Network Working Group
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CLNS MIB
for use with
Connectionless Network Protocol (ISO 8473)
and
End System to Intermediate System (ISO 9542)

Status of this Memo

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. This is an Experimental Protocol for the Internet community. Discussion and suggestions for improvement are requested. Please refer to the current edition of the "IAB Official Protocol Standards" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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1. The Network Management Framework

The Internet-standard Network Management Framework consists of three components. They are:

RFC 1155 which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management. RFC 1212 defines a more concise description mechanism, which is wholly consistent with the SMI.

RFC 1156 which defines MIB-I, the core set of managed objects for the Internet suite of protocols. RFC 1213, defines MIB-II, an evolution of MIB-I based on implementation experience and new operational requirements.

RFC 1157 which defines the SNMP, the protocol used for network access to managed objects.

The Framework permits new objects to be defined for the purpose of experimentation and evaluation.

2. Objects

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) [7] defined in the SMI. In particular, each object has a name, a syntax, and an encoding. The name is an object identifier, an administratively assigned name, which specifies an object type. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the OBJECT DESCRIPTOR, to also refer to the object type.

The syntax of an object type defines the abstract data structure corresponding to that object type. The ASN.1 language is used for this purpose. However, the SMI [3] purposely restricts the ASN.1 constructs which may be used. These restrictions are explicitly made for simplicity.

The encoding of an object type is simply how that object type is represented using the object type's syntax. Implicitly tied to the notion of an object type's syntax and encoding is how the object type is represented when being transmitted on the network.

The SMI specifies the use of the basic encoding rules of ASN.1 [8], subject to the additional requirements imposed by the SNMP.

2.1. Format of Definitions

Section 4 contains the specification of all object types contained in this MIB module. The object types are defined using the conventions defined in the SMI, as amended by the extensions specified in [9].

3. Overview

The objects defined in this MIB module are be used when the ISO Connectionless-mode Network Protocol [10] and End System to

Intermediate System [11] protocols are present. No assumptions are made as to what underlying protocol is being used to carry the SNMP.

This memo uses the string encoding of [12] to textually describe OSI addresses.

3.1. Textual Conventions

A new data type is introduced as a textual convention in this MIB document. This textual conventions enhance the readability of the specification and can ease comparison with other specifications if appropriate. It should be noted that the introduction of this textual convention has no effect on either the syntax nor the semantics of any managed objects. The use of this is merely an artifact of the explanatory method used. Objects defined in terms of this methods are always encoded by means of the rules that define the primitive type. Hence, no changes to the SMI or the SNMP are necessary to accommodate this textual convention which are adopted merely for the convenience of readers and writers in pursuit of the elusive goal of clear, concise, and unambiguous MIB documents.

The ASN.1 type ClnpAddress is used to denote an OSI address. This consists of a string of octets. The first octet of the string contains a binary value in the range of 0..20, and indicates the the length in octets of the NSAP. Following the first octet, is the NSAP, expressed in concrete binary notation, starting with the most significant octet. A zero- length NSAP is used as a "special" address meaning "the default NSAP" (analogous to the IP address of 0.0.0.0). Such an NSAP is encoded as a single octet, containing the value 0. All other NSAPs are encoded in at least 4 octets.

3.2. Changes from RFC 1162

Features of this MIB include:

(1) The managed objects in this document have been defined using the conventions defined in the Internet-standard SMI, as amended by the extensions specified in [9]. It must be emphasized that definitions made using these extensions are semantically identically to those in RFC 1162.

(2) The PhysAddress textual convention from MIB-II has been introduced to represent media addresses.

(3) The clnpRoutingDiscards, clnpRouteMetric5, and clnpRouteInfo objects have been defined.

(4) The ClnpAddress type was mistakenly given a tag in RFC 1162. This error has been corrected.

4. Definitions

```
CLNS-MIB DEFINITIONS ::= BEGIN

IMPORTS
        experimental, Counter
                FROM RFC1155-SMI
        PhysAddress
                FROM RFC-1213
        OBJECT-TYPE
                FROM RFC-1212;

--  This MIB module uses the extended OBJECT-TYPE macro as
--  defined in [9]


--  the CLNS MIB module

clns    OBJECT IDENTIFIER ::= { experimental 1 }


-- textual conventions

ClnpAddress ::=
        OCTET STRING (SIZE (1..21))
-- This data type is used to model NSAP addresses.


-- groups in the CLNS MIB

clnp    OBJECT IDENTIFIER ::=   { clns 1 }

error   OBJECT IDENTIFIER ::=   { clns 2 }

echo    OBJECT IDENTIFIER ::=   { clns 3 }

es-is   OBJECT IDENTIFIER ::=   { clns 4 }


-- the CLNP group

-- Implementation of this group is recommended for all
-- systems which implement the CLNP.
```

```
        clnpForwarding OBJECT-TYPE
            SYNTAX  INTEGER {
                        is(1),   -- entity is an intermediate system

                                 -- entity is an end system and does
                        es(2)   -- not forward PDUs
                    }
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The indication of whether this entity is active
                    as an intermediate or end system.  Only
                    intermediate systems will forward PDUs onward that
                    are not addressed to them."
             ::= { clnp 1 }

        clnpDefaultLifeTime OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The default value inserted into the Lifetime
                    field of the CLNP PDU header of PDUs sourced by
                    this entity."
            ::= { clnp 2 }

        clnpInReceives OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The total number of input PDUs received from all
                    connected network interfaces running CLNP,
                    including errors."
            ::= { clnp 3 }

        clnpInHdrErrors OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of input PDUs discarded due to errors
                    in the CLNP header, including bad checksums,
                    version mismatch, lifetime exceeded, errors
                    discovered in processing options, etc."
            ::= { clnp 4 }
```

```
        clnpInAddrErrors OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of input PDUs discarded because the
                    NSAP address in the CLNP header's destination
                    field was not a valid NSAP to be received at this
                    entity.  This count includes addresses not
                    understood.  For end systems, this is a count of
                    PDUs which arrived with a destination NSAP which
                    was not local."
            ::= { clnp 5 }

        clnpForwPDUs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of input PDUs for which this entity
                    was not the final destination and which an attempt
                    was made to forward them onward."
            ::= { clnp 6 }

        clnpInUnknownNLPs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of locally-addressed PDUs successfully
                    received but discarded because the network layer
                    protocol was unknown or unsupported (e.g., not
                    CLNP or ES-IS)."
            ::= { clnp 7 }

        clnpInUnknownULPs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of locally-addressed PDUs successfully
                    received but discarded because the upper layer
                    protocol was unknown or unsupported (e.g., not
                    TP4)."
            ::= { clnp 8 }

        clnpInDiscards OBJECT-TYPE
            SYNTAX  Counter
```

```
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of input CLNP PDUs for which no
                    problems were encountered to prevent their
                    continued processing, but were discarded (e.g.,
                    for lack of buffer space).  Note that this counter
                    does not include any PDUs discarded while awaiting
                    re-assembly."
            ::= { clnp 9 }

        clnpInDelivers OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The total number of input PDUs successfully
                    delivered to the CLNS transport user."
            ::= { clnp 10 }

        clnpOutRequests OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The total number of CLNP PDUs which local CLNS
                    user protocols supplied to CLNP for transmission
                    requests.  This counter does not include any PDUs
                    counted in clnpForwPDUs."
            ::= { clnp 11 }

        clnpOutDiscards OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of output CLNP PDUs for which no other
                    problem was encountered to prevent their
                    transmission but were discarded (e.g., for lack of
                    buffer space).  Note this counter includes PDUs
                    counted in clnpForwPDUs."
            ::= { clnp 12 }

        clnpOutNoRoutes OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
```

```
                "The number of CLNP PDUs discarded because no
                route could be found to transmit them to their
                destination.  This counter includes any PDUs
                counted in clnpForwPDUs."
        ::= { clnp 13 }

    clnpReasmTimeout OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The maximum number of seconds which received
                segments are held while they are awaiting
                reassembly at this entity."
        ::= { clnp 14 }

    clnpReasmReqds OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of CLNP segments received which needed
                to be reassembled at this entity."
        ::= { clnp 15 }

    clnpReasmOKs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of CLNP PDUs successfully re-assembled
                at this entity."
        ::= { clnp 16 }

    clnpReasmFails OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of failures detected by the CLNP
                reassembly algorithm (for any reason: timed out,
                buffer size, etc)."
        ::= { clnp 17 }

    clnpSegOKs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
```

```
            DESCRIPTION
                    "The number of CLNP PDUs that have been
                    successfully segmented at this entity."
            ::= { clnp 18 }

        clnpSegFails OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP PDUs that have been discarded
                    because they needed to be fragmented at this
                    entity but could not."
            ::= { clnp 19 }

        clnpSegCreates OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP PDU segments that have been
                    generated as a result of segmentation at this
                    entity."
            ::= { clnp 20 }

        clnpInOpts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP PDU segments that have been
                    input with options at this entity."
            ::= { clnp 25 }

        clnpOutOpts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP PDU segments that have been
                    generated with options by this entity."
            ::= { clnp 26 }

        clnpRoutingDiscards OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
```

```
                "The number of routing entries which were chosen
                to be discarded even though they are valid.  One
                possible reason for discarding such an entry could
                be to free-up buffer space for other routing
                entries."
        ::= { clnp 27 }


    -- the CLNP Interfaces table

    -- The CLNP interfaces table contains information on the
    -- entity's interfaces which are running the CLNP.

    clnpAddrTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF ClnpAddrEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "The table of addressing information relevant to
                this entity's CLNP addresses.  "
        ::= { clnp 21 }

    clnpAddrEntry OBJECT-TYPE
        SYNTAX  ClnpAddrEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "The addressing information for one of this
                entity's CLNP addresses."
        INDEX   { clnpAdEntAddr }
        ::= { clnpAddrTable 1 }

    ClnpAddrEntry ::=
        SEQUENCE {
            clnpAdEntAddr
                ClnpAddress,
            clnpAdEntIfIndex
                INTEGER,
            clnpAdEntReasmMaxSize
                INTEGER (0..65535)
        }

    clnpAdEntAddr OBJECT-TYPE
        SYNTAX  ClnpAddress
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The CLNP address to which this entry's addressing
```

```
                information pertains."
        ::= { clnpAddrEntry 1 }

    clnpAdEntIfIndex OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The index value which uniquely identifies the
                interface to which this entry is applicable.  The
                interface identified by a particular value of this
                index is the same interface as identified by the
                same value of ifIndex."
        ::= { clnpAddrEntry 2 }

    clnpAdEntReasmMaxSize OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The size of the largest CLNP PDU which this
                entity can re-assemble from incoming CLNP
                segmented PDUs received on this interface."
        ::= { clnpAddrEntry 3 }


    -- The CLNP Routing table

    -- The CLNP routing table contains an entry for each route
    -- known to the entity.

    clnpRoutingTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF ClnpRouteEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "This entity's CLNP routing table."
        ::= { clnp 22 }

    clnpRouteEntry OBJECT-TYPE
        SYNTAX  ClnpRouteEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "A route to a particular destination."
        INDEX   { clnpRouteDest }
        ::= { clnpRoutingTable 1 }
```

```
        ClnpRouteEntry ::=
            SEQUENCE {
                clnpRouteDest
                    ClnpAddress,
                clnpRouteIfIndex
                    INTEGER,
                clnpRouteMetric1
                    INTEGER,
                clnpRouteMetric2
                    INTEGER,
                clnpRouteMetric3
                    INTEGER,
                clnpRouteMetric4
                    INTEGER,
                clnpRouteNextHop
                    ClnpAddress,
                clnpRouteType
                    INTEGER,
                clnpRouteProto
                    INTEGER,
                clnpRouteAge
                    INTEGER,
                clnpRouteMetric5
                    INTEGER,
                clnpRouteInfo
                    OBJECT IDENTIFIER
            }

        clnpRouteDest OBJECT-TYPE
            SYNTAX  ClnpAddress
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The destination CLNP address of this route."
            ::= { clnpRouteEntry 1 }

        clnpRouteIfIndex OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The index value which uniquely identifies the
                    local interface through which the next hop of this
                    route should be reached.  The interface identified
                    by a particular value of this index is the same as
                    identified by the same value of ifIndex."
            ::= { clnpRouteEntry 2 }
```

```
        clnpRouteMetric1 OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The primary routing metric for this route.  The
                    semantics of this metric are determined by the
                    routing-protocol specified in the route's
                    clnpRouteProto value.  If this metric is not used,
                    its value should be set to -1."
            ::= { clnpRouteEntry 3 }

        clnpRouteMetric2 OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "An alternate routing metric for this route.  The
                    semantics of this metric are determined by the
                    routing-protocol specified in the route's
                    clnpRouteProto value.  If this metric is not used,
                    its value should be set to -1."
            ::= { clnpRouteEntry 4 }

        clnpRouteMetric3 OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "An alternate routing metric for this route.  The
                    semantics of this metric are determined by the
                    routing-protocol specified in the route's
                    clnpRouteProto value.  If this metric is not used,
                    its value should be set to -1."
            ::= { clnpRouteEntry 5 }

        clnpRouteMetric4 OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "An alternate routing metric for this route.  The
                    semantics of this metric are determined by the
                    routing-protocol specified in the route's
                    clnpRouteProto value.  If this metric is not used,
                    its value should be set to -1."
            ::= { clnpRouteEntry 6 }
```

```
        clnpRouteNextHop OBJECT-TYPE
            SYNTAX  ClnpAddress
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The CLNP address of the next hop of this route."
            ::= { clnpRouteEntry 7 }

        clnpRouteType OBJECT-TYPE
            SYNTAX  INTEGER {
                        other(1),       -- none of the following

                        invalid(2),     -- an invalidated route

                                        -- route to directly
                        direct(3),      -- connected (sub-)network

                                        -- route to a non-local
                        remote(4)       -- host/network/sub-network
                    }
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The type of route.

                    Setting this object to the value invalid(2) has
                    the effect of invaliding the corresponding entry
                    in the clnpRoutingTable.  That is, it effectively
                    dissasociates the destination identified with said
                    entry from the route identified with said entry.
                    It is an implementation-specific matter as to
                    whether the agent removes an invalidated entry
                    from the table.  Accordingly, management stations
                    must be prepared to receive tabular information
                    from agents that corresponds to entries not
                    currently in use.  Proper interpretation of such
                    entries requires examination of the relevant
                    clnpRouteType object."
            ::= { clnpRouteEntry 8 }

        clnpRouteProto OBJECT-TYPE
            SYNTAX  INTEGER {
                        other(1),     -- none of the following

                                      -- non-protocol information
                                      --   e.g., manually
                        local(2),     --   configured entries
```

```
                                -- set via a network
                    netmgmt(3),   --   management protocol

                                -- similar to ipRouteProto but
                                -- omits several IP-specific
                                -- protocols

                    is-is(9),
                    ciscoIgrp(11),
                    bbnSpfIgp(12),
                    ospf(13),
                    bgp(14)
                }
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The routing mechanism via which this route was
                learned.  Inclusion of values for gateway routing
                protocols is not intended to imply that hosts
                should support those protocols."
        ::= { clnpRouteEntry 9 }

    clnpRouteAge OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The number of seconds since this route was last
                updated or otherwise determined to be correct.
                Note that no semantics of `too old' can be implied
                except through knowledge of the routing protocol
                by which the route was learned."
        ::= { clnpRouteEntry 10 }

    clnpRouteMetric5 OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "An alternate routing metric for this route.  The
                semantics of this metric are determined by the
                routing-protocol specified in the route's
                clnpRouteProto value.  If this metric is not used,
                its value should be set to -1."
        ::= { clnpRouteEntry 11 }

    clnpRouteInfo OBJECT-TYPE
        SYNTAX  OBJECT IDENTIFIER
```

```
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "A reference to MIB definitions specific to the
                    particular routing protocol which is responsible
                    for this route, as determined by the value
                    specified in the route's clnpRouteProto value.  If
                    this information is not present, its value should
                    be set to the OBJECT IDENTIFIER { 0 0 }, which is
                    a syntatically valid object identifier, and any
                    conformant implementation of ASN.1 and BER must be
                    able to generate and recognize this value."
            ::= { clnpRouteEntry 12 }


        -- the CLNP Address Translation table

        -- The Address Translation tables contain the CLNP address
        -- to physical address equivalences.  Some interfaces do not
        -- use translation tables for determining address
        -- equivalences; if all interfaces are of this type, then the
        -- Address Translation table is empty, i.e., has zero
        -- entries.

        clnpNetToMediaTable OBJECT-TYPE
            SYNTAX  SEQUENCE OF ClnpNetToMediaEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
                    "The CLNP Address Translation table used for
                    mapping from CLNP addresses to physical
                    addresses."
            ::= { clnp 23 }

        clnpNetToMediaEntry OBJECT-TYPE
            SYNTAX  ClnpNetToMediaEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
                    "Each entry contains one CLNP address to
                    `physical' address equivalence."
            INDEX   { clnpNetToMediaIfIndex, clnpNetToMediaNetAddress }
            ::= { clnpNetToMediaTable 1 }

        ClnpNetToMediaEntry ::=
            SEQUENCE {
                clnpNetToMediaIfIndex
                    INTEGER,
```

```
            clnpNetToMediaPhysAddress
                PhysAddress,
            clnpNetToMediaNetAddress
                ClnpAddress,
            clnpNetToMediaType
                INTEGER,
            clnpNetToMediaAge
                INTEGER,
            clnpNetToMediaHoldTime
                INTEGER
        }

    clnpNetToMediaIfIndex OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The interface on which this entry's equivalence
                is effective.  The interface identified by a
                particular value of this index is the same
                interface as identified by the same value of
                ifIndex."
        ::= { clnpNetToMediaEntry 1 }

    clnpNetToMediaPhysAddress OBJECT-TYPE
        SYNTAX  PhysAddress
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The media-dependent `physical' address."
        ::= { clnpNetToMediaEntry 2 }

    clnpNetToMediaNetAddress OBJECT-TYPE
        SYNTAX  ClnpAddress
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The CLNP address corresponding to the media-
                dependent `physical' address."
        ::= { clnpNetToMediaEntry 3 }

    clnpNetToMediaType OBJECT-TYPE
        SYNTAX  INTEGER {
                    other(1),       -- none of the following
                    invalid(2),     -- an invalidated mapping
                    dynamic(3),
                    static(4)
                }
```

```
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The type of mapping.

                    Setting this object to the value invalid(2) has
                    the effect of invalidating the corresponding entry
                    in the clnpNetToMediaTable.  That is, it
                    effectively dissassociates the interface
                    identified with said entry from the mapping
                    identified with said entry.  It is an
                    implementation-specific matter as to whether the
                    agent removes an invalidated entry from the table.
                    Accordingly, management stations must be prepared
                    to receive tabular information from agents that
                    corresponds to entries not currently in use.
                    Proper interpretation of such entries requires
                    examination of the relevant clnpNetToMediaType
                    object."
            ::= { clnpNetToMediaEntry 4 }

        clnpNetToMediaAge OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The number of seconds since this entry was last
                    updated or otherwise determined to be correct.
                    Note that no semantics of `too old' can be implied
                    except through knowledge of the type of entry."
            ::= { clnpNetToMediaEntry 5 }

        clnpNetToMediaHoldTime OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The time in seconds this entry will be valid.
                    Static entries should always report this field as
                    -1."
            ::= { clnpNetToMediaEntry 6 }

        clnpMediaToNetTable OBJECT-TYPE
            SYNTAX  SEQUENCE OF ClnpMediaToNetEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
                    "The CLNP Address Translation table used for
```

```
                mapping from physical addresses to CLNP
                addresses."
        ::= { clnp 24 }

    clnpMediaToNetEntry OBJECT-TYPE
        SYNTAX  ClnpMediaToNetEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "Each entry contains on ClnpAddress to `physical'
                address equivalence."
        INDEX   { clnpMediaToNetIfIndex, clnpMediaToNetPhysAddress }
        ::= { clnpMediaToNetTable 1 }

    ClnpMediaToNetEntry ::=
        SEQUENCE {
            clnpMediaToNetIfIndex
                INTEGER,
            clnpMediaToNetNetAddress
                ClnpAddress,
            clnpMediaToNetPhysAddress
                PhysAddress,
            clnpMediaToNetType
                INTEGER,
            clnpMediaToNetAge
                INTEGER,
            clnpMediaToNetHoldTime
                INTEGER
        }

    clnpMediaToNetIfIndex OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The interface on which this entry's equivalence
                is effective.  The interface identified by a
                particular value of this index is the same
                interface as identified by the same value of
                ifIndex."
        ::= { clnpMediaToNetEntry 1 }

    clnpMediaToNetAddress OBJECT-TYPE
        SYNTAX  ClnpAddress
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The ClnpAddress corresponding to the media-
```

```
                dependent `physical' address."
        ::= { clnpMediaToNetEntry 2 }

    clnpMediaToNetPhysAddress OBJECT-TYPE
        SYNTAX  PhysAddress
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The media-dependent `physical' address."
        ::= { clnpMediaToNetEntry 3 }

    clnpMediaToNetType OBJECT-TYPE
        SYNTAX  INTEGER {
                    other(1),       -- none of the following
                    invalid(2),     -- an invalidated mapping
                    dynamic(3),
                    static(4)
                }
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The type of mapping.

                Setting this object to the value invalid(2) has
                the effect of invalidating the corresponding entry
                in the clnpMediaToNetTable.  That is, it
                effectively dissassociates the interface
                identified with said entry from the mapping
                identified with said entry.  It is an
                implementation-specific matter as to whether the
                agent removes an invalidated entry from the table.
                Accordingly, management stations must be prepared
                to receive tabular information from agents that
                corresponds to entries not currently in use.
                Proper interpretation of such entries requires
                examination of the relevant clnpMediaToNetType
                object."
        ::= { clnpMediaToNetEntry 4 }

    clnpMediaToNetAge OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-write
        STATUS  mandatory
        DESCRIPTION
                "The number of seconds since this entry was last
                updated or otherwise determined to be correct.
                Note that no semantics of `too old' can be implied
                except through knowledge of the type of entry."
```

```
            ::= { clnpMediaToNetEntry 5 }

        clnpMediaToNetHoldTime OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-write
            STATUS  mandatory
            DESCRIPTION
                    "The time in seconds this entry will be valid.
                    Static entries should always report this field as
                    -1."
            ::= { clnpMediaToNetEntry 6 }


        -- the CLNP Error group

        -- Implementation of this group is recommended for all
        -- systems which implement the CLNP Error protocol.

        clnpInErrors OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP Error PDUs received by this
                    entity."
            ::= { error 1 }

        clnpOutErrors OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of CLNP Error PDUs sent by this
                    entity."
            ::= { error 2 }

        clnpInErrUnspecs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unspecified CLNP Error PDUs
                    received by this entity."
            ::= { error 3 }

        clnpInErrProcs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
```

```
            STATUS  mandatory
            DESCRIPTION
                    "The number of protocol procedure CLNP Error PDUs
                    received by this entity."
            ::= { error 4 }

        clnpInErrCksums OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of checksum CLNP Error PDUs received
                    by this entity."
            ::= { error 5 }

        clnpInErrCongests OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of congestion drop CLNP Error PDUs
                    received by this entity."
            ::= { error 6 }

        clnpInErrHdrs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of header syntax CLNP Error PDUs
                    received by this entity."
            ::= { error 7 }

        clnpInErrSegs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of segmentation disallowed CLNP Error
                    PDUs received by this entity."
            ::= { error 8 }

        clnpInErrIncomps OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of incomplete PDU CLNP Error PDUs
```

```
                received by this entity."
        ::= { error 9 }

    clnpInErrDups OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of duplicate option CLNP Error PDUs
                received by this entity."
        ::= { error 10 }

    clnpInErrUnreachDsts OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unreachable destination CLNP Error
                PDUs received by this entity."
        ::= { error 11 }

    clnpInErrUnknownDsts OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unknown destination CLNP Error PDUs
                received by this entity."
        ::= { error 12 }

    clnpInErrSRUnspecs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unspecified source route CLNP Error
                PDUs received by this entity."
        ::= { error 13 }

    clnpInErrSRSyntaxes OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of source route syntax CLNP Error PDUs
                received by this entity."
        ::= { error 14 }
```

```
        clnpInErrSRUnkAddrs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of source route unknown address CLNP
                    Error PDUs received by this entity."
            ::= { error 15 }

        clnpInErrSRBadPaths OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of source route bad path CLNP Error
                    PDUs received by this entity."
            ::= { error 16 }

        clnpInErrHops OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of hop count exceeded CLNP Error PDUs
                    received by this entity."
            ::= { error 17 }

        clnpInErrHopReassms OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of hop count exceeded while
                    reassembling CLNP Error PDUs received by this
                    entity."
            ::= { error 18 }

        clnpInErrUnsOptions OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unsupported option CLNP Error PDUs
                    received by this entity."
            ::= { error 19 }

        clnpInErrUnsVersions OBJECT-TYPE
            SYNTAX  Counter
```

```
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of version mismatch CLNP Error PDUs
                    received by this entity."
            ::= { error 20 }

        clnpInErrUnsSecurities OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unsupported security option CLNP
                    Error PDUs received by this entity."
            ::= { error 21 }

        clnpInErrUnsSRs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unsupported source route option
                    CLNP Error PDUs received by this entity."
            ::= { error 22 }

        clnpInErrUnsRRs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unsupported record route option
                    CLNP Error PDUs received by this entity."
            ::= { error 23 }

        clnpInErrInterferences OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of reassembly interference CLNP Error
                    PDUs received by this entity."
            ::= { error 24 }

        clnpOutErrUnspecs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
```

```
                "The number of unspecified CLNP Error PDUs sent by
                this entity."
        ::= { error 25 }

    clnpOutErrProcs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of protocol procedure CLNP Error PDUs
                sent by this entity."
        ::= { error 26 }

    clnpOutErrCksums OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of checksum CLNP Error PDUs sent by
                this entity."
        ::= { error 27 }

    clnpOutErrCongests OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of congestion drop CLNP Error PDUs
                sent by this entity."
        ::= { error 28 }

    clnpOutErrHdrs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of header syntax CLNP Error PDUs sent
                by this entity."
        ::= { error 29 }

    clnpOutErrSegs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of segmentation disallowed CLNP Error
                PDUs sent by this entity."
        ::= { error 30 }
```

```
        clnpOutErrIncomps OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of incomplete PDU CLNP Error PDUs sent
                    by this entity."
            ::= { error 31 }

        clnpOutErrDups OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of duplicate option CLNP Error PDUs
                    sent by this entity."
            ::= { error 32 }

        clnpOutErrUnreachDsts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unreachable destination CLNP Error
                    PDUs sent by this entity."
            ::= { error 33 }

        clnpOutErrUnknownDsts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unknown destination CLNP Error PDUs
                    sent by this entity."
            ::= { error 34 }

        clnpOutErrSRUnspecs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unspecified source route CLNP Error
                    PDUs sent by this entity."
            ::= { error 35 }

        clnpOutErrSRSyntaxes OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
```

```
            STATUS  mandatory
            DESCRIPTION
                    "The number of source route syntax CLNP Error PDUs
                    sent by this entity."
            ::= { error 36 }

        clnpOutErrSRUnkAddrs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of source route unknown address CLNP
                    Error PDUs sent by this entity."
            ::= { error 37 }

        clnpOutErrSRBadPaths OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of source route bad path CLNP Error
                    PDUs sent by this entity."
            ::= { error 38 }

        clnpOutErrHops OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of hop count exceeded CLNP Error PDUs
                    sent by this entity."
            ::= { error 39 }

        clnpOutErrHopReassms OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of hop count exceeded while
                    reassembling CLNP Error PDUs sent by this entity."
            ::= { error 40 }

        clnpOutErrUnsOptions OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of unsupported option CLNP Error PDUs
```

```
                sent by this entity."
        ::= { error 41 }

    clnpOutErrUnsVersions OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of version mismatch CLNP Error PDUs
                sent by this entity."
        ::= { error 42 }

    clnpOutErrUnsSecurities OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unsupported security option CLNP
                Error PDUs sent by this entity."
        ::= { error 43 }

    clnpOutErrUnsSRs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unsupported source route option
                CLNP Error PDUs sent by this entity."
        ::= { error 44 }

    clnpOutErrUnsRRs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of unsupported record route option
                CLNP Error PDUs sent by this entity."
        ::= { error 45 }

    clnpOutErrInterferences OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The number of reassembly interference CLNP Error
                PDUs sent by this entity."
        ::= { error 46 }
```

```
        -- the ES-IS group

        -- Implementation of this group is recommended for all
        -- systems which implement the End-System to Intermediate
        -- System protocol.

        esisESHins OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of ESH PDUs received by this entity."
            ::= { es-is 1 }

        esisESHouts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of ESH PDUs sent by this entity."
            ::= { es-is 2 }

        esisISHins OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of ISH PDUs received by this entity."
            ::= { es-is 3 }

        esisISHouts OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of ISH PDUs sent by this entity."
            ::= { es-is 4 }

        esisRDUins OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of RDU PDUs received by this entity."
            ::= { es-is 5 }

        esisRDUouts OBJECT-TYPE
            SYNTAX  Counter
```

```
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of RDU PDUs sent by this entity."
            ::= { es-is 6 }

        END
```

5. References

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6. Security Considerations

Security issues are not discussed in this memo.

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