
Liant Software Corporation

Relativity[®]
Client/Server for Windows
Installation Guide

Version 5

LIANT

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Preface

Introducing Relativity Client/Server for Windows

The Relativity Data Server and Data Client components are used in the two-tier (or client/server) configuration of Relativity. In the two-machine configuration, the Data Server component of the Relativity Database Management System (DBMS) resides on a remote Microsoft Windows server machine, called the Windows server, close to the data files that the DBMS accesses. The Data Client component of the Relativity DBMS resides on the Windows workstation machine, called the Windows client, close to the ODBC-enabled application that needs to access the data.

Note In this document, the term “Windows server” refers to these operating systems: Microsoft Windows NT 4.0 or later (Service Pack 6 or higher is recommended) and the Microsoft Windows 2000 family of servers.

Relativity provides for a *true* relational database view of your COBOL application data. It also provides a Microsoft Windows Open Database Connectivity (ODBC)-compliant relational database engine that allows SQL-based access to your COBOL application data without moving, converting, replicating, or re-engineering your legacy data files. With Relativity, you can choose virtually any modern Windows development tool to build applications for ad hoc reporting, decision support, and specialized data processing functions. Moreover, using Relativity, you do not have to rewrite or migrate any of your working applications in order to benefit from a client/server environment.

This manual, the *Relativity Client/Server for Windows Installation Guide*, which is part of the Relativity document set listed in [Related Relativity Documentation](#) (on page 3), is intended for a System Administrator and describes the following procedures:

- How to install the Relativity Data Server software component on a computer running a Windows operating system and verify that the installation was successful; start and stop the Data Server; troubleshoot problems; and configure a Data Server data source on the Windows server.
- How to install the Relativity Data Client software component on a secure Windows workstation (such as the workstation belonging to a Database Administrator) for the purpose of catalog development; install the Relativity Server Administrator utility program, select a Windows server for the Windows client, and configure a Data Server data source; and ensure that the installation was successful by configuring a Data Client data source and associating it with the Data Server data source in order to verify communications between the Data Client and the Data Server.
- How to install the Relativity Data Client software component on an end user's Windows workstation and verify that the installation was successful by configuring a Data Client data source and associating it with a Data Server data source.

Note The two chapters in this documentation that refer to the Relativity Data Client are ODBC-specific. For information related to the implementation, installation, verification, and deployment of the Relativity Java Client component, refer to the HTML document, *Relativity Java Client User's Guide*, located on the product CD.

In addition, your Relativity package contains the document, *The Theory of Relativity, A Primer*, which defines specific terminology and provides a comprehensive overview of the Relativity software tools and their functions. Before you install this Relativity product, be sure to read this book, paying particular attention to the two-tier (or client/server) topic.

Related Relativity Documentation

In addition to the *Relativity Client/Server Installation Guide* and *The Theory of Relativity, A Primer*, the Relativity documentation set consists of the following items:

- **Relativity Client/Server for UNIX Installation Guide.** A document similar to this manual that is intended for a System Administrator installing Relativity Client/Server for UNIX.
- **Relativity Data Manager Installation Guide.** A document that describes how to install and verify the Relativity Data Manager software component on a Windows-based workstation.
- **Relativity Designer Installation Guide.** A document that describes how to install the Relativity Designer software component and verify that the installation was successful.
- **Relativity DBA Installation Guide.** A document that describes how to install and verify the Relativity DBA (Database Administrator) software component on a Windows-based workstation.
- **Relativity Java Client User's Guide.** An HTML document, located on the Relativity product CD, that describes the installation and verification of the Relativity Java Client as well as information about deploying it with Java applications and applets, and setting up data source connections. The Java Client is a Java Database Connectivity (JDBC) component that resides in a Java runtime environment (JRE).
- **Relativity Online Documentation.** An online help documentation system that provides fast access to detailed information on Relativity features and options. The help system also contains step-by-step presentations on how to accomplish specific tasks with Relativity and an extensive glossary. A separate help file is provided for each of the various Relativity tools: the DBMS, the Designer, the DBA, and the Server Administrator.
- **Relativity README Files.** A set of online HTML documents that lists any changes to the Relativity documentation since its publication and contains new technical information that supplements the documentation.

Conventions Used in this Document

This document contains visual cues to help the reader identify important information.

| Table Convention | Indicates |
|---------------------------|---|
| Initial Capitals | Menu names, command names, and dialog box and form titles. |
| Bold | Menu, command, and button names. Other elements to be selected or typed to accomplish an action. Label on input media used during installation. |
| <i>Italic</i> | Reference to a topic in the current document or another Relativity document. Reference to another document. |
| <i>Bold Italic</i> | Variables. |

Registration

Please take a moment to fill out and mail (or fax) the registration card you received with Relativity. You can also complete this process by registering your Liant product online at: <http://www.liant.com>.

Registering your product entitles you to the following benefits:

- **Customer support.** Free 30-day telephone support, including direct access to support personnel and 24-hour message service.
- **Special upgrades.** Free media updates and upgrades within 60 days of purchase.
- **Product information.** Notification of upgrades or revisions to Relativity when they are released.

You can also receive up-to-date information about Liant and all its products via our web site. Check back often for updated content.

Technical Support

Liant Software Corporation is dedicated to helping you achieve the highest possible performance from the Liant family of products. The technical support staff is committed to providing you prompt and professional service when you have problems or questions about your Liant products.

Technical support services are subject to Liant's prices, terms, and conditions in place at the time the service is requested.

While it is not possible to maintain and support specific releases of all software indefinitely, we offer priority support for the most current release of each product. For customers who elect not to upgrade to the most current release of the products, support is provided on a limited basis, as time and resources allow.

Support Guidelines

When you need assistance, you can expedite your call by having the following information available for the technical support representative:

- Company name and contact information.
- Liant product serial number (found on the media label, or registration card, or product banner message).
- Liant product version number.
- Operating system and version number.
- Hardware, related equipment, and terminal type.
- Exact message appearing on screen.
- Concise explanation of the problem and process involved when the problem occurred.

Test Cases

You may be asked for an example (test case) of the source that demonstrates the problem.

- The smaller the test case is, the faster we will be able to isolate the cause of the problem.
- Do not send full applications.
- Reduce the test case to the smallest possible combination of components required to reproduce the problem.
- If you have very large data files, write a small program to read in your current data files and to create new data files with as few records as necessary to reproduce the problem.
- Test the test case before sending it to us to ensure that you have included all the necessary components to run the test case.

When submitting your test case, please include the following items:

1. **README text file that explains the problems.** This file must include information regarding the hardware, operating system, and versions of all relevant software (including the operating system and all Liant products). It must also include step-by-step instructions to reproduce the behavior.
2. **Program source files.** We require source for any program that is called during the course of the test case. Be sure to include any copy files necessary for recompilation.
3. **Data files required by the programs.** These files should be as small as possible to reproduce the problem described in the test case.

Installation and Verification of Relativity Data Server for Windows

This chapter lists the [system and setup requirements](#) (on page 8) and describes the procedures for [installing the Relativity Data Server for Windows](#) (on page 10) software on a computer running Microsoft Windows.

This chapter also discusses the following topics:

| How to | See page |
|---|-----------------|
| Amend the Relativity Data Server for Windows license certificate. | 15 |
| Start the Relativity Data Server for Windows. | 16 |
| Verify that the installation was successful. | 17 |
| Terminate the Relativity Data Server for Windows. | 17 |
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| Troubleshoot Relativity Data Server for Windows problems. | 19 |
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System and Setup Requirements

Installation of the Relativity Data Server for Windows software requires the following minimum software and hardware.

| Component | Requirement |
|--------------------|---|
| Operating System | Microsoft Windows NT 4.0 or later (Service Pack 6 or higher is recommended) or the Windows 2000 family of servers. |
| Disk Space | 10 MB for RM/COBOL. 10 MB for Micro Focus COBOL. 20 MB recommended. |
| Installation Media | Internet access and/or one CD-ROM drive and one 3.5" diskette drive. |
| Monitor | SVGA graphics adapter and color SVGA monitor with 800x600 or greater resolution. |
| Internet Browser | A browser (for example, Netscape or Microsoft Internet Explorer) capable of viewing HTML files, such as the README text or other documents that are available in this format. |

The installation of a Relativity Data Server for Windows requires the following:

- The person installing the software must have Administrator privileges, either locally or on the domain.
- A user account must exist that has the desired permissions for the Relativity Data Server for Windows, unless it is to be installed to run under the "system account." See [User Account and Permissions for the Relativity Data Server for Windows](#) (on page 9) for more information.

Note Only a single version of Relativity Data Server for Windows can exist on a single Windows server machine. Any previously installed Relativity Data Server for Windows must be uninstalled prior to installing a different version. See [Removing the Relativity Data Server for Windows](#) (on page 18).

If a version of the Relativity Data Server for Windows has been installed and is currently running as a Windows service, the service will be stopped automatically when you install a different version.

User Account and Permissions for the Relativity Data Server for Windows

The Relativity Data Server for Windows runs as a Windows service. Most services run under a special account called the “system account” that has access to all files on the machine. If the Relativity Data Server for Windows is installed to run under a user account, it will have all of the permissions of that account. The account that the Relativity Data Server for Windows runs under must have the permissions to meet the needs of all clients that will connect to it. Liant recommends that the Relativity Data Server for Windows be given a separate user account.

File Access Permissions

The account under which the Data Server runs must have the following permissions to access files:

- Read and write permissions to all Relativity catalogs to which the Windows client application must have access.
- Read permission to all data files referenced by the Relativity catalogs.
- Write access to any data files that are referenced by the Relativity catalogs via tables that can be updated.

Directory Access Permissions

The account under which the Data Server runs must have the following permissions to access directories (folders):

- Read permission to the following types of directories:
 - Directories containing COBOL data files to be accessed by the Windows client applications.
 - A directory that is the current working directory for the Data Server process. This is normally the directory where the Relativity Data Server for Windows was installed. The account also must have write permission to this directory.
- Write permission to the directories where catalogs are to be created if the creation of new Relativity catalogs is permitted.
- Write permission to the directory containing the catalog if the creation of tables is permitted from the ODBC-enabled application. The data files created for the new tables are placed in the same directory as the catalog.

End-User Permissions

If other user accounts on the Windows server are to have access to the data files created for new tables, the user account of the Data Server must be set up to do the following:

1. Create the new files with read and write permissions.
2. Give read and write permissions to other users in the Windows server domain.

Installing the Relativity Data Server for Windows

Note If you have a version of the Relativity Data Server that supports the uninstall process, you should remove it prior to installing a newer version. See [Removing the Relativity Data Server for Windows](#) (on page 18).

The Relativity Data Server for Windows can be installed on the Windows server using either of the following methods:

- [CD-ROM Installation for Data Server](#) (on page 11)
- [Electronic Software Delivery Installation for Data Server](#) (on page 12)

The Relativity Data Server installation procedure can also be automated to allow the installation of the Data Server to be incorporated within the installation of another product, as described in [Automated Installation for Data Server](#) (on page 14).

To verify that the installation is successful, see [Verifying Installation of the Relativity Data Server for Windows](#) (on page 17).

CD-ROM Installation for Data Server

To install the Relativity Data Server for Windows software from the CD-ROM:

1. Insert the product CD in the appropriate CD-ROM drive.
2. Do one of the following:
 - If the installation program starts automatically, proceed to Step 3.
 - If the installation program does not start automatically, click **Start** on the Windows task bar, and then click **Run**. In the Run dialog box, in Open, type

```
d:autorun
```

where *d* is drive letter of the CD-ROM drive. Click **OK**.
3. From the list of installation options, click **View the Installation Documentation** to read or install the documentation for this product, which is provided on the CD-ROM.
4. From the list of installation options, click **Data Server Installation** and choose from a second list of options:
 - Click the **View the README file** option to review important, last-minute information about Relativity.
 - Click the **View Installation Documentation** option to read or install the appropriate Relativity installation guides (in Adobe PDF).
 - Click the **Install the Relativity Data Server** option to begin the actual installation process.
5. Follow the instructions presented by the installation program.
6. When the Liant License File dialog box opens, enter the complete filename of the license file, **liant.lic**, which contains the license certificate for this product. (This license file is included on the license diskette that came as part of the installation media). If your machine has a diskette drive, insert the license diskette into drive A and continue to follow the instructions presented on your screen.

Note 1 If you are using a drive other than A, be sure to correct the location of the license file in the Liant License File dialog box.

Note 2 If necessary, the **liant.lic** license file can be copied to a location on a hard drive and that location can be specified during installation.

7. When the TCP/IP Port dialog box opens, type the number of the service port to use. Use the default value of 1583 unless this conflicts with some other program on your machine.
8. When the Service Account dialog box opens, enter the domain name, account (user) name, and password of the account under which the Relativity Data Server for Windows will run or leave all fields blank to use the local system account. If you enter an account name, leave the domain name blank unless the account is not in the default domain.

If the specified account is not permitted to run services, the installation program will modify the policies of the specified domain to give that permission to the account.

9. Continue to follow the instructions until you complete the installation process.
10. When the Setup Complete dialog box opens, select the check box to register your product online or click **Finish** to close the dialog box.

Note When the Setup Complete dialog box opens, the Relativity Data Server for Windows has been installed, but it is not running. To start the service, be sure that the “Yes, I want to start the Data Server now.” check box is selected before you register the product or click **Finish**.

Electronic Software Delivery Installation for Data Server

Note You must have an Internet connection and an Internet browser installed to proceed with this method of installation.

The Relativity Data Server for Windows software is available as a download from the Liant Electronic Software Delivery web site in two formats. Simply follow the instructions on the web site for downloading and decompressing the file for the format selected:

- **ISO CD Image.** The download format for ISO CD Image contains the full product. Use CD-ROM Burning software, such as Nero (<http://www.nero.com>) or Roxio’s Easy CD Creator (<http://www.roxio.com>), to create the physical CD-ROM media and then follow the instructions contained in the [CD-ROM installation for Data Server](#) (on page 11) section to install your product.
- **Windows Self-Extracting EXE.** The download format for Windows Self-Extracting EXE does *not* contain a full product. In order to reduce the size of the download file, the AutoPlay and Adobe Acrobat Reader software, normally available on the CD, are not present. Furthermore, the

Relativity installation guides are included in the deliverable download file but not the installation script to install these guides. The installation guides, formatted as PDF files, can be installed simply by copying them to the desired location.

After the deliverable has been downloaded and uncompressed, and the installation components have been created from the Windows Self-Extracting EXE format, follow the instructions below to install the Relativity Data Server for Windows software:

1. Start Windows.
2. Click **Start**, and then click **Run**. In the Run dialog box, click the **Browse** button.
3. In the Browse dialog box, navigate to the directory containing the installation components and open the **DServer** directory.
4. Click on the file, **Setup**, and then click **Open**.
5. In the Run dialog box, click **OK**.
6. Follow the instructions presented by the installation program.
7. When the Liant License File dialog box opens, enter the complete filename of the license file, **liant.lic**, which contains the license certificate for this product. (The license file was attached to the original electronic software delivery e-mail.)
8. When the TCP/IP Port dialog box opens, type the number of the service port to use. Use the default number of 1583 unless this conflicts with some other program on your machine.
9. When the Service Account dialog box opens, enter the domain name, account (user) name, and password of the account number under which the Relativity Data Server for Windows will run or leave all fields blank to use the local system account. If you enter an account name, leave the domain name blank unless the account is not in the default domain.

If the specified account is not permitted to run services, the installation program will modify the policies of the specified domain to give that permission to the account.

10. Continue to follow the instructions until you complete the installation process.
11. When the Setup Complete dialog box opens, select the check box to register your product online or click **Finish** to close the dialog box.

Note When the Setup Complete dialog box opens, the Relativity Data Server for Windows has been installed, but it is not running. To start

the service, be sure that the “Yes, I want to start the Data Server now.” check box is selected before you register the product or click **Finish**.

Automated Installation for Data Server

You can also automate the installation program of the Relativity Data Server for Windows, which allows the installation of the Data Server to be incorporated with the installation of your product. To automate the installation, use a set of options that predefine answers to the installation prompts. The predefined answers are supplied on the command line to the **setup** command (**Dserver\setup.exe**). You can also configure the installation not to prompt for questions at all.

The following set of command line options can be used to change the initial default values for the installation prompts presented to the user. Note that the **-_AUTO** option is used to prevent any prompting by the Relativity Data Server for Windows installation program. In order for the calling installation program to wait for the Data Server installation program, you must add the **-SMS** option as the very last option on the command line. This option allows the calling installation program to determine when the Relativity Data Server for Windows installation program completes.

Note Option values that contain spaces must be enclosed in quotes (“ ”) or square brackets ([]).

- **-_ACCOUNT=*name***. This option specifies *name* as the account under which the Data Server is to run. The default is blank.
- **-_AUTO=*Y***. This option specifies automatic installation without prompting. The default is to prompt the user during installation.
- **-_FILEMGR=*file managers***. This option specifies that support for the listed file managers should be installed. The choices are MF, RM, or both MF and RM (separated by a comma). There is no default.
- **-_FOLDER=*folder***. This option specifies *folder* as the folder for icons. The default is Relativity Server.
- **-_LICENSE=*license file***. This option specifies that *license file* is the location of the license file. The default is A:\liant.lic.

Note If necessary, the **liant.lic** file can be copied to a location on a hard drive and that location can be specified during installation.

- **-_ORG=*organization***. This option specifies *organization* as the name of the user’s organization. The default is blank.

- **-_PASSWORD=*password*.** This option specifies *password* as the password for the account under which the Data Server is to run. The default is blank.
- **-_PORTNUMBER=*number*.** This option specifies *number* as the TCP/IP port number for the server. The default is 1583.
- **-SMS.** This option, which allows the calling installation program to determine when the Relativity Data Server installation program completes, must be entered as the last option on the command line.
- **-_TARGETDIR=*directory*.** This option specifies *directory* as the installation directory. The default is C:\Program Files\Relativity Server.
- **-_USERNAME=*user name*.** This option specifies *user name* as the name of the user installing the Data Server. The default is blank.

Note The default values for most of these options are generally sufficient. However, the **-_LICENSE** option is particularly useful in order to specify another location for the license file other than the diskette drive.

Amending the Relativity Data Server for Windows License Certificate

A Liant license certificate may be amended in order to increase its use count or to extend its expiration date. The program contained in the Amend directory is intended to install an amendment license certificate to an existing license certificate on a Windows system.

To install a Relativity amendment license certificate:

1. Start Windows.
It is not necessary to close other applications before proceeding with the installation, although the Relativity Data Server for Windows will not use the new amended license certificate until the product is started again.
2. Click **Start**, and then click **Run**. In the Run dialog box, click the **Browse** button.
3. In the Browse dialog box, navigate to the CD or directory containing the installation components. If necessary, open the **Amend** directory.
4. Click on the file, **Setup**, and then click **Open**.
5. In the Run dialog box, click **OK**.

6. Follow the instructions presented in the Liant License Amendment program dialog boxes.
7. When the Software License Agreement dialog box opens, you must click **Yes** in order to continue with the installation.
8. When the Liant License File dialog box opens, enter the complete filename of the license file, **liant.lic**, which contains the license certificate for this product.
Note In the case of **electronic software delivery installation for Data Server** (on page 12), the license file was attached to the original e-mail.
9. When the Product Installation Directory dialog box opens, enter the name of the directory containing the product to be amended.
10. When the Install Amendments dialog box opens, verify the amendment license certificates to be applied.
11. When the Install Complete dialog box opens, verify that the amendment license certificates were applied correctly.
12. Click **Finish** to close the Liant License Amendment program.

Starting the Relativity Data Server for Windows

After installation is successfully completed, you can start running the Relativity Data Server for Windows by one of two methods:

- **At Windows Startup.** By default, the Relativity Data Server for Windows will start automatically every time Windows starts. You may change this behavior by using the Services applet in the Windows Control Panel.
- **Manually.** You may manually start the Relativity Data Server for Windows by using the Services applet in the Windows Control Panel.

Verifying Installation of the Relativity Data Server for Windows

These instructions assume that the Relativity Data Server for Windows is running, as described in [Starting the Relativity Data Server for Windows](#) (on page 16).

To verify the installation of the Relativity Data Server for Windows:

1. On the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Run the Services applet.
Note On Windows 2000, it will first be necessary to double-click **Administrative Tools**.
3. Look for the service named “Relativity Data Server.”
4. If the service status does not indicate “Started”, click **Start**. If the status does not change to “Started”, check the contents of the Windows Application Log.

Terminating the Relativity Data Server for Windows

The Relativity Data Server for Windows may be terminated by any of the following methods:

- If Relativity Data Server for Windows starts automatically at Windows server startup, it will automatically stop when the Windows server operating system is shut down.
- Use the Services applet in the Windows Control Panel to manually stop the Relativity Data Server for Windows.
- Use the Relativity Server Administrator program from a Windows client workstation to shut down the Relativity Data Server for Windows.

Removing the Relativity Data Server for Windows

The Relativity Data Server for Windows can be removed from the Windows server on which it was installed. This may be necessary if the Data Server is to be moved to a different machine or if a new release of the Data Server is to be installed on the same machine.

Removing an existing version of the Data Server prior to installing a new one ensures accurate use counts on shared files and enables all files to be properly removed during a later uninstall process.

To remove the Relativity Data Server from the Windows server:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Close the Windows Control Panel. (This is necessary in order to remove the Relativity applet.)
4. In the Add/Remove Programs Properties dialog box, click the **Install/Uninstall** tab.
5. In the list box, select **Relativity vX.Y Data Server** where *X.Y* indicates the version number of the Data Server.
6. Click the **Add/Remove** button.

A message box will appear requesting confirmation of the uninstall.

7. Click **OK** to continue.
8. Check for any errors in the Uninstall Relativity window when the uninstall is complete. It may be necessary to select this window from the task bar first in order to bring it to the front of other windows. The operations involved in the uninstall process will be recorded in the **uninsRel.log** file located in the temporary folder on the Windows server.

Troubleshooting the Relativity Data Server for Windows Server Problems

The Relativity Data Server for Windows writes messages to the Windows Application Log. These may be viewed with the Event Viewer application provided with Windows. The Relativity Data Server for Windows also writes a history of all connections in a file named **connect.log** in the working folder from which it is run.

If you receive one of these messages and require assistance, contact Liant Technical Support.

Event Log Messages

The following error messages can be written in the Application Log by the Relativity Data Server for Windows.

SimbaServer started.

This message indicates that the Data Server has started.

Key SimbaServer.SvrPort not found. Run 'SimbaExpress Configuration' program to set port.

This message indicates that the Data Server port number has not been set properly in the Windows Registry. The server port number is established during the Data Server installation. To correct this problem, reinstall the Data Server.

StartServiceControlDispatcher failed.

This message indicates that the Data Server could not be started as Windows service.

SetServiceStatus failed.

This message indicates that the Data Server encountered an error updating its service status.

SQLAllocEnv returned error. Cannot continue. Check ODBC settings.

This message indicates that the call to SQLAllocEnv to allocate an environment handle for the Data Server failed.

pAgentCreate failed. Initial protocols: *protocol name* Secondary protocols: *protocol name*.

This is a debugging message.

Listener failed.

This is a debugging message.

Failed to establish connection (client machine.server thread ID) rc=internal error code.

This message indicates that a connection attempt from the Windows client machine failed.

Connection established (client machine.server thread ID).

This message indicates that a connection attempt from the Windows client machine succeeded.

Failure in disconnect (client machine) rc=internal error code.

This message indicates that a disconnect operation for the Windows client machine encountered an error.

Connection terminated (client machine.server thread ID).

This message indicates that a disconnect operation for the Windows client machine succeeded.

Exception *eeeeeeee* happened in the connection from client *client machine* to driver Relativity Server at address *aaaaaaaa*. Number of parameters *n*, parameter *x = y, ...*

This message indicates a serious problem with the Data Server. Capture this message and the accompanying Dr. Watson message in the event viewer and report them to Liant Technical Support.

The value *eeeeeeee* is the type of exception. The value *aaaaaaaa* is the address of the instruction that caused the exception. The value *n* is the number of parameters associated with the exception. The value *x* indicates the parameter number, and the value *y* is the value of the parameter. Parameter *x = y* will be repeated for each parameter, up to *n*.

pMemAlloc error. Failed to allocate *number* bytes.

This message indicates that a memory allocation error occurred in the server.

SQLAllocConnect failed.

This message indicates that a call to SQLAllocConnect on the server failed.

Failed to allocate memory for connect.

This message indicates that a memory allocation error occurred in the server.

Failed connecting to driver. Connection string: *connection string*.

This message indicates that the server's attempt to connect to the Relativity driver failed.

Failed to allocate memory for statement.

This message indicates that a call to SQLAllocStmt on the server failed.

Failure in internal function name.

This message indicates that a server function failed.

Maximum number of connections to server exceeded.

This message indicates that the number of clients connecting to the server exceeded the maximum, as set by the license.

Configuring a Relativity Data Server Data Source on the Windows Server

A Relativity Data Server data source may be configured on the Windows server by one of the following methods:

- The Relativity Server Administrator may be run on a Windows client machine. See [Using the Relativity Server Administrator to Configure a Relativity Data Server Data Source on the Windows Server](#) (on page 38).
- Configure Data Server data sources from installation scripts using the Relativity installation kit DLL. For more details, see [Configuring Relativity Data Server Data Sources from Catalog Developer Installation Scripts](#) (on page 51).
- The ODBC Data Source Administrator may be run on the Windows server machine to configure a system data source.

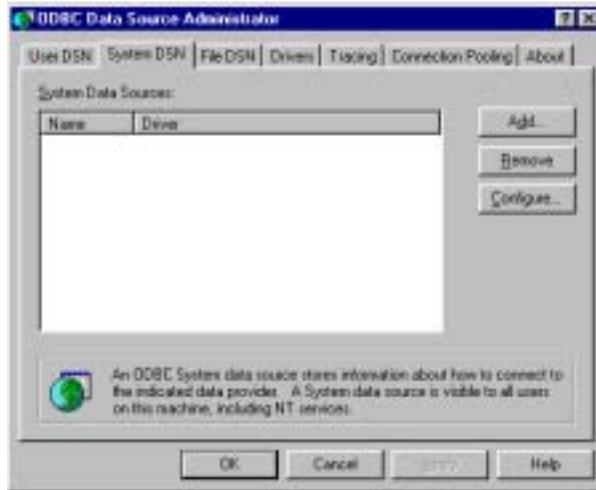
This section describes the latter procedure. Before you configure the Relativity Data Server data source, however, you must first start the ODBC Data Source Administrator. The ODBC Data Source Administrator, a standard ODBC program distributed with Relativity, is accessed from the Windows Control Panel. The ODBC Data Source Administrator is used to configure and maintain ODBC data sources.

To configure a Data Server data source on the Windows server:

1. On the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. From the Control Panel, on Windows NT, double-click **ODBC**; on Windows 2000, double-click **Administrative Tools** and then click **Data Sources (ODBC)**.

3. In the ODBC Data Source Administrator dialog box, select the **System DSN** tab and click **Add**.

Note Relativity data sources are normally created as user data sources. However, because the Relativity Data Server for Windows runs as a Windows service, Windows data sources must be system data sources.



4. In the Create New Data Source dialog box, double-click the **Relativity Server** driver.



5. If support for both Micro Focus COBOL and RM/COBOL files is installed, in the **File Manager** tab of the Relativity dialog box, select the desired type of files.



6. On the **DSN** tab in the Relativity dialog box, type the name of the data source in the Data Source Name box. For example, type **Verify**.
A data source name must have a length within the range of 1 through 32 characters. The characters [] { } () , ; ? * = ! @ \ must not appear in a data source name. The data source name must also begin with a letter.

7. Optionally, in the Description box, type a description of the data source. For example, type **Relativity C/S for Windows NT Data Source**.



8. Click **Select Catalog**. The Select Catalog for Data Source dialog box is displayed. (Alternatively, you can click **Create Catalog** and the Create Catalog for Data Source dialog box is displayed.)

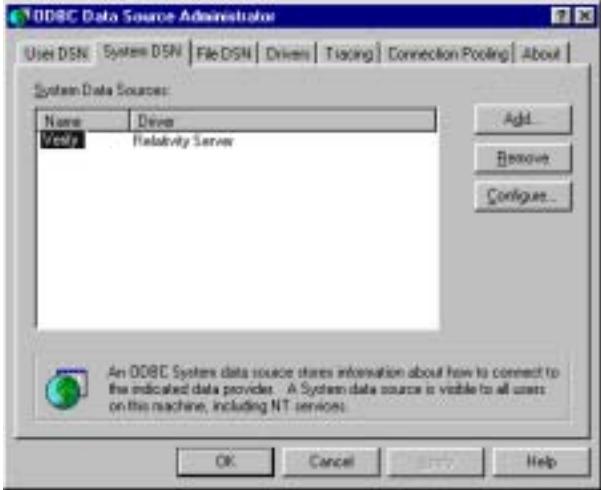


9. In the Look in list, find the folder where the catalog is located (or where it will be created if you clicked Create Catalog in the previous step).
10. In the File name box, type or select the name of the catalog file. The filename extension is **.rcg**.
11. Click **Open**. The Select Catalog for Data Source dialog box closes and the pathname of the selected catalog appears in the Relativity dialog box.



12. Click **OK** to close the Relativity dialog box. You have successfully configured a Relativity Data Server data source.

The ODBC Data Source Administrator dialog box is displayed with the new data source listed as a system data source in the System DSN tab.



13. Click **OK** to close the ODBC Data Source Administrator dialog box.

Accessing Relativity Data Sources from Microsoft SQL Server via OLE DB

It is possible to access Relativity data sources from Microsoft SQL Server via OLE DB (Microsoft's set of interfaces for data access). The following procedures describe how to access the Relativity sample database, Verify, using the Relativity Data Client and the Microsoft OLE DB Provider for ODBC drivers.

Note These procedures assume that you have installed the Relativity Data Client software client on the Windows server. See the additional chapters in this guide, *Installation and Verification of Relativity Data Client for Catalog Development* (on page 31) and *Installation and Verification of Relativity Data Client for End Users* (on page 57), for more information.

1. Create a Relativity Data Server data source for the Verify database and name the data source **Verify**.
2. On the Windows server machine running SQL Server, create a Relativity Data Client data source named **NTVerify** using the System DSN tab in the ODBC Data Source Administrator dialog box and connect it to the Data Server data source (Verify) created in Step 1.
3. Using the SQL Server Enterprise Manager, navigate to the Console Root\Microsoft SQL Servers\SQL Server Group\YourServer'sName\Security\Linked Servers option.
4. Right-click on **Linked Servers** and select **New Linked Server**. The Linked Server Properties - New Linked Server dialog box opens.
5. In the Linked Server field, enter the name of the database that is to be used by your ADO application. For this example, use **TESTLINK**.
6. Select the **Other Data Source** option button.
7. From the Provider Name list box, select **Microsoft OLE DB Provider for ODBC Drivers**.
8. In the Data Source field, enter the name of the Relativity Data Client data source created in Step 2 (NTVerify). (Alternatively, you can leave the Data Source field blank and place a connection string in the Provider String field.)
9. Click **OK**.

10. To query this table, you must provide a four-part table name having the following format:

LinkedServerName . Catalog . Owner . ActualTableName .

where:

LinkedServerName is the name specified in the Linked Server field in Step 5 (TESTLINK).

Catalog is the name of the Relativity Data Server data source specified in Step 1 (Verify).

Note When accessing Relativity data sources from Microsoft SQL Server, it is not obvious that the Relativity Data Server data source name is what is required in *Catalog*. However, if you return to the SQL Server Enterprise Manager, navigate to Linked Servers again, select the linked server name and under that, select Tables, a list of all the tables in the Relativity data source is displayed on the right. A column labeled Catalog is also displayed. This is the value that should be placed in the *Catalog* field of the four-part table name.

Owner is the user name to open the data source and can be left blank.

ActualTableName is the name of the table to be queried in the Relativity data source.

For example, to query the Backorder table in the sample database, Verify, use the following SELECT statement:

```
select * from TestLink.Verify..Backorder
```


Installation and Verification of Relativity Data Client for Catalog Development

This chapter lists the system requirements and provides the instructions for the System Administrator on how to install the Relativity Data Client software and the Relativity Server Administrator utility program (on page 32) on a secure Windows client workstation (such as the workstation belonging to a Database Administrator) for the purpose of catalog development.

This chapter also discusses the following topics:

| How to | See page |
|---|-----------------|
| Ensure that the installation was successful by configuring a Relativity Data Client data source and associating it with the Relativity Data Server data source in order to verify communications between the Windows client and the Windows server. | 36 |
| Remove the Relativity Data Client and Server Administrator software components. | 45 |
| Use the options available to the System Administrator for installing the Relativity Data Client on end-user machines. | 46 |
| Configure Relativity Data Server data sources from catalog developer installation scripts using the installation kit DLL. | 51 |

System Requirements

Installation of the Relativity Data Client software on a Windows client workstation requires the following minimum software and hardware.

| Component | Requirement |
|--------------------|---|
| Computer | Pentium-class processor or higher. |
| Operating System | Microsoft Windows 98 or Windows 98 Second Edition (SE), Windows Millennium Edition (Me), Windows NT 4.0 or later (Service Pack 6 or higher recommended), Windows 2000, or Windows XP. |
| Memory | 4 MB of RAM (8 MB is recommended). |
| Disk Space | A hard drive with at least 5 MB of free disk space. |
| Installation Media | Internet access and/or one CD-ROM drive and one 3.5" diskette drive. |
| Monitor | SVGA graphics adapter and color SVGA monitor with 800x600 or greater resolution. |
| Internet Browser | A browser (for example, Netscape or Microsoft Internet Explorer) capable of viewing HTML files, such as the README text or other documents that are available in this format. |

Installing the Relativity Data Client and Server Administrator

Note If you have a version of the Relativity Data Client that supports the uninstall process, you should remove it prior to installing a newer version. See [Removing the Relativity Data Client and Server Administrator](#) (on page 45).

The Relativity Data Client and Relativity Server Administrator can be installed on a Windows workstation using either of the following methods:

- [CD-ROM Installation for Data Client and Server Administrator](#) (on page 33)
- [Electronic Software Delivery Installation for Data Client and Server Administrator](#) (on page 34)

CD-ROM Installation for Data Client and Server Administrator

To install the Relativity Data Client software and the Relativity Server Administrator utility program from the CD-ROM:

1. Start Windows.
2. Insert the product CD with Relativity Data Client and Server Administrator in the CD-ROM drive.
3. Do one of the following:
 - If the installation program starts automatically, proceed to Step 4.
 - If the installation program does not start automatically, click **Start**, and then click **Run**. In the Run dialog box, in Open, type

```
d:autorun
```

where *d* is the drive letter of the CD-ROM drive. Click **OK**.
4. From the list of installation options, click **View the Installation Documentation** to read or install the documentation for this product, which is provided on the CD-ROM.
5. Click **Data Client Installation** from the list of installation options. A second list of options is presented:
 - Click the **View the README file** option to review important, last-minute information about Relativity.
 - Click the **View the Installation Documentation** option to read or install the appropriate Relativity installation guides (in Adobe PDF).
 - Click the **Install the Relativity Data Client** option to begin the actual installation process.
6. Follow the instructions presented by the installation program.
7. When the Installation Type dialog box opens, select the **Database Administrator** option in order to install the Relativity Server Administrator utility program.

The Server Administrator utility allows you to define a Windows server for the Data Client and configure a Relativity Data Server data source on the Windows server machine.
8. When the Define Server dialog box opens, in the Server's Network Name box, enter the network name of the Windows server on which the Relativity Data Server was installed. The value in the Service Port box should match

the service port number for the Windows server on which the Data Server was installed. The default is 1583.

9. Continue to follow the instructions until you have completed the installation process.
10. When the Setup Complete dialog box opens, select the check box to view the ReadMe files or click **Finish** to close the dialog box.

Electronic Software Delivery Installation for Data Client and Server Administrator

Note You must have an Internet connection and an Internet browser installed to proceed with this method of installation.

The Relativity Data Server for Windows software (which includes the Relativity Data Client and Server Administrator components) is available as a download from the Liant Electronic Software Delivery web site in two formats. Simply follow the instructions on the web site for downloading and decompressing the file for the format selected:

- **ISO CD Image.** The download format for ISO CD Image contains the full product. Use CD-ROM Burning software, such as Nero (<http://www.nero.com>) or Roxio's Easy CD Creator (<http://www.roxio.com>), to create the physical CD-ROM media and then follow the instructions contained in the [CD-ROM Installation for Data Client and Server Administrator](#) (on page 33) section to install your product.
- **Windows Self-Extracting EXE.** The download format for Windows Self-Extracting EXE does *not* contain a full product. In order to reduce the size of the download file, the AutoPlay and Adobe Acrobat Reader software, normally available on the CD, are not present. Furthermore, the Relativity installation guides are included in the deliverable download file but not the installation script to install these guides. The installation guides, formatted as PDF files, can be installed simply by copying them to the desired location.

After the deliverable has been downloaded and uncompressed, and the installation components have been created from the Windows Self-Extracting EXE format, follow the instructions below to install the Relativity Data Client software.

Note 1 To facilitate installation of the Data Client on end users' machines, refer to [Installation Options for the Relativity Data Client](#) (on page 46).

Note 2 These instructions assume that the Relativity Data Client is being installed for catalog development. For additional options, see [Installation and Verification of Relativity Data Client for End Users](#) (on page 57).

1. Start Windows.
2. Click **Start**, and then click **Run**. In the Run dialog box, click the **Browse** button.
3. In the Browse dialog box, navigate to the directory containing the installation components and open the **DClient** directory.
4. Click on the file, **Setup**, and then click **Open**.
5. In the Run dialog box, click **OK**.
6. Follow the instructions presented on the installation dialog boxes.
7. When the Installation Type dialog box opens, select the **Database Administrator** option in order to install the Relativity Server Administrator utility program.

The Server Administrator utility allows you to define a Windows server for the Data Client and configure a Relativity Data Server data source on the Windows server machine.

8. When the Define Server dialog box opens, in the Server's Network Name box, enter the network name of the Windows server on which the Relativity Data Server was installed. The value in the Server Port box should match the service port number for the Windows server on which the Data Server was installed. The default is 1583.
9. Continue to follow the instructions until you have completed the installation process.
10. When the Setup Complete dialog box opens, select the check box to view the ReadMe files or click **Finish** to close the dialog box.

Verifying Client/Server Communications Using the Server Administrator

The procedure for verifying communications between the Relativity Data Client and the Relativity Data Server includes the following tasks:

- [Starting the Relativity Server Administrator](#) (see below)
- [Selecting a Windows Server](#) (on page 37)
- [Using the Relativity Server Administrator to Configure a Relativity Data Server Data Source on the Windows Server](#) (on page 38)
- [Configuring a Relativity Data Client Data Source on the Windows Client](#) (on page 42)

Starting the Relativity Server Administrator

To start the Relativity Server Administrator:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. From the Control Panel, double-click **Relativity Server** to open the Relativity Server Administrator utility program.



Using the Relativity Server Administrator, take the following steps:

1. Select a Windows server (see the following section).
2. Use the Relativity Server Administrator to configure a Data Server data source on the Windows server and select a catalog to be associated with the Data Server data source (see page 38).

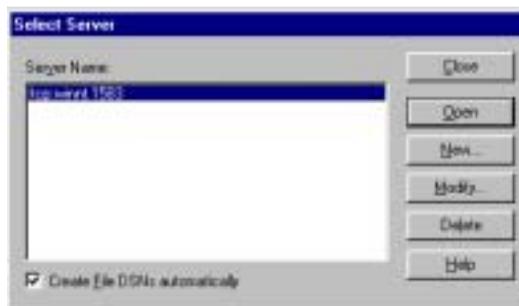
Note For detailed information about the Relativity Server Administrator utility, see the Relativity Server Administrator online help file.

Selecting a Windows Server

To select a Windows server:

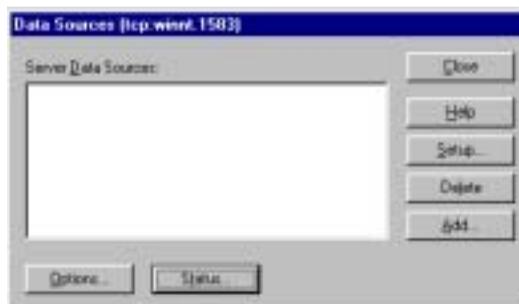
1. In the Select Server dialog box, select the server listed in the Server Name list.

The server listed here is defined in Step 8 during the installation of the Relativity Data Client on the Windows client workstation (see page 33).



2. Click **Open**.

The Data Sources dialog box is displayed.



Using the Relativity Server Administrator to Configure a Relativity Data Server Data Source on the Windows Server

To configure a Relativity Data Server data source on the Windows server using the Relativity Server Administrator:

1. In the Data Sources dialog box, click **Add** to open the Relativity setup dialog box.

This dialog box allows you to configure a Data Server data source on the Windows server and select a catalog to associate with that data source.

Note The Relativity setup dialog box will vary depending on the type of COBOL files that the Data Server can access. The common options are displayed on the initial DSN tab with the file manager-specific options displayed in the remaining tab(s). This discussion will focus only on the common options of the DSN tab.



2. In the Data Source Name box, type **Verify** as the name of the Data Server data source.

A data source name must have a length within the range of 1 through 32 characters. The characters [] { } () , ; ? * = ! @ \ must not appear in a data source name. The data source name must also begin with a letter.

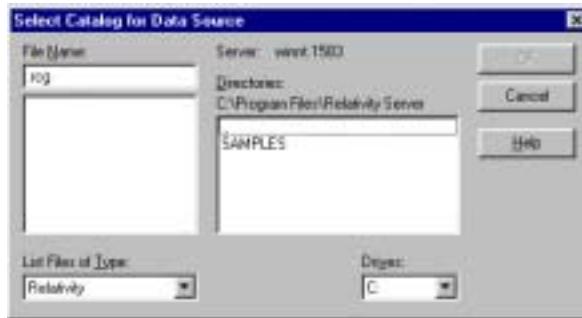
Tip It is helpful to use the same name for the Data Client (see page 42) and Data Server data sources that will be associated with one another.

3. Optionally, in the Description box, type a description of the data source. For example, type **Relativity C/S for Windows NT Data Source**.

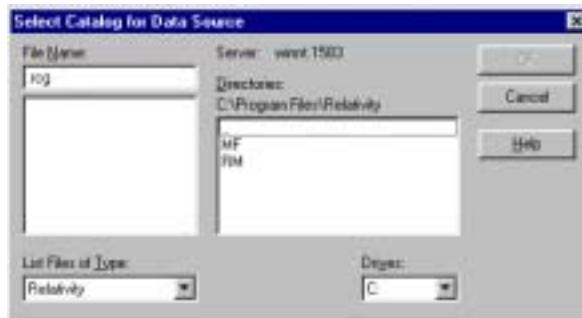


4. In the Catalog area, click **Select Catalog** to open the Select Catalog for Data Source dialog box.

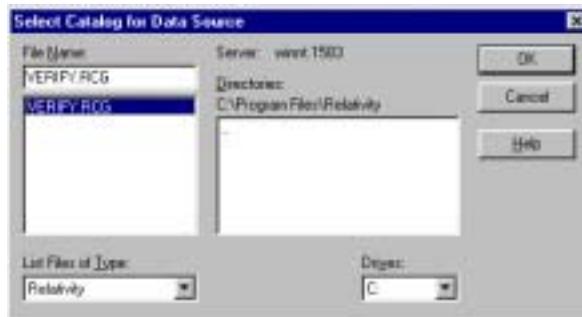
5. In the Directories list, double-click the **SAMPLES** folder.



6. Next, double-click either the **RM** or **MF** folder and then double-click the **VERIFY** folder.



7. Select **VERIFY.RCG** in the File Name list.

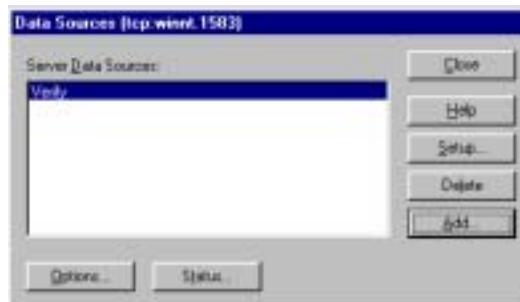


8. Click **OK**.

The Select Catalog for Data Source dialog box closes and the pathname of the selected catalog appears in the Relativity setup dialog box.

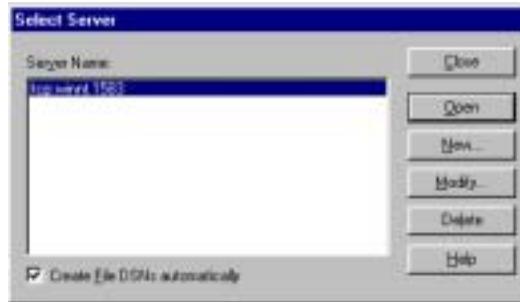


9. Click **OK** to exit the Relativity setup dialog box.
10. In the Data Sources dialog box, notice that the Server Data Sources list contains the data source name that you configured on the Data Server.



11. Click **Close** to exit the Data Sources dialog box.

12. In the Select Server dialog box, click **Close** to exit the Relativity Server Administrator utility program.



The Data Server data source that you configured is now available to all Windows client workstations on which the Data Client is installed.

Next, you must configure a Data Client data source on the Windows client and associate it with the Data Server data source on the Windows server in order to verify communications between the Data Client and the Data Server.

Note For information on how to configure Relativity Data Server data sources from a catalog developer installation script on the Windows server machine, see [Configuring Relativity Data Server Data Sources from Catalog Developer Installation Scripts](#) (on page 51).

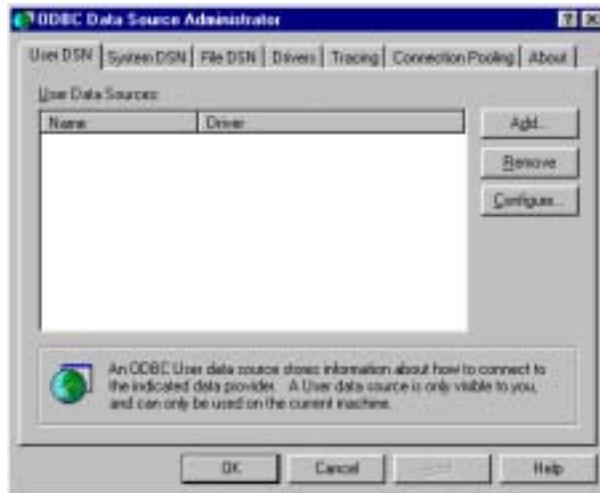
Configuring a Relativity Data Client Data Source on the Windows Client

Before you configure the Relativity Data Client data source on the Windows client, you must first start the ODBC Data Source Administrator. The ODBC Data Source Administrator, a standard ODBC program distributed with Relativity, is accessed from the Windows Control Panel. The ODBC Data Source Administrator is used to configure and maintain ODBC data sources.

Note A Data Client data source also can be configured from within the Relativity Designer. See the Relativity Designer online help file for more information.

To configure a Relativity Data Client data source on the Windows client:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. From the Control Panel, on Windows 98, double-click **ODBC Data Sources (32bit)**; on Windows NT, double-click **ODBC**; on Windows 2000, double-click **Administrative Tools** and then click **Data Sources (ODBC)**.
3. In the ODBC Data Source Administrator dialog box, select the **User DSN** tab and click **Add**.



4. In the Create New Data Source dialog box, select a driver for which you want to configure a Data Client data source by double-clicking the driver name (**Relativity Client**).



- In the ODBC Relativity C/S Setup dialog box, click the Windows server from the Server Name list. The Server DSN list box containing Data Server data sources for the selected Windows server will appear.

Note The Data Server data source, **Verify**, which is listed in the Server DSN list, was configured previously using the Relativity Server Administrator (see page 22).



- In the Data Source Name box, type **Verify** as the name of the Data Client data source with which you want to associate a Data Server data source from the Server DSN list.

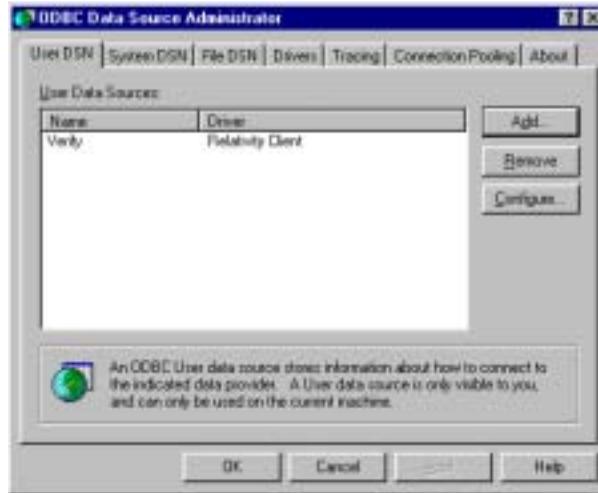
Tip It is helpful to use the same name for the Data Client and Data Server data sources that will be associated with one another.



- Optionally, in the Description box, type a description of the Data Client data source.
- Click **OK** to close the ODBC Relativity C/S Setup dialog box.

The ODBC Data Source Administrator dialog box is displayed with Verify listed as a user data source in the User DSN tab.

The Data Client data source has now been associated with the Data Server data source.



In this verification procedure, the Data Client and Data Server data sources refer, indirectly through the Relativity catalog, to the sample Relativity database named Verify. Once the verification procedure has been successfully completed, the Relativity Verify database can be accessed from any ODBC-enabled application.

Removing the Relativity Data Client and Server Administrator

The Relativity Data Client, as well as the Relativity Server Administrator, can be removed from the Windows client workstation on which it was installed. This may be necessary if these components are to be moved to a different machine or if a new release of the product is to be installed on the same machine.

Removing an existing version of the Data Client (and Server Administrator) prior to installing a new one ensures accurate use counts on shared files and enables all files to be properly removed during a later uninstall process.

To remove the Relativity Data Client and Relativity Server Administrator:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Close the Windows Control Panel. (This is necessary in order to remove the Relativity Server Administrator applet.)
4. In the Add/Remove Programs Properties dialog box, click the **Install/Uninstall** tab.
5. In the list box, select **Relativity vX.Y Data Client** where X.Y indicates the version number of the Data Client.
6. Click the **Add/Remove** button.
A message box will appear requesting confirmation of the uninstall.
7. Click **OK** to continue.
8. Check for any errors in the Uninstall Relativity window when the uninstall is complete. It may be necessary to select this window from the task bar first in order to bring it to the front of other windows. The operations involved in the uninstall process will be recorded in the **uninsRel.log** file located in the temporary folder on the Windows client workstation.

Installation Options for the Relativity Data Client

The standard type of installation for the Relativity Data Client on an end user's Windows workstation is from CD-ROM. In this type of installation, which is described in [Installing the Relativity Data Client](#) (on page 58), no preparatory procedures are required on the part of the System Administrator.

If the Relativity Data Server for Windows software was downloaded via Electronic Software Delivery using the Windows Self-Extracting EXE format, one straightforward method of installing the Data Client on end-user machines is to use a CD-ROM Burner to create a CD for installation. Then, the procedures described in [Installation and Verification of Relativity Data Client for End Users](#) (on page 57) may be used directly. If this method is chosen, merely place the **DClient** directory on the root directory of the CD.

Optionally, the Data Client software may be installed on a Windows client by two other methods: using a network or diskettes. This section describes each of these installation procedures and the preparatory tasks that must be performed by the System Administrator before end-user installation can occur.

Preparing Network Installation

For those end-user sites where installation from CD-ROM is unavailable, the Relativity Data Client installation can be placed on a Windows server by the System Administrator. The Windows client workstations can then perform the installation across the network as described in [Network Installation](#) (on page 60).

Note To facilitate network installation, the Data Client installation procedure can be automated. See [Automated Installation of the Relativity Data Client from a Network](#) (on page 47) and [Creating a Windows Shortcut](#) (on page 50).

To install the Relativity Data Client on a Windows server:

1. Create a folder on the Windows server in a location where the Windows client workstations can access it. This can be in a folder that is already shared, or it may be a folder that can be shared after creation.
2. Share the folder by doing the following:
 - a. In Windows Explorer, right-click the folder you want to share. A shortcut menu appears.
 - b. Click **Sharing**. A Properties dialog box opens for the selected folder.
 - c. If necessary, select the **Sharing** tab, and then click **Shared As**. (The defaults for the fields are usually sufficient. If not, modify them as necessary.)
 - d. In the **Share Name** text box, type the name of the shared folder for use with the Windows client workstation installations. See Step 2 in [Network Installation](#) (on page 60).
 - e. Click **OK** to apply the changes you have made and close the dialog box.
3. Copy the contents of the **DCClient** folder from the Relativity Data Server's installation CD into the shared folder created in Step 2 of these procedures.

Automated Installation of the Relativity Data Client from a Network

The System Administrator can automate the installation program for the Relativity Data Client, which allows the installation of the Data Client to be incorporated with the installation of your product. This is useful for network installations. To automate the installation, use a set of options that predefine answers to the installation prompts. The predefined answers are supplied as

arguments on the command line to the **setup** command. The installation can also be configured not to prompt for questions at all.

The following set of command line options can be used to change the initial default values for the installation prompts presented to the user. Note that the **-_AUTO** option is used to prevent any prompting by the Relativity Data Client installation program. In order for the calling installation program to wait for the Relativity Data Client installation program, you must add the **-SMS** option as the very last option on the command line. This option allows the calling installation program to determine when the Relativity Data Client installation program completes.

Note Option values that contain spaces must be enclosed in quotes (“ ”) or square brackets ([]).

- **-_AUTO=Y.** This option specifies automatic installation without prompting. The default is to prompt the user during installation.
- **-_DELETE=Y.** This option specifies that any previous Relational DataBridge or Relativity Data Clients that are found on the machine should be deleted. The default is to leave the previous Data Clients.
- **-_DRIVER=driver name.** This option specifies the driver name with which the Relativity Data Client is to be installed. This is the name that will appear in the ODBC Administrator dialog box when creating new data sources. The default is Relativity Client. This option is useful when several different versions of the Relativity Data Client need to be installed at the same time. When installing multiple versions of Relativity, be sure to install them in separate directories.
- **-_FOLDER=folder.** This option specifies *folder* as the folder for icons. The default is Relativity.
- **-_MFFH=Micro Focus file handler DLL.** This option specifies the fully qualified filename of the *Micro Focus file handler DLL (mffh.dll)* that will be used to access Micro Focus COBOL files. Specify this option when the MF file manager support is being installed. The default is to use the Micro Focus file handler that is installed on this machine. If a Micro Focus file handler is not detected on this machine, a Micro Focus NetExpress version 3.0 file handler will be installed in the Relativity installation directory and used instead.
- **-_MOVE=Y.** This option specifies that any previous Relational DataBridge and Relativity client data sources that are found on the machine should be moved to the Relativity driver. The default is to leave the previous data sources.

- **-_ORG=organization.** This option specifies *organization* as the name of the user's organization. The default is blank.
- **-_SERVER=server.** This option specifies *server* as the default Windows server name for the Data Client. The default is that no default Windows server will be configured (see Step 8 on page 33).

The format of the *server* argument is *NetworkName.PortNumber*, where *NetworkName* is the network name of the Windows server on which the Relativity Data Server is installed. *PortNumber* is the TCP/IP service port number to which the Relativity Data Server is configured. This argument corresponds to the **-_PORTNUMBER** argument for the Relativity Data Server for Windows installation. See [Automated Installation for Data Server](#) (on page 14).

- **-SMS.** This option, which allows the calling installation program to determine when the Relativity Data Client installation program completes, must be entered as the last option on the command line.
- **-_TARGETDIR=directory.** This option specifies *directory* as the installation directory. The default is C:\Program Files\Relativity.
- **-_TYPE=DBA.** This option specifies that the Relativity Server Administrator is to be installed in the Windows workstation's Control Panel. The default is not to install the Relativity Server Administrator.
- **-_USERNAME=user name.** This option specifies *user name* as the name of the user installing the Data Client. The default is blank.

Note The default values for most of these options are generally sufficient. However, the **-_SERVER** option is particularly useful because it can configure the Data Client to the desired Windows server for Data Client data source creation.

Creating a Windows Shortcut

It is also possible to create a shortcut in a shared folder on the Windows server to encapsulate the automated installation options and thus quickly start the installation program. This shortcut would be visible to Windows client workstations that have access to the shared folder.

To create a Windows shortcut:

1. Install the **DClient** folder, as described in the network procedures to install the Relativity Data Client on the Windows server. See [Preparing Network Installation](#) (on page 47).
2. In Windows Explorer, click the name of the folder you created in Step 1 of those same instructions.
3. On the File menu, point to **New**, and then click **Shortcut**. The Create Shortcut wizard opens.
4. In the Command line box, enter the command line for the **setup** command.
 - Be sure to use network names so that the Windows workstations will not require that drive letters be mapped to the Windows server. For example, type `\\WindowsServerName\ShareName\setup`. See Step 2 under installation of the Relativity Data Client in the topic [Network Installation](#) (on page 60).
 - Following the **setup** command, specify the options to automate installation, as described in [Automated Installation of the Relativity Data Client from a Network](#) (on page 47).
5. Click **Next**. The Select a Title for the Program dialog box opens.
6. Enter a descriptive name. For example, type **Install**.
7. Click **Finish** to close the dialog box.

The Windows client workstations can now simply double-click the Install shortcut instead of performing the installation by invoking `\\WindowsServerName\ShareName\setup` from the Run dialog box.

Preparing Diskette Installation

For those end-user sites where neither CD-ROM nor network installation is available (for example, when there are security concerns on the Windows server), the System Administrator must place the Relativity Data Client installation on diskettes.

To create the diskettes that will be used to install the Relativity Data Client at end-user sites:

1. On a Windows machine with a CD-ROM drive, format two floppies and label them diskette 1 and diskette 2.
2. Insert the Relativity Data Server for Windows installation CD in the CD-ROM drive.
3. In Windows Explorer, open the CD-ROM drive, and then open the folder, **DClient**.
4. Copy all files from the **DClient** folder *except* **DISK2.ID** and **RELDBMS.2** to diskette 1.

Note The file **Defects.htm** may be too large to fit on a floppy with the remaining files. If there is not enough room on the floppy, put another **.htm** file in its place. For example, copy **Readme.htm** to the floppy again, this time with the name **Defects.htm**.

5. Copy **DISK2.ID** and **RELDBMS.2** to diskette 2.

Once the diskettes have been made, they can be used to install the Data Client on the Windows client workstations, as described in [Diskette Installation](#) (on page 60).

Configuring Relativity Data Server Data Sources from Catalog Developer Installation Scripts

Liant provides an alternative to having your end users use either the Relativity Server Administrator utility or the ODBC Data Source Administrator to configure Relativity Data Server data sources on the Windows server, as described in [Configuring a Relativity Data Server Data Source on the Windows Server](#) (on page 22). The Relativity installation kit, a DLL that currently is shipped only with the Relativity Data Client, provides support during installation for the creation of Data Server data sources. This method may be

used only after the Data Client has been installed by your installation script. Note that the configuration of the Data Server data sources by this method needs to be performed only once, after which you must create Data Client data sources that refer to the Data Server data sources.

The routines in the installation kit provide access to some of the functionality provided by the Server Administrator utility from installation tools such as Install Shield and Wise. These routines may also be called from a Microsoft Visual Basic or C program, although the interface is not well suited for calling them directly from Visual Basic.

The installation kit DLL, named **relink32.dll**, is installed in the installation directory when the Administrator option is selected during the Relativity Data Client installation. For more information, see [Installing the Relativity Data Client and Server Administrator](#) (on page 32).

When calling the installation kit DLL, it is necessary first to load the DLL from the installation script and then call the `LogInToServer` function in order to establish connection to the Relativity Data Server. Then the remaining functions will use this connection until the `LogOutFromServer` function is called to disconnect from the Relativity Data Server.

Installation Kit Functions

The following descriptions of the installation kit functions use a C interface. Although the types used by these functions are all standard Windows types, three of them, in particular, deserve further explanation in order to be able to use them from your installation scripts.

- The **BOOL** type is a 32-bit integer that is either TRUE (nonzero) or FALSE (zero).
- The **HWND** type is a double word (32-bit) value.
- The **KEY_VAL** type is a C character-string containing keyword-value pairs. Keyword-value pairs have the form *keyword=value*, where *keyword* is the name of an attribute for a data source, and *value* is the value for that attribute. For example, to communicate the name for a data source to the Relativity Data Server, the keyword **DSN** is used. The value of this keyword is the actual name of the data source.

Keyword-value pairs are placed into a single C (NUL-terminated) string and are delimited by semicolons (;). Semicolons within a *value* may be escaped with a backslash (\).

ConfigServerDataSource

The `ConfigServerDataSource` function manipulates Relativity Data Server data sources. This function can be used to add a new data source, delete an existing data source, or change an existing data source.

The calling sequence is as follows:

```
BOOL WINAPI
ConfigServerDataSource(
    HWND          hwndParent,
    int           Request,
    char          *pDriver,
    KEY_VAL      *pAttributes);
```

ConfigServerDataSource returns TRUE if successful or FALSE if not.

hwndParent contains a parent window handle. This parameter may be NULL (0) to indicate there is no parent handle.

Request contains the type of request and may contain one of the following values:

- The value 1, which adds a new data source.
- The value 2, which configures an existing data source.
- The value 3, which removes an existing data source.

pDriver contains the address of a NUL-terminated string that is the driver description. (This parameter is currently unused.)

pAttributes contains the address of NUL-terminated string containing keyword-value pairs. For a complete list of keywords, see the `SQLConfigDataSource Attribute Strings` topic in the DBMS help file. The DSN, FileMgr, and Catalog keywords are required when creating a data source. The CreateCat keyword is useful for creating a catalog for the Relativity Data Server data source.

GetServerDataSource

The `GetServerDataSource` function returns the entries from an existing Relativity Data Server data source. This function is useful in replacing a data source with an updated one or looking for the directory in which the catalog for a data source is installed.

The calling sequence is as follows:

```
BOOL WINAPI
GetServerDataSource (
    char            *pDataSource,
    KEY_VAL        *pAttributes,
    unsigned int    AttrMax,
    unsigned int    *pAttrLength);
```

GetServerDataSource returns TRUE if successful or FALSE if not.

pDataSource contains the address of a NUL-terminated string that is the name of the data source whose entries are to be returned.

pAttributes contains the address of a memory area in which to return the entries. These entries are in a NUL-terminated string containing keyword-value pairs.

AttrMax contains the length (in bytes) of the memory area indicated by pAttributes.

pAttrLength contains the address of a 32-bit integer in which the length of the data source entries is returned.

GetServerDataSourceList

The GetServerDataSourceList function returns the current data sources defined on the Relativity Data Server. This function is useful in processing all the existing Data Server data sources.

The calling sequence is as follows:

```
BOOL WINAPI
GetServerDataSourceList (
    char            *pBuffer,
    unsigned int    BufMax,
    unsigned int    *pBufLength);
```

GetServerDataSourceList returns TRUE if successful or FALSE if not.

pBuffer contains the address of a memory area in which to return the entries. The Data Server data source names are returned in a NUL-terminated string and delimited by semicolons (;).

BufMax contains the length (in bytes) of the memory area indicated by pBuffer.

pBufLength contains the address of a 32-bit integer in which the length of the data source entries is returned.

LogInToServer

The LogInToServer function connects to a Relativity Data Server. This function must be called before any of the other installation kit functions and all subsequent calls apply to the Data Server contacted by this function.

The calling sequence is as follows:

```
BOOL WINAPI
LogInToServer (
    HWND    hwndParent,
    char    *pszServerAddr);
```

LogInToServer returns TRUE if the server is connected or FALSE if not.

hwndParent contains the window handle of the owner dialog box.

pszServerAddr contains the address of a NUL-terminated string, in the form **ServerName.Port**, containing the UNIX or Windows server's network name (*ServerName*) or address and port on which Relativity is listening (*Port*). For example, to contact the Relativity Data Server running on service port 1583 of the machine UnixServer, this argument is **UnixServer.1583**.

LogOutFromServer

The LogOutFromServer function closes the connection to the current Relativity Data Server.

The calling sequence is as follows:

```
BOOL WINAPI
LogOutFromServer (
    HWND    hwndParent);
```

LogOutFromServer returns TRUE if the server logout was successful or FALSE if not.

hwndParent contains the window handle of the owner dialog box.

Installation and Verification of Relativity Data Client for End Users

This chapter lists the system requirements and provides the instructions on how to install the Relativity Data Client software (on page 58) on an end user's Windows client workstation.

This chapter also discusses the following topics:

| How to | See page |
|---|-----------------|
| Ensure that the installation was successful by configuring a Relativity Data Client data source and associating it with the Relativity Data Server data source in order to verify communications between the Windows client and the Windows server. | 61 |
| Remove the Relativity Data Client software component. | 64 |

System Requirements

Installation of the Relativity Data Client software on a Windows client workstation requires the following minimum software and hardware.

| Component | Requirement |
|--------------------|---|
| Computer | Pentium-class processor or higher. |
| Operating System | Microsoft Windows 98 or Windows 98 Second Edition (SE), Windows Millennium Edition (Me), Windows NT 4.0 or later (Service Pack 6 or higher recommended), Windows 2000, or Windows XP. |
| Memory | 4 MB of RAM (8 MB is recommended). |
| Disk Space | A hard drive with at least 5 MB of free disk space. |
| Installation Media | Internet access and/or one CD-ROM drive and one 3.5" diskette drive. |
| Monitor | SVGA graphics adapter and color SVGA monitor with 800x600 or greater resolution. |
| Internet Browser | A browser (for example, Netscape or Microsoft Internet Explorer) capable of viewing HTML files, such as the README text or other documents that are available in this format. |

Installing the Relativity Data Client

Note If you have a version of the Relativity Data Client that supports the uninstall process, you should remove it prior to installing a newer version. See [Removing the Relativity Data Client](#) (on page 64).

The Relativity Data Client can be installed on an end user's Windows workstation from any of the following methods:

- [CD-ROM Installation](#) (on page 59)
- [Network Installation](#) (on page 60)
- [Diskette Installation](#) (on page 60)

To verify the Relativity Data Client installation, see [Verifying Client/Server Communications](#) (on page 61).

CD-ROM Installation

To install the Relativity Data Client on an end user's Windows workstation from the CD-ROM:

1. Start Windows.
2. Insert the CD with Relativity Data Client in the CD-ROM drive.
3. Do one of the following:
 - If the installation program starts automatically, proceed to Step 4.
 - If the installation program does not start automatically, click **Start**, and then click **Run**. In the Run dialog box, in Open, type

```
d:autorun
```

where *d* is the drive letter of the CD-ROM drive. Click **OK**.
4. From the list of installation options, click **View the Installation Documentation** to read or install the documentation for this product, which is provided on the CD-ROM.
5. Click **Data Client Installation** from the list of installation options. A second list of options is presented:
 - Click the **View the README file** option to review important, last-minute information about Relativity.
 - Click the **Install the Relativity Data Client** option to begin the actual installation process.
6. Follow the instructions presented by the installation program.
7. When the Installation Type dialog box opens, select **End User** in order to install the Relativity Data Client.
8. When the Define Server dialog box opens, in the Server's Network Name box, enter the network name of the Windows server on which the Relativity Data Server was installed. The value in the Service Port box should match the service port number for the Windows server on which the Data Server was installed. The default is 1583.
9. Continue to follow the instructions until you have completed the installation process.
10. When the Setup Complete dialog box opens, select the check box to view the ReadMe files or click **Finish** to close the dialog box.

Network Installation

For those end-user sites where installation from CD-ROM is unavailable, the Relativity Data Client can be installed on the Windows server, as described in [Preparing Network Installation](#) (on page 47). The end users' Windows client workstations can then perform the installation across the network.

To install the Relativity Data Client across the network:

1. Click **Start**, and then click **Run**.
2. In the Run dialog box, in Open, type

```
\\WindowsServerName\ShareName\setup
```

where:

- *WindowsServerName* is the name of the Windows server on which the Data Client was installed, as described in Step 2 of [Preparing Network Installation](#) (on page 47), and
 - *ShareName* is the name of the shared folder into which the client installation was copied in Step 3 of those same instructions.
3. Click **OK**.
 4. Follow the instructions provided by the installation procedure.

Diskette Installation

Note The diskettes were prepared previously by the System Administrator, as described in [Preparing Diskette Installation](#) (on page 51).

To install the Relativity Data Client from diskettes on an end user's Windows client workstation:

1. Insert diskette 1 into a diskette drive.
2. Click **Start**, and then click **Run**.
3. In the Run dialog box, in Open, type

```
d:setup
```

where *d* is the drive letter of the diskette drive. Click **OK**.

4. Follow the instructions provided by the installation procedure.

Verifying Client/Server Communications

The procedure to verify communications between the Relativity Data Client and the Data Server consists of successfully configuring a Relativity Data Client data source on the Windows client workstation.

Configuring a Relativity Data Client Data Source on the Windows Client for End Users

Before you configure the Relativity Data Client data source on the Windows client, you must first start the ODBC Data Source Administrator. The ODBC Data Source Administrator, a standard ODBC program distributed with Relativity, is accessed from the Windows Control Panel. The ODBC Data Source Administrator is used to configure and maintain ODBC data sources.

To configure a Relativity Data Client data source on the Windows client:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. From the Control Panel, on Windows 98, double-click **ODBC Data Sources (32bit)**; on Windows NT, double-click **ODBC**; on Windows 2000, double-click **Administrative Tools** and then click **Data Sources (ODBC)**.
3. In the ODBC Data Source Administrator dialog box, select the **User DSN** tab and click **Add**.



- In the Create New Data Source dialog box, select a driver for which you want to configure a Data Client data source by double-clicking the driver name (**Relativity Client**).



- In the ODBC Relativity C/S Setup dialog box, click the Windows server from the Server Name list.

Note The Data Server data source, Verify, which is listed in the Server DSN list, was configured previously by the end user's System Administrator.



- In the Data Source Name box, type **Verify** as the name of the Data Client data source with which you want to associate a Data Server data source from the Server DSN list.

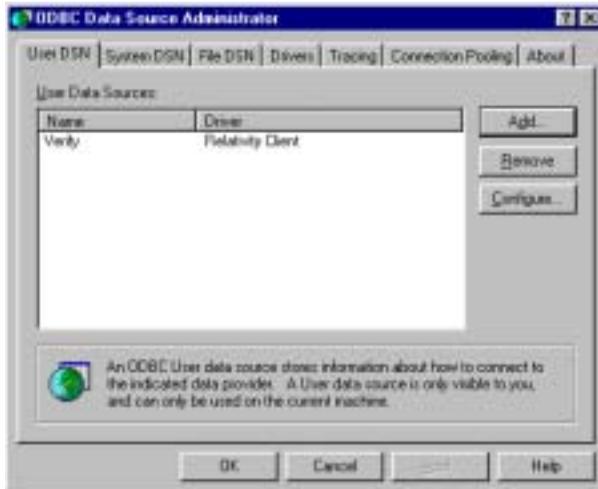
Tip It is helpful to use the same name for the Data Client and Data Server data sources that will be associated with one another.



7. Optionally, in the Description box, type a description of the Data Client data source.
8. Click **OK** to close the ODBC Relativity C/S Setup dialog box.

The ODBC Data Source Administrator dialog box is displayed with Verify listed as a user data source in the User DSN tab.

The Data Client data source has now been associated with the Data Server data source.



In this verification procedure, the Data Client data source refers, indirectly through the Data Server data source, to the sample Relativity database named Verify. Once the verification procedure has been successfully completed, the Relativity Verify database can be accessed from any ODBC-enabled application.

Removing the Relativity Data Client

The Relativity Data Client can be removed from the Windows client workstation on which it was installed. This may be necessary if the Data Client is to be moved to a different machine or if a new release of the Data Client is to be installed on the same machine.

Removing an existing version of the Data Client prior to installing a new one ensures accurate use counts on shared files and enables all files to be properly removed during a later uninstall process.

To remove the Relativity Data Client:

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. In the Add/Remove Programs Properties dialog box, click the **Install/Uninstall** tab.
4. In the list box, select **Relativity vX.Y Data Client** where *X.Y* indicates the version number of the Data Client.
5. Click the **Add/Remove** button.

A message box will appear requesting confirmation of the uninstall.

6. Click **OK** to continue.
7. Check for any errors in the Uninstall Relativity window when the uninstall is complete. It may be necessary to select this window from the task bar first in order to bring it to the front of other windows. The operations involved in the uninstall process will be recorded in the **uninsRel.log** file located in the temporary folder on the Windows client workstation.

Appendix: Indexed File Recovery Utility (recover1) for RM/COBOL

RM/COBOL indexed files that have become corrupted can be recovered using the RM/COBOL Indexed File Recovery utility (**recover1**).

This appendix provides instructions for using the **recover1** utility when opening a Relativity RM/COBOL catalog or data file results in a 98, "File is Broken" error.

Installing the Recovery Utility Program

The **recover1** utility is shipped on the Relativity CD-ROM for those installations in which RM/COBOL is not already installed on the Windows machine.

To install **recover1**:

1. Start Windows.
2. Insert the product CD in the appropriate CD-ROM drive.
3. If the installation program for the Relativity Data Client and Data Server starts automatically, terminate it by clicking **Finish**.
4. Click **Start**, and then click **Run**.
5. In the Run dialog box, in Open, type

```
d:recover1\setup
```

where *d* is the letter of the CD-ROM drive. Click **OK**.

6. Follow the instructions provided by the installation procedure.

7. When the Software License Agreement dialog box opens, you must click **Yes** in order to continue with the installation.
8. When the Liant License File dialog box opens, enter the complete filename of the license file, **liant.lic**, which contains the license certificate for this product.
Note This license file is included on the license diskette that came as part of the CD-ROM installation media, or it was attached to the original electronic software delivery e-mail.
9. When the Select Destination Directory dialog box opens, note that the Destination Folder box indicates the location on your hard drive where **recover1** will be installed.
10. When the Select Program Folder dialog box opens, specify the program folder name that will appear on the Windows Start menu.
11. When the installation is complete, click **Finish**.

Using the Recovery Utility Program

By default, the **recover1** utility will be installed in the directory, **c:\Program Files\RMCOBOL**. From an MS-DOS Prompt window, change your Windows directory to be the directory into which **recover1** was installed and invoke the **recover1** command as described in the instructions that follow.

The **recover1** utility recovers data stored in an RM/COBOL indexed file. It is a standalone program; that is, it does not require use of the RM/COBOL Runtime Command (**runcobol**) to be executed.

Note 1 In order to recover data stored in a Btrieve file, use the Btrieve File Manager (either the Windows interactive version, **wbmanage.exe**, or the command line version, **butil.exe**). Refer to the appropriate Btrieve installation and operation manual for complete information about the utility.

Note 2 If the output window of the Windows version of the **recover1** program disappears upon successful completion and you want that window to remain visible, set the Persistent property to TRUE for the **recover1.exe** program.

Recovery Command

The Indexed File Recovery utility (**recover1**) is executed by issuing the following command:

```
recover1 indexed-file drop-file [options] ...
```

indexed-file is the filename of the indexed file to be recovered. The name is not resolved through any environment variables.

drop-file is the name of the file where **recover1** places any unrecoverable records found in the indexed file (see page 70). If *drop-file* specifies an environment variable name, the environment variable value will be resolved before opening the dropped record file.

option is zero or more command line options as described in [Recovery Command Options](#) (on page 68). Options are specified with letters that must be preceded with a hyphen (-) or a slash (/). Option letters may be specified in upper or lower case. Certain option letters allow an optional pathname as part of the option format. The presence or absence of the pathname is determined by whether or not the next non-white space character following the option letter is a hyphen or slash, whichever one was used preceding the option letter.

Note The option introducer character slash is supported for Windows compatibility and should not be used on UNIX, where it can be confused with an absolute pathname; that is, a pathname that begins with a slash. Nevertheless, either the hyphen or the slash may be used to introduce option letters on Windows and UNIX. In the option formats given in this document, only the hyphen is shown, but the hyphen may be replaced with a slash.

WARNING Because of several changes in the RM/COBOL 7.5 runtime system, it is possible that an indexed file created by performing an OPEN OUTPUT in a COBOL program using the RM/COBOL 7.5 runtime system may have a different block size than a file you are attempting to recover. This may happen even though you specify the same file control entry and file description entry for the template file as when you initially created the file with an earlier version of RM/COBOL. Attempting to use this new file with a different block size as a template file may result in a loss of a large percentage of the recoverable records. You should verify that the block size of your template file is correct by using the Map Indexed File (**rmmapinx**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) You can also avoid this problem by creating the template file with a version of RM/COBOL prior to 7.5 or by using a backup copy of the undamaged file. Keywords MINIMUM-BLOCK-

SIZE and ROUND-TO-NICE-BLOCK-SIZE of the RUN-INDEX-FILES configuration record may also be used to cause the runtime to create a file with a block size that matches releases prior to 7.5.

Recovery Command Options

Note These options may also be placed into the registry (on Windows) or the resource files (on UNIX). In the Windows registry, the Command Line Options property provides command line options for the Indexed File Recovery utility when “Recovery” is selected on the Select File tab of the RM/COBOL Properties dialog box. In UNIX resource files, the Options keyword provides command line options for the Indexed File Recovery utility in the global resource file, `/etc/default/recover1rc`, and the local resource file, `~/recover1rc`. For more information, see Chapter 2, *Installation and System Considerations for UNIX*, and Chapter 3, *Installation and System Considerations for Windows*, in the *RM/COBOL User’s Guide*.

The following Recovery Command options may be specified on the command line to modify the behavior of the Indexed File Recovery utility (**recover1**):

- **-I Option.** The **-I** option causes **recover1** to test only the file integrity and then stop. The file will not be modified in any way. Specifying the **-I** option causes both the **-T** and **-Z** options to be ignored. If no problems are discovered, the return code is set to 0. If a problem is discovered, the return code is set to 1. The default is for **recover1** to do a complete recovery of the indexed file if the file is marked as needing recovery. See the **-Y** and **-Z** options for additional options that modify the behavior of the Indexed File Recovery utility.

Note The integrity scan is a quick test of the file and is not comprehensive. Some problems, such as records with invalid duplicate keys, will not be detected. Indexed files with no errors detected by the integrity scan may still receive “98” errors or other I/O errors.

- **-K [template-file] Option.** The **-K** option is used to indicate that the Key Information Block (KIB) should be assumed to be invalid and, optionally, to specify a template file (*template-file*) for recovering the KIB. If no *template-file* is specified, the user will be prompted either for a template file or for enough information to rebuild the KIB. If *template-file* is specified, it should be the name of a valid indexed file with the same format as the file being recovered. This file will be used as a template. The required KIB information is read from the KIB of the template file. The template file can be a backup copy of the file being recovered, if the backup occurred before the file was damaged, or, it can be a file created by performing an OPEN OUTPUT in a COBOL program with the proper file control entry and file description entry for the file being recovered. An OPEN OUTPUT must

have been performed on the template file, but it need not contain any records. A template file must be specified if the KIB is corrupt and the file uses either an enumerated code set or an enumerated collating sequence. The default is to check the KIB for validity and, if it is found to be invalid, prompt for either a template file or information to rebuild the KIB. The name of the template file is not resolved through any environment variables.

WARNING A template file with the wrong block size can cause the loss of a large percentage of the recoverable records in your file. This can happen because of changes in the method used by the RM/COBOL 7.5 runtime system for calculating the block size. See the warning on page 67 for additional information.

- **-L [*log-file*] Option.** The -L option is used to write information about errors encountered while recovering the file to a log file (*log-file*). Only the first 100 errors will be logged. In addition to errors, a number of informational lines about the indexed file and its recovery are written to the log file, including information about sort memory (see the -M option regarding sort memory). If *log-file* specifies an environment variable name, the environment variable value will be resolved before opening the log file; this allows the use of the name PRINTER to send the log information to the print device. If *log-file* is omitted in the -L option, the default value of *log-file* is PRINTER. If the -L option is not specified, the default is not to write a log file.
- **-M [*MB-of-memory*] Option.** The -M option is used to specify the number of megabytes of memory (*MB-of-memory*) to allocate to the sort algorithm used in phase 4, build node blocks (see page 71). *MB-of-memory* is a number in the range 0 to 500. Allocating more memory generally results in faster execution of **recover1** and causes fewer node blocks to be built. If this option is not specified, a suitable number will be computed. When a log file is written (see the -L option), a line is written into the log file to show the maximum effective sort-memory size.

Note Specifying a number for *MB-of-memory* that is too large for your system may result in very poor system performance.

- **-Q Option.** The -Q option causes **recover1** to perform its work without displaying information or asking the operator questions. If the file is marked as needing recovery, or has a non-zero Open For Modify Count, then it will be recovered. Otherwise, no action occurs. This behavior can be modified by using the -Y option. The default is to display information and ask questions, which must be answered by the operator.

- **-T Option.** The -T option is used to indicate that unused space should be truncated, and returned to the operating system. Specifying the -T option will result in a minimal size indexed file, but may reduce performance if records are subsequently added to the indexed file. The default is not to truncate the file. When the file is not truncated, any empty blocks remain part of the file and are available for use in adding new records to the file.

Note Some versions of UNIX do not support the operating system call required to truncate a file.

- **-Y Option.** The -Y option causes **recover1** to assume that the operator wants to answer “y” to all possible questions and therefore not stop to wait for a response. Using the -Y option will cause a file to be recovered even if it is not marked for recovery, including the case of when the -Q option is also specified. The default is to wait for a response from the operator after a question is displayed.
- **-Z Option.** The -Z option is used to reset the Open For Modify Count to zero, without performing a full recovery. If the file is marked as needing recovery, the -Z option is ignored. The default is to treat a non-zero Open For Modify Count as indicating that the file needs recovery.

Note Use the -Z option with caution. Resetting the Open For Modify Count to zero without performing a full recovery may leave the file in a corrupted state.

Recovery Process Description

The **recover1** program attempts to recover the indexed file in place; that is, the program rebuilds the internal file structure in the actual file being recovered. If necessary, the Key Information Block (KIB) is rebuilt and any corrupted data blocks are repaired. Corrupt data blocks may result in loss of some data records. Because of this feature, it is strongly recommended that you either backup the file or copy the indexed file to be recovered to some other directory or pathname as additional security. Any records that cannot be successfully reindexed into the file due to invalid duplicate key values, or invalid record sizes, are decompressed (if compression is selected for the file), converted to the native code set, and then written to *drop-file*. **recover1** should be able to handle most kinds of indexed file corruption problems, but some fatal errors may still cause the recovery to fail. Any fatal error is displayed and causes the program to terminate. Broken hardware should be suspected in many of these cases.

drop-file can be in fixed- or variable-length format; this is set by **recover1** based on whether *indexed-file* is fixed- or variable-length format. Records placed in *drop-file* were those undergoing change at the time of the system failure that

required recovery or have invalid record sizes. Investigate any records appearing in *drop-file* and make the appropriate corrections to *indexed-file*.

The **recover1** program's processing consists of up to four separate phases, which are run in the following order:

1. **Integrity Scan.** If the -Q option or -Y option is specified, the Integrity Scan phase is disregarded unless it is forced to occur by the specification of the -I option or -L option. This phase reads the entire file in a forward direction checking for simple errors, and produces a summary report showing the state of the file and an estimate of the number of records **recover1** can recover. The indexed file is not modified during this phase.
2. **Repair Blocks.** The Repair Blocks phase, which is always run, reads and writes the file in a backward direction repairing corrupt data blocks, converting non-data blocks to empty blocks, and rebuilding some internal file structures.
3. **Move Data Blocks.** The Move Data Blocks phase is run only when the truncate file option (-T) is specified. This phase reads and writes parts of the file moving high-numbered data blocks (near the end of the file) to lower-numbered available blocks to maximize the amount of space at the end of the file that can be truncated and returned to the operating system when **recover1** finishes.
4. **Build Node Blocks.** The Build Node Blocks phase, which is always run, reads data blocks and writes node blocks in the file in a forward direction rebuilding the entire node structure for each key of the file.

Note 1 After the Integrity Scan phase, if the Estimated Recoverable records value is zero or very low, and the number of corrupt data blocks is very close to the total number of data blocks found, the number of keys that allow duplicates may be incorrect, either because the KIB is corrupt or the user provided incorrect key information to **recover1**.

Note 2 After the Integrity Scan phase, if most of the blocks are invalid, the Disk Block Size or the Disk Block Increment may have been incorrectly specified or the KIB may be corrupt.

Note 3 During the Repair Blocks phase, a count of blocks that could be read but not written may be displayed. This count may indicate the presence of a hardware problem with your disk.

If the **recover1** program is successful, the exit code is set to 0. If the **recover1** program is canceled by the operator, the exit code is set to 2. Otherwise, the exit code is set to 1.

You may produce a list of the support modules loaded by the **recover1** program by defining the environment variable `RM_DYNAMIC_LIBRARY_TRACE`. The listing will indicate which Terminal Interface support module is used and whether the Automatic Configuration File module is present. This information is most helpful when attempting to diagnose a problem with support modules.

Note The information will be visible only if you enter the **recover1** command without any parameters. In this case, **recover1** will show the proper form for the command and the list of support modules.

Recovery Support Module Version Errors

During initialization, the Indexed File Recovery utility (**recover1**) locates and loads various support modules, including the automatic configuration module, and, on UNIX, either the terminfo or the termcap Terminal Interface support module. Also, at initialization, the **recover1** utility verifies that each support module is the correct version for the utility. If a support module is not the correct version, the following message is displayed:

```
RM/COBOL:  module-name version mismatch, expected
            7.5n.nn, found n.nn.nn.
```

When the previous message is displayed, the **recover1** utility terminates with the following message:

```
Recover1:  Error invoking mismatched recover1
            and support module.
```

Example

An example run through the Indexed File Recovery utility is described below. The **recover1** session is started in this example by the following command:

```
recover1 master.inx dropout1
```

Figure 1: File Recovery Verification on page 74 shows information about the file, **master.inx**.

Under the name of the file to be recovered, a description of the state of the file is displayed. Any of the following messages may appear:

- This file has not been marked as needing recovery!
- The Open For Modify Count for this file is not zero: *count*
- File has been marked as corrupted due to a previous error.
- KIB is corrupt. Using template file: *template-file*
- KIB is corrupt. Enter a template filename (press Enter for manual entry).

WARNING Because of several changes in the RM/COBOL 7.5 runtime system, it is possible that an indexed file created by performing an OPEN OUTPUT in a COBOL program using the RM/COBOL 7.5 runtime system may have a different block size than a file you are attempting to recover. This may happen even though you specify the same file control entry and file description entry for the template file as when you initially created the file with an earlier version of RM/COBOL. Attempting to use this new file with a different block size as a template file may result in a loss of a large percentage of the recoverable records. You should verify that the block size of your template file is correct by using the Map Indexed File (**rmmapinx**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) You can also avoid this problem by creating the template file with a version of RM/COBOL prior to 7.5 or by using a backup copy of the undamaged file. Keywords MINIMUM-BLOCK-SIZE and ROUND-TO-NICE-BLOCK-SIZE of the RUN-INDEX-FILES configuration record may also be used to cause the runtime to create a file with a block size that matches releases prior to 7.5.

If the KIB is corrupt, and a template filename is not entered, **recover1** will prompt the user for the required KIB information before continuing.

If more keys exist than can appear on this screen, as many as possible appear, after which you are asked if you want to see the remaining key descriptors. This continues until all keys are shown. You are then asked to verify that this is the

file you want to recover. Entering N terminates the program. Entering Y continues the program.

Figure 1: File Recovery Verification

```
Indexed File Recovery Utility
Recover1 Version 7.5n.00

Index File: master.inx

This file has not been marked as needing recovery!

Disk Block Size:          1024      Minimum Record Length:    80
Disk Block Increment:    1024      Maximum Record Length:   80
Number of Index Blocks:  170       Number of Records:       150

  Key Position Size  Remarks
PRIME      1      8
  1        9      8
  2       17      8  duplicates allowed

Is this the file you wish to recover (y/n)?
```

Figure 2: Recover1 Summary shows a summary of the information that is gathered during the file integrity scan. You are then asked if you would like to proceed with the recovery process. Entering N terminates the program. Entering Y continues the program.

The “Average record length” is computed by adding the length of all the records in the file and dividing by the number of records. The “Average data size” is computed by adding the size that the record actually occupies in the file and dividing by the number of records. This size allows you to determine how much your data can be compressed.

Figure 2: Recover1 Summary

```

                                Indexed File Recovery Utility
                                Recover1 Version 7.5n.00

Index File: master.inx
Drop File: dropout1

This file has not been marked as needing recovery!

Disk Block Size:      1024      Minimum Record Length:      80
Disk Block Increment: 1024      Maximum Record Length:      80
Number of Index Blocks: 170      Number of Records:          150
Phase: Integrity Scan           Estimated Recoverable:       150

Block Type | Total | Total | First | Last |
           | Found| Corrupt| Corrupt| Corrupt|
KIB       |     1|      0|       |       |
Data      |    102|      0|       |       |
Node      |     61|      0|       |       |
Empty     |     6|      0|       |       |
Invalid   |     0|      0|       |       |
Unreadable|     0|      0|       |       |

Average data size: 14, Average record length: 80

Do you wish to proceed with recovery (y/n)?

```

Figure 3: Recover1 Statistics shows the information that is displayed while **recover1** is rebuilding the node blocks for the prime key.

Figure 3: Recover1 Statistics

```
Indexed File Recovery Utility
Recover1 Version 7.5n.00

Index File: master.inx
Drop File: dropout1

This file has not been marked as needing recovery!

Disk Block Size:          1024   Minimum Record Length:   80
Disk Block Increment:    1024   Maximum Record Length:  80
Number of Index Blocks:  170    Number of Records:      150
Phase: Build Node Blocks   Estimated Recoverable:  150

Key being processed:                                PRIME
Records recovered:                                    100
Records written to drop file:
Block being processed:                                13
Number of data blocks moved (for truncate):          5
```

Figure 4: Recover1 Finished Successfully shows the information that is displayed after **recover1** terminates successfully. The two lines regarding truncation are shown only when the **-T** option is specified.

Figure 4: Recover1 Finished Successfully

```

                                Indexed File Recovery Utility
                                Recover1 Version 7.5n.00

Index File: master.inx

Drop File: dropped

This file has not been marked as needing recovery!

Disk Block Size:      1024      Minimum Record Length: 126
Disk Block Increment: 1024      Maximum Record Length: 126
Number of Index Blocks: 120      Number of Records: 100
Phase: Build Node Blocks      Estimated Recoverable: 100

Key being processed:      PRIME
Records recovered:      100
Records written to drop file:
Block being processed:      120
Truncate option specified - number of data blocks moved: 4
Truncate action successful - new Number of Index Blocks: 112

Recovery successful.
```

Figure 5: Entering Key Information shows that the KIB of the file has been corrupted, and that key information must be entered for the file to be recovered. Key information can be obtained from the output of the Map Indexed File (**rmmapi`nx`**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) Underlined characters have been entered by the user.

The **recover1** session is started by the following command:

```
recover1 master.inx dropout1 -k
```

Note Entering incorrect information about how many keys, or which keys, can have duplicate values may cause unpredictable results.

Figure 5: Entering Key Information

```
Indexed File Recovery Utility
Recover1 Version 7.5n.00

Index File: master.inx

Last error was 98,38 at 9:29 on 03-21-2002

Are any of the keys in this file segmented (split) (y/n)? y
Key #: PRIME Segment #: 2 Starting Position? 10 Length? 5
      Another Segment (y/n)? n
      Total Key Length = 13 Duplicates Permitted (y/n)? n
Another Key (y/n)? n
```

Figure 6: Entering KIB Information shows an example of entering the remainder of the KIB information. Underlined characters have been entered by the user.

Figure 6: Entering KIB Information

```
Indexed File Recovery Utility
Recover1 Version 7.5n.00

Index File: master.inx

Last error was 98,38 at 9:29 on 03-21-2002

Minimum Record Length (in bytes)? 80
Maximum Record Length (in bytes)? 80
Disk Block Size (in bytes)? 1024
User Block Size (1=none/2=in bytes/3=in records)? 1
Data Compression (y/n)? y Space Character Value? 32
Zero Character Value? 48
Key Compression (y/n)? y Space Character Value? 32
File Version Number (0,2/3/4)? 4 Atomic I/O Enabled (y/n)? y
File Lock Limit (in GB)? 2
Disk Block Increment (in bytes)? 1024
Allocation Increment (in blocks)? 8
Force Write Data Blocks (y/n)? n Force Write Index Blocks (y/n)? n
Force to Disk (y/n)? n Force File Closed (y/n)? n
Code Set (1=none/2=ASCII/3=EBCDIC)? 1
Collating Sequence (1=none/2=ASCII/3=EBCDIC)? 1

Is this information correct (proceed with recovery) (y/n)? y
```

After the key and KIB information has been successfully entered, the recovery process proceeds the same as before, as illustrated in Figure 6: Entering KIB Information on page 79. If a template file had been specified on the command line or a template filename had been entered when prompted, the screens prompting for the key and KIB information would not have been displayed. A template file must be specified if the KIB is corrupt and the file uses either an enumerated code set or an enumerated collating sequence.

Recovery Program Error Messages

Error *status* initializing file manager

recover1 was unable to initialize the RM/COBOL file management system for the reason indicated by *status*. The usual cause for this error is that a buffer pool has been configured that is too large to be allocated.

Truncate option not supported

recover1 detected that the truncated function was not supported on the system when the user requested file truncation. Truncation of the file is not possible.

recovery terminating - no records recoverable!

recover1 detected corruption in the indexed file and no records could be recovered. In this case, **recover1** terminates at the end of the integrity scan to protect the user from erroneously deleting all the records from the file. This error may indicate that the block size, the block size increment, or the number of keys that allow duplicates has been incorrectly specified, or the KIB may be corrupt.

Error *status* on template file

recover1 detected an error in the KIB of the template file specified by the user. The user may enter another template file, may enter the KIB information manually, or may enter a Ctrl-C to terminate **recover 1**.

Cannot write near end of file - check “ulimit”

recover1 detected that blocks near the end of the file can be read but not written, but other blocks of the file may be both read and written. This error may indicate that the operating system file size limit (ulimit) may be smaller than the size of the file. Set the file size limit correctly or use an account with sufficient privileges and run **recover1** again.