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Dynamic Authorization Client MIB
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Abstract

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 the RADIUS dynamic authorization client (DAC) functions that support the dynamic authorization extensions as defined in [RFC3576](#).

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1. Requirements notation

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 [[RFC2119](#)].

2. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. It is becoming increasingly important to support Dynamic Authorization extensions on the network access server (NAS) devices to handle the Disconnect and Change-of-Authorization (CoA) messages as described in [[RFC3576](#)] . As a result, the effective management of RADIUS Dynamic Authorization entities is of considerable importance. It complements the managed objects used for managing RADIUS authentication and accounting servers as described in [[RFC2619](#)] and [[RFC2621](#)], respectively.

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 \[RFC3410\]](#).

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, [RFC2578](#) [[RFC2578](#)], STD 58, [RFC2579](#) [[RFC2579](#)] and STD 58, [RFC2580](#) [[RFC2580](#)].

4. Terminology

Dynamic Authorization Server (DAS)

The component that resides on the NAS which processes the Disconnect and CoA requests sent by the Dynamic Authorization Client as described in [[RFC3576](#)].

Dynamic Authorization Client (DAC)

The component which sends the Disconnect and CoA requests to the Dynamic Authorization Server as described in [[RFC3576](#)]. This is typically a RADIUS Server, but is not limited to it and may, for example, be a Rating Engine used for Prepaid Billing.

Dynamic Authorization Server Port

The UDP port on which the Dynamic Authorization server listens for the Disconnect and CoA requests sent by the Dynamic Authorization Client.

5. Overview

The RADIUS dynamic authorization extensions defined in [[RFC3576](#)], distinguish between the client function and the server function. [[DYNSERV](#)] defines the terms Dynamic Authorization Server (DAS) and Dynamic Authorization Client (DAC), the MIB for the DAS, and the relationship with other MIB modules. This MIB module for the dynamic authorization client contains the following:

1. One scalar object
2. One Dynamic Authorization Server Table. This table contains one row for each DAS that the DAC shares a secret with.

6. RADIUS Dynamic Authorization Client MIB Definitions

RADIUS-DYNAUTH-CLIENT-MIB DEFINITIONS ::= BEGIN

IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE,
Counter32, Gauge32, Integer32,
mib-2, TimeTicks                FROM SNMPv2-SMI
SnmpAdminString                 FROM SNMP-FRAMEWORK-MIB
InetAddressType, InetAddress,
InetPortNumber                 FROM INET-ADDRESS-MIB
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF;
```

radiusDynAuthClientMIB MODULE-IDENTITY

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DESCRIPTION

"The MIB module for entities implementing the client side of the Dynamic Authorization extensions Remote Authentication Dial In User Service (RADIUS) protocol.

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```
version of this MIB module was published in RFC yyyy;
for full legal notices see the RFC itself.  Supplementary
information may be available on
http://www.ietf.org/copyrights/ianamib.html."
-- RFC Ed.: replace yyyy with actual RFC number & remove this note

REVISION "200507020000Z" -- 2 July 2005
DESCRIPTION "Initial version as published in RFC yyyy"
-- RFC Ed.: replace yyyy with actual RFC number & remove this note
::= { radiusDynamicAuthorization 2 }

radiusDynamicAuthorization OBJECT IDENTIFIER ::= { mib-2 xxx }
-- The value xxx to be assigned by IANA.

radiusDynAuthClientMIBObjects OBJECT IDENTIFIER ::=
    { radiusDynAuthClientMIB 1 }

radiusDynAuthClient OBJECT IDENTIFIER ::=
    { radiusDynAuthClientMIBObjects 1 }

radiusDynAuthClientDisconInvalidServerAddresses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of Disconnect messages received from unknown
        addresses."
    ::= { radiusDynAuthClient 1 }

radiusDynAuthClientCoAInvalidServerAddresses OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of CoA messages received from unknown
        addresses."
    ::= { radiusDynAuthClient 2 }

radiusDynAuthServerTable OBJECT-TYPE
    SYNTAX SEQUENCE OF RadiusDynAuthServerEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The (conceptual) table listing the RADIUS Dynamic
        Authorization servers with which the client shares a
        secret."
    ::= { radiusDynAuthClient 3 }
```


radiusDynAuthServerEntry OBJECT-TYPE

SYNTAX RadiusDynAuthServerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) representing one Dynamic Authorization Server with which the client shares a secret."

INDEX { radiusDynAuthServerIndex }

::= { radiusDynAuthServerTable 1 }

RadiusDynAuthServerEntry ::= SEQUENCE {

radiusDynAuthServerIndex	Integer32,
radiusDynAuthServerAddressType	InetAddressType,
radiusDynAuthServerAddress	InetAddress,
radiusDynAuthServerClientPortNumber	InetPortNumber,
radiusDynAuthServerID	SnmpAdminString,
radiusDynAuthClientRoundTripTime	TimeTicks,
radiusDynAuthClientDisconRequests	Counter32,
radiusDynAuthClientDisconRetransmissions	Counter32,
radiusDynAuthClientDisconAcks	Counter32,
radiusDynAuthClientDisconNaks	Counter32,
radiusDynAuthClientMalformedDisconResponses	Counter32,
radiusDynAuthClientDisconBadAuthenticators	Counter32,
radiusDynAuthClientDisconPendingRequests	Gauge32,
radiusDynAuthClientDisconTimeouts	Counter32,
radiusDynAuthClientDisconPacketsDropped	Counter32,
radiusDynAuthClientCoARequests	Counter32,
radiusDynAuthClientCoARetransmissions	Counter32,
radiusDynAuthClientCoAAcks	Counter32,
radiusDynAuthClientCoANaks	Counter32,
radiusDynAuthClientMalformedCoAResponses	Counter32,
radiusDynAuthClientCoABadAuthenticators	Counter32,
radiusDynAuthClientCoAPendingRequests	Gauge32,
radiusDynAuthClientCoATimeouts	Counter32,
radiusDynAuthClientCoAPacketsDropped	Counter32,
radiusDynAuthClientUnknownTypes	Counter32

}

radiusDynAuthServerIndex OBJECT-TYPE

SYNTAX Integer32 (1..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A number uniquely identifying each RADIUS Dynamic Authorization server with which this Dynamic Authorization client communicates. This number is

allocated by the agent implementing this MIB module,
and is unique in this context."
 ::= { radiusDynAuthServerEntry 1 }

radiusDynAuthServerAddressType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The type of IP-Address of the RADIUS Dynamic
Authorization server referred to in this table entry."
 ::= { radiusDynAuthServerEntry 2 }

radiusDynAuthServerAddress OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The IP-Address value of the RADIUS Dynamic
Authorization server referred to in this table entry."
 ::= { radiusDynAuthServerEntry 3 }

radiusDynAuthServerClientPortNumber OBJECT-TYPE
SYNTAX InetPortNumber
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The UDP destination port that the RADIUS Dynamic
Authorization client is using to send requests to this
server."
 ::= { radiusDynAuthServerEntry 4 }

radiusDynAuthServerID OBJECT-TYPE
SYNTAX SnmpAdminString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The NAS-Identifier of the RADIUS Dynamic
Authorization server referred to in this table
entry."
REFERENCE
"[RFC 2865, Section 5.32](#), NAS-Identifier."
 ::= { radiusDynAuthServerEntry 5 }

radiusDynAuthClientRoundTripTime OBJECT-TYPE
SYNTAX TimeTicks
UNITS "hundredths of a second"

MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The time interval (in hundredths of a second) between
 the most recent Disconnect or CoA request and the
 reception of the corresponding Disconnect or CoA reply.
 A value of zero is returned in case no reply has been
 received yet from this server."
::= { radiusDynAuthServerEntry 6 }

radiusDynAuthClientDisconRequests OBJECT-TYPE

SYNTAX Counter32
UNITS "requests"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-Requests sent
 to this Dynamic Authorization server."
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."
::= { radiusDynAuthServerEntry 7 }

radiusDynAuthClientDisconRetransmissions OBJECT-TYPE

SYNTAX Counter32
UNITS "retransmissions"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-request packets
 retransmitted to this RADIUS Dynamic authorization
 server."
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."
::= { radiusDynAuthServerEntry 8 }

radiusDynAuthClientDisconAcks OBJECT-TYPE

SYNTAX Counter32
UNITS "replies"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-ACK packets
 received from this Dynamic Authorization server"
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."
::= { radiusDynAuthServerEntry 9 }

radiusDynAuthClientDisconNaks OBJECT-TYPE

SYNTAX Counter32
UNITS "replies"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-NAK packets
 received from this Dynamic Authorization server."
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."
::= { radiusDynAuthServerEntry 10 }

radiusDynAuthClientMalformedDisconResponses OBJECT-TYPE

SYNTAX Counter32
UNITS "replies"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of malformed RADIUS Disconnect-Response
 packets received from this Dynamic Authorization
 server. Bad authenticators and unknown types are not
 included as malformed Disconnect-Responses."
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM), and
 [Section 2.3](#), Packet Format."
::= { radiusDynAuthServerEntry 11 }

radiusDynAuthClientDisconBadAuthenticators OBJECT-TYPE

SYNTAX Counter32
UNITS "replies"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-Response packets
 which contained invalid Authenticator field
 received from this Dynamic Authorization server."
REFERENCE
 "[RFC 3576, Section 2.1](#), Disconnect Messages (DM), and
 [Section 2.3](#), Packet Format."
::= { radiusDynAuthServerEntry 12 }

radiusDynAuthClientDisconPendingRequests OBJECT-TYPE

SYNTAX Gauge32
UNITS "requests"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS Disconnect-request packets
 destined for this server that have not yet timed out

or received a response. This variable is incremented when an Disconnect-Request is sent and decremented due to receipt of an Disconnect-Ack, Disconnect-NAK or a timeout or a retransmission."

REFERENCE

"[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."

::= { radiusDynAuthServerEntry 13 }

radiusDynAuthClientDisconTimeouts OBJECT-TYPE

SYNTAX Counter32

UNITS "timeouts"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Disconnect request timeouts to this server. After a timeout the client may retry to the same server or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as a Disconnect-Request as well as a timeout."

REFERENCE

"[RFC 3576, Section 2.1](#), Disconnect Messages (DM)."

::= { radiusDynAuthServerEntry 14 }

radiusDynAuthClientDisconPacketsDropped OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of incoming Disconnect-Responses from this Dynamic Authorization server silently discarded by the client application for some reason other than malformed, bad authenticators or unknown types."

REFERENCE

"[RFC 3576, Section 2.1](#), Disconnect Messages (DM), and [Section 2.3](#), Packet Format."

::= { radiusDynAuthServerEntry 15 }

radiusDynAuthClientCoARequests OBJECT-TYPE

SYNTAX Counter32

UNITS "requests"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of RADIUS CoA-Requests sent to this Dynamic Authorization server."

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization
Messages (CoA)."

::= { radiusDynAuthServerEntry 16 }

radiusDynAuthClientCoARetransmissions OBJECT-TYPE

SYNTAX Counter32

UNITS "retransmissions"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of RADIUS CoA-request packets
retransmitted to this RADIUS Dynamic authorization
server."

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization
Messages (CoA)."

::= { radiusDynAuthServerEntry 17 }

radiusDynAuthClientCoAAcks OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of RADIUS CoA-ACK packets
received from this Dynamic Authorization server"

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization
Messages (CoA)."

::= { radiusDynAuthServerEntry 18 }

radiusDynAuthClientCoANaks OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of RADIUS CoA-NAK packets
received from this Dynamic Authorization server."

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization
Messages (CoA)."

::= { radiusDynAuthServerEntry 19 }

radiusDynAuthClientMalformedCoAResponses OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of malformed RADIUS CoA-Response
 packets received from this Dynamic Authorization
 server. Bad authenticators and unknown types are
 not included as malformed CoA-Responses."
REFERENCE
 "[RFC 3576, Section 2.2](#), Change-of-Authorization
 Messages (CoA), and [Section 2.3](#), Packet Format."
::= { radiusDynAuthServerEntry 20 }

radiusDynAuthClientCoABadAuthenticators OBJECT-TYPE

SYNTAX Counter32
UNITS "replies"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS CoA-Response packets
 which contained invalid Authenticator field
 received from this Dynamic Authorization server."
REFERENCE
 "[RFC 3576, Section 2.2](#), Change-of-Authorization
 Messages (CoA), and [Section 2.3](#), Packet Format."
::= { radiusDynAuthServerEntry 21 }

radiusDynAuthClientCoAPendingRequests OBJECT-TYPE

SYNTAX Gauge32
UNITS "requests"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of RADIUS CoA-request packets destined for
 this server that have not yet timed out or received a
 response. This variable is incremented when an
 CoA-Request is sent and decremented due to receipt of
 a CoA-Ack, CoA -NAK or a timeout or a retransmission."
REFERENCE
 "[RFC 3576, Section 2.2](#), Change-of-Authorization
 Messages (CoA)."
::= { radiusDynAuthServerEntry 22 }

radiusDynAuthClientCoATimeouts OBJECT-TYPE

SYNTAX Counter32
UNITS "timeouts"
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of CoA request timeouts to this server. After a timeout the client may retry to the same server or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as a CoA-Request as well as a timeout."

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization Messages (CoA)."

::= { radiusDynAuthServerEntry 23 }

radiusDynAuthClientCoAPacketsDropped OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of incoming CoA-Responses from this Dynamic Authorization server silently discarded by the client application for some reason other than malformed, bad authenticators or unknown types."

REFERENCE

"[RFC 3576, Section 2.2](#), Change-of-Authorization Messages (CoA), and [Section 2.3](#), Packet Format."

::= { radiusDynAuthServerEntry 24 }

radiusDynAuthClientUnknownTypes OBJECT-TYPE

SYNTAX Counter32

UNITS "replies"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of incoming packets of unknown types which were received on the Dynamic Authorization port."

REFERENCE

"[RFC 3576, Section 2.3](#), Packet Format."

::= { radiusDynAuthServerEntry 25 }

-- conformance information

radiusDynAuthClientMIBConformance

OBJECT IDENTIFIER ::= { radiusDynAuthClientMIB 2 }

radiusDynAuthClientMIBCompliances

OBJECT IDENTIFIER ::= { radiusDynAuthClientMIBConformance 1 }

radiusDynAuthClientMIBGroups

OBJECT IDENTIFIER ::= { radiusDynAuthClientMIBConformance 2 }

-- compliance statements


```
radiusDynAuthClientMIBCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for entities implementing
        the RADIUS Dynamic Authorization Client."
    MODULE -- this module
    MANDATORY-GROUPS { radiusDynAuthClientMIBGroup }
    ::= { radiusDynAuthClientMIBCompliances 1 }

-- units of conformance

radiusDynAuthClientMIBGroup OBJECT-GROUP
    OBJECTS { radiusDynAuthClientDisconInvalidServerAddresses,
        radiusDynAuthClientCoAInvalidServerAddresses,
        radiusDynAuthServerAddressType,
        radiusDynAuthServerAddress,
        radiusDynAuthServerClientPortNumber,
        radiusDynAuthServerID,
        radiusDynAuthClientRoundTripTime,
        radiusDynAuthClientDisconRequests,
        radiusDynAuthClientDisconRetransmissions,
        radiusDynAuthClientDisconAcks,
        radiusDynAuthClientDisconNaks,
        radiusDynAuthClientMalformedDisconResponses,
        radiusDynAuthClientDisconBadAuthenticators,
        radiusDynAuthClientDisconPendingRequests,
        radiusDynAuthClientDisconTimeouts,
        radiusDynAuthClientDisconPacketsDropped,
        radiusDynAuthClientCoARequests,
        radiusDynAuthClientCoARetransmissions,
        radiusDynAuthClientCoAAcks,
        radiusDynAuthClientCoANaks,
        radiusDynAuthClientMalformedCoAResponses,
        radiusDynAuthClientCoABadAuthenticators,
        radiusDynAuthClientCoAPendingRequests,
        radiusDynAuthClientCoATimeouts,
        radiusDynAuthClientCoAPacketsDropped,
        radiusDynAuthClientUnknownTypes
    }
    STATUS current
    DESCRIPTION
        "The collection of objects providing management of
        a RADIUS Dynamic Authorization Client."
    ::= { radiusDynAuthClientMIBGroups 1 }
```

END

7. Security Considerations

There are no management objects defined in this MIB module that have a MAX-ACCESS clause of read-write and/or read-create. So, if this MIB module is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB module via direct SNMP SET operations

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

radiusDynAuthServerAddress and radiusDynAuthServerAddressType

These can be used to determine the address of the DAS with which the DAC is communicating. This information could be useful in mounting an attack on the DAS.

radiusDynAuthServerID

This can be used to determine the Identifier of the DAS. This information could be useful in impersonating the DAS.

radiusDynAuthServerClientPortNumber

This can be used to determine the destination port number to which the DAC is sending. This information could be useful in mounting an attack on the DAS.

The other readable objects are not really considered as being sensitive or vulnerable. These objects are:

radiusDynAuthClientDisconInvalidServerAddresses,
radiusDynAuthClientCoAInvalidServerAddresses,
radiusDynAuthClientRoundTripTime,
radiusDynAuthClientDisconRequests,
radiusDynAuthClientDisconRetransmissions,
radiusDynAuthClientDisconAcks,
radiusDynAuthClientDisconNaks,
radiusDynAuthClientMalformedDisconResponses,
radiusDynAuthClientDisconBadAuthenticators,
radiusDynAuthClientDisconPendingRequests,
radiusDynAuthClientDisconTimeouts,
radiusDynAuthClientDisconPacketsDropped,
radiusDynAuthClientCoARequests,
radiusDynAuthClientCoARetranmissions,
radiusDynAuthClientCoAAcks,
radiusDynAuthClientCoANaks,
radiusDynAuthClientMalformedCoAResponses,
radiusDynAuthClientCoABadAuthenticators,
radiusDynAuthClientCoAPendingRequests,
radiusDynAuthClientCoATimeouts,
radiusDynAuthClientCoAPacketsDropped, and
radiusDynAuthClientUnknownTypes.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, 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 module.

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.

8. IANA considerations

IANA is requested to assign an OID under mib-2.

9. Acknowledgements

This document reuses some of the work done in earlier RADIUS MIB specifications [[RFC2619](#)] and [[RFC2621](#)].

The authors would also like to acknowledge the following people for their comments to this document: Anjaneyulu Pata, Dan Romascanu, and Bert Wijnen.

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