



ODBC Driver Guide

July 2005

Version 9.1

This manual describes Dharma SDK support for the ODBC(Open Database Connectivity) interface. The ODBC driver provides access to Dharma SDK environments from desktop tools and applications that support the ODBC interface.



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PURPOSE OF THIS MANUAL

This manual describes Dharma SDK support for the ODBC(Open Database Connectivity) interface. It also describes the configuration of the Dharma SDK ODBC Driver.

AUDIENCE

This manual is intended for a variety of audiences that will use the Dharma SDK ODBC Driver to access data in proprietary storage systems. The audience includes administrators who set up access to a proprietary storage system from existing ODBC applications. The audience also includes application programmers writing ODBC applications that will access proprietary data through the Dharma SDK ODBC Driver.

STRUCTURE OF THIS DOCUMENT

The following summary describes the contents of this manual:

Chapter 1	Introduces the Dharma ODBC SDK and its components.
Chapter 2	Describes configuring data sources to use the Dharma SDK ODBC Driver.
Chapter 3	Details the Dharma SDK ODBC Driver's support for the ODBC standard, including information it returns to the SQLGetInfo call, and which ODBC API calls it supports.

SYNTAX DIAGRAM CONVENTIONS

UPPERCASE	Uppercase type denotes reserved words. You must include reserved words in statements, but they can be upper or lower case.
lowercase	Lowercase type denotes either user-supplied elements or names of other syntax diagrams. User-supplied elements include names of tables, host-language variables, expressions and literals. Syntax diagrams can refer to each other by name. If a diagram is named, the name appears in lowercase type above and to the left of the diagram, followed by a double-colon (for example, <code>privilege ::</code>). The name of that diagram appears in lowercase in diagrams that refer to it.
{ }	Braces denote a choice among mandatory elements. They enclose a set of options, separated by vertical bars (). You must choose at least one of the options.
[]	Brackets denote an optional element or a choice among optional elements.
	Vertical bars separate a set of options.
...	A horizontal ellipsis denotes that the preceding element can optionally be repeated any number of times.
() , ;	Parentheses and other punctuation marks are required elements. Enter them as shown in syntax diagrams.

RELATED DOCUMENTATION

Refer to the following guides for more information:

<i>Dharma SDK SQL Reference Manual</i>	This manual describes syntax and semantics of SQL language statements and elements for Dharma SDK .
<i>Dharma SDK User Guide</i>	This manual describes the Dharma Software Development Kit (SDK).It describes implementing JDBC, ODBC and .NET access to proprietary data and considerations for creating a release kit to distribute the completed implementation.
<i>Dharma SDK ISQL Reference Manual</i>	This manual provides reference material for the ISQL interactive tool provided in the Dharma SDK environment. It also includes a tutorial describing how to use the ISQL utility.
<i>Dharma SDK ODBC Driver Guide</i>	This manual describes Dharma SDK support for ODBC (Open Database Connectivity) interface and how to configure the Dharma SDK ODBC Driver.

<i>Dharma SDK JDBC Driver Guide</i>	Describes Dharma SDK support for the JDBC interface and how to configure the Dharma SDK JDBC Driver.
<i>Dharma SDK .NET Data Provider Guide</i>	This guide gives an overview of the .NET Data Provider. It describes how to set up and use the .NET Data Provider to access a Dharma SDK database from .NET applications.



Introduction

1.1 OVERVIEW

The Dharma ODBC SDK allows users to access proprietary storage systems through the Open Database Connectivity (ODBC) interface.

The Dharma ODBC SDK supports two different configurations for different network environments.

- The Dharma ODBC SDK Desktop configuration implements a "single-tier" ODBC architecture where the ODBC-compliant front-end tool, the Dharma ODBC Desktop Driver, and the proprietary data all reside on the same Windows XP or Windows 2000 computer.
- The Dharma ODBC SDK Client/Server configuration provides network access to your proprietary data. The ODBC-compliant front-end tool and the Dharma SDK ODBC Driver run on Windows or UNIX clients, while the Dharma SDK Server library runs on the UNIX or Windows server hosting the proprietary storage system.

This manual describes how to add data sources for both configurations, and provides detailed reference material about the ODBC and SQL support they offer.

1.1.1 What is ODBC?

The ODBC interface enables Windows applications to access data from a variety of data sources while insulating the applications from differences between them. The ODBC standard specifies two major components:

- A library of function calls that allows applications to connect with a database system and issue requests. Chapter 3 details Dharma ODBC SDK support for the ODBC Standard.
- Syntax for Structured Query Language (SQL) statements, based on existing standards. Chapters 4 and 5 provide detailed reference material about the SQL interface to the Dharma SDK.

1.1.2 Desktop Configuration

With the Dharma ODBC SDK Desktop version, all components reside on a single computer.

ODBC Application

An ODBC application can be any program that calls ODBC functions and uses them to issue SQL statements. Vendors of Windows-based tools typically include ODBC

capabilities with their software. Tools such as PowerBuilder™, Visual Basic™, and Web tools all can use ODBC for data access.

ODBC Driver Manager

The ODBC driver manager is a Microsoft-supplied program that routes calls from an application to the appropriate ODBC driver for a data source. To an application, the ODBC driver manager and a driver are a single entity that process requests to a particular data source.

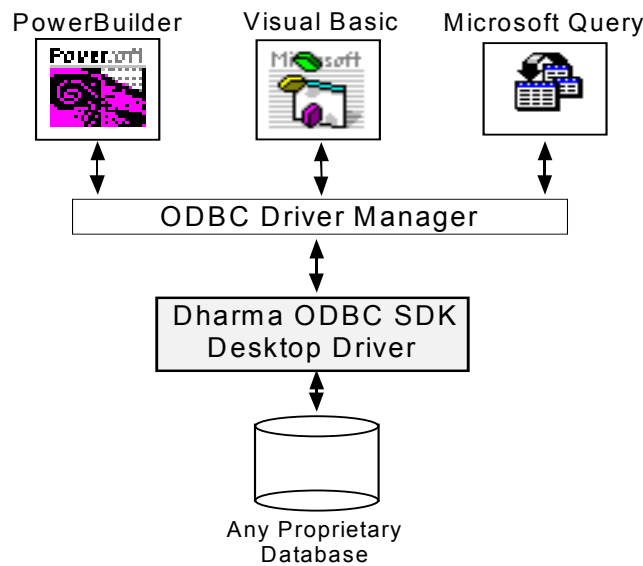
Dharma ODBC SDK Desktop Driver

The Dharma ODBC SDK Desktop Driver processes ODBC function calls from applications that need to access the proprietary storage system. The driver translates the standard SQL statements into syntax the data source can process, retrieves the requested data from the proprietary storage system, and returns data to the application.

The Dharma ODBC SDK Desktop Driver runs on Windows XP and Windows 2000. It is compatible with Version 3.52 of the Microsoft ODBC standard. It supports all Core and Level 1 API functions, and all Level 2 functions required by Windows and Web tools.

The following figure shows how these components work together to provide access to proprietary data.

Figure 1-1: Components of the Dharma Desktop ODBC SDK



1.2 CLIENT/SERVER CONFIGURATION

With the Dharma ODBC SDK Client/Server, there are components on two separate computers. The client is the system where the ODBC application runs. The server is the system that contains the proprietary storage system.

With the client/server configuration, the functions performed by the Dharma Desktop ODBC Driver are separated into two components, the Dharma SDK ODBC Driver and the Dharma SDK Server:

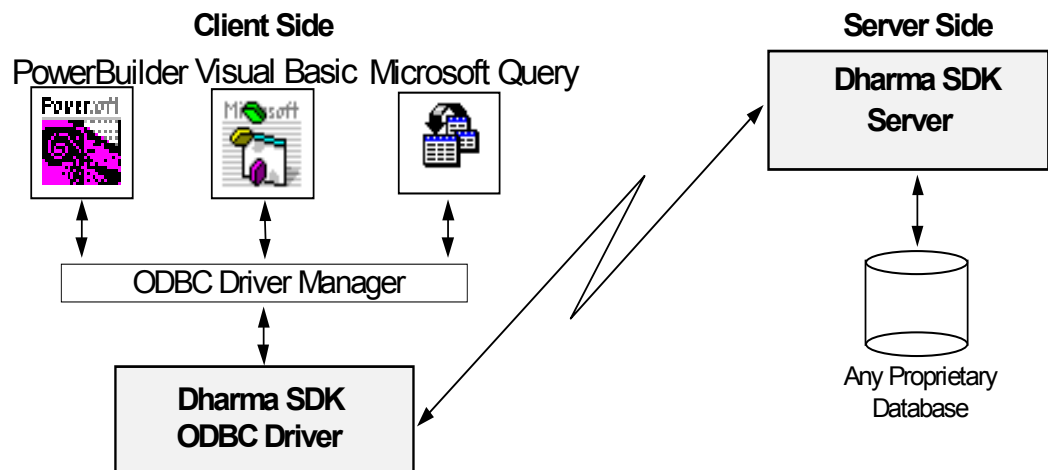
- The Dharma SDK ODBC Driver processes ODBC function calls from applications that request data from the proprietary storage system. The driver connects to the Dharma SDK Server, translates the standard SQL statements into syntax the data source can process, and returns data to the application.

The Dharma SDK ODBC Driver runs on Windows clients. It is compatible with Version 3.52 of the Microsoft ODBC standard. It supports all Core and Level 1 API functions, and all Level 2 functions required by Windows and Web tools.

- The Dharma SDK Server runs on the server hosting the proprietary storage system. It receives requests from the Dharma SDK ODBC Driver, processes them, and retrieves the requested data from the proprietary storage system.

The following figure shows how these components work together to provide access to proprietary data.

Figure 1-2: Dharma ODBC SDK Client/Server



Configuring ODBC Data Sources

2.1 INTRODUCTION

This chapter describes how to add ODBC data sources that provide access to a proprietary storage system.

2.2 CONFIRMING INSTALLATION

This chapter assumes that the Dharma SDK ODBC Driver has already been installed in your environment. Refer to the *Dharma SDK User Guide* for installation instructions.

Refer to information for your proprietary storage system for details on setting up the Dharma SDK in your environment. The following steps may be completed as part of a setup program, or you may have to perform them yourself:

Desktop

- Install the necessary executable files, scripts and initialization file for the Dharma ODBC SDK Desktop executable.
- Create a data dictionary and, if necessary, load it with SQL metadata that describe tables and indexes in the proprietary storage system.

Client/Server

- On the server system, install components for the Dharma SDK Server.
- On the server system, create the *sqlnw* service name and associate it with a port number.
- On the server system, start the *dhdaemon* server process.
- On the server system, create a data dictionary and, if necessary, load it with SQL metadata that describe tables and indexes in the proprietary storage system.
- On the client system, install the Dharma SDK ODBC Driver
- On the client system, create the *sqlnw* service name and associate it with the same port number as specified on the server.

2.3 ADDING NAMES FOR ODBC DATA SOURCES

The ODBC Administrator is a Microsoft utility to configure ODBC data sources and drivers.

All the information an application needs to connect to a particular database is called a data source in ODBC terminology. This information includes the driver name and location, network address, network software, and database name. Depending on the

version of Windows, the ODBC Administrator stores data source information in text files or in the system registry.

The ODBC Administrator lets you enter the connection details for accessing a Dharma SDK database and associate it with a data source name that users refer to when they need to access the data through an ODBC application.

2.3.1 Desktop

Use the Microsoft ODBC Administrator utility to add names of specific data sources you want to access.

1. Invoke the Microsoft ODBC Administrator from Windows (by default, from the Control Panel program group). The ODBC Administrator's Data Sources dialog box appears.
2. Click on the System DSN tab. A list of existing system data sources appears.
3. Click on the Add... button. The Add Data Source dialog box appears.
4. In the list box, double-click on the Dharma Desktop SDK driver. The Dharma ODBC Setup dialog box appears.
5. Enter information in the following text boxes:
 - **Data Source Name:** the name of the ODBC data source for use in ODBC connect calls and by the ODBC Administrator.
 - **Description:** an optional descriptive string.
 - **Database:** the database name. Use the same name here that was specified to the *mdcreate* utility (see Appendix A) to create the data dictionary for the proprietary storage system.
 - **User ID:** the user name for the process.
 - **Password:** the password for the process.
 - **Data Dir:** the location of the data dictionary directory. Leave this field blank unless the *mdcreate* command used the *-d* argument. (If it did, specify the same value here as that used in the *-d* argument.)
 - **Options:** An optional implementer specific string specifying additional connection options. This string has a maximum length of 200 characters. The contents of this string are implementer dependent.

You must supply the name of the data source. If you omit the database name, user name, or password, the driver prompts the ODBC application user for that information when it connects to the data source.

2.3.2 Client/Server

Use the Microsoft ODBC Administrator utility to add the names of any Dharma SDK Server data sources the ODBC driver will connect to:

1. Invoke the Microsoft ODBC Administrator from Windows (by default, from the Control Panel program group). The Administrator's Data Sources dialog box appears.
2. Click on the System DSN tab. A list of existing system data sources appears.
3. Click on the Add... button. The Create New Data Source dialog box appears.
4. In the Installed ODBC Drivers list box, double-click on the Dharma Dharma SDK ODBC driver. The Dharma ODBC Setup dialog box appears.
5. Enter information in the following text boxes:
 - **Data Source Name:** a local name for the Dharma SDK Server data source for use in ODBC connect calls and by the ODBC Administrator.
 - **Description:** an optional descriptive string
 - **Host:** the name of the system where the Dharma SDK Server data source resides
 - **Database:** the database for the process to connect to on the host system. Use the same name here that was specified to the *mdcreate* utility (see Appendix B) to create the data dictionary for the proprietary storage system.
 - **User ID:** the user name for the process
 - **Password:** the password for the process
 - **Service:** the service name used by the server. Leave this field blank unless the *dhdaemon* server process was started using the command line and the command specified the *-s* argument (see Appendix A). (If it did, specify the same value here as that used in the *-s* argument.)
 - **Options:** An optional implementer specific string specifying additional connection options. This string has a maximum length of 200 characters. The contents of this string are implementer dependent

You must supply the name of the data source. If you omit the host name, database name, user name, or password, the driver prompts the ODBC application user for that information when it connects to the data source.

The ODBC Administrator utility updates the ODBC Driver manager registry entry with the information supplied in the dialog box.

ODBC Driver Conformance

3.1 INTRODUCTION

This chapter details the ODBC functionality that Dharma ODBC SDK supports through the ODBC driver.

3.2 GENERAL ODBC AND SQL SUPPORT LEVELS

This chapter details the ODBC functionality the Dharma ODBC SDK supports through the Dharma SDK ODBC Driver. ODBC specifies general conformance levels in two areas:

- ODBC application programming interface (API). Dharma supports all Core and Level 1 ODBC API functions, and most Level 2 functions.
- ODBC SQL syntax. Dharma supports Extended SQL syntax.

This chapter details the information the Dharma SDK ODBC Driver returns when applications call the following functions:

- SQLGetInfo returns various details about the driver and its data source
- SQLGetEnvAttr, SQLGetConnectAttr, SQLGetStmtAttr return attributes of driver behavior
- SQLGetFunctions returns ODBC functions the driver supports
- SQLGetTypeInfo returns data types the driver supports

3.3 RESPONSES TO SQLGETINFO

Applications call the SQLGetInfo function to retrieve details about support for a specific driver and data source provide for different ODBC functionality.

Applications supply the InfoType argument to SQLGetInfo to specify what information type they seek. SQLGetInfo returns the information to the InfoValuePtr output argument. The following table lists each InfoType argument the Dharma SDK ODBC Driver recognizes along with the associated value returned to SQLGetInfo. Shaded rows indicate information types renamed or deprecated for ODBC 3.0.

For more detail about the SQLGetInfo function, see the *Microsoft ODBC Programmer's Reference*.

Table 3-1: Information the Dharma SDK ODBC Driver Returns to SQLGetInfo

Description	InfoType Argument	Returns
Note: Shaded rows indicate information types renamed or deprecated for ODBC 3.0.		

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Guaranteed execute privileges on all procedures returned by SQLProcedures	SQL_ACCESSIBLE_PROCEDURES	Y (guaranteed)
Guaranteed read access to all table names returned by SQLTables	SQL_ACCESSIBLE_TABLES	N (not guaranteed)
Maximum number of active connections	SQL_ACTIVE_CONNECTIONS (Renamed for ODBC 3.0.)	See SQL_MAX_DRIVER_CONNECTIONS
Maximum number of active environments	SQL_ACTIVE_ENVIRONMENTS(ODBC 3.0)	0 (no limit)
Maximum number of active SQL statements	SQL_ACTIVE_STATEMENTS (Renamed for ODBC 3.0.)	See SQL_MAX_CONCURRENT_ACTIVITIES
Aggregate function support	SQL_AGGREGATE_FUNCTIONS(ODBC 3.0)	SQL_AF_ALL SQL_AF_AVG SQL_AF_COUNT SQL_AF_DISTINCT SQL_AF_MAX SQL_AF_MIN SQL_AF_SUM
Support for ALTER DOMAIN statement	SQL_ALTER_DOMAIN(ODBC 3.0)	0 (does not support)
Support for ALTER TABLE clauses	SQL_ALTER_TABLE	SQL_AT_ADD_COLUMN (supports adding columns)
Level of asynchronous mode support	SQL_ASYNC_MODE(ODBC 3.0)	SQL_AM_NONE (not supported)
Behavior with respect to the availability of row counts in batches	SQL_BATCH_ROW_COUNT (ODBC 3.0)	0 (does not support)
Support for batches	SQL_BATCH_SUPPORT (ODBC 3.0)	0 (does not support)
Support for bookmarks	SQL_BOOKMARK_PERSISTENCE	0 (does not support)
Position of qualifier in a qualified table name	SQL_CATALOG_LOCATION(Renamed for ODBC 3.0. Was SQL_QUALIFIER_LOCATION)	0 (does not support)
Support for catalog names	SQL_CATALOG_NAME(ODBC 3.0)	N (does not support)
Character used to separate table, column qualifiers	SQL_CATALOG_NAME_SEPARATOR(Renamed for ODBC 3.0. Was SQL_QUALIFIER_NAME_SEPARATOR)	""

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Name for a catalog	SQL_CATALOG_TERM(Renamed for ODBC 3.0. Was SQL_QUALIFIER_TERM)	"" (does not support)
Statements that support catalog names	SQL_CATALOG_USAGE(Renamed for ODBC 3.0. Was SQL_QUALIFIER_USAGE)	0 (does not support)
Default collation sequence name for the default character set	SQL_COLLATION_SEQ(ODBC 3.0)	"" (unknown)
Support for column aliases	SQL_COLUMN_ALIAS	Y (supports)
Result of concatenation of NULL character column with non-NULL column	SQL_CONCAT_NULL_BEHAVIOR	SQL_CB_NULL (result is null)
Conversion from BIGINT	SQL_CONVERT_BIGINT	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_TINYINT SQL_CVT_SMALLINT SQL_CVT_INTEGER SQL_CVT_FLOAT SQL_CVT_DOUBLE SQL_CVT_BIT
Conversion from BINARY	SQL_CONVERT_BINARY	0 (does not support)
Conversion from BIT	SQL_CONVERT_BIT	0 (does not support)
Conversion from CHAR	SQL_CONVERT_CHAR	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DATE SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TIME SQL_CVT_TIMESTAMP SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from DATE	SQL_CONVERT_DATE	SQL_CVT_CHAR SQL_CVT_DATE SQL_CVT_TIMESTAMP SQL_CVT_VARCHAR

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Conversion from DECIMAL	SQL_CONVERT_DECIMAL	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from DOUBLE	SQL_CONVERT_DOUBLE	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from FLOAT	SQL_CONVERT_FLOAT	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Support for conversion functions	SQL_CONVERT_FUNCTIONS	SQL_FN_CVT_CONVERT (supports)
Conversion from INTEGER	SQL_CONVERT_INTEGER	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from INTERVAL_DAY_TIME	SQL_CONVERT_INTERVAL_DAY_TIME(ODBC 3.0)	0 (does not support)
Conversion from INTERVAL_YEAR_MONTH	SQL_CONVERT_INTERVAL_YEAR_MONTH(ODBC 3.0)	0 (does not support)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Conversion from LONG-VARBINARY	SQL_CONVERT_LONGVARIABLE	0 (does not support)
Conversion from LONG-VARCHAR	SQL_CONVERT_LONGVARIABLE	0 (does not support)
Conversion from NUMERIC	SQL_CONVERT_NUMERIC	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from REAL	SQL_CONVERT_REAL	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from SMALLINT	SQL_CONVERT_SMALLINT	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from TIME	SQL_CONVERT_TIME	SQL_CVT_CHAR SQL_CVT_TIME SQL_CVT_TIMESTAMP
Conversion from TIMESTAMP	SQL_CONVERT_TIMESTAMP	SQL_CVT_CHAR SQL_CVT_DATE SQL_CVT_TIME SQL_CVT_TIMESTAMP SQL_CVT_VARCHAR

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Conversion from TINYINT	SQL_CONVERT_TINYINT	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from VARBINARY	SQL_CONVERT_VARBINARY	0 (does not support)
Conversion from VARCHAR	SQL_CONVERT_VARCHAR	SQL_CVT_BIGINT SQL_CVT_CHAR SQL_CVT_DATE SQL_CVT_DECIMAL SQL_CVT_DOUBLE SQL_CVT_FLOAT SQL_CVT_INTEGER SQL_CVT_NUMERIC SQL_CVT_REAL SQL_CVT_SMALLINT SQL_CVT_TIME SQL_CVT_TIMESTAMP SQL_CVT_TINYINT SQL_CVT_VARCHAR
Conversion from WCHAR	SQL_CONVERT_WCHAR	0 (does not support)
Conversion from WLONGVARCHAR	SQL_CONVERT_WLONGVARCHAR	0 (does not support)
Conversion from WVARCHAR	SQL_CONVERT_WVARCHAR	0 (does not support)
Support for table correlation names	SQL_CORRELATION_NAME	SQL_CN_ANY
Support for CREATE ASSERTION statement	SQL_CREATE_ASSERTION(ODBC 3.0)	0 (does not support)
Support for CREATE CHARACTER SET statement	SQL_CREATE_CHARACTER_SET(ODBC 3.0)	0 (does not support)
Support for CREATE COLLATION statement	SQL_CREATE_COLLATION(ODBC 3.0)	0 (does not support)
Support for CREATE DOMAIN statement	SQL_CREATE_DOMAIN(ODBC 3.0)	0 (does not support)
Support for CREATE SCHEMA statement	SQL_CREATE_SCHEMA(ODBC 3.0)	0 (does not support)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Support for CREATE TABLE statement	SQL_CREATE_TABLE(ODBC 3.0)	SQL_CT_CREATE_TABLE SQL_CT_COMMIT_DELETE SQL_CT_COLUMN_CONSTRAINT SQL_CT_TABLE_CONSTRAINT (supports CREATE TABLE, deleted rows are deleted on commit, supports column constraints and table constraints)
Support for CREATE TRANSLATION statement	SQL_CREATE_TRANSLATION(ODBC 3.0)	0 (does not support)
Support for CREATE VIEW statement	SQL_CREATE_VIEW(ODBC 3.0)	SQL_CV_CREATE_VIEW SQL_CV_CHECK_OPTION (supports CREATE VIEW, CHECK OPTION clause)
Effect of COMMIT operation on cursors and prepared statements	SQL_CURSOR_COMMIT_BEHAVIOR	SQL_CB_CLOSE (closes cursors but statements remain in prepared state)
Effect of ROLLBACK operation on cursors and prepared statements	SQL_CURSOR_ROLLBACK_BEHAVIOR	SQL_CB_CLOSE (closes cursors but statements remain in prepared state)
Support for cursor sensitivity	SQL_CURSOR_SENSITIVITY(ODBC 3.0)	SQL_INSENSITIVE (all cursors on the statement handle show the result set without reflecting any changes made to it by any other cursor within the same transaction)
Name of the data source as specified to the ODBC Administrator	SQL_DATA_SOURCE_NAME	(string containing the name)
Access limited to read-only	SQL_DATA_SOURCE_READ_ONLY	N (read-write access)
Name of the Dharma SDK data source on the server system	SQL_DATABASE_NAME	(string containing the name)
Support for date-time literals	SQL_DATETIME_LITERALS(ODBC 3.0)	0 (does not support)
Name of the database product supporting the data source	SQL_DBMS_NAME	Dharma ODBC SDK
Version of the database product	SQL_DBMS_VER	9.00.0000
Support for creation and dropping of indexes	SQL_DDL_INDEX(ODBC 3.0)	SQL_DI_CREATE_INDEX SQL_DI_DROP_INDEX (supports)
Default transaction isolation level	SQL_DEFAULT_TXN_ISOLATION	SQL_TXN_SERIALIZABLE
Support for describing parameters via DESCRIBE INPUT statement	SQL_DESCRIBE_PARAMETER(ODBC 3.0)	Y (supports)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Name of the dynamic link library file for the ODBC Driver	SQL_DRIVER_NAME	DHSODBC.DLL/DHSTODBC.DLL
Supported ODBC version	SQL_DRIVER_ODBC_VER	03.52
Current Version of the ODBC Driver	SQL_DRIVER_VER	9.00.0000
Support for DROP ASSERTION statement	SQL_DROP_ASSERTION(ODBC 3.0)	0 (does not support)
Support for DROP CHARACTER SET statement	SQL_DROP_CHARACTER_SET(ODBC 3.0)	0 (does not support)
Support for DROP COLLATION statement	SQL_DROP_COLLATION(ODBC 3.0)	0 (does not support)
Support for DROP DOMAIN statement	SQL_DROP_DOMAIN(ODBC 3.0)	0 (does not support)
Support for DROP SCHEMA statement	SQL_DROP_SCHEMA(ODBC 3.0)	0 (does not support)
Support for DROP TABLE statement	SQL_DROP_TABLE(ODBC 3.0)	SQL_DT_DROP_TABLE (supports)
Support for DROP TRANSLATION statement	SQL_DROP_TRANSLATION(ODBC 3.0)	0 (does not support)
Support for DROP VIEW statement	SQL_DROP_VIEW(ODBC 3.0)	SQL_DV_DROP_VIEW (supports)
Supported attributes of a dynamic cursor: subset 1	SQL_DYNAMIC_CURSOR_ATTRIBUTES1(ODBC 3.0)	0 (does not support dynamic cursors)
Supported attributes of a dynamic cursor: subset 2	SQL_DYNAMIC_CURSOR_ATTRIBUTES2(ODBC 3.0)	SQL_CA2_READ_ONLY_CONCURRENCY SQL_CA2_MAX_ROWS_SELECT SQL_CA2_CRC_EXACT
Support for expressions in ORDER BY clause	SQL_EXPRESSIONS_IN_ORDERBY	Y (supports)
Direction that FETCH operations can support	SQL_FETCH_DIRECTION(Deprecated in ODBC 3.0.)	SQL_FD_FETCH_NEXT (fetch next row only)
Single-tier driver behavior	SQL_FILE_USAGE	SQL_FILE_NOT_SUPPORTED (not a single-tier driver)
Supported attributes of a forward-only cursor: subset 1	SQL_FORWARD_ONLY_CURSOR_ATTRIBUTES1(ODBC 3.0)	SQL_CA1_NEXT (supports SQL_FETCH_NEXT argument to SQLFetchScroll for forward-only cursors)
Supported attributes of a forward-only cursor: subset 2	SQL_FORWARD_ONLY_CURSOR_ATTRIBUTES2(ODBC 3.0)	SQL_CA2_READ_ONLY_CONCURRENCY SQL_CA2_MAX_ROWS_SELECT SQL_CA2_CRC_EXACT
Supported extensions to SQLGetData	SQL_GETDATA_EXTENSIONS	0 (does not support)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Relationship between GROUP BY clause and columns in the select list	SQL_GROUP_BY	SQL_GB_GROUP_BY_CONTAINS_SELECT (GROUP BY clause must contain all non-aggregated columns in select list)
Case-sensitivity of user-supplied names	SQL_IDENTIFIER_CASE	SQL_IC_LOWER (case insensitive, stored in lower case)
Character used to enclose delimited identifiers	SQL_IDENTIFIER_QUOTE_CHARACTER	" (double quotation mark)
Supported views in INFORMATION_SCHEMA	SQL_INFO_SCHEMA_VIEWS(ODBC 3.0)	0 (does not support)
Support for INSERT statement	SQL_INSERT_STATEMENT(ODBC 3.0)	SQL_IS_INSERT_LITERALS SQL_IS_SELECT_INTO
Referential integrity syntax support	SQL_INTEGRITY(Renamed for ODBC 3.0. Was SQL_ODBC_SQL_OPT_IEF)	Y (supports referential integrity syntax)
Supported attributes of a keyset cursor: subset 1	SQL_KEYSET_CURSOR_ATTRIBUTES1(ODBC 3.0)	0 (does not support keyset cursors)
Supported attributes of a keyset cursor: subset 2	SQL_KEYSET_CURSOR_ATTRIBUTES2(ODBC 3.0)	0 (does not support keyset cursors)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Data-source specific keywords	SQL_KEYWORDS	acos,add_month,after,an,array,ascii,asin,atan,atan2,before,begin,bigint,binary,bind,binding,call,ceiling,chartorowid,chr,cleanup,clustered,colgroup,complex,compress,concat,contains,cos,curdate,curtime,cvar,database,datapages,dayname,dayofmonth,dayofweek,dayofyear,db_name,dba, declaration, decode, definition,degrees,dhtype,difference, each, exclusive, exit,exp,explicit,field,file,floor,go,goto,grant,greatest,identified,ifnull,indexpages,initcap,inout,instr,interface,lastday, lcase,least,length,link,list,locate, lock, log,log10,long,lpad,ltrim,lvarbinary,lvarchar, main, metadata_only,minus,mod,mode,moify,money,monthename,months_between,newrow,next_day,nocompress,now,nowait,nullvalue,number,nvl,object_id,odbc_convert,odbcinfo,oldrow,out,pctfree,pi,power,prefix,quarter,radians,rand,range,raw,referencing, rename,repeat,replace,resource,row,rowid, rowidtochar, rpad,rtrim,rownum,searched_case,second,service,share,short,sign,simple_case,sin,soundex,sql_bigint,sql_binary,sql_bit,sql_char,sql_date,sql_decimal,sql_double,sql_float,sql_integer,sql_longvarbinary,sql_longvarchar,sql_numeric,sql_real,sql_smallint,sql_time,sql_timestamp,sql_tinyint,sql_tsi_day,sql_tsi_frac_second,sql_tsi_hour,sql_tsi_minute,sql_tsi_month,sql_tsi_quarter,sql_tsi_second,sql_tsi_week,sql_tsi_year,sql_varbinary,sql_varchar,sqrt,start,statement,statitics,stop,storage_attributes,storage_manager,store_in_dharma,substr,suffix,suser_name,synonym,sysdate,systemtime,systemtimestamp,tan,timeout,timestampadd,timestampdiff,tinyint, to_char, to_date, to_number,to_time,to_timestamp,tpe,trigger,type, ucase,uid,unsigned,user_id,user_name,uuid,varbinary,variables,version,week
Support for escape clause in LIKE predicates	SQL_LIKE_ESCAPE_CLAUSE	Y (supports)
Supported lock types	SQL_LOCK_TYPES(Deprecated in ODBC 3.0.)	0 (does not support)
Maximum number of active concurrent statements in asynchronous mode	SQL_MAX_ASYNC_CONCURRENT_STATEMENTS(ODBC 3.0)	1
Maximum length in hexadecimal characters of binary literals	SQL_MAX_BINARY_LITERAL_LEN	2000
Maximum length of a table or column qualifier	SQL_MAX_CATALOG_NAME_LEN(Renamed for ODBC 3.0. Was SQL_MAX_QUALIFIER_NAME_LEN)	0 (does not support)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Maximum length in characters of character string literals	SQL_MAX_CHAR_LITERAL_LENGTH	2000
Maximum length of a column name	SQL_MAX_COLUMN_NAME_LENGTH	32
Maximum number of columns allowed in GROUP BY clause	SQL_MAX_COLUMNS_IN_GROUP_BY	0 (no limit)
Maximum number of columns allowed in an index	SQL_MAX_COLUMNS_IN_INDEX	100
Maximum number of columns allowed in ORDER BY clause	SQL_MAX_COLUMNS_IN_ORDER_BY	0 (no limit)
Maximum number of columns allowed in a select list	SQL_MAX_COLUMNS_IN_SELECT	0 (no limit)
Maximum number of columns allowed in a table	SQL_MAX_COLUMNS_IN_TABLE	500
Maximum number of active SQL statements	SQL_MAX_CONCURRENT_ACTIVITIES(Renamed for ODBC 3.0. Was SQL_ACTIVE_STATEMENTS)	0 (no maximum)
Maximum length of a cursor name	SQL_MAX_CURSOR_NAME_LENGTH	32
Maximum number of active connections	SQL_MAX_DRIVER_CONNECTIONS(Renamed for ODBC 3.0. Was SQL_ACTIVE_CONNECTIONS)	0
Maximum length of user-defined names	SQL_MAX_IDENTIFIER_LENGTH(ODBC 3.0)	32
Maximum number of bytes allowed in the combined fields of an index	SQL_MAX_INDEX_SIZE	0 (no limit)
Maximum length of an owner name	SQL_MAX_OWNER_NAME_LENGTH(Renamed for ODBC 3.0.)	See SQL_MAX_SCHEMA_NAME_LENGTH
Maximum length of a procedure name	SQL_MAX_PROCEDURE_NAME_LENGTH	32
Maximum length of a table or column qualifier	SQL_MAX_QUALIFIER_NAME_LENGTH(Renamed for ODBC 3.0.)	See SQL_MAX_CATALOG_NAME_LENGTH
Maximum length in bytes of a table row	SQL_MAX_ROW_SIZE	0 (no limit)
Whether maximum row size includes LONGVARCHAR and LONGVARBINARY	SQL_MAX_ROW_SIZE_INCLUDES_LONG	N

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Maximum length of an owner name	SQL_MAX_SCHEMA_NAME_LEN(Renamed for ODBC 3.0. Was SQL_MAX_OWNER_NAME_LENGTH)	32
Maximum number of characters in a SQL statement	SQL_MAX_STATEMENT_LEN	35000
Maximum length of a table name	SQL_MAX_TABLE_NAME_LEN	32
Maximum number of tables allowed in FROM clause	SQL_MAX_TABLES_IN_SELECT	250
Maximum length of a user name	SQL_MAX_USER_NAME_LEN	32
Support for multiple result sets	SQL_MULT_RESULT_SETS	N (does not support)
Support for active transactions on multiple connections	SQL_MULTIPLE_ACTIVE_TXN	N
Whether data source requires length of LONG-VARCHAR and LONGVARIABLE data	SQL_NEED_LONG_DATA_LEN	N
Support for NOT NULL clause in CREATE TABLE statement	SQL_NON_NULLABLE_COLUMNS	SQL_NNC_NON_NULL (supports)
Where null values are sorted in a list	SQL_NULL_COLLATION	SQL_NC_LOW (sorted at the low end of the list)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Numeric functions supported	SQL_NUMERIC_FUNCTIONS	SQL_FN_NUM_ABS SQL_FN_NUM_ACOS SQL_FN_NUM_ASIN SQL_FN_NUM_ATAN SQL_FN_NUM_ATAN2 SQL_FN_NUM_CEILING SQL_FN_NUM_COS SQL_FN_NUM_DEGREES SQL_FN_NUM_EXP SQL_FN_NUM_FLOOR SQL_FN_NUM_LOG10 SQL_FN_NUM_LOG SQL_FN_NUM_MOD SQL_FN_NUM_PI SQL_FN_NUM_POWER SQL_FN_NUM_RADIANS SQL_FN_NUM_RAND SQL_FN_NUM_SIGN SQL_FN_NUM_SIN SQL_FN_NUM_SQRT SQL_FN_NUM_TAN (bit masks specifying support for indicated functions)
ODBC API conformance level	SQL_ODBC_API_CONFORMANCE(Deprecated in ODBC 3.0.)	SQL_OAC_LEVEL1 (supports level 1)
SQL Access Group (SAG) conformance	SQL_ODBC_SAG_CLI_CONFORMANCE	SQL_OSCC_COMPLIANT (complies with SAG CLI specification)
ODBC SQL syntax conformance	SQL_ODBC_SQL_CONFORMANCE(Deprecated in ODBC 3.0.)	SQL_OSC_EXTENDED (supports extended SQL syntax as defined by ODBC)
Referential integrity syntax support	SQL_ODBC_SQL_OPT_IEF(Renamed for ODBC 3.0.)	See SQL_INTEGRITY
ODBC version supported by driver manager	SQL_ODBC_VER	Returned by ODBC driver manager
Whether columns in ORDER BY clause must also be in select list	SQL_ORDER_BY_COLUMNS_IN_SELECT	N
Support for outer joins	SQL_OUTER_JOINS	Y (supports)
Term for entity that has owner privileges on objects	SQL_OWNER_TERM(Renamed for ODBC 3.0.)	See SQL_SCHEMA_TERM
Statements that support use of owner qualifiers	SQL_OWNER_USAGE(Renamed for ODBC 3.0.)	See SQL_SCHEMA_USAGE
Characteristics of row counts available in a parameterized execution	SQL_PARAM_ARRAY_ROW_COUNTS(ODBC 3.0)	SQL_PARC_NO_BATCH (only one row count available, which is the cumulative row count resulting from the execution of the statement for the entire array of parameters)
Characteristics of result sets available in a parameterized execution	SQL_PARAM_ARRAY_SELECTS(ODBC 3.0)	SQL_PAS_NO_SELECT

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Supported operations in SQLSetPos	SQL_POS_OPERATION(Deprecated in ODBC 3.0.)	0 (does not support SQLSetPos)
Statements that support positioned operations	SQL_POSITIONED_STATEMENTS(Deprecated in ODBC 3.0.)	SQL_PS_POSITIONED_DELETE SQL_PS_POSITIONED_UPDATE SQL_PS_SELECT_FOR_UPDATE
Term for procedures	SQL_PROCEDURE_TERM	procedure
SQL procedures support	SQL_PROCEDURES	Y (supports SQL procedures)
Position of qualifier in a qualified table name	SQL_QUALIFIER_LOCATION(Renamed for ODBC 3.0.)	See SQL_CATALOG_LOCATION
Character used to separate table, column qualifiers	SQL_QUALIFIER_NAME_SEPARATOR(Renamed for ODBC 3.0.)	See SQL_CATALOG_NAME_SEPARATOR
Term for object that qualifies table names	SQL_QUALIFIER_TERM(Renamed for ODBC 3.0.)	See SQL_CATALOG_TERM
Statements that support qualifiers	SQL_QUALIFIER_USAGE(Renamed for ODBC 3.0.)	See SQL_CATALOG_USAGE
Case-sensitivity of quoted user-supplied names	SQL_QUOTED_IDENTIFIER_CASE	SQL_IC_SENSITIVE (case sensitive, stored in mixed case)
Detect changes to any row in mixed-cursor operations	SQL_ROW_UPDATES	N
Term for entity that has owner privileges on objects	SQL_SCHEMA_TERM(Renamed for ODBC 3.0. Was SQL_OWNER_TERM)	owner
Statements that support use of owner qualifiers	SQL_SCHEMA_USAGE(Renamed for ODBC 3.0. Was SQL_OWNER_USAGE)	SQL_OU_DML_STATEMENTS SQL_OU_PROCEDURE_INVOCATION SQL_OU_TABLE_DEFINITION SQL_OU_INDEX_DEFINITION SQL_OU_PRIVILEGE_DEFINITION
Concurrency control options supported for scrollable cursors	SQL_SCROLL_CONCURRENCY(Deprecated in ODBC 3.0.)	SQL_SCCO_READ_ONLY
Options supported for scrollable cursors	SQL_SCROLL_OPTIONS	SQL_SO_FORWARD_ONLY
Character to permit wildcard characters in search strings	SQL_SEARCH_PATTERN_ESCAPE	\ (backslash)
Name of the system where the Dharma SDK data source resides	SQL_SERVER_NAME	(string containing the name)
Special characters allowed in user-supplied names	SQL_SPECIAL_CHARACTERS	""
Level of SQL-92 support	SQL_SQL_CONFORMANCE(ODBC 3.0)	SQL_SC_SQL92_ENTRY (entry level SQL-92 compliant)

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Datetime scalar functions supported	SQL_SQL92_DATETIME_FUNCTIONS(ODBC 3.0)	SQL_SDF_CURRENT_DATE SQL_SDF_CURRENT_TIME
Behavior of DELETE statement that refers to a foreign key	SQL_SQL92_FOREIGN_KEY_DELETE_RULE(ODBC 3.0)	0 (not supported)
Behavior of UPDATE statement that refers to a foreign key	SQL_SQL92_FOREIGN_KEY_UPDATE_RULE(ODBC 3.0)	0 (not supported)
GRANT statement clauses supported	SQL_SQL92_GRANT(ODBC 3.0)	SQL_SG_DELETE_TABLE SQL_SG_INSERT_TABLE SQL_SG_INSERT_COLUMN SQL_SG_REFERENCES_TABLE SQL_SG_REFERENCES_COLUMN SQL_SG_SELECT_TABLE SQL_SG_UPDATE_TABLE SQL_SG_UPDATE_COLUMN
Numeric scalar functions supported	SQL_SQL92_NUMERIC_VALUE_FUNCTIONS(ODBC 3.0)	SQL_SNVF_CHAR_LENGTH SQL_SNVF_CHARACTER_LENGTH
Predicates supported	SQL_SQL92_PREDICATES(ODBC 3.0)	SP_EXISTS SQL_SP_ISNOTNULL SQL_SP_ISNULL SQL_SP_UNIQUE SQL_SP_LIKE SQL_SP_IN SQL_SP_BETWEEN
Relational join operators supported	SQL_SQL92_RELATIONAL_JOIN_OPERATORS(ODBC 3.0)	0 (not supported)
REVOKE statement clauses supported	SQL_SQL92_REVOKE(ODBC 3.0)	SQL_SR_GRANT_OPTION_FOR SQL_SR_CASCADE SQL_SR_RESTRICT SQL_SR_DELETE_TABLE SQL_SR_INSERT_TABLE SQL_SR_INSERT_COLUMN SQL_SR_REFERENCES_TABLE SQL_SR_REFERENCES_COLUMN SQL_SR_SELECT_TABLE SQL_SR_UPDATE_TABLE SQL_SR_UPDATE_COLUMN
Row value constructor expressions supported	SQL_SQL92_ROW_VALUE_CONSTRUCTOR(ODBC 3.0)	0 (does not support)
String scalar functions supported	SQL_SQL92_STRING_FUNCTIONS(ODBC 3.0)	SQL_SSF_CONVERT SQL_SSF_LOWER SQL_SSF_UPPER SQL_SSF_SUBSTRING SQL_SSF_TRANSLATE SQL_SSF_TRIM_LEADING SQL_SSF_TRIM_TRAILING

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Value expressions supported	SQL_SQL92_VALUE_EXPRESSIONS(ODBC 3.0)	SQL_SVE_COALESCE SQL_SVE_NULLIF
CLI standards to which the driver conforms	SQL_STANDARD_CLI_CONFORMANCE(ODBC 3.0)	SQL_SCC_XOPEN_CLI_VERSION1 (conforms to X/Open CLI version 1)
Supported attributes of a static cursor: subset 1	SQL_STATIC_CURSOR_ATTRIBUTES1(ODBC 3.0)	SQL_CA1_NEXT (supports SQL_FETCH_NEXT argument to SQLFetchScroll for static cursors)
Supported attributes of a static cursor: subset 2	SQL_STATIC_CURSOR_ATTRIBUTES2(ODBC 3.0)	0 (does not support any attributes in the subset)
Whether static cursor changes are detectable	SQL_STATIC_SENSITIVITY(Deprecated in ODBC 3.0.)	0 (does not support static cursors)
String functions supported	SQL_STRING_FUNCTIONS	SQL_FN_STR_ASCII SQL_FN_STR_LTRIM SQL_FN_STR_RTRIM SQL_FN_STR_CONCAT SQL_FN_STR_LENGTH SQL_FN_STR_LOCATE SQL_FN_STR_CHAR SQL_FN_STR_SOUNDEX SQL_FN_STR_CHAR_LENGTH SQL_FN_STR_CHARACTER_LENGTH SQL_FN_STR_DIFFERENCE SQL_FN_STR_INSERT SQL_FN_STR_LCASE SQL_FN_STR_LEFT SQL_FN_STR_UCASE SQL_FN_STR_SPACE SQL_FN_STR_SUBSTRING SQL_FN_STR_REPLACE SQL_FN_STR_REPEAT
Predicates that support subqueries	SQL_SUBQUERIES	SQL_SQ_CORRELATED_SUBQUERIES SQL_SQ_COMPARISON SQL_SQ_EXISTS SQL_SQ_IN SQL_SQ_QUANTIFIED
System functions supported	SQL_SYSTEM_FUNCTIONS	SQL_FN_SYS_DBNAME SQL_FN_SYS_IFNULL SQL_FN_SYS_USERNAME
Term for tables	SQL_TABLE_TERM	Table
Timestamp intervals supported for <i>TIMESTAMPADD</i> function	SQL_TIMEDATE_ADD_INTERVALS	SQL_TSI_FRAC_SECOND SQL_TSI_SECOND SQL_TSI_MINUTE SQL_TSI_HOUR SQL_TSI_DAY SQL_TSI_WEEK SQL_TSI_MONTH SQL_TSI_QUARTER SQL_TSI_YEAR

Table 3-1: Information the Dharma SDK ODBC Driver Returns to *SQLGetInfo*

Description	InfoType Argument	Returns
Timestamp intervals supported for <i>TIMESTAMP-DIFF</i> function	SQL_TIMEDATE_DIFF_INTERVALS	SQL_TSI_FRAC_SECOND SQL_TSI_SECOND SQL_TSI_MINUTE SQL_TSI_HOUR SQL_TSI_DAY SQL_TSI_WEEK SQL_TSI_MONTH SQL_TSI_QUARTER SQL_TSI_YEAR
Date-time functions supported	SQL_TIMEDATE_FUNCTIONS	SQL_FN_TD_CURDATE SQL_FN_TD_CURTIME SQL_FN_TD_DAYNAME SQL_FN_TD_DAYOFMONTH SQL_FN_TD_DAYOFWEEK SQL_FN_TD_DAYOFYEAR SQL_FN_TD_HOUR SQL_FN_TD_MINUTE SQL_FN_TD_MONTH SQL_FN_TD_MONTHNAME SQL_FN_TD_QUARTER SQL_FN_TD_SECOND SQL_FN_TD_TIMESTAMPADD SQL_FN_TD_TIMESTAMPDIFF SQL_FN_TD_WEEK SQL_FN_TD_YEAR
Support for DML, DDL within transactions	SQL_TXN_CAPABLE	SQL_TC_ALL (supports both DML and DDL)
Options for setting transaction isolation levels	SQL_TXN_ISOLATION_OPTION	SQL_TXN_READ_UNCOMMITTED SQL_TXN_READ_COMMITTED SQL_TXN_REPEATABLE_READ SQL_TXN_SERIALIZABLE
UNION support	SQL_UNION	SQL_U_UNION SQL_U_UNION_ALL
Name of user connected to the data source	SQL_USER_NAME	(string containing the name)
A character string that indicates the year of publication of the X/Open specification with which the version of the ODBC Driver Manager fully complies.	SQL_XOPEN_CLI_YEAR	1995

3.4 SUPPORTED ENVIRONMENT, CONNECTION, AND STATEMENT ATTRIBUTES

The following table details the driver attributes that the Dharma SDK ODBC Driver supports. Applications can set and retrieve supported driver attributes through the following routines:

- SQLGetEnvAttr and SQLSetEnvAttr for environment attributes
- SQLGetConnectAttr and SQLSetConnectAttr for connection attributes
- SQLGetStmtAttr and SQLSetStmtAttr for statement attributes

Table 3-2: Supported Environment, Connection, and Statement Attributes

Attribute	Supported?
ODBC Environment Attributes	
SQL_ATTR_CONNECTION_POOLING	No
SQL_ATTR_CP_MATCH	No
SQL_ATTR_ODBC_VER	Yes
SQL_ATTR_OUTPUT_NTS	Yes
ODBC Connection Attributes	
SQL_ATTR_ACCESS_MODE	Yes (supports both read_only and read_write connection modes)
SQL_ATTR_ASYNC_ENABLE	Yes (supports only SQL_ASYNC_ENABLE_OFF, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_AUTO_IPD	Yes
SQL_ATTR_AUTOCOMMIT	Yes
SQL_ATTR_CONNECTION_TIMEOUT	Yes (supports only 0, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_CURRENT_CATALOG	No
SQL_ATTR_LOGIN_TIMEOUT	Yes (supports only 0, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_ODBC_CURSORS	Yes
SQL_ATTR_PACKET_SIZE	Yes (supports only default, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_QUIET_MODE	Yes (supports only default, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_TRACE	No

Table 3-2: Supported Environment, Connection, and Statement Attributes

Attribute	Supported?
SQL_ATTR_TRACEFILE	No
SQL_ATTR_TRANSLATE_DLL	No
SQL_ATTR_TRANSLATE_LIB	No
SQL_ATTR_TRANSLATE_OPTION	No
SQL_ATTR_TXN_ISOLATION	Yes
ODBC Statement Attributes	
SQL_ATTR_APP_PARAM_DESC	Yes
SQL_ATTR_APP_ROW_DESC	Yes
SQL_ATTR_ASYNC_ENABLE	Yes (supports only SQL_ASYNC_ENABLE_OFF, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_CONCURRENCY	Yes (supports only SQL_CONCUR_READ_ONLY, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_CURSOR_SCROLLABLE	No
SQL_ATTR_CURSOR_TYPE	Yes (supports only SQL_FORWARD_ONLY, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_CURSOR_SENSITIVITY	Yes (supports only SQL_INSENSITIVE, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_ENABLE_AUTO_IPD	No
SQL_ATTR_FETCH_BOOKMARK_PTR	No
SQL_ATTR_IMP_PARAM_DESC	Yes
SQL_ATTR_IMP_ROW_DESC	Yes
SQL_ATTR_KEYSET_SIZE	No
SQL_ATTR_MAX_LENGTH	No
SQL_ATTR_MAX_ROWS	Yes
SQL_ATTR_METADATA_ID	Yes
SQL_ATTR_NOSCAN	No
SQL_ATTR_PARAM_BIND_OFFSET_PTR	Yes
SQL_ATTR_PARAM_BIND_TYPE	Yes
SQL_ATTR_PARAM_OPERATION_PTR	Yes
SQL_ATTR_PARAM_STATUS_PTR	Yes

Table 3-2: Supported Environment, Connection, and Statement Attributes

Attribute	Supported?
SQL_ATTR_PARAMS_PROCESSED_PTR	Yes
SQL_ATTR_PARAMSET_SIZE	Yes
SQL_ATTR_QUERY_TIMEOUT	Yes (supports only 0, for other values returns warning "Option value changed" and sets to default)
SQL_ATTR_RETRIEVE_DATA	Yes
SQL_ATTR_ROW_ARRAY_SIZE	Yes
SQL_ATTR_ROW_BIND_OFFSET_PTR	Yes
SQL_ATTR_ROW_BIND_TYPE	Yes
SQL_ATTR_ROW_NUMBER	No
SQL_ATTR_ROW_OPERATION_PTR	Yes
SQL_ATTR_ROW_STATUS_PTR	Yes
SQL_ATTR_ROWS_FETCHED_PTR	Yes
SQL_ATTR_SIMULATE_CURSOR	No
SQL_ATTR_USE_BOOKMARKS	No

3.5 SUPPORTED ODBC API FUNCTIONS

The Dharma SDK ODBC Driver supports all Core and Level 1 API functions, and most Level 2 functions. Here is a complete list of the functions the driver supports. Applications can request this same information through the SQLGetFunctions function with a FunctionId of SQL_API_ODBC3_ALL_FUNCTIONS.

SQLAllocConnect
(Deprecated in ODBC 3.0)

SQLAllocEnv
(Deprecated in ODBC 3.0)

SQLAllocHandle

SQLAllocStmt
(Deprecated in ODBC 3.0)

SQLBindCol

SQLBindParam
(Deprecated in ODBC 3.0)

SQLBindParameter

SQLBrowseConnect

SQLCancel

SQLCloseCursor

SQLColAttribute
SQLColAttributes
(Deprecated in ODBC 3.0)
SQLColumnPrivileges
SQLColumns
SQLConnect
SQLCopyDesc
SQLDataSources
SQLDescribeCol
SQLDescribeParam
SQLDisconnect
SQLDriverConnect
SQLDrivers
SQLEndTran
SQLError
(Deprecated in ODBC 3.0)
SQLExecDirect
SQLExecute
SQLExtendedFetch
(Deprecated in ODBC 3.0)
SQLFetch
SQLFetchScroll
SQLForeignKeys
SQLFreeConnect
(Deprecated in ODBC 3.0)
SQLFreeEnv
(Deprecated in ODBC 3.0)
SQLFreeHandle
SQLFreeStmt
(Deprecated in ODBC 3.0)
SQLGetConnectAttr
SQLGetConnectOption
(Deprecated in ODBC 3.0)
SQLGetCursorName
SQLGetData
SQLGetDescField

SQLGetDescRec
SQLGetDiagField
SQLGetDiagRec
SQLGetEnvAttr
SQLGetFunctions
SQLGetInfo
SQLGetStmtAttr
SQLGetStmtOption
(Deprecated in ODBC 3.0)
SQLGetTypeInfo
SQLMoreResults
SQLNativeSql
SQLNumParams
SQLNumResultCols
SQLParamData
SQLParamOptions
(Deprecated in ODBC 3.0)
SQLPrepare
SQLPrimaryKeys
SQLProcedureColumns
SQLProcedures
SQLPutData
SQLRowCount
SQLSetConnectAttr
SQLSetConnectOption
(Deprecated in ODBC 3.0)
SQLSetCursorName
SQLSetDescField
SQLSetDescRec
SQLSetEnvAttr
SQLSetParam
(Deprecated in ODBC 3.0)
SQLSetScrollOptions
SQLSetStmtAttr

SQLSetStmtOption
 (Deprecated in ODBC 3.0)

SQLSpecialColumns

SQLStatistics

SQLTablePrivileges

SQLTables

SQLTransact
 (Deprecated in ODBC 3.0)

3.6 SUPPORTED DATA TYPES

The Dharma SDK ODBC Driver supports data types that it maps to corresponding ODBC SQL data types. The following table lists the Dharma data types and the corresponding ODBC data types.

Table 3-3: Dharma and Corresponding ODBC Data Types

Dharma Data Type	ODBC Data Type
BIGINT	SQL_BIGINT
BINARY	SQL_BINARY
BIT	SQL_BIT
CHARACTER	SQL_CHAR
DATE	SQL_TYPE_DATE
DECIMAL	SQL_DECIMAL
DOUBLE PRECISION	SQL_DOUBLE
FLOAT	SQL_FLOAT
INTEGER	SQL_INTEGER
LVARBINARY	SQL_LONGVARBINARY
LVARCHAR	SQL_LONGVARCHAR
MONEY	SQL_NUMERIC
NUMERIC	SQL_NUMERIC
REAL	SQL_REAL
SMALLINT	SQL_SMALLINT
TIME	SQL_TYPE_TIME
TIMESTAMP	SQL_TYPE_TIMESTAMP
TINYINT	SQL_TINYINT
VARBINARY	SQL_VARBINARY
VARCHAR	SQL_VARCHAR

3.7 THREAD SAFETY OF DHARMA SDK ODBC DRIVER

By default, the Dharma SDK ODBC Driver is THREAD SAFE. However, this may not always be desired as it involves overhead on the performance of the system. Single Threaded ODBC Applications do not require Thread Safety since only one thread is involved.

To disable the Thread Safety feature, the following runtime flag is used:

DH_DISABLE_ODBC_THREAD_SAFETY

This flag must be set in the initialization file (*dhsodbc.ini* for Client/Server and *dhstodbc.ini* for Desktop) for Dharma ODBC SDK on Windows. In UNIX, it will be an environment variable in the setup file.

The default is Thread Safety enabled. To disable the Thread Safety feature, set

DH_DISABLE_ODBC_THREAD_SAFETY = Y

3.8 ERROR MESSAGES

The error messages generated by the driver are documented in the Dharma SDK SQL Reference guide.

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