Internet-Draft IPv6 MIB: UDP and TCP Groups March 1997

Management Information Base for IP Version 6:
UDP and TCP Groups

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Dimitry Haskin
Steve Onishi
Bay Networks, Inc.

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Abstract

This document is one in the series of documents that define various MIB object groups for IPv6. Specifically, the UDP and TCP groups are defined in this document.

This memo defines an experimental portion of the Management
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Information Base (MIB) for use with network management protocols in the IPv6-based internets.

This document specifies a MIB module in a manner that is both compliant to the SNMPv2 SMI, and semantically identical to the peer SNMPv1 definitions.

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1. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework presently consists of three major components. They are:

- the SMI, described in RFC 1902 [1] - the mechanisms used for describing and naming objects for the purpose of management.

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

1.1. Object Definitions

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to refer to the object type.
2. Overview

This document is the one in the series of documents that define various MIB object groups for IPv6. These groups are the basic unit of conformance: if the semantics of a group is applicable to an implementation, then it must implement all objects in that group. For example, an implementation must implement the TCP group if and only if it implements the TCP over IPv6 protocol.

This document defines the UDP and TCP groups of the IPv6 MIB.
3. The UDP Group

IPV6-UDP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
    Counter32, Unsigned32            FROM SNMPv2-SMI
    ipv6, Ipv6Address                FROM IPV6-TC
    MODULE-COMPLIANCE, OBJECT-GROUP  FROM SNMPv2-CONF
    ipv6IfIndex                      FROM IPV6-MIB;    -- [8]

ipv6UdpMIB MODULE-IDENTITY
LAST-UPDATED "9703222155Z"
ORGANIZATION "IETF IPv6 MIB Working Group"
CONTACT-INFO
    " Dimitry Haskin
    Postal: Bay Networks, Inc.
    2 Federal St.
    Billerica, MA 01821
    US
    Tel: +1-508-916-8124
    E-mail: dhaskin@baynetworks.com
    
    Steve Onishi
    Postal: Bay Networks, Inc.
    3 Federal Street
    Billerica, MA 01821
    US
    Tel: +1-508-916-3816
    E-mail: sonishi@baynetworks.com"
DESCRIPTION
    "The MIB module for entities implementing UDP
    over IPv6."
 ::= { ipv6  3}

-- the UDP group

ipv6UdpMIBObjects OBJECT IDENTIFIER ::= { ipv6UdpMIB 1 }
ipv6UdpInDatagrams OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The total number of UDP datagrams delivered to
UDP users."
 ::= { ipv6UdpMIBObjects 1 }

ipv6UdpNoPorts 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."
 ::= { ipv6UdpMIBObjects 2 }

ipv6UdpInErrors 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."
 ::= { ipv6UdpMIBObjects 3 }

ipv6UdpOutDatagrams OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The total number of UDP datagrams sent
from this entity."
 ::= { ipv6UdpMIBObjects 4 }

ipv6UdpTable OBJECT-TYPE
SYNTAX     SEQUENCE OF Ipv6UdpEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The UDP listener table contains information
about this entity’s UDP end-points on which
a local application is currently accepting
datagrams."
::= { ipv6UdpMIBObjects 5 }

ipv6UdpEntry OBJECT-TYPE
SYNTAX     Ipv6UdpEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"Information about a particular current UDP
listener."
INDEX   { ipv6IfIndex,
        ipv6UdpLocalAddress,
        ipv6UdpLocalPort }
::= { ipv6UdpTable 1 }

Ipv6UdpEntry ::= SEQUENCE {
    ipv6UdpLocalAddress    Ipv6Address,
    ipv6UdpLocalPort       Unsigned32
}

ipv6UdpLocalAddress OBJECT-TYPE
SYNTAX     Ipv6Address
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The local IPv6 address for this UDP listener.
In the case of a UDP listener which is willing
to accept datagrams for any IPv6 address
associated with the interface, the value ::0
is used."
::= { ipv6UdpEntry 1 }

ipv6UdpLocalPort OBJECT-TYPE
SYNTAX     Unsigned32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The local port number for this UDP listener."
::= { ipv6UdpEntry 2 }

-- conformance information
ipv6UdpConformance OBJECT IDENTIFIER ::= { ipv6UdpMIB 2 }

ipv6UdpCompliances OBJECT IDENTIFIER ::= { ipv6UdpConformance 1 }
ipv6UdpGroups OBJECT IDENTIFIER ::= { ipv6UdpConformance 2 }

-- compliance statements

ipv6UdpCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
    "The compliance statement for SNMPv2 entities which implement UDP over IPv6."
  MODULE -- this module
    GROUP ipv6UdpGroup
    DESCRIPTION
      "This group is mandatory for all entities which implement UDP over IPv6."
    ::= { ipv6UdpCompliances 1 }

ipv6UdpGroup OBJECT-GROUP
  OBJECTS { ipv6UdpInDatagrams,
    ipv6UdpNoPorts,
    ipv6UdpInErrors,
    ipv6UdpOutDatagrams,
    ipv6UdpLocalPort }
  STATUS current
  DESCRIPTION
    "The UDP group of objects providing information specific to UDP over IPv6."
  ::= { ipv6UdpGroups 1 }

END
4. The TCP Group

IPV6-TCP-MIB DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY, OBJECT-TYPE,
Unsigned32, Gauge32, Counter32,
Integer32                          FROM SNMPv2-SMI
ipv6, Ipv6Address                  FROM IPV6-TC
MODULE-COMPLIANCE, OBJECT-GROUP    FROM SNMPv2-CONF
ipv6IfIndex                        FROM IPV6-MIB;

ipv6TcpMIB MODULE-IDENTITY
LAST-UPDATED "9610042155Z"
ORGANIZATION "IETF IPv6 MIB Working Group"
CONTACT-INFO
"Dimitry Haskin
Postal: Bay Networks, Inc.
2 Federal St.
Billerica, MA 01821
US
 Tel: +1-508-916-8124
 E-mail: dhaskin@baynetworks.com

Steve Onishi
Postal: Bay Networks, Inc.
3 Federal Street
Billerica, MA 01821
US
 Tel: +1-508-916-3816
 E-mail: sonishi@baynetworks.com"

DESCRIPTION
"The MIB module for entities implementing TCP over IPv6."
::= { ipv6  4}

-- the TCPv6 group

ipv6TcpMIBObjects OBJECT IDENTIFIER ::= { ipv6TcpMIB 1 }
Note that instances of object types that represent information about a particular TCP connection are transient; they persist only as long as the connection in question.

**ipv6TcpRtoAlgorithm** OBJECT-TYPE
SYNTAX INTEGER {
    other(1), -- none of the following
    constant(2), -- a constant rto
    rsre(3), -- MIL-STD-1778, Appendix B
    vanj(4) -- Van Jacobson’s algorithm [9]
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The algorithm used to determine the timeout value used for retransmitting unacknowledged octets."
::= { ipv6TcpMIBObjects 1 }

**ipv6TcpRtoMin** OBJECT-TYPE
SYNTAX Unsigned32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in RFC 793."
::= { ipv6TcpMIBObjects 2 }

**ipv6TcpRtoMax** OBJECT-TYPE
SYNTAX Unsigned32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics..."
for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the UBOUND quantity described in RFC 793."
::= { ipv6TcpMIBObjects 3 }

ipv6TcpMaxConn OBJECT-TYPE
SYNTAX   Integer32
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1."
::= { ipv6TcpMIBObjects 4 }

ipv6TcpActiveOpens OBJECT-TYPE
SYNTAX   Counter32
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state."
::= { ipv6TcpMIBObjects 5 }

ipv6TcpPassiveOpens OBJECT-TYPE
SYNTAX   Counter32
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state."
::= { ipv6TcpMIBObjects 6 }

ipv6TcpAttemptFails OBJECT-TYPE
SYNTAX   Counter32
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The number of times TCP connections have made a direct transition to the CLOSED state from either
the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.

::= { ipv6TcpMIBObjects 7 }

ipv6TcpEstabResets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state."

::= { ipv6TcpMIBObjects 8 }

ipv6TcpCurrEstab OBJECT-TYPE
SYNTAX Gauge32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of TCP connections for which the current state is either ESTABLISHED or CLOSE-WAIT."

::= { ipv6TcpMIBObjects 9 }

ipv6TcpInSegs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The total number of segments received, including those received in error. This count includes segments received on currently established connections."

::= { ipv6TcpMIBObjects 10 }

ipv6TcpOutSegs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets."
::= { ipv6TcpMIBObjects 11 }

ipv6TcpRetransSegs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The total number of segments retransmitted - that is, the number of TCP segments transmitted containing one or more previously transmitted octets."
::= { ipv6TcpMIBObjects 12 }

ipv6TcpInErrs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The total number of segments received in error (e.g., bad TCP checksums)."
::= { ipv6TcpMIBObjects 13 }

ipv6TcpOutRsts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of TCP segments sent containing the RST flag."
::= { ipv6TcpMIBObjects 14 }

-- the TCPv6 Connection table

-- The TCPv6 connection table contains information about this entity’s existing TCPv6 connections.

ipv6TcpConnTable OBJECT-TYPE
SYNTAX SEQUENCE OF Ipv6TcpConnEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table containing TCP connection-specific information."
::= { ipv6TcpMIBObjects 15 }
ipv6TcpConnEntry OBJECT-TYPE
SYNTAX     Ipv6TcpConnEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"Information about a particular current TCP connection. An object of this type is transient, in that it ceases to exist when (or soon after) the connection makes the transition to the CLOSED state."
INDEX   { ipv6IfIndex,
    ipv6TcpConnLocalAddress,
    ipv6TcpConnLocalPort,
    ipv6TcpConnRemAddress,
    ipv6TcpConnRemPort }
::= { ipv6TcpConnTable 1 }

Ipv6TcpConnEntry ::= SEQUENCE {
    ipv6TcpConnLocalAddress    Ipv6Address,
    ipv6TcpConnLocalPort       INTEGER (0..65535),
    ipv6TcpConnRemAddress      Ipv6Address,
    ipv6TcpConnRemPort         INTEGER (0..65535),
    ipv6TcpConnState           INTEGER
}

ipv6TcpConnLocalAddress OBJECT-TYPE
SYNTAX     Ipv6Address
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The local IPv6 address for this TCP connection. In the case of a connection in the listen state which is willing to accept connections for any IPv6 address associated with the interface, the value ::0 is used."
::= { ipv6TcpConnEntry 1 }

ipv6TcpConnLocalPort OBJECT-TYPE
SYNTAX     INTEGER (0..65535)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The local port number for this TCP connection."
::= { ipv6TcpConnEntry 2 }
ipv6TcpConnRemAddress OBJECT-TYPE
SYNTAX Ipv6Address
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The remote IPv6 address for this TCP connection."
::= {ipv6TcpConnEntry 3 }

ipv6TcpConnRemPort OBJECT-TYPE
SYNTAX INTEGER (0..65535)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The remote port number for this TCP connection."
::= {ipv6TcpConnEntry 4 }

ipv6TcpConnState OBJECT-TYPE
SYNTAX INTEGER {
    closed(1),
    listen(2),
    synSent(3),
    synReceived(4),
    established(5),
    finWait1(6),
    finWait2(7),
    closeWait(8),
    lastAck(9),
    closing(10),
    timeWait(11),
    deleteTCB(12)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The state of this TCP connection.

The only value which may be set by a management station is deleteTCB(12). Accordingly, it is appropriate for an agent to return a 'badValue' response if a management station attempts to set this object to any other value.

If a management station sets this object to the value deleteTCB(12), then this has the effect of deleting the TCB (as defined in RFC 793) of the
corresponding connection on the managed node,
resulting in immediate termination of the
connection.

As an implementation-specific option, a RST
segment may be sent from the managed node to the
other TCP endpoint (note however that RST segments
are not sent reliably)."
::= { ipv6TcpConnEntry 5 }

-- conformance information

ipv6TcpConformance OBJECT IDENTIFIER ::= { ipv6TcpMIB 2 }

ipv6TcpCompliances OBJECT IDENTIFIER ::= { ipv6TcpConformance 1 }
ipv6TcpGroups OBJECT IDENTIFIER ::= { ipv6TcpConformance 2 }

-- compliance statements

ipv6TcpCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "The compliance statement for SNMPv2 entities which
  implement TCP over IPv6."
  MODULE -- this module
  GROUP ipv6TcpGroup
  DESCRIPTION "This group is mandatory for all entities
  which implement TCP over IPv6."
  ::= { ipv6TcpCompliances 1 }

ipv6TcpGroup OBJECT-GROUP
  OBJECTS {
    ipv6TcpRtoAlgorithm,
    ipv6TcpRtoMin,
    ipv6TcpRtoMax,
    ipv6TcpMaxConn,
    ipv6TcpActiveOpens,
    ipv6TcpPassiveOpens,
    ipv6TcpAttemptFails,
    ipv6TcpEstabResets,
    ipv6TcpCurrEstab,
    ipv6TcpInSegs,
    ipv6TcpOutSegs,
    ipv6TcpRetransSegs,
ipv6TcpInErrs,
ipv6TcpOutRsts,
ipv6TcpConnState
}

STATUS current

DESCRIPTION
"The TCP group of objects providing information specific to TCP over IPv6."

::= { ipv6TcpGroups 1 }

END
5. Acknowledgments

This document borrows from MIB works produced by IETF for IPv4-based internets.

6. References


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7. Security Considerations

Certain management information defined in this MIB may be considered sensitive in some network environments. Therefore, authentication of received SNMP requests and controlled access to management information should be employed in such environments.

8. Authors' Address

Dimitry Haskin
Bay Networks, Inc.
2 Federal Street
Billerica, MA 01821
email: dhaskin@baynetworks.com

Steve Onishi
Bay Networks, Inc.
3 Federal Street
Billerica, MA 01821
email: sonishi@baynetworks.com