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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:

- An overall architecture, described in RFC 2571 [1].
- 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].

- 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].

- 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].

- 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
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       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.

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[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.

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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 2572, April 1999.

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[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.

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[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.

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