

TN3270E Working Group

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**Base Definitions of Managed Objects for
TN3270E Using SMIv2**

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Abstract

The purpose of this memo is to define a Management Information Base (MIB) for configuring and managing TN3270E Servers.

The MIB defined by this memo is intended to provide generic support for both Host and Gateway TN3270E Server implementations. It is the intent that the MIB defined herein be extended by subsequent memos to provide non-generic configuration support and to enable TN3270E Response Time Collection.

It is the intent of this MIB to fully adhere to all prerequisite MIBs unless explicitly stated. Deviations will be documented in corresponding conformance statements. The specification of this MIB will utilize the Structure of Management Information (SMI) for Version 2 of the Simple Network Management Protocol Version (refer to [RFC1902](#), reference [1]).

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[1.](#) **Introduction**

This document is a product of the TN3270E Working Group. Its purpose is to define a MIB module for extending the traditional MIBs supported by a TCP/IP implementation for configuration and management of TN3270E Servers.

This memo considers IPv6 addressability to be out of scope with respect to the MIB module defined herein. It is the intent of the author of this document to address IPv6 addressing in an additional submission.

[2.](#) **The SNMPv2 Network Management Framework**

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

- o the SMI, described in [RFC 1902](#) [1], - the mechanisms used for describing and naming objects for the purpose of management.
- o the MIB-II, STD 17, [RFC 1213](#) [5], - the core set of managed objects for the Internet suite of protocols.
- o the protocol, [RFC 1157](#) [9] and/or [RFC 1905](#) [7] - the protocol for accessing managed information.

Textual conventions are defined in [RFC 1903](#) [6], and conformance

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statements are defined in [RFC 1904 \[8\]](#).

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

This memo specifies a MIB module that is compliant to the SNMPv2 SMI. A semantically identical MIB conforming to the SNMPv1 SMI can be produced through the appropriate translation.

2.1. 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 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.

3. Structure of the MIB

The TN3270E-MIB is split into the following components:

- o TN3270E Server Control
- o TN3270E Server Resource Configuration
- o Resource/IP Address Mappings

The TN3270E-MIB is defined for support primarily by TN3270E Servers. Use of this MIB by TN3270 Servers that do not support the TN3270E protocol is not explicitly addressed by this memo. A significant portion of the objects do apply in the TN3270 only case. Addressing the TN3270 only case was not done since it is unlikely that this MIB would be implemented by TN3270 only servers.

3.1. TN3270E Server Control

This group of objects provides for TN3270E Server configuration and consists of:

- o tn3270eSrvrConfTable
- o tn3270eSrvrPortTable
- o tn3270eSrvrStatsTable

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3.1.1. tn3270eSrvrConfTable

The tn3270eSrvrConfTable contains a set of objects primarily for configuring and managing a TN3270E Server. This table, as well most of the tables in the TN3270E-MIB, are structured to be indexed by a unsigned integer, tn3270eSrvrConfIndex. The primary index element, tn3270eSrvrConfigIndex, enables support of multiple TN3270E Servers on the same host.

An earlier version of this memo had used the local IP Address associated with a TN3270E Server along with tn3270eSrvrConfIndex as the primary indexes into most of its tables. Use of a local IP Address was thought to enable representation of these tables by management applications. This approach was dropped since it introduces a level of complexity with respect to MIB table indexing for little actually benefit.

tn3270eSrvrConfInactivityTimer defines the inactivity period for TN3270 and TN3270E Sessions. tn3270eSrvrConfSessionTermState defines how a session should be terminated. The three objects:

- o tn3270eSrvrConfActivityCheck
- o tn3270eSrvrConfActivityTimeout
- o tn3270eSrvrConfActivityInterval

defines the parameters for performing the "Telnet Timing Mark Option" as defined by [RFC 860](#) [3]. The object tn3270eSrvrConfActivityCheck is defined to enable selection of either a NOP command or a TIMEMARK command. Sending a NOP command results in less overhead then a TIMEMARK command since a client doesn't send a reply.

The objects tn3270eSrvrConfAdminStatus and tn3270eSrvrConfOperStatus exists in order to enable remote starting and stopping of a TN3270E Server. tn3270eSrvrConfFunctionsSupported indicates which of the TN3270 and TN3270E options that a server supports. The object tn3270eSrvrConfSessionTermState defines as a global option what processing steps that a TN3270E Server should perform when a TN3270E Session terminates with respect to the associating TCP Connection. The object tn3270eSrvrConfSrvrType indicates the implementation type of TN3270E Server that the tn3270eSrvrConfEntry represents. The object tn3270eSrvrConfRowStatus provides the capability to perform remote creation and deletion operations on this table.

3.1.2. tn3270eSrvrPortTable

The tn3270eSrvrPortTable exists in order to assign and retrieve the local ports associated with a TN3270E Server. Some TN3270E Server

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implementations support multiple local port usage.

3.1.3. tn3270eSrvrStatsTable

The tn3270eSrvrStatsTable defines a series of objects used to provide general statistics on the use of a TN3270E Server.

3.2. TN3270E Server Resource Configuration

The TN3270E Server Resource Configuration collection of objects consists of three tables:

- o tn3270eIpGroupTable
- o tn3270eResPoolTable
- o tn3270eIpResMapTable

The tn3270eIpGroupTable and tn3270eResPoolTable enable implementations to define groupings of both IP Addresses and Resource Pools for mapping IP Addresses to resources. The mapping of a IP Group to a Resource Pool is enabled via the tn3270eIpResMapTable.

3.3. Resource/IP Address Mappings

Two tables are defined by this memo to enable mapping of Resource Name to IP Address and IP Address to Resource Name:

- o tn3270eResMapTable
- o TCP Connection Table Additions

3.3.1. tn3270eResMapTable

The tn3270eResMapTable is a read-only table that provides for mapping a resource name to a IP Client's IP Address. An entry in this table is added when a TCP Connection is received by a TN3270E Server and mapped to a resource. The entry is deleted with the resource to IP Address association is no longer valid.

3.3.2. TCP Connection Table Additions

The TCP Connection Table is defined by [RFC 2012](#) (Refer to reference 10, TCP-MIB Definitions). Traditionally, the contents of the TCP

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Connection Table has been implementation dependent. Its formal definition consists of the following objects:

- o tcpConnState (INTEGER)
- o tcpConnLocalAddress (IpAddress)
- o tcpConnLocalPort (INTEGER)
- o tcpConnRemAddress (IpAddress)
- o tcpConnRemPort (INTEGER)

and is indexed by: tcpConnLocalAddress, tcpConnLocalPort, tcpConnRemAddress and tcpConnRemPort. The tn3270eTcpConnTableGroup contains the objects defined by the tn3270eTcpConnTable for keeping a list of the current set of TN3270 and TN3270E sessions at a TN3270E Server. The tn3270eTcpConnTable has the same index elements as the tcpConnTable but doesn't AUGMENT it since the relationship is not one-to-one.

4. Definitions

```
TN3270E-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, BITS, Unsigned32,
    experimental, IpAddress, TimeTicks,
    Counter32, Gauge32
        FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, RowStatus, DisplayString
        FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF
    tcpConnLocalAddress, tcpConnLocalPort,
    tcpConnRemAddress, tcpConnRemPort
        FROM TCP-MIB
;

tn3270eMIB MODULE-IDENTITY
    LAST-UPDATED "9707280000Z" -- July 28, 1997
    ORGANIZATION "TN3270E Working Group"
    CONTACT-INFO
        "Kenneth White (kennethw@vnet.ibm.com)
         IBM Corp."
DESCRIPTION
    "This module defines a portion of the management
     information base (MIB) for managing TN3270E Servers"
-- Need an experimental OID from IANA
::= { experimental 2001 }
```

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-- Textual Conventions

```
Tn3270ResourceType ::= TEXTUAL-CONVENTION
  STATUS      current
  DESCRIPTION
    "The type of resource defined by a Resource Pool. Refer
     to tn3270eResPoolTable."
  SYNTAX      INTEGER {
    other(0),
    lu(1),
    printer(2)
  }
```

```
Tn3270Functions ::= TEXTUAL-CONVENTION
  STATUS      current
  DESCRIPTION
    "This textual convention is intended to reflect the
     current set of TN3270 and TN3270E functions that can
     be negotiated between a server and its client:
```

[RFC856](#)

transmitBinary	The sender of this command REQUESTS permission to begin transmitting, or confirms that it will now begin transmitting characters which are to be interpreted as 8 bits of binary data by the receiver of the data.
----------------	---

[RFC820](#)

timeMark	The sender of this command REQUESTS that the receiver of this command return a WILL TIMING-MARK in the data stream at the 'appropriate place' ...
----------	--

[RFC885](#)

endOfRecord	The sender of this command requests permission to begin transmission of the Telnet END-OF-RECORD (EOR) code when transmitting data characters, or the sender of this command confirms it will now begin transmission of EORs with transmitted data characters.
-------------	--

[RFC1091](#)

terminalType	Sender is willing to send terminal type information in a subsequent sub-negotiation.
--------------	---

[RFC1041](#)

tn3270Regime	Sender is willing to send list of supported 3270 Regimes in a subsequent sub-negotiation.
--------------	--

[RFC1647](#)

scsCtrlCodes	(Printer sessions only). Allows the use
--------------	---

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	of the SNA Character Stream (SCS) and SCS control codes on the session. SCS is used with LU type 1 SNA sessions.
dataStreamCtl	(Printer sessions only). Allows the use of the standard 3270 data stream. This corresponds to LU type 3 SNA sessions.
responses	Provides support for positive and negative response handling. Allows the server to reflect to the client any and all definite, exception, and no response requests sent by the host application.
bindImage	Allows the server to send the SNA Bind image and Unbind notification to the client.
sysreq	Allows the client and server to emulate some (or all, depending on the server) of the functions of the SYSREQ key in an SNA environment."
SYNTAX	BITS {
	transmitBinary(0), -- rfc856
	timemark(1), -- rfc860
	endOfRecord(2), -- rfc885
	terminalType(3), -- rfc1091
	tn3270Regime(4), -- rfc1041
	scsCtlCodes(5), -- rfc1647
	dataStreamCtl(6), -- rfc1647
	responses(7), -- rfc1647
	bindImage(8), -- rfc1647
	sysreq(9) -- rfc1647
	}

Tn3270DeviceTypes ::= TEXTUAL-CONVENTION

STATUS	current
DESCRIPTION	"This textual convention defines the list of device types that can be set as defined by RFC 1647 ."
SYNTAX	INTEGER { -- terminals
	unknown(0),
	ibm3278d2(1), -- (24 row x 80 col display)
	ibm3278d2E(2), -- (24 row x 80 col display)
	ibm3278d3(3), -- (32 row x 80 col display)
	ibm3278d3E(4), -- (32 row x 80 col display)
	ibm3278d4(5), -- (43 row x 80 col display)
	ibm3278d4E(6), -- (43 row x 80 col display)
	ibm3278d5(7), -- (27 row x 132 col display)
	ibm3278d5E(8), -- (27 row x 132 col display)
	ibmDynamic(9), -- (no pre-defined display size)
	ibm3287d1(10) -- printers

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```

}

-- Top-level structure of the MIB

tn3270eNotifications OBJECT IDENTIFIER ::= { tn3270eMIB 0 }
tn3270eObjects        OBJECT IDENTIFIER ::= { tn3270eMIB 1 }
tn3270eConformance    OBJECT IDENTIFIER ::= { tn3270eMIB 3 }

-- MIB Objects

tn3270eSrvrConfTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF Tn3270eSrvrConfEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table defines the configuration elements for
     TN3270E Servers. The number of entries in this table
     is expected to vary depending on the location of the
     table. A particular TN3270E Server is expected to
     have a single entry. Modeling of the configuration
     elements as a table allows multiple
     TN3270E Servers to exist at the same host."
  ::= { tn3270eObjects 1 }

tn3270eSrvrConfEntry OBJECT-TYPE
  SYNTAX      Tn3270eSrvrConfEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Definition of the configuration elements for a single
     TN3270E Server."
  INDEX      { tn3270eSrvrConfIndex }
  ::= { tn3270eSrvrConfTable 1 }

Tn3270eSrvrConfEntry ::= SEQUENCE {
  tn3270eSrvrConfIndex          Unsigned32,
  tn3270eSrvrConfInactivityTimeout Unsigned32,
  tn3270eSrvrConfActivityCheck   INTEGER,
  tn3270eSrvrConfActivityTimeout Unsigned32,
  tn3270eSrvrConfActivityInterval Unsigned32,
  tn3270eSrvrFunctionsSupported  Tn3270Functions,
  tn3270eSrvrConfAdminStatus     INTEGER,
  tn3270eSrvrConfOperStatus      INTEGER,
  tn3270eSrvrConfSessionTermState INTEGER,
  tn3270eSrvrConfSrvrType        INTEGER,
  tn3270eSrvrConfRowStatus       RowStatus
}

```

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```
tn3270eSrvrConfIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Indicates the instance of a TN3270E Server that
         exists at a IP Host."
    ::= { tn3270eSrvrConfEntry 1 }

tn3270eSrvrConfInactivityTimeout OBJECT-TYPE
    SYNTAX      Unsigned32 (0..99999999)
    UNITS "seconds"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The inactivity time-out specified in seconds. When a
         connection has been inactive for the number of seconds
         specified by this object it is closed. The default of
         0 means no inactivity time-out."
    DEFVAL { 0 }
    ::= { tn3270eSrvrConfEntry 2 }

tn3270eSrvrConfActivityCheck OBJECT-TYPE
    SYNTAX      INTEGER {
                    noCheck(0),
                    timeMark(1),
                    nop(2)
                }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object is intended to enable either timemark or
         nop processing."
    DEFVAL { noCheck }
    ::= { tn3270eSrvrConfEntry 3 }

tn3270eSrvrConfActivityTimeout OBJECT-TYPE
    SYNTAX      Unsigned32 (1..99999999)
    UNITS "seconds"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The TIMEMARK or NOP processing time-out specified in seconds.
         Note that a value of 0 is not allowed for this object since
         the function that uses this object relies on
         tn3270eSrvrConfActivityCheck for function enablement."
    DEFVAL { 600 }    -- 10 minutes
    ::= { tn3270eSrvrConfEntry 4 }
```

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```
tn3270eSrvrConfActivityInterval OBJECT-TYPE
    SYNTAX      Unsigned32 (1..99999999)
    UNITS "seconds"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The scan interval to be used by a TN3270E Server.
         TIMEMARK or NOP processing scans the Telnet sessions
         on the interval provided by this object looking for
         sessions that have been idle for more than the value
         provided by tn3270eSrvrConfActivityTimeout.
         Note that a value of 0 is not allowed for this object since
         the function that uses this object relies on
         tn3270eSrvrConfActivityCheck for function enablement."
    DEFVAL { 120 } -- 2 minutes
    ::= { tn3270eSrvrConfEntry 5 }

tn3270eSrvrFunctionsSupported OBJECT-TYPE
    SYNTAX      Tn3270Functions
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the functions supported by a
         TN3270E Server."
    DEFVAL { { scsCtlCodes, dataStreamCtl,
              responses, bindImage, sysreq } }
    ::= { tn3270eSrvrConfEntry 6 }

tn3270eSrvrConfAdminStatus OBJECT-TYPE
    SYNTAX  INTEGER {
                up(1),
                down(2),
                stopImmediate(3)
            }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The desired state of the TN3270E Server:

            up(1)          - Activate a TN3270E Server.
            down(2)         - Informs the associating TN3270E Server
                            to gracefully terminate its processing.
            stopImmediate(3) - Informs the associating TN3270E Server
                            to terminate immediately.

        Implementation as to the exact symantics of either down(2)
        or stopImmediate(3) processing is left as implementation
        dependent. A TN3270E Server that does not distinguish
```

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```
        between down or stopImmediate transitions should not
        support stopImmediate."
 ::= { tn3270eSrvrConfEntry 7 }

tn3270eSrvrConfOperStatus OBJECT-TYPE
    SYNTAX  INTEGER {
                up(1),
                down(2)
            }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The current operational state of a TN3270E Server:
         up(1) - The corresponding TN3270E Server is active.
         down(2) - The corresponding TN3270E Server is inactive."
 ::= { tn3270eSrvrConfEntry 8 }

tn3270eSrvrConfSessionTermState OBJECT-TYPE
    SYNTAX  INTEGER {
                terminate(1),
                luSessionPend(2),
                queueSession(3)
            }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The current state for determining what a TN3270E Server
         should do when a TN3270 Session terminates:
         terminate(1) => Terminate TCP connection.
         luSessionPend(2) => Do not drop the TCP Connection
                            associated with a IP Client when their
                            TN3270 Session ends. Processing should
                            redrive session initialization as if the
                            client was first connecting.
         queueSession(3) => QUEUESSESSION deals with CLSDST-Pass.
                            An example is the easiest explanation.
                            Assume APPL1 does a CLSDST-Pass
                            to APPL2. Then the client logs off APPL
                            Without QUEUESSESSION the connection
                            would now be broken. With QUEUESSESSION
                            the TN3270E Server keeps the LU around
                            after getting the APPL2 unbind waiting
                            for a bind from APPL1."
    DEFVAL { terminate }
 ::= { tn3270eSrvrConfEntry 9 }
```

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```
tn3270eSrvrConfSrvrType OBJECT-TYPE
  SYNTAX      INTEGER {
                unknown(0),
                host(1),
                gateway(2)
            }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "This object indicates the type of TN3270E Server.
     The existence of MIB tables and objects that will be
     defined by follow-on MIBs may be predicated on whether the
     TN3270E Server can be local to the same host as a
     Target Application (host(1)) or will always be remote
     (gateway(2))."
 ::= { tn3270eSrvrConfEntry 10 }

tn3270eSrvrConfRowStatus OBJECT-TYPE
  SYNTAX      RowStatus
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "This object allows entries to be created and deleted in the
     tn3270eSrvrConfTable.

     An entry in this table is deleted by setting this object
     to destroy(6)."
  REFERENCE
    "RFC 1903, 'Textual Conventions for version 2 of the Simple
     Network Management Protocol (SNMPv2).'"
 ::= { tn3270eSrvrConfEntry 11 }

tn3270eSrvrPortTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF Tn3270eSrvrPortEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table defines the TCP ports associated with TN3270E
     Servers."
 ::= { tn3270eObjects 2 }

tn3270eSrvrPortEntry OBJECT-TYPE
  SYNTAX      Tn3270eSrvrPortEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Definition of a single TCP port assignment to a
     TN3270E Server."
```

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```
INDEX      { tn3270eSrvrConfIndex, tn3270eSrvrPort }
 ::= { tn3270eSrvrPortTable 1 }

Tn3270eSrvrPortEntry ::= SEQUENCE {
    tn3270eSrvrPort          Unsigned32,
    tn3270eSrvrPortRowStatus RowStatus
}

tn3270eSrvrPort OBJECT-TYPE
SYNTAX      Unsigned32 (0..65535)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Indicates a port assigned to a server."
 ::= { tn3270eSrvrPortEntry 1 }

tn3270eSrvrPortRowStatus OBJECT-TYPE
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object allows entries to be created and deleted in the
tn3270eSrvrPortTable.

An entry in this table is deleted by setting this object
to destroy(6)."
REFERENCE
    "RFC 1903, 'Textual Conventions for version 2 of the Simple
Network Management Protocol (SNMPv2).'"
 ::= { tn3270eSrvrPortEntry 2 }

tn3270eSrvrStatsTable OBJECT-TYPE
SYNTAX      SEQUENCE OF Tn3270eSrvrStatsEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table defines a set of statistics concerning
global TN3270E Server performance."
 ::= { tn3270eObjects 3 }

tn3270eSrvrStatsEntry OBJECT-TYPE
SYNTAX      Tn3270eSrvrStatsEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Collection of a set of statistic objects for a single
TN3270 Server."
INDEX      { tn3270eSrvrConfIndex }
```

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```
::= { tn3270eSrvrStatsTable 1 }

Tn3270eSrvrStatsEntry ::= SEQUENCE {
    tn3270eSrvrStatsUpTime          TimeTicks,
    tn3270eSrvrStatsMaxLus          Unsigned32,
    tn3270eSrvrStatsLusInUse        Gauge32,
    tn3270eSrvrStatsSpareLus       Gauge32,
    tn3270eSrvrStatsMaxPtrs         Unsigned32,
    tn3270eSrvrStatsPtrsInUse      Gauge32,
    tn3270eSrvrStatsSparePtrs      Gauge32,
    tn3270eSrvrStatsConnectsIn     Counter32,
    tn3270eSrvrStatsConnRejects    Counter32,
    tn3270eSrvrStatsDisconnects   Counter32
}
```

```
tn3270eSrvrStatsUpTime OBJECT-TYPE
    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the amount of time that a particular TN3270E
         has been active. This is total time since the server was
         started and is not reset on tn3270eSrvrConfOperStatus."
::= { tn3270eSrvrStatsEntry 1 }
```

```
tn3270eSrvrStatsMaxLus OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the maximum number of LUs for use by a
         TN3270E Server."
::= { tn3270eSrvrStatsEntry 2 }
```

```
tn3270eSrvrStatsLusInUse OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the current number of LUs in use by a
         TN3270E Server."
::= { tn3270eSrvrStatsEntry 3 }
```

```
tn3270eSrvrStatsSpareLus OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

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```
"Indicates the number of free LUs for a particular TN3270E
Server. It is possible that the difference between
tn3270eSrvrStatsMaxLus and tn3270eSrvrStatsLusInUse does
not equal tn3270eSrvrStatsSpareLus. An LU may exist
but not be useable by a IP Client connection."
 ::= { tn3270eSrvrStatsEntry 4 }

tn3270eSrvrStatsMaxPtrs OBJECT-TYPE
 SYNTAX      Unsigned32
 MAX-ACCESS  read-only
 STATUS      current
 DESCRIPTION
 "Indicates the maximum number of Printer Resources for use by a
 TN3270E Server."
 ::= { tn3270eSrvrStatsEntry 5 }

tn3270eSrvrStatsPtrsInUse OBJECT-TYPE
 SYNTAX      Gauge32
 MAX-ACCESS  read-only
 STATUS      current
 DESCRIPTION
 "Indicates the current number of Printer Resources in use by a
 TN3270E Server."
 ::= { tn3270eSrvrStatsEntry 6 }

tn3270eSrvrStatsSparePtrs OBJECT-TYPE
 SYNTAX      Gauge32
 MAX-ACCESS  read-only
 STATUS      current
 DESCRIPTION
 "Indicates the number of free Printer Resources for a
 particular TN3270E Server. It is possible that the
 difference between tn3270eSrvrStatsMaxPtrs and
 tn3270eSrvrStatsPtrsInUse does not equal
 tn3270eSrvrStatsSparePtrs. A Printer resource may
 exist but not be useable by a IP Client connection."
 ::= { tn3270eSrvrStatsEntry 7 }

tn3270eSrvrStatsConnectsIn OBJECT-TYPE
 SYNTAX      Counter32
 MAX-ACCESS  read-only
 STATUS      current
 DESCRIPTION
 "Indicates the number of client connections received by a
 TN3270E Server."
 ::= { tn3270eSrvrStatsEntry 8 }

tn3270eSrvrStatsConnRejects OBJECT-TYPE
```

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SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Indicates the number of client connections rejected during connection setup. An example of this is when no LU or Printer resource is available to associate with the TCP Connection of a IP Client."
 ::= { tn3270eSrvrStatsEntry 9 }

tn3270eSrvrStatsDisconnects OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Indicates the number of client connections disconnected by a TN3270E Server."
 ::= { tn3270eSrvrStatsEntry 10 }

tn3270eIpGroupTable OBJECT-TYPE
SYNTAX SEQUENCE OF Tn3270eIpGroupEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table defines IP Address groupings for use by a TN3270E Server."
 ::= { tn3270eObjects 4 }

tn3270eIpGroupEntry OBJECT-TYPE
SYNTAX Tn3270eIpGroupEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Definition of a single IP Address entry. All entries with the same first two indexes, tn3270eSrvrConfIndex and tn3270eIpGroupName, are considered to be in the same IP Group."
INDEX { tn3270eSrvrConfIndex,
tn3270eIpGroupName,
tn3270eIpGroupIpAddress }
 ::= { tn3270eIpGroupTable 1 }

Tn3270eIpGroupEntry ::= SEQUENCE {
tn3270eIpGroupName DisplayString,
tn3270eIpGroupIpAddress IPAddress,
tn3270eIpGroupSubnetMask IPAddress,
tn3270eIpGroupRowStatus RowStatus }

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```
tn3270eIpGroupName OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(1..24))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The name of a IP Group."
    ::= { tn3270eIpGroupEntry 1 }

tn3270eIpGroupIpAddress OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP Address of a member of a IP Group."
    ::= { tn3270eIpGroupEntry 2 }

tn3270eIpGroupSubnetMask OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The corresponding subnet mask associated with
         tn3270eIpGroupIpAddress. A single IP Address
         is represented by having this object contain
         the value of 255.255.255.255."
    DEFVAL { 'FFFFFFF' }
    ::= { tn3270eIpGroupEntry 3 }

tn3270eIpGroupRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object allows entries to be created and deleted in the
         tn3270eIpGroupTable.

         An entry in this table is deleted by setting this object
         to destroy(6)."
    REFERENCE
        "RFC 1903, 'Textual Conventions for version 2 of the Simple
         Network Management Protocol (SNMPv2).'"
    ::= { tn3270eIpGroupEntry 4 }

tn3270eResPoolTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Tn3270eResPoolEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

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```
"This table defines Resource groupings and using the term
pool as defined by RFC 1647."
 ::= { tn3270eObjects 5 }

tn3270eResPoolEntry OBJECT-TYPE
 SYNTAX      Tn3270eResPoolEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
   "Definition of a single Resource Pool member. All entries
    with the same first two indexes, tn3270eSrvrConfIndex and
    tn3270eResPoolName, are considered to be in the same Pool."
 INDEX   { tn3270eSrvrConfIndex,
            tn3270eResPoolName,
            tn3270eResPoolElementName }
 ::= { tn3270eResPoolTable 1 }

Tn3270eResPoolEntry ::= SEQUENCE {
  tn3270eResPoolName          DisplayString,
  tn3270eResPoolElementName   DisplayString,
  tn3270eResPoolElementType   Tn3270ResourceType,
  tn3270eResPoolRowStatus     RowStatus }

tn3270eResPoolName OBJECT-TYPE
 SYNTAX      DisplayString (SIZE(1..24))
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
   "The name of a Resource Pool.."
 ::= { tn3270eResPoolEntry 1 }

tn3270eResPoolElementName OBJECT-TYPE
 SYNTAX      DisplayString (SIZE(1..8))
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
   "The Name of a member of a Resource Pool."
 ::= { tn3270eResPoolEntry 2 }

tn3270eResPoolElementType OBJECT-TYPE
 SYNTAX      Tn3270ResourceType
 MAX-ACCESS  read-create
 STATUS      current
 DESCRIPTION
   "The type of the entity in a Resource Pool."
 ::= { tn3270eResPoolEntry 3 }

tn3270eResPoolRowStatus OBJECT-TYPE
```

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SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object allows entries to be created and deleted in the tn3270eResPoolTable.

An entry in this table is deleted by setting this object to destroy(6)."

REFERENCE
[RFC 1903](#), 'Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2).'
::= { tn3270eResPoolEntry 4 }

tn3270eIpResMapTable OBJECT-TYPE
SYNTAX SEQUENCE OF Tn3270eIpResMapEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table defines Resource Pool to IP Group mappings.
Since both the Resource Pool Name and IP Group Name are included in the index clause of this table multiple Resource Pools can be assigned to the same IP Group. This enables use of multiple Resource Pools for use in IP to resource mapping. Assigning multiple IP Groups to the same Resource Pool is also allowed but is not the primary purpose for how the indexing is structured.

Assignment of Resource Pool to IP Group can be restricted based on TCP Port. A index value of 0 for tn3270eIpResMapClientPort disables restriction of resource assignment based on IP Client target port selection."
::= { tn3270eObjects 6 }

tn3270eIpResMapEntry OBJECT-TYPE
SYNTAX Tn3270eIpResMapEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Definition of a single Resource Pool to IP Group mapping."
INDEX { tn3270eSrvrConfIndex,
tn3270eIpResMapPoolName,
tn3270eIpResMapIpGroupName,
tn3270eIpResMapClientPort }
::= { tn3270eIpResMapTable 1 }

Tn3270eIpResMapEntry ::= SEQUENCE {
tn3270eIpResMapPoolName DisplayString,

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```
tn3270eIpResMapIpGroupName    DisplayString,  
tn3270eIpResMapClientPort     Unsigned32,  
tn3270eIpResMapRowStatus      RowStatus }
```

```
tn3270eIpResMapPoolName OBJECT-TYPE  
SYNTAX      DisplayString (SIZE(1..24))  
MAX-ACCESS  not-accessible  
STATUS      current  
DESCRIPTION  
    "The name of a Resource Pool."  
::= { tn3270eIpResMapEntry 1 }
```

```
tn3270eIpResMapIpGroupName OBJECT-TYPE  
SYNTAX      DisplayString (SIZE(1..24))  
MAX-ACCESS  not-accessible  
STATUS      current  
DESCRIPTION  
    "The name of the IP Group that is mapped to a  
    Resource Pool."  
::= { tn3270eIpResMapEntry 2 }
```

```
tn3270eIpResMapClientPort OBJECT-TYPE  
SYNTAX      Unsigned32 (0..65535)  
MAX-ACCESS  not-accessible  
STATUS      current  
DESCRIPTION  
    "The port to restrict a Resource Pool to a IP Group  
    mapping. A value of 0 for this objects implies that  
    the mapping is not restricted."  
::= { tn3270eIpResMapEntry 3 }
```

```
tn3270eIpResMapRowStatus OBJECT-TYPE  
SYNTAX      RowStatus  
MAX-ACCESS  read-create  
STATUS      current  
DESCRIPTION  
    "This object allows entries to be created and deleted in the  
    tn3270eIpResMapTable.
```

An entry in this table is deleted by setting this object
to destroy(6)."

REFERENCE
 "[RFC 1903](#), 'Textual Conventions for version 2 of the Simple
 Network Management Protocol (SNMPv2).'"
::= { tn3270eIpResMapEntry 4 }

```
tn3270eResMapTable OBJECT-TYPE  
SYNTAX      SEQUENCE OF Tn3270eResMapEntry
```

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```
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table defines the actual mapping of a resource to
     a IP Address."
 ::= { tn3270eObjects 7 }

tn3270eResMapEntry OBJECT-TYPE
 SYNTAX      Tn3270eResMapEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
    "Definition of the mapping of a Resource Element to
     a IP Address."
INDEX  { tn3270eSrvrConfIndex,
          tn3270eResMapElementName,
          tn3270eResMapIpAddress }
 ::= { tn3270eResMapTable 1 }

Tn3270eResMapEntry ::= SEQUENCE {
    tn3270eResMapElementName      DisplayString,
    tn3270eResMapIpAddress        IpAddress,
    tn3270eResMapElementType      Tn3270ResourceType }

tn3270eResMapElementName OBJECT-TYPE
 SYNTAX      DisplayString (SIZE(1..8))
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
    "The Name of a resource element."
 ::= { tn3270eResMapEntry 1 }

tn3270eResMapIpAddress OBJECT-TYPE
 SYNTAX      IpAddress
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
    "A client IP Address."
 ::= { tn3270eResMapEntry 2 }

tn3270eResMapElementType OBJECT-TYPE
 SYNTAX      Tn3270ResourceType
 MAX-ACCESS  read-only
 STATUS      current
 DESCRIPTION
    "The type of the associating resource element/"
 ::= { tn3270eResMapEntry 3 }
```

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-- Define the set of objects to add to the Tcp Connection Table

tn3270eTcpConnTable OBJECT-TYPE
SYNTAX SEQUENCE OF Tn3270eTcpConnEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Extends tcpConnTable to support TN3270 and TN3270E
performance monitoring."
 ::= { tn3270eObjects 8 }

tn3270eTcpConnEntry OBJECT-TYPE
SYNTAX Tn3270eTcpConnEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Provides information about a single TN3270/TN3270E
session."
INDEX { tcpConnLocalAddress, tcpConnLocalPort,
tcpConnRemAddress, tcpConnRemPort }
 ::= { tn3270eTcpConnTable 1 }

Tn3270eTcpConnEntry ::=
SEQUENCE
{
tn3270eTcpConnLastActivity TimeTicks,
tn3270eTcpConnBytesIn Counter32,
tn3270eTcpConnBytesOut Counter32,
tn3270eTcpConnResourceName DisplayString,
tn3270eTcpConnResourceType Tn3270ResourceType,
tn3270eTcpConnDeviceType Tn3270DeviceTypes,
tn3270eTcpConnFunctions Tn3270Functions
}

tn3270eTcpConnLastActivity OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of 100ths of seconds since any data was
transferred for the associating TCP Connection."
DEFVAL { 0 }
 ::= { tn3270eTcpConnEntry 1 }

tn3270eTcpConnBytesIn OBJECT-TYPE
SYNTAX Counter32
UNITS "octets"
MAX-ACCESS read-only

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```
STATUS current
DESCRIPTION
    "The number of bytes received by the Server from TCP
     for this connection."
 ::= { tn3270eTcpConnEntry 2 }

tn3270eTcpConnBytesOut OBJECT-TYPE
SYNTAX Counter32
UNITS "octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of bytes sent to TCP for this connection."
 ::= { tn3270eTcpConnEntry 3 }

tn3270eTcpConnResourceName OBJECT-TYPE
SYNTAX DisplayString (SIZE(0..8))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "LU/Print secondary name for connecting a IP Client
     into a SNA network."
 ::= { tn3270eTcpConnEntry 4 }

tn3270eTcpConnResourceType OBJECT-TYPE
SYNTAX Tn3270ResourceType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Indicates the type of resource identified by
     tn3270eTcpConnResourceName."
 ::= { tn3270eTcpConnEntry 5 }

tn3270eTcpConnDeviceType OBJECT-TYPE
SYNTAX Tn3270DeviceTypes
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Indicates the device type if negotiated with client.
     This object is also known as logmode."
 ::= { tn3270eTcpConnEntry 6 }

tn3270eTcpConnFunctions OBJECT-TYPE
SYNTAX Tn3270Functions
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "This object will indicates which of the TN3270 and TN3270E
```

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functions that are supported by the Server was negotiated
with a client. Refer to tn3270eSrvrFunctionsSupported."
 ::= { tn3270eTcpConnEntry 7 }

-- Conformance Definitions

tn3270eGroups OBJECT IDENTIFIER ::= { tn3270eConformance 1 }
tn3270eCompliances OBJECT IDENTIFIER ::= { tn3270eConformance 2 }

-- compliance statements

tn3270eCompliance MODULE-COMPLIANCE
 STATUS current
DESCRIPTION
 "The compliance statement for agents that support the
 TN3270E-MIB."
MODULE -- this module
 MANDATORY-GROUPS { tn3270eBasicGroup,
 tn3270eSessionGroup
 }
OBJECT tn3270eSrvrConfActivityCheck
 MIN-ACCESS read-only
DESCRIPTION
 "The agent is not required to support a set to this
 object if the associating TN3270E Server doesn't
 support either TIMEMARK or NOP processing. In
 this case an agent should return noCheck on
 retrieval."
OBJECT tn3270eSrvrConfActivityTimeout
 MIN-ACCESS read-only
DESCRIPTION
 "The agent is not required to support a set to this
 object if the functions enabled by
 tn3270eSrvrConfActivityCheck are not supported.
 An agent in this case should return a value of 0."
OBJECT tn3270eSrvrConfActivityInterval
 MIN-ACCESS read-only
DESCRIPTION
 "The agent is not required to support a set to this
 object if the functions enabled by
 tn3270eSrvrConfActivityCheck are not supported.
 An agent in this case should return a value of 0."
OBJECT tn3270eSrvrConfAdminStatus
DESCRIPTION
 "A TN3270E Server is not required to support a
 stopImmediate state transition."
 ::= { tn3270eCompliances 1 }

-- units of conformance

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```
tn3270eBasicGroup OBJECT-GROUP
OBJECTS {
    tn3270eSrvrConfInactivityTimeout,
    tn3270eSrvrConfActivityCheck,
    tn3270eSrvrConfActivityTimeout,
    tn3270eSrvrConfActivityInterval,
    tn3270eSrvrFunctionsSupported,
    tn3270eSrvrConfAdminStatus,
    tn3270eSrvrConfOperStatus,
    tn3270eSrvrConfSessionTermState,
    tn3270eSrvrConfSrvrType,
    tn3270eSrvrConfRowStatus,
    tn3270eSrvrPortRowStatus,
    tn3270eSrvrStatsUpTime,
    tn3270eSrvrStatsMaxLus,
    tn3270eSrvrStatsLusInUse,
    tn3270eSrvrStatsSpareLus,
    tn3270eSrvrStatsMaxPtrs,
    tn3270eSrvrStatsPtrsInUse,
    tn3270eSrvrStatsSparePtrs,
    tn3270eSrvrStatsConnectsIn,
    tn3270eSrvrStatsConnRejects,
    tn3270eSrvrStatsDisconnects,
    tn3270eIpGroupSubnetMask,
    tn3270eIpGroupRowStatus,
    tn3270eResPoolElementType,
    tn3270eResPoolRowStatus,
    tn3270eIpResMapRowStatus
}
STATUS current
DESCRIPTION
"This group is mandatory for all hosts supporting the
TN3270E-MIB."
::= { tn3270eGroups 1 }

tn3270eSessionGroup OBJECT-GROUP
OBJECTS {
    tn3270eResMapElementType,
    tn3270eTcpConnLastActivity,
    tn3270eTcpConnBytesIn,
    tn3270eTcpConnBytesOut,
    tn3270eTcpConnResourceName,
    tn3270eTcpConnResourceType,
    tn3270eTcpConnDeviceType,
    tn3270eTcpConnFunctions
}
STATUS current
DESCRIPTION
```

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```
"This group is mandatory for all hosts supporting the  
TN3270E-MIB."  
 ::= { tn3270eGroups 2 }
```

END

5. 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. The method for this authentication is a function of the SNMP Administrative Framework, and has not been expanded by this MIB.

Several objects in this MIB allow write access or provide for remote creation. Allowing this support in a non-secure environment can have a negative effect on network operations. It is recommended that implementers seriously consider whether set operations should be allowed without providing, at a minimum, authentication of request origin. It is recommended that without such support that the following objects be implemented as read-only:

- o tn3270eSrvrConfInactivityTimout
- o tn3270eSrvrConfActivityCheck
- o tn3270eSrvrConfActivityTimeout
- o tn3270eSrvrConfActivityInterval
- o tn3270eSrvrConfAdminStatus
- o tn3270eSrvrConfSessionTermState
- o tn3270eIpGroupSubnetMask
- o tn3270eResPoolElementType

The following objects should either be implemented as read-only or not implemented when security is an issue as previously discussed:

- o tn3270eSrvrConfRowStatus
- o tn3270eSrvrPortRowStatus
- o tn3270eIpGroupRowStatus
- o tn3270eResPoolRowStatus
- o tn3270eResMapRowStatus

6. Acknowledgments

This document is a product of the TN3270E Working Group.

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7. References

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- [2] Network Working Group, Postel, J., and Reynolds, J., "Telnet Protocol Specification", [RFC 854](#), May 1983.
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- [4] Network Working Group and Rekhter J., "Telnet 3270 Regime Option", [RFC 1041](#), January 1988.
- [5] McCloghrie, K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, [RFC 1213](#), Hughes LAN Systems, Performance Systems International, March 1991.
- [6] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1903](#), January 1996.
- [7] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), January 1996.
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- [9] Case, J., M. Fedor, M. Schoffstall, J. Davin, "Simple Network Management Protocol", [RFC 1157](#), SNMP Research, Performance Systems International, MIT Laboratory for Computer Science, May 1990.
- [10] IETF SNMPv2 Working Group and McCloghrie, K., "TCP-MIB

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