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Definitions of Managed Objects for APPN/HPR in IP Networks

Status of this Memo

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines objects for monitoring and controlling HPR (High Performance Routing) network devices which have the capability to communicate in IP (Internet Protocol) networks. This memo identifies managed objects for the HPR in IP network communications.

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1. Introduction

This document is a product of the SNA NAU Services MIB Working Group. It defines a MIB module for managing devices with HPR in IP networks capabilities.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [17].

2. The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in RFC 2271 [1].
- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in STD 16, RFC 1155 [2], STD 16, RFC 1212 [3] and RFC 1215 [4]. The second version, called SMIv2, is described in STD 58, RFC 2478 [5], RFC 2579 [6] and RFC 2580 [7].
- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, RFC 1157 [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [9] and RFC 1906 [10]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [10], RFC 2272 [11] and RFC 2274 [12].
- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [8]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [13].
- A set of fundamental applications described in RFC 2273 [14] and the view-based access control mechanism described in RFC 2275 [15].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. A MIB conforming to the SMIv1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIv2 will be converted into textual descriptions in SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

3. Overview

This document identifies a set of objects for monitoring the configuration and active characteristics of devices with HPR in IP network capabilities. HPR is an enhancement to the Advanced Peer-to-Peer Network (APPN) architecture that provides fast data routing and improved session reliability. APPN is the aspect of Systems Network Architecture (SNA) that supports peer-to-peer networking. APPN/HPR in IP Networks is a further enhancement to the APPN/HPR architecture, described in RFC 2353 [18]. It provides a method with which APPN/HPR nodes can communicate in IP networks.

APPN management information is defined by the APPN MIB [19]. HPR management information is defined by the HPR MIB, RFC 2238 [20].

Highlights of the management functions supported by the APPN/HPR in IP Networks MIB module include the following:

- A count of UDP packets sent with each type of APPN traffic on HPR/IP links.

- Monitoring and setting configuration parameters for the mappings between APPN traffic types on Type of Service (TOS) Precedence settings in the IP header. Note that the TOS Precedence settings have been redefined in RFC 2474 [21] as the first three bits of the differentiated services code point (DSCP).

This MIB module does not support:

- Configuration of IP addresses used for APPN ports or link stations.

3.1. HPR/IP Values for Objects in the APPN MIB

Ports and link stations are the APPN device’s interface to the data link control (DLC), which provides the physical transport, or to another protocol, such as IP. The APPN MIB identifies ports and link stations using IP as the transport with the following objects:

- appnPortDlcType
- appnLsDlcType
- appnLsStatusDlcType

These objects all have the syntax IANAifType, and the value 126, defined as "IP (for APPN HPR in IP networks)" shall be returned when they identify an HPR/IP port or link station.

The IP address used for the port or link station is returned in the following objects:

- appnPortDlcLocalAddr
- appnLsLocalAddr
- appnLsRemoteAddr
- appnLsStatusLocalAddr
- appnLsStatusRemoteAddr

These objects have the syntax DisplayableDlcAddress, defined in the APPN MIB as a textual convention to represent the address as an octet string of ASCII characters.

The following two objects return object identifiers that tie port and link table entries in the APPN MIB to lower-layer MIB entries:

- appnPortSpecific
- appnLsSpecific

Both objects should return a RowPointer to the ifEntry in the agent's ifTable for the physical interface associated with the local IP address for the port. If the agent implements the IP-MIB (RFC 2011), this association between the IP address and the physical interface will be represented in the ipNetToMediaTable.

3.2. APPN/HPR in IP Networks MIB Structure

The APPN/HPR in IP Networks MIB module contains two groups of objects:

- hprIpMonitoringGroup - an object for counting outgoing HPR/IP traffic for each APPN traffic type

- hprIpConfigurationGroup - objects to represent TOS Precedence to APPN traffic type mappings

These groups are described below in more detail.

3.2.1. hprIpMonitoringGroup

The hprIpMonitoringGroup group consists of the hprIpActiveLsTable. This table is indexed by the link station name and traffic type, and contains a counter for the number of UDP packets sent on a link station for that traffic type.

3.2.2. hprIpConfigurationGroup

The hprIpMonitoringGroup group consists of the following objects and tables:

1) hprIpAppnPortTable

This table supports reading and setting the default mapping between APPN traffic types and TOS Precedence settings for all link stations using a port. This mapping may be overridden for individual link stations or individual connection networks.

2) hprIpLsTable

This table supports reading and setting the mappings between APPN traffic types and TOS Precedence settings for an individual link station and APPN traffic type. If there is no entry in this table for a given link station and traffic type, then that link station inherits its mapping from its port.

3) hprIpCnTable

This table supports reading and setting the mapping between APPN traffic types and TOS Precedence settings for an individual connection network and traffic type. If there is no entry in this table for a given connection network and traffic type, then that connection network inherits its mapping from its port.

4. Definitions

```
HPR-IP-MIB DEFINITIONS ::= BEGIN

IMPORTS
        MODULE-IDENTITY,OBJECT-TYPE, Counter32
                    FROM SNMPv2-SMI
        DisplayString, RowStatus, TEXTUAL-CONVENTION
                    FROM SNMPv2-TC
        MODULE-COMPLIANCE, OBJECT-GROUP
                    FROM SNMPv2-CONF
        SnaControlPointName
                    FROM APPN-MIB
        hprObjects, hprCompliances, hprGroups
                    FROM HPR-MIB  ;

hprIp   MODULE-IDENTITY
   LAST-UPDATED "9809240000Z" -- September 24, 1998
   ORGANIZATION "IETF SNA NAU MIB WG / AIW APPN MIBs SIG"
   CONTACT-INFO
       "
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       "
   DESCRIPTION
       "The MIB module for HPR over IP.  This module contains two
       groups:

        -  the HPR over IP Monitoring Group provides a count of the UDP
           packets sent by a link station for each APPN traffic type.

        -  the HPR over IP Configuration Group provides for reading and
           setting the mappings between APPN traffic types and TOS
           Precedence settings in the IP header.  These mappings are
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           configured at the APPN port level, and are inherited by the
           APPN connection networks and link stations associated with an
           APPN port.  A port-level mapping can, however, be overridden
           for a particular connection network or link station."
   REVISION  "9809240000Z" -- September 24, 1998
   DESCRIPTION
       "Initial version, Published as RFC 2584"

   ::= { hprObjects 5 }

-- ****************************************************************
-- Textual Conventions
-- ****************************************************************
AppnTrafficType ::= TEXTUAL-CONVENTION
      STATUS current
      DESCRIPTION
          "APPN traffic type.  The first four values correspond
          to APPN transmission priorities (network, high, medium and
          low), while the fifth is used for both LLC commands (XID,
          TEST, DISC, and DM) and function-routed NLPs (XID_DONE_RQ
          and XID_DONE_RSP)."

      SYNTAX INTEGER { low (1),
                       medium (2),
                       high (3),
                       network (4),
                       llcAndFnRoutedNlp (5) }

AppnTOSPrecedence ::= TEXTUAL-CONVENTION
      STATUS current
      DESCRIPTION
          "A DisplayString representing the setting of the three TOS
          Precedence bits in the IP Type of Service field for this APPN
          traffic type.  The HPR over IP architecture specifies the
          following default mapping:

               APPN traffic type           IP TOS Precedence bits
               ------------------          ----------------------
                Network                     110
                High                        100
                Medium                      010
                Low                         001
                LLC commands, etc.          110
          "

      SYNTAX DisplayString (SIZE(3))

-- ****************************************************************
```

```
-- hprObjects              OBJECT IDENTIFIER ::= { hprMIB 1 }
-- ****************************************************************

-- ****************************************************************
-- HPR over IP Monitoring Group
--
-- This group contains a single table, the hprIsActiveLsTable,
-- providing a  count of UDP packets sent with each type of
-- APPN traffic on each active link supporting HPR over IP.
-- ****************************************************************
hprIpActiveLsTable OBJECT-TYPE
      SYNTAX SEQUENCE OF HprIpActiveLsEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "The HPR/IP active link station table.  This table provides
          counts of the number of UDP packets sent for each APPN
          traffic type."

      ::= { hprIp 1 }

hprIpActiveLsEntry OBJECT-TYPE
      SYNTAX HprIpActiveLsEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Entry of the HPR/IP link station table."

      INDEX { hprIpActiveLsLsName,
              hprIpActiveLsAppnTrafficType }

      ::= { hprIpActiveLsTable 1 }

HprIpActiveLsEntry ::= SEQUENCE {
        hprIpActiveLsLsName              DisplayString,
        hprIpActiveLsAppnTrafficType     AppnTrafficType,
        hprIpActiveLsUdpPackets          Counter32 }

hprIpActiveLsLsName OBJECT-TYPE
      SYNTAX DisplayString (SIZE (1..10))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Administratively assigned name for the link station.  If this
          object has the same value as the appnLsName in the APPN MIB,
          then the two objects are referring to the same APPN link
          station."
```

```
      ::= { hprIpActiveLsEntry 1 }

hprIpActiveLsAppnTrafficType OBJECT-TYPE
      SYNTAX AppnTrafficType
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "APPN traffic type being sent through the link station."

      ::= { hprIpActiveLsEntry 2 }

hprIpActiveLsUdpPackets OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The count of outgoing UDP packets carrying this type of APPN
          traffic.  A discontinuity in the counter is indicated by the
          appnLsCounterDisconTime object in the APPN MIB."

      ::= { hprIpActiveLsEntry 3 }


-- ****************************************************************
-- HPR over IP Configuration Group
--
-- This group contains three tables for reading and setting the
-- mapping between APPN traffic types and values for the TOS
-- Precedence bits in the IP header.  hprIpAppnPortTOSPrecedence
-- represents the APPN port-level mapping.  This mapping can be
-- overridden for an individual link station or an individual
-- connection network via, respectively, the hprIpLsTOSPrecedence
-- and the hprIpCnTOSPrecedence objects.
-- ****************************************************************

hprIpAppnPortTable OBJECT-TYPE
      SYNTAX SEQUENCE OF HprIpAppnPortEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "The HPR/IP APPN port table.  This table supports reading and
          setting the mapping between APPN traffic types and TOS
          Precedence settings for all the link stations at this APPN
          port.  This mapping can be overridden for an individual link
          station or an individual connection network via, respectively,
          the hprIpLsTOSPrecedence and the hprIpCnTOSPrecedence objects."

      ::= { hprIp 2 }
```

```
hprIpAppnPortEntry OBJECT-TYPE
      SYNTAX HprIpAppnPortEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Entry of the HPR/IP APPN port table.  Entries exist for
          every APPN port defined to support HPR over IP."

      INDEX { hprIpAppnPortName,
              hprIpAppnPortAppnTrafficType }

      ::= { hprIpAppnPortTable 1 }

HprIpAppnPortEntry ::= SEQUENCE {
        hprIpAppnPortName            DisplayString,
        hprIpAppnPortAppnTrafficType AppnTrafficType,
        hprIpAppnPortTOSPrecedence   AppnTOSPrecedence }

hprIpAppnPortName OBJECT-TYPE
      SYNTAX DisplayString (SIZE (1..10))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Administratively assigned name for this APPN port.  If this
          object has the same value as the appnPortName in the APPN MIB,
          then the two objects are referring to the same APPN port."

      ::= { hprIpAppnPortEntry 1 }

hprIpAppnPortAppnTrafficType OBJECT-TYPE
      SYNTAX AppnTrafficType
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "APPN traffic type sent through the port."

      ::= { hprIpAppnPortEntry 2 }

hprIpAppnPortTOSPrecedence OBJECT-TYPE
      SYNTAX AppnTOSPrecedence
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
          "A setting for the three TOS Precedence bits in the IP Type of
          Service field for this APPN traffic type.

          When this value is changed via a Set operation, the new setting
          for the TOS Precedence bits takes effect immediately, rather
```

```
          than waiting for some event such as reinitialization of the
          port or of the APPN node itself."

      ::= { hprIpAppnPortEntry 3 }


-- ****************************************************************
hprIpLsTable OBJECT-TYPE
      SYNTAX SEQUENCE OF HprIpLsEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "The HPR/IP link station table.  Values for TOS Precedence at
          the link station level override those at the level of the
          containing port.  If there is no entry in this table for a
          given link station, then that link station inherits its TOS
          Precedence values from its port."

      ::= { hprIp 3 }

hprIpLsEntry OBJECT-TYPE
      SYNTAX HprIpLsEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Entry of the HPR/IP link station table."

      INDEX { hprIpLsLsName,
              hprIpLsAppnTrafficType }

      ::= { hprIpLsTable 1 }

HprIpLsEntry ::= SEQUENCE {
        hprIpLsLsName            DisplayString,
        hprIpLsAppnTrafficType   AppnTrafficType,
        hprIpLsTOSPrecedence     AppnTOSPrecedence,
        hprIpLsRowStatus         RowStatus }

hprIpLsLsName OBJECT-TYPE
      SYNTAX DisplayString (SIZE (1..10))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Administratively assigned name for the link station.  If this
          object has the same value as the appnLsName in the APPN MIB,
          then the two objects are referring to the same APPN link
          station."
```

```
      ::= { hprIpLsEntry 1 }

hprIpLsAppnTrafficType OBJECT-TYPE
      SYNTAX AppnTrafficType
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "APPN traffic type sent through the link station."

      ::= { hprIpLsEntry 2 }

hprIpLsTOSPrecedence OBJECT-TYPE
      SYNTAX AppnTOSPrecedence
      MAX-ACCESS read-create
      STATUS current
      DESCRIPTION
          "A setting for the three TOS Precedence bits in the IP Type of
          Service field for this APPN traffic type.

          When this value is changed via a Set operation, the new setting
          for the TOS Precedence bits takes effect immediately, rather
          than waiting for some event such as reinitialization of the
          port or of the APPN node itself."

      ::= { hprIpLsEntry 3 }

hprIpLsRowStatus OBJECT-TYPE
      SYNTAX RowStatus
      MAX-ACCESS read-create
      STATUS current
      DESCRIPTION
          "This object allows entries to be created and deleted in the
          hprIpLsTable.  As soon as an entry becomes active, the mapping
          between APPN traffic types and TOS Precedence settings that it
          specifies becomes effective.

          The value of the other accessible object in this entry,
          hprIpLsTOSPrecedence, can be changed via a Set operation when
          this object's value is active(1).

          An entry in this table is deleted by setting this object to
          destroy(6).  Deleting an entry in this table causes the
          link station to revert to the default TOS Precedence
          mapping for its port."

      ::= { hprIpLsEntry 4 }
```

```
-- ********************************************************************
hprIpCnTable OBJECT-TYPE
      SYNTAX SEQUENCE OF HprIpCnEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "The HPR/IP connection network table.  Values for TOS
          Precedence at the connection network level override those at
          the level of the containing port.  If there is no entry in
          this table for a given connection network, then that
          connection network inherits its TOS Precedence values from
          its port.

          A node may have connections to a given connection network
          through multiple ports.  There is no provision in the HPR-IP
          architecture for variations in TOS Precedence values for
          a single connection network based on the port through which
          traffic is flowing to the connection network.  Thus an entry
          in this table overrides the port-level settings for all the
          ports through which the node can reach the connection
          network."

      ::= { hprIp 4 }

hprIpCnEntry OBJECT-TYPE
      SYNTAX HprIpCnEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Entry of the HPR/IP connection network table."

      INDEX { hprIpCnVrnName,
              hprIpCnAppnTrafficType }

      ::= { hprIpCnTable 1 }

HprIpCnEntry ::= SEQUENCE {
        hprIpCnVrnName           SnaControlPointName,
        hprIpCnAppnTrafficType   AppnTrafficType,
        hprIpCnTOSPrecedence     AppnTOSPrecedence,
        hprIpCnRowStatus         RowStatus }

hprIpCnVrnName OBJECT-TYPE
      SYNTAX SnaControlPointName
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "SNA control point name of the virtual routing node (VRN) that
```

```
          identifies the connection network in the APPN topology
          database.  If this object has the same value as the appnVrnName
          in the APPN MIB, then the two objects are referring
          to the same APPN VRN."

      ::= { hprIpCnEntry 1 }

hprIpCnAppnTrafficType OBJECT-TYPE
      SYNTAX AppnTrafficType
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "APPN traffic type sent to this connection network."

      ::= { hprIpCnEntry 2 }

hprIpCnTOSPrecedence OBJECT-TYPE
      SYNTAX AppnTOSPrecedence
      MAX-ACCESS read-create
      STATUS current
      DESCRIPTION
          "A setting for the three TOS Precedence bits in the IP Type of
          Service field for this APPN traffic type.  This setting applies
          to all traffic sent to this connection network by this node,
          regardless of the port through which the traffic is sent.

          When this value is changed via a Set operation, the new setting
          for the TOS Precedence bits takes effect immediately, rather
          than waiting for some event such as reinitialization of a
          port or of the APPN node itself."
      ::= { hprIpCnEntry 3 }

hprIpCnRowStatus OBJECT-TYPE
      SYNTAX RowStatus
      MAX-ACCESS read-create
      STATUS current
      DESCRIPTION
          "This object allows entries to be created and deleted in the
          hprIpCnTable.  As soon as an entry becomes active, the mapping
          between APPN traffic types and TOS Precedence settings that it
          specifies becomes effective.

          The value of the other accessible object in this entry,
          hprIpCnTOSPrecedence, can be changed via a Set operation when
          this object's value is active(1).

          An entry in this table is deleted by setting this object to
          destroy(6).  Deleting an entry in this table causes the
```

```
          connection network to revert to the default TOS Precedence
          mapping for each port through which it is accessed."

      ::= { hprIpCnEntry 4 }


-- ****************************************************************
-- Conformance Statement
-- ****************************************************************
-- Definitions imported from the HPR MIB:
--   hprConformance      OBJECT IDENTIFIER ::= { hprMIB 2 }
--   hprCompliances      OBJECT IDENTIFIER ::= { hprConformance 1 }
--   hprGroups           OBJECT IDENTIFIER ::= { hprConformance 2 }

-- Compliance statements
hprIpCompliance MODULE-COMPLIANCE
       STATUS current
       DESCRIPTION
      "Compliance statement for the HPR over IP MIB module."
   MODULE   -- this module

   --  Conditionally mandatory groups
   GROUP hprIpMonitoringGroup
      DESCRIPTION
          "The hprIpMonitoringGroup is mandatory for APPN implementations
          supporting HPR over IP."

   GROUP hprIpConfigurationGroup
      DESCRIPTION
          "The hprIpConfigurationGroup is mandatory for APPN
          implementations supporting HPR over IP.  It may, however,
          be implemented as a collection of read-only objects."

   OBJECT hprIpAppnPortTOSPrecedence
   MIN-ACCESS  read-only
      DESCRIPTION
          "Write access is not required."

   OBJECT hprIpLsTOSPrecedence
   MIN-ACCESS  read-only
      DESCRIPTION
          "Write access is not required."

   OBJECT hprIpLsRowStatus
   MIN-ACCESS  read-only
      DESCRIPTION
          "Write access is not required."
```

```
   OBJECT hprIpCnTOSPrecedence
   MIN-ACCESS  read-only
      DESCRIPTION
          "Write access is not required."

   OBJECT hprIpCnRowStatus
   MIN-ACCESS  read-only
      DESCRIPTION
          "Write access is not required."

::= { hprCompliances 2 }

-- Group definitions

hprIpMonitoringGroup OBJECT-GROUP
      OBJECTS { hprIpActiveLsUdpPackets }
      STATUS current
      DESCRIPTION
          "An object for counting outgoing HPR/IP traffic for each APPN
          traffic type."

::= { hprGroups 5 }

hprIpConfigurationGroup OBJECT-GROUP
      OBJECTS { hprIpAppnPortTOSPrecedence,
                hprIpLsTOSPrecedence,
                hprIpLsRowStatus,
                hprIpCnTOSPrecedence,
                hprIpCnRowStatus }
      STATUS current
      DESCRIPTION
          "A collection of HPR/IP objects representing the mappings
          between APPN traffic types and TOS Precedence bits at the APPN
          port, APPN link station, and APPN connection network levels."

::= { hprGroups 6 }

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. An authentication protocol is defined in [12]. A protocol for access control is defined in [15]. It is a customer responsibility to properly set up access control for MIB access.

None of the read-only objects in this MIB reports a password, user data, or anything else that is particularly sensitive. Some enterprises view their network configuration itself, as well as information about network usage and performance, as corporate assets; such enterprises may wish to restrict SNMP access to most of the objects in the MIB.

The one read-write and four read-create objects in the MIB can affect network operations; it is recommended that SNMP access to these objects be restricted. The five objects are:

- hprIpPortTOSPrecedence: Setting this object immediately changes the mapping for all link stations using this port which do not have an entry to override the port value. Improper mappings may cause delays or disruptions in the network. For example, if APPN traffic type 'High' is mapped to IP TOS Precedence bits '001', network control traffic will have the same TOS precedence as bulk data traffic. This may cause delays with session initializations, and timeouts on control sessions that could cause network outages.

- hprIpLsTOSPrecedence: Setting this object has the potential for delay or disruption for this link station as described above with hprIpPortTOSPrecedence.

- hprIpLsRowStatus: Setting this object to delete(6) causes this link station to revert to the default TOS Precedence mapping for its port. The customized mapping for this link station will no longer be in effect.

- hprIpCnTOSPrecedence: Setting this object has the potential for delay or disruption for this links created for this connection network as described above with hprIpPortTOSPrecedence.

- hprIpCnRowStatus: Setting this object to delete(6) causes links created for this connection network to revert to the default TOS Precedence mapping for its port. The customized mapping for this connection network will no longer be in effect.

6. Intellectual Property

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and

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The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

7. Acknowledgments

This MIB module is the product of the IETF SNA NAU MIB WG and the AIW APPN/HPR MIBs SIG. The editors would like to thank Katie Lee, IBM Corporation, for her work in creating the original version of this MIB.

8. References

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