      Definitions of Managed Objects for Network Address Translators (NAT)
                    draft-ietf-behave-nat-mib-11

Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for devices implementing Network Address Translator (NAT) function.
   This MIB module may be used for monitoring of a device capable of NAT
   function.

   This document obsoletes RFC 4008.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on July 28, 2014.

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1. Introduction

   This memo defines a portion of the Management Information Base (MIB)
   for devices implementing NAT function. This MIB module may be used
   for monitoring of a device capable of NAT function. Using it for
   configuration is deprecated. NAT types and their characteristics are
   defined in [RFC2663]. Traditional NAT function, in particular is
   defined in [RFC3022]. This MIB does not address the firewall
   functions and must not be used for configuring or monitoring these.
   Section 2 provides references to the SNMP management framework, which
   was used as the basis for the MIB module definition. Section 3
   provides an overview of the MIB features. Lastly, Section 4 has the
   complete NAT MIB definition.

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
   "OPTIONAL" in this document are to be interpreted as described in
   [RFC2119].

2. The Internet-Standard Management Framework

   For a detailed overview of the documents that describe the current
   Internet-Standard Management Framework, please refer to section 7 of
   RFC 3410 [RFC3410].

   Managed objects are accessed via a virtual information store, termed
   the Management Information Base or MIB. MIB objects are generally

accessed through the Simple Network Management Protocol (SNMP).
Objects in the MIB are defined using the mechanisms defined in the
Structure of Management Information (SMI). This memo specifies a MIB
module that is compliant to the SMIv2, which is described in STD 58,
RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580
[RFC2580].

3. Overview

3.1. Deprecated Features

   All objects defined in [RFC4008] have been marked with "STATUS
   deprecated" for the following reasons:

   Writability: Experience with NAT has shown that implementations vary
      tremendously. The NAT algorithms and data structures have little
      in common across devices, and this results in wildly incompatible
      configuration parameters. Therefore, few implementations were
      ever able to claim full compliance.

      Lesson learned: the MIB should be read-only as much as possible.

   Exposing configuration parameters: Even in read-only mode, many
      configuration parameters were exposed by [RFC4008] (e.g.
      timeouts). Since implementations vary wildly in their sets of
      configuration parameters, few implementations could claim even
      basic compliance.

      Lesson learned: the NAT MIB's purpose is not to expose
      configuration parameters.

   Interfaces: Objects from [RFC4008] tie NAT state with interfaces
      (e.g. the interface table, the way map entries are grouped by
      interface). Many NAT implementations either never keep track of
      the interface or associate a mapping to a set of interfaces.
      Since interfaces are at the core of [RFC4008], many NAT devices
      were unable to have a proper implementation.

      Lesson learned: NAT is a logical function that may be independent
      of interfaces. Do not tie NAT state with interfaces.

   NAT service types: [RFC4008] used four categories of NAT service:
      basicNat, napt, bidirectionalNat, twiceNat. These are ill-defined
      and many implementations either use different categories or do not
      use categories at all.

      Lesson learned: do not try to categorize NAT types.

   Limited transport protocol set: The set of transport protocols was
      defined as: other, icmp, udp, tcp. Furthermore, the numeric
      values corresponding to those labels were arbitrary, without
      relation to the actual standard protocol numbers. This meant that
      NAT implementations were limited to those protocols and were
      unable to expose information about DCCP, SCTP, etc.

      Lesson learned: use standard transport protocol numbers.

3.2. New Features

   New features in this module are as follows:

   Counters: Many new counters are introduced. Most of them are
      available in two variants: global and per-transport protocol.

   Limits: A few limits on the quantity of state data stored by the NAT
      device. Some of them can trigger notifications.

   Address+Port Pools: Pools of external addresses and ports are often
      used in enterprise and ISP settings. Pools are listed in a table,
      each with its range of addresses and ports. It is possible to
      inspect each pool's usage, to set limits, and to receive
      notifications when thresholds are crossed.

   Address Mappings: NATs that have an "IP address pooling" behavior of
      "Paired" [RFC4787] maintain a mapping from internal address to
      external address. This module allows inspection of this mapping
      table.

   Mapping table indexed by external 3-tuple: It is often necessary to
      determine the internal address that is mapped to a given external
      address and port. This MIB provides this table with an index to
      accomplish this efficiently, without having to iterate over all
      mappings.

   Realms: See Section 3.3.

   RFC 4787 terminology: Mapping table entries indicate the mapping
      behavior, the filtering behavior, and the address pooling behavior
      that were used to create the mapping.

   Subscriber awareness: With the advent of CGN deployment, a set of
      subscriber specific counters, limits and parameters are added.

   NAT instances: Multiple NAT instances may be managed by a single
      SNMP agent. All instance-specific objects (counters, limits,
      etc.) are indexed by NAT instance ID. In addition, NAT instances
      may be reliably identified using the natInstanceAlias object.

3.3. Realms

   Current NAT devices commonly allow the internal and external parts of
   a mapping to come from different realms. The meaning of "realm" is
   implementation-dependent. On some implementations it can be
   equivalent to the name of a VPN Routing and Forwarding table (VRF).
   On others it is simply the numeric index of a virtual routing table.
   Note that this usage of "realm" is completely different from the one
   in [RFC4008].

   This MIB allows the realm to be indicated where it makes sense. The
   format is an SnmpAdminString. On platforms that identify realms with
   integers, the string representation of the integer is used instead.
   The empty string has special meaning: it refers to the default realm.

   Note that many MIBs implicitly support realms in one form or another
   by using SNMPv3 contexts. See for example the OSPFv2 MIB [RFC4750].
   This method cannot be used for the NAT MIB because mapppings can
   belong to two realms simultaneously: the internal part can be in one
   realm while the external part is in another. In such cases the NAT
   function acts like a "wormhole" between two realms. Using contexts
   would implicitly impose the restriction that all objects would have
   to belong to the same realm.

4. Definitions

   This MIB module IMPORTs objects from [RFC2578], [RFC2579], and
   [RFC4001].

   NAT-MIB DEFINITIONS ::= BEGIN

   IMPORTS
       MODULE-IDENTITY,
       OBJECT-TYPE,
       Integer32,
       Unsigned32,
       Gauge32,
       Counter64,
       TimeTicks,
       mib-2,
       NOTIFICATION-TYPE
               FROM SNMPv2-SMI
       TEXTUAL-CONVENTION,

```
        DisplayString,
        StorageType,
        RowStatus
                FROM SNMPv2-TC
        MODULE-COMPLIANCE,
        NOTIFICATION-GROUP,
        OBJECT-GROUP
                FROM SNMPv2-CONF
        ifIndex,
        ifCounterDiscontinuityGroup,
        InterfaceIndex
                FROM IF-MIB
        SnmpAdminString
                FROM SNMP-FRAMEWORK-MIB
        InetAddressType,
        InetAddress,
        InetAddressPrefixLength,
        InetPortNumber
                FROM INET-ADDRESS-MIB
        VPNIdOrZero
                FROM VPN-TC-STD-MIB;

   natMIB MODULE-IDENTITY
        LAST-UPDATED "201304260000Z"
   -- RFC Ed.: set to publication date
        ORGANIZATION
                "IETF Behavior Engineering for Hindrance Avoidance
                 (BEHAVE) Working Group"
        CONTACT-INFO
                "Working Group Email: behave@ietf.org

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                 USA
```

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                    Cisco Systems
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                    Research Triangle Park, North Carolina 27709
                    USA

                    Phone: +1 919 392 5158
                    Email: ssenthil@cisco.com"
        DESCRIPTION
                "This MIB module defines the generic managed objects
                 for NAT.

                 Copyright (C) The Internet Society (2013). This
                 version of this MIB module is part of RFC yyyy; see
                 the RFC itself for full legal notices."
  -- RFC Ed.: replace yyyy with actual RFC number & remove this note"
        REVISION   "201304260000Z"
  -- RFC Ed.: set to publication date
        DESCRIPTION
                "Complete rewrite, published as RFC yyyy."
  -- RFC Ed.: replace yyyy with actual RFC number & set date"
        REVISION   "200503210000Z" -- 21th March 2005
        DESCRIPTION
                "Initial version, published as RFC 4008."
        ::= { mib-2 123 }

    natMIBObjects OBJECT IDENTIFIER ::= { natMIB 1 }

    NatProtocolType ::= TEXTUAL-CONVENTION
          STATUS   deprecated
          DESCRIPTION
                  "A list of protocols that support the network
                   address translation. Inclusion of the values is
                   not intended to imply that those protocols
                   need to be supported. Any change in this
                   TEXTUAL-CONVENTION should also be reflected in
                   the definition of NatProtocolMap, which is a
                   BITS representation of this."
          SYNTAX   INTEGER {
                    none (1), -- not specified
                    other (2), -- none of the following
                    icmp (3),
                    udp (4),
                    tcp (5)

```
                    }

   NatProtocolMap ::= TEXTUAL-CONVENTION
           STATUS       deprecated
           DESCRIPTION
                   "A bitmap of protocol identifiers that support
                    the network address translation.  Any change
                    in this TEXTUAL-CONVENTION should also be
                    reflected in the definition of NatProtocolType."
           SYNTAX   BITS {
                     other (0),
                     icmp (1),
                     udp (2),
                     tcp (3)
                     }

   NatAddrMapId ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS deprecated
           DESCRIPTION
                   "A unique id that is assigned to each address map
                    by a NAT enabled device."
           SYNTAX   Unsigned32 (1..4294967295)

   NatBindIdOrZero ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS deprecated
           DESCRIPTION
                   "A unique id that is assigned to each bind by
                    a NAT enabled device.  The bind id will be zero
                    in the case of a Symmetric NAT."
           SYNTAX   Unsigned32 (0..4294967295)

   NatBindId ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS deprecated
           DESCRIPTION
                   "A unique id that is assigned to each bind by
                    a NAT enabled device."
           SYNTAX   Unsigned32 (1..4294967295)

   NatSessionId ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS deprecated
           DESCRIPTION
                   "A unique id that is assigned to each session by
                    a NAT enabled device."
           SYNTAX   Unsigned32 (1..4294967295)
```

```
    NatBindMode ::= TEXTUAL-CONVENTION
            STATUS deprecated
            DESCRIPTION
                    "An indication of whether the bind is
                     an address bind or an address port bind."
            SYNTAX    INTEGER {
                        addressBind (1),
                        addressPortBind (2)
                    }

    NatAssociationType ::= TEXTUAL-CONVENTION
            STATUS deprecated
            DESCRIPTION
                    "An indication of whether the association is
                     static or dynamic."
            SYNTAX    INTEGER {
                        static (1),
                        dynamic (2)
                    }

    NatTranslationEntity ::= TEXTUAL-CONVENTION
            STATUS        deprecated
            DESCRIPTION
                    "An indication of a) the direction of a session for
                     which an address map entry, address bind or port
                     bind is applicable, and b) the entity (source or
                     destination) within the session that is subject to
                     translation."
            SYNTAX    BITS {
                       inboundSrcEndPoint (0),
                       outboundDstEndPoint(1),
                       inboundDstEndPoint (2),
                       outboundSrcEndPoint(3)
                    }


    --
    -- Default Values for the Bind and NAT Protocol Timers
    --

    natDefTimeouts OBJECT IDENTIFIER ::= { natMIBObjects 1 }

    natNotifCtrl OBJECT IDENTIFIER ::= { natMIBObjects 2 }

    --
    -- Address Bind and Port Bind related NAT configuration
    --
```

```
    natBindDefIdleTimeout OBJECT-TYPE
        SYNTAX      Unsigned32 (0..4294967295)
        UNITS       "seconds"
        MAX-ACCESS read-write
        STATUS      deprecated
        DESCRIPTION
                "The default Bind (Address Bind or Port Bind) idle
                 timeout parameter.

                 If the agent is capable of storing non-volatile
                 configuration, then the value of this object must be
                 restored after a re-initialization of the management
                 system."
        DEFVAL { 0 }
        ::= { natDefTimeouts 1 }

    --
    -- UDP related NAT configuration
    --

    natUdpDefIdleTimeout OBJECT-TYPE
        SYNTAX      Unsigned32 (1..4294967295)
        UNITS       "seconds"
        MAX-ACCESS read-write
        STATUS      deprecated
        DESCRIPTION
                "The default UDP idle timeout parameter.

                 If the agent is capable of storing non-volatile
                 configuration, then the value of this object must be
                 restored after a re-initialization of the management
                 system."
        DEFVAL { 300 }
        ::= { natDefTimeouts 2 }

    --
    -- ICMP related NAT configuration
    --

    natIcmpDefIdleTimeout OBJECT-TYPE
        SYNTAX      Unsigned32 (1..4294967295)
        UNITS       "seconds"
        MAX-ACCESS read-write
        STATUS      deprecated
        DESCRIPTION
                "The default ICMP idle timeout parameter.

                 If the agent is capable of storing non-volatile
```

```
                    configuration, then the value of this object must be
                    restored after a re-initialization of the management
                    system."
            DEFVAL { 300 }
            ::= { natDefTimeouts 3 }

     --
     -- Other protocol parameters
     --

     natOtherDefIdleTimeout OBJECT-TYPE
          SYNTAX      Unsigned32  (1..4294967295)
          UNITS       "seconds"
          MAX-ACCESS read-write
          STATUS      deprecated
          DESCRIPTION
                    "The default idle timeout parameter for protocols
                    represented by the value other (2) in
                    NatProtocolType.

                    If the agent is capable of storing non-volatile
                    configuration, then the value of this object must be
                    restored after a re-initialization of the management
                    system."
          DEFVAL { 60 }
          ::= { natDefTimeouts 4 }

     --
     -- TCP related NAT Timers
     --

     natTcpDefIdleTimeout OBJECT-TYPE
          SYNTAX      Unsigned32  (1..4294967295)
          UNITS       "seconds"
          MAX-ACCESS read-write
          STATUS      deprecated
          DESCRIPTION
                    "The default time interval that a NAT session for an
                    established TCP connection is allowed to remain
                    valid without any activity on the TCP connection.

                    If the agent is capable of storing non-volatile
                    configuration, then the value of this object must be
                    restored after a re-initialization of the management
                    system."
          DEFVAL { 86400 }
          ::= { natDefTimeouts 5 }
```

```
   natTcpDefNegTimeout OBJECT-TYPE
       SYNTAX       Unsigned32  (1..4294967295)
       UNITS        "seconds"
       MAX-ACCESS read-write
       STATUS       deprecated
       DESCRIPTION
               "The default time interval that a NAT session for a TCP
                connection that is not in the established state
                is allowed to remain valid without any activity on
                the TCP connection.

                If the agent is capable of storing non-volatile
                configuration, then the value of this object must be
                restored after a re-initialization of the management
                system."
       DEFVAL { 60 }
       ::= { natDefTimeouts 6 }

   natNotifThrottlingInterval OBJECT-TYPE
       SYNTAX       Integer32 (0 | 5..3600)
       UNITS        "seconds"
       MAX-ACCESS  read-write
       STATUS       deprecated
       DESCRIPTION
               "This object controls the generation of the
                natPacketDiscard notification.

                If this object has a value of zero, then no
                natPacketDiscard notifications will be transmitted by
                the agent.

                If this object has a non-zero value, then the agent must
                not generate more than one natPacketDiscard
                'notification-event' in the indicated period, where a
                'notification-event' is the generation of a single
                notification PDU type to a list of notification
                destinations.  If additional NAT packets are discarded
                within the throttling period, then notification-events
                for these changes must be suppressed by the agent until
                the current throttling period expires.

                If natNotifThrottlingInterval notification generation
                is enabled, the suggested default throttling period is
                60 seconds, but generation of the natPacketDiscard
                notification should be disabled by default.

                If the agent is capable of storing non-volatile
                configuration, then the value of this object must be
```

```
                restored after a re-initialization of the management
                system.

                The actual transmission of notifications is controlled
                via the MIB modules in RFC 3413."
        DEFVAL { 0 }
        ::= { natNotifCtrl 1 }


   --
   -- The NAT Interface Table
   --

   natInterfaceTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF NatInterfaceEntry
        MAX-ACCESS  not-accessible
        STATUS      deprecated
        DESCRIPTION
                "This table specifies the attributes for interfaces on a
                 device supporting NAT function."
        ::= { natMIBObjects 3 }

   natInterfaceEntry OBJECT-TYPE
        SYNTAX      NatInterfaceEntry
        MAX-ACCESS  not-accessible
        STATUS      deprecated
        DESCRIPTION
                "Each entry in the natInterfaceTable holds a set of
                 parameters for an interface, instantiated by
                 ifIndex.  Therefore, the interface index must have been
                 assigned, according to the applicable procedures,
                 before it can be meaningfully used.
                 Generally, this means that the interface must exist.

                 When natStorageType is of type nonVolatile, however,
                 this may reflect the configuration for an interface
                 whose ifIndex has been assigned but for which the
                 supporting implementation is not currently present."
        INDEX   { ifIndex }
        ::= { natInterfaceTable 1 }

   NatInterfaceEntry ::= SEQUENCE {
        natInterfaceRealm          INTEGER,
        natInterfaceServiceType    BITS,
        natInterfaceInTranslates   Counter64,
        natInterfaceOutTranslates  Counter64,
        natInterfaceDiscards       Counter64,
        natInterfaceStorageType    StorageType,
```

```
        natInterfaceRowStatus        RowStatus
   }

   natInterfaceRealm OBJECT-TYPE
       SYNTAX     INTEGER {
                   private (1),
                   public (2)
               }
       MAX-ACCESS read-create
       STATUS     deprecated
       DESCRIPTION
               "This object identifies whether this interface is
                connected to the private or the public realm."
       DEFVAL  { public }
       ::= { natInterfaceEntry 1 }

   natInterfaceServiceType OBJECT-TYPE
       SYNTAX  BITS {
                   basicNat (0),
                   napt (1),
                   bidirectionalNat (2),
                   twiceNat (3)
               }
       MAX-ACCESS  read-create
       STATUS      deprecated
       DESCRIPTION
               "An indication of the direction in which new sessions
                are permitted and the extent of translation done within
                the IP and transport headers."
       ::= { natInterfaceEntry 2 }

   natInterfaceInTranslates OBJECT-TYPE
       SYNTAX     Counter64
       MAX-ACCESS read-only
       STATUS     deprecated
       DESCRIPTION
               "Number of packets received on this interface that
                were translated.
                Discontinuities in the value of this counter can occur
                at reinitialization of the management system and at
                other times as indicated by the value of
                ifCounterDiscontinuityTime on the relevant interface."
       ::= { natInterfaceEntry 3 }

   natInterfaceOutTranslates OBJECT-TYPE
       SYNTAX     Counter64
       MAX-ACCESS read-only
       STATUS     deprecated
```

          DESCRIPTION
                  "Number of translated packets that were sent out this
                   interface.

                   Discontinuities in the value of this counter can occur
                   at reinitialization of the management system and at
                   other times as indicated by the value of
                   ifCounterDiscontinuityTime on the relevant interface."
          ::= { natInterfaceEntry 4 }

     natInterfaceDiscards OBJECT-TYPE
          SYNTAX   Counter64
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                  "Number of packets that had to be rejected/dropped due to
                   a lack of resources for this interface.

                   Discontinuities in the value of this counter can occur
                   at reinitialization of the management system and at
                   other times as indicated by the value of
                   ifCounterDiscontinuityTime on the relevant interface."
           ::= { natInterfaceEntry 5 }

     natInterfaceStorageType OBJECT-TYPE
          SYNTAX   StorageType
          MAX-ACCESS read-create
          STATUS   deprecated
          DESCRIPTION
                  "The storage type for this conceptual row.
                   Conceptual rows having the value 'permanent'
                   need not allow write-access to any columnar objects
                   in the row."
          REFERENCE
                  "Textual Conventions for SMIv2, Section 2."
          DEFVAL { nonVolatile }
          ::= { natInterfaceEntry 6 }

     natInterfaceRowStatus OBJECT-TYPE
          SYNTAX   RowStatus
          MAX-ACCESS read-create
          STATUS   deprecated
          DESCRIPTION
                  "The status of this conceptual row.

                   Until instances of all corresponding columns are
                   appropriately configured, the value of the
                   corresponding instance of the natInterfaceRowStatus

```
            column is 'notReady'.


            In particular, a newly created row cannot be made
            active until the corresponding instance of
            natInterfaceServiceType has been set.

            None of the objects in this row may be modified
            while the value of this object is active(1)."
    REFERENCE
            "Textual Conventions for SMIv2, Section 2."
    ::= { natInterfaceEntry 7 }

--
-- The Address Map Table
--

natAddrMapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF NatAddrMapEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
            "This table lists address map parameters for NAT."
    ::= { natMIBObjects 4 }

natAddrMapEntry OBJECT-TYPE
    SYNTAX      NatAddrMapEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
            "This entry represents an address map to be used for
             NAT and contributes to the dynamic and/or static
             address mapping tables of the NAT device."
    INDEX   { ifIndex, natAddrMapIndex }
    ::= { natAddrMapTable 1 }

NatAddrMapEntry ::= SEQUENCE {
    natAddrMapIndex             NatAddrMapId,
    natAddrMapName              SnmpAdminString,
    natAddrMapEntryType         NatAssociationType,
    natAddrMapTranslationEntity NatTranslationEntity,
    natAddrMapLocalAddrType     InetAddressType,
    natAddrMapLocalAddrFrom     InetAddress,
    natAddrMapLocalAddrTo       InetAddress,
    natAddrMapLocalPortFrom     InetPortNumber,
    natAddrMapLocalPortTo       InetPortNumber,
    natAddrMapGlobalAddrType    InetAddressType,
    natAddrMapGlobalAddrFrom    InetAddress,
```

```
        natAddrMapGlobalAddrTo              InetAddress,
        natAddrMapGlobalPortFrom            InetPortNumber,
        natAddrMapGlobalPortTo              InetPortNumber,
        natAddrMapProtocol                  NatProtocolMap,
        natAddrMapInTranslates              Counter64,
        natAddrMapOutTranslates             Counter64,
        natAddrMapDiscards                  Counter64,
        natAddrMapAddrUsed                  Gauge32,
        natAddrMapStorageType               StorageType,
        natAddrMapRowStatus                 RowStatus
    }

    natAddrMapIndex  OBJECT-TYPE
        SYNTAX      NatAddrMapId
        MAX-ACCESS  not-accessible
        STATUS      deprecated
        DESCRIPTION
                "Along with ifIndex, this object uniquely
                 identifies an entry in the natAddrMapTable.
                 Address map entries are applied in the order
                 specified by natAddrMapIndex."
        ::= { natAddrMapEntry 1 }

    natAddrMapName OBJECT-TYPE
        SYNTAX      SnmpAdminString (SIZE(1..32))
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "Name identifying all map entries in the table associated
                 with the same interface.  All map entries with the same
                 ifIndex MUST have the same map name."
        ::= { natAddrMapEntry 2 }

    natAddrMapEntryType OBJECT-TYPE
        SYNTAX      NatAssociationType
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "This parameter can be used to set up static
                 or dynamic address maps."
        ::= { natAddrMapEntry 3 }

    natAddrMapTranslationEntity OBJECT-TYPE
        SYNTAX      NatTranslationEntity
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "The end-point entity (source or destination) in
```

                    inbound or outbound sessions (i.e., first packets) that
                    may be translated by an address map entry.

                    Session direction (inbound or outbound) is
                    derived from the direction of the first packet
                    of a session traversing a NAT interface.
                    NAT address (and Transport-ID) maps may be defined
                    to effect inbound or outbound sessions.

                    Traditionally, address maps for Basic NAT and NAPT are
                    configured on a public interface for outbound sessions,
                    effecting translation of source end-point. The value of
                    this object must be set to outboundSrcEndPoint for
                    those interfaces.

                    Alternately, if address maps for Basic NAT and NAPT were
                    to be configured on a private interface, the desired
                    value for this object for the map entries
                    would be inboundSrcEndPoint (i.e., effecting translation
                    of source end-point for inbound sessions).

                    If TwiceNAT were to be configured on a private
                    interface, the desired value for this object for the map
                    entries would be a bitmask of inboundSrcEndPoint and
                    inboundDstEndPoint."
            ::= { natAddrMapEntry 4 }

    natAddrMapLocalAddrType OBJECT-TYPE
        SYNTAX   InetAddressType
        MAX-ACCESS   read-create
        STATUS   deprecated
        DESCRIPTION
                "This object specifies the address type used for
                natAddrMapLocalAddrFrom and natAddrMapLocalAddrTo."
        ::= { natAddrMapEntry 5 }

    natAddrMapLocalAddrFrom OBJECT-TYPE
        SYNTAX   InetAddress
        MAX-ACCESS   read-create
        STATUS   deprecated
        DESCRIPTION
                "This object specifies the first IP address of the range
                of IP addresses mapped by this translation entry. The
                value of this object must be less than or equal to the
                value of the natAddrMapLocalAddrTo object.

                The type of this address is determined by the value of
                the natAddrMapLocalAddrType object."

```
        ::= { natAddrMapEntry 6 }

    natAddrMapLocalAddrTo OBJECT-TYPE
        SYNTAX      InetAddress
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "This object specifies the last IP address of the range
                of IP addresses mapped by this translation entry.  If
                only a single address is being mapped, the value of this
                object is equal to the value of natAddrMapLocalAddrFrom.
                For a static NAT, the number of addresses in the range
                defined by natAddrMapLocalAddrFrom and
                natAddrMapLocalAddrTo must be equal to the number of
                addresses in the range defined by
                natAddrMapGlobalAddrFrom and natAddrMapGlobalAddrTo.
                The value of this object must be greater than or equal
                to the value of the natAddrMapLocalAddrFrom object.

                The type of this address is determined by the value of
                the natAddrMapLocalAddrType object."
        ::= { natAddrMapEntry 7 }

    natAddrMapLocalPortFrom OBJECT-TYPE
        SYNTAX      InetPortNumber
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "If this conceptual row describes a Basic NAT address
                mapping, then the value of this object must be zero.  If
                this conceptual row describes NAPT, then the value of
                this object specifies the first port number in the range
                of ports being mapped.

                The value of this object must be less than or equal to
                the value of the natAddrMapLocalPortTo object.  If the
                translation specifies a single port, then the value of
                this object is equal to the value of
                natAddrMapLocalPortTo."
        DEFVAL { 0 }
        ::= { natAddrMapEntry 8 }

    natAddrMapLocalPortTo OBJECT-TYPE
        SYNTAX      InetPortNumber
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "If this conceptual row describes a Basic NAT address
```

                    mapping, then the value of this object must be zero. If
                    this conceptual row describes NAPT, then the value of
                    this object specifies the last port number in the range
                    of ports being mapped.

                    The value of this object must be greater than or equal
                    to the value of the natAddrMapLocalPortFrom object. If
                    the translation specifies a single port, then the value
                    of this object is equal to the value of
                    natAddrMapLocalPortFrom."
             DEFVAL { 0 }
             ::= { natAddrMapEntry 9 }

       natAddrMapGlobalAddrType OBJECT-TYPE
             SYNTAX   InetAddressType
             MAX-ACCESS read-create
             STATUS   deprecated
             DESCRIPTION
                    "This object specifies the address type used for
                    natAddrMapGlobalAddrFrom and natAddrMapGlobalAddrTo."
             ::= { natAddrMapEntry 10 }

       natAddrMapGlobalAddrFrom OBJECT-TYPE
             SYNTAX   InetAddress
             MAX-ACCESS read-create
             STATUS   deprecated
             DESCRIPTION
                    "This object specifies the first IP address of the range
                    of IP addresses being mapped to. The value of this
                    object must be less than or equal to the value of the
                    natAddrMapGlobalAddrTo object.

                    The type of this address is determined by the value of
                    the natAddrMapGlobalAddrType object."
             ::= { natAddrMapEntry 11 }

       natAddrMapGlobalAddrTo OBJECT-TYPE
             SYNTAX   InetAddress
             MAX-ACCESS read-create
             STATUS   deprecated
             DESCRIPTION
                    "This object specifies the last IP address of the range
                    of IP addresses being mapped to. If only a single
                    address is being mapped to, the value of this object is
                    equal to the value of natAddrMapGlobalAddrFrom. For a
                    static NAT, the number of addresses in the range defined
                    by natAddrMapGlobalAddrFrom and natAddrMapGlobalAddrTo
                    must be equal to the number of addresses in the range

```
                 defined by natAddrMapLocalAddrFrom and
                 natAddrMapLocalAddrTo.  The value of this object must be
                 greater than or equal to the value of the
                 natAddrMapGlobalAddrFrom object.

                 The type of this address is determined by the value of
                 the natAddrMapGlobalAddrType object."
        ::= { natAddrMapEntry 12 }

    natAddrMapGlobalPortFrom OBJECT-TYPE
        SYNTAX      InetPortNumber
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "If this conceptual row describes a Basic NAT address
                mapping, then the value of this object must be zero.  If
                this conceptual row describes NAPT, then the value of
                this object specifies the first port number in the range
                of ports being mapped to.


                The value of this object must be less than or equal to
                the value of the natAddrMapGlobalPortTo object.  If the
                translation specifies a single port, then the value of
                this object is equal to the value
                natAddrMapGlobalPortTo."
        DEFVAL { 0 }
        ::= { natAddrMapEntry 13 }

    natAddrMapGlobalPortTo OBJECT-TYPE
        SYNTAX      InetPortNumber
        MAX-ACCESS  read-create
        STATUS      deprecated
        DESCRIPTION
                "If this conceptual row describes a Basic NAT address
                mapping, then the value of this object must be zero.  If
                this conceptual row describes NAPT, then the value of
                this object specifies the last port number in the range
                of ports being mapped to.

                The value of this object must be greater than or equal
                to the value of the natAddrMapGlobalPortFrom object.  If
                the translation specifies a single port, then the value
                of this object is equal to the value of
                natAddrMapGlobalPortFrom."
        DEFVAL { 0 }
        ::= { natAddrMapEntry 14 }
```

```
   natAddrMapProtocol OBJECT-TYPE
       SYNTAX      NatProtocolMap
       MAX-ACCESS  read-create
       STATUS      deprecated
       DESCRIPTION
             "This object specifies a bitmap of protocol identifiers."
       ::= { natAddrMapEntry 15 }

   natAddrMapInTranslates OBJECT-TYPE
       SYNTAX      Counter64
       MAX-ACCESS read-only
       STATUS      deprecated
       DESCRIPTION
             "The number of inbound packets pertaining to this address
              map entry that were translated.

              Discontinuities in the value of this counter can occur
              at reinitialization of the management system and at
              other times, as indicated by the value of
              ifCounterDiscontinuityTime on the relevant interface."
       ::= { natAddrMapEntry 16 }

   natAddrMapOutTranslates OBJECT-TYPE
       SYNTAX      Counter64
       MAX-ACCESS read-only
       STATUS      deprecated
       DESCRIPTION
             "The number of outbound packets pertaining to this
              address map entry that were translated.

              Discontinuities in the value of this counter can occur
              at reinitialization of the management system and at
              other times, as indicated by the value of
              ifCounterDiscontinuityTime on the relevant interface."
       ::= { natAddrMapEntry 17 }

   natAddrMapDiscards OBJECT-TYPE
       SYNTAX      Counter64
       MAX-ACCESS read-only
       STATUS      deprecated
       DESCRIPTION
             "The number of packets pertaining to this address map
              entry that were dropped due to lack of addresses in the
              address pool identified by this address map.  The value
              of this object must always be zero in case of static
              address map.

              Discontinuities in the value of this counter can occur
```

               at reinitialization of the management system and at
               other times, as indicated by the value of
               ifCounterDiscontinuityTime on the relevant interface."
        ::= { natAddrMapEntry 18 }

    natAddrMapAddrUsed OBJECT-TYPE
        SYNTAX   Gauge32
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
               "The number of addresses pertaining to this address map
                that are currently being used from the NAT pool.
                The value of this object must always be zero in the case
                of a static address map."
        ::= { natAddrMapEntry 19 }

    natAddrMapStorageType OBJECT-TYPE
        SYNTAX   StorageType
        MAX-ACCESS read-create
        STATUS   deprecated
        DESCRIPTION
               "The storage type for this conceptual row.
                Conceptual rows having the value 'permanent'
                need not allow write-access to any columnar objects
                in the row."
        REFERENCE
               "Textual Conventions for SMIv2, Section 2."
        DEFVAL { nonVolatile }
        ::= { natAddrMapEntry 20 }

    natAddrMapRowStatus OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS read-create
        STATUS   deprecated
        DESCRIPTION
               "The status of this conceptual row.

                Until instances of all corresponding columns are
                appropriately configured, the value of the
                corresponding instance of the natAddrMapRowStatus
                column is 'notReady'.

                None of the objects in this row may be modified
                while the value of this object is active(1)."
        REFERENCE
               "Textual Conventions for SMIv2, Section 2."
        ::= { natAddrMapEntry 21 }

```
   --
   -- Address Bind section
   --

   natAddrBindNumberOfEntries OBJECT-TYPE
       SYNTAX     Gauge32
       MAX-ACCESS read-only
       STATUS     deprecated
       DESCRIPTION
               "This object maintains a count of the number of entries
                that currently exist in the natAddrBindTable."
       ::= { natMIBObjects 5 }

   --
   -- The NAT Address BIND Table
   --

   natAddrBindTable OBJECT-TYPE
       SYNTAX     SEQUENCE OF NatAddrBindEntry
       MAX-ACCESS not-accessible
       STATUS     deprecated
       DESCRIPTION
               "This table holds information about the currently
                active NAT BINDs."
       ::= { natMIBObjects 6 }

   natAddrBindEntry OBJECT-TYPE
       SYNTAX     NatAddrBindEntry
       MAX-ACCESS not-accessible
       STATUS     deprecated
       DESCRIPTION
               "Each entry in this table holds information about
                an active address BIND.  These entries are lost
                upon agent restart.

                This row has indexing which may create variables with
                more than 128 subidentifiers.  Implementers of this
                table must be careful not to create entries that would
                result in OIDs which exceed the 128 subidentifier limit.
                Otherwise, the information cannot be accessed using
                SNMPv1, SNMPv2c or SNMPv3."

       INDEX   { ifIndex,
                 natAddrBindLocalAddrType,
                 natAddrBindLocalAddr }
       ::= { natAddrBindTable 1 }

   NatAddrBindEntry ::= SEQUENCE {
```

```
     natAddrBindLocalAddrType       InetAddressType,
     natAddrBindLocalAddr           InetAddress,
     natAddrBindGlobalAddrType      InetAddressType,
     natAddrBindGlobalAddr          InetAddress,
     natAddrBindId                  NatBindId,
     natAddrBindTranslationEntity   NatTranslationEntity,
     natAddrBindType                NatAssociationType,
     natAddrBindMapIndex            NatAddrMapId,
     natAddrBindSessions            Gauge32,
     natAddrBindMaxIdleTime         TimeTicks,
     natAddrBindCurrentIdleTime     TimeTicks,
     natAddrBindInTranslates        Counter64,
     natAddrBindOutTranslates       Counter64
  }

  natAddrBindLocalAddrType OBJECT-TYPE
      SYNTAX      InetAddressType
      MAX-ACCESS  not-accessible
      STATUS      deprecated
      DESCRIPTION
              "This object specifies the address type used for
               natAddrBindLocalAddr."
      ::= { natAddrBindEntry 1 }

  natAddrBindLocalAddr OBJECT-TYPE
      SYNTAX      InetAddress (SIZE (4|16))
      MAX-ACCESS not-accessible
      STATUS      deprecated
      DESCRIPTION
              "This object represents the private-realm specific
               network layer address, which maps to the public-realm
               address represented by natAddrBindGlobalAddr.

               The type of this address is determined by the value of
               the natAddrBindLocalAddrType object."
      ::= { natAddrBindEntry 2 }

  natAddrBindGlobalAddrType OBJECT-TYPE
      SYNTAX      InetAddressType
      MAX-ACCESS  read-only
      STATUS      deprecated
      DESCRIPTION
              "This object specifies the address type used for
               natAddrBindGlobalAddr."
      ::= { natAddrBindEntry 3 }

  natAddrBindGlobalAddr OBJECT-TYPE
      SYNTAX      InetAddress
```

          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                  "This object represents the public-realm network layer
                   address that maps to the private-realm network layer
                   address represented by natAddrBindLocalAddr.

                   The type of this address is determined by the value of
                   the natAddrBindGlobalAddrType object."
          ::= { natAddrBindEntry 4 }

      natAddrBindId OBJECT-TYPE
          SYNTAX   NatBindId
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                  "This object represents a bind id that is dynamically
                   assigned to each bind by a NAT enabled device. Each
                   bind is represented by a bind id that is
                   unique across both, the natAddrBindTable and the
                   natAddrPortBindTable."
          ::= { natAddrBindEntry 5 }

      natAddrBindTranslationEntity OBJECT-TYPE
          SYNTAX   NatTranslationEntity
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                  "This object represents the direction of sessions
                   for which this bind is applicable and the endpoint
                   entity (source or destination) within the sessions that
                   is subject to translation using the BIND.

                   Orientation of the bind can be a superset of
                   translationEntity of the address map entry which
                   forms the basis for this bind.

                   For example, if the translationEntity of an
                   address map entry is outboundSrcEndPoint, the
                   translationEntity of a bind derived from this
                   map entry may either be outboundSrcEndPoint or
                   it may be bidirectional (a bitmask of
                   outboundSrcEndPoint and inboundDstEndPoint)."
          ::= { natAddrBindEntry 6 }

      natAddrBindType OBJECT-TYPE
          SYNTAX   NatAssociationType
          MAX-ACCESS read-only

```
        STATUS      deprecated
        DESCRIPTION
                "This object indicates whether the bind is static or
                dynamic."
        ::= { natAddrBindEntry 7 }

    natAddrBindMapIndex OBJECT-TYPE
        SYNTAX      NatAddrMapId
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object is a pointer to the natAddrMapTable entry
                (and the parameters of that entry) which was used in
                creating this BIND.  This object, in conjunction with
                the ifIndex (which identifies a unique addrMapName)
                points to a unique entry in the natAddrMapTable."
        ::= { natAddrBindEntry 8 }

    natAddrBindSessions OBJECT-TYPE
        SYNTAX      Gauge32
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "Number of sessions currently using this BIND."
        ::= { natAddrBindEntry 9 }

    natAddrBindMaxIdleTime OBJECT-TYPE
        SYNTAX      TimeTicks
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object indicates the maximum time for
                which this bind can be idle with no sessions
                attached to it.

                The value of this object is of relevance only for
                dynamic NAT."
        ::= { natAddrBindEntry 10 }

    natAddrBindCurrentIdleTime OBJECT-TYPE
        SYNTAX      TimeTicks
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "At any given instance, this object indicates the
                time that this bind has been idle without any sessions
                attached to it.
```

                    The value of this object is of relevance only for
                    dynamic NAT."
            ::= { natAddrBindEntry 11 }

    natAddrBindInTranslates OBJECT-TYPE
        SYNTAX   Counter64
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                "The number of inbound packets that were successfully
                 translated by using this bind entry.

                 Discontinuities in the value of this counter can occur
                 at reinitialization of the management system and at
                 other times, as indicated by the value of
                 ifCounterDiscontinuityTime on the relevant interface."
            ::= { natAddrBindEntry 12 }

    natAddrBindOutTranslates OBJECT-TYPE
        SYNTAX   Counter64
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                "The number of outbound packets that were successfully
                 translated using this bind entry.

                 Discontinuities in the value of this counter can occur
                 at reinitialization of the management system and at
                 other times as indicated by the value of
                 ifCounterDiscontinuityTime on the relevant interface."
            ::= { natAddrBindEntry 13 }

    --
    -- Address Port Bind section
    --

    natAddrPortBindNumberOfEntries OBJECT-TYPE
        SYNTAX   Gauge32
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                "This object maintains a count of the number of entries
                 that currently exist in the natAddrPortBindTable."
            ::= { natMIBObjects 7 }

    --
    -- The NAT Address Port Bind Table
    --

```
natAddrPortBindTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF NatAddrPortBindEntry
    MAX-ACCESS not-accessible
    STATUS      deprecated
    DESCRIPTION
            "This table holds information about the currently
             active NAPT BINDs."
    ::= { natMIBObjects 8 }

natAddrPortBindEntry OBJECT-TYPE
    SYNTAX      NatAddrPortBindEntry
    MAX-ACCESS not-accessible
    STATUS      deprecated
    DESCRIPTION
            "Each entry in the this table holds information
             about a NAPT bind that is currently active.
             These entries are lost upon agent restart.

             This row has indexing which may create variables with
             more than 128 subidentifiers.  Implementers of this
             table must be careful not to create entries which would
             result in OIDs that exceed the 128 subidentifier limit.
             Otherwise, the information cannot be accessed using
             SNMPv1, SNMPv2c or SNMPv3."
    INDEX   { ifIndex, natAddrPortBindLocalAddrType,
              natAddrPortBindLocalAddr, natAddrPortBindLocalPort,
              natAddrPortBindProtocol }
    ::= { natAddrPortBindTable 1 }

NatAddrPortBindEntry ::= SEQUENCE {
    natAddrPortBindLocalAddrType        InetAddressType,
    natAddrPortBindLocalAddr            InetAddress,
    natAddrPortBindLocalPort            InetPortNumber,
    natAddrPortBindProtocol             NatProtocolType,
    natAddrPortBindGlobalAddrType       InetAddressType,
    natAddrPortBindGlobalAddr           InetAddress,
    natAddrPortBindGlobalPort           InetPortNumber,
    natAddrPortBindId                   NatBindId,
    natAddrPortBindTranslationEntity    NatTranslationEntity,
    natAddrPortBindType                 NatAssociationType,
    natAddrPortBindMapIndex             NatAddrMapId,
    natAddrPortBindSessions             Gauge32,
    natAddrPortBindMaxIdleTime          TimeTicks,
    natAddrPortBindCurrentIdleTime      TimeTicks,
    natAddrPortBindInTranslates         Counter64,
    natAddrPortBindOutTranslates        Counter64
}
```

```
   natAddrPortBindLocalAddrType OBJECT-TYPE
       SYNTAX       InetAddressType
       MAX-ACCESS   not-accessible
       STATUS       deprecated
       DESCRIPTION
               "This object specifies the address type used for
               natAddrPortBindLocalAddr."
       ::= { natAddrPortBindEntry 1 }

   natAddrPortBindLocalAddr OBJECT-TYPE
       SYNTAX       InetAddress (SIZE(4|16))
       MAX-ACCESS not-accessible
       STATUS       deprecated
       DESCRIPTION
               "This object represents the private-realm specific
               network layer address which, in conjunction with
               natAddrPortBindLocalPort, maps to the public-realm
               network layer address and transport id represented by
               natAddrPortBindGlobalAddr and natAddrPortBindGlobalPort
               respectively.


               The type of this address is determined by the value of
               the natAddrPortBindLocalAddrType object."
       ::= { natAddrPortBindEntry 2 }

   natAddrPortBindLocalPort OBJECT-TYPE
       SYNTAX       InetPortNumber
       MAX-ACCESS not-accessible
       STATUS       deprecated
       DESCRIPTION
               "For a protocol value TCP or UDP, this object represents
               the private-realm specific port number.  On the other
               hand, for ICMP a bind is created only for query/response
               type ICMP messages such as ICMP echo, Timestamp, and
               Information request messages, and this object represents
               the private-realm specific identifier in the ICMP
               message, as defined in RFC 792 for ICMPv4 and in RFC
               2463 for ICMPv6.

               This object, together with natAddrPortBindProtocol,
               natAddrPortBindLocalAddrType, and
               natAddrPortBindLocalAddr, constitutes a session endpoint
               in the private realm.  A bind entry binds a private
               realm specific endpoint to a public realm specific
               endpoint, as represented by the tuple of
               (natAddrPortBindGlobalPort, natAddrPortBindProtocol,
               natAddrPortBindGlobalAddrType, and
```

```
                        natAddrPortBindGlobalAddr)."
        ::= { natAddrPortBindEntry 3 }

    natAddrPortBindProtocol OBJECT-TYPE
        SYNTAX       NatProtocolType
        MAX-ACCESS   not-accessible
        STATUS       deprecated
        DESCRIPTION
                "This object specifies a protocol identifier.  If the
                 value of this object is none(1), then this bind entry
                 applies to all IP traffic.  Any other value of this
                 object specifies the class of IP traffic to which this
                 BIND applies."
        ::= { natAddrPortBindEntry 4 }

    natAddrPortBindGlobalAddrType OBJECT-TYPE
        SYNTAX       InetAddressType
        MAX-ACCESS   read-only
        STATUS       deprecated
        DESCRIPTION
                "This object specifies the address type used for
                 natAddrPortBindGlobalAddr."
        ::= { natAddrPortBindEntry 5 }

    natAddrPortBindGlobalAddr OBJECT-TYPE
        SYNTAX       InetAddress
        MAX-ACCESS read-only
        STATUS       deprecated
        DESCRIPTION
                "This object represents the public-realm specific network
                 layer address that, in conjunction with
                 natAddrPortBindGlobalPort, maps to the private-realm

                 network layer address and transport id represented by
                 natAddrPortBindLocalAddr and natAddrPortBindLocalPort,
                 respectively.

                 The type of this address is determined by the value of
                 the natAddrPortBindGlobalAddrType object."
        ::= { natAddrPortBindEntry 6 }

    natAddrPortBindGlobalPort OBJECT-TYPE
        SYNTAX       InetPortNumber
        MAX-ACCESS read-only
        STATUS       deprecated
        DESCRIPTION
                "For a protocol value TCP or UDP, this object represents
                 the public-realm specific port number.  On the other
```

hand, for ICMP a bind is created only for query/response
type ICMP messages such as ICMP echo, Timestamp, and
Information request messages, and this object represents
the public-realm specific identifier in the ICMP
message, as defined in RFC 792 for ICMPv4 and in RFC
2463 for ICMPv6.

This object, together with natAddrPortBindProtocol,
natAddrPortBindGlobalAddrType, and
natAddrPortBindGlobalAddr, constitutes a session
endpoint in the public realm. A bind entry binds a
public realm specific endpoint to a private realm
specific endpoint, as represented by the tuple of
(natAddrPortBindLocalPort, natAddrPortBindProtocol,
natAddrPortBindLocalAddrType, and
natAddrPortBindLocalAddr)."
      ::= { natAddrPortBindEntry 7 }

natAddrPortBindId OBJECT-TYPE
    SYNTAX   NatBindId
    MAX-ACCESS read-only
    STATUS   deprecated
    DESCRIPTION
            "This object represents a bind id that is dynamically
             assigned to each bind by a NAT enabled device. Each
             bind is represented by a unique bind id across both
             the natAddrBindTable and the natAddrPortBindTable."
      ::= { natAddrPortBindEntry 8 }

natAddrPortBindTranslationEntity OBJECT-TYPE
    SYNTAX   NatTranslationEntity
    MAX-ACCESS read-only
    STATUS   deprecated
    DESCRIPTION
            "This object represents the direction of sessions
             for which this bind is applicable and the entity
             (source or destination) within the sessions that is
             subject to translation with the BIND.

             Orientation of the bind can be a superset of the
             translationEntity of the address map entry that
             forms the basis for this bind.

             For example, if the translationEntity of an
             address map entry is outboundSrcEndPoint, the
             translationEntity of a bind derived from this
             map entry may either be outboundSrcEndPoint or
             may be bidirectional (a bitmask of

```
                    outboundSrcEndPoint and inboundDstEndPoint)."
        ::= { natAddrPortBindEntry 9 }

    natAddrPortBindType OBJECT-TYPE
        SYNTAX      NatAssociationType
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object indicates whether the bind is static or
                 dynamic."
        ::= { natAddrPortBindEntry 10 }

    natAddrPortBindMapIndex OBJECT-TYPE
        SYNTAX      NatAddrMapId
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object is a pointer to the natAddrMapTable entry
                 (and the parameters of that entry) used in
                 creating this BIND.  This object, in conjunction with
                 the ifIndex (which identifies a unique addrMapName),
                 points to a unique entry in the natAddrMapTable."
        ::= { natAddrPortBindEntry 11 }

    natAddrPortBindSessions OBJECT-TYPE
        SYNTAX      Gauge32
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "Number of sessions currently using this BIND."
        ::= { natAddrPortBindEntry 12 }

    natAddrPortBindMaxIdleTime OBJECT-TYPE
        SYNTAX      TimeTicks
        MAX-ACCESS read-only
        STATUS      deprecated

        DESCRIPTION
                "This object indicates the maximum time for
                 which this bind can be idle without any sessions
                 attached to it.
                 The value of this object is of relevance
                 only for dynamic NAT."
        ::= { natAddrPortBindEntry 13 }

    natAddrPortBindCurrentIdleTime OBJECT-TYPE
        SYNTAX      TimeTicks
        MAX-ACCESS read-only
```

```
      STATUS      deprecated
      DESCRIPTION
              "At any given instance, this object indicates the
               time that this bind has been idle without any sessions
               attached to it.

               The value of this object is of relevance
               only for dynamic NAT."
      ::= { natAddrPortBindEntry 14 }

  natAddrPortBindInTranslates OBJECT-TYPE
      SYNTAX      Counter64
      MAX-ACCESS read-only
      STATUS      deprecated
      DESCRIPTION
              "The number of inbound packets that were translated as
               per this bind entry.

               Discontinuities in the value of this counter can occur
               at reinitialization of the management system and at
               other times, as indicated by the value of
               ifCounterDiscontinuityTime on the relevant interface."
      ::= { natAddrPortBindEntry 15 }

  natAddrPortBindOutTranslates OBJECT-TYPE
      SYNTAX      Counter64
      MAX-ACCESS read-only
      STATUS      deprecated
      DESCRIPTION
              "The number of outbound packets that were translated as
               per this bind entry.

               Discontinuities in the value of this counter can occur
               at reinitialization of the management system and at
               other times, as indicated by the value of
               ifCounterDiscontinuityTime on the relevant interface."
      ::= { natAddrPortBindEntry 16 }

  --
  -- The Session Table
  --

  natSessionTable OBJECT-TYPE
      SYNTAX      SEQUENCE OF NatSessionEntry
      MAX-ACCESS not-accessible
      STATUS      deprecated
      DESCRIPTION
              "The (conceptual) table containing one entry for each
```

```
              NAT session currently active on this NAT device."
       ::= { natMIBObjects 9 }

   natSessionEntry OBJECT-TYPE
       SYNTAX     NatSessionEntry
       MAX-ACCESS not-accessible
       STATUS     deprecated
       DESCRIPTION
              "An entry (conceptual row) containing information
               about an active NAT session on this NAT device.
               These entries are lost upon agent restart."
       INDEX   { ifIndex, natSessionIndex }
       ::= { natSessionTable 1 }

   NatSessionEntry ::= SEQUENCE {
       natSessionIndex                     NatSessionId,
       natSessionPrivateSrcEPBindId        NatBindIdOrZero,
       natSessionPrivateSrcEPBindMode      NatBindMode,
       natSessionPrivateDstEPBindId        NatBindIdOrZero,
       natSessionPrivateDstEPBindMode      NatBindMode,
       natSessionDirection                 INTEGER,
       natSessionUpTime                    TimeTicks,
       natSessionAddrMapIndex              NatAddrMapId,
       natSessionProtocolType              NatProtocolType,
       natSessionPrivateAddrType           InetAddressType,
       natSessionPrivateSrcAddr            InetAddress,
       natSessionPrivateSrcPort            InetPortNumber,
       natSessionPrivateDstAddr            InetAddress,
       natSessionPrivateDstPort            InetPortNumber,
       natSessionPublicAddrType            InetAddressType,
       natSessionPublicSrcAddr             InetAddress,
       natSessionPublicSrcPort             InetPortNumber,
       natSessionPublicDstAddr             InetAddress,
       natSessionPublicDstPort             InetPortNumber,
       natSessionMaxIdleTime               TimeTicks,
       natSessionCurrentIdleTime           TimeTicks,
       natSessionInTranslates              Counter64,
       natSessionOutTranslates             Counter64
   }

   natSessionIndex OBJECT-TYPE
       SYNTAX     NatSessionId
       MAX-ACCESS not-accessible
       STATUS     deprecated
       DESCRIPTION
              "The session ID for this NAT session."
       ::= { natSessionEntry 1 }
```

```
    natSessionPrivateSrcEPBindId OBJECT-TYPE
        SYNTAX      NatBindIdOrZero
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "The bind id associated between private and public
                 source end points.  In the case of Symmetric-NAT,
                 this should be set to zero."
        ::= { natSessionEntry 2 }

    natSessionPrivateSrcEPBindMode OBJECT-TYPE
        SYNTAX      NatBindMode
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object indicates whether the bind indicated
                 by the object natSessionPrivateSrcEPBindId
                 is an address bind or an address port bind."
        ::= { natSessionEntry 3 }

    natSessionPrivateDstEPBindId OBJECT-TYPE
        SYNTAX      NatBindIdOrZero
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "The bind id associated between private and public
                 destination end points."
        ::= { natSessionEntry 4 }

    natSessionPrivateDstEPBindMode OBJECT-TYPE
        SYNTAX      NatBindMode
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "This object indicates whether the bind indicated
                 by the object natSessionPrivateDstEPBindId
                 is an address bind or an address port bind."
        ::= { natSessionEntry 5 }

    natSessionDirection OBJECT-TYPE
        SYNTAX      INTEGER {
                    inbound (1),
                    outbound (2)
                    }

        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
```

```
                    "The direction of this session with respect to the
                     local network.  'inbound' indicates that this session
                     was initiated from the public network into the private
                     network.  'outbound' indicates that this session was
                     initiated from the private network into the public
                     network."
             ::= { natSessionEntry 6 }

         natSessionUpTime OBJECT-TYPE
             SYNTAX     TimeTicks
             MAX-ACCESS read-only
             STATUS     deprecated
             DESCRIPTION
                     "The up time of this session in one-hundredths of a
                      second."
             ::= { natSessionEntry 7 }

         natSessionAddrMapIndex OBJECT-TYPE
             SYNTAX     NatAddrMapId
             MAX-ACCESS read-only
             STATUS     deprecated
             DESCRIPTION
                     "This object is a pointer to the natAddrMapTable entry
                      (and the parameters of that entry) used in
                      creating this session.  This object, in conjunction with
                      the ifIndex (which identifies a unique addrMapName),
                      points to a unique entry in the natAddrMapTable."
             ::= { natSessionEntry 8 }

         natSessionProtocolType OBJECT-TYPE
             SYNTAX     NatProtocolType
             MAX-ACCESS read-only
             STATUS     deprecated
             DESCRIPTION
                     "The protocol type of this session."
             ::= { natSessionEntry 9 }

         natSessionPrivateAddrType OBJECT-TYPE
             SYNTAX      InetAddressType
             MAX-ACCESS  read-only
             STATUS      deprecated
             DESCRIPTION
                     "This object specifies the address type used for
                      natSessionPrivateSrcAddr and natSessionPrivateDstAddr."
             ::= { natSessionEntry 10 }

         natSessionPrivateSrcAddr OBJECT-TYPE
             SYNTAX     InetAddress
```

```
     MAX-ACCESS read-only
     STATUS     deprecated
     DESCRIPTION
             "The source IP address of the session endpoint that
             lies in the private network.

             The value of this object must be zero only when the
             natSessionPrivateSrcEPBindId object has a zero value.
             When the value of this object is zero, the NAT session
             lookup will match any IP address to this field.

             The type of this address is determined by the value of
             the natSessionPrivateAddrType object."
     ::= { natSessionEntry 11 }

  natSessionPrivateSrcPort OBJECT-TYPE
     SYNTAX     InetPortNumber
     MAX-ACCESS read-only
     STATUS     deprecated
     DESCRIPTION
             "When the value of protocol is TCP or UDP, this object
             represents the source port in the first packet of
             session while in private-realm.  On the other hand, when
             the protocol is ICMP, a NAT session is created only for
             query/response type ICMP messages such as ICMP echo,
             Timestamp, and Information request messages, and this
             object represents the private-realm specific identifier
             in the ICMP message, as defined in RFC 792 for ICMPv4
             and in RFC 2463 for ICMPv6.

             The value of this object must be zero when the
             natSessionPrivateSrcEPBindId object has zero value
             and value of natSessionPrivateSrcEPBindMode is
             addressPortBind(2).  In such a case, the NAT session
             lookup will match any port number to this field.

             The value of this object must be zero when the object
             is not a representative field (SrcPort, DstPort, or
             ICMP identifier) of the session tuple in either the
             public realm or the private realm."
     ::= { natSessionEntry 12 }

  natSessionPrivateDstAddr OBJECT-TYPE
     SYNTAX     InetAddress
     MAX-ACCESS read-only
     STATUS     deprecated
     DESCRIPTION
             "The destination IP address of the session endpoint that
```

                lies in the private network.

                The value of this object must be zero when the
                natSessionPrivateDstEPBindId object has a zero value.
                In such a scenario, the NAT session lookup will match
                any IP address to this field.

                The type of this address is determined by the value of
                the natSessionPrivateAddrType object."
        ::= { natSessionEntry 13 }

    natSessionPrivateDstPort OBJECT-TYPE
        SYNTAX   InetPortNumber
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                "When the value of protocol is TCP or UDP, this object
                represents the destination port in the first packet
                of session while in private-realm. On the other hand,
                when the protocol is ICMP, this object is not relevant
                and should be set to zero.

                The value of this object must be zero when the
                natSessionPrivateDstEPBindId object has a zero
                value and natSessionPrivateDstEPBindMode is set to
                addressPortBind(2). In such a case, the NAT session
                lookup will match any port number to this field.

                The value of this object must be zero when the object
                is not a representative field (SrcPort, DstPort, or
                ICMP identifier) of the session tuple in either the
                public realm or the private realm."
        ::= { natSessionEntry 14 }

    natSessionPublicAddrType OBJECT-TYPE
        SYNTAX   InetAddressType
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                "This object specifies the address type used for
                natSessionPublicSrcAddr and natSessionPublicDstAddr."
        ::= { natSessionEntry 15 }

    natSessionPublicSrcAddr OBJECT-TYPE
        SYNTAX   InetAddress
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION

               "The source IP address of the session endpoint that
               lies in the public network.

               The value of this object must be zero when the
               natSessionPrivateSrcEPBindId object has a zero value.
               In such a scenario, the NAT session lookup will match
               any IP address to this field.

               The type of this address is determined by the value of
               the natSessionPublicAddrType object."
          ::= { natSessionEntry 16 }

      natSessionPublicSrcPort OBJECT-TYPE
          SYNTAX   InetPortNumber
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
               "When the value of protocol is TCP or UDP, this object
               represents the source port in the first packet of
               session while in public-realm. On the other hand, when
               protocol is ICMP, a NAT session is created only for
               query/response type ICMP messages such as ICMP echo,
               Timestamp, and Information request messages, and this
               object represents the public-realm specific identifier
               in the ICMP message, as defined in RFC 792 for ICMPv4
               and in RFC 2463 for ICMPv6.

               The value of this object must be zero when the
               natSessionPrivateSrcEPBindId object has a zero value
               and natSessionPrivateSrcEPBindMode is set to
               addressPortBind(2). In such a scenario, the NAT
               session lookup will match any port number to this
               field.

               The value of this object must be zero when the object
               is not a representative field (SrcPort, DstPort or
               ICMP identifier) of the session tuple in either the
               public realm or the private realm."
          ::= { natSessionEntry 17 }

    natSessionPublicDstAddr OBJECT-TYPE
          SYNTAX   InetAddress
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
               "The destination IP address of the session endpoint that
               lies in the public network.

            The value of this object must be non-zero when the
            natSessionPrivateDstEPBindId object has a non-zero
            value. If the value of this object and the
            corresponding natSessionPrivateDstEPBindId object value
            is zero, then the NAT session lookup will match any IP
            address to this field.

            The type of this address is determined by the value of
            the natSessionPublicAddrType object."
       ::= { natSessionEntry 18 }

   natSessionPublicDstPort OBJECT-TYPE
       SYNTAX   InetPortNumber
       MAX-ACCESS read-only
       STATUS   deprecated
       DESCRIPTION
               "When the value of protocol is TCP or UDP, this object
               represents the destination port in the first packet of
               session while in public-realm. On the other hand, when
               the protocol is ICMP, this object is not relevant for
               translation and should be zero.

               The value of this object must be zero when the
               natSessionPrivateDstEPBindId object has a zero value
               and natSessionPrivateDstEPBindMode is
               addressPortBind(2). In such a scenario, the NAT
               session lookup will match any port number to this
               field.

               The value of this object must be zero when the object
               is not a representative field (SrcPort, DstPort, or
               ICMP identifier) of the session tuple in either the
               public realm or the private realm."
       ::= { natSessionEntry 19 }

   natSessionMaxIdleTime OBJECT-TYPE
       SYNTAX   TimeTicks
       MAX-ACCESS read-only
       STATUS   deprecated
       DESCRIPTION
               "The max time for which this session can be idle
               without detecting a packet."
       ::= { natSessionEntry 20 }

   natSessionCurrentIdleTime OBJECT-TYPE
       SYNTAX   TimeTicks
       MAX-ACCESS read-only
       STATUS   deprecated

```
     DESCRIPTION
             "The time since a packet belonging to this session was
              last detected."
        ::= { natSessionEntry 21 }

   natSessionInTranslates OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
             "The number of inbound packets that were translated for
              this session.

              Discontinuities in the value of this counter can occur
              at reinitialization of the management system and at
              other times, as indicated by the value of
              ifCounterDiscontinuityTime on the relevant interface."
        ::= { natSessionEntry 22 }

   natSessionOutTranslates OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
             "The number of outbound packets that were translated for
              this session.

              Discontinuities in the value of this counter can occur
              at reinitialization of the management system and at
              other times, as indicated by the value of
              ifCounterDiscontinuityTime on the relevant interface."
        ::= { natSessionEntry 23 }

   --
   -- The Protocol table
   --

   natProtocolTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF NatProtocolEntry
        MAX-ACCESS not-accessible
        STATUS      deprecated
        DESCRIPTION
             "The (conceptual) table containing per protocol NAT
              statistics."
        ::= { natMIBObjects 10 }

   natProtocolEntry OBJECT-TYPE
        SYNTAX      NatProtocolEntry
```

```
        MAX-ACCESS not-accessible
        STATUS      deprecated
        DESCRIPTION
                "An entry (conceptual row) containing NAT statistics
                 pertaining to a particular protocol."
        INDEX    { natProtocol }
        ::= { natProtocolTable 1 }

    NatProtocolEntry ::= SEQUENCE {
        natProtocol                 NatProtocolType,
        natProtocolInTranslates     Counter64,
        natProtocolOutTranslates    Counter64,
        natProtocolDiscards         Counter64
    }

    natProtocol    OBJECT-TYPE
        SYNTAX      NatProtocolType
        MAX-ACCESS not-accessible
        STATUS      deprecated
        DESCRIPTION
                "This object represents the protocol pertaining to which
                 parameters are reported."
        ::= { natProtocolEntry 1 }

    natProtocolInTranslates OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "The number of inbound packets pertaining to the protocol
                 identified by natProtocol that underwent NAT.

                 Discontinuities in the value of this counter can occur
                 at reinitialization of the management system and at
                 other times, as indicated by the value of
                 ifCounterDiscontinuityTime on the relevant interface."
        ::= { natProtocolEntry 2 }

    natProtocolOutTranslates OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS read-only
        STATUS      deprecated
        DESCRIPTION
                "The number of outbound packets pertaining to the
                 protocol identified by natProtocol that underwent NAT.

                 Discontinuities in the value of this counter can occur
                 at reinitialization of the management system and at
```

```
                     other times, as indicated by the value of
                     ifCounterDiscontinuityTime on the relevant interface."
              ::= { natProtocolEntry 3 }

        natProtocolDiscards OBJECT-TYPE
            SYNTAX      Counter64
            MAX-ACCESS read-only
            STATUS      deprecated
            DESCRIPTION
                     "The number of packets pertaining to the protocol
                     identified by natProtocol that had to be
                     rejected/dropped due to lack of resources.  These
                     rejections could be due to session timeout, resource
                     unavailability, lack of address space, etc.

                     Discontinuities in the value of this counter can occur
                     at reinitialization of the management system and at
                     other times, as indicated by the value of
                     ifCounterDiscontinuityTime on the relevant interface."
              ::= { natProtocolEntry 4 }

        --
        -- Notifications section
        --

        natMIBNotifications OBJECT IDENTIFIER ::= { natMIB 0 }

        --
        -- Notifications
        --

        natPacketDiscard NOTIFICATION-TYPE
            OBJECTS { ifIndex }
            STATUS  deprecated
            DESCRIPTION
                     "This notification is generated when IP packets are
                      discarded by the NAT function; e.g., due to lack of
                      mapping space when NAT is out of addresses or ports.

                      Note that the generation of natPacketDiscard
                      notifications is throttled by the agent, as specified
                      by the 'natNotifThrottlingInterval' object."
              ::= { natMIBNotifications 1 }


        --
        -- Conformance information.
```

```
   --

   natMIBConformance OBJECT IDENTIFIER ::= { natMIB 2 }

   natMIBGroups      OBJECT IDENTIFIER ::= { natMIBConformance 1 }
   natMIBCompliances OBJECT IDENTIFIER ::= { natMIBConformance 2 }

   --
   -- Units of conformance
   --

   natConfigGroup OBJECT-GROUP
       OBJECTS { natInterfaceRealm,
                 natInterfaceServiceType,
                 natInterfaceStorageType,
                 natInterfaceRowStatus,
                 natAddrMapName,
                 natAddrMapEntryType,
                 natAddrMapTranslationEntity,
                 natAddrMapLocalAddrType,
                 natAddrMapLocalAddrFrom,
                 natAddrMapLocalAddrTo,
                 natAddrMapLocalPortFrom,
                 natAddrMapLocalPortTo,
                 natAddrMapGlobalAddrType,
                 natAddrMapGlobalAddrFrom,
                 natAddrMapGlobalAddrTo,
                 natAddrMapGlobalPortFrom,
                 natAddrMapGlobalPortTo,
                 natAddrMapProtocol,
                 natAddrMapStorageType,
                 natAddrMapRowStatus,
                 natBindDefIdleTimeout,
                 natUdpDefIdleTimeout,
                 natIcmpDefIdleTimeout,
                 natOtherDefIdleTimeout,
                 natTcpDefIdleTimeout,
                 natTcpDefNegTimeout,
                 natNotifThrottlingInterval }
       STATUS  deprecated
       DESCRIPTION
               "A collection of configuration-related information
                required to support management of devices supporting
                NAT."
       ::= { natMIBGroups 1 }

   natTranslationGroup OBJECT-GROUP
       OBJECTS { natAddrBindNumberOfEntries,
```

```
                natAddrBindGlobalAddrType,
                natAddrBindGlobalAddr,
                natAddrBindId,
                natAddrBindTranslationEntity,
                natAddrBindType,
                natAddrBindMapIndex,
                natAddrBindSessions,
                natAddrBindMaxIdleTime,
                natAddrBindCurrentIdleTime,
                natAddrBindInTranslates,
                natAddrBindOutTranslates,
                natAddrPortBindNumberOfEntries,
                natAddrPortBindGlobalAddrType,
                natAddrPortBindGlobalAddr,
                natAddrPortBindGlobalPort,
                natAddrPortBindId,
                natAddrPortBindTranslationEntity,
                natAddrPortBindType,
                natAddrPortBindMapIndex,
                natAddrPortBindSessions,
                natAddrPortBindMaxIdleTime,
                natAddrPortBindCurrentIdleTime,
                natAddrPortBindInTranslates,
                natAddrPortBindOutTranslates,
                natSessionPrivateSrcEPBindId,
                natSessionPrivateSrcEPBindMode,
                natSessionPrivateDstEPBindId,
                natSessionPrivateDstEPBindMode,
                natSessionDirection,
                natSessionUpTime,
                natSessionAddrMapIndex,
                natSessionProtocolType,
                natSessionPrivateAddrType,
                natSessionPrivateSrcAddr,
                natSessionPrivateSrcPort,
                natSessionPrivateDstAddr,
                natSessionPrivateDstPort,
                natSessionPublicAddrType,
                natSessionPublicSrcAddr,
                natSessionPublicSrcPort,
                natSessionPublicDstAddr,
                natSessionPublicDstPort,
                natSessionMaxIdleTime,
                natSessionCurrentIdleTime,
                natSessionInTranslates,
                natSessionOutTranslates }
        STATUS  deprecated
```

```
        DESCRIPTION
                "A collection of BIND-related objects required to support
                 management of devices supporting NAT."
        ::= { natMIBGroups 2 }

    natStatsInterfaceGroup OBJECT-GROUP
        OBJECTS { natInterfaceInTranslates,
                  natInterfaceOutTranslates,
                  natInterfaceDiscards }
        STATUS  deprecated
        DESCRIPTION
                "A collection of NAT statistics associated with the
                 interface on which NAT is configured, to aid
                 troubleshooting/monitoring of the NAT operation."
        ::= { natMIBGroups 3 }

    natStatsProtocolGroup OBJECT-GROUP
        OBJECTS { natProtocolInTranslates,
                  natProtocolOutTranslates,
                  natProtocolDiscards }
        STATUS  deprecated
        DESCRIPTION
                "A collection of protocol specific NAT statistics,
                 to aid troubleshooting/monitoring of NAT operation."
        ::= { natMIBGroups 4 }

    natStatsAddrMapGroup OBJECT-GROUP
        OBJECTS { natAddrMapInTranslates,
                  natAddrMapOutTranslates,
                  natAddrMapDiscards,
                  natAddrMapAddrUsed }
        STATUS  deprecated
        DESCRIPTION
                "A collection of address map specific NAT statistics,
                 to aid troubleshooting/monitoring of NAT operation."
        ::= { natMIBGroups 5 }

    natMIBNotificationGroup NOTIFICATION-GROUP
        NOTIFICATIONS { natPacketDiscard }
        STATUS          deprecated
        DESCRIPTION
                "A collection of notifications generated by
                 devices supporting this MIB."
        ::= { natMIBGroups 6 }


    --
    -- Compliance statements
```

```
       --

     natMIBFullCompliance MODULE-COMPLIANCE
         STATUS  deprecated
         DESCRIPTION
                 "When this MIB is implemented with support for
                  read-create, then such an implementation can claim
                  full compliance.  Such devices can then be both
                  monitored and configured with this MIB.

                  The following index objects cannot be added as OBJECT
                  clauses but nevertheless have the compliance
                  requirements:
                     "
                 -- OBJECT   natAddrBindLocalAddrType
                 -- SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
                 -- DESCRIPTION
                 --         "An implementation is required to support
                 --          global IPv4 and/or IPv6 addresses, depending
                 --          on its support for IPv4 and IPv6."

                 -- OBJECT   natAddrBindLocalAddr
                 -- SYNTAX   InetAddress (SIZE(4|16))
                 -- DESCRIPTION
                 --         "An implementation is required to support
                 --          global IPv4 and/or IPv6 addresses, depending
                 --          on its support for IPv4 and IPv6."

                 -- OBJECT   natAddrPortBindLocalAddrType
                 -- SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
                 -- DESCRIPTION
                 --         "An implementation is required to support
                 --          global IPv4 and/or IPv6 addresses, depending
                 --          on its support for IPv4 and IPv6."

                 -- OBJECT   natAddrPortBindLocalAddr
                 -- SYNTAX   InetAddress (SIZE(4|16))
                 -- DESCRIPTION
                 --         "An implementation is required to support
                 --          global IPv4 and/or IPv6 addresses, depending
                 --          on its support for IPv4 and IPv6."

         MODULE IF-MIB -- The interfaces MIB, RFC2863
           MANDATORY-GROUPS {
             ifCounterDiscontinuityGroup
           }

         MODULE  -- this module
```

```
        MANDATORY-GROUPS { natConfigGroup, natTranslationGroup,
                           natStatsInterfaceGroup }

        GROUP      natStatsProtocolGroup
        DESCRIPTION
               "This group is optional."
        GROUP      natStatsAddrMapGroup
        DESCRIPTION
               "This group is optional."
        GROUP      natMIBNotificationGroup
        DESCRIPTION
               "This group is optional."

        OBJECT  natAddrMapLocalAddrType
        SYNTAX  InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
               "An implementation is required to support global IPv4
                and/or IPv6 addresses, depending on its support
                for IPv4 and IPv6."

        OBJECT  natAddrMapLocalAddrFrom
        SYNTAX  InetAddress (SIZE(4|16))
        DESCRIPTION
               "An implementation is required to support global IPv4
                and/or IPv6 addresses, depending on its support
                for IPv4 and IPv6."

        OBJECT  natAddrMapLocalAddrTo
        SYNTAX  InetAddress (SIZE(4|16))
        DESCRIPTION
               "An implementation is required to support global IPv4
                and/or IPv6 addresses, depending on its support
                for IPv4 and IPv6."

        OBJECT  natAddrMapGlobalAddrType
        SYNTAX  InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
               "An implementation is required to support global IPv4
                and/or IPv6 addresses, depending on its support
                for IPv4 and IPv6."

        OBJECT  natAddrMapGlobalAddrFrom
        SYNTAX  InetAddress (SIZE(4|16))
        DESCRIPTION
               "An implementation is required to support global IPv4
                and/or IPv6 addresses, depending on its support
                for IPv4 and IPv6."
```

```
        OBJECT   natAddrMapGlobalAddrTo
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natAddrBindGlobalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natAddrBindGlobalAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natAddrPortBindGlobalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natAddrPortBindGlobalAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natSessionPrivateAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."


        OBJECT   natSessionPrivateSrcAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."
```

```
        OBJECT   natSessionPrivateDstAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."

        OBJECT   natSessionPublicAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."

        OBJECT   natSessionPublicSrcAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."

        OBJECT   natSessionPublicDstAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support
                 for IPv4 and IPv6."

    ::= { natMIBCompliances 1 }

 natMIBReadOnlyCompliance MODULE-COMPLIANCE
     STATUS   deprecated
     DESCRIPTION
             "When this MIB is implemented without support for
              read-create (i.e., in read-only mode), then such an
              implementation can claim read-only compliance.
              Such a device can then be monitored but cannot be
              configured with this MIB.

              The following index objects cannot be added as OBJECT
              clauses but nevertheless have the compliance
              requirements:
              "
              -- OBJECT   natAddrBindLocalAddrType
              -- SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
              -- DESCRIPTION
              --          "An implementation is required to support
              --           global IPv4 and/or IPv6 addresses, depending
```

```
             --             on its support for IPv4 and IPv6."

             -- OBJECT   natAddrBindLocalAddr
             -- SYNTAX   InetAddress (SIZE(4|16))

             -- DESCRIPTION
             --         "An implementation is required to support
             --          global IPv4 and/or IPv6 addresses, depending
             --          on its support for IPv4 and IPv6."

             -- OBJECT   natAddrPortBindLocalAddrType
             -- SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
             -- DESCRIPTION
             --         "An implementation is required to support
             --          global IPv4 and/or IPv6 addresses, depending
             --          on its support for IPv4 and IPv6."
             -- OBJECT   natAddrPortBindLocalAddr
             -- SYNTAX   InetAddress (SIZE(4|16))
             -- DESCRIPTION
             --         "An implementation is required to support
             --          global IPv4 and/or IPv6 addresses, depending
             --          on its support for IPv4 and IPv6."

        MODULE IF-MIB -- The interfaces MIB, RFC2863
          MANDATORY-GROUPS {
            ifCounterDiscontinuityGroup
          }

        MODULE  -- this module
          MANDATORY-GROUPS { natConfigGroup, natTranslationGroup,
                             natStatsInterfaceGroup }

          GROUP        natStatsProtocolGroup
          DESCRIPTION
                  "This group is optional."
          GROUP        natStatsAddrMapGroup
          DESCRIPTION
                  "This group is optional."
          GROUP        natMIBNotificationGroup
          DESCRIPTION
                  "This group is optional."
          OBJECT natInterfaceRowStatus
          SYNTAX RowStatus { active(1) }
          MIN-ACCESS   read-only
          DESCRIPTION
                  "Write access is not required, and active is the only
                   status that needs to be supported."
```

```
        OBJECT   natAddrMapLocalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."


        OBJECT   natAddrMapLocalAddrFrom
        SYNTAX   InetAddress (SIZE(4|16))
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."


        OBJECT   natAddrMapLocalAddrTo
        SYNTAX   InetAddress (SIZE(4|16))
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."


        OBJECT   natAddrMapGlobalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."


        OBJECT   natAddrMapGlobalAddrFrom
        SYNTAX   InetAddress (SIZE(4|16))
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."


        OBJECT   natAddrMapGlobalAddrTo
        SYNTAX   InetAddress (SIZE(4|16))
        MIN-ACCESS   read-only
        DESCRIPTION
               "Write access is not required.  An implementation is
                required to support global IPv4 and/or IPv6 addresses,
                depending on its support for IPv4 and IPv6."
```

```
        OBJECT natAddrMapRowStatus
        SYNTAX RowStatus { active(1) }
        MIN-ACCESS   read-only
        DESCRIPTION
                "Write access is not required, and active is the only
                 status that needs to be supported."

        OBJECT   natAddrBindGlobalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natAddrBindGlobalAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natAddrPortBindGlobalAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natAddrPortBindGlobalAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natSessionPrivateAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natSessionPrivateSrcAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."
```

```
        OBJECT   natSessionPrivateDstAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natSessionPublicAddrType
        SYNTAX   InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natSessionPublicSrcAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

        OBJECT   natSessionPublicDstAddr
        SYNTAX   InetAddress (SIZE(4|16))
        DESCRIPTION
                "An implementation is required to support global IPv4
                 and/or IPv6 addresses, depending on its support for
                 IPv4 and IPv6."

    ::= { natMIBCompliances 2 }


--=====================================================================
-- END OF DEPRECATED OBJECTS. CURRENT OBJECTS FOLLOW.


-- textual conventions

ProtocolNumber ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS current
    DESCRIPTION
        "A transport protocol number, from the 'protocol-numbers'
         IANA registry."
    SYNTAX Unsigned32 (0..255)

NatPoolId ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS current
```

```
      DESCRIPTION
          "A unique ID that is assigned to each pool."
      SYNTAX Unsigned32 (1..4294967295)

   NatBehaviorType ::= TEXTUAL-CONVENTION
      STATUS current
      DESCRIPTION
          "Behavior type as described in [RFC4787] sections 4.1 and 5."
      SYNTAX INTEGER {
          endpointIndependent (0),
          addressDependent (1),
          addressAndPortDependent (2)
      }

   NatPoolingType ::= TEXTUAL-CONVENTION
      STATUS current
      DESCRIPTION
          "Pooling type as described in [RFC4787] sections 4.1."
      SYNTAX INTEGER {
          arbitrary (0),
          paired (1)
      }

   VlanIndexOrZero ::= TEXTUAL-CONVENTION
      DISPLAY-HINT "d"
      STATUS       current
      DESCRIPTION
          "A value used to index per-VLAN tables: a value of 4095 is
           not permitted.  A value of 0 indicates no index is present.
           If the value is between 1 and 4094 inclusive, it represents
           an IEEE 802.1Q VLAN-ID with global scope within a given
           bridged domain (see VlanId textual convention in
           [RFC4363]).  If the value is greater than 4095, then it
           represents a VLAN with scope local to the particular agent,
           i.e., one without a global VLAN-ID assigned to it. Such
           VLANs are outside the scope of IEEE 802.1Q, but it is
           convenient to be able to manage them in the same way using
           this MIB."
      SYNTAX       Unsigned32

   SubscriberIndex ::= TEXTUAL-CONVENTION
      DISPLAY-HINT "d"
      STATUS current
      DESCRIPTION
          "A unique ID that is assigned to each subscriber."
      SYNTAX Unsigned32 (1..4294967295)

   SubscriberIdentifierType ::= TEXTUAL-CONVENTION
```

```
STATUS      current
DESCRIPTION
    "Type of additional classifying information used by the NAT
     to identify the subscriber from an incoming packet, when
     the packet source address is not sufficient to do so
     unambiguously.

     null(0)

         No additional information is needed.

     interfaces(1)

         A set of one or more ingress interface indexes specified
         by the [RFC2863] InterfaceIndex textual convention.

     vlan(2)

         An ingress VLAN index using the VlanIndexOrZero textual
         convention, which is the [RFC4363] VlanIndex textual
         convention modified for local use in this MIB.

     vpn(3)

         An ingress layer 3 VPN identifier using the [RFC4265]
         VPNIdOrZero textual convention.

     ipencaps(4)

         Incoming source address of an encapsulating IPv4 or IPv6
         tunnel (e.g., IPv6 as used in DS-Lite, [RFC6333]) as
         defined by the InetAddressType and InetAddress textual
         conventions.

     other(5)

         The implementation supports other classifiers and/or
         combinations of classifier types. In the latter case the
         implementation MUST specify the semantics of the
         combination ('OR' or 'AND')."

SYNTAX       INTEGER {
                 null(0),
                 interfaces(1),
                 vlan(2),
                 vpn(3),
                 ipencaps(4),
                 other(5)
```

```
                     }

    SubsInterfaceIdRowIndex ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "A unique ID that is assigned to each row in the
             natSubsInterfaceIdentifierTable."
        SYNTAX Unsigned32 (1..4294967295)


    -- notifications

    natNotifPoolWatermarkLow NOTIFICATION-TYPE
        OBJECTS { natPoolWatermarkLow }
        STATUS current
        DESCRIPTION
            "This notification is generated when a pool's usage
             percentage becomes lower than or equal to the specified
             threshold. The threshold is specified by the
             natPoolWatermarkLow object"
        ::= { natMIBNotifications 2 }

    natNotifPoolWatermarkHigh NOTIFICATION-TYPE
        OBJECTS { natPoolWatermarkHigh }
        STATUS current
        DESCRIPTION
            "This notification is generated when a pool's usage
             percentage becomes greater than or equal to the specified
             threshold. The threshold is specified by the
             natPoolWatermarkHigh object"
        ::= { natMIBNotifications 3 }

    natNotifMappings NOTIFICATION-TYPE
        OBJECTS { natMappingCreations, natMappingRemovals }
        STATUS current
        DESCRIPTION
            "This notification is generated when the number of active
             mappings exceeds the value of natMappingsNotifyThreshold."
        ::= { natMIBNotifications 4 }

    natNotifAddrMappings NOTIFICATION-TYPE
        OBJECTS { natAddressMappingCreations, natAddressMappingRemovals }
        STATUS current
        DESCRIPTION
            "This notification is generated when the number of active
             address mappings exceeds the value of
             natAddrMapNotifyThreshold."
```

```
        ::= { natMIBNotifications 5 }

    natNotifSubscriberMappings NOTIFICATION-TYPE
        OBJECTS { natSubscriberMappingCreations,
                  natSubscriberMappingRemovals }
        STATUS current
        DESCRIPTION
            "This notification is generated when the number of active
             mappings exceeds the value of natSubscriberMapNotifyThresh,
             unless natSubscriberMapNotifyThresh is zero.."
        ::= { natMIBNotifications 6 }


    -- instance table

    natInstanceTable OBJECT-TYPE
        SYNTAX SEQUENCE OF NatInstanceEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of NAT instances."
        ::= { natMIBObjects 11 }

    natInstanceEntry OBJECT-TYPE
        SYNTAX NatInstanceEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Objects related to a single NAT instance."
        INDEX { natInstanceIndex }
        ::= { natInstanceTable 1 }

    NatInstanceEntry ::=
        SEQUENCE {
            natInstanceIndex Unsigned32,
            natInstanceAlias DisplayString
        }

    natInstanceIndex OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "NAT instance index. Semantics of this number are
             implementation-specific. This object is used as an index for
             many tables defined below."
        ::= { natInstanceEntry 1 }
```

```
    natInstanceAlias OBJECT-TYPE
        SYNTAX DisplayString (SIZE (0..64))
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "This object is an 'alias' name for the NAT instance as
             specified by a network manager, and provides a non-volatile
             'handle' for the instance.

             On the first instantiation of a NAT instance, the value of
             natInstanceAlias associated with that instance is the
             zero-length string.  As and when a value is written into an
             instance of natInstanceAlias through a network management
             set operation, then the agent must retain the supplied value
             in this obejct instance associated with the same interface
             for as long as that NAT instance remains instantiated,
             including across all re-initializations/reboots of the
             network management system, including those which result in a
             change of the interface's natInstanceIndex value.

             An example of the value which a network manager might store
             in this object for a NAT instance is the name/identifier of
             the interface that brings in internal traffic for this NAT
             instance or the name of the VRF for internal traffic.

             An agent may choose to provide read-only access if the agent
             itself assigns an identifier for the NAT instance. An agent
             which supports write access to this object is required to
             keep the value in non-valite storage, but it may limit the
             length of new values depending on how much storage is
             already occupied by the current values for other
             NAT instances."
        ::= { natInstanceEntry 2 }


    -- counters

    natCounters OBJECT IDENTIFIER ::= { natMIBObjects 12 }

    natCountersTable OBJECT-TYPE
        SYNTAX SEQUENCE OF NatCountersEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of counters of a NAT instance. The counters are global
             across L4 protocols."
        ::= { natCounters 1 }
```

```
    natCountersEntry OBJECT-TYPE
        SYNTAX NatCountersEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Counters related to a single NAT instance."
        INDEX { natInstanceIndex }
        ::= { natCountersTable 1 }

    NatCountersEntry ::=
        SEQUENCE {
            natTranslations            Counter64,
            natOutOfPortErrors         Counter64,
            natResourceErrors          Counter64,
            natQuotaDrops              Counter64,
            natMappingCreations        Counter64,
            natMappingRemovals         Counter64,
            natAddressMappingCreations Counter64,
            natAddressMappingRemovals  Counter64
        }

    natTranslations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets translated."
        ::= { natCountersEntry 1 }

    natOutOfPortErrors OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets not translated because no external
             port was available, excluding quota limitations."
        ::= { natCountersEntry 2 }

    natResourceErrors OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets not translated because of resource
             constraints (excluding out-of-ports error and quota drops)."
        ::= { natCountersEntry 3 }

    natQuotaDrops OBJECT-TYPE
```

```
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of incoming packets not translated because of
             quota limitations.  Quotas include absolute limits as well
             as limits on rate of allocation."
        ::= { natCountersEntry 4 }

    natMappingCreations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of mapping creations. This includes static mappings."
        ::= { natCountersEntry 5 }

    natMappingRemovals OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of mapping removals. This includes static mappings."
        ::= { natCountersEntry 6 }

    natAddressMappingCreations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of address mapping creations. This includes static
             mappings."
        ::= { natCountersEntry 7 }

    natAddressMappingRemovals OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of address mapping removals. This includes static
             mappings.

             The number of active mappings is equal to
             natAddressMappingCreations - natAddressMappingRemovals."
        ::= { natCountersEntry 8 }

    natL4ProtocolTable OBJECT-TYPE
        SYNTAX SEQUENCE OF NatL4ProtocolEntry
```

```
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of protocols with per-protocol counters."
        ::= { natCounters 2 }

    natL4ProtocolEntry OBJECT-TYPE
        SYNTAX NatL4ProtocolEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Per-protocol counters."
        INDEX { natInstanceIndex, natL4ProtocolNumber }
        ::= { natL4ProtocolTable 1 }

    NatL4ProtocolEntry ::=
        SEQUENCE {
            natL4ProtocolNumber            ProtocolNumber,
            natL4ProtocolTranslations      Counter64,
            natL4ProtocolOutOfPortErrors   Counter64,
            natL4ProtocolResourceErrors    Counter64,
            natL4ProtocolQuotaDrops        Counter64,
            natL4ProtocolMappingCreations  Counter64,
            natL4ProtocolMappingRemovals   Counter64
        }

    natL4ProtocolNumber OBJECT-TYPE
        SYNTAX ProtocolNumber
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Counters in this conceptual row apply to packets using the
             transport protocol identified by this object's value."
        ::= { natL4ProtocolEntry 1 }

    natL4ProtocolTranslations  OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets translated."
        ::= { natL4ProtocolEntry 2 }

    natL4ProtocolOutOfPortErrors OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

```
        "The number of packets not translated because no external
         port was available."
    ::= { natL4ProtocolEntry 3 }

natL4ProtocolResourceErrors OBJECT-TYPE
    SYNTAX Counter64
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of packets not translated because of resource
         constraints (excluding out-of-ports errors and quota
         drops)."
    ::= { natL4ProtocolEntry 4 }

natL4ProtocolQuotaDrops OBJECT-TYPE
    SYNTAX Counter64
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of incoming packets not translated because of
         exceeded quotas. Quotas include absolute limits as well as
         limits on rate of allocation."
    ::= { natL4ProtocolEntry 5 }

natL4ProtocolMappingCreations OBJECT-TYPE
    SYNTAX Counter64
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Number of mapping creations. This includes static mappings."
    ::= { natL4ProtocolEntry 6 }

natL4ProtocolMappingRemovals OBJECT-TYPE
    SYNTAX Counter64
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Number of mapping removals. This includes static mappings.

         The number of active mappings is equal to
         natL4ProtocolMappingCreations -
         natL4ProtocolMappingRemovals."
    ::= { natL4ProtocolEntry 7 }


-- limits

natLimitsTable OBJECT-TYPE
```

```
        SYNTAX SEQUENCE OF NatLimitsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of limits for a NAT instance."
        ::= { natMIBObjects 13 }

    natLimitsEntry OBJECT-TYPE
        SYNTAX NatLimitsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Limit related to a single NAT instance."
        INDEX { natInstanceIndex }
        ::= { natLimitsTable 1 }

    NatLimitsEntry ::=
        SEQUENCE {
            natLimitMappings            Unsigned32,
            natMappingsNotifyThreshold  Unsigned32,
            natLimitAddressMappings     Unsigned32,
            natAddrMapNotifyThreshold   Unsigned32,
            natLimitFragments           Unsigned32,
            natLimitSubscribers         Unsigned32
        }

    natLimitMappings OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Global limit on the total number of mappings. Zero means
             unlimited."
        ::= { natLimitsEntry 1 }

    natMappingsNotifyThreshold OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "See natNotifMappings."
        ::= { natLimitsEntry 2 }

    natLimitAddressMappings OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
```

```
         "Global limit on the total number of internal-to-external
          address mappings.  Zero means unlimited.

          This limit is only applicable to NATs that have an 'IP
          address pooling' behavior of 'Paired' [RFC4787]."
     ::= { natLimitsEntry 3 }

natAddrMapNotifyThreshold OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "See natNotifAddrMappings."
    ::= { natLimitsEntry 4 }

natLimitFragments OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "Global limit on the total number of fragments pending
         reassembly.  Zero means unlimited.

         This limit is only applicable to NATs having 'Receive
         Fragments Out of Order' behavior [RFC4787]."
    ::= { natLimitsEntry 5 }

natLimitSubscribers OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "Global limit on the number of subscribers with active
         mappings.  Zero means unlimited."
    ::= { natLimitsEntry 6 }


-- pools

natPoolObjects OBJECT IDENTIFIER ::= { natMIBObjects 14 }

natPoolTable OBJECT-TYPE
    SYNTAX SEQUENCE OF NatPoolEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Table of pools."
    ::= { natPoolObjects 1 }
```

```
natPoolEntry OBJECT-TYPE
    SYNTAX NatPoolEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Entry in the table of pools."
    INDEX { natInstanceIndex, natPoolIndex }
    ::= { natPoolTable 1 }

NatPoolEntry ::=
    SEQUENCE {
        natPoolIndex          NatPoolId,
        natPoolRealm          SnmpAdminString,
        natPoolWatermarkLow   Integer32,
        natPoolWatermarkHigh  Integer32,
        natPoolPortMin        InetPortNumber,
        natPoolPortMax        InetPortNumber
    }

natPoolIndex OBJECT-TYPE
    SYNTAX NatPoolId
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Index of an address pool."
    ::= { natPoolEntry 1 }

natPoolRealm OBJECT-TYPE
    SYNTAX SnmpAdminString (SIZE (0..32))
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Realm to which this pool's addresses belong."
    ::= { natPoolEntry 2 }

natPoolWatermarkLow OBJECT-TYPE
    SYNTAX Integer32 (-1|0..100)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "Low watermark on a pool's usage, in percentage of the total
         number of ports available. If set to -1, the watermark is
         disabled. Otherwise when the usage percentage becomes lower
         than or equal to natPoolWatermarkLow, a notification is
         sent. The NAT may also start behaving in low usage mode
         (this is implementation-defined).

         The pool's current usage percentage can be computed by
```

```
        summing (natPoolRangeAllocations -
        natPoolRangeDeallocations) over all address ranges
        belonging to this pool, then dividing by the total number of
        IP addresses in this pool and by the size of the port range
        in this pool (natPoolPortMax - natPoolPortMin + 1)."
    ::= { natPoolEntry 3 }

natPoolWatermarkHigh OBJECT-TYPE
    SYNTAX Integer32 (-1|0..100)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "High watermark on a pool's usage, in percentage of the total
        number of ports available. If set to -1, the watermark is
        disabled. Otherwise, when the usage percentage becomes
        higher than or equal to natPoolWatermarkHigh, a notification
        is sent.  The NAT may also start behaving in high usage mode
        (this is implementation-defined)."
    ::= { natPoolEntry 4 }

natPoolPortMin OBJECT-TYPE
    SYNTAX InetPortNumber
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "Minimal port number to be allocated in this pool."
    ::= { natPoolEntry 5 }

natPoolPortMax OBJECT-TYPE
    SYNTAX InetPortNumber
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "Maximal port number to be allocated in this pool."
    ::= { natPoolEntry 6 }


natPoolRangeTable OBJECT-TYPE
    SYNTAX SEQUENCE OF NatPoolRangeEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table contains address ranges used by pool entries."
    ::= { natPoolObjects 2 }

natPoolRangeEntry OBJECT-TYPE
    SYNTAX NatPoolRangeEntry
    MAX-ACCESS not-accessible
```

```
     STATUS current
     DESCRIPTION
         "NAT pool address range."
     INDEX { natInstanceIndex, natPoolRangePoolIndex }
     ::= { natPoolRangeTable 1 }

NatPoolRangeEntry ::=
     SEQUENCE {
         natPoolRangePoolIndex        NatPoolId,
         natPoolRangeType             InetAddressType,
         natPoolRangeBegin            InetAddress,
         natPoolRangeEnd              InetAddress,
         natPoolRangeAllocations      Counter64,
         natPoolRangeDeallocations    Counter64
     }

natPoolRangePoolIndex OBJECT-TYPE
     SYNTAX NatPoolId
     MAX-ACCESS not-accessible
     STATUS current
     DESCRIPTION
         "Index of the address pool to which this address range
          belongs.  See natPoolIndex."
     ::= { natPoolRangeEntry 1 }

natPoolRangeType OBJECT-TYPE
     SYNTAX InetAddressType
     MAX-ACCESS read-only
     STATUS current
     DESCRIPTION
         "The address type of natPoolRangeBegin and
          natPoolRangeEnd."
     ::= { natPoolRangeEntry 2 }

natPoolRangeBegin OBJECT-TYPE
     SYNTAX InetAddress
     MAX-ACCESS read-only
     STATUS current
     DESCRIPTION
         "Lowest address included in this range."
     ::= { natPoolRangeEntry 3 }

natPoolRangeEnd OBJECT-TYPE
     SYNTAX InetAddress
     MAX-ACCESS read-only
     STATUS current
     DESCRIPTION
         "Highest address included in this range."
```

```
        ::= { natPoolRangeEntry 4 }

    natPoolRangeAllocations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of ports that have been allocated on the addresses in
             this range."
        ::= { natPoolRangeEntry 5 }

    natPoolRangeDeallocations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of ports that have been allocated and then
             deallocated on the addresses in this range.

             The number of ports currently allocated on the addresses in
             this range can be computed by subtracting
             natPoolRangeDeallocations from natPoolRangeAllocations."
        ::= { natPoolRangeEntry 6 }


    -- indexed mapping tables

    natMapObjects OBJECT IDENTIFIER ::= { natMIBObjects 15 }

    natMapIntAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF NatMapIntAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of mappings from internal to external address.

             This table is only applicable to NATs that have an 'IP
             address pooling' behavior of 'Paired' [RFC4787]."
        ::= { natMapObjects 1 }

    natMapIntAddrEntry OBJECT-TYPE
        SYNTAX NatMapIntAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Mapping from internal to external address."
        INDEX { natInstanceIndex,
                natMapIntAddrIntRealm,
```

```
            natMapIntAddrIntType,
            natMapIntAddrInt }
    ::= { natMapIntAddrTable 1 }

NatMapIntAddrEntry ::=
    SEQUENCE {
        natMapIntAddrIntRealm   SnmpAdminString,
        natMapIntAddrExtRealm   SnmpAdminString,
        natMapIntAddrIntType    InetAddressType,
        natMapIntAddrInt        InetAddress,
        natMapIntAddrExtType    InetAddressType,
        natMapIntAddrExt        InetAddress,
        natMapIntAddrSubsIndex  Unsigned32
    }

natMapIntAddrIntRealm OBJECT-TYPE
    SYNTAX SnmpAdminString (SIZE(0..32))
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Realm to which natMapIntAddrInt belongs."
    ::= { natMapIntAddrEntry 1 }

natMapIntAddrExtRealm OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Realm to which natMapIntAddrExt belongs."
    ::= { natMapIntAddrEntry 2 }

natMapIntAddrIntType OBJECT-TYPE
    SYNTAX InetAddressType
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Address type for natMapIntAddrInt."
    ::= { natMapIntAddrEntry 3 }

natMapIntAddrInt OBJECT-TYPE
    SYNTAX InetAddress (SIZE (4|16))
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Internal address."
    ::= { natMapIntAddrEntry 4 }

natMapIntAddrExtType OBJECT-TYPE
```

```
        SYNTAX InetAddressType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Address type for natMapIntAddrExt."
        ::= { natMapIntAddrEntry 5 }

    natMapIntAddrExt OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "External address."
        ::= { natMapIntAddrEntry 6 }

    natMapIntAddrSubsIndex OBJECT-TYPE
        SYNTAX Unsigned32 (0|1..4294967295)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Subscriber to which this address mapping applies, or zero if
             it applies to all subscribers."
        ::= { natMapIntAddrEntry 7 }

    natMappingTable OBJECT-TYPE
        SYNTAX SEQUENCE OF NatMappingEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Table of mappings indexed by external 3-tuple."
        ::= { natMapObjects 2 }

    natMappingEntry OBJECT-TYPE
        SYNTAX NatMappingEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "A single NAT mapping."
        INDEX { natInstanceIndex,
                natMappingProto,
                natMappingExtRealm,
                natMappingExtAddressType,
                natMappingExtAddress,
                natMappingExtPort }
        ::= { natMappingTable 1 }

    NatMappingEntry ::=
        SEQUENCE {
```

```
        natMappingProto          ProtocolNumber,
        natMappingExtRealm       SnmpAdminString,
        natMappingExtAddressType InetAddressType,
        natMappingExtAddress     InetAddress,
        natMappingExtPort        InetPortNumber,
        natMappingIntRealm       SnmpAdminString,
        natMappingIntAddressType InetAddressType,
        natMappingIntAddress     InetAddress,
        natMappingIntPort        InetPortNumber,
        natMappingPool           Unsigned32,
        natMappingMapBehavior    NatBehaviorType,
        natMappingFilterBehavior NatBehaviorType,
        natMappingAddressPooling NatPoolingType,
        natMappingSubsIndex      SubscriberIndex
    }

natMappingProto OBJECT-TYPE
    SYNTAX ProtocolNumber
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The mapping's transport protocol number."
    ::= { natMappingEntry 1 }

natMappingExtRealm OBJECT-TYPE
    SYNTAX SnmpAdminString (SIZE(0..32))
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The realm to which natMappingExtAddress belongs."
    ::= { natMappingEntry 2 }

natMappingExtAddressType OBJECT-TYPE
    SYNTAX InetAddressType
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Type of the mapping's external address."
    ::= { natMappingEntry 3 }

natMappingExtAddress OBJECT-TYPE
    SYNTAX InetAddress (SIZE (4|16))
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The mapping's external address. If this is the undefined
         address, all external addresses are mapped to the internal
         address."
```

```
        ::= { natMappingEntry 4 }

    natMappingExtPort OBJECT-TYPE
        SYNTAX InetPortNumber
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The mapping's external port number. If this is zero, all
             external ports are mapped to the internal port."
        ::= { natMappingEntry 5 }

    natMappingIntRealm OBJECT-TYPE
        SYNTAX SnmpAdminString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The realm to which natMappingIntAddress belongs."
        ::= { natMappingEntry 6 }

    natMappingIntAddressType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Type of the mapping's internal address."
        ::= { natMappingEntry 7 }

    natMappingIntAddress OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The mapping's internal address. If this is the undefined
             address, addresses are not translated."
        ::= { natMappingEntry 8 }

    natMappingIntPort OBJECT-TYPE
        SYNTAX InetPortNumber
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The mapping's internal port number. If this is zero, ports
             are not translated."
        ::= { natMappingEntry 9 }

    natMappingPool OBJECT-TYPE
        SYNTAX Unsigned32 (0|1..4294967295)
        MAX-ACCESS read-only
```

```
      STATUS current
      DESCRIPTION
          "Index of the pool that contains this mapping's external
           address and port. If zero, no pool is associated with this
           mapping."
      ::= { natMappingEntry 10 }

  natMappingMapBehavior OBJECT-TYPE
      SYNTAX NatBehaviorType
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Mapping behavior as described in [RFC4787] section 4.1."
      ::= { natMappingEntry 11 }

  natMappingFilterBehavior OBJECT-TYPE
      SYNTAX NatBehaviorType
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Filtering behavior as described in [RFC4787] section 5."
      ::= { natMappingEntry 12 }

  natMappingAddressPooling OBJECT-TYPE
      SYNTAX NatPoolingType
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Type of address pooling behavior that was used to create
           this mapping."
      ::= { natMappingEntry 13 }

  natMappingSubsIndex OBJECT-TYPE
      SYNTAX SubscriberIndex
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Subscriber using this mapping."
      ::= { natMappingEntry 14 }


  -- subscribers

  natSubscribers OBJECT IDENTIFIER ::= { natMIBObjects 16 }

  natSubscribersTable OBJECT-TYPE
      SYNTAX SEQUENCE OF NatSubscribersEntry
      MAX-ACCESS not-accessible
```

```
        STATUS current
        DESCRIPTION
            "Table of CGN subscribers."
        ::= { natSubscribers 1 }

    natSubscribersEntry OBJECT-TYPE
        SYNTAX NatSubscribersEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry describes a single CGN subscriber or a host
             served by a managed enterprise NAT."
        INDEX { natInstanceIndex,
                natSubscriberIndex }
        ::= { natSubscribersTable 1 }

    NatSubscribersEntry ::=
        SEQUENCE {
            natSubscriberIndex              SubscriberIndex,
            natSubscriberIdentifierType     SubscriberIdentifierType,
            natSubscriberIntPrefixType      InetAddressType,
            natSubscriberIntPrefix          InetAddress,
            natSubscriberIntPrefixLength    InetAddressPrefixLength,
            natSubscriberRealm              SnmpAdminString,
            natSubscriberTranslations       Counter64,
            natSubscriberOutOfPortErrors    Counter64,
            natSubscriberResourceErrors     Counter64,
            natSubscriberQuotaDrops         Counter64,
            natSubscriberMappingCreations   Counter64,
            natSubscriberMappingRemovals    Counter64,
            natSubscriberLimitMappings      Unsigned32,
            natSubscriberMapNotifyThresh    Unsigned32,
            natSubscriberVlanIdentifier     VlanIndexOrZero,
            natSubscriberVpnIdentifier      VPNIdOrZero,
            natSubscriberIPEncapsIdType     InetAddressType,
            natSubscriberIPEncapsIdAddr     InetAddress
        }

    natSubscriberIndex OBJECT-TYPE
        SYNTAX SubscriberIndex
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Index of the subscriber or host."
        ::= { natSubscribersEntry 1 }

    natSubscriberIdentifierType OBJECT-TYPE
        SYNTAX SubscriberIdentifierType
```

```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Type of additional information needed to identify the
            subscriber or host from incoming packets, when the packet
            source address does not do so unambiguously.

            The implementation MUST ensure that the type and the
            identifier value provided are synchronized, as follows.
            Unused identifier values MUST be zero or equivalent.

            Type             Identifier object

            null(0)          None.
            interfaces(1)    natSubsInterfaceIdentifierTable
            vlan(2)          natSubscriberVlanIdentifier
            vpn(3)           natSubscriberVpnIdentifier
            ipencaps(4)      natSubscriberIPEncapsIdType and
                             natSubscriberIPEncapsIdAddr
            other(5)         As specified by the implementation"
        ::= { natSubscribersEntry 2 }

    natSubscriberIntPrefixType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Subscriber's internal prefix type."
        ::= { natSubscribersEntry 3 }

    natSubscriberIntPrefix OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Prefix assigned to a subscriber's CPE."
        ::= { natSubscribersEntry 4 }

    natSubscriberIntPrefixLength OBJECT-TYPE
        SYNTAX InetAddressPrefixLength
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Length of the prefix assigned to a subscriber's CPE, in
             bits.  In case a single address is assigned, this will be 32
             for IPv4 and 128 for IPv6."
        ::= { natSubscribersEntry 5 }
```

```
    natSubscriberRealm OBJECT-TYPE
        SYNTAX SnmpAdminString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The realm to which this subscriber belongs."
        ::= { natSubscribersEntry 6 }

    natSubscriberTranslations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of translated packets received from or sent to
             this subscriber."
        ::= { natSubscribersEntry 7 }

    natSubscriberOutOfPortErrors OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets received from this subscriber not
             translated because no external port was available, excluding
             quota limitations."
        ::= { natSubscribersEntry 8 }

    natSubscriberResourceErrors OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of packets received from this subscriber not
             translated because of resource constraints (excluding
             out-of-port errors and quota drops)."
        ::= { natSubscribersEntry 9 }

    natSubscriberQuotaDrops OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of incoming packets received from or destined to
             this subscriber not translated because of quota limitations.
             Quotas include absolute limits as well as limits on the rate
             of allocation."
        ::= { natSubscribersEntry 10 }
```

```
    natSubscriberMappingCreations OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of mappings created by or for this subscriber."
        ::= { natSubscribersEntry 11 }

    natSubscriberMappingRemovals OBJECT-TYPE
        SYNTAX Counter64
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of mappings removed by or for this subscriber."
        ::= { natSubscribersEntry 12 }

    natSubscriberLimitMappings OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Limit on the number of active mappings created by or for
             this subscriber. Zero means unlimited."
        ::= { natSubscribersEntry 13 }

    natSubscriberMapNotifyThresh OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "See natNotifSubscriberMappings."
        ::= { natSubscribersEntry 14 }

    natSubscriberVlanIdentifier OBJECT-TYPE
        SYNTAX VlanIndexOrZero
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "When non-zero, VLAN index used to identify subscriber in
             combination with packet source address."
        ::= { natSubscribersEntry 15 }

    natSubscriberVpnIdentifier OBJECT-TYPE
        SYNTAX VPNIdOrZero
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "When non-zero, VPN identifier used to identify subscriber
```

```
          in combination with packet source address."
      ::= { natSubscribersEntry 16 }

  natSubscriberIPEncapsIdType OBJECT-TYPE
      SYNTAX InetAddressType
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "When not unknown(0), type of address of encapsulating IP
           ingress tunnel."
      ::= { natSubscribersEntry 17 }

  natSubscriberIPEncapsIdAddr OBJECT-TYPE
      SYNTAX InetAddress
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Source address in outer header of packets incoming via IP
           tunnel, used to identify subscriber in combination with
           inner packet source address."
      ::= { natSubscribersEntry 18 }

  natSubsInterfaceIdentifierTable OBJECT-TYPE
      SYNTAX SEQUENCE OF NatSubsInterfaceIdentifierEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of interface indexes. If non-empty, used along with
           packet source address to identify the subscriber sending
           the packet. 'OR' semantics if multiple interface indexes
           are present."
      ::= { natSubscribers 2 }

  natSubsInterfaceIdentifierEntry OBJECT-TYPE
      SYNTAX NatSubsInterfaceIdentifierEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Each entry provides a single interface index."
      INDEX { natInstanceIndex,
              natSubsInterfaceIdSubsIndex,
              natSubsInterfaceIdRowIndex }
      ::= { natSubsInterfaceIdentifierTable 1 }

  NatSubsInterfaceIdentifierEntry ::=
      SEQUENCE {
          natSubsInterfaceIdSubsIndex      SubscriberIndex,
          natSubsInterfaceIdRowIndex       SubsInterfaceIdRowIndex,
```

```
        natSubsInterfaceIndex              InterfaceIndex
    }

natSubsInterfaceIdSubsIndex OBJECT-TYPE
    SYNTAX SubscriberIndex
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Index of the subscriber to which this conceptual table is
         related."
    ::= { natSubsInterfaceIdentifierEntry 1 }

natSubsInterfaceIdRowIndex OBJECT-TYPE
    SYNTAX SubsInterfaceIdRowIndex
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Row index."
    ::= { natSubsInterfaceIdentifierEntry 2 }

natSubsInterfaceIndex OBJECT-TYPE
    SYNTAX InterfaceIndex
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Interface index of an ingress interface through which
         packets from this subscriber may flow."
    ::= { natSubsInterfaceIdentifierEntry 3 }


-- object groups

natGroupStatelessObjects OBJECT-GROUP
    OBJECTS { natInstanceAlias,
              natTranslations,
              natResourceErrors,
              natQuotaDrops,
              natMappingCreations,
              natMappingRemovals,
              natL4ProtocolTranslations ,
              natL4ProtocolResourceErrors,
              natL4ProtocolQuotaDrops,
              natL4ProtocolMappingCreations,
              natL4ProtocolMappingRemovals,
              natMappingIntRealm,
              natMappingIntAddressType,
              natMappingIntAddress,
              natMappingIntPort,
```

```
                natMappingPool,
                natMappingMapBehavior,
                natMappingFilterBehavior }
        STATUS current
        DESCRIPTION
            "Basic counters, limits, and thresholds that do not require
             stateful NAT. That is, they apply to both stateless and
             stateful NATs.

             For this MIB's purposes, stateless NATs are defined as NATs
             that do not create mappings dynamically (either implicitly
             or explicitly using, for instance, the Port Control
             Protocol).  Their mappings are created statically by the NAT
             administrator."
        ::= { natMIBGroups 7 }

    natGroupStatefulObjects OBJECT-GROUP
        OBJECTS { natOutOfPortErrors,
                natL4ProtocolOutOfPortErrors,
                natLimitMappings,
                natMappingsNotifyThreshold,
                natPoolRealm,
                natPoolWatermarkLow,
                natPoolWatermarkHigh,
                natPoolPortMin,
                natPoolPortMax,
                natPoolRangeType,
                natPoolRangeBegin,
                natPoolRangeEnd,
                natPoolRangeAllocations,
                natPoolRangeDeallocations,
                natMappingAddressPooling }
        STATUS current
        DESCRIPTION
            "Basic counters, limits, and thresholds that require stateful
             NAT."
        ::= { natMIBGroups 8 }

    natGroupAddrMapObjects OBJECT-GROUP
        OBJECTS { natAddressMappingCreations,
                natAddressMappingRemovals,
                natLimitAddressMappings,
                natAddrMapNotifyThreshold,
                natMapIntAddrExtRealm,
                natMapIntAddrExtType,
                natMapIntAddrExt }
        STATUS current
        DESCRIPTION
```

```
        "Objects that require 'Paired IP address pooling' behavior
         [RFC4787]."
    ::= { natMIBGroups 9 }

natGroupFragmentObjects OBJECT-GROUP
    OBJECTS { natLimitFragments }
    STATUS current
    DESCRIPTION
        "Objects that require 'Receive Fragments Out of Order'
         behavior [RFC4787]."
    ::= { natMIBGroups 10 }

natGroupBasicNotifications NOTIFICATION-GROUP
    NOTIFICATIONS { natNotifPoolWatermarkLow,
                    natNotifPoolWatermarkHigh,
                    natNotifMappings }
    STATUS current
    DESCRIPTION
        "Basic notifications."
    ::= { natMIBGroups 11 }

natGroupAddrMapNotifications NOTIFICATION-GROUP
    NOTIFICATIONS { natNotifAddrMappings }
    STATUS current
    DESCRIPTION
        "Notifications about address mappings."
    ::= { natMIBGroups 12 }

natGroupSubscriberObjects OBJECT-GROUP
    OBJECTS { natMapIntAddrSubsIndex,
              natMappingSubsIndex,
              natSubscriberIdentifierType,
              natSubscriberIntPrefixType,
              natSubscriberIntPrefix,
              natSubscriberIntPrefixLength,
              natSubscriberRealm,
              natSubscriberTranslations,
              natSubscriberOutOfPortErrors,
              natSubscriberResourceErrors,
              natSubscriberQuotaDrops,
              natSubscriberMappingCreations,
              natSubscriberMappingRemovals,
              natSubscriberLimitMappings,
              natSubscriberVlanIdentifier,
              natSubscriberVpnIdentifier,
              natSubscriberIPEncapsIdType,
              natSubscriberIPEncapsIdAddr,
              natSubsInterfaceIndex,
```

```
                natLimitSubscribers,
                natSubscriberMapNotifyThresh }
      STATUS current
      DESCRIPTION
          "Per-subscriber counters, limits, and thresholds."
      ::= { natMIBGroups 13 }

  natGroupSubscriberNotifications NOTIFICATION-GROUP
      NOTIFICATIONS { natNotifSubscriberMappings }
      STATUS current
      DESCRIPTION
          "Subscriber notifications."
      ::= { natMIBGroups 14 }


  -- compliance statements

  natBasicStatelessCompliance MODULE-COMPLIANCE
      STATUS current
      DESCRIPTION
          "Basic stateless compliance with this MIB is attained when
           the objects contained in the mandatory groups are
           implemented."
      MODULE  -- this module
          MANDATORY-GROUPS { natGroupStatelessObjects }

          OBJECT      natInstanceAlias
          MIN-ACCESS  read-only
          DESCRIPTION
              "Write access is not required."

      ::= { natMIBCompliances 3 }

  natBasicStatefulCompliance MODULE-COMPLIANCE
      STATUS current
      DESCRIPTION
          "Basic stateful compliance with this MIB is attained when the
           objects contained in the mandatory groups are implemented."
      MODULE  -- this module
          MANDATORY-GROUPS { natGroupStatelessObjects,
                             natGroupStatefulObjects,
                             natGroupBasicNotifications }
      ::= { natMIBCompliances 4 }

  natAddrMapCompliance MODULE-COMPLIANCE
      STATUS current
      DESCRIPTION
          "NATs that have 'Paired IP address pooling' behavior
```

```
        [RFC4787] and implement the objects in this group can claim
        this level of compliance."
     MODULE  -- this module
        MANDATORY-GROUPS { natGroupStatelessObjects,
                           natGroupStatefulObjects,
                           natGroupBasicNotifications,
                           natGroupAddrMapObjects,
                           natGroupAddrMapNotifications }
     ::= { natMIBCompliances 5 }

 natFragmentsCompliance MODULE-COMPLIANCE
     STATUS current
     DESCRIPTION
        "NATs that have 'Receive Fragments Out of Order' behavior
        [RFC4787] and implement the objects in this group can claim
        this level of compliance."
     MODULE  -- this module
        MANDATORY-GROUPS { natGroupStatelessObjects,
                           natGroupStatefulObjects,
                           natGroupBasicNotifications,
                           natGroupFragmentObjects }
     ::= { natMIBCompliances 6 }

 natCGNCompliance MODULE-COMPLIANCE
     STATUS current
     DESCRIPTION
        "NATs that have 'Paired IP address pooling' and 'Receive
        Fragments Out of Order' behavior [RFC4787] and implement the
        objects in this group can claim this level of compliance.

        This level of compliance is to be expected of a CGN
        compliant with [RFC6888]."
     MODULE  -- this module
        MANDATORY-GROUPS { natGroupStatelessObjects,
                           natGroupStatefulObjects,
                           natGroupBasicNotifications,
                           natGroupAddrMapObjects,
                           natGroupAddrMapNotifications,
                           natGroupFragmentObjects,
                           natGroupSubscriberObjects,
                           natGroupSubscriberNotifications }
     ::= { natMIBCompliances 7 }


 END
```

5. Security Considerations

   There are a number of management objects defined in this MIB module
   with a MAX-ACCESS clause of read-write and/or read-create. Such
   objects may be considered sensitive or vulnerable in some network
   environments. The support for SET operations in a non-secure
   environment without proper protection can have a negative effect on
   network operations. These are the tables and objects and their
   sensitivity/vulnerability:

   Limits: An attacker setting a very low or very high limit can easily
      cause a denial-of-service situation.

      * natLimitMappings

      * natLimitAddressMappings

      * natLimitFragments

      * natLimitSubscribers

      * natSubscriberLimitMappings

   Notification thresholds: An attacker setting an arbitrarily low
      treshold can cause many useless notifications to be generated.
      Setting an arbitrarily high threshold can effectively disable
      notifications, which could be used to hide another attack.

      * natMappingsNotifyThreshold

      * natAddrMapNotifyThreshold

      * natSubscriberMapNotifyThresh

   Some of the readable objects in this MIB module (i.e., objects with a
   MAX-ACCESS other than not-accessible) may be considered sensitive or
   vulnerable in some network environments. It is thus important to
   control even GET and/or NOTIFY access to these objects and possibly
   to even encrypt the values of these objects when sending them over
   the network via SNMP. These are the tables and objects and their
   sensitivity/vulnerability:

   Objects that reveal host identities: Various objects can reveal the
      identity of private hosts that are engaged in a session with
      external end nodes. A curious outsider could monitor these to
      assess the number of private hosts being supported by the NAT
      device. Further, a disgruntled former employee of an enterprise
      could use the information to break into specific private hosts by

intercepting the existing sessions or originating new sessions
into the host.

   * natMapIntAddrType

   * natMapIntAddrInt

   * natMapIntAddrExt

   * natMappingIntRealm

   * natMappingIntAddressType

   * natMappingIntAddress

   * natMappingIntPort

   * natMappingMapBehavior

   * natMappingFilterBehavior

   * natMappingAddressPooling

   * natSubscriberIntPrefixType

   * natSubscriberIntPrefix

   * natSubscriberIntPrefixLength

Other objects that reveal NAT state: Other managed objects in this
   MIB may contain information that may be sensitive from a business
   perspective, in that they may represent NAT state information.

   * natCntAddressMappings

   * natCntProtocolMappings

   * natPoolUsage

   * natPoolRangeAllocatedPorts

   * natSubscriberCntMappings

There are no objects that are sensitive in their own right, such as
passwords or monetary amounts.

SNMP versions prior to SNMPv3 did not include adequate security.
Even if the network itself is secure (for example by using IPsec),

there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

Implementations SHOULD provide the security features described by the SNMPv3 framework (see [RFC3410]), and implementations claiming compliance to the SNMPv3 standard MUST include full support for authentication and privacy via the User-based Security Model (USM) [RFC3414] with the AES cipher algorithm [RFC3826]. Implementations MAY also provide support for the Transport Security Model (TSM) [RFC5591] in combination with a secure transport such as SSH [RFC5592] or TLS/DTLS [RFC6353].

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

6. IANA Considerations

   IANA has assigned object identifier 123 to the natMIB module, with prefix iso.org.dod.internet.mgmt.mib-2 in the Network Management Parameters registry [SMI-NUMBERS].

   No IANA actions are required by this document.

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7.2. Informative References

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