LifeKeeper® for Linux
Module 8: Maintenance and Troubleshooting
Learning Objectives

At the end of this module, you will understand:

- common maintenance tasks
- troubleshooting techniques
Common Maintenance Tasks:

- Change a server’s hostname
- Upgrade LifeKeeper software
- Remove LifeKeeper software
- Start and stop LifeKeeper
- Start and stop the GUI server
- Configure GUI users
- Add / remove a server from the cluster
- Change priorities of a resource hierarchy
- Gather debugging data
Change a server’s hostname using `lk_chg_value`:

1. Stop LifeKeeper on all servers in the cluster using the `lkstop` command.
2. Change the server's hostname using the Linux `hostname(1)` command.
3. Ensure that new host name(s) are resolvable by all of the servers in the cluster.
4. If more than one LifeKeeper value is to be changed, old and new values should be specified in a file on each server in the cluster in the following format:
   
   ```
   old_value1=new_value1
   ```
Change a server’s hostname using \texttt{lk\_chg\_value} (continued):

5. Verify that the changes to be made do not have any unexpected side effects by examining the output of running the \texttt{lk\_chg\_value} command on all servers in the cluster. (Using \texttt{-M} does not actually make the changes.) Run the command:

\begin{verbatim}
$LKROOT/bin/lk\_chg\_value \texttt{-Mvo old\_value -n new\_value}
\end{verbatim}

6. Modify LifeKeeper files by running the \texttt{lk\_chg\_value} command without the \texttt{-M} option on all servers in the cluster:

\begin{verbatim}
$LKROOT/bin/lk\_chg\_value \texttt{-vf file\_name}
\end{verbatim}

7. Restart LifeKeeper using the \texttt{lkstart} command.
Maintenance Tasks

Upgrade LifeKeeper Software:

- Upgrade is recommended if you need to reinstall a LifeKeeper package.
  - Removing all LifeKeeper packages will also remove the LifeKeeper Configuration Database.
  - If you upgrade LifeKeeper packages, the LifeKeeper Configuration Database is unchanged and existing resource hierarchies are preserved.

- Procedure
  1. Run $LKROOT/LifeKeeper/bin/lcdstatus and save output for reference.
  2. Switchover all resource hierarchies from the server to be upgraded to a backup server.
  3. If necessary, upgrade Linux before upgrading LifeKeeper.
  4. Upgrade either through GNOME RPM (select upgrade) or the rpm command line (rpm -U).
Maintenance Tasks

Remove LifeKeeper Software:

- Unextend all resource hierarchies from the server.
- Delete all communication paths from and to the server.
- Remove all LifeKeeper packages.
  - Packages that depend on the core (steeleye-lk) should be removed before the steeleye-lk package.
  - Use either GNOME RPM or the rpm command line (rpm -e).
Maintenance Tasks

Start and Stop LifeKeeper:
- Start: /opt/LifeKeeper/bin/lkstart
- Stop: /opt/LifeKeeper/bin/lkstop

Start and Stop the LifeKeeper GUI server:
- Start: /opt/LifeKeeper/bin/lkGUIserver start
- Stop: /opt/LifeKeeper/bin/lkGUIserver stop

Configure GUI users:
- Add a user: /opt/LifeKeeper/bin/lkpasswd <user>
- Remove a user: /opt/LifeKeeper/bin/lkpasswd -d <user>
Add a server to a cluster:

1. Confirm that all new hardware is configured and operational.
2. Install and configure Linux on the server.
3. Configure networking and verify that it is operational.
4. Run the Installation Support setup process.
5. Install LifeKeeper and the appropriate recovery kits.
6. Obtain and install permanent licenses.
7. Start LifeKeeper and the LifeKeeper GUI daemons.
8. Configure communication paths to all other systems in the cluster.
9. Extend resource hierarchies to the new server.
10. Test the configuration.
Remove a live server from a cluster:
1. Move all in-service resources to another server in the cluster.
2. Unextend all resource hierarchies from the server.
3. Delete all communication paths to and from the server.
4. Remove all LifeKeeper packages.

Remove a failed server from a cluster:
- Call SteelEye Technology support to help walk you through the following steps:
  1. Use the eqv_remove command to delete all shared equivalencies from other servers.
  2. Use the net_remove command to delete all communication paths from other servers.
  3. Use the sys_remove command to delete all failed server references from other servers.
Maintenance Tasks

Change priority of a resource hierarchy:

- The priority of a resource hierarchy may be changed through the LifeKeeper GUI or the `hry_setpri` CLI.

- If using the GUI:
  - Open the property sheet of the resource at the top of the hierarchy.
  - Select the equivalencies tab
  - Change the priorities and click OK or Apply.

- If using the CLI:

  ```sh
  hry_setpri [-d dest] [-t tag(s)] -p priority [-q] [-l]
  ```

  - **-d** dest: root resource tag of the hierarchy to be modified
  - **-t** tag(s): new priority
  - **-q**: output to stdout is suppressed
  - **-l**: list of systems the hierarchy is resident on and the associated priorities.

- The priority of all children in the hierarchy is also modified to the same new priority.
Gather debugging data:

- Debugging cluster problems requires review of all configuration information and log files.
- Time and date on all cluster members should be the same.
  - Best practice is to use NTP
- Run the `$LKROOT/bin/lksupport` CLI to gather all information.
- Run this command on all cluster members.
- Command produces a compressed tar file.
- E-mail or ftp these files to SteelEye Technology support for analysis.
Useful tasks and tools:

- View log files
- Use the lcdstatus command
- Verifying the network configuration
- Test LifeKeeper failover and switchover
- Enable the Java Console for GUI testing
LifeKeeper log files:

- **Log**
  - log entries specific to status of LifeKeeper-protected resources, resource local recovery event handling and other LifeKeeper events.

- **LCD**
  - log entries specific to the LifeKeeper Configuration Database daemon.

- **LCM**
  - log entries specific to the LifeKeeper Communication Manager daemon and TCP communication paths.

- **TTYLCM**
  - log entries specific to the LifeKeeper Communication Manager daemon and the TTY communication path.

- **remote_execute**
  - log entries specific to remote LifeKeeper requests.
LifeKeeper log files (continued):

- GUI
  - log entries specific to the LifeKeeper GUI server.

- SNMP (text file)
  - log entries specific to SNMP traps.
Log files are viewable either from the command line or from the GUI

Command Line:

- With the exception of the SNMP log, you must use $LKROOT/LifeKeeper/bin/lk_log to view.
- Example:
  
  ```bash
  /opt/LifeKeeper/bin/lk_log log > /tmp/lk.log
  ```
View Log Files

Through the LifeKeeper GUI:

[Image of LifeKeeper GUI interface with options to view logs, create resource hierarchy, and manage resources.]
Use the lcdstatus Command

**Icdstatus:**
- Prints out status of all LifeKeeper resource hierarchy configurations and communication path data.
- See man page for lcdstatus

<table>
<thead>
<tr>
<th>BACKUP</th>
<th>TAG</th>
<th>ID</th>
<th>STATE</th>
<th>PRIO</th>
<th>PRIMARY</th>
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<tbody>
<tr>
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<td>appfs3910-on-svr1</td>
<td>appfs4238</td>
<td>ISP</td>
<td>1</td>
<td>svr2</td>
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<td>/jrl1</td>
<td>ISP</td>
<td>1</td>
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<td>IP-192.168.1.1</td>
<td>ISP</td>
<td>10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>MACHINE</th>
<th>NETWORK</th>
<th>ADDRESSES/DEVICE</th>
<th>STATE</th>
<th>PRIO</th>
</tr>
</thead>
<tbody>
<tr>
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<td>TCP</td>
<td>192.168.1.10/192.168.1.20</td>
<td>ALIVE</td>
<td>1</td>
</tr>
<tr>
<td>svr1</td>
<td>TCP</td>
<td>192.168.1.11/192.168.1.21</td>
<td>ALIVE</td>
<td>2</td>
</tr>
</tbody>
</table>
Verify Network Configuration

Tasks:

- From each server, ping the local server and ping the other server(s) in the cluster.
  - Use ping with both the hostname and the IP address.
  - If ping fails, perform the necessary troubleshooting and corrective actions before continuing.
- Perform the same tests with the telnet or ssh command.
- If your server has more than one network adapter, you should configure the adapters to be on different subnets.
  - If they are on the same subnet, TCP/IP cannot effectively utilize the second adapter.
- Ensure that localhost is resolvable by each server in the cluster. If the /etc/hosts file is used, ensure there is an entry for localhost:
  
  127.0.0.1 localhost
- Verify DNS functionality if used. Also verify localhost is resolvable from DNS.
- The ifconfig utility is useful.
Testing LifeKeeper

Failover:
- shutdown the primary server and verify all of the resource hierarchies failover to the backup server. Note: The shutdown strategy must be set to “Switchover Resources”. This can be done via the GUI -- <Edit> <Server> <Properties>

Switchover:
- Switchover refers to bringing a resource in-service on a backup server. This can be done via the GUI -- <Edit> <Resource> <In-Service>

Communication Paths:
- If redundant communication paths are available, pull the appropriate serial or ethernet cable to verify the other communication path works.
  - This will not cause a failover if the other communication path is functioning
  - If TCP is the primary network interface and the ethernet cable is disconnected, the GUI will no longer be functional. The GUI utilizes the primary network interface to communicate with servers in the cluster. The lcdstatus must be used to verify the status of the communication paths.
Java Plug-In:

- Required by the GUI client to run Java applets. In Windows, the Java plug-In is installed as part of the JRE (downloaded the first time the browser attempts to run the GUI. A “Java Plug-In Control Panel” is available as part of the download to display information useful in debugging the GUI.
Networking:

- Multiple network adapters should be on different sub-nets.
- The IP address used for a virtual IP address should be obtained from the network administrator. The virtual IP address is the address that clients use to connect to other LifeKeeper-protected resources.
- Virtual IP addresses should be on the same sub-net as the IP address for the associated interface for accessibility.
- Primary and backup servers should be on the same sub-net. If they are on different sub-nets, a router is required and represents a possible point of failure.
- Servers have illegal characters in their hostname (i.e. “_”).
Troubleshooting Common Problems

Installation:

- Installing LifeKeeper on shared storage is not supported. Each server should have its own copy installed on a local disk.
- By default, LifeKeeper packages are installed in the /opt/LifeKeeper directory. This is $LKROOT.
GUI Configuration:

- **Error 114 <Server Name>**
  - Security Exception caused connection failure to this server.
  - This is usually caused by either of the following:
    - The user running the client does not have a .java.policy file in the home directory
    - No localhost entry is available

- **Error 117 -- Initial connection to server failed ....**
  - This is usually caused by one or more of the following:
    - Network is not operational. Verify all servers in cluster can be pinged.
    - Hostname cannot be resolved by the GUI client – GUI client must be able to ping by hostname from the client.
    - The GUI Server is not running.
GUI Configuration (continued):

- If you need to run the GUI from a Linux client and do not want to use a Java-enabled web browser, utilize XWindows on the Linux client:
  - On the Linux client, execute “xhost <servername>” where servername is the hostname of a LifeKeeper server
  - telnet or ssh to the LifeKeeper server and run the GUI from the server as an application
    - telnet <servername>
    - /opt/LifeKeeper/bin/lkGUIapp
  - The GUI should now be displayed on the Linux client. The Linux client does not require any LifeKeeper packages for the above to work.
How do I find?

- **Device information:**
  - `cat /proc/scsi/scsi`
    - Lists all SCSI devices that the system recognizes.
  - `cat /proc/partitions`
    - Lists all partitions (SCSI, IDE/ATA devices).
  - Under `$LKROOT/subsys/scsi/resources/hostadp device_info` and `device_info.<backupmachine>`
    - SCSI devices that LifeKeeper sees; must be in both files

- **System information:**
  - `/var/log/messages`
    - Various system messages including some LifeKeeper
  - `/var/log/dmesg`
How do I find?

- **Process Information:**
  
  - `ps awx | grep <process name> > filename`
  
  - Provides detailed, wide display of running processes which match `<process name>`, redirected to a file.

- **LifeKeeper Information:**
  
  - `lcdstatus -e`
    
    - Shows all hierarchies and comm paths defined on a machine and their current state
  
  - `rpm -qa | grep steeleye`
    
    - Lists all SteelEye packages installed and their versions.
  
  - `lk_log log > filename`
    
    - Dumps the LK log into a text editable format.
LifeKeeper Messages

Messages:

- The following message categories are produced by LifeKeeper:
  - Administration
  - Operational
  - GUI
- These are documented in the on-line help.
Backup a LifeKeeper Configuration

LKBBackUp:

- Backup and restore LifeKeeper configuration files located on the server or on every server in the cluster. See the MAN page for more details.
- LifeKeeper 7.0 – Auto-Lkbackup

Examples:

- Create backups of the LifeKeeper configuration for each server in the cluster, using the default archive file, which is created on each server in the cluster:
  - lkbackup -c --cluster
- Restore a system from scratch, given a fresh LifeKeeper install and an archive file:
  - Install LifeKeeper
  - Make sure LifeKeeper is stopped (lkstop)
  - Set up LKROOT and PATH in the /etc/default/LifeKeeper file
  - Extract files from lkbackup archive (lkbackup -x -f archive)

Replicate Any Data. Protect Any Application