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RADIUS Accounting Server MIB

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3. 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.

4. 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.

5. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2271](#) [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 [RFC 1155](#) [2], [RFC 1212](#) [3] and [RFC 1215](#) [4]. The second version, called SMIV2, is described in [RFC 1902](#) [5], [RFC 1903](#) [6] and [RFC 1904](#) [7].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in [RFC 1157](#) [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [9] and [RFC 1906](#) [10]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [10], [RFC 2272](#) [11] and [RFC 2274](#) [12].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in [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 2273](#) [14] and the view-based access control mechanism described in [RFC 2275](#) [15].

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

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

6. 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.

6.1. 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.

7. Definitions

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

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY,  
    Counter32, Integer32,  
    IpAddress, TimeTicks
```

```
    FROM SNMPv2-SMI
```



```

SnmpAdminString          FROM SNMP-FRAMEWORK-MIB
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF
mib-2                    FROM RFC1213-MIB;

```

```

radiusAccServMIB MODULE-IDENTITY
  LAST-UPDATED "9901290000Z" -- 29 Jan 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 "9903290000Z" -- 29 Mar 1999
  DESCRIPTION "Initial version as published in RFC xxxx"
    -- RCC xxxx to be assigned by IANA
  ::= { radiusAccounting 1 }

```

```

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

```

```

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

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

8. References

- [1] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", [RFC 2271](#), Cabletron Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, January 1998.
- [2] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", [RFC 1155](#), Performance Systems International, Hughes LAN Systems, May 1990.
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- [4] M. Rose, "A Convention for Defining Traps for use with the SNMP", [RFC 1215](#), Performance Systems International, March 1991.
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- [6] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1903](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
- [7] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1904](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
- [8] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", [RFC 1157](#), SNMP Research, Performance Systems International, Performance Systems International, MIT Laboratory for Computer Science, May 1990.
- [9] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", [RFC 1901](#), SNMP Research,

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- [11] Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", [RFC 2272](#), SNMP Research, Inc., Cabletron Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, January 1998.
- [12] Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2274](#), IBM T. J. Watson Research, January 1998.
- [13] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
- [14] Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications", [RFC 2273](#), SNMP Research, Inc., Secure Computing Corporation, Cisco Systems, January 1998
- [15] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2275](#), IBM T. J. Watson Research, BMC Software, Inc., Cisco Systems, Inc., January 1998
- [16] Rigney, C., "RADIUS Accounting", [RFC 2139](#), April 1997.

9. 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 2274](#) [12] and the View-based Access Control Model [RFC 2275](#) [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.

10. Acknowledgments

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13. Expiration Date

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