Reliable Server Pooling (RSerPool) is a framework to provide reliable server pooling. The RSerPool framework consists of two protocols: ASAP (Aggregate Server Access Protocol) and ENRP (Endpoint Handlespace Redundancy Protocol). This document defines an SMIv2-compliant (Structure of Management Information Version 2) Management Information Base (MIB) module providing access to managed objects in an RSerPool implementation.
1. Introduction

This memo defines a Management Information Base (MIB) module that describes managed objects for RSerPool implementations.

2. The Reliable Server Pooling (RSerPool) Framework

For a detailed overview of the documents that describe the current Reliable Server Pooling (RSerPool) framework, please refer to [RFC3237], [RFC5351], [RFC5352], [RFC5353], [RFC5354], [RFC5355], and [RFC5356]. A more informal introduction can be found at [RSerPoolPage] as well as in [Dre2006], [LCN2005], and [IJHIT2008].

3. Conventions

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].

4. 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]. The textual conventions are compliant to RFC 4001 [RFC4001].

5. Structure of the MIB

The following diagram illustrates the structure of the MIB.

Structure of MIB

+-rserpoolMIB(125)
  |
  +-rserpoolMIBObjects(1)
    |
    +-rserpoolENRPServers(1)
      |
      +-rserpoolENRPTable(1)
        |
        +-rserpoolENRPEntry(1)
          Index: rserpoolENRPIndex

          +- ---- Unsigned  rserpoolENRPIndex(1)
            Range: 1..4294967295

          +- -R-- String  rserpoolENRPOperationScope(2)
            Textual Conv.: RSerPoolOperationScopeTC
            Size: 0..65535

          +- -R-- Unsigned  rserpoolENRPIdentifier(3)
            Textual Conv.: RSerPoolENRPServerIdentifierTC
            Range: 1..4294967295

          +- -RW- String  rserpoolENRPDescription(4)
            Size: 0..255

          +- -R-- TimeTicks  rserpoolENRPUptime(5)

          +- -R-- Unsigned  rserpoolENRPPort(6)
            Textual Conv.: InetPortNumber
            Range: 0..65535

          +- -R-- Unsigned  rserpoolENRPASAPAnnouncePort(7)
            Textual Conv.: InetPortNumber
            Range: 0..65535

          +- -R-- EnumVal  rserpoolENRPASAPAnnounceAddrType(8)
            Textual Conv.: InetAddressType
            Values: ipv4(1), ipv6(2)

          +- -R-- String  rserpoolENRPASAPAnnounceAddr(9)
            Textual Conv.: InetAddress
            Size: 4 | 16
+++ -R-- Unsigned  rserpoolENRPolicyWeight(9)
| Textual Conv.: RSerPoolPolicyWeightTC
| Range: 0..4294967295
+++ -R-- Unsigned  rserpoolENRPolicyLoad(10)
| Textual Conv.: RSerPoolPolicyLoadTC
| Range: 0..4294967295
+++ -R-- Unsigned  rserpoolENRPolicyLoadDeg(11)
| Textual Conv.: RSerPoolPolicyLoadTC
| Range: 0..4294967295
+++ -R-- TimeTicks  rserpoolENRPRegistrationLife(12)
+++ -R-- Unsigned  rserpoolENRPHomeENRPServer(13)
| Textual Conv.: RSerPoolENRPServerIdentifierTC
| Range: 1..4294967295

---rserpoolENRPASAPAddrTable(5)

---rserpoolENRPASAPAddrTableEntry(1)
| Index: rserpoolENRPIndex, rserpoolENRP poolingIndex, rserpoolENRPElementIndex, rserpoolENRP ASAPAddrTableIndex

--- ---- Unsigned  rserpoolENRPASAPAddrTableIndex(1)
| Range: 1..4294967295
+++ -R-- EnumVal  rserpoolENRP ASAPL3Type(2)
| Textual Conv.: InetAddressType
| Values: ipv4(1), ipv6(2)
+++ -R-- String  rserpoolENRP ASAPL3Addr(3)
| Textual Conv.: InetAddress
| Size: 4 | 16

---rserpoolENRPUserAddrTable(6)

---rserpoolENRPUserAddrTableEntry(1)
| Index: rserpoolENRPIndex, rserpoolENRP poolingIndex, rserpoolENRPElementIndex, rserpoolENRP UserAddrTableIndex

--- ---- Unsigned  rserpoolENRPUserAddrTableIndex(1)
| Range: 1..4294967295
+++ -R-- EnumVal  rserpoolENRPUserL3Type(2)
| Textual Conv.: InetAddressType
| Values: unknown(0), ipv4(1), ipv6(2)
+++ -R-- String  rserpoolENRPUserL3Addr(3)
| Textual Conv.: InetAddress
| Size: 0 | 4 | 16
+++ -R-- String  rserpoolENRPUserL3Opaque(4)
| Textual Conv.: RSerPoolOpaqueAddressTC
| Size: 0..65535
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Type</th>
<th>Range</th>
<th>Textual Conv.</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>rserpoolENRPENRPAddrTable(7)</td>
<td></td>
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<tr>
<td>rserpoolENRPENRPAddrTableEntry(1)</td>
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<td>rserpoolENRPPeerTable(8)</td>
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<td>rserpoolENRPPeerEntry(1)</td>
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<tr>
<td>rserpoolENRPPeerAddrTable(9)</td>
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<tr>
<td>rserpoolPoolElements(2)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
--- rserpoolPEASAPAddrTable(2)
  |
  --- rserpoolPEASAPAddrTableEntry(1)
      Index: rserpoolPEIndex, rserpoolPEASAPAddrTableIndex
      |
      --- ---- Unsigned rserpoolPEASAPAddrTableIndex(1)
          Range: 1..4294967295
      --- -R-- EnumVal rserpoolPEASAPL3Type(2)
          Textual Conv.: InetAddressType
          Values: ipv4(1), ipv6(2)
      --- -R-- String rserpoolPEASAPL3Addr(3)
          Textual Conv.: InetAddress
          Size: 4 | 16

--- rserpoolPEUserAddrTable(6)
  |
  --- rserpoolPEUserAddrTableEntry(1)
      Index: rserpoolPEIndex, rserpoolPEUserAddrTableIndex
      |
      --- ---- Unsigned rserpoolPEUserAddrTableIndex(1)
          Range: 1..4294967295
      --- -R-- EnumVal rserpoolPEUserL3Type(2)
          Textual Conv.: InetAddressType
          Values: unknown(0), ipv4(1), ipv6(2)
      --- -R-- String rserpoolPEUserL3Addr(3)
          Textual Conv.: InetAddress
          Size: 0 | 4 | 16
      --- -R-- String rserpoolPEUserL3Opaque(4)
          Textual Conv.: RSerPoolOpaqueAddressTC
          Size: 0..65535

--- rserpoolPoolUsers(3)
  |
  --- rserpoolPUTable(1)
  |
  --- rserpoolPUEntry(1)
      Index: rserpoolPUIndex
      |
      --- ---- Unsigned rserpoolPUIndex(1)
          Range: 1..4294967295
      --- -R-- String rserpoolPUOperationScope(2)
          Textual Conv.: RSerPoolOperationScopeTC
          Size: 0..65535
      --- -RW- String rserpoolPUPoolHandle(3)
          Textual Conv.: RSerPoolPoolHandleTC
          Size: 0..65535
      --- -RW- String rserpoolPUDescription(4)
As the figure shows, the MIB consists of three main branches:
"rserpoolENRPServers", "rserpoolPoolElements", and
"rserpoolPoolUsers". The first branch, "rserpoolENRPServers", is
used to access managed objects in the set of ENRP servers running on
a given host. While it is assumed that it does not make much sense
to run multiple ENRP servers for the same operation scope on one
host, running multiple ENRP servers for different operation scopes is
very likely when the ENRP server processes run on routers.
Therefore, the MIB has to be able to manage multiple ENRP servers on
the same host.

"rserpoolPoolElements" is used to access managed objects in the set
of pool elements that are running on a given host.

The third branch, "rserpoolPoolUsers", is used to access managed
objects in the set of pool users that are running on a given host.

Note: "rserpoolENRPServers" is filled on hosts running ENRP server
instances, "rserpoolPoolElements" is filled on hosts running pool
element instances, and "rserpoolPoolUsers" is filled on hosts running
pool user instances. Of course, multiple different components may
run on the same host, which leads to filling of multiple different
branches.

In fact, the structure of the three branches is very similar.
Because the other two branches are so similar, we describe only the
first branch in detail, and provide a summary description of the
second and third branch. We now proceed with a description of the
branches.
5.1. Access to Managed Objects on ENRP Servers

The first branch describes managed objects at a set of ENRP servers. Any given ENRP server of this set will, at a certain moment in time, have registration information for a set of active pools. Each of these pools in turn may have a list of pool elements that are registered under that pool. To allow this information to be retrieved via SNMP, the ENRP server branch of the RSerPool MIB uses the table-in-table technique described in [SNMPMIBS].

Specifically, the ENRP servers branch creates four levels of nesting, as indicated in the following diagram:

Nesting of the ENRP Server Branch

Nesting Structure:

Level 1: rserpoolENRPTable
Level 2: rserpoolENRPConnectorTable
Level 3: rserpoolENRPConnectorElementTable
Level 4: rserpoolENRPASAPAddrTable
rserpoolENRPUserAddrTable

Level 2: rserpoolENRPENRPAddrTable

Level 2: rserpoolENRPENRPConnectorTable
Level 3: rserpoolENRPConnectorElementTable

5.2. Access to Managed Objects on Pool Elements

The construction of the Pool Elements branch is very similar to the pool elements table of the ENRP servers branch. But instead of grouping the pool elements into pools (which does not make sense here), the pool elements table is the top of the hierarchy, and each pool element entry specifies its operation scope and pool handle.

That is, the nesting structure is as follows:

Nesting of the Pool Elements Branch

Level 1: rserpoolPETable
Level 2: rserpoolPEASAPAddrTable
rserpoolPEUserAddrTable
5.3. Access to Managed Objects on Pool Users

For the Pool Users branch, it is only necessary to list the pool user instances, including their operation scope and pool handle.

5.4. Persistency Behavior

Upon changes of writable objects, an implementation SHOULD store the new values in a persistent manner if it has the capability to do this. An implementation SHOULD use these stored values upon reset or reinitialization.

6. Definitions

RSERPOOL-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, experimental,
    TimeTicks, Unsigned32
    FROM SNMPv2-SMI
    TEXTUAL-CONVENTION
    FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
    InetAddressType, InetAddress, InetPortNumber
    FROM INET-ADDRESS-MIB;

-- ## Module definition #%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
rserrpoo1MIB MODULE-IDENTITY
    LAST-UPDATED
        "200904070000Z" -- April 07, 2009
    ORGANIZATION
        "IEM-TdR, UNIVERSITY OF DUISBURG-ESSEN"
    CONTACT-INFO
        " THOMAS-DREIBHOLZ"
        Postal:  University of Duisburg-Essen
        Institute for Experimental Mathematics
        Ellernstrasse 29
        D-45326 Essen
        Germany
        Phone:  +49-201-183-7637
        Fax:  +49-201-183-7673
        Email:  dreibh@iem.uni-due.de
DESCRIPTION

"The MIB module for managing an RSerPool implementation.

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This version of this MIB module is part of RFC 5525; see the RFC itself for full legal notices.

REVISION
"200904070000Z" -- April 07, 2009
DESCRIPTION
"This version of the MIB module is published as RFC 5525"
::= { experimental 125 }

-- ## RSerPool type definitions #################################################################
RSerPoolENRPServerIdentifierTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "x"
   STATUS current
   DESCRIPTION "The ID of an ENRP server"
   SYNTAX Unsigned32 (1..4294967295)

RSerPoolOperationScopeTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "1024t"
   STATUS current
   DESCRIPTION "The ID of an operation scope"
   SYNTAX OCTET STRING (SIZE (0..65535))

RSerPoolPoolHandleTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "1024t"
   STATUS current
   DESCRIPTION "The pool handle"
   SYNTAX OCTET STRING (SIZE (0..65535))

RserpoolPoolElementIdentifierTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "x"
   STATUS current
   DESCRIPTION "The pool element ID"
   SYNTAX Unsigned32 (1..4294967295)

RSerPoolPolicyIdentifierTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "x"
   STATUS current
   DESCRIPTION "The ID of the pool policy"
   SYNTAX Unsigned32 (1..4294967295)

RSerPoolPolicyLoadTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "d"
   STATUS current
   DESCRIPTION "The load status of a pool element"
   SYNTAX Unsigned32 (0..4294967295)
RSerPoolPolicyWeightTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "d"
   STATUS current
   DESCRIPTION "The weight of a pool element"
   SYNTAX Unsigned32 (0..4294967295)

RSerPoolTransportUseTypeTC ::= TEXTUAL-CONVENTION
   STATUS current
   DESCRIPTION "The transport use of a pool element"
   SYNTAX INTEGER {
      dataOnly(0),
      dataPlusControl(1)
   }

RSerPoolOpaqueAddressTC ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "1024t"
   STATUS current
   DESCRIPTION "Opaque address"
   SYNTAX OCTET STRING (SIZE (0..65535))

-- ## Top-level definitions #######################################
rserpoolMIBObjects OBJECT IDENTIFIER ::= { rserpoolMIB 1 }    
rserpoolMIBConformance OBJECT IDENTIFIER ::= { rserpoolMIB 2 }  

rserpoolENRPServers OBJECT IDENTIFIER ::= { rserpoolMIBObjects 1 } 
rserpoolPoolElements OBJECT IDENTIFIER ::= { rserpoolMIBObjects 2 } 
rserpoolPoolUsers   OBJECT IDENTIFIER ::= { rserpoolMIBObjects 3 } 

-- ################################################################

-- #### ENRP Servers Section                                   ####
-- ################################################################

-- ## Definition of the ENRP server table ########################
rserpoolENRPRTable OBJECT-TYPE
   SYNTAX      SEQUENCE OF RserpoolENRPEntry
   MAX-ACCESS not-accessible
   STATUS      current
   DESCRIPTION "The table listing of ENRP servers."
   ::= { rserpoolENRPServers 1 }

rserpoolENRPEntry OBJECT-TYPE
   SYNTAX      RserpoolENRPEntry
   MAX-ACCESS not-accessible
   STATUS      current
DESCRIPTION

"An ENRP server entry in the table listing of ENRP servers."

INDEX { rserpoolENRPIndex }
::= { rserpoolENRPTable 1 }

RserpoolENRPEntry ::= SEQUENCE {
    rserpoolENRPIndex                Unsigned32,
    rserpoolENRPOperationScope       RSerPoolOperationScopeTC,
    rserpoolENRPIdentifier           RSerPoolENRPServerIdentifierTC,
    rserpoolENRPDescription          OCTET STRING,
    rserpoolENRPUptime               TimeTicks,
    rserpoolENRPPort                 InetPortNumber,
    rserpoolENRPA SAPAnnouncePort    InetPortNumber,
    rserpoolENRPA SAPAnnounceAddrType InetAddressType,
    rserpoolENRPA SAPAnnounceAddr    InetAddress,
    rserpoolENRPENRPAAnnouncePort    InetPortNumber,
    rserpoolENRPENRPAAnnounceAddrType InetAddressType,
    rserpoolENRPENRPAAnnounceAddr    InetAddress
}

rserpoolENRPIndex OBJECT-TYPE
SYNTAX     Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
    "An integer to uniquely identify an ENRP server."
::= { rserpoolENRPEntry 1 }

rserpoolENRPOperationScope OBJECT-TYPE
SYNTAX     RSerPoolOperationScopeTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The definition of the operation scope of this ENRP server."
REFERENCE
    "Section 1.2 of RFC 3237 defines the term operation scope."
::= { rserpoolENRPEntry 2 }

rserpoolENRPIdentifier OBJECT-TYPE
SYNTAX     RSerPoolENRPServerIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The ENRP server identifier of this ENRP server."
REFERENCE
    "Section 3.1 of RFC 5351 explains the ENRP server identifier."
::= { rserpoolENRPEntry 3 }

Dreibholz & Mulik             Experimental                     [Page 15]
rserpoolENRPDescription OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (0..255))
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"A textual description of this ENRP server, e.g., its location and a contact address of its administrator.

This object SHOULD be maintained in a persistent manner."
::= { rserpoolENRPEntry 4 }

rserpoolENRPUnknown Uptime OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The ENRP service uptime of this ENRP server."
::= { rserpoolENRPEntry 5 }

rserpoolENRPUnknown Port OBJECT-TYPE
SYNTAX InetPortNumber
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The Stream Control Transmission Protocol (SCTP) port number of the ENRP protocol endpoint of this ENRP server."
REFERENCES
"RFC 5353 defines the ENRP protocol."
::= { rserpoolENRPEntry 6 }

rserpoolENRPUnknown announces Port OBJECT-TYPE
SYNTAX InetPortNumber
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The destination UDP port number to which ASAP multicast announce messages are sent."
REFERENCES
"Section 3.2 of RFC 5351 explains the server-discovery mechanism using ASAP announces."
::= { rserpoolENRPEntry 7 }

rserpoolENRPUnknown announces AddrType OBJECT-TYPE
SYNTAX InetAddressType { ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The network-layer protocol over which ASAP multicast announce messages are sent."

REFERENCE

"Section 3.2 of RFC 5351 explains the server-discovery mechanism using ASAP announces."

::= { rserpoolENRPEntry 8 }

rserpoolENRPASAPAnnounceAddr OBJECT-TYPE
SYNTAX     InetAddress (SIZE(4|16))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION

"The destination IP multicast address to which ASAP multicast announce messages are sent. The type of this address is given in rserpoolENRPASAPAnnounceAddrType."

REFERENCE

"Section 3.2 of RFC 5351 explains the server-discovery mechanism using ASAP announces."

::= { rserpoolENRPEntry 9 }

rserpoolENRPENRPAnnouncePort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-only
STATUS     current
DESCRIPTION

"The destination UDP port number to which ENRP multicast announce messages are sent."

REFERENCE

"Section 3.1 of RFC 5353 explains the ENRP multicast announce mechanism."

::= { rserpoolENRPEntry 10 }

rserpoolENRPENRPAnnounceAddrType OBJECT-TYPE
SYNTAX     InetAddressType { ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION

"The network-layer protocol over which ENRP multicast announce messages are sent."

REFERENCE

"Section 3.1 of RFC 5353 explains the ENRP multicast announce mechanism."

::= { rserpoolENRPEntry 11 }

rserpoolENRPENRPAnnounceAddr OBJECT-TYPE
SYNTAX     InetAddress (SIZE(4|16))
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
"The destination multicast IP address to which ENRP multicast
announce messages are sent. The type of this address
is given in rserpoolENRPENRPAnnounceAddrType."
REFERENCE
"Section 3.1 of RFC 5353 explains the ENRP multicast
announce mechanism."
::= { rserpoolENRPEntry 12 }

-- ## Definition of the pool table ################################

rserpoolENRPoolTable OBJECT-TYPE
SYNTAX     SEQUENCE OF RserpoolENRPPoolEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The table listing of pools."
::= { rserpoolENRPServers 3 }

rserpoolENRPPoolEntry OBJECT-TYPE
SYNTAX     RserpoolENRPPoolEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"The pool entry in the table listing of pools."
INDEX { rserpoolENRPIndex, rserpoolENRPPoolIndex }
::= { rserpoolENRPPoolTable 1 }

RserpoolENRPPoolEntry ::= SEQUENCE {
  rserpoolENRPIndex  Unsigned32,
  rserpoolENRPPoolHandle RSerPoolPoolHandleTC }

rserpoolENRPIndex OBJECT-TYPE
SYNTAX     Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"An integer to uniquely identify a pool."
::= { rserpoolENRPPoolEntry 1 }

rserpoolENRPPoolHandle OBJECT-TYPE
SYNTAX     RSerPoolPoolHandleTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The pool handle of this pool."
REFERENCE
"Section 1.2 of RFC 3237 defines the term pool handle."
::= { rserpoolENRPPoolEntry 2 }

-- ## Definition of the pool element table ###############################
rserpoolENRPPoolElementTable OBJECT-TYPE
SYNTAX SEQUENCE OF RserpoolENRPPoolElementEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The table listing of pool elements."
::= { rserpoolENRPServers 4 }

rserpoolENRPPoolElementEntry OBJECT-TYPE
SYNTAX RserpoolENRPPoolElementEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A pool element in the table listing of pool elements."
INDEX {
    rserpoolENRPIndex,
    rserpoolENRPPoolIndex,
    rserpoolENRPPoolElementIndex }
::= { rserpoolENRPPoolElementTable 1 }

RserpoolENRPPoolElementEntry ::= SEQUENCE {
    rserpoolENRPPoolElementIndex   Unsigned32,
    rserpoolENRPPoolElementID      RserpoolPoolElementIdentifierTC,
    rserpoolENRPA SAPTransportPort  InetPortNumber,
    rserpoolENRPUserTransportProto Unsigned32,
    rserpoolENRPUserTransportPort  InetPortNumber,
    rserpoolENRPUserTransportUse   RSerPoolTransportUseTypeTC,
    rserpoolENRPPolicyID           RSerPoolPolicyIdentifierTC,
    rserpoolENRPPolicyDescription  OCTET STRING,
    rserpoolENRPPolicyWeight       RSerPoolPolicyWeightTC,
    rserpoolENRPPolicyLoad         RSerPoolPolicyLoadTC,
    rserpoolENRPPolicyLoadDeg      RSerPoolPolicyLoadTC,
    rserpoolENRPRegistrationLife   TimeTicks,
    rserpoolENRPHomeENRPServer     RSerPoolENRPServerIdentifierTC }

rserpoolENRPPoolElementIndex OBJECT-TYPE
SYNTAX   Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
"An integer to uniquely identify a pool element. Note, that uniqueness of a pool element identifier in the pool is not enforced; therefore, this index is required here!"
::={ rserpoolENRPPoolElementEntry 1 }

rserpoolENRPPoolElementID OBJECT-TYPE
SYNTAX     RserpoolPoolElementIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The pool element identifier of this pool element."
REFERENCE
"Section 2.2 of RFC 5351 explains the pool element identifier usage."
::={ rserpoolENRPPoolElementEntry 2 }

rserpoolENRPASAPTransportPort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The SCTP port number of the ASAP endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the port number is given here."
::= { rserpoolENRPPoolElementEntry 3 }

rserpoolENRPUserTransportProto OBJECT-TYPE
SYNTAX     Unsigned32 (0..255)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The transport protocol number of the service endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the transport protocol number is given here."
::= { rserpoolENRPPoolElementEntry 4 }

rserpoolENRPUserTransportPort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The transport protocol’s port number of the service endpoint of this pool element."
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REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the port number is given here."
::= { rserpoolENRPPoolElementEntry 5 }

rserpoolENRPUserTransportUse OBJECT-TYPE
SYNTAX  RSerPoolTransportUseTypeTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The transport use of the service endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the transport use is given here."
::= { rserpoolENRPPoolElementEntry 6 }

rserpoolENRP PolicyID OBJECT-TYPE
SYNTAX     RSerPoolPolicyIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The pool policy of this pool element."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy Parameter of which the policy identifier is given here."
::= { rserpoolENRPPoolElementEntry 7 }

rserpoolENRP PolicyDescription OBJECT-TYPE
SYNTAX     OCTET STRING (SIZE (0..255))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The textual description of the pool policy of this pool element."
::= { rserpoolENRPPoolElementEntry 8 }

rserpoolENRP PolicyWeight OBJECT-TYPE
SYNTAX     RSerPoolPolicyWeightTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The pool policy's weight parameter for this pool element."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy Parameter of which the policy's weight parameter is given here."
::= { rserpoolENRPPoolElementEntry 9 }

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rserpoolENRPolicyLoad OBJECT-TYPE
SYNTAX     RSerPoolPolicyLoadTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
 "The pool policy's load status for this pool element."
REFERENCE
 "Section 3.8 of RFC 5354 defines the Member Selection Policy
 Parameter of which the policy's load parameter is given here."
 ::= { rserpoolENRPoolElementEntry 10 }

rserpoolENRPolicyLoadDeg OBJECT-TYPE
SYNTAX     RSerPoolPolicyLoadTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
 "The pool policy's load degradation parameter for this pool
 element."
REFERENCE
 "Section 3.8 of RFC 5354 defines the Member Selection Policy
 Parameter of which the policy's load degradation parameter is
 given here."
 ::= { rserpoolENRPoolElementEntry 11 }

rserpoolENRRegistrationLife OBJECT-TYPE
SYNTAX     TimeTicks
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
 "The registration life of this pool element."
REFERENCE
 "Section 3.10 of RFC 5354 defines the Registration Life."
 ::= { rserpoolENRPoolElementEntry 12 }

rserpoolENRHomeENRPServer OBJECT-TYPE
SYNTAX     RSerPoolENRPServerIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
 "The ID of the Home ENRP server of this pool element."
REFERENCE
 "Section 3.10 of RFC 5354 defines the Home ENRP Server
 Identifier."
 ::= { rserpoolENRPoolElementEntry 13 }

-- ## Definition of the ASAP transport address list table ##########
rserpoolENRPASAPAddrTable OBJECT-TYPE
SYNTAX     SEQUENCE OF RserpoolENRPASAPAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table listing of all IP addresses of the ASAP transport endpoint."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the addresses are listed in this table."
::= { rserpoolENRPServers 5 }

rserpoolENRPASAPAddrTableEntry OBJECT-TYPE
SYNTAX RserpoolENRPASAPAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An IP address of the ASAP transport endpoint."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which an address is contained by this entry."
INDEX {
  rserpoolENRPIndex,
  rserpoolENRPPoolIndex,
  rserpoolENRPPoolElementIndex,
  rserpoolENRPASAPAddrTableIndex }
::= { rserpoolENRPASAPAddrTable 1 }

rserpoolENRPASAPAddrTableEntry ::= SEQUENCE {
  rserpoolENRPASAPAddrTableIndex Unsigned32,
  rserpoolENRPASAPL3Type InetAddressType,
  rserpoolENRPASAPL3Addr InetAddress }

rserpoolENRPASAPAddrTableIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A unique identifier for the IP address of an ASAP transport endpoint."
::= { rserpoolENRPASAPAddrTableEntry 1 }

rserpoolENRPASAPL3Type OBJECT-TYPE
SYNTAX InetAddressType { ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The network-layer protocol (IPv4 or IPv6) of an IP address of an ASAP transport endpoint."
REFERENCE

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"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the network-layer protocol number is given here."

::= { rserpoolENRPASAPAddrTableEntry 2 }

rserpoolENRPASAPL3Addr OBJECT-TYPE
SYNTAX InetAddress (SIZE(4|16))
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The IP address of an ASAP transport endpoint. The type of this address is given in rserpoolENRPASAPL3Type."
REFERENCE "Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the network-layer address (IPv4 or IPv6) is given here."

::= { rserpoolENRPASAPAddrTableEntry 3 }

-- ## Definition of the user transport address list table #######

rserpoolENRPUserAddrTable OBJECT-TYPE
SYNTAX SEQUENCE OF RserpoolENRPUserAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table listing of all IP addresses of the user transport endpoint."
REFERENCE "Section 3.10 of RFC 5354 defines the User Transport Parameter of which the addresses are listed in this table."

::= { rserpoolENRPServers 6 }

RserpoolENRPUserAddrTableEntry OBJECT-TYPE
SYNTAX RserpoolENRPUserAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An IP address of the user transport endpoint."
REFERENCE "Section 3.10 of RFC 5354 defines the User Transport Parameter of which an address is contained by this entry."
INDEX {
  rserpoolENRPIIndex,  
  rserpoolENRPPoolIndex,  
  rserpoolENRPPoolElementIndex,  
  rserpoolENRPUserAddrTableIndex }
::= { rserpoolENRPUUserAddrTable 1 }

RserpoolENRPUserAddrTableEntry ::= SEQUENCE {
  rserpoolENRPUserAddrTableIndex Unsigned32,  
  rserpoolENRPUserL3Type InetAddressType,  
  ...}
rsrpoolENRPUserL3Addr OBJECT-TYPE
SYNTAX InetAddress,
rsrpoolENRPUserL3Opaque OBJECT-TYPE RSerPoolOpaqueAddressTC

rsrpoolENRPUserAddrTableIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A unique identifier for the IP address of a user transport endpoint."
::= { rsrpoolENRPUserAddrTableEntry 1 }

rsrpoolENRPUserL3Type OBJECT-TYPE
SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The network-layer protocol (IPv4 or IPv6) of an IP address of a user transport endpoint. Set to unknown for an opaque address."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the network-layer protocol number is given here."
::= { rsrpoolENRPUserAddrTableEntry 2 }

rsrpoolENRPUserL3Addr OBJECT-TYPE
SYNTAX InetAddress (SIZE(0|4|16))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The IP address of a user transport endpoint. The type of this address is given in rsrpoolENRPUserL3Type."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the network-layer address (IPv4 or IPv6) is given here."
::= { rsrpoolENRPUserAddrTableEntry 3 }

rsrpoolENRPUserL3Opaque OBJECT-TYPE
SYNTAX RSerPoolOpaqueAddressTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The opaque address of a user transport endpoint."
REFERENCE
"Section 3.16 of RFC 5354 defines the opaque transport address."
::= { rsrpoolENRPUserAddrTableEntry 4 }

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-- ## Definition of ENRP address list table #######################
rserpoolENRPENRPAddrTable OBJECT-TYPE
   SYNTAX SEQUENCE OF RserpoolENRPENRPAddrTableEntry
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION "A table listing of all IP addresses of the ENRP
   transport endpoint."
   ::= { rserpoolENRPServers 7 }

rserpoolENRPENRPAddrTableEntry OBJECT-TYPE
   SYNTAX RserpoolENRPENRPAddrTableEntry
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION "An IP address of the ENRP transport endpoint."
   INDEX {
      rserpoolENRPIndex,
      rserpoolENRPENRPAddrTableIndex }
   ::= { rserpoolENRPENRPAddrTable 1 }

RserpoolENRPENRPAddrTableEntry ::= SEQUENCE {
   rserpoolENRPENRPAddrTableIndex Unsigned32,
   rserpoolENRPENRPL3Type InetAddressType,
   rserpoolENRPENRPENRPAddr InetAddress }

rserpoolENRPENRPAddrTableIndex OBJECT-TYPE
   SYNTAX Unsigned32 (1..4294967295)
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION "A unique identifier for the IP address of an ENRP transport
   endpoint."
   ::= { rserpoolENRPENRPAddrTableEntry 1 }

rserpoolENRPENRPL3Type OBJECT-TYPE
   SYNTAX InetAddressType { ipv4(1), ipv6(2) }
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION "The network-layer protocol (IPv4 or IPv6) of an IP address of
   an ENRP transport endpoint."
   REFERENCE "RFC 5353 defines the ENRP protocol."
   ::= { rserpoolENRPENRPAddrTableEntry 2 }

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rserpoolENRPENRPL3Addr OBJECT-TYPE
SYNTAX InetAddress (SIZE(4|16))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The IP address of an ENRP transport endpoint. The type of this address is given in rserpoolENRPENRPType."
REFERENCE
"RFC 5353 defines the ENRP protocol."
::= { rserpoolENRPENRPAddrTableEntry 3 }

-- ## Definition of peer table ####################################
rserpoolENRPPeerTable OBJECT-TYPE
SYNTAX SEQUENCE OF RserpoolENRPPeerEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The table listing of a peer table."
::= { rserpoolENRPServers 8 }
rserpoolENRPPeerEntry OBJECT-TYPE
SYNTAX RserpoolENRPPeerEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A peer entry in the table listing of a peer table."
INDEX { rserpoolENRPPeerIndex }
::= { rserpoolENRPPeerTable 1 }

RserpoolENRPPeerEntry ::= SEQUENCE {
rserpoolENRPPeerIndex Unsigned32,
rserpoolENRPPeerIdentifier RSerPoolENRPServerIdentifierTC,
rserpoolENRPPeerPort InetPortNumber,
rserpoolENRPPeerLastHeard TimeTicks }
rserpoolENRPPeerIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A unique identifier for a peer entry in the table listing of a peer table."
::= { rserpoolENRPPeerEntry 1 }
rserpoolENRPPeerIdentifier OBJECT-TYPE
SYNTAX RSerPoolENRPServerIdentifierTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The ENRP identifier of this peer."
REFERENCE
"RFC 5353 explains the usage of the ENRP server identifier."
::= { rserpoolENRPPeerEntry 2 }

rserpoolENRPPeerPort OBJECT-TYPE
SYNTAX InetPortNumber
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The SCTP port number of the ENRP transport endpoint of
this peer."
REFERENCE
"RFC 5353 defines the ENRP protocol."
::= { rserpoolENRPPeerEntry 3 }

rserpoolENRPPeerLastHeard OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The time since the reception of the last ENRP Presence
message of this peer."
REFERENCE
"Section 4.1 of RFC 5353 defines the last heard value."
::= { rserpoolENRPPeerEntry 4 }

-- ## Definition of peer address list table #######################
rserpoolENRPPeerAddrTable OBJECT-TYPE
SYNTAX SEQUENCE OF RserpoolENRPPeerAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table listing of the peer endpoint addresses."
::= { rserpoolENRPServers 9 }

rserpoolENRPPeerAddrTableEntry OBJECT-TYPE
SYNTAX RserpoolENRPPeerAddrTableEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table listing of all IP addresses of the ENRP
transport endpoint of a peer referenced by rserpoolENRPPeerIndex."
INDEX { rserpoolENRPPeerIndex,
         rserpoolENRPPeerAddrTableIndex }
::= { rserpoolENRPPeerAddrTable 1 }
RserpoolENRPPeerAddrTableEntry ::= SEQUENCE {
    rserpoolENRPPeerAddrTableIndex Unsigned32,
    rserpoolENRPPeerL3Type InetAddressType,
    rserpoolENRPPeerL3Addr InetAddress }

rserpoolENRPPeerAddrTableIndex OBJECT-TYPE
SYNTAX     Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
    "A unique identifier for the IP address of a peer ENRP
    transport endpoint."
 ::= { rserpoolENRPPeerAddrTableEntry 1 }

rserpoolENRPPeerL3Type OBJECT-TYPE
SYNTAX     InetAddressType { ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The network-layer protocol (IPv4 or IPv6) of an IP address
    of a peer ENRP transport endpoint."
REFERENCE
    "RFC 5353 defines the ENRP protocol."
 ::= { rserpoolENRPPeerAddrTableEntry 2 }

rserpoolENRPPeerL3Addr OBJECT-TYPE
SYNTAX     InetAddress (SIZE(4|16))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "The IP address of a peer ENRP transport endpoint. The type
    of this address is given in rserpoolENRPPeerL3Type."
REFERENCE
    "RFC 5353 defines the ENRP protocol."
 ::= { rserpoolENRPPeerAddrTableEntry 3 }

--- # Pool Elements Section #
--- # Definition of the pool element table #

rserpoolPETable OBJECT-TYPE
SYNTAX     SEQUENCE OF RserpoolPEEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
    "The table listing of pool elements."
 ::= { rserpoolPoolElements 1 }
rserpoolPEEntry OBJECT-TYPE
SYNTAX     RserpoolPEEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
   "A pool element in the table listing of pool elements."
INDEX { rserpoolPEIndex }
::= { rserpoolPETable 1 }

RserpoolPEEntry ::= SEQUENCE {
   rserpoolPEIndex              Unsigned32,
   rserpoolPEOperationScope     RserPoolOperationScopeTC,
   rserpoolPEPoolHandle         RserPoolPoolHandleTC,
   rserpoolPEIdentifier         RserpoolPoolElementIdentifierTC,
   rserpoolPEDescription        OCTET STRING,
   rserpoolPEUptime             TimeTicks,
   rserpoolPEASAPTransportPort  InetPortNumber,
   rserpoolPEUserTransportProto Unsigned32,
   rserpoolPEUserTransportPort  InetPortNumber,
   rserpoolPEUserTransportProto OctetString,
   rserpoolPEPolicyID           RSerPoolPolicyIdentifierTC,
   rserpoolPEPolicyDescription  OCTET STRING,
   rserpoolPEPolicyWeight       RSerPoolPolicyWeightTC,
   rserpoolPEPolicyLoad         RSerPoolPolicyLoadTC,
   rserpoolPEPolicyLoadDeg      RSerPoolPolicyLoadTC,
   rserpoolPERegistrationLife   TimeTicks,
   rserpoolPEHomeENRPServer     RSerPoolENRPServerIdentifierTC }

rserpoolPEIndex OBJECT-TYPE
SYNTAX     Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
   "An integer to uniquely identify a pool element.  Note,
   that uniqueness of a pool element identifier in the pool
   is not enforced; therefore, this index is required here!"
::={ rserpoolPEEntry 1 }

rserpoolPEOperationScope OBJECT-TYPE
SYNTAX     RserPoolOperationScopeTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
   "The operation scope of this pool element."
REFERENCE
   "Section 1.2 of RFC 3237 defines the term operation scope."
::= { rserpoolPEEntry 2 }
rserpoolPEPoolHandle OBJECT-TYPE
SYNTAX     RSerPoolPoolHandleTC
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The pool handle of this pool element. Changing this object
will update the pool element's pool handle and result in a
re-registration.

This object SHOULD be maintained in a persistent manner."
REFERENCE
"Section 1.2 of RFC 3237 defines the term pool handle."
::={ rserpoolPEEntry 3 }

rserpoolPEIdentifier OBJECT-TYPE
SYNTAX     RserpoolPoolElementIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The pool element identifier of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the pool element identifier."
::={ rserpoolPEEntry 4 }

rserpoolPEDescription OBJECT-TYPE
SYNTAX     OCTET STRING (SIZE (0..255))
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"A textual description of this pool element, e.g., its location
and a contact address of its administrator.

This object SHOULD be maintained in a persistent manner."
::={ rserpoolPEEntry 5 }

rserpoolPEUptime OBJECT-TYPE
SYNTAX     TimeTicks
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The ENRP service uptime of this pool element."
::={ rserpoolPEEntry 6 }

rserpoolPEASAPTransportPort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The SCTP port number of the ASAP endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the port number is given here."
::= { rserpoolPEEntry 7 }

rserpoolPEUserTransportProto OBJECT-TYPE
SYNTAX Unsigned32 (0..255)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The transport protocol number of the service endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the transport protocol number is given here."
::= { rserpoolPEEntry 8 }

rserpoolPEUserTransportPort OBJECT-TYPE
SYNTAX InetPortNumber
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The transport protocol’s port number of the service endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the port number is given here."
::= { rserpoolPEEntry 9 }

rserpoolPEUserTransportUse OBJECT-TYPE
SYNTAX RSerPoolTransportUseTypeTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The transport use of the service endpoint of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the User Transport Parameter of which the transport use is given here."
::= { rserpoolPEEntry 10 }

rserpoolPEPolicyID OBJECT-TYPE
SYNTAX RSerPoolPolicyIdentifierTC
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The pool policy of this pool element. Changing this object will update the pool element’s policy and result in a
re-registration.

This object SHOULD be maintained in a persistent manner."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy
Parameter of which the policy identifier is given here."
::= { rserpoolPEEntry 11 }

rserpoolPEPolicyDescription OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (0..255))
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The textual description of the pool policy of this pool element.
This object SHOULD be maintained in a persistent manner."
::= { rserpoolPEEntry 12 }

rserpoolPEPolicyWeight OBJECT-TYPE
SYNTAX RSerPoolPolicyWeightTC
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The pool policy’s weight parameter for this pool element.
Changing this object will update the pool element’s policy
weight setting and result in a re-registration.
This object SHOULD be maintained in a persistent manner."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy
Parameter of which the policy’s weight parameter is given here."
::= { rserpoolPEEntry 13 }

rserpoolPEPolicyLoad OBJECT-TYPE
SYNTAX RSerPoolPolicyLoadTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The pool policy’s load status for this pool element."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy
Parameter of which the policy’s load parameter is given here."
::= { rserpoolPEEntry 14 }
rserpoolPEPolicyLoadDeg OBJECT-TYPE
SYNTAX     RSerPoolPolicyLoadTC
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The pool policy's load degradation parameter for this pool element. Changing this object will update the pool element's load degradation setting and result in a re-registration.

This object SHOULD be maintained in a persistent manner."
REFERENCE
"Section 3.8 of RFC 5354 defines the Member Selection Policy Parameter of which the policy's load degradation parameter is given here."
::= { rserpoolPEEntry 15 }

rserpoolPERegistrationLife OBJECT-TYPE
SYNTAX     TimeTicks
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The registration life of this pool element. Changing this object will update the pool element's lifetime setting and result in a re-registration.

This object SHOULD be maintained in a persistent manner."
REFERENCE
"Section 3.10 of RFC 5354 defines the Registration Life."
::= { rserpoolPEEntry 16 }

rserpoolPEHomeENRPServer OBJECT-TYPE
SYNTAX     RSerPoolENRPServerIdentifierTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The ID of the Home ENRP server of this pool element."
REFERENCE
"Section 3.10 of RFC 5354 defines the Home ENRP Server Identifier."
::= { rserpoolPEEntry 17 }

-- ## Definition of the ASAP transport address list table ############

rserpoolPEASAPAddrTable OBJECT-TYPE
SYNTAX     SEQUENCE OF RserpoolPEASAPAddrTableEntry
MAX-ACCESS not-accessible
STATUS     current

-- ## Definition of the ASAP transport address list table ############
DESCRIPTION
"A table listing of all IP addresses of the ASAP transport endpoint."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the addresses are listed in this table."

::= { rserpoolPoolElements 2 }

rserpoolPEASAPAddrTableEntry OBJECT-TYPE
SYNTAX    RserpoolPEASAPAddrTableEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"An IP address of the ASAP transport endpoint."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which an address is contained by this entry."
INDEX {
    rserpoolPEIndex,
    rserpoolPEASAPAddrTableIndex }
::= { rserpoolPEASAPAddrTable 1 }

RserpoolPEASAPAddrTableEntry ::= SEQUENCE {
    rserpoolPEASAPAddrTableIndex Unsigned32,
    rserpoolPEASAPL3Type         InetAddressType,
    rserpoolPEASAPL3Addr         InetAddress }

rserpoolPEASAPAddrTableIndex OBJECT-TYPE
SYNTAX    Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"A unique identifier for the IP address of an ASAP transport endpoint."
::= { rserpoolPEASAPAddrTableEntry 1 }

rserpoolPEASAPL3Type OBJECT-TYPE
SYNTAX    InetAddressType { ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The network-layer protocol (IPv4 or IPv6) of an IP address of an ASAP transport endpoint."
REFERENCE
"Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of which the network-layer protocol number is given here."
::= { rserpoolPEASAPAddrTableEntry 2 }

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rserpoolPEASAPL3Addr OBJECT-TYPE
SYNTAX       InetAddress (SIZE(4|16))
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION  "The IP address of an ASAP transport endpoint. The type of
this address is given in rserpoolPEASAPL3Type."
REFERENCE    "Section 3.10 of RFC 5354 defines the ASAP Transport Parameter of
which the network-layer address (IPv4 or IPv6) is given here."
::= { rserpoolPEASAPAddrTableEntry 3 }

rserpoolPEUserAddrTable OBJECT-TYPE
SYNTAX       SEQUENCE OF RserpoolPEUserAddrTableEntry
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION  "A table listing of all IP addresses of the user
transport endpoint."
REFERENCE    "Section 3.10 of RFC 5354 defines the User Transport Parameter of
which the addresses are listed in this table."
::= { rserpoolPoolElements 6 }

rserpoolPEUserAddrTableEntry OBJECT-TYPE
SYNTAX       RserpoolPEUserAddrTableEntry
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION  "An IP address of the user transport endpoint."
REFERENCE    "Section 3.10 of RFC 5354 defines the User Transport Parameter of
which an address is contained by this entry."
INDEX {
    rserpoolPEIndex,
    rserpoolPEUserAddrTableIndex }
::= { rserpoolPEUserAddrTable 1 }

RserpoolPEUserAddrTableEntry ::= SEQUENCE {
    rserpoolPEUserAddrTableIndex Unsigned32,
    rserpoolPEUserL3Type         InetAddressType,
    rserpoolPEUserL3Addr         InetAddress,
    rserpoolPEUserL3Opaque       RSerPoolOpaqueAddressTC }

rserpoolPEUserAddrTableIndex OBJECT-TYPE
SYNTAX       Unsigned32 (1..4294967295)
MAX-ACCESS   not-accessible
STATUS     current
DESCRIPTION
  "A unique identifier for the IP address of a user transport
dependency."
 ::= { rserpoolPEUserAddrTableEntry 1 }

rserpoolPEUserL3Type OBJECT-TYPE
SYNTAX     InetAddressType { unknown(0), ipv4(1), ipv6(2) }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "The network-layer protocol of an IP address of a user transport
dependency. Set to unknown for opaque address."
REFERENCE
  "Section 3.10 of RFC 5354 defines the User Transport Parameter of
which the network-layer protocol number is given here."
 ::= { rserpoolPEUserAddrTableEntry 2 }

rserpoolPEUserL3Addr OBJECT-TYPE
SYNTAX     InetAddress (SIZE(0|4|16))
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "The IP address of a user transport endpoint. The type of
this address is given in rserpoolPEUserL3Addr."
REFERENCE
  "Section 3.10 of RFC 5354 defines the User Transport Parameter of
which the network-layer address (IPv4 or IPv6) is given here."
 ::= { rserpoolPEUserAddrTableEntry 3 }

rserpoolPEUserL3Opaque OBJECT-TYPE
SYNTAX     RSerPoolOpaqueAddressTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "The opaque address of a user transport endpoint."
REFERENCE
  "Section 3.16 of RFC 5354 defines the opaque transport address."
 ::= { rserpoolPEUserAddrTableEntry 4 }

-- ################################################################
-- #### Pool Users Section                                      ####
-- ################################################################

-- ################################################################
-- ## Definition of the pool user table ###########################
rserpoolPUTable OBJECT-TYPE
SYNTAX     SEQUENCE OF RserpoolPUEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The table listing of pool users."
 ::= { rserpoolPoolUsers 1 }

rserpoolPUEntry OBJECT-TYPE
SYNTAX  RserpoolPUEntry
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"A pool user in the table listing of pool users."
INDEX { rserpoolPUIndex }
 ::= { rserpoolPUTable 1 }

RserpoolPUEntry ::= SEQUENCE {
   rserpoolPUIndex          Unsigned32,
   rserpoolPUOperationScope RSerPoolOperationScopeTC,
   rserpoolPUPoolHandle     RSerPoolPoolHandleTC,
   rserpoolPUDescription    OCTET STRING,
   rserpoolPUUptime         TimeTicks }

rserpoolPUIndex OBJECT-TYPE
SYNTAX     Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
"An integer to uniquely identify a pool user."
 ::= { rserpoolPUEntry 1 }

rserpoolPUOperationScope OBJECT-TYPE
SYNTAX     RSerPoolOperationScopeTC
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The operation scope of this pool user."
REFERENCE
"Section 1.2 of RFC 3237 defines the term operation scope."
 ::= { rserpoolPUEntry 2 }

rserpoolPUPoolHandle OBJECT-TYPE
SYNTAX     RSerPoolPoolHandleTC
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The pool handle of this pool user. Changing this object will update the pool user’s pool handle for all future sessions.

This object SHOULD be maintained in a persistent manner."

REFERENCE
"Section 1.2 of RFC 3237 defines the term pool handle."
 ::= { rserpoolPUEntry 3 }

rserpoolPUDescription OBJECT-TYPE
 SYNAX OCTET STRING (SIZE (0..255))
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "A textual description of this pool user, e.g., its location and a contact address of its administrator.

This object SHOULD be maintained in a persistent manner."
 ::= { rserpoolPUEntry 4 }

rserpoolPUUptime OBJECT-TYPE
 SYNAX TimeTicks
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The ENRP service uptime of this pool user."
 ::= { rserpoolPUEntry 5 }

-- ## MIB conformance and compliance ##############################

rserpoolMIBCompliances OBJECT IDENTIFIER ::= {
 rserpoolMIBConformance 1
}

rserpoolMIBGroups OBJECT IDENTIFIER ::= {
 rserpoolMIBConformance 2
}

rserpoolMIBCompliance MODULE-COMPLIANCE
 STATUS current
 DESCRIPTION
 "The compliance statement for SNMP entities that implement RSerPool."
 MODULE
 MANDATORY-GROUPS {
   rserpoolENRPGroup,
   rserpoolPEGroup,
   rserpoolPUGroup
}
::= { rserpoolMIBCompliances 1 }

rsrerpoolENRPGroup OBJECT-GROUP
OBJECTS {
    rserpoolENRPOperationScope,
    rserpoolENRPIdentifier,
    rserpoolENRPDescription,
    rserpoolENRPUptime,
    rserpoolENRPPort,
    rserpoolENRPA SAPAnnouncePort,
    rserpoolENRPA SAPAnnounceAddr,
    rserpoolENRPA SAPAnnounceAddrType,
    rserpoolENRPENRPAnnouncePort,
    rserpoolENRPENRPAnnounceAddr,

    rserpoolENRPENRPoolHandle,
    rserpoolENRPENRPoolElementID,

    rserpoolENRPA SAPTransportPort,
    rserpoolENRPUserTransportProto,
    rserpoolENRPUserTransportUse,
    rserpoolENRPUserTransportPort,
    rserpoolENRPPolicyID,
    rserpoolENRPPolicyDescription,
    rserpoolENRPPolicyWeight,
    rserpoolENRPPolicyLoad,
    rserpoolENRPPolicyLoadDeg,
    rserpoolENRPRegistrationLife,
    rserpoolENRPHomeENRPServer,

    rserpoolENRPA SAPL3Type,
    rserpoolENRPA SAPL3Addr,

    rserpoolENRPUserL3Type,
    rserpoolENRPUserL3Addr,
    rserpoolENRPUserL3Opaque,

    rserpoolENRPENRPL3Type,
    rserpoolENRPENRPL3Addr,

    rserpoolENRPPeerIdentifier,
    rserpoolENRPPeerPort,
    rserpoolENRPPeerLastHeard,
    rserpoolENRPPeerL3Type,
    rserpoolENRPPeerL3Addr }

STATUS current
DESCRIPTION
"The group contains all ENRP server instances running on the system"
::= { rserpoolMIBGroups 1 }

rserpoolPEGroup OBJECT-GROUP
OBJECTS {
    rserpoolPEOperationScope,
    rserpoolPEPoolHandle,
    rserpoolPEIdentifier,
    rserpoolPEDescription,
    rserpoolPEUptime,
    rserpoolPEASAPTransportPort,
    rserpoolPEUserTransportProto,
    rserpoolPEUserTransportPort,
    rserpoolPEUserTransportUse,
    rserpoolPEPolicyID,
    rserpoolPEPolicyDescription,
    rserpoolPEPolicyWeight,
    rserpoolPEPolicyLoad,
    rserpoolPEPolicyLoadDeg,
    rserpoolPERegistrationLife,
    rserpoolPEHomeENRPServer,
    rserpoolPEASAPL3Type,
    rserpoolPEASAPL3Addr,
    rserpoolPEUserL3Type,
    rserpoolPEUserL3Addr,
    rserpoolPEUserL3Opaque }
STATUS current
DESCRIPTION
    "The group contains all pool element instances running on the system"
::= { rserpoolMIBGroups 2 }

rserpoolPUGroup OBJECT-GROUP
OBJECTS {
    rserpoolPUOperationScope,
    rserpoolPUPoolHandle,
    rserpoolPUDescription,
    rserpoolPUUptime }
STATUS current
DESCRIPTION
    "The group contains all pool user instances running on the system"
::= { rserpoolMIBGroups 3 }

END
7. Operational Considerations

The RSerPool MIB is an Experimental track MIB module, since the RSerPool documents are Experimental RFCs.

8. Security Considerations

There are a number of management objects defined in this MIB module with 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 the tables and objects and their sensitivity/vulnerability:

- `rserpoolENRPDescription` (textual description change)
- `rserpoolPEPoolHandle` (pool handle of pool element change, similar to ASAP)
- `rserpoolPEDescription` (textual description change)
- `rserpoolPEPolicyID` (pool element ID change, similar to ASAP)
- `rserpoolPEPolicyDescription` (textual description change)
- `rserpoolPEPolicyWeight` (policy weight change, similar to ASAP)
- `rserpoolPEPolicyLoadDeg` (policy load degradation change, similar to ASAP)
- `rserpoolPERegistrationLife` (registration lifetime change, similar to ASAP)
- `rserpoolPUPoolHandle` (pool handle of accessed pool change, similar to ASAP)
- `rserpoolPUDescription` (textual description change)

The security implications of changing these items are similar to changes via ASAP; the corresponding security implications are described in the threats document [RFC5355]. Modifying the textual descriptions of components may result in wrong administrator decisions upon malicious information.
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. Read access reveals the same information which is also available by ASAP and ENRP access. The security implications of these two protocols are explained in detail by the threats document [RFC5355].

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.

9. IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

<table>
<thead>
<tr>
<th>Descriptor OBJECT IDENTIFIER Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>rserpoolMIB { experimental 125 }</td>
</tr>
</tbody>
</table>

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11. References

11.1. Normative References


11.2. Informative References


Authors’ Addresses

Thomas Dreibholz  
University of Duisburg-Essen, Institute for Experimental Mathematics  
Ellernstrasse 29  
45326 Essen, Nordrhein-Westfalen  
Germany  
Phone: +49-201-1837637  
Fax: +49-201-1837673  
EMail: dreibh@iem.uni-due.de  
URI: http://www.iem.uni-due.de/~dreibh/

Jaiwant Mulik  
Delaware State University  
CIS Department  
Room 306A, Science Center North  
1200 N. DuPont Hwy  
Dover, DE 19904  
USA  
Phone: +1-302-857-7910  
Fax: +1-302-857-6552  
EMail: jaiwant@mulik.com  
URI: http://netlab.cis.desu.edu