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D. Nelson  
Enterasys Networks  
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## RADIUS Authentication Server MIB for IPv6

### Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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### Abstract

This memo defines a set of extensions that 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. 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].

## 2. 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".

## 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 [RFC4001] 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. The server MIB is defined in this document, and the client MIB is defined in [RFC4668].

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 thirteen columns presenting a view of the activity of the RADIUS authentication server.

This MIB imports from [RFC2578], [RFC2580], [RFC3411], and [RFC4001].

## 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 "200608210000Z" -- 21 August 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. Copyright (C) The Internet Society (2006). This version of this MIB module is part of RFC 4669; see the RFC itself for full legal notices."

REVISION "200608210000Z" -- 21 August 2006

DESCRIPTION

"Revised version as published in RFC 4669. 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 "199906110000Z" -- 11 Jun 1999

DESCRIPTION "Initial version as published in RFC 2619."

::= { 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  
    that 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 that
    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
        that 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 that
        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,
    radiusAuthServCounterDiscontinuity TimeTicks
}

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. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."

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. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."

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. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."

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. This counter may experience a discontinuity when the RADIUS Server module within the



managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."  
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. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."  
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. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."  
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 that contained invalid Message Authenticator attributes received from this client. This counter may experience a discontinuity when the RADIUS Server module within the managed entity is reinitialized, as indicated by the current value of radiusAuthServCounterDiscontinuity."

```
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.
        This counter may experience a discontinuity when the
        RADIUS Server module within the managed entity is
        reinitialized, as indicated by the current value of
        radiusAuthServCounterDiscontinuity."
    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 that
        were received from this client. This counter may
        experience a discontinuity when the RADIUS Server
        module within the managed entity is reinitialized, as
        indicated by the current value of
        radiusAuthServCounterDiscontinuity."
    REFERENCE "RFC 2865 section 4"
    ::= { radiusAuthClientExtEntry 13 }
```

```
radiusAuthServCounterDiscontinuity OBJECT-TYPE
    SYNTAX TimeTicks
    UNITS "centiseconds"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of centiseconds since the last
        discontinuity in the RADIUS Server counters.
        A discontinuity may be the result of a
        reinitialization of the RADIUS Server module
        within the managed entity."
    ::= { radiusAuthClientExtEntry 14 }
```

```
-- 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)."
```

```
    OBJECT radiusAuthClientInetAddressType
```

```
SYNTAX InetAddressType { ipv4(1), ipv6(2) }
DESCRIPTION
    "An implementation is only required to support
    IPv4 and globally unique IPv6 addresses."

OBJECT radiusAuthClientInetAddress
SYNTAX InetAddress ( SIZE (4|16) )
DESCRIPTION
    "An implementation is only required to support
    IPv4 and globally unique IPv6 addresses."

 ::= { 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,
        radiusAuthServCounterDiscontinuity
    }
    STATUS current
    DESCRIPTION
        "The collection of objects providing management of
        a RADIUS Authentication Server."
    ::= { radiusAuthServMIBGroups 2 }
```

END

## 8. 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 can 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 implementation details, this action may or 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.

## 9. References

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### 9.2. Informative References

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## Appendix A. Acknowledgements

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## Author's Address

David B. Nelson  
Enterasys Networks  
50 Minuteman Road  
Andover, MA 01810  
USA

EMail: dnelson@enterasys.com



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