Autodesk MapGuide® Release 6

autodesk®

Provider for Oracle® Spatial Guide

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Getting Started

1

This chapter introduces the Autodesk MapGuide® Provider for Oracle® Spatial. Provider for Oracle Spatial is a Microsoft® OLE DB data provider that serves spatial and attribute data from an Oracle8*i*™ Spatial or Oracle9*i*™ Spatial data source. The data that Provider for Oracle Spatial serves to Autodesk MapGuide® follows the OpenGIS Simple Features specification for a COM/OLE component.

In this chapter

- About this document
- Overview
- System requirements
- Before installing Provider for Oracle Spatial
- Installation tasks
- Cancelling installation
- Removing the installation
- Updating or repairing the installation

About This Document

This document is written for system administrators who install Provider for Oracle Spatial for Autodesk MapGuide and manage its operations. The document provides details about the following topics:

- The features and software requirements of Provider for Oracle Spatial
- Installing and configuring Provider for Oracle Spatial configuration files
- The mapping of OpenGIS WKB (Well-Known Binary) geometry to Autodesk MapGuide geometry, which accounts for the minor differences in appearance of maps in the Oracle and MWF file formats
- Information about feature table availability, coordinate systems, and error messages

For information about how to use Provider for Oracle Spatial, choose Help ➤ Contents in Autodesk MapGuide Author, click the Index tab, and look up "vector layers."

Documentation Conventions and Assumptions

This document assumes that you know how to configure, manage, and use Oracle8*i* Spatial or Oracle9*i* Spatial, and how to create maps using Autodesk MapGuide® Author. It assumes that you have read the *Autodesk MapGuide User's Guide* and *Autodesk MapGuide Help*.

This document also assumes that you have already loaded your data into Oracle8*i* Spatial or Oracle9*i* Spatial. You can use the conversion tool from FME® (Feature Manipulation Engine) at http://www.safe.com to load your data into the Oracle8*i* Spatial or Oracle9*i* Spatial formats.

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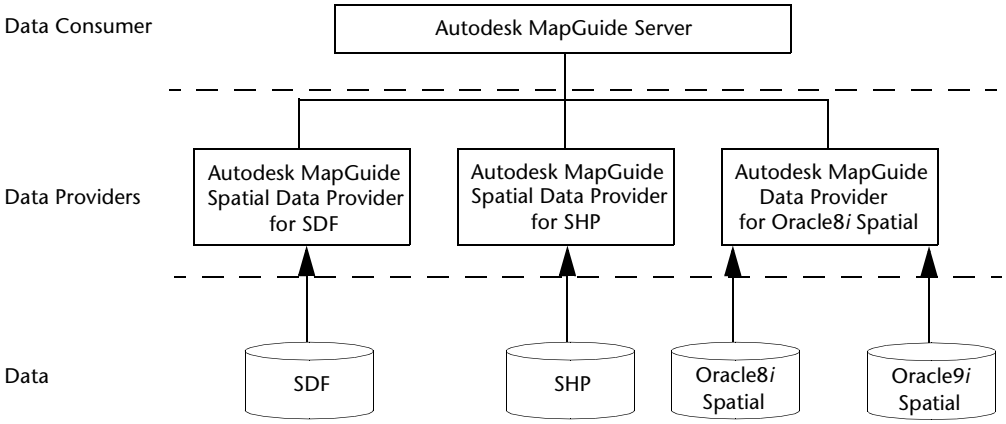
3. Right-click and choose Copy from the shortcut menu.

   The text is copied to the Clipboard.

Overview

The Provider for Oracle Spatial is a member of the family of OLE DB providers to Autodesk MapGuide Server. With the introduction of the Provider for Oracle Spatial, Autodesk MapGuide® Server can now serve spatial and attribute data directly from Oracle8*i* Spatial and Oracle9*i* Spatial data sources using an open industry standard interface. Early versions of Autodesk MapGuide Server could serve spatial data from proprietary SDF data sources only. Autodesk MapGuide Server acts as a data consumer, and is able to access data from SDF, Oracle8*i* Spatial, and other OLE DB data provider components known as Spatial Data Providers (SDP), as shown in the following diagram of OLE DB components.



The Provider for Oracle Spatial is a member of the family of OLE DB providers to Autodesk MapGuide.

OLE DB data providers, such as Provider for Oracle Spatial, implement a set of core OLE DB interfaces for interoperation with other OLE DB data providers, service components, and consumer applications. OLE DB data consumers are software programs, such as Autodesk MapGuide Server, development tools, personal productivity applications, database products, and OLE DB service components that need to access many kinds of data.

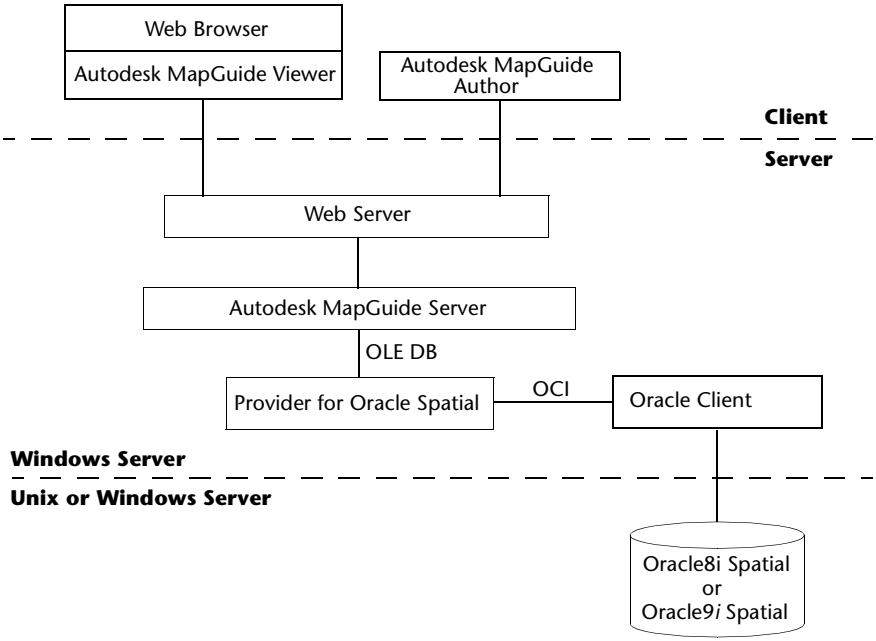
The standardized data access architecture of Provider for Oracle Spatial gives Autodesk MapGuide users the following flexibility:

- Access to spatial and attribute data from SDP and OLE DB data sources
- Ability to create themes based on any SDP or OLE DB attribute, such as an SDF key, name, or URL

This release of Provider for Oracle Spatial does not support data updates.

System Requirements

The following diagram shows the typical system configuration.



The Provider for Oracle Spatial serves Oracle Spatial data through a Web server to authors and viewers.

Supported Platforms

You can install Autodesk MapGuide Server and Provider for Oracle Spatial and on Windows® 2000 Server SP1 or SP2 (SP2 recommended) or on Windows NT 4.0 SP4-SP6a (SP6a recommended).

Required Software

The following software, not included with Provider for Oracle Spatial, must be installed on the server before installing Provider for Oracle Spatial:

- **MDAC/OLE DB 2.5 SP1 or later (Windows NT only)**—Microsoft® Data Access Components (MDAC) establish a connection to the OLE DB data source, which is Oracle8*i* Spatial or Oracle9*i* Spatial. MDAC 2.5 SP1 is a component of the Windows 2000 operating system, and it is available as

a stand-alone distribution program for Windows NT 4.0 that you can download from the Web. MDAC is also included on the Autodesk MapGuide Release 6 CD.

- **Autodesk MapGuide Server Release 6 or later**—Install and authorize Autodesk MapGuide Server before installing Provider for Oracle Spatial. Provider for Oracle Spatial does not function with versions earlier than Autodesk MapGuide Server Release 6.
- **Web Server**—Ensure that Microsoft® Internet Information Server (IIS) 4.0 or later, or Netscape® Enterprise Server 3.6 or later, or iPlanet Web Server Enterprise Edition 4.1 is installed and properly configured.
- **Oracle8i Spatial Release 8.1.7 or Oracle9i Spatial Server**—Install Oracle8*i* Spatial Server or Oracle9*i* Spatial Server on a computer in a network that the Oracle client software can access. You install the Server using the Oracle installer or the command line. For more information,refer to the Oracle documentation.
- **Oracle8i Release 8.1.7 or later client**—Install the Oracle8*i* or Oracle9*i* client software on the same computer as Provider for Oracle Spatial for Autodesk MapGuide.

Required Hardware

- Pentium, 128 MB of RAM (minimum)
- 25 MB free hard disk space (minimum) plus space for data

Before Installing Provider for Oracle Spatial

Before installing Provider for Oracle Spatial, perform the tasks described in this section.

To prepare for installing Provider for Oracle Spatial

1. Uninstall any Beta versions of Autodesk MapGuide Server and Provider for Oracle Spatial if you installed them.

   Warning You cannot install Autodesk MapGuide Server and Provider for Oracle Spatial over previously installed Beta versions of those products.

2. Install MDAC/OLE DB 2.5 SP1.

3 Install Autodesk MapGuide Server Release 6 or later (refer to the *Autodesk MapGuide Server User's Guide*).

Note Do not attempt to use an evaluation version of Autodesk MapGuide Server.

4 Register Autodesk MapGuide Server.

You cannot install Provider for Oracle Spatial unless you are running an authorized version of Autodesk MapGuide Server Release 6 or later.

5 Install the Oracle8*i* or Oracle9*i* client. The minimum client installation, Application User, is sufficient.

6 Using the Oracle Net8™ Configuration Assistant, configure the Oracle network service name, and test the Oracle client connection to the Oracle server.

Installation Tasks

Perform the tasks described in this section to install Provider for Oracle Spatial.

Note To install Provider for Oracle Spatial, you must be logged on as Administrator or as a user who is a member of the Administrators group.

1 Inform Autodesk MapGuide users to discontinue use of the Autodesk MapGuide Server Service until you complete the installation.

The setup program stops Autodesk MapGuide Server Service during installation and restarts it after completing installation.

2 Insert the Autodesk MapGuide Release 6 CD into the CD-ROM drive. An installation dialog box showing the following options is displayed:

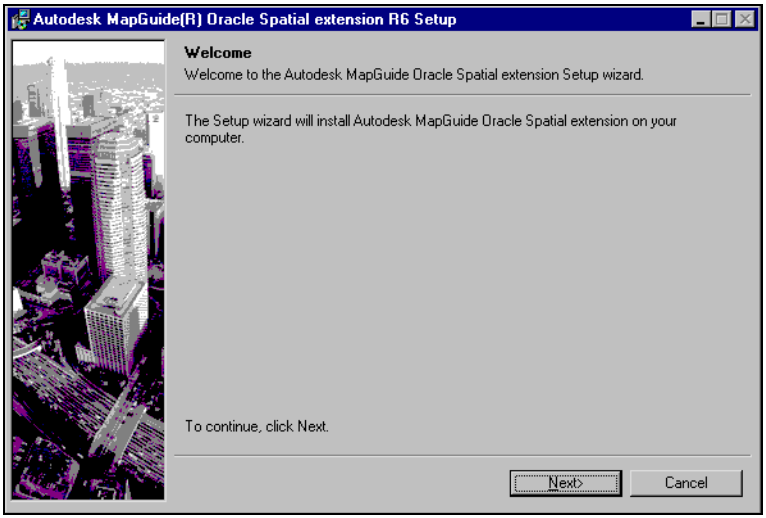
- Server Products
- Author Products
- Viewer Products
- Third-Party Products

Note If the installation dialog box is not displayed, double-click the *setup.exe* file on the Autodesk MapGuide Release 6 CD.

3 Click Autodesk MapGuide Server Products.

4 Click Provider for Oracle Spatial.

The Welcome screen is displayed.



5 Click Next, and follow on-screen instructions to install the Provider for Oracle Spatial.

Cancelling Installation

To cancel the installation, click the Cancel button displayed by the Provider for Oracle Spatial installation program. Do not cancel the installation using the Windows NT Task Manager. Cancelling the installation using the Task Manager leaves files on your hard disk and does not restore your computer to its original state.

Removing the Installation

Use the Add/Remove button on the Add/Remove Programs control panel to remove Provider for Oracle Spatial. You can also use the Autodesk MapGuide Release 6 CD to remove the installation. Removing the installation includes removing registry entries and shortcuts.

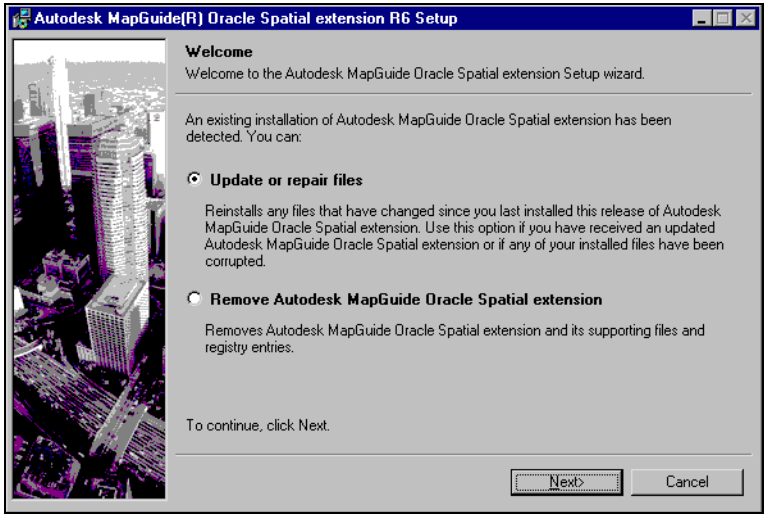
Note To remove the installation, you must be logged on as Administrator or as a user who is a member of the Administrators group.

To remove the installation

1 Inform Autodesk MapGuide users to discontinue use of the Autodesk MapGuide Server service until you complete the changes.

2 Double-click Add/Remove Programs in the Control Panel.

The options for updating, repairing, or removing the installation are displayed.



3 Click Remove Autodesk MapGuide Provider for Oracle Spatial.

4 Click Next, and then follow on-screen instructions to remove the Provider for Oracle Spatial.

Updating or Repairing the Installation

When you update or repair the installation, the install program reinstalls all of the Provider for Oracle Spatial files according to their configuration during the initial installation. If an older or missing file is detected on the system, the installation program reinstalls the files and overwrites shortcuts.

To update or repair the Provider for Oracle Spatial, you need to use the Autodesk MapGuide Release 6 CD. Do not use the Add/Remove Programs control panel. Follow these steps to upgrade or repair the installation.

Note To update or repair Provider for Oracle Spatial, you must be logged on as Administrator or as a user who is a member of the Administrators group.

To update or repair the installation

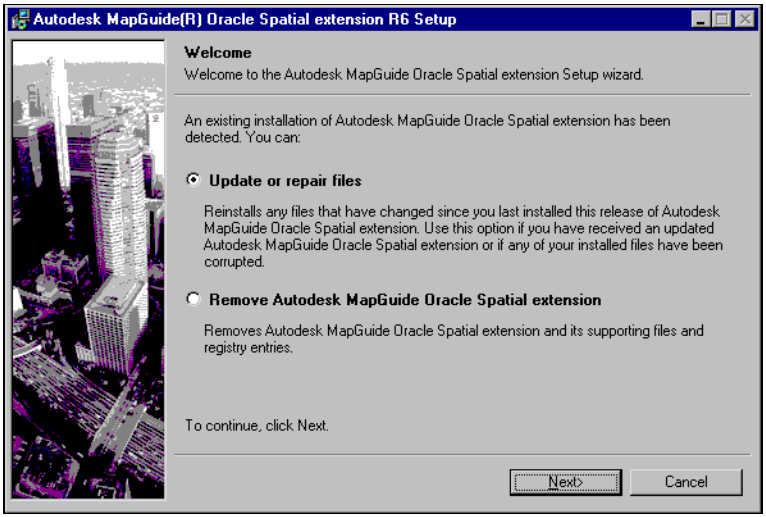
1 Inform Autodesk MapGuide users to discontinue use of the Autodesk MapGuide Server Service until you complete the changes.

2 Insert the Autodesk MapGuide Release 6 CD into the CD-ROM drive. An installation dialog box should be displayed. If it is not, double-click the *setup.exe* file on the Autodesk MapGuide Release 6 CD.

3 Click Autodesk MapGuide Server Products.

4 Click Provider for Oracle Spatial.

The options for updating, repairing, or removing the installation are displayed.



5 Click Update Or Repair Files.

6 Click Next, and then follow on-screen instructions to update or repair the Provider for Oracle Spatial files.

Configuration

2

This chapter describes how to configure Autodesk MapGuide® Provider for Oracle® Spatial by creating a data source, a Microsoft® Universal Data Link (UDL) file, which is used to establish an OLE DB connection from Autodesk MapGuide® Server to Provider for Oracle Spatial. You control error logging during creation of the data source.

In this chapter

- Configuration tasks
- Controlling error logging
- Supported database standard and schemas

Configuration Tasks

You configure the Provider for Oracle Spatial by performing the following tasks:

- **Gathering data source information**—You need to obtain the name of the Oracle server, user ID, password, and other information listed in the "Data Source Information" table shown in "Gathering Data Source Information."
- **Creating a data source**—You store configuration information for the OLE DB data source in the UDL file, which Autodesk MapGuide Server uses to start Provider for Oracle Spatial. Use the Data Sources tab of the Properties dialog box in Autodesk MapGuide® Server Admin to specify the name and location of the file. Provider for Oracle Spatial loads data sources from the specified location.

Gathering Data Source Information

Before creating the data source (UDL file), gather the information shown in the following table:

Data Source Information

Name	Property ID	Description
Server Name	DBPROP_INIT_DATASOURCE	The name of the Oracle server as set up in the Net8 client configuration for the Oracle client. Required. Default Value: None.
User ID	DBPROP_AUTH_USERID	The user name for connecting to the Oracle server that defines the default schema of the connection. Required. Default Value: None.

Data Source Information (*continued*)

Name	Property ID	Description
Password	DBPROP_AUTH_PASSWORD	The password to use when connecting to the Oracle server. Not required. Default Value: None.
Log Level	DBPROP_INIT_LOGLEVEL	The level of logging supported by the provider, which is shown by one of the following possible values: 0 - All logs reported 1 - Only error and warning logs reported 2 - Only error logs reported 3 - No logs reported Not required. Default Value: 0 For more information, see "Controlling Error Logging" on page 23.

Creating Data Sources

After installing Provider for Oracle Spatial, you create data sources. A data source provides the following information for accessing data from an OLE DB provider:

- The type of data that you want to access
- The server on which the data resides
- The database in which the data is stored

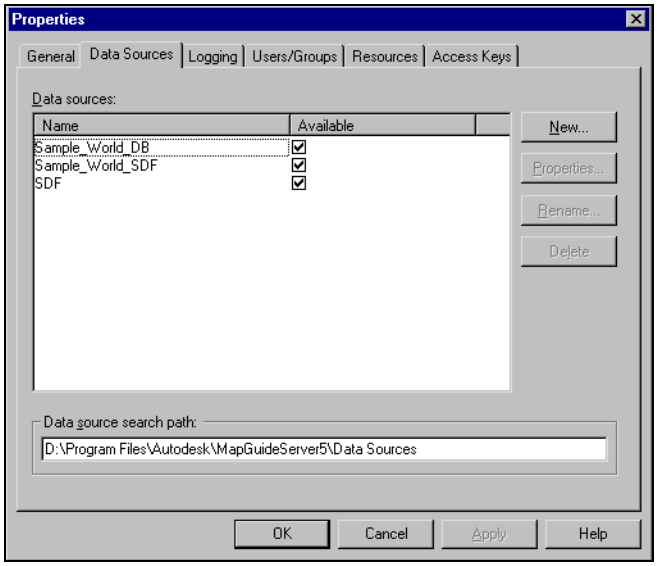
There are several ways to create a data source using the Data Link Properties dialog box:

- Using Autodesk MapGuide Server Admin
- Using Windows NT® tools to create a UDL file for displaying the Data Link Properties dialog box
- Using Windows 2000 tools to create a text file that contains the OLE DB connection string for displaying the Data Link Properties dialog box

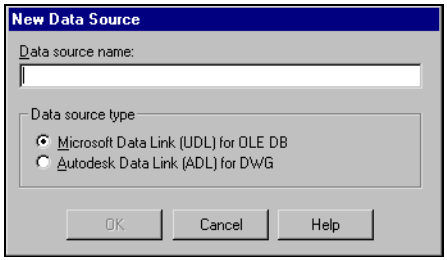
Using Autodesk MapGuide Server Admin

To create a data source file using Autodesk MapGuide Server Admin

1 In Autodesk MapGuide Server Admin, choose Edit ➤ Properties, and click the Data Sources tab in the Properties dialog box.



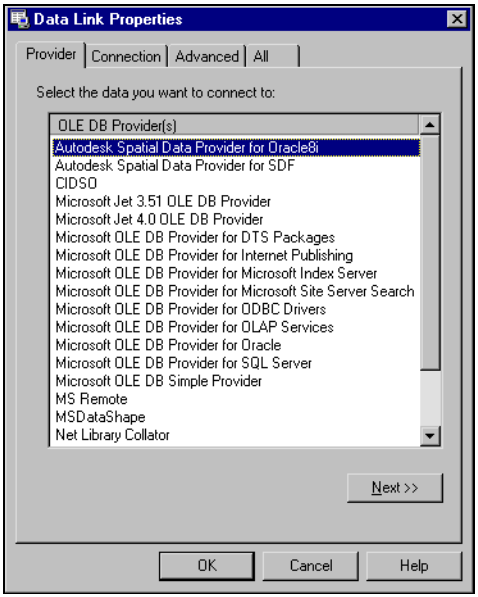
2 Click New.



3 Click Microsoft Data Link (UDL) For OLE DB if it is not selected.

4 Enter a data source name and click OK.

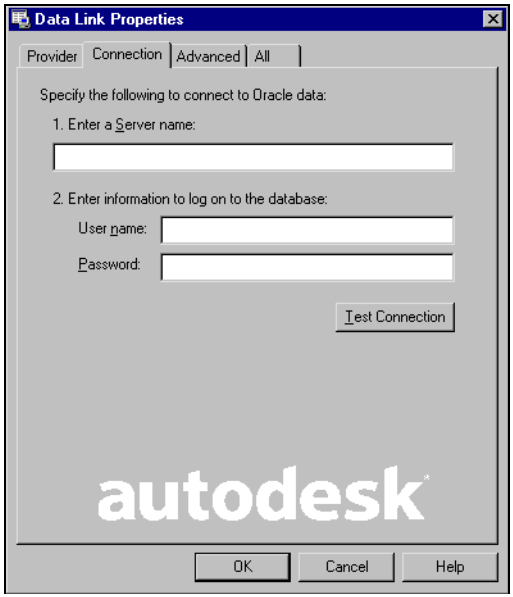
The Data Link Properties dialog box is displayed.



5 On the Provider tab, select Autodesk Spatial Data Provider For Oracle8*i* from the list of data providers.

6 Click Next.

The Connection tab is displayed.



7 On the Connection tab, enter the name of the Oracle server (Server Name) and the Oracle user name (User ID) and password, and then click Test Connection. For more information about these parameters, see the Data Source Information table on page 16.

A message is displayed indicating the success or failure of making the connection.

In the event of a failure, check your user name and password and the connection parameters.

8 Configure error logging (see “Controlling Error Logging” on page 23).

When you finish setting error logging, click OK. Autodesk MapGuide Server creates the data source in the first directory in the server's data sources search path.

9 Close the Data Link Properties dialog box.

Autodesk MapGuide Server Admin displays the name of the new data source on the Data Sources tab of the Properties dialog box.

Using Windows NT

To create the data source using Windows NT

1 Open the Windows Explorer and navigate to the directory location for the data source, or right-click in the Desktop.

2 Choose File ➤ New in the Windows Explorer, or choose New in the Desktop.

Note If you installed MDAC 2.5, you must run the script provided by Microsoft to restore the Microsoft Data Link submenu of the New menu.

3 Click Microsoft Data Link.

4 Perform steps 4–9 of “Using Autodesk MapGuide Server Admin” on page 18.

Using Windows 2000

To create the data source using Windows 2000

1 Open the Windows Explorer.

2 Select the folder in which you want to save the data source. Right-click in the results pane, and choose New ➤ Text Document.

3 Right-click the text file you created in step 2, and then choose Rename. Enter the new file name using a *.udl* file extension. Press ENTER.

Ignore the warning, if it is displayed, that changing file extensions may cause files to become unusable.

4 Select the data source (UDL) file.

5 Perform steps 4–9 of “Using Autodesk MapGuide Server Admin” on page 18.

Troubleshooting Data Source Problems

After completing one of the procedures to create the data source, perform the following steps to check the data source.

To check the data source

1. Choose Edit ➤ Properties in Autodesk MapGuide Server Admin, and click the Data Sources tab. Under Data Source Search Path, check that the data source exists in the search path of the server.

   If the data source does not exist, perform steps 2–4 below.

2. Check that a directory for the data source exists and that you have write permission to access it.
3. Check that the name of the data source file is unique and valid for your operating system. Delete a data source file of the same name if it exists.
4. Check for sufficient disk space for saving the data source.
5. Verify that you installed the Oracle client software correctly by using SQL Plus to connect to the Oracle database from the server where you installed the Provider for Oracle Spatial.

Understanding the Data Source File Syntax

You need to understand data source file syntax if you want to edit UDL files manually or programmatically. During creation of the data source, a connection string is written into the UDL file in flat text format. A connection string is a string version of the initialization properties needed to connect to a data store. The following example shows the minimal connection string:

```
[oledb]
; Everything after this line is an OLE DB initstring
Provider=ASDPOSP.O8ISDP.1;Password=password;User ID=username;Data
Source=mg_01;Locale Identifier=0;Extended Properties="";Connect
Timeout=0;Log Level=2
```

Connection String Syntax

The connection string syntax must adhere to the formats described in this section.

Connection String Format

The basic connection string format consists of a series of keyword and value pairs separated by semicolons. The equals symbol (=) connects each keyword and its value. For example, `keyword1=value; keyword2=value.`

Provider Keyword Format

The Provider keyword identifies the OLE DB provider. The keyword is followed by an equals symbol (=). For example, `Provider=. . .`

The value of the provider may have a version number attached to the end of it. The following example specifies version 1:

```
Provider=ASDPOSP.O8ISDP.1
```

Controlling Error Logging

The operating system reports errors in the Event Viewer. Options on the Advanced tab of the Data Link Properties dialog box set the level of error logging provided by Provider for Oracle Spatial.

To set error logging

1. In Autodesk MapGuide Server Admin, choose Edit ➤ Properties and click the Data Sources tab in the Properties dialog box.
2. Select Autodesk Spatial Data Provider For Oracle from the list of data sources.
3. Click Properties.

   The Data Link Properties dialog box is displayed.
4. Click the Advanced tab.

The Error Logging Level options are displayed.

5 Specify the error logging level by clicking one of the following options:

- All Logs Reported
- Only Error And Warning Logs Reported
- Only Error Logs Reported
- No Logs Reported

6 Click OK to close the Data Link Properties dialog box and click OK again to close the Properties dialog box.

Supported Database Standard and Schemas

The Provider for Oracle Spatial supports OLE DB, Microsoft's component database architecture. OLE DB is a Component Object Model (COM) programming interface for accessing diverse information sources, regardless of location or type. OLE DB is an open specification that includes Microsoft's Open Database Connectivity (ODBC) industry-standard data access interface. ODBC accesses relational databases, but OLE DB works with relational and nonrelational information sources.

Autodesk MapGuide Server accesses Oracle data provided by the Provider for Oracle Spatial, using database schema information to determine its interaction with Oracle. Using this schema information, Autodesk MapGuide Viewer processes and displays the results of queries.

Geometry Mapping, Coordinate Systems, and Error Messages

3

This chapter describes the geometry mapping between the OLE DB components, how feature table availability is determined, and how the coordinate system of the data within a feature table is established. Also included in this chapter are error messages produced by Autodesk MapGuide® Provider for Oracle® Spatial.

In this chapter

- Oracle Spatial to OpenGIS WKB mapping
- OpenGIS to Autodesk MapGuide feature geometry mapping
- Determining feature table availability and the coordinate system
- Using error messages

Oracle8*i* Spatial and Oracle9*i* Spatial to OpenGIS WKB Mapping

Understanding the mapping of the geometry types identified within Oracle8*i*™ Spatial and Oracle9*i*™ Spatial to the types exported from Provider for Oracle Spatial is important for using the products effectively. Oracle8*i* Spatial and Oracle9*i* Spatial maintains a list of geometry types in a value list called SDO_GTYPE and enumerate the values from 0 to 7. Provider for Oracle Spatial uses these types and creates the WKB data array based on the SDO_GTYPE to OpenGIS WKB mapping. The SDO_GTYPE has a value that is expressed as d00x, where *d* is a value of 1 through 4 and *x* is an integer. The OpenGIS WKB Format column in the following table describes what the Oracle data looks like after Provider for Oracle Spatial exports the data to Autodesk MapGuide® Server:

Oracle Spatial–OpenGIS WKB Mapping

SDO_GTYPE	Description	OpenGIS WKB Format
UNKNOWN_ GEOMETRY Value: d000	Oracle8i Spatial and Oracle9i Spatial ignore this GTYPE.	NULL Comment: The provider does not enumerate this geometry element.
Single Point Value: d001	Geometry contains one point only.	Formats as a wkbPoint. Comments: Examines the first triplet in SDO_ELEM_INFO only. Ignores subsequent triplets without an error or warning. All geometry types other than point (ETYPE 1) generate an error—a point cluster in the first triplet (ETYPE 2) is treated as an error.
Single Linestring or Arc String Value: d002	Geometry contains one line string only.	Formats a single linestring (ETYPE 2) or single compound linestring (ETYPE 4) as a single wkbLineString. Comments: Examines only the first triplet or set of triplets forming a compound linestring in SDO_ELEM_INFO. Ignores subsequent triplets without an error or warning. All geometry types other than linestring (ETYPE 2) or compound linestring (ETYPE 4) generate an error if encountered in the first triplet or in the first set of triplets identified for a compound linestring.

Oracle Spatial–OpenGIS WKB Mapping (*continued*)

SDO_GTYPE	Description	OpenGIS WKB Format
Single Polygon Value: d003	Geometry contains one polygon only. May contain multiple holes.	Formats a single polygon (ETYPE 3) with only one ring as a wkbPolygon. Formats a single polygon with more then one ring as a wkbMultiPolygon. Comments: Geometry types other than polygon (ETYPE 3) or compound polygon (ETYPE 5, which can contain ETYPE 2 elements) generate an error.
Heterogeneous Collection Value: d004	Geometry is a heterogeneous collection of other geometries.	Comments: Compound linestrings (ETYPE 4) must contain only linestring (ETYPE 2) elements, or an error occurs. Collections (SDO_GTYPE 4) can contain any type of geometry in any order without restrictions. Objects created within a collection are formatted as specified elsewhere in this table for each individual geometry or homogenous geometry group. Errors occur if the collections are related to an invalid database entry, such as a NULL ordinate.
Point Collection Value: d005	Multipoint. Geometry contains one or more points.	Formats a single point (ETYPE 1) as a wkbMultiPoint composed of a single wkbPoint. Formats a single point cluster (ETYPE 2) as a wkbMultiPoint composed of multiple wkbPoints. Formats an arbitrary mixture of single point (ETYPE 1) and point clusters (ETYPE 2) as a single wkbMultiPoint composed of multiple wkbPoints. Formats a multipolygon (SDO_GTYPE 5) as a wkbMultiPolygon. Comments: Geometry types other then single point (ETYPE 1) or point cluster (ETYPE 2) generate an error.

Oracle Spatial–OpenGIS WKB Mapping (*continued*)

SDO_GTYPE	Description	OpenGIS WKB Format
Linestring or Arc String Collection Value: d006	Multilinesegment. Geometry contains one or more line strings.	Formats a single linestring (ETYPE 2) or single compound linestring (ETYPE 4) as a single wkbMultiLineString composed of a single wkbLineString. Formats an arbitrary mixture of single linestring (ETYPE 2) or compound linestring (ETYPE 4) elements as a single wkbMultiLineString composed of multiple wkbLineString. Comments: All geometry types other than linestring (ETYPE 2) or compound linestring (ETYPE 4) generate an error.
Polygon Collection Value: d007	Geometry contains one or more polygons.	Formats mixed polygons (ETYPE 5) as one polygon. Formats polygons with holes (more then one ring) as a wkbMultipolygon composed of wkbPolygons for each ring. Comments: Autodesk MapGuide renders polygons with holes correctly. Compound polygons (ETYPE 5) must contain linestring (ETYPE 2) elements, or an error occurs. No verification of the orientation or nesting of exterior or interior rings of polygons is made.

Handling ETYPES and GTYPES with More Than Two Dimensions

ETYPES greater than 10, which denote interior/exterior rings, are ignored. Geometry GTYPES with a dimension greater than 2 are downgraded to a two-dimensional geometry object. Downgraded geometries handle ordinates in a dimensional fashion; ordinals subsequent to the first two are ignored.

Tessellating Arcs and Circles

Oracle8*i* Spatial and Oracle9*i* Spatial specify three points on an arc or circle. Provider for Oracle Spatial uses a formula to create the arc from the beginning angle to the end angle, or to draw the circumference of the circle. Two parameters determine how the Provider for Oracle Spatial writes the arc:

- Minimum segments per arc
- Radians per arc stroke

The default value for the minimum segments per arc is 20 and the default value of the radians per arc stroke is an angle in radians, 0.0523599 (3 degrees). You can change the values of these parameters in the Registry.

By default, Provider for Oracle Spatial creates an arc using 3-degree line segments. The minimum segments per arc value sets the minimum number of line segments that Provider for Oracle Spatial uses to make the arc. This minimum ensures good resolution for small arcs.

Provider for Oracle Spatial draws the first point after 0 at 3 degrees. If an arc is composed of less than 20 points, the angle for calculating each point is decreased until the arc is composed of a minimum of 20 points.

OpenGIS WKB to Autodesk MapGuide Feature Geometry Mapping

Autodesk MapGuide Server maps OpenGIS Well-Known Binary (WKB) Geometry representations to Autodesk MapGuide® feature geometry in the context of the map layer on which the features are displayed. The following table describes the mapping of OpenGIS WKB geometry types by Autodesk MapGuide layer type:

OpenGIS WKB–Autodesk MapGuide Feature Geometry Mapping

Autodesk MapGuide Layer Type	OpenGIS WKB Geometry Type	Autodesk MapGuide Feature Geometry
Text	wkbPoint	Text feature
	wkbGeometryCollection	First wkbPoint element mapped to text feature, all other elements ignored
Point	wkbPoint	Point feature
	wkbGeometryCollection	First wkbPoint element mapped to point feature, all other elements ignored
	wkbMultiPoint	First point from wkbMultiPoint mapped to point feature, all others ignored
Polyline	wkbLinestring	Polyline feature
	wkbMultiLinestring8	Polypolyline feature
	wkbGeometryCollection	First wkbLinestring or wkbMultiLinestring element mapped to polyline or polypolyline feature, all other elements ignored

OpenGIS WKB–Autodesk MapGuide Feature Geometry Mapping

Autodesk MapGuide Layer Type	OpenGIS WKB Geometry Type	Autodesk MapGuide Feature Geometry
Polygon	wkbPolygon	Polygon feature if there is only a single ring, all others become polypolygon features
	wkbMultiPolygon	Polypolygon feature
	wkbGeometryCollection	First wkbPolygon or wkbMultiPolygon element mapped to polygon or polypolygon feature, all other elements ignored

Determining Feature Table Availability and the Coordinate System

A feature table is an Oracle8*i* Spatial or Oracle9*i* Spatial table that has at least one geometry column of type SDO_GEOMETRY.

The Provider for Oracle Spatial relies on the information contained in a view called ALL_SDO_GEOM_METADATA to determine which tables are feature tables with one or more geometry columns of type SDO_GEOMETRY. For more information about feature tables, refer to the Oracle documentation.

Using the SRID Column to Determine the Coordinate System

If the SRID column for a row in the ALL_SDO_GEOM_METADATA view is NULL, Autodesk MapGuide always assumes that the data is in a latitude/longitude (geographic) coordinate system, unless the Map Window in which the data is displayed is in an arbitrary *XY* (local) coordinate system. If a local coordinate system is used, the SRID element within the SDO_GEOMETRY object of each geometry should also be NULL.

If the SRID column for a row in the ALL_SDO_GEOM_METADATA view is set to a value, then Autodesk MapGuide uses this value as a foreign key into the Oracle coordinate system table called MDSYS.CS_SRS to determine the coordinate system of the geometry. The MDSYS.CS_SRS table contains a list of coordinate systems and their definitions, which are described using the OpenGIS Well-Known Text (WKT) representation. Based on the information contained within the WKTEXT column of MDSYS.CS_SRS, Autodesk MapGuide automatically transforms the geometry from the storage coordinate system used within Oracle8*i* Spatial and Oracle9*i* Spatial to that used by the Map Window in which the data is being displayed.

Known Issue with Oracle WKT Representations

The OpenGIS WKT representation for coordinate systems is relatively new and different vendors may use different WKT strings to represent the same coordinate system. In some cases, Autodesk MapGuide may not recognize the Oracle WKT representation of coordinate systems that come pre-installed in MDSYS.CS_SRS. In this case, you can use the file *CSMap_WKT.txt*, which contains a list of all coordinate systems and their associated WKT representation strings that are supported by Autodesk MapGuide and Provider for Oracle Spatial. You can add the coordinate system definitions from this file to the MDS.CS_SRS table to represent any coordinate system supported by Autodesk MapGuide. As the OpenGIS WKT representation of coordinate systems matures, differences will be minimized.

Using Error Messages

Provider for Oracle Spatial reports errors in the Event Viewer. Error messages include an error code, an error level indicator, and a text string describing the error and the line number, file name, and module name where the error occurred. Provider for Oracle Spatial generates the following error messages:

Provider for Oracle Spatial Error Messages

Error Code	Error Message
ERRORCODE_OCI_GENERICERROR	An indeterminate Oracle Call Interface (OCI) error occurred.
ERRORCODE_OCI_WITHTEXT	Oracle Call Interface (OCI): < Text message identifying the OCI error - generated by Oracle>
ERRORCODE_OCI_INVALIDHANDLE	Invalid OCI handle.
ERRORCODE_OCI_NOTINITIALIZED	An attempt was made to use the OCI library without initialization.
ERRORCODE_OCI_INITIALIZED	An attempt was made to initialize an already initialized OCI library.
ERRORCODE_OCI_SERVERNOTINITIALIZED	An attempt was made to use an OCI server object without initialization.
ERRORCODE_OCI_SERVERNOTATTACHED	An attempt was made to use an OCI server object without attaching to it.
ERRORCODE_OCI_SERVERALREADYATTACHED	An attempt was made to attach to an OCI server object that was already attached to.
ERRORCODE_OCI_SESSIONNOTINITIALIZED	An attempt was made to use an OCI session object without initialization.
ERRORCODE_OCI_SESSIONALREADYSTARTED	An attempt was made to start an OCI session that was already started.
ERRORCODE_OCI_SESSIONNOTSTARTED	An attempt was made to use an OCI session object that was not started.

Provider for Oracle Spatial Error Messages (*continued*)

Error Code	Error Message
ERRORCODE_OCI_SERVERCONTEXTNOTINITIALIZED	An attempt was made to use an OCI server context without initialization.
ERRORCODE_OCI_STATEMENTNOTINITIALIZED	An attempt was made to use an OCI statement object without initialization.
ERRORCODE_OCI_NULLOBJECT	A geometry object definition contained an invalid data (OCI) and was set to NULL (empty object).
ERRORCODE_OCI_ELEMENT_DOESNT_EXIST	An attempt was made to access an element outside the valid bounds of an OCI Array or Collection.
ERRORCODE_OCI_BAD_ARRAY_VALUE	An OCI Array or Collection contained an invalid value.
ERRORCODE_SUCCESSWITHINFO	The OCI call succeeded and returned extended information.
ERRORCODE_STLEXCEPTION	An STL Exception was thrown.
ERRORCODE_BUFFERTOOSMALL	A preallocated buffer was too small to handle the source data.
ERRORCODE_OUTOFMEMORY	Memory allocation failure.
ERRORCODE_NULLSTATEMENTOBJECT	The OCI Statement object is null.
ERRORCODE_DS_GENERICERROR	An indeterminate data source error has occurred.
ERRORCODE_DS_NOTINITIALIZED	An attempt was made to use the data source object prior to its initialization.
ERRORCODE_DS_ALREADYINITIALIZED	An attempt was made to initialize an already initialized data source object.
ERRORCODE_DS_NOSERVERNAME	An attempt was made to initialize a data source object without providing a target server name.

Provider for Oracle Spatial Error Messages (*continued*)

Error Code	Error Message
ERRORCODE_DS_CANTCREATESESSION	Failed to create session object.
ERRORCODE_DS_REQ_INIT_PROPERTIES_NOT_AVAILABLE	Required initialization properties are not available in the UDL string.
ERRORCODE_SESS_OPENSESSIONS	All active sessions must be closed before uninitializing the provider.
ERRORCODE_SESS_ALREADYINITIALIZED	An attempt was made to initialize an already initialized session object.
ERRORCODE_RS_NOSESSIONOBJECT	The provider could not retrieve the rowset object's session.
ERRORCODE_RS_NOSTATEMENTOBJECT	Failed to create an Oracle statement object within the rowset object.
ERRORCODE_RS_NOSTATEMENTTORESET	An attempt to reset the execution of a SQL statement has failed.
ERRORCODE_RS_INVALID_SQBOX_DATATYPE	The SPATIAL_FILTER bind parameter has an invalid datatype. The filter must be either an IStream* or a SafeArray.
ERRORCODE_RS_INVALID_SQBOX_FEATURE	The SPATIAL_FILTER bind parameter must be a WKB represented polygon.
ERRORCODE_RS_INVALID_SPATIAL_OPERATOR	The SPATIAL_FILTER operator must be of type DBPROP_OGIS_INTERSECTS for this provider.
ERRORCODE_COULD_NOT_RETRIEVE_METADATA_INFO	Sufficient information could not be retrieved from the underlying datasource to properly compose the requested metadata table.
ERRORCODE_CD_NOSESSIONOBJECT	The provider could not retrieve the command object's session.
ERRORCODE_CD_NOSTATEMENTOBJECT	Failed to create an Oracle statement object within the command object.

Provider for Oracle Spatial Error Messages (*continued*)

Error Code	Error Message
ERRORCODE_COLINFOTARGET_NOTEMPTY	An attempt was made to create column information in an object with column info already present.
ERRORCODE_COLINFOSOURCE_EMPTY	An attempt was made to copy column information from an empty dataset.
ERRORCODE_NOCOLUMNOBJECT	An attempt was made to bind a column without having a column object.
ERRORCODE_NOFETCHEDDATAAVAILABLE	No prefetched data was available to fulfill the get data request.
ERRORCODE_NOSOURCEDATA	An attempt was made to copy fetched data from an invalid internal datasource.
WARNINGCODE_SOME_COLS_UNDEFINED	Some column types could not be defined within the data provider.
WARNINGCODE_BAD_GEOMETRY_OBJECT	A geometry object contained invalid data such as an invalid GTYPE value or a NULL ordinate or info element.
ERRORCODE_BAD_GTYPE_VALUE	A geometry object contained an invalid GTYPE value.
ERRORCODE_GEOM_ELEMENT_DOESNT_EXIST	An sdo_elem_info triplet for a geometry was expected but was not found.
ERRORCODE_GEOM_BAD_OFFSET	An sdo_elem_info triplet for a geometry contained a bad OFFSET value.
ERRORCODE_GEOM_BAD_ETYPE	An sdo_elem_info triplet for a geometry contained a bad ETYPE value.
ERRORCODE_GEOM_BAD_INTERPRETATION	An sdo_elem_info triplet for a geometry contained a bad INTERPRETATION value.
ERRORCODE_GEOM_BAD_POINT_GTYPE	A geometry of GTYPE Point contained invalid point data.

Provider for Oracle Spatial Error Messages (*continued*)

Error Code	Error Message
ERRORCODE_GEOM_BAD_POINT_DATA	A geometry of GTYPE MultiPoint or Point contained invalid data.
ERRORCODE_GEOM_BAD_MIXEDSTRING_SUB_GTYPE	A geometry of GTYPE MultiLinestring contained a sub ETYPE that is not a linestring.
ERRORCODE_GEOM_BAD_LINESTRING_ETYPE	A geometry of GTYPE MultiLinestring or Linestring contained an invalid linestring ETYPE.
ERRORCODE_GEOM_BAD_LINESTRING_DATA	A geometry of GTYPE MultiLinestring or Linestring contained invalid data.
ERRORCODE_GEOM_BAD_ORDINATE	A geometry object definition contained invalid ordinate data.
ERRORCODE_GEOM_TOO_FEW_CURVE_POINTS	A linestring geometry object definition contained too few points to fully define a curve.
ERRORCODE_GEOM_BAD_POLYGON_SUB_GTYPE	A mixed polygon geometry object definition contained an invalid sub ETYPE. Only linestring subtypes are valid.
ERRORCODE_GEOM_BAD_POLYGON_ETYPE	A geometry of GTYPE Multipolygon or Polygon contained an invalid geometry ETYPE.
ERRORCODE_GEOM_BAD_POLYGON_DATA	A geometry of GTYPE Multipolygon or Polygon contained invalid data.
ERRORCODE_GEOM_TOO_FEW_POLYGON_POINTS	A polygon geometry object definition contained too few points to fully define the polygon.
ERRORCODE_GEOM_BAD_POLYGON_INTERPRETATION	A polygon geometry object definition contained an invalid interpretation value.
WARNINGCODE_GEOM_POLYGON_NOT_CLOSED	A polygon geometry object definition did not form a closed object.
ERRORCODE_GEOM_POINTS_ARE_COLINEAR	An arc or circle definition contains three points that are colinear.
ERRORCODE_GEOM_CREATEBYTEARRAY_FAILED	A geometry data fetch via a byte array failed.

Provider for Oracle Spatial Error Messages (*continued*)

Error Code	Error Message
ERRORCODE_GEOM_GETBUFFERFAILED	A geometry data fetch into a data buffer failed.
ERRORCODE_PARAMETER_FETCH_FAILED	An error occurred while fetching parameters for the O8i SDP.
ERRORCODE_DLG_COULD_NOT_SET_RESOURCE	A resource on a custom property page could not be set with data from a UDL file.
ERRORCODE_DLG_COULD_NOT_GET_RESOURCE	Data could not be retrieved from a field on a custom property page.
ERRORCODE_INVALID_LICENSE	Authentication of the Autodesk Spatial Data Provider for Oracle8*i* has failed (rc=IL).
ERRORCODE_KEYOPEN_FAILED	Authentication of the Autodesk Spatial Data Provider for Oracle8*i* has failed (rc=KF).
ERRORCODE_ALPHA_EXPIRED	Authentication of the Autodesk Spatial Data Provider for Oracle8*i* has failed (rc=AE).
ERRORCODE_BETA_EXPIRED	Authentication of the Autodesk Spatial Data Provider for Oracle8*i* has failed (rc=BE).

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