

Network Working Group
Internet-Draft
Updates: RFC [2620](#) (if approved)
Expires: January 18, 2006

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July 17, 2005

**RADIUS Acct Client MIB (IPv6)
draft-nelson-rfc2620bis-01.txt**

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Abstract

This memo updates [RFC 2620](#) by deprecating the MIB table containing IPv4-only address formats and defining a new table to add support for version neutral IP address formats.

Table of Contents

1.	Terminology	3
2.	Introduction	3
3.	The Internet-Standard Management Framework	3
4.	Scope of Changes	3
5.	Structure of the MIB Module	4
6.	Deprecated Objects	4
7.	Definitions	4
8.	IANA Considerations	16
9.	Security Considerations	16
10.	References	17
10.1	Normative References	17
10.2	Informative References	18
	Author's Address	18
A.	Acknowledgments	18
	Intellectual Property and Copyright Statements	19

1. Terminology

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](#) [[RFC2119](#)].

This document uses terminology from [RFC 2866](#) [[RFC2866](#)].

2. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. The objects defined within this memo relate to the Remote Authentication Dial-In User Service (RADIUS) Accounting Client as defined in [RFC 2866](#) [[RFC2866](#)].

3. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

4. Scope of Changes

This document updates [RFC 2620](#) [[RFC2620](#)], RADIUS Authentication Client MIB, by deprecating the radiusAuthServerTable table and adding a new table, radiusAuthServerExtTable, containing radiusAuthServerInetAddressType, radiusAuthServerInetAddress, and radiusAuthClientServerInetPortNumber. The purpose of these added MIB objects is to support version neutral IP addressing formats. The existing table containing radiusAuthServerAddress and radiusAuthClientServerPortNumber is deprecated.

[RFC 4001](#) [[RFC4001](#)], which defines the SMI Textual Conventions for IPv6 addresses, contains the following recommendation.

'In particular, when revising a MIB module that contains IPv4 specific tables, it is suggested to define new tables using the textual conventions defined in this memo [[RFC 4001](#)] that support all

versions of IP. The status of the new tables SHOULD be "current", whereas the status of the old IP version specific tables SHOULD be changed to "deprecated". The other approach, of having multiple similar tables for different IP versions, is strongly discouraged.'

5. Structure of the MIB Module

The structure of the MIB Module defined in this memo corresponds to the structure of the MIB Module defined in RADIUS Authentication Client MIB, [RFC 2620](#) [[RFC2620](#)]. This MIB module contains two scalars as well as a single table, the RADIUS Accounting Server Table, which contains one row for each RADIUS server with which the client shares a secret.

Each entry in the RADIUS Accounting Server Table includes fifteen columns presenting a view of the activity of the RADIUS client.

6. Deprecated Objects

The deprecated table in this MIB is carried forward from [RFC 2620](#) [[RFC2620](#)]. There are two conditions under which it MAY be desirable for managed entities to continue to support the deprecated table:

1. The managed entity only supports IPv4 address formats.
2. The managed entity supports both IPv4 and IPv6 address formats, and the deprecated table is supported for backwards compatibility with older management stations. This option SHOULD only be used when the IP addresses in the new table are in IPv4 format and can accurately be represented in both the new table and the deprecated table.

Managed entities SHOULD NOT instantiate the deprecated table containing IPv4-only address objects when the RADIUS server address represented in the table row is not an IPv4 address. Managed entities SHOULD NOT return inaccurate values of IP address or SNMP object access errors for IPv4-only address objects in otherwise populated tables.

7. Definitions

RADIUS-ACCT-CLIENT-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY,
Counter32, Integer32, Gauge32,
IpAddress, TimeTicks, mib-2 FROM SNMPv2-SMI
SnmpAdminString FROM SNMP-FRAMEWORK-MIB
InetAddressType, InetAddress,


```
InetPortNumber          FROM INET-ADDRESS-MIB
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF;
```

```
radiusAccClientMIB MODULE-IDENTITY
```

```
  LAST-UPDATED "200507150000Z" -- 15 Jul 2005
```

```
  ORGANIZATION "IETF RADIUS Working Group."
```

```
  CONTACT-INFO
```

```
    " Bernard Aboba
      Microsoft
      One Microsoft Way
      Redmond, WA 98052
      US
      Phone: +1 425 936 6605
      EMail: bernarda@microsoft.com"
```

```
  DESCRIPTION
```

```
    "The MIB module for entities implementing the client
      side of the Remote Authentication Dial-In User Service
      (RADIUS) accounting protocol."
```

```
  REVISION "9906110000Z" -- 11 Jun 1999
```

```
  DESCRIPTION "Initial version as published in RFC 2620"
```

```
  REVISION "200507150000Z" -- 15 Jul 2005
```

```
  DESCRIPTION "Revised version as published in RFC XXXX"
```

```
-- RFC Editor: replace xxx with actual RFC number at the time of
-- publication, and remove this note.
```

```
 ::= { radiusAccounting 2 }
```

```
radiusMIB OBJECT-IDENTITY
```

```
  STATUS current
```

```
  DESCRIPTION
```

```
    "The OID assigned to RADIUS MIB work by the IANA."
```

```
 ::= { mib-2 67 }
```

```
radiusAccClientExtMIB OBJECT-IDENTITY
```

```
  STATUS current
```

```
  DESCRIPTION
```

```
    "The OID assigned to RADIUS MIB Extension work by
      the IANA."
```

```
 ::= { mib-2 TBA }
```

```
-- RFC Editor: replace TBA with IANA assigned OID value, and
-- remove this note.
```

```
radiusAccounting OBJECT IDENTIFIER ::= {radiusMIB 2}
```

```
radiusAccClientMIBObjects OBJECT IDENTIFIER
```



```
 ::= { radiusAccClientMIB 1 }

radiusAccClient OBJECT IDENTIFIER
 ::= { radiusAccClientMIB0bjects 1 }

radiusAccClientInvalidServerAddresses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS Accounting-Response packets
         received from unknown addresses."
    ::= { radiusAccClient 1 }

radiusAccClientIdentifier OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The NAS-Identifier of the RADIUS accounting client.
         This is not necessarily the same as sysName in MIB
         II."
    ::= { radiusAccClient 2 }

radiusAccServerTable OBJECT-TYPE
    SYNTAX SEQUENCE OF RadiusAccServerEntry
    MAX-ACCESS not-accessible
    STATUS deprecated
    DESCRIPTION
        "The (conceptual) table listing the RADIUS accounting
         servers with which the client shares a secret."
    ::= { radiusAccClient 3 }

radiusAccServerEntry OBJECT-TYPE
    SYNTAX RadiusAccServerEntry
    MAX-ACCESS not-accessible
    STATUS deprecated
    DESCRIPTION
        "An entry (conceptual row) representing a RADIUS
         accounting server with which the client shares a
         secret."
    INDEX { radiusAccServerIndex }
    ::= { radiusAccServerTable 1 }

RadiusAccServerEntry ::= SEQUENCE {
    radiusAccServerIndex Integer32,
    radiusAccServerAddress IpAddress,
    radiusAccClientServerPortNumber Integer32,
```

Nelson

Expires January 18, 2006

[Page 6]

```
radiusAccClientRoundTripTime      TimeTicks,
radiusAccClientRequests           Counter32,
radiusAccClientRetransmissions    Counter32,
radiusAccClientResponses          Counter32,
radiusAccClientMalformedResponses Counter32,
radiusAccClientBadAuthenticators  Counter32,
radiusAccClientPendingRequests    Gauge32,
radiusAccClientTimeouts           Counter32,
radiusAccClientUnknownTypes       Counter32,
radiusAccClientPacketsDropped     Counter32
}

radiusAccServerIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "A number uniquely identifying each RADIUS
        Accounting server with which this client
        communicates."
    ::= { radiusAccServerEntry 1 }

radiusAccServerAddress OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The IP address of the RADIUS accounting server
        referred to in this table entry."
    ::= { radiusAccServerEntry 2 }

radiusAccClientServerPortNumber OBJECT-TYPE
    SYNTAX Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The UDP port the client is using to send requests to
        this server."
    ::= { radiusAccServerEntry 3 }

radiusAccClientRoundTripTime OBJECT-TYPE
    SYNTAX TimeTicks
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The time interval between the most recent
        Accounting-Response and the Accounting-Request that
        matched it from this RADIUS accounting server."
```



```
 ::= { radiusAccServerEntry 4 }

-- Request/Response statistics
--
-- Requests = Responses + PendingRequests + ClientTimeouts
--
-- Responses - MalformedResponses - BadAuthenticators -
-- UnknownTypes - PacketsDropped = Successfully received

radiusAccClientRequests OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS Accounting-Request packets
         sent. This does not include retransmissions."
    ::= { radiusAccServerEntry 5 }

radiusAccClientRetransmissions OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS Accounting-Request packets
         retransmitted to this RADIUS accounting server.
         Retransmissions include retries where the
         Identifier and Acct-Delay have been updated, as
         well as those in which they remain the same."
    ::= { radiusAccServerEntry 6 }

radiusAccClientResponses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS packets received on the
         accounting port from this server."
    ::= { radiusAccServerEntry 7 }

radiusAccClientMalformedResponses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of malformed RADIUS Accounting-Response
         packets received from this server. Malformed packets
         include packets with an invalid length. Bad
         authenticators and unknown types are not included as
```



```
        malformed accounting responses."
 ::= { radiusAccServerEntry 8 }

radiusAccClientBadAuthenticators OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS Accounting-Response
         packets which contained invalid authenticators
         received from this server."
 ::= { radiusAccServerEntry 9 }

radiusAccClientPendingRequests OBJECT-TYPE
    SYNTAX Gauge32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS Accounting-Request packets
         sent to this server that have not yet timed out or
         received a response. This variable is incremented
         when an Accounting-Request is sent and decremented
         due to receipt of an Accounting-Response, a timeout
         or a retransmission."
 ::= { radiusAccServerEntry 10 }

radiusAccClientTimeouts OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of accounting timeouts to this server.
         After a timeout the client may retry to the same
         server, send to a different server, or give up.
         A retry to the same server is counted as a
         retransmit as well as a timeout. A send to a different
         server is counted as an Accounting-Request as well as
         a timeout."
 ::= { radiusAccServerEntry 11 }

radiusAccClientUnknownTypes OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS packets of unknown type which
         were received from this server on the accounting port."
 ::= { radiusAccServerEntry 12 }
```



```
radiusAccClientPacketsDropped OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The number of RADIUS packets which were received from
         this server on the accounting port and dropped for some
         other reason."
    ::= { radiusAccServerEntry 13 }
```

-- Extended MIB Objects

```
radiusAccClientExtMIBObjects OBJECT IDENTIFIER
    ::= { radiusAccClientExtMIB 1 }
```

```
radiusAccClientExt OBJECT IDENTIFIER
    ::= { radiusAccClientExtMIBObjects 1 }
```

```
radiusAccServerExtTable OBJECT-TYPE
    SYNTAX SEQUENCE OF RadiusAccServerExtEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The (conceptual) table listing the RADIUS accounting
         servers with which the client shares a secret."
    ::= { radiusAccClientExt 1 }
```

```
radiusAccServerExtEntry OBJECT-TYPE
    SYNTAX RadiusAccServerExtEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An entry (conceptual row) representing a RADIUS
         accounting server with which the client shares a
         secret."
    INDEX { radiusAccServerExtIndex }
    ::= { radiusAccServerExtTable 1 }
```

```
RadiusAccServerExtEntry ::= SEQUENCE {
    radiusAccServerExtIndex          Integer32,
    radiusAccServerInetAddressType  InetAddressType,
    radiusAccServerInetAddress      InetAddress,
    radiusAccClientServerInetPortNumber  InetPortNumber,
    radiusAccClientExtRoundTripTime  TimeTicks,
    radiusAccClientExtRequests       Counter32,
    radiusAccClientExtRetransmissions Counter32,
```



```
radiusAccClientExtResponses          Counter32,
radiusAccClientExtMalformedResponses Counter32,
radiusAccClientExtBadAuthenticators Counter32,
radiusAccClientExtPendingRequests   Gauge32,
radiusAccClientExtTimeouts          Counter32,
radiusAccClientExtUnknownTypes      Counter32,
radiusAccClientExtPacketsDropped     Counter32
}

radiusAccServerExtIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A number uniquely identifying each RADIUS
        Accounting server with which this client
        communicates."
    ::= { radiusAccServerExtEntry 1 }

radiusAccServerInetAddressType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The type of address format used for the
        radiusAccServerInetAddress object."
    ::= { radiusAccServerExtEntry 2 }

radiusAccServerInetAddress OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The IP address of the RADIUS accounting
        server referred to in this table entry, using
        the IPv6 address format."
    ::= { radiusAccServerExtEntry 3 }

radiusAccClientServerInetPortNumber OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The UDP port the client is using to send requests
        to this accounting server."
    ::= { radiusAccServerExtEntry 4 }
```



```
radiusAccClientExtRoundTripTime OBJECT-TYPE
    SYNTAX TimeTicks
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The time interval between the most recent
        Accounting-Response and the Accounting-Request that
        matched it from this RADIUS accounting server."
    ::= { radiusAccServerExtEntry 5 }

-- Request/Response statistics
--
-- Requests = Responses + PendingRequests + ClientTimeouts
--
-- Responses - MalformedResponses - BadAuthenticators -
-- UnknownTypes - PacketsDropped = Successfully received

radiusAccClientExtRequests OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS Accounting-Request packets
        sent. This does not include retransmissions."
    ::= { radiusAccServerExtEntry 6 }

radiusAccClientExtRetransmissions OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS Accounting-Request packets
        retransmitted to this RADIUS accounting server.
        Retransmissions include retries where the
        Identifier and Acct-Delay have been updated, as
        well as those in which they remain the same."
    ::= { radiusAccServerExtEntry 7 }

radiusAccClientExtResponses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS packets received on the
        accounting port from this server."
    ::= { radiusAccServerExtEntry 8 }

radiusAccClientExtMalformedResponses OBJECT-TYPE
```


SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of malformed RADIUS Accounting-Response
 packets received from this server. Malformed packets
 include packets with an invalid length. Bad
 authenticators and unknown types are not included as
 malformed accounting responses."
::= { radiusAccServerExtEntry 9 }

radiusAccClientExtBadAuthenticators OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Accounting-Response
 packets which contained invalid authenticators
 received from this server."
::= { radiusAccServerExtEntry 10 }

radiusAccClientExtPendingRequests OBJECT-TYPE

SYNTAX Gauge32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Accounting-Request packets
 sent to this server that have not yet timed out or
 received a response. This variable is incremented
 when an Accounting-Request is sent and decremented
 due to receipt of an Accounting-Response, a timeout
 or a retransmission."
::= { radiusAccServerExtEntry 11 }

radiusAccClientExtTimeouts OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of accounting timeouts to this server.
 After a timeout the client may retry to the same
 server, send to a different server, or give up.
 A retry to the same server is counted as a
 retransmit as well as a timeout. A send to a different
 server is counted as an Accounting-Request as well as
 a timeout."
::= { radiusAccServerExtEntry 12 }


```
radiusAccClientExtUnknownTypes OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS packets of unknown type which
         were received from this server on the accounting port."
    ::= { radiusAccServerExtEntry 13 }

radiusAccClientExtPacketsDropped OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of RADIUS packets which were received from
         this server on the accounting port and dropped for some
         other reason."
    ::= { radiusAccServerExtEntry 14 }

-- conformance information

radiusAccClientMIBConformance OBJECT IDENTIFIER
    ::= { radiusAccClientMIB 2 }

radiusAccClientMIBCompliances OBJECT IDENTIFIER
    ::= { radiusAccClientMIBConformance 1 }

radiusAccClientMIBGroups OBJECT IDENTIFIER
    ::= { radiusAccClientMIBConformance 2 }

radiusAccClientExtMIBConformance OBJECT IDENTIFIER
    ::= { radiusAccClientExtMIB 2 }

radiusAccClientExtMIBCompliances OBJECT IDENTIFIER
    ::= { radiusAccClientExtMIBConformance 1 }

radiusAccClientExtMIBGroups OBJECT IDENTIFIER
    ::= { radiusAccClientExtMIBConformance 2 }

-- units of conformance

radiusAccClientMIBCompliance MODULE-COMPLIANCE
    STATUS deprecated
    DESCRIPTION
        "The compliance statement for accounting clients"
```



```
        implementing the RADIUS Accounting Client MIB."
MODULE  -- this module
    MANDATORY-GROUPS { radiusAccClientMIBGroup }

    ::= { radiusAccClientMIBCompliances 1 }

radiusAccClientExtMIBCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for accounting clients
        implementing the RADIUS Accounting Client MIB."
    MODULE  -- this module
        MANDATORY-GROUPS { radiusAccClientMIBGroup }

    ::= { radiusAccClientExtMIBCompliances 1 }

-- units of conformance

radiusAccClientMIBGroup OBJECT-GROUP
    OBJECTS { radiusAccClientIdentifier,
        radiusAccClientInvalidServerAddresses,
        radiusAccServerAddress,
        radiusAccClientServerPortNumber,
        radiusAccClientRoundTripTime,
        radiusAccClientRequests,
        radiusAccClientRetransmissions,
        radiusAccClientResponses,
        radiusAccClientMalformedResponses,
        radiusAccClientBadAuthenticators,
        radiusAccClientPendingRequests,
        radiusAccClientTimeouts,
        radiusAccClientUnknownTypes,
        radiusAccClientPacketsDropped
    }
    STATUS deprecated
    DESCRIPTION
        "The basic collection of objects providing management of
        RADIUS Accounting Clients."
    ::= { radiusAccClientMIBGroups 1 }

radiusAccClientExtMIBGroup OBJECT-GROUP
    OBJECTS { radiusAccClientIdentifier,
        radiusAccClientInvalidServerAddresses,
        radiusAccServerInetAddressType,
        radiusAccServerInetAddress,
```



```
        radiusAccClientExtServerInetPortNumber,
        radiusAccClientExtRoundTripTime,
        radiusAccClientExtRequests,
        radiusAccClientExtRetransmissions,
        radiusAccClientExtResponses,
        radiusAccClientExtMalformedResponses,
        radiusAccClientExtBadAuthenticators,
        radiusAccClientExtPendingRequests,
        radiusAccClientExtTimeouts,
        radiusAccClientExtUnknownTypes,
        radiusAccClientExtPacketsDropped
    }
    STATUS current
    DESCRIPTION
        "The basic collection of objects providing management of
        RADIUS Accounting Clients."
    ::= { radiusAccClientExtMIBGroups 1 }
```

END

8. IANA Considerations

This document requires IANA assignment of a number in the MIB-2 OID number space.

9. Security Considerations

There are no management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. So, if this MIB is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB via direct SNMP SET operations.

There are a number of managed objects in this MIB that may contain sensitive information. These are:

radiusAcctServerIPAddress This can be used to determine the address of the RADIUS accounting server with which the client is communicating. This information could be useful in mounting an attack on the accounting server.

radiusAcctServerInetAddress This can be used to determine the address of the RADIUS accounting server with which the client is communicating. This information could be useful in mounting an attack on the accounting server.

radiusAcctClientServerPortNumber This can be used to determine the port number on which the RADIUS accounting client is sending. This information could be useful in impersonating the client in order to send data to the accounting server.

radiusAcctClientServerInetPortNumber This can be used to determine the port number on which the RADIUS accounting client is sending. This information could be useful in impersonating the client in order to send data to the accounting server.

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.

SNMP versions prior to SNMPv3 do not provide a secure environment. Even if the network itself is secure (for example by using IPSec), 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 [[RFC2574](#)] and the View-based Access Control Model [[RFC2575](#)] is recommended. Using these security features, customer/users can give access to the objects only to those principals (users) that have legitimate rights to GET or SET (change/create/delete) them.

[10. References](#)

[10.1 Normative References](#)

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2574] Blumenthal, U. and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2574](#), April 1999.
- [RFC2575] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2575](#), April 1999.
- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.

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- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.
- [RFC3418] Presuhn, R., "Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)", STD 62, [RFC 3418](#), December 2002.
- [RFC4001] Daniele, M., Haberman, B., Routhier, S., and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses", [RFC 4001](#), February 2005.

[10.2](#) Informative References

- [RFC2620] Aboba, B. and G. Zorn, "RADIUS Accounting Client MIB", [RFC 2620](#), June 1999.
- [RFC2866] Rigney, C., "RADIUS Accounting", [RFC 2866](#), June 2000.

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[Appendix A](#). Acknowledgments

The Authors of the original MIB are Bernard Aboba and Glen Zorn.

Many thanks to all reviewers, especially to Dave Harrington, Dan Romascanu, C.M. Heard, Bruno Pape and Greg Weber.

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Acknowledgment

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

