



**SteelEye Protection Suite for Windows
Oracle Recovery Kit
v8.0**

Administration Guide

February 2014

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Chapter 1: Introduction

LifeKeeper Oracle

The LifeKeeper Oracle Recovery Kit provides a way to recover an Oracle database instance (version, 10g or 11g) from a failed server to a backup server. You can also extend the protection of the database instance to other servers. Using the LifeKeeper GUI, you can easily create a complete resource hierarchy so that the recovery operation includes all the disk resources used by the Oracle System Identifier (SID) as well as the Named Pipe and/or IP socket resources used to access the database.

Oracle Overview

The LifeKeeper Oracle Recovery Kit provides the ability to concurrently run Oracle database instances on other servers, and to optionally place these instances under LifeKeeper protection. Such a configuration is known as Active/Active and allows LifeKeeper servers to be fully utilized under normal operating conditions.

The LifeKeeper Oracle Recovery Kit includes the ability to recover the database instance locally (local recovery) before trying to fail over the database instance to a standby server.

The LifeKeeper Oracle Recovery Kit protects the following Core/Standard Oracle services:

- Oracle Service
- Oracle TNS Listener

The LifeKeeper Oracle Recovery Kit protects the following Optional Services for each release:

Optional 10g Services	Optional 11g Services
Oracle DB Console	Oracle DB Console
Oracle Job Scheduler	Oracle Job Scheduler
Oracle ISQL*Plus	
Oracle SNMP Peer Encapsulator	
Oracle SNMP Peer Master Agent	
Oracle Cluster Service Note: This service is for Automatic Storage Management (ASM) and is not available for protection under LifeKeeper because LifeKeeper does not currently support ASM.	Oracle Cluster Service Note: This service is for Automatic Storage Management (ASM) and is not available for protection under LifeKeeper because LifeKeeper does not currently support ASM.

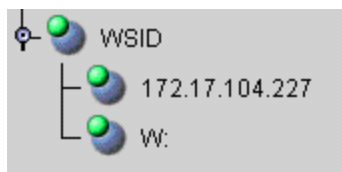
The typical Oracle resource hierarchy consists of the following resources:

- Oracle
- Shared communication resource (IP or LAN Manager alias name)
- Volume(s)

All Oracle data, log, and trace (core database) files for the protected SID are stored on shared or replicated volumes. Upon detecting a failure, LifeKeeper switches the core database files, along with its associated data volumes and communication resources, to a backup server. The recovery can be completely transparent to database users. Once LifeKeeper switches all dependent resources to the backup server, it starts the Oracle service on that server.

The LifeKeeper GUI display shown below depicts a typical resource hierarchy. The Oracle resource is the topmost resource in the hierarchy tree. It is responsible for starting and stopping the dependent resources (communication and volume resources) in the correct order.

This particular Oracle hierarchy uses only IP for its communication/Listener resource.



Oracle Services

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Resource Hierarchy for Oracle

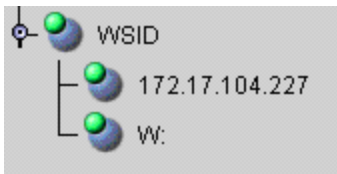
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This particular Oracle hierarchy uses only IP for its communication/Listener resource.



Restriction: If you are configuring multiple ORACLE instances, then you must configure each listener to listen on a unique virtual IP address.

LifeKeeper will not allow you to configure multiple listeners to listen on the same virtual IP address with different ports.

Recovery Kit Requirements

Before installing and configuring the LifeKeeper Oracle Recovery Kit, be sure that your configuration meets the following requirements:

Operating System software. LifeKeeper supports the following versions of Windows operating systems:

- Windows Server 2008 R2 and Windows 2012, Standard, Enterprise, Datacenter Editions (64-bit versions)

LifeKeeper software. You must install the same version of LifeKeeper software and any patches on each server. Please refer to the Release Notes for specific LifeKeeper requirements.

SteelEye DataKeeper software (optional). If you plan to use Oracle with replicated volumes rather than shared storage, you should install the SteelEye DataKeeper for Windows software on each server.

Oracle Database. The recovery kit supports Oracle versions 10g or 11g.

Chapter 2: Oracle Installation

The LifeKeeper Oracle Recovery Kit is available via ftp download. Installation is simple and quick using InstallShield to provide a standard installation interface.

Recovery Kit Installation

Before installing the LifeKeeper Oracle Recovery Kit, be sure you are familiar with the product prerequisites listed above, as well as the installation/configuration procedure outlined in the section [Installing and Configuring LifeKeeper with Oracle](#).

Upgrading Recovery Kit from Previous Version

You may upgrade from the previous version of the LifeKeeper Oracle Recovery Kit software while preserving your resource hierarchies.

Note: You must close and restart the LifeKeeper GUI after upgrading the LifeKeeper Oracle Recovery Kit.

Kit Removal

To remove the LifeKeeper Oracle Recovery Kit software, choose the "**LifeKeeper Oracle Recovery Kit vX.X**" in the **Program and Features applet** in the control panel.

Installing and Configuring LifeKeeper with Oracle

The LifeKeeper with Oracle installation and configuration procedure differs slightly for replicated storage systems and shared stored systems. We have created separate sections in this document for each type of storage configuration in an effort to clarify the installation and configuration process.

For the most efficient setup, perform the following tasks to create an Oracle database instance first on the primary server and then on the secondary server.

Important Considerations

- When working on a particular server, switch the communication resource on that particular server, e.g. if working on the backup server, the communication resource should be switched to the backup server.
- The resource hierarchy will be preserved on an upgrade
- Only one SID is supported per Oracle Home directory
- Special consideration is required when the Oracle Home is not installed to the same LifeKeeper protected volume as the database (SID). If Oracle Home is installed on a different shared or replicated volume, that volume must be LifeKeeper protected and manually added as a dependent resource in the Oracle resource hierarchy. If Oracle Home is not installed on a LifeKeeper protected volume no changes are necessary.

- Use Windows disk management tools to configure the disk resources and the volumes. Use Oracle tools, e.g. Net Manager, to configure network protocols

Before Installing Oracle

Before you install the Oracle software, the servers and storage must be configured and LifeKeeper must be installed on each server in the cluster. By doing so, you can then install Oracle onto a volume that is already LifeKeeper-protected.

Replicated Storage Systems

On the Primary Server

1. Use the **Windows Disk Management** tool to configure your disk resources and define the replicated volumes that you want to use. (Be sure the volume size is adequate.)
2. It is recommended that you use **Windows Explorer** to unshare from the network all volumes to be used by the Oracle SID.
3. Configure your networking to support the LifeKeeper TCP/IP comm path(s) and, if applicable, the switchable IP address.
4. Install the LifeKeeper Core software on a local disk followed by the LifeKeeper Oracle Recovery Kit.
5. If you have a very large Oracle database, you should review the MAXWAIT value and consider increasing it.
6. Install the SteelEye DataKeeper software to the local disk now. Refer to the [SteelEye Protection Suite Installation Guide](#) for more details.

On the Backup Server

1. Bring up the backup server and use the **Disk Management** utility to assign the same drive letter to the replicated volume as assigned on the primary server.
2. Install the LifeKeeper Core software on a local disk followed by the LifeKeeper Oracle Recovery Kit.
3. If you have a very large Oracle database, you should review the MAXWAIT value and consider increasing it.
4. Install the SteelEye [DataKeeper](#) software.

On the Primary Server

Now that you have LifeKeeper installed on both servers, go back to the primary server and do the following:

1. Using the LifeKeeper GUI, create comm paths between the primary and backup servers.
2. In LifeKeeper, create your communication resources (including either IP, LAN Manager or both) and extend them to the backup server. Later, when you create your Oracle resource hierarchy, LifeKeeper will automatically bring these resources into the hierarchy as dependencies.

Note: When the Oracle Hierarchy is created, the SteelEye DataKeeper resource will automatically be created and brought into the Oracle resource hierarchy as a dependency.

Installing Oracle

Once you have installed LifeKeeper and configured the volume and communication resources, you are ready to install Oracle to the protected volume(s).

On the Primary Server

1. Install the Oracle software to the protected shared volume. This creates the Oracle SID. Note that all files related to this Oracle SID (including log, trace, control, and data files) must be located on protected volumes.
2. Stop the default TNSListener service `Oracle<OraHome>TNSListener` and set the startup mode to **Manual**. (You will create a new Listener for the SID to be protected in a later step.)
3. Using Oracle Net Manager, configure Oracle to use the LifeKeeper-protected communication resource(s) as follows:
 - a. Create a new **TNSListener Service** using the SID name. Configure **Listening Locations** designating the LifeKeeper-protected IP address and/or named pipe (LAN Manager alias name). Then configure the Database Services specifying the **Oracle Home directory** and SID.
 - b. Modify the **Oracle Service** for your SID. For TCP/IP, change the host name to the protected IP address. For **Named Pipes**, change the machine name to the LAN Manager alias.
4. Create a separate **TNSListener Service** instance for the SID to be protected under LifeKeeper. The service should be created using the `lsnrctl Start <SID>` command. This will create a service with the name `Oracle<OraHome>TNSListener<SID>`.
5. Use the **Services** tool to test your Oracle services as follows:
 - a. Verify that the new **TNSListener** service can be stopped and started successfully.
 - b. Ensure that the `OracleService<SID>` service has been created by Oracle.
 - c. Stop all Oracle services.

On the Backup Server

1. In LifeKeeper, bring the protected volume in service on the backup server.
2. Remove the Oracle inventory directory and rename the directory or directories that contain the Oracle data files. If this is a new installation you can delete the data files.
3. Install the Oracle software to the protected volume. Use EXACTLY the same installation options as on the primary server (the Oracle Home, SID name and paths must be identical). If prompted, choose to overwrite the existing Oracle configuration. **Note:** Ignore errors regarding moving files to `*.bak`.
4. Stop the default TNSListener service `Oracle<OraHome>TNSListener`, and set the startup mode to **Manual**.
5. Using **Oracle Net Manager**, configure Oracle to use the LifeKeeper-protected communication resource(s) as follows, if required:
 - a. Create a new **TNSListener Service** using the SID name. Configure **Listening Locations**, designating the LifeKeeper-protected IP address and/or named pipe (LAN Manager alias name). Then configure the **Database Services**, specifying

the Oracle Home directory and SID.

- b. Modify the **Oracle Service** for your SID. For TCP/IP, change the host name to the protected IP address. For **Named Pipes**, change the machine name to the LAN Manager alias.
6. Create a separate **TNSListener Service** instance for the SID to be protected under LifeKeeper. The service should be created using the `lsnrctl Start <SID>` command. This will create service with the name `Oracle<OraHome>TNSListener<SID>`.
7. Use the **Services** tool to test your Oracle services as follows:
 - a. Verify that the new **TNSListener Service** can be stopped and started successfully.
 - b. Ensure that the `OracleService<SID>` service has been created by Oracle.
 - c. Stop all Oracle services on the backup server.

On the Primary Server

1. Bring the volume resource back in service on the primary server.
2. Start the `OracleService<SID>` service on the primary server.
3. Create the Oracle hierarchy on the primary server and extend it to the backup server. See [Creating an Oracle Hierarchy](#) for details.
4. Test the new Oracle hierarchy by performing a manual failover.

Chapter 3: Oracle Resource Configuration Tasks

Once you have completed the setup tasks as described in the previous section, you are ready to create and extend your Oracle resource hierarchies.

The following four tasks are described in this guide, as they are unique to an Oracle resource instance and different for each Recovery Kit.

- **Create a Resource Hierarchy** Creates an application resource hierarchy in your LifeKeeper cluster.
- **Extend a Resource Hierarchy** Extends a resource hierarchy from the primary server to a backup server.
- **Unextend a Resource Hierarchy** Unextends (removes) a resource hierarchy from a single server in the LifeKeeper cluster.
- **Delete a Resource Hierarchy** Deletes a resource hierarchy from all servers in your LifeKeeper cluster.

The following tasks are described in the GUI Administrative Tasks section within the LifeKeeper Online Product Manual, because they are common tasks with steps that are identical across all recovery kits.

- **Create a Resource Dependency.** Creates a parent/child dependency between an existing resource and another resource instance and propagates the dependency changes to all applicable servers in the cluster.
- **Delete a Resource Dependency.** Deletes a resource dependency and propagates the dependency changes to all applicable servers in the cluster.
- **In Service.** Brings a resource hierarchy into service on a specific server.
- **Out of Service.** Takes a resource hierarchy out of service on a specific server.
- **View/Edit Properties.** View or edit the properties of a resource hierarchy on a specific server.

Note: Throughout the rest of this section, configuration tasks are performed using the Edit menu. You can also perform most of these tasks:

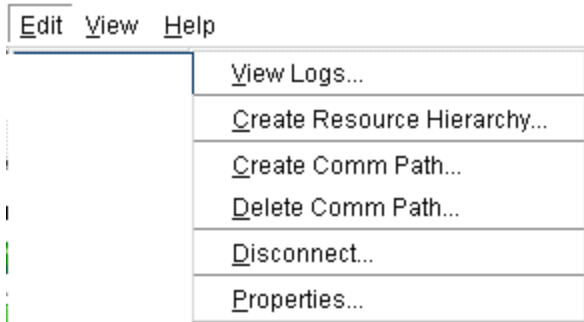
- from the toolbar
- by right clicking on a global resource in the left pane of the status display
- by right clicking on a resource instance in the right pane of the status display

Using the right-click method allows you to avoid entering information that is required when using the Edit menu.

Creating an Oracle Hierarchy

After you have completed the necessary setup tasks, use the following steps to define the Oracle Server hierarchy to protect your database(s).

1. From the LifeKeeper GUI menu, select **Edit**, then **Server**. From the menu, select **Create Resource Hierarchy**.



2. The **Create Protected Application** dialog box will display. Select the appropriate **Primary** and **Backup Servers** from the pull-down list. Select **Next** to continue. A window will display with a list of all the recognized Recovery Kits installed within the cluster
3. Select **Oracle** and click **NEXT**.
4. You will be prompted to enter the following information. When the **Back** button is active in any of the dialog boxes, you can go back to the previous dialog box. This is helpful should you encounter an error requiring you to correct previously entered information. You may click **Cancel** at any time to cancel the entire creation process.

Field	Tips
Select the Oracle Home directory	Select the appropriate Oracle Home directory for this hierarchy.
Select the Oracle SID	Select the Oracle SID that you wish to place under LifeKeeper protection.
Enter the Oracle User Name	Enter the administrative user name for Oracle. This user account must have system permissions to the database.
Enter Password	Enter the system password for the Oracle administrative user.
Optional Services	Select the optional services to be protected with this hierarchy. The list includes only those services that are eligible for LifeKeeper protection.
Oracle Tag Name	Enter a unique tag name, or you can accept the default tag name offered by LifeKeeper.

5. After you click **Next**, the **Create Resource Wizard** will create your Oracle resource. LifeKeeper will validate the data entered. If LifeKeeper detects a problem, an error message will appear in the information box.
6. Another information box will appear indicating that you have successfully created an Oracle resource hierarchy, and you must extend that hierarchy to another server in your cluster in order to achieve failover protection. Click **Next**.
7. After you click **Next**, LifeKeeper will launch the **Pre-Extend Wizard**. Refer to [Extending An Oracle Hierarchy](#) for details on how to extend your resource hierarchy to another server.

Extending an Oracle Hierarchy

This operation can be started from the **Edit** menu or initiated automatically upon completing the **Create Resource Hierarchy** option in

which case you should refer to Step 2 below.

1. On the **Edit** menu, select **Resource**, then **Extend Resource Hierarchy**. The **Pre-Extend Wizard** appears. If you are unfamiliar with the **Extend** operation, click **Next**.
2. The **Pre-Extend Wizard** will prompt you to enter the following information.

Field	Tips
Backup Priority	Enter a number between 1 and 999 to specify the target server's priority in the cascading failover sequence for this resource. A lower number means a higher priority. LifeKeeper offers a default of 10 for the first server to which a hierarchy is extended.

3. After receiving the message that the pre-extend checks were successful, click **Next**.
4. Depending upon the hierarchy being extended, LifeKeeper will display a series of information boxes showing the **Resource Tags** to be extended, which cannot be edited. Click **Extend**.

Unextending an Oracle Hierarchy

To remove a resource hierarchy from a single server in the LifeKeeper cluster, do the following:

1. On the **Edit** menu, select **Resource**, then **Unextend Resource Hierarchy**.
2. Select the **Target Server** where you want to unextend the Oracle resource. It cannot be the server where the Oracle resource is currently in service. (This dialog box will not appear if you selected the **Unextend** task by right-clicking on a resource instance in the right pane.) Click **Next**.
3. Select the Oracle hierarchy to unextend and click **Next**. (This dialog will not appear if you selected the **Unextend** task by right-clicking on a resource instance in either pane).
4. An information box appears confirming the target server and the Oracle resource hierarchy you have chosen to unextend. Click **Unextend**.
5. Another information box appears confirming that the Oracle resource was unextended successfully. Click **Done** to exit the **Unextend Resource Hierarchy** menu selection.

Deleting an Oracle Hierarchy

Before deleting an Oracle hierarchy or instance, make sure that the hierarchy is active (green) on its primary server. You may also wish to remove the dependencies before deleting the hierarchy; otherwise, the dependencies will be deleted also.

Deleting an Oracle hierarchy accomplishes the following:

- Stops the Oracle services.
- Deletes the Oracle hierarchy and all dependencies.

Notes:

- Make sure both servers are active when a delete is initiated for LifeKeeper to properly withdraw the databases from the backup server.

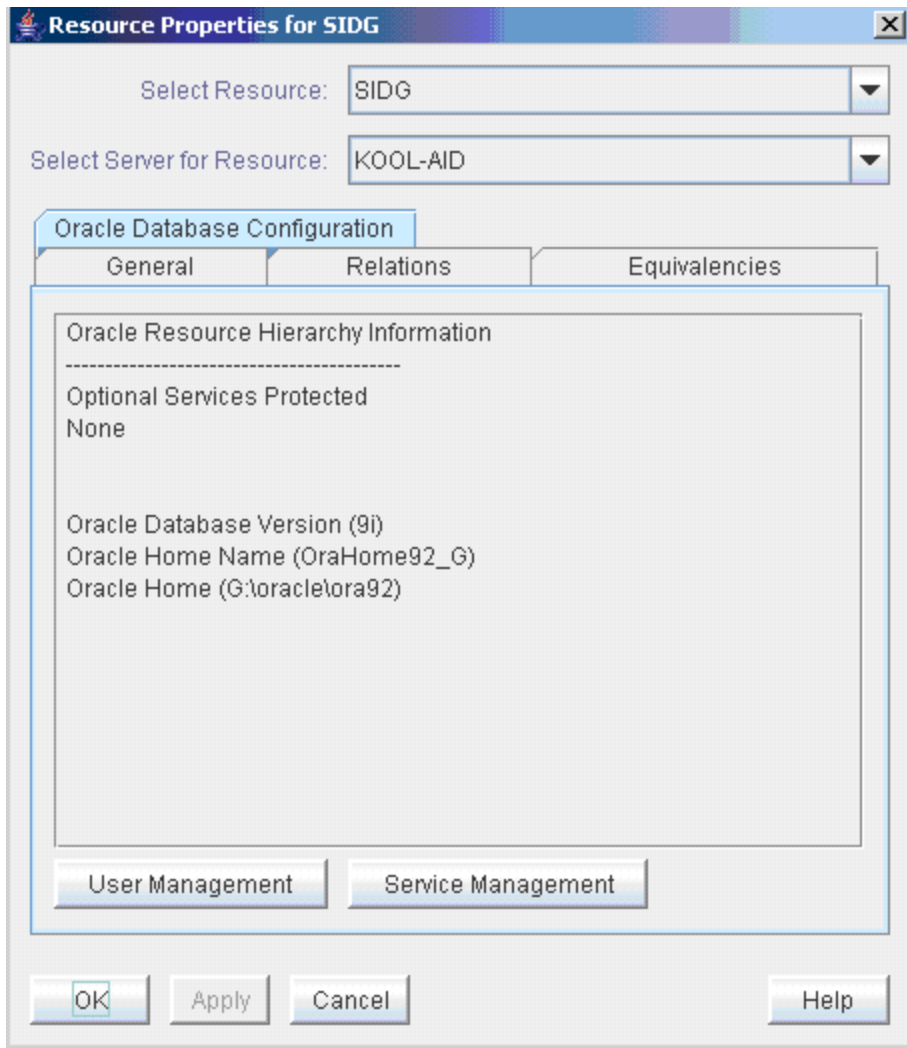
- If you want the IP address and volume to remain under LifeKeeper protection, you should delete volume and TCP/IP dependencies prior to deletion.

To delete a resource hierarchy from all the servers in your LifeKeeper environment, complete the following steps:

1. On the **Edit** menu, select **Resource**, then **Delete Resource Hierarchy**.
2. Select the **Target Server** where you will be deleting your Oracle resource hierarchy and click **Next**. (This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in either pane.)
3. Select the **Hierarchy to Delete**. (This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in the left or right pane.) Click **Next**.
4. An information box appears confirming your selection of the target server and the hierarchy you have selected to delete. Click **Next**.
5. Another information box appears confirming that the Oracle resource was deleted successfully.
6. Click **Done** to exit.

Manage Oracle Database Configuration

To administer a protected Oracle resource from the LifeKeeper GUI, right-click on the Oracle resource (on the right-hand side of the LifeKeeper GUI) and select **properties**, then select the **Oracle Database Configuration** tab. Use the **Oracle Database Configuration** page to view or change information about your Oracle resource.



User Management:

This menu allows users to manage the Oracle DBA user that will be used during LifeKeeper operations.

Select Management Action:

- **Show Current User** - Display the current user name used by the protected resource hierarchy.
- **Change Password** - Update the user password for the current user associated with the protected resource hierarchy.
- **Change User and Password** - Update both the Oracle DBA user and password to be used during LifeKeeper operations to administer and monitor the Oracle instance. The user must have DBA privileges for all databases under protection.

Field	Tips
Enter User Name	Enter the administrative user name. This user account must include DBA permissions to all databases under LifeKeeper protection.

Field	Tips
Enter Password	Enter the administrative password for the user account being updated.

Service Management:

This menu allows users to modify the list of optional Oracle Services that are protected under the resource hierarchy. LifeKeeper will monitor all protected optional services.

Select Service Action:

- **Add Service** - Add an additional service to the protected configuration. LifeKeeper will start monitoring added optional Oracle service.
- **Delete Service** - Remove a service from the protected configuration. LifeKeeper will stop monitoring optional Oracle service.

Field	Tips
Service Name	Enter the service name for the service to Add or Delete from the protected configuration. For Add operations, enter the service name. For Delete operations, choose the service name to remove from the list provided.
Update Cluster	Select Yes to update all systems in this cluster. Otherwise, select No to only update the current system. If you chose No , you must manually add the service to the backup servers.

Testing Your Oracle Resource Hierarchy

You can test your Oracle resource hierarchy by initiating a manual switchover. This will simulate a failover of a resource instance from the primary server to the backup server.

You can select **Edit**, then **Resource**, then **In Service**. For example, an In Service request executed on a backup server causes the application hierarchy to be taken out of service on the primary server and placed in service on the backup server. At this point, the original backup server is now the primary server and original primary server has now become the backup server.

If you execute the Out of Service request, the application is taken out of service without bringing it in service on the other server, and the Oracle services are stopped.

Chapter 4: Oracle Hierarchy Administration

The topics in this section assist in the administration of Oracle hierarchies.

Oracle Hierarchy Administration Guidelines

Follow these guidelines for administering your Oracle hierarchy:

- **Access via protected communication paths.** To ensure that users can access the Oracle SID, regardless of the physical system on which it is running, all remote access of the database should be done through the protected Named Pipe (LAN Manager alias) or IP addresses, which are part of the Oracle hierarchy. LifeKeeper automatically makes protected communication paths available on the backup system in case of a switchover.
- **Reserve volumes for exclusive Oracle use.** Reserve volumes containing the Oracle database files for use exclusively by Oracle. They should not be shared for users to access via LAN Manager, and should not be accessed by any other local applications. This is because LifeKeeper operations that remove a volume resource from service, for example in a failover, can fail if a remote user is accessing one of the volumes over the network or if a local process has done an open for write access on the volume.

Local processes that have read-only access to volumes do not prevent removal of a resource from service, but the read-only access may cause a restore to fail when you attempt to switch the resource back. Examples of processes with read-only access are the Performance Monitor, which periodically polls each volume, or any running process which is installed on the shared volume.

- **Start and Stop Oracle Through LifeKeeper.** Although much of your administration of Oracle databases is done through the Oracle tools, use the LifeKeeper Out of Service function to stop the Oracle SID and use the In Service function to start the Oracle SID. When LifeKeeper stops and starts the SID, it maintains a consistent view of the server on all nodes in the configuration.
- **Protect volume resources before adding to Oracle SID.** As your environment grows, if you need to add new volumes to the Oracle SID already under LifeKeeper protection, you should do the following:
 1. Protect the volume first (create a volume resource).
 2. Add the volume to the SID.
 3. Manually create a dependency between the Oracle resource and the volume resource.

LifeKeeper Oracle Recovery Kit MAXWAIT Variable

The LifeKeeper Oracle Recovery Kit installation creates a registry entry called *MAXWAIT*, which is stored in the following registry key:

```
HKEY_LOCAL_MACHINE\SOFTWARE\SteelEye\LifeKeeper\RK\ORAapp
```

MAXWAIT is a decimal integer that specifies the number of seconds that the recovery kit will wait for a single Oracle service to start or stop. If the service has not started within the specified time frame, LifeKeeper will assume there is a failure and initiate a failover.

The default value for *MAXWAIT* is **300**; however, it is possible that for extremely large databases, 300 seconds might not be enough time for the database services to reach the *STARTED* or *STOPPED* state. If this is the case, change the registry entry to a reasonable value.

Updating Oracle Username and Password for LifeKeeper

During the creation of a LifeKeeper Oracle resource, the user must enter an Oracle user name and password for that instance of Oracle. Should the password of this user name change at some point in the future, the LifeKeeper Oracle resource must be updated on all systems in the cluster with this new password. Failure to do so will leave the Oracle resource out of sync and will prevent it from coming in and out of service properly. LifeKeeper will log an error message to the **Application Event Log** stating that LifeKeeper cannot remove or restore the resource during any subsequent failover or manual switchover.

The LifeKeeper GUI provides an interface to manage the user account associated with the Oracle resource. See the section on [Manage Oracle Database Configuration](#) for more information.

Manually Configure Oracle 11g DB Console

You must manually configure Oracle 11g DB Console to use the protected virtual IP address or LAN Manager Alias so that the service will start successfully on all systems in the cluster.

On the primary, edit `<ORACLE_HOME>\<SYSTEM_NAME>_<ORACLE_SID>\sysman\config\emoms.properties`

Set the property `oracle.sysman.emSDK.svlt.ConsoleServerHost=<virtual IPaddress> or <LAN Manager Alias>`.

Chapter 5: Oracle Troubleshooting Tips

This section is intended to provide suggestions and insights into occurrences that are not specifically related to the LifeKeeper software, but have a relationship with the total environment.

Create Hierarchy Failed

Suggestion

Check the following:

- All volumes and communications resources (IP and/or LAN Manager) associated with the SID should already be under LifeKeeper protection.
- All the shared or replicated volumes are available to the primary server and all volumes are mapped to the same drive letters on each server.

Bring In Service Failed

Suggestion

Check if any other Oracle resource is already in service on the system you are trying to bring in service and/or that shared volumes can be accessed from this system.

Oracle TNSListener Service is Not Started or Stopped as it Should Be

Suggestion

Do the following:

- Check if at least one TCP/IP or LAN Manager resource is part of the Oracle hierarchy.
- Take hierarchy out of service and bring back in service to start *Oracle<OraHome>TNSListener<SID>*.

Server Not Responding

TCP/IP Client Cannot Access Server (Server Not Responding) After a Successful Switchover by LifeKeeper

Insight

The client system has old information in its IP-to-Physical address translation table used by address resolution protocol (arp).

Suggestion

The IP address being used to access the server must be reset. To reset this address, issue the command `arp -d server_ip_address`. This deletes the address from the translation table. On the next request of that IP address, the table entry will be filled.

Remote Users Cannot Log In ORA 12504 or ORA 12514 or ORA 12541

Insight

Oracle connect issues indicate Oracle TNS setup issues are not caused by LifeKeeper.

Suggestion

Do the following:

- Read the specific Oracle error and message
- Using **Oracle Net Manager**, make certain that the listener and the TNS names are configured correctly.
- Make certain the service is configured using the IP or LAN Manager alias created.
- Use TNSPING to reach the service.