SNMPv2 Management Information Base
for the Transmission Control Protocol using SMIv2

Status of this Memo

This document specifies an Internet standards track protocol for the
Internet community, and requests discussion and suggestions for
improvements. Please refer to the current edition of the "Internet
Official Protocol Standards" (STD 1) for the standardization state
and status of this protocol. Distribution of this memo is unlimited.

IESG Note:

The IP, UDP, and TCP MIB modules currently support only IPv4. These
three modules use the IpAddress type defined as an OCTET STRING of
length 4 to represent the IPv4 32-bit internet addresses. (See RFC
1902, SMI for SNMPv2.) They do not support the new 128-bit IPv6
internet addresses.

Table of Contents

1. Introduction ................................................ 1
2. Definitions .................................................. 2
2.1 The TCP Group .............................................. 3
2.2 Conformance Information ................................... 8
2.2.1 Compliance Statements ................................... 8
2.2.2 Units of Conformance .................................. 9
3. Acknowledgements ............................................ 10
4. References ................................................... 10
5. Security Considerations ..................................... 10
6. Editor’s Address ............................................. 10

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
          " Postal: Cisco Systems, Inc.
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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 rsre(3), an object of this type has the semantics of the UBOUND quantity described in 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),
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).
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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