InterBase Server Manager Help contents

Overview of InterBase Server Manager and a general introduction.

Tasks you can perform with Server Manager.

Menu Commands provides help on Server Manager's menu system and commands.

Toolbar explains Server Manager's Toolbar buttons.

Troubleshooting provides help in determining the source of any problems in establishing client-server connections.

Server Manager overview

InterBase Server Manager is a Windows application for administering InterBase local or remote databases and servers. Server Manager runs on a client PC, but can manage databases on the client PC or any server on the network.

Server Manager enables you to:

- Manage database security: authorize new users, change user passwords, and remove user authorizations.
- Back up and restore databases.
- Perform database maintenance: validate the integrity of a database, repair a corrupted database, sweep a database, and recover "limbo" transactions.
- Shut down and restart a database.

The Server Manager window has:

- A menu bar, across the top of the window containing commands you can choose to perform Server Manager tasks.
- A Toolbar, just below the menu bar. This is a row of shortcut buttons for menu commands.
- Server/database tree, displayed in the left side of the window below the Toolbar, showing the server and databases to which the client is currently connected.
- Summary information area, displayed in the right side of the window below the Toolbar. This area displays information about the current server or database, depending on which is selected in the server/database tree.
- Status line, that shows the current server and user login and flyover help for menus and the Toolbar.
- A dynamic popup menu that appears when the user clicks the right-button on a server tree item.

Tasks

Menu commands

The Server Manager menus are:

<u>File menu</u>, that provides commands to login to a server and logout from a server, connect to and disconnect from a database and exit Server Manager.

<u>Tasks menu</u>, that provides commands to perform other tasks with Server Manager, including administrating user security, backing up and restoring a database, and so on.

<u>Maintenance menu</u>, that provides commands to perform database maintenance.

<u>Window menu</u>, that provides commands to minimize and close windows.

Toolbar

The Toolbar provides shortcuts to common menu commands. When you rest the mouse cursor over a button (without clicking), a popup tag shows the command that the button carries out.

The Toolbar is also "floatable," which means you can drag it from its usual position beneath the menu bar and drop it anywhere on your Windows desktop. Just grab the bar on any empty gray area between or near any button, and drag it to a new position on your desktop.

To reposition the floating Toolbar, drag its title bar.

To remove the Toolbar entirely, first float it, then click the "X" in its title bar. To restore a closed Toolbar, choose Show Toolbar from the Window menu.

The Toolbar buttons

Server Login opens a dialog box that lets you enter the name of the server you want to log in to, along with your user name and password.

Server Logout logs you out of the currently selected server and disconnects you from all databases on that server.

Database Connect opens a dialog box that lets you enter the name of a database with which you want to connect.

Database Disconnect disconnects you from the currently selected database (not enabled if a database is not selected in the server tree).

User Security opens the InterBase Security dialog box, which lets the system database administrator (SYSDBA) add and remove users, or change passwords and other information for existing users.

Database Backup lets you back up a database. The Database Backup dialog box lets you choose the database and set backup parameters.

Database Restore lets you restore a database that you previously backed up. The Database Restore dialog box lets you choose the database and set a number of parameters for the restoration.

Database Statistics automatically retrieves a number of statistics for the currently selected database and displays them in a separate Database Statistics window. You can then locate specific information among the statistics, or save, print, copy from, analyze or summarize the information. (This button is not enabled if a database is not selected in the server tree.)

Database Properties opens a dialog box that displays summary information for the currently selected database. The dialog also lets the SYSDBA set the sweep interval as well as toggle forced writes on or off for the current database. (This button is not enabled if a database is not selected in the server tree.)

Database Connections opens a dialog box that lists the users connected to the current database. (This button is not enabled if a database is not selected in the server tree.)

Database Shutdown lets you restrict the currently selected database to single user mode. The Database Shutdown dialog box lets you set parameters for the shutdown operation. (This button is not enabled if a database is not selected in the server tree.)

Database Restart lets you bring a database back online that was previously restricted to single user mode with Database Shutdown. (This button is not enabled if a database is not selected in the server tree.)

Database Validation scans a database for corruption and orphaned pages. The Database Validation dialog box lets you choose a database to scan and set a number of validation options.

Windows ISQL opens the Windows Interactive SQL (WISQL) application.

Command/button availability
When you open a new Server Manager session, only Server Login and Help are available. After you log in to a server, Database Connect becomes available. Additional commands are enabled when you connect to a database.

File menu

The File menu contains the following commands:

Server Login

Server Logout

Database Connect

Database Disconnect

Exit

Tasks menu

The Tasks menu contains the following commands:

- User Security
- Backup
- Restore
- Database Statistics
- Lock Manager Statistics
- Interactive SQL

Maintenance menu

The Maintenance menu contains the following commands:

Database Connections
Database Sweep
Transaction Recovery
Database Shutdown
Database Restart
Database Validation
Disable WAL
Database Properties

Window menu

The Window menu contains the following commands:

Minimize Server Manager

Minimize All

Close All

Show Toolbar

File | Server Login

Before performing any local or remote database administration tasks, you must be logged in to an InterBase server.

To log on to a remote or local server, click the Server Login button on the Toolbar or choose Server Login from the File menu. Then use the <u>InterBase Login dialog box</u> to enter your logon information.

After logging on, you can connect to a database on the server. All servers to which Server Manager is logged on and databases to which it is connected are displayed in the server tree area on the left side of the Server Manager window.

If connected to more than one database, you can switch among them anytime. To switch context, just click on a different database name in the server tree or use your arrow keys.

For server login problems, see Troubleshooting.

InterBase Login dialog box

To connect to a local or remote server, you have to use the InterBase Login dialog box. To open the dialog, click the first button on the Server Manager Toolbar or choose Server Login from the File menu. To use the dialog:

1. Choose the type of server--local or remote--by clicking one of the radio buttons at the top of the dialog.
2. If you choose a remote server, you have to enter the name of the remote server (the machine running the InterBase server software) in the Server field. If you want to connect to a remote server you've used before, you can choose it from the dropdown list. You also have to choose a protocol (method of connection) for the selected server from the Network Protocols list. If your server is local, the Server and Network Protocol fields are not required and thus disabled.
3. Add your User Name and Password, then click OK to dismiss the dialog and connect to the selected server.

Upon connection, a new top-level item appears in the server tree (left panel), and the server type and InterBase version appears in the summary information area (right panel).

Note: Initially, the only authorized user of a server is SYSDBA, with default password "masterkey". All other users must be added by the SYSDBA using the Tasks | User Security dialog box.

Communications troubleshooting

Troubleshooting Local Server Connections

If you encounter problems connection to a Local InterBase Server, first consult the READIB.TXT file to see if there are any general restrictions that affect your configuration.

Make sure the application is finding the correct InterBase DLLs. Use File | Search... in the Windows File Manager to search for GDS.DLL and ensure that they are the InterBase 4.0 versions and installed in your path.

Client applications will search directories for DLLs in the following order:
1. The current directory.
2. WINDOWS directory.
3. WINDOWS\SYSTEM directory.
4. The directory containing the executable for the task requiring the DLL.
5. Directories listed in the PATH environment variable.

Troubleshooting Remote Server Connections

Make sure the client application is using the correct InterBase DLLs. Make sure that no DLLs remain loaded from previous applications. Then make sure the application is finding the correct InterBase DLLs. Use File | Search... in the Windows File Manager to search for REMOTE.DLL and GDS.DLL and ensure that they are the InterBase 4.0 versions.

Client applications will search directories for DLLs in the following order:
1. The current directory.
2. WINDOWS directory.
3. WINDOWS\SYSTEM directory.
4. The directory containing the executable for the task requiring the DLL.
5. Directories listed in the PATH environment variable.

Communications Diagnostic Tool

InterBase includes a diagnostic tool to help determine the source of any problems in establishing client-server connections. This tool, called WSDiag, is installed in the BIN subdirectory of the InterBase home directory (C:\INTERBAS by default).

To use it, choose File | Run... in Program Manager and enter the following on the command line:
 COMDIAG

Alternatively, you can double-click on COMDIAG.EXE in File Manager when the INTERBAS\BIN directory is displayed. For more information on ComDiag and more details about troubleshooting for each protocol, see ComDiag's online help.

See Also
Networking Requirements

File | Server Logout

Choose File | Server Logout to log out from the current server (the server noted in the Summary Information area on the right side of the window). After confirmation, Server Manager disconnects from the server and all databases to which it is connected via that server.

You can also log out by clicking the Server Logout button on the Toolbar or choosing Server Logout from the menu that appears when you right-click on a server name in the server tree (left panel).

File | Database Connect

Connect to a database by clicking on the Database Connect Toolbar button or choosing File | Database Connect. The <u>Connect to Database dialog box</u> will then appear.

You can also connect by choosing Database Connect from the menu that appears when you right-click on a server name in the server tree (left panel).

File | Database Disconnect

Disconnect from the current database by choosing File | Database Disconnect. To display all databases to which Server Manager is connected on a server, double-click on the server name in the server tree. To make a database the current database, click on its name in the server tree.

Connect to Database dialog box

The last database connected to is shown in the Database text field. Click on OK to connect to that database, or enter a different database name, or click on the arrow to the right of the text field for a drop-down list of databases to which Server Manager has previously connected. To be able to connect to a database, your user name must be registered in the security database on the server and you must enter the proper password.

The database file name and path must be the path to the file on the current server, not relative to any client drive mappings or share names. Here are some examples of connecting to databases on various types of servers.

For a local InterBase server or servers running on Windows NT or Windows 95, the database path name must contain the appropriate drive letter designation. For example:

 D:\USERS\ACCTING\FIN\ACCREC.GDB

For a Novell NetWare server, the database path must contain the NetWare volume name. You cannot use disk letter mappings in the database name. For example:

 VOL2:\USERS\ACCTING\FIN\ACCREC.GDB

For a Unix server, you must enter the complete and explicit (not relative) directory path for the database. For example:

 /usr/accting/fin/accrec.gdb

File | Exit

To exit Server Manager choose File | Exit. Server Manager will automatically disconnect from any databases to which it is connected and log out from all servers.

Tasks | User Security

Choose Tasks | User Security to open the <u>InterBase Security dialog box</u> and perform the following operations:

- Display the list of authorized users for the server.
- Add a user.
- Modify user password and optional information. You cannot modify a user name. To change a user name, you must delete a user and then add the new user name. Select the user whose configuration you want to modify and then choose Modify User....
- Delete a user. Select the user name you want to remove and choose Delete.... A dialog box will ask you to confirm the action.

Note: Only the SYSDBA user is authorized to add, modify, or delete user information. Other users will get permission errors.

InterBase Security dialog box

Database security is controlled through the InterBase security database that contains information on all the authorized users for the current server. The InterBase Security dialog box enables you to view the authorized users, and enables the SYSDBA to add and delete users, and change users' passwords and optional information.

When a user attempts to connect to a database on the server, the user name and password are verified against records in the security database. The password is encrypted for transmission over the network. If a matching record is found, the connection succeeds.

To add a new user, choose Add User.... This opens the <u>User Configuration dialog box</u>.

To change a user's password or optional information, select the user name to highlight it, and then choose Modify.... Alternatively, double-click on the user name. This opens the <u>User Configuration dialog box</u> for that user. You may not modify a user name. The only way to change a user name is to delete the user and then add a user with the new name.

To delete a user, select the user name to highlight it, and then choose Delete.

The SYSDBA user

Every InterBase server has a SYSDBA user, with password "masterkey". Initially, SYSDBA is the only authorized user on a server; the SYSDBA must authorize all other users on the server. SYSDBA is a special user that can bypass normal SQL security, and perform special tasks such as database shutdowns.

Only the SYSDBA user can update the security database to add new users, delete users, or modify user configurations. The SYSDBA may authorize a new user by assigning a user name and password in the security database.

Important: It is strongly recommended to change the password for SYSDBA as soon as possible. Otherwise, the SYSDBA account will not be secure, and unauthorized users can access databases on the server.

User Configuration dialog box

This dialog box enables the SYSDBA to add a new user to the InterBase security database and to modify existing users' passwords and optional information.

To add a new user, type the new user name in the User Name text field, and then type the user's password in both the Password and the Confirm Password text fields. Do not create user names containing spaces. Add any desired optional information in the corresponding text fields, and then click on OK.

Note: User names can be up to 31 characters long and are not case sensitive. Passwords are case sensitive. Only the first eight characters of the password are significant.

To modify a user's information, type the new password in the Password text field, and type the same password again in the Confirm Password text field. You may also modify optional information. Then click on OK to enter the changes.

Tasks | Backup

A database backup saves a database to a file on a hard disk or other storage medium. To protect a database from power failure, disk crashes or other potential data loss, you should regularly back up the database. For additional safety, it is recommended to store the backup medium in a different physical location from the database server.

Choose Tasks | Backup to back up a database to the current server. The Database Backup dialog box will open, allowing you to enter the backup source, target, and backup options.

Database Backup dialog box

The Database Backup dialog box enables you to back up a database to a file or device. This dialog box consists of three areas: Backup Source, Backup Destination, and Backup Options. The current server name is displayed in the upper left of the Backup Source area.

To perform a backup:

- To back up a local database, type the name and directory path of the database you want to back up in the Database Path text field. By default, the current database is displayed in this field. To back up a database from a remote server , click on the Remote button. Because remote backup is not supported by InterBase for NetWare, this button will be dimmed and unavailable when the current server is a NetWare server.

- Type the name of the destination file or device in the Backup File or Device text field. This should always be a fully qualified path name relative to the server. The backup file must reside on the same machine as either a local or remote server. Tape backup is supported on NT servers and the tape device should be specified as follows:

    \\.\tape0

  Note: Multi-volume tape backup is not supported. If the database is too large to fit on one tape, run the gbak utility from the NT console to perform the backup.

- Select the desired backup options, then click on OK.

  Note: Database files and backup files can have any name that is legal on your operating system; the .gdb and .gbk file extensions are InterBase conventions only.

When creating a backup file, Server Manager stores the database as one file. You cannot split a large database among multiple backup files. A backup file will typically occupy less space than the database because the files include only the current version of data and incur less overhead for data storage.

If you specify a backup file that already exists, Server Manager overwrites it. To avoid overwriting, specify a unique name for the backup file.

If a database spans multiple files, specify only the first file (the primary file) as the source. Server Manager uses the header page of each file to locate additional files, so the entire database can be backed up based on the primary file.

Backing up a database from a remote server

Server Manager enables you to back up a database that is on a server other than the current server. Such a server is referred to as a remote server. A remote server may or may not be connected to the network.

You may want to back up a database to a different server to:
- Access larger or faster disks.
- Place the database on the machine where it is most frequently used.
- Shut down the original server for maintenance while keeping the database running.

Procedure

If the source and the target server are connected by a network, then:
- Log in with Server Manager to the target server and make it the current server by selecting it in the server/database tree. Choose Tasks | Backup or click on the Backup Toolbar button.
- Enter the name of the database you want to back up in the Database Path text field. Click on the arrow to display a drop-down list of databases to which Server Manager is connected.
- Choose the Remote button. The Remote Backup Source dialog box will open.
- In the Database Backup dialog box, choose the Backup Options and then click on OK.

After you backup a database from one machine to another, two copies of the database exist. If you intend to maintain only one active copy, delete one. It is also possible to back up the database on the server on which it resides and then restore it to a remote server.

If the current server and the target server are not connected by a network, then:
- Log in with Server Manager to the server on which the database currently resides.
- Enter the path of a device (for example, a tape drive) to which to backup the database in the Backup Destination text field.
- Take the removable medium (for example, a tape) to a device connected to the target server.
- On a client connected to the remote target server, log in with the Server Manager to the server, and restore the database there.

Remote Backup Source dialog box

Enter the name of the remote server, or select from the drop-down list. Select the desired network protocol to use. Enter your user name and password on the remote server, and click on OK.

Note: The network protocol for a remote backup must be usable by *both* the source and target servers. Use NetBEUI only if both source and target servers are Windows NT servers. Use TCP/IP to back up between heterogeneous servers that both have TCP/IP software installed. Novell SPX servers are not supported.

Backup options

The following backup options are available:

- <u>Transportable Format</u>
- <u>Back Up Metadata Only</u>
- <u>Disable Garbage Collection</u>
- <u>Ignore Transactions in Limbo</u>
- <u>Ignore Checksums</u>
- <u>Verbose Output</u>

The backup options are indicated by check boxes on the right side of the dialog box. If a check box has an "X" inside, then the option is selected. If the box is empty, the option is not selected.

Transportable Format

To move a database to another machine that is not on the network, check on the Transportable Format option. This option writes data in a generic format, enabling you to restore to any machine that supports InterBase.

To make a transportable backup:

1. Back up the database using transportable format by selecting the Transportable Format option in the Database Backup dialog box.
2. If you backed up to a removable medium, proceed to Step 3. If you created a backup file, use operating-system commands to copy the file to tape, then load the contents of the tape onto another machine. Or copy it across a network to the other machine.
3. On the destination machine, restore the backup file. If restoring from a removable medium, such as tape, specify the device name instead of the backup file.

If you work in a heterogeneous environment, you should make transportable backups regularly, even if the database is on a networked machine. If the network connection is interrupted, a remote database will not be available unless a transportable copy is placed on local machines.

Back Up Metadata Only

When backing up a database, you can exclude its data, saving only its metadata. You might want to do this:
- To retain a record of the metadata before it is modified.
- To create an empty copy of the database. The copy will have the same metadata but can be populated with different data.

To back up metadata only, click on the Back Up Metadata Only option.

You can also extract a database's metadata using Windows ISQL. This produces a data definition file (a text file), whereas the Server Manager creates a backup file (containing metadata only).

Disable Garbage Collection

By default, the Server Manager performs garbage collection during backup. To prevent garbage collection during a backup, click on the Disable Garbage Collection option.

Garbage collection physically erases old versions of records from disk. Generally, you will want the Server Manager to perform garbage collection during backup.

You might not want to perform garbage collection during backup if there is data corruption in old record versions and you want to prevent InterBase from visiting those records during a backup.

Ignore Transactions in Limbo

To ignore limbo transactions during backup, click on the Ignore Transactions in Limbo option.

When the Server Manager ignores limbo transactions during backup, it ignores all record versions created by any limbo transaction, finds the most recently committed version of a record, and backs up that version.

Limbo transactions are usually caused by the failure of a two-phase commit. They can also exist due to system failure or when a single-database transaction is prepared.

Before backing up a database that contains limbo transactions, it is a good idea to perform transaction recovery, by choosing Maintenance | Transaction Recovery....

Ignore Checksums

To ignore checksums during backup, click on the Ignore Checksums option.

A checksum is a page-by-page analysis of data to verify its integrity. A bad checksum means that a data page has been randomly overwritten; for example, due to a system crash.

Checksum errors indicate data corruption, and InterBase normally prevents you from backing up a database if bad checksums are detected. Examine the data the next time you restore the database.

Verbose Output

To monitor the backup process as it runs, click on the Verbose Output option. This option will open a standard text display window to display status messages on the screen.

By default, the backup window will display the time that the backup process starts, the time it ends, and any error messages.

The standard text display window enables you to search for specific text, save the text to a file, and print the text to a printer.

Tasks | Restore

Choose Tasks | Restore to restore a database from the current server. The <u>Database Restore dialog box</u> will open, enabling you to enter the restore source, target, and options.

Database Restore dialog box

The Database Restore dialog box enables you to restore a database from a previously created backup file. This dialog box consists of three areas: Restore Source, Restore Destination, and <u>Restore Options</u>. The current server name is displayed in the upper left of the Restore Source area.

The backup file from which the database is being restored is called the source. The database being restored is called the destination or target.

To restore a database:

- Type the name of the source file or device on the current server in the Restore Source / Backup File or Device text field. This should be the fully qualified path name relative to the server of a previously created InterBase backup file.
- Type the name (including directory path) of the database to restore to in the Primary Database File text field. To <u>restore a database to multiple files</u>, click on the Multi-file... button. To <u>restore a database to a remote server</u> (a server other than the current server), click on the Remote... button. Because remote restore is not supported by InterBase for NetWare, this button will be dimmed and unavailable when the current server is a NetWare server.
- Enter the database page size, in bytes (1024 by default). Legal values for databases are: 1024, 2048, 4096, and 8192.
- Select the desired <u>Restore Options</u>, and click on the OK button to begin the restore.

Typically, a restored database occupies less disk space than it did just before being backed up, but disk space requirements may change when the on-disk structure changes with new product releases.

 Note: Multi-volume restoration is not supported. If the database resides on more than one tape, run **gbak** from the server console to perform the restoration.

Restoring a database to a remote server

Server Manager enables you to restore a database to a server other than the current server. Such a server is referred to as a remote server. The source server must be the current server.

To restore a database to a remote server:

▪ Log in with Server Manager to the source server (the server with the backup file) and make it the current server, by clicking on it in the server/database tree.

▪ Choose Tasks | Restore.

▪ In the Database Restore dialog box, enter the name of the backup file on the current server in the Backup File or Device text field.

▪ Click on the Remote... button. The Remote Restore Destination dialog box will open. Enter the name of the remote server in the Destination Server text field (or select it from the drop down list). Select the desired Network protocol, and enter your user name and password for the remote server. Click on OK.

▪ Enter the directory path and database name to restore the backup file to in the Primary Database File text field.

▪ Choose the desired Restore Options and then click on OK. The remote database restore will begin.

Note: The network protocol for a remote backup must be usable by *both* the source and target servers. Use NetBEUI only if both source and target servers are Windows NT servers. Use TCP/IP to back up between heterogeneous servers that both have TCP/IP software installed.   Novell SPX servers are not supported.

Restoring a database to multiple files

You might want to restore a database to multiple files to distribute it among different disks, which provides more flexibility in allocating system resources.

To restore a database to multiple database files, click on the Multi-file... button in the Database Restore dialog box. The Multi-File Database Restore dialog box opens.

To specify names of files to restore to, type the name of each file to restore to in the File Path text field and then type the number of pages for that file in the text field below it. The minimum number of pages in a file is 200. Choose Save, and the file name will appear in the File List on the right side of the dialog box.

To modify one of the files in the list, select it and choose Modify. The selected file name will appear in the File Path text field, where you can edit it, and the associated number of pages will appear in the Pages text field. To delete a file, select it in the File List and choose the Delete button.

After entering all the names of the database files to restore to, choose OK to return to the Database Restore dialog box.

Restore options

The following restore options are available:

- Replace Existing Database
- Commit After Each Table
- Restore Without Shadow
- Deactivate Indexes
- Do Not Restore Validity Conditions
- Verbose Output
- Changing the Database Page Size

The restore options are shown in check boxes on the right side of the Database Restore dialog box. If a check box has an "X" inside, then the option is selected. If the box is empty, the option is not selected.

Replace Existing Database

Server Manager will not overwrite an existing database file unless the Replace Existing Database option is selected. If you attempt to restore to an existing database name, and this option is not selected, the restore will fail.

Caution: Replacing an existing database is discouraged. When restoring to an existing file name, a safer approach is to rename the existing database file, restore the database, then drop or archive the old database as needed.

Commit After Each Table

Normally, the Server Manager restores all metadata before restoring any data. If you select the Commit After Each Table option, the Server Manager restores the metadata and data for each table together, committing one table at a time.

This option is useful when you are having trouble restoring a backup file; for example, if the data is corrupt or invalid according to integrity constraints.

If you have a problem backup file, restoring the database one table at a time lets you recover some of the data intact. You can restore only the tables that precede the bad data; restoration fails the moment it encounters bad data.

Restore Without Shadow

To restore a database without restoring its shadow, select this option. You might want to do this if:

- You are restoring from a server that supports shadows to a server type that does not support shadows.
- The database you are restoring is a copy of an existing database that has a shadow.
- You are migrating a database from InterBase version 3.3 to a version 4.0 server that does not support shadows.
- The shadow would end up on a machine that is unavailable to the database (due to a network failure, for example).

When a database is restored without its shadow, the definition of its shadow is deleted in the restored database. You can then create a new shadow if you like (if you are logged on to a server that supports shadowing), specifying a new name or new location as appropriate.

Do Not Restore Validity Conditions

If you redefine validity constraints in a database where data is already entered, your data might no longer satisfy the validity constraints. You might not discover this until you try to restore the database, at which time an error message about invalid data appears.

Caution: Always make a copy of metadata before redefining it; for example, by extracting it using Windows ISQL.

To restore a database that contains invalid data, select the Do Not Restore Validity Conditions option. This option deletes validity constraints from the metadata. After the database is restored, change the data to make it valid according to the new integrity constraints. Then add back the constraints that were deleted.

This option is also useful if you plan to redefine the validity conditions after restoring the database. If you do so, thoroughly test the data after redefining any validity constraints.

Verbose Output

To monitor the restore process as it runs, click on the Verbose Output option. This option will open a standard text display window to display status messages on the screen.
The standard text display window enables you to search for specific text, save the text to a file, and print the text to a printer.

Deactivate Indexes

Normally, InterBase rebuilds indexes when a database is restored. If the database contained duplicate values in a unique index when it was backed up, restoration will fail. Duplicate values can be introduced into a database if indexes were temporarily made inactive (for example, to allow insertion of many records or to rebalance an index).

To enable restoration to succeed in this case, click on the Deactivate Indexes option. This makes indexes inactive and prevents them from rebuilding. Then eliminate the duplicate index values, and re-activate indexes through ALTER INDEX in Windows ISQL.

A unique index cannot be activated using the ALTER INDEX statement; a unique index must be dropped and then created again. For more information on activating indexes, see the online SQL Reference.

Note: The Deactivate Indexes option is also useful for bringing the database online more quickly. Data access will be slower until the indexes are rebuilt, but at least the database is available. After the database is restored, users can access the database while you reactivate the indexes.

Changing the database page size

InterBase Workgroup Server supports database page sizes of 1024, 2048, 4096, and 8192 bytes. The default is 1024 bytes. To change page size, back up the database and then restore it, modifying the Page Size field in the Database Restore dialog box.

Changing the page size can improve performance because:

- Storing and retrieving BLOB data is most efficient when the entire BLOB fits on a single database page. If an application stores many BLOBs exceeding 1K, using a larger page size reduces the time for accessing the BLOBs.
- InterBase performs better if rows do not span pages. If a database contains long rows of data, consider increasing the page size.
- If a database has a large index, increasing the database page size reduces the number of levels in the index hierarchy. Indexes work faster if their depth is kept to a minimum. Choose Tasks | Database Statistics to display index statistics, and consider increasing the page size if index depth is greater than two on any frequently used index.
- If most transactions involve only a few rows of data, a smaller page size may be appropriate, since less data needs to be passed back and forth and less memory is used by the disk cache.

Tasks | Database Statistics

To view database statistics, select the desired database in the server/database tree and then choose Tasks | Database Statistics from the Server Manager menu. This opens the <u>Database Statistics window</u>.

Database Statistics window

The Database Statistics window automatically displays a number of statistics for the currently selected database. You can then locate specific information among the statistics, or save, print, copy from, analyze or summarize the information.

The window is comprised of a <u>menu</u>, toolbar and a viewing area in which the retrieved information is displayed.

Database Statistics menus

File Menu
  Save As to save the text in the window to a file.
  Print to print the text in the window.
  Print Setup to configure your printer.
  Close to close the window.

Edit Menu
  Copy to copy the currently selected text to the clipboard.

Search Menu
  Find to find a text pattern that you enter.
  Next to find the next occurrence of the last search text.

Window Menu
  Main Window switches focus back to the Server Manager.

View menu
View operations display database statistics from the header page, such as the oldest transaction and number of allocated pages. Database pages can also be analyzed to determine the number of pages and the fill distribution of pages within each table. View options are:
  Database Summary
  Database Analysis
  WAL Statistics (NetWare servers only)

Tasks | Lock Manager Statistics

To view lock manager statistics, select a server from the server/database tree and then choose Tasks | Lock Manager Statistics. This will open the Lock Manager Statistics window and automatically display lock manager statistics for the current server. The features of this window are described in the Standard Display Window Overview.

Lock Manager Statistics window

Locks are a mechanism that InterBase uses to maintain the consistency of the database when it is accessed by multiple users. The lock manager is the server process that coordinates locking.

The lock manager uses a lock table to coordinate resource sharing among processes connected to the database. The lock table contains information on all the locks in the system and their states. Global header information contains useful aggregate information such as the size of the lock table, the number of free locks, the number of deadlocks, and so on. There is also process information which includes whether the lock has been granted or is waiting, and so on. This information is useful when trying to correct deadlock situations.

To view lock manager statistics, choose Tasks | Lock Manager Statistics. Lock manager statistics are displayed in a standard display window.

Lock manager statistics are generally for use by InterBase technical support in diagnosing any locking problems that may occur. The information is not intended for interpretation by users.

Standard display window overview

The standard text display window is used to display database and server statistics and to monitor database backup and restoration for remote InterBase servers. Although these operations use the standard text display window, some windows may have menu commands specific to the particular operation.

It contains a menu bar, a Toolbar with buttons for often-used menu commands, and a scrolling text display area. The scrolling text area displays information of interest: either messages from database backup and restore processes or database and server statistics.

If you are viewing Database Statistics, a View menu is provided in addition to the standard menu commands.

Standard window menu commands

The standard text display window contains the following menu commands:

     <u>File | Save As</u> to save the text in the window to a file.

     <u>File | Print</u> to print the text in the window.

     <u>File | Print Setup</u> to configure your printer.

     <u>File | Close</u> to close the window.

     <u>Edit | Copy</u> to copy the currently selected text to the clipboard.

     <u>Search | Find</u> to find a text pattern that you enter.

     <u>Search | Next</u> to find the next occurrence of the last search text.

     <u>Window | Main Window</u> to switch focus back to the Server Manager window.

Note: In the <u>Database Statistics</u>, a <u>View menu</u> is also provided.

File | Save As

Choose File | Save As to save the current text displayed in the window to a file. The Save As dialog box will open enabling you to name the file.

File | Print

Choose File | Print to print the current text displayed in the scrolling area of the window to a printer. The Print dialog box will open enabling you to print the file.

File | Print Setup

Choose File | Print Setup to modify print setup options. The <u>Print Setup dialog box</u> will open.

Print Setup dialog box

This dialog box enables you to configure your printer. In the Printer area, select the printer to use. In the Orientation area, select the desired paper orientation, and in the Paper area, select the desired paper source and size.

Choose the Options... button for additional print options. Separate help is available for the Print Options dialog box.

File | Close

Choose File | Close to close the current window.

Edit | Copy

Choose Edit | Copy to copy the selected text into the clipboard.

Search | Find

Choose Search | Find to search for a specific text pattern in the text currently displayed in the window. This command will open the Find dialog box. This dialog box enables you to enter a text pattern for which to search. By default, the search will search forward (down) through the text starting at the current cursor position. The direction of the search can be altered using the Direction radio buttons. Check boxes are also provided to control word matching and case sensitivity.

Search | Next

Choose Search | Next to search for the next occurrence of the pattern entered in the Find dialog box.

View | Database Summary

Choose View | Database Summary in the Database Statistics window to display summary statistics about the current database. The following information is displayed:

Database name information
The first line displays the name and location of the primary database file.

Database header page information
These items are:
- Flags
- Checksum: The header page checksum. This is a unique value computed from all the data in the header page. When the header page is stored to disk and later retrieved, the checksum of the retrieved page is recomputed and compared to the stored value to ensure that the information is correct.
- Generation: Counter incremented each time header page is written.
- Page size: The current database page size in bytes.
- ODS version: The version of the database's on-disk structure.
- Oldest transaction: The transaction ID number of the oldest transaction not marked committed (active, in limbo, or rolled back).
- Oldest active: The transaction ID number of the oldest active transaction.
- Next transaction: The transaction ID number that will be assigned to the next transaction.
  The difference between the oldest transaction and the next transaction determines when database sweeping will occur. For example, if the difference is greater than 20,000, then by default the database will be swept.
- Sequence number: The sequence number of the header page (zero is used for the first page, one for second page, and so on).
- Next attachment ID: ID number of the next database attachment.
- Implementation ID
- Shadow count: The number of shadow files defined for the database.
- Number of cache buffers: The number of page buffers in the database cache.
- Next header page: The ID of the next header page.
- Creation date: The date when the database was created.

Variable header data
- Shared Cache file: Not used.
- Sweep Interval: Number of transactions between database sweeps.

Database file sequence
- This section lists all the files associated with the database, including any secondary files.

Database log page information
This section contains information on the database log page. This applies only to databases with the write-ahead log enabled (NetWare servers only).
These items are:
- Log flags
- Next log page: For future use.
For each control point (checkpoint), the following information is listed:
- Control point 1 is the at checkpoint encountered. Control point 2 is the checkpoint before the last. Current file is the file to which WAL is currently writing.
- Partition offset: Reserved for future use.
- Seqno: The sequence number of the current log file in the WAL sequence.
- Offset: The byte offset into the current log file.

View | Database Analysis

Choose View | Database Analysis in the Database Statistics window to display a full analysis of the current database in the text display area.

First, the database header page information is displayed. This is the same information generated by <u>View | Database Summary</u>. Then information on all the tables and indexes in the database is displayed.

Table and index information

Then information on each table and index in the database is displayed.

- Primary pointer page: The page that is the first pointer page for the table.
- Index root page: The page number that is the first pointer page for indexes.
- Data pages: The total number of data pages.
- Average fill: The average percentage to which the data pages are filled.
- Fill distribution: A histogram that shows the number of data pages that are filled to the percentages.

For each index in the database:

- Index: The name of the index.
- Depth: The number of levels in the index page tree.
- Leaf buckets: The number of leaf (bottom level) pages in the index page tree.
- Nodes: The total number of index pages in the tree
- Average data length: The average length of each key in bytes.
- Total dup: The total number of rows that have duplicate indexes.
- Max dup: The number of duplicates in the index with the most duplicates.
- Fill distribution: A histogram that shows the number of index pages filled to the specified percentages.

If the depth of the index page tree is greater than three, then sorting may not be as efficient as possible. To reduce the depth of the index page tree, increase the page size. If increasing the page size does not reduce the depth, then return it to its previous size.

View | WAL Statistics

WAL is supported only on remote NetWare servers.

For InterBase for NetWare servers, choose View | WAL Statistics to display statistics on the write-ahead log.

WAL statistics consist of a number of sections separated by horizontal lines.

The first section lists the WAL segment flags. These may be useful to InterBase technical support in diagnosing problems. Next is the current database page size, in bytes, and the owner and group IDs. The final line lists the number of connections to and disconnections from the database. The difference between the connections and disconnections minus two is the number of users connected to the database, since there is one connection for the cache thread and one for the WAL thread.

The next section lists the configured size (in bytes) and number of WAL buffers. In future releases on platforms that support mapped files, the "total" buffers may increase automatically as necessary. On NetWare, "total" will always equal "original". The remaining information tells what the system is doing with the buffers, and may be useful to InterBase technical support in diagnosing problems.

The next section gives the name of the current log file, its offset into the file that the log records are being written at, and the size of the file (rollover).

The next section lists the maximum checkpoint interval in bytes, the current checkpoint interval in bytes, and for each log file: current checkpoint sequence number, log file name, log partition offset, and checkpoint offset.

The next two sections list the WAL writer process ID, the process ID of the last process acquiring the WAL protocol, the total number of WAL I/Os, the average size of each I/O (in bytes), and the next block sequence number.

The next section lists group commit information. Use the average group commit size to determine the effective group commit value for your database. If the value listed after "grpc wait micro-seconds" is zero, then no group commits are happening.

The final two sections provide information that may be useful to Borland InterBase technical support in diagnosing problems.

Window | Main Window

Choose Window | Main Window to change focus from the current window to the main Server Manager window.

Tasks | Interactive SQL

Choose Tasks | Interactive SQL in the Server Manager window to open the Windows ISQL tool. Windows ISQL will be started, automatically connected to the current database.

Maintenance | Database Connections

Choose Maintenance | Database Connections to display a list of active connections to the current database.

Maintenance | Database Sweep

To perform a database sweep, choose Maintenance | Database Sweep.

This operation runs an immediate sweep of the database, releasing space held by records which were rolled back and by out-of-date record versions. Sweeps can also be performed automatically at a specified interval by configuring Database Properties.

Important: Sweeping a database does not require it to be shut down. You can perform sweeping at any time, but it can impact system performance and should be done when it will least affect users.

Maintenance | Transaction Recovery

When committing a transaction that spans multiple databases, InterBase automatically performs a two-phase commit. A two-phase commit guarantees that the transaction updates either all of the databases involved or none of them; data is never partially updated.

In the first phase of a two-phase commit, InterBase prepares each database for the commit by writing the changes from each subtransaction to the database. A subtransaction is the part of a multi-database transaction that involves only one database. In the second phase, InterBase marks each subtransaction as committed, in the order that it was prepared.

If a two-phase commit fails during the second phase, some subtransactions will be committed and others will not be. A two-phase commit can fail if a network interruption or disk crash makes one or more databases unavailable. Failure of a two-phase commit causes limbo transactions, transactions that do not know whether to commit their changes or roll them back. You can recover these limbo transactions using Server Manager.

To recover transactions that are "in limbo" from two-phase commit, choose Maintenance | Transaction Recovery.... The Transaction Recovery dialog box will then appear and display a list of limbo transactions that can then be operated upon to recover, that is, to commit or roll back.

Server Manager analyzes the state of subtransactions by determining when the two-phase commit failed. If the first transactions are in limbo but later transactions are not, Server Manager assumes that the prepare phase did not complete. In this case, you are prompted to do a rollback.

Transaction Recovery dialog box

The Transaction Recovery dialog box lists all the pending transactions in the database in the scrolling area on the left side of the dialog box. Click on the "+" to display all the subtransactions of a transaction. You can change the path of the database specified by each subtransaction by choosing Connect Path. A dialog box will open enabling you to enter the directory path of the other database involved in the subtransaction, including the server name and separator indicating communication protocol, then click on OK. This may be necessary because the path shown was the path to the database from the client machine which expected the transaction. It is possible that the indicated network protocol or intermediate servers are unavailable from your workstation and you will therefore need to enter a new value.

To use TCP/IP, separate the server and directory path with a colon (:). To use Novell SPX, separate the server and directory path with an at-sign (@). To use Named Pipes/NetBEUI, precede the server name with either a double backslash (\\) or a double slash (//), and then separate the server name and directory path with either a backslash or a slash.

You can choose to either commit or roll back each transaction. You can also seek advice by choosing the Advice button. This will open the Transaction Recovery Advice dialog box.

Transaction Recovery Advice dialog box

This dialog box displays information on each sub-transaction: whether it has been committed, the remote server name, and database name.

At the bottom, an action will be recommended: either commit or roll back for the subtransaction.

Maintenance | Database Shutdown

Shutting down a database means that no users can connect to it except the SYSDBA user or the database owner. This is useful for performing maintenance tasks which require exclusive access such as defining a WAL log file or running database validation. Only the SYSDBA or the owner of a database may shut it down, and only those users may connect to the database while it is shutdown.

To shut down the database, choose Maintenance | Database Shutdown.... The <u>Database Shutdown dialog box</u> then opens.

Database Shutdown dialog box

The Database Shutdown dialog box enables you to choose the following parameters:

- Time-out period in minutes. Server Manager will attempt to shut down the database during this period. Exactly how it does it depends on the other shutdown parameters.
- Deny new connections while waiting. All existing database connections can complete their operations unaffected. The database is shut down after all current users or processes disconnect from the database. At the end of the time-out period, if there are still active connections, then the database is NOT shut down.
- Deny new transactions while waiting. Allows existing transactions to run to normal completion. Once transaction processing is complete, the database is shut down. Denying new transactions will also deny new connections, since a database connection requires a transaction. At the end of the time-out period, if there are still active transactions, then the database is NOT shut down.
- Force shutdown after the time-out period. During the time-out period, there are no restrictions on transactions or connections. At the end of the time-out period, or as soon as there are no active transactions, the database is shut down, any uncommitted transactions are rolled back, and the users are disconnected.

Caution: Forcing database shutdown will interfere with normal database operations, and should only be used after users have been given appropriate broadcast notification well in advance.

Denying new connections

To prevent connections to the database during the time-out period, select the "Deny New Connections While Waiting" option in the Database Shutdown dialog box. If there are still active connections at the end of the time-out period, then shutdown is canceled.

Denying new transactions

To prevent new transactions against the current database during the time-out period, select the "Deny New Transactions While Waiting" option in the Database Shutdown dialog box. If there are still active transactions at the end of the time-out period, then shutdown is canceled.

Maintenance | Database Restart

After a database is shut down, it must be restarted (brought back online) before users can access it.

To restart a database which has been shut down, choose Maintenance | Database Restart. The currently selected database will be brought back online immediately.

Maintenance | Database Validation

To validate a database, choose Tasks | Database Validation. The <u>Database Validation Dialog Box</u> will open.

In day-to-day operation, a database is sometimes subjected to events that pose minor problems to database structures. These events include:

- Abnormal termination of a database application. This does not affect the integrity of the database. When an application is canceled, committed data is preserved, and uncommitted changes are rolled back. If InterBase has already assigned a data page for the uncommitted changes, the page might be considered an orphan page. Orphan pages are unassigned disk space that should be returned to free space.
- Write errors in the operating system or hardware. These usually create a problem with database integrity. Write errors can result in "broken" or "lost" data structures, such as a database page or index. These corrupt data structures can make committed data unrecoverable.

You should validate a database:

- Whenever a database backup is unsuccessful.
- Whenever an application receives a "corrupt database" error.
- Periodically, to monitor for corrupt data structures or misallocated space.
- Any time you suspect data corruption.

Database Validation dialog box

When Server Manager validates a database it verifies the integrity of data structures. Specifically, it will:

- Report corrupt data structures.
- Report misallocated data pages.
- Return orphan pages to free space.

Validation Options

You can select three options with Database Validation:

- Validate record fragments
- Read-only validation
- Ignore checksum errors

By default, database validation reports and releases only page structures. When you select the Validate Record Fragments option, validation reports and releases record structures as well as page structures. By default, validating a database will perform non-user data related updates, if necessary. To prevent updating, select the Read-only validation option. Validation should not take any action which will endanger user data, only reclaim space.

Handling Checksum Errors

A checksum is a page-by-page analysis of data to verify its integrity. A bad checksum means that a database page has been randomly overwritten (for example, due to a system crash). Checksum errors indicate data corruption. To repair a database that reports checksum errors, select the Ignore Checksum Errors option.

This option enables Server Manager to ignore checksums and continue with the validation.

If you have a corrupt database, when you validate it the Validation Report Dialog Box will open. Before continuing, make a copy of the database using an operating-system command. Do not use the InterBase Backup utility, because it cannot back up a database containing corrupt data.

Validation Report dialog box

If a database contains errors, this dialog box will open. Database validation does not fix write errors; it only reports them. You can fix errors by clicking on the Repair button in this dialog box. This will fix problems that cause records to be corrupt and mark corrupt structures. In subsequent operations (such as backing up), InterBase ignores the marked records.

If you suspect you have a corrupt database, perform the following steps:

1. Make a copy of the database using an operating-system command. Do not use the InterBase Backup utility, because it cannot back up a database containing corrupt data.
2. Validate and repair the copy database to mark corrupt structures.
   If Server Manager reports any checksum errors, validate and repair the database again, choosing the Ignore checksum errors option.
3. Validate the database again, with the Read-only validation option selected. Note that the free pages are no longer reported, and the broken record is marked as damaged. Any records marked Server Manager are ignored when the database is backed up.
4. Back up the mended database with Server Manager. At this point, any damaged records are lost, since they were not included during the backup.
5. Restore the database to rebuild indexes and other database structures. The restored database should now be free of corruption.
6. Verify that restoring the database fixed the problem by validating the restored database with the Read-only validation option.

Note: Some corruptions are too serious for Server Manager to correct. These include corruptions to certain strategic structures, such as space allocation pages. In addition, Server Manager cannot fix certain checksum errors that are random by nature and not specifically associated with InterBase.

Maintenance | Disable WAL

WAL is supported on only remote NetWare Servers.

Choose Tasks | Disable WAL to disable the write-ahead log protocol for the current database. This will open the <u>Disable WAL dialog box</u>. This menu item will be dimmed and unavailable unless the current server is a NetWare server.

This command does not delete WAL files and does not include any pending recovery actions in the WAL.

Disable WAL dialog box

WAL is supported on only remote NetWare Servers.

The InterBase Workgroup Server for Novell NetWare includes a feature called the write-ahead log (WAL). This dialog box lets you disable WAL for a database on the current server. You might want to do this if the WAL files have become corrupted or deleted.

 Important: This command should only be used as an emergency measure when WAL files have become corrupted. Under normal circumstances, use the ALTER DATABASE DROP LOGFILE command to drop WAL. For more information, see *Installing and Running InterBase on NetWare.*

Type the name of the database in the text field, including full directory path, or select one from the drop down list. Then choose OK to disable WAL for the database. Any pending recoveries will be lost by forcibly dropping the WAL files with this dialog box.

Database Properties dialog box

This dialog box contains a Summary Information area that does not allow modification of parameters and a Configuration area, that does allow modification.

The Summary Information area displays:

- The full database name and path.
- The user name of the database owner.
- Secondary File names and their start pages.
- The number of database pages allocated.
- Page Size, in bytes.

The Configuration area enables you to:

- Adjust the database sweep interval (number of transactions between sweeps).
- Disable and enable forced database writes.

Adjusting database sweep interval

Sweeping a database is a systematic way of removing outdated records from the database. Periodic sweeping prevents a database from growing too large. However, sweeping can also slow system performance.

InterBase uses a multi-generational architecture. This means that multiple versions of data records are stored directly on the data pages. When a record is updated or deleted, InterBase keeps a copy of the old state of the record and creates a new version. This can increase the size of a database.

To limit the growth of the database, InterBase performs garbage collection, which frees up space allocated to outdated versions of a record. Whenever a transaction accesses a record, outdated versions are garbage collected. However, records that were rolled back are ignored by typical transactions and will not be garbage collected. To guarantee that all records are garbage collected, including those that were rolled back, InterBase periodically "sweeps" the database.

When sweeping a database, InterBase reads every record in the database. This forces garbage collection of outdated record versions as well as rolled back records. InterBase automatically sweeps a database at a set interval: by default, 20,000 transactions.

Because automatic sweeping is tied to a transaction, sweeping a database can affect application performance. For example, on a single-threaded platform, if a user's transaction coincides with the sweep interval, the user's process may stop while the sweep takes place. On multi-threaded platforms, the sweep can spawn a separate process so that it does not block other processes.

Sweeping a database is not the only way to perform systematic garbage collection. Backing up a database achieves the same result because InterBase must read every record, an action that forces garbage collection throughout the database. As a result, regularly backing up and restoring a database can reduce the need to sweep. This enables you to maintain better application performance.

The Database Properties dialog box enables you to control several aspects of database sweeping. You can:

- Change the automatic sweep interval.
- Disable automatic sweeping.

You can perform an immediate sweep of the database by choosing Maintenance | Database Sweep.

Setting the sweep Interval

To set the automatic sweep interval, type the number of transactions between each database sweep in the Sweep Interval text field. For example, to set the sweep interval to 10,000 transactions, type 10000 in the text field.

Sweeping a database can affect transaction startup if rolled back transactions exist in the database. As the time since the last sweep increases, the time for transaction startup may also increase. Lowering the sweep interval may help reduce the time for transaction startup.

On the other hand, frequent database sweeps may reduce application performance. Raising the sweep interval may help improve overall performance. The DBA should weigh the issues for the affected applications and decide whether the sweep interval provides the desired database performance.

Unless the database contains many rolled back transactions, changing the sweep interval has little effect on database size. As a result, it is more common for a DBA to tune the database by disabling sweeping and performing it at specific times. These activities are described in the next two sections.

Disabling automatic sweeping

To disable automatic sweeping, set the sweep interval to 0. Disabling automatic sweeping is useful:

- If maximum throughput is important. Transactions will never be delayed by sweeping.
- If you want to schedule sweeping at specific times. Once automatic sweeping is disabled, you can manually sweep the database at a specified time.

Enabling forced writes

When an InterBase Workgroup Server performs forced writes (also referred to as synchronous writes), it physically writes data to disk whenever the database performs an (internal) write operation.

If forced writes are not enabled, then even though InterBase performs a write, the data may not be physically written to disk, since operating systems buffer disk writes. If there is a system failure before the data is written to disk, then information can be lost.

Performing forced writes ensures data integrity and safety, but will slow performance. In particular, operations which involve data modification will be slower.

When forced writes are enabled an "X" appears in the box labeled "Enable Forced Writes" in the Database Properties dialog box. To disable forced writes, click on the check box to remove the "X".

InterBase for NetWare has a feature called the write-ahead log (WAL) which performs much the same function as forced writes. If a database is using WAL, then it is not necessary to enable forced writes to ensure data integrity. Therefore, forced writes will be automatically disabled when WAL is enabled for a database. Conversely, when WAL is disabled (dropped), forced writes are automatically re-enabled. You can manually override these defaults by enabling and disabling forced writes in the Database Properties dialog box.

Caution: If neither WAL nor forced writes are enabled for a database, then the database will be subject to data loss if there is a hardware or other system failure. In general, it is best to have at least one of these features active.

Window | Minimize Server Manager

Choose Window | Minimize Server Manager to minimize all Server Manager windows to one icon. When the icon is reopened, all windows are restored to their original size and position. The database connections and servers logged into will not be affected.

Window | Minimize All

Choose Window | Minimize All to minimize (iconify) all child windows opened by the Server Manager. Any active tasks will not be affected and the windows can be restored individually by selecting the icons form the Windows desktop.

Window | Close All

Choose Window | Close All to close all child windows opened by the Server Manager. This will not affect the main window or the state of the database/server connection. You will, however, be disconnected from any active tasks running in a child window. Server Manager will prompt you for confirmation before closing the window. If you choose to close it, the task will still continue running on the server machine but you will not have a way to view the output. Typically, this is not a good idea since you will not be informed of any errors which may occur. If possible, it is best to let the job continue running in the background until complete.

Window | Show Toolbar

If you removed the toolbar, this command restores it.

Flags

A number and corresponding status message, as follows:

Number	Status Message
1	Database is a shadow file
2	Forced writes are enabled
4	Reserved
8	Reserved
16	Reserved
32	Do not reserve space on each page for version information
64	Reserved
128	Database is shut down

Implementation ID

Architecture of the system on which the database was created:

ID	Platform
1	Apollo
2	Sun, HP 9000, IMP Delta, NeXT
3	Reserved
4	VMS
5	VAX Ultrix
6	Reserved
7	HP 900
8	OS/2, Windows NT, Novell NetWare
9	Reserved
10	RS 6000
11	Data General AViiON
12	HP MPE/XL
13	Silicon Graphics Iris
14	Reserved
15	DEC OSF/1

Log flags

A number followed by a status message, as follows:

Number	Status Message
1	Recovery required. This flag is set if there are any active connections to the database. If there is a system failure, the log page will indicate that recovery is required for the database.
2	No WAL. No WAL parameters have been defined for the database.
4	Log files have been deleted.
8	Log files have been added.
16	Recovery in progress.
32	Partial recovery in progress.
64	Long-term recovery in progress.

Networking requirements

To connect to a remote database using the Server Manager or Windows ISQL, at least one of the following must be installed:

▪ A Winsock 1.1-compliant TCP/IP package that includes a compliant WINSOCK.DLL driver.
▪ Novell SPX/IPX (for connection to NetWare servers only; supported in InterBase Client version 4.0 or earlier).
▪ NetBEUI/Named Pipes, from Windows for Workgroups or LAN Manager (for connection to Windows NT servers only).

Network library files

TCP/IP operation requires the presence of WINSOCK.DLL. Windows95 and Windows NT install a standard version of this library, along with a counterpart library called WSOCK32.DLL. If WINSOCK.DLL is not present on your system, or has been replaced by another DLL, check the documentation for the application that installed the new DLL for instructions on proper setup of your TCP/IP connections.
NetBEUI/Named Pipes requires the presence of NETAPI.DLL, which is installed by LAN Manager, Windows for Workgroups, Windows95 and Windows NT.
For Novell SPX, the InterBase Client installation program (for version 4.0 or earlier only) installs NWIPXSPX.DLL and NWCALLS.DLL into your WINDOWS directory.

TCP/IP

To use TCP/IP, the InterBase Client writes to the Windows Sockets (Winsock) API, a standard TCP/IP socket interface for Windows applications. Windows95 and Windows NT install WINSOCK.DLL (along with a counterpart library named WSOCK32.DLL) to handle TCP/IP services.

Many TCP/IP software vendors have adopted this standard and provide their own Winsock drivers with their products. If you use one of these and want to continue to use it, you should check the documentation for your TCP/IP product to be sure it is Winsock 1.1-compliant.

Configuring Network Sockets
Identifying the Server IP Address
Identifying the Server Port Number
TCP/IP Troubleshooting

Configuring network sockets

Each InterBase server connection uses its own socket. Each database connection uses one additional socket for all events on that connection. These sockets are freed when the client application disconnects from the database or terminates normally.

If an application exits abnormally, for example from a protection fault, the sockets may not be freed. Over time, this can cause the system to run out of sockets. If this occurs, InterBase will display a socket error when an application tries to connect. To correct this, restart the client PC.

A minimum of eight sockets is recommended. The maximum number of sockets depends on the networking software being used and the desired performance. To determine how to configure the number of network sockets, see the communication software vendor's documentation.

Note: Each socket allocated consumes real memory. Consider memory limitations when configuring the number of sockets.

If an application attempts to make a connection beyond the number of sockets configured, the server connection will fail and return an error message.

Identifying the server IP address

Before the Windows Client can connect to an InterBase server via TCP/IP, the server must be registered in the HOSTS file on the client or the client must be properly configured to use Domain Name Services (DNS). This file lists the network IP address of every host that the PC can access over the network. The location of this file depends on the TCP software being used--refer to the vendor's documentation.
The HOSTS file consists of a series of lines formatted as follows:

```
IP_address      hostname [alias]
```

where:
▪   IP_address is the internet address of the host computer. Ask the network administrator for the host machine's TCP/IP internet address.
▪   hostname is the name of the host associated with the internet address.
▪   alias is an optional alternate name for the host.
For example, a host named SLUG (with alias BNSLUG) might be referenced in the HOSTS file as follows:

```
144.286.78.23  SLUG [BNSLUG]
```

Identifying the server port number

To connect with TCP/IP to an InterBase server on the network, the client must identify the server's port number in its SERVICES file. The SERVICES file is an ASCII text file that contains the names of the available services on the network, and defines how those services are mapped to the TCP/IP port number to which they are attached.

InterBase uses port 3050 for the TCP/IP protocol. Therefore, ensure that the client's SERVICES file contains the following line:

```
gds_db    3050/tcp
```

gds_db is the name of the server process used by InterBase, 3050 is the port number, and TCP is the protocol used. If you specified the location of the SERVICES file during installation, then the installation program adds the above entry to the file.

Note: Each entry in the SERVICES file must be terminated by a newline character. Some editors, such as Windows Notepad, do not put a newline character at the end of a file. Make sure there is a terminating newline if the entry is the last in the SERVICE file.

TCP/IP troubleshooting

Your Winsock driver must be Winsock 1.1-compliant and must be on your search path. The drivers (WINSOCK.DLL and WSOCK32.DLL) installed with Windows95 and Windows NT meet both of these criteria.

 Important: It is recommended to have only one WINSOCK.DLL in the above search path. If there are multiple DLLs, different applications can behave differently, depending on which DLL they find.

If you have problems establishing a connection between the InterBase Client and the server, first determine if the client and server can communicate over the network at all. Use a TCP/IP ping utility to see if the client recognizes the existence of the server on the network. To run the test, simply type the following command on the client machine:

```
ping HOSTNAME
```

where HOSTNAME is the name of the InterBase server machine. Refer to your TCP/IP documentation for specific information on using ping.

If the host responds to the ping, a message is displayed on the screen. If the host does not respond, then the source of the problem is in the TCP/IP software or its configuration. If the host does respond, then the source of the problem may be with the configuration of the InterBase Client.

NetBEUI/Named Pipes

To connect to an InterBase for Windows NT server, you must either be logged in to Windows 95 or Windows for Workgroups 3.11 using a user name and password that is valid on the NT machine or an undefined NT user name which will default to the GUEST user. If you are logged on to Windows 95 or Windows for Workgroups with a valid user name but different password, the InterBase connection will fail with an error trying to create the pipe.

NetBEUI connections from an InterBase Client running on the 16-bit subsystem of Windows NT to a server on the same NT machine can take an unusually long time to complete. This occurs because the foreground client application runs at a higher priority than the background server process and so can potentially deprive the server of a CPU share. To correct this problem, you can either boost the InterBase server priority or change the relative priority of foreground and background processes.

 Note: Windows 95 can be a NetBEUI/Named Pipes client, but not a server.