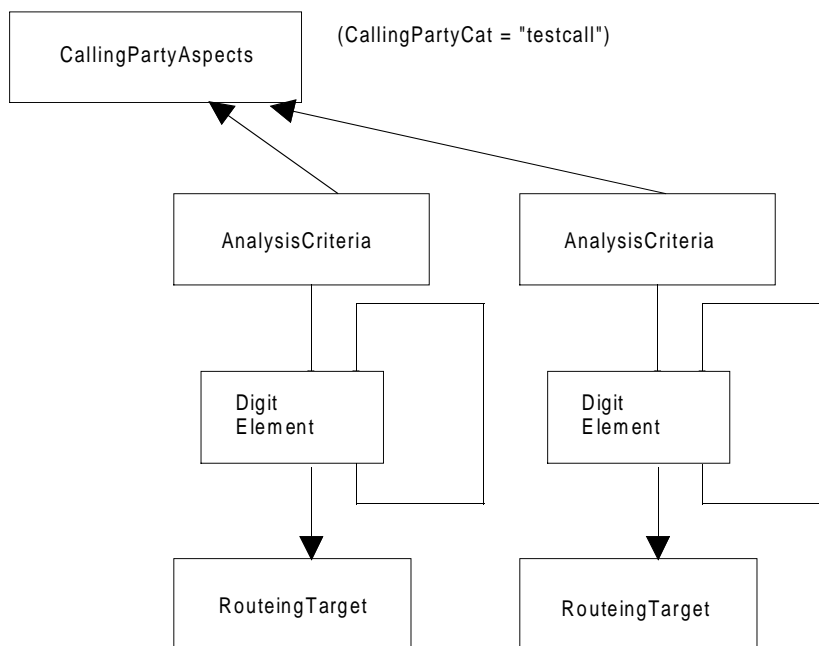


Figure B.1: Example of management of testcalls

Annex C (informative): Candidate object classes for other management services

This annex is provided in order to help other groups standardizing related subjects, to investigate what could be reused of this I-ETS. The authors are aware of their "lack" of knowledge of those related subjects, therefore this annex provides candidate object classes with a rationale why the authors think the candidates to be valid ones. Only candidates for related subjects with a more mature (management) service definition are provided.

Candidates for Traffic Management:

routeingTarget

Rationale: The routeingTarget is an abstraction of a set of Terminal Points. The routeingTarget can be equal to a Destination. Possible controls which apply to the routeingTarget are Call Gapping and Hard To Reach.

Routeing Criteria

Rationale: The Routeing Criteria provides the information for which calls a routeing scenario applies. The Routeing Criteria are routeingTarget, BearerCapabilities, SignallingCapabilities and a few more. Although the authors are not aware of any Traffic Controls which will be applied to those criteria, this candidate is still brought to the attention.

OrderedListXTPSGComb / XTPSGComb / XTPSG

Rationale: These object classes encapsulates the routeing algorithm. e.g. it assigns priorities to XTPSGComb. Possible controls to be applied to those classes are Skip, CancelTo, CancelFrom, Reroute. Additionally Circuit Reservation is related to the XTPSG.

X-OGroup

Rationale: This class represent incoming "ports" e.g. Circuit Reservation is dependent on the source of incoming calls.

Candidates for Customer Administration:

X-OGroup

Rationale: This object class represents a number of "OriginGroups". The OriginGroups are related to the AccessPort object class of the Customer Administration model.

LocalDestination

Rationale: This object class represents terminal points for terminating traffic. Those set of terminal points may be grouped in the same way as for the Customer Administration model.

CallingPartyAspects

Rationale: The CallingPartyCategory is an attribute of the CallingPartyAspects object class. This information element could also be defined an aspect of the Customer Administration model.

Annex D (informative): Formal description of object classes defined in I-ETS 300 293

The contents of this annex should be identical to annex A of I-ETS 300 293 [1]. It is included for information only. In case of differences, annex A of I-ETS 300 293 [1] takes precedence.

D.1 Definition of managed objects

```
xtp MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100":connectionTerminationPointBidirectional;
CHARACTERIZED BY
  "Recommendation M.3100":ctpInstancePackage,
  xtpPackage PACKAGE
  BEHAVIOUR
    xtpBhv BEHAVIOUR
      DEFINED AS "The attributes upStreamConnectivityPointer and downStream
ConnectivityPointer have NULL value. The value of cTPIid could be e.g. the
serial number of the 64 kbit/s connection within a 2 Mbit/s trail.";;
  ATTRIBUTES
    cic GET-REPLACE,
    associatedOwningXTPSG GET;;;
REGISTERED AS {managedObjectClass 1};

xtpsg MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100":tpPool;
CHARACTERIZED BY
  xtpsgPackage PACKAGE
  BEHAVIOUR
    xtpsgBhv BEHAVIOUR
      DEFINED AS "If no xtp is associated with an xtpsg, its operational state is
'disabled'. The attribute 'tpsInTpPoolList' is used as relationship attribute
to the associated xtp's (xtpsg is owner).";;
  ATTRIBUTES
    signCapab GET-REPLACE,
    bearerCapab GET-REPLACE,
    satelLink GET-REPLACE,
    echoControl GET-REPLACE,
    continCheck GET-REPLACE,
    adjacentXId GET-REPLACE,
    typeOfAdjacentX GET-REPLACE,
    label GET-REPLACE,
    attenuator GET-REPLACE,
    dcme GET-REPLACE,
    "Recommendation M.3100":alarmStatus GET,
    "Recommendation X.721":administrativeState GET-REPLACE,
    "Recommendation X.721":operationalState GET,
    "Recommendation X.721":availabilityStatus GET-REPLACE;
  NOTIFICATIONS
    "Recommendation X.721":objectCreation,
    "Recommendation X.721":objectDeletion,
    "Recommendation X.721":attributeValueChange;
  ACTIONS
    addXTPToXTPSG,
    removeXTPFromXTPSG;;;
REGISTERED AS {managedObjectClass 2};

xtpsgIn MANAGED OBJECT CLASS
DERIVED FROM xtpsg;
CHARACTERIZED BY
  xtpsgInPackage PACKAGE
  xtpsgInBhv BEHAVIOUR
  BEHAVIOUR
    DEFINED AS "XTP's listed in this xtpsg are used only for incoming
traffic.";;;
REGISTERED AS {managedObjectClass 3};

xtpsgOut MANAGED OBJECT CLASS
DERIVED FROM xtpsg;
CHARACTERIZED BY
  xtpsgOutPackage PACKAGE
  BEHAVIOUR
    xtpsgOutBhv BEHAVIOUR
      DEFINED AS "XTP's listed in this xtpsg are used only for outgoing
traffic.";;
  ATTRIBUTES
    searchMethod PERMITTED VALUES
      ASN1TypeModule.SearchMethodPValues
      GET-REPLACE;;;
REGISTERED AS {managedObjectClass 4};
```

```
xtpsgBid MANAGED OBJECT CLASS
  DERIVED FROM xtpsg;
  CHARACTERIZED BY
    xtpsgBidPackage PACKAGE
      BEHAVIOUR
        xtpsgBidBhv BEHAVIOUR
          DEFINED AS "XTP's listed in this xtpsg are used only for both outgoing and
incoming traffic.>";
      ATTRIBUTES
        searchMethod          GET-REPLACE,
        prefTrafficDirect     GET-REPLACE;;
REGISTERED AS {managedObjectClass 5};

xttp MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation M.3100":trailTerminationPointBidirectional;
  CHARACTERIZED BY
    "Recommendation M.3100":ttpInstancePackage,
    xttpPackage PACKAGE
      BEHAVIOUR
        xttpBhv BEHAVIOUR
          DEFINED AS "This object class represents the logical aspects of the outlet of
a switch. The attributes upStreamConnectivityPointer and downStream
ConnectivityPointer have NULL value.";;;
REGISTERED AS {managedObjectClass 6};
```

D.2 Definiton of attributes

```
adjacentXId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 1};

associatedOwningXTPSG ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.OwningXTPSG;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 2};

attenuator ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.YesNo;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 3};

bearerCapab ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.BearerCapab;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 4};

cic ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 5};

continCheck ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.ContinCheck;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 6};

dcme ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.YesNo;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 7};

echoControl ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.YesNo;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 8};

label ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 9};

prefTrafficDirect ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.TrafficDirect;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 10};
```

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

searchMethod ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.SearchMethod;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 12};

signCapab ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.SignCapab;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 13};

typeOfAdjacentX ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1TypeModule.NameType;
  MATCHES FOR EQUALITY;
REGISTERED AS {attribute 14};
```

D.3 Name bindings

```
xtpsg-equipment NAME BINDING
  SUBORDINATE OBJECT CLASS      xtpsg;
  NAMED BY SUPERIOR OBJECT CLASS equipment;
  WITH ATTRIBUTE                 tpPoolId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 3};

xtp-xttp NAME BINDING
  SUBORDINATE OBJECT CLASS      xtp;
  NAMED BY SUPERIOR OBJECT CLASS xttp;
  WITH ATTRIBUTE                 cTPId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 5};

xttp-mangedSwitchingElement NAME BINDING
  SUBORDINATE OBJECT CLASS      xttp;
  NAMED BY SUPERIOR OBJECT CLASS mangedSwitchingElement;
  WITH ATTRIBUTE                 tTPId;
  CREATE WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 6};
```

D.4 Definition of actions

```
addXTPToXTPSG ACTION
  BEHAVIOUR
    addXTPToXTPSGBehaviour BEHAVIOUR
      DEFINED AS "This action is used to arrange xtps into xtpsg. The xtp is added to those
        already in the xtpsg. The relationship attributes 'tpsInTpPoolList' (inherited from
        tpPool) in the affected object instance xtpsg and "associatedOwningXTPSG" in the
        affected object instance xtp are updated. If used, the attribute "hannelNumber" in
        the affected object instance xtp is to be updated as well. If it is used as the
        serial number of the xtps within the xtpsg, the value to of xtpsg's attribute
        'totalTpCount' (inherited from tpPool) plus one. Independently from the use of be
        assigned here is the value the attribute 'channelNumber', the value of the attribute
        'totalTpCount' is to be incremented by one as well as, depending on the operational
        state of the xtp, xtpsg's attribute connectedTpCount or idleTpCount (inherited from
        tpPool, too). If the first xtp is added to an xtpsg, the operational state of the
        xtpsg changes to enabled.";;
      MODE CONFIRMED;
      WITH INFORMATION SYNTAX ASN1TypeModule.XTPRelatedToXTPSGInformation;
      WITH REPLY SYNTAX      ASN1TypeModule.XTPRelatedToXTPSGResult;
REGISTERED AS {action 1};
```

```

removeXTPFromXTPSG ACTION
  BEHAVIOUR
    removeXTPFromXTPSGBehaviour BEHAVIOUR
      DEFINED AS "This action is used to remove xtps from xtpsg. If the attribute
        'channelNumber' is used as the serial number of the xtps within the xtpsg, this
        action can only be performed on the xtp object instance whose attribute
        'channnelNumber' has the same value as the xtpsg's attribute 'totalTpCount' (i.e.,
        only the association between an xtpsg and its xtp with the highest channelNumber can
        be deleted). In any case, from the attribute 'tpsInTpPoolList' of the affected object
        instance xtpsg the cTPId of the affected object instance xtp is removed. The
        'attributes associatedOwningXTPSG' and, if used, 'channelNumber' in the affected
        object instance xtp are set to default value. The value of xtpsg's attribute
        'totalTpCount' (inherited from tpPool) is to be decremented by one as well as,
        depending on the operational state of the xtp, xtpsg's attribute connectedTpCount or
        idleTpCount (inherited from tpPool, too). If the last xtp is removed from an xtpsg,
        the operational state of the xtpsg changes to disabled.";;
      MODE CONFIRMED;
      WITH INFORMATION SYNTAX ASN1TypeModule.XTPRelatedToXTPSGInformation;
      WITH REPLY SYNTAX ASN1TypeModule.XTPRelatedToXTPSGResult;
REGISTERED AS {action 2};

```

D.5 ASN.1 defined types module

```

ASN1TypeModule {ccitt(0) identified-organization(4) etsi(0) genericManagedObjects(293)
  informationModel(0) asnModule(2) asn1TypeModule(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS
  -- CCITT Recommendation M.3100
  NameType,
  ProbableCause
  FROM ASN1DefinedTypesModule {ccitt(0) recommendation m gnm(3100) informationModel(0)
  asnModules(2) asn1DefinedTypesModule(0)};

informationModel OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0)
  genericManagedObjects(293) informationModel(0)}
managedObjectClass OBJECT IDENTIFIER ::= {informationModel managedObjectClass (3)}
package OBJECT IDENTIFIER ::= {informationModel package (4)}
parameter OBJECT IDENTIFIER ::= {informationModel paramater (5)}
nameBinding OBJECT IDENTIFIER ::= {informationModel nameBinding (6)}
attribute OBJECT IDENTIFIER ::= {informationModel attribute (7)}
attributeGroup OBJECT IDENTIFIER ::= {informationModel attributeGroup (8)}
action OBJECT IDENTIFIER ::= {informationModel action (9)}
notification OBJECT IDENTIFIER ::= {informationModel notification (10)}

BearerCapab ::= INTEGER {
  speech (0),
  r64kbitsUnrestricted (1),
  r56kbitsDigitalRestricted (2),
  r3klHzAudio (3),
  r7kHzAudio (4)}

ContinCheck ::= INTEGER -- list with values of checks (ffs.)

Failed ::= CHOICE {
  logicalProblem [0] LogicalProblem,
  resourceProblem [1] ResourceProblem}

LogicalProblem ::= SEQUENCE {
  problemCause [0] ProbableCause,
  incorrectInstances [1] SET OF ObjectInstance OPTIONAL}

NameTypeN ::= SET OF NameType

OwningXTPSG ::= ObjectInstance -- of class xtpsg

ResourceProblem ::= ProbableCause

SatelLink ::= BOOLEAN

SearchMethod ::= INTEGER {
  sequential (0),
  cyclic (1),
  reversed (2),
  lifoFifoEven (3),
  lifoFifoOdd (4),
  lifoFifoFirst (5),
  lifoFifoLast (6)}

SearchMethodPValues ::= INTEGER (1..3)

```

```
SignCapab ::= INTEGER {
    isupV1 (0),
    isupV2 (1),
    isup1988BlueBook (2),
    isupQ767-1990 (3),
    isup-1992 (4),
    ccittNO5 (5),
    r2 (6)}

TrafficDirect ::= INTEGER{
    noPref (0),
    incoming (1),
    outgoing (2)}

XTPRelatedToXTPSGInformation ::= SET OF ObjectInstance -- of class xtp

XTPRelatedToXTPSGResult ::= CHOICE {
    failed [0] Failed,
    success [1] XTPRelatedToXTPSGInformation}

YesNo ::= BOOLEAN

END -- of ASN1TypeModule
```


Annex E (informative): Bibliography

The following references give information related to this I-ETS:

ETSI generic TMN documents

- 1) ETR 037: "Network Aspects (NA); Telecommunications Management Network (TMN) Objectives, principles, concepts and reference configurations".
- 2) ETR 046: "Network Aspects (NA); Telecommunications management networks modelling guidelines".
- 3) ETR 047: "Network Aspects (NA); Telecommunications Management Network (TMN) Management services".
- 4) ETR 048: "Network Aspects (NA); Telecommunications Management Network (TMN) Management services prose descriptions".
- 5) ETR 078: "Maintenance: Telecommunications management network interface specification methodology [CCITT Recommendation M.3020 (1992)]".
- 6) ETR 088: "Network Aspects (NA) Time/type of day dependent scheduling function support object classes".

CCITT generic TMN Recommendations

- 7) CCITT Recommendation M.3010: "Principles for a telecommunications management network".
- 8) CCITT Recommendation M.3180: "Catalogue of TMN management information".
- 9) CCITT Recommendation M.3200: "TMN management service: overview".
- 10) CCITT Recommendation M.4300: "TMN application functions".

CCITT OSI management Recommendations

- 11) CCITT Recommendation X.700 (1992): "Management framework for Open Systems Interconnection (OSI) for CCITT applications".
- 12) CCITT Recommendation X.701 (1992): "Information technology - Open Systems Interconnection - Systems management overview".
- 13) CCITT Recommendation X.720 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Management information model".
- 14) CCITT Recommendation X.722 (1992): "Information technology - Open Systems Interconnection - Structure of management information: Guidelines for the definition of managed objects".
- 15) CCITT Recommendation X.730 (1992): "Information technology - Open Systems Interconnection - Systems management: Object management function".
- 16) CCITT Recommendation X.731 (1992): "Information technology - Open Systems Interconnection - Systems management: State management function".
- 17) CCITT Recommendation X.733 (1992): "Information technology - Open Systems Interconnection - Systems management: Alarm reporting function".

- 18) CCITT Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems management: Event report management function".
- 19) CCITT Recommendation X.746 (1992): "Information technology - Open Systems Interconnection - Systems management: Scheduling function".

CCITT call routing Recommendations

- 20) CCITT Recommendation E.164: "Numbering plan for the ISDN era".
- 21) CCITT Recommendation E.170: "Traffic routing".
- 22) CCITT Recommendation E.171: "International telephone routing plan".
- 23) CCITT Recommendation E.172: "ISDN routing plan".
- 24) CCITT Recommendation I.330: "ISDN numbering and addressing principles".
- 25) CCITT Recommendation I.335: "ISDN routing principles".
- 26) ITU-T Recommendation Q.700: "Introduction to CCITT Signalling System No.7".
- 27) ITU-T Recommendation Q.751: "Signalling system No. 7 Managed Objects".
- 28) CCITT Recommendation Q.762: "General function of messages and signals".
- 29) CCITT Recommendation Z.335: "Routing administration".

History

Document history	
January 1995	First Edition
January 1996	Converted into Adobe Acrobat Portable Document Format (PDF)