

## RADIUS Accounting Server MIB

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### Abstract

This memo defines a set of extensions which instrument RADIUS accounting server functions. These extensions represent a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. Using these extensions IP-based management stations can manage RADIUS accounting servers.

### 1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects used for managing RADIUS accounting servers.

RADIUS accounting servers are today widely deployed by dialup Internet Service Providers, in order to provide accounting services. As a result, the effective management of RADIUS accounting servers is of considerable importance.

### 2. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in RFC 2571 [1].
- 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 15, RFC 1155 [2], STD 16, RFC 1212 [3] and RFC 1215 [4]. The second version, called SMIV2, is described in STD 58, RFC 2578 [5], RFC 2579 [6] and RFC 2580 [7].

- 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 [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 2572 [11] and RFC 2574 [12].
- o 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].
- o A set of fundamental applications described in RFC 2573 [14] and the view-based access control mechanism described in RFC 2575 [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

The RADIUS accounting protocol, described in [16], distinguishes between the client function and the server function. In RADIUS accounting, clients send Accounting-Requests, and servers reply with Accounting-Responses. Typically NAS devices implement the client function, and thus would be expected to implement the RADIUS accounting client MIB, while RADIUS accounting servers implement the server function, and thus would be expected to implement the RADIUS accounting server MIB.

However, it is possible for a RADIUS accounting entity to perform both client and server functions. For example, a RADIUS proxy may act as a server to one or more RADIUS accounting clients, while simultaneously acting as an accounting client to one or more accounting servers. In such situations, it is expected that RADIUS entities combining client and server functionality will support both the client and server MIBs.

### 3.1. Selected objects

This MIB module contains thirteen scalars as well as a single table:

- (1) the RADIUS Accounting Client Table contains one row for each RADIUS accounting client that the server shares a secret with.

Each entry in the RADIUS Accounting Client Table includes eleven columns presenting a view of the activity of the RADIUS accounting server.

### 4. Definitions

```
RADIUS-ACC-SERVER-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY,
    Counter32, Integer32,
    IpAddress, TimeTicks, mib-2          FROM SNMPv2-SMI
    SnmpAdminString                     FROM SNMP-FRAMEWORK-MIB
    MODULE-COMPLIANCE, OBJECT-GROUP    FROM SNMPv2-CONF;
```

```
radiusAccServMIB MODULE-IDENTITY
```

```
    LAST-UPDATED "9906110000Z" -- 11 Jun 1999
    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 server
    side of the Remote Access Dialin User Service (RADIUS)
    accounting protocol."
```

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

```
DESCRIPTION "Initial version as published in RFC 2621"
```

```
 ::= { radiusAccounting 1 }

radiusMIB OBJECT-IDENTITY
  STATUS current
  DESCRIPTION
    "The OID assigned to RADIUS MIB work by the IANA."
    ::= { mib-2 67 }

radiusAccounting OBJECT IDENTIFIER ::= {radiusMIB 2}

radiusAccServMIBObjects OBJECT IDENTIFIER ::=
    { radiusAccServMIB 1 }

radiusAccServ OBJECT IDENTIFIER ::= { radiusAccServMIBObjects 1 }

radiusAccServIdent OBJECT-TYPE
  SYNTAX SnmpAdminString
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The implementation identification string for the
    RADIUS accounting server software in use on the
    system, for example; 'FNS-2.1'"
    ::= {radiusAccServ 1}

radiusAccServUpTime OBJECT-TYPE
  SYNTAX TimeTicks
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "If the server has a persistent state (e.g., a process),
    this value will be the time elapsed (in hundredths of a
    second) since the server process was started.
    For software without persistent state, this value will
    be zero."
    ::= {radiusAccServ 2}

radiusAccServResetTime OBJECT-TYPE
  SYNTAX TimeTicks
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "If the server has a persistent state (e.g., a process)
    and supports a 'reset' operation (e.g., can be told to
    re-read configuration files), this value will be the
    time elapsed (in hundredths of a second) since the
    server was 'reset.' For software that does not
    have persistence or does not support a 'reset' operation,
```

```
        this value will be zero."  
 ::= {radiusAccServ 3}
```

```
radiusAccServConfigReset OBJECT-TYPE
```

```
    SYNTAX INTEGER { other(1),  
                    reset(2),  
                    initializing(3),  
                    running(4)}
```

```
    MAX-ACCESS read-write
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "Status/action object to reinitialize any persistent  
        server state.  When set to reset(2), any persistent  
        server state (such as a process) is reinitialized as if  
        the server had just been started.  This value will  
        never be returned by a read operation.  When read, one  
        of the following values will be returned:
```

```
            other(1) - server in some unknown state;  
            initializing(3) - server (re)initializing;  
            running(4) - server currently running."
```

```
 ::= {radiusAccServ 4}
```

```
-- New Stats proposed by Dale E. Reed Jr (daler@iea.com)
```

```
radiusAccServTotalRequests OBJECT-TYPE
```

```
    SYNTAX Counter32
```

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

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The number of packets received on the  
        accounting port."
```

```
 ::= { radiusAccServ 5 }
```

```
radiusAccServTotalInvalidRequests OBJECT-TYPE
```

```
    SYNTAX Counter32
```

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

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The number of RADIUS Accounting-Request packets  
        received from unknown addresses."
```

```
 ::= { radiusAccServ 6 }
```

```
radiusAccServTotalDupRequests OBJECT-TYPE
```

```
    SYNTAX Counter32
```

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

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The number of duplicate RADIUS Accounting-Request
```

```
        packets received."
 ::= { radiusAccServ 7 }
```

radiusAccServTotalResponses OBJECT-TYPE

```
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Response packets sent."
 ::= { radiusAccServ 8 }
```

radiusAccServTotalMalformedRequests OBJECT-TYPE

```
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of malformed RADIUS Accounting-Request
    packets received. Bad authenticators or unknown
    types are not included as malformed Access-Requests."
 ::= { radiusAccServ 9 }
```

radiusAccServTotalBadAuthenticators OBJECT-TYPE

```
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Request packets
    which contained invalid Signature attributes."
 ::= { radiusAccServ 10 }
```

radiusAccServTotalPacketsDropped OBJECT-TYPE

```
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of incoming packets silently discarded
    for a reason other than malformed, bad authenticators,
    or unknown types."
 ::= { radiusAccServ 11 }
```

radiusAccServTotalNoRecords OBJECT-TYPE

```
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Request packets
    which were received and responded to but not
    recorded."
```

```
 ::= { radiusAccServ 12 }
```

```
radiusAccServTotalUnknownTypes OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"The number of RADIUS packets of unknowntype which
were received."
```

```
 ::= { radiusAccServ 13 }
```

```
-- End of new
```

```
radiusAccClientTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF RadiusAccClientEntry
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"The (conceptual) table listing the RADIUS accounting
clients with which the server shares a secret."
```

```
 ::= { radiusAccServ 14 }
```

```
radiusAccClientEntry OBJECT-TYPE
```

```
SYNTAX RadiusAccClientEntry
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"An entry (conceptual row) representing a RADIUS
accounting client with which the server shares a secret."
```

```
INDEX { radiusAccClientIndex }
```

```
 ::= { radiusAccClientTable 1 }
```

```
RadiusAccClientEntry ::= SEQUENCE {
```

radiusAccClientIndex	Integer32,
radiusAccClientAddress	IpAddress,
radiusAccClientID	SnmpAdminString,
radiusAccServPacketsDropped	Counter32,
radiusAccServRequests	Counter32,
radiusAccServDupRequests	Counter32,
radiusAccServResponses	Counter32,
radiusAccServBadAuthenticators	Counter32,
radiusAccServMalformedRequests	Counter32,
radiusAccServNoRecords	Counter32,
radiusAccServUnknownTypes	Counter32

```
}
```

```
radiusAccClientIndex OBJECT-TYPE
```

```
SYNTAX Integer32 (1..2147483647)
```

```
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "A number uniquely identifying each RADIUS accounting
    client with which this server communicates."
 ::= { radiusAccClientEntry 1 }
```

```
radiusAccClientAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The NAS-IP-Address of the RADIUS accounting client
    referred to in this table entry."
 ::= { radiusAccClientEntry 2 }
```

```
radiusAccClientID OBJECT-TYPE
SYNTAX SnmpAdminString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The NAS-Identifier of the RADIUS accounting client
    referred to in this table entry. This is not necessarily
    the same as sysName in MIB II."
 ::= { radiusAccClientEntry 3 }
```

```
-- Server Counters
--
-- Requests - DupRequests - BadAuthenticators - MalformedRequests -
-- UnknownTypes - PacketsDropped - Responses = Pending
--
-- Requests - DupRequests - BadAuthenticators - MalformedRequests -
-- UnknownTypes - PacketsDropped - NoRecords = entries logged
```

```
radiusAccServPacketsDropped OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of incoming packets received
    from this client and silently discarded
    for a reason other than malformed, bad
    authenticators, or unknown types."
 ::= { radiusAccClientEntry 4 }
```

```
radiusAccServRequests OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
```

```
STATUS current
DESCRIPTION
    "The number of packets received from this
    client on the accounting port."
 ::= { radiusAccClientEntry 5 }
```

```
radiusAccServDupRequests OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of duplicate RADIUS Accounting-Request
    packets received from this client."
 ::= { radiusAccClientEntry 6 }
```

```
radiusAccServResponses OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Response packets
    sent to this client."
 ::= { radiusAccClientEntry 7 }
```

```
radiusAccServBadAuthenticators OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Request packets
    which contained invalid authenticators received
    from this client."
 ::= { radiusAccClientEntry 8 }
```

```
radiusAccServMalformedRequests OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of malformed RADIUS Accounting-Request
    packets which were received from this client.
    Bad authenticators and unknown types
    are not included as malformed Accounting-Requests."
 ::= { radiusAccClientEntry 9 }
```

```
radiusAccServNoRecords OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
```

```
STATUS current
DESCRIPTION
    "The number of RADIUS Accounting-Request packets
    which were received and responded to but not
    recorded."
 ::= { radiusAccClientEntry 10 }

radiusAccServUnknownTypes OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of RADIUS packets of unknown type which
    were received from this client."
 ::= { radiusAccClientEntry 11 }

-- conformance information

radiusAccServMIBConformance
    OBJECT IDENTIFIER ::= { radiusAccServMIB 2 }
radiusAccServMIBCompliances
    OBJECT IDENTIFIER ::= { radiusAccServMIBConformance 1 }
radiusAccServMIBGroups
    OBJECT IDENTIFIER ::= { radiusAccServMIBConformance 2 }

-- compliance statements

radiusAccServMIBCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
    "The compliance statement for accounting servers
    implementing the RADIUS Accounting Server MIB."
MODULE -- this module
MANDATORY-GROUPS { radiusAccServMIBGroup }

OBJECT      radiusAccServConfigReset
WRITE-SYNTAX INTEGER { reset(2) }
DESCRIPTION "The only SETable value is 'reset' (2)."
```

```
 ::= { radiusAccServMIBCompliances 1 }

-- units of conformance

radiusAccServMIBGroup OBJECT-GROUP
OBJECTS {radiusAccServIdent,
        radiusAccServUpTime,
```

```
radiusAccServResetTime,  
radiusAccServConfigReset,  
radiusAccServTotalRequests,  
radiusAccServTotalInvalidRequests,  
radiusAccServTotalDupRequests,  
radiusAccServTotalResponses,  
radiusAccServTotalMalformedRequests,  
radiusAccServTotalBadAuthenticators,  
radiusAccServTotalPacketsDropped,  
radiusAccServTotalNoRecords,  
radiusAccServTotalUnknownTypes,  
radiusAccClientAddress,  
radiusAccClientID,  
radiusAccServPacketsDropped,  
radiusAccServRequests,  
radiusAccServDupRequests,  
radiusAccServResponses,  
radiusAccServBadAuthenticators,  
radiusAccServMalformedRequests,  
radiusAccServNoRecords,  
radiusAccServUnknownTypes  
}  
STATUS current  
DESCRIPTION  
    "The collection of objects providing management of  
    a RADIUS Accounting Server."  
 ::= { radiusAccServMIBGroups 1 }
```

END

## 5. References

- [1] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", RFC 2571, April 1999.
- [2] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990.
- [3] Rose, M., and K. McCloghrie, "Concise MIB Definitions", STD 16, RFC 1212, March 1991.
- [4] Rose, M., "A Convention for Defining Traps for use with the SNMP", RFC 1215, Performance Systems International, March 1991.

- [5] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [6] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [7] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [8] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, May 1990.
- [9] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", RFC 1901, January 1996.
- [10] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1906, January 1996.
- [11] Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", RFC 2572, April 1999.
- [12] Blumenthal, U., and B. Wijnen, "User-based Security Model for Version 3 of the Simple Network Management Protocol (SNMPv3)", RFC 2574, April 1999.
- [13] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1905, January 1996.
- [14] Levi, D., Meyer, P., and B. Stewart, "SNMP Applications", RFC 2573, April 1999.
- [15] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model for the Simple Network Management Protocol (SNMP)", RFC 2575, April 1999.
- [16] Rigney, C., "RADIUS Accounting", RFC 2139, April 1997.

## 6. Security Considerations

There are management objects (radiusAccServConfigReset) defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects 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 sensitive information. These are:

### radiusAccClientAddress

This can be used to determine the address of the RADIUS accounting client with which the server is communicating. This information could be useful in impersonating the client.

radiusAccClientID This can be used to determine the client ID for the accounting client with which the server is communicating. This information could be useful in impersonating the client.

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), 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 [12] and the View-based Access Control Model RFC 2575 [15] 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.

## 7. Acknowledgments

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