

Veritas™ Cluster Server Agent for DB2 Installation and Configuration Guide

HP-UX 11i v3

5.0.1



Veritas™ Cluster Server Agent for DB2 Installation and Configuration Guide

The software described in this book is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

Product version: 5.0.1

Document version: 5.0.1.0

Legal Notice

Copyright © 2009 Symantec Corporation. All rights reserved.

Symantec, the Symantec Logo, Veritas, Veritas Storage Foundation are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

The product described in this document is distributed under licenses restricting its use, copying, distribution, and decompilation/reverse engineering. No part of this document may be reproduced in any form by any means without prior written authorization of Symantec Corporation and its licensors, if any.

THE DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. SYMANTEC CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, PERFORMANCE, OR USE OF THIS DOCUMENTATION. THE INFORMATION CONTAINED IN THIS DOCUMENTATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

The Licensed Software and Documentation are deemed to be commercial computer software as defined in FAR 12.212 and subject to restricted rights as defined in FAR Section 52.227-19 "Commercial Computer Software - Restricted Rights" and DFARS 227.7202, "Rights in Commercial Computer Software or Commercial Computer Software Documentation", as applicable, and any successor regulations. Any use, modification, reproduction release, performance, display or disclosure of the Licensed Software and Documentation by the U.S. Government shall be solely in accordance with the terms of this Agreement.

Symantec Corporation
350 Ellis Street
Mountain View, CA 94043
<http://www.symantec.com>

Technical Support

Symantec Technical Support maintains support centers globally. Technical Support's primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

Symantec's maintenance offerings include the following:

- A range of support options that give you the flexibility to select the right amount of service for any size organization
- Telephone and Web-based support that provides rapid response and up-to-the-minute information
- Upgrade assurance that delivers automatic software upgrade protection
- Global support that is available 24 hours a day, 7 days a week
- Advanced features, including Account Management Services

For information about Symantec's Maintenance Programs, you can visit our Web site at the following URL:

www.symantec.com/techsupp/

Contacting Technical Support

Customers with a current maintenance agreement may access Technical Support information at the following URL:

www.symantec.com/techsupp/

Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system

- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
 - Error messages and log files
 - Troubleshooting that was performed before contacting Symantec
 - Recent software configuration changes and network changes

Licensing and registration

If your Symantec product requires registration or a license key, access our technical support Web page at the following URL:

www.symantec.com/techsupp/

Customer service

Customer service information is available at the following URL:

www.symantec.com/techsupp/

Customer Service is available to assist with the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information about product updates and upgrades
- Information about upgrade assurance and maintenance contracts
- Information about the Symantec Buying Programs
- Advice about Symantec's technical support options
- Nontechnical presales questions
- Issues that are related to CD-ROMs or manuals

Documentation feedback

Your feedback on product documentation is important to us. Send suggestions for improvements and reports on errors or omissions. Include the title and document version (located on the second page), and chapter and section titles of the text on which you are reporting. Send feedback to:

clustering_docs@symantec.com

Maintenance agreement resources

If you want to contact Symantec regarding an existing maintenance agreement, please contact the maintenance agreement administration team for your region as follows:

Asia-Pacific and Japan	customercare_apac@symantec.com
Europe, Middle-East, and Africa	semea@symantec.com
North America and Latin America	supportolutions@symantec.com

Additional enterprise services

Symantec offers a comprehensive set of services that allow you to maximize your investment in Symantec products and to develop your knowledge, expertise, and global insight, which enable you to manage your business risks proactively.

Enterprise services that are available include the following:

Symantec Early Warning Solutions	These solutions provide early warning of cyber attacks, comprehensive threat analysis, and countermeasures to prevent attacks before they occur.
Managed Security Services	These services remove the burden of managing and monitoring security devices and events, ensuring rapid response to real threats.
Consulting Services	Symantec Consulting Services provide on-site technical expertise from Symantec and its trusted partners. Symantec Consulting Services offer a variety of prepackaged and customizable options that include assessment, design, implementation, monitoring, and management capabilities. Each is focused on establishing and maintaining the integrity and availability of your IT resources.
Educational Services	Educational Services provide a full array of technical training, security education, security certification, and awareness communication programs.

To access more information about Enterprise services, please visit our Web site at the following URL:

www.symantec.com

Select your country or language from the site index.

Contents

Technical Support	4	
Chapter 1	Introducing the Veritas™ Cluster Server Agent for DB2	11
	About the Veritas™ Cluster Server Agent for DB2	11
	How Veritas™ Cluster Server Agent for DB2 makes DB2 highly available	12
	What's new in this release	12
	Supported software for VCS Agent for DB2	12
	About agent functions VCS Agent for DB2	13
	About the online agent function for VCS Agent for DB2	13
	About the offline agent function for VCS Agent for DB2	13
	About the monitor agent function for VCS Agent for DB2	13
	About the clean agent function for VCS Agent for DB2	14
	About the info agent function for VCS Agent for DB2	14
	About the action agent function for VCS Agent for DB2	15
	About running the info agent function to get database information for VCS Agent for DB2	15
	Typical DB2 configuration in a VCS cluster	16
	Road map for setting up DB2 UDB in a VCS environment	17
Chapter 2	Installing and configuring DB2	19
	VCS requirements for installing DB2	19
	Preparing to install DB2 UDB non-MPP versions	19
	Preparing to install DB2 UDB MPP versions	20
	Creating the file systems for non-MPP instances for DB2	21
	Creating the shared file systems for MPP instances for DB2	22
	Defining user and group accounts for DB2	23
	Installing DB2 in a VCS environment	24
	Setting up the DB2 configuration	25
	Checking /etc/services for DB2	25
	Creating \$DB2InstHome/.rhosts for DB2	26
	Modifying the \$DB2InstHome/sql/lib/db2nodes.cfg file for DB2	26
	Confirming the DB2 installation	27

Chapter 3	Installing and removing the Veritas™ Cluster Server Agent for DB2	29
	Before you install or upgrade the VCS Agent for DB2	29
	Installing the VCS Agent for DB2	30
	Installing the VCS agent for DB2 software	31
	Removing the VCS Agent for DB2	31
Chapter 4	Configuring VCS service groups for DB2	33
	About configuring service groups for DB2	33
	About DB2 configurations in VCS	34
	Non-MPP configuration service groups for DB2	34
	MPP configuration service groups for DB2	35
	Before configuring the service group for DB2	36
	Importing the Db2udbTypes.cf file	36
	Configuring the VCS Agent for DB2 from Cluster Manager (Java Console)	38
	Adding service group for DB2 MPP using the Cluster Manager (Java Console)	38
	Adding a service group for DB2 non-MPP with the Cluster Manager (Java Console)	40
	Configuring the VCS Agent for DB2 by editing the main.cf file	42
	Configuring the agent to use the DB2 MPP configuration	42
	Configuring the agent to use the DB2 non-MPP configurations	43
	Verifying the configuration for VCS Agent for DB2	45
	Setting up in-depth monitoring of a DB2 instance	46
	Enabling in-depth monitoring of a DB2 instance	46
	Enabling in-depth monitoring from the command line for DB2	46
	Handling DB2 error codes during in-depth monitoring	47
	Disabling in-depth monitoring for DB2	48
Chapter 5	Administering VCS service groups for DB2	51
	About administering service groups for DB2	51
	Bringing the DB2 service group online	51
	Taking the DB2 service group offline	52
	Switching the DB2 service group	52
	Disabling the agent for DB2	52

Appendix A	Troubleshooting Veritas™ Cluster Server Agent for DB2	55
	Creating a db2profile for environment variables for DB2	55
	Setting the RestartLimit attribute for VCS Agent for DB2	56
Appendix B	Resource type information for Veritas™ Cluster Server Agent for DB2	57
	About the resource type definitions for DB2	57
	DB2 UDB type definition file: Db2udbTypes.cf on HP-UX	57
Appendix C	Resource type attributes for DB2	59
	Db2udb resource type attributes	59
Index	63

Introducing the Veritas™ Cluster Server Agent for DB2

This chapter includes the following topics:

- [About the Veritas™ Cluster Server Agent for DB2](#)
- [How Veritas™ Cluster Server Agent for DB2 makes DB2 highly available](#)
- [What's new in this release](#)
- [Supported software for VCS Agent for DB2](#)
- [About agent functions VCS Agent for DB2](#)
- [Typical DB2 configuration in a VCS cluster](#)
- [Road map for setting up DB2 UDB in a VCS environment](#)

About the Veritas™ Cluster Server Agent for DB2

The Veritas™ Cluster Server Agent for DB2, version 5.0.1, for DB2 UDB is a high availability solution for the relational database management system.

This guide describes the agent for DB2 UDB, its modes of operation, and its attributes. It describes how to install and configure the agent. It also describes how to administer service groups where the resource runs.

How Veritas™ Cluster Server Agent for DB2 makes DB2 highly available

The agent monitors DB2 UDB database processes at the partition level. If the system fails, the agent detects the failure and takes the applicable database partition offline. VCS moves the failed instances to another node in the cluster, where the agent brings the database partition or partitions online.

The agent performs different levels of monitoring and different actions, which you can configure. You can also configure many of the actions that the agent can perform.

See [“About agent functions VCS Agent for DB2”](#) on page 13.

What's new in this release

This release introduces support for the VCS agent for DB2.

Supported software for VCS Agent for DB2

The Veritas™ Cluster Server Agent for DB2, version 5.0.1, supports the DB2 Universal Database Enterprise Server Edition (ESE).

For the ESE multi-partition instance, it supports both of the following configurations:

- Symmetric Multiprocessing (SMP) hardware configuration
- Massively Parallel Processing (MPP) hardware configuration

The agent for DB2 ESE must support the following platforms for single and multi-partition instances.

Table 1-1 Supported operating systems and versions

Operating system	DB2 UDB version
HP-UX 11i version 3.0	9.1 and 9.5

The memory requirements vary for different versions of DB2 being used. Check the relevant IBM DB2 guide for information about memory requirements.

About agent functions VCS Agent for DB2

The agent can perform different operations or functions on the database. These functions are online, offline, monitor, clean, info, and action. With the action agent function, you can add custom actions for the agent.

For information on how to define custom actions, refer to the *Veritas Cluster Server Agent Developer's Guide*.

Note: On IA-64, the default awk command may produce this error: Input line /usr/bin:/bin:/usr/s cannot be longer than 3,000 bytes. The source line number is 1. To fix this, install GNU awk.

About the online agent function for VCS Agent for DB2

The agent uses the `db2gcf` program to start a DB2 instance or database partition. The command is:

```
su $DB2InstOwner -c "$InstHome/sqlllib/bin/db2gcf -u -i  
$DB2InstOwner -p $nodenum
```

This agent can also use the `db2start` command to start all DB2 partitions.

About the offline agent function for VCS Agent for DB2

The agent uses the `db2gcf` program to stop a DB2 database partition. For a database with only one partition, it stops the instance. The command is:

```
su $DB2InstOwner -c "$InstHome/sqlllib/bin/db2gcf -d -i  
$DB2InstOwner -p $nodenum
```

The agent can also use the `db2stop` command to stop all DB2 partitions.

About the monitor agent function for VCS Agent for DB2

The agent executes the `db2gcf -s -i $DB2InstOwner -p $nodenum` command to check the status of the database partition or node number. If the exit status of the `db2gcf` command is 0, the monitor returns the exit code 110. Otherwise, the monitor returns an exit code of 100 and the resource is taken offline. The agent then restarts or fails over the resource. This action depends on other type-independent attributes, such as `RestartLimit` or `ToleranceLimit`.

Set the `IndepthMonitor` attribute to 1 for in-depth monitoring. The agent looks for the `monitor_custom_$db2instance_$nodenum` file in the

/opt/VRTSagents/ha/bin/Db2udb directory. It executes this customized in-depth monitor file, if the file exists and is executable. You can find samples of custom monitor scripts in the /etc/VRTSagents/ha/conf/sample_db2udb directory.

If the custom monitor has any errors or problems, it checks the value of the WarnOnlyIfDBQueryFailed attribute of the Db2udb agent. If you have a db2error.dat file in the /opt/VRTSagents/ha/bin/Db2udb directory, the agent checks this file, and handles the error according to the error configuration.

See [“Handling DB2 error codes during in-depth monitoring”](#) on page 47.

If you set the WarnOnlyIfDBQueryFailed attribute to 1 (its default), and you have configured the Notifier resource, the agent performs the following actions:

- Sends a notification
- Returns the exit code 110

If you set the WarnOnlyIfDBQueryFailed attribute to 0, it performs error handling in the db2error.dat file. Note that the file needs to exist to perform error handling. If it does not exist, it returns the exit code 100, which is the default.

About the clean agent function for VCS Agent for DB2

The agent first uses the `db2stop` command with the `force` option. If the command is unable to clean the agent function, the agent then uses the `db2_kill` script to kill the instance. If the `db2_kill` script fails, the `kill -9` command is invoked.

```
su $DB2InstOwner -c "$InstHome/sqlllib/bin/db2stop force  
nodenum $nodenum"
```

About the info agent function for VCS Agent for DB2

The agent supports the `info` function, which provides static and dynamic information about the database partition and its critical processes.

For more information about the Info agent function, see the following guides:

- *Veritas Cluster Server Administrator's Guide*
- *Veritas Cluster Server Agent Developer's Guide*

See [“About running the info agent function to get database information for VCS Agent for DB2”](#) on page 15.

About the action agent function for VCS Agent for DB2

The agent for DB2 supports the action function, which enables you to perform predefined actions or custom actions on a resource. To perform an action on a resource, type the following command:

```
# hares -action res token [-actionargs arg1 ...]  
[-sys system] [-rclus cluster]
```

The agent supports the following predefined actions:

- The `VRTS_GetInstanceName` token retrieves the DB2 instance name of the configured `Db2udb` resource.
- The `VRTS_GetRunningServices` token retrieves the list of processes that the agent monitors for the `Db2udb` resource.

For example:

```
# hares -action db2udb1 VRTS_GetInstanceName -sys systemName
```

```
VCS NOTICE V-16-13323 Resource (db2udb0): action  
(VRTS_GetInstanceName) completed successfully. Output is:
```

```
db2inst1
```

```
# hares -action db2udb0 VRTS_GetRunningServices -sys systemName
```

```
VCS NOTICE V-16-13323 Resource (db2udb0): action  
(VRTS_GetRunningServices) completed successfully. Output is:
```

```
PARTITION: 0
```

```
PID TTY TIME CMD
```

```
9800 ? 0:06 db2sysc
```

About running the info agent function to get database information for VCS Agent for DB2

You can run the info agent function to return database information. In this example, the info agent function retrieves the database information.

To retrieve database information

- 1 Make the configuration writable:

```
# haconf -makerw
```

- 2 Specify the periodic interval in seconds that the info agent function is invoked. The default value of 0 means info agent function is not invoked.

```
# hatype -modify Db2udb InfoInterval 300
```

In this command, Db2udb is the name of the DB2 resource type. InfoInterval 300 is the duration (in seconds) after which the info agent function executes the info script. The script gets the processes' information that the agent monitors.

- 3 Show the requested ResourceInfo value. The following example output shows the processes that the agent monitors for the DB2 resource.

Note that ResourceInfo refreshes every 300 seconds (five minutes), since you set the InfoInterval to 300 in the previous step.

```
# hares -value db2udb1 ResourceInfo
```

```
State Valid
```

```
Msg
```

```
PARTITION: 0
```

PID	TTY	TIME	CMD
413924	-	0:00	db2sysc

```
TS Fri Jan 14 18:11:52 2005
```

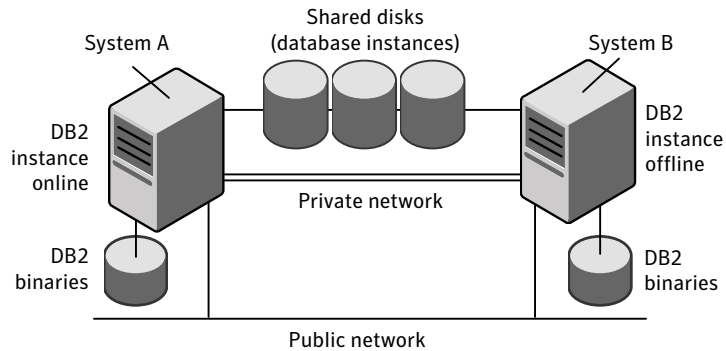
Typical DB2 configuration in a VCS cluster

DB2 UDB is configured on a two-system cluster. DB2 UDB system binaries are installed identically on local file systems on System A and System B. The instance home directory, instance binaries, and the database reside on shared storage, available to either node.

In the case of the non-MPP configuration, an instance is online on only one system at a time. The other system is the failover system.

[Figure 1-1](#) shows a DB2 installation with a non-MPP configuration.

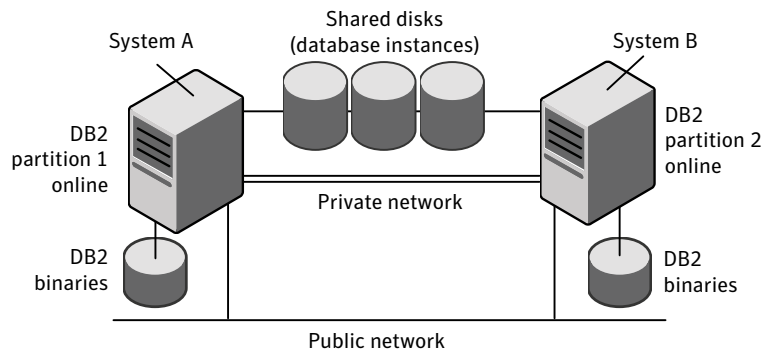
Figure 1-1 DB2 installation with a non-MPP configuration



In the case of the MPP configuration, a database partition can run on each system and each system can become a failover system.

[Figure 1-2](#) shows a DB2 installation with an MPP configuration.

Figure 1-2 DB2 installation with an MPP configuration



Road map for setting up DB2 UDB in a VCS environment

Review the following tasks and information:

- Check the supported software.
See [“Supported software for VCS Agent for DB2”](#) on page 12.
- Review the agent functions.
See [“About agent functions VCS Agent for DB2”](#) on page 13.
- Check the agent requirements.

See [“VCS requirements for installing DB2”](#) on page 19.

- Install and set up DB2.

See [“Installing DB2 in a VCS environment”](#) on page 24.

See [“Setting up the DB2 configuration”](#) on page 25.

- Install the VCS agent for DB2.

See [“Installing the VCS Agent for DB2”](#) on page 30.

- Configure the service groups for the VCS agent for DB2.

See [“Configuring the VCS Agent for DB2 from Cluster Manager \(Java Console\)”](#) on page 38.

- Optionally, configure in-depth monitoring and any automated actions.

See [“Setting up in-depth monitoring of a DB2 instance”](#) on page 46.

- Bring the service group online.

See [“Bringing the DB2 service group online”](#) on page 51.

Installing and configuring DB2

This chapter includes the following topics:

- [VCS requirements for installing DB2](#)
- [Installing DB2 in a VCS environment](#)
- [Setting up the DB2 configuration](#)

VCS requirements for installing DB2

Perform the following tasks before you install:

- Review preparing to install DB2 UDB non-MPP versions.
See [“Preparing to install DB2 UDB non-MPP versions”](#) on page 19.
- Review preparing to install DB2 UDB MPP versions.
See [“Preparing to install DB2 UDB MPP versions”](#) on page 20.
- Create the file systems for non-MPP instances.
See [“Creating the file systems for non-MPP instances for DB2”](#) on page 21.
- Create the shared file systems for MPP instances.
See [“Creating the shared file systems for MPP instances for DB2”](#) on page 22.
- Define user and group accounts.
See [“Defining user and group accounts for DB2”](#) on page 23.

Preparing to install DB2 UDB non-MPP versions

Review the following list:

- Verify that all nodes in the cluster have adequate resources to run DB2 and VCS.
- Make sure that you meet the VCS requirements to install.
- Define DB2 UDB user and group accounts.
See [“Defining user and group accounts for DB2”](#) on page 23.
For your particular version of DB2 UDB, refer to the appropriate DB2 UDB guide.
- Install the DB2 UDB system binaries locally.
- Install the DB2 UDB database instances on shared storage.
- Install and configure VCS version 5.0.1 on all nodes in the cluster. For installation instructions, refer to the *Veritas Cluster Server Installation Guide*.

Preparing to install DB2 UDB MPP versions

Review the following list:

- Verify that all systems have enough resources to run DB2 UDB. An example of this kind of resource is shared memory. Check the memory requirements, which vary due to the version and the hardware configuration of DB2.
- Define DB2 UDB user and group accounts.
See [“Defining user and group accounts for DB2”](#) on page 23.
For your particular version of DB2 UDB, refer to the appropriate DB2 UDB guide.
- Install the DB2 UDB system binaries on the local file systems on each system.
- Install the DB2 UDB database instances on shared storage.
- Install and configure VCS version 5.0.1 on all nodes in the cluster. For installation instructions, refer to the *Veritas Cluster Server Installation Guide*.
- The MPP configuration requires the Storage Foundation Cluster File System software.

This software includes the following:

- Veritas Cluster Server (VCS)
- Veritas Volume Manager with cluster functionality enabled (CVM)
Veritas Storage Foundation Cluster File System Installation Guide.
- Veritas File System with cluster functionality enabled (CFS)
Veritas Storage Foundation Cluster File System Administration Guide.

Creating the file systems for non-MPP instances for DB2

To create a file system for non-MPP instances, you first create a disk group on the physically shared disk. You then create a volume of sufficient size within the disk group.

To create a file system for non-MPP instances on HP-UX

- 1 Create a disk group on the shared disk. List the disks using the `vxdisk list` command. In this case the group consists of one disk, `/dev/disk/disk19`. For example:

```
# vxdg init db2db_dg /dev/disk/disk19
```

Deport and import the disk group:

```
# vxdg deport db2db_dg
# vxdg import db2db_dg
```

- 2 Create a 3 GB volume on a disk group using the `vxassist` command:

```
# vxassist -g db2db_dg make db2db_vol 3g
```

- 3 Create the file system:

```
# mkfs -V vxfs -o largefiles /dev/vx/dsk/db2db_dg/db2db_vol
```

- 4 Create the mount point directory and mount the file system. Make sure that the mount point exists on all nodes in the cluster on the local file system—not on shared storage.

```
# mkdir /db2_mnt/db2inst1
# mount -V vxfs /dev/vx/dsk/db2db_dg/db2db_vol \
/db2_mnt/db2inst1
```

- 5 Create the mount point directory and mount the file system. Make sure that the mount point exists on all nodes in the cluster on the local file system—not on shared storage.

```
# mkdir /db2_mnt/db2inst1
# mount -F vxfs /dev/vx/dsk/db2db_dg/db2db_vol \
/db2_mnt/db2inst1
```

Creating the shared file systems for MPP instances for DB2

Install the Storage Foundation Cluster File System software. To create a shared file system for MPP instances, create a shared disk group on the physically shared disk. You then create a volume of sufficient size within the disk group.

To create a shared file system for MPP instances on HP-UX

- 1 You must issue the commands to create a shared disk group from the CVM master node. To determine whether a node is the master or the slave, enter the command:

```
# vxdctl -c mode
```

In the output, look for:

```
cluster active - MASTER
```

Or

```
cluster active - SLAVE
```

- 2 From the master node, create the disk group. List the disks using the `vxdisk list` command.
- 3 Create a shared disk group. In this case, the group consists of one disk. In this example the disk is `/dev/disk/disk20`:

```
# vxdg -s init db2db_dg /dev/disk/disk20
```

- 4 Deport and import the disk group:

```
# vxdg deport db2db_dg  
# vxdg -s import db2db_dg
```

- 5 Use the `vxassist` command to create a 7-GB volume:

```
# vxassist -g db2db_dg make db2db_vol 7g
```

- 6 Create the file system:

```
# mkfs -V vxfs -o largefiles /dev/vx/rdisk/db2db_dg/db2db_vol
```

- 7 Create the mount point directory and mount the file system.

```
# mkdir /db2_mnt/db2inst1  
# mount -V vxfs -o cluster /dev/vx/dsk/db2db_dg/db2db_vol \  
/db2_mnt/db2inst1
```

Defining user and group accounts for DB2

Before you install DB2 UDB binaries and create instances, you must define DB2 UDB user and group accounts for each instance on each system.

Note the following requirements:

- The IDs for DB2 users and groups must be exactly the same across all cluster nodes.
- The DB2 instance owner's home directory must exist locally on each node. This directory is the mount point that the DB2 instance uses. The database that you want to mount must be on shared storage. Create the mount point directory locally on each node, if it does not already exist.
- All DB2 user accounts must exist on the local systems. Symantec does not recommend the use of NIS or NIS+ for users, because these services are not highly available. If their service is interrupted, VCS may not be able to work correctly.

Creating user group accounts for DB2

Three user group accounts are required on each node in the cluster.

To create the group accounts on each node in the cluster on HP-UX

- 1 Create a group for the DB2 UDB instance owner. For example, enter:

```
# mkgroup id=999 db2iadm1
```

- 2 Create a group for the user to execute fenced user-defined functions (UDFs) or store procedures. For example, enter:

```
# mkgroup id=998 db2fadm1
```

- 3 Create a group for the database administration server. For example, enter:

```
# mkgroup id=997 db2asgrp
```

Adding user accounts for DB2 on HP-UX

In the following examples that show creating user accounts, you can use the following options:

- The -g option specifies the group
- The -u option specifies the user ID
- The -d option specifies the home directory

- The `-m` option creates the home directory if it doesn't exist
- The `-s` option is the user's logon shell
- The final expression is the user's logon.

Create the user accounts on each node in the cluster.

This example shows how to create the user, `db2inst1`, who is the DB2 UDB instance owner. The instance's home directory is also the mount point: `/db2_mnt/db2inst1`. The file system that hosts the DB2 UDB instance home directory on shared storage uses this mount point. The DB2 UDB instance home directory must exist on every node. For example:

```
# useradd -g db2iadml -u 1004 -d /db2_mnt/db2inst1 -m -s  
/bin/ksh/db2inst1
```

The following examples show how to create user accounts for `db2fenc1` and `db2as`. These users' home directories are under `/home` in the local file system on each node.

```
# useradd -g db2fadml -u 1003 -d /home/db2fenc1 -m -s /bin/ksh  
db2fenc1  
# useradd -g db2asgrp -u 1002 -d /home/db2as -m -s /bin/ksh db2as
```

Installing DB2 in a VCS environment

For installing DB2 in a VCS environment, Symantec recommends that you follow the installation procedure in the relevant IBM DB2 UDB guide.

Install binaries on local disks of each node, and the database instances on shared storage, accessible by each cluster node.

To install DB2 in VCS environment

- 1 Set shared memory parameters. Refer to the relevant IBM DB2 UDB guide to make sure that memory requirements are met.
- 2 Install the binaries. Install the DB2 UDB system binaries on local disks on each node (mirrored disks are recommended) not on shared storage. You can use IBM's `db2setup` tool.
- 3 Install the DB2 license. Install the DB2 license on each node. For example, enter:

```
# /opt/IBM/db2/V8.1/adm/db2licm -a db2ese.lic
```

- 4 Install the instances. Install the database instances on the shared storage only on the one node where the instance's home directory is currently

mounted. You can choose to install single-partition instance or multi-partition instance. You can use IBM's db2setup tool.

Keep in mind the following when you install:

- When you use the db2setup, do not select the option to Auto start DB2 instance at system boot in the DB2 Instance Properties window. Note that this option does not exist on all DB2 versions. VCS needs to bring up the resources for the DB2 instances in a specific order before it brings the instance online.
- The instance's home directory is a mount point on the local system.

Setting up the DB2 configuration

Use the following procedures to configure DB2 UDB in a VCS environment.

You need to do the following tasks:

- Check `/etc/services`.
See [“Checking /etc/services for DB2”](#) on page 25.
- Create `$DB2InstHome/.rhosts`.
See [“Creating \\$DB2InstHome/.rhosts for DB2”](#) on page 26.
- Modify the `$DB2InstHome/sql/lib/db2nodes.cfg` file for DB2.
See [“Modifying the \\$DB2InstHome/sql/lib/db2nodes.cfg file for DB2”](#) on page 26.
- Confirm the setup of the DB2 installation.
See [“Checking /etc/services for DB2”](#) on page 25.

Checking /etc/services for DB2

On each system in the cluster, use the `more` command to check the file `/etc/services`.

Remember to perform the following:

- Make sure each partition has a port number assigned. The number of reserved ports depends on the number of partitions.
- Make sure that no other services use the ports. Manually assign new numbers if necessary.
- Make sure all systems in the cluster have the same entries in the `/etc/services` file.

The following is an example for two DB2 instances: `db2inst1` and `db2inst2`. Both instances have two partitions each. Each instance requires two ports plus one port per partition, hence four lines per instance.

```
# more /etc/services
DB2_db2inst1      60000/tcp
DB2_db2inst1_1   60001/tcp
DB2_db2inst1_2   60002/tcp
DB2_db2inst1_END 60003/tcp
DB2_db2inst2     60004/tcp
DB2_db2inst2_1   60005/tcp
DB2_db2inst2_2   60006/tcp
DB2_db2inst2_END 60007/tcp
```

Inspect the file and verify that no duplicate port numbers exist.

Creating \$DB2InstHome/.rhosts for DB2

On each system, create a file named \$DB2InstHome/.rhosts, and place a "+" character within it. This file permits a system to access the database without the use of a password.

If security is a concern, put the hostname and user ID inside the .rhosts file, as shown in the following examples:

```
dbmach01 db2inst1
dbmach02 db2inst1
dbmach03 db2inst1
dbmach04 db2inst1
```

Or

```
+ db2inst1
```

With the `rsh system_name` command, you can test password free remote logon. From one system in the cluster to another, the command tests that you can remotely log on with the DB2 instance (for example, db2inst1) account. You should not be prompted for a password. Test this command from each system in the cluster to all other systems.

Modifying the \$DB2InstHome/sqllib/db2nodes.cfg file for DB2

DB2 uses the \$DB2InstHome/sqllib/db2nodes.cfg file during failover from one node to another.

To modify the \$DB2InstHome/sqllib/db2nodes.cfg file for non-MPP versions

- 1 Open the \$DB2InstHome/sqllib/db2nodes.cfg file.
- 2 Create an entry for each database partition.
- 3 For IPv4, assign the virtual IP address as the hostname, for example for this step and the previous step:

```
0 virtualhostname 0
1 virtualhostname 1
```

Note that the *virtualhostname* corresponds to the virtual IP address in the */etc/hosts* file. Make sure that the virtual IP address is up and works.

Confirming the DB2 installation

On the host where the shared file system is mounted, check whether you can start and stop each instance. Do this procedure to verify the DB2 installation.

To check if a DB2 instance can start and stop

- 1 Log on as the instance owner:

```
# su - db2inst1
```

- 2 Attempt to start the instance:

```
$ db2start
```

DB2 should start on the partitions in the *db2nodes.cfg* file. If DB2 does not start, check the error codes.

- 3 Assuming that the previous command is successful, stop the instance:

```
$ db2stop
```

- 4 If the application does not stop correctly on each node, check for configuration errors. Review the DB2 UDB documentation for error codes.

- 5 Create a database.

```
$ db2 create database dbname
```

- 6 List the database directory

```
$ db2 list database directory
```

To check the rest of the DB2 configuration in the cluster

- 1** For each node in the VCS cluster, import the disk group and start all the volumes in the disk group.
- 2** Mount the file system for the volume that contains the DB2 instance and database.
- 3** Unmount and deport the disk group.
- 4** Repeat this procedure for each node in the cluster.

Installing and removing the Veritas™ Cluster Server Agent for DB2

This chapter includes the following topics:

- [Before you install or upgrade the VCS Agent for DB2](#)
- [Installing the VCS Agent for DB2](#)
- [Installing the VCS agent for DB2 software](#)
- [Removing the VCS Agent for DB2](#)

Before you install or upgrade the VCS Agent for DB2

Meet the following prerequisites to install or upgrade the Veritas High Availability Agent for DB2:

- Meet VCS requirements for installing DB2.
See [“VCS requirements for installing DB2”](#) on page 19.
- Install DB2 in a VCS environment.
See [“Installing DB2 in a VCS environment”](#) on page 24.
- Make sure that VCS is installed in the cluster.
- Verify that DB2 is installed and configured.
- Symantec recommends installing the VCS graphical user interface, the Cluster Manager (Java Console). Refer to the *Veritas Cluster Server Installation Guide*.

Installing the VCS Agent for DB2

Mount the disc and install the agent.

To install the agent on HP-UX

- 1 Insert the software disc into the system's disc drive.
- 2 Log in as superuser.
- 3 Set the display permission on your workstation.

```
# xhost +myws
```

- 4 Configure the shell environment variable DISPLAY on your workstation. For example, if your workstation has the name "myws." type

For Bourne or Korn shell (sh or ksh)

```
DISPLAY=myws:0.0  
export DISPLAY
```

For C shell (csh or tcsh)

```
setenv DISPLAY=myws:0.0
```

Setting the DISPLAY environment variable this way enables you to use the SD-UX graphical interface.

- 5 Create a mount point directory, /cdrom, if it does not exist. The directory must have read-write permissions.
- 6 Determine the block device file for the disk drive. The device file should have the form /dev/dsk/c#t#d#. Type the following:

```
# ioscan -fnC disk
```

- 7 Run the following commands to start PFS (Portable File System).

```
# nohup pfs_mountd &  
  
# nohup pfsd &
```

- 8 Mount the CD. For example, to mount the CD to the mount point /cdrom, type

```
# /usr/sbin/pfs_mount -t rrip /dev/dsk/clt2d0 /cdrom
```

where /dev/dsk/clt2d0 is the drive's block device file.

- 9 Type the following command to install the agent:

```
# swinstall -s /cdrom/hpux/application/ \
db2_agent/5.0/VRTSdb2
```

Repeat step 1 through step 9 on all nodes that are part of the DB2 service group.

- 10 Copy the file Db2udbTypes.cf from /etc/VRTSagents/ha/conf/Db2udb/ directory to /etc/VRTSvcscs/conf/config directory.

Installing the VCS agent for DB2 software

The agent binaries for Veritas™ Cluster Server Agent for DB2 is part of VRTSvcsea package. The VRTSvcsea package is already installed if you chose to install all packages or recommended packages during VCS installation. You must manually install the VRTSvcsea package if you installed minimal packages during VCS installation.

You can install the Veritas™ Cluster Server Agent for DB2 from the product disc. You must install the VCS Agent for DB2 enterprise agent on all nodes that will host the DB2 service group.

Removing the VCS Agent for DB2

Before you remove the agent, you must disable it.

See “[Disabling the agent for DB2](#)” on page 52.

To remove the agent from HP-UX

- ◆ On each system that has the agent, type:

```
# swremove VRTSvcscsdb
```


Configuring VCS service groups for DB2

This chapter includes the following topics:

- [About configuring service groups for DB2](#)
- [About DB2 configurations in VCS](#)
- [Before configuring the service group for DB2](#)
- [Configuring the VCS Agent for DB2 from Cluster Manager \(Java Console\)](#)
- [Configuring the VCS Agent for DB2 by editing the main.cf file](#)
- [Setting up in-depth monitoring of a DB2 instance](#)

About configuring service groups for DB2

Configuring the DB2 service group involves creating the DB2 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 agent using the following methods:

- Use the VCS Cluster Manager (the Java Console).
You can use the Cluster Manager (Java Console) to edit a service group template for the Veritas™ Cluster Server Agent for DB2.
See [“Configuring the VCS Agent for DB2 from Cluster Manager \(Java Console\)”](#) on page 38.
- Use the VCS Management Console.

You can use the VCS Management Console to configure service groups. For more information on the VCS Management Console, refer to the *VCS Management Console Implementation Guide*.

- Use VCS commands.
From the command line, you can configure the agent. For information about configuring service groups from the command line, see the *Veritas Cluster Server Administrator's Guide*

- Edit the main.cf file.
You can edit the main.cf file. This method requires that you stop and restart VCS before the new configuration takes effect.

For more information on the main.cf file refer to the following:

- You can use the `hacf -verify` command to ensure that the modified main.cf file works. For more information on this command, refer to the *Veritas Cluster Server Administrator's Guide*.

- Configuring the Veritas™ Cluster Server Agent for DB2 by editing the main.cf file

See “[Configuring the VCS Agent for DB2 by editing the main.cf file](#)” on page 42.

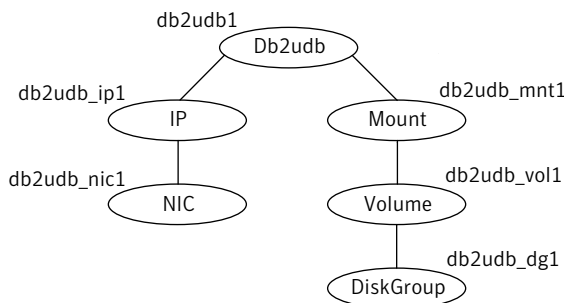
About DB2 configurations in VCS

You can configure DB2 service groups in MPP and non-MPP configurations.

Non-MPP configuration service groups for DB2

[Figure 4-1](#) illustrates the dependencies among the resources that are configured for a non-MPP DB2 instance resource group.

Figure 4-1 Dependency graph for a DB2udb resource



This configuration shows a service group for a Db2udb resource. The db2udb1 resource (the database) requires the IP resource and the Mount resource. The service group IP address for the DB2 server is configured using the IP resource (db2udb_ip1) and the NIC resource (db2udb_nic1). The mount resource (db2udb_mnt1) requires the Volume resource (db2udb_vol1), which in turn requires the DiskGroup resource (db2udb_dg1). You can start the service group after each of these resources is available.

MPP configuration service groups for DB2

The DB2 agent uses two service groups to support MPP configuration.

These service groups are as follows:

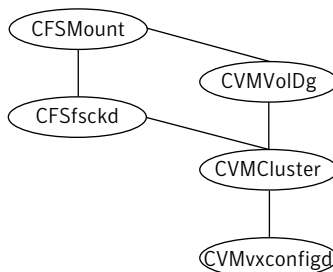
- Parallel CVM
- DB2 failover

Parallel CVM service group for MPP configuration for DB2

One CVM/Infrastructure group per cluster node exists. This service group has the CVM resource and the necessary resources for support of CFS. This group also contains all common components that DB2 needs, such as the instance's home directory, which is shared on all the cluster nodes.

[Figure 4-2](#) illustrates the parallel CVM service group, which is the first of two service groups that support the MPP configuration.

Figure 4-2 Parallel CVM service group

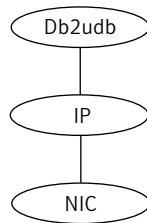


Failover service group for MPP configuration for DB2

This service group monitors one database partition with MPP configuration. The failover DB2 service group depends on the parallel CVM service group with online local firm dependency.

[Figure 4-3](#) illustrates the DB2 failover service group, which is the second of two service groups that support the MPP configuration.

Figure 4-3 DB2 failover service group



Before configuring the service group for DB2

Before you configure the DB2 service group, you must meet the following prerequisites:

- Verify that VCS is installed and configured on all nodes in the cluster where you plan to configure the service group. For more information on installing VCS:
See the *Veritas Cluster Server Installation Guide*.
- Verify that DB2 is installed and configured identically on all nodes in the cluster.
See [“Installing DB2 in a VCS environment”](#) on page 24.
- Verify that the Veritas agent for DB2 is installed on all nodes in the cluster.
See [“Installing the VCS Agent for DB2”](#) on page 30.

Importing the Db2udbTypes.cf file

Before you use the DB2 UDB templates, use the Cluster Manager (Java Console) to import the Db2udbTypes.cf file to the VCS engine.

To import the Db2udbTypes.cf file using the Cluster Manager

- 1 On one of the nodes in the cluster, start the Cluster Manager (Java Console).
Type:

```
# haGUI&
```

- 2 Log in to the cluster and wait for the Cluster Explorer to launch.
- 3 From the **File** menu select **Import Types**. Switch to the read/write mode if prompted.
- 4 In the Import Types dialog box, select the file:

```
/etc/VRTSagents/ha/conf/Db2udb/Db2udbTypes.cf
```

- 5 Click **Import** and wait for the file to import.
- 6 Save the configuration.

When the Db2udb types are imported to the VCS engine, the Db2udb agent can be configured.

Refer to the following:

- If you use the DB2 UDB MPP configuration:
See [“Adding service group for DB2 MPP using the Cluster Manager \(Java Console\)”](#) on page 38.
- If you use the DB2 UDB non-MPP configuration:
See [“Adding a service group for DB2 non-MPP with the Cluster Manager \(Java Console\)”](#) on page 40.

To import the Db2udbTypes.cf file using the command line

- 1 Log in to a cluster system as superuser.
- 2 Make the cluster configuration as read-only. This action ensures that all changes to the existing configuration have been saved and further changes are prevented while you modify main.cf:

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

- 3 To ensure that VCS is not running while you edit main.cf, issue the following command to stop the VCS engine on all systems. Leave the resources that are available online.

```
# hstop -all -force
```

- 4 Make a backup copy of the main.cf file.

```
# cd /etc/VRTSvcs/conf/config
# cp main.cf main.cf.orig
```

- 5 Edit the main.cf file to include the Db2udbTypes.cf file.

```
# include "Db2udbTypes.cf"
```

The DB2 types definition is imported to the VCS engine. The agent for DB2 can be configured without interrupting or stopping VCS.

Configuring the VCS Agent for DB2 from Cluster Manager (Java Console)

Templates for the DB2 resource groups were automatically installed when you installed the agent for DB2. Using the Cluster Manager (Java Console), you can use the template (/etc/VRTSagents/ha/Templates/Db2udbGroup.tf) to configure the DB2 service group, its resources, and their attributes. You can also use the Cluster Manager (Java Console) to dynamically modify the attributes' values as necessary for your configuration.

For information on the Cluster Manager (Java Console), see the *Veritas Cluster Server Administrator's Guide*.

Adding service group for DB2 MPP using the Cluster Manager (Java Console)

If you have imported the Db2udbTypes.cf file, you can use the template (/etc/VRTSagents/ha/Templates/Db2udbGroup.tf) to configure a service group.

See [“Importing the Db2udbTypes.cf file”](#) on page 36.

After you log into the Cluster Manager, the **Status** tab indicates that the CVM service group is online on each system in the cluster. The CVM service group is automatically configured when you complete the installation of the Storage Foundation Cluster File System (SFCFS) software.

To start adding the service group for the DB2 MPP database

- 1 In the Cluster Explorer window, click the **Add Service Group** icon on the toolbar.
- 2 In the Add Service Group window, enter the name of the service group you want to create for the service group. For example, enter `db2mpp_grp1`. Do not press Return or Enter.

- 3 In the Available Systems box, double-click the systems that you want in your configuration.
- 4 Select the system where you want to automatically start the service group. In the window that shows the systems in the configuration, select the check box next to the system.
- 5 Click the **Failover** radio button to specify the Service Group Type.

To select the template for the DB2 MPP database

- 1 Click the Templates button.
- 2 In the Select Templates window, select db2udb_mpp_grp from the list in the Templates box. The Dependency graph information and the Types information should change to reflect the template choice. Click **OK**. In the Add Service Group window, the name of the template is now shown as selected.
- 3 Click **OK** on at the bottom of the Add Service Group window. The group is added. On the left pane of the Cluster Manager (Java Console) window, the service group is under the CVM service group. On the Status tab, the group is shown Offline on each system.

To configure the resources for the DB2 MPP database

- 1 In the left pane, double-click the db2mpp_grp1 service group. The types of resources that you can configure for the group appear: Db2udb, IP, and NIC.
- 2 Double-click the Db2udb resource type. Select the resource, db2udb, which is under the Db2udb type. Click the **Properties** tab.
- 3 On the Properties tab for the db2udb resource, a list of Type Specific Attributes is shown. click the **Edit** icon for each attribute you want to configure. In the Edit Attribute window, enter the necessary attribute value information. For example, enter the db2inst1 as the value for DB2InstOwner.
- 4 Assign values for the IP and the NIC resources in the same manner as you assigned values to the db2udb resource: double-click the type to display the resource and select the resource. With the Properties tab visible, you can edit the Type Specific Attributes for each resource.
- 5 Right-click the db2mpp_grp1 service group in the left pane. Click Link in the drop-down menu.

The Link Service Groups window shows the following:

- The Parent Group as db2mpp_grp1
- The Child group as CVM
- The Relationship as "online local"

- The Dependency Type as "firm"
- 6 Click **OK** to create the dependency link.

To finalize the service group for the DB2 MPP database

- 1 Click the **Save Configuration** icon.
- 2 Enable the db2udb and IP resources. Right-click a resource and select **Enabled** in the drop-down menu. If necessary, make the configuration read and write.
- 3 Click the **Online Service Group** icon.
- 4 In the window, select the service group and the system that you want to bring online. Click **OK**.

Adding a service group for DB2 non-MPP with the Cluster Manager (Java Console)

If you have imported the Db2udbTypes.cf file, you can use the Db2udb_Group template to configure a service group.

See ["Importing the Db2udbTypes.cf file"](#) on page 36.

To configure a service group if you have imported the Db2udbTypes.cf file

- 1 In the Cluster Explorer window, answer **No** when prompted to use the configuration wizard. Note that if you choose to use the wizard, the steps that follow are similar.
- 2 In the Cluster Explorer window, click the **Add Service Group** icon on the toolbar.
- 3 In the Add Service Group window, enter the name of the service group you want to create for the service group. For example, enter db2_group1. Do not press Return or Enter.
- 4 From the systems in the Available Systems box, double-click those that you want in your configuration.
- 5 Select the system where you want to automatically start the service group. In the window that shows the systems in the configuration, select the check box next to the system.
- 6 Click the **Failover** radio button to specify the Service Group Type.

To configure templates if you have imported the Db2udbTypes.cf file

- 1 Click the **Templates** button.
- 2 In the Select Templates window, select db2udb_grp from the list in the Templates box. The Dependency graph information and the Types information should change to reflect the template choice. Click **OK**. In the Add Service Group window, the name of the template is now shown as selected.

To finalize the service group if you have imported the Db2udbTypes.cf file

- 1 Click **OK** on at the bottom of the Add Service Group window. The group is added. On the left pane of the Cluster Manager (Java Console) window, the service group is shown under the cluster name. On the Status tab, the group is shown Offline on each system.
- 2 In the left pane, double-click the **db2_group1** service group. The types of resources that you can configure for the group appear: Db2udb, DiskGroup, IP, Mount, NIC, and Volume.
- 3 Double-click the **Db2udb** resource type. Select the resource **db2udb**, which is under the Db2udb type. Click the **Properties** tab.
- 4 On the Properties tab for the db2udb resource, a list of Type Specific Attributes is shown. Click the **Edit** icon for each attribute you want to configure. In the Edit Attribute window, enter the necessary attribute value information. For example, enter the db2inst1 as the value for DB2InstOwner.

DB2InstOwner and DB2InstHome are required attributes. You must edit these attributes.

- 5 Assign values for the DiskGroup, IP, Mount, NIC, and Volume resources in the same manner as you assigned values to the db2udb resource: double-click the type to display the resource and select the resource. With the **Properties** tab visible, you can edit the Type Specific Attributes.

For a list of the required attributes and their descriptions, see the *Veritas Cluster Server Bundled Agents Reference Guide*.

- 6 Enable the resources in db2_group1. Right-click each resource and select **Enabled** in the drop-down menu. If necessary, make the configuration read and write.
- 7 Click the **Save and Close Configuration** icon.
- 8 Click the **Online Service Group** icon.
- 9 In the window, select the service group and the system that you want to bring online. Click the system where you want to bring it online. Click **OK**. Click **Yes** at the confirmation question.

Configuring the VCS Agent for DB2 by editing the main.cf file

The VCS agent for DB2 comes with three sample VCS configuration files, which are in the `/etc/VRTSagents/ha/conf/Db2udb/sample_db2udb` directory.

The samples are as follows:

- A single-partition instance configuration
- A multi-partition instance SMP configuration
- A multi-partition instance MPP configuration.

The appropriate file can be used as reference to directly modify your present `main.cf` configuration file. When you use this method, you must stop and restart VCS to implement the configuration.

After you complete these steps, go to one of the following sections that describe configuring the agent.

To prepare to edit the main.cf file

- 1 Log on to System A as root.
- 2 Save your existing configuration to prevent any changes while you modify the `main.cf` file:

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

- 3 Make sure to stop VCS while you edit `main.cf`. Use the `hastop` command to stop the VCS engine on all systems and leave the resources available:

```
# hastop -all -force
```

- 4 Make a backup copy of the `main.cf` file:

```
# cd /etc/VRTSvcs/conf/config  
# cp main.cf main.cf.orig
```

Configuring the agent to use the DB2 MPP configuration

Edit the `main.cf` file. Use `/etc/VRTSagents/ha/conf/Db2udb/sample_db2udb/main.cf.MPP` for reference. Notice that CVM service group is present in the configuration file.

To configure the agent to use the DB2 MPP configuration

- 1 Add the fully qualified path to the Db2udbTypes.cf file.

```
include "/etc/VRTSagents/ha/conf/Db2udb/Db2udbTypes.cf"
```

- 2 Create service groups for the Db2udb resources. Refer to the sample configuration file. The example shows four DB2 MPP service groups and a CVM service group.
- 3 In the DB2 MPP service groups, include the definitions for the Db2udb, IP, and NIC resources. Assign values to the attributes for the resources to match the parameters of your configuration.

For more information review the following information:

- Db2udb resource type attributes
See [“Db2udb resource type attributes”](#) on page 59.
- Sample configuration files.
- For information about IP and NIC resources refer to the *Veritas Cluster Server Bundled Agents Reference Guide*.

- 4 Assign the online local firm service group dependency of the db2udb service group for the cvm service group. For example:

```
requires group cvm online local firm
```

- 5 Immediately following the service group dependency, assign dependencies for the newly created resources. Refer to the appropriate sample configuration file. For the group db2mpp_grp0, enter:

```
db2udb0 requires Db2_IP0
Db2_IP0 requires Db2_NIC0
```

For more information on assigning dependencies refer to the *Veritas Cluster Server Administrator’s Guide*.

- 6 Save and close the file.

Configuring the agent to use the DB2 non-MPP configurations

Edit the main.cf file. Use /etc/VRTSagents/ha/conf/Db2udb/sample_db2udb/main.cf.EE or /etc/VRTSagents/ha/conf/Db2udb/sample_db2/main.cf.EEE for reference.

To configure the agent to use the DB2 non-MPP configurations

- 1 Add the fully qualified path to the Db2udbTypes.cf file.

```
include "/etc/VRTSagents/ha/conf/Db2udb/Db2udbTypes.cf"
```

- 2 Create a service group for the DB2 resources.

This example that shows a group named "db2_grp1" in which two partitions are defined.

- 3 Include all resources in the service groups. These resources include the Db2udb, DiskGroup, IP, Mount, NIC, and Volume resources. Assign values to the attributes for the resources to match the parameters of your configuration.

For more information:

- Db2udb resource type attributes
See [“Db2udb resource type attributes”](#) on page 59.
- The sample configuration files

For information about the DiskGroup, IP, Mount, NIC, and Volume resources, refer to the *Veritas Cluster Server Bundled Agents Reference Guide*.

- 4 Assign dependencies for the newly created resources. For the group db2udb_grp1, enter:

```
db2udb1 requires db2udb_ip1
db2udb1 requires db2udb_mnt1
db2udb_ip1 requires db2udb_nic1
db2udb_mnt1 requires db2udb_vol1
db2udb_vol1 requires db2udb_dg1
```

And for group db2udb_grp3, enter:

```
db2udb3 requires db2udb_ip3
db2udb3 requires db2udb_mnt3
db2udb_ip3 requires db2udb_nic3
db2udb_mnt3 requires db2udb_vol3
db2udb_vol3 requires db2udb_dg3
```

For more information, refer to the appropriate sample configuration file.

For more information on assigning dependencies, refer to the *Veritas Cluster Server Administrator's Guide*.

- 5 Save and close the file.

Verifying the configuration for VCS Agent for DB2

Check the configuration after you edit the main.cf.

To check the configuration

- 1 Verify the syntax of the file /etc/VRTSvcs/conf/config/main.cf:

```
# cd /etc/VRTSvcs/conf/config
# hacf -verify .
```

- 2 Start the VCS engine on System A:

```
# hstart
```

- 3 Type the `hastatus` command:

```
# hastatus
```

- 4 When "LOCAL_BUILD" is listed in the message column, start VCS on System B:

```
# hstart
```

- 5 Verify that all DB2 service group resources are brought online on System A:

```
# hagr -display
```

- 6 Take the service groups offline on System A and verify that all resources are stopped:

```
# hagr -offline db2udb_grp1 -sys sysa
# hagr -offline db2udb_grp3 -sys sysa
# hagr -display
```

- 7 Bring the service groups online again on System A and verify that all resources are available:

```
# hagr -online db2udb_grp1 -sys sysa
# hagr -online db2udb_grp3 -sys sysa
# hagr -display
```

- 8 Switch the DB2 service group to System B:

```
# hagr -switch db2udb_grp1 -to sysb
# hagr -switch db2udb_grp3 -to sysb
```

- 9 Verify that all DB2 service group resources are brought online on System B:

```
# hagrps -display
```

- 10 On all the systems, look at the following log files for any errors or status:

```
/var/VRTSvcs/log/engine_A.log
```

```
/var/VRTSvcs/log/Db2udb_A.log
```

Setting up in-depth monitoring of a DB2 instance

To dynamically reconfigure the Veritas™ Cluster Server Agent for DB2, use Cluster Manager (Java Console) or the VCS command line. The following description of configuration changes to include in-depth monitoring shows the use of VCS commands from the command line. For information on reconfiguring VCS from the command line refer to the *Veritas Cluster Server Administrator's Guide*.

Enabling in-depth monitoring of a DB2 instance

Shallow monitoring of a DB2 instance involves checking the exit status of the `db2gcf` command.

In contrast, in-depth monitoring provides a higher level of confidence in the availability of the instance or partition and its database. It makes additional queries to the database to verify whether the database is available.

Enabling in-depth monitoring from the command line for DB2

You can dynamically configure in-depth monitoring. Symantec recommends that you successfully run DB2 with the agent's default (shallow) monitoring before you start the in-depth monitoring. In the MPP configuration, make sure the database can be accessible locally by the database partition.

You need to have custom monitoring scripts. Refer to the following table for information on the Indepth Monitor attribute:

See "[Db2udb resource type attributes](#)" on page 59.

To start the in-depth monitor for a given instance

- 1 Make the VCS configuration writable:

```
# haconf -makerw
```

- 2 Freeze the service group so VCS does not perform actions automatically based on an incomplete reconfiguration:

```
# hagrps -freeze db2udb_group
```

- 3 Enable in-depth monitoring using the command:

```
# hares -modify resource DatabaseName name  
hares -modify resource IndepthMonitor 1
```

For example:

```
# hares -modify db2udb DatabaseName SAMPLE  
# hares -modify db2udb IndepthMonitor 1  
# haconf -dump -makero  
# hagrps -unfreeze db2udb_group
```

Handling DB2 error codes during in-depth monitoring

The agent for DB2 comes with enhanced ability to handle DB2 errors during in-depth monitoring. The agent classifies DB2 errors according to their severity and associates predefined actions with each error code.

You can create a custom error handling file, `db2error.dat`. The file lists the DB2 errors and the associated actions that you want the agent to take when it encounters an error.

The file stores information in the following format:

```
SQL_error_string:action_to_be_taken
```

For example:

```
SQL1034N: IGNORE  
SQL1039N: WARN  
SQL1234N: FAILOVER
```

[Table 4-1](#) shows the available actions for in-depth monitoring.

Table 4-1 Available actions for in-depth monitoring

Action	Description
IGNORE	Ignores the error.
UNKNOWN	Marks the resource state as UNKNOWN and sends a notification if the Notifier resource is configured. For more information about VCS notification, refer to the <i>Veritas Cluster Server Administrator's Guide</i> . This action is typically associated with configuration errors.
WARN	Marks the resource state as ONLINE and sends a notification if the Notifier resource is configured. This action is typically associated with low-severity errors.
FAILOVER (Default)	Marks the resource state as OFFLINE. This faults the service group, which fails over to the next available system. This action is the agent's default behavior. If the DB2 error code that the agent encounters does not exist in the db2error.dat file, then the agent assumes this default behavior.
NOFAILOVER	Freezes the service group temporarily and marks the resource state as OFFLINE. The agent also sends a notification if the Notifier resource is configured. This action is typically associated with the errors that are not system-specific. For example a failover to another node does not help a corrupt database, .

Disabling in-depth monitoring for DB2

You can dynamically disable in-depth monitoring.

To dynamically disable in-depth monitoring

- 1 Make the VCS configuration writable:

```
# haconf -makerw
```

- 2 Freeze the service group so VCS does not perform actions automatically based on an incomplete reconfiguration:

```
# hagrps -freeze db2udb_group
```

- 3 Assign the InDepthMonitor attribute a null value to disable in-depth monitoring. Use the command:

```
# hares -modify  
resource InDepthMonitor 0
```

For example:

```
# hares -modify db2udb InDepthMonitor 0  
# haconf -dump -makero  
# hagrps -unfreeze db2udb_group
```


Administering VCS service groups for DB2

This chapter includes the following topics:

- [About administering service groups for DB2](#)
- [Bringing the DB2 service group online](#)
- [Taking the DB2 service group offline](#)
- [Switching the DB2 service group](#)
- [Disabling the agent for DB2](#)

About administering service groups for DB2

You can administer service groups with the Cluster Manager (Java Console), the Veritas Cluster Server Management Console, or from the command line. The following procedures use the Cluster Manager (Java Console).

Bringing the DB2 service group online

Perform the following steps to bring a service group online. Note that in the initial few cycles of bringing a service group online, the memory usage by the agent can spike.

To bring a service group online

- 1 From Cluster Explorer, click the **Service Groups** tab in the configuration tree.
- 2 Right-click the service group and click **Enable Resources** to enable all the resources in this group.

- 3 Right-click the service group, hover over **Enable**, and select either the node or all the nodes where you want to enable the service group.
- 4 Save and close the configuration. Click **File > Save Configuration**, then **Close Configuration**.
- 5 Right-click the service group, pause over Online, and select the system where you want to bring the service group online.

Taking the DB2 service group offline

Perform the following procedure from Cluster Manager (Java Console) to take the service group offline. Note that in the initial few cycles of taking a service group offline, the agent's memory usage can spike.

To take a service group offline

- 1 In the Cluster Explorer configuration tree with the Service Groups tab selected, right-click the service group that you want to take offline.
- 2 Choose **Offline**, and select the appropriate system from the pop-up menu.

Switching the DB2 service group

The process of switching a service group involves taking it offline on its current system and bringing it online on another system. Perform the following procedure from Cluster Manager (Java Console) to switch the service group.

To switch a service group

- 1 In the Cluster Explorer configuration tree with the Service Groups tab selected, right-click the service group.
- 2 Choose **Switch To**, and select the appropriate system from the pop-up menu.

Disabling the agent for DB2

To disable the agent on a system, you must first change the DB2 service group to an OFFLINE state. You can stop the application completely, or switch the service group to another system.

To disable the agent

- 1 Determine if the service group is online. At the prompt, type:

```
# hagrps -state service_group -sys system_name
```

- 2 If the service group is online, take it offline. At the prompt, type:

```
# hagrps -switch service_group -to system_name
```

Or

```
# hagrps -offline service_group -sys system_name
```

- 3 Stop the agent on the system. At the prompt, type:

```
# haagent -stop DB2 -sys system_name
```

- 4 When you get the message "Please look for messages in the log file," check the file `/var/VRTSvcs/log/engine_A.log` for a message confirming the agent has stopped.

You can also use the `ps` command to verify that the agent has stopped.

- 5 When the agent has stopped, you can remove the system, the service group, or the resource type from the VCS configuration.

For more information, refer to the chapter on reconfiguring VCS from the command line in *Veritas Cluster Server Administrator's Guide*.

Troubleshooting Veritas™ Cluster Server Agent for DB2

This appendix includes the following topics:

- [Creating a db2profile for environment variables for DB2](#)
- [Setting the RestartLimit attribute for VCS Agent for DB2](#)

Creating a db2profile for environment variables for DB2

You can create a profile file for each instance of DB2 and place environment variables in the profile file. You can use this profile to create unique variables for each database user. Each DB2 instance has a home directory that is associated with the instance's log on ID, for example:

```
$InstHome/sql1lib/db2profile
```

Where db2profile is the name of the logon ID.

Place the variables that you are interested in using (for example the TimeZone variable) in the profile file. When you then issue a `su -db2instX` command (where X is the instance's name), the environment variables are sourced.

Setting the RestartLimit attribute for VCS Agent for DB2

VCS starts multiple partitions simultaneously, which can lead to a race condition. The agent's RestartLimit attribute is set to a value of three to help avoid this condition. You can alleviate the potential for this condition by building resource dependencies for each partition. For example, within a service group you can have the Db2udb resource 4 (where nodenum=1) depend on Db2udb resource 3 (where nodenum=2) etc. With the partitions built in a dependency tree, you can set the value of the RestartLimit to zero.

Resource type information for Veritas™ Cluster Server Agent for DB2

This appendix includes the following topics:

- [About the resource type definitions for DB2](#)

About the resource type definitions for DB2

The resource type represents the VCS configuration definition of the agent. It also specifies how the configuration file, `main.cf`, defines the agent. When you configure the agent, you need to assign values to the resource type attributes.

DB2 UDB type definition file: `Db2udbTypes.cf` on HP-UX

The following is the type definition for the agent.

```
type Db2udb (  
    static str AgentDirectory = "/opt/VRTSagents/ha/bin/Db2udb"  
    static str AgentFile = "/opt/VRTSagents/ha/bin/Db2udb/  
    Db2udbAgent"  
    static keylist SupportedActions = { VRTS_GetInstanceName,  
    VRTS_GetRunningServices }  
    static int CleanTimeout = 240  
    static int MonitorTimeout = 240  
    static int OfflineTimeout = 240  
    static int OnlineRetryLimit = 2  
    static int OnlineTimeout = 180
```

```
static int OnlineWaitLimit = 1
static int RestartLimit = 3
static int ToleranceLimit = 1
static str ArgList[] = { DB2InstOwner, DB2InstHome,
IndepthMonitor, DatabaseName, NodeNumber, StartUpOpt,
ShutDownOpt, AgentDebug, Encoding, WarnOnlyIfDBQueryFailed,
LastWarningDay }
str DB2InstOwner
str DB2InstHome
int IndepthMonitor
str DatabaseName
int NodeNumber
str StartUpOpt = START
str ShutDownOpt = STOP
boolean AgentDebug = 0
str Encoding
boolean WarnOnlyIfDBQueryFailed = 1
temp str LastWarningDay
)
```

Resource type attributes for DB2

This appendix includes the following topics:

- [Db2udb resource type attributes](#)

Db2udb resource type attributes

The DB2 resource has several required and optional attributes.

[Table C-1](#) shows the required attributes for the agent for DB2.

Table C-1 Required attributes for the agent for DB2

Required attributes	Description
DB2InstHome	Path to DB2 UDB instance home directory that contains critical data and configuration files for the DB2 instance. Type and dimension: string-scalar
DB2InstOwner	User ID of Instance Owner that starts a DB2 UDB instance. Each instance requires a unique user ID. Type and dimension: string-scalar Caution: Incorrect changes to this attribute can result in DB2 entering an inconsistent state.

[Table C-2](#) shows the optional attributes for the agent for DB2.

Table C-2 Optional attributes for the agent for DB2

Optional attributes	Description
DatabaseName	<p>Name of the database for in-depth monitoring; required if in-depth monitor is enabled (IndepthMonitor = 1).</p> <p>Note: Be careful when you change the DataBase name attribute as you can fault all the partitions in the database. Do not change the DataBaseName attribute to an invalid or an incorrect value.</p> <p>Type and dimension: string-scalar</p>
NodeNumber	<p>Node number or partition number of the database. Used when monitoring a specific database partition.</p> <p>Default: 0</p> <p>Type and dimension: integer-scalar</p>
StartUpOpt	<p>Provides start up options. The allowed values are: START, ACTIVATEDDB, or CUSTOM.</p> <p>Review the following options:</p> <ul style="list-style-type: none"> ■ START (default) Starts the DB2 instance or partition. ■ ACTIVATEDDB Performs activate database command after db2 processes start. ■ CUSTOM The agent leaves all the online function completely to the user when the StartUpOpt attribute is set to CUSTOM. It looks for a file named start_custom_\${db2instance}_\${nodenum} in the /opt/VRTSagents/ha/bin/Db2udb directory. If this file exists and is executable, it executes this customized online file instead. <p>Example: To customize the online function for partition/nodenum 1 for the db2 instance named db2inst1, the agent for DB2 runs this customized file start_custom_db2inst1_1. It runs this file under the /opt/VRTSagents/ha/bin/Db2udb directory.</p> <p>Type and dimension: string-scalar</p>

Table C-2 Optional attributes for the agent for DB2 (*continued*)

Optional attributes	Description
ShutDownOpt	<p>The allowed values for this attribute are STOP and CUSTOM.</p> <p>Review the following options:</p> <ul style="list-style-type: none"> ■ STOP Shuts the Db2 instance or partition down in the usual way. ■ CUSTOM Leaves all the offline function completely to the user when the ShutDownOpt is set to CUSTOM. It looks for a file named <code>stop_custom_\$db2instance_\$nodenum</code> in the <code>/opt/VRTSagents/ha/bin/Db2udb</code> directory. If this file exists and is executable, it executes this customized offline file instead. <p>Example: You want to customize the offline function for partition/nodenum 0 for the db2 instance named <code>db2inst1</code>. You have the agent for DB2 run this customized file: <code>stop_custom_db2inst1_0</code>. The file is in the <code>/opt/VRTSagents/ha/bin/Db2udb</code> directory.</p> <p>Type and dimension: string-scalar</p>
IndepthMonitor	<p>Set the value of the IndepthMonitor attribute to 1 to enable in-depth monitoring. Before this release, IndepthMonitor performed a default SQL query to the database. In 5.0, this default query no longer exists. The agent now looks for the <code>monitor_custom_\$db2instance_\$nodenum</code> file in the <code>/opt/VRTSagents/ha/bin/Db2udb</code> directory.</p> <p>It executes this customized indepth monitor file if the file exists and is executable. You can find samples of custom monitor scripts in the <code>sample_db2udb</code> directory.</p> <p>Type and dimension: string-integer</p>
Encoding	<p>Specifies the operating system encoding corresponding to DB2 UDB encoding for display of DB2 UDB output.</p> <p>Type and dimension: string-scalar</p>

Table C-2 Optional attributes for the agent for DB2 (*continued*)

Optional attributes	Description
AgentDebug	<p>When the value of this attribute is 1, it causes the agent to log additional debug messages.</p> <p>Type and dimension: boolean-scalar</p>
WarnOnlyIfDBQueryFailed	<p>This attribute either logs SQL errors, or checks the errors to handle them specially.</p> <p>Set the value of the WarnOnlyIfDBQueryFailed attribute to 1 to enable it. When this attribute is enabled, it ignores all SQL errors and logs a warning message in the agent log once a day.</p> <p>Set the value of the WarnOnlyIfDBQueryFailed attribute to 0 to disable it. When disabled, it checks if an error code needs to be handled specially in the db2error.dat file. If the error code does not exist in the db2error.dat file, then it returns OFFLINE for monitor. Otherwise, it follows the action of that particular error code in the db2error.dat file.</p> <p>Type and dimension: boolean-scalar</p>
UseDB2start	<p>Enables you to choose an alternate way to start DB manager. The agent executes the db2start when UseDBStart is set to 1, whereas it uses db2gcf when UseDBStart is set to 0.</p> <p>Type and dimension: boolean-scalar</p> <p>Default: 0</p>

[Table C-3](#) shows the internal attributes for the agent for DB2.

Table C-3 Internal attributes for the agent for DB2

Required attributes	Description
AgentDirectory	<p>Specifies the location of other files and scripts that are related to the agent.</p> <p>Do not use. For internal use only.</p>

Index

Symbols

.rhosts
 editing for database access 26
/etc/services
 checking assigned ports 25

A

agent
 configuring
 overview 33
attributes of Db2udb resource type 59

B

binaries
 DB2 UDB
 installing locally 24

C

Cluster Manager (Java Console)
 configuring DB2 service group 38
 using to import Db2udbTypes.cf 38
commands
 hagrp 52
 hagui 36
 pkgm 31
 rsh 26
configuration files
 db2nodes.cfg
 host for partitions 26
 Db2udbTypes.cf 57
configuring DB2 agent
 by editing configuration files 42
 using Cluster Manager (Java Console) 38
CVM (infrastructure) service group 35

D

DatabaseName attribute 60
DB2
 error handling 47

DB2 UDB instances
 installing on shared storage 24
DB2 UDB type definition file 57
db2gcf -d command 13
db2gcf -u command 13
DB2InstHome attribute 59
DB2InstOwner attribute 59
db2nodes.cfg
 virtual host for partitions 26
db2setup tool
 for binaries
 instances 24
Db2udb resource
 depends on IP
 Mount resources 35
Db2udbTypes.cf
 including in main.cf file 42–43
 type definition file 57
Db2udbTypes.cf file
 importing 36
dependency
 between DB2 and CVM service groups 40
 defining in main.cf 44
DiskGroup resource
 required by Volume resource 35

E

Encoding attribute 61
enterprise agent
 installing 31

F

file system
 creating for MPP configuration 22
 creating for non-MPP instances 21
files
 .rhosts 26
 db2nodes.cfg 26
 Db2udbTypes.cf 57
 main.cf (VCS configuration) 42

- G**
- groups (user)
 - adding 23
- H**
- hagrp command 52
 - hagui command 36
- I**
- importing Db2udbTypes.cf file 36
 - in-depth monitoring
 - disabling 48–49
 - enabling 46
 - installing DB2 UDB
 - confirming setup 27
 - instances on shared storage 24
 - requirements 24
 - system binaries 24
 - instances
 - installing on shared disk 24
 - starting and stopping 27
 - IP address
 - virtual 26
 - IP resource
 - requires a NIC resource 35
- J**
- Java Console
 - configuring service group 38, 40
- M**
- main.cf file
 - editing 42
 - examples 42
 - verifying configuration 45
 - monitoring
 - configuring in-depth monitoring 46
 - shallow and in-depth 46
 - Mount resource
 - requires the Volume resource 35
 - MPP (Massively Parallel Processing)
 - support 12
- N**
- NIC resource
 - required by IP resource 35
 - NodeNumber attribute 60
- P**
- parallel mode for CVM service group 35
 - partition number (NodeNumber) 60
 - pkgm command 31
- R**
- ResourceInfo resource attribute 16
 - rsh command 26
- S**
- service group
 - adding using Cluster Manager (Java Console) 38
 - adding using wizard 40
 - creating in main.cf file 42–43
 - CVM 35
 - dependency link DB2 and CVM 40
 - MPP configuration
 - dependencies 35
 - non-MPP configuration
 - dependencies 34
 - shallow monitoring
 - described 46
 - SMP (Symmetric Multiprocessing)
 - support 12
 - stopping DB2 instance 13
- T**
- template
 - for DB2 MPP service group 40
 - using for non-MPP service group 42
 - testing
 - remotely logging on 26
 - service groups are configured 45
- V**
- VCS supported version 12
 - virtual IP address 26
 - Volume resource
 - requires the DiskGroup resource 35
- W**
- WarnOnlyIfDBQueryFailed attribute 14