SNMPv2 Management Information Base
for the Transmission Control Protocol using SMIv2

1. Introduction
A management system contains: several (potentially many) nodes, each with a processing entity, termed an agent, which has access to management instrumentation; at least one management station; and, a management protocol, used to convey management information between the agents and management stations. Operations of the protocol are carried out under an administrative framework which defines authentication, authorization, access control, and privacy policies.
Management stations execute management applications which monitor and control managed elements. Managed elements are devices such as hosts, routers, terminal servers, etc., which are monitored and controlled via access to their management information.

Management information is viewed as a collection of managed objects, residing in a virtual information store, termed the Management Information Base (MIB). Collections of related objects are defined in MIB modules. These modules are written using a subset of OSI’s Abstract Syntax Notation One (ASN.1) [1], termed the Structure of Management Information (SMI) [2].

This document is the MIB module which defines managed objects for managing implementations of the Transmission Control Protocol (TCP) [3].

The managed objects in this MIB module were originally defined using the SNMPv1 framework as a part of MIB-II [4]. This document defines the same objects for TCP using the SNMPv2 framework.

2. Definitions

TCP-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY, OBJECT-TYPE, Integer32, Gauge32,
  Counter32, IpAddress, mib-2 FROM SNMPv2-SMI
  MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF;

tcpMIB MODULE-IDENTITY
  LAST-UPDATED "9411010000Z"
  ORGANIZATION "IETF SNMPv2 Working Group"
  CONTACT-INFO
    " Keith McCloghrie
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DESCRIPTION
"The MIB module for managing TCP implementations."

REVISION
"9103310000Z"

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

 ::= { mib-2 49 }

-- the TCP group

tcp OBJECT IDENTIFIER ::= { mib-2 6 }

tcpRtoAlgorithm 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 [5]
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The algorithm used to determine the timeout value used for
retransmitting unacknowledged octets."
 ::= { tcp 1 }

tcpRtoMin OBJECT-TYPE
SYNTAX Integer32
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."
 ::= { tcp 2 }

tcpRtoMax OBJECT-TYPE
SYNTAX Integer32
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 \texttt{rsre(3)}, an object of this type has the semantics of the UBOUND quantity described in \texttt{RFC 793}.

::= \{ tcp 3 \}

tcpMaxConn 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."

::= \{ tcp 4 \}

tcpActiveOpens 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."

::= \{ tcp 5 \}

tcpPassiveOpens 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."

::= \{ tcp 6 \}

tcpAttemptFails 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."

::= \{ tcp 7 \}
tcpEstabResets 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."
::= { tcp 8 }

tcpCurrEstab 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."
::= { tcp 9 }

tcpInSegs 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."
::= { tcp 10 }

tcpOutSegs 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."
::= { tcp 11 }

tcpRetransSegs 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."
::= { tcp 12 }

-- the TCP Connection table

-- The TCP connection table contains information about this
-- entity's existing TCP connections.

tcpConnTable OBJECT-TYPE
SYNTAX      SEQUENCE OF TcpConnEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A table containing TCP connection-specific information."
::= { tcp 13 }

tcpConnEntry OBJECT-TYPE
SYNTAX      TcpConnEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A conceptual row of the tcpConnTable containing information
about a particular current TCP connection. Each row of this

table is transient, in that it ceases to exist when (or soon

after) the connection makes the transition to the CLOSED

state."
INDEX   { tcpConnLocalAddress,
tcpConnLocalPort,
tcpConnRemAddress,
tcpConnRemPort }
::= { tcpConnTable 1 }

TcpConnEntry ::= SEQUENCE {
tcpConnState          INTEGER,
tcpConnLocalAddress   IpAddress,
tcpConnLocalPort      INTEGER,
tcpConnRemAddress     IpAddress,
tcpConnRemPort        INTEGER
}

tcpConnState OBJECT-TYPE
SYNTAX      INTEGER {
closed(1),
listen(2),
synSent(3),
synReceived(4),
established(5),
finWait1(6),
"A table containing TCP connection-specific information."

index { tcpConnLocalAddress,
tcpConnLocalPort,
tcpConnRemAddress,
tcpConnRemPort }

::= { tcpConnTable 1 }

TcpConnEntry ::= SEQUENCE {
tcpConnState          INTEGER,
tcpConnLocalAddress   IpAddress,
tcpConnLocalPort      INTEGER,
tcpConnRemAddress     IpAddress,
tcpConnRemPort        INTEGER
}

tcpConnState 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)."

::= { tcpConnEntry 1 }

tcpConnLocalAddress OBJECT-TYPE
SYNTAX      IpAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The local IP address for this TCP connection. In the case of a connection in the listen state which is willing to accept connections for any IP interface associated with the node, the value 0.0.0.0 is used."

::= { tcpConnEntry 2 }

tcpConnLocalPort OBJECT-TYPE
SYNTAX      INTEGER (0..65535)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The local port number for this TCP connection."

::= { tcpConnEntry 3 }

tcpConnRemAddress OBJECT-TYPE
SYNTAX      IpAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
   "The remote IP address for this TCP connection."
 ::= { tcpConnEntry 4 }

tcpConnRemPort OBJECT-TYPE
SYNTAX      INTEGER (0..65535)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
   "The remote port number for this TCP connection."
 ::= { tcpConnEntry 5 }

tcpInErrs OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
   "The total number of segments received in error (e.g., bad
    TCP checksums)."
 ::= { tcp 14 }

tcpOutRsts OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
   "The number of TCP segments sent containing the RST flag."
 ::= { tcp 15 }

-- conformance information

tcpMIBConformance OBJECT IDENTIFIER ::= { tcpMIB 2 }
tcpMIBCompliances OBJECT IDENTIFIER ::= { tcpMIBConformance 1 }
tcpMIBGroups      OBJECT IDENTIFIER ::= { tcpMIBConformance 2 }

-- compliance statements

tcpMIBCompliance MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
   "The compliance statement for SNMPv2 entities which
    implement TCP."
MODULE      -- this module
Mandatory-Groups { tcpGroup

::= { tcpMIBCompliances 1 }

-- units of conformance

tcpGroup OBJECT-GROUP

  OBJECTS { tcpRtoAlgorithm, tcpRtoMin, tcpRtoMax,
             tcpMaxConn, tcpActiveOpens,
             tcpPassiveOpens, tcpAttemptFails,
             tcpEstabResets, tcpCurrEstab, tcpInSegs,
             tcpOutSegs, tcpRetransSegs, tcpConnState,
             tcpConnLocalAddress, tcpConnLocalPort,
             tcpConnRemAddress, tcpConnRemPort,
             tcpInErrs, tcpOutRsts }

  STATUS current

  DESCRIPTION
    "The tcp group of objects providing for management of TCP
     entities."

::= { tcpMIBGroups 1 }

END
3. Acknowledgements

This document contains a modified subset of RFC 1213.

4. References


5. Security Considerations

Security issues are not discussed in this memo.

6. Editor’s Address

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