

Network Working Group
Internet-Draft
Obsoletes: 4008 (if approved)
Intended status: Standards Track
Expires: March 8, 2012

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September 5, 2011

Definitions of Managed Objects for Network Address Translators (NAT)
draft-perreault-opsawg-natmib-bis-00

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 configuration as well as monitoring of a device capable of NAT function. This memo is a revision of the previous NAT-MIB [RFC4008] to take into account new types of NAT.

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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 configuration and monitoring of a device capable of NAT function. 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 3 provides references to the SNMP management framework, which was used as the basis for the MIB module definition. Section 4 describes the terms used throughout the document. Section 5 provides an overview of the key objects, their inter-relationship, and how the MIB module may be used to configure and monitor a NAT device. Lastly, Section 6 has the complete NAT MIB definition.

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

2. Changes from RFC4008

TODO: Move this section to an appendix after initial reviews.

- o Address pools can now be shared between multiple interfaces. This change makes this MIB applicable to DS-Lite's AFTR [RFC6333]. See [draft-schoenw-behave-nat-mib-bis-00] for rationale.
- o TODO: Merge CGN stuff from draft-jpdionne-behave-cgn-mib.
- o TODO: Merge NAT64 stuff from draft-jpdionne-behave-nat64-mib.
- o TODO: Update to RFC 4787 terminology for describing NAT behavior.
- o TODO: Support protocols other than UDP and TCP.
- o TODO: Add support to limit and/or throttle binding allocations.
- o TODO: Clarify existing notifications (e.g., natPacketDiscard) and add any additional notifications that may be needed for binding limits / binding throttling.
- o TODO: Are we missing anything for PCP support? (time-limited static entries)
- o TODO: Include (for example in an appendix) a description plus examples how the revised NAT-MIB can be used by NAT64 implementations, CGNs, and DS- Lite implementations.

3. 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 [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].

4. Terminology

[To be Reviewed]

Definitions for a majority of the terms used throughout the document may be found in [RFC2663]. Additional terms that further classify NAPT implementations are defined in [RFC3489]. Listed below are terms used in this document.

Address realm - An address realm is a realm of unique network addresses that are routable within the realm. For example, an enterprise address realm could be constituted of private IP addresses in the ranges specified in [RFC1918], which are routable within the enterprise, but not across the Internet. A public realm is constituted of globally unique network addresses.

Symmetric NAT - Symmetric NAT, as defined in [RFC3489], is a variation of Network Address Port Translator (NAPT). Symmetric NAT does not use port bind for translation across all sessions originating from the same private host. Instead, it assigns a new public port to each new session, irrespective of whether the new session used the same private end-point as before.

Bind or Binding - Several variations of the term 'Bind' (or 'Binding') are used throughout the document. Address Bind (or Address Binding) is a tuple of (Private IP address, Public IP Address) used for translating an IP address end-point in IP packets. Port Bind (or, Port Binding, or Address Port Bind, or Address Port Binding) is a tuple of (transport protocol, Private IP address, Private port, Public IP Address, Public port) used for translating a port end-point tuple of (transport protocol, IP address, port). Bind is used to refer to either Address Bind or Port Bind. Bind Mode identifies whether a bind is Address Bind or Port Bind.

NAT Session - A NAT session is an association between a session as seen in the private realm and a session as seen in the public realm, by virtue of NAT translation. If a session in the private realm were to be represented as (PrivateSrcAddr, PrivateDstAddr, TransportProtocol, PrivateSrcPort, PrivateDstPort) and the same session in the public realm were to be represented as (PublicSrcAddr, PublicDstAddr, TransportProtocol, PublicSrcPort, PublicDstPort), the NAT session will provide the translation glue between the two session representations. NAT sessions in the document are restricted to sessions based on TCP and UDP only. In the future, NAT sessions may be extended to be based on other transport protocols such as SCTP, UDP-lite and DCCP.

The terms 'local' and 'private' are used interchangeably throughout the document when referring to private networks, IP addresses, and ports. Likewise, the terms 'global' and 'public' are used interchangeably when referring to public networks, IP addresses, and ports.

5. Overview

NAT MIB is configurable on a per-interface basis and depends in several parts on the IF-MIB [RFC2863].

NAT MIB requires that an interface for which NAT is configured be connected to either a private or a public realm. The realm association of the interface plays an important role in the definition of address maps for the interface. An address map entry identifies the orientation of the session (inbound or outbound to the interface) for which the entry may be used for NAT translation. The address map entry also identifies the end-point of the session that must be subject to translation. An SNMP Textual-Convention 'NatTranslationEntity' is defined to capture this important characteristic that combines session orientation and applicable session endpoint for translation.

An address map may consist of static or dynamic entries. NAT creates static binds from a static address map entry. Each static bind has a direct one-to-one relationship with a static address map entry. NAT creates dynamic binds from a dynamic address map entry upon seeing the first packet of a new session.

The following subsections define the key objects used in NAT MIB, their inter-relationship, and how to configure a NAT device using the MIB module.

5.1. natInterfaceTable

[To be reviewed]

natInterfaceTable is defined in the MIB module to configure interface specific realm type and the NAT services enabled for the interface. natInterfaceTable is indexed by ifIndex and also includes interface specific NAT statistics.

The first step for an operator in configuring a NAT device is determining the interface over which NAT service is to be configured. When NAT service is operational, translated packets traverse the NAT device by ingressing on a private interface and egressing on a public interface or vice versa. An operator may configure the NAT service on either the public interface or the private interface in the traversal path.

As the next step, the operator must identify the NAT service(s) desired for the interface. The operator may configure one or more NAT services on the same interface. The MIB module identifies four types of NAT services: Basic NAT, NAT, twice NAT and bidirectional NAT. These are NAT varieties as defined in [RFC2663]. Note that [RFC3489] further classifies NAT implementations based on the behavior exhibited by the NAT devices from different vendors. However, the MIB module does not explicitly distinguish between the NAT implementations. NAT implementations may be distinguished between one another by monitoring the BIND and NAT Session objects generated by the NAT device as described in section Section 5.6.

5.2. natAddrMapTable

[To be reviewed]

natAddrMapTable is defined in the MIB module to configure address maps on a per-interface basis. natAddrMapTable is indexed by the tuple of (ifIndex, natAddrMapIndex). The same table is also used to collect Statistics for the address map entries. Address maps are key to NAT configuration. An operator may configure one or more address map entries per interface. NAT looks up address map entries in the order in which they are defined to determine the translation function at the start of each new session traversing the interface. An address map may consist of static or dynamic entries. A static address map entry has a direct one-to-one relationship with binds. NAT will dynamically create binds from a dynamic address map entry.

The operator must be careful in selecting address map entries for an interface based on the interface realm-type and the type of NAT service desired. The operator can be amiss in the selection of

address map entries when not paying attention to the associated interface characteristics defined in `natInterfaceTable` (described in section 4.1). For example, say the operator wishes to configure a NAPT map entry on an interface of a NAT device. If the operator chooses to configure the NAPT map entry on a public interface (i.e., interface `realm-type` is `public`), the operator should set the `TranslationEntity` of the NAPT address map entry to be `outboundSrcEndPoint`. On the other hand, if the operator chooses to configure the NAPT map entry on a private interface (i.e., interface `realm-type` is `private`), the operator should set the `TranslationEntity` of the NAPT address map entry to be `InboundSrcEndPoint`.

5.3. Default Timeouts, Protocol Table, and Other Scalars

[To be reviewed]

`DefTimeouts` is defined in the MIB module to configure idle Bind timeout and IP protocol specific idle NAT session timeouts. The timeouts defined are global to the system and are not interface specific.

Protocol specific statistics are maintained in `natProtocolTable`, which is indexed by the protocol type.

The scalars `natAddrBindNumberOfEntries` and `natAddrPortBindNumberOfEntries` hold the number of entries that currently exist in the Address Bind and the Address Port Bind tables, respectively.

The generation of `natPacketDiscard` notifications can be configured by using the `natNotifThrottlingInterval` scalar MIB object.

5.4. `natAddrBindTable` and `natAddrPortBindTable`

[To be reviewed]

Two Bind tables, `natAddrBindTable` and `natAddrPortBindTable`, are defined to hold the bind entries. Entries are derived from the address map table and are not configurable. `natAddrBindTable` contains Address Binds, and `natAddrPortBindTable` contains Address Port Binds. `natAddrBindTable` is indexed by the tuple of (`ifIndex`, `LocalAddrType`, `LocalAddr`). `natAddrPortBindTable` is indexed by the tuple of (`ifIndex`, `LocalAddrType`, `LocalAddr`, `LocalPort`, `Protocol`). These tables also maintain bind specific statistics. A Symmetric NAT will have no entries in the Bind tables.

5.5. natSessionTable

[To be reviewed]

natSessionTable is defined to hold NAT session entries. NAT session entries are derived from NAT Binds (except in the case of Symmetric NAT) and are not configurable.

The NAT session provides the necessary translation glue between two session representations of the same end-to-end session; that is, a session as seen in the private realm and in the public realm. Session orientation (inbound or outbound) is determined from the orientation of the first packet traversing the NAT interface. Address map entries and bind entries on the interface determine whether a session is subject to NAT translation. One or both endpoints of a session may be subject to translation.

With the exception of symmetric NAT, all other NAT functions use end-point specific bind to perform individual end-point translations. Multiple NAT sessions would use the same bind as long as they share the same endpoint. Symmetric NAT does not retain a consistent port bind across multiple sessions using the same endpoint. For this reason, the bind identifier for a NAT session in symmetric NAT is set to zero. natSessionTable is indexed by the tuple of (ifIndex, natSessionIndex). Statistics for NAT sessions are also maintained in the same table.

5.6. RFC 3489 NAPT Variations, NAT Session and Bind Tables

[To be reviewed, translate to new terminology]

[RFC3489] defines four variations of NAPT - Full Cone, Restricted Cone, Port Restricted Cone, and Symmetric NAT. These can be differentiated in the NAT MIB based on different values for the objects in the session and the bind tables, as indicated below.

In a Port Restricted Cone NAT, NAT Session objects will contain a non-zero PrivateSrcEPBindId object. Further, all address and port objects within a NAT session will have non-zero values (i.e., no wildcard matches).

An Address Restricted Cone NAT may have been implemented in the same way as a Port Restricted Cone NAT, except that the UDP NAT Sessions may use ANY match on PrivateDstPort and PublicDstPort objects; i.e., PrivateDstPort and PublicDstPort objects within a NAT session may be set to zero.

A Full Cone NAT may have also been implemented in the same way as a

Port Restricted Cone NAT, except that the UDP NAT Sessions may use ANY match on PrivateDstAddr, PrivateDstPort, PublicDstAddr, and PublicDstPort objects. Within a NAT Session, all four of these objects may be set to zero. Alternately, all address and port objects within a NAT Session may have non-zero values, yet the TranslationEntity of the PrivateSrcEPBindId for the NAT Sessions may be set bi-directionally, i.e., as a bit mask of (outboundSrcEndPoint and inboundDstEndPoint) or (inboundSrcEndPoint and outboundDstEndPoint), depending on the interface realm type. Lastly, a Symmetric NAT does not maintain Port Bindings. As such, the NAT Session objects will have the PrivateSrcEPBindId set to zero.

5.7. Notifications

[To be reviewed]

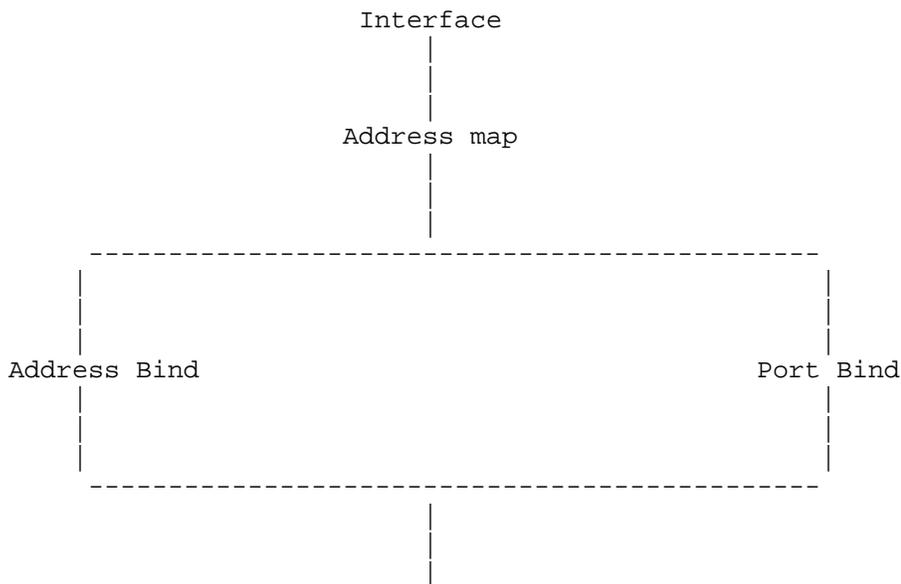
natPacketDiscard notifies the end user/manager of packets being discarded due to lack of address mappings.

[Port exhaustion, CGN-MIB?]

5.8. Notifications

[To be reviewed]

The association between the various NAT tables can be represented as follows:



NAT Session

All NAT functions, with the exception of Symmetric NAT, use Bind(s) to provide the glue necessary for a NAT Session. natSessionPrivateSrcEPBindId and natSessionPrivateDstEPBindId objects represent the endpoint Binds used by NAT Sessions.

5.9. Configuration via the MIB

[To be reviewed]

Section 5.1, and Section 5.2 and part of Section 5.3 refer to objects that are configurable on a NAT device. NAT derives Address Bind and Address Port Bind entries from the Address Map table. Hence, an Address Bind or an Address Port Bind entry must not exist without an associated entry in the Address Map table.

Further, NAT derives NAT session entries from NAT Binds, except in the case of symmetric NAT, which derives translation parameters for a NAT session directly from an address map entry. Hence, with the exception of Symmetric NAT, a NAT session entry must not exist in the NAT Session table without a corresponding bind.

A Management station may use the following steps to configure entries in the NAT-MIB:

- o Create an entry in the natInterfaceTable specifying the value of ifIndex as the interface index of the interface on which NAT is being configured. Specify appropriate values, as applicable, for the other objects (e.g., natInterfaceRealm, natInterfaceServiceType) in the table (refer to Section 5.1).
- o Create one or more address map entries sequentially in reduced order of priority in the natAddrMapTable, specifying the value of ifIndex to be the same for all entries. The ifIndex specified would be the same as that specified for natInterfaceTable (refer to Section 5.2).
- o Configure the maximum permitted idle time duration for BINDs and TCP, UDP, and ICMP protocol sessions by setting the relevant scalars in natDefTimeouts object (refer to Section 5.3).

5.10. Relationship to Interface MIB

[To be reviewed, relationship to other MIB?]

The natInterfaceTable specifies the NAT configuration attributes on each interface. The concept of "interface" is as defined by

InterfaceIndex/ifIndex of the IETF Interfaces MIB [RFC2863].

6. Definitions

This MIB module IMPORTs objects from [RFC2578], [RFC2579], [RFC2580], [RFC2863], [RFC3411], and [RFC4001]. It also refers to information in [RFC0792], [RFC2463], and [RFC3413].

```
NAT-MIB DEFINITIONS ::= BEGIN
```

IMPORTS

```
MODULE-IDENTITY,
OBJECT-TYPE,
Integer32,
Unsigned32,
Gauge32,
Counter64,
TimeTicks,
mib-2,
NOTIFICATION-TYPE
    FROM SNMPv2-SMI
TEXTUAL-CONVENTION,
StorageType,
RowStatus
    FROM SNMPv2-TC
MODULE-COMPLIANCE,
NOTIFICATION-GROUP,
OBJECT-GROUP
    FROM SNMPv2-CONF
ifIndex,
ifCounterDiscontinuityGroup
    FROM IF-MIB
SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB
InetAddressType,
InetAddress,
InetPortNumber
    FROM INET-ADDRESS-MIB;
```

natMIB MODULE-IDENTITY

```
LAST-UPDATED "YYYYMMDDhhmmZ"
ORGANIZATION "IETF Transport Area"
CONTACT-INFO
    "
        Simon Perreault
        Viagenie
        2875 boul. Laurier, suite D2-630
        Quebec
        Canada
```

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"

DESCRIPTION

"This MIB module defines the generic managed objects for NAT.

Copyright (C) The Internet Society (YYYY). This version of this MIB module is part of RFC XXXX; see the RFC itself for full legal notices."

REVISION "200503210000Z" -- 21th March 2005

DESCRIPTION

"Initial version, published as RFC 4008."

REVISION "YYYYMMDDhhmmZ"

DESCRIPTION

"Second version, published as RFC XXXX."

::= { mib-2 123 }

natMIBObjects OBJECT IDENTIFIER ::= { natMIB 1 }

NatProtocolType ::= TEXTUAL-CONVENTION

STATUS current

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      current
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 current
    DESCRIPTION
        "A unique id that is assigned to each address map
        by a NAT enabled device."
    SYNTAX      Unsigned32 (1..4294967295)

```

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

```

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

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

NatTranslationEntity ::= TEXTUAL-CONVENTION
STATUS      current
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      current
    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      current
    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      current
```

```
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      current
    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      current
    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 current
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 current
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      current  
    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      current  
    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,
    natInterfaceSharedAddrMapIndex NatSharedAddrMapId
}
```

natInterfaceRealm OBJECT-TYPE

```
SYNTAX      INTEGER {
                private (1),
                public (2)
            }
```

MAX-ACCESS read-create

STATUS current

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 current

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 current

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      current
    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      current
    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      current
    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      current
    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 }

natInterfaceSharedAddrMapIndex OBJECT-TYPE

SYNTAX NatSharedAddrMapId

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Link to a NatSharedAddrMapEntry. If NULL, it is expected that there exist at least one NatAddrMapEntry pointing to this interface entry."

::= { natInterfaceEntry 8 }

--

-- The Address Map Table

--

natAddrMapTable OBJECT-TYPE

SYNTAX SEQUENCE OF NatAddrMapEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table lists address map parameters for NAT."

::= { natMIBObjects 4 }

natAddrMapEntry OBJECT-TYPE

SYNTAX NatAddrMapEntry

MAX-ACCESS not-accessible

STATUS current

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      current
    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      current
    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      current
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      current
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      current
DESCRIPTION
    "This object specifies the address type used for
    natAddrMapLocalAddrFrom and natAddrMapLocalAddrTo."
```

```
::= { natAddrMapEntry 5 }
```

natAddrMapLocalAddrFrom OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

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 current

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 current

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 NAT, 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 current
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 NATP, 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 current
DESCRIPTION
"This object specifies the address type used for natAddrMapGlobalAddrFrom and natAddrMapGlobalAddrTo."
 ::= { natAddrMapEntry 10 }

natAddrMapGlobalAddrFrom OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-create
STATUS current
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 current
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 current
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 NATPT, 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 current
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 NATPT, 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 current
DESCRIPTION
"This object specifies a bitmap of protocol identifiers."
 ::= { natAddrMapEntry 15 }

natAddrMapInTranslates OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
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 current
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 current
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 current

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 current

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 current

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      current
    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      current
    DESCRIPTION
        "This table holds information about the currently
         active NAT BINDS."
 ::= { natMIBObjects 6 }
```

natAddrBindEntry OBJECT-TYPE

```

    SYNTAX      NatAddrBindEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    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      current
    DESCRIPTION
        "This object specifies the address type used for
         natAddrBindLocalAddr."
    ::= { natAddrBindEntry 1 }
```

```
natAddrBindLocalAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    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      current
    DESCRIPTION
        "This object specifies the address type used for
         natAddrBindGlobalAddr."
```

```
 ::= { natAddrBindEntry 3 }

natAddrBindGlobalAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    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      current
    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      current
    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      current
    DESCRIPTION
        "This object indicates whether the bind is static or
        dynamic."
    ::= { natAddrBindEntry 7 }

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

natAddrBindMaxIdleTime OBJECT-TYPE
    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      current
    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      current
    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 current

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 current

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 current

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      current
    DESCRIPTION
        "This table holds information about the currently
        active NAPT BINDs."
    ::= { natMIBObjects 8 }

natAddrPortBindEntry OBJECT-TYPE
    SYNTAX      NatAddrPortBindEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    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 current

DESCRIPTION

"This object specifies the address type used for
natAddrPortBindLocalAddr."

::= { natAddrPortBindEntry 1 }

natAddrPortBindLocalAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

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 current

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      current
    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      current
    DESCRIPTION
        "This object specifies the address type used for
        natAddrPortBindGlobalAddr."
    ::= { natAddrPortBindEntry 5 }
```

```
natAddrPortBindGlobalAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    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      current
```

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 current

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 current

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      current
    DESCRIPTION
        "This object indicates whether the bind is static or
        dynamic."
 ::= { natAddrPortBindEntry 10 }
```

```
natAddrPortBindMapIndex OBJECT-TYPE
    SYNTAX      NatAddrMapId
    MAX-ACCESS  read-only
    STATUS      current
    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      current
    DESCRIPTION
        "Number of sessions currently using this BIND."
 ::= { natAddrPortBindEntry 12 }
```

```
natAddrPortBindMaxIdleTime OBJECT-TYPE
    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      current

    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      current
    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      current
    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      current
    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      current
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      current
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      current
DESCRIPTION

```

```
        "The session ID for this NAT session."
 ::= { natSessionEntry 1 }

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

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

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

natSessionPrivateSrcAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

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 current

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 current

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 current

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 current

DESCRIPTION

"This object specifies the address type used for natSessionPublicSrcAddr and natSessionPublicDstAddr."

::= { natSessionEntry 15 }

natSessionPublicSrcAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

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 current

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 current

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 current

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 current

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      current
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      current
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      current
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      current
DESCRIPTION
    "The (conceptual) table containing per protocol NAT
    statistics."
 ::= { natMIBObjects 10 }
```

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

natProtocolInTranslates OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    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      current
    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      current
    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 }

--
-- The Shared Address Map Table
--

natSharedAddrMapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF NatSharedAddrMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table lists address map parameters for NAT."
 ::= { natMIBObjects 11 }

natSharedAddrMapEntry OBJECT-TYPE
    SYNTAX      NatSharedAddrMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    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      { natSharedAddrMapIndex }
 ::= { natSharedAddrMapTable 1 }

NatSharedAddrMapEntry ::= SEQUENCE {
```

```

    natSharedAddrMapIndex          NatSharedAddrMapId,
    natSharedAddrMapName          SnmpAdminString,
    natSharedAddrMapEntryType     NatAssociationType,
    natSharedAddrMapTranslatEntity NatTranslationEntity,
    natSharedAddrMapLocalAddrType InetAddressType,
    natSharedAddrMapLocalAddrFrom InetAddress,
    natSharedAddrMapLocalAddrTo   InetAddress,
    natSharedAddrMapLocalPortFrom InetPortNumber,
    natSharedAddrMapLocalPortTo   InetPortNumber,
    natSharedAddrMapGlobalAddrType InetAddressType,
    natSharedAddrMapGlobalAddrFrom InetAddress,
    natSharedAddrMapGlobalAddrTo   InetAddress,
    natSharedAddrMapGlobalPortFrom InetPortNumber,
    natSharedAddrMapGlobalPortTo   InetPortNumber,
    natSharedAddrMapProtocol       NatProtocolMap,
    natSharedAddrMapInTranslates   Counter64,
    natSharedAddrMapOutTranslates  Counter64,
    natSharedAddrMapDiscards       Counter64,
    natSharedAddrMapAddrUsed       Gauge32,
    natSharedAddrMapStorageType    StorageType,
    natSharedAddrMapRowStatus      RowStatus
}

```

natSharedAddrMapIndex OBJECT-TYPE

SYNTAX NatSharedAddrMapId

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Along with ifIndex, this object uniquely identifies an entry in the natAddrMapTable. Address map entries are applied in the order specified by natAddrMapIndex."

::= { natSharedAddrMapEntry 1 }

natSharedAddrMapName OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE(1..32))

MAX-ACCESS read-create

STATUS current

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."

::= { natSharedAddrMapEntry 2 }

natSharedAddrMapEntryType OBJECT-TYPE

SYNTAX NatAssociationType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This parameter can be used to set up static or dynamic address maps."

::= { natSharedAddrMapEntry 3 }

natSharedAddrMapTranslatEntity OBJECT-TYPE

SYNTAX NatTranslationEntity

MAX-ACCESS read-create

STATUS current

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 NAT 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 NAT 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."

::= { natSharedAddrMapEntry 4 }

natSharedAddrMapLocalAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object specifies the address type used for natAddrMapLocalAddrFrom and natAddrMapLocalAddrTo."

::= { natSharedAddrMapEntry 5 }

natSharedAddrMapLocalAddrFrom OBJECT-TYPE

SYNTAX InetAddress
MAX-ACCESS read-create
STATUS current
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."

::= { natSharedAddrMapEntry 6 }

natSharedAddrMapLocalAddrTo OBJECT-TYPE

SYNTAX InetAddress
MAX-ACCESS read-create
STATUS current
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."

::= { natSharedAddrMapEntry 7 }

natSharedAddrMapLocalPortFrom OBJECT-TYPE

SYNTAX InetPortNumber
MAX-ACCESS read-create
STATUS current
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 NAT, 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 }
 ::= { natSharedAddrMapEntry 8 }

natSharedAddrMapLocalPortTo OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    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 NATP, 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 }
    ::= { natSharedAddrMapEntry 9 }

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

natSharedAddrMapGlobalAddrFrom OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    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."
    ::= { natSharedAddrMapEntry 11 }

natSharedAddrMapGlobalAddrTo OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
```

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."

::= { natSharedAddrMapEntry 12 }

natSharedAddrMapGlobalPortFrom OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

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 }

::= { natSharedAddrMapEntry 13 }

natSharedAddrMapGlobalPortTo OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

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 }
 ::= { natSharedAddrMapEntry 14 }

natSharedAddrMapProtocol OBJECT-TYPE
    SYNTAX      NatProtocolMap
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object specifies a bitmap of protocol identifiers."
    ::= { natSharedAddrMapEntry 15 }

natSharedAddrMapInTranslates OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    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."
    ::= { natSharedAddrMapEntry 16 }

natSharedAddrMapOutTranslates OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    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."
    ::= { natSharedAddrMapEntry 17 }

natSharedAddrMapDiscards OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    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."

::= { natSharedAddrMapEntry 18 }

natSharedAddrMapAddrUsed OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

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."

::= { natSharedAddrMapEntry 19 }

natSharedAddrMapStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

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 }

::= { natSharedAddrMapEntry 20 }

natSharedAddrMapRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

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."
 ::= { natSharedAddrMapEntry 21 }
```

```

--
-- Notifications section
--

natMIBNotifications OBJECT IDENTIFIER ::= { natMIB 0 }

--
-- Notifications
--

natPacketDiscard NOTIFICATION-TYPE
  OBJECTS { ifIndex }
  STATUS current
  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 ,
    natSharedAddrMapName ,
    natSharedAddrMapEntryType ,
    natSharedAddrMapTranslatEntity ,
    natSharedAddrMapLocalAddrType ,
    natSharedAddrMapLocalAddrFrom ,
    natSharedAddrMapLocalAddrTo ,
    natSharedAddrMapLocalPortFrom ,
    natSharedAddrMapLocalPortTo ,
    natSharedAddrMapGlobalAddrType ,
    natSharedAddrMapGlobalAddrFrom ,
    natSharedAddrMapGlobalAddrTo ,
    natSharedAddrMapGlobalPortFrom ,
    natSharedAddrMapGlobalPortTo ,
    natSharedAddrMapProtocol ,
    natSharedAddrMapStorageType ,
    natSharedAddrMapRowStatus ,
    natBindDefIdleTimeout ,
    natUdpDefIdleTimeout ,
    natIcmpDefIdleTimeout ,
    natOtherDefIdleTimeout ,
    natTcpDefIdleTimeout ,
    natTcpDefNegTimeout ,
    natNotifThrottlingInterval }
STATUS current
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    current

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 current
  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 current
  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,
            natSharedAddrMapInTranslates,
            natSharedAddrMapOutTranslates,
            natSharedAddrMapDiscards,
            natSharedAddrMapAddrUsed }
  STATUS current
  DESCRIPTION
    "A collection of address map specific NAT statistics,
    to aid troubleshooting/monitoring of NAT operation."
 ::= { natMIBGroups 5 }

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

```
--
-- Compliance statements
--

natMIBFullCompliance MODULE-COMPLIANCE
  STATUS current
  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 current

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

7. Acknowledgements

The authors would like to thank R. Rohit, P. Srisuresh, Rajiv Raghunarayan, Nalinksh Pai, and Cliff Wang, the original authors of [RFC4008], as well as the following individuals who have participated in the drafting, review, and discussion of this memo:

Cathy Zhou, Juergen Schoenwaelder, Marc Blanchet, and Yu Fu.

8. Security Considerations

[To be reviewed, note about large number of mappings/bindings]

It is clear that this MIB can potentially be useful for configuration. Unauthorized access to the write-able objects could cause a denial of service and/or widespread network disturbance.

Hence, the support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

At this writing, no security holes have been identified beyond those that SNMP Security is itself intended to address. These relate primarily to controlled access to sensitive information and the ability to configure a device - or which might result from operator error, which is beyond the scope of any security architecture.

There are a number of managed objects in this MIB that may contain information that may be sensitive from a business perspective, in that they may represent NAT bind and session information. The NAT bind and session objects reveal the identity of private hosts that are engaged in a session with external end nodes. A curious outsider could monitor these two objects to assess the number of private hosts being supported by the NAT device. Further, a disgruntled former employee of an enterprise could use the NAT bind and session information to break into specific private hosts by intercepting the existing sessions or originating new sessions into the host. There are no objects that are sensitive in their own right, such as passwords or monetary amounts. It may even be important to control GET access to these objects and possibly to encrypt the values of these objects when they are sent over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

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

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

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.

9. IANA Considerations

TBD

10. References

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