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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.

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1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. 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"
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E-mail: daveb@ingres.com"

DESCRIPTION

"The MIB module to describe objects for generic relational
 databases."

::= { mib-2 39 }

rdbmsObjects OBJECT IDENTIFIER ::= { rdbmsMIB 1 }

rdbmsDbTable OBJECT-TYPE

SYNTAX SEQUENCE OF RdbmsDbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table of databases installed on a system."

::= { rdbmsObjects 1 }

```

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

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 }

```

-----

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
```

```

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 }

```

```

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

```

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

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 }

```

-----
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/rdisk/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 }
```

```
-----
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
```

"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 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
    read and 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 rdbmsSrvParamTable. 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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Bob Taylor, Tandem
Maria Valls, IBM
Bert Wijnen, IBM
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6. References

- [1] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1442, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [2] McCloghrie, K., and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets - MIB-II", STD 17, RFC 1213, Hughes LAN Systems, Performance Systems International, March 1991.
- [3] Galvin, J., and K. McCloghrie, "Administrative Model for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1445, Trusted Information Systems, Hughes LAN Systems, April 1993.
- [4] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1448, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [5] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1443, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [6] Kille, S., WG Chair, and N. Freed, Editor, "The Network Services Monitoring MIB", RFC 1565, ISODE Consortium, Innosoft, January 1994.

7. Security Considerations

Security issues are not discussed in this memo.

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