StarLicense Server for UNIX User's Guide

Version 1.3

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CHAPTER 1

Introduction

StarQuest provides StarLicense Server software so customers can centralize license management and take advantage of floating licensing available for client computers that are running StarQuest software. The StarLicense server software is available for UNIX- and Windows-based computers. This manual describes how StarQuest software products are licensed and how to install and use the StarLicense for UNIX server software. The StarLicense for Windows server software includes online help that is available from the StarLicense Manager window.

Licensing StarQuest Products

All StarQuest products are licensed for use. Each product setup contains a client module used to configure the specific license option used to enforce the use of the product.

Licenses that are configured to provide support for applications on a particular computer are referred to as *node-locked*. For its client software products, such as Client Access and StarSQL, StarQuest also offers the flexible and economical *floating* licensing. The following table summarizes the StarQuest products and the product ID associated with each. Some StarQuest products may be provided with either node-locked or floating licensing, while some Products are available with both licensing options.

Table 1. StarQuest Product IDs

Product	Product ID
Data Replicator Manager (SQDR)	DR
SQDR bundled ODBC drivers	DD

Product	Product ID
SQDR Plus	*+
StarPipes	SP
StarSQL[1]	SQ
StarSQL for iSeries[2]; Client Access for UNIX	CA
StarSQL for UDB[3]	UX

1.StarSQL is comprised of StarSQL for Windows, StarSQL for UNIX, and StarSQL for Java. Any variant of StarSQL can use the same license.

2.StarSQL is capable of connecting to any supported host. StarSQL for iSeries only supports connections to DB2 for i.

3.StarSQL is capable of connecting to any supported host. StarSQL for UDB only supports connections to DB2 LUW.

Node-locked Licensing

A node-locked license allows you to use the Product on a single computer. Node-locked licenses are only available for computers using Microsoft Windows Operating Systems. With a node-locked license:

- The computer is identified by a unique Host ID.
- The product can run only on the identified computer.
- The product usage may not exceed the limits allowed by the license.

In addition to the setup of the StarQuest product you will be provided with a unique registration code that should be used for the activation of the software license. It is also possible to use the client module to display the HOSTID to request a software license via email or telephone.

The software license should be activated online using the supplied registration code, or manually after communicating a HOSTID with StarQuest and receiving an email response containing a license string.

Floating License

A floating license allows multiple computers using a StarQuest product to share use of the software license. The software license can be used on any computer within a network provided that the number of concurrent requests does not exceed the limit allowed by the license. All StarQuest products for UNIX and Mac OS X ***must*** use a floating license. StarQuest products for Windows ***may*** use a floating license. Generally, only one license server need be installed on a network, to service any number of clients.

For a floating license, in addition to the setup of StarQuest product you will be provided with a StarLicense Server setup and a unique registration code to activate the license server. The *StarLicense Server for UNIX User's Guide* contains details about installing and configuring the server software, but in general:

- The StarLicense Server software should be installed on a network server.
- The network server is usually identified by a unique, static IP address.
- The StarLicense Server should be activated online or via e-mail.
- The StarLicense Server controls the total number of concurrent connections within the network.

For a client to obtain a license from a StarLicense server the parameters of the network server where the StarLicense Server is installed are specified in the appropriate client license module on any computer using the StarQuest product.

Servicing License Requests

The StarQuest licensing model provides flexibility, allowing the licensing service to run locally on the same computer as the software, or to run on a server that client computers can access over a TCP/IP network. When the StarLicense service receives a request for a license, it uses the following order to find a license:

1. from a license installed on the local computer
2. from a list of primary and secondary license servers
3. from a DNS definition for a license server

Using a Local License

SQDR Plus requires that a license be configured on the computer that is running the Data Replicator Manager (SQDR) software. A node-locked license is associated with the host ID or static IP address of the particular computer that is running the software. If you need to configure a node-locked license for using StarQuest software on a single computer, refer to the documentation that is distributed with the software for details.

Using Primary and Secondary StarLicense Servers

You can set up multiple StarLicense servers to handle different licenses or different groups of clients, and you can specify license servers to be Primary or Secondary responders to license requests to provide failover protection. Configuring a secondary StarLicense server helps ensure that license requests can be fulfilled even if the Primary server becomes unavailable. The StarLicense server that is acting as a backup to a primary StarLicense server does *not* require a license key. Detailed instructions for setting up primary and secondary StarLicense servers are provided in "Setting Up a Failover StarLicense Server" on page 11.

Using DNS Resolution to Find a StarLicense Server

You can use DNS resolution to find a StarLicense Server that can service the request for a license. To use DNS resolution the client software is configured to look for a StarLicense server with a unique name or IP address and the number of the port on which the server is listening for license requests.

The StarLicense service is initially configured with DNS resolution enabled with a symbolic name of **starlic** for the license server. If you install and configure a primary license server with **starlic** as the hostname that listens for license requests on port 4999, the client computers can use DNS to access the license server with no additional configuration of the client. If the StarLicense server has a different hostname or listens on a different port, that unique information must be configured for each cient; refer to the documentation for the client software for details about customizing the configuration of the client software.

To change the default hostname of the license server that a client will use, create this entry in the [Global] section of /etc/starlicense.rc on the client machine, using the desired hostname in place of licserver.mycompany.com.

```
DNSServerName=licserver.mycompany.com
```

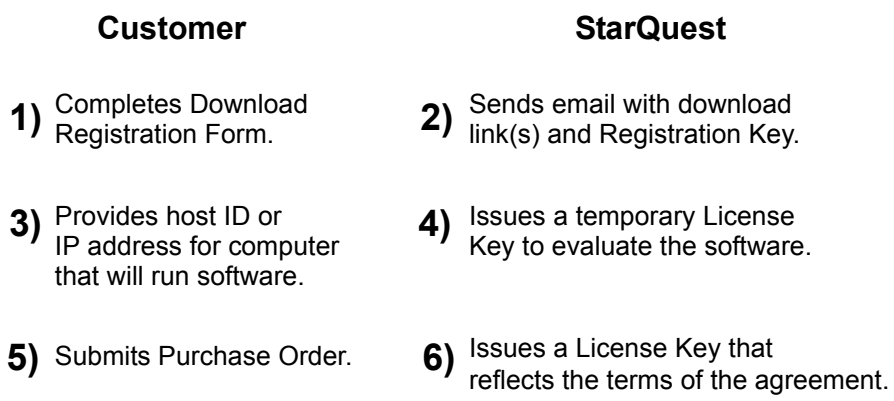
The client will attempt to contact the default hostname (**starlic** or whatever is defined in the DNSServerName entry) only if no other licenses (node-locked licenses or explicit client-server connections) are configured.

StarQuest Licensing Process

StarQuest allows prospective and existing customers to use its software products in their own environment to ensure it meets the organization's needs. A temporary license key, which expires at the end of the evaluation period, is issued so you can use all the features of the software. After an organization purchases licenses for one or more StarQuest products, Customer Support issues a license key that reflects the terms of the purchase agreement.

StarQuest software is available for downloading at http://www.starquest.com. After you complete a Product Download Registration Form you will receive an email from StarQuest Customer Support that contains a Registration Key and links for downloading the software of interest. You provide the Registration Key, along with a host ID or static IP address of the computer on which the software will be run, to obtain a License Key that allows you to use the software. Figure 1 summarizes the process.

Figure 1. StarQuest Software Licensing Process



Documentation

There are many sources of information that can help you install, configure, and use the StarLicense server software. The following sections describe the information available from StarQuest.

Quick Path to Using StarLicense Server

StarQuest provides StarLicense Quick Start Guides that provide step-by-step instructions for quickly installing and using the StarLicense server software on a particular computing platform. The procedures in the Quick Start Guides are appropriate for the most common environments and describe the fastest way to install and configure the software you need to begin using the licensing service. If you need to customize the StarLicense configuration or have an environment for which the default values are not appropriate you can refer to the product documentation for details.

All the Quick Start Guides are listed at http://www.starquest.com/Supportdocs/browseQuickStarts.shtml.

StarLicense Product Documentation

The StarLicense Server for UNIX product documentation consists of this User's Guide and Release Notes that are included with the distribution. The StarLicense for Windows product documentation consists of an online help system, which is available from the StarLicense Manager window, and Release Notes that are included with the distribution.

The Release Notes contain important information about using StarLicense in specific environments, known limitations, and a history of changes to the software.

Contacting StarQuest

Please use the following methods to contact StarQuest Ventures if you need to obtain a license key, or have suggestions or need information about StarQuest products.

The easiest method for licensing StarQuest products is to use the online licensing feature of the StarLicense Server Configuration utility (see "Adding Licenses" on page 13). If you cannot request a license over the Internet you can obtain a license key for a StarQuest product by sending an email to support@starquest.com with the following information:

- TCP/IP address or Host ID of the computer on which the license will be installed
- Number of connections purchased
- Company Name
- Contact Name
- Phone Number
- Email Address

StarQuest Support will send a reply email that provides the license key for your organization's use of the product. Since the license is unique to the computer on which it will be installed, you must contact StarQuest should you need to move the license from one computer to another.

Additional technical support may be available subject to the prices, terms, and conditions specified in your organization's maintenance contract with StarQuest Ventures, Inc.

CHAPTER 2

Installing the StarLicense Server Software

This chapter describes how to install and configure the StarLicense for UNIX server software.

System Requirements for StarLicense Server

You can install the StarLicense server software on a computer that runs any of the following operating systems:

- IBM AIX 5.3 or later
- Linux (see the Release Notes for specific Linux distributions that have been tested with StarLicense Server)
- Mac OS X 10.4 or later (PPC or i386)
- Sun Solaris 10 or later (SPARC)

Installing StarLicense Server for UNIX

After you have downloaded the StarLicense server distribution file, follow the steps in this section to install the software. If you want to install StarLicense to a different location, copy the setup directory and modify the setup shell script to specify the desired location before you run it. If you customize the installation location you also need to modify the configuration script, `sqlicd.sh`, and uninstallation scripts with the custom installation location.

The installer creates symbolic links in /usr/lib for the shared libraries `libstarlicense.so` and `libjstarlicense.so`; this enables StarQuest applications that do not include the client licensing components to find the libraries. If the /usr/lib is a read-only file system, such as for Solaris Zones sparse root scenario, the symbolic links cannot be created automatically by the installer. In this case you can add

the StarLicense installation directory (such as /opt/starlicense) to the environment variable that is used for library paths (LD_LIBRARY_PATH, SHLIB_PATH, LIBPATH, or DYLD_LIBRARY_PATH), or copy the libraries to the library directory of the StarQuest application that needs access to it (such as usr/share/starsql/lib).

Follow the steps below to install the StarLicense server software.

1. Logon to UNIX as `root` user.
2. Change to the directory that contains the StarLicense installer for your version of UNIX.
3. If you are using a Max OS X computer, double-click on **setup-macos.command**. For all other UNIX distributions, enter the following command to execute the "setup" shell script.

```
# ./setup
```

The setup script installs the StarLicense server software to the default location, which is:
`/usr/lpp/starlicense` for AIX
`/usr/local/share/starlicense` for FreeBSD
`/usr/share/starlicense` on Linux
`/Applications/starlicense` on Max OS X
`/opt/starlicense` for HP-UX or Solaris

After you install the StarLicense server software you need to configure a license and start the license server daemon, which are discussed in the next sections, before the service can respond to license checkout requests.

Configuring a License on the StarLicense Server

StarQuest issues the appropriate license key when an organization places a software order, and it also issues a temporary license key that allows prospective customers to try the software within their own environment.

After you receive a license key from StarQuest you need to enter it into the StarLicense configuration. StarLicense includes a utility to help you configure licenses and manage the StarLicense service.

1. Enter the following command to display the StarLicense Configuration Menu.

```
# ./configure
```

2. To add a license based on a registration key, select option 1 and enter the registration key that StarQuest provided. If a license key has already been issued to you, select option 2 and enter the license key.
3. Enter option 4 to start the licensing daemon.

4. Enter option 8 to verify the StarLicense configuration, and use option 7 to test that you can check out a license.
5. Enter option 12 to exit from the configuration utility.

If you use a hostname other than **starlic** for the StarLicense server, or set up more than one StarLicense server, you need to configure the client computers to check out licenses as appropriate for your environment. The procedure for configuring a client to use a StarLicense server varies depending on the type of operating system the client computer is running. Refer to the Client Access for UNIX or StarSQL documentation for details.

Setting Up a Failover StarLicense Server

If you set up more than one StarLicense server in the network you can configure backup servers for failover service. Having a failover server allows requests for license connections to be fulfilled even if the primary server fails or the service is temporarily stopped. The StarLicense server that is acting as a backup to a primary StarLicense server does *not* require a license key.

1. Install the StarLicense server software on the computer that you want to act as the secondary (failover) server. This computer must be able to access the primary StarLicense server within a TCP/IP network.
2. Ensure that you are logged on to the failover server as `root` user, and open the `/etc/starlicense.rc` file in a text editor.
3. Add the following section to the `starlicense.rc` file, replacing <*IP_address*> with the IP address of the *primary* StarLicense server that you want this backup server to monitor:

   ```
   [PrimaryServer0]
   Hostname=<IP_address>
   ```

4. Enter the following command to display the StarLicense Server Configuration Menu.

   ```
   # ./configure
   ```

5. Restart the license server daemon by entering 5 to execute the option to stop the licensing daemon, and then 4 to start it.
6. Configure client computers that need to check out a license to use the appropriate primary and secondary StarLicense servers. The procedure differs depending on the operating system the client computer is running:

   For a **Windows**-based computer start the License Configuration utility and add the appropriate StarLicense servers, selecting which serves as the Primary server and which acts in the Secondary role.

On a **UNIX**-based computer, ensure that you are logged in as `root` user and open the local `/etc/starlicense.rc` file in a text editor. Add or modify the following sections with information specific to the Primary and Secondary StarLicense server. The Product ID will be CA for Client Access for UNIX or SQ for StarSQL.

```
[ClientServer0]
ProdID=[CA|SQ]
IP=<IP_of_PRIMARY_license_server>
Port=4999
Primary=1

[ClientServer1]
ProdID=[CA|SQ]
IP=<IP_of_SECONDARY_license_server>
Port=4999
Primary=0
```

7. Use the StarLicense Client Configuration Utility to test that a UNIX-based client computer can check out a license. On a Windows-based client computer, open the StarSQL DSN configuration and click the Test Connection button to verify that a license can be checked out.

CHAPTER 3

Managing a StarLicense Server

After you install the StarLicense software, as described in the previous chapter, you can use the StarLicense Server Configuration utility to manage the local StarLicense daemon. This chapter also describes how to monitor active connections and adjust the interval for cleaning up connections.

Using the StarLicense Server Configuration Utility

The StarLicense Configuration Utility lets you easily obtain and manage license keys and manage the licensing service. Follow the steps below to start the StarLicense Server Configuration utility.

1. Log on to the computer as `root` user.
2. Change to the directory where StarLicense is installed.
3. Enter the following command to execute the startup script and display the StarLicense Server Configuration Menu.

```
# ./configure
```

Use Options 1 through 3 to add and remove license keys. Options 4 though 8 help you manage a StarLicense daemon that is running on the local computer, and options 9 and 10 allow you to configure the local computer to use a remote StarLicence server or to remove a connection to a StarLicense server.

Adding Licenses

To use StarQuest products you must configure a license that specifies the number of connections that are allowed and the duration of the licensing period. When you download StarQuest software, either for a trial evaluation or after purchase, StarQuest sends a Registration Key that identifies the software and terms of use. A License Key must then be generated based on the Registration Key and information that identifies the

particular computer on which the software will run. A single Registration Key can produce more than one License Key, depending on the StarQuest software you are licensing.

Adding Licenses from a Registration Key

Option 1 of the StarLicense Configuration Menu lets you enter a Registration Key that is then used to automatically request a License Key from StarQuest. The computer must have access to the Internet to request a License Key using this option.

1. Select Option 1 from the StarLicense Configuration Menu.
2. Enter Y to continue past a warning that the License Key will be permanently associated with this computer.
3. Enter the Registration Key that was provided via email from StarQuest. Copy and paste the Registration Key to ensure that it is entered exactly as it was issued.
4. If you are running StarLicense on a multihomed computer a prompt appears to ask which TCP/IP address you want to associate with the license. Enter the option number that appears next to the address you want to use.

A message informs you that the utility is connecting to the StarQuest Licensing Web Service to obtain the License Key, and then shows the License Key that is being added, which product is licensed, and information about the number of connections the license allows and for what duration. A message also appears to inform you that a listener is being added and prompts for the TCP/IP interface that the listener should use.

5. Enter the TCP/IP address that you want the listener to use, or accept the default 0.0.0.0 to have the listener listen on all IP addresses of this computer.
6. Enter the port address that you want the listener to use, or accept the default value of port 4999.
7. If you do *not* use the default port of 4999, select Option 10 and delete the client-server connection that was added for that listener, and then select Option 9 and specify the port number you want to use for the StarLicense connection.

Directly Adding a License Key

If you convert a registration key to a license key, the license key is automatically added to the StarLicense configuration. Option 2, “Add License with License Key,” of the StarLicense Configuration Menu lets you directly add a license key, such as a new license for another product or to reflect changes in a licensing agreement for using a StarQuest product. If possible, copy and paste the license key string to avoid data entry errors.

After you enter the License Key you are prompted for an IP address and port number for the listener to monitor for license requests. Enter a specific IP address and port number, or press Enter to accept the default values of the listener listening on port 4999 for all IP addresses (0.0.0.0).

Removing a License Key

When you select Option 3 of the StarLicense Configuration Menu another screen appears that shows the first license configured on this computer and a prompt asking if you want to delete it. If there is more than one license key configured on this computer, enter N or Y at each prompt, as appropriate for the license that you want to remove.

Starting and Stopping the StarLicense Daemon

Use Options 4 and 5 of the StarLicense Configuration Menu to start and stop the StarLicense daemon on the local computer. After you configure a license you must start the StarLicense daemon for the listener to be available to listen for license requests.

You may want to add the StarLicense daemon to the boot process so that it starts automatically when the operating system starts. The procedure varies depending on the operating system you are using. Refer to "Adding StarLicense to the Boot Process" on page 49 for details.

You also can start the StarLicense daemon from a UNIX command prompt. The syntax for the command is:

```
# ./sqlicd [-f logfile] [-l loglevel] [-p license_dir] [-v]
[-h|-?]
```

The options you can specify are:

-f	to specify the name of a file to use for logging activity between the license service and clients. Specify SYSLOG to use the UNIX SYSLOG file.
-l	to specify the level of information that is logged. See "server-loglevel-set" on page 43 for a list of the values you can enter for the loglevel.
-p	to specify the directory that contains the license file, `starlicense.rc`. Unless you specify a different directory the license file is located in the /etc directory.
-v	to display the version of the StarLicense server software.
-h or -?	to display help for the command.

Testing License Checkout

Option 7 of the StarLicense Configuration Menu lets you test that one or more licenses can be checked out. After you configure a license it is good practice to execute this option to verify that licenses can be checked out.

After you select Option 7 a prompt appears so you can enter the number of licenses to check out. The default is 1 license, but you can enter any number. After you specify the number of licenses, the utility attempts to check out that number of licenses for the particular product ID and displays the results. Press Enter to check the license(s) back in so they will be available for other connections.

You also can test that licenses for a particular product can be checked out by running the following command from the directory where StarLicense is installed (refer to Table 1 on page 3 for a list of the valid product IDs):

```
$ /client_tester checkout <number_of_licenses> <productID>
```

Displaying the StarLicense Configuration

Option 8 of the StarLicense Configuration Menu displays information about the current configuration of StarLicense. The information is categorized by Client License Servers, Client License Keys, Server License Keys, and Primary Server Entries. Configuration details include:

- the license keys that have been configured
- which StarQuest product the key is for (see Table 1 on page 3)
- when the license expires
- how many connections the license allows
- the IP address and port that listeners are configured to use
- the primary and secondary servers if more than one remote StarLicense server has been configured
- the logging level configured for the server
- the journaling level configured for the server
- the number of days that the server journal entries are retained

Adding a Connection to a Remote StarLicense Server

Option 9, “Configure local StarLicense client to use a License Server,” of the StarLicense Configuration Menu lets you define connections to a remote StarLicense server. After you select Option 9 a screen appears so you can specify information about the StarLicense server you want to use.

1. Enter the hostname or TCP/IP address of the StarLicense server.
2. Enter the port number that the server is using to listen for license requests.
3. If the license allows for using multiple StarQuest products, enter the ID of the product you want to use (see Table 1 on page 3).

After you provide the StarLicense server information the StarLicense Configuration utility shows the client-server connection being added.

Removing a Connection to StarLicense

Option 10, “Remove a client-server connection from local StarLicense configuration,” of the StarLicense Configuration Menu lets you remove a StarLicense connection. The connection can be to a StarLicense daemon on the local computer or to a remote StarLicense server.

After you select Option 10 a screen appears with information similar to the following:

```
Hostname=127.0.0.1 Port=4999 ProductID=SQ PRIMARY
Delete this connection (y/n)?
```

If there is more than one connection defined, respond with N until the connection that you want to remove appears and enter Y to confirm that’s the connection you want to delete.

Monitoring Active Connections

To monitor StarLicense connections you can use the **netstat** command and search for the port number on which StarLicense is listening for connection requests. Use the -a option of the netstat command to show all sockets and routing table entries.

The following example illustrates how to use the netstat command to search for connections to port 4999. The sample output shows the StarLicense service is listening on port 4999 and there is one active client (myclient.mydomain.com) and two active connections from the local UNIX computer (myhost) to another StarLicense server (server2).

```
$ netstat -a | grep 4999
* 4999 ** 0 0 244576 0 LISTEN
myhost.4999 myclient.mydomain.com.2367 65427 0 25200 0
ESTABLISHED
```

```
myhost.41612 server2.mydomain.com.4999 65427 0 25200 0
ESTABLISHED
myhost.41613 server2.mydomain.com.4999 65427 0 25200 0
ESTABLISHED
```

Cleaning Up Connections

The StarLicense server uses the system TCP/IP KeepAlive settings to clean up connections from clients that have disconnected without releasing a license that has been checked out. The default values should be sufficient for most environments, but you can change the TCP KeepAlive parameter if you need the abandoned license checkouts to be cleaned up more frequently.

The KeepAlive parameter names vary by operating system but generally specify:

- the interval to wait before probing the idle connection (on most platforms the default is 2 hours)
- the interval to wait before retrying the probe after an initial failure to respond
- the maximum number of times to retry the probe

Modifying the KeepAlive parameter settings may affect the operation of other applications on the computer. Depending on the overall impact to other TCP connections and settings, you may want to set additional TCP/IP parameters after you modify the KeepAlive settings.

The method of changing the KeepAlive parameter settings varies by operating system, so refer to your system documentation for details. This section describes the general steps for displaying and modifying the KeepAlive parameter for the UNIX platforms on which the StarLicense server software can be run.

The following table shows the names of the KeepAlive parameters for most of the supported operating systems. If you are using Mac OS X, refer to the Mac OS X documentation for information about setting TCP/IP parameters.

Table 2. KeepAlive Parameters by Operating System

Operating System	Parameter wait time before probing the connection	Parameter interval between retry probes	Parameter maximum retry probes	Unit of measure
AIX	tcp_keepidle	tcp_keepintvl	n/a	half-seconds
FreeBSD	TCPTV_KEEP_IDLE	TCPTV_KEEPINTVL	TCPTV_KEEPCNT	seconds
HP-UX	tcp_time_wait_interval	tcp_keepalive_interval	tcp_keepalives_kill[1]	milliseconds
Linux	tcp_keepalive_time	tcp_keepalive_intvl	tcp_keepalive_probes	seconds
Solaris	tcp_time_wait_interval	tcp_keepalive_interval	n/a	milliseconds

1. tcp_keepalives_kill cannot be modified on HP. It is set to 1.

Displaying and Modifying KeepAlive Values

Follow these steps to modify the KeepAlive values.

1. Log in to UNIX as `root` user.
2. Refer to the information for the operating system you are using, as suggested in the following table, to display information about the network tuning parameters.

Operating System	Command
AIX	no -a
FreeBSD	Examine /usr/src/sys/netinet/tcp_timer.h and tcp_timer.c
HP-UX	ndd -h supported

Operating System	Command
Linux	sysctl -h
Solaris	ndd /dev/tcp \?

3. Display the current KeepAlive settings, replacing the <*tcp_parameter*> shown below with the names shown in Table 2 on page 19.

Operating System	Command
AIX	no -o<*tcp_parameter*>
FreeBSD	Examine /usr/src/sys/netinet/tcp_timer.h and tcp_timer.c
HP-UX	ndd -get /dev/tcp <*tcp_parameter*>
Linux	sysctl net.ipv4.<*tcp_parameter*>
Solaris	ndd -get /dev/tcp <*tcp_parameter*>

4. If you are running HP-UX you can enter the following command to display the range of available settings. (This function is not available for other UNIX distributions.)

```
ndd -h <tcp_parameter>
```

5. Modify the KeepAlive values as desired.

Operating System	Command
AIX	no -o <*tcp_parameter*>= <*tcp_value*>
FreeBSD	Modify `/usr/src/sys/netinet/tcp_timer.h` and rebuild the kernel.
HP-UX	ndd -set /dev/tcp <*tcp_parameter*> <*tcp_value*>

Operating System	Command
Linux	To set the value temporarily until the computer is restarted: sysctl -w net.ipv4.<*tcp_parameter*> = <*tcp_value*> To make the change permanently: Update `/etc/sysctl.conf` with net.ipv4.<*tcp_parameter*> = <*tcp_value*> and issue one of the following commands, depending on which version of Linux you are running: Red Hat: **chkconfig sysctl on** Suse: **chkconfig boot.sysctl on**
Solaris	ndd -set /dev/tcp <*tcp_parameter*> <*tcp_value*>

Removing the StarLicense Server Software

Follow the steps in this section to remove the StarLicense server software from a computer.

1. Uninstall any StarQuest applications, such as StarSQL or Client Access for UNIX, that depend on StarLicense. Following is an example command for removing the StarSQL software—refer to the product documentation for details about uninstalling particular StarQuest software products.

   ```
   # rpm -e starsql
   ```

2. Remove the StarLicense server software. Follow one of the procedures below, depending on the method that was used to install the software and the operating system the computer is running.
   - To remove StarLicense from a computer that is running Mac OS X, double-click the **uninstall** command. You will be prompted for your password to confirm the sudo operation.
   - If the StarLicense software was installed using a tar-based installer, run the `uninstall` script that is located in the StarLicense program directory. You may need to copy this script elsewhere so the script itself and the StarLicense program directory can be deleted.

– If the StarLicense software was installed using the RPM installer, use the RPM erase command to remove StarLicense:

```
# rpm -e starlicense
```

3. Issue the following command to remove the symbolic links that were added to `/usr/lib` during the installation process.

```
# cd /usr/lib
# rm libstarlicense.so libjstarlicense.so
```

4. If desired, issue the following command to remove the StarLicense configuration file.

```
# rm /etc/starlicense.rc
```

Appendix D

starlic-admin Command Reference

This chapter describes all of the starlic-admin command line options that you can use to set up and manage a StarLicense server, StarQuest software licenses, and client computers. The StarLicense Configuration Menu uses the starlic-admin command and provides an easier method for managing licenses, servers, and client-server connections. Refer to page 13 for information about using the StarLicense Server Configuration utility.

The starlic-admin command provides options for accomplishing the same tasks you can perform from the StarLicense Server Configuration menu, and additional options for troubleshooting and managing the client computers, obtaining license keys, and managing a license server. The options in this appendix are ordered alphabetically within the categories of Client, License, and Server Options.

Command Syntax

The starlic-admin command provides options for managing StarLicense servers, clients, and licenses. The starlic-admin command can be run from a Mac OS X, UNIX, or Windows command line. The general format of the command is:

```
starlic-admin [options]
```

Type "**\?**" after any option to display details about that option.

Client Options

Use the **client-** options to configure a client computer to use one or more StarLicense servers and to manage local license keys and logging.

client-show

Syntax

```
client-show
```

Description

Shows the License server the client computer is configured to use, the logging level that is set, and the license keys that are configured on the client.

Example

```
# ./starlic-admin client-show


Client License Servers:

   Prod
    ID  Host Name                                  Port  Role
   ---- ---------------------------------------- ----- ---------
     SQ starlic                                   4999 PRIMARY


Client Logging Level:

   0x00000000


Client License Keys:

                                    Prod
   License Key                       ID   Lock     Expires   Count
   -------------------------------- ---- -------    ------    ---
   113114EE33926ECB3028D324101C35E6   SQ H-007F0101 2009/07/24 10
```

client-key-add

Syntax

```
client-key-add <key>
```

Description

Adds the specified key to provide a license for the local computer to use StarQuest software. The key string specifies which software is licensed and the duration of the license.

Examples

The following example configures the client computer with a license key for using StarSQL. (The license key string shown in the example does not provide a valid license.)

```
# ./starlic-admin client-key-add 12A34B56C78D90E9999FG
```

client-key-remove

Syntax

```
client-key-remove <key>
```

Description

Removes the specified key from the local computer.

Example

```
# ./starlic-admin client-key-remove 12A34B56C78D90E9999FG
```

client-key-show

Syntax

```
client-key-show
```

Description

Displays information about the configured client keys, including the unique license string, the ID of the licensed product, the type of license (client or server), the type of lock (D=disk serial number, H=host ID, I=IP address, S=hardware serial number), number of checkouts allowed by the license (0=unlimited), and the date the license expires.

Example

```
# ./starlic-admin client-key-show


Client License Keys:

                                 Prod
License Key                      ID  Lock        Expires    Count
--------------------------------  -------------   ----------   --
113114EE33926ECB3028D324101C35E6   SQ H-007F0101   2009/07/24   10
```

client-loglevel-show

Syntax

```
client-loglevel-show
```

Description

Displays the log level value, which indicates whether logging is enabled (FFFFFFFF) or disabled (0).

Example

```
# ./starlic-admin client-loglevel-show


Client Logging Level:

   0x00000000
```

client-loglevel-set

Syntax

```
client-loglevel-set <hex>
```

Description

Setting the log level to 0 (zero) disables logging. Set the log level to FFFFFFFF (eight F's) to enable logging of activity between the client and license service. The log file is created in the /tmp directory with the filename format **starliccli.<*processID*>.log**.

The following table shows the hexidecimal values you can enter to specifically control what information is logged.

loglevel Value	Description
00000001	Log transport layer of activity.
00000002	Log the protocol layer of activity.
00000004	Log the license daemon activity.
00000008	Log the connection activity.
00000010	Log the license activity.
00000020	Log the license key activity.
00000040	Log the Remote Procedure Call activity.
00000080	Log license server failover activity.
00000100	Log API calls to the license service.
FFFFFFFF	Log all activity for the license service.

Example

./starlic-admin client-loglevel-set FFFFFFFF

client-server-add

Syntax

`client-server-add <product_ID> <hostname> <port> <PRI|SEC>`

Description

Configures the client to check out a license for the specified StarQuest product on the specified host. See Table 1 on page 3 for a list of the valid product IDs. The *hostname* can be the DNS name or TCP/IP address of the license server and the *port* variable is the number of the port on which the server is listening for license requests. Specify the option PRI to add the server as a Primary server, or SEC to add it as a Secondary server.

Examples

The following example configures the computer to checkout StarSQL licenses from a StarLicense server named **starlic** that is listening for license requests on port 4999.

./starlic-admin client-server-add SQ starlic 4999 PRI

The following example configures the client computer to use a StarLicense server named **starlic2** as a Secondary server if the Primary license server cannot satisfy the license request. The starlic2 server listens for license requests on port 5001.

```
# ./starlic-admin client-server-add SQ starlic2 5001 SEC
```

client-server-remove

Syntax

```
client-server-remove <product_ID> <hostname> <port>
<PRI|SEC>
```

Description

Removes the specified StarLicense server from the client license configuration. See Table 1 on page 3 for a list of the valid product IDs.

Example

./starlic-admin client-server-remove SQ starlic 4999 PRI

client-server-show

Syntax

```
client-server-show
```

Description

Shows information about the license server(s) the client is configured to use.

Example

```
# ./starlic-admin client-server-show
```

Client License Servers:

```
   Prod
    ID  Host Name                                 Port  Role
   ---- ---------------------------------------- ----- ---------
     SQ starlic                                   4999 PRIMARY
```

License Options

The licensing options of the starlic-admin command let you obtain a license key over the Internet and display the key(s) that have been configured.

license-key-show

Syntax

`license-key-show <`*`license_key`*`>`

Description

Displays information about the specified license key, including which StarQuest product it allows use of and the duration of the license.

Example

```
# ./starlic-admin license-key-show
113114EE33926ECB3028D324101C35E6

License = 113114EE33926ECB3028D324101C35E6
ProdID = SQ
IP address = H-007F0101
Expires = 2009/07/24
Count = 10
```

online-license

Syntax

```
online-license <registration_key>
```

Description

Using the internet you can use the online-license option to provide the registration key that StarQuest sends to you. The licensing server converts the registration key to a license key that is associated with the computer from which the command is run. Be sure you execute the command from the computer that you want to run the StarQuest software you are licensing.

Example

The following example submits the specified registration key to the StarQuest licensing server and returns a license key to configure on the local computer. (The registration key string shown in the example does not return a valid license.)

```
# ./starlic-admin online-license 79A8CED4674E1611E11C47FE1
Using hostname starhost
Using IP address 10.0.0.6 for license generation
connecting to StarQuest Licensing Web Service
http://starcust.starquest.com:80
Description: StarSQL for Linux
Adding License = 4F240917E42807B6476FAA9F9199947E
ProdID = SQ
IP address = 10.0.0.6
Expires = 2009/07/21
Count = 10

Ok
Adding a local client server connection to 10.0.0.6 for
product ID SQ

Ok
```

Server Options

Use the **server** options to configure and manage StarLicense servers and license keys.

server-journallevel-set

Syntax

```
server-journallevel-set [0|1|2|3]
```

Description

Introduction to Journaling:

The Journal feature provides a record of license activity. The information is delimited by quotation marks and commas so it can be imported into another application, such as Microsoft Excel, for further analysis or reporting.

You can record the activity by service (license) and/or by client checkout. In the following example journal entries, journaling was configured to show both service and client activity; the first two lines show the client and service data for a Checkout, and the third and fourth lines show data for a Checkin.

```
"2010-07-27 16:32:40.032","Client","Checked-
Out","Success","127.0.0.1",60147,"SQ","/usr/share/starlice
nse/client_tester",19595,"0804B018",30,
"None"
"2010-07-27 16:32:40.032","Service","Checked-
Out","Success","SQ9999-01-01 5",5,1,0,0,30,"None"
"2010-07-27 16:32:42.023","Client","Checked-
In","Success","127.0.0.1",60147,"SQ","/usr/share/starlicen
se/client_tester",19595,"0804B018",30,"
Client initiated check-in"
"2010-07-27 16:32:42.023","Service","Checked-
In","Success","SQ9999-01-01 5",5,0,1,0,30,"Client
initiated check-in"
```

Enabling Journaling on UNIX

Use the server-journallevel-set option of the starlic-admin command to enable journaling:

Example:

```
# cd /opt/starlicense
# ./starlic-admin server-journallevel-set 2
Ok - changed from 0x0000 to 0x0002
```

Alternatively, you can use a text editor to edit the JournalLevel field in the [Global] section of /etc/starlicense.rc.

Restart the License Server daemon to apply your changes.

You can record the activity by license and/or by client checkout. In the following example journal entries, the first entry is data for a Checkout, and the second entry is for a License, as indicated by the second field (the “C” and “L”).

```
"20090805154514","C","O","S","192.168.1.4",2063,"SQ","BugTrak
32.exe",1192,"0012E688"
"200930805154514","L","O","S","SQ999901010",0,1,0,0
```

The following tables list the JournalLevel values:

journallevel Value	Description
0	No journaling of license activity.
1	Captures Service (License) statistics.
2	Captures Client statistics.
3	Captures both Client and License statistics.

The server-journalretain-set parameter of starlic-admin (or editing the JournalRetain field of /etc/starlicense.rc) sets the number of days that the journal of license activity will be retained. Specifying a value of 0 (zero) retains the journal indefinitely.

Example:

```
# ./starlic-admin server-journalretain-set 30
Ok - changed from 0 to 30 days
```

The journal is created with a filename of YYYY-MM-DD.jrn and stored in the **/var/tmp** directory.

Contents of the Journal file:

The following tables describe the data that is written to the journal for both Client and Service activity.

Table 3. Journal Data for Clients

Field	Data	Description
Timestamp	"YYYY-MM-DD HH:MM:DD[.mmm]"	the time of the license activity
Record Type	“Client”	indicates that the journal activity is for a Client
Disposition	"Checked-In", "Checked-Out" or ”Revoked”	indicates whether the license was checked in, checked out, or revoked
Status	"Success" or "Failure"	indicates whether the license checkin or checkout was successful or failed
Client IP	*nnn.nnn.nnn.nnn*	the IP address of the client that is checking the license in or out
Client Port	*nnnn*	the number of the TCP port that the client is using for communications
Product ID	*PP* (2-byte product ID)	an ID, such as SQ for StarSQL, that identifies which StarQuest product is licensed. See table below.
App name	"xxxxxxxx"	the name of the application that is checking the license in or out
Process ID	*nnnn*	the Process ID of the application checking the license in or out

Client ID	"nnnnnnnn"	an ID assigned to the client by the application checking the license in or out
Grace Period	n	number of seconds associated with a soft-license. A zero value indicates that soft-license policy is not in use
Reason	“text”	Reason for the disposition

Table 4. Journal Data for Service (Licenses)

Field	Data	Description
Timestamp	"yyyymmddhhmmss"	the time of the license activity
Record Type	"Service"	indicates that the journal activity is for a Service
Disposition	"Checked-In","Checked-Out" or ”Revoked”	indicates whether the license was checked in, checked out, or revoked
Status	"Success" or "Failure"	indicates whether the license checkin or checkout was successful or failed
Product ID, License expiration, and License count	"PPyyyymmdd nnn"	the product ID, such as SQ for StarSQL, that identifies which StarQuest product is licensed (See table below), the date the license expires (a date of 9999-01-01 indicates a permanent license) and the number of checkouts that the license allows, or 0 (zero) if the license is for unlimited use.
License count	*nnn*	the number of checkouts that the license allows, or 0 (zero) if the license is for unlimited use

Field	Data	Description
Checkouts	*nnn*	the number of licenses that are currently checked out
High water mark	*nnn*	the maximum number of licenses that have been checked out since the server was started
Failure	*nnn*	the number of checkout failures against the license since the server was started
Grace Period	n	number of seconds associated with a soft-license. A zero value indicates that soft-license policy is not in use
Reason	“text”	Reason for the disposition

Table 5. StarQuest Product IDs

Data Replicator Manager (SQDR)	DR
SQDR bundled ODBC drivers	DD
SQDR Plus	*+
StarPipes	SP
StarSQL[1]	SQ
StarSQL for iSeries[2]; Client Access for UNIX	CA
StarSQL for UDB[3]	UX

1.StarSQL is comprised of StarSQL for Windows, StarSQL for UNIX, and StarSQL for Java. Any variant of StarSQL can use the same license.

2.StarSQL is capable of connecting to any supported host. StarSQL for iSeries only supports connections to DB2 for i.

3.StarSQL is capable of connecting to any supported host. StarSQL for UDB only supports connections to DB2 LUW.

Table 6. Disposition Reasons

Connection closed
Client initiated check-in
License removal
Revoked by administrator during grace period. Typically this may be caused by clients disconnecting without checking in (in the case of "hardlicenses") or because the soft-license grace period has expired.
None

server-journallevel-show

Syntax

```
server-journallevel-show
```

Description

Shows whether journaling is enabled and, if so, the level of information being journaled. See "server-journallevel-set" on page 31 for a list of the log level values.

Example

```
# ./starlic-admin server-journallevel-show

   Server Journal Level:
           0x0002
```

server-journalretain-set

Syntax

```
server-journalretain-set <#days>
```

Description

Sets the number of days that the journal of license activity will be retained. Enter 0 (zero) to retain the journal indefinitely.

Example

```
# ./starlic-admin server-journalretain-set 30

Ok - changed from 0 to 30 days
```

server-journalretain-show

Syntax

```
server-journalretain-show
```

Description

Shows the time period that is configured for retaining the journal of license activity. The retention period is set using the server-journalretain-set option.

Example

```
# ./starlic-admin server-journalretain-show

Server Journal Retain:

   journals are kept for 30 day(s)
```

server-key-add

Syntax

```
server-key-add <key>
```

Adds the specified key to the StarLicense server. The key string is encoded to reflect which software is licensed, the number of concurrent connections allowed, and the duration of the license.

Examples

The following example configures the StarLicense server with a license key. (The license key string shown in the example does not provide a valid license.)

```
# ./starlic-admin server-key-add 2C64810C4A8DAE2CBCCADF957

Ok
```

server-key-remove

Syntax

```
server-key-remove [<key>|ALL|PROMPT]
```

Description

Removes the specified key from the StarLicense server configuration. You can specify to remove a particular license key, all license keys, or to display a prompt for each license key that is configured.

Examples

```
# ./starlic-admin server-key-remove PROMPT
License = 20C648010C34AB8DAAEA2CBCCA9DF957
ProdID = SQ
IP address = 10.0.0.6
Expires = 2009/07/17
Count = 10

Delete this key (y/n)? y
Deleting key 20C648010C34AB8DAAEA2CBCCA9DF957

Ok


# ./starlic-admin server-key-remove ALL
Deleting key 20C648010C34AB8DAAEA2CBCCA9DF957

Ok
```

server-key-show

Syntax

```
server-key-show
```

Description

Displays information about the license keys configured for the StarLicense server.

Example

```
# ./starlic-admin server-key-show

Server License Keys:
```

```
                                Prod                            Grace
License Key                     ID   Lock      Expires  Count Period
------------------------------- ---- --------- --------  ---- ----
20C64010C4AB8DAAEACBCCA9DF957   SQ 10.0.0.6  2009/07/17  10    0
```

server-listener-add

Syntax

```
server-listener-add <IP_address> <port>
```

Description

Adds a listener that uses the specified IP address and port number to listen for client requests for licenses. Use the IP address 0.0.0.0 to configure a listener to listen on all IP addresses. For a multi-homed server you can limit which IP addresses on the computer are available for accepting connections. For example, for a server that has an IP address for an Internet connection and an IP address for a local network, you can listen for license requests only on the LAN IP address to avoid exposure from Internet connections.

To request license connections from the StarLicense server, client computers must be configured to use the same IP address and IP port as configured for the StarLicense server to listen on.

Example

```
# ./starlic-admin server-listener-add 0.0.0.0 4999server-
listener-remove
```

Syntax

```
server-listener-remove <IP_address> <port>
```

Description

Removes the specified listener. Be sure there is another listener active on the StarLicense server to avoid disruption to client computers that request a license after you remove the listener.

Example

```
# ./starlic-admin server-listener-remove 0.0.0.0 4999

Ok
```

server-listener-show

Syntax

```
server-listener-show
```

Description

Shows on what port the StarLicense server is listening to for license requests.

Example

```
# ./starlic-admin server-listener-show

Server Listeners:

   IP Address      Port

   --------------- -----

   *ALL*            4999
```

server-loglevel-set

Syntax

```
server-loglevel-set <hex>
```

Description

Setting the log level to 0 (zero) disables logging. Set the log level to FFFFFFFF (eight F's) to enable logging of all activity between the client and license service. The following table shows the hexidecimal values you can enter to specifically control what information is logged.

loglevel Value	Description
00000001	Log transport layer of activity.
00000002	Log the protocol layer of activity.
00000004	Log the license daemon activity.
00000008	Log the connection activity.
00000010	Log the license activity.
00000020	Log the license key activity.
00000040	Log the Remote Procedure Call activity.
00000080	Log license server failover activity.
00000100	Log API calls to the license service.
FFFFFFFF	Log all activity for the license service.

The log file is created in the /tmp directory with the filename format **`starliccli.<processID>.log`**. If you want the information logged to a different file or use SYSLOG, start the licensing daemon with the -f option set to the appropriate filename or SYSLOG (see "Starting and Stopping the StarLicense Daemon" on page 15 for details).

Example

```
# ./starlic-admin server-loglevel-set FFFFFFFF

Ok - changed from 0x00000000 to 0xFFFFFFFF

root@porkbuns:/usr/share/starlicense
```

server-loglevel-show

Syntax

```
server-loglevel-show
```

Description

Shows whether logging is enabled and, if so, the level of information being logged. See "server-loglevel-set" on page 43 for a list of the log level values.

Example

```
# ./starlic-admin server-loglevel-show

Server Logging Level:

   0xFFFFFFFF
```

server-primary-add

Syntax

```
server-primary-add <hostname | IP_address>
```

Description

Adds the specified StarLicense server as the primary server to respond to license requests. You can specify the server either by its hostname or a static IP address.

Example

The following example adds a primary StarLicense server that has a hostname of “starlic.”

```
# ./starlic-admin server-primary-add starlic

Ok
```

server-primary-remove

Syntax

```
server-primary-remove <hostname | IP_address>
```

Description

Removes the specified StarLicense server. You can specify the server either by its hostname or a static IP address. To avoid interruption to client computers that are running StarQuest software be sure to set up another computer as a StarLicense server and reconfigure the client computers to use the new StarLicense server before you remove a primary StarLicense server.

Example

The following example removes a primary StarLicense server that has a hostname of "starlic."

```
# ./starlic-admin server-primary-remove starlic

Ok
```

server-primary-show

Syntax

```
server-primary-show
```

Description

Shows which StarLicense server is configured to be the primary responder to license requests.

Example

```
# ./starlic-admin server-primary-show

Primary Server Entries:

   Primary Server
   ------------------------------------
   starlic
```

server-service-show

Syntax

```
server-service-show
```

Description

Shows the status of the license service. If the service is running the Process ID (PID) also is provided.

Examples

```
# ./starlic-admin server-service-show
StarLicense server (PID: 11378) is running
```

```
# ./starlic-admin server-service-show
StarLicense server is not running
```

server-show

Syntax

```
server-show
```

Description

Displays information about the StarLicense server, including the license keys that are configured, the names of primary and secondary license servers, the IP address and port number on which the service is listening for requests, the server and journal logging levels, how long the journals will be retained, and the status of the service.

Example

```
# ./starlic-admin server-show

Server License Keys:

                             Prod                          Grace
License Key                  ID   Lock      Expires  Count Period
------------------------------ ---- --------- --------  ---- ----
20C64010C4AB8DAAEACBCCA9DF957   SQ 10.0.0.6  2009/07/17  10    0
```

```
Primary Server Entries:
   Primary Server
   -------------------------
   starlic
Server Listeners:
   IP Address      Port
   --------------- -----
   *ALL*            4999
Server Logging Level:
   0xFFFFFFFF
Server Journal Level:
   0x0002
Server Journal Retain:
   journals are kept for 30 day(s)
StarLicense server is not running
```

Appendix E

Adding StarLicense to the Boot Process

This appendix describes how to add the StarLicense for UNIX daemon to the boot process so that it starts automatically when the operating system starts. The procedure differs depending on the distribution of UNIX that you are running. Refer to the section that is appropriate for the operating system that you want to start the StarLicense service.

StarLicense for AIX

The runtime control (rc) script for StarLicense, `/etc/rc.sqlicd`, is automatically created when StarLicense is installed. Use the **mkitab** command to add an entry to the `/etc/inittab` file that instructs the operating system to start the StarLicense daemon when the system starts up.

1. Log on as `root` user.
2. Execute the command **/usr/sbin/mkitab 'sqlicd:2:once:/etc/rc.sqlicd start'**.
3. View the contents of the `/etc/inittab` file to ensure that the entry was added correctly.

StarLicense for FreeBSD

To have the FreeBSD operating system start StarLicense when it starts up, create a symbolic link in `/usr/local/etc/rc.d` directory that points to the StarLicense daemon startup script.

1. Log on as `root` user.
2. Run the following command:

```
$ ln -s /usr/share/starlicense/100.sqlicd.sh
/usr/local/etc/rc.d
```

3. Add the following line to `/etc/rc.conf` to enable `sqlicd':

```
sqlicd_enable="YES"
```

StarLicense for HP-UX

To have an HP-UX operating system start StarLicense when it starts up, create symbolic links in the `/sbin/rc2.d and /sbin/rc1.d` directories that specify the location of the StarLicense daemon startup and shutdown script, `sqlicd.sh`.

1. Log on as `root` user.
2. Verify that a symbolic link in `/sbin/init.d/sqlicd` exists and points to `/opt/starlicense/sqlicd.sh`. If the link does not exist, create it using the following command:

```
$ ln -s /opt/starlicense/sqlicd.sh
/sbin/init.d/sqlicd
```

3. Create two additional symbolic links using the following commands:

```
$ ln -s /sbin/init.d/sqlicd /sbin/rc2.d/S99sqlicd
$ ln -s /sbin/init.d/sqlicd /sbin/rc1.d/K99sqlicd
```

The placement of the `S99sqlicd` symbolic link in the `rc2.d` directory instructs the operating system to start the StarLicense daemon, using the linked script, when entering level 2 of the startup process, at a priority of 99.

The placement of the K99sqlicd symbolic link in the `rc1.d` directory instructs the operating system to kill the StarLicense daemon, using the linked script, when entering level 1 of the shutdown process, at a priority level of 99.

StarLicense for Linux

Use the **chkconfig** command to add the StarLicense daemon to the boot process of a Linux operating system.

1. Log on as `root` user.
2. Verify that the `/etc/init.d/sqlicd` symbolic link exists and points to `/usr/share/starlicense/sqlicd.sh`.
3. Run the following command to create the necessary links in `/etc/rc2.d`, `etc`. (`/etc/init.d/rc2.d` on SUSE Linux):

```
$ /sbin/chkconfig --add sqlicd
```

For Debian Linux, use the **update-rc.d** command to create symbolic links in the `/etc/rc2.d, etc` directories:

```
$ update-rc.d sqlicd start 99 2 3 4 5 . stop 99 0
1 6 .
```

StarLicense for Mac OS X

Follow the procedures below to configure the Mac OS X operating system to automatically run the StarLicense server daemon when the system is started.

1. Log on as a user with `root` access (i.e., use the **sudo** command).
2. Run the command:

   ```
   $ sudo ./setup_autostart
   ```

   This will perform the following operations:

   – create a directory "sqlicd" in /Library/StartupItems, and

   – copy the sqlicd and StartupParameters.plist files to `/Library/StartupItems/sqlicd`
3. Verify that `/Library/StartupItems/sqlicd/sqlicd` is executable, as shown in the sample command below.

   ```
   $ sudo chmod +x
   /Library/StartupItems/sqlicd/sqlicd
   ```

If you installed StarLicense to a location other than `/Applications/starlicense`, edit `/Library/StartupItems/sqlicd/sqlicd` and change the STARLICENSE variable.

If you want to control the automatic startup from `/etc/hostconfig`, add the following line to `/etc/hostconfig`:

```
SQLICD=-YES-
```

Comment out the "sqlicd=-YES-" line in `/Library/StartupItems/sqlicd/sqlicd`.

StarLicense for Solaris

To have the Solaris operating system automatically start the StarLicense daemon when it starts, create symbolic links in the `/etc/rc2.d` and `/etc/rc1.d` directories that specify the location of the StarLicense daemon startup and shutdown script.

1. Log on as `root` user.

2. Verify that a symbolic link in `/etc/init.d/sqlicd` exists and points to `/opt/starlicense/sqlicd.sh`. If the link does not exist, create it using the following command.

```
$ ln -s /opt/starlicense/sqlicd.sh
/etc/init.d/sqlicd
```

3. Create two additional symbolic links using the following commands:

```
$ ln -s /etc/init.d/sqlicd /etc/rc2.d/S99sqlicd
$ ln -s /etc/init.d/sqlicd /etc/rc1.d/K99sqlicd
```

The placement of the S99sqlicd symbolic link in the `rc2.d` directory instructs the operating system to start the StarLicense daemon, using the linked script, when entering level 2 of the startup process, at a priority of 99.

The placement of the K99sqlicd symbolic link in the `rc1.d` directory instructs the operating system to kill the StarLicense daemon, using the linked script, when entering level 1 of the shutdown process, at a priority level of 99.

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