



Mimer SQL Engine

OpenVMS Guide

Version 9.3

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Produced and published by Mimer Information Technology AB, Uppsala, Sweden.
P.O. Box 1713,
SE-751 47 Uppsala, Sweden.
Tel +46(0)18-780 92 00.
Fax +46(0)18-780 92 40.

Mimer SQL Web Sites:
<http://developer.mimer.com>
<http://www.mimer.com>

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Chapter 1

Introduction

Since the first release of Mimer on VMS in 1982 (Mimer version 3.1 on VAX VMS 3), a large number of Mimer SQL users have deployed their solutions on the OpenVMS platform.

The current release of Mimer SQL Engine for OpenVMS is version 9.3. The VAX architecture is no longer supported since it lacks in DECThreads support. Instead both the Alpha and Integrity (Itanium, IA64) platforms are supported.

About this Guide

This guide describes how to install and use version 9.3 of the Mimer SQL Engine relational database server under OpenVMS. It contains OpenVMS specific instructions about installing the software, creating databases and managing database servers and is for general users, system administrators and programmers who use Mimer SQL Engine on the OpenVMS operating system.

This guide is common for the Alpha and Integrity platforms. The way Mimer operates on the two platforms has been made as identical as possible. Whenever there is a difference depending on the architecture you are used, this will be explicitly marked.

About Mimer SQL Engine for OpenVMS

You can download a full version of Mimer SQL Engine for OpenVMS for *free* from <http://developer.mimer.com/downloads>. This distribution is for development and evaluation. It contains a complete copy of Mimer SQL Engine Version 9.3 and a built-in software key, with no time-limit. It supports up to 10 concurrent database connections.

Mimer SQL Run-time License

To use Mimer SQL Engine for OpenVMS in production, you need a run-time license key.

Please contact your local Mimer representative, see <http://www.mimer.com/contact.asp?seclD=175>, or e-mail info@mimer.com.

The Mimer SQL Database Server

The Mimer SQL Engine database server is a single, multi-threaded process. By using DECThreads, good SMP scalability is achieved.

Clients using TCP/IP or Decnet can access the server. For clients running on the same host as the server, a special shared-memory based communication method is used.

Embedded SQL

An embedded SQL preprocessor is included. It enables SQL commands to be embedded in programs written in C, C++, FORTRAN and COBOL. The embedded syntax complies with the ISO standard for embedded SQL.

JDBC Driver

A JDBC driver is included in the distribution. The driver is a type 4 driver, which means that it is written entirely in Java. This provides the driver with full portability so that it can be copied or downloaded to any Java-enabled platform. The driver uses TCP/IP to access a Mimer SQL Engine server on any platform.

Three drivers are supplied. Each driver support a different JDBC standard. Pick the one that best matches your needs.

JDBC Driver	JDBC Standard	Java environment
MIMJDBC1.JAR	JDBC 1	Java 1.1.8 or later
MIMJDBC2.JAR	JDBC 2	Java 1.2 to Java 1.3
MIMJDBC3.JAR	JDBC 3	Java 1.4 or later

ODBC Driver

The Mimer ODBC driver is a client library that enables applications to access Mimer database servers running on any platform. The driver complies with the ODBC 3.52 specification.

By using the ODBC driver on OpenVMS, you can develop ODBC applications and execute them on the OpenVMS platform.

Unlike other platforms, OpenVMS does not include a Driver Manager that enables OpenVMS applications to dynamically load drivers for different database products. Until such a Driver Manager becomes available on OpenVMS, you can link your applications directly to the Mimer ODBC driver.

Note that in order to run an ODBC application on a Windows platform, the Windows ODBC driver has to be installed on the client side. This driver can then access Mimer database servers on any platform (including OpenVMS). There is no need to install any special software on the server side in order to use ODBC.

Utilities

Mimer SQL includes the following utilities:

Utility	Description
BSQL	BSQL executes SQL statements which are entered interactively or read from a command file. It is described in the <i>Mimer SQL Engine User's Manual</i> .
DBC	DBC checks if a databank file is internally consistent. It is described in the <i>Mimer SQL Engine System Management Handbook</i> .

Utility	Description
DBOPEN	DBOPEN opens and restarts all databanks in a database. It is described in the <i>Mimer SQL Engine System Management Handbook</i> .
ESQL	ESQL is a pre-processor for embedded SQL.
EXLOAD	Utility to load the example database. See <i>Mimer SQL Engine System Management Handbook</i> .
EXPTOLOAD	A program that converts export files generated by the old UTIL program to a format suitable for MIMLOAD. See <i>Mimer SQL Engine System Management Handbook</i> .
MIMCONTROL	MIMCONTROL provides facilities for managing the operation of a database server, for example, starting, controlled shutdown, etc.
MIMINFO	MIMINFO displays status information for a database server.
MIMLICENSE	Utility for managing Mimer SQL licenses.
MIMLOAD	Utility to load or unload data from the database. See <i>Mimer SQL Engine System Management Handbook</i> .
MIMREPADM	Administration utility for Mimer Replication.
MIMSYNC	Utility to bring two replicated Mimer systems back into sync.
PSMDEBUG	Java-based utility for debugging PSM procedures.
REPSERVER	Replication server.
SDBGEN	SDBGEN generates the Mimer SQL system databanks SYSDB, TRANSDB, LOGDB and SQLDB.
TCPCONTROL	Procedure to manage MIMTCP processes.

The Mimer SQL Engine distribution also contains examples of database programs and SQL statements. See *Appendix A Distributed Files* for more information.

OpenVMS System Requirements

For latest news regarding the OpenVMS version to use with Mimer SQL Engine, please see our developer Web site:

http://developer.mimer.com/platforms/productinfo_9.htm

On Alpha, use OpenVMS 7.3 or later. The following patches are required:

- When using OpenVMS 7.3, the patch PTHREAD_V0300 is needed.
- When using OpenVMS 7.3-1, the patch PTHREAD_V0400 is needed.

On Integrity, use OpenVMS 8.3 or later.

Patches for OpenVMS can be downloaded from this site:

http://h71000.www7.hp.com/serv_support.html

User Requirements

To install Mimer SQL Engine, you should have a working knowledge of system management within the OpenVMS environment.

Documentation Resources

You can find relevant information in the OpenVMS System Management Guide (published by HP).

Note: Most OpenVMS manuals can be found online at the following Internet address: <http://www.openvms.compaq.com:8000/>

You should be familiar with the concepts and facilities provided by the Mimer SQL system.

Other documents that are referred to in this document or that may be of interest when dealing with the tasks described here are: the *Mimer SQL Engine System Management Handbook*, the *Mimer SQL Engine Programmer's Manual*, and the *Mimer SQL Engine Release Notes*.

You can find them at <http://developer.mimer.com/documentation/index.tml>

The documentation is also included in the Mimer SQL Engine distribution, as PDF (Adobe Portable Document Format) files. You can find the files in the [MIMER937E.DOC] directory. Once MIMESSETUP9 is executed, you can use the MIMDOC9 logical name for convenient access to the documentation directory.

Documentation Conventions

Convention	Example	Explanation
All uppercase	COMMIT	Indicates command names, SQL reserved words, and keywords
Monospace	\$ SET COMMAND MIMLIB9:MIMER	Indicates directory names, file names, code examples and interactive screen displays.
[]	[timeout]	Encloses optional items.
[]		Vertical bars separating optional items indicate that you can choose none, one or more than one item.
<i>Italics</i>	<i>Mimer SQL Engine User's Guide</i>	Indicates a cross reference or the title of a guide.

Terms and Definitions

The following terms and acronyms are used in this document:

Term	Explanation
API	Application Programming Interface.
BSQL	Batch SQL, a program used to execute SQL statements which are read from a command file or entered interactively.
CLD	A Command Language Definition (CLD) file that contains definitions for new DCL commands.
Data source	ODBC term for a database.
Databank	Databank is the Mimer SQL term for the physical file in which one or more Mimer SQL tables are stored. A databank corresponds to one file in the operating system. A database may contain several databanks.
Database	A database is a collection of databanks, tables, shadows, etc., all defined as objects in the data dictionary. A computer may have several databases operating simultaneously, but no information is shared between them. Each database has a unique name, registered in the SQLHOSTS file.
Database home directory	The directory where the SYSDB databank file is located, also recorded in the SQLHOSTS file.
DCL	Digital Command Language.
DCL\$PATH	A logical name used by DCL to find executable programs. By including the MIMEXE9 directory in the definition of this logical name, all Mimer SQL programs can be started by typing their names directly. Some of the programs also accept UNIX-style command options when started in this fashion.
Dynamic SQL	SQL statements constructed at runtime and passed to the database management system for execution.
Embedded SQL	The term used for SQL statements when they are embedded in a traditional host language.
ESQL	The preprocessor for embedded SQL.
Java	A platform independent language invented by Sun. See http://java.sun.com .
JDBC	Java DataBase Connectivity. A set of Java interfaces for accessing relational databases. See http://java.sun.com/jdbc .
MIMERxxxxx	Symbolic name for the distribution directory tree, unique for each Mimer SQL release, where "xxxxx" stands for the current version number, e.g. "937E".

Term	Explanation
ODBC	Open Database Connectivity, a specification for a database API in the C language, independent of any specific DBMS or operating system.
PSM	Persistent Stored Modules, the term used by ISO/ANSI for Stored Procedures.
Shadow	<p>A shadow is a copy of the original (master) databank and is continuously updated by Mimer SQL.</p> <p>A Mimer SQL databank may have one or more shadows. If the databank is shadowed, there will be one file for each shadow. If the master databank is lost, it is possible to continue operations from the shadow databank without stopping the database server. A databank must have the TRANS or LOG option to be shadowed. For more information, see the <i>Mimer SQL Engine System Management Handbook</i>.</p>
SQL	Structured Query Language, standardized language for database manipulation.
SQLHOSTS	<p>A file containing lookup information for all accessible Mimer SQL databases, relative to the current node.</p> <p>It is located at <code>SYS\$MANAGER:SQLHOSTS.DAT</code>.</p>
Table	Tables (or relations) hold all the information in a relational database. A table is stored in a databank. It may not be split across databanks, but a databank may contain several tables.

Chapter 2

Installing Mimer SQL

This chapter describes how to install the Mimer SQL Engine software on OpenVMS. It also documents how to remove a Mimer SQL Engine installation.

Overview

The following steps provide an overview of how to install Mimer SQL Engine for OpenVMS.

Step 1 Unpack the distribution file to a directory tree

To unpack the file, simply execute it. Note that the `MIMER937E.EXE` file must reside in your current directory, so you may have to copy the file.

A new directory will be created in your current default directory. For example:

```
$ COPY MIMER937E.EXE somedisk:[000000]
$ SET DEF somedisk:[000000]
$ RUN MIMER937E
```

For more information, see *Unpacking the Mimer SQL Distribution File* on page 8.

Step 2 Set-up the Mimer SQL Environment

Using `MIMSETUP9`, you set up locations for programs, libraries, data files, documentation, etc., for users and applications. For example:

```
$ @somedisk:[MIMER937E]MIMSETUP9 SYS
```

For more information, see *Setting-up the Mimer SQL Environment* on page 9.

Step 3 (Optional) Install your Mimer SQL License Key

A default key, for test and development only, is automatically installed, that is, you can finish the installation without adding a key.

But, if you are going to put Mimer SQL Engine into production you must install a run-time license.

See *Installing the Mimer SQL License Key* on page 11.

Step 4 (Optional) Add a MIMSETUP9 command in the SYSTARTUP_VMS.COM file

In order to set-up Mimer SQL each time the system boots, include the MIMSETUP9 command in the system startup file:

`SYS$MANAGER:SYSTARTUP_VMS.COM`, for example:

```
$ @disk:[MIMER937E]MIMSETUP9 SYSTEM
```

When you have carried out the steps above, you are ready to create your first database, see *Chapter 3, Establishing a Database*.

Unpacking the Mimer SQL Distribution File

The most common way of acquiring the Mimer SQL Engine distribution for OpenVMS is to download it, in ZIP file format, from <http://developer.mimer.com>. The ZIP file is created using Info-ZIP.

Once downloaded, the file looks like an ordinary executable (*.exe) file, for example, the file containing Mimer SQL version 9.3.7E is named `MIMER937E.EXE`.

Unpacking the ZIP File

To unpack the contents of the ZIP file, execute the file. Note that the `MIMER937E.EXE` file must reside in your current directory, so you may have to copy the file.

The Mimer SQL distribution directory will be created under the current directory. For example:

```
$ COPY MIMER937E.EXE somedisk:[000000]
$ SET DEF somedisk:[000000]
$ RUN MIMER937E
```

Note that you must download an executable file that matches your server platform, Alpha or Integrity. If you try to execute the wrong distribution file, you will get an error message.

Ensuring Correct File Protections

Note: The three consecutive dots in the “[...]” construction used in the OpenVMS command examples that follow, together with savesets, are an essential part of the command syntax. If they are omitted, all files on the distribution media will be assigned to a single directory and the Mimer SQL installation will fail.

The auto-extract facility may not always apply the correct file protections to the files it extracts.

Therefore, we recommend that you run the following commands to ensure that the correct file protections are applied to the files in the tree:

```
$ SET FILE/PROT=(S:RWED,O:RWED,G:RE,W:RE) [MIMERxxxxx...] *.*
$ SET FILE/PROT=(S:RWE,O:RWE,G:RE,W:RE) MIMERxxxxx.DIR
```

The Mimer SQL Directory Tree

Once you have successfully unpacked Mimer SQL, you can review the directory structure in which the Mimer SQL Engine Version 9.3 software resides.

The name of the installation root directory in the tree contains the word ‘MIMER’ and the version number of the product, for example: ‘MIMER937E’ (generally denoted as MIMERxxxxx).

The name of the root directory is unique for each Mimer SQL release. This makes it easier to install new versions without affecting any previous versions of the product.

For more information about the files installed, see *Appendix A Distributed Files*.

Setting-up the Mimer SQL Environment

Before you can run Mimer SQL Engine, you must carry out certain setup operations. These include defining locations for programs, libraries, data files and documentation for users and applications.

You set up Mimer SQL using the MIMSETUP9 command procedure. MIMSETUP9 defines the logical names needed to run Mimer SQL applications.

You can find the MIMSETUP9 command procedure in the Mimer SQL root directory.

Note: When running MIMSETUP9, you may require some of the following privileges: SYSPRV, CMKRNL, SYSNAM, see *Privileges* on page 10 for details.

MIMSETUP9 Syntax

The syntax for the MIMSETUP9 command is as follows:

```
$ @disk:[MIMERxxxxxx]MIMSETUP9 [-] [lnm-table]
```

The parameter `lnm-table` specifies which logical name table to use when defining the logical names required to access a Mimer SQL installation.

If the parameter `lnm-table` is preceded by a hyphen (-), the MIMSETUP9 command procedure will remove the effects of any Mimer SQL setup previously performed for the specified table, including uninstalling shareable images.

Valid Values

Valid values for `lnm-table` are:

- SYSTEM
- GROUP
- JOB
- PROCESS

In general, we recommend that you execute MIMSETUP9 to update the SYSTEM logical name table so that the definitions are available to all users.

SYSTEM or GROUP

If you specify SYSTEM or GROUP, the following shared images will be installed if they are not installed already:

- MIMLIB9:MIMDBP9.EXE
- MIMLIB9:MIMDB9.EXE
- MIMLIB9:MIMDBS.EXE

Therefore, for a Mimer SQL installation, you must perform a SYSTEM or GROUP level setup at least once in order to get these essential shared images installed. For more information, see *Shared Images* on page 40.

PROCESS or JOB

You can perform MIMSETUP9 at the PROCESS or JOB level to set up logical names that may be different to those available from the SYSTEM or GROUP level (no shared image installation is involved in a PROCESS or JOB level setup).

If you run MIMSETUP9 without specifying the `lnm-table` parameter, a PROCESS level setup is performed by default.

Privileges

In order to run a SYSTEM-wide MIMSETUP9, you must have SYSPRV, CMKRNL and SYSNAM privileges.

When logical names are defined in the SYSTEM table, they are defined in executive mode.

To run a GROUP-wide MIMSETUP9, you must have SYSPRV and CMKRNL privileges.

System Startup Command File

Since all setups have to be re-executed each time the OpenVMS system is booted, we recommend that you enter the command(s) in the system startup command file:

```
SYS$MANAGER:SYSTARTUP_VMS.COM.
```

For example:

```
$ @disk:[MIMER937E]MIMSETUP9 SYSTEM
```

MIMSETUP9 Examples

Defining Logical names SYSTEM Wide

The following example defines logical names SYSTEM wide, that is, all OpenVMS users may access the Mimer SQL installation. Shareable images are installed.

```
$ @SDEPT2:[MIMER937E]MIMSETUP9 SYSTEM
```

Overriding the Default Definition of the Logical Names

The following example shows how any user can override the default definition of the logical names. This is useful when a user wants to test an alternative Mimer SQL installation. No shareable images are installed.

```
$ @SDEPT2:[MIMER937E]MIMSETUP9
```

Removing a Mimer SQL Setup

The following example demonstrates how to remove a Mimer SQL setup which was previously made GROUP wide by running MIMSETUP9 (MIMROOT9 was defined by MIMSETUP9). Shareable images are uninstalled.

```
$ @MIMROOT9:[000000]MIMSETUP9 -GROUP
```

Logical Names Defined by MIMSETUP9

The MIMSETUP9 command defines the logical names listed below:

Logical Name	Description
MIMROOT9	A concealed logical name pointing to the root of the Mimer SQL distribution.
MIMER_SQLHOSTS	Points to the SQLHOSTS file which contains one entry for every accessible Mimer SQL database. Normally this logical name is set to <code>SYSS\$SPECIFIC:[SYSMGR]SQLHOSTS.DAT</code>
MIMDB9	Logical name pointing to the Mimer SQL shareable library. Used when starting Mimer SQL applications.
MIMDBP9	Logical name pointing to the MIMDBP9 image. Used when starting Mimer SQL applications.
MIMDOC9	Points to the directory containing on-line documentation.
MIMEXAMPLES9	Points to the examples directory in the Mimer SQL distribution.
MIMEXE9	Points to the directory containing executable programs in the Mimer SQL distribution.
MIMLIB9	Points to the directory containing application libraries, CLD files, etc.
MIMODBC9	Points to the Mimer ODBC shared library.
MIMCOMM	Points to a native communication library for JDBC.

Installing the Mimer SQL License Key

Mimer SQL Engine for OpenVMS is free for development and evaluation. A development and evaluation license key is included in the Mimer SQL distribution and is automatically installed.

This means that, as long as you use Mimer SQL for development and/or evaluation, you can set up a complete Mimer SQL environment and work with Mimer SQL without adding any additional license keys.

Mimer SQL for OpenVMS in Production

If you want to use Mimer SQL in production, you must purchase a valid run-time license key and then install it. Please contact your local Mimer SQL representative, see <http://www.mimer.com/contact.asp?seclD=175> or e-mail info@mimer.com.

Node Name

Your representative will need to know the node name of the computer on which the Mimer SQL database server will run.

There are three ways of obtaining the node name:

- 1 Use MIMSETUP9, for example:

```
$ @disk:[MIMERxxxxxx]MIMSETUP9
```

- 2 If the OpenVMS node is part of a cluster, the `scsnod` parameter describes its name:

```
$ WRITE SYS$OUTPUT F$GETSYI("SCSNODE")
```

- 3 If the OpenVMS system is not clustered, the node name parameter may be blank. In this case, you should check the `SYS$NODE` logical name instead:

```
$ SHOW LOG SYS$NODE
```

Receiving Your Run-time License Key

Your run-time license key and instructions for installing it will be e-mailed or faxed to you.

Usually, license key files are distributed via e-mail. When you receive the file, save it in an accessible directory.

The MIMLICENSE Utility

You use the MIMLICENSE utility to administrate the license key file. You can add, remove and update keys using MIMLICENSE.

You can also use MIMLICENSE to list and describe the contents of the key file.

Note: When entering the Mimer SQL license key, you must have appropriate access to the key file.

Adding a License Key using MIMLICENSE**To add a license key**

- 1 Assuming that SET COMMAND MIMLIB9:MIMER is done, see *Setting the Command Style* on page 20, enter the following:

```
$ mimlicense /FILE=file_name.mcfg
```

For example, if the license key file you received was named `1234.mcfg`, you would enter the following:

```
$ mimlicense /FILE=1234.mcfg
```

MIMLICENSE Syntax

The MIMLICENSE program is controlled by options specified on the command-line.

Argument	Function
/ADD= <i>hexcode</i>	Adds a license key.
/FILE= <i>file-name</i>	Adds a license key from a .mcf _g file.
/DELETE= <i>key-id</i>	Deletes the specified key.
/REMOVE	Removes all keys. (Each key must be verified.)
/LIST	Lists the contents of the key file.
/COMBINED	Describes what the combined keys permits.
/SILENT	Silent mode, i.e. execution with no output.

The Mimer SQL license keys are stored in the file:

```
SYS$SPECIFIC:[SYSMGR]MIMERKEY.DAT
```

Removing a Mimer SQL Installation

Caution: If you plan to remove any Mimer SQL databases, see *Removing a Mimer SQL Database* on page 21 **before** removing the Mimer SQL installation.

To remove a Mimer SQL installation:

- 1 Check that no Mimer SQL applications or database servers are using the installation.
- 2 Run the MIMSETUP9 command procedure to uninstall shared images and deassign logical names:

```
$ disk:[MIMERxxxxx]MIMSETUP9 -SYSTEM
```

- 3 Delete the Mimer SQL directory tree, for example:

```
$ SET DEF disk:[000000]
$ SET PROC/PRIV=BYPASS
$ DELETE [.MIMERxxxxx...]*.*.*
$ DELETE [.MIMERxxxxx...]*.*.*
$ DELETE [.MIMERxxxxx...]*.*.*
$ SET PROC/PRIV=NOBYPASS
```

Note: You may have to issue the DELETE command more than once, because the DELETE command will not remove directory files unless they are empty.

- 4 If there are no other Mimer SQL installation trees in the system, you may want to delete the SQLHOSTS file and the Mimer SQL license key file:

```
$ DELETE SYS$SPECIFIC:[SYSMGR]SQLHOSTS.DAT.*
$ DELETE SYS$SPECIFIC:[SYSMGR]MIMERKEY.DAT.*
```

- 5 If you have added any Mimer SQL-related commands to the OpenVMS startup file: SYS\$MANAGER:SYSTARTUP_VMS.COM or the OpenVMS shutdown file: SYS\$MANAGER:SYSHUTDWN.COM, remove the commands.

- 6 If you have added any database-specific commands to the system startup file:
`SYS$MANAGER:SYSTARTUP_VMS.COM` or the shutdown file:
`SYS$MANAGER:SYSHUTDOWN.COM` you should remove them.

Chapter 3

Establishing a Database

This chapter describes how to establish a local database and how to access a remote database already established in the network. It also describes how to upgrade and remove a database.

Refer to the *Mimer SQL Engine System Management Handbook* for background information which is useful for understanding the issues and the different components involved in establishing a Mimer SQL database.

Overview

Having installed Mimer SQL, you can now establish a local database on the node on which you unpacked the Mimer SQL distribution.

To establish a database on an OpenVMS node, you must carry out the following steps:

Step 1 Create a home directory for your Mimer SQL database

See *Creating a Home Directory* on page 15.

Step 2 Prepare access to the database by editing the SQLHOSTS file

See *Editing the SQLHOSTS File* on page 15.

Step 3 Run SDBGEN to generate the system databanks and the SYSADM ident

See *Generating System Databanks and SYSADM* on page 17.

Creating a Home Directory

First of all you must create a home directory for your database, for example:

```
$ CREATE/DIR somedisk:[TESTDB]
```

Editing the SQLHOSTS File

The SQLHOSTS file is used to list all the databases that are accessible to a Mimer SQL application from the node on which it is installed.

On a VMS node, the SQLHOSTS file is located by translating the logical name MIMER_SQLHOSTS.

The MIMSETUP9 command will define it to be:

```
SYS$SPECIFIC:[SYSMGR]SQLHOSTS.DAT
```

A default SQLHOSTS file is installed the first time you run MIMSETUP9.

The SQLHOSTS file contains three sections:

- **LOCAL**
The LOCAL section contains the names of the local databases on the current node, see *Adding a Local Database* on page 16.
- **REMOTE**
The REMOTE section contains the names of remote databases accessible from the node, see *Accessing a Remote Database* on page 19.
- **DEFAULT**
One of the local or remote databases can be set to be the default database for the node by specifying its name in the DEFAULT section, see *Specifying the Default Database* on page 16.

Note: In the SQLHOSTS file, a line of text beginning with the character sequence -- is interpreted as a comment.
The maximum length for the name of a database on an OpenVMS node is 30 characters.

Adding a Local Database

To add a local database:

- 1 Open the SQLHOSTS file in a text editor and locate the LOCAL section.
- 2 Under Database, enter the name of the database.
- 3 Under Path, enter the name of the directory which is to be the database's home directory.

Example of a LOCAL Entry

```
LOCAL:
--
-- Database           Path
-----
TESTDB                DISK:[TESTDB]
-----
```

Specifying the Default Database

The DEFAULT section in the SQLHOSTS file contains a single line that specifies the default database. This is the database which will be used if a database is not explicitly specified when logging on.

The default database must be listed in either the LOCAL or the REMOTE section.

Example of a Default Entry

```

DEFAULT:
--
-- Database
-----
      TESTDB
-----

```

Generating System Databanks and SYSADM

You generate the Mimer SQL system databanks SYSDB, TRANSDB, LOGDB and SQLDB by running the SDBGEN program.

When you run SDBGEN, it also generates the system administration ident SYSADM.

SDBGEN loads the system tables and defines the data dictionary views detailed in the *Mimer SQL Reference Manual*.

Note: A databank created for one SYSDB cannot be accessed by using a different SYSDB even if identical data dictionary definitions are created in it.

SDBGEN

The SDBGEN command has two purposes. Either to create a new set of system databank files, or to upgrade database files created in an earlier version of Mimer SQL to version 9.3. Upgrade can be done for databank files created by Mimer SQL version 7.1 and later.

For more information on upgrading, see *Mimer SQL Engine Release Notes*.

SDBGEN Syntax

Assuming that SET COMMAND MIMLIB9:MIMER is done, you run SDBGEN from the command line, using arguments.

The syntax for creating databank files is as follows:

```
SDBGEN [/PASSWORD=password] [dbase] [syssz] [tfn] [tsz] [lfn] [lsz] [sfn] [ssz]
```

sdbgen Command-line Arguments

Argument	Function
<code>/PASSWORD=password</code>	Password for SYSADM
<code>dbase</code>	Database name
<code>syssz</code>	Size of SYSDB
<code>tfn</code>	Filename for TRANSDB
<code>tsz</code>	Size of TRANSDB
<code>lfn</code>	Filename for LOGDB
<code>lsz</code>	Size of LOGDB
<code>sfn</code>	Filename for SQLDB
<code>ssz</code>	Size of SQLDB

Generating the System Databanks

For example, the following SDBGEN call:

```
$ SDBGEN /PASSWORD=oops TESTDB
```

will generate a database named `my_database` and the database administration ident `SYSADM` will be assigned the password `oops`.

If you do not enter the `password` parameter, SDBGEN will prompt you for all parameters that are missing, including the password for `SYSADM`.

If you enter the `password` parameter, SDBGEN will not prompt for any missing parameters, it will use default values.

If you do not enter the `dbase` parameter, the environment variable `MIMER_DATABASE` is used to determine which database the databank files should be created for.

Setting the Initial Size

You can specify the initial size for each of the Mimer SQL system databanks.

The size for the databanks is specified in Mimer SQL pages. The size of a Mimer SQL page is 2 kilobytes.

SYSADM Password

When you run SDBGEN, the database administration ident `SYSADM` is created and you must specify a password (passwords are case-sensitive) for this ident.

SYSADM Password Case

DCL converts all VMS-style commands to uppercase and all UNIX-style commands to lowercase. To control the case used in your password, you may have use quotes.

The following table shows how to use quotes to set the password case.

Entering:	Sets the password to:
<code>SDBGEN/PASS=oops</code>	<code>OOPS</code>
<code>SDBGEN/PASS="oops"</code>	<code>oops</code>
<code>SDBGEN -p OOPS</code>	<code>oops</code>
<code>SDBGEN -p "OOPS"</code>	<code>OOPS</code>

SYSADM Password Security

For security reasons, the password specified for `SYSADM` is not echoed on the screen when you enter it.

You should change the password at appropriate intervals using Mimer SQL with the ALTER IDENT statement.

Caution: Take care to safeguard the SYSADM password, because if it is lost, it cannot be retrieved from the system and it is not possible to set a new one.

Accessing a Remote Database

You can access databases that reside on other nodes on the network by editing the REMOTE section in the SQLHOSTS file and adding information about the remote database.

For more information on the SQLHOSTS file, see *Editing the SQLHOSTS File* on page 15.

Access to remote databases is provided by using either DECNET or TCP/IP to establish a client/server connection to the remote machine.

Each entry in the REMOTE section can contain up to five fields, separated by spaces and/or tab characters.

The fields in the REMOTE section specify the following:

Field	Explanation
DATABASE	The DATABASE field specifies the name of the remote database.
NODE	The NODE field specifies the network node name of the remote machine. If you are using the TCP/IP interface, you can specify the IP address here.
PROTOCOL	You can specify DECNET or TCP depending on the type of network protocol to be used to create the client/server connection. The default, specified by ' ' (two single quote characters), is TCP.
INTERFACE	The INTERFACE field is currently not used. Specify ' ' (two single quote characters) here.
SERVICE	TCP/IP If using the TCP/IP protocol, enter the TCP/IP port number the database server uses. The default is 1360. DECNET If using DECNET, enter the database name. The server listens to the network object using the same name as the database. (A Mimer SQL 7 database server using DECNET listens to the network object named "MIMER").

Adding a Remote Database

To add a remote database:

- 1 Open the SQLHOSTS file in a text editor and locate the REMOTE section.
- 2 Fill in the fields, as specified above, according to your network configuration.

Example of a REMOTE Entry

```
REMOTE:
--
-- Database           Node           Protocol Interface Service
-----
REMTEST              STARTREK      TCP           ' '          1360
```

Mimer SQL System Settings

You can edit your startup and shutdown files to automatically set-up logical names and install images, command style and automatic database server startup and shutdown.

Setting-up Logical Names and Install Images

In order to set-up Mimer SQL logical names and install images each time your OpenVMS system starts up, you must edit your startup file.

Edit `SYS$MANAGER:SYSSTARTUP_VMS.COM` to include the following line:

```
$ @disk:[MIMER937E]MIMSETUP9 SYSTEM
```

Setting the Command Style

You can use either OpenVMS- or UNIX-style commands.

To set-up your system to automatically accept the style you prefer, you can edit the `LOGIN.COM` file.

OpenVMS-style Commands

In `LOGIN.COM`, add the following line:

```
$ SET COMMAND MIMLIB9:MIMER
```

UNIX-style Commands

In `LOGIN.COM`, add the following line:

```
$ DEFINE DCL$PATH MIMEXE9
```

Automatic Database Server Start

If you want the Mimer SQL database server to start automatically whenever the system is booted, you must edit the `SYS$MANAGER:SYSTARTUP_VMS.COM` file.

The following example starts two Mimer SQL database servers:

```
$ MIMCONTROL/START TESTDB
$ MIMCONTROL/START INVENTORY
```

Automatic Database Server Shutdown

If you want to perform a controlled shutdown of the database server whenever the OpenVMS system is shut down, you must edit the `SYS$MANAGER:SYSHUTDOWN.COM` file and add the relevant commands at the end.

The following example stops two database servers:

```
$ MIMCONTROL/STOP TESTDB
$ MIMCONTROL/STOP INVENTORY
```

Removing a Mimer SQL Database

To remove a database, perform the following steps:

- 1 Check that no one is using the database.
- 2 Check that no database server is started against the database you are going to remove.
- 3 Create a list of all databank files by doing the following:

```
$ BSQL/SINGLE database
Username: SYSADM
Password: xxxxxx
SQL> SELECT DATABANK_FILENAME FROM SYSTEM.DATABANKS;
SQL> EXIT;
```

- 4 Using the list generated in the previous step, locate and delete all the physical databank files. If the file name does not contain a directory specification, the directory will be the home directory of the database.
- 5 Delete any directories that have been specifically created to hold databank files for the database.
- 6 Delete the database entry in:

```
SYS$SPECIFIC: [SYSMGR] SQLHOSTS.DAT
```


Chapter 4

Managing a Database Server

This chapter contains a short guide to administrating database servers under OpenVMS. It also describes how to use the MIMCONTROL command under OpenVMS.

For general information on managing database servers, refer to the *Mimer SQL System Management Handbook*.

The MIMCONTROL Command

Before you can access a database, the Mimer SQL database server must be started on the node it resides on.

You start, stop and control database servers on OpenVMS using the MIMCONTROL command.

Note: You cannot start the MIMCONTROL program by using the DCL command RUN.

Required Privileges

To use MIMCONTROL you must have either:

- SETPRV privilege

or

- CMKRNL, CMEXEC, SHMEM, SYSPRV, WORLD, TMPMBX, OPER, NETMBX, PSWAPM, DETACH, ALTPRI, PRMGBL, SYSGBL, SYSLCK and SYSNAM privileges.

Database Server Parameters – the MULTIDEFS File

When you start a database server on an OpenVMS machine for the first time, MIMCONTROL will create a MULTIDEFS file containing default parameter values for the database server. These parameters are based on the amount of memory installed on the machine.

You may also generate the MULTIDEFS file manually by using the MIMCONTROL/GENERATE command. For example:

```
$ MIMCONTROL/GENERATE TESTDB
```

It is not possible to change the parameters for a running database server.

You can fine-tune database server performance by adjusting the parameters as required. Refer to the *Mimer SQL System Management Handbook* for details.

MIMCONTROL Syntax

You run the MIMCONTROL program is using arguments specified on the command-line.

For example:

```
$ MIMCONTROL/START TESTDB
```

Starts the database server and provides access to TESTDB.

If you run the MIMCONTROL command without any options it displays help on command-line arguments.

MIMCONTROL Command-line Arguments

For more information on MIMCONTROL arguments and their combinations, see the *Mimer SQL System Management Handbook*.

Argument	Function
/STATUS/DCL	Output status information about the specified database server into the symbol MIMER_STATUS for use in a command procedure. For details about the output string resulting from this option, see <i>MIMCONTROL (/STATUS/DCL)</i> on page 25.
/STATUS	Output status information about the specified database server.
/DISABLE	Disable new user connections to the database server. Users already connected are not affected.
/ENABLE	Enable new user connections to the database server.
/KILL	Kill the database server immediately. This should only be used in emergency situations when a normal stop does not work. The next time the database is started, all databanks that were open at the time the server was killed will be automatically checked. Connected users will receive an error the next time they attempt to access the database.
/LOGOUT=chan	Force logout of the specified channel number. Use channel numbers displayed by the USERS option of the MIMINFO command, see the <i>Mimer SQL System Management Guide</i> .
/START [=timeout]	Start the database server. If the server does not become operational within the specified number of seconds, the server will be killed. The default timeout is 600 seconds.

Argument	Function
<code>/STOP [=timeout]</code>	Stop a database server. Any remaining users will be logged out. If the database server does not stop within the specified number of seconds, the server will be killed. The default timeout is 120 seconds.
<code>/WAIT [=timeout]</code>	Wait for all connected users to log out. If there are still users connected after the timeout period expires, the command fails. The timeout period should be given in seconds. If no timeout period is specified wait will be performed without any timeout.
<code>/DUMP</code>	Create a dump directory and produce dumps of all internal database server areas to files in that directory. The files produced can be examined by using MIMINFO, see the <i>Mimer SQL System Management Guide</i> .
<code>/GENERATE</code>	Create a new MULTIDEFS.DAT file with default for parameters, if the file is missing.
<code>database</code>	Specifies the name of the database to access. If a database name is not specified, the default database will be controlled. The default database is determined by setting the MIMER_DATABASE logical name. The DEFAULT setting in SQLHOSTS is not used for MIMCONTROL.

MIMCONTROL (/STATUS/DCL)

The MIMCONTROL/STATUS/DCL command is a special form of the MIMCONTROL/STATUS command which returns the database server status information in the form of a single string containing a comma-separated list which is useful when writing command procedures.

On OpenVMS, the MIMCONTROL command is silent and sets the DCL symbol MIMER_STATUS to the value of the status string.

You can use the lexical function F\$ELEMENT () to extract the list elements. For example:

```
$ MIMCONTROL/STATUS/DCL
$ SHOW SYMBOL MIMER_STATUS
MIMER_STATUS == "Running,Enabled,LOKE_0:[PER.LOKE],0,A2,2003-11-16 16:10"
$ DIR=F$ELEMENT(2,"",MIMER_STATUS)
$ USERS=F$ELEMENT(3,"",MIMER_STATUS)
$ PID=F$ELEMENT(4,"",MIMER_STATUS)
$ SHOW SYMBOL DIR
DIR = "LOKE_0:[PER.LOKE]"
$ SHOW SYMBOL USERS
USERS = "0"
$ SHOW SYMBOL PID
PID = "A2"
```

The MIMTCP Server

If you are using the TCP/IP protocol, a MIMTCP server listening to a specific port (usually port 1360) will be started the first time the database server is started.

TCP/IP Port Number

The TCP/IP port number that the MIMTCP server will listen to is specified in the `TCP_PORT` parameter in the `MULTIDEFS.DAT` file. If several database servers specify the same port number, they will share the same MIMTCP server.

When a client connects to the TCP/IP port, the MIMTCP server will accept the connection. The client specifies the database to which a connection is to be established and the MIMTCP server will hand over the connection to the appropriate database server. All further communication between the client and the database server is then done directly without involving the MIMTCP server.

System Logical Names

Whenever a MIMTCP server starts, it will define the system logical name “MIMTCP_XXXX” (where XXXX is the port number) to be the PID of the MIMTCP server process. This makes it easy to find the MIMTCP server process that is listening to a particular TCP/IP port.

Controlling MIMTCP servers

The command procedure `MIMEXE9:TCPCONTROL.COM` can be used to manage MIMTCP processes. The first parameter given to the procedure controls what the procedure should do. If no parameter is given, a short help message is displayed. The following example shows how the MIMTCP server for port 1360 is stopped and a new server for port 1337 is started:

```
$ @mimexe9:tcpcontrol
Usage: TCPCONTROL STATUS          ! Display status for all MIMTCP processes
      TCPCONTROL START [port]    ! Start MIMTCP process for a port
      TCPCONTROL STOP  [port]    ! Stop the MIMTCP process for a port
      TCPCONTROL STOP  ALL       ! Stop all running MIMTCP processes

$ @mimexe9:tcpcontrol status
      Pid      Port Version      Username      Started
00000227     1360   937E          SYSTEM      25-OCT-2003 22:14:29.22
$ @mimexe9:tcpcontrol stop 1360
MIMTCP process for port 1360 STOPPED
$ @mimexe9:tcpcontrol start 1337
Starting MIMTCP process version 937E
%RUN-S-PROC_ID, identification of created process is 00004D04
$ @mimexe9:tcpcontrol status
      Pid      Port Version      Username      Started
00004D04     1337   937E          SYSTEM      18-NOV-2003 12:09:11.96
```

Starting and stopping MIMTCP servers explicitly using the `TCPCONTROL` procedure is rarely needed. When the `MIMCONTROL/START` command is used, a MIMTCP process will be started automatically. This process will normally be active until the machine is shut down. Since the MIMTCP process does not hold any resources, it is not necessary to shut it down explicitly in the machine shutdown procedure.

Troubleshooting Tips

In order to successfully start a database server, the following conditions must be fulfilled:

- The system databank file, `SYSDB93.DBF`, must have been created. See *Generating System Databanks and SYSADM* on page 17
- There must be an entry for the database in the local section of the `SQLHOSTS` file. See *Editing the SQLHOSTS File* on page 15
- The `ProcName` of the `MULTIDEFS` file must not specify a process name prefix that is identical to that of another running multi-user system.
- The `MIMSETUP9` command procedure must have defined the logical names to be `SYSTEM`-wide or `GROUP`-wide.
- There must not be any logical names in the `JOB` or `PROCESS` tables that override the `SYSTEM` or `GROUP` definitions.
- The shareable image in the file named `MIMLIB9:MIMDBP9.EXE` must be properly installed.
- There must not be any other node in a cluster which has started the same database server.
- The database must not be in use in single-user access mode at the time the database server is started.
- The file `SYS$MANAGER:MIMERKEY.DAT` must contain a valid Mimer SQL license key.

Chapter 5

Running Mimer SQL Applications

This chapter describes how to run applications in the Mimer SQL Engine environment. It covers information that applies to the utilities included in the Mimer SQL Engine installation as well as to applications that may have been created to access a Mimer SQL database.

This chapter also describes:

- Defining whether OpenVMS-style or UNIX-style command-line flags are accepted by the utilities which are supplied as part of the Mimer SQL installation.
- Selecting a Mimer SQL installation – if several Mimer SQL installations reside on the same computer, it is essential that users access the correct one.

Executing Mimer SQL Utilities

This section describes the various ways an application can be executed under OpenVMS and also describes how to set up the Mimer SQL-supplied utilities to use UNIX-style or OpenVMS-style command-line flags.

Using the DCL command RUN

The DCL command `RUN` can be used as follows:

```
$ RUN MIMEXE9:BSQL
```

You cannot specify any flags or other input parameters on the command-line when you use the `RUN` command.

Some of the Mimer SQL-supplied programs allow parameters and options to be supplied via logical names, e.g. `MIMER_DATABASE` to supply a database name and `MIMER_MODE` to define the database access mode.

See documentation for the programs in the *Mimer SQL System Management Handbook* for specific details.

Using OpenVMS Command Definitions

You can set up the programs supplied by Mimer SQL so that they can be run by specifying the program name followed by the VMS-style command line flags and parameters.

You do this by defining the Mimer SQL programs as DCL command verbs.

Use the following OpenVMS command to define all the Mimer SQL-supplied programs as DCL command verbs:

```
$ SET COMMAND MIMLIB9:MIMER
```

Example using OpenVMS-style command-line arguments:

```
$ BSQL/SINGLE TESTDB
```

You can un-define a DCL command by issuing the following command:

```
$ SET COMMAND/DELETE=command-name
```

Caution: Take care when using this DCL command, because any DCL command verb can be un-defined.

Using the DCL\$PATH Logical Name

The DCL\$PATH logical name defines a list of directories in which the OpenVMS operating system will look when trying to locate the executable for a specified program name.

Utilities started this way accept UNIX-style command options.

Note: If you set-up a Mimer SQL-supplied utility as a DCL command verb, the UNIX-style command-line flags and parameters are not used, even if MIMEXE9 is included in DCL\$PATH.

In order for the utilities supplied by Mimer SQL to be run by specifying the utility name followed by the UNIX-style command line flags and parameters, you must include the MIMEXE9 directory in the directory list defined in DCL\$PATH.

If there are other directories containing executables for programs that are to be run this way, those directories must also be included in the directory list defined in DCL\$PATH.

For example, the following DCL\$PATH definition:

```
$ DEFINE DCL$PATH MIMEXE9,disk:<directory.app>
```

will allow the utilities supplied by Mimer SQL to be run by specifying the utility name followed by the UNIX-style command line flags and parameters.

It will also allow all programs found in the specified application directory to be run by specifying the program name.

Example using UNIX-style command-line flags:

```
$ bsql -s testdb
```

Running the PSM Debugger

You can use the Mimer SQL PSM Debugger for debugging PSM procedures that are stored in the Mimer SQL database server. The PSM debugger is written in Java and requires a Java 2 environment.

Since the Debugger accesses the Mimer SQL server by using the TCP protocol, you can execute the Debugger on any machine that has adequate Java support, such as a Windows or Linux machine.

If you want to execute the PSM debugger on the OpenVMS platform, you must first make sure that the Java 2 environment is active.

You can display the current Java version using the following command:

```
$ JAVA -VERSION
```

If you need to install a newer Java version on OpenVMS, you can download the installation kit from the following site:

<http://www.compaq.com/java/download/index.html>

Starting the PSM Debugger

To start the PSM debugger, use the following command:

```
$ JAVA -JAR MIMLIB9:PSMDEBUG.JAR
```

More information about the PSM debugger can be found in the included on-line help file.

Selecting a Mimer SQL Installation

A host computer can have several versions of the Mimer SQL database system installed simultaneously.

Access to a specific version is done through logical names (MIMEXE9, etc.). Since the major version number (currently 9) is included in the logical names, Mimer SQL version 7, version 8 and version 9 can run concurrently without any interference.

If several versions of Mimer SQL Engine version 9 are installed, you can use the MIMSETUP9 command procedure to specify exactly which version a program should work with.

Normally, you do a system wide definition of the logical names. However, you can specify another Mimer SQL version by running the MIMSETUP9 command procedure and specifying a GROUP, JOB or PROCESS logical name definition (see *MIMSETUP9 Syntax* on page 9 for details on MIMSETUP9).

Note: When starting a database server, any JOB or PROCESS logical names will not be inherited by the database server process. The database server will use the Mimer SQL version specified in the GROUP or SYSTEM logical name tables.

Chapter 6

Using the JDBC Driver

The Mimer SQL distribution includes a JDBC driver. This driver enables Java programs running on OpenVMS to access any Mimer SQL database server running at least version 8.2.

The JDBC driver is a ‘type 4’ driver which means that it is written entirely in Java, and can be moved to any platform supporting Java.

Three drivers are supplied. Each driver support a different JDBC standard. Pick the one that best matches your needs.

JDBC Driver	JDBC Standard	Java environment
MIMJDBC1.JAR	JDBC 1.	Java 1.1.8 or later
MIMJDBC2.JAR	JDBC 2	Java 1.2 to Java 1.3
MIMJDBC3.JAR	JDBC 3	Java 1.4 or later

For more information about Java and JDBC, please see:

- SYS\$COMMON:[SYSHLP.JAVA.RELEASE_NOTES]
JDK118_VMS_RELEASE_NOTES.HTML – Java 1.1.8 information (old)
- SYS\$COMMON:[JAVA*.DOCS] INDEX.HTML – Java information for more recent versions
- MIMDOC9:MIMJDBEN.PDF – Information on the Mimer JDBC driver.
- <http://java.sun.com/products/jdbc> – JDBC technology information from Sun.

Using the JDBC Driver

To use the JDBC driver, you must first set-up the OpenVMS Java environment.

Defining Java Commands

When using Java 1.1.8, use the following commands to define the Java commands:

```
$ DEASSIGN JAVA$USE_DCL
$ @SYS$MANAGER:JAVA$SETUP
```

When using a more recent Java version, use the following commands (Java version 1.4.2 is used in the example):

```
$ @SYS$MANAGER:JAVA$142_SETUP
```

Setting CLASSPATH

To use a Mimer JDBC driver, the Java environment must be able to find it.

The logical name CLASSPATH is used for this purpose. This logical name contains a list of directories and Java archives (.ZIP and .JAR files).

On OpenVMS you can use either the JAVA\$CLASSPATH or CLASSPATH logical name to specify a Java classpath. The JAVA\$CLASSPATH logical name is easier to use since it uses standard OpenVMS file specifications.

Example

```
$ DEFINE JAVA$CLASSPATH MIMLIB9:MIMJDBC2.JAR, SYS$DISK:[]
```

It is also possible to use the CLASSPATH logical name. This logical name uses a UNIX syntax to specify a search path. Please read the OpenVMS Java documentation for details.

The following example sets the CLASSPATH logical name to include the Mimer JDBC 1 driver.

Since the equivalence string becomes rather long, and must be enclosed in quotes, a DCL string is constructed.

Example

```
$ SHOW LOG CLASSPATH
"CLASSPATH" = "/sys$common/java/lib/JDK118_CLASSES.ZIP:."
(LNM$PROCESS_TABLE)
$ CLASSPATH=F$TRNLNM("CLASSPATH")+ "/MIMLIB9/MIMJDBC1.JAR"
$ DEFINE CLASSPATH "'CLASSPATH'"
```

The Mimer JDBC driver should now be accessible.

Note: Using logical names that enclose directory specifications with < and > is problematic in Java. Please make sure you use [and] instead.

Verifying the Environment

Since the driver contains a main() function, it is possible to execute it as a program for testing purposes.

Use the -version switch to verify that the Java environment can locate and use the Mimer JDBC driver. Note that quotes must be used since Java package names are case sensitive.

```
$ JAVA "com.mimer.jdbc.Driver" -version
Mimer JDBC driver version 2.14
```

Testing the Connection

Use the `-ping` switch to test that the driver can make a connection with a Mimer SQL v9.3 database server.

Please read the JDBC driver guide for an explanation of the syntax of the connection URL.

```
$ JAVA "com.mimer.jdbc.Driver" -ping -
$_      "jdbc:mimer://SYSADM:PASSWORD@mynode/testdb"
Database connection established.
getDatabaseProductName():  MIMER/DB
getDatabaseProductVersion(): 09.03.0007 MIMER/DB 9.3.07

Ping tests:
 0      2 ms
 1      2 ms
 2      1 ms
 3      1 ms
 4      1 ms
 5      1 ms
 6      0 ms
 7      2 ms
 8      1 ms
 9      1 ms
avg     1 ms      min     0 ms      max     2 ms
```

Finally, compile and execute the JDBC example program. You should copy the example program to a private directory and edit it in order to set the connection URL string, database user name and passwords.

```
$ SET DEF [SOMEWHERE.PRIVATE]
$ COPY MIMEXAMPLES9:EXAMPLE.JAVA []
$ ! Edit the example. Alter the URL and username/password
$ EDIT EXAMPLE.JAVA
$ JAVAC EXAMPLE.JAVA
$ JAVA "Example"
```


Appendix A

Distributed Files

The Mimer SQL distributed files are all located in a directory structure.

Root Directory Files

File Name	Description
DEFAULTKEY.MCFG	Default Mimer SQL license key.
MIMSETUP9.COM	Command procedure that defines logical names and installs images, see <i>Setting-up the Mimer SQL Environment</i> on page 9.
VERSION.DAT	Contains the version number of the Mimer SQL distribution.

Documentation Files (MIMDOC9)

File Name	Description
RELNOTEN.PDF	Mimer SQL Release Notes.
MIMJDBEN.PDF	JDBC usage guide.
README.TXT	A short description of Mimer SQL and how to get started.
MIMVMS.PDF	The VMS guide.
MIMSQLEN.PDF	The Mimer SQL Engine documentation.

Example Files (MIMEXAMPLES9)

File Name	Description
BLOBSAMP . EC	Example of a program written in embedded C that stores and retrieves binary data.
DSQL . EC	Embedded C examples that demonstrates the use of dynamic SQL.
DSQL . H	Header file for the dynamic SQL example.
DSQLSAMP . C	Main program for the dynamic SQL example.
EXAMPLE . EC	Very simple embedded C example.
EXAMPLE . ECO	Very simple embedded COBOL example.
EXAMPLE . EFO	Very simple embedded FORTRAN example.
EXAMPLE . JAVA	Java example program using JDBC.
FREQCALL . EC	Example of a program written in embedded C that calls a stored procedure.
FREQCALL . ECO	Same as FREQCALL.EC, but written in COBOL.
FREQCALL . EFO	Same as FREQCALL.EC, but written in FORTRAN.
SINGLEDEFS . DAT	Contains a template for database parameters in single-user mode, see the <i>Mimer SQL Engine System Management Handbook</i> .
SQLHOSTS . DAT	Contains a template for the SQLHOSTS . DAT file. The actual SQLHOSTS file is pointed to by the MIMER_SQLHOSTS logical name (normally SYS\$MANAGER : SQLHOSTS . DAT). Do not edit this template file.
WAKECALL . EC	Example of a program written in embedded C that calls a stored procedure.
WAKECALL . ECO	Same as WAKECALL.EC, but written in COBOL.
WAKECALL . EFO	Same as WAKECALL.EC, but written in FORTRAN.

Executable Programs (MIMEXE9)

File Name	Description
BSQL . EXE	Program that executes SQL statements which are entered interactively or read from a command file. It is described in the <i>Mimer SQL Engine User's Manual</i> .

File Name	Description
DBC . EXE	Program that can check if a databank file is internally consistent. It is described in the <i>Mimer SQL Engine System Management Handbook</i> .
DBOPEN . EXE	Program that opens and restarts all databanks in a database. It is described in the <i>Mimer SQL Engine System Management Handbook</i> .
DBSERVER . EXE	The database server. Do not start this program directly, use MIMCONTROL to do this.
ESQL . EXE	Pre-processor for embedded SQL.
EXLOAD . EXE	Program to load the example database.
EXPTOLOAD . EXE	Program converting old export files to the new mimload format.
MIMCONTROL . EXE	The MIMCONTROL command, which is used to control database servers, <i>The MIMCONTROL Command</i> on page 23.
MIMINFO . EXE	Program that can display status information for a database server.
MIMLICENSE . EXE	Application used to administrate the license key(s).
MIMLOAD . EXE	Utility to load and unload data.
MIMREPADM . EXE	Administration utility for Mimer Replication.
MIMSYNC . EXE	Utility to bring two replicated Mimer systems back into sync.
MIMTCP . EXE	The program executed by the MIMTCP server, see <i>The MIMTCP Server</i> on page 26. Do not start this program directly.
PSMDEBUG . JAR	The PSM Debugger. For more information, see <i>Running the PSM Debugger</i> on page 31.
REPSERVER . EXE	Mimer Replication server.
SDBGEN . EXE	Program used to create the initial Mimer SQL system databank files in a database, described in the <i>Mimer SQL Engine System Management Handbook</i> .
TCPCONTROL . COM	Procedure to manage MIMTCP processes.

Library Files (MIMLIB9)

File Name	Description
LR.OLB	Library with entries for backward compatibility.
LRU.OLB	Library with entries for backward compatibility.
MDR.OLB	Library with entries for backward compatibility.
MIMCOMM.EXE	Library for shared memory communication in JDBC.
MIMDB9.EXE	Shareable library image containing the code for the Mimer SQL database client API, see <i>Shared Images</i> on page 40.
MIMDBP9.EXE	Protected shareable library image containing code that performs secure and fast shared memory based communication with local database servers.
MIMDBS.EXE	Shareable library image containing code for running a Mimer SQL database in single-user mode. This library is mapped in dynamically when required.
MIMER.CLD	Command definitions for all the executable programs supplied with the Mimer SQL software.
MIMER.OPT	Options file used for linking Mimer SQL applications.
MIMJDBC1.JAR	JDBC 1 driver.
MIMJDBC2.JAR	JDBC 2 driver.
MIMJDBC3.JAR	JDBC 3 driver.
MIMODBC.H	C-definitions for Mimer ODBC specific descriptor attributes, working with 64-bit integers.
MIMODBC9.EXE	ODBC driver library.
MIMSQLXA.OBJ	Object file containing an <code>xa_switch_t</code> entry defining <code>mimsqlxa</code> , which is used when accessing the XA routines in Mimer SQL.

Shared Images

The Mimer SQL Engine distribution contains a number of shareable images which are located in the MIMLIB9 directory.

The shared images are installed by the MIMSETUP9 command procedure when defining logical names in the SYSTEM or GROUP name table.

Mimer SQL applications are linked with the shareable library `MIMLIB9:MIMDB9.EXE`.

When the application image is activated, the OpenVMS system locates the correct shareable image by using the logical name `MIMDB9` (which `MIMSETUP9` has defined as `MIMLIB9:MIMDB9`). This allows users to run applications with other versions of Mimer SQL by using the `MIMSETUP9` procedure, without having to re-link the applications.

If you start an image that is installed with privileges or if you do not have read (R) access to the image file, OpenVMS will only use logical names defined in executive mode when activating shareable images. This is a security precaution that OpenVMS takes to avoid activating non-trusted shareable images together with trusted images.

Note: All logical names that `MIMSETUP9` defines in the `SYSTEM` logical name table are defined in executive mode. This means that privileged or protected images will run the Mimer SQL version defined in the `SYSTEM` table even if there is another Mimer SQL version defined in one of the other tables!

Appendix B

Data Types Used in Mimer SQL

The following sections explain how to compile applications using floating point data types, and what data types Mimer SQL uses internally and externally.

Compiling Applications Using Floating Point Data Types

OpenVMS supports various floating point types. Mimer SQL uses the types that the C compiler uses as default. Unfortunately, this differs between the Alpha and Integrity platforms.

F_FLOAT	4 bytes	Used by Mimer on Alpha
S_FLOAT	4 bytes	Used by Mimer on Integrity
G_FLOAT	8 bytes	Used by Mimer on Alpha
T_FLOAT	8 bytes	Used by Mimer on Integrity
D_FLOAT	8 bytes	Not supported by Mimer
H_FLOAT	16 bytes	Not supported by Mimer

Internal Mimer SQL Representation

Mimer SQL uses only two data representations internally: numeric and character. These two types are used to store all data in the database.

The numeric data type stores numbers in packed BCD format with a maximum precision of 45 digits. Every number stored has an exponent with a range of -999 to +999.

The character data type uses the ISO 8859-1 standard character set, also known as Latin 1. This standard specifies graphic characters and the representation of each character.

On most platforms, including OpenVMS, the ISO 8859-1 character set is used by Mimer SQL to transfer data to and from the application, i.e. the same character set as is used internally.

The ISO 8859-1 character set is presented in the *Mimer SQL Engine Reference Manual*.

External Data Types Supported by Mimer SQL

Any value stored in the database may be read into host language variables as described in the *Mimer SQL Engine Programmer's Manual*.

Mimer SQL will perform all the necessary conversions and will signal an error if the value to be converted is not compatible with the destination type.

Appendix C

Using Version 8 Applications With Mimer SQL Version 9

Note: This chapter applies to Mimer SQL on Alpha/VMS and not Integrity, since no Mimer SQL version 8 was released there.

A Mimer SQL version 8 application is linked with the `MIMDB8` shared library which provides client-side functionality for the application. The `MIMDB8` shared library communicates with the database server.

The API exported by the `MIMDB8` library is compatible with the `MIMDB9` library. Likewise the client/server protocol used between the `MIMDB8/MIMDB9` libraries and the database server is also compatible between versions. This means that there are several ways to run a Mimer SQL Engine version 8 application with a Mimer SQL Engine version 9 server.

Relink the Application

The preferred method is to relink the version 8 application with the `MIMDB9` shared library. This will make the application a true version 9 application and eliminate the setup needed by the other approaches.

This is the preferred method if the sources or object files of the application is still available.

Remap the Shareable Libraries

By defining the logical name `MIMDB8` to point to `MIMDB9`, all version 8 applications will use the `MIMDB9` shared library

```
$ DEFINE MIMDB8 MIMDB9
```

(Define the logical name in the `SYSTEM` or `GROUP` logical name tables as appropriate.)

This method is very similar to relinking the application, but requires extra setup. This setup will also affect all version 8 applications simultaneously, which may lead to undesired effects unless care is exercised.

Continue With the Old Shared Library

Since the client/server protocol used between the `MIMDB8` shared library and the database server is compatible between version 8 and version 9, the old version 8 application can access the version 9 server directly. There is no need to do anything special to the version 8 application.

The drawback with this method is that new features, optimizations and bug corrections in the new `MIMDB9` shared library will not be available to the application; it will function as it did before and rely on the compatibility of the client/server protocol.

This method works for all kinds of communication protocols available; shared-memory, TCP/IP and DECNET. There is no need to do anything special in the `SQLHOSTS` file for this to work.

However, be aware that if you should try to access a database in single-user mode, the `MIMDB8` shared library will map the version 8 single-user library. This library will fail if it tries to open a version 9 database in single-user mode.

Appendix D

Using Version 7 Applications With Mimer SQL Version 9

Note: This chapter applies to Mimer SQL on Alpha/VMS and not Integrity, since no Mimer SQL version 7 was released there.

General database upgrade information is provided in the *Mimer SQL Engine Release Notes*.

This appendix describes the specific task of using a Mimer SQL version 7 application with a Mimer SQL Engine version 9 database server.

License Keys

Please note that the version 7 application needs a version 7 license key (located in MIMKEY7).

The Mimer SQL Engine version 9 database server needs a version 9 license key located in SYSSSPECIFIC:[SYSMGR]MIMERKEY.DAT.

A single node will need both license keys if it runs version 7 applications and a Mimer SQL Engine version 9 server.

Communication Methods

If a Mimer SQL version 7 application is to be used with a Mimer SQL Engine version 9 server, there are four main approaches to establishing communication:

- Re-link the application with the MIMDB9 library. See *Re-linking Applications* on page 48.

- Use the sharable images distributed with MIMER9. See *Remapping Shareable Libraries* on page 48
- Connect to the database using the client/server interface, i.e. from a Mimer SQL version 7 client node to a Mimer SQL Engine version 9 server node. See *Client-server Access* on page 48.
- Connect to the database using the client/server interface locally, i.e. the Mimer SQL version 7 client and Mimer SQL Engine version 9 server are on the same node. See *Local Client/server Access* on page 49.

Re-linking Applications

This method is recommended for applications running on the same node as the database server.

You can re-link Mimer SQL version 7 tools, such as QL or PG, for use in a Mimer SQL Engine version 9 environment, accessing a version 9 database server using the special command procedure `MIMBUILD9.COM`.

To read more about this and download `MIMBUILD9.COM`, please go to:
<http://developer.mimer.com/howto>

Remapping Shareable Libraries

This method is recommended when the sources or objects files for the application is missing.

A Mimer version 7 application can access a Mimer SQL Engine version 9 server by mapping in the version 9 sharable image instead of the version 7 one.

This can be achieved by defining the following logical names, after executing `MIMSETUP7`:

```
$ DEFINE MIMDB7M MIMDB9
$ DEFINE MIMDB7S MIMDB9
```

Client-server Access

This method is recommended when the Mimer SQL Engine version 9 database server is on a remote node in a network.

Mimer SQL version 7 applications and tools can access a Mimer SQL Engine version 9 server through the client/server interface without any modification to the application.

The entry created for a version 9 server in the `SQLHOSTS` file is described in the *Mimer SQL Engine System Management Handbook*.

In version 9, the `SERVICE` field of the `SQLHOSTS` file should specify the specific port (TCP/IP) or network object (DECNET) to which the database server listens. If the `NODE` field is set to the name of the current node and the `SERVICE` field specifies a local database server, the connection will be established to the local server, using the client/server interface.

Local Client/server Access

It is possible to use the client/server interface locally, i.e. using a remote database definition which actually points to a local database server.

To achieve this, the file MIMLIB7:SQLHOSTS.DAT must be updated in a specific way using a 6th parameter in the remote definition.

The following example demonstrates this. The current node is STARTREK, i.e. where the Mimer SQL Engine version 9 server M9SERVER runs.

To access the M9SERVER database, the version 7 application must connect to the database M9ACCESS.

```
--
-- =====
DEFAULT:
--
-- Database
-- -----
M9ACCESS
-- =====
LOCAL:
--
-- Database          Path
-- -----
M9SERVER            DISK: [DIRECTORY]
-- =====
REMOTE:
--
-- Database          Node          Protocol Interface Service
-- -----
M9ACCESS            STARTREK      TCP          ''          1360 M9SERVER
-- =====
```


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