Management Information Base for the PINT Services Architecture

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Abstract

   This memo describes a proposed MIB for the PINT Services
   Architecture.

Status of this Memo

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1. Introduction

   PINT services are an emerging set of new Internet based applications
   where voice (and fax) requests to the PSTN (Public Switched Telephone
   Network) are carried over the Internet. RFC 2458 [1] gives a good

introduction to the (pre-standard) PINT architecture and services.
It also has examples of some of the early implementations of pre-
PINT.

This document defines a MIB which contains the elements for
monitoring the performance of a PINT based service. The MIB consists
of details of the four basic PINT services and their performance
statistics measured under various criteria.

It is not the purpose of this MIB to enable management of the PINT
networking elements. We are concerned only with the PINT specific
performance parameters. While it is understood that PINT service
performance is closely related to host and network performance, they
are not addressed here.

2. The SNMP Management Framework

The SNMP Management Framework presently consists of five major
components:

o   An overall architecture, described in RFC 2571 [2].

o   Mechanisms for describing and naming objects and events for
    the purpose of management. The first version of this Struc-
    ture of Management Information (SMI) is called SMIv1 and
    described in RFC 1155 [3], RFC 1212 [4] and RFC 1215 [5]. The
    second version, called SMIv2, is described in RFC 2578 [6],
    RFC 2579 [7] and RFC 2580 [8].

o   Message protocols for transferring management information.
    The first version of the SNMP message protocol is called
    SNMPv1 and described in RFC 1157 [9]. A second version of the
    SNMP message protocol, which is not an Internet standards
    track protocol, is called SNMPv2c and described in RFC 1901
    [10] and RFC 1906 [11]. The third version of the message pro-
    tocol is called SNMPv3 and described in RFC 1906 [11], RFC
    2572 [12] and RFC 2574 [13].

o   Protocol operations for accessing management information. The
    first set of protocol operations and associated PDU formats
    is described in RFC 1157 [9]. A second set of protocol opera-
    tions and associated PDU formats is described in RFC 1905
    [14].

o   A set of fundamental applications described in RFC 2573 [15]

and the view-based access control mechanism described in RFC
2575 [16].

A more detailed introduction to the current SNMP Management Framework
can be found in RFC 2570 [17].

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. The need for PINT services monitoring MIB

Traditionally voice (and fax) requests originate and terminate inside
a PSTN network. This network is well known for robust handling of the
requests, in terms of availability and security. However when the
requests originate from the Internet there is a concern both on the
part of the user as well as the provider about issues like reliable
forwarding of the call requests to the PINT gateway under various
network conditions, user/host authentication, secure handling of the
user information etc. Performance and security management becomes
all the more important where PINT services cross multiple administra-
tive domains (or providers).

This MIB is an attempt to list the parameters that need to be moni-
tored on an user, PINT client, PINT server and PINT gateway basis.

(PINT services, their invocation methods/protocols and security
issues associated with the PINT architecture are discussed in detail
in [18]).

4. PINT MIB - Overview

Following is a list of some explanations on the MIB definitions that
we have chosen to construct.

  o   The basic purpose of this MIB is to monitor the access to PINT
       services both from the performance and security point of view.
       Information may pertain to a certain user or his/her system
       (PINT client) or the system providing the PINT services (PINT
       server) or the PINT gateway that forwards the call to the PSTN
       network.

  o   We propose to build the configuration table as an extension of
       the Application MIB - RFC 2287 [19] using the augments con-
       struct. Server location and contact might be retrieved from the
       standard MIB-II sysLocation and sysContact objects. There is no
       need to replicate this information in the PINT MIB. However, the
       PINT administrator may be a different person than the sysadmin
       with global responsibilities, thus a pintSysContact object is
       defined.

  o   We chose to monitor the gateway connections from the PINT
       server. While the agent runs in the PINT servers, the connec-
       tions to the gateways might need to be monitored in order to
       understand what goes on. We placed them in a separate MIB group,
       and by using MODULE-COMPLIANCE clauses, agents that cannot
       implement this stuff will not be mandated to do it.

  o   There is no traps definition in this preliminary proposal. Note
       that thresholding on counters is always possible by using a
       standard mechanism defined by the Remote Monitoring MIB, that
       can be referenced here. Some events that may be defined by using
       this mechanisms:

    *   continuous login/authentication failure or refusal from a
         particular client or user

    *   nuisance call - repeated calls (within a specified period)
         to a number originating from the same user

  o   The client performance and user performance tables may be rather
       resource demanding for an agent implementation. In some MIBs,
       like the Remote Monitoring (RMON) MIBs, control mechanisms were
       built in order to activate those statistics on demand. If
       needed, a sorting ('topN') mechanism can be designed, so that a

         sorted view of clients or users is presented for the high level
         debugging.

   o   We built a time-distribution trying to cover both short-lived,
         as well as longer sessions (1-10 secs, 10 secs - 1 min., 1-15
         min., 15 mins-24 hours, longer).

   o   PintServerClientAddress is defined as a SnmpAdminString. It may
         include an IpAddress and/or name, but we preferred to minimize
         the number of indices at this stage, and keep a human-readable
         format at the same time.

   o   We define pintServerUserIdName as the UserId. This UserId needs
         to be unique across multiple PINT servers and gateways (depend-
         ing on the architecture) and is mapped to the SessionId. One
         way to achieve this uniqueness is by appending clientId to the
         UserId string before sending to the PINT server. The SessionId
         could then be a combination of this new UserId and a timestamp.

5. Definitions

```
PINT-MIB DEFINITIONS ::= BEGIN

IMPORTS
    OBJECT-TYPE, Counter32, MODULE-IDENTITY, mib-2
      FROM SNMPv2-SMI
    TEXTUAL-CONVENTION
      FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
      FROM SNMPv2-CONF
    SysApplInstallPkgIndex
      FROM SYSAPPL-MIB
    SnmpAdminString
      FROM SNMP-FRAMEWORK-MIB;   -- RFC 2271 [20]

        pintMib MODULE-IDENTITY
             LAST-UPDATED "9908310732Z"
             ORGANIZATION "Lucent Technologies"
             CONTACT-INFO
        "Murali Krishnaswamy
        Postal: 3C-512, 101 Crawfords Corner Rd.
```

          Holmdel, NJ 07733
          Tel: +1 (732)949-3611
          FAX: +1 (732)949-3210
          E-mail: murali@lucent.com

          Dan Romascanu
          Postal: Atidim Technology Park, Bldg 3
          Tel Aviv, Israel
          Tel: +972 3 6458414
          E-mail: dromasca@lucent.com"

              DESCRIPTION
                 "This MIB defines the objects necessary to monitor
                  PINT Services"
              REVISION "9909161200Z"
              DESCRIPTION
                 "Initial version, published as RFC xxxx."
              ::= { mib-2 99999 } -- Not an IANA number

PintServiceType ::= TEXTUAL-CONVENTION
        SYNTAX INTEGER {
                R2C(1),   -- Request-to-Talk
                R2F(2),   -- Request-to-Fax
                R2FB(3),   -- Request-to-Fax-Back
                R2HC(4)   -- Request-to-Hear-Content
                }

PintPerfStatPeriod ::= TEXTUAL-CONVENTION
        SYNTAX INTEGER {
                Last30sec(1),   -- Performance Statics for the last 30 sec
                Last15min(2),   --   15 min
                Last24Hr(3),   --   24 Hour
                SinceReboot(4) --   Since the time the pint server was
                                --   last rebooted
                }
          DESCRIPTION
        "Note that the values of the counters indexed with a value
         SinceReboot(4) can be potentially affected by a counter rollover.
         It is the responsibility of the application using this object to
         take into account that the counter has been zeroed each time it
         reached a value of (2**32-1)."

pintServerConfig   OBJECT IDENTIFIER ::= { pintMib 1 }
pintServerMonitor   OBJECT IDENTIFIER ::= { pintMib 2 }
pintMibConformance   OBJECT IDENTIFIER ::= { pintMib 3 }

-- pintServerConfig - PINT configuration MIB variables

```
pintReleaseNumber OBJECT-TYPE
        SYNTAX      SnmpAdminString
            MAX-ACCESS read-only
            STATUS current
            DESCRIPTION
      "An indication of version of the PINT protocol supported
       by this agent."
   ::= { pintServerConfig 1 }

pintSysContact          OBJECT-TYPE
        SYNTAX        SnmpAdminString
         MAX-ACCESS read-write
            STATUS current
            DESCRIPTION
      "Contact information related to the administration of the PINT
      services."
::= { pintServerConfig 2 }

pintApplInstallPkgTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF PintApplInstallPkgEntry
        MAX-ACCESS  not-accessible
            STATUS      current
            DESCRIPTION
      "Table describing the PINT applications that are installed."
   ::= { pintServerConfig 3 }

    pintApplInstallPkgEntry OBJECT-TYPE
       SYNTAX      PintApplInstallPkgEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
      "Entries per PINT Application."
       AUGMENTS { sysApplInstallPkgIndex }
        ::= { pintApplInstallPkgTable 1 }

    PintApplInstallPkgEntry ::= SEQUENCE {
       pintApplInstallPkgDescription    SnmpAdminString
    }

   pintApplInstallPkgDescription OBJECT-TYPE
       SYNTAX    SnmpAdminString
       MAX-ACCESS  read-only
       STATUS    current
       DESCRIPTION
      "Textual description of the installed PINT application."
   ::= { pintApplInstallPkgEntry 1 }
```

```
pintRegisteredGatewayTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF PintRegisteredGatewayEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
      "Table describing the registered gateway applications."
::= { pintServerConfig 4 }

   pintRegisteredGatewayEntry OBJECT-TYPE
        SYNTAX       PintRegisteredGatewayEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
      "Entries per Registered Gateway Application."
        AUGMENTS { sysApplInstallPkgIndex, pintRegisteredGatewayName }
 ::= { pintRegisteredGatewayTable 1 }

   pintRegisteredGatewayEntry ::= SEQUENCE {
        pintRegisteredGatewayName        SnmpAdminString
        pintRegisteredGatewayDescription SnmpAdminString
   }

pintRegisteredGatewayName OBJECT-TYPE
        SYNTAX   SnmpAdminString
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
      "Name of the registered gateway."
  ::= { pintRegisteredGatewayEntry 1 }

pintRegisteredGatewayDescription OBJECT-TYPE
        SYNTAX   SnmpAdminString
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
      "Textual description of the registered gateway."
  ::= { pintRegisteredGatewayEntry 2 }

-- pintServerMonitor - PINT monitoring statistics MIB variables

pintServerGlobalPerf    OBJECT IDENTIFIER ::= {pintServerMonitor 1 }
pintServerClientPerf    OBJECT IDENTIFIER ::= {pintServerMonitor 2 }
pintServerUserIdPerf    OBJECT IDENTIFIER ::= {pintServerMonitor 3 }
pintServerGatewayPerf   OBJECT IDENTIFIER ::= {pintServerMonitor 4 }
```

```
pintServerGlobalStatsTable      OBJECT-TYPE
        SYNTAX      SEQUENCE OF PintServerGlobalStatsEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
      "Table displaying the monitored global server statistics."
::= { pintServerGlobalPerf 1 }

pintServerGlobalStatsEntry OBJECT-TYPE
        SYNTAX      PintServerGlobalStatsEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
      "Entries in the global statistics table.
       One entry is defined for each monitored service type and
       performance statistics collection period."
        INDEX {pintServerServiceTypeIndex, pintServerPerfStatPeriodIndex}
::= { pintServerGlobalStatsTable 1 }

PintServerGlobalStatsEntry      ::=  SEQUENCE {
pintServerServiceTypeIndex                        PintServiceType,
pintServerPerfStatPeriodIndex                     PintPerfStatPeriod,
pintServerGlobalCallsReceived                     Counter32,
pintServerGlobalSuccessfulCalls                   Counter32,
pintServerGlobalDisconnectedCalls                 Counter32,
pintServerGlobalDisconnectedClientUserAuthorizationFailureCalls
                                                  Counter32,
pintServerGlobalDisconnectedServerProblemCalls    Counter32,
pintServerGlobalDisconnectedGatewayProblemCalls   Counter32
}

pintServerServiceTypeIndex OBJECT-TYPE
    SYNTAX      PintServiceType
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
  "The unique identifier of the monitored service."
::= { pintServerGlobalStatsEntry 1 }

pintServerPerfStatPeriodIndex OBJECT-TYPE
    SYNTAX      PintPerfStatPeriod
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
  "Time period for which the performance statistics are requested
        from the pint server."
::= { pintServerGlobalStatsEntry 2 }
```

```
pintServerGlobalCallsReceived OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of received global calls."
::= { pintServerGlobalStatsEntry 3 }


pintServerGlobalSuccessfulCalls OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of global successful calls."
::= { pintServerGlobalStatsEntry 4 }


pintServerGlobalDisconnectedCalls OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of global disconnected (failed) calls."
::= { pintServerGlobalStatsEntry 5 }


pintServerGlobalDisconnectedClientUserAuthorizationFailureCalls
OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of global calls that were disconnected because of client
or user authorization failure."
::= { pintServerGlobalStatsEntry 6 }


pintServerGlobalDisconnectedServerProblemCalls OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of global calls that were disconnected because of
server problems."
::= { pintServerGlobalStatsEntry 7 }


pintServerGlobalDisconnectedGatewayProblemCalls OBJECT-TYPE
```

```
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
  "Number of global calls that were disconnected because of
gateway problems."
::= { pintServerGlobalStatsEntry 8 }

pintServerClientStatsTable     OBJECT-TYPE
        SYNTAX      SEQUENCE OF PintServerClientStatsEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
     "Table displaying the monitored server client statistics."
::= { pintServerClientPerf 1 }

pintServerClientStatsEntry OBJECT-TYPE
        SYNTAX      PintServerClientStatsEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
     "Entries in the client server statistics table.
     One entry is defined for each client identified by name,
     monitored service type and performance statistics collection
     period."
INDEX {pintServerClientAddress, pintServerServiceTypeIndex,
       pintServerPerfStatPeriodIndex}
        ::= { pintServerClientStatsTable 1 }

PintServerClientStatsEntry      ::=  SEQUENCE {
pintServerClientAddress                          SnmpAdminString,
pintServerClientCallsReceived                    Counter32,
pintServerClientSuccessfulCalls                  Counter32,
pintServerClientDisconnectedCalls                Counter32,
pintServerClientDisconnectedClientAuthorizationFailureCalls
                                                 Counter32,
pintServerClientDisconnectedEgressFacilityProblemCalls  Counter32
}

pintServerClientAddress OBJECT-TYPE
    SYNTAX     SnmpAdminString
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
  "The unique identifier of the monitored client
```

   identified by its address represented as as a string."
::= { pintServerClientStatsEntry 1 }

pintServerClientCallsReceived OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls received from the specific client."
::= { pintServerClientStatsEntry 2 }

pintServerClientSuccessfulCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the client successfully completed."
::= { pintServerClientStatsEntry 3 }

pintServerClientDisconnectedCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls received from the client, and that were
  disconnected (failed)."
::= { pintServerClientStatsEntry 4 }

pintServerClientDisconnectedClientAuthorizationFailureCalls
OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the client that were disconnected because of
client authorization failure."
::= { pintServerClientStatsEntry 5 }

pintServerClientDisconnectedEgressFacilityProblemCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the client that were disconnected because
   of egress facility problems."
::= { pintServerClientStatsEntry 6 }

```
pintServerUserIdStatsTable     OBJECT-TYPE
        SYNTAX       SEQUENCE OF PintServerUserIdStatsEntry
         MAX-ACCESS  not-accessible
      STATUS        current
       DESCRIPTION
     "Table displaying the monitored Pint service user statistics."
::= { pintServerUserIdPerf 1 }

pintServerUserIdStatsEntry OBJECT-TYPE
        SYNTAX        PintServerUserIdStatsEntry
         MAX-ACCESS  not-accessible
         STATUS        current
         DESCRIPTION
     "Entries in the user statistics table.
     One entry is defined for each user identified by name,
     each monitored service type and performance statistics collection
     period."
        INDEX {pintServerUserIdName, pintServerServiceTypeIndex,
         pintServerPerfStatPeriodIndex}
        ::= { pintServerUserIdStatsTable 1 }

PintServerUserIdStatsEntry     ::=  SEQUENCE {
pintServerUserIdName                               UserIdName,
pintServerUserIdCallsReceived                      Counter32,
pintServerUserIdSuccessfulCalls                    Counter32,
pintServerUserIdDisconnectedCalls                  Counter32,
pintServerUserIdDisconnectedUserIdAuthorizationFailureCalls
                                                   Counter32,
pintServerUserIdDisconnectedEgressFacilityProblemCalls  Counter32
}

pintServerUserIdName OBJECT-TYPE
    SYNTAX     SnmpAdminString
    MAX-ACCESS not-accessible
    STATUS       current
    DESCRIPTION
  "The unique identifier of the monitored user
  identified by its name."
::= { pintServerUserIdStatsEntry 1 }

pintServerUserIdCallsReceived OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS       current
    DESCRIPTION
  "Number of calls received from the specific user."
::= { pintServerUserIdStatsEntry 2 }
```

pintServerUserIdSuccessfulCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the user successfully completed."
::= { pintServerUserIdStatsEntry 3 }

pintServerUserIdDisconnectedCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls received from the user that were
  disconnected (failed)."
::= { pintServerUserIdStatsEntry 4 }

pintServerUserIdDisconnectedUserIdUserAuthorizationFailureCalls
OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the user that were disconnected because of user
authorization failure."
::= { pintServerUserIdStatsEntry 5 }

pintServerUserIdDisconnectedEgressFacilityProblemCalls OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
  "Number of calls from the user that were disconnected because of
   egress facility problems."
::= { pintServerUserIdStatsEntry 6 }

pintServerGatewayStatsTable   OBJECT-TYPE
        SYNTAX   SEQUENCE OF PintServerGatewayStatsEntry
        MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
     "Table displaying the monitored gateway statistics."
::= { pintServerGatewayPerf 1 }

```
pintServerGatewayStatsEntry OBJECT-TYPE
        SYNTAX       PintServerGatewayStatsEntry
         MAX-ACCESS  not-accessible
      STATUS       current
       DESCRIPTION
      "Entries in the gateway table.
      One entry is defined for each gateway identified by name,
      each monitored service type and performance statistics collection
      period."

       INDEX { pintRegisteredGatewayName, pintServerServiceTypeIndex,
         pintServerPerfStatPeriodIndex
         ::= { pintServerGatewayStatsTable 1 }

PintServerGatewayStatsEntry     ::=  SEQUENCE {
pintServerGatewayCallsReceived                 Counter32,
pintServerGatewaySuccessfulCalls               Counter32,
pintServerGatewayDisconnectedCalls             Counter32
}

pintServerGatewayCallsReceived OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of calls received at the specified gateway."
::= { pintServerGatewayStatsEntry 1 }

pintServerGatewaySuccessfulCalls OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of calls successfully completed at the specified gateway."
::= { pintServerGatewayStatsEntry 2 }

pintServerGatewayDisconnectedCalls OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
  "Number of calls that were disconnected (failed) at the specified
   gateway."
::= { pintServerGatewayStatsEntry 3 }

--
```

```
-- Notifications Section
-- (none defined)
--


--
-- Conformance Section
--

pintMibCompliances OBJECT IDENTIFIER ::= { pintMibConformance 1 }
pintMibGroups      OBJECT IDENTIFIER ::= { pintMibConformance 2 }

pintMibCompliance MODULE-COMPLIANCE
    STATUS  current
    DESCRIPTION
            "Describes the requirements for conformance to the
            PINT MIB."
    MODULE  -- this module
    MANDATORY-GROUPS { pintMibConfigGroup, pintMibMonitorGroup }
    ::= { pintMibCompliances 1 }

pintMibConfigGroup OBJECT-GROUP
        OBJECTS {
           pintReleaseNumber,
           pintSysContact,
           pintApplInstallPkgDescription,
           pintRegisteredGatewayName,
           pintRegisteredGatewayDescription
        }
        STATUS  current
        DESCRIPTION
               "A collection of objects providing configuration
information
               for a PINT Server."
   ::= { pintMibGroups 1 }

pintMibMonitorGroup OBJECT-GROUP
        OBJECTS {
pintServerServiceTypeIndex,
pintServerPerfStatPeriodIndex,
pintServerGlobalCallsReceived,
pintServerGlobalSuccessfulCalls,
pintServerGlobalDisconnectedCalls,
pintServerGlobalDisconnectedClientUserAuthorizationFailureCalls,
pintServerGlobalDisconnectedServerProblemCalls,
pintServerGlobalDisconnectedGatewayProblemCalls,
pintServerClientAddress,
pintServerClientCallsReceived,
pintServerClientSuccessfulCalls,
```

```
pintServerClientDisconnectedCalls,
pintServerClientDisconnectedClientAuthorizationFailureCalls,
pintServerClientDisconnectedEgressFacilityProblemCalls,
pintServerUserIdName,
pintServerUserIdCallsReceived,
pintServerUserIdSuccessfulCalls,
pintServerUserIdDisconnectedCalls,
pintServerUserIdDisconnectedUserIdAuthorizationFailureCalls,
pintServerUserIdDisconnectedEgressFacilityProblemCalls,
pintServerGatewayCallsReceived,
pintServerGatewaySuccessfulCalls,
pintServerGatewayDisconnectedCalls
        }
        STATUS  current
        DESCRIPTION
                "A collection of objects providing monitoring
information
                for a PINT Server."
   ::= { pintMibGroups 2 }

END
```

6. Acknowledgements

The authors would like to thank Igor Faynberg for his encouragement
to produce this work.

7. Security Considerations

There is only one management object defined in this MIB that has a
MAX-ACCESS clause of read-write (pintSysContact). There are no read-
create objects. This read-write object may be considered sensitive or
vulnerable in some network environments. The support for SET opera-
tions in a non-secure environment without proper protection can have
a negative effect on network operations.

There are a number of managed objects in this MIB that may contain
information that may be sensitive from a business perspective. One
could be the customer identification (UserIdName). Also information
on PINT services performance might itself be need to be guarded. It
is thus important to control even GET access to these objects and
possibly to even encrypt the values of these object when sending them
over the network via SNMP. Not all versions of SNMP provide features
for such a secure environment.

SNMPv1 by itself is not a secure environment. Even if the network
itself is secure (for example by using IPSec), even then, there is no
control as to who on the secure network is allowed to access and
GET/SET (read/change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security
features as provided by the SNMPv3 framework. Specifically, the use
of the User-based Security Model RFC 2574 [13] and the View- based
Access Control Model RFC 2575 [16] is recommended.

It is then a customer/user responsibility to ensure that the SNMP
entity giving access to an instance of this MIB, is properly config-
ured to give access to the objects only to those principals (users)
that have legitimate rights to indeed GET or SET
(change/create/delete) them.

8. References

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[6]   McCloghrie, K., Perkins, D., and Schoenwaelder, J., "Structure of
       Management Information Version 2 (SMIv2)", RFC 2578, April 1999.

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