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**Management Information Base  
for the User Datagram Protocol (UDP)  
draft-ietf-ipv6-rfc2013-update-02.txt**

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects used for implementations of the User Datagram Protocol (UDP) in an IP version independent manner. This memo obsoletes RFCs 2013 and 2454.

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## Revision History

[Note to RFC Editor: Please remove prior to publication]

Changes from [draft-ietf-ipv6-rfc2013-update-00.txt](#)

24 October 2003

Dropped `udpEndpointInDatagrams`, `udpEndpointHCInDatagrams`,  
`udpEndpointOutDatagrams`, `udpEndpointHCOutDatagrams`,  
`udpEndpointInOctets`, `udpEndpointHCInOctets`,  
`udpEndpointOutOctets`, `udpEndpointHCOutOctets`, and  
`udpEndpointStartTime`.

Removed `udpEndpointStatsGroup`, `udpEndpointHCDatagramStatsGroup`  
and `udpEndpointHCOctetStatsGroup`.

Changed `udpEndpointInstance` back to read-only, since there is no  
longer a mandatory non-auxiliary column in the `udpEndpointTable`.

Removed Open Issues section.

Moved Revision History section to beginning of document and  
removed its section number, to allow for easier removal at RFC  
publication.

Updated to latest MIB boilerplate.

Updated working group mailing list address.



Removed SIZE constraints from udpEndpointLocalAddress and udpEndpointRemoteAddress, and updated the DESCRIPTION clause of udpEndpointEntry.

Removed "Use of IP Addresses" section, since this information is already documented in the relevant MIB DESCRIPTIONs.

Changes from [draft-ietf-ipngwg-rfc2013-update-01.txt](#)

28 May 2002

Removed udpConnectionTable

Renamed ListenerTable to EndpointTable, since with a remote address Listener is not quite correct.

Use 'h consistently for 'any IP address', instead of sometimes 'h and sometimes all-zeroes of the right address family.

Use "Datagram" instead of "Packet" to talk about UDP datagrams.

Added mandatory udpEndpointStartTime, this also fixes the udpEndpointInstance needing to be read-only and mandatory.

Make udpEndpointProcess mandatory on systems that have process IDs.

Make a note of { udp 6 } in a comment for clarity on why it's skipped.

Fleshed out [section 3](#).

Changed the deprecated udpLocalPort SYNTAX to Integer32. Since it was already restricted to (0..65536) this is not a semantic change.

Changes from [draft-ietf-ipngwg-rfc2013-update-00.txt](#)

14 November 2001

Added udpConnectionTable

Added udpListenerRemoteAddressType, to distinguish e.g. IPV6\_V6ONLY

Added counters to udpListenerTable and udpConnectionTable

Changes from [draft-ops-rfc2013-update-00.txt](#)



12 Jul 2001

Turned into IPNG WG document

Changes from first draft posted to v6mib mailing list:

23 Feb 2001

Made threshold for HC packet counters 1Mpps

Added copyright statements and table of contents

21 Feb 2001 -- Juergen's changes

Renamed udpInetTable to udpListenerTable

Updated Conformance info

6 Feb 2001

Removed v6-only objects.

Removed remote and instance objects, turning the table back into a listener-only table.

Renamed inetUdp\* to udpInet\*

Added HC in and out datagram counters

Added SIZE restriction to udpListenerLocalAddress. (36 = 32-byte addresses plus 4-byte scope, but it's just a strawman)

Used InetPortNumber TC from updated INET-ADDRESS-MIB

Updated compliance statements.

Added Keith to authors

Added open issues section.

## **1. The Internet-Standard Management Framework**

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

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



accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

## **2. Overview**

The current UDP-MIB defined in this memo consists of one table and a group of scalars:

- The udp group of scalars reports parameters and statistics of a UDP protocol engine. Two scalars udpHCInDatagrams and udpHCOutDatagrams have been added to this group since the publication of [RFC 2013](#) in order to provide high-capacity counters for fast networks.
- The udpEndpointTable provides access to status information for all UDP endpoints handled by a UDP protocol engine. The table provides for strictly listening endpoints, as with the historical udpTable, and also for "connected" UDP endpoints, which only accept packets from a given remote system. It also reports identification of the operating system level processes which handles UDP connections.

### **[2.1.](#) Relationship to Other MIBs**

This section discusses the relationship of this UDP-MIB module to other MIB modules.

#### **[2.1.1.](#) Relationship to [RFC1213](#)-MIB**

UDP related MIB objects were originally defined as part of the [RFC1213](#)-MIB defined in [RFC 1213](#) [[RFC1213](#)]. The UDP related objects of the [RFC1213](#)-MIB were later copied into a separate MIB module and published in [RFC 2013](#) [[RFC2013](#)] in SMIV2 format.

The previous versions of the UDP-MIB both defined the udpTable, which has been deprecated for basically two reasons:

- (1) The udpTable only supports IPv4.

The current approach in the IETF is to write IP version neutral MIBs rather than having different definitions for various version of IP. This reduces the amount of overhead when new objects are introduced since there is only one place to add them. Hence, the





approach taken in [RFC 2454](#) [[RFC2454](#)] of having separate tables is not continued.

- (2) The udpTable does not permit describing "connected" UDP endpoints.

It turns out that "connected" endpoints tend to have a different behaviour and management access pattern compared to listening endpoints. Adding remote endpoint information to the udpEndpointTable thus allows for the addition of specific status and statistic objects for "connected" endpoints and connections.

### **[2.1.2.](#) Relationship to the IPV6-UDP-MIB**

The IPV6-UDP-MIB defined in [RFC 2454](#) has been moved to Historic since the approach of having separate IP version specific tables is not followed anymore. Implementation of [RFC 2454](#) is thus not suggested anymore.

### **[2.1.3.](#) Relationship to HOST-RESOURCES-MIB and SYSAPPL-MIB**

The udpEndpointTable reports the identification of the operating system level process which handles a connection or a listening endpoint. The value is reported as an Unsigned32 which is expected to be the same as the hrSWRunIndex of the HOST-RESOURCES-MIB [[RFC2790](#)] (if the value is smaller than 2147483647) or the sysAppElmtRunIndex of the SYSAPPL-MIB [[RFC2287](#)]. This allows management applications to identify the UDP connections that belong to an operating system level process, which has proven to be valuable in operational environments.

## **[3.](#) Definitions**

UDP-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, Integer32, Counter32, Counter64,  
Unsigned32, IPAddress, mib-2 FROM SNMPv2-SMI  
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF  
InetAddress, InetAddressType,  
InetPortNumber FROM INET-ADDRESS-MIB;

udpMIB MODULE-IDENTITY

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#### DESCRIPTION

"The MIB module for managing UDP implementations.

Copyright (C) The Internet Society (2003). This  
version of this MIB module is part of RFC XXXX;  
see the RFC itself for full legal notices.

-- RFC Ed.: Replace XXXX with the actual RFC number & remove  
-- this note"

REVISION "200310240000Z" -- October 24, 2003

#### DESCRIPTION

"IP version neutral revision, published as RFC XXXX."

-- RFC Ed.: Replace XXXX with the actual RFC number & remove  
-- this note"

REVISION "199411010000Z" -- November 1, 1994

#### DESCRIPTION

"Initial SMIV2 version, published as [RFC 2013](#)."

REVISION "199103310000Z" -- March 31, 1991

#### DESCRIPTION

"The initial revision of this MIB module was part of MIB-II."

::= { mib-2 50 }

-- the UDP group

udp OBJECT IDENTIFIER ::= { mib-2 7 }

udpInDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"The total number of UDP datagrams delivered to UDP users."

::= { udp 1 }



## udpNoPorts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The total number of received UDP datagrams for which there was no application at the destination port."

::= { udp 2 }

## udpInErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port."

::= { udp 3 }

## udpOutDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The total number of UDP datagrams sent from this entity."

::= { udp 4 }

## udpHCInDatagrams OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The total number of UDP datagrams delivered to UDP users, for devices which can receive more than 1 million UDP datagrams per second."

::= { udp 8 }

## udpHCOutDatagrams OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The total number of UDP datagrams sent from this entity, for devices which can transmit more than 1 million UDP datagrams per second."

::= { udp 9 }



-- { udp 6 } was defined as the ipv6UdpTable in [RFC2454](#)'s IPV6-UDP-MIB.  
-- This RFC obsoletes [RFC 2454](#), so { udp 6 } is obsoleted.  
--

-- The UDP "Endpoint" table.

udpEndpointTable OBJECT-TYPE

SYNTAX SEQUENCE OF UdpEndpointEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing information about this entity's UDP endpoints on which a local application is currently accepting or sending datagrams.

The address type in this table represents the address type used for the communication, irrespective of the higher-layer abstraction. For example, an application using IPv6 'sockets' to communicate via IPv4 between ::ffff:10.0.0.1 and ::ffff:10.0.0.2 would use InetAddressType ipv4(1).

Unlike the udpTable in [RFC 2013](#), this table also allows the representation of an application which completely specifies both local and remote addresses and ports. A listening application is represented in three possible ways:

- 1) an application which is willing to accept both IPv4 and IPv6 datagrams is represented by a udpEndpointLocalAddressType of unknown(0) and udpEndpointLocalAddress of ''h (a zero-length octet-string).
- 2) an application which is willing to accept only IPv4 or only IPv6 datagrams is represented by a udpEndpointLocalAddressType of the appropriate address type, and udpEndpointLocalAddress of ''h (a zero-length octet-string).
- 3) an application which is listening for datagrams only for a specific IP address, but from any remote system, is represented by a udpEndpointLocalAddressType of the appropriate address type, udpEndpointLocalAddress specifying the local address.

In all cases where the remote is a wildcard, the udpEndpointRemoteAddressType is unknown(0), the udpEndpointRemoteAddress is ''h (a zero-length octet-string), and the udpEndpointRemotePort is 0.





If the operating system is demultiplexing UDP packets by remote address and port, or if the application has 'connected' the socket specifying a default remote address and port, the udpEndpointRemote\* values should be used to reflect this."

::= { udp 7 }

udpEndpointEntry OBJECT-TYPE

SYNTAX UdpEndpointEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a particular current UDP endpoint.

Implementers need to be aware that if the total number of elements (octets or sub-identifiers) in udpEndpointLocalAddress and udpEndpointRemoteAddress exceeds 111 then OIDs of column instances in this table will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3."

INDEX { udpEndpointLocalAddressType,  
udpEndpointLocalAddress,  
udpEndpointLocalPort,  
udpEndpointRemoteAddressType,  
udpEndpointRemoteAddress,  
udpEndpointRemotePort,  
udpEndpointInstance }

::= { udpEndpointTable 1 }

UdpEndpointEntry ::= SEQUENCE {

udpEndpointLocalAddressType InetAddressType,

udpEndpointLocalAddress InetAddress,

udpEndpointLocalPort InetPortNumber,

udpEndpointRemoteAddressType InetAddressType,

udpEndpointRemoteAddress InetAddress,

udpEndpointRemotePort InetPortNumber,

udpEndpointInstance Unsigned32,

udpEndpointProcess Unsigned32

}

udpEndpointLocalAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address type of udpEndpointLocalAddress. Only IPv4, IPv4z, IPv6 and IPv6z addresses are expected, or unknown(0) if datagrams for all local IP addresses are



accepted."  
::= { udpEndpointEntry 1 }

udpEndpointLocalAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The local IP address for this UDP endpoint. This is either one of the IP addresses assigned to the system, or a null octet-string ('h) to represent that datagrams destined to any address assigned to the system of an IP version consistent with udpEndpointLocalAddressType (or any IP version, if udpEndpointLocalAddressType is unknown(0)) will be accepted."

::= { udpEndpointEntry 2 }

udpEndpointLocalPort OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The local port number for this UDP endpoint."

::= { udpEndpointEntry 3 }

udpEndpointRemoteAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address type of udpEndpointRemoteAddress. Only IPv4, IPv4z, IPv6 and IPv6 addresses are expected, or unknown(0) if datagrams for all remote IP addresses are accepted."

::= { udpEndpointEntry 4 }

udpEndpointRemoteAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The remote IP address for this UDP endpoint. If datagrams from any remote system are to be accepted, this value is 'h (a zero-length octet-string). Otherwise, it has the type described by udpEndpointRemoteAddressType, and is the address of the remote system from which datagrams are to be accepted (or to which all datagrams will be sent)."

::= { udpEndpointEntry 5 }



**udpEndpointRemotePort OBJECT-TYPE**

SYNTAX InetPortNumber

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"The remote port number for this UDP endpoint. If datagrams from any remote system are to be accepted, this value is zero."

::= { udpEndpointEntry 6 }

**udpEndpointInstance OBJECT-TYPE**

SYNTAX Unsigned32 (1..'ffffffff'h)

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The instance of this tuple. This object is used to distinguish between multiple processes 'connected' to the same UDP endpoint."

::= { udpEndpointEntry 7 }

**udpEndpointProcess OBJECT-TYPE**

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The system's process ID for the process associated with this endpoint, or zero if there is no such process. This value is expected to be the same as HOST-RESOURCES-MIB::hrSWRunIndex or SYSAPPL-MIB::sysAppElmtRunIndex for some row in the appropriate tables."

::= { udpEndpointEntry 8 }

-- The deprecated UDP Listener table

-- The deprecated UDP listener table only contains information about this  
-- entity's IPv4 UDP end-points on which a local application is  
-- currently accepting datagrams. It does not provide more detailed  
-- connection information, or information about IPv6 endpoints.

**udpTable OBJECT-TYPE**

SYNTAX SEQUENCE OF UdpEntry

MAX-ACCESS not-accessible

STATUS deprecated

## DESCRIPTION

"A table containing IPv4-specific UDP listener information. It contains information about all local IPv4 UDP end-points on which an application is currently accepting datagrams."



```

        This table has been deprecated in favor of the version
        neutral udpEndpointTable."
 ::= { udp 5 }

udpEntry OBJECT-TYPE
    SYNTAX      UdpEntry
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "Information about a particular current UDP listener."
    INDEX       { udpLocalAddress, udpLocalPort }
    ::= { udpTable 1 }

UdpEntry ::= SEQUENCE {
    udpLocalAddress  IpAddress,
    udpLocalPort     Integer32
}

udpLocalAddress OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The local IP address for this UDP listener.  In the case of
        a UDP listener which is willing to accept datagrams for any
        IP interface associated with the node, the value 0.0.0.0 is
        used."
    ::= { udpEntry 1 }

udpLocalPort OBJECT-TYPE
    SYNTAX      Integer32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The local port number for this UDP listener."
    ::= { udpEntry 2 }

-- conformance information

udpMIBConformance OBJECT IDENTIFIER ::= { udpMIB 2 }

udpMIBCompliances OBJECT IDENTIFIER ::= { udpMIBConformance 1 }
udpMIBGroups      OBJECT IDENTIFIER ::= { udpMIBConformance 2 }

-- compliance statements

udpMIBCompliance2 MODULE-COMPLIANCE
    STATUS      current
```





## DESCRIPTION

"The compliance statement for systems which implement UDP."

MODULE -- this module

MANDATORY-GROUPS { udpBaseGroup, udpEndpointGroup }

GROUP udpHCGroup

## DESCRIPTION

"This group is mandatory for those systems which are capable of receiving or transmitting more than 1 million UDP datagrams per second. 1 million datagrams per second will cause a Counter32 to wrap in just over an hour."

GROUP udpEndpointProcessGroup

## DESCRIPTION

"This group is mandatory for systems which implement a 'process ID' concept, in particular those that also implement the HOST-RESOURCES-MIB or SYSAPPL-MIB."

::= { udpMIBCompliances 2 }

udpMIBCompliance MODULE-COMPLIANCE

STATUS deprecated

## DESCRIPTION

"The compliance statement for IPv4-only systems which implement UDP. For IP version independence, this compliance statement is deprecated in favor of udpMIBCompliance2. However, agents are still encouraged to implement these objects in order to interoperate with the deployed base of managers."

MODULE -- this module

MANDATORY-GROUPS { udpGroup }

::= { udpMIBCompliances 1 }

-- units of conformance

udpGroup OBJECT-GROUP

OBJECTS { udpInDatagrams, udpNoPorts,  
udpInErrors, udpOutDatagrams,  
udpLocalAddress, udpLocalPort }

STATUS deprecated

## DESCRIPTION

"The deprecated group of objects providing for management of UDP over IPv4."

::= { udpMIBGroups 1 }

udpBaseGroup OBJECT-GROUP

OBJECTS { udpInDatagrams, udpNoPorts, udpInErrors, udpOutDatagrams }

STATUS current

## DESCRIPTION

"The group of objects providing for counters of UDP"



```
        statistics."
 ::= { udpMIBGroups 2 }

udpHCGroup OBJECT-GROUP
    OBJECTS      { udpHCInDatagrams, udpHCOutDatagrams }
    STATUS       current
    DESCRIPTION   "The group of objects providing for counters of high speed
                   UDP implementations."
 ::= { udpMIBGroups 3 }

udpEndpointGroup OBJECT-GROUP
    OBJECTS      { udpEndpointInstance }
    STATUS       current
    DESCRIPTION   "The group of objects providing for the IP version
                   independent management of UDP 'endpoints'."
 ::= { udpMIBGroups 4 }

udpEndpointProcessGroup OBJECT-GROUP
    OBJECTS      { udpEndpointProcess }
    STATUS       current
    DESCRIPTION   "The object mapping a UDP 'endpoint' to a system process."
 ::= { udpMIBGroups 5 }

END
```

#### **4. Intellectual Property**

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in [BCP-11](#). Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

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this standard. Please address the information to the IETF Executive Director.

## 5. Acknowledgements

This document contains a modified subset of [RFC 1213](#) and updates [RFC 2013](#) and [RFC 2454](#). Acknowledgments are therefore due to the authors and editors of these documents for their excellent work.

## 6. Contributors

This document is an output of the IPv6 MIB revision team, and contributors to earlier versions of this document include:

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Much of Keith McCloghrie's text from [RFC1213](#)/RFC2013 remains in this document, and the structure of the MIB is due to him.

Mike Daniele wrote the original IPv6 UDP MIB in [RFC2454](#).

Juergen Schoenwalder provided much of the text for [section 2](#).

## 7. Normative References

[RFC768] Postel, J., "User Datagram Protocol", STD 6, [RFC 768](#), August 1980.

[RFC2287] Krupczak, C., and J. Saperia, "Definitions of System-Level Managed Objects for Applications", [RFC 2287](#), February 1998.



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- [RFC2790] Waldbusser, S. and P. Grillo, "Host Resources MIB", [RFC 2790](#), March 2000.
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## 8. Informative References

- [RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.
- [RFC1213] McCloghrie, K. and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, [RFC 1213](#), March 1991.
- [RFC2013] McCloghrie, K., "Management Information Base for the User Datagram Protocol using SMIv2", [RFC 2013](#), November 1996.
- [RFC2454] Daniele, M., "IP Version 6 Management Information Base for the User Datagram Protocol", [RFC 2454](#), December 1998.

## 9. Security Considerations

There are no management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. So, if this MIB is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB module via direct SNMP SET operations.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or





vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

The `udpEndpointLocalPort` and `udpLocalPort` objects can be used to identify what ports are open on the machine and can thus what attacks are likely to succeed, without the attacker having to run a port scanner.

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 module.

It is recommended that the implementors 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).

Furthermore, 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.

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