

Network Working Group
Request for Comments: 3055
Category: Standards Track

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February 2001

Management Information Base for the PINT Services Architecture

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This memo describes a proposed Management Information Base (MIB) for the PSTN/Internet Interworking (PINT) Services Architecture.

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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 Structure of Management Information (SMI) is called SMIV1 and described in STD 16, RFC 1155 [3], STD 16, RFC 1212 [4] and RFC 1215 [5]. The second version, called SMIV2, is described in STD 58, 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 STD 15, 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 protocol 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 STD 15, RFC 1157 [9]. A second set of protocol operations 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 administrative domains (or providers).

This MIB is an attempt to list the parameters that need to be monitored 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 chose to build the configuration table as an extension of the Application MIB - RFC 2287 [19] using the augments construct. 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 connections 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 MIB module. 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 (depending 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
sysApplInstallPkgEntry
FROM      SYSAPPL-MIB
SnmpAdminString
FROM      SNMP-FRAMEWORK-MIB; -- RFC 2571 [2]

pintMib MODULE-IDENTITY
    LAST-UPDATED "200102010000Z" -- 1 Feb 2001
```

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"

DESCRIPTION

"This MIB defines the objects necessary to monitor
PINT Services"

-- Revision history

REVISION "200102010000Z" -- 1 Feb 2001

DESCRIPTION

"Initial version, published as RFC 3055."

::= { mib-2 93 }

PintServiceType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This TC describes the type of a PINT service."

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

STATUS current

DESCRIPTION

"This TC describes the statistics period of time."

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)."

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
}

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 { sysApplInstallPkgEntry }
    ::= { 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 { sysApplInstallPkgEntry }
    ::= { pintRegisteredGatewayTable 1 }

PintRegisteredGatewayEntry ::= SEQUENCE {
    pintRegisteredGatewayName      SnmpAdminString,
    pintRegisteredGatewayDescription SnmpAdminString
}

pintRegisteredGatewayName OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    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,
pintServerGlobalDisCUAutFCalls  Counter32,
pintServerGlobalDisServProbCalls Counter32,
pintServerGlobalDisGatProbCalls 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 }

pintServerGlobalDisCUAutFCalls
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 }

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

pintServerGlobalDisGatProbCalls 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,
pintServerClientDisCAutFCalls		Counter32,
pintServerClientDisEFProbCalls		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 }

pintServerClientDisCAutFCalls

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 }

pintServerClientDisEFProbCalls 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."

It is assumed that the capabilities of the pint server
 are enough to accommodate the number of entries in this table.
 It is a local server implementation issue if an aging mechanism
 is implemented in order to avoid scalability problems."

INDEX {pintServerUserIdName, pintServerServiceTypeIndex,
 pintServerPerfStatPeriodIndex}

::= { pintServerUserIdStatsTable 1 }

```
PintServerUserIdStatsEntry      ::= SEQUENCE {
pintServerUserIdName                SnmpAdminString,
pintServerUserIdCallsReceived      Counter32,
pintServerUserIdSuccessfulCalls    Counter32,
pintServerUserIdDisconnectedCalls Counter32,
pintServerUserIdDiscUIdAFailCalls Counter32,
pintServerUserIdEFProbCalls        Counter32
}
```

pintServerUserIdName OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE(0..64))

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 }

pintServerUserIdDiscUIdAFailCalls

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 }

pintServerUserIdEFProbCalls 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 {
pintServerGlobalCallsReceived,
pintServerGlobalSuccessfulCalls,
pintServerGlobalDisconnectedCalls,
pintServerGlobalDisCUAutFCalls,
pintServerGlobalDisServProbCalls,
pintServerGlobalDisGatProbCalls,
pintServerClientCallsReceived,
pintServerClientSuccessfulCalls,
pintServerClientDisconnectedCalls,
pintServerClientDisCAutFCalls,
pintServerClientDisEFProbCalls,
--pintServerUserIdName,
pintServerUserIdCallsReceived,
pintServerUserIdSuccessfulCalls,
pintServerUserIdDisconnectedCalls,
pintServerUserIdDiscUIdAFailCalls,
pintServerUserIdEFProbCalls,


```
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 operations 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 configured 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. IANA Considerations

All extensions to the values listed in this MIB must be done through Standards Action processes as defined in RFC 2434 [20].

9. 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 standards-related documentation can be found in BCP-11. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

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Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

