

Veritas™ High Availability Agent for SAP MaxDB Installation and Configuration Guide

AIX, HP-UX, Linux, Solaris

5.0

Veritas High Availability Agent for SAP MaxDB Installation and Configuration Guide

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Introducing the Veritas High Availability Agent for SAP MaxDB

This chapter includes the following topics:

- [About the Veritas agent for SAP MaxDB](#)
- [What's new in this agent](#)
- [Supported software](#)
- [How the agent makes SAP MaxDB highly available](#)
- [SAP MaxDB agent functions](#)
- [Typical SAP MaxDB configuration in a VCS cluster](#)
- [Setting up SAP MaxDB in a VCS cluster](#)

About the Veritas agent for SAP MaxDB

The Veritas High Availability agents monitor specific resources within an enterprise application. They determine the status of resources and start or stop them according to external events.

The Veritas agent for SAP Max DB provides high availability for SAP Max DB Servers in a cluster.

MaxDB is a relational database system that was developed for Online Transaction Processing (OLTP).

It is the first agent to support SAP MaxDB Server with ACC Library.

See the following Technical Support TechNote for the latest updates or software issues for this agent:

<http://www.symantec.com/business/support/index?page=content&id=TECH46455>

What's new in this agent

The enhancements in this release of SAP MaxDB agent are as follows:

- Added support for AIX 7.1.

For information on the changes introduced in the previous releases:

See [“Changes introduced in previous releases”](#) on page 61.

Supported software

The Veritas agent for SAP MaxDB supports the following software versions:

Veritas Cluster Server

- AIX—VCS 4.0, 5.0, 5.1
- HP-UX—VCS 4.1, 5.0
- Linux—VCS 4.0, 4.1, 5.0, 5.1
- Solaris—VCS 4.0, 4.1, 5.0, 5.1

and all intermediate Maintenance Packs of these major releases.

Note: In the software disc, no separate agent is provided for VCS 4.0 and 5.1, on Linux and Solaris. To use the agent for VCS 4.0 and 5.1 on both these platforms, use the agent provided for VCS 4.1 and 5.0 respectively.

Similarly, on AIX, to use the agent for VCS 5.1, use the agent provided for VCS 5.0

ACC Library

5.1 and later

Review the ACC Library version for i18n support.

See [“Prerequisites for enabling i18n support”](#) on page 32.

Operating Systems

- AIX 5.2, 5.3, 6.1, 7.1 on pSeries
- HP-UX 11i v2, 11iv3 on Itanium and PA-RISC
- Red Hat Enterprise Linux 4, 5 on Intel and ppc64
- SUSE Linux 9, 10 on Intel and ppc64
- Solaris 8, 9 and 10 SPARC
- Solaris 10 x64

SAP MaxDB

7.5, 7.6, 7.7, 7.8

and all intermediate minor versions of these releases.

How the agent makes SAP MaxDB highly available

The Veritas agent for SAP MaxDB continuously monitors the SAP MaxDB database server processes to verify that they function properly.

The agent provides the following levels of application monitoring:

- **Primary or Basic monitoring**
 This mode has Process check and Health check monitoring options. With the default Process check option, the agent verifies that the SAP MaxDB database server processes are present in the process table. Process check cannot detect whether processes are in hung or stopped states.
- **Secondary or Detail monitoring**
 In this mode, the agent runs a utility to verify the status of SAP MaxDB database server. The agent detects application failure if the monitoring routine reports an improper function of the SAP MaxDB database server processes. When this application failure occurs, the SAP MaxDB database server service group fails over to another node in the cluster.
 Thus, the agent ensures high availability for SAP MaxDB database server.

SAP MaxDB agent functions

The agent consists of resource type declarations and agent executables. The agent executables are organized into online, offline, monitor, and clean functions.

Online

The online function performs the following tasks:

- Verifies that the required attributes are set correctly. If the attribute values are invalid the agent responds with appropriate error message.
- Verifies whether the SAP MaxDB Server instance is not already online. If the instance is online, the online function exits immediately.
- If any SAP MaxDB Server processes remain online, the function kills these processes using the user name associated with the specific pattern kernel <DBName>.
- Removes all the IPC resource IDs from <independentdatapath>/ipc directory if it exists.

- Starts the SAP MaxDB server with SAP supplied utility "dbmcli".
- Confirms that the SAP MaxDB processes starts up.
- Returns the status of SAP MaxDB agent to VCS.

Offline

The offline function performs the following tasks:

- Verifies that the required attributes are set correctly. If the attribute values are invalid the agent responds with appropriate error message.
- Verifies that the SAP MaxDB Server instance is not offline. If the instance is offline, the offline function exits immediately.
- Stops the SAP MaxDB server with SAP supplied 'dbmcli' utility.
- Checks if any processes exist for the MaxDB Instance. If any processes exist kills them.
- Cleans up all the IPC resources for the SAP MaxDB Instance.
- Returns the exit status of SAP MaxDB agent to VCS.

Monitor

The monitor function monitors the states of the SAP MaxDB server on all nodes within the cluster. The function performs the following tasks:

- Verifies that the required attributes are set correctly. If the attribute values are invalid the agent responds with appropriate error message
- Confirms that the SAP MaxDB processes exists.
- Runs the second level monitor attribute checks.
- Runs the DBM command dbmcli to get the state of the MaxDB Instance if SLM is enabled.
- Validates the MonitorProgram attributes and aborts if the values are not valid.
- Runs the monitor program.
- Returns the exit status of the monitor program to VCS HAD.

Clean

In case of a failure or after an unsuccessful attempt to online or offline a MaxDB server instance, the clean function performs the following tasks:

- Attempts to gracefully shut down the MaxDB server instance.

- If the instance does not shut down normally, the clean function kills the remaining MaxDB processes.
- Removes any existing IPC resources of the MaxDB instance.
- Runs the dbmcli command to clear the runtime environment for MaxDB Instance.
- Returns the exit status to VCS.

Typical SAP MaxDB configuration in a VCS cluster

A typical SAP MaxDB configuration in a VCS cluster has the following characteristics:

- VCS is installed and configured in a two-node cluster.
- The /sapdb/DBName directory is installed on shared storage.
- The SAP MaxDB binaries are installed locally on both nodes or on shared disks.
- The Veritas agent for SAP MaxDB is installed on both the nodes.

Figure 1-1 depicts a configuration where SAP MaxDB instance binaries and /sapdb/DBName are installed completely on shared disks.

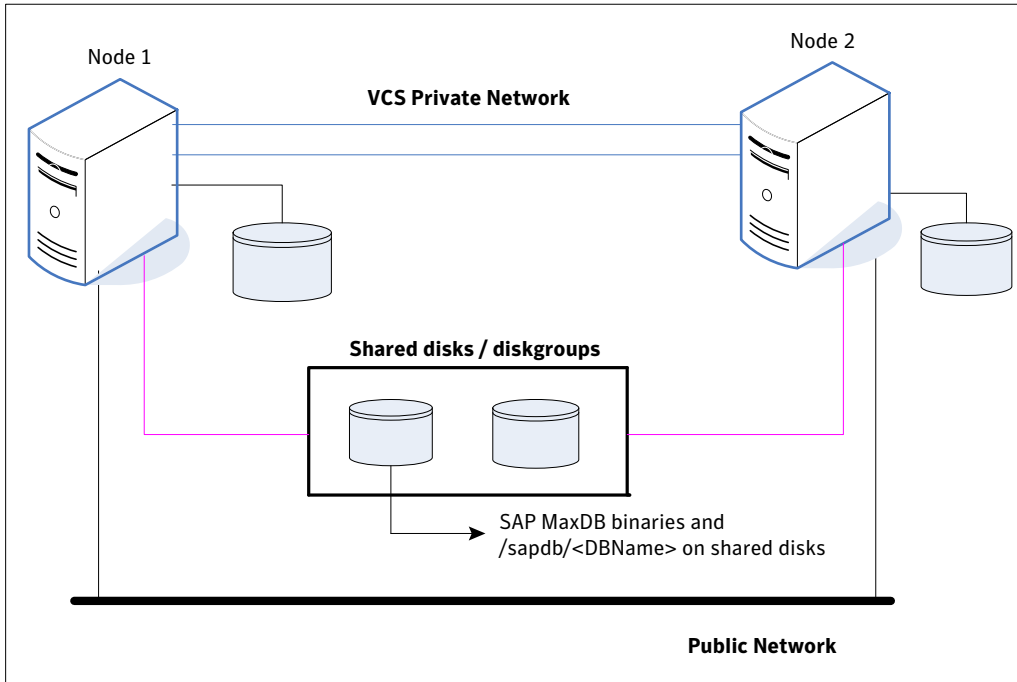
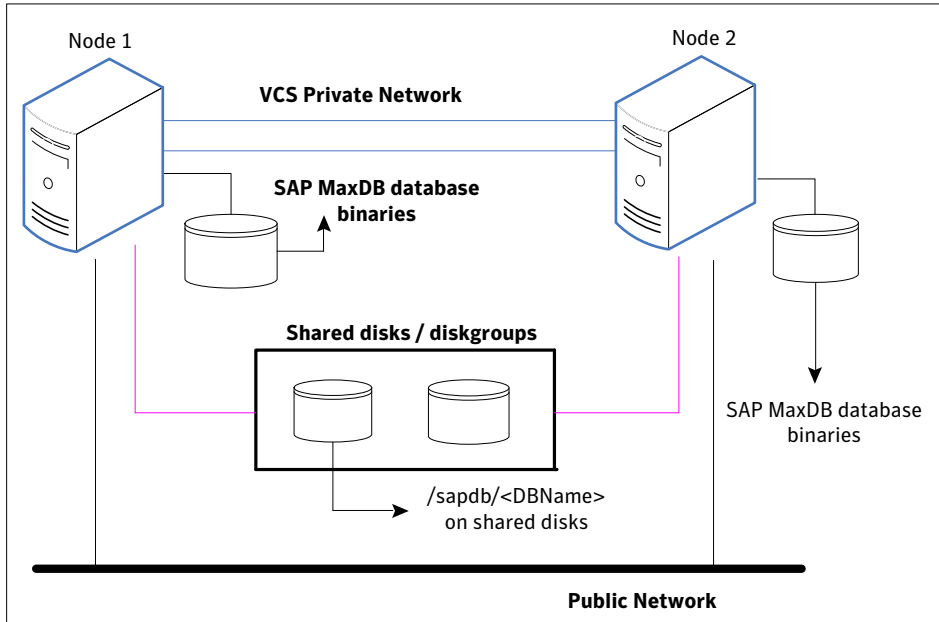


Figure 1-2

depicts a configuration where SAP MaxDB instance binaries are installed locally on each node and /sapdb/DBName is installed on shared disks.



Setting up SAP MaxDB in a VCS cluster

Follow the steps below to set up SAP MaxDB in a cluster:

- Set up a VCS cluster.
Refer to *Veritas Cluster Server Installation Guide* for more information on installing and configuring VCS.
- Install and configure SAP MaxDB for High Availability.
See [“About installing SAP MaxDB for high availability”](#) on page 27.
See [“About configuring SAP MaxDB for high availability”](#) on page 27.
- Install the Veritas High Availability agent for SAP MaxDB.
See [“Installing the agent in a VCS environment”](#) on page 33.
- Configure the service groups for SAP MaxDB.
See [“About configuring service groups for SAP MaxDB”](#) on page 49.

Installing and configuring SAP MaxDB for high availability

This chapter includes the following topics:

- [About SAP MaxDB server](#)
- [Uniquely identifying SAP MaxDB server instances](#)
- [Monitoring a SAP MaxDB instance](#)
- [About installing SAP MaxDB for high availability](#)
- [About configuring SAP MaxDB for high availability](#)
- [Configuring SAP MaxDB Server for cluster support](#)

About SAP MaxDB server

SAP MaxDB is a relational database system that was developed for Online Transaction Processing (OLTP). The OLTP database instance type has been optimized for the rapid processing of individual transactions with a large number of users and large databases.

SAP MaxDB is a relational database system with which you can create, use and manage MaxDB database instances. You can use a MaxDB database as the database for an SAP system, among other uses. Prior to version 7.5, MaxDB was delivered under the name SAP DB.

SAP DB and MaxDB

In May 2003, SAP concluded a cooperation agreement with MySQL AB. The contract stipulates that, as of database version 7.5, the SAP DB database shall be delivered under the name MaxDB. MaxDB 7.5 is the result of the continuing development of the SAP DB source code. The MaxDB software 7.5 can be used as a direct upgrade for previous SAP DB versions as of 7.2.04. As per the releases for SAP applications, this also applies to SAP DB databases in SAP installations. For SAP customers, nothing changes as a result of this contract.

Overview of the Database System

SAP MaxDB is SAP's own relational database system. You can use it in SAP solutions as a less expensive alternative to databases from other vendors.

A database instance comprises a database and the additional information required for the operation of the database. A database is a set of data with a regular structure. The data in a database is comprised of the application data (data records) and the database catalog (metadata). Every database instance has a unique name. A database instance can be in different operational states, for example ONLINE, ADMIN, OFFLINE. In the ONLINE operational state, users can work with the data in the database instance, while the ADMIN operational state allows database administrators to execute administration tasks.

As a user, to query or change data in a database, you use the Structured Query Language (SQL). Using SQL, you can display, change and delete the logical units (database objects) of the database instance, such as tables. You can use schemas to group database objects logically. The database system executes SQL statements within transactions. In physical terms, a database instance comprises the data and log volumes (permanent storage), multiple caches, the files in the run directory and a collection of metadata (including configuration files, database parameters, paths of the volumes, etc.). The database system uses page chains and B* trees as logical access structures.

Accessing a MaxDB Database Instance From Remote Computers

Several different database tools help to work with database instances. To use a database instance in a database application, integrate the database instance in the database application via an interface. Database application, database tools, interfaces and database instance can be located on different computers in a network. To access a database instance located on a remote computer, the database tools and interfaces require the MaxDB XServer (communication server).

XServer

The Max DB XServer is the communication server for the database system. The XServer listens out for connection requests from clients such as database applications and database tools. The XServer is necessary if a client is establishing a connection to a database instance located on a remote computer. The JDBC interface also requires the XServer for local communication. Communication between clients and XServer can be encrypted with SSL/TLS in SAP systems. The XServer can be used on all operating systems supported by the database system. The XServer is part of the MaxDB software package.

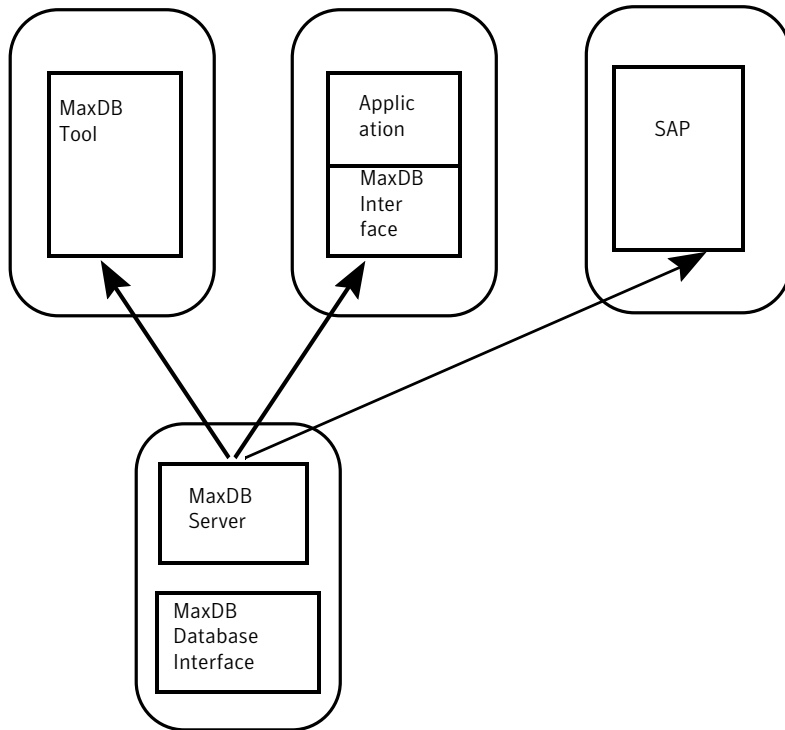
XUSER

The MaxDB XUSER database tool enables user log-in data to be stored and provides simplified log-on to database instances. You can use XUSER to store log-in data for database system administrators (SYSDBA users), database manager operators (DBM operators) and database users. XUSER is a command line tool and can be used on all operating systems supported by the database system. XUSER can be used in SAP systems. XUSER is part of the MaxDB software package.

Log-on data for logging on to database instances is defined as XUSER entry data and stored under a user key. When logging on to a database instance, you specify the user key only. XUSER entries are stored separately for each operating system user. XUSER entries are stored in the file system in UNIX/Linux. Operating system users can define up to 32 user keys for themselves. If several users are working with the same computer but log on under different user names using one database instance, individual user data can be managed separately in such cases.

[Figure 2-1](#) illustrates how you can access a MaxDB database from remote computers.

Figure 2-1 Accessing a MaxDB database instance from remote computers



Integrating MaxDB Instances into SAP Systems

You can use MaxDB database instances in SAP systems. MaxDB can be integrated into the following SAP systems:

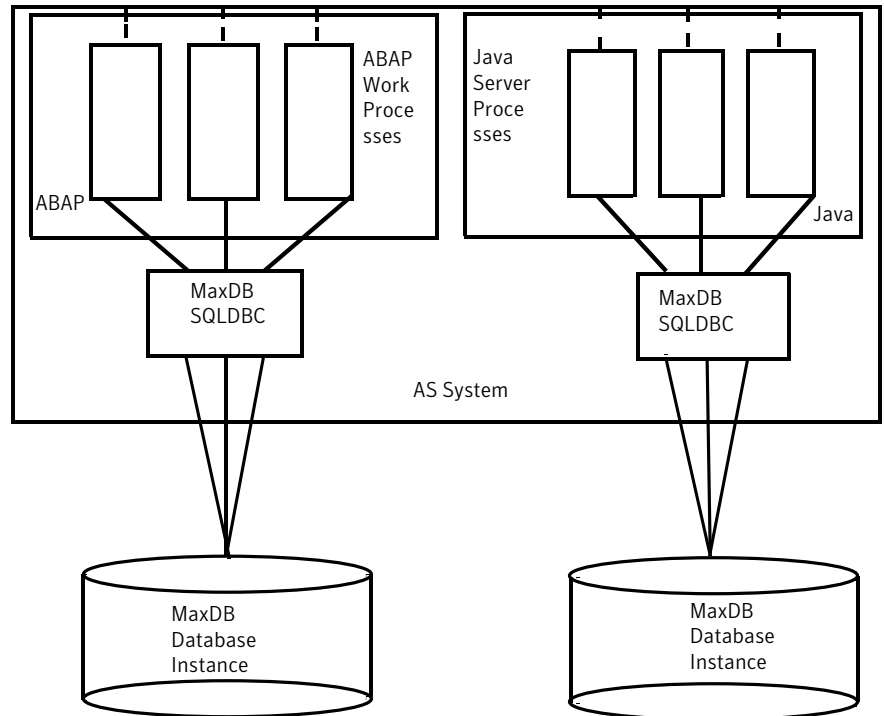
SAP NetWeaver AS	MaxDB SQLDBC
SAP NetWeaver BI	MaxDB SQL DBC
SAP NetWeaver EP	MaxDB JDBC
SAP NetWeaver MI (Clients)	MaxDB JDBC
SAP NetWeaver MDM	MaxDB JDBC
SAP NetWeaver XI	MaxDB JDBC

Integration of MaxDB into SAP NetWeaver AS

MaxDB is integrated into SAP NetWeaver AS using MaxDB SQLDBC.

Figure 2-2 shows the integration of MaxDB with SAP NetWeaver AS

Figure 2-2 Integration of MaxDB with SAP NetWeaver AS



Communication with MaxDB Server

To establish a connection to a database on a remote computer, database applications and database tools use the MaxDB X Server running on the remote computer. The X Server is concurrently available to all database instances even if several database instances are installed on one computer, only one X Server ever runs. To secure the connection between the client and the X Server, SAP customers can use SSL/TLS. Connections to database instances on the local computer use shared memory. If you want to force the database to establish the connection via the X Server nonetheless, specify localhost as the database computer when you log on to the database instance.

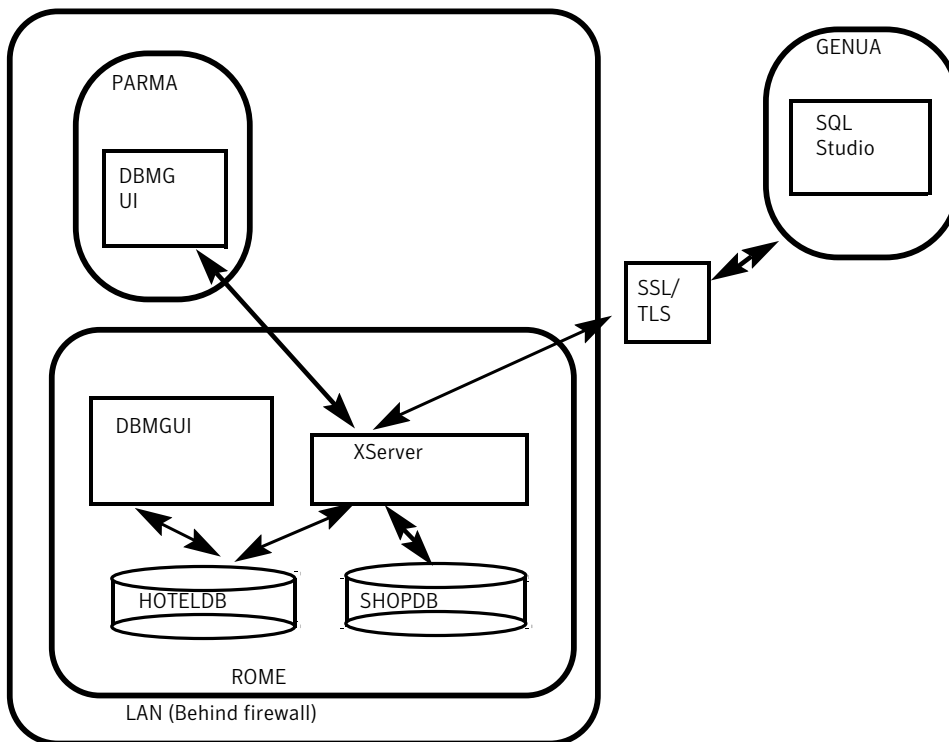
Example: Communication between Clients and Database Instance

Consider the following two database instances HOTELDB and SHOPDB that are installed on computer ROME:

- A user on computer PARMA uses the Database Manager GUI (DBMGUI) to access the database instance HOTELDB via the X Server on computer ROME.
- A second user, on computer GENUA, uses the SQL Studio to access the database instance SHOPDB via the same X Server on computer ROME.
- A third, local, user uses the Database Manager GUI to access the database instance HOTELDB without using the X Server.

Figure 2-3 shows the communication between a client and database instance

Figure 2-3 Communication between client and database Instance



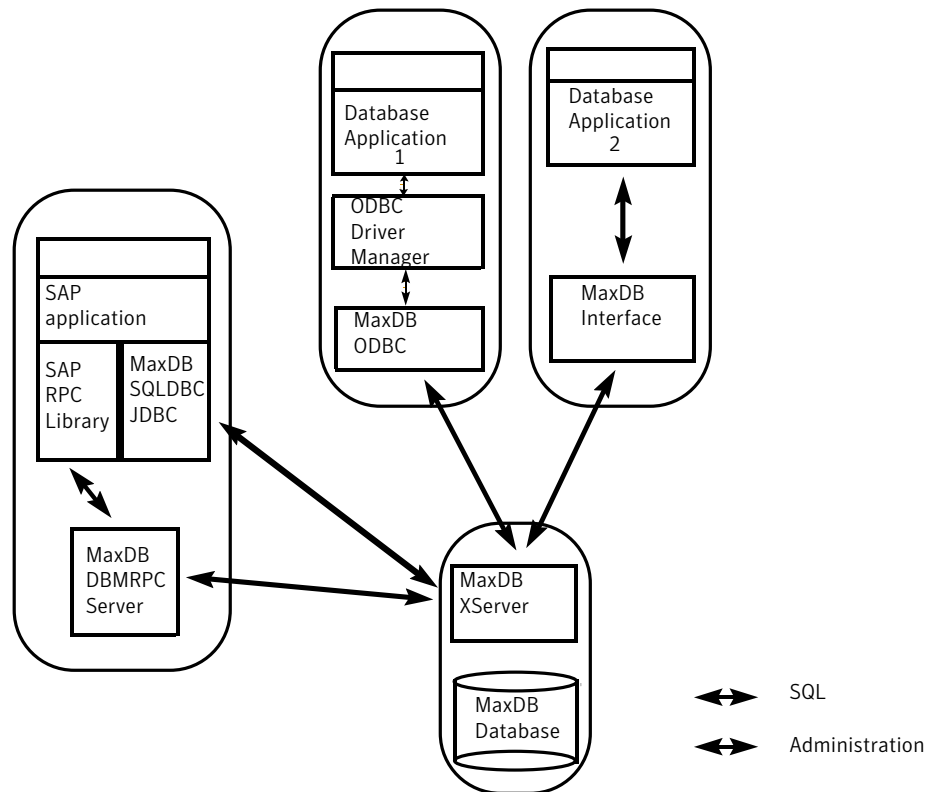
SAP MaxDB Interface

Database applications, such as SAP systems, access MaxDB database instances via interfaces. If the database application (and thus the MaxDB interface) is on a different computer than the database instance, the database system also needs

the MaxDB XServer (communication server) for communication. The JDBC interface needs the MaxDB XServer even for local communication.

Figure 2-4 shows how database applications access a MaxDB Database instance via MaxDB interfaces.

Figure 2-4 Database applications accessing a MaxDB Database instance via MaxDB interfaces



High Availability for SAP MaxDB Database

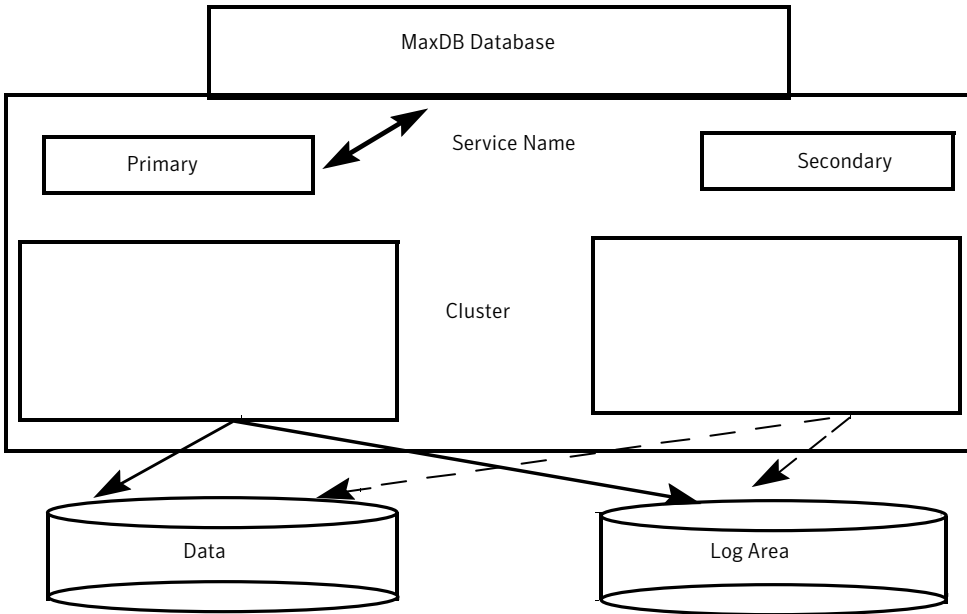
A database instance can fail due to hardware or logical errors. To restore the database instance, you have to import data and log backups. If you have a lot of data to import, restoring the database instance can take a long time. The database instance is not available for use during this time.

To make the database instance available for use more quickly (high availability), you can cluster the SAP MaxDB using VCS. VCS uses two systems for clustering SAP MaxDB. Only one system will be active for MaxDB at any point of time. When

a failure occurs on the first system the file system and IP will be brought online on the second system and then MaxDB will be brought online.

Figure 2-5 shows how high availability can be achieved for SAP MaxDB database using VCS.

Figure 2-5 High availability for SAP MaxDB database



Uniquely identifying SAP MaxDB server instances

You can virtualize a SAP MaxDB instance using a cluster. Using shared disk and virtual IP addresses, you can manage a large set of SAP MaxDB instances in a single cluster.

For multiple instances running concurrently on a single node, the agent must be able to uniquely identify each SAP MaxDB instance on a single host system.

Each instance has a unique instance name.

The instance names may follow the naming conventions as follows:

- Instance name should contain only three alphanumeric uppercase characters.
- Instance name should always start with an alphabet.
- Instance name should be unique on the cluster.

Note that the DBName attribute forms a unique identifier that can identify the processes running for a particular SAP MaxDB database server instance.

For example, HOT, ERP

Monitoring a SAP MaxDB instance

The monitor operation performs process level check to ensure the proper functioning of an SAP MaxDB instance. It checks for the processes from the process table that contains "kernel DBName" in its name. It also checks the database state with "dbmcli" utility if SecondLevelMonitor attribute is set.

About installing SAP MaxDB for high availability

You can install SAP MaxDB in the following ways, in a VCS environment:

SAP MaxDB on a shared disk

Install the SAP MaxDB binaries and /sapdb/DBName on the shared disks.

SAP MaxDB on a local disk

Install the SAP MaxDB binaries on each node and /sapdb/DBName on the shared disks.

Note: /sapdb/DBName includes the kernel, data files and log files for SAP MaxDB database server.

When installing SAP MaxDB, ensure that the login_id, id_name, group_id, and group_name for the sqdDBName and sdb users is the same on all the nodes.

The user sqdDBName and sdb users and the group 'sdba' must be local and not Network Information Service (NIS and NIS+) users.

For more details, refer to the product documentation.

About configuring SAP MaxDB for high availability

The guidelines for configuring SAP MaxDB for high availability are as follows:

- In a service group, keep the single point of failure as minimal as possible and watch the application startup time.
- Assign a virtual hostname to the component within the switchover environment. Since the physical hostname changes with the switchover, this is a must have requirement.

- Based on the expected failover time configure the reconnection parameters for all software components and enable its automatic reconnection.

Configuring SAP MaxDB Server for cluster support

Configuring the SAP MaxDB server for cluster support involves the following phases:

Installing the MaxDB server on first node

Install the MaxDB server using SAP provided installation tool SAPInst for the required SAP application.

Complete the following steps:

To install the MaxDB server on first node

- 1 Start the Database Instance installation for the SAP application using `SAPINST_USE_HOSTNAME=<Virtual Host Name>`.

Use the following command for starting the installation:

```
sapinst SAPINST_USE_HOSTNAME=<Virtual Host Name>
```

And proceed as per the instructions on the SAP installation GUI for installing Database Instance.

- 2 If you are installing MaxDB database for Standalone use (not with SAP applications) install the MaxDB server using SDBINST tool provided with SAP MaxDB software.

For Standalone use install the MaxDB server with SDBINST.

```
SDBINST
```

- 3 Perform all the post-installation steps described in the SAP MaxDB installation guide.

Installing the MaxDB software on second node

Install the MaxDB software on the second node with the same MaxDB name used in installing on the first node.

Complete the following steps:

To install the MaxDB server on second node

- 1** Create SAP MaxDB database software owner "sdb" user on the system with logon permission disabled with same UID as of first node.
- 2** Create SAP MaxDB database administration group "sdba" on the system with same GID as of first node.
- 3** Create SAP MaxDB user "<DBUser>" with same permissions as on first node and with same UID as of first node.
- 4** Start the MaxDB software installation from the MaxDB media with SDBINST.
- 5** Setup the X server logon credentials for all SAP users: <DBUser>, control, superdba as described in SAP note 39439.
- 6** Mount the data and log volumes on first node on to second node.
- 7** Start the MaxDB server.

Installing, upgrading, and removing the agent for SAP MaxDB

This chapter includes the following topics:

- [Before you install the Veritas agent for SAP MaxDB](#)
- [About the ACC library](#)
- [Installing the ACC library](#)
- [Installing the agent in a VCS environment](#)
- [Removing the agent in a VCS environment](#)
- [Removing the ACC library](#)
- [Upgrading the agent in a VCS environment](#)

Before you install the Veritas agent for SAP MaxDB

You must install the Veritas agent for SAP MaxDB on all the systems that will host SAP MaxDB service groups.

Ensure that you meet the following prerequisites to install the agent for SAP MaxDB.

For VCS, do the following:

- Install and configure Veritas Cluster Server.
For more information on installing and configuring Veritas Cluster Server, refer to the *Veritas Cluster Server Installation Guide*.

- Remove any previous version of this agent.
To remove the agent,
See “[Removing the agent in a VCS environment](#)” on page 35.
- Install the latest version of ACC Library.
To install or update the ACC Library package, locate the library and related documentation in the agentpack tarball.
See “[Installing the ACC library](#)” on page 33.

Prerequisites for enabling i18n support

Perform the following steps to enable i18n support to the agent:

- Install ACCLib version 5.1.4.0 or later.
See “[Installing the ACC library](#)” on page 33.
- For VCS 5.0 and earlier releases, copy the latest ag_i18n_inc.pm module from the following location on the agent pack disc.

Note: Review the readme.txt for instructions to copy this module.

VCS 5.0	cd1/platform/arch_dist/vcs/application/i18n_support/5.0
VCS 4.1	cd1/platform/arch_dist/vcs/application/i18n_support/4.1
VCS 4.0	cd1/platform/arch_dist/vcs/application/i18n_support/4.0

where *arch_dist* takes the following values:
'sol_sparc' for Solaris SPARC
'sol_x64' for Solaris x64
'generic' for Linux and HP-UX

About the ACC library

The operations of a VCS agent depend on a set of Perl modules known as the ACC library. The library must be installed on each system in the cluster that runs the agent. The ACC library contains common, reusable functions that perform tasks, such as process identification, logging, and system calls.

Instructions to install or remove the ACC library on a single system in the cluster are given in the following sections. The instructions assume that the agent's tar file has already been extracted.

Installing the ACC library

Install the ACC library on each system in the cluster that runs an agent that depends on the ACC library.

To install the ACC library

- 1 Log in as superuser.
- 2 Download ACC Library.

You can download either the complete Agent Pack tarball or the individual ACCLib tarball from the Symantec Operations Readiness Tools (SORT) site (<https://sort.symantec.com/agents>).

- 3 If you downloaded the complete Agent Pack tarball, navigate to the directory containing the package for the platform running in your environment.

AIX	<code>cd1/aix/vcs/application/acc_library/version_library/pkgs</code>
HP-UX	<code>cd1/hpux/generic/vcs/application/acc_library/version_library/pkgs</code>
Linux	<code>cd1/linux/generic/vcs/application/acc_library/version_library/rpms</code>
Solaris	<code>cd1/solaris/dist_arch/vcs/application/acc_library/version_library/pkgs</code>

where *dist_arch* is *sol_sparc* or *sol_x64*.

- 4 If you downloaded the individual ACCLib tarball, navigate to the `pkgs` directory (for AIX, HP-UX, and Solaris), or `rpms` directory (for Linux).
- 5 Install the package. Enter **Yes** if asked to confirm overwriting of files in the existing package.

AIX	<code># installp -ac -d VRTSacclib.bff VRTSacclib</code>
HP-UX	<code># swinstall -s 'pwd' VRTSacclib</code>
Linux	<code># rpm -i \ VRTSacclib-VersionNumber-GA_GENERIC.noarch.rpm</code>
Solaris	<code># pkgadd -d VRTSacclib.pkg</code>

Installing the agent in a VCS environment

Install the agent for SAP MaxDB on each node in the cluster.

To install the agent in a VCS environment

- 1 Download the agent from the Symantec Operations Readiness Tools (SORT) site: <https://sort.symantec.com/agents>.

You can download either the complete Agent Pack tarball or an individual agent tarball.

- 2 Uncompress the file to a temporary location, say /tmp.
- 3 If you downloaded the complete Agent Pack tarball, navigate to the directory containing the package for the platform running in your environment.

AIX `cd1/aix/vcs/database/sapmaxdb_agent/
vcs_version/version_agent/pkg`

HP-UX `cd1/hpux/generic/vcs/database/sapmaxdb_agent/
vcs_version/version_agent/pkg`

Linux `cd1/linux/generic/vcs/database/sapmaxdb_agent/
vcs_version/version_agent/rpms`

Solaris `cd1/solaris/dist_arch/vcs/database/sapmaxdb_agent/
vcs_version/version_agent/pkg`

where, *dist_arch* is sol_x64 or sol_sparc

If you downloaded the individual agent tarball, navigate to the pkg directory (for AIX, HP-UX, and Solaris), or rpms directory (for Linux).

- 4 Log in as superuser.
- 5 Install the package.

AIX `# installp -ac -d VRTSsapdb.rte.bff VRTSsapdb.rte`

HP-UX `# swinstall -s `pwd` VRTSsapdb`

Linux `# rpm -ihv \
VRTSsapdb-AgentVersion-GA_GENERIC.noarch.rpm`

Solaris `# pkgadd -d . VRTSsapdb`

- 6 After installing the agent package, you must import the agent type configuration file. See “[Importing the agent types files in a VCS environment](#)” on page 39.

Removing the agent in a VCS environment

You must uninstall the agent for SAP MaxDB from a cluster while the cluster is active.

To uninstall the agent in a VCS environment

- 1 Log in as a superuser.
- 2 Set the cluster configuration mode to read/write by typing the following command from any node in the cluster:

```
# haconf -makerw
```

- 3 Remove all SAP MaxDB resources from the cluster. Use the following command to verify that all resources have been removed:

```
# hares -list Type=SAPMaxDB
```

- 4 Remove the agent type from the cluster configuration by typing the following command from any node in the cluster:

```
# hatype -delete SAPMaxDB
```

Removing the agent's type file from the cluster removes the include statement for the agent from the main.cf file, but the agent's type file is not removed from the cluster configuration directory. You can remove the agent's type file later from the cluster configuration directory.

- 5 Save these changes. Then set the cluster configuration mode to read-only by typing the following command from any node in the cluster:

```
# haconf -dump -makero
```

- 6 Use the platform's native software management program to remove the agent for SAP MaxDB from each node in the cluster.

Execute the following command to uninstall the agent:

```
AIX # installp -u VRTSsapdb.rte
```

```
HP-UX # swremove VRTSsapdb
```

```
Linux # rpm -e VRTSsapdb
```

```
Solaris # pkgrm VRTSsapdb
```

Removing the ACC library

Perform the following steps to remove the ACC library.

To remove the ACC library

- 1 Ensure that all agents that use ACC library are removed.
- 2 Run the following command to remove the ACC library package.

```
AIX          # installp -u VRTSacclib
HP-UX        # swremove VRTSacclib
Linux        # rpm -e VRTSacclib
Solaris      # pkgrm VRTSacclib
```

Upgrading the agent in a VCS environment

Perform the following steps to upgrade the agent with minimal disruption, in a VCS environment.

To upgrade the agent in a VCS environment

- 1 Persistently freeze the service groups that host the application.

```
# hagr -freeze GroupName -persistent
```
- 2 Stop the cluster services forcibly.

```
# hstop -all -force
```
- 3 Ensure that the agent operations are stopped on all the nodes.

```
# ps -ef | grep SAPMaxDB
```
- 4 Uninstall the agent package from all the nodes. Use the platform's native software management program to remove the agent for SAP MaxDB from each node in the cluster.

Execute the following command to uninstall the agent:

```
AIX          # installp -u VRTSsapdb.rte
HP-UX        # swremove VRTSsapdb
Linux        # rpm -e VRTSsapdb
Solaris      # pkgrm VRTSsapdb
```

- 5 Install the new agent on all the nodes.
See [“Installing the agent in a VCS environment”](#) on page 33.
- 6 Copy the new SAPMaxDBTypes.cf file from the agent's conf directory, to the VCS conf directory /etc/VRTSvcs/conf/config.

VCS version	Operating system	Agent types file
VCS 4.x	<ul style="list-style-type: none"> ■ AIX ■ HP-UX ■ Linux ■ Solaris 	/etc/VRTSvcs/conf/sample_SAPMaxDB/ SAPMaxDBTypes.cf
VCS 5.x	<ul style="list-style-type: none"> ■ AIX ■ HP-UX ■ Linux 	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes.cf
VCS 5.0	<ul style="list-style-type: none"> ■ Solaris SPARC and x64 	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes50.cf
VCS 5.1	<ul style="list-style-type: none"> ■ Solaris SPARC and x64 	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes51.cf

- 7 Check for the changes in the resource values required, if any, due to the new agent types file.

Note: To note the list of changed attributes, compare the new type definition file with the old type definition file.

- 8 Start the cluster services.
`# hstart`
- 9 Start the agent on all nodes, if not started.
`# haagent -start SAPMaxDB -sys SystemName`
- 10 Unfreeze the service groups once all the resources come to an online steady state.
`# hagrps -unfreeze GroupName -persistent`

Configuring the agent for SAP MaxDB

This chapter includes the following topics:

- [About configuring the Veritas agent for SAP MaxDB](#)
- [Importing the agent types files in a VCS environment](#)
- [SAP MaxDB agent attributes](#)
- [Executing a customized monitoring program](#)

About configuring the Veritas agent for SAP MaxDB

After installing the Veritas agent for SAP MaxDB, you must import the agent type configuration file. After importing this file, you can create and configure SAP MaxDB resources. Before you configure a resource, review the attributes table that describes the resource type and its attributes.

See [“About sample configurations for the agent for SAP MaxDB”](#) on page 57.

Importing the agent types files in a VCS environment

To use the agent for SAP MaxDB, you must import the agent types file into the cluster.

To import the agent types file using the Veritas Cluster Server graphical user interface

- 1 Start the Veritas Cluster Manager and connect to the cluster on which the agent is installed.
- 2 Click **File > Import Types**.

3 In the Import Types dialog box, select the following file:

VCS version	Operating System	Agent types file
VCS 4.x	■ AIX	/etc/VRTSvcs/conf/sample_SAPMaxDB/
	■ HP-UX	SAPMaxDBTypes.cf
	■ Linux	
	■ Solaris	
VCS 5.x	■ AIX	/etc/VRTSagents/ha/conf/SAPMaxDB/
	■ HP-UX	SAPMaxDBTypes.cf
	■ Linux	
VCS 5.0	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes50.cf
VCS 5.1	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes51.cf

4 Click **Import**.

5 Save the VCS configuration.

The SAP MaxDB agent type is now imported to the VCS engine.

You can now create SAP MaxDB resources. For additional information about using the VCS GUI, refer to the *Veritas Cluster Server User's Guide*.

To import the agent types file using the Veritas Cluster Server command line interface (CLI), perform the following steps.

1 Log on to any one of the systems in the cluster as the superuser.

2 Create a temporary directory.

```
# mkdir ./temp

# cd ./temp
```

3 Copy the sample file Types.cf.

VCS 4.x	■ AIX	/etc/VRTSvcs/conf/sample_SAPMaxDB/
	■ HP-UX	SAPMaxDBTypes.cf
	■ Linux	
	■ Solaris	
VCS 5.x	■ AIX	/etc/VRTSagents/ha/conf/SAPMaxDB/
	■ HP-UX	SAPMaxDBTypes.cf
	■ Linux	

VCS 5.0	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes50.cf
VCS 5.1	■ Solaris SPARC and x64	/etc/VRTSagents/ha/conf/SAPMaxDB/ SAPMaxDBTypes51.cf

4 Create a dummy main.cf file:

```
# echo 'include "SAPMaxDBTypes.cf"' > main.cf
```

5 Create the SAP resource type as follows:

```
# hacf -verify .

# haconf -makerw

# sh main.cmd

# haconf -dump
```

The SAP MaxDB agent type is now imported to the VCS engine.

You can now create SAP MaxDB resources. For additional information about using the VCS CLI, refer to the *Veritas Cluster Server User's Guide*.

SAP MaxDB agent attributes

SAP MaxDB service is managed within a Veritas Cluster Server (VCS) environment. VCS uses software agents to control software services within a VCS cluster. To allow VCS to monitor and control the MaxDB service effectively, the service is managed with the agent for SAP MaxDB server.

VCS deploys agents to manage all components or resources of the same type. For example, a single Mount agent will be responsible for managing all mounted file systems that are under VCS control.

The agent attributes define the specific details that will be passed from the VCS engine to the agent to uniquely identify the specific resource component that is to be managed.

[Table 4-1](#) lists the attributes are that are passed to the SAPMaxDB agent.

Table 4-1 Required Attributes

Attribute Type and Dimension	Definition
ResLogLevel	<p>String used to set the ResLogLevel of each instance of a resource. This attribute should not be confused with the VCS generic LogLevel type-attribute, which controls the VCS engine log level on a per agent-type basis. The ResLogLevel attribute controls the amount of ACCLib VCS agent framework based logging that is written to the VCS log file on a per resource instance basis.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> ■ ERROR : Only Error level messages are logged. ■ WARN : Above plus warning level messages are logged. ■ INFO: Above plus informational level messages are logged. This is the default log level. ■ TRACE: Above plus trace level messages are logged. This is very verbose and should only be used during diagnostic operations. <p>Type and dimension: string-scalar</p> <p>Example: "TRACE"</p> <p>Default: "INFO"</p>
EnvFile	<p>Environments file for DBUser to be sourced before starting/stopping the MaxDB database server. Symantec recommends to keep the environments file on shared disk for easy maintenance.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: /home/sqderp/erpdbenv.csh</p>
DBHome	<p>Directory where the MaxDB database software is installed. This directory is needed to find the dbmcli and XServer executables.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: "/sapdb/programs/bin"</p>
DBUser	<p>Operating system user for MaxDB server. This user is responsible for starting and stopping the MaxDB database server. It must always be set to a value. In general this user takes the form sqd<DBName> or <DBName>adm.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: sqderp</p>

Table 4-1 Required Attributes (*continued*)

Attribute Type and Dimension	Definition
DBName	<p>Name of the MaxDB instance which contains a maximum of eight alphanumeric characters. Also called MaxDB SID. Only upper case letters are allowed and the first letter must be a character. This attribute is needed to uniquely identify the processes of the MaxDB database. When you use MaxDB with SAP systems the length of the DBName is three alphanumeric characters.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: ERP</p>
DBHost	<p>Description: Virtual hostname of the MaxDB database server.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: saperpdb</p>
DBMUserId String-Scalar	<p>Description: The Database Manager UserId used in the "dbmcli" to connect to the MaxDB database server.</p> <p>Type and dimension: string-scalar</p> <p>Example: control.</p> <p>Default: "control "</p>
DBMPassword	<p>Description: Password for the user <DBMUserId>.</p> <p>-store encrypted</p> <p>- agent to do decryption appropriately</p> <p>Use <code>vcsencrypt -agent</code> option to encrypt the password. If you are using VCS GUI to enter password no need to encrypt the password. VCS GUI will automatically encrypt password for you.</p> <p>Type and dimension: string-scalar</p> <p>Default: " "</p> <p>Example: jxpVmxMpkPlpMpnPo</p>

Table 4-2 lists the optional attributes

Table 4-2 Optional attributes

Attribute Type and Dimension	Definition
MonitorProgram	<p>Description: Full path and file name of an external, user-supplied monitor program. If specified, the monitor entry point will execute this file to perform an additional server state check. There are no restrictions for what actions the external monitor program performs to determine the state of a SAP MaxDB database. The only constraint is that the external monitor program must return one of the following integer values:</p> <ul style="list-style-type: none">■ 0 (server is online)■ 110 (server is online)■ 100 (server is offline)■ 1 (server is offline)■ 99 or any thing other than{0,1,110,100}(server state is unknown)■ Symantec recommends storing the external monitor program on the shared disk directory to ensure the file is always available on the online system. <p>Arguments are supported.</p> <p>Type and dimension: string-scalar</p> <p>Default: No default value</p> <p>Example1:</p> <p>/sapdb/data/db/wrk/ERP/mymonitor.sh</p> <p>Example2:</p> <p>/sapdb/data/db/wrk/ERP/mymonitor.sh arg1 arg2</p>

Table 4-2 Optional attributes (*continued*)

Attribute Type and Dimension	Definition
SecondLevelMonitor	<p>Used to enable second-level monitoring and specify how often it is run. Second-level monitoring is a deeper, more thorough state check of the configured SAP MaxDB instance. The numeric value specifies how often that the second-level monitoring routines are run. Zero (0) means never run the second-level monitoring routines. One (1) would mean to run it every monitor interval. Two (2) means to run the second-level monitoring routines every second monitor interval, and so on.</p> <p>Care should be taken when setting this attribute to large numbers. For example, if the MonitorInterval is set to 60 seconds, and the SecondLevelMonitor is set to 100, then the 'dbmcli' command for this attribute would only get executed every 100 minutes, which may not be as often as intended. In order to provide maximum flexibility, the value set is not checked for an upper limit. Thus, you could cause the SecondlevelMonitor command to run once a month, if that is what is desired.</p> <p>Type and dimension: integer-scalar</p> <p>Default: 0</p> <p>Example: 1</p>

Table 4-2 Optional attributes (continued)

Attribute Type and Dimension	Definition
ContainerInfo	<p>This attribute defines the non-global zone support for VCS 5.1 on Solaris.</p> <p>It specifies if you can use the service group with the container.</p> <p>Assign the following values to the ContainerInfo attribute:</p> <p>Name: The name of the container. For example, sapmaxdb-zone1</p> <p>Type: The type of the container. Set this to Zone.</p> <p>Enabled: If you want to enable the container, specify the value as 1. Else specify it as 0.</p> <p>For more details refer to <i>Veritas Cluster Server User's Guide</i></p> <p>Type and dimension: string-association</p> <p>Example: {Name=sapmaxdb-zone1, Type=Zone, Enabled=1}</p> <p>Default: ""</p>
ContainerName	<p>This attribute defines the non-global zone support for VCS 5.0 on Solaris. It defines the name of the non-global zone.</p> <p>For more details refer to, <i>Veritas Cluster Server User's Guide</i>.</p> <p>Type and dimension: string-association</p> <p>Example: {Name=sapmaxdb-zone1, Type=Zone, Enabled=1}</p>

When you create a database instance, you define the name of the database instance (database name).

The following restrictions apply:

- The maximum length of a database name is 8 characters.
- The database name may only contain characters from the 7-Bit ASCII character set.
- The database name must not begin with an underscore or a period.

- When you create a database instance, the database system automatically changes all lowercase letters in the database name into uppercase letters.

Executing a customized monitoring program

The monitor function can execute a customized monitoring utility to perform an additional SAP MaxDB server state check.

The monitor function executes the utility specified in the MonitorProgram attribute if the following conditions are satisfied:

- The specified utility is a valid executable file.
- The first level process check indicates that the SAP MaxDB instance is online.
- The SecondLevelMonitor attribute is either set to 0 or 1, and the second level check indicates that the SAP MaxDB instance is online.

110 or 0	SAP MaxDB server instance is online
100 or 1	SAP MaxDB server instance is offline
99	SAP MaxDB server instance is unknown
Any other value	SAP MaxDB server instance is unknown

Configuring the service groups for SAP MaxDB

This chapter includes the following topics:

- [About configuring service groups for SAP MaxDB](#)
- [Before configuring the service groups for SAP MaxDB](#)
- [Configuring service groups for SAP MaxDB](#)

About configuring service groups for SAP MaxDB

Configuring the SAP MaxDB service group involves creating the SAP MaxDB service group, its resources, and defining attribute values for the configured resources. You must have administrator privileges to create and configure a service group.

You can configure the service groups using one of the following:

- The Cluster Manager (Java console)
- Veritas Operations Manager
- The command-line

See [“Configuring service groups for SAP MaxDB”](#) on page 50.

Before configuring the service groups for SAP MaxDB

Before you configure the SAP MaxDB service group, you must:

- Verify that VCS is installed and configured on all nodes in the cluster where you will configure the service group.

Refer to the *Veritas Cluster Server Installation Guide* for more information.

- Verify that SAP MaxDB is installed and configured identically on all nodes in the cluster.
 See [“About installing SAP MaxDB for high availability”](#) on page 27.
 See [“About configuring SAP MaxDB for high availability”](#) on page 27.
- Verify that the Veritas agent for SAP MaxDB is installed on all nodes in the cluster.
 See [“Installing the agent in a VCS environment”](#) on page 33.

Configuring service groups for SAP MaxDB

While setting up a cluster, you must always ensure that the cluster has some spare capacity to handle the SAP MaxDB failover scenarios. For example, in case of a backend database failure, the cluster must be able to run another database instance in conjunction with other running applications.

See *Veritas Cluster Server Installation and Configuration Guide*.

The cluster should be able to provide application failover by encapsulating the resources required for an application into a service group. A service group is a virtualized application that can switch between the cluster nodes. It contains a set of dependent resources, such as disk groups, disk volumes, file systems, IP addresses, NIC cards, and dependent application processes. It also includes logic about the dependencies between the application components.

These service groups should thus be configured such that the cluster can start, stop, monitor, and switch the service groups between the nodes, depending upon the server faults or resource faults. An administrator should also be proactively able to move a service group between cluster nodes to perform preventative maintenance or apply patches.

Perform the following steps to add a service group for SAP MaxDB

- 1 Create a service group for SAP MaxDB.

```
# hagrpl -add SAP76-DBS
```

For more details on creating a service group refer to, *Veritas Cluster Server User's Guide*.

- 2 Modify the SystemList attribute for the group, to add systems.

For example,

```
# hagrpl -modify SAP76-DBS SystemList vc55x074 0 vc55x075 1
```

- 3** Create resources for NIC, IP, DiskGroup, Volume and Mount in the service group.

```
# hares -add SAP76-DBS_nic NIC SAP76-DBS
```

```
# hares -add SAP76-DBS_ip IP SAP76-DBS
```

For more details on creating and modifying resource attributes for NIC, IP, DiskGroup, Volume and Mount refer to, *Bundled Agents Reference Guide*.

- 4** Create links between the resources.

```
# hares -link SAP76-DBS_ip SAP76-DBS_nic
```

- 5** Create SAPMaxDB resource for SAP MaxDB database server.

```
# hares -add SAP76-DBS_db SAPMaxDB SAP76-DBS
```

Based on the SAP MaxDB database server instance you are clustering, modify the resource attributes.

For more information on agent attributes,

[SAP MaxDB agent attributes](#)

- 6** Create resource dependencies for SAPMaxDB resource.

The SAPMaxDB resource depends on the IP and Mount resources.

```
# hares -link SAP76-DBS_db SAP76-DBS_ip
```

```
# hares -link SAP76-DBS_db SAP76-DBS_mnt
```

- 7** Verify the final resource dependencies for SAP MaxDB server group.

```
# hares -dep
```

for example,

Group	Parent	Child
SAP76-DBS	SAP76-DBS_db	SAP76-DBS_mnt
SAP76-DBS	SAP76-DBS_db	SAP76-DBS_ip
SAP76-DBS	SAP76-DBS_ip	SAP76-DBS_nic
SAP76-DBS	SAP76-DBS_mnt	SAP76-DBS_vol
SAP76-DBS	SAP76-DBS_vol	SAP76-DBS_dg

Troubleshooting the agent for SAP MaxDB

This chapter includes the following topics:

- [Meeting prerequisites](#)
- [Starting the SAP MaxDB instance outside a cluster](#)
- [Reviewing error log files](#)

Meeting prerequisites

Before installing the agent for SAP MaxDB, double check that you meet the prerequisites.

For example, you must install the ACC library on VCS before installing the agent for SAP MaxDB.

See [“Before you install the Veritas agent for SAP MaxDB”](#) on page 31.

Starting the SAP MaxDB instance outside a cluster

If you face problems while working with a resource, you must disable the resource within the cluster framework. A disabled resource is not under the control of the cluster framework, and so you can test the SAP MaxDB instance independent of the cluster framework. Refer to the cluster documentation for information about disabling a resource.

You can then restart the SAP MaxDB instance outside the cluster framework.

Note: Use the same parameters that the resource attributes define within the cluster framework while restarting the resource outside the cluster framework.

A sample procedure to start a SAP instance outside the cluster framework, is illustrated as follows.

To restart the SAP instance outside the cluster framework

- 1 Log in as superuser.
- 2 Use the DBUser attribute to log in to the SAP server.

```
# su DBUser
$ USER=DBUser; LOGNAME=DBUser; HOME=/home/DBUser
$ export USER LOGNAME HOME
$ . EnvFile
```

For certain shell versions on AIX, LOGNAME is read-only.

- 3 Start the SAPMaxDB server instance, using the following command:

```
$ DBHome/dbmcli -d DBName -n DBHost -u DBMUserId,DBMPassword db_online
```

- 4 Ensure that the SAPMaxDB instance is running successfully by running the grep command for DBName.

For example, for SAPMaxDB server instance ERP run the following command:

```
$ ps -ef | grep ERP
```

The kernel processes run on the system for MaxDB server.

If the SAP MaxDB server instance is running outside the cluster framework, you can attempt to restart the SAP MaxDB server within the cluster framework by enabling the MaxDB cluster resource.

Reviewing error log files

If you face problems while using SAP MaxDB or the agent for SAP MaxDB, use the log files described in this section to investigate the problems.

Using SAP MaxDB log files

If a SAP MaxDB database server is facing problems, you can access the server log files to further diagnose the problem. The SAP MaxDB log files are located in the /sapdb/data/wrk/<DBName> directory.

Reviewing cluster log files

In case of problems while using the agent for SAP MaxDB, you can access the engine log file for more information about a particular resource. The engine log file is located at `/var/VRTSvcS/log/engine_A.log`.

Additionally, you can also refer to the latest SAPMaxDB agent log files located at `/var/VRTSvcS/log/SAPMaxDB_A.log`

Note: Include both these log files while addressing the problem to Symantec support team.

Using trace level logging

The `ResLogLevel` attribute controls the level of logging that is written in a cluster log file for each SAP MaxDB resource. You can set this attribute to `TRACE`, which enables very detailed and verbose logging.

If you set `ResLogLevel` to `TRACE`, a very high volume of messages are produced. Symantec recommends that you localize the `ResLogLevel` attribute for a particular resource.

Note: Starting with version 5.1.1.0 of the ACC library, the `TRACE` level logs for any `ACCLib` based agent are generated locally at the location `/var/VRTSvcS/log/Agent_A.log`.

Warning: You may consider to temporarily increase the timeout values for SAPMaxDB for debugging purposes. After the debugging process is complete, you can revert back to the original timeout values.

To localize `ResLogLevel` attribute for a resource

- 1 Identify the resource for which you want to enable detailed logging.
- 2 Localize the `ResLogLevel` attribute for the identified resource:

```
# hares -local Resource_Name ResLogLevel
```

- 3 Set the `ResLogLevel` attribute to `TRACE` for the identified resource:

```
# hares -modify Resource_Name ResLogLevel TRACE -sys SysA
```

- 4 Note the time before you begin to operate the identified resource.

- 5 Test the identified resource. The function reproduces the problem that you are attempting to diagnose.
- 6 Note the time when the problem is reproduced.
- 7 Set the ResLogLevel attribute back to INFO for the identified resource:

```
# hares -modify Resource_Name ResLogLevel INFO -sys SysA
```

- 8 Review the contents of the log file. Use the time noted in Step 4 and Step 6 to diagnose the problem.

You can also contact Symantec support for more help.

Sample Configurations

This appendix includes the following topics:

- [About sample configurations for the agent for SAP MaxDB](#)
- [Sample agent type definition For MaxDB](#)
- [Sample SAP MaxDB resource configuration for VCS](#)
- [Sample service group configuration for SAP MaxDB](#)

About sample configurations for the agent for SAP MaxDB

The sample configuration graphically depicts the resource types, resources, and resource dependencies within the service group. Review these dependencies carefully before configuring the agent for SAP MaxDB. For more information about these resource types, see the *Veritas Cluster Server Bundled Agents Reference Guide*.

Sample agent type definition For MaxDB

For VCS 4.1

```
type SAPMaxDB (  
    static str ArgList[] = { ResLogLevel, State, IState, EnvFile,  
        DBHome, DBUser,      DBName, DBHost, DBMUserId, DBMPassword,  
        SecondLevelMonitor,      MonitorProgram }  
    str ResLogLevel = "INFO"  
    str EnvFile  
    str DBHome  
    str DBUser
```

```
str DBName
str DBHost
str DBMUserId = "control"
str DBMPassword
int SecondLevelMonitor
str MonitorProgram)
```

For VCS 5.0

```
type SAPMaxDB (
    static str AgentDirectory =    "/opt/VRTSagents/ha/bin/SAPMaxDB"
    static str AgentFile = "/opt/VRTSvcs/bin/Script50Agent"

    static str ArgList[] = { ResLogLevel, State, IState,
        EnvFile, DBHome, DBUser, DBName, DBHost, DBMUserId,
        DBMPassword, SecondLevelMonitor, MonitorProgram }
    str ResLogLevel = "INFO"
    str EnvFile
    str DBHome
    str DBUser
    str DBName
    str DBHost
    str DBMUserId = "control"
    str DBMPassword
    int SecondLevelMonitor
    str MonitorProgram
)
```

Sample SAP MaxDB resource configuration for VCS

A sample resource configuration for SAP MaxDB is as follows:

```
SAPMaxDB Resource_MaxDB (
    ResLogLevel      = INFO
    EnvFile          = /home/sqderp/erpdbenv.csh
    DBHome           = /sapdb/programs/bin
    DBUser           = sqderp
    DBName           = ERP
    DBHost           = saperpdb
    DBMUserId        = control
    DBMPassword      = xdfaasaskfaasei
    SecondLevelMonitor = 0
```

```
MonitorProgram      = /sapdb/data/wrk/ERP/mymonitor.sh
)
```

Sample service group configuration for SAP MaxDB

Create SAP MaxDB resource using VCS GUI.

Figure A-1 shows a sample configuration of VCS resource for the SAP MaxDB Server.

Figure A-1 SAP MaxDB service group configuration

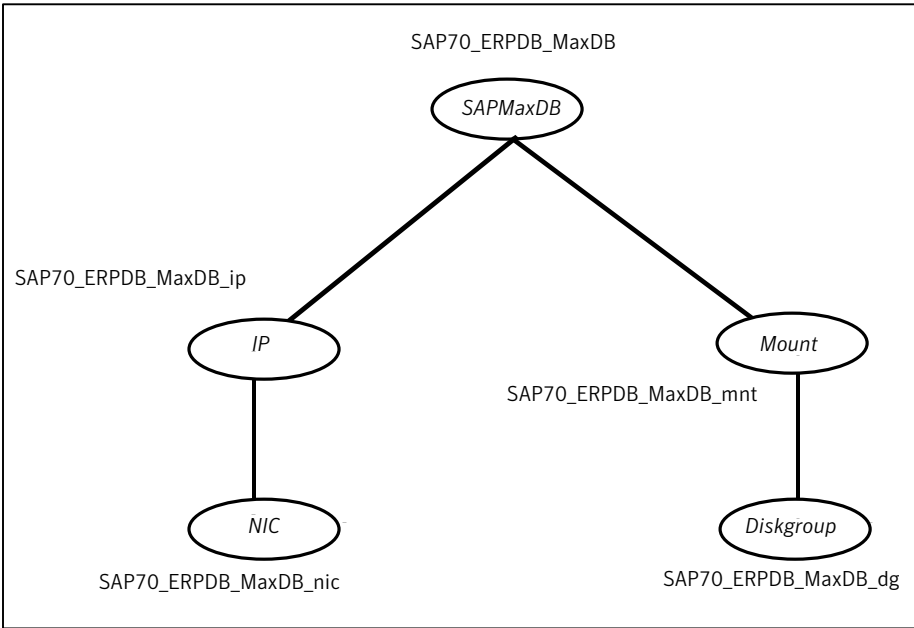


Table A-1 depicts a typical resource configuration for SAPMaxDB.

Table A-1 SAPMaxDB resource configuration

Attribute	Value
ResLogLevel	INFO
EnvFile	/home/sqderp/saperpdb.csh
DBHome	/sapdb/programs/bin
DBUser	sqderp

Table A-1 SAPMaxDB resource configuration (continued)

Attribute	Value
DBName	ERP
DBHost	saperpdb
DBMUserId	control
DBMPassword	iwoUlwLojOkoLomOn
SecondLevelMonitor	0
MonitorProgram	

Changes introduced in previous releases

This appendix includes the following topics:

- [Changes introduced in previous releases](#)

Changes introduced in previous releases

The enhancements in the previous releases of SAP MaxDB agent are as follows:

- Added support for SAP MaxDB 7.8
- Added support for VCS 5.1 on AIX, Linux, and Solaris.
- Added support for AIX 6.1 on p-series
- Added support for special characters in the passwords
- Added support for HP-UX 11i v3
- Added support for RHEL 5.0 and SuSE 10.0
- Added support for Solaris 10 x64

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