



# **LifeKeeper for Windows**

LifeKeeper IBM Director Recovery Kit

Administration Guide

**August 2006**

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# LifeKeeper IBM Director Recovery Kit Administration Guide

The LifeKeeper® IBM Director Recovery Kit provides fault resilience for IBM Director Server v5.10.1 and v5.10.2 in a LifeKeeper environment.

The LifeKeeper IBM Director Recovery Kit is compatible with IBM Director using the Apache Derby database, Microsoft SQL Server, and Oracle. **Note:** When used with Microsoft SQL Server or Oracle, fully licensed versions of LifeKeeper for Windows Core, SteelEye Data Replication, and LifeKeeper SQL Server Recovery Kit or LifeKeeper Oracle Recovery Kit are required.

## Document Contents

This guide provides the following information topics:

- [IBM Director Recovery Kit Overview](#). This section provides a general overview of the product and the LifeKeeper environment required for protecting IBM Director Server.
- [IBM Director Server Configuration Considerations](#). This section describes basic configuration concepts that are important to a successful installation of IBM Director Server with LifeKeeper.
- [Installing and Configuring IBM Director Server with LifeKeeper](#). Follow the pre-installation checklist and special procedures to set up your servers for a highly available instance of IBM Director Server.
- [IBM Director Server Resource Configuration Tasks](#). After you have completed the necessary setup tasks, use the steps in this section to create, extend and manage the LifeKeeper generated IBM Director Server hierarchy.
- [Hierarchy Administration](#). This section describes how set up and administer a single Director Server instance, add resource dependencies, and understand switchover capabilities.

## LifeKeeper Documentation

The following documentation is associated with the LifeKeeper core product:

- *Release Notes*
- *Online Product Manual*
- *Planning and Installation Guide*

This documentation, along with documentation associated with other LifeKeeper recovery kits and SteelEye Data Replication for Windows, is available online at:

[www.steeleye.com/support/documentation](http://www.steeleye.com/support/documentation)

In this document the terms IBM Director and IBM Director Server are used interchangeably. References to IBM Director imply a more specific reference to IBM Director Server.

Consult your LifeKeeper sales representative for release and ordering information.

## Recovery Kit Requirements

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

- **Operating System software.** LifeKeeper supports the following versions of Windows operating systems:
  - Windows 2000 Server Standard, Advanced, Data Center Editions
  - Windows Server 2003 Standard, Enterprise, Data Center, Web Editions
  - Windows Server 2003 R2 Editions
- **LifeKeeper software.** You must install the same version of LifeKeeper for Windows on *all* servers in the cluster.
- **IBM Director Server software.** This recovery kit is compatible with IBM Director Server v5.10.1 and v5.10.2. The same version of IBM Director Server must be installed on all systems in the cluster. IBM Director Server will be protected in an Active/Passive configuration *and must be installed on a LifeKeeper protected volume*. The system volume is not eligible for volume protection. The protected volume will be accessible under LifeKeeper control from primary and backup servers in the cluster.
- **SteelEye Data Replication for Windows (optional).** If you plan to install IBM Director Server on a replicated volume rather than shared volume, you must also install SteelEye Data Replication software on each server in the cluster where IBM Director Server will run.
- **IBM Director Server Name and IP Address Configuration.** IBM Director Server services bind to a user selected server name and IP address during IBM Director Server software installation and configuration. The server name and associated IP address must be:
  - defined in a DNS “A” host record that is bound to this IP address
  - the IP address must be configured by LifeKeeper as an IP protected resource
  - the IP address must be configured by LifeKeeper as a dependent resource of the IBM Director Server resource.
- **IBM Director Server Database Selection.** This recovery kit is compatible with IBM Director Server when used with the following databases:
  - The internal Apache Derby database
  - Microsoft SQL Server 2000 database. The SQL 2000 database may also be protected by LifeKeeper with the optional LifeKeeper Microsoft SQL Server Recovery Kit (recommended).
  - Oracle 9i and 10g databases. The Oracle database may also be protected by LifeKeeper with the optional LifeKeeper Oracle Recovery Kit (recommended).

## Recovery Kit Installation

The LifeKeeper IBM Director Recovery Kit is available via download from the SteelEye website ([SteelEye : Partners > IBM and SteelEye](#)). The software download includes:

- LifeKeeper for Windows
- SteelEye Data Replication for Windows
- LifeKeeper IBM Director Recovery Kit

Free Licenses are delivered to registered users via email and include:

- SteelEye Data Replication for Windows (No GUI Support)
- LifeKeeper For Windows with the following resource types enabled:
  - IP Resource Protection (1 instance)
  - Volume Resource Protection (1 instance)
  - IBM Director Server Protection (1 instance)

Paid Licenses are delivered to registered users via email and include:

- SteelEye Data Replication for Windows (Full version)
- LifeKeeper For Windows (Full version)
- LifeKeeper Microsoft SQL Server Recovery Kit
- LifeKeeper Oracle Recovery Kit

Installation is simple using InstallShield to provide a standard installation interface. For complete LifeKeeper installation instructions, refer to the *Planning and Installation Guide*.

Before installing the LifeKeeper IBM Director Recovery Kit software, be sure you are familiar with the product prerequisites listed above, as well as the installation procedure outlined in the [Setup Checklist](#).

### Kit Removal/Uninstall

To remove the LifeKeeper IBM Director Recovery Kit, choose the **LifeKeeper IBM Director Recovery Kit v5.3** in the Add/Remove programs applet in the control panel.

**CAUTION:** Be sure that all IBM Director Server resource instances are out of service and the resources are deleted before this recovery kit software is removed from the system. Once this kit is uninstalled, these resources will all be unusable.

# IBM Director Recovery Kit Overview

The LifeKeeper IBM Director Recovery Kit software makes IBM Director Server services highly available through the clustering technology provided by LifeKeeper for Windows®. LifeKeeper monitors the IBM Director Server service and the associated IP communication resource.

Making IBM Director Server highly available is accomplished by configuring the IBM Director Server service and its clients to use a **virtual server name** and a **protected IP address** rather than the name of any specific server it is installed on. Using this approach IBM Director Server can be run on either a primary or backup server while using the same equipment inventory database. Director client connections are completed by referencing the virtual server name or the associated IP address.

The LifeKeeper GUI allows you to create a complete IBM Director Server resource hierarchy. LifeKeeper will also protect the disk resources used by IBM Director Server, as well as the IP addresses used to access them.

The LifeKeeper IBM Director Recovery Kit will monitor and protect the following services:

- TWGIPC (IBM Director Support Program)
- TWGSERVER (IBM Director Server)

Should these services stop unexpectedly, or if the system experiences a catastrophic failure, they will be restarted locally or restarted on another server in the cluster in the order and priority selected by the administrator. The recovery kit also runs an IBM Director command periodically to check whether IBM Director Server service is running or not. If this check fails, LifeKeeper will restart all IBM Director services locally or failover the complete resource hierarchy to another server in the cluster. Local recovery is an optional setting for each resource instance.

When the IBM Director server resource is created, LifeKeeper will change all of the following services to Manual startup mode. A LifeKeeper *In-Service* action will start all of the following services and an *Out-of-Service* action will stop them all.

- ibmsa (IBM SLP Service Agent)
- cimlistener (IBM Director CIM Listener)
- wmicimserver (IBM Director Agent WMI CIM Server)
- tier1slp (IBM Director Agent SLP Attributes)
- twgipc (IBM Director Support Program)
- twgserver (IBM Director Server)

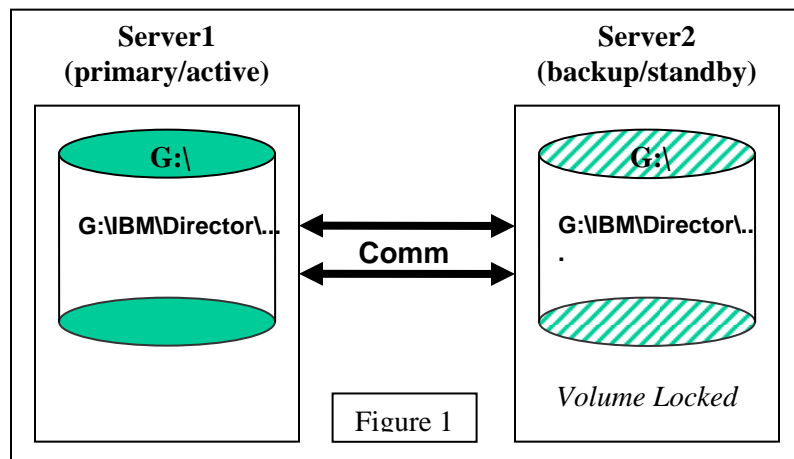
# IBM Director Server Configuration Considerations

IBM Director Server is managed by LifeKeeper in an Active/Standby configuration. Before you install and configure your cluster servers, including IBM Director Server, it is important to understand the concepts of Active/Passive configurations; also called Active/Standby.

## IBM Director Active/Standby Configuration

A configuration is **Active/Standby** when there is only one instance of IBM Director Server running, and it is located on a single LifeKeeper shared or replicated volume. IBM Director Server services are active and running on only one system at a time. The systems are assigned priorities within the LifeKeeper cluster which determine the order of failover for the complete resource hierarchy.

The figure below depicts a single IBM Director Server instance installed on a pair of servers and resident on a single LifeKeeper protected shared or mirrored volume (G:\). The IBM Director Server and its information database (Integrated Apache Derby, Microsoft SQL, or Oracle) must be resident on a LifeKeeper protected volume.



When you create the LifeKeeper IBM Director Server resource, the LifeKeeper *Create Resource Wizard* will identify the LifeKeeper protected IP resource that will be used by IBM Director Server for client connections. LifeKeeper will also verify which protected volume IBM Director Server has been installed on. The selected IP resource and the associated volume for IBM Director Server will become dependent resources in the IBM Director hierarchy.

Once the hierarchy is created, it will appear as follows in the LifeKeeper GUI.

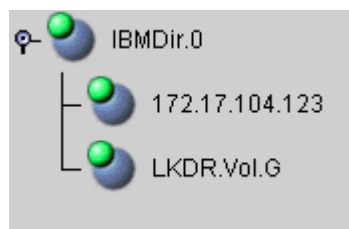


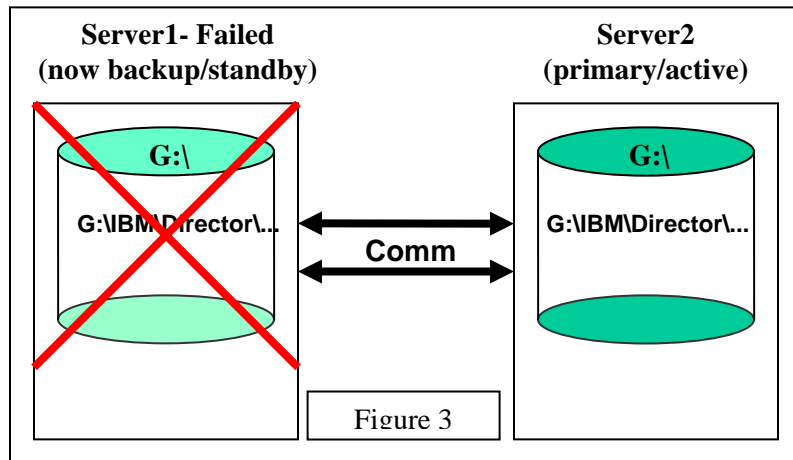
Figure 2

**Notes:**

- The hierarchy tag name *IBMDir.0* is the default name generated by LifeKeeper for the IBM Director Server resource.
- The IP tagname *172.17.104.123* represents an IP address protected by LifeKeeper before the IBM Director resource is created. LifeKeeper will automatically create a dependency relationship to the protected IP resource when the IBM Director resource is created.
- The Volume tagname *LKDR.Vol.G* represents a volume protected by LifeKeeper before the IBM Director resource was created. LifeKeeper will automatically create a dependency relationship to the protected volume resource when the IBM Director resource is created.

**Active/Standby Failover**

In the event of failure, LifeKeeper brings the IBM Director hierarchy in-service on the backup server. As soon as it is started and initialized, it will begin serving clients such as IBM Director Agent, and IBM Director Console.



# Installing and Configuring IBM Director Server with LifeKeeper

Proper operation of the LifeKeeper IBM Director Recovery Kit depends upon correct installation and configuration of the hardware and software from IBM and SteelEye Technology.

Before continuing, please preview the [Hierarchy Administration](#) section of this guide. This section provides general guidelines, configuration details, and troubleshooting hints to help you administer IBM Director Server in a LifeKeeper environment.

## Setup Checklist

The installation and setup sequence should be performed in the following sequence. More detailed instructions for each of these steps are provided in the sections to follow. See the *Planning and Installation Guide* for additional details on the first three steps.

1. Set up your shared or replicated storage to reserve a protected volume for use by IBM Director Server. IBM Director Server must be installed on a LifeKeeper protected volume to permit access to the IBM Director Server software and saved configuration information from primary and backup servers.
2. If a replicated (mirrored) volume will be used, also install SteelEye Data Replication for Windows.
3. Set up and test your network. LifeKeeper will transmit configuration information, status information and heartbeats across the network between primary and backup systems. It is essential that the network be operating properly.
4. Install and configure the LifeKeeper Core that includes the IP Recovery Kit and Volume Recovery Kit. Also install the IBM Director Recovery Kit.
5. Create a DNS Host “A” record for the virtual server name and IP address
6. Create LifeKeeper IP and Volume resource hierarchies.
7. Create the IBM Director resource hierarchy.

## Setup Tasks

The following paragraphs provide more detailed information for each checklist step identified above.

### **Set up and allocate shared or replicated volume storage.**

Follow these steps to ensure the correct configuration.

1. Use the Windows Disk Management tool to **identify the volume you want to use** for IBM Director Server. A shared volume must be accessible from both primary and backup systems. A replicated volume must be equivalent in size and use the same volume letter on primary and backup servers.

2. Use Windows Explorer to **unshare from the network any volume that is to be used by IBM Director Server**. A LifeKeeper-protected volume may fail to switchover if another application or process is using it.
3. For a replicated volume, SteelEye Data Replication software must be installed on primary and backup systems. Once installed, a replicated volume must have its endpoints identified and synchronized across the network with the LifeKeeper Core. If only shared volumes will be used, SteelEye Data Replication will not be needed.

### **Set up and test your network.**

Ensure your network is configured and working correctly before installing LifeKeeper, since LifeKeeper communications paths and the LifeKeeper GUI depend upon the network. If a replicated volume will be used, a crossover cable for volume data traffic is highly recommended. **DO NOT register IP address endpoints with DNS when installing a crossover cable for volume replication traffic. Also, replicated volume end points must be identified by IP addresses rather than system names.**

### **Install and Configure LifeKeeper Core and Recovery Kits**

Install the LifeKeeper Core. The LifeKeeper Core product includes the IP Recovery Kit and Volume Recovery Kit. Also install the LifeKeeper IBM Director Recovery Kit on each server in the cluster. You must have the same version of the LifeKeeper Core and LifeKeeper recovery kits on all servers.

### **Create a DNS Host “A” record for the virtual server name and IP address**

Have your network administrator create a DNS A record that maps a new virtual server name (**what ever name you want**) to a new floating IP address that LifeKeeper will manage for IBM Director Server. For example, the following line is from a DNS forward lookup zone display.

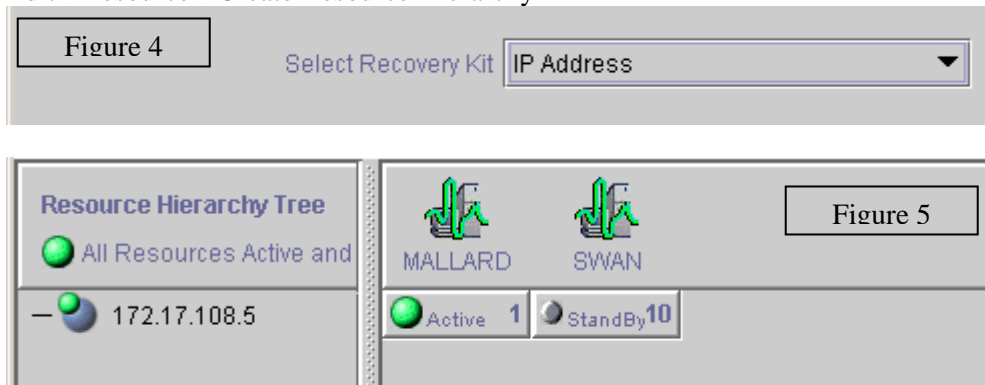
```
MALLARD (HOST) A 172.17.108.5
```

If you are not using a domain, simply create entries in the etc/hosts file on each system and include this same information.

### Create LifeKeeper IP and Volume resources

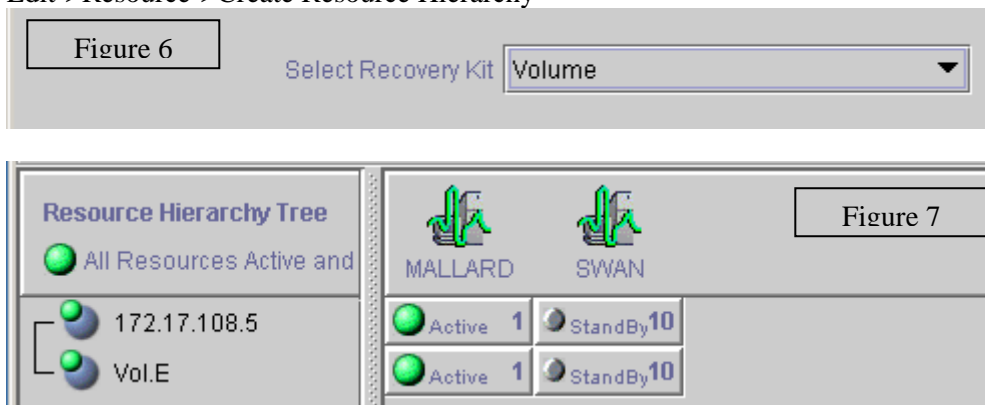
1. Create a LifeKeeper IP resource for use with IBM Director Server (Figure 4). IBM Director Server will bind and listen on IP addresses identified during IBM Director software installation and configuration. Refer to the LifeKeeper *Online Product Manual* for details on creating LifeKeeper IP resources. After the IP resource is created on the primary server and extended to the backup server, the completed resource diagram should appear similar to Figure 5.

Edit->Resource->Create Resource Hierarchy

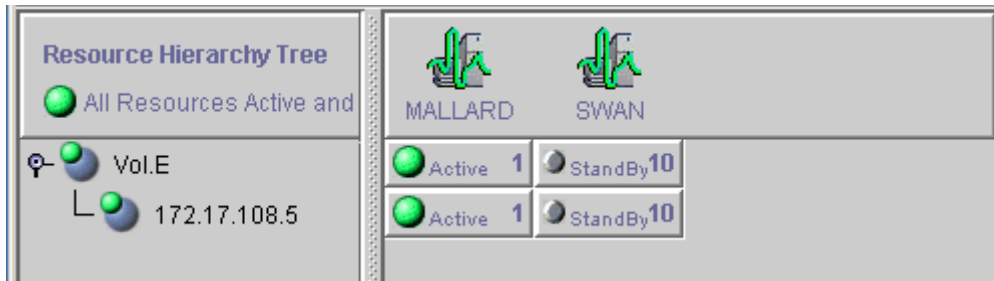
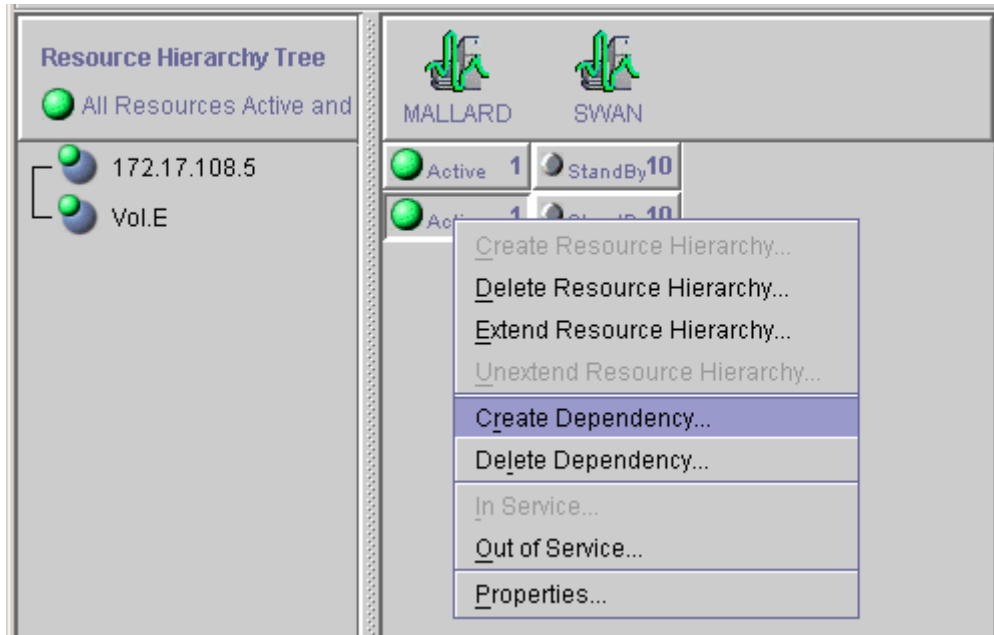


2. For the shared or replicated volume that will be used for IBM Director Server installation, create a protected volume resource using the LifeKeeper GUI (Figure 6). After the Volume resource is created on the primary server and extended to the backup server, the completed resource diagram should appear similar to Figure 7.

Edit->Resource->Create Resource Hierarchy



- The final step in preparing the IP and Volume resources is to create a dependency relationship between the Volume and IP resources. For example refer to Figure 8 and to Figure 9 below.



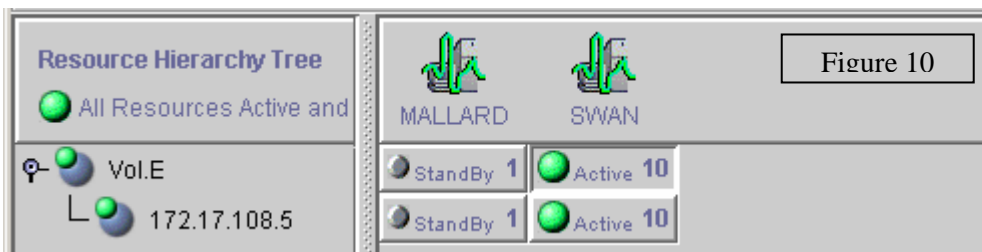
The Volume and IP resources to be used with IBM Director Server should be defined, and should not be part of another hierarchy when creating the IBM Director Server resource. Volume and IP resources must be in-service to be extended to another system.

## Installing IBM Director Server Software

Use the following steps to install IBM Director Server on your backup and primary servers.

**Note:** If the IBM Director Server is already installed on the system and if that volume can not be protected through LifeKeeper, then you must first uninstall the IBM Director Server software taking care to save any inventory information. Once the IBM Director software is uninstalled, use the following procedure to reinstall the IBM Director software on a volume that is either shared or replicated using LifeKeeper.

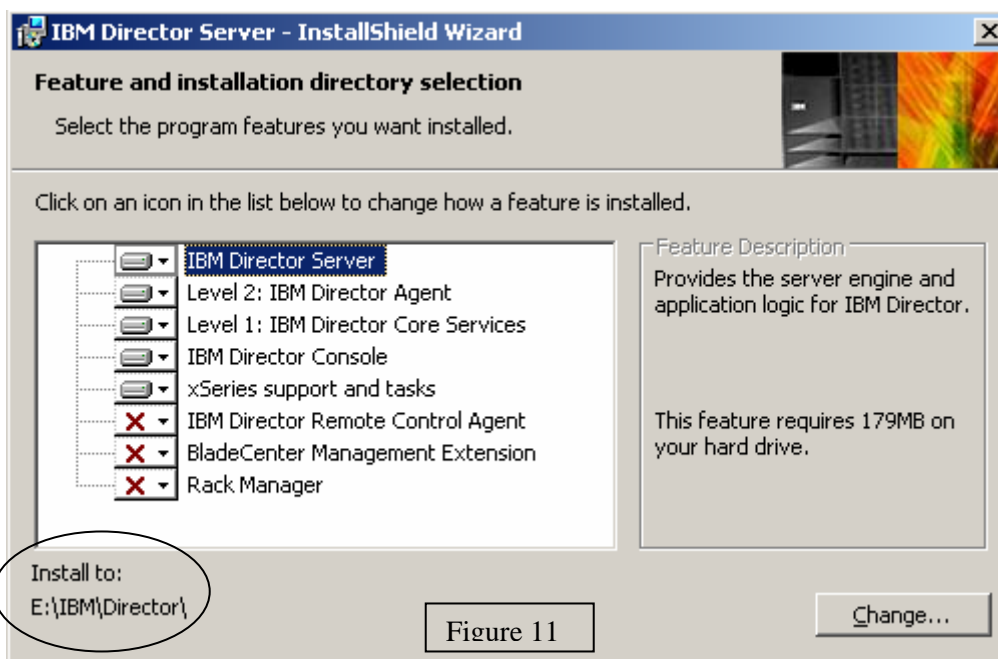
1. Start installing IBM Director Server on the **backup** server first. On the backup server place the LifeKeeper protected Volume and IP resources in-service as illustrated in Figure 10.



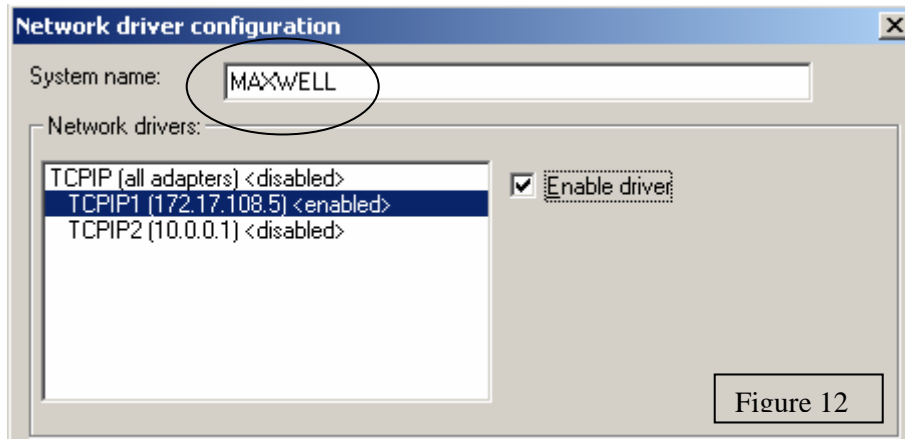
Start the setup program from the IBM Director installation CD; select the **IBM Director Server** component. Install IBM Director Server on the LifeKeeper protected volume.



2. On the page labeled **Feature and installation directory selection**, use the LifeKeeper protected volume ( for example E:\IBM\Director to install IBM Director Server.



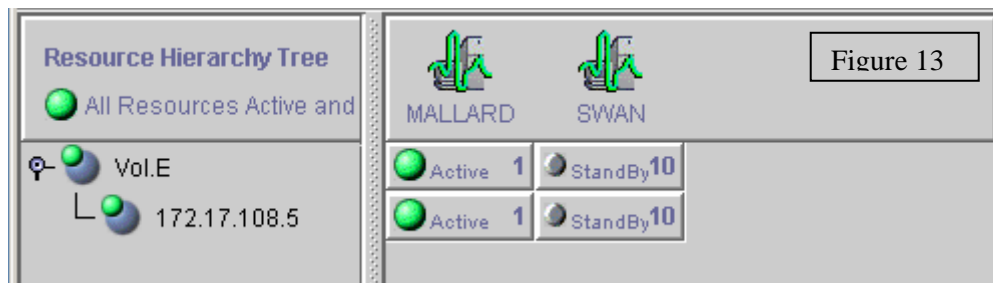
- On **Network driver configuration** page, change the **System name** from the local computer name to the virtual host name that is now defined in the DNS (host) A record shown previously in the [Setup Tasks Section](#).



- In the above example, the name of the physical server where the IBM Director Server is being installed is **SWAN**. For this installation, change the IBM Director Server *System name* field to a new virtual server name, for example **MAXWELL**. Also, use the checkbox to bind this server name in IBM Director Server to the TCPIP address associated with MAXWELL.

Finish the IBM Director Server installation and reboot the server as requested. **Tips for configuring IBM Director Server for use with Microsoft SQL Server and Oracle databases are included in the next section.** Once IBM Director Server is started, test the clients, such as IBM Director Agent, and especially the IBM Director Console login. In the IBM Director Console login, you may now use the IBM Director Server virtual server name (for example MAXWELL) that you assigned in step 3.

- Using the Windows Services MMC snap-in, set all 5 IBM Director Server services to Manual start mode and stop them all in the following order:
  - IBM Director Support Program service (automatically stops IBM Director Server service)
  - IBM Director Agent SLP Attributes service
  - IBM Director CIM Listener service (automatically stops Agent WMI CIM Server service)
  - IBM SLP SA service
- Using LifeKeeper, bring the Volume (shared or replicated) resource and IP resource in-service once again on the **primary** server as shown in Figure 13.



- Install IBM Director Server on the **primary** server EXACTLY as you did on the backup server. If you are using a local service account instead of a domain account, the account and

password must be valid on the local server. Be sure to use the same DNS virtual server name and IP address selection that was used while installing IBM Director Server on the backup server. When the installation is complete reboot the server as requested.

8. After the server has been restarted, verify that IBM Director Server console logins work on the primary system, and clients can connect to IBM Director Server. When proceeding directly to hierarchy resource creation IBM Director Server services may be left running in Automatic start mode. Otherwise all 6 services should be changed to Manual start mode at this time.

## Tips for Using Microsoft SQL 2000 Database

Use the following information to supplement Microsoft SQL Server installation procedures and IBM Director Server configuration instructions. We also recommend protecting the SQL Server database using the LifeKeeper Microsoft SQL Server Recovery Kit available from SteelEye Technology, Inc.

Because IBM Director Server is a Java based server application, your installation will require the Microsoft JDBC drivers for SQL 2000. They may be downloaded from the Microsoft web site by referencing the following title:

### SQL Server 2000 Driver for JDBC Service Pack 3

**Supported Operating Systems:** Windows 2000 Service Pack 2; Windows 2000 Service Pack 3; Windows 2000 Service Pack 4; Windows Server 2003; Windows XP

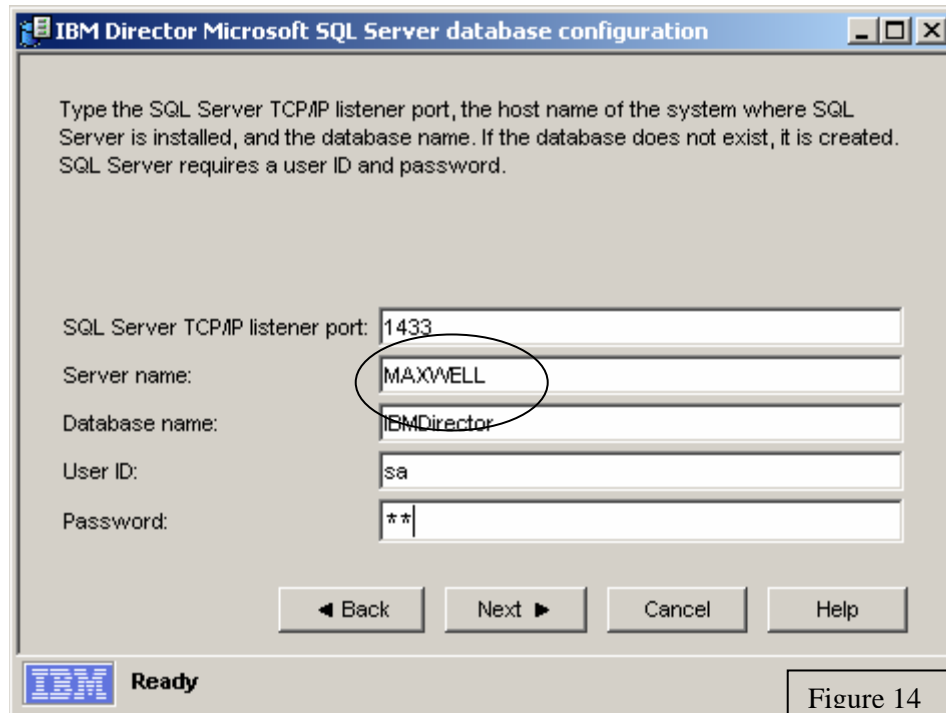
- SQL Server 2000 Standard and Enterprise Editions\*
- SQL Server 2000 Standard and Enterprise Editions with Service Pack 1 or higher\*
- SQL Server 2000 Enterprise Edition (64-bit)\*

\* SQL Server 2000 Service Pack 3a is strongly recommended

After installing the Microsoft JDBC package you will need to customize the CLASSPATH system environment variable used by Java on your particular system. For example:

```
CLASSPATH=.;C:\Program Files\Microsoft SQL Server 2000 Driver for JDBC\lib\msbase.jar;
C:\Program Files\Microsoft SQL Server 2000 Driver for JDBC\lib\msutil.jar;
C:\Program Files\Microsoft SQL Server 2000 Driver for JDBC\lib\mssqlserver.jar
```

When configuring IBM Director Server for use with Microsoft SQL Server 2000, use the same virtual server name that was entered previously for the Network driver configuration.



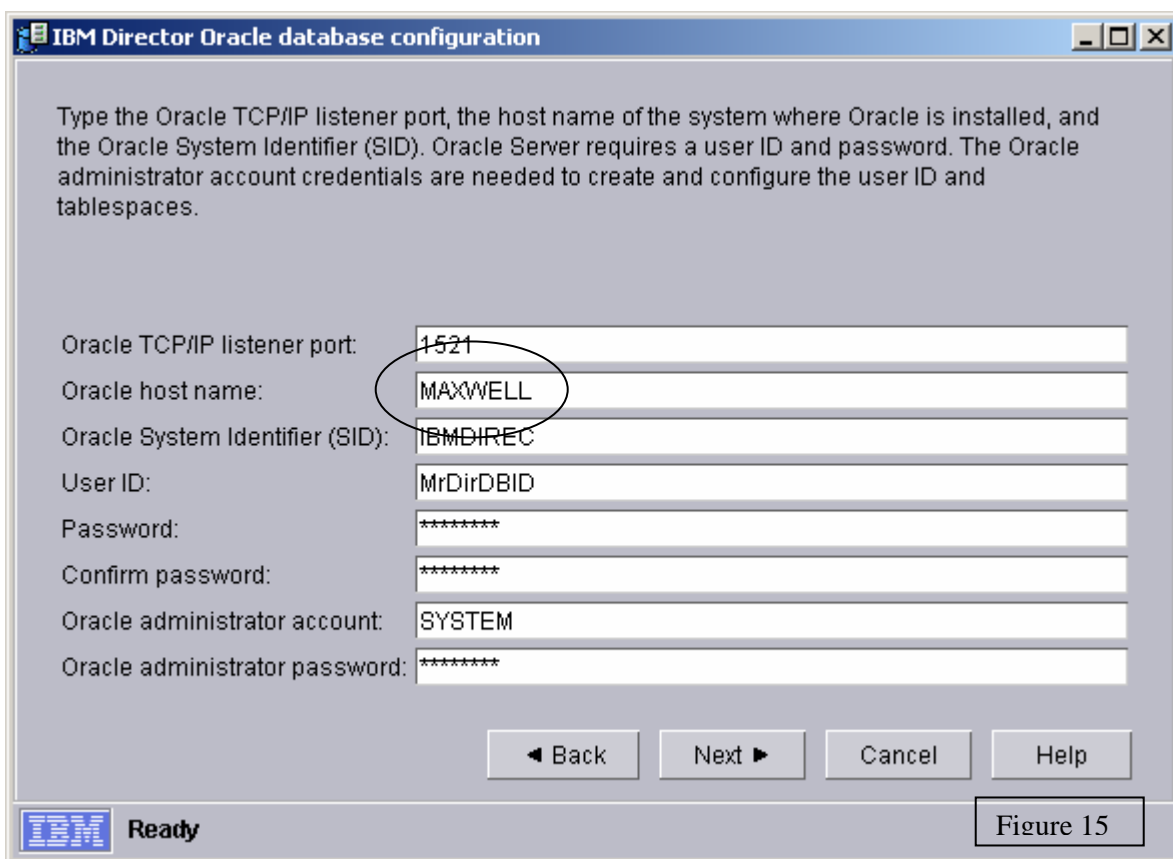
## Tips for Using Oracle 9i and 10g Databases

Use the following information to supplement Oracle database installation and IBM Director Server configuration instructions. We recommend protecting the Oracle database using the LifeKeeper Oracle Recovery Kit available from SteelEye Technology, Inc.

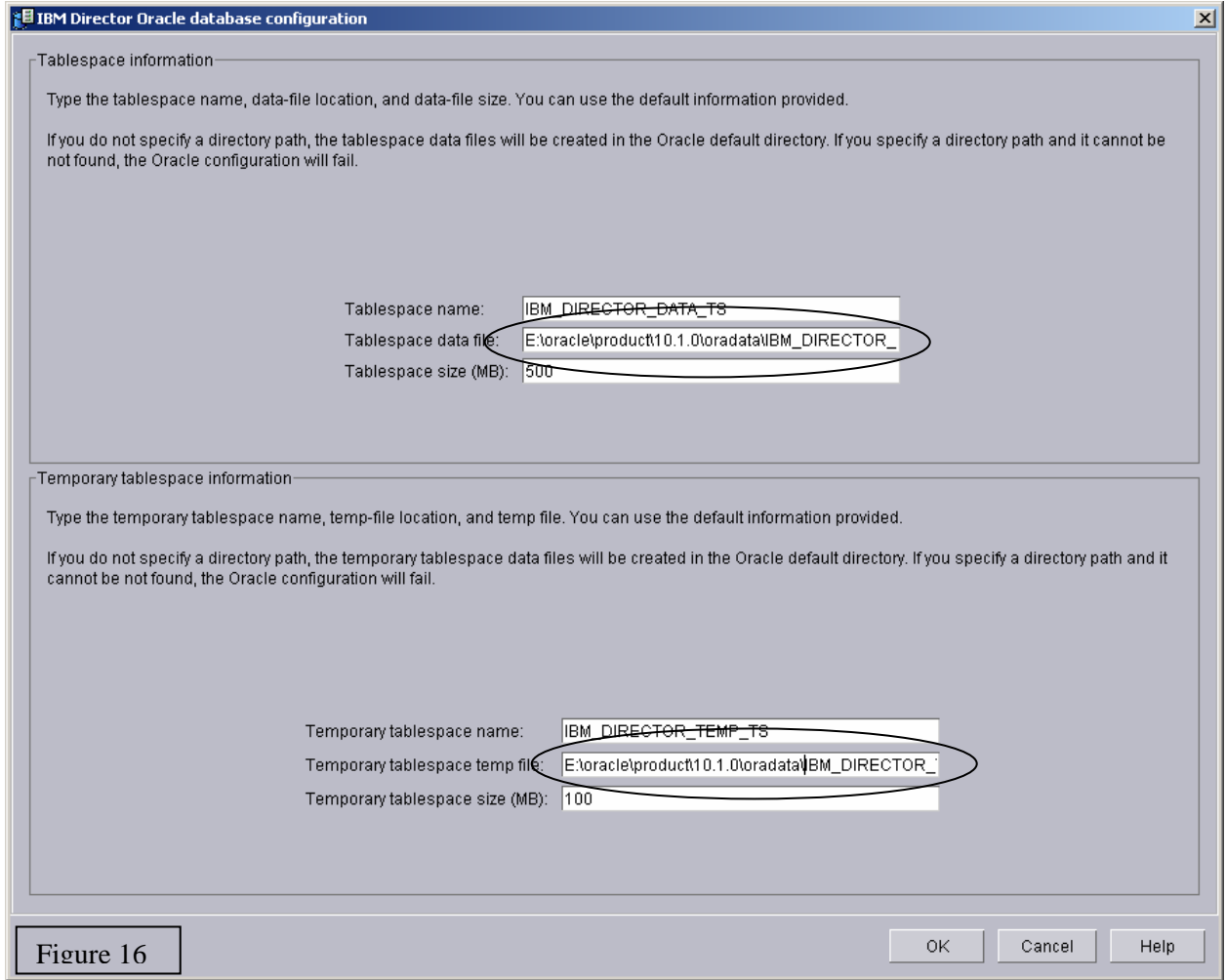
Because IBM Director Server is a Java based server application, your installation will require the Oracle JDBC drivers. They are located in the Oracle database installation path by default. After installing the Oracle database you will need to customize the CLASSPATH system environment variable used by Java on your particular system. For example, using Oracle 10g:

```
CLASSPATH=.;E:\oracle\product\10.1.0\Db_1\jdbc\lib\ojdbc14.jar
```

**IMPORTANT:** When configuring IBM Director Server for use with an Oracle database, use the same virtual server name that was entered previously for the Network driver configuration.



**IMPORTANT:** The complete path of the tablespace data files must be entered to ensure that these tablespaces are located on a LifeKeeper shared or replicated volume. **This is extremely important since tablespaces using Oracle default locations may not be placed on a LifeKeeper shared or replicated volume and will not be accessible on other systems.** For example, the tablespaces identified below will be located on a LifeKeeper replicated volume E:\.



## Upgrading IBM Director Server Software

IBM Director Server software stores version information in the registry of each system where it has been installed. To upgrade IBM Director Server it must first be taken Out-Of-Service and then upgraded on each server. To upgrade IBM Director Server from version 5.10.1 to 5.10.2, use the following procedure.

1. In the figure below the IBM Director Server resource, IBMDir.0, has been placed Out-Of-Service service leaving dependent resources, including its own installed path on Volume resource E:\, In-Service and accessible.

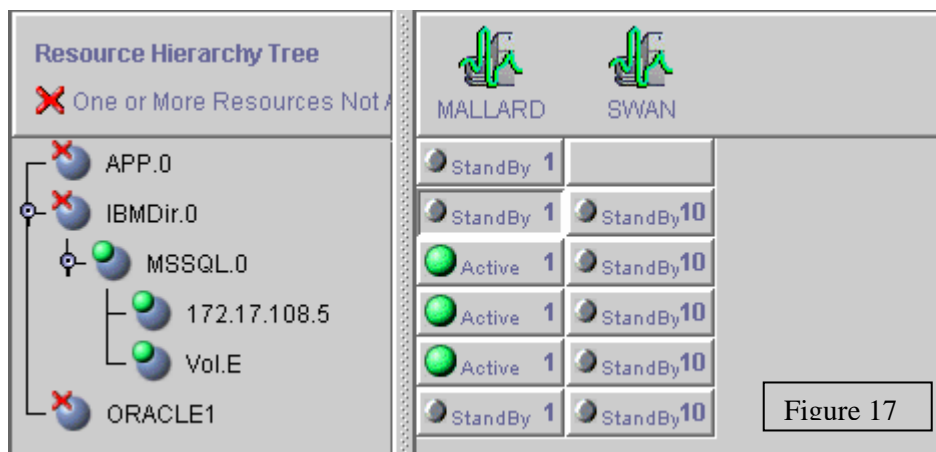


Figure 17

2. During the upgrade procedure it will be necessary to access the IBM Director Server installation path first on the primary server and then later on the backup server. To make this possible, temporarily remove all resource dependencies from the IBM Director Server resource, including the protected volume resource where IBM Director Server is installed. In the figure below all resource dependencies have been removed from the IBM Director Server resource, IBMDir.0.

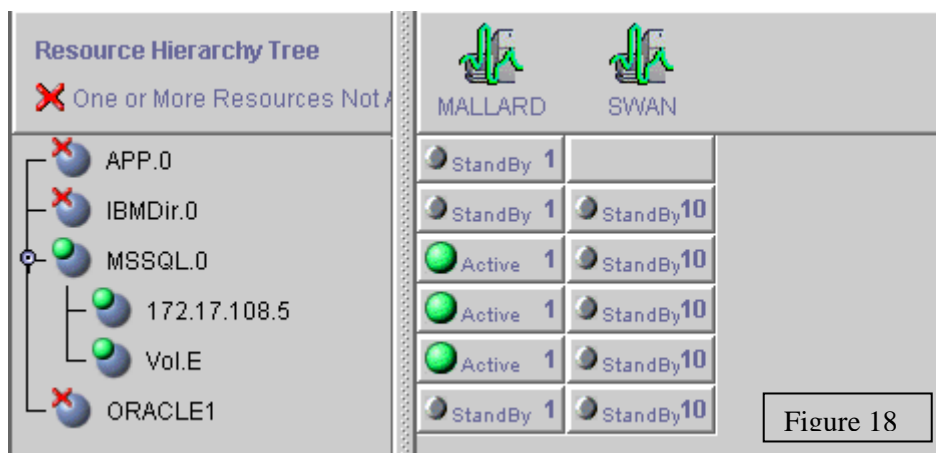


Figure 18

To ensure that all components of IBM Director Server are upgraded to the same level, the upgrade procedure consists of an uninstall, using the option to **save** the IBM Director configuration data, followed by a reinstall.

- Use the Windows Control Panel and the “Add or Remove Programs” applet to uninstall IBM Director Server software from the primary server. However, reply “No” when prompted to delete the configuration data. The IBM Director Server uninstall program will display the following pop-up message during the uninstall process:



Respond “No”, follow the instructions, and reboot the primary server

- Reinstall IBM Director Server exactly as it was originally installed including:

IBM Director Server Network Driver Configuration

IBM Director Server Database Configuration

The IBM Director Server database, not deleted during the uninstall, must be reused. Follow the instructions and reboot the primary server. When the system is restarted, IBM Director Server services will startup automatically because the installation process has reset its service startup modes to “Automatic”. To put IBM Director Server under LifeKeeper control again, use the LifeKeeper GUI to place the IBM Director Server resource In-Service. After reaching the In-Service state, use the LifeKeeper GUI again and put the IBM Director Server resource **Out-of-Service**. This will set IBM Director Server service startup modes to “Manual”. Place the protected volume, containing the IBM Director Server installation path, in-service on the backup system. In the following illustration, the protected volume resource “E:\” has been placed In-Service on the backup server while the IBM Director Server resource remains Out-Of-Service.

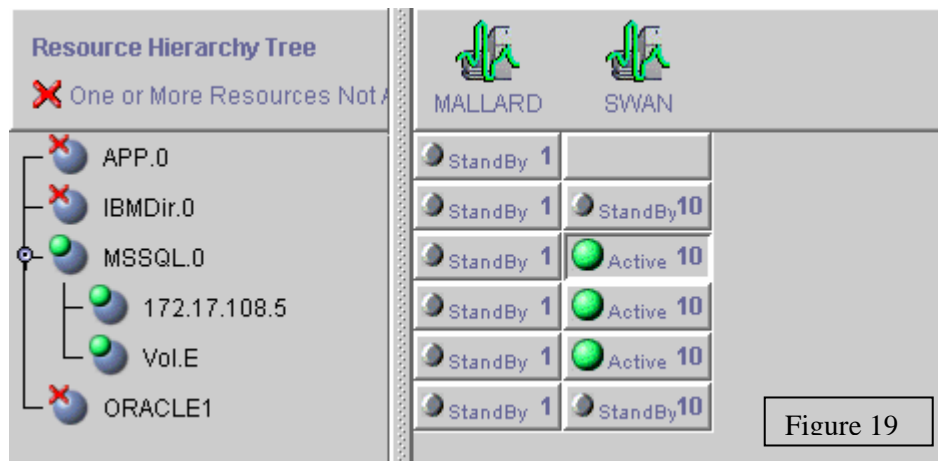


Figure 19

5. Using the same procedure that was used on the primary server, uninstall the IBM Director Server software from the backup server. Be sure to respond “No” when prompted to delete the IBM Director Server configuration data. Follow the instructions and reboot the backup server.

6. Re-install the IBM Director Server software including:

IBM Director Server Network Driver Configuration  
IBM Director Sever Database Configuration

The IBM Director Sever database, not deleted during the uninstall, must be reused

7. Follow the instructions and reboot the backup server. When the system is rebooted, IBM Director Server services will startup automatically because the installation process has reset its service startup modes to “Automatic”. Put IBM Director Server under LifeKeeper control again by using the LifeKeeper GUI to place the IBM Director Server resource In-Service. After reaching the In-Service state, use the LifeKeeper GUI again and place the IBM Director Server resource **Out-of-Service**. This will set IBM Director Server service startup modes to “Manual”.
8. Restore any resource dependencies for the IBM Director Server resource that were temporarily removed before starting the software update procedure. The IBM Director resource hierarchy should now appear exactly as it did before starting the software upgrade procedure.

## Create Hierarchy Overview

After completing the IBM Director Server installation and setup tasks, you are ready to use LifeKeeper to **create** and **extend** an IBM Director hierarchy. See the next section for details on creating the IBM Director Server resource hierarchy.

### Resource Configuration Tasks

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

The following four tasks are described in this guide, as they are unique to an IBM Director 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](#)**. Unextend (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

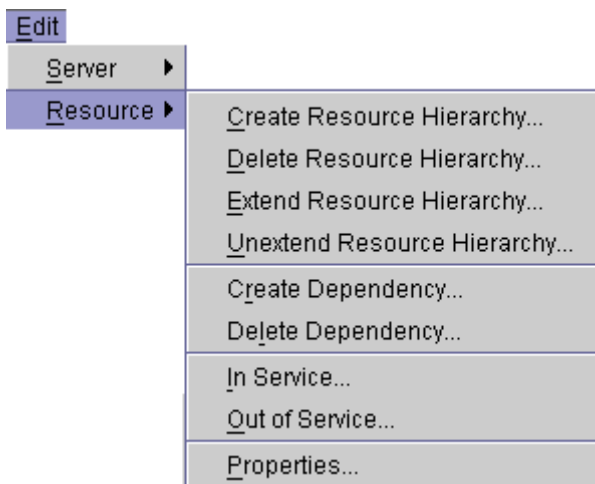
Using the right-click method allows you to avoid entering information that is required when using the **Edit** menu.

## Creating the IBM Director Hierarchy

After completing the necessary setup tasks, use the following steps to create the IBM Director Server resource.

Verify that all IBM Director Server services are running.

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



The *Create Resource Wizard* dialog box will appear with a drop down list box displaying all recognized recovery kits installed within the cluster.

2. Select *IBM Director Server* and click **NEXT**.
3. 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
Switchback Type	Choose either intelligent or automatic This dictates how the IBM Director resource instance will be switched back to this server when the server comes back up after a failover. The switchback type can be changed later from the General tab of the Resource Properties dialog box. <b>Note:</b> <u>The switchback strategy must match that of the IP and Volume resource to be used by the IBM Director resource, or else the create will fail.</u>
Server	Select the Server on which you want to create the hierarchy.

IBM Director Root Directory (Display only)	Display the root directory path where IBM Director is installed on the server.
IBM Director Server Name (Display only)	Display the virtual server name to be used by IBM Director Server. This name was entered during the installation of IBM Director Server in the Network Driver Configuration. This is a host name mapped via DNS to a LifeKeeper protected IP address.
IBM Director Protected IP Address	The associated LifeKeeper protected IP address that IBM Director Server is listening on will be displayed. You may also enter "NONE" and not include a protected IP address in the hierarchy at this time. However, a successful switchover or failover may require an IP resource dependency for this resource. It is recommended that you protect an IP address for IBM Director Server prior to creating the IBM Director resource.
Enter IBM Director Service Account ID	Enter the IBM Director Server <u>service account name</u> which has privileges to administer IBM Director Server on this server. This will be used by LifeKeeper to check the health of IBM Director Server. In a domain managed configuration enter the account ID in <b>DomainName\UserID</b> format where <b>DomainName</b> is the NetBIOS name of the domain. In a local account configuration enter the account ID in <b>LocalServerName\UserID</b> format.
Enter Password	Enter the password for the service account.
IBM Director Resource Tag	Enter a unique tag name, or you can accept the default tag name generated by LifeKeeper.
Quick Check Interval	Enter the interval (in minutes) between basic checks of the resource's availability. Different values can be specified for each system. The default is 3 minutes. Value can be between 0 to 10080. Setting interval value to 0 will disable the quick check monitoring.
Deep Check Interval	Enter the interval (in minutes) between extensive checks of the resource's availability. Different values can be specified for each system. The default value is 5 minutes. Value can be between 0 to 10080. An entry of 0 will disable the deep check monitoring.
Local Recovery	Select <b>Yes</b> to enable Local Recovery for this resource. Local recovery for an IBM Director resource means that if any of the protected services fail, LifeKeeper will attempt to restart the affected service. If the restart is unsuccessful, then LifeKeeper will failover the service to the backup server.

4. Click **Create** and the *Create Resource Wizard* will create the IBM Director Server resource. LifeKeeper will validate the data entered. If LifeKeeper detects a problem, an error message will appear in the information box.
5. Another information box will appear indicating that you have successfully created an IBM Director resource hierarchy. You must Extend that hierarchy to another server in your cluster in order to achieve failover protection. Click **Next**.
6. Click **Continue** and LifeKeeper will launch the *Pre-Extend Wizard*. Refer to Step 2 under **Extending a IBM Director Resource Hierarchy** (below) for details on how to extend your resource hierarchy to another server.

## Extending an IBM Director 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.

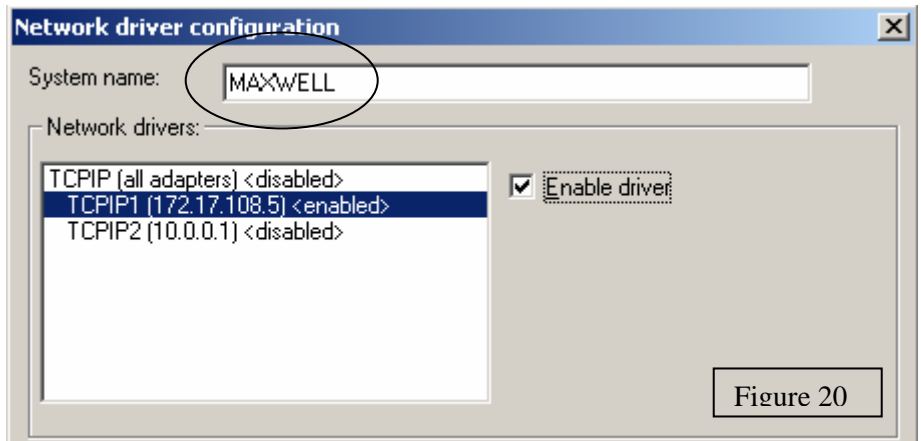
1. On the **Edit** menu, select **Resource**, then Extend Resource Hierarchy. The Pre-Extend Wizard appears. If you are unfamiliar with the Extend operation, click **Next**. If you are familiar with the LifeKeeper **Extend Resource Hierarchy** defaults and want to bypass the prompts for input/confirmation, click **Accept Defaults**.
2. The *Pre-Extend Wizard* will prompt you to enter the following information.  
**Note:** The first two fields appear only if you initiated the Extend from the **Edit** menu.

Field	Tips
Template Server	Enter the server where your IBM Director resource is currently in service.
Tag to Extend	Select the IBM Director resource you wish to extend.
Target Server	Enter or select the server you are extending <i>to</i> .
Switchback Type	This dictates how the IBM Director instance will be switched back to this server when it comes back into service after a failover to the backup server. You can choose either intelligent or automatic. The switchback type can be changed later, if desired, from the General tab of the Resource Properties dialog box. <b>Note:</b> <u>Remember that the switchback strategy must match that of the dependent resources to be used by the IBM Director resource.</u>
Template Priority	(This field appears only if you did NOT extend directly from the Create function.) Enter a number between 1 and 999 to specify the template server's priority in the cascading failover sequence for this resource. A lower number means a higher priority. LifeKeeper assigns the number "1" to the server on which the hierarchy was created. No two servers can have the same priority for a given resource.

Target 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.
IBM Director Resource Tag for Target Server <i>(Display Only)</i>	The resource extend process will display the LifeKeeper tag name to be used for the extended resource on the target server. This is for information purposes. It cannot be modified.
IBM Director Service Account ID	The resource extend process will display the service account previously entered for the template server. This field must use either the <b>DomainName\UserID</b> format, or the <b>TargetServerName\UserID</b> format. In a local account configuration the server name must be modified to match the target server name and the account must be a qualified IBM Director Server administrator account on that server. This is usually the IBM Director Server service account and it will be used by LifeKeeper to check the health of IBM Director Server on the target server.
Password	Use the same Service Account password, or modify it for the target server.

3. After receiving the message that the pre-extend checks were successful, click **Next**.
4. After receiving the message "Hierarchy Verification Finished", click **Done**.
- 5.\* Bring the IBM Director Server Hierarchy In-Service on the backup system.

**\*IMPORTANT:** Run the **Network Driver Configuration** program (twgipccf.exe) on the backup system to once again configure driver connectivity on the backup system. LifeKeeper will now save a copy of the netdrvr.ini file for this system and restore it every time IBM Director Server is started on the backup system.



## Unextending an IBM Director 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 IBM Director resource. It cannot be the server where the IBM Director 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 IBM Director 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 IBM Director resource hierarchy you have chosen to unextend. Click **Unextend**.
5. Another information box appears confirming that the IBM Director resource was unextended successfully. Click **Done** to exit the Unextend Resource Hierarchy menu selection.

## Deleting an IBM Director Hierarchy

Before deleting an IBM Director 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.

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 IBM Director 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 IBM Director resource was deleted successfully.
6. Click **Done** to exit.

## Manage IBM Director Resource Properties

To view and manage a protected IBM Director Server resource from the LifeKeeper GUI, right-click on the resource instance (on the right hand side of the LifeKeeper GUI) and select **Properties**, then select the **Resource Settings** tab. Use the resource properties page to view or change information about the IBM Director Server resource.



Figure 21 shows a typical IBM Director Server resource property page that identifies the IBM Director Server installation path, the virtual server name currently being used by IBM Director Server, and the database type. The IBM Director Server service must be running to show all information fields. Also shown is a **Manage Account** button.

## Manage Account

This menu allows administrators to change the Admin ID and password that LifeKeeper uses to perform health checks of the IBM Director Server service. If it needs to be modified press the Manage Account button and select or enter the following:

Manage Account Action:

Field	Tips
Enter User ID	Enter an IBM Director Server <u>service account name</u> which has privileges to administer IBM Director Server on this server. This will be used by LifeKeeper to check the health of IBM Director Server. In a domain managed configuration enter the account ID in <b>DomainName\UserID</b> format where <b>DomainName</b> is the NetBIOS name of the domain. In a local account configuration enter the account ID in <b>LocalServerName\UserID</b> format.
Enter Password	Enter the administrative password for the user account being updated.
Select Scope	Select the scope for this ID and password save operation. The choices are <b>LOCAL</b> and <b>CLUSTER</b> . A local update will attempt to save the new ID and password for the LifeKeeper resource on the local system only. A cluster wide update will attempt to save the ID and password for the LifeKeeper resource on every system in the cluster where this resource is defined. Domain account users will prefer the cluster wide option. Workgroup account users will prefer the local system update option.

## Testing the Resource Hierarchy

Test the IBM Director resource hierarchy by initiating a manual switchover. This will simulate a failover of a resource instance from the primary server to the backup server.

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.

# Hierarchy Administration

Follow these guidelines when administering your IBM Director Server:

## Access via protected TCP/IP address

All remote access of the IBM Director Server service should be done through the hierarchy's protected IP address. Through a DNS host "A" record this IP address is associated with a virtual host name. The protected IP address managed by LifeKeeper will ensure that administrators and director clients can access the IBM Director Server service regardless of which server it is currently running on.

## Reserve volumes for IBM Director use

The volume containing the protected IBM Director installation files should be reserved for use by IBM Director exclusively. However, the same protected volume may also be used for SQL Server 2000 databases or Oracle databases that are used by IBM Director Server.

A LifeKeeper protected volume may fail to switchover if it is accessed by another non-protected application, process, or remote user outside of LifeKeeper control.

## Start and stop IBM Director *ONLY* through LifeKeeper

Although most administration of IBM Director Server is done through the IBM Director Console, there are two distinct benefits from bringing the IBM Director Server in-service and out-of-service using the LifeKeeper administration options:

- **Resource monitoring failure.** If any of the IBM Director services, TWGIPC (IBM Director Support Program) or TWGSERVER (IBM Director Server) are stopped manually outside LifeKeeper management and control, the resource monitoring scripts will report the failure and LifeKeeper will initiate recovery of the IBM Director Server service. Please refer to the **IBM Director Recovery Kit Overview** section earlier in this guide for resource monitoring feature of the kit.
- **Consistent view.** When LifeKeeper stops and starts IBM Director Server, it maintains a consistent and complete view of the IBM Director Server service on all nodes in the cluster.
- **Protected IBM Director Server services are set to **Manual** startup mode** when the resource hierarchy is created. The startup type setting of the IBM Director Server service should not be changed while it is protected by LifeKeeper.

## Understand manual switchover limitations

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

## Running IBM Director Console on the LifeKeeper server

Open the IBM Director Console on the system where LifeKeeper is protecting IBM Director only when needed, and do not run it constantly.

If the IBM Director Console is open, it may prevent the IBM Director hierarchy from coming into service properly on a backup sever and the failover will not complete successfully. If this occurs, close the IBM Director Console and manually bring the IBM Director resource into service.

## Monitoring And Recovering Your IBM Director Hierarchy

As mentioned in the **LifeKeeper IBM Director Recovery Kit Overview** section, the kit monitors two services, TWGIPC (IBM Director Support Program) and TWGSERVER (IBM Director Server). This check is done by the quick check script, which is executed by LifeKeeper at the interval specified by user when the IBM Director resource is created. Default interval is 3 minutes. The kit also comes with a deep check script, which runs an IBM Director command periodically to check whether IBM Director Server is servicing commands..

If either quick check or deep check fails, LifeKeeper will restart all IBM Director services locally if local recovery is enabled for the IBM Director resource. If you choose not to enable the local recovery feature during create of the resource hierarchy, then LifeKeeper will initiate an immediate failover to another server in the cluster.

# Troubleshooting

## IBM Director Status Icon does not show in Taskbar

When a switchover or a failover of an IBM Director hierarchy occurs, sometimes the icon showing the status of IBM Director server does not show up in notification area (tray) of the taskbar of the Windows desktop. The reason the icon is not displayed is because an IBM Director process **twgsrvst.exe** is not running. Even if all the IBM Director services are started successfully, sometimes this process does not get started. To resolve this issue, the logged on user needs to start the process manually. The program file for the process is located in the **bin** subdirectory of the IBM Director installation root directory. For example, if the IBM Director Server is installed in the **U:\Program Files\IBM\Director** directory, then the program file for the process **twgsrvst.exe** would be in the **U:\Program Files\IBM\Director\bin** directory.

## IBM Director Console logins do not work and LifeKeeper can not restore the IBM Director Server resource to the in-service state.

There are several technical details that can go awry and cause this problem.

- 1) The account name and password to be used by LifeKeeper for monitoring the health of IBM Director Server must be correct. If you are not sure the account and password used to create and extend the IBM Director Server resource are valid, right click on the resource, select Properties, and then press the Manage Account button. The account and password may be changed locally, or globally on primary and backup servers. **If the IBM Director Server resource is to be deleted, we recommend that the Database, IP, and Volume dependent resources be manually removed from the IBM Director Server resource before deleting it.** They will be automatically reattached when the new IBM Director Server resource is re-created.
- 2) The service account entered in the LifeKeeper resource create and extend processes must be a qualified IBM Director Administrator login. This is usually the same account as the IBM Director Server service account. Perform an IBM Director Console login to verify this.
- 3) The account used by LifeKeeper to monitor IBM Director Server must be assigned the “Act as part of the OS” privilege. If this is a domain account, then the Domain Security Policy must clearly show that this privilege is assigned to the account. Verify this on the Windows Domain Controller. In addition, the Local Security Policy on the primary and backup servers must also show that the Effective Policy Setting for the “Act as part of the OS” privilege does include this domain account. In fact, it should include all accounts that will be used for IBM Director Console logins. If the account is a local account, then the Local Security Policy on the primary and backup server must show the local account as having this privilege. Check this on both the primary and backup servers.

## **The IBM Director Server hierarchy has just been extended to a new system and the IBM Director resource will not come in-service.**

The IBM Director Server network driver must be configured correctly for each system because it contains system specific information. However, there is only one netdrv.ini file. To handle this situation LifeKeeper saves a local copy of the netdrv.ini file periodically during its deep check health monitoring process and whenever the IBM Director Server is placed out-of-service on each system. During the next In-Service operation this file is replaced on the local system with this saved local copy immediately before IBM Director Server is restarted.

When the IBM Director Server resource is extended to another system, the netdrv.ini file still contains server specific information from the last system it was run on. Until this configuration file is updated by running the Network Driver Configuration utility, alerts from Director clients may not be received by IBM Director Server. Also, the IBM Director Server service “twgserver” may not start. To resolve this problem and immediately after extending the resource to a new system always perform the following procedure.

- 1) Run the IBM Director Server Network Configuration utility “twgipccf.exe” and make the correct network settings. Then press the “OK” button to save the updated configuration information and close the utility.
- 2) If IBM Director Server is In-Service, perform a LifeKeeper Out-Of-Service operation on the resource.
- 3) Restart IBM Director Server with an In-Service operation. If it will not start, then the system should be rebooted and the IBM Director Server resource placed In-Service.

Once the netdrv.ini file is configured correctly for the local system and a copy is saved by LifeKeeper, IBM Director Server should operate normally. LifeKeeper saves the local copy of netdrv.ini on each system at the following location: <LKROOT> \admin\kit\IBMDir\netdrv.ini