                  Relational Database Management System (RDBMS)
                  Management Information Base (MIB) using SMIv2

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.

Table of Contents

1. Introduction

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols in the Internet community.
   In particular, it describes managed objects used for managing
   relational database (RDBMS) implementations.

2. The SNMPv2 Network Management Framework

    The SNMPv2 Network Management Framework consists of four major
    components. They are:

        o RFC 1442 [1] which defines the SMI, the mechanisms used for
          describing and naming objects for the purpose of management.

        o STD 17, RFC 1213 [2] defines MIB-II, the core set of managed
          objects for the Internet suite of protocols.

        o RFC 1445 [3] which defines the administrative and other
          architectural aspects of the framework.

        o RFC 1448 [4] which defines the protocol used for network
          access to managed objects.

        o RFC 1443 [5] which describes textual conventions for the
          framework.

    The framework permits new objects to be defined for the purpose of
    experimentation and evaluation. In particular, the RDBMS-MIB can be
    seen as an extension of

        o RFC 1565 [6] which defines the MIB for monitoring network
          service applications.

2.1. Object Definitions

    Managed objects are accessed via a virtual information store, termed
    the Management Information Base or MIB. Objects in the MIB are
    defined using the subset of Abstract Syntax Notation One (ASN.1)
    defined in the SMI. In particular, each object type is named by an
    OBJECT IDENTIFIER, an administratively assigned name. The object
    type together with an object instance serves to uniquely identify a
    specific instantiation of the object. For human convenience, we
    often use a textual string, termed the descriptor, to refer to the
    object type.

3. Overview

    The RDBMS-MIB contains objects that may be used to manage relational
    database implementations. Specifically, it contains information on
    installed databases, servers, and on the relation of databases and
    servers. The terms used in this database are described below.

3.1. Terminology

     Vendors and Products
          are providers of database systems on a host. These vendors
          may have more than one database product that is manageable
          through this MIB. On a host, there may be systems from
          multiple vendors, multiple systems from a single vendor, or
          any other combination. There may be a private MIB for each
          vendor, and this may be located using the PrivateMibOID
          objects in some of the tables.

     Databases
          are collections of interrelated data organized according to a
          schema to serve one or more applications. A database is, for
          purposes of this MIB, a collection of tables whose
          organization is based on the relational model. There may be
          one or more databases available in each system on the host
          from each product. In the MIB, data about databases is
          captured in the rdbmsDbTable and the rdbmsDbInfoTable, each
          with one row per database.

     Relational Database Management System (RDBMS)
          A collection of integrated services which support database
          management and together support and control the creation, use
          and maintenance of relational databases. Servers as defined
          in this MIB provide the functions of the RDBMS.

     Servers
          are entities that provide access to databases. For this MIB,
          servers are defined to be entities that may exist
          independently of other servers. A server may or may not be a
          single process, based on its independence from other
          processes. In this MIB, information about servers is
          captured in the rdbmsSvrTable, the rdbmsSvrInfoTable, each
          with one row per server extending the applTable from the
          APPLICATION-MIB of RFC 1565. The rdbmsSvrTable and
          rdbmsSvrInfoTable are both indexed by the applIndex of that
          MIB.

     Associations
          Inbound associations are local or remote conversations,
          usually instances of the SQL CONNECT statement, as made
          visible in servers. The MIB does not currently reveal
          individual associations; there are association counters in
          the dbmsSvrInfoTable and the applTable.

     There are also relationships between servers and databases. All
     obvious relationships are possible and supported:

    o   1 database : 1 server

    o   1 database : many servers

    o   many databases : 1 server

    o   many databases : many servers

3.2. Structure and Features

   The information in this MIB module is organized into nine tables,
   twelve potentially writable objects, and two traps, as follows.

3.2.1. Tables

    o   databases installed on a host/system (rdbmsDbTable)

    o   actively opened databases (rdbmsDbInfoTable)

    o   database configuration parameters (rdbmsDbParamTable)

    o   database limited resources (rdbmsDbLimitedResourceTable)

    o   database servers installed on a system (rdbmsSrvTable)

    o   active database servers (rdbmsSrvInfoTable)

    o   configuration parameters for a server (rdbmsSrvParamTable)

    o   server limited resources (rdbmsSrvLimitedResourceTable)

    o   relation of servers and databases on a host (rdbmsRelTable)

   These entities have broad applicability among database systems, and
   are enough for many monitoring tasks. They are far from adequate for
   detailed management or performance monitoring of specific database
   products. This gap is expected to be filled with vendor and product
   specific MIBs addressing the entities that have not been codified
   here.

3.2.2. Writable objects

   The MIB requires no writable objects for conformance. There is no
   expectation that RDBMS systems may be actively managed through this
   MIB. However, the RDBMS-MIB supports the capability to modify the
   following objects if the implementor so chooses.

   o   rdbmsDbContact

   o   rdbmsDbInfoSizeAllocated

   o   rdbmsDbParamCurrValue

   o   rdbmsDbParamComment rdbmsDbLimitedResourceLimit

   o   rdbmsDbLimitedResourceDescription

   o   rdbmsSrvContact

   o   rdbmsSrvInfoMaxInboundAssociations

   o   rdbmsSrvParamCurrValue

   o   rdbmsSrvParamComment

   o   rdbmsSrvLimitedResourceLimit

   o   rdbmsSrvLimitedResourceDescription

3.2.3. Traps

   The RDBMS-MIB contains two traps:

   o   rdbmsStateChange

   o   rdbmsOutOfSpace

4. Definitions

   RDBMS-MIB DEFINITIONS ::= BEGIN

   IMPORTS
      MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
       Counter32, Gauge32, Integer32
           FROM SNMPv2-SMI
       DisplayString, DateAndTime, AutonomousType
           FROM SNMPv2-TC
       applIndex, applGroup
           FROM APPLICATION-MIB
       mib-2
           FROM RFC1213-MIB;

   rdbmsMIB MODULE-IDENTITY
       LAST-UPDATED "9406150655Z"
       ORGANIZATION "IETF RDBMSMIB Working Group"
       CONTACT-INFO
                "   David Brower

                    Postal: The ASK Group, INGRES DBMS Development
                            1080 Marina Village Parkway
                            Alameda, CA 94501
                            US

                       Tel: +1 510 748 3418
                       Fax: +1 510 748 2770

                    E-mail: daveb@ingres.com"
       DESCRIPTION
           "The MIB module to describe objects for generic relational
            databases."

       ::= { mib-2 39 }

   rdbmsObjects   OBJECT IDENTIFIER ::= { rdbmsMIB 1 }

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   rdbmsDbTable   OBJECT-TYPE
       SYNTAX   SEQUENCE OF RdbmsDbEntry
       MAX-ACCESS   not-accessible
       STATUS   current
       DESCRIPTION
           "The table of databases installed on a system."
       ::= { rdbmsObjects 1 }

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rdbmsDbEntry    OBJECT-TYPE
    SYNTAX      RdbmsDbEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry for a single database on the host.  Whether a
         particular database is represented by a row in rdbmsDbTable
         may be dependent on the activity level of that database,
         according to the product's implementation.  An instance of
         rdbmsRelState having the value active, other, or restricted
         implies that an entry, corresponding to that instance, will
         be present."
    INDEX  { rdbmsDbIndex }
    ::= { rdbmsDbTable 1 }

RdbmsDbEntry    ::=
    SEQUENCE {
        rdbmsDbIndex            INTEGER,
        rdbmsDbPrivateMibOID      OBJECT IDENTIFIER,
        rdbmsDbVendorName       DisplayString,
        rdbmsDbName             DisplayString,
        rdbmsDbContact          DisplayString
    }

rdbmsDbIndex        OBJECT-TYPE
    SYNTAX          INTEGER (1..2147483647)
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "A numeric index, unique among all the databases from all
         products on this host.  This value is a surrogate for the
         conceptually unique key, which is {PrivateMibOID,
         databasename}"
    ::= { rdbmsDbEntry  1 }

rdbmsDbPrivateMibOID    OBJECT-TYPE
    SYNTAX          OBJECT IDENTIFIER
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The authoritative identification for the private MIB for
         this database, presumably based on the vendor, e.g., {
         enterprises 111 <optional subidentifiers>} for Oracle
         databases, {enterprises 757 <optional subidentifiers>} for
         Ingres databases, { enterprises 897 <optional
         subidentifiers>} for Sybase databases, etc.

         If no OBJECT IDENTIFIER exists for the private MIB, attempts
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        to access this object will return noSuchName (SNMPv1)
        or noSuchInstance (SNMPv2)."
     ::= { rdbmsDbEntry  2 }

  rdbmsDbVendorName    OBJECT-TYPE
      SYNTAX           DisplayString
      MAX-ACCESS       read-only
      STATUS           current
      DESCRIPTION
          "The name of the vendor whose RDBMS manages this database,
           for informational purposes."
      ::= { rdbmsDbEntry 3 }

  rdbmsDbName        OBJECT-TYPE
      SYNTAX      DisplayString
      MAX-ACCESS  read-only
      STATUS      current
      DESCRIPTION
          "The name of this database, in a product specific format.  The
           product may need to qualify the name in some way to resolve
           conflicts if it is possible for a database name to be
           duplicated on a host.  It might be necessary to construct a
           hierarchical name embedding the RDBMS instance/installation
           on the host, and/or the owner of the database.  For instance,
           '/test-installation/database-owner/database-name'."
      ::= { rdbmsDbEntry 4 }

  rdbmsDbContact   OBJECT-TYPE
      SYNTAX      DisplayString
      MAX-ACCESS  read-write
      STATUS      current
      DESCRIPTION
          "The textual identification of the contact person for this
           managed database, together with information on how to contact
           this person.

           Note: if there is no server associated with this database, an
           agent may need to keep this in other persistent storage,
           e.g., a configuration file.

           Note that a compliant agent does not need to
           allow write access to this object."

      ::= { rdbmsDbEntry 5 }
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   rdbmsDbInfoTable     OBJECT-TYPE
       SYNTAX            SEQUENCE OF RdbmsDbInfoEntry
       MAX-ACCESS        not-accessible
       STATUS            current
       DESCRIPTION
           "The table of additional information about databases present
            on the host."
       ::= { rdbmsObjects 2 }

   rdbmsDbInfoEntry     OBJECT-TYPE
       SYNTAX            RdbmsDbInfoEntry
       MAX-ACCESS        not-accessible
       STATUS            current
       DESCRIPTION
           "Information that must be present if the database is actively
            opened.  If the database is not actively opened, then
            attempts to access corresponding instances in this table may
            result in either noSuchName (SNMPv1) or noSuchInstance
            (SNMPv2).  'Actively opened' means at least one of the
            rdbmsRelState entries for this database in the rdbmsRelTable
            is active(2)."
       INDEX   { rdbmsDbIndex }
       ::= { rdbmsDbInfoTable 1 }

   RdbmsDbInfoEntry ::=
       SEQUENCE {
           rdbmsDbInfoProductName      DisplayString,
           rdbmsDbInfoVersion          DisplayString,
           rdbmsDbInfoSizeUnits        INTEGER,
           rdbmsDbInfoSizeAllocated    INTEGER,
           rdbmsDbInfoSizeUsed         INTEGER,
           rdbmsDbInfoLastBackup       DateAndTime
       }

   rdbmsDbInfoProductName  OBJECT-TYPE
       SYNTAX            DisplayString
       MAX-ACCESS        read-only
       STATUS            current
       DESCRIPTION
           "The textual product name of the server that created or last
            restructured this database.  The format is product specific."
       ::= { rdbmsDbInfoEntry 1 }

   rdbmsDbInfoVersion  OBJECT-TYPE
       SYNTAX            DisplayString
       MAX-ACCESS        read-only
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     STATUS             current
     DESCRIPTION
         "The version number of the server that created or last
          restructured this database.  The format is product specific."
     ::= { rdbmsDbInfoEntry 2 }

  rdbmsDbInfoSizeUnits     OBJECT-TYPE
     SYNTAX                INTEGER {
                               bytes(1),
                               kbytes(2),
                               mbytes(3),
                               gbytes(4),
                               tbytes(5)
                               }
     MAX-ACCESS           read-only
     STATUS               current
     DESCRIPTION
         "Identification of the units used to measure the size of this
          database in rdbmsDbInfoSizeAllocated and rdbmsDbInfoSizeUsed.
          bytes(1) indicates individual bytes, kbytes(2) indicates
          units of kilobytes, mbytes(3) indicates units of megabytes,
          gbytes(4) indicates units of gigabytes, and tbytes(5)
          indicates units of terabytes.  All are binary multiples -- 1K
          = 1024.  If writable, changes here are reflected in the get
          values of the associated objects."

     ::= { rdbmsDbInfoEntry 3 }

  rdbmsDbInfoSizeAllocated   OBJECT-TYPE
     SYNTAX                INTEGER (1..2147483647)
     MAX-ACCESS           read-write
     STATUS               current
     DESCRIPTION
         "The estimated size of this database (in
          rdbmsDbInfoSizeUnits), which is the disk space that has been
          allocated to it and is no longer available to users on this
          host.  rdbmsDbInfoSize does not necessarily indicate the
          amount of space actually in use for database data.  Some
          databases may support extending allocated size, and others
          may not.

          Note that a compliant agent does not need to
          allow write access to this object."

  --       Note:  computing SizeAllocated may be expensive, and SNMP
  --       agents might cache the value to increase performance.

     ::= { rdbmsDbInfoEntry 4 }
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    rdbmsDbInfoSizeUsed        OBJECT-TYPE
        SYNTAX                 INTEGER (1..2147483647)
        MAX-ACCESS             read-only
        STATUS                 current
        DESCRIPTION
            "The estimated size of this database, in rdbmsDbInfoSizeUnits,
             which is actually in use for database data."

    --        Note:  computing SizeUsed may be expensive, and SNMP
    --        agents might cache the value to increase performance.
        ::= { rdbmsDbInfoEntry 5 }

    rdbmsDbInfoLastBackup      OBJECT-TYPE
        SYNTAX                 DateAndTime
        MAX-ACCESS             read-only
        STATUS                 current
        DESCRIPTION
            "The date and time that the latest complete or partial backup
             of the database was taken. If a database has never been
             backed up, then attempts to access this object will
             result in either noSuchName (SNMPv1) or noSuchInstance
             (SNMPv2)."
        ::= { rdbmsDbInfoEntry 6 }


    ----------------------------------------------------------------


    rdbmsDbParamTable          OBJECT-TYPE
        SYNTAX                 SEQUENCE OF RdbmsDbParamEntry
        MAX-ACCESS             not-accessible
        STATUS                 current
        DESCRIPTION
            "The table of configuration parameters for a database.
             Entries should be populated according to the following
             guidelines:
             (1) The value should be specified through administrative
                 (human) intervention.
             (2) It should be configured on a per-database basis.
             (3) One of the following is true:
                 (a) The parameter has a non-numeric value;
                 (b) The current value is numeric, but it only changes due
                     to human intervention;
                 (c) The current value is numeric and dynamic, but the
                     RDBMS does not track access/allocation failures
                     related to the parameter;
                 (d) The current value is numeric and dynamic, the
                     RDBMS tracks changes in access/allocation failures
                     related to the parameter, but the failure has no
                     significant impact on RDBMS performance or
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                    availability.
                (e) The current value is numeric and dynamic, the
                    RDBMS tracks changes in access/allocation failures
                    related to the parameter, the failure has
                    significant impact on RDBMS performance or
                    availability, and is shown in the
                    rdbmsDbLimitedResource table."
          ::= { rdbmsObjects 3 }

    rdbmsDbParamEntry   OBJECT-TYPE
          SYNTAX   RdbmsDbParamEntry
          MAX-ACCESS   not-accessible
          STATUS   current
          DESCRIPTION
              "An entry for a single configuration parameter for a database.
               Parameters with single values have a subindex value of one.
               If the parameter is naturally considered to contain a
               variable number of members of a class, e.g. members of the
               DBA user group, or files which are part of the database, then
               it must be presented as a set of rows. If, on the other
               hand, the parameter represents a set of choices from a class,
               e.g. the permissions on a file or the options chosen out of
               the set of all options allowed, AND is guaranteed to always
               fit in the 255 character length of a DisplayString, then it
               may be presented as a comma separated list with a subindex
               value of one. Zero may not be used as a subindex value.

               If the database is not actively opened, then attempts
               to access corresponding instances in this table may result in
               either noSuchName (SNMPv1) or noSuchInstance (SNMPv2).
               'Actively opened' means at least one of the
               rdbmsRelState entries for this database in the rdbmsRelTable
               is active(2)."
          INDEX { rdbmsDbIndex, rdbmsDbParamName, rdbmsDbParamSubIndex }
          ::= { rdbmsDbParamTable 1 }

    RdbmsDbParamEntry ::=
          SEQUENCE {
              rdbmsDbParamName   DisplayString,
              rdbmsDbParamSubIndex   INTEGER,
              rdbmsDbParamID   AutonomousType,
              rdbmsDbParamCurrValue   DisplayString,
              rdbmsDbParamComment   DisplayString
          }

    rdbmsDbParamName   OBJECT-TYPE
          SYNTAX   DisplayString (SIZE (1..64))
          MAX-ACCESS   not-accessible

```
      STATUS              current
      DESCRIPTION
          "The name of a configuration parameter for a database.  This
           name is product-specific.  The length is limited to 64
           characters to constrain the number of sub-identifiers needed
           for instance identification (and to minimize network
           traffic)."

      ::= { rdbmsDbParamEntry 1 }

  rdbmsDbParamSubIndex    OBJECT-TYPE
      SYNTAX              INTEGER (1..2147483647)
      MAX-ACCESS          not-accessible
      STATUS              current
      DESCRIPTION
          "The subindex value for this parameter.  If the parameter is
           naturally considered to contain a variable number of members
           of a class, e.g.  members of the DBA user group, or files
           which are part of the database, then it must be presented as
           a set of rows.  If, on the other hand, the parameter
           represents a set of choices from a class, e.g. the
           permissions on a file or the options chosen out of the set of
           all options allowed, AND is guaranteed to always fit in the
           255 character length of a DisplayString, then it may be
           presented as a comma separated list with a subindex value of
           one.  Zero may not be used as a value."
      ::= { rdbmsDbParamEntry 2 }

  rdbmsDbParamID          OBJECT-TYPE
      SYNTAX              AutonomousType
      MAX-ACCESS          read-only
      STATUS              current
      DESCRIPTION
          "The ID of the parameter which may be described in some other
           MIB (e.g., an enterprise-specific MIB module).  If there is
           no ID for this rdbmsDbParamName, attempts to access this
           object will return noSuchName (SNMPv1) or noSuchInstance
           (SNMPv2)."
      ::= { rdbmsDbParamEntry 3 }

  rdbmsDbParamCurrValue OBJECT-TYPE
      SYNTAX              DisplayString
      MAX-ACCESS          read-write
      STATUS              current
      DESCRIPTION
          "The value for a configuration parameter now in effect, the
           actual setting for the database.  While there may multiple
           values in the temporal domain of interest (for instance, the
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          value to take effect at the next restart), this is the
          current setting.

          Note that a compliant agent does not need to
          allow write access to this object."

     ::= { rdbmsDbParamEntry 4 }

  rdbmsDbParamComment   OBJECT-TYPE
      SYNTAX   DisplayString
      MAX-ACCESS   read-write
      STATUS   current
      DESCRIPTION
          "Annotation which describes the purpose of a configuration
           parameter or the reason for a particular parameter's
           setting.

           Note that a compliant agent does not need to
           allow write access to this object."

     ::= { rdbmsDbParamEntry 5 }

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  rdbmsDbLimitedResourceTable   OBJECT-TYPE
      SYNTAX   SEQUENCE OF RdbmsDbLimitedResourceEntry
      MAX-ACCESS   not-accessible
      STATUS   current
      DESCRIPTION
          "The table of limited resources that are kept per-database."
      ::= { rdbmsObjects 4 }

  rdbmsDbLimitedResourceEntry   OBJECT-TYPE
      SYNTAX   RdbmsDbLimitedResourceEntry
      MAX-ACCESS   not-accessible
      STATUS   current
      DESCRIPTION
          "An entry for a single limited resource kept per-database.
           A limited resource has maximum use determined by a parameter
           that might or might not be changeable at run time, or visible
           in the rdbmsDbParamTable. Examples would be the number of
           available locks, or disk space on a partition. Arrays of
           resources are supported through an integer sub index, which
           should have the value of one for single-instance names.

           Limited resources that are shared across databases, are best
           put in the rdbmsSvrLimitedResourceTable instead of this one.

         If the database is not actively opened, then attempts to
         access corresponding instances in this table may result in
         either noSuchName (SNMPv1) or noSuchInstance (SNMPv2).
         'Actively opened' means at least one of the rdbmsRelState
         entries for this database in the rdbmsRelTable is active(2)."

     INDEX { rdbmsDbIndex, rdbmsDbLimitedResourceName }
     ::= { rdbmsDbLimitedResourceTable 1 }

  RdbmsDbLimitedResourceEntry ::=
     SEQUENCE {
         rdbmsDbLimitedResourceName   DisplayString,
         rdbmsDbLimitedResourceID   AutonomousType,
         rdbmsDbLimitedResourceLimit   INTEGER,
         rdbmsDbLimitedResourceCurrent   INTEGER,
         rdbmsDbLimitedResourceHighwater   INTEGER,
         rdbmsDbLimitedResourceFailures   Counter32,
         rdbmsDbLimitedResourceDescription DisplayString
     }

  rdbmsDbLimitedResourceName   OBJECT-TYPE
     SYNTAX   DisplayString
     MAX-ACCESS   not-accessible
     STATUS   current
     DESCRIPTION
         "The name of the resource, for instance 'global locks' or
          'locks for the FOO database', or 'data space on /dev/rdsk/5s0
          for FOO'. The length is limited to 64 characters to constrain
          the number of sub-identifiers needed for instance
          identification (and to minimize network traffic)."
     ::= { rdbmsDbLimitedResourceEntry 1 }

  rdbmsDbLimitedResourceID OBJECT-TYPE
     SYNTAX   AutonomousType
     MAX-ACCESS   read-only
     STATUS   current
     DESCRIPTION
         "The ID of the resource which may be described in some other
          MIB (e.g., an enterprise-specific MIB module). If there is
          no ID for this rdbmsDbLimitedResourceName, attempts to access
          this object will return noSuchName (SNMPv1) or noSuchInstance
          (SNMPv2)."
     ::= { rdbmsDbLimitedResourceEntry 2 }

  rdbmsDbLimitedResourceLimit   OBJECT-TYPE
     SYNTAX   INTEGER (1..2147483647)
     MAX-ACCESS   read-write
     STATUS   current

        DESCRIPTION
            "The maximum value the resource use may attain.

             Note that a compliant agent does not need to
             allow write access to this object."

        ::= { rdbmsDbLimitedResourceEntry 3 }

  rdbmsDbLimitedResourceCurrent   OBJECT-TYPE
        SYNTAX   INTEGER (1..2147483647)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The current value for the resource."
        ::= { rdbmsDbLimitedResourceEntry 4 }

  rdbmsDbLimitedResourceHighwater   OBJECT-TYPE
        SYNTAX   INTEGER (1..2147483647)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The maximum value of the resource seen since applUpTime
             was reset for the earliest server which has the database
             actively opened.

             If there are two servers with the database open, and the
             oldest one dies, the proper way to invalidate the value is by
             resetting sysUpTime."
        ::= { rdbmsDbLimitedResourceEntry 5 }

  rdbmsDbLimitedResourceFailures   OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The number of times the system wanted to exceed the limit of
             the resource since applUpTime was reset for the earliest
             server which has the database actively opened.

             If there are two servers with the DB open, and the
             oldest one dies, the proper way to invalidate the value is by
             resetting sysUpTime."
        ::= { rdbmsDbLimitedResourceEntry 6 }

  rdbmsDbLimitedResourceDescription   OBJECT-TYPE
        SYNTAX   DisplayString
        MAX-ACCESS   read-write
        STATUS   current

         DESCRIPTION
             "A description of the resource and the meaning of the integer
              units used for Limit, Current, and Highwater.

              Note that a compliant agent does not need to
              allow write access to this object."

         ::= { rdbmsDbLimitedResourceEntry 7 }

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   rdbmsSrvTable   OBJECT-TYPE
       SYNTAX   SEQUENCE OF RdbmsSrvEntry
       MAX-ACCESS   not-accessible
       STATUS   current
       DESCRIPTION
           "The table of database servers running or installed
            on a system."
       ::= { rdbmsObjects 5 }

   rdbmsSrvEntry   OBJECT-TYPE
       SYNTAX   RdbmsSrvEntry
       MAX-ACCESS not-accessible
       STATUS   current
       DESCRIPTION
           "An entry for a single database server. A server is an
            independent entity that provides access to one or more
            databases. Failure of one does not affect access to
            databases through any other servers. There might be one or
            more servers providing access to a database. A server may be
            a 'process' or collection of 'processes', as interpreted by
            the product."
       INDEX { applIndex }
       ::= { rdbmsSrvTable 1 }

   RdbmsSrvEntry ::=
       SEQUENCE {
           rdbmsSrvPrivateMibOID   OBJECT IDENTIFIER,
           rdbmsSrvVendorName DisplayString,
           rdbmsSrvProductName DisplayString,
           rdbmsSrvContact   DisplayString
       }

   rdbmsSrvPrivateMibOID   OBJECT-TYPE
       SYNTAX   OBJECT IDENTIFIER
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION

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            "The authoritative identification for the private MIB for this
             server, presumably based on the vendor, e.g., { enterprises
             111 <optional subidentifiers>} for Oracle servers, {
             enterprises 757 <optional subidentifiers>} for Ingres
             servers, { enterprises 897 <optional subidentifiers>} for
             Sybase servers, etc.

             If no OBJECT IDENTIFIER exists for the private MIB, attempts
             to access this object will return noSuchName (SNMPv1)
             or noSuchInstance (SNMPv2)."
        ::= { rdbmsSrvEntry  1 }

   rdbmsSrvVendorName  OBJECT-TYPE
        SYNTAX           DisplayString
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "The name of the vendor whose RDBMS manages this database,
             for informational purposes."
        ::= { rdbmsSrvEntry 2 }

   rdbmsSrvProductName  OBJECT-TYPE
        SYNTAX           DisplayString
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "The product name of this server.  This is normally the
             vendor's formal name for the product, in product specific
             format."
        ::= { rdbmsSrvEntry 3 }

   rdbmsSrvContact OBJECT-TYPE
        SYNTAX      DisplayString
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The textual identification of the contact person for this
             managed server, together with information on how to contact
             this person.

             Note: if there is no active server associated with this
             object, an agent may need to keep this in other persistent
             storage, e.g., a configuration file.

             Note that a compliant agent does not need to
             allow write access to this object."

        ::= { rdbmsSrvEntry 4 }
```

        ----

   rdbmsSrvInfoTable   OBJECT-TYPE
        SYNTAX   SEQUENCE OF RdbmsSrvInfoEntry
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
             "The table of additional information about database servers.

             Entries in this table correspond to applications in the
             APPLICATION-MIB applTable. Some objects in that table are
             application-specific. When they are associated with an RDBMS
             server in this table, the objects have the following
             meanings.

             applName - The name of this server, i.e., the process or
             group of processes providing access to this database. The
             exact format will be product and host specific.

             applVersion - The version number of this server, in product
             specific format.

             applOperStatus - up(1) means operational and available for
             general use. down(2) means the server is not available for
             use, but is known to the agent. The other states have broad
             meaning, and may need to be supplemented by the vendor
             private MIB. Halted(3) implies an administrative state of
             unavailability. Congested(4) implies a resource or or
             administrative limit is prohibiting new inbound associations.
             The 'available soon' description of restarting(5) may include
             an indeterminate amount of recovery.

             applLastChange is the time the agent noticed the most recent
             change to applOperStatus.

             applInboundAssociation is the number of currently active
             local and remote conversations (usually SQL connects).

             applOutboundAssociations is not provided by this MIB.

             applAccumulatedInboundAssociations is the total number of
             local and remote conversations started since the server came
             up.

             applAccumulatedOutbound associations is not provided by this
             MIB.

             applLastInboundActivity is the time the most recent local or

          remote conversation was attempted or disconnected.

          applLastOutboundActivity is not provided by this MIB.

          applRejectedInboundAssociations is the number of local or
          remote conversations rejected by the server for
          administrative reasons or because of resource limitations.

          applFailedOutboundAssociations is not provided by this MIB."

     ::= { rdbmsObjects 6 }

  rdbmsSrvInfoEntry   OBJECT-TYPE
      SYNTAX   RdbmsSrvInfoEntry
      MAX-ACCESS   not-accessible
      STATUS   current
      DESCRIPTION
          "Information that must be present for a single 'up' database
           server, with visibility determined by the value of the
           corresponding applOperStatus object. If an instance of
           applOperStatus is not up(1), then attempts to access
           corresponding instances in this table may result in either
           noSuchName (SNMPv1) or noSuchInstance (SNMPv2) being returned
           by the agent."
      INDEX { applIndex }
      ::= { rdbmsSrvInfoTable 1 }

  RdbmsSrvInfoEntry ::=
      SEQUENCE {
          rdbmsSrvInfoStartupTime   DateAndTime,
          rdbmsSrvInfoFinishedTransactions   Gauge32,
          rdbmsSrvInfoDiskReads   Counter32,
          rdbmsSrvInfoDiskWrites   Counter32,
          rdbmsSrvInfoLogicalReads   Counter32,
          rdbmsSrvInfoLogicalWrites   Counter32,
          rdbmsSrvInfoPageWrites   Counter32,
          rdbmsSrvInfoPageReads   Counter32,
          rdbmsSrvInfoDiskOutOfSpaces   Counter32,
          rdbmsSrvInfoHandledRequests   Counter32,
          rdbmsSrvInfoRequestRecvs   Counter32,
          rdbmsSrvInfoRequestSends   Counter32,
          rdbmsSrvInfoHighwaterInboundAssociations   Gauge32,
          rdbmsSrvInfoMaxInboundAssociations   Gauge32
      }

  rdbmsSrvInfoStartupTime OBJECT-TYPE
      SYNTAX   DateAndTime
      MAX-ACCESS   read-only

```
    STATUS              current
    DESCRIPTION
        "The date and time at which this server was last started."
    ::= { rdbmsSrvInfoEntry 1 }

rdbmsSrvInfoFinishedTransactions  OBJECT-TYPE
    SYNTAX              Gauge32
    MAX-ACCESS          read-only
    STATUS              current
    DESCRIPTION
        "The number of transactions visible to this server that have
         been completed by either commit or abort.  Some database
         operations, such as read-only queries, may not result in the
         creation of a transaction."
    ::= { rdbmsSrvInfoEntry 2 }

rdbmsSrvInfoDiskReads   OBJECT-TYPE
    SYNTAX              Counter32
    MAX-ACCESS          read-only
    STATUS              current
    DESCRIPTION
        "The total number of reads of database files issued to the
         operating system by this server since startup.  Numbers are
         not comparable between products.  What constitutes a
         readand how it is accounted is product-specific."
    ::= { rdbmsSrvInfoEntry 3 }

rdbmsSrvInfoLogicalReads    OBJECT-TYPE
    SYNTAX              Counter32
    MAX-ACCESS          read-only
    STATUS              current
    DESCRIPTION
        "The total number of logical reads of database files made
         internally by this server since startup.  The values of this
         object and those of rdbmsSrvInfoDiskReads reveal the effect
         of caching on read operation. Numbers are not comparable
         between products, and may only be meaningful when aggregated
         across all servers sharing a common cache."
    ::= { rdbmsSrvInfoEntry 4 }

rdbmsSrvInfoDiskWrites  OBJECT-TYPE
    SYNTAX              Counter32
    MAX-ACCESS          read-only
    STATUS              current
    DESCRIPTION
        "The total number of writes to database files issued to the
         operating system by this server since startup.  Numbers are
         not comparable between products."
```

```
        ::= { rdbmsSrvInfoEntry 5 }

   rdbmsSrvInfoLogicalWrites  OBJECT-TYPE
       SYNTAX              Counter32
       MAX-ACCESS          read-only
       STATUS              current
       DESCRIPTION
           "The total number of times parts of the database files have
           been marked 'dirty' and in need of writing to the disk.  This
           value and rdbmsSrvInfoDiskWrites give some indication of the
           effect of 'write-behind' strategies in reducing the number of
           disk writes compared to database operations.  Because the
           writes may be done by servers other than those marking the
           parts of the database files dirty, these values may only be
           meaningful when aggregated across all servers sharing a
           common cache.  Numbers are not comparable between products."
       ::= { rdbmsSrvInfoEntry 6 }

   rdbmsSrvInfoPageReads  OBJECT-TYPE
       SYNTAX              Counter32
       MAX-ACCESS          read-only
       STATUS              current
       DESCRIPTION
           "The total number of pages in database files read by this
           server since startup.  'Pages' are product specific units of
           disk i/o operations.  This value, along with
           rdbmsSrvInfoDiskReads, reveals the effect of any grouping
           read-ahead that may be used to enhance performance of some
           queries, such as scans."
       ::= { rdbmsSrvInfoEntry 7}

   rdbmsSrvInfoPageWrites  OBJECT-TYPE
       SYNTAX              Counter32
       MAX-ACCESS          read-only
       STATUS              current
       DESCRIPTION
           "The total number of pages in database files written by this
           server since startup.  Pages are product-specific units of
           disk I/O.  This value, with rdbmsSrvInfoDiskWrites, shows the
           effect of write strategies that collapse logical writes of
           contiguous pages into single calls to the operating system."
       ::= { rdbmsSrvInfoEntry 8 }

   rdbmsSrvInfoDiskOutOfSpaces OBJECT-TYPE
       SYNTAX                  Counter32
       MAX-ACCESS              read-only
       STATUS                  current
       DESCRIPTION
```

```
             "The total number of times the server has been unable to
              obtain disk space that it wanted, since server startup.  This
              would be inspected by an agent on receipt of an
              rdbmsOutOfSpace trap."
         ::= { rdbmsSrvInfoEntry 9 }

  rdbmsSrvInfoHandledRequests     OBJECT-TYPE
       SYNTAX             Counter32
       MAX-ACCESS         read-only
       STATUS             current
       DESCRIPTION
             "The total number of requests made to the server on inbound
              associations.  The meaning of 'requests' is product specific,
              and is not comparable between products.

              This is intended to encapsulate high level semantic
              operations between clients and servers, or between peers.
              For instance, one request might correspond to a 'select' or
              an 'insert' statement.  It is not intended to capture disk
              i/o described in rdbmsSrvInfoDiskReads and
              rdbmsSrvInfoDiskWrites."
         ::= { rdbmsSrvInfoEntry 10 }

  rdbmsSrvInfoRequestRecvs        OBJECT-TYPE
       SYNTAX             Counter32
       MAX-ACCESS         read-only
       STATUS             current
       DESCRIPTION
             "The number of receive operations made processing any requests
              on inbound associations. The meaning of operations is product
              specific, and is not comparable between products.

              This is intended to capture lower-level i/o operations than
              shown by HandledRequests, between clients and servers, or
              between peers.  For instance, it might roughly correspond to
              the amount of data given with an 'insert' statement.  It is
              not intended to capture disk i/o described in
              rdbmsSrvInfoDiskReads and rdbmsSrvInfoDiskWrites."
         ::= { rdbmsSrvInfoEntry 11 }

  rdbmsSrvInfoRequestSends        OBJECT-TYPE
       SYNTAX             Counter32
       MAX-ACCESS         read-only
       STATUS             current
       DESCRIPTION
             "The number of send operations made processing requests
              handled on inbound associations.  The meaning of operations
              is product specific, and is not comparable between products.
```

```
     This is intended to capture lower-level i/o operations than
     shown by HandledRequests, between between clients and
     servers, or between peers.  It might roughly correspond to
     the number of rows returned by a 'select' statement.  It is
     not intended to capture disk i/o described in DiskReads."
::= { rdbmsSrvInfoEntry 12 }
```

```
rdbmsSrvInfoHighwaterInboundAssociations  OBJECT-TYPE
    SYNTAX              Gauge32
    MAX-ACCESS          read-only
    STATUS              current
    DESCRIPTION
        "The greatest number of inbound associations that have been
        simultaneously open to this server since startup."
    ::= { rdbmsSrvInfoEntry 13 }
```

```
rdbmsSrvInfoMaxInboundAssociations OBJECT-TYPE
    SYNTAX              Gauge32
    MAX-ACCESS          read-write
    STATUS              current
    DESCRIPTION
        "The greatest number of inbound associations that can be
         simultaneously open with this server.  If there is no limit,
         then the value should be zero.

         Note that a compliant agent does not need to
         allow write access to this object."

    ::= { rdbmsSrvInfoEntry 14 }
```

```
    ------------------------------------------------------------------
```

```
rdbmsSrvParamTable        OBJECT-TYPE
    SYNTAX                SEQUENCE OF RdbmsSrvParamEntry
    MAX-ACCESS            not-accessible
    STATUS                current
    DESCRIPTION
        "The table of configuration parameters for a server.  Entries
        should be populated according to the following guidelines:
        (1) The value should be specified through administrative
            (human) intervention.
        (2) It should be configured on a per-server or a more global
            basis, with duplicate entries for each server sharing
            use of the parameter.
        (3) One of the following is true:
            (a) The parameter has a non-numeric value;
            (b) The current value is numeric, but it only changes due
                to human intervention;
```

```
                    (c) The current value is numeric and dynamic, but the
                        RDBMS does not track access/allocation failures
                        related to the parameter;
                    (d) The current value is numeric and dynamic, the
                        RDBMS tracks changes in access/allocation failures
                        related to the parameter, but the failure has no
                        significant impact on RDBMS performance or
                        availability.
                    (e) The current value is numeric and dynamic, the
                        RDBMS tracks changes in access/allocation failures
                        related to the parameter, the failure has
                        significant impact on RDBMS performance or
                        availability, and is shown in the
                        rdbmsSrvLimitedResource table."
            ::= { rdbmsObjects 7 }

    rdbmsSrvParamEntry          OBJECT-TYPE
         SYNTAX               RdbmsSrvParamEntry
         MAX-ACCESS           not-accessible
         STATUS               current
         DESCRIPTION
             "An entry for a single configuration parameter for a server.
              Parameters with single values have a subindex value of one.
              If the parameter is naturally considered to contain a
              variable number of members of a class, e.g.  members of the
              DBA user group, or tracepoints active in the server, then it
              must be presented as a set of rows.  If, on the other hand,
              the parameter represents a set of choices from a class,
              e.g. the permissions on a file or the options chosen out of
              the set of all options allowed, AND is guaranteed to always
              fit in the 255 character length of a DisplayString, then it
              may be presented as a comma separated list with a subindex
              value of one.  Zero may not be used as a subindex value.

              Entries for a server must be present if the value of the
              corresponding applOperStatus object is up(1).  If an instance
              of applOperStatus is not up(1), then attempts to access
              corresponding instances in this table may result in either
              noSuchName (SNMPv1) or noSuchInstance (SNMPv2) being returned
              by the agent."
         INDEX  { applIndex, rdbmsSrvParamName, rdbmsSrvParamSubIndex }
         ::= { rdbmsSrvParamTable 1 }

    RdbmsSrvParamEntry ::=
         SEQUENCE {
             rdbmsSrvParamName            DisplayString,
             rdbmsSrvParamSubIndex        INTEGER,
             rdbmsSrvParamID              AutonomousType,
```

```
        rdbmsSrvParamCurrValue      DisplayString,
        rdbmsSrvParamComment        DisplayString
    }

rdbmsSrvParamName        OBJECT-TYPE
    SYNTAX               DisplayString (SIZE (1..64))
    MAX-ACCESS           not-accessible
    STATUS               current
    DESCRIPTION
        "The name of a configuration parameter for a server.  This
         name is product-specific. The length is limited to 64
         characters to constrain the number of sub-identifiers needed
         for instance identification (and to minimize network
         traffic)."
    ::= { rdbmsSrvParamEntry 1 }

rdbmsSrvParamSubIndex    OBJECT-TYPE
    SYNTAX               INTEGER (1..2147483647)
    MAX-ACCESS           not-accessible
    STATUS               current
    DESCRIPTION
        "The subindex value for this parameter.  If the parameter is
         naturally considered to contain a variable number of members
         of a class, e.g.  members of the DBA user group, or files
         which are part of the database, then it must be presented as
         a set of rows.  If, on the other hand, the parameter
         represents a set of choices from a class, e.g. the
         permissions on a file or the options chosen out of the set of
         all options allowed, AND is guaranteed to always fit in the
         255 character length of a DisplayString, then it may be
         presented as a comma separated list with a subindex value of
         one.  Zero may not be used as a value."
    ::= { rdbmsSrvParamEntry 2 }

rdbmsSrvParamID          OBJECT-TYPE
    SYNTAX               AutonomousType
    MAX-ACCESS           read-only
    STATUS               current
    DESCRIPTION
        "The ID of the parameter which may be described in some
         other MIB.  If there is no ID for this rdbmsSrvParamName,
         attempts to access this object will return noSuchName
         (SNMPv1) or noSuchInstance (SNMPv2)."
    ::= { rdbmsSrvParamEntry 3 }

rdbmsSrvParamCurrValue   OBJECT-TYPE
    SYNTAX               DisplayString
    MAX-ACCESS           read-write
```

```
     STATUS              current
     DESCRIPTION
         "The value for a configuration parameter now in effect, the
          actual setting for the server.  While there may multiple
          values in the temporal domain of interest (for instance, the
          value to take effect at the next restart), this is the
          current setting.

          Note that a compliant agent does not need to
          allow write access to this object."

     ::= { rdbmsSrvParamEntry 4 }

 rdbmsSrvParamComment     OBJECT-TYPE
     SYNTAX              DisplayString
     MAX-ACCESS          read-write
     STATUS              current
     DESCRIPTION
         "Annotation which describes the purpose of a configuration
          parameter or the reason for a particular parameter's
          setting.

          Note that a compliant agent does not need to
          allow write access to this object."

     ::= { rdbmsSrvParamEntry 5 }

 --------------------------------------------------------------------

 rdbmsSrvLimitedResourceTable         OBJECT-TYPE
     SYNTAX          SEQUENCE OF RdbmsSrvLimitedResourceEntry
     MAX-ACCESS      not-accessible
     STATUS          current
     DESCRIPTION
         "The table of limited resources relevant to a server."
     ::= { rdbmsObjects 8 }

 rdbmsSrvLimitedResourceEntry     OBJECT-TYPE
     SYNTAX      RdbmsSrvLimitedResourceEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
         "An entry for a single limited resource kept by the server.
          A limited resource has maximum use determined by a parameter
          that might or might not changeable at run time, or visible in
          the rbmsSrvParamTable.  Examples would be the number of
          available locks, or number of concurrent executions allowed
          in a server.  Arrays of resources are supported through an
```

```
        integer subindex, which should have the value of one for
        single-instance names.

        Limited resources that are shared across servers or databases
        are best duplicated in this table across
        all servers accessing the resource."
    INDEX { applIndex, rdbmsSrvLimitedResourceName }
    ::= { rdbmsSrvLimitedResourceTable 1 }

RdbmsSrvLimitedResourceEntry ::=
    SEQUENCE {
        rdbmsSrvLimitedResourceName        DisplayString,
        rdbmsSrvLimitedResourceID          AutonomousType,
        rdbmsSrvLimitedResourceLimit       INTEGER,
        rdbmsSrvLimitedResourceCurrent     INTEGER,
        rdbmsSrvLimitedResourceHighwater   INTEGER,
        rdbmsSrvLimitedResourceFailures    Counter32,
        rdbmsSrvLimitedResourceDescription DisplayString
    }

rdbmsSrvLimitedResourceName        OBJECT-TYPE
    SYNTAX          DisplayString
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "The name of the resource, for instance 'threads' or
        'semaphores', or 'buffer pages'"
    ::= { rdbmsSrvLimitedResourceEntry  1 }

rdbmsSrvLimitedResourceID OBJECT-TYPE
    SYNTAX            AutonomousType
    MAX-ACCESS        read-only
    STATUS            current
    DESCRIPTION
        "The ID of the resource which may be described in some other
         MIB.  If there is no ID for this rdbmsSrvLimitedResourceName,
         attempts to access this object will return noSuchName
         (SNMPv1) or noSuchInstance (SNMPv2)."
    ::= { rdbmsSrvLimitedResourceEntry 2 }

rdbmsSrvLimitedResourceLimit        OBJECT-TYPE
    SYNTAX            INTEGER (1..2147483647)
    MAX-ACCESS        read-write
    STATUS            current
```

          DESCRIPTION
              "The maximum value the resource use may attain.

               Note that a compliant agent does not need to
               allow write access to this object."

          ::= { rdbmsSrvLimitedResourceEntry 3 }

     rdbmsSrvLimitedResourceCurrent   OBJECT-TYPE
          SYNTAX   INTEGER (1..2147483647)
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "The current value for the resource."
          ::= { rdbmsSrvLimitedResourceEntry 4 }

     rdbmsSrvLimitedResourceHighwater   OBJECT-TYPE
          SYNTAX   INTEGER (1..2147483647)
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "The maximum value of the resource seen since applUpTime
               was reset."
          ::= { rdbmsSrvLimitedResourceEntry 5 }

     rdbmsSrvLimitedResourceFailures   OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "The number of times the system wanted to exceed the limit of
               the resource since applUpTime was reset."
          ::= { rdbmsSrvLimitedResourceEntry 6 }

     rdbmsSrvLimitedResourceDescription   OBJECT-TYPE
          SYNTAX   DisplayString
          MAX-ACCESS   read-write
          STATUS   current
          DESCRIPTION
              "A description of the resource and the meaning of the integer
               units used for Limit, Current, and Highwater.

               Note that a compliant agent does not need to
               allow write access to this object."

          ::= { rdbmsSrvLimitedResourceEntry 7 }

```
   ----------------------------------------------------------------


   rdbmsRelTable    OBJECT-TYPE
       SYNTAX       SEQUENCE OF RdbmsRelEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A table relating databases and servers present on a host."
       ::= { rdbmsObjects 9 }

   rdbmsRelEntry    OBJECT-TYPE
       SYNTAX       RdbmsRelEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "An entry relating a single database server to a single
            database to which it may provide access.  The table is
            indexed first by the index of rdbmsDbTable, and then
            rdbmsSrvTable, so that all servers capable of providing
            access to a given database may be found by SNMP traversal
            operations (get-next and get-bulk).  The makeup of this table
            depends on the product's architecture, e.g. if it is one
            server - many databases, then each server will appear n
            times, where n is the number of databases it may access, and
            each database will appear once.  If the architecture is one
            database - many servers, then each server will appear once
            and each database will appear n times, where n is the number
            of servers that may be accessing it."
       INDEX  { rdbmsDbIndex, applIndex }
       ::= { rdbmsRelTable 1 }

   RdbmsRelEntry ::=
       SEQUENCE {
            rdbmsRelState            INTEGER,
            rdbmsRelActiveTime    DateAndTime
       }

   rdbmsRelState    OBJECT-TYPE
       SYNTAX       INTEGER{
                    other(1),
                    active(2),
                    available(3),
                    restricted(4),
                    unavailable(5)
                    }
       MAX-ACCESS   read-only
       STATUS       current
       DESCRIPTION
```

```
        "The state of this server's access to this database.
         Active(2) means the server is actively using the database.
         Available(3) means the server could use the database if
         necessary.  Restricted(4) means the database is in some
         administratively determined state of less-than-complete
         availability.  Unavailable(5) means the database is not
         available through this server.  Other(1) means the
         database/server is in some other condition, possibly
         described in the vendor private MIB."

    ::= { rdbmsRelEntry 1 }

rdbmsRelActiveTime  OBJECT-TYPE
    SYNTAX          DateAndTime
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The time the database was made active by the server.  If an
         instance of rdbmsRelState is not active(1), then attempts to
         access the corresponding instance of this object may result
         in either noSuchName (SNMPv1) or noSuchInstance (SNMPv2)
         being returned by the agent."
    ::= { rdbmsRelEntry 2 }


----------------------------------------------------------------

-- Well known resources for which limits, high water marks,
-- access or allocation failures, and current levels of use
-- are possibly available in either the rdbmsDbLimitedResources
-- or the rdbmsSrvLimitedResources tables.

rdbmsWellKnownLimitedResources OBJECT IDENTIFIER
        ::= { rdbmsObjects 10 }

rdbmsLogSpace   OBJECT-IDENTITY
                STATUS  current
                DESCRIPTION
                "Storage allocated for redo and undo logs."
        ::= { rdbmsWellKnownLimitedResources 1}

----------------------------------------------------------------

rdbmsTraps        OBJECT IDENTIFIER ::= { rdbmsMIB 2 }

rdbmsStateChange    NOTIFICATION-TYPE
    OBJECTS         { rdbmsRelState }
    STATUS          current
    DESCRIPTION
```

              "An rdbmsStateChange trap signifies that one of the database
               server/databases managed by this agent has changed its
               rdbmsRelState in a way that makes it less accessible for use.
               For these purposes, both active(2) and available(3) are
               considered fully accessible. The state sent with the trap is
               the new, less accessible state."
         ::= { rdbmsTraps 1 }

   rdbmsOutOfSpace NOTIFICATION-TYPE
        OBJECTS   { rdbmsSrvInfoDiskOutOfSpaces }
        STATUS   current
        DESCRIPTION
            "An rdbmsOutOfSpace trap signifies that one of the database
             servers managed by this agent has been unable to allocate
             space for one of the databases managed by this agent. Care
             should be taken to avoid flooding the network with these
             traps."
        ::= { rdbmsTraps 2 }

   -- compliance information

   rdbmsConformance   OBJECT IDENTIFIER ::= { rdbmsMIB 3 }
   rdbmsCompliances   OBJECT IDENTIFIER ::= { rdbmsConformance 1 }
   rdbmsGroups   OBJECT IDENTIFIER ::= { rdbmsConformance 2 }

   -- compliance statements

   rdbmsCompliance   MODULE-COMPLIANCE
        STATUS   current
        DESCRIPTION
            "The compliance statement for SNMP entities which
             implement the RDBMS MIB"
        MODULE HOST-RESOURCES-MIB
           MANDATORY-GROUPS   { hrSystem }
        MODULE APPLICATION-MIB
           MANDATORY-GROUPS { applGroup }
        MODULE RDBMS-MIB
           MANDATORY-GROUPS { rdbmsGroup }

        GROUP rdbmsGroup
            DESCRIPTION
                "The rdbmsGroup is mandatory, but no write access
                 to objects is required for compliance."
            OBJECT   rdbmsDbContact
            MIN-ACCESS read-only
            DESCRIPTION

```
        "A compliant system need not allow write-access to this
        object."
OBJECT      rdbmsDbParamCurrValue
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsDbParamComment
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsDbLimitedResourceLimit
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsDbLimitedResourceDescription
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvContact
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvInfoMaxInboundAssociations
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvParamCurrValue
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvParamComment
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvLimitedResourceLimit
MIN-ACCESS  read-only
DESCRIPTION
    "A compliant system need not allow write-access to this
    object."
OBJECT      rdbmsSrvLimitedResourceDescription
```

```
        MIN-ACCESS  read-only
        DESCRIPTION
            "A compliant system need not allow write-access to this
            object."

    ::= { rdbmsCompliances 1 }

 -- units of conformance

    -- rdbmsStateChange and rdbmsOutOfSpace traps are omitted
    -- intentionally.  They are not required or part of any
    -- conformance group.

 rdbmsGroup    OBJECT-GROUP
    OBJECTS   {
                rdbmsDbPrivateMibOID, rdbmsDbVendorName,
                rdbmsDbName, rdbmsDbContact,

                rdbmsDbInfoProductName, rdbmsDbInfoVersion,
                rdbmsDbInfoSizeUnits, rdbmsDbInfoSizeAllocated,
                rdbmsDbInfoSizeUsed, rdbmsDbInfoLastBackup,

                rdbmsDbParamCurrValue, rdbmsDbParamComment,

                rdbmsDbLimitedResourceLimit,
                rdbmsDbLimitedResourceCurrent,
                rdbmsDbLimitedResourceHighwater,
                rdbmsDbLimitedResourceFailures,
                rdbmsDbLimitedResourceDescription,

                rdbmsSrvPrivateMibOID, rdbmsSrvVendorName,
                rdbmsSrvProductName, rdbmsSrvContact,

                rdbmsSrvInfoStartupTime,
                rdbmsSrvInfoFinishedTransactions,
                rdbmsSrvInfoDiskReads, rdbmsSrvInfoDiskWrites,
                rdbmsSrvInfoLogicalReads, rdbmsSrvInfoLogicalWrites,
                rdbmsSrvInfoPageReads, rdbmsSrvInfoPageWrites,
                rdbmsSrvInfoHandledRequests,
                rdbmsSrvInfoRequestRecvs, rdbmsSrvInfoRequestSends,
                rdbmsSrvInfoHighwaterInboundAssociations,
                rdbmsSrvInfoMaxInboundAssociations,

                rdbmsSrvParamCurrValue, rdbmsSrvParamComment,

                rdbmsSrvLimitedResourceLimit,
                rdbmsSrvLimitedResourceCurrent,
                rdbmsSrvLimitedResourceHighwater,
```

```
                rdbmsSrvLimitedResourceFailures,
                rdbmsSrvLimitedResourceDescription,

                rdbmsRelState, rdbmsRelActiveTime }
      STATUS    current
      DESCRIPTION
           "A collection of objects providing basic instrumentation of an
            RDBMS entity."
      ::= { rdbmsGroups 1 }

      ----------------------------------------------------------------

   END
```

5. Acknowledgements

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        1994.

7. Security Considerations

    Security issues are not discussed in this memo.

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