

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.

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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.  
                170 West Tasman Drive  
                San Jose, CA 95134-1706  
                US
```

```
        Phone:  +1 408 526 5260  
        Email:  kzm@cisco.com"
```

```

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),
```

```

        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

- [1] Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1), International Organization for Standardization. International Standard 8824, (December, 1987).
- [2] McCloghrie, K., Editor, "Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1902, Cisco Systems, January 1996.
- [3] Postel, J., "Transmission Control Protocol - DARPA Internet Program Protocol Specification", STD 7, RFC 793, DARPA, September 1981.
- [4] McCloghrie, K., and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, March 1991.
- [5] Jacobson, V., "Congestion Avoidance and Control", SIGCOMM 1988, Stanford, California.

5. Security Considerations

Security issues are not discussed in this memo.

6. Editor's Address

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