RADIUS Auth Server MIB (IPv6)
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Abstract

   This memo defines a set of extensions which instrument RADIUS
   authentication 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
   authentication servers.

   This memo obsoletes RFC 2619 by deprecating the MIB table containing

   IPv4-only address formats and defining a new table to add support for
   version neutral IP address formats. The remaining MIB objects from
   RFC 2619 are carried forward into this document. This memo also adds
   UNITS and Reference clauses to selected objects.

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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 2865 [RFC2865].

This document uses the word "malformed" with respect to RADIUS
packets, particularly in the context of counters of "malformed
packets". While RFC 2865 does not provide an explicit definition of
"malformed", malformed generally means that the implementation has
determined the packet does not match the format defined in RFC 2865.
Some implementations may determine that packets are malformed when
the Vendor Specific Attribute (VSA) format does not follow the RFC
2865 recommendations for VSAs. Those implementations are used in
deployments today, and thus set the de-facto definition of
"malformed".

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) Authentication Server as
defined in RFC 2865 [RFC2865].

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 obsoletes RFC 2619 [RFC2619], RADIUS Authentication

Server MIB, by deprecating the radiusAuthClientTable table and adding
a new table, radiusAuthClientExtTable, containing
radiusAuthClientInetAddressType and radiusAuthClientInetAddress. The
purpose of these added MIB objects is to support version neutral IP
addressing formats. The existing table containing
radiusAuthClientAddress is deprecated. The remaining MIB objects
from RFC 2619 are carried forward into this document. This memo also
adds UNITS and REFERENCE clauses to selected objects.

RFC 4001 [RFC4001], which defines the SMI Textual Conventions for
version neutral IP 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 RADIUS authentication protocol, described in RFC 2865 [RFC2865],
distinguishes between the client function and the server function.
In RADIUS authentication, clients send Access-Requests, and servers
reply with Access-Accepts, Access-Rejects, and Access-Challenges.
Typically NAS devices implement the client function, and thus would
be expected to implement the RADIUS authentication client MIB, while
RADIUS authentication servers implement the server function, and thus
would be expected to implement the RADIUS authentication server MIB.

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

This MIB module contains fourteen scalars as well as a single table,
the RADIUS Authentication Client Table, which contains one row for
each RADIUS authentication client with which the server shares a
secret. Each entry in the RADIUS Authentication Client Table
includes twelve columns presenting a view of the activity of the
RADIUS authentication server.

6. Deprecated Objects

   The deprecated table in this MIB is carried forward from RFC 2619
   [RFC2619]. 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 row entries in the deprecated
   table, containing IPv4-only address objects, when the RADIUS client
   address represented in such a 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. When row entries exist in both the deprecated
   IPv4-only table and the new IP version neutral table that describe
   the same RADIUS client, the row indexes SHOULD be the same for the
   corresponding rows in each table, to facilitate correlation of these
   related rows by management applications.

7. Definitions

   RADIUS-AUTH-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
           InetAddressType, InetAddress   FROM INET-ADDRESS-MIB
           MODULE-COMPLIANCE, OBJECT-GROUP   FROM SNMPv2-CONF;

   radiusAuthServMIB MODULE-IDENTITY
           LAST-UPDATED "200601200000Z"   -- 20 Jan 2006
           ORGANIZATION "IETF RADIUS Extensions 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 Authentication Dial-In User
                 Service (RADIUS) authentication protocol."
            REVISION "200601200000Z" -- 20 Jan 2006
            DESCRIPTION "Revised version as published in RFC xxxx.
            This version obsoletes that of RFC 2619 by deprecating the
            MIB table containing IPv4-only address formats and defining
            a new table to add support for version neutral IP address
            formats. The remaining MIB objects from RFC 2619 are carried
            forward into this version."
            REVISION "9906110000Z"   -- 11 Jun 1999
            DESCRIPTION "Initial version as published in RFC 2619."

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

            ::= { radiusAuthentication 1 }

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

    radiusAuthentication OBJECT IDENTIFIER ::= {radiusMIB 1}

    radiusAuthServMIBObjects OBJECT IDENTIFIER
             ::= { radiusAuthServMIB 1 }

    radiusAuthServ OBJECT IDENTIFIER
             ::= { radiusAuthServMIBObjects 1 }

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

    radiusAuthServUpTime 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."
            ::= {radiusAuthServ 2}

   radiusAuthServResetTime 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."
            ::= {radiusAuthServ 3}

   radiusAuthServConfigReset 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."
            ::= {radiusAuthServ 4}

   radiusAuthServTotalAccessRequests OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
```

                      "The number of packets received on the
                       authentication port."
              REFERENCE "RFC 2865 section 4.1"
              ::= { radiusAuthServ 5}

     radiusAuthServTotalInvalidRequests OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
                     "The number of RADIUS Access-Request packets
                      received from unknown addresses."
             REFERENCE "RFC 2865 section 4.1"
              ::= { radiusAuthServ 6 }

     radiusAuthServTotalDupAccessRequests OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
                     "The number of duplicate RADIUS Access-Request
                      packets received."
             REFERENCE "RFC 2865 section 4.1"
             ::= { radiusAuthServ 7 }

     radiusAuthServTotalAccessAccepts OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS current
             DESCRIPTION
                     "The number of RADIUS Access-Accept packets sent."
             REFERENCE "RFC 2865 section 4.2"
              ::= { radiusAuthServ 8 }

     radiusAuthServTotalAccessRejects OBJECT-TYPE
            SYNTAX Counter32
            UNITS "packets"
            MAX-ACCESS read-only
            STATUS current
            DESCRIPTION
                    "The number of RADIUS Access-Reject packets sent."
            REFERENCE "RFC 2865 section 4.3"
            ::= { radiusAuthServ 9 }

     radiusAuthServTotalAccessChallenges OBJECT-TYPE

```
        SYNTAX Counter32
        UNITS "packets"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
               "The number of RADIUS Access-Challenge packets sent."
        REFERENCE "RFC 2865 section 4.4"
        ::= { radiusAuthServ 10 }

   radiusAuthServTotalMalformedAccessRequests OBJECT-TYPE
        SYNTAX Counter32
        UNITS "packets"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
               "The number of malformed RADIUS Access-Request
                packets received. Bad authenticators
                and unknown types are not included as
                malformed Access-Requests."
        REFERENCE "RFC 2865 section 4.1"
        ::= { radiusAuthServ 11 }

   radiusAuthServTotalBadAuthenticators OBJECT-TYPE
        SYNTAX Counter32
        UNITS "packets"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
               "The number of RADIUS Authentication-Request packets
                which contained invalid Message Authenticator
                attributes received."
        REFERENCE "RFC 2865 section 3"
        ::= { radiusAuthServ 12 }

   radiusAuthServTotalPacketsDropped OBJECT-TYPE
        SYNTAX Counter32
        UNITS "packets"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
               "The number of incoming packets
                silently discarded for some reason other
                than malformed, bad authenticators or
                unknown types."
        REFERENCE "RFC 2865 section 3"
        ::= { radiusAuthServ 13 }

   radiusAuthServTotalUnknownTypes OBJECT-TYPE
```

```
        SYNTAX Counter32
        UNITS "packets"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The number of RADIUS packets of unknown type which
               were received."
        REFERENCE "RFC 2865 section 4"
        ::= { radiusAuthServ 14 }


   radiusAuthClientTable OBJECT-TYPE
        SYNTAX     SEQUENCE OF RadiusAuthClientEntry
        MAX-ACCESS not-accessible
        STATUS     deprecated
        DESCRIPTION
              "The (conceptual) table listing the RADIUS
               authentication clients with which the server shares
               a secret."
        ::= { radiusAuthServ 15 }


   radiusAuthClientEntry OBJECT-TYPE
        SYNTAX     RadiusAuthClientEntry
        MAX-ACCESS not-accessible
        STATUS     deprecated
        DESCRIPTION
              "An entry (conceptual row) representing a RADIUS
               authentication client with which the server shares a
               secret."
        INDEX     { radiusAuthClientIndex }
        ::= { radiusAuthClientTable 1 }

   RadiusAuthClientEntry ::= SEQUENCE {
        radiusAuthClientIndex                    Integer32,
        radiusAuthClientAddress                  IpAddress,
        radiusAuthClientID                      SnmpAdminString,
        radiusAuthServAccessRequests             Counter32,
        radiusAuthServDupAccessRequests          Counter32,
        radiusAuthServAccessAccepts              Counter32,
        radiusAuthServAccessRejects              Counter32,
        radiusAuthServAccessChallenges           Counter32,
        radiusAuthServMalformedAccessRequests    Counter32,
        radiusAuthServBadAuthenticators          Counter32,
        radiusAuthServPacketsDropped             Counter32,
        radiusAuthServUnknownTypes               Counter32
   }
```

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

    radiusAuthClientAddress OBJECT-TYPE
          SYNTAX   IpAddress
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                "The NAS-IP-Address of the RADIUS authentication client
                 referred to in this table entry."
          REFERENCE "RFC 2865 section 2"
          ::= { radiusAuthClientEntry 2 }

    radiusAuthClientID OBJECT-TYPE
          SYNTAX   SnmpAdminString
          MAX-ACCESS read-only
          STATUS   deprecated
          DESCRIPTION
                "The NAS-Identifier of the RADIUS authentication client
                 referred to in this table entry. This is not
                 necessarily the same as sysName in MIB II."
          REFERENCE "RFC 2865 section 5.32"
          ::= { radiusAuthClientEntry 3 }

    -- Server Counters

    --
    -- Responses = AccessAccepts + AccessRejects + AccessChallenges
    --
    -- Requests - DupRequests - BadAuthenticators - MalformedRequests -
    -- UnknownTypes - PacketsDropped - Responses = Pending
    --
    -- Requests - DupRequests - BadAuthenticators - MalformedRequests -
    -- UnknownTypes - PacketsDropped = entries logged

    radiusAuthServAccessRequests OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS deprecated
          DESCRIPTION

                    "The number of packets received on the authentication
                     port from this client."
             REFERENCE "RFC 2865 section 4.1"
             ::= { radiusAuthClientEntry 4 }

    radiusAuthServDupAccessRequests OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS deprecated
             DESCRIPTION
                    "The number of duplicate RADIUS Access-Request
                     packets received from this client."
             REFERENCE "RFC 2865 section 4.1"
             ::= { radiusAuthClientEntry 5 }

    radiusAuthServAccessAccepts OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS deprecated
             DESCRIPTION
                    "The number of RADIUS Access-Accept packets
                     sent to this client."
             REFERENCE "RFC 2865 section 4.2"
             ::= { radiusAuthClientEntry 6 }

    radiusAuthServAccessRejects OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS deprecated
             DESCRIPTION
                    "The number of RADIUS Access-Reject packets
                     sent to this client."
            REFERENCE "RFC 2865 section 4.3"
             ::= { radiusAuthClientEntry 7 }

    radiusAuthServAccessChallenges OBJECT-TYPE
             SYNTAX Counter32
             UNITS "packets"
             MAX-ACCESS read-only
             STATUS deprecated
             DESCRIPTION
                    "The number of RADIUS Access-Challenge packets
                     sent to this client."
             REFERENCE "RFC 2865 section 4.4"
             ::= { radiusAuthClientEntry 8 }

    radiusAuthServMalformedAccessRequests OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS deprecated
          DESCRIPTION
                "The number of malformed RADIUS Access-Request
                 packets received from this client.
                 Bad authenticators and unknown types are not included
                 as malformed Access-Requests."
          REFERENCE "RFC 2865 section 3"
          ::= { radiusAuthClientEntry 9 }

    radiusAuthServBadAuthenticators OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS deprecated
          DESCRIPTION
                "The number of RADIUS Authentication-Request packets
                 which contained invalid Message Authenticator
                 attributes received from this client."
          REFERENCE "RFC 2865 section 3"
          ::= { radiusAuthClientEntry 10 }

    radiusAuthServPacketsDropped OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS deprecated
          DESCRIPTION
                "The number of incoming packets from this
                 client silently discarded for some reason other
                 than malformed, bad authenticators or
                 unknown types."
          REFERENCE "RFC 2865 section 3"
          ::= { radiusAuthClientEntry 11 }

    radiusAuthServUnknownTypes OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS deprecated
          DESCRIPTION
                "The number of RADIUS packets of unknown type which
                 were received from this client."
          REFERENCE "RFC 2865 section 4"
          ::= { radiusAuthClientEntry 12 }

```
   -- New MIB objects added in this revision

   radiusAuthClientExtTable OBJECT-TYPE
         SYNTAX     SEQUENCE OF RadiusAuthClientExtEntry
         MAX-ACCESS not-accessible
         STATUS     current
         DESCRIPTION
               "The (conceptual) table listing the RADIUS
                authentication clients with which the server shares
                a secret."
         ::= { radiusAuthServ 16 }

   radiusAuthClientExtEntry OBJECT-TYPE
         SYNTAX     RadiusAuthClientExtEntry
         MAX-ACCESS not-accessible
         STATUS     current
         DESCRIPTION
               "An entry (conceptual row) representing a RADIUS
                authentication client with which the server shares a
                secret."
         INDEX     { radiusAuthClientExtIndex }
         ::= { radiusAuthClientExtTable 1 }

   RadiusAuthClientExtEntry ::= SEQUENCE {
         radiusAuthClientExtIndex                 Integer32,
         radiusAuthClientInetAddressType          InetAddressType,
         radiusAuthClientInetAddress              InetAddress,
         radiusAuthClientExtID                    SnmpAdminString,
         radiusAuthServExtAccessRequests          Counter32,
         radiusAuthServExtDupAccessRequests       Counter32,
         radiusAuthServExtAccessAccepts           Counter32,
         radiusAuthServExtAccessRejects           Counter32,
         radiusAuthServExtAccessChallenges        Counter32,
         radiusAuthServExtMalformedAccessRequests Counter32,
         radiusAuthServExtBadAuthenticators       Counter32,
         radiusAuthServExtPacketsDropped          Counter32,
         radiusAuthServExtUnknownTypes            Counter32
   }

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

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

      radiusAuthClientInetAddress OBJECT-TYPE
            SYNTAX   InetAddress
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                   "The IP address of the RADIUS authentication
                    client referred to in this table entry, using
                    the version neutral IP address format."
            ::= { radiusAuthClientExtEntry 3 }

   radiusAuthClientExtID OBJECT-TYPE
          SYNTAX   SnmpAdminString
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
                 "The NAS-Identifier of the RADIUS authentication client
                  referred to in this table entry. This is not
                  necessarily the same as sysName in MIB II."
          REFERENCE "RFC 2865 section 5.32"
          ::= { radiusAuthClientExtEntry 4 }

   -- Server Counters

   --
   -- Responses = AccessAccepts + AccessRejects + AccessChallenges
   --
   -- Requests - DupRequests - BadAuthenticators - MalformedRequests -
   -- UnknownTypes - PacketsDropped - Responses = Pending
   --
   -- Requests - DupRequests - BadAuthenticators - MalformedRequests -
   -- UnknownTypes - PacketsDropped = entries logged

   radiusAuthServExtAccessRequests OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION

                    "The number of packets received on the authentication
                     port from this client."
              REFERENCE "RFC 2865 section 4.1"
              ::= { radiusAuthClientExtEntry 5 }

      radiusAuthServExtDupAccessRequests OBJECT-TYPE
              SYNTAX Counter32
              UNITS "packets"
              MAX-ACCESS read-only
              STATUS current
              DESCRIPTION
                    "The number of duplicate RADIUS Access-Request
                     packets received from this client."
              REFERENCE "RFC 2865 section 4.1"
              ::= { radiusAuthClientExtEntry 6 }

      radiusAuthServExtAccessAccepts OBJECT-TYPE
              SYNTAX Counter32
              UNITS "packets"
              MAX-ACCESS read-only
              STATUS current
              DESCRIPTION
                    "The number of RADIUS Access-Accept packets
                     sent to this client."
              REFERENCE "RFC 2865 section 4.2"
              ::= { radiusAuthClientExtEntry 7 }

      radiusAuthServExtAccessRejects OBJECT-TYPE
              SYNTAX Counter32
              UNITS "packets"
              MAX-ACCESS read-only
              STATUS current
              DESCRIPTION
                    "The number of RADIUS Access-Reject packets
                     sent to this client."
             REFERENCE "RFC 2865 section 4.3"
              ::= { radiusAuthClientExtEntry 8 }

      radiusAuthServExtAccessChallenges OBJECT-TYPE
              SYNTAX Counter32
              UNITS "packets"
              MAX-ACCESS read-only
              STATUS current
              DESCRIPTION
                    "The number of RADIUS Access-Challenge packets
                     sent to this client."
              REFERENCE "RFC 2865 section 4.4"
              ::= { radiusAuthClientExtEntry 9 }

    radiusAuthServExtMalformedAccessRequests OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION
                "The number of malformed RADIUS Access-Request
                 packets received from this client.
                 Bad authenticators and unknown types are not included
                 as malformed Access-Requests."
          REFERENCE "RFC 2865 sections 3, 4.1"
          ::= { radiusAuthClientExtEntry 10 }

    radiusAuthServExtBadAuthenticators OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION
                "The number of RADIUS Authentication-Request packets
                 which contained invalid Message Authenticator
                 attributes received from this client."
          REFERENCE "RFC 2865 section 3"
          ::= { radiusAuthClientExtEntry 11 }

    radiusAuthServExtPacketsDropped OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION
                "The number of incoming packets from this
                 client silently discarded for some reason other
                 than malformed, bad authenticators or
                 unknown types."
          REFERENCE "RFC 2865 section 3"
          ::= { radiusAuthClientExtEntry 12 }

    radiusAuthServExtUnknownTypes OBJECT-TYPE
          SYNTAX Counter32
          UNITS "packets"
          MAX-ACCESS read-only
          STATUS current
          DESCRIPTION
                "The number of RADIUS packets of unknown type which
                 were received from this client."
          REFERENCE "RFC 2865 section 4"
          ::= { radiusAuthClientExtEntry 13 }

    -- conformance information

    radiusAuthServMIBConformance OBJECT IDENTIFIER
            ::= { radiusAuthServMIB 2 }

    radiusAuthServMIBCompliances OBJECT IDENTIFIER
            ::= { radiusAuthServMIBConformance 1 }

    radiusAuthServMIBGroups OBJECT IDENTIFIER
            ::= { radiusAuthServMIBConformance 2 }

    -- compliance statements

    radiusAuthServMIBCompliance MODULE-COMPLIANCE
                STATUS deprecated
                DESCRIPTION
                      "The compliance statement for authentication
                       servers implementing the RADIUS Authentication
                       Server MIB. Implementation of this module is for
                       IPv4-only entities, or for backwards compatibility
                       use with entities that support both IPv4 and
                       IPv6."
                MODULE -- this module
                MANDATORY-GROUPS { radiusAuthServMIBGroup }

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

                ::= { radiusAuthServMIBCompliances 1 }

    radiusAuthServMIBExtCompliance MODULE-COMPLIANCE
                STATUS current
                DESCRIPTION
                      "The compliance statement for authentication
                       servers implementing the RADIUS Authentication
                       Server IPv6 Extensions MIB. Implementation of
                       this module is for entities that support IPv6,
                       or support IPv4 and IPv6."
                MODULE -- this module
                MANDATORY-GROUPS { radiusAuthServExtMIBGroup }

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

                ::= { radiusAuthServMIBCompliances 2 }

    -- units of conformance

    radiusAuthServMIBGroup OBJECT-GROUP
         OBJECTS {radiusAuthServIdent,
                  radiusAuthServUpTime,
                  radiusAuthServResetTime,
                  radiusAuthServConfigReset,
                  radiusAuthServTotalAccessRequests,
                  radiusAuthServTotalInvalidRequests,
                  radiusAuthServTotalDupAccessRequests,
                  radiusAuthServTotalAccessAccepts,
                  radiusAuthServTotalAccessRejects,
                  radiusAuthServTotalAccessChallenges,
                  radiusAuthServTotalMalformedAccessRequests,
                  radiusAuthServTotalBadAuthenticators,
                  radiusAuthServTotalPacketsDropped,
                  radiusAuthServTotalUnknownTypes,
                  radiusAuthClientAddress,
                  radiusAuthClientID,
                  radiusAuthServAccessRequests,
                  radiusAuthServDupAccessRequests,
                  radiusAuthServAccessAccepts,
                  radiusAuthServAccessRejects,
                  radiusAuthServAccessChallenges,
                  radiusAuthServMalformedAccessRequests,
                  radiusAuthServBadAuthenticators,
                  radiusAuthServPacketsDropped,
                  radiusAuthServUnknownTypes
                 }
         STATUS deprecated
         DESCRIPTION
               "The collection of objects providing management of
                a RADIUS Authentication Server."
         ::= { radiusAuthServMIBGroups 1 }

    radiusAuthServExtMIBGroup OBJECT-GROUP
         OBJECTS {radiusAuthServIdent,
                  radiusAuthServUpTime,
                  radiusAuthServResetTime,
                  radiusAuthServConfigReset,
                  radiusAuthServTotalAccessRequests,
                  radiusAuthServTotalInvalidRequests,
                  radiusAuthServTotalDupAccessRequests,
                  radiusAuthServTotalAccessAccepts,
                  radiusAuthServTotalAccessRejects,
                  radiusAuthServTotalAccessChallenges,
                  radiusAuthServTotalMalformedAccessRequests,
                  radiusAuthServTotalBadAuthenticators,

```
                radiusAuthServTotalPacketsDropped,
                radiusAuthServTotalUnknownTypes,
                radiusAuthClientInetAddressType,
                radiusAuthClientInetAddress,
                radiusAuthClientExtID,
                radiusAuthServExtAccessRequests,
                radiusAuthServExtDupAccessRequests,
                radiusAuthServExtAccessAccepts,
                radiusAuthServExtAccessRejects,
                radiusAuthServExtAccessChallenges,
                radiusAuthServExtMalformedAccessRequests,
                radiusAuthServExtBadAuthenticators,
                radiusAuthServExtPacketsDropped,
                radiusAuthServExtUnknownTypes
              }
      STATUS  current
      DESCRIPTION
            "The collection of objects providing management of
             a RADIUS Authentication Server."
      ::= { radiusAuthServMIBGroups 2 }


   END
```

8. IANA Considerations

This document requires no new IANA assignments.

9. Security Considerations

There are a number of management objects 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. These are:

radiusAuthServConfigReset This object cab be used to reinitialize the
   persistent state of any server. When set to reset(2), any
   persistent server state (such as a process) is reinitialized as if
   the server had just been started. Depending on the server
   implemlentation details, this action may ot may not interrupt the
   processing of pending request in the server. Abuse of this object
   may lead to a Denial of Service attack on the server.

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

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

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 implementers consider the security features as
provided by the SNMPv3 framework (see [RFC3410], section 8),
including full support for the SNMPv3 cryptographic mechanisms (for
authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT
RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to
enable cryptographic security. It is then a customer/operator
responsibility to ensure that the SNMP entity giving access to an
instance of this MIB module 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

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10.2. Informative References

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Appendix A. Acknowledgments

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