

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 Monitoring. 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.

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

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

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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 TCP Connection Table Additions

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 TN3270 and TN3270E configuration and consists of:

- o tn3270eSrvrConfTable
- o tn3270eSrvrPortTable
- o tn3270eSrvrStatsTable

### [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 the local IP Address (tn3270eSrvrConfIpAddress) and a unsigned integer (tn3270eSrvrConfIndex). The primary index, tn3270eSrvrConfIpAddress, was added to the tables in order for the tables to be used at both a TN3270E Server host implementation as well as by a management application that supports multiple TN3270E capable hosts. The second index element, tn3270eSrvrConfIndex, was added in order to support multiple TN3270E Servers on the same host.

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 tn3270eSrvrConfActivityOption was defined to enable sending of a NOP command as oppose to 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. tn3270eSrvrConfProtoSupported indicates which of the TN3270 and TN3270E options that a server supports. 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 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.

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## [3.2.](#) TN3270E Server Resource Configuration

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

- o tn3270eIpGroupTable
- o tn3270eResPoolTable
- o tn3270eResMapTable
- o tn3270eIpMapTable

[3.2.1.](#) 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 tn3270eResPoolIpGroupName. Creating an entry in the tn3270eResPoolTable results in creation of an entry or entries in both the tn3270eResMapTable and tn3270eIpMapTable. Both the tn3270eIpGroupTable and the tn3270eResPoolTable are optional since not every TN3270E Server has the ability to define their IP to Resource mappings in this manner. tn3270eResPoolClientPort exists to enable implementations to restrict a collection of resources to a particular

local port. This object is optional since not every implementation provides this type of support.

### [3.2.2.](#) tn3270eResMapTable and tn3270eIpMapTable

The tables: tn3270eResMapTable and tn3270eIpMapTable provide mappings of IP Address(es) to Resource(s) and Resource(s) to IP Address(es). The index objects, tn3270eResMapClientPort and tn3270eIpMapClientPort, as allowed to be zero when these tables are implemented by TN3270E Servers that do provide local port to resource mapping.

### 3.3. 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 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)

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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, Integer32, IPAddress, TimeTicks,
Counter32
    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 "9706200000Z" -- June 20, 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 }
```

-- Textual Conventions

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

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```
        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](#)

scsCtlCodes        (Printer sessions only). Allows the use 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



```

        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
              }

```

DeviceTypes ::= 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
              }

```

-- 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 TN3270 Servers. The number of entries in this table is expected to vary depending on the location of the table. A particular TN3270 Server is expected to have a single entry. Modeling of the configuration elements as a table enable use of the table by management applications as well as allowing multiple TN3270 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 TN3270 Server."

INDEX      { tn3270eSrvrConfIpAddress, tn3270eSrvrConfIndex }

::= { tn3270eSrvrConfTable 1 }

Tn3270eSrvrConfEntry ::= SEQUENCE {

tn3270eSrvrConfIpAddress	IpAddress,
tn3270eSrvrConfIndex	Unsigned32,
tn3270eSrvrConfInactivityTimer	Unsigned32,
tn3270eSrvrConfActivityCheck	INTEGER,
tn3270eSrvrConfActivityTimeout	Unsigned32,
tn3270eSrvrConfActivityInterval	Unsigned32,
tn3270eSrvrConfProtoSupported	Tn3270Functions,
tn3270eSrvrConfAdminStatus	INTEGER,
tn3270eSrvrConfOperStatus	INTEGER,
tn3270eSrvrConfSessionTermState	INTEGER,
tn3270eSrvrConfSrvrType	INTEGER,
tn3270eSrvrConfRowStatus	RowStatus

}

tn3270eSrvrConfIpAddress OBJECT-TYPE

SYNTAX      IpAddress

MAX-ACCESS not-accessible

STATUS      current

DESCRIPTION

"Indicates the local IP Address associated with a TN3270

Server. A value of 0 is allowed when the entry exists at a single TN3270 Server instance host."

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::= { tn3270eSrvrConfEntry 1 }

tn3270eSrvrConfIndex OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Indicates the instance of a TN3270/TN3270E Server that exists at the IP Host pointed to by tn3270eSrvrConfIpAddress."

::= { tn3270eSrvrConfEntry 2 }

tn3270eSrvrConfInactivityTimer 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 3 }

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 4 }

tn3270eSrvrConfActivityTimeout OBJECT-TYPE

```
SYNTAX      Unsigned32
UNITS "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The TIMEMARK or NOP processing time-out specified in seconds."
DEFVAL { 600 } -- 10 minutes
 ::= { tn3270eSrvrConfEntry 5 }
```

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tn3270eSrvrConfActivityInterval OBJECT-TYPE

```
SYNTAX      Unsigned32
UNITS "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The scan interval to be used by the Telnet 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."
DEFVAL { 120 } -- 2 minutes
 ::= { tn3270eSrvrConfEntry 6 }
```

tn3270eSrvrConfProtoSupported OBJECT-TYPE

```
SYNTAX      Tn3270Functions
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object indicates the TN3270 functions supported by a
    TN3270 Server."
DEFVAL { { scsCtlCodes, dataStreamCtl,
           responses, bindImage, sysreq } }
 ::= { tn3270eSrvrConfEntry 7 }
```

tn3270eSrvrConfAdminStatus OBJECT-TYPE

```
SYNTAX      INTEGER {
                up(1),
                down(2),
                stopImmediate(3)
            }
MAX-ACCESS  read-create
```

```
STATUS      current
DESCRIPTION
    "The desired state of the Telnet Server. The stopImmediate
    state is intended to enable Servers to gracefully terminate
    via down or to terminate immediate without ending its
    client connections. There is no requirement for support
    of stopImmediate."
 ::= { tn3270eSrvrConfEntry 8 }
```

```
tn3270eSrvrConfOperStatus OBJECT-TYPE
SYNTAX  INTEGER {
                up(1),
                down(2)
            }
MAX-ACCESS  read-only
STATUS      current
```

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```
DESCRIPTION
    "The current operational state of the Telnet Server."
 ::= { tn3270eSrvrConfEntry 9 }
```

```
tn3270eSrvrConfSessionTermState OBJECT-TYPE
SYNTAX  INTEGER {
                terminate(1),
                luSessionPend(2),
                queueSession(3)
            }
MAX-ACCESS  read-create
STATUS      current
```

```
DESCRIPTION
    "The current state for determining what happens when
    Telnet connection terminates:

    terminate(1)      => Terminate connection.
    luSessionPend(2) => Allows the client's session to revert
                        to their Default Application upon
                        termination of their Telnet connection.
    queueSession(3)  => ????"
DEFVAL { terminate }
 ::= { tn3270eSrvrConfEntry 10 }
```

```
tn3270eSrvrConfSrvrType OBJECT-TYPE
```

```
SYNTAX      INTEGER {
                unknown(0),
                host(1),
                gateway(2)
            }
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

DESCRIPTION

"This object indicates the type of TN3270/TN3270E Server. The existence of MIB tables and objects that will be defined by follow-on MIBs may be predicated on whether the TN3270/TN3270E Server is local to the same host as the secondary LU used to attach the IP client into a SNA network."

```
::= { tn3270eSrvrConfEntry 11 }
```

tn3270eSrvrConfRowStatus OBJECT-TYPE

```
SYNTAX      RowStatus
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

DESCRIPTION

"This object allows entries to be created and deleted in the tn3270eSrvrConfTable. Creating an entry in this table

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at a management application informs enable that application to manage the associating TN3270 Server. Deleting an entry removes it from that application's management domain.

A server based implementation of this table may chose to not support creation or deletion of its (probably only) entry in this table via this object.

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 12 }
```

tn3270eSrvrPortTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF Tn3270eSrvrPortEntry
```

```
MAX-ACCESS  not-accessible
```

STATUS current  
DESCRIPTION  
"This table defines the ports associated with TN3270/  
TN3270E Servers."  
 ::= { tn3270eObjects 2 }

tn3270eSrvrPortEntry OBJECT-TYPE  
SYNTAX Tn3270eSrvrPortEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"Definition of a single server port assignment."  
INDEX { tn3270eSrvrConfIpAddress, 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 TN3270 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       { tn3270eSrvrConfIpAddr, tn3270eSrvrConfIndex }  
 ::= { tn3270eSrvrStatsTable 1 }
```

```
Tn3270eSrvrStatsEntry ::= SEQUENCE {  
    tn3270eSrvrStatsUpTime      TimeTicks,  
    tn3270eSrvrStatsMaxLus      Integer32,  
    tn3270eSrvrStatsLusInUse    Integer32,  
    tn3270eSrvrStatsSpareLus    Integer32,  
    tn3270eSrvrStatsMaxPtrs     Integer32,  
    tn3270eSrvrStatsPtrsInUse   Integer32,  
    tn3270eSrvrStatsSparePtrs   Integer32,  
    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 TN3270
```



has be active. This is total time since the server was started and is not reset on tn3270eSrvrConfOperStatus."  
 ::= { tn3270eSrvrStatsEntry 1 }

tn3270eSrvrStatsMaxLus OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the maximum number of LUs for use by a TN3270 Server."

::= { tn3270eSrvrStatsEntry 2 }

tn3270eSrvrStatsLusInUse OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the current number of LUs in use by a TN3270 Server."

::= { tn3270eSrvrStatsEntry 3 }

tn3270eSrvrStatsSpareLus OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of free LUs for a particular TN3270 Server."

::= { tn3270eSrvrStatsEntry 4 }

tn3270eSrvrStatsMaxPtrs OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the maximum number of Printer Resources for use by a TN3270 Server."

::= { tn3270eSrvrStatsEntry 5 }

tn3270eSrvrStatsPtrsInUse OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the current number of Printer Resources in use by a TN3270 Server."

::= { tn3270eSrvrStatsEntry 6 }

tn3270eSrvrStatsSparePtrs OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of free Printer Resources for a particular TN3270 Server."

::= { tn3270eSrvrStatsEntry 7 }

tn3270eSrvrStatsConnectsIn OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of client connections received by a TN3270 Server."

::= { tn3270eSrvrStatsEntry 8 }

tn3270eSrvrStatsConnRejects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of client connections rejected during connection setup."

::= { tn3270eSrvrStatsEntry 9 }

tn3270eSrvrStatsDisconnects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of client connections disconnected by a TN3270 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 the

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::= { 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 1st index, tn3270eIpGroupName are considered to be in the same IP Group."

INDEX { tn3270eSrvrConfIpAddr, tn3270eSrvrConfIndex, tn3270eIpGroupName, tn3270eIpGroupIpAddress }

::= { tn3270eIpGroupTable 1 }

Tn3270eIpGroupEntry ::= SEQUENCE {

tn3270eIpGroupName DisplayString,

tn3270eIpGroupIpAddress IpAddress,

tn3270eIpGroupSubnetMask IpAddress,

tn3270eIpGroupRowStatus RowStatus }

tn3270eIpGroupName OBJECT-TYPE

SYNTAX DisplayString (SIZE(1..8))

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."

::= { tn3270eIpGroupEntry 3 }

tn3270eIpGroupRowStatus OBJECT-TYPE

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---

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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

"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 1st index, tn3270eResPoolName are considered to be in the same Pool."

INDEX { tn3270eSrvrConfIpAddr, tn3270eSrvrConfIndex,  
tn3270eResPoolName, tn3270eResPoolElementName }

```

 ::= { tn3270eResPoolTable 1 }

Tn3270eResPoolEntry ::= SEQUENCE {
    tn3270eResPoolName          DisplayString,
    tn3270eResPoolElementName  DisplayString,
    tn3270eResPoolIpGroupName  DisplayString,
    tn3270eResPoolElementType  ResourceType,
    tn3270eResPoolClientPort   Unsigned32,
    tn3270eResPoolRowStatus    RowStatus }

```

```

tn3270eResPoolName OBJECT-TYPE
    SYNTAX          DisplayString (SIZE(1..255))
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION

```

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```

    "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 }

```

```

tn3270eResPoolIpGroupName OBJECT-TYPE
    SYNTAX          DisplayString (SIZE(1..8))
    MAX-ACCESS      read-create
    STATUS          current
    DESCRIPTION
        "The name of a IP Group to map a Resource Element to."
 ::= { tn3270eResPoolEntry 3 }

```

```

tn3270eResPoolElementType OBJECT-TYPE
    SYNTAX          ResourceType
    MAX-ACCESS      read-create
    STATUS          current
    DESCRIPTION
        "The type of the entity in a Resource Pool."
 ::= { tn3270eResPoolEntry 4 }

```

tn3270eResPoolClientPort OBJECT-TYPE  
SYNTAX Unsigned32 (0..65535)  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"If specified this a pool to a specific client  
port."  
 ::= { tn3270eResPoolEntry 5 }

tn3270eResPoolRowStatus OBJECT-TYPE  
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

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Network Management Protocol (SNMPv2)."  
 ::= { tn3270eResPoolEntry 6 }

tn3270eResMapTable OBJECT-TYPE  
SYNTAX SEQUENCE OF Tn3270eResMapEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"This table defines Resource Element to IP Address mappings."  
 ::= { tn3270eObjects 6 }

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 { tn3270eSrvrConfIpAddr, tn3270eSrvrConfIndex,

```
tn3270eResMapClientPort, tn3270eResMapElementName }  
 ::= { tn3270eResMapTable 1 }
```

```
Tn3270eResMapEntry ::= SEQUENCE {  
    tn3270eResMapClientPort    Unsigned32,  
    tn3270eResMapElementName  DisplayString,  
    tn3270eResMapIpAddress    IPAddress,  
    tn3270eResMapSubnetMask   IPAddress,  
    tn3270eResMapElementType  ResourceType,  
    tn3270eResMapRowStatus    RowStatus }
```

tn3270eResMapClientPort OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The port that this assignment is restricted to. Note that a value of 0 for this object implies that the assignment is global to all client ports."

```
 ::= { tn3270eResMapEntry 1 }
```

tn3270eResMapElementName OBJECT-TYPE

SYNTAX DisplayString (SIZE(1..8))

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The Name of a resource element."

```
 ::= { tn3270eResMapEntry 2 }
```

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---

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tn3270eResMapIpAddress OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"A client IP Address or subnet if tn3270eResMapSubnetMask is set to 255.255.255.255."

```
 ::= { tn3270eResMapEntry 3 }
```

tn3270eResMapSubnetMask OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS read-create

STATUS current  
DESCRIPTION  
"The corresponding subnet mask associated with  
tn3270eResMapIpAddress. A single IP Address  
is represented by having this object contain  
the value of 255.255.255.255."  
 ::= { tn3270eResMapEntry 4 }

tn3270eResMapElementType OBJECT-TYPE  
SYNTAX ResourceType  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"The type of the entity in a Resource Pool."  
 ::= { tn3270eResMapEntry 5 }

tn3270eResMapRowStatus OBJECT-TYPE  
SYNTAX RowStatus  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"This object allows entries to be created and deleted in the  
tn3270eResMapTable.  
  
Entries in this table should occur automatically when an  
entry is created in the tn3270eResPoolTable. Deleting an  
entry in the tn3270eResPoolTable should remove all  
corresponding entries in this table.  
  
The tn3270eResPoolTable is optional. This implies that entries  
can be added directly to this table."  
REFERENCE  
"[RFC 1903](#), 'Textual Conventions for version 2 of the Simple  
Network Management Protocol (SNMPv2).'  
 ::= { tn3270eResMapEntry 6 }

tn3270eIpMapTable OBJECT-TYPE  
SYNTAX SEQUENCE OF Tn3270eIpMapEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION



"This table defines IP Address to Resource Element mappings."  
 ::= { tn3270eObjects 7 }

tn3270eIpMapEntry OBJECT-TYPE

SYNTAX Tn3270eIpMapEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Definition of the mapping of a IP  
Address or Group to a Resource Element."

INDEX { tn3270eSrvrConfIpAddr, tn3270eSrvrConfIndex,  
tn3270eIpMapIpAddress, tn3270eIpMapSubnetMask,  
tn3270eIpMapClientPort }

::= { tn3270eIpMapTable 1 }

Tn3270eIpMapEntry ::= SEQUENCE {

tn3270eIpMapIpAddress IpAddress,

tn3270eIpMapSubnetMask IpAddress,

tn3270eIpMapClientPort Unsigned32,

tn3270eIpMapResElementName DisplayString,

tn3270eIpMapElementType ResourceType,

tn3270eIpMapRowStatus RowStatus }

tn3270eIpMapIpAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP Address of a member of a IP Group."

::= { tn3270eIpMapEntry 1 }

tn3270eIpMapSubnetMask OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

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."

::= { tn3270eIpMapEntry 2 }

tn3270eIpMapClientPort OBJECT-TYPE

```
SYNTAX      Unsigned32 (0..65535)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The port that this assignment is restricted to. Note that
    a value of 0 for this object implies that the assignment
    is global to all client ports."
 ::= { tn3270eIpMapEntry 3 }
```

```
tn3270eIpMapResElementName OBJECT-TYPE
SYNTAX      DisplayString (SIZE(0..8))
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The Resource Element mapping to IP Address(es)."
 ::= { tn3270eIpMapEntry 4 }
```

```
tn3270eIpMapElementType OBJECT-TYPE
SYNTAX      ResourceType
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The type resource element."
 ::= { tn3270eIpMapEntry 5 }
```

```
tn3270eIpMapRowStatus OBJECT-TYPE
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object allows entries to be created and deleted in the
    tn3270eIpMapMapTable.

    Entries in this table should occur automatically when an
    entry is created in the tn3270eResPoolTable. Deleting an
    entry in the tn3270eResPoolTable should remove all
    corresponding entries in this table.

    The tn3270eResPoolTable is optional. This implies that entries
    can be added directly to this table."
REFERENCE
    "RFC 1903, 'Textual Conventions for version 2 of the Simple
    Network Management Protocol (SNMPv2).'"
 ::= { tn3270eIpMapEntry 6 }
```

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

```
tn3270eTcpConnTable OBJECT-TYPE
```

---

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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 in formation about a single TN3270/TN3270E  
 session."  
 INDEX { tcpConnLocalAddress, tcpConnLocalPort,  
 tcpConnRemAddress, tcpConnRemPort }  
 ::= { tn3270eTcpConnTable 1 }

Tn3270eTcpConnEntry ::=

```

SEQUENCE
{
    tn3270eTcpConnLastActivity      TimeTicks,
    tn3270eTcpConnBytesIn          Counter32,
    tn3270eTcpConnBytesOut         Counter32,
    tn3270eTcpConnTargetAppl       DisplayString,
    tn3270eTcpConnResourceName     DisplayString,
    tn3270eTcpConnResourceType     ResourceType,
    tn3270eTcpConnClientId         DisplayString,
    tn3270eTcpConnDeviceType       DeviceTypes,
    tn3270eTcpConnProto            Tn3270Functions
}

```

tn3270eTcpConnLastActivity OBJECT-TYPE  
 SYNTAX TimeTicks  
 MAX-ACCESS read-only  
 STATUS current  
 DESCRIPTION  
 "The number of 100ths of seconds since this entry  
 was last used."  
 DEFVAL { 0 }  
 ::= { tn3270eTcpConnEntry 1 }

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

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---

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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 }

tn3270eTcpConnTargetAppl OBJECT-TYPE  
SYNTAX DisplayString (SIZE(0..8))  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"When the corresponding TCP connection is for a  
3172 Telnet session then this object contains the  
Target VTAM Application name. For gateway server  
implementations this object will not be known and  
should be returned as a null OCTET STRING."  
 ::= { tn3270eTcpConnEntry 4 }

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 5 }

```
tn3270eTcpConnResourceType OBJECT-TYPE
    SYNTAX      ResourceType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the type of resource identified by
         tn3270eTcpConnResourceName."
    ::= { tn3270eTcpConnEntry 6 }
```

```
tn3270eTcpConnClientUserId OBJECT-TYPE
    SYNTAX      DisplayString (SIZE(0..8))
    MAX-ACCESS  read-only
    STATUS      current
```

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---

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```
DESCRIPTION
    "When the corresponding TCP connection is for a
     3172 Telnet session then this object contains the
     Client's userid."
    ::= { tn3270eTcpConnEntry 7 }
```

```
tn3270eTcpConnDeviceType OBJECT-TYPE
    SYNTAX      DeviceTypes
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the device type if negotiated with client."
    ::= { tn3270eTcpConnEntry 8 }
```

```
tn3270eTcpConnProto OBJECT-TYPE
    SYNTAX      Tn3270Functions
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This flag will indicates which of the TN3270 and TN3270E
         functions that are supported by the Server was negotiated
         with a client. Refer to tn3270eSrvrConfProtoSupported."
    ::= { tn3270eTcpConnEntry 9 }
```

-- 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 TN3270
    MIB."
MODULE -- this module
MANDATORY-GROUPS { tn3270eBasicGroup,
                    tn3270eSessionGroup
                  }
GROUP tn3270ePoolGroup
DESCRIPTION
    "This group is optional."
OBJECT tn3270eSrvrConfActivityCheck
MIN-ACCESS read-only
DESCRIPTION
    "The agent is not required to support a set to this
    object if the associating TN3270 Server doesn't
    support either TIMEMARK or NOP processing. In
```

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```
        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 tn3270eTcpConnTargetAppl
DESCRIPTION
    "A TN3270 Server is not required to support this
    object if it doesn't provide for Target Application
    mapping. In this case either a null OCTET STRING
```

```
        can be returned or noSuchObject."
OBJECT tn3270eTcpConnClientUserId
DESCRIPTION
    "A TN3270 Server is not required to support this
    object if it doesn't provide for Target Application
    mapping. In this case either a null OCTET STRING
    can be returned or noSuchObject."
 ::= { tn3270eCompliances 1 }

-- units of conformance
```

```
tn3270eBasicGroup OBJECT-GROUP
OBJECTS {
    tn3270eSrvrConfInactivityTimer,
    tn3270eSrvrConfActivityCheck,
    tn3270eSrvrConfActivityTimeout,
    tn3270eSrvrConfActivityInterval,
    tn3270eSrvrConfProtoSupported,
    tn3270eSrvrConfAdminStatus,
    tn3270eSrvrConfOperStatus,
    tn3270eSrvrConfSessionTermState,
    tn3270eSrvrConfSrvrType,
    tn3270eSrvrConfRowStatus,
    tn3270eSrvrPortRowStatus,
    tn3270eSrvrStatsUpTime,
    tn3270eSrvrStatsMaxLus,
    tn3270eSrvrStatsLusInUse,
```

```
    tn3270eSrvrStatsSpareLus,
    tn3270eSrvrStatsMaxPtrs,
    tn3270eSrvrStatsPtrsInUse,
    tn3270eSrvrStatsSparePtrs,
    tn3270eSrvrStatsConnectsIn,
    tn3270eSrvrStatsConnRejects,
    tn3270eSrvrStatsDisconnects,
    tn3270eResMapIpAddress,
    tn3270eResMapSubnetMask,
    tn3270eResMapElementType,
    tn3270eResMapRowStatus,
    tn3270eIpMapResElementName,
    tn3270eIpMapElementType,
    tn3270eIpMapRowStatus
```

```
}
STATUS current
DESCRIPTION
    "This group is mandatory for all hosts supporting the
    TN3270E-MIB."
 ::= { tn3270eGroups 1 }
```

tn3270ePoolGroup OBJECT-GROUP

```
OBJECTS {
    tn3270eIpGroupSubnetMask,
    tn3270eIpGroupRowStatus,
    tn3270eResPoolElementType,
    tn3270eResPoolIpGroupName,
    tn3270eResPoolClientPort,
    tn3270eResPoolRowStatus
}
```

STATUS current

DESCRIPTION

"This group is optional and allows a server to configure a collection of IP Address and Resource Pools and their mappings."

```
 ::= { tn3270eGroups 2 }
```

tn3270eSessionGroup OBJECT-GROUP

```
OBJECTS {
    tn3270eTcpConnLastActivity,
    tn3270eTcpConnBytesIn,
    tn3270eTcpConnBytesOut,
    tn3270eTcpConnTargetAppl,
    tn3270eTcpConnResourceName,
    tn3270eTcpConnResourceType,
    tn3270eTcpConnClientUserId,
    tn3270eTcpConnDeviceType,
    tn3270eTcpConnProto
}
```

```
}
STATUS current
DESCRIPTION
    "This group is mandatory for all hosts supporting the
    TN3270E-MIB."
 ::= { tn3270eGroups 3 }
```



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 tn3270eSrvrConfInactivityTimer
- o tn3270eSrvrConfActivityCheck
- o tn3270eSrvrConfActivityTimeout
- o tn3270eSrvrConfActivityInterval
- o tn3270eSrvrConfAdminStatus
- o tn3270eSrvrConfSessionTermState
- o tn3270eIpGroupSubnetMask
- o tn3270eResPoolIpGroupName
- o tn3270eResPoolElementType
- o tn3270eResPoolClientPort
- o tn3270eResMapIpAddress
- o tn3270eResMapSubnetMask
- o tn3270eResMapElementType
- o tn3270eIpMapResElementName
- o tn3270eIpMapElementType

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
- o tn3270eIpMapRowStatus

## 6. Acknowledgments

This document is a product of the TN3270E Working Group.

## 7. References

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- [2] Network Working Group, Postel, J., and Reynolds, J., "Telnet Protocol Specification", [RFC 854](#), May 1983.
- [3] Network Working Group, Postel, J., and Reynolds, J., "Telnet Timing Mark Option", [RFC 860](#), May 1983.
- [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.
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- [8] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Conformance Statements for version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1904](#), January 1996.
  
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- [10] IETF SNMPv2 Working Group and McCloghrie, K., "TCP-MIB Definitions", November 1994.

#### 8. Authors' Address

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