

October 28, 1991

X3S3.3/91-340: Marked-up IDRP GDMO

**Subject:** Marked-up IDRP GDMO  
**Source:** C. A. Kunzinger (Project Editor)  
**Reference:** X3S3.3/91-307 by S. Hares

This is an editorial revision of the material that Sue Hares presented in 91-307. The change bars and strike-throughs were applied relative to the existing text in CD 10747 so that you can readily identify the things that have changed.

I believe that all the changes I made are strictly editorial (capitalization, consecutive parameter numbering, removal of duplicate sections of text, etc.). I also added some change bars to denote a few differences between CD 10747 and 91-307 that were not marked as such in 91-307.

## 12.0 System Management and GDMO Definitions

The operation of the inter-domain routing functions in a BIS may be monitored and controlled using System Management. This clause contains management specification for IDRP, expressed in the GDMO notation defined in ISO 10165-4.

### 12.1 Name Bindings

#### iSOxxxx-NB NAME BINDING

**SUBORDINATE OBJECT CLASS** idrp\_config  
**NAMED BY**  
**SUPERIOR OBJECT CLASS** "ISO/IEC xxxx":  
networkEntity;  
**WITH ATTRIBUTE** "ISO/IEC xxxx":  
idrp\_config\_MO\_Name  
**CREATE** with-automatic-instance-naming  
iSO-xxxxx-NB-pl;  
**DELETE** on-if-no-contained-objects;  
**REGISTERED AS** {ISO xxxxx-IDRP.nboi  
iSOxxxx-NB (1)};

#### adjacentBIS NAME BINDING

**SUBORDINATE OBJECT CLASS** adjacentBIS  
**NAMED BY**  
**SUPERIOR OBJECT CLASS** idrp\_config  
**WITH ATTRIBUTE** BIS-NET;  
**DEFINED AS** This name binding attribute identifies a BIS to BIS connection information block. One of these blocks of data should exist per remote BIS that this local BIS exchanges BISPDU with.;  
**REGISTERED AS** {ISO xxxx-IDRP.nboi adjacentBIS (2)};

### 12.2 Local BIS Managed Objects for IDRP

#### idrp\_config MANAGED OBJECT CLASS

**DERIVED FROM** "ISO/IEC xxxxxx": top  
**CHARACTERIZED BY** localbispackage **PACKAGE BEHAVIOUR**

iDRPBasicImportedAlarmNotifications-B  
**BEHAVIOUR DEFINED AS** Imports the communicationsAlarm notification from ISO/IEC 10165-2. It is used to report the following protocol events:

**errorBISPDUent:** generated when a BISPDU is received with an error in its format. In addition to the parameters specified by ISO/IEC 10733, the following information will be reported in the AdditionalInformation field for the BIS Connection on which the error BISPDU was received:

- RemoteBIS-NET for BIS-BIS connection—using the **notificationRemoteBIS-NET** parameter
- BISPDU error code (see 7.4 and 8.19)—this reports the error code that will be sent in the ERROR PDU using the parameter **notificationBISpduerrorcode**.
- BIS error subcode (see 7.4 and 8.19)—this reports the subcode that will be sent using the parameter **notificationBISerrorsubcode**.
- BISPDU error information (see 7.4 and 8.19)—this reports the data from the received BISPDU that will be used to diagnose the problem for the Notification. The parameter **notificationBISpduerrorinfo** will be used to report this information.

**openBISpduRDCerror:** generated when an OPEN BISPDU is received from another BIS in the same routing domain, and the remote BIS is not a member of identically the same confederations as the local BIS. In addition to the parameters specified by ISO/IEC 10733, the following information will be reported by the AdditionalInformation field for the BIS Connection on which this OPEN PDU was received:

- Remote BIS NET for this BIS-BIS connection—using the **notificationRemoteBIS-NET** parameter.
- Remote BIS Routing Domain Confederation (RDC) information using the **notificationRemoteRDCconfig** parameter.
- Local BIS Routing Domain Confederation (RDC) information using the **notificationLocalRDCconfig** parameter.

**errorBISPDUconnectionclose:** generated when an ERROR PDU has been received from a remote BIS. In addition to the parameters specified by ISO/IEC 10733, the following information will be reported by the AdditionalInformation field for the BIS Connection on which this OPEN PDU was received:

- RemoteBIS-NET for BIS-BIS connection—using the **notificationRemoteBIS-NET** parameter
- BISPDU error code (see 7.4 and 8.19)—this reports the error code that will be sent in the ERROR PDU using the parameter **notificationBISpduerrorcode**.

- ! c) BIS error subcode (see 7.4 and 8.19)—this reports the subcode that will be sent using the parameter **notificationBISerrorssubcode**.
- ! d) BISPDU error information (see 7.4 and 8.19)—this reports the data from the received BISPDU that will be used to diagnose the problem for the Notification. The parameter **notificationBISpduerrorinfo** will be used to report this information.

! **CorruptAdjRIBIn**: generated when the local method of checking the Adj-RIB-In has found an error. All Adj-RIBs-In are being purged. In addition to the parameters specified by ISO/IEC 10733, the following information will be reported by the AdditionalInformation field for the BIS with the parameter **MaxAdjRIBIntegritycheck**.

! **packetBomb**: generated when the local BIS has been presented with a BISPDU whose source is not one of the BISs adjacent to the local BIS. Such BISPDU are rejected by the local BIS. In addition to the parameters specified by ISO/IEC 10733, the following information will be reported by the AdditionalInformation field with the parameter Source BIS NET in the parameter **notificationSourceBis**.

! **BEHAVIOUR**

! iDRPBasicImportedInfoNotifications-B

! **BEHAVIOUR DEFINED AS** Imports the communicationsInformation notification from ISO/IES 10165-2. It is used to report the following protocol events:

! **enterFSMState**: generated when a BIS starts the IDRP FSM state machine to establish a connection with a remote BIS. The RemoteBis-NET is reported in the AdditionalInformation field using the **notificationRemoteBis-NET** parameter. The significant subparameter of each item of AdditionalInformation shall be set to "false" (that is, not significant) so that a managing system receiving the event report will be less likely to reject it.

! **FSMStateChange**: generated when the IDRP FSM used to communicate with another BIS transitions from one state to another. The RemoteBis-NET is reported in the AdditionalInformation field using the **notificationRemoteBis-NET** param-

! eter. The significant sub-parameter of each item of AdditionalInformation shall be set to "false" (that is, not significant) so that a managing system receiving the event report will be less likely to reject it.

! **ATTRIBUTES**

- ! InternalBIS **GET**,
- ! IntraIS **GET**,
- ! ExternalBISNeighbor **GET**,
- ! InternalSystems **GET**,
- ! LocalRDI **GET**,
- ! RDC-Config **GET**,
- ! LocalSNPA **GET**,
- ! MultiExit **GET**,
- ! routeserver **GET**,
- ! maximumPDUsize **GET**,
- ! holdTime **GET**,
- ! outstandingPDUs **GET**,
- ! authenticationCode **GET**,
- ! RetransmissionTimer **GET**,
- ! CloseWaitDelayPeriod **GET**,
- ! RDTransitDelay **GET**,
- ! RDLRE **GET**,
- ! LocExpense **GET**,
- ! RIBAttsSet **GET**,
- ! Capacity **GET**,
- ! Priority **GET**;
- ! version **GET**
- ! maxRIBIntegrityCheck **GET**
- ! maxIntegrityTimer **GET**

! **ACTIONS**

- ! startevent,
- ! stopevent;

! **NOTIFICATIONS**

- ! ~~enterFSMState,~~
- ! ~~FSMStateChange,~~
- ! ~~errorBISPDUsent,~~
- ! ~~openBISpduRDCerror,~~
- ! ~~errorBISPDUconnectionclose,~~
- ! ~~CorruptAdjRIBIn~~
- ! ~~packetbomb~~

! "REC X.721 | ISO/IEC 10165-2:1992":

! communicationsAlarm

- ! notificationRemotebis-NET
- ! notificationBISpduerrorcode
- ! notificationBISerrorssubcode
- ! notificationBISpduerrorinfo
- ! notificationRemoteRDCconfig
- ! notificationLocalRDCconfig
- ! maxAdjRibIntegritycheck
- ! notificationSourceBis

! "REC X.723 | ISO/IEC 10165-5: 1992":

! communicationsInformation

- ! notificationRemotebis-NET

! **REGISTERED AS** {ISOxxx-IDRP.moi idrp\_config

! (1) ;;;

## 12.3 Adjacent BIS Peer Managed objects

### adjacentBIS MANAGED OBJECT CLASS

**DERIVED FROM** "ISO/IEC xxxxx": top  
**CHARACTERIZED BY** adjacentBIS PACKAGE  
**ATTRIBUTES**

BIS\_NET **GET**,  
 BIS\_RDI **GET**,  
 BIS\_RDC **GET**,  
 BISnegotiatedversion **GET**,  
 BISpeerSNPAs **GET**,  
 Authentication\_type **GET**,  
 State **GET**,  
 Lastseqnosent **GET**,  
 Lastseqnorecv **GET**,  
 Lastacksent **GET**,  
 Lastackrecv **GET**,  
 updatesIn **GET**,  
 updatesOut **GET**,  
 totalBISPDUsIn **GET**,  
 totalBISPDUsOut **GET**,  
 KeepalivesSinceLastUpdate **GET**,  
 closeWaitDelayTimer **GET**,  
 keepAliveTimer **GET**,  
 minRouteSelectionTimer **GET**,  
 maxCPUOverloadTimer **GET**,  
 minRDOriginationTimer **GET**,

#### ATTRIBUTE GROUPS

"REC X.723 | ISO/IEC 10165-5": counters  
 updateIN  
 updateOUT  
 totalBISPDUsIN  
 totalBISPDUsOUT  
 KeepalivesSinceLastUpdate;  
 "REC X.723 | ISO/IEC 10165-5": state  
 state  
 lastseqnosent  
 lastseqnorecv  
 lastacksent  
 lastackrecv;  
 "REC X.723 | ISO/IEC 10165-5": timer  
 closeWaitDelayTimer **GET**;  
 keepALiveTimer **get**;  
 MinRouteSelectionTimer **GET**;  
 maxCPUOverloadTimer **GET**;  
 minRDUOriginationTimer **GET**;

**REGISTERED AS** [ISO xxxxx-IDRP.moi  
 adjacentBIS(2);

## 12.4 Attribute Definitions

### InternalBIS ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**  
 ISOXXXX-IDRP.BIS\_group;  
**MATCHES FOR** Equality;  
**BEHAVIOUR** InternalBIS-B  
**BEHAVIOUR DEFINED AS** The set of NETs  
 which identify the BISs in this routing  
 domain;

**REGISTERED AS** {ISOXXXX-IDRP.aoi  
 InternalBIS(1);

### IntraIS ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**  
 ISOXXXX-IDRP.BIS\_group;  
**MATCHES FOR** Equality;  
**BEHAVIOUR** IntraIS-B  
**BEHAVIOUR DEFINED AS** The set of NETs of  
 the ISs to which the local BIS may deliver an  
 inbound NPDUs whose destination lies within  
 the BIS's routing domain. These ISs must  
 be located on the same common subnetwork  
 as this local BIS, and must be capable of  
 delivering NPDUs to destinations that are  
 located within the local BIS's routing  
 domain.  
**REGISTERED AS** {ISOXXXX-IDRP.aoi IntraBIS(2);

### ExternalBISNeighbor ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**  
 ISOXXXX-IDRP.BIS\_group;  
**MATCHES FOR** Equality;  
**BEHAVIOUR** ExternalBISNeighborB  
**BEHAVIOUR DEFINED AS** The set of NETs  
 which identify the BISs in adjacent routing  
 domain that are reachable via a single sub-  
 network hop.  
**REGISTERED AS** {ISOXXXX-IDRP.aoi  
 ExternalBISNeighbor (3);

### InternalSystems ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**  
 ISOXXXX-IDRP.system\_id\_group  
**MATCHES FOR** Equality;  
**BEHAVIOUR** InternalSystems-B  
**BEHAVIOUR DEFINED AS** The set of NETs  
 and NSAPS which identify the systems in this  
 routing domain which the BIS uses to con-  
 struct network layer reachability information;  
**REGISTERED AS** ISOXXXX-IDRP.aoi  
 InternalSystems (4);

### LocalIRDI ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISOXXXX-IDRP.rdi  
**MATCHES FOR** Equality;  
**BEHAVIOUR** LocalIRDI-B  
**BEHAVIOUR DEFINED AS** The Routing  
 Domain Identifier for the routing domain  
 where this BIS is located;  
**REGISTERED AS** ISOXXXX-IDRP.aoi LocalIRDI (5);

### RDC-Config ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**  
 ISOXXXX-IDRP.rdc\_group  
**MATCHES FOR** Equality;  
**BEHAVIOUR** RDC-Config-B  
**BEHAVIOUR DEFINED AS** All of the Routing  
 Confederations to which the RD of this BIS

belongs and the nesting relationships that are in force between them. The nesting relationships are described as a sequence of sets of RDC Identifiers;

**REGISTERED AS** ISOXXXX-IDRP.aoi RDC-Config (6);

#### LocalSNPA ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOXXXX-IDRP.localSNPA

**MATCHES FOR** Equality;

**BEHAVIOUR** localSNPA-B

**BEHAVIOUR DEFINED AS** The list of SNPA's of this BIS;

**REGISTERED AS** ISOXXXX-IDRP.aoi LocalSNPA(7);

#### Multixit ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** Boolean

**MATCHES FOR** Equality

**BEHAVIOUR** Multixit-B

**BEHAVIOUR DEFINED AS** The indication whether this BIS will use the MULTI\_EXIT\_DISC attribute to decide between otherwise identical routes. The Multixit parameter is used as the default value for the "multi\_exit\_disc" function in policy decisions;;

**REGISTERED AS** ISOXXXX-IDRP.aoi MultiExit(8);

#### maximumPDUsize ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.MaximumPDUSize;

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** maximumPDUsize-B

**BEHAVIOUR DEFINED AS** The maximum number of octets that this BIS is able to handle in an incoming BISPDU;

**REGISTERED AS** ISOXXXX-IDRP.aoi maximumPDUsize(9);

#### holdtime ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.Holdtime;

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** holdtime-B

**BEHAVIOUR DEFINED AS** The maximum number of seconds that may elapse between the receipt of two successive BISPDU's of any of the following types: KEEPALIVE, UPDATE, RIB CHECKSUM PDU's or RIB REFRESH PDU's;

**REGISTERED AS** ISOXXXX-IDRP.aoi holdtime(10);

#### outstandingPduS ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.OutstandingPduS;

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** outstandingPduS-B

**BEHAVIOUR DEFINED AS** The maximum number of BISPDU's that may be sent to this BIS without receiving an acknowledgement;

**REGISTERED AS** ISOXXXX-IDRP.aoi outstandingPduS(11);

#### authenticationCode ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.AuthenticationCode;

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** authenticationCode-B

**BEHAVIOUR DEFINED AS** Indication of which authentication mechanism will be used;

**REGISTERED AS** ISOXXXX-IDRP.aoi authenticationCode (12);

#### RetransmissionTimer ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.retransmissiontimer

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** RetransmissionTimer-B

**BEHAVIOUR DEFINED AS** The Number of seconds of between KEEPALIVE messages if no other traffic is sent;

**REGISTERED AS** ISOXXXX-IDRP.aoi RetransmissionTimer (13);

#### CloseWaitDelayPeriod ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.closewaitdelayperiod

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** CloseWaitDelayPeriod-B

**BEHAVIOUR DEFINED AS** The number of seconds the local system shall stay in the CLOSE-WAIT state prior to changing to the CLOSED state.;

**REGISTERED AS** ISOXXXX-IDRP.aoi CloseWaitDelayPeriod (14);

#### RDTransitDelay ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.RDtransitdelay

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** RDTransitDelay-B

**BEHAVIOUR DEFINED AS** The estimated average delay across a Routing Domain in units of 500ms.

**REGISTERED AS** ISOXXXX-IDRP.aoi RDTransitDelay (15);

#### RDLE ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISOxxxx-IDRP.rdle

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** RDLE-B

**BEHAVIOUR DEFINED AS** The average error rate of a Routing Domain in units of an integer which if divided by  $2^{*32-1}$  will provide the actual probability of the error.

**REGISTERED AS** ISOXXXX-IDRP.aoi RDLE(16);

## LocExpense ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.locexpense

**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** LocExpense-B

**BEHAVIOUR DEFINED AS** The monetary expense of transiting this Routeing Domain. The attribute contains an indication of cost and the units in which it is calculated;

**REGISTERED AS** ISOXXXX-IDRP.aoi

LocExpense(17);

## RIBAttsSet ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.ribattsSet

**MATCHES FOR** Equality;**BEHAVIOUR** RIBAttsSet-B

**BEHAVIOUR DEFINED AS** The set of Rib Attributes supported by this BIS.;

**REGISTERED AS** ISOXXXX-IDRP.aoi

RIBAttsSet(18);

## Capacity ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISOxxxx-IDRP.capacity**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** Capacity-B

**BEHAVIOUR DEFINED AS** The traffic carrying capacity of this Routeing Domain.

**REGISTERED AS** ISOXXXX-IDRP.aoi Capacity(19);

## Priority ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISOxxxx-IDRP.priority**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** Priority-B

**BEHAVIOUR DEFINED AS** The lowest value of ISO 8473 priority parameter that this RD will provide forwarding services for;

**REGISTERED AS** ISOXXXX-IDRP.aoi Priority(20);

## BIS\_NET ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISO xxxx-IDRP.bis\_net;**MATCHES FOR** Equality;**BEHAVIOUR** BIS\_NET-B

**BEHAVIOUR DEFINED AS** The NET of the remote BIS of this BIS to BIS connection.;

**REGISTERED AS** {ISO-IDRP.aoi BIS\_NET (21)};

## BIS\_RDI ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISO xxxx-IDRP.rdi;**MATCHES FOR** Equality;**BEHAVIOUR** BIS\_RDI-B

**BEHAVIOUR DEFINED AS** The RDI of the remote BIS of this BIS to BIS connection.;

**REGISTERED AS** {ISO-IDRP.aoi BIS\_RDI (22)};

## BIS\_RDC ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.rdc\_group

**MATCHES FOR** Equality;**BEHAVIOUR** BIS\_RDC-B

**BEHAVIOUR DEFINED AS** The RDC the remote BIS belongs to in this BIS to BIS connection.;

**REGISTERED AS** {ISO-IDRP.aoi BIS\_RDC (23)};

## BISnegotiatedversion ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.bisnegotiatedvesion;

**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** BISnegotiatedversion-B

**BEHAVIOUR DEFINED AS** The negotiated version of IDRП protocol this BIS to BIS connection is using.;

**REGISTERED AS** {ISOxxxx-IDRP.aoi

BISnegotiatedversion (24)};

## BISpeerSNPAs ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.bispeersSNPAs

**MATCHES FOR** Equality;**BEHAVIOUR** BISpeerSNPAs-B

**BEHAVIOUR DEFINED AS** The SNPAs announced by the remote BIS of this BIS to BIS connection.

**REGISTERED AS** {ISOxxxx-IDRP.aoi

BISpeerSNPAs (25)};

## Authentication\_type ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.auth\_type

**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** authentication\_type-B

**BEHAVIOUR DEFINED AS** The authentication type the remote BIS sent in the OPEN BISPDU in this BIS to BIS connection.

**REGISTERED AS** {ISOxxxx-IDRP.aoi

Authentication\_type (26)};

## State ATTRIBUTE

**WITH ATTRIBUTE SYNTAX** ISOxxxx-IDRP.state**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** state-B

**BEHAVIOUR DEFINED AS** The current state of BIS to BIS communication in the local BIS.

**REGISTERED AS** {ISOxxxx-IDRP.aoi state (27)};

## Lastseqnosent ATTRIBUTE

**WITH ATTRIBUTE SYNTAX**

ISOxxxx-IDRP.lastseqnosent

**DERIVED FROM** nonWrappingCounter;**MATCHES FOR** Equality, Ordering;**BEHAVIOUR** Lastseqnosent-B

**BEHAVIOUR DEFINED AS** The last sequence number sent to the remote BIS from this local BIS on this BIS to BIS connection.

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REGISTERED AS {ISOxxxx-IDRP.aoi
Lastseqnosent (28)};

Lastseqnorecv ATTRIBUTE
WITH ATTRIBUTE SYNTAX
ISOxxxx-IDRP.lastseqnorecv
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR Lastseqnorecv-B
    BEHAVIOUR DEFINED AS The last sequence
    number received from the remote BIS by this
    local BIS on this BIS to BIS connection.
REGISTERED AS {ISO xxxx-IDRP.aoi
Lastseqnorecv (29)};

Lastacksent ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.lastacksent
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR Lastacksent-B
    BEHAVIOUR DEFINED AS The number of the
    last ack sent to the remote BIS from this
    local BIS on this BIS to BIS connection.
REGISTERED AS {ISO xxxxx-IDRP.aoi Lastacksent
(30)};

Lastackrecv ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.lastackrecv
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR Lastacksent-B
    BEHAVIOUR DEFINED AS The number of the
    last ack received from the remote BIS by this
    local BIS on this BIS to BIS connection.
REGISTERED AS {ISO xxxxx-IDRP.aoi Lastackrecv
(31)};

updatesIn ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.updatesin
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR updatesIn-B
    BEHAVIOUR DEFINED AS The number of
    UPDATE BISPDU's received by this BIS on
    this BIS to BIS connection.
REGISTERED AS {ISO xxxx-IDRP.aoi updatesIn
(32)};

updatesOut ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.updatesout
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR updatesOut-B

BEHAVIOUR DEFINED AS The number of
UPDATE BISPDU's sent by this BIS on this BIS
to BIS connection.
REGISTERED AS {ISO xxxx-IDRP.aoi updatesOut
(33)};

totalBISPDUIn ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.totalbispdusin
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR totalBISPDUIn-B
    BEHAVIOUR DEFINED AS The number of
    BISPDU'S received by this BIS from the
    remote BIS on this BIS to BIS connection.
REGISTERED AS {ISO xxxx-IDRP.aoi
totalBISPDUIn (34)};

totalBISPDUOut ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.totalbispdusout
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR totalBISPDUOut-B
    BEHAVIOUR DEFINED AS The number of
    BISPDU'S received by this BIS from the
    remote BIS on this BIS to BIS connection.
REGISTERED AS {ISO xxxx-IDRP.aoi
totalBISPDUOut (35)};

KeepalivesSinceLastUpdate ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxxx-IDRP.keepaliveSincelastupdate
DERIVED FROM nonWrappingCounter;
MATCHES FOR Equality, Ordering;
BEHAVIOUR KeepalivesSinceLastUpdate-B
    BEHAVIOUR DEFINED AS The number of
    KEEPALIVE BISPDU'S received by this BIS
    from the remote BIS since this last UPDATE
    BISPDU.
REGISTERED AS {ISO xxxx-IDRP.aoi
KeepAlivesSinceLastUpdate (36)};

version ATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO xxxx-IDRP.version
MATCHES FOR Equality, Ordering;
BEHAVIOUR version-B
    BEHAVIOUR DEFINED AS The version of
    IDRP protocol this machine defaults to using.;
REGISTERED AS {ISO xxxx-IDRP.aoi version (37)};

maxRIBIntegrityCheckATTRIBUTE
WITH ATTRIBUTE SYNTAX ISO
xxxx-IDRP.maxribintegritycheck
MATCHES FOR Equality, Ordering;
BEHAVIOUR maxRIBIntegrityCheck-B
    BEHAVIOUR DEFINED AS The maximum time
    in seconds between checking of the
    Adj-RIBs-In by a local mechanism. If corrupt

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Adj-RIB-In is detected, the BIS shall purge the offending Adj-RIB-In;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! MaxRIBIntegrityCheck(38)};

maxRIBIntegrityTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.ribintegritytimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** RIBIntegritytimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time remaining until the Adj-RIBs-In must be checked by a local mechanism. If a corrupt Adj-RIB-In is detected, the BIS shall purge the offending Adj-RIB-In;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! MaxRIBIntegrityTimer(39)};

closeWaitDelayTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.waitdelaytimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** CloseWaitDelaytimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the BIS FSM entered the CLOSE-WAIT state. Upon timer expiration, the BIS FSM will enter the CLOSED state;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! CloseWaitDelayTimer(40)};

keepAliveTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.keepalivetimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** Keepalivetimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the previous KEEPALIVE PDU was received by the local BIS. Upon its expiration, the BIS will send a BISPDU to its peer BIS;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! KeepAliveTimer(41)};

minRouteSelectionTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.routeselectiontimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** Routeselectiontimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the advertisement by the local BIS of a better route that was received from a BIS located in another routing domain. See clause -- Heading 'MINSEL' unknown --;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! MinRouteSelectiontimer(42)};

minRDOriginationTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.rdoriginationtimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** RDOriginationtimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the advertisement by the local BIS of an UPDATE PDU that reported changes within the local BIS's routing domain. See clause -- Heading 'MINORG' unknown --;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! MinRDOriginationtimer(43)};

maxCPUOverloadTimer**ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** ISO  
xxxx-IDRP.maxcpuoverloadtimer  
**DERIVED FROM** timer  
**MATCHES FOR** Equality, Ordering;  
**BEHAVIOUR** MaxCPUOverloadTimer-B  
**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the local BIS has detected that its CPU has become overloaded. See Annex -- Heading 'CPUOLD' unknown --;  
**REGISTERED AS** {ISO xxxx-IDRP.aoi  
! MaxCPUOverloadtimer(44)};

routesever **ATTRIBUTE**  
**WITH ATTRIBUTE SYNTAX** Boolean;  
**MATCHES FOR** Equality  
**BEHAVIOUR** routesever-B  
**BEHAVIOUR DEFINED AS** The indication whether this BIS may set the "IDRP\_Server\_Allowed" field in the NEXT\_HOP attribute to X"FF" for BIS to BIS UPDATE BISPDU. If this variable is true then in accordance with local policy, the IDRP\_Server\_Allowed field may be set on some UPDATE BISPDU that this BIS sends. If this attribute is set to false, then no UPDATE BISPDU will be sent by this BIS with NEXT\_HOP attributes containing an "IDRP\_Server flag" equal to X"FF".;  
**REGISTERED AS** ISOXXXX-IDRP.aoi  
! routesever(45);

## 12.5 Action Definitions

### minRDOriginationTimer **ATTRIBUTE**

**WITH ATTRIBUTE SYNTAX** ISO

xxxx-IDRP.rdorignationtimer

**MATCHES FOR** Equality, Ordering;

**BEHAVIOUR** RDOriginationtimer-B

**BEHAVIOUR DEFINED AS** The timer that measures in seconds the time that has elapsed since the advertisement by the local BIS of an UPDATE PDU that reported changes within the local BIS's routing domain. See clause -- Heading 'MINORC' unknown --;

**REGISTERED AS** (ISO xxxx-IDRP.aci MinRDOriginationtimer(40));

### startevent **Action**

**BEHAVIOUR**

startevent **BEHAVIOUR**

**MODE** CONFIRMED;

**CONTEXT ACTION-INFO**;

**WITH INFORMATION SYNTAX** ISO

xxxx-idrp.Actioninfo;

**WITH REPLY SYNTAX** ISO

xxxx-idrp.Startevenreply;

**DEFINED AS** The request to start communication with a remote BIS peer;

**PARAMETERS** Remotebis-NET;

**MODE** CONFIRMED;

**REGISTERED AS** ISO xxxxx-IDRP.aci startevent (1);

### Stopevent **Action**

**BEHAVIOUR**

stopevent **BEHAVIOUR**

**MODE** CONFIRMED;

**CONTEXT ACTION-INFO**;

**WITH INFORMATION SYNTAX** ISO

xxxx-idrp.Actioninfo;

**WITH REPLY SYNTAX** ISO

xxxx-idrp.Stopevenreply;

**PARAMETERS** Remotebis-NET;

**MODE** CONFIRMED;

**DEFINED AS** The request to stop communication with a remote BIS peer;

**REGISTERED AS** ISO xxxxx-IDRP.aci stopevent (2);

## 12.6 Notification Definitions

### enterFSMstatemachine **NOTIFICATON**

**BEHAVIOUR** enterFSMstatemachine-B

**BEHAVIOUR DEFINED AS** The indication of starting the FSM state machine to establish a connection with a remote BIS.;

**MODE** NON-CONFIRMED

**PARAMETERS** Remotebis-NET;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi

enterFSMstatemachine (1);

### FSMstatechange **NOTIFICATION**

**BEHAVIOUR** FSMstatechange-B

**BEHAVIOUR DEFINED AS** The indication of transiting from one state to another in the IDRP connection state machine in communication with another BIS.;

**MODE** NON-CONFIRMED

**PARAMETERS** remoteBIS-NET, state;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi

FSMstatechange(2);

### errorBISPDUsent **NOTIFICATION**

**BEHAVIOUR** errorBISPDUsent-B

**BEHAVIOUR DEFINED AS** The indication of an error in the format of BISPDU.;

**MODE** NON-CONFIRMED

**PARAMETERS** Remotebis-NET, BISpduerrorcode, BISerrorsubcode, BISpduerrorinfo;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo **REGISTERED AS**

ISOxxxx-IDRP.noi errorBISPDUsent (3);;

### openBISpduRDCerror **NOTIFICATION**

**BEHAVIOUR** openBISpduRDCerror-B

**BEHAVIOUR DEFINED AS** The indication that an OPEN PDU has been received with the RDC Config for remote BIS and this BIS do not indicate that the two BIS trying to establish a connection are a part of the same confederations;

**MODE** NON-CONFIRMED

**PARAMETERS** Remotebis-NET, RemoteRDCconfig, LocalRDCConfig;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi

errorpduRDCerror(4);

### errorBISPDUconnectionclose **NOTIFICATION**

**BEHAVIOUR** errorBISPDUconnectionclose-B

**BEHAVIOUR DEFINED AS** The indication that an ERROR BISPDU has been received from a remote BIS;

**MODE** NON-CONFIRMED

**PARAMETERS** Remotebis-NET, bispduerrorcode, bispduerrorsubcode, bispduinfo;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi

errorBISPDUconnectionclose(5);;

### CorruptAdjRIBIn **NOTIFICATION**

**BEHAVIOUR** corruptAdjRIBIn-B

**BEHAVIOUR DEFINED AS** The indication that the local method of checking the Adj-RIB-In has found an error. All Adj-RIBs-In are being purged.

**MODE** NON-CONFIRMED

**PARAMETERS** maxAdjRibIntegritycheck;

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi corruptAdjRIBIn(6);;

packetBomb **NOTIFICATION**

**BEHAVIOUR** packetBomb-B

**BEHAVIOUR DEFINED AS** The indication that the local BIS has been presented with a BISPDU whose source is not one of the BISs adjacent to the local BIS. Such BISPDU are rejected by the local BIS.

**MODE** NON-CONFIRMED

**WITH INFORMATION SYNTAX**

ISOxxxx-IDRP.NotificationInfo

**REGISTERED AS** ISOxxxx-IDRP.noi packetBomb(7);;

## 12.7 Parameter Definitions

! notificationRemoteBIS-NET **PARAMETER**

**CONTEXT** ACTION-REPLY;

**WITH SYNTAX** ISOxxxx-IDRP.remoteBIS-NET;

**BEHAVIOUR** RemoteBIS-NET-B

**PARAMETER DEFINED AS** The NET of the Remote BIS that this local BIS is starting IDRP protocol communication with.;

**REGISTERED AS** ISOxxx-IDRP.pro RemoteBIS-NET(1);

! ~~Remotebis-NET~~ **PARAMETER**

~~**CONTEXT** EVENT-INFO;~~

~~**WITH SYNTAX** ISOxxxx-IDRP.remoteBIS-NET;~~

~~**BEHAVIOUR** Remotebis-NET-B~~

~~**PARAMETER DEFINED AS** The NET of the Remote BIS that this local BIS is starting IDRP protocol communication with.;~~

~~**REGISTERED AS** ISOxxxx-IDRP.pro Remotebis-NET(1);~~

! notificationSTATE **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.state

**BEHAVIOUR** ISOxxx-IDRP.STATE-B

**PARAMETER DEFINED AS** The state of the local BIS Finite State machine.;

**REGISTERED AS** ISOxxxx-IDRP.prio STATE(1);

! notificationBISpduerrorcode **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.bispduerrorcode

**BEHAVIOUR** ISOxxxx-IDRP.BISpduerrorcode-B

**BEHAVIOUR DEFINED AS** The error code indicating what type of error occurred in the BIS PDU.;

**REGISTERED AS** ISOxxxx-IDRP.prio

BISpduerrorcode(2)

! notificationBISpduerrorsubcode **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.bispduerrorsubcode

**BEHAVIOUR** ISOxxxx-IDRP.BISpduerrorcode-B

**BEHAVIOUR DEFINED AS** The error code indicating what type of error within the major error type occurred in the BIS PDU.;

**REGISTERED AS** ISOxxxx-IDRP.prio

BISpduerrorsubcode(3)

! notificationBISpduerrorinfo **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.bispduerrorinfo

**BEHAVIOUR** ISOxxxx-IDRP.BISpduerrorinfo-B

**BEHAVIOUR DEFINED AS** The additional information from original pdu that indicated an error in the BIS PDU.;

**REGISTERED AS** ISOxxxx-IDRP.prio

BISpduerrorinfo(4);

! notificationRemoteRDCconfig **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.remoteRDCconfig;

**BEHAVIOUR** ISOxxxx-IDRP.RemoteRDCconfig-B

**BEHAVIOUR DEFINED AS** The Routing Domain Confederation (RDC) information from the remote BIS on this BIS to BIS communication.;

**REGISTERED AS** ISOxxxx-IDRP.prio

RemoteRDCconfig(5);

! notificationLocalRDCconfig **PARAMETER**

**CONTEXT** EVENT-INFO;

**WITH SYNTAX** ISOxxxx-IDRP.localRDCconfig;

**BEHAVIOUR** ISOxxx-IDRP.LocalRDCconfig-B

**BEHAVIOUR DEFINED AS** The Routing Domain Confederation (RDC) information from this local BIS on this BIS to BIS communication.;

**REGISTERED AS** ISOxxxx-IDRP.prio

LocalRDCconfig(6);

## 12.8 Attribute Groups

counters **ATTRIBUTE** group

**DESCRIPTION** The group of all counter per BIS connection

**REGISTERED AS** {ISO xxxx-IDRP.agoi counters [1]};

stateinfo **ATTRIBUTE** group

**DESCRIPTION** The group of all state information per BIS connection  
**REGISTERED AS** {ISO xxxx-IDRP.agoi stateinfo[2]};

! bistimer **ATTRIBUTE** group

! **DESCRIPTION** The group of all timers per BIS connection  
 !  
 ! **REGISTERED AS** {ISO xxxx-IDRP.agoi bistimer[2]};

## 12.9 ASN.1 MODULES

! ISO 10747-IDRP(tbd1) **DEFINITIONS::=BEGIN**  
 -- object identifier definitions  
 sc6 **OBJECT IDENTIFIER** ::= {joint-iso-ccitt sc6(?)}  
 -- value to be assigned by SC21 secretariat  
 ! idrpoi **OBJECT IDENTIFIER** ::= {sc6 iso 10747(?)}  
 -- value to be assigned by SC6 secretariat  
 ! sseoi **OBJECT IDENTIFIER** ::= {idrpoi standSpecificExtensions(0)}  
 ! moi **OBJECT IDENTIFIER** ::= {idrpoi objectClass (3)}  
 poi **OBJECT IDENTIFIER** ::= {idrpoi package (4)}  
 proi **OBJECT IDENTIFIER** ::= {idrpoi parameter(5)}  
 nboi **OBJECT IDENTIFIER** ::= {idrpoi nameBinding (6)}  
 aoi **OBJECT IDENTIFIER** ::= {idrpoi attribute (7)}  
 agoi **OBJECT IDENTIFIER** ::= {idrpoi attributeGroup (8)}  
 aoi **OBJECT IDENTIFIER** ::= {idrpoi action (9)}  
 noi **OBJECT IDENTIFIER** ::= {idrpoi action (10)}  
 !  
 ! --  
 ! --object identifiers for notification parameters  
 ! --  
 !  
 ! **OBJECT IDENTIFIER** ::= {sseoi SpecificProblems(3)?}  
 !  
 ! errorBISPDUent **OBJECT IDENTIFIER** ::= {se errorBISPDU(0)}  
 ! openBISpduRDCerror **OBJECT IDENTIFIER** ::= {se errorBISPDU(1)}  
 ! errorBISPDUconnectionclose **OBJECT IDENTIFIER** ::= {se errorBISPDU(2)}  
 ! CorruptAdjRIBIn **OBJECT IDENTIFIER** ::= {se errorBISPDU(3)}  
 ! packetBomb **OBJECT IDENTIFIER** ::= {se errorBISPDU(4)}  
 ! enterFSMstate **OBJECT IDENTIFIER** ::= {se errorBISPDU(5)}  
 ! FSMStateChange **OBJECT IDENTIFIER** ::= {se errorBISPDU(6)}  
 !  
 ! --  
 ! --ASN1 Types and Values  
 ! --  
 !

ActionInfo ::= **SET OF** Parameter  
 ActionReply ::= **SEQUENCE** {  
   responseCode **OBJECT IDENTIFIER**  
   responseArgs **SET** of Parameter **OPTIONAL**}  
 AuthenticationCode ::= **ENUMERATED** {  
   integrityOnly(0),  
   integrityPlusAuthentication(1)}  
 auth\_type ::= AuthenticationCode  
 BIS\_group ::= **SET OF** {NetworkEntityTitle}  
 bis\_net ::= NetworkEntityTitle  
 bisnegotiatedversion ::= version  
 bispduerrorcode ::= **ENUMERATED** {  
   OPEN\_PDU\_Error (1),  
   UPDATE\_PDU\_Error (2),  
   Hold\_timer\_Expired (3),  
 bispduerrorsubcode ::= **SET OF** {  
   openererrorsubcode,  
   updateerrorsubcode}  
 bispduerrorinfo ::= **OCTETSTRING**(1...50)  
 bispeersSNPAs ::= SNPAAddresses  
 Boolean ::= **BOOLEAN**  
 capacity ::= **INTEGER**(1...255)  
 closewaitdelayperiod ::= **INTEGER**(150)  
 destinationspecificqos ::= ribattsec  
 destinationspecificsecurity ::= ribattsec  
 expensevalue ::= localexpense  
 Holdtime ::= **INTEGER**(1...65 535)  
 keepliveSincelastupdate ::= **INTEGER**(1...65 535)  
 keeplivetimer ::= timer  
 lastseqnosent ::= **INTEGER**(1...(4 294 967 295))  
 lastseqnorecv ::= **INTEGER**(1...(4 294 967 295))  
 lastacksent ::= **INTEGER**(1...(4 294 967 295))  
 lastackrecv ::= **INTEGER**(1...(4 294 967 295))  
 locexpense ::= **INTEGER**(1...65 535)  
 localRDCconfig ::= rdc\_group  
 local\_SNPAs ::= SNPAAddresses  
 MaximumPDUSize ::= **INTEGER**(1..65 535)  
 Metriclength ::= **INTEGER**(1...255)  
 Metricvalue ::= **OCTETSTRING**(**SIZE**(1...255))  
 NSAPprefixLength ::= **INTEGER**(1...160)  
 NSAPprefix ::= **BITSTRING**(**SIZE**(1...160))  
 NetworkEntityTitle ::= **OCTETSTRING**(**SIZE**(1...20))  
 NotificationInfo ::= **SET OF** Parameter  
 openererrorsubcode ::= **ENUMERATED** {  
   UnsupportedVersion\_number (1),  
   Bad\_Max\_PDU\_size (2),  
   Bad\_Outstanding\_PDUs (3),  
   Bad\_Peer\_RD (4),  
   Unsupported\_Authentication\_code (5),  
   Authentication\_Failure (6),  
   Bad\_RIB-AttrsSet (7),  
   RDC\_mismatch (8)}  
 OutstandingPdus ::= **INTEGER**(0...255)  
 Parameter ::= **SEQUENCE** {  
   paramID **OBJECT IDENTIFIER**  
   paramInfo **ANY DEFINED BY** ParamID}  
 priority ::= **INTEGER**(0...14)  
 priorityvalue ::= priority  
 QOSlength ::= **INTEGER**(1...255)  
 QOSvalue ::= **OCTETSTRING**(**SIZE**(1...255))  
 rdi ::= **OCTETSTRING**(**SIZE**(1...20));

```

--assigned from the NSAP address space
rdc_group ::= SEQUENCE { SEQUENCE
  rdc_set_id, SET OF {rdi}}
rdc_set_id ::= INTEGER(1..255)
RDtransitDelay ::= INTEGER(0...65 535)
rdlre ::= INTEGER(0...(4 294 967 295))
! retransmission_timer ::= INTEGER(0...65535)
remoteBIS-NET ::= NetworkEntityTitle
remoteRDCconfig ::= rdc_group
ribattsSet ::= SEQUENCE {
  SEQUENCE {
    ribsetid,
    ribsetcount,
    SET OF {rib_attributes}}
ribsetid ::= INTEGER(1..255)
ribsetcount ::= INTEGER(0..255)
rib_attributes ::= SEQUENCE OF {
  rib_attribute,
  rib_value}
rib_attribute ::= ENUMERATED {
! TRANSIT_DELAY (9),
! RESIDUAL_ERROR (10),
! EXPENSE (11),
! SourceSpecificQOS (12),
! DestinationSpecificQOS (13),
! SourceSpecificSecurity (17),
! DestinationSpecificSecurity(18),
! Capacity (19),
! Priority (20)}
rib_value ::= OCTETSTRING
! -- This octetstring may vary according to the
! -- rib_attribute value: Source Specific QOS,
! -- Destination Specific QOS, Source Specific
! -- Security, Destination Specific Security,
! -- may have varying lengths of rib attribute
! values-
! -- See the appropriate subclause of 8-12
! -- for more details
rib_value ::= SEQUENCE OF {ribattlength,
ribattvalue}
ribattlength ::= INTEGER
ribattvalue ::= CHOICE OF {
! transitdelayvalue,
! residualerrorvalue,
! expensevalue,
! sourcespecificqos,
! destinationspecificqos,
! sourcespecificsecurity,
! destinationspecificsecurity,
! capacityvalue,
! priorityvalue}
ribattqos ::= SEQUENCE OF {
! NSAPprefixlength,
! NSAPprefix,
! QOSlength,
! QOSvalue,
! metriclength,
! metricvalue}
ribattsec ::= SEQUENCE OF {
! NSAPprefixlength,
! NSAPprefix,
! securitylength,
! securitylevel}
securitylength ::= INTEGER(0...255)
securitylevel ::= OCTETSTRING(SIZE(1...255))
routeselectiontimer ::= timer
rdoriginatortimer ::= timer
SNPAAddress ::= SET OF {
  SNPA_Type, SNPAAddress}
SNPAAddress ::= SEMIOCTET STRING
(FROM
('1'H|'2'H|'3'H|'4'H|'5'H|'6'H|'7'H|'8'H|'9'H|
'A'H|'B'H|'C'H|'D'H|'E'H|'F'H))
--integral number of hexadecimal digits
SNPAAddresses ::= SET OF SNPAAddress
state ::= ENUMERATED {
  closed (0),
  open-recv(1),
  established(2),
  open-sent(3),
  close-wait(4)}
system_id_group ::= SEQUENCE OF {
  SET OF {NetworkEntityTitle},
  SET OF {EndSystemNSAPs}}
timer ::= SEQUENCE {
! exponent {1} INTEGER (-62...63)
! mantissa {2} INTEGER (0...65 535)
updateerrorsubcode ::= ENUMERATED {
  Malformed_Attribute_list (1),
  Unrecognized_Well-known_Attribute (2),
  Missing_Well-known_Attribute (3),
  Attribute_Flags_Error (4),
  Attribute_Length_Error (5),
  RD_Routeing_Loop (6),
  Invalid_NEXT_HOP_Attribute (7),
  Optional_Attribute_error (8),
  Invalid_Reachability_Information (9),
  Misconfigured_RDCs (10)}
updatesin ::= INTEGER(1...4 294 967 295)
updatesout ::= INTEGER(1...4 294 967 295)
totalbispdusin ::= INTEGER(1..4 294 967 295)
totalbispdusout ::= INTEGER(1..4 294 967 295)
version ::= INTEGER (1...255)
waitdelattimer ::= timer

```